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Vol. 1090 Number 1

# OFFICIAL GAZETTE

of the

## UNITED STATES PATENT AND TRADEMARK OFFICE

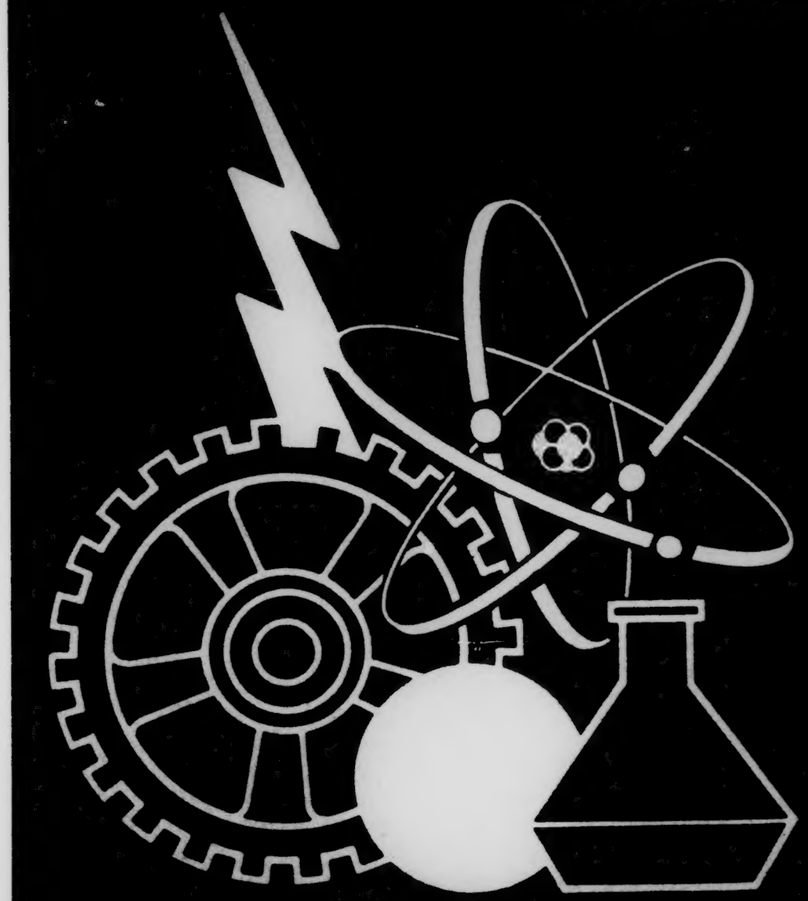
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PATENTS

May 3, 1988



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# PATENT AND TRADEMARK OFFICE NOTICES

### Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1076 O.G. 3 on Mar. 3, 1987.

For use of the European Patent Office as a Searching Authority for PCT applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as a Preliminary Examining Authority for PCT applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987.

Certain domestic PCT fees for international applications have been changed effective Oct. 5, 1985 in the rule change notice titled "Revision of Patent Fees" published at 1057 O.G. 24 on Aug. 20, 1985.

The Search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar with regard to the German Mark as of Mar. 15, 1988, and was announced in the *Official Gazette* at 1087 O.G. 24 on Feb. 16, 1988.

Domestic PCT Fees for Chapter II, effective July 1, 1987, were announced in the *Official Gazette* at 1079 O.G. 32 on June 16, 1987.

International PCT fees were changed on July 1, 1987 due to a difference in the exchange rate of the U.S. dollar with regard to the Swiss Franc and were announced in the *Official Gazette* at 1079 O.G. 50 on June 23, 1987.

International PCT Chapter II fees which were effective July 1, 1987, were announced in the *Official Gazette* at 1079 O.G. 50 on June 23, 1987. The elimination of multiple handling fees and the supplement to the handling fee under PCT Rule 57 was announced at 1085 O.G. 34 on Dec. 22, 1987.

The withdrawal of the Japanese declaration under PCT Article 64(2)(a), concerning the requirement for a Japanese translation of the international application within 20 months from the priority date when Japan is elected under PCT Chapter II, as from Dec. 8, 1987, was announced at 1085 O.G. 34 on Dec. 22, 1987.

National stage fees effective July 1, 1987, for entering the U.S. Patent and Trademark Office as a designated or elected Office were changed effective July 1, 1987, and were announced in the *Official Gazette* at 1079 O.G. 32 on June 16, 1987.

The current schedule of PCT fees is as follows:

| | |
|---|---|
| Transmittal fee: | 170.00 |
| Search Fee | |
| U.S. Patent and Trademark Office as Searching Authority (ISA) | |
| —No corresponding prior U.S. national application filed: | 520.00 |
| —Corresponding prior U.S. national application filed: | 350.00 |
| —Supplemental search fee, per additional invention | 140.00 |
| European Patent Office as Searching Authority | 1300.00 |
| Preliminary examination fee | |
| U.S. Patent and Trademark Office as Preliminary Examining Authority (IPEA) | |
| —Search fee paid to USPTO as Searching Authority | 370.00 |
| —Additional examination fee, per additional invention | 125.00 |
| —Searching Authority not the USPTO | 570.00 |
| —Additional examination fee, per additional invention | 190.00 |
| International fees | |
| Basic fee: | 485.00 |
| Basic Supplemental fee (for each page over 30): | 10.00 |
| Designation fee per country or region for the first 10 national or regional offices: | 120.00 |
| Designation fee for 11th and subsequent designations: | No Charge |
| Handling fee: | 150.00 |

U.S. National Stage fees

| | Small Entity | Non-small Entity |
|---|---|---|
| U.S. Patent and Trademark Office was Preliminary Examining Authority (IPEA) | 150.00 | 300.00 |
| USPTO was ISA but not IPEA | 170.00 | 340.00 |
| USPTO was neither ISA nor IPEA | 225.00 | 450.00 |
| USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(1) to (4) | 25.00 | 50.00 |
| —For each independent claim in excess of 3 | 17.00 | 34.00 |
| —For each claim in excess of 20 | 6.00 | 12.00 |
| —For each application containing a multiple dependent claim | 55.00 | 110.00 |
| —Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39.1 | 55.00 | 110.00 |
| —Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39.1 | 26.00 | 26.00 |

DONALD J. QUIGG,
*Assistant Secretary and Commissioner of Patents and Trademarks.*

Mar. 21, 1988.

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### Status of Appeal Cases

**The date of Examiner's Answer of Oldest Ex Parte Appeals Awaiting Assignment to Panel for A Decision Without A Hearing as of March 31, 1988.**

| | | |
|---|---|---|
| Chemical Discipline | – | April 1, 1987 |
| Mechanical Discipline | – | March 4, 1986 |
| Electrical Discipline | – | March 11, 1986 |





**The Date of Examiner' s Answer of Oldest Ex Parte Appeals Awaiting Hearing as of March 31, 1988.**

| | | |
|---|---|---|
| Chemical | – | January 2, 1986 |
| Electrical | – | March 5, 1986 |
| Mechanical | – | January 24, 1986 |

**Board of Patent Appeals and Interferences Decisions Rendered in Ex Parte Appeals During the Month of March 31, 1988**

| | |
|---|---|
| Affirmed | 240 |
| Affirmed-in-Part | 62 |
| Reversed | 211 |
| Total Decided | 513 |

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### Notice of Maintenance Fees Payable

Tipaid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on applications filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Oct. 5, 1985. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the grant.

Attention is drawn to the patents which were issued on April 30, 1985, for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,513,449 through 4,514,860
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months are set forth in 37 CFR 1.20(e) and (h), as amended effective Oct. 5, 1985, which are reproduced below:

37 CFR §1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant . . . $ 225.00"

"(h) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)) . . . . . $ 225.00
By other than a small entity . . . . . $ 450.00"

The amounts of the surcharges as amended effective Oct. 5, 1985, are set forth in 37 CFR 1.20 (k) and (l) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982 . . . . . $ 110.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity (§1.9(f)) . . . . . $ 55.00
By other than a small entity . . . . . $ 110.00"

Section 1.20 paragraph (m) as amended as a result of enactment of Public Law 98-622 effective Nov. 8, 1984, is reproduced below:

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay in payment is shown to the satisfaction of the Commissioner to have been unavoidable . . . . . $ 500.00"

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### Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

*PATENTS WHICH EXPIRED FEBRUARY 14, 1988, DUE TO FAILURE TO PAY MAINTENANCE FEES*

| Patent Number | Serial Number | Issue Date |
|---|---|---|
| 4,430,762 | 06/419,729 | 2/14/84 |
| 4,430,780 | 06/338,570 | 2/14/84 |
| 4,430,786 | 06/378,708 | 2/14/84 |
| 4,430,787 | 06/260,346 | 2/14/84 |
| 4,430,795 | 06/404,503 | 2/14/84 |
| 4,430,798 | 06/424,817 | 2/14/84 |
| 4,430,802 | 06/353,769 | 2/14/84 |
| 4,430,803 | 06/388,680 | 2/14/84 |
| 4,430,804 | 06/328,546 | 2/14/84 |
| 4,430,810 | 06/288,182 | 2/14/84 |
| 4,430,812 | 06/426,183 | 2/14/84 |
| 4,430,813 | 06/322,933 | 2/14/84 |
| 4,430,821 | 06/279,866 | 2/14/84 |
| 4,430,822 | 06/288,412 | 2/14/84 |
| 4,430,825 | 06/271,632 | 2/14/84 |
| 4,430,831 | 06/378,053 | 2/14/84 |
| 4,430,834 | 06/265,586 | 2/14/84 |
| 4,430,843 | 06/294,460 | 2/14/84 |
| 4,430,854 | 06/275,768 | 2/14/84 |
| 4,430,859 | 06/251,584 | 2/14/84 |
| 4,430,878 | 06/315,335 | 2/14/84 |
| 4,430,883 | 06/342,329 | 2/14/84 |
| 4,430,884 | 06/330,576 | 2/14/84 |
| 4,430,885 | 06/383,402 | 2/14/84 |
| 4,430,887 | 06/358,244 | 2/14/84 |
| 4,430,890 | 06/378,161 | 2/14/84 |
| 4,430,892 | 06/317,004 | 2/14/84 |
| 4,430,894 | 06/343,059 | 2/14/84 |
| 4,430,900 | 06/334,582 | 2/14/84 |
| 4,430,902 | 06/284,372 | 2/14/84 |
| 4,430,903 | 06/305,406 | 2/14/84 |
| 4,430,914 | 06/282,066 | 2/14/84 |
| 4,430,925 | 06/410,550 | 2/14/84 |
| 4,430,931 | 06/404,555 | 2/14/84 |
| 4,430,938 | 06/300,543 | 2/14/84 |
| 4,430,939 | 06/323,129 | 2/14/84 |
| 4,430,942 | 06/318,655 | 2/14/84 |
| 4,430,949 | 06/325,438 | 2/14/84 |
| 4,430,953 | 06/237,583 | 2/14/84 |
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| Patent Number | Serial Number | Issue Date |
|---|---|---|
| 4,430,960 | 06/318,175 | 2/14/84 |
| 4,430,961 | 06/408,474 | 2/14/84 |
| 4,430,964 | 06/276,472 | 2/14/84 |
| 4,430,967 | 06/346,609 | 2/14/84 |
| 4,430,972 | 06/308,803 | 2/14/84 |
| 4,430,982 | 06/265,642 | 2/14/84 |
| 4,430,986 | 06/350,394 | 2/14/84 |
| 4,430,988 | 06/240,409 | 2/14/84 |
| 4,430,994 | 06/262,080 | 2/14/84 |
| 4,431,007 | 06/231,526 | 2/14/84 |
| 4,431,016 | 06/306,867 | 2/14/84 |
| 4,431,017 | 06/272,690 | 2/14/84 |
| 4,431,022 | 06/339,138 | 2/14/84 |
| 4,431,029 | 06/336,559 | 2/14/84 |
| 4,431,037 | 06/334,662 | 2/14/84 |
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| 4,431,046 | 06/216,276 | 2/14/84 |
| 4,431,053 | 06/325,535 | 2/14/84 |
| 4,431,058 | 06/243,234 | 2/14/84 |
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| 4,431,072 | 06/337,157 | 2/14/84 |
| 4,431,076 | 06/276,775 | 2/14/84 |
| 4,431,080 | 06/276,017 | 2/14/84 |
| 4,431,081 | 06/441,486 | 2/14/84 |
| 4,431,088 | 06/300,686 | 2/14/84 |
| 4,431,091 | 06/337,699 | 2/14/84 |
| 4,431,101 | 06/249,472 | 2/14/84 |
| 4,431,102 | 06/297,223 | 2/14/84 |
| 4,431,105 | 06/273,726 | 2/14/84 |
| 4,431,107 | 06/337,323 | 2/14/84 |
| 4,431,116 | 06/349,962 | 2/14/84 |
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| 4,431,122 | 06/493,955 | 2/14/84 |
| 4,431,127 | 06/305,806 | 2/14/84 |
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| 4,431,135 | 06/324,795 | 2/14/84 |
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| 4,431,154 | 06/376,301 | 2/14/84 |
| 4,431,155 | 06/378,661 | 2/14/84 |
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| 4,431,170 | 06/426,186 | 2/14/84 |
| 4,431,173 | 06/486,105 | 2/14/84 |
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| 4,431,181 | 06/274,889 | 2/14/84 |
| 4,431,182 | 06/374,620 | 2/14/84 |
| 4,431,186 | 06/236,783 | 2/14/84 |
| 4,431,188 | 06/264,582 | 2/14/84 |
| 4,431,189 | 06/290,611 | 2/14/84 |
| 4,431,190 | 06/407,739 | 2/14/84 |
| 4,431,191 | 06/406,985 | 2/14/84 |
| 4,431,194 | 06/317,271 | 2/14/84 |
| 4,431,195 | 06/383,704 | 2/14/84 |
| 4,431,208 | 06/397,578 | 2/14/84 |
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| 4,431,212 | 06/267,781 | 2/14/84 |
| 4,431,213 | 06/218,745 | 2/14/84 |
| 4,431,219 | 06/357,332 | 2/14/84 |
| 4,431,220 | 06/279,858 | 2/14/84 |
| 4,431,223 | 06/394,228 | 2/14/84 |
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| 4,431,227 | 06/361,400 | 2/14/84 |
| 4,431,229 | 06/330,948 | 2/14/84 |
| 4,431,230 | 06/276,888 | 2/14/84 |
| 4,431,231 | 06/312,316 | 2/14/84 |
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| 4,431,314 | 06/372,067 | 2/14/84 |
| 4,431,321 | 06/343,972 | 2/14/84 |
| 4,431,332 | 06/428,946 | 2/14/84 |
| 4,431,341 | 06/372,302 | 2/14/84 |
| 4,431,350 | 06/279,815 | 2/14/84 |
| 4,431,351 | 06/407,769 | 2/14/84 |
| 4,431,353 | 06/268,124 | 2/14/84 |
| 4,431,362 | 06/295,596 | 2/14/84 |
| 4,431,363 | 06/357,537 | 2/14/84 |
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| 4,431,379 | 06/332,438 | 2/14/84 |
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| 4,431,385 | 06/322,027 | 2/14/84 |
| 4,431,386 | 06/326,893 | 2/14/84 |
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| 4,431,403 | 06/256,851 | 2/14/84 |
| 4,431,405 | 06/351,496 | 2/14/84 |
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| 4,431,414 | 06/342,505 | 2/14/84 |
| 4,431,418 | 06/365,463 | 2/14/84 |
| 4,431,432 | 06/328,700 | 2/14/84 |
| 4,431,439 | 06/395,770 | 2/14/84 |
| 4,431,441 | 06/382,750 | 2/14/84 |
| 4,431,443 | 06/450,515 | 2/14/84 |
| 4,431,463 | 06/341,944 | 2/14/84 |
| 4,431,464 | 06/304,190 | 2/14/84 |
| 4,431,469 | 06/425,613 | 2/14/84 |
| 4,431,477 | 06/510,052 | 2/14/84 |
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| 4,431,495 | 06/489,968 | 2/14/84 |
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| 4,431,569 | 06/377,290 | 2/14/84 |
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| 4,431,587 | 06/330,656 | 2/14/84 |
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| 4,431,625 | 06/508,687 | 2/14/84 |
| 4,431,633 | 06/372,410 | 2/14/84 |
| 4,431,635 | 06/341,137 | 2/14/84 |
| 4,431,648 | 06/394,881 | 2/14/84 |
| 4,431,657 | 06/380,974 | 2/14/84 |
| 4,431,659 | 06/426,470 | 2/14/84 |
| 4,431,662 | 06/353,007 | 2/14/84 |
| 4,431,667 | 06/326,896 | 2/14/84 |
| 4,431,670 | 06/363,974 | 2/14/84 |
| 4,431,680 | 06/313,992 | 2/14/84 |
| 4,431,683 | 06/368,666 | 2/14/84 |
| 4,431,719 | 06/413,467 | 2/14/84 |
| 4,431,721 | 06/390,467 | 2/14/84 |
| 4,431,742 | 06/249,229 | 2/14/84 |
| 4,431,751 | 06/382,211 | 2/14/84 |
| 4,431,778 | 06/372,880 | 2/14/84 |
| 4,431,790 | 06/289,689 | 2/14/84 |
| 4,431,802 | 06/324,244 | 2/14/84 |
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| 4,431,813 | 06/239,445 | 2/14/84 |
| 4,431,815 | 06/462,769 | 2/14/84 |
| 4,431,830 | 06/371,221 | 2/14/84 |
| 4,431,832 | 06/411,051 | 2/14/84 |
| 4,431,840 | 06/436,003 | 2/14/84 |
| 4,431,851 | 06/473,182 | 2/14/84 |
| 4,431,860 | 06/381,407 | 2/14/84 |
| 4,431,873 | 06/328,648 | 2/14/84 |
| 4,431,874 | 06/305,013 | 2/14/84 |
| 4,431,884 | 06/406,183 | 2/14/84 |
| 4,431,890 | 06/218,908 | 2/14/84 |
| 4,431,902 | 06/288,880 | 2/14/84 |
| 4,431,904 | 06/437,863 | 2/14/84 |
| 4,431,905 | 06/277,079 | 2/14/84 |
| 4,431,911 | 06/307,466 | 2/14/84 |
| 4,431,920 | 06/368,473 | 2/14/84 |
| 4,431,924 | 06/252,173 | 2/14/84 |
| 4,431,947 | 06/384,853 | 2/14/84 |
| 4,431,980 | 06/423,447 | 2/14/84 |
| 4,431,989 | 06/279,057 | 2/14/84 |



| Patent Number | Serial Number | Issue Date |
|---|---|---|
| 4,432,029 | 06/394,810 | 2/14/84 |
| 4,432,032 | 06/353,095 | 2/14/84 |
| 4,432,038 | 06/487,055 | 2/14/84 |
| 4,432,078 | 06/226,891 | 2/14/84 |
| 4,432,086 | 06/374,372 | 2/14/84 |
| 4,432,090 | 06/273,501 | 2/14/84 |
| 4,431,094 | 06/296,867 | 2/14/84 |

**Notification of Acceptance of Delayed Payment of Maintenance Fee (35 U.S.C. 41(c); 37 CFR 1.378)**

The patents listed below are considered as not having expired but are subject to the conditions set forth in 35 U.S.C. 41(c)(2), in view of the Petition to Accept Late Payment of the maintenance fees which has been GRANTED BY THE COMMISSIONER OF PATENTS AND TRADEMARKS, as provided for under 35 U.S.C. 41(c)(1) and 37 CFR 1.378.

| Patent No. | Serial No. | Patent Date | Application Filing Date | Delayed Payment Acceptance Date |
|---|---|---|---|---|
| 4,378,984 | 06/296,130 | 4/05/83 | 8/25/81 | 3/23/88 |
| 4,427,967 | 06/283,350 | 1/24/84 | 7/14/81 | 3/24/88 |

**REISSUE APPLICATIONS FILED**

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.19(a)).

**D. 287,570,** Re. S.N. 126,906, Filed Nov. 30, 1987, Cl. D9/306, COMBINED SAMPLE TUBE, SCREW CAP AND MARKING PLUG, Henning Olsen, Owner of Record: *A/S Nune, Roskide, Denmark,* Attorney or Agent: Richard H. Tushin, Ex. Gp.: 292

**4,306,908,** Re. S.N. 116,883, Filed Nov. 5, 1987, Cl. 148/403, FERROMAGNETIC AMORPHOUS ALLOY, Shinji Takayama, Owner of Record: *Hitachi, Ltd., Tokyo, Japan,* Attorney or Agent: Donald R. Antonelli, et al., Ex. Gp.: 111

**4,352,960,** Re. S.N. 144,011, Filed Jan. 14, 1988, Cl. 128/420.6, MAGNETIC TRANSCUTANEOUS MOUNT FOR EXTERNAL DEVICE OF AN ASSOCIATED IMPLANT, Kenneth J. Dormer, et al., Owner of Record: *Baptist Medical Center of Oklahoma Inc., Oklahoma, Okla.,* Attorney or Agent: William R. Laney, et al., Ex. Gp.: 335

**4,524,619,** Re. S.N. 148,168, Filed Jan. 22, 1988, Cl. 73/505, VIBRATORY ANGULAR RATE SENSOR SYSTEM, Juergen Staudte, Owner of Record: *Piezoelectric Technology Investors, Ltd., Laguna Hills, Calif.,* Attorney or Agent: Harold C. Hohbach, Ex. Gp.: 265

**4,569,463,** Re. S.N. 154,402, Filed Feb. 9, 1988, Cl. 222/181, CONTROLLED DISPENSING APPARATUS, Raymond W. Pellegrino, Owner of Record: *Inventor,* Attorney or Agent: John H. Mion, et al., Ex. Gp.: 311

**4,571,191,** Re. S.N. 154,791, Filed Feb. 10, 1988, Cl. 434/126, FUNNELL TEACHING METHOD AND APPARATUS, Peteris E. Graube, Owner of Record: *Inventor,* Attorney or Agent: Peter P. Price, et al., Ex. Gp.: 334

**4,571,865,** Re. S.N. 157,572, Filed Feb. 18, 1988, Cl. 40/10R, CONTAINER FOR A STACK OF PICTURES, Peter Ackeret, Owner of Record: *Licinvest AG, Chur, Switzerland,* Attorney or Agent: Charles B. Smith, et al., Ex. Gp.: 333

**4,589,711,** Re. S.N. 151,275, Filed Feb. 1, 1988, Cl. 312/330R, DRAWER APPARATUS, Robert R. Black, Owner of Record: *Inventor,* Attorney or Agent: Jack C. Munro, Ex. Gp.: 357

**4,604,937,** Re. S.N. 158,558, Filed Feb. 22, 1988, Cl. 84/435, KEYBOARD DEVICE OF ELECTRONIC MUSICAL INSTRUMENT, Shinji Kumano, et al., Owner of Record: *Nippon Gakki Seizo Kabushiki Kaisha, Shizuoka, Japan,* Attorney or Agent: Roger W. Blakely, et al., Ex. Gp.: 211

**4,624,785,** Re. S.N. 148,211, Filed Jan. 25, 1988, Cl. 210/414, EASILY-CLEANABLE FILTERS, Mordeki Drori, Owner of Record: *Inventor,* Attorney or Agent: None, Ex. Gp.: 136

**4,637,202,** Re. S.N. 146,505, Filed Jan. 21, 1988, Cl. 56/16.6, LAWN MOWER GRASS COLLECTOR BAG SUPPORT, Gary R. Lamusga, Owner of Record: *Toro Co., Minneapolis, Minn.,* Attorney or Agent: R. Lawrence Buckley, et al., Ex. Gp.: 333

**4,672,301,** Re. S.N. 149,441, Filed Jan. 28, 1988, Cl. 323/243, POWER CONTROLLER CIRCUIT WITH AUTOMATIC CORRECTION FOR PHASE LAG BETWEEN VOLTAGE AND CURRENT, Raymond T. Westfall, et al., Owner of Record: *Industrial Power Control Inc., North Redington Beach, Fla.,* Attorney or Agent: Edwin E. Greigg, et al., Ex. Gp.: 212

**4,678,591,** Re. S.N. 144,260, Filed Jan. 15, 1988, Cl. 252/8.514, TERPOLYMER COMPOSITION FOR AQUEOUS DRILLING FLUIDS, David M. Giddings, et al., Owner of Record: *Nalco Chemical Co., Oak Brook, Ill.,* Attorney or Agent: Michael Macklin, et al., Ex. Gp.: 223

**4,687,571,** Re. S.N. 154,568, Filed Feb. 8, 1988, Cl. 209/167, PROCESS FOR THE FROTH-FLOATATION OF A PHOSPHATE MINERAL FROM A PHOSPHATE-CARBONATE ORE, Esko T. Kari, et al., Owner of Record: *Kemira Oy, Helsinki, Finland,* Attorney or Agent: Nathaniel R. French, Ex. Gp.: 133

**4,694,924,** Re. S.N. 158,246, Filed Feb. 19, 1988, Cl. 180/68.3, MOTORCYCLE, Toshimitsu Asakura, et al., Owner of Record: *Honda Giken Kogyo Kabashiki Kaisha, Tokyo, Japan,* Attorney or Agent: Morris Relson, et al., Ex. Gp.: 316

**REQUESTS FOR REEXAMINATION FILED**

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

**3,779,401,** Reexam. No. 90/001,477, Requested: Mar. 18, 1988, Cl. 414/751, PNEUMATIC DEVICE FOR MOVING ARTICLES, George Carroll, Owner of Record: *Festo KG, Esslingen-Berkheim, Germany,* Attorney

or Agent: Gerald T. Bodner, Ex. Gp.: 310, Requester: Owner

**4,687,137,** Reexam. No. 90/001,479, Requested: Apr. 1, 1988, Cl. 239/124, CONTINUOUS/INTERMITTENT ADHESIVE DISPENSING APPARATUS, Bentley J. Boger, et al., Owner of Record: *Nordson Corp., Westlake, Ohio,* Attorney or Agent: Wood, Herron, et al., Ex. Gp.: 310, Requester: Owner

**4,714,194,** Reexam. No. 90/001,476, Requested: Mar. 28, 1988, Cl. 237/70, HOUSING FOR WALL MOUNTED HEATING UNIT, Harold J. Eckman, Owner of Record: *Cadet Mftg. Co., Vancouver, Wash.,* Attorney or Agent: Cheroff, Vilhauer, et al., Ex. Gp.: 340, Requester: Owner

**4,719,246,** Reexam. No. 90/001,478, Requested: Mar. 31, 1988, Cl. 521/134, POLYLACTIDE COMPOSITIONS, Joseph R. Murdoch, Owner of Record: *E.I. duPont deNemours & Co., Wilmington, Del.,* Attorney or Agent: Samuel S. Blight, Ex. Gp.: 150, Requester: Owner

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**Service by Publication**

A petition to cancel each of the registrations identified below having been filed, and the notice of such proceedings sent by registered mail to each registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrants listed herein, their assigns or legal representatives, shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

Pure Body Creations, Weston, Vt., Reg. No. 1,223,778, for the mark "UNPETROLEUM JELLY", Canc. No. 16,511.

Information Dialogues Inc., Minneapolis, Minn. 55413, Reg. No. 1,324,166, for the miscellaneous design mark, Canc. No. 16,580.

Criterion Realty Corp. Realtors, Valrico, Fla., Reg. No. 1,358,416, for the mark "CRITERION" and design, Canc. No. 16,604.

Turnkey Information Processing, Inc., New York, N.Y., Reg. No. 1,304,778, for the mark "VOICE-KEY", Canc. No. 16,677.

Delaware Punch Co., San Antonio, Tex., Reg. No. 859,396, for the mark "AMIGO", Canc. No. 16,691.

Mego Corp., New York, N.Y., Reg. No. 1,024,756, for the mark "LUV'N STUFF", Canc. No. 16,698.

ERMA S. BROWN,
*Administrator*
*of the Trademark Trial*
*and Appeal Board.*
For JEFFREY M. SAMUELS,
*Assistant Commissioner*
*for Trademarks.*

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**Notice of Reclassification and Request for Information**

Pursuant to 35 USC 9, the Classification Groups are planning to begin revising, between now and Sept. 30, 1988, the classes and subclasses in the U.S. Patent Classification System, which are listed below.

The PTO requests information from the public concerning the subject matter of these reclassification projects. Specifically, we seek responses which would:

1. Identify recent technological advances in any of the subject matter under reclassification which should be included in the revised classes and subclasses.
2. Identify any technology in the listed classifications that is classified in other classes, as well, without clear or meaningful lines of distinction between those classes, and which would be better searchable if combined into one class.
3. Identify any inaccurate, misdescriptive, or vague class or subclass titles or definitions in the listed classes and subclasses. In this regard, submission of definitions of such subject matter that are used by skilled workers in the art would be appreciated.
4. Identify illogical or obsolete classification breakdowns of the subject matter in the listed classes and subclasses.
5. Identify subclasses that do not fit well in any of the listed classes.
6. Provide any other constructive criticism of the existing classification of the subject matter under reclassification, including suggested improvements, e.g., proposed term definitions, subclass titles and arrangements, etc.

Comments may be submitted at any time, but preferably by June 1, 1988, since some of the projects are scheduled to begin by that date. Comments should be addressed to:

Mr. Edward J. Earls
Deputy Administrator for Documentation
Patent and Trademark Office
Washington, D.C. 20231

| Class | Subclasses | Description |
|---|---|---|
| NEW | New | MOBILITY AIDS FOR INVALIDS AND HANDICAPPED: Invalid hoists, wheelchairs, walkers, harnesses, modified vehicles, etc. |
| 10 | ALL SUBCLASSES | BOLT, NAIL, NUT, RIVET, AND SCREW MAKING |
| 24 | 579, 598-601, 697-699, 230.5 - 239.4 | BUCKLES, BUTTONS, CLASPS, ETC.: Hook type fasteners |
| 47 | 1, 28 and 41 | PLANT HUSBANDRY: Flower holders, transparent top plant covers, and "miscellaneous" |
| 53 | 128-139.3, 266, and 371-389 | PACKAGE MAKING: filling and closing preformed receptacles, e.g., envelopes; package opening or closing means, flaps or seam holders, receptacle opening; flap manipulation |
| 72 | 241-243, 342, 353-355, 365, 366, 379, 391 | METAL DEFORMING: using roller with backup, using closed-die and coacting workforcers; using concentric or telescoped tools; using a rolling process; and deforming sheet material |



| Class | Subclasses | Description |
|---|---|---|
| 124 | 20, 23, 24, 35, 41, and 51 | MECHANICAL GUNS AND PROJECTORS: using a spring e.g., crotch type, bows, cord or band release elements; various projectile holders and carriers; and various mechanically fed magazine elements |
| 128 | 82-91A, 93, 94, and 155-171 | SURGERY: Bandages; and bandaging using splints, slings and fracture apparatus |
| 219 | 271-382 | ELECTRIC HEATING: Includes electric hot water heaters, tanks, and heating systems; radiant heaters and convection heaters, etc. |
| 252 | 8.6-8.9; 80-88; 89.1-136; 523-540; 139-151; 153-160; 162-174.25; 541-559; 367-370; Digests 1-17 & 19 | COMPOSITIONS: detergents for use on solid materials |
| 282 | ALL SUBCLASSES | MANIFOLDING: writing on an original produces impression copies on manifold sheets or leafs under the original |
| 318 | 34-113; 244-253 255-300; 362-383 | ELECTRICITY, MOTIVE POWER CONTROL SYSTEMS: Plural. diverse or diversely controlled electric motors; A.C. commutating motors; series motors, homopolar or uniform field motors; plural diverse controls; and motor reversing |
| 330 | 4.3 | AMPLIFIERS: Laser amplifiers |
| 332 | 7.51 | MODULATORS: Laser modulators |
| 350 | SUBCLASSES DEALING WITH ACTIVE MODULATION OF LIGHT | OPTICS, SYSTEM AND ELEMENTS: to the extent that it deals with active modulation of light |
| 370 | 58, 85-90, 94-96 100, 104 | MULTIPLEX COMMUNICATIONS: Time Division Multiplexing and multiplex switching, including synchronizing |
| 371 | 2, 5, 8-11, 15, 16 20-22, 25, 29, 37, 38, 47, 49-51, 57, 67-69 | ERROR DETECTION/CORRECTION AND FAULT DETECTION/RECOVERY: data formatting, error rate determination; diagnostic testing; and error detection for synchronization control |
| 427 | 12-57 | COATING PROCESSESS: involving the direct application of electrical, magnetic or wave energy |
| 455 | 600-620 | TELECOMMUNICATIONS: Light wave communication and certain miscellaneous communications media |

WILLIAM S. LAWSON,
*Administrator for*
*Documentation.*

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## Foreign Filing of Secrecy Order Inventions

## In Designated Countries

## 37 CFR Part 5

Under the provisions of 37 CFR Part 5, -Secrecy of Certain Inventions and Licenses to File Applications in Foreign Countries - the Patent and Trademark Office may, with the approval of the defense agency sponsoring the secrecy order, permit the filing of secrecy order applications under 37 CFR 5.5 in designated foreign countries with which the Government of the United States of America has entered into reciprocal patent secrecy arrangements.

The United States of America has detailed arrangements with 16 countries, most of whom are members of the Coordinating Committee for Multilateral Export Controls (COCOM). These arrangements provide protection for classified and other sensitive inventions when patent applications are being held in secret. These countries are as follows: Australia, Belgium, Canada, Denmark, France, Federal Republic of Germany, Greece, Italy, Japan, Luxembourg, Netherlands, Norway, Portugal, Sweden, Turkey and United Kingdom.

For further information contact Kenneth L. Cage by telephone at (703) 557-2877 or by mail marked to his attention and addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231.

4-12-88
Date

Donald J. Quigg
Assistant Secretary and Commissioner
of Patents and Trademarks



## Foreign Filing of Secrecy Order

## Inventions In Japan

## 37 CFR Part 5

Under the provisions of 37 CFR Part 5 - Secrecy of Certain Invention and Licenses to File Applications in Foreign Countries - the Patent and Trademark Office may, with the approval of the defense agency sponsoring the secrecy order, permit the filing of secrecy order applications under 37 CFR 5.5 in designated foreign countries. The designated countries are those where the Government of the United States of America has entered into reciprocal patent secrecy arrangements.

Such arrangements between the United States of America and Japan include the transfer of technology and the national security provisions of the Mutual Defense Assistance Agreement, signed at Tokyo on March 8, 1954, and the Agreement between the Government of the United States of America and the Government of Japan to Facilitate Interchange of Patent Rights and Technical Information for Purposes of Defense, signed at Tokyo on March 22, 1956. These agreements became effective for the filing in Japan of patent applications under secrecy order in the United States of America as of April 12, 1988, through an exchange of notes between the Government of the United States of America and the Government of Japan on April 12, 1988. With the exchange of notes, the United States of America may permit transfer to Japan and Japan will protect certain defense-related technical information in patent applications in Japan disclosing inventions which are the subject of patent applications held in secrecy in the United States of America. Japan will accord patent protection to these applications consistent with Japanese patent law.

The 1956 Agreement recognizes that privately owned technology should, to the greatest extent practicable, be exchanged through commercial agreements between owners and users. It also stipulates that rights of

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private owners of patents and technical information should be fully recognized and protected in accordance with laws applicable to such rights. Other provisions are intended to assure fair treatment of private owners when they deal directly with a foreign government and to prevent private information that is communicated through government channels from being used or disclosed without authorization.

The 1956 Agreement also provides for the establishment of a Technical Property Committee to be composed of representatives from each government. The Technical Property Committee is charged with general responsibility for making recommendations to the two governments on any matters relating to the Agreement which are brought before the Committee by either government, either on its own behalf or on behalf of its nationals. One of the specific functions of the Committee is to make recommendations to the governments concerning disparities in the laws of both countries affecting the compensation of owners of patents and technical information.

Policy guidance for the United States of America representatives on the Technical Property Committee is provided by the Department of Commerce, the Department of Defense, and the Department of State.

The Patent and Trademark Office is providing for the addition of Japan as a country that is available for foreign filing of secrecy order applications in the following manner:

Type 1 secrecy orders entitled "Secrecy Order and Permit for Foreign Filing in Certain Countries" 51 Federal Register 32938, (September 17, 1986), 1071 Official Gazette 31, (October 21, 1986), list all available countries where foreign filing is authorized. The countries are: Australia, Belgium, Canada, Denmark, France, Federal Republic of Germany, Greece, Italy, Luxembourg, Netherlands, Norway, Portugal, Sweden, Turkey and United Kingdom.

As of April 12, 1988, Japan will be included in all type 1 secrecy orders as one of the authorized countries for foreign filing. All type 1 secrecy orders issued prior to April 12, 1988, will be modified by the Patent and Trademark Office within 30 days of this notice to include Japan as an authorized country. A sample copy of this new type 1 secrecy order appears in Appendix I.



Under all other Patent and Trademark Office secrecy orders, foreign filing in Japan will be considered on a case-by-case basis under 37 CFR 5.5. All principals as defined in 37 CFR 5.2 to be the applicant's successors, assignees and legal representatives who requested, but were denied, Japan as a country for foreign filing under 37 CFR 5.5(c) since January 1, 1982, will have their petitions automatically reviewed within 90 days of the date of notice to determine if the invention may be foreign filed in Japan. In those instances where filing in Japan was requested, these principals will not have to file any petition under 37 CFR 5.5(c) before the Patent and Trademark Office in order to receive this review. If permission for filing in Japan is granted, the principals will be notified by the Patent and Trademark Office, including the identification of appropriately designated attorneys. A sample copy of this special permit for foreign filing in Japan appears in Appendix II.

Any other principals presently having an application under secrecy order desiring to file the secrecy order application in Japan should file a petition under 37 CFR 5.5 naming Japan a designated country.

To the extent possible, principals should designate whether the invention described in the patent application is or has been transferred in a format other than a patent application to Japan under the Mutual Defense Assistance Agreement between the United States of America and Japan, signed in Tokyo on March 8, 1954. This information will be necessary in order to assure both governments that appropriate national security controls as provided for in the specific Mutual Defense Assistance Agreement will be utilized.

For further information contact, Kenneth L. Cage, Director of Group 220, by telephone at (703) 557-2877 or by mail marked to his attention and addressed to the Commissioner of Patents and Trademarks, Washington D.C. 20231.

4-12-88
Date

Donald J. Quigg
Assistant Secretary and Commissioner
of Patents and Trademarks

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APPENDIX I

Serial No: Filed:

Applicant:

Title:

Sponsoring Agency & Address:

| ECCN[1] REFERENCE | | ITAR[2] REFERENCE |
|---|---|---|
| Goods Accompanied by Sophisticated Know-How | Keystone Equipment or Materials | Goods Accompanied by Sophisticated Know-How |

SECRECY ORDER AND PERMIT FOR FOREIGN FILING IN CERTAIN COUNTRIES
(Title 35, United States Code, Sections 181-188 (1952)

NOTICE: To the applicant(s) above named, his, her, or their heirs; and any and all of the assignees, licensees, attorneys and agents, hereinafter designated principals:

You are hereby notified that the above-identified patent application has been found to contain subject matter which discloses critical technology with military or space application. The unauthorized disclosure of such subject matter would be detrimental to the national security, and you are ordered to keep the subject matter secret (as required by 35 U.S.C. 181) and you are further ordered NOT TO PUBLISH OR DISCLOSE the subject matter to any person except as specifically authorized herein.

---

[1]Export Control Commodity Number (ECCN) on the Commodity Control List (Supplement No. 1 to 15 CFR 399.1).

[2]International Traffic in Arms Regulation (ITAR), 22 CFR §§120-130.



Any other patent application already filed or hereafter filed in the U.S. or any foreign country which contains any significant part of the subject matter of the above-identified application falls within the scope of this Order. If such other patent application is not under a Secrecy Order imposed by the U.S. Patent and Trademark Office, it and the common subject matter immediately must be brought to the attention of the Director, Group 220, Attn: Licensing and Review, U.S. Patent and Trademark Office, Washington, D.C. 20231.

Publication or disclosure of the subject matter of the above-identified patent application, except as authorized herein or subsequently by the Commissioner of Patents and Trademarks, may subject the person publishing or disclosing the subject matter to the penalties of 35 U.S.C. 182, 185 and 186 (1952).

The principals may disclose, for legitimate business purposes,[3] the subject matter of the above-identified application to a U.S. citizen or to a person who is both admitted lawfully into the United States for permanent residence and is located in the United States provided the U.S. citizen or person is furnished with a copy of this Secrecy Order and is informed that this Secrecy Order is applicable to the subject matter disclosed.

Legitimate business purposes include selling or producing products for the commercial domestic marketplace, or for the commercial foreign marketplace providing that any required export license is obtained. Legitimate business purposes also include selling or otherwise disclosing technical data to foreign contractors or foreign governments after receiving the required export license or approval by the U.S. Government.

The principals shall notify the Commissioner of Patents and Trademarks if a validated license is obtained from the Office of Export Administration or a license is obtained from the Director, Office of Munitions Control under regulations governing the export of technical data (15 CFR 379 of the Export Administration Regulations or 22 CFR 125 of the International Traffic in Arms Regulations).

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[3]The term legitimate business purposes is to be interpreted consistent with DOD Directive 5230.25 entitled "Withholding of Unclassified Technical Data From Public Disclosure," issued by the Secretary of Defense on November 6, 1984, 32 CFR Part 250, 49 FR 484040 (December 10, 1984).

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The subject matter of the above-identified application has been determined not to be encompassed by E.O. 10865, entitled "Safeguarding of Classified Information Within Industry" or E.O. 12356, entitled "National Security Information" and thus is not subject to the "Industrial Security Manual for Safeguarding Classified Information." However, since the disclosure of the subject matter would be detrimental to the national security, the subject matter must be safeguarded under conditions that will provide adequate protection and prevent access by unauthorized persons. When copies of the subject matter are no longer needed, they should be destroyed by any method that will prevent disclosure of the contents or reconstruction of the document.

The principals are permitted, subject to the conditions stated hereinafter, to file and prosecute a corresponding application for patent in each of the following countries: Australia, Belgium, Canada, Denmark, France, Federal Republic of Germany, Greece, Italy, Japan, Luxembourg, Netherlands, Norway, Portugal, Sweden, Turkey and United Kingdom. The papers for each foreign application and its prosecution shall be transmitted to the sponsoring agency, identified herein, for forwarding through diplomatic channels for filing in the foreign country either directly by the principals or through the principals' foreign patent attorney or agent if authorized by the foreign government. Correspondence exclusively relating to payments of taxes and fees need not be sent through the sponsoring agency and diplomatic channels provided that such correspondence contains no information pertaining to the subject matter of the above-identified application.

International reciprocal agreements providing for the filing of patent applications under a Secrecy Order in the above-identified countries require the principals to furnish to the sponsoring agency identified herein (in addition to the papers to be filed in the foreign patent office) a copy of the specification (including any drawings annexed thereto, any resume and the claims included in the patent application) filed in the patent office of the foreign country. This copy will be furnished to the appropriate defense agency of the foreign government for information only and without prejudice to any rights of the principals. The filing date and serial number of the patent application should also be furnished to the sponsoring agency.



The principals shall request the foreign patent office to place in secrecy the foreign patent applications corresponding to the above-identified application and shall furnish a copy of this Secrecy Order and permit with the first papers to be filed in the foreign patent office.

The use of this permit shall constitute a waiver, unless otherwise required by the international agreements, of any claim to compensation for loss or damage due solely to the imposition of secrecy or similar treatment of the invention. Belgium, France, Federal Republic of Germany, Netherlands, Norway, Turkey and United Kingdom normally require a separate document confirming such a waiver.

In the case of Japan, the applicant shall ensure in its contract with its patent attorney that the patent attorney shall submit to the Japanese Patent Office a certified copy of this Secrecy Order and Permit. The submission of this permit to the Japanese Patent Office is considered notification to the Government of Japan and the Secrecy Order status of the above-mentioned application and a corresponding Japanese application will be considered an Agreement Application referred to in 3(a) of the Protocal to the 1956 United States-Japan Agreement.

This Order should not be construed in any way to mean that the U.S. Government has adopted or contemplates adoption of the invention disclosed in this application and it is not any indication of the value of such invention.

Director, Special Laws Administration

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APPENDIX II

PERMIT FOR FOREIGN FILING IN JAPAN (35 USC 182)

Permit Docket
U.S.Serial No. Petition Filed
Applicant:
Title:

INITIATING AGENCY
Address

The order of secrecy in the above-identified application is modified to permit filing of a corresponding application for patent in Japan on condition that:

(1) the papers for application in Japan be transmitted in a manner approved for information assigned protection at a classification level of _____ to the Initiating Agency for forwarding for filing in Japan; (Questions with respect to the handling of such information should be directed to the Initiating Agency);

(2) at the time the papers for the application in Japan are transmitted to the Initiating Agency for forwarding for filing in Japan, an extra copy of the application be included, this extra copy to be transmitted by the Initiating Agency to the authorities of the government of Japan for defense purposes;

(3) the applicant submit to the Initiating Agency as soon as possible the Application Number and filing date of the application in the Japanese Patent Office;

(4) the applicant take all reasonable steps to safeguard the information in the application in the Japanese Patent Office; and

(5) the applicant ensure in its contract with its patent attorney in Japan that the patent attorney shall submit a certified copy of this permit to the Japanese Patent Office with the whole set of documents for the application.

The use of this permit shall constitute a waiver by the applicant of any right to compensation for damage which might arise under the laws of Japan by virtue of the mere fact that the invention is being handled pursuant



to 3(a) of the Protocol to the Agreement between the Government of the United States of America and the Government of Japan to Facilitate Interchange of Patent Rights and Technical Information for Purposes of Defense, signed at Tokyo on March 22, 1956 (hereinafter referred to as the 1956 Agreement), or for unauthorized disclosure of the invention, but reserving a right of compensation under Article IV of the 1956 Agreement.

This permit does not lessen the responsibility of the applicant to comply with the provisions of any applicable government contract which may require that approval to disclose information in Japan be obtained from the contracting officer.

This permit constitutes the notification to the Government of Japan, which the Government of the United States of America undertakes to make pursuant to 4(a) of the Protocol to the 1956 agreement, that the patent application mentioned in this permit is held in secrecy in the United States of America.

Further, this permit identifies an application to be filed in the Japanese Patent Office, which corresponds to the patent application mentioned in the Permit For Foreign Filing, as an Agreement Application referred to in 3(a) of the Protocol to the 1956 Agreement.

This permit may be altered or revoked, in whole or in part, by appropriate notice.

Director, Special Laws Administration

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# PATENT NOTICES

**Certificates of Correction for the Week of May 3, 1988**

| | | | |
|---|---|---|---|
| Re. 31,980 | 4,674,907 | 4,696,830 | 4,707,748 |
| Re. 32,526 | 4,675,298 | 4,697,140 | 4,708,246 |
| D. 291,103 | 4,675,981 | 4,697,583 | 4,708,454 |
| D. 291,592 | 4,677,105 | 4,698,773 | 4,708,504 |
| 4,279,894 | 4,678,606 | 4,699,392 | 4,708,703 |
| 4,352,805 | 4,680,286 | 4,699,707 | 4,708,834 |
| 4,459,853 | 4,680,326 | 4,699,909 | 4,709,312 |
| 4,495,675 | 4,680,785 | 4,700,297 | 4,709,647 |
| 4,534,004 | 4,680,905 | 4,700,422 | 4,710,101 |
| 4,596,888 | 4,681,955 | 4,700,599 | 4,710,122 |
| 4,620,118 | 4,682,583 | 4,700,732 | 4,710,125 |
| 4,630,882 | 4,683,560 | 4,700,740 | 4,710,140 |
| 4,636,419 | 4,684,321 | 4,700,818 | 4,710,189 |
| 4,637,241 | 4,685,720 | 4,700,912 | 4,710,486 |
| 4,644,419 | 4,686,181 | 4,701,274 | 4,710,547 |
| 4,644,512 | 4,687,382 | 4,701,392 | 4,710,603 |
| 4,645,925 | 4,687,658 | 4,701,429 | 4,710,690 |
| 4,646,339 | 4,687,821 | 4,701,485 | 4,710,733 |
| 4,647,347 | 4,688,859 | 4,701,514 | 4,710,769 |
| 4,650,367 | 4,688,968 | 4,701,593 | 4,710,925 |
| 4,657,135 | 4,689,302 | 4,701,771 | 4,711,576 |
| 4,657,755 | 4,690,954 | 4,702,268 | 4,711,615 |
| 4,661,874 | 4,691,819 | 4,702,893 | 4,711,723 |
| 4,662,098 | 4,692,049 | 4,702,986 | 4,711,993 |
| 4,663,153 | 4,692,782 | 4,702,988 | 4,712,208 |
| 4,664,682 | 4,692,819 | 4,703,060 | 4,713,844 |
| 4,666,776 | 4,693,055 | 4,703,112 | 4,714,141 |
| 4,667,700 | 4,693,280 | 4,703,228 | 4,714,263 |
| 4,667,723 | 4,694,024 | 4,703,617 | 4,714,512 |
| 4,669,163 | 4,694,269 | 4,704,158 | 4,714,786 |
| 4,669,464 | 4,694,625 | 4,704,257 | 4,715,968 |
| 4,670,040 | 4,694,628 | 4,704,923 | 4,717,118 |
| 4,670,890 | 4,694,857 | 4,705,533 | 4,717,917 |
| 4,672,114 | 4,695,454 | 4,706,309 | |
| 4,672,630 | 4,695,633 | 4,706,619 | |
| 4,673,757 | 4,696,223 | 4,707,195 | |





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Since there are variations in the scope of patent collections among the PDLs and in their hours of service to the public, anyone contemplating use of the patents at a particular library is advised to contact that library, in advance, about its collection and hours in order to avert possible inconvenience.

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| | Milwaukee Public Library | (414) 278-3247 |



## PATENT EXAMINING CORPS

**RENE D. TEGTMEYER, Assistant Commissioner**

**JAMES E. DENNY, Deputy Assistant Commissioner**

**CONDITION OF PATENT APPLICATIONS AS OF March 26, 1988**

| PATENT EXAMINING GROUPS | Actual Filing Date of Oldest New Case Awaiting Action |
|---|---|
| **CHEMICAL EXAMINING GROUPS** | |
| GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director | 1-12-87 |
| ORGANIC CHEMISTRY AND BIOTECHNOLOGY, GROUP 120—C. E. VAN HORN, Director | 9-3-85 |
| SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. F. WHITE, Director | 1-27-87 |
| HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director | 5-7-86 |
| **ELECTRICAL EXAMINING GROUPS** | |
| INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—G. GOLDBERG, Director | 5-5-86 |
| SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director | 10-14-85 |
| INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—E. LEVY, Director | 2-6-86 |
| PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX, Director | 11-10-86 |
| ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director | 2-17-87 |
| COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260—S. G. KUNIN, Director | 7-17-86 |
| DESIGN, GROUP 290—K. L. CAGE, Director | 4-17-85 |
| **MECHANICAL EXAMINING GROUPS** | |
| HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director | 2-25-87 |
| MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—S. N. ZAHARNA, Director | 10-04-85 |
| MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—R. E. AEGERTER, Director | 2-18-86 |
| SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—D. J. STOCKING, Director | 2-20-87 |
| GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director | 7-1-87 |

**Expiration of patents**: The patents within the range of numbers indicated below expire during March 1988, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,566,409 to 3,573,335, inclusive

Plant Patents ..... Numbers 3,030 to 3,036 inclusive

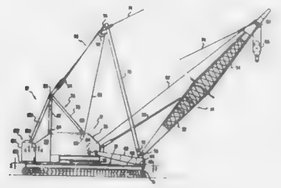
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# REEXAMINATIONS

MAY 3, 1988

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

**B1 3,485,383 (845th)**
**AUXILIARY SUPPORT FOR CRANES**
**Daniel E. Beduhn, Manitowoc, Wis., assignor to The Manitowoc Company, Inc., Manitowoc, Wis.**
**Reexamination Request No. 90/001,291, Jul. 28, 1987.**
**Reexamination Certificate for Patent No. 3,485,383, issued Dec. 23, 1969, Ser. No. 704,488, Feb. 9, 1968.**
**Int. Cl.[4] B66C *23/72***
**U.S. Cl. 212—195**



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1–19** are now disclaimed.

**1**. A load handling assembly comprising:
a central station;
a support having a segment disposed on one side of the central station;
a boom carried by the assembly on the other side of the central station for handling a load at the free end thereof;
means for hoisting a load from the free end of the boom;
a counterweight supportedly engaging the support; and
means interconnecting the counterweight and the boom for raising the counterweight off of the support when the boom is loaded by hoisting a load.

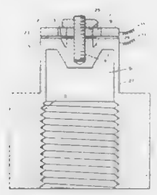
Claim **1** is determined to be patentable as amended.

Claims **2–6**, dependent on an amended claim, are determined to be patentable.

**1**. A pressure sensing capacitor comprising *a generally tubular shaped member,* an [edge-supported] elastic member responsive to pressure *in said generally tubular member and* having a conducting portion *and secured continuously at its periphery to said tubular member to contain said pressure,* a flat electrode member with a central support means, a periphery conductive means and an insulative means connecting said periphery conductive means and said central support means in fixed spaced relationship, means physically in contact with the center of said elastic member responsive to pressure and said central support means and spacing said periphery conductive means and said conducting portion of said elastic member responsive to pressure and said central support means and spacing said periphery conductive means and said conducting portion of said elastic member [in capacitive relationship] *to form a single variable capacitor,* whereby when force is applied to [the center of] the elastic member the spacing between the conducting portion and the periphery conductive means will vary.

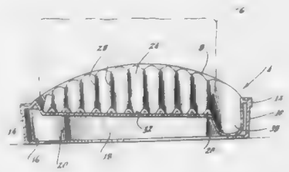
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**B1 3,859,575 (846th)**
**VARIABLE CAPACITANCE SENSOR**
**Shih-Ying Lee, and Yao-Tzu Li, both of Huckleberry Hill, Lincoln, Mass. 01773**
**Reexamination Request No. 90/001,260, Jun. 5, 1987.**
**Reexamination Certificate for Patent No. 3,859,575, issued Jan. 7, 1975, Ser. No. 441,026, Feb. 11, 1974.**
**Int. Cl.[4] H01G *7/00***
**U.S. Cl. 361—283**



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

**B1 4,140,889 (847th)**
**COOKING VESSEL FOR MICROWAVE OVEN COOKERY ADAPTED TO AID IN BROWNING FOODS BY HEAT FROM HOT, LIQUID FATS**
**Stanley I. Mason, Jr., and Charlotte G. Mason, both of 61 River Rd., Weston, Conn. 06880**
**Reexamination Request No. 90/001,317, Aug. 28, 1987.**
**Reexamination Certificate for Patent No. 4,140,889, issued Feb. 20, 1979, Ser. No. 813,952, Jul. 8, 1977.**
**Int. Cl.[4] H05B *6/80***
**U.S. Cl. 219—10.55 E**



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–22** is confirmed.

**1**. A microwave oven cooking vessel adapted to utilize heat absorbed by liquid fat from food being cooked thereon to aid in remotely browning the outside of said food, said vessel constructed to utilize both direct and reflected microwave radiation to heat said food, said vessel including:
a base having a downwardly extending sidewall around the perimeter of said base,
a top integral with said base and extending over said sidewall, said sidewall supporting said top, said top being of material which is transparent to microwave radiation, said

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base and said top defining an inner chamber below said top, and said top having an upper surface thereon,
said upper surface being sloped from the horizontal and having a series of food-supporting ribs thereon, and ribs defining sloping grooves with sloping surfaces on said upper surface,
said sloping grooves being positioned below said cooking food to receive liquid fat dripping therefrom,
said food supporting ribs being of sufficient height so that said sloping grooves are unobstructed by said food thereabove,
receiving means remote from said ribs and associated with the lower portion of said sloping grooves to receive and store said liquid fat remote from said sloping grooves, said receiving means being so positioned to heat said liquid fat stored therein by exposure thereof to microwave radiation,
said sloping grooves being sufficiently inclined to rapidly transport said fat away from said cooking food and towards said remote receiving means to provide a substantially fat-free microwave transmissive portion on said upper surface below said cooking food,
said downwardly extending sidewall being of sufficient height to maintain said top and said upper surface at a sufficient elevation from the floor of said microwave oven so that microwave radiation reflected from said floor of said oven can pass through said fat-free portion of said upper surface,
said food supporting ribs and said sloping grooves being dimensioned relative to each other such that said grooves are wider than said ribs so that a wide surface area of said cooking food is exposed to said reflected microwave radiation and said fat can drip freely from said surface of said cooking food into said wide grooves thereunder, wherein said reflected microwave radiation penetrates said wide surface area of said food without being absorbed by liquid fat,
whereby said food is cooked by direct microwave radiation, is further heated and remotely browned by heat from said liquid fat stored in said remote receiving means, and the cooking time of said food is further decreased by application of reflected microwave radiation thereto.

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**B1 4,157,643 (848th)**
**BALER LOADING APPARATUS**
**Allen A. White, Peabody, Kans., assignor to Hesston Corporation, Hesston, Kans.**
**Reexamination Request No. 90/000,819, Jul. 12, 1985.**
**Reexamination Certificate for Patent No. 4,157,643, issued Jun. 12, 1979, Ser. No. 778,248, Mar. 16, 1977.**
**Division of Ser. No. 675,529, Apr. 9, 1976, Pat. No. 4,132,163.**
**Int. Cl.[4] A01D** *39/00*
**U.S. Cl. 56—341**



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claim **1** is cancelled.

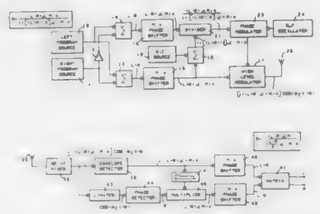
Claims **2–6** are determined to be patentable as amended.

Claims **7–9**, dependent on an amended claim, are determined to be patentable.

**2.** [In a crop baler as claimed in claim **1**,] *In a crop baler having a baling chamber and a plunger reciprocable within said chamber, the improvement comprising:*
*a pickup for lifting crop materials from the ground;*
*an elongated tubular duct leading from the pickup to the baling chamber,*
*said duct having an inlet adjacent said pickup and an outlet adjacent said baling chamber,*
*said plunger being disposed across said outlet during a portion of its reciprocation to thereby close the outlet;*
*a packer at said inlet of the duct positioned to feed a continuous stream of crop materials into the duct from the pickup,*
*the holding capacity of said duct relative to the feeding capacity of said packer being such that, when said outlet of the duct is closed by the plunger, the packer may compact the materials it feeds to the duct into a precompressed charge of materials that fills the duct from inlet to outlet and assumes the internal configuration thereof; and*
*a loader separate from said packer that is operable to stuff the precompressed charge into the baling chamber when the plunger opens said outlet of the duct,*
wherein said baling chamber extends generally horizontally, said duct being disposed below said chamber for loading charges into the chamber from the bottom thereof.

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**B1 4,184,046 (849th)**
**COMPATIBLE SINGLE SIDEBAND SYSTEM FOR AM STEREO**
**Norman W. Parker, Wheaton, Ill., assignor to Motorola, Inc., Schaumburg, Ill.**
**Reexamination Request No. 90/001,330, Sep. 15, 1987.**
**Reexamination Certificate for Patent No. 4,184,046, issued Jan. 15, 1980, Ser. No. 894,051, Apr. 6, 1978.**
**Int. Cl.[4] H04H** *5/00*
**U.S. Cl. 381—16**



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–8** is confirmed.

**1.** A transmitter for providing a compatible AM stereo signal of the form $[1+(L+R)\angle\phi]$ cos $(\omega_c t+D)$ where D is $[(L-R)\angle\phi]/\{1+[(L+R)/2]\angle\phi\}$ where $\phi$ and $\theta$ differ by 90° and L and R are distinct program signals, the transmitter comprising in combination:
first adder means for combining additively the L and R program signals;
second adder means for combining substractively the L and R program signals;
phase shifter means coupled to shift the phase of at least one of the first and second adder means output signals to provide a 90° phase difference between said output signals;
third adder means for adding a DC component to the phase-shifted output of the first adder means;
divider means coupled to divide the phase-shifted output signal from the second adder means by the output signal of the third adder means;
a source of carrier fequency signals;

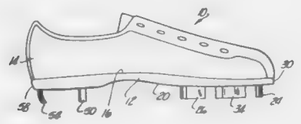


phase modulating means for modulating the carrier frequency signal with the divider output signal; and
amplitude modulating means for modulating the carrier frequency signal with the phase-shifted output signal from the first adder means.

**3.** A receiver for receiving a compatible AM stereo signal of the form $[1+(L+R)\angle\phi]\cos(\omega_c t+D)$ where D is $[(L-R)\angle\phi]/\{1+[(L+R)/2]\angle\phi\}$ where $\phi$ and $\theta$ differ by 90° and L and R are distinct program signals, the receiver comprising in combination:
input means for receiving said signal;
first detector means for providing a signal proportional in amplitude to the amplitude modulation on the received signal;
second detector means for providing a signal proportional in amplitude to the phase modulation on the received signal;
filter means coupled to the first detector means for reducing the amplitude of the audio portion of the output signal thereof to substantially one-half with respect to a band of frequencies lower than audio frequencies and including DC;
multiplier means coupled to multiply the output signals of the filter means and the second detector means;
first phase shifter means for restoring the original phase of the L+R signal;
second phase shifter means for restoring the original phase of the L−R signal; and
matrixing means coupled to the outputs of the first and second phase shifter means for providing separate L and R output signals.

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**B1 4,347,674 (850th)**
**ATHLETIC SHOE**
**Gary F. George, 5076 Bishop, Detroit, Mich. 48224**
**Reexamination Request No. 90/001,186, Mar. 3, 1987.**
**Reexamination Certificate for Patent No. 4,347,674, issued Sep. 7, 1982, Ser. No. 138,317, Apr. 8, 1980.**
**Int. Cl.[4] A43B** *5/00;* **A43C** *15/00*
**U.S. Cl. 36—126**



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

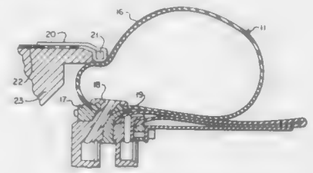
Claim **1** is determined to be patentable as amended.

Claims **2–6**, dependent on an amended claim, are determined to be patentable.

**1.** An athletic shoe comprising:
a sole,
an upper secured to said sole and extending outwardly from an upper side of the sole,
a first set of at least three narrow and arcuate cleats secured to the forward portion of said sole and extending outwardly from the lower side of said sole, each of said cleats being positioned on said sole on substantially the same radius of curvature and substantially having a common center and
a second set of at least three narrow and arcuate cleats secured to the forward portion of said sole and extending outwardly from said lower side of said sole, said second set of cleats being positioned on said sole concentrically with said first set of cleats but on a radius from said center smaller than said first set of cleats,
*wherein said cleats are dimensioned so that a lower edge of said cleat(s) digs into a ground surface in use,*
*wherein said cleats are constructed of a rigid material,*
*wherein a lower free edge of each cleat is elongated, arcuate and spaced from but substantially parallel to the sole of the shoe.*

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**B2 4,381,331 (851st)**
**NON-STICKING PLY END TURN-OVER BLADDER AND METHOD OF MANUFACTURE THEREOF**
**James L. Johnson, Indiana, Pa., assignor to McCreary Tire & Rubber Company, Indiana, Pa.**
**Reexamination Request No. 90/001,069, Aug. 15, 1986.**
**Reexamination Certificate for Patent No. 4,381,331, issued Apr. 26, 1983, Ser. No. 338,229, Jan. 11, 1982.**
**Continuation of Ser. No. 157,950, Jun. 9, 1980, abandoned.**
**Int. Cl.[4] D03D** *3/00*
**U.S. Cl. 428—224**



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–6** is confirmed.

**1.** A ply turn-over bladder formed of a rubbery polymer at least a portion of its outer surface having reduced adhesion to unvulcanized rubbery polymers, said portion comprising a fabric layer of spaced cords calendered with a coating of unvulcanized uncured rubbery polymer partially embedded in the rubbery polymer surface, the spaces between the cords being free of said polymer at said surface so that such cords project above said surface.

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**B1 4,487,782 (852nd)**
**TOPICAL TREATMENT OF NON-INFLAMMATORY ACNE**
**James A. Mezick, East Brunswick, N.J., assignor to Ortho Pharmaceutical Corporation, Raritan, N.J.**
**Reexamination Request No. 90/000,830, Aug. 7, 1985.**
**Reexamination Certificate for Patent No. 4,487,782, issued Dec. 11, 1984, Ser. No. 362,356, Mar. 26, 1982.**
**Int. Cl.[4] A61K** *31/20*
**U.S. Cl. 514—559**

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–8** is confirmed.

**1.** The method of treating non-inflammatory acne which comprises applying 13-cis-retinoic acid topically to the affected area in a concentration effective for the treatment of acne.

**B1 4,550,045 (853rd)**

## BIASED MULTI-LAYER STRUCTURAL FABRIC COMPOSITES STITCHED IN A VERTICAL DIRECTION

**Harold K. Hutson, Sequin, Tex., assignor to Knytex Proform, Sequin, Tex.**

**Reexamination Request No. 90/001,059, Jul. 22, 1986.**
**Reexamination Certificate for Patent No. 4,550,045, issued Oct. 29, 1985, Ser. No. 660,366, Oct. 12, 1984.**
**Division of Ser. No. 536,734, Sep. 28, 1983, Pat. No. 4,484,459.**
**Int. Cl.[4] B32B** *3/06*
**U.S. Cl. 428—102**



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1** and **7** are determined to be patentable as amended.

Claims **2–6** and **8–10**, dependent on an amended claim, are determined to be patentable.

**1**. A multi-layer non-woven structural fabric comprised of at least a top, middle and bottom layer, each of substantially parallel structural fibers, each of said layers being free of secondary fibers in the plane of said layer designed to maintain parallelity, vertical stitching normal to said layers and passing therethrough to maintain said layers in said vertical relationship and the parallelity of fibers within each layer, wherein at least one of said layers is biased, *the angle of bias of each layer in the fabric being independent of the angle of bias of all other layers by virtue of a continuous advance of layers.*

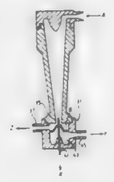
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**B1 4,578,199 (854th)**

## CYCLONE SEPARATORS

**John D. Peel, Cheshire, and Paul A. Knight, Lancashire, both of England, assignors to Beloit Corporation, Beloit, Wis.**

**Reexamination Request No. 90/001,261, Jun. 15, 1987.**
**Reexamination Certificate for Patent No. 4,578,199, issued Mar. 25, 1986, Ser. No. 726,303, Apr. 25, 1985.**
**Continuation of Ser. No. 520,021, Aug. 3, 1983, abandoned, which is a continuation-in-part of Ser. No. 346,176, Feb. 5, 1982, abandoned.**
**Claims priority, application United Kingdom, Feb. 14, 1981, [illegible]**
**Int. Cl.[4] B04C** *5/04, 5/107*
**U.S. Cl. 210—512.1**



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1–4** and **6** are cancelled.

Claim **5** is determined to be patentable as amended.

**5**. [A] *An air-cored* hydrocyclone separator for separating a relatively light, rejects portion of particulate matter from a relatively heavy, accepts portion of particulate matter carried by an aqueous fluid mixture of both portions thereof, comprising:

a *vertically-disposed* chamber having *upper and lower ends and* a longitudinal axis and a *smooth,* continuous curved wall thereabout and coextending therewith *from the upper end to the lower end, means defining* an inlet opening [at one] *only at its upper* end and an outlet opening *means only* at its [other] *lower* end, said inlet opening being substantially tangential to the curved wall and at an angle to the longitudinal axis, said outlet opening *means* being concentric with the longitudinal axis *and including an outlet opening concentric with the longitudinal axis;*

means, *including a stabilizer centrally-disposed near the inlet opening having a wall tapering inwardly toward an end thereof away from the inlet opening and extending forward toward the outlet opening means for guiding the incoming aqueous mixture stream and controlling the extent of roll vortexing,* for constraining all of the incoming fluid mixture to travel along a substantially unilateral, streamline flow spirally through the chamber toward the outlet opening *means, whereby a central air core is established along the longitudinal axis of the separator; and*

an outlet chamber *being larger than, and disposed about,* the outlet opening to receive the aqueous mixture of the accepts portion of the particulate matter which is traveling near the separator wall;

*said outlet opening means including* a pipe extending through the outlet chamber and into the outlet opening, concentric therewith, and into the chamber to receive the aqueous mixture of the rejects portion of the particulate matter which is traveling near the longitudinal axis of the separator, *whereby all of the inlet fluid mixture, including all of the accepts and rejects portions, is discharged at the lower end of the separator.*

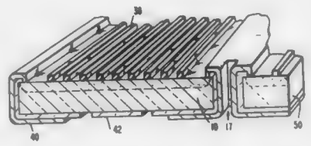
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**B1 4,610,077 (855th)**

## PROCESS FOR FABRICATING A WRAPAROUND CONTACT SOLAR CELL

**Joseph A. Minahan, Simi Valley; Eugene L. Ralph, San Gabriel, and Hans G. Dill, Newhall, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Reexamination Request No. 90/001,307, Aug. 17, 1987.**
**Reexamination Certificate for Patent No. 4,610,077, issued Sep. 9, 1986, Ser. No. 605,319, Apr. 30, 1984.**
**Int. Cl.[4] H01L** *31/18*
**U.S. Cl. 437—2**




AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1–7** are cancelled.

[**1**. A process for fabricating a wraparound contact solar cell comprising:

(a) providing a silicon substrate of a chosen size and shape having first and second opposed major surfaces,

(b) forming openings in said substrate and extending through said substrate from said first major surface thereof to said second major surface and spaced apart by a desired lateral dimension of a solar cell,

(c) processing said substrate to form a p-n junction therein and between said openings, whereby the vertical walls of said substrate defining said openings are exposed for oxidation, photolithography, and junction-forming steps,

(d) utilizing these steps in paragrah (c) above to also form p-region and n-region contacts on the major surfaces of said substrate and extending to a single one of said first and second major surfaces thereof through said openings where they are electrically isolated for bonding to a common solar cell support member, and

(e) forming grid lines on one major surface of said substrate for interconnection to one of said p- or n-region contacts for deriving a solar cell output voltage resulting from charge carriers generated at said p-n junction.]

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# STATUTORY INVENTION REGISTRATIONS

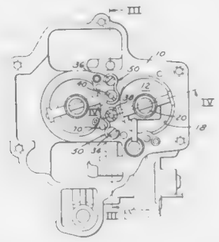
PUBLISHED MAY 3, 1988

A statutory invention registration is not a patent. It has the defensive attributes of a patent but does not have the enforceable attributes of a patent. No article or advertisement or the like may use the term patent, or any term suggestive of a patent, when referring to a statutory invention registration. For more specific information on the rights associated with a statutory invention registration see 35 U.S.C. 157.

## H463
## CARBURETOR SPRING RETAINER CLIP

**Robert F. Bollens, Detroit, Mich., assignor to Ford Motor Company, Dearborn, Mich.**

**Filed Mar. 15, 1985, Ser. No. 712,068**
**Int. Cl.[4] F16B *21/18***
**U.S. Cl. 411—520** **8 Claims**



1. A carburetor for an automotive type engine, the carburetor having a pair of adjacent air/fuel induction passages, a pair of threaded fuel channels adjacent one another, each having a threaded part at one end and each opening into an induction passage at the other end, a fuel metering rod axially movably receivable in each fuel channel and having threads on one end engagable with the threaded part of the fuel channel for an axial adjustability of the rod, the threaded portion of the one end of each rod having a portion thereof projecting out of its fuel channel to a position above the carburetor, and a flexible spring type retaining clip engagable simultaneously with the threads of each threaded rod portion projecting out of the fuel channel with a frictional interference fit sufficient to prevent inadvertent rotation of the threads and rods due to engine vibration or the like during engine operation, the clip comprising a continuous piece of flat deformable spring metal having a longitudinally extending central portion interconnecting spaced reversely bent open end portions adapted to circumferentially engage and surround portions of the threads of the threaded rods, the longitudinal extent of the clip being slightly less than the distance from diametrically opposite sides of the metering rods to provide the interference fit between the clip and the rods upon the yieldable deformation of the clip during assembly over the threads of the pair of metering rods to provide a continuous compression force acting directly against the threads resisting rotary movement of the rods.

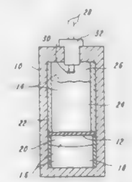
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## H464
## METAL HYDRIDE EXPLOSIVE SYSTEM

**Woodrow W. Lee; Alexander G. Rozner, both of Potomac, and James C. Waldron, Silver Spring, all of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Apr. 9, 1987, Ser. No. 38,381**
**Int. Cl.[4] F42B *13/14*; C06B *45/14***
**U.S. Cl. 102—364** **15 Claims**

1. A molten metal-liquid explosive device comprising:
(1) a metal casing enclosing an inner space;
(2) a fusable metal wall dividing the inner space into a liquid chamber and a pyrotechnic material chamber;
(3) a liquid contained in the liquid chamber;
(4) a pyrotechnic material essentially comprising
(a) a magnesium nickel alloy hydride of the formula $MgNi_xH_y$ wherein $0<x\leqq0.50$ and $1.50\leqq y\leqq2.00$ and
(b) a oxidizer selected from the group consisting of CuO, $Li_2O_2$, $BaO_2$, and mixtures thereof;
wherein the molar ratio of oxidizer to magnesium nickel alloy hydride is from about 0.75:1.00 to about (1.50+0.5y):1.00, and



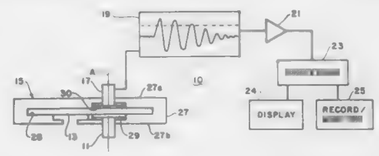
wherein the pyrotechnic material is contained in the pyrotechnic material chamber in an amount sufficient to melt the fusable metal wall dividing the liquid chamber and the pyrotechnic material chamber; and
(5) means for igniting the pyrotechnic material.

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## H465
## ACOUSTO-ULTRASONIC MONITORING

**Scott C. Brown, Sacramento, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed May 12, 1987, Ser. No. 48,858**
**Int. Cl.[4] G01N *29/00***
**U.S. Cl. 73—590** **4 Claims**




1. A system for monitoring resin cure in the fabrication of composite sheet material, comprising:
(a) first transducer means for directing a plurality of ultrasonic pulses of preselected pulse frequency along a selected propagation axis onto a first surface of composite sheet material containing resin for curing;
(b) second transducer means disposed along said axis near the second surface of said material for receiving the ultrasonic pulses transmitted through said material and for providing output signals characteristic of the transmitted pulses received by said second transducer means; and
(c) electronic means responsive to said signals from said second transducer means for analyzing said signals and providing output corresponding to the amplitude and duration of said transmitted pulses.

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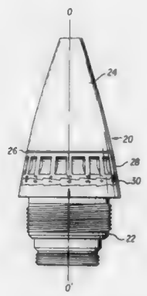


**H466**

## HALL EFFECT DEVICE ASSEMBLY

**Alan C. Reiter, Gaithersburg, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Sep. 3, 1987, Ser. No. 92,853**
**Int. Cl.[4] F42C** *19/06*
**U.S. Cl. 102—293** **6 Claims**




1. In an electronic device having a housing which includes an axis and having an annular setting ring which is disposed about the housing axis and is interconnected with the housing to be rotatable about the housing axis to a plurality of preselected angular positions, a system for sensing the angular position of the setting ring and coverting it into a digital signal indicative of that position, comprising:

a first element of magnetic material, which is integral with or affixed to the housing and which includes an outer cylindrical surface extending about the housing axis beneath the setting ring;

a plurality of axially-spaced Hall effect digital switches, affixed to the outer surface of the first magnetic element and connected to be energized by a direct voltage source, each energized switch being operable in either an open state or a closed state, each switch switching from one state to the other state whenever magnetic flux supplied to it exceeds an OPERATE threshold and each switch switching back from the other state to said one state whenever the magnetic flux supplied to it is reduced below a RELEASE threshold which is less than the OPERATE threshold;

a second element of magnetic material, which is integral with or affixed to an inner portion of the setting ring and which includes an inner cylindrical surface extending about the housing axis concentric with the outer surface of the first magnetic element;

a plurality of third elements of magnetic material, which are integral with or affixed to the second magnetic element and which extend radially inward from the inner cylindrical surface of the second magnetic element, the third magnetic elements being disposed in a plurality of axially-spaced circular tracks which extend respectively over the Hall effect digital switches, the arrangement and number of third magnetic elements in each track being such that a different combination of third magnetic elements are disposed directly over the plurality of Hall effect digital switches at each preselected angular position of the setting ring;

an adjustable magnetic circuit for selectively activating the Hall effect digital switches to indicate the setting ring position, including the first, second, and third magnetic elements and a magnetic flux generator which provides magnetic flux to the magnetic circuit such that the magnetic flux supplied to any Hall effect digital switch disposed directly beneath a third magnetic element exceeds said OPERATE threshold and the magnetic flux supplied to any Hall effect digital switch not disposed beneath a third magnetic element is less than said RELEASE threshold, wherein the plurality of third magnetic elements consitutes a multi-bit code which is sensed by the plurality of Hall effect digital switches, the combination of open and closed states of the Hall effect digital switches indicating the angular position of the setting ring; and

encoding means for energizing the Hall effect digital switches, sensing the open or closed states of the Hall effect digital switches, and generating the digital signal indicative of the angular position of the setting ring.

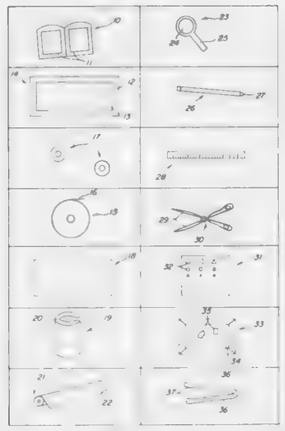
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**H467**

## ARTPRINTOGRAPHY KIT

**Bruce W. Gladden, 6322 Dogwood Dr., Orlando, Fla. 32807**

**Filed Sep. 21, 1987, Ser. No. 99,329**
**Int. Cl.[4] B65D** *69/00*
**U.S. Cl. 206—234** **1 Claim**



1. An artprintography kit comprising a container having separate compartments, a collection of tools placed respectively in the various compartments and a collection of materials placed respectively in others of the various compartments.

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**H468**

## ALKALINE HARD-SURFACE CLEANERS CONTAINING ALKYL GLYCOSIDES

**Arshad H. Malik; Robert S. McDaniel, and Gilles M. L. Verboom, all of Decatur, Ill., assignors to A. E. Staley Manufacturing Company, Decatur, Ill.**

**Filed Nov. 22, 1985, Ser. No. 801,170**
**Int. Cl.[4] C11D** *7/32, 7/12, 7/06, 3/26*
**U.S. Cl. 252—542** **9 Claims**

1. A process for cleaning a soiled hard surface by applying thereto and subsequently removing therefrom a cleaning composition comprising:

(a) about 0.1 to 50 weight percent alkali metal hydroxide or ammonium hydroxide;

(b) about 0.1 to 40 weight percent of an alkyl glycoside having the formula:

$$RO—(R'O)_x—Z_y$$

where R is a monovalent alkyl radical containing about 8 to 25 carbon atoms, O is an oxygen atom, R′ is a divalent alkyl radical containing 2 to 4 carbon atoms, x is a number having an average value of 0 to about 12, Z is a reducing saccharide moiety containing 5 to 6 carbon atoms, and y is a number having an average value of about 1 to 10; and

(c) about 10 to 95 weight percent water.

6. A hard-surface cleaning composition comprising:



(a) about 0.1 to 8 weight percent alkali metal hydroxide or ammonium hydroxide;

(b) about 12 to 20 weight percent of an alkyl glycoside having the formula:

$$RO—(R'O)_x—Z_y$$

where R is a monovalent alkyl radical containing about 8 to 25 carbon atoms, O is an oxygen atom, R′ is a divalent alkyl radical containing 2 to 4 carbon atoms, x is a number having an average value of 0 to about 12, Z is a reducing saccharide moiety containing 5 or 6 carbon atoms, and y is a number having an average value of about 1 to 10; and

(c) about 60 to 85 weight percent water.

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**H469**

## CLEAR PLASTIC CONTAINER WITH GOOD GAS AND WATER VAPOR BARRIER PROPERTIES

**Gedeon I. Deak, 14 Ravine Rd., Wilmington, Del. 19810**

**Filed Nov. 4, 1986, Ser. No. 928,948**
**Int. Cl.[4] B32B** *27/08*
**U.S. Cl. 428—35** **19 Claims**

1. A container having a multi-layer structure comprising a plurality of thermoplastic resins, wherein at least one layer of the container comprises one or more amorphous polyamides and at least one of the remaining layers comprises an oriented thermoplastic resin.

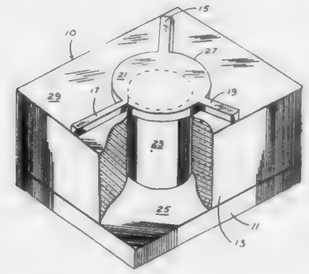
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**H470**

## MILLIMETER WAVE MICROSTRIP CIRCULATOR UTILIZING HEXAGONAL FERRITES

**Richard A. Stern, Allenwood, and Richard W. Babbitt, Fair Haven, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Jul. 18, 1986, Ser. No. 887,413**
**Int. Cl.[4] H01P** *1/32, 3/08*
**U.S. Cl. 333—1.1** **7 Claims**




1. A device comprising:

a metallic ground plane;

a substrate of dielectric material disposed upon said ground plane; said substrate having a cavity therein, said cavity extending completely through said substrate and exposing a portion of said ground plane;

a plurality of separate metallic transmission arms disposed upon the upper surface of said substrate;

a metallic junction connecting each of said transmission arms, said junction being disposed upon the upper surface of said substrate and covering said cavity;

an aligned uniaxial hexagonal ferrite centrally positioned in said cavity, said ferrite being in contact with both said ground plane and said junction, said ferrite having a resonance frequency; and

electromagnetic energy having a frequency different from said resonance frequency incident in the direction of one of said transmission arms whereby said ferrite directs said electromagnetic energy to exit preferentially along the direction of a predetermined adjacent arm.

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**H471**

## REMNANT FIELD DETECTOR

**Age T. Visser, Geneva, Ill., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Nov. 24, 1986, Ser. No. 934,518**
**Int. Cl.[4] G01N** *27/72*
**U.S. Cl. 324—239** **7 Claims**



1. A magnetic field detector for detecting remnant magnetic fields in magnet cores associated with an apparatus having multiple magnet cores to be degaussed, said remnant field detector comprised of:

first and second matched magnet cores;

flux generator means coupled to said first and second magnet cores capable of inducing a predetermined magnetic flux in said first magnet core with a predetermined orientation and inducing a predetermined magentic flux in said second magnet core with an orientation opposite said orientation of said first flux in said first magnet core;

first flux sensor means coupled to said first magnet core, capable of generating an output voltage from magnetic flux change in said first magnet core;

second flux sensor means coupled to said second magnet core for generating an output voltage from magnetic flux change in said second magnet core;

voltage comparison means coupled to said first flux sensor means and coupled to said second flux sensor means, capable of producing an output signal indicating a difference in output voltage from said first flux sensor means and from said second flux sensor means;

whereby magnetic flux change generated in said magnet cores by said flux generator means causes an induced voltage in said first and second flux sensor means the magnitude and polarity of such voltages in said first and second sensor means being dependent upon remnant magnetic fields in said magnetic cores prior to induced flux in said cores from said flux generator means.

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**H472**

## METHOD AND APPARATUS FOR PROCESSING BINARY-CODED/PACKED DECIMAL DATA

**Ralph W. Peterson, 6S556 Sussex Rd., Naperville, Ill. 60540**

**Filed Jan. 12, 1987, Ser. No. 2,428**
**Int. Cl.[4] G06F** *1/00;* **G05F** *7/50*
**U.S. Cl. 364—200** **52 Claims**

1. A method of generating object-program code from source-program code, comprising the steps of:

receiving source code specifying operation on two operands;

generating object code for obtaining two signals each representing a different one of the operands and each having a plurality of sequentially-ordered data fields each of which

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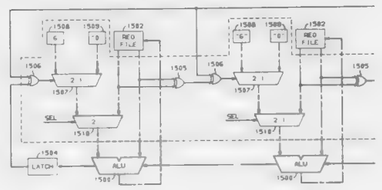
includes a plurality of bits, including a least-significant bit, defining a binary-coded-decimal value;

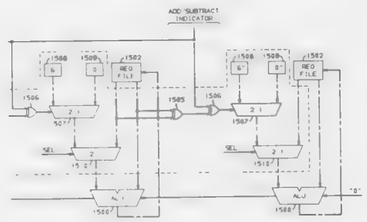
generating object code for summing binary values of the fields of the same sequential order and a value comprising a plurality of sixes, one six for data fields of the same sequential order, to get a resultant signal defining a value representing the result of the summing and having a plurality of data fields ordered correspondingly to the data fields of the obtained signals and each including a plurality of bits including a least-significant bit;

generating object code for examining values of least-significant bits of data fields of the same sequential order of the two obtained signals and the resultant signal; and

generating object code for subtracting, for each examination of least-significant bit values that include an odd number of zeros, six from the value of the data field of the resultant signal preceding the compared values in the sequential order of data fields, to obtain a modified resultant signal;

whereby an object program comprising the generated object code yields the modified resultant signal defining binary-





coded-decimal values representing the result of the operation on the two operands.

# REISSUES

MAY 3, 1988

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

**Re. 32,658**

## HANGING BAG WITH DETACHABLE COWL

**Jay E. Myers, Laguna Beach, Calif., and M. Todd Myers, New York, N.Y., assignors to Andiamo, Inc., Fountain Valley, Calif.**

**Original No. 4,489,829, dated Dec. 25, 1984, Ser. No. 477,151, Mar. 21, 1983. Application for reissue Dec. 27, 1985, Ser. No. 816,499**

**Int. Cl.[4] B65D *85/18***

**U.S. Cl. 206—287** **11 Claims**



8. A garment bag comprising:

a vertically elongated main receptacle having generally rectangular, horizontal, and vertical cross sections, and including

rear wall panel means,

front wall panel means substantially parallel and spaced apart from said rear wall panel means, *and*

peripheral wall means connecting said rear and front wall panel means at their corresponding edges, [and

zipper closure means affixed to said front wall panel means for permitting and excluding access to the interior of said receptacle,]

said front wall panel means being affixed along its bottom edge and side edges to said peripheral wall means, but being unattached along at least a portion of its top edge,

said receptacle being constructed of [collapsable] *collapsible* material and being vertically foldable such that, when folded, an upper portion of said receptacle faces and is aligned with a lower portion thereof,

retaining means for securing said receptacle in folded position,

cowl means for covering the upper edge of said front wall panel means, and

zipper means for detachably connecting said cowl means to said receptacle, said zipper means running along at least a substantial portion of the side edges and along the top edge of said cowl means, and along corresponding edge portions of said receptacle.

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**Re. 32,659**
**Patent Not Issued For This Number**

**Re. 32,660**

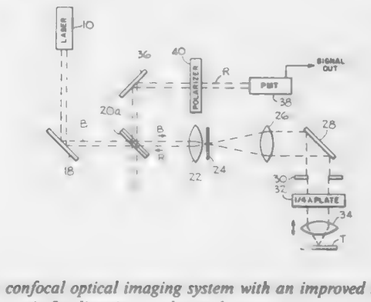
## CONFOCAL OPTICAL IMAGING SYSTEM WITH IMPROVED SIGNAL-TO-NOISE RATIO

**James T. Lindow, Saratoga; Simon D. Bennett, San Jose, and Ian R. Smith, Los Gatos, all of Calif., assignors to SiScan Systems, Inc., Campbell, Calif.**

**Original No. 4,634,880, dated Jan. 6, 1987, Ser. No. 830,964, Feb. 19, 1986. Continuation-in-part of Ser. No. 725,082, Apr. 19, 1982. Application for reissue Jun. 17, 1987, Ser. No. 63,474**

**Int. Cl.[4] G01J *1/20***

**U.S. Cl. 250—201** **16 Claims**




*9. A confocal optical imaging system with an improved signal-to-noise ratio for directing a coherent beam onto a spot on a target and determining the reflectance therefrom, said system comprising means for producing a linearly polarized light beam; a photodetector for receiving a reflected light beam from the target; a beam splitter for passing at least a portion of the transmitted beam from the beam producing means to the target and for receiving and directing at least a portion of the reflected beam from the target to the photodetector; a plurality of optical elements positioned between the beam splitter and the target including a pinhole plate including a pinhole for passing the transmitted beam to the target and a focusing lens for focusing the transmitted beam on the target; a retardation plate located in the beam path between the pinhole plate and the target for altering the polarization of the transmitted beam relative to the reflected beam; and polarization means for passing only the reflected beam from the target to the photodetector and rejecting those beams reflected from the optical elements between the retardation plate and the beam splitter.*

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**Re. 32,661**

## CLEANING ALUMINUM AT LOW TEMPERATURES

**Robert E. Binns, Roslyn, Pa., assignor to Amchem Products, Inc., Ambler, Pa.**

**Original No. 4,009,115, dated Feb. 22, 1977, Ser. No. 607,154, Aug. 25, 1975. Continuation of Ser. No. 189,741, Sep. 23, 1980, abandoned, and a continuation-in-part of Ser. No. 442,726, Feb. 14, 1974, abandoned. Application for reissue Jul. 27, 1984, Ser. No. 634,668**

**Int. Cl.[4] C11D *1/72, 7/08;* C23C *22/06;* C23G *1/12***

**U.S. Cl. 252—142** **9 Claims**

*7. An acidic aqueous cleaning solution having a pH of less than 2.0 and consisting essentially of about 1 to about 10 g/l of sulfuric acid, about 0.005 to about 0.1 g/l of hydrofluoric acid, and about 0.1 to about 10 g/l of a surfactant selected from the group consisting of nonionic and anionic surfactants, wherein the sources of said acids are respectively sulfuric acid and hydrofluoric acid, wherein said solution is free of a corrosion inhibitor in a corrosion-inhibiting amount and of a sludge-forming material, and wherein said solution is effective in removing and dissolving aluminum fines and in cleaning lubricating oils from the surfaces of drawn and*



210-369 O.G.-88-2

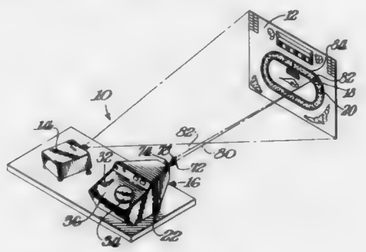
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*ironed aluminum cans of 3004 alloy at a temperature within the range of about 110° F. to about 135° F., said cleaned surfaces being water-break-free.*

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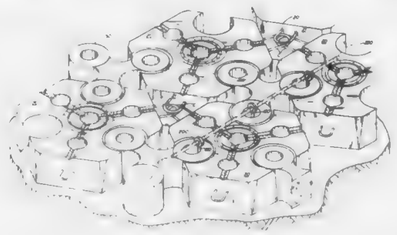
**Re. 32,662**
**IMAGE PROJECTING AMUSEMENT DEVICE**
**Hugh S. Pennington, Wilmington, Del., assignor to David R. Capasso, Killingworth, Conn.**
**Original No. 4,322,080, dated Mar. 30, 1982, Ser. No. 132,092, Mar. 20, 1980. Application for reissue Feb. 15, 1984, Ser. No. 580,447**
**Int. Cl.[4] A63F *9/14*; F41J *5/02***
**U.S. Cl. 273—86 B** **27 Claims**



*21. An amusement device comprising:*
*means providing a viewing surface;*
*means for projecting a target image onto said viewing surface, said target image including a background course having a first predetermined light intensity and at least one obstacle having a second predetermined light intensity, one of said first and second light intensities being relatively high and the other thereof being relatively low;*
means for selectively and controllably projecting an object image onto said viewing surface to be located at any position on said target image, said object image having a third predetermined light intensity;
*means for sensing the light intensity at any position on said target image to which said object image is projected and thereby sensing superimposition of said object image on said background course by sensing the combined first and third light intensities and sensing superimposition of said object image on any said obstacle by sensing the combined second and third light intensities; and*
*indicating means connected to said sensing means for detecting a change in light intensity sensed thereby and for producing an indication when said sensing means senses said combined second and third light intensities representing superimposition of said object image and any said obstacle image but for not producing an indication when said sensing means senses said combined first and third light intensities representing superimposition of said object image and said background course.*

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**Re. 32,663**
**ARTICULATED EROSION CONTROL SYSTEM**
**Francis S. Atkinson, 4930 Imogene, Houston, Tex. 77096**
**Original No. 4,372,705, dated Feb. 8, 1983, Ser. No. 207,879, Nov. 18, 1980. Application for reissue Feb. 8, 1985, Ser. No. 699,698**
**Int. Cl.[4] E02B *3/12***
**U.S. Cl. 405—19** **22 Claims**



*33. A matrix system of soil erosion prevention blocks conforming to the underlying terrain for controlling the erosion of soil therefrom, comprising:*
*a plurality of blocks each having three major sides forming at least a portion of an equilateral triangle having three equidistant sides;*
*adjacent sides of said triangular modules of adjoining blocks abutting to form a matrix of adjacent equilateral triangular modules wherein the apex of said triangular modules converge; and*
*connectors for interlocking said adjoining blocks.*

# PLANT PATENTS

## GRANTED MAY 3, 1988

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

**6,163**
**ROSE PLANT—MEIJUNKA VARIETY**
**Marie-Louise Meilland, Antibes, France, assignor to The Conard-Pyle Company, West Grove, Pa.**
**Filed Feb. 27, 1986, Ser. No. 833,612**
**Int. Cl.[4] A01H *5/00***
**U.S. Cl. Plt.—11** **1 Claim**

1. A new and distinct variety of Intermediate Class rose plant characterized by the following combination of characteristics:
(a) forms elegant double neyron pink blossoms which tend to be darker on the upper surface than on the under surface,
(b) forms petals which have wavy edges,
(c) is particularly well suited for growing under greenhouse conditions,
(d) exhibits a strong and vigorous growth habit, and
(e) exhibits good resistance to fungal diseases; substantially as herein shown and described.

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**6,164**
**ROSE PLANT—MEISPOLA VARIETY**
**Marie-Louise Meilland, Antibes, France, assignor to The Conard-Pyle Company, West Grove, Pa.**
**Filed Feb. 27, 1986, Ser. No. 833,613**
**Int. Cl.[4] A01H *5/00***
**U.S. Cl. Plt.—14** **1 Claim**

1. A new and distinct variety of Hybrid Tea rose plant characterized by the following combination of characteristics:
(a) forms elegant double pure white blossoms having a distinctive delicate fragrance and a long vase life,
(b) is particularly well suited for growing under greenhouse conditions,
(c) exhibits a vigorous growth habit, and
(d) exhibits good resistance to fungal diseases; substantially as herein shown and described.

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**6,165**
**ROSE PLANT—MEIROSPRAY VARIETY**
**Marie-Louise Meilland, Antibes, France, assignor to The Conrad-Pyle Company, West Grove, Pa.**
**Filed Feb. 27, 1986, Ser. No. 833,615**
**Int. Cl.[4] A01H *5/00***
**U.S. Cl. Plt.—25** **1 Claim**

1. A new and distinct variety of Floribunda rose plant characterized by the following combination of characteristics:
(a) forms attractive long lasting multiple blossom floral sprays wherein the blossoms are tangerine red on the upper surface and geranium red on the under surface,
(b) is particularly well suited for growing under greenhouse conditions, and
(c) exhibits a strong and vigorous growth habit; substantially as herein shown and described.

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**6,166**
**HYBRID GRAPEVINE ROOTSTOCK**
**Lloyd A. Lider; Harold P. Olmo, both of Davis, and Austin C. Goheen, Winters, all of Calif., assignors to The Regents of the University of California, Berkeley, Calif.**
**Filed May 23, 1986, Ser. No. 866,536**
**Int. Cl.[4] A01H *5/03***
**U.S. Cl. Plt.—47** **1 Claim**

1. The new and distinct variety of grapevine rootstock herein described and illustrated and identified by the characteristics enumerated above.

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**6,167**
**LILY PLANT NAMED STARSHELL**
**Ted T. Kirsch, Myrtle Point, Oreg., assignor to Melridge Inc., Gresham, Oreg.**
**Filed May 8, 1986, Ser. No. 860,861**
**Int. Cl.[4] A01H *5/00***
**U.S. Cl. Plt.—68** **1 Claim**

1. A new and distinct variety of Oriental hybrid lily, substantially as herein shown and described, characterized by its slightly upright and outward facing bowl-shaped flowers of large size, good substance and form, and borne as a raceme with ascending pedicels on a strong stem of medium height.

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**6,168**
**LILY PLANT CALLED LITTLE PINK RASCAL**
**Ted T. Kirsch, Myrtle Point, Oreg., assignor to Melridge Inc., Gresham, Oreg.**
**Filed May 8, 1986, Ser. No. 861,241**
**Int. Cl.[4] A01H *5/00***
**U.S. Cl. Plt.—68** **1 Claim**

1. A new and distinct Oriental hybrid lily, substantially as herein shown and described, characterized by its short stature, its richly colored, outwardly facing flowers of large size, its short, moderately broad leaves of dark green color, and its adaptability as a potted plant cultivar.

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**6,169**
***BOTRYOCOCCUS BRAUNII* VAR. SHOWA**
**Arthur M. Nonomura, Del Mar, Calif., assignor to The Regents of the University of CA, Berkeley, Calif.**
**Filed Apr. 15, 1986, Ser. No. 852,048**
**Int. Cl.[4] A01H *13/00***
**U.S. Cl. Plt.—89** **1 Claim**

1. A new and distinct variety of algal plant having the characteristics described and illustrated herein.

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# PATENTS

## GRANTED MAY 3, 1988

### ERRATA

| For CLASS | See PATENT NO. |
|---|---|
| 083-421 | 4,741,387 |
| 191-010 | 4,741,418 |
| 439-412 | 4,741,480 |
| 242-158 | 4,741,500 |
| 544-273 | 4,742,065 |
| 528-098 | 4,742,117 |
| 548-435 | 4,742,166 |
| 556-146 | 4,742,173 |
| 382-001 | 4,742,549 |

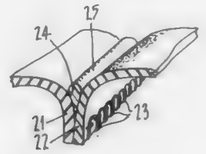
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# PATENTS

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## GENERAL AND MECHANICAL

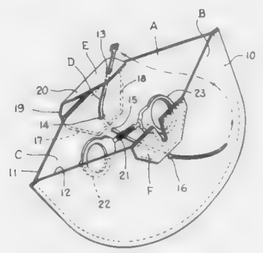
**4,741,050**
**WETSUITS**
**Brian O'Kane, and Douglas M. Warbrick, both of Torquay, Australia, assignors to Rip Curl International Pty. Ltd., Victoria, Australia**
**PCT No. PCT/AU85/00122, § 371 Date Feb. 7, 1986, § 102(e) Date Feb. 7, 1986, PCT Pub. No. WO86/00272, PCT Pub. Date Jan. 16, 1986**
**PCT Filed Jun. 6, 1985, Ser. No. 830,525**
**Claims priority, application Australia, Jun. 21, 1984, PG5621**
**Int. Cl.[4] A62B** *17/00;* **A41D** *27/24*
**U.S. Cl. 2—2.1 R** **11 Claims**




1. A seam construction for a wetsuit, which seam is overlock stitched to form a well or groove on the outside of the wetsuit, with the well or groove of the seam having bonded therein an injected bead of material having elastic recovery properties and rendering the seam substantially waterproof.

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**4,741,051**
**PROTECTIVE MITT FOR USE WITH HANDCUFFS**
**Kenneth G. Bible, 201 Butler Dr., Greenville, S.C. 29611**
**Filed Mar. 9, 1987, Ser. No. 23,149**
**Int. Cl.[4] A41D** *13/08*
**U.S. Cl. 2—158** **6 Claims**




1. A protective mitt for use by police officers or other attendants when placing handcuffs comprised of two cuff elements connected by a connecting element on the wrists having fastening means extending between both hands for further restraining movement of the hands and providing a cover therefor comprising:

a pair of opposed fabric wall panels secured about edge portions leaving an opening for insertion of the hands and wrists with the handcuffs carried thereon;

said fabric wall panels forming a pouch containing the hands, wrists and the handcuffs; and

said fastening means carried by said pouch extending between respective cuff elements and around said connecting element securing said handcuffs within said pouch;

whereby the hands are covered and movement thereof is restricted.

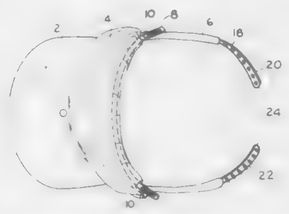
**4,741,052**
**HAND COVERING FOR USE WITH FIREARMS**
**Howard J. Rubin, Weston, Conn., assignor to Kombi Ltd., Naugatuck, Conn.**
**Filed Dec. 8, 1986, Ser. No. 939,415**
**Int. Cl.[4] A41D** *13/00, 19/00, 27/02*
**U.S. Cl. 2—161 A** **2 Claims**




1. A hand covering in the form of a six-fingered glove comprising an inner layer, an intermediate layer composed of substantially water proof, gas permeable material and, an outer layer, said inner layer being received within said intermediate layer, said intermediate layer being received within said outer layer, said intermediate layer and said outer layer each having first and second trigger finger receiving stalls, the volume of each of said second trigger finger receiving stalls being substantially smaller than the volume of the corresponding first trigger finger receiving stalls, said first and said second trigger finger receiving stalls of said intermediate layer being respectively situated within said first and said second trigger finger receiving stalls of said outer layer, said inner layer having a single trigger finger receiving stall situated within said first trigger finger receiving stall of said intermediate layer and an opening proximate said second trigger finger receiving stall of said intermediate layer.

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**4,741,053**
**CONVERTIBLE SUNVISOR CAP**
**Edward T. Okamura, Sr., 2209 Young St., Honolulu, Hi. 96826**
**Filed Mar. 27, 1987, Ser. No. 30,923**
**Int. Cl.[4] A42B** *1/24*
**U.S. Cl. 2—196** **19 Claims**




1. An adjustable support band apparatus for use with a convertible sunvisor cap having an adjustable head band connected to a bill and a crown movable between sunvisor and cap positions comprising,

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an elongated support band adapted to carry a rearward portion of the crown, wherein the support band is pivotally movable from one end of the head band to the opposite end,

means for pivotally connecting and slideably receiving opposite end portions of the support band to the head band, and

means for adjusting the length of the support band between the connection means to coincide with the length of the head band between the connecting means.

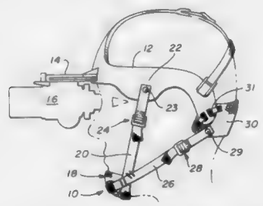
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**4,741,054**

## CHIN CUP FOR USE WITH MILITARY HEADGEAR

Paul B. Mattes, Garland, Tex., assignor to Varo, Inc., Garland, Tex.

Filed Jan. 22, 1987, Ser. No. 6,023
Int. Cl.[4] A42B *3/00*
U.S. Cl. 2—421 10 Claims



1. A chin cup for use with a headgear, comprising:

a high density foam material contoured similar to the chin of a wearer;

a nonstretchable canvas material bonded to said foam, said canvas material and said foam material having apertures for air circulation therethrough;

a coating of a dark colored vinyl/nitrile material covering said foam and said canvas material to form a smooth non-allergenic surface; and

a strap arrangement fixed to said bonded canvas and foam material, said strap being adapted for fastening to the headgear.

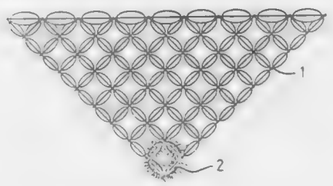
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**4,741,055**

## FUR SHAWL

Joung-Ho Lee, Seoul, Rep. of Korea, assignor to Sam Yang Fur Co., Ltd., Rep. of Korea

Filed Apr. 8, 1987, Ser. No. 36,008
Claims priority, application Rep. of Korea, Apr. 9, 1986, 86-4541
Int. Cl.[4] A41D *5/00*
U.S. Cl. 2—65 11 Claims



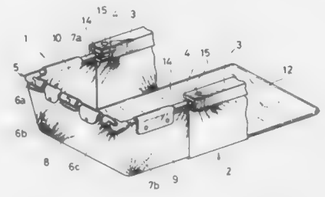
1. A fur shawl, comprising a fur material member rolled around each of a plurality of side elements forming a net, said fur material members being sewn up around each side element of said net with sewing thread whereby said fur material members are united to form a body.

**4,741,056**

## BABY CARRIAGE SEAT EXTENSION MEMBER

Kenzou Kassai, Osaka, Japan, assignor to Aprica Kassai Kabushikikaisha, Osaka, Japan

Continuation of Ser. No. 742,888, Jun. 10, 1985, abandoned. This application Apr. 10, 1987, Ser. No. 37,107
Claims priority, application Japan, Jul. 16, 1984, 59-108056[U]
Int. Cl.[4] B62B *7/06, 9/12;* A47D *13/02*
U.S. Cl. 5—99 A 3 Claims



1. A baby carriage, comprising a frame structure including a pair of handrails forming arm rests each having a forward opening therein, a baby holding body member including a supporting member having a plurality of sections foldably interconnected and forming a seat and backrest changeable into a bed bottom and head wall and vice versa, said supporting member being attached to said frame structure, a separate seat extension member being separable from and forming a box type baby carriage bed in cooperation with said baby holding body member, said separate seat extension member comprising a U-shaped extension frame having rear end portions, means for removably attaching said rear end portions of said U-shaped extension frame to front end portions of said pair of handrails disposed on both sides of and laterally above said seat of said baby carriage, said means for removably attaching comprising manually outwardly removable pins passing through said handrails and through said rear end portions of said U-shaped extension frame when said rear end portions are inserted in said forward openings formed in said arm rests, said U-shaped extension frame extending substantially horizontally, and a separate extension body being separable from said supporting member and including a front wall, a right lateral wall and a left lateral wall having upper edges secured to said U-shaped extension frame, and a bottom wall connected to said lower edges of said front wall and of said two lateral walls, said separate seat extension member with its extension body being removable as a unit from said baby holding body member, said bottom wall of said extension body having a length substantially longer than said two lateral walls, a portion of said bottom wall overlapping a substantial portion of said seat forming said bed bottom of said baby holding body member of said baby carriage, said overlapping portions forming a double bottom at least where a firm support for a baby's back is needed, and core means inserted into said bottom wall of said extension body for providing a cushioning effect.

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**4,741,057**

## RELAXATION MATTRESS

Pascal Rosier, and Sully-Pierre Rosier, both of Paris, France, assignors to Nat-Relax S.A.R.L., Paris, France

Filed Jun. 23, 1986, Ser. No. 877,372
Claims priority, application France, Jul. 12, 1985, 85 10715
Int. Cl.[4] B32B *3/12*
U.S. Cl. 5—455 18 Claims

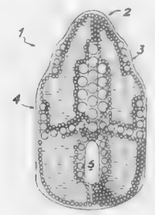
1. A relaxation mattress, comprising:

two successive coupled and superimposed layers of foamed plastics material, each said layer being formed by an individual fluidtight surrounding wall;

a first of said layers being adapted to receive the body of the user and containing a plurality of adjacent but separate air bubbles each having a substantially identical volume at all points of said first layer and each of said air bubbles being isolated from each other; and

a second of said layers containing air bubbles which are also





adjacent and separate but have different volumes according to their location in said second layer, the air bubbles of the second layer having a volume which is proportional to the relative density of the various parts of the body of the user stretched out on the mattress.

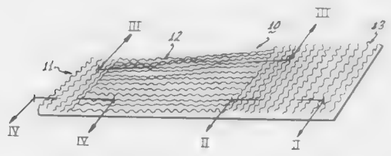
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**4,741,058**

## CONVOLUTED SUPPORT PAD FOR PREVENTION OF DECUBITUS ULCERS AND APPARATUS FOR MAKING SAME

H. Albert Williams, and Janet L. Williams, both of Canyon Country, Calif., assignors to Bio Clinic Corp., Rancho Cucamonga, Calif.

Continuation of Ser. No. 685,320, Dec. 24, 1984, Pat. No. 4,620,337. This application Aug. 29, 1986, Ser. No. 886,355
The portion of the term of this patent subsequent to Nov. 4, 2003, has been disclaimed.
Int. Cl.[4] A47C *27/14*
U.S. Cl. 5—468 1 Claim



1. A rectangular foam pad of a size sufficient for supporting a human body on a bed, said pad being elongated between two pad ends and having a planar undersurface and a convoluted upper surface, said upper surface comprising:

a first, head supporting section adjacent one said pad end and a second, foot and leg supporting section adjacent the opposite of said pad ends, each of said sections having a convoluted supporting surface comprising adjacent rows of peaks, said peaks in each row being separated by depressions, said peaks in adjacent rows being staggered to form a checkerboard pattern; and

a third, torso supporting section intermediate said first and second supporting sections, said torso supporting section having a ribbed convoluted supporting surface comprising substantially parallel ribs separated by substantially parallel valleys extending longitudinally on said pad between said first and second supporting sections;

the height of said peaks in each of said first and second sections being at least as great as the height of said ribs;

each of said three sections extending the full width of said pad, neither of said first and second sections being greater than one half the length of said pad, said convoluted surface in all three sections being characterized by a peak-to-base ratio in the range of about 1.1 to about 7.0 and said foam having a density in the range of about 1 to about 5 lbs/ft3.

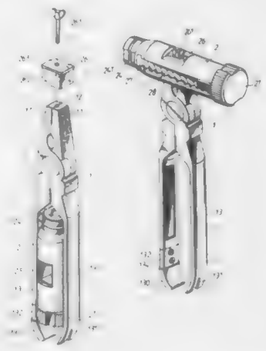
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**4,741,059**

## REORGANIZABLE TOOL FOR VARIOUS PURPOSES

Yung-Hsiang Lee, Linkow Hsiang, and Yau-Zung Pan, 4th Fl., 22 Kan Chou St., Taipei, both of Taiwan, assignors to Yau-Zung Pan, Taiwan

Filed Mar. 9, 1987, Ser. No. 23,660
Int. Cl.[4] B25F *1/02*
U.S. Cl. 7—127 10 Claims



1. A combined tool unit which can be disassembled and reorganized into various independent tools comprising:

a hammer portion;

a tongs portion;

said hammer portion having a cylindrical shape extending in a longitudinal direction and being of a hard metallic material;

said tongs portion including a pair of members having jaws at one end thereof and hand grips at the other end thereof, the members being pivoted together and including means for holding said hammer portion between said hand grips when said jaws are closed together; and

a cap means for holding said jaws together in a closed position, whereby said cap means maintains said hand grips of said tongs portion such that the hammer portion and tongs portion are held together as a tool unit.

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**4,741,060**

## ARTICULATED WRENCH

Jack H. Hose, 4968 Ferro St., Long Beach, Calif. 90815

Filed Apr. 24, 1986, Ser. No. 855,491
Int. Cl.[4] B25F *1/00*
U.S. Cl. 7—138 4 Claims

1. An articulated wrench comprising:

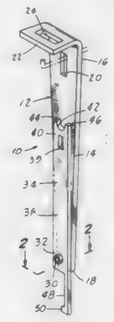
a solid, unitary, elongated leg member having an inner end and an outer end formed flat throughout its length and having its width gradually increasing to about 2¼ inches at said outer end, said outer end having a flange attached thereto with a slot about 1¾ inches long and about ⅝ inch wide in said flange;

a solid, unitary, elongated arm member formed flat throughout its length and having a hook integrally formed at its inner end in the same plane as said arm member and having its outer end formed integrally into a pair of spaced prongs in the same plane as said arm member, said arm

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member adapted to be superimposed on said leg member by means pivotally connecting the inner end of said leg



member with said inner end of said arm member between opened and closed positions of use.

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**4,741,061**

**METHOD FOR WASHING MATERIAL WOUND ON A PERFORATED BEAM**

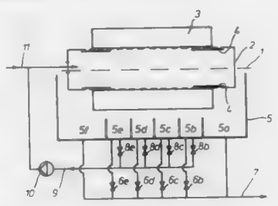
**Manfred Schuierer, Michelstadt, Fed. Rep. of Germany, assignor to Bruckner Apparatebau GmbH, Erbach, Fed. Rep. of Germany**

**Filed Jan. 9, 1987, Ser. No. 2,272**

**Claims priority, application Fed. Rep. of Germany, Jan. 10, 1986, 3600557**

**Int. Cl.⁴ D06B** *5/18*

**U.S. Cl. 8—155.1** **1 Claim**



1. Method of washing material wound on a perforated beam (2), in which

(a) the material is wound on the beam (2) and the perforations in the beam are sealed in the region of the two end edges of the roll of material (3) to prevent the escape of washing fluid,

(b) and washing fluid is forced outwards from inside through the roll (3),

characterised in that

(c) from the time at which a specific degree of cleanness has been reached in the central region of the roll length until the end of the washing process the proportion of the washing fluid coming out of the central region of the roll length is returned directly to the beam (2) and only the remaining proportion of the washing fluid is replaced by fresh washing fluid.

**4,741,062**

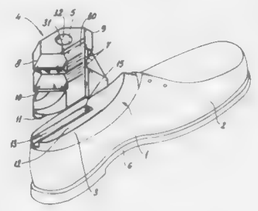
**LAST FOR AUTOMATED SHOE MANUFACTURE**

**Roger Blanc, Route de Virieu, Le Pin, 38730 Virieu sur Bourbre, and Jean Kessler, La Joncere, 38137 Paladru, both of France**

**Filed Oct. 10, 1986, Ser. No. 918,000**

**Int. Cl.⁴ A43D** *3/00, 25/00*

**U.S. Cl. 12—133 R** **6 Claims**



1. In combination:

a last having

an insert shaped to fit within a shoe during its manufacture,

a stem projecting along an axis from the insert and formed with

radially oppositely projecting front and rear protrusions,

a radially open seat, and

a radially directed flat,

machine-readable indicia carried on the flat, and means releasably fixing the stem to the insert;

a rack having a formation complementarily engageable with the seat for holding and positioning the last and a shoe carried on the insert thereof in a predetermined position relative to the rack; and

a robot arm provide with

a gripper having front and rear jaws formed with respective recesses complementarily engageable with the protrusions and

means on the arm juxtaposable with the indicia on the flat of a last held by the gripper for reading such indicia.

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**4,741,063**

**SUSPENSION BRIDGE STRUCTURE WITH FLUTTER DAMPING MEANS**

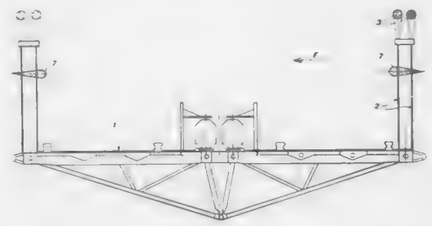
**Giorgio Diana, Milan, Italy, assignor to Stretto di Messina, S.P.A., Rome, Italy**

**Filed Feb. 2, 1987, Ser. No. 9,896**

**Claims priority, application Italy, Feb. 5, 1986, 19302 A/86**

**Int. Cl.⁴ E01D** *11/00*

**U.S. Cl. 14—18** **12 Claims**



1. Suspension bridge structure comprising a suspension bridge having a horizontally oriented, substantially flat main structure that terminates in lateral edges, said suspension bridge having a flutter speed below the top speed of the wind expected in the bridge area, and at least one wing for generating a vertically oriented force when exposed to a side wind moving substantially parallel to said flat main structure, the flutter speed proper to said wing being considerably higher that the flutter speed proper to the bridge structure, and said bridge structure and said wing being rigidly interconnected in order to shift the flutter speed of the suspension bridge structure at least above the top speed of the wind expected in the bridge area.



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**4,741,064**

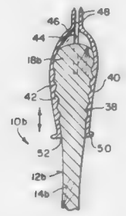
**COMBINATION PAINT BRUSH/PAINT CAN OPENER/SCRAPER**

**William J. Riegert, 54 Lake Shore Dr., Lake Ronkonkoma, N.Y. 11779, and George Spector, 233 Broadway, Rm. 3815, New York, N.Y. 10007**

**Filed Jul. 31, 1986, Ser. No. 891,137**

**Int. Cl.⁴ A47L** *13/02, 13/12*

**U.S. Cl. 15—111** **2 Claims**



1. A combination paint brush, paint can opener and scraper tool comprising:

(a) a paint brush having a handle being thicker at extreme end thereof with a plurality of notches thereon; and

(b) a retractable metal sheath which fits over said handle, said sheath having a plurality of internal ridges to contact said notches, an elongated slit at closed end thereof, a pair of blades spaced apart between said slit and extending therefrom and a flange around open end thereof so that said sheath above said flange can be gripped, moved up and down said handle for adjusting said blades between said slit for engaging and removing different thicknesses of paint can lids and removing loose paint from hard to get places.

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**4,741,065**

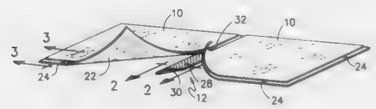
**INTERLOCKING DUST CONTROL MATS**

**John H. Parkins, LaGrange, Ga., assignor to Milliken Research Corporation, Spartanburg, S.C.**

**Filed Mar. 9, 1987, Ser. No. 23,768**

**Int. Cl.⁴ B32B** *3/10*

**U.S. Cl. 15—217** **5 Claims**



1. A large dust control mat having a plurality of interconnected smaller dust control mats comprising: a first dust control mat having a predetermined pattern of cleats on the bottom thereof, a second dust control mat having a predetermined pattern of cleats on the bottom thereof, a connecting strip under said first and said second dust control mats having cleats on the upper surface thereof mating with the cleats on the bottom of said first and second dust control mats, said first and second dust control mats being closely adjacent one another.

**4,741,066**

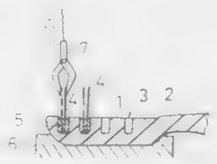
**BRUSH**

**Ryu Ito; Akiyoshi Umebara, both of Chiba, and Tsuneo Umezawa, Tokyo, all of Japan, assignors to Lion Corporation, Japan**

**Filed Aug. 6, 1986, Ser. No. 894,307**

**Int. Cl.⁴ A46B** *3/16*

**U.S. Cl. 15—195** **6 Claims**



1. A brush, comprising a handle portion, a base portion formed with recesses for holding filaments or bristles, holding means for holding filaments or bristles in said recesses, and filaments or bristles held in said recesses by said holding means, said base portions being formed of a synthetic resin which permits said holding means to be pressed into the sides of the recesses without cracking or deformation of the base portion, wherein said base portion is formed of a composition consisting of 30–90% by weight of polycarbonate and 70–10% by weight of polyethylene terephthalate.

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**4,741,067**

**HEIGHT-ADJUSTABLE WINDSHIELD WIPER**

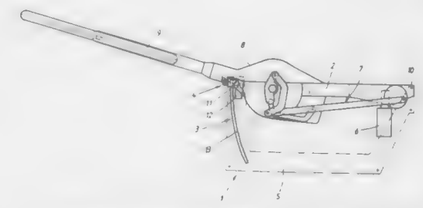
**Arno Jambor, Vaihingen/Enz; Gunther Ellenrieder, Esslingen, and Hans J. Ostertag, Sindelfingen, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany**

**Filed Nov. 21, 1986, Ser. No. 933,396**

**Claims priority, application Fed. Rep. of Germany, Nov. 21, 1985, 3541206**

**Int. Cl.⁴ B60S** *1/24*

**U.S. Cl. 15—250.16** **13 Claims**

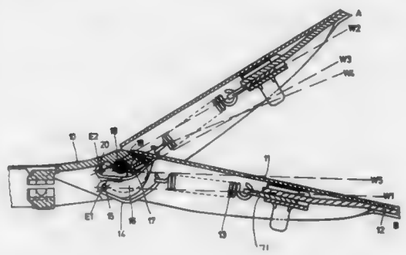


1. A windshield wiper installation for vehicles, with wiper means driven by a wiper motor by way of wiper gear means, and in which the wiper means are operable to be lowered after deenergization of the wiper motor by an additional movement from an operating position in a wiper field in front of a windshield into a rest position behind an engine hood, comprising support arm means for supporting thereon the wiper motor, the wiper gear means and the wiper arm means, said support arm means being adjustable in height at least along one toothed rack guidance means by way of a pinion driven by an adjusting motor, wherein the support arm means is pivotally supported at one end thereof fixed at the vehicle and is guided at its other end along an arc of a toothed rack means.

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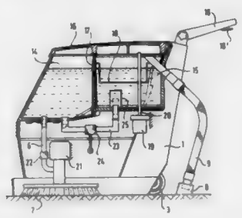
**4,741,068**
## WINDSHIELD WIPER ARM
**Christian Roth, Bietigheim-Bissingen, Fed. Rep. of Germany, assignor to SWF Auto-Electric GmbH, Bietigheim-Bissingen, Fed. Rep. of Germany**
**Filed Jun. 13, 1986, Ser. No. 873,798**
**Claims priority, application Fed. Rep. of Germany, Jun. 15, 1985, 3521527**
**Int. Cl.⁴ B60S** *1/34*
**U.S. Cl. 15—250.19** **7 Claims**



1. A windshield wiper arm comprising:
a fastening member coupleable to a windshield wiper means;
a link swivellably mounted on said fastening member by means of an articulated axle and serving as a guide for a wiper blade;
a spring element coupled at one end to said link and coupled at its other end to a holding pin, said holding pin guided on said fastening member by a rotatable rocker member, said spring element acting upon said link such that when said link is in an operating position said holding pin guided on said rocker member is in a first position wherein the action line of said spring element lies on one side of said articulated axle so that said spring element stresses said link towards the window pane to be cleaned·
said rocker arm being sufficiently rotatable to enable said holding pin guided on said rocker arm to change from said first position to a second position when said link is moved from said operating position to a tilted position, said changing of said holding pin from said first position to said second position causing the action line of said spring element to be on the other side of said articulated axle so that said spring element stresses said link away from said window pane.

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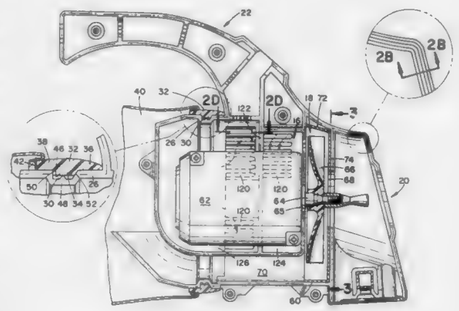
**4,741,069**
## MOBILE WET CLEANING MACHINE
**Kurt Helm, Plaggen 14, 2061 Nahe, and Dieter Thiel, Helgolandstr. 21, 2400 Luebeck, both of Fed. Rep. of Germany**
**Filed Nov. 14, 1986, Ser. No. 931,335**
**Claims priority, application Fed. Rep. of Germany, Nov. 16, 1985, 3540783**
**Int. Cl.⁴ A47L** *11/283, 11/30*
**U.S. Cl. 15—320** **19 Claims**



1. A mobile wet cleaning machine including at least one drivable cleaning tool for cleaning floor surfaces, comprising:
fluid storage means defining first and second fluid storage compartments for storing cleaning fluid;
means coupled to said first fluid storage compartment for passing fluid from said first fluid storage compartment into the action area of said cleaning tool for a floor surface to be cleaned;
transfer means having a fluid inlet located adjacent to the floor surface and a fluid outlet communicating with said second fluid storage compartment, said transfer means removing used cleaning fluid from the floor surface and introducing it into said second fluid storage compartment for storage therein;
means defining a fluid passageway between said second fluid storage compartment and said first fluid storage compartment to permit used fluid to flow from said second fluid storage compartment through said first fluid storage compartment to said cleaning tool solely under the force of gravity;
said means defining a fluid passageway including a generally U-shaped conduit having a fluid inlet connected to a fluid outlet of said second fluid storage compartment and having a fluid outlet connected to a fluid inlet of said first fluid storage compartment;
said second fluid storage compartment including filter means for filtering used cleaning fluid introduced thereinto by said transfer means prior to the passing of the used fluid to said passageway defining means.

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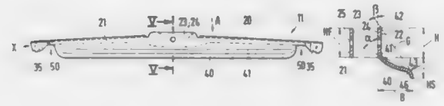
**4,741,070**
## HAND VACUUM CLEANER
**John F. Sovis, Coldwater, Mich.; Robert M. Smith, Copley, Ohio, and George H. Bramhall, Boulder, Colo., assignors to Royal Appliance Manufacturing Co., Cleveland, Ohio**
**Continuation of Ser. No. 670,553, Nov. 9, 1984, Pat. No. 4,633,543. This application Jan. 5, 1987, Ser. No. 451**
**Int. Cl.⁴ A47L** *5/24*
**U.S. Cl. 15—344** **1 Claim**



1. A hand held vacuum cleaner including a housing comprising mating first and second half housing elements, said housing having a handle and a nozzle, a selectively separable bag assembly and a working air channel for communicating working air from said nozzle to said bag assembly;
said housing including a tapered air deflector substantially received in said bag assembly having a terminal end portion tapering radially inwardly past said working air channel from a housing outer wall and a bag assembly outer wall, said terminal end portion further extending laterally into the bag assembly to provide an unobstructed working air deflection whereby the deflector directs the working air to facilitate greater storage of vacuumed dirt and prevents heavy objects received in the bag from rolling back into the housing.



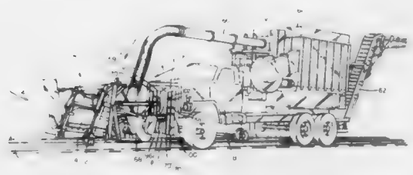
**4,741,071**
## WIPER BLADE
**Kurt Bauer, Bietigheim-Bissingen; Helmut Markert, Lochgau; Hans Prohaska, Bietigheim-Bissingen, and Eckhardt Schmid, Brackenheim, all of Fed. Rep. of Germany, assignors to SWF Auto-Electric GmbH, Bietigheim-Bissingen, Fed. Rep. of Germany**
**Filed Sep. 12, 1986, Ser. No. 906,793**
**Claims priority, application Fed. Rep. of Germany, Sep. 12, 1985, 3532536**
**Int. Cl.⁴ B60S** *1/38*
**U.S. Cl. 15—250.42** **24 Claims**



1. A wiper blade assembly including a supporting yoke system for guiding a wiper element, said assembly comprising:
a connecting element to a wiper arm;
a main yoke articulated to said connecting element;
intermediate yokes articulated onto the ends of said main yoke;
said main yoke having a substantially U-shaped cross-section with a web connecting a pair of side walls forming parallel guide surfaces for said connecting element;
a spoiler extending from the edge adjacent to said wiper element of one side wall of said side walls at a predetermined angle of inclination and said spoiler having a free rim;
the width of said spoiler, the height of said one side wall and said angle of inclination being selected such that the effective angle of the air stream from an imaginary line connecting an upper edge of said one side wall with said free rim of said spoiler lies in the range between 30 degrees and 60 degrees.

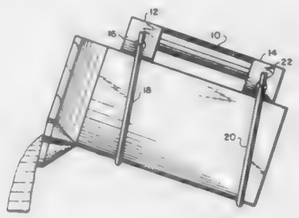
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**4,741,072**
## RAILROAD TRACK CLEANER
**Kenneth R. Wilkerson, 487 Huron, Irvington, Ill. 62848**
**Filed Feb. 17, 1987, Ser. No. 15,796**
**Int. Cl.⁴ E01H** *8/10*
**U.S. Cl. 15—312 R** **18 Claims**



1. A railroad track cleaner consisting essentially of a frame, a pair of front and a pair of rear flanged rail-engageable wheels supporting said frame for rendering same traversable along the track being cleaned, a housing mounted on said frame and having a front wall, a top wall, parallel side walls, and a rear wall and being open at the lower end thereof for defining a downwardly open chamber, a rotary broom assembly mounted in said chamber for sweeping track debris, a debris feed conveyor provided in said housing rearwardly of said broom assembly, said feed conveyor comprising first and second components with an intervening spacing therebetween, said housing having a debris outlet opening located in the top wall of said housing above said intervening spacing, and an air inlet port provided in said top wall forwardly of said debris outlet opening.

**4,741,073**
## COLLAPSIBLE HANDLE FOR CARTON
**Thomas F. Capen, 6 Butler St., Cos Cob, Conn. 06807**
**Filed Dec. 16, 1986, Ser. No. 942,363**
**Int. Cl.⁴ E05B** *1/00*
**U.S. Cl. 16—114 R** **7 Claims**



1. A detachable handle for a weighted carton comprising two spaced end blocks, each having a hole therethrough, a hand gripping part intermediate said end blocks and connected thereto whereby a recess is formed in space bounded by said hand gripping part and said spaced end blocks, a pair of band elements, each having their free end parts passing through the respective hole in one of said end blocks and provided with means for holding each of said band elements in their respective hole whereby said bands are freely pivotal in said hole so that when the bands are placed over said carton in an extended position at spaced locations thereon and the carton lifted by said handle, said bands move to a position to frictionally grip said carton, said bands being capable of being collapsed to a superposed position in said recess, and said bands being generally of fixed dimensions such that when said bands are in a superposed position in said recess a part of each of said bands remote from the end block through which said band passes will always be frictionally engaged by a surface of the other end block when collapsed in said recess.

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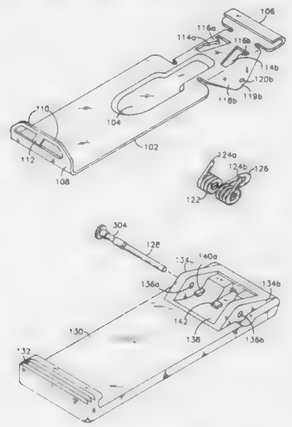
**4,741,074**
## DETACHABLE BELT CLIP SUITABLE FOR AUTOMATED ASSEMBLY
**Joseph A. Budano, II, Plantation, and Anthony M. Potts, Lauderdale Lakes, both of Fla., assignors to Motorola, Inc., Schaumburg, Ill.**
**Filed Jan. 7, 1987, Ser. No. 1,078**
**Int. Cl.⁴ A45F** *5/02*
**U.S. Cl. 24—3 J** **6 Claims**

1. A belt clip assembly attachable to a portable radio receiver and suitable for automated manufacture, said assembly comprising in combination:
a base plate including means to hold a spring in one of two positions, specifically no-load and pre-load positions;
a clip;
means for moveably attaching said clip to said base plate; and
a spring for forcing said clip towards said base plate when said spring is held in said pre-load position;

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whereby, to attach said clip to said base plate, said spring is positioned in said no-load position during and throughout



attachment, the said spring is moved to said pre-load position after attachment.

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**4,741,075**
**COMPOSITE SHEET AND METHOD OF PRODUCING SAME**
**Setsuo Taguchi; Hiroki Fukunaga, both of Otsu, and Mineto Fushida, Moriyama, all of Japan, assignors to Toray Industries, Inc., Tokyo, Japan**
**Filed Jul. 15, 1985, Ser. No. 755,072**
**Claims priority, application Japan, Jul. 23, 1984, 59-151337; Jul. 25, 1984, 59-153108; Oct. 18, 1984, 59-219098**
**Int. Cl.[4] D04H *1/46***
**U.S. Cl. 28—104** **8 Claims**



1. A method for producing a composite sheet comprising the steps of (a) adhering a multiplicity of fibers to a binder to form a sheet and (b) directing a fluid jet stream against and into said sheet to break up the binder.

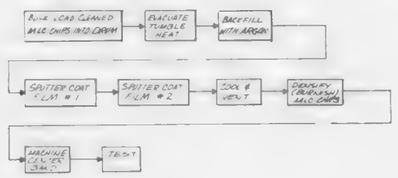
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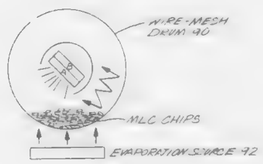
**4,741,076**
**METHOD OF MAKING A HIGH STABILITY QUARTZ CRYSTAL OSCILLATOR**
**John R. Vig, Colts Neck, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**
**Filed Apr. 18, 1983, Ser. No. 486,125**
**Int. Cl.[4] H01L *41/22***
**U.S. Cl. 29—25.35** **10 Claims**

1. Method of making a high stability quartz crystal oscillator from a quartz crystal plate, said method including the steps of
(A) cutting the quartz crystal plate at the angles that result in a resonator having a turnover temperature below the lowest operating temperature of the equipment in which the oscillator is to be used,
(B) fabricating a resonator from the cut quartz crystal plate,
(C) connecting the resonator into a high stability oscillator circuit, and
(D) placing the oscillator-circuit/resonator combination into a temperature controlled environment wherein the temperature is maintained at below the lowest operating temperature of the equipment in which the oscillator is to be used.

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**4,741,077**
**END TERMINATIONS FOR CAPACITORS**
**Mark Langlois, Oro Valley, Ariz., assignor to SFE Technologies, San Fernando, Calif.**
**Filed May 15, 1987, Ser. No. 50,883**
**Int. Cl.[4] H01G *4/12, 4/30***
**U.S. Cl. 29—25.42** **11 Claims**

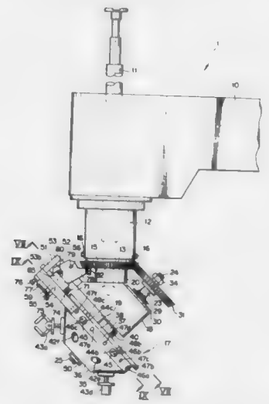



1. A process for providing end terminations on a multilayer capacitor chip containing first and second sets of conductive layers and alternating dielectric layers, with each of the layers of the first set having an edge exposed at one end of the chip to enable connection to one of the end terminations to define an electrode, and with each of the layers of the second set having an edge exposed at the opposite end of the chip to enable connection to another of the end terminations to define another electrode, the process comprising the steps of:
(1) sequentially forming a plurality of sputter-coated metallization films so that each such film covers the opposite ends of the chip and extends between the opposite ends, and so that the first such formed film is in direct contact with each of the edges of the conductive layers contained in the chip; and
(2) removing the metallization films from the chip intermediate its ends sufficiently to eliminate every direct-current conductive path around the outside of the chip from one end to the other, leaving the metallization films on and surrounding each end thereof for electrical connection of the resulting capacitor to external electrical circuitry.



**4,741,078**
**MULTI-FUNCTION INDUSTRIAL ROBOT**
**Akira Kimura, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan**
**Filed Oct. 16, 1985, Ser. No. 788,135**
**Claims priority, application Japan, Oct. 19, 1984, 59-219491**
**Int. Cl.[4] B25J *15/05***
**U.S. Cl. 29—39** **12 Claims**

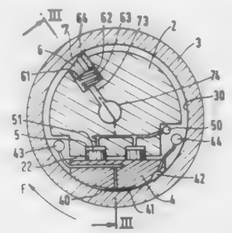


1. An industrial robot for use with at least two tools, comprising:
a frame;
arm means pivotally supported at one end on said frame;
a spindle rotatably supported and arranged for vertical movement at an end of said arm means opposite said frame, said spindle arranged to extend vertically relative to said arm;
a turret base element fixed to one end of said spindle and rotatable with said spindle about a first axis;
a turret shaft rotatably supported by said turret base element;
a turret head fixed at one end of said turret shaft, having the tools mounted thereon, and being rotatable with said turret shaft about a second axis angularly arranged relative to said first axis; and
coupling means for selectively transmitting rotational motion of said spindle, about said first axis to said turret shaft about said second axis in a coupled state, whereby said turret head is rotated to select one of said at least two tools, and for disconnecting rotary motion about the first axis from rotary motion about the second axis.

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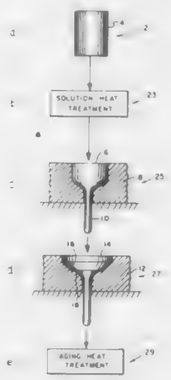
**4,741,079**
**ROLL WITH A ROTATING SHELL**
**André Quehen, Pontoise, France, assignor to Clecim, Courbevoie, France**
**Filed Nov. 24, 1986, Ser. No. 934,040**
**Claims priority, application France, Nov. 22, 1985, 85 17337**
**Int. Cl.[4] B21B *13/02***
**U.S. Cl. 29—116 R** **13 Claims**

1. Roll with a rotating shell comprising:
(a) a stationary shaft (2) in the form of an elongate beam whose ends rest on a supporting stand (1),
(b) a rotating shell consisting of a cylindrical shell (3) surrounding the stationary shaft (2) and resting on the latter by means of two centering bearings (21) placed at both ends of the shell (3) and aligned along an axis of rotation (20);
(c) a line of supporting shoes (4) with a fluid bearing, which are arranged along the shaft (2), each supporting shoe (4) resting on said shaft by means of at least one individual thrust jack (5) and having on the side adjoining the inner face (30) of the shell (3) a cylindrical bearing face (40);
(d) means for injecting a lubricating fluid under pressure between said bearing face (40) and said inner face (30) of the shell, said fluid escaping at a certain leakage rate; and
(e) at least one device (6) for recovery of at least a part of the lubricating fluid escaping from the supporting shoes (4), said device (6) consisting of at least one shoe forming a hydrodynamic bearing, placed downstream, in the direction of rotation of the shell, of the line of supporting shoes (4), and applied against the inner face (30) of the shell (3), said at least one shoe having an end facing the inner face of the shell (3) and forming with the latter a recovery zone (70) which is open in the reverse direction to the rotation of the shell and a circuit (8) connected to said zone (70) for removal and recycling of the recovered fluid.



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**4,741,080**
**PROCESS FOR PROVIDING VALVE MEMBERS HAVING VARIED MICROSTRUCTURE**
**Jay M. Larson, Marshall, Mich.; Emory Z. Pankas, Riverdale; Charles E. Pennock, Kearney, both of Nebr.; Stephen B. Caird, Belmond; Michael A. Allibone, Garner, both of Iowa; John D. Dingell, III, Marshall, Mich., and Antonio Gutierrez, Belmond, Iowa, assignors to Eaton Corporation, Cleveland, Ohio**
**Filed Feb. 20, 1987, Ser. No. 17,293**
**Int. Cl.[4] B21K *1/24***
**U.S. Cl. 29—156.7 R** **9 Claims**




1. A process for providing an engine valve from an iron or nickel based metallic valve composition having a microstructure responsive to solution heat treating, said valve of the type having a generally cylindrical head portion and a fillet portion tapering concavely inwardly from the head portion to a generally cylindrical stem portion with the head portion having a combustion face and a seat face disposed peripherally about the head portion such that the head portion is provided with a central region beneath the combustion face having a generally uniformly distributed A.S.T.M. grain size of from about 1 to about 7 for optimum high temperature creep and fatigue char-

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acteristics, the seat face is worked to provide moderate to high temperature wear resistance, and the stem portion has a generally uniformly distributed fine A.S.T.M. grain size of less than about 8 for optimum low temperature fatigue, impact and wear characteristics, and said process including the steps of:

(a) providing a generally cylindrical slug made from the composition having an initial fine A.S.T.M. grain size of less than about 8 distributed substantially uniformly throughout;

(b) solution heat treating the slug of step (a) at a temperature of from about 1900° F. to about 2300° F. for a time sufficient to provide a coarse grain size distributed substantially uniformly throughout that is larger than the initial grain size; and

(c) forging the slug of step (b) such that the central head portion region substantially retains the coarse grain size of step (b) whilst the seat face is worked to provide the moderate to high temperature wear resistance and the stem portion is extruded such that the grain size is recrystallized and altered to the fine grain size of less than A.S.T.M. 7 distributed substantially uniformly throughout.

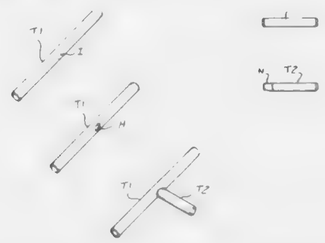
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**4,741,081**

## METHOD AND APPARATUS FOR MAKING T-TUBE FITTINGS

**Robert J. Redman, Indian River, Mich., assignor to Tube Fab of Afton Corporation, Afton, Mich.**

**Filed Jan. 27, 1987, Ser. No. 6,808**
**Int. Cl.[4] B21D** *53/00*
**U.S. Cl. 29—157 T** **4 Claims**



1. The method of making a T fitting from first and second lengths of tubing of like inside and outside diameters comprising the steps of

(1) forming a reduced diameter neck section at one end of said first length of tubing;

(2) drilling a hole radially through the wall of said second length of tubing intermediate its ends, said hole being of a diameter such as to receive the reduced diameter neck section of said first length of tubing with a force fit,

(3) forcing the reduced diameter neck section of said first length of tubing into said hole in said second length of tubing to seat said neck section therein with said first length of tubing projecting radially from said second length of tubing,

(4) connecting the neck portion of said first length of tubing to said second length of tubing around the periphery of said hole, and

(5) removing that portion of the neck section which projects into the interior of said second length of tubing.

4. Apparatus for assembling a T tube fitting comprising a turret mounted for rotation about a vertical axis, a plurality of like tubing clamping means mounted on said turret at uniformly spaced locations about said axis, said tube clamping means being operable to releasably clamp a first length of tubing with the longitudinal axis of the first length of tubing perpendicularly intersecting a radius from said vertical axis, means for driving said turret in step-by-step rotation about said axis to advance said clamping means sequentially to each of a plurality of work stations disposed about the periphery of said turret, means at a first of said work stations for forming a drill guiding indentation in the sidewall of a first length of tubing clamped in one of said tube clamping means, drill means at a second of said work stations for advancing a drill into a drill guiding indentation in a first length of tubing clamped in one of said tube clamping means and drilling a radial bore through the sidewall of the last mentioned first length of tubing, and means at a third of said work stations for longitudinally advancing a second length of tubing axially along a path coaxial with the radial bore in a first length of tubing clamped in one of said clamping means until one end of said second length of tubing is seated in a force fitted engagement in said radial bore.

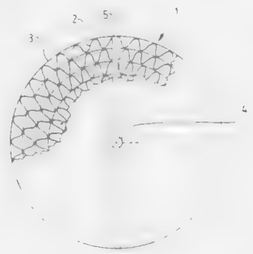
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**4,741,082**

## METHOD FOR MANUFACTURING AND REINFORCING A CATALYTIC UNIT INTENDED FOR PURIFYING EXHAUST GASES

**Kauko Kanniainen, and Veikko Loukeinen, both of Vihtavuori, Finland, assignors to Kemira Oy, Helsinki, Finland**

**Filed Apr. 24, 1987, Ser. No. 42,310**
**Claims priority, application Finland, Apr. 29, 1986, 861801**
**Int. Cl.[4] B21D** *53/00*
**U.S. Cl. 29—157 R** **6 Claims**



1. A method for making and reinforcing a catalytic unit used for the purification of exhaust gases by forming a helical catalytic unit from a corrugated foil band and a straight foil band said method comprising the steps of: coating the corrugated and the straight foil bands with both a support-material layer and a catalyst layer, placing said bands one on top of the other, securing the bands to a central shaft, around which the catalytic unit of a desired size if formed, and securing rigid end supports to the ends of the shaft in such a way that they press about 1–3 mm into the inside of the catalytic unit thereby preventing movement of the foil bands in relation to each other.

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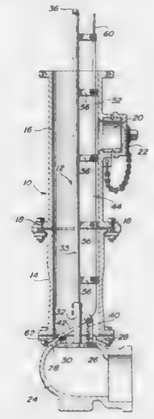
**4,741,083**

## TOOL FOR UNPLUGGING FIRE HYDRANT DRAINS

**Donald E. Wolfe, 2250 Grant Ave., St. Albans, W. Va. 25177**

**Filed Jan. 9, 1987, Ser. No. 1,760**
**Int. Cl.[4] B23P** *19/04*
**U.S. Cl. 29—213.1 R** **5 Claims**

1. A tool for unplugging fire hydrant drain holes from within a hydrant comprising a disc-like base plate shaped to fit on a hydrant valve seat in place of a hydrant valve plate which has been removed, an elongate stem and handle extending from the base plate for manipulating the base plate and positioning same on the valve seat, a drill bit attached to one end of a flexible drill bit drive wire, support means on the base plate for rotatably receiving a lower end portion of the drive wire including the drill bit, the support means being configured and related to the base plate for positioning the drill bit so as to align with the hydrant drain hole when the base plate is seated as aforesaid and suitably aligned circumferentially of the hydrant, and guide means for the drive wire extending upwardly in generally coextensive relation to the stem and handle so that an upper end of the drive wire can be rotated from the top of the



tool to cause the drill bit to penetrate into and drill out the drain hole.

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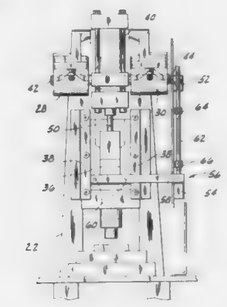


**4,741,084**

## CONVERSION OF MECHANICAL PUNCH PRESSES TO HYDRAULIC PUNCH PRESSES

**Leroy B. Ronk, Nokomis, Ill., assignor to Ronk Electrical Industries, Inc., Nokomis, Ill.**

**Filed Aug. 12, 1986, Ser. No. 896,519**
**Int. Cl.[4] B21K** *21/16;* **B23D** *17/04*
**U.S. Cl. 29—401.1** **3 Claims**



1. A method of converting a mechanically operated punch press to a hydraulically operated punch press, the mechanical punch press being of the type having a motor-driven flywheel coupled with a clutch to a crank journaled between two bearing seats, the method comprising the steps of:

disconnecting the flywheel;

replacing the crank with a hydraulic ram having trunnions projecting laterally therefrom, the trunnions sized and positioned to be journaled in the same bearing seats in which the crank was journaled; and,

connecting the hydraulic ram to a source of hydraulic fluid.

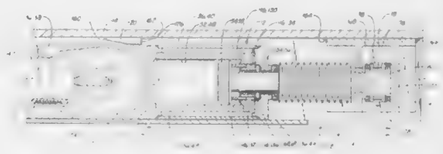
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**4,741,085**

## REPAIR OF RAILWAY CUSHIONING APPARATUS

**Charles T. Bomgardner, Burleson, Tex., assignor to Halliburton Company, Duncan, Okla.**

**Filed Sep. 25, 1986, Ser. No. 912,888**
**Int. Cl.[4] B23P** *6/00*
**U.S. Cl. 29—402.08** **15 Claims**



1. A method of repairing a cushioning apparatus having:

a housing including a cylinder disposed therein, said cylinder having a cylinder bore defined therein, and said housing further including a cylinder end plate closing one end of said cylinder bore;

a piston means including a piston slidably received in said cylinder bore and a shaft extending from said piston through said cylinder end plate; and

an original limit pin received in a pin bore of said cylinder end plate with an interference fit therebetween, said pin extending a first distance out of said pin bore toward said piston;

said method comprising the steps of:

(a) removing said cylinder, said cylinder end plate, and said piston means from said housing; and

(b) providing a relocated limit pin received in said pin bore and extending a second distance out of said pin bore toward said piston, said second distance being different from said first distance, and said second distance being sufficient to initially limit axially outward movement of said piston means within said cylinder upon reassembly of said cushioning apparatus to a position of said piston means short of a fully extended position thereof.

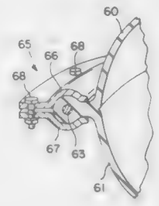
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**4,741,086**

## PNEUMATIC LIFT JACK

**Roy L. Orndorff, Jr., Kent, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio**

**Division of Ser. No. 770,460, Aug. 29, 1985, which is a continuation-in-part of Ser. No. 714,766, Mar. 22, 1985, abandoned. This application Feb. 6, 1987, Ser. No. 11,573**
**Int. Cl.[4] B23P** *17/00*
**U.S. Cl. 29—423** **9 Claims**



7. A method of making a pneumatic jack comprising the steps of laying a bead on the peripheral edge of a first sheet of an elastomer, locating a thin separator layer on said sheet of said elastomer and having the peripheral edge of said separator spaced radially inwardly from said bead, placing a second sheet of an elastomer onto said first sheet of elastomer and said separator layer to form a composite and with said bead forming a bulge and a peripheral edge, connecting a valve to said sheets of elastomer to communicate with said separator, heating said composite to vulcanize said composite with said pair of elasto-

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meric sheets adhered integrally to each other along their peripheral edge with said separator preventing adherence of oppositely disposed adjacent portions of said sheets of elastomers to each other that were separated by said separator layer as said separator layer disintegrates into a thin film of powder, and placing a clamp onto said peripheral edge of said bead of said vulcanized composite to firmly engage said peripherally extending elastomeric covered bead.

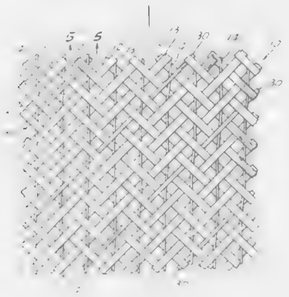
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**4,741,087**

## METHOD OF MAKING PRE-EXPANDED BRAIDED SLEEVING

**Walter A. Plummer, Jr., 3546 Crownridge Dr., Sherman Oaks, Calif. 91403**

**Division of Ser. No. 532,707, Sep. 16, 1983, abandoned. This application Jan. 13, 1986, Ser. No. 817,868**
**Int. Cl.[4] D03D** *3/02*
**U.S. Cl. 29—446** **8 Claims**



1. An improved method of processing expandable-contractable braided sleeving which comprises:

spirally interweaving multiple strands of flexible filaments into a tubular sleeve with at least one filament of resilient heat reactive material extending lengthwise of said sleeving and entrapped between at least some of said spirally interwoven strands; and

heating said sleeving containing said filament of heat reactive material to a sufficient temperature to contract said sleeving axially thereof and to expand said sleeving girthwise and to retain said sleeving axially contracted and girthwise expanded, until said sleeving is placed in tension.

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**4,741,088**

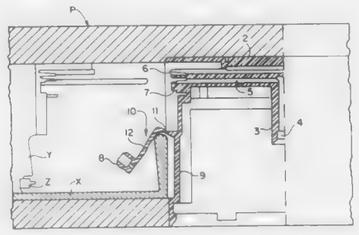
## METHOD OF MAKING A DELIVERY HEAD FOR CONTAINERS OF SUBSTANCES TO BE NEBULIZED HAVING A BREAK-UP PLASTIC INSERT INTEGRALLY FORMED WITH THE HEAD

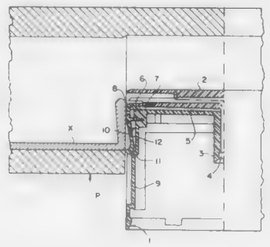
**Luca Ramella, Milan, Italy, assignor to Somova S.p.A., Buccinasco, Italy**

**Division of Ser. No. 765,388, Aug. 13, 1985, abandoned. This application Jul. 20, 1987, Ser. No. 75,517**
**Claims priority, application Italy, Mar. 21, 1985, 2000 A/85**
**Int. Cl.[4] B23P** *11/02*
**U.S. Cl. 29—450** **3 Claims**

1. A method of molding and assembling a delivery head, the head comprising an inverted cup-shaped cap having a central downward discharge conduit and connected lateral conduit under the top wall of the cap, the conduit terminating outwardly in a delivery outlet in the sidewall of the cap, and an insert having a central orifice and being adapted to fit in mating relation with the outlet, the shape of the outlet and the shape of the insert between them defining a breakup chamber, the insert being connected to the side wall of the cap at a point under the outlet by an attachment strip, the strip, the cap, and the insert being integrally molded, said method comprising the steps of:

(a) molding the head in a mold in which the side of the cap on which the insert is disposed is formed by a laterally moving mold die, and a movable mold fence is disposed between the said mold die and the cap, the fence and the said mold die forming between them the attachment strip and the insert, the latter being molded in disposition extending downward from the point with the insert at its lower end,





(b) opening the mold after molding,

(c) slightly retracting the mold fence back a short distance away from the cap after molding,

(d) stripping the head out of the mold in a downward direction so that the attachment strip engages the top of the fence and pivots about the point as the head is moved downward, the insert at the end of the pivoting being pressed by the fence into frictional engagement with the delivery outlet to complete the assembly.

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**4,741,089**

## METHOD OF PRODUCING CONTAMINANT RESTRAINING BOOMS AND THE LIKE

**Per O. Öberg, P.O. Box 898, S-914 00 Nordmaling, Sweden**

**Filed Jun. 27, 1986, Ser. No. 879,647**
**Claims priority, application Sweden, Jul. 12, 1985, 8503465**
**Int. Cl.[4] E04C** *3/30*
**U.S. Cl. 29—463** **7 Claims**

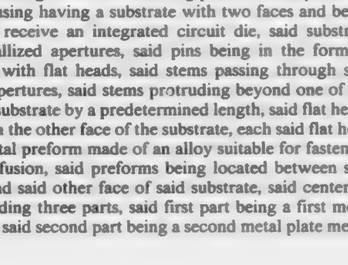
1. Method of producing a contaminant-restraining boom, comprising an expandable buoyant body, such boom being formed by joined side members and being divided by partition walls into chambers distributed along the boom, comprising the steps:

providing side members each with respective partition members, namely by attaching an edge of a given said partition member to extend transverse to a respective said side member, the attached edge of the partition member having a length substantially the same as the width of the respective side member;

at a given distance (L) from the attached edge of a respective partition member, applying to a given side member a part of an expander means for opposition to and coaction with a corresponding expander means part similarly applied to a corresponding place on an opposing side member, each expander means part being spring biased toward an erected state and locked in a collapsed state by removable catch members, the catch member being connected to each other by a cordlike member;

opposing the side members and thereby placing in opposed register the partition members on the opposed side members;

joining together the opposed partition members along free edges thereof, and thereby causing each pair of opposed



partition members to form a partition wall to separate two chambers in the boom and to hold the side members in opposed register;

bringing into coaction opposed parts of the expander means; and

leading part of the cordlike member out sideways from between the side members at a place along their opposed side edges and therewith forming a vent for a respective chamber in the boom; and

tightly joining the side members along their longitudinal outer edges while joining thereto outer portions of the partition members.

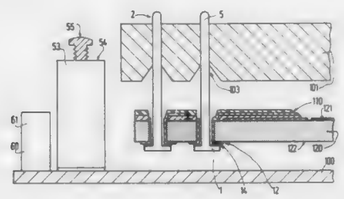
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**4,741,090**

## CENTERING DEVICE FOR INSERTING PINS IN A MULTIPIN HOUSING

**Michel J. C. Monnier, Montgeron, France, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Dec. 3, 1986, Ser. No. 937,640**
**Claims priority, application France, Dec. 13, 1985, 85 18471**
**Int. Cl.[4] B23Q** *3/06*
**U.S. Cl. 29—464** **7 Claims**



1. In a centering device for inserting pins in a multipin housing, said housing having a substrate with two faces and being designed to receive an integrated circuit die, said substrate having metallized apertures, said pins being in the form of stems fitted with flat heads, said stems passing through said metallized apertures, said stems protruding beyond one of the faces of the substrate by a predetermined length, said flat heads bearing upon the other face of the substrate, each said flat head having a metal preform made of an alloy suitable for fastening the pins by fusion, said preforms being located between said flat heads and said other face of said substrate, said centering device including three parts, said first part being a first metal plate means, said second part being a second metal plate means for calibrating the centering of said pins, said second metal plate means having apertures arranged according to a geometrical pattern in compliance with the pattern chosen for the arrangement of the pins on the housing and being calibrated for both holding and centering the stems temporarily in the apertures of the housing, said third part being a gripping means for locking the substrate of the housing fitted with its pins on said first metal plate means so that said second metal plate means may be removed from said pins after centering the stems, said first plate means having a coefficient of expansion substantially the same as the coefficient of expansion of the housing substrate in the temperature range in which said preforms can fuse said pins to said substrate.

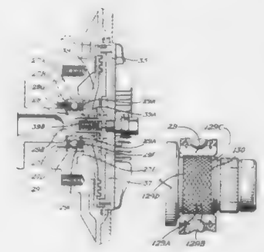
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**4,741,091**

## CLUTCH FOR A COOLING FAN OF A MOTOR VEHICLE AND METHOD OF MAKING THE SAME

**David J. Settles, Ft. Worth, Tex., assignor to Dayco Products-Eaglemotive, Inc., Fort Worth, Tex.**

**Filed Aug. 12, 1986, Ser. No. 895,976**
**Int. Cl.[4] F16D** *35/00*
**U.S. Cl. 29—525** **4 Claims**



1. In a method of making a clutch for a cooling fan of a motor vehicle, said clutch comprising a shaft having a first end to be attached to a rotable member of the motor vehicle and having a second end defined by a cylindrically shaped knurled portion and an adjacent second portion, said knurled portion having protuberances defined by slots formed in the exterior of said shaft, said knurled portion having an outer diameter and having an inner edge adjacent said second portion and an outer edge adjacent said first end, a bearing means having an inner race member press-fitted onto said knurled portion, a housing comprising a body member and a plate member secured together to form an enclosed chamber for holding a viscous fluid, said housing having means for mounting a fan, said body member having a central opening defined by structural means, said bearing means being disposed in said central opening of said body member and engaging said structural means such that said bearing means supports said body member and hence said housing for rotation, and a drive plate having a central opening defined by inner structure press-fitted onto said second portion of said shaft, the improvement comprising the step of forming said shaft before using said shaft to form said clutch with a solid ring shaped portion between said knurled portion and said second portion and next to said inner edge of said knurled portion and with said solid ring shaped portion having an outer diameter about equal to that of said outer diameter of said knurled portion so as to have part of said inner race member of said bearing means be adapted to be press-fitted thereon whereby said solid ring shaped portion is adapted to block the flow of said viscous fluid out of said enclosed chamber by way of said slots which define said protuberances of said knurled portion, said step of forming said shaft comprising the steps of first forming said knurled portion with said proturberances so that said knurled portion has a diameter larger than said solid ring shaped portion and then burnishing said proturberances and said solid ring shaped portion to about the same diameter, and then press-fitting said bearing means on said knurled por-

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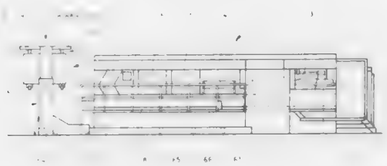
tion of said shaft so that said part of said inner race member of said bearing means remains press-fitted on said solid ring shaped portion.

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**4,741,092**
**HANDLING DEVICE FOR CHANGING TOOLS OF A CUTTING PRESS**

**Claude Labarre, Bussigny, Switzerland, assignor to Bobst SA, Switzerland**

**Filed Apr. 13, 1987, Ser. No. 37,983**
**Claims priority, application Switzerland, Apr. 14, 1986, 1481/86**
**Int. Cl.⁴ B23Q *3/157*; B30B *15/06***
**U.S. Cl. 29—568** **9 Claims**



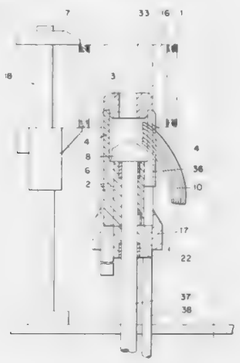
1. A handling device for exchanging tools of a cutting press having at least two units arranged in a row for acting on a blank sequentially as it moves along a side of the press, said device including a roller path extending along the press, a carrier member having a column being movable on said roller path, said column having a lifting fork movable vertically therein and means for moving the fork in said column, said fork having means for releasably coupling a tool holder carriage to said fork for movement therewith, said fork being provided with a table above the means for releasably coupling and said carrier member and said roller path having coacting means for centering the carrier member at each of the units and at a transfer station.

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**4,741,093**
**METHOD FOR INSERTING WINDINGS INTO STATOR SLOTS**

**Otto Rist, Schwanenstrasse 34, 7980 Ravensburg, Fed. Rep. of Germany**

**Continuation of Ser. No. 811,562, Jun. 30, 1977, abandoned. This application Aug. 29, 1984, Ser. No. 645,302**
**Claims priority, application Fed. Rep. of Germany, Jul. 5, 1976, 2630183**
**Int. Cl.⁴ H02K *15/06***
**U.S. Cl. 29—596** **2 Claims**



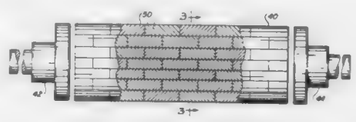
1. A method for inserting windings in slots of stator packages in electric motors by means of a draw-in tool that is movable along the stator slots and that has circularly disposed needles carried on an insertion head so that the windings arranged on the needles are inserted into the slots, the tool also having an inner shaping head movable separately from the insertion head, said method comprising:
(a) looping a winding on the insertion head to pass between pairs of adjacent needles;
(b) attaching a centering head for the insertion head to outer ends of the needles by pin and hole connection means for centering the needles relative to the stator bore;
(c) moving the centering head, shaping head, and insertion head with the winding in place on the needles together in a first direction into the stator bore at a first axial end of the stator to draw the winding into the stator slots;
(d) continuing the movement of the draw-in tool until a forward end of the winding extends outwardly of the stator bore at an opposite, second axial end of the stator;
(e) stopping the movement of the draw-in tool when the inner shaping head of the draw-in tool is adjacent the opposite end of the stator bore;
(f) reversing the movement of the insertion head and needles to move in a second direction opposite from the first direction independently of the shaping head and inwardly of the stator bore, with the centering head being detached from the needles, until the outer ends of the needles are opposite the second end of the stator; and
(g) moving the inner shaping head outwardly in said first direction toward and past the second end of the stator independently of the insertion head to bend a portion of the winding radially outwardly adjacent said second stator end.

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**4,741,094**
**TWO POLE PERMANENT MAGNET ROTOR CONSTRUCTION METHOD**

**Joseph Denk, Manhattan Beach, and Kenneth L. Wuertz, Torrance, both of Calif., assignors to The Garrett Corporation, Los Angeles, Calif.**

**Division of Ser. No. 800,183, Nov. 20, 1985, Pat. No. 4,667,123. This application Dec. 22, 1986, Ser. No. 945,105**
**Int. Cl.⁴ H02K *15/02***
**U.S. Cl. 29—598** **11 Claims**



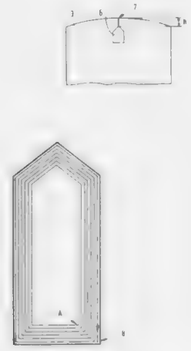
1. A method of making a two pole magnet rotor for an electrical machine, comprising the step of:
forming a cylindrical two pole permanent magnet from a plurality of small magnet blocks aligned with the same axis of magnetic polarity assembled in a solid overlaying relationship;
bonding a first end piece onto one end of said cylindrical two pole permanent magnet;
bonding a second end piece onto the other end of said cylindrical two pole permanent magnet; and
installing a thin cylindrical retaining hoop in interference fit fashion around said cylindrical two pole permanent magnet and the portions of said first and second end pieces adjacent to said cylindrical two pole permanent magnet.



**4,741,095**
**METHOD OF MANUFACTURING MAGNETIC HEAD CORES**

**Johannes P. M. Verbunt, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Apr. 23, 1986, Ser. No. 855,531**
**Claims priority, application Netherlands, Sep. 30, 1985, 8502664**
**Int. Cl.⁴ G11B *5/127***
**U.S. Cl. 29—603** **8 Claims**



1. A method of manufacturing magnetic head cores in which a plurality of magnetic head cores is cut from a pre-processed ferrite core block, said block having a surface representing the future tape contact faces of the respective head cores, said method comprising the following steps:
cutting the individual head cores from said core block,
providing a winding aperture in each magnetic head core at a distance from the future tape contact face, which distance is at least substantially equal to the desired gap height, said winding aperture being provided by means of a laser,
generating a fracture in a cross-section of the core located between the future tape contact face and the winding aperture, said fracture being generated while providing said winding aperture,
providing a non-magnetic material in liquid form between the fracture faces,
converting the non-magnetic material to solid form while maintaining the fracture faces at a predetermined distance from each other.

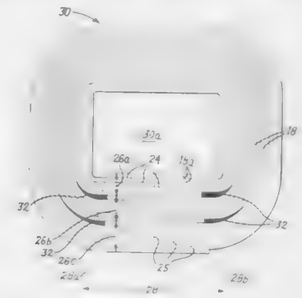
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**4,741,096**
**METHOD OF MANUFACTURING WOUND TRANSFORMER CORE**

**Albert C. Lee, Hickory, and Donald E. Ballard, Conover, both of N.C., assignors to General Electric Company, King of Prussia, Pa.**

**Filed Mar. 13, 1986, Ser. No. 839,234**
**Int. Cl.⁴ H01F *41/02, 27/24***
**U.S. Cl. 29—605** **11 Claims**

1. A method of making a transformer core comprising the steps of:
(a) winding a strip of ferromagnetic material about a first generally cylindrical mandrel having a first diameter, thereby forming a first annulus;
(b) cutting through said first annulus along a radial line, thereby forming a plurality of separate laminations;
(c) assembling said laminations in lamination groups about a second generally cylindrical mandrel having a second diameter smaller than said first diameter, each said lamination group consisting of at least one of said laminations, the first-assembled of said lamination groups being wrapped around said second mandrel adjacent the surface thereof and each successive lamination group being wrapped around the immediately preceding lamination group to form a second annulus of progressively increasing diameter;
(d) arranging said lamination groups during said assembling step so that the ends of each said lamination group overlap each other to form a lap joint therebetween and so that said ends of each said lamination group respectively substantially abut with the ends of said lamination groups immediately adjacent thereto, whereby each of said lap joints of adjacent lamination groups are angularly displaced from each other, a plurality of adjacent lamination groups constituting a lamination packet and a plurality of said lamination packets constituting said second annulus;



(e) locating said lap joints of the first said lamination packet formed during said assembling step so that successive lap joints thereof are distributed between a first and second angular positions on said second annulus defining the boundaries of a joint region, and locating said lap joints of each successive lamination packet so that successive lap joints in said lamination packets are distributed over said joint region; and
(f) the cross sectional area of said joint region being greater than the uniform cross sectional area of the remainder of said second annulus, and the number of lamination groups in the first assembled lamination packet is less than the number of lamination groups in later-assembled packets.

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**4,741,097**
**LINE TIE ASSEMBLY AND METHOD**

**John R. D'Agati, Independence, and Paul A. Daniels, Chardon, both of Ohio, assignors to Preformed Line Products, Cleveland, Ohio**

**Filed Apr. 21, 1986, Ser. No. 854,196**
**Int. Cl.⁴ H01B *17/06***
**U.S. Cl. 29—631** **13 Claims**



1. A method of securing a cable to an insulator comprising the steps of:
providing a line tie having first and second components, each component having a non-helical central portion disposed between helical portions having the same lay;
aligning said central portions adjacent one another;
spreading said central portions apart and sliding said central portions into engagement with a first groove on opposed sides of said insulator;
placing said cable in a second groove of said insulator; and,

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wrapping said helical portions in the same direction and in circumferential gripping engagement with said cable.

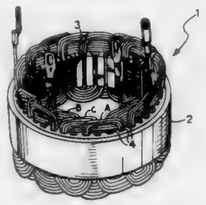
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**4,741,098**

## DEVICE FOR INSERTING PREWOUND COILS IN THE CAVITIES OF A STATOR OF A DYNAMO-ELECTRIC MACHINE AND APPARATUS USING SUCH A DEVICE

**Giorgio Barrera, Leumann, Italy, assignor to Officine Meccaniche Pavesi & C. S.p.A., Cascine Vica, Italy**

**Filed Aug. 12, 1986, Ser. No. 895,635**
**Claims priority, application Italy, Nov. 5, 1985, 67927 A/85**
**Int. Cl.[4] H02K** *15/02, 15/08, 15/09*
**U.S. Cl. 29—736** **6 Claims**



1. Device for inserting prewound coils in the cavities of a stator of a dynamo-electric machine, comprising:
an annular series of coil guide blades (6),
a support (8) for the blades (6), having a cylindrical body with a circumferential series of longitudinal slots (7) in which the coil guide blades (8) are located, these blades (6) having end portions projecting axially from the support (8) for receiving the prewound coils (A,B,C) to be inserted in the cavities (4) of the stator (1),
an annular series of key guide blades (10) surrounding the series of coil guide blades (6),
a thrust member (12) slidable axially into the series of coil guide blades (6) to insert the coils in the stator cavities,
an outer auxiliary coil guide member (13) having an annular body locatable around the key guide blades (10) and having an inner surface (15) spaced from the outer surface of the key guide blades (10) so as to define a first annular passage (16) for guiding the coils during the insertion operation, and
an inner auxiliary coil guide member (17) movable with the thrust member (12) into the series of coil passage (19) for guiding the coils during the insertion opeation, wherein the distance between the outer surface (18) of the inner auxiliary coil guide member (17) and the cylindrical surface touching the inside of the series of coil guide blades (6) is substantially equal to the thickness of the wire constituting the coils.

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**4,741,099**

## APPARATUS FOR ACCURATELY TERMINATING AN ELECTRICAL CONNECTOR WITH A MULTICONDUCTOR CABLE

**Billy E. Olsson, New Cumberland, Pa., assignor to AMP Incorporated, Harrisburg, Pa.**

**Filed Feb. 17, 1987, Ser. No. 14,945**
**Int. Cl.[4] H01R** *43/01*
**U.S. Cl. 29—749** **21 Claims**

1. An apparatus for installing a multicontact electrical connector on a flat multiconductor cable, the connector having a housing means with terminals extending therefrom and a cover means with grooves therein, the cable having closely spaced conductors therein, the apparatus comprising:
a base plate having a top surface and a bottom surface, an opening provided in the base plate extending from the top surface to the bottom surface;
a yoke portion positioned adjacent the base plate and springably mounted thereto, such that the yoke portion is movable relative to the base plate, the yoke portion having a top surface and a bottom surface, an opening extending from the top surface to the bottom surface, the opening of the yoke portion being dimensioned to receive the connector housing means and cover means therein, the opening of the yoke portion being in alignment with the opening of the base plate;
a support block movable between a first position and a second position, the support block positioned in the opening of the base plate when the support block is in the first position;



connector cooperation means which can be moved in and out of the opening of the yoke portion as required, to allow the housing means to be inserted and maintained in proper position;
whereby the connector is accurately terminated to the cable as the yoke portion and support block are moved relative to the base plate.

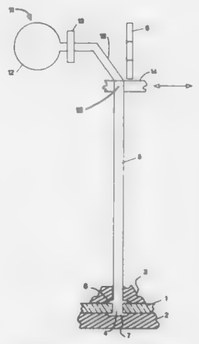
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**4,741,100**

## PIN RETENTION METHOD AND APPARATUS

**Mark V. Pierson, Binghamton, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Sep. 24, 1986, Ser. No. 911,186**
**Int. Cl.[4] H01R** *9/16;* **B23P** *19/00*
**U.S. Cl. 29—845** **12 Claims**



1. A method for retaining at least one pin in a ceramic substrate comprising the steps of:
(a) providing a ceramic substrate with at least one hole adapted for receiving the pin, the substrate having a tensile strength greater than the compressive strength of the pin, and the diameter of the hole being greater than the diameter of the pin;
(b) holding the substrate between a stopping block and a clamp, both of which have a hardness greater than that of the pin, such that the hole is axially coextensive with a passage through the clamp, the passage being adapted for transport of the pin; and
(c) moving the pin along a path defined by the passage and the hole such that the pin while moving impacts the stopping block with sufficient kinetic energy whereby the pin is cold forged with a shape within and defined by the hole, and whereby the pin is retained in the hole.

6. An apparatus for retaining at least one pin in a ceramic substrate having first and second planar surfaces and a tensile strength greater than the compressive strength of the pin, the substrate further having at least one hole for receiving said pin, the diameter of said hole being greater than the diameter of said pin, said hole extending through said substrate between said first and second surfaces, the apparatus comprising:
(a) a stopping block adjacent said first surface;
(b) a clamp adjacent said second surface and having a passage therethrough, said clamp being adapted for holding the substrate against said block such that the hole in the substrate is axially aligned with the passage in the clamp, which passage is adapted for transport of the pin therethrough; and
(c) a means for transporting the pin through the passage in said clamp and from thence into and through the hole in the substrate such that the pin while moving impacts said block with sufficient kinetic energy whereby the pin is cold forged with a shape within and defined by the hole, and whereby the pin is retained in the hole.

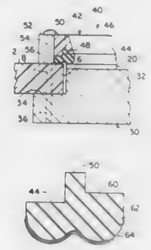
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**4,741,101**

## CONTACT DEVICE

**William E. Berg, Portland, and Andrew E. Finkbeiner, Beaverton, both of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.**

**Filed Sep. 29, 1986, Ser. No. 913,029**
**Int. Cl.[4] H01R** *9/09*
**U.S. Cl. 29—848** **4 Claims**



1. A method of manufacturing a resiliently-deformable contact member having multiple discrete contact elements, comprising:
providing a sheet of flexible dielectric material having multiple discrete contact elements of conductive material adhered to one main face thereof, and
bonding a body of elastomeric material to an opposite main face of the sheet of flexible material by
placing the sheet of flexible dielectric material in a mold cavity bounded by a surface which is presented towards but spaced from said conductive material,
injecting said elastomeric material in uncured form onto said opposite main face, whereby said flexible material is deformed and said conductive material is brought into contact with said surface, and
curing said elastomeric material.



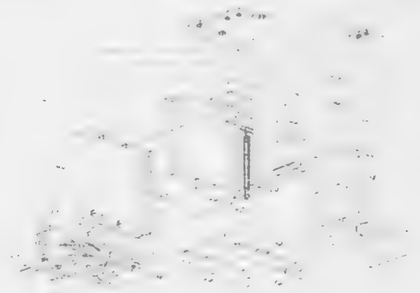
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**4,741,102**

## METHOD AND DEVICE FOR SENSING ALIGNMENT

**Joseph Baldyga, Isiamorada, Fla., assignor to Diamond Die & Mold Company, Mt. Clemens, Mich.**

**Filed Feb. 24, 1987, Ser. No. 17,911**
**Int. Cl.[4] H01R** *43/04;* **B23P** *19/00*
**U.S. Cl. 29—861** **16 Claims**



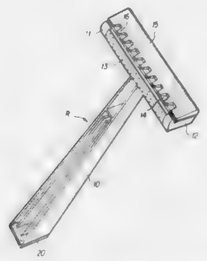
1. A method for sensing alignment of an article in relation to an apparatus performing a task associated with the article requiring alignment, the method comprising the steps of:
energizing a timer with a selectable timer period to activate an alarm if alignment of the article in relation to the apparatus is not sensed within a selected time period;
moving an alignment sensing device toward the article;
initiating contact between the article and a first lever of the alignment sensing device;
rotating the first lever relative to a second lever having an aperture corresponding to a portion of an outer contour of the article as the alignment sensing device continues to move toward the article;
matingly engaging the portion of the outer contour of the article with the aperture of the second lever as the first lever simultaneously reaches an engaged position;
sensing the engaged position of the first lever;
activating the apparatus associated with the article in response to sensing the engaged position of the first lever;
deenergizing the timer; and
retracting the alignment sensing device.

3. An alignment sensing device, for use with an article and an apparatus performing a task associated with the article requiring alignment of the article in relation to the apparatus, comprising:
a first lever;
a second lever having an aperture corresponding to a portion of an outer contour of the article;
means for pivotally mounting the first lever to the second lever allowing pivotal rotation of the first lever relative to the second lever from a normal rest position to an engaged position;
means mounted adjacent the first lever for sensing the first lever in the engaged position;
means for moving the second lever in relation to the article, wherein such movement initiates contact between the first lever and the article, thereafter the first lever begins to rotate from the normal rest position toward the engaged position, subsequently when the aperture of the second lever matingly encompasses the portion of the outer contour of the article, the first lever simultaneously reaches the engaged position thereby activating the sensing means; and
means, responsive to activation of the sensing means, for activating the apparatus to perform the task associated with the article.

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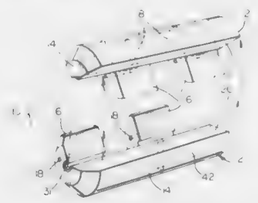
**4,741,103**
**RAZOR FOR SHAVING A FACE HAVING PSEUDOFOLLICULITIS BARBAE**
**Carl A. Hultman, Derby, Conn., assignor to Warner Lambert Company, Morris Plains, N.J.**
**Filed Jul. 25, 1986, Ser. No. 890,992**
**Int. Cl.[4] B26B** *19/42*
**U.S. Cl. 30—34.2** **13 Claims**



1. Guard bar for a razor comprising at least ten closely spaced knurls, having a series of closely spaced truncated cones having four upwardly tapering sides, per lineal guard bar inch as measured across the long axis of the guard bar, said knurls defining a discontinuous upper surface by their top.

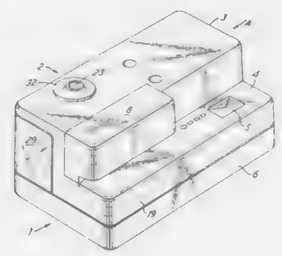
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**4,741,104**
**CUTTING TOOL FOR TUBES**
**Laurence Noon, Saskatoon, Canada, assignor to Northern Telecom Limited, Montreal, Canada**
**Filed Mar. 12, 1987, Ser. No. 25,246**
**Int. Cl.[4] B21F** *13/00*
**U.S. Cl. 30—90.4** **4 Claims**



1. A cutting tool for cutting into a tube comprising a cutter blade holder comprising:
two holder parts which are relatively locatable in an open position and alternatively in a closed position in which they confront each other for defining a through passageway for acceptance of the tube and for relative movement of the tube and holder axially of the passageway with each holder part defining a circumferential portion of the passageway; and
two cutting blades extending one from each holder part into the passageway at positions spaced around the passageway, the blades having cutting edges oriented to cut along the tube during said relative movement;
the holder parts being identical in shape with each part having a body extending axially of the passageway and a plurality of hinge portions which extend laterally from the body in axially spaced positions, and the two holder parts are assembled together with their hinge portions intermeshed to hinge the holder parts together about an axis spaced from and extending substantially parallel to the axis of the passageway to permit relative hinging movement of the holder parts between the open and closed positions.

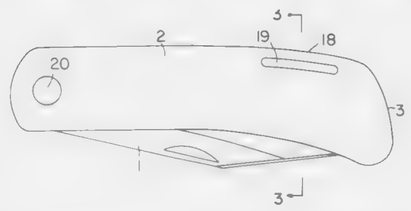
**4,741,105**
**COMBINED ENVELOPE OPENER AND PENCIL SHARPENER UNIT**
**Man K. Wong, Quarry Bay, Hong Kong, assignor to Wellmann Industrial Co. Ltd., Hong Kong**
**Filed Jan. 23, 1987, Ser. No. 6,663**
**Claims priority, application United Kingdom, Sep. 19, 1986, 8622650**
**Int. Cl.[4] B23B** *1/00*
**U.S. Cl. 30—123** **10 Claims**



1. A combined envelope opener and pencil sharpener unit having an envelope opener part constructed to receive a letter envelope or the like to be opened passed in a substantially horizontal plane therethrough and operable from a source of electrical power to cut open an edge margin of the envelope or the like in a direction substantially at right angles to said plane during passage therethrough, and a pencil sharpener part constructed to receive a pencil or the like to be sharpened inserted substantially at right angles to said plane and operable from a source of electrical power to sharpen the inserted end of the pencil or the like.

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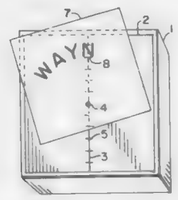
**4,741,106**
**POCKET KNIFE**
**Masami Yamagishi, Tokyo, Japan, assignor to Kai Cutlery Co., Ltd., Tokyo, Japan**
**Continuation of Ser. No. 705,098, Feb. 25, 1985, abandoned. This application Jul. 17, 1986, Ser. No. 888,094**
**Claims priority, application Japan, Dec. 12, 1984, 59-187385[U]**
**Int. Cl.[4] B26B** *3/06*
**U.S. Cl. 30—161** **2 Claims**



1. A folding pocket knife, wherein a blade is pivotally held by a handle in a rotatable manner between side plates covered with a cover member, and the engagement between a lever and base of the blade is released by depressing a press area of the lever installed in the handle, said knife being characterized in that said cover member which covers said press area is a soft pliable material which is movable together with said press area, said pliable material is relatively thick and openings are provided in said cover member such that spaces are formed between the top edges of said side plates and the bottom surfaces of said soft pliable material of the cover member covering said press area.



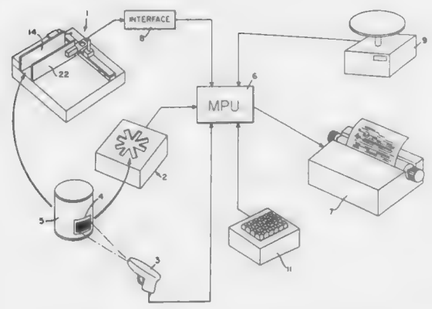
**4,741,107**
**ARTWORK AID ADAPTED FOR FACILITATING PLACEMENT OF LETTERING ALONG ARC OF A CIRCLE**
**Jeffrey L. Circle, R.R. 11, Box 735, Indianapolis, Ind. 46229**
**Filed Jul. 31, 1987, Ser. No. 80,098**
**Int. Cl.[4] G09B** *11/00*
**U.S. Cl. 33—1 AA** **5 Claims**




1. An aid for use in artwork involving the placement of lettering along the arc of a circle;
said aid comprising a lightbox having a translucent platen, a vertical centerline scribed on said platen, a basemark on said centerline, and a pivot means located on said centerline;
said platen being adapted for supporting a sheet of art paper;
said pivot means being adapted for serving as a center extending through a hole in the art paper about which said art paper can be rotated;
said basemark serving as a position indicator for placement of successive letters of said lettering; and
said centerline serving as a guide for orientation of said lettering.

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**4,741,108**
**MEASUREMENT SYSTEM**
**Robert M. Cohen, Rockville, Md., assignor to Logistics Data Systems, Inc., Irving, Tex.**
**Filed Dec. 13, 1985, Ser. No. 808,746**
**Int. Cl.[4] G01B** *7/12*
**U.S. Cl. 33—143 L** **11 Claims**




1. Apparatus for accurately measuring a variety of objects of disparate shape and reliably correlating measurements with corresponding objects, comprising:
a substantially planar base member;
a first stationary measurement defining member fixed to said base member and having a substantially flat enlarged plate-like surface;
a second, movable measurement defining member having a substantially flat enlarged plate-like surface facing and parallel to the plate-like surface of said first measurement defining member;
said plate-like members being disposed substantially perpendicularly to said planar base member;
the dimensions of each plate-like surface being greater than the largest dimension of an object to be measured, such that said plate-like surfaces make contact with the outermost surface of an object in a given orientation of the object to be measured;
means for moving said second measurement defining member toward and away from said first measurement defining member while maintaining the plate-like surfaces of said first and second members parallel to each other and perpendicular to said base member;
means for measuring the distance between said plate-like surfaces when an object is placed on said base member between said first and second members and said plate-like surfaces are in abutting contact with said object;
means for providing first electronically transmissible data indicative of the distance between said plate-like members, said first electronically transmissible data comprising product measurement data;
means for generating second electronically transmissible data identifying the object measured, said second electroncally transmissible data comprising product identification data; and
means for correlating and storing the product identification data and product measurement data.

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**4,741,109**
**ROLLER CALIPER GAUGE**
**Donald J. McCurdy, Stouffville, and Michael T. Riggin, Concord, both of Canada, assignors to Sentrol Systems, Ltd., Ontario, Canada**
**Filed Nov. 7, 1986, Ser. No. 928,882**
**Int. Cl.[4] G01B** *3/22*
**U.S. Cl. 33—147 L** **11 Claims**



1. An on-line gauge for providing a measure of the thickness of a web moving in the direction of its length including in combination, a pair of elongated rollers, a platen, means mounting said rollers and said platen on opposite sides of said moving web and for movement toward and away from each other, said mounting means mounting said rollers with the lengths thereof generally perpendicular to said direction and parallel to each other in spaced relationship in said direction, a proximity device for producing a signal as a measure of the thickness of a web, means mounting said proximity device on the same side of said web as said rollers and in the space therebetween, and pneumatic means for moving said platen and said rollers toward each other to bring said web into engagement with said rollers and into proximity with said device.

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**4,741,110**

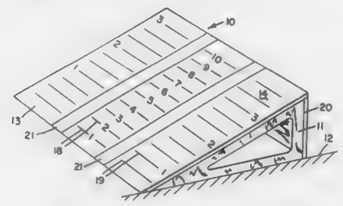
## MEASUREMENT OF PERIPHERAL STRENGTH

**William A. Maykel, 36 Stark Rd., Worcester, Mass. 01602**

**Continuation of Ser. No. 772,877, Sep. 5, 1985, abandoned, which is a division of Ser. No. 612,346, May 21, 1985, Pat. No. 4,539,756. This application Mar. 4, 1987, Ser. No. 21,631**

**Int. Cl.⁴ A61F** *3/00;* **G01B** *3/20*

**U.S. Cl. 33—162** **3 Claims**



1. Gage to measure the point of heel elevation at which peripheral strength is lost, comprising:

(a) a support structure adapted to rest on a flat first surface,

(b) a plate connected to the support structure and having a second surface, which surface is inclined at a selected angle to the first surface and arranged to provide a clear path from said second surface to said first surface, so that a patient to be tested can be placed in a standing position with the balls of both feet on the said first surface and with the heels of both feet on the second surface, the foot angle between the first surface (on the one hand) and the plane of the balls and heels (on the other hand) being changed in successive steps while measuring peripheral strength at each step to observe the step at which peripheral strength begins to decrease,

(c) means applied to said inclined second surface and essentially in the same plane as said second surface to support and hold the patient's heel against downward sliding movement,

(d) markings including horizontal lines to indicate the heel position at the successive steps, the said means of supporting the patient's heel comprising a pair of spaced, parallel strips of abrasive material extending perpendicular to said horizontal lines, and

(e) an adjustable brace extending between the support structure and the plate to change the angle between them, the balls and heels remaining in fixed positions on the two surfaces, while the angle of the second surface is adjusted, the markings being located on a protractor extending between the support structure and the plate.

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**4,741,111**

## RECREATIONAL VEHICLE HOOK-UP AID

**George D. Emerick, 1595 Manzanita Ave., Space #13, Chico, Calif. 95926**

**Filed Aug. 27, 1987, Ser. No. 90,701**

**Int. Cl.⁴ B60Q** *1/26*

**U.S. Cl. 33—264** **1 Claim**

1. Apparatus for a recreational vehicle hook-up aid comprising:

an assemblage of fitted plastic pipes of the PVC designation or similar with attaching and guiding fixtures including:

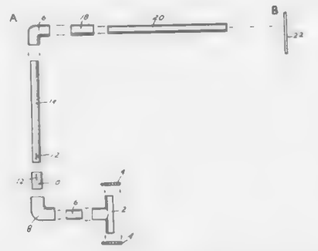
a T-joint mounting bracket with the T top member half rounded longitudinally for vertical mounting to the jack shaft of a trailer hitch and the leg member tubular for horizontal attachment to a continuing connector;

a short plastic pipe connector sized to interfit said leg member as a horizontal connector to

a plastic ninety degree elbow sized to accept said horizontal connector and vertically attach to

a short vertically positioned pipe connector having a single longitudinal alignment stripe in the outer surface adjacent an upwardly end to match a similar alignment strip in the downwardly end of

a vertical plastic pipe extension of sufficient length to position a ninety degree reduction elbow, a horizontally aligned reduction fitting, and a horizontal pointer formed



of a removable length of plastic pipe aligned centrally with the rear window of a motor vehicle, there being a peel-off backed target strip as a part hereof for attachment inside said motor vehicle said rear window;

a set of two hose-clamp type adjustable mounting brackets sized to said top T member half and to said jack shaft.

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**4,741,112**

## MEASURING MACHINE WITH THIN STEEL PLATE CLADDING

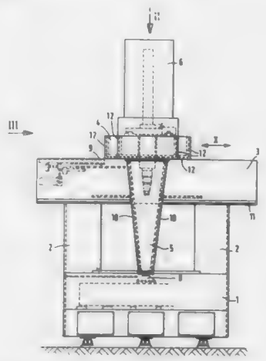
**Gerhard Band; Günter Berger, and Günther Ross, all of Oberndorf, Fed. Rep. of Germany, assignors to Mauser-Werke Oberndorf GmbH, Fed. Rep. of Germany**

**Filed Dec. 1, 1986, Ser. No. 936,184**

**Claims priority, application Fed. Rep. of Germany, Dec. 4, 1985, 3542766**

**Int. Cl.⁴ G01B** *5/00*

**U.S. Cl. 33—503** **8 Claims**



1. A measuring machine comprising an abutment, at least one supporting member movably mounted to said abutment for movement in a coordinate direction, said abutment and said supporting member being made of welded steel construction and having elongate surface portions, and a thin shell covering at least some of said elongate surface portions, and spaced away from said elongate surface portions, to define a space with said elongate surface portions, thereby to extend at least longitudinally of said abutment and said supporting member.



**4,741,113**

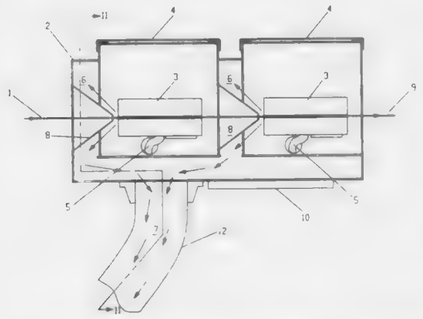
## AIR WIPER

**Fred Burdick, Noank, and John R. Wheeler, Jr., Mystic, both of Conn., assignors to Crompton & Knowles Corporation, New York, N.Y.**

**Filed Dec. 12, 1986, Ser. No. 941,055**

**Int. Cl.⁴ F26B** *13/28*

**U.S. Cl. 34—92** **4 Claims**



1. Apparatus for drying or removing adhering substances from the surface of a continuous strand or other substantially non-adsorptive material which is being advanced along its longitudinal axis comprising:

(a) at least one or more pressurized air assemblies applying compressed air against and away from a strand and the strand's direction of travel;

(b) in a high velocity vacuum suction chamber at least one or more cone deflectors located in the path of the pressurized air and surrounding the strand;

(c) means to supply compress air to the air assemblies, and

(d) pressurized air passing along the external surface of the cone with means to draw and exhaust wet air and moisture away from the deflector to a drainage.

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**4,741,114**

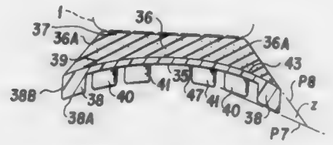
## SHOE SOLE CONSTRUCTION

**Jerry D. Stubblefield, Portland, Oreg., assignor to AVIA Group International, Inc., Portland, Oreg.**

**Continuation of Ser. No. 899,057, Aug. 22, 1986, abandoned, which is a division of Ser. No. 792,005, Oct. 28, 1985, abandoned, which is a continuation of Ser. No. 751,127, Jul. 2, 1985, abandoned, which is a continuation of Ser. No. 602,261, Apr. 20, 1984, abandoned, which is a continuation of Ser. No. 571,645, Jan. 18, 1984, abandoned, which is a continuation of Ser. No. 464,313, Feb. 7, 1983, abandoned, which is a division of Ser. No. 185,957, Sep. 10, 1980, Pat. No. 4,372,058, which is a continuation of Ser. No. 935,584, Aug. 21, 1978, abandoned, which is a continuation-in-part of Ser. No. 853,482, Nov. 21, 1977, abandoned. This application Jun. 22, 1987, Ser. No. 65,682**

**Int. Cl.⁴ A43B** *13/04, 13/18, 13/26, 5/00*

**U.S. Cl. 36—32 R** **15 Claims**



1. A sole for an athletic shoe comprising:

shock absorbing means for cushioning the foot and leg of the wearer against impact loads and for dissipating impact forces laterally outwardly upon impact of the shoe with the ground, said shock absorbing means comprising:

a midsole having an upper surface, a concave lower surface, and peripheral and central portions, said upper surface adapted to be connected to an upper, said midsole having inclined side walls extending downwardly and outwardly from the periphery of said upper surface to the periphery of said concave lower surface;

an outer sole having peripheral and central portions and top and bottom surfaces, said outsole being of substantially uniform thickness and connected to said concave lower surface of said midsole to define a general lateral concavity for the sole;

said peripheral portions of said outer sole and said midsole cooperating to support said central portions of said outer sole and said midsole in a cantilever fashion; and

a plurality of tread members disposed about said peripheral portion of said bottom surface of said outer sole, said tread members cooperating with said peripheral portions of said midsole to support said central portions in a cantilever fashion.

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**4,741,115**

## SKI BOOT WITH AN OPERATING ASSEMBLY FOR THE CLOSING AND ADJUSTMENT DEVICES

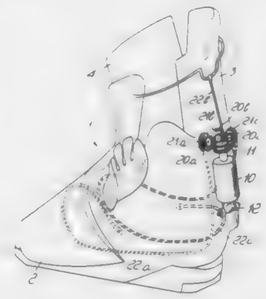
**Alessandro Pozzobon, Paderno Di Ponzano Veneto, Italy, assignor to Nordica S.p.A., Montebelluna TV, Italy**

**Filed Nov. 19, 1986, Ser. No. 932,810**

**Claims priority, application Italy, Dec. 2, 1985, 23045 A/85**

**Int. Cl.⁴ A43B** *5/04;* **A43C** *11/00*

**U.S. Cl. 36—117** **7 Claims**



1. Ski boot with closing and adjustment devices having cables, and an operating assembly for the closing and adjustment devices, said ski boot comprising a power source, said power source being supported by said ski boot and operating a driving gearwheel, said driving gearwheel being selectively engageable with driven gearwheels, said driven gearwheels being adapted for winding said cables of said closing and adjustment devices of said ski boot, said ski boot further comprising means for removably blocking unwinding of said cables.

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**4,741,116**

## SNOWPLOW WING ASSEMBLY

**Edward P. Engle, 1201 Shortline Dr., Fort Lupton, Colo. 80621, and Lester O. Dowler, 4061 Sunrise La., Brighton, Colo. 80601**

**Filed May 7, 1987, Ser. No. 46,745**

**Int. Cl.⁴ E01H** *5/06*

**U.S. Cl. 37—280** **1 Claim**

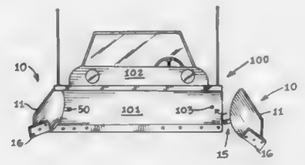
1. A snow plow wing assembly in combination with a conventional generally C-shaped vehicle mounted snow plow wherein the wing assembly consists of:

a pair of heavy duty plow wing extension units wherein each of said extension units comprises: a generally flat blade element having a leading edge and a trailing edge; an apertured mounting bracket affixed to the rear of the blade element; wherein, the mounting bracket is vertically disposed on the blade element and angled away from said

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leading edge of the blade element; a brace member secured on one end to said blade element, and secured on the other end to said mounting bracket; a resilient guard element attached to the front of the blade element and extending below and projecting beyond the leading edge of the blade element; and securing means for operatively connecting the mounting bracket to the side of the conventional snow plow blade; whereby, the pair of plow wing units may be secured at a fixed angle relative to the direction of travel of the conventional snow plow blade; wherein, each of said pair of plow wing units further comprises:




a stabilizing arm attached to the trailing edge of said blade element and comprising an apertured angle arm member affixed on one end to said blade member and secured on the other end to the face of the conventional snow plow; wherein, said mounting bracket is disposed at an angle "$\alpha$" relative to the blade element; the outboard end of the angled arm member is disposed at an angle of "$\beta$" with respect to the longitudinal axis of the inboard end of the angled arm member; and, the combined values of the angles "$\alpha$" and "$\beta$" do not exceed 90°.

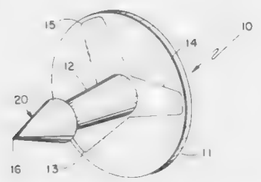
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**4,741,117**

## ANIMAL EAR TAG

**D. Michael Fearing, St. Paul, Minn., assignor to Fearing Manufacturing Co., Inc., South St. Paul, Minn.**

**Filed Oct. 23, 1986, Ser. No. 922,265**
**Int. Cl.[4] G09F *3/00***
**U.S. Cl. 40—301** **14 Claims**



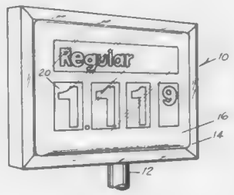

1. An animal identification tag comprising
a first member for receiving an ear tag stud;
an animal ear tag stud for piercing the ear of an animal;
said stud including a shaft of hard resilient material for extending through the ear of an animal, said shaft having a first end and a second end;
an ear-piercing tip of hard resilient material attached to one end of said shaft, said ear-piercing tip having sufficient hardness to permit an operator to force said ear-piercing tip through the ear of an animal;
a first retaining flange of hard resilient material attached to the opposite end of said shaft, said retaining flange extending out from said shaft to prevent withdrawal of said stud from an animal's ear, said first retaining flange having sufficient thinness to provide flexibility;
a second retaining flange of flexible material attached to said first retaining flange, said first flange and said second flange coacting to provide a flexible flange to reduce snagging of said animal ear tag.

**4,741,118**

## SIGN WITH IMPROVED SCROLLING MECHANISM

**Robert B. Aiken, Grafton; Dennis M. Bauer, Random Lake, and James R. Hogan, Milwaukee, all of Wis., assignors to Milwaukee Sign Company, Inc, Grafton, Wis.**

**Filed Jun. 5, 1986, Ser. No. 871,072**
**Int. Cl.[4] G09F *11/18***
**U.S. Cl. 40—518** **36 Claims**




1. An improved scrolling sign comprising:
a sign face member having at least one window in which indicia may appear;
a framework mounted proximate one side of said sign face member;
a pair of spaced, parallel shafts journalled in said framework;
drive means for rotating said shafts;
at least one web roll mounted on each of said shafts such that said shafts can rotate relative to said web rolls;
a web containing indicia extending between said web rolls for being unwound and rewound on said rolls, said web having indicia arranged in series therealong, said web extending across said window on said one side of said sign face member;
clutch means interposed between each of said web rolls and the shaft on which same is mounted, said clutch means selectively coupling one or the other of said web rolls to the associated shaft for moving said web across said window to selectively display said indicia by unwinding and rewinding said web on said rolls; and
constantly applied differential braking means, said braking means being coupled to each of said web rolls for applying tension to, and maintaining tension on, said web, said braking means applying a greater braking action to the web roll from which said web is being unwound than to the web roll on which said web is being rewound.

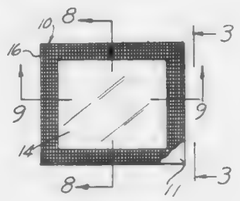
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**4,741,119**

## ELECTROSTATIC DISPLAY BOARD

**Stanley J. Baryla, 1740 W. Isabella Rd., Midland, Mich. 48640**

**Filed Dec. 5, 1985, Ser. No. 805,842**
**Int. Cl.[4] G09F *7/12***
**U.S. Cl. 40—594** **11 Claims**




1. A display board for viewing a document comprising:
a plate having a dielectric plastic face having a plurality of perimetral edge portions;
a double-sided adhesive strip member affixed to said plate adjacent one of said plurality of perimetral edge portions;
a sheet of flexible transparent dielectric film having a first edge portion affixed to said double-sided adhesive strip member in a spaced apart relationship from said plate, said sheet having a cover portion movable between a contact position in which said cover portion of said sheet is drawn into contact with said plate by electrostatic force and a release position in which said cover portion of said sheet is not in contact with said plate, said sheet having a curved portion extending between said first edge portion and said curved portion, said curved portion having a radius of curvature extending from said curved portion in a direction outwardly from said plate, said curved portion extending between said strip member and said plate when said cover portion of said sheet is in said contact position such that said curved portion biasingly urges said cover portion of said sheet against said plate such that said document is held in position between said plate and said sheet by electrostatic force and said biasing force of said curved portion of said sheet, said sheet having a second edge portion extending beyond at least one of said plurality of perimetral portions.



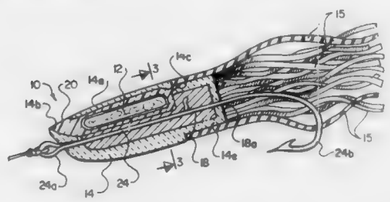
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**4,741,120**

## SELF-ILLUMINATING FISHING LURE

**Albert O. Cota, Suite A-331, 5460 White Oak Ave., Encino, Calif. 91316, and Dennis J. Copeland, 2948 E. Sierra Madre Blvd., Pasadena, Calif. 91107**

**PCT No. PCT/US85/00877, § 371 Date Jan. 12, 1987, § 102(e) Date Jan. 12, 1987, PCT Pub. No. WO86/06584, PCT Pub. Date Nov. 20, 1986**
**PCT Filed May 14, 1985, Ser. No. 15,232**
**Int. Cl.[4] A01K *85/00***
**U.S. Cl. 43—17.6** **5 Claims**




1. A method for manufacturing a self-illuminating fishing lure where said method comprises the following steps:
(a) bore a tritium module cavity into a hard, translucent fishing lure body having encapsulated therein a lure weight and a fish-hook and line assembly,
(b) drill an air hole into end of said cavity,
(c) pour a clear resilient material into said tritium module cavity,
(d) before said resilient material sets insert and centrally position a tritium capsule into said tritium module cavity, and
(e) pour a quantity of resilient material into end of cavity to completely fill said cavity and hermetically seal said module.

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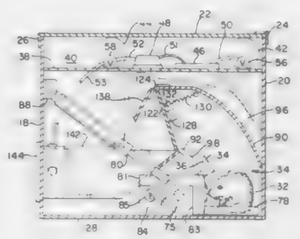
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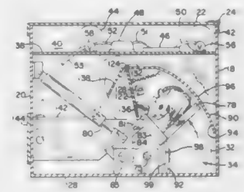
## GAS CHAMBER ANIMAL TRAP

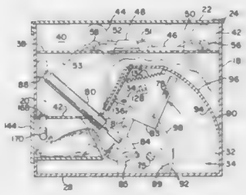
**Andrew J. Pratscher, 267 Cornell, Calumet City, Ill. 60409, and Philip J. Andres, IV, Wheaton, Ill., assignors to Andrew J. Pratscher, Calumet City, Ill.**

**Filed Mar. 13, 1986, Ser. No. 839,082**
**Int. Cl.[4] A01M *23/04***
**U.S. Cl. 43—58** **11 Claims**

3. An animal trap, comprising:
an elongated entrance compartment providing a feeding chamber with an interior having opposite ends and a ceiling and stationary substantially concentric radial walls extending laterally between and connecting said opposite ends, said radial walls including an outer radial wall with a concave front surface facing toward the interior of the entrance compartment and an inner radial wall with a back convex surface facing toward the interior of the entrance compartment, said inner radial wall providing a barrier extending between and connecting portions of said ends and defining a receiving hole, said outer radial wall arcuately extending and connected to said ceiling, said barrier being spaced from and cooperating with said ceiling to define a discharge opening, each of said opposite ends defining an access opening for entrance of an animal into said entrance compartment, said entrance compartment comprising an elongated tunnel with an intermediate central portion located between said opposite ends adjacent said receiving hole and defining bait passageways for passage of scent of a bait to attract the animal into said entrance compartment;







each of said ends having a vertically moveable, power-driven door operable from a normally open position to permit the animal to enter said entrance compartment to a substantially closed position substantially blocking said access opening to prevent the animal from passing through said access opening;
a disposal compartment defining a gas chamber positioned inwardly of said inner radial wall for receiving animals from said entrance compartment, said inner radial wall separating said entrance and disposal compartments;
an overhead power-driven panel being vertically pivotable from a normally closed position substantially blocking said discharge opening for preventing passage of the animal between the entrance compartment and the disposal compartment to an open position for permitting passage and disposal of the animal from said entrance compartment to said disposal compartment;
said entrance compartment having a vertically pivotable

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power-driven floor, said floor being radially pivotable from a normally lower position to provide a base of said entrance compartment to an upward forwardly position, when said panel is in said open position, to lift, push, and discharge the animal into said disposal compartment;

at least one tank of carbon dioxide;

an injector operatively connected to and communicating with said tank of carbon dioxide and positioned in said gas chamber for injecting a sufficient amount of carbon dioxide in said gas chamber to kill said animal; and

a detector extending through said receiving hole of said intermediate central portion of said entrance compartment compartment and being operatively connected to and triggering the sequential operation of said doors, panel, floor and injector when said animal is detected in said entrance compartment.

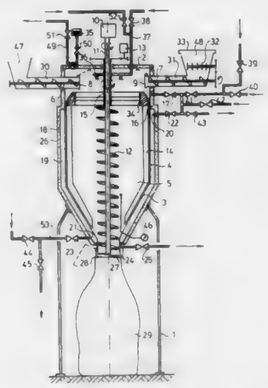
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**4,741,122**

## PROCESS AND APPARATUS FOR STERILE AND/OR PARTIALLY STERILE PREPARATION, INOCULATION AND BAGGING OF MUSHROOM SUBSTRATUM

**Marton Becsy; Magdolna Kopcsanyi; Laszlo Bognar; Ferenc Major, and Kalman Sunyovzsky, all of Budapest, Hungary, assignors to Coopex/Inanovocoop, Budapest, Hungary**

**Filed Jun. 13, 1986, Ser. No. 874,129**
**Int. Cl.[4] A01G** *1/04*
**U.S. Cl. 47—1.1** **7 Claims**



1. A process for the at least partially sterile preparation, inoculation, and packaging of substrate for mushroom growing, which comprises the steps of:

(a) comminuting a dry base material of straw and/or corn cob to a maximum particle size of 6 mm;

(b) mixing the comminuted base material with one or more organic and/or inorganic additives in a closed system;

(c) introducing hot water into the system so that the base material mixture attains a higher moisture content;

(d) introducing steam into the system for increasing the moisture content of the base material mixture;

(e) heating the closed system for sterilizing the basic material mixture;

(f) cooling the base material mixture to about ambient temperature while maintaining agitation thereof;

(g) equalizing the internal pressure of the closed system with the pressure outside of said syatem;

(h) introducing an inoculum from a sterile space into the system;

(i) mixing the base mixture with the inoculum; and

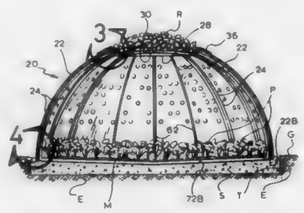
(j) transferring the resulting mixture from the at least partially sterile space into closed sterile storage for cultivation.

**4,741,123**

## GREENHOUSE

**Jean Gauthier, 14, rue Saint-Louis, Loretteville, Province of Quebec, Canada G2B 1J9**

**Filed Dec. 12, 1986, Ser. No. 944,812**
**Int. Cl.[4] A01G** *9/00*
**U.S. Cl. 47—17** **25 Claims**



1. In a greenhouse for growing plants, a dome-shaped rigid opaque shell (22), a plurality of windows mounted into apertures in said shell, and each defining a transparent pane an opening at the apex of the dome shell a rigid container closing said opening and fixedly secured to said shell, said container defining a flooring (32) and an upwardly-inclined circular side wall, said container including load of impervious rocks; a shell door attached to said shell for access to said greenhouse; collecting means to recuperate condensate water on said rocks from morning and evening dews; and distribution means for watering said plants with the water recuperated from the dew by said collecting means.

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**4,741,124**

## PLANT BASKET

**Bruce T. Scism, Route 5, Box 166, Kings Mountain, N.C. 28086**

**Continuation of Ser. No. 707,241, Mar. 1, 1985, Pat. No. 4,646,469. This application Jan. 30, 1987, Ser. No. 9,356**
**The portion of the term of this patent subsequent to Mar. 3, 2004, has been disclaimed.**
**Int. Cl.[4] A01G** *9/02*
**U.S. Cl. 47—67** **16 Claims**



1. A basket for displaying household plants comprising a circular base of molded plastic material having a bottom with a substantially planar bottom surface and a thickened peripheral portion serving as a rim and extending upwardly from said bottom so as to form with said bottom a water retaining reservoir, a spacer connected to said bottom and disposed within the reservoir and comprising a plurality of arms having upper surfaces adapted to supportingly receive a flower pot positioned within the basket, said rim having an upwardly and outwardly diverging outer periphery, a plurality of uniformly spaced apart positioning means integrally formed with and extending around said rim in a circular array and serving as stake positioning indicia along the periphery of said rim, a frusto-conically shaped shell of interwoven material surrounding said plastic base and extending upwardly therefrom, said interwoven material including a circular array of a plurality of uprightly positioned stakes uniformly spaced about said rim of said base and each stake being located between adjacent pairs of said spaced apart means, and fastener means penetrating each of said stakes adjacent lower portions thereof and securing the stakes to said rim of said plastic base.



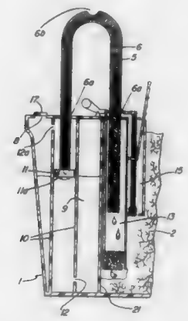
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**4,741,125**

## WICK-BASED LIQUID DELIVERY SYSTEM FOR PLANTS

**Donald Demorest, 813 Westwood, Fenton, Mich. 48430**

**Filed Mar. 21, 1986, Ser. No. 842,671**
**Int. Cl.[4] A01G** *25/00*
**U.S. Cl. 47—81** **9 Claims**



1. An apparatus for the delivery of liquids to the growing medium of a plant comprising:

(a) a refillable reservoir for the storage of said liquid;

(b) a receiving reservoir for the receipt of said liquid;

(c) a wick for transmission of said liquid from said refillable reservoir to said receiving reservoir;

(d) support means for holding said wick in the approximate shape of an invert U, and float means for suspending one end of the wick support means inside the said refillable reservoir;

(e) means for transmission of said liquid from said receiving reservoir to the growing medium of a plant;

(f) a moisture-reactive adjustable pawl of bi-expandable material for regulating the movement of said wick in said refillable reservoir; and

(g) means for attachment of one end of said pawl to said receiving reservoir so as to cause the opposing end of said pawl to contact said wick support means when said bi-expandable material is deformed.

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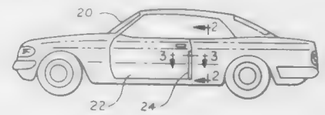
**4,741,126**

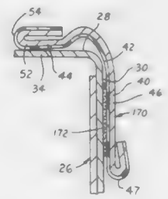
## DOOR CORNER EDGE GUARD

**Robert Adell, Sunnyvale, Tex., assignor to U.S. Product Development Company, Sunnyvale, Tex.**

**Continuation-in-part of Ser. No. 840,351, Mar. 17, 1986, Pat. No. 4,674,233. This application Jun. 22, 1987, Ser. No. 64,831**
**The portion of the term of this patent subsequent to Jun. 23, 2004, has been disclaimed.**
**Int. Cl.[4] B60J** *5/00*
**U.S. Cl. 49—462** **4 Claims**

1. In combination with the trailing edge of a swinging closure of an automobile wherein the trailing edge is defined by surfaces which intersect at approximately 90 degrees to form a corner, one of said surfaces being an exterior surface of the automobile which is visible when the swinging closure is in closed position and the other surface being an end surface, a decorative and protective corner edge guard for protecting said corner comprising an elongate metal channel protectively fitting over at least a portion of the length of said corner and having an outer leg disposed against said exterior surface and a back leg disposed against said end surface, fastening means disposed between said back leg and said end surface for holding said back leg against said end surface such that as viewed in transverse cross section said fastening means is located at a central region of said back leg, and said corner edge guard being constructed and arranged such that concurrently with the action of said fastening means in holding said back leg against said end surface, the distal end of said outer leg is also





forcefully urged against said exterior surface by the distance from the location of action of said fastening means on said end surface to said exterior surface relative to the distance from the location of action of said fastening means on said back leg to the distal end of the outer leg, said fastening means being constructed and arranged to have a manner of attachment to said back leg and to said end surface to preclude any appreciable shifting of said back leg on said end surface which would result in the distal end of said outer leg losing forceful engagement with said exterior surface.

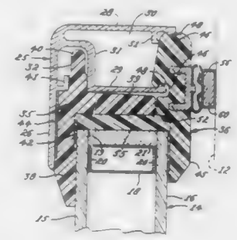
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**4,741,127**

## REFRIGERATOR DOOR WITH THERMAL INSULATED OUTER FRAME

**Gerald J. Bockwinkel, Mundelein, Ill., assignor to Ardco Inc., Chicago, Ill.**

**Filed Dec. 22, 1986, Ser. No. 945,031**
**Int. Cl.[4] E06B** *3/00*
**U.S. Cl. 49—501** **24 Claims**



1. An insulated door comprising

a glass unit having a plurality of glass panes disposed in side-by-side relation, a spacer interposed between adjacent of said panes for maintaining said panes in parallel relation with an air space therebetween, and means sealing said air space from the outer side environment,

an outer metal frame member about the periphery of said glass unit for supporting the weight of said glass unit,

means formed of rigid non-metallic material interposed

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between the outer metal frame member and said insulated glass unit for retaining the glass unit within the outer metal frame member and for forming a thermal insulating barrier therebetween, and

said retaining and barrier means including a pair of barrier members disposed adjacent the outer periphery of said glass unit, each said barrier member having a leg portion disposed on a respective side of said glass unit, and said barrier members each being engagable with said outer metal frame member for positively retaining said glass unit between said leg portions.

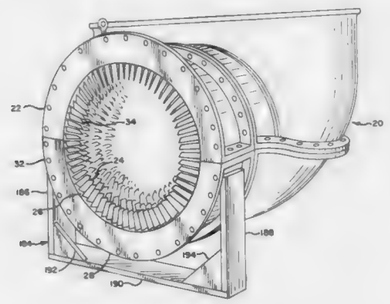
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**4,741,128**

## CUTTER ASSEMBLY

**Benjamin H. Reaves, West Texas City, and William E. Nelson, Dickinson, both of Tex., assignors to Amoco Corporation, Chicago, Ill.**

**Filed Aug. 14, 1986, Ser. No. 896,757**
**Int. Cl.[4] B24B** *19/00*
**U.S. Cl. 51—241 S** **5 Claims**



1. A cutter assembly for cutting stator blades of a gas turbine, comprising:

a grinding wheel shaft;

an abrasive grinding wheel mounted on said shaft;

an arcuate grinding wheel cover for covering a substantial portion of said grinding wheel, said cover having a substantially planar, upper arm-engaging base portion;

an electrically powered motor positioned in coaxial alignment with said grinding wheel for rotating and driving said grinding wheel shaft, said motor having an electric power cord;

an upper swing arm positioned between said motor and said cover, said upper swing arm having an upper outer end portion defining an outer upper opening for rotatably receiving said grinding wheel shaft and an upper inner end portion defining an inward upper pair of substantially parallel, elongated slots, said upper outer end portion having an arcuate outer edge, said upper arm having an upper, substantially planar, inwardly facing surface extending between and connecting said upper end portions and an upper, substantially planar, outwardly facing surface extending between and connecting said upper end portions and positioned substantially parallel to said upper inwardly facing surface, said upper inwardly facing surface having a cover-engaging portion adjacent said upper outer end portion for abutting against and engaging said base portion of said cover and said upper outwardly facing surface having a motor-engaging portion adjacent said upper outer end portion for abutting against and engaging said motor;

a lower swing arm secured to said upper swing arm, said lower swing arm having a lower outer end portion defining an outer lower opening positioned diametrically opposite said upper opening and a lower inner end portion defining a pair of bolt-receiving threaded holes aligned in registration with said slots of said upper arm, said lower end portion having an arcuate edge, said lower arm having a lower, substantially planar, inwardly facing surface extending between and connecting said lower end portions and a lower, substantially planar, outwardly facing surface extending between and connecting said lower end portions and positioned substantially parallel to said lower inwardly facing surface, said lower inwardly facing surface having a central coupling-engaging portion positioned in proximity to said lower outer end portion and having an inner counterweight-engaging portion positioned adjacent said lower end portion, and said lower outwardly facing surface having an outer counterweight-engaging surface positioned adjacent said lower end portion;

a counterweight shaft extending through said outer lower opening of said lower swing arm, said counterweight shaft having an inner portion and an outer portion;

at least one inner counterweight secured on said inner portion of said counterweight shaft and abutting against and engaging said inner counterweight-engaging portion of said lower arm for substantially counter-balancing said grinding wheel and cover;

at least one outer counterweight secured on said outer portion counterweight shaft and abutting against and engaging said outer counterweight-engaging portion of said lower arm for substantially counterbalancing said motor;

an adjustment assembly connected to said arm for adjusting the overall length and diameter of rotation of said arms, said adjustment means including a set of fasteners extending through said slots of said upper arm and threadedly engaging said threaded holes of said lower arm;

a coupling connected to said central coupling-engaging portion of said lower arm;

a driven gear shaft connected to said coupling and positioned substantially perpendicular to said inwardly facing surface of said lower arm;

a wheel-actuated drive shaft positioned in coaxial alignment with said gear shaft;

a reduction gear assembly comprising a set of intermeshing reduction gears positioned between and operatively connected to said drive shaft and said driven shaft for substantially reducing the angular speed of rotation of said driven shaft relative to said drive shaft;

a manually operable steering wheel having a hub connected to said drive shaft for rotating said arms, grinding wheel, motor and counterweights about said coupling and gear shaft, to selectively engage the grinding wheel in cutting engagement with the stator blades of a gas turbine;

a control panel operatively connected to said electric power cord and having a manually operable switch for selectively activating said motor;

a saddle assembly having a generally U-shaped portion for supporting said reduction gear assembly, said U-shaped portion having substantially parallel, upwardly extending legs with upper and lower portions and a substantially horizontal gear assembly-supporting member extending between and connecting said lower portions of said legs, said saddle assembly having substantially horizontal, elongated, cantilevered support arms extending laterally outwardly in opposite directions from said upper portions of said legs for supporting said control panel, and said support platforms having lateral guide members with substantially planar, downwardly facing portions providing guide plates for seating upon sections of the compressor case of said gas turbine to facilitate setup and efficiency of cutting with said grinding wheel;

an upright barrier wall positioned between said saddle assembly and said rotatable arms carrying said grinding wheel, said upright barrier wall defining a gear shaft-receiving opening and having an upper transparent safety shield for permitting viewing of the grinding wheel while protecting the operator's upper body, arms, face, and eyes and an arcuate guard plate extending substantially downwardly from said safety shield for protecting the operator's legs from flying metal chips and other debris during operation of said cutter assembly.

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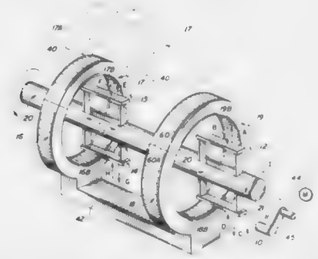


**4,741,129**

## METHOD AND APPARATUS FOR HONING TRUCK RING GEAR BEARING SURFACES

**Robert Blake, 1444 S. 8th St., Phoenix, Ariz. 85034**

**Filed Apr. 1, 1987, Ser. No. 34,031**
**Int. Cl.[4] B24B** *5/01*
**U.S. Cl. 51—290** **1 Claim**



1. A method for truing the coaxial cylindrical inner surfaces of the spaced apart differential bearing cap assemblies mounted on a base in a truck axle drive unit, said cylindrical surfaces normally carrying a cup which receives a differential bearing, said differential bearing cap assemblies each including

a lower generally semicircular portion attached to said base and including a portion of one of said coaxial cylindrical inner surfaces, said lower portion having a pair of planar surfaces each with an aperture formed therein, and

an upper generally semicircular portion including a portion of said one of said coaxial cylindrical inner surfaces and having

a pair of planar surfaces opposed to and normally contacting said planar surfaces of said lower portion, and

a pair of guide means each outwardly extending from one of said planar surfaces of said upper member and received by one of said apertures in said planar surfaces of said lower portion,

said method comprising the steps of

(a) removing said cup and differential bearing from said coaxial inner surface of each of said differential bearing cap assemblies;

(b) removing said upper generally semicircular portion from at least one of said differential bearing cap assemblies;

(c) abrading and truing each planar surface of at least one of said upper portions on grinding apparatus, said grinding apparatus including

(i) a generally convex rotating abrading surface with an opening formed through the center thereof; and,

(ii) a depressible member extending through said opening and having an aperture sized to slidably receive said guide means,

each of said planar surfaces being abraded and trued by placing said guide means in said aperture and pressing said planar surface against said rotating convex surface;

(d) attaching said upper generally semicircular portions to one of said lower portions;

(e) honing at least one of said coaxial cylindrical inner surfaces with abrading apparatus, said abrading apparatus including

(i) a rotating shaft,

(ii) at least a pair of expansible and contractible honing tools spaced apart and carried on said shaft, at least one of said tools comprising an abrasive stone,

(iii) means for rotating said shaft,

(iv) means for reciprocating said shaft to repeatedly traverse said honing tools over said coaxial cylindrical inner surfaces, and

(v) means for independently expandibly and contractibly adjusting each one of said honing tools independently of the other of said honing tools,

said honing of said cylindrical inner surface including the steps of

(vi) placing said shaft and honing tools inside said cylindrical inner surfaces,

(vii) operating said adjustment means to expand each of said honing tools against one of said cylindrical inner surfaces, and

(viii) operating said reciprocating means and rotating means to rotatably reciprocate said honing tools over said cylindrical inner surfaces.

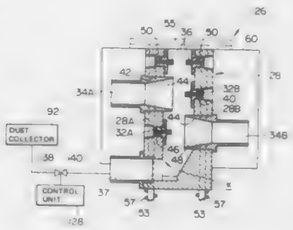
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**4,741,130**

## METHOD AND APPARATUS FOR SANDBLASTING A WORKPIECE

**Teruo Tano, Tokyo, and Shuji Hamada, Yokohama, both of Japan, assignors to Niigata Engineering Co., Ltd., Tokyo, Japan**

**Filed Aug. 1, 1986, Ser. No. 893,039**
**Claims priority, application Japan, Aug. 6, 1985, 60-172712**
**Int. Cl.[4] B24C** *1/04, 3/22*
**U.S. Cl. 51—319** **19 Claims**




1. A method of sandblasting a workpiece having a face, comprising the steps of:

(a) placing the workpiece at a machining position;

(b) sucking air around the workpiece at the machining position in a first direction to produce air streams; and

(c) during the suction step (b), blowing abrasive grains against the face of the workpiece in a second direction for sandblasting the workpiece, said second direction crossing the first direction at an angle $\theta$ smaller than 90°, whereby abrasive grains blown against peripheries of the workpiece are larger in velocity than abrasive grains blown against a central portion of the workpiece for reducing damage to the central portion of the workpiece due to the blown abrasive grains and for sandblasting the peripheries of the face.

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**4,741,131**

## ROOF STRUCTURE

**Geoffrey C. Parker, P.O. Box WK610, Warwick 7, Bermuda**

**Filed Nov. 25, 1986, Ser. No. 934,645**
**Int. Cl.[4] E04D** *3/32, 1/30*
**U.S. Cl. 52—15** **14 Claims**

1. Roof structure for use on a building having rafters sloping downwardly from a ridge and having purlins connecting the upper surfaces of the rafters, comprising:

(a) a series of elongated plank elements extending across the rafters and parallel to the purlins, each plank element having a main body of generally rectangular cross-section formed with a water-impermeable skin enclosing a lightweight reinforced interior mass, each plank having a tail member extending from one edge and constituting an extension of one flat surface, the main body of each upper

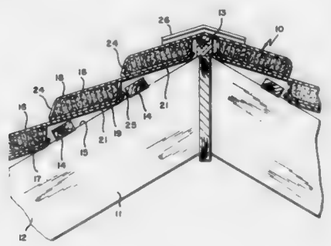
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adjacent plank resting on the extension member of its next lower adjacent plank,

(b) a ridge element of tent-like configuration bridging the plank elements adjacent the ridge,

(c) an eave element overlying the lower ends of the rafters and is similar in construction to a plank element, except that the upper and lower surfaces lie at an angle to one another so that they are further apart at the lower edge than they are at the upper edge from which a tail member extends,



(d) a rainwater guide element overlying one of the plank elements, the rainwater guide element having a main body of triangular cross-section whose base lies on the upper surface of the plank element and having a tail member that extends from the base and overlies the tail member of the plank element, and

(e) a gutter element consisting of a trough member from which extends a tail member, the tail member extending under and held in place by the main body of the eave element.

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**4,741,132**

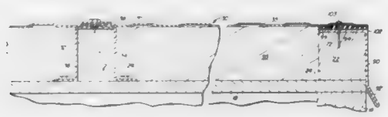
**MULTIPLE PANEL METAL ROOFING SYSTEM WITH OVERLAPPING PANEL EDGES**

**Robert T. Emblin, 5150 E. Paradise Dr., Scottsdale, Ariz. 85254**

**Continuation of Ser. No. 608,350, May 8, 1984, abandoned, which is a continuation of Ser. No. 274,492, Jun. 17, 1981, abandoned. This application Apr. 27, 1987, Ser. No. 43,166**

**Int. Cl.⁴ E04D** *1/28*

**U.S. Cl. 52—58** **24 Claims**



1. A roofing system comprising:

(a) a plurality of elongated support members forming a grid-like supporting frame structure secured to a continuous, load bearing roof deck;

(b) said supporting frame structure defining a plurality of grid sections each having a predetermined length and opposing, spaced apart ends defining the perimeter of each grid section;

(c) said supporting frame structure including a plurality of elongated support members having an upper surface spaced apart from the roof deck by a defined height to form a profile surface of said grid sections;

(d) filler means disposed within each grid section and extending up to about said defined height to provide a substantially continuous, substantially planar surface covering the roof deck within each grid section;

(e) a plurality of outer skin sections each having an edge surface extending around the perimeter of each skin section and each being freely disposed over said filler means without bonding thereto, the intersection of the edge surfaces of each skin section with the edge surfaces of adjacent skin sections defining an elevated overlap zone where the edge surfaces of each skin section overlap both the upper surfaces of the support members defining each grid section and the edge surfaces of adjacent skin sections surrounding said skin section;

(f) sealant means disposed within the elevated overlap zone between the overlapping edge surfaces of each skin section and each adjacent skin section; and

(g) means penetrating through the skin section, the adjacent skin sections and the sealant means at spaced apart intervals within the elevated overlap zone along the entire perimeter of each grid section for compressively securing the overlapping edge surfaces to the support members to form an immovable, watertight seal along the entire perimeter of each grid section;

whereby the surface of each outer skin section lying inside the perimeter of each grid section is free to expand or contract in response to temperature changes without causing relative movement of the watertight seal.

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**4,741,133**

**TRANSPORTABLE SHELTER**

**Jürgen Kutzner, Alsenstrasse 26b, D-1000 Berlin 39, Fed. Rep. of Germany**

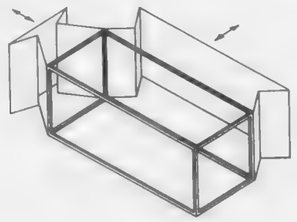
**PCT No. PCT/DE86/00091, § 371 Date Nov. 3, 1986, § 102(e) Date Nov. 3, 1986, PCT Pub. No. WO86/05223, PCT Pub. Date Sep. 12, 1986**

**PCT Filed Mar. 5, 1986, Ser. No. 926,087**

**Claims priority, application Fed. Rep. of Germany, Mar. 5, 1985, 3508188**

**Int. Cl.⁴ E04B** *1/344, 1/343*

**U.S. Cl. 52—79.5** **14 Claims**



1. A shelter with dimensions reducible for transport, having a box-like structure including four side walls in the transport configuration, characterized in that in order to enlarge the inner space and based on the box-like structure, each of said side walls is outwardly movable mainly parallel to its position in the transport configuration, wherein are provided for creating the connecting between the box-like basic structure and each movable side wall:

additional side walls, connected to each movable side wall as well as to the box-like basic structure, disposed accordion-like in foldable fashion, and a floor and a ceiling plate each for the room area enlarged over the box-like basic structure, which are hingeably fastened on the upper or lower edge of the box-like basic structure,

and in that the lateral distance of the movable side wall from the box-like basic structure in its outwardly displaced state is generally equal to the height of the basic structure.



**4,741,134**

**COMPOSITE METAL/CONCRETE BAR JOIST FLOOR AND METHOD**

**Larry A. Stohs, Columbia, S.C., assignor to Consolidated Systems, Inc., Columbia, S.C.**

**Continuation-in-part of Ser. No. 626,721, Jul. 2, 1984. This application Oct. 22, 1985, Ser. No. 790,307**

**Int. Cl.⁴ E04B** *5/48;* **E04F** *19/08;* **H02G** *3/18, 3/28*

**U.S. Cl. 52—221** **17 Claims**



1. An electrified floor comprising:

a plurality of spaced bar joists defining the area of a floor;

an electrical distribution raceway carried by an adjacent pair of said bar joists parallel thereto at an elevation below the upper surface of said bar joists;

a metal electrical distribution header carried by said bar joists at an elevation above the upper surface thereof and in an orientation normal thereto;

a metal corrugated form deck carried in areas other than those of said header and said raceway by said bar joists in a side-by-side relationship at an elevation above the upper surface thereof to thereby form a continuous deck over said floor area; and

concrete overlying said form deck and said electrical distribution raceway to thereby form an electrified floor.

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**4,741,135**

**MODULAR STRUCTURE FOR A PREFABRICATED BUILDING**

**Juan A. M. Baena, Barriada de los Millones Bloque, 5 Bajo Malaga, Spain**

**Filed May 29, 1986, Ser. No. 868,638**

**Claims priority, application Spain, Jun. 5, 1985, 543.952; May 22, 1986, 555.227**

**Int. Cl.⁴ E04C** *3/10*

**U.S. Cl. 52—227** **18 Claims**

1. A modular structure for a prefabricated building, comprising:

at least two slab-shaped modules, each module having opposite generally-planar faces and edges therebetween, correspondingly-positioned blind bores opening perpendicularly into the edges and at least one other bore opening perpendicularly into at least one of the generally-planar faces of the module from each blind bore;

support means adjustably supporting the modules with an edge of one module juxtaposed with an edge of another module for opposing at least some of the blind bores thereof, whereby the modules may be coupled at the thereby-coupling, juxtaposed edges;

fasteners, each expanding with diverging frustrum-of-the-cone sectors into heads at opposite ends thereof, respectively in at least some of the opposing blind bores with the heads thereof respectively surpassing slightly the axes of the other bores opening from blind bores the fasteners are in; and

setscrew means respectively in the other bores, each setscrew measn comprising a setscrew having a frustrum-of-the-cone front end in the other bore and abutting means for abuttlingly affecting the frustrum-of-the-cone sector of the fastener in the blind bore from which the other bore with the setscrew opens with the end of the setscrew, whereby to couple between the coupling edges of the juxtaposed modules.

**4,741,136**

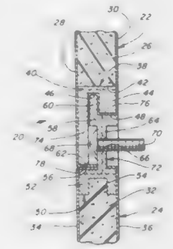
**EDGE FASTENER FOR CAULKLESS JOINTED PANELS**

**Gerald M. Thompson, 1437 Creekside Dr., Wheaton, Ill. 60187**

**Filed Oct. 8, 1986, Ser. No. 916,789**

**Int. Cl.⁴ E04C** *1/10, 2/20*

**U.S. Cl. 52—302** **9 Claims**



1. The combination of a two-piece edge fastener with two building panels having adjoining edges, one of said two pieces of said edge fastener being bonded to the adjoining edge of the first of said two building panels and the other of said two pieces being bonded to the adjoining edge of the second of said two building panels, each of said panels having an interior face and an exterior face, said edge fastener being adapted to secure said two panels to a substrate or supporting structure with the interior face of each panel adjacent said substrate or supporting structure, said edge fastener comprising:

(a) a first, female fitting having an inner base portion bonded to the adjoining edge of one of said panels, and an outer portion defining a cavity with a shoulder on one side thereof;

(b) a second, male fitting having an inner base portion bonded to the adjoining edge of the other of said panels, and an outer portion carrying an outwardly extending protuberance, the free end portion of said protuberance having a shape at least generally complementary to the shape of said cavity, said outer portion of the male fitting having a shoulder on one side of said protuberance;

(c) a fastening flange extending rigidly outwardly from the outer portion of one of said two fittings adjacent the interior faces of said two panels when the panels are installed in place, said flange defining a hole for receiving the hereinafter mentioned fastener and having a free end portion;

(d) a fastener having an enlarged head and a shank for attaching said fastening flange of said one fitting to said substrate or supporting structure; and

(e) a masking member extending rigidly outwardly from the outer portion of the other of said two fittings to conceal said fastener head from view when the fastener is installed in place securing said one fitting to said substrate or supporting structure, said masking member having a midportion and a free end and being spaced for at least a portion of its length from said fastening flange to provide clearance for said fastener head, said clearance for said fastener head extending from said midportion of said masking member to said free end thereof.

said female fitting and either (i) said fastening flange or (ii) said masking member being integrally formed with each other, rigid throughout their extent, and formed separately from said two building panels,

said male fitting and the other of (i) said fastening flange and (ii) said masking member being integrally formed with each other, rigid throughout their extent, and formed separately from said two building panels,

the free end portion of said fastening flange that is carried by said one fitting terminating adjacent said shoulder on the other of said fittings, and the free end portion of said masking member carried by said other fitting terminat-

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ing adjacent said shoulder of said one fitting that carries said fastening flange,

each of said building panels being a laminated panel formed of a lightweight core with a thin skin layer bonded to each face thereof to form a sandwich of said core between said thin layers, the exterior skin layer of each of said panels extending beyond the outer edge of the fitting that is associated with said panel and extending inward between said two fittings.

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**4,741,137**

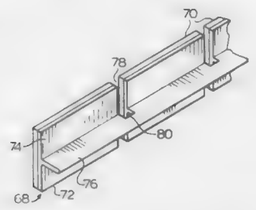
**BRICK FACING SYSTEM**

**William C. Barratt, Niagara Falls, Canada, assignor to W. C. Barratt Construction Ltd., Niagara Falls, Canada**

**Filed Aug. 5, 1986, Ser. No. 893,252**

**Int. Cl.[4] E04B *1/00***

**U.S. Cl. 52—314** **15 Claims**




1. An ornamental facing structure comprising:

an elongate base member having first and second sides in opposed facing relationship, said base member having an upper edge and a lower edge,

at least one facing member supported on said first side,

at least one thin bar member integrally formed with said base member and extending generally perpendicularly from said second side, intermediate said upper and lower edges,

said bar member being adapted to be received in a narrow elongate slot in a base structure to mount said facing structure on said base structure.

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**4,741,138**

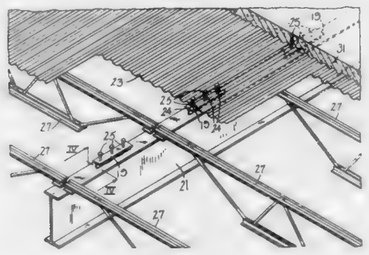
**GIRDER SYSTEM**

**James Rongoe, Jr., 52 Strawberry Hill Ct., Stamford, Conn. 06902**

**Continuation of Ser. No. 586,418, Mar. 5, 1984, Pat. No. 4,597,233. This application Jun. 3, 1986, Ser. No. 870,777**

**Int. Cl.[4] E04B *1/16***

**U.S. Cl. 52—334** **11 Claims**




1. A framed concrete slab structure comprising at least one girder having an upper surface, at least one joist intersecting said at least one girder along the upper surface of said at least one girder, said at least one joist being supported by the upper surface of said at least one girder, and continuous deck means disposed to rest on said joist spaced above said girder by said joist and adapted to receive poured concrete thereon,

shear connector mounting means mounted on said upper surface of said at least one girder and spaced away and separate from said joist, said shear connector mounting means projecting upwardly from said upper surface of said at least one girder, and

a shear connector mounted to said shear connector mounting means and projecting upwardly therefrom, said shear connector having an upper portion thereof extending through an opening defined in said continuous deck means so that said upper portion of said shear connector is adapted to be embedded in said poured concrete on said deck means.

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**4,741,139**

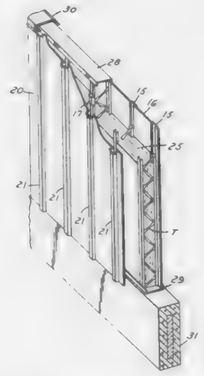
**PREFABRICATED BUILDING PANEL**

**Henry F. Campbell, 9301 Michigan Ave., Detroit, Mich. 48210, assignor to Henry Fred Campbell, Birmingham, Mich.**

**Continuation of Ser. No. 783,062, Oct. 2, 1985, which is a continuation of Ser. No. 583,149, Feb. 24, 1984. This application Oct. 8, 1986, Ser. No. 917,250**

**Int. Cl.[4] E04B *5/00***

**U.S. Cl. 52—408** **7 Claims**




1. A prefabricated panel comprising

a plurality of longitudinally extending transversely spaced trusses,

each truss comprising opposed channel members and an undulating truss member joined to and extending between said channel members,

each said channel member having a longitudinally extending base,

a first sheet having a plurality of longitudinally extending parallel grooves,

one of said channel members of each said truss extending into and fastened in at least some of said grooves,

a plurality of clips fastened to at least some of the bases of said other opposed channel members of at least some of said trusses at longitudinally spaced points along said other channel members,

each said clip including wings extending transversely of said other channel members,

and a second sheet,

said second sheet having longitudinally extending parallel grooves,

said grooves on said second sheet having a configuration such that the spring clips fastened to each of said respective channel member of each of said truss extend into said groove of said second sheet and the wings engage portions of said grooves to laterally restrain the sheet, and

each said grooves including inwardly extending flanges, exending longitudinally along each edge of said grooves, which are engaged by the wings of the clips, said flanges engaging the edges of the bases of the said channel members of said trusses on which said clips are fastened along substantially the entire length of the bases of said channel members,

said flanges extending parallel to the bases of said channel members along substantially the entire length of the bases of said channel members.



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**4,741,140**

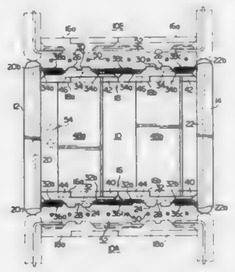
**MASONRY WALL STRUCTURE**

**Moritoshi Nakamura, c/o Cosmo Real Estate Company, Limited, No. 4-10, 4-chome, Ginza, Chuo-ku, Tokyo, Japan**

**Filed Jun. 29, 1987, Ser. No. 66,955**

**Int. Cl.[4] E04B *2/00***

**U.S. Cl. 52—427** **5 Claims**



1. A masonry wall structure comprising a number of block units laid in courses each composed of a series of block units positioned laterally adjacent to one another, wherein each of the block units comprises

(a) a front panel member of concrete,

(b) a rear panel member of concrete rearwardly spaced apart substantially in parallel from the front panel member,

(c) a pair of side panel assemblies spaced apart substantially in parallel from each other laterally of the block unit, one of the side panel assemblies extending between one lateral end portion of the front panel member and one lateral end portion of the rear panel member, each of the side panel assemblies being held in abutting contact at its front end with the inner face of the front panel member and at its rear end with the inner face of the rear panel member, adjacent two of said series of block units being spaced apart from each other laterally of the masonry wall structure by a gap defined by one of the side panel assemblies of one of the adjacent two block units and by one of the side panel assemblies of the other of the adjacent two block units, each of said side panel assemblies comprising at least one side panel member of concrete,

(d) a plurality of reinforcing bars extending horizontally through said front panel member and having opposite bent end portions projecting rearwardly from opposite end portions, respectively, of the front panel member respectively into the gaps on both sides of the block unit,

(e) a plurality of reinforcing bars extending horizontally through said rear panel member and having opposite bent end portions projecting forwardly from opposite end portions, respectively, of the rear panel member respectively into the gaps on both sides of the block unit,

(f) a plurality of connecting bars extending horizontally through each of said side panel assemblies and having end portions projecting into each of the gaps on both sides of the block unit forwardly toward the inner face of the front panel member and rearwardly toward the inner face of the rear panel member, wherein each bent end portion of each of the reinforcing bars projecting from the front panel member in part overlaps with the end portion of each of the connecting bars projecting forwardly from each of said side panel assemblies and each bent end portion of each of the reinforcing bars projecting from the rear panel member in part overlaps with the end portion of each of the connecting bars projecting rearwardly from each of said side panel assemblies,

(g) binding means by which each bent end portion of each of the reinforcing bars projecting from each of the front and rear panel members is bound to that end portion of each of the connecting bars which is overlapped by the bent end portion, and

(h) a body of curable cementitious material filling up each of said gaps for having embedded therein said bent end portions of the reinforcing bars projecting respectively from said front and rear panel members and said end portions of said connecting bars projecting from said side panel assemblies so that the adjacent two of said series of block units are interlocked together along each of said courses of the masonry wall structure.

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**4,741,141**

**BRACKET-STYLE SUPPORT ELEMENT FOR CURTAIN FACADES ON BUILDING WALLS**

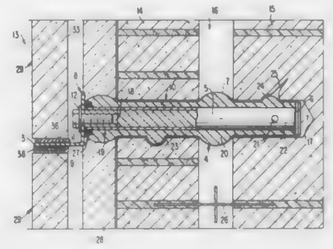
**Alfons Harke, Affligem-Hekelgem, Belgium, assignor to International INTEC, co. Establishment, Belgium**

**Filed Apr. 25, 1986, Ser. No. 855,696**

**Claims priority, application Fed. Rep. of Germany, Apr. 26, 1985, 3515146**

**Int. Cl.[4] E04B *1/4***

**U.S. Cl. 52—506** **17 Claims**



1. A bracket-style support element for curtain facades on building walls, said support element comprising:

a plurality of grouting anchors adapted to be inserted in predrilled blind holes in the building wall, with the blind holes being arranged horizontally adjacent to one another and spaced in pairs at equal intervals, each of said grouting anchors including a hollow anchoring bolt having a central channel for accommodating the grouting material;

a barbed disc provided at an insertion end of each of said anchoring bolts, each of said anchoring bolts including at least one outlet opening for enabling a discharge of the grouting material;

a grouting sleeve provided for each grouting anchor and surrounding the anchoring bolt;

sealing means provided at a forward end of the anchoring bolt so as to hold the respective grouting sleeves, said sealing means being disposed with an inwardly delimiting longitudinal segment of the anchoring bolt and grouting sleeve in a forward area of the opening of the blind hole in the building wall whereby, when the grouting material is forced into the anchoring bolt, a segment of the grouting sleeve located forwardly of the opening expands and an anchoring bulb is formed which fits around an opening of the blind hole and abuts a front of the building wall and the grouting sleeve is laterally expanded in the blind hole in the masonry wall forming a grouting material plug with internal anchoring projections, and said barbed disc is anchored in the blind hole by the grouting material plug;

said support element further comprising:

an L-shaped rail associated with each pair of grouting anchors, said L-shaped rail having a vertical leg from

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which the fastened grouting anchors project, said L-shaped rail including a horizontal support leg extending away from the building wall; and

a joint tube adapted to be inserted between adjacent curtain facades of the building wall, said joint tube being disposed at an underside of the horizontal leg support of the L-shaped rail, said joint tube being provided with an injection opening for enabling an injection of mortar whereby a plurality of curtain facades, joint tubes, and L-shaped rails produce a continuous supporting second masonry wall which is joined by said grouting anchors with the original masonry wall forming a statically stable double wall.

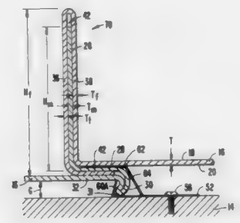
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**4,741,142**

## SLIM SEAM ROOFING PANEL

**Lyle G. Otto, Terrell, and Justin L. McNamee, Dallas, both of Tex., assignors to Alumax Inc., San Mateo, Calif.**

**Filed Aug. 20, 1986, Ser. No. 898,371**
**Int. Cl.[4] E04D** *1/34*
**U.S. Cl. 52—520** **14 Claims**



1. A slim seam roofing panel system having a plurality of roofing panel sections positioned adjacent one another, each of the roofing panel sections comprising a generally planar roofing panel section having top and bottom surfaces, and opposed side edges;

a first, upstanding male section integrally connected to the planar roofing panel section, wherein the male section has a particular height and a lower, arcuate mounting portion that is integrally connected to the planar roofing panel section; and

a second, upstanding, freestanding female section integrally connected to the planar roofing panel section at a location remote from and parallel with the male section for mounting over the male section of an identical adjoining roofing panel, wherein the female section has two substantially parallel plates connected together each of the plates having a height that is greater than the height of the male section, and a central opening formed between the two plates that snugly receives the male section of the adjacent roofing panel, whereby

the female section and the male section of the adjoining roofing panel form an assembled slim seam.

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**4,741,143**

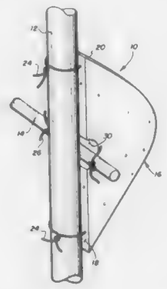
## PIER SLED WITH INTEGRAL TIE WIRES

**Thomas W. Foster, Jr., 3901 Shady Valley Dr., Arlington, Tex. 76013**

**Filed Oct. 6, 1986, Ser. No. 915,772**
**Int. Cl.[4] E04C** *5/16*
**U.S. Cl. 52—677** **11 Claims**

1. A wedge-shaped spacer adapted to hold a metal reinforcing cage away from the sides of a pier hole into which the cage is to be installed, said cage being installed prior to the step of pouring wet concrete into the hole and around the cage, comprising:

(a) wedge-shaped body of cementitious material having a first surface adapted to be positioned immediately next to an outer surface of a selected member of the reinforcing cage and the body having a second surface which is convex and which projects outwardly where it is adapted to bear against the sides of the hole, and the distance between the first and second surfaces providing a stand-off distance to hold the reinforcing cage away from the sides of the hole, and the angles of intersection between the two ends of the first surface and the convex second surface being acute angles, such that the two ends of the shaped body may be accurately described as pointed when examined in a side elevational view, and further including a concave portion in the first surface of the shaped body, and the concave portion being substantially smaller than the convex second surface, and said concave portion being located so that it may be easily juxtaposed with a spirally wrapped member of the reinforcing cage, and the sides of the shaped body being generally planar, whereby the passage of wet concrete around a vertically oriented shaped body will be facilitated; and



(b) a plurality of tie wires molded integrally with the shaped body so as to be permanently connected therewith, and the wires having portions which extend outwardly from the shaped body so as to facilitate the step of tying the shaped body to a selected member of the reinforcing cage, and said plurality of tie wires including at least two wires which are oriented longitudinally of the shaped body and at least two other wires which are oriented transversely of the shaped body.

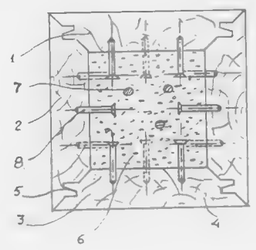
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**4,741,144**

## COMPOSITE STRUCTURAL BEAM

**Andre Graffin, Le Tremblay-Omonville, 27110, Le Neubourg, France**

**Filed Oct. 23, 1986, Ser. No. 922,467**
**Claims priority, application France, Oct. 31, 1985, 85 16179**
**Int. Cl.[4] E04C** *3/34, 3/20*
**U.S. Cl. 52—725** **13 Claims**



1. An elongated composite beam of polygonal cross-section, comprising wooden external walls defining an internal space, and a core in the space, the core comprising a material providing the beam with at least a substantial of mechanical strength, a plurality of transversely extending threaded fasteners having a threaded portion embedded partially within each wall and a threaded portion partially within the core to fasten the walls to the core, and an axially extending metal reinforcing member within said core.



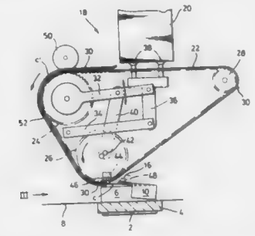
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**4,741,145**

## PACKING MACHINES

**Graham J. Bright, and Robert H. Taylor, both of London, England, assignors to Molins PLC, Milton Keynes, England**

**Filed Oct. 3, 1986, Ser. No. 914,968**
**Claims priority, application United Kingdom, Oct. 10, 1985, 8525040**
**Int. Cl.[4] B65B** *61/20*
**U.S. Cl. 53—415** **8 Claims**



1. A method of inserting coupons in packets during formation thereof, in particular cigarette packets, in which each packet has an opening end and an inner blank partly surrounding the contents at said opening end, comprising the steps of establishing the in each successive partially formed packet a gap between the contents and an edge of the inner blank remote from said opening end, feeding a coupon edgewise into said gap so that the coupon lies against the contents, and completing formation of said packet including sealing said coupon within said packet.

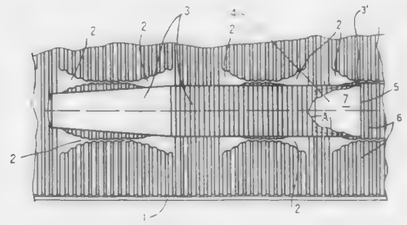
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**4,741,146**

## PACKAGING DEVICE AND METHOD FOR BOTTLE CAP SLEEVES

**Mariano B. Rialp, Barcelona, Spain, assignor to Highland Supply Corporation, Highland, Ill.**

**Filed Aug. 29, 1986, Ser. No. 901,900**
**Int. Cl.[4] B65D** *1/34*
**U.S. Cl. 53—447** **14 Claims**



1. A packaging device for bottle sleeves, comprising: a body of material, which has the general form of a tray, means defining accommodations for groups of sleeves for lateral immobilization, a retention device which is adapted to be inserted into a sleeve and means for mating and engaging said retention device with said tray to thereby immobilize said sleeves longitudinally.

7. A method of packaging bottle sleeves, said method comprising the steps of:

providing a tray having partitions defining accommodations for groups of said sleeves;

stacking said sleeves in groups and placing a retention unit in an open end of each said groups of sleeves; and

placing said groups of sleeves in said tray, the first sleeve of each said groups of sleeves abutting an edge of said tray and the retention unit of each said groups of sleeves engaging said tray.

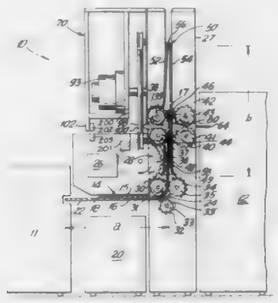
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**4,741,147**

## INSERTING APPARTUS AND PROCESS AND ENVELOPES THEREFOR

**Marvin Noll, 208 Howard Ave., Passaic, N.J. 07055**

**Filed Apr. 16, 1986, Ser. No. 852,615**
**Int. Cl.[4] B65B** *25/14, 57/12*
**U.S. Cl. 53—505** **7 Claims**



1. An inserting apparatus, comprising:

a first feeder means for sequentially feeding first sheets of material therefrom, each said first sheet having opposed first and second sides and opposed leading and trailing edges;

guide means for channelizing said first sheet along a predetermined path;

a pair of insert rollers disposed in spaced parallel relationship to one another and substantially adjacent said first side of said first sheet at a selected location along said path, said insert rollers being rotatably driven in opposite directions to define a nip therebetween;

second feeder means disposed substantially in line with the nip of the insert rollers but being substantially adjacent the second side of said first sheet, said second feeder means being operative to feed second sheets of material into contact with the first sheet at a selected location intermediate the leading and trailing edges thereof, and further being operative to urge both the first and second sheets into the nip between said insert rollers;

third feeder means for feeding envelopes having metallic material at a selected location thereon, said third feeder means being disposed to feed envelopes into a position in alignment with the nip between the insert rollers and on a side thereof opposite the second feeder, such that the first and second inserts urged through the nip between said insert rollers are urged by the insert rollers into an envelope from said third feeder means;

control means operatively connected to said first, second and third feeder means to coordinate the feeding operations thereof; and

sensing means for sensing the presence of an envelope in a position to receive said first and second sheets of material, said sensing means being in communication with said control means and said third feeder means such that said third feeder means stops after one said envelope is sensed as being in a position to receive said first and second inserts, said sensing means being operative to sense the

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presence of said metallic material, the respective locations of said sensing means on said apparatus and said metallic material on said envelope being selected such that the metallic material is sensed substantially when the envelope is in position to receive the first and second sheets of material, the sensitivity of said sensing means being such that the metallic material will not be sensed when the first and second sheets of material are inserted between the metallic material and the sensing means, whereby upon complete insertion, as sensed by the sensing means, the third feeder commences operation again.

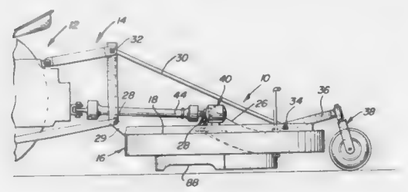
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**4,741,148**

## TRACTOR ATTACHED LEAF OR CLIPPING BLOWER/VACUUM DEVICE

**Frank E. Ekas, Sr., and Frank E. Ekas, Jr., both of 851 Ekastown Rd., Sarver, Pa. 16055**

**Filed Jul. 3, 1985, Ser. No. 751,578**
**Int. Cl.[4] A01D** *35/262*
**U.S. Cl. 56—12.9** **13 Claims**



1. A vacuum for vacuuming lawn debris and the like, said vacuum including a downwardly opening housing of generally circular plan shape, defining opposite side maximum width portions and incorporating one peripheral portion defining a generally tangentially exhaust chute opening outwardly from said housing, the lower portion of said housing being partially closed by an annular air flow shielding lower end wall having an inner periphery including a rear extremity and an outer periphery, said outer periphery being supported from the outer periphery of said housing, a depending skirt shield supported from said housing, said shield including a generally transverse depending front wall portion having opposite ends, depending opposite sidewall portions having front and rear ends and extending rearwardly from the opposite ends of said front portion and substantially tangential to the opposite side maximum width portions of said housing and rearwardly convergent depending opposite side rear wall portions extending rearwardly and inwardly from the rear ends of said sidewall portions and joined at their rear ends, the rear ends of said opposite side rear wall portions being joined at a point generally registered with the rear extremity of the inner periphery of said annular lower end wall, and a rotary blade assembly journalled within said housing above said lower end wall for rotation about an axis generally coaxial with said annular lower end wall, said blade assembly including generally radial blade members whose outermost ends are spaced inward of the internal surfaces of said housing and outward of the inner periphery of said lower end wall.

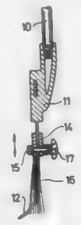
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**4,741,149**

## GARDEN AND/OR YARD-CLEANING IMPLEMENT

**Hans vom Braucke, Vlotho; Manfred vom Braucke, Bielefeld, and Dieter Westerwelle, Bielfelder, all of Fed. Rep. of Germany, assignors to Bielefelder Kuchenmaschinen-und Transport-geratefabrik vom Braucke GmbH, Bielefeld, Fed. Rep. of Germany**

**Filed Dec. 18, 1986, Ser. No. 943,055**
**Claims priority, application Fed. Rep. of Germany, Dec. 21, 1985, 8536153[U]**
**Int. Cl.[4] A01D** *7/10*
**U.S. Cl. 56—400.04** **2 Claims**



1. A cleaning implement for gardens or yards, comprising:
an elongated handle having a lower end;
a transverse elongated plate secured to the lower end of said handle;
a plurality of flat resilient tines having upper and lower ends and being secured by their upper ends to said elongated plate, the lower ends of said tines terminating in a curved portion;
an elongated adjustment bar adjustably secured to and slidably mounted on said tines and being disposed in parallel relation to said elongated plate;
a plurality of broom tufts having upper and lower ends and being secured by their upper ends to said adjustment bar and extending downwardly therefrom; and
the length of said tines being sufficient to permit said elongated bar to be vertically adjusted thereon so that the lower end of said broom tufts can be positioned in a range of positions from above the lower ends of said tines to below said lower ends of said tines.

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**4,741,150**

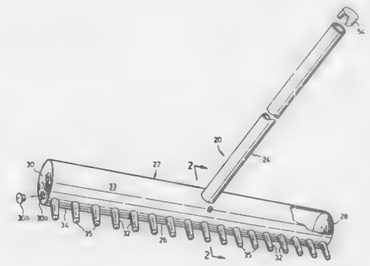
## REVERSIBLE TOOL HEAD AND TOOL FOR SMOOTHING GRANULAR MATERIAL

**John L. Saksun, Islington, Canada, assignor to Saksun Holdings Ltd., Islington, Canada**

**Filed Mar. 7, 1986, Ser. No. 837,115**
**Claims priority, application Canada, Oct. 24, 1985, 493742**
**Int. Cl.[4] A01D** *7/00*
**U.S. Cl. 56—400.21** **13 Claims**

1. A reversible tool head for smoothing a surface of granular material, said reversible tool head comprising:
a body which is curvilinear in cross-sectional profile, and has a diameter, said body having horizontal material contacting surfaces,
a plurality of tines extending from one side of the body, the length of the tines being less than said diameter;
a first surface on the body, curved in profile, on one side of the tines for preventing material building up ahead of the tines,
a second surface on the body, curved in profile, on the other side of the tines for smoothing the surface of the material which the tines have passed through,
and





a third surface, curved in profile, on the opposite side of the body from the tines for final smoothing of the material upon reversing the head.

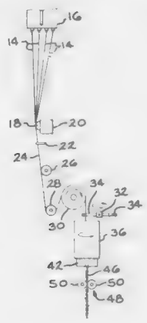
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**4,741,151**

## METHOD AND APPARATUS FOR THE MANUFACTURE OF GLASS FIBER BULK STRAND ROVING

**Jerome P. Klink, and Hellmut I. Glaser, both of Granville, Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio**

**Filed Apr. 30, 1987, Ser. No. 44,182**
**Int. Cl.[4] D01H** *7/00;* **D02G** *3/18, 3/22;* **D02J** *1/02*
**U.S. Cl. 57—350** **25 Claims**



1. A method of forming a roving from a plurality; of fibers, the roving having axially extending loops, and a relatively large number of unbroken cross-axially extending loops formed in the axially extending loops and at least partly extending outwardly from the axially extending loops, the axially extending loops and the cross-axially extending loops being interengaged and intertwined with one another, the roving having a relatively high bulk, said method comprising the steps of:
providing a plurality of fibers;
combining said plurality of fibers into a plurality of strands, each of said strands comprising more than one of said fibers;
providing a wheel with a plurality of fingers projecting outwardly therefrom and a central axis;
rotating said wheel about said central axis;
advancing said plurality of strands in a direction that extends axially of said plurality of strands toward and between the fingers of said wheel as said wheel rotates about said central axis to form a plurality of axially extending loops in each of said plurality of strands;
providing a spinner having an inside surface defining a passage with an inlet, an outlet and an axis extending between said inlet and said outlet to receive said plurality of strands with said plurality of loops from said fingers of said wheel;
providing an orifice adjacent said outlet of said passage of said spinner, said orifice having an axis that is generally parallel to said axis of said passage of said spinner, the size of said orifice in a plane extending transversely of said axis of said orifice being very small relative to the size of said passage in a plane extending transversely of said passage;
rotating said spinner about said axis of said passage;
advancing said plurality of strands with said plurality of loops through said passage of said spinner from said inlet to said outlet to thereby twist said plurality of strands with said plurality of loops and form a mass of said plurality of strands with said plurality of loops in said spinner adjacent said outlet of said passage, said mass having no appreciable velocity in a direction extending axially of said plurality of strands with said plurality of loops to form a second plurality of loops in said plurality of strands with said plurality of loops, said second plurality of loops extending crosswise of said plurality of strands with said plurality of loops to interengage and intertwine with said plurality of strands with said plurality of loops and other loops in said second plurality of loops; and
withdrawing said plurality of strands with said plurality of loops and said second plurality of loops from said mass in said spinner through said orifice.

13. Apparatus for forming a roving from a plurality of fibers, the roving having generally axially extending loops, a relatively large number of unbroken, cross-axially extending loops formed in the axially extending loops and at least partly extending outwardly from the axially extending loops, the axially extending loops and the cross-axially extenidng loops being interengaged and intertwined with one another, the roving having a realtively high bulk, said apparatus comprising, in combination;
means for providing a plurality of fibers;
means for combining said plurality of fibers into a plurality of strands, each of said strand scompriisng more than one of said fivers, the number of strnads in said plurality of strand being less than the number of fibers in said plurality of fibers;
a wheel having a plurality of fingers projecting outwardly therefrom and a central axis;
means for rotating said wheel about said central axis;
means for advancing said plurality of strands in a direction that extends axially of said plurality of strands and between said fingers of said wheel as said wheel rotates about said central axis to form a plurality of axially extending loops in said plurality of strands;
a spinner having an inside surface defining an interior passage to receive said plurality of strands with said plurality of axially extending loops from said wheel, said interior passage having an inlet, an outlet, and an axis extending between said inlet and said outlet;
orifice means defining an orifice, said orifice means being disposed adjacent said outlet of said passage of said spinner, said orifice means having an axis that is generally parallel to said axis of said passage of said spinner, the size of said oriifce of said orifice means in a plane extending transversely of said axis of said orifice being very small relative to the size of said passage in a plane extending transversely of said interior passage, said means for advancing said plurality of strands with said plurality of axially extending loops into said spinner and through said interior passage from said inlet to said outlet to form a mass of said plurality of strands within said spinner adjacent said outlet, said mass having no appreciable velocity in a direction extending axially of said plurality of strands with said plurality of axially extending loops; and
means for rotating said spinner to twist said plurality of strands with said plurality of axially extending loops and to form a second plurality of loops in said mass of said plurality of strands with said plurality of axially extending

loops, said second plurality of loops extending crosswise of said plurality of strands with said plurality of axially extending loops to interengage and intertwine with said plurality of strands with said plurality of axially extending loops and other loops in said second plurality of loops, said means for advancing further being effective to withdraw said plurality of strands with said plurality of axially extending loops and said second plurality of loops from said mass in said spinner through said orifice means.

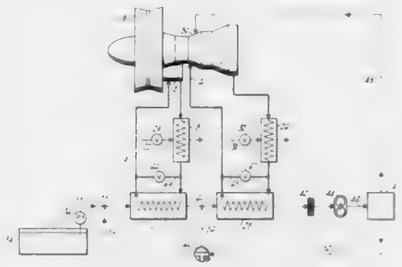
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**4,741,152**

## FUEL AND OIL HEAT MANAGEMENT SYSTEM FOR A GAS TURBINE ENGINE

**Donald N. Burr, Glastonbury; Paul S. Danilowicz, Manchester; Thomas C. Franz; Thomas P. Mortimer, both of Bolton, and Edward B. Pero, Somers, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.**

**Division of Ser. No. 870,192, Jun. 3, 1986, Pat. No. 4,696,156.**
**This application May 15, 1987, Ser. No. 50,261**
**Int. Cl.[4] F02C** *7/06, 7/224*
**U.S. Cl. 60—39.02** **2 Claims**



1. A method for distributing heat energy among a first oil loop, a second oil loop, and a fuel stream flowing into a main fuel pump, the fuel stream being inclusive of a bypass flow of fuel diverted from the fuel flowing from the main fuel pump and returned to the fuel stream upstream of the main fuel pump, comprising the steps of:

sequentially passing at least a portion of the fuel flowing into the main pump through a first fuel-oil heat exchanger coupled to the first oil loop and a second fuel-oil heat exchanger coupled to the second oil loop; and

distributing the bypass flow of fuel among a plurality of return locations upstream of the main fuel pump responsive to a desired heat energy transfer among the first oil loop, the second oil loop and the flowing fuel stream.

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**4,741,153**

## SYSTEM FOR CONTROLLING HEAT EXPANSION AND THERMAL STRESS IN A GAS TURBINE DISK

**Claude C. Hallinger, and Robert Kervistin, both of Le Mee Sur Seine, France, assignors to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation, "S.N.E.C.M.A.", Paris, France**

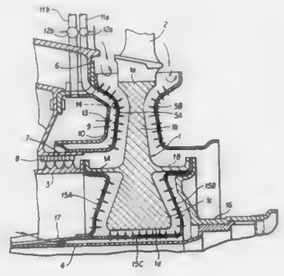
**Filed Oct. 14, 1982, Ser. No. 434,423**
**Claims priority, application France, Oct. 14, 1981, 81 19293**
**Int. Cl.[4] F02C** *7/12*
**U.S. Cl. 60—39.07** **8 Claims**

1. Means for controlling heat expansion and thermal stress in a turbine rotor disk of a gas turbine machine including a turbine rotor disk having a radially inner bulb portion, a radially intermediate web portion and a radially outer rim portion, said means for controlling comprising:

perforated plates associated with at least one surface of each of at least two of said disk portions, each said perforated plate having a first side extending parallel to, and spaced from, the corresponding surface of said disk portion;

separate first conduit means associated with each of said at least two disk portions for communicating a second side of each said perforated plate with a source of cool air flow;

separate second conduit means associated with each of said at least two disk portions for communicating said second side of each said perforated plate with a source of hot air flow;



valve means in said first and second conduit means for regulating the flow of air therethrough; and

control means connected to said valve means, whereby the radial temperature gradient of said disk is reduced during all operating phases of said gas turbine machine.

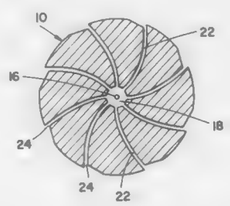
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**4,741,154**

## ROTARY DETONATION ENGINE

**Shmuel Eidelman, Rockville, Md., assignor to The United States of America as represented by the Secretary of the Navy**

**Filed Mar. 26, 1982, Ser. No. 362,377**
**Int. Cl.[4] F02C** *3/14, 5/02*
**U.S. Cl. 60—39.34** **32 Claims**



1. In an engine of the type wherein the combustion of the fuel mixture is carried out by a detonation wave, the improvement comprising:

(a) an elongated shaft having a central longitudinal chamber, said chamber being supplied with a detonatable fuel mixture;

(b) a plurality of axisymmetrical elements integral with said shaft and disposed along the length thereof, each said axisymmetrical element having a central annular initiation chamber and a plurality of ducts extending outward from said initiation chamber to exhaust openings on the periphery of the axisymmetrical element, said ducts having a cross-sectional area which permits propagation of detonation waves;

(c) means for selectively introducing said detonatable mixture from said central chamber into the initiation chamber of each said axisymmetrical element and the ducts of said axisymmetrical element; and

(d) means for selectively initiating detonation of said fuel mixture in the initiation chamber of each said axisymmetrical element, whereby ignition and detonation of fuel mixture in said initiation chamber will produce a detonation wave which travels outward from such initiation chamber in said ducts to initiate fast combustion of the fuel mixture in said ducts, the combustion products being



exhausted from said exhaust openings in the form of high speed jets oriented to produce a rotational moment in said element and said shaft.

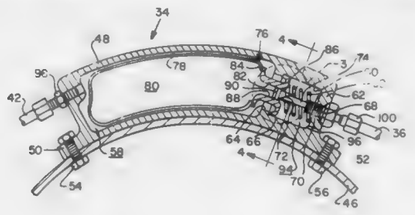
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**4,741,155**

## LUBRICATION METHOD AND APPARATUS

**Robert S. McCarty, Phoenix, Ariz., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.**

**Division of Ser. No. 806,587, Dec. 9, 1985, Pat. No. 4,697,414.**
**This application Jun. 3, 1987, Ser. No. 57,393**
**Int. Cl.[4] F02C** *7/06;* **B67B** *7/24*
**U.S. Cl. 60—39.02** **11 Claims**



1. In a combustion turbine engine comprising a bearing member journaling a rotatable component, and compressor means providing pressurized air, the method of providing liquid lubricant to said bearing member comprising the steps of:

providing said liquid lubricant sealed within a collapsible and penetrable bladder member;

enclosing said bladder member and lubricant within a substantially closed housing sealingly cooperating with said bladder member to define a pair of chambers;

arranging a penetrating lance member in one of said pair of chambers in confronting relationship with said bladder member;

providing communication of said pressurized air with the other of said pair of chambers to force said bladder member into impaled sealing relationship with said lance member;

communicating said lubricant to said bearing member via said lance member; and

utilizing said pressurized air within said other chamber to collapse said bladder member, simultaneously flowing said lubricant to said bearing member.

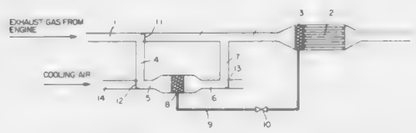
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**4,741,156**

## PROCESS FOR IGNITING A REGENERATIVE SOOT FILTER IN THE EXHAUST GAS CONNECTION OF DIESEL ENGINES

**Helmut Buchner, Baltmannsweiler, Fed. Rep. of Germany, assignor to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany**

**Filed Oct. 24, 1986, Ser. No. 922,952**
**Claims priority, application Fed. Rep. of Germany, Oct. 26, 1985, 3538148**
**Int. Cl.[4] F01N** *3/02;* **F28D** *15/00*
**U.S. Cl. 60—303** **8 Claims**




1. A process for the ignition of a soot combustion filter in an exhaust gas connection of a diesel engine, comprising the steps of charging with hydrogen under a pressure of 5 bar or more a first storage container in heat-conducting connection with the soot combustion filter, said first storage container containing at least one of a hydride-forming alloy and a hydride-forming metal that heats up to a temperature level of at least 650° C. when charged with hydrogen under a pressure of 5 bar or more,

taking the hydrogen from a second storage container which contains at least one of a metal hydride and a metal alloy hydride that releases, at a temperature within the range of 250° to 400° C., hydrogen under a pressure of more than 5 bar in said first storage chamber, at least one said metal hydride and a metal alloy hydride being heated up by the exhaust gases to a temperature within the range of 250° to 400° C., cooling the second storage container after the ignition of the soot combustion filter to a temperature at which a hydrogen pressure of 1 bar or less establishes itself within the second storage container, and conducting the hydrogen from the first storage container, which is heated up by the exhaust gases, back to the second storage container.

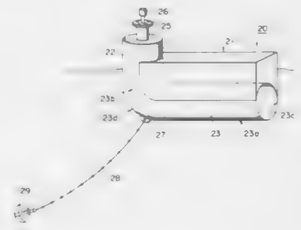
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**4,741,157**

## WAVE-ACTIVATED POWER GENERATING APPARATUS HAVING A BACKWARDLY OPEN DUCT

**Koichi Nishikawa, 58, Komatsu-cho, Toyohashi-shi, Aichi-ken, Japan**

**Filed Apr. 1, 1987, Ser. No. 33,978**
**Claims priority, application Japan, Apr. 1, 1986, 61-72428**
**Int. Cl.[4] F03B** *13/12*
**U.S. Cl. 60—398** **14 Claims**



1. A wave-activated power generating apparatus, comprising:

a generally L-shaped duct including a vertically extending portion and a horizontally extending portion which is in fluidic communication with the vertically extending portion, said horizontally extending portion having an open rear end;

a floatable main body fixedly attached to said duct as located rearwardly of said vertically extending portion with respect to the advancing direction of travelling waves moving past the apparatus in operation;

generating means for generating electric energy, said generating means being mounted to be in operative association with an air flow discharged out of said duct; and

mooring means for mooring the apparatus such that the apparatus floats on the water surface with said open rear end of said horizontally extending portion directed backwardly with respect to the advancing direction of travelling waves.

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**4,741,158**

## CONTROLS FOR DRIVE SYSTEM WITH CONTINUOUSLY ADJUSTABLE DRIVE UNITS

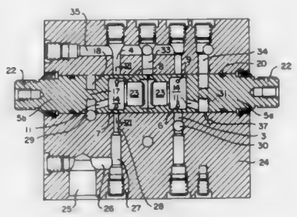
**Horst Deininger, Horstein/Alzenau; Binio Binev, Sulzbach-/Main, and Wolfgang Grone, Aschaffenburg, all of Fed. Rep. of Germany, assignors to Linde Aktiengesellschaft, Wiesbaden, Fed. Rep. of Germany**

**Continuation of Ser. No. 634,121, Jul. 25, 1984, abandoned. This application Feb. 18, 1987, Ser. No. 15,937**

**Claims priority, application Fed. Rep. of Germany, Jul. 26, 1983, 3326926**

**Int. Cl.⁴ F01B** *251/00*

**U.S. Cl. 60—443** **28 Claims**



1. In a control for the drive of a working machine, such as a forklift, equipped with a continuously adjustable hydraulic drive unit, an adjusting element for adjusting said hydraulic drive unit in which the setting of the adjusting element of the drive unit is adjustable by means of a control-pressure, and a first control-pressure adjusting element for adjusting the control-pressure, the improvement comprising at least one restrictor in said first control-pressure adjusting element and a second control-pressure element having at least one restrictor therein connected to the first control-pressure adjusting element acting to influence the control-pressure at the control-pressure at the first adjusting element and wherein the control-pressure adjusting element has two series-connected restrictors in a rotary slide valve that is rotatably supported in a slide valve borehole of a housing, a cavity in said slide valve intermediate the restrictor, an inlet borehole in the housing connected at one end with a source of pressure medium, and at the other with the valve borehole, a drain hole in the housing connected at one end with a drain line and at the other with the valve borehole opposite the inlet borehole, a control-pressure borehole in said housing connected with a line leading to a regulating unit of the drive unit, said inlet borehole and said drain hole lie opposite each other and the control-pressure line is connected with the cavity of the rotary slide valve and perforations are arranged in the wall of the cavity of the rotary slide valve so that in the neutral position of the rotary slide valve the inlet borehole is completely covered by a wall of the slide valve and the drain hole is at least partly covered and with increasing rotation to an end position in one direction of the rotary slide valve one of the perforations, together with the mouth of the inlet borehole forms one of said two series connected restrictors and a second perforation, together with the mouth of the drain hole, forms the second of said series connected restrictors, which second restrictors are completely closed in the rotation end position of the rotary slide valve, and the perforation collaborating with the mouth of the inlet borehole lies in front of the full width of the mouth of the inlet borehole in this swivelling end position of the rotary slide valve.

**4,741,159**

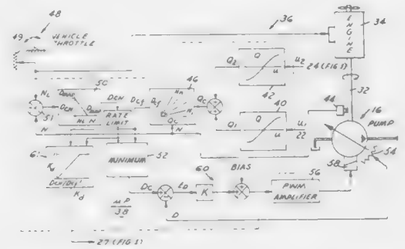
## POWER TRANSMISSION

**Rajamouli Gunda, Rochester; Michael R. McCarty, Troy, and Melvin A. Rode, West Bloomfield, all of Mich., assignors to Vickers, Incorporated, Troy, Mich.**

**Continuation-in-part of Ser. No. 849,542, Apr. 8, 1986. This application Dec. 22, 1986, Ser. No. 944,657**

**Int. Cl.⁴ F16D** *31/02*

**U.S. Cl. 60—443** **24 Claims**



1. An electrohydraulic servo system which includes, in combination, a pressure compensated flow control servo valve for proportionally variably feeding hydraulic fluid to a load at a flow rate which is a predetermined proportional function of an electronic valve control signal, a variable output pump for coupling to a source of motive power to feed hydraulic fluid under pressure from a source to said servo valve, pump control means for controlling output of said pump, and an electronic servo control coupled to said valve and including means for receiving a first signal indicative of motion desired at the load, means for receiving a second signal indicative of actuation motion at the load and means for generating said valve control signal to said valve as a function of a difference between said first and second signals, said valve control signal being indicative of fluid flow velocity at said valve required to obtain said desired motion at the load, characterized in that said pump control means comprises:

means for receiving said valve control signal, means for providing a signal indicative of fluid flow rate at said valve as said predetermined function of said valve control signal, and means for providing an output control signal to said pump as a function of said flow-indicative signal.

**4,741,160**

## HYDRAULIC MULTIPLE-CIRCUIT BRAKE SYSTEM

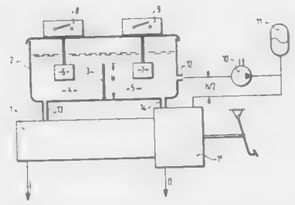
**Heinz Leiber, Oberriexingen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Jul. 6, 1982, Ser. No. 395,554**

**Claims priority, application Fed. Rep. of Germany, Mar. 19, 1982, 3210115**

**Int. Cl.⁴ F15B** *7/00*

**U.S. Cl. 60—535** **3 Claims**



1. A hydraulic multiple-circuit brake system having a multiple-circuit brake amplifier for actuating one open brake circuit and one closed brake circuit, said closed brake circuit being disposed functionally subsequent to said open brake circuit, said system further having an energy supply apparatus comprising a pump and a reservoir on the pressure side of said pump, said system having a multiple-chambered refill container having a separate refill chamber for each of said brake circuits with a minimum fill level between said separate refill chambers, said minimum fill level being approximately two-thirds the height of said refill container, in which at least one chamber of said refill container is intended for the supply of said open brake circuit (II) said at least one chamber is provided with an intake connection means for said pump, said intake means being established at a level which is approximately half the height (H/2) of the minimum fill level (H) of said refill container.



**4,741,161**

## BRAKING PRESSURE GENERATOR FOR A HYDRAULIC BRAKE SYSTEM FOR AUTOMOTIVE VEHICLES

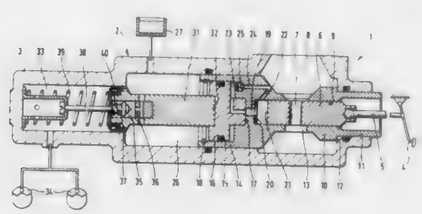
**Juan Belart, Moerfelden-Walldorf, Spain; Wolfram Seibert, Pfungstadt, and Norbert Ocvirk, Offenbach, both of Fed. Rep. of Germany, assignors to Alfred Teves GmbH, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Dec. 8, 1986, Ser. No. 938,865**

**Claims priority, application Fed. Rep. of Germany, Dec. 9, 1985, 3543479**

**Int. Cl.⁴ B60T** *13/00*

**U.S. Cl. 60—547.1** **5 Claims**



1. A braking pressure generator for a hydraulic brake system for automotive vehicles, with a master brake cylinder whose working chamber is in communication with an unpressurized compensating reservoir in the brake release position via a valve closable by the actuating stroke of the master cylinder piston, and with a hycraulic brake power booster connected upstream of the master brake cylinder and comprising a booster piston designed as a stepped piston, which latter penetrates the booster chamber and is composed of two pistons of differing effective surfaces movable in relation to one another and being applicable in opposed directions by the pressure in the booster chamber and comprising stops which limit their relative movement to an amount which at least corresponds approximately to the closure travel of the valve in the master brake cylinder, both pistons being movable by resilient means to abut on one another in the direction of brake release, and the piston of smaller effective surface being movable to abut on a housing stop, wherein the two pistons (**10, 16**) enclose a pressure chamber (**23**) which is enlargeable by their moving apart and which is connected to the booster chamber (**8**) through a valve passage (**19**), and in that the valve passage (**19**) is closable at least in the event of the brake power booster (**1**) being at its maximum output.

**4,741,162**

## ENGINE WITH TURBO-CHARGER FOR AN OUTBOARD MOTOR

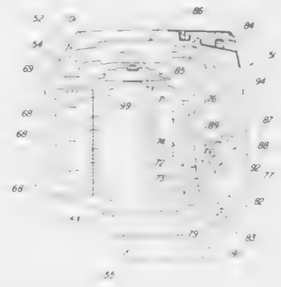
**Katsumi Torigai, Hamamatsu, Japan, assignor to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan**

**Filed Jun. 4, 1986, Ser. No. 870,613**

**Claims priority, application Japan, Jun. 4, 1985, 60-119828**

**Int. Cl.⁴ F02B** *29/04*

**U.S. Cl. 60—599** **8 Claims**



1. An outboard motor for propelling a watercraft through a body of water, said outboard motor comprising an internal combustion engine having an output shaft, clamping means for affixing said outboard motor to a transom of the watercraft with said output shaft rotating about a vertically extending axis, a watercraft propulsion device positioned beneath said engine, driven by said output shaft and cooperable with the body of water for propelling the watercraft therethrough, an exhaust conduit extending vertically downwardly along one vertical side of the engine, induction ports for said chambers positioned on a vertical side of said engine opposite to said one side, a turbo-charger having a turbine stage with an exhaust inlet communicating with said exhaust conduit and disposed adjacent to said exhaust conduit on said one vertical side of said engine, a compressor stage driven by said turbine stage, an intercooler located along the top of the engine and extending in a horizontal plane, means for delivering a compressed air charge from said compressor stage to said intercooler, and means for delivering the compressed air from said intercooler to said induction ports.

**4,741,163**

## METHOD AND APPARATUS FOR CONTROLLING SUPERCHARGE PRESSURE FOR A TURBOCHARGER

**Terufumi Hidaka, Fujisawa, and Yoshio Iwasa, Nagareyama, both of Japan, assignors to Nissan Motor Co., Ltd., Kanagawa, Japan**

**Filed Dec. 23, 1985, Ser. No. 812,407**

**Claims priority, application Japan, Jan. 16, 1985, 60-5475**

**Int. Cl.⁴ F02D** *23/00*

**U.S. Cl. 60—602** **12 Claims**

1. A method of controlling supercharge pressure for a turbocharger, which comprises the steps of:

(a) detecting a plurality of engine parameters including actual engine speed CN, intake air flow rate Q, and actual supercharge pressure P;

(b) reading a basic control amount D and a target supercharge pressure $P_s$ from a look-up table in accordance with said detected engine parameters;

(c) comparing the actual supercharge pressure P, in a first comparison, with a predetermined first target value ($P_s+P_o$) of supercharge pressure, wherein $P_o$ indicates a dead zone and $P_s$ indicates a predetermined supercharge pressure;

(d) comparing the actual supercharge pressure P, in a second comparison, with a predetermined second target value

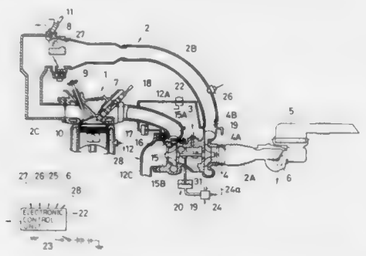
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($P_s - P_o$) of the supercharge pressure in accordance with the result of the first comparison;

(e) maintaining the same control condition as that performed at a previous time by adding a previous control amount vd to the basic control amount D if the results of said first and second comparisons satisfy a certain condition ($P_s - P_o / P/P_s + P_o$); and

(f) calculating a feedback correction amount vd' by subtracting a predetermined value a from the previous control amount vd if the result of the first comparison is that the actual supercharge pressure is greater than the predetermined first target pressure or by adding a predetermined value a to the previous control amount vd if the result of the first comparison is that the actual supercharge pressure is not greater then the predetermined first target value and the result of the second comparison is that the actual supercharge pressure is less than the predetermined second target pressure and controlling the opening of a control valve which controls exhaust gas flow to said turbocharger in accordance with the value of vd' either in the direction of opening or in the direction of closure of the control valve to adjust the flow of exhaust gas to said turbocharger.



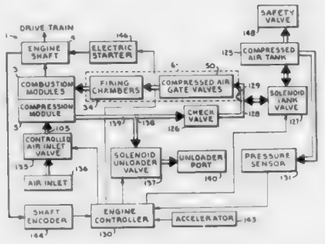
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**4,741,164**

**COMBUSTION ENGINE HAVING FUEL CUT-OFF AT IDLE SPEED AND COMPRESSED AIR STARTING AND METHOD OF OPERATION**

**Eldon E. Slaughter, 9 Sachem Rd., Greenwich, Conn. 06830**

**Continuation of Ser. No. 787,677, Oct. 15, 1985, abandoned.**
**This application Apr. 30, 1987, Ser. No. 45,153**
**Int. Cl.[4] F02D** *17/04;* **F02N** *9/04*
**U.S. Cl. 60—627** **11 Claims**




**1**. A non-idle method of operating an internal combustion engine including a rotary engine shaft; fuel supply means to supply fuel to said engine to cause the operation of said engine; an air compressor driven by rotation of said shaft and communicating with said engine to supply compressed air thereto for mixing with fuel to form a combustible mixture; spark means associated with said engine and controllable to cause the ignition of a fuel-air mixture therein to cause the rotation of said shaft; a compressed air reservoir storing excess compressed air from said compressor; an air valve connecting said reservoir with said compressor and said engine to control the flow of compressed air from said compressor to said reservoir and from said reservoir to said engine; an accelerator movable to operatively control the rotational speed of said engine shaft; shaft encoder means generating a shaft speed signal indicative of the rotational speed of said engine shaft; and an engine controller operatively interconnected with said fuel supply means, said spark means, said valve, said accelerator, and said shaft encoder, said method comprising the steps of:

(a) running said engine;

(b) storing excess compressed air in said reservoir during the running of said engine;

(c) sensing the rotational speed of said engine shaft;

(d) sensing the position of said accelerator;

(e) upon sensing that said accelerator is on an idle speed position and that said engine shaft has slowed to an idle rotational speed, controlling said fuel supply means and said spark means by said engine controller to be inhibited to cause the shutdown of said engine; and

(f) upon sensing that said accelerator is in a position indicating a demand to an increase in engine shaft speed, controlling, by said engine controller, said air valve to cause the communication of compressed air to said engine to cause the rotation of said engine shaft and controlling said fuel supply means and said spark means to be reactivated to thereby restart said engine.

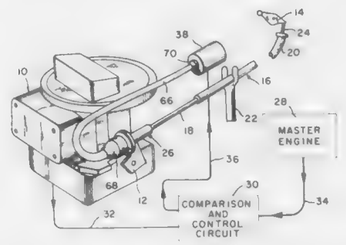
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**4,741,165**

**TWIN ENGINE SYNCHRONIZER**

**John R. Kobus, 18 Elm Pl., Red Bank, N.J. 07701**

**Filed Apr. 25, 1986, Ser. No. 856,641**
**The portion of the term of this patent subsequent to May 6, 2003, has been disclaimed.**
**Int. Cl.[4] F02B** *73/00*
**U.S. Cl. 60—700** **41 Claims**




**1**. Apparatus for synchronizing the speeds of two engines, each having its own throttle lever connected by an associated cable to a respective hand throttle lever, comprising moving means carried by said throttle lever of one of said engines for moving said throttle lever of said one engine independently of its associated cable and its respective hand throttle lever to increase or decrease the speed of said one engine until the speed of said one engine matches the speed of the other engine, whereby said moving means moves said throttle lever of said one engine without moving its associated cable or its respective hand throttle lever, and actuating means mounted remote from said throttle lever of said one engine for actuating said moving means.

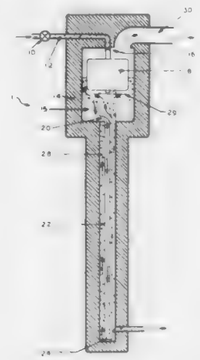


**4,741,166**

**LIQUIFIED GAS SUBCOOLER AND PRESSURE REGULATOR**

**Eric L. Jensen, Richmond, and Harry W. Lee, Jr., Chesterfield County, both of Va., assignors to Reynolds Metals Company, Richmond, Va.**

**Filed Sep. 1, 1987, Ser. No. 91,936**
**Int. Cl.[4] F17C** *13/02*
**U.S. Cl. 62—49** **5 Claims**



**1**. An apparatus for subcooling a liquified gas from a source of said liquified gas and for providing a constant stream of subcooled liquified gas at a preselected pressure comprising a chamber, an inlet line in fluid flow connection with said chamber and said source of liquified gas, float means within said chamber for controlling fluid flow from said inlet line, a column positioned beneath said chamber having its upper end in fluid flow connection with said chamber and having its lower end in fluid flow connection with an outlet line, said column having a height selected to provide said preselected pressure, a tube surrounding said column having its upper end in fluid flow connection with said chamber and having its lower end in fluid flow connection with the lower end of said column and a gas exhaust in fluid flow connection with said chamber.

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**4,741,167**

**METHOD AND APPARATUS FOR TRANSPORTING PERISHABLE MATERIALS**

**Freddie J. Wigley, 712 North Birch, Ponca City, Okla. 74601**

**Filed Nov. 20, 1986, Ser. No. 933,044**
**Int. Cl.[4] F25D** *17/02*
**U.S. Cl. 62—62** **5 Claims**

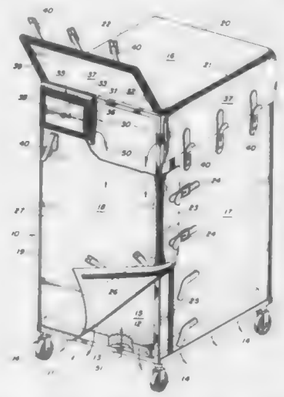
**1**. Apparatus for the cooling of perishable materials stored on a cart means having at least a bottom comprising:

(a) first insulation means extending over said bottom;

(b) second flexible insulation means extending over said perishable material and to said bottom, said second insulation means having a top, sides, an inside and an outside surface said sides having a top and a bottom;

(c) pocket means attached to said second insulation means and positioned on the inside of said second insulation means at the top of said sides said pocket means having permeable means through at least a portion of said pocket means;

(d) access means through said sides of said second insulation means to said pocket means for permitting the insertion of



refrigeration material there through and into said pocket means; and

(e) means for closing said access means.

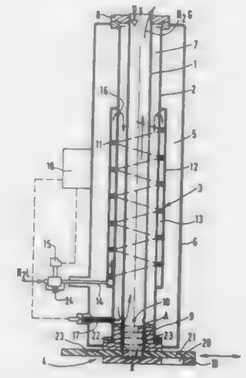
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**4,741,168**

**COOLING PROCESS AND TUNNEL**

**Bernard Boyer, Sassenage; Louis Giacinti, Claix, and Jean-Yves Thonnelier, Sassenage, all of France, assignors to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude, Paris, France**

**PCT No. PCT/FR86/00192, § 371 Date Jan. 21, 1987, § 102(e) Date Jan. 21, 1987, PCT Pub. No. WO86/07440, PCT Pub. Date Dec. 18, 1986**
**PCT Filed Jun. 4, 1986, Ser. No. 15,862**
**Claims priority, application France, Jun. 11, 1985, 85 08777**
**Int. Cl.[4] F25D** *13/06*
**U.S. Cl. 62—63** **24 Claims**

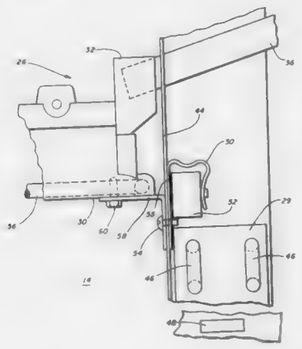


**1**. A process for cooling material, comprising: providing a tube which is open adjacent an upper end of the tube; forming a column of said material in said tube; vaporizing a cryogenic liquid outside said tube and thereby generating a cooling gas; causing said gas to flow downwardly around said tube, then to be injected into said tube adjacent a base of said column and then to flow upwardly in said tube; and progressively extracting the material from a lower end of the tube by the effect of gravity.

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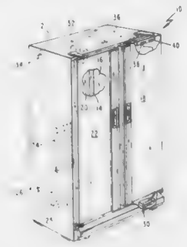
4,741,169
## ICE MAKER SAFETY CONTROL
William J. Linstromberg, Lincoln Township, Berrien County, Mich., assignor to Whirlpool Corporation, Benton Harbor, Mich.
Filed Aug. 6, 1987, Ser. No. 82,646
Int. Cl.[4] F25C *5/08*
U.S. Cl. 62—135 19 Claims



1. In a refrigeration apparatus including an evaporator, a defrost heater for defrosting said evaporator, a defrost thermostat having a switch for de-energizing said defrost heater at a preselected high temperature of the evaporator, and an ice making apparatus having a mold, a mold heater, and a control circuit controllably energizing said mold heater, a safety control for said ice making apparatus comprising:
means for thermally coupling said defrost thermostat with said mold; and
means electrically connecting said defrost thermostat switch with said control circuit for de-energizing said mold heater at a preselected high temperature of the mold to prevent overheating thereof.

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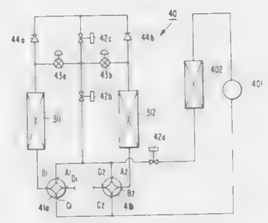
4,741,170
## FAULT TOLERANT CONTROL FOR A REFRIGERATOR
Andrew T. Tershak, Center Township, Vanderburgh County, Ind., assignor to Whirlpool Corporation
Filed Dec. 22, 1986, Ser. No. 946,914
Int. Cl.[4] F25B *49/00*; F25D *17/04*
U.S. Cl. 62—229 6 Claims



1. In a refrigerator having a cabinet defining a first, below freezing compartment and a second, above freezing compartment, cooling means for cooling said first compartment, a wall defining an opening between said compartments, a baffle operative for selectively closing said opening, operating means to operate said baffle, a first temperature sensing means associated with said below-freezing compartment for sensing the temperature therein and a second temperature sensing means associated with said above-freezing compartment for sensing the temperature therein, means responsive to said first temperature sensing means for selectively energizing said cooling means to maintain a first set-point temperature in said below-freezing compartment, means responsive to said second temperature sensing means for selectively energizing said baffle operating means to maintain a second set point temperature in said above-freezing compartment, first fault detecting means for diagnosing a fault in said first temperature sensing means, second fault detecting means for diagnosing a fault in said second temperature sensing means, means responsive to said first detecting means diagnosing a fault in said first temperature sensing means for cycling said cooling means at a first predetermined energized and de-energized duty cycle, means responsive to said second detecting means diagnosing a fault in said second temperature sensing means for cycling said baffle operating means at a second predetermined energized and de-energized duty cycle; an improvement, comprising:
third fault detecting means for diagnosing a fault in said baffle operating means; and
means responsive to said third detecting means diagnosing said baffle operated to a failed-open position for adjusting said first set point temperature to a first value and responsive to said third detecting means diagnosing said baffle operated to a failed-closed position for adjusting said first set point temperature to a second value lower than said first value.

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4,741,171
## REFRIGERATED DISPLAY CABINET
Fukuda Toshiyuki, Isesaki, Japan, assignor to Sanden Corporation, Japan
Filed Mar. 16, 1987, Ser. No. 26,256
Claims priority, application Japan, Mar. 15, 1986, 61-38170[U]; Mar. 15, 1986, 61-38171[U]; Mar. 15, 1986, 61-38172[U]; Mar. 15, 1986, 61-38173[U]
Int. Cl.[4] F25D *21/22*
U.S. Cl. 62—234 9 Claims

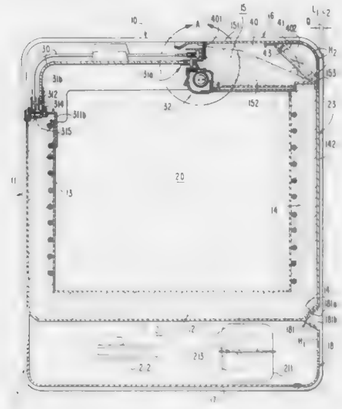


1. In a refrigerated display cabinet comprising an external housing, an internal housing within the external housing for storing merchandise, a front opening for access to the interior of said internal housing, passage means formed between said external and internal housings including inner and outer conduits having respective inlets and outlets extending across opposite edges of said front opening, circulating means for driving air around said passage means and from said outlets to said inlets in the form of inner and outer air curtains, refrigerating means disposed in the inner conduit for refrigerating the inner air curtain, said refrigerating means comprising a compressor, a condenser, and two evaporators, the improvement comprising:
two four-way valves each connected to a bottom terminal port of a respective evaporator for selectively and alternately connecting said bottom terminal port of said evaporator to an outlet side of said condensor and a suction port of said compressor, a top terminal port of each said evaporator being connected to each other by first and second communicating lines connected in paralle, said communicating lines being connected to each other through a first control valve device, and at least one of said communicating lines being connected to a point between said two four-way valves through a second control valve device, at least one expansion valve located in one of said first and second communicating lines whereby said refrigerating means is capable of concurrently refrigerating the inner air curtain and defrosting one said evaporator.



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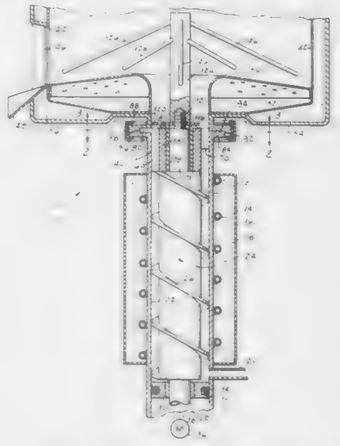
4,741,172
## REFRIGERATED DISPLAY CABINET
Shigeki Aoki, Machashi, Japan, assignor to Sanden Corporation, Isesaki, Japan
Filed Dec. 2, 1986, Ser. No. 937,053
Claims priority, application Japan, Dec. 4, 1985, 60-185971[U]
Int. Cl.[4] A47F *3/04*
U.S. Cl. 62—248 3 Claims



1. In a refrigerated display cabinet including a refrigerating chamber to store and display merchandise and a mechanical chamber in which the refrigerating apparatus is located, an access opening into said refrigerating chamber, movable transparent panels for closing said access opening, said mechanical chamber having an opening, a rear plate for closing said opening and having a plurality of holes for the circulation of air from the interior thereof to the atmosphere, blower means for circulating air from said mechanical chamber through said holes, said refrigerating chamber having a front wall and a rear wall, a bottom wall connected between the lower portions of said front and rear walls, an upper wall partly covering said access opening and having a rear plate, and a pair of side walls having rear edges, the improvement comprising said rear plates of said mechanical chamber and of said upper wall being aligned in the same plane with said rear wall, which plane is displaced forwardly from a plane defined by the rear edges of said side walls whereby when the cabinet is positioned against the wall, the rear wall thereof is spaced from such wall, said upper wall having a duct to direct air onto the surface of said transparent panels, said rear plate of said upper wall having a plurality of holes communicating with said duct for the circulation of air from the atmosphere into said duct, said upper wall having an air outlet opening for directing air from said duct onto said transparent panels, and blower means in said duct for circulating air through said duct onto said transparent panels.

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4,741,173
## AUGER TYPE ICEMAKER
Charles G. Neumann, Palatine, Ill., assignor to Reynolds Products, Inc., Schaumburg, Ill.
Continuation of Ser. No. 610,962, May 16, 1984, abandoned, which is a continuation-in-part of Ser. No. 381,433, May 24, 1982, abandoned, which is a continuation of Ser. No. 205,786, Nov. 10, 1980, abandoned. This application Jan. 28, 1986, Ser. No. 823,826
Int. Cl.[4] F25C *1/14*
U.S. Cl. 62—298 12 Claims



1. In an ice maker, apparatus including a generally vertically disposed evaporator housing having a generally cylindrical inner freezer surface on which ice crystals are adapted to form, an annular flange at the upper end of said evaporator housing, a plurality of radial grooves in the upper surface of said flange, an extruding head having a plurality of radially extending lugs adapted to be received in said grooves to support said head at the upper end of said housing, said head being formed with a bore, a sleeve of bearing material within said bore adapted to act as a radial bearing, bearing material extending over the top of said head to act as a thrust bearing, an auger within said housing adapted to be driven to harvest ice crystals from said surface and to advance said crystals toward said head, a shaft extending upwardly from said auger through said sleeve and means for translating thrust from said shaft to said thrust bearing.

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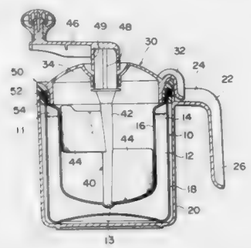
4,741,174
## ICE CREAM FREEZER
Susumu Uesaka, Funabashi, Japan, assignor to Nippon Light Metal Company, Ltd., Tokyo, Japan
Filed Apr. 24, 1987, Ser. No. 42,065
Claims priority, application Japan, Aug. 20, 1986, 61-125812[U]
Int. Cl.[4] A23G *9/12*
U.S. Cl. 62—342 8 Claims

1. An ice cream freezer having a double walled container containing therein a heat regenerating agent and with a heat insulating ring mounted at the top end thereof, an external case containing said double wall container and simultaneously supporting said heat insulating ring, and a cover detachably mounted on said heat insulating ring, and a mixer rotatably inserted into said double walled container, characterized by having a supporting shoulder provided in said heat insulating ring for engagement with the top end of said external case, a portion for engagement provided at the lower periphery of

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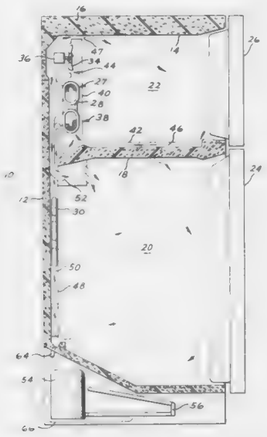
said supporting shoulder for close contact with the inner upper portion of said external case, and a mating portion projecting



from said cover for detachably fitting into a portion of a handle projecting from said external case.

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**4,741,175**
**AUTO DEFROST REFRIGERATOR**
**James L. Schulze, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.**
**Filed Mar. 17, 1987, Ser. No. 26,617**
**Int. Cl.[4] F25D** *11/02*
**U.S. Cl. 62—442** **10 Claims**



1. A refrigerator including:
an upper freezer compartment, a lower fresh food compartment and an insulating partition separating said compartments;
an evaporator chamber separate from said freezer and fresh food compartments and above said fresh food compartment;
means for conducting relatively cold air from said chamber to said freezer compartment and means for conducting relatively cold air from said chamber to said fresh food compartment;
return means for returning relatively warm air from said freezer compartment to said chamber;
duct means connecting the lower portion of said fresh food compartment with said chamber for returning relative warm air from said fresh food compartment to said chamber;
evaporator means, including a first evaporator section positioned in said evaporator chamber and a second evaporator section positioned in said duct means, for cooling air passing thereover; and
fan means for withdrawing relatively warm air from said compartments, circulating the air from said freezer compartment over said first evaporator section, circulating the air from said fresh food compartment serially over both said second and first evaporator sections and discharging cooled air from said evaporator chamber.

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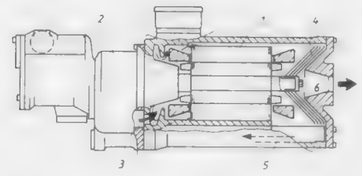
**4,741,176**
**BEVERAGE COOLER**
**Mark D. Johnson, Box 180 APO, New York, N.Y. 09030, and George Spector, 233 Broadway, Rm 3815, New York, N.Y. 10007**
**Filed May 7, 1987, Ser. No. 46,894**
**Int. Cl.[4] F25D** *3/08*
**U.S. Cl. 62—457** **1 Claim**



1. A beverage cooler comprising:
(a) a cylindrical plastic/styrofoam cup having an open top;
(b) a hollow cylindrical freezer pack insert placed within said open top of said cylindrical cup so that a beverage container can be placed therein;
(c) a reinforced plastic/styrofoam cover placed over said open top of said cylindrical cup so that said hollow cylindrical freezer pack insert will keep the beverage container colder longer wherein said hollow cylindrical freezer pack insert includes:
(d) a plurality of removable plastic pouch sections having perforations therebetween;
(e) a removeable plug for each of said pouch sections so that coolant fluid can be placed therein; and
(f) means for securing free ends of said two remote pouch sections together to form said hollow cylindrical shape of said freezer pack insert, wherein each of said removeable pouch sections includes a bottom wedge portion with pleats to also hold coolant fluid therein and a fold line therebetween so that when said hollow cylindrical freezer pack insert is placed within said cylindrical cup said bottom wedge portion of each of said removeable pouch sections will bend inwardly along said fold line allowing the beverage container to sit upon said bottom wedge portion to help keep the beverage container even colder longer.



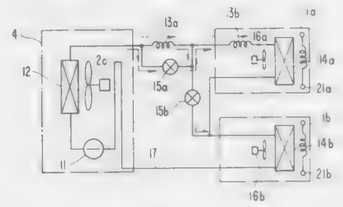
**4,741,177**
**OIL SEPARATOR IN A COOLANT SYSTEM**
**Rune V. Glanvall, Norrköping, Sweden, assignor to Stal Refrigeration AB, Norrköping, Sweden**
**Filed Jan. 29, 1987, Ser. No. 8,162**
**Claims priority, application Sweden, Jan. 31, 1986, 8600425**
**Int. Cl.[4] F25B** *43/02*
**U.S. Cl. 62—470** **6 Claims**



1. An apparatus for use in compressing an operating medium in a coolant system, said apparatus comprising
an oil-injection rotary compressor that provides a mixture of oil and compressed operating medium,
a drive motor connected to said oil-injection rotary compressor, said drive motor including a drive shaft having an end which is remote from said oil-injection rotary compressor, and
at least one separation plate connected to the remote end of said drive shaft and against which the mixture of oil and compressed operating medium flows, each separation plate including a hole therein, rotation of each said separation plate by rotation of said drive shaft causing oil in said mixture of oil and compressed operating medium to be forced radially outwardly while the compressed operating medium passes radially inwardly thereof and through the hole therein, such that the oil and the compressed operating medium are separated.

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**4,741,178**
**REFRIGERATING APPARATUS FOR A VENDING MACHINE**
**Minoru Fujiu, Onama, and Kazumi Aoki, Gunma, both of Japan, assignors to Sanden Corporation, Isesaki, Japan**
**Filed Apr. 20, 1987, Ser. No. 39,723**
**Claims priority, application Japan, Apr. 19, 1986, 61-58257[U]**
**Int. Cl.[4] F25B** *39/02*
**U.S. Cl. 62—525** **4 Claims**



1. In a refrigerating apparatus for a vending machine provided with a plurality of storage chambers, said apparatus comprising refrigeration components including a compressor, a condenser, a plurality of evaporators adapted to be disposed one in each of said storage chambers and a plurality of expansion devices corresponding in number to the number of said evaporators, said refrigeration components being connected in series to form an enclosed refrigerating circuit adapted to refrigerate each of said storage chambers individually in accordance with the merchandise to be stored therein, the improvement comprising connecting said expansion devices in series with each other and with the intake of a first one of said evaporators, a bypass for each of said expansion devices, and valve means for selectively directing the refrigerant into each of said evaporators through at least one of said expansion devices.

**4,741,179**
**MULTI-POST EARRING STRUCTURE FOR PIERCED EARS**
**Theo McConnell, Jr., 706 7th St., Pitcairn, Pa. 15140**
**Filed Oct. 10, 1986, Ser. No. 917,476**
**Int. Cl.[4] A44C** *7/00*
**U.S. Cl. 63—13** **12 Claims**



1. An ear ornament for attachment to an ear lobe through which a plurality of holes have been pierced, including:
a unitary rod member having a first bent portion, a second bent portion, and a central bent portion therebetween, said first and second bent portions being uniformly spaced apart by a distance selected to extend through at least two of said plurality of holes forming retaining members to retain the rod member on the ear lobe, and said central portion forming a bight.

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**4,741,180**
**TERRYING MECHANISM FOR DOUBLE CYLINDER KNITTING MACHINE**
**Denis Harris, Leicester, United Kingdom, assignor to Stuart Frederick Jones, Leicester, England**
**Filed Dec. 3, 1985, Ser. No. 804,263**
**Int. Cl.[4] D04B** *9/10, 9/12*
**U.S. Cl. 66—14** **30 Claims**



1. Terrying mechanism for mounting in one cylinder of superimposed double cylinder knitting machine, said mechanism including:
a pillar for arranging in alignment with a central axis of said one cylinder and for arranging in its interior, said pillar having means at its upper end for holding the pillar against rotation:
an annular cam system mounted on the pillar, a retractable cam means incorporated in the annular cam system;
a dial having a tricked body having trick walls defined by tricks extending radially, terry instruments in the tricks having butts for operation by said annular cam system, and means for coupling the tricked body to said one cylinder, bearing means supporting said dial rotatably with respect to the annular cam system and the pillar;
a key means associated with said dial;
a toe-pouch tensioner having a shaft extending through aligned openings in the pillar and said dial to permit axial sliding movement but engaged by the key means for conjoint rotation with the dial,
said means for coupling the tricked body to said one cylinder including a ring fastened concentrically to the tricked body against free ends of said trick walls, and further key means located in the ring for causing said dial and said one cylinder to rotate conjointly,
said ring and trick walls having mutually engageable shoulders to center the ring and tricked body, a projection provided on the trick walls and defining an undercut, and

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clamping means engaging the undercut for securing the ring and tricked body in any desired angular relationship.

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**4,741,181**

## CIRCULAR KNITTING MACHINE WITH NEEDLES AND HOLDING-DOWN PLATE MEMBERS

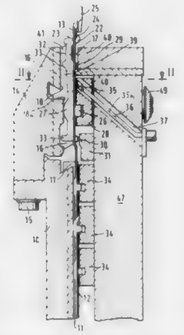
**Ernst-Dieter Plath, Albstadt, Fed. Rep. of Germany, assignor to Sipra Patententwicklungs-und Beteiligungsgesellschaft mbH, Albstadt, Fed. Rep. of Germany**

**Filed Sep. 8, 1986, Ser. No. 905,667**

**Claims priority, application Fed. Rep. of Germany, Sep. 14, 1985, 3532856**

**Int. Cl.[4] D04B** *15/06, 35/32*

**U.S. Cl. 66—104** **8 Claims**



1. A knitting machine for producing mesh products, comprising a needle carrier provided with a plurality of guiding grooves each having an upper groove end and a base; a plurality of needles and a plurality of plate members alternatingly arranged in said guiding grooves so that said plate members are longitudinally displaceable and turnable in said guiding grooves and having rear sides abutting against said bases of said guiding grooves; means for cleaning at least one location and supplying an air stream which rises in said guiding grooves upwardly toward said groove ends into a space formed between said rear sides of said plate members and said bases of said guiding guiding grooves; and cam means arranged to control said plate members, each of said guiding grooves having a predetermined width, said needles having needle shafts, said needle carrier having a plurality of guide webs between which said plate members are located, said means for cleaning including a blowing nozzle arranged in the region of said cam means and extending at least over the width of one of said guiding grooves, said blowing nozzle being located at a predetermined height, said plate members being provided at said height with a thickness-reducing lateral recess which forms an air passage to said space.

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**4,741,182**

## WASHING AND/OR DRYING MACHINE HAVING MEANS FOR DETERMINING A LOAD OF CLOTHES IN A ROTARY DRUM

**Laurent Didier, La Roche Sur Yon, and Jean C. Geay, St. Florent Des Bois, both of France, assignors to Esswein S.A., Courbevoie, France**

**Division of Ser. No. 663,695, Oct. 22, 1984, Pat. No. 4,607,408. This application Jul. 17, 1986, Ser. No. 886,333**

**Claims priority, application France, Oct. 25, 1983, 83 16997**

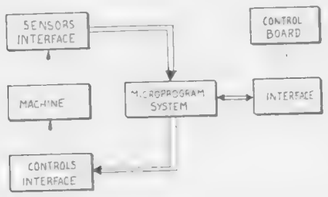
**Int. Cl.[4] D06F** *33/02*

**U.S. Cl. 68—12 R** **10 Claims**

1. An apparatus for determining a load of clothes in a rotating drum of a clothes machine, comprising:

means for rotating said drum; and

means for determining a moment of inertia of said clothes in




said rotating drum thereby obtaining loading data on said load of clothes.

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**4,741,183**

## DRIVES FOR CLOTHES WASHING MACHINES

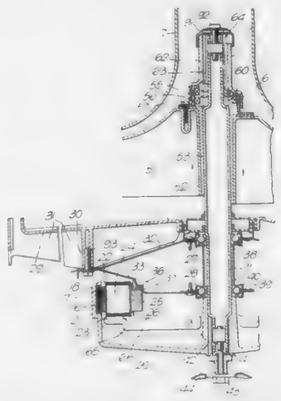
**Dennis E. Smith; John J. A. Williams; Gerald D. Duncan; Graeme D. Thomas; John G. Borrows, and Frank W. Shacklock, all of Auckland, New Zealand, assignors to Fisher & Paykel Limited, Auckland, New Zealand**

**Filed Mar. 6, 1987, Ser. No. 22,894**

**Claims priority, application New Zealand, Mar. 6, 1986, 215389; Sep. 18, 1986, 217623; Nov. 21, 1986, 218356**

**Int. Cl.[4] D06F** *23/04*

**U.S. Cl. 68—23.7** **29 Claims**



1. A drive for a clothes washing machine of the type having a cabinet in which an agitator is mounted on a vertical shaft so as to rotate therewith and is oscillated back and forth within a coaxially mounted perforated spin tub, the spin tub and the agitator rotating continuously in one direction to give a spin action and the perforated spin tub and agitator in turn being mounted within a water tight container, said cabinet containing an electric motor and driving means to oscillate said agitator back and forth or rotate said spin tub continuously in one direction characterized in that at least one part of said spin tub and one part rotatable with said agitator are axially movable relative to each other, each said one part has a part of an interconnecting means associated therewith and interconnection actuating means are provided operable in a washing sequence to actuate said parts of said interconnecting means by relative axial movement of said at least one part rotatable with said agitator and said at least part of said spin tub to connect said agitator to said spin tub when spin action is required and to actuate said parts of said interconnecting means to separate by opposite relative axial movement to permit said agitation of said agitator without material relative movement of said spin tub during a washing phase in said sequence.



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**4,741,184**

## LAUNDRY PRESS

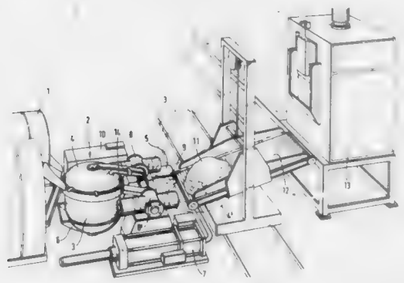
**Berthold Magin, Hassloch/Pfalz, Fed. Rep. of Germany, assignor to MTM Obermaier GmbH & Co., KG**

**Filed May 3, 1985, Ser. No. 730,330**

**Claims priority, application Fed. Rep. of Germany, May 4, 1984, 3416458; Sep. 11, 1984, 8426718[U]**

**Int. Cl.[4] D06F** *15/00*

**U.S. Cl. 68—210** **17 Claims**



1. A laundry press comprising a perforated laundry basket for receiving laundry to be drained, a cover placeable on said basket, an elastic diaphragm mounted on said cover on the side facing said basket when said cover is placed on said basket, said cover and said basket forming a space therebetween, means for introducing a pressure medium into said space for exerting pressure on the laundry, said basket displaceable about an axis independently from said cover, said basket displaceable from a first position inside said vessel to a second position for emptying out the laundry, said basket being essentially hemispherical, a flexible plate placed in said basket, said plate being pressed against the laundry by said diaphragm when pressure medium is introduced into said space, said flexible plate capable of pressing against the laundry in such a way that damage to pieces of the laundry is prevented, and a vessel underneath said basket for collecting the water pressed out of the laundry, said vessel including means for discharging the water, said means for introducing pressure medium comprising a first pump for initially introducing said pressure medium at a high rate of delivery, and a second pump for generating the pressure exerted on the laundry.

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**4,741,185**

## VEHICULAR TAPE DECK LOCKING AND LOCK-STATE INDICATING ARRANGEMENT

**Alfons Weinert, Hildesheim, and Klaus Gröger, Diekholzen, both of Fed. Rep. of Germany, assignors to Blaupunkt Werke GmbH, Hildesheim, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 799,030, Nov. 18, 1985, abandoned. This application Apr. 14, 1986, Ser. No. 851,771**

**Claims priority, application Fed. Rep. of Germany, Nov. 30, 1984, 3443651; Jun. 8, 1985, 3520604**

**Int. Cl.[4] E05B** *65/00*

**U.S. Cl. 70—57** **19 Claims**

1. In combination with a vehicle,

a locking arrangement for a tape deck accessory apparatus (10) installed in the vehicle, wherein

said tape deck accesory includes

an accessory housing (16') formed with an opening (14) to receive a tape cassette; and wherein

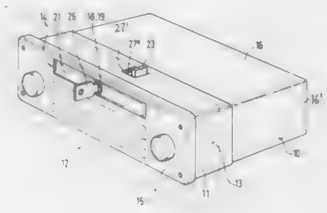
the vehicle includes

a frame (11, 30), secured within the vehicle and located behind a dashboard of the vehicle, shaped to telescopically receive and at least in part surround the accessory housing,

said arrangement comprising, in accordance with the invention,

means for preventing unauthorized removal of the accessory apparatus from the vehicle including a dummy cassette (17) shaped to fit into the cassette opening and insertable in the tape cassette receiving opening of the housing (16'),

said dummy cassette having a lock (18) accessible from the front side of the dummy cassette, said lock including a locking bolt (23) movable between an open, or unlocked and a closed, or locked position upon operation of the lock with an appropriate key (26),



and wherein the dummy cassette (17), the accessory housing (16) and the frame (11, 30) of the vehicle are formed with at least approximately aligned openings (27, 27', 27''), positioned to receive the locking bolt (23) when the dummy cassette (17) is inserted into the tape cassette receiving opening and the lock is moved into locked position,

said bolt being of sufficient size to engage, when in locked position, in the window (27'') of the frame (11) of the vehicle, to thereby lock the tape deck accessory apparatus (10) to the frame (11) of the vehicle.

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**4,741,186**

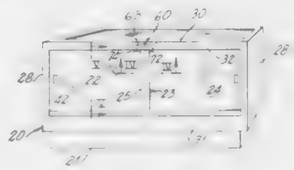
## LOCKING MECHANISM FOR SLIDING DOORS OR WINDOWS AND METHOD OF INSTALLATION

**Guillermo O. Martin, 386 W. 43rd St., Hialeah, Fla. 33011**

**Filed Mar. 23, 1987, Ser. No. 28,919**

**Int. Cl.[4] E05B** *65/08*

**U.S. Cl. 70—100** **16 Claims**



1. A lock for a display case having a pair of vertically mounted windows movable in closely spaced, parallel, horizontal paths, each of said windows having an inner vertical edge and a length approximately half the length of said display case,

horizontally extending track means comprising pairs of parallel tracks defining said paths for guiding said movement of said windows between open positions wherein said windows are essentially aligned to provide an open area approximately half the area of said display case and closed positions wherein said inner vertical edges overlap to cause said windows to close said open area,

a pair of apertures extending vertically through said track means in positions longitudinally and transversely spaced along said track means adjacent the positions occupied by the inner edges of said windows and just clear of said windows when the latter occupy said closed positions,

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said apertures being positioned in spaced relation to the side edges of said respective tracks,

a chamber within said display case,

a rear wall having an opening communicating with said chamber,

an open wall lock box having a horizontally extending vertically movable plate constructed and arranged to be mounted for linear movement in said chamber within said display case, said plate being constructed and arranged to support a pair of vertically extending pins constructed and arranged to be in alignment with said apertures when said plate is installed for operation in said chamber,

and lock means supported by said rear wall and extending into said chamber to engage said plate to move said pins through said apertures to slidably engage said inner vertical edges to lock said windows in said closed positions when actuated in one sense and to permit said pins to move to positions clear of said windows when actuated in an opposite sense, whereby said windows are free to move along said track means to said open positions,

wherein said plate forms a closed horizontal wall of said open wall lock box having said closed horizontal wall in facing relation to said track means, a pair of end walls extending from the ends of said closed horizontal wall away from said track means and an open wall interconnecting the end walls in spaced relation to said closed horizontal wall, said lock means extending through an opening in said open wall and provided with a radial arm constructed and arranged to engage said open wall in spaced relation to said closed wall to cause said pins to move in said positions clear of said windows and to engage said closed horizontal wall in spaced relation to said open wall to cause said pins to move through said apertures into said inner vertical edge engaging positions.

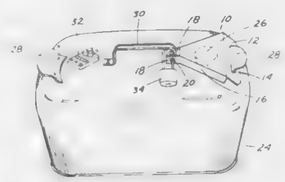
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**4,741,187**

**CAP LOCKING SHIELD FOR PORTABLE FUEL TANKS**

**Keith E. Ethell, 1943 Drendel Cir., Paradise, Calif. 95969**

**Filed Nov. 6, 1987, Ser. No. 117,331**
**Int. Cl.[4] B65D** *55/14*
**U.S. Cl. 70—158** **4 Claims**



1. A locking shield for covering the fuel cap of particular portable fuel tanks which are manufactured with a centrally positioned closed loop handle in the top surface and have tab handles longitudinally aligned horizontally with said closed loop handle manufactured in said top surface adjacent either end of said portable fuel tanks and said portable fuel tanks having a low profile fuel filler neck with a removable cap thereon in said top surface between one of said handle tab and said centrally positioned closed loop handle;

said locking shield consisting of a thin flat sheet shield base sized and arranged for horizontal placement over said cap on said fuel filler neck with said shield base having a narrowed end and sides tapering outwardly to a widened end terminating downwardly in an angled base extension sufficiently lengthened and apertured to fit retained to said handle tab adjacent said fuel filler neck covering said cap thereon, there being downwardly angled side flanges along said tapering sides of said shield base with apertured extensions at said narrowed end of said shield base, said side flange extensions of sufficient length to removably attach a padlock shackle through said apertures in said side extension to position a locking padlock in the loop of said closed loop handle and secure said shield base and said side flanges downwardly covering said fuel filler neck and the cap thereon.

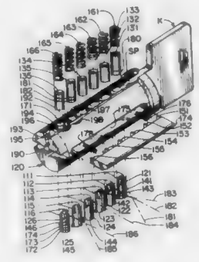
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**4,741,188**

**REKEYABLE MASTER AND USER LOCK SYSTEM WITH HIGH SECURITY FEATURES**

**Jerry R. Smith, 5690 W. Rowland Ave., Littleton, Colo. 80123**

**Filed Jul. 16, 1985, Ser. No. 755,471**
**Int. Cl.[4] E05B** *25/00*
**U.S. Cl. 70—383** **79 Claims**



1. In lock apparatus having a housing, a cylinder rotatably positioned in said housing with a longitudinal keyway therein, a plurality of pin chambers extending radially from said housing into said cylinder to intersect said keyway, driver pins slideably positioned in the housing portions of said pin chambers and service pins positioned in the cylinder portions of said pin chamber, the interface between said cylinder and said housing defining a shear plane through which said driver and service pin can extend to prevent rotation of said cylinder in said housing, the improvement of a multiple level rekeyable user and master key system comprising:

removable first user level spacer means positioned in one of said common pin chambers between the driver and service pins therein;

removable master first level spacer means positioned in another of said common pin chambers between the driver and service pins therein;

a user key having bitting means thereon for positioning the bottom of the driver pin in said one common pin chamber at said shear plane and the top of the service pin in the other of said common pin chambers at said shear plane;

a master key having bitting means thereon for positioning the top of the service pin in said one common chamber at said shear plane and the bottom of the driver pin in the other of said common pin chambers at said shear plane;

removal means for removing said first user level spacer means from said one common pin chamber;

removal means for removing said first master level spacer means from said other common pin chamber; and

permanent master spacer means positioned in a third common pin chamber between the driver and service pins therein, and wherein said user key has bitting means thereon for positioning the top of the service pin in said third common pin chamber at said shear plane and said master key has bitting means thereon for positioning the bottom of the driver pin in said third common pin chamber at said shear plane.

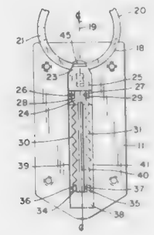


**4,741,189**

**KEY GUARD**

**Tibor Battenberg, 7 E. Ridge Dr., Merrimack, N.H. 03054**

**Filed Oct. 1, 1986, Ser. No. 914,019**
**Int. Cl.[4] A47G** *29/10*
**U.S. Cl. 70—456 R** **6 Claims**



1. A key guard comprising:

a housing comprising a top and a bottom;

means for joining the top and bottom forming between them when joined, a circularly arcutate channel extending arcuately for a part of a circle, and a longitudinal channel having a longitudinal axis;

a follower captured in and free to slide longitudinally and radially in the longitudinal channel and carrying an interposer movable radially to intersect the arcuate channel;

a finger control attached to the follower, the top having a slot through which the finger control extends outside the housing;

spring means comprising a plurality of symmetrical compression springs disposed in the housing symmetrically about the axis and applied symmetrically with respect to said axis to the follower to urge the follower longitudinally toward the intersection, the spring means having a portion remote from the follower and the remote portion having an end;

the housing having longitudinal channel means, said channel means comprising separate channels for each spring and having side walls parallel to the axis and having end wall means remote from the follower, the side walls restraining the spring means end from movement transverse to the axis and the end wall means restraining the spring means end from longitudinal motion; and

a ring captured in the arcuate channel absent a sector arcuately less than the arcuate extent of the arcuate channel;

whereby the follower and interposer are urged by the spring means into locking position interposed in the absent segment in the arcuate channel at the intersection to lock the ring against rotation in the arcuate channel, whereby the follower may be retracted by the finger control against the spring means to unlock the circular rotation in the arcuate channel to expose the absent sector outside the housing for threading of keys, and whereby when the ring is rotated to return the absent sector to the intersection of the arcuate channel and the interposer, the spring means symmetrically urges the follower for retention in locking position at the intersection to lock the ring against further rotation and thereby retain the keys on the ring.

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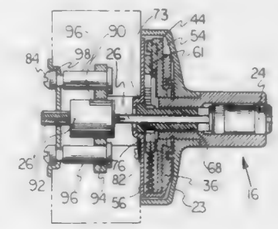
**4,741,190**

**LOCKSET ASSEMBLY**

**Theodore H. Miller, New Britain, Conn., assignor to Emhart Industries, Inc., Farmington, Conn.**

**Filed Oct. 3, 1986, Ser. No. 915,294**
**Int. Cl.[4] E05B** *55/00*
**U.S. Cl. 70—467** **4 Claims**

1. A lockset for a door comprised of a latch assembly including a bolt movable between a fully extended locked position, and a retracted position, a first spindle extending through said latch assembly in a direction transverse of the direction of movement of said bolt, means connecting said first spindle to said bolt for moving said bolt between its positions upon rotation of said first spindle, said connecting means including a second spindle and a lost motion mechanism joining said first spindle to said second spindle to permit rotational movement of said first spindle relative to said second spindle, and an operating assembly comprising a hand operator having locking means therein connected to said first spindle and movable between unlocked and locked positions such that movement of said locking means from its locked to unlocked position results in rotation of said first spindle through said lost motion mecha-



nism relative to said second spindle, a first plate mounted for linear movement in a direction transverse to the axis of said first spindle, an actuating member connected to said hand operator for moving said first plate, a second plate mounted for linear movement in a direction transverse to the axis of said first spindle, and rotatable drive means attached to said first spindle and operable to drive said second plate between a fully extended position and a retracted position, spring means biasing said second plate from its retracted unlocked position towards its fully extended position, and detent means for engaging said second plate when the locking means is in an unlocked position for preventing the second plate from moving from a retracted position into a fully extended position.

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**4,741,191**

**METHOD FOR SPLINING AND FLANGING THIN-WALLED MEMBERS**

**Carl E. Anderson, Mt. Clemens, and James T. Killop, Warren, both of Mich., assignors to Anderson-Cook, Inc., Fraser, Mich.**

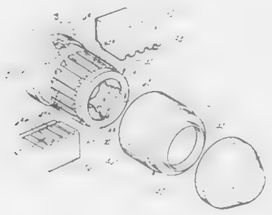
**Division of Ser. No. 747,971, Jun. 12, 1985, Pat. No. 4,677,836, which is a continuation-in-part of Ser. No. 626,286, Jun. 29, 1984, abandoned. This application Feb. 26, 1987, Ser. No. 19,364**
**Int. Cl.[4] B21H** *5/02;* **B21D** *53/28*
**U.S. Cl. 72—88** **8 Claims**

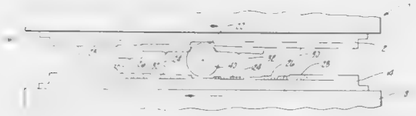
1. A method for forming splines in a right circular wall of a thin-walled annular sleeve portion (**46**) of a power transmission member (**42**) having an annular end wall (**44**), said method comprising the steps of: positioning the right circular cylindrical wall of said sleeve portion (**46**) of said power transmission member (**42**) on a toothed mandrel (**40**) with an end wall (**44**) of said transmission member (**42**) tightly engaged with an end (**74**) of said mandrel (**40**); rotatably supporting said mandrel (**40**) and said member (**42**) mounted thereon between a plurality of spaced die members (**26,30;112,114;138,140**) having toothed work surfaces (**34**) including spline forming teeth, moving said die members (**26,30;112,114;138,140**) relative to one another on opposite sides of said mandrel (**40**) to mesh said die teeth (**34**) and mandrel teeth (**48**) with said sleeve portion (**46**) therebetween and, deforming said sleeve portion (**46**) radially in a rolling manner forming splines (**64**) as said man-

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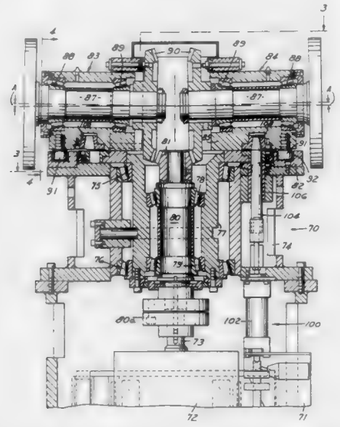
drel rotates while simultaneously outwardly chamfering the end (**66**) of said sleeve portion (**46**) between the formed splines





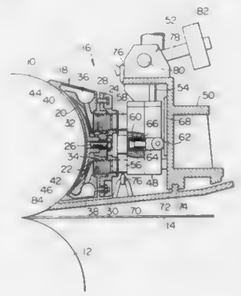
opposite said end wall (**44**) and uniformly deforming said member (**42**) radially during the splining operation.

**4,741,192**
**ROLLING METAL RIBBON STOCK INTO CONVOLUTED FIN STRIP FOR USE IN HEAT EXCHANGERS**
**Bernard J. Wallis, 2215 Dacosta Ave., Dearborn, Mich. 48128**
**Filed Jul. 14, 1986, Ser. No. 885,033**
**Int. Cl.⁴ B21D** *53/02;* **B21C** *47/24*
**U.S. Cl. 72—187** **4 Claims**



**1**. For use in an apparatus for rolling metal ribbon stock into convoluted pin strip for use in heat exchangers, an uncoiler apparatus comprising:
a base,
a pair of coil supports for supporting a pair of coils of sheet metal ribbon stock,
a rotatable support on which said coil supports are mounted, said rotatable support being rotatable about a vertical axis,
a motor drive,
means on said rotatable support for guiding said supports for radial movement into and out of engagement with said motor drive,
interengaging means between the coil supports and the base such that when the rotatable support is rotated, one coil support is moved radially into driving engagement with the motor drive and the other coil support is moved radially out of driving engagement with the motor drive.

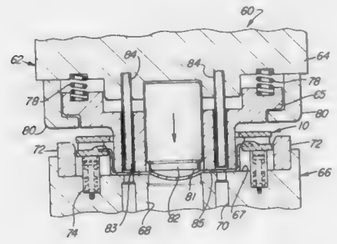
**4,741,193**
**METHOD AND APPARATUS FOR COOLING ROLLING MILL ROLLS**
**Tomoaki Kimura; Yoshio Takakura; Sakae Nishimura, all of Hitachi; Nobuyoshi Sasaki, Chiba; Toshio Ohki, Chiba, and Yoshito Kawai, Chiba, all of Japan, assignors to Hitachi, Ltd., Tokyo and Kawasaki Steel Corporation, Kobe, both of, Japan**
**Filed May 16, 1986, Ser. No. 863,992**
**Claims priority, application Japan, May 17, 1985, 60-105642; May 20, 1985, 60-107151; May 22, 1985, 60-108200; Sep. 19, 1985, 60-207120**
**Int. Cl.⁴ B21B** *27/06*
**U.S. Cl. 72—201** **5 Claims**



**1**. A roll cooling device for a rolling mill having rolls, comprising at least one cooling water guide plate having a curved surface along a circumferential direction of an associated one of said rolls, said cooling water guide plate having opposite circumferential ends being positioned in close proximity to the associated roll; a cooling water passage formed between said guide plate and the associated roll; cooling water supply means for suuplying cooling water to said cooling water passage; water discharge means for discharging the cooling water from said cooling water passage; said cooling water supply means being positioned at one of said circumferential ends of said cooling water guide plate; said cooling water discharge means being positioned at the other of said circumferential ends of said cooling water guide plate such that the cooling water flows through said cooling water passage in the circumferential direction of the roll from said cooling water supply means to said cooling water discharge means; a support member for supporting said cooling water guide plate; and said cooling water guide plate having a central portion and circumferentially opposed upper and lower edge portions, wherein a thickness of the cooling water guide plate is increased from each edge portion to the central portion in the circumferential direction of the associated roll.

**4,741,194**
**COMPOSITE ROTOR MANUFACTURING METHOD**
**William L. Kozyra, Rochester Hills, and Frank J. Vancsik, Grosse Pointe Woods, both of Mich., assignors to The Budd Company, Troy, Mich.**
**Filed Sep. 25, 1986, Ser. No. 911,498**
**Int. Cl.⁴ B21D** *28/32, 53/34, 53/88*
**U.S. Cl. 72—334** **6 Claims**

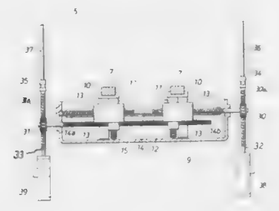
**1**. A process for improving the flatness of the center section of a composite rotor, comprising the steps of:
providing a stamped sheet metal center section with a braking face portion defined by cast or forged material,
forming a dome-shaped bubble of deflected material within said center section after said braking face portion is formed on said center section while supporting said center section around said deflected material, thereby radially inwardly straining portions of said rotor center section

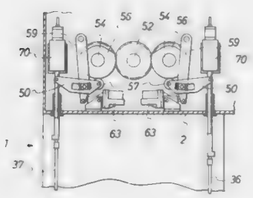


and reducing waviness and imperfections in said center section, and
removing said bubble from said center section thereby defining a center clearance hole.



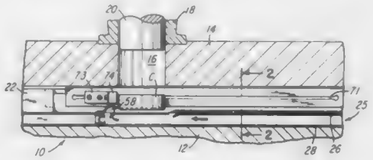
**4,741,195**
**APPARATUS FOR CLAMPING AND UNCLAMPING FEED BARS FOR A TRANSFER PRESS**
**Toshihiko Arai, Tsukui; Masaharu Kusunoki, Sagamihara; Tadao Odaka, Sagamihara; Shozo Imanishi, Sagamihara; Yoshinori Kato, Otsuki; Masakazu Hashimoto, and Yoshiyuki Hashimoto, both of Sagamihara, all of Japan, assignors to Aida Engineering, Ltd., Sagamihara, Japan**
**Filed Sep. 9, 1986, Ser. No. 905,326**
**Claims priority, application Japan, Sep. 9, 1985, 60-137735[U]; Oct. 8, 1985, 60-154225[U]; Feb. 25, 1986, 61-26912[U]**
**Int. Cl.⁴ B21D** *43/10*
**U.S. Cl. 72—421** **13 Claims**





**1**. In a transfer press having feed bars and a press drive, an improved feed bar driving appartus comprising:
a vertical rod means reciprocally movable in association with the press drive and having a threaded portion;
a drive means connected to said vertical rod means for rotating said vertical rod means in opposite directions;
a feed screw means connected to the threaded portion of said vertical rod means for being rotated by said vertical rod means in opposite directions by rotation and reciprocation of said vertical rod means;
a pair of feed bar receptacles slidably supporting the feed bars and connected to the feed screw means for being moved toward and away from each other when said feed screw means is rotated in respective opposite directions for moving said feed bars in a clamping and unclamping movement;
a cam means rotatable in association with the press drive;
a lever mounted on a fulcrum means and connected to said vertical rod means and in contact with said cam means for being pivoted around said fulcrum by said cam means for moving said vertical rod means through a stroke; and
a stroke adjusting mechanism connected to said fulcrum means for changing the position of said fulcrum means for selectively adjusting the stroke of said vertical rod means and thereby adjusting the stroke of said feed bars.

**4,741,196**
**AIR CONVEYOR AND METHOD FOR REMOVING PARTS FROM A HIGH SPEED FORMING PRESS**
**Harry D. Stewart, Tipp City, and Ralph P. Stodd, Dayton, both of Ohio, assignors to Formatec Tooling Systems, Inc., Dayton, Ohio**
**Filed Feb. 9, 1987, Ser. No. 12,500**
**Int. Cl.⁴ B21D** *45/02;* **B21J** *13/08*
**U.S. Cl. 72—427** **19 Claims**



**15**. An air conveyer adapted for use in a space defined between the bed of a mechanical press and a lower die shoe mounted on the press for rapidly and dependably removing a succession of metal cups formed in the press, said conveyer comprising an elonated generally flat sheet metal duct having vertically spaced and generally parallel top and bottom walls and defining a longitudinally extending air chamber, said duct having an inner end portion adapted to be located within the press and a discharge end portion adapted to project from the press, means defining an air supply inlet for said chamber within said bottom wall of said discharge end portion of said duct, an air blower having an outlet connected to said inlet, said inner end portion of said top wall having a cup receiving portion where the cups are successively deposited on said top wall, air directing means projecting upwardly from said top wall adjacent said cup receiving portion and defining an air outlet, said air directing means being positioned to direct a substantial flow of air longitudinally above said top wall for immediately moving each cup from said cup receiving portion and longitudinally along said top wall towards said discharge end portion, and said top wall having a plurality of longitudinally extending and upwardly projecting parallel spaced ribs to control frictional drag between the cups and said top wall of said duct especially when the cups carry a lubricating oil.

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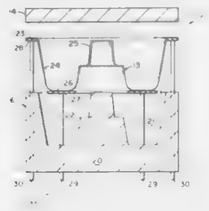


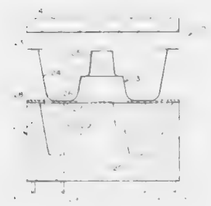
**4,741,197**

## EJECTION OF SUPERPLASTICALLY FORMED PART WITH MINIMUM DISTORTION

**Edwin H. Spuhler, Colorado Springs, Colo., and James M. Story, Plum Boro, Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.**

**Filed Apr. 25, 1986, Ser. No. 856,023**
**Int. Cl.⁴ B21D *45/02***
**U.S. Cl. 72—427** **2 Claims**





1. A method of removing a part from a first die after the part has been superplastically formed in the die at an elevated temperature from a blank of material, the part tending to adhere to the surfaces of the die and having relatively low strength because of the elevated temperature at which the part is formed such that the removal of the part from the die without deforming the part while it has such low strength is difficult, the method comprising the steps of:

providing opposed dies and peripheral die surfaces for clamping a peripheral portion of a blank therebetween, which portion forms an integral flange of the part when the part is superplastically formed,

providing movable means within a cavity of the first die that occupies one or more relatively broad surface areas of the cavity such that the movable means is positioned to uniformly engage relatively broad areas of the part superplastically formed in association with the broad surface areas of said cavity,

providing movable means on the peripheral surface of the first die that generally matches and uniformly engages the area of the flange of the part,

separating the dies,

moving the means that uniformly engage the cavity and flange portions of the part simultaneously in a direction away from the die surfaces to remove the part from the die cavity and periphery while it has low strength without deforming the part, and

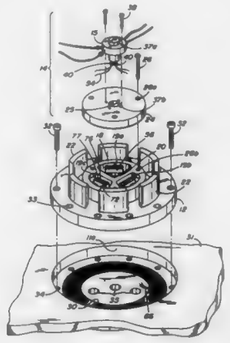
retracting the movable means on the periphery of the first die toward the first die such that the part remains exposed on the means movable from the cavity of the first die, thereby providing access for removal of the part from said last named movable means.

**4,741,198**

## THERMAL CONDUCTIVITY DETECTOR ASSEMBLY

**Carl A. Farren, Placentia, and James H. Crabtree, Long Beach, both of Calif., assignors to Beckman Industrial Corporation, LaHabra, Calif.**

**Filed Oct. 6, 1986, Ser. No. 915,677**
**Int. Cl.⁴ G01N *30/66***
**U.S. Cl. 73—23.1** **16 Claims**



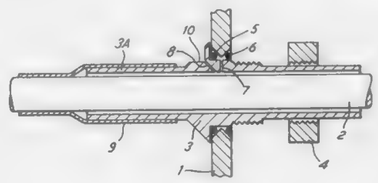
1. A gas chromatography detector assembly comprising a thermally conductive body, sample separation means carried by said body in heat transfer relationship thereto, said body defining at least one cell having disposed therein a thermal conductivity sensor element, means for leading sample and carrier gas through said separation means into said cell for contact with said sensor and for leading fluids out of said cell after contact with said sensor, said sensor element being electrically connected to circuit means for controlling said sensor operating temperature and resistance and for controlling electrical power to said sensor responsive to the resistance of said sensor and to means for amplifying and displaying a signal received from said sensor, heater means in heat transfer relationship through said body with said cell and with said sample separation means and heater control circuitry including a temperature detector disposed in said body adjacent said cell for activating said heater means and for controlling the output thereof responsive to the temperature within said cell whereby the ambient temperature of said cell is maintained at a substantially constant preselected level resulting in a substantially improved signal to noise ratio.

**4,741,199**

## TESTABLE CABLE ENTRY GLAND

**Herbert J. C. Spencer, Ascot, Berkshire, England, assignor to Telepec Limited, Rochester, England**

**Filed Nov. 18, 1986, Ser. No. 932,471**
**Claims priority, application United Kingdom, Nov. 22, 1985, 8528789**
**Int. Cl.⁴ G01M *3/26***
**U.S. Cl. 73—46** **6 Claims**



3. A method of sealing an electrical cable into an aperture in a wall of a housing, wherein said cable is passed through an entry gland comprising a central annular portion adapted to fit said aperture, a collar arranged to engage one side of said wall around said aperture, and a clamping member screw threaded to the entry gland and arranged to be clamped into engagement with the opposite side of said wall in order to retain said central portion within said aperture, and wherein said seals comprise resilient "O"-rings and are located around said central portion of the entry gland respectively between said collar and said wall and said clamping member and said wall, said cable is sealed to said entry gland on both sides thereof by means of corresponding portions of shrink-down sleeving arranged to engage the external periphery of said cable, said entry gland is sealed into said aperture by two seals arranged to contact adjacent portions of said wall in such a manner that said two seals and said adjacent portions of sleeving together enclose a common space between the periphery of said cable and the periphery of said aperture, wherein said central annular portion of the entry gland is formed integrally with axially extending sleeves arranged to surround said cable, and said shrink-down tubing is arranged to overlap the external peripheries of said sleeves and the external surface of said cable, and the integrity of the seal enclosing said common space is then tested by applying fluid pressure to said space to establish a pressure drop across said seals and monitoring potential leakage of fluid to or from the said space.

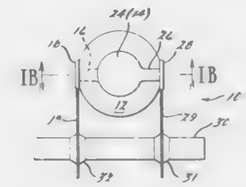


**4.741,200**

## METHOD AND APPARATUS FOR MEASURING VISCOSITY IN A LIQUID UTILIZING A PIEZOELECTRIC SENSOR

**Robert H. Hammerle, Franklin, Mich., assignor to Ford Motor Company, Dearborn, Mich.**

**Filed Jul. 11, 1986, Ser. No. 884,824**
**Int. Cl.⁴ G01N *11/16***
**U.S. Cl. 73—54** **11 Claims**



1. An apparatus for measuring the viscosity of liquids comprising:

piezoelectric means containing a thickness shear mode crystal with opposing major surfaces, opposing electrodes mounted on said major surfaces and lead wires correspondingly connected to said electrodes for suspending said thickness shear mode crystal and conveying electrical drive energy to said electrodes;

energization means for supplying AC electrical drive energy to said piezoelectric means; and

detection means for monitoring electrical characteristics of said piezoelectric means when driven by said energization means.

**4,741,201**

## CEMENT MIX ANALYZING SYSTEM

**Robert L. Propst, 18845 N.E. 49th Pl., Redmond, Wash. 98052**

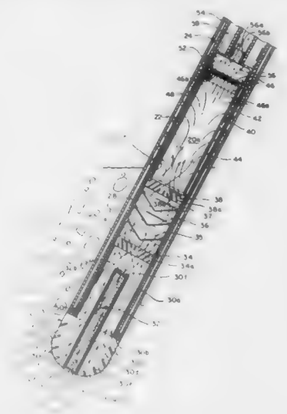
**Filed Dec. 10, 1986, Ser. No. 940,036**
**Int. Cl.⁴ G01N *33/38***
**U.S. Cl. 73—61 R** **19 Claims**

1. A method for determining the cement-to-liquid ratio in a sample of a cement and liquid mix, comprising the steps of:

passing the sample through a hydrophilic collector unit of predetermined weight which is adapted to filter out the cement in the sample;

saturating a hygroscopic collector unit of predetermined capacity with the liquid passing through the hydrophilic collector unit and stopping the collection of cement by the hydrophilic collector unit when the hygroscopic collector unit becomes saturated with collected liquid; and

determining the weight of the collected cement.

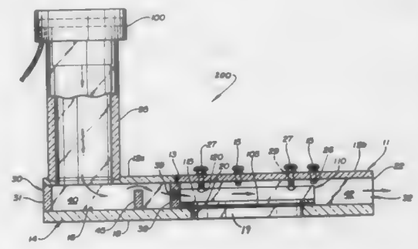


**4,741,202**

## MOISTURE VAPOR TRANSMISSION TEST CELL

**Ronald J. Gillespie, Milltown, and Allan P. Farrington, Englishtown, both of N.J., assignors to Johnson & Johnson, New Brunswick, N.J.**

**Continuation-in-part of Ser. No. 722,931, Apr. 12, 1985, Pat. No. 4,581,921. This application Apr. 11, 1986, Ser. No. 850,798**
**The portion of the term of this patent subsequent to Apr. 15, 2003, has been disclaimed.**
**Int. Cl.⁴ G01N *5/02***
**U.S. Cl. 73—73** **7 Claims**



1. A test cell useful in determining moisture vapor transmission characteristics comprising:

an enclosure having

a top wall,

a bottom wall having an upper surface and a lower surface,

a first side wall,

a second side wall,

a first end which is closed by an end wall, and a second end which is open;

means associated with said enclosure near its first end for supplying air to said enclosure, and

an aperture in the bottom wall of said enclosure near its open end.

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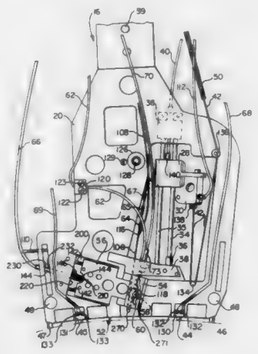


**4,741,203**

## TURBINE INSPECTION DEVICE AND ASSOCIATED COIL ASSEMBLY AND ASSOCIATED METHOD

**Dwight O. Willaman, Ridley Park; George F. Dailey, Plum Boro, and Michael J. Metala, Murrysville, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Nov. 21, 1986, Ser. No. 933,707**
**Int. Cl.[4] G01M** *19/00*
**U.S. Cl. 73—116** **16 Claims**



1. A turbine inspection device comprising:
support assembly means,
sensor means on said support assembly means for inspection the turbine for defects, and
a blade root sensor on said support assembly means adapted to be moveable along a cam adjacent a turbine blade root and shaped to follow a serrated contour of an edge of the turbine blade root for inspecting the blade root of the turbine,
said support assembly means having attachment means for engaging a portion of the turbine thereby positioning said sensor means and said blade root sensor to facilitate inspection of the turbine and the blade root of the turbine.

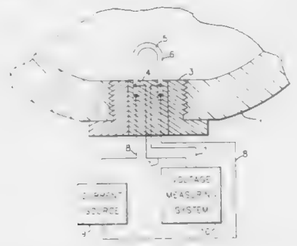
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**4,741,204**

## MEASUREMENT OF THE DEPLETION OF BASIC ADDITIVES IN LUBRICATING OIL

**Russell M. Luck, Monroeville; Allan I. Bennett, Murrysville, both of Pa., and David H. Taylor, Bloomington, Minn., assignors to Thermo King Corporation, Minneapolis, Minn.**

**Filed Apr. 16, 1987, Ser. No. 39,145**
**Int. Cl.[4] G01M** *15/00*
**U.S. Cl. 73—116** **15 Claims**




1. A method of measuring the depletion of basic additives in a lubricating oil comprising:
(A) immersing into said oil a sensor made of a metal consisting of lead;
(B) passing an electric current through said sensor; and
(C) measuring the electrical resistance of said sensor.

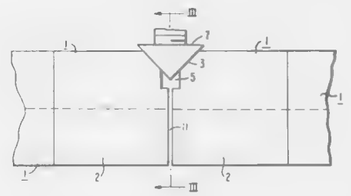
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**4,741,205**

## "V" NOTCHED INTEGRALLY SHROUDED TURBINE BLADE AND METHOD FOR DETERMINING SHROUD TIGHTNESS AND WEAR OF A CIRCULAR ARRAY OF ROTATING BLADES DISPOSED IN A ROTOR

**Bobby R. Keller, Charlotte, N.C., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Dec. 22, 1986, Ser. No. 946,211**
**Int. Cl.[4] G01M** *15/00*
**U.S. Cl. 73—116** **12 Claims**



1. Method of checking the tightness of a shroud portion of a circular array of integrally shrouded turbine blades disposed in a turbine rotor comprising the steps of:
forming each turbine blade so that it has a shroud portion made integral therewith;
forming a notch in the shroud portion of the circular array of turbine blades at the juncture of two blades by removing corner portions of two adjacent blade shroud portions;
providing spreading means which register with the notch for forcing the two adjacent blade shroud portions with the corners removed apart forming a gap therebetween when a force is applied to the spreading means;
applying a predetermined force to the spreading means to form the gap between the two adjacent blade shroud portions that form the notch; and
measuring the width of the gap formed by the predetermined force to obtain an indication of the tightness of the shroud portion of the circular array of blades when the blades are disposed in a turbine rotor.

10. A method of checking the tightness of a shroud portion of a circular array of integrally shrouded turbine blades disposed in a turbine rotor comprising the steps of:
forming each turbine blade so that it has a shroud portion made integral therewith;
forming a notch in the shroud portion of the circular array of integrally shrouded turbine blades at the juncture of two blades by removing corner portions of two adjacent blade shroud portions;
providing spreading means which register with the notch for forcing the two adjacent blade shroud portions forming the notch apart to form a gap therebetween;
applying sufficient force to the spreading means to form a gap sufficiently wide to receive a shim of predetermined thickness;
inserting said shim in said gap;
reducing said force being applied to the spreading means in order to clamp said shim in the gap;
increasing said force applied to the spreading means gradually until said shim can be pulled from the gap; and
recording the force being applied when said shim can be pulled from the gap to provide an indication of the tightness of the shroud portion of the circular array of turbine blades disposed in a turbine rotor.

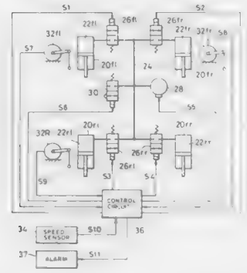


**4,741,206**

## VEHICLE HEIGHT DETECTING SYSTEM

**Yoshinori Ishiguro, Chiryu; Kohji Kamiya, Chita; Kiyoshi Miyake; Hideki Kabune, both of Kariya; Noriyuki Nakashima, Nagoya, and Masami Itou, Toyota, all of Japan, assignors to Nippondenso Co., Ltd., Kariya and Toyota Jidosha Kabushiki Kaisha, Toyota, both of, Japan**

**Filed Dec. 15, 1986, Ser. No. 942,082**
**Claims priority, application Japan, Dec. 16, 1985, 60-282607**
**Int. Cl.[4] G01M** *17/04*
**U.S. Cl. 73—118.1** **7 Claims**




1. A vehicle height detecting system comprising:
(a) a vehicle height sensor including switching circuits which are turned on and off in accordance with height of a vehicle;
(b) means for outputting a drive signal to the vehicle height sensor and thereby driving the vehicle height sensor;
(c) means for feeding a present voltage to terminals of the respective switching circuits and outputting voltages at the terminals as vehicle height data having bits corresponding to the respective switching circuits;
(d) means for, when the driving means suspends the output of the drive signal, reading the vehicle height data as vehicle height sensor malfunction detecting data; and;
(e) means for comparing the malfunction detecting data with preset reference data and judging the vehicle height sensor to be wrong when the malfunction detecting data differ from the preset reference data.

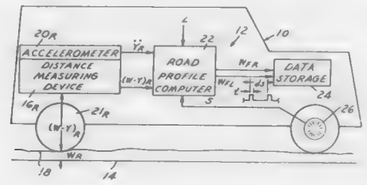
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**4,741,207**

## METHOD AND SYSTEM FOR MEASUREMENT OF ROAD PROFILE

**Elson B. Spangler, 1465 Sodon Lake Dr., Bloomfield Hills, Mich. 48013**

**Filed Dec. 29, 1986, Ser. No. 946,932**
**Int. Cl.[4] E01C** *23/00*
**U.S. Cl. 73—146** **13 Claims**




3. In a method of measuring road surface profile which includes the steps of providing a vehicle having a suspended mass adapted to be propelled over a road surface, measuring distance from the suspended mass to the road surface at each of two spaced locations on said vehicle as said vehicle is propelled over the road surface, determining acceleration of said suspended mass perpendicularly of the road surface at each of said locations on said vehicle as said vehicle is propelled over the road surface, and determining road profiles at said locations as respective functions of said distances and accelerations, the improvement for measuring slope of said road surface between said profiles comprising the steps of measuring total acceleration of said vehicle in a direction parallel to said road surface, measuring motion acceleration of said vehicle in said direction parallel to said road surface due solely to motion of said vehicle over said road surface, determining acceleration of said vehicle in said direction parallel to said road surface due solely to gravity as a function of a difference between said total acceleration and said motion acceleration, and determining slope of said road surface between said road profiles as a function of said acceleration difference.

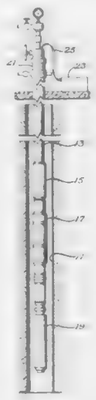
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**4,741,208**

## PUMP DIFFERENTIAL PRESSURE MONITOR SYSTEM

**Joseph E. Vandevier, Claremore, Okla., assignor to Hughes Tool Company, Houston, Tex.**

**Filed Oct. 9, 1986, Ser. No. 916,915**
**Int. Cl.[4] E21B** *47/06*
**U.S. Cl. 73—155** **4 Claims**

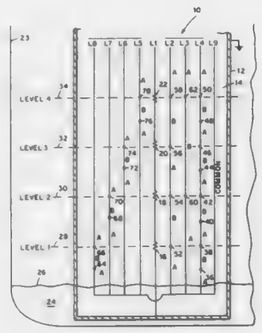


1. In a well having casing and a submersible pump connected to a string of tubing for drawing production fluid from the annulus between the casing and the tubing and pumping the fluid through the tubing to the surface, the improvement being means for monitoring at the surface the pressure in the annulus and in the tubing adjacent to the pump comprising:
a sub mounted between the pump and the tubing;
a receptacle located inside the sub;
bypass passage means extending past the receptacle for directing fluid discharged from the pump past the receptacle and into the tubing;
a pair of pressure sensors located inside the receptacle, one of the sensors being in communication with the bypass passage means for monitoring pressure in the tubing;
port means extending from the receptacle to the exterior of the sub for communicating annulus pressure to the other sensor; and
electrical cable means extending from each of the pressure sensors to the surface for transmitting electrical data from the pressure sensors to the surface.

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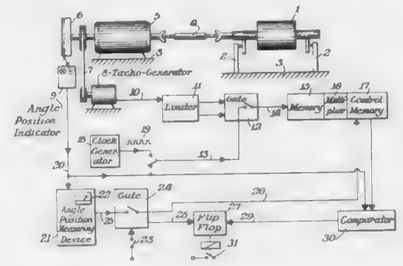


**4,741,209**
**APPARATUS FOR DETECTING THE BOUNDARY BETWEEN TWO SUBSTANCES**
**Reg W. McCulloch, 27 Bradford Cir., Oak Ridge, Tenn. 37830, assignor to Reg McCulloch, Oak Ridge, Tenn.**
**Filed Nov. 19, 1985, Ser. No. 799,617**
**Int. Cl.[4] G01F *23/22***
**U.S. Cl. 73—295** **4 Claims**



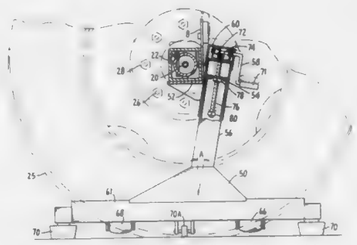
1. An apparatus for detecting the location of a boundary between two substances having different thermal absorption properties comprising:
an elongate thermally conductive sheath for being disposed once across the boundary;
a plurality of elongate wire sensors for being disposed once across the boundary between the two substances, said sensors being disposed within said sheath and extending for substantially the entire length thereof, each of said sensors being constructed of a-type segments and b-type segments, said segments, being connected with alternating types connected end-to-end so that a series of a-type to b-type junctions are formed along said sensors, said a-type segments being constructed of a material different from said b-type segments so that thermocouple junctions are formed between a-type and b-type segments;
a common return wire disposed in said sheath and extending substantially the length thereof, said return wire being connected at one end to the ends of said elongate wire sensors;
a segmented heating element having a plurality of heating segments for heating selected ones of said thermocouple junctions and having a plurality of non-heating segments interposed between the heating segments in series;
said wire sensors and said heating element being disposed in an adjacent side-by-side substantially parallel relationship;
means for electrically insulating said sensors and said return wire, one from the other along their length except at the connections at their ends, and from said heating element, said sheath and the two substances in which the sensor is disposed, said electrical insulation means being thermally conductive for transferring heat from said heating element to said sensor and from said sensor and heating element through said sheath to the two substances in which said sensor is disposed so that the temperatures of said heated junctions are dependent in part upon the substance in which the junctions are disposed; and
means connected to said sensor and return wire for measuring the voltage potential across said sensor and indicating the location of the boundary between the two substances.

**4,741,210**
**METHOD AND APPARATUS FOR BRINGING ROTATING BODY TO STANDSTILL**
**Otfrid Maus, Darmstadt, Fed. Rep. of Germany, assignor to Schenck Auto-Service-Gerate GmbH, Fed. Rep. of Germany**
**Filed Jun. 6, 1985, Ser. No. 742,098**
**Claims priority, application European Pat. Off., Jul. 18, 1984, 84 108 464.3**
**Int. Cl.[4] G01M *1/18***
**U.S. Cl. 73—462** **11 Claims**




1. A procedure for bringing a rotating body to a standstill at a specific point on its circumference as the conclusion of a work cycle including the steps of accelerating the rotating body, measuring the time span during a selected portion of the acceleration phase of the rotating body between a predetermined lower speed limit and a predetermined upper speed limit below the maximum speed of the rotating body, braking the speed of the rotating body from its maximum speed to zero, and utilizing said measured time span of the same work cycle for controlling the beginning of the braking to bring the rotating body to a standstill with a specific point on its circumference relative to a fixed point.

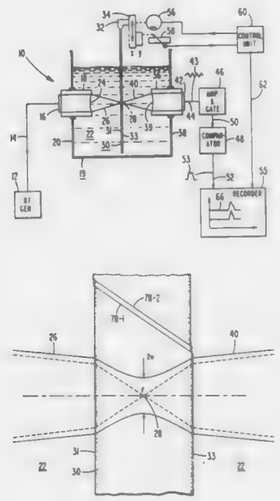
**4,741,211**
**HEAVY WHEEL BALANCER**
**Willy Borner, 21096 Grenola Dr., Cupertino, Calif. 95014, and Bernie F. Jackson, 23485 Summit Rd., Los Gatos, Calif. 95030**
**Continuation of Ser. No. 689,947, Jan. 9, 1985, abandoned, which is a continuation-in-part of Ser. No. 571,832, Jan. 19, 1984, abandoned. This application Nov. 13, 1986, Ser. No. 928,576**
**Int. Cl.[4] G01M *1/02***
**U.S. Cl. 73—462** **13 Claims**



5. In a machine for determining dynamically the imbalance of a wheel which includes a horizontal rotatable shaft adapted to support a wheel to be balanced, coupled to means for measuring dynamically forces of imbalances transmitted by said shaft when the wheel rotates and means for determining and displaying dynamic imbalance data related to the measured forces, the improvement comprising providing a carriage mounted on an upright for adjusting the vertical position of said horizontal shaft to align said shaft with the center of the wheel in a vertically standing position and means for raising said horizontal shaft supporting the wheel together with the coupled means for measuring forces of imbalance with the carriage to a height that permits the wheel to clear the ground and providing preloading of the carriage against the upright with a force which exceeds the maximum forces of imbalance generated by rotating the wheel and shaft in the dynamic imbalance measuring process.

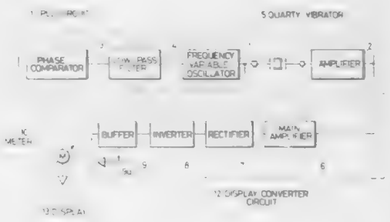


**4,741,212**
**METHOD FOR DETERMINING STRUCTURAL DEFECTS IN SEMICONDUCTOR WAFERS BY ULTRASONIC MICROSCOPY**
**Walther Rehwald, Wettingen, Switzerland, assignor to General Electric Company, Schenectady, N.Y.**
**Filed Jul. 31, 1986, Ser. No. 891,170**
**Int. Cl.[4] G01N *29/04***
**U.S. Cl. 73—600** **5 Claims**



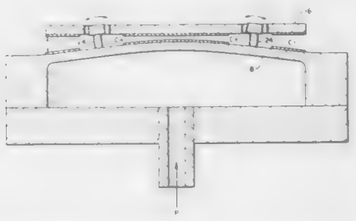

1. A method for locating and quantifying a structure defect in the form of a slip plane caused by thermoplastic deformation, in a semiconductor body comprising the steps of:
(a) focusing an incident beam of acoustic energy within the body, said incident beam having a wavelength that is significantly smaller than the thickness of said body and a beam waist diameter that is smaller than the thickness of said body;
(b) providing relative movement between said body and said beam so that a portion of the major surface is scanned in a given direction;
(c) providing a position signal indicative of the position of said surface portion receiving said incident beam;
(d) detecting the acoustic energy of the beam transmitted through said body and producing a transmitted electrical signal corresponding to the attenuation of said acoustic beam through said body; and
(e) processing said transmitted electrical signal such that attenuation peaks in said transmitted signal are indicative of the location and magnitude of said structural defect in said body.

**4,741,213**
**QUARTZ-TYPE GAS PRESSURE GAUGE**
**Hiso Hojoh, Tokyo, Japan, assignor to Seiko Instruments & Electronics Ltd., Tokyo, Japan**
**Filed Feb. 9, 1987, Ser. No. 12,355**
**Claims priority, application Japan, Feb. 7, 1986, 61-25392**
**Int. Cl.[4] G01L *11/00*; H01L *41/04***
**U.S. Cl. 73—702** **1 Claim**




1. In a quartz-type gas pressure gauge comprising:
a phase locked loop circuit which consists of at least a frequency variable oscillator, a phase comparator, a low-pass filter and an amplifier;
a quartz vibrator connected to said frequency variable oscillator;
a display converter circuit connected to said phase locked loop circuit; and
a display unit connected to said display converter circuit;
wherein the pressure of a gas surrounding said quartz vibrator is measured relying upon a resonance resistance of said quartz vibrator, or a resonance current of said quartz vibrator or a resonance voltage of said quartz vibrator, and wherein said quartz vibrator is of the type of a tuning fork obtained from a Z-plate which is cut at an angle of +1°50′ or larger with respect to the Y-axis.

**4,741,214**
**CAPACITIVE TRANSDUCER WITH STATIC COMPENSATION**
**Eugene Vidmantas, Rochester, N.Y., assignor to Combustion Engineering, Inc., Windsor, Conn.**
**Filed Sep. 19, 1986, Ser. No. 909,761**
**Int. Cl.[4] G01L *7/08, 9/12***
**U.S. Cl. 73—708** **13 Claims**



1. In a capacitive transducer for monitoring a first condition, the transducer including a pair of transducer capacitors, each of said transducer capacitors including a pair of spatially displaced conductors, at least one of the transducer capacitors having a fluidic dielectric medium and having a capacitance which varies with a second condition, the spacing between the electrodes of the said one capacitor varying in response to changes in the monitored condition whereby the ratio of the capacitances of the transducer capacitors will vary as a function of the monitored condition, the improvement comprising:
a shunt capacitor connected in parallel with only the said

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one of the transducer capacitors that has a fluidic dielectric medium, said shunt capacitor being positioned outside the range of influence of the first and second conditions and being sized to minimize changes in the ratio of the capacitances of the transducer capacitors resulting from changes in said second condition to which the transducer capacitors are exposed.

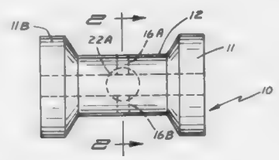
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**4,741,215**

## FLOW TUBE FOR A MAGNETIC FLOWMETER

**David C. Bohn, Eden Prairie, and Lloyd E. Graupmann, Plato, both of Minn., assignors to Rosemount Inc., Eden Prairie, Minn.**

**Continuation of Ser. No. 751,784, Jul. 3, 1985, abandoned. This application Apr. 15, 1987, Ser. No. 39,821**
**Int. Cl.[4] G01F** *1/58*
**U.S. Cl. 73—861.12** **29 Claims**




15. A flow tube formed of a low permeability, non-conductive ceramic material for a magnetic flowmeter; the flowmeter having means externally disposed on the flow tube for producing a magnetic field in an electrically conductive fluid flowing through a bore in the flow tube and having circuit means external to the flow tube for receiving a signal representative of flow; the flow tube comprising:

a first region formed of a ceramic material having enhanced magnetic permeability sintered in the ceramic material of the flow tube and disposed between the means for producing and the bore of the flow tube for transferring the magnetic field from the means for producing to the electrically conductive fluid flowing in the bore in the flow tube, and

a second region formed of a ceramic material having enhanced electrical conductivity sintered in the ceramic material of the flow tube and disposed between the circuit means and the bore of the flow tube for transferring the signal representative of flow from the fluid to the circuit means and having mechanical strength such that the flow tube is pressure bearing.

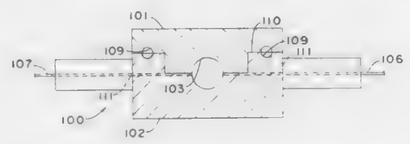
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**4,741,216**

## SPLIT FLOWTUBE FOR MOLTEN METAL MAGNETIC FLOWMETER

**Robert C. Bates, Allison Park, and Richard F. Kwiatkowski, Wexford, both of Pa., assignors to Mine Safety Appliances Company, Pittsburgh, Pa.**

**Filed Feb. 26, 1987, Ser. No. 19,197**
**Int. Cl.[4] G01F** *1/58, 15/04*
**U.S. Cl. 73—861.12** **1 Claim**




1. A molten metal flowtube for a magnetic flowmeter comprising:

an elongated casing comprising a top and bottom piece, each piece having a lengthwise central hollowed-out groove in one face of said piece where said grooves form a center flow channel when said two faces are aligned lengthwise, and where said casing has a means for sealing said top and bottom pieces around the outer edge of said channel when assembled, and where said center channel is comprised of or lined with any material composition that cannot be corroded by the conductive metal that is flowing through said flowtube, and where said lining material composition is non-magnetic and has low conductive properties; and,

a means for securing together said top and bottom pieces.

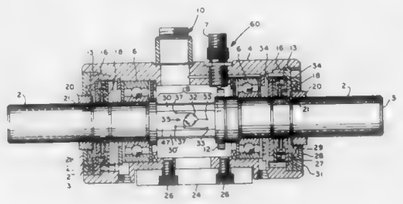
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**4,741,217**

## MAGNETIC FIELD COUPLING CIRCUIT AND ROTARY TRANSDUCER USING SAME

**Paul W. Morgan, Pontiac, and Richard C. Phillips, Birmingham, both of Mich., assignors to Eaton Corporation, Cleveland, Ohio**

**Filed Apr. 6, 1987, Ser. No. 34,238**
**Int. Cl.[4] G01L** *3/10;* **H01F** *23/00*
**U.S. Cl. 73—862.35** **8 Claims**



1. An improved magnetic field coupling circuit between relatively fixed and rotary members, said fixed member comprising a pair of adjacently positioned magnetic stator sections secured in coaxial relation to the rotary member and having an electrical contact relationship therebetween and having a portion of respective facing surfaces thereof spaced axially apart from each other to provide an annular air gap therebetween disposed coaxially about the rotary member in which electrical stator windings are disposed that upon electrification by an electrical power source provide an electromagnetic field having a reluctance characteristic thereof, and a rotor member secured to the rotary member and operative to rotate in unison therewith, said rotor member carrying electrical rotor windings that are rotated thereby within the air gap electromagnetic field to provide the electromagnetic coupling circuit between the stator and rotor windings, wherein the improvement is characterized by at least one of said stator sections comprising a plurality of wedge shaped segments spaced circumferentially about the rotary member having their respective narrowest circumferential breadth located closest the rotary member and having at least a portion of respective adjacent facing edges thereof providing electrical contact therebetween.

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**4,741,218**

## MANIPULATOR DRIVE WITH SLIP-ELIMINATING ADJUSTMENT

**Ernst Zimmer, Friedberg, Fed. Rep. of Germany, assignor to Kuka Schweissanlagen + Roboter GmbH, Augsburg, Fed. Rep. of Germany**

**Continuation of Ser. No. 587,929, Mar. 9, 1984, abandoned. This application Jun. 26, 1986, Ser. No. 880,953**
**Claims priority, application Fed. Rep. of Germany, Mar. 9, 1983, 3308413**
**Int. Cl.[4] B25J** *17/00*
**U.S. Cl. 74—89.2** **7 Claims**

1. In a manipulator having a pair of main elements pivoted at a main axis, a drive comprising:



a motor mounted on one of the main elements and having a motor output;

a first belt-type stepdown transmission having

an input wheel connected rotationally to the motor output,

an output wheel rotatable about the axis, and

a toothed belt interconnecting the input and output wheels for joint rotation without substantial slip;

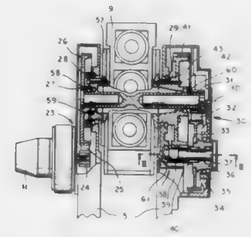
a second belt-type stepdown transmission having

a toothed input wheel coaxial with and fixed rotationally on the output wheel,

a toothed output wheel centered on a gear axis offset from the input wheel of the second transmission and connected thereto, and

a toothed belt interconnecting the input and output wheels of the second transmission;

a third gear-type stepdown transmission of relatively high stepdown ratio greater than that of the second transmission, mounted on the same axial side of the main elements as the second transmission, and having



a relatively large output gear fixed rotationally to the other main element and centered on the main axis, and

a relatively small input gear rotatable about the gear axis offset from the main axis and having two axially separate halves relatively rotatable about the gear axis and both directly meshing with the output gear;

directly meshing with the output gear;

a shaft having an outer end connected to one of the gear halves an an inner end connected to the output element of the second transmission;

a sleeve surrounding the shaft, having an outer end connected to the other gear half and an inner end connected to the output element of the second transmission, and of generally the same torsional elasticity between its ends as the shaft between its ends; and

slip-adjusting means effective between the inner ends of the shaft and sleeve for maintaining opposite torsional stresses in the sleeve and shaft.

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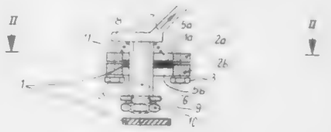
**4,741,219**

## COUPLING FOR COUPLING A DRIVEN ELEMENT TO A DRIVING ELEMENT SAID ELEMENTS FOLLOWING DIFFERENT DISPLACEMENT TRAJECTORIES

**Michel Wiand, and Jean-Marie Jeuffray, both of Bressuire, France, assignors to Etablissements Farnier et Penin, Courbevoie, France**

**Filed Feb. 2, 1987, Ser. No. 9,496**
**Claims priority, application France, Feb. 7, 1986, 86 01690**
**Int. Cl.[4] F16H** *21/44*
**U.S. Cl. 74—104** **4 Claims**

1. A device for coupling a belt driving element to a driven element which driven element is guided generally parallel to itself along a trajectory which is close but not parallel to the belt driving element comprising: a driving core which is fixed to the belt driving element; an oblong opening in said core which oblong opening extends transversely to the belt driving element and lies within the width of the belt driving element; and a connection finger which is fixed to the driven element and which is slidably mounted in said oblong opening; whereby the said finger is capable of moving both generally



parallel to the belt driving element and capable of moving perpendicularly to the belt driving element.

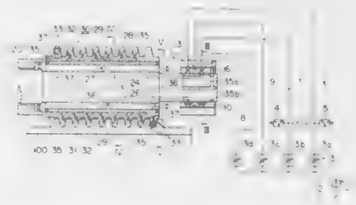
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**4,741,220**

## HYDROSTATIC PRESSURE WORM-RACK DEVICES

**Koya Watanabe, Numazu, and Sadaji Hayama, Mishima, both of Japan, assignors to Toshiba Kikai Kabushiki Kaisha, Tokyo, Japan**

**Continuation-in-part of Ser. No. 772,860, Sep. 5, 1985, abandoned. This application Nov. 26, 1986, Ser. No. 935,704**
**Claims priority, appiication Japan, Sep. 12, 1984, 191087**
**Int. Cl.[4] F16H** *57/04;* **F10M** *9/10*
**U.S. Cl. 74—424.6** **6 Claims**



1. In a hydrostatic pressure worm-rack device of the type comprising a worm formed with operating oil supply openings at opposite flanks of respective teeth of the worm, a rack meshing with said worm, opposite flanks of respective teeth of said rack being formed with hydrostatic pressure oil pockets, drive means for driving a shaft of said worm, and means for supplying the operating oil to said supply openings of said worm, the improvement which comprises:

an oil distributor mounted on one end of said worm shaft for supplying oil to mating surfaces and non mating surfaces of the teeth of said worm and said rack and for supplying pilot oil to pilot oil supply ports provided for flanks of teeth at the opposite ends of said worm which firstly mate with the teeth of said rack;

oil passages provided through said worm shaft and through respective teeth of said worm for independently supplying said operating oil and said pilot oil;

flow quantity adjusting valve means installed between said operating oil supply means and said oil distributor, said flow quantity adjusting valve means having a constant flow quantity characteristic; and

adjusting pins having a length of a lead angle of said worm and respectively threaded into ends of said oil passages.

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**4,741,221**

## FEED AND RAPID RETURN MEANS FOR MACHINE TOOLS

**George S. Hudimac, Jr., Allentown, Pa., assignor to Mechanical Service Co., Allentown, Pa.**

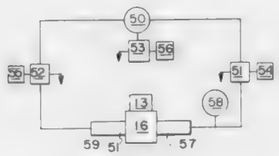
**Filed Sep. 15, 1986, Ser. No. 906,937**
**Int. Cl.[4] F16H** *1/20, 55/17, 3/44*
**U.S. Cl. 74—424.8 NA** **2 Claims**

1. In the combination of a lead screw having a thread thereon and a ball nut on the screw, the nut comprising:

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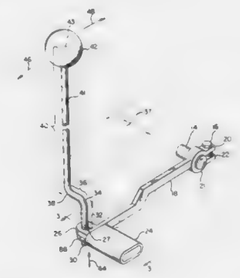
a housing having a bore surrounding and coaxial with said lead screw;
a spool inside of said housing and secured thereto;
a bore inside of said spool coaxial with first said bore and receiving said lead screw for rotation therein;
an annular groove on the outer surface of the spool cooperating with first said bore to form an air chamber;
a set of bores comprising a plurality of radial bores in said spool disposed around the axis of said screw and each radial bore having a pistor. section and a ball section of smaller diameter than the piston section, each piston section being open to said air chamber and each ball section being open to said lead screw;
a plurality of balls respectively in said ball sections, each ball making a snug, rolling fit with its section;
a plurality of pistons respectively in said piston sections, each piston carrying an O-ring making an air seal between the piston and the piston section;




means to admit air to said air chamber and to create air pressure on each of said pistons and to exhaust the air from said chamber to relieve the air pressure on said pistons;
said air pressure on said pistons causing each piston to be positioned in its bore to confine the respective balls between the valley of the lead screw and the end of the piston in a snug, rolling fit;
the snug rolling fit between each ball and its ball section and between each ball and the end of its piston causing each ball to be interengaged between said spool and said lead screw whereby rotation of the lead screw causes movement of the nut along the lead screw in one direction; and
said relieving the air pressure on said pistons providing for each ball to be moved out of its valley and onto the crest of the thread and thereby permit the nut to be moved along the lead screw in the opposite direction by a force applied thereto.

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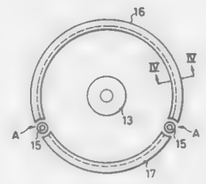
**4,741,222**
**MANUAL SHIFTING DEVICE**
**Thomas J. Berndt, 511 Schuler Grade, Yakima, Wash. 98908**
**Filed Jun. 3, 1987, Ser. No. 57,611**
**Int. Cl.[4] G05G *11/00, 1/14***
**U.S. Cl. 74—481** **6 Claims**



1. An improved foot-operated gearshift mechanism includes a foot-operated pedal which is operable to be moved arcuately in two directions, a mechanical link attached to one end thereof of said foot-operated pedal and the other end thereof operably connected to a shaft to translate the arcuate movement of said foot-operated pedal to rotational movement of said shaft, the improvement comprising:
a first section defining a first end for a shifting lever assembly, the first end being fixed to said foot-operated pedal;
a second section for the shifting lever assembly, defining a first elbow with the first section; and
a third section for the shifting lever assembly defining a second elbow with the second section and defining a second end for the shifting lever assembly wherein said first section and said third section are substantially parallel to each other and extend away from said foot-operated pedal.

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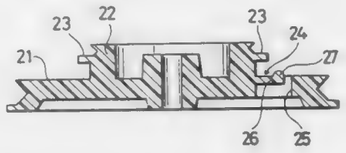
**4,741,223**
**STEERING WHEEL**
**Katsumi Kondo; Yasuhiro Tsutiya; Yasushi Yamazawa, all of Toyota; Takatsune Niimi, Aichi, and Takashi Yamamoto, Ichinomiya, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan**
**Filed Dec. 24, 1984, Ser. No. 685,737**
**Claims priority, application Japan, Dec. 25, 1983, 58-205129[U]**
**Int. Cl.[4] B62D *1/04***
**U.S. Cl. 74—552** **10 Claims**




2. A steering wheel comprising:
a boss;
at least one spacer; and
a reinforcement formed of hardened windings of a continuous strand of long fiber impregnated with a hardenable resin, said reinforcement defining a ring part, a sub-ring part and at least one spoke part, said boss being being integrally formed with each said spoke part at one end of said spoke part, and each said spacer being integrally formed with said reinforcement at a joint between one said spoke part, said ring part and said sub-ring part.

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**4,741,224**
**FLYWHEEL**
**Tadao Arata, Inagi, Japan, assignor to Tanashin Denki Co., Ltd., Tokyo, Japan**
**Filed Nov. 19, 1986, Ser. No. 932,362**
**Claims priority, application Japan, Aug. 8, 1986, 61-121674**
**Int. Cl.[4] G05G *1/00, 3/00;* B60B *27/00;* B25G *3/28***
**U.S. Cl. 74—572** **3 Claims**

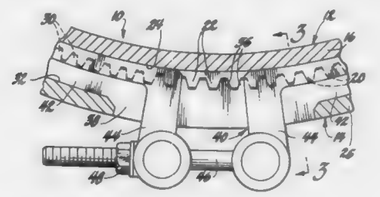



1. In a flywheel composed of an annular metal plate and a pulley made of a synthetic resin and superposed coaxially as a unitary member with the annular metal plate, the improvement wherein the annular metal plate defines a plurality of outwardly-extending notches at an equal angular interval along an inner peripheral edge portion and a corresponding number of interlocking holes along the inner peripheral edge portion between the respective notches; the pulley is provided at the same equal angular interval as the angular interval of the notches with a plurality of holding lugs extending outwardly beyond the inner peripheral edge of the annular metal plate and holding the inner peripheral edge portion between the lugs and the pulley; and the pulley is provided, at at least one of locations opposing to the interlocking lugs, with an elastic interlocking member maintained in engagement with one of the holes, so that upon assembly of the flywheel, the elastic interlocking member is brought into engagement with said one of the interlocking holes by coaxially superposing the metal plate and pulley with the holding lugs and elastic interlocking member registered with the notches and then turning the metal plate and pulley relative to each other.

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**4,741,225**
**ENGINE AND TRANSMISSION HOUSING WITH IMPROVED ATTACHMENT**
**Arthur Hall, III, Indianapolis, and Harry E. Latshaw, Danville, both of Ind., assignors to General Motors Corporation, Detroit, Mich.**
**Filed Feb. 17, 1987, Ser. No. 15,320**
**Int. Cl.[4] F16H *57/02;* B25G *3/18;* F16B *3/00***
**U.S. Cl. 74—606 R** **3 Claims**



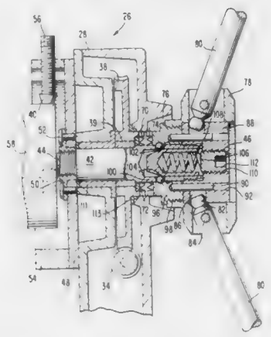

1. In combination an engine housing and transmission housing adapted to be moved axially together along an axis, an easily actuatable and releasable attachment means for joining said housings coaxially together so as to prevent relative rotation and axial separation, comprising,
a first substantially cylindrical wall formed on one of said housings coaxial to said axis including a first set of axially extending splines, said first splines terminating on a plane normal to said axis so as to provide a first substantially planar stop surface facing in one axial direction,
a second substantially cylindrical wall formed on the other of said housings coaxial to said axis including a second set of axially extending splines that interfit with said first splines when said housings are moved axially together, thereby preventing said housings from relatively rotating. said second cylindrical wall further including an annular retention groove cut through said second splines normal to said axis so as to provide a second substantially planar limit surface facing in the other axial direction, said retention groove further extending into said second cylindrical wall sufficiently far to provide an annular pocket radially outside of the root of said second splines,
limit means engagable between said housings when said splines are interfitted so as to axially space said first and second limit surfaces from one another by a predetermined distance,
a generally annular having a C shaped body with a thickness substantially equal to said predetermined distance and sized so as to fit within said pocket, said retention ring further having a pair of spaced legs extending radially out of said pocket, and,
a turnable fastener interconnecting said retention ring legs to so move said legs together and apart and thereby move said ring body out of and into said pocket, whereby said housings may be moved axially together without interference to interfit said first and second splines until said limit means are engaged, whereupon said attachment means may be actuated by turning said fastener in one direction to move said ring body out of said pocket and closely between said axially facing limit surfaces, thereby preventing said housings from being pulled axially apart, said attachment means being releasable by turning said fastener in the other direction to move said retention ring back into said pocket to allow said housings to be pulled axially apart without resistance.

2. In combination an engine housing and transmission housing adapted to be moved axially together along an axis, an easily actuatable and releasable attachment means for joining said housings coaxially together so as to prevent relative rotation and axial separation, comprising,
a first substantially cylindrical wall formed on one of said housings coaxial to said axis including a first set of axially extending splines, said first splines terminating on a plane normal to said axis so as to provide a first substantially planar limit surface facing in one axial direction, said first cylindrical wall further including a first annular retention groove aligned with said first limit surface,
a second substantially cylindrical wall formed on the other of said housings coaxial to said axis including a second set of axially extending splines that interfit with said first splines when said housings are moved axially together, thereby preventing said housings from relatively rotating, said second cylindrical wall further including a second annular retention groove of a thickness substantially equal to said first annular retention groove cut through said second splines normal to said axis so as to provide a second substantially planar limit surface facing in the other axial direction, said second retention groove further extending into said second cylindrical wall sufficiently far to provide an annular pocket radially outside of the root of said second splines,
limit means engagable between said housings when said splines are interfitted so as to bring said first and second retention grooves into alignment,
a generally annular retention ring having a C shaped body with a thickness substantially equal to said retention grooves and with a width sufficiently small so as to fit within said pocket, but greater than the radial separation between said first and second cylindrical walls, said retention ring further having a pair of spaced legs extending radially out of said pocket, and,
a turnable fastener interconnecting said retention ring legs to so move said legs together and apart and thereby move said ring body out of and into said pocket, whereby said housings may be moved axially together without interference to interfit said first and second splines until said limit means are engaged, whereupon said attachment means may be actuated by turning said fastener in one direction to move said ring body out of said pocket and closely between said axially facing limit surfaces, thereby preventing said housings from being pulled axially apart, said ring body, by virtue of its width, also extending into said retention grooves so as to provide additional resistance to prevent said housings from being pulled axially apart, said attachment means being releasable by turning said fastener in the other direction to move said retention ring back into said pocket to allow said housing to be pulled axially apart without resistance.

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**4,741,226**
**POWER FEED**
**David A. Bernard, and William C. Christian, both of Ashland, Oreg., assignors to Darex Corporation, Ashland, Oreg.**
**Filed Nov. 4, 1986, Ser. No. 926,550**
**Int. Cl.[4] F16H *49/00*; B23B *47/00*; B23G *3/08***
**U.S. Cl. 74—625** **9 Claims**

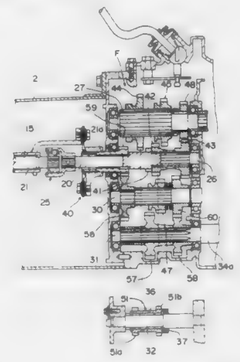


1. A generally universal power feed for a machine used for drilling comprising a housing, an electric motor having an output shaft of the motor projecting into the housing, a worm within the housing mounted to rotate with the motor output shaft, a drive shaft mounted in the housing, a worm gear rotatable on the drive shaft in engaging relation to the worm, a first clutch half mounted to rotate with the worm gear, one end of the drive shaft provided with means for attaching the power feed to a drilling machine down feed shaft, a power feed hub slidable mounted on the other end of the drive shaft, a second clutch half secured to the feed hub, feed hub handles mounted for pivotal movement on said feed hub, and adapted in one position to urge the feed hub and the feed hub clutch half into engagement with the worm gear clutch half and in a second position to manually move the drilling machine down feed shaft; further including an axial bore in the drive shaft, a member having a conical end face slidably mounted in the drive shaft bore, a compression spring acting against the member, a plurality of detent balls, each of the balls carried by the drive shaft and engaging the conical end face of the member, said member, balls and compression spring releasably holding the clutch halves in the clutch engaging relationship.

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**4,741,227**
**TRACTOR TRANSMISSION TO PERMIT SMOOTH CHANGE OF SPEED OPERATION EFFECTUATED BY ROTATIONAL RESISTANCE**
**Shunzo Yamada, Kishiwada; Satoshi Fujita, Sakai, and Kiyokazu Nakanishi, Kawchinagano, all of Japan, assignors to 501 Kubota, Ltd., Osaka, Japan**
**Filed Dec. 2, 1986, Ser. No. 937,114**
**Claims priority, application Japan, Jun. 19, 1986, 61-93674[U]; Jun. 19, 1986, 61-93676[U]; Jun. 19, 1986, 61-93671[U]**
**Int. Cl.[4] F16H *37/06***
**U.S. Cl. 74—664** **7 Claims**

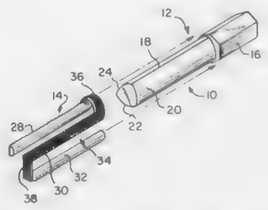
1. A transmission having a propelling line and a power takeoff line, comprising:
an engine output shaft,
a double clutch connected to said engine output shaft for transmitting engine output to said propelling line and/or said power takeoff line,
a transmission gear means including a propelling line change speed mechanism having a reversing gear and a reversing shaft for supporting said reversing gear, and a power take off change speed mechanism, said reversing gear operatively connected to said propelling line,
connecting shaft means for connecting said double clutch to said transmission gear means, said connecting shaft means including a tubular outer shaft and an inner shaft mounted in said outer shaft, and



rotational resistance applying means provided on said reversing shaft for applying a rotational resistance to said reversing gear by friction.

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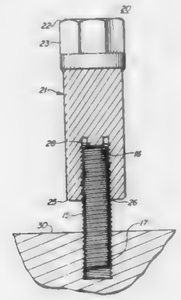
**4,741,228**
**STUD EXTRACTOR**
**Lawrence J. O'Flaherty, 742 S. Seventh St., Upper Sandusky, Ohio 43351**
**Filed Apr. 30, 1987, Ser. No. 44,100**
**Int. Cl.[4] B25B *13/50***
**U.S. Cl. 81—53.2** **10 Claims**



1. A stud extractor for removing a stud embedded in a structure comprising:
a shaft having an end portion adapted to be grasped by a tool and a body having a plurality of longitudinal camming surfaces; and
pin means for engaging said body at said camming surface, said pin means comprising a plurality of rod portions formed from a continuous length of metallic wire which also forms first and second bridge elements at respective upper and lower ends of said rod portions for maintaining said rod portions in the form of a pocket for receiving said body, whereby rotation of said body relative to said pin means within a bore formed in a stud causes the rod portions of said pin means to be jammed against a wall of said bore by said camming surfaces, such that relative rotation between said shaft and said stud is prevented and said stud rotates with said shaft.



**4,741,229**
**STUD INSTALLER**
**Michael A. Rachanski, and Edward J. Rachanski, Jr., both of Burbank, Ill., assignors to EEM Rachanski Enterprises, Inc., Burbank, Ill.**
**Continuation of Ser. No. 770,754, Aug. 29, 1985, abandoned. This application Feb. 13, 1987, Ser. No. 14,817**
**Int. Cl.[4] B25B *13/50***
**U.S. Cl. 81—53.2** **5 Claims**



1. A stud installing tool for fixedly securing a threaded stud into an associated stud receiving member, said tool comprising:
an elongated member having open and closed ends;
an internally threaded bore formed in said member and directed from said open end toward said closed end;
stud locking means for frictionally engaging one end of an associated threaded stud received within said threaded bore;
said stud locking means comprising a member portion fixed at all times within said bore and having a lower generally flat faced portion directed toward the open end of said bore said lower face portion being of lesser abutting surface area than the abutting end of an associated threaded stud; and
said member portion being substantially fixed against deformation and axial and rotational movement within said bore and depending thereinto from said closed end thereof and adapted to engage the end of the associated stud so as to prevent the end of the associated stud from engaging the closed end of the bore whereby upon rotation of said tool and the stud relative to the stud receiving member said locking means causes a downward force to be exerted onto the upper center portion of the stud and whereby upon counterrotation said locking means is freely disengaged from the driven stud so that said tool effects no counterrotation of the stud while withdrawing said tool from the installed stud.

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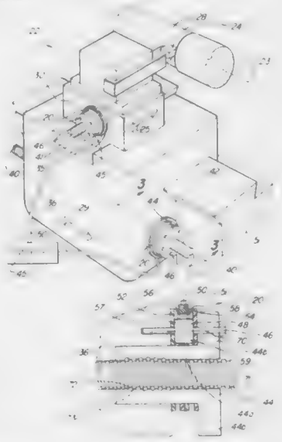
**4,741,230**
**APPARATUS FOR FACING AND INTERNAL TURNING**
**Christian Böhner, Schlüsselfeld; Harold Gähr, and Gerhard Wohlhaupter, both of Frickenhausen, all of Fed. Rep. of Germany, assignors to Emil Wohlhaupter & Co., Frickenhausen, Fed. Rep. of Germany**
**Filed Jul. 15, 1986, Ser. No. 886,191**
**Claims priority, application Fed. Rep. of Germany, Jul. 26, 1985, 3526712**
**Int. Cl.[4] B23B *41/00***
**U.S. Cl. 82—1.2** **6 Claims**

1. An apparatus for facing an internal turning, comprising a housing rotatable about an axis of rotation; at least one carriage displaceable in a guideway transversely to said axis of rotation; cutting tools arranged on said carriage; a drive motor arranged in the rotatable housing for displacing the carriage; measuring means provided in the housing for direct measurement of the distances of displacement of said carriage relative to said housing; an evaluation and control unit stationarily arranged outside the rotatable housing for evaluating the results of distance measurement and for controlling the drive motor; measurement and supply lines between the rotatable housing and the stationary evaluation and control unit; said measurement and supply lines being connected to said measuring means and said motor and a transfer unit arranged in the measurement and supply lines for transferring the measurement signals and supply of energy from those parts of the measurement and supply lines communicating with the rotatable housing to those parts of said lines communicating with the stationary evaluation and control unit, said distance measuring means comprising a glass scale rigidly connected to the carriage and at least one scanning element rigidly connected to the housing, said glass scale being lit from a light source provided outside the housing via a first or supply light conductor, the light signals from the glass scale being conveyed directly to additional or measurement light conductors at the scanning element, and said transfer unit having a stationary ring including a photoelectrically effective interior surface for each measurment light conductor, the light exit ends of said measurement light conductors travelling past said interior surface when the housing rotates, to introduce light signals continuously into said photoelectrically effective interior surface.



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**4,741,231**
**TOOL FORCE SENSOR AND METHOD OF MAKING SAME**
**Richard L. Patterson, South Euclid; Jyoti Mukherjee, North Royalton; Edward L. Slaby, West Farmington, and Robert A. Furmanek, Maple Heights, all of Ohio, assignors to The Warner & Swasey Company, Cleveland, Ohio**
**Filed Apr. 14, 1986, Ser. No. 851,833**
**Int. Cl.[4] B23B *13/00***
**U.S. Cl. 82—2 B** **11 Claims**



1. In combination with machine tool apparatus (**22**) of the type including a workpiece cutting tool (**24**) mounted on a support (**36**), means (**42**) for mounting the support (**36**) for movement on a base (**51**) and along a reference axis (**29**), means (**40, 44**) adapted to be coupled with a source of motive power for driving said support (**36**) along said reference axis (**29**) and a plurality of elongate fasteners (**46**) connecting said driving means (**40, 44**) with said support (**36**), a tool force sensor for

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generating electrical signals corresponding to cutting tool force and indicative of the wear condition or failure of said tool (24), comprising:

means (20) mounted in force-transmitting relationship between said driving means (40, 44) and said support (36) for sensing the magnitude of force applied by said driving means (40, 44) to said support (36) and for producing an electrical signal corresponding to the magnitude of sensed force, the sensed force being proportional to the force applied by said cutting tool (24) to said workpiece (28) and indicative of the wear condition or failure of said tool (24), said sensing means including a plurality of ring shaped transducers (48), each of said transducers (48) including a pair of spaced apart faces (57, 59) adapted to be loaded with a force, a force sensing axis (70) extending essentially perpendicular to said faces (57, 59) and a through hole therein, said fasteners (46) respectively extending through said through holes.

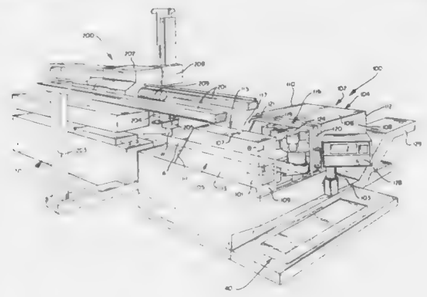
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**4,741,232**

**APPARATUS FOR USE IN MACHINING WORKPIECES**

**Carl J. Myers, Mentor, Ohio, assignor to The Warner & Swasey Company, Cleveland, Ohio**

**Filed Nov. 6, 1986, Ser. No. 927,758**
**Int. Cl.[4] B23B** *13/02*
**U.S. Cl. 82—2.7** **5 Claims**



1. An apparatus for use in machining workpieces, said apparatus comprising a base (103), chuck means (101) connected with said base for holding a workpiece (W), a housing (102) connected with said base and having a top (106, 107) and plurality of sides (108, 109, 110, 111, 112, 113), said housing being operable between a closed condition enclosing said chuck means and an open condition, transfer means (200) for moving workpieces to and from said chuck means when said housing is in the open condition, said apparatus being characterized by

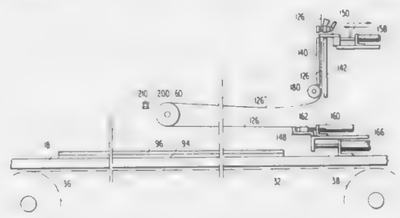
said housing (102) including means for defining an opening (117) which extends across the top (106,107) of said housing and down opposite sides (108, 109, and 110, 111) of said housing when said housing is in the open condition, door means (116) which extends across the top and down opposite sides of said housing to block said opening and to block the path of movement of said transfer means when said housing is in the closed condition, said door means being ineffective to block said opening when said housing is in the open condition, said transfer means including a transfer structure (204) which extends downwardly from a level above the top of said housing to a level below the top of said housing and adjacent to the level of an upper portion of said chuck means (101) and means (202) for moving said transfer structure from one side of said housing into the opening (117) and for moving the transfer structure from the opening to the side of said housing opposite said one side when said housing is in the open condition to transfer workpiece (W) to and from said chuck means.

**4,741,233**

**CLUSTER SPREADING AND CUTTING SYSTEM**

**Verl M. Mershon, 6487 Heritage Hills Dr., Glen Burnie, Md. 21061**

**Continuation of Ser. No. 775,694, Sep. 12, 1985, abandoned, which is a continuation of Ser. No. 599,121, Apr. 11, 1984, abandoned. This application Oct. 20, 1986, Ser. No. 920,939**
**Int. Cl.[4] B65H** *29/46*
**U.S. Cl. 83—91** **19 Claims**



1. A system for spreading and severing material comprising;

a severing table;

a source of material disposed remote from said severing table;

means for spreading said material without tension comprising a spreader engaging said material at one end of said severing table, means to move said spreader across said severing table whereby at least one layer of said material is placed on said severing table;

an array of electrical resistance elements movable over said layer of material for contact therewith to simultaneously sever said material into multiple patterns; and

first severing means for severing said material at a position adjacent to one end of said severing table and second severing means movable with said spreader for severing said material when said spreader has traversed said severing table a predetermined distance, and means for determining the distance said spreader traverses said severing table.

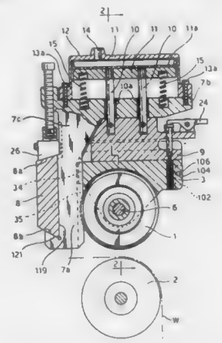
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**4,741,234**

**COMPACT KNIFE UNIT FOR SLITTING A WEB**

**Antonio P. Colombo, Via Lomeni 4, Magenta, Milan, Italy**

**Filed Dec. 23, 1985, Ser. No. 812,767**
**Claims priority, application Italy, Jul. 9, 1985, 21490 A/85**
**Int. Cl.[4] B23D** *19/00;* **B26D** *1/14*
**U.S. Cl. 83—481** **29 Claims**



1. A compact knife unit adapted for use in slitting a web of material, said unit including a body, means for securing said body to a support member, a knife holder having parallel, spaced apart walls defining a slot therebetween, a circular knife disposed within said slot and having means defining a center opening, knife support means for supporting said knife for rotation within said slot, and fluid actuated means operatively connected to said body and to said knife holder for moving said knife holder and said knife in a linear direction of movement, wherein said knife support means includes a spacer bushing and means for rigidly clamping said walls against said bushing thereby precisely spacing said walls relative to said knife and a bearing mounted on said spacer bushing and supporting said knife for precision rotation therearound, said fluid actuated means including a base member, said base member including sliding track means for slidably receiving said knife holder, said track means providing for removal of said knife holder and said knife from said base member in a direction traverse to said linear direction to provide for the convenient and quick replacement of said knife.



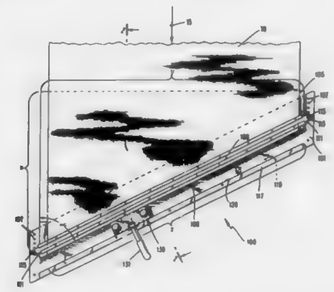
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**4,741,235**

**APPARATUS FOR SPLICING BELT**

**John G. Price, P.O. Box 17689, Montgomery, Ala. 36117**

**Division of Ser. No. 737,255, May 23, 1985, Pat. No. 4,671,834. This application Jul. 9, 1986, Ser. No. 883,651**
**Int. Cl.[4] B26D** *3/28, 5/10*
**U.S. Cl. 83—870** **8 Claims**



1. A jig for cutting a belt end in a splicing procedure comprising:

(a) base plate means for supporting said belt thereon;

(b) clamping means for clamping said belt to said base plate means;

(c) guide means on said base plate means;

(d) holding means slidably mounted in said guide means, said holding means comprising;

(1) a top plate having a top surface and a bottom surface;

(2) a bottom plate having a top surface and a bottom surface; and

(3) said top surface of said bottom plate and said bottom surface of said top plate facing one another at an interface defining a stepped configuration comprising a plurality of steps from one lateral side of said plate to another lateral side thereof; and

(e) cutting means mountable on said holding means, said holding means being slidably movable in said guide means whereby said cutting means may cut said belt.

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**4,741,236**

**APPARATUS FOR NOTCHING THE BACK OF A BOOK**

**James S. Averill, Plattsburg, N.Y., assignor to Harris Graphics Corporation, Melbourne, Fla.**

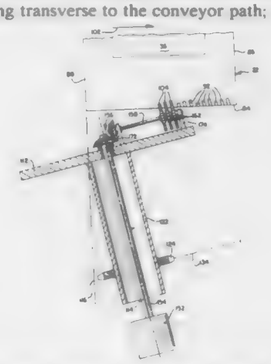
**Filed Aug. 18, 1986, Ser. No. 897,205**
**Int. Cl.[4] B26D** *3/06*
**U.S. Cl. 83—876** **11 Claims**

1. An apparatus for notching the back of a book, said apparatus comprising:

conveyor means for moving the book along a conveyor path with the back exposed;

cutter means for forming notches in the back of the book, said cutter means includes at least one blade and a cutter shaft connected with said blade and supporting said blade for rotation about a longitudinal axis of said cutter shaft;

a cutter support disc for supporting said cutter shaft adjacent the conveyor path, said cutter support disc being rotatable about its axis for moving said cutter means along a path extending transverse to the conveyor path;



first drive means connected with said cutter support disc for rotating said cutter support disc about the axis to form notches in the back of the book with said cutter means; and

second drive means connected with said cutter shaft for rotating said cutter shaft about its longitudinal axis, which is coaxial with said disc axis, relative to said cutter support disc to form notches in the back of the book.

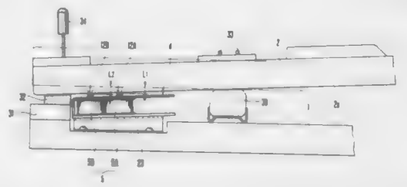
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**4,741,237**

**ACTUATOR FOR AUTOMATIC PERFORMANCE PIANO**

**Kazuo Murakami, and Toshio Tajima, both of Hamamatsu, Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan**

**Filed Mar. 12, 1987, Ser. No. 25,287**
**Claims priority, application Japan, Mar. 14, 1986, 61-55042; Mar. 14, 1986, 61-36266[U]; Mar. 14, 1986, 61-36267[U]; Mar. 14, 1986, 61-36269[U]; Mar. 14, 1986, 61-36270[U]**
**Int. Cl.[4] G10C** *3/20*
**U.S. Cl. 84—20** **14 Claims**



1. An actuator for an automatic performance piano, comprising electromagnetic plunger units provided in correspondence to and adjacent to a plurality of keys of the piano,

each of said electromagnetic plunger units having an excitation coil and a plunger,

a key drive portion, provided at the distal end of said plunger, for driving the key,

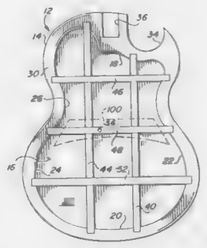
said actuator characterized in that said electromagnetic plunger units are arranged along the key arrangement direction to be deviated from each other in the front-back direction of the key in a staggered manner,

and that a motion stroke of said key drive portion of said electromagnetic plunger unit in one row is made smaller than a motion stroke of said key drive portion of said electromagnetic plunger unit in the other row.

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**4,741,238**
## SEMI-HOLLOW-BODY GUITAR APPARATUS
**Ronald S. Carriveau, 2029 W. Elm, Phoenix, Ariz. 85015**
**Continuation-in-part of Ser. No. 827,520, Feb. 10, 1986, abandoned. This application Jul. 13, 1987, Ser. No. 72,286**
**Int. Cl.[4] G10D** *3/00*
**U.S. Cl. 84—291** **14 Claims**

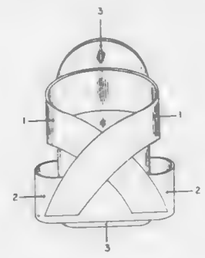


1. Guitar apparatus comprising, in combination: body means, including
a relatively thick bottom,
relatively thick wall means secured to and extending outwardly from the relatively thick bottom, including a top end wall, a bottom end wall, and first and second side walls joining the top and bottom end walls,
a relatively thick top secured to the relatively thick wall means, and
internal bracing means secured to the relatively thick wall means and to the relatively thick top for supporting the relatively thick top;
a sound chamber disposed within the body means and defined by the relatively thick bottom, the relatively thick wall means, and the relatively thick top whereby the relatively thick bottom, the relatively thick wall means, and the relatively thick top minimize their vibration and prevent communication between air within the sound chamber and air outside the sound chamber, and having an acoustic center at which sound waves generated within the sound chamber are focused;
bridge means secured to the relatively thick top adjacent to the acoustic center of the sound chamber;
neck means secured to the body means, and including a fret board;
head means secured to the neck means;
string means secured to the head means and to the relatively thick top and disposed over the fret board, the neck means, and the bridge means; and
pickup means for sensing vibrations generated by the string means, the sound chamber, and the body means.

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**4,741,239**
## SECUREMENT NET-WORK CONFIGURATION FOR HOLDING MUSICAL INSTRUMENT PICKS
**Charles R. Crafton, 4022 Deerlick Rd., Lewisburg, Ky. 42256**
**Filed Feb. 17, 1987, Ser. No. 16,190**
**Int. Cl.[4] G10D** *3/16*
**U.S. Cl. 84—322** **9 Claims**

1. A pick for a stringed musical instrument comprising:
a pick body having the general shape of a human fingernail; and
a securement network consisting of:
an annular, stretchable band secured to the lower portion of said pick body, said band forming a finger receiving loop extending behind said pick body; and
a stretchable strip attached to the upper portion of said pick body, said strip diverging downwardly from said pick



body, criss-crossing intermediate the length of said pick body, and having two ends secured to said band.

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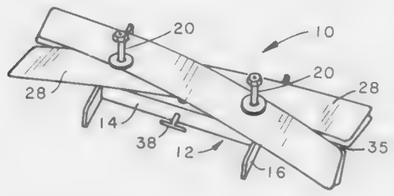
**4,741,240**
## RECORDER
**Shuhei Kawano; Yuko Yamada; Masaaki Mizuguchi, and Akihiko Takeuchi, all of Hamamatsu, Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Japan**
**Filed Nov. 17, 1986, Ser. No. 931,074**
**Claims priority, application Japan, Nov. 20, 1985, 60-260390; Nov. 20, 1985, 60-260391; Nov. 20, 1985, 60-260392; Nov. 20, 1985, 60-178962[U]; Nov. 20, 1985, 60-178963[U]**
**Int. Cl.[4] G10D** *7/02*
**U.S. Cl. 84—380 C** **11 Claims**



1. An improved recorder, comprising:
(A) an elongated tube having a bore formed therein, said bore being open at one end of said tube and closed at the other end of said tube, a wind-way formed at said other end of said tube in communication with said bore, a radially open window formed in the vicinity of said wind-way in communication with said bore and a plurality of aligned sound holes in communication with said bore, and
(B) sound sensing means located internally of said tube at said other end of said tube and adjacent said bore for sensing the vibrations in said bore and producing electrical signals as a function thereof.



**4,741,241**
## PERCUSSION MUSICAL INSTRUMENT
**Peter B. Engelhart, 2815 Cherry St., Berkeley, Calif. 94705**
**Filed Jan. 30, 1987, Ser. No. 8,845**
**Int. Cl.[4] G10D** *13/06*
**U.S. Cl. 84—403** **12 Claims**



1. A percussion musical instrument comprising:
a base, including two generally parallel spaced apart transverse support members,
a pair of posts attached to and rising vertically from the base,
a plurality of relatively thin-gauge, elongated bowed metal leaves or strips having oversized holes located for registry with the vertical posts, the leaves being stacked on the base bowed upwardly with the center of each leaf higher than its ends and the two transverse support members supporting the stack and with the posts extending through the holes, and
the holes in the leaves being so located that each leaf lies obliquely across the length of the base and such that alternate leaves cross the base in opposite oblique directions, so that the alternate leaves in the stack form generally an X-configuration,
whereby, when the instrument is struck with a sharp downward blow generally centrally, a metallic sound of relatively long sustain is produced.

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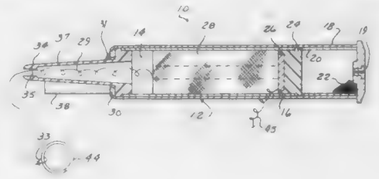
**4,741,242**
## AUTOMATIC INDICATING TUNING SYSTEM FOR VISUAL TUNING OF TIMPANI AND OTHER TUNABLE INSTRUMENTS
**Jesse Aronstein, Poughkeepsie, N.Y., assignor to Protune Corporation, Poughkeepsie, N.Y.**
**Filed Oct. 29, 1986, Ser. No. 927,177**
**Int. Cl.[4] G10G** *7/02*
**U.S. Cl. 84—454** **21 Claims**



1. A tuner for percussion instruments such as drums having a vibrating membrane element comprising the drum head including in combination an automatic sound frequency signal analyzer for receiving an electric input signal whose frequency characteristics correspond to the sound signal characteristics of a particular drum being tuned and for automatically comparing the electric input signal to preset standards for identifying and visibly indicating on a display a particular note in the musical scale or the closest note thereto whose frequency corresponds to the frequency of the input electric signal and whether the note being played is sharp or flat and by how much; a sound signal frequency sensor for sensing vibrations of the vibrating membrane element of the drum being tuned and deriving an output electric signal for supplying as the input signal to the automatic sound frequency signal analyzer, the frequency of the electric signal corresponding to the frequency of vibration of the vibrating membrane element of the drum being tuned; and said sound signal frequency sensor comprising a non-contacting vibration sensor mounted in closely spaced-apart confronting relation to the vibrating membrane element of the drum for deriving the output electric signal whose frequency characteristics correspond to those of the drum being tuned without changing the acoustic properties of the drum vibrating membrane element, wherein the non-contacting vibration sensor comprises an electro-optical light emitter and juxtaposed light detector pair mounted in closely spaced-apart relationship with respect to the vibrating drum head of the drum being tuned, the vibrating drum head having secured thereto a target member having a light reflecting surface positioned thereon directly opposite the light emitter/detector pair; and means for blocking and trapping stray and ambient background light that might be transmitted through the drum head and preventing it from impinging on the light detector.

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**4,741,243**
## LINE LAUNCHER
**Billy G. Snider, 10334 Dar La., Goodrich, Mich. 48438**
**Filed Mar. 26, 1987, Ser. No. 30,086**
**Int. Cl.[4] F42B** *13/56*
**U.S. Cl. 89—1.34** **6 Claims**

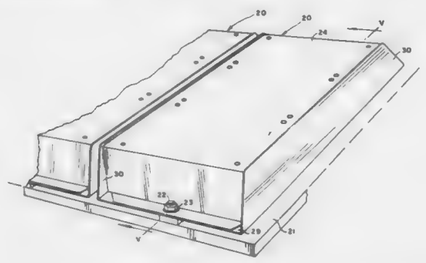


1. A line launcher for use in combination with a marine flare pistol, said line launcher comprising:
a tubular housing having fore and aft ends;
an aft end cap mounted on the aft end of the housing;
propelling means disposed behind the aft end of the housing, which is adapted to chamber into the marine flare pistol;
a line spool disposed within the housing, said spool being provided with a length of line wound thereon in such a manner as to permit ready coiling off therefrom, wherein the line has a free end;
a fore end cap mounted in the fore end of the housing and formed with a bore therethrough, said fore end cap including a portion of reduced diameter projecting from the housing, wherein the free end of the line is threaded through the bore and projects therefrom; and
a fastening means attached to the free end of the line,
wherein, when the housing is chambered into the marine flare pistol and the fastening means is secured, the pistol may be fired and the propelling means activated to cause the housing to be forcibly ejected from the pistol in the direction of fire thereof, the line spool uncoiling the line during its trajectory to provide a secure line between its point of impact and the point of attachment to the secondary line.

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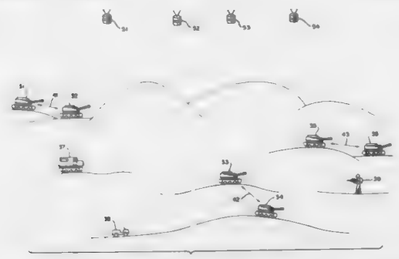
**4,741,244**
**ELEMENTS FOR AN ADD-ON REACTIVE ARMOUR FOR LAND VEHICLES**
**Eugene Ratner, deceased, late of Galil; by Ruth Eshel, heir; by Michal Yuzis, heir, both of Haifa; by Dan Ratner, heir, Galil, and Joab Erlich, Moshav Yuvalim, all of Israel, assignors to The State of Israel, Ministry of Defence, Rafael Armament Development Authority, Israel**
**Continuation of Ser. No. 699,256, Feb. 7, 1985, abandoned. This application Feb. 27, 1987, Ser. No. 20,210**
**Claims priority, application Israel, Feb. 9, 1984, 70914**
**Int. Cl.[4] F41H** *5/04*
**U.S. Cl. 89—36.17** **4 Claims**



1. An element of an add-on reactive armour for protecting existing armour against shaped charge warheads, comprising a cover member having suspended and distanced therefrom on a side that faces the existing armour, at least one explosive insert comprising an explosive layer sandwiched between two metal layers, such that when the element is mounted on the existing armour, the explosive insert remains distanced therefrom, and further comprising a base member that is longitudinally skirted and comprises side walls extending to a level slightly above said cover member when fastened to the same, whereby said explosive insert is shielded from the surroundings and shock waves emanating from a detonating explosive insert of said element are prevented from spreading laterally.

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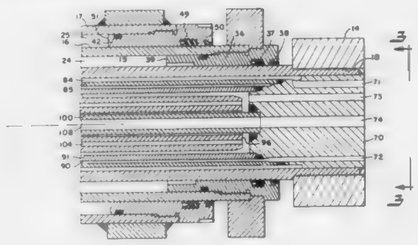
**4,741,245**
**METHOD AND APPARATUS FOR AIMING ARTILLERY WITH GPS NAVSTAR**
**Daniel K. Malone, Purcellville, Va., assignor to DKM Enterprises, Purcellville, Va.**
**Filed Oct. 3, 1986, Ser. No. 915,990**
**Int. Cl.[4] F41G** *3/16*
**U.S. Cl. 89—41.03** **29 Claims**



1. An apparatus for aiming a ballistic trajectory launcher or other ordenance, comprising:
first and second geopositioning system (GPS) ground stations for determining first and second positions, respectively, said first and second positions being remote from each other, said first GPS ground station being integral with a first piece of artillery;
means for communicating the position of said second GPS ground station to said first GPS ground station;
a first Receiver Processor Unit (RPU) for determining an external reference direction from said first and second position determinations at said first GPS ground station;
means for computing a first azimuthal angle of said second GPS ground station relative to said external reference direction at said first GPS ground station; and
first means for transferring said first azimuthal angle to the first piece of artillery, including means for aligning said second GPS ground station at said first azimuthal angle.

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**4,741,246**
**STAGE SELECTABLE TELESCOPIC CYLINDER ASSEMBLY**
**Nikolay K. Padarev, Mayfield Heights, Ohio, assignor to Universal Hydraulics, Inc., Willoughby, Ohio**
**Filed Aug. 7, 1986, Ser. No. 894,110**
**Int. Cl.[4] F15B** *11/18*
**U.S. Cl. 91—167 R** **16 Claims**

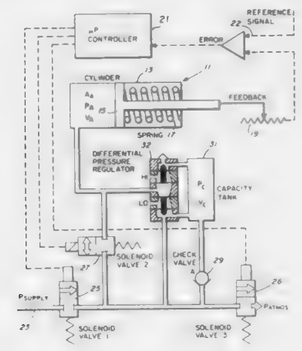


1. A multiple stage telescopic cylinder assembly comprising:
a base at a rearward end of the assembly, said base including porting means comprising first, second, third and fourth inlet ports;
an inner tubular structure attached at its rearward end to said base and first and second stage cylinders of successively greater diameter mounted on said inner tubular structure in telescoping relationship for extension during their forward strokes and retraction during their rearward strokes, said first and second stage cylinders each having extend facing means relatively adjacent its forward end for fluid pressure to contact to effect extension thereof and retract facing means relatively adjacent its rearward end for fluid pressure to contact to effect retraction thereof, said inner tubular structure circumscribing a generally cylindrical interior space;
a pair of telescoping members extending axially through said interior space circumscribed by said inner tubular structure, one of said telescoping tubular members being attached to said base and the other of said telescoping tubular members being attached to said first stage cylinder for axial movement therewith;
first fluid passage means for directing fluid under pressure from said first port forwardly through said inner tubular structure and then into contact with the extend facing means of said second stage cylinder;
second fluid passage means for directing fluid under pressure from said second port forwardly through said inner tubular structure and then into contact with the retract facing means of said first stage cylinder;
third fluid passage means for directing fluid under pressure from said third port forwardly through said inner tubular structure and then into contact with the extend facing means for said first stage cylinder; and
fourth fluid passage means for directing fluid under pressure from said fourth port forwardly through said inner tubular structure and then into contact with the retract facing means of said second stage cylinder, said fourth fluid passage means including an axial passage is said other of said telescoping tubular members, and said pair of telescoping members forming with said inner tubular structure a fluid space connecting said axial passage to said fourth port.



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**4,741,247**
**PNEUMATIC ACTUATOR APPARATUS**
**J. Robert Glomeau, Dover, and Gareth A. Keith, Sherborn, both of Mass., assignors to Rexa Corporation, Dover, Mass.**
**Filed Sep. 17, 1986, Ser. No. 908,177**
**Int. Cl.[4] F15B** *13/16*
**U.S. Cl. 91—361** **7 Claims**

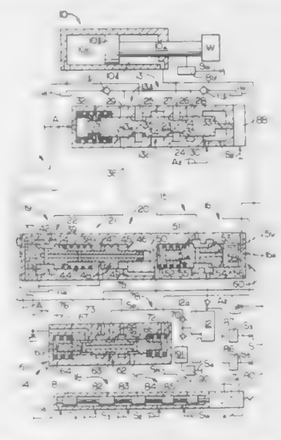


1. Apparatus for operating a pneumatic actuator from a source of gas under pressure, said apparatus comprising:
means defining a step volume;
means for selectively charging said step volume from said source;
first pressure regulating means operative during charging to control the pressure in said step volume as a first predetermined function of the then extant pressure in said actuator, said first function providing a step volume pressure which is higher than said then extant pressure;
means for selectively discharging gas from said step volume;
second pressure regulating means for controlling discharging of gas from said step volume to limit the pressure in said step volume as a second predetermined function of the then extant pressure in said actuator, said second function providing a step volume pressure which is lower than said actuator pressure;
means for selectively connecting said step volume to said actuator; and
said charging means and said connecting means being operable alternately for advancing said actuator in steps, said discharging means and said connecting means being operable alternately for retracting said actuator in steps.

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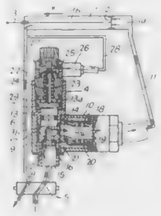
**4,741,248**
**LOAD RESPONSIVE SYSTEM HAVING SYNCHRONIZING SYSTEMS BETWEEN POSITIVE AND NEGATIVE LOAD COMPENSATION**
**Tadeusz Budzich, Moreland Hills, Ohio, assignor to Caterpillar Inc., Peoria, Ill.**
**Filed May 8, 1987. Ser. No. 47,396**
**Int. Cl.[4] F15B** *13/02*
**U.S. Cl. 91—421** **36 Claims**

25. A load responsive system, comprising:
a valve assembly interposed between a fluid motor operable to control positive and negative loads and subjected to positive and negative load pressure, fluid exhaust means and a source of presurized fluid, first valve means operable to selectively interconnect said fluid motor with said exhaust means and said source of presureized fluid, isolating means operable to selectively isolate said source of pressurized fluid from said fluid motor, fluid replenishing means operable to interconnect said fluid motor and said exhaust means when said isolating means is activated, logic means operable to determine whether said fluid motor is subjected to negative or positive load pressure, positive load pressure throttling means including said isolating means and located between said fluid motor and said source of pressurized fluid, variable outflow orifice means located between said fluid motor and said exhaust means, control signal generating means operable to selectively provide a control signal, said control signal generating means has valve means operable to provide said control signal by selectively interconnecting said isolating means with said exhaust means or siad negative load pressure, and actuating means of said isolating means responsive to the control signal from the control signal generating means whereby during control of said negative load fluid flow from said source of pressurized fluid to said fluid motor can be selectively interrupted in response to said contro' signal.



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**4,741,249**
**AUTOMATIC ECONOMIZING DEVICE FOR COMPRESSED AIR**
**André Legris, Rennes, France, assignor to Societe Anonyme Styled Legris, Rennes Cedex, France**
**PCT No. PCT/FR84/00099, § 371 Date Dec. 11, 1984, § 102(e) Date Dec. 11, 1984, PCT Pub. No. WO84/04138, PCT Pub. Date Oct. 25, 1984**
**PCT Filed Apr. 11, 1984, Ser. No. 691,562**
**Claims priority, application France, Apr. 12, 1983, 83 05965**
**Int. Cl.[4] F15B** *11/08;* **F16K** *17/06*
**U.S. Cl. 91—443** **18 Claims**



1. An economizing device for supplying pressurized fluid to

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an apparatus having first and second expandable chambers separated by a moveable element having a stroke length, said economizing device being operable for supplying pressurized fluid to said first chamber during most of said stroke length, and for blocking passage of said pressurized fluid to said first chamber near the end of said stroke length, and comprising:

a first fluid circuit disposed between said apparatus and a source of pressurized fluid for connecting the source of pressurized fluid to said first chamber, said first fluid circuit including a valve having a valve outlet and a piston means for actuating said valve, said valve and said piston means being disposed in a cylinder, said valve being operable for closing and opening said first fluid circuit;

a second fluid circuit terminating generally at said valve outlet and including an exhaust pipe, said second fluid circuit bypassing at least a portion of said first fluid circuit and being operable to connect said first chamber to said exhaust pipe;

a means for adjusting an opening of said valve; and

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**4,741,250**

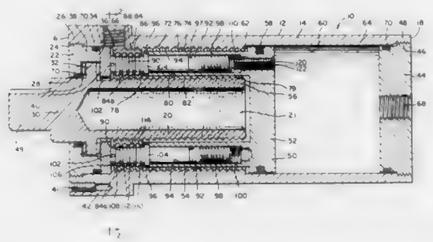
**FLUID-POWER DEVICE USING ROLLERS**

**Paul P. Weyer, 48811 284th SE., Enumclaw, Wash. 98022**

**Continuation-in-part of Ser. No. 662,256, Oct. 17, 1984, Pat. No. 4,667,528, Ser. No. 692,293, Jan. 17, 1985, Pat. No. 4,683,767, and Ser. No. 803,954, Dec. 2, 1985, Pat. No. 4,691,582, each is a continuation-in-part of Ser. No. 575,228, Jan. 30, 1984, Pat. No. 4,590,816. This application Jul. 3, 1986, Ser. No. 881,904**

**Int. Cl.[4] F01B** *3/00;* **F16H** *25/24, 55/18*

**U.S. Cl. 92—33** **106 Claims**



1. A fluid-power device, comprising:

a body having a plurality of helical grooves with ridges therebetween formed on an inward facing surface portion thereof;

an axially extending drive member supported for movement relative to said body and connectable to an external device, said drive member having a plurality of helical grooves with ridges therebetween formed on an outward facing surface portion thereof positioned within said body, said body helical grooves having a first lead and said drive member helical grooves having a second lead, with said drive member helical grooves having a hand turn opposite the hand turn of said body helical grooves and having substantially the same axial pitch as said body helical grooves;

a plurality of elongated rollers having circumferential grooves with ridges therebetween, said roller grooves having an axial pitch corresponding to the axial pitch of said body and drive member helical grooves;

an axially reciprocating member reciprocally mounted within said body, said reciprocating member rotatably retaining said rollers in fixed axial and circumferential position relative to said reciprocating member during powered operation of the device, said rollers being retained by said reciprocating member in circumferentially distributed arrangement between said grooved body inward surface portion and said grooved drive member outward surface portion with said rollers in seated engagement with both said grooved body inward surface portion and said grooved drive member outward surface portion for transmitting force between said body, drive member and reciprocating member, each ridge of said rollers being positioned for rolling travel in the corresponding grooves of said body or said drive member; and

at least one piston mounted for reciprocal movement and operatively enganging said reciprocating member.

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**4,741,251**

**SWASHPLATE ASSEMBLY FOR A SWASHPLATE TYPE HYDRAULIC PRESSURE DEVICE**

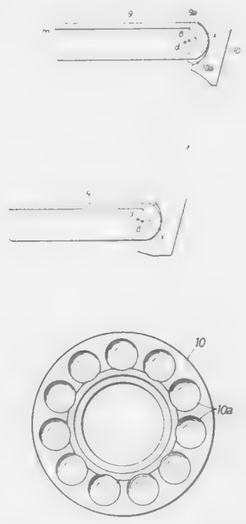
**Tsutomu Hayashi; Mitsuru Saito, and Yoshihiro Yoshida, all of Tokyo, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed May 28, 1986, Ser. No. 868,318**

**Claims priority, application Japan, May 28, 1985, 60-115046; Jul. 5, 1985, 60-147751**

**Int. Cl.[4] F01B** *13/04*

**U.S. Cl. 92—57** **5 Claims**



1. A swashplate type hydraulic pressure device comprising:

a cylinder having an axis;

a number of plungers axially slidably disposed in a number of cylinder bores which are arranged in said cylinder annularly around the axis thereof;

a swashplate holder disposed opposedly to the tip ends of said plungers; and

a swashplate rotatably supported on said swashplate holder and having a number of spherical concave portions formed on a surface thereof to be abutted by spherical ends which are formed at the tip ends of the plungers;

wherein said spherical concave portions are each formed to have a radius of curvature larger than that of the associated spherical end of the plunger and a center point of engagement between the spherical concave portion and the associated spherical end of the plunger is displaceable in an inclined state of the swashplate, in response to sliding motion of the plunger in said cylinder bore, between a radially outer side position at which said center point of engagement is located radially outer than an axis of the plunger with respect to the cylinder axis and a radially inner side position at which said center point is located radially inner than said axis of the plunger with respect to the cylinder axis; and

wherein radial forces acting on said swashplate at respective center points of engagement between the spherical concave portions and the spherical ends of the plungers are directed such that the radial forces appearing in the spherical concave portions located on a substantially same diametrical line on the swashplate work to offset each other regardless of the angle of inclination of the swashplate so as to center said swashplate.



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**4,741,252**

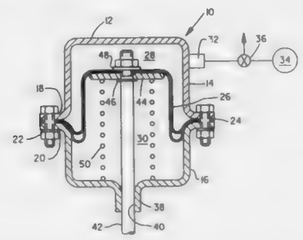
**DIAPHRAGM OF THE ROLLING TYPE HAVING A MEMBRANE PORTION AND A REINFORCING PORTION**

**James B. Harter, and Donald J. Novkov, both of Tempe, Ariz., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.**

**Filed Sep. 24, 1986, Ser. No. 911,280**

**Int. Cl.[4] F01B** *19/00;* **F16J** *3/00*

**U.S. Cl. 92—103 SD** **8 Claims**



1. A diaphragm having a flexing portion and comprising:

a gas impermeable elastomeric yieldably shape-retaining membrane member composed essentially of relatively thin sheet-like elastomeric material free of fibrous reinforcement and formed to a selected configuration;

a gas permeable, yieldably shape-retaining fabric member composed essentially of inextensible fibrous woven cloth formed to a determined configuration complementary with said selected configuration, said shape-retaining fabric member determined configuration being nestable with said membrane member selected configuration to define an annular convolute wherein said fabric member defines an axial clearance with said membrane member;

said membrane member and said fabric member being united without interbonding in said flexing portion for movement in unison in response to fluid pressure applied to said membrane member, fluid pressure forces on said membrane member being conveyed exclusively therein below a selected level for said fluid pressure while said axial clearance is maintained, and said fabric member supportively receives fluid pressure forces from said membrane member only above said selected fluid pressure level at which said membrane member stretches to fully engage said fabric member without axial clearance, and the woven fibers of said cloth are free to move relative one another in said flexing portion.

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**4,741,253**

**PISTON FOR INTERNAL COMBUSTION ENGINES**

**Yutaka Ogawa; Takayuki Ogasawara, and Yoshiaki Hori, all of Nagoya, Japan, assignors to NGK Insulators, Ltd., Aichi, Japan**

**Filed May 27, 1986, Ser. No. 867,142**

**Claims priority, application Japan, May 29, 1985, 60-115575**

**Int. Cl.[4] F16J** *1/04*

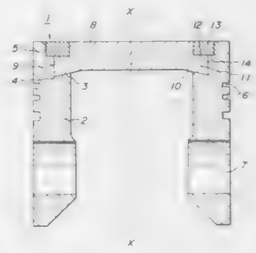
**U.S. Cl. 92—212** **14 Claims**

1. A piston for an internal combustion engine, comprising:

a piston main body comprising a metallic material having a substantially cylindrical configuration and a longitudinal central axis, said piston main body having a first end portion;

a piston head member comprising a ceramic material, said head member being embedded in said first end portion of the piston main body;

said piston head member having a peripheral surface which includes extension means formed thereon and protruding radially outward therefrom, said extension means having a pair of axially opposite end surfaces, at least one of the end surfaces being in abutting engagement with said piston main body; and



at least one of the end surfaces of said extension means being inclined with respect to a plane intersected perpendicularly by said longitudinal central axis of the piston main body, wherein each axially opposite end surface of said extension means has a tangent lying in a plane which includes said longitudinal central axis of the piston main body, said tangents intersecting at a common point on said longitudinal central axis of the piston main body, such that said extension means has an axial thickness which is greater at a radial outermost point than at a radial innermost point.

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**4,741,254**

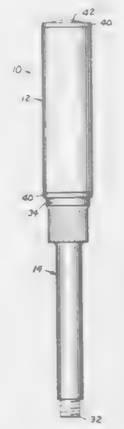
**PUMP PLUNGER**

**Julian S. Taylor, 8300 SW. 8th, Oklahoma City, Okla. 73128**

**Filed Jun. 12, 1986, Ser. No. 873,559**

**Int. Cl.[4] F16J** *9/00*

**U.S. Cl. 92—248** **7 Claims**



1. A pump plunger, comprising:

a centrally bored non-metallic right-circular cylinder having a counterbore in its respective ends defining oppositely disposed axially spaced-apart annular shoulders converg-

ing toward each other and the cylinder longitudinal axis at a predetermined angle;

metallic core means having a greater thermal coefficient of expansion than said cylinder axially received and projecting, at one end, beyond one end of said cylinder,

said core means comprising a bolt having a threaded shank and having a head nested by one counterbore of the cylinder and characterized, at is juncture with the shank, by an annular bolt head shoulder converging toward the shank longitudinal axis on an angle complementary with the respective said cylinder annular shoulders;

a nut threadedly engaging said bolt shank within the other cylinder counterbore, the end surface of said nut facing said bolt head converging toward the axis of the bolt shank on an angle complementary with the respective said cylinder annular shoulders,

said metallic core means longitudinally stressing the cylinder in a shrink fit at its respective ends for insuring concentricity and a leak proof seal of the core means with the cylinder; and,

an elongated metallic shaft having an axial socket in a diametrically enlarged head at one end portion axially receiving the projecting end of said core for rigidly connecting said shaft with said core means one end portion.

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**4,741,255**

## FLUID FLOW DISTRIBUTION DUCTS

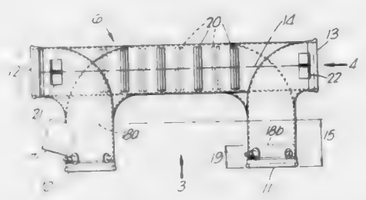
**David H. Lancaster, Woodford, United Kingdom, assignor to British Aerospace PLC, London, England**

**Filed Nov. 5, 1986, Ser. No. 927,022**

**Claims priority, application United Kingdom, Nov. 5, 1985, 8527201**

**Int. Cl.[4] F24F** *13/02*

**U.S. Cl. 98—1** **6 Claims**



1. A fluid flow distribution duct for an aircraft air-conditioning system comprising first air inlet duct means for receiving air from a first air supply source, second air inlet duct means for receiving air from a second air supply source, said first and second air inlet duct means including air inlet flow dividing means forming first and second fluid flow pasageway means of substantially equal cross-sectional area for communicating with first and second air outlet duct means, said air inlet flow dividing means comprising a diaphragm web extending longitudinally substantially throughout said distribution duct from said first and second air inlet duct means to said first and second air outlet duct means, the arrangement being such that the flow in the respective first and second air inlet duct means is divided into substantially equal fluid flow portions for balanced distribution to port and starboard sides of the aircraft.

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**4,741,256**

## VEHICULAR INTERNAL VENTILATING DEVICE

**Feng-Lin Huang, Keelung, Taiwan, assignor to Tech Zeal Industrial Company, Ltd., Taiwan, Taiwan**

**Filed Jan. 6, 1987, Ser. No. 813**

**Int. Cl.[4] B60H** *3/06*

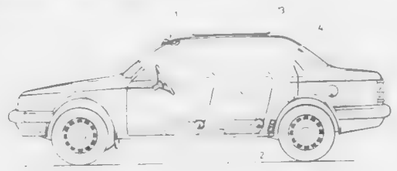
**U.S. Cl. 98—2.14** **10 Claims**

6. An internal ventilation device for a vehicle having a passenger compartment, a back wall for the passenger compartment with seats against said back wall and a windshield, said ventilation device comprising:

an air inlet device, an air exhaust device and a power supply;

said air inlet device having at least one external wind tube, said tube being shaped into an arched conical shape with a slant cut air inlet port;

at least one wind tube seat; said external wind tube being connected to said wind tube seat;



an internal wind tube for each of said external wind tubes, said internal wind tubes being connected to said wind tube seat;

said internal wind tubes being also formed into an arched conical shape and having the outlet thereof facing upwardly in the compartment above the windshield;

at least one push door valve strip means of said wind tube seat movable in one direction to establish a path between said external tube and said internal tube and in another direction to close said path.

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**4,741,257**

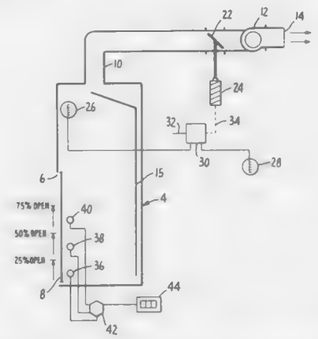
## FUME HOOD AIR FLOW CONTROL

**Merlon E. Wiggin, Long Island, N.Y., and Robert H. Morris, Randolph, N.J., assignors to Air Monitor Corporation, Santa Rosa, Calif.**

**Filed Jan. 9, 1985, Ser. No. 690,093**

**Int. Cl.[4] B08B** *15/02*

**U.S. Cl. 98—115.3** **5 Claims**



1. An apparatus for controlling the face velocity of air flowing through a variable sash opening between a room and a chamber, such as a fume hood, having an exhaust port leading outside said room and having air moving means to move air from said room, through said chamber and out through said exhaust port comprising in combination:

(a) means for measuring the static air pressure within said room;

(b) means for measuring the static air pressure within said chamber; and

(c) means for maintaining a constant differential in static air pressure between said chamber and said room regardless of the amount of said variable sash opening.



**4,741,258**

## DEFROSTING DEVICE FOR THE INTERIOR OF MOTOR VEHICLE WINDSHIELDS

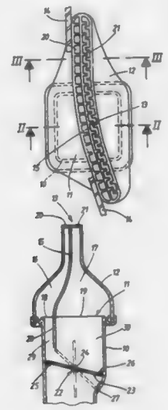
**Hans Trube, Herrenberg, and Klaus Arold, Sindelfingen, both of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany**

**Filed Nov. 24, 1986, Ser. No. 933,804**

**Claims priority, application Fed. Rep. of Germany, Nov. 22, 1985, 3541284**

**Int. Cl.[4] B60H** *1/00*

**U.S. Cl. 98—2.08** **8 Claims**



3. A vent arrangement for the interior of a motor vehicle having an air distributor housing with at least one air outlet opening through which defroster air is selectively allowed to flow and having a defroster air nozzle covering the air outlet opening opening into a mouth extending along a portion of the windshield of a motor vehicle for guiding the defroster air flow onto the windshield and having an adjustable covering for regulating the defroster air flow, said vent arrangement comprising:

a wall web extending from the mouth end of the defroster nozzle to the other end of the defroster nozzle dividing the defroster nozzle into two air guiding ducts of unequal cross-section,

air outlet openings opening through the mouth parallelly aligned and in approximate parallel alignment with the windshield,

air inlet openings opening through the other end of the defroster nozzle,

an adjustable covering developed to permit the air guiding duct of the smaller cross-section to remain open to the flow of defroster air when the air guiding duct of the larger cross-section is closed to the flow of defroster air.

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**4,741,259**

## COFFEE MAKER HAVING A DETACHABLE CASSETTE CONTAINING THE PUMP AND HEATER ASSEMBLY

**Shiro Ogata, and Kazutoshi Konaka, both of Tokyo, Japan, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Apr. 24, 1987, Ser. No. 42,496**

**Claims priority, application European Pat. Off., Apr. 29, 1986, 86200728**

**Int. Cl.[4] A47J** *31/00*

**U.S. Cl. 99—279** **8 Claims**

1. A coffee maker of the type comprising a housing, a water reservoir, a filter device, and a flow heater having a pump chamber and a heating element which is in thermal contact with the pump chamber, said flow heater being arranged to supply hot water to the filter device, further comprising a cassette which is detachably mounted in the housing containing said flow heater, said flow heater having a detachable inlet



and outlet connection which permits said cassette to be removed.

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**4,741,260**

## SAFETY LOCK IN STEAM PRESSURE COFFEE MAKERS

**Domingo F. A. Bolivar, Ermua Vizcaya, Spain, assignor to Oficina De Investigacion Agrupada, S.A., Eibar, Spain**

**Filed Feb. 10, 1986, Ser. No. 828,026**

**Int. Cl.[4] A47J** *31/00*

**U.S. Cl. 99—279** **3 Claims**



1. A steam pressure coffee maker having a safety lock, comprising:

a body defining a steam chamber, said body having a main aperture and a stepped orifice having at least one step;

a threaded plug for closing said main aperture, said threaded plug having recesses provided along its periphery so as to define a circular pattern;

a piston within said stepped orifice, said piston comprising a rod and a plunger, said plunger being in communication with said steam chamber, and said rod being in communication with the exterior of said body at a point at which it is located opposite a part of said circular pattern; and

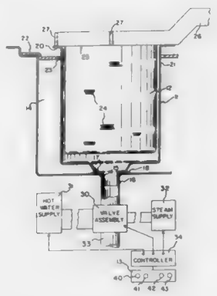
an opposing spring positioned between said plunger and a step of said stepped orifice;

whereby said opposing spring, when in the resting position, retains said rod inside said stepped orifice, but when sufficient steam builds up in the chamber for the steam pressure on the plunger to be greater than the resistance of the opposing spring, said spring is compressed, and the rod of the piston projects out of said body of the coffee maker and can penetrate one of said recesses in the threaded plug, preventing said threaded plug from turning and preventing opening of said plug while these steam pressure conditions prevail.

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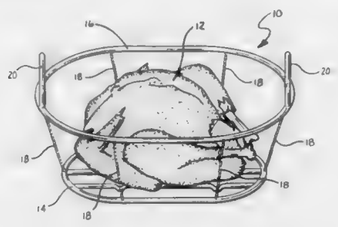
**4,741,261**
**COOKING APPARATUS**
**Bruno DiMaria, Nobleton, Canada, assignor to 630387 Ontario Limited, Mississauga, Canada**
**Filed Jan. 28, 1987, Ser. No. 7,569**
**Int. Cl.[4] A47J** *27/16, 27/21*
**U.S. Cl. 99—330** **3 Claims**



1. Cooking apparatus comprising
(a) a cooking pot,
(b) means for supplying hot water to said pot,
(c) means for supplying steam to said pot,
(d) means for draining the pot,
(e) a perforated basket for holding a load of food material in the pot, and
control means for
(i) operating the hot water supply means to charge the pot with hot water an immerse the food material therein,
(ii) operating the steam supply means to inject steam into the water in the pot to cook the food material, and
(iii) after a selected cooking time, operating the steam supply means to cease injection of steam and operating the draining means for draining the pot and leaving the cooked food material in the basket.

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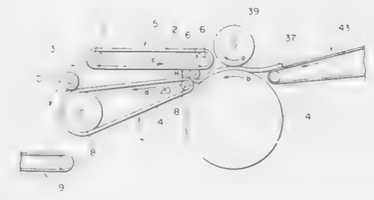
**4,741,262**
**COLLAPSIBLE RACK FOR MEAT**
**Nellie L. Moncrief, Rte. 1, Box 67B, LaPine, Ala. 36046**
**Filed Feb. 24, 1987, Ser. No. 17,934**
**Int. Cl.[4] A47J** *43/18, 37/04*
**U.S. Cl. 99—449** **5 Claims**



1. A combination supporting and lifting utensil for roasts comprising:
a generally planar base formed of a closed, peripheral outer wire and an open grid of interior wires, each interior wire having its opposite ends secured to spaced points on the outer wire to form an upper surface for supporting a roast or the like and a lower surface adapted to maintain said roast or the like in spaced relationship from a surface on which it is disposed;
a rigid lifting ring formed of a closed loop of wire having a shape similar to the peripheral wire of the base;
a pair of handle members joined to the lifting ring at diametrically opposed locations; and
a plurality of elongated flexible members, each having one end secured to the peripheral wire of the base and its opposite end secured to a complementary point on the lifting ring, at locations spaced with respect to one another around the perimeter of the base and the lifting ring, the lifting ring and the peripheral wire of the base forming the sole interconnection between said flexible members,
whereby said utensil may be disposed on the bottom of a roasting pan with the flexible members collapsed and the lifting ring disposed adjacent the peripheral wire of the base, and a roast supported on the upper surface of the base may be lifted from the roasting pan by raising the lifting ring through forces applied to the handles so that the center of gravity of the roast is disposed below the lifting ring.

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**4,741,263**
**APPARATUS AND METHOD FOR PRODUCING CROISSANTS**
**Sadao Ueno, 636-151, Nagaoka-machi, Utsunomiya-shi, Tochigi-ken, and Torahiko Hayashi, 3-4, Nozawa-machi, Utsunomiya-shi, Tochigi-ken, both of Japan**
**Filed May 27, 1986, Ser. No. 867,815**
**Int. Cl.[4] A21C** *3/06*
**U.S. Cl. 99—450.2** **11 Claims**

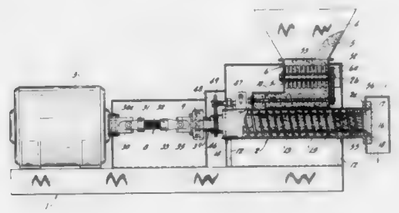


1. An apparatus for producing croissant dough rolls of a given diameter by rolling up a lengthy dough piece, comprising:
moving means for moving each dough piece lengthwise from an upstream to a downstream direction, wherein a leading tip of the dough piece moves toward a rolling area;
a rolling mechanism for rolling up the dough piece having a lower endless belt device and an upper endless belt device arranged spaced apart one above the other, wherein the lower endless belt device has a lower belt portion moving from an upstream end in the vicinity of the rolling area to a downstream end in a discharge area, and the upper endless belt device has an upper belt portion moving from an upstream end spaced above the rolling area to a downstream end in the discharge area, said upper and lower belt portions facing each other with a spacing therebetween which gradually increases from their upstream ends spaced apart by a first gap to their downstream ends spaced apart by a larger, second gap;
driving means for driving each of said upper and lower endless belt devices so that the upper and lower belt portions move in the downstream direction, the lower endless belt device being driven at a higher downstream speed than the upper endless belt device; and
adjusting means for adjusting the first gap between the upstream ends of the lower and upper endless belt devices in the rolling area, from an intial height to a wider height, in conjunction with rolling each dough piece,
whereby the tip of the dough piece entering the rolling area is turned up by moving contact with the upstream end of the lower endless belt device, the tip of the dough piece becomes initially rolled up in the rolling area by moving contact with the lower endless belt device being driven at a higher speed than the upper endless belt device, the initially rolled up tip of the dough piece becomes further rolled up to an increasingly larger diameter by the adjusting of the first gap to the wider height by the adjusting means, and the further rolled up dough piece then becomes conveyed downstream between the lower and upper belt portions while being rolled up by their different downstream speeds to an increasingly larger diameter until the given diameter of the rolled up croissant dough roll is attained toward the discharge area.



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**4,741,264**
**RICE BRAN PROCESSING APPARATUS**
**Daniel L. McPeak, Torrance, Calif., assignor to Brady International Inc., Torrance, Calif.**
**Filed May 5, 1986, Ser. No. 859,452**
**Int. Cl.[4] A23K** *1/14, 3/00;* **A23L** *1/20*
**U.S. Cl. 99—483** **22 Claims**

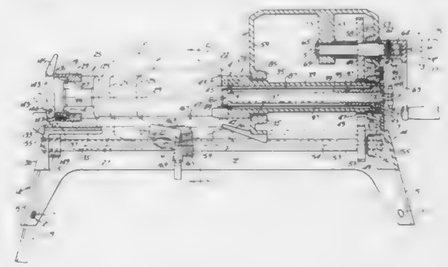


1. A rice bran extruding apparatus for extruding powdery rice bran and thereby heating said rice bran, said heat functioning to inactivate the lipase, destroy the bacteria and stabilize the free acid in said rice bran, comprising an extruder having a tubular shell, a rotor rotatably mounted within said tubular shell, said rotor including a free end protruding outwardly of said shell, said shell and said rotor having complementing spaced surfaces defining an extrusion passageway from said shell to the exterior of said shell at said free end of said rotor, an extrusion cone secured to said shell about the free end of said rotor and defining an extrusion passageway, said rotor having a spiral flight including a plurality in excess of four turns and defining a spiral passageway extending backwardly from said extrusion passageway, a plurality of at least twelve agitator bar members secured within the final four spiral turns defined by said spiral flight, said agitator bars being angularly oriented to define a reverse flight construction, said agitator bars being substantially at a smaller angle to the horizontal axis than said flights to extrude the powdery rice bran, an electric motor mounted in alignment with said rotor, a direct drive connection unit connecting said motor to said rotor and establishing a direct one-to-one drive between said motor and said rotor, said rotor being operable to move said rice bran in a continous manner through said shell and said extrusion cone, and a releasable connection unit in said direct drive connection unit and operably disengaging said rotor from said motor in response to a predetermined differential pressure across said connection unit.

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**4,741,265**
**PINEAPPLE CORER AND PEELER**
**Richard Cushman, Livonia, Mich., assignor to R. Cushman & Associates, Inc., Livonia, Mich.**
**Filed Jul. 27, 1987, Ser. No. 77,743**
**Int. Cl.[4] A23N** *4/20, 7/00, 7/08*
**U.S. Cl. 99—542** **28 Claims**

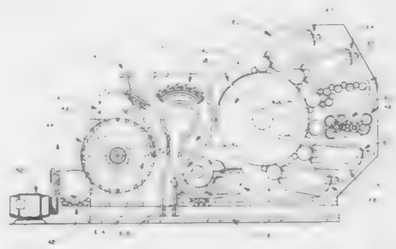
1. A pineapple corer and peeler comprising:
a framework having a platform;
a power rotated head stock assembly journaled upon said framework above said platform upon a longitudinal first axis adapted to axially grip and rotatably support one end of a pineapple;
a tail stock assembly aligned with and spaced from said head stock assembly mounted upon the framework longitudinally adjustable upon said axis and adapted to axially engage and rotatably journal the other end of a pineapple;



a rotatable core cutting tube with a sharpened circular end mounted within said head stock assembly upon said first axis and connected thereto for rotation therewith; and
threaded means disposed between said head stock assembly and core cutting tube for effecting longitudinal movement of the core cutting tube relative to said head stock assembly along said axis and along the length of the pineapple for severing the pineapple core therefrom.

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**4,741,266**
**CAN DECORATING APPARATUS**
**James S. Stirbis, Littleton; Chet L. Rose, Lakewood, and Roscoe W. O'Hair, Golden, all of Colo., assignors to Adolph Coors Company, Golden, Colo.**
**Filed Oct. 8, 1986, Ser. No. 916,604**
**Int. Cl.[4] B41F** *17/22*
**U.S. Cl. 101—40** **71 Claims**



1. A decorator apparatus for applying a decorative ink image to the cylindrical outer surface of a one piece aluminum or steel can body or the like comprising:
a rotatable mandrel wheel means for supporting can body members on circumferentially spaced mandrel members;
infeed means for loading undecorated can body members onto the mandrel members;
a rotatable inking blanket wheel means having a plurality of circumferentially spaced blanket segment means thereon for applying ink images to the can body members;
a plurality of circumferentially spaced plate cylinder means for transferring ink images to said blanket segment means;
a plurality of circumferentially spaced ink fountain means for holding a supply of ink for each of said plate cylinder means;
an ink transfer system associated with each ink fountain means including a plurality of ink transfer roll means associated with each ink fountain means for transferring ink from each fountain means to an associated plate cylinder means and then to the blanket segment means;

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a transfer wheel means for receiving decorated can body members from the mandrel wheel means;

a can carrying means for receiving decorated can body members from the transfer wheel means and transferring the decorated can body members away from the decorator apparatus;

a main base frame means for supporting the decorator apparatus and a vertically extending rigid frame plate means for supporting said plate cylinder means and said ink fountain means and said ink transfer system in juxtaposition to said blanket wheel means;

a plurality of circumferentially spaced plate cylinder mounting openings extending through said frame plate means in radially outwardly spaced relationship to said blanket wheel means;

a plurality of circumferentially spaced ink transfer system mounting openings extending through said frame plate means in generally radiallly outwardly spaced relationship to said plate cylinder openings;

a motor means and a main drive means operatively associated with the various wheel means for causing synchronous rotation thereof and including a bull gear means for driving said blanket wheel means;

each of said plate cylinder means being constructed as a separate sub-assembly and being separately and removably mounted in one of said plate cylinder mounting openings on said frame plate means and each plate cylinder means having a separate drive gear means for being directly driven by said bull gear means;

each ink transfer system being constructed as a separate sub-assembly and having separate roll drive gear means for operating said ink transfer roll means separately from said plate cylinder means and said plate cylinder drive gear means and being separately and removably mounted in one of said ink transfer system mounting openings; and

ink transfer system drive means separate from said plate cylinder drive gear means for operating said roll drive gear means separately from said plate cylinder means and said plate cylinder drive gear means.

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**4,741,267**

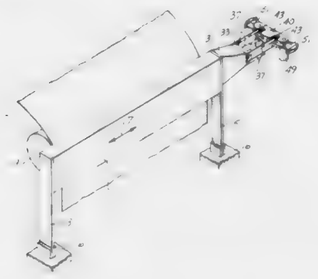
**SHUTTLE DRIVE FOR RECIPROCABLY MOUNTED LINE PRINTER CARRIAGES**

**Lev M. Lipkovker, Bellevue, Wash., and Wolfgang G. Wunderlich, deceased, late of Federal Way, Wash. (by Erika Wunderlich, heir), assignors to Mannesmann Tally Corporation, Kent, Wash.**

**Filed Mar. 26, 1986, Ser. No. 844,092**

**Int. Cl.[4] B41S *3/00***

**U.S. Cl. 101—93.04** **23 Claims**



1. In a line printer wherein a series of printing mechanisms are positioned side by side on an elongate carriage supported for reciprocating movement along a linear, horizontally oriented axis lying parallel to a horizontally oriented print line defined by said printing mechanisms, the improvement comprising a twin counterweight shuttle drive, for said carriage, said twin counterweight shuttle drive including:

a support bracket secured to said carriage suitable for supporting a pair of rotatably mounted unbalancing weights;

a pair of equally sized and configured unbalancing weights rotatably mounted on and entirely supported by said support bracket, said unbalancing weights being positioned so that the carriage driving force produced by each weight is in phase with the carriage driving force produced by the other weight such that the rotation of said unbalancing weights in opposite directions at the same speed creates a reciprocating unidirectional drive force that reciprocably shuttles said carriage along said linear, horizontally oriented axis said drive force resulting from rotation of said unbalanced weights being the sole drive force causing said reciprocating motion of said carriage; and,

rotation means coupled to said pair of equally sized and configured unbalancing weights for rotating said pair of equally sized and configured unbalancing weights in opposite directions at the same speed.

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**4,741,268**

**PLANETARY TRANSMISSION SYSTEM FOR SELECTIVE TYPE WHEELS**

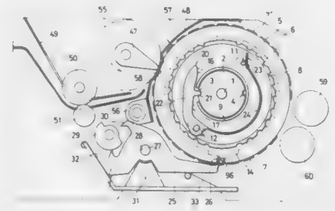
**Fumihisa Hori, Takizawa, Japan, assignor to Alps Electric Co., Ltd., Japan**

**Filed Nov. 26, 1986, Ser. No. 935,311**

**Claims priority, application Japan, Dec. 20, 1985, 60-285692; Dec. 27, 1985, 60-293090**

**Int. Cl.[4] B41J *1/48***

**U.S. Cl. 101—93.28** **3 Claims**



1. In a wheel printer having a rotary shaft rotatable in opposite directions by a drive motor which is rotated in one direction, a plurality of printing wheels mounted in parallel on the rotary shaft, each printing wheel having printing types along the circumferential surface thereof, and means for attaching and detaching each of the printing wheels selectively to the rotary shaft in order to rotate a selected printing wheel to bring a selected type thereon to a printing position,

the improvement of a transmission system for transmitting the drive output of the drive motor to rotate the rotary shaft selectively in one and the other of said opposite directions, comprising:

a planet gear system having a sun gear which in concentric and unitary with said rotary shaft, a ring gear concentric with said sun gear which is independent of said rotary shaft, and a carrier concentric with said sun gear and ring gear which supports at least one planet gear in mesh between said sun gear and said ring gear, wherein said ring gear and carrier are two inputs to the planet gear system and the sun gear is an output of the planet gear system for driving said rotary shaft in one and the opposite direction, selectively;

a first member directly connected to the drive output of said drive motor which transmits the drive output to one of said two inputs to said planet gear system; and

a second member selectively attached to and detached from the drive output of said drive motor by a selection mechanism so as to respectively transmit and not transmit the dirve output to the other of said two inputs to said planet gear system;

whereby when said selection mechanism is operated to attach said second member to the drive output of said drive motor, said first member drives one input and the second member drives the other input of the two inputs to the planet gear system resulting in an output driving said sun gear in one direction, and when said selection mechanism is operated to detach said second member from the drive output of said drive motor, said first member does not drive the one input and the second member drives the other input of the two inputs to the planet gear system resulting in an output driving said sun gear in the opposite direction.



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**4,741,270**

**FUSE FOR PROJECTILE**

**Jean-Pierre Golay, Viry, France, assignor to Mefina S.A., Fribourg, Switzerland**

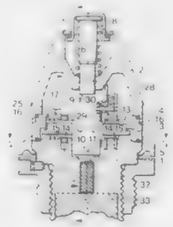
**PCT No. PCT/CH86/00087, § 371 Date Mar. 12, 1987, § 102(e) Date Mar. 12, 1987, PCT Pub. No. WO87/00615, PCT Pub. Date Jan. 29, 1987**

**PCT Filed Jun. 13, 1986, Ser. No. 41,073**

**Claims priority, application Switzerland, Jul. 12, 1985, 3025/85**

**Int. Cl.[4] F42C *9/14, 15/24***

**U.S. Cl. 102—271** **3 Claims**



1. A fuse for a projectile comprising a body, a cap rotatably mounted relative to said body, said body carrying a rotor having two firing caps having different characteristics, said two firing caps cooperating with a detonator, a firing pin mounted for rotation with said cap, said firing pin being axially displaceable during impact of said projectile for striking one of said two firing caps, said two firing caps being

mounted on said rotor, said two firing caps having parallel axes extending along a plane, said plane extending parallel to the axis of rotation of said rotor, said rotor rotating a predetermined angular displacement to an active position from a safety position to bring said two firing caps to the active position and means for allowing said firing pin to selectively cooperate with one of said two firing caps.

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**4,741,269**

**DAMPENING APPARATUS FOR PRINTING PRESS**

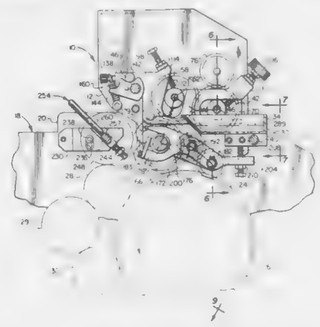
**John E. Aylor, Fort Worth, and Jose A. Villarreal, Mesquite, both of Tex., assignors to Graphic Specialties, Inc., Garland, Tex.**

**Continuation of Ser. No. 894,444, Aug. 1, 1986, Pat. No. 4,676,156, which is a continuation of Ser. No. 800,089, Nov. 20, 1985, abandoned, which is a continuation of Ser. No. 616,719, Jun. 4, 1984, abandoned. This application Jun. 22, 1987, Ser. No. 65,256**

**The portion of the term of this patent subsequent to Jun. 30, 2004, has been disclaimed.**

**Int. Cl.[4] B41F *7/40, 31/30***

**U.S. Cl. 101—148** **9 Claims**



1. A dampening apparatus for a lithographic press and the like having a rotating plate cylinder and an inking form roller engageable with said plate cylinder, said apparatus comprising:

an applicator roller for applying dampening liquid to said plate cylinder;

a distribution roller simultaneously engageable with said applicator roller and said form roller while both said applicator roller and said form roller are engaged with said plate cylinder;

means for selectively moving said distribution roller to a position in which said distribution roller is disengaged from said form roller while said distribution roller remains engaged with said applicator roller;

and means for maintaining said distribution roller in said position disengaged from said form roller and in engagement with said applicator roller.

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**4,741,271**

**PROJECTILE FOR ROUND BORE ELECTROMAGNETIC LAUNCHERS WITH SPIN PRODUCED OR PREVENTED BY ELECTROMAGNETIC MEANS**

**Robert M. Delvecchio, Monroeville Boro, Pa., and Emmanuel Aivaliotis, San Jose, Calif., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Oct. 6, 1986, Ser. No. 915,607**

**Int. Cl.[4] F42B *13/02*; F41F *1/02***

**U.S. Cl. 102—501** **16 Claims**

1. A projectile for use with an electromagnetic projectile launcher, said projectile comprising:

a projectile body;

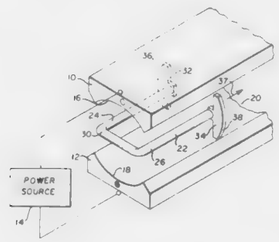
a conductive open loop mechanically attached to said projectile body; and

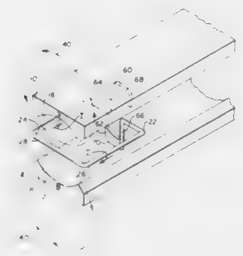
means for electrically connnecting said open loop between a pair of generally parallel projectile launching rails when said open loop is in a predetermined angular orientation

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with respect to said rails, whereby current flowing in said open loop interacts with magnetic flux produced by current flowing within said rails to place a torque on said open loop.



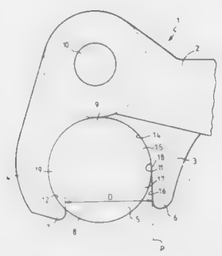
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**4,741,272**

## OVERHEAD CABLE CLAMP AND TRANSPORT SYSTEM USING THE CLAMP

**Serge Tarassoff, Seyssinet Pariset, France, assignor to Pomagalski SA, France**

**Filed Apr. 25, 1986, Ser. No. 856,574**
**Claims priority, application France, Apr. 25, 1985, 85 06323**
**Int. Cl.[4] B61B** *9/00*
**U.S. Cl. 104—173.1** **19 Claims**



**1**. A disconnectable locking clamp for use with a carrier/towing cable for a transport installation having at least one overhead carrier/towing cable for locking a vehicle rigidly to the cable from above, the clamp comprising a body having a fixed jaw and a movable jaw pivotally connected to the fixed jaw, said clamp being operable between a normally locked connected condition where it is rigidly locked with the cable from above and the jaws are flush with the lower surface of the cable and present a small projection relative to the upper part of the cable and a second disconnected condition wherein it is not locked with the cable, and the jaws are unlocked and disengaged from the cable, and said fixed jaw having an internal support surface including a first cylindrical surface complementary to the cross-sectional shape of the cable whereby in said locked condition the first surface contacts a first corresponding surface of the cable and a second surface which is an extension of the first cylindrical surface and which, in the locked condition is spaced from a second corresponding surface of the cable.

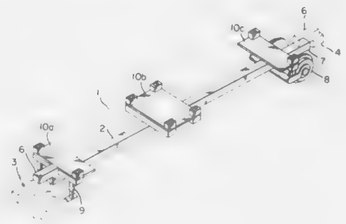
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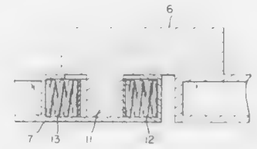
**4,741,273**

## RAIL SEMI-TRAILER AND RELEASABLE COUPLER

**Clyde L. Sherwood, 19102 16th Ave., NW., Seattle, Wash. 98177**

**Continuation-in-part of Ser. No. 392,673, Aug. 16, 1982, abandoned. This application Oct. 7, 1985, Ser. No. 785,105**
**Int. Cl.[4] B61G** *5/02*
**U.S. Cl. 105—4.1** **1 Claim**





**1**. A railroad semi-trailer and a releasable coupler; trailer for immediate transport of sought-for intermodal-type cargo and other adaptable cargo, made joinable end to end with similar trailers by use of releasable coupler; trailer structured to include: centered longitudinal main frame beam extending to and slightly beyond both front and rear cargo-supporting deck frame segments mounted on top surface of beam; flanged wheel-airbrake assembly extending downwardly from rear end of beam lower surface, positioned to support and give mobility to trailer; trailer front end supports consisting of two legs with pads conforming to rail surfaces extending downwardly from lower surface of front deck frame segment cross beam, fulfilling in a stabilizing means dual purpose of supporting front end of dis-engaged trailer and as means for engaging and dis-engaging trailers; and releasable coupler structured of two upper and lower segments mating in over and under mode, lower coupler segment incorporated into rear end of front trailer longitudinal main frame beam consisting of cavity with entry from top beam surface; within that cavity are positioned two shock absorber springs in horizontal and longitudinal mode, each spring having one end adjacent to inserted tongue; tongue is incorporated as an upper segment and downward extension of front end of trailer longitudinal main frame beam, extending when mated with lower segment into cavity between shock absorber springs to form coupler pivot; tongue shaped as a horizontal wedge having narrower blunted end facing forward opposing front spring and wider rear end opposing rear spring; wedge conformation to facilitate free movement of pivot within cavity.



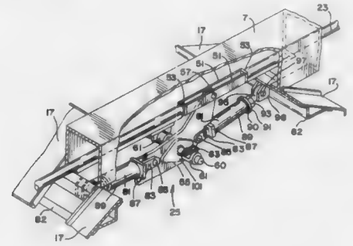
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**4,741,274**

## HOPPER DOOR OPERATING MECHANISM

**Ray L. Ferris, Thornton; Bradford Johnstone, Flossmoor, both of Ill.; Emmanuel L. Komasinski, Michigan City, Ind.; Maurico F. Rosellini, Butler, and William D. Stoughton, Slippery Rock, both of Pa., assignors to Trinity Industries, Dallas, Tex.**

**—Filed Mar. 27, 1986, Ser. No. 844,798**
**Int. Cl.[4] B61D** *7/18, 7/26, 7/28*
**U.S. Cl. 105—240** **25 Claims**



**1**. In a railway hopper car having a first hopper structure, said hopper structure including a first door assembly supported thereon for opening and closing the hopper structure to unload lading from the interior of the hopper car, a door operating mechanism for opening and closing the door assembly, said door operating mechanism comprising:

a door operator supported on said hopper car and including a movable thrust member, lever means having connection means connected with the thrust member;

means for rotatably supporting said lever means on said hopper car;

said lever means being adapted to rotate responsive to longitudinal movement of the thrust member;

first strut means having a first pivot connection connected with the lever means and a second pivot connection operatively associated with the door for opening and closing the door responsive to rotation of the lever means whereby the door is opened and closed responsive to operation of the door operator; and

the first and second pivot connections of the first strut means, the thrust member, and the connection means of the lever means being substantially coplanar within a generally vertical plane extending generally longitudinally with respect to the hopper car for reducing moments in the mechanism about vertical and longitudinal axes.

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**4,741,275**

## DEVICE FOR CONTROLLING ACCESSES OF THE SECURITY CHAMBER

**Jacques Lewiner, 5, rue Bory d'Arnex, 92210 Saint Cloud, and Claude Hennion, 18, rue Flatters, 75005 Paris, both of France**

**Filed Nov. 26, 1984, Ser. No. 674,673**
**Claims priority, application France, Nov. 24, 1983, 83 18762**
**Int. Cl.[4] E05G** *3/00*
**U.S. Cl. 109—7** **9 Claims**

**1**. A device for controlling an access of the security chamber type, comprising at least two doors each equipped with a lock with electrically controlled locking and a control device for applying to the security chamber n separate operating programs, where n is a finite whole number greater than 3, said programs including a program providing simultaneous locking of the two doors, a program providing simultaneous unlocking of the two doors according to at least two respective predetermined control modes, a program providing successive unlocking of the two doors according to at least two respective predetermined control modes, and at least one further program wherein a different control mode is provided for unlocking at least one of said doors, said device further comprising a single n position selector capable of easy and rapid actuation, and electric means, associated with said selector, for automatically applying to the security chamber an individual program of the n operating programs when the selector is placed in the position among its n positions which correspond to that program.



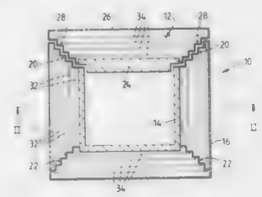
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**4,741,276**

## FIRE RESISTANT CABINET

**James F. Pollock, Old Windsor, England, assignor to United Kingdom Atomic Energy Authority, London, England**

**Filed Sep. 29, 1986, Ser. No. 912,234**
**Claims priority, application United Kingdom, Oct. 10, 1985, 8524975**
**Int. Cl.[4] E04F** *5/00*
**U.S. Cl. 109—65** **4 Claims**

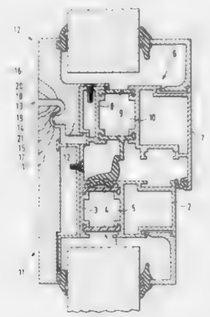


**1**. A fire resistant cabinet for maintaining its contents below a predetermined temperature comprising, an inner container at least partly of double-walled construction, a material located within the walls of the inner container and which undergoes a phase change requiring latent heat below the predetermined temperature; an outer casing surrounding and spaced apart from the inner container; a thermal insulation layer between the outer casing and the inner container comprising a plurality of spaced apart, low thermal emissivity, heat shields each being parallel to the adjacent wall of the outer casing; and at least six bridge members connecting the inner container and the outer casing, each bridge member being of zig-zag shape and defining a plurality of slots extending generally parallel to the crests of the zig-zag, the bridge members supporting the inner container relative to the outer casing even if the cabinet is subjected to an impact.

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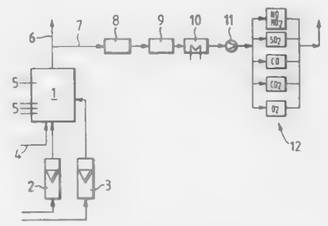
4,741,277
DOOR OR WINDOW
Heinrich Sälzer, Industriestrasse 4, 3550 Marburg-Wehrda, Fed. Rep. of Germany
Filed Jan. 20, 1987, Ser. No. 4,913
Claims priority, application Fed. Rep. of Germany, Jan. 25, 1986, 3602218
Int. Cl.[4] E06B 1/04
U.S. Cl. 109—77 4 Claims



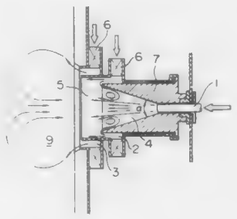
1. A door or window having a fixed frame and a swingably mounted sash frame arranged therein, the front surface of said fixed and swingable frames being defined by a complemental and generally planar fixed frame profile and a sash frame profile covering the faces of said fixed and sash frames respectively, a safety pane mounted in said sash frame, the edge regions of said safety pane being masked by bombardment-inhibiting portions of said sash profile, other portions of said sash profile overlapping bombardment-inhibiting portions of said fixed frame profile, said profiles together defining a gap therebetween in the overlap region, said gap defining a sinuous path running generally in the direction of said pane and changing its direction more than once in a plane perpendicular to the plane of said pane, said sash profile and fixed frame profile being mutually indented in said gap region such that, in each case, a ridge integrally formed on each said profile lies within a groove formed into the other said profile, the outermost edge portions of said sash frame profile being outwardly lapped by portions of said fixed frame profile.

4,741,278
SOLID FUEL AND A PROCESS FOR ITS COMBUSTION
Friedrich H. Franke, Fischbek, and Michael J. Paersch, Aachen, both of Fed. Rep. of Germany, assignors to British Petroleum Company p.l.c., London, England
PCT No. PCT/GB85/00385, § 371 Date May 8, 1986, § 102(e) Date May 8, 1986, PCT Pub. No. WO86/01528, PCT Pub. Date Mar. 13, 1986
PCT Filed Aug. 29, 1985, Ser. No. 855,850
Claims priority, application Fed. Rep. of Germany, Mar. 9, 1984, 3432365
Int. Cl.[4] F23B 7/00
U.S. Cl. 110—342 2 Claims

1. Process for the production of pellets from finely divided coal or carbonaceous materials, using a first heat hardening binding agent which is water-soluble or water-swellable, and a second binding agent based on aqueous emulsions of heavy hydrocarbons, the process comprising the steps of:
(a) forming a mixture by adding to the coal (i) up to 10% by weight calculated on the coal (daf) of calcium oxide; and (ii) 0.1 to 5%, calculated on coal (waf), of iron in the form of an iron compound selected from the group consisting of iron oxide, iron carbonate, elemental iron, substantially halogen free and sulfate free, iron rich minerals and substantially halogen free and sulfate free, iron rich technical by-products;
(b) agglomerating said mixture with said binding agent in a pelletising device to produce a concentration gradient of binding agent in the pellets by controlled addition of said first and second binding agents in the course of pelletisation, so that the concentration of the first binding agent decreases from the inside of the pellet to the outside and that of the second binding agent decreases from the outside to the inside; and
(c) thermally drying and subsequently thermally hardening the pellets.



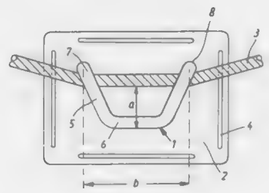
4,741,279
METHOD OF AND APPARATUS FOR COMBUSTING COAL-WATER MIXTURE
Shigeru Azuhata, Hitachi; Kazutoshi Higashiyama, Katsuta; Kiyoshi Narato, Ibaraki; Hironobu Kobayashi, Katsuta; Norio Arashi, Hitachi; Tooru Inada; Kenichi Sohma, both of Hitachi; Keizou Ohtsuka, Katsuta; Yoshitaka Takahashi, Kure; Fumio Koda, Kure; Tadahisa Masai, Kure; Masakiyo Tanikawa, Kure, and Kei Kawano, Kure, all of Japan, assignors to Hitachi, Ltd. and Babcock-Hitachi Kabushiki Kaisha, both of Tokyo, Japan
Filed Jan. 7, 1987, Ser. No. 1,166
Claims priority, application Japan, Jan. 8, 1986, 61-629; Oct. 25, 1986, 61-254086
Int. Cl.[4] F23D 1/00
U.S. Cl. 110—347 13 Claims



1. A method of combusting a coal-water mixture comprising:
atomizing said mixture into a conical primary pre-combustion chamber and in a conical jet spray pattern so that the angle of divergence of the conical primary pre-combustion chamber is greater than the atomizing angle of the mixture conical spray pattern to reduce the velocity of said mixture by lateral expansion;
supplying, in the form of a downstream moving swirl about the axis of the jet of the atomizing mixture, primary air from an outer peripheral portion of and downstream of said primary pre-combustion chamber into a secondary pre-combustion chamber connected downstream to said primary pre-combustion chamber, at a rate smaller than that required for the complete burning of said mixture;
forming a region of low pressure around the jet of said mixture and inside of said conical primary pre-combustion chamber due to the angle of divergence being greater than the atomizing angle;
due to said region of low pressure, inducing said primary air from said secondary pre-combustion chamber at a higher temperature than said primary pre-combustion chamber back into said primary pre-combustion chamber into said region of low pressure thereby to promote the evaporation of water content of said mixture, prevent the deposition of particles on the inner wall of said primary pre-combustion chamber and to ignite said mixture;
mixing said mixture with the remainder portion of said primary air in said secondary pre-combustion chamber so as to combust said mixture at a low air-to-ratio, thus forming a region of a reducing atmosphere in said secondary pre-combustion chamber, thereby suppressing generation of NOx; and
supplying, in the form of a swirl downstream of said secondary pre-combustion chamber about the axis of the jet of said mixture, secondary air, at a rate large enough to completely burn said mixture, into a furnance connected downstream to said secondary pre-combustion chamber, thereby completely combusting said mixture.



4,741,280
SAFETY HOOK FOR TRAPEZE HARNESSES, IN PARTICULAR FOR WINDSURFERS
Werner Mauderer, Lindenberg, and Utz Kador, Starnberg, both of Fed. Rep. of Germany, assignors to Peter Brockhaus GmbH & Co., Handels KG, Eurasburg, Fed. Rep. of Germany
Continuation of Ser. No. 582,537, Feb. 22, 1984, abandoned, which is a continuation of Ser. No. 382,576, May 27, 1982, abandoned. This application Dec. 19, 1985, Ser. No. 811,323
Claims priority, application Fed. Rep. of Germany, Jun. 3, 1981, 8116416[U]; Aug. 11, 1981, 3131722; Oct. 20, 1981, 3141582
Int. Cl.[4] B63B 35/00
U.S. Cl. 114—39.2 19 Claims



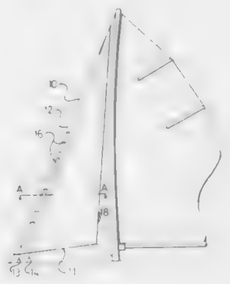
1. A safety trapeze harness system for sailboards operatively associated with a trapeze rope loosely attached to a wishbone comprising:
(a) a clevis hook for receiving a trapeze rope, said clevis hook having a tongue comprising a contact area formed by at least two separated distinct contact points between which said rope extends and is held during use and a remainder contact suface of said tongue over which said rope passes as it slides off of said clevis hook, said contact area being at least as wide as the remainder contact surface;
(b) a hook plate;
(c) means on said hook plate for attaching said clevis hook to an operator of said sailboard; and
wheein said clevis hook is attached to said hook plate at one end, and is free at its other end to allow for release of said trapeze rope, and wherein the perpendicular projection of said remainder contact surface on said hook plate tapers towards the free end of said clevis hook.

4,741,281
SAIL HANDLING SYSTEM
Robert E. Doyle, Marblehead, Mass., assignor to Doyle Sailmakers, Inc., Marblehead, Mass.
Filed Aug. 28, 1986, Ser. No. 901,754
Int. Cl.[4] B63H 9/04
U.S. Cl. 114—102 11 Claims



1. A sail system comprising, in combination,
a sail having a luff edge adapted for running up a mast and a foot,
a cover extending substantially the length of the foot, being attached to the foot and including a cover side extending upwardly from the foot to a top edge on each side of the sail, and
lazy jack means having portions extending adjacent and on both sides of the sail and tending to guide it into the cover sides upon furling.

4,741,282
SAIL
Terrence R. Duke, 9 Lucknow Place, Blockhouse Bay, Auckland 4, New Zealand
Filed Nov. 5, 1986, Ser. No. 927,123
Claims priority, application New Zealand, Nov. 5, 1985, 214082
Int. Cl.[4] B63H 9/04
U.S. Cl. 114—103 7 Claims



1. A sail including:
at least two opposed flexible sheets,
at least one vent by which air may in normal use flow into a space between said flexible sheets, and,
at least one outlet vent by which air may in normal use flow out of said space between said flexible sheets, said sail taking in normal use an aerofoil shape having two outer faces comprised of said at least two opposed flexible sheets with a first said face having a greater useful surface area than the second said face, wherein said opposed flexible

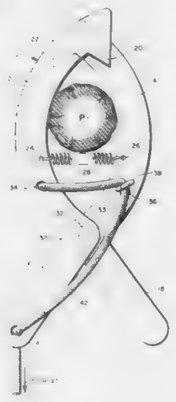
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sheets are connected by at least one flexible element joined to both, forming at least one baffle, said at least one baffle extending substantially vertically between said opposed flexible sheets, and having at least one vent therein through which air may flow in normal use.

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**4,741,283**
**BOAT SECURER**
**Ellis Conner, P.O. Box 26, Crestview, Fla. 32536**
**Filed Nov. 4, 1986, Ser. No. 926,669**
**Int. Cl.[4] B63B** *21/00*
**U.S. Cl. 114—230** **13 Claims**

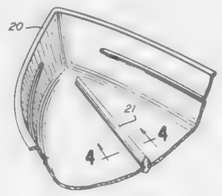


1. A mooring device for detachably securing a boat to any convenient stationary object, said device comprising:
first and second opposed, inwardly curving arms forming a jaw portion;
a first handle portion extending from one end of said first arm and a second handle portion extending from one end of said second arm;
fastener means for connecting said first and second arms adjacent said handle portions at a fastening point;
a resilient member coupled between said first arm and said second arm, said resilient member holding said jaw portion in a normally closed position while yielding to allow said jaw portion to open when said handle portions are drawn together; and
tie-line means for connecting said device to a boat to be secured, said tie-line means extending from said first arm to said second arm, and from said second arm to said first handle portion, and being fixedly attached to said first handle portion.

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**4,741,284**
**MOLDED PLASTIC CANOE**
**George B. Madison, Wichita, Kans., assignor to The Coleman Company, Inc., Wichita, Kans.**
**Division of Ser. No. 613,051, May 22, 1984, Pat. No. 4,660,498.**
**This application Aug. 29, 1986, Ser. No. 901,733**
**Int. Cl.[4] B63B** *5/24*
**U.S. Cl. 114—357** **10 Claims**

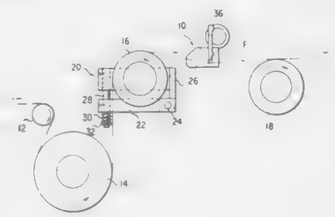
1. A molded plastic canoe comprising a unitary molded plastic hull having an outer surface and an inner surface and an elongated keelson attached to the inner surface of the hull, the keelson inclcuding a longitudinally extending channel-shaped portion having a pair of laterally inwardly extending flangs, the molded plastic hull including an interconnecting portion which extends into the channel-shaped portion of the keelson



and laterally outwardly over the flanges of the keelson whereby the keelson and the hull are interconnected.

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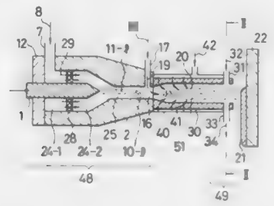
**4,741,285**
**APPARATUS FOR COATING ONE SIDE OF ONE OR MORE SURFACE TYPE FASTENER TAPES OR LIKE STRIPS**
**Noritaka Tsubata, Uozu, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan**
**Filed Dec. 5, 1986, Ser. No. 937,993**
**Claims priority, application Japan, Dec. 17, 1985, 60-192962[U]**
**Int. Cl.[4] B05C** *3/18*
**U.S. Cl. 118—415** **12 Claims**



1. An apparatus for continuously coating one side of an elongate strip of substrate material such as a surface type fastener tape traveling longitudinally along a predetermined path in a predetermined direction, the coating apparatus comprising:
(a) at least a pair of coating units disposed opposite each other on both sides of the predetermined path of the strip;
(b) there being a recessed guideway defined in that side surface of each coating unit which is directed toward the other coating unit, for slidably receiving one longitudinal edge portion of the strip, so that the strip has its opposite longitudinal edge portions slidably engaged in the guideways in the pair of coating units, said recessed guideway in each coating unit having upper and lower guide surfaces extending along said predetermined path of the strip for relative sliding contact with the opposite surfaces of one longitudinal edge portion of the strip, the upper guide surface tapering in width from an upstream end toward a downstream end of the guideway with respect to the predetermined traveling direction of the strip;
(c) there also being a passageway in each coating unit for supplying a coating material onto the surface of the strip traveling between the pair of coating units; and
(d) a doctor blade mounted to the pair of coating units so as to extend across the predetermined path of the strip and having a scraping edge disposed opposite the surface of the strip so as to create a uniform film of the coating material thereon as the strip travels past the doctor blade.



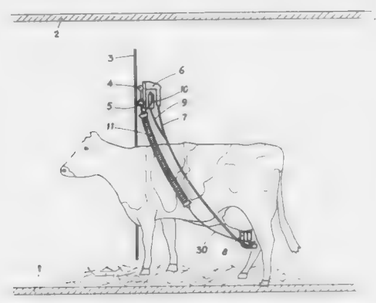
**4,741,286**
**SINGLE TORCH-TYPE PLASMA SPRAY COATING METHOD AND APPARATUS THEREFOR**
**Tsutomu Itoh; Haruo Tateno, both of Tokyo; Hideo Nagasaka, Hitachi; Masahiro Yamamoto, Sakura; Yusuke Mitsuyoshi, Tokyo; Susumu Matsuno, Ichikawa; Hiroshi Saitoh, Funabashi, and Masayuki Kitoh, Higashikurume, all of Japan, assignors to Onoda Cement Company, Ltd., Yamaguchi, Japan**
**Filed May 12, 1986, Ser. No. 862,031**
**Claims priority, application Japan, May 13, 1985, 60-101081**
**Int. Cl.[4] B05B** *5/02*
**U.S. Cl. 118—620** **19 Claims**



1. A single torch-type plasma spray coating apparatus for coating articles, said apparatus having an arc torch for generating a plasma flame, a charging port for plasma gas, a cathode and an anodic nozzle, said apparatus comprising a plasma gas rectifying device arranged upstream from the tip of said cathode for converting the plasma gas and plasma flame flowing from said anodic nozzle into a laminar flow, means for feeding a spray coating material into the plasma flame at a point near the outlet of said arc torch, means surrounding and confining said plasma gas, plasma flame and material during a travel interval long enough to melt the material component thereof, said means terminating adjacent the article to be coated, and means for separating the plasma gas component from the plasma flame and melted entrained material, said departing means being an exhausting port for absorbing gas from the plasma flame, said separating means being at the end of said surrounding means and immediately before the plasma flame and entrained material impacts the article to be coated.

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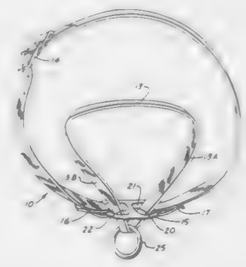
**4,741,287**
**APPARATUS FOR REMOVING A MILKING CLUSTER, PARTICULARLY FOR A COW-SHED**
**Jan Kummer, Leeuwarden, Netherlands, assignor to Kummer Electronics B.V., Leeuwarden, Netherlands**
**Filed Sep. 29, 1986, Ser. No. 913,115**
**Claims priority, application Netherlands, Oct. 2, 1985, 8502694**
**Int. Cl.[4] A01J** *5/00*
**U.S. Cl. 119—14.08** **10 Claims**



1. Apparatus for supporting a vacuum operable milking cluster adapted to be detachedly applied to the udder of an animal, comprising an elongated flexible and longitudinally elastic and air-tight hollow member connected at one end to a standard above the animal and at its other end to the milking cluster, said member being longitudinally expansible in response to the presence of air therein to permit said milking cluster to be applied to the udder of said animal and contractible in response to the removal of air to cause said hollow member to lift said milking cluster from said udder.

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**4,741,288**
**COMBINATION COLLAR AND MUZZLE HUMANE TRAINING AID**
**Robert K. Anderson, Roseville; Ruth E. Foster, Minneapolis, and Jeffrey A. Levine, Bloomington, all of Minn., assignors to Regents of the University of Minnesota, Minneapolis, Minn.**
**Continuation-in-part of Ser. No. 719,697, Apr. 4, 1985, Pat. No. 4,621,591. This application Oct. 23, 1986, Ser. No. 922,156**
**The portion of the term of this patent subsequent to Nov. 11, 2003, has been disclaimed.**
**Int. Cl.[4] A01K** *25/00*
**U.S. Cl. 119—130** **10 Claims**



1. A combination collar and muzzle humane training aid for dogs, comprising:
a first adjustable collar loop adapted to fit around the neck of a dog immediately behind the head of such dog and adjustable to snugly fit to prevent its slipping downwardly on the neck from its position immediately behind the head;
a first divided ring carried by said collar loop and having a center divider bar forming ring end portions, opposite ends of said collar loop being attached to the respective ring end portions to form collar side straps with said first ring forming a part of said collar loop, the first ring being positioned underneath the neck and immediately to the rear of the lower jaw of a dog on which the training aid is placed;
a second muzzle loop passing through said first ring with a separate side of the muzzle loop positioned on each of the ring end portions of the first ring and freely sliding relative to said first ring, said muzzle loop including means for adjusting the size thereof to have a first loop portion extending from the first ring to encompass the muzzle and at least a portion of the lower jaw of a dog on which the training aid is to be used, and said muzzle loop being adjusted to have a short second loop portion extending to the opposite side of said first ring from the first loop portion of the muzzle loop; and
the second loop portion of the muzzle loop being positioned on the underside of the first ring and below the lower jaw of a dog on which the training aid is to be used, whereby a leash may be attached to the second loop portion to provide a pulling force on the muzzle loop to tighten the muzzle loop and thereby through the first ring to simultaneously exert a force on the collar loop when the training aid is installed on a dog, to provide simultaneous pressure on both the collar loop and muzzle loop in directions toward the first ring in its position underneath and imme-

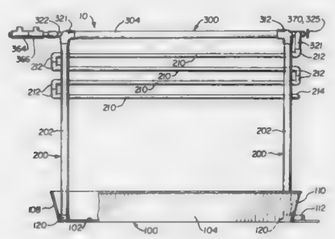
VOL 1090 ISS 1 MY 3 1988 UMI



diately to the rear of the lower jaw of a dog on which the training aid is mounted, the means for adjusting permitting opening of the first muzzl. loop portion.

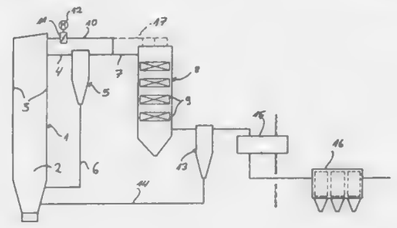
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**4,741,289**
**DOG SHOWER**
**Terry M. Blose, R.D. #2 Mayport, Box 158A,, Timlin, Pa. 16240**
**Filed Jul. 23, 1986, Ser. No. 889,096**
**Int. Cl.[4] A01K** *13/00*
**U.S. Cl. 119—158** **7 Claims**



1. An animal shower apparatus comprising:
(a) a base in the form of a tub having a bottom portion and upwardly depending walls extending around a perimeter thereof, said base having spaced-apart tube receiving means provided on opposite sides of said base;
(b) a pair of removable, independent side spray grid means, each grid means having a tubular vertical support member at each end and having plural spaced-apart longitudinally extending parallel spray tubes supported between the vertical supports, said side spray tubes interconnected to provide a single continuous passageway and each of said side spray tubes having a plurality of spray openings at spaced intervals along its length, said vertical support members adapted to be removably inserted into said tube receiving means whereby said side grid means are supported in substantially vertical planes on opposite sides of said base and said side spray tubes of each grid extend substantially horizontally, and are vertically spaced and said spray openings are oriented to direct a spray of water generally toward an opposite side grid; and
(c) a removable, independent top spray grid means having a generally rectangular tubular frame, water input means, a plurality of interconnected longitudinally extending parallel spray tubes supported by said frame and connected to said water input means, said top spray tubes each having a plurality of spray openings at spaced intervals along its length, said top grid means also having connection means for interconnecting the top spray tubes of the top grid to the side spray tubes of the side grids, said top grid means adapted to be removably supported in a substantially horizontal plane on upper ends of said vertical support members of said side grid means by additional tube receiving means whereby said openings in said top spray tubes are oriented to direct a spray of water generally downwardly toward said base, said side grid means and said top grid means adapted to be easily assembled onto said base for use and easily disassembled for portability, said water input means further comprising separate soap and conditioner input means each in the form of a regulator device.

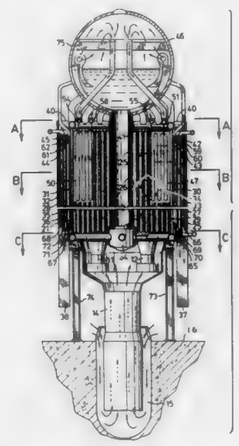
**4,741,290**
**PROCESS FOR THE COMBUSTION OF CARBONACEOUS MATERIALS IN A CIRCULATING FLUIDIZED BED, AND FLUIDIZED BED FURNACE INSTALLATION FOR PERFORMING THE PROCESS**
**Ernst Krieger, Waldbrol, and Karl Ihne, Wiehl, both of Fed. Rep. of Germany, assignors to L. & C. Steinmuller GmbH, Gummersbach, Fed. Rep. of Germany**
**Filed Jul. 28, 1987, Ser. No. 79,111**
**Claims priority, application Fed. Rep. of Germany, Jul. 31, 1986, 3625992**
**Int. Cl.[4] F22B** *1/00*
**U.S. Cl. 122—4 D** **7 Claims**



4. Fluidized bed furnace installation, especially steam generator, with a circulation system at least consisting of a fluidized bed reactor with at least one heating surface, a separator arranged downstream thereof, and a return line from the separator to the fluidized bed reactor, and with a waste heat disposal unit connected downstream of the separator on the waste gas side, characterized in that a device (**10**) is provided for withdrawing a partial stream of solids from the circulation system (**3**, **4**, **5**, **6**) and a device is furthermore provided for admixing the partial stream of solids into the stack gases (**7**) exiting from the separator (**5**).

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**4,741,291**
**WATER TUBE STEAM GENERATOR**
**John W. Varney, 242 Linwell Rd. Suit 106, St. Catherines, Ontario, Canada (L2N 1S2)**
**Filed Mar. 11, 1987, Ser. No. 24,390**
**Int. Cl.[4] F22B** *15/00, 25/00, 37/10*
**U.S. Cl. 122—235 MF** **15 Claims**



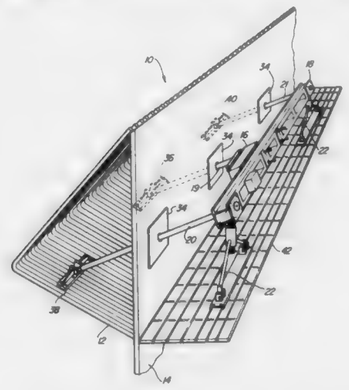
1. A natural circulation package boiler comprising a plurality of identical vertical combustion chambers symmetrically



arranged around and open to a central vertical downcomer, a spherical steam drum mounted on and supported by and connected to said downcomer, a first header assembly at the lower end of said boiler including a central enlargement on which said downcomer is mounted and to which it is connected, a second header assembly at the upper end of said boiler, a plurality of radiation tubes interconnecting said first and second headers all of said radiation tubes being linear and a plurality of risers interconnecting said second header and said steam drum each of said combustion chambers including a vertically upward firing burner.

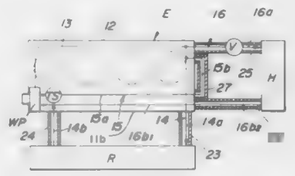
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**4,741,292**
**ELECTRO-IMPULSE RAPPER SYSTEM FOR BOILERS**
**Paul Novak, Lancaster, Ohio, assignor to The Babcock & Wilcox Company, New Orleans, La.**
**Filed Dec. 22, 1986, Ser. No. 945,093**
**Int. Cl.[4] F23J** *3/02;* **F28G** *5/00, 7/00*
**U.S. Cl. 122—379** **27 Claims**



1. A rapper for inducing modal response conditions in portions of heat exchanger components to remove ash encrustations from said components, comprising:
an electro-impulse actuator having first and second mounting points, said actuator generating a mechanical impulse through displacement between said mounting points when an electrical pulse is applied to said actuator,
a first coupling means for mechanically coupling said first actuator mounting point to said heat exchanger components at one or more first driving location wherein at least a portion of said first coupling means is loaded in tension when said electrical pulse is applied to said actuator, and
a second coupling means for mechanically coupling said second actuator mounting point to said heat exchanger components at one or more second driving location wherein at least a portion of said second coupling means is loaded in compression when said electrical pulse is applied to said actuator, said first and second driving locations being displaced and mechanically coupled to each other through said heat exchanger components, whereby said first and second coupling means simultaneously exert opposing forces on said heat exchanger components such that responses are produced at said first driving location which reinforce the responses produced at said second driving location, and wherein said responses at said first and second driving location drive said heat exchanger components into oscillation thus deflecting said components which cause said encrustation to be removed.

**4,741,293**
**ENGINE COOLING STRUCTURE**
**Toshinobu Itoh; Hiroichi Takubo, and Kazuaki Nishimura, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan**
**Filed Oct. 8, 1986, Ser. No. 917,076**
**Claims priority, application Japan, Oct. 9, 1985, 60-153674[U]; Dec. 16, 1985, 60-193696[U]**
**Int. Cl.[4] F02F** *1/14;* **F01P** *5/10*
**U.S. Cl. 123—41.79** **9 Claims**



1. An engine cooling structure comprising:
a water pump located at or near one end portion of an engine body in the direction of the cylinder alignment;
a radiator circulating passage for circulating a cooling water led from the outlet portion of a water pump into a main coolant passage disposed in a cylinder block and a cylinder head through a radiator and leading it to the inlet portion of the water pump;
a by-pass passage for by-passing the cooling water led into the main coolant passage disposed in the cylinder head from the radiator core and leading it to the inlet portion of the water pump;
a heater circulating passage for circulating the cooling water led into the main coolant passage disposed in the cylinder head through an air-conditioning heater and leading it to the inlet portion of the water pump;
a thermostat valve for operatively opening or closing the radiator circulating passage or the by-pass passage in accordance with a variation of temperature of the cooling water; and at least either one of the by-pass passage and the heater circulating passage including a coolant return passage disposed in the cylinder block and extending in the direction of the cylinder alignment in the cylinder block over substantially the length or more than the length of the cylinders in the cylinder block.

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**4,741,294**
**INERTIA SUPERCHARGING INDUCTION SYSTEM FOR MULTI-CYLINDER INTERNAL COMBUSTION ENGINE**
**Makoto Yasuda, Yokohama; Syousabu Ura, Fujisawa; Shuichi Nishimura; Isaya Matsuo, both of Yokohama; Masami Kato, and Munehiro Sagata, both of Nagoya, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama and Aichi Machine Industry Co., Ltd., Nagoya, both of, Japan**
**Filed Dec. 19, 1985, Ser. No. 810,685**
**Claims priority, application Japan, Dec. 21, 1984, 59-270368**
**Int. Cl.[4] F02B** *75/18*
**U.S. Cl. 123—52 MV** **8 Claims**

1. In a non-supercharged mult-cylinder V-type internal combustion engine:
a first group of cylinders, said first group of cylinders having a discontinuous ignition sequence, said first group of cylinders being aligned to define a first bank of cylinders of said V-type engine;
a second group of cylinders, said second group of cylinders having a discontinuous ignition sequence, said second group of cylinders being aligned to define a second bank of cylinders of said V-type engine which second bank is arranged parallel to said first bank of cylinders; and
a naturally aspirated induction system for supplying air to

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said first and second groups of cylinders, said naturally aspirated system comprising:

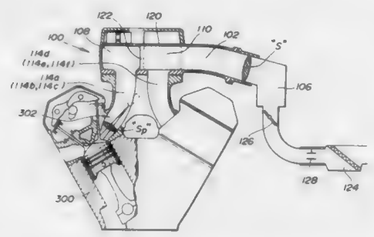
a first elongate collector section, said first collector section being fluidly communicated with the cylinders of said first group of cylinders, said first collector section being arranged essentially parallel with said first group of cylinders and having first and second ends;

a second elongate collector section, said second collector section being fluidly communicated with the cylinders of said second group of cylinders, said second collector being arranged parallel with said second group of cylinders and having first and second ends, the first and second ends of said second collector section being located adjacent the first and second ends of said first collector section, respectively;

said first and second collector sections being defined in the same housing and located above and essentially between the first and second banks of cylinders;

an air cleaner;

a surge tank fluidly communicated with said air cleaner, said surge tank being arranged parallel with said first and second collector sections and between said air cleaner and



said first and second collector sections, said surge tank having first and second ends;

a first induction conduit leading from a first end of said surge tank to a first end of said first collector section;

a second induction conduit leading from a second end of said surge tank to a second end of said second collector section, said second induction conduit passing the second end of said first collector section;

an essentially U-shaped connection passage fluidly interconnecting said first and second collector sections at locations essentially mid-way between the first and second ends thereof, said connection passage being disposed above said first and second collector sections and arranged so that the curved portion thereof is located proximate the first ends of said first and second collector sections;

a valve disposed in said connection passage; and

a motor for operating said valve, said motor being arranged below the lower surface of said connection passage and proximate the first end of said second collector section, said motor being arranged to be selectively operable in response to the value of an engine operational parameter exceeding a predetermined level to move said valve from a closed position to an open one.

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**4,741,295**

**INTAKE MANIFOLD SYSTEM FOR V-TYPE MULTIPLE CYLINDER INTERNAL COMBUSTION ENGINE**

**Hideaki Hosoya; Shigeru Suzuki; Akihisa Senga; Shoichi Ohtaka; Yukio Kondo; Kaoru Aoki; Tadashi Hashimoto, and Yasuo Kitami, all of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Japan**

**Filed Sep. 5, 1986, Ser. No. 904,338**

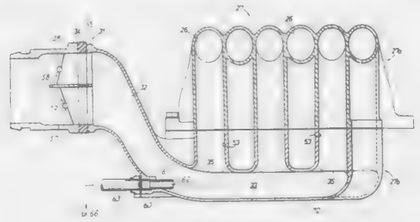
**Claims priority, application Japan, Sep. 9, 1985, 60-199072; Oct. 17, 1985, 60-159105[U]**

**Int. Cl.⁴ F02B** *75/18*

**U.S. Cl. 123—52 MV** **7 Claims**

1. An intake manifold system, comprising an upstream intake passage communicating with a main throttle valve located upstream thereof, an intake chamber communicating with the downstream end of the upstream intake passage, an intake manifold communicating with the downstream end of the intake chamber, and a plurality of downstream intake passages which are connected between the downstream ends of the intake manifold and intake ports of the engine in communication therewith, in a gap defined between two cylinder banks of a V-type multiple cylinder engine, wherein:

the intake chamber extends along the direction of the crank shaft of the engine as a hollow chamber which is integrally



formed with the intake manifold, and the upstream intake passage, which is connected between the throttle body and the intake chamber, inclines upward from its intake chamber end to its throttle body end;

an EGR gas supply port opens at a downstream end of the upstream intake passage and is directed to a central part of the cross section of the intake chamber, said EGR gas port includes a tubular member which extends a certain distance into the downstream end of the upstream intake passage and aligns with a central axial line of the intake chamber.

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**4,741,296**

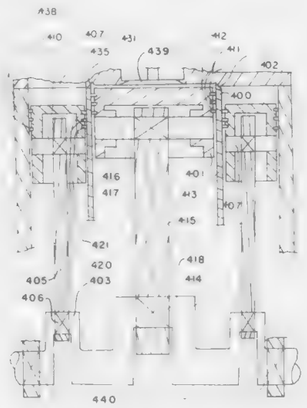
**MULTIPLE PISTON EXPANSION CHAMBER ENGINE**

**Francis W. Jackson, 409 Penwyn Rd., Wynnewood, Pa. 19096**

**Continuation-in-part of Ser. No. 727,338, Apr. 25, 1985, abandoned, which is a continuation-in-part of Ser. No. 688,954, Dec. 31, 1984, Pat. No. 4,507,580, which is a division of Ser. No. 647,842, Sep. 6, 1984, Pat. No. 4,580,532. This application Oct. 30, 1986, Ser. No. 924,887**

**Int. Cl.⁴ F02B** *75/18*

**U.S. Cl. 123—52 B** **2 Claims**



1. The method of operation for the extraction of work from combusted products in two chambers hereafter referred to as working and auxiliary having a means of controlling isolation between the two said chambers , said method comprising of

isolating said working chamber from said auxiliary chamber when said working chamber piston is at substantially TDC,

admitting a charge of pressurized carbureted air into said working chamber as said working chamber piston moves toward BDC,

closing a valve admiting said charge after said working chamber piston is past BDC but before it is midway to TDC,

compressing said charge in said working chamber,

said compression ratio at said working piston TDC shall not exceed eighteen,

initiating combustion of said charge prior to said working chamber piston passing TDC,

expanding said combusted products in said working chamber until a point in the cycle after combustion is completed and before said working chamber piston is within 60 degrees of BDC,

said combusted products are permitted to communicate freely to said auxiliary chamber, said auxiliary chamber piston being at about TDC as said communication is commenced,

expansion of said combusted products in said working chamber piston chamber prior to establishing communication between the working and auxiliary chambers shall not exceed four,

said auxiliary chamber piston then expands said combusted products communicated from said working chamber to said auxiliary chamber,

before the combined expansion of both said chambers reaches maximum expansion an exhaust valve between said chamber containing said combusted products and an exhaust manifold opens and said combusted products, except for residual gases, are exhausted.



and for disconnecting said first and second rocker arms from each other in low-speed operation of the engine.

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**4,741,297**

**VALVE OPERATING MECHANISM FOR INTERNAL COMBUSTION ENGINE**

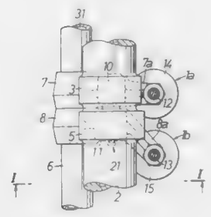
**Kenichi Nagahiro; Yoshio Ajiki; Masaaki Katoh, all of Saitama, and Kazuo Inoue, Tokyo, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Jul. 31, 1986, Ser. No. 892,181**

**Claims priority, application Japan, Jul. 31, 1985, 60-168713; Jul. 31, 1985, 60-168712**

**Int. Cl.⁴ F01L** *1/34, 1/26*

**U.S. Cl. 123—90.16** **12 Claims**



1. A valve operating mechanism for operating at least one valve of an internal combustion engine, comprising:

a camshaft rotatable in synchronism with rotation of the internal combustion engine and having a pair of low- and high speed cams of different cam profiles;

a rocker shaft;

a pair of first and second rocker arms mounted for pivotal movement on said rocker shaft, each of said rocker arms being held in sliding contact with one of said cams and being operable selectively by said low- and high-speed cams for operating the valve according to the cam profiles of said cams; and

means operatively disposed in and between said first and second rocker arms for interconnecting said first and second rocker arms in high-speed operation of the engine

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**4,741,298**

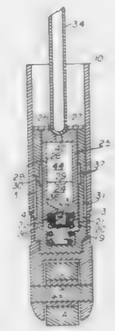
**ROLLERIZED TIMING LIFTER**

**Gary E. Rhoads, 8565 Boulder Dr., La Mesa, Calif. 92041**

**Filed Aug. 4, 1986, Ser. No. 892,107**

**Int. Cl.⁴ F01L** *1/14*

**U.S. Cl. 123—90.5** **13 Claims**



1. A rollerized timing lifter assembly comprising:

a first tubular roller body sleeve having a top end and a bottom end;

a roller;

means for mounting said roller on the bottom end of said first tubular roller body sleeve;

said first tubular roller body sleeve having an oil collecting channel and an oil feed port hole extending through said first tubular roller body sleeve;

a second tubular body with a top end and a closed bottom end that is placed within said first tubular roller body sleeve and engages telescopically a shoulder at near bottom of the first tubular roller body sleeve;

said second tubular body having a external collecting channel positioned around said second tubular body and a second port hole to admit oil through said second tubular body;

a hollow cylindrical plunger axially slideable in said second tubular body and enclosing a pressure chamber in the lower end of said second tubular body;

a port in said plunger communicating with said first and second mentioned ports to admit oil into the plunger;

and a valve in said plunger opening into said pressure chamber and means for receiveably capturing the bottom end of a push rod in a top end of said plunger.

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**4,741,299**

**INTERNAL COMBUSTION ENGINE**

**Masaaki Matsuura, Tokyo; Masaharu Nakamori, Asaka; Shoichi Honda, Tokyo; Yoichi Ishida, Niiza, and Tetsuya Nakanishi, Ohmiya, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Japan**

**Filed Jan. 21, 1986, Ser. No. 821,166**

**Claims priority, application Japan, Jan. 26, 1985, 60-13192; Jan. 26, 1985, 60-13193; Jan. 26, 1985, 60-9294[U]**

**Int. Cl.⁴ F01L** *1/04*

**U.S. Cl. 123—90.31** **3 Claims**

1. An internal combustion engine comprising:

(a) an engine body having a chamber;

(b) a crankshaft rotatably mounted on said engine body;

(c) a camshaft rotatably mounted on said engine body;

(d) an oil lubricated endless transmission member extended around and operatively engaged with said crankshaft and

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said camshaft, said endless transmission member being movable along a closed path of travel in said chamber;

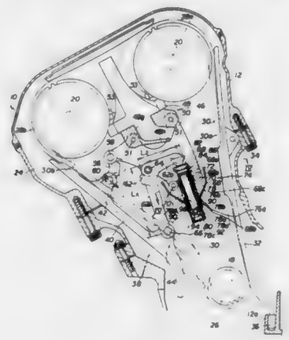
(e) a tensioner hanger comprising an upper hanger member detachably secured to said engine body and a lower hanger member secured at an upper portion thereof to said upper hanger member, said upper hanger member having oil passage means adapted to receive lubrication oil from the endless transmission member at an inlet and guide said oil downwardly therethrough to an outlet;

(f) a hollow mounting member affixed at an upper portion thereof to a lower portion of the lower hanger member of said tensioner hanger, said mounting member having upper and lower ends with a peripheral wall extending between said ends, said upper end opening under the outlet of said oil passage means for receiving oil therefrom, and said lower end being tapered into a tubular shape;

(g) a hydraulic lock mechanism comprising a hollow cylinder and a plunger slidably received in said cylinder to define a hydraulic chamber in said cylinder, said cylinder being received in said hollow mounting member and sealably engaging said lower tubular portion of said hollow mounting member;

(h) a replenishable oil reservoir defined by a funnel-shaped space between said mounting member and said cylinder for receiving oil from said oil passage means and for holding the oil received therein, said oil reservoir being in selective fluid communication with said hydraulic chamber via conduit means, check valve means being connected to said conduit means for selectively permitting the plunger to move in only one direction; and

(i) a tensioner member movably attached to said engine body and operatively engaged with said plunger, thereby maintaining said plunger in sliding contact with said endless transmission member, said plunger thrusting against said endless transmission member as the plunger moves in said one direction.



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**4,741,300**

**ROTATING CYLINDER INTERNAL COMBUSTION ENGINE**

**Donald W. Benson, 1907 SE. 19th St., Pompano Beach, Fla. 33062**

**Filed Jun. 4, 1987, Ser. No. 58,163**
**Int. Cl.⁴ F02B** *57/00*
**U.S. Cl. 123—43 R** **11 Claims**

1. A valve-free, eight cylinder engine comprising a fixed inner assembly, a fixed outer assembly and a rotatable intermediate assembly movable in a circular path between said fixed inner assembly and said fixed outer assembly,

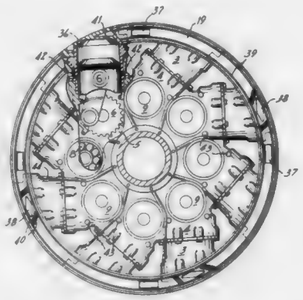
said fixed inner assembly comprising a fixed shaft and a pair of sun gears fixed to said shaft in axially spaced relation therealong,

said fixed outer assembly comprising two opposite, fore and aft, outer assembly elements enclosing said fixed inner assembly and said movable intermediate assembly, each said outer assembly element being provided with an intake port and an exhaust port in its peripheral portion, said intake port of one outer assembly element being diametrically opposite said intake port of said other outer assembly element and said exhaust port of said one outer assembly element being diametrically opposite said exhaust port of said other outer assembly element, said intake port of each outer assembly element being circumferentially spaced from said exhaust port thereof,

said rotatable intermediate assembly having pairs of planetary gears engaging said pair of sun gears to rotate around said sun gears, a crankshaft interconnecting each pair of planetary gears for rotation therewith, a piston operatively connected to each of said crankshafts for in and out movement responsive to rotation of its associated crankshaft, a piston cylinder within which each piston is mounted for movement therewithin as said planetary gears rotate about said sun gear and said intermediate assembly moves in a circular path about said fixed inner assembly, each said piston cylinder having a cylinder head comprising an intake opening positioned alternately for sweeping alignment with said intake port of one and misalignment with said intake port of the other outer assembly element and an exhaust opening positioned for sweeping alignment with said exhaust port of one and misalignment with said exhaust port of the other outer assembly element as said intermediate assembly rotates, said intake opening and said exhaust opening of alternate of said piston cylinder heads being alternately positioned for alignment with said intake ports and said exhaust ports of opposite of said outer assembly elements,

diametrically opposite of said crankshafts being oriented so that said pistons operatively connected thereto are spaced equal radial distances from said fixed inner assembly at all times during a rotational cycle of said intermediate assembly,

the orientation of said crankshafts differing by an equal amount between adjacent of said crankshafts and said piston cylinders being equally spaced circumferentially of said intermediate assembly.



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**4,741,301**

**ENGINE VALVE TRAIN WITH INNER AND OUTER CAM FOLLOWERS**

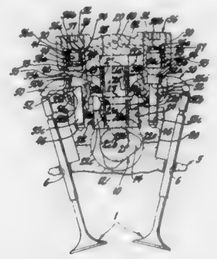
**Charles E. Patterson, Mount Clemens, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Nov. 28, 1986, Ser. No. 935,759**
**Int. Cl.⁴ F01L** *1/26*
**U.S. Cl. 123—90.22** **5 Claims**

1. A valve train for an internal combustion engine of the type having an engine block means including a cylinder and with a cylinder head defining two inlet ports and two exhaust ports for the cylinder, a valve reciprocably located in each of said inlet ports and said exhaust ports with the two said valves



associated with said inlet ports alternating with the two said valves associated with said exhaust ports, with all said valves being arranged in a splayed configuration, said engine block means further including an upper support member fixed to said cylinder head, an engine driven camshaft operatively mounted in said engine block means and having a pair of axially spaced apart exhaust cams thereof and an inlet cam thereon located between said exhaust cams, a plurality of rocker arms each operatively associated at one end thereof with an associate one of said valves, a stepped bore in said cylinder head and upper support means formed at right angles to said cams on said camshaft and above said cams, plural means each defining a rocking support intermediate the ends of an associate one of said valves, and a tubular inner inlet lifter and a tubular outer lifter reciprocably journaled in said stepped bore with said inner lifter engaging said inlet cam and being operative to engage the opposite end of each one of said rocker arm associated with said inlet valves, said outer lifter engaging said exhaust cams and being operative to engage the opposite end of each one of said rocker arms associated with said exhaust valves, the axis of reciprocation of said inner and outer lifters being located on the intersection of two imaginary planes extending through the axis of reciprocation of opposed sets of said valves.



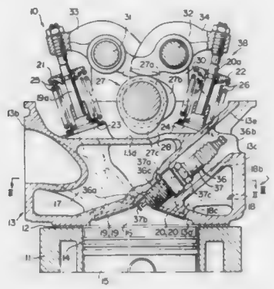
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**4,741,302**

**INTERNAL COMBUSTION ENGINE**

**Hiroyuki Oda; Akira Kageyama, and Yasuyuki Morita, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Japan**

**Filed Dec. 5, 1985, Ser. No. 804,839**
**Claims priority, application Japan, Dec. 10, 1984, 59-261334; Dec. 10, 1984, 59-261337; Dec. 14, 1984, 59-265084; Jan. 8, 1985, 60-1823**
**Int. Cl.⁴ F01L** *1/26*
**U.S. Cl. 123—90.23** **9 Claims**



1. An internal combustion engine comprising a cylinder block having a plurality of cylinders in which a plurality of pistons are respectively slidably received, and a cylinder head fixedly mounted on the cylinder block to form a plurality of combustion chambers respectively with at least said plurality of pistons, each combustion chamber being provided with a pair of intake ports each of which is opened and closed by an intake valve, a pair of exhaust ports each of which is opened and closed by an exhaust valve and a means for forming flame in the combustion chamber receiving hole into which means for forming flame in the combustion chamber is inserted, a single overhead camshaft for driving the intake and exhaust valves in which said exhaust valves for opening and closing the pair of exhaust ports for each combustion chamber are respectively driven by rocker arms which are supported on a first rocker arm shaft and in which said intake valves for opening and closing the pair of intake ports for each combustion chamber are respectively driven by rocker arms which are supported on a second rocker arm shaft, where each said means for forming flame in the combustion chamber receiving hole is obliquely formed in the cylinder head between a pair of exhaust ports associated with a combustion chamber so that the inner end of each means for forming flame in the combustion chamber receiving hole opens to the combustion chamber substantially in the middle thereof and the outer end of the same opens toward the outside of the cylinder head at a portion between, as viewed in the crankshaft direction of the engine, the outer end of the pair of exhaust ports and the portion of the cylinder head at which the valve spring seats for the exhaust valves are formed, where said pair of exhaust ports are provided with bight portions at which they are bent to diverge away from each other at a portion near the inner ends thereof, where said means for forming flame in the combustion chamber receiving hole passes between the bight portions of the exhaust ports, and where head bolts for securing the cylinder head to the cylinder block are disposed between the exhaust ports of adjacent combustion chambers, the exhaust ports for each combustion chamber being further bent toward each other downstream of the means for forming flame in the combustion chamber receiving hole and opening to the side of the cylinder block between an adjacent pair of head bolts.

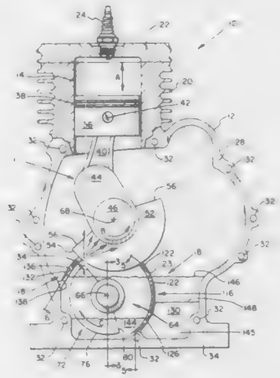
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**4,741,303**

**COMBINATION COUNTERBALANCE AND OIL SLINGER FOR HORIZONTAL SHAFT ENGINES**

**Peter G. Kronich, Sheboygan, Wis., assignor to Tecumseh Products Company, Tecumseh, Mich.**

**Filed Oct. 14, 1986, Ser. No. 918,503**
**Int. Cl.⁴ F02B** *75/06;* **F01M** *9/06*
**U.S. Cl. 123—192 B** **22 Claims**



1. In an internal combustion engine including a crankcase having moving parts therein including a piston, a connecting rod pivotally connected to said piston, a substantially horizontally disposed rotatable crankshaft pivotally connected to said connecting rod, and a crankshaft counterweight connected to said crankshaft, and a lubricating fluid sump below said mov-

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ing parts, a counterbalancing and lubricating mechanism comprising:

lubricating fluid in said sump;

an eccentric member rotatably mounted substantially parallel to said crankshaft in said sump and substantially vertically in line below said piston and said crankshaft, said eccentric member being disposed in said sump;

drive means coupling together said crankshaft and said eccentric member for rotatably driving said eccentric member in counterrotation to said crankshaft to balance forces created by said moving parts, said eccentric member including slinger means thereon for throwing lubricating fluid from the sump towards said moving parts;

wherein said lubricating fluid is at a level vertically below the highest rotational point of said slinger means during operation of said engine; and,

deflector means extending at least partially above the level of the lubricating fluid and being at least partially positioned above said eccentric member for directing thrown lubricating fluid towards said moving parts.

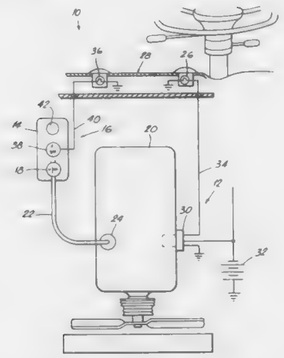
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**4,741,304**

## ELECTRONIC ENGINE OIL DISPENSER

**Charles E. Martin, 2511 Holloway, Midland, Tex. 79701, and George Spector, 233 Broadway RM 3615, New York, N.Y. 10007**

**Filed Mar. 17, 1986, Ser. No. 840,093**
**Int. Cl.[4] F02M *1/00***
**U.S. Cl. 123—196 S** **4 Claims**



**1**. An automatic engine oil dispenser and indicator which comprises

(a) means for sensing low engine oil pressure;

(b) a reservoir storing a quantity of oil when said engine oil pressure is at a specified level;

(c) means for indicating a low amount of said oil in said reservoir; and

(d) an automatic check valve communicating with said reservoir, said check valve being responsive to engine oil pressure to open and allow unrestricted flow of said oil from said reservoir to said engine when said engine oil pressure falls below a specified level until said oil pressure in said engine rises back to said specified level thereby closing said valve.

**4,741,305**

## OIL FILTER BY-PASS CROWN PART

**Shi W. Moon, Woosung Apartment 2-310, Sadang-dong, Dongjak-ku, Seoul, Rep. of Korea**

**Filed Mar. 6, 1986, Ser. No. 836,956**
**Claims priority, application Rep. of Korea, Mar. 27, 1985, 85-3179[U]**
**Int. Cl.[4] F02M *1/00***
**U.S. Cl. 123—196 A** **1 Claim**



**1**. A filter comprising:

an outer case having a top and a bottom;

a filter element disposed in said outer case to form a space at said top and said bottom, said filter element having a central passage;

a flow tube in said central passage, said flow tube being connected to said top of said outer case to close the space at the top of said case from said passage;

means for introducing a fluid to be filtered into said top space, said fluid passing axially through said filter element into said bottom space and then into said flow passage; and

a bypass valve in said top space and connected to said flow passage, said bypass valve being in a substantially radial direction of said flow passage.

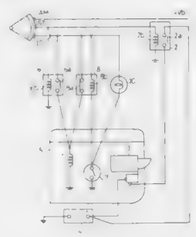
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**4,741,306**

## FUEL CUTOFF APPARATUS FOR ENGINE-DRIVEN VEHICLE

**Toru Watanabe, and Katuya Miyata, both of Kariya, Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Kariya, Japan**

**Filed May 5, 1986, Ser. No. 859,658**
**Claims priority, application Japan, May 10, 1985, 60-100328**
**Int. Cl.[4] F02B *77/08***
**U.S. Cl. 123—198 DB** **8 Claims**



**1**. A fuel cutoff apparatus for use in an engine-driven vehicle, comprising

an ignition switch having an off-position and an on-positon;

a fuel supply means for supplying fuel to the engine of the vehicle and comprising a fuel supply solenoid which, when energized, supplies fuel to said engine and, when deenergized, stops said supply of fuel, said solenoid being normally energized when said ignition switch is in its said on-position;

a normally-closed hydraulically actuated switch means that is actuated to an open position in response to the normal operating pressure of the engine oil in said vehicle engine, and to its closed position in response to a decrease in said engine oil pressure to a predetermined pressure which is below said normal operating prepssure;

a fuel cutoff control means comprising an electric circuit including said fuel supply solenoid, said hydrualically actuated switch means, and a fuel cutoff relay having a driver coil for operating said fuel cutoff relay, whereby, when the pressure of the engine oil decreases to said predetermined pressure while said ignition switch is in its said on-position, said hydraulically actuated switch means moves to its said closed position and said driver coil operates said fuel cutoff relay and deenergizes said fuel supply solenoid so that the supply of fuel to the engine is cut off; and

a warning means actuated independently of said driver coil by said hydraulically actuated switch means moving to its said closed position, said warning means and said hydraulically actuated switch means being in series electrical connection between substantially said ignition switch on-position and ground.



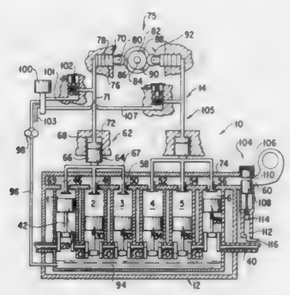
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**4,741,307**

## APPARATUS AND METHOD FOR COMPRESSION RELEASE RETARDING OF AN ENGINE

**Vincent A. Meneely, Langley, Canada, assignor to Pacific Diesel Brave Co., Surrey, Canada**

**Filed Feb. 17, 1987, Ser. No. 15,683**
**Int. Cl.[4] F22B *21/00***
**U.S. Cl. 123—321** **42 Claims**



**1**. A method for compression release retarding of a four cycle, multi-cylinder internal combustion engine with first and second cylinders having exhaust outlets communicating with a common manifold and wherein the piston of the second cylinder is on its intake stroke while the piston of the first cylinder is near top dead centre of a compression stroke, the method comprising the steps of:

reducing the fuel intake of the engine;

opening an exhaust valve of the first cylinder each time the first cylinder is near top dead centre of the compression stroke; and

opening an exhaust valve of the second cylinder during the intake stroke of the second cylinder while the exhaust valve of the first cylinder is open said each time.

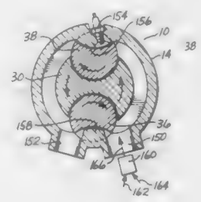
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**4,741,308**

## ROTARY INTERNAL COMBUSTION ENGINE AND METHOD OF OPERATION

**Michael S. Ballinger, 6115 156th Northeast, Redmond, Wash. 98052**

**Filed Aug. 15, 1986, Ser. No. 896,933**
**Int. Cl.[4] F02B *53/00***
**U.S. Cl. 123—231** **8 Claims**



**1**. A rotary internal combustion engine, comprising:

a stator including a peripheral wall and a pair of end walls defining a chamber;

a rotor within said chamber mounted for rotation about a center axis, said rotor including a periphery and a plurality of angularly spaced apart, radially outwardly opening recesses in said periphery, each of which is elongated axially of the rotor and has a base wall of concave circular curvature;

a plurality of axially extending rotary pistons, one for each recess, each said rotary piston having a basically circular cross section conforming to the base wall curvature of the recesses in the rotor, and each said rotary piston being engaged by a recess in the rotor;

each rotary piston including a radially outwardly opening side pocket which is elongated axially of the piston and has a base wall of concave circular curvature;

said peripheral wall of said stator including a plurality of radially inwardly projecting lobes, each of which is elongated axially of the rotor and presents a convex surface of circular curvature which substantially conforms to the curvature of the base walls of the pockets in the rotary pistons;

said peripheral wall of said stator between the lobes being spaced radially outwardly from the periphery of the rotor, said wall between the lobes having an inner surface of circular curvature;

said rotary pistons projecting radially outwardly beyond the periphery of the rotor to positions contiguous the inner surface of the peripheral wall of the stator;

means connecting the rotary pistons and the rotor together such that the rotary pistons will rotate about their individual axes in one direction, and the rotor will rotate about its axis in the opposite direction, and as it rotates it will carry the rotary pistons with it;

an inlet in the stator leading into a space between a pair of said lobes, and positioned closely adjacent the first lobe of said pair of lobes;

means for deliverying a lean fuel/air explosive charge to said inlet;

an ignition device providing an igntion zone in an ignition chamber formed in the second lobe of said pair of lobes, said ignition chamber being a recess in said second lobe which is offset from the center of the lobe towards the inlet, and said convex surface of the second lobe and said concave surface of the rotary piston cavity nearly contacting each other in the region surrounding the ignition chamber when the lobe and cavity are meshing;

an exhaust outlet in the stator spaced angularly from the second lobe in the direction of rotor rotation;

wherein the drive connection between the rotary pistons and the rotor is coordinated such that as the rotor rotates the pocket regions of the rotary pistons move sequentially

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first into and then out from engagement with each stator lobe as the rotary piston is carried past such stator lobe;
wherein the rotary pistons, as they move through the regions between the stator lobes during rotor rotation, present closed peripheral surfaces which are contiguous the inner surface of the peripheral wall of the stator between the lobes;
wherein movement of a rotary piston past the inlet causes a suction at the inlet, for drawing the explosive charge into the space between said first and second lobes;
and wherein the explosive charge is compressed between the second stator lobe and the base wall of the pocket in said rotary piston and is compressed into said ignition chamber when said pocket region of the rotary piston engages the second stator lobe; and
ignition control means for energizing the ignition means when the second stator lobe and the rotary piston pocket are engaged, to igntie the explosive mixture in the ignition chamber, for creating an explosive force acting between the stator and the rotary piston to cause an increment of rotation of the rotor.

8. A method of generating rotary power, comprising:
providing a stator of a type having a peripheral wall and a pair of endwalls defining a chamber;
providing a rotor within said chamber and mounting said rotor for rotation about a center axis, and providing said rotor with a periphery and a plurality of angularly spaced apart, radially outwardly opening recesses, each of which is elongated axially of the rotor and has a base wall of concave circular curvature;
providing a plurality of axially extending rotary pistons, one for each recess, and providing each rotary piston with a basically circular cross section conforming to the base wall curvature of the recesses in the rotor, and positioning each said rotary piston in a separate recess in the rotor;
providing each rotary piston with a radially outwardly opening side pocket which is elongated axially of the piston and has a base wall of concave circular curvature;
providing the peripheral wall of the stator with a plurality of radially inwardly projecting lobes, each of which is elongated axially of the rotor and presents a convex surface of circular curvature which substantially conforms to the curvature of the base walls of the pockets of the rotary pistons, so that the convex lobe surface and the concave surface of the recess are in near contact when the lobe and recess are meshing;
between said lobes spacing the peripheral wall of the stator radially outwardly from the periphery of the rotor;
between the lobes providing the peripheral wall with an inner surface of circular curvature;
wherein said rotary pistons project radially outward beyond the periphery of the rotor to positions continguous the inner surface of the peripheral wall of the stator;
connecting the rotary pistons and the rotor together such that the rotary pistons will rotate about their individual axis in one direction, and the rotor will rotate about its axis in the opposite direction, and as it rotates it will carry the rotary pistons with it;
providing an inlet in the stator leading into a space between a pair of said lobes, and positioning the inlet closely adjacent the first lobe of said pair of lobes;
delivering a lean fuel/air explosive charge to said inlet;
providing an ignition zone in a portion of the second lobe of said pair of lobes;
providing an exhaust outlet in the stator spaced angularly from the second lobe in the direction of rotor rotation;
using the drive connection between the rotary pistons and the rotor to, as the rotor rotates, coordinate the movement of the rotary pistons, so that the pocket regions of the rotary pistons move sequentially first into and then out from meshing engagement with each stator lobe as the rotary piston is carried past said stator lobe;
dimensioning the rotary pistons so that as they move through the regions between the stator lobes during rotor rotation, they will present closed peripheral surfaces which are contiguous the inner surface of the peripheral wall of the stator, between the lobes;
using movement of a rotary piston past the inlet to cause a suction at the inlet, for drawing the explosive charge into a space between said first and second lobes;
providing the lobe which includes the ignition means with a small volume ignition chamber;
compressing the explosive charge between the second stator lobe and the base wall of the pocket between said rotary piston, and compressing it into said ignition chamber, when said pocket region of the rotary piston engages the second stator lobe resulting in a high compression of the lean mixture in said chamber; and
energizing the ignition means when the second stator load and the rotary piston pockets are engaged, to ignite the explosive mixture for creating explosive force acting between the stator and the rotary piston to cause an increment of rotation of the rotor, whereby ignition of the highly compressed lean mixture will cause an explosion which applies a sudden increment of rotational force on the rotor assembly.

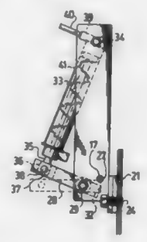
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**4,741,309**

## THROTTLE LOCKING DEVICE FOR A DIESEL ENGINE

**Corrie Bergen, 139 Whiteside Road, N.E., Calgary, Alberta, Canada T1Y 1Y6**

Filed Oct. 22, 1986, Ser. No. 921,429
Int. Cl.[4] F02M *39/00*
U.S. Cl. 123—366 4 Claims



1. A vehicle including a diesel drive engine, an engine compartment within which the engine is mounted, a driver compartment separate from the engine compartment, a fuel flow throttle control device mounted within the engine compartment for varying the amount of fuel fed to the engine so as to vary the rate of revolution thereof, a foot actuable lever mounted within the driver compartment movable to varying positions between a maximum and minimum position of said throttle control device, a linkage system connected to the throttle control device and movable in response to actuation of said lever, said linkage system including an elongate rod, a clamp member mounted within the engine compartment said clamp member including a support member having an opening therethrough through which the rod passes and which constrains the rod to move in a direction longitudinal of the rod and a clamp body mounted on said suport member and movable relative to said support member from a first position free from said rod in which said rod can freely move in said opening in response to actuation of said lever to a second position in which the clamp body engages said rod and presses said rod against a side of said opening so as to clamp said rod between said clamp body and said side to hold the throttle control device at a position between the maximum and minimum positions of the throttle control device, and an air operated cylinder mounted on said support member for moving said clamp body between the first and second positions thereof and a switch mounted within said driver compartment for selectively supplying operating air to said air operated cylinder.

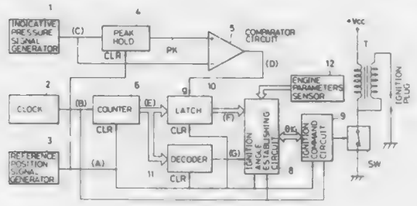


**4,741,310**

## IGNITION TIMING CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINE

**Shizuo Yagi, Asaka; Yoshiaki Hirosawa, Shiki; Makoto Kawai, Tokorozawa; Yorihisa Yamamoto, Shiki; Haruhiko Yoshikawa, Niiza, and Kenichi Nakamura, Fujimi, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

Filed May 30, 1986, Ser. No. 868,587
Claims priority, application Japan, May 30, 1985, 60-117231; Feb. 25, 1986, 61-40109; Feb. 25, 1986, 61-40108
Int. Cl.[4] F02P *5/15, 5/14;* F02B *5/04*
U.S. Cl. 123—425 7 Claims



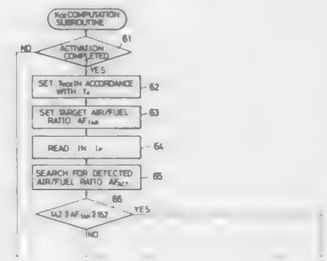

1. An ignition timing control system for an internal combustion engine, comprising:
reference pulse generating means for generating a reference position pulse each time the rotational angle position of said internal combustion engine reaches a predetermined reference crank angle position;
pressure signal generating means for generating a pressure signal which is representative of the pressure in the combustion chamber of said engine;
maximum peak pressure position detecting means for detecting a maximum peak pressure position of said indicative pressure signal during an interval between the consecutive two of said reference position pulses so as to produce a maximum peak pressure position data signal representing the crank angle of said engine at which minimum peak pressure occurs; and
ignition angle establishing means for producing an error signal representative of a difference between said maximum peak pressure position provided by said maximum peak pressure position data signal and a desired peak pressure position, and for estabishing an ignition angle at which said engine is to be ignited within the next engine cycle, in accordance with said error signal so as to reduce the magnitude of said error signal;
said maximum peak pressure position detecting means including,
clock pulse generating means for geneating clock pulses,
peak detecting means for producing a peak appearance pulse each time a peak appears in said pressure signal having a pressure level higher than the level of said pressure signal at the occurrence of other said peak appearance pulses since the last said reference position pulse,
count means for continuously counting the number of clock pulses appearing since the last said reference position pulse to develop n count value,
latch means for latching said count value developed by said count means each time said peak appearance pulse is produced by said peak determining means,
read-in command signal geneating means for generating a read-in command signal when said count value reaches a reference count value, and
determining means for establishing the latched count value from said latch means as said maximum peak pressure position data in response to said read-in command signal.

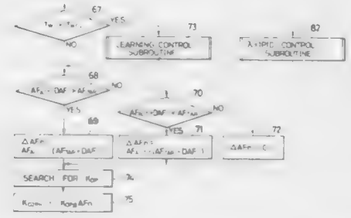
**4,741,311**

## METHOD OF AIR/FUEL RATIO CONTROL FOR INTERNAL COMBUSTION ENGINE

**Toyohei Nakajima; Yasushi Okada; Toshiyuki Mieno, and Nobuyuki Oono, all of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

Filed Apr. 24, 1987, Ser. No. 42,371
Claims priority, application Japan, Apr. 24, 1986, 61-096033; Apr. 30, 1986, 61-100383
Int. Cl.[4] F02M *51/00*
U.S. Cl. 123—489 8 Claims



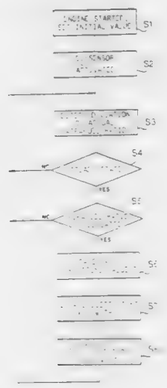




1. A method of control of an air/fuel ratio of a mixture supplied to an internal combustion engine equipped with an oxygen concentration sensor disposed in an exhaust system for producing an output varying in proportion to an oxygen concentration in an exhaust gas of the engine, the method comprises setting a basic value ($T_i$) for control of the air/fuel ratio, in accordance with a plurality of engine operating parameters relating to engine load and periodically executing at predetermined intervals a sequence of operations comprises:
detecting said air/fuel ratio of said mixture based upon the oxygen concentration sensor output;
computing a current first compensation value ($K_{REF}$) for compensating an error of said basic value, utilized in the computation is a preceding first compensation value computed during a previous execution of said sequence of operations in which an operating region of said engine was substantially identical to an operating region during computation of said current first compensation value, where said operating region is determined in accordance with said plurality of engine operating parameters;
computing a deviation from a target air/fuel ratio of an air/fuel ratio detected by utilizing said output of said oxygen concentration sensor, and compensating said deviation by said current first compensation value and said preceding first compensation value to obtain a second compensation value ($K_{O2}$);
computing an output value ($T_{OUT}$), determined with respect to said target air/fuel ratio, by a process with comprises compensating said basic value by said current first compensation value and said second compensation value; and;
controlling said air/fuel ratio of said mixture supplied to said engine in accordance with said output value.

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**4,741,312**
**AIR-FUEL RATION CONTROL SYSTEM FOR AN AUTOMOTIVE ENGINE**
**Hiroshi Ohishi, Hoya, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan**
**Filed Aug. 5, 1987, Ser. No. 83,021**
**Claims priority, application Japan, Aug. 13, 1986, 61-191017**
**Int. Cl.⁴ F02M *51/00***
**U.S. Cl. 123—489** **4 Claims**

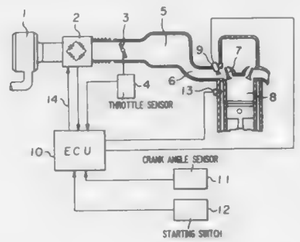


1. An air-fuel ratio control system for an automotive engine, comprising:
an $O_2$-sensor for detecting oxygen concentration of exhaust gas and for producing a feedback signal;
first means responsive to the feedback signal for producing an air-fuel ratio signal;
second means for producing a deviation signal representing the air-fuel ratio dependent on the air-fuel ratio signal from a desired air-fuel ratio;
a first lookup table storing a plurality of basic fuel injection pulse widths from which one of pulse widths is derived in accordance with engine operating conditions;
a second lookup table storing a plurality of maximum correcting quantities for correcting a derived basic fuel injection pulse width in order to correct deviation of air-fuel ratio due to change of a characteristic of a device used in the engine;
third means for producing a learning correcting quantity for correcting a learning coefficient for said maximum correcting quantities and for producing a corrected learning coefficient in dependence on the learning coefficient and learning correcting quantity;
fourth means for producing a necessary correcting quantity by multiplying said corrected learning coefficient and a derived maximum correcting quantity;
fifth means for producing a desired fuel injection pulse width in accordance with the necessary correcting quantity and the derived basic fuel injection pulse width;
said learning correcting quantity being so determined as to produce said corrected learning coefficient which has such a value as to reduce the deviation to an allowable value at a time.

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**4,741,313**
**FUEL CONTROL APPARATUS**
**Setsuhiro Shimomura, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**
**Filed Apr. 16, 1987, Ser. No. 38,902**
**Claims priority, application Japan, Apr. 22, 1986, 61-95138**
**Int. Cl.⁴ F02D *41/18***
**U.S. Cl. 123—494** **4 Claims**

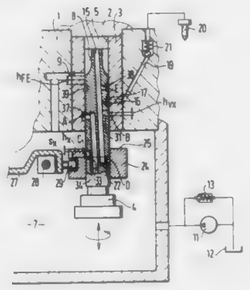
1. A fuel control apparatus which comprises:
a first means for supplying a fuel to an internal combustion engine depending on the operation of a fuel control valve,
a hot-wire type intake air quantity sensor disposed in an air intake passage for the internal combustion engine to detect the quantity of air passing therethrough, and
a second means for calculating the quantity of the fuel required to operate the combustion engine based on an output of said hot-wire type intake air quantity sensor and controlling the first means based on a calculated value so that an optimum quantity of the fuel is supplied to said




combustion engine by controlling said fuel control valve, said second means comprising a memory which gives a setting condition when said combustion engine is operated under a given condition for a given time after a predetermined time has passed from the starting of the combustion engine, and said combustion engine is warmed up to reach a predetermined temperature, wherein a hot wire is heated at a temperature higher than a temperature in the normal operation of said engine when said memory is in the set condition after said combustion engine has been stopped to thereby burn-off a deposit on said hot wire.

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**4,741,314**
**FUEL INJECTION PUMP FOR INTERNAL COMBUSTION ENGINE**
**Gerald Höfer, Weissach-Flacht, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**
**Filed Jul. 3, 1986, Ser. No. 881,937**
**Claims priority, application Fed. Rep. of Germany, Jul. 6, 1985, 3524241**
**Int. Cl.⁴ F02M *59/24***
**U.S. Cl. 123—449** **25 Claims**



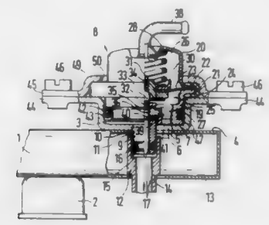
1. A fuel injection pump for an internal combustion engine comprising:
a barrel;
a pumping plunger that is driven to reciprocate in said barrel and encloses in said barrel a pump working space which during a delivery stroke of said pumping plunger is communicable with a fuel injection point on the internal engine;



said pump including a first relief line which permanently communicates with said pump working space and which has an outlet port which is opened and closed at an adjustable point in the course of the delivery stroke of said pumping plunger;
control means adapted to be guided by a governor as a function of at least one of engine load and speed including a control edge for opening and closing said outlet port at said adjustable point;
a relief channel branching off from said barrel;
said pumping plunger including a relief opening which permanently communicates with said pump working space and which upon completion of a pre-set maximum delivery stroke of said pumping plunger communicates with said relief channel branching off from said barrel; and
in full-load operation said control edge being adapted to be brought into a position where said outlet port of said pumping plunger is opened during the delivery stroke thereof after said relief channel has been brought into communication with said relief opening.

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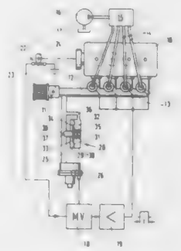
**4,741,315**
**PRESSURE REGULATING APPARATUS**
**Siegfried Fehrenbach, Markgröningen, and Kurt Herbst, Burgstetten, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**
**Filed Nov. 18, 1986, Ser. No. 931,811**
**Claims priority, application Fed. Rep. of Germany, Mar. 8, 1986, 3607812**
**Int. Cl.⁴ F02M *39/00***
**U.S. Cl. 123—463** **5 Claims**



1. A pressure regulating apparatus positioned on and connected to a rigid fuel distributor line for supplying fuel to fuel injection valves of a fuel injection system for internal combustion engines, said pressure regulating apparatus comprising a holder bushing including an upwardly extending wall and positioned on and secured to one side of said rigid fuel distributor line, a pressure regulating valve, said pressure regulating valve including a valve housing, said valve housing including a bottom part placed in a guide bore in said holder bushing and a cap, said pressure regulating valve having a resilient wall secured between said bottom part of said housing and said cap that divides a spring chamber from a fuel chamber in said valve housing, a valve carried by said resilient wall, an outlet fitting in said fuel distribution line secured to a bottom wall of said distributor line, a valve seat body which protrudes from said valve housing into said outlet fitting in said fuel distribution line, a valve seat on said valve seat body which cooperates with said valve, at least one inlet conduit in said bottom part of said holder bushing which communicates between said fuel chamber and said fuel distributor line, an outlet conduit which leads from said valve seat to a fuel return line via said valve seat body and said outlet fitting, said holder bushing (3) completely surrounds a portion of said valve housing bottom part (19) of said pressure regulating valve (8) and encompasses said at least one inlet conduit in an axial direction in an area leading away from said fuel distributor line (1), and an elastic seal (43) is disposed between said valve housing part (19) and said holder bushing (3).

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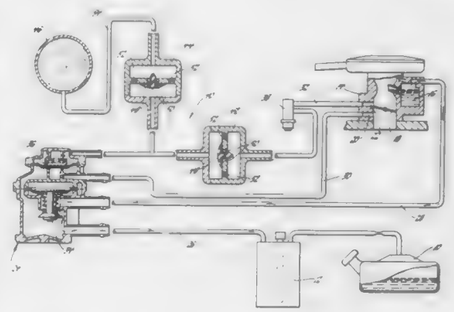
**4,741,316**
**FUEL INJECTION SYSTEM**
**Heinrich Knapp, Leonberg, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**
**Filed Mar. 26, 1982, Ser. No. 362,369**
**Claims priority, application Fed. Rep. of Germany, Mar. 26, 1981, 3111946**
**Int. Cl.⁴ F02M *51/00*; F02D *3/02***
**U.S. Cl. 123—494** **5 Claims**



1. A fuel injection system for internal combustion engines having an intake tube and a throttle device disposed therein, wherein the determination of the quantity of fuel to be injected is made in accordance with a sensor attached to an intake tube to sense pressure therein, said sensor being attached to said intake tube section downstream of said throttle device, characterized in that a connecting line is disposed between said intake tube section downstream of said throttle device and said intake tube pressure sensor and further that a throttle restriction the cross section of which is variable in accordance with said intake tube pressure is provided in said connecting line.

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**4,741,317**
**VAPOR RECOVERY SYSTEM WITH VARIABLE DELAY PURGE**
**John V. Yost, Trenton, Mich., assignor to General Motors Corporation, Detroit, Mich.**
**Filed Jun. 12, 1987, Ser. No. 60,915**
**Int. Cl.⁴ F02M *33/02***
**U.S. Cl. 123—520** **2 Claims**



1. In a vehicle fuel vapor recovery system of the type in which fuel vapors are selectively drawn from a vapor storage canister through a canister purge valve and purge line by engine manifold vacuum to be burned in the engine, said canister purge valve being activated by vacuum drawn through a control vacuum line from a control vacuum source that is exposed either to manifold vacuum or to atmosphere respectively as an engine throttle is opened or closed, a control means for activating said canister purge valve with a time delay after throttle opening that depends on how long said throttle has

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been closed before opening, said control means comprising, in combination,

an air accumulator in communication with said control vacuum line to which air can be sent and from which air can be drawn, and

air valve means acting in cooperation with said accumulator to restrict the drawing of air through said control vacuum line when said throttle is first opened, but allowing unrestricted drawing of air from said accumulator, said air valve means also acting, when said throttle is closed, to restrict the refilling of said accumulator, but allowing unrestricted flow of atmospheric air back through said control vacuum line to said canister purge valve, whereby, when said throttle initially opens and said control vacuum source first applies vacuum to said control line, air will first be drawn freely from said accumulator, but restrictively through said control vacuum line, thereby delaying the activating of said canister purge valve until sufficient air has been drawn from said accumulator to allow sufficient vacuum to be applied to said purge valve to activate it, after which, when said throttle is closed, air will flow back from atmosphere freely through said control line to said purge valve, thereby deactivating said purge valve substantially immediately, while air simultaneously flows back restrictively to said accumulator, so that the amount of air that flows back to said accumulator will be proportional to the amount of time that said throttle remains closed, and the delay in reactivating said purge valve when said throttle is reopened will accordingly be shorter than the initial delay if said throttle does not remain closed long enough for said accumulator to completely refill.

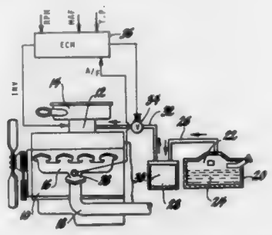
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**4,741,318**

## CANISTER PURGE CONTROLLER

**Jerry W. Kortge, and Steven L. Piedmont, both of Clarkston, Mich., assignors to General Motors Corporation, Detroit, Mich.**

**Filed Aug. 22, 1986, Ser. No. 899,259**
**Int. Cl.⁴ F02M** *25/08*
**U.S. Cl. 123—520** **4 Claims**




1. The method of controlling the purge flow rate from a fuel vapor collection canister to the induction system of an internal combustion engine having a system for delivering a mixture of air and fuel to the induction system and a closed loop controller for adjusting the fuel delivered to the induction system in a fuel increasing or decreasing direction so as to maintain a predetermined air/fuel ratio, the method comprising the steps of:

sensing the closed loop controller adjustment of the fuel delivered to the induction system; and

progressively increasing the purge flow rate from the fuel vapor collection canister to the induction system during the period that the sensed closed loop controller adjustment in a fuel decreasing direction is less than a first predetermined value.

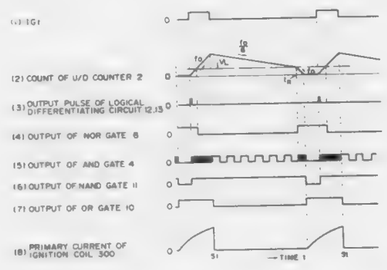
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**4,741,319**

## IGNITION SYSTEM FOR INTERNAL COMBUSTION ENGINES

**Ko Narita, Aichi; Koichi Toyama, Kariya, and Toshihito Nonaka, Obu, all of Japan, assignors to Nippondenso Co. LTD., Kariya, Japan**

**Filed Aug. 7, 1987, Ser. No. 82,658**
**Claims priority, application Japan, Aug. 22, 1986, 61-197966**
**Int. Cl.⁴ F02P** *3/045*
**U.S. Cl. 123—609** **11 Claims**




1. An ignition system for an internal combustion engine comprising:

an ignition coil for generating a high voltage for ignition upon turning off of a primary current flowing therethrough;

a power transistor for turning on and off the primary current flowing through said ignition coil;

ignition signal generating means for producing an ignition signal having a predetermined angular width for turning off said power transistor at an ignition timing in synchronism with the rotation of said internal combustion engine;

storing means having a storage quantity increased gradually from an initial value in response to each said ignition signal through a predetermined angle before a succeeding ignition timing and then decreased gradually;

first storage quantity detecting means for detecting a first time point at which the storage quantity of said storing means has been decreased to reach the initial value and producing a first detection output signal for turning on said power transistor at the first time point; and

second storage quantity detecting means for detecting a second time point at which the storage quantity of said storing means has been decreased to reach a set value larger than the initial value and producing a second detection output signal for changing a decrease rate of the storage quantity of said storing means at the second time point.

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**4,741,320**

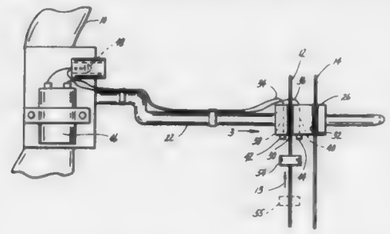
## ARCHERY TRAINING AID

**Arthur R. Wiard, 11694 Monsbrook Ct., Sterling Heights, Mich. 48077**

**Filed Mar. 14, 1986, Ser. No. 839,376**
**Int. Cl.⁴ F41B** *5/00*
**U.S. Cl. 124—24 R** **6 Claims**

4. In an archery bow comprising compound flights of bow string and a cable guard, the improvement comprising an indicator light, a source of electric energy for the indicator light, and means to connect the source of electric energy to the indicator light upon sufficient draw with the bow,

said connection means comprising a slide block slideably engaging the cable guard, said slide block positioned on one side of the cable guard only, bow string engagement means on said slide block, said bow string engagement means slideably engageable with at least one movable flight, said bow string flight retaining the slide block to the cable guard, and contact means attachable to a movable flight whereby upon sufficient draw of the bow said



contact means engages the slide block and the source of electric energy is thereby connected to the indicator light.

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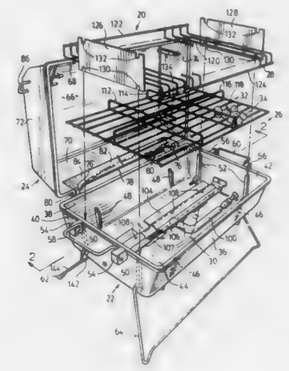


**4,741,321**

## PORTABLE BARBEQUE

**Thomas E. Squires, Oakville, Canada, assignor to B. D. Wait Co. Limited, Oakville, Canada**

**Filed May 27, 1986, Ser. No. 866,657**
**Claims priority, application Canada, May 30, 1985, 482852**
**Int. Cl.⁴ F24C** *1/16*
**U.S. Cl. 126—9 R** **5 Claims**



1. A housing for a portable barbeque comprising:

a base being generally rectangular in plan and having front, back, sides and a bottom for containing a heat source and grill, the sides defining pairs of openings adjacent the bottom, each one of the openings in one side being axially aligned with the other opening of the pair in the other side, and channels extending downwardly from the openings to the bottom ends of the sides;

a lid shaped to cover the base and having a back, front and sides, the back of the lid being pivotally connected to the back of the base;

a pair of allochiral feet, each of the feet having a center portion and a pair of opposed end portions extending generally parallel to one another and terminating in aligned stubs projecting towards one another, the center portion being stressed to bias the stubs towards one another, and the feet being engaged one in each of the pairs of aligned openings with the stubs journalled for rotation in the openings so that with the legs extending downwardly in a supporting position, the end portions of the legs are engaged in the respective channels to lock the legs and prevent rotation, and such that upon deflecting the end portions of the legs outwardly, these portions leave the corresponding channels to permit the legs to be rotated to bring the center portions into engagement with the lid in a storage position; and

means coupled to the lid to retain the legs in the storage position whereby the lid is retained on the base.

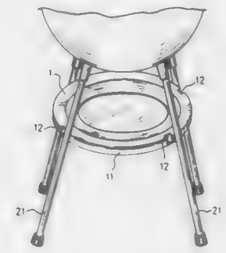
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**4,741,322**

## ASH CATCH TRAY FOR BARBECUE KETTLE

**Patrick Lin, 12th Fl., No. 1034, Min Sheng East Rd., Taipei, Taiwan**

**Filed Jul. 21, 1987, Ser. No. 77,186**
**Int. Cl.⁴ F24B** *3/00*
**U.S. Cl. 126—25 R** **2 Claims**



1. A dismountable ash catch tray for barbecue kettle which has a plurality of support legs each having a stud fixed on the inside wall of the corresponding leg at a predetermined height of the leg, comprising a round plate having a recess in the middle portion thereof for catching ash and having its outer circumference folded downwardly to form a ring-shaped folded side, said folded side provided on the circumference thereof with a plurality of mounting holes corresponding in number to said legs of the barbecue kettle and each of said mounting hole having the profile of an L-shape and comrpising in sequence a fitting hole portion having its upper part extending radially to the upper face and large enough to allow said stud to pass through, a guiding hole portion communicating with said fitting hole portion at one side lower part thereof and horizontally extending along the circumference of said folded side and a hanging hole portion communicating with said guiding hole portion at one end and having an upwardly extending hole edge for engaging with said stud.

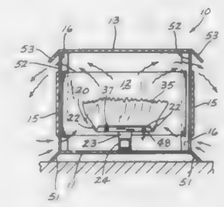
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**4,741,323**

## SPACE HEATER

**Ralph M. Pivonka, 915 Maple, LaCrosse, Kans. 67548**

**Filed Dec. 23, 1986, Ser. No. 946,441**
**Int. Cl.⁴ F24C** *3/00*
**U.S. Cl. 126—85 R** **5 Claims**



1. A heater apparatus comprising:

a housing having a substantially flat bottom wall, a substantially flat top wall parallel to said bottom wall, a pair of substantially vertical sidewalls, a rear vertical wall and a non-vertical front wall, the bottom of said front wall being closer to the rear wall than the top thereof is to the rear wall, the distance between the bottom of the front wall

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and the rear wall being substantially the same as the distance between the sidewalls;

a burner assembly disposed centrally on top of the bottom wall of said housing, said burner assembly comprising:

a vertically extending conduit having an opening in the top thereof;

a first square plate attached to the top of said vertically extending conduit, said first square plate being disposed parallel to the bottom wall of the housing, a round opening disposed in the center of said first square plate for allowing a fuel and air mixture to exit therethrough from said vertically extending conduit, said first square plate having a plurality of upwardly extending flanges attached to each edge thereof for directing the flames upwardly;

a second square plate smaller than the first square plate, said second square plate being flat and parallel to the first square plate except for downwardly extending corners which are rigidly attached to said first square plate, said second square plate being oriented so that the outer edges of adjacent walls of the first and second square plates are at a forty-five degree angle with respect to each other whereby the flame will tend to be spread evenly over the top of said first square plate;

means for supplying a fuel and air mixture to said vertically extending conduit;

means for igniting the fuel air mixture passing over the top of said first square plate;

air inlet opening means disposed between said sidewalls and said bottom wall of the housing for permitting cold air to enter said housing; and

air outlet opening means disposed between said top wall and said sidewalls of said housing for permitting heated air to exit said housing.

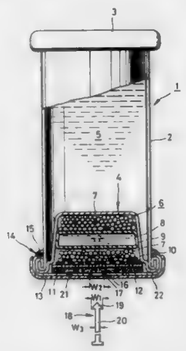
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**4,741,324**

## SELF-HEATING CONTAINER

**Shizuo Ina, and Shoji Tokura, both of Shizuoka, Japan, assignors to Toyo Jozo Kabushiki Kaisha, Shizuoka and Ueda Lime Manufacturing Co., Ltd., Fifu, both of, Japan**

**Continuation of Ser. No. 848,290, Apr. 4, 1986, abandoned. This application Jul. 6, 1987, Ser. No. 70,111**
**Claims priority, application Japan, Apr. 4, 1985, 60-69999**
**Int. Cl.[4] F24J** *1/00*
**U.S. Cl. 126—263** **3 Claims**



1. A container capable of heating the contents of the container from inside, having at its bottom a cylindrical inner shell made of a thermoconductive material opening downward and defining internally of itself a reaction chamber in which are disposed an active substance and a reacting substance capable of causing an exothermic reaction upon contact with each other, a partition isolating said substances from each other, a covering lid disposed across the opening of said inner shell so as to cover the reaction chamber and to constitute the bottom of the container, said covering lid having a temporarily sealed piercing hole therethrough, and a separate piercer for piercing through said temporarily sealed piercing hole and said partition into the reaction chamber, said piercer having an enlarged head that is of lesser width than the internal diameter of said piercing hole, a shank of substantially lesser width than said enlarged head, an enlarged tail of substantially greater width than said shank, and an extent such that when said piercer is fully inserted in said cylindrical inner shell said enlarged head is disposed beyond said partition and said enlarged tail is disposed in said piercing hole to temporarily seal such and act as a pressure release control.

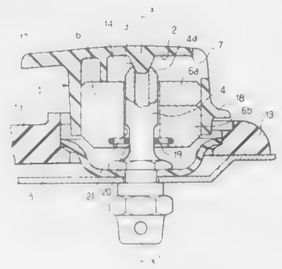
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**4,741,325**

## OPERATING VALVE FOR A PRESSURE COOKER

**Daniel Anota, Dijon, France, assignor to Seb S.A., Selongey, France**

**Filed Jan. 28, 1987, Ser. No. 7,561**
**Claims priority, application France, Jan. 29, 1986, 86 01244**
**Int. Cl.[4] A47J** *27/00*
**U.S. Cl. 126—389** **9 Claims**



1. An operating valve for a pressure cooker having a steam discharge nozzle (**4**) having an upper end (**4***a*), said valve comprising a movable valve body (**1**) in the form of a cap having an end-wall (**2**) provided with a central conical valve pintle (**3**) adapted to close the nozzle (**4**), the interior of the movable valve body having a ballast weight (**6**) so arranged that the center of gravity of the movable body is located beneath the valve pintle, the movable valve body (**1**) having a cavity (**14**) which is formed between the end-wall (**2**) of the movable valve body and the ballast weight (**6**) and surrounds the valve pintle (**3**) and the upper end (**4***a*) of the discharge nozzle, said cavity (**14**) communicating with the exterior by a steam release opening (**7**), said cavity having a dissymetrical shape, such that the passage of the steam in said cavity and release of steam from said opening produce a torque (**F**) which tends to displace said movable valve body (**1**) in pivotal motion around the nozzle, said valve body having an abutment lug (**8**) adapted to engage a stationary stop (**9**) for preventing pivotal displacement of said valve body under the action of said torque.

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**4,741,326**

## ENDOSCOPE DISPOSABLE SHEATH

**Christopher O. R. Sidall, Rye, and Robert L. Savitt, White Plains, all of N.Y., assignors to Fujinon, Inc., Wayne, N.J.**

**Filed Oct. 1, 1986, Ser. No. 914,730**
**Int. Cl.[4] A61B** *1/00*
**U.S. Cl. 128—4** **22 Claims**

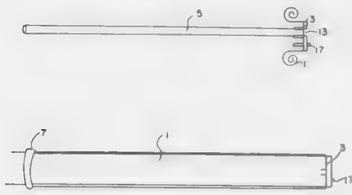
1. A protective covering assembly for a medical instrument comprising:

an end plate having an opening therethrough;

an elongatable hollow sheath means for receiving a shaft, said sheath means being attached at a first end to said end plate; and



a tube means for accommodatng a medical instrument component attached at a first end to said end plate and aligned



with said opening, said tube means being dimensioned to be received within a medical instrument channel and being surrounded by said sheath means.

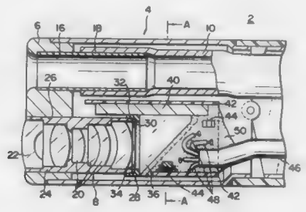
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**4,741,327**

## ENDOSCOPE HAVING BENT CIRCUIT BOARD

**Hisao Yabe, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed Apr. 14, 1987, Ser. No. 38,019**
**Claims priority, application Japan, Apr. 30, 1986, 61-98199**
**Int. Cl.[4] A61B** *1/06*
**U.S. Cl. 128—6** **8 Claims**



1. An endoscope comprising:

an insertion section having a hard distal end portion;

an objective optical system arranged in said distal end portion of said insertion section;

an optical element one side surface of which is in contact with a proximal end face of said objective optical system, said optical element being adapted to change a direction of an optical path into a direction substantially perpendicular to an optical axis of said objective optical system;

a solid-state image sensor mounted on the other side surface of said optical element, said image sensor being adapted to convert light incident on said objective optical system into an electrical signal; and

a circuit board having an electrical circuit connected to said solid-state image sensor, said circuit board being bent to surround said optical element.

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**4,741,328**

## MEANS FOR INTRAAORTIC ASSIST AND METHOD OF POSITIONING A CATHETER THEREFOR

**Shlomo Gabbay, 1 Randall Dr., Short Hills, N.J. 07078**

**Filed Mar. 14, 1985, Ser. No. 712,016**
**Int. Cl.[4] A61M** *29/00*
**U.S. Cl. 128—1 D** **26 Claims**

1. An intraaortic cardiac assist balloon pump having a first portion and a second portion, said first portion comprising

(a) a catheter having a first end and a hollow portion terminating adjacent said first end, said first end being insertable into an artery,

(b) a first inflatable balloon and an inflation/deflation pathway in connection with said first balloon, both said first balloon and said pathway surrounding at least a part of said catheter,

(c) means, connected to said pathway at a first access which is remote from said first balloon, for inflating and deflating said first balloon in synchronism with a heartbeat, and

(d) sensor for operative connection with a blood pressure measuring device, said sensor operative connection to said



sensor, said sensor extending to a point adjacent said first end,

said second portion at least partly outside said artery and including a control portion comprising a redirecting means and a control tip remote from said first end, said redirecting means extending from said control tip to a point adjacent said first end, whereby manipulation of said control tip causes reorientation of said catheter.

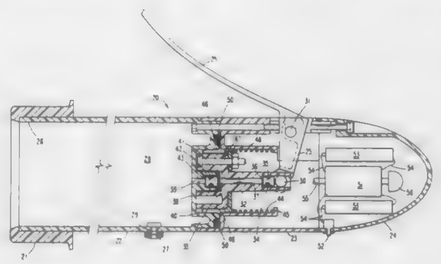
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**4,741,329**

## SURGICAL APPLIANCE FOR STIMULATING AN ERECTION

**Benjamin F. Marcune, Rydal, Pa., assignor to Lehigh Group Ltd, West Chester, Pa.**

**Filed May 14, 1986, Ser. No. 862,987**
**Int. Cl.[4] A61F** *5/41*
**U.S. Cl. 128—79** **17 Claims**



1. A surgical appliance for stimulating an erection of the male genital organ comprising:

an elongated shaped surgical appliance having a vacuum housing portion connected to a pump housing portion and adapted to be held and operated with one hand,

said vacuum housing having an open end adapted to receive the male genital organ, and a closed end connected to said pump housing,

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a vacuum plenum connected to said closed end of said vacuum housing, in said pump housing

vacuum pump means in said pump housing connected to said vacuum plenum and having a flexible diaphragm for providing a high vacuum in said vacuum plenum,

spring means for biasing said flexible diaphragm toward said vacuum housing,

valve means between said vacuum housing and said vacuum plenum for transferring said high vacuum to said vacuum housing, and

lever means extending along a side wall of said vacuum housing and connected to said vacuum pump means, whereby each successive operation of said lever means is effective to create a greater vacuum in said vacuum plenum to provide a high vacuum in said vacuum housing.

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**4,741,330**

## METHOD AND APPARATUS FOR ANCHORING AND MANIPULATING CARTILAGE

**John O. Hayhurst, 14751 SE. Wanda Dr., Milwaukie, Oreg. 97222**

**Continuation of Ser. No. 496,116, May 19, 1983, abandoned, which is a continuation-in-part of Ser. No. 380,043, May 20, 1982, abandoned. This application Apr. 4, 1986, Ser. No. 848,341**

**Int. Cl.[4] A61F** *5/04*

**U.S. Cl. 128—92 YF** **7 Claims**



1. A device for use in anchoring and manipulating fibrous tissue such as cartilage and the like within a joint of a patient during a surgical procedure, comprising:

(a) anchoring means, including an elongate member, for attaching a suture to fibrous tissue, said anchoring means being adapted to fit within an open tip of a hollow needle;

(b) a suture, attached to said anchoring means medially of said elongate member thereof; and

(c) retainer means, easily slidable along said suture toward said anchoring means but thereafter resistant to movement along said suture away from said anchoring means, for retaining tension in said suture within tissue held between said anchoring means and said retainer means, said retainer being of resilient material having a pair of opposite surfaces and defining a plurality of intersecting slits extending therethrough between said opposite faces.

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**4,741,331**

## DISPOSABLE RADIOACTIVE AEROSOL INHALATION APPARATUS

**Alan Wunderlich, Miller Place, N.Y., assignor to Atomic Products Corporation, Shirley, N.Y.**

**Filed Feb. 2, 1987, Ser. No. 9,463**

**Int. Cl.[4] A61M** *11/00*

**U.S. Cl. 128—200.14** **11 Claims**

1. An aerosol inhalation apparatus for supplying an aerosol mist containing radioactive tagged particles and air to a person, comprising:

nebulizer means for producing said aerosol mist containing radioactive tagged particles and air, said nebulizer means including mixing chamber means for mixing said radioactive tagged particles and air to form said aerosol mist;

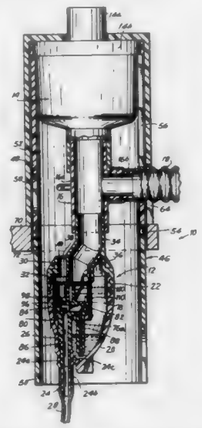
filter means for filtering air traveling therethrough in opposite directions, said filter means having a first end open to ambient atmosphere and a second end;

first conduit means, connecting said filter means and said nebulizer means, for supplying an aerosol mist from said nebulizer means and air from the ambient atmosphere from said filter means to a junction opening of said first conduit means during an inhalation operation and for supplying exhaust air and aerosol mist from said junction opening to said filter means during an exhalation operation, said junction opening being situated between said filter means and said nebulizer means;

second conduit means for supplying the aerosol mist and air to the person from said junction opening during the inhalation operation and for supplying exhaust air and aerosol mist to said junction opening during the exhalation operation, said second conduit means having a first end fluidly connected to said junction opening of said first conduit means, and a second end; and

a mouthpiece connected to the second end of said second conduit means;

whereby said aerosol mist travels to said second conduit means from said nebulizer means and said first conduit means and ambient atmosphere travels to said second conduit means from said filter means and said first conduit means when the person inhales, and exhaust air and aerosol mist travel to said filter means from said second conduit means through said first conduit means when the person exhales such that said exhaust air is expelled to ambient atmosphere and said aerosol mist is trapped by said filter means.



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**4,741,332**

## EQUIPMENT FOR PROTECTING PERSONNEL FROM CONTAMINATION

**Raymond Beaussant, Bretigny, France, assignor to Intertechnique, France**

**Filed Sep. 19, 1985, Ser. No. 777,544**

**Int. Cl.[4] A62B** *17/04, 18/00*

**U.S. Cl. 128—201.23** **11 Claims**

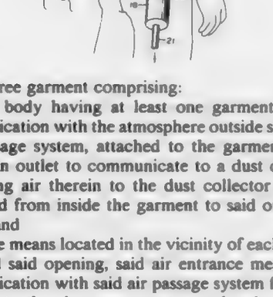
1. Protective breathing equipment comprising:

breathing mask means for donning by a wearer;

protective hood means for wearing over and encompassing the head of the wearer and the breathing mask and for preventing entrance of ambient air and overpressurizing;

a positive pressure type demand regulator having a housing provided with an inlet adapted for connection with a source of pressurized breathing gas, an outlet connected to said breathing mask and pressure regulating means in said housing for controlling flow of pressurized breathing gas from said inlet to said outlet,

case means surrounding said housing and defining therewith a space surrounding said housing, and



means for supplying said hood and said surrounding space with filtered air under a pressure higher than ambient pressure,

said housing being provided with an inlet communicating said surrounding space and said pressure regulating means for delivering dilution air to be mixed with said breathing gas.

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**4,741,333**

## DUST-FREE GARMENT

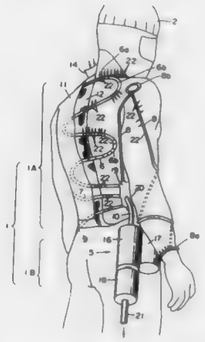
**Yoshinobu Suzuki, Fujishiro; Shusaku Nisiate, Kawasaki; Kenzo Sato, Ohtsu; Masakazu Ueno, Suita; Hiroaki Shimizu, Nara, and Katsunori Fujimura, Kashihara, all of Japan, assignors to Shimizu Construction Co., Ltd., Japan**

**Filed Jan. 30, 1987, Ser. No. 8,965**

**Claims priority, application Japan, Oct. 27, 1986, 61-253792**

**Int. Cl.[4] A62B** *17/04, 18/00;* **A41D** *13/00, 19/00*

**U.S. Cl. 128—201.23** **26 Claims**



1. A dust-free garment comprising:

a garment body having at least one garment opening in communication with the atmosphere outside said garment;

an air passage system, attached to the garment body and having an outlet to communicate to a dust collector for exhausting air therein to the dust collector to filter air exhausted from inside the garment to said outside atmosphere; and

air entrance means located in the vicinity of each opening to surround said opening, said air entrance means being in communication with said air passage system for introducing air into the air passage system, whereby air is introduced into said air passage system through said air entrance means by producing negative air pressure around said opening.

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**4,741,334**

## MONITORING ARRANGEMENT FOR A HIGH FREQUENCY SURGERY DEVICE

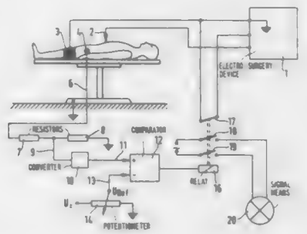
**Werner Irnich, Birkenweg 60, 6301 Wettenberg 3, Fed. Rep. of Germany**

**Filed May 7, 1986, Ser. No. 860,657**

**Claims priority, application Fed. Rep. of Germany, May 7, 1985, 3516354**

**Int. Cl.[4] A61B** *17/39*

**U.S. Cl. 128—303.13** **10 Claims**



9. A high frequency surgical apparatus comprising

a neutral electrode adapted to be affixed to a patient's body,

an active electrode adapted for treatment of the patient's body,

a high frequency current generator coupled to said active and neutral electrodes, and

a control circuit, said control circuit comprising

a control electrode adapted to be affixed to the patient's body at a distance from said active electrode for detecting a high frequency body surface voltage relative to said neutral electrode,

conversion means for converting said high frequency body surface voltage detected by said control electrode into a directly proportional D.C. voltage,

a voltage comparator having first and second inputs, said first input being coupled to said conversion means to receive said D.C. voltage corresponding to said high frequency body surface voltage, said second input being coupled to receive a reference voltage determined individually for the patient and corresponding to approximately the maximum individually tolerable body surface voltage for the patient, and

switch means actuated by said voltage comparator for turning off said high frequency current generator when said D.C. voltage corresponding to said high frequency body surface voltage exceeds said reference voltage.

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**4,741,335**

## CALCULUS CRUSHING APPARATUS

**Tsutomu Okada, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 696,596, Jan. 31, 1985, abandoned. This application Jan. 9, 1987, Ser. No. 4,769**

**Claims priority, application Japan, Feb. 3, 1984, 59-17802; May 17, 1984, 59-99607**

**Int. Cl.[4] A61B** *17/22*

**U.S. Cl. 128—320** **7 Claims**

1. A crushing apparatus for crushing a calculus produced in a body cavity, comprising:

a flexible sheath having a proximal end and a distal end and including a rigid portion at the distal end and adapted to be inserted into the body cavity;

an operating wire longer than the sheath and slidably in-

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serted into the sheath and having a proximal end portion and a distal end portion;

a collapsible basket for seizing the calculus, said basket including a plurality of elastic wires coupled to the distal end portion of the operating wire and extending from the distal end of the sheath;

a body removably connected to the proximal end of the sheath;

a rack slidably arranged in the body and coupled to the proximal end portion of the operating wire, to be slidable together with the operating wire;

and first and second operating means for selectively sliding said rack and thereby sliding said operating wire relative to said sheath so as to expand or contract said basket;



said first operating means including a handle grip portion connected to said rack and extending outwardly from the body for sliding said rack directly by hand;

said second operating means including an operating handle mounted on said body so as to be freely rotatable with respect to and unobstructed by said body, and also including a speed reduction and force amplifying mechanism including a plurality of meshing gears of different sizes interposed between said operating handle and said rack such that a rotary speed and a rotary force applied to said operating handle are transmitted to said rack and thereby to said operating wire as a reduced speed and an amplified force, respectively.

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**4,741,336**

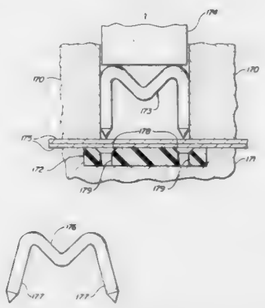
**SHAPED STAPLES AND SLOTTED RECEIVERS (CASE VII)**

**Stephen J. Failla, Chester, and Carmen Gerrone, Stockton, both of N.J., assignors to Ethicon, Inc., Somerville, N.J.**

**Continuation-in-part of Ser. No. 631,115, Jul. 16, 1984, abandoned. This application Mar. 12, 1986, Ser. No. 838,869**

**Int. Cl.⁴ A61B** *17/08;* **F16B** *15/00;* **B31B** *1/00*

**U.S. Cl. 128—334 R** **10 Claims**



**9**. A two piece fastener for joining tissue said fastener comprising a staple and a receiver that interlocks with the staple, said staple comprising a pair of legs and a connecting portion connecting said legs, said staple having the general shape of an M and the connecting portion being resiliently compressible, said receiver having a pair of openings for frictionally engaging the legs of said staple, the distance between the legs of the staple being greater than the distance between the openings in the receiver whereby when the staple legs are inserted in the receiver opening the distance between the legs is reduced and the legs are thereby retained by the receiver openings.

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**4,741,337**

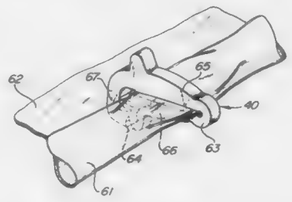
**SURGICAL FASTENER MADE FROM GLYCOLIDE-RICH POLYMER BLENDS**

**Carl R. Smith, Bloomingdale; Mark T. Gaterud, Annandale; Dennis D. Jamiolkowski, Long Valley; Hugh D. Newman, Jr., Chester, and Shalaby W. Shalaby, Lebanon, all of N.J., assignors to Ethicon, Inc., Somerville, N.J.**

**Filed Jul. 17, 1985, Ser. No. 755,888**

**Int. Cl.⁴ A61B** *17/04, 17/08*

**U.S. Cl. 128—334 R** **8 Claims**



**1**. A surgical fastener comprising a blend of at least two polymers, one of said polymers being polyglycolide homopolymer or a copolymer containing at least about 90 mole percent polymerized glycolide, the other of said polymers being polyactide homopolymer or a copolymer containing at least about 85 mole percent polymerized lactide, with the overall blend containing from about 65 to about 85 weight percent polymerized glycolide, the remainder being polymerized lactide, wherein the fastener comprising said blend is non-palpable after six to ten weeks in vivo.

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**4,741,338**

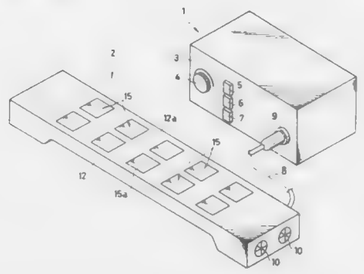
**THERMOELECTRIC PHYSICAL REMEDY APPARATUS**

**Toshiaki Miyamae, 9-15, 1-Chome, Nakagawa-nishi, Ikuno-ku, Osaka, Japan**

**Filed Oct. 6, 1986, Ser. No. 915,756**

**Int. Cl.⁴ A61F** *7/00*

**U.S. Cl. 128—399** **4 Claims**



**1**. A thermoelectric physical remedy apparatus comprising

a plurality of thermoelements for generating high and low temperatures by Peltier effect;

a hollow elongated cover made of soft flexible material and providing a ventilation path therewithin, said plurality of thermoelements being held by said cover with part of said thermoelements being exposed outside of said cover;

means for selectively applying electric current to said plurality of thermoelements; and

a plurality of blower fans disposed inside of said cover and in said ventilation path therewithin.



**4,741,339**

**POWER TRANSFER FOR IMPLANTED PROSTHESES**

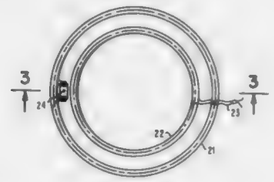
**James M. Harrison, Watsonia, and Peter M. Seligman, Essendon, both of Australia, assignors to Cochlear Pty. Limited, New South Wales and University of Melbourne, Victoria, both of, Australia**

**Filed Oct. 21, 1985, Ser. No. 789,874**

**Claims priority, application Australia, Oct. 22, 1984, P67767**

**Int. Cl.⁴ A61N** *1/36*

**U.S. Cl. 128—419 PS** **6 Claims**



**1**. Apparatus for improving the coupling of an external inductive transmitting coil to an internal inductive receiving coil to transmit power and/or data to said receiving coil from said transmitting coil comprising:

a coupling coil inductively coupled to said transmitting coil to increase the coupling between said transmitting coil and said receiving coil.

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**4,741,340**

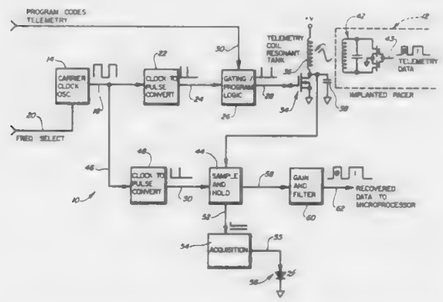
**PULSE TO SINEWAVE TELEMETRY SYSTEM**

**William P. Batina, and Lamar H. Gipson, both of Miami, Fla., assignors to Cordis Corporation, Miami, Fla.**

**Filed Dec. 18, 1985, Ser. No. 810,940**

**Int. Cl.⁴ A61N** *1/36*

**U.S. Cl. 128—419 PT** **20 Claims**



**1**. A telemetry system for communicating with a tank circuit contained in a pacer implanted in a patient comprising:

a telemetry coil being positionable externally on the patient's skin in proximity to the implanted pacer;

capacitive means connected to said telemetry coil for forming a resonant tank;

said resonant tank having a varying impedance in response to telemetered digital data signals from the implanted tank circuit;

clocking means for generating a squarewave at a selected frequency;

delayed clock-to-pulse converter means responsive to said squarewave for generating drive pulses which are slightly delayed from the leading edges of said squarewave;

coil driver means for generating a sinusoidal carrier waveform having a varying amplitude and frequency in response to the drive pulses and to the varying impedance of said resonant tank;

means for sampling each cycle of the sinusoidal carrier wave of varying amplitude and frequency to provide a sample and hold signal; and

output means coupled to said sampling means for recovering of the telemetered digital data signals in the form of a binary pulse-width modulated signal.

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**4,741,341**

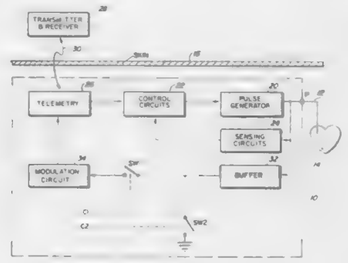
**PROTECTION CIRCUIT AND METHOD FOR IMPLANTED ECG TELEMETRY CIRCUITS**

**Ronald R. Marach, Valencia, Calif., assignor to Siemens-Pacesetter, Inc., Sylmar, Calif.**

**Filed Mar. 12, 1986, Ser. No. 839,233**

**Int. Cl.⁴ A61N** *1/36*

**U.S. Cl. 128—419 PT** **6 Claims**



**1**. In a cardiac pacemaker system comprised of a pacemaker having a pulse generator that generates high level stimulation pulses, a lead connected to said pacemaker through which said pacemaker may deliver high level stimulation pulses to a desired cardiac location and through which low level cardiac signals may be sensed, a receiver remote from said pacemaker, and telemetry means within said pacemaker for transmitting signals applied thereto to said receiver, a means for preserving the integrity of the low level signals comprising:

first switch means for selectively connecting said lead to an input signal line of said telemetry means whenever said high level stimulation pulses are not being delivered over said lead and whenever a telemetry mode is enabled, and for disconnecting said lead from said input signal line whenever said high level stimulation pulses are being delivered over said lead,

buffer means interposed between said first switch means and said lead for buffering said telemetry means from signals and stimulation pulses appearing on said lead; and

second switch means for selectively connecting the first switch means side of said passive buffer means to a fixed voltage potential within said pacemaker when a high-level signal appears on said lead.

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**4,741,342**

**CARDIAC PACEMAKER WITH SELECTIVE UNIPOLAR/BIPOLAR PACING**

**Lawrence J. Stotts, Lake Jackson, Tex., assignor to Intermedics, Inc., Angleton, Tex.**

**Filed Mar. 11, 1986, Ser. No. 838,603**

**Int. Cl.⁴ A61N** *1/36*

**U.S. Cl. 128—419 P** **5 Claims**

**1**. A dual chamber cardiac pacemaker for pacing the atrial and ventricular chambers of the heart in any combination of unipolar and bipolar pacing modes, comprising:

atrial and ventricular leads each including a stimulating cathodic electrode and an anodic electrode to be positioned within the respective chamber of the heart.

a dc power source for delivering a voltage of predetermined polarity and magnitude between a power terminal and a ground reference terminal thereof,

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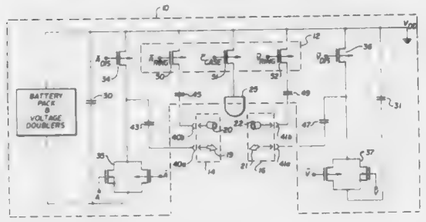
circuit means coupled across the power and reference terminals of said power source for sequentially applying said voltage as an electrical stimulus to first one and then the other of said stimulating electrodes,

a case housing said circuit means, said case including a third anodic electrode,

said circuit means including

switch means for selectively conductively connecting at least one among the three anodic electrodes to the reference terminal of the power source at all times, and

control means for completing a conductive path between the power terminal of the power source and the stimulating electrode for the respective chamber undergoing pacing while simultaneously actuating said switch



means to maintain a conductive connection between the reference terminal of the power source and one of said anodic electrodes selected according to the desired pacing mode for said respective heart chamber undergoing pacing, said control means including

means for selectively applying control voltages of the same polarity as the voltage at said power terminal to said switch means for actuation thereof to provide the respective conductive connections, and

means for maintaining each of said control voltages at a magnitude greater than the magnitude of the voltage at said power terminal to maintain said switch means in the desired actuated state and to avoid undesired switching of said reference terminal among said anodic electrodes.

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**4,741,343**

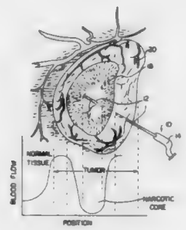
**METHOD AND APPARATUS FOR MEASURING OXYGEN PARTIAL PRESSURE AND TEMPERATURE IN LIVING TISSUE**

**H. Frederick Bowman, Needham, Mass.; Stephen K. Burns, Henniker, N.H.; David J. Edell, Lexington, and James C. Weaver, Sudbury, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.**

**Continuation of Ser. No. 730,614, May 6, 1985, abandoned. This application Dec. 22, 1986, Ser. No. 945,120**

**Int. Cl.⁴ A61N** *1/40*

**U.S. Cl. 128—635** **7 Claims**



1. Apparatus for measuring at least one characteristic of living tissue comprising oxygen partial pressure, temperature, thermal conductivity, thermal diffusivity, specific absorption rate, and perfusion in living tissue at a plurality of locations in said tissue, which comprises a thin probe substrate having a cross-section sufficiently small to permit insertion of said thin probe into said tissue, a plurality of thermal sensors secured spatially separated sites along the length of said probe substrate, a plurality of oxygen sensors positioned at spatially separated sites along the length of said probe substrate, means for polarizing said oxygen sensors, each of said oxygen sensors being positioed within 100 μm or less or comprises a portion of one of said thermal sensors, each of said oxygen sensors and said thermal sensors being sufficiently small to permit insertion of said thin probe, said oxygen sensors and said thermal sensors into said tissue, electrical connecting means for supplying known electrical excitation to each of said thermal sensors, said thermal sensors having electrical resistance means for sensing electrical resistance of said thermal sensors means for sensing the direct current produced by said oxygen sensors when said oxygen sensors are polarized and means for converting said resistance and said direct current to said at least one characteristic.

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**4,741,344**

**EAR CANAL ELECTRODE**

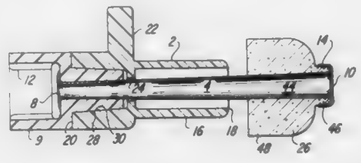
**Hal C. Danby, Palo Alto, and Myron A. Beigler, Los Altos Hills, both of Calif., assignors to Nicolet Instrument Corporation, Madison, Wis.**

**Continuation of Ser. No. 424,387, Sep. 27, 1982, Pat. No. 4,622,975, Continuation-in-part of Ser. No. 342,490, Jan. 26, 1982, abandoned. This application Nov. 17, 1986, Ser. No. 932,007**

**The portion of the term of this patent subsequent to Nov. 18, 2003, has been disclaimed.**

**Int. Cl.⁴ A61B** *5/04*

**U.S. Cl. 128—642** **7 Claims**



1. A non-invasive external ear canal electrode comprising a tubular electrode means of electro-conductive material for conducting electrical signals picked up from the ear canal surface and for transmitting a sound stimulus to an ear canal, said electrode means having a proximal end and a distal end, the distal end having mounted thereon an electro-conductive, resilient, annular plastic foam means through which the electrode means protrudes for contacting the skin surface of the ear canal and picking up and conducting electrical signals therefrom.

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**4,741,345**

**CONTINUOUS FLOW TISSUE PRESSURE MEASUREMENT**

**Matthews, Larry S., and Steven A. Goldstein, both of Ann Arbor, Mich., assignors to Board of regents of the University of Michigan, Ann Arbor, Mich.**

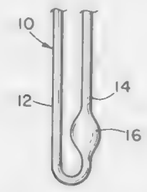
**Division of Ser. No. 699,049, Feb. 7, 1985. This application Aug. 4, 1986, Ser. No. 892,264**

**Int. Cl.⁴ A61B** *5/02*

**U.S. Cl. 128—675** **2 Claims**

1. A catheter for use in measuring pressure in animal tissue which comprises a single long tubular member having only one lumen throughout and having a section having a wall more flexible than the rest: said long tubular member forms a U-shaped single flow channel open at each end and through which fluid may flow continuously, and said more flexible





section is a part of said U-shaped flow channel and is near the bend of said U-shaped flow channel and is a bubble.

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**4,741,346**

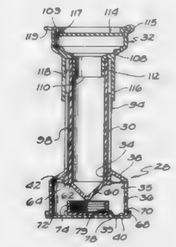
**SPECIMAN COLLECTOR**

**Johnson N. S. Wong, Rolling Hills, and Gary Watanabe, Redondo Beach, both of Calif., assignors to Evergreen Industries, Inc., Los Angeles, Calif.**

**Filed Jun. 16, 1986, Ser. No. 874,766**

**Int. Cl.⁴ A61B** *5/00*

**U.S. Cl. 128—760** **18 Claims**



1. A specimen collecting apparatus comprising:

a substantially elongated tubular container having a first closed end and a second open end;

collection means which is removably secured to said container second open end for directing said specimen into said container;

cap means formed to releasably close said container open end after removal of said collection means;

means for supporting said container with or without said collection means in a substantially upright position; and

graspable means releasably coupled to said supporting means, releasably holding said cap means in said supporting means when said graspable means is secured thereto, said graspable means being adapted to be grasped while holding said cap means as said closing means is coupled to and/or released from said container, whereby said graspable means aids in the coupling and/or releasing of said cap means.

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**4,741,347**

**PIEZOELECTRIC CURRENT GENERATING DEVICE**

**Hervé Robert, Paris, and Henry Kogan, 15 rue du Bac, 75007 Paris, both of France, assignors to Henry Kogan, Paris, France**

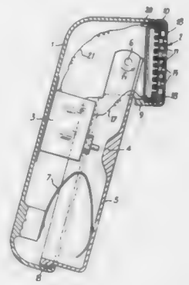
**Filed Jun. 12, 1986, Ser. No. 873,578**

**Claims priority, application France, Nov. 22, 1985, 85 17314**

**Int. Cl.⁴ A61N** *1/32*

**U.S. Cl. 128—800** **13 Claims**

1. An electric pulse generator apparatus for therapeutic applications on a patient, comprising a body with a distribution head provided with notches and having a peripherally conductive belt, a piezoelectric generator, a plurality of electrodes connected to one pole of said generator, wherein said plurality of electrodes are respectively located in said notches at a level lower than the level of said conductive belt, and wherein said



peripherally conductive belt is connected to another pole of said generator, whereby a current of piezoelectric origin is caused to flow through said notches between said plurality of electrodes and said conductive belt of said head.

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**4,741,348**

**HEATING APPARATUS FOR HYPERTHERMIA**

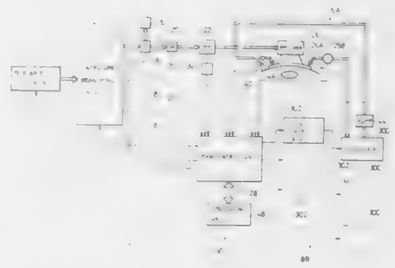
**Makoto Kikuchi, 16-19, Inokashira 1-chome, Mitaka-shi, Tokyo; Shinsaku Mori, 31-6, Okusawa 1-chome,, Setagaya-ku, Tokyo; Yoshio Nikawa, 26-14, Nerima 2-chome, Nerima-ku, Tokyo, and Takashige Terakawa, c/o. Tokyo Keiki Co. Ltd., 16-46, Minamikamata 2-chome, Ohta-ku, Tokyo, all of Japan, assignors to Tokyo Keiki Co., Ltd.; Kikuchi, Makoto; Shinsaku Mori and Yoshio Nikawa, all of Tokyo, Japan**

**Filed Jul. 26, 1985, Ser. No. 759,307**

**Claims priority, application Japan, Jul. 31, 1984, 59-162468; Jul. 31, 1984, 59-162469; Jul. 31, 1984, 59-162470**

**Int. Cl.⁴ A61N** *5/00*

**U.S. Cl. 128—804** **15 Claims**



1. Hyperthermia apparatus comprising:

(a) a microwave oscillator for generating microwaves;

(b) a branching circuit connected to said oscillator for dividing the generated microwaves into a plurality of branches, each branch having controllable impedance means for establishing the power level in the branch in response to a power level control signal;

(c) an applicator associated with each branch for applying microwaves therein to a treatment region of a patient; and

(d) a main control unit comprising means for producing power level control signals that are supplied to said branching circuit such that a change in the impedance of the controllable impedance means in one branch automatically produces compensating changes in the impedances

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of the controllable impedance means in the other branches, said compensating changes minimizing changes in the power level of said other branches and response to a change in the power level of said one branch.

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**4,741,349**

## SELF-PROPELLED HARVESTER THRESHER

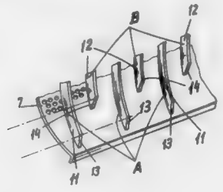
**Heinrich Roderfeld, and Johannes Dammann, both of Harsewinkel, Fed. Rep. of Germany, assignors to Claas Ohg, Harsewinkel, Fed. Rep. of Germany**

**Filed Oct. 21, 1986, Ser. No. 921,771**

**Claims priority, application Fed. Rep. of Germany, Oct. 25, 1985, 3537959**

**Int. Cl.[4] A01F** *7/06, 12/44*

**U.S. Cl. 130—27 T** **4 Claims**



**1**. A self-propelled harvester thresher, comprising means for a front product supply; threshing means performing threshing of a product; and separating means arranged downstream of product supply means, said separating means extending in a longitudinal direction and operating in accordance with the principle of axial flow, said separating means including at least one separating rotor and a sieve housing surrounding said separating rotor and provided with inlet and outlet openings, said housing having an upper region provided with a plurality of inner guiding members arranged parallel to one another and extending in a helical manner, said guiding members extending in a running direction and having front ends as considered in said running direction, said guiding members including at least two groups of guiding members, said front ends of the guiding members of one of said groups of guiding members being offset from said front ends of the guiding members of the other of said groups of guiding members as considered in said running direction.

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**4,741,350**

## METHOD FOR PRODUCING CIGARETTES CONTAINING AT LEAST TWO DIFFERENT TOBACCO MIXTURES

**Bruno Belvederi, San Martino Di Monte S. Pietro, Italy, assignor to G. D. Societa per Azioni, Bologna, Italy**

**Filed Nov. 6, 1986, Ser. No. 927,922**

**Claims priority, application Italy, Nov. 19, 1985, 3612 A/85**

**Int. Cl.[4] A24C** *5/14*

**U.S. Cl. 131—84.3** **11 Claims**

**1**. A method for producing cigarettes containing at least two different tobacco mixtures, comprising the following steps:

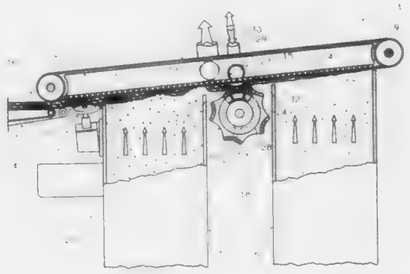
feeding a first tobacco mixture onto a conveyor belt to form a substantially continuous layer having a thickness less than that of a tobacco layer for forming a continuous rod;

by means of a transfer device, successively withdrawing from said layer tobacco portions which measured centrally from said portions are spaced apart by a distance equal to a multiple of the length of one cigarette;

depositing said tobacco portions by means of said transfer device onto the tobacco remaining on said conveyor belt to form a succession of tobacco parts distributed at constant pitch;

feeding a second tobacco mixture onto said conveyor belt to fill the areas left vacant through said withdrawing step between said tobacco parts which remained on said conveyor belt after said withdrawing step;

trimming with a trimmer device the composite layer to make said composite layer's thickness uniform, said trimmer



device operating in determined phase relationship with said transfer device; and

wrapping said composite layer in paper to form a continuous cigarette rod.

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**4,741,351**

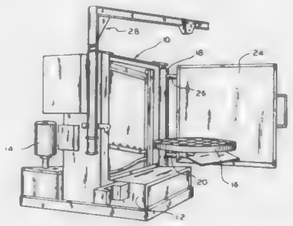
## PARTS WASHER

**Gary E. Minkin, Saint Louis, Mo., assignor to The Modern Auto Recycling Techniques Corporation, St. Louis, Mo.**

**Filed Mar. 7, 1985, Ser. No. 709,079**

**Int. Cl.[4] B08B** *3/02*

**U.S. Cl. 134—144** **1 Claim**



**1**. A parts washer comprising, a cabinet, a turntable positionable in the cabinet for supporting parts to be washed and rotatable about an axis of rotation, drive means for rotating the turntable, a spray manifold having a vertical tube at one side of the turntable pivotally mounted for movement about an axis parallel to said axis of rotation, an upper arm extending from said vertical tube at a level above and spanning said turntable, a lower arm extending from said vertical tube at a level below said turntable, said lower arm and upper arm having spray nozzles directed toward said turntable at opposte sides of said axis of rotation thereof to direct sprays of cleaning fluid toward the top and bottom of parts on the turntable, said vertical tube also having spray nozzles, the upper and lower arms extending from the vertical tube at different angles and out of the plane of the spray nozzles on the vertical tube whereby the spray nozzles direct cleaning fluid toward the top, bottom and sides of parts on the turntable in three different nonintersecting planes, and means for oscillating said spray manifold about the pivot axis of the vertical tube in an advancing movement counter to the direction of turntable rotation and in an opposite return movement, said means for oscillating including a motor and drive connections between the motor and the vertical tube to cause the return movement to be faster than the advancing movement and at a cycle speed to assure that the spray from the spray nozzles in successive advances of the spray manifold has overlapping contact with a part on the turntable.



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**4,741,352**

## ADHESIVE FOR HIGH TEMPERATURE THREAD LOCKING IN HYDRAULIC SYSTEM

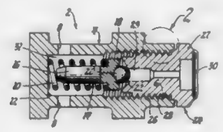
**Richard K. Gray, Warren, Mich., assignor to General Motors Corporation, Detroit, Mich.**

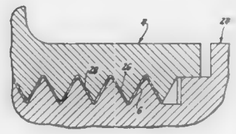
**Division of Ser. No. 732,183, May 9, 1985, Pat. No. 4,644,023.**

**This application Oct. 9, 1986, Ser. No. 917,359**

**Int. Cl.[4] F16K** *11/04*

**U.S. Cl. 137—15** **1 Claim**





**1**. A method of calibrating the relief pressure of a valve for use in the power steering system of an automotive vehicle wherein said valve comprises a valve seat and a valve body which are threadingly engaged to form a conduit for hydraulic fluid therebetween, wherein said conduit a check ball is pressed against the valve seat by a valve stem biased by means of a coil spring and the relief pressure of the valve is calibrated by threading the valve seat and body together to compress the spring, said method comprising the steps of applying a liquid adhesive composition consisting essentially of an epoxy novolac resin, about three to four weight parts of a diglycidyl ether of bisphenol-A for each weight part said novolac resin, and about three to six weight parts 2-ethyl-4-methyl imidazole curing agent per 100 parts total resin to the threads of said valve seat and/or said valve body, threading said valve seat and body together to disperse the adhesive between their threads, passing hydraulic fluid through said conduit and adjusting the relative positions of the valve seat and body such that the check ball unseats at the desired hydraulic fluid pressure, and heating said adhesive to cure it and bond said valve seat and body together.

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**4,741,353**

## WASHING MACHINE WITH IMPROVED LIQUID FLOW DISTRIBUTING VALVE

**Claudio Milocco, Pordenone, Italy, assignor to Industrie Zanussi, S.p.A., Pordenone, Italy**

**Filed Mar. 4, 1987, Ser. No. 21,484**

**Claims priority, application Italy, Mar. 19, 1986, 45711 A/86**

**Int. Cl.[4] G05D** *7/03;* **F16K** *15/04*

**U.S. Cl. 137—119** **7 Claims**

**1**. In a washing machine assembly including first and second liquid ducts having respective inlets and outlets, said first duct having an interior volume greater than said second duct and said outlet of said first duct being at a level higher than said outlet of said second duct, pump means for pumping liquid to said ducts, and valve means for controlling the flow of liquid from said pump means to said inlets of said first or second ducts, the improvement wherein said valve means comprises:

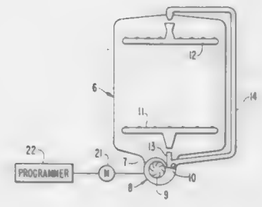
a valve housing having an inlet connected to the delivery side of said pump means and first and second outlets connected respectively to said inlets of said first and second ducts;

a weight-biased valve closing element within said housing and movable therein between a stable first unblocking position spaced from and aligned with said first outlet, an unstable second unblocking position spaced from and aligned with said second outlet, a first blocking position closing said first outlet, and a second blocking position closing said second outlet, said unstable second unblocking position being at a level higher than said stable first unblocking position;

whereby with said closing element in said first or second unblocking positions, starting of said pump means to pump liquid through said valve means causes said closing element to be moved by the pumped liquid to said first or second blocking positions, respectively, thereby enabling said pump means to pump liquid to said second or first ducts, respectively, and whereby when operation of said pump means is stopped said closing element tends to fall by gravity away from said first or second blocking positions, respectively;

guide means for guiding movement of said closing element from said unstable second unblocking position to said stable first unblocking position;

bypass means for, when said closing element is in said first blocking position, allowing some pumped liquid to bypass




said closing element into said first duct, whereby when operation of said pump means is stopped said bypassed liquid in said first duct falls by gravity from said first duct and moves said closing element to said unstable second unblocking position, and whereby after all of said bypassed liquid has fallen from said first duct said closing element moves by gravity along said guide means from said unstable second unblocking position to said stable first unblocking position; and

said bypass means being calibrated to provide a supply of said bypassed water into said first duct during a first operating phase of said pump means sufficient to, upon stopping of said first operating phase, maintain said closing element in said unstable second unblocking position for a predetermined time period, whereby starting a second operating phase of said pump means before the end of said predetermined time period causes said closing element to be moved by the pumped liquid from said unstable second unblocking position to said second blocking position, and starting said second operating phase of said pump means after the end of said predetermined time period allows said closing element to move by gravity along said guide means from said unstable second unblocking position to said stable first unblocking position and then causes said closing element to be moved by the pumped liquid from said stable first unblocking position to said first blocking position.

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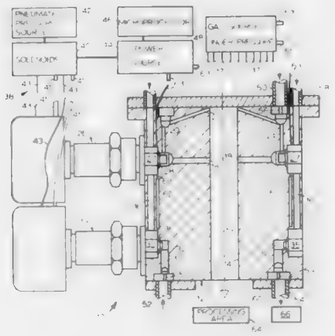


**4,741,354**

## RADIAL GAS MANIFOLD

**Leonard C. DeMild, Jr., Peabody, Mass., assignor to Spire Corporation, Bedford, Mass.**

**Filed Apr. 6, 1987, Ser. No. 34,615**
**Int. Cl.[4] F16K** *11/10, 49/00*
**U.S. Cl. 137—240** **11 Claims**



1. A radial gas manifold comprising:
(a) a body provided with a mixing channel therethrough;
(b) a plurality of gas conduits formed in said body in parallel spaced relation to said mixing channel;
(c) a radial passage connecting each of said plurality of gas conduits to said mixing channel;
(d) a first annular duct having passages respectively connecting said duct to said mixing channel and to each of said plurality of gas conduits;
(e) first valve means operatively disposed in each of said plurality of gas conduits at their junctions with said radial passages;
(f) a second annular duct having passages for connecting said duct to each of said plurality of gas conduits at points axially spaced along the length of said conduits;
(g) second valve means operatively disposed in each of said plurality of gas conduits at their junctions with said passages connecting to said second annular duct; and
(h) means for operating said first and second valve means.

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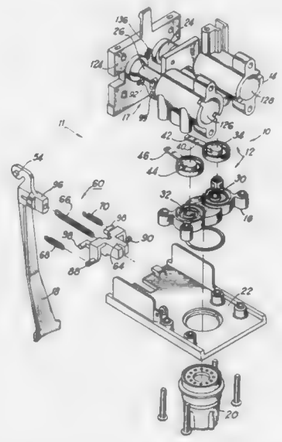
**4,741,355**

## LOW COST BEVERAGE DISPENSER VALVE ASSEMBLY

**William S. Credle, Jr., Stone Mountain, Ga., and Alfred A. Schroeder, San Antonio, Tex., assignors to The Coca-Cola Company, Atlanta, Ga.**

**Filed Dec. 9, 1985, Ser. No. 806,886**
**Int. Cl.[4] F16K** *11/14, 31/56*
**U.S. Cl. 137—269** **32 Claims**

30. A method comprising:
(a) providing a beverage dispenser valve assembly including a valve body having first and second separate liquid conduits therethrough and first and second valves in said first and second conduits, respectively, for controlling fluid flow therethrough, a pivotable cup lever arm mounted for movement between a rest position and an actuated position, valve actuating means interconnected between said cup lever arm and said valves for snap moving said valves to simultaneously open both of said valves when said cup lever arm is moved to its actuated position, a yoke interconnected between said valve actuating means and said valves and being movable by said valve actuating means from a rest to an actuated position when said cup lever arm is moved from its rest to its actuated position, each of said valves including a movable actuating lever arm extending outside of said conduits and movable between valve closed and valve open positions, and said yoke being operatively associated with said actuating lever arms for moving said lever arms from their rest to their actuated position;
(b) providing said valve actuating means as one of: (1) an electrically operated valve actuating means including a



single solenoid, and (2) a mechanical valve actuating means including a snap-acting spring means; and
(c) converting said valve assembly for use with the other of said valve actuating means by removing one of said electrical and mechanical valve actuating means and replacing it with the other of said electrical and mechanical valve actuating means.

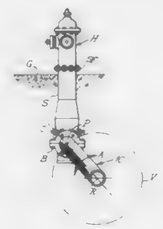
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**4,741,356**

## HYDRANT VARIABLE RISER AND RESTRAINT

**Richard C. Letzo, and Joseph R. James, both of Sarasota, Fla., assignors to Assured Flow Sales, Inc., Sarasota, Fla.**

**Filed Aug. 8, 1986, Ser. No. 894,854**
**Int. Cl.[4] E03B** *9/02*
**U.S. Cl. 137—272** **9 Claims**



1. A variable riser conduit connectable between a fixed below grade water main and a fire hydrant for adjustable vertical positioning of the fire hydrant with respect to the water main comprising:
a housing having an elongated continuous passage therethrough;
said passage having an inlet portion at one end, an outlet portion at the other end, and a central portion therebetween along a common axis therethrough;
said passage configured such that said axis portions passing through said inlet and outlet portions are parallel and spaced apart;



said inlet portion sized for releasable water tight interconnection to the water main;
said outlet portion sized for releasable water tight interconnection to the inlet shoe of the fire hydrant;
said housing having an external annular collar adjacent to but spaced from said one end;
said housing having an external annular collar adjacent to but spaced from said other end;
said housing manually rotatable when loosely interconnected between the water main and the fire hydrant such that the vertical positioning of the fire hydrant is varied according to the rotational positioning of said housing; and
said housing nonrotatable when said housing is tightly connected to the fire hydrant and the water main.

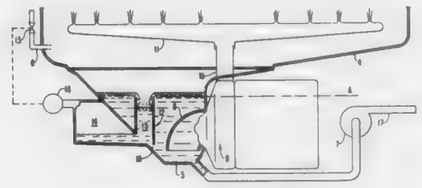
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**4,741,357**

## WASHING MACHINE WITH A CONTROL SYSTEM FOR CONTROLLING THE SUPPLY OF WATER

**Mario Battel, and Claudio Milocco, both of Pordenone, Italy, assignors to Industrie Zanussi SpA, Prodenone, Italy**

**Filed May 28, 1987, Ser. No. 55,331**
**Claims priority, application Italy, Jun. 4, 1986, 45730 A/86**
**Int. Cl.[4] F16K** *31/00, 31/12*
**U.S. Cl. 137—387** **3 Claims**



1. In a washing machine including a tub having a water collecting well, a water supply conduit provided with a controllable valve for supplying water to said well during at least one water supply phase of the operation of said washing machine, and a circulation pump for circulating water collected in the well during at least a latter portion of said supply phase, the improvement of control system means for automatically controlling the operation of said valve and thereby the supply of water to establish a minimum water level within said well required for optimum operation of said circulation pump, said control system means comprising:
a control chamber;
overflow wall means, having a predetermined overflow level and communicating said well with said control chamber, such that when the level of water in said well reaches said overflow level the water overflows said overflow wall means into said control chamber, resulting in a pressure increase within said chamber above the level of water therein;
calibrated flow communication means, continually communicating an intake of said circulation pump with said control chamber, such that operation of said circulation pump draws water directly from said well and also from said control chamber through said flow communication means;
whereby said control system means amplifies changes of pressure within said control chamber above the water level therein as a function of variations in the water level within said well; and
pressure sensitive means, operatively connected to said valve and responsive to the pressure within said control chamber above the level of water therein, for closing said valve when the rate of water overflowing said overflow wall means into said control chamber is at least equal to the rate of water flowing from said control chamber through said flow communication means.

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**4,741,358**

## LIQUID LEVEL CONTROL FLOAT VALVE

**Jin S. Cho, P.O. Box 426, 600 Pusan, Rep. of Korea**

**Filed Oct. 1, 1986, Ser. No. 914,066**
**Int. Cl.[4] F16K** *31/32, 33/00*
**U.S. Cl. 137—426** **8 Claims**



1. A liquid level control float valve which comprises:
a valve body,
an open/close valve disposed in said valve body, said open/close valve being mounted on a gear shaft which extends from the inside of said valve body to the outside of said valve body and on opposite sides thereof,
engaging members fixed to the gear shaft on opposite sides of the valve body, said engaging members being provided with a projecting nipple,
stud means disposed on the gear shaft at opposite sides of the valve body and the engaging members having a shape which substantially corresponds to the shape of the stud means whereby a secure engagement is achieved between the stud means and the engaging members,
passive gears rotatably engaged with said gear shaft on opposite sides of said valve body and adapted to engage said engaging members after a selected portion of its rotation has taken place, said passive gear containing a plurality of holes for selectively receiving a pin, said pin being adapted to engage the projecting nipple of the engaging member for selectively and adjustably rotating the degree of opening and closing of the valve within the valve body,
driving gears mounted for rotational engagement with said passive gears,
a float ball provided to determine the liquid level, and
lever arms connected at one end to said float ball and at the other end to said driving gears whereby upon the change in the level of the liquid, the float ball is raised or lowered which in turn rotates the driving gears and the passive gears engaged therewith which further rotates the engaging members upon the engagement of the pin against the projecting nipple of the engaging members for operating the gear shaft to operate the open/close valve.

5. A liquid level of claim 1 wherein the lever arms has a horizontal portion which contains a plurality of apertures whereby the portion of the float ball can be varied along the lever arm.

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**4,741,359**

## PRESSURE REDUCER

**Hansjurgen F. Siebald, Weinheim, Fed. Rep. of Germany, assignor to DruVa Sonderventile GmbH, Eppelheim, Fed. Rep. of Germany**

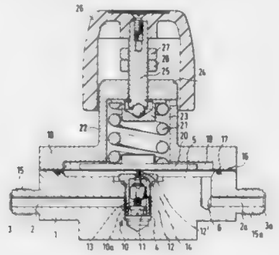
**Filed Oct. 16, 1986, Ser. No. 919,809**
**Claims priority, application Fed. Rep. of Germany, Oct. 31, 1985, 3538828**
**Int. Cl.[4] F16K** *31/12*
**U.S. Cl. 137—505.42** **14 Claims**

1. Pressure reducer for ultra-pure gases, comprising a one piece solid block-like casing body formed at one of its ends with a central recess adapted to receive a tubular regulator and which in plan view exhibits an outer contour of a polygon, said one-piece casing body having a planar closure wall, at an end

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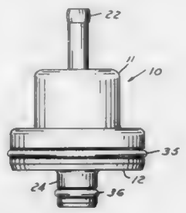
opposite said one of its ends, spaced from said central recess, a plurality of fluid channels directed radially inwardly from outer side faces of said polygon toward the center of said casing body and extending outwardly from said casing body



into and through connecting pieces outwardly projecting from central regions of at least some of said side faces of said polygon, said connecting pieces being integrally formed with said casing body and constituting therewith said one piece block-like casing body.

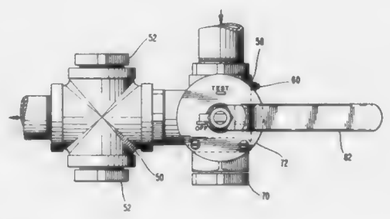
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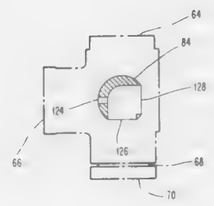
**4,741,360**
**FUEL PRESSURE REGULATOR**
**Roger D. Affeldt, Davisburg, and Kenneth L. Rische, Canton, both of Mich., assignors to Tom McGuane Industries, Inc., Auburn Hills, Mich.**
**Filed Sep. 14, 1987, Ser. No. 95,643**
**Int. Cl.[4] F16K *31/12***
**U.S. Cl. 137—510** **4 Claims**



1. A fuel pressure regulator comprising a housing,
a diaphragm dividing the housing into a first chamber and second chamber,
a passage from the exterior of the housing to said first chamber,
an inlet and an outlet associated with the second chamber of the housing,
a valve seat associated with the outlet,
a carrier mounted on and movable with the diaphragm,
a spring within the first chamber yieldingly urging the carrier toward the valve seat,
said carrier supporting a plate that has an opening therein,
a valve having a hollow tubular closed end portion that projects through said opening in the plate for engagement with said valve seat,
said valve having a peripheral portion that retains said valve between said carrier and said plate,
a second spring interposed between said carrier and extending into the tubular portion of the valve to yieldingly urge said closed end tubular portion of said valve toward the valve seat and permit relative movement between said valve and said valve seat.

**4,741,361**
**VALVE AND ARRANGEMENT FOR FIRE SUPRESSION WATER SPRINKLER SYSTEM**
**George J. McHugh, Broomall, Pa., assignor to AGF Manufacturing, Inc., West Chester, Pa.**
**Continuation-in-part of Ser. No. 874,653, Jun. 16, 1986, abandoned. This application Jul. 2, 1986, Ser. No. 881,270**
**Int. Cl.[4] G01M *19/00*; F16K *5/10***
**U.S. Cl. 137—559** **24 Claims**



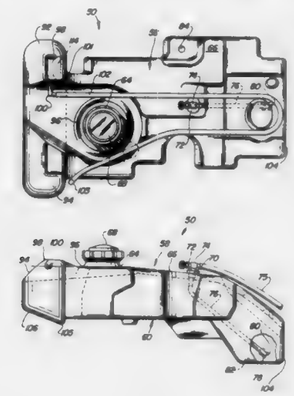


1. An arrangement for testing and draining a fire suppression water sprinkler system, comprising:
conduit means for supplying water to a plurality of sprinklers;
means for sensing a flow of water in said conduit means;
valve means provided downstream of said means for sensing and in communication with said conduit means, said valve means comprising
a housing defining an interior chamber having an inlet and an outlet, said inlet and said outlet being generally perpendicularly to one another,
a valve member provided within said interior chamber, the valve member having first, second and third ports arranged about a circumference of said valve member, said first and second ports being generally perpendicular to one another and said second and third ports being generally perpendicular to one another, said first port having a size which is smaller than either of the second and third ports,
seat means for sealingly receiving a surface of said valve member adjacent the outlet; and
means for selectively moving said valve member within said interior chamber whereby communication between said inlet and outlet may be sequentially closed, open to a first preselected flow rate and then opened to a second preselected flow rate, said second preselected flow rate being greater than said first preselected flow rate.

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**4,741,362**
**FUEL TANK FOR AN OFF-ROAD VEHICLE**
**Robert J. Smola, Watertown, Wis., assignor to Deere & Company, Moline, Ill.**
**Filed Aug. 20, 1986, Ser. No. 898,471**
**Int. Cl.[4] F16K *24/00***
**U.S. Cl. 137—587** **30 Claims**

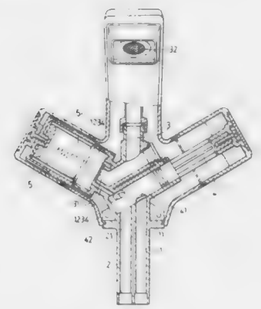
1. A fuel tank having an upper and a lower surface operatively positioned on a vehicle having an engine and an operator seat comprising: filler means, operatively positioned in said tank, for introducing fuel into said tank such that during refueling operations, little if any fuel is spilled from said tank onto said tank surfaces or said vehicle;
cap means, operatively selectably attachable and detachable to said filler means, for selectively closing and opening said filler means such that, when said filler means is selectively closed, no fuel is spilled therefrom;
valve means, operatively positioned in said upper surface of said tank, for controlling the flow of fuel therefrom;



seal means, operatively connecting said valve means to said tank, for sealing said valve means to said tank;
expansion means, operatively connected to said upper surface of said tank, for permitting expansion of said fuel therein;
vent means, operatively connected to said expansion means, for venting said tank; and
first conduit means, operatively connected to said vent means, for receiving fuel from said expansion means, said first conduit means being positioned at least partically contiguous with said upper surface such that no fuel contacts or accumulates on any surface of said fuel tank.

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**4,741,363**
**FLUID FAUCET**
**Lee-Ping Hu, Hsin Tien, Taiwan, assignor to Hydrotek Corporation, Taichung, Taiwan**
**Filed Oct. 29, 1986, Ser. No. 925,498**
**Int. Cl.[4] F16K *11/06, 31/06***
**U.S. Cl. 137—607** **2 Claims**



1. A water faucet comprising:



a first passage having a first mouth and adapted to be connected to a hot water source;
a second passage having a second mouth and adapted to be connected to a cold water source wherein said second mouth is in communication with said first mouth;
a third passage having a third mouth for passing the mixed water constituted from said hot and cold water;
an outlet for discharging said mixed water;
a hollow tube passing through said first and second passages for guarding the opening amount of each of said first and second mouths, said tube including a first hole capable of fully escaping from said first mouth when said tube is in a first position and fully communicating with said first mouth when said tube is in the second position, and a second hole capable of fully escaping from said second mouth when said tube is in a second position and fully communicating with said second mouth when said tube is in said first position and a third hole permitting the mixed water to enter a communicating passage between said tube and said third passage, whereby said tube will guard the opening amounts of both of said first and second mouths when said tube is in a position between said first and said second position to regulate water passed through said first and second mouths from said hot and said cold water sources;
a handle connected to said tube for moving said tube between said first position and said second position without resulting in axial translation of said tube;
a mouth engaging disk capable of sealingly engaging said third mouth;
an electromagnetic valve including:
a valve stem for engaging said mouth engaging disk which in turn sealingly engages said third mouth;
a spring connected to the end of said valve stem that does not engage said mouth engaging disk;
a valve stem receiver for receiving said valve stem and said spring when said electromagnetic valve is actuated; and
a valve body for housing said valve stem receiver, whereby said spring biases said valve stem against said mouth engaging disk and prevents the water from entering said third mouth when said electromagnetic valve is not actuated and whereby said spring is compressed by said valve stem into said valve stem receiver when said electromagnetic valve is actuated allowing the water contained within said communicating passage to push said mouth engaging disk axially to compress said spring and allow said water to pass through said third mouth to said third passage and to be discharged from said outlet;
a sensing means with an infrared coupling-and-controlling circuit for sensing a body, said circuit actuating said electromagnetic valve to permit said mixed water to pass through said third mouth when said body is at a distance close to said faucet and to deactuate said electromagnetic valve to prevent said mixed water from passing through said third mouth when said body is at a distance remote from said faucet, said circuit adapted to be powered by a regulator voltage, said circuit including:
a signal generator for generating infrared rays of intermediate frequency;
a receiver for receiving said infrared rays reflected from said body to effect a potential difference and for giving a voltage output obtained through amplifying said potential difference;
a filter for filtering said voltage output and transmitting an output signal of stabilized voltage;
an amplifier amplifying said output signal; and
an electronic trigger for receiving the amplified output signal and triggering said electromagnetic valve when said reflected rays received by said receiver reach a certain quantity.

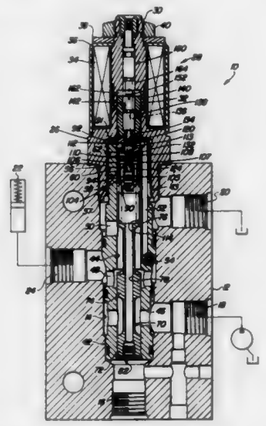
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**4,741,364**
## PILOT-OPERATED VALVE WITH LOAD PRESSURE FEEDBACK

**Kenneth J. Stoss, Cedar Falls, and Richard A. Felland, Waterloo, both of Iowa, assignors to Deere & Company, Moline, Ill.**

**Filed Jun. 12, 1987, Ser. No. 60,880**
**Int. Cl.[4] F15B *13/043***
**U.S. Cl. 137—625.64** **13 Claims**

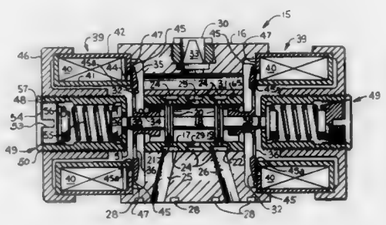


1. A valve comprising:
a housing having a valve bore therein, and having a supply port communicating the valve bore with a pressure source, a return port communicating the valve bore with a reservoir and a load port communicating the valve bore with a hydraulic load;
a pressure-operated main valve member movable in the valve bore to control fluid communication between the load port and the supply and return ports;
a pressure-responsive pilot valve member movable to control a pilot pressure communicated to the main valve member;
a load feedback passage communicating fluid pressure from the load port to the pilot valve; and
feedback valve means for opening and closing fluid communication through the load feedback passage.

**4,741,365**
## COMPOUND PNEUMATIC VALVE

**Charles A. Van Ornum, Fountain Valley, Calif., assignor to McDonnell Douglas Corporation, Long Beach, Calif.**

**Filed Aug. 4, 1986, Ser. No. 892,303**
**Int. Cl.[4] F15B *13/044***
**U.S. Cl. 137—625.65** **11 Claims**

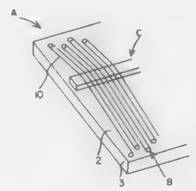


1. A high power, compound, pneumatic, bang-bang, spool type valve with a closed center position and very fast opening and closing time, adapted to be electro mechanically driven by a pulse width modulated command signal, for driving a balanced piston actuator with high bandwidth comprising:
a valve body having a thru bore, a pressure inlet port, an external vent, and first and second cylinder ports formed by at least one asymmetrical slot,;
a valve spool slideably oriented in said valve body bore and having at least two enlarged first and second lands oriented to cover said first and second cylinder ports when said spool is in said center position and displacement of said spool in one direction connects said pressure port with said first cylinder port and said vent to said second cylinder port and displacement of said spool in the opposite direction connects said pressure port with said second cylinder port and said vent to said first cylinder port;
said asymmetrical slots forming said first and second cylinder ports oriented so that when said spool is displaced to vent said cylinder port, the area of said cylinder port is greater than the area of said cylinder port when said spool is displaced to connect said pressure port to said cylinder port;
first and second solenoids having a flat faced armature and a core assembly with said armatures attached to the respective ends of said spool and spaced from said core assembly;
means to bias said spool in said closed center position in the absence of said pulsed command signal, said biasing means applying essentially no force when said spool is in said closed center position and an essentially constant force with spool displacement so that said solenoids produce a force which when algebraically summed with all other forces acting on said spool produce a high net force authority which increases as the spool stroke increases so as to produce a fast opening and closing valve.

**4,741,366**
## HAND-WEAVING DEVICE

**Kuniharu Yamotogi, Osaka, Japan, assignor to Yokota Co., Ltd., Osaka, Japan**

**Filed Apr. 28, 1987, Ser. No. 43,638**
**Claims priority, application Japan, Dec. 18, 1986, 61-195789[U]**
**Int. Cl.[4] D03D *29/00***
**U.S. Cl. 139—34** **7 Claims**



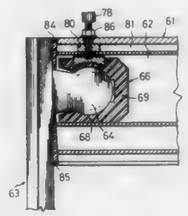
1. A hand-weaving device comprising a body (A) including a plastic boad (2) having small holes (1) positioned at intervals of 3 to 10 mm to each other in a lattice-form, and a leg portion (3) formed on the periphery of the plastic board (2), and
pins (B) each adapted to be inserted into one of the small holes (1),
said small hole (1) being composed of an upper opening portion (4) having a relatively small diameter, and a lower opening portion (5) concentrically continuous with the upper opening portion (4) and having a slightly larger diameter than that of the upper opening portion (4), the diameter of the upper opening portion (4) being slighly smaller at a lower position thereof whereby the upper opening portion (4) becomes thinner toward the lower end,
said pin B being composed of a rod-form portion (6), a fringe portion (7) positioned below the rod-form portion (6) and having a diameter larger than that of the upper opening portion (4) at the upper end of the upper opening portion (4), a narrow portion (8) positioned below the fringe portion (7) and having a diameter substantially equal to or slightly smaller than the lower end diameter of the upper opening portion (4), and further a lowermost portion containing an expansion portion (9) positioned below the narrow portion (8), the diameter of said expansion porti on (9) being smaller than that of the upper end of the upper opening portion (4) and larger than that of the lower end of the upper opening portion(4) and smaller than that of the lower opening portion (5), said lowermost portion being thinner from the expansion portion (9) toward the lower end of the lowermost portion, the length of the narrow portion (8) being substantially equal to or slightly longer than that of the upper opening portion (4) of the small hole (1).



**4,741,367**
## HEALD FRAME FOR LOOMS

**Kazuya Kitawaki, Osaka, Japan, assignor to Nankai Kogyo Kabushiki Kaisha, Osaka, Japan**

**Filed Apr. 22, 1987, Ser. No. 41,734**
**Claims priority, application Japan, Apr. 22, 1986, 61-60347[U]**
**Int. Cl.[4] D03C *9/06***
**U.S. Cl. 139—91** **5 Claims**



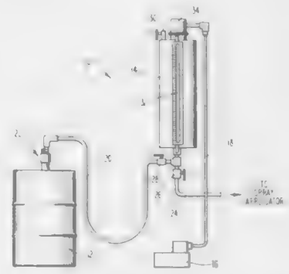
1. A heald frame for looms, comprising:
a pair of frame staves having hollow ends;
a pair of side stays each having projections at their ends for joining each of said projections with a spacer mounter thereto for disposal interiorly together with a retaining member within a hollow end of the frame stave;
a plurality of resilient spacers each disposed on and substantially surrounding a said projection respectively, each spacer having a resting shape wherein it is insertable into said hollow end, and a deformed shape;
a cushioning member positioned between an edge of each said frame stave hollow end and a respective side stay;
a retaining member directly connected to each spacer, the retaining member being pressed against the spacer to provide said deformed shape of said spacer; and
means for exerting pressure upon each retaining member thus to depress the spacer and provide said deformed shape to hold the projection securely and, at the same time, remain depressed intensively against the inner wall at the hollow end.

**4,741,368**
## RETURNABLE CONTAINER FOR LIQUID CHEMICALS AND FITTING THEREFOR

**Tom I. Crumby, Greenwood, Miss., assignor to FMC Corporation, Philadelphia, Pa.**

**Filed Sep. 2, 1986, Ser. No. 902,908**
**Int. Cl.[4] B65B *3/04***
**U.S. Cl. 141—18** **18 Claims**

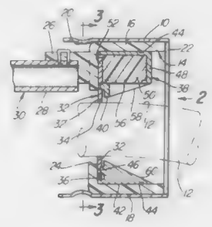
10. The combination of a closed container for dispensing liquid chemical and a fitting mounted in the lid of the container, said fitting comprising:
a tubular support member having an open end adapted on the periphery thereof for sealing engagement with the lid;
a closure plate in the opposing end of the tubular support member;
a liquid chemical dispensing tube sealingly mounted in the closure plate and extending axially in the tubular support member for contact with liquid chemical in the container;
coupling means capping the upper end of the dispensing tube for connection to a liquid transfer line; and
a vent tube assembly sealingly mounted adjacent the dispensing tube in the closure plate and having a pressure relief or pressurization valve which is removable for filling the container with liquid chemical.



**4,741,369**
## INLETTING DEVICE FOR FUEL TANK

**Gary D. Dawson, Rochester, Mich., assignor to Chrysler Motors Corporation, Highland Park, Mich.**

**Filed Feb. 12, 1987, Ser. No. 14,417**
**Int. Cl.[4] B65B *3/04***
**U.S. Cl. 141—286** **2 Claims**



1. A fuel fill tube of a fuel tank having an inlet forming end portion therein with a device to receive a liquid fuel delivery nozzle and to hinder the discharge of vaporous fuel from the tank, comprising:
the device having a housing with a peripheral surface configuration conforming to the shape of the fuel fill tube so that the device is securely held therein and does not permit flow of fuel or vapor therebetween;
the housing encircling a liquid fill inlet opening adapted to receive the associated delivery nozzle for fuel during a fill operation of the fuel tank;
a flexible elastomeric seal member having a generally centrally located aperture therethrough and supported near the inner edge portion forming the central aperture whereby the dimensional configuration of the aperture conforms to the shape of the associated delivery nozzle so that fuel and vapor will not pass therebetween;
at least one vent opening through the housing located radially outward from the central aperture of the seal member,

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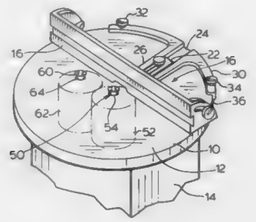


an outer edge portion of the seal member overlying the vent opening to normally block flow from the fuel tank to the atmosphere;

filter means of compressible open celled foamed plastic material supported and positioned in abutting engagement with the outer surface of the seal's peripheral edge portion thereby normally urging the edge portion against the housing and over the vent opening, but permitting the seal's edge portion to move away from the vent opening by slight compression of the filter material in response to greater pressure within the fuel tank than atmosphere.

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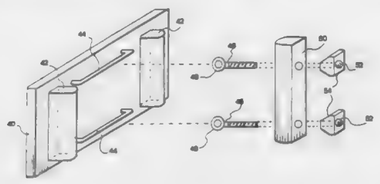
**4,741,370**
**ROUTER TOOL**
**Ken B. Heaton, Box 29, Millbrook, Ontario, Canada (L0A 1G0)**
**Filed Jun. 11, 1987, Ser. No. 60,579**
**Int. Cl.[4] B27F** *1/06*
**U.S. Cl. 144—134 A** **4 Claims**



1. A woodworking apparatus comprising, in combination: a support table having a flat, circular table surface; a first power driven cutting tool having a spindle mounted below the table surface, wherein said spindle is adapted to project upwardly through an orifice in the table surface substantially centrally thereof; a second power driven cutting tool mounted off-center from the first cutting tool below the table surface and having a spindle adapted to project upwardly through an orifice in the table surface; a guide fence mounted on said table surface on a chord thereof, means for adjusting said guide fence radially from a position substantially central of the table surface diametrically thereof to a retracted chordal position; and means for adjusting said guide fence angularly about the table surface, whereby the effective distance between the two cutting tools can be selectively adjusted by radial and angular adjustment of the said guide fence.

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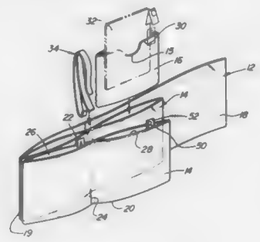
**4,741,371**
**JIG FOR BENDING A HOCKEY STICK BLADE**
**Ghyslain C. Lord, 335, Parizeau Street, Boisbriand, Qc, Canada J7G 2C6**
**Filed Jul. 24, 1987, Ser. No. 77,340**
**Int. Cl.[4] B27H** *1/00*
**U.S. Cl. 144—269** **7 Claims**



1. A jig for bending a hockey stick blade comprising a rigid backing plate, the said backing plate being provided with a pair of longitudinal guiding tracks on said backing plate, the said tracks being adjacent and substantially parallel to each other, spacer means fixed to said backing plate on one side thereof and at each end of said pair of tracks, a pressure plate located between said spacer means for connecting said tracks to said pressure plate for laterally moving said pressure plate and for adjustably spacing the said pressure plate relative to said backing plate, whereby a hockey stick blade abutting at both ends on said spacer means is adapted to be adjustably bent by said pressure plate.

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**4,741,372**
**POCKET ORGANIZER**
**Michael A. Santilli, 3528 Cotillion, Plano, Tex. 75074**
**Filed Jun. 3, 1986, Ser. No. 869,999**
**Int. Cl.[4] A45C** *1/06, 11/18*
**U.S. Cl. 150—137** **15 Claims**



1. A pocket organizer comprising

a substantially rectangular sheet

at least one first open-topped envelope having transverse edges adjacent its open top,

means for medially folding each said first envelope parallel to its transverse edges to form first and second open topped envelope compartments,

at least one second open-topped envelope dimensioned to be slidably received in one of said first and second compartments,

wherein said sheet includes a transverse edge having a length substantially the same as the length of a transverse edge of one of said first envelopes,

means for securing said transverse edge of said sheet to said transverse edge of at least one of said at least one first envelope,

wherein said rectangular sheet is longer than said at least one first envelope, whereby a portion of said sheet overlaps said sheet when said sheet is wrapped about each said at least one medially folded first envelope.

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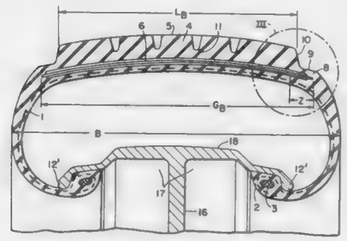
**4,741,373**
**VEHICLE WHEEL AND TIRE ARRANGEMENT**
**Gerhard Mauk, Wunstorf, Fed. Rep. of Germany, assignor to Continental Gummi-Werke Aktiengesellschaft, Hanover, Fed. Rep. of Germany**
**Continuation of Ser. No. 766,026, Aug. 15, 1985, abandoned. This application Mar. 5, 1987, Ser. No. 23,921**
**Claims priority, application Fed. Rep. of Germany, Aug. 18, 1984, 3430500**
**Int. Cl.[4] B60C** *11/01*
**U.S. Cl. 152—209 R** **2 Claims**

1. A vehicle wheel and pneumatic tire arrangement, which includes a rim on which can be be mounted a tire having: a radial carcass which has a neutral line with extremely flat orientation and is anchored in the tire beads; sidewalls having a predetermined uniformly thin thickness; a tread strip; respective shoulder-like widening step extensions which are each formed by a step, are disposed on each side of said tread strip, and do not come into contact with the roadway under normal driving conditions; and a belt which extends laterally beyond the ends of the tread strip to within the vicinity of each widening step extension to such an extent that a given one of said belt portions which is disposed within the vicinity of a given one of



said step extensions extends laterally beyond the ends of the tread strip a total distance equal to approximately 25–40% of the total amount by which a widest part of said tire extends beyond the sides of said tread strip which are adjacent to said given step extensions;

the improvement in combination therewith comprising an arrangement wherein said beads of said tire are disposed axially inwardly on said rim to such an extent that said beads are disposed completely axially inwardly of said widening step extensions; and wherein furthermore said carcass neutral line essentially conforms to the membrane theory in the region of said sidewalls of said tire, said sidewalls having relatively considerable curvature and deflecting independently due to flexible nearly hinge-like-acting attachment of the tire sidewalls between said tread strip and said beads; said rim having a support member including a support surface radially inwardly of said tread strip and having essentially radially inwardly extending



rim flanges; said tire beads being disposed on the radially inner periphery of said rim next to said rim flanges so that during deflection a lateral bulging of the tire can occur without any hindrance from the rim flanges disposed within the interior of the tire and primarily due to extremely flat orientation of the carcass neutral line in the region of the rim flanges, there results a great bulging and hance a deflection condition wherein energy is no longer transmitted from the tire sidewalls to said tread strip; said carcass of a mounted tire, in the vicinity of said rim flanges, extending essentially horizontally, with said carcass neutral line, in this region, conforming to the equation of a catenary curve; the thickness of a given one of said sidewalls of said tire being approximately uniform from the widest part of said tire to the region of the associated rim flange due to construction of a lower sidewall and bead region of the tire with as little material as possible yet having completely satisfactory stability.

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**4,741,374**
**VEHICLE WHEEL**
**Douglas J. Major, Sutton Coldfield, United Kingdom, assignor to SP Tyres UK Limited, Fort Dunlop, England**
**Filed Jun. 27, 1986, Ser. No. 879,576**
**Claims priority, application United Kingdom, Jun. 29, 1985, 8516520**
**Int. Cl.[4] B60C** *17/00*
**U.S. Cl. 152—379.3** **6 Claims**

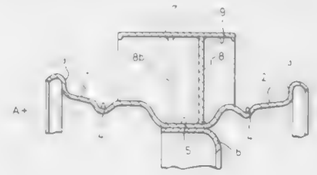
1. A wheel comprising

a pair of parallel, circumferentially extending, axially spaced-apart, radially outwardly facing bead seats,

a radially, outwardly projecting tire retaining flange disposed adjacent to and axially outwards of each bead seat,

a tire fitting well extending between the bead seats in an axial direction and

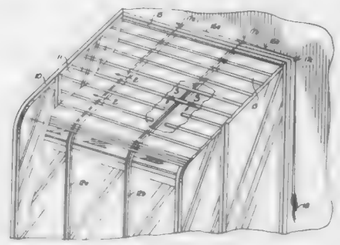
a substantially rigid, deflated-tire support surface extending radially, outwardly of the bead seats and mounted upon a support member projecting radially from the well, wherein the support member is positioned near one side of the well to extend around part of the circumference of the well, and is positioned near the other side of the well to



extend around the remainder of the circumference of the well.

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**4,741,375**
**ADJUSTABLE SOLARIUM SHADE**
**Patricia Milford, and Laurence Milford, both of 7600 Trail Blvd. N., Naples, Fla. 33940**
**Filed Apr. 21, 1983, Ser. No. 487,176**
**Int. Cl.[4] A47H** *5/00*
**U.S. Cl. 160—84.1** **4 Claims**



1. An adjustable shade for shielding from the sun a room having an inclined glass panelled roof and an adjoining glass panelled side wall supported by a plurality of vertically ascending beams each having a C-shaped track on its inside surface comprising

a rectangular shade having sewn into the shade at spaced vertical intervals a series of vertically spaced horizontal loops extending downwardly across the width of the shade,

the upper horizontal edge of the shade being attached to a wall of the room immediately beneath the uppermost edge of the glass panels forming the roof of the room,

a plurality of curtain rods each located within one of the horizontally extending loops in the shade,

the shade being suspended immediately adjacent to the glass panels forming the roof and side wall of the room from the C-shaped tracks on the inside of the beams by a series of key rings sewn to the shade above each of the loops in the shade and a series of eyebolts each connected to one of the key rings, each eyebolt supported by a nut nested in a cylindrical race resting upon one of the C-shaped tracks, and

the shade being raised and lowered by a plurality of cords, each cord anchored at the lower edge of the shade adjacent to one of the C-shaped tracks and then successively threaded through the eyes of the vertically ascending eyebolts and a pulley mounted on the wall of the room.

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4,741,376

## MANUFACTURING OF KRAFT PAPER

Nils Landqvist, Gävle; Sven Spangenberg, Svärdsjö; Torsten Järnberg, and Bengt Nordin, both of Gävle, Sweden, assignors to Korsnas Aktiebolag, Stockholm, Sweden

Continuation of Ser. No. 593,954, Mar. 27, 1984, abandoned. This application Feb. 21, 1986, Ser. No. 833,418
Claims priority, application Sweden, Mar. 30, 1983, 8301804
Int. Cl.[4] D21H 5/24
U.S. Cl. 162—111 15 Claims

1. A process for manufacturing high strength kraft sack or bag paper having improved tensile energy absorption, comprising:

forming on a paper machine at least two separate moist layers of kraft sack or bag paper pulp;

couching said layers together and pressing to form a single pressed web; and

drying said pressed web partly by free drying and partly by cylinder drying, the part of the drying performed by said free drying being within a dry solids content range of from about 55% to about 85% by weight and permitting sufficient free shrinkage of the web to provide substantially increased stretch at break in the cross direction, and the part of said drying not performed by free drying being performed by cylinder drying.

4,741,377

## DOUBLE CAVITY MOULD FOR ANODE CASTING

Robert A. Roberti; Vladimir K. Blechta, and Sid E. Segsworth, all of Sudbury, Canada, assignors to Inco Limited, Toronto, Canada

Filed Jun. 13, 1985, Ser. No. 731,866
Claims priority, application Canada, Oct. 15, 1984, 465402
Int. Cl.[4] B22D 5/02
U.S. Cl. 164—4.1 4 Claims



1. In the process of casting planar anodes within close tolerances for electro-refining purposes which includes pouring molten anode material into a cavity in the top face of a metal block mould and solidifying and cooling said anode material in said mould by conducting heat through said block mould in a direction essentially normal to the top surface of said mould the improvement comprising employing in said process a mould having a casting cavity in both the top and bottom faces of said mould, predetermining a maximum tolerable mould warpage, monitoring mould warpage, and periodically inverting said mould at points in time prior to that time at which mould warpage exceeds said maximum tolerable mould warpage.

4,741,378

## SPRUE PIN FOR PRODUCING CASTINGS

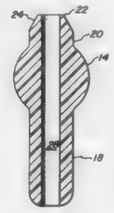
Melvin A. Engelman, Wappingers Falls; Victor Zamaloff, Poughkeepsie, and Lori D. Cooke, Hyde Park, all of N.Y., assignors to Dentifax International, Inc., Wappingers Falls, N.Y.

Filed Sep. 20, 1985, Ser. No. 778,196
Int. Cl.[4] B22C 7/02, 9/04
U.S. Cl. 164—244 7 Claims

1. A sprue pin used in the lost wax process for producing castings, comprising:

an elongated body member having a lumen lengthwise therethrough; and

a bulbous extension around a portion of the body toward one end of the body member, said extension separating the body into a stem segment and a shorter tip segment, the outer circumference of said tip segment gradually decreasing from an area toward the extension to the end of



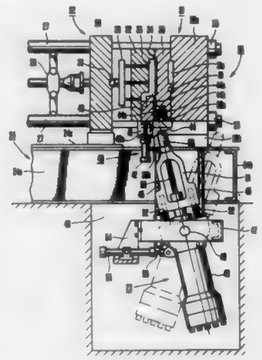
the tip segment, the end of said tip segment defining one end of the lumen and adapted to receive a wax pattern.

4,741,379

## HORIZONTAL MOLD CLAMPING AND VERTICLE INJECTION TYPE INJECTION MOLDING MACHINE

Sadayuki Dannoura, Yamaguchi, Japan, assignor to Ube Industries, Ltd., Japan

Filed Jul. 8, 1987, Ser. No. 70,900
Int. Cl.[4] B22D 17/12
U.S. Cl. 164—312 1 Claim



1. A horizontal mold clamping and vertical injection type injection molding machine comprising:

stationary and movable metal molds clamped with each other with respect to a vertical mating plane; and

a vertical casting unit pivotally located below said stationary and movable metal molds, said vertical casting unit having a pivoting center at a position deviated from the vertical mating plane between said stationary and movable metal molds toward said stationary metal mold and being inclined during injection.

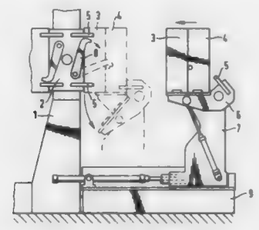
4,741,380

## COMBINED MOLD ASSEMBLY AND INSPECTION DEVICE FOR CORE AND SHELL SHOOTERS

Werner Landua, and Reiner Rommel, both of Mannheim, Fed. Rep. of Germany, assignors to Adolf Hottinger Maschinenbau GmbH

Continuation of Ser. No. 784,803, Oct. 4, 1985, abandoned. This application Mar. 13, 1987, Ser. No. 27,095
Claims priority, application Fed. Rep. of Germany, Dec. 5, 1984, 3444343
Int. Cl.[4] B22C 9/10
U.S. Cl. 164—341 1 Claim

1. A combined mold assembly and inspection device having a double mold mounting, the mold including first and second mold halves, the mold mounting being rotatable about a horizontal axis, adapted for attaching to core and shell shooters, the device comprising a base frame, a movable and mechanically actuated slide member mounted on the base frame, a hinged table for supporting the first and second mold halves,



the table mounted on the slide member mechanically actuated by means of a cylinder, and the table including a first gripping device for gripping the first and second mold halves, and the mold mounting having a second gripping device and arm grippers for fastening the first mold half and the second mold half, respectively.

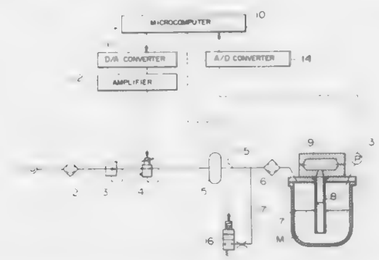


4,741,381

## METHOD OF AND APPARATUS FOR AUTOMATICALLY CONTROLLING PRESSURE IN HOLDING FURNACE INCORPORATED IN LOW PRESSURE DIE-CASTING SYSTEM

Tadashi Nishida; Shinichi Kondo, and Tetsuji Matsui, all of Toyokawa, Japan, assignors to Sintokogio Ltd., Nagoya, Japan

Filed Jan. 16, 1987, Ser. No. 3,897
Claims priority, application Japan, Jan. 22, 1986, 61-11698; Feb. 28, 1986, 61-44353; Mar. 14, 1986, 61-57941
Int. Cl.[4] B22D 17/32
U.S. Cl. 164—457 7 Claims



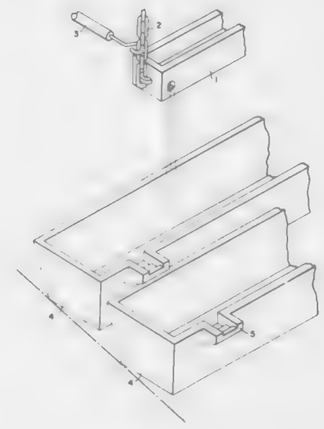

1. A method of automatically controlling the pressure in a holding furnace incorporated in a low pressure die-casting system by controlling the pressurized gas to be supplied to the molten metal holding furnace using a proportional pressure control valve operated by a microcomputer, comprising the steps of: reading out a desired pressure $P_{i+1}$ at a time $t_{i+1}$ which is a unit time ahead of a time $t_i$ from a desired pressurization pattern of the time—pressure curve associated with said holding furnace which has been stored in said microcomputer beforehand; reading out an input command value Vo corresponding to said desired pressure $P_{i+1}$ from the steady values of the output pressure which are associated with the input command values of said proportional pressure control valve, said input command values being stored in said microcomputer beforehand; detecting a pressure Pm in said holding furnace at said time $t_i$; calculating a pressure deviation $\Delta P$ from said desired pressure $P_{i+1}$ and said pressure Pm in said holding furnace; calculating a correction value Vd by multiplying said pressure deviation $\Delta P$ by a preset gain G; calculating an input command value V by adding said correction value Vd to said input command value Vo; and sending said input command value V to said proportional pressure control valve.

4,741,382

## PROCESS FOR PRODUCING PIGS AS FINISHED PRODUCTS

Jacques Andre, Waterloo, Belgium, and Raoul Colin, Grand-Lancy, Switzerland, assignors to ACEC-Heating, Brussels, Belgium

Filed Jan. 8, 1987, Ser. No. 1,475
Int. Cl.[4] B22D 5/04
U.S. Cl. 164—457 4 Claims



1. A process for producing pigs as finished products, providing molds equipped with at least one spout with a stairway-shaped profile having at least two steps, filling the molds from a ladle containing molten metal via a movable runner equipped with a handling means, observing the steps of the spout or spouts during the mold filling, and as soon as the molten metal spreads over a specified step of the spout, acting on the handling means for sudden movement of the runner in order to direct the casting jet outside of the mold.

4,741,383

## HORIZONTAL ELECTROMAGNETIC CASTING OF THIN METAL SHEETS

John R. Hull, Hinsdale; Robert J. Lari, Aurora; Walter F. Praeg, Palos Park, and Larry R. Turner, Naperville, all of Ill., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

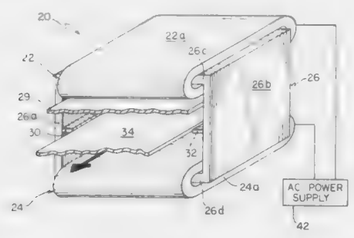
Continuation of Ser. No. 872,725, Jun. 10, 1986, Pat. No. 4,678,024. This application Mar. 23, 1987, Ser. No. 29,035
The portion of the term of this patent subsequent to Jul. 7, 2004, has been disclaimed.
Int. Cl.[4] B22D 27/02
U.S. Cl. 164—467 20 Claims

1. A method for the horizontal casting of a thin metal sheet comprising; providing a supply of molten metal; forming the molten metal into a thin, horizontal sheet in motion along its length; directing an alternating magnetic field across the width of and about said molten metal sheet; positioning a conductive shield within said magnetic field and electrically coupling said conductive shield to said molten metal sheet for at least partially shielding said molten metal sheet from the magnetic field to define a horizontally oriented equilibrium position within the magnetic field, wherein the strength of the magnetic field increases with increasing displacement of the molten metal sheet below the equilibrium position and decreases with in-

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creasing displacement of the molten metal sheet above the equilibrium position such that the magnetic field exerts a constant, uniform levitating force on the molten metal sheet in the equilibrium position.



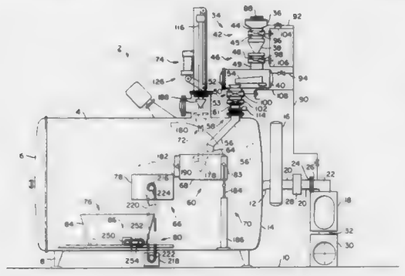

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**4,741,384**

## APPARATUS FOR MELTING, CASTING AND DISCHARGING A CHARGE OF METAL

**George J. Healey, Nepean, Canada, assignor to GTE Products Corporation, Stamford, Conn.**

**Filed Jan. 7, 1982, Ser. No. 337,888**
**Int. Cl.⁴ B22D** *27/15*
**U.S. Cl. 164—514** **14 Claims**



1. Apparatus for melting, casting and discharging a metal comprising

a chamber;

delivering means external of said chamber and attached for delivering a charge of metal to be fed into said chamber;

discharging means internal of said chamber and attached for pivotal movement relative to a melting means for receiving said charge of metal from said delivering means and discharging said charge into said melting means;

melting means internal of said chamber and attached for movement relative to a molding means for receiving said charge of metal from said discharging means, heating said metal to a molten state and emptying said molten metal into said molding means;

molding means internal of said chamber and attached for movement relative to a transporting means for receiving said molten metal from said melting means, solidifying said metal and emptying said solidified metal into transporting means; and

transporting means internal of said chamber and moveable relative to said molding means for receiving said solidified metal from and transporting said solidified metal relative to said molding means.

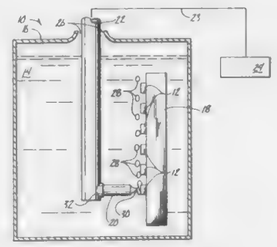
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**4,741,385**

## GAS JET IMPINGEMENT MEANS AND METHOD

**Arthur E. Bergles, Ames, Iowa, and Chung Ma Fang, Beijing, China, assignors to Iowa State University Research Foundation, Inc., Ames, Iowa**

**Continuation of Ser. No. 830,279, Feb. 18, 1986, abandoned.**
**This application Aug. 18, 1987, Ser. No. 88,004**
**Int. Cl.⁴ H01L** *23/44*
**U.S. Cl. 165—1** **15 Claims**



11. A method for cooling enhancement of microelectric devices tested at high power levels in a liquid bath, comprising:

submersing said microelectric devices positioned on a substrate into a liquid bath;

operatively connecting said microelectric devices to a source of electrical power;

adjustably positioning a gas jet adjacent to a selected microelectric device; and

impinging a gas jet upon a selected microelectric device.

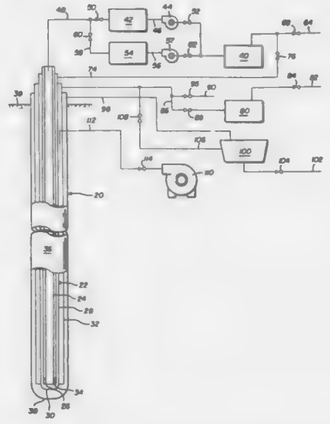
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**4,741,386**

## FLUID TREATMENT APPARATUS

**Gerald C. Rappe, Denver, Colo., assignor to VerTech Treatment Systems, Inc., Denver, Colo.**

**Division of Ser. No. 755,880, Jul. 17, 1985, Pat. No. 4,671,351.**
**This application Aug. 25, 1986, Ser. No. 943,533**
**Int. Cl.⁴ C02F** *1/68;* **F28D** *7/12;* **F28F** *13/18*
**U.S. Cl. 165—45** **6 Claims**



1. A fluid treatment apparatus for continuous treatment of fluid wastes at elevated temperatures and pressures, said fluid treatment apparatus comprising a plurality of elongated generally concentric and telescopically nested pipes extending vertically into the ground, said pipes including a first inner pipe having an open lower end comprising an insulated tubular, said insulated tubular including generally concentric telescopically nested spaced tubes, the space between said tubes sealed and filled with an inert gas, a second pipe surrounding said first pipe in spaced relation having a closed lower end and communicating with said first pipe at its lower end, a third pipe surrounding said second pipe in spaced relation having an opening at its lower end and a fourth pipe surrounding said third pipe in spaced relation having a closed end and communicating with said third pipe in spaced relation, hot heat transfer fluid received in said first pipe insulated tubular flowing downwardly through said first pipe and recirculating upwardly between said first pipe and said second pipe in heat transfer relation with said fluid waste flowing downwardly in the annular space between said second pipe and said third pipe and said fluid waste recirculating upwardly in the annular space between said third pipe and said fourth pipe to be discharged from said apparatus, the length of said pipes being sufficient to create a fluid pressure head sufficient to react said fluid waste, and said insulated tubular having a hydrogen permeation barrier means limiting permeation of atomic hydrogen into said space between said tubes of said insulated tubular, reducing heat losses from said heat transfer fluid flowing downwardly in said first pipe to the upwardly recirculating heat transfer fluid in annular space between said first pipe and said second pipe, and defining a predetermined reaction zone in the lower portion of said third pipe, whereby said fluid waste is reacted under heat and pressure in said reaction zone.



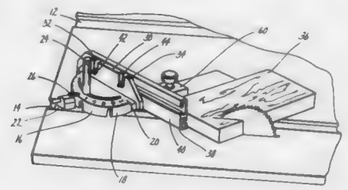
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**4,741,387**

## LOCKING MEANS FOR MITER GAUGE ATTACHMENT

**Donald Strong, 20425 Beatrice St., Livonia, Mich. 48152**

**Filed Aug. 3, 1987, Ser. No. 80,801**
**Int. Cl.⁴ B27B** *25/10, 27/08*
**U.S. Cl. 83—421** **3 Claims**



1. An attachment for a miter gauge mounted on a table saw table, the gauge having a body, said attachment comprising:

an elongated fence having a slot having a pair of shoulders, and means for connecting the fence to the miter gauge body;

a stop member, and means for connecting the stop member to the fence comprising;

the stop member having a first opening formed about an axis disposed in a plane parallel to the slot in the fence;

a cam rotatably mounted in said first opening, and a knob connected to the cam for rotating the cam about said first axis, the cam having a slot formed about said first axis and communicating with said first opening;

a plug slideably mounted in said first opening so as to be rotatable therein about a second axis, the plug having a threaded opening;

structure on the stop member receivable in the slot in the fence such that the stop member is slidable along the fence, the stop member having a fastener-receiving opening extending from the first opening in the stop member;

a threaded member having a first end and a second end, and a head on the second end, the first end being received through the fastener-receiving opening in the stop member being threadably received in the threaded opening in the plug, and the head being received in the slot in the fence such that the head is in abutment with the slot shoulders such that rotation of the cam biases the plug and the fastener either toward or away from the fence slot depending upon the direction of rotation of the knob.

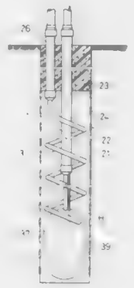
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**4,741,388**

## UNDERGROUND HEAT EXCHANGING APPARATUS

**Kazuo Kuroiwa, 750-186, Shirane-cho, Asahi-ku, Yokohama-shi, Kanagawa-ken, Japan**

**Filed Dec. 13, 1985, Ser. No. 808,800**
**Claims priority, application Japan, Dec. 20, 1984, 59-267444; Jan. 5, 1985, 60-39**
**Int. Cl.⁴ F25D** *23/12*
**U.S. Cl. 165—45** **10 Claims**



1. An underground heat exchanging apparatus using a heat exchanging fluid existing in gaseous and liquid form during operation of said apparatus, said apparatus comprising

a first heat insulating tube;

a second heat exchangeable tube;

a reservoir connecting said first and second tubes, said reservoir being disposed at the lowermost portions of said tubes and dimensioned to store liquified heat exchanging fluid therein for facilitating start-up of operation of said system;

said tubes being adapted for insertion into a deep hole bored in the underground, said second tube having a spiral shape which spirally extends about said first tube located at the center of the hole; and

a recirculating system connecting said first and second tubes, said recirculating system including a heat exchanging unit on the ground surface, said first and second tubes being filled with the heat exchanging fluid.

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**4,741,389**

## CLOSED LOOP ENERGY EXCHANGE SYSTEM

**James R. Smith, 12642 Perkins Rd., Baton Rouge, La. 70810**

**Filed May 23, 1985, Ser. No. 737,276**
**Int. Cl.⁴ F25D** *23/00;* **F25B** *27/02*
**U.S. Cl. 165—45** **3 Claims**

1. A closed loop energy exchange for circulating a fluid and utilizing the relative constant temperature of the earth's subsoil to heat or cool the fluid comprising:

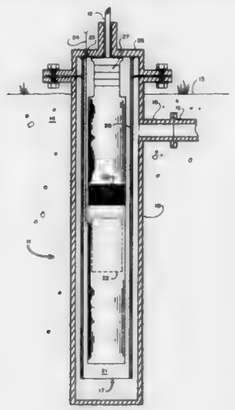
(a) a first length of tubing, a substantial portion of which is positioned at a predetermined depth in the earth's subsoil, said first length connected at one end to a heat exchange means and connected at its opposite end to the inlet connection of a sealable submersible pump assembly, said submersible pump assembly comprising,

an enclosed housing, said housing having at least one side wall for receiving said inlet connection of said sealable submersible pump assembly,

a submersible pump positioned in said enclosed housing,

a hollow member fixedly attached to the enclosed housing and positioned between the submersible pump and the enclosed housing, wherein the inlet connection is positioned to create a turbulent flow of fluid through said housing and past a motor that drives said submersible pump; and

(b) a second length of tubing connected at one end to the outlet connection of the sealable submersible pump assembly and its other end operatively connected to the heat exchange means to allow flow of fluid through the second length to the first length of tubing.



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**4,741,390**

**METHOD AND APPARATUS FOR HEATING, VENTILATING AND EXHAUST AIR PURIFYING OF INDUSTRIAL BUILDINGS**

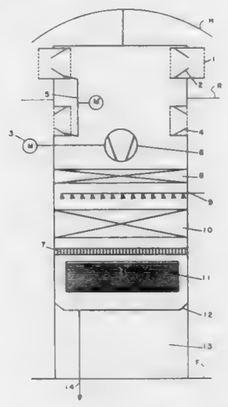
**Christian Koch, Muhlweg 13, 8570 Pegnitz, Fed. Rep. of Germany**

**Filed May 12, 1986, Ser. No. 862,018**

**Claims priority, application Fed. Rep. of Germany, May 21, 1985, 3518143; May 21, 1985, 8514955[U]; Apr. 5, 1986, 3611434**

**Int. Cl.⁴ F24F** *3/14*

**U.S. Cl. 165—54** **8 Claims**



1. Apparatus for producing high air quality in industrial plant buildings, wherein a high degree of air exchange, recovery of heat from the exhaust air and purification of the exhaust air discharged into the atmosphere takes place, said apparatus comprises a feed air tower resting on the floor of the plant building and extending through the roof of the plant building, said tower having the following elements arranged from top to bottom therein: a rain hood, feed air and circulating air openings having closing flaps, a ventilator, a wetting system, a heat exchanger, fine-mesh filters, adjustable feed air nozzles for providing treated air to approximately the lower two meters of the plant building, a drip water-collecting trough and condensate drain conduit; and said apparatus further comprising a liquid heat recovery system connected to the heat exchanger of said feed air tower having a heat exchanger unit disposed in the stream of exhaust air, a pump for returning the liquid to the heat exchanger of said tower, a water injection system disposed in the exhaust air stream upstream from said heat exchanger therefor, a wetting grid with a drip water collecting trough arranged beneath said grid and disposed downstream of said system, and a heat pump for transfer of heat between the exhaust and the feed air.

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**4,741,391**

**METHOD AND APPARATUS FOR RECOVERING OF TRANSMITTED HEAT**

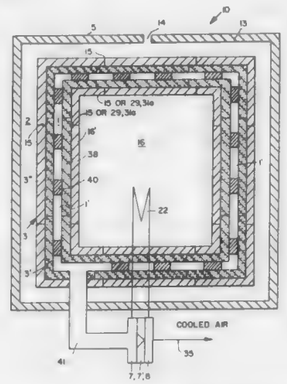
**Johannes Schmitz, Nordstrasse 2, 5162 Niederzier, Fed. Rep. of Germany**

**Filed Mar. 6, 1987, Ser. No. 22,401**

**Claims priority, application Fed. Rep. of Germany, Mar. 8, 1986, 36077719; European Pat. Off., Jan. 23, 1987, 87100898.3**

**Int. Cl.⁴ F24H** *3/02*

**U.S. Cl. 165—56** **26 Claims**




1. A method for recovering heat transmitted through a wall structure enclosing an inner hollow volume relative to the atmosphere, comprising the following steps:

(a) enclosing a substantial surface proportion of said structure with a first inner hollow space and a second outer hollow space separated from each other by an intermediate separation wall, said second outer hollow space being separated from the atmosphere by an outer enclosure wall,

(b) providing leakage flow paths through said intermediate separation wall for flow communication between said first and second hollow spaces,

(c) locating duct means only at elevations as high as determined by said structure through said enclosure wall for flow communication between the atmosphere and said second outer hollow space,

(d) sucking air out of said first inner hollow space for maintaining said first inner hollow space at a reduced pressure relative to the atmosphere, said reduced pressure in said inner hollow space causing an inward air flow from said second outer hollow space through said leakage flow paths into said first inner hollow space, said inward air flow travelling substantially in a direction opposite to any outward heat transmission through said intermediate separation wall, whereby said inward air flow takes up heat from said outward heat transmission, and

(e) recovering heat from air sucked out of said first inner hollow space for heating or air conditioning.



**4,741,392**

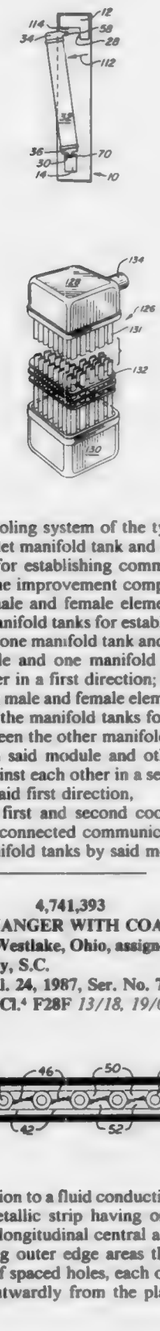
**SECTIONAL CORE RADIATOR**

**James D. Morse, Racine, Wis., assignor to Modine Manufacturing Company, Racine, Wis.**

**Filed Dec. 24, 1986, Ser. No. 946,022**

**Int. Cl.⁴ F28F** *7/00, 9/26*

**U.S. Cl. 165—76** **12 Claims**



1. An improved cooling system of the type having an inlet manifold tank, an outlet manifold tank and at least one module with conduit means for establishing communication between the manifold tanks, the improvement comprising:

first cooperating male and female elements on the module and one of the manifold tanks for establishing communication between the one manifold tank and the conduit means upon said module and one manifold tank being moved against each other in a first direction; and

second cooperating male and female elements on the module and the other of the manifold tanks for establishing communication between the other manifold tank and the conduit means upon said module and other manifold tanks being moved against each other in a second direction that is transverse to said first direction,

whereby with the first and second cooperating male and female elements connected communication is established between the manifold tanks by said module.

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**4,741,393**

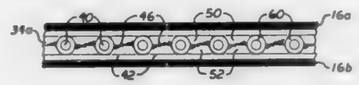
**HEAT EXCHANGER WITH COATED FINS**

**Howard I. J. Collier, Westlake, Ohio, assignor to JW Aluminum Company, Mt. Holly, S.C.**

**Filed Jul. 24, 1987, Ser. No. 77,251**

**Int. Cl.⁴ F28F** *13/18, 19/02*

**U.S. Cl. 165—133** **6 Claims**



1. A fin for connection to a fluid conducting tube comprising an elongated thin metallic strip having on at least one side thereof an uncoated, longitudinal central area and stripes of a coating material along outer edge areas thereof, said central area having a series of spaced holes, each of said holes having a collar extending outwardly from the plane of said fin and surrounding said hole, and each of said stripes of coating material extending from the outer edge of said fin toward an area adjacent to each of said collars.

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**4,741,394**

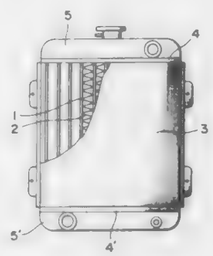
**RADIATOR FOR MOTOR CARS**

**Toru Tanigawa; Shoji Shiga; Kiichi Akasaka, and Yoshimasa Oyama, all of Nikko, Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo and Nippondenso Co., Ltd., Kariya, both of, Japan**

**Filed Aug. 11, 1986, Ser. No. 895,465**

**Int. Cl.⁴ F28D** *1/02*

**U.S. Cl. 165—153** **7 Claims**



1. In a radiator for motor cars wherein fins are fitted between vertical tubes through which a heat exchanging medium is adapted to flow to form a core, and tube plates are provided at both ends of the tubes of said core to connect with a resinous tank, a concave groove is formed outside the peripheral portion of said tube plates, and an elastic seal member is provided in said concave groove to insert the open end of said resinous tank, the improvement in that said tube plates are $\alpha$ brass consisting of 15 to 38 wt. % Zn, 0.05 to 1.5 wt. % Si, and the remainder Cu.

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**4,741,395**

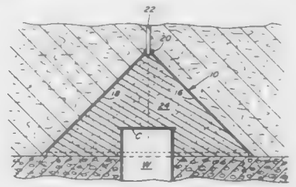
**VENT-WELL SYSTEM**

**Robert W. Reed, 19560 Vissale St., and Thomas L. Jacobs, 207 Alabama St., both of Huntington Beach, Calif. 92648**

**Filed Dec. 8, 1986, Ser. No. 939,786**

**Int. Cl.⁴ E21B** *33/03;* **E02B** *15/04*

**U.S. Cl. 166—81** **7 Claims**



1. A capped oil or gas well comprising, in combination: the top of the well casing disposed beneath the surface of the earth; means sealing the top of the well casing; a frusto-conical collector constructed of upwardly converging walls over and surrounding the top of the well casing; a porous mass of gravel substantially filling said frusto-conical collector through which gas flows providing long-term structural support for the sides of the frusto-conical collector; and a conduit connected to and in fluid communication with the top of the frusto-conical collector extending to a point above the earth for discharging collected gases.

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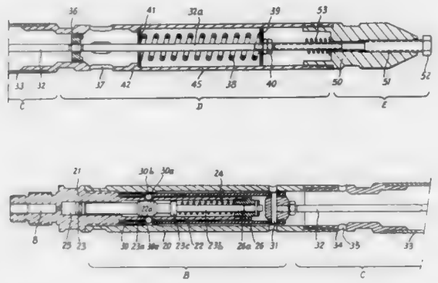


**4,741,396**

## HYDROSTATIC SYRINGE FOR DEPOSITING PROCESSING PRODUCTS IN WELLS

**Henri Falxa, Bidart, France, assignor to Societe Nationale Elf Aquitaine (Production), France**

**Filed Dec. 9, 1986, Ser. No. 939,560**
**Claims priority, application France, Dec. 9, 1985, 85 18168**
**Int. Cl.[4] E21B** *27/00*
**U.S. Cl. 166—169** **4 Claims**



**1**. Apparatus for injecting fluid material into a well, comprising an elongated assembly which contains, seriatim, an elongated timer mechanism (A), an elongated hydraulic latch mechanism (B) having one end connected to one end of said timer mechanism; an elongated hollow fluid container (C) for containing the fluid to be injected and having one end thereof connected to the opposite end of said latch mechanism, and an elongated end and guide mechanism (D) connecting to the opposite end of said elongated hollow fluid container; said timer mechanism including a rupturable cap (7) and a pressurized chamber (8) which is sealed by said cap and means (3, 4, 5, 6) for rupturing said cap after a predetermined time delay to enable controlled release of pressure from said pressurized chamber; said elongated hydraulic latch mechanism comprising an elongated piston (23) having one surface thereof defining one end of said pressurized chamber whereby said piston moves longitudinally toward the opposite end of said pressurized chamber when said cap is ruptured, and further including a longitudinally movable operating rod (30) and a latch means (30*a*, 30*b*) coupled between said longitudinally movable operating rod and said elongated piston, whereby said latch means is defeated in response to a predetermined axial movement of said elongated piston; said elongated hollow fluid container containing valve means (36, 37) in said hollow fluid container, said valve means being operable between opened and closed positions whereby said fluid material in said hollow fluid container is injected into said well when said valve is open and biasing means (38) coupled to said valve means for biasing said valve means to its said closed position, and connector means (31, 32) connecting said longitudinally movable operating rod to said valve, whereby said biasing means opens said valve when said latch means is defeated.

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**4,741,397**

## JET PUMP AND TECHNIQUE FOR CONTROLLING PUMPING OF A WELL

**Benjamin R. Weeks, Corpus Christi, Tex., assignor to Texas Independent Tools & Unlimited Services, Incorporated, Corpus Christi, Tex.**

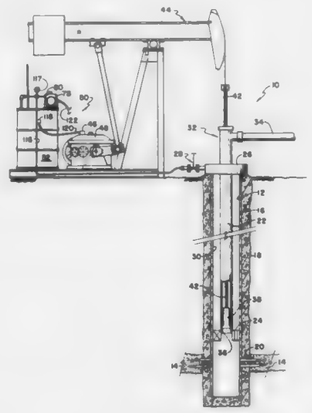
**Filed Dec. 15, 1986, Ser. No. 941,685**
**Int. Cl.[4] E21B** *43/00*
**U.S. Cl. 166—250** **14 Claims**

**1**. In a pumping well of the type comprising a casing string extending from adjacent the surface of the earth into the earth to adjacent a subterranean formation, a tubing string inside the casing string and defining therewith an annulus, means for pumping formation liquids upwardly through the tubing string, and means for stopping the pumping means, the improvement comprising

means for exhausting gas from the annulus comprising a pump arrangement including a pump suction connected to the annulus and exhibiting a measurable parameter representative of a condition of the pump;

means for sensing the parameter; and

means responsive to the sensing means for energizing the stopping means for stopping the pumping means in response to the sensed parameter.



**7**. A method of pumping a well comprising a casing string extending into the earth from the surface to adjacent a subterranean formation, a tubing string inside the casing string and defining therewith an annulus, a downhole pump carried by the tubing string and means at the surface for operating the downhole pump, comprising the steps of

pumping formation liquid up the tubing string with the downhole pump and concurrently exhausting gas out of the annulus at the surface and reducing the pressure in the annulus; and

stopping pumping in response to rising pressure in the annulus at a predetermined pressure.

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**4,741,398**

## HYDRAULIC ACCUMULATOR-COMPRESSOR FOR GEOPRESSURED ENHANCED OIL RECOVERY

**Fred L. Goldsberry, Spring, Tex., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Dec. 30, 1986, Ser. No. 947,714**
**Int. Cl.[4] E21B** *43/40*
**U.S. Cl. 166—266** **4 Claims**

**1**. Apparatus for pressurization of low pressure, $CO_2$ rich, waste gas for use in an enhanced oil recovery system from a system for recovering pipeline quality gas from geopressured geothermal brine, said pressurization apparatus using said geothermal brine comprising

a pipeline connected to a geopressured geothermal well,

a vessel having a first end lower than a second end, and having its axis at an acute angle with respect to the horizontal,

means at said first end of said vessel for sensing a low geothermal brine level in said vessel, and producing a first signal in response thereto,

means at said second end of said vessel for sensing a high geothermal brine level in said vessel, and producing a second signal in response thereto,

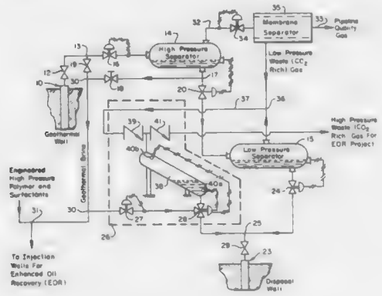
a pipeline with a check valve for admitting said low pressure, $CO_2$ rich, waste gas from said gas source into said vessel at said second end,



a pipeline with a check valve for carrying high pressure, $CO_2$ rich, waste gas from said vessel at said second end,

a pipeline for disposing of liquid connected to said vessel at said first end, and

valve means for connecting said first end of said vessel to said geopressured geothermal well pipeline in response to said first signal, and for connecting said first end of said vessel to said disposal pipeline in response to said second signal.



**3**. A method for geothermal enhanced oil recovery comprising the steps of extracting geopressured geothermal brine from a well, separating natural gas from said brine by vaporization in a vessel through which said brine is processed, separating high quality pipeline gas from said natural gas and pressurizing the residual waste gas having a high percentage of $CO_2$ for enhanced oil recovery, wherein said pressurizing of waste gas consists of compressing said waste gas in a vessel with geopressured geothermal brine.

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**4,741,399**

## OIL RECOVERY PROCESS UTILIZING GRAVITATIONAL FORCES

**B. George Hurd, Coppell; Lloyd G. Jones, Dallas, and Lloyd K. Strange, Grand Prairie, all of Tex., assignors to Mobil Oil Corporation, New York, N.Y.**

**Filed Jan. 2, 1987, Ser. No. 265**
**Int. Cl.[4] E21B** *43/22*
**U.S. Cl. 166—273** **31 Claims**

**1**. A method of recovering oil from a subterranean oil formation having the vertical thickness of at least about 40 feet, comprising an oil column which is a portion of the formation containing the oil, the formation containing at least one injection well and at least one production well spaced-apart from said injection well, comprising the consecutive steps of:

(1) injecting a surfactant slug into the lower 50 to 75% vertical thickness of the oil column;

(2) injecting a slug of a mobility control polymer into the upper 50 to 75% portion of the vertical thickness of the oil column;

(3) injecting a slug of a drive fluid over substantially the entire vertical thickness of the oil column; and,

(4) recovering oil from the production well.

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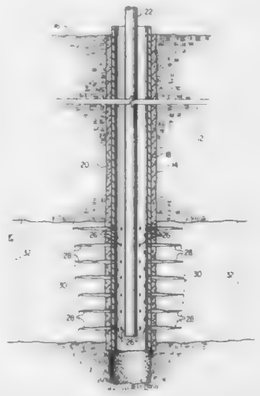
**4,741,400**

## METHOD FOR SCALE INHIBITION IN A WELL PENETRATING A SUBTERRANEAN FORMATION

**David R. Underdown, Plano, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.**

**Filed Aug. 7, 1986, Ser. No. 894,152**
**Int. Cl.[4] E21B** *41/02*
**U.S. Cl. 166—279** **11 Claims**

**11**. In a method for inhibiting the formation of scale in a well penetrating a subterranean formation for the production of fluids from said formation, said method including injecting at least one scale inhibitor into said formation through said well so that said scale inhibitor is thereafter slowly released from said formation to inhibit the formation of scale, the improvement comprising: injecting at least one polymeric material into said well in an amount effective to prolong said scale formation inhibition, said polymeric material having a composition different from said scale inhibitor a number average molecular



weight in the range of about 6,000 to about 25,000 and being a copolymer derived from at least one first monomer having a maleic moiety and at least one second monomer selected from the group consisting of acrylic acid, methacrylic acid and mixtures thereof.

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**4,741,401**

## METHOD FOR TREATING SUBTERRANEAN FORMATIONS

**Wilhelm E. Walles, Freeland, Mich.; Trevor D. Williamson, Tulsa, Okla., and Donald L. Tomkinson, Auburn, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Jan. 16, 1987, Ser. No. 4,385**
**Int. Cl.[4] E21B** *43/26*
**U.S. Cl. 166—300** **35 Claims**

**1**. A method for breaking an aqueous fracturing fluid which comprises injecting into a subterranean formation controlled release capsules comprising an enclosure member enclosing a breaker for the aqueous fracturing fluid; the enclosure member being sufficiently permeable to at least one fluid existing in the subterranean environment or injected with the controlled release capsules such that the enclosure member is capable of releasing the breaker upon sufficient exposure to the fluid.

**21**. A fracturing fluid comprising a carrier fluid, a viscosifying polymer and controlled release capsules of an enclosure member enclosing a breaker for the viscosifying polymer wherein the enclosure member is sufficiently permeable to the carrier fluid or at least one fluid existing in the subterranean environment such that, upon sufficient exposure, the enclosure member is capable of rupturing, thereby releasing the breaker.

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**4,741,402**

## SUBSEA HYDRAULIC CONNECTOR WITH MULTIPLE PORTS

**John D. Smith, Houston, Tex., assignor to Hughes Tool Company, Houston, Tex.**

**Filed Oct. 14, 1986, Ser. No. 918,753**
**Int. Cl.[4] F16L** *35/00;* **E21B** *33/035*
**U.S. Cl. 166—344** **5 Claims**

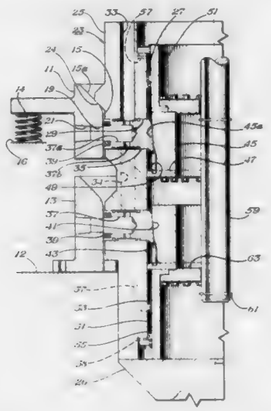
**1**. An improved subsea hydraulic connector, comprising in combination:

an annular member, having a sidewall and an axial bore, adapted to be mounted to a subsea subassembly;

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a plurality of radial ports extending through the sidewall of the annular member;
a connector adapted to be lowered into engagement with the annular member, the connector having a sidewall;
a plurality of radially oriented piston passage extending to the connector sidewall and positioned for alignment with the radial ports of the receptacle;
communication passage means extending through the connector and intersecting the piston passages for supplying hydraulic fluid to the piston passages;
a plurality of pistons, each reciprocally carried in one of the



piston passages, each piston having an open end, a closed end, and a cylindrical sidewall slidingly engaging one of the piston passages;
a flow passage in each piston extending from the open end to a sidewall port in the piston sidewall in communication with the communication passage means; and
cam means carried by the connector including a cam for moving each piston into sealing engagement with each radial port of the annular member, to supply hydraulic fluid from the communication passage means through the sidewall port, the piston flow passage and the radial port to other subsea equipment.

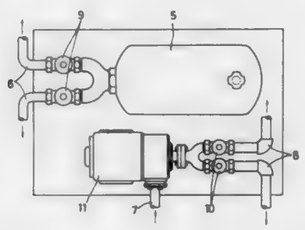
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**4,741,403**

**AUTOMATIC FIRE EXTINGUISHING SYSTEM**

**Yoshitaka Nishimura, Hikone, Japan, assignor to Iron Work Nishimura Co., Ltd., Hikone, Japan**

**Filed Aug. 8, 1986, Ser. No. 894,905**
**Claims priority, application Japan, Mar. 11, 1986, 61-36370**
**Int. Cl.[4] A62C** *35/52, 37/18*
**U.S. Cl. 169—61** **4 Claims**



1. An automatic fire extinguishing system comprising a fire alarm, a signal means for generating a signal being connected to said alarm, a water nozzle, a fire extinguisher nozzle means, said water nozzle and fire extinguisher nozzle means being connected to said fire alarm, a first valve means for connecting said water nozzle and a source of water, a second valve means for connecting said fire extinguisher nozzle means and a fire extinguisher tank, and control means for receiving the signal from said fire alarm and for controlling said first and second valve means, for causing said second valve means to be opened in response to the signal from said fire alarm, and for causing said first valve means to be opened when the signal from said fire alarm is generated for longer than a predetermined period of time.

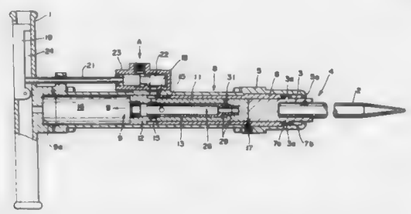
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**4,741,404**

**PERCUSSION TOOL UTILIZING NEGATIVE PRESSURE**

**Nobuo Oyama, Choufu, Japan, assignor to Landmark West Ltd., Tokyo, Japan**

**Filed Sep. 4, 1985, Ser. No. 772,596**
**Claims priority, application Japan, Nov. 2, 1984, 59-230311**
**Int. Cl.[4] B25D** *9/16*
**U.S. Cl. 173—17** **4 Claims**



1. A percussion tool having a percussion element and a hammer movable between a percussion position and a standby position away from said percussion element, comprising;
a frame;
a fluid tight low pressure chamber within said frame between said percussion element and hammer;
a high pressure chamber within said frame, said hammer being mounted to be responsive to high pressure in said high pressure chamber to move to said standby position;
an intermediate pressure chamber; and
a pressure reducing means for venting said high pressure chamber to said intermediate chamber when said hammer is moved to said standby position;
said pressure reducing means comprising;
a valve slidably fitting in a bore of the hammer;
first and second air ports positioned in the hammer for cooperating with said high pressure chamber;
an annular pressure regulation chamber in said hammer open to said second of said air ports;
a longitudinal bore in the valve, said bore having a third air port opening to said regulation chamber and a fourth air port, said bore opening to the intermediate pressure chamber;
whereby the pressure in said low pressure chamber is reduced by movement of said hammer to said standby position and the hammer is attracted to move toward the percussion position by the reduced pressure in the low pressure chamber when the hammer reaches the standby position, when the hammer is in the standby position, a high pressure fluid in the high pressure chamber flowing through the second air port into the annular pressure regulation chamber to move the valve in a direction away from th percussion element, and when the valve is in the furthermost position of the hammer away from the percussion element, the high pressure fluid in the high pressure chamber flowing through the first and fourth air ports and said longitudinal bore into the intermediate pressure chamber to reduce the pressure of the high pressure chamber.

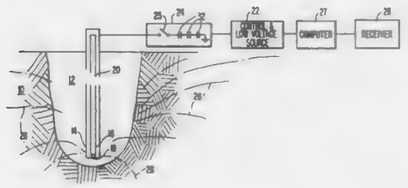


**4,741,405**

**FOCUSED SHOCK SPARK DISCHARGE DRILL USING MULTIPLE ELECTRODES**

**William M. Moeny, and James G. Small, both of Albuquerque, N. Mex., assignors to Tetra Corporation, Albuquerque, N. Mex.**

**Filed Jan. 6, 1987, Ser. No. 768**
**Int. Cl.[4] E21B** *7/15*
**U.S. Cl. 175—16** **29 Claims**




1. A spark discharge focused shock drill comprising:
a drill casing;
a source of potential;
a pulse forming line connected to said source of potential;
one set of electrodes provided within said drill casing and extending therein to form a drill face, said set of electrodes including a first electrode positively connected to said pulse forming line, a second electrode positively connected to ground potential and a plurality of third electrodes, said third electrodes including a first adjacent third electrode and a second adjacent third electrode, said plurality of third electrodes disposed near said first and second electrodes;
a working fluid provided in the drill surrounding the drill face; and
a first switch provided between said source of potential and said pulse forming line for causing a series spark array to be formed, when said first switch is closed, wherein a voltage gradient is created between said first electrode and a first adjacent third electrode such that a spark jumps the gap between said first electrode and said first adjacent third electrode, thereby subsequently establishing a voltage gradient between said first adjacent third electrode and a second adjacent third electrode, therefore creating a second spark jump and whereby additional spark jumps are created between said third electrode until a spark jump is created between the last of said third electrodes and said second electrode, all of said sparks produced within said working fluid to create a pressure wave directed against the material to be drilled.

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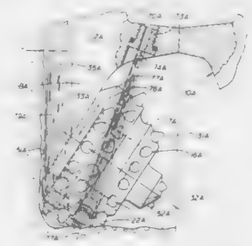
**4,741,406**

**DRILL BIT HAVING OFFSET ROLLER CUTTERS AND IMPROVED NOZZLES**

**John D. Deane, and Paul E. Pastusek, both of Houston, Tex., assignors to Reed Tool Company, Houston, Tex.**

**Continuation-in-part of Ser. No. 553,937, Nov. 21, 1983, Pat. No. 4,611,673, which is a continuation-in-part of Ser. No. 133,164, Mar. 24, 1980, abandoned. This application Sep. 15, 1986, Ser. No. 908,080**
**The portion of the term of this patent subsequent to May 14, 2002, has been disclaimed.**
**Int. Cl.[4] E21B** *10/18*
**U.S. Cl. 175—340** **5 Claims**

1. A tri-cone rotary drill bit for drilling a well bore, said bit comprising:
a bit body having a threaded pin at its upper end adapted to be detachably secured to a drill string for rotating the bit and delivering liquid drilling fluid under pressure to the bit, a shank below said pin, and three legs below said shank at the lower end of the bit body, each leg having a downwardly and generally radially inwardly extending cylindrical journal having an attached end and a free end:
nozzle means having a plurality of nozzle orifices, one for each journal, for exit of liquid drilling fluid from the bit in a plurality of high velocity liquid streams flowing at a rate of at least one hundred (100) feet per second;
three roller cutters, one for each leg, each roller cutter comprising a generally conical roller cutter body mounted on the respective leg for rotation about the longitudinal centerline of the journal and a plurality of cutting elements on the roller cutter body, each cutting element at least at a portion of its surface being formed of a material resistant to erosion by a high velocity stream of drilling fluid which may impinge it, the cutting elements of each roller cutter being arranged in a plurality of annular rows extending around the roller cutter body, with the rows of cutting elements on each roller cutter interfitting the rows of cutting elements on the adjacent roller cutters;
the centers of the journals at their attached ends to said legs defining upon rotation of the bit a cylindrical surface of revolutions about the longitudinal axis of the bit body which constitutes a central portion of the bit body;
the nozzle means being mounted on the underside of the bit body, with the orifices thereof being disposed within said central portion of the bit body and directing each of the streams of high velocity drilling fluid from the bit body downwardly and radially outwardly with respect to the bit body and generally in a plane perpendicular to the longitudinal centerline of the respective journal, each



stream of drilling fluid flowing generally between a pair of adjacent roller cutters and impinging cutting elements on the leading face of one roller cutter of said pair of roller cutters generally above the longitudinal centerline of the respective journal of said one roller cutter, and thereafter impinging the well bore bottom in an area thereof between said pair of roller cutters in advance of engagement of such impinged bore bottom by said one roller cutter, the cutting elements on said one roller cutter entering the stream for being cleaned and then exiting the stream prior to engaging the bore bottom;
the drill bit being free of nozzle means positioned outside of said central portion with the bit body having a portion of the outer surface of the shank thereof within a vertical projection above each said area of the well bore bottom recessed radially from the wall of the well bore, to provide an upwardly extending fluid passageway of relatively large cross-sectional area between the wall of the well bore and the entire height of the shank, whereby each stream of drilling fluid flows radially outwardly first in a downward direction such that the stream impinges at least one row of cutting elements on the respective roller cutter body and thereafter a portion of the well bore bottom to be engaged by said row of cutting elements for enhanced removal of cuttings from the roller cutter and the well bore bottom, and then flows in an upward direction from the well bore bottom in a path spaced from the path of the downward stream for enhanced transport of these cuttings away from the well bore bottom, with the downward and

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upward flow of the streams of drilling fluid thus being substantially free of interference from each other.

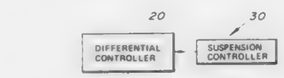
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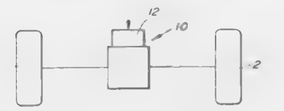
**4,741,407**

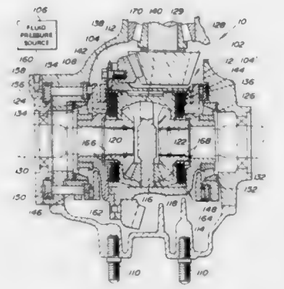
## METHOD AND SYSTEM FOR CONTROLLING LIMITED-SLIP DIFFERENTIAL GEAR UNIT FOR AUTOMOTIVE VEHICLE

**Shuuji Torii, Yokohama; Kiyotaka Ozaki, Yokosuka, and Masatsugu Owada, Yokohama, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan**

**Filed Nov. 6, 1986, Ser. No. 927,397**
**Claims priority, application Japan, Nov. 8, 1985, 60-250423**
**Int. Cl.[4] B60K** *17/16*
**U.S. Cl. 180—76** **14 Claims**




**1**. A slip-limit control system for a limited-slip differential gear unit, comprising:

a slip-limit adjusting means, incorporated in said limited-slip differential gear unit, for producing a controlled magnitude of slip-limiting torque according to a differential control signal so as to adjust driving torque distribution for left and right wheels;

a first sensor means for monitoring a vehicle driving condition to produce a first sensor signal indicative of a preselected slip control parameter;

a second sensor for monitoring a suspension mode of an adjustable suspension system which has variable suspension characteristics, to produce a second sensor signal indicative of the suspension mode; and

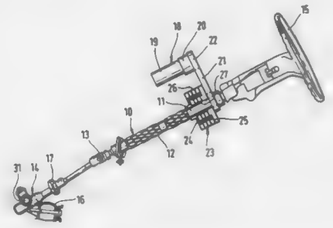
a controller being preset with a plurality of differential control characteristics corresponding to different magnitudes of slip-limiting torque for different driving torque distributions, said controller being responsive to said first sensor signal to derive said differential control signal based thereon according to one of said differential control characteristics, and said controller being responsive to said second sensor signal to select one of said differential control characteristics depending upon the suspension mode of said adjustable suspension system.

**4,741,408**

## POWER STEERING SYSTEM FOR MOTOR VEHICLES

**Paul Bausch, Hattenheim, and Klaus-Peter Harth, Florsheim, both of Fed. Rep. of Germany, assignors to General Motors Corporation, Detroit, Mich.**

**Filed Aug. 22, 1986, Ser. No. 898,993**
**Claims priority, application Fed. Rep. of Germany, Dec. 14, 1985, 3544350**
**Int. Cl.[4] B62D** *5/04*
**U.S. Cl. 180—79.1** **2 Claims**



**1**. Electromotive drive apparatus for supplying power assist torque to a motor vehicle steering shaft adapted to receive manually supplied steering torque, comprising:

variable speed motor means;

viscous drag clutch means connected between the variable speed motor means and the steering shaft to establish a passive and unregulated coupling therebetween; and

control means for sensing the manually supplied steering torque and controlling the speed of the variable speed motor means in relation thereto, thereby to supply power assist torque in relation to the manually supplied steering torque.

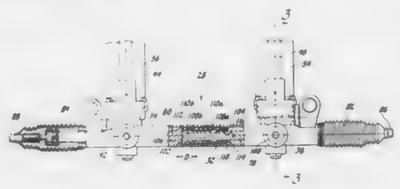
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**4,741,409**

## ELECTRIC STEERING SYSTEM FOR AUTOMOBILES

**Kenneth L. Westercamp, Frankenmuth, and Steven J. Hallman, Saginaw, both of Mich., assignors to General Motors Corporation, Detroit, Mich.**

**Filed Jun. 25, 1987, Ser. No. 66,655**
**Int. Cl.[4] B62D** *5/04*
**U.S. Cl. 180—79.1** **4 Claims**



**1**. In combination with an automobile having at least one pair of steerable road wheels each pivotable independently of the other about a corresponding one of a pair of steering axes of said automobile, a manual steering implement on said automobile, and an electronic control connected to said steering implement operative to convert a manual steering input to said implement into at least two electric current outputs corresponding to said steering input,

an electric steering system comprising:

a tubular main housing on said automobile aligned on a transverse axis thereof between said pair of steerable road wheels,

a first steering rack disposed in said main housing for bodily shiftable movement in opposite directions along said transverse axis and including an inboard end and an outboard end,



a second steering rack disposed in said main housing for bodily shiftable movement in opposite directions along said transverse axis and including an inboard end and an outboard end,

means connecting said outboard end of each of said first and said second steering racks to a corresponding one of said steerable road wheels so that bodily shiftable movement of each of said first and said second steering racks effects steering pivotal movement of said corresponding steerable road wheel,

a first reversible electric motor mounted on said main housing and connected to one of said electric current outputs whereby said first motor is selectively energized by said electronic control,

a second reversible electric motor mounted on said main housing and connected to the other of said electric current outputs whereby said second motor is selectively energized by said electronic control,

first reversible reduction gear means between said first motor and said first steering rack operative when said first motor is energized to bodily shift said first steering rack along said transverse axis and to back drive said first motor when said first motor is deenergized and said first steering rack is forcibly bodily shifted along said transverse axis,

second reversible reduction gear means between said second motor and said second steering rack operative when said second motor is energized to bodily shift said second steering rack along said transverse axis and to back drive said second motor when said second motor is deenergized and said second steering rack is forcibly bodily shifted along said transverse axis,

means on said inboard end of said first steering rack and on said inboard end of said second steering rack defining a telescopeable sliding connection between said first and said second steering racks, and

stop means on each of said first and said second steering racks operative to limit said relative telescopeable sliding movement to a predetermined dimension so that attempted relative movement beyond said predetermined dimension is accompanied by positive driving engagement of one of said first and said second steering racks on the other.

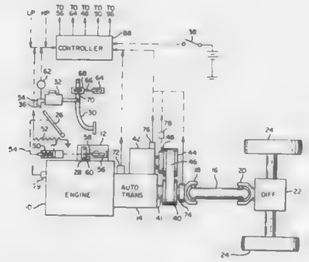
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**4,741,410**

## ENERGY STORAGE AUTOMOTIVE DRIVE SYSTEM PARTICULARLY ADAPTABLE FOR RETROFITTING

**Fred Tunmore, San Mateo, Calif., assignor to Advanced Energy Systems Inc., Redwood City, Calif.**

**Filed Jul. 5, 1985, Ser. No. 752,055**
**Int. Cl.[4] B60K** *9/00*
**U.S. Cl. 180—165** **11 Claims**




**1**. In a wheeled vehicle having an engine, a vehicle drive system comprising:

(a) energy storage means for collecting and storing energy;

(b) torque transmitting means mechanically coupled to at least one wheel of said vehicle for driving said wheel;

(c) mode selection means for selectively operating said torque transmitting means alternatively either in a first mode, wherein said torque transmitting means receives more energy to drive said wheel from said energy storage means than from said engine, or in a second mode wherein said torque transmitting means receives more energy to drive said wheel from said engine than from said energy storage means;

(d) energy sensor means connected to said energy storage means for sensing the amount of energy stored therein;

(e) said mode selection means including means automatically responsive to said energy sensor means for preventing the commencement of operation of said torque transmitting means in said first mode in response to the amount of energy in said energy storage means being less than a predetermined minimum useful amount; and

(f) said mode selection means further including means automatically responsive to said energy sensor means for permitting the delivery of energy from said energy storage means to said torque transmitting means, after the commencement of operation of said torque transmitting means in said first mode, despite the amount of energy in said energy storage means decreasing below said predetermined minimum useful amount, and for subsequently interrupting said delivery of energy in response to the amount of energy in said energy storage means decreasing to a predetermined amount which is less than said predetermined minimum useful amount.

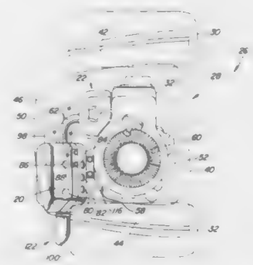
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**4,741,411**

## MUFFLER SYSTEM

**David K. Stricker, Juneau, Wis., assignor to Deere & Company, Moline, Ill.**

**Filed Jan. 14, 1987, Ser. No. 3,103**
**Int. Cl.[4] F01N** *1/14*; **F01P** *1/6*
**U.S. Cl. 181—283** **13 Claims**



**1**. A muffler system at least partially mounted within an engine compartment of a vehicle having an engine mounted therein, said muffler system comprising:

manifold means operatively connected to said engine, for transporting exhaust gases from said engine;

muffler means having an inlet and an outlet, operatively connected to said manifold means, for attenuating the engine noise carried by said exhaust gases;

shield means, operatively connected to and at least partially enclosing said muffler means such that a space is defined therebetween, for selectively reducing the heat radiated from said muffler means;

exhaust gas discharging means, operatively connected to said shield means, for receiving exhaust gases from said muffler means outlet;

aperture means, selectively operatively formed in said shield means adjacent selective areas in said engine compartment, for selectively allowing cooler air into said space between said shield means and said muffler means thereby selectively directing heat radiated from said muffler means away from said selected areas of said engine compartment such that selected areas of said shield means

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radiate relatively less heat than other areas of said shield means; and

venturi effect means formed by positioning said muffler means outlet relative to said discharging means such that said cooler air is pulled into said space defined between said shield means and said muffler means through said aperture means thereby mixing said cooler air with said exhaust gases prior to said mixture being discharged through said discharging means outside said engine compartment.

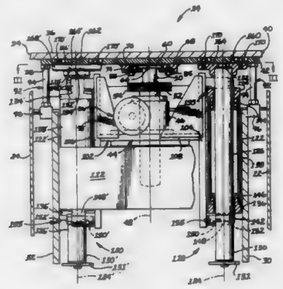
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**4,741,412**

**ELEVATING DEVICE FOR A WORK VEHICLE**

**Frank R. Sable, Wickliffe, Ohio, assignor to Caterpillar Industrial Inc., Mentor, Ohio**

**Filed Dec. 19, 1986, Ser. No. 943,358**
**Int. Cl.⁴ B66B** *9/20*
**U.S. Cl. 187—9 R** **14 Claims**



1. A work vehicle, comprising:

a vehicle frame;

a platform having opposed load engaging and connecting surfaces;

a lifting mechanism having a housing, a lifting axis, and a shaft movably connected to the housing, said housing being connected to said frame, and said shaft having a first end portion and being movable relative to said housing along said lifting axis between first and second spaced apart positions;

a first guide assembly having a guide housing, a guide axis, and a guide rod slidably connected to said guide housing and movable along said guide axis, said guide rod having a first end portion connected to said connecting surface at a first location on the connecting surface and said guide housing being connected to the frame;

a second guide assembly having a guide housing, a guide axis, and a guide rod slidably connected to said second guide assembly guide housing and movable along the second guide assembly guide axis, said second guide assembly guide rod having a first end portion connected to the connecting surface at a second location on the connecting surface spaced from the first location, said first guide assembly guide housing being connected to the frame;

a bearing member having a load bearing portion and being connected to the shaft first end portion, said load bearing portion being engaged with said connecting surface at a third location on the connecting surface spaced from said first and second locations; and

means for engaging said bearing member and maintaining said bearing member at said third location on the connecting surface, said engaging means having a flange portion and said flange portion being spaced a preselected distance from said bearing member, in a direction along said lifting axis, when said bearing member is engaged with the connecting surface, said bearing member being free to roll relative to said connecting surface an amount determined by said preselected distance between the flange portion and bearing member.

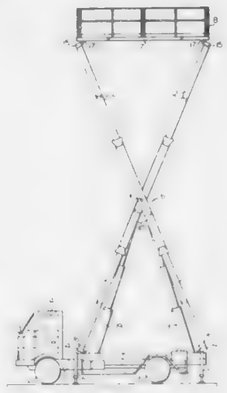
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**4,741,413**

**ELEVATING APPARATUS**

**Mitsuhiro Kishi, Ashikaga, Japan, assignor to Kabushiki Kaisha Hikoma Seisakusho, Tochigi, Japan**

**Continuation of Ser. No. 646,891, Aug. 30, 1984, abandoned.**
**This application Dec. 29, 1986, Ser. No. 948,458**
**Claims priority, application Japan, Nov. 29, 1983, 58-224679**
**Int. Cl.⁴ B60S** *13/00;* **E04G** *1/18*
**U.S. Cl. 187—8.72** **10 Claims**



1. An elevating apparatus comprising:

(a) a base;

(b) a platform;

(c) at least a pair of pivotally interconnected boom assemblies connecting said base and said platform together, said pair of boom assemblies including a pair of hollow middle booms pivotally interconnected substantially centrally thereof by a shaft, and upper and lower booms telescopically disposed in each of said middle booms and movable out of upper and lower ends of said middle booms, said lower booms having ends pivotally mounted on said base in spaced relation and said upper booms having ends pivotally mounted on said platform in spaced relation, each of said boom assemblies including means for synchronzing intervals of extension of said upper and lower booms from said middle boom; and

(d) a pair of hydraulic mechanisms operatively coupled between said shaft and said base at spaced locations thereon for moving said middle booms to displace said upper and lower booms into and out of said middle booms to lift and lower said platform, said hydraulic mechanisms being composed of a hollow outer frame pivotally connected at one end of said base, a hydraulic cylinder longitudinally movably mounted in said outer frame and capable of telescopically moving at least one stage, and a synchronous pushing mechanism interposed between said outer frame and said hydraulic cylinder for pushing said hydraulic cylinder out of said outer frame with an extension of said hydraulic cylinder and

(e) means for selectively controlling said hydraulic mechanisms to move said platform substantially vertically and horizontally, said selectively controlling means comprising a hydraulic circuit composed of a source of hydraulic pressure, a first directional control valve connected between said source of hydraulic pressure and one of said hydraulic mechanisms and a second directional control valve connected between the pair of said hydraulic mechanisms, said first directional control valve having three selectable positions to supply hydraulic pressure to said one of the hydraulic mechanisms, stop the hydraulic pressure to said one hydraulic mechanism, and, relieve pressure from said one hydraulic mechanism, said second directional control valve having two selectable positions for delivering hydraulic pressure from said one to said other hydraulic mechanism, and, relieving pressure from said other hydraulic mechanism.



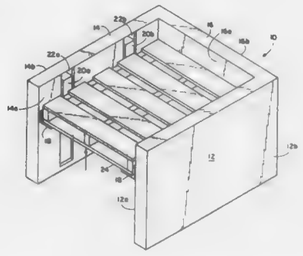
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**4,741,414**

**LIFT APPARATUS FOR PALLETS**

**Robert D. Claassen, 12015 SW. Karol Ct., Tigard, Oreg. 97223**

**Filed Mar. 1., 1987, Ser. No. 25,368**
**Int. Cl.⁴ B66F** *7/08*
**U.S. Cl. 187—18** **8 Claims**



1. A lift apparatus for pallets to facilitate the loading and unloading thereof comprising:

(a) a U-shaped enclosure having a rear wall portion and two adjacent sidewall portions;

(b) selectively movable lift cradle means situated within said enclosure for holding a loading platform; and

(c) lift actuating means located within and extending through an elongated aperture in each of said sidewall enclosure portions for selectively moving said lift cradle means up or down whereby said loading platform may be positioned at a convenient height for loading and unloading; (d) stop means comprising a plurality of pins insertable into apertures in an inner wall of said enclosure, for acting between said inner wall and said lift cradle means for retaining said lift cradle means at a predetermined height, whereby said apparatus may be raised by exerting upward pressure from underneath said lift cradle means.

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**4,741,415**

**CONTROL SYSTEM FOR AN AC ELEVATOR**

**Masami Nomura, Inazawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 22, 1986, Ser. No. 944,161**
**Claims priority, application Japan, Dec. 20, 1985, 60-287389; Jul. 10, 1986, 61-162414**
**Int. Cl.⁴ B66B** *1/32*
**U.S. Cl. 187—119** **6 Claims**

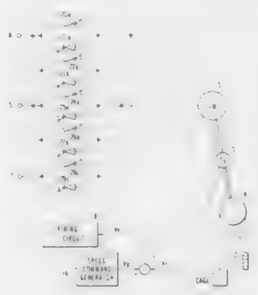
1. A control system for an elevator driven by a three-phase induction motor (5), comprising:

(a) an upward driving thyristor circuit including first and second reversed polarity thyristor pairs (20*a*, 21*a*; 24*a*, 25*a*) individually connected between first and second phase terminals (R, S) of a three-phase AC power source and said motor;

(b) a downward driving thyristor circuit including third and fourth reversed polarity thyristor pairs (22*b*, 23*b*, 26*b*, 27*b*) individually connected between said first and said second phase terminals of said power source and said motor, said downward driving thyristor circuit pairs being disposed in parallel with respective upward driving thyristor circuit pairs;

(c) a three-phase/single-phase switching thyristor circuit connected between a third phase terminal (T) of said power source and said motor, and including a fifth pair of reversed polarity thyristors (28*c*, 29*c*); and

(d) firing circuit means (18) for selectively and sequentially controlling the conduction of all of said thyristors in a predetermined pattern and based on a difference signal between actual and commanded speed signals in such a manner as to substantially equalize the overall duty cycles of the individual thyristors for all operational modes,



(e) wherein, when said motor is subjected to DC damping, the conduction of a thyristor selected in said upward driving thyristor circuit and the conduction of a thyristor selected in said downward driving thyristor circuit is controlled, and wherein said thyristors (25*a*, 26*b*) selected during DC damping in an upward direction are different from said thyristors (21*a*, 22*b*) selected during DC damping in a downward direction.

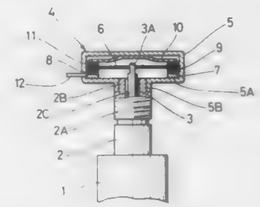
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**4,741,416**

**HYDRAULIC SHOCK ABSORBER WITH ADJUSTABLE DAMPING FORCE**

**Fujio Tanigawa, Yokohama, Japan, assignor to Tokico Ltd., Kanagawa, Japan**

**Filed Aug. 7, 1986, Ser. No. 893,638**
**Claims priority, application Japan, Aug. 15, 1985, 60-179847**
**Int. Cl.⁴ F16K** *31/02;* **F16F** *9/46*
**U.S. Cl. 188—299** **9 Claims**




1. In an adjustable damping force hydraulic shock absorber including a piston rod projected out of a cylinder, an adjusting rod extended axially through said piston rod, and an actuator mounted on said piston rod for rotating said adjusting rod to adjust the damping force of said shock absorber, the improvement wherein said actuator comprises:

a casing fixedly mounted on the outer end of said piston rod;

a rotor fixedly supported on said adjusting rod and rotatable integrally with said adjusting rod in said casing;

an ultrasonic vibratory element provided in said casing in association with said rotor to generate ultrasonic vibrations upon application thereto of a high frequency voltage; and

means, interposed between said ultrasonic vibratory element and said rotor, for transducing said vibrations of said

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ultrasonic vibratory element into rotary motion of said rotor, and thereby for rotating said adjusting rod.

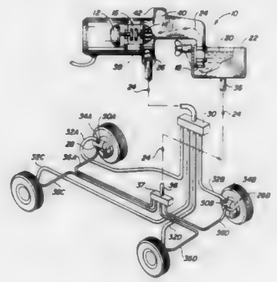
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**4,741,417**

## APPARATUS AND METHOD FOR BLEEDING A HYDRAULIC BRAKE SYSTEM

**George Caramanna, Phoenix, Ariz. (Judith S. Caramanna, legal representative), assignor to Judith S. Caramanna, Phoenix, Ariz.**

**Filed Apr. 20, 1987, Ser. No. 39,978**
**Int. Cl.[4] B60T** *11/30*
**U.S. Cl. 188—352** **16 Claims**



1. A method for bleeding a gas from a hydraulic system comprising the steps of:

connecting an outlet of an auxiliary pump to at least one operating cylinder in the hydraulic system;

immersing an inlet of said auxiliary pump in the fluid of at least one master cylinder reservoir in the hydraulic system; and

circulating hydraulic fluid from said at least one operating cylinder to said master cylinder reservoir within the hydraulic system and from said master cylinder reservoir to said at least one operating cylinder external to the hydraulic system by means of said auxiliary pump, wherein the gas is expelled from the hydraulic system at said master cylinder reservoir of said hydraulic system until any visual evidence of the gas in the fluid of said master cylinder reservoir is eliminated; and

removing said auxiliary pump from the hydraulic system.

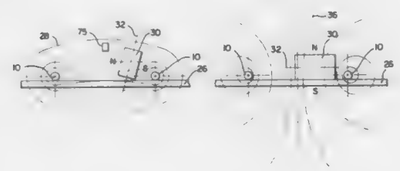
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**4,741,418**

## ELECTROMAGNETIC ENERGIZATION SYSTEM WITH NON-COILED, SINGLE WIRE CONDUCTOR

**Helmut Kaiser, Wohrwiese 4, D-8540 Schwabach, Fed. Rep. of Germany**

**Filed Oct. 25, 1984, Ser. No. 664,848**
**Int. Cl.[4] B60L** *9/16*
**U.S. Cl. 191—10** **9 Claims**



1. An electromagnet drive system comprising:

a mobile object including a rotatable permanent magnet rotor having opposed pole sections arranged on opposite sides of the rotational axis of the rotor, said magnet arranged to motivate the object when rotated;

a non-coil configured electrical conductor in single wire form extending along a desired continuous path of motivation of the mobile object, said conductor arranged to be connected in a circuit to means for electrically energizing said conductor with alternating electrical current;

said permanent magnet rotor being disposed near the conductor so that a component of stray alternating field around the conductor extends generally perpendicular to the axis of rotor, whereby, upon energization of the conductor, the rotor will be synchronously rotated with the alternating field to motivate the mobile object.

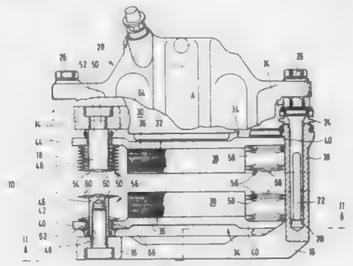
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**4,741,419**

## DISC BRAKE, ESPECIALLY FOR MOTOR VEHICLES

**Heinrich-Bernhard Rath, Vallendar, Fed. Rep. of Germany, assignor to Lucas Industries, Birmingham, England**

**Filed Apr. 21, 1987, Ser. No. 40,804**
**Claims priority, application Fed. Rep. of Germany, Apr. 22, 1986, 8611037[U]**
**Int. Cl.[4] F16D** *55/22, 65/14, 21/00;* **B61F** *15/22*
**U.S. Cl. 188—72.3** **7 Claims**



1. A disc brake, especially for motor vehicles, comprising a pair of brake pads (**34**), one each associated with either side of a brake disc (**10**) and at least one brake pad (**34**) thereof including a backplate (**36**) which has a projection (**40**) free of friction lining and serving to guide the brake pad on a guide pin (**46**) for displacement towards the brake disc (**10**), the guide pin being fixed to a carrier member (**12**) of the brake, passing through the corresponding projection (**40**) into a protective sleeve (**56**) fixed to the same, and having a free end (**54**) adjacent the brake disc (**10**),

characterized in that the protective sleeve (**56**) is designed to be elastic in its longitudinal direction and has an end (**60**) remote from the corresponding projection (**40**) of the backplate (**36**) which end (**60**) is fixed tightly to the free end (**54**) of the associated guide pin (**46**), and in that the fastening of the guide pin (**46**) at the carrier member (**12**) is releasable.

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**4,741,420**

## DAMPER FOR A DIAPHRAGM SPRING IN A CLUTCH

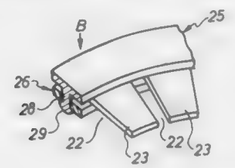
**Nobutoshi Fujito, Neyagawa; Tamio Nagano, Hirakata; Syogo Ohga, Osaka, and Hideo Kohno, Neyagawa, all of Japan, assignors to Kabushiki Kaisha Daikin Seisakusho, Osaka, Japan**

**Filed Dec. 12, 1986, Ser. No. 941,114**
**Claims priority, application Japan, Dec. 13, 1985, 60-281702; Dec. 16, 1985, 60-193322[U]**
**Int. Cl.[4] F16D** *13/50*
**U.S. Cl. 192—30 V** **2 Claims**

1. A damper for a diaphragm spring in a clutch, said diaphragm spring including a portion supported by a fulcrum rigidly connected to a flywheel, a portion connected to a pressure plate for pressing a clutch disc onto the flywheel, a



portion for contacting a release bearing, a plurality of radial slits extending from the inner periphery of said spring to the radially middle portion thereof and a plurality of radial fingers circumferentially divided by said slits; said damper including a pair of annular damper members made from non-metallic material and extending along opposite sides of said diaphragm



spring and connected together by connecting means integrally formed on one of said annular damper members and extending through said slits and through aligned holes in the other of said annular damper members, the ends of said connecting means extending through and beyond said other of said annular damper members fixing said annular damper members to said fingers.

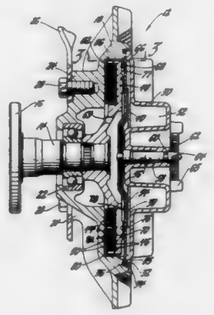
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**4,741,421**

## VISCOUS CLUTCH FOR ENGINE COOLING FAN WITH IMPROVED FLUID FLOW PATH CONTROL AND FEED TO SHEAR ZONE

**Gary L. Johnston, Pleasant Hill, Ohio, assignor to General Motors Corporation, Detroit, Mich.**

**Continuation-in-part of Ser. No. 671,502, Nov. 15, 1984, Pat. No. 4,699,258, and a continuation-in-part of Ser. No. 657,974, Oct. 5, 1984, Pat. No. 4,630,721. This application Nov. 10, 1986, Ser. No. 929,014**
**The portion of the term of this patent subsequent to Dec. 23, 2003, has been disclaimed.**
**Int. Cl.[4] F16D** *35/00, 43/25*
**U.S. Cl. 192—58 B** **6 Claims**



1. A bladed fan and hydraulic clutch assembly for inducing a flow of cooling air through a radiator in which engine coolant is circulated comprising an input shaft member adapted to be rotatably driven, annular clutch plate means rotatably driven by said shaft member, said clutch plate means having front and rear faces, said rear face having a plurality of axially extending and concentric lands, rotatable clutch body means axially spaced from said clutch plate means having a plurality of axially extending and concentric lands interleaved with said lands of said clutch plate means to form a fluid shear zone therebetween, a pump plate fixed to said clutch body means and encasing said clutch plate in said clutch body means, said pump plate cooperating with said body to define reservoir means for containing a quantity of viscous shear fluid for operating said clutch assembly, an outlet opening in said pump plate for said reservoir, control means for opening and closing said outlet opening, axially extending openings formed in said clutch plate connected to said shear zone and extending through the front face of said clutch plate and at least to the concentric lands in the rear face thereof, said openings having an outer limit disposed radially inwardly of the periphery of said clutch plate means, annular fluid seal ring means adjacent to the outer limits of said axially extending openings and operatively interposed between said pump plate and said clutch plate for diverting said fluid supplied from said reservoir axially through said axially extending openings and directly into said shear zone so that said clutch body means is rotatably driven by said clutch plate means through the shear of fluid in said shear zone, fan blade means extending from said clutch body means, said pump plate having pumping means associated therewith to pump fluid exiting from said shear zone back into said reservoir means.

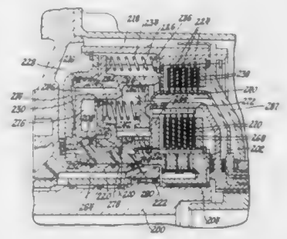
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**4,741,422**

## CLUTCH ASSEMBLY WITH A PRESSURE BALANCE CHAMBER

**Reece R. Fuehrer, Danville; Donald Klemen, Carmel, and James C. Polak, Indianapolis, all of Ind., assignors to General Motors Corporation, Detroit, Mich.**

**Filed Mar. 9, 1987, Ser. No. 23,540**
**Int. Cl.[4] F16D** *25/063, 25/10, 25/12*
**U.S. Cl. 192—87.11** **3 Claims**



1. A clutch assembly in an engine driven power transmission having a rotary input member, said clutch assembly comprising: input hub means drivingly connected with said rotary input member and including an outer hub portion and an inner hub portion; a first piston slidably disposed between said inner hub portion and said outer hub portion and cooperating with said input hub means to define a first clutch apply chamber; a second piston slidably disposed between said first piston and one of said hub portions and cooperating with said first piston and said input hub means to define a second apply chamber; a wall member drivingly connected with said input hub means and sealingly engaging said first piston and cooperating with both said first piston and said second piston to form a balance chamber; means for individually admitting fluid to said first apply chamber, said second apply chamber and said balance chamber, said first and second apply chambers being individually selectively pressurizable to urge said first piston and said second piston, respectively, in an axial direction relative to said input hub means and said fluid in said first and second apply chambers also being subjected to a pressure component proportional to the rotary speed of said rotary input member, said fluid in said balance chamber being subject to pressure proportional to the rotary speed of the rotary input hub means and acting on said second piston to counterbalance fluid pressure therein which is proportional to the rotary speed of the rotary input member, and said pressure in said balance chamber and the fluid pressure in said second apply chamber both acting on said first piston to counterbalance pressure in the fluid in the first apply chamber which is proportional to the rotary speed of the rotary input member whereby the rotary speed created pressure will not affect the axial movement of either the first or second piston.

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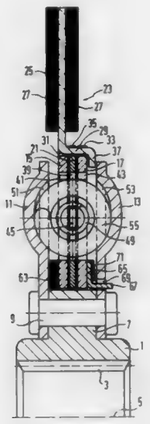


**4,741,423**

## CLUTCH DISC FOR A FRICTION CLUTCH

**Johann Hayen, Eversmeer, Fed. Rep. of Germany, assignor to Fichtel & Sachs AG**

**Filed Jul. 24, 1986, Ser. No. 890,072**
**Claims priority, application Fed. Rep. of Germany, Jul. 24, 1985, 8521345**
**Int. Cl.⁴ F16D *3/14***
**U.S. Cl. 192—106.2** **9 Claims**



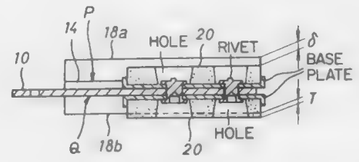
1. A clutch disc for a friction clutch, comprising
(a) a hub which defines a rotation axis,
(b) two annular side discs which are arranged with axial spacing on the hub and are firmly connected with the hub,
(c) two annular intermediate discs which are arranged axially between the side discs with axial spacing from one another and are held on the hub rotatably about the rotation axis relative to the hub,
(d) an annular middle disc which is arranged axially between the intermediate discs and is held on the hub rotatably about the rotation axis in relation to the intermediate discs and to the hub,
(e) at least one group of mutually axially corresponding windows in the middle disc, the two intermediate discs and the two side discs,
(f) at least one first spring arranged in the windows of the middle disc and the intermediate discs and connecting the middle discs and the intermediate disc rotationally elastically with one another,
(g) at least one second spring enclosing the first spring, arranged in the windows of the intermediate discs and of the side discs and connecting the intermediate discs rotationally elastically with the side discs, which second spring has a higher spring rating than the first spring and penetrates the window of the middle disc with play in the circumferential direction of the middle disc,
(h) an annular friction lining carrier which is connected with the middle disc substantially without play in rotation and with the intermediate discs with a predetermined play in rotation, the friction lining carrier carries axially protruding tabs on its internal circumference, at least one of which engages without play in the circumferential direction in an aperture of the middle disc and at least one of which engages with play in the circumferential direction in an aperture of at least one of the intermediate discs.

**4,741,424**

## CLUTCH DISC

**Seiichi Kitano, Nakano, and Mitsuhiko Takenaka, Neyagawa, both of Japan, assignors to Kabushiki Kaisya Daikin Seisakusyo, Osaka, Japan**

**Filed May 27, 1986, Ser. No. 867,046**
**Claims priority, application Japan, Jun. 19, 1985, 60-133788**
**Int. Cl.⁴ F16D *13/60***
**U.S. Cl. 192—107 M** **6 Claims**



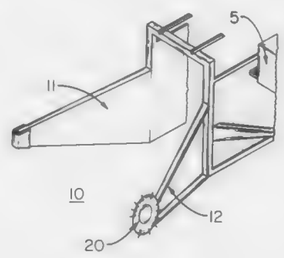

1. A clutch disc equipped with an organic facing for a relatively light load and a cerametallic facing for a relatively heavy load, said clutch disc comprising:
a driven plate;
organic clutch facings operably connected to each side of said driven plate and having a first axial thickness;
cerametallic clutch facings operably connected to each side of said driven plate and having a second axial thickness;
the axial thickness of said cerametallic facing being greater than the axial thickness of said organic facing on each side of said driven plate; and
cushion means formed between said driven plate and said organic facings on the side of said driven plate operably adjacent a pressure plate; said cushion means operably extending said organic facings outwardly from said driven plate, an amount greater than the extent of said cerametallic clutch facings such that when said clutch disc is positioned between a flywheel and a pressure plate, the pressure plate initially contacts said organic facings and said cerametallic clutch facing initially contact the flywheel.

**4,741,425**

## CHUTE FOR BALE LOADER

**Steven E. Land, Rte. 2, Box 23, Adrian, Oreg. 97901**

**Filed Sep. 1, 1983, Ser. No. 528,415**
**Int. Cl.⁴ B65G *11/20***
**U.S. Cl. 193—45** **8 Claims**




1. An improved bale chute of the type attachable to a bale loader and having opposing arm members for receiving a bale, wherein the improvement comprises a wheel rotatably mounted on the forwardmost end of one of said arm members rearwardly inclined and said wheel adapted to engage and lift a bale for rotating the bale 90 degrees.

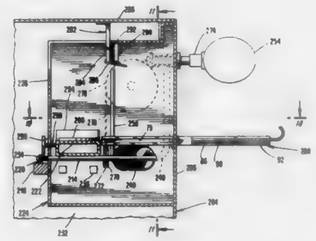


**4,741,426**

## COIN ACCEPTOR FOR VENDING MACHINE

**Frank J. Koch, Ogdensburg, N.Y., assignor to DeFelsko Corporation, Ogdensburg, N.Y.**

**Continuation-in-part of Ser. No. 812,506, Dec. 23, 1985, Pat. No. 4,705,153. This application Dec. 4, 1986, Ser. No. 938,038**
**Int. Cl.⁴ G07D *5/04*; G07F *11/04***
**U.S. Cl. 194—261** **25 Claims**



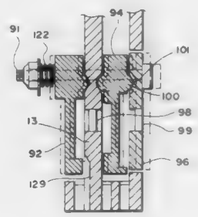
1. An object comparator, comprising:
first and second members spaced apart from one another in an initial configuration;
a third member having the object selectively positioned thereon and being supported by said first and second members with said third member being frictionally engaged by an upper surface of said first and second members;
means for preventing substantially horizontal movement of said third member;
means for moving said first and second members toward one another whereby the relative movement of each of the first and second members with respect to the third member corresponds to the weight of the object; and
means for comparing the relative movement with a reference position.

**4,741,427**

## COIN ACCEPTOR WITH FINAL SIZE GAUGE SYSTEM

**Nathan Choderker, 1880 S. Ocean Dr., Hallandale, Fla. 33009, and Carl E. Dorman, 7155 W. 14th Ct., Hialeah, Fla. 33014**

**Filed Oct. 10, 1985, Ser. No. 785,993**
**Int. Cl.⁴ G07D *5/02, 5/04*; G07F *3/02***
**U.S. Cl. 194—335** **13 Claims**



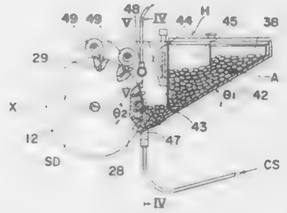

8. In a coin acceptor having means for selectively processing coins of increasing size and weight and varying denominations and having multiple processing zones, means in said zones for differentiating the coins, and means in said zones for measuring the thickness of the coins,
a final size gauge being fed from said multiple zones for processing the various coins,
said size gauge having multiple rotatable and expandable zone tracks,
each of said tracks being proportioned to taper both in diameter and in thickness to the precise size of the coin to be accepted even though legal tender coin is presented,
and means for reversibly rotating said final size gauge and expanding the tracks so that any coin which becomes entrapped in the various tracks is tilted to a reject discharge orientation, and the coin is thereafter released.

**4,741,428**

## SUPPLY HOPPER ASSEMBLY

**Shin ichi Taniguchi, Osaka, and Takashi Ohtsuki, Kawabe, both of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan**

**Continuation of Ser. No. 585,583, Mar. 2, 1984, abandoned. This application Feb. 21, 1986, Ser. No. 831,125**
**Claims priority, application Japan, Mar. 4, 1983, 58-36454**
**Int. Cl.⁴ B65G *47/24***
**U.S. Cl. 198—397** **3 Claims**




1. A hopper and drum assembly for use in a tablet transporting apparatus for transporting substantially uniform tablets, said assembly comprising at least one rotary drum having the periphery formed with a plurality of radially inwardly recessed pockets having a size for receiving only a single tablet and arranged in at least one circumferentially extending row in equally spaced relation to each other, each of which pockets is, during each complete rotation of said drum, sequentially communicated with a vacuum source to receive a tablet from the hopper assembly and with a source of compressed air to blow the tablet off the respective pocket onto a subsequent process; a container mounted adjacent the periphery of the rotary drum with a portion of said rotary drum accommodated therein, said container having a bottom plate for guiding the tablets towards the perihery of the rotary drum by the effect of their own weight, said bottom plate being inclined downwardly towards the rotary drum at an angle within the range of 25° to 45° relative to a horizontal plane passing through the axis of rotation of the rotary drum and terminating at a point on the arc which is defined by the central angle of 0° to 45° between horizontal plane passing through the axis of rotation of the rotary drum and an imaginary line drawn between the axis of rotation of the rotary drum and the terminating point of said bottom plate, the arc extending along the rotary drum opposite the direction of rotation of the drum, and an adjustable damper plate dividing the interior of said container into first and second compartments adjacent to and remote from the outer periphery of the drum, respectively, and terminating at a level above said bottom plate, a nozzle assembly carried by the bottom plate for injecting jets of compressed air; and means for supplying compressed air to said nozzle assembly at a pressure for causing the tablets within the container to be moved upwardly within the first compartment at a speed corresponding to the velocity of the peripheral surface of the rotary drum so as to permit each tablet to be sucked into and received in the respective pocket then communicated to the vacuum source.

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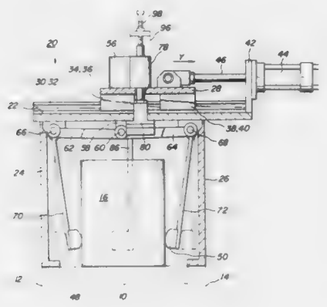


**4,741,429**

## CENTERING APPARATUS FOR CERAMIC ARTICLES AND THE LIKE

**Isao Hattori, and Hiroyuki Tsuji, both of Nagoya, Japan, assignors to NGK Insulators, Ltd., Japan**

**Filed Mar. 26, 1986, Ser. No. 844,106**
**Claims priority, application Japan, Mar. 29, 1985, 60-63388**
**Int. Cl.[4] B65G** *47/24, 47/26*
**U.S. Cl. 198—456** **4 Claims**



1. A centering apparatus for an article supported on, and conveyed by an endless conveyor belt, comprising:

a first, stationary frame arranged across said conveyor belt;

a first pair of centering members carried by said first frame, having respective first ends adapted to move toward and away from each other in a substantially transverse direction of the conveyor belt, said first ends of said first pair of centering members being engageable with respective side surfaces of said article;

first actuator means mounted on the first frame and connected to respective second ends of said first pair of centering members for actuating said first pair of centering members such that said first ends thereof are moved toward each other while maintaining a predetermined first distance therebetween;

a second, movable frame supported on said first frame and adapted to move in a substantially transverse direction of the conveyor belt, such that said second frame moves into, and out of an operative position along said conveyor belt;

a second pair of centering members carried by said second frame, having respective first ends adapted to move toward and away from each other in a substantially longitudinal direction of the conveyor belt, at least in the operative position of the second frame, said first ends of said second pair of centering members being engageable with respective front and rear surfaces of said article in the operative position of the second frame, said second pair of centering members allowing an undisturbed movement of said article in a longitudinal direction along the conveyor belt when said second frame is out of the operative position;

second actuator means mounted on said second frame and connected to respective second ends of said second pair of centering members for actuating said second pair of centering members such that said first ends thereof move toward each other while maintaining a predetermined second distance therebetween; and

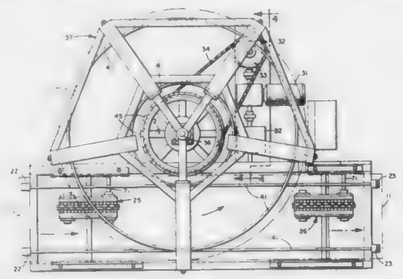
means for controlling the operation of said first and second actuator means such that one of the actuator means is actuated after the other of the two actuator means has been actuated.

**4,741,430**

## POSITIVE DRIVE HELICAL CONVEYOR SYSTEM

**Gerald C. Roinestad, Winchester, Va., assignor to Ashworth Bros., Inc., Fall River, Mass.**

**Filed Sep. 27, 1985, Ser. No. 780,790**
**Int. Cl.[4] B65G** *21/18*
**U.S. Cl. 198—778** **17 Claims**



1. A conveyor system comprising

an endless flat belt having a plurality of links connected together and adapted for alternate collapse and expansion along at least one edge of said belt to permit passage of the belt around lateral curves,

means to support said belt for passage through an endless path including a helical portion extending through a plurality of vertically spaced loops with the belt curved laterally in each of said loops, a planar approach portion leading into the first loop at one end of said helical portion and a planar exit portion leading away from the last loop at the other end of said helical portion, guide means directing said belt into said planar approach portion,

primary drive means having drive surfaces engaging said belt in positive driving relationship at a plurality of places closely spaced circumferentially along a radially inner edge of said belt in each of said loops to positively drive said radially inner edge at the same speed as said driving surfaces,

secondary drive means synchronized with said primary drive means and positively engaging said belt at a first location along said planar approach portion closely adjacent said one end of said helical portion and at a second location along said planar exit portion closely adjacent said other end of said helical portion to cause the belt to travel at the same speed at said first and second locations, said secondary drive means having forwardly facing drive surfaces engaging said belt in forward driving relation and rearwardly facing retarding surfaces engaging said belt in rearward retarding relation while said belt moves in a planar path along said approach and exit portions, said first and second locations being positioned to maintain a substantially fixed length of belt extending between said one end and said other end of said helical portion to enable said belt to be positively driven smoothly through said loops by said primary drive means under substantially minimal tension and substantially minimal driving pressure exerted by said primary drive means.

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**4,741,431**

## CONVEYOR FOR BULK GOODS

**Jerald M. Whitehead, 5136 W. Cherry La., Meridian, Id. 83642**

**Continuation of Ser. No. 234,351, Feb. 13, 1981, abandoned.**
**This application Aug. 4, 1986, Ser. No. 894,493**
**Int. Cl.[4] B65G** *17/00*
**U.S. Cl. 198—844** **1 Claim**

1. Conveyor apparatus for bulk goods comprising:

(a) an elongated floor having a substantially planar upper surface and a pair of oppositely disposed longitudinal sidewalls upwardly and divergently extending from respective edges of said floor;



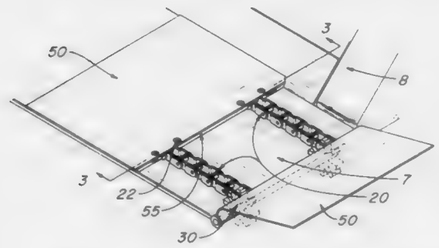
(b) a framework attached to and supporting the floor;

(c) at least two laterally spaced drive sprockets rotatably mounted to said framework adjacent one end of the floor;

(d) idler means mounted to the framework adjacent to the opposing end of the floor;

(e) at least two endless chains, each of said chains operable to engage respective laterally spaced drive sprockets and said idler means;

(f) a plurality of flexible conveyor flap members mounted to extend between the laterally spaced chains, each of the flap members having a forward edge and a trailing edge, the trailing edge adapted to overlap the forward edge of the rearwardly and adjacently mounted flap, at least one



of said flap members including a downwardly depending flexible scraper mounted parallel to and adjacent to the forward edge of said flap member to which it is attached and configured to conform to the floor and sidewalls of the conveyor; and

(g) forward edge mounting means for securing the forward edge of each flexible flap member between the laterally spaced chains at discrete attachment points on the flexible flap members, the forward edge mounting means having no rigid transverse members extending between the endless chains to thereby permit bending of the forward edge of the flap member between the discrete attachment points.

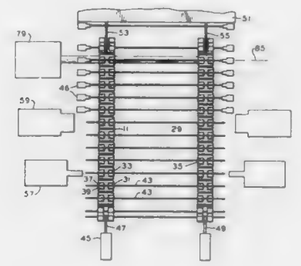
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**4,741,432**

## CONVEYOR BELT

**Chester E. Dekko, Kendallville, Ind., assignor to Lyall Electric, Inc., Kendallville, Ind.**

**Filed Jul. 23, 1986, Ser. No. 888,223**
**Int. Cl.[4] B65G** *15/58, 23/02;* **F16H** *7/02*
**U.S. Cl. 198—803.8** **24 Claims**



1. In a conveyor system of the type having a flexible endless belt entrained on at least a driving wheel and an idler wheel, the improvement wherein the driving wheel periphery is of a generally regular polygonal configuration having a plurality of generally flat faces and the endless belt includes a plurality of uniformly spaced apart relatively inflexible key segments each having an inner face conforming to the contour of one face of the polygonal driving wheel and an outer face adapted to releaseably receive components to be conveyor thereby, each key segment inner face including a pair of generally orthogonal ridges, one ridge for maintaining lateral alignment of the belt on the driving wheel and the other ridge for tractively moving the belt as it passes over the driving wheel.

11. A one piece traction lug and component gripper for a conveyor system comprising a conveyor drive wheel engaging surfaces having at least one drive wheel engaging boss protruding therefrom and four flexible projections extending from the piece in a direction opposite the boss and in spaced aligned relationship for resiliently gripping a component placed therebetween, each of the four flexible projections being of a generally "U" shape with one "U" end integral with the piece and the other "U" end free.

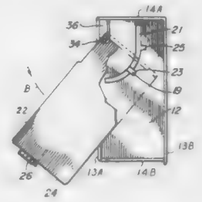
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**4,741,433**

## CHILD RESISTANT BOX

**J. David Irvine, Scarborough, Canada, assignor to IDMD Inc., Scarborough, Canada**

**Filed Mar. 10, 1987, Ser. No. 24,319**
**Int. Cl.[4] B65D** *43/18*
**U.S. Cl. 206—1.5** **9 Claims**



1. A child resistant storage box, suitable for storing small articles, comprising a container being at least partially open at the top and having a base with understanding side walls; a housing for the container having a top adapted to close the container connected to a bottom said container being slidably located between the top and bottom of said housing, said container and housing having means for slidably interconnection permitting the container to be movable in the housing in a first dimension between a closed position and a partially open position and in a second dimension between the partially open position and an open position; and including cooperating latch means actuable to selectively engage the container and housing in closed position against slideable movement, movement of the container in the first dimension being rectilinear in a plane parallel to the housing top and bottom and movement of the container in the second dimension being rotary movement in the same plane.

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**4,741,434**

## KEY HOLDER WITH ATTACHED CONDOM CASE

**Herman Liebman, 4704 Satinwood Trail, Coconut Creek, Fla. 33063**

**Filed Jun. 15, 1987, Ser. No. 61,723**
**Int. Cl.[4] B65D** *85/08, 85/14;* **A45C** *11/00*
**U.S. Cl. 206—38** **1 Claim**

1. A key holder and condom case comprising:

Two matable members formed of transparent plastic material, each having a recessed surface to form an enclosure when mated;

at least one condom arranged in said enclosure;

means having openings therein formed on each member;

continuous holder means extending through said openings;

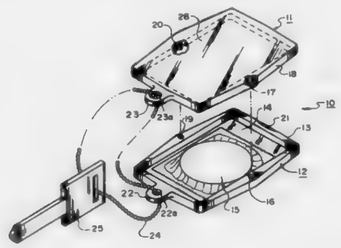
said matable members comprising identically configured members, each having an engageable, peripheral shoulder

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surrounding a recessed surface to form said enclosure when engaged;

engageable locking pins and associated locking apertures formed on said shoulders for releasably locking said member to each other when said pins and apertures are engaged;



at least one key also arranged on said continuous holder means; and

means formed on said shoulders to facilitate separating said members to open said case when said members are engaged and locked together.

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**4,741,435**

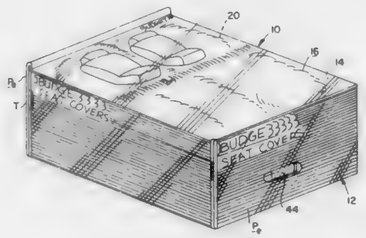
**PACKAGE ASSEMBLY INCLUDING A TRANSPARENT SLEEVE HAVING LOCKING FLANGES**

**Edwin B. Clarke, Bala Cynwyd, Pa., assignor to Budge Manufacturing Co., Inc., Pennsauken, N.J.**

**Filed Mar. 3, 1987, Ser. No. 20,506**

**Int. Cl.[4] B65D** *5/38*

**U.S. Cl. 206—45.33** **2 Claims**



1. A package assembly comprising a main container having an open side and including a pair of spaced parallel side walls of a predetermined height and a pair of end walls located at opposite ends of said side walls, one of said end walls being of the same height as said side walls and the other end wall projecting above the plane of the open side to define an abutment surface, a tubular sleeve member of transparent material engageable over the container portion and having one panel of generally the same peripheral dimensions of the open side of said main container, and a pair of inwardly directed flexible flanges at opposite edges of said one panel of said sleeve member confronting the open side of the container, said flanges extending the full width of said end walls and being perpendicular to said one panel, the flange at one end abutting the abutment surface in the assembled relation and the flange at the other end engaging inboard of the opposite end wall to secure said sleeve member on the container.

**4,741,436**

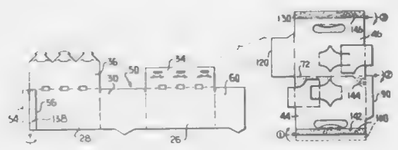
**MULTICELL CARRIER AND METHOD OF FORMING THE SAME**

**Robert E. Davis, Nutley, N.J., assignor to Federal Paper Board Company, Inc., Montvale, N.J.**

**Filed Apr. 30, 1987, Ser. No. 44,040**

**Int. Cl.[4] B65D** *5/32, 5/48, 85/72;* **B31B** *11/00*

**U.S. Cl. 206—178** **11 Claims**



1. A method of forming a multicell carrier of the type including a body, internal dividers and a handle, said method comprising the steps of forming a body blank and separately forming a combined divider and handle blank, and joining said combined divider and handle blank to said body blank to form a knocked-down multicell carrier, each of said blanks being provided in a flat state, and said combined divider and handle blank including a central divider portion and remote handle portions with said divider portion being centrally folded upon itself with said remote handle portions joining together to form a rigid handle structure before said blanks are joined together.

7. A multicell carrier comprising a generally rectangular body defined by end and side walls and a bottom wall, an upstanding divider positioned within said body and extending between and secured to said end walls, said divider including projecting partition members secured to said side walls and an upper handle portion formed integrally with said divider, said carrier being improved by said body being formed from a body blank and said divider and said handle being formed from a separately formed combined divider and handle blank, said body blank having spaced apart ends disposed along one of said body walls, and said combined divider and handle blank including a body panel at one end of said divider extending between and joined to said body blank ends to complete said one body wall and to in part join said combined divider and handle blank to said body blank.

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**4,741,437**

**SELF-CONTAINED INDICATOR DEVICE**

**Theodore W. Gorski, and Richard F. Wallin, both of Perrysburg, Ohio, assignors to North American Science Associates Inc., Northwood, Ohio**

**Continuation-in-part of Ser. No. 462,516, Jan. 31, 1983, Pat. No. 4,580,682. This application Jun. 24, 1985, Ser. No. 748,301**

**The portion of the term of this patent subsequent to Apr. 8, 2003, has been disclaimed.**

**Int. Cl.[4] B65D** *25/08, 81/32*

**U.S. Cl. 206—222** **6 Claims**

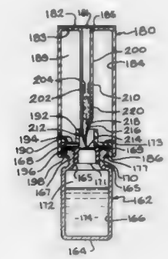
1. A test vial, comprising:

a first liquid impermeable chamber defined by at least one gas imprevious wall and a gas impervious seal member, and filled with a fluid;

a second chamber defined by at least one wall having an open end adjacent said first chamber and a gas permeable end opposite said open end, said second chamber operatively connected to said first chamber for movement from an open position to a closed position adjacent said gas impervious seal member;

said second chamber defining an open path from an outside environment through said open end and said gas permeable end of said second chamber;

an article supported within said second chamber and isolated from said first chamber by said seal member for exposure to said outside environment; and,



means on said second chamber for penetrating said seal member, moving said article from said second chamber into said first chamber, and maintaining said first chamber in a liquid impermeable condition, thereby sealing said article and said fluid medium within said first chamber.

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**4,741,438**

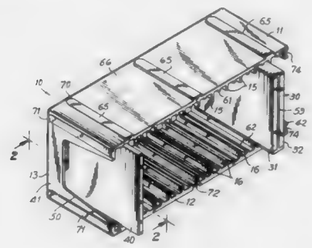
**DUAL AND SINGLE AUDIO DISC BOX STORAGE TRAY**

**Patrick Mastronardo, 3151 Highbridge Rd., Stamford, Conn. 06903, and Fu-Jung Liu, Taipei, Taiwan, assignors to Patrick Mastronardo, Stamford, Conn.**

**Filed Jul. 21, 1986, Ser. No. 887,839**

**Int. Cl.[4] B65D** *65/672*

**U.S. Cl. 206—309** **11 Claims**



1. A storage tray for audio disc boxes comprising:

opposed top and bottom walls, a plurality of elongated first ribs disposed on at least one of the top and bottom walls, with the spacing between adjacent first ribs being about equal to the thickness of a conventional dual audio disc box, and a plurality of second ribs, and one of said second ribs being disposed between adjacent first ribs with the distance between a first rib and an adjacent second rib being about equal to the thickness of a conventional single audio disc box, and wherein the length of the second rib being sized to slidably fit a back recess formed in the conventional dual audio disc box, said second ribs are disposed on said back wall and are shorter than said first ribs and are centrally disposed between said top wall and bottom wall, whereby one dual disc box is stored in the compartment between adjacent first ribs with the second rib fitting into the back recess or two single audio disc boxes are stored in the compartment with each single disc box disposed between a first rib and a second rib.



**4,741,439**

**CASSETTE FOR PHOTOGRAPHIC STRIP MATERIAL**

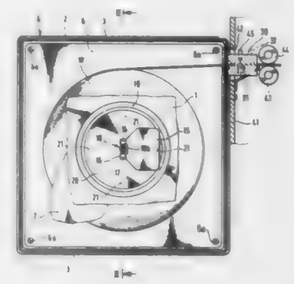
**Milan Bizic, Dänikon, Switzerland, assignor to GRETAG Aktiengesellschaft, Regensdorf, Switzerland**

**Filed Jul. 29, 1986, Ser. No. 890,274**

**Claims priority, application Switzerland, Jul. 30, 1985, 3290/85**

**Int. Cl.[4] G03B** *27/48*

**U.S. Cl. 206—316** **14 Claims**



1. A cassette for a roll of photographic strip material comprising:

a housing having two opposing frontal plates and a jacket connecting them with each other in a light-tight manner, each of the frontal plates being equipped with an inwardly projecting, essentially cylindrical lug arranged coaxially with respect to each other and together forming a bearing arbor to receive and rotatably support said roll of photographic strip material;

at least one of the frontal plates being removable from the remaining parts of the housing to open the cassette and further including a closure element operatively connected to said lugs, said two frontal plates being releasably connected to each other by means of said closure element;

each frontal plate having a guide plate that is perpendicular to the axes of the lugs for the frontal guidance of said roll of photographic strip material supported on the bearing arbor; and

one of the guide plates being resiliently displaceable parallel to the axes of the lugs against said roll to be inserted in said housing to provide braking for such a roll.

11. A cassette for a roll of photographic strip material comprising:

a housing having two opposing frontal plates and a jacket connecting them with each other in a light-tight manner, each of the frontal plates being equipped with an inwardly projecting, essentially cylindrical lug arranged coaxially with respect to each other and together forming a bearing arbor to receive and rotatably support said roll of photographic strip material;

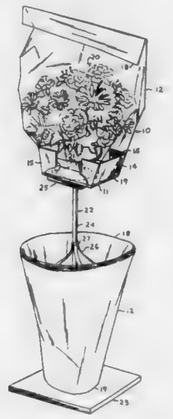
at least one of the frontal plates being removable from the remaining parts of the housing to open the cassette and further including a closure element operatively connected to said lugs, said two frontal plates being releasably connected to each other by means of said closure element;

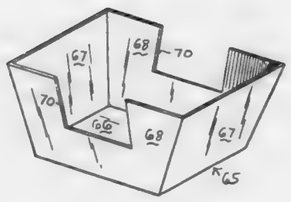
a connecting sleeve projecting from the jacket, said sleeve capable of being inserted, in the course of the attachment of the cassette to a copying device, into a connecting orifice in such a copying device, said photographic strip material capable of being removed through said connecting sleeve and conducted to a copying device, said connecting sleeve including coding means which contain, in a coded form, information concerning the width of the strip material to be contained within the cassette and which are readable by reading means that may be provided in the copying device.

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**4,741,440**
**PACKAGE FOR HORTICULTURAL ITEMS**
Charles C. Harris, 1022 Fox Chase Industrial Dr., Arnold, Mo. 63010
Continuation of Ser. No. 670,679, Nov. 13, 1984. This application Nov. 10, 1986, Ser. No. 928,981
The portion of the term of this patent subsequent to Nov. 11, 2003, has been disclaimed.
Int. Cl.[4] B65D *85/50*
U.S. Cl. 206—423 6 Claims



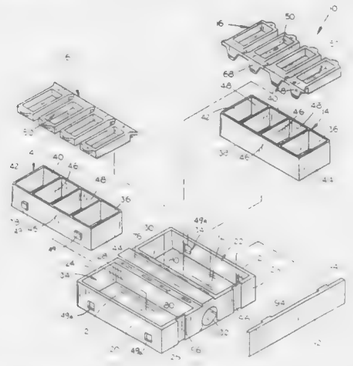


1. A package for horticultural items with a receptacle comprising:
(a) a molded plastic container means including:
1. a polygonal shaped base portion for supporting the receptacle, and
2. a plurality of side portions connected to and extending upwardly from the base portion about the receptacle the side portions including a first pair of opposed side portions extending upwardly and outwardly from the base portion, and
(b) a tapered flexible sleeve of foldable plastic sheet material having a relatively larger upper opening and a relatively smaller lower opening, the sleeve being initially formable into a generally conical configuration to receive the different shaped container and being generally conformable to and engageable with the container side portions to support the container means.

6. A package for horticultural items with a receptacle comprising:
(a) an erectable container means including:
1. as polygonal shaped base portion for supporting the receptacle, and
2. a plurality of side portions connected to and extending upwardly from the base portion about the receptacle the side portions including a first pair of opposed side portions extending upwardly from the base portion, and
(b) a tapered flexible sleeve of foldable plastic sheet material having a relatively larger upper opening and a relatively smaller lower opening, the sleeve being initially formable into a generally conical configuration to receive the different shaped container and being generally conformable to and engageable with the container side portion to support the container means.

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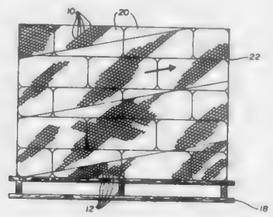
**4,741,441**
**MEDICATION DISPENSER WITH REMOVABLE LINER AND SEALED COMPARTMENTS**
Paul J. Keffeler, 9706 Brentwood Rd., Omaha, Nebr. 68114
Filed Jul. 13, 1987, Ser. No. 73,062
Int. Cl.[4] B65D *83/04*
U.S. Cl. 206—532 21 Claims



1. A medication dispenser, comprising
a container comprising at least one upstanding sidewall, opposite upstanding end walls, and divider wall extended between said end walls in spaced relation from one side wall to define a generally trough shaped cavity,
a multicompartment liner removably insertable into said cavity, said liner defining a plurality of open-topped compartments whereby medication placed within said compartments is maintained out of direct contact with said container,
a plurality of disposable compartment covers, each adapted to overlie and close a respective one of said compartments upon insertion of said liner into said container cavity,
each cover includng a separate integral fracturable tab adjacent to one end thereof,
coacting lock means on said container and on the individual tabs for independently securing each tab in snap-fit locked relation onto said container to hold the liner therein, each cover being fractured from its respective tab in response to upward movement of the opposite end of said cover to open said compartment, and
coacting seal means on each cover and a respective one of said liner compartments, said seal means being engaged upon securement of said covers in snap-fit locked relation onto said container with a liner inserted therein, thereby to provide a separate substantially airtight closure of each of said compartments.



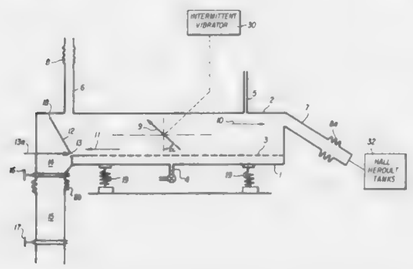
**4,741,442**
**PLASTIC NETTING FOR PALLETIZED LOADS WITH EQUAL TENSION IN ALL STRANDS**
Robert C. Slocumb, New Brighton, Minn., assignor to Leucadia, Inc., New York, N.Y.
Filed Nov. 4, 1986, Ser. No. 926,967
Int. Cl.[4] B65D *19/00*
U.S. Cl. 206—597 6 Claims



1. A pallet load wrapped with at least one continuous length of plastic netting, the netting having one set of spaced substantially parallel strands extending at an angle of less than 90 degrees upwardly with respect to the longitudinal direction and a second set of spaced substantially parallel strands overlying the first set and extending at an angle of less than 90 degrees downwardly with respect to the longitudinal direction of the netting length, the strands being joined at the intersections thereof and providing a diamond-like configuration to the netting, the netting being so positioned relative to the load such that all the netting strands are subjected to approximately equal tension.

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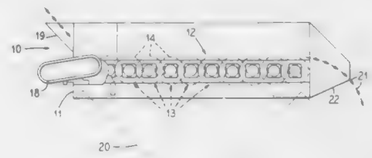
**4,741,443**
**FLUIDIZED BED FOR CONTINUOUS SEPARATION OF TWO MIXED SOLID PHASES**
Jean-Pascal Hanrot, Aix-En-Provence; Jacky Volpeliere, and Andre Pitour, both of Gardanne, France, assignors to Aluminium Pechiney, Gardanne, France
Filed Jan. 8, 1986, Ser. No. 817,146
Claims priority, application France, Jan. 8, 1985, 85 00468
Int. Cl.[4] B03B *4/00*
U.S. Cl. 209—44.1 5 Claims



1. A fluidized closed bed apparatus for the separation of two mixed solid phases, one of said phases being formed by a fluidized powdery material, the other of said phase being formed by a material which is not fluidized under conditions of fluidization of said one phase, said apparatus comprising:
a closed casing suspended by resilient means, said casing having a lower casing portion for a flow of a fluidizing gas and an upper casing portion for a flow of fluidized powdery materials;
a substantially horizontal porous fluidization wall separating said upper and lower casing portions, said fluidization wall forming an angle of less than 3° with the horizontal;
means for said feeding fluidizing gas to said lower casing portion;
means for discharging said fluidizing gas from the top of said upper casing portion;
means for introducing a mixture of said two phases into said upper casing portion;
means for communicating to said porous wall a periodic vibration having a first component directed towards one end of said casing and a vertical upwardly directed component of a magnitude such that the resultant of said components forms an angle $\alpha$ of between 20 and 60° with the vertical, said periodic vibration having a frequency of between 750 and 1500 cycles per minute and an amplitude of between 2 and 5 mm, wherein said means for communicating include means for intermittently producing said vibration for a period of time of from 1 to 3 minutes and at a rate of from 2 to 4 times per hour, whereby said one phase is fluidized;
overflow means adjacent an end of said casing opposite said one end for discharging said fluidized phase; and
means for removing said other phase from adjacent said one end of said casing, said means for removing comprising a partition having an opening at a vertical level of said porous wall.

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**4,741,444**
**DISC MODULE SPACER IMPROVEMENT**
Joseph B. Bielagus, Tualatin, Oreg., assignor to Beloit Corporation, Beloit, Wis.
Filed Jan. 8, 1987, Ser. No. 1,473
Int. Cl.[4] B07B *1/16*
U.S. Cl. 209—672 13 Claims



1. A disc screen or like rotatable shaft assembly comprising:
an elongate metallic shaft member;
a plurality of screen discs mounted co-rotatively on said shaft member and having central shaft receiving openings complementary to said shaft member with the discs mounted in spaced relation axially along the shaft member;
non-metallic spacers between said discs accommodating limited tilting of the discs relative to the axis of the shaft with deflection of the spacers;
metallic surrounds for each of the spacers having an axial dimension slightly less then the spacers so that the spacers accommodate tilting of the discs without constraint from said surrounds; and
means for axially compressively connecting said discs and spacers together and for expanding said spacers radially against said surrounds, securing said discs, spacers, and surrounds into a modular unit which can be supported on the shaft member.

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**4,741,445**

## KNOCKDOWN STORAGE RACK WITH WEDGE CONNECTORS

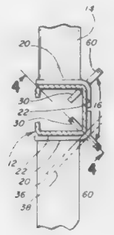
**Herbert H. Klein, Arlington Heights, Ill., assignor to Unarco Industries, Inc., Chicago, Ill.**

**Filed Jan. 15, 1987, Ser. No. 3,503**

**The portion of the term of this patent subsequent to Dec. 15, 2004, has been disclaimed.**

**Int. Cl.[4] A47B** *47/00*

**U.S. Cl. 211—192** **12 Claims**



1. A wedge connector in combination with a knockdown storage rack that includes a hollow, upright, post having an inside, an outside and at least one pair of vertically aligned, vertically oriented, spaced elongated slots in the wall of said post, the upper slot of said pair having a first predetermined length, the lower slot having a second predetermined length, the two slots of said pair being spaced apart vertically a third predetermined distance, said rack further including a horizontal cross beam that terminates in a support plate matingly related to the exterior surface of said post, said support plate defining a vertically oriented elongated slot of substantially the same shape and dimensions as said upper elongated slot in said post wall, the bottom edge of said vertical elongated slot in said cross beam support plate being spaced above the bottom edge of the support plate a distance equal to said third predetermined distance, which wedge connector comprises:

(a) a flat, elongated shank spanning at least the lower one of said two post slots, the portion of the post wall lying between said two slots, and a portion of said upper slot, the median plane of said shank being perpendicular to the respective planes tangent to the surfaces of the wall of said hollow post and of said mating support plate in the area adjacent said elongated slots in said post and said support plate,

said elongated shank having a width bottom edge, an inner edge, an upper edge and an outer edge, the inner edge of said shank abutting the inner surface of said post wall, and the outer, edge of said shank being remote from said post wall,

(b) two ear-supporting members extending laterally from said inner edge of said elongated shank, one for each slot of said pair of post slots, said ear-supporting members being disposed one above the other;

(c) a wedging ear supported by each of said laterally extending members, said two ears being disposed one above the other, with a free end of each of said ears being directed each of said ears having a bottom edge, an outer side edge, an upper edge located at the free end of the ear, and an inner edge adjacent the upper portion of said ear, the lateral dimension of said connector adjacent the lower end thereof, comprising the widths of said shank, said lower ear-supporting member and said lower ear, being slightly less than said first predetermined length of said upper post slot such that said lower end of said wedge connector, with said wedging ears pointed downward and the longitudinal axis of said elongated shank generally perpendicular to the upper one of said two elongated post slots, is inserted from outside the post into said upper post slot, the lateral dimension of said connector adjacent the upper end thereof, comprising the widths of said shank, said upper ear-supporting member and said upper ear, being slightly more than said first predetermined length of said upper post slot such that said upper end of said wedge connector can not pass through said upper elongated post slot during insertion of said lower end portion of said wedge connector into said upper post slot,

the shape and dimensions of the upper portion of said elongated shank and the shape, dimensions, and location on said shank of said two wedging ears being such that, after said lower wedging ear has been inserted in said upper elongated post slot while said cross beam support plate is matingly engaged with said post wall and said upper post slot and said support plate slot are aligned with each other, the lower end portion of said elongated shank is pivoted within said upper elongated post slot down around the upper end portion of said shank and the lowest point on said bottom edge of said lower wedging ear is moved to a position just within said lower elongated slot in said post wall,

the shape, dimensions and location on said elongated shank of said lower wedging ear being such that the lowest point on said bottom edge of said lower wedging ear continues to fall above the bottom edge of said lower elongated slot in said post wall as said lower end portion of the wedge connector is pivoted farther beyond the position in which said lower ear lies just within said lower elongated slot in said post wall, the shape and dimensions of said lower ear being such that said ear is inserted, after the wedge connector has been pivoted as just described, entirely through said lower post slot and said cross heam support plate,

said inner edge of each of said upper and lower wedging ears having a first inclined surface that is inclined away from said shank in the upward direction towards the free end of the ear, with the bottom portion of said inner edge being spaced from said inner edge of said shank a distance less than the combined thickness of said cross beam support plate and the wall of said post, to provide a wedging surface to confine (i) the portion of said support plate that lies immediately above said elongated slot in said plate, and (ii) the portion of said support plate that lies immediately above said bottom edge of the plate, respectively, when said support plate slot is aligned with said upper post slot, said lower wedging ear is inserted as aforesaid in the elongated slots thus aligned, and the support plate is moved downward,

whereby portions of said support plate above the confined portions just mentioned are urged against the outer surface of the wall of said upright post, and said inner edge of said shank is urged against the inner surface of the wall of said upright post, thereby connecting said support plate and its associated cross beam securely to the post.

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**4,741,446**

## COMPUTER GENERATED STOPPER

**Henry F. Miller, Clifton, N.J., assignor to Becton, Dickinson and Company, Franklin Lakes, N.J.**

**Filed Dec. 29, 1986, Ser. No. 947,311**

**Int. Cl.[4] B65D** *47/36*

**U.S. Cl. 215—247** **6 Claims**

1. A stopper having increased sealing properties for containers

said stopper comprising

(a) an annular stopper body with an integral upper flange portion;

(b) a lower integral annular sealing portion on said body;

(c) an annular notch in said body at the juncture of said upper flange portion and said lower sealing portion;

(d) the outer annular surface of said lower portion being the sealing surface with a container and tapered inwardly continuously toward the axis of said body, said taper being from said annular notch to the bottom surface of said lower annular sealing portion;

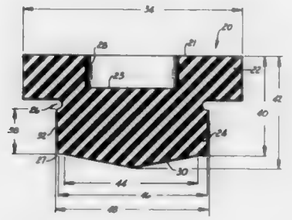


(e) the said bottom surface of said annular sealing portion being conical;

said stopper being obtained by the method characterized by the steps of

(f) generating said stopper from a three-dimensional axisymmetrical computer model;

(g) said three-dimensional axisymmetrical computer model being selected to provide said bottom surface with continuous compressive stresses along the entire extent thereof upon insertion of said stopper body into a container;



(h) said three-dimensional axisymmetrical computer model being selected to provide said tapered outer annular surface of said lower sealing portion with continuous compressive radial stresses along the entire length thereof with a mating container inside wall upon insertion of said stopper body into a container;

(i) said computer model having a pre-selected linear modulus; and

(j) said computer model having a pre-selected poissons ratio.

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**4,741,447**

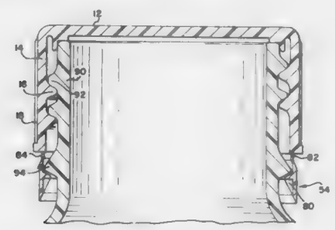
## LINERLESS CAP CLOSURE

**Christian J. John, Downers Grove, Ill., assignor to American National Can Company, Chicago, Ill.**

**Filed Apr. 27, 1987, Ser. No. 43,106**

**Int. Cl.[4] B65D** *41/34, 53/00*

**U.S. Cl. 215—252** **3 Claims**



1. A linerless cap closure comprising a generally circular top wall with a depending annular skirt having an internal thread adapted to engage with an external thread on a container neck and sealing means depending form a lower surface of said top wall adjacent said annular skirt, said sealing means including an annular protrusion integral with said lower surfaces and being generally rectangular in cross-section and having an outer wall, an inner wall and a flat bottom wall, and an annular projection integral with said bottom wall of said protusion, said projection having an outer wall extending substantially parallel to the closure axis and an arcuate inner wall merging with said outer wall through a reduced radiused portion, said inner wall of said projection merging with said flat bottom wall of said protusion intermediate said inner and outer walls of said protrusion and extending substantially perpendicular to said bottom wall at a point of intersection so that upon threading of said closure onto a threaded container neck, the projection will engage and slide along an outer edge of the container neck to provide a side seal and said flat bottom wall of said protrusion will engage on a top surface of said container neck to produce an additional top seal.

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**4,741,448**

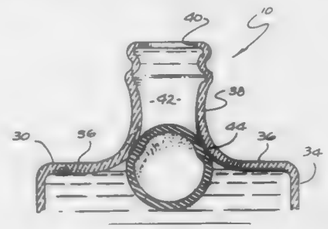
## CONTAINER WITH BUOYANT FLUID FLOW RESTRICTOR

**Kenneth A. Alley, R.D. 4, Box 4820, Aliramo Estate, Berwick, Pa. 18603, and Jonothon M. W. McIntyre, Van Nuys, Calif., assignors to Kenneth Ali Alley, Burbank, Calif.**

**Filed Jun. 2, 1987, Ser. No. 57,440**

**Int. Cl.[4] B65D** *39/06*

**U.S. Cl. 215—266** **18 Claims**



1. A novel fluid container for use in connection with a fluid dispensing station, the container comprising:

bottle means having a tapered fluid port at an upper end through which fluid passes to fill or empty the container; and

means within the bottle means for momentarily restricting fluid flow out of the port when the bottle means is inverted, the restricting means having a construction such that when the bottle means is filled with fluid in an upright position, the fluid is permitted free passage through the port until the bottle means is substantially full at which time the port becomes substantially occluded by the restricting means, and when the bottle means is inverted some passage of fluid is permitted past the restricting means yet the port remains substantially occluded until the fluid pressure at the port reduces sufficiently so that the restricting means disengages to permit the fluid to flow without obstruction through the port.

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**4,741,449**

## CONTAINER SHAPED STRUCTURAL ELEMENT AND STRUCTURE OBTAINED FROM A PLURALITY OF COMPONENTS FROM SUCH CONTAINERS

**Pier Bersani, Brussels, Belgium, assignor to Parteurosa S.A., Luxembourg, Luxembourg**

**Continuation of Ser. No. 251,044, Apr. 6, 1981. This application Jun. 16, 1983, Ser. No. 504,591**

**Claims priority, application Belgium, Apr. 15, 1980, PVO/200.228**

**Int. Cl.[4] B65D** *88/00*

**U.S. Cl. 220—1.5** **27 Claims**

1. A container-shaped structural element, comprising:

(1) first and second spaced unitary structural components, each including

(a) a surface member having outer and inner parallel faces and a plurality of corners;

(b) corner members secured to corners of said surface member, each of said corner members having a face substantially parallel to the plane of the outer face of said surface member and having a first fastening means therein; and

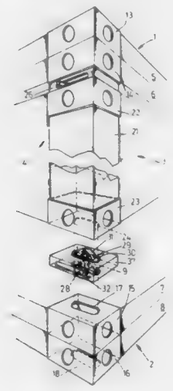
(c) connecting members secured to said surface member, each of said connecting members having a face substantially parallel to the plane of the inner face of said sur-

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face member and having a second fastening means therein, and

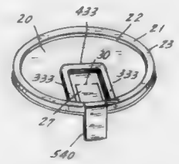
(2) frame elements interposed between respective connecting members of said first and second structural components, each of said frame elements having first and second opposing ends and third fastening means in said first and second opposing ends, respectively, the third fastening



means in the first and second ends of said frame element cooperating with the second fastening means in respective connecting members of said first and second structural components to couple said frame element thereto, each corresponding second and third fastening means being mutually connectable and releasable independently of the other second and third fastening means.

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**4,741,450**
**DRINK-THROUGH BEVERAGE LID**
**Elton Braude, 41-29 Fiftieth St., Suite 2E, Woodside, N.Y. 11377**
**Filed Apr. 28, 1986, Ser. No. 856,382**
**Int. Cl.[4] B65D *41/46, 41/56***
**U.S. Cl. 220—90.4** **17 Claims**



1. A lid for a drinking cup, said lid having an opening adjacent the edge of the lid and the rim of the cup on which it is to be mounted;

a flap covering said opening, said flap having a closed position and an open position, and having an interior face which in said closed position faces the interior of the cup on which said lid is mounted, and an exterior face which in said closed position faces away from the interior of the cup;

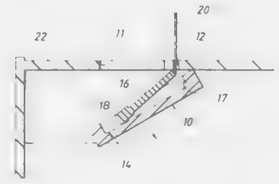
said flap being hinged at a first hinge line spaced inwardly of the lid by a distance of the order of the length of the flap, said flap being rotatable on said first hinge line upwardly and away from said opening in said open position of said flap;

said flap having a second hinge line away from aid first hinge line and toward said edge of said lid, said flap being rotatable into said open position on said second hinge line, in a direction of rotation opposite to that of said first hinge line, simultaneously with rotation on said first hinge line: said interior face thereby remaining substantially concealed from the exterior of the cup while uncovering a portion of said opening adjacent the rim of the cup, when said flap is in said open position; and

holding means on the lid for retaining said flap in said open position to restrain it from rotating and thereby covering said opening; said holding means comprising holding members extending upwardly from the exterior face of said lid, said holding members extending in spaced relation to each other at distances which cause them to closely engage edges of the flap when the flap is rotated into said open position.

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**4,741,451**
**EASY OPEN CONTAINER**
**Douglas H. Hobbs, Seabrook, Tex., assignor to Shell Oil Company, Houston, Tex.**
**Filed Jul. 31, 1986, Ser. No. 892,231**
**Int. Cl.[4] B65D *41/32***
**U.S. Cl. 220—271** **12 Claims**



1. An easy open device for a container which comprises:

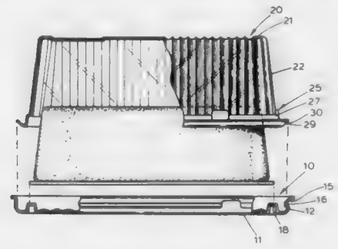
a container lid; a closure block which is positioned contiguous to and under said lid of said container, where a substantial portion of said closure block is beneath an aperture in said lid of said container; and

an opening actuator which is at least temporarily adhered to said closure block so that a substantial portion of said opening actuator is beneath said aperture in said lid of said container, and where a pull tab end of said opening actuator protrudes through a second aperture in said lid of said container, wherein said closure block contains an aperture positioned at one end of said closure block so that a seal area of said opening actuator covers said aperture in said closure block until said actuator is pulled, thereby venting any carbonation, gas pressure or pressurized liquid within said container through said aperture in said closure block.

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**4,741,452**
**DOMED CONTAINER WITH INTERLOCKING RESILIENT FLANGES**
**Michael E. Holzkopf, Libertyville, Ill., assignor to Ekco Products, Inc., Wheeling, Ill.**
**Filed May 2, 1985, Ser. No. 729,654**
**Int. Cl.[4] B65D *41/18***
**U.S. Cl. 220—306** **3 Claims**

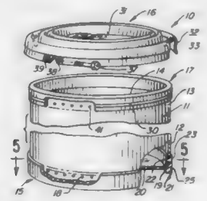
1. The combination of a container and a dome cover therefor having locking means for releasably locking the cover to the container, said container comprising a bottom surface delimited by an upstanding rib and terminating in an outwardly extending resilient rim wherein said rim is outwardly yieldable, said rim encompassing in spaced relation said rib and being provided with an inwardly extending shoulder, and a first camming surface formed on said rim and extending outwardly and upwardly from said shoulder; said dome cover comprising a top surface having at least one wall depending therefrom and terminating in an outwardly extending resilient flange adapted to underlie said shoulder in abutting locking engagement therewith preventing movement of said dome cover relative to said container, a second camming surface formed on the exterior of said flange, and an outwardly and downwardly extending skirt member formed inwardly from said flange and interconnecting said flange and depending wall, said skirt member including a laterally extending ledge section, said flange being in substantially encompassing outwardly spaced relation with said skirt member; when said cover is moved towards said container to effect locking engagement therewith, said first and second



camming surfaces initially coacting with one another causing said rim to be deformed outwardly and said flange to be deformed inwardly towards said skirt member while the latter is substantially reinforced by a portion of said rib until said flange abuttingly engages the underside of said shoulder; when said cover and container are in interlocking engagement, the ledge section of said skirt member being disposed in substantially superposed spaced relation with portions of said rib and cooperating therewith to form a pocket opening towards the interior of the cover and spaced inwardly from the container rim.

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**4,741,453**
**CONTAINER AND CLOSURE WITH FASTENING MEANS**
**Michael D. Stolzman, Lake Forest, Ill., assignor to International Precision Components Corporation, Lake Forest, Ill.**
**Filed Jun. 22, 1987, Ser. No. 64,673**
**Int. Cl.[4] B65D *45/00***
**U.S. Cl. 220—315** **31 Claims**



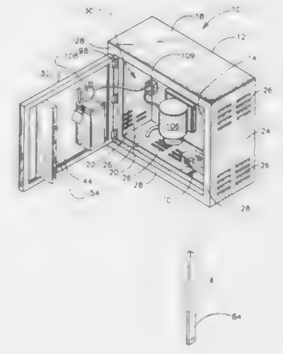
1. A container comprising: a tubular sidewall defining a peripherally enclosed space, said sidewall having an annular end portion defining an open end of said space, said end portion being provided with through openings spaced circumferentially about said open end; and

a closure molded of synthetic resin in situ in association with said end portion of the sidewall, said closure having a transverse center wall portion closing said end of said space, and a U-shaped, annular peripheral connecting portion extending adjacent said end portion of the sidewall and defining spaced annular legs embracing said end portion, said connecting portion further having a plurality of securing portions extending between said legs through said openings in said

sidewall end portion.



**4,741,454**
**PROTECTIVE ENCLOSURE FOR VENDING APPARATUS AND THE LIKE**
**John S. Ray, 4008 NW. Highway 67, Sedalia, Colo. 80135, and Larry H. Ellis, Colorado Springs, Colo., assignors to John S. Ray, Sedalia, Colo.**
**Filed Jan. 16, 1986, Ser. No. 819,796**
**Int. Cl.[4] B65D *45/00***
**U.S. Cl. 220—315** **19 Claims**



1. A protective enclosure having a generally open interior adapted to receive and mount vending apparatus to resist unauthorized access and vandalism thereto and to otherwise protect the vending apparatus comprising:

a box-like housing structure having a back wall panel and surrounding sidewalls to define said interior, said housing structure having an open front area for allowing access into the interior thereof;

a door panel adapted to selectively and completely enclose said interior by being positioned and retained across said front area to define a closed position;

securing means for securing a first edge portion of said door panel to said housing structure;

latching means cooperating with said securing means for releaseably latching said door panel in a closed position to prevent access to the interior, said latching means including an elongated sleeve attached to said door panel adjacent a second edge portion thereof and projecting into the interior when the door panel is in the closed position, said elongated sleeve extending across said door panel from a third side edge to a fourth and opposite side edge and having retaining means on each end thereof for mechanically retaining said sleeve and said door panel together in the event that said sleeve becomes detached from said door panel while said latch bar is engaged therewith, said latching means including a latch bar insertable through a slot in one of said sidewalls and into telescopic engagement with said sleeve whereby said door panel cannot be removed from said front area when said latch bar is engaged with said sleeve; and

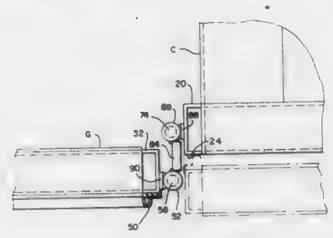
a keyed lock mechanism mounted to said housing structure on the interior thereof and having a locking element moveable between a locked state wherein the locking element locks said latch bar in engagement with said sleeve and an unlocked state releasing said latch bar for withdrawal from said sleeve, said housing structure having a key opening immediately adjacent said lock mechanism whereby a key may be inserted through said key opening into said lock mechanism to permit manipulation of the locking element.

**4,741,455**

## BUSTLE GATE ASSEMBLY AND METHOD

**James K. Robbins, Fayette, Ala., assignor to Marathon Corporation, Birmingham, Ala.**

**Filed Jan. 13, 1987, Ser. No. 2,994**
**Int. Cl.[4] B65D *43/14, 51/04***
**U.S. Cl. 220—333** **20 Claims**



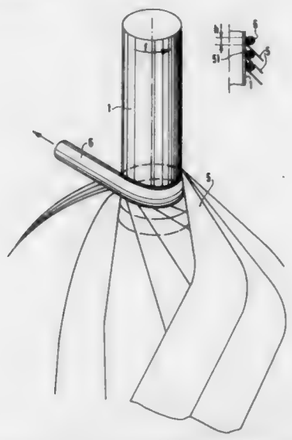
1. A bustle gate pivot mechanism, comprising:
(a) a multisided container;
(b) first seal means disposed about a first end portion of container;
(c) first means connected to first one of said sides and including first link means extending therefrom and pivotally connected thereto;
(d) second means connected to said first link means at a distance from said first means and pivotal therewith;
(e) gate means operably connected to said second means and pivotal therewith; and,
(f) second seal means disposed about said gate means whereby said gate means is pivotal about said second means for selectively engaging and disengaging said first and second seal means and said gate means and said first link means are pivotal about said first means for selectively positioning said gate means proximate to and remote from said first end portion.

**4,741,456**

## CRYOGENIC RESERVOIR WITH HELICALLY WOUND THERMAL INSULATION

**Jean-Yves Faudou, Suce S/Erdre, and Bernard Simon, Le Plessis-Trevise, both of France, assignors to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude, Paris, France**

**Filed Apr. 22, 1986, Ser. No. 854,580**
**Claims priority, application France, Apr. 23, 1985, 85 06131; Jun. 5, 1985, 85 08471**
**Int. Cl.[4] B65D *25/18, 8/02***
**U.S. Cl. 220—414** **8 Claims**



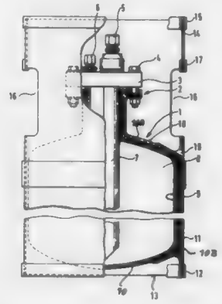
1. A reservoir for a cryogenic fluid comprising an elongated filling neck and a vessel and thermally insulated by means of at least one band of thermal insulating material wound around the neck and the vessel and forming a plurality of superimposed layers each of which has an edge adjacent the neck and an edge remote from the neck, and a cord helically wound around the neck in a plurality of turns and which contacts a said adjacent edge of each said layer.

**4,741,457**

## TRANSPORT CONTAINER

**Frank Joseph, Gernsheim, and Helmuth Krauss, Bensheim, both of Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft Mit Beschraenkter Haftung, Darmstadt, Fed. Rep. of Germany**

**Filed Oct. 9, 1987, Ser. No. 106,297**
**Claims priority, application Fed. Rep. of Germany, Oct. 30, 1986, 3636886**
**Int. Cl.[4] B65D *7/00***
**U.S. Cl. 220—466** **5 Claims**



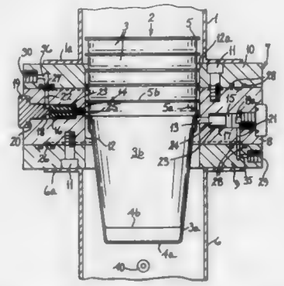
1. A transport container for very pure liquid chemicals having an inner container consisting of synthetic resin with an upper sealing flange, the inner container being in an outer container, which has a protective collar, provided with openings, surrounding the sealing flange at a distance, wherein the inner container is made of two skins, the inner skin being made of an inert fluoro-synthetic resin and the outer skin being made of glass-fiber-reinforced synthetic resin completely enclosing the inner skin, the outer skin being made in one piece with a cylindrical mantle, the upper section of which forms the protective collar.

**4,741,458**

## PLASTIC CUP DISTRIBUTOR

**Franco Odorici, Bologna, Italy, assignor to Azionaria Costruzoni Macchine Automatiche A.C.M.A. S.p.A., Bologna, Italy**

**Filed Jul. 1, 1986, Ser. No. 880,779**
**Claims priority, application Italy, Jul. 22, 1985, 3510 A/85**
**Int. Cl.[4] B65H *3/08***
**U.S. Cl. 221—221** **11 Claims**



1. A distributor for plastic cups which are arranged to form a stack in a store and to be released one at a time into a tube, each of said cups including a sidewall having a circumferential top portion defining a substantially planar opening and a rim which projects substantially parallel to the plane of and radially outwardly from the opening of the cup, the store being disposed above the tube and being separated therefrom by a separation station at which cups are separate from the stack, the distributor comprising first, lower, supports and second, upper, supports at the separation station, the supports being arranged peripherally with respect to the cups and the first supports being separated from the second supports by a distance which is less than that between the rims of two adjacent cups in the stack, the first and the second supports being movable between respective operational and non-operational positions and being arranged to alternate with one another in their operational positions to provide support for the stack by providing support for a rim of a cup, the distributor also comprising compressed air blowers at a level between the first and the second supports, the blowers being operational when the second supports move into their operational positions to exert a downwardly-directed pressure against the radially-outwardly projecting rim of a first cup which has just ceased to be supported by the first supports so that said first cup is driven by said pressure against its rim in a downward direction to separate said first cup from a second cup supported by said second supports.

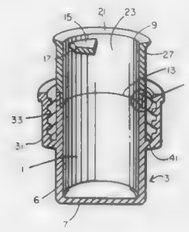


**4,741,459**

## COMBINED CLOSURE AND MEASURING DEVICE

**Scott A. Silvenis, Mauldin, and William J. Britt, Greenville, both of S.C., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Mar. 21, 1986, Ser. No. 842,617**
**Int. Cl.[4] B67D *5/00***
**U.S. Cl. 222—23** **9 Claims**



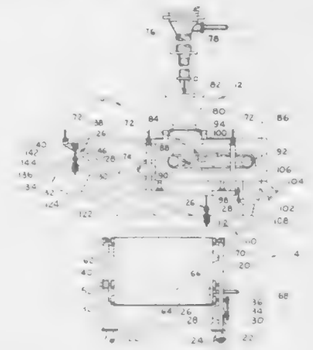
1. A dispensing apparatus comprising:
a hollow cylindrical member, said cylindrical member being closed at one end and open at the other end thereof and formed of separate upper and lower sections;
indicia within the hollow of said hollow cylindrical member designating a predetermined volume between said indicia and said closed end said indicia being formed by the joinder of said upper and lower sections;
a ledge within said hollow, said ledge defining an aperture therethrough for preciser pouring through said aperture and said open end;
a skirt about said hollow cylindrical member having threads therein for engaging mating complementary threads on a container for closing said container.

**4,741,460**

## PROCESS AND APPARATUS FOR DISPENSING A PARTICULATE SOLID

**William A. Blain, Spring Valley, and Amal C. Bhattacharjee, Jackson Heights, both of N.Y., assignors to Nabisco Brands, Inc., Parsippany, N.J.**

**Filed Apr. 18, 1985, Ser. No. 724,559**
**Int. Cl.[4] B67D *5/08***
**U.S. Cl. 222—55** **7 Claims**



1. A process for dispensing a particulate solid on to articles, comprising the steps of:
(a) forming a layer of particulate solid on a surface of a movable belt, said layer being of substantially constant thickness; and
(b) sensing weight of the particulate solid on the belt; and
(c) adjusting rate of movement of the belt so that a weight of a particulate solid discharged from the belt is substantially constant per unit time, said adjustment being carried out using a time delay to compensate for a time which the belt takes to travel from a point at which the weight of the particulate solid on the belt is sensed to a point at which the particulate solid is discharged from the belt; and
(d) depositing the particulate solid onto an intake section of a dispensing member, the dispensing member having an elongated slot extending therethrough, the intake section being spaced from the slit, the dispensing member being substantially horizontal; and
(e) vibrating the dispensing member in a direction which lies in a vertical plane and makes an acute angle to the horizontal so as to cause the particulate solid to move along the dispensing member in a direction which makes an acute angle with the length of the slot, and to drop through the slot; and
(f) moving the articles beneath and across the slot while the particulate solid is dropping through the slot, thereby causing the particulate solid to be deposited upon the articles.

6. An apparatus for dispensing a particulate solid onto articles, the apparatus comprising:
(a) a movable belt;
(b) a gate member disposed adjacent the belt so as to leave a metering slot of substantially constant width between the belt and an adjacent edge of the gate member, whereby means are provided for forming on the surface of this belt a layer of the particulate solid, said layer being of substantially constant thickness;
(c) load sensing means for sensing the weight of the particulate solid on the belt;
(d) control means for adjusting the rate of movement of the belt in response to the load sensing means in such a manner that the weight of the particulate solid discharged from the belt per unit time is held substantially constant, whereby supply means is provided for depositing the particulate solid on an intake section of a dispensing mem-

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ber, the supply means being arranged such that the particulate solid passes through the metering slot, thereby forming said layer;

(e) a dispensing member having an elongate slot extending therethrough, the dispensing member having an intake section spaced from the elongated slot;

(f) vibrator means for causing the dispensing member to vibrate vertically in such a manner as to cause the particulate solid on the dispensing member to move therealong in a direction which makes an acute angle with the length of the elongated slot, and to drop through the elongated slot;

(g) transport means for transporting the articles beneath and across the slot in the dispensing member.

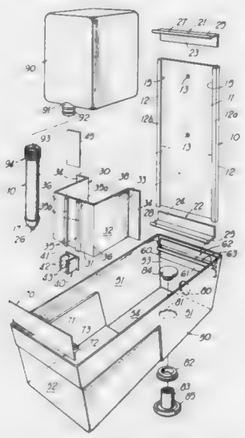
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**4,741,461**

## HOUSING FOR A LIQUID DISPENSER FOR DISPENSING LIQUID SOAP AND THE LIKE

**Wayne A. Williamson, Warner Robins; George O. Haskell, III, and Francis J. Perzinski, both of Macon, Ga., assignors to Southern Chemical Products Company, Macon, Ga.**

**Filed Oct. 12, 1983, Ser. No. 541,144**
**Int. Cl.[4] B65D *25/48***
**U.S. Cl. 222—181** **13 Claims**



1. A housing for a liquid dispenser for dispensing liquid soap and the like comprising:

(a) a back member for being received and held in an upright position against a vertical wall;

(b) a front casing proturuding forwardly from said back member, said front casing having a front panel, a pair of spaced opposed side panels joined by their front edges to said front panel, a top panel joined by its front edge to said front panel, and a bottom panel joined by its front edge to said front panel, the side edges of said side panels, said top panel and said bottom panel being joined so that said front panel, said side panels, said top panel and said bottom panel define an open interior and the rear edges of said side panels, said top panel and said bottom panel define an open rear end for said casing;

(c) a hinge member connecting said bottom panel and back member, said hinge member having bases respectively secured to said back member and said bottom panel, a hinge tongue protruding from one of said bases and a stationary hinge pin carried by said hinge tongue, said hinge pin being of a thickness greater than the thickness of said hinge tongue, the other of said bases carrying an arcuate pin receiving member partially surrounding said pin for confining said pin for limited pivotal movement within said pin receiving member when said casing is moved from an upright closed position, in which said open rear end is adjacent to said back, to an inclined forwardly and upwardly open position;

(d) a friction latch for frictionally joining the upper end portions of said casing and said back member when said casing is in its closed position.

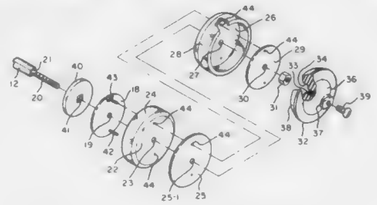
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**4,741,462**

## ADJUSTABLE PISTON PACKING EXPANDER FOR CAULKING GUNS

**Franz K. Schneider, Jr., Moorestown, N.J., assignor to Albion Engineering Company, Philadelphia, Pa.**

**Filed Oct. 29, 1981, Ser. No. 316,104**
**Int. Cl.[4] B67D *5/42***
**U.S. Cl. 222—386** **4 Claims**



1. A caulking gun comprising, in combination:

a gun barrel having an inner wall and adapted to receive caulking compound;

an end cap and associated nozzle secured on one end of the gun barrel;

a piston rod extending through the gun barrel and terminating in a first end, a portion of which is of non-circular configuration;

a piston assembly including an expandable packing engaging the inner wall of the gun barrel and carried by the first end of the piston rod;

packing expansion means carried by the first end of the piston rod and adjustably movable relative to the expandable packing to vary the pressure of the packing against the inner wall of the gun barrel; and

piston assembly interlocking means secured to the piston assembly and of configuration complementary to the non-circular portion of the piston rod and positioned thereon to interlock the piston rod and piston assembly against relative rotational movement, one to another.

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**4,741,463**

## INGATE DEVICE AND PROCESS FOR CASTING MOLTEN METALS

**Ernst Müller, Wattenheim; Hans D. Grabowski, Bochum; Hans-Joachim Böhm, Büsingen, and Adolf Trautwein, Gottmadingen, all of Fed. Rep. of Germany, assignors to Chamotte- und Tonwerk Kurt Hagenburger, Gründstadt, Fed. Rep. of Germany and Georg Fischer Aktiengesellschaft, Schaffhausen, Switzerland**

**Filed Nov. 29, 1984, Ser. No. 676,242**
**Int. Cl.[4] B22D *43/00***
**U.S. Cl. 222—590** **18 Claims**

1. In an ingate device for transferring molten metal to a casting device, the ingate device including means defining an inlet channel for receiving the molten metal, means defining a rotation chamber in fluid communication with the inlet channel for separating nonmetallic materials from the molten metal, and means defining an outlet channel in fluid communication with the rotation chamber for conveying molten metal from the rotation chamber, the improvement wherein:

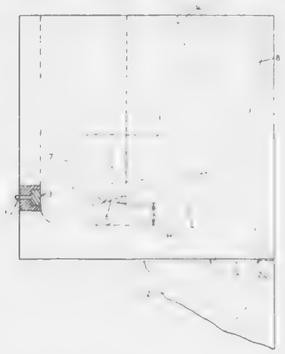
said means defining an inlet channel, means defining a rotation chamber, and means defining an outlet channel comprise a unitary structure that is compact and re-usable, said unitary structure being positionable on said casting device;



said rotation chamber has an upwardly disposed chamber opening, a bottom, and a wall between said chamber opening and bottom, said wall having an inlet opening from said inlet channel and having an outlet opening to said outlet channel, with the cross-sectional dimensions of said rotation chamber at every point above said bottom being at least as great as the cross-sectional dimensions of said rotation chamber adjacent said bottom so that metal solidified at said bottom can be withdrawn through said chamber opening;

said unitary structure additionally has a feeding opening, said inlet channel sloping continuously downward to said inlet opening in said wall of said rotation chamber so that substantially all molten metal that is poured into said feeding opening drains into said rotation chamber;

said unitary structure additionally has an outflow opening, said outlet channel sloping continuously downward from said outlet opening in said wall of said rotation chamber to said outflow opening so that substantially all molten metal that flows out of said rotation chamber drains out of said unitary structure through said outflow opening; and



said outlet channel is an airtight conduit commmunicating between said outlet opening in said wall of said rotation chamber and said casting device.

14. A process for transferring molten metal to a casting device having an inlet, comprising:

joining to the casting device a compact and substantially unitary structure that is configured as an ingate device having a chamber and downwardly directed outlet channel within the substantially unitary structure by creating a substantially air-tight seal between the outlet channel and the inlet of the casting device;

injecting molten metal into the chamber of the substantially unitary device;

rapidly rotating the molten metal within the substantially unitary device;

flushing the molten metal with an inert gas that is introduced into said chamber as the molten metal rotates;

discharging at least a portion of the molten metal from the chamber via the outlet channel; and

removing any remaining metal from the chamber so that the ingate device can be re-used.

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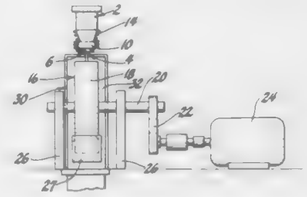
**4,741,464**

## MULTIPLE ORIFICE NOZZLE FOR JET CASTING RAPIDLY SOLIDIFIED MOLTEN METAL

**Frederick E. Pinkerton, Sterling Heights, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed May 23, 1986, Ser. No. 866,257**
**Int. Cl.[4] B22D *11/10***
**U.S. Cl. 222—598** **3 Claims**

1. An apparatus for jet casting molten metal comprising a crucible for retaining said metal, a nozzle at the base of said crucible having a plurality of ejection orifices therethrough, a plug which is shaped to be sealingly and movably engaged with the upstream side of said nozzle, at least one passage through said plug through which said metal can flow from said crucible through said passage and through a desired ejection



orifice while at least one other orifice is blocked by said plug, and means engaging the upstream side of said plug to move said plug in said nozzle such that metal can flow through said desired orifice while the plug is blocking said at least one other orifice.

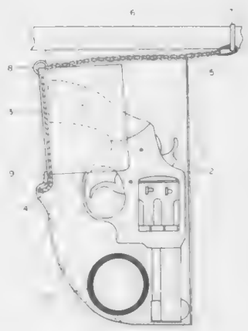
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**4,741,465**

## CONCEALMENT POCKET HOLSTER

**Wayne A. Johnson, 5941 Skyline Dr., Corpus Christi, Tex. 78408**

**Continuation-in-part of Ser. No. 818,478, Jan. 13, 1986, abandoned. This application Jan. 20, 1987, Ser. No. 5,116**
**Int. Cl.[4] F41C *33/02***
**U.S. Cl. 224—230** **2 Claims**

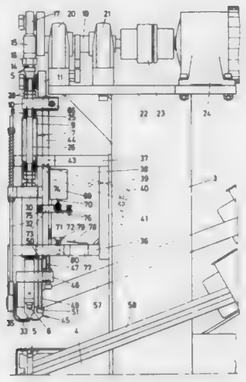


1. A concealment holster for a handgun which is held in the opening of a front pants pocket designed to appear as a truckers wallet, said holster including two generally flat side surfaces joined by a rounded side portion defining a pouch sized to fit about the grip handle of said handgun, the pouch being joined at the upper end and having a configuration which appears to be a truckers wallet, a metal bar inserted vertically in said pouch, the metal bar being fastened to said rounded side portion and including a hook at the lower end of the metal bar and a wallet chain mounted to said bar at the upper end of the pouch, and shaping means for placement in the pants pocket for conforming the pocket to substantially conceal and camouflage the shape of the lower end of the handgun.

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**4,741,466**
**MACHINE FOR ATTACHING RIVETS, SNAP FASTENERS OR SIMILAR**
**Herbert Birkhofer, Brunswick, Fed. Rep. of Germany, assignor to Scovill Apparel Fasteners Inc., Watertown, Conn.**
**Filed Jul. 8, 1986, Ser. No. 883,115**
**Int. Cl.⁴ B21J *15/28***
**U.S. Cl. 227—4** **13 Claims**

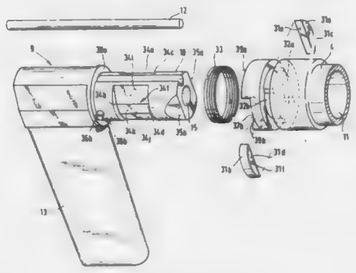


1. A machine for attaching fasteners, said machine comprising:
an upper tool, a lower tool, said upper tool being movable toward said lower tool;
an upper tool ram, means interconnecting said upper tool ram and said upper tool for moving said upper tool with said ram toward said lower tool;
a guide rod, means mounting said guide rod for reciprocating movement in a vertical direction in coordination with said upper tool;
holding tongs for said fasteners, means interconnecting said holding tongs and said guide rod for movement therewith;
braking means engageable with said guide rod, said braking means being interconnected to said upper tool ram;
an operating switch, means responsive to actuation of said operating switch for initiating downward movement of said guide rod and said tongs toward said lower tool;
a second switch for controlling actuation of said upper tool ram when said tongs are shifted to a predetermined lower limit position.

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**4,741,467**
**EXPLOSIVE POWDER CHARGE OPERATED FASTENING MEMBER DRIVING TOOL**
**Theo Gassner, Triesenberg, and Peter Von Flue, Mauren, both of Liechtenstein, assignors to Hilti Aktiengesellschaft**
**Filed Feb. 26, 1987, Ser. No. 19,482**
**Claims priority, application Fed. Rep. of Germany, Feb. 28, 1986, 3606514**
**Int. Cl.⁴ B25C *1/14, 1/18***
**U.S. Cl. 227—8** **11 Claims**

1. Explosive powder charge operated fastening member driving tool comprising a housing having a firing direction in which fastening elements are driven from the tool, said housing having a front end leading in the firing direction and an oppositely facing rear end trailing in the firing direction, a handle extending outwardly from said housing transversely of the firing direction and located adjacent to the rear end of said housing, said housing including a tubular receiving member located within the front part of said housing, a muzzle part having a front end and a rear end spaced apart in the firing direction and having an axially-extending bore therethrough extending in the firing direction, said muzzle part being displaceable into said housing opposite to the firing direction in position for firing the driving tool, a rear part of said muzzle part located within said housing and a front part projecting in the firing direction out of the front end of said housing, the front part of said muzzle part having a non-circular outer circumferential surface, said muzzle part being displaceable within said housing in the firing direction between a retaining means and a stop means with the stop means trailing said retaining means in the firing direction, an elongated contact pressure sensor extending parallel to the firing direction and mounted in said muzzle part for displacement in the direction of the axis of the bore in said muzzle part between a first position projecting from the front end of said muzzle part and a second position flush with the front end of said muzzle part when the driving tool is ready to be fired, said sensor cocking a firing spring in the second position thereof, wherein the improvement comprises that said muzzle part is rotatable about the bore axis thereof relative to said housing, said stop means



comprises a first stop surface on said muzzle part facing a second stop surface on said housing which second stop surface faces in the firing direction, a stop element on one of said housing and said muzzle part extending transversely of the firing direction and located in the path between a first stop surface and a second stop surface, one of said first and second stop surfaces having a circumferentially extending recess therein arranged to receive said stop element, said retaining means comprises a shoulder on said muzzle part and a counter-shoulder on said housing, said shoulder, when said muzzle part is in the position for firing the driving tool, is spaced in the axial direction of said bore axis from said counter-shoulder by a distance corresponding to the insertion movement in the bore axis direction of said stop element into said recess when said shoulder and counter-shoulder are in registration in the bore axis direction.

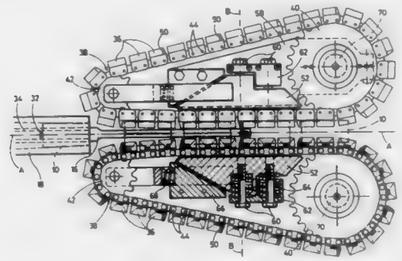
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**4,741,468**
**APPARATUS FOR CONVEYING ROUNDED BODY BLANKS THROUGH A WELDING ZONE**
**Wolfgang Weil, Heitersheim, Fed. Rep. of Germany; Michael Baumgartner, Rudolfstetten, and Andreas Lanz, Bergdietikon, both of Switzerland, assignors to Elpatronic AG, Switzerland**
**Filed Apr. 16, 1987, Ser. No. 39,674**
**Claims priority, application Switzerland, Apr. 22, 1986, 1628/86**
**Int. Cl.⁴ B23K *37/04***
**U.S. Cl. 228—16** **6 Claims**

1. An apparatus for conveying rounded body blanks (10) through a welding zone for a machine for welding the longitudinal edges (12,14) of the blanks (10), having groups of movable guide elements (36) which are situated opposite one another with respect to the blanks (10) and exert radial guiding forces on these, characterized in that the guide elements (36) of each group are disposed on an endless chain (30) which comprises a chain strand extending in the direction of movement (axis A) of the blanks (10) and supported at both sides of a welding plane B containing the welding zone and normal to the direction of movement of the blanks (10), by rails (52) each



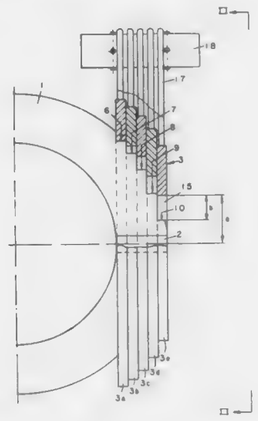
of which extends without interruption and in a straight line between a beginning and an end, the distance of which from



the welding plane B is greater than the length of each individual blank (10).

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**4,741,469**
**CLAMPING RING ATTACHABLE WITH SPLIT CLAMPING MEANS**
**Rune Adolfsson, Boras, Sweden, assignor to SKF Nova AB, Gothenburg, Sweden**
**Filed Jul. 23, 1987, Ser. No. 76,759**
**Int. Cl.⁴ B23K *37/00*; B25B *1/08***
**U.S. Cl. 228—50** **3 Claims**



1. A clamping ring with adjustable bore circumference and having at least one slot (2) between two ring portions, which slot is encircled by a clamping means (3) displaceable in the axis direction of the clamping ring and having surfaces (4), which cooperate with corresponding surfaces (5) in the clamping ring, which surfaces are provided on each side of the slot, whereby the intersections of the surfaces with a plane straight through the slot and in parallel with the axis of the clamping ring defines lines which form an angle ($\alpha$) to each other, characterized thereby that the clamping means incorporates several separate sections (3*a*–3*e*), which enclose one step of a stepladder-shaped portion of the clamping ring on each side of the slot (2), whereby the steps constitute said surfaces and means (11–14) being arranged for displacement of all sections along the associated surfaces.

**4,741,470**
**METHOD FOR ASSEMBLING AN OPTICAL FIBER COMMUNICATION CABLE**
**Joseph Winter, New Haven, and Michael J. Pryor, Woodbridge, both of Conn., assignors to Olin Corporation, New Haven, Conn.**
**Division of Ser. No. 497,546, May 24, 1983, which is a continuation-in-part of Ser. No. 272,154, Jun. 10, 1981, abandoned. This application Dec. 3, 1985, Ser. No. 814,445**
**The portion of the term of this patent subsequent to Mar. 25, 2003, has been disclaimed.**
**Int. Cl.⁴ H04B *9/00*; B23K *1/19***
**U.S. Cl. 228—148** **13 Claims**



1. A process for making an optical fiber communication cable comprising:
providing at least one optical fiber;
providing a strip of a high strength copper alloy having a desired transverse strip cross-sectional area which exceeds a transverse cross-sectional area of a tube to be formed from said strip;
providing at least one forming die for forming said strip into said tube; and
drawing said strip through said die while inserting said optical fiber to form said tube about said optical fiber;
whereby said tube formed by said drawing step comprises a high strength drawn copper alloy tube having a generally longitudinally extending seam, said seam being defined by opposing substantially nonlinear deformed edges whose length from the outside of said tube to the inside of said tube exceeds the thickness of said strip.

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**4,741,471**
**METHOD FOR MANUFACTURING A ROTARY ROCK BIT**
**Eric C. Sullivan, Houston, Tex., assignor to Hughes Tool Company - USA, Houston, Tex.**
**Filed Apr. 20, 1987, Ser. No. 40,381**
**Int. Cl.⁴ B23K *31/10, 31/02, 33/00***
**U.S. Cl. 228—166** **5 Claims**

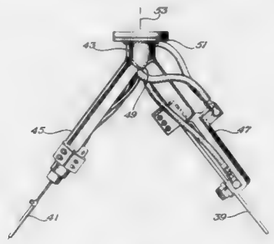
1. A method for manufacturing a rotary rock bit by welding separate sections of the bit together along seams between the sections, the bit having a connecting end for connection to a drill string for rotation about a vertical axis, comprising the steps of:
assembling the bit sections in a suitable fixture, the assembled sections forming radial seams which lie in planes that radially intersect the axis of rotation of the bit and forming outside, axial seams which lie in planes generally parallel to the bit axis of rotation;
cutting a first radial weld groove and then welding the first radial weld groove at a single welding station by means of a welding tool having both a cutting torch and a welding torch mounted on a single bracket;
cutting a second radial weld groove end which intersects the

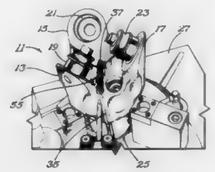
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first radial weld and then welding the second radial weld groove at the same welding station;

repeating the process for all additional radial welds;





cutting outside, axial weld grooves which intersect each radial weld and welding the outside, axial weld grooves at the same welding station.

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**4,741,472**

**METHOD OF SOLDERING AN INTEGRATED CIRCUIT AND PRINTED CIRCUIT BOARD**

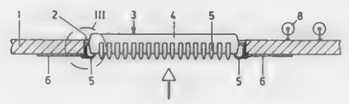
**Dieter Bärmann, Hersbruck, Fed. Rep. of Germany, assignor to Grundig E.M.V. Elektro-Mechanische Versuchsanstalt Max Grundig, Fuerth/Bay., Fed. Rep. of Germany**

**Filed Jul. 28, 1986, Ser. No. 890,901**

**Claims priority, application Fed. Rep. of Germany, Jul. 27, 1985, 3527043**

**Int. Cl.⁴ B23K** *31/00, 31/02*

**U.S. Cl. 228—180.1** **6 Claims**



1. A method of incorporating an integrated circuit into a printed circuit board having conductors thereon, wherein said integrated circuit includes a housing having a plurality of yieldable contacts rigidly mounted on its perimeter, said method comprising:

(a) providing said integrated circuit;

(b) providing a printed circuit board;

(c) providing an opening in the printed circuit board slightly smaller than the outer dimensions of the housing and contacts of the integrated circuit;

(d) placing the integrated circuit in the opening of the printed circuit board such that the contacts are biased against or clampingly engage the sides of the opening so as to maintain the integrated circuit in position therein; and

(e) soldering the contacts with respective conductors on the printed circuit board.

**4,741,473**

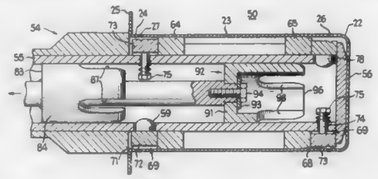
**EXPANDABLE STRUCTURE**

**Richard C. Bennett, 4 Court of Chapelwood, Northbrook, Ill.**

**Filed Mar. 11, 1986, Ser. No. 838,456**

**Int. Cl.⁴ B23K** *37/04*

**U.S. Cl. 228—49.3** **20 Claims**



1. An expandable structure comprising a hollow tubular frame, a segmented cylinder carried by and encompassing said frame and including a plurality of discrete segment means each having a part-cylindrical outer surface, each of said segment means being movable inwardly and outwardly of said cylinder between an expanded condition wherein said outer surfaces cooperate to form a substantially continuous cylindrical surface and a retracted condition, means cooperating with said frame for inhibiting movement of said segment means axially of said frame, bias means resiliently urging only first ones of said segment means inwardly to the retracted condition thereof, drive means disposed within said frame and movable axially thereof for engagement with only second ones of said segment means to effect movement thereof outwardly to the expanded condition thereof, and means responsive to movement of either of said first or second ones of said segment means for effecting a corresponding movement of the other ones of said segment means.

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**4,741,474**

**PROCESS FOR MANUFACTURING REINFORCED PANEL**

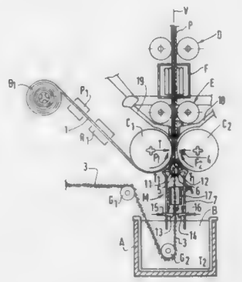
**Henri-Jacques Potet, Le Vesinet, and Jean-Claude Vacher, Douai, both of France, assignors to Asturienne France, Auby-les-Douai, France**

**Filed Aug. 4, 1986, Ser. No. 892,955**

**Claims priority, application France, Aug. 5, 1985, 85 11959; Feb. 19, 1986, 86 02245**

**Int. Cl.⁴ B23K** *1/20*

**U.S. Cl. 228—190** **6 Claims**



1. A process for the manufacture of a reinforced panel comprising heating at least one sheet metallized on at least one surface as a preliminary step to a first predetermined temperature, covering a strip or plate of mesh in a preliminary step with a welding material by immersing into a bath of liquid metallic material, thus heating said covered mesh to a second predetermined temperature higher than the melting point of the welding material, and compressing the sheet and the mesh superimposed with their metallized surfaces in contact in such a manner as to assure the welding of the mesh to the sheet by transfer of heat from the higher temperature in order to bring simultaneously to the weld temperature, the coverings of the sheet and of the mesh, and by diffusion of said coverings into each other, wherein the sheet is metallized with zinc, and the welding material is aluminum or an aluminum alloy, whereby energy of latent heat of solidification of the aluminum welding material is utilized to effect the welding.



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**4,741,475**

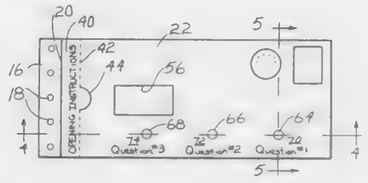
**MASS MAILER**

**John A. Norman, Downers Grove, Ill., assignor to Uarco Incorporated, Barrington, Ill.**

**Filed Feb. 5, 1987, Ser. No. 11,293**

**Int. Cl.⁴ B65D** *27/04*

**U.S. Cl. 229—71** **10 Claims**




1. A mailer comprising:

an envelope including a front, a back and an end adapted to be opened to achieve access to the contents of the envelope and remove the same therefrom in a direction of withdrawal;

insert material within the envelope and removable therefrom through said end in said direction of withdrawal when said end is opened;

a window in said front through which an aligned portion of said insert material may be viewed;

a series of at least two index openings in said front, each spaced from each other along a line generally parallel to said direction of withdrawal;

a series of first data receiving areas on said front, one for each of said index openings, and located adjacent the associated index opening;

an index mark on said insert material, and located generally on said line so as to be selectively alignable with each of said index openings as said insert material is removed from said end in said direction of withdrawal; and

a series of second data receiving areas on said insert material and spaced from each other along a line generally parallel to said direction of withdrawal and alignable with said window, each said second data receiving area corresponding to one of said index openings with adjacent ones of said second data receiving areas being spaced a distance corresponding to the spacing between the corresponding index openings such that when said index mark is aligned with any one of said index openings, the corresponding second data receiving area will be viewable through said window;

whereby data in a first data receiving area indexed by said index mark through the corresponding index opening can be mentally correlated with data in the corresponding second data receiving area appearing through said window.

**4,741,476**

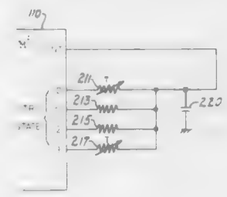
**DIGITAL ELECTRONIC THERMOSTAT WITH CORRECTION FOR TRIAC SELF HEATING**

**James Russo; Michael R. Levine; Victor Rigotti, all of Ann Arbor, and Nicholas Skogler, Ypsilant, all of Mich., assignors to Honeywell Inc., Minneapolis, Minn.**

**Filed Jul. 7, 1987, Ser. No. 70,437**

**Int. Cl.⁴ H01L** *31/00;* **F23N** *5/20*

**U.S. Cl. 236—46 R** **10 Claims**




1. An electronic thermostat having a correction for self heating comprising:

a circuit board for supporting and interconnecting electrical parts of the electronic thermostat;

a semiconductor power switching device disposed on said circuit board, controlled for selective connection of electric power to a temperature control unit;

a first temperature sensor disposed on said circuit board at a location remote from said semiconductor power switching device, having an electrical characteristic which varies with ambient temperature;

a second temperature sensor disposed on said circuit board at a location intermediate between said semiconductor power switching device and said first temperature sensor, having an electrical charactersistic which varies with ambient temperature;

a temperature correction means connected to said first and second temperature sensors for generating a corrected temperature signal from the temperature indicated by the electrical charactersistic of said first temperature sensor and the temperature indicated by the electrical charactersistic of said second temperature sensor;

a desired temperature means for generating a desired temperature signal indicative of a desired temperature;

a control unit connected to said semiconductor power switching device, said temperature correction means and said desired temperature means for controlling the state of said semiconductor power switching device based upon the relationship of the corrected temperature signal and said desired temperature signal.

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**4,741,477**

**AIR-CONDITIONING CONTROL APPARATUS**

**Akinori Ito, Furukawa, Japan, assignor to Alps Electric Co., Ltd., Japan**

**Filed Jan. 29, 1987, Ser. No. 8,621**

**Claims priority, application Japan, Apr. 25, 1986, 61-61708[U]**

**Int. Cl.⁴ B60H** *1/02*

**U.S. Cl. 237—12.3 A** **5 Claims**

1. An air-conditioning control apparatus for controlling the position of a door between an open position and a closed position remotely by means of an operating lever in an apparatus body, comprising:

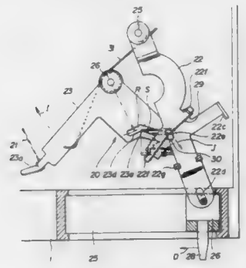
said operating lever having one end pivotably supported on a first shaft fixed in the apparatus body, another end swingable in an arc from a first position corresponding to the open position of the door to a second position corresponding to the closed position of the door, and a pin insert groove between said ends extending a short distance in a radial direction along said operating lever relative to said first pivot shaft;

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a traction lever having a pivot portion pivotably supported on a second shaft fixed in the apparatus body, an engaging portion spaced from said pivot portion and engaged with connecting means connected at a remote end thereof to the door for opening and closing the door, and a guide groove having an operating portion extending toward said pin insert groove of said operating lever;

a pin member inserted between said pin insert groove and said guide groove to connect said operating lever movably with said traction lever, wherein at said first position of said operating lever, said pin member is at one end of the operating portion of said guide groove and said engaging portion of said traction lever holds the door through



said connecting means at the open position, then, as said operating lever is moved toward said second position, said pin member pushes said traction lever so that said engaging portion moves the door through corresponding closing position, and, at said second position, said pin member is at the other end of the operating portion of said guide groove and said engaging portion of said traction lever holds the door at the closed position;

a first urging means mounted on the operating lever for always urging said pin member in the radial direction away from said first pivot shaft toward said other end of the operating lever; and

a second urging means engaging said traction lever for urging it in a direction toward closing the door.

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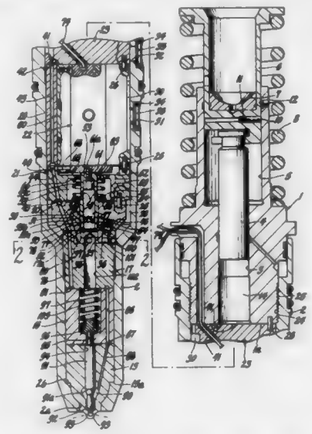
**4,741,478**

## DIESEL UNIT FUEL INJECTOR WITH SPILL ASSIST INJECTION NEEDLE VALVE CLOSURE

**Richard F. Teerman, Wyoming, and Richard S. Knape, Grand Rapids, both of Mich., assignors to General Motors Corporation, Detroit, Mich.**

**Filed Nov. 28, 1986, Ser. No. 935,841**
**Int. Cl.⁴ F02M *47/02***
**U.S. Cl. 239—88** **2 Claims**

1. In a diesel unit fuel injector of the type including a pump cylinder with an externally actuated plunger reciprocable therein to define a pump chamber open at one end in which fuel is pressurized during a pump stroke of the plunger, fuel supply/drain means for supplying fuel to said pump chamber, a fuel injection nozzle means operatively connected to said pump chamber, said fuel injection nozzle including a spray tip with fuel spray outlet means at the free end thereof which is in flow communication with said pump chamber, an injection valve having one end thereof movable to open and close said fuel spray outlet means, a spring chamber, a valve return spring positioned in said spring chamber and operatively connected to the opposite end of said injection valve to normally bias said injection valve in a direction to close said fuel spray outlet means, and spill flow control means operatively connected to said pump chamber to effect spill flow of fuel during a pump stroke of said plunger whereby to control the start and end of injection, the improvement wherein said spill flow control means includes a supply/drain passage means in flow communication at one end with said pump chamber; said supply/drain means being operatively connectable at one end to a source of fuel at a predetermined supply pressure and having orifice passage means next adjacent to its opposite end; a flow control valve means controlling flow between opposite end of said supply drain passage means and said opposite end of said supply/drain means; and, a passage means interconnecting said spring chamber and said supply/drain means upstream of said orifice passage means in terms of the direction of spill flow



from said pump chamber out through said orifice passage means for the spill flow of fuel to said spring chamber, the arrangement being such that said injection valve will open when supplied with pressurized fuel at a predetermined valve opening pressure and will close at a higher pressure as a result of the spill flow of pressurized fuel from the pump chamber into said spring chamber acting with the valve return spring to effect movement of said injection valve to close said spray outlet means.

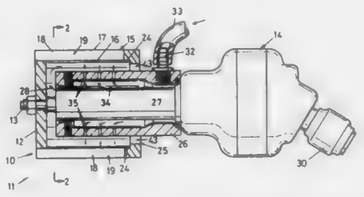
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**4,741,479**

## ROTARY DRUM ATOMISER

**Barry G. Wills; Wladyslaw J. Rokicki, both of Werribee, and Geoffrey O. Furness, Loxton, all of Australia, assignors to State of Victoria as represented by the Minister for the Dept. of Agriculture and Rural Affairs, Australia**

**Filed Jun. 5, 1986, Ser. No. 871,101**
**Claims priority, application Australia, Jun. 5, 1985, PH00918**
**Int. Cl.⁴ B05B *3/04***
**U.S. Cl. 239—214.25** **4 Claims**



1. A rotary drum atomiser comprising a drum having a driving end portion, an inner drum surface and an outer drum surface defining an annular drum portion, and slot surfaces extending along the drum and spaced from one another around the drum, the slot surfaces extending between the inner and outer drum surfaces and defining a plurality of circumferentially spaced slots around said annular portion, an air operable turbine assembly comprising a turbine, an air inlet attachment for the turbine, a shaft housing extending from the turbine through the drum but terminating before the driving end portion of the drum, an output shaft journalled for rotation in the shaft housing and having an end thereof projecting from one end of the housing, means securing that said end of the output shaft to the driving end portion of the drum, said shaft housing also comprising a passage for air when exhausted from said turbine,

a body member within the drum and surrounding said shaft housing and having a cylindrical wall with an inner surface spaced radially away from said shaft housing to define an annular space, a liquid inlet fitting extending from said body member and in fluid flow communication with said annular space, apertures extending through said body member cylindrical wall for discharge of liquid from said annular space, said driving end portion of said drum being spaced from the end of said shaft housing such that air when exhausted from said turbine is deflected by said driving end portion into said drum and discharge through said slots.

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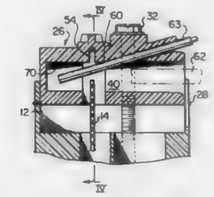


**4,741,480**

## ELECTRICAL CONNECTORS

**Paul R. Despault, Kirkland; Roger Paradis, Boucherville, and George Debortoli, Ottawa, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada**

**Filed Jul. 1, 1987, Ser. No. 68,303**
**Int. Cl.⁴ H01R *4/24***
**U.S. Cl. 439—412** **7 Claims**



1. An electrical connector having an insulation body, a closure member and an insulation displacement contact member carried within the insulating body, the contact member formed at one end with an insulation displacement terminal projecting from the insulating body, the closure member and the body being relatively movable to cause the closure member to cover the insulation displacement terminal, the closure member having a first passage for guidance of an insulated conductor wire within a certain range of outside diameters into and beyond a wire terminal position within the closure member, the closure member also formed with:

(a) entry and exit passages for the insulation displacement terminal, the entry and exit passages aligned across the first passage; and

(b) a second passage for guidance of an insulated wire within another and smaller range of outside diameters, the second passage being of smaller cross-sectional area than the first passage, extending at an angle to the first passage towards the wire terminal position and having an opening into the first passage to direct the smaller diameter wire across the exit passage and through the terminal position, said opening of the second passage being sufficiently close to the terminal position to produce a bend in the smaller diameter wire adjacent to the terminal position so as to stiffen the wire in the terminal position.

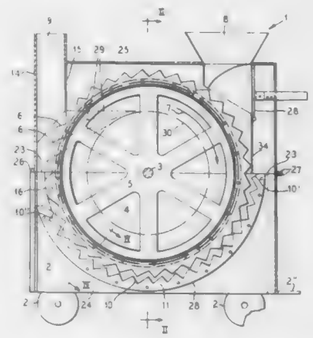
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**4,741,481**

## APPARATUS AND METHOD FOR THE COMMINUTION OF PLANT MATTER

**Klemens Kalverkamp, Possenbrock 29, D-4730 Ahlen/Westf., Fed. Rep. of Germany**

**Filed May 3, 1984, Ser. No. 606,669**
**Claims priority, application Fed. Rep. of Germany, May 3, 1983, 3316142**
**Int. Cl.⁴ B02C *19/00***
**U.S. Cl. 241—29** **32 Claims**



1. A method for comminuting plant matter in an apparatus including a plurality of first self-sharpening cutters forming a precomminuting zone and a portion of a comminuting zone, a plurality of second self-sharpening cutters forming, with said first cutters, the remainder of the comminuting zone, each of said first and second cutters having a thickness in the range of 0.3–3 mm, said first cutters lying along radial paths which are spaced from, parallel to, and overlappingly bypassing said second cutters, said method comprising the steps of:

feeding the plant matter into the precomminuting zone;

precomminuting and contemporaneously non-uniformly and multiply accelerating the plant matter by rotating said first cutters;

decelerating the plant matter by delivering it to said comminuting zone where it is decelerated by said second cutters;

shearing the plant matter between said first and second cutters in said comminution zone; and

discharging the sheared plant matter.

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**4,741,482**

## MAGNETIC SAFETY SWITCH DEVICE FOR FOOD PROCESSOR

**Marcel Coggiola, Le Perreux; Patrick Ribassin, Fontenay sous bois; Manuel Gallardo, Chelles; Jean Meyer, Cormelles le Royal, and Alain J. L. Bertin, Chelles, all of France, assignors to Robot-Coupe S.A., Vincennes, France**

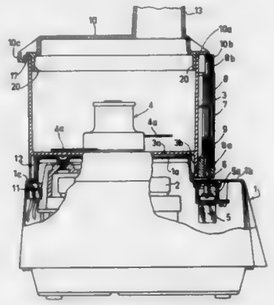
**Continuation of Ser. No. 177,850, Aug. 14, 1980, abandoned. This application Nov. 17, 1983, Ser. No. 552,016**
**Claims priority, application France, Aug. 29, 1979, 79 21651; Dec. 19, 1979, 79 31062**
**Int. Cl.⁴ B02C *18/12***
**U.S. Cl. 241—37.5** **15 Claims**

1. A magnetic safety device in combination with a food processor comprising a base, an electric motor enclosed by the base, an electric control circuit for the motor, a working vessel including a bowl and a cover removably locked on the bowl, an means for locking the bowl on the base in a working position, the safety device comprising a magnetically controlled working contact mounted inside the base and connected to the electric control circuit, a duct integral with the bowl and extending along a generatrix of the bowl, said duct containing a rod made of ferromagnetic material extending fixedly therein, such that when the bowl is locked on the base in a

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working position, a lower end of the rod is adjacent to and facing the working contact, and a permanent magnet secured



to the cover, such that when the cover is locked on the bowl, the magnet is adjacent to and facing an upper end of the rod.

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**4,741,483**

**APPARATUS FOR MIXING SOLIDS AND LIQUIDS**

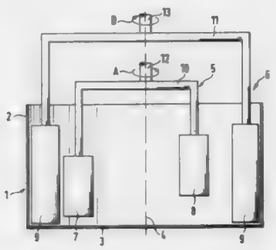
**Norbert Damm, Karlsdorf-Neuthard, and Thomas Parr, Karlsruhe, both of Fed. Rep. of Germany, assignors to BMD Badische Maschinenfabrik Durlach GmbH, Fed. Rep. of Germany**

**Filed Jul. 9, 1986, Ser. No. 883,758**

**Claims priority, application Fed. Rep. of Germany, Jul. 10, 1985, 3524537**

**Int. Cl.⁴ B02C** *23/36*

**U.S. Cl. 241—46.17** **17 Claims**



1. An apparatus for mixing solids with one another and with liquids, particularly for producing foundry moulding sand mixtures, the apparatus comprising:

a circular, fixed trough with a vertical axis and a bottom;

at least an inner group and an outer group of mixing tools fixed to arms,

wherein the inner and outer groups of mixing tools revolve with a relative speed and in opposite directions with a different spacing from the trough vertical axis and from the trough bottom, and are inclined with respect to a tangent of their circular path or orbit under opposite angles, such that

the outer group of mixing tools feed the material being mixed inwards and the inner group of mixing tools feed the material being mixed outwards,

wherein the mixing tools are constructed in a paddle-like manner as circumferential segments of a circular cylinder having an approximately horizontally arranged axis to have a concave and a convex side; and

the outer group of mixing tools have their concave side facing inwards toward the trough vertical axis, while the inner group of mixing tools have their concave side facing outwards from the trough vertical axis; and

a twisting movement is imparted to the material being mixed, revolving wall strippers being associated with the insides of outer and inner trough walls.

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**4,741,484**

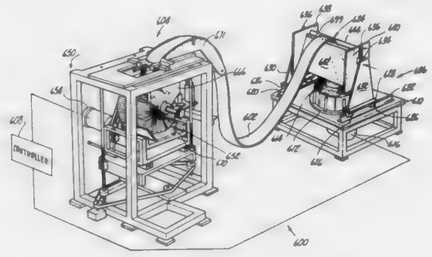
**APPARATUS AND METHOD FOR WINDING A MAGNETIC CORE FOR TOROIDAL TRANSFORMER**

**Joe E. Curtis, Jr., Lexington, Ky.; Clair E. Piatt, Bronson, Mich.; John L. Fisher, Lexington, and John E. Cloyd, Versailles, both of Ky., assignors to Kuhlman Corporation, Troy, Mich.**

**Continuation of Ser. No. 662,330, Oct. 17, 1984, abandoned. This application Feb. 6, 1987, Ser. No. 11,454**

**Int. Cl.⁴ H01F** *41/02;* **H02K** *15/04;* **B65H** *81/02*

**U.S. Cl. 242—703** **48 Claims**



1. An apparatus for unreeling a strip of metallic material of a composition suitable for use as the core of a transformer from the inside of a wound coil of the material, said apparatus comprising:

turntable means for rotating the coil about its axis in a direction to continually unwind the strip of material from the inside of the coil;

directing means including a directing passage for receiving the strip of material from the inside of the coil and for directing the strip of material away from the coil, said directing passage coacting with the strip of material for applying a force along the strip of material toward the inside of the coil and acting against the unwinding of the strip from the inside of the coil to limit the degree of bending of the strip as it separates from the inside of the coil during unwinding;

receiving means for receiving the strip of material upon exiting from said directing passage; and

winding the strip of material into a core of an electrical transformer.

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**4,741,485**

**WINDER LAYOUT**

**Adolf Flueli; Claudio Molteni; Jürg Neff; Heinz Oswald, all of Winterthur; Beat Ruf, Hettlingen, and Kurt Schefer, Winterthur, all of Switzerland, assignors to Rieter Machine Works, Ltd., Winterthur, Switzerland**

**Filed Dec. 15, 1986, Ser. No. 941,418**

**Claims priority, application United Kingdom, Dec. 18, 1985, 8531151**

**Int. Cl.⁴ B65H** *54/02, 67/044*

**U.S. Cl. 242—18 A** **33 Claims**

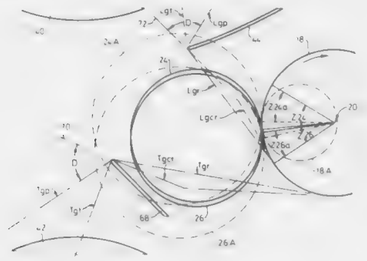
1. A winder for thread comprising

a contact member rotatable about a longitudinal axis thereof for receiving a travelling thread and having a winding zone for delivering a thread therefrom;

a first chuck rotatable about a longitudinal chuck axis and movable along a first path from a first rest position spaced from said member to a winding position adjacent a first sub-zone of said winding zone of said member to receive and wind a thread from said first sub-zone into a thread package on the chuck and movable along said first path to return to said rest position;



a second chuck rotatable about a longitudinal chuck axis and movable along a second path from a second rest position to a winding position adjacent a second sub-zone of said winding zone spaced from said first sub-zone to receive and wind a thread package on said second chuck and movable along said second path to return to said second rest position;



said first and second rest positions being disposed on opposite sides of a plane passing through said axis of said contact member and through said winding zone with said paths converging towards said winding zone; and

said sub-zones being separated by an arc on the surface of said contact member subtending up to 20 degrees at the longitudinal axis of said contact member.

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**4,741,486**

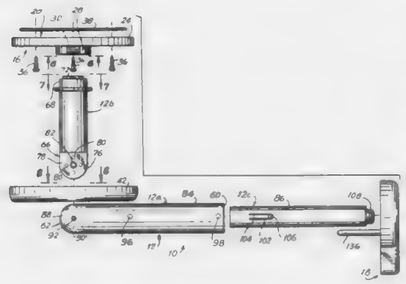
**PAPER TOWEL HOLDER**

**Jane Ancona, and Bruce Ancona, both of New York, N.Y., assignors to M. Kamenstein, Inc., White Plains, N.Y.**

**Filed Apr. 16, 1987, Ser. No. 38,995**

**Int. Cl.⁴ B65H** *19/00*

**U.S. Cl. 242—55.2** **20 Claims**



1. A device for holding and dispensing paper toweling in roll form, comprising:

base means adapted to be mounted onto a supporting surface for supporting said device;

shaft means for rotatably supporting said roll, said shaft means including;

(a) a first shaft portion having first and second opposite ends;

(b) a second shaft portion having a first end secured to said base means and a second end secured to a first end of said first shaft portion, and means to secure said first and second shaft portions selectively in either a co-axial relation or a perpendicular relation; and

(c) a third shaft portion having a free end and being telescopically receivable in said first shaft portion in a retracted position when said first and second shaft positions are secured in said co-axial relation and in an extended position when said first and second shaft portions are secured in perpendicular relation, whereby the effective shaft length corresponds at all times to the length of the paper toweling roll; and

closure means secured to the free end of said third shaft portion for releasably restraining said roll on said shaft means.

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**4,741,487**

**APPARATUS FOR WINDING A CONTINUOUSLY ARRIVING IMBRICATED FORMATION OF FLEXIBLE FLAT STRUCTURES INTO A WOUND PRODUCT PACKAGE**

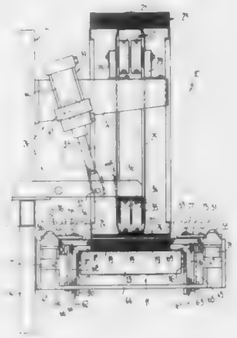
**Valentin Balass, Zürich, Switzerland, assignor to Ferag AG, Hinwil, Switzerland**

**Filed Jan. 22, 1987, Ser. No. 5,693**

**Claims priority, application Switzerland, Jan. 27, 1986, 298/86**

**Int. Cl.⁴ B65H** *75/00*

**U.S. Cl. 242—59** **22 Claims**



1. An apparatus for winding a continuously arriving imbricated formation of flexible flat structures, especially folded printed products, into a wound product package having substantially flat end faces, comprising:

a winding core equipped with substantially flat end faces and upon which there are wound the continuously arriving imbricated formation into a wound product package;

a bearing arrangement for rotatably mounting said winding core;

delivery means for substantially tangentially delivering the continuously arriving imbricated formation to said winding core or said wound product package formed thereon along a predeterminate conveying path;

drive means for frictionally driving said wound product package exclusively at the vicinity of its circumference;

said drive means for frictionally driving said wound product package comprising at least one pair of friction wheels;

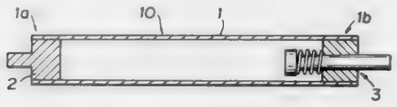
means for supplying a winding strap which is wound up under tension together with the imbricated formation to form the wound product package; and

means for positionally adjusting said at least one pair of friction wheels for engaging at said substantially flat end faces of said winding core or at said substantially flat end faces of said wound product package formed thereon at engagement locations situated substantially axially opposite one another at the vicinity of the circumference of said winding core or at the vicinity of the wound product package formed thereon.

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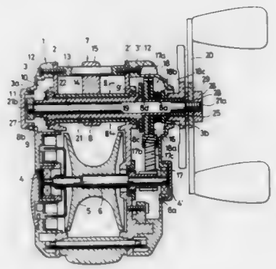
**4,741,488**
## SPRING ROLLER
**Toshinobu Futagawa, Tokyo, Japan, assignor to Futawaga License Corporation, Tokyo, Japan**
**Filed Feb. 13, 1987, Ser. No. 14,287**
**Claims priority, application Japan, Feb. 18, 1986, 61-33168**
**Int. Cl.⁴ B65H** *16/08, 18/26*
**U.S. Cl. 242—67.3 R** **3 Claims**




1. In apparatus for transferring a sheet of material from a first roller to a second roller, both of said rollers having parallel longitudinal axes, said second roller being driven from a rotating drive shaft and said sheet unwinding from said first roller and winding onto said second roller, the improvement wherein said second roller is a spring roller for absorbing slack in said sheet, said spring roller comprising,
a hollow, cylindrical roller body having a first end and a second end,
a second shaft aligned with the longitudinal axis of said roller body and fixed to said first end of said roller body providing an axis around which said roller body can rotate,
a sleeve fixed to said second end of said roller body, said sleeve having a first hole therethrough, said first hole extending along the longitudinal axis of said roller body, said drive shaft having a first end extending through said first hole in said sleeve into said roller body,
a torsion spring having a first and a second end and being wound around the portion of said drive shaft extending into said roller body,
means for connecting said first end of said spring to said first end of said drive shaft, and
means for connecting said second end of said spring to said sleeve so that, during the transfer to said sheet from said first roller to said second roller, said spring is under tension and can absorb slack by allowing relative rotation between said spring roller and said drive shaft.

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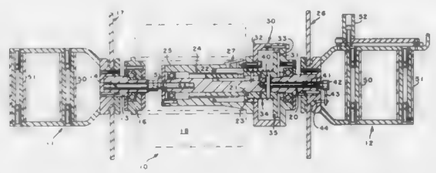
**4,741,489**
## DRAG MECHANISM IN DOUBLE-BEARING REEL
**Masaharu Emura, and Takehiro Kobayashi, both of Hiroshima, Japan, assignors to Ryobi Ltd., Hiroshima, Japan**
**Filed Apr. 2, 1987, Ser. No. 33,188**
**Claims priority, application Japan, Apr. 3, 1986, 61-50397[U]**
**Int. Cl.⁴ A01K** *89/04, 89/02*
**U.S. Cl. 242—84.1 R** **6 Claims**



1. A reel comprising:
(a) a pair of spaced apart side frame members, each including a side cover member with an opening therein;
(b) a spool member rotatably supported by said side frame members;
(c) a drive mechanism operatively connected to said spool member and including a master gear;
(d) drag means operatively connected to said spool member;
(e) a handle member operatively connected to said drive mechanism for applying torque to said spool member;
(f) a level wind mechanism operatively connected to said handle member and said spool member for uniformly winding a fishing line on said spool member and including a traverse cam shaft, said traverse cam shaft supporting said master gear and said drag means, having each end thereof aligned with one of said openings in said side covers, and being rotatably supported by said side frames;
(g) a handle shaft having a base end and a top end, said handle shaft being connected at said base end to said handle member and having a retaining member at said top end, and being detachably inserted into said traverse cam shaft, rotatable therewith, and slidable thereon, said handle shaft being insertable into said traverse cam shaft from either end;
(h) a drag control ring non-rotatably mounted on the base end of said handle shaft and slidable thereon in the axial direction; and
(i) a drag handle threadably engaged with said drag control ring and moveable with respect thereto in the axial direction so as to tighten said drag means when said drag handle is turned in the forward direction of rotation of said handle member, said drag handle, drag means, master gear and traverse cam shaft being held, in the axial direction, between said handle member and said retaining member.

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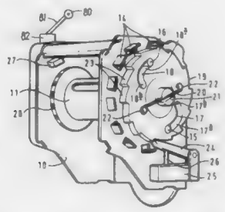
**4,741,490**
## MANDREL FOR APPLYING WRAPPING MATERIAL
**John R. Evans, Slough, England, assignor to W. R. Grace Ltd., London, England**
**Continuation of Ser. No. 883,200, Jul. 8, 1986, abandoned. This application Oct. 14, 1987, Ser. No. 106,950**
**Claims priority, application United Kingdom, Jul. 26, 1985, 8518946**
**Int. Cl.⁴ B65H** *75/40, 23/06;* **B65B** *11/00, 45/00*
**U.S. Cl. 242—96** **10 Claims**



1. A mandrel for use in winding a web around an article, the mandrel comprising a support for a roll of the web, a holding means rotatably attached at one end of the support, freely rotatable wheels at each side of the support and extending radially outwardly beyond a roll of the web on the support, a brake means which retards rotation of the support relative to said holding means by an amount depending on the relative rotation between the holding means and support which has already taken place, and means to disengage and reset the brake means when a new roll is applied.



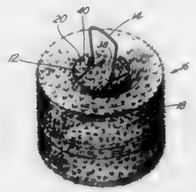
**4,741,491**
## REEL FOR VEHICLE SAFETY BELT
**Tommy Andersson, Alingsas, and Lars Y. Haland, Flasterbo, both of Sweden, assignors to Autoliv Development AB, Vargarda, Sweden**
**Filed Jun. 18, 1986, Ser. No. 875,842**
**Claims priority, application United Kingdom, Jun. 28, 1985, 8516449**
**Int. Cl.⁴ B60R** *22/34*
**U.S. Cl. 242—107.4 R** **12 Claims**



1. A retractor reel assembly for a vehicle safety belt in a vehicle comprising: a reel housing and a reel disposed in said reel housing; rotatable means disposed within said housing for automatically winding the safety belt when the safety belt is not in use; locking means disposed within said housing for locking said rotatable means to limit unwinding of the safety belt, said locking means normally being engaged with said rotatable means; sensing means for sensing the acceleration or deceleration of the vehicle; and releasing means disposed in said housing and operatively connected to said sensing means for releasing said locking means in response to withdrawal of a length of the belt from said reel assembly and said releasing means releasing the belt only when the acceleration or deceleration of the vehicle is within predetermined limits.

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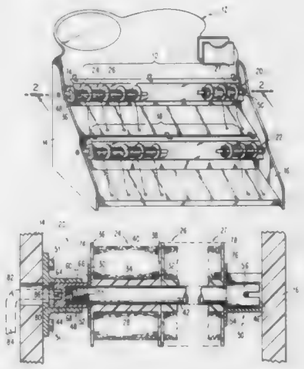
**4,741,492**
## CARRYING DEVICE FOR COILED WIRE
**Richard D. Reysen, Eureka, Ill., assignor to Keystone Steel & Wire, Peoria, Ill.**
**Filed Jul. 15, 1985, Ser. No. 755,415**
**Int. Cl.⁴ B65H** *49/00*
**U.S. Cl. 242—129** **8 Claims**



1. A carrying device for a coil of barbed wire having a substantially hollow core, said device cooperative with a winding mandrel used for forming the coil of wire, said mandrel of the type including a pair of flanges spaced by a generally cylindrical core member defining a longitudinal axis and a diameter, one end of the core member including first and second parallel slots generally perpendicular to the longitudinal axis, one of said flanges being removable from the one end of the mandrel to reveal the slots and to permit placement of the device therein for coil formation on the mandrel and device, said carrying device comprising in combination:
first and second generally straight, parallel and spaced chordal supports positionable in the parallel slots of the core member, each support having two opposite end sections and a central section therebetween, each of said end sections extending beyond the diameter of the core member into a coil wound thereon, and said central section positioned within the hollow core of the coil spaced from the sides thereof, said central sections including notch means within the hollow core of the coil also spaced from the sides, said end sections including means for projecting within the wound coil and for simultaneously engaging against the outside, generally cylindrical surface of the core member to thereby position the chordal support in the slot and prevent sliding motion in the slot when the coil is being formed on the mandrel; and
a handle having two end sections and a central section therebetween, each of said sections including hooking means for interconnecting an end section of said handle to a notch means respectively of said central section of said chordal support, whereby said carrying device and coil of wire may be raised by lifting said central section of said handle.

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**4,741,493**
## LOCKING SYSTEM FOR SPOOLS HOLDING DISPLAY CHAINS
**Daniel Schaiewitz, 87 Slocum Ave., Broaxville, N.Y. 10708**
**Filed Jun. 26, 1986, Ser. No. 879,097**
**Int. Cl.⁴ B65H** *49/00*
**U.S. Cl. 242—129.8** **8 Claims**



1. A system for locking spools for chains on display, comprising, in combination,
at least one generally horizontal spool member including a cylindrical portion having opposed first and second axial spool ends and forming a cylindrical axial hole extending between said opposed first and second axial ends and a pair of opposed radially extending rims connected to said cylindrical portion,
an elongated chain spooled around said cylindrical portion between said rims,
an elongated cylindrical pivot member having opposed first and second pivot ends and extending through said axial spool hole beyond said first and second spool ends, respectively, said first pivot end having external threads,
first and second support means located proximate each of said first and second pivot ends, respectively, for supporting said pivot member, said support means including a pair of generally parallel spaced generally vertical first and second walls having facing surfaces and a pair of opposed first and second brackets secured to said first and second walls, respectively, at said facing surfaces, each said bracket forming a generally semicylindrical bottom portion supporting said first and second pivot ends, said second pivot end being nonrotatably positioned at said second bracket,
locking means mounted to said first bracket and threadably connected to said pivot member for moving said one spool member between a first spooling mode and a second non-

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spooling mode wherein in said second nonspooling mode said one spool member is held in a frictional locking relationship between said means for locking and said second support means whereby said chain cannot be unspooled from said one spool member; said locking means being releasable from holding said one spool member in said nonspooling mode so that said one spool member is in a spooling mode wherein said one spool member is positioned in a nonfrictional, nonlocking relationship between said means for locking and said second support means, whereby said chain can be unspooled from said one spool member; said locking means including a cylindrical locking member having opposed inner and outer axial ends and an axial pocket having internal threads at said inner axial end, said first pivot end of said pivot member being threadably mounted in said pocket, said locking member being capable of being threaded onto said pivot member toward said first axial spool end and from said pivot member away from said first axial spool end, said outer axial end having keyway means,

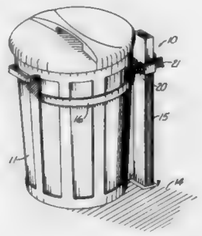
first pressure means positioned between said inner axial end of said locking member and said first axial spool end of said spool member, and second pressure means positioned between said second axial end of said pivot member and said second bracket means, said locking member pressuring said first pressure means against said first axial spool end and pressuring said second pressure means said second bracket means during movement from said first spooling to said second nonspooling positions, and

locking tool means for rotating said locking member between said first and second positions in response to operation by a user, said locking tool means having key means for fitting into said keyway means, said locking tool means being removably mounted to said locking member at said keyway means during rotation of said locking member so as to threadably and axially move said locking member relative to said pivot member between said first and second positions,

said first wall having opposed inner and outer surfaces and having an aperture extending between said inner and outer surfaces, said outer axial end of said locking member being spaced proximate said inner surface in alignment with said aperture, said tool means having a handle portion positioned away from said outer surface and a tool portion including said key means being extendable through said aperture and removably connected to said keyway means of said locking member at said outer axial end, whereby said locking member can be rotated by way of said handle portion.

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**4,741,494**
**UNIVERSAL GARBAGE CAN HOLDER**
**Nicholas M. Voornas, 5 John Dr., Hawthorn Woods, Ill. 60047**
**Filed Sep. 30, 1987, Ser. No. 102,888**
**Int. Cl.[4] A47G *23/02***
**U.S. Cl. 248—154** **1 Claim**




1. A universal garbage can holder comprising:

a sleeve adapted to be buried in the ground, said sleeve having means for forming hollow portion formed about a longitudinal axis, said hollow portion being of a non-circular shape in cross-section;

a post slidably disposed within said the hollow portion of said sleeve, said post having a cross-sectional shape and size substantially the same as said non-circular cross-sectional shape of the hollow portion of said sleeve, said post having a longitudinal axis coincident with the longitudinal axis of said hollow portion of the sleeve when the post is disposed in said sleeve, whereby said post can be selectively slid into or out from said sleeve and thereby preventing said post from rotating abouts its longitudinal axis when the post is disposed in said sleeve; and

garbage can holding means attached to an upper portion of said post for selectively holding a garbage can to prevent it from being tipped over or being moved laterally, said garbage can holding means including:

a first semi-rigid strip means, one end of said first strip means being at least partially arcuate in shape for abutment with one side of a garbage can, the other end of said first strip means having a non-arcuate portion thereon extending in abutment with three sides of said upper portion of the post, said first semi-rigid strip means having a first hole disposed between said arcuate one end thereof and the non-arcuate portion thereof and a second hole in the other end of said first strip means on the opposite side of said non-arcuate portion thereof from said first hole;

a second semi-rigid strip means, one end of said second strip means being at least partially arcuate in shape for abutment with the other side of a garbage can, the other end of said second strip means having a portion extending in abutment with at least three sides of said upper portion of the post, said second semi-rigid strip means having a first hole disposed between said arcuate one end thereof and the non-arcuate portion thereof, said first hole of said second strip means being in alignment with the first hole in said first strip means, and a second hole being disposed in the other end of said second strip means on the opposite side of said non-arcuate portion thereof from said first hole in the second strip means, said second hole in the second strip means being in alignment with the second hole in the first strip means;

first fastener means extending through the first hole in the first strip means and through the first hole in the second strip means for holding the first and second strip means to said post; and

second fastener means extending through the second hole in the first strip means and the second hole in the second strip means for further holding the first and second strip means to said post.

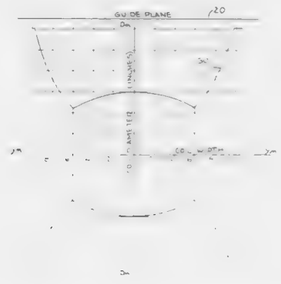
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**4,741,495**
**WOUND PACKAGE OF FLEXIBLE MATERIAL**
**Frank W. Kotzur, Mahopac, N.Y., assignor to Windings, Inc., Goldens Bridge, N.Y.**
**Continuation of Ser. No. 261,882, May 8, 1981, Pat. No. 4,406,419. This application Jul. 1, 1983, Ser. No. 510,186**
**Int. Cl.[4] B65H *55/02***
**U.S. Cl. 242—163** **6 Claims**

1. A package of flexible material wound in a series of figure 8's in which the crossovers of successive figure 8's are angularly displaced around the package, said package having an internal surface defining an axial opening therethrough, the wind of the package being formed by the rotation of a mandrel about a given axis and the reciprocation of a traverse guide with a selected stroke along a path spaced from, by a distance Gd and substantially parallel to, said given axis, said traverse guide winding said flexible material onto said mandrel, one complete reciprocation of the traverse guide defining a stroke A thereof, said crossovers of successive figure 8's being angularly displaced and forming at least one radial hole extending from the inner layer of the wind to the outermost layer thereof



to build the wind having a wind diameter Dm and a width ym by conrolling the gain or advance G of the wind, defined as the change in the instantaneous movement of said traverse guide

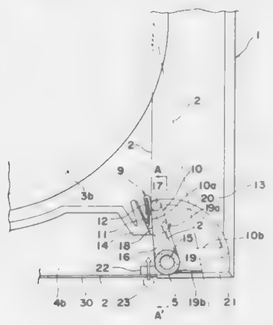



with respect to the instantaneous rotation of said mandrel, said package width being determined in accordance with the following formula:

$$ym = -\frac{A}{\left[1+\left(\frac{Gd(1+G)}{Dm}\right)^2-\left(\frac{1+G}{2}\right)^2\right]^{\frac{1}{2}}}$$

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**4,741,496**
**TAPE CARTRIDGE**
**Hikaru Mizutani, Minoh; Hiroyoshi Takagi, Kameoka; Toshiyuki Amaike, and Harutaka Hayashi, both of Otokuni, all of Japan, assignors to Hitachi Maxell, Ltd., Osaka, Japan**
**Filed Sep. 17, 1986, Ser. No. 908,383**
**Claims priority, application Japan, Sep. 18, 1985, 60-207444**
**Int. Cl.[4] G11B *15/43, 1/04***
**U.S. Cl. 242—199** **17 Claims**




1. A tape cartridge comprising:

a tape cartridge case containing first and second reels;

a tape directed along a predetermined tape run path between said first and second reels in said tape cartridge case;

a tape receiving member disposed in said tape cartridge case near said tape run path for receiving said tape; and

a tape pushing member disposed in said tape cartridge case and positioned to oppose said tape receiving member so that said tape is directed between said tape pushing member and said tape receiving member;

wherein said tape pushing member moves between (1) a tape pinching position whereby said tape is pinched between said tape receiving member and said tape pushing member when said tape is not running, and (2) a cancellation position whereby said tape pushing member is moved away from said tape receiving member and said tape when said tape is running.

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**4,741,497**
**GRADUATED AIRCRAFT DESIGN AND CONSTRUCTION METHOD**
**William W. Fox, San Diego, Calif., assignor to Fox Brothers Limited Partnership, San Diego, Calif.**
**Continuation-in-part of Ser. No. 674,407, Nov. 23, 1984, abandoned. This application Jun. 27, 1986, Ser. No. 879,485**
**Int. Cl.[4] B64C *1/00, 3/00***
**U.S. Cl. 244—117 R** **12 Claims**



1. A method for economically constructing a size-graduated range of airframes characterized by a generally similar profile wherein each of a plurality of airfoils and other sub-assemblies in each of said airframes comprises a plurality of series of size-graduated but otherwise generally identical components and wherein each component Cxy is characterized by a basic dimension Dxy from which all other measurements of said components can be derived wherein x indicates a size of airframe in said range and y indicates a size of component in said series; which comprises:

making a set of drawings and calculating a set of manufacturing specifications for constructing at least one primary airframe;

using said sets of drawings and manufacturing specifications in making at least one subset of drawings and in calculating one subset of manufacturing specifications for constructing a secondary airframe;

said step of using said sets comprising the step of calculating manufacturing specifications for the minimum number of different sizes of each component Cxy which must be used in constructing said primary and secondary airframe;

constructing broad-ranged molds, mandrels and patterns to produce some of said series of components;

setting numerically-controlled machines to manufacture some of said series of components; and

producing kits of said components necessary to construct one of said airframes;

assembling said kits into said airfoils and other subassembly for said airframe;

wherein the step of constructing broad-ranged molds, mandrels and patterns comprises fabricating a mandrel sized and dimensioned to shape skin panels of at least one of said airfoils for a plurality of airframes.

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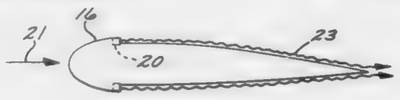


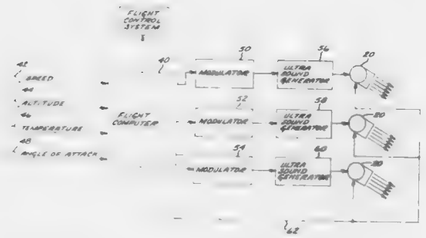
**4,741,498**

## ULTRASONIC DRAG REDUCTION AND LIFT INCREASE

**Heinz A. A. Gerhardt, Redondo Beach, Calif., assignor to Northrop Corporation, Hawthorne, Calif.**

**Filed Sep. 11, 1986, Ser. No. 906,359**
**Int. Cl.[4] B64C** *23/00*
**U.S. Cl. 244—130** **26 Claims**




1. Apparatus for controlling the turbulence of a fluid boundary layer contiguous to the surface of an air vehicle comprising:

means for operating an ultrasonic sound wave of a first frequency;

means for amplitude modulating said ultrasonic sound wave with an acoustic sound signal of a second frequency to produce a modulated sound wave; and

means for radiating said modulated sound wave into said boundary layer.

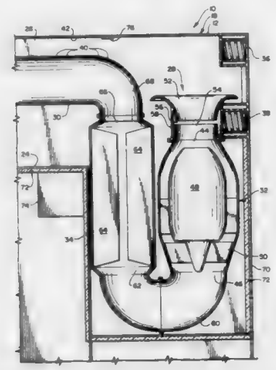
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**4,741,499**

## ANTI-ICING SYSTEM FOR AIRCRAFT

**Peter K. C. Rudolph, Seattle, and Douglas L. Bader, Renton, both of Wash., assignors to The Boeing Company, Seattle, Wash.**

**Filed Dec. 31, 1984, Ser. No. 687,586**
**Int. Cl.[4] B64C** *9/24, 21/04;* **B64D** *15/04*
**U.S. Cl. 244—134 B** **11 Claims**



1. An electrically powered deicing system for an aircraft structure which has a surface member having an exposed surface area upon which ice tends to collect, and which defines an enclosed chamber adjacent thereto, said system comprising:

a. a hot air distribution tube means having an inlet portion, said tube means being positioned in said chamber and having outlets to discharge hot air into said chamber so as to be in heat exchange relationship with said surface member,

b. a fan means having an inlet to receive air from said chamber and to move said air to the inlet portion of the tube means,

c. an electric heater arranged to heat the air which travels through the tube means and is discharged in heat exchange relationship with the surface member,

d. pressure relief valve means communicating between said chamber and an ambient air location, said valve means being arranged to discharge air from the chamber when pressure in the chamber exceeds a predetermined pressure level, and to admit ambient air into said chamber when pressure in the chamber is below a predetermined pressure level,

e. power supply and control means adapted to selectively supply electric power as a main energy source to, and cause operation of, said fan means and said heater to cause heated air to be directed through said distribution tube means and in heat exchange relationship with the surface member,

f. wherein said aircraft structure comprising a leading edge structure, and said system comprising a modular system which can be inserted in, and removed from, said leading edge structure,

g. said leading edge structure being a movable leading edge device mounted to a main structure, and said system being positioned totally in said leading edge device.

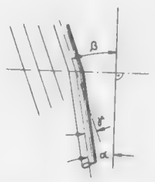
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**4,741,500**

## PROCESS FOR AUTOMATIC FEEDBACK CONTROLLED CABLE WINDING

**Gérard A. Lavanchy, 12, avenue de la Rochelle, 1008 Prilly, Switzerland**

**Continuation of Ser. No. 896,309, Aug. 12, 1986, abandoned, which is a continuation of Ser. No. 541,558, Oct. 13, 1983, abandoned. This application Sep. 10, 1987, Ser. No. 96,823**
**Claims priority, application Switzerland, Oct. 28, 1982, 6282/82**
**Int. Cl.[4] B65H** *54/28*
**U.S. Cl. 242—158 R** **4 Claims**




1. A process for automatically winding an elongate object on a motorized spool (20), about an axis of rotation having a guiding means (21, 22, 23) and a controlled feedback means (52) for adjusting movement of one of said spool and guide means, comprising the steps of measuring corresponding angular position Ω of the motorized spool, axial displacement of one of said spool and said guiding means and a load angle α, where the load angle α is the angle formed by a rectilinear part of the elongate object with a plane perpendicular to said axis of rotation of the spool, transmitting the measured data to an electronic recording, memorizing and calculating means, determining a desired helix angle $\beta$, where the helix angle $\beta$ is the angle formed by a tangent point at any point along the already wound elongate object and a plane perpendicular to the axis of rotation of the spool, calculating a tightening angle $\gamma$, where the tightening angle $\gamma$ is the angle formed by the rectilinear part of the elongate object and a tangent point of the preceding turn, by the difference between the helix angle $\beta$ of the preceding turn and the load angle $\alpha$, and controlling said feedback means to adjust the relative position of said one of said spool and said guide means to maintain said tightening angle $\gamma$ substantially constant and equal to a predetermined tightening angle $\gamma_o$.



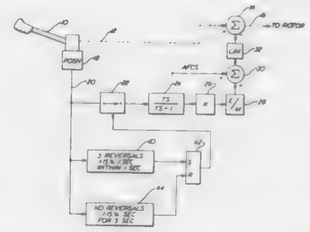
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**4,741,501**

## PREVENTING AUGMENTING VERTICAL LOAD INDUCED OSCILLATIONS IN A HELICOPTER

**Douglas H. Cleiford; Richard D. Murphy, both of Trumbull, and Franklin A. Tefft, Killingworth, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.**

**Continuation of Ser. No. 819,188, Jan. 15, 1986, abandoned. This application Jun. 26, 1987, Ser. No. 65,104**
**Int. Cl.[4] B64C** *27/57*
**U.S. Cl. 244—17.13** **7 Claims**




1. A method of preventing augmenting vertical load induced oscillations in the collective control channel of a helicopter, comprising:

sensing whether collective stick inputs are alternating in excess of a threshold collective authority rate of 15 percent per second and in excess of a threshold frequency; and

cancelling the alternating collective stick inputs based on the affirmative result of the previous step.

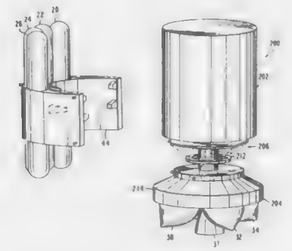
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**4,741,502**

## METHOD AND APPARATUS FOR LAUNCHING A SPACECRAFT BY USE OF A RECOVERABLE UPPER ROCKET STAGE

**Harold A. Rosen, Santa Monica, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.**

**Continuation-in-part of Ser. No. 782,746, Oct. 1, 1985. This application Oct. 1, 1986, Ser. No. 914,103**
**Int. Cl.[4] B64G** *1/10*
**U.S. Cl. 244—172** **19 Claims**



1. A method for launching a spacecraft including a payload and a delivery stage powered by fluid bipropellant, including first and second bipropellant constituents, from the earth into an orbit above the earth and for returning said delivery stage to the earth, said method comprising the steps of:

placing said spacecraft and said fluid bipropellant in a transport vehicle for carrying said spacecraft and said fluid bipropellant from the earth to a parking orbit above the earth, said first and second bipropellant constituents being placed in separate tanks in said transport vehicle disposed external to said spacecraft;

carrying said spacecraft and said external tanks containing said fluid bipropellant in said transport vehicle to said parking orbit above the earth;

transferring said first and second bipropellant constituents from said external tanks to tanks integral to said spacecraft for containing said first and second bipropellant constituents;

deploying said spacecraft from said transport vehicle into said parking orbit;

actuating a firing of a rocket engine in said delivery stage at least once to achieve an orbit by said spacecraft higher than said parking orbit;

separating said payload from said delivery stage following the delivery of said payload into the desired orbit;

actuating said rocket engine at least once after said separation step to return said delivery stage to a recovery orbit;

measuring the mass of each bipropellant constituent remaining following each firing of said rocket engine;

adjusting a gas pressure level in said integral tanks containing said first bipropellant constituent relative to a gas pressure level in the integral tanks containing said second bipropellant constintuent following said measuring step to adjust the relative proportion of said first and second bipropellant constituents delivered to said rocket engine during the next firing of said rocket engine;

recovering said delivery stage with a recovery vehicle in said recovery orbit; and

returning said recovery vehicle and said delivery stage to earth.

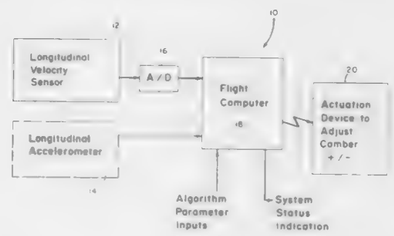
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**4,741,503**

## CAMBER CONTROL SYSTEM

**Leonard R. Anderson, Phoenix, Ariz., and Ronald W. DeCamp, Dayton, Ohio, assignors to The Boeing Company, Seattle, Wash.**

**Filed Sep. 26, 1985, Ser. No. 780,204**
**Int. Cl.[4] B64C** *13/16*
**U.S. Cl. 244—203** **17 Claims**




1. A method of adjusting the camber of an airfoil extending from an aircraft for optimum flight performance, comprising:

(a) producing a velocity signal representative of the longitudinal velocity of the aircraft;

(b) utilizing the change in the velocity signal over time to determine if an increase or a decrease in the camber of the airfoil can increase the aircraft's flight performance; and

(c) increasing or decreasing the camber of the airfoil, as determined in step (b), until an optimum flight performance is achieved.

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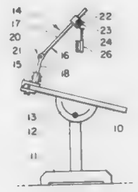


**4,741,504**

## UTILITY RACK FOR DRAFTING IMPLEMENTS

**James W. Monroe, 7720 Lexington Ave., West Hollywood, Calif. 90046**

**Filed Nov. 28, 1986, Ser. No. 935,945**
**Int. Cl.[4] E04G** *3/00*
**U.S. Cl. 248—286** **7 Claims**



1. A utility rack for removably supporting a variety of implements comprising the combination of:
base means;
an elongated support member;
support means connecting said support member to said base means;
a plurality of hangers arranged in slidable relationship on said support means having carriers for suspending said variety of implements therefrom,
said base means includes a pair of jaws having opposing serrated surfaces for gripping the opposite surfaces of a work table; and
fastener means for drawing said pair of jaws together in a clamping action,
said support member is a rod or bar slidably carried on a joining block between its opposite ends,
said support means is an elongated arm having a pair of limbs joined at adjacent ends in a movable joint;
said joining block coupling said support member to one end of said support means cantilevered away from said base means.

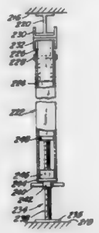
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**4,741,505**

## SCAFFOLDING ARRANGEMENT

**Carl E. Anderson, 12 St. Stephens Pl., Staten Island, N.Y. 10306**

**Division of Ser. No. 714,931, Mar. 22, 1985, Pat. No. 4,598,794. This application Apr. 2, 1986, Ser. No. 847,210**
**Int. Cl.[4] E04G** *25/00*
**U.S. Cl. 248—357** **2 Claims**



1. A scaffolding arrangement for positioning between an upper and lower support surface, comprising a hollow pole, coupling means at one distal end for retention against one of said support surfaces, and height adjustment means insertable into the other distal end for adjustment of the pole height to reach the other support surface, whereby said pole is securely wedged between said support surface, and comprising a leveling jack for positioning on a lower support surface and including an elongated screw, and adjustable handle rotatably positioned along the screw, a plug along said screw above the handle for snug insertion into the bottom end of the hollow pole to close it off, a plate beneath said plug abutting the lower end of the hollow pole, and a centering plate at the top end of the screw insertable within said hollow pole, wherein the upper support surface includes I-beams and said coupling means includes a pair of back-to-back arranged unattached U-shaped caps one of which is inverted and loosely sits on top of said pole and the other of which loosely fits under the I-beam, and wherein the caps are secured in place only by the vertical wedging of the pole.

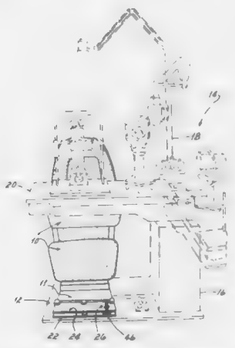
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**4,741,506**

## MOVEABLE BASE SUPPORT FOR AN EXAMINATION/TREATMENT CHAIR

**Gary G. Schwaegerle, Cincinnati, Ohio, assignor to F & F Koenigkramer, Inc., Cincinnati, Ohio**

**Filed Jul. 20, 1987, Ser. No. 75,359**
**Int. Cl.[4] F16M** *13/00*
**U.S. Cl. 248—430** **7 Claims**



1. A base support for an examination/treatment chair comprising:
a first plate having a top surface, a bottom surface, opposed sides and opposed ends, said first plate being formed with at least two apertures extending along a line from one of said ends toward the other of said ends;
a pair of tracks mounted to said top surface of said first plate, one of said tracks being positioned adjacent each of said opposed sides thereof;
at least two pairs of guide rollers rotatably mounted to said top surface of said first plate approximately midway between said opposed sides thereof, said guide rollers of each pair being laterally spaced relative to one another;
a second plate having a top surface, a bottom surface, opposed ends and opposed sides;
a guide plate mounted to said bottom surface of said second plate approximately midway between said opposed sides thereof;
a wheel assembly mounted to said bottom surface of said second plate at each of the four corners thereof;
said second plate being positionable atop said first plate so that said guide plate of said second plate is received between and axially movable relative to said two pairs of rollers of said first plate, and so that said wheel assemblies of said second plate rest atop and are axially movable along said tracks of said first plate;
a locking assembly connected between said first and second plates, said locking assembly comprising:
(i) a cover plate mounted to said upper surface of said second plate, said cover plate being formed with a guide bore;
(ii) a pivot arm mounted between said first and second plates;
(iii) a locking pin mounted at one end of said pivot arm, said locking pin having one end axially movable within said guide bore of said cover plate and an opposite end axially movable into each of said apertures formed in said first plate;
(iv) means for pivoting said pivot arm to move said locking pin between a first position in which said locking pin extends between said guide bore of said cover plate and one of said apertures in said first plate, and a second position in which said locking pin disengages said aperture in said first plate while remaining within said guide bore in said cover plate, said locking pin being effective in said first position to secure said second plate from movement relative to said first plate and said locking pin being effective in said second position to permit adjustment of the lateral position of said second plate relative to said first plate.



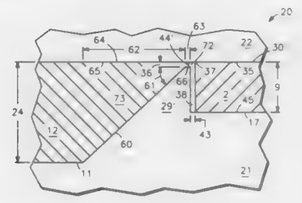
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**4,741,507**

## SELF-CLEANING MOLD

**John Baird, Scottsdale, Ariz., assignor to Motorola Inc., Schaumburg, Ill.**

**Continuation of Ser. No. 869,643, Jun. 2, 1986, abandoned. This application Aug. 20, 1987, Ser. No. 88,549**
**Int. Cl.[4] B29C** *45/14*
**U.S. Cl. 249—91** **8 Claims**



1. A mold for receiving electronic components mounted on a leadframe having a first thickness, for encapsulation in a plastic comprising a premixed filler and resin, comprising:
first and second mold halves which separate along a parting plane and have opposed surfaces facing said parting plane and wherein parts of said opposed surfaces of said mold are nominally closed together or on said leadframe when said mold halves are engaged;
a cavity in either or both of said mold halves extending to said parting plane for receiving said leadframe;
channel means in either or both of said mold halves, extending to said parting plane, for conducting said plastic to the vicinity of said cavity, wherein said channel means is laterally separated from said cavity or said nominally closed portions of said mold by a first distance, and wherein said channel has a bottom portion displaced from said parting plane;
shelf means in said mold, wherein said shelf means is located adjacent said cavity or said nominally closed portion of said mold and extends substantially to said channel means for separating said cavity or said nominally closed portion of said mold and said channel means for preventing flow of said plastic from said channel means toward said cavity or said nominally closed portions of said mold;
wherein said shelf means has an outer first surface facing an outer second surface of an opposing mold half;
wherein said first surface has a first portion adjacent said cavity or said nominally portion of said mold and facing a first portion of said second surface, and a second portion adjacent said first portion and facing a second portion of said second surface;
wherein said second portion of said first surface extends from said first portion of said first surface to said channel bottom, and wherein said second portion of said first surface extends at least partly toward said bottom of said channel at an angle of 10 to 50 degrees; and
wherein said angle is measured in a plane perpendicular to said parting plane and between said second portions of said first and second surfaces.

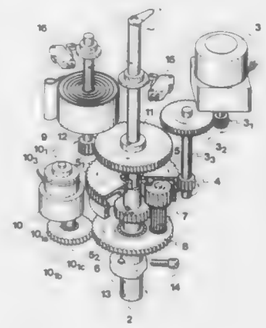
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**4,741,508**

## ACTUATOR FOR VALVE

**Rikuo Fukamachi, 1-44-10, Tezukayama, Nara City, Japan**

**Filed Apr. 13, 1987, Ser. No. 49,344**
**Int. Cl.[4] F16K** *31/04*
**U.S. Cl. 251—71** **1 Claim**



1. Actuator for valve comprising:
a casing (1);
an output shaft (2) adapted to be connected directly to a rotary shaft of the body of a valve (A), said shaft (2) being pivotally supported in said casing (1);
a gear (4) rotated in one direction only by a motor (3);
an internal gear (5) having outer peripheral teeth ($5_1$) meshed with said gear (4), said gear (5) being rotatable independently from said output shaft (2) and pivotally supported thereby;
a gear (7) meshed with inner peripheral teeth ($5_2$) of said internal gear (5) and with a gear (6) secured to said output shaft (2);
a gear (8) for pivotally supporting said gear (7) at a shaft ($7_1$), said gear (8) being pivotally supported by said output shaft (2) such that said gear (8) is rotatable independently therefrom;
a power spring (9) to be wound by the rotation of said output shaft (2) in the valve opening direction; and
an electromagnetic device (10) for preventing said gear (8) from being rotated while power is supplied, and permitting said gear (8) to be rotated when power is shut off.

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**4,741,509**

## GATE VALVE WITH IMPROVED SECONDARY BODY TO BUSHING SEALS

**Paul D. Bunch, and James E. Kilmoyer, both of Houston, Tex., assignors to Cameron Iron Works, Inc., Houston, Tex.**

**Filed Feb. 19, 1987, Ser. No. 16,334**
**Int. Cl.[4] F16K** *25/00, 3/00*
**U.S. Cl. 251—172** **8 Claims**

1. A gate valve comprising;
a body having a central gate chamber, an inlet passage extending through the body into communication with the gate chamber, an outlet passage extending through the body into communication with the gate chamber and a recess in the body surrounding the opening of each of the passages into the gate chamber,
a floating bushing positioned in each of said recesses,
a gate positioned within the chamber,
means for moving the gate within the chamber between said floating bushings and between positions communicating flow between the passages and closing flow between the passages,
inner and outer unidirectional seals positioned upstream and

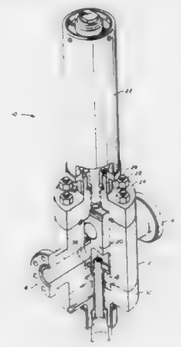
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downstream between the surface of each of the recesses facing the gate and the opposing surface of the bushing in the recess,

each of the seals include a U-shaped lip sealing element and a U-shaped spring positioned within the lip sealing element and urging the legs of the element apart into sealing engagement between sealing surfaces on the bushing and the body,

the inner seal, which is positioned closest to the passage has the open end of its sealing element facing the passage and the outer seal, which is farther from the passage than the inner seal, has the open end of its sealing element facing away from the passage,



each of the seals being positioned within a separate recess in its bushing which separate recess has an axial dimension less than the free axial dimension between the lip sealing surfaces when it is not compressed, the downstream axially seals being compressible to an axial dimension between the lip sealing surfaces which is the same as the axial dimension of their separate recesses responsive to pressure differential loading on the gate when the gate is in a closed position so that their bushings engage the body recess surface in a metal-to-metal seal when they are loaded and are recoverable from such compressed position, the seals being axially extendible to provide a tight seal and maintain sufficient sealing between the bushing and body recess sealing surfaces to prevent entry of contaminants therebetween.

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**4,741,510**

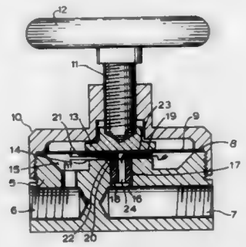
**FLOW CONTROL VALVE**

**Hans D. Baumann, 32 Pine St., Rye, N.H. 03870**

**Filed Sep. 4, 1987, Ser. No. 93,779**

**Int. Cl.⁴ F16K** *7/16*

**U.S. Cl. 251—205** **5 Claims**



1. Flow Control Valve comprising a valve housing having an upper terminal surface; a second central, flattened surface extending parallel below said upper terminal surface, at least one inlet and one outlet passage; a sealing diaphragm suitably retained on top of said upper terminal surface of the valve housing; actuating means capable of moving said sealing diaphragm; a port connecting said inlet and outlet passages and extending perpendicular to said central, flattened surface of the body; a valve insert member comprising a conical wall portion having at least one flow passage therein and having a central bore and capable of being elastically deformed to assume a flattened shape upon movement of said actuating means thereby progressively opening and closing said flow passage said conical wall having an inner and an outer periphery, one of whose periphery is in contact with said sealing diaphragm and whose other periphery is supported by said central, flattened housing surface; when said conical wall and said diaphragm is in a fully open position, said conical wall being deformed upon moving said actuating means and progressively closing said at least one flow passage as said diaphragm engages a larger portion of said conical wall and as said conical wall engages a larger portion of said flattened housing surface.

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**4,741,511**

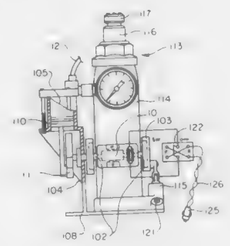
**JACK HAVING ALTERNATE HYDRAULIC LIFTING AND AIR PUMP FUNCTIONS USING A COMMON DRIVE MOTOR**

**Tai-Her Yang, 5-1 Taipin St., Si-Hu Town, Dzan-Hwa, Taiwan**

**Filed Aug. 14, 1986, Ser. No. 896,269**

**Int. Cl.⁴ B66F** *3/24*

**U.S. Cl. 254—93 H** **6 Claims**



1. In a hydraulic jack of the type adapted to provide an auxiliary air pumping function, and having a hydraulically-actuated lifting mechanism, and an air pump, the improvement thereupon comprising, in combination: a reversible electric motor, a double-ended drive shaft being carried by the motor having respective end portions projecting therefrom, said drive haft being rotatably driven by the motor in, alternatively, one of a first direction and a second opposite direction, a first one-way clutch means for coupling the lifting mechanism to one of the end portions of the shaft, a second one-way clutch means for coupling the air pump to the other opposite end portion of the shaft, the first and second one-way clutch means being independently operable and oppositely configured, such that at any given time the rotation of the shaft drives only one of the lifting mechanism and air pump respectively, and means for reversing the motor.



**4,741,512**

**LIFTING DEVICE OR LOAD-SUPPORTING APPARATUS**

**Harald Elkuch, Oberbühl 166, FL-9487 Bendern, Liechtenstein, and Sigmund Elkuch, Brunnenstr. 5, CH-9470 Buchs, Switzerland**

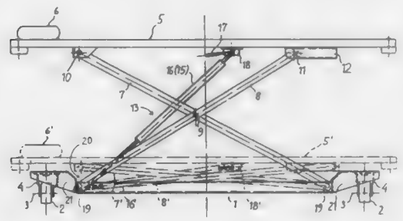
**PCT No. PCT/CH86/00050, § 371 Date Dec. 8, 1986, § 102(e) Date Dec. 8, 1986, PCT Pub. No. WO86/06053, PCT Pub. Date Oct. 23, 1986**

**PCT Filed Apr. 16, 1986, Ser. No. 2,664**

**Claims priority, application Switzerland, May 16, 1985, 1610/85**

**Int. Cl.⁴ B66F** *3/22*

**U.S. Cl. 254—9 C** **20 Claims**



1. Load-supporting apparatus which is connected to a stand arranged on the floor by means of scissor-like connecting rods, of which at lesat two connecting rods are each coupled to an axle borne by the stand, and whose height can be adjusted via at least two spring units which have different characteristics and each of which has a starting position in which it is completely relaxed, a bearing being assigned to one end of each spring unit and an abutment to the other end, wherein the two spring units (**15,16**) are each connected to a bearing and an abutment over the entire lifting height of the load-supporting apparatus (**5**), and the locking apparatus (**17**) is in the form of an adjusting means which permits the starting position of at least one spring unit (**15** or **16**) to be fixed at different lifting heights of the load-supporting apparatus (**5**); and at least the spring unit (**15**) with the less steep characteristic (**115**) and lower initial spring force has a starting position which can be fixed at various lifting heights and is therefore adjustable in respect of the force exerted on the load-supporting apparatus (**5**) in the direction of lifting.

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**4,741,513**

**STRAINER POST AND FITTING THEREFOR**

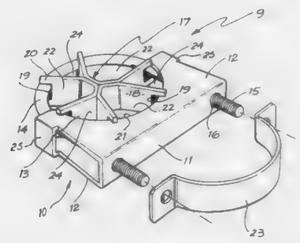
**Colin M. Smith, 15 Hillcrest Road, Merewether, New South Wales 2291, Australia**

**Filed Dec. 17, 1986, Ser. No. 942,764**

**Claims priority, application Australia, Dec. 17, 1985, PH3901**

**Int. Cl.⁴ E04H** *17/20;* **F16B** *7/00, 7/04*

**U.S. Cl. 256—21** **8 Claims**



6. A method of construction of a strainer post comprising the steps of:

inserting a first post through a first space in a first fitting comprising

a base,

a U-bolt whose arms are threaded and pass through the base and are provided with nuts for clamping thereto, and

a yoke, having spokes radiating from a hub, captured between the U-bolt and the base and providing a plurality of spaces defined by the U-bolt, the spokes and the base, the arrangement being such that by tightening of the nuts for clamping said spaces are reduced in area;

driving the post into the ground,

inserting a second post through a second space in said fitting,

driving the second post into the ground,

locating a second fitting at an upper part of and enclosing said posts,

said second fitting comprising a base, a U-bolt whose arms are threaded and pass through the base and are provided with nuts for clamping thereto, and a yoke,

having spokes radiating from a hub,

captured between the U-bolt and the base and providing a plurality of spaces defined by the U-bolt,

the spokes and the base, the arrangement being such that by tightening of the nuts for clamping said spaces are reduced in area;

clamping said first and second fittings upon the first and second posts.

8. A strainer post which comprises,

a plurality of star posts; and

a pair of fittings spaced apart along the length of said strainer post and clamped to hold said star posts together in a cluster, wherein said fittings comprise a base, a U-bolt having arms threaded and passing through said base, with nuts for clamping thereto;

a yoke, having spokes radiating from a hub, captured between said U-bolt and said base and providing a plurality of spaces defined by said U-bolt, said spokes, and said base, wherein each of said star posts extends through a respective one of said spaces, and said fitting is clamped to said cluster of star posts.

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**4,741,514**

**HIGH TEMPERATURE AND/OR MELTING FURNACE FOR NON-FERROUS METALS WITH DOSING DEVICE**

**Gerhard Bleickert, Kaiserstr. 3, D-6920 Sinsheim, Fed. Rep. of Germany**

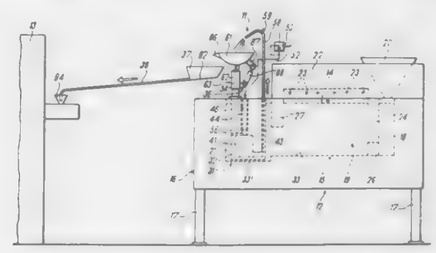
**PCT No. PCT/EP84/00192, § 371 Date Oct. 4, 1985, § 102(e) Date Oct. 4, 1985, PCT Pub. No. WO85/03656, PCT Pub. Date Aug. 29, 1985**

**PCT Filed Jun. 20, 1984, Ser. No. 785,361**

**Claims priority, application Fed. Rep. of Germany, Feb. 23, 1984, 3406467**

**Int. Cl.⁴ C22B** *9/16*

**U.S. Cl. 266—239** **9 Claims**



1. A holding or smelting furnace for nonferrous metals, comprising:

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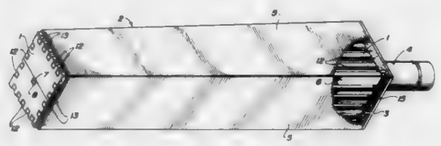
a housing containing a quantity of nonferrous molten metal melt, said housing having a bottom surface;
an apportioning chamber formed integral with the housing adjacent to the bottom surface, said apportioning chamber having an inlet for receiving metal melt and an outlet through which a predetermined quantity of the molten metal melt is removed from the furnace; and
a closure plunger for engagement with the inlet of the apportioning chamber to close said inlet, said closure plunger defining a passage for communicating with the apportioning chamber when the closure plunger is in engagement with said inlet,
whereby a pressurized medium is communicated through said passage to the molten metal melt in the apportioning chamber when the closure plunger is in engagement with said inlet to thereby displace the molten metal melt in the apportioning chamber out said outlet as a function of time.

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**4,741,515**
**APPARATUS FOR INTRODUCING GAS INTO A METALLURGICAL VESSEL**

**Sudhir K. Sharma, Center Valley; Guido P. Brita, Bethlehem, and Philip D. Stelts, Center Valley, all of Pa., assignors to Bethlehem Steel Corporation, Bethlehem, Pa.**

**Filed Oct. 20, 1986, Ser. No. 920,631**
**Int. Cl.[4] C21C *5/48***
**U.S. Cl. 266—266** **6 Claims**



1. Apparatus for introducing a gas through the refractory lining of a metallurgical vessel comprising at least one refractory block contained within a metal canister, said metal canister having a base plate fitted with a gas inlet manifold, side walls in close proximity to said refractory block and an open end, said refractory block having a plurality of slots in one or more faces thereof adjacent the side walls of said metal canister, each of said slots containing one or more cylindrical metal tubes extending between said open end of said canister and said gas inlet manifold.

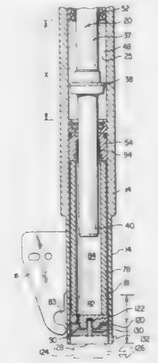
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**4,741,516**
**FLUID SUSPENSION SPRING AND DAMPER FOR VEHICLE SUSPENSION SYSTEM**

**Leo W. Davis, Dallas, Tex., assignor to LiquidSpring Investors, Ltd., Dallas, Tex.**

**Continuation-in-part of Ser. No. 907,140, Sep. 12, 1986, Pat. No. 4,735,402, which is a continuation of Ser. No. 753,365, Jul. 5, 1985, abandoned, which is a continuation of Ser. No. 550,883, Nov. 9, 1983, abandoned, and a continuation of Ser. No. 625,452, Jun. 28, 1984, Pat. No. 4,652,008. This application Dec. 12, 1986, Ser. No. 941,289**
**Int. Cl.[4] F16F *5/00*; B60G *11/26***
**U.S. Cl. 267—64.13** **24 Claims**

1. In combination with a vehicle having a chassis and a wheel, a spring support and damping device for interconnecting the wheel and the chassis comprising:
a fluid cylinder means having opposite first and second ends including first and second rod load bearing means and first and second seal means, respectively,
piston rod means disposed in the fluid cylinder having first and second rod portions extending through and reciprocally disposed in the first and second bearing means and first and second seal means respectively to define a pressure chamber for fluid,
the piston rod including damping piston means dividing the cylinder and thereby the pressure chamber into a bounce chamber formed between the cylinder, the damping piston, the rod means and the first seal means and a rebound chamber formed between the cylinder, the damping piston means, the rod means and the second seal means,
the diameters of the second rod piston and second seal means being greater than the diameter of the first rod portion and first seal means to provide a volume within the cylinder which is decreased as the second rod end is reciprocated into the cylinder and increased as the second rod end is reciprocated out of the cylinder,
a compressible liquid filling the pressure chamber defined by the cylinder means, rod means and the first and second seal means around the rod means, the liquid being at a static pressure sufficient to force the second rod means out of the cylinder to support the vehicle with the piston means positioned at a desired level within the cylinder,
means controlling the flow of liquid between the bounce chamber and the rebound chamber during reciprocation of the rod means to provide dynamic damping of the reciprocating motion of the rod means relative to the cylinder means as the vehicle traverses uneven terrain, and
first coupling means for attaching the wheel to one of the piston rod means or the cylinder means and second coupling means for connecting the chassis to the other of said piston rod means or cylinder means.



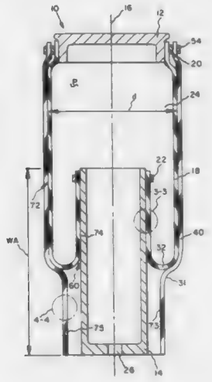
24. A liquid spring cylinder device having a piston reciprocally disposed in a cylinder and connected to a piston rod extending through an end wall of the cylinder which carries a peripheral seal means slidably disposed about the rod, the piston and rod dividing the cylinder into a high pressure chamber and a lower pressure chamber in which the pressure progressively increases as the piston approaches the cylinder end wall,
fluid passageway means extending through the rod providing restricted fluid flow from the high pressure chamber to the lower pressure chamber, the point of communication of the fluid passageway with the high pressure chamber being spaced from the piston means,
peripheral means on the cylinder end spaced inwardly from the seal means and forming a limited annular clearance with the respective rod portion such that as the point of communication of the passageway means passes the peripheral means the flow of fluid from the high pressure chamber will be significantly restricted and the maximum pressure acting on the seal means will be substantially reduced as compared to the pressure in the high pressure chamber as the piston means continues to move toward the cylinder end to provide a fluid cushion for retarding travel of the piston toward the cylinder end without subjecting the seal means to the corresponding higher pressure.



**4,741,517**
**AIR SPRING WITH EXTENSIBLE FABRIC RESTRAINING CYLINDER**

**Ivan J. Warmuth, II; Thomas E. Burkley, and Christian H. Hershberger, all of Akron, Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Filed Sep. 24, 1986, Ser. No. 910,902**
**Int. Cl.[4] F16F *9/04*; F01B *19/04***
**U.S. Cl. 267—64.24** **8 Claims**



1. A rolling lobe air spring having an axis and an axial stroke, said air spring comprising:
(a) a rigid end cap;
(b) a piston axially spaced apart from said rigid end cap having an outside peripheral surface;
(c) a flexible membrane, said membrane being sealingly attached around said end cap on one end and around said rigid piston on a second end to form a working cavity therebetween, said flexible membrane forming a meniscus as the piston moves axially relative to said rigid end cap over said axial stroke of said air spring, said flexible membrane assuming an inflated diameter when said working cavity is pressurized; and
(d) a fabric restraining cylinder attached at one end to said rigid end cap and extending coaxially with said flexible member from said end cap over the axial stroke of said air spring, said fabric restraining cylinder being formed of at least two adjacent layers of fabric having primary reinforcement cords which cords oriented at opposite bias angles relative to said axis in each adjacent layer of fabric, and being extensible in the radial direction and having an unstretched diameter less then said inflated diameter of said flexible membrane, thereby restraining the radial expansion of said flexible membrane when said working cavity is pressurized, said fabric restraining cylinder radially contracting to said unstretched diameter to substantially conform to a radially outward portion of said meniscus of said flexible membrane as the air spring moves through said axial stroke, thereby providing radial support to said flexible membrane and radial and axial support to said portion of said meniscus.

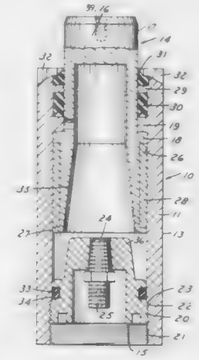
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**4,741,518**
**SELF CONTAINED GAS SPRING INTERCHANGEABLE WITH COIL SPRING**

**Bernard J. Wallis, 2215 Dacosta, Dearborn, Mich. 48128**

**Filed Aug. 26, 1986, Ser. No. 900,452**
**Int. Cl.[4] F01B *31/00*; F16F *13/00, 5/00***
**U.S. Cl. 267—75** **14 Claims**

1. A self contained gas spring interchangeable with a coil spring comprising
a cylindrical body having a substantially constant diameter external cylindrical surface,
said cylindrical body having open ends and an inner surface,
a one-piece piston having an end and an integral side wall having an outer surface,
said piston being inserted in said cylindrical body and having one closed end projecting through one of the open ends of the cylindrical body,
said piston having an integral outwardly extending radial first flange on the external surface thereof,
said cylindrical body having an integral inwardly extending first flange on the inner surface thereof adapted to interengage the flange on said piston to limit the outward movement of said piston relative to said cylindrical body,
a plug positioned in the other end of the cylindrical body to close said other end the cylindrical body,
an axial charging valve positioned in the plug for charging the interior of the gas spring,



said piston having a hollow inner end with an inner surface having a lower portion of the inner surface thereof tapering outwardly and axially toward said plug,
the plug having a central portion projecting axially toward said piston and having a generally complementary surface such that the side wall of the piston can move downwardly about the central portion of the plug thereby substantially reducing the height of the gas spring,
said plug having an axially outwardly extending opening,
said one-way charging valve supported in said plug entirely within the confines of said opening in said plug,
said gas spring being capable of being inserted in a cylindrical opening of a base member such that it is interchangeable with a coil spring in the cylindrical opening.

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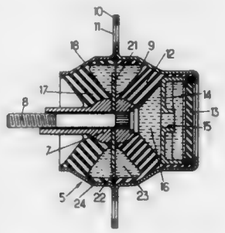
**4,741,519**
**HYDRAULIC DAMPERS**

**Daniel Dubos, Asnieres, and Jean-Luc Salaud, Conflans Ste Honorine, both of France, assignors to Hutchinson, France**

**Filed Nov. 17, 1986, Ser. No. 931,108**
**Claims priority, application France, Nov. 18, 1985, 85 16997**
**Int. Cl.[4] F16F *9/34***
**U.S. Cl. 267—140.1** **3 Claims**

1. Device intended to be inserted for the purposes of holding and damping between two rigid elements, including a sealed case inserted between the two rigid elements, which case includes a rigid base (7) able to be fixed to one of the two rigid elements, a rigid ring (9) able to be fixed to the other rigid element, a resilient wall (12) of a substantially truncated cone shape resisting axial compression and sealingly connecting the base to the ring, and a flexible membrane (13) sealingly connected to the ring, the inside of this case being divided, by a sealed dividing wall (14) connected to the ring between the truncated cone shaped wall and the membrane, into two chambers permanently communicating with each other through a restricted passage (15), and a liquid mass (16) filling the two chambers as well as the restricted passage, characterized in

that it further includes a second resilient wall (17) of a substantially truncated cone shape resisting axial compression and oriented in a direction opposite that of the first one (12), the



small bases of these two truncated cone shaped walls being juxtaposed axially and both secured to the rigid base (7), and a rigid external framework (18) connecting the large base of the second resilient wall to the rigid ring (9).

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**4,741,520**

## HYDRAULIC ANTIVIBRATION SUPPORTS

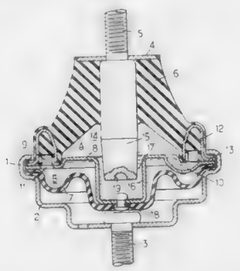
**Alain Bellamy, Vendome, and Francois Bodin, Jallans, both of France, assignors to Hutchinson, France**

**Filed Oct. 17, 1986, Ser. No. 919,868**

**Claims priority, application France, Oct. 28, 1985, 85 15988**

**Int. Cl.⁴ F16F** *9/34*

**U.S. Cl. 267—140.1** **9 Claims**



1. Antivibration device designed to be interposed for support and damping purposes between two rigid elements, constituted by a fluid-tight box comprising a rigid base which can be made fast to one of the two rigid elements, a rigid ring which can be made fast to the other rigid element, an annular elastic support wall connecting the base to the ring in fluid-tight manner and a flexible diaphragm attached in fluid-tight manner to the ring, the inside of this box being divided by a rigid partition attached to the ring between the annular wall and the diaphragm, into two chambers, namely a working chamber on the side toward the annular wall and a compensating chamber on the side toward the diaphragm, these two chambers communicating with one another permanently through a throttled passage and a liquid mass filling the two chambers as well as the throttled passage, characterized in that the working chamber is divided into two compartments connected to one another through at least one throttled annular column bounded internally and externally by two cylindrical or substantially cylindrical surfaces fast respectively to the rigid base and the rigid ring.

**4,741,521**

## AXIALLY-LOADABLE BEARING

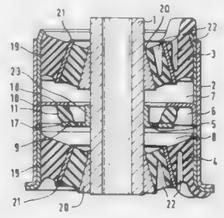
**Klaus Schiffner, Bad Neuenahr-Ahrweiler; Jörn-Rainer Quast, Sinzig, and Gerd Gäb, Bad Neuenahr-Ahrweiler, all of Fed. Rep. of Germany, assignors to Boge GmbH, Eitorf, Fed. Rep. of Germany**

**Filed May 27, 1986, Ser. No. 868,116**

**Claims priority, application Fed. Rep. of Germany, May 25, 1985, 3519016**

**Int. Cl.⁴ F16F** *9/14*

**U.S. Cl. 267—140.1** **20 Claims**



1. A hydraulically damped bearing which is substantially cylindrical and has a substantially longitudinal axially directional axis and a substantially radial direction substantially at right angles to said longitudinal axis, said bearing being loadable both substantially axially and subtantially radially, said bearing for hydraulically damping, in use, along said substantially axial and substantially radial directions

said bearing comprising:

inner means;

outer means disposed at a given distance from said inner means;

first and second substantially resilient means disposed between said inner means and said outer means;

said first and second resilient means forming a substantially annular cylindrical space for being filled with and for containing damping fluid;

annular divider means being disposed in said annular space to divide said annular space into two substantially annular chambers, each of said chambers being disposed adjacent the other and both being disposed axially along said longitudinal axis;

said annular divider means comprising a rigid sliding portion disposed to be slidable, in operation, on said inner means;

said annular divider means additionally comprising a thrust washer innerconnecting said rigid sliding portion and said outer means, said thrust washer being substantially ring shaped and being disposed with its major longitudinal axis of extension substantially parallel to said longitudinal axis of said bearing; and

at least one throttle orifice provided through said annular divider means and interconnecting said two annular chambers.

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**4,741,522**

**Patent Not Issued For This Number**

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**4,741,523**

## POSITIONING PIN DEVICE

**Toshiaki Sato, Kasuga, and Fumihiko Nishida, Kyoto, both of Japan, assignors to Dainippon Screen Mfg. Co., Ltd., Kyoto, Japan**

**Filed Oct. 22, 1986, Ser. No. 921,767**

**Claims priority, application Japan, Oct. 24, 1985, 60-163771[U]; May 6, 1986, 61-68547[U]**

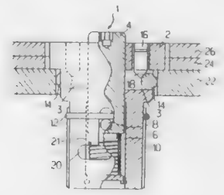
**Int. Cl.⁴ B23Q** *3/18*

**U.S. Cl. 269—316** **6 Claims**

1. A positioning pin device adapted to engage within a hole



formed in a base plate, comprising a bush having at least 3 holes radially bored within the bush, a positioning pin arranged within the bush to be movable in an axial direction, a spring urging said positioning pin toward an upper side of said bush, at least 3 balls, each respectively disposed in one of said holes and within openings formed in sides of the bush, and screws extending in said bush, said screws having tips, each formed with an inclined face against which associated balls abut for



urging said balls against walls forming the hole in the plate, said screws being longitudinally adjustable to radially displace the balls relative to the longitudinally axis of the bush to thereby radially displace the positioning pin in the base plate hole said bush having an outer diameter which is smaller than an inner diameter of said base plate hole in which the pin is mounted to generally define an annular space between the hole and the bush.

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**4,741,524**

## SORTING APPARATUS

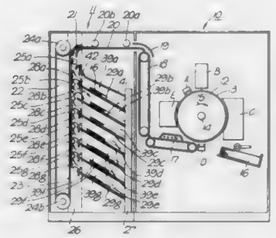
**David F. Bromage, Ross on Wye, United Kingdom, assignor to Xerox Corporation, Stamford, Conn.**

**Filed Mar. 18, 1987, Ser. No. 28,643**

**Claims priority, application United Kingdom, Mar. 18, 1986, 8606681**

**Int. Cl.⁴ R65H** *31/00*

**U.S. Cl. 271—208** **9 Claims**



1. A sheet sorting apparatus comprising a plurality of sheet receiving bins, means for transporting a sheet past each of said bins, respective deflection means associated with each of said bins for selectively deflecting and guiding sheets from said transport means into the associated bin, and a respective static eliminator associated with each bin for reducing the static electricity of a sheet entering the bin, characterized in that each deflection means comprises an electrically insulating diverter member having said static eliminator attached thereto in the form of an electrically conductive brush arranged to contact a sheet entering a bin, and in that an electrically conductive track connects said brush to grounding (earthing) means.

**4,741,525**

## APPARATUS FOR CONVEYING FLAT ARTICLES PROVIDED WITH TWO LOCATING HOLES PREFERABLY BAGS MADE OF PLASTIC FILM

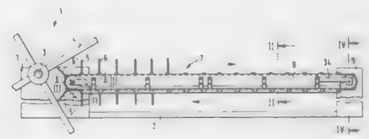
**Wilfried Ebmeyer, Enger, and Werner Krutemeier, Löhne, both of Fed. Rep. of Germany, assignors to Windmoller & Hölscher, Lengerich, Fed. Rep. of Germany**

**Filed Nov. 19, 1985, Ser. No. 799,645**

**Claims priority, application Fed. Rep. of Germany, Nov. 19, 1984, 3442263; Feb. 14, 1985, 3505109**

**Int. Cl.⁴ B65H** *31/04*

**U.S. Cl. 271—213** **6 Claims**

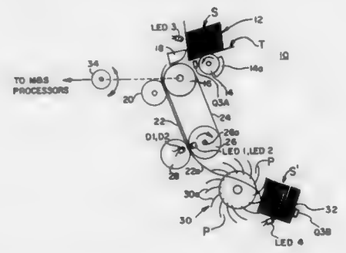


1. Apparatus for receiving flat articles having a pair of spaced locating holes adjacent one end of the articles and for carrying stacks of the articles, which apparatus comprises: a frame; a stacking conveyor carried on said frame and including two juxtaposed parallel belts defining endlessly belt means, said belt means carried on and trained around respective pairs of belt carrying means rotatably supported by said frame, said belt means each carrying one of a pair of upstanding spaced stacking pins, said stacking pins mounted on respective carrying plates with alternate plates carried by respective ones of said belt means, said belt means being movable forwardly and rearwardly relative to each other in a conveying direction and interconnected in a predetermined relative position to define the spacing between stacking pins of a pair, and adjusting means for moving said belt means relative to each other in said conveying direction to change the spacing between adjacent stacking pins, wherein said belt carrying means includes a pair of gears at each end of said stacking conveyor, said belt means each trained around one of a pair of gears disposed at respective ends of the stacking conveyor, the gears of one pair mounted on a common shaft and feely rotatable relative to each other, and the gears of the other pair interconnected in a predetermined angular position relative to each other and including means to adjust the relative angular position therebetween, wherein the pair of relatively angularly adjustable gears includes a first gear having an axially extending hub, and a second gear rotatably mounted on said hub and formed with at least one arcuate slot concentric to a common axis of the two gears, a clamp bolt extending through aid slot and in threaded engagement with said tapped bore formed in the adjacent side face of the first gear to permit relative angular movement between the said first and second gears when said clamp bolt is loosened and to secure said gears in a predetermined relative angular position when said clamp bolt is tightened, said first gear including an annular collar adjacent to its hub to define a shoulder, said second gear includes an axially extending flange spaced radially from and overlying said shoulder to define an annular space therebetween, said collar having a substantially cylindrical outer surface, and said flange having internal gear teeth, a pinion in said annular space in meshing engagament with said internal gear teeth and connected to a shaft which extends through an axial bore of said first gear, said shaft having a drive member at its end opposite to said pinion and disposed on the outside of the first gear for engagement by a drive means.

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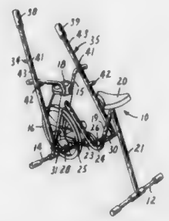


**4,741,526**
**ADAPTIVE DOUBLES AND LENGTH MEASUREMENT TECHNIQUES AND APPARATUS THEREFOR FOR USE IN SHEET HANDLING AND COUNTING DEVICES**
**John M. Reed, Lebanon, N.J., assignor to Brandt, Inc., Bensalem, Pa.**
**Filed Jan. 24, 1986, Ser. No. 822,121**
**Int. Cl.[4] B65H *7/14***
**U.S. Cl. 271—261** **24 Claims**




1. A method for evaluating sheets moving in spaced relation along a nominal feed path past first and second sensors spaced a predetermined distance apart along a line substantially perpendicular to said feed path comprising the steps of:
generating a first count representing the interval between the times the leading and trailing edges of a sheet pass the first sensor;
generating a second count representing the interval between the times the leading and trailing edges of said sheet pass the second sensor, said first and second counts representing first and second length values,
determining the absolute difference between said counts, and
generating an error signal when said absolute difference exceeds a predetermined value.

**4,741,527**
**EXERCISE ARM FOR A STATIONARY BICYCLE**
**Sander C. Nestegard, 175 Galtier Pl., Shoreview, Minn. 55126**
**Filed Oct. 3, 1986, Ser. No. 916,006**
**Int. Cl.[4] A63B *23/02***
**U.S. Cl. 272—73** **4 Claims**




1. An arm for a stationary exercise bicycle to increase the exercise gained while pedalling comprises,
hollow cylindrical sleeve means having an axis for rotatably receiving coaxially the pedal shaft of a bicycle sprocket,
a rod having a first end and a distal end, a hand grip attached to said distal end,
connecting means connecting said first end of said rod to said sleeve means for affording swinging movement of said distal end axially of said sleeve means,
wherein said connecting means comprises an eye bracket extending radially from said sleeve means and having a hole perpendicular to the axis of said sleeve means, said first end of said rod having a bifurcated end to receive said eye bracket, and a pin through said bifurcation and said hole for defining a pivotal connection to said sleeve means perpendicular to the axis of said sleeve means.

**4,741,528**
**ARCHER'S EXERCISE DEVICE**
**Bobby C. Church, Rte. 1, Box 809, Panama City, Fla. 32404**
**Filed Jun. 12, 1987, Ser. No. 61,143**
**Int. Cl.[4] A63B *21/06***
**U.S. Cl. 272—118** **18 Claims**

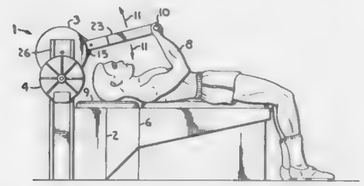



1. An archer's exercise device comprising an elongated vertical tubular post having a top and a bottom and a linear elongated slotted passageway through the wall of said post and extending from said top to adjacent said bottom; a tubular weight support concentrically surrounding said post adjacent said bottom and slideable vertically on said post, said weight support having a top and a bottom with an outwardly extending base adjacent its bottom and adapted to support dead weights placed thereon around said tubular portion, said weight support having an anchoring means adjacent its top for attachment of a flexible cable thereto positioned on the axis of said tubular post, said anchoring means being adapted to slide vertically in said slotted passageway; a pulley at said top of said tubular post; a flexible cable attached to said anchoring means and extending upwardly around said pulley and outwardly beyond said pulley to terminate in a handle adapted to resemble the center of a bowstring which is pulled away from the bow in shooting an arrow from a bow, said tubular post having rigidly affixed thereto a bow handle resembling that of the central portion of a bow, and a plurality of weights adapted to be slideably placed on said weight support.

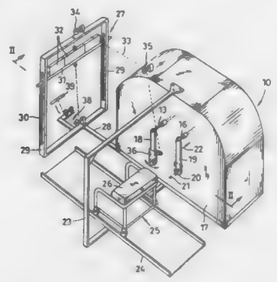
**4,741,529**
**EXERCISE APPARATUS**
**Brent J. Bloemendaal, Indianapolis, Ind., assignor to Bio-Dynamic Innovations, Inc., Indianapolis, Ind.**
**Continuation-in-part of Ser. No. 695,077, Jan. 25, 1985, Pat. No. 4,645,199. This application Sep. 18, 1985, Ser. No. 777,467**
**The portion of the term of this patent subsequent to Feb. 24, 2004, has been disclaimed.**
**Int. Cl.[4] A63B *21/00***
**U.S. Cl. 272—130** **19 Claims**

1. A muscle exercise apparatus for providing exercise to an operator, said apparatus comprising:
(a) a resistance mechanism including fluid-shearing friction means; said fluid-shearing friction means including a rotor and a resistance surface;
(i) said rotor having a friction surface and being mounted with said friction surface generally facing said resistance surface; said rotor friction surface being spaced from said resistance surface, forming a fluid receiving space therebetween;
(ii) said rotor being rotatably mounted, rotation of said rotor causing rotation of said rotor friction surface relative to said resistance surface; and,
(b) actuator means for selectively rotating said rotor; and
(i) said actuator means including a reciprocating mechanism having an actuator member selectively movable between a first extreme position and second extreme position;
(ii) movement of said actuator member selectively rotating said rotor, with movement of said actuator member from said first extreme position to said second extreme position corresponding to a first stroke, and with selective movement of said actuator member from said second extreme position to said first extreme position corresponding to a return stroke; movement of said actuator member during said return stroke being through a reverse path of movement of said first stroke;
(iii) said first stroke selectively rotating said rotor; and
(c) a viscous fluid positioned in said fluid receiving space; said fluid, causing frictional drag and resistance to rotational movement of said rotor relative to said resistance surface;
(d) whereby, selectively, when said operator moves said actuator member through said first stroke, energy is required to overcome said resistance and said operator receives exercise by providing said energy.



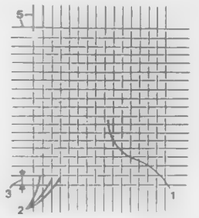


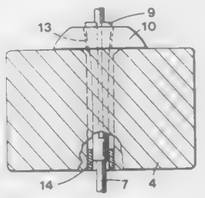

**4,741,530**
**POWER TRAINING ARRANGEMENT**
**Hans-Gerd Wolf, Nittumer Weg 76, 5060 Bergisch Gladbach, Fed. Rep. of Germany**
**Filed Jul. 16, 1986, Ser. No. 886,250**
**Claims priority, application Fed. Rep. of Germany, Oct. 31, 1985, 8530853[U]**
**Int. Cl.[4] A63B *21/22***
**U.S. Cl. 272—134** **12 Claims**




1. A power training arrangement comprising in combination a support,
a moving element mounted on said support for movement in a predetermined path and including a gripping member,
means for moving said moving element in said predetermined direction, including
a motor including an output member,
means for controlling the operation of said motor, and
a transmission which transmits the movement of said output member of said motor to said moving element,
a horizontal bar component;
a slide mounted on said horizontal bar component for vertical movement,
at least one deviating roller rotatably mounted on one of said support and said horizontal bar component,
a tow cable trained about said deviating roller and having two end portions,
means for connecting one of said ends of said tow cable to said slide and the other of said ends to said moving element,
a cable deviating device disposed at a lower region of said horizontal bar component,
an additional tow cable having one end connected to said slide and another end remote from said slide, said additional tow cable being trained about said cable deviating device, and
a handgrip secured to said other end of said additional tow cable and enabling the use of the arrangement to pull said other end of said additional tow cable upwardly against the force exerted by said motor.

**4,741,531**
**STRINGING SYSTEM FOR A RACKET AND METHOD FOR STRINGING A RACKET**
**Yvan Szedressy, 5, rue Ami Argand, 1290 Versoix, Switzerland**
**Continuation of Ser. No. 634,395, Jul. 25, 1984, abandoned. This application Feb. 25, 1986, Ser. No. 832,686**
**Claims priority, application Switzerland, Jul. 26, 1983, 4071/83**
**Int. Cl.[4] A63B *51/04, 49/00***
**U.S. Cl. 273—73 D** **6 Claims**




4. A device for securing an independent string to a rigid frame, said frame having frame holes located therein for receiving string comprising
a first member, tubular in shape, adapted to cooperate with a frame hole and having a first portion adapted to extend within a frame hole and having a second portion adapted to extend radially and exteriorly of said frame, said second portion having an outer end located away from said first

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portion and also having a slot formed therein which separates the tubular member into two half shells forming a conical surface which is laterally expandable near the outer end of said second portion and having an inner surface which is threaded and adapted to secure a string to be placed therethrough when the two half shells are pressed against each other, and

a second member having a first face adapted to cooperate with the exterior surface of the frame and having a conically tapered hole located therethrough, said conically tapered hole expanding in a direction away from said first face, said second member having an outer peripheral surface that decreases in circumference in a direction away from said first face,

whereby during stringing, said first member is placed inside said second member and into a frame hole, said string being passed through the interior hole of said first member, the slotted part of which is oriented radially exteriorly of the frame, and whereby as said first member slides into said second member, said two half shells of said first member are pressed together around the string by said conical hole to thus hold the string in place when under tension.

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**4,741,532**
**REEL DRIVE DEVICE FOR SLOT MACHINE**
**Kazuo Okada, Tokyo, Japan, assignor to Kabushiki Kaisha Universal, Tochigi, Japan**
**Filed Jul. 22, 1983, Ser. No. 516,276**
**Claims priority, application Japan, Jul. 26, 1982, 57-112184[U]**
**Int. Cl.⁴ A63F *5/04***
**U.S. Cl. 273—143 R** **1 Claim**




1. In a slot machine having a plurality of juxtaposed reels each having a plurality of symbol patterns arranged along the outer periphery and driven from a motor;

a reel rotatably fitted on a shaft of said motor;

a drive lever secured to and radially extending from said motor shaft; and

elastic means coupling said reel and drive lever and capable of storing energy with the start of said motor to cause said reel to be suddenly rotated by the restored energy; the improvement in which:

said elastic means is leaf spring means sandwiching said drive lever, portions of said leaf spring means on the back side of said drive lever being secured to said reel.

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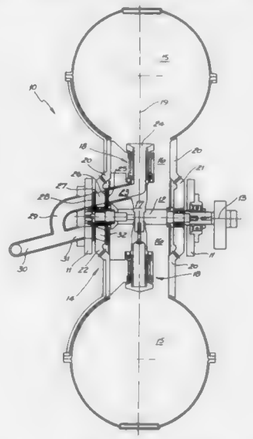
**4,741,533**
**GAMES APPARATUS**
**Robert Michael, Lane Cove, Australia, assignor to Keno Computer Systems Pty, Limited, Queensland, Australia**
**Filed Nov. 14, 1986, Ser. No. 930,208**
**Claims priority, application Australia, Nov. 15, 1985, PH3439**
**Int. Cl.⁴ A63F *9/00***
**U.S. Cl. 273—144 B** **7 Claims**

1. A games apparatus, said games apparatus comprising:

an enclosure to receive a plurality of loose objects;

means supporting said enclosure for rotation about at least two generally perpendicular axes so that said enclosure may be rotated to randomly arrange the objects;

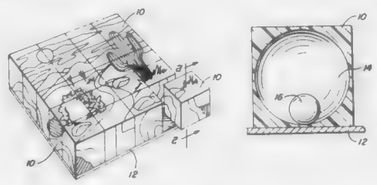
drive means to drive said enclosure rotatably about one of said axes, said enclosure including two chambers spaced from each other in the direction of the other of said axes, said chambers being joined by a duct to permit the passage of the objects between said two chambers; and



means to select one or more or the objects from within said enclosure to provide a set of selected objects with the selected objects being a random sample of the objects contained within said enclosure.

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**4,741,534**
**MULTI-PICTURE PUZZLE APPARATUS**
**Dino J. Rogahn, 3737 E. Turney, Number 135, Phoenix, Ariz. 85018**
**Filed Jan. 9, 1987, Ser. No. 2,234**
**Int. Cl.⁴ A63F *9/10***
**U.S. Cl. 273—157 R** **10 Claims**



1. An article of manufacture, comprising:

a base;

at least one cube having a single spherical internal chamber therein; and

a sphere freely movable within said chamber and magnetically attracted to said base for removably securing said at least one cube to said base.

9. An article of manufacture comprising:

a cube having single spherical internal chamber therein; and

a magnetic ball freely movable within said chamber.

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**4,741,535**
**GOLF PUTTER**
**Robert L. Leonhardt, 14201 Poplar La., Jeffersontown, Ky. 40299**
**Filed Feb. 26, 1986, Ser. No. 833,894**
**Int. Cl.⁴ A63B *53/04***
**U.S. Cl. 273—164** **1 Claim**

1. A golf putter with a head connected thereto, the putter head comprising:

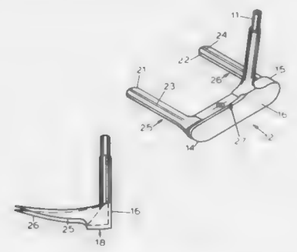
(a) a heel portion comprising 15–25 percent of the width of the putter head and 30–50 percent of the weight of the putter head;

(b) a center portion comprising 10–45 percent of the weight of the putter head and 40–75 percent of the width of the putter head and is divided into a front portion equal in height to the club head with a depth of 1/16 of an inch to ¾ of an inch and a rear portion whose height is 1/16 of an inch to ¾ of an inch and whose depth is ⅛ of an inch to 2 inches;

(c) a toe portion comprising 5–25 percent of the width of the putter head and 25–40 percent of the weight of the putter head;

(d) a smooth bottom surface;

(e) a ball striking surface for striking a golf ball;

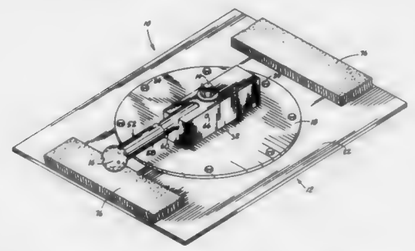


(f) a first and a second alignment shaft connected to the toe and the heel portions, respectively, of the putter head, the bottom surface of the alignment shafts being above the bottom surface of the putter head, each shaft being directed rearward from the toe and the heel portion of the putter head, each shaft being from 1 to 6 inches in length and ⅛ of an inch in width, each shaft having an arcuate top and bottom surface arching upward along its length, each shaft having a centered marked line on the top surface perpendicular to the ball striking surface and said shafts being spaced apart approximately the same distance as the diameter of a golf hole; and

(g) a third alignment mark on the top surface of the putter head extending at a right angle to the planar ball striking surface and located at approximately the center of the weight distribution of the putter head.

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**4,741,536**
**GOLF SWING TRAINING AID**
**William K. Tai, E. 14725 Terra Verde Ct., Spokane, Wash. 99037, and Robert Faggioli, Spokane, Wash., assignors to William Ku Tai, Spokane, Wash.**
**Filed Feb. 12, 1987, Ser. No. 13,968**
**Int. Cl.⁴ A63B *69/36***
**U.S. Cl. 273—200 B** **10 Claims**



1. A golf-swing practicing apparatus comprising:

a support base;

a rigid spinner mounted on the base for rotation about a substantially vertical axis, the spinner including a channel formed in one end thereof, the channel being upwardly open, the channel being downwardly closed by a channel base;

a rigid radial support arm having a pair of opposed ends;

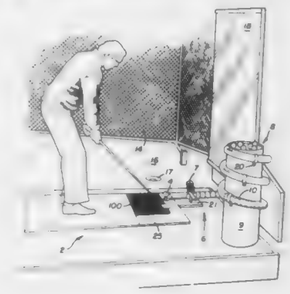
a golf ball sized object secured to the support arm adjacent one end thereof;

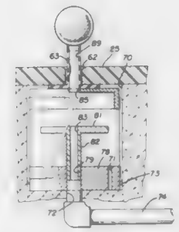
the remaining end of the radial support arm being pivotally received within the spinner channel for pivotal movement about a horizontal pivot axis that is perpendicular to a line extending between the center of the golf ball sized object and the vertical axis, the horizontal pivot axis extending horizontally through the spinner, channel and radial support arm; and

the radial support arm being free to pivot upwardly relative to the spinner to a predetermined maximum angle leading upwardly from the channel base.

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**4,741,537**
**TEEING DEVICE**
**Alvin R. Adam, 490-42nd St. #8, Oakland, Calif. 94609**
**Filed Sep. 3, 1985, Ser. No. 771,692**
**Int. Cl.⁴ A63B *57/00***
**U.S. Cl. 273—201** **23 Claims**





1. A device for individually dispensing balls including, in combination, storage means for retaining a plurality of said balls preparatory to individual dispensement thereof, and feeder means for individually transmitting on demand each said ball from said storage means to a point of use, said feeder means including a single movable mechanical member which, in a first position contacts one of said balls and prevents movement thereof, and which, in a second position permits movement of said one of said balls toward said point of use while permitting another of said balls to move from said storage means into said feeder means ready for selective transmission on demand toward said point of use, teeing means proximate said point of use, said teeing means including means for selectively lifting each said ball transmitted by said feeder means from a first elevation at said point of use to a second elevation at said point of use under the influence of positive air pressure, said storage means including flexible tubing having a first open end communicating with a supply of said balls and a second

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open end in communication with said feeder means, said first open end being disposed at a higher elevation than said second open end for providing gravitational impetus tending to move said balls from said first open end to said second open end, said flexible tubing being wrapped into the form of an upstanding cylinder having a downward slope from said first end to said second end of approximately 1.8 inches per foot of length of flexible tubing.

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**4,741,538**

## METHOD OF PLAYING A WORD FORMING GAME

**Milton Lewis, 1721 Eager St., Baltimore, Md. 21205**

**Filed May 5, 1986, Ser. No. 859,811**
**Int. Cl.[4] A63F *3/00***
**U.S. Cl. 273—243** **1 Claim**




1. A method of playing a board game wherein the board game is comprised of a game board, a plurality of playing pieces, a bank including play money, a plurality of chance cards and a plurality of alphabet cards, said alphabet cards having indicia thereon designating various letters of the alphabet, said cards also having indicia thereon designating a pay-off price, said game board having a plurality of contiguous spaces thereon, some of said spaces having indicia thereon designating various letters of the alphabet and also having indicia thereon designating a purchase price, the method of play comprising the steps of:

(A) Each player choosing a playing piece and placing the chosen piece on one of said spaces;

(B) A first one of said players picking up one of said chance cards and moving the appropriate playing piece from one space to another on the board according to the directions given on the chosen chance card;

(C) Said first player deciding whether to purchase a letter of the alphabet that corresponds to the letter of the alphabet designated on the space on which the first player's playing piece landed;

(D) Paying an amount of play money equal to the purchase price designated on the space landed on when the player decides to purchase the letter;

(E) Said first player receiving one of said alphabet cards that has a letter of the alphabet thereon that corresponds to the letter just purchased;

(F) Repeating steps B–E by all other players so as to define an order of play and thereafter, continuing to follow steps B–E by each of the players according to the order of play;

(G) Purchasing and collecting said alphabet cards by each of said players in an attempt to form words comprised of the alphabet letters on said alphabet cards;

(H) Any player, after having formed a word, receiving from the bank an amount of play money equal to the total sum of the pay-off price indicia on the alphabet cards that constitute the formed word and receiving the same amount of play money from those other players whose playing pieces are located on a game board space having an alphabet letter thereon that corresponds to one of the alphabet letters constituting the formed word.

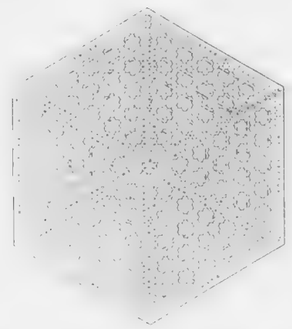
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**4,741,539**

## BOARD GAME RELATING TO PERSONALITY TRAITS

**John A. Sutton, 6 Pump Hill, Loughton, Essex, and Philip E. Sawyer, London, both of England, assignors to John A. Sutton, Loughton, England**

**Filed Apr. 1, 1985, Ser. No. 718,445**
**Int. Cl.[4] A63F *3/00***
**U.S. Cl. 273—275** **1 Claim**



1. A board game comprising: a playing board having a generally hexagonal configuration including a playing area separated into six regions by three main axes, each said region having a triangular area, each said region having indicia representing a trait of a personality and each said region including a plurality of contiguous hexagonal areas; at least one set of cards printed with questions to be answered by the players to determine their progress during the game;

said three main axes having a common intersection;

opposed pairs of said six regions of said playing board representing opposing personality traits;

each of said six regions having a plurality of sub-areas comprising groups of contiguous hexagonal areas which have indicia representing characteristics subordinate to the personality trait represented by respective said regions and which together comprise a description of the personality represented by each said region;

a first set of tokens for predicting a final position of a player, for placement along an edge of said playing area adjacent a location representing a final predicted board position;

answers to questions posed by ones of said of cards being awarded points based upon the personality trait indicated;

a second set of tokens for indicating progress of a player during a game; said second set of tokens respectively providing a device by which the accuracy of the prediction is tested by comparing its position and progress on the board with that of the predictor token;

the nature and value of the answers to said questions posed by said cards testing the accuracy of the players predictions of the personalities involved, manifested as the sum of the individual values of the answers provided by each player during the game which are listed on a chart provided, the individual values demonstrating numerically the relationship between the player's response to each question and said main axes on the board.

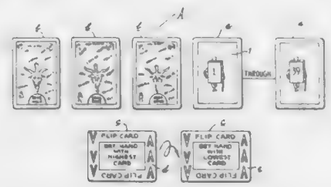


**4,741,540**

## LOTTERY NUMBERS SELECTOR GAME

**Sidney Levine, St. Louis, Mo., assignor to Sidney Levine Co. Inc., Florissant, Mo.**

**Filed May 1, 1987, Ser. No. 44,601**
**Int. Cl.[4] A63F *1/04***
**U.S. Cl. 273—292** **5 Claims**



1. A lottery numeral selector game comprising a plurality of first stackable members, each first stackable member having an obverse and a reverse side, the number of said first stackable members being predetermined for corresponding to a preselected range, each first stackable member carrying a different number on the obverse side thereof within said preselected range, a plurality of second stackable members, each of said stackable members having an obverse and a reverse side, said second stackable members being non-numeral bearing, visually detectable means provided on each second stackable member productive of ready distinction between same and said first stackable members, said second stackable members being substantially reduced in number relative to said first stackable members and being of such quantity that when added to the number of said first stackable members will provide the nearest total equally divisible by a predetermined divisor whereby a multiplicity of groups of like number of said first and second stackable members may be provided, and means for selecting a group from those containing only said first stackable members.

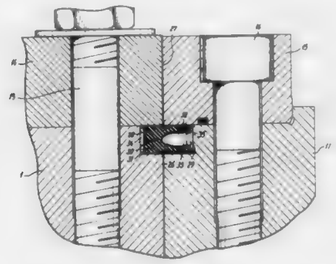
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**4,741,541**

## SEAL FOR A ROTATABLE PIPE COUPLING

**Wouter A. G. Franken, La Turbie, France, assignor to Single Buoy Moorings Inc., Marly, Switzerland**

**Continuation of Ser. No. 892,425, Aug. 4, 1986, abandoned. This application Sep. 14, 1987, Ser. No. 97,311**
**Claims priority, application Netherlands, Aug. 9, 1985, 8502217**
**Int. Cl.[4] F16J *15/32, 15/34;* F16L *17/03***
**U.S. Cl. 277—26** **5 Claims**



1. A pipe coupling comprising a pair of relatively rotatable members disposed one within the other with cylindrical faces which lie opposite one another to form a first gap, said coupling comprising a radially inner member and a radially outer member, the radially inner member having a radially outwardly opening groove that communicates and registers with a radially inwardly opening groove in the radially outer member, a pair of relatively rotatable rings disposed one within the other with cylindrical faces that lie opposite one another to form a second gap, means releasably clamping the radially outer ring to said radially outer member and the radially inner ring to said radially inner member, and a sealing ring disposed in both said grooves, each groove having radially extending opposing side walls located on one side on said members and on the other side on said rings with an end wall therebetween, said sealing ring having a shoulder which is rectangular in cross section and is sealingly guided between said radially extending side walls of the groove in the radially inner member, said sealing ring having radially outwardly extending elastic lips that are disposed at least in part in the groove in the radially outer member and bridge said gaps, said lips lying against said radially extending side walls of said groove in the radially outer member, said sealing ring being so disposed in the grooves to adapt itself to temperature variations by movement of the sealing ring in its own plane, the sealing ring extending on each radial side of said gaps a distance which is a plurality of times greater than the radial width of said gaps.

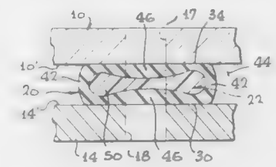
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**4,741,542**

## SEALING CONSTRUCTION

**John C. Kimerly, Corona, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.**

**Filed Sep. 8, 1983, Ser. No. 530,324**
**Int. Cl.[4] B23P *15/00;* B64C *1/14;* F16J *15/46***
**U.S. Cl. 277—34** **13 Claims**




1. An elastomer injection dry seal positioned between a pair of spaced part surfaces of structural parts having holes therein and fastener means received in said holes to connect said structural parts, said seal produced by a process which comprises

placing a tube-like flexible elastic body member having a hollow cross-section between spaced part surfaces of structural parts, to be sealed, said parts having holes therein across said part surfaces which are aligned when said elastic body member is placed therebetween,

connecting said part surfaces by fastener means passing through said aligned holes,

injecting a curable liquid resin under pressure into the hollow interior of said body member, causing said flexible body member to stretch laterally in the space between said surfaces and to be compressed into engagement with said surfaces, and

curing said resin to an elastomeric state, the energy stored in stretching said body laterally and in compressing same into contact with said surfaces, effecting a seal therebetween.

8. A process for installing an elastomer injection dry seal between the surfaces of spaced parts having fastener holes therein, which comprises

placing a tube-like flexible elastic body member having a hollow cross-section between spaced part surfaces of structural parts to be sealed, said parts having holes therein across said part surfaces which are aligned when said elastic body member is placed therebetween,

connecting said part surfaces by fastener means passing through said aligned holes,

injecting a curable liquid resin under pressure into the hollow interior of said body member, causing said flexible body member to stretch laterally in the space between said surfaces and to be compressed into engagement with said

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surfaces, against restraining opposing forces exerted by said parts, and

curing said resin to an elastomeric state, the energy stored in stretching said body laterally and in compressing same into contact with said surfaces, effecting a seal therebetween.

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**4,741,543**

## PISTON SCRAPER RING

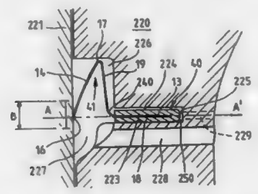
**Robert Geffroy, and Christophe Geffroy, both of 1 Blvd., Richard Wallace Neuilly/s/s Maillot 38-57, Paris, France**

**Filed Jan. 30, 1987, Ser. No. 9,223**

**Claims priority, application France, Feb. 14, 1986, 86 023033**

**Int. Cl.⁴ F16J** *9/12, 9/00, 9/20*

**U.S. Cl. 277—216** **18 Claims**




1. A cylinder and reciprocable oil lubricated piston assembly equipped with an oil scraper ring including a radially washer (**40**) seated in a radial piston groove (**223**) and a scraping skirt (**41**) having a radially resilient truncated portion (**14**) with a base edge engaging the cylinder wall in a scraping line (**16**), characterized by the location of said base edge scraping line in or substantially close to the median plane (A—A') of said washer.

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**4,741,544**

## TOY VEHICLE

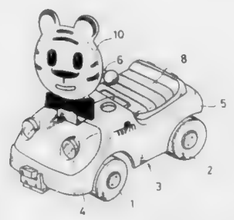
**Kenzou Kassai, Osaka, Japan, assignor to Aprica Kassai Kabushiki Kaisha, Osaka, Japan**

**Filed Jan. 13, 1987, Ser. No. 2,958**

**Claims priority, application Japan, Jan. 29, 1986, 61-12344[U]; Jan. 29, 1986, 61-12345[U]**

**Int. Cl.⁴ A63G** *19/18*

**U.S. Cl. 280—113** **10 Claims**




1. A toy vehicle comprising front and rear regions; and upwardly projecting handle post disposed in said front region and comprising grips to be gripped by a child with his hands; and a seat formed in said rear region for a child to sit on; a first accessory simulating a driver's face, and attaching means to said first accessory for attaching the first accessory to said handle post or some other area adjacent said handle post; said first accessory being in the form of a flat plate as a whole and being of a stuffed toy construction comprising a relatively elastic core material, a cover sheet, and a cushion material interposed between said core material and said cover sheet.

**4,741,545**

## FRONT WHEEL STEERING DEVICE FOR MOTOR VEHICLES

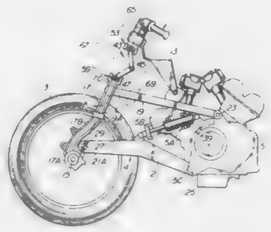
**Kenji Honma, and Tsutomu Sakuma, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Feb. 24, 1987, Ser. No. 17,785**

**Claims priority, application Japan, Feb. 24, 1986, 61-38569**

**Int. Cl.⁴ B62K** *11/12*

**U.S. Cl. 280—92** **10 Claims**



1. A front wheel steering device for a motor vehicle, comprising:

a motor vehicle body;

a steering handle angularly movably mounted on said motor vehicle body;

a front wheel supporting member;

a single front wheel rotatably supported by said front wheel supporting member;

an arm means extending forwardly from said motor vehicle body and supporting said front wheel supporting members on said motor vehicle body; and

a link assembly by which said steering handle and said front wheel supporting member are angularly movably interconnected, said link assembly including a first joint operatively coupled to said steering handle and a second joint operatively coupled to said front wheel supporting member;

said front wheel supporting member having an axis about which it is angularly movable, an extension of said axis extending through a center of said second joint;

said link assembly comprises an upper link having one end coupled by said first joint to said steering handle and a lower link having one end coupled by said second joint to said front wheel supporting member;

said upper and lower links having opposite ends which are pivotally coupled to each other by means of a single shaft; and

said front wheel supporting member comprising a knuckle having a lower end portion supporting an axle of the front wheel in a cantilevered fashion, an extension extending upwardly from the lower end portion, and an upper end portion directed transversely over the front wheel.

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**4,741,546**

## TORQUE RESPONSIVE AUTOMATIC BICYCLE TRANSMISSION

**James B. Reswick, 1003 Dead Run Dr., McLean, Va. 22101**

**Continuation-in-part of Ser. No. 823,463, Jan. 28, 1986, Pat. No. 4,652,250, which is a division of Ser. No. 593,928, Mar. 27, 1984, Pat. No. 4,608,034. This application Jan. 23, 1987, Ser. No. 6,155**

**Int. Cl.⁴ B62M** *9/08;* **F16H** *9/10*

**U.S. Cl. 280—236** **14 Claims**

1. An automatic transmission for a cycle having a frame, front and rear wheels wherein one of said wheels is a driven wheel, axle means mounted on said frame for supporting said driven wheel in rotation about a first axis of rotation, a first sprocket mounted to said driven wheel for fixed rotation therewith, a chain wheel mounted to said frame and journalled for rotation about a second axis of rotation, and pedal means for driving said chain wheel in rotation, comprising:

a transmission mounting bracket having first and second parallel shafts and means for mounting said bracket to said frame, said mounting means including means for receiving said axle means, and means or engaging said axle means for tightening said bracket against said frame;

a drive pulley and a driven pulley supported by said first and said second shafts respectively and mounted for free relative rotation with respect to said bracket;

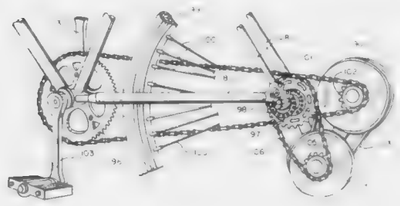
said drive pulley having a hub and a second sprocket drivingly connected to said drive pulley for fixed rotation therewith;

said driven pulley having a hub and a third sprocket drivingly connected to said driven pulley for fixed rotation therewith;

each of said pulleys including a plurality of arms having a first end pivotally mounted to the respective one of said hubs, and each of said arms having an annnular drive surface portion opposite said first end, each said annular drive surface portion of each of said arms together constituting an annular drive surface for supporting an endless flexible transmission belt passed over said pulleys for transmitting torque from said drive pulley to said driven pulley;

means for varying the diameter of said drive pulley annular drive surface between an expanded position and a plurality of contracted positions including means for constantly biasing said drive pulley toward said expanded position by applying a predetermined biasing torque through said





biasing means to each of said arms, and means for contracting said drive pulley to said plurality of contracted positions from said expanded position against said biasing means in response to a torque exceeding said predetermined torque applied to said drive pulley through said second sprocket and transmitted to said driven pulley through the belt;

means for varying the diameter of said driven pulley annular drive surface between a contracted position and a plurality of expanded positions;

means for expanding said driven pulley to said plurality of expanded positions in response to a decrease in diameter of said drive pulley;

said biasing means producing a belt force being transmitted to said driven pulley through the belt;

said diameter varying means of said driven pulley causing said driven annular drive surface to contract toward said contracted position from said expanded positions solely in response to said belt force;

said mounting bracket having a bracket portion extending rearwardly of said bracket mounting means for supporting said drive pulley on said first shaft in position rearwardly of said axle means such that said axle means in positioned between said chain wheel and said drive pulley;

a first chain engaging said second sprocket and said chain wheel for transmitting torque from said chain wheel to said drive pulley; and

a second chain engaging said third sprocket and said first sprocket for transmitting torque from said driven pulley to said driven wheel, whereby the speed ratio between said chain wheel and said driven wheel is automatically varied in response to a torque exceeding said predetermined torque applied to said chain wheel through said pedal means and transmitted to said drive pulley through said first chain.

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**4,741,547**

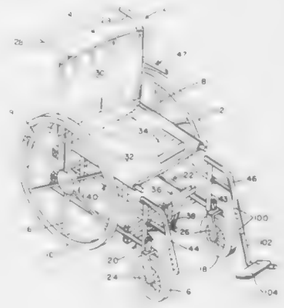
## FOLDING WHEELCHAIR

**Alan L. Tholkes, 725 10th Ave., Granite Falls, Minn. 56241**

**Filed May 14, 1987, Ser. No. 49,469**

**Int. Cl.⁴ A61G** *5/00*

**U.S. Cl. 280—242 WC** **11 Claims**



1. A folding wheel chair frame comprising:

(a) first and second tubular frame assemblies mountable in generally planar parallel relation to one another each having;

(1) a back upright member, the uppermost end of which is bent to provide a hand-hold,

(2) a front upright member,

(3) an upper horizontal seat attachment member, and

(4) a lower horizontal front caster attachment member, said front and back upright and said upper and lower horizontal members coupled to one another in a generally parallelogram framework;

(b) a front hinge assembly comprising first and second tubular wings, each wing having a pair of upper and lower horizontal members the outermost ends of which members are pivotally mounted via first and second pivots to said respective first and second frames adjacent said front uprights and the innermost ends of which are coupled to one of a front pair of mating right angled hinge plates, said front pair of mating right angled hinge plates being pivotally interconnected by a front hinge pivot pin;

(c) a rear hinge assembly comprising third and fourth tubular wings, each wing having a pair of upper and lower horizontal members, the outermost ends of which members are independently pivotally mounted to the back upright of said first and second frames and the innermost ends of which are coupled to one of a rear pair of mating right angle hinge plates, said rear paid of mating right angled hinged plates being pivotally interconnected by a rear hinge pivot pin;

(d) a first longitudinally positioned tubular slide member;

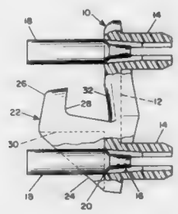
(e) a second longitudinally positioned tubular slide member slidably mounted to said first slide member; and

(f) said front and rear hinge pivot pins each being mounted in vertical relation to said first and second slide members and each pivot pin having one end thereof fixedly attached to said second tubular slide member, whereby relative longitudinal movement of said first and second slide members causes pivoting of said hinge assemblies thereby folding said wheelchair.

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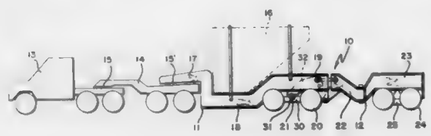
**4,741,548**
**BICYCLE CHAIN HANGER**
**Raphael Schlanger, New Rochelle, N.Y., assignor to Cannondale Corporation, Georgetown, Conn.**
**Filed Feb. 2, 1987, Ser. No. 9,957**
**Int. Cl.⁴ B62H** *13/00*
**U.S. Cl. 280—289 R** **4 Claims**



1. A chain hanger adapted to be attached to a seat stay of a bicycle frame about six inches along the seat stay from the axle dropout and to hold the bicycle drive chain trained around the rear derailleur and the drive sprocket when the rear wheel is detached from the frame comprising a unitary member molded from a polymeric material and including a disc-like base portion having a concavely curved internal surface adapted to bear against the wall of the seat stay and having an external surface, at least one hole through the base portion, a split sleeve portion surrounding each hole and extending from the internal surface of the base portion and adapted to extend through a hole in the seat stay wall and to project into the space within the wall, a hook portion including a base leg part extending outwardly from a portion of the external surface of the base portion and a hook leg part extending transversally from the base leg part and adapted to accept and hold an element of the chain in hooked relation, and a pin adapted to be driven with a force fit through each of the holes and through the corresponding split sleeve into the space within the tube walls and to deflect portions of the split sleeve within the tube hole away from each other into interfering relation with the walls and internal edges of the tube hole and thereby retain the member on the seat stay.

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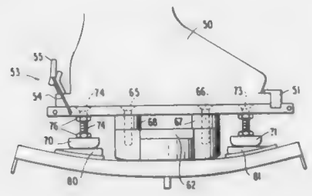
**4,741,549**
**EQUALIZING BOOSTER AXLE SYSTEM**
**David Gevers, 8455 Mason Montgomery Rd., Mason, Ohio 45040, assignor to Robert J. Nadalin, Worcester, Mass.; David E. Gevers, Mason, Ohio and John F. Wenzell, Boylston, Mass.**
**Filed Oct. 6, 1986, Ser. No. 915,504**
**Int. Cl.⁴ B62D** *53/04*
**U.S. Cl. 280—405 A** **12 Claims**



1. A trailer incorporating an equalizing booster axle system, comprising:
(a) a main frame having a front portion and a rear portion,
(b) a kingpin assembly connecting the front portion to a power unit,
(c) a rear axle assembly connected to and supporting the rear portion via a main suspension system,
(d) a booster assembly including a booster axle group and a secondary frame,
(e) a front suspension arm pivotally connected at a first end to the main suspension and extending upwardly and rearwardly therefrom,
(f) means pivotally connecting the front suspension arm to the main frame,
(g) main pivoting means connecting the rear portion of the main frame directly to the secondary frame of the booster assembly, and
(h) connecting link elements connecting the front suspension arm to the secondary frame of the booster assembly wherein each link element is pivotally connected at one end to the front suspension arm and at the other end to the secondary frame of the booster assembly.

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**4,741,550**
**RELEASABLE BINDING SYSTEM FOR SNOWBOARDING**
**David Dennis, 2212 Sandpiper Rd., Virginia Beach, Va. 23456**
**Division of Ser. No. 798,492, Nov. 15, 1985, Pat. No. 4,652,007.**
**This application Mar. 20, 1987, Ser. No. 28,262**
**Int. Cl.⁴ A63C** *9/00*
**U.S. Cl. 280—618** **2 Claims**



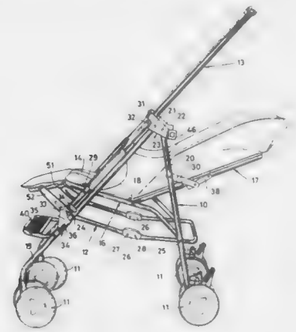
1. A binding apparatus for securing a conventional ski boot having a sole to a snowboard having releasable toe and heel bindings mounted thereon along its longitudinal axis, said binding apparatus comprising:
a mounting plate having toe and heel bindings for releasably securing said mounting plate to the sole of said ski boot, said mounting plate having a substantially planar surface with a plurality of apertures extending therethrough,
a sole plate adapted to be releasably secured to said toe and heel bindings on said snowboard said sole plate having a substantially planar surface with a plurality of apertures extending therethrough, and
coupling means extending through selected ones of said apertures for releasably coupling said mounting plate to said sole plate at a selected one of a plurality of angles relative to said longitudinal axis while maintaining said planar surface of said mounting plate in a substantially parallel relationship with respect to said planar surface of said sole plate.

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**4,741,551**
**FOLDING BABY CARRIAGE**
**Gianluca Perego, Arcore, Italy, assignor to Peg Perego Pines S.p.A., Italy**
**Filed Oct. 20, 1986, Ser. No. 921,344**
**Claims priority, application Italy, Apr. 23, 1986, 21630/86[U]**
**Int. Cl.⁴ B62B** *7/08*
**U.S. Cl. 280—642** **4 Claims**

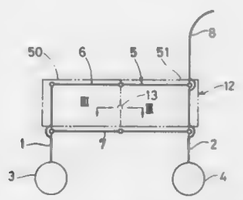
1. A foldable baby carriage formed of an articulated tubular metal framework and being adjustable into a stable operative position and a stable folded position, comprising: first and second connection members; right and left side frame members each side frame member having first and second rods, each first rod and each second rod connected at an upper end to a pivot associated with one of said first and second connection members; a U-shaped base frame positioned between and connecting with each of said first rods, said U-shaped base frame having a first foldable leg member having a central articulated joint and second foldable leg member having a central articulated joint, each of said first and second foldable leg members being pivotally connected to one of said second rods; a U-shaped steering handle member having a first steering handle leg member and a second steering handle leg member, each handle leg member being slidably connected to an upper portion of said side frame members through a slide opening in respective first and second connection members; a seat and backrest assembly including a backrest structure fixed to first and second seat frame members and fixed to a backrest frame, said backrest frame being articulated to an intermediate point in each of said first and second seat frame members, each of said first and second seat frame members being pivotally connected at a forward part to a lower portion of respective first and second steering handle leg members and each of said first and second seat frame members being pivotally connected at a rear part to respective said first rods of said side frame members, and backrest frame being connected to respective said side frame members by link work assemblies so that the backrest may be moved between an upright and a reclined position; and, engagable reciprocal engagement means for fixing the position of the slidable U-shaped steering handle member relative to the side frame members for maintaining the carriage in a stable operative position and for releasing the U-shaped steering handle member relative to the side frame members for adjustment of the carriage into a fixed stable folded position.





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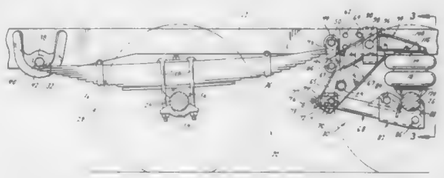
**4,741,552**
**LATERAL SEAT SECTION WALL FOR BABY CARRIAGES**
**Kenzou Kassai, Osaka, Japan, assignor to Aprica Kassai Kabushikikaisha, Osaka, Japan**
**Filed Jul. 31, 1986, Ser. No. 891,734**
**Claims priority, application Japan, Jul. 31, 1985, 60-170416; Aug. 13, 1985, 60-178297**
**Int. Cl.⁴ B62B** *7/08*
**U.S. Cl. 280—647** **5 Claims**



1. A baby carriage, comprising a foldable frame structure, a seat section including side wall means positioned on each of two opposite sides of said seat section, said side wall means extending upwardly from said seat section, said seat section being held between said side wall means by said foldable frame structure, each of said side wall means comprising first and second side wall panels (**50, 51**) which are contiguous with each other and normally extend longitudinally of the baby carriage when the baby carriage is in an unfolded state, pivot shaft means for turnably interconnecting said first and second side wall panels, said pivot shaft means (**13**) having an axis extending widthwise of said baby carriage, said pivot shaft means being positioned between upper and lower edges of said first and second side wall panels, said first and second side wall panels being turnable around said axis of said pivot shaft means (**13**), guide means (**81, 82, 88, 90**) for displacing said first and second side wall panels relative to each other axially of said pivot shaft means, when said first and second side wall panels perform a relative turning movement in response to a folding movement of said foldable frame structure, said first and second side wall panels being turnable around said axis of said pivot shaft means for at least partly overlapping each other in a folded state, said baby carriage further including spring means (**14, 92**) for urging said first and second side wall panels (**50, 51**) into alignment with each other in said unfolded state.

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**4,741,553**
**AIR RIDE TRAILING AXLE SUSPENSION WITH LEAF SPRING GUIDED DRIVE AXLE SUSPENSION AND LOAD EQUALIZATION**
**John E. Raidel, II, 4925 Royal Dr., Springfield, Mo. 65804**
**Filed Jan. 5, 1987, Ser. No. 686**
**Int. Cl.⁴ B60G** *5/00*
**U.S. Cl. 280—682** **19 Claims**



1. In a vehicle of the kind having a chassis, a lead axle, and a trailing axle, a suspension system comprising a leaf spring assembly having first and second ends, means to support the first end of the leaf spring assembly from the chassis, means to connect the lead axle to the leaf spring assembly intermediate the ends thereof, an equalizer beam having oppositely extending first and second arms, the first arm extending angularly outwardly from the second arm to provide a spring seat spaced laterally outwardly relative to the chassis, means comprising a bushing assembly for supporting the beam between the arms thereof from the chassis while permitting rocking of the beam about the support means, an offset in the second arm to space the bushing assembly laterally outward relative to the articulated connecting means thereby locating the load on the bushing assembly closer to the center thereof, a first spring seat supported by the first arm, means to connect the trailing axle to the chassis while permitting vertical movement of the axle relative to the chassis, a second spring seat supported by the trailing axle, spring means mounted between the first and second spring seats, and articulated connecting means connected between the second end of the leaf spring assembly and the second arm, whereby a vertical force applied to either axle is resisted by both the leaf spring assembly and the spring means.

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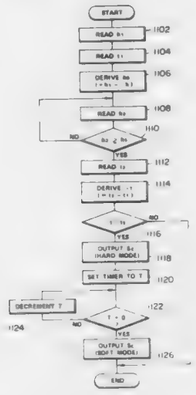


**4,741,554**

## CONTROL SYSTEM FOR AUTOMOTIVE VEHICLE SUSPENSION HAVING VARIABLE DAMPING CHARACTERISTICS WITH ANTI-DIVE CONTROL DURING DECELERATION

**Mitsuyuki Okamoto, Isehara, Japan, assignor to Nissan Motor Company, Limited, Kanagawa, Japan**

**Filed Oct. 24, 1985, Ser. No. 791,061**
**Claims priority, application Japan, Oct. 24, 1984, 59-223269**
**Int. Cl.⁴ B60G** *17/08*
**U.S. Cl. 280—703** **32 Claims**




**1**. A suspension control system for an automotive vehicle comprising:

a vehicular suspension system with damping characteristics variable at least between a first harder suspension mode and a second softer suspension mode;

a first sensor which detects vehicular braking and produces a first sensor signal indicative thereof;

a second sensor for monitoring vehicle height relative to a road surface and producing a second sensor signal indicative of the vehicle height;

a controller responsive to said first sensor signal indicating vehicle braking to derive a signal indicating magnitude of vehicle height displacement after vehicle braking and a signal indicating rate of change of vehicle height after vehicle braking from said second sensor signal, comparing the signal indicating magnitude of height displacement with a first reference value representative of a vehicle height displacement harder suspension criterion and comparing the signal indicating rate of change of vehicle height with a second reference value representative of a vehicle rate of change of height harder suspension mode criterion, and producing a control signal for operating said vehicular suspension system in said first harder suspension mode when said signal indicating magnitude of height displacement is greater than said first reference value and said signal indicating rate of change of vehicle height is higher than said second reference value.

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**4,741,555**

## DOOR MOUNTED TRANSPORT MECHANISM FOR PASSIVE THREE POINT SAFETY RESTRAINT SYSTEM

**Richard L. Frantom, Richmond, and Rudy V. Thomas, Sterling Heights, both of Mich., assignors to Allied Corporation, Morris Township, Morris County, N.J.**

**Filed Feb. 24, 1987, Ser. No. 18,315**
**Int. Cl.⁴ B60R** *21/10*
**U.S. Cl. 280—804** **20 Claims**

**1**. A door mounted passive three point safety restraint system for motor vehicles comprising:

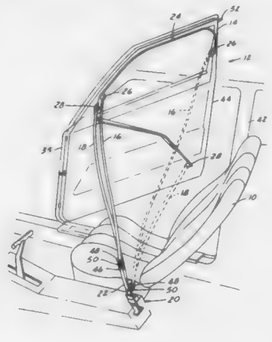
retractor means associated with a motor vehicle occupant seating position;

belt means having a retractor portion connected to said retractor means and an occupant position portion having a shoulder belt portion and a lap belt portion;

door mounted track means with a shoulder belt section mounted along the top portion of the door and a lap belt section mounted in the lower portion of the door;

slider means mounted for movement along said track means and having a shoulder belt slider and a lap belt slider,

said shoulder belt slider providing anchor means for said shoulder belt portion and operable to move said shoulder belt portion along said top portion of the door from a first anchor position away from the vehicle occupant and above the bottom of the window of the door during ingress and egress of the vehicle to a second anchor position securing the occupant in said occupant seating position when the door is closed,



said lap belt slider providing a second anchor means for said lap belt portion and operable to move said lap belt portion along said lower portion of the door from a third anchor position away from the vehicle occupant and above the bottom of the window of the door during ingress and egress of the vehicle to a fourth anchor position restraining the occupant in said occupant seating position when the door is closed;

a flexible transport member operatively connected to each of said sliders;

motor means mounted in the door and operatively coupled to said flexible transport member; and

control means operatively connected to said motor means for moving said transport member and said slider means between said first and second and said third and fourth anchor positions on said track.

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**4,741,556**

## SEAT BELT RETRACTOR

**Hideyuki Nagashima, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Japan**

**Filed May 16, 1986, Ser. No. 863,727**
**Claims priority, application Japan, May 22, 1985, 60-108366**
**Int. Cl.⁴ B60R** *21/10*
**U.S. Cl. 280—807** **18 Claims**

**1**. A seat belt retractor for a vehicle comprising:

a housing;

a take-up shaft rotatably mounted to said housing;

biasing means for biasing said take-up shaft in a belt retracting direction to retract a seat belt;

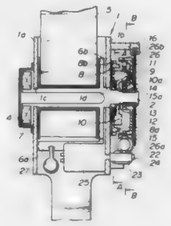
a gear mechanism operatively connected to said belt take-up shaft;

a tensionless mechanism operatively connected to said gear mechanism and selectively operable to prevent said biasing means from rotating said take-up shaft in the belt retracting direction;



a motor actuated slack control mechanism operatively connected to said gear mechanism and selectively operable, independently of said biasing means, to rotate said belt take-up shaft to provide the belt with a predetermined slack by retracting or feeding the same;

first means for controlling operation of said tensionless



mechanism and said motor actuated slack control mechanism in a first given manner;

second means for controlling operation of said tensionless mechanism and said motor actuated slack control mechanism in a second given manner; and

third means for selectively operating said first and second means in response to instruction signals.

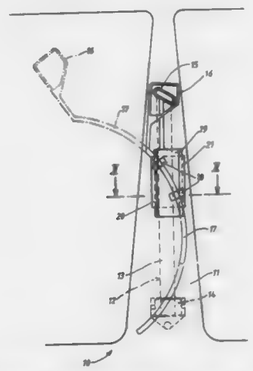
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**4,741,557**

## SAFETY-BELT ARRANGEMENT IN A VEHICLE

**Arno Jambor, Vaihingen/Enz; Gerhard Brodbeck, Schonaich; Gerhard Busch, Gechingen, and Jürgen Heuberger, Pliezhausen-Gniebel, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany**

**Filed Oct. 22, 1986, Ser. No. 921,410**
**Claims priority, application Fed. Rep. of Germany, Oct. 22, 1985, 3537519; Jun. 13, 1986, 3619934**
**Int. Cl.⁴ B60R** *22/02*
**U.S. Cl. 280—808** **24 Claims**



**1**. Safety-belt arrangement in a vehicle, especially a passenger car, comprising: a shoulder belt which in its upper region engages on a holder, and with a feeder arm which has a belt lug located at its end and engaging on the belt and wherein the feeder arm is movable on a guide part on the vehicle from a position of rest into a feed position pulling the belt band forwards, and back again, both the holder and the guide part being retained on the vehicle, wherein the holder and the guide part of the feeder arm are coupled to one another to form a single unit and are retained on the vehicle so as to be jointly adjustable vertically.

**4,741,558**

## TRANSACTIONS SLIPS PACK

**Joe N. Louis, 3017 Red Hawk Dr., Grand Prairie, Tex. 75051**

**Filed Nov. 24, 1986, Ser. No. 934,182**
**Int. Cl.⁴ B41L** *1/16;* **B42D** *15/00;* **G09C** *1/04;* **G09F** *3/00*
**U.S. Cl. 282—8 R** **9 Claims**



**1**. An improved transactions slips pack comprising:

at least two transaction slips with a location for multiple parallel lines of confidential identifying information;

an overlying copy slip between said transaction slips;

said overlying copy slip having a strip of jagged perforations, the strip extending along a line parallel to said multiple lines of confidential identifying information;

said strip of jagged perforations corresponding to said location for multiple lines of confidential identifying information; and

whereby when the transaction slips are separated the overlying copy slip is also severed at the jagged perforations obscuring any confidential identifying information thereon.

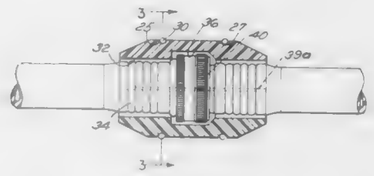
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**4,741,559**

## COUPLING PROTECTOR

**Earle E. Berghman, P.O. Box 196, Norton, Mass. 02766**

**Filed May 28, 1987, Ser. No. 55,174**
**Int. Cl.⁴ F16L** *11/12*
**U.S. Cl. 285—45** **1 Claim**



**1**. A device for protecting hose couplings, said hose couplings having a female fastening portion and a male fastening portion threadingly interconnected, and restricted against relative rotation, a housing having a first half portion and a second half portion which are similar and are constructed of impact resistant material, each half having an outer wall of non-circular section with tapered end portions, each half having longitudinal edges and interengaging means on said edges to align the two halves, each half having an inner wall defining a semi-circular recess of uniform radius with a separate large radius central semi-circular chamber therein for the reception of the female fastening portion of the coupling, said recesses and chamber permitting the housing to rotate about the coupling and locking means fastening the two halves together.

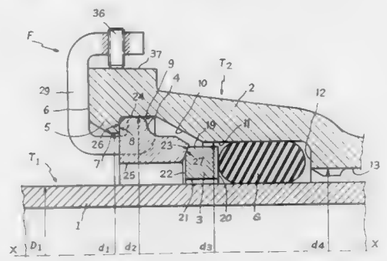
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**4,741,560**
## SEAL ASSEMBLY FOR CONNECTING TWO PIPE SECTIONS

**Pierre Vigneron, Maidieres, France, assignor to Pont-A-Mousson S.A., Nancy, France**

**Filed Jan. 5, 1987, Ser. No. 502**
**Claims priority, application France, Jan. 3, 1986, 86 00059**
**Int. Cl.⁴ F16L** *55/00*
**U.S. Cl. 285—91** **8 Claims**



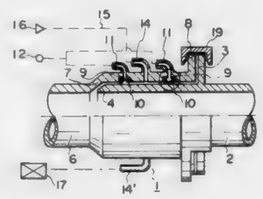
1. A seal assembly for connecting one section of a pipeline or conduit (T1) having an axis X—X and a spigot end (1), to a second section (T2) having an axis X—X and an end socket (2), said seal assembly comprising: in succession within a space defined between an outer surface of the spigot end and inner surfaces of the socket, and in a direction from an innermost base end (12) of said space towards a mouth thereof, a radially compressed gasket (G) sealingly disposed between an outer surface of the spigot end and an inner surface (11) of the socket, wherein the gasket has an internal diameter (di) equal to 0.98 Dmin, with Dmin being the minimum outer diameter of the spigot end, a metal ring (3) disposed around the spigot end and having an inner axial surface (20) abutting the gasket, and an internal split metal mating flange (4) having outer axial and outer radial surfaces (26, 24) abutting first and second internal surfaces (8, 9) on a radially inturned lip of the socket, and an inner axial surface (27) abutting an outer axial surface (23) of the ring.

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**4,741,561**
## REMOTELY MONITORED SEAL IN A CONNECTION JOINT

**Eiji Morita; Noritaka Hashimoto, and Akira Wadamoto, all of Katsuta, Japan, assignors to Doryokuro Kakunenryo Kaihatsu Jigyodan, Tokyo, Japan**

**Filed Feb. 25, 1985, Ser. No. 704,889**
**Claims priority, application Japan, Mar. 2, 1984, 59-038847**
**Int. Cl.⁴ F16L** *55/00*
**U.S. Cl. 285—93** **4 Claims**



1. A pipe joint with a remotely monitorable seal for male and female pipe ends in which the male pipe end is inserted into and engaged in sealing relationship with the female pipe end, comprising:

(a) at least two ring-shaped pockets; said ring-shaped pockets being formed at an interval on an inner surface of said female pipe end;

(b) inflatable rubber gaskets having a first side and a second side in each of said pockets; said inflatable rubber gaskets being connected to an external compressed air-source so that said inflatable rubber gaskets are inflated by compressed air to thereby seal a clearance between said male pipe end and said female pipe end;

(c) a first flange at an end portion of said female pipe end;

(d) a second flange at said male pipe end; said second flange being engageable with said first flange when said male pipe end is inserted into said female pipe end;

(e) clamp means connected to said second flange; said clamp means having a pair of arc-shaped clips in the form of a U-shaped cross-section so that said first flange and said second flange are enclosed by said clips unitarily to clamp said first flange and said second flange;

(f) a first monitor nozzle disposed between said inflatable gaskets; said first monitor nozzle being connected to said clearance between said male pipe end and said female pipe end so that a monitoring fluid is fed to said clearance through said first monitor nozzle; and

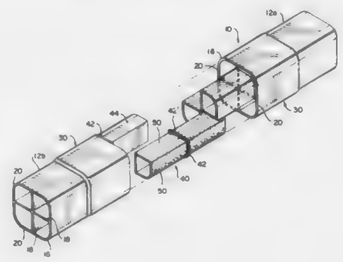
(g) a second monitor nozzle disposed between said inflatable gaskets relative to said first monitor nozzle; said second monitor nozzle being connected to said clearance at one end thereof and having a monitor detector, said monitor detector being connected to other end of said second monitor nozzle so that said monitor fluid flown into said clearance from said first monitor nozzle is fed to said monitor detector through said second monitor nozzle, whereby the sealing relationship of the joint for the male and female pipe ends can be remotely monitored.

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**4,741,562**
## MULTI-CELL CONDUIT CONNECTION JOINT

**Jimmie R. McGregor, Mineral Wells, Tex., assignor to Harsco Corporation, Wormleysburg, Pa.**

**Filed Dec. 31, 1986, Ser. No. 948,080**
**Int. Cl.⁴ F16L** *39/00*
**U.S. Cl. 285—137.1** **17 Claims**



1. A multi-cell conduit system having at least two sections of conduit to be joined end-to-end, said system comprising:

a first and a second section of multi-cell conduit, each section having an integral web forming a plurality of cells in an interior part of each section, each cell of said first section having an associated cell in said second section defining pairs of associated cells, each of said sections having a main portion and at least one integral connector portion, said connector portions having substantially identical cross-sectional configurations, said connector portions having expanded interior and exterior cross-sectional areas which are greater than interior and exterior cross-areas of said main portions, each of said connector portions extending axially inwardly for a predetermined distance from an end of said conduit section;

each of said pair of associated cells of said first and second conduit sections having an associated cell insert, each of said cells inserts having an external cross-sectional configuration conforming substantially in geometry to an internal cross-sectional configuration of the connector portions of its pair of associated cells; and

a joint between said first and second sections said joint comprising a portion of each of said cell inserts extending into associated cells of the connector portion of the first and the second conduit section, the sections being aligned along their longitudinal axis with the ends holding the inserts facing each other such that a protruding portion of each of the cell inserts enters it associated cell in the opposing conduit section with said sections abutting each other.

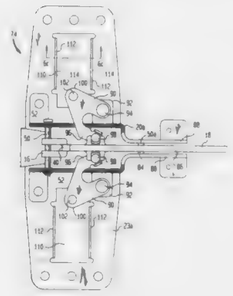


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**4,741,563**
## CENTER CASE ASSEMBLY, AND A UNIVERSAL, CENTER CASE SUB-ASSEMBLY

**Richard B. Cohrs, Indianapolis, Ind., assignor to Von Duprin, Inc., Indianapolis, Ind.**

**Filed Apr. 7, 1986, Ser. No. 849,018**
**Int. Cl.⁴ E05B** *65/10*
**U.S. Cl. 292—21** **4 Claims**



1. A universal, center case sub-assembly, for a panic-type exit device, compriisng:

first means defining a chassis;

second means defining a center case housing coupled to said chassis;

a main control link;

said housing and link having means cooperating for guiding said link for slidable translation thereof within said housing between first and second dispositions; and

a pair of bellcranks of generally V-shaped configuration, each thereof having a pair of limbs mutually diverging, to terminal limb ends, from a common, angular juncture; wherein

each of said bellcranks has one of said terminal limb ends thereof pivotably mounted to one of said first and second means;

each of said bellcranks has the other of said terminal limb ends thereof engaged with said link (a) for pivotable movement thereof coincident with, and as a consequence of translation of said link, and (b) for translation of said link concident with, and as a consequence of, bellcrank pivotable movement;

said chassis has means on opposite sides of said housing defining guideways for movable thumbpiece lifts;

said common, angular junctures of said bellcranks each have means for coupling thereof to a thumbpiece lift, and each said juncture, with bellcrank pivotable movement, slues through an arc, of a given radius, toward and away from that one of said guideways which is most proximate thereto;

said control link has (a) means at one end for attachment thereof to a control link translating mechanism of a panic-type exit device, and (b) means at the opposite end thereof for coupling thereto a latchbolt link; and

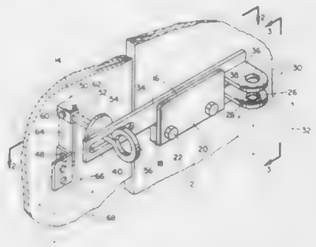
said housing has means for pinning a latchbolt, pivotably, thereto.

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**4,741,564**
## DOUBLE OPENING GATE LATCH

**Allen W. Alford, 4812 Andrews, Baytown, Tex. 77521**

**Filed Sep. 11, 1986, Ser. No. 906,135**
**Int. Cl.⁴ F05C** *11/00*
**U.S. Cl. 292—285** **13 Claims**



1. A double opening gate latch mechanism for single and double gates defining relatively movable gate parts and capable of being unlocked and opened from either side thereof, comprising:

(a) first latch bracket means to be fixed to one relatively movable gate part and forming a first locking aperture;

(b) second latch bracket means to be fixed to the opposite relatively movable gate part and forming a second locking flange having a second locking aperture;

(c) first latch means including an elongated locking bar for locking registry with a locking bar receptacle of said first latch bracket means and defining a third locking aperture cooperating with said first locking aperture of said first latch bracket means for receiving a first padlock, said elongated locking bar forming an elongated slot therein; and

(d) second latch means including an elongated shaft having a latch forming a latch aperture for registry with said second locking aperture of said second latch bracket means for receiving a second padlock, said elongated shaft forming an enlargement for registry with said elongated slot of said elongated locking bar to permit relative movement of said enlargement through said elongated opening to thus permit opening of said movable gate part, said enlargement also being positionable out of registry with said elongated slot in the locked position thereof thus securing said enlargement and said elongated locking bar in locked assembly and preventing opening of said relatively movable gate part, said second latch means being selectively positionable in locking and release positions relative to said first latch means, at said locking position said first and second latch means are in locked assembly and at said release position said first and second latch means are separable, said first or second latch means being operable to unlock said gate latch mechanism with the opposite one of said first and second padlocks in locking relation with its respective latch bracket assembly.

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**4,741,565**
## DISPOSAL LITTER COLLECTOR

**Richard L. Bagg, 849 Brookwood Ave., Vallejo, Calif. 94591**

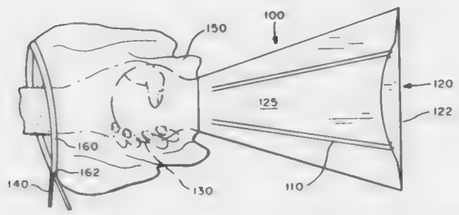
**Filed Nov. 19, 1986, Ser. No. 932,474**
**Int. Cl.⁴ A01K** *29/00*
**U.S. Cl. 294—1.3** **19 Claims**

1. A disposable litter scooper comprising: a shovel having a flat bottom; the flat bottom having a leading edge and two opposite side edges, both side edges of the flat bottom tapering into a handle; said handle extending from the flat bottom; a

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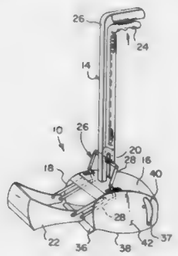
hood extending from one side edge of the flat bottom to the other side edge of the flat bottom; one end of the hood being vertically spaced from the leading edge of the flat bottom and the other end of the hood connected to the handle so that the flat bottom forms a receiver for litter; a moisture impregnable




sleeve mechanically fastened at one end circumferentially to said scooper so that said scooper is centrally located within said sleeve and the other end of the sleeve opened, the sleeve having sufficient length to extend past the leading edge of the flat bottom, and means at the open end of the sleeve to draw close the open end of the sleeve.

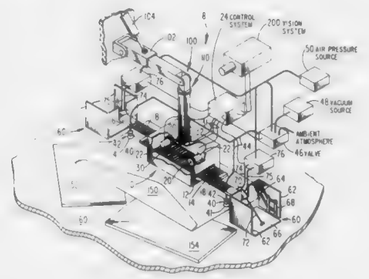
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**4,741,566**
**DOG EXCREMENT CLEANER**
**Im Byung-Do, 3038 Bainbridge Ave., Bronx, N.Y. 10467, and George Spector, 233 Broadway, Rm 3815, New York, N.Y. 10007**
**Filed Oct. 14, 1986, Ser. No. 918,785**
**Int. Cl.[4] A01K** *29/00*
**U.S. Cl. 294—1.4** **2 Claims**




1. An apparatus for removing animal feces from a surface comprising:
(a) a longitudinal handle;
(b) a receptacle having an open end, said receptacle attached to the lower end of said handle;
(c) a scraper normally in a closed position across said open end of said receptacle and moveable outward to an open position;
(d) a spring biased trigger attached to the upper end of said handle;
(e) means for connecting said scraper to said spring biased trigger whereby when said trigger is squeezed said scraper will move away from said open end of said receptacle to said open position and when said trigger is released said scraper will move towards said open end of said receptacle scraping said surface and sliding said animal feces into said receptacle in returning to said closed position wherein said means comprise parallel sets of links having a transverse connective link secured to said trigger and guided vertically through a slot in said handle.

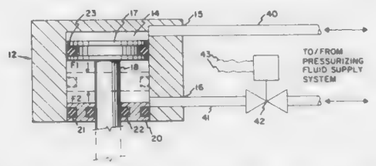
**4,741,567**
**ROBOTIC SYSTEM AND END EFFECTOR**
**John J. Zimmer, Cherry Hill, and Paul B. Pierson, Medford, both of N.J., assignors to RCA Corporation, Princeton, N.J.**
**Filed Jan. 12, 1987, Ser. No. 2,290**
**Int. Cl.[4] B66C** *1/02, 1/10*
**U.S. Cl. 294—2** **8 Claims**




1. A robotic end effector for manipulating articles, comprising:
first second substantially parallel arms, each including an inboard end and an outboard end, said arms being mounted for reciprocal longitudinal motion;
means for extending said arms;
first and second suction cups mounted near said outboard ends of said first and second arms, respectively, with their suction surfaces facing away from said arms; and
means for sensing which of said first and second arms is manipulating the greater mass.

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**4,741,568**
**METHOD AND MEANS FOR LIMITING THE EXTENT OF RELEASE TRAVEL OF PISTON-OPERATED GRIPPERS**
**Nicky Borcea, Weston, and Alexandrv D. Ionescu, Easton, both of Conn., assignors to Robohand Inc., Trumbull, Conn.**
**Continuation-in-part of Ser. No. 852,614, Apr. 16, 1986, abandoned. This application Jun. 23, 1987, Ser. No. 65,519**
**Int. Cl.[4] B25B** *15/08;* **B75J** *15/00*
**U.S. Cl. 294—88** **14 Claims**

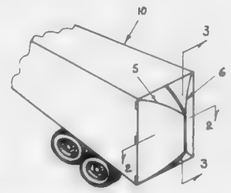



1. In a piston-operated robotic gripper system having a piston mounted within a cylinder for movement between a first position and a second position, with the piston operatively linked to move grasping means between a first retracted position and a second extended position corresponding to the first and second piston positions, respectively, movement of the piston being achieved by introducing pressurized fluid through a conduit into the cylinder on a first side of the piston to cause the piston and grasping means to move to their first positions and introducing pressurized fluid through a conduit into the cylinder on a second side of the piston while exhausting the fluid from the cylinder on the first side of the piston to cause the piston and grasping means to move to their second positions; a method of selectively limiting the extended position of the grasping means, comprising: stopping the exhausting of fluid from the cylinder on the first side of the piston, so that the remaining fluid on that side will increase in pressure until the force acting on the first side of the piston equals the force acting on the second side of the piston and the piston and grasping means are held at positions intermediate to their first and second positions.

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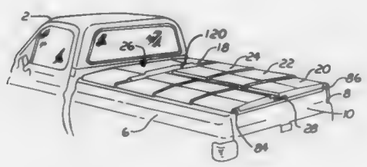
**4,741,569**
**INFLATABLE DRAG REDUCER FOR LAND TRANSPORT VEHICLES**
**Paul F. Sutphen, 309 S. State St., Owosso, Mich. 48867**
**Filed Mar. 4, 1987, Ser. No. 4,130**
**Int. Cl.[4] B62D** *35/00*
**U.S. Cl. 296—1 S** **1 Claim**




1. A streamlining inflatable attachment for truck afterbodies including a pair of rearwardly facing doors having flat surfaces, hinges on outward sides thereof and adjacent door handles on inward sides thereof, said attachment comprising: a pair of air bags which attach one to each of said doors on said flat surfaces thereof; each of said bags having a first surface extending from a first point at the hinge side of the respective one of said doors toward the center of the truck to a second point short of the respective one of said door handle, a second surface extending from said second point rearwardly and inwardly to a third point at the center of said truck and adjacent the other one of said bags, a third surface extending from said third point rearwardly to a fourth point and a fourth surface extending from said fourth point outwardly and forwardly to said first point, said fourth surfaces of said bags forming an apex rearward of the truck to reduce air drag on the rear surface of the truck, said second surfaces and said doors defining a chamber to accommodate the door handles and latch mechanism of each door and to substantially reduce the inflated volume of each bag.

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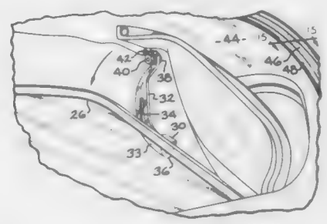
**4,741,570**
**VEHICLE BED COVER ASSEMBLY**
**Ann B. Lovass, Crystal River, Fla., assignor to ABL Unlimited, Inc., Brooksville, Fla.**
**Continuation-in-part of Ser. No. 933,483, Nov. 21, 1986. This application Apr. 10, 1987, Ser. No. 36,987**
**Int. Cl.[4] B60J** *7/10*
**U.S. Cl. 296—100** **20 Claims**




1. A telescoping cover assembly for a vehicle bed, comprising:
a plurality of substantially rigid cover members, each having lateral sides extending transversely beyond the longitudinal edges of the lateral sides of said vehicle bed and each being longitudinally movable relative to another and each overlapping a longitudinally adjacent said cover member, with a first said cover member being releasably fixable in a position covering the front end of said vehicle bed, and a second cover member being releasably fixable in a position covering the rear end of said vehicle bed, at least one cover member of each adjacent pair of cover members comprising a trough portion that extends substantially from the rear of said one cover member to a location proximate the front thereof and intermediate the opposing lateral sides thereof, each adjacent pair of cover members further comprising interengagable means limiting relative movement of said adjacent cover members to a predetermined amount and including an intermediate guide track member and intermediate guide means slidably engageable with said intermediate guide track member, one of said intermediate guide track member and said intermediate guide means being attached to said one adjacent cover member within said trough portion and the other of said intermediate guide track member and said intermediate guide means being attached to the other said adjacent cover member;
a pair of vehicle bed guide track members, one each affixed to said vehicle adjacent and longitudinally parallel to each lateral side of said vehicle bed for guiding said longitudinal movement of said cover members;
at least two support slide assemblies affixed to each said cover member, with one each of said support slide assemblies engaging each said vehicle guide track member to provide sliding support for said longitudinal movement of said cover member;
first releasable latching means affixed to said first cover member for releasably latching said first cover member in a position covering the front end of said vehicle bed, whereby release of said first latching means permits the first cover member to be moved longitudinally of the vehicle along the guide track members to expose the front portion of the vehicle bed; and
second releasable latching means affixed to said second cover member for releasably latching said second cover member in a position covering the rear of said vehicle bed, whereby release of said second latching means permits the second cover member to be moved longitudinally of the vehicle bed along the guide track members to expose the rear portion of the vehicle bed.

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**4,741,571**
**MANUALLY FOLDABLE TOP FOR AUTOMOBILE VEHICLES**
**Robert G. Godette, Adrian, Mich., assignor to Dura Corporation, Adrian, Mich.**
**Filed Dec. 15, 1986, Ser. No. 941,778**
**Int. Cl.[4] B60J** *7/12*
**U.S. Cl. 296—107** **10 Claims**




1. A manually foldable top for automobile vehicles which includes:
means for installing the foldable top on a vehicle body including a spring assembly operatively attached to a side arm assembly for movement of the top from a closed position to an open position;

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means for moving a back window on the top between an open and a closed position, including means for forming a sealed window when the window is in the closed position; the means for moving the back window on the foldable top between the open and closed position including a hinge mechanism having a first end connected to the back window and a second end connected to the foldable top, the hinge mechanism including a mounting bracket connected to an interior portion of the back window and a slotted hinge mechanism operatively connected thereto, the slotted hinge mechanism having a generally arcuate shape and including a generally arcuate slot positioned in the first end of the hinge mechanism adjacent the mounting bracket, the hinge mechanism pivotally connected to the mounting bracket by a nut assembly, the second end of the slotted hinge mechanism operatively attached to a first portion of the foldable top by a pivotally mounted nut and bolt assembly for movement of the back window between the open and closed position;

means for securing the top to the vehicle body when the top is in the closed position, including a linkage and securing assembly which releasably attaches to the vehicle body; and,

means for adjusting the position of the foldable top with respect to the vehicle body during installation of the foldable top on the vehicle body and during the movement of the foldable top between the open and closed positions.

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**4,741,572**

## SLIDING AUTOMOBILE ROOF COVER HAVING A SHALLOW CONSTRUCTION

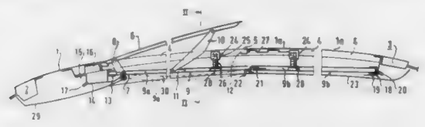
**Karl Bauhof, Weinsberg, Fed. Rep. of Germany, assignor to Karosseriewerke Weinsberg GmbH, Weinsberg, Fed. Rep. of Germany**

**Filed Jul. 11, 1986, Ser. No. 884,763**

**Claims priority, application Fed. Rep. of Germany, Jul. 11, 1985, 3524840**

**Int. Cl.[4] B60J** *7/05*

**U.S. Cl. 296—221** **12 Claims**



1. A sliding roof top assembly having a shallow construction for an automative vehicle, including a vehicle roof having a roof opeing adapted to be sealed by the roof top assembly and a roof frame around the roof opening, the roof top assembly including a cover member mounted in the vehicle roof so as to be slidable in a selected direction and selectively movable from a closed position, sealing the roof opening into an open position uncovering the roof opening and into an upwardly tilted ventilating position above the roof opening, the roof top assembly comprising:

guide rails, each having front and rear portions which are operatively connected to each other for relative angular movement, said front portion being articulated to a front of the roof frame and said rear portion being articulated to a rear of the roof frame;

a lowering device operatively connected between each guide rail and the roof frame for lowering said poritons of each guide rail between the front and rear of the roof frame;

a front sliding block slidably mounted to each guide rail and pivotally connected to the cover member near a front end of the cover member for permitting pivoting of the cover member upwardly into its tilted ventlating position;

a front sliding block slidably mounted to each guide rail;

a support arm pivotally mounted to each rear sliding block, each support arm being articulated to the cover member near a rear end of the cover member; and

said cover member being slidable on said front and rear sliding blocks, along said guide rails, when said guide rails are lowered by said lowering device to bring the cover member into its open position, said lowering device being operable when the cover member is below the roof opening to raise said guide rails for bringing the cover member into its closed position, sealing the roof opening.

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**4,741,573**

## SLIDING ROOF DEVICE

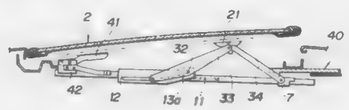
**Chitoshi Yokota, Tokyo, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 8, 1985, Ser. No. 785,476**

**Claims priority, application Japan, Oct. 9, 1984, 59-212260**

**Int. Cl.[4] B60J** *7/05, 7/057*

**U.S. Cl. 296—221** **5 Claims**



1. A sliding roof device (**100**) comprising:

a roof panel (**2**) adapted to open and close a roof opening (**3***a*) defined by an opened part (**3**) of a roof (**1**) and to be selectively movable between a closed position thereof, an open position thereof, and a tilt-up position thereof;

a sunshade (**40**) disposed under said roof panel (**2**) for blocking light coming through said roof opening (**3***a*);

panel transfer means (**11**, **12**, **13***b*, **31**, **33**, **34**, **7**, **21**) for moving said roof panel (**2**) between said closed position and said open position;

panel tilt-up means (**11**, **12**, **13***a*, **32**, **33**, **34**, **7**, **21**) for moving said roof panel (**2**) between said closed position and said tilt-up position;

reversible electric motor means (**51**) for driving said panel transfer means (**11**, **12**, **13***b*, **31**, **33**, **34**, **7**, **21**) and said panel tilt-up means (**11**, **12**, **13***a*, **32**, **33**, **34**, **7**, **21**);

a first operation switch comprising

a first operation switch means (**58***a*, **58***b*) for actuating said motor means (**51**) to thereby have said roof panel (**2**) moved from said closed position to said tilt-up position, and

a second operation switch means (**58***a*, **58***c*) for actuating said motor means (**51**) to thereby have said roof panel (**2**) moved from said closed position to said open position;

a second operation switch (**57**) for manually actuating said motor means (**51**) to thereby have said roof panel (**2**) moved from said open position as well as from said tilt-up position to said closed position;

sunshade position detecting means (**44**) adapted to connect said first operation switch (**58***a*, **58***b*) into actuation of said motor means (**51**) under a condition that said sunshade (**40**) is put in a predetermined open position thereof; and

roof panel sensor switch means in an electrical circuit between the first and second operation switches to deactivate the motor means in the closed position.

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**4,741,574**

## SEAT BELT COVER AND CUSHION

**Judy M. Weightman, and Andrew K. Mirikitani, both of 1717 Mott-Smith Dr., No. 1501, Honolulu, Hi. 96822**

**Filed Jul. 11, 1985, Ser. No. 753,924**

**Int. Cl.[4] B60R** *21/00*

**U.S. Cl. 297—482** **9 Claims**

1. A decorative cover apparatus for an automotive seat belt comprising a single elongated rectangular panel having inner and outer faces and having a decorative outer surface, the panel being flexible and supple, the panel having first and second generally parallel opposite relatively long edge portions and having first and second opposite generally parallel relatively short edge portions respectively connecting complementary end portions of the opposite elongated edge portions, first fastener means extending along and overlying one long edge portion on a first surface of the panel and complementary second fastener means extending along and overlying a long portion of a second opposite surface of the panel, whereby after folding the panel around an automotive seat belt the first and second fastener means are juxtaposed and joined together to hold the fabric panel around the seat belt, wherein the first





and second fastener means respectively comprise complementary microhook and microloop fasteners provided on opposite surfaces of the panel, wherein the first fastener means is positioned directly along one edge portion on the first surface of the panel and wherein the second fastener means is positioned on a longitudinal edge portion spaced slightly inward from the longitudinal edge of a second opposite surface of a panel, whereby after folding the panel around an automotive seat belt, a portion of the longitudinal edge, which extends beyond the second fastener means, also extends beyond a first fastener means in use so as to prevent unwanted contact with the first fastener means, and a plurality of slits provided longitudinally along the panel to facilitate movement of the panel along a seat belt.

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**4,741,575**

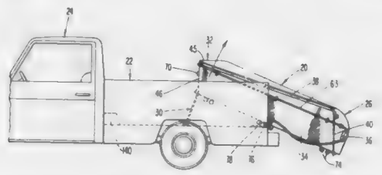
## PNEUMATICALLY ACTUATED DUMPING BIN

**Curtis R. Sloan, 217 North Lehigh Ave., Munhall, Pa. 15121**

**Filed Nov. 26, 1984, Ser. No. 674,911**

**Int. Cl.[4] B60P** *1/32;* **E06B** *7/00*

**U.S. Cl. 298—12** **27 Claims**



27. A bin having a removable gate member, comprising:

a floor portion, a left side wall portion, a right side wall portion, a front wall portion and a rear wall portion, said front wall portion including a gate member selectively removable from said bin with said gate member being pivotably mounted on said side wall portions of said bin at an upper end of said gate member, and including left and right pin members which extend longitudinally from the upper end of said gate member, said left pin member extending beyond the left edge of the gate member and said right pin member exending beyond the right edge of the gate member, said pin members being fixedly mounted on the gate member, said left and right pin members being rotatably received within said left and right sidewall portions of said bin, said gate member being recessed along a portion of one of said left and right edges at one of said pin members whereby said gate member may be urged first toward one of said side wall portions and then toward the other of said side wall portions to disengage said pin members from said sidewall portions of said bin.

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**4,741,576**

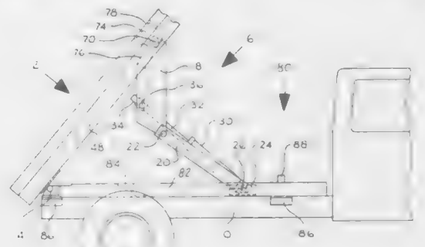
## DUMP HOIST

**Eldon D. Jones, R.R. 2, Lake Crystal, Minn. 56055**

**Continuation-in-part of Ser. No. 571,421, Jan. 17, 1984, abandoned. This application Jun. 13, 1985, Ser. No. 744,367**

**Int. Cl.[4] B60P** *1/20*

**U.S. Cl. 298—22 J** **46 Claims**



29. A hoist mechanism for use in raising and lowering a dump bed pivotally connected to a vehicle chassis at a chassis-to-bed pivotal connection, said hoist mechanism comprising:

a first and a second lifting arm connected at a first pivot point and said lifting arms having a rest position, said first lifting arm having a second pivot point at one end thereof, said first and second pivot points being in substantially the same plane as said chassis-to-bed pivotal connection when the arms are in their rest position,

said second lifting arm having engaging means which includes stop means and is located on one end of the second lifting arm for gradually increasing the effective length of said second lifting arm as said second lifting arm is rotated around said first pivot point from the rest position until said second lifting arm forms a predetermined angle with respect to said first lifting arm; and

an extensible and retractable hydraulic cylinder means for raising and lowering said lifting arms, said hydraulic cylinder means being connected to said second lifting arm;

said hydraulic cylinder means and said engaging means being so arranged that upon initial extension of said cylinder means, said first lifting arm remains stationary relative to said second pivot point in the rest position as said second lifting arm rotates around said first pivot point from the rest position until said second lifting arm reaches said predetermined angle with respect to said first lifting arm;

said stop means being so located that when said second lifting arm reaches said predetermined angle and thereafter as said angle is exceeded said stop means causes said first lifting arm to rotate around said second pivot point upon further extension of said hydraulic cylinder means thereby to increase the rate of lifting of the dump bed relative to the amount of cylinder extension.

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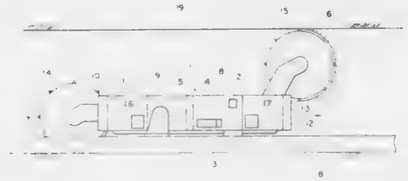


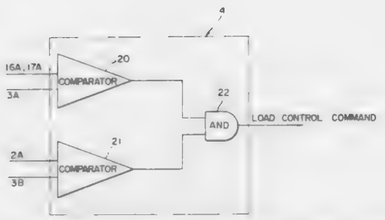
**4,741,577**

## DOUBLE RANGING DRUM CUTTER HAVING LOAD CONTROLLER

**Koji Sato, Chiba; Hiroshi Kuroda, Omuta; Ryuji Yamada, Omuta, and Mamoru Serino, Omuta, all of Japan, assignors to Zaidan Hojin Sekitan Gijutsu Kenkyusho; Mitsui Sekitan Kogyo Kabushiki Kaisha and Kabushiki Kaisha Mitsui Miike Seisakusho, all of Tokyo, Japan**

**Continuation-in-part of Ser. No. 703,268, Feb. 20, 1985, abandoned. This application Sep. 24, 1986, Ser. No. 911,168**
**Claims priority, application Japan, Feb. 24, 1984, 59-32687**
**Int. Cl.[4] E21C** *27/02*
**U.S. Cl. 299—1** **1 Claim**






1. An arrangement used in mining coal using a face conveyer leading to a coal layer, including a double ranging drum cutter for moving along the face conveyor towards the coal layer, comprising in combination:

(a) an elongated body for moving along the face conveyor, said body having a front and rear, also a motor section, at the center of said body;

(b) front and rear cutter drums with adjustable cutter assemblies at the front and rear of said body;

(c) front and rear drum height controllers for controlling the height of the cutter drums;

(d) front and rear cutter assembly vibration measuring means mounted on said body and coupled to said assemblies;

(e) a motor load meauring unit mounted on said body and coupled to the motor section;

(f) running speed controller means on said body;

(g) a load controller including a data setter mounted on said body, said running speed controller means, also the drum height controllers all being connected to said load controller, further, said load controller having input and output sides, the vibration measuring units as well as the motor load measuring unit being connected to said input side, said load controller including first and second comparators, the first comparator having a first signal level comparator for receiving the output from the vibration measuring units, and a data signal from the control data setter and a first time comparator for receiving the output from said first signal level comparator and a first time setting signal, the second comparator having a second level comparator for receiving a signal from the motor load measuring unit and a data signal from the control data setters, and a second time comparator for receiving the output from said second level comparator and a second time setting signal; and a gate connected to the first and second time comparators, said gate providing a command output to the front and rear height controllers and the running speed controller means when an overload is detected.

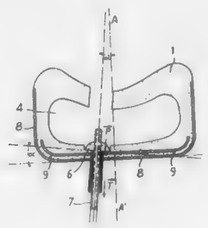
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**4,741,578**

## ASSEMBLY OF COMPOSITE MATERIALS FORMING A SPOKE WHEEL RIM

**Paul-Henri Viellard, 11 rue de Sontay, F-75116, Paris, France**

**PCT No. PCT/FR85/00225, § 371 Date Apr. 21, 1986, § 102(e) Date Apr. 21, 1986, PCT Pub. No. WO86/01463, PCT Pub. Date Mar. 13, 1986**
**PCT Filed Aug. 19, 1985, Ser. No. 862,352**
**Claims priority, application France, Aug. 21, 1984, 84 13024; Aug. 19, 1985, 85 12496**
**Int. Cl.[4] B60B** *5/02*
**U.S. Cl. 301—63 PW** **5 Claims**



1. A spoke wheel rim assembly made of light composite material which comprises:

(a) a rim portion made of carbon fibers embedded in harden resins,

(b) at least a pair of shock resistant layers, one of said layers being embedded within said rim portion and another of said layers on an outer surface of said rim portion,

(c) spokes extending through said rim portion, and

(d) nut heads for tightening said spokes and pressing on said embedded shock resistant layer to pinch the carbon fibers between said layers to provide a good cohesion of the assembly even if the carbon fibers are broken.

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**4,741,579**

## PNEUMATIC DISTRIBUTOR OF THE DUPLEX TYPE FOR MOTOR VEHICLE BRAKING SYSTEMS

**Domenico Angelillo, Sesto San Giovanni, Italy, assignor to Industrie Magneti Marelli S.p.A., Milan, Italy**

**Filed Apr. 2, 1987, Ser. No. 33,377**
**Claims priority, application Italy, Apr. 2, 1986, 67265 A/86**
**Int. Cl.[4] B60T** *15/20*
**U.S. Cl. 303—52** **3 Claims**

1. Pneumatic distributor of the duplex type for motor vehicle braking systems, including a body with first and second inlet connectors for connection to respective pressure sources, and first and second outlet connectors for connection to two separate brake circuits; first and second valves being formed coaxially in the body and arranged to put the first inlet connector, into communication with the first outlet connector and the second inlet connector into communication with the second outlet connector respectively, the valves having a common control device including:

first and second control pistons movable coaxially within the body to control the first and second valves respectively, the first piston being controllable by means of the brake pedal and having an extension which extends through an aperture in the second piston;

first resilient means biassing the second piston towards the position in which it opens the second valve, and

second resilient means cooperating with the extension of the first piston and opposing the action of the first resilient means on the second piston,

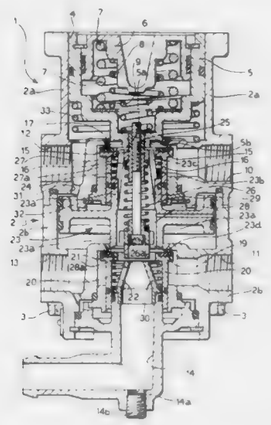


characterised in that the common control device for the valves comprises:

a first reaction member movable along the extension of the first piston and through the aperture in the second piston,

a second reaction member movable along the extension between the first reaction member and end retaining means for the extension;

the second resilient means being located between the reaction members so as to thrust the first and second reaction



members towards the first piston and towards the retaining means respectively;

stop means being provided in the body for stopping the second reaction member relative to the extension of the first piston only when the latter is close to the position in which it causes the opening of the first valve, so that the further movement of the first piston causes the compression of the second resilient means between the reaction members.

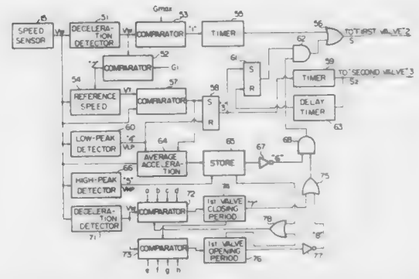
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**4,741,580**

## ANTI-SKID CONTROL SYSTEM FOR MOTOR VEHICLE

**Yuji Matsubara, Kazo; Hiroshi Ikegami, Kuki; Hideo Akima, Yokohama; Akira Hoashi, Kawasaki; Katsuya Miyake, Ageo; Isao Yamaki, Iwatsuki, and Toshifumi Maehara, Saitama, all of Japan, assignors to Akebono Brake Industry Co., Ltd., Tokyo and Fujitsu Limited, Kanagawa, both of, Japan**

**Filed Jul. 30, 1986, Ser. No. 890,611**
**Claims priority, application Japan, Aug. 2, 1985, 60-170913; Dec. 27, 1985, 60-292997**
**Int. Cl.[4] B60T** *8/70, 8/68*
**U.S. Cl. 303—105** **5 Claims**




1. In an anti-skid control system for a motor vehicle, including a brake fluid pressure reduction-control mode and a brake fluid pressure buildup-control mode, each of which occurs cyclically, wherein in said reduction-control mode, reduction of the brake fluid pressure is started on the basis of detection of an abrupt drop in wheel speed which occurs when a wheel of the vehicle is braked; and in said buildup-control mode, valve means is repetitively opened and closed so that brake fluid pressure buildup and holding operations are performed alternately and repetitively, whereby the brake fluid pressure is caused to buildup gradually, the improvement comprising:

means for determining the length of time period for the first one of said pressure buildup operations in said buildup-control mode, on the basis of variation in the wheel speed occurring during a period of time between a low peak point and a high peak point, said period of time being determined in relation to the difference between the wheel speed at a point of time when reduction-control of brake fluid pressure is to be started, and said low peak point;

means for determining a point of time when reduction-control of brake fluid pressure is to be started, on the basis of detection of an abrupt drop in the wheel speed which occurs when the wheel is braked;

means for detecting the wheel speed $V_a$ at said point of time when reduction-control of brake fluid pressure is to be started;

means for detecting a low peak point when the wheel speed is changed from deceleration to acceleration by the reduction-control of brake fluid pressure which is started from said point of time when reduction-control of brake fluid pressure is to be started;

means for detecting the wheel speed $V_{LP}$ at said low peak point;

means for calculating the speed difference A between said wheel speeds $V_a$ and $V_{LP}$;

means for detecting a first point of time when said wheel speed is increased from the speed $V_{LP}$ at the low peak point to a speed $V_b$ which is higher than said speed $V_{LP}$ by a quantity corresponding to $K_1 \times 100\%$ of said speed difference A, where $K_1$ is a preset value that is greater than zero but smaller than unity;

means for detecting a second point of time when the wheel speed is increased from the speed $V_{LP}$ at said low peak point to a speed $V_c$ which is higher than the speed $V_{LP}$ by a quantity corresponding to $K_2 \times 100\%$ of said speed difference A, where $K_2$ is a preset value that is greater than zero but smaller than unity;

means for calculating average acceleration $(V_c - V_b)/\Delta T$, where $\Delta T$ is the time interval from said first point of time to said second point of time; and

means for determining the length of time period $T_x$ for the first pressure build operation in said brake fluid pressure buildup-control mode, on the basis of said average acceleration.

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**4,741,581**

## DEVICE FOR ANTI-LOCK CONTROL AND FOR THRUST CONTROL ON A MOTOR VEHICLE WITH ALL-WHEEL DRIVE

**Hellmut Krohn, Esslingen, Fed. Rep. of Germany, assignor to Daimler-Benz Aktiengesellshaft, Stuttgart, Del.**

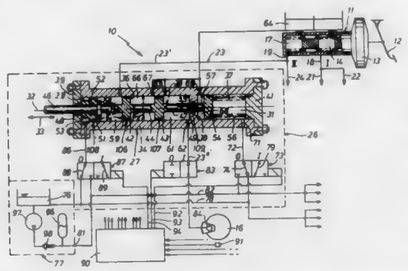
**Filed Sep. 2, 1986, Ser. No. 902,682**
**Claims priority, application Fed. Rep. of Germany, Aug. 31, 1985, 3531157**
**Int. Cl.[4] B60T** *8/42, 13/68*
**U.S. Cl. 303—115** **13 Claims**

1. Device for anti-lock control and for thrust control on a motor vehicle with all-wheel drive, with a multiple-circuit brake system which can be controlled by means of a main cylinder, and in which the brake pressures proportional to the pedal force, which can be fed into the wheel brakes, are provided in outlet-pressure spaces by pressure modulators which are assigned individually to the wheel brakes and which have a control piston, movably limiting the outlet-pressure space, and a drive piston acting on the control piston and, on one side, limiting a drive-pressure space which, for the purpose of thrust

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control, is either connected to a high-pressure outlet or to a resevoir of an operating-pressure source of the thrust-control device by means of a control valve controlled by output signals from an electronic control unit provided for the thrust and anti-lock control, and with brake-pressure regulating valve arrangements of an anti-lock control device, which are assigned to the individual wheel brakes and which, by means of output signals from the electronic control unit, can be switched from a basic position effecting the build-up of brake pressure into pressure-holding and pressure-reduction positions, the electronic control unit generating its output signals from the processing of speed-proportional signals of wheel-spaced sensors assigned individually to the vehicle wheels, said device comprising: said control piston for delimiting the outlet-pressure space of the pressure modulators from a control-pressure space and building up the brake pressure statically; a first drive-pressure space for the thrust control; a second drive-pressure space for the anti-lock control which is connectable as an alternative to said first drive-pressure space to the pressure

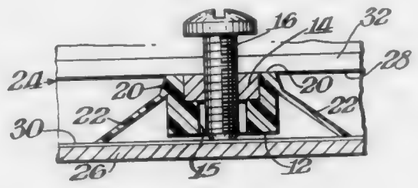


outlet or the reservoir of the operating-pressure source for causing the control piston to effect an increase in the volume of the outlet-pressure space as a result of pressure on said second drive-pressure space; wherein the brake-pressure regulating valve arrangement contains a solenoid valve having a basic position in which it connects the outlet-pressure space to the connected wheel brake, and an energized position in which it prevents this connection, and a second solenoid valve, having a basic position in which the second drive-pressure space is connected to reservoir of the operating-pressure source, and an energized position in which the second drive-pressure space is connected to the operating-pressure source; wherein the outlet-pressure space of the pressure modulator has a fixed housing limitation formed by an intermediate wall of the modulator housing, this intermediate wall being provided with a central bore, through which passes a plunger which projects from the control piston and on which is supported a drive piston displaceable in the second drive-presure space and held up against the piston plunger by means of a prestressed compression spring.

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**4,741,582**
**MOUNTING FASTENER**
**Peter A. Peroni, Pottstown, Pa., assignor to Lafrance Corporation, Philadelphia, Pa.**
**Filed Sep. 30, 1982, Ser. No. 429,466**
**Int. Cl.⁴ B25G *3/00***
**U.S. Cl. 312—257 SK** **10 Claims**

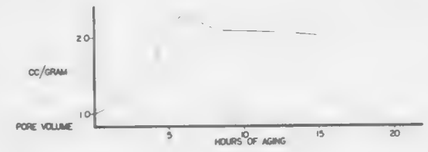
1. A mounting fastener comprising a nut carrier, means on said nut carrier for receiving a nut or the like which is capable of engagement with a fastening element, a wing section extending from opposite sides of said nut carrier outwardly from and below the lower surface of said nut carrier to provide a spring-like engagement with a track into which said nut carrier may slide, said means on said nut carrier including a recess in the upper surface of said nut carrier to form a pocket therein, a free standing threaded nut snugly located in said pocket, said nut carrier being made of a plastic material to facilitate the sliding movement thereof for initially sliding said fastener to the desired location, a threaded fastening element in threaded engagement with said nut, and said nut carrier having a bore coaxial with and of a larger diameter than the threaded open-



ing of said nut whereby said fastening element may penetrate said nut carrier bore without contacting said nut carrier with said nut carrier thereby functioning as a follower when said nut and said fastening element are threaded into a locked position.

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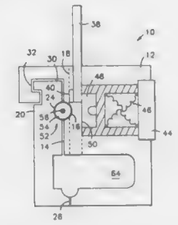
**4,741,583**
**FASTENING DEVICE FOR ADJUSTABLE FRONT PLATES**
**Erich Röck, Höchst, and Klaus Brüstle, Lauterach, both of Austria, assignors to Julius Blum Gesellschaft M.B.H., Höchst, Austria**
**Filed Jan. 30, 1986, Ser. No. 825,558**
**Claims priority, application Austria, Feb. 12, 1985, 399/85**
**Int. Cl.⁴ A47B *88/00***
**U.S. Cl. 312—330 R** **11 Claims**




1. A fastening device for use on each of opposite sides of an extractable furniture part for adjustably mounting a front plate on the extractable furniture part, said fastening device comprising:
- a supporting part to be fixed to a respective side of the extractable furniture part, said supporting part including a vertical fastening flange extending in a direction to be transverse to the front plate when the front plate is mounted and a holding flange extending in a direction transverse to said fastening flange and to be parallel to the front plate when the front plate is mounted, said holding flange having therethrough an opening;
- a holding part to be fixed to the front plate, said holding part having means for engaging upper and lower portions of said supporting part; and
- means for forming a bracing engagement between said supporting part and said holding part or the front plate and thereby for clamping together said supporting and holding parts, said means comprising a clamp member supporting by said fastening flange and extending through said opening in said holding flange, screw means extending through said fastening flange and connected to said clamp member for selectively moving said clamp member toward said fastening flange, and cooperating means provided on said clamp member and said fastening flange for, upon said screw means moving said clamp member toward said fastening flange, also moving said clamp member through said opening in said holding flange into clamping engagement with said holding part or the front plate.



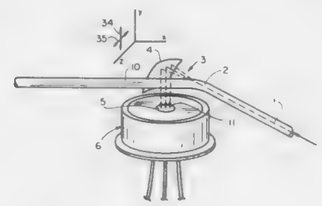
**4,741,584**
**FIBER OPTIC TAP CONNECTOR AND METHOD**
**Eugene A. Segerson, Tempe, Ariz., assignor to Motorola Inc., Schaumburg, Ill.**
**Filed Dec. 29, 1986, Ser. No. 947,231**
**Int. Cl.⁴ G02B *6/42***
**U.S. Cl. 350—96.15** **15 Claims**



1. A fiber optic tap connector comprising:
- a body having a first face including an outwardly facing notch, said outwardly facing notch having an opening into a shear groove;
- a clamp having a first face including an inwardly facing notch, said clamp being connected to said body by hinge means;
- means for locking said clamp in a prearranged relationship to said body wherein said outwardly facing notch of said first face of said body and said inwardly facing notch of said first face of said clamp are opposite each other;
- a shear having an outwardly extending cutting surface tightly fit movably disposed in said shear groove; and
- a retaining plug press fit into a plug opening in said body and which applies constant pressure to said shear by an attached spring means.

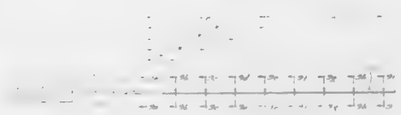
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**4,741,585**
**OPTICAL FIBER TAP UTILIZING REFLECTOR**
**William D. Uken, Fremont, Calif., assignor to Raychem Corporation, Menlo Park, Calif.**
**Filed Feb. 13, 1987, Ser. No. 14,890**
**Int. Cl.⁴ G02B *6/26***
**U.S. Cl. 350—96.15** **17 Claims**



1. A tap for withdrawing light from an intermediate portion of an optical fiber core by passing the light through a side of the optical fiber, comprising:
- a light element having an end surface;
- means for maintaining the intermediate portion of the optical fiber bent and disposed in a plane, the end surface of the light element being completely outside the plane;
- an optical coupler in contact with an outer surface of the optical fiber;
- a light reflector extending traverse to the plane so as to deflect the withdrawn light toward the light element end surface.

**4,741,586**
**DYNAMIC COUPLER USING TWO-MODE OPTICAL WAVEGUIDES**
**Byoung Y. Kim, Menlo Park, and Herbert J. Shaw, Stanford, both of Calif., assignors to The Board of Trustees of the Leland Stanford Junior University, Stanford, Calif.**
**Filed Feb. 20, 1987, Ser. No. 17,762**
**Int. Cl.⁴ G02B *6/26***
**U.S. Cl. 350—96.15** **17 Claims**



1. An optical mode coupling apparatus comprising an optical waveguide which couples an optical signal propagating in the optical waveguide between propagation modes of the waveguide, the optical signal having an optical signal beat length for the modes, the coupling apparatus further comprising a light source for introducing a perturbational light signal into the waveguide, the perturbational signal having an optical wavelength selected such that the perturbational signal propagates in the waveguide in two spatial modes which have different propagation constants so as to cause the perturbational signal to beat in the waveguide in accordance with a perturbational signal beat length and thereby cause the perturbational signal to have an intensity distribution in the waveguide which varies along the length of the waveguide, the perturbational signal having an intensity which is selected to optically perturb the refractive index of the waveguide at intervals defined by the perturbational signal beat length, the optical wavelength of the perturbational signal further selected such that the intervals have a spacing related to the beat length of the optical signal to cause cumulative coupling of said optical signal from one of the propagation modes to another.

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**4,741,587**
**OPTICAL COMMUNICATIONS SYSTEM AND METHOD FOR THE GENERATION OF A SEQUENCE OF OPTICAL PULSES BY MEANS OF INDUCED MODULATIONAL INSTABILITY**
**Jack L. Jewell, Bridgewater; Kuochou Tai, Westfield, and Akira Tomita, New Providence, all of N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.**
**Filed Feb. 20, 1986, Ser. No. 831,175**
**Int. Cl.⁴ G02B *6/26*; G02F *1/00***
**U.S. Cl. 350—96.15** **15 Claims**



1. Method of producing a sequence of optical pulses having nominal carrier frequency $f_0$ and period $\tau_M$ between adjacent pulses, the method comprising
- (a) providing optical radiation;
- (b) coupling, at an input location, the optical radiation into a single mode optical fiber, the optical fiber having anomalous dispersion in a spectral region containing $f_0$, the coupled-in radiation propagating in the optical fiber from the input location to a pulse output location, the length of propagation in the optical fiber to be termed the length of the fiber, and
- (c) coupling the radiation from the optical fiber at the pulse

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output location, the coupled-out radiation comprising the sequence of pulses;

characterized in that

(d) the provided optical radiation comprises first and second cw or quasi cw optical radiation having first frequency $f_1$ and second frequency $f_2$, respectively, with $f_o$ being a frequency between $f_1$, and $f_2$ and $\tau_M^{-1}=|f_1-f_2|$; and

(e) the length of the fiber is such that the width $\tau_p$ of the pulses in the coupled-out radiation is at most $\tau_M/4$.

10. Communications system comprising

(a) means for producing a sequence of optical pulses of nominal carrier frequency $f_o$, the period between adjacent pulses in the sequence of pulses being $\tau_M$;

(b) means for modulating the sequence of pulses in response to a signal;

(c) means for coupling the modulated sequence of pulses into a transmission optical fiber at an input location; and

(d) means for detecting, at an output location spaced apart from the input location, the coupled-in sequence of pulses transmitted through the transmission optical fiber from the input location to the output location;

characterized in that the means for producing a sequence of pulses comprise

(e) means for producing first and second cw or quasi cw optical radiation of frequency $f_1$ and $f_2$, respectively, with $f_o$ being between $f_1$ and $f_2$, and $\tau_M^{-1}=|f_1-f_2|$;

(f) single mode optical fiber having anomalous dispersion in a spectral region containing $f_o$;

(g) means for coupling the first and the second optical radiation into the single mode optical fiber at a first fiber location, the coupled-in radiation to travel through the single mode fiber to a pulse output location; and

(h) means for coupling radiation comprising the sequence of pulses from the single mode optical fiber at the pulse output location.

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**4,741,588**

## OPTICAL MULTIPLEXER AND DEMULTIPLEXER

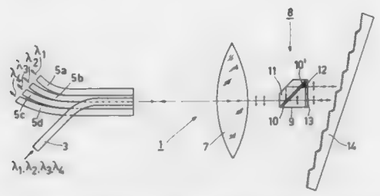
**Antonius J. A. Nicia; Theodorus L. Van Rooy, and Jan Haisma, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Aug. 26, 1982, Ser. No. 411,927**

**Claims priority, application Netherlands, Sep. 7, 1981, 8104123**

**Int. Cl.[4] G02B *6/34*; H04B *9/00***

**U.S. Cl. 350—96.19** **7 Claims**




1. An optical multiplexer and demultiplexer comprising a first optical fiber for transmitting a pluarlity of light signals of different wavelengths, a plurality of further optical fibers each transmitting a different light signal of at least one of said different wavelengths, wavelength-selective means for directing light of said different wavelengths along a plurality of wavelength-dependent paths between said one fiber and said further fibers, each of said further fibers being associated with a respective one of said paths, means for optically coupling said first and further fibers to said wavelength-selective means, and means arranged between said coupling means and said wavelength-seletive means for converting unpolarized light into substantially linearly polarized light so that light incident on said wavelength selective means is linearly polarized, said converting means comprising means for producing from said unpolarized light two beams of linearly polarized light whose polarization directions are perpendicular to one another and an optical member for rotating the polarization direction of one of the beams through an angle of 90°.

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**4,741,589**

## COUPLER FOR OPTICAL WAVEGUIDES

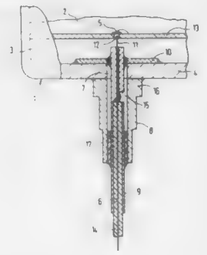
**Ernst Halder, Renningen, and Michael Ulmer, Stuttgart, both of Fed. Rep. of Germany, assignors to Alcatel N.V., Amsterdam, Netherlands**

**Filed Oct. 16, 1984, Ser. No. 661,504**

**Claims priority, application Fed. Rep. of Germany, Oct. 21, 1983, 3338315**

**Int. Cl.[4] G02B *6/36***

**U.S. Cl. 350—96.20** **10 Claims**




1. An optical coupler comprising:

a housing having a wall with an opening therethrough, the opening having a predetermined diameter;

an outer holding sleeve fixedly mounted to an outer surface of said wall such that the interior of the sleeve coincides with the opening in said wall, said outer sleeve having an internal diameter which is substantially the same as said predetermined diameter;

an electrical-to-optical transducer positioned in the housing behind said opening;

a guide sleeve extending through the opening in said housing and through said holding sleeve and having an outer diameter which is smaller than the predetermined diameter in order to form a space between said guide sleeve and the opening in said housing and between said guide sleeve and the interior of said holding sleeve to permit adjustment of said guide sleeve relative to said transducer;

an optical waveguide extending through said guide sleeve and into said housing and having one end which is metalized and is positioned in front of and adjacent to said transducer, said optical waveguide being secured to said guide sleeve in a gas tight manner using a high melting point solder;

a cover plate having an opening therein, the opening having a diameter which is greater than the guide sleeve outer diameter, said plate being positioned on the inner surface of said wall, said cover plate being secured to said guide sleeve and said housing such that the opening in said cover plate is substantially concentric with the outer diameter of said guide sleeve when said one end of said waveguide is optically aligned with said transducer;

wherein said cover plate is soldered to said housing and to the front end of said guide sleeve in a gas-tight manner, and any forces resulting from the cooling of the solder joint at the front end of the guide sleeve act circularly symmetrically and cannot cause any transverse displacement of the guide sleeve and

wherein said holding sleeve is soldered to the rear end of said guide sleeve using a low melting point solder, whereby said rear end of guide sleeve may be soldered to said holding sleeve after the front end of said guide sleeve has already been soldered to said cover plate and said cover plate has already been soldered to said frame, so that any non-circularly symmetric forces resulting from the cooling of the solder joint at the rear end of the guide sleeve have no misadjusting influence on the previously fixed front end of the guide sleeve.



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**4,741,590**

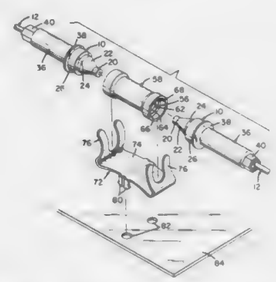
## FIBER OPTIC CONNECTOR

**Bernard G. Caron, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.**

**Division of Ser. No. 810,826, Dec. 18, 1985, which is a continuation of Ser. No. 501,597, Jun. 6, 1983, abandoned, which is a continuation-in-part of Ser. No. 415,123, Sep. 7, 1982. This application Nov. 19, 1986, Ser. No. 932,254**

**Int. Cl.[4] G02B *6/38, 6/36***

**U.S. Cl. 350—96.21** **12 Claims**




1. A fiber optic connector assembly for connecting two fiber optic transmission means together, of the type comprising a rigid housing having a profiled bore extending therethrough, said bore including a central cylindrical bore portion of selected diameter and having other bore portions outwardly therefrom towards each housing end of greater dimension than said selected diameter, and two ferrules of resiliently rigid but deformable material each terminated onto an end of a respective fiber optic transmission means secured in a central both thereof, and a means for securing each ferrule in the housing and urging the ferrules toward and to each other within the housing bore, each said ferrule having a profiled front end including a substantially flat front surface and with the front end of the fiber optic transmission means being coincident with the flat front surface, where the profiled front end of each ferrule is insertable into the profiled bore of the housing from a respective end thereof, each said profiled front end having a front cylindrical section slightly greater in diameter than the diameter of the central cylindrical bore portion along which the profiled front end is disposed so that the central cylindrical bore portion tightly engages the larger diameter front cylindrical sections of both ferrules and reduces both front cylindrical sections in diameter centering end portions of both respective fiber optic transmission means within the bore and axially aligning them, characterized in that:

said housing has a support bore portion spaced axially outwardly from each end of said central cylindrical bore portion a selected distance therefrom and having a selected diameter larger than said selected diameter of said central cylindrical bore portion, said bore having a transition portion between said central cylindrical bore portion and each said support bore portion; and

each said ferrule has an alignment section means located a selected distance axially rearwardly from said front cylindrical section to be disposed along a respective said support bore portion, said alignment section means being slightly larger in dimension than said selected diameter of said respective support bore portion to be tightly and sealingly engaged thereby, said ferrule including a transition section between said front cylindrical section and said alignment section means adapted to be disposed along a corresponding said transition bore portion and substantially unengaged therewith,

each said transition section being approximately as long as the combined axial lengths of said front cylindrical section and said alignment section means, and each said transition bore portion being correspondingly at least as long as said transition section, whereby the total axial length of tight engagement of each said ferrule in said housing is substantially less than the distance from the forwardmost point to the rearwardmost point of tight engagement between said ferrule and said housing,

whereby said central cylindrical bore portion tightly engages each said ferrule at a respective first location and each said support bore portion tightly engages a respective said ferrule at respective second location spaced axially rearwardly from said respective first location, and whereby said housing thus tightly engages each said ferrule at two axially spaced locations axially aligning said ferrules and thereby said respective fiber optic transmission means therewithin and enabling said ferrules to resist lateral forces thereon and maintain said respective fiber optic transmission means therewithin in axial alignment.

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**4,741,591**

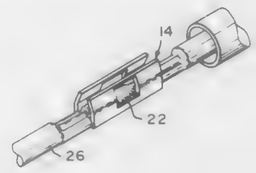
## OPTICAL FIBER CONNECTOR

**Dimitry Grabbe, Middletown; Johannes C. W. Bakermans, Harrisburg, and James D. Kevern, Wellsville, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.**

**Filed Dec. 20, 1984, Ser. No. 683,848**

**Int. Cl.[4] G02B *6/38***

**U.S. Cl. 350—96.21** **32 Claims**




13. A connector for single-mode optical fibers, comprising:

a. an elongated connector member including a base adapted to support a portion of a first optical fiber and a second optical fiber and oppositely disposed shoulder elements projecting upwardly from said base and defining a space therebetween, the optical fibers being aligned such that an end of the first optical fiber is adjacent an end of the second optical fiber,

b. a meltable slug means for encapsulating a portion of said first and second optical fibers on said base, said slug means being characterized by a melting point temperature between 100 degrees Celsius and 1000 degrees Celsius, minimum volume shrinkage upon transition from a melted state to a solid state and high surface tension,

c. whereby positioning said slug means on the intersection of said first and second fibers supported by said base and melting said slug means causes said slug means to flow onto said fibers without migrating into the inersection therebetween, and upon cooling, said slug means solidifies with a minimum volume change thereby avoiding compressive forces on said fibers, and securing the first and second fibers together as well as to the base member.

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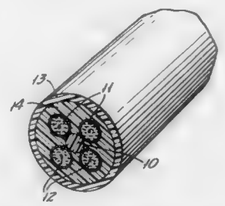


**4,741,592**

## HYDROGEN ABSORBING COMPOSITION FOR OPTICAL FIBER CABLES AND CABLES CONTAINING SUCH COMPOSITION

**Alessandro Secco, Bareggio; Pietro Anelli, and Franco Pasini, both of Milan, all of Italy, assignors to Societa' Cavi Pirelli S.p.A., Milan, Italy**

**Continuation-in-part of Ser. No. 723,901, Apr. 16, 1985, Pat. No. 4,718,747, and Ser. No. 798,598, Nov. 15, 1985, Pat. No. 4,688,889. This application Mar. 31, 1986, Ser. No. 846,576**
**Claims priority, application Italy, Apr. 12, 1985, 20310 A/85**
**Int. Cl.[4] G02B *6/44***
**U.S. Cl. 350—96.23** **28 Claims**




1. A hydrogen absorbing composition for optical fiber cables and their components formed by a mixture which comprises:
an unsaturated polymer selected from the group consisting of:
(a) unsaturated homopolymers obtained through the polymerization of monomers selected from the group consisting of butadiene, pentadiene, methylbutadiene and 2-chlorobutadiene,
(b) unsaturated interpolymers obtained through the polymerization between:
(i) a first monomer selected from the group consisting of butadiene, pentadiene, methylbutadiene and 2-chlorobutadiene, and
(ii) a second monomer selected from the group consisting of styrene, 4-vinylpyridine and acrylonitrile,
and
(c) unsaturated polymers obtained by grafting to the homopolymers of (a) and the interpolymers of (b) monomers containing at least one unsaturated group selected from the group consisting of vinyl, allyl and mixtures thereof,
and a catalyst selected from the group consisting of palladium powder, platinum powder, nickel powder, iron pentacarbonyl copper chromite and mixtures of two or more thereof
whereby when said composition is inside an optical fiber cable or an optical fiber cable component, said composition, at ambient temperature, is able to form a protective barrier for the optical fiber cable or the optical fiber cable component against at least traces of hydrogen by chemically blocking said hydrogen.

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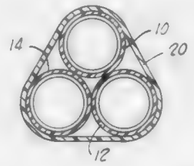
**4,741,593**

## MULTIPLE CHANNEL DUCT MANIFOLD SYSTEM FOR FIBER OPTIC CABLES

**Helmut P. Fochler, Chagrin Falls, Ohio, assignor to TBG Inc., New York, N.Y.**

**Filed Feb. 19, 1986, Ser. No. 830,939**
**Int. Cl.[4] G02B *6/44***
**U.S. Cl. 350—96.23** **2 Claims**

1. A multiple channel duct for optical fiber cable comprising:
a plurality of contiguous, co-directionally extending, substantially parallel sections of elongated, tubular corrugated conduit in abutting contact with each other, each of said sections having a series of encircling contiguous convolutions extending over the length thereof to impart flexibility to the respective elongated conduit sections, said convolutions being made up of contiguous ridges and troughs whereby the frictional resistance to the pulling of optical fibers therethrough is substantially reduced, and the resistance of said sections to longitudinal sliding movement against each other is substantially increased; and
a flexible, synthetic resin overwrap sheath consisting of a sheath of rigid polyvinylchloride having a thickness of about 5 mils to about 15 mils, said sheath of rigid polyvinylchloride encircling and jacketing the corrugated conduit sections over their entire length to retain them in their contiguous relationship, said sheath having sufficient strength and flexibility to permit said conduit sections to undergo flexing without any substantial restriction of, or reduction in, the extent of flexibility of said sections resulting from encircling them with said sheath, and said sheath maintaining its physical integrity without parting or fracturing as said conduit sections undergo bending through a small radius of curvature.



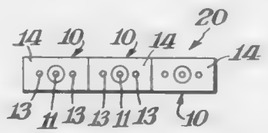

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**4,741,594**

## OPTICAL TRANSMISSON LINE AND MULTICONDUCTOR FLAT CABLE INCORPORATING SAME

**Hirosuke Suzuki, Tokorozawa, Japan, assignor to Junkosha Co., Ltd., Tokyo, Japan**

**Filed Oct. 2, 1984, Ser. No. 656,990**
**Claims priority, application Japan, Oct. 18, 1983, 58-194718**
**Int. Cl.[4] G02B *6/44***
**U.S. Cl. 350—96.23** **9 Claims**




1. An optical signal transmission line comprising an elongate light guide surrounded along its length by a buffer layer of a porous plastic material, and having at least one elongate reinforcing strand positioned externally with respect to said buffer layer in substantially parallel relationship to said light guide, this assembly of light guide, buffer layer and reinforcing strand encased in a resin sheath having a rectangular cross-section, said light guide being positioned at the geometric center of said sheath along the length of said transmission line.

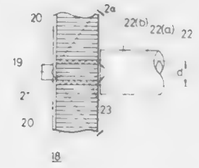


**4,741,595**

## OPTICAL TRANSMISSION DEVICE

**Seiichi Onoda, Tokorozawa; Yasumasa Koakutsu, Fujisawa; Masaaki Kusano; Tamio Takeuchi, both of Yokohama; Syouji Yamada, Aichi; Masao Yano, Yokohama; Ichiro Ikushima, Yokohama; Kiyohide Miyake, Yokohama, and Toshiki P. Tanaka, Oume, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jul. 15, 1985, Ser. No. 754,928**
**Claims priority, application Japan, Jul. 13, 1984, 59-144256; Jul. 18, 1984, 59-147512; Jul. 20, 1984, 59-149465**
**Int. Cl.[4] G02B *6/08***
**U.S. Cl. 350—96.27** **7 Claims**




1. An optical transmission device comprising:
a light source;
an optical transmission path structure comprising a plurality of light transmitting elements disposed in an optical path of transmission light emitted from said light source for receiving the transmission light as incident light having an angle of incidence and for outputting the incident light at an outgoing angle equal to the angle of incidence; and
means for transmitting the light output by said optical transmission path structure;
each of said light transmitting elements of said optical transmission path structure being arranged in parallel with the optical path of the transmission light being disposed such that the distance from the light source to one end face of the optical transmission path structure is the same as the distance from the end face of the means for transmitting to the other end face of the optical transmission path structure.

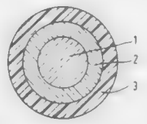
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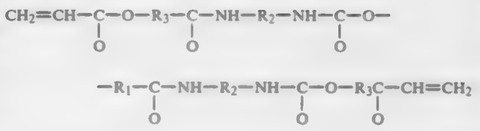
## OPTICAL GLASS FIBRE HAVING A SYNTHETIC RESIN COATING AND METHOD OF MANUFACTURING SAME

**Dirk J. Broer, and Grietje N. Mol, both of Eindhoven, Netherlands, assignors to U.S. Philips Corp., New York, N.Y.**

**Filed May 28, 1985, Ser. No. 737,993**
**Claims priority, application Netherlands, Jun. 22, 1984, 8401981**
**Int. Cl.[4] B32B *9/00*; C03C *25/02*; G02B *6/00***
**U.S. Cl. 350—96.34** **9 Claims**




1. An optical glass fibre having a synthetic resin coating comprising a synthetic rubber formed from a curable synthetic resin composition which consists of a mixture of from 50 to 95% by weight of an oligomer urethane acrylate, from 5 to 50% by weight of at least one monomeric acrylate, from 0 to 20% by weight of one or more monomeric polyfunctional acrylate compounds and from 0 to 10% by weight of an initiator that can be activated by light, the oligomeric urethane acrylate being a polyurethane acrylate having a number-averaged molecular weight in excess of 3000 with the following structural formula:



wherein $R_1$ is a bivalent group selected from the group consisting of polyether chains and polyester chains having a number-averaged molecular weight in excess of 2500, wherein $R_2$ is a bivalent radical of a diisocyanate and wherein $R_3$ is a bivalent radical of an dihydric alcohol, the monomeric acrylates having a single acrylate-ester group per molecule.

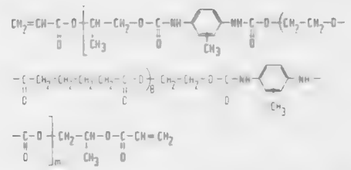
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**4,741,597**

## METHOD OF MANUFACTURING AN OPTICAL FIBRE HAVING A SYNTHETIC RESIN COATING AND OPTICAL FIBRE HAVING A SYNTHETIC RESIN COATING MANUFACTURED ACCORDING TO THE METHOD

**Dirk J. Broer, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Sep. 30, 1985, Ser. No. 781,428**
**Claims priority, application Netherlands, Oct. 18, 1984, 8403179**
**Int. Cl.[4] G02B *1/04***
**U.S. Cl. 350—96.34** **7 Claims**



1. A method of manufacturing an optical fibre having a synthetic resin coating which consists of at least two layers, according to which method the optical fibre is enveloped with two synthetic resin layers immediately after it has been formed, the second synthetic resin layer being formed from a curable synthetic resin composition which is completely cured by exposing it to radiation by electrons or to UV-light radiation, characterized in that the first synthetic resin layer is formed from a molten synthetic resin material which comprises at least two acrylate ester groups per molecule, and in which the second synthetic resin layer is applied after the first layer has cooled and solidified and the two layers are completely cured simultaneously by exposure to radiation by electrons or UV-light.

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**4,741,598**

## FOAM SPONGE TORQUE TRANSMITTING ASSEMBLY

**Gerald L. Goedert, 3337 W. Adams St., St. Charles, Mo. 63301**

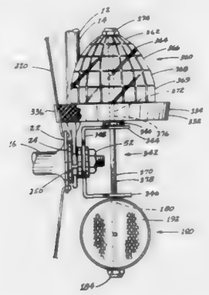
**Filed Jun. 7, 1985, Ser. No. 592,883**
**Int. Cl.[4] G02B *5/12*; B62J *3/00***
**U.S. Cl. 350—99** **16 Claims**

1. A cycle reflector assembly comprising: an integral foam drive member located adjacent to, and in driving engagement

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with the spokes of the cycle; a rotatable, driven reflector located generally adjacent the foam drive member; and drive



means extending from the foam drive member to the reflector whereby the reflector is rotated by the foam drive member.

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**4,741,599**

**DISPLAY INFORMATION EXCHANGE DEVICE FOR AN ELECTROSTATIC DISPLAY APPARATUS**

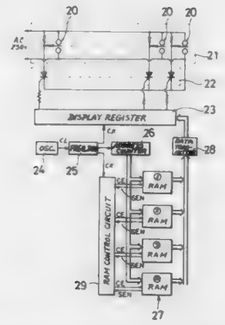
**Hidehiko Togo, and Yoshiaki Azumi, both of Kakogawa, Japan, assignors to Daiwa Shinku Corporation, Hyogo, Japan**

**Filed Feb. 15, 1985, Ser. No. 701,949**

**Claims priority, application Japan, Feb. 17, 1984, 59-29396; Feb. 17, 1984, 59-29397**

**Int. Cl.⁴ G02B *26/02*; G09G *3/34***

**U.S. Cl. 350—269** **2 Claims**




1. A display information exchange device for an electrostatic display apparatus, said device being for exchanging the display information of an electrostatic display apparatus constituted with a plurality of electrostatic display units arranged in the form of a matrix, each of said electrostatic display units consisting of a fixed electrode, an elastic movable electrode held in the vicinity of said fixed electrode, a dielectric layer provided on the surface of either or both of said fixed electrode and said movable electrode, and lead wires for supplying voltage between said fixed electrode and said movable electrode, whereby each of said electrostatic display units is made to have its appearance changed with said voltage supplied because said movable electrode is electrostatically attracted so as to cover the surface of said fixed electrodes, said device comprising:

a display unit driving circuit consisting of a plurality of switching elements each of which switches the voltages to be supplied to each of said electrostatic display units;

a display register consisting of a plurality of shift registers whose output signals control said electrostatic display units by directly operating said switching elements constituting said display unit driving circuit;

a RAM or RAMs separately provided with their respective back-up batteries and separately mounted on their respective separate circuit boards devised so as to be detachably connected to the main circuit portion of said device, said RAM or RAMs storing signals for controlling said display register and display mode instruction code signals; and

a RAM control circuit for controlling said RAM or RAMs according to externally inputted clock signals and said display mode instruction code signals.

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**4,741,600**

**LC MATRIX DISPLAY WITH MEASURING NET**

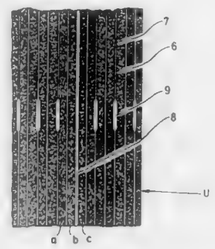
**Janez Pirs; Bojan Marin; Igor Musevic; Silva Pirs, and Andrej Gartner, all of Ljubljana, Yugoslavia, assignors to Iskra-Sozd Elektrokovinske Industrije n.sol.o., Ljubljana, Yugoslavia**

**Continuation-in-part of Ser. No. 648,269, Sep. 7, 1984, abandoned. This application Nov. 5, 1986, Ser. No. 927,035**

**Claims priority, application Yugoslavia, Sep. 9, 1983, 1834/83**

**Int. Cl.⁴ G02F *1/133***

**U.S. Cl. 350—336** **2 Claims**




1. A liquid crystal matrix display with an internal reflector including an upper glass plate, a lower glass plate, a liquid crystal layer with dichroic admixtures in the space between the upper and the lower glass plate, a set of mutually parallel transparent upper electrodes imbedded in an orientation deposit layer on the inner side of the upper glass plate and a set of mutually parallel metal lower electrodes imbedded in an orientation deposit layer on the inner side of the lower glass plate, wherein the upper electrodes are non-parallel with the lower electrodes, the improvement comprising a configuration of the upper and of the lower electrodes such that the width of the interspaces being situated on lines along which marked coordinate axes and lines of a measuring net should appear, is so large that said interspaces, due to the opacity of the LC when the matrix display is activated, become visible, and that the width of all other interspaces between the electrodes is so small that the opaque LC layer along said spaces is not visible.

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**4,741,601**

**NON-LINEAR DEVICE FOR DRIVING LIQUID CRYSTAL DISPLAY**

**Takeshi Saito, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed Oct. 8, 1985, Ser. No. 785,552**

**Claims priority, application Japan, Oct. 8, 1984, 59-210738**

**Int. Cl.⁴ G02F *1/133*; H01L *45/00***

**U.S. Cl. 350—339 R** **5 Claims**

1. A bidirectional switching circuit comprising:

a bidirectional non-linear device having a first amorphous silicon layer, a second amorphous silicon layer, an insulator layer sandwiched between said first and second amorphous silicon layers,

a first electrode connected to said first amorphous silicon layer,

a second electrode connected to said second amorphous silicon layer,

first means coupled between said first electrode and said second electrode for applying a positive voltage of an absolute value of more than about 5 volts therebetween to turn said bidirectional switching device ON and to allow an electric current to flow in a direction from said first electrode to said second electrode, and

second means coupled between said first electrode and said second electrode for applying a negative voltage of an absolute value of more than about 5 volts therebetween to turn said bidirectional switching device ON and to allow an electric current to flow in a direction from said second electrode to said first electrode.

3. A liquid crystal display device comprising:

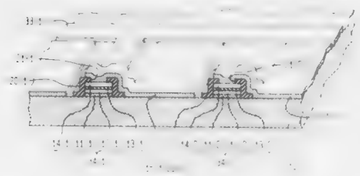
a plurality of row lines,

a plurality of column lines,

a plurality of series connection circuits, said series connection circuits being disposed at the respective intersections of said row and column lines,

a bidirectional switching device in each said series connection circuit, each said bidirectional switching device having a first amorphous silicon layer doped with impurities and electrically connected to one of said row lines, an





insulator layer formed on said first amorphous silicon layer, and a second amorphous silicon layer doped with impurities and formed on said insulator layer, said first amorphous silicon layer having the same conductivity type as that of said second amorphous silicon layer,

a liquid crystal display cell in each said series connection circuit, each said liquid crystal display cell having a first electrode coated thereover with a liquid crystal material and being electrically connected to said second amorphous silicon layer of said bidirectional switching device and having a second electrode formed on said liquid crystal material and being electrically connected to one of said column lines,

means for applying a positive voltage exceeding a threshold voltage of said bidirectional switching device between selected row and column lines to turn selected bidirectional switching devices ON, and

means for applying a negative voltage exceeding said threshold voltage between selected row and column lines to turn selected bidirectional switching devices ON.

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**4,741,602**

**SPATIAL LIGHT MODULATOR**

**Tsutomu Hara, and Yoshiji Suzuki, both of Hamamatsu, Japan, assignors to Hamamatsu Photonics Kabushiki Kaisha, Hamamatsu, Japan**

**Filed Jul. 21, 1986, Ser. No. 887,610**

**Claims priority, application Japan, Aug. 20, 1985, 60-182794; Aug. 20, 1985, 60-182795**

**Int. Cl.⁴ G02F *1/03, 1/05*; G02B *5/30***

**U.S. Cl. 350—356** **2 Claims**

1. A spatial light modulator, comprising:

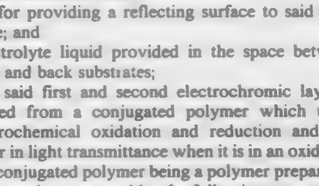
a vacuum envelope;

a source for an electron beam, within said envelope;

a substrate;

an electro-optical crystal having a surface and being disposed on said substrate; said crystal being located to be exposed to the electron beam in said envelope, and having means for storing a charge on said surface and an optical property which corresponds to the amount of the charge stored by said storing means;

an adhesive fixing said crystal onto said substrate, said adhesive having an exposed portion; and




a low vapor pressure material covering said exposed portion of said adhesive, said material forming an overcoat sealing said adhesive.

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**4,741,603**

**ELECTROCHROMIC NONGLARING MIRROR**

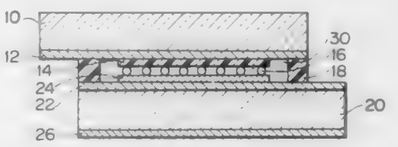
**Harutoshi Miyagi, Yokohama; Masazumi Ishikawa, Yokosuka, and Yasuyuki Murofushi, Yokohama, all of Japan, assignors to Nissan Motor Co., Ltd., Japan**

**Filed May 5, 1986, Ser. No. 859,355**

**Claims priority, application Japan, May 8, 1985, 60-96023**

**Int. Cl.⁴ G02F *1/01***

**U.S. Cl. 350—357** **14 Claims**




1. An electrochromic nonglaring mirror, comprising:

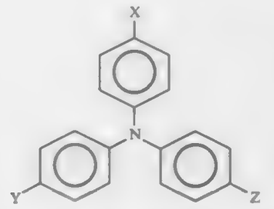
a transparent front substrate which is coated with a transparent first electrode film, and a back substrate which is coated with a second electrode film, said back substrate positioned parallel to said front substrate such that the first and second electrode films are opposite to and spaced from each other;

a first electrochromic layer formed on said first electrode film and a second electrochromic layer formed on said second electrode film;

means for providing a reflecting surface to said back substrate; and

an electrolyte liquid provided in the space between said front and back substrates;

one of said first and second electrochromic layers being formed from a conjugated polymer which undergoes electrochemical oxidation and reduction and becomes lower in light transmittance when it is in an oxidized state, said conjugated polymer being a polymer prepared from a compound represented by the following general formula:




wherein X, Y and Z each represent a hydrogen atom, a

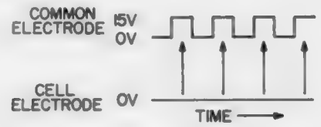
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halogen atom, a hydroxyl group, an alkyl group, an alkoxyl group, an acyl group, an allyl group, a vinyl group or a vinylidene group, the other electrochromic layer being formed of a transition metal oxide which becomes lower in light transmittance when it is in an electrochemically reduced state.

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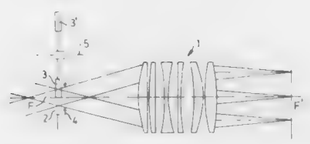
**4,741,604**
**ELECTRODE ARRAYS FOR CELLULAR DISPLAYS**
**Cary D. Kornfeld, 232 Mountain Ave., Murray Hill, N.J. 07974**
**Filed Feb. 1, 1985, Ser. No. 697,344**
**Int. Cl.[4] G02B** *26/02*
**U.S. Cl. 350—362** **4 Claims**




1. A method for driving electrophoretic cellular display device comprising,
applying a periodic voltage signal to a common electrode of an electrophoretic cellular display device, said periodic voltage signal having a low voltage and a high voltage, and
setting each cell electrode of said display device to one of two cell state non-periodic DC voltages, one of said voltages being near the low voltage of said periodic voltage signal, the other of said voltages being near the high voltage of said periodic voltage signal.

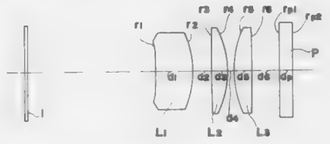
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**4,741,605**
**MULTIFOCAL OBJECTIVE**
**Hans Alfredsson; Bo Möller; Erik Ingelstam; Per-Olof Ohlsson, all of Stockholm, and Georg Vogl, Saltsjöbaden, all of Sweden, assignors to AB Svensk Filmindustri and Svenska Ord AB, both of Stockholm, Sweden**
**PCT No. PCT/SE84/00096, § 371 Date Nov. 29, 1984, § 102(e) Date Nov. 29, 1984, PCT Pub. No. WO84/03952, PCT Pub. Date Oct. 11, 1984**
**PCT Filed Mar. 19, 1984, Ser. No. 680,332**
**Claims priority, application Sweden, Mar. 29, 1983, 8301744**
**Int. Cl.[4] G02B** *15/02, 13/20*
**U.S. Cl. 350—422** **8 Claims**




1. A lens system having an image-forming objective which is capable of forming sharp images of objects at at least two different distances from said objective, a corrective element (3) divided into at least two fields of differing refractive power being arranged at one focal plane (F) of the objective, said corrective element (3) being arranged in the objective focal plane (F) which is located closest to a said object, and an entrance pupil of said objective being located at its forward focus in the direction of said object.

**4,741,606**
**OBJECTIVE LENS SYSTEM FOR OPTICAL RECORDING AND READING DEVICE**
**Sachiko Takamura, Kyoto, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan**
**Filed Aug. 8, 1986, Ser. No. 894,636**
**Claims priority, application Japan, Aug. 19, 1985, 60-182320**
**Int. Cl.[4] G02B** *13/18, 9/12*
**U.S. Cl. 350—432** **3 Claims**




1. An objective lens system for a device for optically recording and reading digital data on an optical disk, comprising from a light source side to a disk side,
a first lens element having a positive refractive power, said first lens element having an aspherical surface on the light source side;
a second lens element having a positive refractive power; and
a third lens element having a positive refractive power, wherein the objective lens system fulfills the following conditions:

$$-0.3<f/r_1<0.25$$

$$|r_4/r_3|<0.5$$

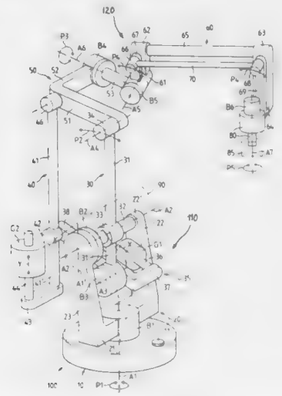
wherein:
f represents the focal length of the whole lens system;
$r_1$ represents the paraxial radius of curvature of the light source side aspherical surface of the first lens element,
$r_3$ represents the radius of curvature of the light source side surface of the second lens element and
$r_4$ represents the radius of curvature of the disk side surface of the second lens element.

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**4,741,607**
**SUPPORTING DEVICE FOR AN OPTICAL OBSERVATION INSTRUMENT**
**Rudolf Heller, Zürich, Switzerland, assignor to Contraves AG, Zürich, Switzerland**
**Filed Mar. 11, 1987, Ser. No. 24,673**
**Claims priority, application Switzerland, Mar. 17, 1986, 01069/86**
**Int. Cl.[4] B02B** *21/00;* **A47G** *29/00*
**U.S. Cl. 350—522** **4 Claims**

1. A supporting device for an optical observation instrument, particularly for a stationary surgical microscope which can be locked with respect to its position and orientation in a predetermined spatial range, comprising:
an upright;
a first pivot system;
said first pivot system being pivotably mounted at said upright;
a second pivot system;
said second pivot system being rotatably and pivotably mounted at said first pivot system;
a predetermined number of adjustable counterweights and a predetermined number of lockable pivot bearings for respectively counterbalancing and locking rotational and pivoting movements of the first pivot system and the second pivot system;
said upright being rotatable about a first substantially vertical axis;
said upright having a substantially U-shaped cross-section and containing two substantially vertical upright side members;
said first pivot system contains a pivot arm pivotable about a predetermined substantially horizontal axis;
said first pivot system further containing a control lever operatively connected to said pivot arm;
said predetermined number of adjustable counterweights comprising a first counterweight;
said pivot arm, said control lever and said first counterweight being arranged intermediate said two substantially vertical upright side members;
said predetermined number of adjustable counterweights comprising a second counterweight;
said first pivot system still further containing a thrust rod for receiving said second counterweight;



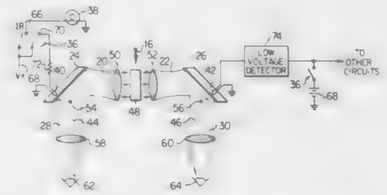


said control lever being operatively connected to said thrust rod;
said pivot arm containing a top portion;
said thrust rod containing a top portion;
said second pivot system containing a substantially L-shaped support arm supporting said second pivot system;
said substantially L-shaped support arm being arranged at said top portion of said pivot arm and at said top portion of said thrust rod;
said first pivot system being lockable with respect to said upright by predeterminate ones of said predetermined number of lockable pivot bearings; and
said second pivot system being lockable with respect to said first pivot system by predeterminate ones of said predetermined number of lockable pivot bearings.

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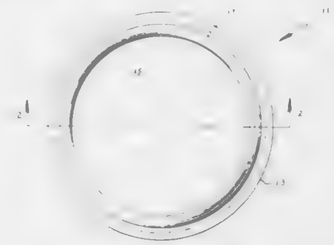
**4,741,608**
**TURNING MIRROR FOR INTEGRATING IMAGE AND LIGHT INDICATOR RAY BUNDLES**
**William A. Kastendieck, Wylie; Paul B. Mattes, and Steve D. Puckett, both of Garland, all of Tex., assignors to Varo, Inc., Garland, Tex.**
**Filed Jun. 9, 1986, Ser. No. 872,274**
**Int. Cl.[4] G02B** *23/10, 27/10*
**U.S. Cl. 350—545** **23 Claims**

1. An optical system for integrating light from a multicolor light source into an optical image path to an eye of an observer, comprising:
a transparent solid having an opaque reflective surface disposed in the optical image path, said solid including a transparent spot formed within said opaque surface;
a focusing element for focusing an image transferred through the optical image path and reflected from said reflected surface, a focal point of said image caused by said focusing element disposed at a location near said spot; and
a multicolor integral light source for transmitting light from within said solid through said spot such that light is emitted colinear with the image reflected from said reflective surface, said light source operable to selectively emit each of a plurality of colors of light to indicate different conditions to the observer.




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**4,741,609**
**STRETCHED MEMBRANE HELIOSTAT WITH INTEGRAL BLADDER**
**Daniel V. Sallis, 5720 Blue Sage Dr., Littleton, Colo. 80123**
**Filed Dec. 12, 1986, Ser. No. 940,915**
**Int. Cl.[4] G02B** *5/08, 7/18*
**U.S. Cl. 350—608** **15 Claims**



1. A stretched membrane heliostat comprisng:
a. a generally circular support frame; and
b. a generally circular membrane having its outermost peripheral portion attached to said support frame, said membrane having a double-walled, generally annular portion near its outer periphery with a sealed space between said double walls defining an inflatable bladder, said bladder having valve means for connecting said bladder to a source of fluid under pressure by which said bladder is presurized so as to induce tension in said membrane while simultaneously compressing said frame.

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**4,741,610**
**OBLIQUE COMPOUND PARABOLIC REFLECTOR**
**Eric Dudley, 8 Victoria Road, Sidcup Kent, United Kingdom (DA15 7HD)**
**Filed Dec. 5, 1986, Ser. No. 938,393**
**Int. Cl.[4] G02B** *17/06;* **F24J** *2/14, 2/18*
**U.S. Cl. 350—619** **7 Claims**

1. A device to focus to a point, or generate from a point, parallel waves, such as solar energy, comprising of two reflectors, each of which is part of a parabolic cylinder, the first reflector reflecting the waves onto the second reflector whose focal length is not greater than the first reflector's, and which is positioned so that its plane of symmetry is perpendicular to both the plane of symmetry and the focal line of the first reflector, so that the second reflector is equidistant from the second reflectors focal line and the plane parrallel to the second reflector's focal line that contains the first reflector's focal line, wherein the improvement comprises the second reflector's

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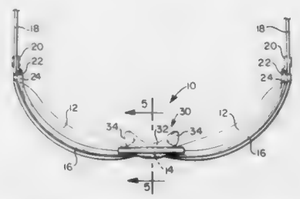
focal line making an acute angle to the plane of symmetry of the first reflector.

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**4,741,611**
**EYEGLASSES ADAPTED FOR SPORTS AND PROTECTIVE USE**

**Dennis L. Burns, Seattle, Wash., assignor to Pro-Tec, Inc., Kent, Wash.**

**Continuation of Ser. No. 247,987, Mar. 26, 1981, abandoned. This application Jan. 27, 1986, Ser. No. 714,906**
**Int. Cl.[4] G02C *7/10***
**U.S. Cl. 351—44** **9 Claims**



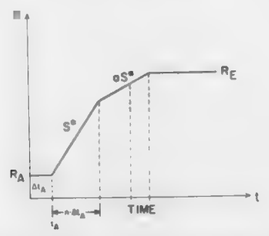

1. Eyeglasses especially adapted for sports use, comprising:
a pair of lenses and a bridge integrally formed with each other, said lenses having a relatively small height, a relatively large width and substantial wrap depth in the horizontal dimension, said lenses further having toric inner and outer surfaces which have radii of curvatures that are selected to provide zero power;
a pair of temples pivotally secured to the outer edges of respective lenses; and
a nosepiece secured to said bridge, said nosepiece having a pair of nose pads adapted to contact and conform to the nose of a wearer.

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**4,741,612**
**DEVICE FOR PERFORMING A PHOTOCOAGULATION OPERATION ON A BIOLOGICAL TISSUE, ESPECIALLY ON THE FUNDUS OF AN EYE**

**Reginald Birngruber, No. 49, Veilchenweg, 8028 Taufkirchen, and Veit-Peter Gabel, No. 8, Peter-Dorfler-Strasse, 8035 Stockdorf, both of Fed. Rep. of Germany**

**Continuation of Ser. No. 630,989, Aug. 24, 1984, abandoned, which is a continuation of Ser. No. 274,096, Jun. 16, 1981, abandoned. This application Jun. 30, 1986, Ser. No. 877,823**
**Claims priority, application Fed. Rep. of Germany, Jun. 27, 1980, 3024169**
**Int. Cl.[4] A61B *3/10, 17/36***
**U.S. Cl. 351—221** **3 Claims**




1. A control system for controlling a source of radiation of a photocoagulation device for photocoagulating biological tissue, said device including means to produce a beam of said source having predetermined spot size, and means for varying exposure parameters of said source including at least one of power regulating means for regulating the power of said source, spot size regulating means for varying the spot size of said beam, exposure time regulating means for varying the exposure time of said source, and wavelength varying means for varying the wavelength of said source, which system comprises:
control means including reflectively sensing means for measuring light reflected from said tissue to sense the level of coagulation of the tissue and means responsive to said reflectivity sensing means for controlling, during the photocoagulation process, at least one of said power regulating means, spot size regulating means, wavelength varying means and exposure time regulating means according to a given relationship, in which, during an initial delay time phase of said relationship, the measured reflected light is substantially constant, which is followed by an initial significant increase in measured reflected light that eventually reaches a saturation level, and wherein said given relationship is dependent on at least one of said delay time, the slope of said increase in measured reflected light, the difference equivalent in measured reflected light between R and $R_A$, and the ration of $R/R_A$, where R is the instantaneous value of measured reflected light along the curve of the increase in measured reflected light and $R_A$ is the measured reflected light during said delay time.

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**4,741,613**
**REDUCED HEIGHT TRANSMISSIVE OVERHEAD PROJECTOR**

**Dennis F. Vanderwerf, Cottage Grove, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Dec. 19, 1986, Ser. No. 944,425**
**Int. Cl.[4] G03B *21/14***
**U.S. Cl. 353—38** **3 Claims**



1. A reduced height transmissive overhead projector comprising:
a light capable of emitting light in a cone;
a projection lens; and
a Fresnel lens assembly of three coaxial annular elements centered over said light source and capable of focusing light emitted from said light source to a focus at said projection lens and having an f-number of less than 0.50 wherein f-number is defined as the reciprocal of the maximum diameter of said Fresnel lens assembly gathering light emitted by said light source divided by the sum of the reciprocal of the distance from the midpoint of said Fresnel lens assembly to said light source and the reciprocal of the distance from said midpoint of said Fresnel lens assembly to said focus at said projection lens, and wherein said Fresnel lens elements are disposed such that the grooved surface of the Fresnel lens element nearest the light source faces away from said light source, the grooved surface of the Fresnel lens element nearest the projection lens faces away from said projection lens, and wherein the grooved surface of the intermediate Fresnel lens element faces away from said light source, wherein the angles of said grooved surfaces are described by the equation:



$$\text{Tangent}(\alpha) = \frac{2YC}{1+\sqrt{1-(K+1)C^2Y^2}} + \frac{(K+1)C^3Y^3}{\sqrt{1-(K+1)C^2Y^2}\,[1+\sqrt{1-(K+1)C^2Y^2}\,]^2} + 4dY^3 + 6eY^5 + 8fY^7 + 10gY^9 \quad (1)$$

where:
Y=distance of groove center to lens center
C=vertex curvature
K=conic constant
d, e, f, g=aspheric deformation coefficients.
and wherein the grooved surface of the Fresnel lens element nearest the light source has the following parameters:
$C=0.014402\ mm^{-1}$
K=−1.09315
d=−2.8876E−8
e=−8.8564E−13
f=1.7153−17
g=−1.934E−23
wherein the grooved surface of the Fresnel lens element nearest the projection lens has the following parameters:
$C=0.005353\ mm^{-1}$
K=−1.05619
d=1.4593E−9
e=−1.9632E−20
g=9.3543E−26
and wherein said grooved surface of said intermediate Fresnel lens has the following parameters:
$C=0.005869\ mm^{-1}$
K=−0.96968
d=2.4298E−9
e=−1.1048E−14
f=3.2017E−20
g=−9.1357E−26.

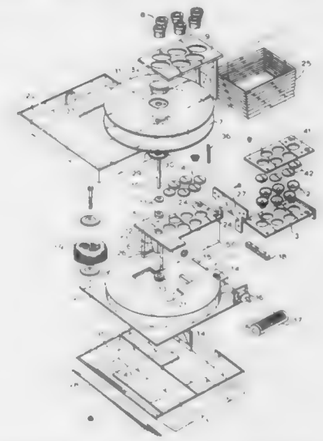
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**4,741,614**
**PROJECTED DEVICE**

**Friedrich-Josef Sacher, Agnesstrasse 52a, D-5210 Troisdorf, Fed. Rep. of Germany**

**PCT No. PCT/EP86/00507, § 371 Date Apr. 28, 1987, § 102(e) Date Apr. 28, 1987, PCT Pub. No. WO87/01471, PCT Pub. Date Mar. 12, 1987**
**PCT Filed Sep. 1, 1986, Ser. No. 45,852**
**Claims priority, application Fed. Rep. of Germany, Sep. 3, 1985, 8525073**
**Int. Cl.[4] G03B *23/10, 23/16***
**U.S. Cl. 353—94** **16 Claims**

1. A projector device, comprising:
a transparency carrier disc (7) having a plurality of sectors and a center, said transparency carrier disc (7) being rotatable about said center and being formed to accomodate plurality of transparencies on said sectors;
a plurality of projectors including a group of at least four lamps (2), a group of at least four condensers (4) and a group of at least four objectives (8);
means for carrying said projectors (2, 4, 8) and including a common lamp carrier (3) on which all of said lamps (2) are arranged, a common condenser carrier plate (5) on which all of said condensers (4) are arranged, and a common objective carrier plate (9) on which all of said objectives (8) are arranged;
a central drive shaft (10) drivably connected to said transparency carrier disc (7);
means for guiding said objective carrier plate (9) and including axially adjustable guide rods (23) secured to said objective carrier plate (9);
shaft bearings (11) arranged around said central drive shaft (10) so as to permit said central drive shaft (10) to be rotatably driven; and
means for obtaining a precise and mechanically resistant bearing system for said central drive shaft (10) and for said guide rods (23) and including a box-like rigid chassis (6) with walls, said condenser carrier plate (5) forming one of said walls of said chassis (6), said lamp carrier (3) being replaceably held in said chassis (6), said walls of said



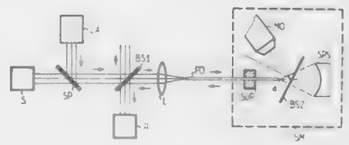
chassis (6) being formed so as to have means for receiving said shaft bearings (11) and for receiving said guide rods (23) and including mutually parallel holes formed in at least one of said walls.

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**4,741,615**
**METHOD AND DEVICE FOR MEASURING COUPLING LOSSES IN SINGLE MODE OPTICAL FIBERS**

**Massimo Calzavara, C. so Peschiera, 142, int. 9; Gianni Coppa, Via Camerana, 4, and Pietro Di Vita, C. so Francia, 357, all of Torino, Italy**

**Filed Jun. 3, 1986, Ser. No. 870,167**
**Claims priority, application Italy, Jul. 22, 1985, 67665 A/85**
**Int. Cl.[4] G01N *21/84***
**U.S. Cl. 356—73.1** **13 Claims**




1. A method of measuring optical coupling losses between single-mode optical fibers, comprising the steps of:
injecting a light beam into one end of a length of a single-mode optical fiber, said beam being transmitted through a core of said length of said single-mode optical fiber and emerging from an opposite end thereof;
centering said opposite end of said core at an optical center of a reflecting system in a reference state of said single-mode optical fiber, and reflecting with said reflecting system an emerging light beam back through said opposite end and through said single-mode optical fiber in a reflected beam which emerges at said one end;
measuring the optical power of said reflected beam as a reference power;
offsetting said opposite end of said core from said optical center of said reflecting system and reflecting with said reflecting system another emerging light beam back through said opposite end and through said single-mode

optical fiber in another reflected beam which emerges at said one end; and

measuring the optical power of said other reflected beam and comparing the measurement thereof with said reference power to determine an optical coupling loss constituting a characterizing parameter of said single-mode optical fiber as a function of the offset.

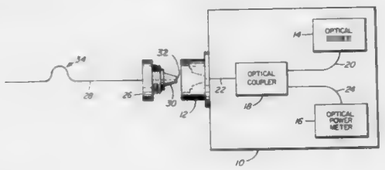
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**4,741,616**

**TEST INSTRUMENT FOR OPTICAL FIBER CONNECTORS**

**Vincent C. Y. So, and Paul J. Vella, both of Edmonton, Canada, assignors to Northern Telecom Limited, Montreal, Canada**

**Filed Jul. 7, 1986, Ser. No. 882,861**
**Int. Cl.⁴ G01N *21/88***
**U.S. Cl. 356—73.1** **8 Claims**




1. A test instrument for testing optical fiber connectors, comprising:

holding means for receiving an optical fiber connector to be tested and for supplying an optical signal thereto;

source means for supplying an optical signal; continuously monitoring means for continuously monitoring an optical signal; and

coupling means for coupling an optical signal supplied by the source means to the holding means and for coupling any reflected optical signal from the holding means to the monitoring means.

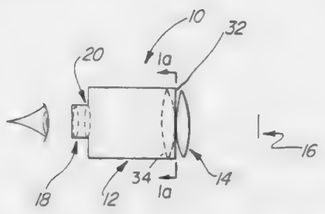
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**4,741,617**

**METHOD AND APPARATUS FOR MEASURING, MAGNIFICATION POWER OF A MAGNIFYING AID**

**Donald J. Strittmatter, Tucson, Ariz., assignor to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Nov. 10, 1986, Ser. No. 929,022**
**Int. Cl.⁴ G01B *9/00***
**U.S. Cl. 356—124** **8 Claims**



1. An optical apparatus, for use in conjunction with a precision scale, for measuring the magnification power of a magnifying aid comprising:

an eyepiece (**18**) which is focusable on a reticle (**20**) positioned in the line of sight of the eyepiece;

an objective lens (**34**) positioned in the line of sight of the apparatus and focused at infinity;

an aperture (**33**) approximately the size of the pupil of the human eye and placed adjacent the objective lens (**34**); and

said reticle having a plurality of division marks (**22**) at least one of which has been calibrated as subtending a measured half-angle from the center of said reticle.

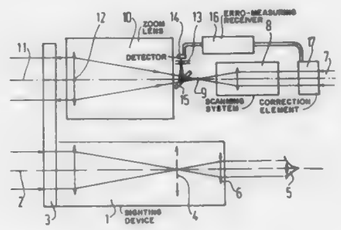
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**4,741,618**

**DEVICE FOR STABILIZING THE AXIS OF A VARIABLE FIELD GUIDANCE SYSTEM WITH RESPECT TO THE AXIS OF A SIGHTING DEVICE**

**Fernand R. Loy, Sceaux, France, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Dec. 9, 1986, Ser. No. 939,586**
**Claims priority, application France, Dec. 13, 1985, 85 18467**
**Int. Cl.⁴ G01B *11/26***
**U.S. Cl. 356—152** **3 Claims**




1. An apparatus for stabilizing the axis of a variable-field guidance system with respect to the axis of a sighting device, said sighting device comprising an objective lens, a reticle and an ocular, and said guidance system comprising an optical-guidance beam transmitter for producing an optical beam, a scanning/coding system for focusing the beam at a guidance field center, and a variable-focus objective lens for producing from the focused beam a collimated beam which is projected parallel to a guidance axis connecting an optical center of the variable-focus lens and the guidance field center;

characterized in that said apparatus comprises:

(a) a plane-parallel plate rigidly attached to the sighting device for establishing a sight axis and for extending through the collimated beam;

(b) means for moving the reticle in a plane defined thereby to establish registration of the reticle and an autocollimated image formed by the plane-parallel plate as observed through the ocular; and

(c) means for correcting for an angular deviation of the guidance axis with respect to a nominal position, comprising:

(1) a partial-transparent plane-parallel plate disposed between the guidance field center and the variable-focus objective lens for directing transversely of the guidance axis radiation from the collimated beam reflected by the plane-parallel plate;

(2) an error-measuring device including an aperture disposed for passing the transversely-directed radiation, a detector arranged behind the aperture for receiving the radiation, and an error-measuring receiver connected to the detector for producing an error signal representing said angular deviation; and

(3) a correction element disposed in the path of the beam for redirecting the beam to relocate the guidance field center such that said angular deviation is corrected.

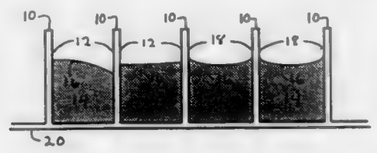


**4,741,619**

**HYDROPHILIC MICROPLATES FOR VERTICAL BEAM PHOTOMETRY**

**Gillian M. K. Humphries, Los Altos, and Viola T. Kung, Menlo Park, both of Calif., assignors to Molecular Devices Corporation, Palo Alto, Calif.**

**Filed May 5, 1987, Ser. No. 47,037**
**Int. Cl.⁴ G01N *21/03***
**U.S. Cl. 356—246** **14 Claims**



8. A microplate for use in vertical beam photometry, wherein the surfaces of the wells of said microplate comprise a hydrophobic plastic treated to increase hydrophilicity beyond that which is present for said hydrophobic plastic when untreated.

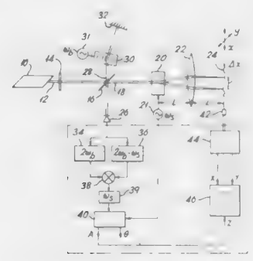
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**4,741,620**

**IRRADIATIVE PROBE SYSTEM**

**Hemantha K. Wickramasinghe, London, England, assignor to National Research Development Corporation, London, England**

**Continuation of Ser. No. 539,408, Oct. 6, 1983, abandoned. This application Jul. 14, 1986, Ser. No. 883,444**
**Claims priority, application United Kingdom, Oct. 8, 1982, 8229834**
**Int. Cl.⁴ G01B *9/02***
**U.S. Cl. 356—349** **14 Claims**



1. A probe system comprising:

irradiating means for irradiating the surface of an object with a focused beam;

deflection means for deflecting said beam in a manner corresponding to periodic motion over a limited region of said surface; and

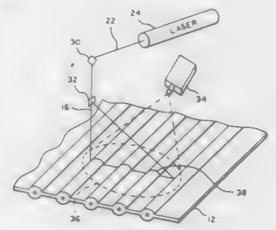
sensing means for deriving an output representative of the value of phase modulation imposed on said beam by virtue of the periodic deflection of said beam causing it to interact with parts of said object exhibiting differences of phase structure, the sensing means being arranged to receive both first signals carrying said phase modulation and second signals representative of the periodic deflection, and arranged to derive said value of phase modulation from the said first and second signals.

**4,741,621**

**GEOMETRIC SURFACE INSPECTION SYSTEM WITH DUAL OVERLAP LIGHT STRIPE GENERATOR**

**Jeffrey D. Taft, Murrysville, and James F. Ellison, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Aug. 18, 1986, Ser. No. 897,473**
**Int. Cl.⁴ G01B *11/24***
**U.S. Cl. 356—376** **15 Claims**




1. A light stripe generator for an irregular surface being examined, comprising:

first light sheet source means for projecting a first light sheet onto the surface as a first stripe; and

second light sheet source means, separate from said first light sheet source means, for projecting a second light sheet onto the surface as a second stripe overlapping the second stripe, the first light sheet being coplanar with the first light sheet.

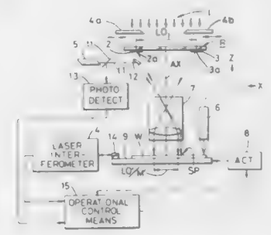
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**4,741,622**

**METHOD AND APPARATUS FOR DETECTING DIVERSION**

**Kyoichi Suwa, Yokohama, and Masaichi Murakami, Tokyo, both of Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan**

**Filed Mar. 3, 1986, Ser. No. 835,526**
**Claims priority, application Japan, Mar. 4, 1985, 60-41187**
**Int. Cl.⁴ G01B *11/27***
**U.S. Cl. 356—401** **20 Claims**




1. A method for detecting a diversion in the registration of a substrate and a mask in an apparatus for aligning said substrate with said mask, said substrate having a first mark means and said mask having a second mark means formed thereon to have a predetermined positional relation with said first mark means when said substrate and said mask are brought into registration with each other, said method comprising the steps of:

forming a photosensitive layer on said substrate so that said first mark means is covered with said photosensitive layer;

projecting, after said registration, an exposure energy beam onto said substrate to be exposed through said mask to form on said photosensitive layer a latent image of said second mark means;

supplying a radiation beam onto said photosensitive layer;

photoelectrically detecting said latent image and said first

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mark means without development of said photosensitive layer; and

detecting the positional relation between said first mark means and said latent image to determine said diversion.

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**4,741,623**

## CASTING SYSTEM FOR THE PROCESSING OF CASTING RESIN

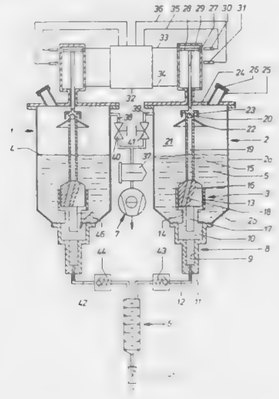
**Erhard Haeuser, Schoeffengrund, and Frank Duchscherer, Aslar-Werdorf, both of Fed. Rep. of Germany, assignors to Wilhelm Hedrich Vakuumanlagen GmbH & Co. KG, Ehringshausen, Fed. Rep. of Germany**

**Filed Jun. 19, 1986, Ser. No. 876,142**

**Claims priority, application Fed. Rep. of Germany, Jun. 27, 1985, 3522922**

**Int. Cl.⁴ B01F** *15/04;* **G05D** *11/00*

**U.S. Cl. 366—160** **17 Claims**



1. A casting system for the processing of casting resin, comprising:

at least two storage containers adapted to hold casting resin components therein;

first pumping means for removing casting resin components from a first of said two storage containers and for conveying of casting resin components to a first discharge opening, and first recirculating means for recirculating casting resin components within said first storage container, said first recirculating means including a first piston, a first piston chamber slidably receiving therein said first piston, and means for facilitating a circulation of said casting resin components within said first storage container in response to a relative movement occurring between said first piston and said first piston chamber, said first pumping means including a second piston affixed to said first piston, and a second piston chamber slidably receiving therein said second piston, said second piston chamber having said first discharge opening therein;

second pumping means for removing casting resin components from a second of said two storage containers and for conveying of casting resin components to a second discharge opening, and second recirculating means for recirculating casting resin components within said second storage container;

pipeline means connected at one end to said second discharge opening and said first discharge opening;

passageway means for admitting casting resin components from said first storage container into at least said second piston chamber when said second piston is removed therefrom so that as said second piston enters said second piston chamber, said casting resin components will be urged through said first discharge opening to said pipeline means;

means defining a mixer connected to the other end of said pipeline means for mixing together said casting resin components from said first and second storage containers; and

drive means connected to said first and second pumping means for effecting a synchronous driving of said first and second pumping means to effect a simultaneous urging of said casting resin components in both of said first and second storage containers to said mixer means through said pipeline means.

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**4,741,624**

## DEVICE FOR PUTTING IN CONTACT FLUIDS APPEARING IN THE FORM OF DIFFERENT PHASES

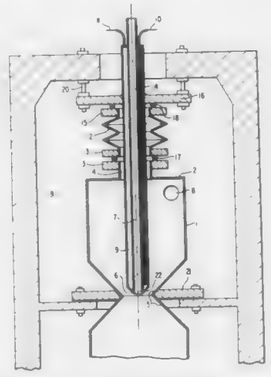
**Bernard Barroyer, Plan D'Orgon, France, assignor to OMYA, S. A., Paris, France**

**Filed Sep. 25, 1986, Ser. No. 911,437**

**Claims priority, application France, Sep. 27, 1985, 85 14566**

**Int. Cl.⁴ B01F** *15/02*

**U.S. Cl. 366—165** **13 Claims**



1. A device for contact mixing a plurality of fluids in different phases, said device comprising:

(a) an outer envelope of revolution having an outer peripheral wall and being provided in its upper part with an upper floor and in its lower part with a convergent-divergent nozzle defining a narrow passage;

(b) means for circulating a hot gas in a helical path in said outer envelope of revolution from above said narrow passage through said narrow passage;

(c) a feed pipe for a second fluid extending into said outer envelope of revolution above said narrow passage, said feed pipe having a mouth located in said narrow passage concentrically to said outer envelope of revolution and spaced inwardly from said outer peripheral wall of said outer envelope of revolution; and

(d) an elastic, fluidtight means able to absorb expansions due to differences of temperature between said feed pipe and said outer envelope of revolution surrounding said feed pipe exteriorally of said outer envelope of revolution.

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**4,741,625**

## FLUENT AND NONFLUENT MATERIAL MIXER

**Benjamin R. Neier, Dodge City, Kans., assignor to Roto-Mix, Inc., Dodge City, Kans.**

**Division of Ser. No. 904,658, Sep. 8, 1986. This application Jun. 5, 1987, Ser. No. 58,384**

**Int. Cl.⁴ B01F** *15/02*

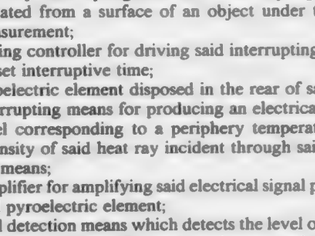
**U.S. Cl. 366—196** **10 Claims**

1. A mixer for fluent and nonfluent material, comprising,

a mixer tank including forward and rearward end walls, a bottom wall and opposite sidewalls,

an auger in said tank extending between said forward and rearward end walls and including flighting for rotation in a direction to move material axially of said auger,

a plurality of paddles circumferentially positioned around said auger adjacent one end of said flighting, said paddles



extending radially and laterally of said auger, each of said paddles having a curved convex forward surface for engaging material in said mixer and moving it laterally of said auger and chamber, and means for rotating said auger.

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**4,741,626**

## PYROELECTRIC THERMAL SENSOR

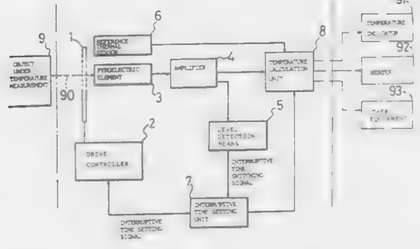
**Kaoru Hashimoto, Toyohashi, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed Nov. 5, 1986, Ser. No. 927,079**

**Claims priority, application Japan, Nov. 11, 1985, 60-252405**

**Int. Cl.⁴ G01J** *5/62*

**U.S. Cl. 374—133** **6 Claims**



1. A pyroelectric thermal sensor comprising:

a heat ray interrupting means for interrupting a heat ray radiated from a surface of an object under temperature measurement;

a driving controller for driving said interrupting means in a preset interruptive time;

a pyroelectric element disposed in the rear of said heat ray interrupting means for producing an electrical signal at a level corresponding to a periphery temperature and an intensity of said heat ray incident through said interrupting means;

an amplifier for amplifying said electrical signal produced by said pyroelectric element;

a level detection means which detects the level of the output signal of said amplifier and produces a switching signal when the level of said output signal has reached a predetermined value;

a reference thermal sensor which produces an electrical signal at a level corresponding to a temperature in the periphery of said pyroelectric element;

a changing means which receives said switching signal for changing the amount of said electrical signal produced by said pyroelectric element to the amplifier; and

a temperature calculation means which calculates the surface temperature of said object from the electrical signals provided by said amplifier and said reference thermal sensor and said switching signal.

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**4,741,627**

## ELECTRONIC THERMOMETER

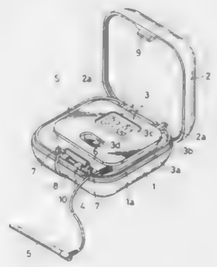
**Ryoichi Fukui, Matsuzaka, and Susumu Minamikawa, Ise, both of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan**

**Filed Dec. 17, 1985, Ser. No. 810,232**

**Claims priority, application Japan, Dec. 18, 1984, 59-267193; Dec. 18, 1984, 59-267194**

**Int. Cl.⁴ G01K** *01/14*

**U.S. Cl. 374—208** **4 Claims**



1. An electronic thermometer, comprising:

a compact-like case;

a cover pivotally connected to a side edge of the case by hinge means;

a thermometer main body fixedly mounted on the inner bottom portion of the case and having a temperature display and a manipulating switch disposed on a top surface, wherein the manipulating switch is a set/reset switch;

a cord extending through a notch in said main body and led outwardly from the thermometer main body even when the cover is closed and accommodated inside a gap formed between the inner wall of the bottom portion of the case, said cord being the thermometer main body;

a temperature sensing probe mounted on the free end of the cord so as to be electrically coupled to an electric/electronic circuit incorporated in the main body; and

a retaining means for releasably securing the temperature sensing probe within the gap of the case.

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**4,741,628**

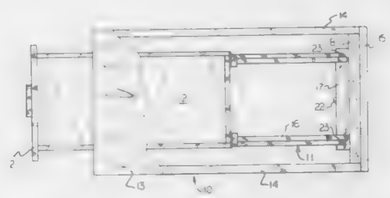
## CABINET AND DRAWER GUIDE ASSEMBLY

**Billy R. Kinley, P.O. Drawer 870, High Point, N.C. 27261**

**Filed Jun. 30, 1986, Ser. No. 879,929**

**Int. Cl.⁴ A47B** *88/00;* **F16C** *23/00*

**U.S. Cl. 384—19** **8 Claims**



5. A cabinet with a movable drawer comprising: a top, a pair of sides, a front, a back, said top, sides, front and back being joined together and having the drawer therein, a drawer guide

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assembly positioned within the cabinet engagable with the drawer, said drawer guide assembly including:

(a) a pair of longitudinal members, and

(b) a transverse member,

said pair of longitudinal members affixed to said front of the cabinet and extending rearwardly, said longitudinal members pivotally attached to said transverse member, a race, said race attached to said back of cabinet, said transverse member slidably positioned to said race whereby said longitudinal members upon lateral movement remain parallel as said transverse member moves within said race.

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**4,741,629**

## GAS BEARING AND BEARING PART AND BEARING MATERIAL SUITABLE FOR SUCH A GAS BEARING

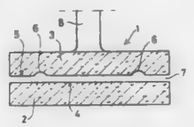
**Carel W. J. Hooykaas, Rotterdam, Netherlands, assignor to Pelt & Hooykaas B.V., Rotterdam, Netherlands**

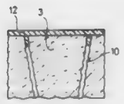
**Filed Sep. 17, 1986, Ser. No. 908,370**

**Claims priority, application Netherlands, Sep. 27, 1985, 8502650**

**Int. Cl.⁴ F16C** *32/06*

**U.S. Cl. 384—121** **7 Claims**





1. A gas bearing comprising:

two relatively movable bearing parts having opposed, spaced apart working faces defining a gap between them,

means for directing a gas into the gap between the working faces,

at least one of the bearing parts being formed of porous granite, and

non-brittle sealant means closing the pores in the bearing part formed of granite, so as to prevent gas leakage through the pores, the sealant means hardening from a liquid state at a temperature below 30° C. in ultraviolet light, and defining a coating layer less than 20 um.

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**4,741,630**

## DEVICE FOR THE LEAKAGE-FREE REMOVAL OF BEARING OIL FROM SLIDING BEARINGS FOR ROTATION SHAFTS OF HIGH-SPEED MACHINES

**Heinrich Oeynhausen, Muelheim, and Ernst Winkelhake, Bochum, both of Fed. Rep. of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mülheim, Fed. Rep. of Germany**

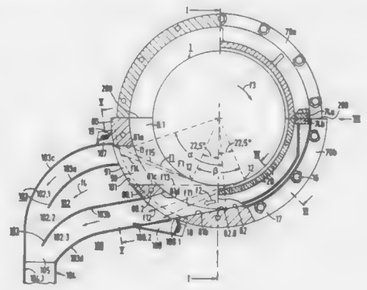
**Continuation of Ser. No. 905,670, Sep. 9, 1986, abandoned. This application May 4, 1987, Ser. No. 48,517**

**Claims priority, application Fed. Rep. of Germany, Sep. 9, 1985, 3532043; Nov. 29, 1985, 3542316**

**Int. Cl.⁴ F16C** *17/02*

**U.S. Cl. 384—144** **9 Claims**

1. Assembly for the leakage-free removal of bearing oil from sliding bearings for rotating shafts of high-speed machines, comprising a shaft with an outer surface rotating in a given direction throwing off an oil spray fan including oil sprays from a downwardly directed portion of said outer surface, a sliding bearing having sides and being axially divided into bearing cups along a parting line and having sliding bearing surfaces supporting said shaft and two bearing end surfaces, contactless shaft seals in the vicinity of said bearing end surfaces preventing escape to the surroundings of bearing oil fed under pressure to said sliding bearing surfaces, an annular oil collecting canal disposed at least at one of said sides of said sliding bearing between one of said shaft seals and one of said bearing end surfaces, said annular oil collecting canal having an outer contour with a geodetically lowest point and an outer peripheral wall having an arcuate cutout formed therein with a slot-shaped opening arc defining an outlet opening through which said annular oil collecting canal discharges an oil flow, said opening arc having an outlet cross section and covering a circumferential angular range of said shaft extending at least



from said geodetically lowest point of said outer contour at most to a position of said outer contour defined by said parting line as seen in said given shaft rotation direction, an oil collecting box having an oil flow space therein and having an inlet opening formed therein matched to said outlet cross section of said opening arc and sealed to said opening arc for receiving oil from said outlet opening, tangentially arched baffles dividing said oil flow space into a plurality of oil flow channels for dividing said oil spray fan and downwardly deflecting said oil sprays thereof, and a common downwardly directed transition piece receiving the oil flow from said oil flow channels.

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**4,741,631**

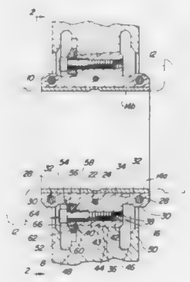
## ROTARY ENGINE INTERMEDIATE HOUSING BEARING SUPPORT ASSEMBLY

**Branko A. Terkovich, Piscataway, N.J., assignor to Deere & Company (John Deere Technologies, Inc.), Moline, Ill.**

**Filed Mar. 20, 1987, Ser. No. 28,506**

**Int. Cl.⁴ F16C** *23/02*

**U.S. Cl. 384—273** **9 Claims**



1. In a multi-unit rotary mechanism having at least two rotors interconnnected by a generally uniform diameter shaft and having a housing with an opening through which the shaft extends, the housing also receiving a bearing support, the bearing support having a central opening for receiving a bearing which slidably engages the shaft, characterized by:

the housing having a frustoconical inner surface surrounding the housing opening;



the bearing support having a frustoconical outer surface for direct engagement with the housing inner surface and having a uniform diameter inner surface for direct engagement with an outer surface of the bearing;

a plurality of bracket members; and

means for fastening the bracket members to the bearing support so that the bracket members engage the housing and hold the housing inner surface in mating engagement with the outer surface of the bearing support.

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**4,741,632**

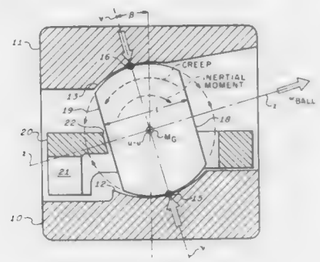
## CONSTANT TORQUE BALL BEARING

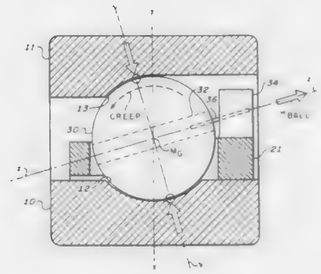
**Peter E. Jacobson, Phoenix, Ariz., assignor to Honeywell Inc., Minneapolis, Minn.**

**Filed Apr. 1, 1986, Ser. No. 847,077**

**Int. Cl.⁴ F16C** *33/32, 33/38, 33/34, 33/52*

**U.S. Cl. 384—491** **3 Claims**




1. In a constant torque ball bearing assembly of the type having an outer bearing ring including an outer bearing race, an inner bearing ring including an inner bearing race, said rings spaced apart and concentricallly disposed on a bearing axis, and a plurality of spaced balls between and in rolling contact with said races, opposing contact surfaces of each of said balls defining an axis of rotation orthogonal thereto, each ball being configured to provide a mass inertia about its respective rotation axis that is greater than that about any other of its axes, said ball configuration comprising first and second planar surfaces, equally truncated on opposite sides of said ball along a common diameter,for providing, in operation, an inertial restoring moment thereby to maintain each of said balls in stable rotation substantially about a preferred rotation axis, the improvement comprising:

ball retaining cage means between said rings, said cage means being generally cylindrical and including a plurality of circular apertures for receiving ones of said balls, having a radially extending ridge acting in cooperation with only one of said first or second planar surfaces of each of said balls for controlling the relative angular positions of said balls for rotation.

2. In a constant torque ball bearing assembly of the type having an outer bearing ring including an outer bearing race, an inner bearing ring including an inner bearing race, said rings spaced apart and concentrically disposed on bearing axis, and a plurality of spaced balls between and in contact with said races, opposing contact surface of each of said balls defining an axis of rotation orthogonal thereto, each ball being configured to provide a mass inertia bout its respective rotation axis that is greater than that about any other of its axes for producing, in operation, an inertial restoring moment thereby to maintain each of said balls in stable rotation substantially about a preferred rotation axis, the improvement wherein:

said balls are in essentially free rolling contact with said races and said ball configuration comprises a cylindrical bore along a diameter thereof, in operation said diamter coinciding with said preferred axis of rotation, and

further comprising a generally cylindrical ball retaining cage between said rings, said cage having a plurality of pins angularly disposed with respect to said bearing axis, ones of said pins aligned to engage ones of said cylindrical bore, for controlling the relative angular positions of said balls along a desired spin axis thereof.

3. In a constant torque ball bearing assembly of the type having an outer bearing ring including an outer bearing race, an inner bearing ring including an inner bearing race, said rings spaced apart and concentrically disposed on a bearing axis,and a plurality of spaced balls between and in essentially free rolling contact with said races, opposing contact surfaces of each of said balls defining an axis or rotation orthogonal thereto, each ball being configured to provide a mass inertia about its respective rotation axis that is greater than that about any other of its axes for producing, in operation, an inertial restoring moment thereby to maintain each of said balls in stable rotation substantially about a preferred rotation axis, the improvement wherein:

said ball configuration comprises two materials of different mass densities comprised of solid matter, one of said materials having a greater density defining at least a portion of an outer surface of said ball, and the other of said materials having a lesser density than said first mentioned material and defining a web-shaped core of said ball along said axis of rotation and a further portion of said outer surface integrally joined with said first mentioned material, in operation said surface of said higher density material defining said opposing contact surfaces.

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**4,741,633**

## IMAGE FORMING APPARATUS

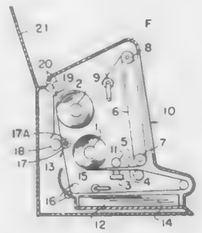
**Kunihiro Shibuya, Kanagawa, and Kunio Hara, Chiba, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Jun. 20, 1985, Ser. No. 746,661**

**Claims priority, application Japan, Jun. 30, 1984, 59-136069**

**Int. Cl.⁴ B41J** *3/46, 3/20*

**U.S. Cl. 400—85** **4 Claims**



1. Apparatus for printing and displaying an image pattern comprising:

a housing;

means for transferring a first pattern of a color agent from a

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medium coated with said agent to a first recording medium leaving a mirror image second pattern on said coated medium;

means for mounting said coated medium and said first recording medium for movement past said transferring means;

a visual display area;

means for separating said coated medium and first recording medium and directing said first recording medium to said display area;

means for transferring said mirror image pattern on said coated medium to a second recording medium to produce a hard copy and

means for directing said coated medium after separation from said first recording means into contact with said second recording means and separating said coating means and second recording means after contact.

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**4,741,634**

## PRINTER WITH VARIABLE HEAD DISPLACEMENT

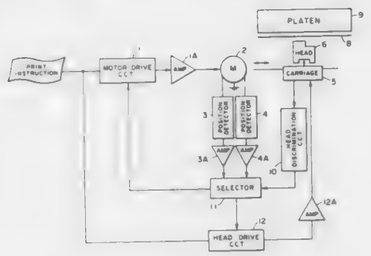
**Mineo Nozaki, Kawasaki; Osamu Asakura, Tokyo, and Masasumi Nagashima, Yokosuka, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 672,867, Nov. 19, 1984, abandoned, which is a continuation of Ser. No. 483,201, Apr. 8, 1983, abandoned, which is a continuation of Ser. No. 266,116, May 21, 1981, abandoned. This application Jun. 9, 1986, Ser. No. 873,294**

**Claims priority, application Japan, May 30, 1980, 60-72510**

**Int. Cl.[4] B41J** *3/20, 19/58*

**U.S. Cl. 400—120** **9 Claims**




1. A printer comprising:

a carriage;

a printing head including conducting means and a plurality of print elements, said conducting means having a plurality of conductors arranged substantially in a plane, and a common connector portion for connecting said conductors to the printer, a first portion of said plurality of conductors modifying a signal applied to said first portion in accordance with a print size printed by said printing head, another portion of said plurality of conductors conveying a drive signal for driving said plurality of print elements;

means for supplying the signal to said printing head;

discriminating means for identifying the print size in accordance with the signal modified by said conducting means; and

drive means, responsive to said discriminating means, for driving said printing head at a rate appropriate to the print size represented by the print signal identified by said discriminating means.

**4,741,635**

## PRINT COMPRESSOR

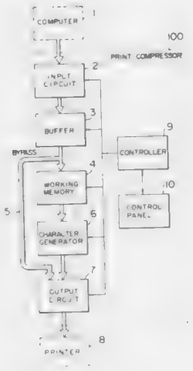
**Yoshimitsu Shibata, Okazaki, and Tadao Nojiri, Obu, both of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan**

**Filed Aug. 4, 1986, Ser. No. 893,085**

**Claims priority, application Japan, Aug. 8, 1985, 60-174693**

**Int. Cl.[4] B41J** *3/02*

**U.S. Cl. 400—121** **8 Claims**




7. A character printing-form compressing apparatus adapted to be connected between a data output equipment which successively generates character data to be printed, and a printer responsive to the character data to print corresponding characters in dot-matrix form, for compressing said character data into a smaller printing space, comprising:

working memory means for storing character data therein in a form having columns and rows;

memory control means for controlling said memory means to store said character data from said data output equipment in a column direction thereof, and controlling said memory means to output data stored therein in a row direction thereof;

character storing means connected to said working memory means for storing at least one compressed inclined character font which is inclined by 90 degrees, and for reading out a character font in said compressed/inclined character font corresponding to each said character data output by said working memory means; and

means, responsive to said character font, to control said printer to print said characters.

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**4,741,636**

## DOT DRIVE CIRCUIT OF WIRE DOT TYPE PRINTER

**Yoshinori Takahashi; Kohtaroh Yoshimura, and Takeo Fujii, all of Tokyo, Japan, assignors to OKI Electric Industry Co., Ltd., Tokyo, Japan**

**Filed Nov. 7, 1986, Ser. No. 927,711**

**Claims priority, application Japan, Nov. 15, 1985, 60-255111**

**Int. Cl.[4] B41J** *9/38*

**U.S. Cl. 400—124** **4 Claims**

1. A dot drive circuit for a wire dot printer adapted to permit respective dot pins of a print head to have different gaps to a platen, said dot drive circuit comprising:

a microprocessor for outputting a dot drive timing signal and a first selection signals;

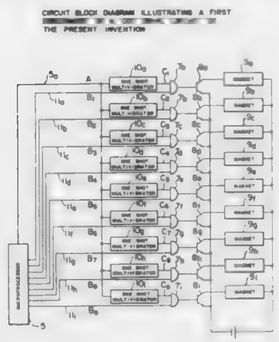
means for setting different dot drive time intervals of said respective dot pins for each dot pin or for each group of dot pins in accordance with the sizes of said gap and for outputting drive pulses having different widths corresponding to the drive time intervals;

gate circuits for receiving said drive pulses;

magnets for printing corresponding to said selection signals



and having a current to be conducted therethrough only during the time of the drive pulses being




output as said microprocessor outputs said selection signals to said gate circuits.

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**4,741,637**

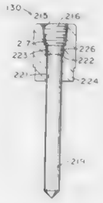
## MARKING PIN FOR PROGRAMMABLE MARKING MACHINE

**Edwin W. Speicher, Pittsburgh, Pa., assignor to M. E. Cunningham Company, Ingomar, Pa.**

**Division of Ser. No. 793,797, Nov. 1, 1985, Pat. No. 4,652,156, which is a division of Ser. No. 642,129, Aug. 17, 1984, Pat. No. 4,591,279. This application Dec. 22, 1986, Ser. No. 945,362**

**Int. Cl.[4] B41J** *3/10*

**U.S. Cl. 400—124** **11 Claims**




1. An impact marking tool comprising,

a pin member,

said pin member having an elongated body portion with a striking end portion and an opposite end portion, said pin member opposite end portion having a shoulder portion perpendicular to said elongated body portion,

a bushing having a generally cylindrical configuration, said bushing including a first threaded bore extending a first preselected distance into said bushing, a second bore extending a second preselected distance from said first threaded bore and having a diameter smaller than a diameter of said first threaded bore, and a third bore extending a third preselected distance from said second bore, said third bore having a diameter smaller than said diameter of said second bore, said first, second and third bores arranged to receive a portion of said pin member,

said bushing second and third bores arranged to form a bushing shoulder portion perpendicular to said second and third bores for supporting said pin member opposite end portion shoulder portion,

said bushing shoulder portion being positioned at a preselected location within said bushing to position said pin member striking end portion a preselected distance from said bushing, and

means engaging said first threaded bore for releasably connecting said bushing to said pin member opposite end portion.

**4,741,638**

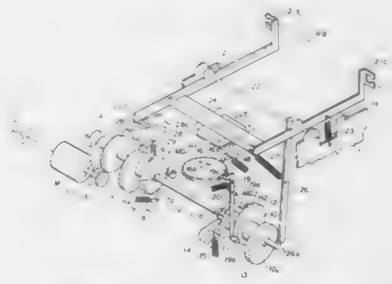
## INK RIBBON FEEDING AND LIFTING DEVICE OPERATED BY A SINGLE REVERSIBLE MOTOR

**Mitumasa Okabayashi, and Norio Shiga, both of Tokyo, Japan, assignors to Tokyo Juki Industrial Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 599,991, Apr. 13, 1984, abandoned. This application Nov. 12, 1986, Ser. No. 930,074**

**Int. Cl.[4] B41J** *23/34*

**U.S. Cl. 400—185** **10 Claims**



1. An apparatus for use in association with a print ribbon in a printer, said apparatus comprising ribbon guide means for engaging the ribbon and movable between a first position in which said guide means holds the ribbon in a print position and a second position in which said guide means holds the ribbon in a retracted position offset from the print position, a rotatable drive member, reversible motor means connected with said drive member for rotating said drive member in first and second directions, first cam means rotatable with said drive member in the first direction to effect movement of said ribbon guide means from said first position to said second position, second cam means rotatable with said drive member in the second direction to effect movement of said ribbon guide means from said second position to said first position, first retaining means for preventing rotation of said first cam means with said drive member during rotation of said drive member in the second direction, and second retaining means for preventing rotation of said second cam means with said drive member during rotation of said drive member in the first direction.

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**4,741,639**

## CARTRIDGE FOR AN INKED RIBBON WITH A RE-INKING PAD

**Bruno Fausto, and Walter Trimboli, both of Turin, Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy**

**Filed Feb. 9, 1987, Ser. No. 12,141**

**Claims priority, application Italy, Mar. 10, 1986, 53087/86[U]**

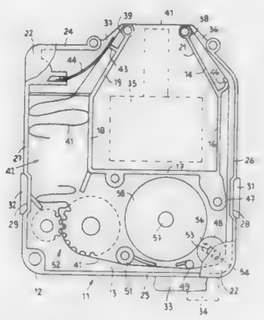
**Int. Cl.[4] B41J** *27/12*

**U.S. Cl. 400—196.1** **1 Claim**

1. A cartridge for an inked ribbon comprising a casing having a bottom, a cover and a magazine; an inked ribbon of closed loop type housed in the magazine; wherein the inked ribbon is disposed in randomly distributed turns; a pair of rollers for the feed movement of said inked ribbon; a re-inking pad rotatably supported about an axis; an ink distribution roller movable with respect to said re-inking pad and which contacts both the re-inking pad and the inked ribbon for re-inking said inked ribbon; and means for enabling the tension of the inked ribbon to automatically regulate the contact pressure of the distribution roller against the re-inking pad to optimize re-inking of the inked ribbon, said means comprising:

the bottom of said casing and the cover of said casing each having a slot of rectilinear configuration, said slots being parallel to each other and radially disposed with respect to said axis;

the ink distribution roller comprising a cylindrical surface extending between two ends and a pivot pin extending axially of said ink distribution roller and having an end projecting from housed and guided by said slots;
said pivot pin being parallel to said axis, said ink distribution



roller being rotated by said ribbon responsive to said ribbon being fed through said magazine by said pair or rollers, said slots permitting said pivot pin to slide in a plane passing through said axis to regulate the contact pressure of the distribution roller against said reinking pad.

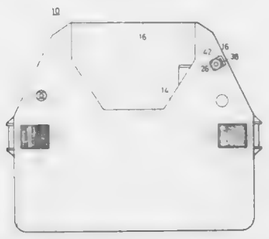
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**4,741,640**

## INK RIBBON CARTRIDGE OF A PRINTING MACHINE

**Satoru Yoshioka, Kamakura, Japan, assignor to Ricoh Company Ltd., Japan**

**Continuation of Ser. No. 450,262, Dec. 16, 1982, abandoned. This application Nov. 20, 1986, Ser. No. 933,305**
**Claims priority, application Japan, Dec. 16, 1981, 56-187623[U]**
**Int. Cl.⁴ B41J** *32/02, 32/28*
**U.S. Cl. 400—208** **9 Claims**



1. An ink ribbon cartridge comprising:
a case including top, bottom and side walls to define a storing space for storing therein ink ribbon said case being provided with supply and take-up ports spaced apart from each other;
ribbon-moving means for moving said ink ribbon out of said space through said supply port and again into said space through said take-up port when driven externally; and
tension-imparting means for imparting a tension to said ink ribbon when said ink ribbon is pulled toward said take-up port through said supply port by said ribbon-moving means, said tension-imparting means including a guide post provided in an ink ribbon guide passage leading to said supply port and integrally formed with said bottom wall with its upper portion extending into a first hole formed in said top wall thereby guiding movement of said ink ribbon partly around said guide post between surfaces of said top and bottom walls, said first hole being substantially larger than said guide post thereby providing a gap between said upper portion and at least part of the periphery of said hole, and urging means held to said case for urging said ink ribbon against said guide post with said ink ribbon sandwiched therebetween wherein said urging means includes a leaf spring having a forward end portion pressed against said guide post, said forward end portion being provided with at least an upper extending side projection which is received in said first hole of said top wall so as to extend beyond the surface of the top wall along with said upper portion of said guide post.

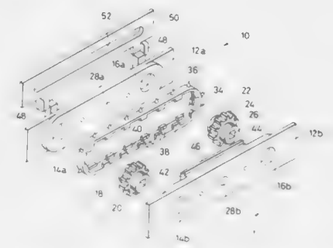
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**4,741,641**

## TRACTOR HAVING AN ENDLESS BELT WITH DRIVING PINS

**Susumu Kuzuya, Gifu; Akira Asai, Nagoye; Yoshiyuki Karube, Nagoye; Yoshikatsu Hirata, and Tetsuro Ueno, both of Toyoake, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Japan**

**Filed Feb. 27, 1987, Ser. No. 19,739**
**Claims priority, application Japan, Feb. 27, 1986, 61-28411[U]**
**Int. Cl.⁴ B41J** *11/26*
**U.S. Cl. 400—616.2** **6 Claims**



1. A tractor having an endless belt with driving pins, which feeds a document, having two rows of perforation, in a given direction comprising:
a pair of pulleys spaced-apart in the feeding direction of the document;
a pair of frames extending in the feeding direction of the document, each frame having a pair of pulley-supporting portions spaced in the feeding direction of the document for rotatably supporting the pair of pulleys;
an endless belt linking the pair of supported pulleys, the belt having an inner surface and an outer feeding surface, a plurality of pins arranged on the outer feeding surface thereof at regular intervals, a plurality of teeth provided on the inner surface thereof which engage with said pair of pulleys, wherein all of the teeth on the endless belt have a width smaller than half the width of the belt and are formed along both lateral side portions of the belt, so that the central portion, viewed in the lateral direction of the belt, is free of teeth, and an engaging portion formed along the endless belt on the inner surface thereof; and
a guide member provided between said pair of supported pulleys for limiting the endless belt to prevent slack in the endless belt, the guide member including a portion to be engaged for limiting the running locus of the endless belt so as not to cause the endless belt to deviate from the feeding direction of the document, said guide member portion to be engaged being engaged with said endless belt engaging portion between said pulleys.

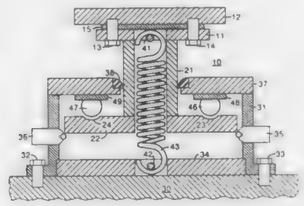


**4,741,642**

## SAFETY JOINT FOR ROBOTIC ARM

**Richard J. Carlton, Santa Clara, Calif., assignor to Phase 2 Automation, Sunnyvale, Calif.**

**Filed Nov. 19, 1986, Ser. No. 932,234**
**Int. Cl.⁴ F16B** *7/06;* **B25J** *19/00*
**U.S. Cl. 403—59** **7 Claims**



1. A mechanical joint comprising:
a cylindrical member having a cylindrical sidewall and upper and lower walls which define a chamber therein;
A platform moveable and rotatable within said chamber, said platform defining at least one socket on an upper surface thereof;
ball means attached to the upper wall and extending into said chamber for engaging said socket;
resilient means connected between said cylindrical member and said platform for urging said platform away from said upper wall; and
a plurality of ball plungers extending through the sidewall of said cylindrical member for retaining said platform member within said cylindrical member.

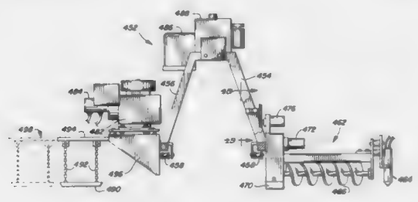
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**4,741,643**

## LATERALLY TRANSLATABLE, CARRIAGE-MOUNTED, CONCRETE FINISHING APPARATUS

**J. Dewayne Allen, Paragould, Ark., assignor to Allen Engineering Corporation, Euless, Tex.**

**Continuation-in-part of Ser. No. 704,339, Feb. 22, 1985, Pat. No. 4,648,741, which is a continuation-in-part of Ser. No. 632,398, Jul. 19, 1984, abandoned, which is a continuation of Ser. No. 598,662, Apr. 10, 1984, abandoned, which is a continuation of Ser. No. 457,727, Jan. 13, 1983, Pat. No. 4,466,757. This application Dec. 24, 1986, Ser. No. 946,422**
**The portion of the term of this patent subsequent to Aug. 21, 2001, has been disclaimed.**
**Int. Cl.⁴ E01C** *19/30*
**U.S. Cl. 404—114** **28 Claims**



1. Apparatus for finishing the irregular surface of an area of plastic concrete lying between first and second laterally spaced apart guide tracks, said apparatus comprising:
a. a supporting frame having first and second laterally spaced apart end sections for engaging said first and second guide tracks and for advancing said apparatus along the length of said area, said frame including a laterally oriented support element extending between said first and second end sections;
b. carriage means laterally translatable along the length of said support element and having front and rear legs straddling said support element, said carriage means including
i. concrete finishing means coupled to the front leg of said carriage means for engaging and finishing the plastic concrete in front of said support element;
ii. power means coupled to the rear leg of said carriage means and interconnected with said concrete finishing means by power transmission means for energizing said concrete finishing means;
iii. carriage suspension means for movably supporting said carriage means on said support element and for enabling said carriage means to be laterally translated back and forth along the length of said support element; and
iv. carriage drive means coupled to said supporting frame and to said carriage means for translating said carriage means back and forth along said support member.

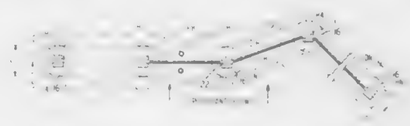
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**4,741,644**

## ENVIRONMENTAL CUT-OFF AND DRAIN

**Nicholas J. Cavalli, Yonkers, N.Y., and Giosue Miotti, Carpendo, Italy, assignors to Finic, B.V., Rotterdam, Netherlands**

**Filed Apr. 11, 1985, Ser. No. 721,982**
**Int. Cl.⁴ E02B** *11/00;* **E02D** *29/00*
**U.S. Cl. 405—50** **11 Claims**



1. A method of constructing an underground drain barrier comprising,
excavating a pair of spaced apart bore holes,
positioning a coupling member in each bore hole, respectively, each coupling member having at least one locking keyway slot formed in an end thereof, each locking keyway having a removable cement stop member therein,
casting in each said bore holes around said coupling member, and allowing said cementious filling to set,
excavating, in the presence of liquid excavating slurry, the earth between said bore holes including the cementious filling between facing locking keyway slots,
removing said removable cement stop members,
positioning a plastic drain barrier in the space between said spaced apart bore holes, including sliding a pair of spaced apart hollow tubular members, perforated at least on the lower most surfaces thereof in said facing locking keyway slots, respectively,
said plastic drain barrier also including a sheath constituted by a pair of plastic films sandwiching a drain mesh net therebetween,
at least all underground edges of said plastic film being sealed to form a sheath.

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**4,741,645**

## CONTINUOUS GUTTER LINING

**Richard W. Butler, 3702 E. 100 North, Marion, Ind. 46952**

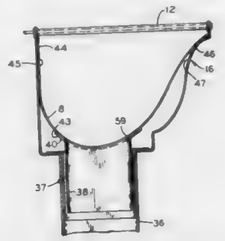
**Filed Feb. 17, 1987, Ser. No. 15,429**
**Int. Cl.⁴ E04D** *13/06;* **E02B** *5/02*
**U.S. Cl. 405—118** **18 Claims**

5. An apparatus for lining a gutter having a downspout and horizontal support members, comprising:
a strip of waterproof, normally flat, resilient material of substantially uniform cross section having a drain hole therein;
said strip being resiliently deformed out of its flat shape to a U-shaped transverse cross-section and being located within said gutter beneath said horizontal support members;
said strip having a width dimension sufficient to traverse a cross-section of said gutter underneath said horizontal

members having a first edge of said strip contacting a back wall of said gutter, a second edge of said strip contacting a front wall of said gutter and forming a U-shaped cross section; and

said drain hole being located above said gutter downspout to facilitate draining.

17. A method for installing a gutter liner apparatus into gutters having a front sidewall, a rear sidewall, a left end, a right end, and a downspout, and said gutter supported by horizontal members, comprising the steps of:



inserting a first end of a continuous flat strip of waterproof, resilient material beneath said horizontal support members at a first end of said gutter, deforming said flat strip to a generally U-shape under the influence of the side walls of said gutter;

sliding said first end of said strip to a second end of said gutter beneath said horizontal members; and

making an incision in said strip in the region above said downspout forming a drain hole opening communicating with said downspout.

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**4,741,646**

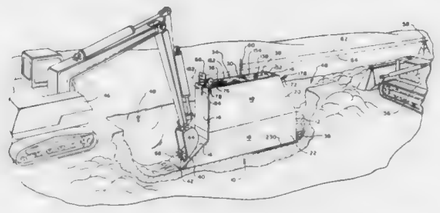
**MACHINE FOR LAYING CONDUCT AND METHODS FOR USE THEREOF**

**G. Brent Hatch, Box 96, 2661 S. Hwy. 23, Mendon, Utah 84325**

**Continuation-in-part of Ser. No. 729,566, May 2, 1985. This application Jun. 20, 1986, Ser. No. 876,802**

**Int. Cl.[4] F16L** *1/02;* **E02F** *5/02;* **E03F** *3/06*

**U.S. Cl. 405—175** **62 Claims**



1. An apparatus for laying conduit within a trench comprising:

a boxlike structure having end walls and side walls;

a conduit laying compartment disposed within said boxlike structure, said conduit laying compartment comprising means for receiving said conduit and means for lowering said conduit to the bottom of said boxlike structure, and for discharging said conduit onto the bottom of said trench;

drawing means connected to the leading end of said boxlike structure for grasping and advancing said boxlike structure along the bottom of the trench;

grade detection means for detecting when the bottom of the trench is at the desired grade and for generating a signal indicating when the bottom of the trench is offgrade; and

adjustable blade means, positioned at a leading end of said boxlike structure, for grading and maintaining the bottom of the trench at a desired grade as said boxlike structure is drawn through the trench, said blade means comprising positioning means, connected to said grade detection means, for automatically adjusting said blade means in response to the signal generated by said grade detection means such that when the bottom of the trench is detected as being off-grade said positioning means will automatically reposition said adjustable blade means independent of said drawing means so as to achieve the desired grade as said boxlike structure is moved through the trench.

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**4,741,647**

**GUIDE TUBE FOR A FLEXIBLE UPRIGHT RISER FOR MARINE PETROLEUM EXPLOITATION**

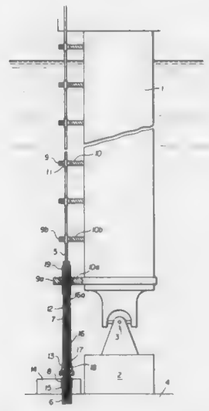
**Christian Dumazy, Bizanos; Francois Baduel, Tarbes, and Jean-Paul Sarrailh, Pau, all of France, assignors to Societe Nationale Elf Aquitaine (Production), Courbevoie, France**

**Filed Jun. 9, 1986, Ser. No. 871,914**

**Claims priority, application France, Jun. 10, 1985, 85 08724**

**Int. Cl.[4] E02B** *17/00*

**U.S. Cl. 405—202** **5 Claims**



1. A stress-limiting device for at least one riser, which is an extension of a pipe rigidly attached to a base plate, whereby said riser is positioned in a set of guides, and the lower part of said riser is flexible; comprising:

a base structure positioned adjacent the base plate;

an elastic guide tube element the lower part of which includes means for providing substantial rigidity, wherein said guide tube is affixed to said base structure, and extends through at least a lower guide of said set of guides rigidly attached to the articulated structure, whereby said guide tube is disposed exteriorly of and coaxially to the riser;

a plurality of supports mounted on said articulated structure and connected to said guides, respectively, wherein said riser is aligned with said guide tube by means of said plurality of supports; and

a fitted bushing positioned in the lower, rigid part of said guide tube and through which said riser extends.



**4,741,648**

**OFFSHORE PLATFORM STRUCTURE HAVING AT LEAST A SUPERSTRUCTURE AND A SUBSTRUCTURE MADE OF REINFORCED CONCRETE, AND SLIPFORMING MEANS FOR SLIPFORMING SUPPORTING COLUMNS OF SUCH STRUCTURE**

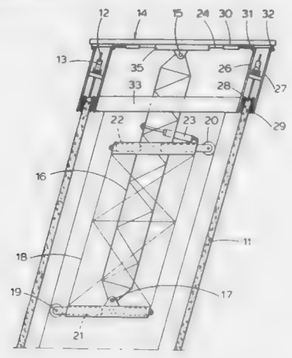
**Tomas Einstab'and, Asker, and Torlak Opedal, Hosle, both of Norway, assignors to Ingenior F. Selmer A/S, Oslo, Norway**

**Division of Ser. No. 619,151, Jun. 5, 1984, Pat. No. 4,688,967. This application Aug. 12, 1987, Ser. No. 46,135**

**Claims priority, application Norway, Oct. 21, 1982, 823503**

**Int. Cl.[4] E02D** *5/40;* **E04G** *11/22*

**U.S. Cl. 405—223** **1 Claim**



1. Slipforming means intended for slipforming of inclined hollow columns of reinforced concrete, comprising a slipform platform including a slipform which is supported by and may be lifted or lowered by means of a climbing rod system which are cast into the cured portion of the column, a downwardly projecting steering tower which is rotatably/pivotably suspended from the slipform platform and which is arranged in general parallel with the lastly cured portion of the column, and a steering waggon suspended from the steering tower, the steering waggon being provided with wheels or sliding element distributed in spaced relation both with respect to the vertical axis and the circumference, said wheels or sliding elements being in forced contact with the inner wall of the column, and means for varying the inclination of the steering tower with respect to the steering waggon and consequently the cured portions of the column wall, and where the slipform work by means of a plurality of yokes is suspended from the slipform platform, the form work comprising an inner and outer, substantially circular or elliptical wall consisting of in circumferential direction arranged form sheets, characterized in that the yokes are adjustably arranged in radial direction on the slipform platform and that the form sheets are adjustably arranged in tangential or circumferential direction with respect to each other and that one of the slipform sheet walls is radially adjustable with respect to the other, thereby enabling slipforming of inclined, hollow columns having increasing and/or decreasing diameter.

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**4,741,649**

**THROWAWAY TIP**

**Yoshikatsu Mori, Itami, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan**

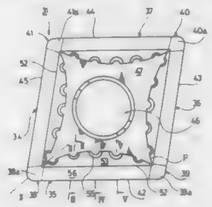
**Filed Nov. 4, 1986, Ser. No. 926,979**

**Claims priority, application Japan, Nov. 14, 1985, 60-174190[U]**

**Int. Cl.[4] B23B** *27/22*

**U.S. Cl. 407—114** **6 Claims**

1. A throwaway cutting tip comprising opposed substantially polygonal main surfaces and lateral surfaces interconnecting said main surfaces for defining a cutting tip body having a substantially polygonal contour and a given thickness between said main surfaces, said cutting tip body comprising nose portions positioned at apexes of said substantially polygonal contour along end edges defined between at least one of said main surfaces and said lateral surfaces, inwardly projecting cutting edges located on at least one of said main surfaces between said nose portions, a flat surface portion formed in a central region of each of said main surfaces, a rake surface formed between said flat portion and each cutting edge, said rake surface having a flat portion and a concave portion having a curved segmental configuration, as seen in a top view, said concave portion having said segmental configuration forming



a chip breaking surface, and a plurality of projections formed on said curved segmental configuration of said chip breaking surface portion of said rake surface, and wherein each of said nose portions comprises a nose protecting surface connected to an end edge defined between a respective one of said lateral surfaces and said main surface, said nose protecting surface extending inwardly in parallel to said flat surface portion, and wherein said plurality of projections differ in size according to the width of said rake surface, so that smaller projections are located where the width is narrow and larger projections are located where the width is larger.

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**4,741,650**

**TOOL HOLDER**

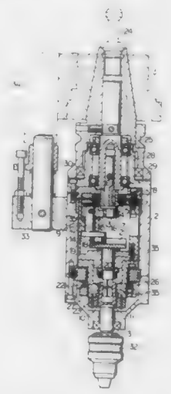
**Kenji Nakata, Kawaguchi, Japan, assignor to Hiroshi Sasaki, Hokkaido, Japan**

**Filed Nov. 5, 1986, Ser. No. 930,444**

**Claims priority, application Japan, Nov. 30, 1985, 60-269845**

**Int. Cl.[4] B23B** *47/00*

**U.S. Cl. 408—137** **6 Claims**



1. A tool holder comprising

a casing;

a rotatable prime shaft extending within said casing for rotating therein when subjected to an external torque;

a speed reduction unit operatively connected to said prime shaft within the casing, said speed reduction unit having an input section at which the rotation of said prime shaft

is input and an output section at which the rotation of the prime shaft is transmitted at a rate that is less than that input at said input section;

a rotary holder fixed to the output section of said speed reduction unit for rotating when the rotation of said prime shaft is transmitted thereto via the output section of said speed reduction unit;

a tool holder mounting shaft coaxial with said prime shaft, said tool holder mounting shaft operatively connected to and movable with respect to said rotary holder within said casing for rotating with the rotation of said rotary holder, and said tool holder mounting shaft having a top end portion projecting from said casing;

engaging means operatively engaged with said tool holder mounting shaft for causing said tool holder mounting shaft to advance and retreat in a direction extending along the longitudinal axis thereof when the tool holder mounting shaft is alternately rotated clockwise and counterclockwise about the longitudinal axis thereof; and

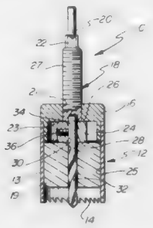
swinging means carried by said rotary holder so as to be rotated therewith, said swinging means for oscillating in response to the rotation of the prime shaft while being rotated with the rotary holder, said swinging means operatively connected to said tool holder mounting shaft for causing said tool holder mounting shaft to alternately rotate clockwise and counterclockwise about its longitudinal axis so as to advance and retreat when the swinging means oscillates such that the rotation of said prime shaft transmitted through said speed reduction unit to said rotary holder and swinging means carried thereby causes said tool holder mounting shaft to rotate and to advance and retreat in a direction extending along the longitudinal axis of the tool holder mounting shaft.

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**4,741,651**
**HOLE SAW**

**Roger J. Despres, 9630 El Rey Ave., No. 13, Fountain Valley, Calif. 92708**

**Filed Apr. 25, 1986, Ser. No. 855,949**
**Int. Cl.[4] B23B** *31/04*
**U.S. Cl. 408—209** **11 Claims**



7. A method of assembling a pilot drill containing a left hand threaded mandrel into a hole saw to enable a plug of material to be removed from an interior of said hole saw, comprising the steps of:

inserting a shank end of said left hand threaded mandrel through an open cutting end of said hole saw;

threading said mandrel into complimentary left hand threads formed in a base of said hole saw;

tightening said mandrel against said base end of said hole saw, a flange formed by said mandrel between said pilot drill and said shank end seats against said base of said hole saw; and

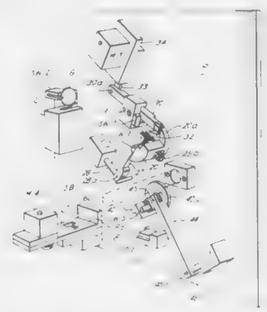
disengaging said mandrel from said base of said hole saw and threading said mandrel out of said base, thereby subsequently removing said plug of previously cut material jammed into said interior of said hole saw therefrom.

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**4,741,652**
**APPARATUS AND METHOD FOR AUTOMATICALLY MAKING A DUPLICATE KEY**

**Ronald L. Marchal, 3740 Westheimer, Houston, Tex. 77027**

**Division of Ser. No. 763,541, Aug. 7, 1985, Pat. No. 4,666,351, which is a continuation-in-part of Ser. No. 541,788, Oct. 13, 1983, abandoned. This application Nov. 28, 1986, Ser. No. 935,768**
**Int. Cl.[4] B23C** *3/35*
**U.S. Cl. 409—83** **7 Claims**



1. An apparatus for duplicating a key, comprising:

a mounting plate;

key clamping means mounted with the plate for receiving and clamping a master key and a key blank, comprising;

a first key clamping mechanism for independently clamping the master key;

first indexing means for properly positioning the master key within the first clamping mechanism;

a second key clamping mechanism for independently clamping the key blank after the master key is clamped; and

second indexing means for properly positioning the key blank within the second clamping mechanism;

a support shaft attached at one end to the plate substantially perpendicular to the plate;

a pivoting base rotatatably and slidably mounted on the support shaft;

key following means mounted with the pivoting base adjacent the key clamping means to engage the master key and pivot the pivoting base in response to edge variations of the master key;

means for sliding the pivoting base along the support shaft;

means for holding the key following means in contact with the edge variations in the master key causing the key following means to trace the master key as the pivoting base slides along the support shaft; and

key cutting means mounted with the pivoting base adjacent the key clamping means to duplicate the edge variations onto the key blank as the key following means traces the master key.

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**4,741,653**
**CARGO SECURING MEANS**

**Thomas F. Schmidt, Jonesboro, Ark., assignor to Joyce Catherine Schmidt, Jonesboro, Ark.**

**Filed Oct. 30, 1986, Ser. No. 925,085**
**Int. Cl.[4] B60P** *7/08*
**U.S. Cl. 410—111** **6 Claims**

1. A securing device for use with a supporting member having a support plane to secure cargo to said supporting member, said device comprising:

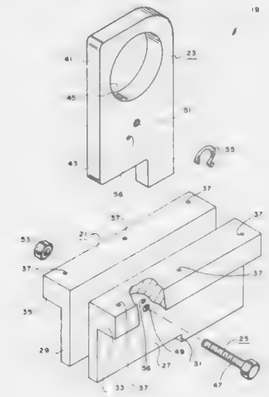
(a) a body member for being attached to said supporting member; said body member including a pair of spaced-apart, parallel side members, a bridge member rigidly joining said side members to one another, and a flange member rigidly attached to each of said side members, each of said flange members having a plurality of apertures therethrough;

(b) a plurality of screws for extending through said apertures in said flange members of said body member for fixedly attaching said body member to said supporting member with all of said body member positioned below said support plane;

(c) an arm member having first and second ends; and

(d) pivot means pivotally attaching said arm member to said body member for allowing said arm member to pivot between a stored position in which all of said arm member is positioned substantially between said side members of said body member below said support plane of said supporting member and an up position in which a portion of said first end of said arm member extends above said





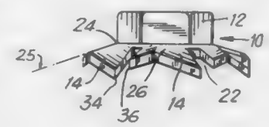
support plane of said supporting member for allowing said cargo to be secured relative thereto; said pivot means including a pivot member extending through said side members of said body member and through said arm member at a location intermediate said first and second ends of said arm member and intermediate said first end of said arm member and the center of gravity of said arm member for allowing said arm member to pivot from said down position to said up position when downward force is applied to said second end of said arm member and for causing said arm member to normally fall to said down position due to the force of gravity; said bridge member of said body member forming a stop means for coacting with said second end of said arm member to stop said arm member in said up position and for coacting with said first end of said arm member to stop said arm member in said stored position.

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**4,741,654**
**SPIDER WASHER HEAD FASTENERS**

**Louis J. Lovisek, Greenlawn, N.Y., assignor to Industrial Fasteners Corp., Port Washington, N.Y.**

**Filed May 1, 1986, Ser. No. 857,876**
**Int. Cl.[4] F16B** *39/282, 39/284*
**U.S. Cl. 411—186** **23 Claims**



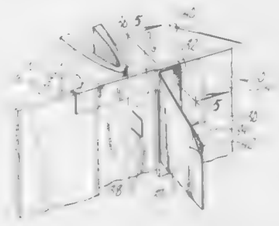
1. A fastener having a threaded body defining an axis of rotation, a flange formed integrally with and extending radially downwardly from said body, said flange being slotted essentially to the base thereof to define a plurality of deformable tabs joined at their respective bases to the body, at least a portion of a plurality of the tabs being twisted relative to its base about an axis extending radially from said axis of rotation along the flange in a direction so that an edge of each of the tabs defined by the slots inclines downwardly, said edge being the leading edge on the side of the tab facing in the direction of rotation of the fastener for tightening thereof, whereby the end of said leading edge and said leading edge cut into the surface of a workpiece during tightening to absorb a portion of the mounting torque.

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**4,741,655**
**PAMPHLET BINDER AND METHOD OF ASSEMBLING SAME AND ATTACHING TO A PAMPHLET**

**Fritz C. James, 4519 Grand Ave., #5, Des Moines, Iowa 50312**

**Filed Nov. 24, 1986, Ser. No. 934,201**
**Int. Cl.[4] B42B** *4/00;* **B42C** *11/02;* **B42D** *3/00*
**U.S. Cl. 412—6** **17 Claims**



1. Method of assembling a pamphlet binder and attaching it to a pamphlet comprising the steps of,

connecting on one side in spaced apart relationship front and back pamphlet covers with a strip of spine reinforcement material,

attaching one side edge of a flap strip to the other side of either the front or back cover,

positioning the bound end of the pamphlet against the strip of spine reinforcement on the side opposite the flap strip,

fastening the pamphlet to the strip of spine reinforcement using fastening means which passes through said spine reinforcement material, and

attaching the other side edge of the flap strip to the other of the front or back covers with the flap strip extending over the fastening means.

12. A pamphlet cover comprising,

front and back cover members,

a spine reinforcement member interconnecting on one side said front and back cover members in spaced apart relationship,

a flap strip secured along one side to the other side of either the front or back cover members whereby the bound end of a pamphlet can be positioned against the spine reinforcement member and secured thereto by fastening means extending through said spine reinforcement member and the other side of the flap strip can be laid over the fastening means and secured to the other of either the front or back cover members.

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**4,741,656**
**CYLINDRICAL BALE FEEDER**

**W. Ray Bishop, Box 156, New Pine Creek, Oreg. 97635**

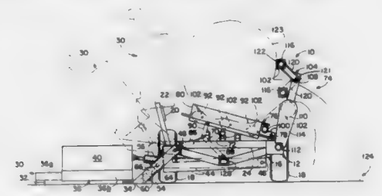
**Filed May 2, 1986, Ser. No. 858,742**
**Int. Cl.[4] A01D** *87/02, 90/10*
**U.S. Cl. 414—24.6** **4 Claims**

1. A field vehicle for handling wound cylindrical bales comprising:

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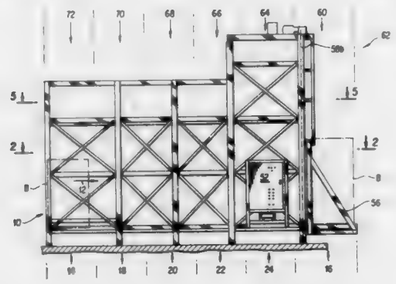
an elongate mobile vehicle frame;
an endless power-driven conveyor mounted on said vehicle frame having a substantially horizontal upper reach extending longitudinally of the vehicle adapted with movement of the conveyor to transfer a bale resting thereon in a direction extending longitudinally of the vehicle by engaging the underside of the bale;
a subframe and at least a pair of rotatable rollers rotatably mounted on said subframe located to either side of said upper reach of the endless conveyor with the axis of the rollers extending longitudinally of the vehicle;



a movable mounting for the subframe accommodating shifting of the subframe from a lowered position where said rollers lie beneath the level of said upper reach of the conveyor and a raised position where the rollers are above said upper reach and support a bale in a position elevated above said upper reach;
means for rotating said rollers on said subframe; and
bale unrolling means mounted on said vehicle frame adjacent said subframe for unrolling a wound bale positioned on said rollers of said subframe.

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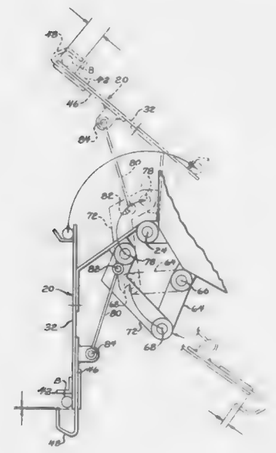
**4,741,657**
**LINE STOCKING CONVEYOR**
**Raymond L. Cassel, North Wales, Pa., assignor to Arco Corporation, Hatfield, Pa.**
**Filed Nov. 26, 1986, Ser. No. 935,519**
**Int. Cl.[4] B65G** *1/06*
**U.S. Cl. 414—267** **11 Claims**



1. A line stocking conveyor comprising:
(a) a feeding channel for conveying bins in a first direction, the feeding channel including:
(i) a plurality of adjacent bin stations sequentially arranged in a row, including a bin entry station at one end of the feeding channel and a bin unloading station at an opposite end of the feeding channel, each of stations including bin support means for supporting a bin when not being conveyed;
(ii) a first bed in the feeding channel capable of reciprocating movement to sequentially advance bins individually placed in the bin entry sation from station to station between the bin entry station and the bin unloading station, the bed including front and rear bed portions each bed portion being comprised of a plurality of linked tables in a row, the front bed portion including an unloading end table, the rear bed portion including an entry end table, the entry end table and the unloading end table being at opposite ends of the first bed, each of the said tables in the feeding channel being capable of conveying one bin at a time in the direction of said bin unloading station, each of said tables including means for selectively independently raising a bin above the bin support means at an upstream bin station prior to movement of the bed in the direction of the unloading station and for lowering the bin onto the bin support means at an adjacent downstream bin station prior to return movement of the bed in the direction of the entry station wherein a bin on one of the tables may be advanced while other bins in the feeding channel remain stationary, means for reciprocating the bed for reciprocal movement of the linked bin tables between corresponding adjacent bin stations for sequentially conveying bins between adjacent bin stations towards the unloading station, means for advancing and retracting the front bed portion towards and away from the unloading station while the rear bed portion is stationary to convey a bin from said front bed portion to said unloading station;
(b) a return channel adjacent to the feeding channel for conveying bins in a direction opposite to said first direction, the return channel including:
(i) a plurality of adjacent bin return stations sequentially arranged in a row including an initial return station at one end of the return chanel adjacent the unloading station of the feeding channel and a final removal station at an opposite end of the return channel adjacent the entry station of the feeding channel, each of said return stations including a bin support means for supporting a bin when not being conveyed;
(ii) a second bed in the return channel capable of reciprocating movement to sequentially advance bins from station to station between the initial return station and the bin removal station, the second bed including fore and aft bed portions each bed portion being comprised of a plurality of linked tables in a row, the fore bed portion including an initial return table, the aft bed portion including a final placement table, the initial return table and the final placement table being at opposite ends of the second bed, each of said tables in the return channel being capable of conveying one bin at a time in the direction of said final bin removal station, each of the return tables including means for selectively independently raising a bin above the bin support means at an upstream bin return station prior to movement of the return bed in the direction of the bin removal station and for lowering the bin onto bin support means at an adjacent downstream bin station prior to return movement of the bed in the direction of the initial bin return station wherein a bin on one of the tables may be advanced while other bins in the return channel remain stationary, means for reciprocating the return bed for retracting a bin from the initial return station and for reciprocal movement of the linked return bin tables between corresponding adjacent bin stations for sequentially conveying bins between adjacent bin stations of the return channel to the removal station, means for advancing and retracting the fore bed portion towards and away from the initial station while the aft bed portion is stationary to convey a bin from said initial return station to an intermediate return station adjacent to and immediately downstream of the initial return station; and
(c) means for conveying a bin from the bin unloading station of the feeding channel to the initial return station of the return channel.

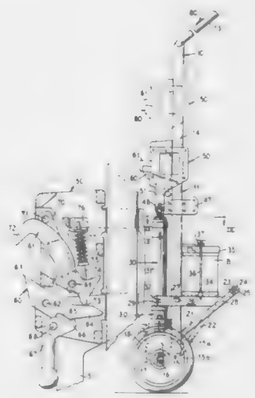


**4,741,658**
**RECEPTACLE DUMPING APPARATUS AND METHOD**
**Robert F. Zelinka, and John W. Redding, both of Roselle, Ill., assignors to Perkins Manufacturing Company, Chicago, Ill.**
**Continuation of Ser. No. 572,389, Jan. 20, 1984, abandoned. This application May 12, 1986, Ser. No. 862,015**
**Int. Cl.[4] B65F** *3/02*
**U.S. Cl. 414—406** **18 Claims**



1. A lifter for emptying a container into a cavity of a vehicle, comprising:
a first plate;
means for pivotally mounting the first plate to the vehicle;
a second plate extending at an angle from the first plate and having a pair of spaced apertures extending therethrough;
a third plate slidably mounted on the second plate and having an outwardly directed first flange adjacent an outer end of the third plate, a tunnel adjacent the outer end of the third plate, and a pair of sets of spaced and aligned openings extending through the third plate and which may be selectively aligned with the apertures;
a pair of pins removably received through the aligned apertures and openings;
hook means comprising a tongue slidably received in the tunnel, and a hook member extending from one end of the tongue and being directed toward the first flange;
a pair of second spaced outwardly directed flanges connected adjacent an other end of the tongue, each of the second flanges having a plurality of spaced apertures aligned along the second flanges;
a cylinder having a piston;
at least one link arm having one end pivotally connected to the vehicle and an other end pivotally connected to an outer end of the piston;
an arcuate arm having one end pivotally connected to the other end of the link arm and an other end pivotally connected to the first plate; and
a pair of rods each having one end pivotally connected to opposed sides of the arcuate arm intermediate the pivotal connections thereof, and each of the rods having a pair of pins adjacent an other end pivotally received in selected apertures of the second flanges.

**4,741,659**
**POWERED DRUM LIFTING TRUCK**
**Bruce A. Berg, Lake Forest, Ill., assignor to Liftomatic Material Handling, Inc., Evanston, Ill.**
**Filed Apr. 3, 1986, Ser. No. 847,534**
**Int. Cl.[4] B66F** *9/00*
**U.S. Cl. 414—450** **4 Claims**

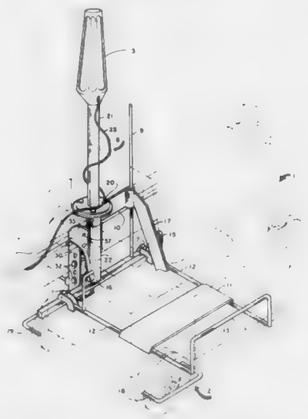


1. A hand operated tiltable two-wheeled drum lifting and conveying truck which comprises a frame having an upright central bar, handle means on the upper end of the bar, a transverse base on the lower end of the bar, a pair of transversely spaced coaxial wheels rotatably mounted on the base for supporting the base above ground level and for tilting the base about the wheel axis, cradle means supported by the base projecting forwardly therefrom inboard from the wheels for cradling a drum forwardly of the wheels unencumbered by any truck structure, a self-actuating drum chime ring clamp slidably mounted on said bar between said base and handle, an electric motor driven linear actuator mounted forwardly of said bar, and substantially behind the cradle means for raising and lowering said clamp on the bar, a horizontal foot step carried by said base spaced rearwardly behind said bar constructed and arranged to be depressed for tilting the truck together with a drum cradled thereon about the wheel axis for inclining the truck and drum to a transport position, a battery mounted on the truck between the horizontal foot step and bar, a switch mounted on the handle means, a circuit including the battery, switch, and electric motor of the actuator for driving the motor in opposite directions for raising and lowering the clamp on the bar, said clamp having chime ring engaging jaws to straddle and then clamp the chime ring of a drum cradled on the truck whereby the truck is adaped to be rolled on said wheels in an upright position to engage the cradle means with the side of the upright drum, the clamp driven to a level on the bar to straddle the top chime ring of the drum with the jaws, the clamp then driven to a higher level to lock the jaws to the chime ring and lift the drum and the horizontal step depressed by the foot of an operator grasping the handle to tilt the drum rearwardly about the axis of the wheels to an inclined transporting position with the drum sufficiently raised to clear the top of a pallet and then be deposited on the pallet by forward tilting of the truck about the axis of the wheels.

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**4,741,660**
**APPARATUS FOR LIFTING AND TRANSPORTING POWERED WHEELCHAIRS**
**Jimmy J. Kent, P.O. Box 634, Denham Springs, La. 70727-0634**
**Filed Sep. 9, 1985, Ser. No. 774,020**
**Int. Cl.[4] B60P** *03/06;* **B60R** *09/06*
**U.S. Cl. 414—462** **1 Claim**

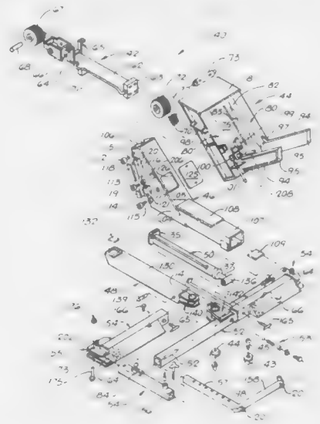


1. An apparatus for lifting and transporting a powered wheelchair, mountable on the rear of a vehicle, comprising:
(a) a lifting means having a stationary section and a vertically adjustable travelling section;
(b) a hitching means for connecting said lifting means to the rear of a vehicle;
(c) a substantially rectangular base for carrying said wheelchair in an upright position, said base having a hinged edge connected to said travelling section of said lifting means whereby said base may be folded up close to the rear of a vehicle when not carrying a wheelchair;
(d) a vertical alignment shaft having a lower end rigidly connected to said base;
(e) an alignment shaft guide having a first end rigidly connected to said stationary section of said lifting means and a second end through which said alignment shaft is matingly slidable when said base is raised and lowered; and
(f) a brace, rigidly connected at one end to said alignment shaft guide, having an opposite end extending over said base to pin the powered wheelchair between said brace and said base when said base is raised.

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**4,741,661**
**WHEEL LIFTING AND TOWING APPARATUS**
**Steven J. Carey, Signal Mountain, Tenn., assignor to Sherman & Reilly Inc., Chattanooga, Tenn.**
**Filed Sep. 22, 1986, Ser. No. 909,572**
**Int. Cl.[4] B60P** *3/12*
**U.S. Cl. 414—563** **16 Claims**

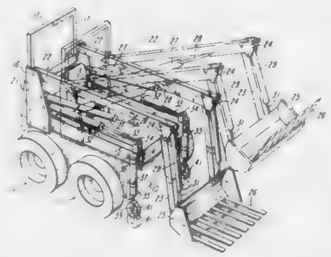
1. For use with a tow truck having a horizontal planar bed, a wheel lift mechanism for engaging, lifting and lowering a vehicle to be towed, comprising: a pair of laterally spaced, parallel and registeringly aligned, elongated, rectilinear track means having laterally opposed open tracks mounted in concealed position beneath the truck bed; said track means being vertically inclined to extend angularly downwardly and rearwardly with the upper ends thereof over the rear axle of the truck and the lower ends thereof terminating above ground level beneath the tailgate portion of the truck; stationary, laterally opposed, elongated cam means carried by and extending lengthwise entirely within each of said open tracks, rigid lift boom means located centrally between said track means and having wheel engaging means attached thereto, plural cam follower means extending outwardly of opposite lateral sides of said boom means for operatively engaging said cam means and supporting said boom means for movement parallel to and between said track means; said cam means being configured and arranged to effect a series of sequential vertical tilting movements of said lift boom means as said follower means



move over said cam means and advance along the incline of said track means; and power actuated means coupled to said boom means and mounted remotely of said track means in concealed position beneath the truck bed; said power actuated means being selectively operable to effect raising and lowering movements of said boom means along said track means.

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**4,741,662**
**MATERIAL HANDLING EQUIPMENT**
**Gregory Schmiesing, R.R. #1, New Bremen, Ohio 45869**
**Continuation of Ser. No. 130,564, Mar. 14, 1980, abandoned, which is a continuation of Ser. No. 875,901, Feb. 7, 1978, abandoned, Continuation-in-part of Ser. No. 830,568, Sep. 6, 1977, abandoned. This application Aug. 28, 1986, Ser. No. 901,133**
**Int. Cl.[4] E02F** *3/342*
**U.S. Cl. 414—686** **14 Claims**



4. Equipment providing material handling apparatus applicable to small vehicles such as agricultural loaders including lift arms, means for mounting said lift arms to a vehicle, said lift arms each having one end thereof adapted for pivotal connection to its mounting means and in side elevation having the end portion thereof which positions outermost from said mounting means obtusely angled with reference to its preceding portion, rigidly connected thereto and mounting thereon means for selectively extending or reducing the reach thereof and means for operative association with said mounting means and connection therewith to the vehicle to which the mounting means is applied arranged to position forwardly of the vehicle and to

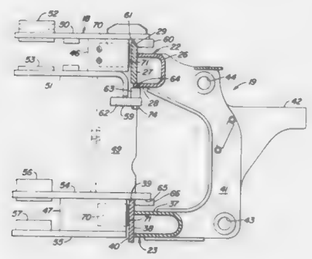


operate in conjunction with extension of the reach of said lift arms to stabilize against unbalancing effects of an engaged and supported load, said stabilizing means including vertically dependent leg portions, portions of which are movable to said mounting means and from said mounting means to the surface which underlies said vehicle to which said mounting means is applied, the dependent extremities of said leg portions being formed for ready movement over the underlying surface when projected thereto.

12. Material handling apparatus for application to a farm tractor or like vehicle having a particular facility for use in spreading and levelling a deposited load comprising a pair of lift arms each arranged to pivotally attach, at what constitutes its inner end, to a support at one of opposite sides of a vehicle chassis to position said arms in a transversely spaced substantially parallel relation, each of said arms having a fixed outer end portion forming an obtuse angle with the portion thereof including its inner end, said outer end portions of said arms cooperating in the support of an assembly including a material handling device and self contained means for tiltably adjusting and setting said material handling device in selective positions of use, means based on said outer end portions of said arms operable independent of said self contained means to move and reciprocate said assembly independent of the setting or adjustment of said material handling device or any control or movement of said arms, said assembly being mounted for reciprocation longitudinally of said obtusely angled outer end portions of said arms and said material handling device being tiltable relative to other components of said assembly to establish a portion thereof in an attitude of use whereby said material handling device may be reciprocated to achieve spreading and leveling of materials deposited on an underlying support surface.

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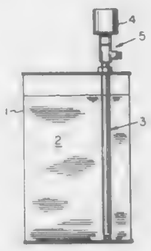
**4,741,663**
**LOCKING AND SLIDING SYSTEM**
**Michael E. Kennedy, Dubuque, Iowa, assignor to Deere & Company, Moline, Ill.**
**Filed Oct. 29, 1986, Ser. No. 925,647**
**Int. Cl.[4] E02F** *3/633*
**U.S. Cl. 414—695.5** **9 Claims**



1. A supporting structure for a backhoe comprising a main transverse frame adapted to be mounted on a tractor and having upper and lower transverse horizontal tracks extending substantially the full width of the tractor, one of the tracks having a chamfered surface extending downwardly and forwardly from the respective track's upper edge, and the other of said tracks having an upper substantially horizontal surface; a sliding frame adapted for attachment to a backhoe having upper and lower track-engaging portions retained respectfully on the upper and lower tracks, one of said track-engaging portions extending over the upper edge of said one of the tracks and having a downwardly inclined surface opposite to and engageable with said chamfered surface, and the other of the track-engaging portions having a part extending over the aforesaid upper horizontal surface and said part having a horizontal surface facing downwardly and engageable with said upper horizontal surface; and power means extending between the sliding frame and transverse frame and movable in one direction to force separation of said frames and to effect vertical shifting of the sliding frame through sliding of said inclined surface along said chamfered surface to a level in which said horizontal surfaces on said other track and said other track-engaging portion disengage and movable in the reverse direction to permit said horizontal surfaces to engage and cause said track with said upper horizontal surface to substantially support the weight of the backhoe.

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**4,741,664**
**PORTABLE PUMP**
**Ronald F. Olmstead, Fairview, and H. David Bowes, Erie, both of Pa., assignors to Thompson-Chemtrex, Inc., Erie, Pa.**
**Filed Mar. 16, 1987, Ser. No. 26,006**
**Int. Cl.[4] F01D** *3/02*
**U.S. Cl. 415—98** **10 Claims**



1. An axial flow liquid pump comprising
an outer tube having upper and lower ends and intake openings near the lower end for liquid to be pumped and an outlet opening near the upper end,
an inner tube positioned within the outer tube and extending substantially the entire length of the outer tube and having upper and lower ends,
a driven shaft journaled within the inner tube and having upper and lower ends,
a double impeller secured near the lower end of the shaft, said impeller having two impeller chambers consisting of a lower impeller chamber for receiving liquid in an axial opening and delivering the liquid to the space between the inner and outer tubes and an upper impeller chamber for receiving liquid through an annular space along the shaft and delivering the liquid to the space between the inner and outer tubes,
conduit means for delivering liquid to be pumped from the exterior of the outer tube to the annular space,
said impeller being positioned so that the lower impeller chamber receives liquid directly from an intake opening near the lower end of the outer tube and the upper impeller chamber receives liquid directly from said conduit means, said conduit means sized for permitting liquid to be drawn into said upper impeller chamber such that the pressure in the vicinity of the upper impeller chamber intake is equal or less than the pressure at the exterior of the outer tube near the conduit intake but sufficient not to draw air down through the inner tube, and
means on the upper end of the shaft for engaging the shaft of a motor to drive the pump shaft.

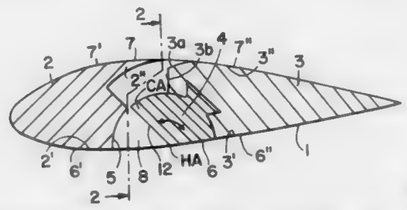
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**4,741,665**
**GUIDE VANE RING FOR TURBO-ENGINES, ESPECIALLY GAS TURBINES**

**Hagen Hanser, Munich, Fed. Rep. of Germany, assignor to MTU Motoren- und Turbinen-Union Muenchen GmbH, Munich, Fed. Rep. of Germany**

**Filed Nov. 12, 1986, Ser. No. 929,624**
**Claims priority, application Fed. Rep. of Germany, Nov. 14, 1985, 3540401**
**Int. Cl.⁴ F01D** *1/30*
**U.S. Cl. 415—150** **13 Claims**




1. A guide vane having a flow dynamic cross-section with a compression side and a suction side for turbo-engines, especially gas turbines, comprising a stationary vane section (2) and a movable vane section (3), adjustment means for adjusting the position of said movable vane section relative to the stationary vane section, a gap between said stationary vane section and said movable vane section, said gap extending through said vane from said compression side to said suction side, first flexible cover means covering said gap on one side of said guide vane, and second yielding elastic cover means covering said gap on the other side on said guide vane, said first and second covering means permitting movement of said position adjustable vane section relative to said stationary vane section, wherein said first flexible cover means comprise a flexible band (6) having longitudinal edges permanently secured to said stationary vane section and to said position adjustable vane section, and wherein said second cover means comprise an elastic tape (7) having a first longitudinal rim permanently secured to said stationary vane section and a second longitudinal rim movably overlapping said position adjustable vane section, and wherein said position adjustment means have a rotational axis coinciding with an outer contour of said guide vane for rotating said movable vane section (2) relative to said stationary vane section (3).

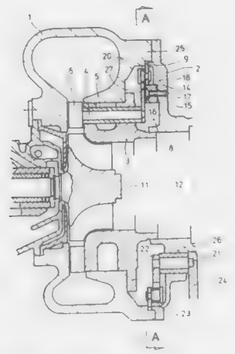
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**4,741,666**
**VARIABLE DISPLACEMENT TURBOCHARGER**

**Masami Shimizu, Chiba; Kinshi Takagi, Tokyo; Nobuhiro Kondo, Noda, and Hiromu Furukawa, Yokohama, all of Japan, assignors to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Japan**

**Filed Dec. 19, 1986, Ser. No. 943,788**
**Claims priority, application Japan, Dec. 23, 1985, 60-198517[U]; Dec. 25, 1985, 60-199975[U]; Dec. 25, 1985, 60-199976[U]; Apr. 17, 1986, 61-57923[U]**
**Int. Cl.⁴ F03D** *7/00*
**U.S. Cl. 415—158** **15 Claims**

1. In a variable displacement turbocharger comprising a turbine casing, a shroud, a gas outlet cover, said turbine casing, said shroud and said gas outlet cover together defining a closed doughnut-shaped space, a nozzle driving ring rotatably located in said space, nozzle blades each having a nozzle shaft extending therefrom, and a link for interconnecting said nozzle shaft and said nozzle driving ring, said nozzle driving ring being adapted to be rotatively driven from outside said space, an



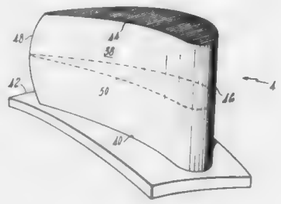

improvement comprising projection means on the gas outlet cover for rotatably supporting the nozzle driving ring.

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**4,741,667**
**STATOR VANE**

**Francis R. Price, Glastonbury, and Charles B. Titus, West Hartford, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.**

**Filed May 28, 1986, Ser. No. 868,397**
**Int. Cl.⁴ F01D** *9/02*
**U.S. Cl. 415—191** **5 Claims**




1. A stator vane for a turbomachine, said vane extending spanwisely across an annular stream of axially flowing working fluid comprising:
an airfoil body for redirecting the fluid stream, including
a concave pressure surface,
a convex suction surface,
a substantially linear leading edge,
a trailing edge, and
wherein the leading and trailing edges of the airfoil body define a spanwisely varying chord length therebetween,
the chord length reaching a maximum at a point intermediate the radially spaced ends of the vane and decreasing with relative spanwise displacement from said point.

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**4,741,668**
**CENTRIFUGAL PUMP STAGE WITH ABRASION RESISTANT IMPELLER HUB**

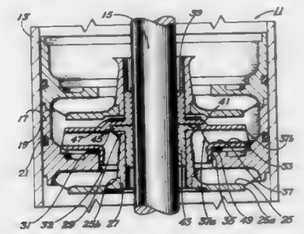
**John L. Bearden, Claremore, Okla., assignor to Hughes Tool Company, Houston, Tex.**

**Filed Oct. 13, 1987, Ser. No. 108,199**
**Int. Cl.⁴ F04D** *29/02*
**U.S. Cl. 415—212 R** **3 Claims**

1. In a submersible centrifugal pump of the type having a housing, a drive shaft extending through the housing, a plurality of stages, each stage having a diffuser containing a plurality of passages and an impeller, each impeller having a vane section containing a plurality of passages, the improvement comprising:



a diffuser sleeve located in a central portion of the diffuser, and having an axial bore coaxial with the axis of the shaft, the diffuser sleeve being of a material harder than the remaining portions of the diffuser and having an upper edge;
a lower hub carried by the shaft for rotation with the shaft within the bore of the diffuser sleeve, the lower hub having an upper end with an external flange, the flange overlying and engaging the upper edge of the diffuser sleeve;



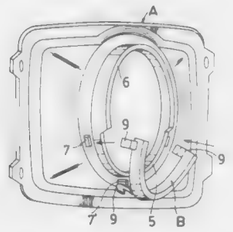
the impeller having an upper hub integrally formed with the vane section and carried by the shaft for rotation with the shaft within the bore of a diffuser sleeve of a next upward stage from the lower hub, the lower end of the upper hub contacting the flange of the lower hub to transmit downward thrust on the impeller to the diffuser sleeve within which the lower hub is carried; and
the lower hub being of a material harder than the impeller vane section and the upper hub.

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**4,741,669**
**SHROUD**

**Tatsuji Shimokawabe, 24-11, Asahi-cho, Sagamihara-shi, Kanagawa-ken, Japan**

**Continuation of Ser. No. 603,505, Apr. 24, 1984, abandoned. This application Feb. 13, 1987, Ser. No. 15,558**
**Claims priority, application Japan, Apr. 27, 1983, 58-63581[U]**
**Int. Cl.⁴ F04D** *29/52*
**U.S. Cl. 415—213 C** **2 Claims**



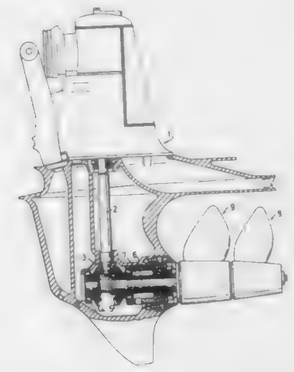

1. An improved shroud consisting of a main upper-shroud and a semicircular lower-shroud to be attached to the cut-off portion of the cylindrical opening of said main upper-shroud, wherein said lower-shroud is provided with more than two integral U-shaped stoppers extending from the outer periphery thereof, said U-shaped stoppers being releasably interlocked into the slits made along the outer periphery of said cut-off portion including a singular barb-shaped protrusion on an outer periphery of each of said U-shaped stoppers for providing a positive locking between said U-shaped stoppers and said main upper shroud, said U-shaped stopper being releasably compressible on either of opposing sides of said slits for removal of said U-shaped stoppers from said interlocking relationship.

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**4,741,670**
**PROPELLER COMBINATION FOR A BOAT PROPELLER UNIT**

**Lennart H. Brandt, Fjärås, Sweden, assignor to AB Volvo Penta, Goteborg, Sweden**

**Filed Sep. 12, 1986, Ser. No. 907,214**
**Claims priority, application Sweden, Sep. 17, 1985, 8504310**
**Int. Cl.⁴ B63H** *1/18*
**U.S. Cl. 416—129** **2 Claims**



1. Propeller combination for a boat propeller unit comprising a forward propeller and an after-propeller that rotate in opposite directions about a common rotational axis, characterized in that the forward propeller is so shaped as to function without cavitating while the after-propeller is so shaped as to function with optimum cavitation and has cupped blades and a total blade area of between $\frac{1}{3}$ and $\frac{2}{3}$ of the total blade area of the forward propeller, the blades of the after-propeller having a mean camber line whose maximum curvature is in its rear half, the blade width of the after-propeller being between 60% and 75% of the blade width of the forward propeller and the propellers having the same number of blades.

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**4,741,671**
**METAL HUB FOR A HELICOPTER ROTOR**

**Emmanovel Asamateros, Cascina Costa Di Samarate, and Vittorio Caramaschi, Gallarate, both of Italy, assignors to Costruzioni Aeronautiche Giovanni Agusta S.p.A., Cascina Costa Di Samarate, Italy**

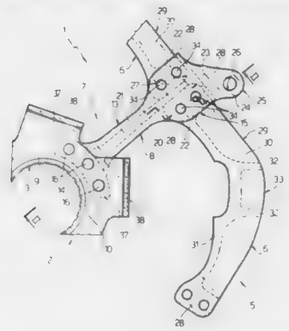
**Filed Feb. 18, 1986, Ser. No. 830,558**
**Claims priority, application Italy, Feb. 19, 1985, 67168 A/85**
**Int. Cl.⁴ B64C** *11/06*
**U.S. Cl. 416—244 R** **4 Claims**

1. A hub for a helicopter rotor with n blades, the hub comprising a metal center element, a metal outer annular frame extending about said metal center element and comprising n identical metal segments, and an intermediate structure connecting said metal frame to said metal center element and

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comprising n identical metal spokes extending radially outward from said metal center element; each said metal spoke



comprising an outer end acting as a connecting element for connecting two adjacent said metal segments to each other.

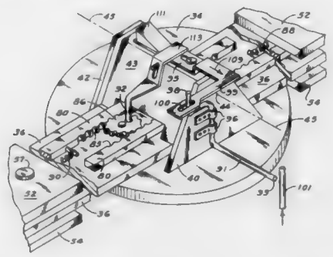
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**4,741,672**

## COLLECTIVE PITCH CHANGE SYSTEM FOR TETER-BAR TYPE GYROPLANE ROTARY WING AIRCRAFT

**Gerald Breuner, 4114 Goodrick Ave., Richmond, Calif. 94801**

**Continuation-in-part of Ser. No. 752,836, Jul. 8, 1985, abandoned. This application May 27, 1987, Ser. No. 54,526**
**Int. Cl.[4] B64C** *27/36, 27/76*
**U.S. Cl. 416—148** **9 Claims**



1. Collective pitch change means for a rotor assembly of a gyroplane rotary wing aircraft wherein the rotor assembly is mounted on a rotatable hub and includes a pair of blades attached to opposite ends of a central teter-bar having a pivotal mounting which permits the teter-bar and attached blades to move together in a see-saw type motion, said collective pitch change means comprising: adjustable blade attachment means at each opposed end of the teter-bar for attaching the blades to the teter-bar, each said adjustable blade attachment means including a feathering pivot for permitting rotation of the blades around a feathering axis which extends generally radially from said hub lengthwise along said teter-bar to change the pitch of the blade, pitch adjustment means for rotating the blade relative to the teter-bar around said feathering pivot, said pitch adjustment means including a first actuator mounted on said said teter-bar for limited movement in a direction generally parallel to said feathering axis, spring bias means mounted on said teter-bar for supplying motive force to move said first actuator relative to said teter-bar, and means coupled to said first actuator for exerting a relative force between the teter-bar and the blade to change the pitch of the blade when said first actuator is moved by said spring bias means, simultaneous actuator means for operating both said pitch adjustment means together such that the pitch is changed simultaneously on both blades, and release means for retaining said spring bias means in an energy storage mode in which said spring bias means is restrained from supplying motive force to said first actuators and for selectively releasing said spring bias means from said energy storage mode whereby spring energy moves said first actuators to change the pitch of said blades.

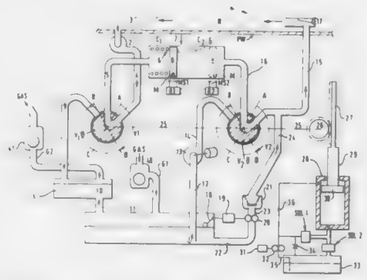
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**4,741,673**

## APPARATUS FOR AND A METHOD OF TRANSFERRING LIQUID

**Albert Jubb, Kenilworth, United Kingdom, assignor to Cosworth Engineering Limited, Northampton, United Kingdom**

**Continuation of Ser. No. 756,980, Jul. 8, 1985, abandoned. This application Jul. 20, 1987, Ser. No. 75,286**
**Claims priority, application United Kingdom, Nov. 11, 1983, 8330107; European Pat. Off., Nov. 12, 1984, 84307796.7**
**Int. Cl.[4] F04B** *9/10*
**U.S. Cl. 417—53** **14 Claims**



1. A method of transferring liquid between regions of first and second pressure comprising the steps of:

operating a first valve operating means to isolate first and second variable volume chambers from one of said regions and then place said chambers in communication with the other of said regions;

operating a first driving means to move a dividing member to cause liquid from said other region to enter into the first variable volume chamber and displacing, from the second variable volume chamber into said other region, liquid which has previously entered the second chamber from said one region;

operating a second valve operating means to isolate the chambers from said other region and then placing the chambers in communication with said one region and then operating a second driving means to move said dividing member to displace, from said first chamber into said one region, liquid which has previously entered said first chamber from said other region and cause liquid from said one region to enter into the second chamber.

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**4,741,674**

## MANIFOLD ARRANGEMENT FOR ISOLATING A NON-OPERATING COMPRESSOR

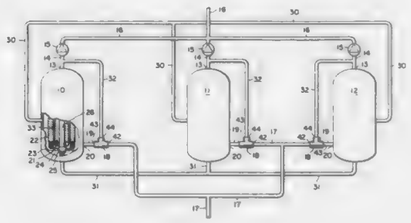
**James C. Tischer, La Crescent, Minn., assignor to American Standard Inc., New York, N.Y.**

**Filed Nov. 24, 1986, Ser. No. 934,361**
**Int. Cl.[4] F04B** *41/06, 49/02*
**U.S. Cl. 417—295** **9 Claims**

1. In a fluid compression system including a plurality of hermetic shell compressors connected in parallel to a system discharge line and a system suction line, apparatus for isolating one of the compressors that is inactive from the discharge and suction lines, comprising:

(a) a check valve disposed in a separate discharge line conveying compressed fluid from said one compressor to the system discharge line, said check valve oriented so as permit compressed fluid to flow into the system discharge line from a discharge port disposed in the hermetic shell of said one compressor when it is operating to compress fluid, and to prevent fluid flow in the opposite direction;

(b) a suction valve that opens in response to pressure in said separate discharge line and connected in fluid communication with both a suction port disposed in the hermetic shell of said one compressor and the system suction line for closing off fluid flow between the system suction line and the suction port when said one compressor is inactive, and for permitting fluid flow into the suction port from the system suction line when said one compressor is operating to compressor fluid;



(c) an oil sump disposed in each of the hermetic shell compressors for containing lubricating oil;

(d) an oil equalizing line interconnecting the oil sumps to enable oil to flow therebetween; and

(e) at least one sump pressure equalizing line interconnecting the oil sumps at an elevation above that at which the oil equalizing lines connect to the oil sumps, said sump pressure lines being operative to equalize sump pressure in the oil sumps of the interconnected compressors.

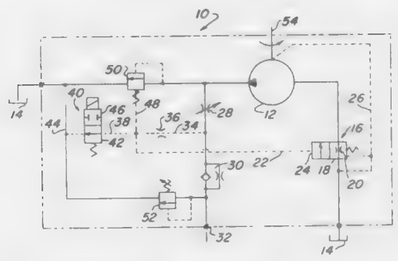
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**4,741,675**

## FLOW CONTROL SYSTEM FOR A HYDRAULIC PUMP

**Charles J. Bowden, Battlecreek, Mich., assignor to Hydreco, Incorporated, Atlanta, Ga.**

**Filed Aug. 4, 1986, Ser. No. 892,555**
**Int. Cl.[4] F04B** *49/02, 49/08*
**U.S. Cl. 417—295** **25 Claims**



1. A hydraulic control system comprising:

a supply of low pressure hydraulic fluid;

a hydraulic pump having a fluid inlet and a fluid outlet through which fluid is delivered at a high operating pressure when said pump is pumping fluid at its capacity;

a first valve in fluid communication with said supply of hydraulic fluid and said pump inlet for permitting fluid communication between said supply of hydraulic fluid and said pump inlet in a first mode of operation and for substantially preventing fluid communication between said supply of hydraulic fluid and said pump fluid inlet in a second mode of operation; and

control means for preventing said first valve from assuming said second mode of operation until the magnitude of the pressure at said pump fluid outlet is below a first predetermined pressure and preventing said first valve from assuming said first mode of operation until the magnitude of the pressure at said pump fluid outlet is above a second predetermined pressure, said first predetermined pressure being substantially below said pump operating pressure and above said second predetermined pressure.

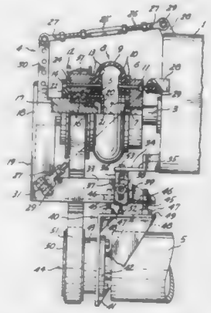
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**4,741,676**

## MARINE ENGINE POWER TAKE-OFF FOR A HYDRAULIC PUMP

**Douglas D. Janes, 19215 7th Ave. W., Lynnwood, Wash. 98036**

**Filed May 21, 1986, Ser. No. 865,500**
**Int. Cl.[4] F04B** *17/00, 35/00*
**U.S. Cl. 417—362** **3 Claims**



1. A power take-off for transmitting rotary force from the front nondriving end portion of the crankshaft of a marine engine to the rotary input member of a hydraulic pump comprising a frame having an upright leg and a rearward-projecting stub shaft cantilevered from said upright leg, means for stationarily mounting said frame on the engine with said stub shaft spaced forward from and coaxial with the engine crankshaft front end portion, an intermediate sheave rotatably mounted on the stub shaft, flex coupling means coupling said intermediate sheave to the engine crankshaft including a flexible force-transmitting member connected between the crankshaft and said intermediate sheave, a pump input sheave for driving the pump rotary input member, means mounting the pump with its input sheave substantially in alignment radially with said intermediate sheave, and a belt coupling said two sheaves such that radial force applied to said intermediate sheave by said belt is transmitted to said frame stub shaft without being transmitted to the engine crankshaft, said frame including a horizontal leg projecting rearward from the bottom end portion of said upright leg a substantial distance below said stub shaft, said frame mounting means including a crosstie extending through and projecting oppositely from said frame horizontal leg and means for supporting said crosstie from the engine.

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**4,741,677**

## ELECTRICAL COMPRESSOR FOR MOTOR VEHICLE HORNS, COMPRISING AN ELECTRIC MOTOR AND AIR COMPRESSOR IN MUTUAL AXIAL ALIGNMENT RELATIONSHIP

**Domenico Frigo, Vicenza, Italy, assignor to Fiamm Componenti Accessori S.p.A., Vicenza, Italy**

**Filed Nov. 12, 1985, Ser. No. 796,912**
**Claims priority, application Italy, Nov. 14, 1984, 2377/84[U]**
**Int. Cl.[4] F04B** *17/00, 35/04*
**U.S. Cl. 417—366** **4 Claims**

1. An electric compressor for motor vehicle horns, comprising:

an elecric motor having a stator, a pair of brushes and a shaft provided with a rotor winding and a commutator

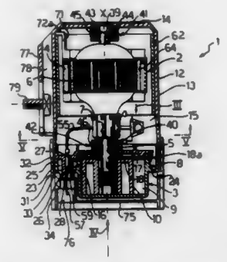
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an air compressor in axial alignment with said electric motor including a casing and a vane rotor rotatably driven by said shaft, wherein said casing comprises a main body having an off-centered chamber for said vane rotor, air intake and delivery ports, a cap forming a stop wall for said chamber and a metal disk positioned in said cap;

a bowl-type shell surrounding said electric motor, said shell having an axis, a bowl bottom and a bowl opening;

bearings positioned in said cap and in said bowl bottom for receiving said motor shaft, each of said bearings comprising a sleeve of highly heat resistant material and a bushing of anti-friction material fitted in said sleeve, said sleeves being housed in tubular appendages extending from said cap and said bowl bottom;



brush holding arms pivotally mounted on pins extending from said cap for mounting said pair of brushes thereon, said axis being axially displaceable along said pins between a pre-assembled position where said brushes are held apart by a stop means, and an operative position where said brushes are in pressure contact with said commutator,

wherein said electric motor stator includes a cylindrical base force fitted within said bowl-type shell and a pair of diametrically opposed polar shoes secured in said base by a cage and wherein said electric motor is mounted coaxially adjacent to said bowl bottom and said air compressor is mounted coaxially adjacent to said bowl opening, said air compressor casing forming a closure for said bowl-type shell.

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**4,741,678**

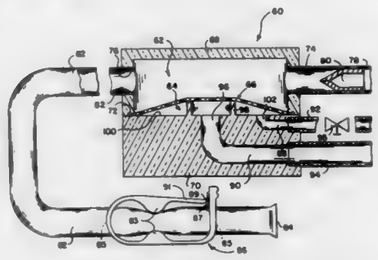
**PULSATILE PUMP**

**John R. Nehring, East Greenwich, R.I., assignor to C. R. Bard, Inc., Murray Hill, N.J.**

**Continuation of Ser. No. 587,250, Mar. 7, 1984, Pat. No. 4,662,829, which is a continuation-in-part of Ser. No. 568,356, Jan. 5, 1984, abandoned, which is a continuation of Ser. No. 297,728, Aug. 21, 1981. This application Nov. 25, 1986, Ser. No. 934,736**

**Int. Cl.⁴ F04B** *43/06*

**U.S. Cl. 417—395** **4 Claims**



1. A pulsatile pump operable to develop two strokes including a filling stroke and an injection stroke, said pump comprising:

a housing; an elastic member within the housing arranged to divide the housing into a first chamber and a second chamber;

said first chamber having an inlet and an outlet, said inlet, first chamber and outlet defining a flow path for fluid to be pumped;

means for directing flow so as to be unidirectional along the flow path, from the inlet to the outlet;

means for developing a pressure in the second chamber different from the pressure in the first chamber thereby to induce a pressure differential across the elastic member, said pressure differential effecting flexure of the elastic member in one of said strokes;

the other of said strokes being effected solely by the resilience of the elastic member;

means responsive to said flexure of the elastic member in said first stroke to abruptly terminate the pressure differential thereby enabling said elastic member to effect said other stroke under the influence of the resilience of the elastic member;

said second chamber being normally sealed and being provided with a normally closed vent means;

said means for terminating abruptly said pressure differential comprising said vent means being triggerable by said movement of said elastic member in said one stroke;

said means for effecting unidirectional flow comprising:

low impedance check valve means at the inlet to the first chamber;

the outlet from the chamber including an outlet tube, the outlet tube being sufficiently long so that it may contain a volume of fluid large enough so that when the elastic member abruptly begins the filling stroke the inertial effect of the mass of fluid in the outlet tube will be great enough to prevent reverse flow of liquid in the tube during the filling stroke whereby the first chamber will fill from liquid from the inlet, the check valve in the inlet having a lower impedance than that defined by the elongate outlet tube.

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**4,741,679**

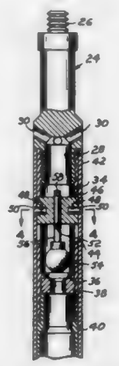
**OIL WELL PUMP TRAVELING VALVE**

**Donald L. Blassingame, 7432 NW. 5 Ter., Oklahoma City, Okla. 73127**

**Filed Oct. 20, 1986, Ser. No. 920,822**

**Int. Cl.⁴ F04B** *21/04*

**U.S. Cl. 417—554** **4 Claims**



1. A traveling valve for a sucker rod operated oil well pump having a standing valve and a working barrel, comprising:

pump head means vertically reciprocated by the depending end of the sucker rod and having a depending tubular end portion provided with fluid outlet ports;



first sleeve means depending from said tubular end portion for forming a fluid passageway therewith,

said first sleeve means comprising a first sleeve having diametrically opposed slots in the upper end portion of its wall;

second sleeve means surrounding the first sleeve means for connecting the pump head to said working barrel,

crosshead means including a generally rectangular crosshead extending transversely through said first sleeve means and connecting said first sleeve means to the second sleeve means by its respective end surfaces confronting the inner wall surface of said second sleeve means through the respective first sleeve slot, the first sleeve slots being vertically elongated a distance greater than the vertical dimension of the crosshead respective end portions permitting vertical reciprocable movement of predetermined magnitude of the first sleeve means relative to the crosshead and the second sleeve means when the first sleeve is reciprocated;

an outstanding pin on each end of the crosshead and projecting through the wall of said second sleeve means; and,

valve means tethered in said first sleeve means for opening and closing the fluid passageway in response to and in cooperative sequence with the reciprocating fluid pumping movement of said first sleeve means.

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**4,741,680**

**HIGH-PRESSURE PLUNGER PUMP WITH COAXIAL PRESSURE AND SUCTION VALVES**

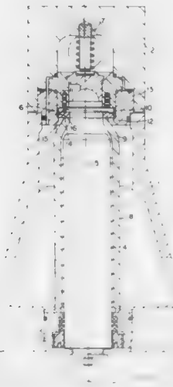
**Erich Bröker, Bad Salzuflen, and Paul Hammelmann, Zum Sundern 17, 4740 Oelde 1, both of Fed. Rep. of Germany, assignors to Paul Hammelmann, Oelde, Fed. Rep. of Germany**

**Filed Jun. 26, 1986, Ser. No. 879,135**

**Claims priority, application Fed. Rep. of Germany, Jun. 29, 1985, 3523387**

**Int. Cl.⁴ F04B** *21/02*

**U.S. Cl. 417—567** **8 Claims**



1. A high-pressure plunger pump, comprising a pump housing centered on an axis and including

a main body having two axially spaced ends, and

a pump head secured to one of said ends of said main body;

a plunger coaxially extending in said pump housing;

a sleeve floatingly supported on said plunger and having two end portions one of which is closer to said pump head than the other, converging toward said pump head and having an axial end face;

an insert body positionally secured in said pump housing and bounding a circumferentially extending annular suction channel with said one end portion of said sleeve, and including an annular shoulder having a substantially axially facing seating surface;

a pressure valve and a suction valve coaxially arranged within said housing, said suction valve being constructed as a plate valve including

an annular plate-shaped member having an outer and an inner region and movable relative to said insert body and said sleeve between an open position and a closed position so that said annular plate-shaped member forms a suction valve member while said sleeve does not move to perform the function of a suction valve member, said outer and inner regions respectively sealingly contacting said annular shoulder of said inner body and said axial end face of said sleeve in said closed position, and

spring means urging said suction valve member towards said closed position thereof.

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**4,741,681**

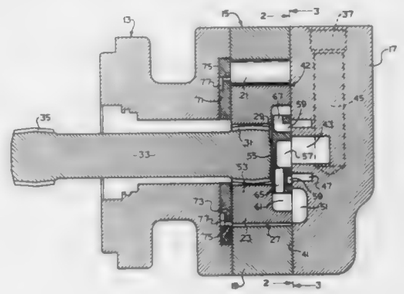
**GEROTOR MOTOR WITH VALVING IN GEROTOR STAR**

**Marvin L. Bernstrom, 8611 Red Oak Dr., Eden Prairie, Minn. 55344**

**Filed May 1, 1986, Ser. No. 858,151**

**Int. Cl.⁴ F03C** *2/08;* **F04C** *2/10*

**U.S. Cl. 418—61 B** **8 Claims**



1. A rotary fluid pressure device of the type comprising housing means including an endcap member defining a fluid inlet port and a fluid outlet port; a gerotor gear set associated with said housing means and including an internally-toothed ring member, and an externally-toothed star member eccentrically disposed within said ring member; one of said ring member and said star member having orbital movement relative to the other of said members, and said star member having rotational movement relative to said ring member and said housing means; the internal teeth of said ring member and the external teeth of said star member interengaging to define a plurality N+1 of expanding and contracting fluid volume chambers during said relative orbital and rotational movements; shaft means and means operable to transmit said rotational movement of said star member to said shaft means; said endcap member defining a first fluid pressure chamber in continuous fluid communication with said one of said fluid inlet port and said fluid outlet port, and a second fluid pressure chamber in continuous fluid communication with the other of said fluid inlet port and said fluid outlet port, said second fluid pressure chamber surrounding said first fluid pressure chamber; said star member defining a first manifold zone in continuous fluid communication with said first fluid pressure chamber, and a second manifold zone in continuous fluid communication with said second fluid pressure chamber; said star member including an end surface disposed toward said endcap member and defining first and second sets of fluid ports, said first set of fluid ports being in continuous fluid communication with said first manifold zone, and said second set of fluid ports being in continuous fluid communication with said second manifold zone, characterized by:

(a) said second manifold zone being generally annular and surrounding said first manifold zone;

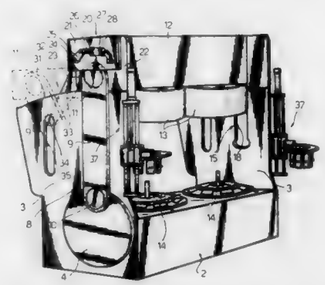
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(b) said end surface of said star member being in sliding, sealing engagement with an adjacent surface of said endcap member;
(c) said adjacent surface of said endcap member defines a plurality N+1 of value passages, each of said valve passages being in continuous fluid communication with one of said expanding and contracting fluid volume chambers; and
(d) said first and second sets of fluid ports being defined solely by said end surface of said star member and being in commutating fluid communication with said plurality N+1 of valve passages defined by said endcap member in response to said relative rotational movement of said star member.

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**4,741,682**
**TIRE MOLDING PRESS**
**Roberto Mauro, Rome, Italy, assignor to The Firestone Tire & Rubber Company, Akron, Ohio**
**Filed Jul. 9, 1987, Ser. No. 71,673**
**Claims priority, application Italy, Jul. 17, 1986, 67578 A/86**
**Int. Cl.[4] B29C *35/00***
**U.S. Cl. 425—28.1** **7 Claims**

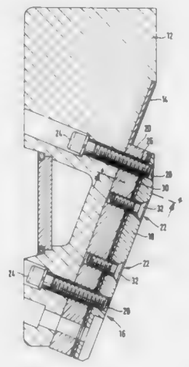


1. A tire molding press comprising a fixed bed; two uprights extending upwards from the said bed; a crosspiece mounted in such a manner as to travel along the said uprights; and a crank mechanism for driving the said crosspiece to and from the said bed, the said crank mechanism comprising a slide connected to the said crosspiece, and first substantially vertical guide means, for the said slide, extending upwards from the said bed; wherein each said upright presents, at the top end, second substantially horizontal guide means for the said slide, and a substantially vertical extension of said vertical guide means above said horizontal guide means; the said first guide means comprising a first guide portion extending along each said upright, and a second guide portion extending along each said extension; and switch means being provided for placing each said first guide portion selectively in communication with the respective said second guide portion and with the said second guide means.

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**4,741,683**
**VULCANIZING MOLD FOR VEHICLE TIRES**
**Rainer Hilke, Starnberg, and Gerhard Schmaderer, Cham, both of Fed. Rep. of Germany, assignors to A-Z Formen- und Maschinenbau GmbH, Munich, Fed. Rep. of Germany**
**Filed Jun. 19, 1987, Ser. No. 64,991**
**Claims priority, application Fed. Rep. of Germany, Jun. 23, 1986, 8616697[U]**
**Int. Cl.[4] B29C *35/00***
**U.S. Cl. 425—47** **13 Claims**

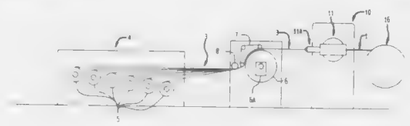
1. A vulcanizing mold for tires of vehicles, with said mold including an upper and lower sidewall part, and a closure ring that has a conical inner surface and is intended for a tread-molding ring, with certain portions of said conical inner surface being subject to pressure; guide mechanisms are provided on said conical inner surface for guiding, in a sliding manner, sliding shoes; segments that form said tread-molding ring are rigidly connected to said sliding shoes; said vulcanizing mold further comprises:



first sheets of sliding material that are disposed on those portions of said conical inner surface that are subject to pressure.

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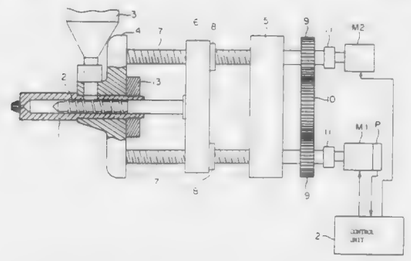
**4,741,684**
**OPTICAL CABLE WITH FILLING COMPOUND AND PARALLEL FIBERS**
**Kenneth E. Cornelison, Overland Park, and Michael E. McGuire, Shawnee Mission, both of Kans., assignors to Ericsson, Inc., Overland Park, Kans.**
**Division of Ser. No. 687,601, Dec. 31, 1984. This application Feb. 9, 1987, Ser. No. 12,754**
**Int. Cl.[4] B29C *47/06, 47/10***
**U.S. Cl. 425—114** **3 Claims**



1. An apparatus for making buffer tubes for optical fiber cable members with optical fibers of equal length comprising:
(a) payoff reels for holding spools of single mode optical fibers;
(b) a capstan;
(c) biasing means to bias the fibers against the capstan for pulling the fibers from the spools;
(d) a guide means for directing the optical fibers in spaced but parallel relationship as they are pulled over the capstan;
(e) a crosshead for extruding a buffer tube around the optical fibers such that said fibers take a random path with respect to each other;
(f) means for collecting the fibers in a random grouping immediately prior to said crosshead; and
(g) means to inject soft filler material within the buffer tube and fill the space within said buffer tube.



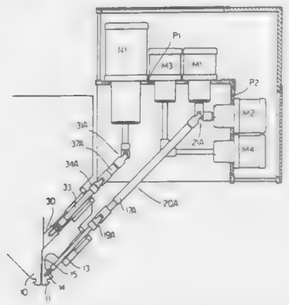
**4,741,685**
**INJECTION DRIVE APPARATUS**
**Yoshiharu Inaba, Kawasaki; Fumio Mitoguchi, Hino; Keiji Sakamoto, and Masatoyo Sogabe, both of Hachioji, all of Japan, assignors to Fanuc Ltd, Minamitsuru, Japan**
**PCT No. PCT/JP86/00612, § 371 Date Jul. 27, 1987, § 102(e) Date Jul. 27, 1987, PCT Pub. No. WO87/03246, PCT Pub. Date Jun. 4, 1987**
**PCT Filed Nov. 29, 1986, Ser. No. 86,141**
**Claims priority, application Japan, Nov. 30, 1985, 60-268296**
**Int. Cl.[4] B29C *45/80***
**U.S. Cl. 425—145** **4 Claims**



1. In an injection drive apparatus for injection molding adapted to perform injection by moving a screw in an axial direction by means of ball screw means driven by servomotors, said injection drive apparatus comprising a plurality of servomotors for driving said ball screw means, a position detector attached to one of said plurality of servomotors, and a control unit adapted to deliver a torque command to power amplifiers, said power amplifiers provided individually for said plurality of servomotors, on reception of a signal from said position detector, thereby controlling the drive of the individual servomotors.

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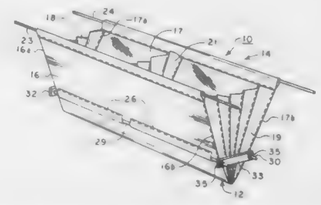
**4,741,686**
**EXTRUSION DIE FOR PLASTIC MATERIAL**
**Gilberto Cazzani, Morazzone, and Luigi Macchi, Gorla Maggiore, both of Italy, assignors to Omipa Italia S.N.C. Di Cazzani Gilberto & C., Morazzone, Italy**
**PCT No. PCT/EP86/00265, § 371 Date Jan. 12, 1987, § 102(e) Date Jan. 12, 1987, PCT Pub. No. WO86/06678, PCT Pub. Date Nov. 20, 1986**
**PCT Filed May 5, 1986, Ser. No. 8,509**
**Claims priority, application Italy, May 15, 1985, 20730 A/85**
**Int. Cl.[4] B29C *47/16***
**U.S. Cl. 425—381** **5 Claims**



1. An extrusion die having an extrusion slit defined by two lips one of which is flexible, a plurality of thrust members disposed very close to one another and bearing against said one lip, a drive motor individual to each thrust member for rotating each thrust member, means converting rotary motion of each thrust member into movement of said one lip toward or away from the other said lip, and a universal joint directly connecting an output shaft of each said motor to its respective thrust member, said output shafts being at oblique angles to their respective thrust members and some of said output shafts being disposed at substantial angles to others of said output shafts whereby said motors are staggered.

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**4,741,687**
**GUIDE SKIRT AND DEVICE OF COLLECTING AND STORING INJECTION MOLDED PARTS**
**Frank Eltvedt, 5 Lake Dr., Lake in the Hills, Ill. 60102**
**Filed Aug. 11, 1986, Ser. No. 895,504**
**Int. Cl.[4] B29C *45/40***
**U.S. Cl. 425—441** **11 Claims**



1. A parts producing machine having a device for collecting and subsequently dropping parts ejected from said machine, said machine including a pair of platens mounted for relative movement toward and away from one another between a first position wherein said platens are disposed in mutual proximity and a second position wherein said platens are remotely disposed, said parts being ejected into the space between said platens when said platens are in said second position, comprising in combination
first and second side wall members each having an upper edge, a bottom edge and two side edges,
two flexible end wall members respectively disposed between the side edges of said side wall members,
said top edges of side wall members being respectively connected to said platens so as to be moved toward and away from one another as said platens move between said first and second positions, and
fulcrum means pivotally connected to each of said side wall members at locations spaced from said top and bottom edges to cause said bottom edges to move toward one another as said platens move away from one another.

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**4,741,688**
**INJECTION STRETCHING AND BLOW MOLDING MACHINE**
**Katashi Aoki, 6037 Ohazaminamijo, Sakaki-machi, Hanishina-gun, Nagano-ken, Japan**
**Continuation of Ser. No. 638,949, Aug. 8, 1984, abandoned, which is a division of Ser. No. 491,030, May 3, 1983, abandoned. This application Jan. 5, 1987, Ser. No. 932,561**
**Claims priority, application Japan, May 1, 1982, 57-78752; May 10, 1982, 57-77988**
**Int. Cl.[4] B29C *49/06, 49/64***
**U.S. Cl. 425—526** **4 Claims**

1. An injection stretching and blow molding machine comprising:
a base plate secured parallel to and spaced from a machine bed;
a rotary disk supported under the base plate and provided with neck molds in a predetermined spaced relationship;
a plurality of operating stations including an injection molding operation station, a temperature control operating

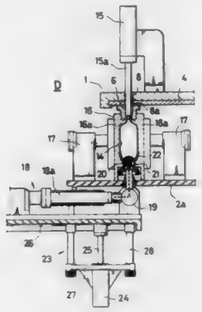
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station, and a stretching and blow molding operation station arranged in that order on said machine bed;

drive means for intermittently turning said rotary disk for predetermined intervals to move said neck molds relative to said plurality of stations;

a secondary working operating station disposed on said machine bed between said stretching and blow molding operating station and a releasing operating station;



said secondary working operating station including a split mold for receiving the hollow molded product and said neck mold, a mechanism for opening and closing said split mold, passageways in said mold for conducting a heat medium to heat the hollow molded product to a predetermined temperature, and a secondary blow core for insertion in to the hollow molded product for blowing high temperature air into the hollow molded product to urge the hollow blow molded product against the engaging surface of the split mold.

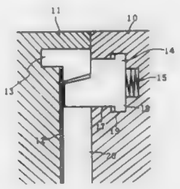
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**4,741,689**

**INJECTION MOLD FOR AN OPTICAL DISK**

**Yoshio Onizawa, Hyogo, and Yasushi Hiramatsu, Himeji, both of Japan, assignors to Daicel Chemical Industries, Ltd., Osaka, Japan**

**Filed Oct. 30, 1986, Ser. No. 924,662**
**Claims priority, application Japan, Nov. 1, 1985, 60-245678**
**Int. Cl.⁴ B29C *45/34***
**U.S. Cl. 425—542** **3 Claims**



1. An injection mold for injection molding a plastic substrate for a high-density information recording medium, comprising:

(a) first and second half molds each having a disk-shaped cavity, said cavity of said first half mold facing said cavity of said second half mold, said half molds being movable relative to each other so as to form a disk-shaped molding cavity therebetween;

(b) a means for injecting molten plastic into said disk-shaped molding cavity;

(c) an annular sliding member axially slidably supported around the outer circumference of said disk-shaped cavity of said first half mold;

(d) biasing means in said first half mold for biasing said annular sliding member toward the disk-shaped cavity surface of said second half mold; and

(e) an annular outer ring and a stamper attached to said second half mold, said annular outer ring and said stamper maintaining a constant clearance with a portion of said annular sliding member to provide a gas vent when said molding cavity is formed.

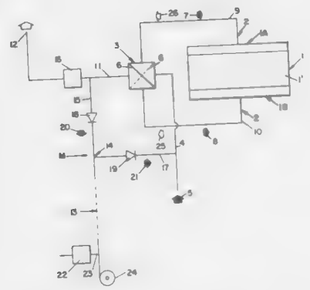
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**4,741,690**

**PROCESS FOR COMBUSTION OR DECOMPOSITION OF POLLUTANTS AND EQUIPMENT THEREFOR**

**Björn Heed, Utlandagatan 19, S-412 61 Göteborg, Sweden**

**PCT No. PCT/SE85/00257, § 371 Date Feb. 18, 1986, § 102(e) Date Feb. 18, 1986, PCT Pub. No. WO86/00389, PCT Pub. Date Jan. 16, 1986**
**PCT Filed Jun. 19, 1985, Ser. No. 848,397**
**Claims priority, application Sweden, Jun. 21, 1984, 8403330**
**Int. Cl.⁴ F23D *3/40***
**U.S. Cl. 431—7** **13 Claims**



1. A process for treatment of gas, vapor, or air-borne particulant pollutants comprising the steps of:

feeding the pollutant gas into a chamber having a heated bed with heat-accumulating and heat-exchanging properties, to raise the termperature of the pollutant gas to cause combustion or decomposition thereof; and

reversing the direction of gas flow in the chamber to cause treated pollutant gas to raise the termperature of the incoming untreated pollutant gas comprising the step of re-routing pollutant gas from the input of the heated chamber to a storage chamber at the time of the changing of direction of gas flow, and from which storage chamber, the pollutant gas is later routed back into the heated chamber.

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**4,741,691**

**WASTE GAS BURNER**

**Joseph L. Messimer, P.O. Box 472, 610 W. Broadway, Winnsboro, Tex. 75494**

**Filed Jan. 20, 1987, Ser. No. 4,444**
**Int. Cl.⁴ F23D *14/00***
**U.S. Cl. 431—202** **13 Claims**

8. A waste gas burner comprising:

a flare stack for receiving waste or hazardous gas and having an open end;

a chamber on said flare stack for receiving said gas from said flare stack;

said chamber having means for the passage of ambient air;

jet line means attached at one end to a source of gas under pressure and entering said flare stack at the opposite end of said jet line and extending co-axially therewith a distance and entering into said chamber at a point above said open end of said flare stack said gas under pressure in said jet line creating a vacuum in said chamber drawing ambient air into said chamber through said means for the passage of ambient air whereby said ambient air is mixed with said gas exiting the flare stack;

a flare tip on said chamber for the passage of said mixed gas and air; and



ignitor means adjacent to said flare tip for igniting said mixed gas and air.

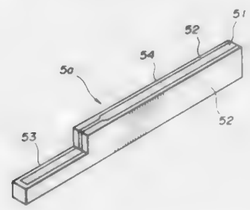
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**4,741,692**

**BURNER IGNITER WITH A CERAMIC HEATER**

**Tomohiko Sadakata, and Shigeyoshi Kawano, both of Kure, Japan, assignors to Babcock-Hitachi Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 1, 1985, Ser. No. 782,624**
**Claims priority, application Japan, Oct. 2, 1984, 59-205500**
**Int. Cl.⁴ F23Q *7/06***
**U.S. Cl. 431—258** **23 Claims**



1. A circuit arrangement for an igniter of a burner comprising:

(a) power source means arranged to control output current therefrom in accordance with a current control signal;

(b) a ceramic heater arranged to be energized by said power source means;

(c) resistance-detecting means for detecting the resistance of said ceramic heater;

(d) current-detecting means for detecting current fed from said power source means to said ceramic heater; and

(e) feedback control means responsive to output signals from said resistance-detecting means and to said current-detecting means for producing a said current control signal which is fed back to said power source means for controlling the current to said ceramic heater.

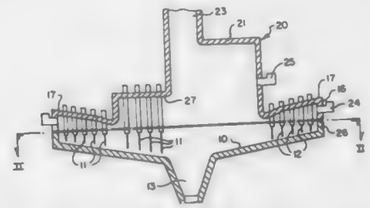


**4,741,693**

**METHOD AND APPARATUS FOR CALCINING MATERIAL CONTAINING VOLATILE CONSTITUENTS**

**William E. Solano; James P. Docherty, and Joseph W. Stubenbort, all of Pittsburgh, Pa., assignors to Salem Furnace Co., Pittsburgh, Pa.**

**Continuation of Ser. No. 895,712, Aug. 12, 1986, abandoned, which is a division of Ser. No. 797,150, Nov. 12, 1985, Pat. No. 4,637,795. This application May 21, 1987, Ser. No. 52,077**
**Int. Cl.⁴ F27D *13/00***
**U.S. Cl. 432—5** **1 Claim**



1. The method of calcining a bulk material containing a volatile constituent in a furnace having a stationary circular chamber and roof and a hearth rotating therein with a discharge opening in its center and transport rabbles mounted in said roof extending into said hearth for urging material on said hearth toward said discharge opening when said hearth is rotated, said chamber having means positioned intermediate said discharge opening and said chamber wall so as to divide said chamber into at least an inner and an outer connecting co-axial annular portion, comprising charging said material on said hearth in said outer portion to form a bed traveling toward said discharge opening, applying radiant heat to said material below calcining temperature in said outer portion, and turning over and mixing the charge with said rabbles in said outer portion against the direction of travel of said material, thereby imparting to said material a transport component directed toward said charging opening so as to reduce the difference between its surface heating rate and its bulk heating rate, then heating said material to calcining temperature in said inner portion while mixing said material in the direction of travel, thereby imparting to said material a transport component directed towards said discharge opening, and adjusting said mixing steps so that the transport of said bed through said annular portions is completed when said volatile constituents are driven off and said calcining is completed.

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**4,741,694**

**METHOD FOR CALCINING CARBONACEOUS MATERIALS**

**Donald R. Mason, Baton Rouge, La., and Robert L. Chambers, League City, Tex., assignors to Reynolds Metals Co., Richmond, Va. and Union Carbide Corporation, Danbury, Conn.**

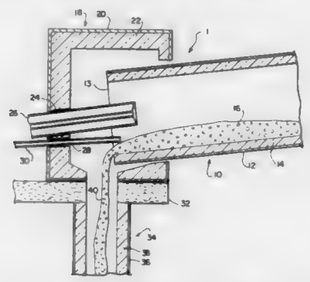
**Continuation of Ser. No. 581,246, Feb. 17, 1984, abandoned. This application Mar. 29, 1985, Ser. No. 717,595**
**Int. Cl.⁴ F27B *15/00***
**U.S. Cl. 432—14** **4 Claims**

1. In a method for calcining carbonaceous materials comprising passing said carbonaceous materials through a rotary kiln and heating said carbonaceous material to a temperature sufficient to drive off volatile components of said carbonaceus material from said carbonaceous material the improvement comprising heating said rotary kiln to an operating temperature by means of an air-combustion fuel burner positioned at the lower end of said rotary kiln during start-up of said rotary kiln, impinging gaseous oxygen onto said carbonaceous material at said lower end of said rotary kiln when said rotary kiln has reached said operating temperature to agitate a portion of said carbonaceous material at said lower end of said rotary kiln and thereby ignite said portion of said carbonaceous material,

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burning said portion of said carbonaceous material to provide the necessary energy input to maintain said operating temperature in said rotary kiln and shutting down said air-combustion



fuel burner when said rotary kiln has reached said operating temperature, whereby said oxygen completely replaces said air-combustion fuel burner after said start-up of said rotary kiln.

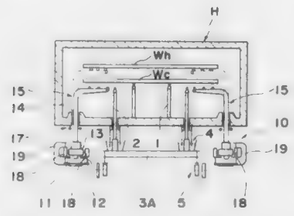
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**4,741,695**

## WALKING BEAM TYPE REHEATING FURNACE

**Shigemi Ushijima, Nagaokakyo, Japan, assignor to Chugai Ro Co., Ltd., Osaka, Japan**

**Filed Jul. 23, 1986, Ser. No. 888,432**
**Claims priority, application Japan, Aug. 9, 1985, 60-176077**
**Int. Cl.⁴ F27B *9/14***
**U.S. Cl. 432—121** **6 Claims**



1. A walking beam type reheating furnace which comprises:
a furnace housing having a charge opening defined at one end thereof for charging a workpiece therethrough and a discharge opening defined at the other end thereof for discharging said workpiece therefrom, with an exhaust port for exhausting gas inside said housing being formed on the charge end of the furnace and a door being arranged on each of said openings;
a plurality of stationary beams extending in a longitudinal direction of the furnace;
a plurality of movable beams parallel to said stationary beams and extending in said longitudinal direction of the furnace, said movable beams being separated at least into first movable beams on the charge side of the furnace and second movable beams on the discharge side thereof, each of which movable beams is provided with a vertical and a horizontal drive unit; and
workpiece transfer means for removing an individual workpiece from any selected position on said stationary beams and said first movable beams in the charge end of the furnace and for moving the individual workpiece directly to a position in the vicinity of a separating portion of the furnace at which the first and the second movable beams are separated from each other in the longitudinal direction, said workpiece transfer means being movable vertically a distance sufficient to pass the individual workpiece over any other workpieces on the first movable beams and stationary beams in the charge end to thereby remove the individual workpiece from the stationary beams and the first movable beams in the charge end of the furnace and the workpiece transfer means being movable in the longitudinal direction to move the individual workpiece to the position in the vicinity of the separating portion of the furnace during transfer of the individual workpiece to the separating portion of the furnace, said workpiece transfer means including a plurality of workpiece supporting members separated from each other in a direction perpendicular to the longitudinal direction, the members being movable both in the longitudinal direction and in a vertical direction, said workpiece supporting members being L-shaped with free ends thereof extending in a direction perpendicular to said longitudinal direction;
whereby a workpiece can be transferred to said separating portion, while being supported on said workpiece transfer means in a zone where said first movable beams are located.

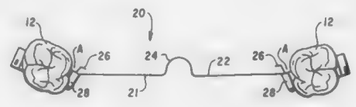
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**4,741,696**

## ORTHODONTIC APPLIANCES FOR DENTAL ARCH EXPANSION

**Norman Cetlin, Newton, Mass., assignor to GAC International, Inc., Central Islip, N.Y.**

**Filed Sep. 25, 1986, Ser. No. 911,408**
**Int. Cl.⁴ A61C *7/00***
**U.S. Cl. 433—7** **10 Claims**



1. A system of orthodontic appliances, comprising:
at least one transpalatal bar means, including adjustable palatal wire means, the ends of said palatal wire means being received in maxillary lingual sheaths carried on a pair of maxillary molars, the wire receiving portions of said lingual sheaths being mesially offset by about eight degrees; and
mandibular expansion means, including lip bumper means extending around the periphery of the mandibular arch without making contact with the teeth thereof, the distal ends of said lip bumper means being received into the bumper receiving portion of mandibular buccal tube means carried on two mandibular molars, said bumper receiving portions being mesially offset by about five degrees.

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**4,741,697**

## CHAIRSIDE FILTER/DRYER FOR DENTAL AIR SYRINGE

**Richard J. Herbison, 198 Park Rd., Pittsford, N.Y. 14534**

**Filed Dec. 24, 1986, Ser. No. 945,826**
**Int. Cl.⁴ A61C *3/00*; B01D *39/00, 19/00***
**U.S. Cl. 433—25** **11 Claims**

1. In combination with a hand-manipulable dental air syringe, a supply of compressed air having primary filtering means for removing undesirable matter from the compressed air, and a flexible air line for conveying compressed air from said primary filtering means to said syringe, the improvement comprising a disposable, non-replenishable filter cartridge removably connected in said flexible air line between said syringe and said primary filtering means and including
a transparent sleeve,
tubular means fixedly secured to opposite ends respectively, of said sleeve,
said tubular means including coupling means releasably and sealingly connecting opposite ends of said sleeve in said flexible air line adjacent said syringe sot that said sleeve is viewable by the dentist manipulating said syringe, and so that compressed air from said primary filtering means will pass through said sleeve on its way to said syringe, and
secondary filtering means mounted in said sleeve for removing residual undesirable matter from the compressed air,
said secondary filtering means including a desiccant for removing residual moisture from the compressed air, said desicant being in direct contact with the inner peripheral surface of said sleeve and normally being of a first color when said cartridge is initally connected in said line, and being operative progressively to change to a second color as it removes moisture from said compressed air during use of the syringe.

9. A disposable filter cartridge for removing residual contaminates from compressed air passed through a flexible air line from a filtered supply of compressed air to a hand manipulable air syringe, comprising
an elongate housing open at opposite ends thereof,



a pair of caps fixed over and closing opposite ends of said housing, each of said caps having therethrough an axial bore communicating with the interior of said housing,
a pair of porous membrane filter elements mounted in said caps and overlying opposite ends, respectively, of said housing,
tubular means integral with and projecting from each of said caps for releasably connecting the interior of said housing in a compressed air supply line for an air syringe, whereby compressed air will be caused to travel longitudinally through said housing and said pair of filter elements during use of said syringe, and
a desiccant mounted in said housing between said membrane filter elements and operative to remove moisture from the air passing through said housing, and operative progressively to change from a first to a second color at a rate proportionate to the amount of the moisture removed thereby from said air,
at least a portion of said housing intermediate its ends being transparent, whereby any change in the color of said desiccant will be readily observable from the exterior of said housing.



**4,741,698**

## SUBPERIOSTEAL IMPANT WITH DETACHABLE BAR AND METHOD FOR ITS IMPLANTING

**Douglas V. Andrews, Pataskala, Ohio, assignor to Andrews Ceramic Laboratory, Inc., Columbus, Ohio**

**Filed Apr. 8, 1986, Ser. No. 849,379**
**Int. Cl.⁴ H61C *8/00***
**U.S. Cl. 433—173** **23 Claims**



1. A subperiosteal dental implant for a denture which comprises:
(a) a frame which is shaped to conform to and cradle around and attachable to the mandibular or maxillary bone, said frame bearing solid or annular post bar retention means;
(b) a detachable bar having complementary interfitting solid or annular post bar retention means for removably attaching said detachable bar to said frame, said bar being adapted for removal from said frames; and
(c) a denture bearing denture bar retention means for attaching said denture to said detachable bar, said denture fashioned from an impression which contains said detachable bar.

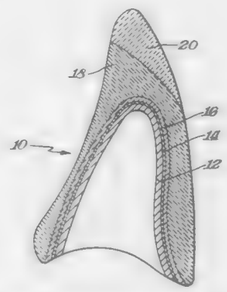
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**4,741,699**

## UNIFORMLY FLUORESCING PORCELAIN DENTAL RESTORATIONS

**Peter Kosmos, Alsip, Ill., assignor to Austenal International, Inc., Chicago, Ill.**

**Continuation of Ser. No. 524,721, Aug. 19, 1983, Pat. No. 4,645,455. This application Sep. 12, 1986, Ser. No. 907,500**
**The portion of the term of this patent subsequent to Feb. 24, 2004, has been disclaimed.**
**Int. Cl.⁴ A61C *13/08***
**U.S. Cl. 433—203.1** **2 Claims**



1. An unfired dental porcelain formulation for imparting a level of fluorescence to match the level of a natural tooth in a dental restoration containing an opaque porcelain layer, a body porcelain layer, and an incisal porcelain layer, said formulation comprising a base porcelain powder, a stained porcelain powder, and an inorganic pigment of the formula:

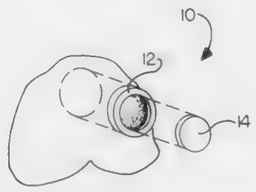
$$(X.SE+A.Ce+B.Tb+C.Mn)_2O_3.SiO_2$$

wherein

SE=at least one of the elements yttrium, gadolinum, and lanthanum;
Ce=cerium;
Tb=terbium;
Mn=manganese;
A=0.005 to 0.1 mole fraction;
B=0.005 to 0.1 mole fraction;
C=0.001 to 0.025 mole fraction; and
X=1.0−(A+B+C),
and wherein said inorganic pigment is present at a level of from about 1.5 to 10 weight percent in the opaque layer; from about 0.05 to 0.5 weight percent in the body layer; and from about 0.02 to 0.2 weight percent in the incisal layer.

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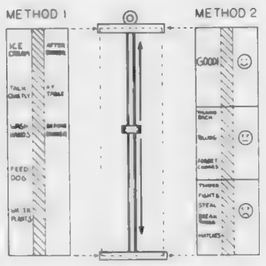
**4,741,700**
**DENTAL BREATH FRESHENING DEVICE**
David J. Barabe, 2741 Lansdale La., Winston-Salem, N.C. 27103
Filed Jul. 16, 1986, Ser. No. 886,636
Int. Cl.[4] A61C *5/00*
U.S. Cl. 433—229 14 Claims




1. A breath freshening device for attachment to a natural tooth within the mouth of a user comprising:
a base means having means for bonding said base means to the surface of the natural tooth; and
a soluble aromatic substance replaceably engaged by said base means, whereby saliva can flow over and dissolve said aromatic substance and thereby freshen the breath of the user for an extended period of time.

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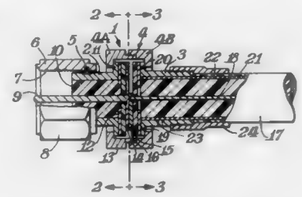
**4,741,701**
**APPARATUS FOR PROVIDING VISUAL FEEDBACK CONCERNING BEHAVIOR**
Steven A. Kossor, R.D. #6, Coatesville, Pa. 19320
Continuation-in-part of Ser. No. 912,599, Sep. 29, 1986, abandoned. This application Mar. 17, 1987, Ser. No. 26,769
Int. Cl.[4] G09B *1/14*
U.S. Cl. 434—238 11 Claims




1. Apparatus for providing visual feedback concerning behavior, comprising:
(a) a shaft,
(b) an indicator mounted for slidable movement along the shaft,
(c) a panel, and
(d) a pair of end pieces,
(e) wherein the end pieces comprise means for holding the shaft and the panel, and wherein the panel includes indicia indicating a plurality of objectives and at least one reward, wherein the indicator can be moved to a position corresponding to the achievement of an objective and the earning of a reward.

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**4,741,702**
**PHASE-ADJUSTABLE COAXIAL CABLE CONNECTOR**
Hiromi Yasumoto, Saitama, Japan, assignor to Junkosha Co., Ltd., Tokyo, Japan
Filed Aug. 31, 1987, Ser. No. 91,644
Claims priority, application Japan, Oct. 3, 1986, 61-235840
Int. Cl.[4] H01R *39/00*
U.S. Cl. 439—13 8 Claims



1. A phase-adjustable coaxial cable connector comprising
a connector housing supporting a metal coupling at one end of said housing and a coaxial cable at the other end of said housing,
said coaxial cable having a center conductor and an outer shield separated from said center conductor by a dielectric material,
said coupling supporting a central connecting and conducting pin element supported by a dielectric material which separates said coupling and said pin element,
one end of said pin element being adjacent an end of said center conductor whereat a first electrical conductor affixed to said center conductor extends perpendicular to said center conductor, said first conductor being in electrical contact with and rotationally moveable with respect to
a second open-circuit electrical conductor affixed to said one end of said pin element and being perpendicular thereto,
whereby, rotation of said first electrical conductor with respect to said second electrical conductor provides means for adjusting the electrical path length of said connector to permit phase adjustability.

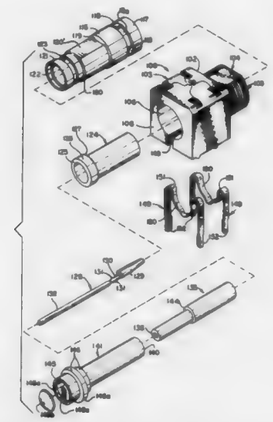
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**4,741,703**
**PCB MOUNTED TRIAXIAL CONNECTOR ASSEMBLY**
Douglas M. Johnescu, York; George W. Michael, III, Harrisburg; Randolph E. Capp, and Ronald C. Laudig, both of Mechanicsburg, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.
Continuation-in-part of Ser. No. 895,964, Aug. 12, 1986, abandoned. This application Jan. 23, 1987, Ser. No. 6,522
Int. Cl.[4] H05K *1/00*
U.S. Cl. 439—63 15 Claims

1. In an electrical connector assembly comprising, an insulative body having a base, an electrical connector encircled by the insulative body and having a conductive exterior shell with a disconnect coupling portion, and having an electrical disconnect contact with an electrical disconnect contact portion and an electrical terminal projecting outwardly from the base, the body holding and positioning the connector within a hollow interior portion of the body, an opening in the body communicating with the hollow interior, an electrical contact constructed for insertion along the opening toward the connector and into engagement with the shell, and electrical terminals

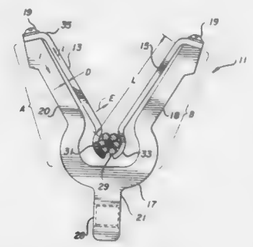


extending from the holder, at least one these terminals projecting outwardly from the base, the improvement comprising;
the electrical contact includes an elongated holder shaped along its length to conform to and engage against the exterior of the shell, the holder has an open side for receiving passage of the exterior of the shell, and the opening in the body is constructed with a cross section to receive passage of the holder transversely of its length and toward the conductor in the hollow interior with the open side of the holder facing the shell.



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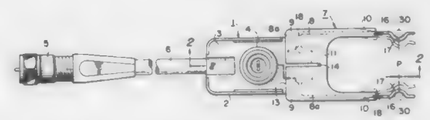
**4,741,704**
**TAP CONNECTOR**
Carlo B. DeLuca, Ormond Beach, Fla., assignor to Homac Mfg. Company, Ormond Beach, Fla.
Filed Mar. 13, 1987, Ser. No. 25,704
Int. Cl.[4] H01R *13/648*
U.S. Cl. 439—92 9 Claims



1. An electrical tap connector comprising
a pad;
means for connecting said pad to a ground connector;
a pair of opposed substantially rigid conductive plates extending from one end of said pad;
substantially flat conductive spring means secured substantially to the terminal ends of said conductive plates and extending toward said pad at a predetermined distance from said plates; and
means at the terminal ends of said springs for supporting an electrical conductor between said springs.

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**4,741,705**
**CONNECTOR APPARATUS FOR ANTENNA TERMINAL OF TELEVISION RECEIVER**
Tsuneo Akiyama, Yokohama, Japan, assignor to Shintom Kabushiki Kaisha, Kanagawa, Japan
Filed May 22, 1986, Ser. No. 866,580
Claims priority, application Japan, May 22, 1985, 60-75040[U]
Int. Cl.[4] H01R *11/22*
U.S. Cl. 439—270 6 Claims



1. A connector apparatus for electrically connecting a coaxial cable having inner and outer conductors and extending from an alternative program source to antenna terminals comprised of a pair of rods spaced apart from each other and provided on the back of a television receiver, said connector apparatus comprising:
a housing;
means disposed in the housing and connected to the end of the coaxial cable extending from said alternative program source for introducing the inner conductor and the outer conductor of said coaxial cable into said housing;
a pair of lead members composed of resilient electric conductors, each of the lead members having one end extended into said housing and the other free end extended from said housing;
means for operationally connecting the one ends of said pair of lead members to the inner conductor and the outer conductor, respectively, of said coaxial cable;
a common support member for supporting said pair of lead members, said common support member being attached to said housing and introducing the one ends of said pair of lead members into said housing, and further having a pair of sleeves, said sleeves being in parallel with each other and extended downwardly outward from one end of the top surface of the housing, and surrounding major portions of said lead members excluding their free ends, said sleeves being resiliently deflectable together with the lead members,
the free ends of said lead members being spaced apart a distance greater than the distance between the rods of said antenna terminals so that when said free ends are inserted forcibly between said antenna terminals, said free ends can resiliently and frictionally engage with the corresponding antenna terminals thereby establishing the electrical connection therebetween; and
a socket section provided on said housing, said socket section including therein an outer terminal and an inner terminal electrically connected respectively to the inner conductor and the outer conductor of said coaxial cable so that said socket section can be optionally connected to connector type antenna terminals provided on the back of a television receiver.

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**4,741,706**
**LOCKED CONNECTOR**
Mitsuru Takeda, and Sadao Kuboi, both of Mooka, Japan, assignors to Daiichi Denshi Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Mar. 5, 1987, Ser. No. 21,995
Claims priority, application Japan, Mar. 6, 1986, 61-49355; Oct. 17, 1986, 61-246910; Oct. 30, 1986, 61-259414
Int. Cl.[4] H01R *13/625*
U.S. Cl. 439—318 5 Claims

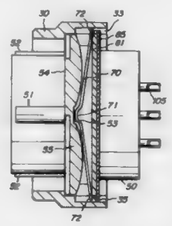
1. A locked connector for use in electric connectors, optical

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fiber connectors and the like, including receptacle means having a recetacle shell, coupling means engaging the receptacle means with relative rotations, plug shell means having a plug shell engaging the receptacle shell with relative movements in their axial directions but against relative rotation, back-up means permitting said coupling means and said plug shell means to rotatably engage with each other, and detent means for holding said receptacle means and said plug shell means in their fitted position and permitting said receptacle means and said plug shell means to disengage from the fitted position by rotating said coupling means relative to said plug shell means with a force, said detent means comprising:

a detent ring encircling said plug shell means and having means for rotating together with said coupling means to



form a detent mechanism in connection with said plug shell, and spring means for urging said detent ring toward said plug shell; said detent ring provided with detent projections extending in an axial direction of the detent ring; said plug shell including a plug flange encircling the plug shell, said plug flange being formed with a plurality of detent recesses for receiving said detent projections of said detent ring to form said detent means; said plug flange provided with surfaces in opposition to said detent ring, said surfaces each having a mid-portion between said adjacent detent recesses and having a progressively decreased thickness from said mid-portion to the adjacent detent recesses to form a plurality of circular surfaces about the circumference of the plug flange, said detent recesses located at the bottoms of said circular arc surface.

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**4,741,707**

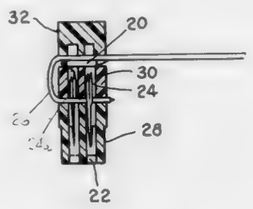
**METHOD AND WOVEN CABLE TERMINATION WITH INSULATION DISPLACEABLE CONNECTOR**

**E. J. Mondor, III, Greenville, S.C., assignor to Woven Electronics Corporation, Greenville, S.C.**

**Filed Feb. 19, 1986, Ser. No. 830,725**

**Int. Cl.[4] H01R** *4/24*

**U.S. Cl. 439—417** **18 Claims**



1. The method of terminating a flat woven multi-conductor electrical transmission cable having a plurality of signal conductors fixed in a first weave pattern which includes a weft element in said cable with a prescribed spacing between the center lines of adjacent conductors and a number of ground conductors woven in said cable wherein the improvement comprises weaving a termination section in which said signal conductors are bound with said warp and weft yarns in a second weave pattern and said ground conductors are unbound with said warp and weft yarns, floating said unbound ground conductors out of said second weave pattern while maintaining said prescribed spacing of said signal conductors fixed in said second weave pattern, terminating said ground conductors to a ground plane, inserting an insulation displaceable connector into said woven cable in a manner that said signal conductors are engaged so that the insulation on said signal conductors is pierced and displaced, and connecting said ground plane to a selected pin of said insulation displaceable connector.

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**4,741,708**

**CONNECTOR PLUG**

**Noboru Yoshida, Gunma, Japan, assignor to Hosiden Electronics Co., Ltd., Osaka, Japan**

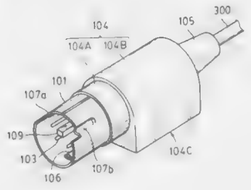
**Continuation of Ser. No. 835,662, Mar. 3, 1986, Pat. No. 4,685,758. This application May 28, 1987, Ser. No. 55,085**

**Claims priority, application Japan, Jun. 7, 1985, 60-86147**

**The portion of the term of this patent subsequent to Aug. 11, 2004, has been disclaimed.**

**Int. Cl.[4] H01R** *13/658*

**U.S. Cl. 439—483** **6 Claims**



1. A connector plug comprising:

an insulating body;

a plurality of contact pins carried by said insulating body in parallel relation to each other, each of said pins having a contact portion and a terminal portion extending outwards of the front and rear ends of said insulating body, respectively;

a cylindrical metal cover having a front end and a rear and, said insulating body being disposed within said cylindrical metal cover with said rear end of said insulating body being offset from the rear end of said cylindrical metal cover; and

an insulating cap provided on the outer periphery of said cylindrical metal cover except for a front end portion of said metal cover, whereby said front end portion of said metal cover remains exposed, said insulating cap including a holding portion having a flat side extending in parallel relation to the central axis of said cylindrical metal cover to provide said holding portion with a substantially D-shaped cross section, and said insulating cap also having a comparatively thin wall portion extending forwardly from a front end of said holding portion along said metal cover, said wall portion being thinner than said holding portion.

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**4,741,709**

**GEL FILLED ENCLOSURE**

**James E. Jervis, Atherton, Calif., assignor to Raychem Corporation, Menlo Park, Calif.**

**Filed Nov. 22, 1985, Ser. No. 801,017**

**Int. Cl.[4] H01R** *13/52*

**U.S. Cl. 439—521** **4 Claims**

1. An apparatus for protecting a substrate, comprising:

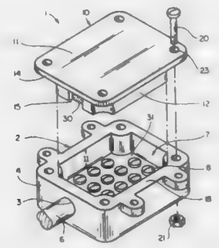
a gel having a cone penetration between 100 and 350 ($10^{-1}$ mm) and an ultimate elongation in excess of 100%, the gel having the cone penetration and elongation prior to coming in contact with the substrate;



first and second telescopically mateable containers;

means for urging the containers together such that at least one surface of the gel is deformed about a substrate to be protected;

sidewalls of the containers being formed and sized so as to be



telescopically mateable, the containers being filled with the gel by amount such that when voids within the containers are substantially eliminated by urging the containers together confronting surfaces of the containers come in contact so as to substantially limit further relative telescopic movement of the containers toward one another.

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**4,741,710**

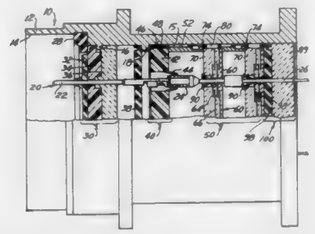
**ELECTRICAL CONNECTOR HAVING A MONOLITHIC CAPACITOR**

**Edward P. Hogan, Sidney; Edward R. Gliha, Bainbridge, and Ronald W. Morse, Sidney, all of N.Y., assignors to Amphenol Corporation, Wallingford, Conn.**

**Filed Nov. 3, 1986, Ser. No. 926,938**

**Int. Cl.[4] H01R** *13/66*

**U.S. Cl. 439—620** **13 Claims**



1. An electrical connector comprising a metal shell, a planar monolithic ceramic capacitor having top and bottom surfaces and including a plurality of active and ground electrodes coalesced in its ceramic, a conductively plated passage passing between the surfaces, a contact retained within the passage, and connecting means for electrically connecting the ground electrodes to the shell and the active electrodes to the contact, the connecting means including a conductive grounding spring encircling the capacitor and completing an electrical and mechanical connection between the shell and the ground electrodes and further characterized by

a ceramic substrate extending from the top surface of the capacitor and having a conductively plated bore extending therethrough, said bore being axially aligned with and electrically connected to the passage, and a conductive spring ring mounted substantially entirely within the bore for completing an electrical circuit path between the active electrodes and the contact.

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**4,741,711**

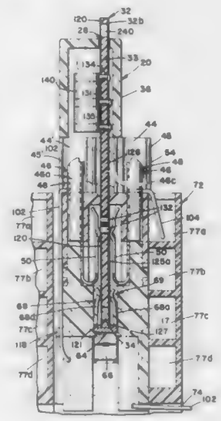
**MODULAR DISTRIBUTION FRAME INCLUDING PROTECTOR MODULES ADAPTED FOR BREAK ACCESS TESTING**

**Loren A. Singer, Jr., Minneapolis, Minn., assignor to ADC Telecommunications, Inc., Minneapolis, Minn.**

**Continuation-in-part of Ser. No. 740,804, Jun. 3, 1985, abandoned. This application Oct. 6, 1986, Ser. No. 917,232**

**Int. Cl.[4] H01R** *13/06*

**U.S. Cl. 439—620** **13 Claims**



1. A distribution frame module, comprising:

(a) a generally rectangular module block having a front face, said module including first and second parallel opposing rows of wire connectors supported therein and connector apertures in said front face through which individual wire connectors may be accessed for terminating wires, said module further including a row of protector apertures disposed between said first and second wire connector rows, said protector apertures for accepting overload protector elements;

(b) said wire connectors each having a wire terminating end and a spring contact finger end, the spring contact finger end of corresponding opposing connectors extending into one of said protector apertures, said finger ends of opposing connectors resiliently biased into making electrical connection between said opposing connectors; and

(c) a protector element having a first end sized to extend into a protector aperture and separate opposing spring fingers, said element having at least two external contacts each for making contact with one of said spring fingers, and circuitry means carried on said element for connecting said external contacts in electrical connection when said protector element is disposed in a first position with said first end disposed between and separating said opposing spring fingers.

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**4,741,712**

**LOW-PROFILE SOCKET FOR SINGLE-ENDED, HIGH-PRESSURE DISCHARGE LAMP**

**Wolfgang Greller, Unterhaching, Fed. Rep. of Germany, assignor to Patent Treuhand Gesellschaft fur Elektrische Gluhlampen mbH, Munich, Fed. Rep. of Germany**

**Continuation of Ser. No. 715,186, Mar. 22, 1985, abandoned. This application Oct. 31, 1986, Ser. No. 924,109**

**Claims priority, application Fed. Rep. of Germany, Apr. 3, 1984, 3412461**

**Int. Cl.[4] H01R** *33/02*

**U.S. Cl. 439—683** **16 Claims**

1. High voltage resistant socket, particularly for use with a single-ended high-pressure discharge lamp (20) having a longi-

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tudinal axis, and a single base (21), and being subject to voltage surges in the range of kilovolts, comprising

a disk-like body (2) defining an outer region adjacent an outer peripheral surface,

said body being of temperature-resistant insulating material, and defining a top surface, said disk-like body being formed with a recess (4, 5, 6) beneath the top surface;

top means (16, 17) of insulating material partly closing off said recess;

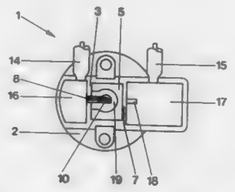
a first and a second elongated connection terminal element (8, 9), each secured to the body,

each connection terminal element having a supply cable connecting end portion (12, 13) located at the outer region of said body and a lamp terminal connection end portion (10, 11) located inwardly of said outer region,

a separating wall (7) extending up to about the top surface and subdividing the recess of the body (2) into a first chamber (4, 5) and a second chamber (6),

the first chamber defining a frist chamber portion (4) and a second chamber portion (5),

the first chamber portion (4) being located adjacent the outer region of said body and receiving said supply cable connecting end portion (12) of said first terminal element and




the second chamber portion (5) being located at an inner region of the body adjacent said first chamber portion (4) and being closed off against said second chamber (6) by said separating wall (7),

the first connection terminal element (8) being located in the first chamber (4, 5) and the second connection terminal element (9) being located in the second chamber (6),

the first connection terminal element (8) extending cantilevered from said first chamber portion (4) of the first chamber toward the inner region of the socket body and into the second chamber portion (5) of the first chamber and being spaced from said separating wall (7),

wherein the top means (16, 17) of the socket body (2) is formed with an access opening leading to the second chamber (6) and to the lamp terminal connection and portion (11) of the connection terminal element (9) therein,

said second chamber portion (5) of the first chamber (4, 5) is open for reception of a portion of said single base (21) of the lamp (20); and

wherein said second chamber portion (5) has a cross-sectional shape and area matching said portion of the base (21) of the lamp to be used with the socket.

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**4,741,713**

**BOAT PROPELLER DRIVE UNIT**

**Lars-Erik Ohlsson, Hisings Kärra; Ulf Soderbaum, Skarhamn, and Kjell Borgersen, Hjalteby, all of Sweden, assignors to AB Volvo Penta, Gothenburg, Sweden**

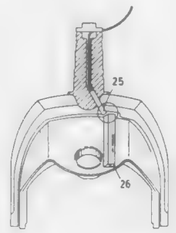
**Filed Sep. 17, 1986, Ser. No. 908,506**

**Claims priority, application Sweden, Sep. 19, 1983, 8305027**

**Int. Cl.⁴ B63H** *5/12*

**U.S. Cl. 440—53** **2 Claims**

1. In a boat propeller drive unit of the type which has a portion securely mounted in an opening in a boat transom and designed to be drivingly connected to a motor inboard of the transom, and a propeller leg disposed outboard of the transom, said leg being adjustable to various angles in relation to the transom by tilting about a horizontal axis and pivotable about an upright steering shaft, said drive unit comprising means for providing an output signal depending on the tilting angle relative to the transom, which signal indicates said angle; the




improvement in which said means comprises an inductive sensor connected to a wire passing through a central bore of the steering shaft and a magnetic core fixedly attached to the propeller leg.

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**4,741,714**

**SUPPORTING DEVICE FOR MARINE PROPULSION APPARATUS**

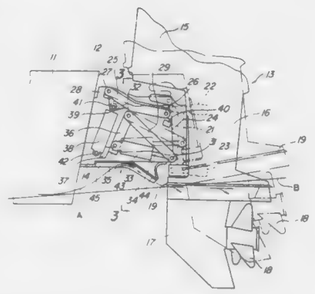
**Tatsuki Uchida, and Masanori Takahashi, both of Hamamatsu, Japan, assignors to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan**

**Filed Feb. 27, 1987, Ser. No. 19,885**

**Claims priority, application Japan, Mar. 5, 1986, 61-47877**

**Int. Cl.⁴ B63H** *5/12*

**U.S. Cl. 440—66** **4 Claims**



1. In a marine propulsion device for a watercraft having a hull terminating in a transom, an outboard drive unit carrying propulsion means for powering said watercraft and a splash plate positioned above said propulsion means, and support means for supporting said outboard drive unit for tilt and trim movement rearwardly of said transom and in spaced relationship thereto, said hull and said support means being related so that movement of the hull through the water at speed causes water to be deflected upwardly of said splash plate and toward said supporting means, the improvement comprising a baffle adapted to be fixed relative to said transom and extending rearwardly therefrom for directing water flow away from said support means and toward the underside of said splash plate.



**4,741,715**

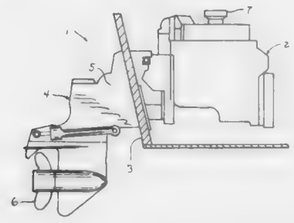
**PRESSURE ACTUATED DRAIN VALVE FOR MARINE DRIVE**

**George C. K. Hedge, Oshkosh, Wis., assignor to Brunswick Corporation, Skokie, Ill.**

**Filed Dec. 30, 1986, Ser. No. 947,599**

**Int. Cl.⁴ B63C** *9/08*

**U.S. Cl. 440—88** **6 Claims**




1. In a marine propulsion drive system having an engine with a water cooling system for cooling the engine including a cooling water pump actuatable between an operating state to pump cooling water through said cooling water system when said engine is running and a non-operating state when said engine is off, and a water drainage system for draining the cooling water including drain passages leading to an outlet, a drain valve for the cooling water drainage system comprising:

a flexible sealing member normally biased to an open position to permit water drainage through said outlet when said cooling water pump is in its non-operating state and movable to a closed position when said cooling water pump is in its operating state to prohibit water drainage through said outlet; and

means for actuating said sealing member to its closed position in response to fluid pressure in said water cooling system developed by the operation of said cooling water pump.

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**4,741,716**

**MOORING SYSTEM**

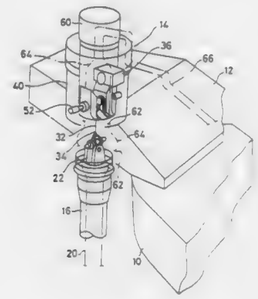
**Hiroshi Hasebe, Saitama; Masanori Kajiwara; Hiroshi Hiramoto, both of Nagareyama, and Hiroya Oka, Matsudo, all of Japan, assignors to Mitsui Ocean Development & Engineering Co., Ltd., Tokyo, Japan**

**Filed May 13, 1987, Ser. No. 50,050**

**Claims priority, application Japan, Feb. 12, 1987, 62-27996**

**Int. Cl.⁴ B63B** *22/02*

**U.S. Cl. 441—4** **3 Claims**




1. A mooring system for a buoyant structure having a storage capacity of an enormous quantity of fluid comprising an outrigger secured to one end of said structure, a buoy supporting structure mounted on said outrigger to rotate about a vertical axis, and a buoy anchored by means of chains, in which said buoy supporting structure is in the form of a hollow cylindrical member, a pair of diametrically opposed projecting members provided on the inner wall of said cylindrical member, each of said projecting members having a horizontal opening and a vertical groove therein, a block having a recess slidably mounted in each of said horizontal openings in said projecting member and, hydraulic means for driving said block, the top of said buoy is provided with a universal joint means having a first link member and a rod projecting beyond the side surfaces of said first link member, and means for lifting up said buoy to insert each end of said rod into said vertical grooves and to align said rod with said horizontal opening in each of said blocks.

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**4,741,717**

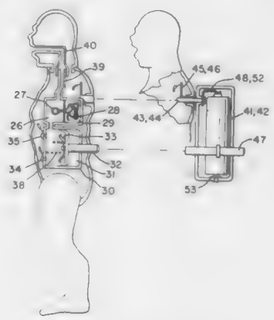
**SMOKE GENERATOR FOR PASSIVE TOY**

**Tobin Wolf, 1610 Harmon Cove Towers, Secaucus, N.J. 07094**

**Filed Jan. 22, 1986, Ser. No. 820,807**

**Int. Cl.⁴ A63H** *33/28, 33/26;* **A63J** *3/00*

**U.S. Cl. 446—24** **4 Claims**




1. A smoke generator, which comprises:

(a) a compartment having a gas ingress and a gas egress,

(b) smoke generating means comprising an electrical resistance means and smoke generating material means in close contact with said electrical resistance means disposed in said compartment, and an electrical energy source means

(c) control means controlling operation of blowing air into said ingress to cause smoke existing in said compartment to exit said compartment through said egress, said control means then actuating said smoke generating means, wherein said control means comprises a normally open switch electrically connected to said electrical energy source and said electrical resistance means, a movable member for closing said switch in response to predetermined movement of said movable member to cause said smoke generating means to generate smoke, said movable member being in the shape of a piston, said smoke generator further including a piston housing containing said movable member and a passage communicating between said piston housing and said compartment ingress to drive air from said piston housing, when said movable member is moved to close said switch, through said passage, to said ingress, to force smoke existing in said compartment out of said egress.

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**4,741,718**

**TOY WHEELED VEHICLE**

**Dirk J. Moolman, The Willow, Middleburg, C.P. 5900, South Africa**

**Filed Jan. 2, 1987, Ser. No. 329**

**Int. Cl.⁴ A63H** *17/38*

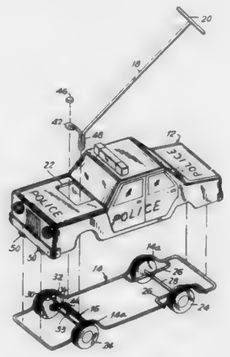
**U.S. Cl. 446—451** **4 Claims**

1. A toy wheeled vehicle comprising a wire frame having a

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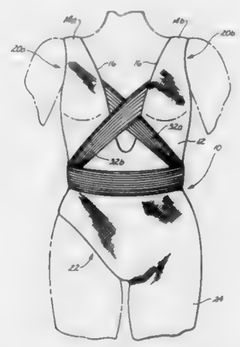


generally rectangular lower frame element and a pair of aligned steerable wheels having horizontal axles, and a steering mechanism comprising a pair of spaced upstanding vertical wires secured to the frame element to which the axles of the wheels are respectively pivoted, the axles each having wire steering arms extending rearward of the vehicle and parallel to the respective wheels, a wire tie rod pivotally connected between the distal ends of the arms and being formed with an eye adjacent to its midpoint, a steering column being pivotally attached to the frame forward of the eye and having a downwardly extending section extending into the eye whereby turning a steering wheel attached to said column causes the tie rod to move laterally of the vehicle thereby pivoting the wheels about said vertical wires, and a plurality of different molded vehicle bodies adapted to fit selectively over the frame, each body having adjacent its lower end a plurality of resilient fingers, adjacent fingers having opposed concave faces, the body adapted to be fitted over the frame with the faces of adjacent fingers engaging opposite sides of the wire in frictional engagement, the steering column extending upward well above the vehicle body.




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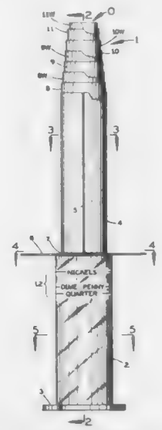
**4,741,719**
**GARMENT WITH BREAST SUPPORTS**
**Cynthia Wirth, Westwood, Calif., assignor to Reebok International Ltd., Canton, Mass.**
**Filed Oct. 21, 1986, Ser. No. 921,298**
**Int. Cl.[4] A41C** *3/02*
**U.S. Cl. 450—30** **9 Claims**



**1**. A garment comprising:
a stretchable fabric outer skin adapted to fit snuggly over at least the torso including the chest;
stretchable fabric disposed beneath the outer skin and so mounted and cojoined thereto to define a pair of breast supports; and
a tendon attached to each support for stretching said supports toward each other across said breasts to adjustably press and hold the breasts against movement, said tendons adapted to be fixed to prevent relax of said supports.

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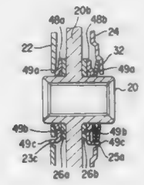
**4,741,720**
**COIN LOADER**
**Steve P. Vargo, 3800 SW. 142nd Ave., Davie, Fla. 33330**
**Filed Feb. 24, 1987, Ser. No. 17,530**
**Int. Cl.[4] B65B** *1/04, 35/50*
**U.S. Cl. 453—58** **8 Claims**




**1**. A coin loader for wrapping a column of coins into a paper coin wrapper, comprising:
a columnar base;
a transfer tube having a height greater than the height of said base;
at least one coin wrapper casing;
at least one paper coin wrapper; said transfer tube and coin wrapper casing further comprising split resilient tube surfaces such that they encircle the column of coins;
said columnar base having a vertical column with an inner diameter slightly wider than said transfer tube such that said transfer tube slides into said vertical column and protrudes above said columnar base; and
said coin wrapper casing having a diameter to encase the paper coin wrapper and slidingly engage the inside of the top of said transfer tube, wherein coins stacked in a columnar fashion inside said vertical column of said columnar base are encased in the bottom of said transfer tube when said transfer tube is inserted therein, and upon inversion and removal of said transfer tube from said columnar base, said coins are transferred by gravity from the bottom of the transfer tube to the inside of the coin wrapper which is in turn encased by the coin wrapper casing and the top of the transfer tube, whereby the coin wrapper casing may be removed from the top of the transfer tube while holding the coin wrapper and coins;
said coin wrapper casing encircling a plurality of smaller circumference coin wrapper casings which in turn encircle their respective paper coin wrappers, thereby enabling the loading of various denomination coins in ascending sequence according to their respective diameter.



**4,741,721**
**DAMPER DISC**
**Yoshio Nishimura, Neyagawa, and Syogo Ohga, Osaka, both of Japan, assignors to Kabushiki Kaisha Daikin Seisakusho, Osaka, Japan**
**Division of Ser. No. 836,369, Mar. 5, 1986. This application Nov. 20, 1986, Ser. No. 932,838**
**Claims priority, application Japan, Mar. 6, 1985, 60/44300**
**Int. Cl.[4] F16D** *3/14, 3/64*
**U.S. Cl. 464—68** **2 Claims**

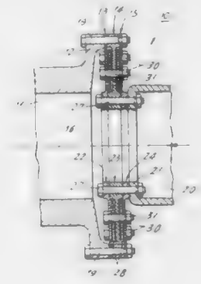


**1**. A damper disc, having a hub, said hub having at least one internal spline tooth and a radially extending flange, first friction washers for generating a large hysteresis torque on opposite sides of said flange, a substantially annular disc-like intermediate member pressed on a side of at least one of said first friction washers opposite to said flange, side plates on said hub, a projection on a radially outer peripheral part of said intermediate member projecting toward one of said side plates, said projection fitting into said one of said side plates so that said intermediate member and said one of said side plates can slide freely relatively to each other within a specified torsion angle, said intermediate member having an annular stepped shape having stepped inner and outer annular peripheral portions, said stepped inner annular peripheral portion projecting toward said side plate side of said intermediate member forming a relatively small friction contact area with said side plate, and said stepped outer annular peripheral portion of said intermediate member projecting toward said one of said first friction washers and forming a relatively large friction contact area with said one of said first friction washers.

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**4,741,722**
**TORSIONALLY RIGID, ELASTICALLY FLEXIBLE SHAFT COUPLING**
**Klaus Federn, Dachsberg 14, D-1000 Berlin 33, Fed. Rep. of Germany**
**PCT No. PCT/DE85/00162, § 371 Date Mar. 7, 1986, § 102(e) Date Mar. 7, 1986, PCT Pub. No. WO85/05419, PCT Pub. Date Dec. 5, 1985**
**PCT Filed May 13, 1985, Ser. No. 855,820**
**Claims priority, application Fed. Rep. of Germany, May 14, 1984, 3417803**
**Int. Cl.[4] F16D** *3/79*
**U.S. Cl. 464—99** **5 Claims**

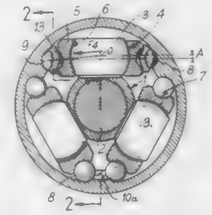
**1**. A torsionally rigid, elastically flexible shaft coupling comprising: a first and a second coupling half;
at least one annular elastic disk arranged between the coupling halves at a right angle to the axis of rotation of the coupling;
a respective plurality of cams affixed to each of the coupling halves and being formed with radially extending tongue-shaped protruding plates, the cams of each coupling half being arranged to enclose both axial sides of the annular disk; the tongue-shaped protruding plates of each cam affixed to one coupling half being arranged in intermeshing radial alignment with the protruding plates of a corresponding cam affixed to the other coupling half so that the protruding plates are fastened to the disk at a respective plurality of circumferential locations around the disk at least approximately on a single radius;
the cams of one of the coupling halves extending, from their respective locations of fastening on the elastic disk, radially inwardly to a first closed circular ring concentric with the axis of rotation and disposed radially inwardly of the space defined by the annular disk;



the cams of the other coupling half extending, from their respective locations of fastening on the elastic disk, radially outwardly to a second closed circular ring concentric with the axis of rotation and disposed radially outwardly of the space defined by the annular disk.

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**4,741,723**
**SLIDABLE HOMOKINETIC JOINT, IN PARTICULAR FOR A LATERAL VEHICLE TRANSMISSION**
**Michel A. Orain, Conflans Ste Honorine, France, assignor to Glaenzer Spicer, Poissy, France**
**Filed Apr. 11, 1986, Ser. No. 851,147**
**Claims priority, application France, Apr. 19, 1985, 85 05995**
**Int. Cl.[4] F16D** *3/20*
**U.S. Cl. 464—111** **18 Claims**



**1**. A homokinetic joint comprising a first element extending along a first axis and carrying three radial arms evenly angularly spaced apart and defining spherical bearing surfaces, a second element having a second axis intersecting the first axis and capable of making an angle therewith, said second element defining three pairs of raceways, six intermediate elements, each of which is disposed between a respective one of said spherical bearing surfaces and a respective one of said raceways, rolling members being interposed between the intermediate elements and the adjacent raceways, wherein the raceways provided on the second element are cylindrical surfaces having a substantially circular cross-section and generatrices parallel to the axis of the second element and each intermediate element comprises on the side thereof facing the adjacent raceway, a raceway having a substantially cylindrical shape and a circular cross-section similar to that of the adjacent raceway on the second element and generatrices parallel to the axis of the second element, wherein each intermediate element undergoes an oscillating movement about the axis of the associated raceways when the joint operates at an angle, and the rolling members interposed between the intermediate elements and the raceways on the second element are balls.

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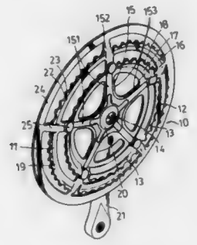


**4,741,724**

## CHAIN WHEEL

**Chen-Tsan Wang, No. 9-8, Jen-Hua Rd., Ta-Li Hsiang, Taichung Hsien, Taiwan**

**Filed Dec. 15, 1986, Ser. No. 941,421**
**Int. Cl.[4] F16H** *55/30*
**U.S. Cl. 474—160** **2 Claims**



1. A chain wheel comprising:

a single plate member including a hub portion with strip members extending radially outward, each of said strip members having a flat portion coplanar with said hub portion and a stepped portion extending radially outward and axially outward relative to the plane of said hub portion;

a first toothed rim portion around said hub including first arc-shaped toothed members centered at the axis of said hub portion and oriented annularly between said flat portions of said strip members, each of said first arc-shaped toothed members having an arc-shaped first base portion coplanar with said hub portion, an arc-shaped first flange extending axially inward from the perimeter of said base portion and an arc-shaped first toothed flange with teeth extending radially outward;

a second toothed rim member, with a greater radius than that of said first toothed rim member, disposed around said first toothed rim member, and including second arc-shaped toothed members centered at said axis and oriented annularly between said flat portions of said strip members, each of said second arc-shaped toothed members having an arc-shaped second base portion coplanar with said hub portion, and a arc-shaped second toothed flange with teeth extending radially outward; and

an outermost rim member connected to said stepped portion of said strip members and offset axially from the planes of said hub portion and said first toothed flanges of said arc-shaped first toothed members;

the width of each of said strip members between adjacent said first arc-shaped toothed members being greater than the pitch of said teeth of said first arc-shaped toothed member, and said strip member further including a circular protruberance provided thereon between adjacent said first arc-shaped tooth members, said protruberance extending axially inward to be flush with said first toothed flange of said first arc-shaped tooth member.

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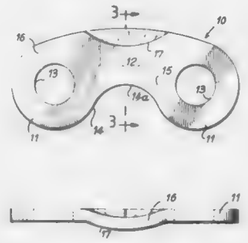
**4,741,725**

## CHAIN IN PARTICULAR FOR A CYCLE PROVIDED WITH A GEAR CHANGER

**Alain F. Ingold, Paris, France, assignor to Compagnie des Transmissions Mecaniques Sedis and Sachs-Huret S.A., France**

**Filed Feb. 6, 1987, Ser. No. 11,567**
**Claims priority, application France, Feb. 10, 1986, 86 01777**
**Int. Cl.[4] F16G** *13/07*
**U.S. Cl. 474—212** **6 Claims**

1. A chain for combination with a gear changer system including sprockets and a chain guide roller for in particular a cycle, said chain comprising alternating inner links and outer links, each inner link comprising a pair of parallel inner plates, and each outer link comprising a pair of outer plates which laterally define a space therebetween and are parallel to each other and to said inner plates, articulation pins interconnecting said inner links and outer links and perpendicular to said plates, said chain having one side for receiving cogs of said sprockets and an opposite side for cooperation with said chain guide roller, said outer plates each including, in a central portion of



an edge thereof located on said opposite side of said chain, a projecting portion extending toward the interior of the respective links, said projecting portions defining therebetween a gap of reduced width relative to the width of said space defined between said outer plates, in which gap said chain guide roller is engageable with a reduced lateral clearance between said chain guide roller and said outer plates.

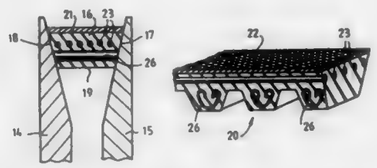
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**4,741,726**

## POWER TRANSMISSION BELT

**Victor Zarifé, Saint-Germain des Prés; Andre Cheymol, Dangé , and Gilles Argy, La Quele en Yvelines, all of France, assignors to Hutchinson, Paris, France**

**Filed Oct. 17, 1986, Ser. No. 922,840**
**Claims priority, application France, Oct. 29, 1985, 85 16039; Apr. 21, 1986, 86 05698**
**Int. Cl.[4] F16G** *5/10*
**U.S. Cl. 474—268** **21 Claims**



1. A trapezoidal cross section cog power transmission belt having an elastomeric material matrix body with inner longitudinally spaced cogs, a longitudinally extending tension resisting girdle embedded in said body outwardly of said cogs and reinforcement members in said cogs extending substantially transversely with respect to the belt, said reinforcement members having a bandular open shape comprising rolled or partially bent edges adapted to undergo deformation in the longitudinal direction of the belt when the same is in use.

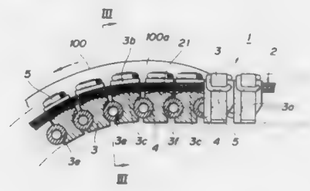


**4,741,727**

## POWER TRANSMISSION V BELT

**Torao Hattori, Saitama; Minoru Nishimura, Kanagawa, and Masaki Gotoh, Shizuoka, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo and Fukui Shinta Kabushiki Kaisha, Kanagawa, both of, Japan**

**Filed Dec. 17, 1986, Ser. No. 943,649**
**Claims priority, application Japan, Dec. 23, 1985, 60-289856; Dec. 23, 1985, 60-289858**
**Int. Cl.[4] F16G** *5/18*
**U.S. Cl. 474—268** **8 Claims**



1. A power transmission V belt for being trained around driver and driven pulleys for transmitting power therebetween, said power transmission V belt comprising:

a loop-shaped metallic belt having a radially inward surface and opposite side surfaces;

a plurality of metallic V blocks mounted on the metallic belt successively in the longitudinal direction thereof and each having a radially outward surface confronting said radially inward surface of the metallic belt and opposite side surfaces; and

a hard layer self-lubricating, heat-resistant, wear-resistant, material coated on at least one of said radially inward surface and opposite side surfaces of said metallic belt, and on the radially outward surface and opposite side surfaces of said V blocks.

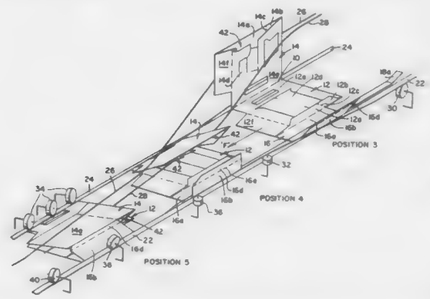
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**4,741,728**

## FOLDING METHOD AND APPARATUS FOR BASKET-STYLE ARTICLE CARRIERS

**Martinus C. M. Bakx, Roosendaal, Netherlands, assignor to The Mead Corporation, Dayton, Ohio**

**Filed Feb. 27, 1987, Ser. No. 19,410**
**Claims priority, application United Kingdom, Feb. 27, 1986, 8604923**
**Int. Cl.[4] B31B** *3/36, 3/62*
**U.S. Cl. 493—131** **3 Claims**



1. A method of forming a collapsed basket-style carrier from a partially assembled blank which includes first and second carrier parts comprising first and second side walls, first and second internal partitions associated with said first and second side walls, respectively, and overlying the respective interior surfaces thereof, first and second handle structures extending from said first and second internal partitions, respectively, and being joined along a central fold line, a bottom panel foldably joined to said first side wall and extending in a direction opposite to said first handle structure having an intermediate fold line substantially parallel with said central fold line, and a securing strip foldably joined to said bottom panel remote from said intermediate fold line, which method comprises the steps of moving said partially assembled blank along a feed path with said first and second carrier parts initially disposed in a horziotnal plane and said central fold line and said intermediate fold line extending in the direction of said feed path, folding said second carrier part along said central fold line in a direction transverse to said feed path and toward said first carrier part, folding said bottom panel about said intermediate fold line toward said second carrier part, temporarily holding said second carrier part in an inclined position spaced from said first part so that said second partition separates from said second side wall and a space is formed therebetween, applying adhesive to the exposed surface of said securing strip, causing said securing strip to enter the space between said second side wall and the partition associated therewith, thereafter moving said second carrier part downwardly into overlying relationship with said first carrier part and applying pressure to said second carrier part so that said securing strip is adhered to the interior surface of said second side wall.

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**4,741,729**

## MULTI-PACKAGING DEVICES, METHODS AND MACHINES

**Bryant Edwards, Clarendon Hills, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.**

**Division of Ser. No. 768,587, Aug. 23, 1985, Pat. No. 4,624,363.**
**This application Jul. 28, 1986, Ser. No. 890,732**
**Int. Cl.[4] B65B** *27/04;* **B31B** *1/14, 1/88*
**U.S. Cl. 493—339** **3 Claims**



1. A method for manufacturing multi-packaging devices including the steps of; providing an elongated web of resilient plastic materials, creating a series of preforms by producing a lengthwise series of apertures of a predetermined size, configuration and pitch in said web, deforming and elongating the preforms by producing a series of transverse corrugations which include small discrete sections of lengthwise, elongated, carrier material, wherein a series of carrier devices are created which include apertures of increased aperture length and pitch from the preform aperture length and pitch.

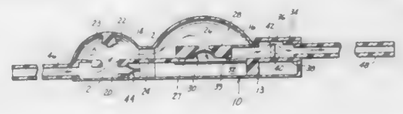
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**4,741,730**

## HYDROCEPHALUS SHUNT WITH IN-LINE FILTER

**Ray H. Dormandy, Jr., Goleta, Calif., and Harold J. Hoffman, Toronto, Canada, assignors to American Hospital Supply, Evanston, Ill.**

**Filed Oct. 4, 1982, Ser. No. 432,502**
**Int. Cl.[4] A61M** *27/00*
**U.S. Cl. 604—8** **24 Claims**



1. A shunt system for implantation in the body comprising:

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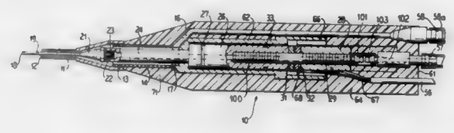
a body having an inlet and an outlet and a first fluid-flow passageway extending through the body between the inlet and outlet;
a pressure regulated valve means positioned within the first fluid-flow passageway for providing fluid flow therethrough at selected fluid pressures;
a filter positioned within the first fluid-flow passageway;
a second fluid-flow passageway extending between the inlet and outlet and providing a passageway through the body around the filter; and
means within the second fluid-flow passageway for selectively blocking or opening the second fluid-flow passageway to fluid flow.

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**4,741,731**
**VENTED ULTRASONIC TRANSDUCER FOR SURGICAL HANDPIECE**

**Brent R. Starck, Gurnee; Joseph F. Brumbach, Niles, and Robert F. Zapka, Berwyn, all of Ill., assignors to Fibra-Sonics, Inc., Chicago, Ill.**

**Filed Feb. 19, 1986, Ser. No. 830,752**
**Int. Cl.[4] A61B *17/32*; A61L *33/00*; A61H *23/02***
**U.S. Cl. 604—22** **6 Claims**



1. An ultrasonic handpiece for surgical operations comprising, a generally cylindrical-shaped housing, an electrical power system including an ultrasonic motor comprising a pair of side-by-side electrically driven crystals and electrical leads mounted in said housing, a surgical tool which must be periodically sterilized with steam or hot moisture having one end connected to said motor and with the other end extending from said housing, first and one or more than other said electrical power leads extending into said housing and said first electrical power lead connected to ground and said one or more other electrical power leads connected to the electrically driven crystals, and at least one vent tube extending through said housing with one end terminating adjacent said side-by-side crystals and power leads of said motor and the other end extending through said housing so as to provide a path for removing moisture deposited during sterilization from the inside of said housing so as to prevent said first and one or more other electrical power leads and crystals from being shorted by moisture which would provide an electrical path within said electrical power system which would prevent operation.

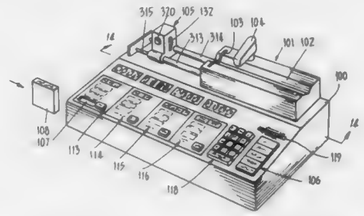
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**4,741,732**
**OPEN-LOOP CONTROL OF DRUG INFUSION**

**David P. Crankshaw, Toorak, and Malcolm D. Boyd, Kew, both of Australia, assignors to The University of Melbourne, Victoria, Australia**

**Filed May 9, 1985, Ser. No. 732,147**
**Claims priority, application Australia, May 10, 1984, PG4934**
**Int. Cl.[4] A61M *5/00***
**U.S. Cl. 604—50** **29 Claims**

1. A method of infusion of a drug into a patient comprising the steps of:
(i) determining the Lean Body Mass of the patient;
(ii) selecting a predetermined profile for the rate of delivery of drug, which rate reduces with time and is configured to maintain a selected substantially steady plasma arterial content of the drug in the patient throughout an infusion period; said profile being determined by:
(a) infusing a drug at arbitrary but known rates into a group of patients for each of whom the Lean Body Mass has been determined;
(b) determining the plasma arterial concentration of the drug in each patient at a number of specific time intervals throughout each infusion period;
(c) for each patient, estimating the rates of loss of drug from the circulation at a number of specific time instants by dividing the known infusion rates per Lean Body Mass of these instants by the plasma arterial concentrations of the drug at each of these instants;
(d) calculating the average of the estimated rates of loss of drug from the circulation per Lean Body Mass unit at each specific time interval for the group of patients;
(e) interpolating the successive average points between the specific time intervals to produce an infusion profile;



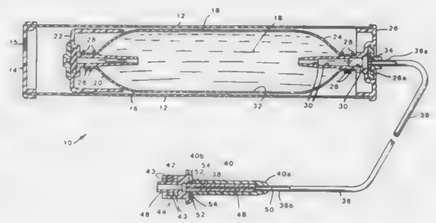
(f) infusing said drug in accordance with said infusion profile determined from said interpolations into a group of patients for each of whom the Lean Body Mass has been determined, said infusion rate being scaled according to said Lean Body Mass of each patient, and
(g) repeating steps (b) to (f) until a desired steady plasma arterial content of the drug is substantially maintained throughout the infusion period;
(iii) scaling said predetermined infusion profile by the determined Lean Body Mass of the patient and by the desired substantially steady plasma arterial content of the drug to be maintained in the system of the patient, and
(iv) administering the drug to the patient in accordance with said scaled profile by means of an infusion device which is controlled to deliver said drug at said scaled infusion rate profile.

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**4,741,733**
**INFUSOR HAVING A DISTAL FLOW REGULATOR**

**David A. Winchell, Spring Grove, and Derek Walsh, Fox Lake, both of Ill., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.**

**Continuation of Ser. No. 689,420, Jan. 7, 1985, abandoned. This application May 14, 1987, Ser. No. 51,174**
**Int. Cl.[4] A61M *5/00***
**U.S. Cl. 604—51** **11 Claims**



1. An infusion device for dispensing a liquid under pressure at a predetermined flow rate comprising in combination:
(a) an elastomeric bladder for receiving the liquid under pressure;



(b) a housing containing said bladder;
(c) a plug mounted to said housing and including an aperture extending therethrough, the inside of said bladder being in fluid communication with said plug aperture;
(d) tubing having proximal and distal ends, said proximal end secured to said aperture for transporting the liquid from said bladder to an infusion site of a patient;
(e) a non-adjustable flow regulator having a pre-selected flow rate, including upstream and downstream ends, said flow regulator upstream end secured adjacent said tubing distal end, said flow regulator being in fluid communication with the lumen of said tubing, said flow regulator placing a maximum limit on the flow rate of liquid out of said infusion device;
(f) said flow regulator including a defined bore having a cross-sectional area less than the cross-sectional area of said tubing lumen, wherein, with a given bore cross-sectional area, the length of said bore affects the liquid flow rate;
(g) connecting means secured adjacent said flow regulator downstream end for securing said infusion device to a separate assembly so that said non-adjustable flow regulator will be adjacent to the infusion site on the patient; and
(h) a regulator housing for carrying said flow regulator and including an upstream end connected to said tubing distal end and a regulator housing downstream end connected to said connecting means;
(i) wherein upon priming of said infusion device, liquid from said elastomeric bladder flows through said tubing before flowing through said flow regulator, so that the amount of time required to prime said infusion device is largely proportional to the length of said flow regulator and is relatively unaffected by the length of said tubing; and
(j) further wherein the air in said tubing, upstream of said regulator housing, is expressed from said tubing before the liquid from said elastomeric bladder flows through said flow regulator.

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**4,741,734**
**RELEASING MEANS FOR ADDING AGENT USING RELEASING MEANS TO IV FLUID**

**Felix Theeuwes, Los Altos, Calif., assignor to Alza Corporation, Palo Alto, Calif.**

**Division of Ser. No. 310,047, Oct. 9, 1981, Pat. No. 4,511,353, which is a continuation-in-part of Ser. No. 283,007, Jul. 13, 1981, abandoned. This application Feb. 15, 1985, Ser. No. 702,171**
**The portion of the term of this patent subsequent to Mar. 27, 2001, has been disclaimed.**
**Int. Cl.[4] A61M *5/14***
**U.S. Cl. 604—84** **1 Claim**

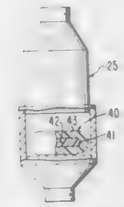
1. A formulation chamber adapted for communication with a drip chamber, the formulation chamber comprising:
(a) a wall that surrounds and defines;
(b) a lumen for containing an intravenously administrable beneficial agent;
(c) an inlet for admitting a pharmaceutically acceptable liquid into the lumen;
(d) an outlet for letting pharmaceutical liquid leave lumen; and,
(e) means in the lumen for releasing a beneficial agent present in the lumen into the pharmaceutical liquid that enters the lumen, said means releasing the agent at a rate controlled by the means and substantially independent of the volume rate of pharmaceutical liquid that flows through the lumen.

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**4,741,735**
**INTRAVENOUS SYSTEM FOR DELIVERING A BENEFICIAL AGENT**

**Felix Theeuwes, Los Altos, Calif., assignor to Alza Corporation, Palo Alto, Calif.**

**Division of Ser. No. 310,047, Oct. 9, 1981, Pat. No. 4,511,353, which is a continuation-in-part of Ser. No. 283,007, Jul. 13, 1981, abandoned. This application Feb. 14, 1985, Ser. No. 701,720**
**The portion of the term of this patent subsequent to Mar. 27, 2001, has been disclaimed.**
**Int. Cl.[4] A61M *37/00***
**U.S. Cl. 604—85** **3 Claims**



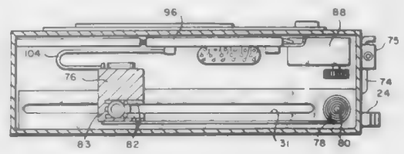
1. A formulation chamber for use in an intravenous delivery system, the chamber comprising;
(a) a wall that surrounds a lumen;
(b) an inlet in the wall for admitting a pharmaceutically acceptable liquid into the chamber;
(c) an outlet in the wall for letting a liquid leave the chamber; and,
(d) means in the chamber for releasing a beneficial agent present in the means into the pharmaceutical liquid that flows through the chamber, said means releasing the agent at a rate controlled by the means and substantially independent of the liquid that flows through the chamber, and which means is nonerodible and nondissolvable in the presence of the liquid.

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**4,741,736**
**PROGRAMMABLE INFUSION PUMP**

**Eric W. Brown, Redondo Beach, Calif., assignor to I-Flow Corporation, Irvine, Calif.**

**Filed Dec. 10, 1986, Ser. No. 940,044**
**Int. Cl.[4] A61M *5/20***
**U.S. Cl. 604—134** **37 Claims**



1. A multiple fluid cartridge assembly comprising:
a housing;
a plurality of flexible compartments for containing fluids, each compartment having an outlet through which said fluids are expelled;
a pressure roller movable within said housing to compress said plurality of flexible compartments, said pressure roller including engagement means extending from said housing;
a plurality of access tubes, each tube connected to the outlet of one of said compartment;
a multiple port connector, each port being connected to one of said access tubes; and
flow restrictor means for adjustably compressing said plural-

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ity of access tubes to regulate the flow of fluid therethrough, said flow restrictor means including:
a compression member for contacting and pressing against said access tubes;
a spring located adjacent said compression member so that said spring may exert force against said compression member;
a rotatable threaded cylindrical member; and
a non-rotating member having a threaded hole engaged by said cylindrical member, said non-rotating member being adjacent said spring opposite said compression member so that rotation of said cylindrical member adjusts the force exerted by said non-rotating member on said spring and consequently adjusting the force exerted by said spring on said compression member.

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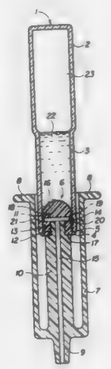
**4,741,737**

## PREFILLED AMPOULE-SYRINGE

**Gabriel Meyer, and Ernst Howald, both of Vesenaz, Switzerland, assignors to Medicorp Holding S.A., Luxembourg**

**Continuation-in-part of Ser. No. 561,057, Dec. 13, 1983, abandoned. This application Oct. 2, 1986, Ser. No. 914,350**
**Claims priority, application World Int. Prop. O., Dec. 20, 1982, PCT/CH82/00134**
**Int. Cl.[4] A61M** *37/00*
**U.S. Cl. 604—140** **8 Claims**

1. Prefilled ampoule-syringe containing a liquid medication and a gas and comprising an ampoule with an ampoule body having a single open end and a neck located near said single open end, this neck having smaller transverse inner dimensions than said body, and a stopper means comprising a stopper body having an upper part communicating with said ampoule and a lower part communicating with a rod element, said rod element being formed integrally with an external capsule, said stopper means being provided with an internal conduit means having at least one transverse branch and a longitudinal branch in fluid communication with the transverse branch for communication of the interior of the ampoule body with a needle holding tip when in an open position, said stopper body being located within said neck of the ampoule and axially movable from a closed to an open position, said axial movement producing a reduction of the inner volume of the ampoule body and inducing an overpressure of said gas, said upper part of said stopper body is provided with at least one continuous annular surface having larger transverse outer dimensions than the transverse inner dimensions of said ampoule neck so as to be in a compressed condition and sealingly engaged in direct contact with the inner wall of said neck in said closed position and during said axial movement so as to prevent flow of liquid from the ampoule body to said transverse branch, and having at least partly smaller transverse outer dimensions than the transverse



inner dimensions of said ampoule body so as to be in at least a partly expanded condition in said open position, and being at least partly disengaged from the inner wall of said ampoule body in said open position so as to permit flow of the liquid medication from the ampoule body to said transverse branch due to said overpressure of said gas, and the axial distance between said transverse branch and the zone where the rod element is attached to the external capsule being substantially equal to the axial length of said neck.



**4,741,738**

## SULFONATION OF FATS AND OILS

**Hans-Herbert Friese, Monheim, and Friedrich Pieper, Langenfeld, both of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany**

**Continuation of Ser. No. 785,430, Oct. 8, 1985, abandoned. This application May 21, 1987, Ser. No. 53,573**
**Claims priority, application Fed. Rep. of Germany, Oct. 12, 1984, 3437443**
**Int. Cl.[4] C14C** *3/00;* **C07C** *143/90*
**U.S. Cl. 8—94.19 R** **25 Claims**

1. A process for the sulfonation of a fat or oil containing unsaturated fractions consisting essentially of
(1) sulfonating 100 parts by weight of a fat or oil mixture consisting of
(A) 20 to 80% by weight of at least one $C_{8-24}$ fatty acid glycerol ester having an iodine number above 20, and
(B) the balance q.s. to 100% by weight of at least one $C_{1-4}$ aliphatic monoalcohol ester of a $C_{8-24}$ fatty acid which is liquid at room temperature and has an iodine number of about 50–100,
with about 10–20 parts by weight of sulfuric acid, oleum, or a mixture of $SO_3$ and air containing up to 8% by volume of $SO_3$, to a degree of sulfonation of about 3–30% by weight of organically bound sulfur trioxide;
(2) neutralizing the resulting sulfonated fat or oil mixture with an alkali hydroxide, ammonia, or amine; and optionally
(3) bleaching the neutralized sulfonated fat or oil mixture with a bleaching effective amount of $H_2O_2$.

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**4,741,739**

## PROCESS FOR PRINTING OR DYEING CELLULOSE-CONTAINING TEXTILE MATERIAL WITH REACTIVE DYES IN AQUEOUS FOAM PREPARATION CONTAINING A QUATERNARY AMMONIUM CONDENSATE

**Hans-Ulrich Berendt, Allschwil, and Martin Kuhn, Dornach, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Filed May 6, 1987, Ser. No. 46,971**
**Claims priority, application Switzerland, May 16, 1986, 1989/86**
**Int. Cl.[4] C09B** *67/00, 62/00*
**U.S. Cl. 8—477** **14 Claims**

1. A process for printing or dyeing cellulose-containing textile material with a reactive dye by printing or dyeing the textile material with a foamed, aqueous preparation and fixing the dye through the action of heat, the preparation containing a reactive dye, a foaming agent, a fixing alkali, a homopolymer or copolymer of acrylamide or methacrylamide or a graft polymer which is obtainable from an addition product of an alkylene oxide onto an at least trihydric aliphatic alcohol having 3 to 10 carbon atoms and acrylamide or methacrylamide, wherein the preparation additionally contains a quaternary ammonium salt obtained by condensation of
(A) a sulfonated asymmetric succinic acid diester which has as ester groups a halohydrin group and an etherified polyalkylene glycol group, with
(B) a tertiary amine-substituted N-alkylamide of ethylenically unsaturated aliphatic monocarboxylic or dicarboxylic acid.

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**4,741,740**

## FLAME-RESISTANT PROPERTIES OF ARAMID FIBERS

**James K. Davis, and Barbara J. Cates, both of Greensboro, N.C., assignors to Burlington Industries, Inc., Greensboro, N.C.**

**Continuation-in-part of Ser. No. 863,038, May 14, 1986. This application Sep. 9, 1986, Ser. No. 905,134**
**Int. Cl.[4] D06P** *5/00*
**U.S. Cl. 8—490** **7 Claims**

1. A process for flame retarding and dyeing a poly(m-phenyleneisophthalamide) fabric, comprising the sequential steps of:
(1) applying from about 0.1% by weight to about 20% by weight of a thermally stable cyclic phosphonate ester flame retardant to a poly(m-phenyleneisophthalamide) fabric and drying the fabric;
(2) contacting the fabric of step (1) with a solution of an organic swelling agent selected from the group consisting of N-methylpyrrolidone, dimethylsulfoxide, and dimethylacetamide, which is adapted to swell said fiber, from about 10 to about 40 parts by weight of a compatible inert diluent, and a solvent-compatible dyestuff dissolved in said solution; and
(3) heating the fabric to fix the dye and the flame retardant in the fabric.

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**4,741,741**

## CHEMICAL BENEFICIATION OF COAL

**George F. Salem, Cleveland Heights, and Angela M. Schmidt, Brunswick, both of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio**

**Filed Oct. 17, 1986, Ser. No. 920,528**
**Int. Cl.[4] C10L** *9/02*
**U.S. Cl. 44—621** **14 Claims**

1. A process for the beneficiation of carbonaceous solids containing inorganic, ash-forming constituents, including silica, alumina and metal-containing compounds, said process comprising the steps of:
(i) mixing said carbonaceous solids with hydrofluoric acid;
(ii) mixing the mineral depleted carbonaceous solids resulting from step (i) with ammonium chloride solution; and
(iii) recovering the resultant beneficiated carbonaceous solids.

2. The process according to Claim 1 wherein said hydrofluoric acid is provided by a source of hydrofluoric acid selected from the group consisting of aqueous hydrofluoric acid, liquid hydrofluoric acid and acidic ammonium fluoride.

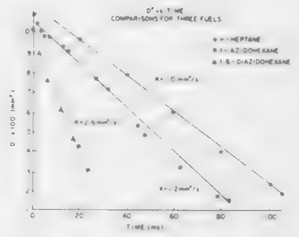
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**4,741,742**

## DIAZIDO ALKANES AND DIAZIDO ALKANOLS AS COMBUSTION MODIFIERS FOR LIQUID HYDROCARBON RAMJET FUELS

**Richard S. Miller, Crofton, Md.; Robert M. Moriarty, Oak Park, Ill., and Chung K. Law, Davis, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Jul. 3, 1986, Ser. No. 881,756**
**Int. Cl.[4] C10L** *1/22*
**U.S. Cl. 44—64** **9 Claims**



1. A liquid hydrocarbon ramjet fuel comprising from more than zero to 100 weight percent of a diazido alkanol of the general formula $N_3CH_2(CH_2)_xCHOH(CH_2)_yCH_2N_3$ wherein x is an integer of from 0 to 9, y is an integer of from 0 to 19, x+y is an integer of from 0 to 19, and $x \leqq y$, and the balance being a conventional jet fuel.

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4,741,743

## GRINDING WHEEL WITH COMBINATION OF FUSED AND SINTERED ABRASIVE GRITS

Kesh S. Narayanan, Holden; Suresh S. Vagarali, Shrewsbury, and Brian E. Swanson, Northborough, all of Mass., assignors to Norton Company, Worcester, Mass.

Filed Aug. 19, 1985, Ser. No. 767,204
Int. Cl.[4] B24D *3/02*
U.S. Cl. 51—309 6 Claims

1. A grinding wheel especially suitable for intermediate grinding speeds comprising abrasive grits bonded by an organic polymer bond in which the abrasive grits are a mixture of (1) cofused alumina-zirconia, containing 20 to 55% zirconia, and, (2) a sintered aluminous gel abrasive having a hardness of at least 13 on the Knoop scale, the ratio of (1) to (2) being in the range of from 30 to 70 to 70 to 30, by volume.

4,741,744

## HYDRATED METAL IONOMER MEMBRANES FOR GAS SEPARATION

Marinda L. Wu, San Ramon, Calif.; Terry D. Gordon, Angleton, and Charles W. Martin, Lake Jackson, both of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Feb. 20, 1987, Ser. No. 18,093
Int. Cl.[4] B01D *53/22*
U.S. Cl. 55—16 11 Claims

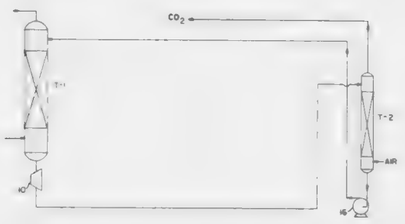
1. A method of separating gases comprising
(a) contacting with a feed gas mixture under pressure one side of a semipermeable membrane fabricated from a polymer containing a perfluorinated backbone and pendant hydrated metal ionomer groups, wherein the pendant hydrated metal ionomer groups are comprised of hydrated metals of alkali metals, alkaline earth metals, and transition metals bound to $—SO_3^-$;
(b) maintaining a pressure differential across the membrane under conditions such that a component(s) of the feed gas selectively permeates through the membrane from the high pressure side to the low pressure side of the membrane;
(c) removing the permeated gas which is enriched in the faster permeating component(s) from the low pressure side of the membrane; and
(d) removing the nonpermeated gas which is depleted in the faster permeating component(s) from the high pressure side of the membrane.

4,741,745

## PROCESS FOR SEPARATION OF CARBON DIOXIDE FROM OTHER GASES

Yukio Kadono; Minoru Miyagawa; Takahiko Nakai, all of Yokohama, and Minoru Saotome, Ebina, all of Japan, assignors to Norton Company, Worcester, Mass.

Filed Apr. 27, 1987, Ser. No. 43,013
Int. Cl.[4] B01D *47/00*
U.S. Cl. 55—43 12 Claims



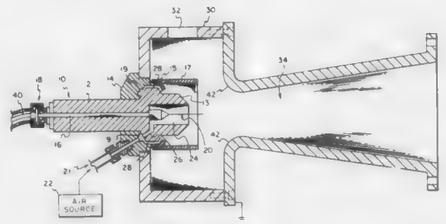

1. In a process for the separation of carbon dioxide from an original mixture of carbon dioxide and a non-acid gas, said process comprising the steps of:
(a) contacting the gas mixture with an initial liquid solvent at an absorption pressure sufficient to cause carbon dioxide to dissolve in said solvent in sufficient amount so that the mole fraction of carbon dioxide remaining in the secondary gas phase that remains after absorption at said absorption pressure is smaller than the mole fraction of carbon dioxide in said original mixture, while the mole fraction of carbon dioxide in the secondary solvent that results after absorption is greater than in said initial solvent;
(b) separating said secondary gas phase and said secondary solvent;
(c) exposing said secondary solvent, in a vessel containing a vapor space above said secondary solvent, to a desorption pressure lower than said absorption pressure, whereby carbon dioxide passes from the secondary solvent phase into a tertiary gas phase in said vapor space and a tertiary solvent phase remains liquid;
(d) separating said tertiary gas phase from the tertiary solvent; and
(e) recycling tertiary solvent to extract more acid gas from a new quantity of the gas mixture, the improvement wherein said initial solvent consists essentially of a composition having the generic chemical formula: $(CH_3)_2CHO—(C_2H_4O)_x—HC(CH_3)_2$, where x is an integer between 2 and 8.

4,741,746

## ELECTROSTATIC PRECIPITATOR

Bei T. Chao, and Shao L. Soo, both of Urbana, Ill., assignors to University of Illinois, Urbana, Ill.

Continuation-in-part of Ser. No. 751,816, Jul. 5, 1985, abandoned. This application Jan. 12, 1987, Ser. No. 2,368
Int. Cl.[4] B03C *3/80*
U.S. Cl. 55—117 9 Claims




1. An exhaust gas particulate removal system positioned in an exhaust gas pathway, the combination comprising:
attractor electrode means connected to a reference potential;
charger means spaced from said attractor electrode means and connected to a source of high negative potential, the space between said attractor electrode means and said charger means sustaining a corona and encompassing said exhaust gas pathway, said charger means further including:
insulating body means provided with a cylindrical cavity, one end of which is closed and the other end of which is open, a portion of said insulating body means extending into said exhaust gas pathway;
electrode means including a corona needle extending through said insulating body means and said cylindrical cavity, said corona needle axially disposed within said cavity and extending beyond and not touching the open end of said cavity;
first gas passage means communicating with said cavity, said first gas passage means oriented to create a helical/vortex flow of gas within and confined by said cavity and around said corona needle when gas is passed therethrough to prevent deposition of particulate within said cavity and upon said corona needle;
second gas passage means disposed about said portion of said insulating body means which extends into said exhaust gas pathway; and
baffle means concentric with the portion of said insulating body means extending into said gas pathway, said baffle means preventing said exhaust gases from directly impinging on said insulating body means and causing the gas flow from said second gas passage means to be confined about said portion of said insulating body means to prevent deposition of a continuous particulate layer thereupon.



4,741,747

## METHOD OF FABRICATING OPTICAL FIBERS

Peter E. E. Geittner, Aachen, Fed. Rep. of Germany, and Alfred L. M. Weling, Eupen, Belgium, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 6, 1985, Ser. No. 806,069
Claims priority, application Fed. Rep. of Germany, Dec. 12, 1984, 3445239
Int. Cl.[4] C03B *37/025;* C03C *25/02*
U.S. Cl. 65—3.12 16 Claims

1. A method of manufacturing an optical fiber, said method comprising the steps of:
providing a glass tube having an inner wall;
heating the tube to a temperature between 1100° and 1300° C.;
passing a reactive glass-forming gas mixture at a pressure between 1 and 30 hPa through the tube;
moving a nonisotherml plasma back and forth in the tube between two reversal points to react the gas mixture to deposit glass layers on the inner wall of the glass tube without the formation of glass soot;
collapsing the tube with the glass layers to produce a solid preform; and
drawing the solid preform into an optical fiber;
characterized in that:
the plasma extends along part of the length of the tube; and
in an end region adjacent a reversal point, the extent of the plasma is changed as a function of time, said region having a length sufficient to reduce end taper in the preform.

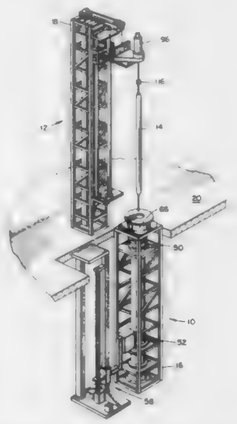
4,741,748

## HEATING OVEN FOR PREPARING OPTICAL WAVEGUIDE FIBERS

Kenneth R. Lane, Wilmington, N.C.; Donald L. Prusha, Painted Post, and William E. Siebold, Horseheads, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Jan. 30, 1986, Ser. No. 824,136
Int. Cl.[4] C03B *23/04, 19/09, 37/02*
U.S. Cl. 65—13 4 Claims

1. A heating oven for processing glass materials from which optical waveguide fibers are prepared comprising:
(a) a stationary elongated chamber in the form of a vertically-oriented cylindrical muffle for receiving the glass material to be processed;
(b) means for heating the chamber, said means comprising an elongated susceptor which surrounds at least a portion of the elongated chamber, the longitudinal axis of the susceptor being parallel to the longitudinal axis of the chamber, an induction heating coil which surrounds a portion of the susceptor, means for moving the induction heating coil along a path parallel to the longitudinal axes of the susceptor and the chamber, and means for energizing the induction heating coil; and
(c) means for supporting the upper end of the muffle, said means being substantially thermally independent of the supporting structure for the remainder of the oven, said substantial thermal independence being achieved by connecting said means to the building housing the heating oven at a location separate from the location at which the supporting structure for the remainder of the oven is connected to the building.

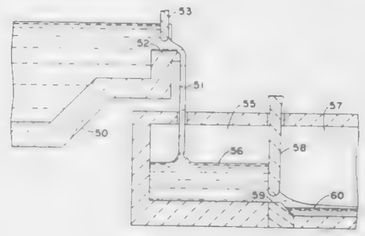


4,741,749

## VERTICAL DELIVERY ARRANGEMENT FOR FLOAT GLASS PROCESS

John E. Sensi, Arnold, and Gerald E. Kunkle, New Kensington, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jan. 2, 1987, Ser. No. 224
Int. Cl.[4] C03B *18/16*
U.S. Cl. 65—99.2 14 Claims



1. A method wherein a stream of molten refined glass is fed from a source of molten glass onto a pool of molten metal within a forming chamber so as to form a flat ribbon of glass, characterized by initially feeding the molten glass through a roof portion of the forming chamber as an uncontained, vertically falling stream into a reservoir of molten glass supported on a layer of molten metal, and drawing glass from the reservoir to form the flat ribbon on molten metal.

4,741,750

## METHOD AND APPARATUS FOR COOLING IN A FLOAT GLASS FORMING OPERATION

Jack A. Bricker, Tarentum, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jan. 2, 1987, Ser. No. 28
Int. Cl.[4] C03B *18/16, 18/18*
U.S. Cl. 65—99.3 8 Claims

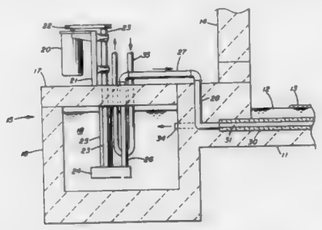
1. A method of forming glass wherein molten glass is passed onto a pool of molten metal in a forming chamber and is shaped into flat glass while floating on the molten metal pool, the glass loses heat to the surroundings in the forming chamber, and heat is removed from the forming chamber, characterized by at

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least a portion of the heat removal from the forming chamber being carried out by circulating molten metal coolant beneath the glass separately from the molten metal pool.

7. Apparatus for forming flat glass comprising a chamber adapted to hold a pool of molten metal, means for delivering



molten glass onto the pool, a graphite member below the surface of and in contact with the molten metal pool, the graphite member being provided with a passageway in communication with pumping means adapted to convey molten metal coolant through the passageway in the graphite member separately from the molten metal pool.

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**4,741,751**

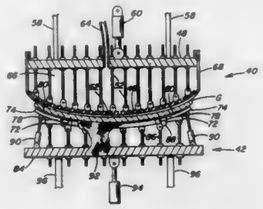
## EXTENDED SURFACE PRESSING MOLD AND METHOD OF SHEET SHAPING

**George R. Claassen, New Kensington; Rudolph A. Karlo, Creighton, and Richard V. Posney, Freeport, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.**

**Filed Jan. 5, 1987, Ser. No. 615**

**Int. Cl.[4] C03B** *23/03*

**U.S. Cl. 65—106** **11 Claims**



1. An apparatus for shaping a heat softened sheet material comprising:

an upper shaping mold with an upper sheet engaging surface generally corresponding to the final desired sheet shape;

a lower shaping mold aligned with said upper mold, said lower mold having a lower sheet engaging surface including a first portion which complements and generally parallels a first aligned portion of said upper sheet engaging surface, a wing portion extending from said first portion of said lower mold, said wing portion being nonparallel to a corresponding second aligned portion of said upper sheet engaging surface and a ring portion positioned outwardly from said wing portion, said ring portion generally complementing a third aligned portion of said upper sheet engaging surface of said upper mold near a portion of the perimeter of said sheet;

means to press said heat softened sheet between said upper and lower mold; and

means to move said ring portion from a first position wherein said ring portion is in a non-engaging position relative to said heat softened glass sheet to a second position wherein said ring portion contacts and engages said perimeter portion of said heat softened sheet to press said perimeter portion against said third portion of said upper mold.

9. A method of shaping a heat softened sheet material comprising:

providing a lower mold with a sheet engaging surface having a first portion corresponding to a portion of the final sheet configuration to shape and support said sheet and an adjacent second portion to support said sheet;

depositing said glass sheet on said lower mold;

pressing said sheet between said lower mold and a vertically aligned upper mold having a sheet engaging surface generally corresponding to the final sheet configuration;

lifting a peripheral portion of said sheet so as to lift said sheet off of said second portion of said lower mold; and

pressing said peripheral portion against a corresponding aligned portion of said upper mold.

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**4,741,752**

## TREATING GLASS COMPOSITIONS

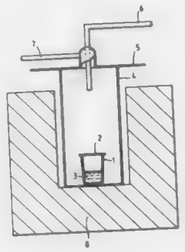
**Paul W. France, Newbourne; John R. Williams, and Steven F. Carter, both of Ipswich, all of England, assignors to British Telecommunications plc, United Kingdom**

**Filed Jul. 18, 1985, Ser. No. 756,304**

**Claims priority, application Fed. Rep. of Germany, Aug. 3, 1984, 8419829**

**Int. Cl.[4] C03B** *5/16*

**U.S. Cl. 65—134** **20 Claims**



1. A method of improving the infrared transmission characteristics at 2.7 microns and of preparing a halide glass composition containing iron in the Fe(II) state, the method comprising oxidizing impurities therein under dry conditions so as to substantially improve infrared transmission characteristics at 2.7 microns, such that substantially all said iron is converted to the Fe(III) state, wherein said oxidation is carried out by contacting said melt with oxygen without exposing the melt to ambient air, whereby a halide glass composition is prepared having substantially improved infrared transmission characteristics and having an attenuation of less than about 100 dB/km at wavelengths on the order of 2.7 microns.

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**4,741,753**

## METHOD AND APPARATUS FOR ELECTRICALLY HEATING MOLTEN GLASS

**Isac M. Sheinkop, and Manoj K. Choudhary, both of Reynoldsburg, Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio**

**Filed Mar. 12, 1987, Ser. No. 24,956**

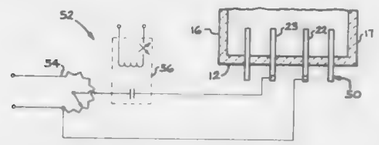
**Int. Cl.[4] C03B** *5/235*

**U.S. Cl. 65—136** **10 Claims**

1. A method of continuously melting and refining molten glass in a furnace comprising the steps of:

applying a preponderance of heat to a molten glass mass by Joule effect heating; and,

pulsating a portion of the heat applied to the molten glass mass in a thermal zone located adjacent a glass exiting region of the furnace such that the temperature of the molten glass surface is increased and the temperature of the molten glass being withdrawn from the furnace is



reduced and the total energy supplied to the furnace is reduced.

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**4,741,754**

## PLANT GROWTH STIMULATING COMPOUNDS AND COMPOSITIONS THEREOF

**Stanley K. Ries, East Lansing, Mich., assignor to Michigan State University, East Lansing, Mich.**

**Filed Apr. 11, 1986, Ser. No. 851,070**

**Int. Cl.[4] A01N** *61/00*

**U.S. Cl. 71—79** **12 Claims**

1. A method for stimulating the growth of plants which comprises applying to said plants, a plant growth stimulating amount of a composition containing one or more plant growth stimulating compounds, said composition having been recovered from plants or plant parts which have been treated with a plant growth stimulating amount of 1-triacontanol, by contacting said treated plant or plant parts with a polar liquid extractant to obtain said composition containing one or more plant growth stimulating compounds.

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**4,741,755**

## CERTAIN 4-OXO-3-BENZOYLVALEROLACTONES AND THIOLACTONES

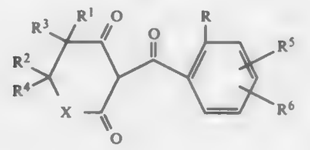
**Christopher G. Knudsen, Berkeley; William J. Michaely, Richmond; Donald R. James, El Sobrante, and Hsiao-Ling M. Chin, Moraga, all of Calif., assignors to Stauffer Chemical Company, Westport, Conn.**

**Filed Jun. 9, 1986, Ser. No. 871,975**

**Int. Cl.[4] A01N** *43/00*

**U.S. Cl. 71—88** **23 Claims**

1. Compounds of the formula



wherein

X is oxygen;

R is halogen; $C_1$–$C_2$ alkyl; $C_1$–$C_2$ alkoxy; nitro; cyano; $C_1$–$C_2$ haloalkyl; or $R^aSO_n$— wherein n is 0 or 2 and $R^a$ is $C_1$–$C_2$ alkyl;

$R^1$ is hydrogen or $C_1$–$C_4$ alkyl;

$R^2$ is hydrogen or $C_1$–$C_4$ alkyl;

$R^3$ is hydrogen or $C_1$–$C_4$ alkyl;

$R^4$ is hydrogen or $C_1$–$C_4$ alkyl; or

$R^1$ and $R^3$ together are alkylene having 2–5 carbon atoms; or

$R^2$ and $R^4$ together are alkylene having 2–5 carbon atoms; and

$R^5$ and $R^6$ independently are (1) hydrogen; (2) halogen; (3) $C_1$–$C_4$ alkyl; (4) $C_1$–$C_4$ alkoxy; (5) trifluoromethoxy; (6) cyano; (7) nitro; (8) $C_1$–$C_4$ haloalkyl; (9) $R^bSO_n$— wherein n is the integer 0, 1 or 2; and $R^b$ is (a) $C_1$–$C_4$ alkyl; (b) $C_1$–$C_4$ alkyl substituted with halogen or cyano; (c) phenyl; or (d) benzyl; (10) —$NR^cR^d$ wherein $R^c$ and $R^d$ independently are hydrogen or $C_1$–$C_4$ alkyl; (11) $R^eC$-(O)— wherein $R^e$ is $C_1$–$C_4$ alkyl or $C_1$–$C_4$ alkoxy; or (12) —$SO_2NR^cR^d$ wherein $R^c$ and $R^d$ are as defined; and (13) —$N(R^c)C(O)R^d$ wherein $R^c$ and $R^d$ are as defined and their salts.

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**4,741,756**

## PROPIONIC ACID THIOL ESTER DERIVATIVES AND HERBICIDAL COMPOSITIONS CONTAINING THEM

**Shinzo Someya, Tokorozawa; Seigo Koura, Tokyo; Mikio Ito, Tokuyama; Akira Nakanishi, Yokohama, and Yuji Nonaka, Tokuyama, all of Japan, assignors to Toyo Soda Mfg. Co., Yamaguchi and Agro-Kenesho Co., Ltd., Tokyo, both of, Japan**

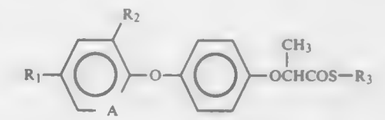
**Filed May 12, 1987, Ser. No. 48,956**

**Claims priority, application Japan, May 16, 1986, 61-11929**

**Int. Cl.[4] A01N** *43/28, 43/40;* **C07D** *277/70, 401/12*

**U.S. Cl. 71—90** **7 Claims**

1. A propionic acid thiol ester derivative having the formula:



(I)

wherein $R_1$ is a cyano group, a trifluoromethyl group, a halogen atom or a nitro group, $R_2$ is a hydrogen atom, a halogen atom or a cyano group, $R_3$ is a thiazolin-2-yl group or a benzothiazol-2-yl group, and A is a methine group.

6. A herbicidal composition comprising a herbicidally effective amount of a propionic acid thiol ester derivative of the formula I as defined in claim 1 and an agricultural adjuvant.

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**4,741,757**

## THIOPHENESULFONAMIDES

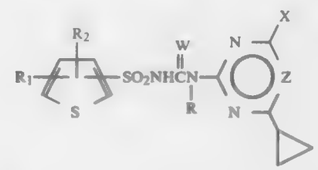
**George Levitt, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Division of Ser. No. 849,332, Apr. 10, 1986, Pat. No. 4,668,281, which is a continuation-in-part of Ser. No. 735,529, May 20, 1985, abandoned. This application Mar. 11, 1987, Ser. No. 24,452**

**Int. Cl.[4] C07D** *239/69, 239/42, 409/12;* **A01N** *43/54*

**U.S. Cl. 71—90** **6 Claims**

1. A compound of the formula:



wherein

W is O or S;

R is H or $CH_3$

$R_1$ is H, $C_1$–$C_4$ alkyl, $CH_2CH{=}CH_2$, $CF{=}CFCF_3$, $C_1$–$C_2$ alkoxy, $NO_2$, Cl, Br, $SO_2NR_3R_4$, $SO_2N(OCH_3)CH_3$, $S(O)_nR_5$, $CO_2R_6$, $C(O)NR_7R_8$, $C(O)R_9$ or $C_1$–$C_2$ alkyl substituted with F, Cl, $C_1$–$C_2$ alkoxy, $C_1$–$C_2$ alkylthio or CN;

$R_2$ is H, Cl, F, Br, $C_1$–$C_2$ alkyl, $C_1$–$C_2$ alkoxy, $S(O)_nR_{10}$, $C_1$–$C_2$ haloalkyl, CN, $C_2$–$C_3$ cyanoalkyl, $CH_2OCH_3$, $CH_2SCH_3$ or $CH_2CH_2OCH_3$;

$R_3$ and $R_4$ are independently $C_1$–$C_3$ alkyl;

$R_3$ and $R_4$ may be taken together as $(CH_2)_4$, $(CH_2)_5$ or $CH_2CH_2OCH_2CH_2$;

$R_5$ is $C_1$–$C_3$ alkyl or $CH_2CH{=}CH_2$;

$R_6$ is $C_1$–$C_3$ alkyl, $CH_2CH{=}CH_2$, $CH_2C{\equiv}CH$, $CH_2CH_2Cl$ or $CH_2CH_2OCH_3$;
$R_7$ is $C_1$–$C_3$ alkyl;
$R_8$ is H, $C_1$–$C_3$ alkyl or $CH_2CH{=}CH_2$;
$R_9$ is H or $C_1$–$C_3$ alkyl;
$R_{10}$ is $C_1$–$C_2$ alkyl;
n is 0, 1 or 2;
X is $CH_3$, $OCH_3$, $OCH_2CH_3$, $CH_2OCH_3$ or $OCF_2H$; and
Z is CH;

and their agriculturally suitable salts; provided that $R_1$ and the sulfonylurea bridge are on adjacent carbon atoms of the thiophene ring and also provided that when X is $OCF_2H$ then Z is CH.

5. A method for controlling the growth of undesired vegetation which comprises applying to the locus to be protected an effective amount of a compound of claim 1.

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4,741,758

## HERBICIDAL SULFONAMIDES

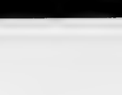
James V. Hay, Newark; Barry A. Wexler, Wilmington, both of Del., and Donna F. Zimmerman, Landenberg, Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 917,927, Oct. 10, 1986, which is a continuation-in-part of Ser. No. 768,158, Aug. 26, 1985, abandoned, which is a continuation-in-part of Ser. No. 680,549, Dec. 11, 1984, abandoned. This application Mar. 27, 1987, Ser. No. 30,598

Int. Cl.[4] C07D *239/69, 409/12;* A01N *43/54*

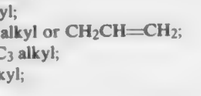
U.S. Cl. 71—90 21 Claims

1. A compound of the formula

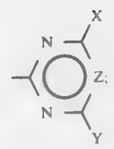


I

wherein
L is

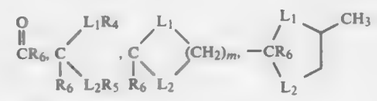


$R_1$ is H, $C_1$–$C_3$ alkyl, $C_1$–$C_3$ haloalkyl, halogen, nitro, $CH_2CN$, $CH_2OCH_3$, $CH_2SCH_3$, CN, $C_1$–$C_3$ alkoxy, $SO_2NR^IR^{II}$, $C_1$–$C_3$ alkylthio, $C_1$–$C_3$ alkylsulfinyl, $C_1$–$C_3$ alkylsulfonyl or $CO_2R^{III}$;
$R^I$ is H, $C_1$–$C_4$ alkyl, $C_2$–$C_3$ cyanoalkyl, methoxy or ethoxy;
$R^{II}$ is H, $C_1$–$C_4$ alkyl or $C_3$–$C_4$ alkenyl; or
$R^I$ and $R^{II}$ may be taken together as $-(CH_2)_3-$, $-(CH_2)_4-$, $-(CH_2)_5-$ or $-CH_2CH_2OCH_2CH_2-$;
$R^{III}$ is $C_1$–$C_4$ alkyl, $C_3$–$C_4$ alkenyl, $C_3$–$C_4$ alkynyl, $C_2$–$C_4$ haloalkyl, $C_2$–$C_4$ cyanoalkyl, $C_5$–$C_6$ cycloalkyl, $C_4$–$C_7$ cycloalkylalkyl or $C_2$–$C_4$ alkoxyalkyl;
W is $W_1$;
$W_1$ is $C_2$–$C_8$ alkenyl substituted with 1–3 atoms of F, Cl or Br;
A is



A-1

X is H, $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkoxy, $C_1$–$C_4$ haloalkoxy, $C_1$–$C_4$ haloalkyl, $C_1$–$C_4$ haloalkylthio, $C_1$–$C_4$ alkylthio, halogen, $C_2$–$C_5$ alkoxyalkyl, $C_2$–$C_5$ alkoxyalkoxy, amino, $C_1$–$C_3$ alkylamino or di($C_1$–$C_3$ alkyl)amino;
Y is H, $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkoxy, $C_1$–$C_4$ haloalkoxy, $C_1$–$C_4$ haloalkylthio, $C_1$–$C_4$ alkylthio, $C_2$–$C_5$ alkoxyalkyl, $C_2$–$C_5$ alkoxyalkoxy, amino, $C_1$–$C_3$ alkylamino, di($C_1$–$C_3$ alkyl)amino, $C_3$–$C_4$ alkenyloxy, $C_3$–$C_4$ alkynyloxy, $C_2$–$C_5$ alkylthioalkyl, $C_1$–$C_4$ haloalkyl, $C_3$–$C_5$ cycloalkyl, $C_2$–$C_4$ alkynyl,



or $N(OCH_3)CH_3$;
m is 2 or 3;
$L_1$ and $L_2$ are independently O or S;
$R_4$ and $R_5$ are independently $C_1$–$C_2$ alkyl;
$R_6$ is H or $CH_3$; and
Z is CH;

and their agriculturally suitable salts; provided that

(a) when X is Cl, F, Br or I, then Y is $OCH_3$, $OC_2H_5$, $N(OCH_3)CH_3$, $NHCH_3$, $N(CH_3)_2$ or $OCF_2H$;
(b) the W substituent and the sulfonylurea bridge are on adjacent carbon atoms;
(c) when $W_3$ is S, then R is H, Y is $CH_3$, $OCH_3$, $OC_2H_5$, $CH_2OCH_3$, $C_2H_5$, $CF_3$, $SCH_3$, $OCH_2CH{=}CH_2$, $OCH_2C{\equiv}CH$, $OCH_2CH_2OCH_3$ or $CH(OCH_3)_2$; and
(d) when the total number of carbon atoms of X and Y is greater than four, then the number of carbons of $R_1$ must be less than or equal to two and the number of carbons of W must be less than or equal to four,
(e) when R is H, $W_3$ is O, n is 0, $R_1$ is H, X is $CH_3$ or $OCH_3$ L and Y is $CH_3$ or $OCH_3$ then $W_1$ is other than $C_2$ alkenyl substituted by 3Cl and /or 3F.

8. An agriculturally suitable composition for controlling the growth of undesired vegetation comprising an effective amount of a compound of claim 1 and at least one of the following: surfactant, solid or liquid diluent.

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4,741,759

## OXYGUANIDINE DERIVATIVES

Hans-Joachim Diehr; Christa Fest, both of Wuppertal; Rolf Kirsten, Monheim; Joachim Kluth, Langenfeld; Klaus-Helmut Müller, Duesseldorf; Theodor Pfister, Monheim; Uwe Priesnitz, Solingen; Hans-Jochem Riebel, Wuppertal; Wolfgang Roy, Langenfeld; Ludwig Eue, Leverkusen; Hans-Joachim Santel, Cologne, and Robert R. Schmidt, Bergisch-Gladbach, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Aug. 23, 1985, Ser. No. 769,187

Claims priority, application Fed. Rep. of Germany, Aug. 30, 1984, 3431913

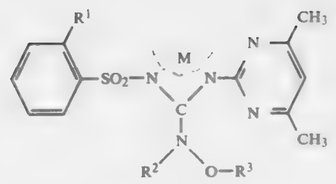
The portion of the term of this patent subsequent to Jul. 29, 2003, has been disclaimed.

Int. Cl.[4] C07D *239/69;* A01N *43/54*

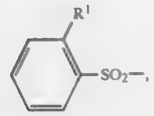
U.S. Cl. 71—92 15 Claims

1. An oxyguanidine derivative of the formula





in which
M represents hydrogen or one equivalent of a metal,
$R^1$ represents halogen, $C_1$–$C_4$-alkyl, $C_1$–$C_2$-halogenoalkyl, $C_1$–$C_4$-alkoxy, phenyl or $C_1$–$C_2$-alkoxy-carbonyl,
$R^2$ represents hydrogen or the radical



and
$R^3$ represents $C_4$–$C_{12}$-alkyl, isopropyl or—if M represents one equivalent of a metal—also propyl, or represents $C_2$–$C_{12}$-halogenoalkyl, $C_1$–$C_4$-alkoxycarbonyl-$C_1$–$C_2$-alkyl, aminocarbonylmethyl, $C_1$–$C_4$-alkylaminocarbonylmethyl, di-$C_1$–$C_4$-alkylaminocarbonylmethyl, $C_3$–$C_{12}$-alkenyl, $C_3$–$C_{12}$-alkinyl, benzyl which is substituted by halogen, nitro, cyano, $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy or $C_1$–$C_4$-alkoxycarbonyl, or phenyl, benzhydryl, or phenethyl, all optionally substituted by halogen, nitro, cyano, $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy or $C_1$–$C_4$-alkoxycarbonyl, or carboxy-$C_1$–$C_2$-alkyl, or an adduct thereof with a strong acid.

14. A method of combating unwanted vegetation which comprises applying to such vegetation or to a locus from which it is desired to exclude such vegetation a herbicidally effective amount of a compound, salt or adduct according to claim 1.

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4,741,760

## PYRIMIDINE DERIVATIVES HAVING A HERBICIDAL ACTION AND AN ACTION REGULATING PLANT GROWTH

Willy Meyer, Riehen; Karl Hoegerle, Basel; Rudolph C. Thummel, Courgenay; Hans Tobler, Allschwil, and Beat Böhner, Binningen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

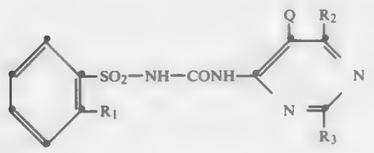
Continuation of Ser. No. 780,547, Sep. 26, 1985, abandoned, which is a continuation of Ser. No. 610,223, May 14, 1984, abandoned. This application Dec. 5, 1986, Ser. No. 938,674

Claims priority, application Switzerland, May 16, 1983, 2636/83

Int. Cl.[4] C07D *239/69;* A01N *43/54*

U.S. Cl. 71—92 8 Claims

1. An N-pyrimidin-4-yl-N′-sulfonylurea of the formula Ia



(Ia)

wherein
Q is halogen, $C_1$–$C_4$-alkyl, nitro, amino, formyl, methylthio, methylsulfinyl or methylsulfonyl,
$R_1$ is halogen, nitro, $C_1$–$C_4$-haloalkyl, $C_1$–$C_4$-alkoxy, $C_1$–$C_4$-haloalkoxy, $C_3$–$C_4$-alkenyloxy, $C_2$–$C_4$-haloalkenyloxy, $C_1$–$C_4$-haloalkylthio, $C_1$–$C_4$-alkoxycarbonyl or $C_1$–$C_4$-alkylsulfonyl,
$R_2$ is halogen, $C_1$–$C_3$-alkyl, cyclopropyl, $C_1$–$C_3$-alkoxy, $C_1$–$C_2$-haloalkoxy, amino, methylamino or dimethylamino,
$R_3$ is $C_1$–$C_2$-alkyl, $C_1$–$C_2$-haloalkyl, cyclopropyl, $C_1$–$C_2$-alkoxy, $C_1$–$C_2$-haloalkoxy or difluoromethoxy.

5. A herbicidal and plant-growth regulating or inhibiting composition which contains, as active ingredient, an N-pyrimidin-4-yl-N′-sulfonylurea according to claim 1, together with an inert carrier and/or other additives.

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4,741,761

## NOVEL PHENYL-SUBSTITUTED SULFONAMIDES

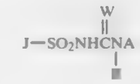
Robert J. Pasteris, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 709,340, Mar. 7, 1985, Pat. No. 4,620,870, which is a division of Ser. No. 533,341, Sep. 20, 1983, Pat. No. 4,586,950, which is a continuation-in-part of Ser. No. 499,443, May 31, 1982, abandoned, which is a continuation-in-part of Ser. No. 437,632, Oct. 29, 1982, abandoned. This application Jun. 25, 1986, Ser. No. 878,216

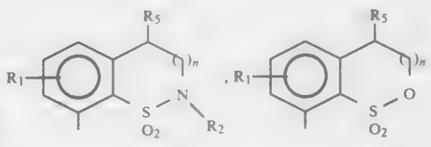
Int. Cl.[4] A01N *43/653;* C07D *401/12, 405/12, 417/12*

U.S. Cl. 71—91 46 Claims

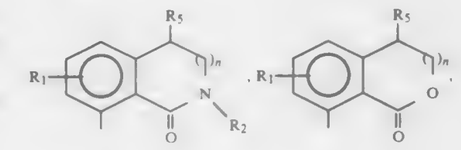
1. A compound of the formula:



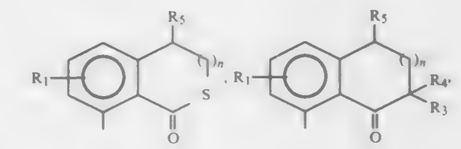
wherein
J is



$J_1$ $J_2$



$J_3$ $J_4$

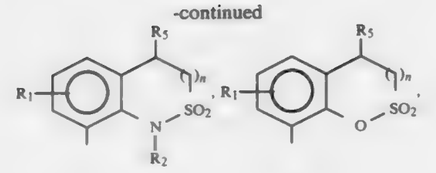


$J_5$ $J_6$

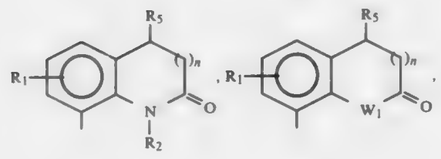
VOL 1090 ISS 1 MY 3 1988 UMI



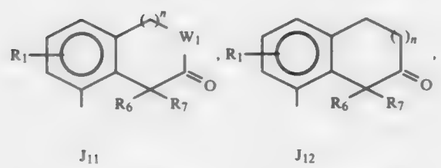
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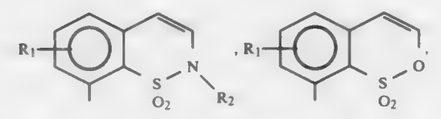
$J_7$ $J_8$



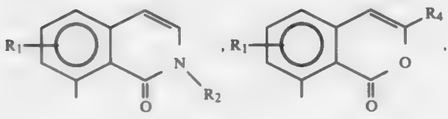
$J_9$ $J_{10}$



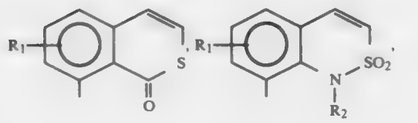
$J_{11}$ $J_{12}$



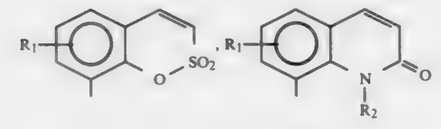
$J_{13}$ $J_{14}$



$J_{15}$ $J_{16}$

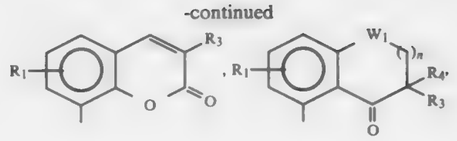


$J_{17}$ $J_{18}$

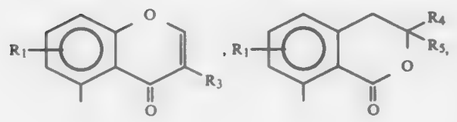


$J_{19}$ $J_{20}$

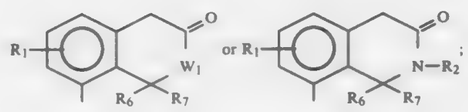
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$J_{21}$ $J_{22}$

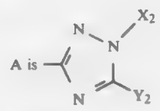


$J_{23}$ $J_{24}$



$J_{25}$ $J_{26}$

n is 0, 1 or 2;
W is O;
$W_1$ is O or S;
R is H or $CH_3$;
$R_1$ is H, F, Cl, Br, $CH_3$, $OCH_3$, $CF_3$, $SCH_3$ or $OCF_2H$;
$R_2$ is H or $C_1$–$C_4$ alkyl;
$R_3$ and $R_4$ are independently H, $C_1$–$C_4$ alkyl, Cl or Br;
$R_5$ is H or $CH_3$;
$R_6$ is H or $CH_3$;
$R_7$ is H or $CH_3$;



A is

$X_2$ is $CH_3$, $C_2H_5$ or $CH_2CF_3$; and
$Y_2$ is $OCH_3$, $OC_2H_5$, $SCH_3$, $SCH_2H_5$, $CH_3$ or $CH_2CH_3$; provided that

(a) the total number of carbon atoms in $R_3$ and $R_4$ is less than or equal to 4;
(b) when $R_5$ is $CH_3$, then n is O;
(c) when J is $J_{24}$, then $R_4$ and $R_5$ are not both H and $R_4$ is not Cl or Br;

and their agriculturally suitable salts.

39. A method for controlling the growth of undesired vegetation which comprises applying to the locus to be protected an effective amount of a compound of claim 1,

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**4,741,762**

**SULFAMOYL UREA DERIVATIVES**

**Barry Van Gemert, Massillon, Ohio, assignor to PPG Industries, Inc., Pittsburgh, Pa.**

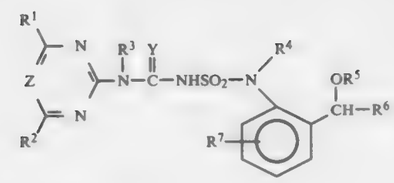
**Division of Ser. No. 748,641, Jun. 25, 1985, Pat. No. 4,666,508. This application Nov. 24, 1986, Ser. No. 934,381**

**Int. Cl.**[4] **C07D** *239/69, 239/47, 239/42;* **A01N** *43/54*

**U.S. Cl. 71—92** **3 Claims**

1. A compound represented by the formula:





wherein:

Y is oxygen or sulfur;
Z is CH;
$R^1$ and $R^2$ are the same or different and represent halogen, $C_1$ to $C_4$ alkyl or alkoxy;
$R^3$ and $R^4$ are the same or different and represent hydrogen, $C_1$ to $C_4$ alkyl, alkoxyalkyl, haloalkyl, or up to $C_3$ alkenyl or alkynyl;
$R^5$ is hydrogen, benzoyl or lower alkanoyl;
$R^6$ is $C_1$ to $C_6$ alkyl, haloalkyl, or alkoxyalkyl; and
$R^7$ is hydrogen, halogen or $C_1$ to $C_4$ alkyl or haloalkyl.

3. In a method of controlling weeds wherein a herbicidally effective amount of herbicide is applied to a growth medium prior to emergence of weeds therefrom or to the weeds subsequent to their emergence from the growth medium, the improvement residing in using as the herbicide a compound or mixture of compounds defined in claim 1.

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**4,741,763**

**HETEROCYCLYLALKYL ESTERS OF 2-IMIDAZOLINONENICOTINIC ACIDS**

**Dieter Dürr, Bottmingen, and Henry Szczepanski, Wallbach, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

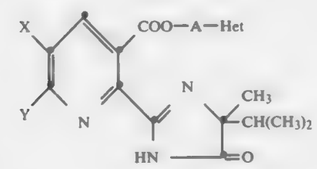
**Filed Sep. 2, 1986, Ser. No. 902,805**

**Claims priority, application Switzerland, Sep. 9, 1985, 3881/85; Feb. 27, 1986, 780/86**

**Int. Cl.**[4] **A01N** *43/40;* **C07D** *401/14*

**U.S. Cl. 71—92** **15 Claims**

1. A heterocyclylalkyl ester of a 2-imidazolinonenicotinic acid of formula I



(I)

wherein

A is a straight chain or branched $C_1$–$C_4$alkylene bridge, X and Y are each independently of the other hydrogen, $C_1$–$C_3$alkyl, $C_1$–$C_3$haloalkyl, $C_1$–$C_3$alkoxy, $C_1$–$C_3$haloalkoxy or halogen, or X and Y together form the butadiene bridge CH=CH—CH=CH, which may be substituted by halogen, cyano or $C_1$–$C_4$alkyl, and Het is a 6-membered heterocycle selected from pyridine, pyridinone and pyridinedione, which heterocycle is unsubstituted or substituted by halogen, $C_1$–$C_3$alkyl, $C_1$–$C_3$haloalkyl, $C_1$–$C_3$alkoxy, $C_1$–$C_3$haloalkoxy, nitro, amino, $C_1$–$C_3$alkylamino or di($C_1$–$C_3$)alkylamino.

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**4,741,764**

**SUBSTITUTED 1,2,4-TRIAZOLO[1,5-A]-PYRIMIDINE-2-SULFONAMIDES AND COMPOSITIONS AND METHODS OF CONTROLLING UNDESIRED VEGETATION AND INHIBITING SUGAR BEET BOLTING**

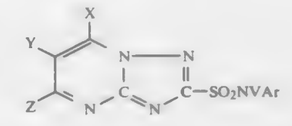
**William A. Kleschick, Martinez; Ben C. Gerwick, III, Clayton, both of Calif.; Robert J. Ehr, Eden Prairie, Minn.; William T. Monte, Concord; Norman R. Pearson, Walnut Creek, both of Calif.; Richard W. Meikle, Alamo, and Mark J. Costales, Walnut Creek, both of Calif., assignors to The Dow Chemical Company, Midland, Mich.**

**Division of Ser. No. 768,393, Aug. 22, 1985, abandoned, which is a continuation-in-part of Ser. No. 551,758, Nov. 14, 1983, abandoned. This application Nov. 21, 1986, Ser. No. 933,717**

**Int. Cl.**[4] **C07D** *487/04;* **A61K** *31/41*

**U.S. Cl. 71—92** **4 Claims**

1. Method for inhibiting the bolting of sugarbeets which comprises the application of a bolting inhibiting amount of a compound having the formula:



I

wherein Ar represents an aromatic or heteroaromatic ring chosen from among phenyl; 1- or 2-naphthyl; 2-, 3- or 4-pyridyl; 2- or 3-thienyl; 2- or 3-furyl; 2-, 4- or 5-thiazolyl; 2-, 4- or 5-imidazoyl; 2-, 4- or 5-oxazoyl; 3-, 4- or 5-isothiazolyl; 3-, 4- or 5-isoxazolyl; 3-, 4- or 5-pyrazoyl; 2-benzthiazoyl; 2-benzoxazoyl; 2-benzimidazoyl or 1-benztriazoyl; and Ar is unsubstituted or Ar is substituted with one to five substituents chosen from among (except in the cases of thio, sulfinyl and sulfonyl substituents where if one of these substituents is present the other one to four Ar substituents may not be chosen from among the other two); oxycarbonyl substituents where the other one to four Ar substituents may not be chosen from among different oxycarbonyl; or aminocarbonyl substituents; where the other one to four Ar substituents may not be chosen from among different aminocarbonyl substituents; $C_1$–$C_6$ alkyl; halo; $C_1$–$C_6$ mono- or polyhaloalkyl; phenyl; hydroxy; $C_1$–$C_6$ alkoxy; $C_1$–$C_6$ mono- or polyhaloalkoxy; phenoxy; phenoxy substituted with one or more of groups chosen from halo, $C_1$–$C_6$ alkyl or $C_1$–$C_6$ haloalkyl; 2-pyridyloxy; 2-pyridyloxy substituted with one or more of groups chosen from halo, $C_1$–$C_6$ alkyl or $C_1$–$C_6$ haloalkyl; $C_1$–$C_6$ alkylamino; $C_1$–$C_6$ dialkylamino; nitro; $C_1$–$C_6$ alkylthio; $C_1$–$C_6$ polyhaloalkylthio; $C_1$–$C_6$ alkylsulfinyl; $C_1$–$C_6$ polyhaloalkylsulfinyl; $C_1$–$C_6$ alkylsulfonyl; $C_1$–$C_6$ polyhaloalkylsulfonyl; phenylthio; phenylthio substituted with one or more of groups chosen from halo, $C_1$–$C_6$ alkyl or $C_1$–$C_6$ haloalkyl; phenylsulfinyl; phenylsulfinyl substituted with one or more of groups chosen from halo, $C_1$–$C_6$ alkyl or $C_1$–$C_6$ haloalkyl; phenylsulfonyl; phenylsulfonyl substituted with one or more of groups chosen from halo, $C_1$–$C_6$ alkyl or $C_1$–$C_6$ haloalkyl; cyano; carboxyl; $C_1$–$C_{10}$ alkoxycarbonyl; phenoxycarbonyl; phenoxycarbonyl substituted with one or more of groups chosen from halo, $C_1$–$C_6$ alkyl or $C_1$–$C_6$ haloalkyl; alkoxyalkoxycarbonyl wherein the number of carbons in the alkoxyalkoxy fraagment ranges from 2–10 and the number of oxygens in the alkoxyalkoxy fragment ranges from 2–4; 2-pyridylmethoxycarbonyl; dialkylaminoalkoxycarbonyl wherein the number of carbons in the dialkyl aminoalkoxy fragment ranges from 3–10 and the number of oxygens in the dialkylaminoalkoxy fragment is one; $C_1$–$C_6$ alkenyloxycarbonyl; COON=$C(R^1)(R^2)$ wherein $R^1$ and $R^2$ independently represent hydrogen, $C_1$–$C_6$ alkyl or phenyl; unsubstituted N-$C_1$–$C_6$ alkyl or N,N-di-$C_1$–$C_6$ alkylaminocarbonyl; $C_1$–$C_{10}$ dialkylaminosulfonyl; formyl; $C_1$–$C_6$ alkylcarbonyl; $C_1$–$C_6$ mono- or polyhaloalkylcarbonyl; phenylcarbonyl; phenylcarbonyl substituted with one or more of groups chosen from halo, $C_1$–$C_6$ alkyl or $C_1$–$C_6$ haloalkyl; or

$C(R^3)(R^4)OR^5$ wherein $R^3$ and $R^4$ independently represent hydrogen or $C_1$–$C_6$ alkyl and $R^5$ represents hydrogen, $C_1$–$C_6$ alkyl, benzyl, phenylcarbonyl or $C_1$–$C_6$ alkylcarbonyl; V is H or R; X, Y and Z independently represent hydroxyl, carboxyl, hydrogen, $C_1$–$C_6$ alkyl, $C_1$–$C_6$ mono- or polyhaloalkyl, $C_1$–$C_6$ alkoxy, $C_1$–$C_6$ mono- or polyhaloalkoxy, phenyl, phenyl substituted with one or more groups chosen from halo, nitro, $C_1$–$C_6$ alkyl or $C_1$–$C_6$ mono- or polyhaloalkyl, $C_1$–$C_6$ alkylthio, halogen, or two adjacent substituents (i.e. X and Y or Y and Z) are joined together to form a saturated five, six or seven-membered saturated cyclic structure of carbon atoms or one carbon atom of X,Y or Y,Z is replaced by a heteroatom chosen from among nitrogen, oxygen or sulfur (i.e. X,Y or Y,Z is $—(CH_2)_n—$ wherein n is 3, 4 or 5; or X,Y or Y,Z is $—(CH_2)_n—A—(CH_2)_m$ wherein n is 0–4, the value of m is equal to the ring size minus (n+3) and A is NH, O or S) and R represents alkyl, alkenyl, alkynyl, phenylalkyl, acyl, alkoxycarbonyl, phenoxycarbonyl, dialkylaminocarbonyl, alkylsulfonyl, phenylsulfonyl, alkylthiocarbonyl or phenylthiocarbonyl wherein alkyl, alkynyl and alkoxy in each instance have from 1 to 10 carbon atoms.

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**4,741,765**

## HERBICIDAL SULFONAMIDES

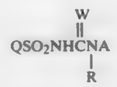
**Robert J. Pasteris, and Ramaurthi Muthukrishnan, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Division of Ser. No. 822,643, Jan. 30, 1986, Pat. No. 4,678,499, which is a continuation-in-part of Ser. No. 710,458, Mar. 11, 1985, abandoned. This application Apr. 3, 1987, Ser. No. 34,138**

**Int. Cl.[4] A01N** *43/90, 43/66, 43/72;* **C07D** *401/12, 401/14, 417/12, 413/12, 403/12*

**U.S. Cl. 71—93** **26 Claims**

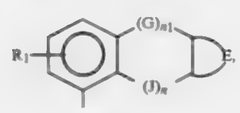
1. A compound of the formula:



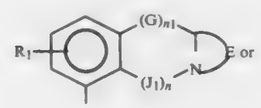
wherein

W is O or S;

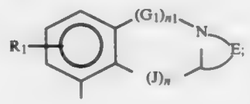
Q is



$Q_1$



$Q_2$



$Q_3$

G is $CH_2$, $CH_2CH_2$, O, S, NH, $NCH_3$ or CH=CH;

$G_1$ is $CH_2$, $CH_2CH_2$ or CH=CH;

J is $CH_2$, C=O, $S(O)_m$, O, NH, $NCH_3$, CHOH, $CHOCH_3$, $CH(CH_3)$ or $C(CH_3)OH$;

$J_1$ is $CH_2$, C=O or $SO_2$;

n and $n_1$ are independently 0 or 1;

m is 0, 1 or 2;

E is a bridge of 3 or 4 atoms containing 0 to 2 heteroatoms selected from the group consisting of oxygen, sulfur or nitrogen, wherein 1 atom of sulfur may take the form of SO or $SO_2$, said bridge also containing 1 to 4 atoms of carbon wherein 1 atom of carbon may take the form of C=O, said bridge together with two attachment sites forming a non-aromatic heterocyclic or carbocyclic ring optionally substituted by 1 to 3 substituent groups selected from the group L, or E is a bridge of 3 or 4 atoms containing 0–1 heteroatoms of oxygen or sulfur and 0–3 heteroatoms of nitrogen, said bridge also containing 0–4 atoms of carbon, said bridge together with two attachment sites forming an aromatic heterocyclic or carbocyclic ring optionally substituted by 1 to 3 substituents selected from the group L, with the proviso that when E contains two oxygen atoms or two sulfur atoms said atoms must be separated by at least one atom of carbon and that oxygen and sulfur are only linked to each other if the sulfur is in the form of SO or $SO_2$;

L is $C_1$–$C_4$ alkyl, $C_1$–$C_4$ haloalkyl, $C_1$–$C_4$ alkoxy, $C_1$–$C_4$ haloalkoxy, $C_2$–$C_8$ alkoxyalkoxy, halogen, $N(CH_3)_2$, cyano, nitro, phenyl or phenyl substituted with $C_1$–$C_3$ alkyl, $C_1$–$C_3$ haloalkyl, halogen, $NO_2$, $C_1$–$C_3$ alkoxy, $C_1$–$C_3$ alkylthio, $C_1$–$C_3$ alkylsulfinyl or $C_1$–$C_3$ alkylsulfonyl;

R is H or $CH_3$;

$R_1$ is H, $C_1$–$C_3$ alkyl, $C_1$–$C_3$ haloalkyl, halogen, nitro, $C_1$–$C_3$ alkoxy, $SO_2NR^IR^{II}$, $C_1$–$C_3$ alkylthio, $C_1$–$C_3$ alkylsulfinyl, $C_1$–$C_3$ alkylsulfonyl, $CO_2R^{III}$ or $NR_aR_b$;

$R^I$ is H, $C_1$–$C_4$ alkyl, $C_2$–$C_3$ cyanoalkyl, methoxy or ethoxy;

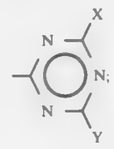
$R^{II}$ is H, $C_1$–$C_4$ alkyl or $C_3$–$C_4$ alkenyl; or

$R^I$ and $R^{II}$ may be taken together as $—(CH_2)_3—$, $—(CH_2)_4—$, $—(CH_2)_5—$ or $—CH_2CH_2OCH_2CH_2—$;

$R^{III}$ is $C_1$–$C_4$ alkyl, $C_3$–$C_4$ alkenyl, $C_3$–$C_4$ alkynyl, $C_2$–$C_4$ haloalkyl, $C_1$–$C_3$ cyanoalkyl, $C_5$–$C_6$ cycloalkyl, $C_4$–$C_7$ cycloalkylalkyl or $C_2$–$C_4$ alkoxyalkyl;

$R_a$ and $R_b$ are independently H or $C_1$–$C_2$ alkyl;

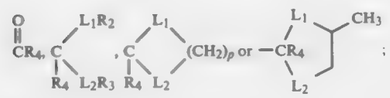
A is



A-1

X is H, $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkoxy, $C_1$–$C_4$ haloalkoxy, $C_1$–$C_4$ haloalkoxy, $C_1$–$C_4$ haloalkylthio, $C_1$–$C_4$ alkylthio, $C_2$–$C_5$ alkylalkyl, $C_2$–$C_5$ alkoxyalkoxy, amino, $C_1$–$C_3$ alkylamino or di($C_1$–$C_3$ alkyl)amino;

Y is H, $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkoxy, $C_1$–$C_4$ haloalkoxy, haloalkylthio, $C_1$–$C_4$ alkylthio, $C_2$–$C_5$ alkoxyalkyl, $C_2$–$C_5$ alkoxyalkoxy, amino, $C_1$–$C_3$ alkylamino, di($C_1$–$C_3$ alkyl)amino, $C_3$–$C_4$ alkenyloxy, $C_3$–$C_4$ alkynyloxy, $C_2$–$C_5$ alkylthioalkyl, $C_1$–$C_4$ haloalkyl, $C_3$–$C_5$ cycloalkyl, $C_2$–$C_4$ alkylnyl, $N(OCH_3)CH_3$,



P is 2 or 3;

$L_1$ and $L_2$ are independently O or S;

$R_2$ and $R_3$ are indenpendently $C_1$–$C_2$ alkyl;



$R_4$ is H or $CH_3$;

and their agriculturally suitable salts;

provided that

(a) X and/or Y are not $C_1$ haloalkoxy;

(b) n and $n_1$ cannot simultaneously be O;

(c) when G or $G_1$ is $CH_2CH_2$ or CH=CH, then n is O;

(d) when Q is $Q_1$ and n is 1, then E must contain at least one heteroatom selected from oxygen, sulfur or nitrogen; and

(e) when W is S, then R is H, and Y is $CH_3$, $OCH_3$, $OC_2H_5$, $CH_2OCH_3$, $C_2H_5$, $CF_3$, $SCH_3$, $OCH_2CH=CH_2$, $OCH_2C\equiv CH$, $OCH_2CH_2OCH_3$, $CH(OCH_3)_2$ or



11. A composition suitable for controlling the growth of undesired vegetation which comprises an effective amount of a compound of claim 1 and at least one of the following: surfactant, solid or liquid diluent.

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**4,741,766**

## SUBSTITUTED 4,6-ALKOXY PYRIDINECARBOXYLATE COMPOUNDS AND HERBICIDAL USE

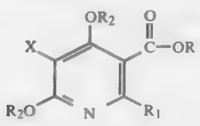
**Len F. Lee, St. Charles, Mo., assignor to Monsanto Company, St. Louis, Mo.**

**Division of Ser. No. 668,790, Nov. 6, 1984, Pat. No. 4,609,399. This application Jun. 2, 1986, Ser. No. 869,490**

**Int. Cl.[4] A01N** *43/40;* **C07D** *213/80, 213/85, 213/82*

**U.S. Cl. 71—94** **9 Claims**

1. A compound represented by the generic formula



wherein:

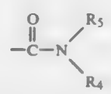
R is selected from the group consisting of hydrogen, lower alkyl, lower alkenyl, lower alkynyl, haloalkyl, haloalkenyl;

$R_1$ is selected from fluorinated methyl and chlorofluorinated methyl;

$R_2$ is selected from hydrogen and lower alkyl radicals; and

X is selected from

H



in which $R_4$ and $R_5$ are independently hydrogen or lower alkyl;

C≡N;

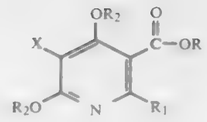
lower alkyl;

haloalkyl;

lower alkoxyalkoxyalkyl;

lower cyanoalkyl.

4. A herbicidal composition containing a carrier and a compound represented by the generic formula



wherein:

R is selected from the group consisting of lower alkyl, lower alkenyl, lower alkynyl, haloalkyl, haloalkenyl;

$R_1$ is trifluoromethyl;

$R_2$ is lower alkyl radical; and

X is selected from

C≡N;

haloalkyl;

lower alkoxyalkoxyalkyl;

lower cyanoalkyl.

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**4,741,767**

## 2H-IMIDAZO(1',2':1,2)PYRROLO(3,4-B)PYRIDINE COMPOUNDS, AND THEIR USE AS HERBICIDAL AGENTS

**Jean-Pierre Obrecht, Schlieren, Switzerland, assignor to Hoffmann-La Roche Inc., Nutley, N.J.**

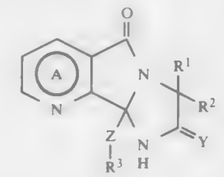
**Filed Nov. 6, 1985, Ser. No. 795,570**

**Claims priority, application Switzerland, Nov. 16, 1984, 5490/84; Aug. 27, 1985, 3675/85**

**Int. Cl.[4] A01N** *43/40, 57/08;* **C07D** *471/14;* **C07F** *9/06*

**U.S. Cl. 71—94** **14 Claims**

1. A compound of the formula



wherein

the pyridine ring A is unsubstituted or substituted with up to three substituents selected from the group consisting of halogen, $C_{1-6}$-alkyl, trifluoromethyl, $C_{1-4}$-hydroxyalkyl, $C_{1-6}$-alkoxy, $C_{1-6}$-alkylthio, nitro, cyano, methylsulphonyl, phenylsulphonyl, p-tolylsulphonyl, unsubstituted phenyl, phenoxy, phenylthio and benzyloxy and substituted phenyl, phenoxy, phenylthio and benzyloxy whereby the substituents for substituted phenyl, phenoxy, phenylthio and benzyloxy are themselves selected from the group consisting of 1 to 3 halogen atoms, 1 or 2 $C_{1-4}$-alkyl residues, a trifluoromethyl group, 1 or 2 $C_{1-4}$-alkoxy groups, 1 or 2 nitro groups and a cyano group, and

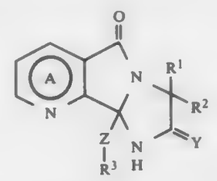
$R^1$ is unsubstituted $C_{1-4}$-alkyl or $C_{1-4}$-alkyl mono- or multiply substituted with substituents selected from the group consisting of fluorine and chlorine,

$R^2$ is $C_{1-10}$-alkyl or $C_{3-6}$-cycloalkyl, or

$R^1$ and $R^2$ together with the carbon atom to which they are attached form a $C_{3-6}$-cycloalkane ring which is unsubstituted or substituted with one or two $C_{1-4}$-alkyl residues;

$R^3$ is substituted straight or branched chain $C_{1-12}$-alkyl with the substituents selected from the group consisting of 1 or more hydroxy, 1 cyano, 1 $C_{3-6}$-cycloalkyl, $C_{1-4}$-alkoxy, unsubstituted or substituted phenoxy with the phenoxy substituents selected from the group consisting of 1 to 3 halogens, 1 or 2 $C_{1-4}$-alkyl, 1 trifluoromethyl, 1 or 2 $C_{1-4}$-alkoxy, 1 or 2 nitro, or 1 cyano; $SO_{n'}R^4$, or $—NHCOOR^5$ wherein $R^4$ is hydroxy, methyl, phenyl or p-tolyl; n' is 0–2; and $R^5$ is $C_{1-4}$ alkyl with the proviso that $n^1$ is 2 when $R^4$ is hydroxy and Y and Z are each independently oxygen or sulphur.

8. A weed control composition comprising from 0.01 to 95 weight percent of at least one compound of the formula



wherein

the pyridine ring A is unsubstituted or substituted with up to three substituents selected from the group consisting of halogen, $C_{1-6}$-alkyl, trifluoromethyl, $C_{1-4}$-hydroxyalkyl, $C_{1-6}$-alkoxy, $C_{1-6}$-alkylthio, nitro, cyano, methylsulphonyl, phenylsulphonyl, p-tolylsulphonyl, unsubstituted phenyl, phenoxy, phenylthio and benzyloxy and substituted phenyl, phenoxy, phenylthio and benzyloxy whereby the substituents for substituted phenyl, phenoxy, phenylthio and benzyloxy are themselves selected from the group consisting of 1 to 3 halogen atoms, 1 or 2 $C_{1-4}$-alkyl residues, a trifluoromethyl group, 1 or 2 $C_{1-4}$-alkoxy groups, 1 or 2 nitro groups and a cyano group, and

$R^1$ is unsubstituted $C_{1-4}$-alkyl or $C_{1-4}$-alkyl mono- or multiply substituted with substituents selected from the group consisting of fluorine and chlorine,

$R^2$ is $C_{1-10}$-alkyl or $C_{3-6}$-cycloalkyl, or

$R^1$ and $R^2$ together with the carbon atom to which they are attached form a $C_{3-6}$-cycloalkane ring which is unsubstituted or substituted with one or two $C_{1-4}$-alkyl residues;

Y and Z each independently are oxygen or sulphur.

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4,741,768

**HERBICIDAL SUBSTITUTED 2-[1-(3-TRANS-CHLORO-ALLYLOXYAMINO)ALKYLIDENE]-CYCLOHEXANE DIONE SALTS**

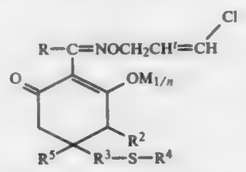
Rawls H. Frazier, Petaluma, and Tatao Luo, El Sobrante, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 657,697, Oct. 9, 1984, abandoned, and Ser. No. 798,670, Nov. 15, 1985, abandoned. This application Jun. 19, 1986, Ser. No. 876,330

Int. Cl.[4] C07C *131/00*

U.S. Cl. 71—98 27 Claims

1. A compound having the formula:



wherein M is a cation selected from the group of cupric, lithium and magnesium and n is its valence;

R is lower alkyl having 1 through 6 carbon atoms;

$R^2$ is hydrogen or alkoxycarbonyl having 2 through 6 carbon atoms;

$R^3$ is lower alkylene having 1 through 6 carbon atoms;

$R^4$ is lower alkyl having 1 through 6 carbon atoms; phenyl, or substituted phenyl having 1 through 3 substituents independently selected from the group of lower alkyl, lower alkoxyl, halo and haloalkyl having 1 through 4 carbon atoms and 1 through 3 of the same or different carbon atoms;

$R^5$ is hydrogen or lower alkyl; and the designation = indicates that the compound is trans geometrically oriented with respect to the double bond.

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4,741,769

**CERTAIN 1-PHENYL-3-ALKYL-1,3-PROPANEDIONES**

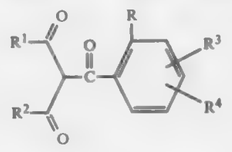
David L. Lee, Martinez, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Jun. 9, 1986, Ser. No. 872,071

Int. Cl.[4] A01N *35/00*

U.S. Cl. 71—123 18 Claims

1. The method of controlling undesirable vegetation comprising applying to the area where control is desired, an herbicidally effective amount of a compound having the formula



wherein

R is halogen; $C_1$–$C_2$ alkyl; $C_1$–$C_2$ alkoxy; nitro; $C_1$–$C_2$ haloalkyl; or $R^aSO_n$— wherein n is 0 or 2 and $R^a$ is $C_1$–$C_2$ alkyl;

$R^1$ is $C_1$–$C_4$ alkyl;

$R^2$ is $C_1$–$C_4$ alkyl or $C_1$–$C_4$ alkoxy;

$R^3$ and $R^4$ independently are (1) hydrogen; (2) halogen; (3) $C_1$–$C_4$ alkyl; (4) $C_1$–$C_4$ alkoxy; (5) trifluoromethoxy; (6) nitro; (7) $C_1$–$C_4$ haloalkyl; (8) $R^bSO_n$— wherein n is the integer 0, 1 or 2; and $R^b$ is (a) $C_1$–$C_4$ alkyl; (b) $C_1$–$C_4$ alkyl substituted with halogen; (c) phenyl; or (d) benzyl and their salts.

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4,741,770

**ZINC SMELTING PROCESS USING OXIDATION ZONE AND REDUCTION ZONE**

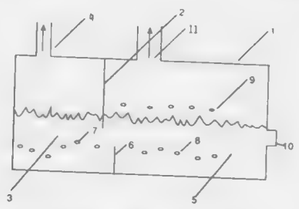
Barry S. Andrews, Victoria; James D. Iley; Mark I. Hoschke, both of New South Wales; Gregorey J. Hardie, and Michael J. Hollitt, both of New South Wales, all of Australia, assignors to CRA Services Limited, Melbourne, Australia

Filed Apr. 2, 1986, Ser. No. 847,342

Claims priority, application Australia, Apr. 3, 1985, PH0002

Int. Cl.[4] C22B *19/20*

U.S. Cl. 75—23 4 Claims



1. A zinc smelting process which comprises

(a) establishing at least one oxidation zone and at least one reduction zone in a furnace each zone comprising a slag bath and a gas space; the gas spaces of the oxidation and reduction zones being separated by a partition;



(b) maintaining a molten matte phase rich in cuprous sulphide in the or each oxidation zone, feeding raw materials comprising zinc sulphides and iron sulphides, together with fluxes, to the or each oxidation zone, and feeding oxygen or oxygen-rich gas into the molten bath in the or each oxidation zone to oxidise metal compounds therein to produce a slag bearing zinc oxide and iron oxide and to produce an off-gas containing fume and $SO_2$, said fume containing zinc and other volatiles;

(b.1) removing from said oxidation zone the off-gas produced in stp (b), removing fume from said off-gas, separating volatiles other than zinc from the removed fume to produce a zinc-containing fume residue, and recycling said zinc-containing fume residue to the oxidation zone;

(c) transferring zinc oxide-bearing slag from at least one oxidation zone to at least one reduction zone;

(d) introducing coal into the or each reduction zone to reduce zinc oxide present in said zinc oxide-bearing slag to produce reduced zinc, discard slag, and reducing gases containing carbon monoxide and hydrogen, said discard slag containing iron oxide;

(e) introducing a controlled stream of oxygen into the or each reduction zone, the amount of oxygen in the said stream being sufficient to partly post-combust said carbon monoxide and hydrogen, thereby producing heat which is transferred back to the slag bath in the reduction zone, while leaving said reducing gases sufficiently reducing to ensure that zinc vapor is not re-oxidised;

(f) recovering reduced zinc from at least one reduction zone; and

(g) removing discard slag from at least one reduction zone, dividing the removed discard slag into two streams, passing one of the streams to waste, passing the other stream to an iron reduction reactor to reduce iron oxide present in said discard slag to produce iron metal, off-gases, and a low-iron slag, recycling iron metal to the zinc reduction zone, and recycling low-iron slag from the reduction reactor to the oxidation zone.

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4,741,771

**PROCESS FOR REDUCTION OF IMPURITIES CONTENT OF HOT METAL**

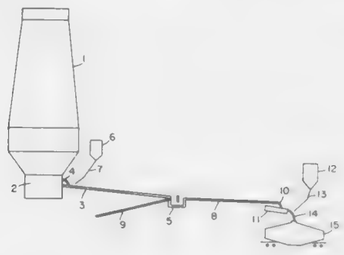
Maurizio Palchetti; Santi Palella, and Adolfo Crisafulli, all of Rome, Italy, assignors to Centro Sperimentale Metallurgico S.P.A., Rome, Italy

Filed Dec. 8, 1986, Ser. No. 939,403

Claims priority, application Italy, Dec. 6, 1985, 48889 A/85

Int. Cl.[4] C21C *7/00*

U.S. Cl. 75—57 7 Claims



1. A continuous process for reduction of the impurities content of hot metal containing phosphorus and more than 0.25% by weight silicon, tapped from the taphole of a blast furnace into the upstream end of runner means and discharged from the downstream end of said runner means into a receptacle, comprising adding a silicon reduction agent to the hot metal at the upstream end of said runner means, deslagging the hot metal, and adding a phosphorus reduction agent to the hot metal at the downstream end of said runner means as the hot metal falls into said receptacle.

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4,741,772

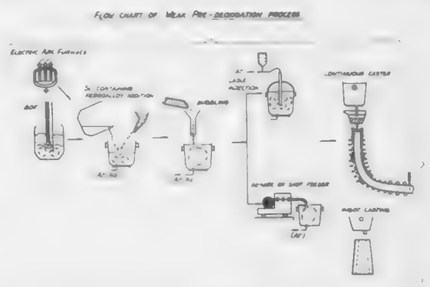
**SI CONTAINED FERROALLOY ADDITION AS A WEAK PRE-DEOXIDATION PROCESS IN STEELMAKING**

Shieh Maw-Cheng, Taipei; Chen Seng-Jung, Kaohsiung; Hu Li-Jung, Kaohsiung, and Su Jin-Luh, Kaohsiung, all of Taiwan, assignors to China Steel Corporation, Taiwan

Filed May 8, 1984, Ser. No. 608,151

Int. Cl.[4] C21C *7/02*

U.S. Cl. 75—58 10 Claims



1. A method for the deoxidation of molten steel treated in a ladle or furnace by a steelmaking process, consisting essentially of;

(a) subjecting the produced molten steel to a Weak Pre-Deoxidizing treatment by adding an effective amount of silicon containing ferroalloy to partially deoxidize the molten steel; immediately thereafter,

(b) treating the partially deoxidized molten steel with one or more deoxidizers and obtaining deoxidized steel without substantial retention of silicon.

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4,741,773

**WATER REPELLENT COMPOSITION**

Katsuhiko Kuroda; Toru Tagawa, and Hiroo Katayama, all of Yokohama, Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo, Japan

Filed May 7, 1986, Ser. No. 860,569

Int. Cl.[4] C09D *5/20*; C09K *3/00*

U.S. Cl. 106—2 12 Claims

1. A water-repellent composition which is liquid at room temperature, which consists essentially of:

(a) a silicone oil;

(b) a substantially non-volatile paraffinic oil or resin having a molecular weight of up to 5,000; and

(c) a compatibilizing agent, which is capable of reducing the separation index of the substantially non-volatile volatile paraffinic oil or hydrocarbon resin to the silicon oil to 0.4 at most, said compatibilizing agent being selected from the group consisting of a surfactant having a HLB of from 0 to 6, a perfluoroalcohol-polypropylene glycol-isocyanate condensation product, an ester of a fatty acid with a monohydric or polyhydric alcohol, a copolymer of an α-olefin having from 6–52 carbon atoms with a maleic acid monoester or maleic acid diester, and an ethylene-vinyl acetate copolymer.

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4,741,774

**PLASTIC COLORED CRAYON**

Salvator Lazar, Hakim Street 22, Holon, Israel

Filed Dec. 16, 1986, Ser. No. 942,219

Int. Cl.[4] C09D *13/00*

U.S. Cl. 106—19 19 Claims

1. A plastic colored crayon, comprising: an outer layer of

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plastic; and an inner, abradable, colored core comprising a mixture of ethyl hydroxyethyl cellulose, a plastic binder, wax and coloring matter; said ethyl hydroxyethyl cellulose being present from 8–30% by weight of the colored core.

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**4,741,775**

## HIGH TEMPERATURE INK WITH AMBIENT TEMPERATURE UTILITY AND METHOD OF PREPARATION

**Cressie E. Holcombe, Jr., Knox County, and Lloyd R. Chapman, Anderson County, both of Tenn., assignors to ZYP Coatings, Inc., Oak Ridge, Tenn.**

**Filed Nov. 6, 1986, Ser. No. 927,520**
**Int. Cl.[4] C09D *11/00***
**U.S. Cl. 106—20** **20 Claims**

1. A composition for applying to surfaces of substrates at temperatures up to at least 2,000 degrees Fahrenheit to form visable deposits that are adherent and water insoluble at room temperature, which comprises:

a liquid phase consisting essentially of about 82-wt % to about 86 wt % water and about 14 wt % to about 18 wt % $R_2O$ and $SiO_2$, where $R_2O$ is selected from $Li_2O$ and a mixture of $Li_2O$ and $Na_2O$, said $R_2O$ and $SiO_2$ having a molar ratio of about 0.34 to about 0.60, said $Li_2O$ of said $R_2O$ being present in about ¼ to ⅝ unreacted form relative to said $SiO_2$; and

a pigment of 12–60 wt %, based upon said liquid phase, said pigment selected from oxides and oxide mixtures containing transition metals.

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**4,741,776**

## METHOD OF PROCESSING WASTE MATERIALS

**Gerald C. Bye, Gravesend, and Kenneth B. Matthews, Swanscombe, both of England, assignors to Blue Circle Industries Limited, London, England**

**PCT No. PCT/GB81/00187, § 371 Date May 6, 1982, § 102(e) Date May 6, 1982, PCT Pub. No. WO82/00998, PCT Pub. Date Apr. 1, 1982**
**Continuation of Ser. No. 377,266, May 6, 1982, abandoned. This PCT application Sep. 11, 1981, Ser. No. 761,326**
**Claims priority, application United Kingdom, Sep. 19, 1980, 8030377**
**Int. Cl.[4] C21F *9/00*; C04B *7/02, 7/14, 7/34***
**U.S. Cl. 106—89** **9 Claims**

1. A method of processing a waste material that is an aqueous acidic liquor containing one or more heavy metals, which method comprises the steps of (1) adding to the waste material an amount of flue dust, obtained from the manufacture of cement, that is sufficient to bring the waste material to a pH of from 6 to 8, said flue dust comprising calcium carbonate and having a CaO analysis value of at least 17.7% by weight, (2) thereafter mixing the waste material with an amount of cement powder effective to bond the waste material and (3) allowing the resultant mixture to harden to a solid material.

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**4,741,777**

## DRY MIX FOR HIGH WORKABILITY STUCCOS AND MORTARS

**Kenneth Williams, and David L. Morris, both of Bedford, Ind., assignors to Rockwall-Peerless Corp., Stucco and Mortar Products, Bedford, Ind.**

**Filed Jul. 15, 1986, Ser. No. 885,645**
**Int. Cl.[4] C04B *24/20, 24/28***
**U.S. Cl. 106—90** **4 Claims**

1. A dry mix mortar composition of 20% to 70% Portland cement by weight, 30% to 80% sand or fine aggregate by weight, 0.15% to 6% Fly ash Type F, 1% to 3% vinyl acetate-ethylene copolymer in powder form, 0.10% to 0.50% sodium salts of polymerized substituted benzoid alkyl sulfonic acids, and 0.05% to 0.15% defoamer or antifoam agent in dry form.

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**4,741,778**

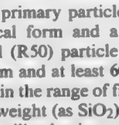
## THERMAL CONTROL COATING COMPOSITION

**Toshio Horie, Iruma, and Yoshinori Hasuda, Koganei, both of Japan, assignors to Nippon Telegraph & Telephone Corporation, Tokyo, Japan**

**Filed Mar. 13, 1987, Ser. No. 25,677**
**Claims priority, application Japan, Mar. 22, 1986, 61-64495; Jun. 13, 1986, 61-136080**
**Int. Cl.[4] C08L *83/06*; C09K *3/00***
**U.S. Cl. 106—287.16** **7 Claims**

1. A thermal control coating composition comprising:

a binder made of a high molecular weight condensation polymerization product of a compounds and oligomers thereof, the silicon compounds being represented byt the following general formula (1) of:



(1)

wherein R may be the same or different groups and each stands for an aliphatic hydrocarbon group having 1 to 8 carbon atoms or a phenyl group; 100 to 300 parts by weight, based on 100 parts by weight of said binder, of common rica particle having an average particle size of not more than 40 μm;

50 to 200 parts by weight, based on 100 parts by weight of said binder, of titanium oxide particle having an average particle size of not more than 1 μm; and

50 to 200 parts by weight, based on 100 parts by weight of said binder, of cerium oxide particle having an average particle size of not more than 40 μm.

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**4,741,779**

## ADDITIVES FOR RESINS AND THEIR COMPOSITION

**Muneo Mita; Kouji Kashiwase, and Tetsuya Osaki, all of Tokyo, Japan, assignors to Nippon Chemical Industrial Co. Ltd. and Kosei Co. Ltd., both of Tokyo, Japan**

**Filed Jul. 11, 1986, Ser. No. 884,373**
**Claims priority, application Japan, Jul. 19, 1985, 60-158272; Sep. 24, 1985, 60-208953**
**Int. Cl.[4] C04B *14/04*; C08K *3/34***
**U.S. Cl. 106—288 B** **11 Claims**

1. An additive for thermoplastic resins in the form of a homogeneously mixed powder which improves heat stability of the resins and antiblocking property of a film made from the resins comprising

(i) zeolite A, the primary particles of which have substantially a spherical form and a particle size distribution wherein medial (R50) particle size is within a range of from 0.5 to 4 μm and at least 60% of the particles of said zeolite fall within the range of from ½ to 1½ of said median,

(ii) 0.2 to 5% by weight (as $SiO_2$) based on said zeolite A of fine amorphous silica having particle sizes within a range of from 1 to 100 mμ.

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**4,741,780**

## TREATMENT OF TITANIUM DIOXIDE AND OTHER PIGMENTS TO IMPROVE DISPERSIBILITY

**George K. Atkinson, 1820 N. 7th Ave., P.O. Box 1684, Laurel, Miss. 39440**

**Continuation-in-part of Ser. No. 700,891, Feb. 11, 1985, Pat. No. 4,599,114. This application Jun. 23, 1986, Ser. No. 877,234**
**The portion of the term of this patent subsequent to Jul. 8, 2003, has been disclaimed.**
**Int. Cl.[4] C09C *1/36***
**U.S. Cl. 106—300** **32 Claims**

1. A composition comprising pigment particles containing on their surfaces a surfactant, said surfactant being present on said surfaces in an amount sufficient to improve the dispersibility of said particles in a resin medium, a plastic medium, a paper making composition, or a reinforced plastic composite composition, wherein the surfactant consists of the reaction product of: a Diamine, a Carboxylic Acid, and a Fatty Acid.



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**4,741,781**

## IRON OXIDE PIGMENT SUSPENSIONS AND SLURRIES

**Hans J. De Witte, Pittsburgh, Pa., assignor to Mobay Corporation, Pittsburgh, Pa.**

**Filed Oct. 29, 1986, Ser. No. 924,544**
**Int. Cl.[4] C04B *14/00***
**U.S. Cl. 106—304** **17 Claims**

1. An iron oxide pigment-.suspension or slurry comprising

(a) 24-70 wt. % water,

(b) 0.05-1.4 wt. % of an additive selected from water soluble salts of citric acid and tartaric acid and,

(c) 40–75 wt. % iron oxide pigment in which the sum of (a), (b), and (c) is approximately 100 wt. %.

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**4,741,782**

## PROCESS FOR FORMING A LIGHT-WEIGHT AGGREGATE

**Robert W. Styron, Marietta, Ga., assignor to Resource Technology, Inc., Tucker, Ga.**

**Continuation-in-part of Ser. No. 669,284, Nov. 7, 1984, Pat. No. 4,624,711. This application Sep. 18, 1986, Ser. No. 908,787**
**Int. Cl.[4] C04B *14/00***
**U.S. Cl. 106—309** **20 Claims**

1. A process for forming light-weight aggregate pellets having a density of less than about 60 lbs./ft.$^3$ comprising:

(a) forming an admixture comprising, by weight-percent of said admixture, about
greater than 60% fly ash,
1 to 25% cement, and
1 to 10% filler selected from the group consisting of cenospheres, silica fume dust, and perlite,

(b) in a pelletizing device, adding to said admixture, by weight percent of the total aggregate, about
1 to 18% water, and
0 to 3% (by weight of the cement percent) chemical accelerator to form aggregate pellets of a predetermined size range,

(c) removing said aggregate pellets from said pelletizing device, and

(d) curing said aggregate pellets with an oxygen containing gas at a temperature less than about 300° F.

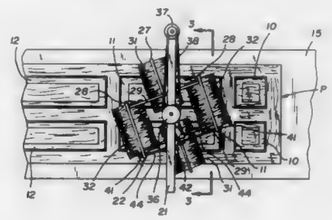
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**4,741,783**

## APPARATUS AND METHOD FOR ROTARY BUFFING

**Lyn R. Daunheimer, Batavia, and Mark A. Ruggie, Park Ridge, both of Ill., assignors to Masonite Corporation, Chicago, Ill.**

**Filed Dec. 31, 1986, Ser. No. 948,060**
**Int. Cl.[4] B08B *1/02***
**U.S. Cl. 134—15** **4 Claims**



1. Apparatus for buffing a surface of an article of lateral and longitudinal extent, said surface lying generally in a plane but having irregularities disposed outside said plane, comprising:

at least one buffing roll supported in a position with the spin axis of said buffing roll lying in a plane generally parallel to said plane of said surface and spaced apart from said surface, said buffing roll rotatable about a second axis generally perpendicular to said plane of said surface;

first drive means for spinning said roll about said spin axis;

second drive means for rotating said roll about said second axis; and

means for longitudinally advancing said article relative to said roll and for supporting said surface in wiping contact with said roll.

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**4,741,784**

## COMPOSITION AND METHOD FOR REMOVING CONFORMAL COATINGS

**Howard L. Roeser, Jr., Mission Viejo, Calif., assignor to Kote-Off, Inc., El Toro, Calif.**

**PCT No. PCT/US85/02339, § 371 Date Jul. 25, 1986, § 102(e) Date Jul. 25, 1986, PCT Pub. No. WO86/03145, PCT Pub. Date Jun. 5, 1986**
**Continuation-in-part of Ser. No. 674,562, Nov. 26, 1984, abandoned. This PCT application Nov. 22, 1985, Ser. No. 893,322**
**Int. Cl.[4] B08B *7/00*; C11D *7/50, 7/52*; C23D *17/00***
**U.S. Cl. 134—38** **21 Claims**

1. A system for removing conformal coating from a printed circuit board, comprising a base component and an activator component in separate containers, said base component and said activator component forming an active conformal coating remover when mixed, wherein:

said base component comprises methylene chloride or toluene or a mixture thereof; and

said activator component comprises (a) about 75 to about 85 parts by volume methylene chloride or toluene, or a mixture thereof, (b) about 7 to about 25 parts by volume lower alkyl alcohol, and (c) about 2 to about 8 parts by volume acetone or methylethylketone.

8. A method for removing a conformal coating from a printed circuit board, comprising the steps of:

combining a base component comprising methylene chloride or toluene or a mixture thereof, and an activator component comprising (a) about 75 to about 85 parts by volume methylene chloride or toluene or a mixture thereof, (b) about 7 to about 25 parts by volume lower alkyl alcohol and (c) about 2 to about 8 parts by volume of acetone or methlyethylketone wherein said base component and said activator component are combined together in a ratio of base component to activator component of from about 1:1 to about 10:1, wherein said ratio is effective to form an active coating remover composition;

treating the conformal coating on a printed circuit board by applying the active coating remover thereto; and

removing the treated conformal coating.

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**4,741,785**

## PROCESS FOR FORMING HARDENED CONTACT SURFACES IN A UNIVERSAL BALL JOINT

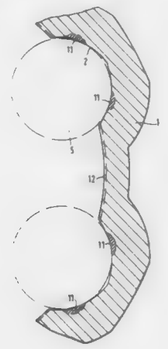
**Hans-Heinrich Welschof, Rodenbach, Fed. Rep. of Germany, assignor to Löhr & Bromkamp GmbH**

**Continuation of Ser. No. 542,089, Oct. 17, 1983, abandoned, which is a continuation of Ser. No. 406,994, Aug. 10, 1982, abandoned. This application Oct. 18, 1984, Ser. No. 662,522**
**Claims priority, application Fed. Rep. of Germany, Aug. 17, 1981, 3132363**
**Int. Cl.[4] C21D *9/40***
**U.S. Cl. 148—154** **7 Claims**

1. A method for manufacturing a universal joint which includes an inner joint member, an outer joint member, a cage member and torque-transmitting balls supported in windows formed in said cage member and received in ball tracks formed respectively in the outer face of said inner joint member and in the inner face of said outer joint member, said balls running axially along said ball tracks in said joint members and radially across said windows in said cage member in contact therewith

along ball contacting surfaces formed in said ball tracks and said windows, said cage member and said joint members further having spherical contact surfaces which are in contact with each other between said cage member and, respectively, said inner joint member and said outer joint member, said method comprising the steps of:

inductively hardening by utilization of a shape inductor said ball contacting surfaces in said inner and outer joint members and in said windows of said cage member to a specific depth which is substantial taken relative to the thickness of the component in which said hardened ball contacting surface is formed, and



providing on each of said spherical contact surfaces of said cage member a wear resistant surface layer having a thickness which is relatively thin taken with relation to the wall thickness of said cage;

said specified depth of hardness of said ball contacting surfaces being at least three times the thickness of said wear resistant layer;

said ball contacting surfaces being hardened at two longitudinally extending surfaces of limited width symmetrically arranged in each of said ball tracks of said inner and said outer joint members and at two radially extending surfaces of limited width axially opposite each other in each of said windows.

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**4,741,786**

**COLD DRAWN FREE-MACHINING STEEL BAR INCLUDING BISMUTH**

**Stephen P. Birman, Mayfield Heights; Richard B. Smith, Elyria, and Richard L. Thompson, Amherst, all of Ohio, assignors to Stanadyne, Inc., Windsor, Conn.**

**Filed Jun. 10, 1986, Ser. No. 872,557**
**Int. Cl.⁴ C22C** *38/60*
**U.S. Cl. 148—320** **15 Claims**

1. A cold drawn free-machining steel bar having a composition consisting essentially of, in weight percent:

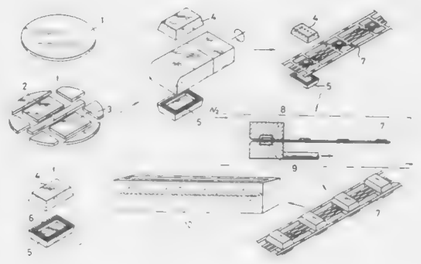
C up to 0.15
Mn 0.7 to 1.3
P 0.03 to 0.09
S 0.30 to 0.50
Bi 0.05 to 0.25
The sum of Ni, Cr, Mo and Cu up to 0.15;
balance iron;
the ratio %Mn / %S is from 1.7 to 2.8
the %Mn - 1.62 X %S is from 0.05 to 0.40; and
the ratio %Bi / (%Ni +%Cu) is at least 2.0.

**4,741,787**

**METHOD AND APPARATUS FOR PACKAGING SEMICONDUCTOR DEVICE AND THE LIKE**

**Katsuo Shimizu, and Saburo Narisawa, both of Saitama, Japan, assignors to Seiei Kohsan Co., Ltd., Saitama, Japan**

**Filed Feb. 27, 1986, Ser. No. 833,866**
**Claims priority, application Japan, Aug. 28, 1985, 60-188852**
**Int. Cl.⁴ B29C** *43/18*
**U.S. Cl. 156—64** **9 Claims**



1. A process for packaging a semiconductor device comprising the steps of:

providing a tablet of curable resin,
weighing the tablet for upper and lower packages,
preheating the upper and lower packages,
compression molding the packages in a package shape,
coating the opposed surfaces to be bonded of the upper and lower packages with a fusible bonding agent,
interposing a chip of a semiconductor device between the upper package and the lower package,
heating the upper and lower packages while supplying nitrogen gas in a vacuum molding machine,
bonding the upper and lower packages, and
conducting an antioxidation of a metal portion.

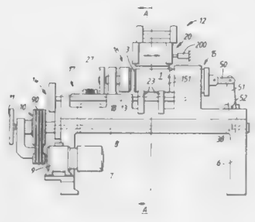
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**4,741,788**

**METHOD OF AND APPARATUS FOR SPIN-WELDING**

**Kenneth R. Clark; Malcolm G. Collins; Keith E. Nuttall, all of Oxfordshire, and Suresh G. Panvalkar, Wiltshire, all of England, assignors to Metal Box p.l.c., Reading, England**

**Filed May 16, 1986, Ser. No. 864,140**
**Claims priority, application United Kingdom, May 24, 1985, 8513240**
**Int. Cl.⁴ B29C** *65/06*
**U.S. Cl. 156—64** **10 Claims**



1. A method of spin-welding together two opposed surfaces of thermo plastics components which when assembled together prior to welding have an interference fit, the method comprising the steps of:

(a) engaging the components with one another and moving them into an assembled position;
(b) applying a radial pressure to the assembled components in the region of the opposed surfaces;



(c) whilst the radial pressure is applied, spinning the components relative to one another at a speed and for a time sufficient to cause welding of the opposed surfaces;
(d) measuring a parameter which is a function of the force required to cause relative movement of the engaged components before applying the radial pressure; and
(e) selecting the value of the radial pressure according to the value of the measured parameter such that contact pressure between the opposed surfaces is controlled during welding.

7. Apparatus for spin-welding together two opposed surfaces of thermoplastics components which when assembled together prior to welding have an interference fit, comprising means for applying a radial pressure to the assembled components in the region of the opposed surfaces, means for spinning the components relative to one another while subjected to the radial pressure, means for measuring a parameter which is a function of the force required to cause relative movement of the engaged components before application of the radial pressure, and means for selecting the radial pressure according to the value of the measured parameter.

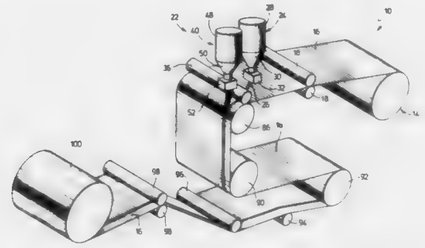
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**4,741,789**

**APPARATUS AND PROCESS FOR FORMING AND APPLYING A PROFILE AND ADJACENT RIB-TYPE ZIPPER TO A TRAVELING FILM WEB**

**Larry Zieke, Midland, and James Trombley, Bentley, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Oct. 20, 1986, Ser. No. 921,023**
**Int. Cl.⁴ B29C** *47/04*
**U.S. Cl. 156—66** **25 Claims**



1. A method for applying a profile with adjacent ribs to a traveling film web comprising the steps of:

providing a bag film web,
extruding a closure profile member, a first rib member and a second rib member as three separate extrudates, and
joining said closure profile member, first rib member and second rib member to said bag film web in an aligned relation such that said closure profile member is disposed between said first and second rib members.

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**4,741,790**

**AQUEOUS ADHESIVES AND THEIR USE**

**Malcolm Hawe, and David Farrar, both of West Yorkshire, England, assignors to Allied Colloids Limited, England**

**Continuation-in-part of Ser. No. 766,096, Aug. 15, 1985, Ser. No. 766,097, Aug. 15, 1985, and Ser. No. 766,098, Aug. 15, 1985, abandoned. This application Aug. 7, 1986, Ser. No. 894,346**
**Claims priority, application United Kingdom, Aug. 12, 1985, 8520218; Feb. 14, 1986, 8603655**
**Int. Cl.⁴ B05D** *5/10*
**U.S. Cl. 156—71** **15 Claims**

1. A method in which a fibrous sheet is bonded to a substrate using an aqueous adhesive the adhesive component of which is selected from water soluble polymeric materials and water swellable polymeric materials which comprise a copolymer of

(a) 20 to 90% ethylenically unsaturated ionic monomer
(b) 0 to 70% ethylenically unsaturated non-ionic monomer and
(c) 0 to 1% cross linker

characterised in that the monomers also include (d) 1 to 70% by weight ethylenically unsaturated monomer that carries a pendant group $—A_mB_nA_pR$ wherein B is ethyleneoxy, n is at least 2, A is propyleneoxy or butyleneoxy, m and p are each a number less than n and R is a hydrophobic group containing at least 8 carbon atoms.

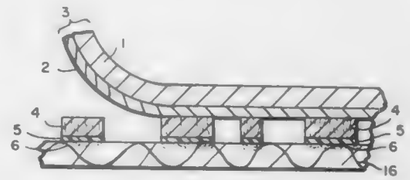
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**4,741,791**

**FLOCKED TRANSFER MATERIAL AND METHOD OF MAKING HEAT-TRANSFERABLE INDICIA THEREFROM**

**Arthur F. Howard, Sudbury, and Philip K. So, Dedham, both of Mass., assignors to Bemis Associates Inc., Watertown, Mass.**

**Filed Jul. 18, 1986, Ser. No. 887,248**
**Int. Cl.⁴ B32B** *5/00*
**U.S. Cl. 156—72** **6 Claims**



1. A method of making a flocked transfer material for attachment to fabric or the like, said method comprising the steps of:

(1) applying a layer of strong-bonding material to the coated side of a first release sheet which has one side coated with a release material;
(2) applying a layer of flock material to the layer of strong-bonding material;
(3) applying a layer of flock material to the layer of flock adhesive;
(4) attaching a second release sheet to the layer of flock material, said second release sheet having one side coated with a release material with a higher melting point than that of said strong-bonding material, wherein the attaching of the second release sheet comprises the steps of:
  (a) heating the second release sheet to a temperature above the tackifying temperature of said release material; and
  (b) pressing the coated side of the heated second release sheet against the layer of flock material; and
(5) peeling the first release sheet from the layer of strong-bonding material.

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**4,741,792**

**METHOD OF MANUFACTURING A CERAMIC HONEYCOMB STRUCTURAL BODY AND AN EXTRUSION DIE THEREFOR**

**Tadaaki Matsuhisa, Kasugai, and Kiminari Kato, Nagoya, both of Japan, assignors to NGK Insulators, Ltd., Nagoya, Japan**

**Division of Ser. No. 651,860, Sep. 18, 1984, Pat. No. 4,645,700. This application Nov. 5, 1986, Ser. No. 927,222**
**Claims priority, application Japan, Oct. 7, 1983, 58-186880**
**Int. Cl.⁴ B29C** *47/12;* **B32B** *31/30*
**U.S. Cl. 156—89** **5 Claims**

1. A die for extruding a ceramic honeycomb structural body comprising a die body member having:

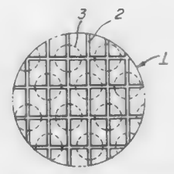
a first plurality of parallel molding slits formed in a top surface of said die;
a second plurality of parallel molding slits formed in said surface and arranged in a direction perpendicular to said

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first plurality of parallel molding slits, such that said first plurality of parallel molding slits and said second plurality of parallel molding slits intersect at right angles;

a plurality of rectangular shaped cell-forming portions formed in said surface and defined by said first plurality of parallel molding slits and said second plurality of parallel molding slits, said molding slits defining a short side and a



long side of at least one of said portions such that the pitch ratio between said short side and said long side is about 1:√3; and

a plurality of ceramic raw material batch supply holes formed in a bottom surface of said die and extending to said molding slits for supplying a ceramic raw material batch to said molding slits.

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**4,741,793**

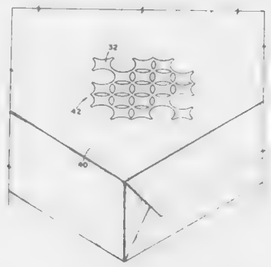
**METHOD OF MAKING PACKAGING DESIGN**

**Carolyn S. Jones, 2102 N. Vancouver, Tulsa, Okla. 74127**

**Division of Ser. No. 738,408, May 28, 1985. This application Aug. 4, 1986, Ser. No. 892,200**

**Int. Cl.⁴ B32B** *35/00, 31/00*

**U.S. Cl. 156—94** **1 Claim**



1. A method of making a decoration for applying a gift package using a design sheet from a backing in which said design sheet is of uniform aesthetic character and has a plurality of non-contiguous rows of cut configuration in which there is a label in each configuration which comprises:

removing the labels from said backing;

thereafter obtaining from said design sheet a plurality of design building strip units having a uniform aesthetic quality, each such building unit to be without aperatures and peeling such design units from said backing sheets;

securing and rearranging substantially all of a adhesive coated side of each building unit to a package and in close proximity to each other to obtain an individual design.

**4,741,794**

**EQUIPMENT FOR THE MANUFACTURE OF MAINLY LARGE-DIAMETER FLEXIBLE HOSES HAVING SPIRALLED REINFORCEMENT**

**Sándor Antal, and Péter Smaroglay, both of Budapest, Hungary, assignors to Taurus Gumiipari Vállalat, Budapest, Hungary**

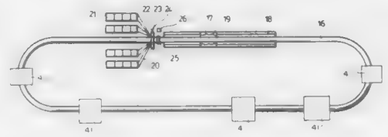
**Continuation of Ser. No. 412,451, Aug. 27, 1982, abandoned. This application Jan. 22, 1985, Ser. No. 693,240**

**Claims priority, application Hungary, Sep. 3, 1981, 2553/81**

**The portion of the term of this patent subsequent to Apr. 3, 2005, has been disclaimed.**

**Int. Cl.⁴ B65H** *81/00*

**U.S. Cl. 156—429** **5 Claims**



1. An apparatus for manufacturing reinforced flexible hoses, having

(a) means for storing and unwinding reinforcing threads for building the reinforced hose on a flexible hose base, said means comprising a plurality of joinable and removable drum supporting platforms as a thread supplying means for simultaneously applying up to about a thousand reinforcing threads to the flexible hose base, said means for storing and unwinding being stationary with respect to the flexible hose base during the application of the reinforcing threads thereto, whereby upon the exhaustion of the threads from said platforms, said platforms can be readily replaced with other platforms having drums with a full complement of threads thereon;

(b) at least one driving mechanism adapted to travel over a pair of tracks and positively gripping said hose for advancing and rotating the gripped hose;

(c) supporting elements for said flexible hose, said supporting elements being disposed within said tracks of said at least one driving mechanism, and being of adjustable height that is automatically adjusted and controlled by contact with the hose while it is being manufactured, and a given one or more supporting elements is depressed out of contact with the hose by said at least one driving mechanism when said mechanism travels on said tracks above said given supporting elements; and

(d) supplementary support means disposed under the hose outside of said tracks of said at least one driving mechanism, which supplementary support means support, allow and/or promote the advancing and rotating movement of said hose.

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**4,741,795**

**METHOD OF AND APPARATUS FOR LINING PIPES**

**John C. Grace, Prestbury, and James C. Grace, Hale, both of United Kingdom, assignors to Tate Pipe Lining Processes Limited, United Kingdom**

**PCT No. PCT/GB86/00486, § 371 Date Apr. 14, 1987, § 102(e) Date Apr. 14, 1987, PCT Pub. No. WO87/01173, PCT Pub. Date Feb. 26, 1987**

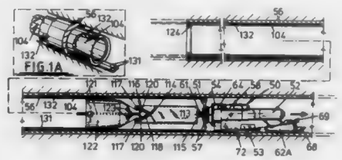
**PCT Filed Aug. 14, 1986, Ser. No. 49,294**

**Claims priority, application United Kingdom, Aug. 15, 1985, 8520525; Dec. 13, 1985, 8520725**

**Int. Cl.⁴ B29C** *63/34*

**U.S. Cl. 156—247** **44 Claims**

1. A method of lining a pipe comprising the steps of laying along the pipe hose means filled with a predetermined quantity of settable lining composition to be applied against the pipe wall; advancing a centrifugal lining machine along the length of the hose means; axially slitting the hose means in front of the advancing centrifugal lining machine to permit egress of the lining composition from the hose means; and guiding the



egressing lining composition into the centrifugal lining machine for application to the pipe wall as it advances along the hose means.

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**4,741,796**

**METHOD FOR POSITIONING AND BONDING A SOLID BODY TO A SUPPORT BASE**

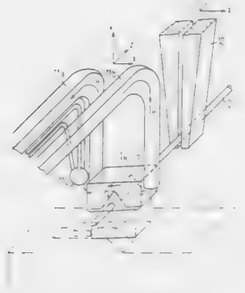
**Hans Althaus, Lappersdorf; Werner Kuhlmann, Munich, and Werner Spaeth, Holzkirchen, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Apr. 24, 1986, Ser. No. 855,275**

**Claims priority, application Fed. Rep. of Germany, May 29, 1985, 3519260**

**Int. Cl.⁴ B29C** *65/02, 65/04, 65/14, 65/18*

**U.S. Cl. 156—272.4** **24 Claims**



1. A method for positioning and mounting a solid body in which a portion of the solid body together with a bonding agent is arranged on a further body and bonded to a support base the further body including a groove and adapted to supply heat energy, position the solid body, and contain the bonding agent; the method comprising:

at least partially immersing the solid body in the bonding agent contained by the further body;

supplying heat energy from the further body such that the solid body and the further body can be moved individually or in relation to each other while contacted by the bonding agent:

aligning the solid body with the further body with the aid of the groove of the further body;

positioning the solid body in a location relative to the support base; and

cooling the bonding agent by controlling a reduction in the supply of heat energy from the further body such that the solid body is bonded to the support base.



**4,741,797**

**APPARATUS FOR APPLYING SURFACING SHEETS TO SUPPORT SURFACES THEREFOR**

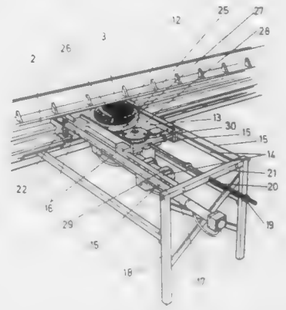
**Pieter M. Henderson, Bedfordview, and Karl-Heinz Schmitt, Benoni, both of South Africa, assignors to Heinrich Brandt Maschinenbau-GmbH, Lemgo, Fed. Rep. of Germany**

**Filed Dec. 30, 1985, Ser. No. 814,689**

**Claims priority, application South Africa, Dec. 28, 1984, 84/10107**

**Int. Cl.⁴ B32B** *3/04, 31/00*

**U.S. Cl. 156—479** **8 Claims**



1. Apparatus for applying surfacing sheet materials to support surfaces therefor comprising:

(a) a frame member;

(b) a support table having a gap therein and a clamp member cooperating with said support table, both being supported by said frame;

(c) means for urging a sheet of surfacing material around a radiused edge of a support surface clamped by said support table and said clamping member;

(d) a rotatable turntable arranged in said gap to support a support surface thereon, said turntable being vertically movable in said gap between an upper position for spacing said support surface from said support table and a lower position permitting said support surface to be clamped by said support table and said clamping member; and

(e) means for actuating said clamping member.

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**4,741,798**

**INSTALLATION FOR ETCHING MATERIAL**

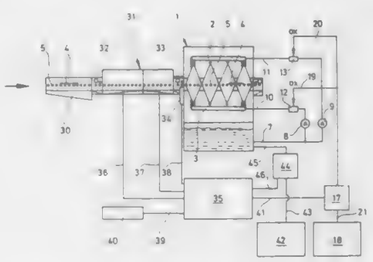
**Rainer D. Haas, Herrenberg, Fed. Rep. of Germany, assignor to Hans Hollmuller Maschinenbau GmbH & Co, Fed. Rep. of Germany**

**Filed Nov. 12, 1986, Ser. No. 929,420**

**Claims priority, application Fed. Rep. of Germany, Nov. 11, 1985, 3539874**

**Int. Cl.⁴ H01L** *21/306;* **C23F** *1/02*

**U.S. Cl. 156—626** **13 Claims**



1. Apparatus for etching supports that have deposited

thereon an etchable metal with an etching medium, which apparatus includes

(a) an etching chamber,

(b) means to convey said supports with metal deposited thereon through said etching chamber,

(c) a plurality of nozzles which are positioned to spray etching medium containing acid on said supports as they move through said etching chamber,

(d) a sump for receiving etching medium withdrawn from said etching chamber,

(e) circulating means for circulating etching medium from said sump back to said plurality of nozzles,

(f) a reservoir for providing an oxidizing agent and a reservoir for providing an acid,

(g) a device for emitting a first signal indicative of the quantity of metal on said support,

(h) a detector which emits a second signal when said support enters said etching chamber,

(i) a control unit which receives said first and second signals and which generates a third signal indicative of the quantity of material in said reservoirs which needs to be included into said etching medium in order to achieve the amount stoichiometrically necessary, for said etching medium to remove the desired quantity of deposited metal from said support, and

(j) metered conduits establishing fluid flow connection of said reservoirs of (f) with either the sump of (d) or the circulation means of (e), said metered conduits being responsive to said third signal set forth in (i).

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**4,741,799**

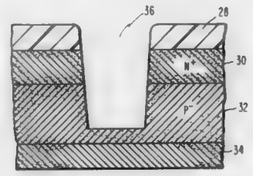
## ANISOTROPIC SILICON ETCHING IN FLUORINATED PLASMA

**Lee Chen, and Gangadhara S. Mathad, both of Poughkeepsie, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Continuation of Ser. No. 730,988, May 6, 1985, abandoned. This application Nov. 17, 1986, Ser. No. 931,909**

**Int. Cl.⁴ H01L** *21/306;* **B44C** *1/22;* **C03C** *15/00, 25/06*

**U.S. Cl. 156—643** **7 Claims**




1. A mehtod of anisotropically etching a silicon body in a single etching step, comprising:

placing said silicon body in a gaseous plasma environment at a constant gas pressure and composition consisting essentially of a chlorine-free fluorine-containing etchant gas, and a polymer-forming gas for substantially limiting lateral etching of said silicon body, said polymer-forming gas consisting of one or more halogenated hydrocarbons wherein the halogen in each is fluorine.

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**4,741,800**

## ETCHING METHOD FOR THE MANUFACTURE OF A SEMICONDUCTOR INTEGRATED CIRCUIT

**Shunpei Yamazaki, Tokyo, Japan, assignor to Semiconductor Energy Laboratory Co., Ltd., Tokyo, Japan**

**Filed Jan. 28, 1986, Ser. No. 823,398**

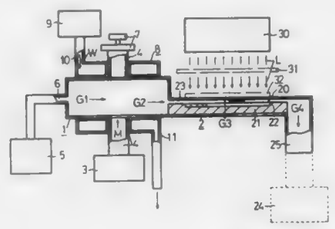
**Claims priority, application Japan, Jan. 28, 1985, 60-013901**

**Int. Cl.⁴ C03C** *5/06*

**U.S. Cl. 156—643** **29 Claims**

1. An etching method for use in the manufacture of a semiconductor integrated circuit, which employs an etching apparatus provided with an exciting chamber into which a reactive gas is introduced and an etching chamber which communicates with the exciting chamber and in which a substrate to be etched is disposed, the etching method comprising the steps of:

exciting the reactive gas by microwave energy in the exciting chamber;




introducing the excited reactive gas from the exciting chamber into the etching chamber in the form of a thin layer parallel and contiguous to the surface of said substrate; and

irradiating, with light, the excited reactive gas and the substrate surface therethrough such that the excited reactive gas is re-excited by the light, thereby etching the substrate surface.

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**4,741,801**

## GLOW DISCHARGE METHOD AND APPARATUS AND PHOTORECEPTOR DEVICES MADE THEREWITH

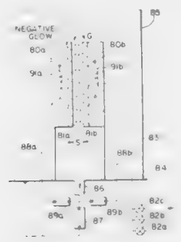
**John H. Coleman, Locust Valley, N.Y., assignor to Plasma Physics Corp., Locust Valley, N.Y.**

**Continuation-in-part of Ser. No. 637,065, Aug. 2, 1984, Pat. No. 4,569,719, which is a division of Ser. No. 284,333, Jul. 17, 1981, Pat. No. 4,484,809. This application Feb. 7, 1986, Ser. No. 827,022**

**The portion of the term of this patent subsequent to Feb. 11, 2003, has been disclaimed.**

**Int. Cl.⁴ B44C** *1/22;* **H01L** *21/306;* **B05D** *3/06;* **G03G** *15/00*

**U.S. Cl. 156—643** **27 Claims**




22. The method of etching a pair of substrate surfaces spaced apart by a separation in an evacuable enclosure, which includes the steps of evacuating said enclosure, introducing a reactive gas at subatmospheric pressure in the region of said pair of said substrates, applying an electric field between a counter electrode positioned in the vicinity of said pair of said substrate surfaces and said substrate surfaces and controlling said pressure within a minimum range of values in relation to said separation to maintain the negative glow region of a glow discharge adjacent the said surfaces of said substrates, the distance separating said substrates being sufficiently short that the negative glow regions of said surfaces interact to reduce the magnitude of said minimum pressure required to maintain the glow discharge.



**4,741,802**

## METHOD FOR MANUFACTURING SEMICONDUCTOR DEVICE

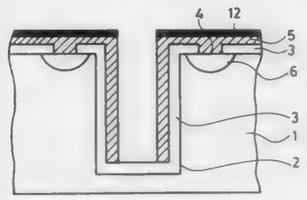
**Yoshinori Okumura, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed May 28, 1987, Ser. No. 55,143**

**Claims priority, application Japan, May 28, 1986, 61-122714**

**Int. Cl.⁴ H01L** *21/306;* **B44C** *1/22;* **C03C** *15/00;* **C23F** *1/02*

**U.S. Cl. 56—648** **6 Claims**




1. A method for manufacturing a semiconductor device comprising the steps of:

preparing a semiconductor substrate,

forming a trench on the surface of said semiconductor substrate,

forming a polysilicon film on the surface of said semiconductor substrate and the entire surface inside said trench,

filling said trench with oxide,

forming a mask for etching on said polysilicon film formed on the surface of said semiconductor substrate in a self-aligning manner using a material which can be selectively deposited on the polysilicon film or selectively removed from the oxide,

removing said oxide inside said trench, and

dividing said polysilicon film formed in the bottom portion of said trench utilizing said mask for etching.

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**4,741,803**

## SPRAY DRYER AND OPERATING METHOD THEREFOR

**Rudolf Loeffelmann, Langenfeld, Fed. Rep. of Germany, assignor to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany**

**Continuation of Ser. No. 571,253, Jan. 16, 1984, abandoned. This application Dec. 20, 1985, Ser. No. 814,008**

**Claims priority, application Fed. Rep. of Germany, Jan. 21, 1983, 3301872**

**Int. Cl.⁴ B01D** *1/18, 1/20*

**U.S. Cl. 159—4.04** **11 Claims**

5. A method for removing water from a product having water associated therewith comprising the steps of

(i) spraying the product having water associated therewith into the spraying zone of the vertical spray dryer;

(ii) simultaneously introducing a heated drying gas into a lower section of the spray dryer so that said drying gas travels upward from below said sprayed product to contact the sprayed product and agglomerate particulate solids while entraining fine particles therein, said agglomerated solids falling to the bottom of said tower under force of gravity;

(iii) passing the drying gas containing the entrained fine particles upward through porous filter elements contained within an upper section of the spray dryer to filter out the entrained fine particles and form agglomerates thereof on the surface of the porous filter elements; and

(iv) intermittently passing a flow of compressed gas through the porous filter elements in a direction opposite to that of the drying gas to dislodge the fine particle agglomerates therefrom, wherein those fine particle agglomerates of sufficient weight to overcome the upward pressure of said-heated drying gas fall to the bottom of said tower under force of gravity.

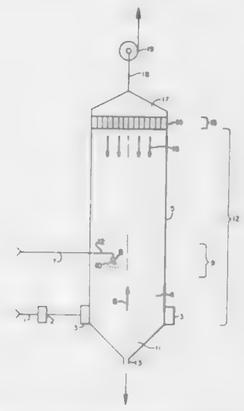
9. A spray dryer for obtaining particulate solids from an aqueous slurry, comprising:

a vertical tower having an upper section surmounted by a top section, a drying zone below said upper section, and a bottom section below said drying zone;

means for introducing said slurry into said tower above the lower end of said drying zone;

means for spraying said introduced slurry into a fine dispersion, thus defining a spraying zone within said drying zone;

means for drying said sprayed slurry to form particulate solids and dust, comprising a conduit for introducing



upwardly flowing heated drying gas into said tower at the bottom of said drying zone, so that said particulate solids fall under force of gravity to the bottom section of said tower and said dust is entrained by said drying gas;

means for exhausting all of said introduced gas from said tower, located in the top section thereof;

means located in said upper section, for collecting said entrained dust;

menas for dislodging agglomerated dust particulate solids from said collecting means so that they fall under force of gravity to the bottom section of said tower; and

means for removing all particulate solids collected in the bottom section of said tower.

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**4,741,804**

## POLYSACCHARIDE DERIVATIVES CONTAINING ALDEHYDE GROUPS, THEIR PREPARATION FROM THE CORRESPONDING ACETALS AND USE AS PAPER ADDITIVES

**Daniel B. Solarek, Somerville; Patrick G. Jobe, Westfield; Martin M. Tessler, Edison; Robert L. Billmers, Stockton; Diane J. Lamb, Bound Brook, and John J. Tsai, Belle Mead, all of N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.**

**Division of Ser. No. 829,675, Feb. 14, 1986, Pat. No. 4,703,116, and a continuation-in-part of Ser. No. 758,634, Jul. 24, 1985, Pat. No. 4,675,394, which is a continuation-in-part of Ser. No. 641,820, Aug. 17, 1984, abandoned. This application Apr. 3, 1987, Ser. No. 34,133**

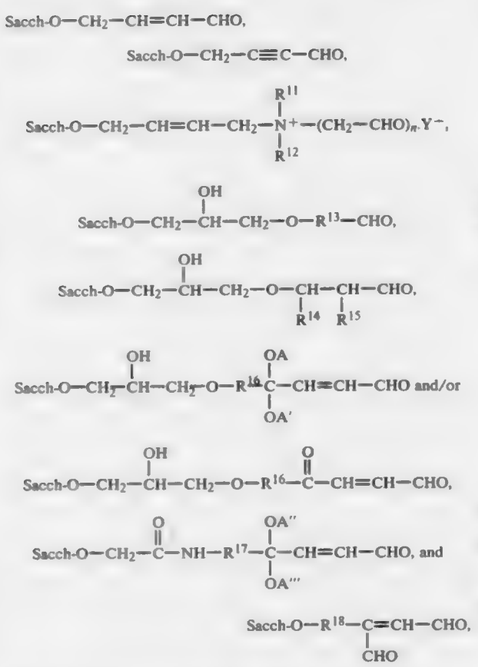
**Int. Cl.⁴ D21H** *3/20*

**U.S. Cl. 162—175** **20 Claims**

1. In a method for making paper having dry strength, wet strength, temporary wet strength, or combinations thereof, the step which comprises adding, as a strength aid, to the stock at any stage prior to forming a web, an effective amount of an aldehyde-containing polysaccharide derivative which has a structure selected from the group consisting of

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wherein Sacch—O— represents a polysaccharide molecule; n is 1 to 3; $R^{11}$ and $R^{12}$ are independently an alkyl, aryl, aralkyl, or alkaryl group when n is 1, $R^{11}$ or $R^{12}$ is one of the groups when n is 2, or $R^{11}$ and $R^{12}$ are not present when n is 3; $R^{13}$ is an alkyl group, optionally containing an ether linkage, or an aralkyl group; $R^{14}$ and $R^{15}$ individually are hydrogen or a methyl group; $R^{16}$, $R^{17}$, and $R^{18}$ individually are an alkyl group; A, A′, A″ and A‴ are independently a lower alkyl group or A and A′ together form at least a 5-membered cyclic acetal; and Y is an anion.

actuating means secured to the shoe for pivoting said nose member relative to the shoe; and

connecting means extending between said actuating means and said nose member for connecting said actuating means to said nose member such that when said actuating means is actuated, said nose member is skewed relative to the shoe so that the blanket is guided laterally relative to the shoe as the blanket moves over, and in contact with, said nose member.

**18**. A method of guiding an extended nip press blanket relative to a pressing shoe of an enclosed "apple type" extended nip press, the method comprising the steps of:

pivotally-connecting a nose member relative to the pressing shoe of the extended nip press; and

actuating an air cylinder extending between the shoe and the nose member such that the nose member is skewed relative to the shoe so that the blanket is guided laterally relative to the shoe as the blanket moves over, and in contact with, the nose member.

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**4,741,806**

## SOLVENT EXTRACTOR

**James Scinta, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Division of Ser. No. 475,991, Mar. 16, 1983, Pat. No. 4,448,669.**
**This application Mar. 21, 1984, Ser. No. 591,757**
**Int. Cl.⁴ B01D** *11/02*
**U.S. Cl. 196—14.52** **1 Claim**



1. Apparatus for supercritical extraction of diatomaceous earth comprising

(a) source means for providing a source of diatomaceous earth containing recoverable hydrocarbons,

(b) operatively connected to said source means an inlet chamber wherein said diatomaceous earth and a solvent can be contacted with each other,

(c) a loop reactor connected to said inlet chamber, said loop reactor having connected thereto at least two settling legs provided with valves for periodic removal of settling mixtures comprising diatomaceous earth and solvent and extracted hydrocarbon values,

(d) connected to said settling legs solid/fluid separation means, having a fluid outlet and a solids outlet,

(e) separator means connected to said fluid outlet which separator means have an overhead outlet for solvent removal and a bottom outlet for the removal of heavier materials,

(f) dryer means connected to said solids outlet of said solid/fluid separator means having a gas outlet and a solids outlet, said gas outlet being directly or indirectly connected to the inlet of said separator means,

(g) recycle means connected to said overhead outlet and to said inlet chamber for recycling solvent from said separator means to said inlet chamber.

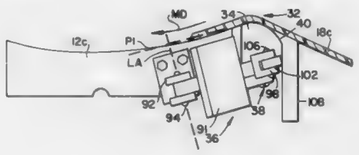
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**4,741,805**

## GUIDING APPARATUS FOR GUIDING AN EXTENDED NIP PRESS BLANKET

**David V. Lange, Beloit, Wis., assignor to Beloit Corporation, Beloit, Wis.**

**Filed Jul. 23, 1987, Ser. No. 76,826**
**Int. Cl.⁴ D21F** *3/02*
**U.S. Cl. 162—205** **18 Claims**




1. In an extended nip press having a blanket and a pressing shoe, a guiding apparatus for guiding the extended nip press blanket relative to the pressing shoe, said apparatus comprising:

a nose member pivotally-connected to the shoe for guiding the blanket relative to the shoe;

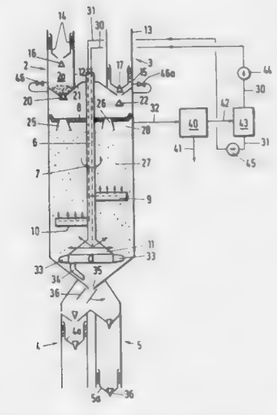


**4,741,807**

## APPARATUS FOR EXTRACTING VALUABLE SUBSTANCES FROM A GRANULAR FEEDSTOCK

**Joachim Wilhelm, Frankfurt am Main; Rainer Reimert, Idstein, and Georg Penk, Bad Vilbel, all of Fed. Rep. of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Sep. 15, 1986, Ser. No. 907,542**
**Claims priority, application Fed. Rep. of Germany, Sep. 14, 1985, 3532957**
**Int. Cl.⁴ B01D** *11/02*; **C11B** *1/10*
**U.S. Cl. 196—14.52** **5 Claims**



1. In an apparatus for recovering valuable substances from a granular feedstock having particle sizes in the range from about 0.5 to 15 mm, having a reactor with a downwardly moving bed of said granular feedstock therein, means for continuously supplying solvent in a liquid or supercritical state to effect a countercurrent extracting to said feedstock in said bed, means for supplying entrainer fluid into said feedstock, means for withdrawing a mixture of valuable substances and solvents from an upper portion of the reactor, means for separating the solvent from the valuable substances by a pressure relief and/or temperature rise and for recycling the solvent to the reactor, and means for discharging extraction residue from a lower end of the reactor, the improvement comprising means for charging feedstock into the reactor comprising at least one charging lock connected to the reactor at its upper portion, wherein the means for discharging the extraction residue comprises at least one discharging lock connected to the reactor at its lower portion and wherein said means for supplying solvent and entrainer are positioned in the lower portion of said bed and are provided at different locations in the lower portion of the reactor, the means for supplying solvent being below the means for supplying entrainer.

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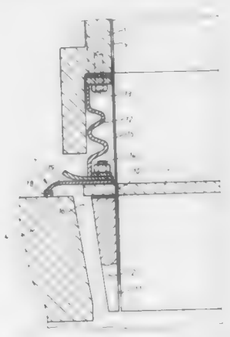
**4,741,808**

## COKE OVEN DOOR

**Wilhelm Holz, Gelsenkirchen-Buer; Helmut Lukaszewicz, Bottrop; Friedhelm Haaf, Velbert, all of Fed. Rep. of Germany, and Mutien-Marie Renverse, Tournai, Belgium, assignors to Krupp Polysius AG, Beckum, Fed. Rep. of Germany**

**Continuation of Ser. No. 664,699, Oct. 25, 1984, abandoned.**
**This application Sep. 18, 1986, Ser. No. 908,635**
**Claims priority, application Fed. Rep. of Germany, Nov. 10, 1983, 3340731**
**Int. Cl.⁴ C10B** *25/06*
**U.S. Cl. 202—248** **8 Claims**

1. In a coke oven having a doorway enclosed by a door frame, a door body movable between positions in which it selectively opens and closes said doorway, a door stop, a door stop support carried by said door body, and a metal sealing element having a bearing surface, said sealing element being supported by the door stop and encircling the door body in a position to bear against the door frame via and said bearing surface when the door body is in its doorway closing position and seal a gap between the door frame and the door body, the improvement wherein said sealing element is fixed at one edge of a continuous resilient metal diaphragm having its opposite edge secured to said door stop support, said bearing surface



having a groove therein, said diaphragm being deformable in response to engagement of said sealing element with said door frame, the deformation of said diaphragm causing said bearing surface to tip and form a wedge-shaped gap between an outer portion of said sealing element and said door frame that is open in a direction away from the interior of said oven, said wedge-shaped gap being in communication with said groove in said bearing surface.

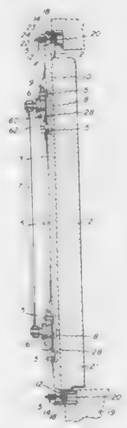
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**4,741,809**

## COKE OVEN DOORS FOR HORIZONTAL-CHAMBER COKE OVENS

**Wolfgang Becker, Stadt, and Heinz Tewes, Gelsenkirchen-Buer, both of Fed. Rep. of Germany, assignors to Ruhrkohle Aktiengesellschaft, Essen, Fed. Rep. of Germany**

**Continuation of Ser. No. 707,443, Mar. 1, 1985, abandoned, which is a division of Ser. No. 524,921, Aug. 19, 1983, abandoned. This application Oct. 8, 1986, Ser. No. 917,261**
**Claims priority, application Fed. Rep. of Germany, Jan. 21, 1983, 3301877; Apr. 2, 1983, 3312072**
**Int. Cl.⁴ C10B** *25/06, 25/16*
**U.S. Cl. 202—248** **18 Claims**



1. A coke oven door in combination with a horizontal cham-

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ber type coke oven having an oven chamber, said coke oven door comprising vertical door arrangement which comprises:

a door member to retain an oven filling inside said oven chamber, said door member having a sealing element;

a door frame having an opening and a portion with a sealing surface, said door member having a closed position when abutting said door frame, and an open position when away from said door frame;

said door member having a longitudinal axis;

a door stopper attached to the door member, said door stopper serving as a substantially heat insulating barrier and being disposed to protrude into the oven chamber sufficiently, to keep the oven filling at a predetermined distance from said door member in said closed position;

a separate force transmittal unit for transmitting force around said door member and for forcing said sealing element against said door frame in said closed position;

said sealing element having a bulge therein, said bulge protruding substantially from said sealing element, said bulge being disposed in a direction away from said oven chamber when said door is in said closed position;

at least one connecting joint means being disposed for supporting said door member when said door member is moved to said open position, said at least one connecting joint means joining said door member and said force transmittal unit, said supporting being provided through said at least one connecting joint means, said at least one connecting joint means having a first element means and a second element means, said second element means being in a co-operative relationship and making contact with said first element means for supporting said door member in said open position, said first element means being connected to be supported by said force transmittal unit when said door member is in said open position, said second element means being connected to support said door member when said door member is in said open position, said force transmittal unit having means for preventing said door member in said closed position from moving in a direction away from said door frame;

said sealing element having a portion which is disposed to make contact with said sealing surface of said door frame in said closed position;

locking means for providing bearing forces on said force transmittal unit at least to assist in sealing said sealing surface of said door frame with said sealing element of said door member;

said first element means and said second element means of said connecting joint means each having at least one surface directly facing at least one surface of the other element means;

said at least one facing surface of said first element means and said at least one facing surface of said second element means forming a gap therebetween along all parts of said facing surfaces such that said first element means and said second element means are non-touchingly disposed from one another in said closed position, whereby heat transfer between said first element means and said second element means because of said gap is minimized in said closed position; and

at least a portion of said at least one facing surface of said first element means making said contact, between said first and said second element means, with at least a portion of said at least one facing surface of said second element means when said door member is in said open position.

**4,741,810**

## PROCESS FOR REDUCTIVE PLUTONIUM STRIPPING FROM AN ORGANIC REPROCESSING SOLUTION INTO AN AQUEOUS, NITRIC ACID SOLUTION BY USE OF AN ELECTROLYTIC CURRENT

**Michael Heilgeist, Linkenheim; Helmut Schmieder, Karlsruhe, and Klaus Flory, Bad Bergzabern, all of Fed. Rep. of Germany, assignors to Kernforschugszentrum Karlsruhe GmbH, Karlsruhe, Fed. Rep. of Germany**

**Filed Dec. 14, 1984, Ser. No. 681,739**

**Claims priority, application Fed. Rep. of Germany, Dec. 14, 1983, 3345199**

**Int. Cl.⁴ C25B** *1/00;* **C01G** *56/00*

**U.S. Cl. 204—1.5** **1 Claim**

1. Process for reductive stripping of plutonium from an organic reprocessing solution in which the plutonium is present as Pu(IV) into an aqueous, nitric acid solution by use of an electrolytic current, comprising:

(a) providing as the aqueous solution one which is free of agents for stabilizing the reduced valence of the plutonium, Pu(III),

(b) establishing an $HNO_3$ concentration in the range of 0.05 to 1.0 mol/l in the aqueous solution and

(c) carrying out the reduction of Pu(IV) to Pu(III) at a maximum temperature of 40° C., and at a current density in the range of 0.5 to 20 $mA/cm^2$.

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**4,741,811**

## PROCESS AND APPARATUS FOR ELECTROLYTICALLY DEPOSITING IN A MOVING MODE A CONTINUOUS FILM OF NICKEL ON METAL WIRE FOR ELECTRICAL USE

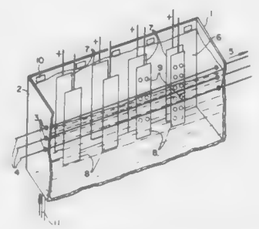
**Jacques Lefebvre, Voiron; Philippe Gimenez, Grenoble; Gabriel Colombier, Saint Egreve; Armand Golay, Moirans, and Jean S. Safrany, Nancy, all of France, assignors to Aluminium Pechiney, Paris, France**

**Filed Feb. 27, 1987, Ser. No. 19,666**

**Claims priority, application France, Jan. 6, 1987, 87 00952**

**Int. Cl.⁴ C25D** *17/00*

**U.S. Cl. 204—28** **9 Claims**



1. A process for electrically depositing, in a moving mode, a continuous film of nickel in the form of globules of controllable size, on metal wire for electrical use, wherein, after degreasing, the wire is subjected to a current density which charges it positively by passing it through an activation bath under voltage and then, after rinsing, a current density which charges it negatively by passing it through an acid nickel-plating bath under voltage and finally a rinsing operation and drying operation, characterised in that, in order to modulate the current density along the path of movement of the wire, the current density is reduced in the upstream portion of the nickel-plating bath and/or the downstream portion of the activation bath, and the acidity of the nickel-plating bath is regulated to a pH-value of between 1 and 5.



**4,741,812**

## METHOD FOR ETCHING ELECTRODE FOIL ALUMINUM ELECTROLYTIC CAPACITORS

**Kouichi Kojima, Hirakata; Masanori Okabayashi, Uji; Nobuyoshi Kanzaki, Joyo; Kenji Touyama, Uji, and Ryouichi Shimatani, Tsuzuki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan**

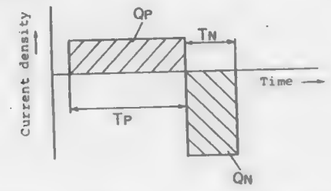
**PCT No. PCT/JP85/00481, § 371 Date Apr. 30, 1986, § 102(e) Date Apr. 30, 1986, PCT Pub. No. WO86/01544, PCT Pub. Date Mar. 13, 1986**

**PCT Filed Aug. 30, 1985, Ser. No. 862,502**

**Claims priority, application Japan, Aug. 30, 1984, 59-181312**

**Int. Cl.⁴ C25F** *3/04*

**U.S. Cl. 204—129.4** **9 Claims**




1. A method for etching foil for use in making aluminum electrolytic capacitors, comprising:

impressing on aluminum foil, while in an electrolytic bath comprising an aqueous solution of hydrochloric acid as an etching solution, an alternating current having a ratio of electric charge of negative cycle to positive cycle in the range of 0.2 to 2.0 and a duty ratio in the range of 51–90 percent.

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**4,741,813**

## DIAPHRAGM FOR AN ELECTROLYTIC CELL

**Arthur C. Schulz, North Tonawanda; Robert Kiszewski, Niagara Falls, both of N.Y., and Ursula I. Keller, Queenston, Canada, assignors to OxyTech Systems, Inc., Chardon, Ohio**

**Filed Dec. 15, 1986, Ser. No. 941,459**

**Int. Cl.⁴ C25B** *13/00*

**U.S. Cl. 204—295** **10 Claims**

1. A process for preparing a diaphragm for use in an electrolytic cell comprising the steps of:

(a) forming an aqueous dispersion of at least one valve metal oxide and at least one water-soluble solvent which is capable of wetting the valve metal oxide and asbestos fibers the valve metal oxide being selected from the group consisting of the oxides of titanium, zirconium hafnium, niobium, tantalum, tungsten, and mixtures, thereof,

(b) mixing the disperson with asbestos fibers to form a slurry,

(c) immersing a cathode in the slurry and depositing a uniform mixture of slurry solids onto the cathode,

(d) heating of diaphragm-deposited cathode at a temperature of at least about 100° C. to cure the diaphragm, and

(e) allowing the diaphragm to cool.

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**4,741,814**

## CONTAINER FOR AN ELECTROPHORETIC SUPPORT MEDIUM

**David G. Mayes, Beaumont; James R. M. Sanford, Vidor, and Eric H. Petersen, Beaumont, all of Tex., assignors to Helena Laboratories Corporation, Beaumont, Tex.**

**Filed Feb. 12, 1987, Ser. No. 14,419**

**Int. Cl.⁴ G01N** *27/26;* **B65D** *85/30, 6/00*

**U.S. Cl. 204—299 R** **7 Claims**

1. A container for protecting and enclosing an electrophoretic support medium having a base sheet with at least two opposed major surfaces and a layer of an electrophoretic gel adhered to one of the major surfaces of the base sheet, said container comprising:

a pair of separable first and second housing portions, each housing portion having a pair of ends, a top, a bottom, a pair of side walls and an end wall at one of the ends joining said top, bottom and side walls, the other end of each housing portion forming an entrance to the interior of the housing portion;

said other end of one of said housing portions being provided with an inner annular lip and the other end of said other housing portion being provided with an outer annular lip;

said inner annular lip of said one housing portion slidably extending into the outer annular lip of the other housing portion when the housing portions are assembled to form a cavity therein;

an internal first rim protruding from the side walls and said one end wall of said first housing portion and said inner annular lip into said cavity, and first rim being spaced apart from the bottom of said first portion to define a first recess in said cavity;

an internal second rim protuding from the side walls and said one end wall of said second housing portion into said cavity, said second rim being spaced apart from the bottom of said second portion to define a second recess in said cavity;

said first and second rims being spaced from the bottoms the same distance;

the recess of one of said housing portions adapted to receive part of the electrophoretic support medium inserted through the entrance thereof, with the corresponding rim being engageable solely with the base sheet of the support medium; and

the recess of the other of the housing portions adapted to receive the remaining part of the electrophoretic support medium inserted through the entrance thereof, with the corresponding rim also being engageable solely with the base sheet of the support medium;

said housing portions when assembled having the inner annular lip in sealing engagement with said outer annular lip and with the end surfaces of said first rim on said inner annular lip abutting the end surfaces of the opposing second rim.

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**4,741,815**

## APPARATUS FOR INDICATION OF THE FINAL STAGE OF A TITRATION ANALYSIS

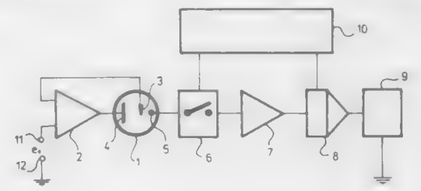
**Juraj Bercik; Jan Dzurov, and Leos Vyskocil, all of Bratislava, Czechoslovakia, assignors to Slovenska vysoka skola technicka, Bratislava, Czechoslovakia**

**Continuation-in-part of Ser. No. 870,139, Jun. 2, 1986, abandoned. This application Apr. 13, 1987, Ser. No. 37,316**

**Claims priority, application Czechoslovakia, May 31, 1985, 3907-85; May 31, 1985, 3908-85**

**Int. Cl.⁴ G01N** *31/16*

**U.S. Cl. 204—405** **6 Claims**




1. An apparatus for electrochemical indication of the final stage of a titration analysis, comprising

a first indication electrode located in an electrochemical titation container;

a timing circuit;

a sampling current amplifier having an input and an output and being activated by said timing circuit;

a switch activated by said timing circuit, said switch connecting and disconnecting said indication electrode to the input of said amplifier;

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a recorder, connected to the output of said amplifier whereby the output of said amplifier is recorded;

whereby the indication electrode is periodically connected by the switch to the sampling current amplifier, and a current sample is measured just after connecting the indication electrode.

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**4,741,816**

**OXYGEN SENSOR**

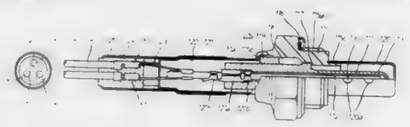
**Hisaharu Nishio, Tokai, and Toshio Okumura, Kakamigahara, both of Japan, assignors to NGK Spark Plug Co., Ltd., Aichi, Japan**

**Continuation of Ser. No. 824,941, Feb. 3, 1986, abandoned, which is a continuation of Ser. No. 662,690, Oct. 19, 1984, abandoned. This application Dec. 29, 1986, Ser. No. 948,467**

**Claims priority, application Japan, Nov. 10, 1983, 58-174005[U]; Nov. 11, 1983, 58-175033[U]**

**Int. Cl.⁴ G01N *27/58***

**U.S. Cl. 204—425** **26 Claims**



1. An oxygen sensor comprising:

a cylindrical oxygen sensing element having one closed end and inner and outer electrode layers formed on the inner and outer surfaces thereof respectively;

an output withdrawing lead wire electrically connected to the inner electrode layer of the oxygen sensing element; and

a metallic terminal disposed in the connection between the output withdrawing lead wire and the inner electrode layer, said metallic terminal having a connection portion formed of a rounded spring steel sheet with a larger uncompressed diameter than the inner diameter of said inner electrode layer and having opposed resilient portions separated by a gap and disposed in contact with an inner periphery of said inner electrode layer to apply a radial force to said inner electrode layer.

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**4,741,817**

**ELECTROCHEMICAL SENSOR FOR THE CONCENTRATION OF ASPECTS IN A FLUID MIXTURE AND SYSTEM FOR REGULATING THE RICHNESS OF AN AIR-FUEL MIXTURE UTILIZING SUCH A SENSOR**

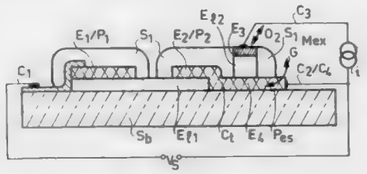
**Michel Croset; Noël Noutilles; Joël Perret; Jean-Philippe Schnell, and Gonzalo Velasco, all of Paris, France, assignors to Socapex, Suresnes, France**

**Continuation of Ser. No. 318,800, Nov. 6, 1981, abandoned. This application Mar. 28, 1985, Ser. No. 716,618**

**Claims priority, application France, Nov. 17, 1980, 80 24380**

**Int. Cl.⁴ G01N *27/46***

**U.S. Cl. 204—425** **21 Claims**




1. A solid electrolyte sensor for sensing the concentrations of reactive species contained in a fluid mixture comprising:

a primary cell including first, second and third regions, said first region having fluid flow limiting means for limiting the fluid flow introduced into said second region, said second region having catalysis means for bringing the admitted fluid into thermodynamic equilibrium, and said third region having an electrochemical measuring cell for detecting the stoichiometry of the reaction of said reactive species;

at least one supplementary electrochemical cell including first and second electrically-conducting means and solid electrolyte means, said solid electrolyte means operatively connected to and separating said first and second electrode means for permitting ionic conduction of one of the reactive species between said first and second electrode means;

electrical power source means operatively connected to said first and second electrode means for supplying an electrical current to said solid electrolyte means for establishing ionic conduction of the reactive species within the solid electrolyte means of predetermined amplitude and polarity;

said first electrode means being adapted to contact a medium supplying or receiving the reactive species or one of its components;

said second electrode means being operatively linked with the second region for modifying, in response to said ionic conduction, the relative concentrations of the fluid admitted into said second region by extraction or injection of the reactive species in a quantity proportional to the predetermined amplitude; and

control means operatively connected to said power source means for controlling the supply of electric current to said first and second electrode means to selectively cause extraction or injection of the reactive species into said second region and for shifting the detected stoichiometry relative to a true stoichiometric value in response to the extraction or injection of the reactive species into said second region by virtue of said ionic conduction between said first and second electrode means.

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**4,741,818**

**ALKALINE BATHS AND METHODS FOR ELECTRODEPOSITION OF PALLADIUM AND PALLADIUM ALLOYS**

**Fred I. Nobel, Sands Point; James L. Martin, Merrick, and Michael P. Toben, Smithtown, all of N.Y., assignors to LeaRonal, Inc., Freeport, N.Y.**

**Continuation of Ser. No. 808,131, Dec. 12, 1985, abandoned, which is a continuation-in-part of Ser. No. 742,258, Jun. 7, 1985, abandoned. This application Mar. 17, 1987, Ser. No. 24,874**

**Int. Cl.⁴ C25D *3/58***

**U.S. Cl. 204—44.2** **46 Claims**

1. An alkaline aqueous electrolyte for the electrodeposition of palladium comprising: a soluble palladium compound and a organic complexing agent for primary complexing the palladium in the electrolyte, said complexing agent containing at least one heterocyclic ring having one or more nitrogen atoms in a ring position, at least one carboxyl group and at least one hydroxyl or carbonyl group and being present in an amount sufficient to maintain the palladium compound in solution in the electrolyte; said electrolyte optionally containing an amount of ammonia or ammonium compounds which is less than that necessary to stoichiometrically complex the palladium and having a sufficiently alkaline pH to solubilize the complexing agent and palladium compound.

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**4,741,819**

**SULFUR REMOVAL SYSTEM FOR PROTECTION OF REFORMING CATALYST**

**Richard C. Robinson, San Rafael; Robert L. Jacobson, Vallejo, and Leslie A. Field, Emeryville, all of Calif., assignors to Chevron Research Company, San Francisco, Calif.**

**Filed Oct. 31, 1984, Ser. No. 667,505**

**Int. Cl.⁴ C10G *35/06***

**U.S. Cl. 208—65** **17 Claims**

1. A method for removing residual sulfur from a hydrotreated naphtha feedstock comprising:

(a) contacting said feedstock with hydrogen under mild reforming conditions in the presence of a less sulfur sensitive reforming catalyst that requires sulfiding, thereby carrying out some reforming reactions and also converting trace sulfur compounds to $H_2S$ and forming a first effluent;

(b) contacting said first effluent with a solid sulfur sorbent to remove the $H_2S$, thereby forming a second effluent which contains less than 0.1 ppm sulfur;

(c) contacting said second effluent with a highly selective reforming catalyst, which is more sulfur sensitive, in subsequent reactors.



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**4,741,820**

**REFORMING/DEHYDROCYCLIZATION CATALYSTS AND PROCESSES**

**Peter K. Coughlin, Yorktown, and Regis J. Pellet, Croton-On-Hudson, both of N.Y., assignors to Union Carbide Corporation, Danbury, Conn.**

**Filed Mar. 27, 1986, Ser. No. 844,951**

**Int. Cl.⁴ C10G *35/06*; C07C *2/52***

**U.S. Cl. 208—138** **66 Claims**

1. The process for reforming of a hydrocarbon feedstock comprising contacting said hydrocarbon feedstock under effective reforming conditions with a catalyst comprising:

(a) at least one MP-NZMS molecular sieve which has been calcined, hydrotreated or chemically treated to remove at least a portion of the template used in the manufacture of the NZMS, or, alternatively, is calcined, hydrotreated or chemically treated in situ prior to carrying out the reforming process, said at least one MP-NZMS being characterized after removal of the template by an adsorption of isobutane of at least 2 percent by weight at a partial pressure of 500 torr and a temperature of 20° C. and also characterized by an adsorption of triethylamine less than 5 percent by weight at a partial pressure of 2.6 torr and a temperature of 22° C.; and

(b) an amount of at least one Group VIII metal effective to render said MP-NZMS active as a reforming catalyst.

46. The process for dehydrocyclization of a hydrocarbon feedstock comprising contacting said hydrocarbon feedstock under effective dehydrocyclization conditions with a catalyst comprising:

(a) at least one MP-NZMS molecular sieve which has been calcined, hydrotreated or chemically treated to remove at least a portion of the template used in the manufacture of the NZMS, or, alternatively, is calcined, hydrotreated or chemically treated in situ prior to carrying out the reforming process, said at least one MP-NZMS being characterized after removal of the template by an adsorption of isobutane of at least 2 percent by weight at a partial pressure of 500 torr and a temperature of 20° C. and also characterized by an adsorption of triethylamine less than 5 percent by weight at a partial pressure of 2.6 torr and a temperature of 22° C.; and

(b) an amount of at least one Group VIII metal effective to render said MP-NZMS active as a dehydrocyclization catalyst.

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**4,741,821**

**CATALYST SYSTEM FOR REMOVAL OF CALCIUM FROM A HYDROCARBON FEEDSTOCK**

**Chi-Wen Hung, San Rafael, and Bruce E. Reynolds, Martinez, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.**

**Filed Oct. 6, 1986, Ser. No. 915,448**

**Int. Cl.⁴ C10G *45/04***

**U.S. Cl. 208—251 H** **5 Claims**

1. A process for removing oil-soluble calcium from a hydrocarbon feedstock having at least 1 ppm oil-soluble calcium, using a catalyst system, comprising:

passing said feedstock, in the presence of hydrogen, through said system at hydrodemetalating conditions, wherein said system comprises a fixed bed catalyst layer characterized by catalyst particles having

(a) at least 10 volume percent of their pore volume in the form of macropores above 1000 Å in diameter;

(b) a surface area ranging from about 50 $m^2/g$ to about 200 $m^2/g$;

(c) less tha 3.5 wt % of a Group VIII metal; and

(d) less than 8.0 wt % of a Group VIB metal.

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**4,741,822**

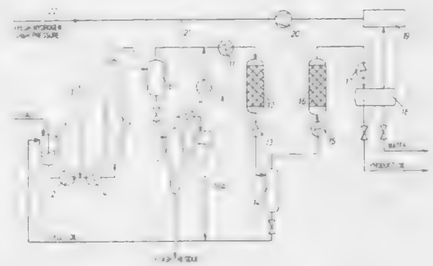
**PROCEDURE FOR HYDROGENATION OF COAL BY MEANS OF LIQUID PHASE AND FIXED-BED CATALYST HYDROGENATION**

**Eckard Wolowski, Muehleim; Rainer Löring, Bottrop; Frank Friedrich, and Bernd Strobel, both of Essen, all of Fed. Rep. of Germany, assignors to Ruhrkohle Aktiengesellschaft, Essen, Fed. Rep. of Germany**

**Filed Jul. 29, 1986, Ser. No. 890,369**

**Int. Cl.⁴ C10G *1/00, 1/06***

**U.S. Cl. 208—412** **6 Claims**



1. A process for the hydrogenation of coal by catalytic liquid phase and catalytic fixed-bed hydrogenation, comprising:

(I) preparing a pumpable coal slurry from ground coal and asphalt-free cycle oil which is recovered from the process.

(II) adding hydrogen-containing recycle gas and make-up hydrogen to the coal slurry,

(III) reacting the coal slurry with the hydrogen-containing gas in a liquid phase reactor in the presence of a catalyst under high temperature and pressure,

(IV) separating the gaseous and vaporous reaction product from the liquid and solide products obtained in step (III) with at least one high-temperature, high-pressure separator.

(V) detaining an asphalt-free distillate oil by flashing the stream of liquid and solid products from the high-distillation step,

(VI) hydrogenating the entire high-temperature, high pressure separator overhead stream of step (V) in a fixed-bed reactor,

(VII) feeding the hydrogenation product of step (VI) to an intermediate temperature, high-pressure separator to obtain (1) cycle oil and (2) vaporous and gaseous materials,

(VIII) feeding the cycle oil obtained from the said intermediate temperature separator of step (VII) to the slurry preparation of step (I).

(IX) hydrogenating the vaporous and gaseous materials obtained from said intermediate, separator of step (VII) in a second fixed-bed reactor to obtain a product oil, and

(X) separating circuit gas from said product oil in a low-temperature separator;

wherein 75 to 100 percent of the cycle oil required for step (I) is obtained from the said intermediate temperature, high-pressure separator of step (VII) and up to 25 percent of the cycle oil is obtained by flash distillation of the residue of the said high-temperature separator,

said process comprising hydrogenating cycle oil obtained from the residue of said high-temperature separator in an additional fixed-bed reactor, and feeding back the entire

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head product from said additional fixed-bed reactor to the product obtained in adding step (I).

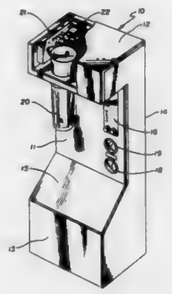
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**4,741,823**

## FLOW CONTROL MANIFOLD FOR CROSS-FLOW MEMBRANE SYSTEM

**Douglas L. Olsen; Paul D. Osmundson, both of Eden Prairie, and Keith G. McLaughlin, Golden Valley, all of Minn., assignors to Osmonics, Inc., Minnetonka, Minn.**

**Filed Dec. 23, 1986, Ser. No. 945,910**
**Int. Cl.⁴ B01D** *13/00*
**U.S. Cl. 210—96.2** **20 Claims**



1. A cross-flow membrane system for separating feed water into a concentrate stream and a permeate stream comprising:

at least one cross-flow membrane module having a permeate outlet and a concentrate outlet;

a flow control manifold block including an elongated feed water bore having a feed water inlet port and a feed water outlet port, an elongated permeate bore having at least one permeate inlet port and a permeate outlet port, an elongated concentrate bore having at least one concentrate inlet port and a concentrate outlet port, a selectively replaceable concentrate pressure control orifice means positioned between said concentrate inlet port and said concentrate outlet for controlling the flow of concentrate from the system and the operating pressure within said module, and a selectively replaceable recycle orifice means connecting said concentrate bore and said feed water bore for controlling the flow of concentrate from said concentrate bore to said feed water bore for recycle, said recycle orifice means being in communication with said concentrate bore at a point upstream from said concentrate pressure control orifice;

means positioned between said feed water outlet port and said cross-flow membrane module for increasing the pressure of said feed water for supply to said membrane module;

conduit means connecting the permeate outlet from said module to said one permeate inlet port; and

conduit means connecting the concentrate outlet from said module to said one concentrate inlet port.

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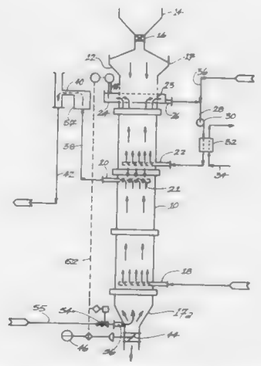
**4,741,824**

## APPARATUS FOR CONTINUOUS ELUTION AND ABSORPTION

**Bruno J. S. Sceresini, Kelmscott, and Malcolm R. Paterson, Nedlands, both of Australia, assignors to Condan Nominees Pty. Ltd., Perth, Australia**

**Filed Aug. 28, 1986, Ser. No. 901,318**
**Claims priority, application Australia, Sep. 2, 1985, PH2235; Mar. 5, 1986, PH4883**
**Int. Cl.⁴ B01J** *47/14*
**U.S. Cl. 210—97** **8 Claims**

1. A continuous elution and absorption apparatus comprising an upright column having a first upper end and a second lower end, means for feeding particulate material into the first end of the column, inlet means for feeding liquid into the column adjacent the second end thereof, outlet means for removing liquid from the column and means for removing particulate material from the second end of the column, wherein the outlet means for removing liquid comprises a screen located at an intermediate point between the first and second ends through which screen the liquid passes whilst the particulate material is retained in the column, said intermediate point being located above the point of introduction of the liquid so that liquid flows upwardly through the column, there being provided screen means for preventing upflow of liquid to the first upper



end of the column so that particulate fed into the first end of the column tends to rill and excess liquid flows downwardly and out through the screen means, and wherein the second lower end of the column is provided with valve means arranged to be opened intermittently so as to discharge a batch of particulate material, and means is provided for sensing the level of liquid in the column and for providing a signal to a valve in a supply conduit for refill water, which valve opens in response to the drop in liquid level so as to enable a supply of refill water to be fed to the column adjacent the lower end thereof to restore the liquid to its normal level.

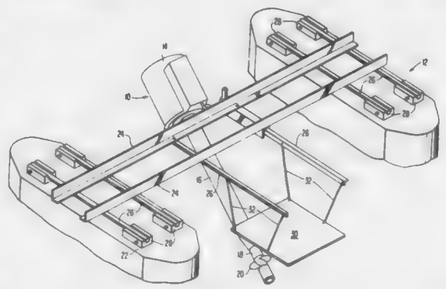
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**4,741,825**

## MOBILE VORTEX SHIELD

**Alan G. Schiller, Arlington, Minn., assignor to Aeration Industries, Inc., Chaska, Minn.**

**Continuation of Ser. No. 810,172, Dec. 18, 1985, abandoned. This application Jul. 2, 1987, Ser. No. 70,143**
**Int. Cl.⁴ C02F** *7/00;* **B01F** *3/04*
**U.S. Cl. 210—170** **16 Claims**



1. A mobile vortex shield apparatus for use with a propeller type aspirating aerator, for preventing the formation of vortices near the aerator propeller in a substance in which the propeller is driven comprising:



a support system for supporting the propeller type aspirating aerator;

a floatable shield which floats on the surface of the aerated substance, said floatable shield being separate from the aerator and flexibly connected to said support system to be moveable on the surface of the aerated substance relative to the aerator and said support system; and

at least one flexible elongated member attaching said floatable shield to said support system to enable said floatable shield to float freely on the substance within a defined area over the propeller of the aerator and relative to the propeller such that said floatable shield will contact and eliminate all vortices created by the aerator propeller by being drawn towards a vortex by the vortex's own swirling motion.

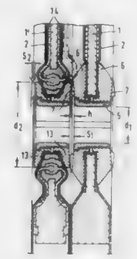
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**4,741,826**

## FILTER CLOTH SECURING DEVICE FOR A PLATE FILTER PRESS

**Matthias Geuenich, Langerwehe-Merode, and Heinz Bonn, Kreuzau-Winden, both of Fed. Rep. of Germany, assignors to Eberhard Hoesch & Söhne GmbH & Co., Düren, Fed. Rep. of Germany**

**Filed Nov. 17, 1986, Ser. No. 931,124**
**Claims priority, application Fed. Rep. of Germany, Nov. 16, 1985, 3540786**
**Int. Cl.⁴ B01D** *25/12*
**U.S. Cl. 210—228** **14 Claims**



1. In a filter press including a filter plate stack formed of a plurality of face-to-face arranged filter plates each having a central plane and peripheral sealing faces being in a mutually contacting sealing relationship in a closed state of the filter plate stack; adjoining filter plates together defining a peripherally sealed filter chamber; each filter plate having a slurry port from which liquid to be filtered is adapted to flow into respective said chambers; each slurry port having an axis; a filter cloth extending in each chamber along a face of each filter plate; and a filter cloth securing device arranged for clamping the filter cloth against an annular zone of said face of a respective said filter plate; said annular zone surrounding said slurry port; said filter cloth securing device including two flanged sleeves inserted into said slurry port from opposite sides thereof and a threaded tightening sleeve coaxially passing through said slurry port and threadedly engaging said flanged sleeves for tightening said flanged sleeves toward one another; each said flanged sleeve having a flange having first and second flange faces extending generally parallel to said central plane; said first flange face being oriented toward the central plane of an associated said filter plate and being arranged to clamp the filter cloth against the associated filter plate in said annular zone; said second flange face being oriented away from the central plane of the associated filter plate; the improvement wherein face-to-face oriented said second flange faces of adjoining flanged sleeves belonging to two consecutive filter plates of the filter plate stack together define, in the closed state of the filter plate stack, an annular clearance between axially aligned slurry ports belonging to said consecutive filter plates; and further wherein at least one said flanged sleeve of each said filter cloth securing device has at least one protuberance extending from the second flange face of said at least one flanged sleeve; said protuberance extending towards the second flange face of an adjoining said flanged sleeve belonging to a consecutive said filter plate; said protuberance remaining out of contact with said second flange face of said adjoining said flanged sleeve in the closed state of said filter plate stack; said protuberance having a height measured parallel to the axis of said slurry port; said height being less than said width of said annular clearance.

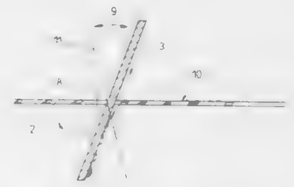
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**4,741,827**

## APPARATUS FOR SEPARATING OF LIQUID FILMS FLOATING ON LIQUIDS

**Gottfried Klinar, Leoben, and Vilim Cvitas, Linz, both of Austria, assignors to Voest-Alpine Aktiengesellschaft, Austria**

**Filed May 23, 1986, Ser. No. 866,283**
**Claims priority, application Austria, May 23, 1985, 1564/85**
**Int. Cl.⁴ E02B** *15/04*
**U.S. Cl. 210—242.3** **10 Claims**



1. Apparatus for separating a liquid film floating on the surface of a liquid, comprising:

plate means for removing said liquid film from said liquid surface being rotatably supported and being partially immersed into said liquid;

stripper means for removing said film from said plate means arranged above the surface of said liquid;

and shaft means for rotating said plate means about an axis of rotation extending through said plate means, said plate means being attached to said shaft means and inclined relative to the surface of said liquid at an angle differing from 90° such that rotation of said shaft means causes the surfaces of said plate means to alternately change their inclination during rotation causing a shifting action in said liquid surface such that said liquid film is urged towards and adheres to the surfaces of said plate means;

said stripper means being guided for engaging at least one surface of said plate means and removing said film from said plate means.

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**4,741,828**

## FILTER CARTRIDGE FOR THE IMPROVEMENT OF THE QUALITY OF DRINKING WATER

**Erich Alhäuser, Am Hölzeberg 2, and Herbert Bendlin, Gothaer Str. 14, both of D-5412 Ransbach-Baumbach, Fed. Rep. of Germany**

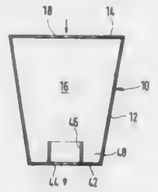
**Filed Jun. 23, 1986, Ser. No. 877,258**
**Claims priority, application Fed. Rep. of Germany, Jun. 27, 1985, 3522966; Sep. 9, 1985, 3532052; Oct. 5, 1985, 3535678**
**Int. Cl.⁴ B01D** *23/10, 27/02*
**U.S. Cl. 210—264** **12 Claims**

1. Filter cartridge for the improvement of the quality of drinking water, consisting of a vessel having a bottom wall, a top wall and a circumferential jacket wall, said vessel being completely filled with a processing material together with a bacterio-statically effective material in dissociable form, said vessel further having a sieve-type covered inlet aperture and outlet aperture provided in said walls for a mainly downwards directed one-pass conduction of the water through the vessel,

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wherein the vessel also defines a collection space for a limited quantity of water trapped on said bottom wall, said collection




space being separated from the outlet aperture such that water in said collection space is trapped to prevent the water from flowing freely to said outlet aperture.

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**4,741,829**

## COMPOSITE HOLLOW FIBERS AND METHOD OF MAKING SAME

**Tohru Takemura, Ohtake; Haruhiko Yoshida, Kugagun, and Osamu Hukunaga, Iwakuni, all of Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan**

**PCT No. PCT/JP85/00362, § 371 Date Sep. 30, 1985, § 102(e) Date Sep. 30, 1985, PCT Pub. No. WO87/00213, PCT Pub. Date Jan. 15, 1987**

**PCT Filed Jun. 27, 1985, Ser. No. 783,931**

**Int. Cl.⁴ B01D** *13/00*

**U.S. Cl. 210—500.23** **15 Claims**

12. A melt-spun and stretched composite hollow fiber comprising at least two layers joined to each other said layer consisting of different thermoplastic organic polymers or the same type of thermoplastic organic polymer having different MI values and having micropores of different sizes, said micropores being internconnected within each of said layers or between siad layers to form contiguous micropores extending from the external surface of said hollow fiber to its internal surface, with the layer having larger micropores being thicker than the layer having smaller micropores.

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**4,741,830**

## SEPARATION MATERIALS FOR THIN LAYER CHROMATOGRAPHY

**Heinz E. Hauck, Frankfurt am Main, and Willi Jost, Langen, both of Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft mit beschränkter Haftung, Darmstadt, Fed. Rep. of Germany**

**Continuation of Ser. No. 759,551, Jul. 26, 1985, abandoned. This application Feb. 11, 1987, Ser. No. 14,162**

**Claims priority, application Fed. Rep. of Germany, Jul. 28, 1984, 3427923**

**Int. Cl.⁴ B01D** *15/08*

**U.S. Cl. 210—635** **15 Claims**

1. A process for controlling water wettability from easily wettable to just wettable of a separation material sized and dimensioned for thin layer chromatography and comprising a carrier material coated with an absorbent silica gel layer whose surface has been modified by reaction with a silanizing agent, comprising, prior to the silanization step, homogeneously doping the silica gel surface by completely impregnating it with a solvent solution of a catalyst effective for catalyzing the silanization reaction of the silica gel surface with the silianization agent, said silica gel surface being doped to a preselected extent, solvent washing the resultant doped silica gel layer of excess catalyst prior to the silanization reaction, and adjusting the water wettability of the separation material by adjusting said impregnation step to achieve a degree of covering of the silica gel surface with an amount of catalyst effective to produce a degree of silanization of 0.15–0.8 μmol/m² for reversed phase materials or 1.2–2.5 μmol/$m_2$ for hydrophilic materials, the less the extent of covering the higher the degree of water wettability.

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**4,741,831**

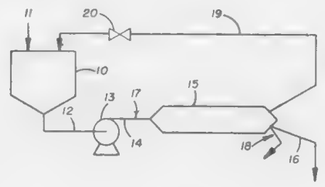
## PROCESS AND COMPOSITION FOR REMOVAL OF METAL IONS FROM AQUEOUS SOLUTIONS

**Robert R. Grinstead, Walnut Creek, Calif., assignor to The Dow Chemical Company, Midland, Mich.**

**Filed Dec. 4, 1986, Ser. No. 937,950**

**Int. Cl.⁴ B01D** *13/00*

**U.S. Cl. 210—638** **18 Claims**

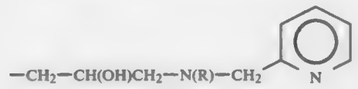



1. A cyclic process for the removal of metal ions selected from the group consisting of iron, cobalt, chromium, vanadium, copper, cadmium, nickel, zinc, lead, aluminum, mercury, silver, manganese from a fluid stream comprising said metal ions, which process comprises:

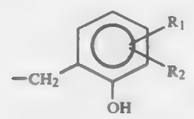
(A) contacting the fluid stream in a contacting zone with an aqueous reaction solution at between about 10° and 90° C. for a time sufficient to chelate the metal ions the reaction solution itself consisting essentially of an effective amount of water-soluble organic polymeric chelant to chelate the metal ion present selected from organic polymeric chelants of the formula:

$$-(CH_2-CH_2-N)_n- \quad \text{(i)}$$
$$\qquad\qquad |$$
$$\qquad\qquad X_1$$

wherein $X_1$ in each unit of the polymer is a pendant group independently selected from —H or a substituent selected from —$CH_2COOH$, —$CH_2$—P(=O)$(OH)_2$,



wherein R is alkyl, aminoalkyl, hydroxyalkyl, sulfoalkyl, or carboxyalkyl, and alkyl in these substituents contains from one to four carbon atoms; or



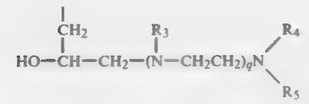

wherein $R_1$ and $R_2$ are each independently —$CH_3$, —$SO_3H$, —Cl, —H, or —COOH; and n is an integer between about 5 and 20,000;

$$-(CH_2-CH_2-N)_p- \quad \text{(ii)}$$
$$\qquad\qquad |$$
$$\qquad\qquad X_2$$

wherein p is an integer between about 5 and 20,000; and



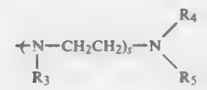
wherein $X_2$ in each polymer unit is each independently selected from H— or a substituent selected from:



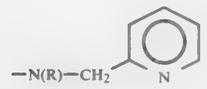
wherein $R_3$, $R_4$, and $R_5$ are each independently selected from —H, —$CH_2COOH$, or —$CH_2P(=O)(OH)_2$ and q is 0, 1, 2, 3, or 4;

$$-(CH_2-CH-O)_r- \quad \text{(iii)}$$
$$\qquad\qquad |$$
$$\qquad\qquad CH_2X_3$$

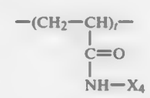
wherein r is an integer between about 10 and 20,000 and $X_3$ in each polymer unit is independently selected from H— or a substituent selected from:



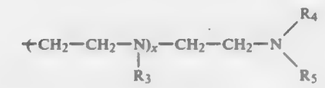
wherein $R_3$, $R_4$, and $R_5$ are as defined hereinabove, and s is an integer between about 1 and 4; or



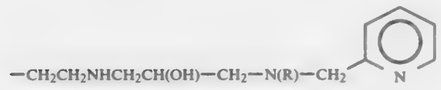
wherein R is as defined hereinabove;



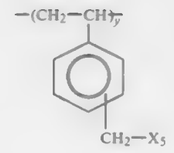
wherein t is an integer between about 10 and 20,000; and $X_4$ in each polymer unit is independently selected from H— or a substituent selected from:



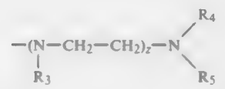
wherein x is an integer between 1 and 4; and $R_3$, $R_4$ and $R_5$ are as defined hereinabove; or



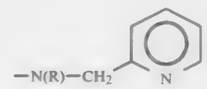
wherein R is as defined hereinabove;



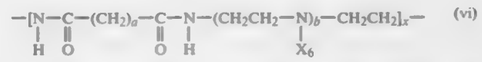
wherein y is an integer between about 10 and 20,000; and $X_5$ in each polymer unit is independently selected from —H or a substituent selected from:



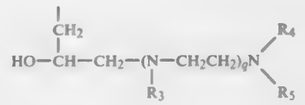
wherein z is an integer between about 1 and 4; and $R_3$, $R_4$ and $R_5$ are as defined hereinabove; or



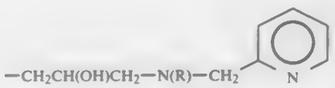
wherein R is as defined hereinabove;



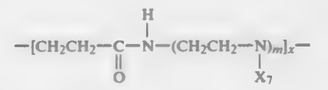
wherein a is 6 and b is 1 to 4, and $X_6$ in each polymeric unit is independently selected from —H or a substituent selected from:



wherein q is 1 to 4, and $R_3$, $R_4$ and $R_5$ are as defined hereinabove; or



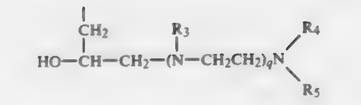
wherein R is as defined hereinabove; and x is between about 10 and 10,000;



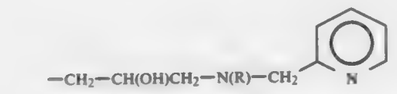
wherein $X_7$ in each polymeric unit is independently selected from —H or a substituent;

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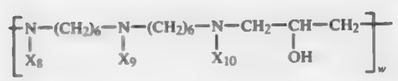


wherein q and $R_3$, $R_4$ and $R_5$ are defined hereinabove; or

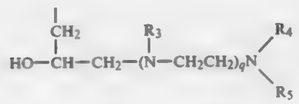


wherein R is as defined hereinabove; and m is an integer from 1 to 4 and x is as defined hereinabove;

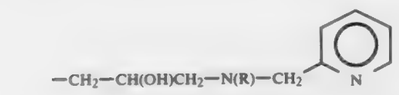
(viii)



wherein $X_8$, $X_9$, and $X_{10}$ are each independently selected from —H or a substituent selected from:



wherein q, $R_3$, $R_4$ and $R_5$ are as defined hereinabove, or



wherein R is as defined hereinabove; and w is between about 10 and 10,000;

with the proviso that the overall ratio of H to substituent in $X_1$, H to substituent in $X_2$, H to substituent in $X_3$, H to substituent in $X_4$, H to substituent in $X_5$, H to substituent in $X_6$, H to substituent in $X_7$, $-CH_2CH(OH)CH_2OH$ or $-CH_2CH(OH)CH_2Cl$ to substituent in each of $X_8$, $X_9$, or $X_{10}$ in each organic polymeric chelant described hereinabove is between about 10/90 and 90/10 and wherein the polymeric chelant has a molecular weight of between about 600 and 1,000,000;

(B) treating the aqueous solution produced in step (A) by membrane separation means effective to remove water and other low molecular weight reaction products having a molecular weight of 500 or less from the aqueous solution as a single phase;

(C) contacting the concentrated aqueous solution produced in step (B) with a mineral acid under conditions effective to release the metal ion from the chelant and form a regenerated chelant; and

(D) removing the released metal ion by a second membrane separation means effective to separate the released metal ion as a single phase from said regenerated chelant; and

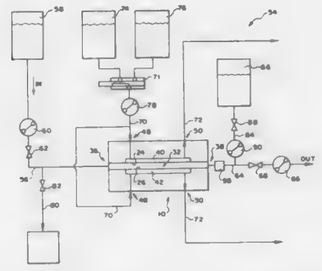
(E) recycling the concentrated aqueous solution including said regenerated chelant from step (D) to the contacting zone of step (A).

**4,741,832**

## PURIFICATION APPARATUS AND METHOD EMPLOYING A REGENERABLE LIGAND

**Edward F. Leonard, Bronxville, N.Y., assignor to The Trustees of Columbia, University in the City of New York, New York, N.Y.**

Filed May 15, 1984, Ser. No. 610,368
Int. Cl.[4] B01D *13/00*
U.S. Cl. 210—638 18 Claims



6. A method of purifying a fluid stream employing a regenerable ligand to adsorb a ligate carried in the fluid stream, said method comprising the steps of

conducting the fluid stream along one surface of a membrane having affixed thereto the regenerable ligand, the membrane being sufficiently impermeable to the ligate-carrying fluid stream to prevent convective transport of the ligate-carrying fluid stream across the membrane in response to pressure differentials while being sufficiently permeable to a selected regeneration agent for the ligand to allow diffusional transport of the selected regeneration agent across the membrane when concentration differences exist, thereby forming a ligate-ligand bond on the one surface of the membrane,

terminating the conduction of the fluid stream along the one surface of the membrane, leaving a fixed volume of the fluid stream in contact with one membrane surface,

exposing the opposite surface of the membrane to a solution containing the selected regeneration agent for the ligand and having a pH which differs from the pH of the fluid stream in an amount sufficient to cause the regeneration agent to diffuse across the membrane to break the ligate-ligand bond, thereby freeing the ligate into the fixed fluid stream volume, and

rinsing the fluid stream volume containing the freed ligate and diffused regeneration agent away from the one surface of the membrane.

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**4,741,833**

## METHOD FOR REDUCTION OF COD IN WATER

**Morris Sheikh, 803 Canterberry Crescent, Bloomfield Hills, Mich. 48013**

**Continuation-in-part of Ser. No. 746,041, Jun. 18, 1985, Pat. No. 4,683,065. This application Dec. 22, 1986, Ser. No. 943,952 The portion of the term of this patent subsequent to Jul. 28, 2004, has been disclaimed.**
Int. Cl.[4] C02F *1/72*
U.S. Cl. 210—665 28 Claims

1. A method for reducing chemical oxygen demand (COD) levels in water containing chemical contaminants comprising the steps of:

(a) adsorbing in soluble chemical contaminants contained in the water on a first adsorptive material selected from the group consisting of porous ceramic, activated alumina, magnesia, silica or mixtures thereof;

(b) adding at least one oxygen source to the water;

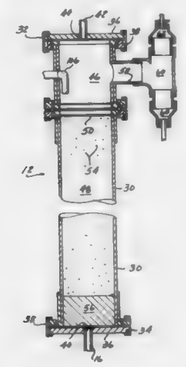
(c) adsorbing soluble contaminants on a second adsorptive surface selected from the group consisting of Group VIIIB metals, Group IB metals or mixtures thereof;

(d) catalytically reacting soluble contaminants adsorbed on the second adsorptive material with the oxygen source to decompose the chemical contaminants;

(e) reacting the products of the catalytic process in (d) to yield insoluble precipitates which adhere to the second adsorptive surface; and

(f) adsorbing additional soluble contaminants on the insoluble precipitate which adheres to the surface of the second





adsorptive material as a result of step (e) and to the second adsorptive surface thereunder;

(g) catalytically reacting the additional soluble contaminants adsorbed in (f) with the oxygen source to decompose the chemical contaminants;

(h) reacting the products of the catalytic process in (g) to yield the insoluble precipitates which adhere to the previously insoluble precipitates produced in (e) and to the second adsorptive surface thereunder; and

(i) repeating steps (f), (g) and (h) as necessary to reduce chemical contaminants.

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**4,741,834**

## METHOD FOR UNDERGROUND SUPPORT AND REMOVAL OF HAZARDOUS IONS IN GROUND WATERS

**Lloyd B. Spangle, Claremore, and S. Ebow Coleman, Broken Arrow, both of Okla., assignors to The Dow Chemical Company, Midland, Mich.**

Filed May 8, 1986, Ser. No. 861,027
Int. Cl.[4] C02F *1/28*
U.S. Cl. 210—683 6 Claims

1. A method for rectifying ground water passages comprising,

(a) forming a pumpable slurry of Type C fly ash containing at least about 8% by weight CaO and at least about 5% by weight tricalcium aluminate and water comprising from about 40 to about 300% water by weight of the ash;

(b) grouting the pumpable slurry into the passage;

(c) permitting the pumpable slurry to cure until it sets into a water permeable screen; and

(d) contacting said screen with ground water contaminated with hazardous waste;

whereby hazardous wastes are removed from the ground water and retentatively fixed, while simultaneously reinforcing the compressive strength of the ground water passage.

**4,741,835**

## OIL-IN-WATER EMULSION BREAKING WITH HYDROPHOBICALLY FUNCTIONALIZED CATIONIC POLYMERS

**Donald F. Jacques, Belle Mead; Jan Bock, Bridgewater, and Paul L. Valint, Asbury, all of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.**

Filed Sep. 8, 1986, Ser. No. 904,418
Int. Cl.[4] C02F *1/56*
U.S. Cl. 210—708 5 Claims

1. A method of breaking an oil-in-water emulsion which comprises the steps of treating said oil-in-water emulsion with at least a de-emulsifying amount of a water dispersible terpolymer comprising an acrylamide monomer, a water soluble cationic monomer and a water insoluble, hydrophobic monomer, and separating the formed water phase from the formed oil phase, wherein said terpolymer contains about 10 mole % 98.9 mole percent of said acrylamide monomer, about 1 to abut 99 mole percent of cationic monomer, and about 0.1 to about 10 mole percent of said water insoluble, hydrophobic monomer, wherein said cationic monomer is selected from the group consisting of salts of ammoniumalkyl(meth)acrylamide, ammonium alkyl(meth)acrylate and diallyl substituted ammonium salt, wherein said water insoluble, hydrophobic monomer is selected from the group consisting of N-alkyl(meth)acrylamide, wherein the alkyl group is a straight, branched or an alkyl cyclic chain having about 6 to about 22 carbon atoms and an alkyl(meth)acrylate, wherein the alkyl group is a straight, branched or an alkyl cyclic chain having about 6 to about 22 carbon atoms.

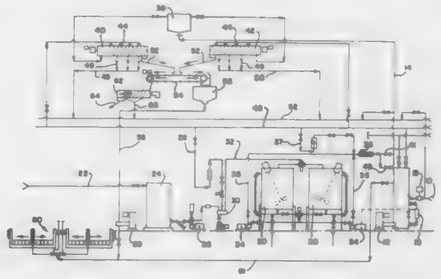
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**4,741,836**

## SLUDGE TREATMENT PROCESS

**Dale Jackman, Munster, Ind., assignor to Jackman Enterprises, Inc., Munster, Ind.**

Filed Mar. 3, 1986, Ser. No. 835,188
Int. Cl.[4] C02F *11/14*
U.S. Cl. 210—709 8 Claims



1. A method for extracting liquids from sludge comprising the steps of providing a source of sludge, providing a source of a treatment chemical adapted to achieve flocculation of the sludge, mixing said sludge and said chemical for achieving a flocculated mixture, delivering said mixture to a progressive cavity continuous press and feeding the mixture through the press, said press comprising a housing defining wall openings and an interior shaft with the size of the cavity defined by the shaft and housing progressively decreasing from the inlet end to the outlet end of the press whereby the mixture is gradually compressed as it progresses through the press, and whereby liquid contained in the mixture is extracted through the openings of the housing wall, providing a separate discharge chamber adjacent the outlet end of the press, associating pressure means with the discharge chamber and applying continuous pressure to the mixture in the chamber whereby the mixture is continuously fed through the press in opposition to the pressure means of the discharge chamber to thereby enhance the

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extraction of liquid, and collecting the mixture at an outlet end of the press.

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**4,741,837**
**PROCESS FOR DRYING BROWN COAL OF HIGH WATER CONTENT**

**Michael Schweizer, Trofaiach; Jaroslav Fohl, Leoben, and Gero Tessmer, Linz, all of Austria, assignors to Voest-Alpine Aktiengesellschaft, Linz, Austria**

**Filed Nov. 5, 1986, Ser. No. 927,095**
**Claims priority, application Austria, Nov. 8, 1985, 3260/85**
**Int. Cl.⁴ C02F *1/28***
**U.S. Cl. 210—665** **11 Claims**



1. In a process for drying brown coal having a high water content, the steps of: spraying the coal with hot water so as to heat the coal and dissolve soluble matter; sieving the sprayed coal to separate a fine solid grain size of a maximum grain size 5 mm plus liquid which contains dissolved matter from solid larger particles of smaller than 300 mm size; drying the thus-separated larger grains by treatment thereof with saturated steam under a pressure of 10 40 bar and a temperature of 180° to 250° C. to produce dry coal and hot waste water; recycling said hot waste water to the spraying step to heat said coal and dissolve said soluble matter; and separating the liquid which contains water and dissolved matter from the fine solids.

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**4,741,838**
**FLOCCULATION OF HIGH SOLIDS MINERAL SLURRIES**

**Andrew J. Sharpe, Jr., Star Rte. Box 130, Comfort, W. Va. 25049**

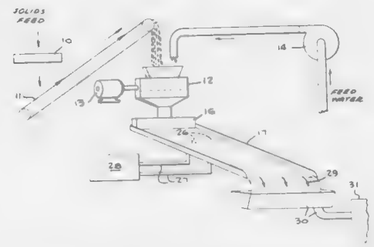
**Continuation-in-part of Ser. No. 744,020, Jun. 12, 1985, Pat. No. 4,647,382. This application Jun. 11, 1986, Ser. No. 872,838**
**The portion of the term of this patent subsequent to Mar. 3, 2004, has been disclaimed.**
**Int. Cl.⁴ C02F *1/56***
**U.S. Cl. 210—710** **13 Claims**

1. Method of preparing a high solids slurry from a slurry containing at least 10% or more finely divided mineral solids comprising (a) adding thereto an effective amount of an anionic polymeric flocculant comprising 1–100 mole percent of repeating units derived from 2-acrylamido-2-methyl propyl sulfonic acid or a water-soluble salt thereof, wherein said polymeric flocculant has a Brookfield viscosity of at least 7000 cps in 7.5% aqueous solution, to flocculate said solids, (b) dewatering said slurry to obtain a dewatered product, and (c) dispersing the said dewatered product to obtain a final slurry having a Brookfield viscosity of less than 1000 cps and a solids content of at least 50%.

**4,741,839**
**ULTRASONIC VIBRATOR TRAY PROCESSES AND APPARATUS**

**William E. Morton, Bridgeport; Harold V. Fairbanks; James Wallis, both of Morgantown, all of W. Va.; Raymond L. Hunicke, Roxbury, and Joseph Krenicki, Danbury, both of Conn., assignors to Heritage Industries Inc., Bridgeport, W. Va.**

**Filed Jul. 16, 1986, Ser. No. 886,010**
**Int. Cl.⁴ C02F *1/34***
**U.S. Cl. 210—748** **10 Claims**



1. The process of treating with vibratory energy a flowable slurry of particulate materials mixed in a liquid for de-agglomeration and cleaning of the particulate material, comprising the steps of
providing a laterally extended and downwardly elongated treatment zone bounded by an adjoining flat boundary surface,
delivering the slurry in a thin laterally extended layer to an upper entrance end of said laterally extended and downwardly elongated treatment zone,
coupling vibratory energy through said boundary surface to cause the slurry to vibrate in a direction substantially perpendicular to its length and to its width at a frequency between about 10 kHz and about 50 kHz for de-agglomeration and cleaning of the particulate material, while the slurry flows downward through the downwardly elongated treatment zone toward a lower exit end thereof,
and thereafter conducting the treated slurry to a separation zone where the particulate materials are separated from the liquid.

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**4,741,840**
**PROCESS FOR TREATING A SLUDGE CONTAINING HYDROCARBONS**

**George A. Atherton, Baton Rouge, La.; Ghazi A. Dickakian, Greenville, S.C., and Edward D. Grant, Jr., Baton Rouge, La., assignors to Exxon Research & Engineering Co., Florham Park, N.J.**

**Continuation of Ser. No. 453,344, Dec. 27, 1982, abandoned, which is a continuation-in-part of Ser. No. 333,989, Dec. 23, 1981, Pat. No. 4,686,048. This application Jun. 25, 1986, Ser. No. 878,122**
**Int. Cl.⁴ B01D *37/02***
**U.S. Cl. 210—771** **13 Claims**

1. A process for treating a steam cracker tar sludge containing liquid hydrocarbons and insoluble particles to remove the liquid hydrocarbons from the particles in the sludge which comprise:
mixing the sludge with heptane which has a boiling point when combined with water of about 182° F. in an amount of 50% to 150% by weight of hydrocarbons in the sludge and mixing the heptane and the sludge within the range of 100° F. to 210° F. to maintain the sludge flowable and heating the sludge to remove any water present as a heptane/water azeotrope;
separating the particles from the heptaneslude mixture by filtration and washing the particles with additional heptane in an amount of 20% to 500% by weight of the hydrocarbons in the original sludge;
mixing the separate particles and remaining heptane with water in an amount of 250% to 700% by weight of the separated fines and recovering heptane; and
removing remaining heptane by distillation to obtain a cake of treated particles containing less than 20% by weight of hydrocarbons.

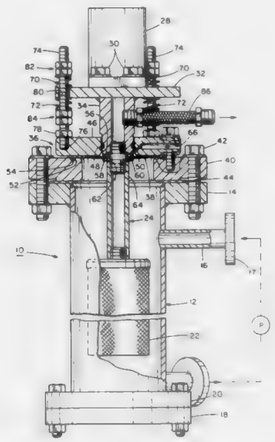


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**4,741,841**
**METHOD AND APPARATUS FOR PARTICLE SEPARATION**

**Earl A. Borre, Itasca; James F. Zievers, LaGrange, and Henry Schmidt, Jr., Hinsdale, all of Ill., assignors to Industrial Filter & Pump Mfg. Co., Cicero, Ill.**

**Filed Jun. 16, 1986, Ser. No. 874,437**
**Int. Cl.⁴ B01D *35/20***
**U.S. Cl. 210—785** **16 Claims**



1. Separation apparatus, comprising in combination
a filter tank enclosing a filter chamber,
a hollow perforate, tubular filter element disposed in said chamber,
said filter element having an upstream surface,
means including a tubular imperforate member spaced from and in proximity to said upstream surface for directing a flow of fluid and entrained particles across said upstream surface in a direction generally parallel thereto,
means for continuously vibrating said filter element while said fluid and entrained particles flow across said upstream surface, and
a helical spacer element positioned between said filter element and said imperforate member in contact with said filter element and said imperforate member.

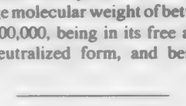
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**4,741,842**
**PARTICULATE DETERGENT SOFTENER COMPOSITIONS COMPRISING A MIXTURE OF CATIONIC SOFTENER AND ETHOXYLATED AMINE**

**Richard P. Adams, Kendall Park, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.**

**Filed Jan. 27, 1986, Ser. No. 823,644**
**Int. Cl.⁴ C11D *1/62, 3/26***
**U.S. Cl. 252—8.75** **19 Claims**

1. A particulate detergent softener composition capable of imparting improved softness, detergency, antistatic and soil antiredeposition properties to fabrics treated therewith in a laundering process comprising by weight from about 5 to 40% of water soluble non-soap, anionic organic surfactant, from about 10 to 60% of water soluble, neutral to alkaline builder salt, and substantially homogeneously dispersed in said composition as discrete particles an intimate mixture of (i) a cationic amine softener in an amount from about 2 to 20% by weight of the total composition with (ii) a water soluble ethoxylated tertiary amine dispersant/softener compound of the formula



where R is alkyl or alkenyl having from about 8 to about 22 carbon atoms, and
x and y are positive numbers such that the sum x+y is from about 2 to about 15,
the percent concentration of anionic surfactant being at least about 1.5Cs+5, Cs representing the percent concentration of total softener (i) and (ii).

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**4,741,843**
**FLUID LOSS CONTROL ADDITIVES AND DRILLING FLUIDS CONTAINING SAME**

**Christopher M. Garvey, Wilmington, Del.; Arpad Savoly, Martinsville, and Albert L. Resnick, Edison, both of N.J., assignors to Diamond Shamrock Chemical, Dallas, Tex.**

**Filed Sep. 26, 1986, Ser. No. 913,133**
**Int. Cl.⁴ C09K *7/02***
**U.S. Cl. 252—8.514** **18 Claims**

1. In an aqueous lime or gypsum based drilling fluid composition containing a water dispersible fluid loss additive, the improvement which comprises:
said water dispersible fluid loss additive being comprised of a terpolymer of (1) from about 10 to about 75 weight percent of a vinyl containing alkyl or aromatic substituted sulfonate selected from the group consisting of 2-acrylamido-2-methylpropane sulfonic acid, sodium vinyl sulfonate and vinyl benzene sulfonate; (2) from about 10 to 76 weight percent of a nonionic monomer selected from the group consisting of acrylamide, N,N-dimethylacrylamide, N-vinyl pyrrolidone, N-vinyl acetamide and dimethylamino ethyl methacrylate; and (3) from about 1 to 60 weight percent of an unsaturated polybasic acid selected from the group consisting of itaconic acid, maleic acid, fumaric acid, citraconic acid, mesaconic acid, glutaconic acid, aconitic acid, α, α′-dimethylmuconic acid and 1-butene 2,3,4-tricarboxylic acid, said polymer having a weight average molecular weight of between about 200,000 and about 1,000,000, being in its free acid or partially or completely neutralized form, and being at least water dispersible.

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**4,741,844**
**LIQUID COMPOSITION AND METHOD OF USE FOR PRODUCING A FOAMED STIMULATION FLUID FOR OIL AND GAS WELLS**

**Ken Posey, Jr., Houston, Tex., assignor to Amoco Corporation, Chicago, Ill.**

**Filed Aug. 4, 1986, Ser. No. 892,973**
**Int. Cl.⁴ E21B *43/27***
**U.S. Cl. 252—8.553** **5 Claims**

1. An additive suitable for use with a water-soluble acid in treating subterranean strata adjacent a wellbore penetrating the subterranean strata comprising:
from about 10 to about 40 volume percent of a foaming agent comprising mixed salts of alkyl ether sulfates and alkyl sulfonates effective for producing foamed solutions of the additive and the water-soluble acid having a half-life of at least 30 minutes and a foam quality of at least 60% for use in treating subterranean strata; and
from about 90 to about 60 volume percent of an alcohol mixture which comprises at least 2 volume percent of at

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least one eight-carbon aliphatic alcohol and at least 22 volume percent of at least one aliphatic alcohol having less than five carbon atoms.

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**4,741,845**

## LUBRICANT ADDITIVE MIXTURES OF ANTIMONY THIOANTIMONATE AND ANTIMONY TRIOXIDE

**James P. King, Upper Gwynedd, Pa., assignor to Pennwalt Corporation, Philadelphia, Pa.**

**Filed Dec. 3, 1986, Ser. No. 937,261**
**Int. Cl.⁴ C10M** *125/24*
**U.S. Cl. 252—18** **24 Claims**

**1.** A lubricating composition consisting essentially of, by weight: (i) from about 60% to about 99.8% of a lubricant selected from the group consisting of a grease, a mineral oil of lubricating viscosity, a synthetic fluid of lubricating viscosity and a solid lubricant resin binder; and (ii) a synergistic combination intimately mixed therewith of from about 0.1% to about 20% of $SbSbS_4$ and from about 0.1 to about 20% of $Sb_2O_3$, the $SbSbS_4$ to $Sb_2O_3$ weight ratio being within the range of about 0.1 to 10.

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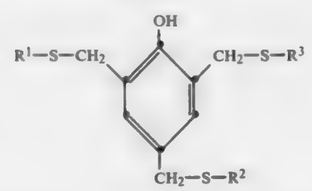
**4,741,846**

## 2,4,6-TRIFUNCTIONALIZED PHENOLS

**Samuel Evans, Marly, Switzerland, assignor to CIBA-GEIGY Corporation, Ardsley, N.Y.**

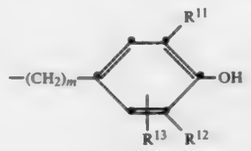
**Filed Jul. 24, 1985, Ser. No. 758,014**
**Claims priority, application Switzerland, Aug. 2, 1984, 3729/84**
**Int. Cl.⁴ C16M** *129/00*
**U.S. Cl. 252—47.5** **11 Claims**

**1.** A compound of the formula I

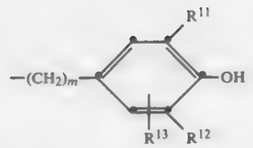



(I)

in which $R^1$, $R^2$ and $R^3$ independently of one another are $C_2$–$C_{20}$-alkyl, $—C(R^4R^5)$ which is substituted by one or two hydroxyl groups, or are $—C(R^4R^5)—CHR^6)_n—W$ or $—(CH_2)_2—OCOR^{10}$ or are a radical




in which $R^4$, $R^5$ and $R^6$ independently of one another are hydrogen, $C_1$–$C_6$-alkyl, phenyl or cyclohexyl, W is $—COR^7$, $—COOR^8$, $—CON(R^9R^{15})$ or —CN, $R^7$ being hydrogen, $C_1$–$C_{20}$-alkyl, $C_5$–$C_{12}$-cycloalkyl, phenyl, 1-naphthyl, 2-naphthyl, $C_7$–$C_{14}$-aralkyl or $C_7$–$C_{14}$-alkaryl, $R^8$ being $C_1$–$C_{20}$-alkyl, $C_5$–$C_{12}$-cycloalkyl, phenyl, 1-naphthyl, 2-naphthyl, $C_7$–$C_{14}$-aralkyl, $C_7$–$C_{14}$-alkaryl or $C_2$–$C_{20}$-alkyl which is substituted by a hydroxyl or cyano group, or $C_2$–$C_{12}$-alkenyl, $C_2$–$C_{12}$-alkenyl or phenyl which is substituted by one or two $—NO_2$, —Cl, —Br, $—OCH_3$ or $—COOR^{14}$ groups, or a radical




m being 0, 1 or 2, n being 0 or 1, $R^{11}$, $R^{12}$ and $R^{13}$ independently of one another being hydrogen, $C_1$–$C_{20}$-alkyl, cyclohexyl or phenyl and, $R^{14}$ being $C_1$–$C_6$-alkyl, phenyl, cyclohexyl, benzyl or tolyl.

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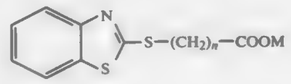
**4,741,847**

## AQUEOUS ANTI-CORROSION AGENT CONTAINING AN AMMONIUM SALT OF 2-BENZTHIAZOLYTHIOCARBOXYLIC ACID

**Francesco Cargnino, Venaria; Giuseppe Natoli, Turin, both of Italy, and Horst Lorke, Liederbach, Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Feb. 18, 1986, Ser. No. 830,370**
**Claims priority, application Italy, Feb. 19, 1985, 19562 A/85**
**Int. Cl.⁴ C10M** *133/38, 135/36*
**U.S. Cl. 252—47.5** **4 Claims**

**1.** An aqueous anticorrosion agent containing a compound of the formula




wherein n denotes a number from 1 to 6 and M denotes an organic ammonium ion.



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**4,741,848**

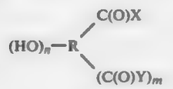
## BORON-CONTAINING COMPOSITIONS, AND LUBRICANTS AND FUELS CONTAINING SAME

**Frederick W. Koch, Willoughby Hills; Joseph W. Pialet; Daniel E. Barrer, both of Euclid, and Calvin W. Schroeck, Eastlake, all of Ohio, assignors to The Lubrizol Corporation, Wickliffe, Ohio**

**Filed Mar. 13, 1986, Ser. No. 839,754**
**Int. Cl.⁴ C10M** *129/00, 133/16*
**U.S. Cl. 252—49.6** **34 Claims**

**1.** A method of preparing a boron-containing composition which comprises reacting

(A) a hydroxy-substituted amide of the formula




(I)

wherein R is a divalent hydrocarbyl group, X is $—NR'R''$, wherein R' is a hydrocarbyl group and R'' is hydrogen or a hydrocarbyl group, Y is OH or X, m is 1 or 2, and n is an integer from 1 to 10 provided that only one free hydroxyl group is attached per carbon atom of the hydrocarbyl group R; with

(B) a boron compound selected from the group consisting of boric acid, boron trioxide, boron halides, boron amides and boron esters and wherein (A) is reacted with (B) at an elevated temperature up to but not including the decomposition temperature of any reactants or the product of the reaction and wherein the ratio of the hydroxyl group to the boron compound is from about 0.5:1 to about 4:1.

**28.** A boron-containing composition prepared by the process of claim **1**.

**33.** A lubricating composition comprising a major amount of a lubricating oil and a minor amount of at least one composition of claim **28**.

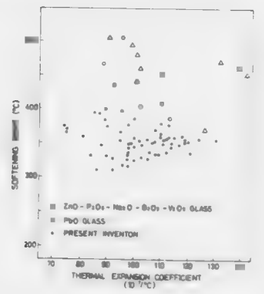
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**4,741,849**

## CERAMIC BODY GLASS COMPOSITION FOR BONDING AND FILLING CERAMIC PARTS THEREOF

**Takashi Naito; Takashi Namekawa, and Satoru Ogihara, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Continuation of Ser. No. 794,448, Nov. 4, 1985, abandoned. This application Jan. 12, 1987, Ser. No. 2,205**
**Claims priority, application Japan, Nov. 2, 1984, 59-230198**
**Int. Cl.⁴ C03C** *3/21, 14/00;* **C04B** *35/26*
**U.S. Cl. 252—62.6** **11 Claims**




**1.** A glass composition for bonding and filling ceramic constituents which consist essentially of:

(a) 55–70 wt% of vanadium pentoxide;

(b) 17–25 wt% of phosphorous pentoxide;

(c1) 1.0–10 wt% of at least one alkaline metal monoxide selected from the group consisting of $Na_2O$, $K_2O$, $Rb_2O$, and $Cs_2O$; and

(c2) 1.0–10 wt% of $Tl_2O$, with the proviso that the amount of (c1)+(c2) is not less than 5 wt%.

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**4,741,850**

## SUPER PARAMAGNETIC FLUIDS AND METHODS OF MAKING SUPER PARAMAGNETIC FLUIDS

**John E. Wyman, Westford, Mass., assignor to Hitachi Metals, Ltd., Tokyo, Japan and Consolidated Chemical Consulting Co., Westford, Mass.**

**Division of Ser. No. 925,248, Oct. 31, 1986, Pat. No. 4,701,276. This application Jul. 30, 1987, Ser. No. 79,145**
**Int. Cl.⁴ H01F** *1/28*
**U.S. Cl. 252—62.52** **13 Claims**

**1.** A process for removing small magnetic particles from an aqueous solution of magnetic particles comprising:

(a) providing an aqueous suspension of magnetic particles;

(b) contacting said magnetic particles in aqueous suspension with a amount of a chelating agent in acid form sufficient to remove magnetic particles having a magnetic particle diameter from about 30 Å to about 60 Å from said aqueous suspension.

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**4,741,851**

## NON-CAKING BLEACHING DETERGENT COMPOSITION CONTAINING A LOWER HYDRATE OF SODIUM PERBORATE

**Giuseppe Borrello, Anzio, Italy, assignor to Colgate Palmolive Co., New York, N.Y.**

**Continuation of Ser. No. 596,122, Apr. 2, 1984, abandoned. This application Oct. 3, 1985, Ser. No. 784,437**
**Int. Cl.⁴ C11D** *1/66, 3/39, 11/00, 17/06*
**U.S. Cl. 252—91** **19 Claims**

**1.** A process for the manufacture of a particulate bleaching detergent component of a non-caking particulate bleaching detergent composition which is stable when stored in a sealed container at elevated temperature, which comprises absorbing a synthetic organic nonionic detergent which is normally in a solid state at room temperature, in liquid state at elevated temperature into particulate sodium perborate hydrate, the hydration of which corresponds to 12 to 15% of water in the hydrate, with the proportion of the nonionic detergent being about 5 to 30% in the bleaching detergent component, and cooling the nonionic detergent in the perborate hydrate particles to solidify it and thereby improve the flowability of the bleaching detergent component particles.

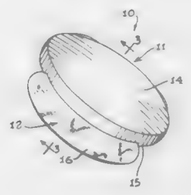
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**4,741,852**

## NON-SLIP SOAP BAR CONSTRUCTION

**John Ondracek, 234 Logan, Apt. 103, Denver, Colo. 80203**

**Filed Jan. 27, 1987, Ser. No. 7,221**
**Int. Cl.⁴ C11D** *17/04*
**U.S. Cl. 252—92** **4 Claims**




**1.** A non-slip soap bar construction comprising:

a soap bar unit comprising a bar of soap having an upper half and a lower half; and,

a fabric unit disposed intermediate the upper half and lower half of said bar of soap; wherein, the fabric unit comprises an elongated generally flat I-shaped flexible fabric mem-

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ber having enlarged ends and an intermediate portion; wherein, the intermediate portion of the fabric member extends across and is captured between the upper and lower halves of the bar of soap and the enlarged ends of the I-shaped flexible fabric member project beyond the sides of the bar of soap to form non-slip flap portions; whereby the enlarged ends of the I-shaped flexible fabric member form frictional gripping surfaces for a users hand and fingers; and, wherein the said flexible fabric member may engage the bar of soap in an enveloping relationship when the dimensions of the bar of soap have diminished.

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**4,741,853**

## SOLID BLEACHING BLOCK

**Adrian W. Walker, and David E. Clarke, both of Wirral, Great Britain, assignors to Lever Brothers Company, New York, N.Y.**

**Filed Feb. 11, 1987, Ser. No. 13,514**

**Claims priority, application United Kingdom, Feb. 12, 1986, 8603440**

**Int. Cl.[4] C11D** *7/54*

**U.S. Cl. 252—96** **3 Claims**

1. A solid bleaching block for use in an in-cistern device for the automatic dosing of controlled amounts of bleaching materials into the cistern when this is flushed, said block comprising from 60–95% by weight of an alkali metal monopersulphate and from 5–30% by weight of an alkaline earth metal salt of a $C_{12}$–$C_{24}$ fatty acid.

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**4,741,854**

## TRANSPARENT TOILET SOAP OF LIGHT COLOR

**Jerry J. Krupa, Rockaway Township, Morris County, and Michael I. Hill, Fords, both of N.J., assignors to Lever Brothers Company, New York, N.Y.**

**Filed Nov. 4, 1986, Ser. No. 926,603**

**Int. Cl.[4] C11D** *7/54;* **C01B** *17/16, 6/00*

**U.S. Cl. 252—105** **16 Claims**

1. A transparent toilet bar comprising:

(i) from 1% to 99% by weight of a $C_{12}$–$C_{22}$ carbon atom fatty acid salt;

(ii) from 0.03 to less than 0.2 wt.% of a first reducing agent selected from the group consisting of the salts of bisulfite, hydrosulfite, metabisulfite, sulfite and mixtures thereof; and

(iii) from 0.0001 to less than 0.2 wt.% of a second reducing agent selected from the group consisting of sodium hydride, calcium hydride, lithium hydride, sodium aluminum hydride, sodium borohydride, sodium amide, diborane, alkyl and alkoxy aluminum hydrides, alkyl and alkoxy borohydrides, alkyl and alkoxy sodium aluminum hydrides, diimide and mixtures thereof.

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**4,741,855**

## SHAMPOO COMPOSITIONS

**Mark B. Grote, Cincinnati, and Glen D. Russell, Middletown, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio**

**Continuation of Ser. No. 795,285, Nov. 5, 1985, abandoned, which is a continuation-in-part of Ser. No. 670,189, Nov. 9, 1984, abandoned. This application Jul. 31, 1987, Ser. No. 80,022**

**Int. Cl.[4] A61K** *7/075;* **C11D** *3/20, 9/36, 17/08*

**U.S. Cl. 252—142** **9 Claims**

1. A shampoo composition comprising

(a) from about 5% to about 70% of a synthetic surfactant selected from the group consisting of anionic surfactants, zwitterionic surfactants, amphoteric surfactants and mixtures thereof;

(b) from about 0.01% to about 10% of a dispersed, insoluble, nonvolatile silicone;

(c) from about 0.5% to about 5% of a long chain ($C_{16}$–$C_{22}$) acyl derivative or long chain ($C_{16}$–$C_{22}$) amine oxide selected from the group consisting of ethylene glycol long chain esters, alkanol amides of long chain fatty acids, long chain esters of long chain fatty acids, glyceryl long chain esters, long chain esters of long chain alkanolamides, long chain alkyl dimethyl amine oxides and mixtures thereof; and

(d) the remainder water.

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**4,741,856**

## PACKAGED PERFUMED GRANULAR DETERGENT

**Edmund H. Taylor, Covington, Ky., and Charles A. Schulz, Fairfield, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio**

**Continuation-in-part of Ser. No. 869,753, Jun. 2, 1986, abandoned. This application Jun. 18, 1986, Ser. No. 875,900**

**Int. Cl.[4] C11D** *17/04*

**U.S. Cl. 252—174** **26 Claims**

1. A granular detergent composition comprising a material selected from the group consisting of perfumes, air-sensitive ingredients and mixtures thereof in a package comprising a conventional fiberboard tube produced from a blank, said fiberboard tube having an open upper end and said package further comprising a separate plastic end piece which is attached so as to seal said open upper end of the upper edge of the tube.

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**4,741,857**

## METHOD OF PURIFYING NEUTRAL ORGANOPHOSPHORUS EXTRACTANTS

**E. Philip Horwitz; Ralph C. Gatrone, both of Naperville, Ill., and Renato Chiarizia, Rome, Italy, assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Oct. 6, 1986, Ser. No. 915,844**

**Int. Cl.[4] C09K** *3/00;* **C07F** *9/08, 9/09, 9/53*

**U.S. Cl. 252—184** **15 Claims**

2. A method of removing acidic contaminants, present in a salt or acid form, from neutral mono and/or bifunctional organophosphorous extractants comprising:

contacting the extractant with a macroporous strong acid cation exchange resin in the $H^+$ state to form a first mixture,

maintaining said contact for a period time and at a temperature sufficient to convert the salt form of the acidic contaminant into the acid form,

contacting the first mixture with a macroporous strong base anion exchange resin in the $OH^-$ state to form a second mixture,

maintaining said contact for a period of time and at a temperature sufficient for the anion resin to take up the acid form of the contaminant from the mixture, and

separating the extractant from the resins containing the contaminants, thereby removing the acidic contaminants from the extractant.

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**4,741,858**

## TIMED-RELEASE HYPOCHLORITE BLEACH COMPOSITIONS

**Clement K. Choy, Walnut Creek, and Gregory van Buskirk, Danville, both of Calif., assignors to The Clorox Company, Oakland, Calif.**

**Filed Mar. 2, 1987, Ser. No. 20,240**

**Int. Cl.[4] C09K** *3/00;* **C11D** *3/075*

**U.S. Cl. 252—186.36** **11 Claims**

1. A timed-release hypochlorite bleach composition, comprising:

granules of a lithium hypochlorite bleaching agent; and

a first coating consisting essentially of sodium silicate, said coating encapsulating substantially each of said granules, thereby forming a lithium metasilicate interface around the lithium hypochlorite encapsulate, said interface having a limited solubility which will cause said first coating to release controlledly in aqueous solution.



**4,741,859**

## THERMOCHROMIC LIQUID CRYSTAL MATERIALS AND DEVICES

**Damien G. McDonnell, and Jennifer Constant, both of Worcester, England, assignors to The Secretary of State of Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England**

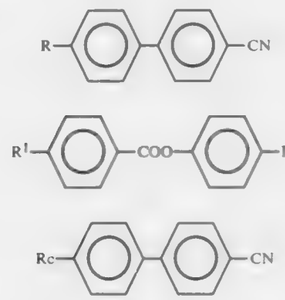
**Filed Jun. 18, 1986, Ser. No. 875,699**

**Claims priority, application United Kingdom, Jun. 19, 1985, 8515510**

**Int. Cl.[4] G02F** *1/13;* **C09K** *19/30, 19/12*

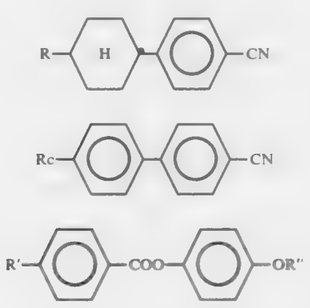
**U.S. Cl. 252—299.63** **8 Claims**

1. A liquid crystal material showing thermochromic behavior in a cholesteric mesophase over the visible region comprising a mixture of two or more components, characterised in that the mixture shows an injected smectic phase at a lower temperature than its cholesteric mesophase, said material containing one or more of each of the compound types having general formulae:



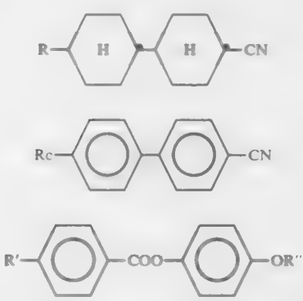
where R is selected from n-alkyl and n-alkoxy containing up to 12 carbon atoms and $R^1$ and $R^2$ are independently selected from n-alkyl containing up to 12 carbon atoms and Rc represents optically active 2-methylbutyl.

2. A liquid crystal material showing thermochromic behavior in a cholesteric mesophase over the visible region comprising a mixture of two or more components, characterised in that the mixture shows an injected smectic phase at a lower temperature than its cholesteric mesophase, said material containing one or more of each of the compound types having general formulae:



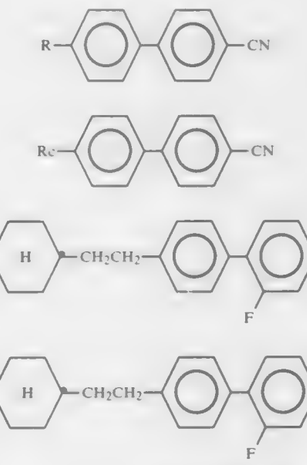
where R, R′, and R″ are independently selected from n-alkyl containing up to 12 carbon atoms and Rc represents optically active 2-methylbutyl.

3. A liquid crystal material showing thermochromic behavior in a cholesteric mesophase over the visible region comprising a mixture of two or more components, characterised in that the mixture shows an injected smectic phase at a lower temperature than its cholesteric mesophase, said material containing one or more of each of the compound types having general formulae:



where R, R′, and R″ are independently selected from n-alkyl containing up to 12 carbon atoms and Rc represents optically active 2-methylbutyl.

4. A liquid crystal material showing thermochromic behavior in a cholesteric mesophase over the visible region comprising a mixture of two or more components, characterised in that the mixture shows an injected smetic phase at a lower temperature than its cholesteric mesophase, said material containing one or more of each of the compound types having general formulae:



where R, R′, R″ and $R_A$ are independently selected from n-alkyl containing up to 12 carbon atoms and Rc represents optically active 2-methylbutyl.

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**4,741,860**

## ADHESION PROMOTERS CONTAINING OPTICAL BRIGHTENER

**Marvis E. Hartman, Pittsburgh, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.**

**Filed Oct. 2, 1986, Ser. No. 914,434**

**Int. Cl.[4] C08K** *5/34;* **C09K** *11/06*

**U.S. Cl. 252—301.21** **11 Claims**

1. A coating composition which when applied as a coating to a polyolefin substrate improves the adhesion of the polyolefin to other materials and which is readily detectable by ultraviolet light, comprising:

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(A) 20 to 80 percent by weight based on total solids weight of the composition of a chlorinated polyolefin and
(B) at least 0.1 percent by weight based on total solids weight of the composition of an optical brightener and
(C) 50 to 98 percent by weight based on total weight of the composition of an organic solvent.

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**4,741,861**

## SILICONE-BASED ANTIFOAM COMPOSITION AND A METHOD FOR THE PREPARATION OF THE SAME

**Fumio Okada; Nobuyuki Terae, and Kiyohiro Kondou, all of Gunma, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan**

**Filed Feb. 18, 1986, Ser. No. 830,568**
**Claims priority, application Japan, Feb. 25, 1985, 60-36043**
**Int. Cl.⁴ B01D** *17/05*
**U.S. Cl. 252—358** **5 Claims**

1. A silicone-based antifoam composition which comprises:
(A) 100 parts by weight of a combination of diorganopolysiloxanes composed of
(A-a) from 98 to 20% by weight of a diorganopolysiloxane having a viscosity in the range from 5 to 2000 centistokes at 25° C. and terminated at both molecular chain ends each with a triorganosilyl group and free from aliphatic unsaturation,
(A-b) from 1 to 60% by weight of a diorganopolysiloxane having a viscosity in the range from 20 to 5000 centistokes at 25° C. and terminated at both molecular chain ends each with a vinyl diorganosilyl group, and
(A-c) from 1 to 60% by weight of a diorganopolysiloxane having a viscosity in the range from 20 to 1000 centistokes at 25° C. and terminated at both molecular chain ends each with a diorganosilyl group;
(B) from 0.1 to 40 parts by weight of an organosilane compound represented by the general formula $R^1_aY_bSi$, in which $R^1$ is a substituted or unsubstituted monovalent hydrocarbon group having 1 to 20 carbon atoms, Y is a group selected from the class consisting of hydroxy group, alkoxy groups having 1 to 6 carbon atoms acyloxy groups, alkenyloxy groups and carboxyl group, and the subscripts a and b are each a positive integer of 1, 2 or 3 with the proviso that a+b is equal to 4:
(C) from 1 to 40 parts by weight of a finely divided silica powder; and
(D) a catalytic amount of a platinum compound.

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**4,741,862**

## ZEOLITE BUILT DETERGENT COMPOSITIONS

**Jeffrey A. Kosal, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.**

**Filed Aug. 22, 1986, Ser. No. 899,128**
**Int. Cl.⁴ C11D** *3/12, 3/33*
**U.S. Cl. 252—527** **18 Claims**

1. A particulate detergent composition comprising
(A) 5 to 50 parts by weight of an organic surfactant selected from the group consisting of anionic, nonionic and ampholytic surfactants;
(B) 5 to 50 parts by weight of zeolite;
(C) 1 to 25 parts by weight of a silicate represented generally by the formula

$$(MO)_nSio_{(4-n)/2}$$

wherein M is hydrogen or alkali metal and n has an average value from 0.5 to 3;
(D) 0.1 to 5 parts by weight of siliconate represented generally by the formula

$$(MO)_aO_{(3-a)/2}Si-R-Yb$$

wherein Y represents an anionic functional group, R is an organic linking group wherein Y is positioned at least 2 carbon atoms removed from the silicon atom, b is an integer from 1 to 3, a has a value of from 0.5 to 3, and M is hydrogen or alkali metal; and
(E) 0.1 to 5 parts by weight of a complexing agent for trivalent aluminum selected from the group consisting of water soluble alkali metal halide salts, polycarboxylic acid chelating agents, alpha-hydroxy carboxylic acid chelating agents, and polyhydroxy chelating agents.

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**4,741,863**

## ALKALINE DEGREASING SOLUTION COMPRISING AMINE OXIDES

**Tsukasa Yamamoto; Asao Mochizuki, both of Toyota; Yoshikazu Shibata, Okazaki; Hiroshi Okita, Yokosuka; Koichi Ando, Sagamihara; Yasuhiro Okano, Ichikawa, and Keiji Hadate, Chiryu, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota and Nihon Parkerizing Company Limited, Tokyo, both of, Japan**

**Continuation of Ser. No. 699,164, Feb. 7, 1985, abandoned. This application Oct. 2, 1986, Ser. No. 914,511**
**Claims priority, application Japan, Feb. 10, 1984, 59-24104**
**Int. Cl.⁴ C11D** *1/75, 3/10*
**U.S. Cl. 252—547** **17 Claims**

1. An aqueous solution of an alkaline degreasing agent comprising at least inorganic alkaline builders, surface active agents and a defoaming agent comprising kerosine, for cleaning metal surfaces,
in which said surface active agents consist of two nonionic and one anionic surface active agents, wherein one nonionic comprises an alkyl dimethylamine oxide having the structural formula



wherein R is a hydrocarbon group having the number of carbon atoms in a range from 12 to 22, and the other nonionic comprises a polyoxyalkylene alkylphenylether or a polyoxyalkylene fatty acid ester;
the composition ratios of said inorganic alkaline builders, defoaming agent and nonionic surface active agents being as follows, where all of the solid portions thereof are determined in weight percent:
5.6 to 11.7 weight percent of said nonionic surface active agents, in which said amine oxide is 1 to 5 weight percent and said nonionic surface active agent other than said amine oxide is 4.6 to 6.7 weight percent,
4.7 to 6.8 weight percent of said defoaming agent, and
the remainder being said inorganic alkaline builders; and
in said alkaline degreasing aqueous solution prepared by adding water to said composition, the content of said alkyl dimethylamine oxide being 0.1 to 2 gram per one liter of said aqueous solution.

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**4,741,864**

## ULTRAVIOLET LIGHT STABLE FLAME RETARDED POLYCARBONATE BLENDS

**Roger W. Avakian, Brasschaat, Belgium, and Ronald J. Wroczynski, Pittsfield, Mass., assignors to General Electric Company, Pittsfield, Mass.**

**Filed Oct. 7, 1985, Ser. No. 785,115**
**Int. Cl.⁴ C09K** *21/00;* **C08K** *3/10, 3/16*
**U.S. Cl. 252—609** **15 Claims**

1. A flame retarded aromatic carbonate polymer composition having improved color stability to UV radiation comprising
a. an aromatic carbonate polymer selected from the group consisting of aromatic polycarbonate and aromatic poly(ester-carbonate);



b. an amount of halogenated aromatic flame retardant effective for flame retardance; and
c. an amount of at least one aliphatic polyester effective for color stability.

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**4,741,865**

## FLAMEPROOFING COMPOSITION

**Donald P. Kintz, Westford, Mass., and Stephen N. Davis, Cleveland, N.C., assignors to Nyacol Products, Inc., Ashland, Mass.**

**Continuation-in-part of Ser. No. 614,921, May 29, 1984, abandoned. This application May 7, 1986, Ser. No. 860,739**
**Int. Cl.⁴ C09K** *21/00;* **C08K** *3/10;* **C07C** *17/42*
**U.S. Cl. 252—609** **2 Claims**

1. In the method of forming a flame retardant thermally color stable polyvinyl chloride polymer comprising the steps of:
(a) preparing a plastisol of polyvinyl chloride in a liquid plasticizer;
(b) combining a colloidal $Sb_2O_5$ powder with said plastisol; and
(c) heating said plastisol to induce fusion of the resin;
the improvement comprising a modified $Sb_2O_5$ powder used in step (b) prepared by the steps of:
(i) adjusting the pH of an aqueous colloidal dispersion of $Sb_2O_5$ to about 6.5 to 11 with NaOH, $Ba(OH)_2$ or $Ca(OH)_2$; and
(ii) drying said adjusted dispersion to provide a powder.

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**4,741,866**

## PROCESS FOR DISPOSING OF RADIOACTIVE WASTES

**LeRoy F. Grantham, Calabasas; Richard L. Gay, Canoga Park, and Lowell R. McCoy, Woodland Hills, all of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.**

**Filed Sep. 15, 1986, Ser. No. 907,428**
**Int. Cl.⁴ G21F** *9/32, 9/08, 9/30;* **F23G** *5/12*
**U.S. Cl. 252—632** **12 Claims**

1. A process for removing water from the pores of spent, contaminated radioactive ion exchange resins and encasing radionuclides entrapped within the pores of said resins, the process consisting essentially of the sequential steps of:
(a) heating said spent ion exchange resins at a temperature of from about 100° C. to about 150° C. to remove water from within and fill the pores of the ion exchange resins by heating said ion exchange resins for from about 46 to about 610 hours at a temperature at which the pores of the resins are sealed while avoiding any fusing or melting of the ion exchange resins to encase radionuclides contained within the resins; and
(b) cooling the resins to obtain dry, flowable ion exchange resins having radionuclides encased within sealed polymeric spheres.

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**4,741,867**

## PROCESS FOR THE PREPARATION OF 1-AMINO-2-BROMO-4-HYDROXYANTHRAQUINONE

**Helmut Dittmer, Leverkusen; Jürgen Schneider; Hubert Schönhagen, both of Odenthal, and Claus Krügermann, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Feb. 7, 1985, Ser. No. 698,988**
**Claims priority, application Fed. Rep. of Germany, Apr. 28, 1984, 3415917**
**Int. Cl.⁴ C07C** *97/26*
**U.S. Cl. 260—380** **5 Claims**

1. Process for the preparation of 1-amino-2-bromo-4-hydroxyanthraquinone by bromination of 1-aminoanthraquinone in concentrated sulphuric acid and hydroxylation of the bromination product without intermediate isolation in the presence of boric acid under conditions which are otherwise customary, characterised in that the bromination is carried out in 2 to 5 times the quantity by weight of 80 to 98% pure sulphuric acid and using 1.1–1.5 mole of bromine—in each case relative to 1-aminoanthraquinone—under an excess pressure of 0.5–5 bar.

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**4,741,868**

## PRODUCTION OF SULFONATED ASPHALT

**Patrick Rooney; Jeffrey A. Russell, and Terry D. Brown, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Mar. 4, 1985, Ser. No. 708,142**
**Int. Cl.⁴ C07C** *143/24*
**U.S. Cl. 260—505 R** **21 Claims**

1. A process for producing sulfonated asphalt comprising:
(a) adding a normally liquid, inert, low boiling solvent to an asphaltic material;
(b) contacting the thus formed mixture of asphaltic material and solvent with a liquid sulfonating agent under sulfonation conditions;
(c) neutralizing the thus produced sulfonic acids with a basic neutralizing agent under neutralizing conditions;
(d) separating said solvent from the thus produced sulfonated asphalt by forming a moving film of said sulfonated asphalt on a heated surface under conditions adapted to simultaneously evaporate said solvent;
(e) recovering the thus evaporated solvent; and
(f) drying the thus separated sulfonated asphalt as a product of the process, wherein vapor phases containing significant amounts of solvent are withdrawn from at least one of the sulfonation step and the neutralization step and solvent is recovered therefrom by one of (1) countercurrently scrubbing said vapor phase with a portion of the neutralizing agent, (2) countercurrently scrubbing said vapor phase with an aqueous solution of sulfuric acid and (3) passing said vapor phase through a fiber-type filter means to purify the same.

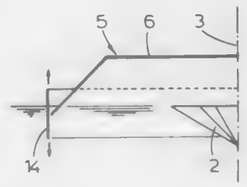
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**4,741,869**

## APPARATUS FOR CONTACTING A GAS WITH A LIQUID, IN PARTICULAR FOR AERATING WASTE WATER

**Dirk T. hove, MR Hooglanderveen, Netherlands, assignor to DHV Raadgevend Ingenieursbureau B.V., Ex Amersfoort, Netherlands**

**Filed Sep. 12, 1986, Ser. No. 906,458**
**Int. Cl.⁴ B01F** *3/04*
**U.S. Cl. 261—24** **19 Claims**




1. An apparatus for contacting a gas with a liquid in particular for aerating waste water, comprising,
a surface aerator adapted to rotate about a vertical axis of rotation,
a driving means coupled to the surface aerator,
a rigid cap disposed over the aerator and comprising,
a top wall and an adjoining downwardly directed circumferential side wall, the side wall having a lower edge which lies at least partially below the liquid level and which has a cylindrical configuration around the axis of rotation of the aerator, wherein the lower edge is adjustable in the vertical direction with respect to the remaining portion of the side wall of the cap,

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a gas inlet opening provided in one of said walls of the cap, the cross-section of the gas inlet opening being adjustable.

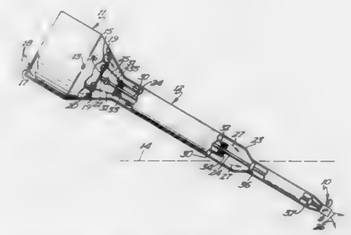
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**4,741,870**

## APPARATUS FOR TREATMENT OF LIQUIDS

**Peter S. Gross, Plymouth, Minn., assignor to Aeromix Systems, Incorporated, Plymouth, Minn.**

**Filed Jun. 26, 1987, Ser. No. 66,601**
**Int. Cl.⁴ B01F** *3/04*
**U.S. Cl. 261—93** **10 Claims**



1. In apparatus for the treatment of liquids, including waste liquids, by aeration, of the type having propeller means, motor means and leg means, said leg means extending between the motor means and propeller means and including shaft means coupled to said motor means for driving said propeller means and an outer housing generally surrounding said shaft means, and also having air inlet means through which air is drawn into said leg means on rotation of said propeller means within said liquid, said drawn air being discharged generally adjacent said propeller means, the improvement wherein said shaft means comprises a solid shaft and further comprising:

tubular cantilever means supported generally at one end within said outer housing in surrounding relation to said shaft means and extending from said one end away from said motor means; and

bearing means supporting said shaft means within said tubular cantilever means at spaced locations along said shaft means and tubular cantilever means.

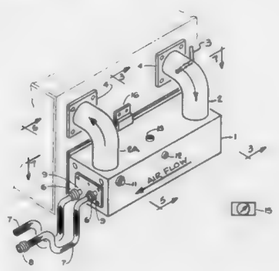
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**4,741,871**

## FREE FLOW HUMIDIFIER

**Richard E. Payha, 881 N. East Dr., North Huntingdon, Pa. 15642**

**Filed Mar. 20, 1987, Ser. No. 28,465**
**Int. Cl.⁴ B01F** *3/04*
**U.S. Cl. 261—153** **1 Claim**




1. An air operated humidifying system comprising a water box installed on the hot air duct of a forced air circulation heating system, inlet and outlet means at each end of said box extending into said hot air duct and diverting a portion of the hot air into said water box and back to said hot air duct, a source of hot water communicating with said water box and means to control the flow of said water into said water box so as to maintain a predetermined level of water therein, a hot water heating coil positioned to be immersed in said water in the water box, a hot water tank, and conduit means supplying by gravity flow hot water from the outlet of said tank to said hot water heating coil and back to said tank.

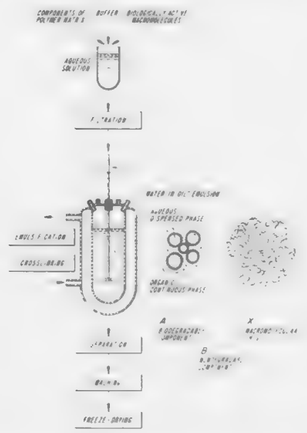
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**4,741,872**

## PREPARATION OF BIODEGRADABLE MICROSPHERES USEFUL AS CARRIERS FOR MACROMOLECULES

**Patrick P. De Luca, Lexington, Ky., and Frantisek Rypacek, Leckova, , assignors to The University of Kentucky Research Foundation, Lexington, Ky.**

**Filed May 16, 1986, Ser. No. 864,147**
**Int. Cl.⁴ A61K** *9/26, 9/52, 9/58;* **B01J** *13/02*
**U.S. Cl. 264—4.7** **13 Claims**



1. A method for preparing biodegradable microspheres having a three-dimensional network in which biologically active macromolecular agents are physically entraoped therein, said microsphere being able to release the macromolecular agent at a controlled rate, comprising emulsifying a vinyl derivative of a biodegradable hydrophilic polymer, a water-soluble monovinyl monomer and a biologically active macromolecule in water, and copolymerizing the biodegradable hydrophilic polymer and the water-soluble monovinyl monomer such that the biologically active macromolecule is entrapped therein.

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**4,741,873**

## METHOD FOR FORMING RIGID COMPOSITE PREFORMS

**Mel J. Fischer; Hollis O. Davis, both of Alameda, and Shih Huei Chen, San Leandro, all of Calif., assignors to Kaiser Aerotech, a Division of Sowa & Sons, San Leandro, Calif.**

**Filed Apr. 15, 1986, Ser. No. 852,066**
**Int. Cl.⁴ B29B** *11/16;* **B29C** *53/58*
**U.S. Cl. 264—25** **40 Claims**

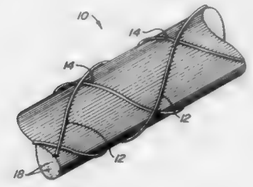
19. A method for fabricating composite articles, said method comprising:

shaping reinforcement strands into a fabric having a desired preform geometry wherein at least some of said reinforcement strands have been served with threads of a thermoplastic material prior to shaping, said strands being arranged so that individual strands cross over one another at particular locations;

heating the shaped strands to a temperature sufficient to melt the thermoplastic threads, thereby causing the thermoplastic to migrate and collect at the cross-over locations of the reinforcement strands;

cooling the shaped strands so that the thermoplastic material solidifies, whereby the strands are held in the desired





geometry by the solidified thermoplastic at said cross-over locations to form the preform;

impregnating the preform with a curable matrix material; and

curing the matrix material to form the composite article.

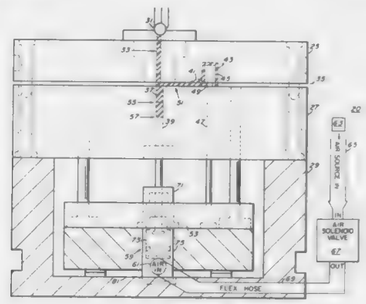
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**4,741,874**

## AUTOMATIC PART AND RUNNER SEPARATOR PROCESS

**James Harrison, 13182 Marshall La., Tustin, Calif. 92680**

**Division of Ser. No. 797,692, Nov. 13, 1985, Pat. No. 4,710,124.**
**This application May 4, 1987, Ser. No. 46,025**
**Int. Cl.⁴ B29C** *45/40*
**U.S. Cl. 264—161** **12 Claims**




1. A method of separating by products of an injection mold comprising:

forming first and second mold portions;

forming mating surfaces in said first and second mold portions so as to define a runner channel and a product cavity therebetween;

forming a plurality of ejector pins;

translatably disposing said plurality of ejector pins within said second mold portion, such that said pins are extendable into one of said runner channel and said product cavity;

translating said ejector pins within said second mold portion a first predetermined distance, causing one of a runner and a molded product to be displaced from said second mold portion, said first predetermined distance being sufficient to extend a first ejector pin into one of said runner channel and said product cavity but insufficient to extend a second ejector pin into one of said runner channel and said product cavity; and

extending said second ejector pin an additional second predetermined distance such that said second ejector pin then extends into one of said runner channel and said product cavity causing the other of said runner and said molded product to be displaced from said second mold portion.

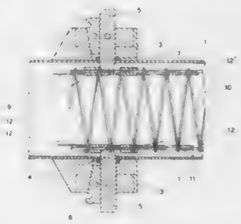
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**4,741,875**

## CENTRIFUGAL MOLDING OF PRESTRESSED PILES

**Amadeo Carraro, Via Bottenigo, 50, 30030 Chirignago, Venezia, Italy**

**Filed Jul. 29, 1986, Ser. No. 890,276**
**Claims priority, application Italy, Aug. 2, 1985, 84133 A/85**
**Int. Cl.⁴ B28B** *1/20, 23/08, 23/10;* **B29C** *41/04*
**U.S. Cl. 264—228** **2 Claims**



1. A method for centrifugally forming prestressed piles, comprising steps of

providing a mould comprising two semicylindrical half-shells with ends bounded by respective headpieces having apertures therein, said half-shells further having lateral apertures therein,

disposing a spiral within a first of the two half-shells of the mould for the pile to be formed,

securing within said spiral a plurality of strands, each strand extending along an axis parallel to that of the mould, each having at least one end emerging from a mould headpiece, and at least some of said strands having one end thereof terminating within the mould, in the vicinity of respective ones of said lateral apertures,

affixing a first block to each of those strands terminating within the mould, in proximity to a respective one of said lateral apertures,

pouring concrete into said first half-shell,

joining the two half-shells together, then

inserting elements for axially restraining the blocks through said lateral apertures provided in the half-shells,

tensioning the strands at those ends which emerge from the headpiece, and

centrifuging the mould prepared in this manner.

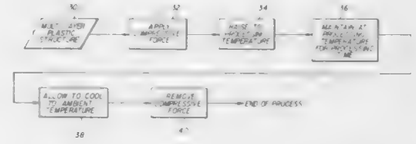
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**4,741,876**

## METHOD FOR MANUFACTURING THERMALLY STABILIZED PLASTIC FILM CAPACITOR

**Charles C. Rayburn, Lynchburg, Va., assignor to Illinois Tool Works Inc., Chicago, Ill.**

**Filed Mar. 26, 1985, Ser. No. 716,275**
**Int. Cl.⁴ B29C** *43/20, 43/54*
**U.S. Cl. 264—346** **5 Claims**




1. A method for processing a layered structure incorporating alternating plastic film and electrically conductive layers to enhance thermal stability of said structure, said plastic film having molecular bonds oriented in a first axis and a second axis, said method comprising the steps of:

applying compressive force to said structure in a third axis, said third axis being substantially perpendicular to said first axis and said second axis; and

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raising said structure from an ambient temperature to an elevated temperature while maintaining said compressive force on said structure, said elevated temperature being sufficiently high to randomize said molecular bonds; and

maintaining said structure at said elevated temperature and under said compressive force for a processing time sufficient to effect said randomization of substantially all of said molecular bonds in said structure; and

said elevated temperature being below the melting point of the plastic film; and

maintaining the thickness of the plastic film constant during compressive and processing temperature steps; and

allowing said structure to substantially cool to said ambient temperature and then removing said compressive force from said structure.

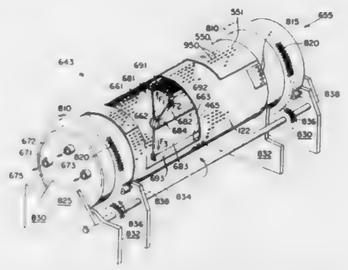
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**4,741,877**

## UNIFORMLY DEBOSSING AND APERTURING A MOVING PLASTIC WEB USING STATIONARY SUPPORT MEMBER IN FORMING AREA

**William I. Mullane, Jr., Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio**

**Continuation of Ser. No. 542,796, Oct. 17, 1983, abandoned.**
**This application Jan. 23, 1986, Ser. No. 822,687**
**Int. Cl.[4] B29C *51/10, 51/20***
**U.S. Cl. 264—504** **4 Claims**



1. A method of uniformly debossing a ribbon of substantially planar plastic film as said film moves continuously in the machine direction to impart a fine scale three-dimensional pattern thereto, said method comprising the steps of:

(a) supporting said plastic film on the outermost surface of a three-dimensional forming structure comprising a cylinder moving in the machine direction, said cylinder exhibiting said fine scale three-dimensional pattern, said three-dimensional pattern including a first predetermined pattern of apertures therein; and

(b) exposing substantially all portions of said plastic film coinciding with said first pattern of apertures in said cylinder to a fluid pressure differential by transporting said plastic film across a fluid pressure differential zone comprising a peripherally stationary vacuum chamber located inside said cylinder, said cylinder being supported substantially continuously in the machine direction by means of a support member which is also substantially stationary in the machine direction and which contacts the innermost surface of said cylinder to prevent deformation of said cylinder as said cylinder and the film supported thereon traverse said substantially stationary fluid pressure differential zone, said cylinder and said support member being movable relative to one another as measured in a radial direction, whereby a constant force is applied to the innermost surface of said rotating cylinder by moving said support member against the innermost surface of said cylinder to prevent separation therebetween, said substantially stationary support member having a second pattern of apertures therein, said apertures in said second pattern overlapping one another in the cross-machine direction so that a continuous, uninterrupted straight line oriented parallel to the machine direction and completely traversing said fluid pressure differential zone cannot be inscribed on the land area defining said apertures in said support member, said apertures in said substantially stationary support member being so sized and so spaced relative to said first pattern of apertures in said moving cylinder that substantially all of said apertures in said moving cylinder are exposed to the fluid pressure differential existing on the opposite sides of said plastic film in said substantially stationary fluid pressure differential zone at some point during their traverse of said substantially stationary fluid pressure differential zone, whereby said plastic film is uniformly debossed in the undistorted pattern of said three-dimensional forming structure comprising said cylinder.

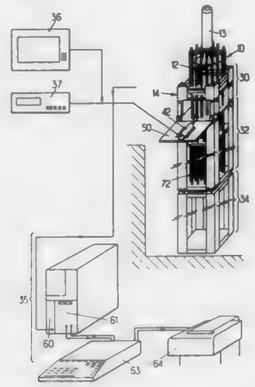
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**4,741,878**

## PROCESS AND DEVICE FOR INSPECTING CONTROL ROD CLUSTERS FOR NUCLEAR FUEL ASSEMBLIES

**Bernard Gebelin, Villeurbanne, and Roger Couture, Tassin la Demi-Lune, both of France, assignors to FRAGEMA, Courbevoie, France**

**Filed Jul. 29, 1986, Ser. No. 890,423**
**Claims priority, application France, Aug. 1, 1985, 85 11781**
**Int. Cl.[4] G21C *17/00***
**U.S. Cl. 376—248** **13 Claims**



1. A process for inspecting elongate rods of a cluster of n parallel rods, n being a predetermined integer, movable into and out of a reactor core, comprising the steps of:

(a) longitudinally moving the cluster of rods through a control unit while simultaneously subjecting n/m rods, m being a predetermined integer smaller than n, to eddy current testing throughout the length of said n/m rods;

(b) repeating step (a) m−1 times after the cluster has been rotated by successive amounts of 360°/m about the longitudinal direction; and

(c) ultrasonically testing doubtful rods revealed during steps (a) and (b) one by one during a longitudinal movement of each doubtful rod in turn over the entire axial length of the doubtful zone and along a plurality of longitudinal profiles in order to provide a detailed map of the doubtful zone.

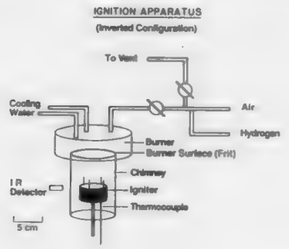


**4,741,879**

## CATALYTIC IGNITERS AND THEIR USE TO IGNITE LEAN HYDROGEN-AIR MIXTURES

**William J. McLean, Oakland; Lawrence R. Thorne, and Joanne V. Volponi, both of Livermore, all of Calif., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Jun. 10, 1986, Ser. No. 872,716**
**Int. Cl.[4] G21C *9/04***
**U.S. Cl. 376—301** **11 Claims**




1. A catalytic igniter adapted for igniting a confined lean hydrogen-air gaseous mixture in a containing structure; the igniter being comprised of:

(a) a non-combustible perforate catalytic substrate through which such a gaseous mixture can freely flow by convection current, about with a pressure drop of less than 0.2 atm, and having a catalytically active surface or surface coating with surface area of at least about 50 $m^2/g$, effective to raise the temperature of the substrate from ambient temperature to above about 80° C. within 200 seconds after the substrate is contacted with such a gaseous mixture; and

(b) at least one catalytically active platinum surfaced metal wire mounted, in a thermally conductive manner, on the portion of substrate which becomes heated when contacted with a lean hydrogen-air gaseous mixture when the igniter is mounted in the substrate so as to be in thermally conductive communication with heated gases which have passed through the substrate and to be in catalytically effective communication with gases which have not passed through the substrate, the catalytic surface to mass ratio of the wire being effective to raise the temperature of the wire to at least red heat in a hydrogen-air mixture containing at least 5 vol % hydrogen only after the temperature of the substrate rises above about 80° C. while in such gas mixture.

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**4,741,880**

## STEEL

**Cestmir Lang, Oberhausen, and Lutz Meyer, Vörde, both of Fed. Rep. of Germany, assignors to Thyssen Stahl AG, Duisburg, Fed. Rep. of Germany**

**Filed Feb. 12, 1987, Ser. No. 13,613**
**Claims priority, application Fed. Rep. of Germany, Feb. 15, 1986, 3604789**
**Int. Cl.[4] C22C *38/28***
**U.S. Cl. 420—104** **8 Claims**

1. A continuously cast steel consisting of
0.32 to 1.0% carbon
0.20 to 3.0% manganese,
up to 2.0 % silicon,
max. 0.05% phosphorus,
max. 0.05% sulphur,
0.002 to 0.008% nitrogen,
0.015 to 0.08% zirconium,
0.010 to 0.10% aluminium,
up to 3.5% chromium,
up to 3.5% nickel and
up to 0.5% molybdenum
rest iron and unavoidable impurities, wherein the zirconium:nitrogen ratio being 7:1 to 10:1 and the austenite grain size being ASTM 6 or a smaller grain size number.

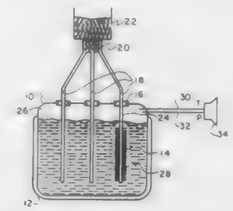
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**4,741,881**

## CHEMICAL REACTOR

**Hans K. Fauske, Hinsdale, Ill., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Jan. 8, 1987, Ser. No. 1,303**
**Int. Cl.[4] G05B *23/12, 9/00*; F16K *17/40***
**U.S. Cl. 422—112** **9 Claims**



1. A chemical reactor, comprising, in combination, a chemical reactor vessel for receiving a quantity of chemical reactants, a quenching reservoir filled in use with a supply of heat exchange fluid disposed within its interior, at least one thermally conductive emergency relief tube having a reactor end portion disposed in heat transfer relation with said chemical reactants when said vessel is in use, a quenching reservoir end portion joined to and in fluid communication with said interior of said reservoir, and an intermediate tube portion extending between said reservoir and reactor end portions, said reactor end portion of said relief tube being filled in use to a preselected level with a vaporizable heat exchange fluid having a predetermined vaporization temperature and vapor pressure, said reservoir being constructed and arranged so as to normally bias said heat exchange fluid in said reservoir for flow within said relief tube from said reservoir end to said reactor end portion of said tube, and pressure responsive flow control means disposed in said intermediate portion of said relief tube, said flow control means being movable from a closed position for preventing fluid flow between said reactor and said reservoir ends of said relief tube to an open position permitting substantial fluid flow between said reservoir and reactor ends of said relief tube, said pressure responsive flow control means being movable from said closed position to said open position in response to attainment by said heat exchange fluid in said reactor end portion of said tube of a predetermined vapor pressure indicative of a potential runaway reaction in said vessel, whereby, when said predetermined vapor pressure is reached, said flow control means is opened and remains open so that said heat exchange fluid in said reactor end portion of said tube may vaporize and pass through said intermediate and reservoir end tube portions and into said reservoir, and said reservoir fluid may pass through said reservoir end and intermediate tube portions and into said reactor end portion of said tube to provide additional heat absorption capacity within said reactor vessel.

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**4,741,882**

## ARRANGEMENT FOR CLEANING GASEOUS ATMOSPHERES FROM A PLURALITY OF SEPARATE, CONTAINED WORKING SPACES

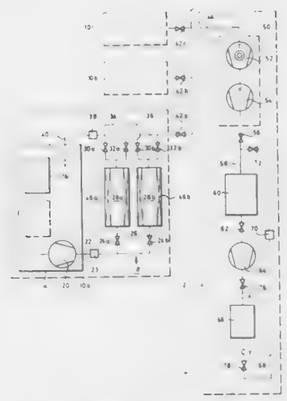
**Heinrich Weichselgartner, Munich, Fed. Rep. of Germany, assignor to Max-Planck-Gesellschaft Zur Foerderung Der Wissenschaften e.V., Goettingen, Fed. Rep. of Germany**

**Filed Feb. 4, 1986, Ser. No. 826,138**

**Claims priority, application Fed. Rep. of Germany, Mar. 28, 1985, 3511320**

**Int. Cl.⁴ B01D** *50/00*

**U.S. Cl. 422—122** **10 Claims**



1. An arrangement for cleaning gaseous atmospheres by removal of noxious, in particular radioactive, gases, the arrangement comprising in combination: a plurality of separate, contained working spaces containing gaseous atmospheres; a plurality of individual gas circuits each of said gas circuits being connected to one of said plurality of working spaces and being constructed for specific atmospheric conditions in said one corresponding working space which it is employed with, each of said gas circuits being provided with a circulation pump, regenerable absorbent means for separating and temporarily intermediately storing gases to be removed, and means for releasing the intermediately stored gases in said regenerable absorbent means; a common gas removal unit selectively connectable to any one of said gas circuits; and means for selectively connecting said gas removal unit with any one of said plurality of individual gas circuits, said common gas removal unit including a vacuum pump arrangement constructed so as to draw-off the gases released in said regenerable absorbent means which is in flow communication with said common gas removal unit at a given time, a vessel positioned and arranged so as to receive the drawn-off gases, means for connecting said vessel to said vacuum pump arrangement and means connected with said vessel for binding the gases.

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**4,741,883**

## FCC CATALYST SEPARATION APPARATUS

**James H. Haddad, Princeton Junction, and Hartley Owen, Belle Mead, both of N.J., assignors to Mobil Oil Corp., New York, N.Y.**

**Division of Ser. No. 632,084, Jul. 18, 1984, Pat. No. 4,629,552. This application Oct. 2, 1986, Ser. No. 914,399**

**Int. Cl.⁴ B01J** *8/18*

**U.S. Cl. 422—144** **7 Claims**

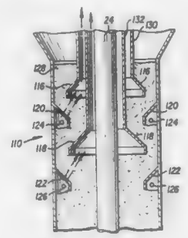
1. An apparatus for the fluid catalytic cracking of a hydrocarbon feed, comprising:

a riser conversion zone defined as a vertically disposed elongated tubular conduit having an upstream end and a downstream end;

means for introducing a suspension of hydrocarbon feed and catalyst into said upstream end of said riser conversion zone tubular conduit to produce a mixture of catalyst and cracked hydrocarbon feed exiting at said downstream end of said riser conversion zone tubular conduit;

at least one separator means, located outside said riser conversion zone and having an inlet disposed at said downstream end of said riser conversion zone tubular conduit, for separating at least a portion of the catalyst from the mixture in said riser conversion zone; and

deflector means, for connecting said downstream end of said riser conversion zone tubular conduit to said separator



inlet said deflector means having at least one closed conduit, each having an interior deflection surface angled relative to the direction of mixture flow through said riser conversion zone tubular conduit;

said conduit of the deflector means being connected to the inlet of said separator means;

said deflection surface and said separator inlet cooperating so that catalyst moving from said upstream to said downstream portion of said riser conversion zone tubular conduit strike said interior deflecting surface and rebound generally towards said separator inlet.

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**4,741,884**

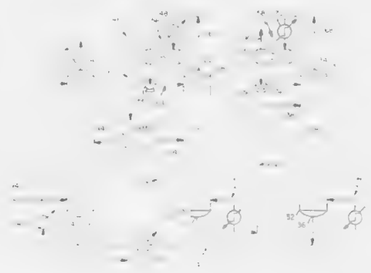
## PROCESS AND APPARATUS FOR REMOVING $H_2S$ FROM GAS STREAMS

**Cecil O. Carter, Wann, and Dwight D. Boesiger, Bartlesville, both of Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Division of Ser. No. 321,017, Nov. 13, 1981, Pat. No. 4,406,868. This application Sep. 30, 1982, Ser. No. 431,443**

**Int. Cl.⁴ B01D** *53/34*

**U.S. Cl. 422—171** **3 Claims**



1. Apparatus comprising:

(a) a first column having an upper end and a lower end with a liquid inlet and a vapor outlet adjacent its upper end and a first vapor inlet and a liquid outlet adjacent its lower end and a second vapor inlet between its upper end and its lower end, said second vapor inlet being positioned between the first vapor inlet and the vapor outlet;

(b) a second column having an upper end and a lower end with a vapor outlet adjacent its upper end, a liquid outlet adjacent its lower end, and a liquid inlet between its upper end and its lower end;

(c) a first conduit means connecting the liquid outlet adjacent the lower end of the first column with the liquid inlet between the upper end and the lower end of the second column;

(d) a third column having an upper end and a lower end with a vapor outlet adjacent its upper end, a liquid outlet adjacent its lower end, and a liquid inlet between its upper end and its lower end;

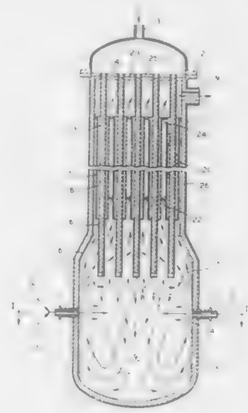
(e) a second conduit means connecting the liquid outlet adjacent the lower end of the second column with the liquid inlet between the upper end and the lower end of the third column;

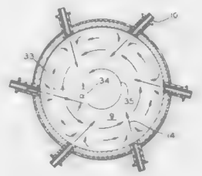
(f) a third conduit means connecting the liquid outlet adjacent the lower end of the third column with the liquid inlet adjacent the upper end of the first column; and

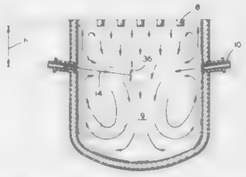
(g) a fourth conduit means connecting the vapor outlet adjacent the upper end of the second column with the second vapor inlet of the first column.



tion, so that the gases flow upwardly along the lower wall portion toward the reforming section where the gases heat the







reformer tubes and subsequently leave the vessel via the outlet nozzle.

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**4,741,885**

## VESSEL FOR THE GENERATION OF SYNTHESIS GAS

**Hans-Joachim Herbort, Frondenberg, and Hans-Dieter Marsch, Dortmund, both of Fed. Rep. of Germany, assignors to Uhde GmbH, Dortmund, Del.X**

**Filed Sep. 9, 1986, Ser. No. 905,120**

**Claims priority, application Fed. Rep. of Germany, Sep. 11, 1985, 3532413**

**Int. Cl.⁴ B01J** *8/04*

**U.S. Cl. 422—197** **15 Claims**

1. In an essentially cylindrical vessel for the generation of synthesis gas at relatively high pressure utilizing hydrocarbons, including a first wall portion defining a catalytic endothermic reforming section, a plurality of reformer tubes having outlet ends, the reformer tubes capable of being heated externally and being filled with a catalyst, the reformer tubes mounted within the reforming section and extending parallel to the longitudinal axial direction of the vessel, an inlet nozzle opening into the first wall portion for introducting a mixture of hydrocarbons and steam into the vessel such that the mixture flows through the reformer tubes, whereby reforming gas is generated in the reformer tubes, an outlet nozzle defined in the first wall portion, a second wall portion adjacent the first wall portion, the second wall portion having a greater diameter than the first wall portion, an end wall connected to the second wall portion, the second wall portion and the end wall defining a pressure chamber forming a partial oxidation section, the outlet ends of the reformer tubes opening into the partial oxidation section, the partial oxidation section serving for mixing the reforming gas with additional hydrocarbons and oxygen or oxigen-rich gas, the improvement comprising a plurality of inlet devices for the hydrocarbons and oxygen or oxygen-rich gas, the inlet devices each defining an axis and mounted in the second wall portion, the axes of the inlet devices extending at an angle $\alpha$ relative to the radial direction of the vessel and the axes of the inlet devices extending transversely of the axial direction of the vessel at an angle $\beta$ ranging from parallel with to inclined to a radial plane of the vessel, the inlet devices axially spaced from the outlet ends of the reformer tubes and from the bottom wall of the vessel, whereby the gases in the partial oxidation section are conducted in a rotating pattern in circumferential direction of the vessel and in a loop-shaped pattern in axial direction of the vessel, such that the gases are conducted from the center of the partial oxidation section toward the bottom wall and then toward the lower wall por-

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**4,741,886**

## PROCESS FOR RECOVERING TUNGSTEN FROM TUNGSTEN BEARING MATERIAL CONTAINING ARSENIC

**Clarence D. Vanderpool; Richard A. Scheithauer, and Martin B. MacInnis, all of Towanda, Pa., assignors to GTE Products Corporation, Stamford, Conn.**

**Filed Oct. 24, 1986, Ser. No. 922,651**

**Int. Cl.⁴ C01G** *41/00*

**U.S. Cl. 423—55** **6 Claims**

1. A process for recovering tungsten from tungsten bearing material containing arsenic, said process comprising:

(a) adjusting a water slurry of said material to a pH of less than about 4 with an acid to solubilize the major portion of the tungsten;

(b) adding to the resulting pH adjusted slurry a ferric compound capable of adsorbing arsenic without adsorbing appreciable amounts of tungsten, and insoluble in said pH adjusted slurry at a pH of less than about 4, to form a two phase system consisting essentially of a solid phase containing the major portion of said arsenic and of any phosphorus which may be present, and a solution phase contianing the major portion of the tungsten;

(c) separating said solid phase from said solution phase;

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(d) adjusting the pH of said solution phase to less than about 2 with an acid;
(e) adding hexamethylenetetramine to the resulting pH adjusted solution phase in an amount sufficient to form a precipitate containing the major portion of the tungsten which is in said solution; and
(f) separating said precipitate from the resulting mother liquor.

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**4,741,887**

## GALLIUM COMPLEXES AND SOLVENT EXTRACTION OF GALLIUM

**James P. Coleman, Maryland Heights; Charles R. Graham, St. Charles, and Bruce F. Monzyk, Maryland Heights, all of Mo., assignors to Monsanto Company, St. Louis, Mo.**

**Filed Dec. 4, 1986, Ser. No. 937,849**
**Int. Cl.[4] C22B *21/00***
**U.S. Cl. 423—112** **28 Claims**

1. A process for recovering gallium from aqueous solutions containing gallium which comprises contacting such a solution with an organic solvent containing at least 2% by weight of a water-insoluble N-organo hydroxamic acid having at least about 8 carbon atoms to extract gallium, and separating the gallium loaded organic solvent phase from the aqueous phase.

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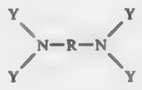
**4,741,888**

## $H_2S$ REMOVAL FROM GAS STREAMS

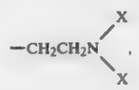
**Howard L. Fong, Sugarland; David A. Van Kleeck, Houston, and John M. Harryman, Katy, all of Tex., assignors to Shell Oil Company, Houston, Tex.**

**Filed Dec. 30, 1986, Ser. No. 947,730**
**Int. Cl.[4] C01B *17/16***
**U.S. Cl. 423—226** **19 Claims**

11. A process for the removal of $H_2S$ from a sour gaseous stream comprising;
(a) feeding the sour gaseous stream to a first contacting zone, and intimately contacting the sour gaseous stream in said first contacting zone with an aqueous reactant solution containing solubilized ferric chelate of an acid having the formula



wherein
from two to four of the groups Y are selected from acetic and propionic acid groups;
from zero to two of the groups Y are selected from 2-hydroxyethyl, 2-hydroxypropyl, and



wherein
x is selected from acetic acid and propionic acid groups; and
R is ethylene, propylene or isopropylene or alternatively cyclohexane or benzene where the two hydrogen atoms replaced by nitrogen are in the 1,2-position, and mixtures thereof, and the solubilized ferrous chelate of said acid or acids, at a temperature below the melting point of sulfur, and at sufficient solution to gas ratio and under conditions to convert $H_2S$ to sulfur and inhibit sulfur deposition, and producing a gas-solution mixture comprising sour gas and aqeous reactant solution;
(b) passing gas-solution mixture from step (a) through a plurality of enclosed contacting sections in serial flow communication in a second contacting zone, under conditions to convert $H_2S$ to sulfur and at a temperature below the melting point of sulfur, the first contacting section of said second contacting zone comprising a plurality of discrete sulfur deposition resistant channels, each discrete channel providing a diverted flow path for gas-solution mixture through the section, such that gas-solution mixture is directed at least initially at an angle acute to that of the direction of flow of the gas-solution mixture entering the section; the second contacting section through which gas-solution mixture is passed comprising an enclosed mixing section adapted to allow radial mixing of gas-solution mixture and redistribution of solution in gas, and to inhibit plugging due to sulfur formation; the third contacting section through which gas-solution mixture is passed comprising a plurality of discrete sulfur deposition resistant channels, each discrete channel providing a diverted flow path for gas-solution mixture through the section, such that gas-solution mixture is directed at least initially at an angle acute to that of the direction of flow of the gas-solution mixture entering the section; and producing a gas-reactant solution mixture containing solid sulfur in said second contacting zone, the reactant solution of said gas-reactant solution mixture having a reduced content of solubilized ferric chelate of said acid or acids and the gas of said mixture having a reduced $H_2S$ content;
(c) separating the gas having reduced $H_2S$ content from gas-reactant solution mixture produced in step (b), and recovering a spent reactant solution containing sulfur;
(d) regenerating spent reactant solution, producing a regenerated solution containing sulfur and having an increased concentration of ferric chelate of said acid or acids;
(e) removing sulfur from said regenerated solution containing sulfur; and
(f) passing regenerated solution from which sulfur has been removed from step (e) to the first contacting zone for use as aqueous reactant solution therein.

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**4,741,889**

## PROCESS FOR ADSORPTIVE REMOVAL OF SUBSTANCES FROM FLUE GASES

**Jürgen Ritter, Uitikon, Switzerland; Erich Sundermann; Hanno Laurien, both of Braunschweig, and Hans Reye, Neustadt, all of Fed. Rep. of Germany, assignors to Perfluktiv Technik AG, Zug, Switzerland**

**PCT No. PCT/EP85/00111, § 371 Date Jan. 9, 1986, § 102(e) Date Jan. 9, 1986, PCT Pub. No. WO85/04343, PCT Pub. Date Oct. 10, 1985**
**PCT Filed Mar. 16, 1985, Ser. No. 810,281**
**Claims priority, application Fed. Rep. of Germany, Mar. 24, 1984, 3410895**
**Int. Cl.[4] B01J *8/00*; C01B *17/00***
**U.S. Cl. 423—239** **12 Claims**

1. A process for removing sulfur oxides adsorbable by activated coke from flue gas, comprising the steps of:
(a) forming an adsorption column in a shaft having a substantially uniform cross section over at least a portion of the height thereof by supporting on a multiplicity of vertically spaced bar grates lying in respective horizontal planes respective beds of activated coke particles of a uniform particle size of at least 6 mm and a maximum of 25 mm of the same bed thickness so that each bed extends uniformly over all of said cross section at the respective grate plane and the upper surface of each bed below an uppermost one of said grates is spaced from a next-overlying grate by a free space;
(b) passing said flue gas upwardly in succession through said beds in said portion from a bed on a lowermost grate of said portion uniformly over said cross section and in a direction perpendicular to said grate planes;
(c) discharging the bed on said lowermost grate for regeneration upon loading of said bed on said lowermost grate with said substance;
(d) thereafter shifting, grate-by-grate in time-spaced succession from the bottom to the top of said portion, grate bars of each grate above said lowermost grate out of the respective grate plane to break up the bed thereon and cause the activated coke particles to cascade uniformly all across said cross section through a respective one of the free spaces underlying the grate whose grate bars are shifted onto a next lower grate to reform an activated coke bed of uniform thickness all across said cross section;
(e) thereafter depositing a new charge of said activated coke particles on said uppermost grate to reform a said bed thereon; and
(f) regenerating said bed discharged from said lowermost grate so as to remove said sulfur oxides therefrom.

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**4,741,890**

## GAS SCRUBBING METHOD

**Jean T. Rose, Fairless Hills, Pa., and J. Michael Stockman, Minneapolis, Minn., assignors to Betz Laboratories, Inc., Trevose, Pa.**

**Filed Jul. 24, 1986, Ser. No. 889,651**
**Int. Cl.[4] C01B *17/00***
**U.S. Cl. 423—242** **8 Claims**

1. In a process for scrubbing flue gases containing sulfur dioxide for the removal thereof which comprises (1) contacting the flue gases with an aqueous medium containing a material which will react with the sulfur dioxide to form either calcium sulfate or calcium sulfite or both; and (2) separating the insoluble either calcium sulfate or calcium sulfite or both from the aqueous medium, the improvement being adding to said aqueous medium prior to contact with the gas a water-soluble surfactant in an amount sufficient to increase sulfur dioxide removal, said surfactant is selected from the group consisting of a polyoxypropylene polyoxyethylene block polymer, alkyl phenol polyethylene oxide polymer, alkyl phenoxy polyethoxyethanol polymer, alkyl phenol polyethylene glycol ether polymer, and alkyl phenol polyethylene oxide polymer.

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**4,741,891**

## SYNTHESIS OF ZEOLITE EU-2

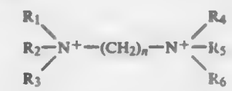
**John L. Casci, Redcar, England; Barrie M. Lowe, Edinburgh, Scotland, and Thomas V. Lowe, Darlington, England, assignors to Imperial Chemical Industries PLC, London, England**

**Continuation of Ser. No. 816,958, Jan. 6, 1986, abandoned, which is a continuation of Ser. No. 272,469, Jun. 11, 1981, abandoned. This application Oct. 15, 1986, Ser. No. 919,577**
**Claims priority, application United Kingdom, Jun. 12, 1980, 8019211**
**The portion of the term of this patent subsequent to Aug. 27, 2002, has been disclaimed.**
**Int. Cl.[4] C01B *35/10***
**U.S. Cl. 423—277** **4 Claims**

1. A method of making zeolite EU-2 having a molar composition expressed by the formula:

0.5 to 1.5$R_2O$:$Y_2O_3$:at least 70$XO_2$:0 to 100$H_2O$

wherein R is a monovalent cation or 1/n of a cation of valency n, X is silicon and/or germanium, Y is one or more of aluminum, iron, gallium or boron, and $H_2O$ is water of hydration additional to water notionally present when R is H, and having an X-ray diffraction pattern substantially as set out in Table 1, which method comprises reacting an aqueous mixture comprising at least one oxide $XO_2$, at least one oxide $Y_2O_3$ and at least one alkylated derivative of a polymethylene $\alpha$–$\omega$ diamine having the formula:



wherein n is in the range from 3 to 12, $R_1$ to $R_6$ are each methyl, the mixture having the molar composition:

| | |
|---|---|
| $XO_2/Y_2O_3$ | at least 70 |
| $OH^-/XO_2$ | 0.1 to 6.0 |
| $(M^+ + Q)/Y_2O_3$ | 0.5 to 100 |
| $Q/(M^+ + Q)$ | 0.1 to 1.0 |
| $H_2O/XO_2$ | 1 to 100 |

where X is silicon and/or germanium, Y is one or more of aluminum, iron, gallium, boron, M is an alkali metal or ammonium and Q is the aforesaid alkylated derivative of a polymethylene diamine, or a precursor thereof.

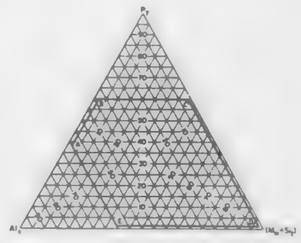
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**4,741,892**

## QUINARY MOLECULAR SIEVE COMPOSITIONS

**Brent M. T. Lok, New City; Bonita K. Marcus, Rye, and Edith M. Flanigen, White Plains, all of N.Y., assignors to Union Carbide Corporation, Danbury, Conn.**

**Filed Apr. 13, 1984, Ser. No. 600,181**
**Int. Cl.[4] C01B *25/00*; B01J *29/02***
**U.S. Cl. 423—306** **38 Claims**



1. Crystalline molecular sieves having three-dimensional microporous framework structures of $M'O_2$, $M''O_2$, $AlO_2$, $PO_2$ and $SiO_2$ tetrahedral units having an empirical chemical composition on an anhydrous basis expressed by the formula:

$$mR:(M'_uM''_vAl_xP_ySi_z)O_2$$

wherein "R" represents at least one organic templating agent present in the intracrystalline pore system; "m" represents the molar amount of "R" present per mole of $(M'_uM''_vAl_xP_ySi_z)O_2$ and has a value of from zero (0) to about 0.3; M′ and M″ are two elements selected from the group consisting of arsenic, beryllium, boron, chromium, cobalt, gallium, germanium, iron, lithium, magnesium, manganese, titanium, vanadium and zinc; and "u", "v", "x", "y" and "z", where "w" is the sum of "u"+"v", represent the mole fractions of M′, M″, aluminum, phosphorus and silicon, respectively, present as tetrahedral oxides and are within the pentagonal compositional area defined by points A, B, C, D, and E of FIG. 1, and wherein "u", "v", "x", "y" and "z" are at least 0.01, said crystalline molecular sieves having a characteristic X-ray powder diffraction pattern which contains at least the d-spacings set forth in one of the following Tables A to H and J to N:

TABLE A

| | (QUINAPSO-5) | |
|---|---|---|
| 2θ | d (Å) | Relative Intensity |
| 7.2–7.7 | 12.28–11.48 | m–vs |
| 19.4–19.9 | 4.58–4.46 | w–m |
| 20.85–21.3 | 4.26–4.17 | w–vs |
| 22.1–22.6 | 4.02–3.93 | m–vs |
| 25.6–26.1 | 3.480–3.414 | vw–m |

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TABLE B

(QUINAPSO-11)

| 2θ | d (Å) | Relative Intensity |
|---|---|---|
| 7.8–8.2 | 11.19–10.85 | m–s |
| 9.0–9.8 | 9.83–9.03 | vw–vs |
| 12.8–13.6 | 6.92–6.51 | vw–m |
| 20.8–21.8 | 4.27–4.08 | m–vs |
| 22.0–22.6 | 4.04–3.93 | m–vs |
| 22.6–23.1 | 3.93–3.85 | vw–vs |
| 23.1–23.5 | 3.85–3.79 | w–vs |

TABLE C

(QUINAPSO-16)

| 2θ | d (Å) | Relative Intensity |
|---|---|---|
| 11.3–11.6 | 7.83–7.63 | w–vs |
| 18.55–18.9 | 4.78–4.70 | vw–m |
| 21.85–22.2 | 4.07–4.00 | m–vs |
| 22.8–23.3 | 3.900–3.818 | w–m |
| 26.4–27.3 | 3.370–3.267 | w–m |
| 29.6–29.9 | 3.018–2.988 | w–m |

TABLE D

(QUINAPSO-20)

| 2θ | d (Å) | Relative Intensity |
|---|---|---|
| 13.8–14.2 | 6.42–6.23 | m–vs |
| 19.6–20.15 | 4.53–4.41 | m |
| 24.1–24.7 | 3.695–3.603 | m–vs |
| 27.9–28.6 | 3.198–3.121 | w |
| 31.3–32.05 | 2.861–2.791 | w |
| 34.35–35.0 | 2.610–2.601 | w–m |

TABLE E

(QUINAPSO-31)

| 2θ | d (Å) | Relative Intensity |
|---|---|---|
| 8.4–9.5 | 10.53–9.31 | w–s |
| 20.2–20.4 | 4.40–4.35 | m |
| 22.0–22.1 | 4.040–4.022 | m |
| 22.5–22.7 | 3.952–3.920 | vs |
| 31.6–31.8 | 2.831–2.814 | w–m |

TABLE F

(QUINAPSO-34)

| 2θ | d (Å) | Relative Intensity |
|---|---|---|
| 9.3–9.8 | 9.51–9.03 | m–vs |
| 12.6–13.2 | 7.03–6.71 | w–m |
| 15.8–16.3 | 5.61–5.44 | vw–m |
| 20.25–21.2 | 4.39–4.19 | w–vs |
| 24.8–25.4 | 3.59–3.507 | vw–m |
| 30.0–30.9 | 2.979–2.894 | vw–m |

TABLE G

(QUINAPSO-35)

| 2θ | d (Å) | Relative Intensity |
|---|---|---|
| 10.6–11.1 | 8.35–7.97 | vw–vs |
| 13.1–13.7 | 6.76–6.46 | vw–vs |
| 17.0–17.6 | 5.22–5.04 | w–s |
| 20.6–21.25 | 4.31–4.18 | vw–m |
| 21.6–22.3 | 4.11–3.99 | m–vs |
| 28.1–28.8 | 3.175–3.100 | vw–m |

TABLE H

(QUINAPSO-36)

| 2θ | d (Å) | Relative Intensity |
|---|---|---|
| 7.45–8.0 | 11.14–11.05 | vs |
| 8.1–8.3 | 10.91–10.65 | w–m |

TABLE H-continued

(QUINAPSO-36)

| 2θ | d (Å) | Relative Intensity |
|---|---|---|
| 16.3–16.6 | 5.44–5.34 | w–m |
| 18.9–19.4 | 4.70–4.57 | w–m |
| 20.7–21.0 | 4.29–4.23 | w–m |

TABLE J

(QUINAPSO-39)

| 2θ | d (Å) | Relative Intensity |
|---|---|---|
| 9.2–9.6 | 9.61–9.21 | ■ |
| 13.1–13.5 | 6.76–6.56 | ■ |
| 17.8–18.4 | 4.98–4.82 | w–m |
| 20.8–21.3 | 4.27–4.17 | m–vs |
| 22.2–22.85 | 4.00–3.892 | m–vs |
| 26.4–27.05 | 3.376–3.296 | w–m |

TABLE K

(QUINAPSO-43)

| 2θ | d (Å) | Relative Intensity |
|---|---|---|
| 12.3–12.95 | 7.20–6.83 | m–vs |
| 16.8–17.45 | 5.28–5.09 | vw–w |
| 21.45–21.85 | 4.145–4.071 | m–vs |
| 27.1–27.85 | 3.291–3.232 | w–vs |
| 32.4–33.2 | 2.763–2.699 | vw–m |

TABLE L

(QUIN PSO-44)

| 2θ | d (Å) | Relative Intensity |
|---|---|---|
| 9.2–9.6 | 9.61–9.21 | m–vs |
| 15.9–16.3 | 5.57–5.44 | vw–m |
| 20.5–21.0 | 4.33–4.23 | m–vs |
| 24.3–25.1 | 3.66–3.548 | w–m |
| 30.5–31.1 | 2.931–2.876 | vw–m |

TABLE M

(QUINAPSO-46)

| 2θ | d (Å) | Relative Intensity |
|---|---|---|
| 7.2–8.1 | 12.28–10.92 | vs |
| 12.9–13.6 | 6.86–6.51 | vw |
| 21.2–22.2 | 4.19–4.501 | vw–m |
| 22.5–23.45 | 3.95–3.793 | vw–m |
| 26.6–27.9 | 3.351–3.198 | vw–m |

TABLE N

(QUINAPSO-47)

| 2θ | d (Å) | Relative Intensity |
|---|---|---|
| 9.4–9.6 | 9.41–9.21 | vs |
| 12.8–13.1 | 6.92–6.76 | vw–m |
| 16.0–16.3 | 5.54–5.44 | vw–m |
| 20.5–21.0 | 4.31–4.23 | m–vs |
| 24.6–25.3 | 3.613–3.526 | vw–m |
| 30.6–31.1 | 2.921–2.876 | vw–m. |



**4,741,893**

## PROCESS FOR PRODUCING FLUORIDES OF METALS

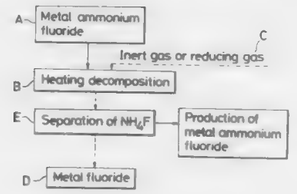
**Morio Watanabe, Hyogo, and Sanji Nishimura, Kyoto, both of Japan, assignors to Solex Research Corporation of Japan, Japan**

**Continuation of Ser. No. 713,440, Mar. 19, 1985, abandoned. This application Jun. 9, 1986, Ser. No. 872,623**

**Claims priority, application Japan, Mar. 19, 1984, 59-51122; Apr. 28, 1984, 59-85183; Jul. 31, 1984, 59-159125**

**Int. Cl.[4] B01D** *11/04;* **C01B** *9/08;* **C01C** *1/16*

**U.S. Cl. 423—471** **9 Claims**




1. A process for producing fluorides of Mo, W, Re, Co, Ni, Cr, Sb, Sn, Pb and rare earth metals, comprising bringing an organic solvent containing ions or complex ions of a metal selected from the group consisting of Mo, W, Re, Co, Ni, Cr, Sb, Sn, Pb and rare earth metals into contact with an aqueous solution containing F − ion and $NH_4$ + ion to transfer the metal ions or metal complex ions into the aqueous phase, said organic solvent being one selected from the group consisting of alkylphosphoric acid, alkyl aryl phosphoric acids, carboxylic acids, oximes, ketones, neutral phosphoric acid esters, and primary through quaternary amines, said solvent being diluted with a petroleum hydrocarbon to separate fluorine-containing ammonium salts from said aqueous solution and to simultaneously regenerate said organic solvent, and heating said fluorine-containing ammonium salts in a stream of inert or reducing gas to decompose said salts into fluorides of the corresponding metals and form $NH_4F$ or $NH_4HF_2$ gases.

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**4,741,894**

## METHOD OF PRODUCING HALIDE-FREE METAL AND HYDROXIDES

**Andreas A. Melas, Burlington, Mass., assignor to Morton Thiokol, Inc., Chicago, Ill.**

**Filed Jun. 3, 1986, Ser. No. 870,070**

**Int. Cl.[4] C01B** *13/14;* **C22B** *34/24*

**U.S. Cl. 423—592** **12 Claims**

1. A method for producing a halide-free oxide or hydroxide of a subject element from the corresponding subject element halide, comprising:

in a first reaction step, providing a liquid medium comprising a water-free alcohol and contacting said alcoholic medium with the subject element halide and further contacting said alcohol and said subject element halide with a replacement species that reacts with halides, said alcohol being provided at at least about a ten-fold stoichiometric excess relative to said subject element halide, thereby producing a subject element alkoxide and a salt of the replacement species and the halide, said alcohol being selected such that the subject element alkoxide is soluble in said medium and said replacement halide salt is insoluble and precipitates from said medium,

physically separating said medium containing said alkoxide from said precipitate salt, and

in a second reaction step, hydrolyzing said subject element alkoxide with 18 mega ohm purity water to produce the corresponding subject element oxide or subject element hydroxide.

**4,741,895**

## PREPARATION OF CHROMIUM(III) OXIDE

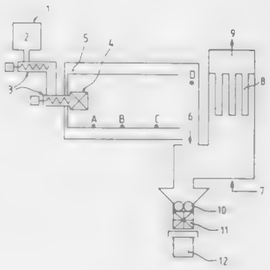
**Norbert Mueller, Friedelsheim; Bernhard Boettcher, Weisenheim; Manfred Ohlinger, Frankenthal; Helmut Reinicke, Gruenstadt, and Gerhard Honecker, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengsellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Filed Oct. 17, 1986, Ser. No. 920,058**

**Claims priority, application Fed. Rep. of Germany, Mar. 25, 1986, 3609971**

**Int. Cl.[4] C01G** *37/033*

**U.S. Cl. 423—607** **2 Claims**




1. A process for the preparation of chromium(III) oxide by decomposing hydrated ammonium dichromate at from 450° to 750° C., wherein the decomposition is carried out in a combustion chamber which is such that the ratio of the volume of the combustion chamber in liters to the weight of ammonium dichromate throughput, in kg per minute, is from 1:1 to 6:1.

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**4,741,896**

## LIME PROCESSING APPARATUS

**Robert L. Thomas, Sr., 1909 Wood La., Forth Worth, Tex. 76117**

**Continuation of Ser. No. 647,052, Sep. 4, 1984, abandoned. This application Jan. 12, 1987, Ser. No. 2,459**

**Int. Cl.[4] E02D** *3/14*

**U.S. Cl. 423—640** **3 Claims**



1. A method of creating a slurry of water and a powder material, comprising the steps of:

providing a mixing vessel with an inlet end on one end and a discharge end on the opposite end;

mounting in the vessel a rotatable agitator;

mounting a mixing tube to the inlet end of the vessel and providing the mixing tube with two inlets;

blowing the powder material while dry into one of the inlets of the mixing tube;

injecting a pressurized flow of the water into the other inlet of the mixing tube, causing the powder material and the water to mix in the mixing tube and enter the vessel as a slurry;

elevating the discharge end of the vessel relative to the inlet end to create a hydrostatic head in the slurry at the inlet end that is greater than at the discharge end;

rotating the agitator to further mix the slurry in the vessel, and continuously flowing the slurry out the discharge end.

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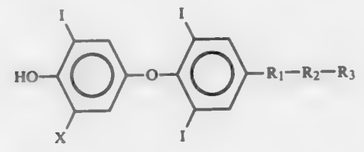
**4,741,897**

## THYROXINE ANALOGS AND REAGENTS FOR THYROID HORMONE ASSAYS

**Judith Andrews, Wayland; Christine Burns, Wellesley, and James Quick, Lexington, all of Mass., assignors to Baxter Travenol, Deerfield, Ill.**

**Filed Jul. 8, 1986, Ser. No. 883,241**
**Int. Cl.[4] G01N** *33/53*
**U.S. Cl. 424—1.1** **10 Claims**

6. A reagent for determining thyroxine or triiodothyroxine in a biological fluid, said reagent comprising an antibody capable of immunologically reacting with said thyroxine or triiodothyroxine and a labelled ligand capable of binding to said antibody, said labelled ligand having the formula

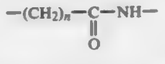


wherein

X is iodine or hydrogen;

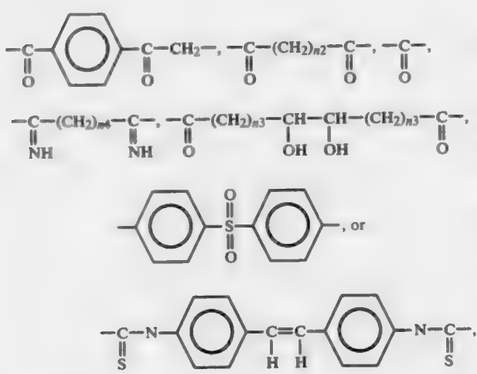
$R_1$ is

$-CH_2-\underset{\displaystyle CO_2R_4}{\underset{|}{CH}}-NH-$, $-CH_2-CH_2-NH-$, $-(CH_2)_{n1}-$, or



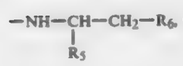
where $n_1$ an integer from 0 to about 4, n is an integer from 0 to about 5, and $R_4$ is hydrogen, methyl, ethyl, or propyl;

$R_2$ is

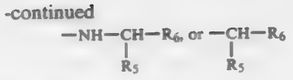


where $n_2$ is an integer from about 2 to about 6, $n_3$ is an integer from about 0 to about 2, and $n_4$ is an integer from about 4 to about 6; and

$R_3$ is



-continued



where $R_5$ is hydrogen, $CO_2R_4$ or $-NH_2$ and $R_6$ is



wherein $R_6$ is labelled with radioactive iodine.

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**4,741,898**

## STABILIZED STAIN COMPOSITION

**Arjun Mallik, Pequannock; Daniel Koetters, Butler, and Ludmilla Pluto, Pequannock, all of N.J., assignors to Fisher Scientific Company, Pittsburgh, Pa.**

**Filed Apr. 1, 1985, Ser. No. 718,308**
**Int. Cl.[4] G01N** *1/00, 1/30;* **C09B** *44/00*
**U.S. Cl. 424—3** **12 Claims**

1. A stabilized Romanowsky-type stain composition comprising:

(a) a cationic dye component selected from the group consisting of Methylene Blue, Azure A, Azure B, Azure C, thionin and mixtures thereof,

(b) an anionic dye component selected from the group consisting of Eosin Y, Eosin B, fluorescein, a substituted fluorescein, Orange G and mixtures thereof,

(c) an alcohol solvent of 1-6 carbons, and

(d) an effective amount of a stabilizer selected from the group consisting of lysine, glycine and acid addition salts of lysine and glycine.

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**4,741,899**

## PROCESS FOR ARRESTING THE PROLIFERATION OF ORGANISMS THAT CONVERT AXILLARY SECRETIONS TO MALODOROUS MATERIALS

**Sydney M. Henry, Westfield; Gene Jacobs, Montclair, and Val F. Cotty, Westfield, all of N.J., assignors to Bristol-Myers Company, New York, N.Y.**

**Filed Jun. 6, 1983, Ser. No. 501,306**
**Int. Cl.[4] A61K** *7/32, 9/07, 9/12*
**U.S. Cl. 424—47** **12 Claims**

1. A process for arresting the proliferation of aerobic diptheroids, staphylococci and micrococci which convert axillary secretions into malodorous materials, which comprises treating said axillary secretions in the axilla of a subject with a composition comprising a compound selected from the group consisting of hexylcaine, tetracaine, naphazoline, xylometazoline and pharmaceutically acceptable salts thereof.

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**4,741,900**

## ANTIBODY-METAL ION COMPLEXES

**Vernon L. Alvarez, Morrisville; John D. Rodwell, Yardley, both of Pa.; Chyi Lee, New Brunswick, N.J.; John W. F. Goers, Atascadero, Calif.; Richard C. Siegel, Yorktown Heights, N.Y., and Thomas J. McKearn, New Hope, Pa., assignors to Cytogen Corporation, Princeton, N.J.**

**Continuation-in-part of Ser. No. 442,050, Nov. 16, 1982, abandoned, which is a continuation-in-part of Ser. No. 356,315, Mar. 9, 1982, Pat. No. 4,671,958. This application Aug. 31, 1984, Ser. No. 646,328**
**The portion of the term of this patent subsequent to Jun. 9, 2004, has been disclaimed.**
**Int. Cl.[4] A61K** *43/00, 49/00;* **C12Q** *1/00;* **C07K** *13/00*
**U.S. Cl. 424—85** **81 Claims**

1. A method for preparing an antibody-chelator conjugate, comprising:



(a) reacting an antibody or antibody fragment with an oxidizing agent to form an aldehyde group in the carbohydrate moiety of the antibody or antibody fragment, in which the carbohydrate moiety is not part of nor directly involved with the antigen binding site of the antibody or antibody fragment; and

(b) reacting the aldehyde group of the resultant oxidized antibody or antibody fragment with a compatible chelator containing an amine group selected from the group consisting of primary amine, hydrazine, hydrazide, hydroxylamine, phenylhydrazine, semicarbazide and thiosemicarbazide groups to form a water-soluble antibody-chelator conjugate being characterized by (i) substantially the same immunospecificity as the unconjugated antibody or antibody fragment; and (ii) aqueous solubility such that the antibody-chelator conjugate, when reacted with a metal ion, is suitable for in vivo administration.

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**4,741,901**

## PREPARATION OF POLYPEPTIDES IN VERTEBRATE CELL CULTURE

**Arthur D. Levinson, Burlingame; Chung-Cheng Liu, San Bruno, and Daniel G. Yansura, San Francisco, all of Calif., assignors to Genentech, Inc., South San Francisco, Calif.**

**Continuation of Ser. No. 326,980, Dec. 3, 1981, abandoned, which is a continuation-in-part of Ser. No. 298,235, Aug. 31, 1981, abandoned. This application Apr. 24, 1984, Ser. No. 603,529**
**Int. Cl.[4] A61K** *39/00, 39/12;* **C12P** *21/00, 21/02, 21/04;* **C12N** *15/00, 5/00, 1/00;* **C07K** *13/00*
**U.S. Cl. 424—88** **1 Claim**

1. A vaccine comprising a pharmaceutically acceptable vehicle and hepatitis B surface antigen particle having a diameter of about 22 nm, the hepatitis B surface antigen in the particle consisting of mature hepatitis B surface antigen.

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**4,741,902**

## COMPOSITIONS FOR TREATMENT OF NEUROLOGICAL AND RELATED DISORDERS

**William E. Haast, Miami Serpentarium Laboratories, Innovation Center, University of Utah Research Park, 419 Wakara Way, Salt Lake City, Utah 84108**

**Filed Jul. 14, 1986, Ser. No. 885,091**
**Int. Cl.[4] A61K** *39/00, 35/58*
**U.S. Cl. 424—88** **12 Claims**

1. A composition of matter having pharmacological activity comprising in an administerable form effective amounts of at least one postsynaptic neurotoxin, at least one presynaptic neurotoxin, and a fraction of a viperid venom capable of stimulating the immune mechanisms of the body, the viperid fraction being the b fraction obtained from elution of the viperid venom on a Sephadex G-50 column.

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**4,741,903**

## NOVEL ENZYNE DERIVATIVES

**Richard A. G. Smith, Reigate, England, assignor to Beecham Group p.l.c., England**

**Continuation of Ser. No. 847,701, Apr. 3, 1986, abandoned, which is a division of Ser. No. 684,359, Dec. 21, 1984, Pat. No. 4,600,580. This application Apr. 15, 1987, Ser. No. 39,114**
**Claims priority, application United Kingdom, Dec. 24, 1983, 8334499**
**The portion of the term of this patent subsequent to Jul. 15, 2003, has been disclaimed.**
**Int. Cl.[4] C12N** *9/96, 11/06, 9/72, 9/68*
**U.S. Cl. 424—94.63** **6 Claims**

1. A derivative of fibrinolytic enzyme in which the catalytic site on the enzyme which is responsible for fibrinolytic activity is blocked by a human protein attached thereto by way of a reversible linking group derived from the linking agent selected from the group consisting of

4-[N-2-(3-[2-pyridyl]dithiopropionyl)hydrazino]benzoic acid-4'-amidinophenyl ester;

N-(6-[3-(2-pyridyl)dithiopropionyl]aminohexyl)anthranilic acid-4'-amidinophenyl ester;

4-amidinophenyl N-4-(N-2-[3-(2-pyridyldithio)propionyl-]aminoethyl)aminobenzoate; and

2-chloro-4-amidinophenyl N-4-(N-2-[3-(2-pyridyldithio)propionyl]aminoethyl)aminobenzoate.

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**4,741,904**

## LONG LIFE SEMI-ARTIFICIAL WATER BORNE FEED

**Malcolm S. Smith, Beaumont, and Colastie J. Daigle, Orange, both of Tex., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 838,635, Mar. 6, 1986, Pat. No. 4,666,717, which is a continuation-in-part of Ser. No. 754,156, Jul. 12, 1985, Pat. No. 4,576,821. This application Mar. 10, 1987, Ser. No. 24,171**
**The portion of the term of this patent subsequent to Mar. 18, 2003, has been disclaimed.**
**Int. Cl.[4] A23L** *1/325;* **A01K** *85/00*
**U.S. Cl. 426—1** **6 Claims**

1. A composition useful as fish and crustacean feed consisting essentially of

(a) from about 0.5 to about 10 weight percent of a water insoluble polymer having a melting point below about 110° C., selected from the group consisting of polyamides and copolymers of ethylene with from about 15 to about 45 weight percent of at least one ethylenically unsaturated comonomer;

(b) from about 75 to about 95 weight percent of a nutrient medium selected from the group consisting of fish meal, crustacea meal, grain derived products, plant derived products, animal derived products, and fish by-products;

(c) from 0 to about 20 weight percent of a lubricant selected from the group consisting of edible oil and fish solid solubles;

(d) from 0 to about 10 weight percent of a vitamin and mineral concentrate;

(e) from 0 to about 10 weight percent of a preservative.

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**4,741,905**

## CHEWING GUM CANDY

**Robert Huzinec, Kenvil, N.J., assignor to Warner-Lambert Company, Morris Plains, N.J.**

**Filed Jun. 19, 1986, Ser. No. 876,945**
**Int. Cl.[4] A23G** *3/30*
**U.S. Cl. 426—3** **12 Claims**

1. A sugarless chewing gum candy confection product prepared by the process comprising:

mixing a melted chewing gum base heated to a temperature of from about 82° C. to about 94° C. with a cooked hard candy syrup of sorbitol at a temperature which renders said gum base and said cooked candy syrup miscible under mild blending conditions to form a substantially single phase continuous plastic chewing gum candy mass,

mildly blending the resulting mixture under controlled cooling to a temperature of from about 60° C. to about 70° C. so that substantially no air is introduced into said mixture, and

final cooling to a hard candy matrix containing chewing gum, said matrix suitable for scoring and cutting, and for grinding into a particulate,

wherein said base is included in an amount of from about 5% to a bout 55% by weight, and said cooked candy syrup is included in an amount of from about 45% to about 95% by weight.

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4,741,906

## COMPOSITE MEAT PRODUCT AND METHOD FOR THE MANUFACTURE THEREOF

**Ernst J. C. Paardekooper, Sint Michielsgestel, and Gerrit Wijngaards, Driebergen-Rijsenburg, both of Netherlands, assignors to Nederlandse Centrale Organisatie Voor Toegepast-Natuurwetenschappelijk Onderzoek, The Hague, Netherlands**

**Filed May 2, 1986, Ser. No. 859,023**

**Claims priority, application Netherlands, May 9, 1985, 8501333**

**Int. Cl.[4] A23L** *1/31*

**U.S. Cl. 426—59** **13 Claims**

1. In a method for manufacturing composite meat products which comprises mixing raw meat parts with a gel-forming substance and shaping the mixture into a desired shape, the improvement comprising the steps of

mixing the raw meat parts with a fibrin gel-forming protein solution which contains fibrinogen in a concentration of 10 to 80 mg per ml and an amount of thrombin effective to catalytically convert the fibrinogen into a fibrin gel,

molding the mixture into a desired shape, and then maintaining the mixture in the desired shape at a temperature between 0 to 55 degrees C. to convert the fibrinogen into a fibrin gel, such that the raw meat parts become bonded to each other by the fibrin gel which is formed and such that said composite meat product is formed.

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4,741,907

## FRESH DOUGH AND A METHOD FOR PRODUCING THE SAME

**Toshiaki Furuhashi, Sashima, Japan, assignor to Asahi Kasei Kogyo Kabushiki Kaisha, Japan**

**Filed Dec. 17, 1985, Ser. No. 809,752**

**Claims priority, application Japan, Dec. 17, 1984, 59-264632; May 29, 1985, 60-114260; Jun. 3, 1985, 60-118952; Jun. 3, 1985, 60-118953**

**Int. Cl.[4] A21D** *10/02*

**U.S. Cl. 426—90** **12 Claims**

1. A fresh dough contained in a container for storage and chemically leavened in the container, which comprises:

(1) expanded dough portions which are derived from a first plurality of layers each containing flour, water and a leavening base but containing no leavening acid;

(2) unexpanded portions which are derived from a second plurality of layers each containing a leavening acid but containing no leavening base; and

(3) partially expanded dough portions which are derived from a third plurality of layers each containing flour and water but containing neither leavening acid nor leavening base,

said first layers, said second layers and said third layers constituting a laminated structure in which the respective third layers intervene between the respective first layers and the respective second layers to prevent direct contact between said respective first layers and said respective second layers wherein the weight ratio of said first layers, said second layers and said third layers to the total of said first, second and third layers are 30 to 80%, 2 to 50% and 10 to 40%, respectively.

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4,741,908

## ENROBED FOOD PRODUCTS AND METHOD OF MANUFACTURE

**Arthur W. Brooks, Richardson, Tex.; Gerald R. Popenhagen, Middleton, and Donna J. Rentschler, Madison, both of Wis., assignors to Oscar Mayer, Madison, Wis.**

**Continuation-in-part of Ser. No. 761,468, Aug. 1, 1985, abandoned. This application Oct. 2, 1986, Ser. No. 914,398**

**Int. Cl.[4] A21D** *13/00*

**U.S. Cl. 426—95** **14 Claims**

1. A method for the manufacture of a frozen enrobed food product having an inner filling material and an enveloping outer layer of uncooked dough which comprises: freezing an inner filling material into a shape having substantially smooth surfaces wherein the edges of said inner filling material are rounded; forming a composite sheet of farinaceous dough of from about 1 mm to about 4 mm thickness wherein the composite sheet comprises layers of an edible shortening selected from the group consisting of edible fats, oils and margarine interposed between layers of dough; enveloping the frozen, shaped, inner filling material within the uncooked composite sheet of dough such that said fats or oils or margarine in the composite dough is not caused to migrate away from between said dough layers and said composite dough substantially maintains its layered integrity throughout areas of contact with said filling material; thereafter freezing and packaging said enrobed food product.

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4,741,909

## BAG FOR PROCESSING FRUIT OR VEGETABLES

**David W. Guthrie, P.O. Box V, Tonasket, Wash. 98855**

**Division of Ser. No. 751,301, Jul. 5, 1985, Pat. No. 4,698,226, which is a continuation-in-part of Ser. No. 630,502, Jul. 13, 1984, abandoned. This application Aug. 4, 1987, Ser. No. 81,667**

**Int. Cl.[4] B65B** *29/00, 25/04;* **B65D** *65/16*

**U.S. Cl. 426—107** **6 Claims**



1. A bag for use in incorporating a design into the skin or surface of a fruit or vegetable, comprising:

a bag having a light reflective outer surface and a non-light-reflective inner surface, said bag having an open proximal end adapted to fit over and substantially surround said fruit, a distal end having at least one aperture communicating with the interior volume of said bag to allow the drainage of fluids therethrough to the exterior of said bag, and a light barrier located at the distal end inward of said aperture, said light barrier positioned to block light from entering through said aperture into the interior volume of the bag, such that said outer and inner surface in combination with said light barrier maintains said fruit or vegetable within a substantially light exclusive environment.

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4,741,910

## METHOD FOR MAKING AGGLOMERATED BITS CONTAINING ASPARTAME

**Jan Karwowski, Franklin Lakes, and Anna M. Magliacano, East Orange, both of N.J., assignors to Nabisco Brands, Inc., Parsippany, N.J.**

**Continuation-in-part of Ser. No. 681,959, Dec. 14, 1984, Pat. No. 4,585,657. This application Mar. 6, 1986, Ser. No. 836,750**

**Int. Cl.[4] A23L** *1/236*

**U.S. Cl. 426—285** **9 Claims**

1. A method for making agglomerated bits comprising:

(a) preblending aspartame and a bulking agent to form an aspartame premix;

(b) mixing dry ingredients with said aspartame premix to form a dry mix;

(c) blending liquid ingredients into said dry mix, said liquid ingredients being in a quantity sufficient to form agglomerated bits; and

(d) drying said agglomerated bits.

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4,741,911

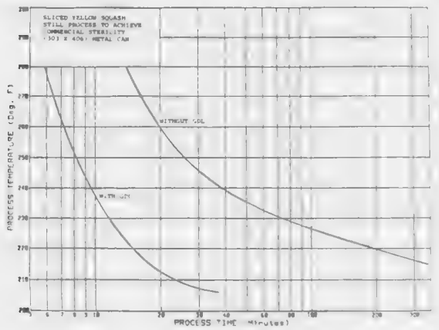
## METHOD OF THERMALLY PROCESSING LOW-ACID FOODSTUFFS IN HERMETICALLY SEALED CONTAINERS AND THE CONTAINERS HAVING THE FOODSTUFFS THEREIN

**Deborah J. McIntyre, Palatine, and Dwight E. Reed, Barrington, both of Ill., assignors to American National Can Company**

**Continuation-in-part of Ser. No. 748,114, Jun. 24, 1985, abandoned, which is a continuation-in-part of Ser. No. 695,530, Jan. 28, 1985, abandoned. This application Sep. 23, 1985, Ser. No. 778,648**

**Int. Cl.[4] A23L** *3/00*

**U.S. Cl. 426—325** **18 Claims**




1. A method of thermally processing a low acid, heat-sensitive foodstuff susceptible to degradation when thermally processed, which comprises:

combining the foodstuff with a hydrolysis mixture of an aldonic acid and its lactones or a precursor thereof in an amount sufficient to lower the equilibrium pH to 4.6 or less and subjecting the combined foodstuff to a thermal process at a reduced time-temperature parameter sufficient to achieve commercial sterilization; said parameter being lower than the higher commericial sterilization needed when said hydrolysis mixture of an aldonic acid and its lactones or a precursor thereof is not employed.

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4,741,912

## CONTINUOUS MULTISTAGE ISOTHERMAL FRYING PROCESS TO PRODUCE HIGH CRUNCH POTATO CHIPS

**Edward Katz, St. Louis County, and Richard G. Pachl, St. Louis, both of Mo., assignors to Anheuser-Busch Companies, Inc., St. Louis, Mo.**

**Filed Dec. 19, 1985, Ser. No. 811,948**

**Int. Cl.[4] A23L** *1/217*

**U.S. Cl. 426—438** **9 Claims**

1. A continuous process of frying potato chips to produce chips having the color and hardness of kettle fried chips comprising the steps of

(a) forming potato slices from white potatoes,

(b) placing the slices in a first stage oil bath having a temperature in the range of about 240°–305° F.,

(c) holding the slices in said first stage oil bath for a first period of time to remove a substantial portion of the water in the slices while maintaining the oil temperature substantially isothermal,

(d) moving the slices to a second stage oil bath having a higher temperature than the first stage and in the range of about 305°–350° F.,

(e) holding the slices in said second stage oil bath for a second period of time shorter than the first period of time to add color and hardness to the slices while maintaining the oil temperature substantially isothermal, and

(f) removing finished fully cooked chips from the second stage oil bath.

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4,741,913

## WHEAT FLOURING PROCESS

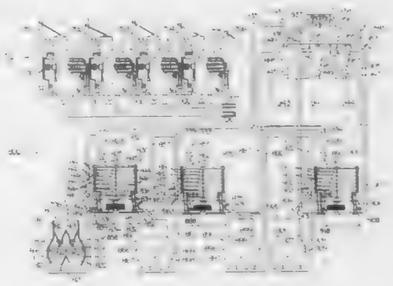
**Toshihiko Satake, Higashihiroshima, Japan, assignor to Satake Engineering Co., Ltd., Tokyo, Japan**

**Filed Jun. 12, 1986, Ser. No. 873,680**

**Claims priority, application Japan, Sep. 30, 1985, 60-218969; Oct. 14, 1985, 60-229627**

**Int. Cl.[4] A23P** *1/00*

**U.S. Cl. 426—483** **20 Claims**



1. A process of flouring wheat, comprising:

the step of preparing a plurality of friction type wheat polishing machines disposed in series relation to form a continuous wheat polishing process line, each of said polishing machines comprising a frame, perforated tubular polishing member mounted on said frame, a frictionally polishing roll rotatably mounted on said frame so as to have an axis substantially coincident with an axis of said perforated tubular polishing member, said polishing roll cooperating with said perforated tubular polishing member to define therebetween a polishing chamber, means for feeding the wheat to be polished into said polishing chamber, means for rotating said frictionally polishing roll relative to said perforated tubular polishing member, the rotation of said frictionally polishing roll relative to said perforated tubular polishing member causing the wheat grains fed into said polishing chamber to be agitated to cause the wheat grains to be brought into frictional contact with each other, to thereby strip a pericarp from each wheat grain to polish the same, and the polished wheat grains being allowed to be discharged out of said polishing chamber and the stripped pericarps being allowed to be discharged out of said polishing chamber through the apertures in said perforated tubular polishing member, the wheat grains discharged out of a polishing chamber of one of the plurality of friction type wheat polishing machines disposed in the series relation being introduced into a polishing chamber of a friction type wheat polishing machine disposed subsequent to said one friction type wheat polishing machine in the series relation;

the step, associated with at least one of said friction type wheat polishing machines, of supplying moisture into the polishing chamber of the friction type wheat polishing machine to add the moisture to the individual wheat grains flowing within the polishing chamber to increase a frictional contact force between the wheat grains, to thereby cause the frictional contact of the wheat grains with each other by the frictionally polishing roll of said at least one friction type wheat polishing machine to moisturize and soften the entire pericarp of each wheat grain,

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to facilitate the stripping of the pericarp from each wheat grain and the exposure of an endosperm part of each wheat grain;

the step of milling the wheat grains each having the endosperm part exposed, to form a powder material; and

the step of screening the powder material provide a flour having a desired particle size.

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**4,741,914**

**FLAVOR ENHANCING SEASONING CONTAINING DEODORIZED GARLIC EXTRACT AND PROCESS**

**Akimitsu Kimizuka, Yokohama; Youichi Ueda; Makoto Sakaguchi, both of Kawasaki, and Ryuichi Miyajima, Yokohama, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan**

**Continuation of Ser. No. 670,577, Nov. 13, 1984, abandoned. This application Apr. 4, 1986, Ser. No. 848,349**

**Int. Cl.⁴ A23L** *1/228, 1/229*

**U.S. Cl. 426—537** **13 Claims**

9. A flavor enhancing seasoning, obtained by a process comprising:

(i) extracting garlic with water after suppression of enzymatic activity, to obtain an extract, wherein said enzymatic activity is suppressed by heating said garlic at a temperature of at least 80° C. for at least 30 minutes;

(ii) deodorizing said extract to obtain an almost odorless material; and

(iii) adding a glutamic acid salt, a 5'-ribonucleotide salt, or a glutamic acid salt and a 5'-ribonucleotide salt to said deodorized extract;

wherein said extract is used in an amount of 5 wt.% or more relative to the weight of said glutamic acid salt, said 5'-ribonucleotide salt, or said glutamic acid salt and 5'-ribonucleotide salt.

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**4,741,915**

**PROTECTION OF FOODSTUFFS FROM OXIDATION**

**David R. Farr, Brent; Danièle Magnolato, La Tour-de-Peilz, and Jürg Löliger, Corseaux, all of Switzerland, assignors to Nestec S.A., Vevey, Switzerland**

**Filed Jun. 27, 1984, Ser. No. 624,953**

**Claims priority, application Switzerland, Jul. 6, 1983, 3707/83**

**Int. Cl.⁴ A23L** *1/42*

**U.S. Cl. 426—542** **9 Claims**

1. A method of inhibiting oxidation in foodstuffs subject to oxidation comprising incorporating pentagalloyl glucose in the foodstuff in an amount effective to inhibit oxidation of the foodstuff.

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**4,741,916**

**METHOD OF AND APPARATUS FOR PRODUCING INDIVIDUAL DOUGH PIECES OF SUBSTANTIALLY CONSTANT SIZE AND SHAPE**

**Daniel J. Heidel, Cincinnati, and Corey J. Kenneally, Maineville, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio**

**Filed Aug. 28, 1987, Ser. No. 90,805**

**Int. Cl.⁴ A21C** *5/00, 11/10;* **A23P** *1/12*

**U.S. Cl. 426—549** **20 Claims**



6. A method of making individual dough pieces, each piece being of substantially constant predetermined size and shape and containing discrete morsels, said method comprising the steps of:

(a) forming a continuous dough rope and placing said rope onto the top surface of a moving conveyor belt, said rope having an end portion and a top surface having a channel formed therein;

(b) depositing a plurality of said discrete morsels into said channel;

(c) cutting a dough piece from said end portion of said rope by horizontally bringing together a pair of cutting elements, said brought together pair of cutting elements defining a mold having an interior cavity and an open top, said dough piece being within said interior cavity of said mold;

(d) tamping said dough piece within said mold cavity by vertically bringing down into contact therewith a tamping plate being shaped complementary to said open top of said mold; and

(e) returning said pair of cutting elements and said tamping plate to their original positions, thereby releasing said dough piece of edible material of predetermined size and shape from said mold cavity.

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**4,741,917**

**ALKALI METAL ACID PYROPHOSPHATE LEAVENING ACID COMPOSITIONS AND METHODS FOR PRODUCING THE SAME**

**Robert M. Lauck, New City, and Robert H. Tieckelmann, Ossining, both of N.Y., assignors to Stauffer Chemical Co., Westport, Conn.**

**Filed Sep. 19, 1986, Ser. No. 909,155**

**Int. Cl.⁴ A21D** *10/02*

**U.S. Cl. 426—551** **9 Claims**

1. A method for stabilizing an alkali metal acid pyrophosphate against significant leavening rate of reaction change comprising blending said alkali metal acid pyrophosphate with an effective amount of magnesium oxide, hydroxide or mixtures thereof.

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**4,741,918**

**COATING PROCESS**

**Erno Nagy de Nagybaczon, London, and Alan C. Paterson, Sharpthorne, both of England, assignors to Tribohesion Limited, London, England**

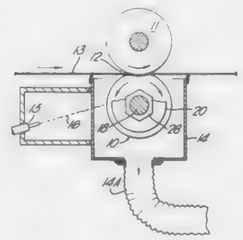
**PCT No. PCT/GB85/00034, § 371 Date Nov. 4, 1985, § 102(e) Date Nov. 4, 1985, PCT Pub. No. WO85/03244, PCT Pub. Date Aug. 1, 1985**

**PCT Filed Jan. 24, 1985, Ser. No. 779,774**

**Claims priority, application United Kingdom, Jan. 24, 1984, 8401838**

**Int. Cl.⁴ B05D** *1/02*

**U.S. Cl. 427—11** **2 Claims**



1. A method of coating a paper, fabric or plastic substrate with a material other than PTFE, comprising rubbing discrete substantially dry particles of the coating material with a rotary applicator, which is in sliding contact with the substrate, across the surface of the substrate with sufficient force and at sufficient speed relative to said surface to cause the material to become deposited on the surface of the substrate in an adherent film, which film is non-microporous and is non-granular in appearance.



**4,741,919**

**PROCESS FOR PREPARATION OF SEMICONDUCTOR DEVICE**

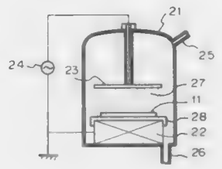
**Kanetake Takasaki, Tokyo, Japan, assignor to Fujitsu Limited, Kawasaki, Japan**

**Filed Jul. 24, 1987, Ser. No. 77,293**

**Claims priority, application Japan, Jul. 25, 1987, 61-173590**

**Int. Cl.⁴ B05D** *3/06*

**U.S. Cl. 427—38** **9 Claims**



1. A process for the preparation of a semiconductor device by the plasma chemical vapor deposition of amorphous silicon on a substrate, which comprises generating plasma in a deposition furnace by using a high frequency wave of less than 1 MHz to deposit an amorphous silicon film, and generating oxygen plasma in the same deposition furnace and irradiating the amorphous silicon film with the oxygen plasma.

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**4,741,920**

**MESH AND PRINTING SCREEN FOR SCREEN PRINTING AND A METHOD FOR THE PREPARATION THEREOF**

**Susumu Ueno, 9809-7, Yatabe, Hazaki-cho; Toru Nakanishi, 3-3-24, Shitte-chuo, Kamisu-cho, both of Kashima-gun, Ibaraki-ken; Kenji Fushimi, 6-26-12, Maebara-higashi, Funabashi-shi, Chiba-ken; Keiichi Ishikawa, 786-46, Nase-cho, Totsuka-ku, Yokohama-shi, Kanagawa-ken, and Yasuo Emori, 1-328-16, Tenjin-cho, Kodaira-shi, Tokyo-to, all of Japan**

**Filed Jul. 8, 1986, Ser. No. 883,172**

**Claims priority, application Japan, Jul. 9, 1985, 60-151087; Jul. 9, 1985, 60-151088; Jul. 12, 1985, 60-153790; Jul. 15, 1985, 60-155858; Aug. 8, 1985, 60-174799; Aug. 8, 1985, 60-174800**

**Int. Cl.⁴ B05D** *3/06*

**U.S. Cl. 427—40** **2 Claims**

1. A method for the preparation of a printing screen used in screen printing which comprises the steps of:

(a) subjecting a mesh made of filaments of polyester or nylon to a treatment by exposure to low temperature plasma generated in an atmosphere of inorganic gas under a pressure in the range from 0.005 to 10 Torr;

(b) coating the plasma-treated mesh with a surface active agent; and

(c) coating the thus plasma-treated mesh with a photosensitive resin composition in the form of an aqueous emulsion.

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**4,741,921**

**METHOD FOR PREPARING COBALT-CONTAINING IRON OXIDE MAGNETIC PARTICLES**

**Susumu Kitaoka, Kyoto; Haruo Andoh, Takatsuki, and Junichi Hirata, Otokuni, all of Japan, assignors to Hitachi Maxell, Ltd., Osaka, Japan**

**Continuation of Ser. No. 739,765, Jun. 3, 1985, abandoned, which is a continuation of Ser. No. 650,993, Sep. 17, 1984, abandoned, which is a continuation of Ser. No. 427,531, Sep. 29, 1982, abandoned, which is a continuation of Ser. No. 898,127, Apr. 20, 1978, abandoned. This application Apr. 24, 1986, Ser. No. 858,575**

**Claims priority, application Japan, Apr. 20, 1977, 52-46045; Apr. 20, 1977, 52-46046; Apr. 20, 1977, 52-46047; Jun. 23, 1977, 52-74991; Jun. 23, 1977, 52-74993**

**Int. Cl.⁴ C01G** *49/06*

**U.S. Cl. 427—127** **6 Claims**

1. A method for preparing cobalt-containing iron oxide magnetic particles, which comprises the steps of:

reducing acicular gamma-$Fe_2O_3$ particles to effect acicular iron oxide particles having a ratio of $Fe^{2+}/Fe^{3+}$ of 0.10 to 0.30;

dispersing the resulting iron oxide particles from the step of reducing into an aqueous solution containing a cobalt salt and an alkali of at least one equivalent to the cobalt salt;

heating the resulting mixture from the step of dispersing under conditions wherein the divalent iron is substantially not oxidized, whereby cobalt is predominantly incorporated into the outermost layer of the acicular iron oxide particles in an amount of at least 0.2% by weight based on the weight of the total metal atoms contained in the particles;

filtering the thus obtained cobalt-containing particles from the step of heating out of the mixture; and

subjecting the obtained cobalt-containing iron oxide particles thus obtained from the step of filtering to oxidation treatment under an oxidizing atmosphere so as to lower the $Fe^{2+}/Fe^{3+}$ ratio from its previous un-oxidized state until the ratio of $Fe^{2+}/Fe^{3+}$ becomes about 0.075 to 0.125 thereby increasing the coercive force of the cobalt-containing iron oxide particles.

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**4,741,922**

**METHOD OF MANUFACTURING A MAGNETIC STORAGE MEDIA**

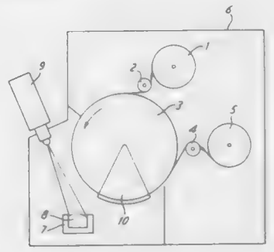
**James L. S. Wales, Caversham, and Robert A. Woolley, Uxbridge, both of England, assignors to EMI Limited, Hayes, England**

**Filed Jun. 23, 1986, Ser. No. 877,415**

**Claims priority, application United Kingdom, Jul. 1, 1985, 8516605**

**Int. Cl.⁴ H01F** *10/02*

**U.S. Cl. 427—130** **1 Claim**



1. A method of manufacturing a magnetic storage medium including the steps of coating a web of flexible plastics material with a thin film of a magnetic metal or alloy and laterally stretching the coated web such that the lateral stress applied to the metal film exceeds the tensile strength of the film and the

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lateral stress applied to the plastics web lies within the yield point of the plastics material, whereby curvature of the medium caused by stress in the film is reduced.

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**4,741,923**

## SURFACE TREATMENT FOR RECORDING MEDIA

**Terence Goulding, Garswood, Nr Wigan, England, assignor to Imperial Chemical Industries PLC, London, England**

**Filed Aug. 13, 1987, Ser. No. 84,853**

**Claims priority, application United Kingdom, Aug. 21, 1986, 8620337; Oct. 7, 1986, 8624022**

**Int. Cl.⁴ H01F** *10/02*

**U.S. Cl. 427—130** **10 Claims**

1. A method for enhancing abrasion resistance of a ferromagnetic recording medium characterised in that the recording medium comprises a layer of electroless plated ferromagnetic material susceptable to disintegration by hydrogen peroxide, and in that the layer is treated with hydrogen peroxide with the treatment terminated prior to the onset of noticeable disintegration of the recording layer.

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**4,741,924**

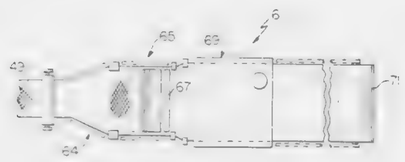
## METHOD OF MAKING A POLYMERIC COATED FABRIC LAYER

**Delmar D. Long, Rock Hill, S.C., and John F. Anderson, Jr., Springfield, Mo., assignors to Dayco Products, Inc., Dayton, Ohio**

**Continuation-in-part of Ser. No. 676,465, Nov. 29, 1984, abandoned, which is a continuation of Ser. No. 488,831, Apr. 26, 1983, abandoned. This application Jun. 16, 1986, Ser. No. 874,955**

**Int. Cl.⁴ B05D** *3/02, 3/12*

**U.S. Cl. 427—173** **6 Claims**




1. In a method of making a polymeric coated fabric layer that has a certain total weight of fabric and polymeric material, said method comprising the steps of providing a fabric layer having warps and fills initially woven at a certain angle relative to each other, disposing said fabric layer on a tenter means, then changing said certain angle with said tenter means to another angle whereby said fabric layer is in an altered condition thereof, and securing a polymeric means to said fabric layer to hold said fabric layer in said altered condition thereof, the step of securing said polymeric means comprising the steps of first coating said polymeric means in liquid form onto said fabric layer while said fabric layer is in said altered condition thereof and is on said tenter means and then drying said coating to at least a condition thereof that tends to hold said fabric layer in said altered condition thereof, the improvement wherein the step of providing said fabric layer comprises the step of forming said fabric layer to have a weave selected from the group of weaves consisting of twill weaves and satin weaves and to have the yarn thereof of substantially the same size and weight and material as a certain plain woven fabric layer that has substantially the same weight per square yard thereof as the selected fabric layer so that said selected fabric layer is substantially quality equivalent to said certain plain woven layer, wherein the step of changing said certain angle to another angle comprises the step of changing said certain angle of said fabric layer that has said twill weave or said satin weave to an angle that is greater than the angle that can be made by changing said certain angle of said substantially quality equivalent fabric layer that has a plain weave, and wherein the step of coating in combination with the step of changing said certain angle to another angle causes said polymeric coated fabric layer to have said certain total weight with the ratio of the weight of the fabric material to the weight of the polymeric material of said polymeric coated fabric layer means to be approximately 50 or less: 50 or greater whereas assuming quality equivalents and without a total weight change the ratio of the weight of the fabric material to the weight of the polymeric material is approximately 60:40 when said quality equivalent fabric layer that has a plain weave has said polymeric material coated thereon in substantially the same manner.

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**4,741,925**

## METHOD OF FORMING SILICON NITRIDE COATING

**Arun K. Chaudhuri, Stratham, N.H.; Vinod K. Sarin, Lexington, and Joseph M. Harris, Topsfield, both of Mass., assignors to GTE Products Corporation, Stamford, Conn.**

**Filed Sep. 14, 1987, Ser. No. 95,985**

**Int. Cl.⁴ B05D** *7/22*

**U.S. Cl. 427—231** **8 Claims**

1. The method of depositing a silicon nitride coating on the inside surface of a crucible comprising the steps of: disposing the crucible inside a reaction chamber; positioning a closed end tube axially within the crucible, the tube having a plurality of peripheral holes at the lower end thereof; introducing reactive gases into the tube and out through the peripheral holes to the inside surface of the crucible where the gases react to produce and deposit silicon nitride coating; rotating the crucible during deposition to obtain uniformity of coating; maintaining crucible temperature during deposition of at least about 1250° C. so that the coating deposited on the crucible surface is alpha crystalline silicon nitride.

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**4,741,926**

## SPIN-COATING PROCEDURE

**Lawrence K. White, W. Windsor Township, Mercer County, and Nancy A. Miszkowski, Lawrence Township, Mercer County, both of N.J., assignors to RCA Corporation, Princeton, N.J.**

**Filed Oct. 29, 1985, Ser. No. 792,535**

**Int. Cl.⁴ B05D** *3/12*

**U.S. Cl. 427—240** **6 Claims**

1. In a process of coating a substrate having nonuniform topographical features comprising dispensing a composition comprising a suitable resin and a solvent onto the substrate thus forming a coating and spinning the substrate to dry the coating, the improvement wherein the substrate is spun to dry the coating in two stages consisting of initially spinning at not less than about 4000 rpm until a detectable build-up of the coating material occurs on a side wall of a topographical feature facing the centrifugal center of the spinning substrate and thereafter spinning the substrate at less than about 4000 rpm for a period of time sufficient to dry the coating.

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**4,741,927**

## PRODUCTION OF CELLULOSE DIALYSIS MEMBRANE WITH IMPROVED BIOCOMPATIBILITY

**Michael Pelger, and Helmut Schulze, both of Wuppertal, Fed. Rep. of Germany, assignors to AKZO NV, Arnhem, Netherlands**

**Division of Ser. No. 713,888, Mar. 20, 1985, abandoned. This application May 16, 1986, Ser. No. 871,761**

**Claims priority, application Fed. Rep. of Germany, Mar. 20, 1984, 3410133; Oct. 20, 1984, 3438531**

**Int. Cl.⁴ B05D** *5/00*

**U.S. Cl. 427—245** **10 Claims**

1. A method for the production of a dialysis membrane, comprising treating a membrane of regenerated cellulose with a solution of an isocyanate prepolymer in an organic solvent which does not react with said prepolymer and does not dissolve cellulose, to chemically bind said prepolymer to at least one surface of said membrane, and removing the solvent from the membrane.

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**4,741,928**

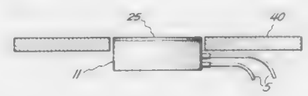
## METHOD FOR SELECTIVE DEPOSITION OF TUNGSTEN BY CHEMICAL VAPOR DEPOSITION ONTO METAL AND SEMICONDUCTOR SURFACES

**Ronald H. Wilson, Niskayuna; Robert W. Stoll, Schenectady, and Herbert R. Philipp, Scotia, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Continuation-in-part of Ser. No. 813,890, Dec. 27, 1985, abandoned. This application Apr. 10, 1987, Ser. No. 36,956**

**Int. Cl.⁴ C23C** *16/06, 16/08*

**U.S. Cl. 427—250** **6 Claims**




1. A method for effecting selective chemical vapor deposition of tungsten on metal and semiconductor surfaces of a substrate in a cold-wall reactor which comprises heating the depositing surface of the substrate to a temperature above about 200° C. by heat transfer to the non-depositing surface, contacting the depositing surface with gaseous reactants which react to form metallic tungsten and isolating the depositng surface from impinging infrared radiation and vaporized nucleating species by a barrier which filters or refelects infrared radiation maintained at a temperature below the temperature of the depositing surface.

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**4,741,929**

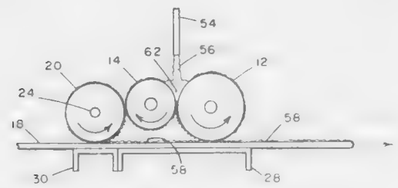
## ROLL-COATING METHOD AND APPARATUS

**Donald A. Kossuth, Buffalo, N.Y., assignor to National Gypsum Company, Dallas, Tex.**

**Filed Mar. 19, 1987, Ser. No. 27,699**

**Int. Cl.⁴ B05D** *5/02;* **B05C** *1/02*

**U.S. Cl. 427—258** **20 Claims**




1. The method of applying a coating to the face of a wide flat board comprising the steps of advancing a continuous supply of board under the applicator roll of a roll-coating apparatus, continuously depositing a thin layer of coating along the narrow edge areas of said face of said board and subsequently continuously depositing thin layer of coating throughout the entire face area of said continuously advancing board by transfer of coating material from said applicator roll.

11. A roll-coating apparatus consisting essentially of a frame supporting an applicator roll for applying coating over the entire area of product being coated thereunder, a closely spaced parallel doctor roll and a pair of narrow circular tires each rotatably mounted to ride on the two side edge areas of said product being coated thereunder, said tires also being mounted to substantially contact said doctor roll and to thus remove coating material from said doctor roll and transfer said coating material to said side edge areas of said product prior to said coating of said entire area of said product.

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**4,741,930**

## INK JET COLOR PRINTING METHOD

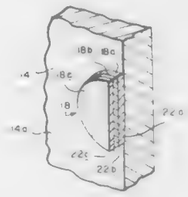
**Robert Howard, New York, N.Y.; Richard R. Helinski, Hudson, and Herbert E. Menhennett, Windham, both of N.H., assignors to Howtek, Inc., Hudson, N.H.**

**Division of Ser. No. 688,000, Dec. 31, 1984, abandoned. This application Oct. 20, 1986, Ser. No. 921,345**

**The portion of the term of this patent subsequent to May 19, 2004, has been disclaimed.**

**Int. Cl.⁴ B41M** *5/00;* **B05D** *1/36*

**U.S. Cl. 427—265** **8 Claims**




1. A method of color printing on a printing medium comprising the steps of

A. applying a first color phase-change ink as a liquid onto an area of said medium so that the first ink forms a first, thin, solid, semi-transparent, well-defined, optically clear ink layer that adheringly covers without appreciably penetrating or distorting said medium area; and

B. applying a second color phase-change ink as a liquid onto the exposed surface of said first ink layer in superposition therewith so that the second ink forms a second, thin, solid, semi-transparent, well-defined, optically clear ink layer that adheringly covers said first ink layer whereby the ink layers transmit ambient light substantially specularly and produce subtractive color printing on said medium area characterized by high color density and brightness.

5. Color printed material comprising

A. a printing medium;

B. a first thin layer of a phase change primary subtractive color printing ink of a first color adhered to a surface area of the medium, said first layer having a well defined boundary substantially at the medium surface;

C. one or more additional thin layers of a phase change printing ink, each additional layer having a different primary subtractive color different from said first color superimposed on the first ink layer, each said additional layer having a well defined boundary with any adjacent layer and each of said layers being optically clear and non-turbid so that specular reflection of ambient light occurs in each layer whereby the observed color of the print on said surface area is a vivid subtractive mixture of the colors of all of said ink layers.

6. Color printed material comprising

A. a printing medium;

B. a first thin layer of a phase change primary subtractive color printing ink of a first color adhered to a surface area of the medium, said first layer having a well defined boundary substantially at the medium surface, said phase change ink comprising

1. a thermoplastic base material which can exist in solid and liquid phases and which is optically clear in both phases; and

2. a first primary subtractive color dye which is soluble in the base material in both material phases and does not appreciably affect the viscosity of the base material, said ink composition having a viscosity when the base material is in the liquid phase of from one to fifty centipoise and an optical density of from one to three and being semitransparent when solid; and

C. one or more additional thin layers of a similar phase

change printing ink, superimposed on the first ink layer, each additional layer having a primary subtractive dye color different from said first color, each said additional layer also having a well defined boundary with any adjacent layer and all of said layers being optically clear and non-turbid so that specular reflection of ambient light occurs in each layer whereby the observed color of the print on said medium surface area is a vivid subtractive mixture of the colors of all of said ink layers.

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**4,741,931**

## TITANATE/ORGANOSILANE COMPOSITIONS

**Chia-Cheng Lin, Gibsonia, and Thomas G. Rukavina, Lower Burrell, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.**

**Division of Ser. No. 812,666, Dec. 23, 1985. This application Sep. 22, 1986, Ser. No. 910,050**

**Int. Cl.⁴ B32B *9/00***

**U.S. Cl. 427—387** **12 Claims**

1. A method of making a primer for use in adhering coatings to polymeric substrates comprising the steps of:

a. mixing alkoxyorganosilane compound and a titanium alkoxide capable of reacting with said alkoxyorganosilane together in a solvent to form a solution;

b. applying said solution to a substrate surface; and

c. evaporating the solvent to form on the substrate surface a film comprising a titanate/organosilane copolymer consisting essentially of the reaction product of said alkoxyorganosilane and titanium alkoxide, wherein the organic moiety of said alkoxyorganosilane promotes adhesion to said substrate surface.

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**4,741,932**

## COATING COMPOSITION AND METHOD FOR FORMING A MULTI-LAYERED COATING

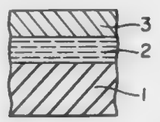
**Kiyoshi Ichimura, Abiko; Koichiro Kido, Nagoya; Kazuhiko Hotta, Nagoya, and Shogo Yamamoto, Nagoya, all of Japan, assignors to Mitsubishi Rayon Company Limited, Tokyo, Japan**

**Continuation of Ser. No. 833,250, Feb. 27, 1986, abandoned. This application Jun. 30, 1987, Ser. No. 68,808**

**Claims priority, application Japan, Mar. 8, 1985, 60-45894; Apr. 30, 1985, 60-93082**

**Int. Cl.⁴ B05D *3/02***

**U.S. Cl. 427—407.1** **14 Claims**




1. A method for forming a multi-layered coating comprising at least two layers, which comprises:

applying a coating composition onto a substrate, followed by drying to form a coating layer I, then forming a top coating layer on the entire surface, or over a part of the coating layer I, without sanding of the applied coating composition, said coating composition comprising an acrylic copolymer prepared from a monomer mixture consisting essentially of:

(1) from 1 to 50% by weight of 1,4-butanediol mono(meth)acrylate,

(2) from 0.2 to 10% by weight of an $\alpha,\beta$-monoethylenically unsaturated carboxylic acid, and

(3) from 40 to 98.8% by weight of other copolymerizable monomers selected from the group consisting of (meth)acrylates, styrene derivatives, polymerizable unsaturated nitriles, vinyl esters, hydroxyalkyl(meth)acrylates, esterification reaction products of monoepoxy compounds with (meth)acrylic acid, fumaric acid or maleic acid, hydroxyl group-containing monomers, N-alkoxy-substituted amides, epoxy group-containing monomers, and basic monomers,

provided that the total of the 1,4-butanediol mono(meth)acrylate and hydroxyl group-containing monomers in the copolymerizable monomers, is not more than 50% by weight of the monomer mixture.

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**4,741,933**

## PREPARATION OF FROZEN FOOD PRODUCT

**Inger C. Larsson, Helsingborg, and Anna M. Linse-Loefgren, Klippan, both of Sweden, assignors to Nestec S. A., Vevey, Switzerland**

**Filed Dec. 11, 1985, Ser. No. 807,548**

**Claims priority, application European Pat. Off., Jan. 21, 1985, 85100597.5**

**Int. Cl.⁴ A23L *1/176, 1/10;* A21D *10/04***

**U.S. Cl. 426—291** **15 Claims**

1. A process which comprises:

preparing a Tempura batter containing a heat-treated wheat flour which does not form any substantial gluten network;

coating a flour coated food piece with the batter; and

prefrying the batter coated food piece.

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**4,741,934**

## STEEL SHEET FOR MAKING CANS, CANS AND A METHOD MAKING CANS

**Kazukiyo Terayama; Yashichi Oyagi, and Yukio Tsukamoto, all of Kitakyushu, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan**

**Filed Apr. 7, 1986, Ser. No. 848,581**

**Claims priority, application Japan, Apr. 19, 1985, 60-82283; Jun. 12, 1985, 60-126208; Feb. 13, 1986, 61-27885**

**Int. Cl.⁴ B65D *25/14;* A21D *51/26***

**U.S. Cl. 428—35** **8 Claims**

1. A drawn and ironed can comprising a wall formed from a thin sheet of steel and having an inner surface carrying a layer of a thermoplastic resin thereon, a foil on said thermoplastic resin layer, and a layer of a thermosetting resin on said foil, said foil being of a material selected from aluminum and an aluminum alloy; wherein the thermoplastic resin layer covers the entire inner surface of the steel sheet, the foil covers the entire thermoplastic resin layer and the thermosetting resin layer covers the entire foil.

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**4,741,935**

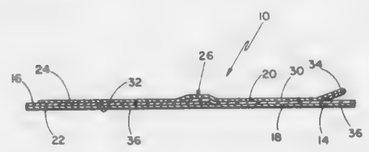
## ADHESIVE TAPE CLOSURE

**Richard L. Sheehan, Jr., Stillwater, Minn., assignor to Minnesota Mining & Manufacturing Company, St. Paul, Minn.**

**Filed Apr. 23, 1987, Ser. No. 41,867**

**Int. Cl.⁴ A61F *13/02***

**U.S. Cl. 428—35** **12 Claims**




1. An adhesive tape closure for releasably interconnecting a first container part to a second container part, comprising:

(a) a first lower tape strip having an adhesive film coated on one side for mounting on the first container part;

(b) a second lower tape strip having an adhesive film coated on one side for mounting on the second container part, with a portion of said first lower tape strip overlapping a portion of said second lower tape strip so as to adhesively secure said second lower tape strip to said first lower tape strip at said overlapped portion while enabling said first and second lower tape strips to be manually separated; and

(c) an upper tape strip coated on one side with a pressure-sensitive adhesive releasably securing said upper tape strip to said first and said second lower tape strips opposite said adhesive films and coextensive with said overlapped portion for securely interconnecting the container parts through said first and said second lower tape strips when said first and said second lower tape strips are mounted thereon, wherein said upper tape strip may be removed from said first and said second lower tape strips, thereby enabling said first and said second lower tape strips to be manually separated from each other and the container parts to be disconnected.



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**4,741,936**

## LAMINATE PREFORM FOR A MULTI-LAYER POLYESTER BOTTLE

**Shigezo Nohara; Takeshi Sugimoto, both of Yokohama; Kozaburo Sakano, Kawasaki; Yoshimichi Ohkubo, Fujisawa, and Junichi Matsuo, Yokohama, all of Japan, assignors to Toyo Seikan Kaisha, Ltd., Tokyo, Japan**

**Division of Ser. No. 686,507, Dec. 26, 1984, Pat. No. 4,649,004. This application Dec. 2, 1986, Ser. No. 937,177**

**Claims priority, application Japan, Dec. 27, 1983, 58-244647; Jan. 12, 1984, 59-2707**

**Int. Cl.⁴ B65D *23/00***

**U.S. Cl. 428—35** **8 Claims**




1. A multi-layer polyester bottle formed of a laminate comprising (i) inner and outer layers of a polyester composed mainly of ethylene terephthalate units, (ii) an intermediate layer of an oxygen-barrier resin and (iii) an adhesive resin layer interposed between every two adjacent layers, said bottle being obtaining by (I) co-extruding said resin into a pipe comprising said laminate, said pipe having the thickness ratio of the inner polyester layer to the outer polyester layer of from 1/1.1 to 1/5, (II) solidifying the extruded pipe by cooling, (III) cutting the solidified pipe into a predetermined size, (IV) forming a closed bottom on one end of the cut pipe, (V) heating the obtained preform at a drawing temperature and (VI) biaxially stretch-blow-forming the heated preform into the bottle.

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**4,741,937**

## FIRE RESISTANT TRASH CONTAINERS AND METHOD

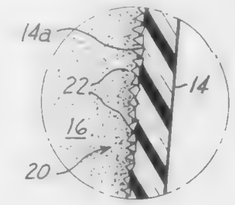
**Bruce H. Parker, 25543 Avenida Frasca, Valencia, Calif. 91355**

**Continuation of Ser. No. 794,075, Nov. 1, 1985, abandoned. This application Apr. 17, 1987, Ser. No. 40,184**

**Int. Cl.⁴ B65D *90/02***

**U.S. Cl. 428—35** **10 Claims**

1. Fire resistant trash container having a generally planar bottom wall, an axially elongated side wall defining a closed figure with the bottom wall, and a closable opening at the upper end of the side wall, said container walls being formed of synthetic organic plastic having a tendency to burn under persistant exposure to direct flame, and means increasing the fire resistance of said walls to such exposure, said means comprising a substantially continuous extend of finely divided,




incombustible particulate embedded ballistically in the wall surfaces to be protected while such surfaces are heated to softness during formation of said container.

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**4,741,938**

## WEB-SHAPED OR TUBULAR PACKAGING FILM, IN PARTICULAR A SAUSAGE CASING, WITH A BARRIER LAYER

**Erna Kastl, Niedernhausen; Ludwig Klenk, Oestrich-Winkel III; Karl Stenger, Ruedesheim, and Horst Faust, Wiesbaden, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Oct. 29, 1986, Ser. No. 924,416**

**Claims priority, application Fed. Rep. of Germany, Oct. 31, 1985, 3538702**

**Int. Cl.⁴ F16L *11/00;* B05D *3/02;* A22C *13/00***

**U.S. Cl. 428—36** **19 Claims**

1. A web-shaped or tubular film for use in food packaging applications, particularly as a sausage casing, comprising a carrier layer comprised of fiber-reinforced cellulose, and on one surface of the carrier layer a resin coating comprised of at least first and second layers comprised of vinylidene chloride copolymers, said first layer of said resin coating being adjacent to the carrier layer and comprising a predominantly amorphous vinylidene chloride copolymer, and said second layer of said resin coating comprising a predominantly crystalline vinylidene chloride copolymer.

15. A process for producing a web-shaped or tubular film for use in food packaging applications, particularly as a sausage casing, comprising the following steps:

(a) coating a fiber web or tube with viscose;

(b) coagulating said viscose;

(c) regenerating said coagulated viscose to form cellulose hydrate gel;

(d) washing said web or tube of cellulose hydrate gel;

(e) pre-drying said web or tube of cellulose hydrate gel to a water content of about 130 to 225% by weight, relative to the total weight of said cellulose hydrate gel, to form a cellulose hydrate gel film;

(f) applying a first layer of a first aqueous vinylidene chloride copolymer dispersion to one side of said film which forms a predominantly amorphous film on drying;

(g) applying a second layer of a second different aqueous vinylidene chloride copolymer dispersion onto said first layer which forms a predominantly crystalline film on drying; and

(h) drying said web or tube of cellulose hydrate gel to form a web-shaped or tubular packaging film of fiber-reinforced regenerated cellulose with a water content of less than about 15% by weight; relative to the total weight of said film, said drying being carried out by heating sufficient to form an impermeable polymer coating of said vinylidene chloride copolymers.

**4,741,939**

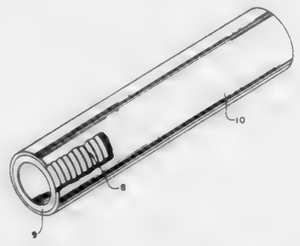
## COMPATIBLE SELF-CROSSLINKING POLY (AMIDE-IMIDE) POLYEPOXIDE RESIN BLENDS AND LAMINATES MADE THEREWITH

**Joseph R. Marchetti, Hempfield Township, Westmoreland County, and Zal N. Sanjana, Penn Hills, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Division of Ser. No. 790,563, Oct. 23, 1985, Pat. No. 4,675,350, which is a continuation-in-part of Ser. No. 670,791, Nov. 13, 1984, abandoned. This application Apr. 6, 1987, Ser. No. 34,455**

**Int. Cl.[4] B32B** *27/00, 27/06*

**U.S. Cl. 428—36** **34 Claims**



**1**. A laminate comprising a plurality of layers of a substrate imbedded within a cured resinous matrix, said resinous matrix comprising, in an uncured state:

(A) about 5 to about 95 phr of a polyepoxide;

(B) about 20 to about 90% aprotic solvent;

(C) about 5 to about 95 phr of a polyimide having sufficient amic acid functionality to be soluble in said solvent, where about 5 to about 50% of the total of amic acid plus imide groups on said polyimide are amic acid groups, and about 50 to about 95% are imide groups; and

(d) sufficient water to hydrolyze substantially all of said amic acid functionality of said polymer.

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**4,741,940**

## ARTICLES AND METHODS FOR PROTECTING SUBSTRATES

**James P. Reed, Redwood City, Calif., assignor to Raychem Corporation, Menlo Park, Calif.**

**Filed May 19, 1986, Ser. No. 864,689**

**Int. Cl.[4] B32B** *1/04, 3/02;* **H01B** *13/00;* **H02G** *13/02*

**U.S. Cl. 428—68** **27 Claims**

**8**. An assembly comprising:

a substrate;

a layer of gel material in contact with the surface of the substrate comprising a material having a cone pentration of about 100 to about 350 ($10^{-1}$ mm) and an ultimate elongation of at least about 100%; and

a layer of protective material over the layer of gel material which is flexible at the time of installation on the substrate and hardens after installation on the substrate to provide mechanical protection for the layer of gel material positioned between the substrate and the layer of protective material.

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**4,741,941**

## NONWOVEN WEB WITH PROJECTIONS

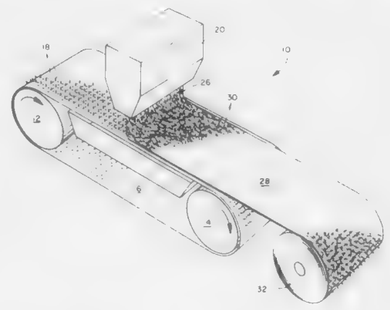
**Stephen M. Englebert, Woodstock, Ga.; Ann L. Wagner, Hortonville, Wis.; Gregory S. Hafer, Atlanta, Ga., and Nanette J. Logsdon, Appleton, Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.**

**Filed Nov. 4, 1985, Ser. No. 794,915**

**Int. Cl.[4] A61F** *13/16;* **B32B** *3/10;* **D04H** *1/74, 5/08*

**U.S. Cl. 428—71** **71 Claims**

**1**. Nonwoven fabric comprised of overlapping thermoplastic fibers or filaments defining an array of hollow projections extending out of said fabric and separated by planar land areas in a plane taken along a line parallel to said fabric ignoring the projections and said fabric characterized by at least a 5 degree



higher average degree of fiber or filament alignment in the projections than in the land areas.

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**4,741,942**

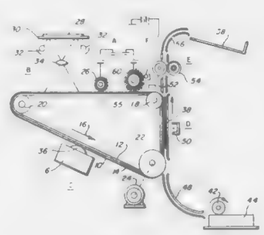
## ELECTROSTATIC CHARGING AND CLEANING BRUSHES

**Joseph A. Swift, Ontario, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Division of Ser. No. 804,563, Dec. 4, 1985, Pat. No. 4,706,320. This application Dec. 5, 1986, Ser. No. 938,500**

**Int. Cl.[4] B32B** *3/00*

**U.S. Cl. 428—82** **6 Claims**



**1**. A cut plush pile woven fabric strip comprising a fabric backing with a woven plush pile, the backing forming a small flange on each side of the pile and wherein the fiber fill density at the outermost pile ends at the strip edges is at least double the fiber fill density in the center portion of the fabric strip.

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**4,741,943**

## AERODYNAMIC STRUCTURES OF COMPOSITE CONSTRUCTION

**James Hunt, King County, Wash., assignor to The Boeing Company, Seattle, Wash.**

**Filed Dec. 30, 1985, Ser. No. 814,383**

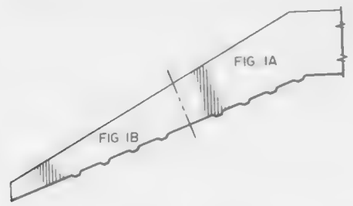
**Int. Cl.[4] B32B** *5/12, 31/00;* **B64C** *1/00;* **B65C** *3/26*

**U.S. Cl. 428—113** **18 Claims**

**1**. An aerodynamic structure of composite construction having a center section and an outboard section joined at an angle to said center section, said aerodynamic structure including: (a) a framework which has longitudinally extending spars at the leading and trailing edges thereof and ribs of airfoil section extending between, oriented transversely relative to, and supported by said spars; and (b) a skin composed of a quasi-isotropic layout of superimposed, bonded together, flat, anisotropic plies of a filament reinforced polymeric composite surrounding and supported by said framework.



**5**. An aerodynamic structure of composite construction having a center section and an outboard section joined at an angle to said center section, said aerodynamic structure including: a framework and a skin composed of bonded together plies of a filament reinforced polymeric composite surrounding and supported by said framework, said skin having four superimposed groups of plies, said plies all having unidirectional filaments and said plies being oriented from top-to-bottom of said skin with said unidirectional fibers extending at the following angles with respect to the zero axis of the structure:




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**4,741,944**

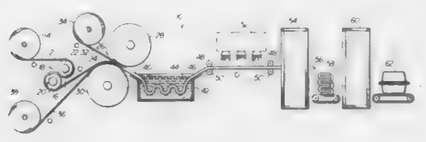
## WET WIPE AND WIPE DISPENSING ARRANGEMENT

**David M. Jackson, Roswell, Ga., and William H. Vogler, Neenah, Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.**

**Filed Jul. 30, 1986, Ser. No. 891,716**

**Int. Cl.[4] D06N** *7/04*

**U.S. Cl. 428—152** **15 Claims**



**1**. A wet wipe which is elastic in at least one direction, said wet wipe comprising:

an elastic sheet;

at least one non-elastic non-woven web joined to said elastic sheet at least at two areas, said non-elastic web being gathered between said two areas; and

a liquid distributed within at least one of said sheet and said web.

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**4,741,945**

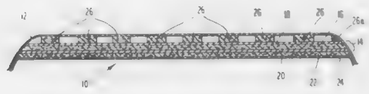
## AUTOMOTIVE TRIM PANEL

**Angela L. Brant, West Chester, Pa., and Ahid D. Nashif, Cincinnati, Ohio, assignors to Arco Chemical Company, Newtown Square, Pa.**

**Filed Jul. 30, 1986, Ser. No. 892,164**

**Int. Cl.[4] B32B** *3/24, 3/26;* **B60R** *13/02*

**U.S. Cl. 428—158** **23 Claims**



**1**. A laminar, automotive trim panel having improved acoustical performance, said panel comprising a semi-flexible support layer enabling snap-in mounting of the panel on an automobile frame, an open-celled, flexible, sound-absorbing foam layer bonded to one face of the support layer, and a dead, vibration damping, foam material in contact with the opposing face of the support layer, wherein the dead foam material is capable of non-adhesive affixing to the metal of an automobile frame and has a substantially lower resilience value and a substantially higher recovery rate than the open-celled foam layer, said improved acoustical performance including reduction of sound produced by structural vibrations of the panel.

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**4,741,946**

## SCUFF AND ABRASION-RESISTANT LAMINATES

**Israel S. Ungar, Randallstown; Robin D. O'Dell, Pasadena, and Sheridan Neimark, Silver Spring, all of Md., assignors to Nevamar Corporation, Odenton, Md.**

**Filed Oct. 7, 1986, Ser. No. 916,412**

**Int. Cl.[4] B32B** *5/16*

**U.S. Cl. 428—207** **12 Claims**

**1**. An abrasion resistant, scuff resistant and sliding can wear resistant decorative laminate comprising a core and a resin impregnated cured surface paper, said surface paper comprising

(a) a paper base layer; and

(b) a top layer integral with said base layer and comprising from about 2–100% by weight of abrasion-resisting mineral particles having a hardness of from 7–10 on the Moh Scale and an average particle size ranging from 10–75 microns, and solid lubricant from particles having a particle size of about 1–30 microns and a melting point of melting point about 150°–285° F., and present at the surface in a amount of about 0.175–0.5 pounds per ream, with the proviso that said solid lubricant is not an oxidized wax or a silicone resin.

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**4,741,947**

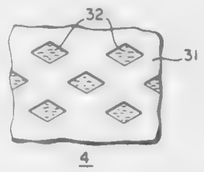
## WATER-BASED EPOXY PATTERNED POROUS INSULATION

**William S. Pataki, Schellsburg, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Apr. 24, 1986, Ser. No. 855,250**

**Int. Cl.[4] B32B** *3/00*

**U.S. Cl. 428—211** **5 Claims**




**1**. A flexible, B-staged, porous insulation comprising a porous sheet material, having coated thereon discrete pattern areas of adhesive resin, covering from about 10 percent to about 90 percent of the area of at least one side of the sheet, said adhesive resin comprising a first epoxy resin, having an epoxy equivalent weight range of from about 5,000 to about 10,000; and a second epoxy resin, having an epoxy equivalent weight range of from about 125 to about 1,500, where the weight ratio of first epoxy resin: second epoxy resin is from about 0.15 to 0.65:1, the thickness of the resin pattern is from about 0.0002 inch to about 0.00125 inch, and the resin does not saturate under the adhesive pattern areas any more than about 0.0002 inch.

### 4,741,948
### COMPOSITE RELEASE SHEET MATERIAL

Toshiharu Konishi; Hadekazu Takashashi; Yoshitsugu Hasegawa; Kazunori Yamamoto; Kenji Sano, and Hideyuki Okada, all of Osaka, Japan, assignors to Nitto Electric Industrial Co., Ltd., Osaka, Japan

Filed Mar. 28, 1986, Ser. No. 845,299
Claims priority, application Japan, May 23, 1985, 60-76821[U]
Int. Cl.[4] B32B *7/02*
U.S. Cl. 428—215 17 Claims



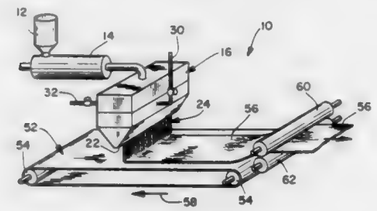

1. A composite release sheet material comprising a low-adhesive polyolefin resin thin layer having a thickness of at least 5 μm and a polyester film layer having a greater tensile strength than said thin layer.

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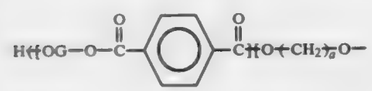
### 4,741,949
### ELASTIC POLYETHERESTER NONWOVEN WEB

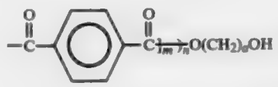
Michael T. Morman, Alpharetta, Ga., and Tony J. Wisneski, Kimberly, Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Filed Oct. 15, 1986, Ser. No. 919,282
The portion of the term of this patent subsequent to Nov. 17, 2004, has been disclaimed.
Int. Cl.[4] D03D *3/00*
U.S. Cl. 428—224 38 Claims




1. Elastic meltblown microfibers comprising:
a polyetherester material having the general formula of:





where:
"G" is selected from the group consisting of: poly(oxyethylene)-alpha,omega-diol poly(oxypropylene)-alpha,omega-diol poly(oxytetramethylene)-alpha,omega-diol and
"a", "m" and "n" are positive integers.

### 4,741,950
### DIFFERENTIAL OPAQUE POLYMER FILM

Leland L. Liu, Macedon, and Victor Platta, Mendon, both of N.Y., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Oct. 22, 1986, Ser. No. 921,579
Int. Cl.[4] B32B *3/26*
U.S. Cl. 428—315.5 10 Claims

1. A differential oriented polymer film comprising:
(a) a core layer containing numerous microscopic voids which impart an opaque, lustrous appearance to an exposed surface of a second skin layer of the film;
(b) a first skin layer of enhanced wettability on its exposed surface adhering to one surface of the core layer, said skin layer containing an anti-blocking effective amount of anti-blocking agent to render said layer substantially non-blocking; and,
(c) a second skin layer of enhanced wettability on its exposed surface adhering to the other surface of the core layer, said exposed surface being metallized and said skin layer being substantially devoid of anti-blocking agent or any other component the presence of which would otherwise significantly attenuate the smooth and/or lustrous appearance of its exposed surface.

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### 4,741,951
### METHOD FOR FORMING THERMOFORMABLE POLYURETHANE FOAM ARTICLES

Michael A. Ricciardi, Statesville, and Gregory W. Howard, Charlotte, both of N.C., assignors to Reeves Bros., Inc., Spartanburg, S.C.

Filed Jan. 29, 1987, Ser. No. 8,437
Int. Cl.[4] B32B *3/26, 31/04, 31/20;* C08G *18/14*
U.S. Cl. 428—316.6 33 Claims

29. A heat molded polyurethane article comprising thermoformed polyurethane foam formed from the reaction of water, an organic isocyanate compound, and a polymer dispersion formed by polymerization of:
(a) a monomer mixture of acrylonitrile or methacrylonitrile in an amount of between 60 and 80 weight percent styrene or vinyl toluene in an amount of between 40 and 20 weight percent; and
(b) a polyol comprising a propylene oxide adduct of propylene glycol; the amount of polyol representing about 45 to 55 weight percent of the dispersion and the monomer mixture representing 55 to 45 weight percent of the dispersion.

31. The article of claim 29 further comprising one or more reinforcing, backing or decorative layers.

32. The article of claim 31 wherein the layer is incorporated into the article between two sheets of foam prior to thermoforming.

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### 4,741,952
### MAGNETIC RECORDING MEDIUM

Shigeo Aoyama, Kyoto; Yoshinori Yamamoto, Takatsuki, and Kenji Sumiya, Suita, all of Japan, assignors to Hitachi Maxell, Ltd., Osaka, Japan

Filed Mar. 19, 1986, Ser. No. 840,581
Claims priority, application Japan, Mar. 20, 1985, 60-56440
Int. Cl.[4] G11B *5/70, 5/708*
U.S. Cl. 428—323 8 Claims

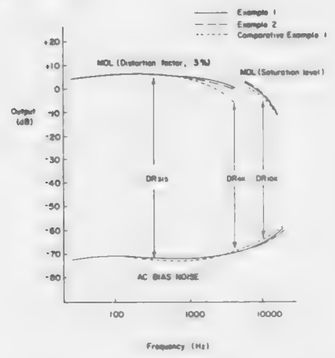
1. A magnetic recording medium comprising a substrate material and a magnetic layer provided on said substrate material, said magnetic layer containing magnetic particles and a resinous binder, characterized in that the magnetic layer further comprises, per 100 parts by weight of the magnetic particles, from about 0.1 to 25 parts by weight of non-magnetic particles of complex oxides or oxide solid solutions of a $Al_2O_3.SiO_2$ system.



### 4,741,953
### MAGNETIC RECORDING MEDIUM

Yoshiharu Katsuta, Takatsuki, and Haruo Ando, Suita, both of Japan, assignors to Hitachi Maxell, Ltd., Osaka, Japan

Filed Mar. 20, 1986, Ser. No. 841,785
Claims priority, application Japan, Mar. 20, 1985, 60-56438
Int. Cl.[4] G11B *7/16*
U.S. Cl. 428—323 11 Claims




1. A magnetic recording medium which comprises a substrate material and a magnetic layer provided on at least one of the surfaces of said substrate material, said magnetic layer comprising a two layered structure including an upper layer and a lower layer of magnetic particles and a resinous binder, said magnetic layer satisfying the following requirements:

$$H_1 > H_2 \quad (1)$$

$$r_1 < r_2 \quad (2)$$

wherein $H_1$ is the coercive force of the upper layer, $H_2$ is the coercive force of the lower layer, $r_1$ is the average size of the long axis of the magnetic particles in the upper layer and $r_2$ is the average size of the long axis of the magnetic particles in the lower layer, and wherein only the lower layer comprises magnetic particles having a particle void content of not more than an average of 5% by volume, said magnetic particles comprising iron oxide.

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### 4,741,954
### MAGNETIC RECORDING MEDIUM

Toshiaki Ide; Tohru Shimozawa, both of Saku, and Masaharu Nishimatsu, Komoro, all of Japan, assignors to TDX Corporation, Tokyo, Japan

Filed Jun. 19, 1985, Ser. No. 746,317
Claims priority, application Japan, Jul. 24, 1984, 59-152073
The portion of the term of this patent subsequent to Oct. 21, 2003, has been disclaimed.
Int. Cl.[4] G11B *5/64, 5/70*
U.S. Cl. 428—323 15 Claims

1. A magnetic recording medium, comprising:
(A) a non-magnetic substrate,
(B) a magnetic recording layer formed on one side of the substrate, and
(C) a back coating layer formed on the other side of the substrate, said back coating layer containing an inorganic pigment having a Mohs hardness of at least 5 and carbon black, with the amount of the inorganic pigment being at most 1/9 by weight relative to the carbon black.

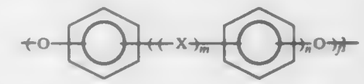
### 4,741,955
### PLASTIC OVENWARE HAVING NON-TACKINESS

Teruo Saito, Kusatsu; Kuniaki Asai, Tondabayashi, and Tadayasu Kobayashi, Ibaraki, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Feb. 24, 1986, Ser. No. 832,330
Claims priority, application Japan, Mar. 1, 1985, 60-41635
Int. Cl.[4] B32B *5/16, 27/08*
U.S. Cl. 428—325 10 Claims

1. A plastic ovenware having non-tackiness, comprising a substrate made from a wholly aromatic polyester having a recurring unit represented by the general formula:





wherein X is an alkyl group having 1 to 4 carbon atoms, —O—, —$SO_2$—, —S— or —CO—; m and n are each 0 or 1; the ratio of d:e is 1:1 to 10:1; the ratio of e:f is 9:10 to 10:9; and the two substituent groups of each aromatic ring are in para or meta positions or from a composition composed of said wholly aromatic polyester and an inorganic filler material, and a surface coating comprising a fluoroplastic type coating material.

2. A plastic ovenware according to claim 1, wherein the inorganic filler material is a glass fiber, glass beads, wollastonite, a potassium titanate fiber, a silica powder, talc, mica, clay, titanium oxide, calcium carbonate, magnesium carbonate, or aluminum hydroxide.

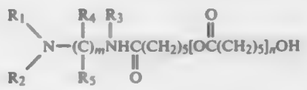
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### 4,741,956
### BIODEGRADABLE COATINGS OF IONOMER POLYMER

Warren A. Thaler, Flemington; Pacifico V. Manalastas, Edison; Evelyn N. Drake, Lebanon, and Robert D. Lundberg, Bridgewater, all of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Filed Jul. 9, 1986, Ser. No. 883,533
Int. Cl.[4] B32B *27/32;* B05D *7/00*
U.S. Cl. 428—334 10 Claims

1. A biodegradable polymeric composite comprising a (a) urea; (b) a coating of about 2 to about 100 microns of a sulfonated polymer on the surface of said urea, said sulfonated polymer having about 10 to about 200 meq. of sulfonate groups per 100 grams of said sulfonated polymer, said sulfonate groups being neutralized with a polycaprolactone polymer having the formula:



wherein $R_1$ or $R_2$ is an alkyl, cycloalkyl or aryl group; $R_3$, $R_4$ and $R_5$ are a hydrogen or alkyl, cycloalkyl, or aryl groups; m equals 1 to 20 and n equals 1 to 500.

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**4,741,957**

## HEAT SEALABLE MULTILAYER FILM AND METHOD OF MAKING SAME

**Hee C. Park, Pittsford, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.**

**Filed Sep. 2, 1986, Ser. No. 902,555**
**Int. Cl.[4] B32B** *27/00*
**U.S. Cl. 428—349** **7 Claims**

1. An improved oriented broad heat sealable three-layer coextruded structure comprising:

(a) a heat sealable layer consisting essentially of a low temperature melting resin having a low softening point, high seal and hot tack strength on at least one surface;

(b) a substrate comprising a polyolefin and

(c) a surface active layer on at least one surface of (b) selected from high temperature stable polymers and wherein (a) has a thickness varying from about 3 to about 20 wt.% of the layered film structure, (b) has a thickness of from about 60 to about 90 percent of the total layered film structure and (c) has a thickness varying from about 7 to about 20 wt.% of the layered film structure.

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**4,741,958**

## ULTRAVIOLET CURABLE OUTER COATINGS FOR OPTICAL FIBER

**Timothy E. Bishop, Algonquin, Ill., assignor to DeSoto, Inc., Des Plaines, Ill.**

**Filed Oct. 29, 1985, Ser. No. 792,464**
**Int. Cl.[4] B32B** *27/00*; **D02G** *3/00*
**U.S. Cl. 428—394** **6 Claims**

1. An organic buffer-coated and topcoated optical glass fiber in which the topcoat is an ultraviolet-cured coating composition which, when formed into a 3 mil cured test film, has a tensile strength of at least about 2500 psi, a tensile modulus measured at room temperature of at least 50,000 psi. and an elongation at least about 25%, said composition consisting essentially of, based on total reactive components, from about 60% up to about 85% of a diepoxide polyacrylate combined with at least about 15% up to 40% of a monoacrylate-functional monomer having a glass transition temperature below 0° C. to provide desired coating viscosity, said diepoxide being a diglycidyl ether of a bisphenol having a molecular weight in the range of about 560 to about 2000 and at least 1.8 oxirane groups per molecule, substantially all of said oxirane groups being consumed in said polyacrylate.

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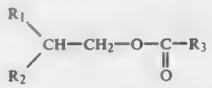
**4,741,959**

## MAGNETIC RECORDING MEDIUM

**Chiaki Abe, Ichikai; Hiroyuki Kanai; Akira Ishikawa, both of Utsunomia; Shigetoshi Suzue, Wakayama; Takashi Takeuchi, Utsunomia, and Takahide Minami, Ichikai, all of Japan, assignors to Kao Corporation, Tokyo, Japan**

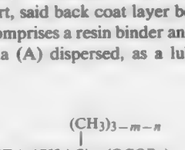
**Filed Oct. 31, 1986, Ser. No. 925,420**
**Claims priority, application Japan, Nov. 1, 1985, 60-245591; Nov. 27, 1985, 60-266875; Nov. 27, 1985, 60-266876; Jan. 14, 1986, 61-6104; Jan. 14, 1986, 61-6105**
**The portion of the term of this patent subsequent to Jun. 23, 2004, has been disclaimed.**
**Int. Cl.[4] G11B** *5/71*
**U.S. Cl. 428—403** **10 Claims**

1. A magnetic recording medium which comprises a support and a magnetic layer coated on said support, said magnetic layer comprising 100 parts magnetic powder, 15 to 60 parts of a binder, (I) an ester compound having the formula:



(I)

in which R1 and R2 are each a saturated alkyl group having 1 to 25 carbon atoms, branched or straight, the total carbon number of R1 and R2 being from 22 to 34, and R3 is a saturated or unsaturated alkyl group having 7 to 29 carbon atoms, branched or straight, and (II) an ester compound having the formula:



(II)

in which R4 is an aliphatic hydrocarbon group having from 1 to 29 carbon atoms, straight or branched, and R5 is an aliphatic hydrocarbon group having from 1 to 23 carbon atoms, straight or branched, or a straight aliphatic hydrocarbon group having from 24 to 36 carbon atoms, the total carbon number of R4 and R5 being 15 to 65.

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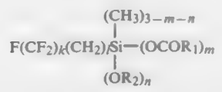
**4,741,960**

## MAGNETIC RECORDING MEDIUM HAVING A BACK COAT LAYER CONTAINING A SPECIFIC TYPE OF LUBRICANT

**Hitoshi Takita; Nobuo Ishikawa, and Shigeru Nakano, all of Mito, Japan, assignors to Victor Company of Japan, Ltd., Japan**

**Filed Feb. 2, 1987, Ser. No. 10,957**
**Claims priority, application Japan, Feb. 5, 1986, 61-22165**
**Int. Cl.[4] G11B** *5/70*
**U.S. Cl. 428—336** **6 Claims**

1. A magnetic recording medium which comprises a non-magnetic support, a magnetic recording layer formed on one side of the support, and a back coat layer formed on the other side of the support, said back coat layer being made of a composition which comprises a resin binder and a compound of the following formula (A) dispersed, as a lubricant, in the resin binder.



(A)

in which $R_1$ represents a saturated or unsaturated monohydrocarbon group having from 7 to 21 carbon atoms, $R_2$ represents a saturated monohydrocarbon group having from 1 to 4 carbon atoms, k is an integer of from 1 to 12, l is an integer of from 2 to 6, m is an integer of 1 or 2, and n is an integer of 1 or 2 provided that $m+n \leqq 3$.

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**4,741,961**

## POLYURETHANE-BASED ADHESIVE COATING OR FILM, AND USE OF SAME IN LAMINATED GLASS PANES

**Kurt C. Frisch, Grosse Ile; Daniel Klempner, Farmington Hills, both of Mich.; Helmer Rädisch, and Gerhard Holzer, both of Aachen, Fed. Rep. of Germany, assignors to Saint-Gobain Vitrage, Aubervilliers, France**

**Filed Feb. 26, 1986, Ser. No. 833,034**
**Claims priority, application France, Feb. 26, 1985, 85 02741**
**Int. Cl.[4] B32B** *27/36*
**U.S. Cl. 428—412** **14 Claims**

1. A transparent adhesive polyurethane-based coating or film usable in laminated glass panes;

wherein the polyurethane is formed from at least one aliphatic or cycloaliphatic diisocyanate, at least one polyol chosen from among the polyether diols, the polycaprolactone diols, the polycarbonate diols, and the polybutadiene diols, and at least one bifunctional chain-lengthening agent containing an aromatic nucleus.

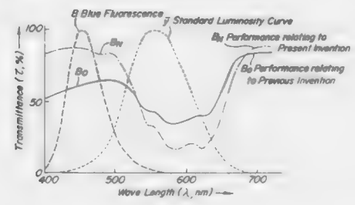


**4,741,962**

## OPTICAL FILTER MADE OF INORGANIC MATERIAL FOR BLUE LIGHT

**Masatoshi Wada; Naritoshi Kitamura; Yukikazu Moritsu, all of Osaka, and Tetsuo Sakai, Tokyo, all of Japan, assignors to Okuno Chemical Industries Co., Ltd., Osaka and Nippon Hoso Kyokai, Tokyo, both of, Japan**

**Filed Jun. 13, 1985, Ser. No. 744,156**
**Claims priority, application Japan, Jun. 20, 1984, 59-125018**
**Int. Cl.[4] B32B** *5/22, 13/12*
**U.S. Cl. 428—428** **1 Claim**




1. An optical filter made of inorganic materials for blue light, comprising:

a glass substrate, and

a layer adhered to said glass substrate and fired at a temperature of 450° C. to 650° C., said layer comprising a powdered mixture of inorganic materials including indispensable constituents consisting of

50–90% by weight of a colored glass powder including 0 to 15% by weight of cobalt oxide, said colored glass powder being glazed onto said glass substrate and made transparent by firing at a temperature below 700° C., said cobalt oxide being used for coloring the glass powder, and

10–50% by weight of blue pigment having spinel structure of a combination of substantially 36 parts by weight of cobalt oxide and substantially 64 parts by weight of aluminum oxide.

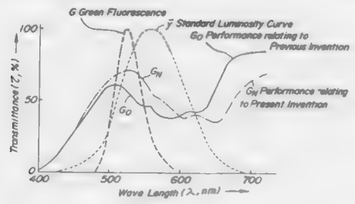
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**4,741,963**

## OPTICAL FILTER MADE OF INORGANIC MATERIAL FOR GREEN LIGHT

**Masatoshi Wada; Naritoshi Kitamura; Yukikazu Moritsu, all of Osaka, and Tetsuo Sakai, Tokyo, all of Japan, assignors to Okuno Chemical Industries, Ltd. and Nippon Hoso Kyokai, both of, Japan**

**Filed Jun. 17, 1985, Ser. No. 745,000**
**Claims priority, application Japan, Jun. 20, 1984, 59-125017**
**Int. Cl.[4] B32B** *5/22, 13/12*
**U.S. Cl. 428—428** **1 Claim**




1. An optical filter made of inorganic materials for green light, comprising:

a glass substrate, and

a layer adhered to said glass substrate and fired at a temperature of 450° C. to 650° C., said layer comprising a powdered mixture of inorganic materials including indispensable constituents selected from the group consisting of:

a colored glass powder including 0.5 to 6% by weight of chromic oxide, 0.5 to 6% by weight of cobalt oxide and 0 to 6% by weight of copper oxide, said oxides being used for coloring the glass powder;

a mixture of 60 to 99% by weight of a colored glass powder including 0.5 to 6% by weight of potassium chromate, said chromate being used for coloring the glass powder, and 1 to 40% by weight of a blue pigment having spinel structure of a combination of cobalt oxide and aluminum oxide; and

a mixture of 80–99% by weight of a colored glass powder including 0 to 6% by weight of copper oxide, said oxide being used for colring the glass powder, and 1 to 20% by weight of green pigment including cobalt oxide, chromic oxide and aluminum oxide;

said colored glass powder being glazed onto said glass substrate and made transparent by firing at a temperature below 700° C.

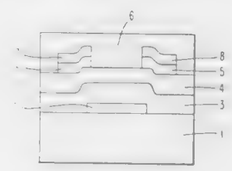
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**4,741,964**

## STRUCTURE CONTAINING HYDROGENATED AMORPHOUS SILICON AND PROCESS

**Ivan Haller, Chappaqua, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Jul. 17, 1986, Ser. No. 887,167**
**Int. Cl.[4] B32B** *9/04*; **H01L** *45/00, 29/78*
**U.S. Cl. 428—446** **7 Claims**




1. A structure comprising:

a substrate suitable for use in semiconductor devices having at least one major surface area;

a first layer of hydrogenated amorphous silicon adjacent said major surface area wherein said first layer has a first concentration of hydrogen incorporated therein;

a second layer of hydrogenated amorphous silicon adjacent said first layer and having a second concentration of hydrogen incorporated therein that differs from said first concentration and wherein the layer having the higher hydrogen concentration is patterned and the layer having the lower concentration is not patterned.

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**4,741,965**

## IMPREGNATED SOFT SUBSTANCE GASKET

**Hans-Rainer Zerfass, Burscheid, and Franz-Josef Giesen, Odenthal, both of Fed. Rep. of Germany, assignors to Goetze AG, Burscheid, Fed. Rep. of Germany**

**Filed Dec. 11, 1986, Ser. No. 940,397**
**Claims priority, application Fed. Rep. of Germany, Dec. 18, 1985, 3544740**
**Int. Cl.[4] B32B** *9/04, 27/04*; **D04H** *1/64*
**U.S. Cl. 428—447** **19 Claims**

1. An impregnated soft substance gasket, obtained by the method of:

mixing a liquid polysiloxane resin having reactive hydrogen groups, an addition cross-linking polysiloxane resin and a cross-linking catalyst to form an impregnating agent, and impregnating a soft substance gasket with said impregnating agent and subsequently cross-linking said resins.

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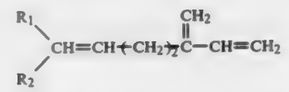
**4,741,966**

## ORGANOPOLYSILOXANE COMPOSITION CURABLE BY HYDROSILYLATION CONTAINING PLATINUM/TRIENE COMPLEXES

**Jacques Cavezzan, Villeurbanne, France, assignor to Rhone-Poulenc Specialties Chimiques, Courbevoie, France**

**Division of Ser. No. 811,393, Dec. 20, 1985, Pat. No. 4,687,870. This application Nov. 20, 1986, Ser. No. 932,670**
**Claims priority, application France, Dec. 20, 1984, 84 19508**
**Int. Cl.[4] B32B** *9/04*
**U.S. Cl. 428—447** **6 Claims**

1. A composition of matter comprising an organopolysiloxane curable by hydrosilylation comprising (1) at least one organopolysiloxane having, per molecule, at least two alkylenically unsaturated groups bonded to a silicon atom and (2) at least one organohydropolysiloxane having, per molecule, at least three ≡SiH groups, and a catalytically effective amount of a hydrosilylation catalyst which comprises a platinum/olefin complex comprising halogen values, the olefin moiety thereof which comprises an aliphatic triene having the general formula:



wherein $R_1$ is a linear or branched chain alkyl radical having from 1 to 6 carbon atoms, and $R_2$ is $R_1$ or a linear or branched chain alkenyl radical having from 2 to 16 carbon atoms and at least one site of ethylenic unsaturation, and said complex having a ratio, in gram-atoms of halogen to gram-atoms of platinum, ranging from virtually 0 to 4.

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**4,741,967**

## MAGNETIC RECORDING MEDIUM

**Satoshi Yoshihara; Shigeharu Iijima, both of Kawasaki; Katsuhiko Takano; Mitsuharu Sawamura, both of Yokohama; Masaaki Matsushima, Machida; Hiroyoshi Kishi, Tokyo; Eizo Sasamori, Yokohama, and Susumu Ito, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed May 30, 1984, Ser. No. 615,381**
**Claims priority, application Japan, Jun. 8, 1983, 58-100930; Jun. 8, 1983, 58-100931**
**Int. Cl.[4] G11B** *7/24*
**U.S. Cl. 428—469** **9 Claims**

1. An optomagnetic recording medium comprising:
a transparent substrate;
a magnetic recording layer of an amorphous magnetic film formed from a rare earth-transition metal alloy on said substrate;
an anticorrosive layer prepared by oxidation treatment of a first surface of the amorphous magnetic film, which first surface is opposite to a second surface thereof facing said substrate; and a reflection layer formed on said anticorrosive layer.

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**4,741,968**

## HEAT AND PRESSURE CONSOLIDATED LAMINATE

**Andrew N. Dion, Auburn, and John B. Jalbert, Mechanic Falls, both of Me., assignors to Sterling Engineered Products Inc., Maumee, Ohio**

**Continuation of Ser. No. 783,731, Oct. 3, 1985, abandoned. This application Dec. 8, 1986, Ser. No. 940,219**
**Int. Cl.[4] B32B** *27/36*
**U.S. Cl. 428—480** **15 Claims**

1. A high pressure decorative laminate comprising:
(a) a thermosetting melamine/formaldehyde reaction product impregnated face sheet;
(b) one or more core sheets impregnated with a core sheet treating composition comprising an unsaturated polyester having an acid number no greater than about 90 for providing flexibility to the consolidated laminate; and
(c) an optional melamine/formaldehyde reaction product impregnated back sheet; the face sheet (a), the core sheets (b) and the optional back sheet (c) being consolidated by heat and pressure to provide a laminate having improved flexibility as well as being resistant to chipping, being easily fabricated and having a color in the core sheets that closely matches that of the face and back sheets.

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**4,741,969**

## AQUEOUS INK RECORDING SHEET

**Kazuhide Hayama, and Akira Yamashita, both of Mie, Japan, assignors to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan**

**Filed Oct. 10, 1986, Ser. No. 917,682**
**Claims priority, application Japan, Oct. 21, 1985, 60-234874**
**Int. Cl.[4] B32B** *23/08, 27/10;* **B05D** *3/06*
**U.S. Cl. 428—514** **17 Claims**

1. An aqueous ink recording sheet which is prepared by:
coating on the surface of a substrate sheet a resin composition containing, as the chief ingredient, a mixture comprising (A) from 10–90 wt.% of a water-soluble, photopolymerizable, double bond containing anionic synthetic resin, and at least one member selected from the group consisting of component (B) and component (C), wherein component (B) is 90–0 wt.% of partially or completely saponified polyvinyl acetate, or a partially or completely saponified polymer resin composed of 20–100 wt.% vinyl acetate and 80–0 wt.% of another polymerizable monomer or derivative thereof, and component (C) is 90–0 wt.% of a homopolymer resin of N-vinylpyrrolidone or a copolymer resin of another polymerizable monomer therewith, with the weight ratio of (A)/[(B)+(C)] being 90/10–10/90;
drying said coated resin composition; and
curing said dried resin composition by irradiating said resin composition with actinic radiation, thereby forming a cured resin coating layer on the substrate.

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**4,741,970**

## THERMOPLASTIC LAMINATE TIE LAYER USING A POLYMERIC BLEND ADHESIVE

**William J. Fairchok, Saginaw; Thomas O. Ginter, Sanford; Bruce P. Thill, and Thomas T. Chiu, both of Midland, all of Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Division of Ser. No. 819,318, Jan. 16, 1986, abandoned, which is a continuation-in-part of Ser. No. 645,647, Aug. 30, 1984, abandoned. This application Jan. 12, 1987, Ser. No. 2,592**
**Int. Cl.[4] B32B** *27/08, 27/36*
**U.S. Cl. 428—516** **9 Claims**

1. A thermoplastic laminate structure consisting of a plurality of layers wherein at least one of said layers is an adhesive polymeric blend comprising:
a dispersed phase of
(a) poly-2-oxazoline, and
(b) a glycol wherein the molar ratio of said poly-2-oxazoline to said glycol is from about 20:1 to about 5:1; and
a continuous phase of
(c) grafted polypropylene wherein a graft is derived from an $\alpha,\beta$-ethylenically unsaturated carboxylic acid or an unsaturated cyclic anhydride and is from about 0.1 to about 5 percent by weight of the total polymer and wherein the molar ratio of said glycol to said graft is from 1.1 to about 1.5:1;
wherein said laminate comprises an inner gas and moisture barrier layer, juxtaposed layers of said adhesive polymeric blend on each side of said barrier layer and outer layers of a rigid or semi-rigid thermoplastic material and wherein said barrier layer is a copolymer of vinylidene chloride and one or more other unsaturated monomers and wherein said outer layers are polypropylene.



**4,741,971**

## METHOD FOR IMPARTING FLAME RESISTANCE TO WOOD SURFACES

**H. Nelson Beck, Walnut Creek, and Dalton C. MacWilliams, Alamo, both of Calif., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed May 23, 1986, Ser. No. 866,540**
**Int. Cl.[4] B32B** *21/04*
**U.S. Cl. 428—537.1** **20 Claims**

1. A method of imparting surface flame resistance to wood which comprises:
(a) providing at least partially dried wood which has pores in an exposed surface; and
(b) impregnating the pores in the surface of the dried wood with finely divided particles of a phosphorus nitride to form a treated wood.

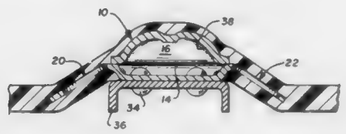
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**4,741,972**

## ROTOMOLD INSERT

**James S. Hardigg, Conway, Mass., assignor to Hardigg Industries, South Deerfield, Mass.**

**Filed Dec. 15, 1986, Ser. No. 941,337**
**Int. Cl.[4] B32B** *3/26*
**U.S. Cl. 428—542.8** **11 Claims**




1. An insert for use in molded articles, said insert having a front portion defined by a central section and a pair of outboard wing members, each of said wing members having an outer vertical member having a length greater than a height of the central section and being spaced from said central section and a pair of connecting arm elements, each said connecting arm element extending from an opposing end of the vertical member to said central section.

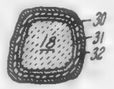
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**4,741,973**

## SILICON CARBIDE ABRASIVE PARTICLES HAVING MULTILAYERED COATING

**David A. Condit, Avon, and Harry E. Eaton, Woodstock, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.**

**Filed Dec. 15, 1986, Ser. No. 941,902**
**Int. Cl.[4] B32B** *15/00*
**U.S. Cl. 428—553** **9 Claims**




1. Metal coated ceramic abrasive particles in the range of about 25 to 1,250 microns, the particles having a duplex metal coating thereon which comprises a first metal coating layer which substantially encapsulates each particle and is selected from the transition metals, high melting temperature noble metals, and alloys thereof; and a second metal coating layer which substantially encapsulates the first coating layer, and is selected from said transition and noble metals and alloys thereof which contain a melting point depressant in sufficient quantity so that the second metal layer melts at a temperature less than the melting temperature of the first metal layer, wherein the second metal layer is capable of significant diffusion into nickel and cobalt base superalloys when heated near its melting temperature and forms no deleterious phases on diffusing into said superalloys, and the second metal layer wets the first metal layer when the second metal layer is molten.

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**4,741,974**

## COMPOSITE WIRE FOR WEAR RESISTANT COATINGS

**Frank N. Longo, East Northport; Joseph D. Reardon, Hauppauge, both of N.Y., and Anil Bansal, Patterson, N.J., assignors to The Perkin-Elmer Corporation, Norwalk, Conn.**

**Filed May 20, 1986, Ser. No. 865,226**
**Int. Cl.[4] B32B** *15/02;* **B23K** *35/22*
**U.S. Cl. 428—558** **38 Claims**

1. A composite wire useful for arc gun spraying, formed of an alloy sheath comprising a metal selected from the group consisting of iron, nickel, cobalt and combinations thereof, and of a core comprising a boron-containing powder of at least one boron substance selected from the group consisting of boron and boron carbide, a substantial portion of the boron-containing powder being less than 20 microns in size.

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**4,741,975**

## EROSION-RESISTANT COATING SYSTEM

**Subhash K. Naik, Milford, and Louis J. Fiedler, Trumbull, both of Conn., assignors to Avco Corporation, Providence, R.I.**

**Continuation-in-part of Ser. No. 672,912, Nov. 19, 1984, abandoned. This application May 20, 1986, Ser. No. 865,138**
**Int. Cl.[4] B32B** *15/04*
**U.S. Cl. 428—621** **21 Claims**

1. A layered erosion-resistant coating to be applied to a metallic substrate without substantially any resulting loss in fatigue properties of the substrate which comprises a first ductile layer on the substrate comprising palladium or platinum; a second layer comprising substantially pure tungsten; and a third erosion-resistant layer on the second layer comprising a material formed of a tungsten-carbon alloy or a material formed of a tungsten matrix having a mixture of tungsten-carbon phases dispersed therein, the second and third layers applied at substantially low temperatures, the first layer capable of retaining substrate integrity, not substantiallly diffusing into the substrate, and preventing diffusion of material from the third layer into the substrate.

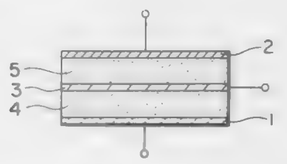
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**4,741,976**

## ELECTROLUMINESCENT DEVICE

**Ken Eguchi, Yokohama; Haruki Kawada, Kawasaki, and Yukuo Nishimura, Sagamihara, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 759,892, Jul. 29, 1985, abandoned. This application Feb. 27, 1987, Ser. No. 20,173**
**Claims priority, application Japan, Jul. 31, 1984, 59-158825; Jul. 31, 1984, 59-158826**
**Int. Cl.[4] H01J** *1/62*
**U.S. Cl. 428—690** **50 Claims**




1. An electroluminescent device comprising in sequence a first electrode, a first luminescent layer provided on said first electrode, a second electrode, a second luminescent layer, and a third electrode, wherein each of said luminescent layers includes a first layer of an electron-accepting organic compound, a second layer of an electron-donating organic compound, wherein at least one of said first layer and said second layer in said first luminescent layer and said second luminescent layer is selected from the group consisting of a

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Langmuir-Blodgett monomolecular film or a built-up film thereof.

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**4,741,977**

**MAGNETIC SHEET**

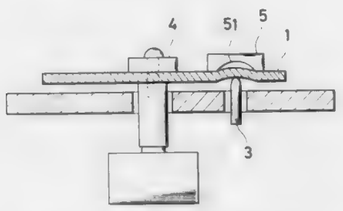
**Keiji Koga; Keiko Tsuchiya; Kazunori Tamazaki; Tsutomu Aoyama, and Yuichi Kubota, all of Nagano, Japan, assignors to TDK Corporation, Tokyo, Japan**

**Filed Aug. 14, 1986, Ser. No. 896,458**

**Claims priority, application Japan, Aug. 20, 1985, 60-182769; Aug. 21, 1985, 60-183283**

**Int. Cl.⁴ G11B** *5/702, 5/716*

**U.S. Cl. 428—694** **5 Claims**




1. In a magnetic sheet comprising a disk-shaped substrate having opposed major surfaces and a magnetic layer formed on at least one major surface of the substrate and comprising a magnetic powder and a radiation-curable binder; said magnetic sheet being used in a magnetic sheet operating device comprising a magnetic head for performing recording and reproducing operations on the sheet while rotating the sheet and a stabilizer member for controlling the contact of the sheet with the head,

the improvement wherein the radiation-curable binder of the magnetic layer has a mechanical dissipation factor tan δ of up to 0.05 as measured at 20° C. and 10 Hz.

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**4,741,978**

**FUEL CELL GENERATOR CONTROL SYSTEM**

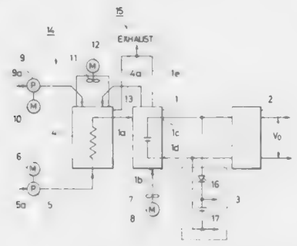
**Yasuhiro Takabayashi, Kanagawa, Japan, assignor to Fuji Electric Co., Ltd., Kanagawa, Japan**

**Filed Aug. 12, 1987, Ser. No. 84,146**

**Claims priority, application Japan, Aug. 14, 1986, 61-190853**

**Int. Cl.⁴ H01H** *8/04*

**U.S. Cl. 429—23** **8 Claims**




1. A fuel cell generator control system to control the operation of a fuel cell generator that includes a fuel cell body, a fuel supply section for supplying fuel to the fuel cell body, and an air supply section for supplying air to the fuel cell body, the control system for protecting the fuel cell generator from damage due to abnormal conditions in the fuel cell body or the fuel supply section, the control system comprising:

means for detecting an abnormal condition in the fuel cell body or the fuel supply section and for outputting an abnormal condition signal;

a secondary battery charged by an output voltage of the fuel cell body;

a control section for outputting a trouble signal in response to the application of said abnormal condition signal;

a current path control means for connecting said secondary battery to the fuel supply section and the air supply section through a first current path and, in response to said trouble signal, for disconnecting said secondary battery from the first voltage path and then connecting said secondary battery to the air supply section through a second current path.

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**4,741,979**

**BATTERY SEPARATOR ASSEMBLY**

**Marilyn A. Faust; Mary R. Suchanski, both of Rochester, and Hans W. Osterhoudt, Spencerport, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed May 19, 1986, Ser. No. 864,376**

**Int. Cl.⁴ H01M** *2/16, 6/14*

**U.S. Cl. 429—144** **13 Claims**

1. A separator assembly for use in batteries comprising a film bearing a thermal fuse in the form of a layer of wax coated fibers; wherein said assembly is sufficiently porous to allow continuous flow of ions in the battery.

12. A battery comprising a lithium anode, an $MnO_2$ cathode, an electrolyte comprising 1M $LiBF_4$ in a solvent mixture of butyrolactone and dimethoxyethane and a separator assembly between the anode and cathode; wherein the separator assembly comprises a porous film bearing a thermal fuse in the form of a porous layer of wax coated fibers.

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**4,741,980**

**METHOD FOR INCREASING COLOR-FASTNESS OF ORGANIC COLORING MATTER**

**Yutaka Kaneko, Sagamihara, Japan, assignor to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan**

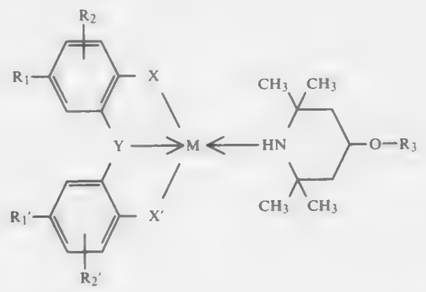
**Filed Sep. 18, 1986, Ser. No. 908,603**

**Claims priority, application Japan, Sep. 19, 1985, 60-207362**

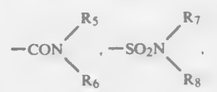
**Int. Cl.⁴ G03C** *1/84, 1/08*

**U.S. Cl. 430—17** **10 Claims**

1. A method for increasing fastness of an organic coloring matter, making coexist the organic coloring matter having the absorption maximum within the wavelength region from 400 nm to 700 nm with a compound represented by the following general formula in a medium:




wherein $R_1$ and $R_1'$ are independently selected from a hydrogen atom, an alkyl group, a cycloalkyl group, a halogen atom, an alkoxy group, an aryloxy group, —CO—O—$R_4$,




—$NHCOR_9$ and —$NHSO_2R_{13}$,



$R_4$ is selected from an alkyl group and a cycloalkyl group,

$R_5$ and $R_6$ are independently selected from a hydrogen atom, an alkyl group, an aryl group and a cycloalkyl group, and $R_5$ and $R_6$ may be bonded to form a five to seven membered ring,

$R_7$ and $R_8$ are the same as $R_5$ and $R_6$, $R_9$ is selected from an alkyl group, an aryl group —$OR_{10}$ and




$R_{10}$ is selected from an alkyl group and a cycloalkyl group, $R_{11}$ and $R_{12}$ are the same as $R_5$ and $R_6$, $R_{13}$ is selected from an alkyl group, an aryl group and




$R_{14}$ and $R_{15}$ are the same as $R_5$ and $R_6$,

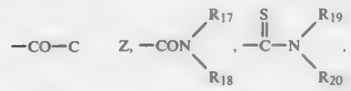
$R_2$ and $R_2'$ are independently selected from a hydrogen atom, a halogen atom, an alkyl group, an alkoxy group, an alkoxycarbonyl group, an alkenyl group and a cycloalkyl group, and $R_1$ and $R_2$, or $R_1'$ and $R_2'$ may be bonded to form a condensed benzene ring, respectively,

M is a metal atom,

X and X' is independently selected from an oxygen atom and a sulfur atom,

Y is selected from an oxygen atom, a sulfur atom, —SO and —$SO_2$, and

$R_3$ is selected from a hydrogen atom, an alkyl group, an aryl group, a cycloalkyl group, —CO—$R_{16}$,




—SO—$R_{21}$ and —$SO_2R_{22}$, $R_{16}$ is selected from an alkyl group, an alkenyl group, an aryl group and a cycloalkyl group, Z is a group of atoms necessary to complete five or six membered heterocyclic ring, $R_{17}$ and $R_{18}$ are independently selected from a hydrogen atom, an alkyl group, an aryl group and a cycloalkyl group, $R_{17}$ and $R_{18}$ may be bonded to form a five to seven membered ring, $R_{19}$ and $R_{20}$ are the same as $R_{17}$ and $R_{18}$, $R_{21}$ is selected from an alkyl group and an aryl group and $R_{22}$ is the same as $R_{21}$.

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**4,741,981**

**PHOTOSENSITIVE MATERIAL FOR ELECTROPHOTOGRAPHY CONTAINS ORGANIC PHOSPHITE COMPOUNDS**

**Junichiro Hashimoto; Izumi Aiso, and Hideki Akiyoshi, all of Numazu, Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan**

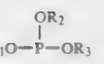
**Filed Jul. 24, 1986, Ser. No. 889,643**

**Claims priority, application Japan, Jul. 30, 1985, 60-166861; Dec. 10, 1985, 60-276046; Jun. 18, 1986, 61-141887**

**Int. Cl.⁴ G03G** *5/14*

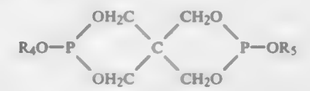
**U.S. Cl. 430—58** **18 Claims**

1. A multilayer photosensitive material for electrophotography, which comprises an electroconductive substrate, a charge generating layer and a charge transfer layer on said electroconductive substrate, said photosensitive material containing an effective amount of an organic phosphite compound for preventing light degradation of the surface potential charging properties of said photosensitive material, said organic phosphite compound being selected from the group consisting of compounds having the formulas (II), (III) and (IV),



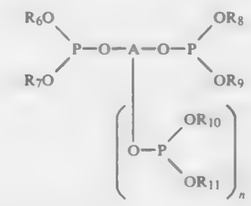

(II)

wherein $R_1$, $R_2$ and $R_3$ represent hydrogen, alkyl having up to 26 carbon atoms, alkenyl having up to 26 carbon atoms, substituted phenyl having an alkyl or alkenyl substituent or non-substituted phenyl, provided that at least one of $R_1$, $R_2$ and $R_3$ is said alkyl or alkenyl;



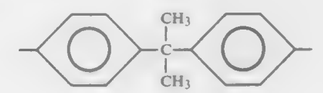

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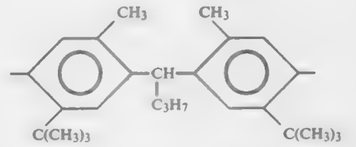
wherein $R_4$ and $R_5$ represent alkyl having up to 26 carbon atoms, alkenyl having up to 26 carbon atoms, substituted phenyl having an alkyl or alkenyl substituent or non-substituted phenyl;

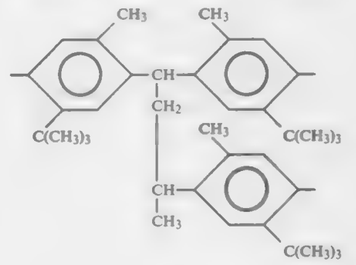



(IV)

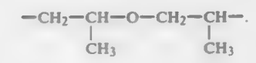
wherein $R_6$, $R_7$, $R_8$, $R_9$, $R_{10}$ and $R_{11}$ represent alkyl having up to 26 carbon atoms, alkenyl having up to 26 carbon atoms, a substituted phenyl having an alkyl or alkenyl substituent or non-substituted phenyl; "n" represents an integer of 0 or 1; and A represents




or



**4,741,982**

## PHOTOSENSITIVE MEMBER HAVING UNDERCOAT LAYER OF AMORPHOUS CARBON

**Shuji Iino, Hirakata; Hideo Hotomi, Suita; Izumi Osawa, Ikeda, and Mitsutoshi Nakamura, Osaka, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed Sep. 10, 1986, Ser. No. 905,562**

**Claims priority, application Japan, Sep. 13, 1985, 60-204154; Sep. 19, 1985, 60-207898; May 17, 1986, 61-112847**

**Int. Cl.[4] G03G** *5/14*

**U.S. Cl. 430—58** **16 Claims**

1. A photosensitive member comprising:

an electrically conductive substrate;

an undercoat layer formed on said substrate and comprising amorphous carbon containing hydrogen, said undercoat layer comprises an impurity element in Group IIIA or VA of the Periodic Table, said undercoat layer having a thickness of about 0.01 to 5 μm;

a charge transporting layer comprising amorphous carbon containing hydrogen, said hydrogen being contained in an amount of about 0.1 to 67 atomic percent based on an amount of all atoms contained therein; and

a charge generating layer.

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**4,741,983**

## DUAL DYE SENSITIZED ELECTROPHOTOGRAPHIC ZINC OXIDE

**Leonard Skuby, Mundelein, Ill., assignor to AM International, Inc., Chicago, Ill.**

**Continuation-in-part of Ser. No. 837,634, Mar. 10, 1986, abandoned. This application Jan. 28, 1987, Ser. No. 7,870**

**Int. Cl.[4] G03G** *5/087, 5/09*

**U.S. Cl. 430—93** **28 Claims**

1. A photoconductive composition comprising a mixture of:

(a) photoconductive zinc oxide;

(b) a binder;

(c) an effective concentration of a first dye which absorbs near infrared radiation and which is effective in sensitizing said zinc oxide to near infrared radiation; and

(d) an effective concentration of a second dye selected from the group consisting of Bromophenol Blue and Phloxine B which absorbs visible radiation, which sensitizes said zinc oxide to said visible radiation and which is effective in enhancing the discharge rate of said sensitized zinc oxide of (c) at any given intensity of said near infrared radiation.

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**4,741,984**

## POSITIVELY CHARGEABLE DEVELOPER

**Eiichi Imai, Narashino, and Takashi Hino, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed May 22, 1986, Ser. No. 865,785**

**Claims priority, application Japan, May 29, 1985, 60-116218**

**Int. Cl.[4] G03G** *9/10*

**U.S. Cl. 430—106.6** **20 Claims**

1. A positively chargeable developer, comprising:

positively chargeable toner particles containing a binder resin, a colorant or magnetic material and a positive charge controlled agent;

positively chargeable silicate fine powder having a positive triboelectric chargeability higher than that of the toner and a mean particle size of 3 microns or smaller; and

a microdisperser having a triboelectric chargeability lower than that of the toner and a mean particle size which is larger than that of the silicate powder and smaller than that of the toner particles.

**4,741,985**

## LIGHT-SENSITIVE COMPOSITION COMPRISING A DIAZONIUM SALT CONDENSATE AND A MODIFIED POLYVINYL ACETAL POLYMER.

**Toshiaki Aoai; Kazuo Maemoto; Akihiko Kamiya, all of Kanagawa, and Toshiyuki Sekiya, Shizuoka, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

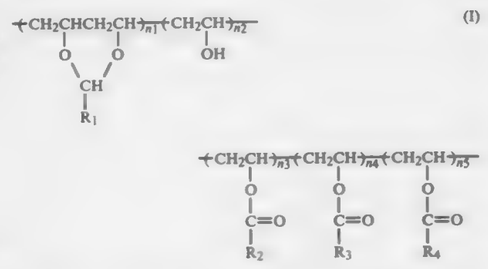
**Filed Jun. 6, 1986, Ser. No. 871,343**

**Claims priority, application Japan, Jun. 7, 1985, 60-123863; Sep. 9, 1985, 60-198742**

**Int. Cl.[4] G03C** *1/52*

**U.S. Cl. 430—175** **21 Claims**

1. A light-sensitive composition comprising a photosensitive diazonium salt condensate in admixture with a polymer having the recurring units represented by the following general formula (I):



(I)

wherein $R_1$ represents a hydrogen atom, a substituted or unsubstituted alkyl group, —COOH or $—N(CH_3)_2$; $R_2$ represents an unsubstituted alkyl group; $R_3$ represents an aliphatic or aromatic hydrocarbon group having a carboxyl group; $R_4$ represents an aliphatic or aromatic hydrocarbon group which has at least one hydroxyl or nitrile group and which may be further substituted; $n_1$, $n_2$, $n_3$, $n_4$ and $n_5$ represent the molar percents of the respective recurring units, provided that $n_1$ is from about 5 to about 85 mol%, $n_2$ is from 0 to about 60 mol%, $n_3$ is from 0 to about 20 mol%, $n_4$ is from about 3 to about 60 mol%, $n_5$ is from greater than 0 to about 60 mol% and said photosensitive diazonium salt condensate is present in an amount sufficient to render said composition insoluble upon exposure to light.

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**4,741,986**

## HIGH-RESOLUTION PHOTOSENSITIVE COMPOSITION WHICH CAN BE DEVELOPED BY PLASMA AND A PHOTOLITHOGRAPHIC METHOD OF USING SAID COMPOSITION

**André Collet, Montpellier; Serge Gourrier, Lognes, and Olivier Maurin, Montpellier, all of France, assignors to U.S. Philips Corp., New York, N.Y.**

**Filed Jun. 16, 1986, Ser. No. 874,744**

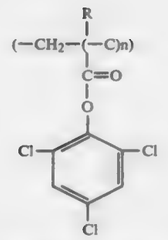
**Claims priority, application France, Jun. 18, 1985, 85 09219**

**Int. Cl.[4] G03C** *1/71, 1/70, 1/68*

**U.S. Cl. 430—197** **5 Claims**

1. A high resolution, plasma developable, photosensitive composition comprising a photosensitively effective amount of a photosensitive aromatic azide and a polymer selected from the group consisting of poly2,4,6-trichlorophenyl methacrylates and acrylates of the formula





where R is H or $CH_3$, copolymers thereof with methyl methacrylate and copolymers thereof with methyl acrylate.

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**4,741,987**

## PHOTOPOLYMERIZABLE COMPOSITION INCLUDING BENZOTRIAZOLE CARBOXYLIC ACID

**Hiroyuki Tohda, Fujisawa; Shigeru Otawa, Yamato, and Junichi Onodera, Yokosuka, all of Japan, assignors to Photopoly Ohka Co., Ltd., Japan**

**Continuation of Ser. No. 817,032, Jan. 8, 1986, abandoned. This application Jun. 12, 1987, Ser. No. 61,212**

**Claims priority, application Japan, Jan. 19, 1985, 60-006675**

**Int. Cl.[4] G03C** *1/68, 1/96*

**U.S. Cl. 430—288** **7 Claims**

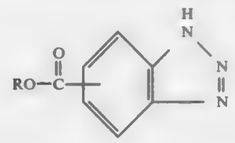
1. A photopolymerizable composition consisting essentially of:

(a) a thermoplastic organic polymer,

(b) a non-gaseous ethylenically unsaturated compound containing at least two terminal ethylenic groups capable of forming a polymer by photoinitiated addition polymerization,

(c) an addition polymerization initiator activatable by actinic radiation, and

(d) from 0.005 to 5 percent by weight, based on the weight of the composition, of a benzotriazole carboxylic acid or its derivative represented by the general formula:



where R represents a hydrogen atom, an alkali metal atom or an aliphatic hydrocarbon group having from 1 to 12 carbon atoms.

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**4,741,988**

## PATTERNED POLYIMIDE FILM, A PHOTOSENSITIVE POLYAMIDE ACID DERIVATIVE AND AN ELECTROPHORETIC IMAGE-DISPLAY CELL

**Johan M. Van der Zande, and Lourens Minnema, both of Eindhoven, Netherlands, assignors to U.S. Philips Corp., New York, N.Y.**

**Filed May 1, 1986, Ser. No. 858,476**

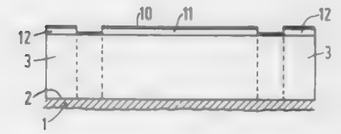
**Claims priority, application Netherlands, May 8, 1985, 8501304**

**Int. Cl.[4] G03C** *5/00;* **B01D** *13/02;* **C25D** *13/00*

**U.S. Cl. 430—312** **7 Claims**

1. A method of forming a patterned polyimide film on a substrate, which patterned polyimide film is provided with an electrically conductive layer at its surface facing away from the substrate, said method comprising:

(a) providing said substrate with a layer of a negative-acting photosensitive polyamide acid derivative which is obtained by reacting polyamide acid with at least one compound of the formula 1



in which

$R_1$ and $R_2$ both independently represent a lower alkyl group of 1–4 carbon atoms or a hydrogen atom,

R is an alkylene group of 1–5 carbon atoms,

X is an oxygen atom or the group $—N(R_3)—$, in which $R_3$ is a hydrogen atom or a lower alkyl group of 1–4 carbon atoms, and m has the value 0 or 1, on the condition that in at least one compound that is used the value of m is 1;

(b) applying a layer of a photosensitive photoresist on said layer of photosensitive polyamide derivative;

(c) exposing the resultant assembly patternwise;

(d) developing the resultant patternwise exposed photoresist layer to remove the exposed portions of said photoresist layer;

(e) applying to the remaining portions of said photoresist layer and to the exposed portions of said layer of the polyamide derivative an electrically conductive layer;

(f) removing, by means of a lift-off process, the remaining portions of said photoresist layer and the overlying portions of said electrically conductive layer; and

(g) subjecting portions of said polyamide derivative remaining on said substrate to a heat treatment and imidization to form a polyimide.

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**4,741,989**

## POSITIVE PHOTORESIST AQUEOUS DEVELOPER SOLUTION CONTAINING QUATERNARY AMMONIUM HYDROXIDE WITH ALIPHATIC KETONE OR CYCLIC ETHER ALONE OR WITH AMINE AS DEVELOPMENT MODIFIER

**Kenji Niwa, and Ichiro Ichikawa, both of Chiba, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan**

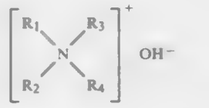
**Continuation of Ser. No. 596,113, Apr. 2, 1984, abandoned. This application May 28, 1986, Ser. No. 869,858**

**Claims priority, application Japan, Apr. 1, 1983, 58-58386**

**Int. Cl.[4] G03C** *5/00, 5/34*

**U.S. Cl. 430—331** **8 Claims**

1. A developer for positive photoresists consisting essentially of a 2 to 5 wt % aqueous solution of a quaternary ammonium hydroxide represented by the formula (I):



(I)

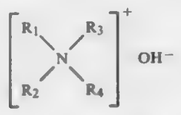
wherein $R_1$, $R_2$, $R_3$, and $R_4$ are each an alkyl group having 1 to 4 carbon atoms or a hydroxyalkyl group having 1 to 5 carbon atoms, and at least one development modifier selected from the group consisting of water-soluble aliphatic ketones and water-

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soluble cyclic ethers, said development modifier being added to the developer in an amount of 10 to 200 ppm (w/w).

2. A developer for positive photoresists consisting essentially of a 2 to 5 wt % aqueous solution of a quaternary ammonium hydroxide represented by the formula (I):



(I)

wherein $R_1$, $R_2$, $R_3$, and $R_4$ are each an alkyl group having 1 to 4 carbon atoms or a hydroxyalkyl group having 1 to 5 carbon atoms, at least one first development modifier selected from the group consisting of water-soluble aliphatic ketones and water soluble cyclic ethers, and at least one second development modifier selected from the group consisting of water-soluble primary amines and water-soluble secondary amines, said first development modifier being added to the developer in an amount of 10 to 200 ppm (w/w) and said second development modifier being added to the developer in an amount of 10 to 200 ppm (w/w).

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**4,741,990**

## METHOD FOR PROCESSING SILVER HALIDE PHOTOGRAPHIC LIGHT-SENSITIVE MATERIALS

**Eiichi Sakamoto, Hannou, and Yutaka Kaneko, Sagamihara, both of Japan, assignors to Konishiroku Photo Industry Co., Ltd., Japan**

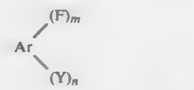
**Filed Mar. 5, 1987, Ser. No. 22,208**

**Claims priority, application Japan, Mar. 7, 1986, 61-50745; Jun. 13, 1986, 61-138870**

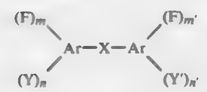
**Int. Cl.[4] G03C** *5/24*

**U.S. Cl. 430—380** **21 Claims**

1. A method for processing silver halide photographic light-sensitive materials which comprises a process in which a silver halide photographic light-sensitive material having a silver halide emulsion layer is developed by a developer in the presence of at least one compound represented by the following Formula [I a]or [I b]:



Formula [Ia]



Formula [Ib]

wherein, Ar is a benzene ring or a naphthalene ring, each being allowed to be in the quinone form, F is a fluorine atom, Y and Y′ are each a substituent substitutable to the benzene ring or naphthalene ring, X is a bivalent atom or a bivalent linkage group, m and m′ are each an integer of 1 to 5 and n and n′ are each an integer of 1 to 3.

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**4,741,991**

## STABLE PHOTOGRAPHIC DEVELOPER AND REPLENISHER THEREFOR

**Peter Wuelfing, Jr., Arden, N.C., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation of Ser. No. 439,568, Nov. 5, 1982, abandoned, which is a continuation-in-part of Ser. No. 286,331, Jul. 23, 1981, abandoned. This application Apr. 14, 1986, Ser. No. 851,920**

**Int. Cl.[4] G03C** *5/26*

**U.S. Cl. 430—399** **8 Claims**

1. A method of automatic processing of exposed photographic silver halide X-ray film wherein the imagewise exposed X-ray film is developed in a photographic developer bath consisting essentially of, per liter: 1-phenyl-3-pyrazolidone (photographic developing agent), 0.8 to 2.5 g, hydroquinone (developing agent, 15 to 35 g, bromide ion, 1 to 7 g, an alkaline material and buffer to maintain the pH of the developer bath at a desired value of 10.0±0.3, an organic antifoggant and film speed restrainer, 0.01 to 6.0 m mole, and water; the developed X-ray film is fixed, washed and dried; and the developer bath is replenished by replenisher solution to maintain constant the photographic properties of the developer bath during long periods of processor operation in which only small quantities of exposed X-ray film are processed; said replenisher solution having a composition within the ranges set forth above but having a pH lower than that of the developer bath.

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**4,741,992**

## THERMALLY PROCESSABLE ELEMENT COMPRISING AN OVERCOAT LAYER CONTAINING POLY(SILICIC ACID)

**Wojciech M. Przezdziecki, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Sep. 22, 1986, Ser. No. 910,033**

**Int. Cl.[4] G03C** *1/76*

**U.S. Cl. 430—523** **12 Claims**

1. In a photothermographic or thermographic imaging element comprising a support, bearing a photothermographic or thermographic imaging layer and an overcoat layer, the improvement wherein the overcoat layer comprises 50% to 90% by weight poly(silicic acid) represented by the formula:



wherein x is an integer within the range of at least 3 to about 600 and comprises a water soluble hydroxyl containing polymer or monomer that is compatible with poly(silicic acid).

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**4,741,993**

## RADIATION IMAGE STORAGE PANEL

**Akiko Kano; Hisanori Tsuchino; Koji Amitani, and Fumio Shimada, all of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan**

**Filed Jul. 9, 1986, Ser. No. 883,596**

**Claims priority, application Japan, Jul. 15, 1985, 60-156346**

**Int. Cl.[4] G03C** *1/76;* **G01N** *21/64*

**U.S. Cl. 430—536** **11 Claims**




1. A radiation image storage panel having at least one stimulable phosphor layer on a support and a protective layer provided on said stimulable phosphor layer, wherein said protective layer comprises at least two layers of which regains under a relative humidity of 90% on a sorption isotherm at 25° C. are different by 0.5% or more; the layer having higher regain being provided on the stimulable phosphor layer and the layer having lower regain being provided on the layer having higher regain.



**4,741,994**

## SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL

**Seiji Ichijima; Kohzaburoh Yamada, and Hideo Usui, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Japan**

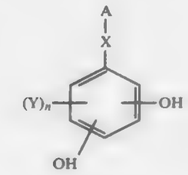
**Filed Oct. 2, 1985, Ser. No. 782,832**

**Claims priority, application Japan, Oct. 2, 1984, 59-206831; Oct. 4, 1984, 59-208554; Oct. 25, 1984, 59-224697**

**Int. Cl.[4] G03C** *1/40, 7/36, 7/34*

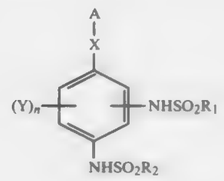
**U.S. Cl. 430—549** **24 Claims**

1. A silver halide color photographic material comprising at least one coupler represented by formulae (Ia), (Ib), or (Ic)

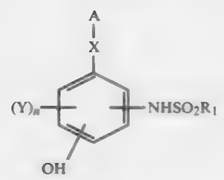


(Ia)

wherein said two —OH groups are at the 2- and 4-positions, the 2- and 3-positions or the 3- and 4-positions with respect to X,



(Ib)



(Ic)

wherein said —OH and —$NHSO_2R_1$ are at the 2- and 4-positions, the 4- and 2-positions, the 3- and 4-positions or the 4- and 3-positions, respectively, with respect to X; wherein A represents a coupler residue which can split away from the coupler by A—X bond cleavage upon reaction with an oxidation product of a developing agent; X represents an oxygen atom or sulfur atom; $R_1$ and $R_2$ each represents an aliphatic group, an aromatic group, or a heterocyclic group; Y represents an aliphatic group, an aromatic group, a heterocyclic group, a halogen atom, an alkoxy group, an aryloxy group, an arylthio group, an alkoxycarbonyl group, a thioureido group, an acylamino group, a sulfonamido group, a cyano group, a nitro group, a carbamoyl group, a sulfamoyl group, an acyloxy group, an alkylthio group, an amino group, a sulfonyl group, a ureido group, an aryloxycarbonyl group, an alkoxycarbonylamino group, a sulfamoylamino group or an acyl group; and n represents 0, 1, or 2, and when n is 2, the two Y's represent the same or different substituent groups, or two of substituents $R_1$, $R_2$ and Y represent divalent groups that combine with each other to form a ring structure.

3. A silver halide color photographic material as in claim 1, wherein said material comprises at least one coupler other than the at least one coupler represented by formulae (Ia), (Ib), or (Ic).

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**4,741,995**

## SILVER HALIDE COLOR PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL

**Tadaaki Tani; Mikio Ihama, and Kiyoshi Nakazyo, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

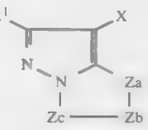
**Filed Apr. 28, 1986, Ser. No. 856,556**

**Claims priority, application Japan, Apr. 26, 1985, 60-90390**

**Int. Cl.[4] G03C** *7/38, 1/12, 1/19*

**U.S. Cl. 430—558** **14 Claims**

1. A silver halide color photographic light-sensitive material comprising a support having thereon at least one silver halide emulsion layer, wherein the silver halide emulsion layer contains a silver halide emulsion which is spectrally sensitized by adding a spectral sensitizing dye prior to the completion of formation of silver halide particles and at least one kind of pyrazoloazole type magenta coupler represented by the following general formula (I):



(I)

wherein $R^1$ represents a hydrogen atom or a substituent; X represents a hydrogen atom or a group capable of being released upon a coupling reaction with an oxidation product of an aromatic primary amine developing agent; Za, Zb and Zc each represents a methine group, a substituted methine group, =N— or —NH—, one of the Za—Zb bond and the Zb—Zc bond being a double bond and the other being a single bond, and when the Zb—Zc bond is a carbon-carbon double bond, it may form a part of an aromatic ring; $R^1$ or X may also form a polymer including a dimer or more; and when Za, Zb or Zc is a substituted methine group, the substituted methine group may form a polymer including a dimer or more.

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**4,741,996**

## HEAT-DEVELOPABLE LIGHT-SENSITIVE MATERIALS HAVING IMPROVED STORAGE STABILITY

**Yasuo Aotsuka; Kiyohiko Yamamuro, and Takanori Hioki, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Continuation of Ser. No. 741,415, Jun. 5, 1985, abandoned. This application Feb. 26, 1987, Ser. No. 21,540**

**Claims priority, application Japan, Jun. 5, 1984, 59-114734**

**Int. Cl.[4] G03C** *1/08, 7/26, 7/32, 1/02*

**U.S. Cl. 430—559** **7 Claims**

1. A heat-developable light-sensitive material comprising a support having thereon at least a light-sensitive silver halide emulsion, an organic silver salt of a benzotriazole compound having a solubility product of less than about $10^{-10}$, and a gelatin binder wherein silver halide grains in the silver halide emulsion are formed in the presence of a sensitizing dye.

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**4,741,997**

## COLOR LIGHT-SENSITIVE MATERIALS WITH AZO DYES

**Kozo Sato; Masaaki Tsukase, and Takeshi Shibata, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed May 29, 1986, Ser. No. 868,390**

**Claims priority, application Japan, May 30, 1985, 60-115227**

**Int. Cl.[4] G03C** *5/54, 7/26*

**U.S. Cl. 430—562** **22 Claims**

1. A color light-sensitive material having at least one silver halide emulsion layer and at least one image forming compound of the following formula (I) on a support

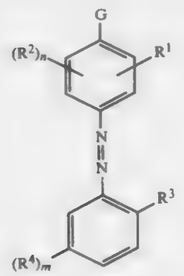


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wherein Dye represents a magenta dye residue or a dye precursor residue represented by the following formula (II); X represents a bond or a binding group; Y represents a group capable of yielding a difference in diffusibility of a dye component before and after the reaction with a photographic silver salt imagewise having a latent image, corresponding to or reversely corresponding to said photographic silver salt; q is 1 or 2, and when q is 2, Dye—X may be the same or different;

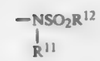


(II)

wherein $R_1$ is a group selected from the class consisting of groups having the following general formulae (A), (B) and (C):



(A)

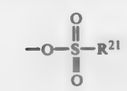


(B)



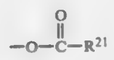
(C)

wherein $R^{11}$ is a hydrogen atom, a substituted or unsubstituted alkyl group, or a heterocyclic residue; $R^{12}$ is substituted or unsubstituted alkyl, cycloalkyl, aryl, aralkyl, alkyloxy, aryloxy, amino, or heterocyclic residue group, $R^{13}$ is a substituted or unsubstituted alkyl, cycloalkyl, aryl, aralkyl, or heterocyclic residue residue group; $R^2$ is a substituted or unsubstituted alkyl group having from 1 to 4 carbon atoms, a substituted or unsubstituted alkoxy group having from 1 to 4 carbon atoms, a substituted or unsubstituted aryl group having from 6 to 8 carbon atoms, a cyano group, a halogen atom, a carboxyl group, a nitro group, a substituted or unsubstituted sulfamoyl group having from 0 to 6 carbon atoms, an acylamino group having from 2 to 8 carbon atoms; an alkyl- or arylsulfonylamino group having from 1 to 7 carbon atoms, a substituted or unsubstituted carbamoyl group having from 1 to 5 carbon atoms, or a substituted or unsubstituted sulfonyl group having from 1 to 4 carbon atoms; $R^3$ is a cyano group or a substituted or unsubstituted alkylsulfonyl, arylsulfonyl, or sulfamoyl group, $R^4$ is an electron-attractive group having a positive Hammett's para-σ value; the symbol n is an integer of 0 to 2 and when n is equal to 2, the two $R^2$'s may be the same or different; the symbol m is an integer of 1 to 3, and when m is equal to 2 or 3, the two or three $R^4$'s may be the same or different; Dye and X are joined to each other at $R^1$, $R^3$ or $R^4$; and G means a hydroxyl group or a salt thereof or a group selected from the class consisting of groups having the following formulas (T) to (V):

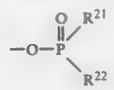


(T)

-continued



(U)



(V)

wherein $R^{21}$ and $R^{22}$ may be the same or different and each is a substituted or unsubstituted alkyl, cycloalkyl, alkenyl, aralkyl, aryl, heterocyclic residue, alkyloxy, aryloxy, alkylthio, arylthio, or amino group; and $R^{21}$ and $R^{22}$ may be joined to each other to form a 5-membered or 6-membered ring.

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**4,741,998**

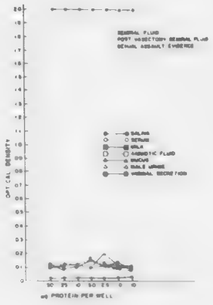
**MONOCLONAL ANTIBODY TO MHS-5: A NEW PROBE FOR SEXUAL ASSAULT ANALYSES**

**John C. Herr; Mark Sigman, and William M. Sutherland, all of Charlottesville, Va., assignors to The University of Virginia Alumni Patents Foundation, Charlottesville, Va.**

**Filed Jun. 5, 1985, Ser. No. 741,601**

**Int. Cl.[4] C07K** *15/00;* **C12N** *5/00;* **G01N** *33/535, 33/577*

**U.S. Cl. 435—7** **9 Claims**



1. A probe for sexual assault analyses, comprising, an antibody which specifically binds to a seminal fluid antigen contained in male human ejaculate wherein said antibody has no cross reactivity with other human biological fluids, semen of an animal selected from a group consisting of rabbits, sheep, dogs, pigs, rhesus monkeys, cats, goats, squirrel monkeys, bulls, stallions, rats and mice, and human epididymal sperm, wherein said seminal fluid antigen has the identifying characteristics of the MHS-5 antigen and originates in seminal vesicles.

4. The ATCC-HB-8830 hybridoma cell line which produces a monoclonal antibody to a seminal fluid antigen contained in male human ejaculate.

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**4,741,999**

**MONOCLONAL ANTIBODIES USEFUL IN THE IDENTIFICATION OF MICROORGANISMS CAUSING PERIODONTAL DISEASE**

**Robert J. Genco, Buffalo; Joseph J. Zambon, Williamsville; Lars A. Christersson, Snyder, and Mirdza E. Neiders, Amherst, all of N.Y., assignors to The Research Foundation of State University of New York, Albany, N.Y.**

**Filed Feb. 26, 1986, Ser. No. 833,856**

**Int. Cl.[4] C12N** *5/00, 15/00;* **G01N** *33/569, 33/577*

**U.S. Cl. 435—7** **6 Claims**

1. A monoclonal antibody reagent useful in determining the presence of pathogens containing at least one monoclonal antibody species specific to the microorganism *Actinobacillus actinomycetemcomitans.*



**4,742,000**

**ANTIBODY TO HUMAN PROGESTERONE RECEPTOR AND DIAGNOSTIC MATERIALS AND METHODS**

**Geoffrey L. Greene, Chicago, Ill., assignor to University of Chicago, Chicago, Ill.**

**Filed May 2, 1986, Ser. No. 859,135**

**Int. Cl.[4] G01N** *33/53, 33/577*

**U.S. Cl. 435—7** **30 Claims**

1. An immunoglobulin specific for human progestin receptor comprising an immunoglobulin produced in any animal system in response to an immunogen containing human progestin receptor.

9. An immunological reagent comprising the human progestin receptor immunoglobulin of claim 1 covalently or noncovalently attached to a detectible marker.

28. A method for determining the presence of progesterone receptor in a tissue or cell or body fluids comprising the steps of:

contacting the antibody of claim 9 with said tissue, cell, or body fluid and,

detecting said marker.

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**4,742,001**

**METHOD OF TERMINATING ISOCITRATE DEHYDROGENASE REACTION IN AN ANALYTICAL SYSTEM**

**Yoji Marui; Takashi Nakano, both of Ousaka; Chozo Hayashi, Hyogo; Tuyosi Fujita, Ousaka, and Isamu Takagahara, Hyogo, all of Japan, assignors to Oriental Yeast Co. Ltd., Tokyo, Japan**

**Filed Apr. 22, 1986, Ser. No. 856,440**

**Claims priority, application Japan, Apr. 26, 1985, 60-88850**

**Int. Cl.[4] C12Q** *1/32*

**U.S. Cl. 435—26** **2 Claims**

1. A method of terminating an isocitrate dehydrogenase reaction in an analytical system wherein $NAD^+$ formed from NADH is reproduced into NADH in the conjoint presence of an isocitrate, metallic ions, and isocitrate dehydrogenase in assaying a substance by means of a reaction of NADH to $NAD^+$, which comprises terminating the isocitrate dehydrogenase reaction by adding ATP and/or a chelating agent to the reaction system.

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**4,742,002**

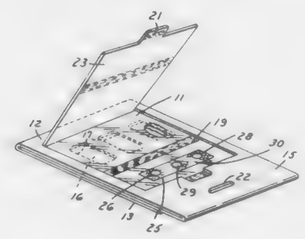
**TEST KIT AND METHOD FOR DETERMINING THE PRESENCE OF BLOOD IN A SPECIMEN AND FOR TESTING THE EFFECTIVENESS OF PEROXIDASE INACTIVATING SOLUTION**

**Philip A. Guadagno, Vidor, Tex., assignor to Helena Laboratories Corporation, Beaumont, Tex.**

**Filed Jan. 16, 1984, Ser. No. 571,254**

**Int. Cl.[4] C12Q** *1/28*

**U.S. Cl. 435—28** **12 Claims**



1. A test kit for determining the presence of blood in a specimen comprising slide means for receiving a sample of the specimen in at least one sample test area thereof, and a second peroxidase inactivating solution test area formed on said slide with means on said slide having a deposit of chromogen reagent and peroxidase in a location spaced from the sample test area to test the effectiveness of a peroxidase inactivating solution.

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**4,742,003**

**HUMAN TRANSFORMING GROWTH FACTOR**

**Rik M. A. Derynck, Burlingame, and David V. Goeddel, Hillsborough, both of Calif., assignors to Genentech, Inc., South San Francisco, Calif.**

**Continuation-in-part of Ser. No. 581,743, Feb. 17, 1984, abandoned. This application May 14, 1985, Ser. No. 695,494**

**Int. Cl.[4] C12P** *21/00, 21/02;* **C12N** *15/00, 1/00*

**U.S. Cl. 435—68** **11 Claims**

1. An expression vector comprising a DNA sequence encoding a human TGF-α species selected from the group of

(1) precursor TGF-α;

(2) a biologically active fragment of precursor TGF-α having at least about 50 residues; or

(3) a biologically active mutant of precursor TGF-α or a fragment of precursor TGF-α having at least about 50 residues, wherein an amino acid residue has been inserted, substituted or deleted in or from the amino acid sequence of the precursor TGF-α sequence or its fragment.

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**4,742,004**

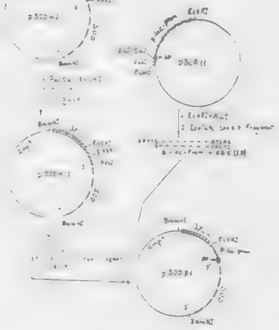
**METHOD FOR PRODUCING ENZYMATICALLY ACTIVE EUCARYOTIC SOD IN BACTERIA**

**Jacob R. Hartman, Holon; Dov Kanner, Rehovot, and Daniel Bartfeld, Nes Ziona, all of Israel, assignors to BIO-Technology General Corp., New York, N.Y.**

**Filed Aug. 27, 1984, Ser. No. 644,105**

**Int. Cl.[4] C12P** *21/02;* **C12N** *15/00, 9/02*

**U.S. Cl. 435—70** **15 Claims**



1. A method of producing an enzymatically active polypeptide analog of human Cu/Zn superoxide dismutase having the identical amino acid sequence and activity of naturally occurring human Cu/Zn superoxide dismutase which comprises:

growing a culture of bacterial cells in a zinc containing production medium supplemented with a nongrowth inhibiting amount of $Cu^{++}$ such that the final concentration of $Cu^{++}$ in the medium is greater than 2 ppm, wherein said cells contain and are capable of expressing DNA encoding the polypeptide analog of human Cu/Zn superoxide dismutase and wherein said culture is grown under suitable conditions such that the DNA is expressed and the polypeptide is produced in the bacterial cells; and

recovering the enzymatically active analog of human Cu/Zn superoxide dismutase so produced.

13. A method of recovering purified enzymatically active human Cu/Zn superoxide dismutase analog of claim 1 which comprises:

(a) isolating the bacterial cells from the production medium;

(b) disrupting the bacterial cells so as to form a suspension comprising cell debris and a protein supernatant solution;
(c) separating said cell debris from the soluble protein supernatant solution;
(d) heating said separated protein supernatant at about 65° C. for about 2 hours;
(e) cooling the heated protein supernatant;
(f) separating the resulting protein supernatant so as to produce a clear supernatant protein solution containing the superoxide dismutase thereof analog thereof; and
(g) recovering the enzymatically active human Cu/Zn superoxide dismutase analog from the clear supernatant protein solution.

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**4,742,005**

## METHOD FOR PRODUCTION OF CELLULOLYTIC ENZYMES AND METHOD FOR SACCHARIFICATION OF CELLULOSIC MATERIALS THEREWITH

**Takashi Yamanobe; Yasushi Mitsuishi, both of Ibaraki, and Yoshiyuki Takasaki, Matsudo, all of Japan, assignors to Agency of Industrial Science & Technology, Ministry of International Trade & Industry, Tokyo, Japan**

**Filed Apr. 5, 1985, Ser. No. 720,416**
**Claims priority, application Japan, Jan. 7, 1985, 60-581; Jan. 11, 1985, 60-3490**
**Int. Cl.[4] C12P *19/14*; C12N *9/24, 9/42*; C12R *1/645***
**U.S. Cl. 435—99** **3 Claims**

1. A method for saccharification of cellulose or a cellulosic material, which comprises:
(a) culturing Tolnaftate-resistant Acremonium cellulolyticus TN (FERM BP-685) in a culture medium containing carbon and nitrogen sources;
(b) collecting an enzyme composite from the resultant culture broth, and
(c) contacting a cellulose or cellulosic material with said enzyme composite.

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**4,742,006**

## FERMENTATION PROCESS FOR THE PRODUCTION OF FRUCTOSE FROM AQUEOUS MIXTURES OF FRUCTOSE AND GLUCOSE AND *ZYMOMONAS MOBILIS* MUTANTS WHICH CAN BE USED FOR SUCH FERMENTATION

**Stephanie Bringer, and Hermann Sahm, both of Jülich, Fed. Rep. of Germany, assignors to Kernforschungsanlage Jülich Gesellschaft mit beschränkter Haftung, Jülich, Fed. Rep. of Germany**

**Filed Nov. 6, 1985, Ser. No. 795,422**
**Claims priority, application Fed. Rep. of Germany, Aug. 13, 1985, 3528933**
**Int. Cl.[4] C12P *19/02*; C12N *15/00, 1/20*; C13L *3/00*; C12R *1/01***
**U.S. Cl. 435—105** **14 Claims**

11. A mutant of *Zymomonas mobilis* which selectively decomposes glucose in mixtures of glucose and fructose to produce or enrich fructose during fermentation, said mutant of *Zymomonas mobilis* produced by the steps of:
mutating the naturally occurring strain of *Zymomonas mobilis;*
isolating fructose-negative mutants of said mutation; and
selecting stable mutants of said fructose-negative mutants by continuously culturing said fructose-negative mutants for at least about ten days.

**4,742,007**

## PROCESS FOR THE PREPARATION OF L-TRYPTOPHAN

**Kuniki Kino; Toshihide Nakanishi, and Masahiro Sugimoto, all of Yamaguchi, Japan, assignors to Kyowa Hakko Kogyo Kabushiki Kaisha, Japan**

**Filed Feb. 15, 1985, Ser. No. 702,560**
**Claims priority, application Japan, Feb. 22, 1984, 59-32149**
**Int. Cl.[4] C12P *13/22*; C12N *1/20*; C12R *1/15***
**U.S. Cl. 435—108** **6 Claims**

1. A process for the preparation of L-tryptophan which comprises culturing an L-tryptophan-producing microorganism of the genus Corynebacterium and recovering L-tryptophan from the culture broth, characterized in that said microorganism is resistant to a member of the group consisting of paraquat and derivatives thereof.

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**4,742,008**

## PREPARATION OF THE ENZYME BETA-GLUCANASE BY FERMENTATION OF FUNGI

**Bernt Nissen, Rykkin, and Jon Hovland, Porsgrunn, both of Norway, assignors to Norsk Hydro a.s., Oslo, Norway**

**PCT No. PCT/NO85/00036, § 371 Date Jun. 4, 1986, § 102(e) Date Jun. 4, 1986, PCT Pub. No. WO86/02946, PCT Pub. Date May 22, 1986**
**PCT Filed Jun. 20, 1985, Ser. No. 881,351**
**Claims priority, application Norway, Nov. 8, 1984, 844.455**
**Int. Cl.[4] C12N *9/24*; C12R *1/785***
**U.S. Cl. 435—200** **4 Claims**

1. A process for producing β-glucanase under submerged, aerobic and thermophilic conditions, which comprises cultivating in a nutrient medium a fungal strain of *Rhizomucor pusillus* (Lindt) Schipper, wherein an inoculum of said strain is introduced into a fermentor containing a nutrient medium and fermentation occurs according to a fed batch method, where a starchy vegetable meal is added first as a source of carbon, and when said starchy vegetable meal is completely or partially consumed, a sugar compound selected from the group consisting of lactose, glucose, sucrose and raffinose is then introduced as a source of carbon, whereupon the fermentation continues until the carbon source is completely or partially consumed.

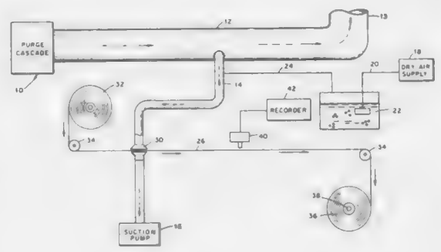
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**4,742,009**

## METHOD FOR MONITORING STACK GASES FOR URANIUM ACTIVITY

**Claude R. Beverly, and Harold G. Ernstberger, both of Paducah, Ky., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Jul. 3, 1985, Ser. No. 751,420**
**Int. Cl.[4] G01N *1/18, 1/22, 23/00***
**U.S. Cl. 436—57** **4 Claims**




1. A method for sampling stack gases emanating from the purge cascade of a gaseous diffusion cascade system utilized to enrich uranium for determining the presence and extent of uranium in the stack gases in the form of gaseous uranium hexafluoride, comprising the steps of removing a side stream of gases from the stack gases, contacting the side stream of the stack gases with a stream of air sufficiently saturated with moisture for reacting with and converting any gaseous uranium hexafluoride contacted thereby in said side stream of stack gases to particulate uranyl fluoride, thereafter contacting said side stream of stack gases containing said particulate uranyl fluoride with moving filter means for continuously intercepting and conveying the intercepted particulate uranyl fluoride away from said side stream of stack gases, and continually scanning the moving filter means with radiation monitoring means for sensing the presence and extent of particulate uranyl fluoride on the moving filter means which is indicative of the extent of particulate uranyl fluoride in the side stream of stack gases which in turn is indicative of the presence and extent of uranium hexafluoride in the stack gases.



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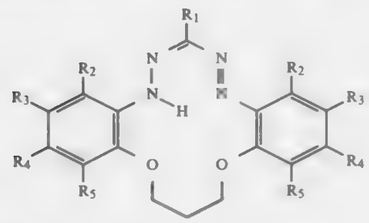
**4,742,010**

## ASSAY METHOD FOR THE DETERMINATION OF LITHIUM WITH NOVEL SUBSTITUTED CROWN DYES

**Cheng-I Lin, and Marcel Pirio, both of San Jose, Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.**

**Filed May 23, 1986, Ser. No. 866,821**
**Int. Cl.[4] G01N *21/78, 33/20, 33/52***
**U.S. Cl. 436—74** **18 Claims**

1. A method for the determination of lithium in a sample suspected of containing lithium without treating said sample to remove proteins, said method comprising:
(a) combining in an aqueous assay medium said sample and a compound according the following formula:



wherein:
$R_1$ is an electron withdrawing group;
$R_2$ and $R_5$ are independently selected from the group consisting of hydrogen, methoxy, carboxymethoxy, nitro, chlorine, bromine and fluorine;
$R_3$ and $R_4$ are independently selected from the group consisting of hydrogen and a hydrophilic substituent consisting of from one to twelve atoms other than hydrogen, which atoms are selected from the group consisting of carbon, oxygen, nitrogen, phosphorous, sulfur and halogen; with the proviso that not more than three of $R_3$ and $R_4$ are hydrogen; and
(b) measuring the absorbance of said medium to determine the presence of lithium in said sample.

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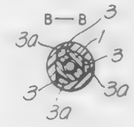
**4,742,011**

## DEVICES FOR CARRYING OUT CHEMICAL AND CLINICAL TESTS, AND THEIR USE

**Anthony Blake, Huntingdon; John Coley, Kettering, and Ronald Smith, Rushden, all of England, assignors to Unilever Patent Holdings B.V., London, England**

**PCT No. PCT/GB85/00102, § 371 Date May 30, 1985, § 102(e) Date May 30, 1985, PCT Pub. No. WO85/04255, PCT Pub. Date Sep. 26, 1985**
**PCT Filed Mar. 15, 1985, Ser. No. 740,918**
**Claims priority, application United Kingdom, Mar. 15, 1984, 8406752**
**Int. Cl.[4] G01N *33/543, 33/76*; B01L *3/00, 9/00***
**U.S. Cl. 436—518** **16 Claims**

1. A sample collecting and testing device comprising:
(a) a test component having a test component surface, said test component surface being sensitized with an immobilized component of a specific binding pair relevant to said assay;
(b) a handling-piece connected to said test component;
(c) an accessory component having an accessory solid surface which is of substantially complementary shape to said test component surface and removably fixed in slightly spaced apart relationship therewith, to define therebetween a containing space for retaining a liquid sample;
(d) a means for removably fixing said accessory component (c) to said handling-piece (b) or to said test component (a) so that said accessory component (c) is maintained in said slightly spaced apart relationship with said test component (a) and so that said accessory component (c) remains




fixed to said handling-piece (b) or said test component (a) when said device is held and moved by said handling-piece (b); and
(e) at least one aperture through which a sample of liquid from an external source enters said space when said device is held in contact with said source, said sample being retained in contact with said test component surface, said device further comprising:
(f) a support component, and
(g) a means for interlocking said support component (f) with said accessory component (c) to facilitate removal of said test component (a) from said accessory component (c) without the user handling either said test component (a) or said accessory component (c) directly.

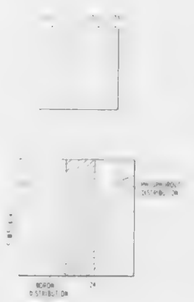
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**4,742,012**

## METHOD OF MAKING GRADED JUNCTION CONTAINING AMORPHOUS SEMICONDUCTOR DEVICE

**Mitsuo Matsumura, Kasukabe; Hideo Yamamoto; Keitaro Fukui; Toshihiro Yoshida; Yoshinobu Okayasu; Kunio Asai, all of Ohi, and Osamu Nakamura, Tokyo, all of Japan, assignors to Toa Nenryo Kogyo K.K., Tokyo, Japan**

**Continuation-in-part of Ser. No. 675,362, Nov. 27, 1984, abandoned. This application Dec. 30, 1986, Ser. No. 948,419**
**Int. Cl.[4] H01L *31/18***
**U.S. Cl. 437—4** **6 Claims**



1. In a method to produce an amorphous P-I-N or N-I-P junction by a plasma decomposition technique, the improvement comprising using an apparatus having a single film forming chamber which is so designed that a dopant gas concentration can be controlled according to a position in the chamber and forming on a base plate a p-type layer or a n-type layer

containing a dopant impurity continuously decreasing to zero, then forming an i-type layer containing no dopant impurity on said p-type layer n-type layer and then forming on the i-type layer the other of said n-type layer or p-type layer containing dopant impurity continuously increasing from zero to a predetermined amount continuously to form a graded P-I-N or N-I-P junction amorphous semiconductor device, in which process the layer is changed by controlling the concentration of each respective dopant in a raw gas, the dopant concentration in the raw material gas varying as a function of position in the chamber.

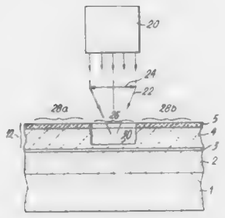
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**4,742,013**

**PROCESS FOR THE PRODUCTION OF A SEMICONDUCTOR LASER WITH TAPE GEOMETRY AND LASER OBTAINED BY THIS PROCESS**

**Louis Menigaux, 85 Avenue des Tilleuls 91440, Bures Sur Yvette, France**

**Filed May 14, 1986, Ser. No. 863,154**
**Claims priority, application France, May 21, 1985, 85 07619**
**Int. Cl.[4] H01L** *21/265, 21/208*
**U.S. Cl. 437—19** **2 Claims**




1. A process for the production of a semiconductor laser, comprising the steps of:
forming a double heterostructure on a substrate, said double heterostructure comprising a first confinement layer, an active layer, a second confinement layer and a contact layer,
implanting in the contact layer and in part of the second confinement layer a p-type doping impurity with an energy and dose such that the implanted zone is made amorphous,
irradiating the implanted structure with a focussed high energy beam able to recrystallize the amorphous zone along a tape.

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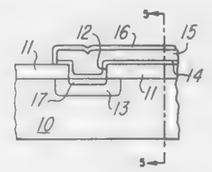
**4,742,014**

**METHOD OF MAKING METAL CONTACTS AND INTERCONNECTIONS FOR VLSI DEVICES WITH COPPER AS A PRIMARY CONDUCTOR**

**Robert C. Hooper, Houston; Bobby A. Roane, Manvel, and Douglas P. Verret, Sugar Land, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Filed May 10, 1985, Ser. No. 732,547**
**Int. Cl.[4] H01L** *21/28*
**U.S. Cl. 437—192** **16 Claims**

1. A method of making a semiconductor device comprising the steps of:
applying a coating of an insulator material on a face of a semiconductor body,
forming in said coating a contact or a via hole,
depositing a first conducting barrier layer on said face whereby the sidewalls of said hole are coated,
forming a copper strip over said first conductor,
selectively depositing by chemical vapor deposition a second conducting barrier layer on said face to cover only




said copper strip on the top and sidewalls of the copper strip, thereby encasing the copper strip.

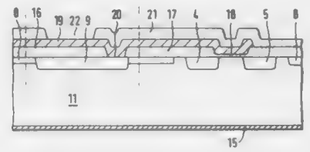
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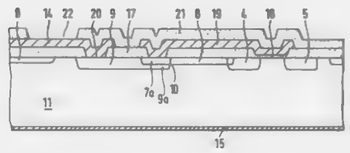
**4,742,015**

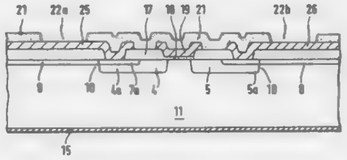
**METHOD FOR PRODUCING A PROTECTIVE ARRANGEMENT FOR A FIELD-EFFECT TRANSISTOR**

**Manfred Ohagen, Untergruppenbach, Fed. Rep. of Germany, assignor to Telefunken electronic GmbH, Heilbronn, Fed. Rep. of Germany**

**Division of Ser. No. 703,180, Feb. 19, 1985, abandoned. This application Apr. 6, 1987, Ser. No. 35,265**
**Claims priority, application Fed. Rep. of Germany, Mar. 7, 1984, 3408285**
**Int. Cl.[4] H01L** *21/385, 21/425*
**U.S. Cl. 437—27** **6 Claims**




1. Process for the production of a protective arrangement for a field effect transistor with an insulated gate electrode using an integrated, in-diffused protective diode whose breakdown voltage is less than that of the gate insulating layer of the transistor, Wherein first impurities producing the first conduction type are implanted in the surface of a substrate of the first conduction type in the surface area provided for the protective diode, wherein second impurities producing the first conduction type are then implanted in the surface of the substrate with the exception of the area provided for the field-effect transistor,



and wherein, finally, the source zone and the drain zone and a third zone of the second conduction type forming the protective diode are diffused into the substrate.

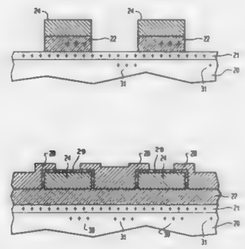
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**4,742,016**

**METHOD OF MANUFACTURE OF A TWO-PHASE CCD**

**Howard E. Rhodes, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Mar. 30, 1987, Ser. No. 31,975**
**Int. Cl.[4] H01L** *29/78*
**U.S. Cl. 437—37** **10 Claims**




1. In the manufacturing of a two-phase charge coupled device, forming an elongated buried channel in a p-type portion of a monocrystalline silicon wafer comprising the steps of:
growing a first silicon oxide layer over a surface of the channel in a wet oxidizing ambient;
implanting arsenic ions into selected regions of the silicon oxide layer to form arsenic-implanted oxide regions;
heating the wafer at a moderately high temperature for putting the arsenic ions in a stable diffusing state;
forming first-phase set of electrodes on said silicon oxide layer so that one edge of the electrodes overlaps one edge portion of an arsenic implanted oxide region and the other edge portion of the arsenic-implanted oxide region overlaps the other edge of the electrode, leaving a portion of each arsenic-implanted region exposed;
masking the exposed portion of the arsenic-implanted oxide region, leaving exposed unimplanted portions of the silicon oxide layer;
implanting arsenic ions through the exposed unimplanted portions of the silicon oxide layer into the underlying channel;
removing the masking;
removing the portions of the silicon oxide layer not covered by the first-phase set of electrodes;
heating the wafer in a dry oxidizing ambient to form a second oxide layer over the channel between the first-phase set of electrodes and over the first-phase set of electrodes; and
depositing the second-phase set of electrodes to overlap edges of the first-phase set of electrodes and to contact the second oxide layer between the first-phase set of electrodes.

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**4,742,017**

**IMPLANTATION METHOD FOR FORMING SCHOTTKY BARRIER PHOTODIODES**

**Richard A. Bredthauer, Dana Point, Calif., assignor to Ford Aerospace Corporation, Dearborn, Mich.**

**Filed Jun. 20, 1986, Ser. No. 876,563**
**Int. Cl.[4] H01L** *21/425, 29/48*
**U.S. Cl. 437—39** **1 Claim**

1. A method of forming a Schottky barrier photodiode suitable for detection of infrared radiation includes the following sequentially ordered steps of:
forming a p-type silicon substrate with a surface area;
forming an annular N+ type silicon guard ring in the silicon substrate around a portion of the surface area of the p-type silicon substrate;
forming a silicon dioxide layer on top of the p-type silicon substrate including the silicon guard ring;
exposing the surface area of the p-type silicon substrate within the silicon guard ring;
implanting metal ions into the exposed surface area of the silicon substrate surrounded by the silicon guard ring;
annealing the resulting structure to form a silicide of the implanted metal within the silicon substrate;
removing a portion of the silicon substrate encircled by the silicon guard ring and between the surface of the silicon substrate and the formed silicide using selective etching;
depositing a thin oxide passivating layer on the silicon substrate encircled by the silicon guard ring,
depositing a reflective metal layer on said thin oxide passivating layer for reflecting infrared radiation back to the metal silicide; and wherein:




the implantation energy of the metal ions is 50 KeV, the metal ion is platinum, and a platinum silicide is formed with a distribution having a maximum concentration at a depth of about 249 angstroms below the silicon surface and having a standard deviation of about 63 angstroms;
the p-type silicon substrate has resistivity of about 10–20Ω per centimeter and is boron doped with a concentration of $1\times10^{15}$ atoms per cubic centimeter;
the implantation energy of the metal ions is 10 KeV and the metal silicide is formed with a distribution having a maximum concentration at a depth of about 85 angstroms; and
these steps of forming the silicon guard ring, the silicon dioxide layer, the implantation of metal ions, and annealing are such that the Schottky barrier photodiode formed is suitable for detection of infrared radiation having a wavelength in the 1 to 6 micron range.

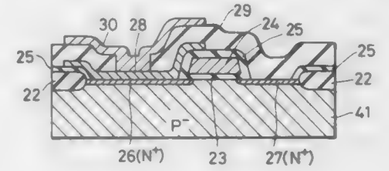
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**4,742,018**

**PROCESS FOR PRODUCING MEMORY CELL HAVING STACKED CAPACITOR**

**Shinichiro Kimura, Hachioji, and Hideo Sunami, Tokyo, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Dec. 1, 1986, Ser. No. 936,602**
**Claims priority, application Japan, Nov. 29, 1985, 60-267533**
**Int. Cl.[4] H01L** *21/70, 27/00*
**U.S. Cl. 437—48** **10 Claims**




1. A process for producing a dynamic random access memory cell having a stacked capacitor, comprising the steps of:
forming a MOSFET having a gate electrode, a drain region

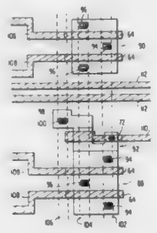
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and a source region, the drain and source regions being formed in a semiconductor substrate;
forming a first conductor layer on said semiconductor substrate so that said first conductor layer is electrically connected to said drain region;
depositing a first insulator film on said first conductor layer and removing said first insulator film except for a necessary portion;
depositing a second conductor layer on said first insulator so that said second conductor layer is electrically connected to said first conductor layer, and removing said second conductor layer except for a necessary portion;
removing said first insulator film alone;
forming a second insulator film on the respective surfaces of said first and second conductor layers; and
forming a third conductor layer on said second insulator film.

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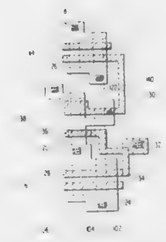
**4,742,019**
**METHOD FOR FORMING ALIGNED INTERCONNECTIONS BETWEEN LOGIC STAGES**
**Roland A. Béchade, South Burlington, Vt., assignor to International Business Machines Corporation, Armonk, N.Y.**
**Filed Oct. 30, 1985, Ser. No. 792,997**
**Int. Cl.[4] H01L *21/38, 21/44***
**U.S. Cl. 437—48** **10 Claims**

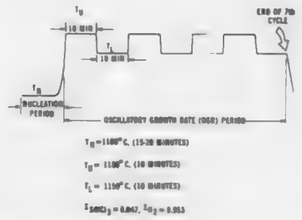


**1. A method of fabricating integrated IGFET logic circuits from a plurality of interconnected multi-input logic gates, at least some of the input nodes of individual logic gates being common to more than one logic gate, each logic gate including a number of input signal responsive devices for coupling a logic gate voltage node to a first reference voltage node to represent a first logic state and load means for coupling the logic gate voltage node to a second reference voltage node to represent a second logic state, including the steps of:**
**establishing a two-dimensional array of logic gates organized in columns and rows, wherein logic gates having common input nodes with other logic gates are placed in the same row and logic gates lacking common input nodes or having input nodes corresponding to input signals generated by others of the logic gates are placed in the same column;**
**aligning the common input devices of logic gates in different columns such that their input nodes are aligned in the row direction;**
**allocating a position in the column direction for each of the remaining input devices and load means;**
**aligning the logic gate voltage nodes, the first reference voltage nodes and the second reference voltage nodes within each logic gate to form three independent sets of linear points running in the column direction;**
**interconnecting any common voltage nodes between adjacent devices and load means within each logic gate by a first level of interconnection means;**
**interconnecting by a second level of interconnecting means the input nodes of the logic gates such that each input node is connected to another input node in a different column of logic gates or is connected to a least one point of an additional independent set of linear points representing a circuit input node running in the column direction or is connected to a logic gate voltage node representative of a circuit output node;**
**providing a plurality of substantially parallel third level interconnecting means aligned substantially in the column direction such that adjacent points within each set of points representing a common voltage node are interconnected; and**
**providing a plurality of fourth level interconnecting means aligned substantially in the row direction such that all of the third plurality of interconnecting means corresponding to the first reference voltage, the second reference voltage, circuit input nodes and circuit output nodes are independently connected.**

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**4,742,020**
**MULTILAYERING PROCESS FOR STRESS ACCOMMODATION IN DEPOSITED POLYSILICON**
**Pradip K. Roy, Reading, Pa., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.**
**Filed Feb. 1, 1985, Ser. No. 680,140**
**The portion of the term of this patent subsequent to Dec. 30, 2003, has been disclaimed.**
**Int. Cl.[4] H01L *21/471***
**U.S. Cl. 437—61** **10 Claims**



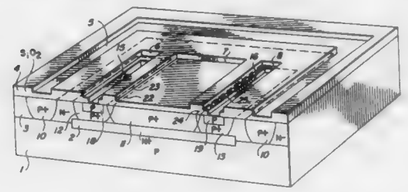


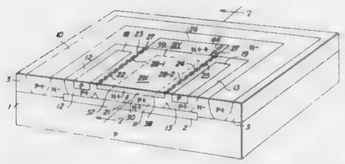

**1. In a process for depositing a polysilicon layer on a substantially planar major surface of a silicon substrate so as to create a multilayered polysilicon structure which is capable of accommodating stress, performing the steps of:**
**(a) growing a relatively thin oxide layer over the major surface of said silicon substrate;**
**(b) forming a polysilicon nucleation layer over said relatively thin oxide layer formed in step (a) such that said nucleation layer comprises a relatively coherent and continuous film of nucleation sites and the state of stress associated with the Si (440), $2\theta$ peak position near the top surface of said polysilicon nucleation layer is $\geqq 107.0°$;**
**(c) depositing polysilicon on said nucleation layer at a first growth rate which is controlled by a predetermined growth parameter;**
**(d) depositing polysilicon on said deposited polysilicon formed in step (c) at a second growth rate which is less than said first growth rate wherein the difference in growth rates is controlled by varying said predetermined growth parameter;**
**(e) repeating steps (c) and (d) so as to form a multilayered polysilicon layer of a predetermined thickness.**



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**4,742,021**
**SUBSURFACE ZENER DIODE AND METHOD OF MAKING**
**Stephen R. Burnham, and William J. Lillis, both of Tucson, Ariz., assignors to Burr-Brown Corporation, Tucson, Ariz.**
**Division of Ser. No. 859,454, May 5, 1985, Pat. No. 4,683,483. This application Apr. 14, 1987, Ser. No. 38,012**
**Int. Cl.[4] H01L *21/383***
**U.S. Cl. 437—149** **8 Claims**

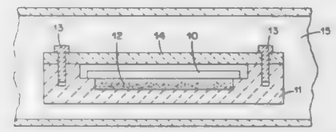




**1. A method of making a subsurface zener diode, comprising the steps of:**
**(a) providing a P type substrate of semiconductor material;**
**(b) providing a lightly doped N type layer of semiconductor material on the P type substrate and providing a heavily doped N type buried layer between the P type substrate and the N type layer;**
**(c) providing a masking layer for the N type layer, the masking layer having a first opening therein exposing a closed loop portion of the surface of the N type layer, the masking layer also having spaced second and third openings respectively exposing spaced portions of the surface of the N type layer within the closed loop;**
**(d) simultaneously passing P type impurities through the first, second and third openings to produce heavily doped corresponding surface regions in the N type layer and then diffusing the P type impurities downward and entirely through the N type layer and also simultaneously diffusing the P type impurities laterally outward from the edges of the first, second, and third openings to form a heavily doped P type isolation region electrically isolating an N type region of the N type layer and to form first and second heavily doped P type regions extending to the N type buried layer and each having relatively heavily doped inner portions and relatively lightly doped, overlapping peripheral outdiffused portions;**
**(e) forming a heavily doped N type region having a first portion in the first heavily doped P type region so that the peripheral portion of the heavily doped N type region includes a first peripheral portion, the entire first peripheral portion being located centrally in the lightly doped laterally outdiffused peripheral portion of the first P type region and the lightly doped peripheral portion of the second P type region; and**
**(f) forming a metal cathode conductor that electrically contacts the heavily doped N type region, and simultaneously forming a first metal anode conductor that electrically contacts the heavily doped second P type region.**

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**4,742,022**
**METHOD OF DIFFUSING ZINC INTO III-V COMPOUND SEMICONDUCTOR MATERIAL**
**Moshe Oren, Wilmington, Del., and A. N. M. Masum Choudhury, Newton, Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.**
**Continuation-in-part of Ser. No. 878,727, Jun. 26, 1986, abandoned. This application Oct. 29, 1987, Ser. No. 115,021**
**Int. Cl.[4] H01L *21/223***
**U.S. Cl. 437—167** **8 Claims**



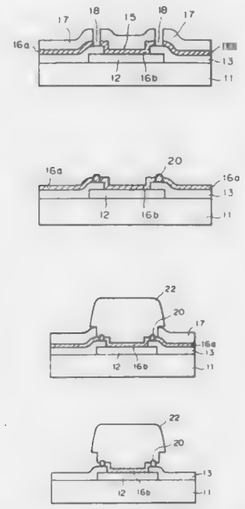
**1. The method of introducing zinc into a body of gallium arsenide or aluminum gallium arsenide comprising**
**placing a body of gallium arsenide or aluminum gallium arsenide in close proximity to a quantity of zinc gallium arsenide in granular form; the composition of the quantity of zinc gallium arsenide being approximately 22% Zn, 18% Ga, and 60% As in atomic percent;**
**placing said body and zinc gallium arsenide in an open-tube furnace; and**
**heating while flowing an inert gas through the open-tube furnace to vaporize zinc whereby zinc diffuses into the gallium arsenide or aluminum gallium arsenide.**

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**4,742,023**
**METHOD FOR PRODUCING A SEMICONDUCTOR DEVICE**
**Hitoshi Hasegawa, Tama, Japan, assignor to Fujitsu Limited, Kawasaki, Japan**
**Filed Aug. 19, 1987, Ser. No. 86,805**
**Claims priority, application Japan, Aug. 28, 1986, 61-203035; Aug. 28, 1986, 61-200101**
**Int. Cl.[4] H01L *21/60, 21/92***
**U.S. Cl. 437—183** **9 Claims**

**1. A method for producing a semiconductor device comprising the steps of:**
**forming an insulating layer on a semiconductor substrate provided with an electrode portion thereon,**
**forming a barrier metal layer over the entire surface thereof,**
**forming a groove in said barrier metal layer so that said groove surrounds said electrode portion,**
**burying a stopper material in said groove,**
**forming a bump on the barrier metal layer positioned on the electrode portion, and**

removing the barrier metal layer outside of the stopper, said stopper preventing a removal of the inside barrier metal



layer during the removal of the outside barrier metal layer.

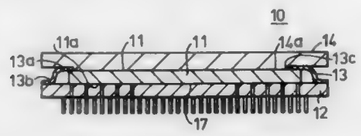
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**4,742,024**

**SEMICONDUCTOR DEVICE AND METHOD OF PRODUCING SEMICONDUCTOR DEVICE**

**Masahiro Sugimoto, Yokosuka; Yasumasa Wakasugi, and Shigeki Harada, both of Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

**Division of Ser. No. 937,414, Dec. 3, 1986, Pat. No. 4,698,663.**
**This application Jul. 23, 1987, Ser. No. 76,762**
**Claims priority, application Japan, Sep. 17, 1986, 61-218301**
**Int. Cl.[4] H01L *23/02, 39/02***
**U.S. Cl. 437—211** **4 Claims**



4. A method of producing a semiconductor device comprising the steps of:

forming a wiring layer on a top surface of a substrate;

mounting at least one semiconductor element with a top face thereof downward on said substrate and electrically coupled to said wiring layer;

mounting a cap on said substrate, said cap having at least one opening which is smaller than an external size of said semiconductor element, a peripheral portion of said cap being soldered on the top surface of said substrate and a portion of said cap around said opening being soldered on the bottom face of said semiconductor element to thereby hermetically seal said semiconductor element;

checking whether or not a satisfactory connection is obtained between said cap and said semiconductor element;

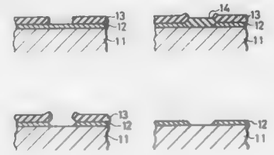
mounting a heatsink member on said cap, said heatsink member having a portion which fits into said opening and is soldered on the bottom face of said semiconductor element.

**4,742,025**

**METHOD OF FABRICATING A SEMICONDUCTOR DEVICE INCLUDING SELECTIVE ETCHING OF A SILICIDE LAYER**

**Kiyonori Ohyu, Hachioji; Nobuyoshi Natsuaki, Higashiyamato; Msao Tamura, Tokorozawa, and Yasuo Wada, Bunkyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Nov. 5, 1985, Ser. No. 795,271**
**Claims priority, application Japan, Nov. 5, 1984, 60-231412**
**Int. Cl.[4] H01L *21/283, 21/326***
**U.S. Cl. 437—225** **13 Claims**



1. A method of fabricating a semiconductor device, including the steps of selectively anodically oxidizing a film formed of a silicide of a refractory metal so as to form oxides of silicon and of the refractory metal selectively from said film, the portion of said film in which said oxides are formed constituting a film portion of said film, said film portion being a portion of the film to be selectively removed, and then etching said film portion so as to completely remove said oxides of silicon and of the refractory metal, to thereby completely remove said film portion of the silicide film selectively.

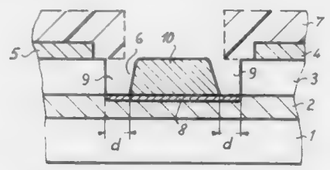
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**4,742,026**

**METHOD FOR THE SELECTIVE DRY ETCHING OF LAYERS OF III-V GROUP SEMICONDUCTIVE MATERIALS**

**Jean Vatus, Verrieres le Buisson, and Jean Chevrier, Gif sur Yvetie, both of France, assignors to Thomson-CSF, Paris, France**

**Filed Apr. 27, 1987, Ser. No. 42,819**
**Claims priority, application France, Apr. 30, 1986, 86 06329**
**Int. Cl.[4] H01L *21/465***
**U.S. Cl. 437—245** **3 Claims**



1. Method for the dry etching of layers of semiconductive materials of the III-V group, the etching being selective between a first layer, containing gallium and partially protected by a mask of resin, and a second layer containing aluminum in a proportion of 10 to 40%, the first layer alone having to be etched by this method comprising a reactive ion etching operation using a pure freon plasma $CCl_2F_2$ in two stages:

in a first stage of anisotropic etching, the first layer is etched up to the interface with the second layer, with the pure freon plasma being at a pressure ranging between 0.5 to 2.5 pascals, at a flowrate of 2 $cm^3$/min and a polarization volate for the cathode of the reactive ion etching device that ranges from −50 to −130 V, under power of 1 $W/cm^2$,

in a second stage of isotropic etching, the first layer is subetched, under the resin mask, by increasing the pressure of pure freon plasma to within a range of 6 to 10 pascals at a flowrate of 2 $cm^3$/min, the electrical conditions being the same as at the first stage.



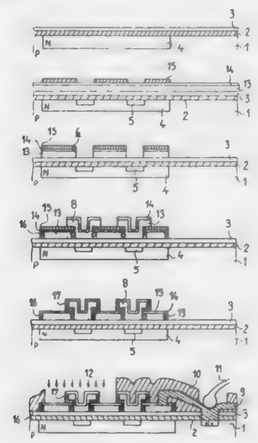
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**4,742,027**

**METHOD OF FABRICATING A CHARGE COUPLED DEVICE**

**Pierre Blanchard, Verrieres-Le-Buisson; Pierrick Descure, Biviers, and Jacques Chautemps, St. Egreve, all of France, assignors to Thomson-CSF, Paris, France**

**Division of Ser. No. 531,440, Sep. 12, 1983, Pat. No. 4,695,860.**
**This application Feb. 17, 1987, Ser. No. 15,292**
**Claims priority, application France, Sep. 21, 1982, 82 15905**
**Int. Cl.[4] H01L *21/425***
**U.S. Cl. 437—2** **11 Claims**



1. A method for preparing a photosensitive charge transfer device comprising

(a) forming over a silicon substrate which is coated with a gate insulator a first composite layer including in succession a polycrystalline layer contacting the gate insulator and a layer of silicon nitride,

(b) etching the composite layer for forming a plurality of first level electrodes each including a layer of polycrystalline silicon and an overlying layer of silicon nitride, and each spaced apart from one another for providing an intervening gap between adjacent electrodes,

(c) oxidizing exposed edge regions of the polycrystalline layer of the first level of electrodes,

(d) depositing over the first level of electrodes a second composite layer including in succession a layer of polycrystalline silicon and an overlying layer of insulating material,

(e) etching the second composite layer for forming a plurality of second level electrodes, each overlapping a pair of first level electrodes and filing the intervening gap, and each including a layer of polycrystalline silicon and an overlying insulating layer,

(f) oxidizing the exposed edge regions of the polycrystalline layer of the second level electrodes, and

(g) forming a passivating layer over first and second level electrodes which are to be shielded from incident radiation.

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**4,742,028**

**OPTICAL AND OPHTHALMIC GLASSES**

**Jean E. Boudot; Jean P. Mazeau, and Michel Prassas, all of Avon, France, assignors to Corning Glass Works, Corning, N.Y.**

**Filed Jun. 20, 1986, Ser. No. 876,933**
**Claims priority, application France, Nov. 29, 1985, 85 17658**
**Int. Cl.[4] C03C *4/00, 3/068, 3/066***
**U.S. Cl. 501—78** **1 Claim**

1. A glass for optical and/or ophthalmic applications having an index of refraction between 1.79–1.81, a density less than or equal to 3.75 $g/cm^3$, an Abbe number greater than 33, and a transmission at a thickness of 2 mm greater than or equal to 78% characterized in that it consists essentially, expressed in terms of weight percent on the oxide basis, of:

| | | | |
|---|---|---|---|
| $SiO_2$ | 21–30 | BaO | 0–5 |
| $B_2O_3$ | 2–10 | MgO + CaO + SrO + BaO | 18–30 |
| $SiO_2 + B_2O_3$ | 24–33 | ZnO | 0–5 |
| $Al_2O_3$ | 0–3 | $La_2O_3$ | 18–22 |
| $Li_2O + Na_2O + K_2O$ | 0–5 | $ZrO_2$ | 1–5 |
| MgO | 0–3 | $Nb_2O_5$ | 6–15 |
| CaO | 15–23 | $TiO_2$ | 5–13. |
| SrO | 0–5 | | |

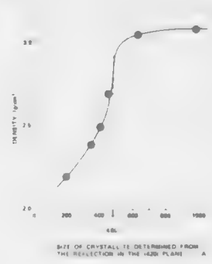
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**4,742,029**

**PROCESS FOR PRODUCING A SINTERED CUBIC SILICON CARBIDE**

**Yasuo Kurachi, Kodaira; Katsuhiko Arai, Iruma, and Koichi Irako, Higashimurayama, all of Japan, assignors to Bridgestone Corporation, Tokyo, Japan**

**Filed Jun. 18, 1985, Ser. No. 746,033**
**Claims priority, application Japan, Jun. 20, 1984, 59-126640; Nov. 29, 1984, 59-252497**
**Int. Cl.[4] C04B *35/56;* C01B *31/36***
**U.S. Cl. 501—88** **22 Claims**



1. A process for producing a high density normal sintered cubic silicon carbide which comprises:

sintering cubic silicon carbide powder made up of crystallites of more than 480 Å in size determined from the reflection in the (4 2 0) plane measured by the powder X-ray diffraction method, said silicon carbide powder being produced by heating and burning a raw material at a temperature of 1600° C. to 2000° C. under a nonoxidizing atmosphere, said raw material being a solid precursor obtained by solidifying a mixture of the following components (a)–(c)

(a) liquid silicide and an organic compound having a functional group,

(b) silicic solid, and

(c) carbonaceous solid

by a polymerization reaction of the liquid silicide with the organic compound having a functional group or by a polymerization reaction or bridging reaction of either the liquid silicide or the silicic acid with sintering additives including carbon of

from 0.5% to 3% by weight and boron of from 0.05% to less than 0.3% by weight or carbon of from 0.5% to 3% by weight, boron of 0.05% to 0.2% by weight and an aluminum-containing compound of from 0.05% to 1% by weight, said sintering being conducted under conditions which depress exaggerated grain growth.

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**4,742,030**

## SINTERED ZIRCONIA MATERIAL AND METHOD FOR MANUFACTURING THE MATERIAL

**Takaki Masaki, and Kiyokazu Shinjo, both of Otsu, Japan, assignors to Toray Industries, Inc., Tokyo, Japan**

**Filed Aug. 26, 1986, Ser. No. 900,581**

**Claims priority, application Japan, Sep. 6, 1985, 60-196076; Apr. 24, 1986, 61-95077**

**Int. Cl.⁴ C04B** *35/48;* **C01G** *25/02*

**U.S. Cl. 501—105** **41 Claims**

1. A sintered zirconia material which comprises:

a substantially carbon free sintered material which contains at least 50 mol% zirconia having a tetragonal crystal structure; wherein said sintered material contains from 1.5 to 5 mol% yttria; wherein the porosity of said sintered material is not greater than 0.6%; wherein the pore size of said sintered material is not greater than 0.1 μm; and wherein the pores of said sintered material exist mainly at triple points of the zirconia grain boundaries.

17. A method for manufacturing a sintered zirconia material comprising the steps of:

(a) preparing a zirconia powder which contains from 1.5 to 5 mol% yttria powder;

(b) making a raw material formed as a solid solution with said yttria and said zirconia powders by milling said powders after calcining said powders at 800° to 1,000° C.;

(c) forming a green body by compacting said raw material;

(d) making a presintered material which has a bulk density that is not less than 95% of a theoretical density by presintering said green body; and

(e) sintering said presintered material in an oxidizing atmosphere by hot isostatic pressing.

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**4,742,031**

## HIGH FREQUENCY WAVE ABSORBING CERAMICS

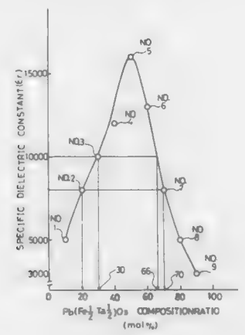
**Nobuyuki Ohya, Nagoya; Toshiki Saburi, Anjo; Toru Yamazaki, Kariya, and Taisei Katoh, Aichi, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan**

**Filed Mar. 7, 1986, Ser. No. 837,404**

**Claims priority, application Japan, Apr. 24, 1985, 60-88136**

**Int. Cl.⁴ C04B** *35/26;* **C01G** *49/06*

**U.S. Cl. 501—134** **5 Claims**




1. A high frequency wave absorbing ceramics composition having a specific dielectric constant of from 8,000 to 16,000 at 1 MHz at room temperature consisting essentially of

$$Pb\{Fe_{\frac{1}{2}}Nb_{(\frac{1}{2}-x)}Ta_x\}O_3$$

wherein $0.1 < x < 0.35$.

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**4,742,032**

## NEUTRALIZATION OF SPENT SOLID PHOSPHORIC ACID CATALYST

**Norman M. Whitton, Katy, Tex., assignor to Conoco Inc., Ponca City, Okla.**

**Filed Oct. 3, 1986, Ser. No. 915,161**

**Int. Cl.⁴ B01J** *27/28, 38/08;* **C07C** *2/02;* **C05B** *7/00*

**U.S. Cl. 502—26** **9 Claims**

1. A process for neutralization and removal of a fixed bed of spent solid phosphoric acid catalyst material contained in a pressurized reactor vessel used to process hydrocarbon material comprising:

(a) discontinuing introduction of fresh hydrocarbon feed to said reactor vessel;

(b) depressuring said reactor vessel;

(c) removing hydrocarbon feed and products from said reactor vessel;

(d) injecting ammonia into said reactor vessel in an amount and for a time sufficient to substantially neutralize the phosphoric acid content of said catalyst;

(e) removing unreacted ammonia from said reactor vessel; and

(f) removing neutralized spent catalyst from said reactor, thereby avoiding generation of toxic dust or highly acidic washings during removal of said spent acid catalyst from said reactor vessel.

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**4,742,033**

## CRACKING CATALYSTS COMPRISING PILLARED CLAYS

**Jesse R. Harris; David R. Battiste, and Brent J. Bertus, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Jan. 29, 1987, Ser. No. 8,711**

**Int. Cl.⁴ B01J** *21/16, 29/04, 29/06*

**U.S. Cl. 502—68** **83 Claims**

45. A composition of matter comprising pillared interlayered clay which has been prepared by the process comprising the steps of:

(a) contacting a smectite clay containing material with a solution comprising at least one dissolved carbon and oxygen containing compound selected from the group consisting of ammonium carboxylates containing from 1 to 20 carbon atoms per carboxylate group, alkali metal carboxylates containing from 1 to 20 carbon atoms per carboxylate group, alkali metal bicarbonates and alkali metal carbonates, at a temperature of at least 20° C. and for a period of time of at least one minute;

(b) separating the clay product formed in step (a) from said contacting solution;

(c) containing the clay product which has undergone treatment comprising steps (a) and (b) with a solution comprising at least one polymeric cationic hydroxy metal complex of at least one metal selected from the group consisting of aluminum, titanium, zirconium and chromium, under such conditions as to increase the content of said metal in said separated clay product obtained in step (b);

(d) separating the clay product having increased metal content formed in step (c) from said solution comprising the polymeric cationic hydroxy metal complex; and

(e) heating the separated clay product having increased metal content obtained in step (d) under such conditions as to remove at least a portion of water from said separated clay product obtained in step (d) so as to form a pillared interlayered clay.

48. A composition of matter in accordance with claim 45, wherein said process comprises the steps of

(a) contacting a smectite clay containing material with a



solution comprising water and at least one dissolved carbon and oxygen containing compound selected from the group consisting of ammonium carboxylates containing from 1 to 20 carbon atoms per carboxylate group, alkali metal carboxylates containing from 1 to 20 carbon atoms per carboxylate group, alkali metal bicarbonates and alkali metal carbonates, at a temperature in the range of from about 20° to about 100° C. and for a period of in the range of from about 5 minutes to about 100 hours;

(b) separating the clay product formed in step (a) from said contacting solution;

(c) contacting the clay product which has undergone treatment comprising steps (a) and (b) with a solution comprising water and at least one polymeric cationic hydroxy metal complex of aluminum under such conditions as to increase the content of aluminum in said clay product which has undergone treatment comprising steps (a) and (b),

(d) separating the clay product having increased aluminum content formed in step (c) from said solution comprising said at least one polymeric cationic hydroxy metal complex of aluminum; and

(e) heating the separated clay product having increased aluminum content obtained in step (d) under such conditions as to remove at least a portion of water from said separated clay product obtained in step (d) so as to form a pillared interlayered clay.

55. A composition of matter in accordance with claim 48, comprising the additional step of impregnating the pillared interlayered clay obtained in step (e) with at least one compound of at least one transition metal selected from the group consisting of metals belonging to Groups IIIB, IVB, VB, VIB, VIIB, VIII and IB of the Periodic Table.

56. A composition of matter in accordance with claim 48, wherein said process comprises the additional step of intimately admixing the pillared interlayered clay obtained in step (e) with zeolite at a weight ratio of about 30:1 to about 1:5, so as to provide a cracking catalyst composition.

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**4,742,034**

## SILVER ETHYLENE OXIDE CATALYST AND PROCESS FOR PREPARATION OF THE CATALYST

**Gosse Boxhoorn, and Aan H. Klazinga, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.**

**Filed Apr. 23, 1987, Ser. No. 41,494**

**Claims priority, application United Kingdom, May 7, 1986, 8611121**

**Int. Cl.⁴ B01J** *21/04, 23/04, 23/50, 27/12*

**U.S. Cl. 502—231** **16 Claims**

1. A silver catalyst, suitable for use in the oxidation of ethylene to ethylene oxide comprising a calcined, alkali metal-enriched alumina carrier having supported thereon:

(a) from 1 to 25 percent by weight of metallic silver, based on the weight of the total catalyst,

(b) an alkali metal of the group consisting of potassium, rubidium, cesium and mixtures thereof in the form of an oxide or hydroxide as a promoter and

(c) a fluoride-anion, the latter two under (b) and (c) each being present in an amount between 10 and 1000 ppm by weight of the total catalyst.

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**4,742,035**

## MIXED METAL PHOSPHORUS OXIDE CATALYSTS FOR THE OXIDATIVE DEHYDROGENATION OF CARBOXYLIC ACIDS

**S. Erik Pederson, Mentor; James L. Callahan, Wooster, and Harley F. Hardman, Lyndhurst, all of Ohio, assignors to The Standard Oil Co., Cleveland, Ohio**

**Continuation of Ser. No. 668,565, Nov. 5, 1984, abandoned, which is a division of Ser. No. 408,860, Aug. 17, 1982, abandoned, which is a continuation of Ser. No. 221,859, Dec. 31, 1980, abandoned. This application Jan. 28, 1987, Ser. No. 7,716**

**Int. Cl.⁴ B01J** *23/50, 23/84, 27/185*

**U.S. Cl. 502—210** **12 Claims**

1. A catalyst composition represented by the formula

$$A_aFe_bP_cO_x$$

wherein

A is selected from the group Cd, Cr, Ge, Th, Ti, U, Zr, rare earths and mixtures thereof; and

wherein

a is greater than zero but less than or equal to 1.0

b = 0.75–1.5

c = 1.0–2.0, and

x is the number of oxygens needed to satisfy the valence requirements of the remaining elements.

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**4,742,036**

## CATALYST PLATE

**Claus Flockenhaus, Essen; Daniel Grimm, Schlangenbad-Bärstadt; Hartmut Kainer, Wiesbaden, and Karl H. Laue, Hattingen, all of Fed. Rep. of Germany, assignors to Didier-Werke AG, Wiesbaden, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 831,142, Feb. 19, 1986, Pat. No. 4,695,559, and a continuation-ir-part of Ser. No. 887,366, Jul. 17, 1986, abandoned. This application Sep. 5, 1986, Ser. No. 904,175**

**Claims priority, application Fed. Rep. of Germany, Sep. 5, 1985, 3531651**

**Int. Cl.⁴ B01J** *23/74, 35/02*

**U.S. Cl. 502—213** **18 Claims**

1. A catalytic plate structure for reducing at least one oxide of nitrogen, said catalytic structure comprising:

a first catalytic material comprising an $Fe_2O_3$ catalyst substance with sulphuric acid as a binder and having a first catalytic activity with respect to said at least one oxide of nitrogen and also having a first sensitivity to water which physically degenerates said first catalytic material at a first rate;

a second catalytic material comprising $Fe_2O_3$ catalyst substance with phosphoric acid as a binder and having a second catalytic activity with respect to said at least one oxide of nitrogen and also having a second sensitivity to water which physically degenerates said second catalytic material at a second rate;

said first catalytic material being disposed in at least one first region in said structure;

said second catalytic material being disposed in at least second one second region in said structure;

said at least one first region and said at least one second region being substantially distinct one from the other;

said first catalytic activity of said first catalytic material being substantially distinct one from the other;

said first catalytic activity of said first catalytic material being substantially greater than said second catalytic activity of said second catalytic material;

said first rate of physical degeneration of said first catalytic material by water being substantially greater than said second raate of physical degeneration of said second catalytic material by water, whereby said first catalytic material does dengenerate physically when acted upon by water, in use;

said second catalytic material further being substantially

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insensitive to degeneration by water, whereby said second catalytic material does not substantially degenerate when acted upon by water, in use; and

said second catalytic material being disposed in said structure to physically reinforce said first catalytic material in said structure, whereby said structure is also reinforced by said second catalytic material, even when said first catalytic material is substantially physically degenerated by water, whereby

said catalytic structure has a catalytic activity which is substantially greater than said catalytic activity of said second catalytic material alone.

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**4,742,037**

## CATALYST FOR REDUCTIVE CONVERSION OF NITROGEN OXIDES IN WASTE GASES

**Alfons Baiker, Opfikon; Peter Dollenmeier, Wallisellen, both of Switzerland, and Marek Glinski, Warsaw, Poland, assignors to Lonza Ltd., Gampel/Valais, Switzerland**

**Filed Mar. 18, 1987, Ser. No. 27,395**

**Claims priority, application Switzerland, Apr. 17, 1986, 1556/86**

**Int. Cl.[4] B01J** *21/06, 23/14, 23/22, 23/26*

**U.S. Cl. 502—247** **11 Claims**

1. Catalyst for the reductive conversion of nitrogen oxides in waste gases, said catalyst being produced by repeating at least once the step sequence of impregnating a support, containing $TiO_2$, $SiO_2$, ZrO, $Cr_2O_3$ and/or $SnO_2$, with a vanadium alkoxide dissolved in an apolar, water-free solvent in an inert atmosphere, and calcining the impregnated support at a temperature of 300° to 600° C. for 3 to 6 hours in the dry gas current with 15 to 25 percent by volume of oxygen to achieve a surface deposit of the active parts in the form of vanadium oxide on the support.

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**4,742,038**

## MONOLITHIC CATALYST SUPPORT AND CATALYST DEPOSITED ON THE SUPPORT

**Shinichi Matsumoto, Aichi, Japan, assignor to Toyota Jidoshi Kabushiki Kaisha, Aichi, Japan**

**Filed Nov. 24, 1986, Ser. No. 933,996**

**Claims priority, application Japan, Nov. 26, 1985, 60-265794; Apr. 9, 1986, 61-081569**

**Int. Cl.[4] B01J** *21/04, 23/02, 23/10, 23/26*

**U.S. Cl. 502—303** **12 Claims**

1. A monolithic catalyst support for use in the purification of exhaust gases comprising:

a metal substrate,

an oxide membrane formed on the surface of said substrate by treating said substrate in an oxidative atomosphere at a temperature between 800° C. and about 1200° C., said membrane containing alumina which substantially comprises active alumina, and

an active alumina layer formed on said oxide membrane,

wherein the composition of the metal substrate is composed of from 5 to 30% by weight of chromium, from 1 to 10% by weight of aluminum, from 0.01 to 0.5% by weight of lanthanoid elements and the balance of iron.

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**4,742,039**

## ADSORBENTS BASED ON PHYLLOSILICIC ACIDS WHICH HAVE BEEN MODIFIED SO AS TO BE ORGANOPHILIC

**Johann F. Hanauer, Eppstein; Hans-Peter Rieck, Hofheim am Taunus; Hans-Jürgen Kalz, Liederbach; Jochen M. Quack, Eppstein, and Armin Weiss, Munich, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Sep. 20, 1985, Ser. No. 778,567**

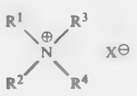
**Claims priority, application Fed. Rep. of Germany, Sep. 21, 1984, 3434709**

**Int. Cl.[4] B01J** *20/22*

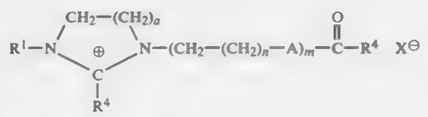
**U.S. Cl. 502—407** **9 Claims**

1. An adsorbent for organic compounds which is based on phyllosilicic acids modified so as to be organophilic and which is prepared from the components comprising

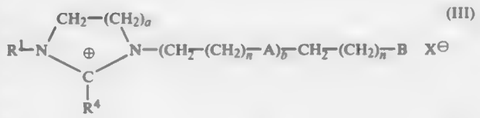
(a) 5–80%, of a quaternary ammonium compound of the formulae I–IV



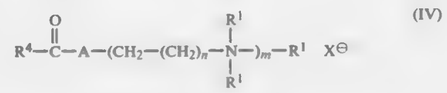
(I)



(II)



(III)



(IV)

in which $R^1$ and $R^2$ can be identical or different and denote hydrogen, $C_1$–$C_4$-alkyl, $C_2$–$C_4$-hydroxyalkyl or benzyl, $R^3$ denotes hydrogen, $C_1$–$C_{22}$-alkyl or $C_2$–$C_{22}$-alkenyl, $C_2$ $C_4$-hydroxyalkyl or benzyl, $R^4$ denotes $C_1$–$C_{22}$-alkyl, $C_6$–$C_{22}$-alkenyl, $C_4$–$C_{22}$-alkoxyalkyl or $C_4$–$C_{22}$-alkylphenoxyethyl, a denotes 1 or 2, b denotes a number from 0 to 3, n or m denote a number from 1 to 4, A denotes NH or 0, B denotes $NH_2$, $N(R^1)_2$, $N^{\oplus}(R^1)_3A^{\ominus}$ or OH and $X^{\ominus}$ denotes an anion, and (b) 20–95%, of a crystalline phyllosilicate belonging to the group comprising phyllosilicates of the formula

$$Me_2Si_xO_{2x+1}.yH_2O$$

in which Me denotes an alkali metal ion or a proton, x denotes a number greater than 7, and y denotes a number smaller than 7 x.

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**4,742,040**

## PROCESS FOR MANUFACTURING A CARBON MOLECULAR SIEVE

**Takushi Ohsaki, and Susumu Abe, both of Bizen, Japan, assignors to Kuraray Chemical Co., Ltd., Bizen, Japan**

**Filed Jan. 29, 1987, Ser. No. 8,327**

**Claims priority, application Japan, Jan. 29, 1986, 61-17487**

**Int. Cl.[4] B01J** *20/20;* **C01B** *31/08*

**U.S. Cl. 502—426** **9 Claims**

1. A process for manufacturing a carbon molecular sieve having both increased gas adsorption capacity and selectivity; comprising:



(a) adding coal tar, coal tar pitch or a combination thereof to powdered coconut shell charcoal as a binder;

(b) pelletizing said mixture and carbonizing the same at about 600°–900° C.;

(c) immersing the pellets in mineral acid solution, thereby substantially removing soluble ingredients comprising alkaline metal compounds therefrom;

(d) drying the immersed pellets;

(e) adding to the dried pellets a fraction of cresote which is distilled at a temperature of 140°–260° C., in an amount sufficient to increase both said gas adsorption capacity and selectivity;

(f) heating the pellets to about 600°–900° C., for about 10–60 minutes; and

(g) cooling the pellets in an inert gas.

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**4,742,041**

## HEAT-SENSITIVE RECORDING MATERIAL

**Kensuke Ikeda; Hirofumi Mitsuo, and Junichi Yoneda, all of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Jun. 26, 1986, Ser. No. 878,756**

**Claims priority, application Japan, Jun. 26, 1985, 60-139868**

**Int. Cl.[4] B41M** *5/18*

**U.S. Cl. 503—200** **11 Claims**

1. A heat-sensitive recording material comprising a support having coated thereon a heat-sensitive coloring layer containing a colorless or light-colored electron donating dye precursor and an electron accepting compound capable of reacting with said electron donating dye precursor to form a color and a protective layer provided on said heat-sensitive coloring layer comprising a saponified product of a vinyl acetate-acrylamide copolymer or vinyl acetate-methacrylamide copolymer having an acrylamide or methacrylamide content of about 0.5 to about 80% by weight.

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**4,742,042**

## THERMOSENSITIVE RECORDING MATERIAL

**Shigetoshi Hiraishi, Tokyo; Naomasa Koike, Takasago; Kazuyoshi Kondo, and Mitsuru Fuchigami, both of Tokyo, all of Japan, assignors to Mitsubishi Paper Mills, Ltd., Tokyo, Japan**

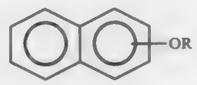
**Filed Jan. 27, 1986, Ser. No. 822,590**

**Claims priority, application Japan, Jan. 31, 1985, 60-15385; Mar. 4, 1985, 60-43192; Mar. 4, 1985, 60-43193; Mar. 4, 1985, 60-43194; Mar. 4, 1985, 60-43195; Apr. 2, 1985, 60-69691**

**Int. Cl.[4] B41M** *5/18*

**U.S. Cl. 503—201** **14 Claims**

1. A thermosensitive recording material comprising a support and, provided thereon, a thermosensitive recording layer containing a generally colorless or slightly colored dye precursor and a developer which, upon being heated, reacts with said dye precursor to develop color, wherein said thermosensitive recording layer contains as sensitizer



(wherein R represents a substituted or unsubstituted aralkyl group and said developer is bis(3-allyl-4-hydroxyphenyl)sulfone or combination of bis(3-allyl-4-hydroxyphenyl)sulfone and 3-allyl-4,4'-dihydroxydiphenylsulfone.

14. The thermosensitive recording material according to claim 1 wherein said developer is bis(3-allyl-4-hydroxyphenyl)sulfone.

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**4,742,043**

## HEAT-SENSITIVE RECORDING MATERIAL

**Toshiharu Tanaka, and Toshimasa Usami, both of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Jan. 23, 1986, Ser. No. 824,346**

**Claims priority, application Japan, Jan. 23, 1985, 60-10270**

**Int. Cl.[4] B41M** *5/18*

**U.S. Cl. 503—213** **25 Claims**

1. A heat-sensitive recording material comprising a support and a heat-sensitive recording layer on the support, said layer containing (1) microcapsules containing a basic dye precursor and an organic solvent as the core thereof and (2) a developer capable of forming color on reacting with the basic dye precursor, wherein said microcapsules are produced by the use of a wall-forming substance comprising xylylene diisocyanate or an adduct thereof such that the microcapsule walls are impermeable to both the basic dye precursor and developer at room temperature, but at a temperature of a thermal head during a recording process, become permeable to at least one of the basic dye precursor and developer, thereby permitting formation of a colored image as a result of the reaction between the basic dye precursor and the developer.

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**4,742,044**

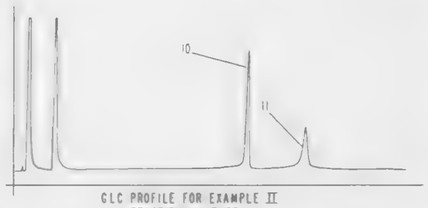
## ARALKOXY, ALKOXY, ALKADIENYLOXY AND ALKENYLOXY-1,3,2-DIOXABORINANE DERIVATIVES AND USES THEREOF IN AUGMENTING OR ENHANCING THE AROMA OF PERFUME COMPOSITIONS, PERFUMED ARTICLES AND PERFUMED POLYMERS

**Richard M. Boden, Ocean, N.J., assignor to International Flavors & Fragrances Inc., New York, N.Y.**

**Filed Aug. 19, 1987, Ser. No. 86,812**

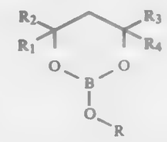
**Int. Cl.[4] A61K** *7/46*

**U.S. Cl. 512—12** **17 Claims**




GLC PROFILE FOR EXAMPLE II
REACTION MIXTURE

1. A 1,3,2-Dioxaborinane derivative defined according to the genus:



wherein $R_1$, $R_2$, $R_3$ and $R_4$ are the same or different hydrogen, methyl and ethyl; and wherein R represents $C_6$ straight chain alkenyloxy; $C_{10}$ branched chain alkenyloxy; $C_{12}$ aralkoxy; $C_{12}$ branched chain alkoxy; or $C_{10}$ branched chain alkadienyloxy.

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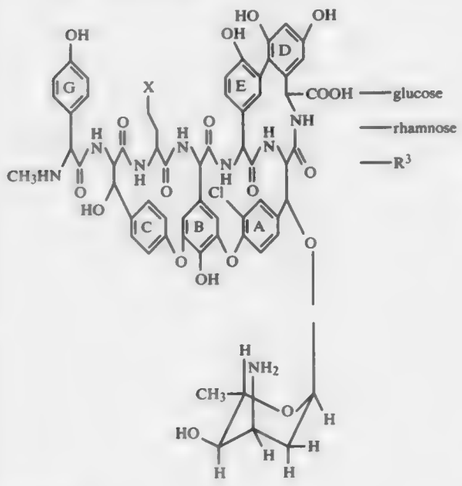
**4,742,045**

## GLYCOPEPTIDE ANTIBIOTICS

**Ashok K. Verma; Anil K. Goel; V. Arjuna Rao; Akella Venkateswarlu, all of Bangalore, India, and Robert D. Sitrin, Lafayette Hill, Pa., assignors to SmithKline Beckman Corporation, Philadelphia, Pa.**

**Filed Jul. 30, 1986, Ser. No. 891,931**
**Int. Cl.⁴ A61K** *37/00;* **C07K** *9/00;* **A23K** *1/00*
**U.S. Cl. 514—8** **36 Claims**

1. The CWI-785 complex of formula (I)




wherein
X is $SCH_3$ or



and
$R^3$ is hydrogen or mannose produced by culturing the Actinomycete SK & F-CWI-785 having the identifying characteristics of ATCC 53296, or an active mutant or derivative thereof, in an aqueous nutrient medium containing assimilable sources of nitrogen and carbon under submerged aerobic conditions.

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**4,742,046**

## METHODS AND COMPOSITIONS FOR INHIBITING THE INFECTIOUS ACTIVITY OF VIRUSES

**Madeleine A. M. Bliah, Paris, France, assignor to Medisearch S.A., Zurich, Switzerland**

**Continuation-in-part of Ser. No. 637,421, Aug. 3, 1984, abandoned. This application Jun. 27, 1985, Ser. No. 749,936**
**Int. Cl.⁴ A61K** *37/02, 35/78;* **C07K** *15/14*
**U.S. Cl. 514—8** **21 Claims**

1. A method of treatment or prophylaxis for animals and man suffering from, or exposed to, a disease induced by an influenza virus which consists of administering a virus-inhibiting amount of a pharmaceutical composition comprising a non-toxic lectin selected from the group consisting of *Sambucus nigra agglutinin* I and *Sambucus nigra agglutinin* II to said animals or humans.

11. A pharmaceutical composition consisting of a viral replicative inhibiting concentration of a non-toxic lectin selected from the group consisting of *Sambucus nigra agglutinin* I and *Sambucus nigra agglutinin* II and a pharmaceutically-acceptable carrier, diluent, encapsulating agent or solvent.

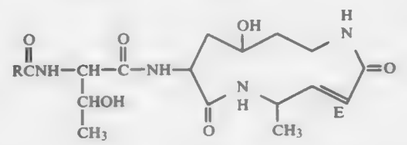
**4,742,047**

## SEMI-SYNTHETIC PEPTIDE ANTIBIOTICS

**Masahisa Oka, Yokohama; Keiichi Numata, Fuchu, and Masataka Konishi, Kawasaki, all of Japan, assignors to Bristol-Myers Company, New York, N.Y.**

**Filed Oct. 10, 1986, Ser. No. 917,575**
**Int. Cl.⁴ C07K** *5/12*
**U.S. Cl. 514—11** **11 Claims**

1. A compound of the formula




wherein the threonyl unit is L-threonyl, and wherein R is a straight chain alkyl group having 8 to 16 carbon atoms; or a group selected from the group consisting of $CH_3$—$(CH_2)_8$—CH=CH—, $CH_3$—$(CH_2)_{13}$CH(OH)—, and p—$CH_3$—$(CH_2)_7$—O—$C_6H_4$—.

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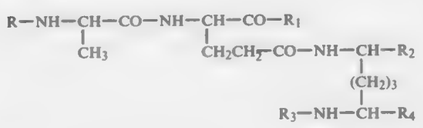
**4,742,048**

## TETRAPEPTIDES AND PENTAPEPTIDES, THEIR PREPARATION AND COMPOSITIONS CONTAINING THEM

**Jean Bouchaudon, Morsang-Sur-Orge; Daniel Farge, Thiais, and Claude James, Paris, all of France, assignors to Rhone-Poulenc Industries, Paris, France**

**Filed Jun. 27, 1980, Ser. No. 163,890**
**Claims priority, application France, Jun. 29, 1979, 79 16845**
**Int. Cl.⁴ A61K** *37/02;* **C07K** *5/08, 5/10*
**U.S. Cl. 514—17** **21 Claims**

1. A peptide of the formula:




wherein
R is a hydrogen atom or a fatty acid residue;
$R_1$ is a hydroxy or amino radical;
$R_2$ is a carboxy or an N-glycyl or N-D-alanyl residue;
$R_3$ is a hydrogen atom, a fatty acid residue, a glycyl or D-alanyl radical or a glycyl or a D-alanyl radical in which the amino group is substituted by a fatty acid residue; and at least one of the symbols $R_2$ and $R_3$ represent a glycyl or a D-alanyl residue and at least one of the symbols R and $R_3$ contains or is a fatty acid residue; and $R_4$ is a hydrogen or carbamoyl; the alanine bonded to the glutamic acid being in the L form; the glutamic acid being in the D form, the lysine, when $R_4$ represents a hydrogen atom, being in the L form, and the 2,6-diaminopimelamic acid, when $R_4$ represents a carbamoyl radical, being in the D,D, L,L, D,D/L,L (racemic) or D,L (meso) form; or a salt thereof.

20. A method of increasing cell immunity reactions or the production of circulating or local antibodies in man or a domestic animal which comprises the administration of an effective amount of a peptide according to claim 1 or a non-toxic salt thereof and an antigen.



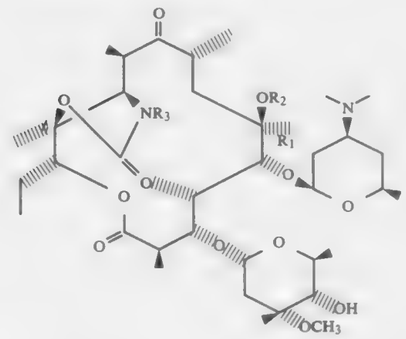
**4,742,049**

## SEMISYNTHETIC ERYTHROMYCIN ANTIBIOTICS

**William R. Baker, Vernon Hills, and Jerry D. Clark, Waukegan, both of Ill., assignors to Abbott Laboratories, Chicago, Ill.**

**Filed Jun. 4, 1986, Ser. No. 870,489**
**Int. Cl.⁴ A61K** *31/70;* **C07H** *17/08*
**U.S. Cl. 514—29** **5 Claims**

1. A compound of the formula




where $R_1$ is selected from hydroxyl or O-acyl of 2 to 20 carbon atoms, $R_2$ is hydrogen or methyl and $R_3$ is hydrogen, alkyl, alkoxy, dimethylaminoalkyl, or haloalkyl, and pharmaceutically acceptable salts thereof.

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**4,742,050**

## SENSITIZATION OF HYPOXIC TUMOR CELLS AND CONTROL OF GROWTH THEREOF

**John M. Yuhas, deceased, late of Bala Cynwyd (by Mary Ellen Yuhas, administrator); Robert L. Goodman, Gladwyne, all of Pa., and Robert E. Moore, Wilmington, Del., assignors to Adamantech, Inc., Linwood, Pa.**

**Continuation of Ser. No. 724,445, Apr. 17, 1985, abandoned, Division of Ser. No. 580,760, Feb. 17, 1984, abandoned, which is a continuation-in-part of Ser. No. 517,150, Jul. 25, 1983, abandoned, which is a continuation-in-part of Ser. No. 408,589, Aug. 17, 1982, abandoned. This application Sep. 9, 1987, Ser. No. 96,298**
**Int. Cl.⁴ A61K** *31/70*
**U.S. Cl. 514—34** **30 Claims**

1. A method of delivering a lipophilic drug in an animal, comprising administering to the animal a therapeutically effective amount of the drug in an aqueous dispersion of a perfluoro compound capable of carrying oxygen.

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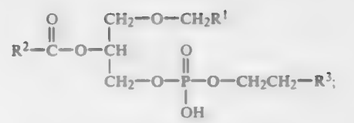
**4,742,051**

## ANTIHYPERTENSIVE COMPOUNDS

**Ernest E. Muirhead, Memphis; Byron E. Leach, deceased, late of Memphis (by Ellanor L. L. Leach, executor), and Lawrence W. Byers, Memphis, all of Tenn., assignors to University of Tennessee Research Corporation, Knoxville, Tenn.**

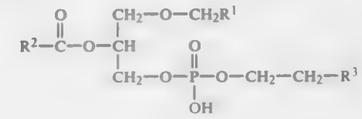
**Continuation of Ser. No. 80,523, Oct. 1, 1979, abandoned, which is a continuation-in-part of Ser. No. 931,859, Aug. 7, 1978, Pat. No. 4,206,201, which is a continuation of Ser. No. 811,891, Jun. 30, 1977, abandoned. This application Jul. 17, 1981, Ser. No. 284,521**
**Int. Cl.⁴ A61K** *31/66;* **C07F** *9/09*
**U.S. Cl. 514—114** **23 Claims**

1. An antihypertensive agent having the formula:




wherein
$R^1$ is an alkyl or alkenyl group having from about 11 to about 23 carbon atoms;
$R^2$ is hydrogen or an alkyl or alkenyl group having from about 1 to about 11 carbon atoms; and
$R^3$ is $NR_4R_5$ or $NR_4R_5R_6{}^+An^-$
wherein $R_4$, $R_5$ and $R_6$ are independently hydrogen or lower alkyl having from 1 to 3 carbon atoms and An is an anion;
said agent having a biological depressor effect activity of at least 0.2 units.

15. A pharmaceutical preparation for treating hypertensive mammals, said preparation comprising a pharmaceutically acceptable carrier and an effective anti-hypertensive treatment amount of a compound having the formula:




wherein:
$R^1$ is an alkyl or alkenyl group having from about 11 to about 23 carbon atoms;
$R^2$ is hydrogen or an alkyl or alkenyl group having from about 1 to about 11 carbon atoms; and
$R^3$ is $NR_4R_5$ or $NR_4R_5R_6{}^+An^-$
wherein $R_4$, $R_5$ and $R_6$ are independently hydrogen or lower alkyl having from about 1 to 3 carbon atoms and An is an anion;
or a pharmaceutically acceptable salt thereof.

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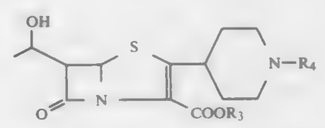
**4,742,052**

## ANTIBACTERIAL β-LACTAM COMPOUNDS

**Makoto Sunagawa; Haruki Matsumura, both of Osaka; Takaaki Inoue, and Masao Enomoto, both of Hyogo, all of Japan, assignors to Sumitomo Pharmaceuticals Company, Limited, Osaka, Japan**

**Filed Jul. 15, 1982, Ser. No. 398,489**
**Claims priority, application Japan, Jul. 15, 1981, 56-111108; Dec. 1, 1981, 56-193947; Dec. 3, 1981, 56-195470; Dec. 4, 1981, 56-196037; Dec. 28, 1981, 56-211416**
**Int. Cl.⁴ A61K** *31/43;* **C07D** *499/00*
**U.S. Cl. 514—195** **16 Claims**

16. A method of preventing bacterial infections in warm-blooded animals in need of said treatment which comprises administering thereto an antibacterial effective amount of a compound of the formula




wherein $R_3$ is hydrogen or a conventional protecting group for a carboxyl group and $R_4$ is hydrogen or $C_4$–$C_{10}$ tert-alkyl or a pharmaceutically acceptable salt thereof.

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**4,742,053**

## 3-ISOQUINOLINIOMETHYL CEPHALOSPORIN DERIVATIVES

**Susumu Nakagawa; Ryosuke Ushijima, both of Okazaki; Eiichi Mano, Kariya; Norikazu Ban, and Minoru Sanada, both of Okazaki, all of Japan, assignors to Banyu Pharmaceutical Co., Ltd., Tokyo, Japan**

**Filed Nov. 8, 1985, Ser. No. 796,187**

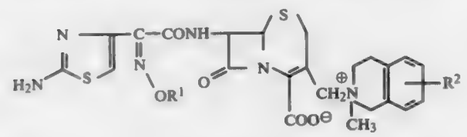
**Claims priority, application Japan, Nov. 12, 1984, 59-236796; Aug. 6, 1985, 60-171838**

**The portion of the term of this patent subsequent to Jun. 3, 2004, has been disclaimed.**

**Int. Cl.⁴ A61K** *31/545;* **C07D** *501/20*

**U.S. Cl. 514—202** **6 Claims**

5. An antibacterial agent comprising an antibacterially effective amount of a compound having the formula:



wherein $R^1$ is a straight chain, branched chain, or cyclic lower alkyl group which may be substituted by a carboxyl group, and $R^2$ designates vicinal dihydroxyl groups or diacetoxy groups; or a pharmaceutically acceptable salt, physiologically hydrolyzable ester or solvate thereof.

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**4,742,054**

## TREATMENT OF MAMMALS SUFFERING FROM DAMAGE TO THE CENTRAL NERVOUS SYSTEM

**Nosrat E. Naftchi, 389 Forest Ave., Teaneck, N.J. 07666**

**Continuation of Ser. No. 443,915, Nov. 23, 1982, abandoned. This application Jan. 16, 1985, Ser. No. 691,830**

**Int. Cl.⁴ A61K** *31/55, 31/495, 31/52, 505*

**U.S. Cl. 514—215** **23 Claims**

1. A method for treating a mammal having an injured spinal cord with the resultant loss of motor and sensory function and the concomitant loss of muscular control, comprising administering to the mammal at least one neural receptor agonist as the primary therapeutic agent, in a dosage amount and at a dosage rate sufficient to at least partially restore the lost motor and sensory function as evidenced by a return of motor and sensory functions.

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**4,742,055**

## 3- AND 5-AMINO THIATRIAZINES, AND THEIR PHARMACEUTICAL USES

**William L. Studt, Harleysville; Donald E. Kuhla, Doylestown; Henry F. Campbell, Lansdale, and Stuart A. Dodson, Lansdale, all of Pa., assignors to Rorer Pharmaceutical Corporation, Fort Washington, Pa.**

**Filed Apr. 27, 1984, Ser. No. 604,988**

**The portion of the term of this patent subsequent to Jun. 17, 2003, has been disclaimed.**

**Int. Cl.⁴ C07D** *285/00, 401/12, 417/12;* **A61K** *31/54*

**U.S. Cl. 514—222.5** **19 Claims**

1. A method for the treatment of gastrointestinal hypersecretory or ulcerogenic disorders of a human or other mammal comprising administering thereto an effective antiulcerogenic amount of a 1,2,4,6-thiatriazine-1,1-dioxide compound substituted in the 2-, 4-or 6- positions by hydrogen, lower alkyl, heterocycloalkyl, cyclololoweralkyl, phenylloweralkyl or substituted phenylloweralkyl, and in the 3-and/or the 5-position by $NR_3R_4$ wherein:

$R_3$ is H or lower alkyl;

$R_4$ is H, lower alkyl, phenyl, substituted phenyl, phenylloweralkyl, substituted phenylloweralkyl, phenoxyloweralkyl, substituted phenoxyloweralkyl, or $-(CH_2)_m-Z-(CH_2)_n-B$;

provided that $R_4$ is $-(CH_2)_m-Z-(CH_2)_n-B$ in at least one of the 3- or 5- positions; and wherein:

m and n are 0, 1, 2, 3 or 4, provided m+n=0;

Z is oxygen or sulfur;

B is phenyl, toluyl, heteroaryl, alkyl heteroaryl or phenyl, toluyl, heteroaryl or alkyl heteroaryl substituted by amino, aminoloweralkyl, loweralkylamino, diloweralkylamino, loweralkylaminoloweralkyl, diloweralkylaminoloweralkyl or azaheterocyclyl;

and wherein:

substituted phenyl means phenyl substituted by loweralkyl, halo, carboxyl, amino, loweralkylamino, amido, hydroxyl, nitro, cyano or sulfonyl;

heteroaryl means furyl, pyridyl, thiazolyl or thienyl; and

azaheterocyclyl means piperidinyl, pyrrolidinyl, morpholinyl, azepinyl, pyrrolyl, imidazolyl, pyrazolyl, and thiamorpholinyl;

or a pharmaceutically acceptable salt thereof.

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**4,742,056**

## OXADIAZINONES AND PESTICIDAL USE

**Saleem Farooq, Arisdorf, and Manfred Kühne, Pfeffingen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

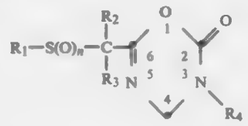
**Filed Jan. 2, 1987, Ser. No. 233**

**Claims priority, application Switzerland, Jan. 9, 1986, 37/86; Nov. 28, 1986, 4768/86**

**Int. Cl.⁴ A01N** *43/72;* **C07D** *273/04*

**U.S. Cl. 514—229.2** **13 Claims**

1. A compound of formula I



(I)

wherein

$R_1$ and $R_4$ are each independently of the other $C_1$–$C_8$alkyl, $C_3$–$C_6$cycloalkyl, $C_3$–$C_4$alkenyl, $C_3$–$C_4$alkynyl, phenyl or benzyl;

$R_2$ and $R_3$ are each independently of the other hydrogen, $C_1$–$C_4$alkyl, or $R_2$ and $R_3$, together with the carbon atom to which they are attached, are $C_3$–$C_6$cycloalkyl; and

n is 0, 1 or 2.

13. A method of controlling insects and representatives of the order Acarina, which method comprises contacting or treating said pests or their eggs and/or their various development stages or the locus thereof with a pesticidally effective amount of a compound of formula I according to claim 1.

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**4,742,057**

## ANTIALLERGIC THIAZOLE COMPOUNDS

**Ikuo Ueda; Masaaki Matsuo, both of Toyonaka; Takashi Manabe, Osaka, and Hiroshi Matsuda, Kyoto, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan**

**Filed Nov. 20, 1986, Ser. No. 932,592**

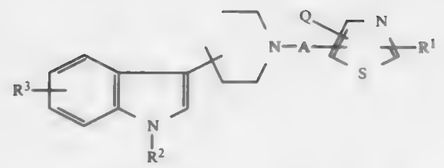
**Claims priority, application Japan, Dec. 5, 1985, 60-274465; Oct. 3, 1986, 61-236879**

**Int. Cl.⁴ A61K** *31/535;* **C07D** *417/14*

**U.S. Cl. 514—231** **14 Claims**

1. A thiazole compound of the formula:





wherein $R^1$ is amino, lower alkylamino, lower alkenylamino, lower alkynylamino, lower alkanoylamino, higher alkanoylamino, lower alkenoylamino, lower alkynoylamino, mono- or di- or trihalo(lower)alkanoylamino, cyclo(lower)alkylcarbonylamino, cyclo(lower)alkenylcarbonylamino, loweralkoxycarbonylamino, hydroxy(lower)alkanoylamino, lower alkoxy(lower) alkanoylamino, lower alkanoyloxy(lower)alkanoylamino, ureido, lower alkylureido, amino-substituted alkanoylamino, carboxy substituted lower alkanoylamino, lower alkoxycarbonylcarbonylamino, lower alkoxycarbonyl(lower)alkanoylamino, lower alkanoylcarbonylamino, lower alkanoyl(lower)alkanoylamino, amino- and carboxy-substituted alkanoylamino, benzoylamino, nicotinoylamino, phenylalkanoylamino, phenylalkenoylamino, morpholino(lower)alkanoylamino, lower alkylsulfonylamino, tosylamino, phenylsulfonylamino, phenylamino, N,N-di(lower)alkylsulfonylamino, N-(lower)alkanoyl-N-(lower)alkylamino, N-cyclo(lower)alkylcarbonyl-N-(lower)alkylamino or N-(lower-)alkylsulfonyl-N-(lower)alkylamino,

$R^2$ is hydrogen, lower alkyl or phenyl,

$R^3$ is hydrogen, nitro, amino, lower alkanoylamino, hydroxy or lower alkoxy,

A is lower alkylene,

Q is hydrogen or halogen, and a heavy solid line means a single or double bond, or a pharmaceutically acceptable salt thereof.

14. A method for the therapeutic treatment of allergic disease which comprises administering an antiallergically effective amount of a compound of claim 1 in human beings or animals.

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**4,742,058**

## POLYPRENYL COMPOUND, PROCESS FOR THE PRODUCTION THEREOF AND DRUG CONTAINING THE SAME

**Isao Yamatsu, Ushiku; Takeshi Suzuki, Ushikumachi; Shinya Abe, Kukizakimachi; Kouji Nakamoto, Tsuchiura; Akiharu Kajiwara, Yatabemachi; Tohru Fujimori, Toyosatomachi; Koukichi Harada, Yatabe, and Shinichi Kitamura, Tokyo, all of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan**

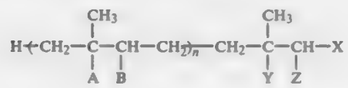
**Continuation of Ser. No. 554,423, Nov. 23, 1983, abandoned. This application Jul. 14, 1986, Ser. No. 885,321**

**Claims priority, application Japan, Nov. 30, 1982, 57-208678**

**Int. Cl.⁴ A61K** *31/535;* **C07D** *295/18*

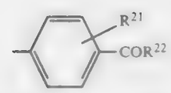
**U.S. Cl. 514—235.2** **35 Claims**

1. A compound having the formula:

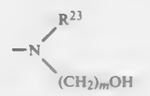


wherein A, B, Y and Z are each hydrogen, or the pair (1) A and B and/or the pair (2) Y and Z together represent a direct valence bond between the carbon atoms to which they are attached, thereby forming a double bond therebetween; n is an integer of 1 to 3; and X is selected from the group consisting of:

(1) a group of the formula

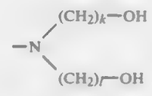


wherein $R^{22}$ is a group of the formula



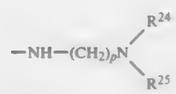
wherein $R^{23}$ is hydrogen or lower alkyl and m is an integer of from 1 to 5,

a group of the formula



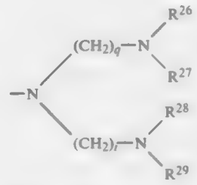
wherein k and l are the same or different and each is an integer of from 1 to 5,

a group of the formula



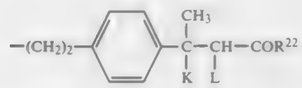
wherein p is an integer of from 0 to 5 and $R^{24}$ and $R^{25}$ are each hydrogen or lower alkyl,

or a group of the formula



wherein q and i are each an integer of 1 to 5 and $R^{26}$, $R^{27}$, $R^{28}$ and $R^{29}$ are each a lower alkyl, and $R^{21}$ is hydrogen, a lower alkyl or a halogen atom,

(2) a group of the formula

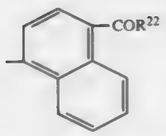


wherein K and L are both hydrogen or represent a direct valence bond between the carbon atoms to which they are attached and $R^{22}$ has the same meaning as defined above,

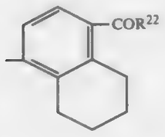
(3) a group of the formula

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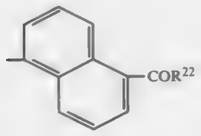




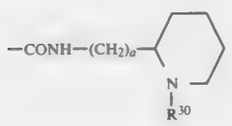
wherein $R^{22}$ has the same meaning as defined above,
(4) a group of the formula



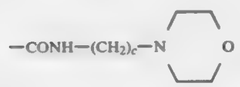
wherein $R^{22}$ has the same meaning as defined above,
(5) a group of the formula



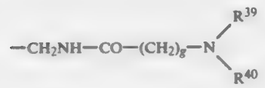
wherein $R^{22}$ has the same meaning as defined above,
(6) a group of the formula*



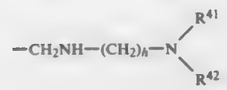
wherein a is zero or an integer of 1 to 5, and $R^{30}$ is a lower alkyl,
(7) a group of the formula



wherein c is zero or an integer of 1 to 5,
(8) a group of the formula



wherein g is an integer of 1 to 5 and $R^{39}$ and $R^{40}$ are each hydrogen or a lower alkyl, and
(9) a group of the formula



wherein h is an integer of 1 to 5 and $R^{41}$ and $R^{42}$ are each hydrogen or a lower alkyl,
or a pharmaceutically acceptable salt thereof.

**34**. A pharmaceutical composition having antithrombic activity which comprises a therapeutically effective amount of a compound as defined in claim **1**, in association with a pharmaceutically acceptable carrier, diluent or vehicle.

**35**. A pharmaceutical composition having anti-PAF activity which comprises a therapeutically effective amount of a compound as claimed in claim **1**, in association with a pharmaceutically acceptable carrier, diluent or vehicle.

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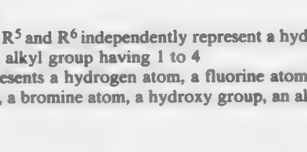
**4,742,059**

## SUBSTITUTED QUINOXALINEDIONES AND THEIR METHODS OF USE

**Jeffrey B. Medwid, West Nyack, and Lawrence W. Torley, Washingtonville, both of N.Y., assignors to American Cyanamide Company, Stamford, Conn.**

**Division of Ser. No. 876,600, Jun. 20, 1986, Pat. No. 4,692,449. This application Aug. 27, 1987, Ser. No. 90,173**
**Int. Cl.**[4] **A61K** *31/495;* **C07D** *401/04*
**U.S. Cl. 514—249** **9 Claims**

**1**. A compound of the formula:



wherein R is alkyl($C_1$–$C_3$), carboalkoxy($C_2$–$C_4$), alkanoyl($C_1$–$C_3$), benzyl, phenyl, m-trifluoromethylphenyl, 2-pyridyl, 2-pyrimidyl, 2-benzoxazolyl or 2-benzothiazolyl; and the pharmacologically acceptable acid-addition salts thereof.

**7**. A method of treating asthma and allergic diseases in a mammal which comprises administering to said mammal an effective amount of a compound of claim **1**.

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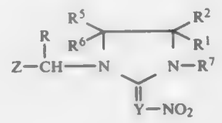
**4,742,060**

## HETEROCYCLIC COMPOUNDS

**Kozo Shiokawa, Kanagawa; Shinichi Tsuboi, Tokyo; Shinzo Kagabu, Tokyo, and Koichi Moriya, Tokyo, all of Japan, assignors to Nihon Tokushu Noyaku Seizo K. K., Tokyo, Japan**

**Filed Jan. 21, 1986, Ser. No. 821,621**
**Claims priority, application Japan, Feb. 4, 1985, 60-18627; Feb. 4, 1985, 60-18628; Feb. 12, 1985, 60-23683; May 21, 1985, 60-106853; May 21, 1985, 60-106854; Oct. 3, 1985, 60-219082**
**Int. Cl.**[4] **A01N** *43/50, 43/54, 43/56, 43/58, 43/60, 43/647, 43/653, 43/66, 43/707, 43/713, 43/72, 43/74, 43/76, 43/78, 43/80, 43/82, 43/84, 43/88;* **C07D** *401/06, 401/14, 403/06, 405/06, 403/14, 405/14, 407/06, 407/14, 409/06, 409/14, 411/06, 411/14, 419/06, 419/14, 413/06, 413/14, 417/06, 417/14*
**U.S. Cl. 514—252** **28 Claims**

**1**. A compound of the formula



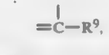
in which
$R^1$, $R^2$, $R^5$ and $R^6$ independently represent a hydrogen atom or an alkyl group having 1 to 4
$R^7$ represents a hydrogen atom, a fluorine atom, a chlorine atom, a bromine atom, a hydroxy group, an alkoxy group



having 1 to 4 carbon atoms, a benzyloxy group, an alkyl group having 1 to 4 carbon atoms which may be substituted by at least one member selected from the class consisting of alkoxy groups having 1 to 4 carbon atoms, alkylthio groups having 1 to 4 carbon atoms, a cyano group, a fluorine atom, a chlorine atom, a bromine atom, a dimethylamino group and trimethylsilyl, an alkenyl group having 2 to 3 carbon atoms which may be substituted by a chlorine atom, an alkynyl group having 2 to 3 carbon atoms, a benzyl group which may be substituted by at least one member selected from the class consisting of a methyl group, a methoxy group, a fluorine atom, a chlorine atom, a bromine atom and a nitro group, a formyl group, an alkenylcarbonyl group having an alkenyl with 2 to 3 carbon atoms, an alkyl carbonyl group having 1 to 5 carbon atoms which may be substituted by at least one member selected from the class consisting of a methoxy group, a phenoxy group, a fluorine, chlorine and bromine atom, a benzoyl group which may be substituted by at least one member selected from the class consisting of a fluorine atom, a chlorine atom, a bromine atom, a methyl group, a trifluoromethyl group, a methoxy group, a difluoromethoxy group, a trifluoromethoxy group and a nitro group, a benzylcarbonyl group which may be substituted by at least one member selected from the class consisting of a fluorine atom, a chlorine atom and a bromine atom, an alkoxycarbonyl group having an alkyl with 1 to 4 carbon atoms which may be substituted by a fluorine atom and/or a chlorine atom, an alkylthiocarbonyl group having an alkyl with 1 to 4 carbon atoms, a phenoxycarbonyl group which may be substituted by at least one member selected from the class consisting of a methyl group, a fluorine atom, a chlorine atom and a bromine atom, a phenylthiocarbonyl group which may be substituted by at least one member selected from the class consisting of a methyl group, a fluorine atom, a chlorine atom and a bromine atom, a benzyloxycarbonyl group, a dimethylaminocarbonyl group, a phenylaminocarbonyl group which may be substituted by at least one member selected from the class consisting of a methyl group, a fluorine atom, a chlorine atom, and a bromine atom, a benzoylaminocarbonyl group which may be substituted by at least one member selected from the class consisting of a methyl group, a fluorine atom, a chlorine atom and a bromine atom, a phenylsulfonylaminocarbonyl group which may be substituted by at least one member selected from the class consisting of a fluorine atom, a chlorine atom and a bromine atom, a phenylthio group, an alkylsulfonyl group which may be substituted by a fluorine atom and/or a chlorine atom, a phenylsulfonyl group which may be substituted by at least one member selected from the class consisting of a methyl group, a fluorine atom, a chlorine atom, a bromine atom and a nitro group, a methylcarbonylmethyl group, a phenacyl group which may be substituted by a fluorine atom and/or a chlorine atom, an organophosphono group, an organothionophosphono group,

$-CH_2-W$ or $-CO-W$,

W represents a 5 to 6 membered hetercyclic group, containing one or two hetero atoms selected from the class consisting of an oxygen atom, a sulfur atom and a nitrogen atom, which may be substituted by at least one member selected from the class consisting of a fluorine atom, a chlorine atom, a bromine atom and alkyl groups having 1 to 4 carbon atoms,
Y represents a nitrogen atom or



$R^9$ represents a hydrogen atom, a fluorine atom, a chlorine atom, a bromine atom, a hydroxy group, an alkoxy group having 1 to 4 carbon atoms, a benzyloxy group, an alkyl group having 1 to 4 carbon atoms which may be substituted by at least one member selected from the class consisting of fluorine atom, a chlorine atom, a hydroxy group, an alkoxy group having 1 to 2 carbon atoms, alkylthio groups having 1 to 2 carbon atoms, a cyano group, a dimethylamino group, alkylcarbonyl groups having an alkyl with 1 to 2 carbon atoms and alkoxycarbonyl groups having an alkyl with 1 to 2 carbon atoms, an alkenyl group having 2 to 3 carbon atoms, a phenyl group, an alkylcarbonyl group having an alkyl with 1 to 4 carbon atoms which may be substituted by at least one member selected from the class consisting of a methoxy group, a chlorine atom and a fluorine atom, an alkenylcarbonyl group having an alkenyl with 2 to 3 carbon atoms, a benzyl group which may be substituted by at least one member selected from the class consisting of a fluorine atom, a chlorine atom, a bromine atom, a methoxy group and a methyl group, an alkoxycarbonyl group which may be substituted by a fluorine atom and/or a chlorine atom, an alkylthiocarbonyl group having an alkyl with 1 to 4 carbon atoms, a phenoxycarbonyl group which may be substituted by at least one member selected from the class consisting of a fluorine atom, a chlorine atom, a bromine atom, a methyl group, a methoxy group and a nitro group, a phenylthiocarbonyl group, a benzyloxycarbonyl group, a benzoylaminocarbonyl group which may be substituted by at least one member selected from the class consisting of a methyl group, a fluorine atom, a chlorine atom and a bromine atom, a phenylsulfonylaminocarbonyl group which may be substituted by at least one member selected from the class consisting of a methyl group, a fluorine atom, a chlorine atom and a bromine atom, an alkylsulfonylaminocarbonyl group having an alkyl with 1 to 4 carbon atoms, an alkylthio group having 1 to 2 carbon atoms, an alkylsulfonyl group which may be substituted by a fluorine atom and/or a chlorine atom, a phenylthio group which may be substituted by at least one member selected from the class consisting of a methyl group, a fluorine atom, a chlorine atom and a bromine atom, or a phenylsulfonyl group which may be substituted by at least one member selected from the class consisting of a methyl group, a fluorine atom, a chlorine atom and a bromine atom, in addition, $R^9$ may form a bis-form of the formula (I), via a methylene group,
R represents a hydrogen atom or a methyl group, and
Z represents a 5 to 6 membered heterocyclic group, containing one to three hetero atoms selected from the class consisting of an oxygen atom, a sulfur atom and a nitrogen atom, at least one of which is a nitrogen atom, which may be substituted by at least one member selected from the class consisting of a fluorine atom, a chlorine atom, a bromine atom, alkyl groups having 1 to 4 carbon atoms which may be substituted by a fluorine atom and/or a chlorine atom, a nitro group, a cyano group, alkylsulfinyl groups having 1 to 4 carbon atoms, alkylsulfonyl groups having 1 to 4 carbon atoms, alkoxy groups having 1 to 4 carbon atoms which may be substituted by a fluorine atom and/or a chlorine atom, alkylthio groups having 1 to 4 carbon atoms which may be substituted by a fluorine atom and/or a chlorine atom, alkenyl groups having 2 to 3 carbon atoms which may be substituted by a chlorine atom, an acetamide group which may be substituted by a fluorine atom and/or a chlorine atom, alkoxycarbonyl groups having an alkyl with 1 to 4 carbon atoms, a thiocyanato group, alkynyl groups having 2 to 4 carbon atoms, an amino group, a methylamino group, a dimethylamino group, an acetyl group, a formyl group, a carboxy group, a hydroxy group, a mercapto group, cycloalkyl groups having 3 to 7 carbon atoms, an oxo group, a thioxo group, alkenylthio groups substituted by a fluorine atom, a chlorine atom and/or a bromine atom, alkoxyalkyl groups having 2 to 4 carbon atoms in total, alkylaminocar-

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bonyl groups having an alkyl with 1 to 2 carbon atoms, dialkylaminocarbonyl groups having an alkyl with 1 to 2 carbon atoms, a phenyl group, a phenoxy group and a benzyl group, provided that where $R^1$, $R^2$, $R^5$ and $R^6$ represent hydrogen atoms simultaneously,

$R^7$ represents hydrogen and

Y represents



then Z does not stand for a pyridyl group.

27. An insecticidal composition comprising an insecticidally effective amount of a compound according to claim 1 in admixture with a diluent.

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**4,742,061**

**BENZOC[C]-1,5-NAPHTHYRIDINES AND RELATED COMPOUNDS AS MEMORY ENHANCING AGENTS**

**Lawrence L. Martin, Lebanon; Linda L. Setescak, Somerville, and Susan J. Scott, No. Brunswick, all of N.J., assignors to Hoechst-Roussel Pharmaceuticals Inc., Somerville, N.J.**

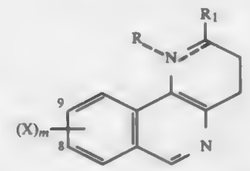
**Continuation-in-part of Ser. No. 711,327, Mar. 13, 1985, Pat. No. 4,652,567. This application Jun. 4, 1986, Ser. No. 870,585**

**The portion of the term of this patent subsequent to Mar. 24, 2004, has been disclaimed.**

**Int. Cl.⁴ A61K** *31/495, 31/435;* **C07D** *401/14, 487/04*

**U.S. Cl. 514—254** **105 Claims**

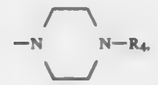
1. A compound having having the formula



where m is 1 or 2; each X is independently H, halogen, loweralkyl, loweralkoxy, $—CF_3$ or —OH, R is H, loweralkyl, chloroloweralkyl, bromoloweralkyl, iodoloweralkyl, aminoloweralkyl, loweralkylaminoloweralkyl, diloweralkylaminoloweralkyl, aryloweralkyl, diaryloweralkyl, thienyloweralkyl, furyloweralkyl, loweralkanoyl, chloroloweralkanoyl, bromoloweralkanoyl, iodoloweralkanoyl, aminoloweralkanoyl, loweralkylaminoloweralkanoyl, diloweralkylaminoloweralkanoyl, aroyl, aryloweralkanoyl, diaryloweralkanoyl, thienylloweralkanoyl or furyloweralkanoyl; and $R_1$ is =O,



or $—NR_2R_3$, $R_2$ and $R_3$ being independently H or loweralkyl, or taken together with the nitrogen atom to which they are attached constituting



$R_4$ in turn being H, loweralkyl, hydroxyloweralkyl, aryl, aryloweralkyl or diaryloweralkyl, wherein the term aryl in each occurrence means a phenyl group having 0, 1, 2 or 3 substituents each of which being independently loweralkyl, loweralkoxy, halogen or $CF_3$, except that said substituents may not be three adjacent tertiary butyl groups or iodo groups, with the proviso that when $R_1$ is $—NR_2R_3$, R is nonexistent, that when $R_1$=0, R is not an acyl group and that when $R_1$ is



is not chloroloweralkyl, bromoloweralkyl or iodoloweralkyl; or a pharmaceutically acceptable acid addition salt thereof.

105. A method of treating a patient suffering from a memory dysfunction characterized by decreased cholinergic function which comprises administering to the patient an effective amount of a compound as defined in claim 1.

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**4,742,062**

**BENZYLPIPERAZINE COMPOUND AND PHARMACEUTICAL COMPOSITION AS HYPOLIPIDEMIC AGENT**

**Hiroshi Ohtaka, Osaka; Yoichiro Hamada, Kobe; Akira Yamashita; Keizo Ito, both of Osaka, and Goro Tsukamoto, Toyonaka, all of Japan, assignors to Kanebo, Ltd., Tokyo, Japan**

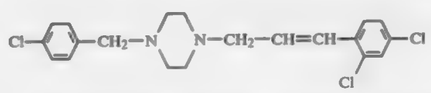
**Filed Jul. 8, 1986, Ser. No. 883,118**

**Claims priority, application Japan, Jul. 16, 1985, 60-157300**

**Int. Cl.⁴ A61K** *31/395;* **C07D** *295/00*

**U.S. Cl. 514—255** **3 Claims**

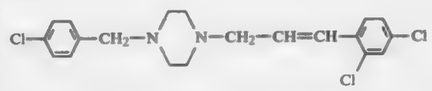
1. A benzylpiperazine compound of the formula:



(I)

or a pharmaceutically acceptable acid addition salt thereof.

3. A method for the prophylaxis and treatment of hyperlipidemia, which comprises administering a prophylactically or therapeutically effective amount of a compound of the formula:



(I)

or a pharmaceutically acceptable acid addition salt thereof to a patient.

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**4,742,063**

**AGRICULTURAL-HORTICULTURAL FUNGICIDE EMPLOYING 5H-1,3,4-THIADIAZOLO[3,2-A]PYRIMIDIN-5-ONE DERIVATIVES**

**Yukio Tokunaga, Shizuoka; Yoshiyuki Kojima, Kakegawa; Shinichiro Maeno; Nobumitsu Sawai, both of Shizuoka, and Yasuo Sato, Miyagi, all of Japan, assignors to Kumiai Chemical Industry Co., Ltd. and Ihara Chemical Industry Co., Ltd., both of Tokyo, Japan**

**Filed Mar. 18, 1987, Ser. No. 27,252**

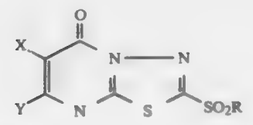
**Claims priority, application Japan, Mar. 19, 1986, 61-61746**

**Int. Cl.⁴ A01N** *43/54*

**U.S. Cl. 514—258** **19 Claims**

1. A method of protecting plants against agricultural or horticultural fungi, which comprises applying to said plants a fungicidally effective amount of a 5H-1,3,4-thiadiazolo[3,2-a]pyrimidin-5-one derivative represented by the formula (I)





(I)

wherein

X is a hydrogen atom, a halogen atom, a lower alkyl group or a lower alkoxycarbonyl group;

Y is a hydrogen atom, a lower alkyl group or a phenyl group; and

R is a linear or branched $C_1$–$C_{12}$ alkyl group, a benzyl group, a mono- or dimethylbenzyl group or a phenethyl group;

with a proviso that when Y is a hydrogen atom or R is a mono- or dimethylbenzyl group, X is a lower alkoxycarbonyl group.

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**4,742,064**

**ANTIVIRAL CARBOCYCLIC ANALOGS OF XYLOFURANOSYLPURINES**

**Robert Vince, St. Paul, Minn., assignor to Regents of the University of Minnesota, Minneapolis, Minn.**

**Filed Sep. 10, 1985, Ser. No. 774,436**

**Int. Cl.⁴ C07D** *473/32;* **A61K** *31/52*

**U.S. Cl. 514—258** **12 Claims**

1. A method for protecting mammalian cell against infection by a virus comprising bringing said cells into contact with an effective amount of the compound in a pharmaceutically-acceptable carrier.

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**4,742,065**

**SALTS OF BASIC CAFFEINE-8-ETHERS AND THEIR USE AS PHARMACEUTICALS**

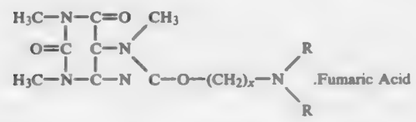
**Josef Klosa, and Hans Kröger, both of Berlin, Fed. Rep. of Cermany, assignors to Sanorania Dr. G. Strohscheer, Berlin, Fed. Rep. of Germany**

**Filed Mar. 1, 1985, Ser. No. 707,488**

**Int. Cl.⁴ C07D** *473/08;* **A61K** *31/52*

**U.S. Cl. 544—273** **7 Claims**

1. Caffeine-8-ether monofumarate compounds selected from the group consisting of compounds of the formula



.Fumaric Acid

wherein X=2 or 3 and R represents an alkyl group of 1 to 3 carbon atoms.

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**4,742,066**

**SKIN TREATMENT COMPOSITION AND METHOD**

**George E. Deckner, Westfield, and Arthur C. W. Georgalas, Leonardo, both of N.J., assignors to Charles of the Ritz Group Ltd., New York, N.Y.**

**Filed Mar. 17, 1986, Ser. No. 840,177**

**Int. Cl.⁴ A61K** *31/47, 31/35*

**U.S. Cl. 514—311** **3 Claims**

1. A method for controlling free radical formation on skin which comprises applying to the skin of a mammalian in need of such treatment an effective amount of skin treatment composition in the form of an ointment, cream, lotion or liquid comprising water, from about 0.01 to about 5% by weight of the composition of a free radical inhibitor or deactivator which is 6-hydroxy-2,5,7,8-tetra-methylchroman-2-carboxylic acid, 6-ethoxy-1,2-dihydro-2,2,4-trimethylquinoline, or mixtures thereof, from about 1 to about 25% by weight of the composition of at least one humectant, from about 0.05 to about 4% by weight of the composition of at least one thickener and from about 0.1 to about 1% by weight of the composition of at least one preservative.

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**4,742,067**

**ACYLALKYLAMINOCARBONYL SUBSTITUTED AMINO AND IMINO ACID COMPOUNDS**

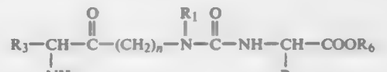
**Sesha I. Natarajan, Neshanic Station, and Eric M. Gordon, Pennington, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.**

**Division of Ser. No. 513,931, Jul. 14, 1983, Pat. No. 4,621,092, which is a continuation-in-part of Ser. No. 400,798, Jul. 22, 1982, Pat. No. 4,623,729. This application Jul. 30, 1986, Ser. No. 890,681**

**Int. Cl.⁴ A61K** *31/44;* **C07D** *401/12*

**U.S. Cl. 514—343** **7 Claims**

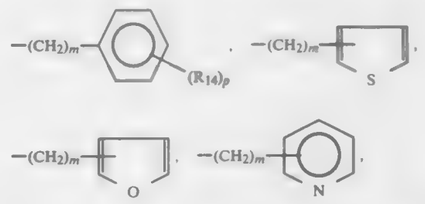
1. A compound of the formula



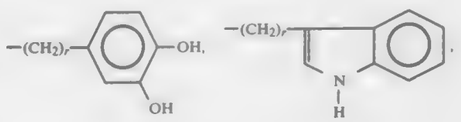
or a pharmaceutically acceptable salt thereof wherein:

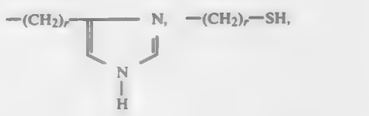
n is one or two;

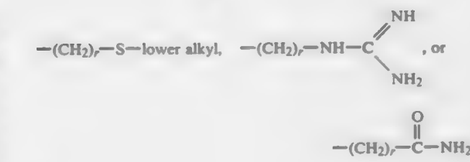
$R_1$ is hydrogen, lower alkyl, halo substituted lower alkyl,



—cycloalkyl wherein cycloalkyl is a saturated ring of 3 to 7 carbon atoms, $—(CH_2)_2—NH_2$, $—(CH_2)_3—NH_2$, $—(CH_2)_4—NH_2$, $—(CH_2)_r—OH$,



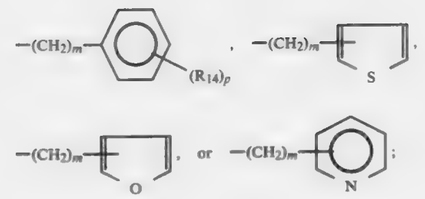




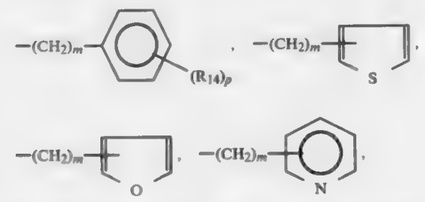
$R_2$ is

VOL
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UMI

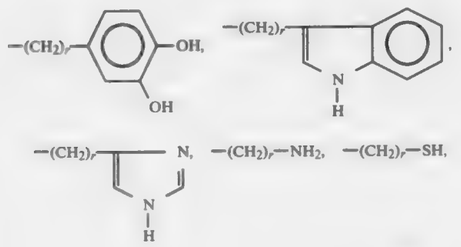




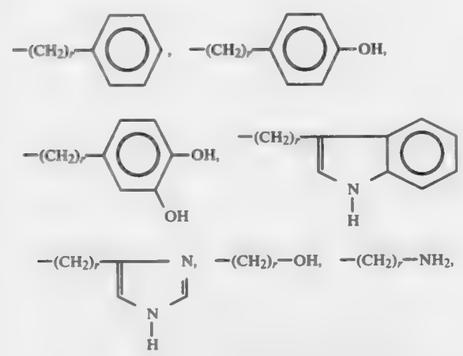
$R_3$ is hydrogen, lower alkyl,



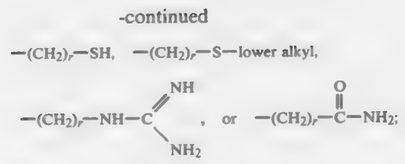
halo substituted lower alkyl, $-(CH_2)_m-$cycloalkyl wherein cycloalkyl is a saturated ring of 3 to 7 carbon atoms,



$R_5$ is hydrogen, lower alkyl,



-continued



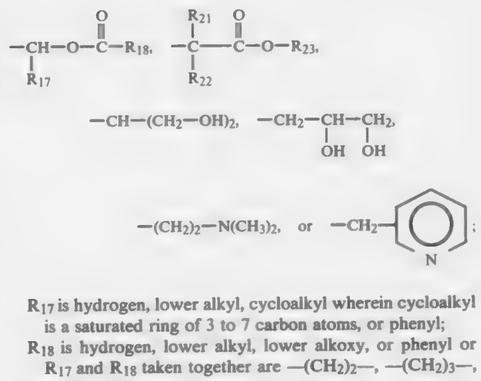
r is an integer from 1 to 4;

$R_{14}$ is hydrogen, lower alkyl of 1 to 4 carbons, lower alkoxy of 1 to 4 carbons, lower alkylthio or 1 to 4 carbons, chloro, bromo, fluoro, trifluoromethyl, or hydroxy;

m is zero, one, two, three, or four;

p is one, two or three provided that p is more than one only if $R_{14}$ is hydrogen, methyl, methoxy, chloro, or fluoro;

$R_6$ is hydrogen, lower alkyl, benzyl, benzhydryl, alkali metal salt ion,



$R_{17}$ is hydrogen, lower alkyl, cycloalkyl wherein cycloalkyl is a saturated ring of 3 to 7 carbon atoms, or phenyl;

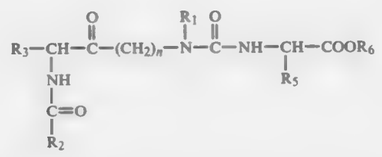
$R_{18}$ is hydrogen, lower alkyl, lower alkoxy, or phenyl or $R_{17}$ and $R_{18}$ taken together are $-(CH_2)_2-$, $-(CH_2)_3-$, $-CH=CH-$, or



$R_{21}$ and $R_{22}$ are independently selected from hydrogen and lower alkyl; and

$R_{23}$ is lower alkyl.

6. A pharmaceutical composition useful as an analgesic comprising a pharmaceutically acceptable carrier and an enkephalinase inhibiting compound of the formula



wherein n, $R_1$, $R_2$, $R_3$, $R_5$ and $R_6$ are as defined in claim 1.



**4,742,068**

## DIHYDROPYRIDINE COMPOUNDS HAVING 1,4,4-TRISUBSTITUTION USEFUL AS ANTIHYPERTENSIVE AGENTS

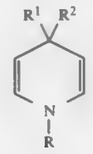
**Michael J. Kukla, Maple Glen, Pa., assignor to McNeilab, Inc., Fort Washington, Pa.**

**Filed Jun. 9, 1986, Ser. No. 871,943**

**Int. Cl.[4] C07D** *211/82;* **A61K** *31/44*

**U.S. Cl. 514—354** **13 Claims**

1. A 1,4,4-trisubstituted dihydropyridine compound of the following formula (I):



(I)

wherein

R is $-COR^3$, $-(CH_2)_nNR^5R^6$ or $-(CH_2)_nCOOR_7$;

$R^1$ is alkyl of 1 to 6 carbons, phenyl, or phenyl substituted by 1 to 3 of alkyl of 1 to 4 carbons, halo, trifluoromethyl, or nitro;

$R^2$ is alkyl of 1 to 6 carbons, phenyl, or phenyl substituted by 1 to 3 of alkyl of 1 to 4 carbons, halo, trifluoromethyl, or nitro;

$R^3$ is phenyl, substituted phenyl, benzyl, substituted benzyl, diphenylmethyl, (substituted diphenyl)methyl, alkylamino of 1 to 4 carbons, dialkylamino of 1 to 4 carbons in each alkyl moiety, dialkylaminoalkyl of 1 to 4 carbons in each alkyl moiety, or phenylamino, wherein the substitution on said substituted phenyl, substituted benzyl and each ring of said (substituted diphenyl)methyl is independently 1 to 3 of alkyl of 1 to 4 carbons, halo, alkoxy of 1 to 4 carbons, trifluoromethyl and nitro;

$R^5$ is alkyl of 1 to 4 carbons;

$R^6$ is alkyl of 1 to 4 carbons;

$R^7$ is alkyl of 1 to 4 carbons or benzyl;

n is one, two, three, four, five or six; and,

a pharmaceutically acceptable acid addition salt thereof, with the provisos (i) that when $R^3$ is phenyl, both $R^1$ and $R^2$ are not methyl and (ii) that when $R^3$ is dimethylamino, both $R^1$ and $R^2$ are not methyl.

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**4,742,069**

## SULFONAMIDE CONTAINING DIHYDROPYRIDINE DERIVATIVES, INTERMEDIATES AND MEDICINAL USE

**Roland Jaunin, Basel, and Henri Ramuz, Birsfelden, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

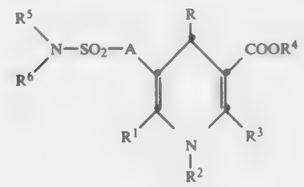
**Filed Jun. 17, 1985, Ser. No. 745,743**

**Claims priority, application Switzerland, Jun. 27, 1984, 3097/84**

**Int. Cl.[4] A61K** *31/455, 31/54;* **C07D** *211/90, 415/00*

**U.S. Cl. 514—356** **30 Claims**

1. A compound of the formula



I

wherein A is $-CH(R^7)-CO-$ or

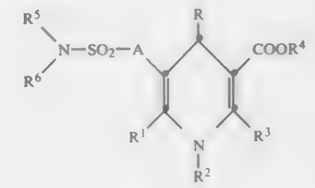
(E)
$-CH=CH-$,

R is a mono- or bicyclic aromatic hydrocarbon residue with up to 10 carbon atoms in the aromatic ring struture which is optionally mono-, di- or tri-substituted by phenyl, $C_1$–$C_6$-alkyl, $C_3$–$C_6$-alkenyl, $C_3$–$C_6$-alkynyl, $C_1$–$C_6$-alkoxy, halogen, trifluoromethyl, trifluoromethoxy, difluoromethoxy, trifluoromethylthio, difluoromethylthio, nitro, cyano, azido, $C_1$–$C_6$-alkoxycarbonyl, aminocarbonyl, aminosulfonyl, $C_1$–$C_6$-alkylthio, $C_1$–$C_6$-alkylsulfonyl, or $C_1$–$C_6$-alkanoyl or which is optionally disubstituted by $C_3$–$C_5$-alkylene or dioxy-$C_1$–$C_2$-alkylene, $R^1$ is hydrogen or methyl, $R^2$ is hydrogen or $C_1$–$C_4$-alkyl, $R^3$ is $C_1$–$C_4$-alkyl or $C_1$–$C_4$-alkanoyloxymethyl, $R^4$ is $C_1$–$C_6$-alkyl, $C_3$–$C_6$-alkenyl, $C_3$–$C_6$-alkynyl, $C_3$–$C_6$-cycloalkyl, $C_3$–$C_6$-cycloalkyl-$C_1$–$C_6$-alkyl, cyano-$C_2$–$C_6$-alkyl, halo-$C_2$–$C_6$-alkyl, hydroxy-$C_2$–$C_6$-alkyl, ω,ω,ω-trifluoro-$C_1$–$C_6$-alkyl, $C_1$–$C_6$-alkoxy-$C_1$–$C_6$-alkyl-, $C_1$—$C_6$-alkoxy-, $C_1$–$C_6$-alkoxy-$C_1$–$C_6$-alkyl, $C_1$–$C_4$-alkanoyloxy-$C_1$–$C_6$-alkyl, $C_3$–$C_6$-alkenyloxy-$C_1$–$C_6$-alkyl, $C_1$–$C_6$-alkylthio-$C_1$–$C_6$-alkyl, benzyloxy-$C_1$–$C_6$-alkyl, or is phenyl-$C_1$–$C_6$-alkyl optionally substituted by halogen, cyano, di-$C_1$–$C_6$-alkylamino, $C_1$–$C_6$-alkoxy, $C_1$–$C_6$-alkyl, trifluoromethyl or nitro, $R^5$ is $C_1$–$C_6$-alkyl or $C_3$–$C_6$-cycloalkyl, $R^6$ is hydrogen, $C_1$–$C_6$-alkyl, $C_3$–$C_6$-alkenyl, $C_3$–$C_6$-alkynyl, $C_3$–$C_6$-cycloalkyl, $C_3$–$C_6$-cycloalkyl-, $C_1$–$C_6$-alkyl or phenyl-$C_1$–$C_6$-alkyl optionally substituted by $C_1$–$C_6$-alkyl, $C_1$–$C_6$-alkoxy or halogen and $R^7$ is hydrogen, $C_1$–$C_6$ -alkyl or phenyl-$C_1$–$C_6$-alkyl optionally substituted by $C_1$–$C_6$-alkyl, $C_1$–$C_6$-alkoxy, or halogen or $R^6$ and $R^7$ together with a $-(CH_2)_n-$ group in which n is the number 2 or 3,

in the form of isomers, isomer mixtures, racemates and optical antipodes.

22. The compound 1,4-dihydro-5-[(isopropylsulfamoyl-)acetyl]-2,6-dimethyl-4-(3-pyridyl)nicotinic acid isopropyl ester.

23. A pharmaceutical composition for controlling or preventing angina pectoris, ischemia, high blood pressure or migraine comprising an amount, effective for the control or prevention of angina pectoris, ischemia, high blood pressure or migraine, of a compound of the formula



I

wherein A is $-CH(R^7)-CO-$ or

(E)
$-CH=CH-$,

R is a mono- or bicyclic aromatic hydrocarbon residue with up to 10 carbon atoms in the aromatic ring struture which is optionally mono-, di- or tri-substituted by phenyl, $C_1$–$C_6$-alkyl, $C_3$–$C_6$-alkenyl, $C_3$–$C_6$-alkynyl, $C_1$–$C_6$-alkoxy, halogen, trifluoromethyl, trifluoromethoxy, difluoromethoxy, trifluoromethylthio, difluoromethylthio, nitro, cyano, azido, $C_1$–$C_6$-alkoxycarbonyl, aminocarbonyl, aminosulfonyl, $C_1$–$C_6$-alkylthio, $C_1$–$C_6$-alkylsulfonyl, or $C_1$–$C_6$-alkanoyl or which is optionally disubstituted by $C_3$–$C_5$-alkylene or dioxy-$C_1$–$C_2$-alkylene, $R^1$ is hydrogen or methyl, $R^2$ is hydrogen or $C_1$–$C_4$-alkyl, $R^3$ is $C_1$–$C_4$-alkyl or $C_1$–$C_4$-alkanoyloxymethyl, $R^4$ is $C_1$–$C_6$-alkyl,

$C_3$–$C_6$alkenyl, $C_3$–$C_6$-alkynyl, $C_3$–$C_6$-cycloalkyl, $C_3$–$C_6$-cycloalkyl-$C_1$–$C_6$-alkyl, cyano-$C_2$–$C_6$-alkyl, halo-$C_2$–$C_6$-alkyl, hydroxy-$C_2$–$C_6$-alkyl, $\omega,\omega,\omega$-trifluoro-$C_1$–$C_6$-alkyl, $C_1$–$C_6$-alkoxy-$C_1$–$C_6$alkyl-, $C_1$–$C_6$-alkoxy-$C_1$–$C_6$-alkoxy-$C_1$–$C_6$-alkyl, $C_1$–$C_4$-alkanoyloxy-$C_1$–$C_6$-alkyl, $C_3$–$C_6$-alkenyloxy-$C_1$–$C_6$-alkyl, $C_1$–$C_6$-alkylthio-$C_1$–$C_6$-alkyl, benzyloxy-$C_1$–$C_6$-alkyl, or is phenyl-$C_1$–$C_6$-alkyl optionally substituted by halogen, cyano, di-$C_1$–$C_6$-alkylamino, $C_1$–$C_6$-alkoxy, $C_1$–$C_6$-alkyl, trifluoromethyl or nitro, $R^5$ is $C_1$–$C_6$-alkyl or $C_3$–$C_6$-cycloalkyl, $R^6$ is hydrogen, $C_1$–$C_6$-alkyl, $C_3$–$C_6$-alkenyl, $C_3$–$C_6$-alkynyl, $C_3$–$C_6$-cylcoalkyl, $C_3$–$C_6$-cycloalkyl-$C_1$–$C_6$-alkyl or phenyl-$C_1$–$C_6$-alkyl optionally substituted by $C_1$–$C_6$-alkoxy or halogen and $R^7$ is hydrogen, $C_1$–$C_6$-alkyl or phenyl-$C_1$–$C_6$-alkyl optionally substituted by $C_1$–$C_6$-alkyl, $C_1$–$C_6$-alkoxy or halogen or $R^6$ and $R^7$ together are a $-(CH_2)_n-$ group in which n is the number 2 or 3,

in the form of an isomer, an isomer mixture, a racemate or an optical antipode and a pharmaceutically acceptable carrier material.

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**4,742,070**

## ARYLSULPHONYL-PYRIDINEALDOXIME DERIVATIVES, USEFUL AS FUNGICIDES

**Christa Fest, Wuppertal; Wilhelm Brandes, Leichlingen; Gerd Hänssler, and Paul Reinecke, both of Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen,, Fed. Rep. of Germany**

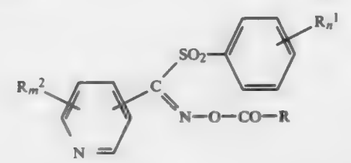
**Filed Mar. 12, 1987, Ser. No. 25,238**

**Claims priority, application Fed. Rep. of Germany, Mar. 13, 1986, 3608383**

**Int. Cl.**[4] **A61K** *31/44;* **C07D** *213/26, 213/30*

**U.S. Cl. 514—357** **7 Claims**

1. Arylsulphonyl-pyridinealdoxime derivatives of the formula (I)



(I)

in which

R represents straight-chain or branched alkyl with 1 to 6 carbon atoms or alkoxy with 1 to 6 carbon atoms,

$R^1$ represents halogen, alkyl or alkoxy with in each case 1 to 6 carbon atoms, alkylthio with 1 to 6 carbon atoms, halogenoalkyl, halogenoalkoxy or halogenoalkylthio with in each case 1 to 6 carbon atoms and in each case 1 to 9 identical or different halogen atoms, nitro, alkoxycarbonyl or alkylcarbonylamino with 1 to 4 carbon atoms in the alkoxy or alkyl part,

$R^2$ represents halogen or alkyl with 1 to 6 carbon atoms,

n represents an integer 0, 1, 2, 3, 4 or 5 and

m represents an integer 0, 1, 2, 3 or 4.

6. A fungicidal composition comprising a fungicidally effective amount of a compound according to claim 1 and a diluent.

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**4,742,071**

## NOVEL 2-ARYL-2-AZOLYLMETHYL-1,3-DIOXEPINE FUNGICIDES

**Udo Kraatz; Gerhard Jäger, both of Leverkusen; Karl H. Büchel, Burscheid; Wilhelm Brandes, Leichlingen; Paul Reinecke, Leverkusen; Hans-Dieter Scharf, Roetgen, and Herbert Frauenrath, Aachen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

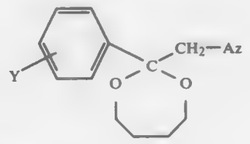
**Division of Ser. No. 522,939, Aug. 12, 1983, Pat. No. 4,559,355. This application Jul. 25, 1985, Ser. No. 759,018**

**Claims priority, application Fed. Rep. of Germany, Sep. 3, 1982, 3232737**

**Int. Cl.**[4] **C07D** *249/08, 233/54;* **A61K** *31/41, 31/415*

**U.S. Cl. 514—383** **20 Claims**

1. A 1-aryl-2-azolylmethyl-1,3-dioxepine of the formula



in which

Az is imidazolyl-1-yl or 1,2,4-triazol-1-yl, and

Y at least once is chlorine, or phenyl which is optionally substituted by halogen or alkyl with 1 to 4 carbon atoms,

or an addition product thereof with an acid or metal salt.

5. A method combating fungi which comprises administering to such fungi or to a fungus habitat a fungicidally effective amount of a compound or addition product according to claim 1.

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**4,742,072**

## 1-DIMETHYLCARBAMOYL-3-T-BUTYL-5-SUBSTITUTED-1H-1,2,4-TRIAZOLES

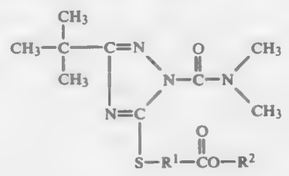
**Richard M. Jacobson, Chalfont, and Muthuvelu Thirugnanam, Langhorne, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.**

**Filed Jul. 25, 1985, Ser. No. 759,016**

**Int. Cl.**[4] **C07D** *249/12;* **A01N** *43/653*

**U.S. Cl. 514—384** **44 Claims**

1. A compound having the formula:



wherein

$R^1$ is an unsubstituted or substituted ($C_1$–$C_{10}$)alkylidene ($-(CH_2)_n-$) group having one to four of the same or different substituents selected from $CO_2R$ or ($C_1$–$C_6$)alkyl and

$R^2$ is hydrogen or ($C_1$–$C_6$)alkyl;

where R is hydrogen or ($C_1$–$C_6$)alkyl; and agronomically acceptable salts thereof.

27. A method of controlling insects of the order Homoptera which comprises applying to the insects or to the loci to be freed or protected from attack by insects an insecticidally effective amount of a compound according to claim 1.



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**4,742,073**

## PILOCARPINE PRODRUGS

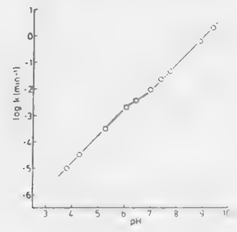
**Hans Bundgaard, 36, Tjornevej, DK-2970 Horsholm; Erik Falch, 31, Olgasvej, DK-2950 Vedb k; Claus S. Larsen, 15, Hulegaardsvej, DK-4320 Lejre, all of Denmark, and Thomas J. Mikkelson, The University of Kansas, School of Pharmacy,, Lawrence, Kans. 66045**

**Filed Sep. 16, 1983, Ser. No. 533,646**

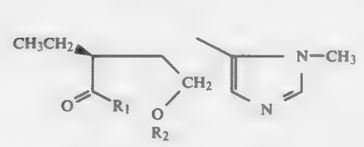
**Claims priority, application Denmark, Sep. 17, 1982, 4170/82**

**Int. Cl.**[4] **C07D** *263/04*

**U.S. Cl. 514—400** **14 Claims**



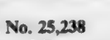
1. Compounds of the formula I



(I)

wherein

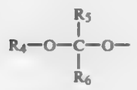
(a) $R_1$ is a group of the formula II



wherein

$R_3$ is $C_{1-8}$ alkyl; phenyl; phenyl substituted with up to three halogen, $C_{1-4}$ alkyl, hydroxy, $C_{1-4}$ alkoxy, or phenoxy groups; phenyl-$C_{1-4}$ alkyl wherein the phenyl group may be substituted with up to three halogen, $C_{1-4}$ alkyl, hydroxy, $C_{1-4}$ alkoxy, or phenoxy groups; and phenyl-$C_{2-5}$-monounsaturated alkenyl wherein the phenyl group may be substituted with up to three halogen, $C_{1-4}$ alkyl, hydroxy, $C_{1-4}$ alkoxy or phenoxy groups; or

(b) $R_1$ is a group of the formula III



(III)

wherein

$R_4$, $R_5$ and $R_6$ may each have the same meaning as $R_3$, or $R_5$ and $R_6$ may each represent hydrogen; or

$R_4$ is a group of the formula IV

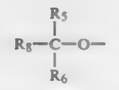


(IV)

wherein

$R_7$ has the same meaning as $R_3$ or is selected from the group consisting of pyridinyl, thienyl, thiazolyl, oxazolyl, imidazolyl, isoxazolyl, isothiazolyl, furanyl, pyrimidinyl, oxazinyl or thiazinyl; or

(c) $R_1$ is a group of the formula V



(V)

wherein

$R_8$ is polyhalogenated $C_{1-4}$ alkyl or a group of the formula VI



(VI)

wherein

$R_3$ is defined above and

(d) $R_2$ is hydrogen or a group of either of formulas IV or VI;

and pharmaceutically acceptable acid addition salts thereof.

14. A method for treating glaucoma, comprising ophthalmic administration to warm-blooded animals in need of treatment for glaucoma of an anti-glaucoma effective amount, in the range of about 0.005 mg to 4 mg per dose, of a compound according to claim 1.

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**4,742,074**

## PYRAZOLECARBOXAMIDE DERIVATIVE AND FUNGICIDE CONTAINING IT AS ACTIVE INGREDIENT

**Sumio Nishida, Takarazuka; Tadashi Ohsumi; Kazunori Tsushima, both of Nishinomiya, all of Japan; Noritada Matsuo, Rochester, N.Y.; Kiyoto Maeda, Nishinomiya, Japan, and Satoru Inoue, Clevedon, United Kingdom, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan**

**PCT No. PCT/JP85/00591, § 371 Date Mar. 31, 1986, § 102(e) Date Mar. 31, 1986, PCT Pub. No. WO86/02641, PCT Pub. Date May 9, 1986**

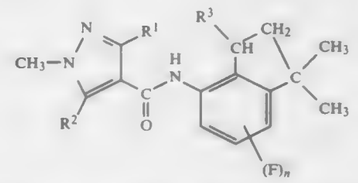
**PCT Filed Oct. 22, 1985, Ser. No. 852,967**

**Claims priority, application Japan, Jun. 5, 1985, 60-121947; Jul. 8, 1985, 60-150935; Oct. 29, 1985, 59-227462**

**Int. Cl.**[4] **A01N** *43/56;* **C07D** *231/14, 231/16*

**U.S. Cl. 514—406** **15 Claims**

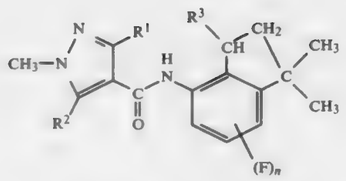
1. A pyrazolecarboxamide derivative represented by the formula (I):



(I)

wherein $R^1$ and $R^2$ which are identical or different represent each a hydrogen atom, a halogen atom, a methyl group, an ethyl group or a trifluoromethyl group, $R^3$ represents a hydrogen atom or a methyl group and n represents 0 or 1.

13. A fungicidal composition which comprises as an active ingredient a fungicidally effective amount of a pyrazolecarboxamide derivative represented by the formula (I)



(I)

wherein $R^1$ and $R^2$ which are identical or different represent each a hydrogen atom, a halogen atom, a methyl group, an ethyl group or a trifluoromethyl group, $R^3$ represents a hydrogen atom or a methyl group and n represents 0 to 1, and an inert carrier.

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**4,742,075**

**SUBSTITUTED HEXAHYDRO-4H-INDOLO[6,5,4-CD]INDOLES**

**William H. Hunter, Amersham, England, assignor to Lilly Industries Limited, London, England**

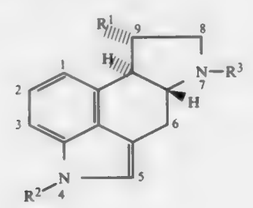
**Filed Jul. 22, 1985, Ser. No. 757,223**

**Claims priority, application United Kingdom, Jul. 27, 1984, 8419278**

**Int. Cl.⁴ A61K** *31/40;* **C07D** *209/56*

**U.S. Cl. 514—410** **9 Claims**

1. A compound of the formula



in which $R^1$ is

(i) R′CO— where R′ is $C_{1-4}$ alkyl;

(ii)



where R′ is hydrogen or $C_{1-4}$ alkyl, X is —OH or —$NH_2$;

(iii)



where R′ is hydrogen or $C_{1-4}$ alkyl, X is =NOH, —$SCH_2CH_2S$—, =$NNH_2$, =NNHR″ where R″ is $C_{1-4}$ alkyl, phenyl, or phenyl substituted with from one to five substituents selected from the group consisting of $C_{1-4}$ alkyl, $C_{1-4}$ alkoxy, nitro, cyano, hydroxy, halo, and amino;

(iv) $C_{1-5}$ alkyl;

(v) —COZ where Z is hydrogen, —OH, halogen, —$OC_{1-4}$ alkyl, —$OC_{1-4}$ alkylphenyl, —$N_3$, —$NH_2$, —NHR′, —$NR'_2$where each R′ is $C_{1-4}$ alkyl;

(vi) —$NH_2$, —NHR′, —$NR'_2$, or —NHCOR′ where R′ is $C_{1-4}$ alkyl;

(vii) —C≡N;

(viii) —$C(OH)(CH_3)$R′ where R′ is phenyl or phenyl substituted with from one to five substituents selected from the group consisting of $C_{1-4}$ alkyl, $C_{1-4}$ alkoxy, nitro, cyano, hydroxy, halo, and amino; and Rand $R^3$ are each hydrogen, $C_1$–$C_4$ alkyl or a protecting group; and salts thereof.

8. A pharmaceutical composition useful for inhibiting prolactin secretion, comprising a prolactin inhibiting amount of a compound of claim 1 in which $R^2$ and $R^3$ are each hydrogen or $C_1$–$C_4$ alkyl; and pharmaceutically acceptable salts thereof, with a pharmaceutically acceptable carrier.

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**4,742,076**

**ETODOLAC FOR LOWERING RHEUMATOID FACTOR**

**John F. Mullane, Westchester, N.Y., assignor to American Home Products Corporation, New York, N.Y.**

**Filed Jun. 3, 1987, Ser. No. 57,462**

**Int. Cl.⁴ A61K** *31/40*

**U.S. Cl. 514—411** **3 Claims**

1. A method for lowering rheumatoid factor blood levels in a human in need of treatment for rheumatoid arthritis, which comprises administering to the human an effective amount of etodolac or a therapeutically acceptable salt thereof.

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**4,742,077**

**BICYCLIC ALLYLETHER DERIVATIVES, PROCESSES FOR THEIR PRODUCTION AND THEIR USE**

**Anton Stütz, Maria Enzersdorf, Austria, assignor to Sandoz Ltd., Basel, Switzerland**

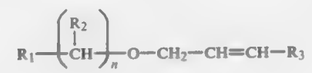
**Filed Sep. 8, 1986, Ser. No. 905,087**

**Claims priority, application Fed. Rep. of Germany, Sep. 14, 1985, 3532861**

**Int. Cl.⁴ C07F** *7/02;* **C07D** *209/02, 333/52;* **C07C** *41/00;* **A61K** *31/38, 31/34*

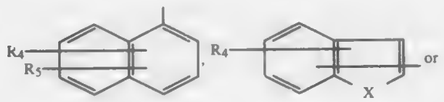
**U.S. Cl. 514—414** **5 Claims**

1. A compound of formula I

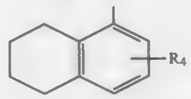


I

wherein $R_1$ represents a group of formula



IIa IIb



IIc

whereby

$R_4$ and $R_5$ are the same or different and represent hydrogen, halogen, lower alkyl, lower alkoxy or trifluoromethyl and X represents oxygen, sulfur, imino, lower alkylimino, —$(CH_2)$—, —$(S.CH_2)$— or —$(O.CH_2)$—,

$R_2$ represents hydrogen or lower alkyl,

$R_3$ represents a group of formula



IIIa IIIb IIIc



-continued



IIId

whereby

$R_6$, $R_7$ and $R_8$ are the same or different and represent hydrogen or alkyl or $R_6$ together with $R_7$ or $R_7$ together with $R_8$ represent —$(CH_2)_m$—

wherein m is 3 to 6,

$R_9$ represents alkyl, alkenyl, trialkylsilyl or alkyl substituted by hydroxy, lower alkoxy, lower halogenalkyl or aryl and n stands for 1, 2 or 3,

in free form or in the form of an acid addition salt.

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**4,742,078**

**PYRAN DERIVATIVES**

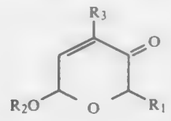
**Hisashi Takao; Norio Osaki, and Norio Yasudomi, all of Tokushima, Japan, assignors to Otsuka Kagaku Kabushiki Kaisha, Osaka, Japan**

**Continuation of Ser. No. 614,165, filed as PCT JP83/00013, Jan. 17, 1983, published as WO84/02910 Aug. 2, 1984, abandoned. This application Oct. 20, 1986, Ser. No. 920,937**

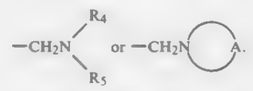
**Int. Cl.⁴ A01N** *43/16;* **C07D** *309/32*

**U.S. Cl. 514—460** **3 Claims**

1. A pyran derivative represented by the formula



wherein $R_1$ is lower alkyl, cycloalkyl or phenyl, $R_2$ is alkyl having 12 to 20 carbon atoms, $R_3$ is hydrogen, halogen,



each of $R_4$ and $R_5$ being lower alkyl or cycloalkyl, A being —$CH_2$—, oxygen or nitrogen,



forming a five or six-membered ring which has no substituent or at least one substituent selected from the group consisting of lower alkyl, lower alkoxy and halogen, and an acid salt thereof.

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**4,742,079**

**FUNGICIDES CONTAINING CYMOXANIL AND METALAXYL**

**André Devoise-Lambert, Tagolsheim, France, and Ulrich Gisi, Wenslingen, Switzerland, assignors to Sandoz Ltd., Basle, Switzerland**

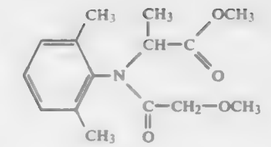
**Division of Ser. No. 827,584, Feb. 10, 1986, abandoned, which is a division of Ser. No. 689,137, Jan. 7, 1985, Pat. No. 4,585,763, which is a division of Ser. No. 459,761, Jan. 21, 1983, Pat. No. 4,507,310. This application Dec. 2, 1986, Ser. No. 936,879**

**Claims priority, application United Kingdom, Jan. 26, 1982, 820215; Oct. 29, 1982, 8231012**

**Int. Cl.⁴ A01N** *37/12, 37/34, 37/44*

**U.S. Cl. 514—528** **12 Claims**

1. A fungicidal composition comprising a component (a) of the formula I,



and a component (b) which is cymoxanil; the weight ratio of component (a) to component (b) being in the range of from 10:1 to 1:1.

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**4,742,080**

**THERAPEUTIC METHOD FOR PRODUCING BRONCHODILATION BY ADMINISTRATION OF 15-DEOXY-16-HYDROXY PROSTAGLANDIN ESTERS**

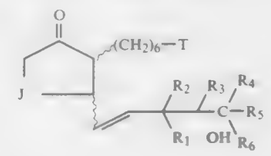
**Harold C. Kluender, South Bend, Ind.; Warren D. Woesner, New York, N.Y., and William G. Biddlecom, Elkhart, Ind., assignors to Miles Laboratories, Inc., Elkhart, Ind.**

**Continuation of Ser. No. 549,090, Nov. 7, 1983, abandoned, which is a division of Ser. No. 357,428, Mar. 12, 1983, Pat. No. 4,415,592, which is a division of Ser. No. 215,802, Dec. 12, 1980, Pat. No. 4,331,688, which is a division of Ser. No. 973,010, Dec. 12, 1978, Pat. No. 4,275,224, which is a division of Ser. No. 880,501, Feb. 23, 1978, Pat. No. 4,132,738. This application Mar. 15, 1985, Ser. No. 712,910**

**Int. Cl.⁴ A61K** *31/215*

**U.S. Cl. 514—530** **9 Claims**

1. A therapeutic method for producing bronchodilation in an individual for whom such therapy is indicated, comprising: administering to the individual an effective bronchodilating amount of a compound having the formula:



wherein:

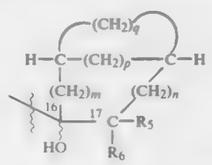
J is selected from the group consisting of R-hydroxy-methylene and S-hydroxymethylene;

T is alkoxycarbonyl having from 2 to 3 carbon atoms inclusive;

$R_1$ is hydrogen;

$R_2$ is hydrogen or together with $R_4$ is a methylene chain of 3 carbon atoms such that a cycloalkyl of 6 carbons atoms inclusive is formed;

$R_3$ is hydrogen or together with $R_4$ is a methylene or a lower alkylated methylene chain of 4 carbon atoms such that a cycloalkyl of 6 carbon atoms inclusive is formed, or together with $R_4$ is a bicycloalkyl or bicycloalkenyl moiety having the formula:



such that a bicycloalkyl or bicycloalkenyl compound is formed, wherein m and n are integers having a value of from 0 to 3, p is an integer having a value of from 0 to 4 and q is an integer having a value of from 1 to 4, and

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wherein the double bond of such bicycloalkenyl is in the m, n, p or q bridge;

$R_4$ is as defined above or is together with $R_5$ a methylene chain of 3 to 4 carbon atoms such that cycloalkyl of 4 to 5 carbon atoms inclusive is formed; and

$R_6$ is H or a straight-chain alkyl of 1 to 3 carbon atoms.

2. A therapeutic method as claimed in claim 1 wherein the compound is methyl 15R,20-cyclo-11α,16S-dihydroxy-9-oxo-prost-13E-en-1-oate.

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**4,742,081**

## CARNITINE COUPLED PHARMACEUTICAL AGENTS

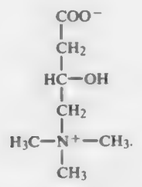
**Alfred Stracher, 47 The Oaks, Roslyn Estates, N.Y. 11576, and Leo Kesner, 1726 E. 32 St., Brooklyn, N.Y. 11234**

**Filed Jan. 6, 1986, Ser. No. 816,546**

**Int. Cl.⁴ A61K** *31/225*

**U.S. Cl. 514—547** **6 Claims**

1. A method of treating cardiac and skeletal muscle in a patient in need thereof which comprises administering to said patient an amount of a pharmaceutical effective therefor which pharmaceutical is chemically linked to



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**4,742,082**

## SOLUTION OF LUPROSTIOL AND 1,2,-PROPANEDIOL AND METHODS OF PREPARATION AND USE

**Eckhard Oelrich, Rossdorf; Carola Starz, and Manfred Wotschokowsky, both of Darmstadt, all of Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft mit Beschrankter Haftung, Darmstadt, Fed. Rep. of Germany**

**Filed Aug. 29, 1986, Ser. No. 901,849**

**Claims priority, application Fed. Rep. of Germany, Aug. 29, 1985, 3530821**

**Int. Cl.⁴ A61K** *31/19*

**U.S. Cl. 514—570** **17 Claims**

1. In a solution containing luprostiol and 1,2-propanediol, the improvement wherein said solution contains luprostiol sodium salt dissolved in a solvent mixture comprising, based on the total solvent mixture, about 50–90 percent by weight 1,2-propanediol and about 10–50 percent by weight water, said solution having a pH of about 6–8.

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**4,742,083**

## METHOD OF RELIEVING PAIN AND INFLAMMATORY CONDITIONS EMPLOYING SUBSTITUTED SALICYLAMIDES

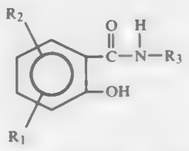
**Thomas W. Ritchey, Norwood, N.J., assignor to Lever Brothers Company, New York, N.Y.**

**Division of Ser. No. 525,916, Aug. 24, 1983, Pat. No. 4,560,519. This application Sep. 10, 1985, Ser. No. 774,613**

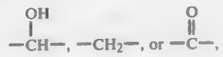
**Int. Cl.⁴ A61U** *31/165*

**U.S. Cl. 514—617** **65 Claims**

1. A method for treating dermatological inflammation in a mammal, which comprises the topical application to the affected area of the skin of an amount effective to ameliorate the inflammatory condition of an anti-inflammatory composition having an octanol/water distribution function of about 4.5 to about 10 which comprises, in admixture a pharmaceutically acceptable carrier vehicle and an anti-inflammatorily effective amount of a compound of the formula:



wherein the lipophilicity imparting substituents $—R_1$ and $—R_2$ which impart an octanol/water distribution function of about 4.5 to about 10 to said compound are —H, normal or branched chain or cyclic or fused ring polycyclic or non-fused ring polycyclic alkyl, alkenyl, alkynyl, or aryl groups optionally containing further substituents thereon, said $—R_1$ and $—R_2$ substituents comprising up to about 30 carbon atoms when taken together either attached directly to the phenyl ring provided with an amido and a hydroxyl group in an ortho orientation with respect to each other or attached to said phenyl ring through a



group with the proviso that $—R_1$ and $—R_2$ are not both —H and wherein $—R_3$ is selected from the group consisting of $R_4$-substituted phenyl wherein $R_4$ is selected from the group consisting of —OH, —COOH, the tautomeric pair



$—CH_2COOH$, $—COOCH_3$, $—COOC_2H_5$, $—CH_2COOCH_3$, $—CH_2COOC_2H_5$, $—NO_2$, and $CX_1X_2X_3$ wherein $X_1$, $X_2$ and $X_3$ are halogen atoms.

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**4,742,084**

## ARALKYKYL (ARYLETHYNYL)ARALKYL AMINES AND THEIR USE AS VASODILATORS AND ANTIHYPERTENSIVES

**John R. Carson, Norristown, Pa., assignor to McNeilab, Inc., Fort Washington, Pa.**

**Continuation of Ser. No. 665,684, Oct. 29, 1984, Pat. No. 4,661,635, which is a continuation-in-part of Ser. No. 553,726, Nov. 21, 1987, abandoned. This application Nov. 19, 1986, Ser. No. 932,433**

**The portion of the term of this patent subsequent to Apr. 28, 2004, has been disclaimed.**

**Int. Cl.⁴ C07C** *87/28;* **A61K** *31/135*

**U.S. Cl. 514—654** **6 Claims**

1. A pharmaceutical composition comprising N-[2-(3,4-dimethoxyphenyl)ethyl]-5-methoxy-N,alpha-dimethy-2-[(phenyl)ethynyl]benzenepropanamine or a pharmaceutically-acceptable, acid-addition salt in combination with a pharmaceutically-acceptable diluent or carrier.

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**4,742,085**

## CROSSLINKED POROUS SKINLESS PARTICLES OF PVC RESIN AND PROCESS FOR PRODUCING SAME

**Ross J. Cozens, North Ridgeville, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio**

**Filed Apr. 14, 1987, Ser. No. 38,087**

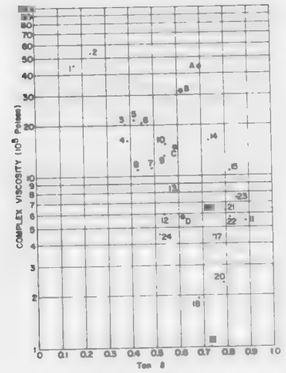
**Int. Cl.⁴ C08J** *9/28*

**U.S. Cl. 521—56** **32 Claims**

1. An agitated aqueous suspension process for producing porous, skinless, agglomerated, crosslinked polyvinyl chloride resin particles comprising polymerizing vinyl chloride monomer together with at least one crosslinking agent in the presence of from about 0.01 part by weight to about 0.1 part by



weight per 100 parts by weight of polymerizable monomer of at least one ionic sensitive primary dispersant capable of thickening water, and at least one secondary dispersant, wherein an a monovalent inorganic or organic ionic compound in amounts sufficient to desorb a substantial amount of said primary dispersant off the monomer droplets, is charged to the polymerization medium at from about 1% to about 5% conversion of monomer to polymer, thereby producing a skinless, agglomer-




ated, crosslinked, porous PVC resin in particulate form, said resin particles having a mercury porosity of from about 0.1 cc/g to about 0.8 cc/g, and a particle size of from about 70 microns to about 1000 microns, and a friability of less than about 2, and a powder mix time of less than about 400 seconds, and a shape factor less than about 0.85 and wherein greater than about 20% of the area of surface of said particle is PVC as measured by ESCA.

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**4,742,086**

## PROCESS FOR MANUFACTURING POROUS POLYMER

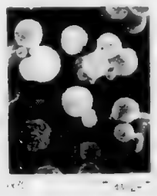
**Koji Masamizu, Houya; Shinya Hirokawa, Chiba, and Sanae Fujita, Tokyo, all of Japan, assignors to Lion Corporation, Tokyo, Japan**

**Filed Oct. 24, 1986, Ser. No. 922,991**

**Claims priority, application Japan, Nov. 2, 1985, 60-246623; Jul. 17, 1986, 61-168806; Sep. 1, 1986, 61-205281**

**Int. Cl.⁴ C08J** *9/26, 9/28*

**U.S. Cl. 521—62** **14 Claims**



1. A process for manufacturing a porous polymer particles comprising the steps of:

(1) forming O/W emulsion by using a water-soluble surfactant or a water-soluble high-molecular dispersant wherein an inner phase of the O/W emulsion is a hydrophobic phase and a outer phase thereof is a water phase containing at least one water-soluble polymerizable monomer;

(2) adding said O/W emulsion to a hydrophobic dispersing medium containing an oil-soluble surfactant or an oil-soluble high-molecular dispersant to form O/W/O emulsion; and

(3) polymerizing the monomer.

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**4,742,087**

## POLYURETHANE PREPOLYMERS BASED ON OLEOCHEMICAL POLYOLS, THEIR PRODUCTION AND USE

**Hermann Kluth, Duesseldorf; Bert Gruber, Bedberg; Alfred Meffert, Monheim, and Wilfried Huebner, Langenfeld, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany**

**Filed Jul. 31, 1987, Ser. No. 80,024**

**Claims priority, application Fed. Rep. of Germany, Aug. 2, 1986, 3626223**

**Int. Cl.⁴ C08G** *18/30*

**U.S. Cl. 521—107** **20 Claims**

1. In a polyurethane prepolymer containing terminal isocyanate groups which comprises the reaction product of (1) a stoichiometric excess of an isocyanate and (2) an oleochemical polyol, the improvement wherein said oleochemical polyol is obtained by (a) the complete ring opening of an epoxidized triglyceride of a fatty acid mixture having olefinic unsaturation with a $C_1$–$C_{12}$ alcohol to provide a triglyceride derivative containing substantially no epoxide groups and (b) partial conversion of said triglyceride derivative to an alkyl ester polyol in which the alkyl group contains from 1 to 12 carbon atoms.

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**4,742,088**

## PHOSPHORUS-CONTAINING NITROGEN COMPOUNDS AS FLAME RETARDANTS AND SYNTHETIC RESINS CONTAINING THEM

**Youn C. Kim, Kumi, Rep. of Korea, assignor to Kolon Industries, Inc., Seoul, Rep. of Korea**

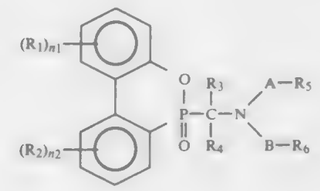
**Filed Jun. 18, 1987, Ser. No. 64,219**

**Claims priority, application Rep. of Korea, Sep. 12, 1986, 86-7663**

**Int. Cl.⁴ C08G** *18/14*

**U.S. Cl. 521—118** **19 Claims**

1. A flame retardant represented by the following formula (I),



(I)

wherein

$R_1$ and $R_2$ may be the same or different and are halogen atoms or hydrocarbon groups with 1 to 10 carbon atoms or may be selected from $R_5$ and $R_6$;

$R_3$ and $R_4$ are hydrogen atoms or hydrocarbon groups with 1 to 10 carbon atoms;

$R_5$ and $R_6$ are hydrogen atoms or functional groups which may be converted to esters;

A and B stand for organic residues of 0 to 10 carbon atoms; each of $n_1$ and $n_2$ is a number from 0 to 4.

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**4,742,089**

## RIGID POLYURETHANE FOAM AND PROCESS FOR PRODUCING THE SAME

**Reishi Naka, and Kazuyoshi Kuroishi, both of Tochigi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Aug. 12, 1987, Ser. No. 84,216**

**Int. Cl.⁴ C08G** *18/30*

**U.S. Cl. 521—110** **14 Claims**

1. A process for producing a rigid polyurethane foam which comprises reacting a polyol component with an isocyanate component in the presence of a blowing agent, a reaction

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catalyst and a foam stabilizer, said polyol component being a mixed polyol composition comprising

(a) 48 to 52% by weight of a polyol obtained by adding propylene oxide and ethylene oxide to tolylenediamine,
(b) 10 to 40% by weight of a polyol obtained by adding ethylene oxide to bisphenol,
(c) 13 to 17% by weight of a polyol obtained by adding propylene oxide to trimethylolpropane,
(d) 9 to 13% by weight of a polyol obtained by adding propylene oxide to sucrose, and
(e) 10 to 14% by weight of a polyol obtained by adding propylene oxide and ethylene oxide to diethanolamine, said mixed polyol composition having an average OH value of 440 to 470.

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**4,742,090**

## BISMUTH/CARBOXYLIC ACID CATALYSTS FOR PREPARING ELASTOMERS

**Douglas L. Hunter, and David E. Schiff, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Mar. 31, 1986, Ser. No. 846,441**
**Int. Cl.[4] C08G** *18/14*
**U.S. Cl. 521—124** **28 Claims**

1. A polyurethane-urea elastomer which is the reaction product of a reaction mixture comprising (1) a liquid active hydrogen-containing composition which comprises a relatively high equivalent weight active hydrogen-containing compound, and an amine-terminated, relatively low equivalent weight compound, (2) a polyisocyanate which is present in an amount to provide about 0.8 to about 1.50 isocyanate groups per active hydrogen-containing group present in the mixture, and (3) a catalytically effective amount of a bismuth carboxylate catalyst.

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**4,742,091**

## RIM ELASTOMER

**Robert A. Grigsby, Jr., Georgetown, and David R. McCoy, Austin, both of Tex., assignors to Texaco Inc., White Plains, N.Y.**

**Filed Aug. 13, 1986, Ser. No. 896,141**
**Int. Cl.[4] C08G** *18/30*
**U.S. Cl. 521—163** **4 Claims**

1. A reaction injection molded elastomer made by reacting in a closed mold amine terminated polyethers of greater than 1500 average molecular weight, having greater than 50% of their active hydrogens in the form of amine hydrogens, a chain extender, an aromatic polyisocyanate and an effective amount of an amine additive of the general structure:

$$R(W)_x(OCH_2CH)_yNH_2$$
$$\quad\quad\quad

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consisting of acrylate and methacrylate esters, styrene, vinyl chloride, vinylidene chloride and vinyl acetate and wherein said acrylate or methacrylate esters are selected from alkyl, hydroxyalkyl, alkylaminoalkyl and dialkylaminoalkyl esters, wherein the weight percentages are based on the combined weights of (a) and (b) monomers and total 100 percent, and wherein said polymerization is carried out in the presence of

60 to 300 weight percent of the amine-epoxy adduct (c) comprising the reaction product of an epoxide and an organic amine having at least one primary or secondary group reactive with said epoxide; and the weight percent (c) being based on total weights of polymerized monomers (a) and (b); and wherein the amine cation-activity is derived from monomer (b), or amine-epoxy adduct (c) or combinations thereof sufficient to provide an amino-cation activity of from 35 to 175 milliequivalents per 100 gram resin solids and to effect polymer solubilization or dispersion on partial or full acidification.

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**4,742,098**

## ORGANOPHILIC CLAY GELLANTS AND PROCESS FOR PREPARATION

**Claude M. Finlayson, Cranbury; Charles A. Cody, Robbinsville; Steven J. Kemnetz, Trenton; William W. Reichert, Freehold; Edward D. Magauran, Mount Holly, and Johnny R. Johnson, Freehold, all of N.J., assignors to NL Chemicals, Inc., Hightstown, N.J.**

**Division of Ser. No. 767,599, Aug. 20, 1985, Pat. No. 4,695,402. This application Jun. 9, 1987, Ser. No. 60,082**

**Int. Cl.[4] C08L** *67/00*

**U.S. Cl. 523—514** **10 Claims**

1. A process of thickening a polyester composition comprising:

(a) forming a pregel which is comprised of an aromatic monomer and the reaction product of

(i) a smectite-type clay having a cation exchange capacity of at least 75 milliequivalents per 100 grams of clay;

(ii) organic cation containing at least one lineal or branched, saturated or unsaturated alkyl group having 12 to 22 carbon atoms, at least one lineal or branched, saturated or unsaturated alkyl group having 1 to 12 carbon atoms and at least one aralkyl group having lineal or branched 1 to 12 carbons in the alkyl portion, said organic cation being in an amount ranging from about 100 to about 130% of the cation exchange capacity of the clay; and

(iii) organic anion having a pKa less than about 11.0 in an amount such that the milliequivalent ratio of the organic cation to the organic anion is in the range of from about 3.0:1.0 to about 12:1.0 whereby at least some of the cation exchange sites of the smectite-type clay are substituted with organic cation and at least some of the organic anion forms a complex with the organic cation which is intercalated with the smectite-type clay; and

(b) mixing the pregel with a liquid unsaturated polyester to form a thickened polyester composition wherein the reaction product is capable of being directly added into the polyester composition in order to thicken the composition and wherein the formation of the pregel yields a higher efficiency compared to said direct addition.

**4,742,099**

## POLYIMIDE FILM AND PROCESS FOR PRODUCING SAME

**Hirosaku Nagano, Ohtsu; Junji Takase, Kobe; Hideki Kawai, Ohtsu; Hitoshi Nojiri, Ohtsu, and Tsuneo Yamamoto, Ohtsu, all of Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan**

**Filed Dec. 1, 1986, Ser. No. 936,524**

**Claims priority, application Japan, Nov. 29, 1985, 60-270118**

**Int. Cl.[4] C08K** *5/52, 5/04*

**U.S. Cl. 524—115** **4 Claims**

1. A polyimide film comprising at least one organic titanium compound selected from the group consisting of compounds of formula (I) and compounds of formula (II):

$$(R_1O)_mTi\text{—}OX)_{4-m} \quad (I)$$

wherein

m=0 to 4

$$X = -\overset{\overset{O}{\|}}{C}-R_2,\ -\overset{\overset{O}{\|}}{\underset{\underset{O}{\|}}{S}}-R_3,\ \text{or}\ -\overset{\overset{O}{\|}}{\underset{\underset{OH}{|}}{P}}-OR_4,$$

$R_1$=$C_3$–$C_{18}$ hydrocarbon residue,

$R_2$, $R_3$=$C_3$–$C_{18}$ hydrocarbon residue,

$R_4$=$C_3$–$C_{13}$ hydrocarbon residue or

$$-P(OR_7)_2,$$
$$\|$$
$$O$$

$R_7$=$C_2$–$C_{18}$ hydrocarbon residue; and

$$(R_8O\rightarrow)_n Ti.[P(OR_9)_2]_{6-n} \quad (II)$$
$$|$$
$$OH$$

wherein

n=0 to 6

$R_8$=$C_3$–$C_{18}$ hydrocarbon residue,

$R_9$=$R_3$–$C_{18}$ hydrocarbon residue,

$R_{10}$, $R_{11}$=$C_1$–$C_8$ hydrocarabon residue;

the amount of titanium in said polyimide film being 30 to 800 ppm expressed in terms of titanium element based on the weight of the film.

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**4,742,100**

## POLYURETHANES CONTAINING AMINE SALTS

**Edward L. Kay, Akron, and Kenneth B. Roskos, Clinton, both of Ohio, assignors to The Firestone Tire & Rubber Company, Akron, Ohio**

**Filed Mar. 16, 1987, Ser. No. 26,421**

**Int. Cl.[4] C08L** *75/00*

**U.S. Cl. 524—238** **18 Claims**

1. A polyurethane composition, comprising:

a polyurethane and an effective amount of a salt to increase the low-strain moduli of said polyurethane, said salt being the reaction product of (a) a basic nitrogen function compound, and (b) a monocarboxylic acid, a dicarboxylic acid, or combinations thereof, the equivalent ratio of said acid to said basic nitrogen compound being at least 1 to 2.



**4,742,101**

## CURABLE FLUOROSILICONE RUBBER COMPOSITION

**Takeo Yoshida, Annaka, Japan, assignor to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan**

**Filed Feb. 10, 1987, Ser. No. 13,253**

**Claims priority, application Japan, Feb. 14, 1986, 61-031559**

**Int. Cl.[4] C08K** *5/54*

**U.S. Cl. 524—267** **9 Claims**

1. A curable fluorosilicone rubber composition comprising:

(A) 100 parts by weight of an organopolysiloxane represented by General Unit Formula (I):

$$R_aSiO_{\frac{4-a}{2}} \quad (I)$$

wherein R comprises 25 to 50 mole % of a group represented by the formula: —$CH_2CH_2Rf$, where Rf represents a perfluoroalkyl group having 1 to 3 carbon atoms, and 75 to 50 mole % of a group selected from the group consisting of a methyl group, an ethyl group, a phenyl group and a vinyl group; and a is a number of 1.98 to 2.02;

and having a viscosity of at least 1,000 cP at 25° C.;

(B) 10 to 50 parts by weight of reinforcing silica powder having a specific surface area of at least 50 $m^2/g$;

(C) 0 to 100 parts by weight of semi-reinforcing silica powder having an average particle diameter of not greater than 50 $\mu$m;

(D) 3 to 10 parts by weight of a fluid organopolysiloxane compound represented by General Formula (II);

$$(R')_3SiO\left[\begin{array}{c}R'\\|\\SiO\\|\\R'\end{array}\right]_n Si(R')_3 \quad (II)$$

wherein some R′ represent methyl groups and other R′ represent phenyl groups; the ratio of the number of the methyl group to the number of the phenyl group in the molecular ranges between 70/30 and 25/75; and n is an integer of 0 to 5; and

(E) a vulcanizing agent.

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**4,742,102**

## POLYSTYRENE COMPOSITIONS

**Nobutoshi Iwata, Kawasaki, and Hisanori Kato, Tokyo, both of Japan, assignors to Nippon Steel Chemical Co., Ltd., Tokyo, Japan**

**Filed Jul. 28, 1986, Ser. No. 890,031**

**Claims priority, application Japan, Jul. 31, 1985, 60-170056**

**Int. Cl.[4] C08K** *5/10*

**U.S. Cl. 524—317** **10 Claims**

1. A polystyrene composition comprising a blend of,

(a) a styrene homopolymer or copolymer;

(b) an adduct of a glycerin fatty acid monoester and alkylene oxide, of formula (I)

$$\begin{array}{l}CH_2OCOR_1\\|\\CHO(XO)_lH\\|\\CH_2O(XO)_mH\end{array} \quad (I)$$

where $R_1$ is a saturated or unsaturated alkyl group containing 11–21 carbon atoms, each X is independently an alkylene group of 2–3 carbon atoms, and l and m are integers such that l+m is 1 to 5; and

(c) a glycerin fatty acid monoester of formula (II)

$$\begin{array}{l}CH_2OCOR_2\\|\\CHOH\\|\\CH_2OH\end{array} \quad (II)$$

where $R_2$ is a saturated or unsaturated alkyl group containing 11–21 carbon atoms.

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**4,742,103**

## CURABLE ORGANOPOLYSILOXANE COMPOSITIONS EXHIBITING IMPROVED ADHESION

**Yoshitsugu Morita, and Shoichi Shida, both of Chiba, Japan, assignors to Toray Silicone Co., Ltd., Tokyo, Japan**

**Filed Mar. 23, 1987, Ser. No. 29,014**

**Claims priority, application Japan, Apr. 11, 1986, 61-83577**

**Int. Cl.[4] C08K** *5/41*

**U.S. Cl. 524—174** **9 Claims**

1. A curable organosiloxane composition comprising

(A) 100 parts by weight of an organopolysiloxane containing at least 2 silicon-bonded lower alkenyl groups in each molecule,

(B) from 0.3 to 40 parts by weight of an organohydrogenpolysiloxane containing at least 2 silicon-bonded hydrogen atoms in each molecule,

(C) a catalytically effective amount of a platinum-group metal or a compound of said metal,

(D) from 0.1 to 30 weight parts of either an organosilicon compound having both ethylenically unsaturated and alkoxy groups bonded to silicon or a partial hydrolysis condensate of said organosilicon compound, and

(E) from 0.001 to 10 parts by weight of either (1) a compound of either aluminum or zirconium, where said compound is an alkoxide, a phenoxide, a carboxylate, or a derivative of a beta-diketone or o-hydroxyketone, or (2) a reaction product of said aluminum or zirconium compound with said organosilicon compound.

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**4,742,104**

## THERMOPLASTIC MOULDING COMPOSITIONS BASED ON POLYCARBONATE/GRAFT POLYMER MIXTURES

**Christian Lindner; Otto Koch, both of Cologne; Hans-Jürgen Kress, Krefeld, and Horst Peters, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Continuation of Ser. No. 832,342, Feb. 24, 1986, abandoned, which is a division of Ser. No. 721,082, Apr. 8, 1985, Pat. No. 4,596,851. This application Dec. 29, 1986, Ser. No. 947,278**

**Claims priority, application Fed. Rep. of Germany, Apr. 12, 1984, 34751**

**Int. Cl.[4] C08K** *5/59*

**U.S. Cl. 524—409** **8 Claims**

1. A thermoplastic molding composition consisting essentially of

(A) 10 to 80 parts by weight of an aromatic thermoplastic polycarbonate,

(B) 10 to 60 parts by weight of a graft polymer of ethylenically unsaturated monmers grafted onto a rubber, with a rubber content of 5 to 80% by weight, based on the weight of component (B), and

(C) 10 to 60 parts by weight of at least one terpolymer of

(i) styrene, a-methylstyrene, a halogenostyrene, a ring-substituted $C_1$–$C_5$-alkylstyrene, or a mixture thereof with

(ii) acrylonitrile, methacrylonitrile, or a mixture of both with

(iii) 0.05 to 5% by weight, based on the total weight of component (C), of an ethylenically unsaturated copolymerized epoxide comound, in which the weight ratio of the monomers of (i) to those of (ii) is between 90:10 and

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50:50 and the sum of (A), (B) and (C) being 100 parts by weight.

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**4,742,105**

## BINARY DEFLOCCULATING COMPOSITIONS

**Edwin L. Kelley, Succasunna, N.J., assignor to Diamond Shamrock Chemicals Company, Dallas, Tex.**

**Filed May 29, 1986, Ser. No. 868,149**
**Int. Cl.[4] C08K *3/34***
**U.S. Cl. 524—447** **9 Claims**

1. Binary mixture of (1) at least one of sodium, potassium and ammonium polyacrylate having a weight average molecular weight of between about 2,000 to about 10,000 and (2) sodium silicate, said polyacrylate and sodium silicate being present in amounts of from greater than about 50% by weight to about 80% by weight of polyacrylate and from less than about 50% by weight to about 20% by weight of sodium silicate on a dry solids basis, said binary mixture being useful as deflocculating agent for aqueous kaolin slurries.

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**4,742,106**

## POLYOLEFIN COMPOSITIONS HAVING HIGH RIGIDITY AND HIGH IMPACT RESISTANCE

**Takeshi Kamiya, Kamakura, and Noboru Yamaoka, Yokohama, both of Japan, assignors to Nippon Petrochemicals Company, Limited, Tokyo, Japan**

**Filed Feb. 2, 1987, Ser. No. 9,524**
**Claims priority, application Japan, Feb. 3, 1986, 61-20278**
**Int. Cl.[4] C08K *3/34***
**U.S. Cl. 524—449** **9 Claims**

1. A polyolefin composition having a high rigidity and a high impact resistance, said polyolefin composition comprising:

(a) 10–96% by weight of a propylene polymer;

(b) 2–30% by weight of an ethylene/α-olefin copolymer obtained by copolymerization ethylene with an α-olefin having 3 to 12 carbon atoms in the presence of a catalyst consisting essentially of a solid material and an organoaluminum compound, said solid material containing magnesium and titanium and/or vanadium, and said ethylene/α-olefin copolymer having an α-olefin content of 5 to 40 mol % and the following properties (i)–(iv):

| | | |
|---|---|---|
| (i) | Melt index | 0.01 100 g/10 min |
| (ii) | density | 0.860 0.910 g/cm$^3$ |
| (iii) | Maximum peak temperature as measured according to a differential scanning calomimetry (DSC) | not lower than 100° C. |
| (iv) | Insolubles in boiling n-hexane | not less than 10 wt. % |

(c) 2–60% by weight of a mica,

provided the total amount of said components (a), (b) and (c) is 100% by weight.

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**4,742,107**

## NOISE REDUCTION AND DAMPING COMPOSITIONS

**Robert J. Statz, Kennett Square, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed May 6, 1987, Ser. No. 46,536**
**Int. Cl.[4] C08K *3/34*; C08L *27/00***
**U.S. Cl. 524—449** **20 Claims**

1. A composition suitable for the manufacture of noise reduction or vibration damping articles, said composition consisting essentially of a blend of

(a) about 10–90% of a copolymer of ethylene with at least one organic monomer X capable of being polymerized to a homopolymer having a glass transition temperature, $T_g$, of less than about −20° C. and selected from the group consisting of esters of unsaturated $C_3$–$C_{20}$ mono- and dicarboxylic acids, vinyl esters of saturated $C_2$–$C_{18}$ carboxylic acids, and vinyl alkyl ethers wherein the alkyl group has 1–18 carbon atoms, and an additional monomer Y selected from the group consisting of ethylenically unsaturated $C_3$–$C_{20}$ carboxylic acids, carbon monoxide, and sulfur dioxide;

(b) about 90–10% of a vinyl chloride homopolymer or a copolymer of vinyl chloride with another ethylenically unsaturated comonomer selected from the group consisting of $C_2$–$C_5$ hydrocarbons, vinyl esters, acrylonitrile, acrylic esters, vinylidene chloride, esters of unsaturated carboxylic acids, and vinyl ethers;

both percentages being based on the total weight of the polymers in the blend, which is about 10–80% of the total weight of the composition; and

(c) about 20–90% of mica, based on the total weight of the composition.

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**4,742,108**

## STRUCTURE REINFORCED LATEX PARTICLES

**Ashok C. Makati; Mezzie L. Ash, and Do I. Lee, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Division of Ser. No. 759,994, Jul. 29, 1985. This application Jul. 27, 1987, Ser. No. 78,328**
**Int. Cl.[4] C08F *2/16***
**U.S. Cl. 524—458** **10 Claims**

1. A pressure sensitive adhesive comprising:

(i) a structure reinforced latex particle having improved tensile and elongation properties prepared by an emulsion polymerization comprising:

(a) polymerizing a first monomer feed to form a core region;

(b) polymerizing in the presence of said (a) a second monomer feed, a polymer of which would have a $T_g$ greater than (a), in an amount from about 5 to about 30 parts per hundred parts monomer in said latex particle to form an intermediate layer;

(c) polymerizing in the presence of (a) and (b) a third monomer feed, a polymer of which would have a $T_g$ less than said (b), to form a shell region whereby a structure reinforced latex particle is produced having a soft polymer core, a hard polymer intermediate layer and a soft polymer shell; and

(ii) a tackifier.

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**4,742,109**

## POLYBUTYLENE TEREPHTHALATE COMPOSITION

**Katuhiko Takahashi, and Yoshihisa Tajima, both of Fuji, Japan, assignors to Polyplastics Co., Ltd., Osaka, Japan**

**Filed Jan. 30, 1986, Ser. No. 823,907**
**Claims priority, application Japan, Jan. 30, 1985, 60-15757**
**Int. Cl.[4] C08L *67/02***
**U.S. Cl. 524—504** **5 Claims**

1. A polybutylene terephthalate composition which comprises 75–99.4 wt. % polybutylene terephthalate, 0.1 to 20 wt. % polyacrylate and 0.5–2.0 wt. % of a silane coupling agent having the formula:

$$YRSiX_3$$

wherein X is a hydrolyzable group, Y is a glycidyl group or an amino group and R is an alkylene group.

4. A composition as claimed in claim 1, which further comprises glass fibers.



**4,742,110**

## POLYTEREPHTHALAMIDE COMPOSITION HAVING GEL PROPORTION, FG, OF 3–90%

**Takeshi Sakashita, Iwakuni; Yurimasa Zenitani, Ohno; Akio Ikeda, Ohtake, and Kenichi Nishiwaki, Waki, all of Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan**

**PCT No. PCT/JP86/00086, § 371 Date Oct. 7, 1986, § 102(e) Date Oct. 7, 1986, PCT Pub. No. WO86/04907, PCT Pub. Date Aug. 28, 1986**
**PCT Filed Feb. 21, 1986, Ser. No. 919,150**
**Claims priority, application Japan, Feb. 21, 1985, 60-31567**
**Int. Cl.[4] C08L *77/10, 77/08***
**U.S. Cl. 524—538** **8 Claims**

1. A polyamide composition having a fraction insoluble in concentrated sulfuric acid at 50° C. and a fraction soluble in concentrated sulfuric acid at 50° C. comprising a polycondensate consisting of (a) an aromatic acid component consisting essentially of 60 to 100 mole % of terephthalic acid component units and 40 to 0 mole % of units of an aromatic dicarboxylic acid component other than the terephthalic acid component and (b) units of an aliphatic alkylene-diamine component having 6 to 18 carbon atoms, wherein the gel proportion (Fg) defined by the following formula:

$$Fg = Wg/W \times 100 \quad (1)$$

wherein W stands for the weight in grams of the polyamide composition and Wg stands for the weight in grams of the fraction of the polyamide composition which is insoluble in concentrated sulfuric acid at 50° C.,

is in the range of from 3% to 90%, and the fraction soluble in concentrated sulfuric acid at 50° C. has an intrinsic viscosity (η) of at least 0.5 dl/g as measured in concentrated sulfuric acid as 30° C.

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**4,742,111**

## PHENOLIC RESIN-CONTAINING AQUEOUS COMPOSITIONS

**Frank K. Chi, Williamsville, N.Y., assignor to Dow Corning Corporation, Midland, Mich.**

**Continuation of Ser. No. 799,717, Nov. 19, 1985, abandoned, which is a continuation of Ser. No. 668,046, Nov. 5, 1984, Pat. No. 4,584,340. This application Jun. 22, 1987, Ser. No. 64,636**
**Int. Cl.[4] C08K *3/36***
**U.S. Cl. 524—596** **5 Claims**

1. An aqueous composition consisting essentially of

(A) 100 parts by weight phenolic resin;

(B) 1 to 100 parts by weight of colloidal silica; and

(C) 300 to 1900 parts by weight of water.

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**4,742,112**

## RICINOLEATE MODIFIED HYDROCARBON POLYOLS

**Melvin Brauer, East Brunswick, and William J. Downey, Linden, both of N.J., assignors to CasChem, Inc., Bayonne, N.J.**

**Filed Jan. 23, 1987, Ser. No. 6,415**
**Int. Cl.[4] C08G *18/28***
**U.S. Cl. 524—705** **36 Claims**

1. A polyol mixture comprising from about 10 to 60 weight percent of at least one ricinoleate compound having at least two hydroxyl groups per molecule and from about 90 to 40 weight percent of a $C_2$ to $C_6$ hydrocarbon polymer having at least one hydroxyl group.

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**4,742,113**

## STRUCTURAL ADHESIVE COMPOSITIONS

**Thomas E. Gismondi, deceased, late of Erie, Pa, by Joanne Smith, legal representative, and Dennis J. Damico, both of Erie, Pa., assignors to Lord Corporation, Erie, Pa.**

**Filed Feb. 20, 1987, Ser. No. 16,843**
**Int. Cl.[4] C08G *18/30***
**U.S. Cl. 524—762** **16 Claims**

1. A structural adhesive composition comprising:

A. at least one organic polyisocyanate compound having at least two isocyanate groups;

B. a polyol comprising at least one polymeric polyol comprising a graft copolymer of a poly(alkylene oxide) polyol and a vinyl monomer selected from acrylonitrile or a mixture of acrylonitrile and stryrene, said polyisocyanate being present in an amount sufficient to provide an NCO:OH ratio of at least 1 with respect to the hydroxyl groups; and

C. a latent catalyst for the reaction of the isocyanate groups of said polyisocyanite and hydroxyl groups of said polyol.

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**4,742,114**

## WATER-IN-OIL EMULSIONS OF AMIDASE

**Robert L. Wetegrove, Winfield, and Ralph W. Kaesler, Barrington, both of Ill., assignors to Nalco Chemical Company, Naperville, Ill.**

**Continuation of Ser. No. 14,328, Feb. 13, 1987, Pat. No. 4,687,807. This application Jun. 19, 1987, Ser. No. 63,933**
**The portion of the term of this patent subsequent to Aug. 18, 2004, has been disclaimed.**
**Int. Cl.[4] C08J *9/04***
**U.S. Cl. 524—827** **1 Claim**

1. An improved method of treating water-in-oil emulsions of acrylamide polymers with Amidase to reduce the acrylamide content thereof which comprises adding the Amidase in the form of a water-in-oil emulsion.

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**4,742,115**

## HEAT RESISTANT, THERMOPLASTIC RESIN COMPOSITION

**Masaaki Mawatari, Suzuka; Syuji Tsuchikawa; Shinichi Kimura, both of Yokkaichi; Nobuyuki Katsuki, Kuwana, and Mitsuo Abe, Yokkaichi, all of Japan, assignors to Japan Synthetic Rubber Co., Ltd., Tokyo, Japan**

**Continuation-in-part of Ser. No. 623,035, Jun. 21, 1984, abandoned. This application Aug. 6, 1985, Ser. No. 762,828**
**Claims priority, application Japan, Jul. 1, 1983, 58-118157; Jul. 1, 1983, 58-118158; Aug. 8, 1984, 59-164909**
**Int. Cl.[4] C08L *71/04***
**U.S. Cl. 525—68** **27 Claims**

1. A thermoplastic resin composition comprising (a) 5 to 99% by weight of a poly(phenylene ether), (b) 95 to 1% by weight of a thermoplastic resin which is obtained by polymerizing, in the absence of a rubber-like polymer, an aromatic alkenyl compound and an alkenyl cyanide compound, while varying the weight ratio of the two in the polymerization, and (c) 2 to 94% by weight of other different styrenic resins other than thermoplastic resin (b) selected from the group consisting of homopolymer and copolymers of styrene and rubber-modified polymers obtained by homopolymerizing or copolymerizing styrene in the presence of a rubber-like polymer, said thermoplastic resin (b) comprising (A) 1–50% by weight of a polymer having an alkenyl cyanide compound content of 1% or more but less than 10% by weight, (B) 1–70% by weight of a polymer having an alkenyl cyanide compound content of 10% or more but less than 20% by weight, (C) 5–90% by weight of a polymer having an alkenyl cyanide compound content of 20% or more but less than 40% by weight.

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**4,742,116**

## THERMOPLASTIC MOULDING COMPOUND

**Herman A. J. Schepers, Stein, and Wilhelmus A. M. Debets, Sittard, both of Netherlands, assignors to Stamicarbon B.V., Geleen, Netherlands**

**Continuation of Ser. No. 656,465, Oct. 1, 1984, abandoned. This application Dec. 13, 1985, Ser. No. 808,651**
**Claims priority, application Netherlands, Oct. 1, 1983, 8303378**
**Int. Cl.[4] C08L *25/08, 25/14, 51/04, 51/06***
**U.S. Cl. 525—74** **20 Claims**

1. A thermoplastic moulding compound based on a rubber-

modified copolymer consisting of styrene and/or α-methylstyrene and maleic anhydride, wherein said moulding compound is composed of a mixture of:

A. 50–95% (wt) of a copolymer consisting of:
(i) 50–95% (wt) styrene and/or α-methylstyrene,
(ii) 50–5% (wt) maleic anhydride,
(iii) 0–20% (wt) acrylate,
(iv) 0–20% (wt) acrylonitrile;

B. 5–50% (wt) of an ethylene-propylene modified rubber or ethylene-propylene-diene modified rubber consisting of said rubber and grafted, by solution polymerization, thereto at least one compound selected from the group consisting of compounds, containing hydroxyl groups, compounds containing amide groups and compounds containing amine groups; and

C. 0–30% (wt) of an ethylene-propylene rubber or an ethylene propylene-diene rubber.

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**4,742,117**

## CONJUGATED DIENE BASED RUBBER COMPOSITION

**Fumio Tsutsumi; Mitsuhiko Sakakibara; Noboru Shimada; Yoshihisa Fujinaga, all of Yokkaichi; Noboru Oshima, Suzuka; Tatsuro Hamada, Higashimurayama, and Tatsuo Fujimaki, Higashimurayama, all of Japan, assignors to Japan Synthetic Rubber Co., Ltd. and Bridgestone Corporation, both of Tokyo, Japan**

**Continuation of Ser. No. 804,952, Dec. 5, 1985, abandoned. This application Apr. 17, 1987, Ser. No. 39,833**

**Claims priority, application Japan, Dec. 13, 1984, 59-263285; Jan. 25, 1985, 60-13355**

**Int. Cl.[4] C08L** *9/00*

**U.S. Cl. 525—98** **13 Claims**

1. A rubber composition containing not less than 30% of a butadiene-based polymer or copolymer which is obtained by the steps of (A) polymerizing butadiene or copolymerizing butadiene with at least one other conjugated diene monomer and an aromatic vinyl compound using a lithium initiator, and (B) reacting an aromatic isocyanate compound with the active terminals of the thus obtained butadiene-based polymer or copolymer, wherein the content of vinyl bonds in the butadiene portion is not less than 15% and the glass transition temperature of the butadiene-based polymer or copolymer is not less than −70° C.

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**4,742,118**

## URETHANE-FUNCTIONAL S-TRIAZINE CROSSLINKING AGENTS AND CURABLE COMPOSITIONS CONTAINING THE SAME

**Girish G. Parekh, Fairfield, Conn., assignor to American Cyanamid Company, Stamford, Conn.**

**Filed May 16, 1986, Ser. No. 864,622**

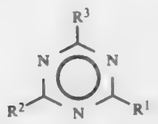
**Int. Cl.[4] C08L** *75/00*

**U.S. Cl. 525—127** **21 Claims**

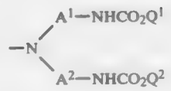
1. A thermosettable composition comprising:

(a) a cross-linking agent comprising:

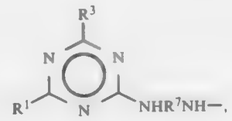
(i) a triazine compound selected from a compound of the formula

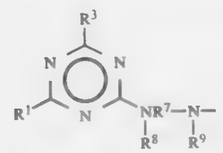


wherein $R^1$ is



wherein $A^1$ and $A^2$ are, independently, straight or branched chain divalent alkylene of from about 2 to about 10 carbon atoms and $Q^1$ and $Q^2$ are, independently, straight or branched chain alkyl or alkoxyalkyl of from about 1 to about 20 carbon atoms or straight or branched chain beta-hydroxyalkyl of from about 2 to about 10 carbon atoms; $R^2$ and $R^3$ are, independently, the same as $R^1$ and, in addition, Cl, Br, I, $OR^4$, $—NHR^5$, $—NR^5R^6$,





and $R^4$, $R^5$, and $R^6$ are, independently, a monovalent and $R^7$ is a divalent aliphatic, cycloaliphatic, aromatic or alkylaromatic radical, which can contain heteroatoms such as O, N, S or P, either in the chain or as side substituents and $R^8$ and $R^9$ are the same as $R^4$, $R^5$ and $R^6$ and, in addition, hydrogen or, when $R^7$, $R^8$ and $R^9$ are taken together, divalent heterocyclic incorporating the nitrogens to which they are attached;

(ii) a self-condensed oligomer of (i);

(iii) a urethane or urea compound comprising the reaction product of (i) or (ii) with a mono- or polyol or a mono- or polyamine; or

(iv) a mixture of any of the foregoing;

(b) a polymer containing two or more active hydrogen functional groups.

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**4,742,119**

## PROTECTIVE AND ADHESIVE COMPOSITIONS

**Donald S. Close, Stow, Ohio, assignor to Syn-Coat Enterprises, Inc., Stow, Ohio**

**Filed Feb. 28, 1986, Ser. No. 835,092**

**Int. Cl.[4] C08L** *23/16, 15/02, 9/00*

**U.S. Cl. 525—211** **4 Claims**

1. A composition useful both as an adhesive and as a protective coating consisting essentially of rubber compounding ingredients and a polymer mixture consisting of:

an EPDM rubber polymer component consisting essentially of at least two different alpha monoolefins and at least one copolymerizable polyene and

a halogenated butyl rubber polymer component;

a rubber solvent,

the EPDM and halogneated butyl rubber components being present on a parts-by-weight basis of from about 4 parts of the halogenated butyl rubber component to about 5 parts of the EPDM rubber component, to about 30 parts of the halogentated butyl rubber component to about 5 parts of the EPDM rubber component.



**4,742,120**

## CURABLE RESIN COMPOSITION

**Hiromichi Higaki; Nobuyuki Miyazaki, and Takashi Takayanagi, all of Yokohama, Japan, assignors to Asahi Glass Company Ltd., Tokyo, Japan**

**Continuation of Ser. No. 570,296, Jan. 13, 1984, abandoned. This application Oct. 28, 1985, Ser. No. 798,131**

**Claims priority, application Japan, Feb. 18, 1983, 58-24678**

**Int. Cl.[4] C08L** *51/00, 27/12, 27/22*

**U.S. Cl. 525—276** **17 Claims**

1. A curable resin composition comprising as its essential constituents:

(1) a synthetic resin; and

(2) a polymerizable compound; characterized in that

the said synthetic resin is a flourine-containing polymer which as 10% by weight or more of fluorine atoms and is dissolved in the said polymerizable compound, wherein the said fluorine-containing polymer is an addition polymer having cure sites which are incorporated by a cure site-providing comonomer, said cure site being at least one member selected from the group consisting of hydroxyl groups, epoxy groups, carboxylic groups, acid amide groups, ester groups, unsaturated bonds, active hydrogen atoms, chlorine, bromine, and iodine atoms, and

wherein the said polymerizable compound contains at least one unsaturated bond or an epoxy group.

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**4,742,121**

## ACRYLATE RESIN GEL COAT COMPOSITION

**Perry A. Toman, Medina, Ohio, assignor to The Glidden Company, Cleveland, Ohio**

**Continuation-in-part of Ser. No. 728,399, Apr. 29, 1985, abandoned. This application Nov. 7, 1986, Ser. No. 927,950**

**Int. Cl.[4] C08F** *265/04*

**U.S. Cl. 525—286** **7 Claims**

1. An improved thermosetting gel coat resin composition adapted to heat react and form a hardened gel coat, the gel coat resin composition consisting essentially of on a weight basis:

between 50% and 90% of a low molecular weight acrylic resin having a number average molecular weight between 550 and 3,000, said acrylic resin having pendant ethylenically unsaturated groups and produced by reacting an acrylic copolymer which is an acrylate or methacrylate copolymer having multiple epoxide groups with lesser equivalents of acrylic or methacrylic acid to produce the pendant unsaturation groups, where the acrylic copolymer has a number average molecular weight between 500 and 2500; and

between 10% and 50% of an aromatic vinyl monomer adapted to coreact with the pendant ethylenically unsaturated groups of the low molecular weight acrylic resin to form a thermoset gel coat.

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**4,742,122**

## MELT-PROCESSIBLE TETRAFLUOROETHYLENE/PERFLUOROOLEFIN COPOLYMERS AND PROCESSES FOR PREPARING THEM

**Marlin D. Buckmaster, and Richard A. Morgan, both of Vienna, W. Va., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation of Ser. No. 791,432, Oct. 25, 1985, abandoned. This application Feb. 17, 1987, Ser. No. 16,517**

**Int. Cl.[4] C08F** *6/26*

**U.S. Cl. 525—326.2** **6 Claims**

1. Melt-processible, substantially nonelastomeric tetrafluoroethylene copolymer comprising recurring units of 80–98 mole % tetrafluoroethylene and complementally 2 to 20 mole % of at least one perfluoroolefin of 3–8 carbon atoms, which copolymer has

(a) a melt viscosity between $0.1\times10^4$ and $100\times10^4$ poise at 327° C.,

(b) a sphere factor less than 1.5,

(c) an attrition factor of less than 60,

(d) fewer than a total of 80 unstable end groups per $10^6$ carbon atoms, said end groups comprising —COOH, —COF, $—CF=CF_2$, $—CONH_2$, $—CH_2OH$, or —COOR, where R is an alkyl group of 1–6 carbon atoms,

(e) an average particle size between 200 and 3000 micrometers.

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**4,742,123**

## THERMOPLASTIC NON-CROSSLINKED POLYMERS, IMIDE POLYMERS, AND PROCESS FOR PREPARATION

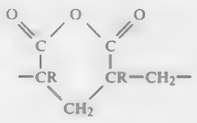
**Richard M. Kopchik, Southampton, Pa., assignor to Rohm and Haas Co., Philadelphia, Pa.**

**Continuation of Ser. No. 858,527, Apr. 23, 1986, abandoned, which is a continuation of Ser. No. 484,719, Apr. 13, 1983, abandoned, which is a continuation of Ser. No. 309,298, Oct. 7, 1981, abandoned. This application Dec. 11, 1986, Ser. No. 941,572**

**Int. Cl.[4] C08F** *20/66*

**U.S. Cl. 525—329.7** **11 Claims**

1. Thermoplastic, non-crosslinked polymer compositions having a glutaric anhydride units of the formula



wherein R represents $CH_3$ or H, said polymer composition being soluble in dimethyl formamide, having thermal stability as defined by an onset of decomposition temperature of at least 250° C., and processability as defined by a Vicat temperature of 50° C. to 175° C., said Vicat temperature being at least 75° C. below said onset of decomposition temperature.

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**4,742,124**

## RUBBER COMPOSITION FOR USE IN TIRE

**Fumio Tsutsumi; Mitsuhiko Sakakibara; Yoshihisa Fujinaga, all of Yokkaichi; Noboru Oshima, Suzuka, and Tatsuo Fujimaki, Higashimurayama, all of Japan, assignors to Japan Synthetic Rubber Co., Ltd. and Bridgestone Corporation, both of Tokyo, Japan**

**Continuation of Ser. No. 739,646, May 31, 1985, abandoned. This application Jul. 6, 1987, Ser. No. 70,117**

**Claims priority, application Japan, Jun. 1, 1984, 59-110870**

**Int. Cl.[4] C08F** *8/42*

**U.S. Cl. 525—332.1** **7 Claims**

1. A rubber composition for use in tires comprising at least 20% by weight of a conjugated diolefinvinyl-substituted aromatic hydrocarbon random copolymer based on the total weight of the rubber content, wherein said random copolymer is produced by:

(A) copolymerizing a conjugated diolefin and a vinyl-substituted aromatic hydrocarbon, in the presence of:

(i) an organolithium initiator containing not less than 50 mol % of an organodilithium compound, or

(ii) an admixture of an organomonolithium initiator and a polyfunctional monomer selected from the group consisting of divinylbenzene and diisopropenyl benzene and then,

(B) subjecting the resulting copolymer to a coupling reaction with a halogenated tin compound in an amount of at least 0.5 equivalents of halogen in the halogenated tin compound per 1.0 equivalent of lithium, and wherein said random copolymer satisfies the following requirements:

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(i) the content of vinyl-substituted aromatic hydrocarbon is 3 to 60% by weight;
(ii) the content of tin bonded to the copolymer is not less than 400 ppm; and
(iii) the Mooney viscosity ($ML_{1+4}^{100°\,C.}$) is 20 to 200.

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**4,742,125**

## PROCESS FOR THE PRODUCTION OF MERCAPTO GROUP-CONTAINING OLIGOURETHANES, OLIGOURETHANES OBTAINABLE BY THIS PROCESS AND THEIR USE IN VARIOUS POLYMER SYSTEMS

**Manfred Schmidt, Dormagen; Wolfgang Wellner; Josef Pedain, both of Colonge, and Hermann Gruber, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Feb. 20, 1986, Ser. No. 831,776**
**Claims priority, application Fed. Rep. of Germany, Mar. 9, 1985, 3508428**
**Int. Cl.⁴ C07C** *149/437;* **C08G** *18/38, 59/66;* **C08F** *279/00*
**U.S. Cl. 525—333.2** **16 Claims**

1. A process for the production of an oligourethane having terminal mercapto groups which comprises reacting
(a) an organic polyisocyanate with
(b) a sub-equivalent quantity of an organic polyhydroxyl compound and
(c) a quantity of a mercapto-alkanol which is sufficient to provide an NCO/OH equivalent ratio of about 0.8 to 1.2, based on the hydroxyl groups of said mercapto-alkanol and either the excess isocyanate groups resulting from the proportions of (a) and (b) used or the isocyanate groups present in the reaction product of (a) and (b) after removal of at least a portion of excess polyisocyanate (a),
wherein the reaction with said mercapto-alkanol (c) is carried out in the presence of
(d) about 0.01 to 5% by weight, based on the weight of components (a), (b) and (c), of at least one ester of phosphoric acid containing at least one hydroxyl group bound to phosphorous.

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**4,742,126**

## PROCESS FOR PREPARING UNSATURATED FLUOROELASTOMERS

**Giovanni Moggi, Milan; Piergiorgio Bonardelli, Brescia; Graziella Chiodini, Saronno, and Stefano Conti, Monza, all of Italy, assignors to Ausimont S.p.A., Milan, Italy**

**Continuation-in-part of Ser. No. 836,125, Mar. 4, 1986, abandoned. This application Jan. 20, 1987, Ser. No. 4,568**
**Claims priority, application Italy, Mar. 6, 1985, 19789 A/85**
**Int. Cl.⁴ C08F** *8/00*
**U.S. Cl. 525—340** **3 Claims**

1. A process for producing unsaturation in elastomeric copolymers comprising from 55 to 87% by moles of vinylidene fluoride, from 13 to 45% by moles of hexafluoropropene and/or chlorotrifluoroethylene, and from 0 to 27% by moles of tetrafluoroethylene, characterized in that a solution of said copolymer in a substantially water-insoluble polar solvent is treated with an aqueous solution of an inorganic base, in the presence of a phase-transfer catalyst; the concentration of the copolymer in its solution being between 1 and 30% by weight; the volume ratio water/copolymer solution ranging from 10/1 to 1/10; the phase-transfer catalyst being an ammonium quaternary compound having the formula $NR_1R_2R_3R_4X$ or a phosphonium quaternary compound having the formula $PR_1R_2R_3R_4X$, wherein X is an inorganic or organic anion and $R_1$, $R_2$, $R_3$ and $R_4$, equal to or different from each other, are alkyl, aryl or alkylaryl radicals, the total amount of carbon atoms in the radicals $R_1+R_2+R_3+R_4$ ranging from 15 to 40.

**4,742,127**

## POLYCARBON SULPHIDE DERIVATIVES

**Michel Armand, Echirolles; Mireille Fouletier, and Pierre Degott, both of Grenoble, all of France, assignors to Societe Nationale Elf Aquitaine, Courbevoie, France**

**Division of Ser. No. 740,919, Jul. 10, 1985. This application Jul. 25, 1986, Ser. No. 889,198**
**Claims priority, application France, Sep. 20, 1983, 83 14940; Jun. 28, 1984, 84 10254**
**Int. Cl.⁴ C08F** *8/34, 8/26*
**U.S. Cl. 525—354** **24 Claims**



1. A process for the preparation of a polycarbon sulfide compound which comprises units of the formula:

$$-(R_xCS_m)_n- \quad (I)$$

wherein:
R is a hydrogen atom, a lithium atom, a sodium atom, a potassium atom, a silver atom, a copper atom, a zinc atom, or a cobalt atom;
x is the degree to which R is present in the carbon-sulfur structure and has a value of from 0 to m/(valency of the metal), these values being inclusive;
m represents the degree of substitution with sulfur, with $0<m\leqq 1$; and
n represents the number of units in the polymeric carbon chain, said process comprising:
reacting a reduced polycarbon compound formed by linear carbon chains comprising units of the formula:

$$-(CM)_z-$$

wherein M is a lithium atom, a sodium atom, a potassium atom, a silver atom, a copper atom, a zinc atom, or a cobalt atom and z represents the degree to which said lithium, sodium, potassium, silver, copper, zinc, or cobalt atom is present in the carbon chain, with sulfur, an organic polysulfide, an alkali metal sulfide, or a sulfur halide, at a temperature of up to 350° C.

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**4,742,128**

## PROCESS FOR PREPARING A POLYMER ALLOY, MOLDED PRODUCT, AND REACTION INJECTION MOLDED PRODUCTS

**Kurt C. Frisch, Grosse Ile; Kaneyoshi Ashida, Farmington Hills, both of Mich.; Jozef L. M. van der Loos, Sittard, and Albert A. van Geenen, Brunssum, both of Netherlands, assignors to Stamicarbon B.V., Geleen, Netherlands**

**Filed Oct. 15, 1985, Ser. No. 787,139**
**Int. Cl.⁴ C08I** *75/00*
**U.S. Cl. 525—424** **46 Claims**

1. A process for preparing a polymer alloy comprising:
(i) introducing into a mold a mixture comprising:
(a) polyamide forming compounds wherein said polyamide forming compounds include at least one lactam, an anionic polymerization catalyst and a polymerization activator, and
(b) polymer forming compounds for forming:
(A) at least one polymer selected from the group consisting of polyurea and polyisocyanurate polymers, or
(B) polyurethane polymers and at least one additional polymer selected from the group consisting of polyurea polymers, and polyisocyanurate polymers,
wherein
said polyurea polymer forming compounds include a polyamine or hydrazine containing compound and a polyisocyanate,
said polyisocyanurate polymer forming compounds include a prepolymer containing isocyanate groups or a polyol and a polyisocyanate, and a trimerization catalyst,
said polyurethane polymer forming compounds include a polyol, a polyisocyanate, and an urethane polymerization catalyst,
said polymer forming compounds reacting to form a polymer alloy comprising:
(A) polyamide polymers and polyurethane polymers, and at least one of the following polymers: polyurea polymers; and polyisocyanurate polymers; or
(B) polyamide polymers and at least one of the following polymers: polyurea polymers and polyisocyanurate polymers; and
(ii) recovering said polymer alloy from said mold.

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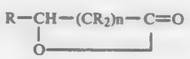
**4,742,129**

## THERMOSETTING COATING COMPOSITIONS COMPRISING HYDROXY-FUNCTIONAL EPOXY-POLYESTER GRAFT COPOLYMERS AND BLOCKED POLYISOCYANATES

**Panagiotis I. Kordomenos, Mt. Clemens; Andrew H. Dervan, Grosse Pointe, and Dennis J. Grebur, Mt. Clemens, all of Mich., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Division of Ser. No. 798,085, Nov. 14, 1985, Pat. No. 4,698,398. This application Aug. 7, 1987, Ser. No. 82,654**
**Int. Cl.⁴ C08G** *59/16, 63/06, 63/08, 63/18*
**U.S. Cl. 525—438** **14 Claims**

1. An organic solvent based, thermosetting coating composition comprising:
(I) hydroxy-functional epoxy-polyester graft copolymer having a number average molecular weight ($\overline{Mn}$) of between about 2,000 and about 20,000, said copolymer being the product of polymerization of lactone monomers in the presence of hydroxy functional epoxy ester resin precursor having a number average molecular weight ($\overline{Mn}$) of between about 1,000 and about 4,000, said precursor being the chain extended product of diepoxide reacted substantially simultaneously with diphenol and dicarboxylic acid and chain terminated with an acid component, said acid component reacted in approximately a 1:1 equivalent ratio with the chain extended product and comprises a primary hydroxy functional acid, said diepoxide being reacted substantially simultaneously with said diphenol and dicarboxylic acid in amounts sufficient to give a weight per epoxide of between about 500 and about 2,500, and wherein said polymerization of said lactone monomers is carried out at a temperature between about 50° C. and about 300° C. and the polymerization reaction mixture comprises between about 10 and about 80 weight percent said hydroxy functional epoxy ester resin precursor and between about 90 and about 20 weight percent said lactone monomers, wherein said lactone monomers are selected from those represented by the general formula:



in which n is at least 4, at least n+2 R's are hydrogen, and the remaining R's are substituents selected from the group consisting of alkyl, cyclolkyl, alkoxy and single ring aromatic hydrocarbon radicals; and
(II) blocked polyisocyanate crosslinking agent comprising at least two isocyanate groups which have been blocked by reaction with an active hydrogen bearing blocking agent, said blocked polyisocyanate crosslinking agent being included in an amount such that upon deblocking of the blocked isocyanate groups thereof at the cure temperature of the composition, said crosslinking agent provides between about 0.5 and about 1.6 reactive isocyanate groups per reactive group on said hydroxy functional epoxy-polyester graft copolymer.

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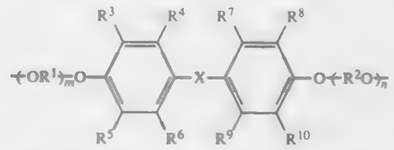
**4,742,130**

## POLYETHYLENE TEREPHTHALATE RESIN COMPOSITION

**Akiyoshi Somemiya, Kobe, and Kazushi Hirobe, Osaka, both of Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan**

**Filed Jun. 4, 1987, Ser. No. 58,053**
**Claims priority, application Japan, Jun. 5, 1986, 61-130578**
**Int. Cl.⁴ C08L** *67/02*
**U.S. Cl. 525—444** **6 Claims**

1. A polyethylene terephthalate resin composition suitable for use in moldings which comprises:
(A) 5 to 93 parts of a polyethylene terephthalate resin and
(B) 95 to 7 parts of a polyethylene terephthalate block copolymer having 10 to 55% by weight of units represented by the formula (I):



(I)

wherein $R^1$ and $R^2$ are the same or different and each is a bivalent hydrocarbon group having 2 to 4 carbon atoms, $R^3$ to $R^{10}$ are the same or different and each is hydrogen atom, a monovalent hydrocarbon group or a halogen atom, X is a bivalent group or single bond, and each of m and n is an integer of 5 to 20, said parts of said components (A) and (B) being parts by weight based on the total amount of said components (A) and (B).

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**4,742,131**

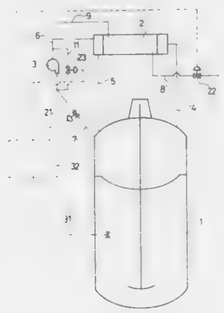
## METHOD OF CONTROLLING POLYMERIZATION TEMPERATURE

**Tadashi Asanuma; Mitsuru Ito; Kaneo Ito; Yoshiyuki Funakoshi, and Akihiko Nakajima, all of Takaishi, Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan**

**Filed Dec. 9, 1986, Ser. No. 939,690**
**Claims priority, application Japan, Dec. 27, 1985, 60-295281; Dec. 27, 1985, 60-295280**
**Int. Cl.⁴ C08F** *2/02*
**U.S. Cl. 526—61** **4 Claims**

1. A method for controlling the polymerization temperature in a polymerization apparatus equipped with a cooling system, wherein steam is produced in the presence of a volatile liquid medium and a non-condensible gas in a reaction system, which comprises:
(a) condensing the steam in a reflux condenser, and returning said condensate and a portion of the noncondensed gas to the reaction system;
(b) compressing and recirculating the remaining portion of said non-condensed gas to said cooling system; and
(c) controlling the flow rate of said recirculated non-con-

densed gas and of a cooling medium introduced into said reflux condenser in accordance with the temperature of



the reaction system, thereby removing polymerization heat.

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**4,742,132**

**PROCESS FOR THE POLYMERIZATION OR COPOLYMERIZATION OF ETHYLENE**

Hiroshi Morinaga, Yotsukaido; Shigeharu Yamamoto; Sakae Kamiyama, both of Ichihara, and Takeshi Iwabuchi, Chiba, all of Japan, assignors to Nissan Chemical Industries, Ltd., Tokyo, Japan

Continuation of Ser. No. 753,130, Jul. 9, 1985, abandoned. This application Oct. 21, 1986, Ser. No. 921,824

Claims priority, application Japan, Sep. 13, 1984, 59-191943

Int. Cl.[4] C08F *4/02, 10/02*

U.S. Cl. 526—128 8 Claims

1. A process for polymerizing or copolymerizing ethylene, which comprises polymerizing ethylene or a mixture of ethylene with one or more other $\alpha$-olefins in the presence of a catlayst consisting essentially of:

(A) a solid catalyst component obtained by reacting the following three components:

(i) a reaction product of an organomagnesium compound with a hydropolysiloxane or a silicon component in which orgainc groups and hdyroxyl groups are bonded to silicon atoms,

(ii) a silicon compound selected from the group consisting of $Si(OCH_3)_4$, $Si(OC_2H_5)_4$, $Si(OC_3H_7)_4$, $HSi(OCH_3)_3$, $HSi(OC_2H_5)_3$, $CH_3Si(OCH_3)_3$, $CH_3Si(OC_2H_5)_3$, $C_2H_5Si(OCH_3)_3$, $C_2H_5Si(OC_2H_5)_3$, $CH_2{=}CHSi(OC_2H_5)_3$ and $(CH_3)_2Si(OC_2H_5)_2$, and

(iii) a titanium compound of the formula $[Ti(OR^3)_nR_{4-n}]Ti(OR^3)_nX_{4-n}$, wherein $R^3$ is a hydrocarbon group having from 1 to 12 carbon atoms, X is a halogen atom, and n is a number of from 0 to 2, and

(B) an organoaluminum compound, and wherein the molar ratio of organomagnesium compound to said hydropolysiloxane is in the range of 0.05:1 to 1:1; and the molar ratio of said organomagnesium compound to said hydroxy groups of said organohydroxysilicon compound is in the range of 0.05:1 to 1:1; a ratio of 0.05–5 mole of titanium compound per gram atom of magnesium is used; and 1–1,000 gram atoms of aluminum per gram atom of titanium is used.

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**4,742,133**

**POLY(ALLYL CARBONATE)-FUNCTIONAL PREPOLYMERS PREPARED BY TREATMENT WITH MOLECULAR OXYGEN**

Felicia Y. Tang, and Robert H. Tang, both of Norton, Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Sep. 24, 1985, Ser. No. 779,400

Int. Cl.[4] G08F *4/00;* C08F *118/24, 218/24*

U.S. Cl. 526—235 18 Claims

1. A method comprising:

(a) contacting a liquid monomer composition comprising at least one poly(allyl carbonate)-functional monomer, with molecular oxygen at a temperature of at least about 65° C. to produce a liquid intermediate composition having an increased hydroperoxide content of at least about 400 ppm, and

(b) thereafter maintaining said intermediate composition at a temperature of at least about 100° C. to produce as a product a polymerizable, liquid, substantially gel-free composition which contains poly(allyl carbonate)-functional prepolymer and which has an allylic utilization of at least about 12 percent.

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**4,742,134**

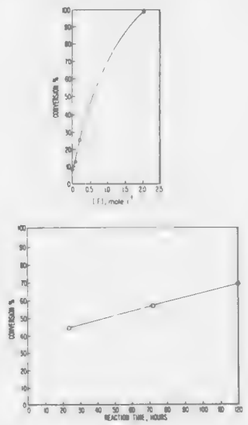
**METHOD OF ENHANCING POLYMERIZATION OF DIALKYLDIALLYL AMMONIUM COMPOUNDS TO PRODUCE HIGH MOLECULAR WEIGHT POLYMERS**

George B. Butler, and Huey Pledger, Jr., both of Gainesville, Fla., assignors to University of Florida, Gainesville, Fla.

Filed Oct. 22, 1986, Ser. No. 921,697

Int. Cl.[4] C08F *2/18, 126/02*

U.S. Cl. 526—238 7 Claims



1. In a method for preparing a polymer of a dialkyldiallyl ammonium compound comprising effecting polymerization thereof in an aqueous reaction medium in the presence of a free radical initiator for said polymerization, the improvement comprising effecting said polymerization in the presence of from about 0.04 mole $l^-$ to about 1.30 $l^-$ of fluoride ion to accelerate the rate of polymerization and to increase the molecular weight of the polymer.



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**4,742,135**

**TERPOLYMERS OF ACRYLAMIDE, ALKYLACRYLAMIDE AND BETAINE MONOMERS**

Donald N. Schulz, Annandale; Ilan Duvdevani, Leonia; Jan Bock, Bridgewater, and Enock Berluche, Lopatcong Township, Phillipsburg County, all of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

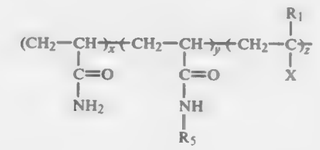
Continuation of Ser. No. 814,252, Dec. 30, 1985, Pat. No. 4,650,848. This application Dec. 4, 1986, Ser. No. 937,688

The portion of the term of this patent subsequent to Mar. 17, 2004, has been disclaimed.

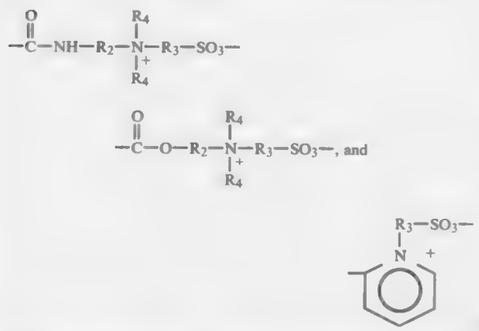
Int. Cl.[4] C08F *26/06*

U.S. Cl. 526—265 2 Claims

1. A water soluble terpolymer having the structure:



wherein x is selected from the group consisting of



wherein x is about 70 to about 95 mole percent; y is about 0.1 to about 5 mole percent; $R_1$ is methyl or hydrogen; z is about 30 mole percent; $R_2$ is an alkyl group of 1–5 carbon atoms; $R_3$ is an alkyl group of 3 to 4 carbon atoms; $R_4$ is an alkyl group of 1–5 carbon atoms; and $R_5$ is an alkyl group of 4–20.

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**4,742,136**

**OPTICAL PLASTIC MATERIAL**

Kingo Uchida, Ikeda, Japan, assignor to Agency of Industrial Science & Technology, Tokyo, Japan

Filed Apr. 28, 1987, Ser. No. 43,389

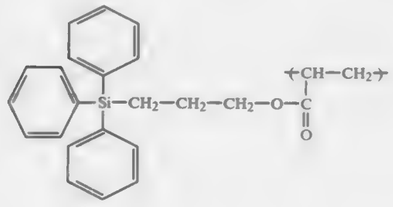
Claims priority, application Japan, Dec. 6, 1986, 61-291296

Int. Cl.[4] C08F *30/08*

U.S. Cl. 526—279 7 Claims

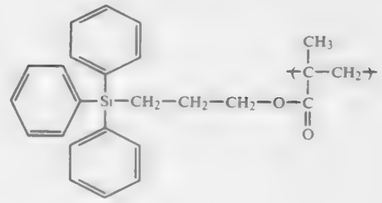
1. An optical plastic material comprising a three-dimensional polymer composed of a structural unit of the following formula (1), (2), (3) or (4):

(1)

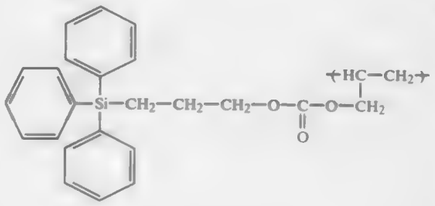


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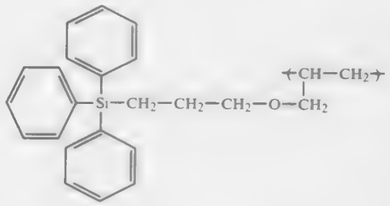
(2)



(3)



(4)



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**4,742,137**

**POLYMER PARTICLES AND PROCESS FOR PRODUCING THE SAME**

Hisao Ono; Nobuyuki Ito, both of Yokkaichi; Kiyoshi Kasai, Yokkaishi; Nobuo Sakurai, Aichi, and Eitaro Okuya, Mie, all of Japan, assignors to Japan Synthetic Rubber Co., Ltd., Tokyo, Japan

Division of Ser. No. 747,304, Jun. 21, 1985, abandoned. This application Sep. 11, 1986, Ser. No. 906,192

Claims priority, application Japan, Jul. 11, 1984, 59-142221; Jul. 11, 1984, 59-142222; Aug. 3, 1984, 59-162873; Dec. 25, 1984, 59-271888; Feb. 21, 1985, 60-31530

Int. Cl.[4] C08F *2/22, 2/16, 36/06, 36/00*

U.S. Cl. 526—92 24 Claims

1. A process for producing composite polymer particles, comprising adding, to an aqueous dispersion of a first catalyst component solution, a conjugated diene monomer and second catalyst component in the presence of seed polymer particles and polymerizing said monomer, said first catalyst component containing (A) a cobalt compound, (B) at least one member selected from the group consisting of alkali metals, organometallic compounds of metals of Groups I to III of the Periodic Table, and hydrides of metals of Groups I to III of the Periodic Table and (C) 1 to 1,000 moles, per mole of the cobalt compound (A), of a conjugated diene monomer and is dispersed in the form of droplets having an average diameter of 10 $\mu$m or less and that the second catalyst component is at least one compound selected from the group consisting of carbon disulfide, phenylisothiocyanic acid and a xanthogen compound.

24. A method of preparing an aqueous latex of composite polymer particles, comprising:

preparing a first catalyst component solution as an aqueous dispersion which contains (A) a cobalt compound, (B) at least one member selected from the group consisting of alkali metals, organometallic compounds of metals of

groups I to III of the Periodic Table, and hydrides of metals of groups I to III of the Periodic Table, (C) 1 to 1,000 moles per mole of the cobalt compund (A), of a conjugated diene monomer, and (D) an emulsifier, said first catalyst component solution being dispersed in the form of droplets having an average diameter of 10 μm or less; and

polymerizing conjugated diene monomer in the presence of seed polymer particles as conjugated diene monomer and a second catalyst component are added to said dispersion, said second catalyst component being at least one compound selected from the group consisting of carbon disulfide, phenylisothiocyanic acid and a xanthogen compound.

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**4,742,138**

## PRODUCTION OF ETHYLENE COPOLYMERS

**Yoshiteru Kageyama, Yokkaichi, Japan, assignor to Mitsubishi Petrochemical Company Limited, Tokyo, Japan**

**Continuation of Ser. No. 783,270, Oct. 4, 1985, abandoned, which is a continuation of Ser. No. 605,108, Apr. 30, 1984. This application Jan. 29, 1987, Ser. No. 9,106**

**Claims priority, application Japan, May 9, 1983, 58-80559**

**Int. Cl.⁴ C08F *4/64***

**U.S. Cl. 526—125** **12 Claims**

1. A process for producing an ethylene copolymer having a total double bond content ranging from 0.55 to 0.77 double bonds/1000 carbon atoms and a hexane extractable fraction ranging from 0.5 to 3% by wt., which comprises: copolymerizing ethylene with 3 to 20% by weight of the resulting copolymer of at least one α-olefin represented by the formula $R—CH=CH_2$, wherein R is a $C_1$–$C_{12}$ hydrocarbyl group, with a catalyst consisting essentially of the following component A, component B and component C under a pressure between 300 to 4000 $Kg/cm^2$ and at a temperature between 180° to 320° C. thereby to produce the ethylene copolymer:

COMPONENT A

A solid composition obtaining by mixing and pulverizing the following compounds (1) through (4),

(1) a halocompound of magnesium,

(2) titanium trichloride,

(3) a halocompound of a IVa-group element of the Periodic Table, and

(4) an electron donor;

COMPONENT B

An organoaluminum compound containing a halogen atom; and

COMPONENT C

A silicon compound represented by the formula $R^4_{4-n}Si(OR^5)_n$ wherein $R^4$ and $R^5$ are each a $C_1$–$C_{10}$ hydrocarbyl group and n is a number defined by $O<n<4$, said catalyst being prepared by contacting component (A) with component (B) thereby forming a catalyst precursor, and then contacting said catalyst precursor with component (C).

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**4,742,139**

## PROCESS FOR PRODUCING OLEFIN POLYMERS OR COPOLYMERS

**Mamoru Kioka, Ohtake, and Norio Kashiwa, Iwakuni, both of Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan**

**Continuation of Ser. No. 803,528, Dec. 2, 1985, abandoned, which is a continuation of Ser. No. 698,758, Feb. 7, 1985, abandoned, which is a continuation of Ser. No. 508,420, Jun. 27, 1983, abandoned, which is a continuation of Ser. No. 355,379, Mar. 8, 1982, abandoned, which is a continuation of Ser. No. 168,202, Jul. 10, 1980, abandoned. This application Jan. 15, 1987, Ser. No. 6,305**

**Claims priority, application Japan, Jul. 11, 1979, 54-86889**

**Int. Cl.⁴ C08F *4/02, 10/00***

**U.S. Cl. 526—125** **4 Claims**

1. In a process for producing a polymer or a copolymer of an olefin having 2 to 8 carbon atoms which comprises polymerizing or copolymerizing the olefin or olefins with or without up to about 5 mole % of a diolefin at a temperature of about 20° to about 200° C. and a pressure of from atmospheric pressure to about 100 $kg/cm^2$ in the presence of a catalyst composed of (A) a solid titanium catalyst component containing magnesium, titanium, halogen and an electron donor and derived from a magnesium-containing solid carrier obtained by contacting a magnesium compound in the liquid state with a precipitant, and (B) an organoaluminum compound: the improvement wherein

(I) said catalyst component (A) is a reaction product of (iv) a titanium compound in the liquid state having the formula $Ti(OR)_gX_{4-g}$ wherein R represents a hydrocarbon group, X represents a halogen atom and g is a number represented by $0 \leqq g \leqq 3.5$ and a magnesium-containing solid carrier formed by contacting

(i) a magnesium compound in the liquid state having no reducing ability and not containing a tetraalkoxy-, tetracycloalkoxy- or tetraaryloxy-titanium compound, said magnesium compound being selected from the group consisting of a liquid magnesium compound, a hydrocarbon solvent solution of a magnesium compound and a magnesium compound in the liquid state obtained by contacting a magnesium compound with an electron donor selected from the group consisting of an alcohol having 6 to 20 carbon atoms, an organic carboxylic acid having 7 to 18 carbon atoms, an aldehyde having 7 to 18 carbon atoms and an amine having 6 to 18 carbon atoms, with

(ii) a precipitant other than a titanium compound of an organometallic compound selected from the group consisting of (1) organoaluminum compounds of the general formula $R_m^1Al(OR^2)_nH_pX_q$ wherein $R^1$ and $R^2$ are identical or different and represent a hydrocarbon group containing 1 to 15 carbon atoms, X represents a halogen atom, m is a number represented by $0<m\leqq 3$, n is a number represented by $0\leqq n<3$, p is a number represented by $0\leqq p<3$, q is a number represented by $0\leqq q<3$ and $m+n+p+q=3$, (2) alkylated complexes of metals of Group I and aluminum which are represented by the general formula $M^1AlR^1_4$ wherein $M^1$ is Li, Na or K, and $R^1$ is as defined above, and (3) dialkyl compounds of metals of Group II which are represented by the general formula $R^1R^2M^2$ wherein $R^1$ and $R^2$ are as defined above, and $M^2$ represents Mg, Zn or Cd or a silicon compound having at least one member selected from the group consisting of halogen, hydrogen and hydrocarbon groups directly bonded to the silicon atom,

in the presence or absence of (iii) an electron donor having no active hydrogen, and

(II) said reaction product is formed by reacting the titanium compound (iv) in the liquid state and the magnesium containing solid carrier pre-treated or not pre-treated with the electron donor (iii) having no active hydrogen and selected from the group consisting of an organic acid ester, an organic acid halide, an organic acid anhydride, an ether, a ketone, a tertiary amine, a carboxylic amide and nitrile in the presence or absence of the electron donor (iii) having no active hydrogen, the electron donor (iii) having no active hydrogen being used at least once in (I) and (II) above, and the reaction product being at least once again reacted with liquid titanium compound, the amount of the electron donor (iii) being about 0.01 to about 10 moles per mole of the magnesium compound (i), the amount of the titanium compound (iv) being 1 mole to about 200 moles per mole of the magnesium compound (based on magnesium atom) in the magnesium-containing solid carrier, and said catalyst component (A) having a magnesium/titanium atomic ratio of from about 2 to about 100, a halogen/titanium atomic ratio of from about 4 to about 100 and an electron donor/titanium mole ratio of from about 0.01 to about 100.



**4,742,140**

## OIL- AND WATER-REPELLENT COPOLYMERS

**Edward J. Greenwood, Newark; Albert L. Lore, Wilmington, and Nandakumar S. Rao, Newark, all of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 824,355, Jan. 23, 1986, abandoned. This application Sep. 9, 1986, Ser. No. 905,307**

**Int. Cl.⁴ C08F *20/24***

**U.S. Cl. 526—245** **16 Claims**

1. An oil- and water-repellent solid fluoropolymer comprising by weight:

(a) 40–75% polymer chain units derived from a mixture of perfluoroalkylethylacrylate monomers of formula

$$CF_3CF_2(CF_2)_kC_2H_4OC(O)CH=CH_2,$$

the monomer mixture consisting essentially of:

(1) 0–10% monomer wherein k is 4 or less;

(2) 45–75% monomer wherein k is 6;

(3) 20–40% monomer wherein k is 8;

(4) 1–20% monomer wherein k is 10; and

(5) 0–5% monomer wherein k is 12;

(b) 10–35% polymer chain units derived from vinylidene chloride;

(c) 10–25% polymer chain units derived from an alkyl acrylate or alkyl methacrylate having an alkyl chain length of 2–18 carbon atoms; and

(d) 0–5% polymer chain units derived from chlorohydroxypropylacrylate or chlorohydroxypropylmethacrylate.

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**4,742,141**

## IMIDO POLYMER FROM BIS IMIDE AND ALKENYLOXYANILINE

**Rene Dien, Millery, and Michel Rakoutz, Brignais, both of France, assignors to Rhone-Poulenc Specialites Chimiques, Courbevoie, France**

**Filed Nov. 13, 1986, Ser. No. 929,837**

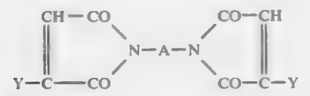
**Claims priority, application France, Nov. 13, 1985, 85 16971**

**Int. Cl.⁴ C08F *22/40***

**U.S. Cl. 526—262** **11 Claims**

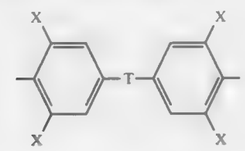
1. An imido polymer comprising the polymerizate of:

(a) at least one N,N′-bisimide having the formula:

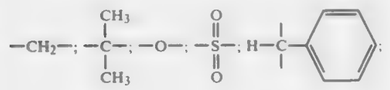


(I)

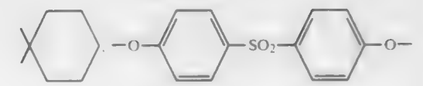
in which Y is H, $CH_3$ or Cl, A is cyclohexylene, phenylene, 4-methyl-1,3-phenylene, 2-methyl-1,3-phenylene, 5-methyl-1,3-phenylene, 2,5-diethyl-3-methyl-1,4-phenylene, or a radical of the formula:



in which T is a single valency bond or T is a group:

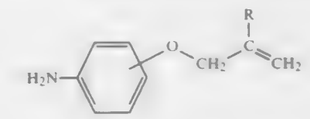


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and X is a hydrogen atom or a methyl, ethyl or isopropyl radical; and

(b) at least one alkenyloxyaniline of the formula:



(II)

in which the allyloxy or methallyloxy radical is in the ortho-, meta- or para-position relative to the benzene ring carbon atom bonded to the nitrogen atom, and R is H or $CH_3$.

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**4,742,142**

## METHOD FOR PRODUCING SILICONE RUBBER POWDER

**Koji Shimizu, and Mitsuo Hamada, both of Chiba, Japan, assignors to Toray Silicone Co., Ltd., Tokyo, Japan**

**Filed Apr. 6, 1987, Ser. No. 34,368**

**Claims priority, application Japan, Apr. 17, 1986, 61-89063**

**Int. Cl.⁴ C08G *77/06***

**U.S. Cl. 528—15** **5 Claims**

1. A method for preparing a cured silicone rubber powder in the form of microfine particles, said method comprising (1) emulsifying a curable liquid silicone rubber composition in a mixture comprising water and a surfactant where said mixture is maintained at a temperature of from 0 to 25 degrees C., (2) curing the liquid silicone rubber into a powder by dispersing the resultant emulsion into water maintained at a temperature of at least 25 degrees C., and (3) isolating the resultant cured powder.

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**4,742,143**

## PRECERAMIC POLYMERS DERIVED FROM CYCLIC SILAZANES, AND HALOSILANES AND A METHOD FOR THEIR PREPARATION

**Loren A. Haluska, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.**

**Filed Nov. 4, 1986, Ser. No. 926,607**

**Int. Cl.⁴ C08G *77/04***

**U.S. Cl. 528—37** **17 Claims**

1. A method of preparing a preceramic polymer comprising contacting and reacting in an inert, essentially anhydrous atmosphere, a component selected from the group consisting of halogen-containing monosilanes having the general formula

$$R'SiX_3$$

and mixtures of halogen-containing monosilanes having the general formula

$$R_c'SiX_{(4-c)}$$

wherein c has a value of 1 or 2 and in the mixtures, the number of monosilanes having diorgano-substituted silicon atoms does not exceed the number of monosilanes having monoorgano-substituted silicon atoms, with a cyclic silazane or a mixture of cyclic silazanes selected from the group consisting of silazanes having the general formula (i) $(CH_3R''SiNH)_x$ and (ii) $(C_6H_5R''SiNH)_x$ at a temperature in the range of 0° to 260° C. and removing by-produced volatile products by distillation, wherein R′ and R″ are each independently selected from the

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group consisting of hydrogen, vinyl, phenyl and alkyl radicals containing 1 to 3 carbon atoms; x has a value of 3 to 6 and X is a halogen atom.

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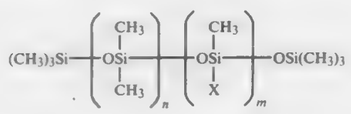
**4,742,144**

## COPOLYMERIC COMPOSITION OF A FUNCTIONAL POLYSILOXANE AND A CARBOXYLIC ACID OR SALT THEREOF

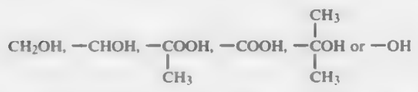
**Tinh Nguyen, Gaithersburg, Md., and James M. Gaul, Exton, Pa., assignors to ARCO Chemical Company, Newtown Square, Pa.**

**Continuation-in-part of Ser. No. 851,770, Apr. 14, 1986, abandoned, which is a division of Ser. No. 662,105, Oct. 18, 1984, abandoned. This application May 15, 1987, Ser. No. 50,841**
**Int. Cl.⁴ C08G** *77/04*
**U.S. Cl. 528—26.5** **10 Claims**

1. A Copolymeric polysiloxane composition, useful as a release agent for lignocellulosic composite molded articles containing an organic polyisocyanate based binder, comprising the copolymeric reaction product of a functional polysiloxane having the formula:



wherein n is an integer of from 5 to 30, m is an integer of from 1 to 20 and X is a group selected from



and a monocarboxylic acid or metal salt thereof having the formula $(CH_3—(CH_2)_y\ COO)_r—Z$ wherein y is an integer of from 5 to 24, r is an integer of from 1 to 3 and Z is a group selected from hydrogen, Na, Li, Ca, Ba, Cd, Mg, K or Fe.

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**4,742,145**

## METHOD FOR CURING ORGANOSILOXANE COMPOSITIONS

**Masayuki Saito, and Mitsuo Hamada, both of Chiba, Japan, assignors to Toray Silicone Co., Ltd., Tokyo, Japan**

**Filed Feb. 5, 1987, Ser. No. 11,467**
**Claims priority, application Japan, Mar. 5, 1986, 61-48153**
**Int. Cl.⁴ C08G** *77/12, 77/20;* **C08L** *83/05*
**U.S. Cl. 528—31** **4 Claims**

1. A method for curing an organosiloxane composition, said method consisting essentially of (1) heating said composition at a temperature of at least 150° C. and under a gauge pressure of at least 9.8 kilopascals for a period of time sufficient to cure said composition, where said composition comprises

(A) 100 parts by weight of an organopolysiloxane with the average unit formula $R_aSiO_{(4-a)/2}$ where R represents an unsubstituted or substituted monovalent hydrocarbon radical where the substituent is at least one member selected from the group consisting of halogen atoms and the cyano group, the average value of a is from 0.8 to 2.2, and said organopolysiloxane contains at least 2 lower alkenyl radicals in each molecule,

(B) an organohydrogenpolysiloxane having at least 2 silicon-bonded hydrogen atoms in each molecule in an amount sufficient to provide at least 1 mole of silicon-bonded hydrogen atoms per 1 mole of alkenyl radicals in ingredient (A), and

(C) 5 to 200 parts by weight of finely divided silica,

and where said composition does not contain a hydrosilation catalyst or an oroganoperoxide.

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**4,742,146**

## URETHANE MODIFIED EPOXY RESIN COMPOSITIONS CONTAINING OXAZOLIDINONE OR THIAZOLIDINONE GROUPS

**Robert E. Hefner, Jr., Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.**

**Filed Oct. 18, 1985, Ser. No. 789,899**
**Int. Cl.⁴ C08F** *26/02*
**U.S. Cl. 528—73** **14 Claims**

1. Urethane oligomer modified epoxy resin compositions which comprise the reaction product of

(1) at least one epoxy resin with

(2) at least one urethane oligomer containing

(a) at least one oxyalkylene group or thioalkylene group;

(b) a polymerizable ethylenically unsaturated group and

(c) an isocyanate or isothiocyanate group; in the presence of

(3) a catalyst for oxazolidinone or thiazolidinone formation; and wherein components (1) and (2) are present in quantities such that from about 0.001 to about 25 percent of the epoxide groups of component (1) are converted to oxazolidinone or thiazolidinone groups and component (3)is employed in an amount sufficient to cause reaction of component (1) with component (2) to form oxazolidinone or thiozolidnone groups.

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**4,742,147**

## LIQUID, SOLVENTLESS, COMPLEX POLYMERIC COMPOSITIONS, THERMOSETTING AT AMBIENT TEMPERATURES THROUGH ADDITION POLYMERIZATION MECHANISMS

**Gus Nichols, 2501 Gulf Freeway, Unit 5, Dickinson, Tex. 77539**

**Continuation-in-part of Ser. No. 593,591, Mar. 26, 1984, Pat. No. 4,547,562. This application Oct. 11, 1985, Ser. No. 786,738**
**Int. Cl.⁴ C08G** *83/00*
**U.S. Cl. 528—75** **6 Claims**

1. A copolymer comprising the addition reaction product of:

a first component comprising at least one amine or acrylate terminated polyurethane, polyurethaneurea or polyurea; and

a second component comprising at least one di or polyacrylate with a structure other than that of said first component.

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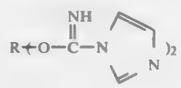
**4,742,148**

## MODIFIED IMIDAZOLE LATENT EPOXY RESIN CATALYSTS AND SYSTEMS COMPRISING THEM

**Frank W. Lee, Dublin, and Kenneth S. Baron, San Ramon, both of Calif., assignors to Hexcel Corporation, San Francisco, Calif.**

**Filed Apr. 17, 1987, Ser. No. 39,175**
**Int. Cl.⁴ C08G** *59/50*
**U.S. Cl. 528—117** **9 Claims**

1. A latent epoxy resin catalyst, of the formula



(I)

wherein R is aromatic or aralkyl and may contain hetero atoms, and is further characterized as being limited, in molecular weight, such that the catalyst is physically compatible with epoxy resin systems.



**4,742,149**

## PRODUCTION OF MELT CONSISTENT AROMATIC POLYESTERS

**Arnold B. Finestone, Woodcliff Lake, N.J., assignor to Dart Industries, Inc., Northbrook, Ill.**

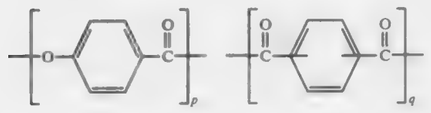
**Continuation of Ser. No. 556,485, Nov. 30, 1983, abandoned. This application May 10, 1985, Ser. No. 732,863**
**Int. Cl.⁴ C08G** *63/06, 63/60*
**U.S. Cl. 528—179** **19 Claims**

1. A melt-processable wholly aromatic polyester having reproducible melting and crystallization temperatures;

said polyester having been made by bulk polymerization, including heat condensing wholly aromatic precursors to form a prepolymer in the presence of an alkali or alkaline earth metal salt, and advancing the prepolymer to the required degree of polymerization;

said metal salt being added in an amount effective to render said melting and crystallization temperatures substantially reproducible with respect to melt processing of said polyester; and

said polyester being an oxybenzoyl polyester which comprises recurrent moieties of the following formulas:



VII VIII



IXA

where n is zero or one; q:r is about 10:15 to 15:10; p:(q+r) is greater than about 1:4; p+q+r is about 5 to 600; the carbonyl groups of the moiety of formula VII or VIII are linked to the oxy groups of the moiety of formula VII or IXa; and the oxy groups of the moiety of formula VII or IXa are linked to the carbonyl groups of the moiety of formula VII or VIII.

13. A melt-processable wholly aromatic polyester having reproducible melting and crystallization temperatures;

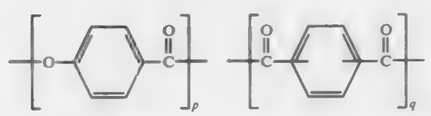
said polyester having been made by bulk polymerization, including heat condensing wholly aromatic precursors to form a prepolymer in the presence of an alkali or alkaline earth metal salt, and advancing the prepolymer to the required degree of polymerization;

said precursors being an aromatic dicarboxylic acid, a hydroxycarboxylic acid, and an aromatic diol;

said metal salt being an inorganic salt of potassium or magnesium;

said metal salt being added with the charge of precursors, in an amount effective to render said melting and crystallization temperatures substantially reproducible with respect to melt processing of said polyester and within the range of about 0.0025 to 0.05% by weight; and

said polyester being an oxybenzoyl polyester which comprises recurrent moieties of the following formulas:



VII VIII

-continued



IXA

where n is zero or one; q:r is about 10:15 to 15:10; p:(q+r) is greater than about 1:4; p+q+r is about 5 to 600; the carbonyl groups of the moiety of formula VII or VIII are linked to the oxy groups of the moiety of formula VII or IXa; and the oxy groups of the moiety of formula VII or IXa are linked to the carbonyl groups of the moiety of formula VII or VIII.

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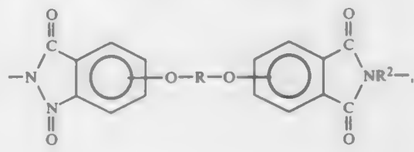
**4,742,150**

## SOLVENT RESISTANT POLYETHERAMIDEIMIDE CONTAINING BENZANILIDE UNITS

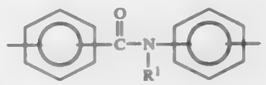
**John W. Verbicky, Jr., Scotia; Elbridge A. O'Neil, Port Henry, and Mark J. Bausch, Schenectady, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Filed Sep. 25, 1986, Ser. No. 911,611**
**Int. Cl.⁴ C08G** *73/10*
**U.S. Cl. 528—208** **7 Claims**

1. Solvent-resistant moldable polyetheramideimide having a $T_g$ in the range of from about 228° C.—260° C. comprising chemically combined amideimide units of the formula,



where R is a $C_{(6-30)}$ divalent aromatic organic radical, $R^2$ is selected from benzanilide units of the formula,



or a mixture of such benzanilide units and up to 90 mol percent of phenylene units of the formula based on the total moles of benzanilide units and phenylene units,



and $R^1$ is a $C_{(1-14)}$ monovalent hydrocarbon radical or $C_{(1-14)}$ monovalent hydrocarbon radical substituted with neutral radicals.

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4,742,151

## ULTRA-HIGH-MOLECULAR-WEIGHT POLYESTERS

Susumu Tate, Shiga; Haruhiko Narusawa; Youichi Watanabe, both of Otsu, and Akira Chiba, Kobe, all of Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 878,712, Jun. 26, 1986, abandoned.
This application Apr. 23, 1987, Ser. No. 42,625
Int. Cl.[4] C08G *63/02*
U.S. Cl. 528—272 7 Claims

1. An ultra-high-molecular-weight polyester prepared from aromatic dicarboxylic acid or alkyl ester thereof and alkylene glycol, and having intrinsic viscosity of not less than 1.5 and insoluble polymer content of not more than 10% by weight, said insoluble polymer content being measured by dissolving 6 g of said polyester in 100 ml of the mixed solvent of trifluoroacetic acid/dichloroethane (1/1) at 25° C. with stirring at 150 to 200 r.p.m. for 6 hours, filtering an insoluble material with a glass filter having opening size of 20 to 30μ under reduced pressure, washing the insoluble material with chloroform, drying at 130° C. for 24 hours in vacuo, weighing the resulting insoluble material and calculating the weight % of the insoluble material based on 6 g of the polyester.

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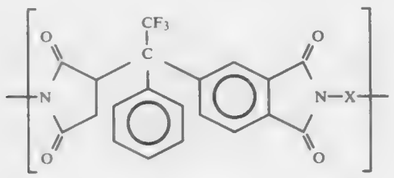
4,742,152

## HIGH TEMPERATURE FLUORINATED POLYIMIDES

Daniel A. Scola, Glastonbury, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed May 27, 1986, Ser. No. 867,720
Int. Cl.[4] C08G *69/26*
U.S. Cl. 528—353 9 Claims

1. A high temperature fluorinated polyimide having repeating polymer units of the formula



wherein X is aromatic or aliphatic.

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4,742,153

## PROCESS FOR PREPARING POLYIMIDES

Richard F. Sutton, Jr., Circleville, Ohio, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 16, 1986, Ser. No. 852,688
Int. Cl.[4] C08G *69/26*
U.S. Cl. 528—353 9 Claims

1. A process for preparing a polyimide comprising
(a) forming an intermediate polyamic acid solution by contacting, in a suitable solvent, X moles of diamine, Y moles of dicarboxylated monoanhydride and Z moles of dianhydride in such proportions that (i) Z<X and (ii) y<about 2 (X−2);
(b) heating said polyamic acid at a temperature above about 50° C. for a time sufficient to form a solid polyimide and sufficient to heat said polyamic acid to a temperature of at least about 220° C.

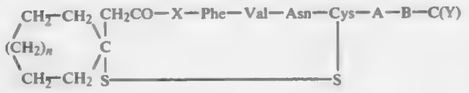
4,742,154

## GLN- OR ASN-VASOPRESSIN COMPOUNDS

William M. Bryan, Philadelphia; William F. Huffman, Malvern, and Michael L. Moore, Media, all of Pa., assignors to Smithkline Beckman Corporation, Philadelphia, Pa.

Filed Oct. 23, 1985, Ser. No. 790,666
Int. Cl.[4] A61K *37/00*; C07C *103/52*
U.S. Cl. 530—315 12 Claims

1. A peptide compound having the formula:



in which:
A is Pro or a single bond;
X is a D or L isomer of Ile, Tyr, Tyr(Alk) or Phe(Alk);
Y is $NH_2$ or OH;
n is 0 or 1;
B is a D or L isomer of Gln, Asn, Lys or Arg; and
C is a D or L isomer of Gln, Asn, Lys or Arg, one of B and C being either a Gln or Asn and the other being either a Lys or Arg; or a pharmaceutically acceptable salt or ester prodrug thereof.

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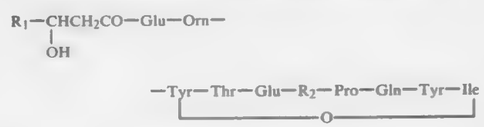
4,742,155

## PLIPASTATIN AND METHOD FOR PREPARATION THEREOF

Hamao Umezawa, Tokyo; Takaaki Aoyagi, Fujisawa; Tomio Takeuchi, Tokyo; Masa Hamada, Tokyo; Hiroshi Naganawa, Tokyo; Yasuhiko Muraoka, Tokyo, and Takaaki Nishikiori, Tokyo, all of Japan, assignors to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai, Tokyo, Japan

Filed Nov. 26, 1985, Ser. No. 801,809
Claims priority, application Japan, Dec. 6, 1984, 59-256475
Int. Cl.[4] C07K *5/12*
U.S. Cl. 530—317 7 Claims

1. A compound of the following general formula:



wherein $R_1$ is $—C_{13}H_{27}$ or $—C_{14}H_{29}$; and $R_2$ is Ala or Val, or salts thereof.

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4,742,156

## PEPTIDE ANTAGONISTS OF NEUROKININ B AND OPTHALMIC SOLUTIONS CONTAINING THEM

David E. Wright, Ambler, Pa., assignor to McNeilab, Inc., Fort Washington, Pa.

Continuation-in-part of Ser. No. 781,839, Sep. 30, 1985, Pat. No. 4,665,157. This application Aug. 29, 1986, Ser. No. 902,351
The portion of the term of this patent subsequent to May 12, 2004, has been disclaimed.
Int. Cl.[4] A61K *37/02*; C07C *103/52*
U.S. Cl. 530—328 10 Claims

1. A decapeptide of the following formula (I):

$A^1$-D-$Pro^2$-$His^3$-$D^4$-$Phe^5$-D-$Trp^6$-$Val^7$-D-$Trp^8$-$Leu^9$-$Nle^{10}$-$NH_2$

wherein
$A^1$ is $Asp^1$ or D-$Asp^1$; and
$D^4$ is $Asp^4$ or D-$Asp^4$,



and the pharmaceutically acceptable salts thereof, provided that if $A^1$ is $Asp^1$, $D^4$ is not $Asp^4$.

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4,742,157

## SUBSTANTIALLY PURE RHEUMATOID ARTHRITIS SPECIFIC PROTEIN AND AN ANTIBODY AGAINST THE SAME

Naoki Yamanaka, Nagoya, and Makoto Yoshida, Kawasaki, both of Japan, assignors to Asahi Medical Co., Ltd., Tokyo and Medecs Co., Ltd., Aichi, both of, Japan

Filed Sep. 13, 1985, Ser. No. 776,022
Claims priority, application Japan, Sep. 14, 1984, 59-191753; Sep. 14, 1984, 59-191754; Jul. 16, 1985, 60-155073
Int. Cl.[4] C07K *15/00*
U.S. Cl. 530—350 1 Claim

1. A substantially pure rheumatoid arthritis specific protein which comprises light peptide chains and heavy peptide chains,
said light peptide chains each having a molecular weight of about 25,000 to 30,000 in terms of a value as measured by an SDS-polyacrylamide gel electrophoresis method as defined herein,
said heavy peptide chains each having a molecular weight of about 55,000 to 60,000 in terms of a value as measured by as SDS-polyacrylamide gel electrophoresis method as defined herein; and which protein has:
(1) a molecular weight of about 150,000 to 170,000 in terms of a value as measured by an SDS-polyacrylamide gel electrophoresis method as defined herein;
(2) an isoelectric point of about 7.3 to 7.8 in terms of a value as measured by a two-dimensional electrophoresis method as defined herein;
(3) an electrophoretic mobility of about 0.30 to 0.45 in terms of a value as measured by a two-dimensional electrophoresis method as defined herein; and
(4) an antigenic determinant common to that of human IgG.

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4,742,158

## PURIFICATION OF HEPATITIS PRE-S ANTIGENS BY POLYMERIZED SERUM ALBUMIN AFFINITY BINDING

E. Dale Lehman, Lansdale; Ted F. Schaefer, Collegeville, and William J. McAleer, Ambler, all of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation of Ser. No. 896,325, Apr. 25, 1986, abandoned.
This application Apr. 14, 1987, Ser. No. 45,792
Int. Cl.[4] C07K *3/20, 3/28*; A61K *39/29*
U.S. Cl. 530—371 9 Claims

1. A method of purifying recombinant expressed hepatitis B virus pre-S surface antigens comprising:
a. attachment of pre-S(2) containing antigen to a polymerized serum albumin matrix;
b. elution of the antigens from the matrix with a salt formed by an alkali metal and a halogenated acetic acid; and
c. final purification of the antigens using butyl agarose affinity chromatography and an acceptable eluant.

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4,742,159

## DIGITALIS ANTIBODIES, PROCESS FOR THE PREPARATION THEREOF AND THE USE THEREOF FOR THE THERAPY OF DIGITALIS INTOXICATIONS

Hans-Georg Batz; Herbert Jungfer; Helmut Lenz, all of Tutzing, and Albert Röder, Seeshaupt, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany

Filed Dec. 19, 1983, Ser. No. 563,217
Claims priority, application Fed. Rep. of Germany, Nov. 26, 1983, 3342870
Int. Cl.[4] C07K *13/00*; C12Q *1/00*; C12P *21/00*
U.S. Cl. 530—388 9 Claims

1. In a process for the preparation of Fab fragments of digitalis antibodies in which appropriate mammals are immunised with an agent for immunizing comprising a digoxin bound to protein, the animal serum obtained, the immune globulin-containing protein fraction is separated in known manner, the immunologically-active globulins adsorbed on an immunologically-active adsorbent in a column and separated from the other proteins, the antibodies again eluted from the column and the Fab fractions split with papain and purified wherein the improvement comprises absorbing the digitalis antibodies on an immunologically-active absorbent which comprises an inorganic matrix to which digitoxin aldehyde is bound via a spacer which cannot be split with papain, treating the matrix with papain so as to split the absorbed antibodies into Fab and Fc fragments, washing the column so as to remove the Fc fragments, washing the column so as to remove the Fc fragments and excess papain, and desorbing the Fab fragments bound to the matrix with a suitable eluting agent.

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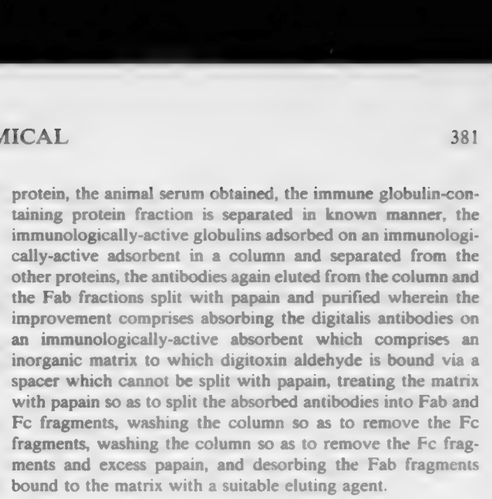
4,742,160

## SULFO GROUP-CONTAINING BASIC AZO COMPOUNDS HAVING A CENTRAL 1,3,5-TRIAZINE RING AND TWO TERMINAL 1-HYDROXYNAPHTHYL-2 GROUPS AND 1:1 AND 1:2 METAL COMPLEXES THEROF

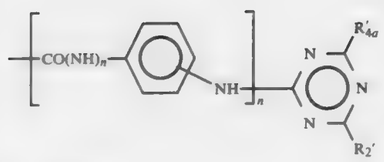
Jacky Dore, Basel, and Reinhard Pedrazzi, Allschwil, both of Switzerland, assignors to Sandoz Ltd., Basle, Switzerland

Continuation of Ser. No. 670,628, Nov. 13, 1984, abandoned.
This application Feb. 28, 1986, Ser. No. 834,976
Claims priority, application Fed. Rep. of Germany, Nov. 14, 1983, 3341136
Int. Cl.[4] C09B *35/18, 44/08, 45/24, 45/26*
U.S. Cl. 534—605 18 Claims

1. A metal-free compound of the formula



a 1:1 or 1:2 metal complex of a metallizable metal-free compound of said formula or an acid addition salt of a metal-free compound of said formula or of a 1:1 or 1:2 metal complex of a metallizable metal-free compound of said formula,
wherein
each R is sulfo and each $R_a$ is independently $—NR_5'R_6'$ or
each R is independently $—NR_5'R_6'$ and each $R_a$ is hydrogen,
wherein
$R_6'$ is

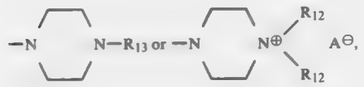


or —CO—$(CH_2)_{m'}$—$K_{a'}$,

wherein

$K_{a'}$ is —$N(R_7')_2$, —$N^{\oplus}(R_8')_2R_9'A^{\ominus}$, —$N^{61}(R_8')_2$—$A_1$—$N(R_7')_2A^{\ominus}$ or —$N^{\oplus}(R_8')_2$—$A_1$—$N^{\oplus}(R_8')_2R_9'$ $2A^{\ominus}$,

$R_2'$ is —$NR_5'R_{20}'$, morpholino, piperidino,

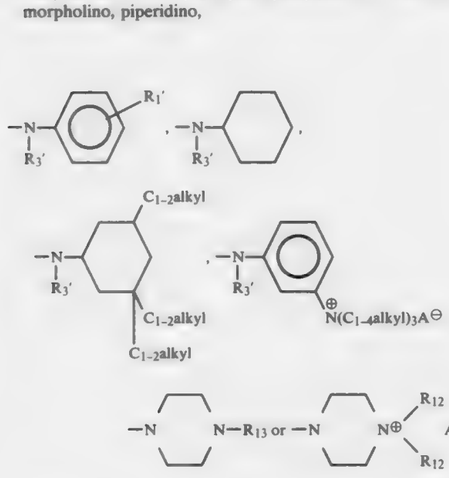


m' is 1, 2 or 3,

each n is independently 0 or 1, and

$R_{4a}'$ is as defined below, and

each of $R_4'$ and $R_{4a}'$ is independently chloro, bromo, methyl, phenyl, hydroxy, methoxy, amino, N—$C_{1-4}$alkyl-N—$C_{3-4}$alkylamino, N,N-di-($C_{2-4}$hydroxyalkyl)amino, —$NR_5'R_{20}'$, morpholino, piperidino,



wherein

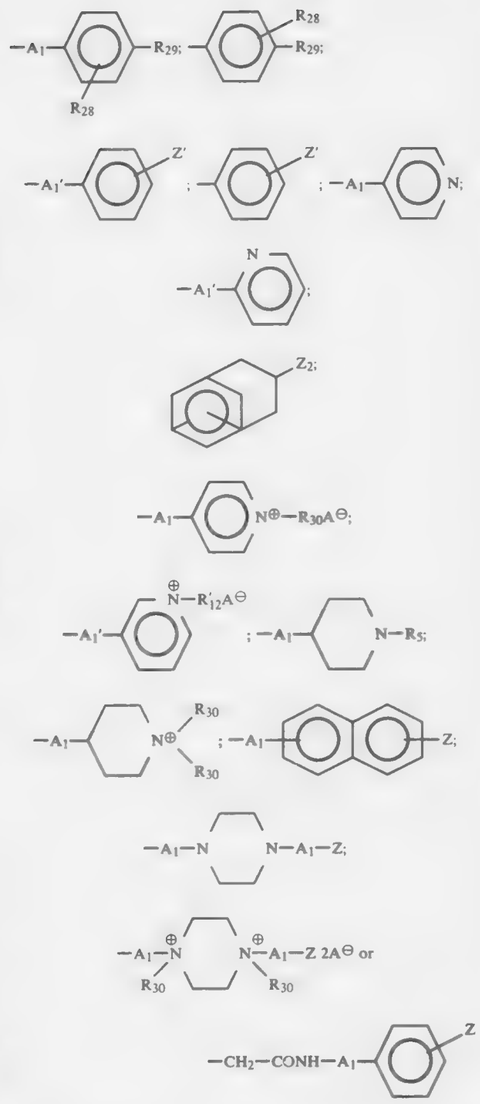
each $R_1'$ is independently hydrogen, chloro, bromo, methyl, methoxy or sulfo,

each $R_3'$ is independently hydrogen or methyl,

each $R_{12}$ is independently $C_{1-4}$alkyl,

each $R_{13}$ is independently hydrogen, $C_{1-4}$alkyl or $C_{1-4}$alkyl substituted by amino,

each $R_{20}'$ is independently $C_{1-12}$alkyl; $C_{1-12}$hydroxyalkyl; alkyl having a maximum of 12 carbon atoms which is interrupted by 1 to 3 radicals selected from —$NR_7$— and —$N^{\oplus}(R_8)_2$—$A^{\ominus}$; alkyl having a maximum of 12 carbon atoms which is substituted by hydroxy and interrupted by 1 to 3 radicals selected from —$NR_7$— and —$N^{\oplus}(R_8)_2$—$A^{\ominus}$; —NHCO—$CH_2$—Z; —$CH_2$—CONH—$A_1$—Z; —$A_1$—Z;



wherein

$A_1'$ is linear or branched $C_{1-8}$alkylene or linear or branched alkylene having a maximum of 8 carbon which is interrupted by —O—, —S— or —$NR_5'$—,

$R_5$ is hydrogen or $C_{1-4}$alkyl,

$R_{12}$ is methyl or ethyl,

$R_{28}$ is halo, hydroxy, nitro, $C_{1-4}$alkyl or $C_{1-4}$alkoxy,

$R_{29}$ is —$N(R_7')_2$, —$N^{\oplus}(R_8')_2R_9'A^{\ominus}$, —CO—$A_2$—$Z_1$, —NHCO—$A_2$—$Z_1$, —CONH—$A_2$—$Z_1$, —$SO_2$NH—$A_2$—$Z_1$, —$A_2$—$Z_1$ or —NHNHCO—$CH_2$—$Z_1$,

wherein $A_2$ is linear or branched $C_{1-8}$alkylene, and $Z_1$ is —$N(R_7')_2$ or —$N^{\oplus}(R_8')_2R_9'A^{\ominus}$,

each $R_{30}$ is independently $C_{1-4}$alkyl, Z is —$N(R_7)_2$, —$N^{\oplus}(R_8)_2R_9A^{\ominus}$, —$A_1$—$Z_1$, —CONH—$A_1$—$Z_1$, —NH—CO—$A_1$—$Z_1$, —$CO$—$A_1$—$Z_1$, —$SO_2$NH—$A_1$—$Z_1$ or —NHNHCO—$CH_2$—$Z_1$,

wherein

$Z_1$ is as defined above, and

Z' is dimethylamino, trimethylammonium $A^{\ominus}$, —CONH—$A_1'$—$Z_2$, —$SO_2$NH—$A_1'$—$Z_2$, —$A_1$—$Z_2$, —NHNHCO—$CH_2$—$Z_2$ or —CO—$A_1'$—$Z_2$,

wherein $Z_2$ is —$N(R_7'')_2$ or —$N^{\oplus}(R_8'')_2R_9''A^{\ominus}$,



wherein

each $A_1$ is independently linear or branched $C_{1-8}$-alkylene; linear or branched alkylene having a maximum of 8 carbon atoms which is interrupted by —O—, —S— or —$NR_5'$—; or linear or branched $C_{3-8}$alkenylene,

wherein $R_5'$ is as defined below,

each $A_1'$ is independently linear or branched $C_{1-8}$alkylene or linear or branched alkylene having a maximum of 8 carbon atoms which is interrupted by —O—, —S— or —$NR_5'$—,

wherein $R_5'$ is as defined below,

each $R_5'$ is independently hydrogen, methyl or ethyl,

each $R_7$ is independently hydrogen; $C_{1-6}$alkyl; $C_{2-6}$alkyl monosubstituted by hydroxy, cyano or halo; phenyl($C_{1-3}$alkyl); phenyl($C_{1-3}$alkyl) the phenyl group of which is substituted by 1 to 3 substituents selected from halo, $C_{1-4}$alkyl and $C_{1-4}$alkoxy; $C_{5-6}$cycloalkyl or $C_{5-6}$cycloalkyl substituted by 1 to 3 $C_{1-4}$alkyl groups, or

—$N(R_7)_2$ is morpholino, piperidino, pyrrolidino, piperazino, N-methylpiperazino or pyrrolyl,

each $R_7'$ is independently hydrogen; $C_{1-4}$alkyl; n-$C_{2-3}$-hydroxyalkyl; 2-cyanoethyl; 2-chloroethyl; phenyl($C_{1-3}$alkyl) or phenyl($C_{1-3}$alkyl) the phenyl group of which is substituted by 1 to 3 substituents selected from chloro, methyl and methoxy, or

—$N(R_7')_2$ is morpholino, piperidino, pyrrolidino, piperazino or N-methylpiperazino,

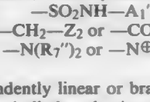
each $R_7''$ is independently hydrogen, methyl or ethyl, or

—$N(R_7'')_2$ is morpholino, piperidino, pyrrolidino, piperazino or N-methylpiperazino,

each $R_8$ is independently $C_{1-6}$alkyl; $C_{2-6}$alkyl monosubstituted by hydroxy, cyano or halo; phenyl($C_{1-3}$alkyl); phenyl($C_{1-3}$alkyl) the phenyl group of which is substituted by 1 to 3 substituents selected from halo, $C_{1-4}$alkyl and $C_{1-4}$alkoxy; $C_{5-6}$cycloalkyl or $C_{5-6}$cycloalkyl substituted by 1 to 3 $C_{1-4}$alkyl groups,

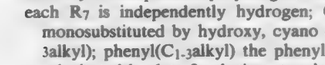
each $R_9$ is independently $C_{1-4}$alkyl; $C_{1-4}$alkyl monosubstituted by phenyl, carbamoyl or cyclohexyl; $C_{2-4}$alkyl monosubstituted by hydroxy, halo or cyano; $C_{3-8}$alkenyl or 2-($C_{1-4}$alkyl)carbonylmethyl, or

—$N^{\oplus}(R_8)_2R_9$ is pyridinium, pyridinium substituted by 1 to 3 $C_{1-4}$alkyl groups or



wherein Zo is a direct bond,

—$CH_2$—, —O—, —S—, —SO—, —$SO_2$—, —NH—,



wherein

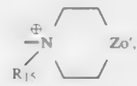
p is 2 or 3, and

$R_9$ is as defined above,

each $R_8'$ is independently $C_{1-4}$alkyl; n-$C_{2-3}$hydroxyalkyl; 2-cyanoethyl; 2-chloroethyl; phenyl($C_{1-3}$alkyl) or phenyl($C_{1-3}$alkyl) the phenyl group of which is substituted by 1 to 3 substituents selected from chloro, methyl and methoxy,

$R_9'$ is methyl, ethyl, propyl, cyanoethyl, hydroxyethyl, chloroethyl, benzyl, allyl, carbamoylmethyl, cyclohexylmethyl or acetylmethyl, or

—$N^{\oplus}(R_8')_2R_9'$ is pyridinium, picolinium, lutidinium or



wherein

$R_{15}$ is methyl or ethyl, and

Zo' is a direct bond,

—$CH_2$—, —O—, —NH—, —$NR_{15}$— or 

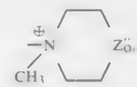
wherein

each $R_{15}$ is independently methyl or ethyl,

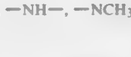
each $R_8''$ is independently methyl or ethyl, and

each $R_9''$ is independently methyl, ethyl or benzyl, or

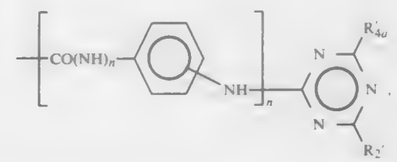
—$N^{\oplus}(R_8'')_2R_9''$ is pyridinium, picolinium or



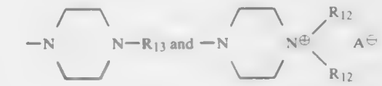
wherein Zo'' is

—$CH_2$—, —O—, —NH—, —$NCH_3$— or 

wherein each $A^{\ominus}$ is independently a non-chromophoric anion, with the provisos that (i) the sum of the cationic groups and protonatable basic groups exceeds the number of sulfo groups by at least one, (ii) the —$NR_3'$— radical attached to Ring A is in the 3- or 4-position thereof and the —$NR_3'$— radical attached to Ring B is in the 3- or 4-position thereof, and (iii) when each R is —$NR_5'R_6'$ wherein $R_6'$ is



then each n is 0, the —$NR_3'$— radicals attached to Rings A and B are in the 3-position of each, and each $R_2'$ and $R_{4a}'$ is other than



**4,742,161**

## DISAZO AND TRISAZO COMPOUNDS CONTAINING ONE 6-HYDROXYPYRID-2-ONE COUPLING COMPONENT RADICAL PER AZO RADICAL

**Jacky Doré, Basle, Switzerland, assignor to Sandoz Ltd., Basle, Switzerland**

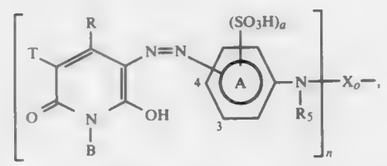
**Filed May 20, 1985, Ser. No. 735,831**

**Claims priority, application Fed. Rep. of Germany, May 19, 1984, 3418739**

**Int. Cl.⁴ C09B** *35/18, 35/20, 35/35, 44/02*

**U.S. Cl. 534—606** **17 Claims**

1. A compound of the formula



or a salt thereof, wherein

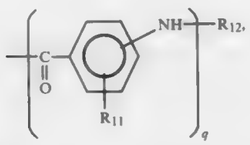
each B is independently hydrogen; $C_{1-4}$alkyl; ($C_{1-4}$alkoxy)$C_{1-4}$alkyl; $C_{2-4}$hydroxyalkyl; $C_{5-6}$cycloalkyl; $C_{5-6}$cycloalkyl substituted by 1 to 3 $C_{1-4}$alkyl groups; phenyl($C_{1-3}$alkyl); phenyl($C_{1-3}$alkyl) the phenyl group of which is substituted by 1 to 3 substituents selected from $C_{1-4}$alkyl, $C_{1-4}$alkoxy and halo; —A—NH—$R_2$; —$A_2$—N($R_7$)$_2$; —$A_1$—N$^{\oplus}$($R_8$)$_2$$R_9A^{\ominus}$ or —N($R_7$)$_2$, wherein

A is linear or branched $C_{1-10}$alkylene, linear or branched $C_{2-10}$alkenylene, cyclohexylene or phenylene,

$A_1$ is linear or branched $C_{2-8}$alkylene; linear or branched $C_{2-8}$alkylene interrupted by one —$NR_5$— radical; linear or branched $C_{2-8}$alkylene monosubstituted by hydroxy; linear or branched $C_{2-8}$alkylene interrupted by one —$NR_5$— radical and monosubstituted by hydroxy; or linear or branched $C_{2-8}$alkenylene,

$A_2$ is linear or branched $C_{1-8}$alkylene; linear or branched $C_{2-8}$alkylene interrupted by one —$NR_5$— radical; linear or branched $c_{2-8}$alkylene monosubstituted by hydroxy; linear or branched $C_{2-8}$alkylene interrupted by one —$NR_5$— radical and monosubstituted by hydroxy; or linear or branched $C_{2-8}$alkenylene, and

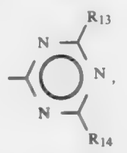
$R_2$ is



wherein

$R_{11}$ is hydrogen, halo, nitro, $C_{1-4}$alkyl or $C_{1-4}$alkoxy,

$R_{12}$ is hydrogen, —CO—$(CH_2)_p$—Z or



wherein

Z is —N($R_7$)$_2$ or —N$^{\oplus}$($R_8$)$_2$$R_9A^{\ominus}$, and

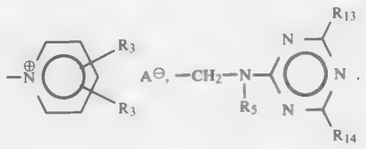
p is 1, 2 or 3, and

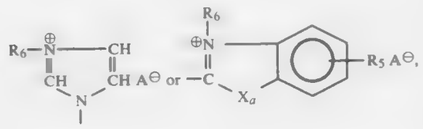
q is 0 or 1,

with the proviso that $R_2$ is other than hydrogen when A is linear or branched $C_{1-8}$alkylene or linear or branched $C_{2-8}$alkenylene,

each R is independently hydrogen; amino; $C_{1-4}$alkyl; $C_{5-6}$cycloalkyl; $C_{5-6}$cycloalkyl substituted by 1 or 2 $C_{1-4}$alkyl groups; phenyl; phenyl substituted by 1 or 2 substituents selected from methyl, ethyl, methoxy and ethoxy; benzyl; phenylethyl; or benzyl or phenylethyl the phenyl group of which is substituted by 1 or 2 substituents selected from methyl, ethyl, methoxy and ethoxy,

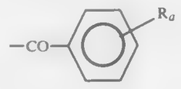
each T is independently hydrogen, cyano, halo, —$COOR_4$, —$CON(R_5)_2$, —$SO_2N(R_5)_2$, —$CH_2$—NHCO—$CH_2$—N($R_7$)$_2$, —$CH_2$—NHCO—$CH_2$—N$^{\oplus}$($R_8$)$_2$$R_9A^{\ominus}$, —$CH_2$—N$R_1R_5$,





wherein

$R_1$ is ($C_{1-4}$alkyl)carbonyl, $C_{1-4}$alkylsulfonyl, —CO—R-$_c$—$R_d$, —$SO_2$—$R_b$ or



wherein

$R_a$ is hydrogen, methyl, halo, methoxy, cyano or —$CONH_2$,

$R_b$ is phenyl; phenyl substituted by 1 to 3 substituents selected from $C_{1-4}$alkyl, $C_{1-4}$alkoxy and halo; naphthyl or naphthyl substituted by 1 or 2 substituents selected from $C_{1-4}$alkyl, $C_{1-4}$alkoxy and halo,

$R_c$ is linear or branched $C_{1-4}$alkylene, and

$R_d$ is halo, cyano or methoxy,

each $R_3$ is independently hydrogen, $C_{1-4}$alkyl, —$N(R_5)_2$ or —$CON(R_5)_2$,

$R_4$ is $C_{1-6}$alkyl or phenyl($C_{1-3}$alkyl),

$R_6$ is $C_{1-4}$alkyl, and

$X_a$ is —O—, —S— or —$NR_5$—,

$X_o$ is a divalent or trivalent bridging radical, each a is independently 0 or 1, with the proviso that at least 2 a's are 1, and

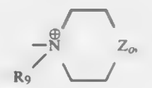
n is 2 or 3, wherein

each $R_5$ is independently hydrogen or $C_{1-4}$alkyl,

each $R_7$ is independently hydrogen; $C_{1-6}$alkyl; $C_{2-6}$alkyl monosubstituted by halo, hydroxy or cyano; phenyl($C_{1-3}$alkyl); phenyl($C_{1-3}$alkyl) the phenyl group of which is substituted by 1 to 3 substituents selected from halo, $C_{1-4}$alkyl and $C_{1-4}$alkoxy; $C_{5-6}$cycloalkyl or $C_{5-6}$cycloalkyl substituted by 1 to 3 $C_{1-4}$alkyl groups, or —N($R_7$)$_2$ is pyrrolidino, piperidino, morpholino, piperazino or N-methylpiperazino,

each $R_8$ is independently $C_{1-6}$alkyl; $C_{2-6}$alkyl monosubstituted by halo, hydroxy or cyano; phenyl($C_{1-3}$alkyl); phenyl($C_{1-3}$alkyl) the phenyl group of which is substituted by 1 to 3 substituents selected from halo, $C_{1-4}$alkyl and $C_{1-4}$alkoxy; $C_{5-6}$cycloalkyl or $C_{5-6}$cycloalkyl substituted by 1 to 3 $C_{1-4}$alkyl groups, and

each $R_9$ is independently $C_{1-4}$alkyl or phenyl($C_{1-4}$alkyl), or —N$^{\oplus}$($R_8$)$_2$$R_9$ is pyridinium, pyridinium substituted by 1 or 2 $C_{1-4}$alkyl groups or



wherein

$Z_o$ is a direct bond, —$CH_2$—, —O—, —S—, —NH—, —$NR_6$—, —N$^{\ominus}$($R_6$)$_2$—$A^{\ominus}$, —SO— or —$SO_2$—,

wherein

each $R_6$ is independently $C_{1-4}$alkyl, and

$R_9$ is $C_{1-4}$alkyl or phenyl($C_{1-4}$alkyl),

each $R_{13}$ is independently halo, hydroxy, $C_{1-4}$alkoxy, $c_{1-4}$alkyl, phenyl, amino or an aliphatic, cycloaliphatic, aromatic or heterocyclic amino group the nitrogen atom of which is attached to the 1,3,5-triazine ring,

each $R_{14}$ is independently an aliphatic, cycloaliphatic, aromatic or heterocyclic amino group the nitrogen atom of which is attached to the 1,3,5-triazine ring, and

each $A^{\ominus}$ is independently a non-chromophoric anion, with the provisos that (1) the total number of basic and cationic groups is at least 3 and exceeds the number of sulfo groups, (2) each —N=N— radical attached to a Ring A is in the 3- or 4-position thereof and (3) the number of —N=N— radicals is 2 or 3.

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**4,742,162**

## AZO-STIBENE CONDENSATES AS LEATHER DYES

**Ulrich Schlesinger, Binzen, Fed. Rep. of Germany, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.**

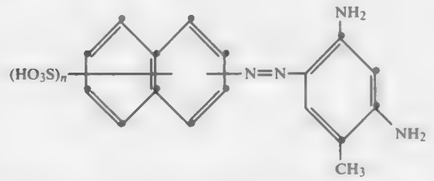
**Continuation of Ser. No. 376,334, May 10, 1982, abandoned. This application Apr. 6, 1984, Ser. No. 597,212**

**Claims priority, application Switzerland, May 18, 1981, 3220/81**

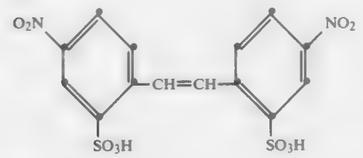
**Int. Cl.⁴ C09B** *43/00, 56/04, 56/06;* **P06P** *3/32*

**U.S. Cl. 534—689** **3 Claims**

1. An azo-stilbene dye which is a condensate of an azo compound of the formula



wherein n is 1 or 2, and the stilbene compound of the formula



in the molar ratio of 1:1.



**4,742,163**

## ALPHA-TOCOPHEROL (HALO)URIDINE PHOSPHORIC ACID DIESTER, SALTS THEREOF, AND METHODS FOR PRODUCING THE SAME

**Kazumi Ogata, Toyonaka, Japan, assignor to Senju Pharmaceutical Co., Ltd., Osaka, Japan**

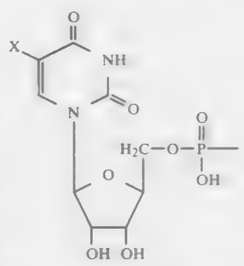
**Filed Oct. 22, 1986, Ser. No. 921,422**

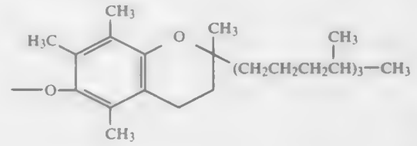
**Claims priority, application Japan, Dec. 18, 1985, 60-284940**

**Int. Cl.⁴ C07H** *19/10*

**U.S. Cl. 536—29** **4 Claims**

1. A phosphoric acid diester of the formula





wherein X represents a hydrogen atom or a halogen atom, or an alkali metal or calcium salt thereof.

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**4,742,164**

## BACTERIAL CELLULOSE-CONTAINING MOLDING MATERIAL HAVING HIGH DYNAMIC STRENGTH

**Masatoshi Iguchi; Shigenobu Mitsuhashi, both of Sakuramura; Kunihiro Ichimura, Yatabemachi; Yoshio Nishi; Masaru Uryu, both of Tokyo; Shigeru Yamanaka, Yokohama, and Kunihiko Watanabe, Kawasaki, all of Japan, assignors to Agency of Industrial Science and Technology; Sony Corporation and Ajinomoto Co., Inc., all of Tokyo, Japan**

**Filed Apr. 16, 1986, Ser. No. 852,838**

**Claims priority, application Japan, Apr. 16, 1985, 60-79291; Jun. 7, 1985, 60-122818**

**Int. Cl.⁴ C08B** *1/00;* **C08L** *1/00*

**U.S. Cl. 536—56** **26 Claims**

1. A molded material having high dynamic strength and a modulus of elasticity of at least 7.4 GPa, containing ribbon-shaped microfibrils of bacterial cellulose, which is produced by:

(a) culturing a bacteria capab'e of producing cellulose in a nutrient medium,

(b) withdrawing the cellulose produced from said culture in the form of a gel, and

(c) pressing said gel to remove water from said cellulose by squeezing the same at a pressure sufficient to enhance said dynamic strength or macerating the same or a combination thereof.

**4,742,165**

## 2-PIPERAZINOPYRIMIDINE DERIVATIVES

**Keiichi Yokoyama, Iwakuni; Tatsuyoshi Ishida; Shigeru Isayama, both of Ohtake; Kohji Kato, Yamaguchi; Takumi Kitahara, Ohtake, and Yoshiaki Furuya, Iwakuni, all of Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan**

**PCT No. PCT/JP85/00500, § 371 Date May 2, 1986, § 102(e) Date May 2, 1986, PCT Pub. No. WO86/01798, PCT Pub. Date Mar. 27, 1986**

**PCT Filed Sep. 7, 1985, Ser. No. 865,566**

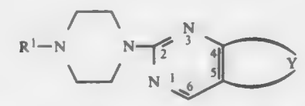
**Claims priority, application Japan, Sep. 7, 1984, 59-186542**

**Int. Cl.[4] C07D** *239/84, 239/70, 471/04, 487/04*

**U.S. Cl. 540—205** **3 Claims**

1. A 2-piperazinopyrimidine derivative represented by the general formula [I]

[I]

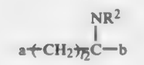


wherein $R^1$ is a hydrogen atom or an aralkyl group and Y is one of the groups represented by the following general formulas [II] to [VII]

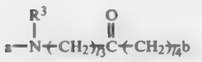
[II]



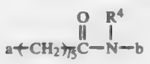
[III]



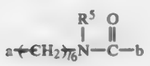
[IV]



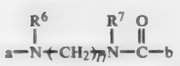
[V]



[VI]



[VII]



(wherein a and b are positions to be bound to 4 and 5 positions of the pyrimidine ring of the formula [I], respectively; $l_1$ and $l_2$ each are an integer of 2 to 4; $l_3$ is 2 or 0; $l_4$ is 0 or 1. provided that $l_4$ is 0 when $l_3$ is 2 and $l_4$ is 1 when $l_3$ is 0; $l_5$ is 2 or 3; $l_6$ is 1 or 2; $l_7$ is 2 or 3; $R^2$ is a hydroxyl group or a toluenesulfonyloxy group; and $R^3$, $R^4$, $R^5$, $R^6$ and $R^7$ each are a hydrogen atom or a lower alkyl group).

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**4,742,166**

## SUBSTITUTED, UNSATURATED, BICYCLIC IMIDES AND POLYMERS THEREOF

**Alfred Renner, Muntelier, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Division of Ser. No. 693,640, Jan. 22, 1985, Pat. No. 4,604,437. This application Apr. 17, 1986, Ser. No. 853,265**

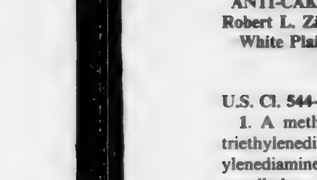
**Claims priority, application Switzerland, Jan. 31, 1984, 450/84; Oct. 5, 1984, 4796/84**

**Int. Cl.[4] C07D** *209/94*

**U.S. Cl. 548—435** **14 Claims**

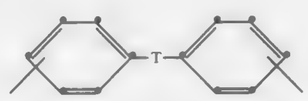
1. An imide of the formula I

[I]



in which E is allyl or methallyl and n is 1 or 2 and, when n is 1, R is hydrogen, alkyl having 1–12 C atoms, alkenyl having 3–6 C atoms, cycloalkyl having 5–8 C atoms, aryl having 6–10 C atoms or benzyl, or, when n is 2, R is $-C_mH_{2m}-$ in which m is 2–20, arylene having 6–10 C atoms or a group of the formula II

(II)



in which T is methylene, isopropylidene, CO, O, S or $SO_2$.

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**4,742,167**

## BIOLOGICALLY ACTIVE N-PYRAZINYL-HALOACETAMIDES

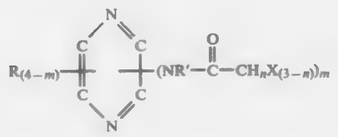
**Gordon C. Fischer, Angleton, Tex., assignor to The Dow Chemical Company, Midland, Mich.**

**Filed May 30, 1986, Ser. No. 868,965**

**Int. Cl.[4] C07D** *241/16, 241/18;* **A01N** *43/60*

**U.S. Cl. 544—336** **17 Claims**

1. An herbicidally or insecticidally active N-pyrazinyl-haloacetamide or a biologically active acid addition salt or tautomer thereof, said haloacetamide having the formula:



wherein each R is independently selected from the group consisting of:

hydrogen;

hydrocarbyl having from 1 to 10 carbon atoms;

halogen;

epoxy;

—OR″ in which R″ is hydrogen or hydrocarbyl having from 1 to 10 carbon atoms;

—SR″ in which R″ is hydrogen or hydrocarbyl having from 1 to 10 carbon atoms;

nitro;

cyano; and

$NR_2''$ in which each R″ is independently hydrogen or hydrocarbyl having from 1 to 10 carbon atoms;

wherein not more than one R is iodo or nitro and when m is less than 4 at least one R is halogen, epoxy, —OR″, —SR″, nitro, cyano, or $NR_2''$;

wherein each R′ is independently hydrogen or hydrocarbyl having from 1 to 10 carbon atoms;

wherein each X is halogen selected from the group consisting of chlorine, bromine, fluorine and iodine;

wherein n is 0, 1 or 2 and m is 1, 2, 3 or 4.



**4,742,168**

## ANTI-CAKING AGENT FOR TRIETHYLENEDIAMINE

**Robert L. Zimmerman, Austin, Tex., assignor to Texaco Inc., White Plains, N.Y.**

**Filed Jul. 31, 1986, Ser. No. 891,087**

**Int. Cl.[4] C07D** *487/00*

**U.S. Cl. 544—351** **7 Claims**

1. A method for improving the anti-caking properties of triethylenediamine which comprises admixing with the triethylenediamine an effective amount of an additive comprising oxyalkylene amines and their amides, the amines comprising compounds of the formula:



wherein X is a methyl radical, Z is a hydrocarbon radical having from 2 to 5 carbon atoms forming from 2 to 4 external ether linkages; n is a number from 1 to about 40 and r is a number from 2 to 4.

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**4,742,169**

## PROCESS FOR THE PREPARATION OF HALOHYDROXYALKYL CARBAMATES AND 2,3-EPOXY CARBAMATES

**Marsha A. Paul, Natick, and George A. Doorakian, Bedford, both of Mass., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Apr. 5, 1985, Ser. No. 720,447**

**The portion of the term of this patent subsequent to Feb. 26, 2002, has been disclaimed.**

**Int. Cl.[4] C07D** *241/04*

**U.S. Cl. 544—388** **29 Claims**

1. A process for the preparation of a halohydroxyalkyl carbamate which comprises contacting an epihalohydrin carbonate with a secondary amine-containing compound, wherein the secondary amine has a pKa at which the secondary amine will react with the epihalohydrin carbonate and will not catalyze the formation of unwanted by-products, in the further presence of an acid scavenger capable of forming a salt with any hydrogen halide formed in an amount sufficient to prevent the formation of unwanted by-products from the hydrogen halides, in a polar organic solvent under conditions such that a halohydroxyalkyl carbamate, or a poly(halohydroxyalkyl) polycarbamate is formed.

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**4,742,170**

## MIX-CRYSTAL PIGMENTS BASED ON PERYLENETETRACARBIMIDES, PROCESS FOR THEIR PREPARATION, AND THEIR USE

**Ernst Spietschka, Idstein/Taunus, and Helmut Tröster, Königstein/Taunus, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Oct. 1, 1985, Ser. No. 782,685**

**Claims priority, application Fed. Rep. of Germany, Oct. 3, 1984, 3436209**

**Int. Cl.[4] C09B** *5/62;* **C07D** *491/06*

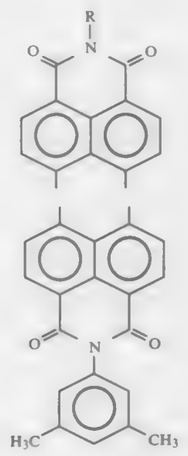
**U.S. Cl. 546—37** **4 Claims**

1. A perylenetetracarbimide mix-crystal pigment in the crystal lattice of the α-modification of N,N′-bis-3′,5′-dimethylphenylperylenetetracarbimide of the formula (1) comprising 98–70 mole percent of the symmetrical diimide of the formula (1) and correspondingly 2–30 mole percent of at least one asymmetrical diimide of the formula (2)

(1)



(2)



in which R denotes a hydrogen atom or a methyl group.

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**4,742,171**

## METHOD OF SYNTHESIZING 1,4-DIHYDRO-BENZO[C]-1,5-NAPHTHYRIDIN-2(3H)-ONES

**Lawrence L. Martin, Lebanon; Linda L. Setescak, Somerville, and Susan J. Scott, No. Brunswick, all of N.J., assignors to Hoechst-Roussel Pharmaceuticals Inc., Somerville, N.J.**

**Division of Ser. No. 711,327, Mar. 13, 1985, Pat. No. 4,652,567. This application Nov. 4, 1986, Ser. No. 926,752**

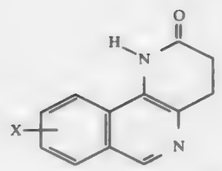
**Int. Cl.[4] C07D** *471/06*

**U.S. Cl. 546—81** **2 Claims**

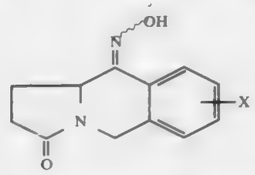
1. A method of preparing a compound of the formula

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where X is H, halogen, loweralkyl, loweralkoxy, —$CF_3$ or —OH, which consists essentially of the Wolff-Semmler aromatization and rearrangement of a compound of the formula



in a substantially anhydrous acidic medium to obtain said compound.

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**4,742,172**

**INTERMEDIATES FOR SYNTHESIZING PHARMACEUTICALLY ACTIVE 3,7-DIAZABICYCLO-(3,3,1)-NONANE COMPOUNDS**

**Uwe Schoen, Hanover; Bernd Hachmeister, Isernhagen; Wolfgang Kehrbach, Hanover; Ulrich Kuehl, Gehrden, and Gerd Buschmann, Hanover, all of Fed. Rep. of Germany, assignors to Kali-Chemie Pharma GmbH, Fed. Rep. of Germany**

**Division of Ser. No. 759,351, Jul. 26, 1985, abandoned, which is a division of Ser. No. 532,762, Sep. 16, 1983, Pat. No. 4,550,112.**

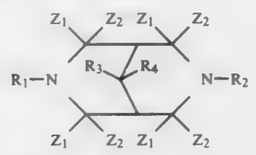
**This application May 27, 1987, Ser. No. 54,868**

**Claims priority, application Fed. Rep. of Germany, Sep. 18, 1982, 3234697**

**Int. Cl.[4] C07D** *471/08*

**U.S. Cl. 546—122** **15 Claims**

1. A compound represented by the formula I



I

wherein

$Z_1$ and $Z_2$ together form an oxygen,

$R_1$ and $R_2$ each denotes (A) a substituent which contains up to 12 carbon atoms and which is selected from the group consisting of alkyl, alkenyl, and alkynyl, or (B) a cycloalkyl group containing 3 to 6 carbon atoms which is attached to the nitrogen atom directly or by an alkylene group containing 1 to 3 carbon atoms or (C) hydrogen, and $R_3$ and $R_4$ each denotes an alkyl group containing up to 7 carbon atoms, or both together form an alkylene chain represented by the formula $—(CH_2)_n—$, wherein n is an integer ranging between 3 and 6, such that

(1) when $R_1$ and $R_2$ are hydrogen, then $R_3$ and $R_4$ are not methyl or ethyl and together do not form tetramethylene or pentamethylene;

(2) when only one of the substituents $R_1$ and $R_2$ is hydrogen and the other one is an alkyl selected from the group consisting of methyl and ethyl, then $R_3$ and $R_4$ are not methyl and at least one of $R_3$ and $R_4$ is not ethyl and $R_3$ and $R_4$ together do not form an alkylene chain, and;

(3) when both substituents $R_1$ and $R_2$ indicate substituents other than hydrogen, then the substituents $R_1$, $R_2$, $R_3$, and $R_4$ together contain at least 6 carbon atoms.

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**4,742,173**

**DITHIENE DERIVATIVE**

**Damien G. McDonnell, Malvern; Paul F. Gordon, Rochdale; Anthony J. Hughes, Malvern Link, and David J. Thompson, Whitefield, all of England, assignors to Imperial Chemical Industries PLC, London, England**

**Continuation of Ser. No. 635,162, Jul. 27, 1984, Pat. No. 4,668,811. This application Sep. 19, 1986, Ser. No. 909,247**

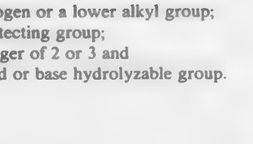
**Claims priority, application United Kingdom, Jul. 28, 1983, 8320389; Aug. 31, 1983, 8323359; Mar. 20, 1984, 8407246**

**The portion of the term of this patent subsequent to May 26, 2004, has been disclaimed.**

**Int. Cl.[4] C07F** *15/00, 15/09*

**U.S. Cl. 556—146** **3 Claims**

1. A compound of the formula



wherein

$R^1$ is $C_{4-9}$-alkyl;

$R^2$ is $C_{4-12}$-alkoxy when $R^3$ is H; or

$R^2$ is 4-$C_{1-6}$-alkyl when $R^3$ is $C_{1-6}$-alkyl; and M is nickel or platinum.

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**4,742,174**

**CEPHALOSPORIN COMPOUNDS**

**Toyonari Oine; Hiroshi Sugano, both of Nara; Yoshihisa Yamada, Kyoto; Totaro Yamaguchi, Urawa, and Satoshi Ohshima, Iwatsuki, all of Japan, assignors to Tanabe Seiyaku Co., Ltd., Osaka, Japan**

**Division of Ser. No. 835,886, Mar. 4, 1986, which is a division of Ser. No. 516,053, Jul. 21, 1983, Pat. No. 4,598,075. This application Oct. 17, 1986, Ser. No. 920,180**

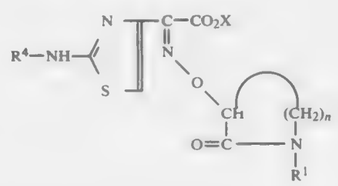
**Claims priority, application United Kingdom, Aug. 7, 1982, 8222823**

**The portion of the term of this patent subsequent to Jul. 1, 2003, has been disclaimed.**

**Int. Cl.[4] C07D** *417/12*

**U.S. Cl. 546—209** **5 Claims**

1. A compound of the formula:



wherein

$R^1$ is hydrogen or a lower alkyl group;

$R^4$ is a protecting group;

n is an integer of 2 or 3 and

X is an acid or base hydrolyzable group.



**4,742,175**

**PREPARATION OF POLYMORPHICALLY PURE TERFENADINE**

**Timothy G. Fawcett; Christian T. Goralski, and David W. Zietlow, all of Midland, Mich., assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio**

**Continuation of Ser. No. 860,619, May 7, 1986, abandoned. This application Jun. 30, 1987, Ser. No. 68,752**

**Int. Cl.[4] C07D** *211/22*

**U.S. Cl. 546—241** **11 Claims**

1. A process for preparing the higher-melting polymorph of terfenadine which comprises dissolving terfenadine in a water-miscible, lower alkanol, heating the solution at about its reflux temperature, slowly adding a sufficient quantity of water with stirring to effect substantial crystallization of terfenadine, cooling, and collecting the crystalline product.

9. A process for preparing the lower-melting polymorph of terfenadine which comprises dissolving terfenadine in a suitable solvent at about 0° C. to about 35° C., allowing the solvent to slowly evaporate and collecting the crystalline product.

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**4,742,176**

**PROCESS FOR 2-[(2-CHLOROPHENYL)METHYL]-4,4-DIMETHYL-3-ISOXAZOLIDINONE**

**Mariano A. Guiducci, Edison, and Matthew I. Levinson, East Brunswick, both of N.J., assignors to FMC Corporation, Philadelphia, Pa.**

**Filed Feb. 14, 1986, Ser. No. 829,337**

**Int. Cl.[4] C07D** *263/08*

**U.S. Cl. 548—243** **5 Claims**

1. A process for preparing an N-benzyl substituted isoxazolidinone, substantially free of azetidinone, which comprises

(i) cyclizing a 3-chloro-N-hydroxypropanamide with a base selected from alkaline and alkaline earth hydroxides, while maintaining the pH in a range of 7.5 to 9.5;

(ii) reacting the unisolated products of step i with a benzyl halide;

(iii) isolating and dehydrating the non-aqueous phase products from the products of step ii;

(iv) treating the products of step iii with at least 0.2 mole of anhydrous hydrogen chloride per mole of propanamide; and

(v) continuously treating the unisolated products of step iv with sufficient base, selected from alkaline and alkaline earth hydroxides and carbonates, to maintain the pH in a range of 7.5 to 9.5, for a period of one to three hours.

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**4,742,177**

**METHACRYLIC ACID ESTER**

**Yasushi Yamamoto; Hironao Fujiki; Hideto Kato, all of Takasaki, and Akira Yoshida, Annaka, all of Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan**

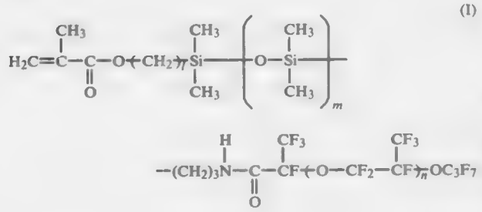
**Filed Jan. 29, 1987, Ser. No. 8,538**

**Claims priority, application Japan, Jan. 31, 1986, 61-19399**

**Int. Cl.[4] C07F** *7/10*

**U.S. Cl. 556—419** **3 Claims**

1. A methacrylic acid ester represented by General Formula (I):



(I)

wherein l is an integer of 1 to 3; m is an integer of 1 to 10; and n is an integer of 1 to 3.

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**4,742,178**

**LOW PRESSURE HYDROFORMYLATION OF DIENES**

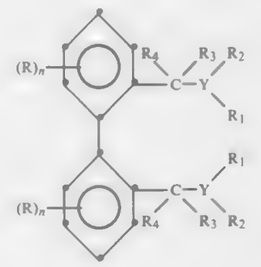
**Gregory O. Nelson, Kingsport, Tenn.; Thomas J. Devon, Longview, Tex.; Thomas A. Puckette, Longview, Tex.; Jerome L. Stavinoha, Longview, Tex.; Gerald W. Phillips, Longview, Tex., and Jeffrey J. Vanderbilt, Longview, Tex., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Nov. 10, 1986, Ser. No. 929,120**

**Int. Cl.[4] C07C** *45/50*

**U.S. Cl. 568—454** **10 Claims**

1. A hydroformylation process for preparing dialydehydes from dienes comprising contacting at least one $C_6$–$C_{10}$ diene in a reaction zone at a temperature of from about 20° C. to about 250° C. and a pressure of from about 15 psig to about 800 psig with hydrogen, carbon monoxide, and a catalyst comprising rhodium in chemical complex with one or more ligands of the formula



wherein:

n is 1–4;

each R is independently selected from hydrogen, alkyl, alkoxy, aryloxy, aryl, aralkyl, alkaryl, alkoxyalkyl, cycloaliphatic, halogen, alkanoyl, alkanoyloxy, alkoxycarbonyl, carboxyl or cyano;

each $R_1$ and $R_2$ is independently selected from alkyl, aryl, aralkyl, alkaryl or cycloaliphatic;

each $R_3$ and $R_4$ is independently selected from hydrogen and the $R_1$ substituents;

wherein each alkyl group or moiety is straight or branched chain of 1–20 carbons, each aryl group contains 6–10 ring carbon, and each cycloaliphatic group carbons from 4–6 ring carbons; and

each Y is independently selected from the elements N, P, As, Sb and Bi;

for a sufficient period of time to permit reaction of said olefin with said carbon monoxide and hydrogen to form aldehyde product.

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**4,742,179**

**CATALYTIC REMOVAL OF PEROXIDE CONTAMINANTS FROM TERTIARY BUTYL ALCOHOL**

**John R. Sanderson, Leander; Robert M. Gipson, Austin; Kenneth P. Keating, Georgetown, and Edward T. Marquis, Austin, all of Tex., assignors to Texaco Inc., White Plains, N.Y.**

**Filed Nov. 3, 1986, Ser. No. 926,159**

**Int. Cl.[4] C07C** *29/88, 27/26*

**U.S. Cl. 568—913** **20 Claims**

1. In a method for enhancing the motor fuel quality of a tertiary butyl alcohol contaminated with tertiary butyl hydroperoxide, ditertiary butyl hydroperoxide, acetone, methanol and isobutylene, the improvement comprising the steps of:

a. charging a reaction zone containing a catalyst with a feed consisting solely of said tertiary butyl alcohol feed stock

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and contacting said feedstock in said reaction zone with said catalyst at a temperature of about 80° to about 280° C. for a period of time sufficient to substantially selectively reduce said tertiary butyl hydroperoxide and said ditertiary butyl peroxide to tertiary butyl alcohol, and

b. recovering from the products of said reaction a tertiary butyl alcohol product containing not more than about 100 ppm of tertiary butyl hydroperoxide, not more than about 100 ppm of ditertiary butyl peroxide, not more than about 1 wt. % of isobutylene and not more than about 3 wt. % each of acetone and methanol,

c. the active metal of said catalyst being base-treated metal selected from the group consisting of vanadium, chromium, iron, nickel, and molybdenum.

**4,742,180**

## HYDROCARBON DEHYDROGENATION

**Anne M. Gaffney, West Chester, Pa., assignor to Atlantic Richfield Company, Los Angeles, Calif.**

**Filed Apr. 16, 1984, Ser. No. 600,735**

**Int. Cl.⁴ C07C** *5/327*

**U.S. Cl. 585—656** **5 Claims**

1. A method for dehydrogenating dehydrogenatable hydrocarbons which comprises:

(a) continuously introducing and contacting in a first zone at a temperature within the range of about 500°–1000° C. a gas comprising said hydrocarbon and a solid comprising:

(1) a support consisting essentially of a reducible oxide of Pr and

(2) at least one member of the group consisting of alkali metals, alkaline earth metals, and compounds thereof, said contacting producing dehydrogenated hydrocarbons, coproduct water and solids comprising a reduced Pr oxide;

(b) recovering dehydrogenated hydrocarbons;

(c) continuously removing solids comprising reduced Pr oxide from the first zone and contacting the reduced solids with an oxygen-containing gas in a second zone to produce solids comprising a reducible Pr oxide; and

(d) returning solids formed in the second zone to the first zone.



**4,742,181**

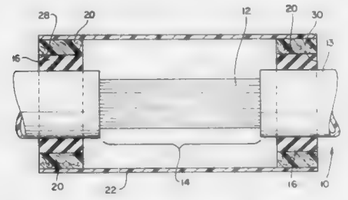
## AERIAL CABLE WITH CLOSURE DRAIN AND VENT AND METHOD OF FORMING SAME

**Zoltan B. Dienes, Annandale, assignor to Thomas & Betts Corporation, Bridgewater, N.J.**

**Filed Jan. 27, 1987, Ser. No. 7,837**

**Int. Cl.⁴ H02G** *1/02, 15/08*

**U.S. Cl. 174—16 R** **12 Claims**




1. In combination, an electrical cable having an exposed extent along its length and an apparatus for enclosing said exposed extent comprising:

an elongate cover disposed in circumscribing relation around said exposed extent of said cable, said cover having a pair of opposed ends with said cable passing therethrough, each of said ends of said cover and said cable defining an annular channel thereat, said cable and said cover further defining therebetween a continuous fluid passage between and through said ends of said cover; and

barrier means disposed in each of said annular channels, said barrier means being fluid permeable to permit ingress and egress of fluid into said passage and being solid impermeable to prevent entry of contaminants into said passage.

7. A method of covering an exposed central area of an elongate electrical cable comprising the steps of:

providing a longitudinal extent of a foraminous web, said web being fluid permeable and substantially solid impermeable;

disposing said web around said cable adjacent each side of said exposed area;

providing a cylindrical cover having a pair of opposed open ends;

disposing said cover over said exposed area with said open ends being adjacent said web, said web forming a fluid permeable barrier for said cover and

maintaining a continuous fluid permeable passage through and between said open ends of said cover.

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**4,742,182**

## FLATPACK FOR HERMETIC ENCAPSULATION OF PIEZOELECTRIC COMPONENTS

**Dieter Fuchs, Landshut, Fed. Rep. of Germany, assignor to Schott Glaswerke, Mainz, Fed. Rep. of Germany**

**Filed Nov. 6, 1986, Ser. No. 927,489**

**Claims priority, application Fed. Rep. of Germany, Nov. 7, 1985, 3539504**

**Int. Cl.⁴ H05K** *5/06*

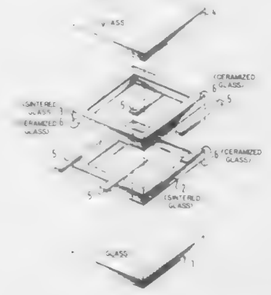
**U.S. Cl. 174—52 FP** **9 Claims**

1. A flatpack for hermetic encapsulation of a piezoelectric component, for use in surface mounting, including a base plate, a cover plate and placed between them, lamellar connecting leads into the flatpack, the improvement characterized in that:

the connecting leads are integral with a mounting unit,

the cover plate, the base plate and mounting unit are made of glass,

the cover plate, the base plate and the mounting unit are hermetically connected to one another by stable or ceramizing solder glass, and




the mounting unit includes two support frames of sintered glass, which are hermetically connected to one another by a ceramizing solder glass.

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**4,742,183**

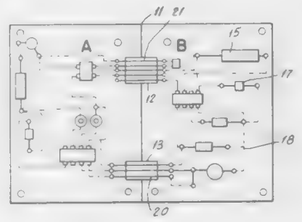
## METHODS AND TECHNIQUES FOR FABRICATING FOLDABLE PRINTED CIRCUIT BOARDS

**Richard Soloway, Lido Beach, and Richard Farrell, West Babylon, both of N.Y., assignors to Napco Security Systems, Inc., Copiague, N.Y.**

**Filed Oct. 24, 1986, Ser. No. 923,048**

**Int. Cl.⁴ H05K** *1/18*

**U.S. Cl. 174—68.5** **3 Claims**




1. A printed circuit board apparatus comprising:

a planar rigid board separated along a scored separation line across said board into first and second sections, said planar rigid board having first and second rectangular apertures symmetrically disposed about said scored separation line, with said first aperture being of a larger area than said second aperture, said first and second apertures each providing rectangular indentations along said scored separation line substantially extending into said first and second sections, said rectangular indentations defining notched rectangular indentations along said scored separation line in each of said first and second sections having a longitudinal extent along said scored separation line which taken separately and in combination is substantially less than the longitudinal extent of said scored separation line between said first and second sections, said board containing on a top surface a plurality of component terminals adapted to receive electrical components by automatic insertion means, and a bottom surface manifesting a plurality of conductive lead areas interconnecting said terminals in a circuit pattern with said apertures having terminals on both sides for both first and second sections with said terminals interconnected by large diameter conductor wires straddling said apertures, said conductor wires serving to interconnect said first and second

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sections and further serving as hinge members when said board is folded along said scored line to form first and second sections hinged together via said wires with said first aperture accommodating a greater number of wires than said second aperture, said conductor wires being present in sufficient number and having a diameter which is sufficient to support said first and second sections in a horizontal plane and define the position of each of said first and second sections with respect to the other.

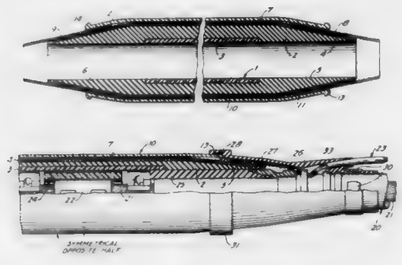
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**4,742,184**

## CONNECTOR WITH EXTERNAL PROTECTION INTERCONNECTING TWO INSULATED ELECTRIC CABLES AND FORMING A JUNCTION THEREBETWEEN

**Jean-Louis R. M. Courty, Danmartin en Goele, and Philippe C. A. David, La Varenne, both of France, assignors to Treficable Pirelli, Saint-Maurice, France**

**Filed May 27, 1987, Ser. No. 54,602**
**Int. Cl.[4] H02G** *15/188*
**U.S. Cl. 174—73 R** **9 Claims**



**1**. A junction between electric cables, comprising: two electric cables, each cable comprising at least one conducting core, insulation around the core, a conducting screen around the insulation and a protective sheath around said conducting screen, and a connector interconnecting said cables, said connector including,

first conductive means conductively interconnecting the core of one of said cables with the core of the other of said cables;

insulation means around said conductive means and extending from the insulation of one of said cables to the insulation of the other of said cables;

second conductive means around said insulation means and conductively interconnecting the conducting screen of one of said cables with the conducting screen of the other of said cables;

a protective tubular envelope of insulation around said second conductive means; and

a pair of tubular caps of insulation, one of said tubular caps extending around the protective sheath of one of said cables and to one end of said protective tubular envelope and the other of said tubular caps extending around the protective sheath of the other of said cables and to the other end of said protective tubular envelope, said tubular caps and said protective tubular envelope having snap fit means at their adjacent ends for sealing and mechanically interconnecting said tubular caps with said protective tubular envelope.

**6**. A junction body for use in forming a junction between a pair of electric cables, said body comprising:

a tubular body having at least a layer of insulation;

a conductive screen around said tubular body, said conductive screen having an axial length greater than the axial length of said tubular body;

a protective tubular envelope of insulation around and covering said conductive screen except for portions thereof at axially opposite ends thereof, said protective tubular envelope having cap engaging portions at its axially opposite ends of a diameter different from the portions of said envelope adjacent to said cap engaging portions.

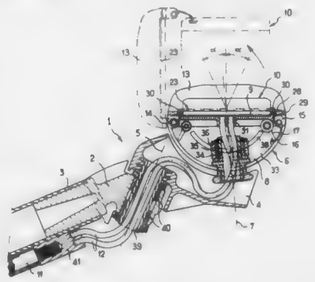
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**4,742,185**

## TROLLEY BUS HEAD

**Yves Pelletier, Les Mureaux, and Max Dumontet, Pantin, both of France, assignors to Delachaux S.A., France**

**Filed Nov. 18, 1986, Ser. No. 932,466**
**Claims priority, application France, Nov. 20, 1985, 85 17165; Jun. 20, 1986, 86 08936**
**Int. Cl.[4] B60L** *5/06*
**U.S. Cl. 191—59.1** **21 Claims**



**1**. A trolley bus head comprising a cradle swivel pivotally mounted at the end of a pole, a cradle mounted on the cradle swivel by means of a connection allowing oscillation about a substantially vertical axis and rocking about a substantially horizontal axis, said cradle receiving a replaceable wiper for transmitting current to a cable mounted on the pole via a shunt connected to the cradle, the head including the improvement whereby the cradle comprises a main body having a support and contact face for engaging a bottom portion of the replaceable wiper, and a moving portion which is latchable on said main body, said moving portion being hinged about an axis carried on said main body and having a longitudinal opening through which a top portion of the replaceable wiper passes, resiliently deformable means being provided for holding the replaceable wiper against the support and contact face when the moving portion is latched against the main body, wherein the replaceable wiper has two longitudinally extending fins at the bottom thereof for co-operating with the moving portion of the cradle in order to hold said replaceable wiper against the support and contact face using said resiliently deformable means.

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**4,742,186**

## SWITCH DEVICE WITH INTERLOCKING SLIDE

**Teiichi Miura, Furukawa, Japan, assignor to Alps Electric Co., Ltd., Japan**

**Filed May 9, 1986, Ser. No. 861,687**
**Claims priority, application Japan, May 9, 1985, 60-68333[U]**
**Int. Cl.[4] H01H** *9/20*
**U.S. Cl. 200—5 E** **5 Claims**

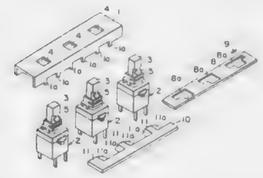
**1**. An interlocking switch device comprising:

a plurality of switches arranged spaced apart in a horizontal row each having a slide which is downwardly depressable against a biasing force, each said slide being provided with an operating portion, including a guide face and a stopping face, and a controlling portion which is spaced a first distance below the operating portion;

an interlocking cam having a plurality of engaging holes spaced apart in a row corresponding to respective ones of said slides of said switches, said interlocking cam being displaceable in a horizontal direction against a biasing force, wherein each operating portion of a slide of a respective switch is depressably engageable with a respective engaging hole of the interlocking cam such that when the slide is depressed, the guide face of the operating portion slidingly engages the engaging hole to displace the interlocking cam horizontally until the interlocking cam is returned by its biasing force to engage the stopping face of the operating portion to hold the switch in a depressed position, said switch being releasable to its original position upon depression of another switch by the operating portion of the other switch displacing said interlocking cam and disengaging it from the stopping face of the first-mentioned switch; and

an inhibiting member, for preventing simultaneous depression of more than one switch at a time, formed as a flat plate which is horizontally displaceable and is spaced a second distance below the interlocking cam, said plate





having a plurality of receiving portions projecting upwardly therefrom arranged in a horizontal row, each receiving portion being positioned between each adjacent pair of the switches and formed with a pair of tapered faces spaced apart a third distance on each side thereof, wherein said first, second, and third distances are arranged such that when the slide of one switch is depressed, the controlling portion thereof engages a tapered face of a corresponding receiving portion and displaces said inhibiting member horizontally, whereby another one of the switches is prevented from being depressed at the same time by blocking engagement of the controlling portion of the other switch with a tapered face of another corresponding receiving portion of the displaced inhibiting member.

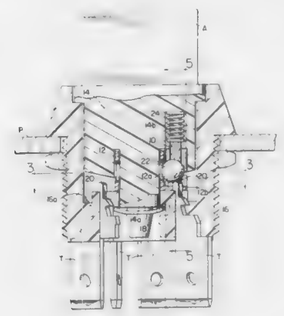
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**4,742,187**

## ROTARY SWITCH WITH COMMON CONTACT

**Richard W. Sorenson, Avon, Conn., assignor to Carlingswitch, Inc., West Hartford, Conn.**

**Filed Apr. 29, 1987, Ser. No. 43,690**
**Int. Cl.[4] H01H** *1/16, 19/54, 21/76*
**U.S. Cl. 200—11J** **10 Claims**



**1**. A rotary switch comprising a generally cylindrical dielectric body portion defining an upwardly open cavity of generally cylindrical shape, said cavity having a longitudinal axis, said body portion having a bottom wall defining a plurality of circumaxially spaced openings, fixed contacts provided in at least some of said openings such that upper ends of said fixed contacts are spaced radially between said cavity axis and the cylindrical cavity wall, a generally cylindrical dielectric control member rotatably received in said cavity, means for restraining said control member from movement axially in said cavity, said control member having at least one downwardly open retainer recess, said recess spaced radially from said axis a distance corresponding to the radial spacing of said fixed contact upper ends, a spherically shaped movable contact element loosely received in said retainer recess, a common contact connected to one of said fixed contacts and having an upwardly projecting wall portion spaced radially from said fixed contact upper ends, said common contact wall portion being of arcuate contour and in continuous contact with said spherically shaped contact element, said common contact wall portion having radially open recesses for receiving segments of said spherically shaped element such that angularly spaced positions are provided for said spherically shaped element wherein said spherically shaped element also contacts one of said fixed contact upper ends and, means biasing said spherically shaped element radially into one of said radially open recesses to provide a positive detent for supporting said spherically shaped element on said one fixed contact.

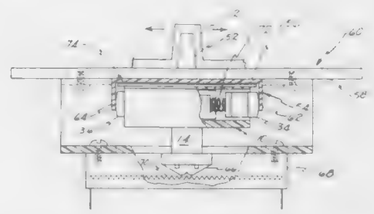
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**4,742,188**

## SLIDING ELECTRICAL CONTROL

**David L. Buehler, Bethlehem, and Michael J. Rowen, Emmaus, both of Pa., assignors to Lutron Electronics Co., Inc., Coopersburg, Pa.**

**Filed Mar. 24, 1987, Ser. No. 29,688**
**Int. Cl.[4] H01H** *15/00;* **H01R** *9/00*
**U.S. Cl. 200—16 R** **8 Claims**



**1**. A sliding electrical control comprising, in combination:

(a) a mounting plate having a first and second surface and an elongated slot through it;

(b) a stationary electrical conductor spaced apart from and supported by the mounting plate first surface;

(c) a slidable electrical conductor mounted for sliding parallel to the elongated slot, while maintaining electrical contact with the stationary electrical conductor;

(d) a switch between the mounting plate first surface and the slidable electrical conductor, coupled to the slidable electrical conductor and having two opposite ends that secure switch actuators facing in opposite directions, parallel to the elongated slot;

(e) a cap comprising

(i) a top section, between the mounting plate first surface and the switch, for sliding along the mounting plate first surface and

(ii) an end section adjoining each of the actuators for transmitting forces to operate the actuators and to slide the switch; and

(f) coupling means for transmitting a force through the slot to the cap.

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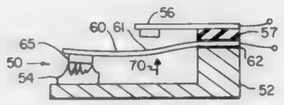


**4,742,189**

## VISCO-ELASTIC DELAYED ACTUATOR

**Robert E. Carter, Auburndale, Mass., and W. Porter Stone, Walpole, N.H., assignors to Piezo Electric Products, Inc., Cambridge, Mass.**

**Filed Dec. 12, 1986, Ser. No. 940,803**
**Int. Cl.[4] H01H** *7/00;* **G04C** *23/00;* **A01G** *27/00*
**U.S. Cl. 200—33 R** **25 Claims**




1. A visco-elastic delayed actuator mechanism, comprising:
a support section;
an actuator section;
visco-elastic adhesive means mounted to one of said sections and being engageable by the other of said sections to temporarily hold said actuator section in a first state; and
resilient means for urging said sections apart until the adhesive engagement is abruptly broken to switch said actuator to a second state.

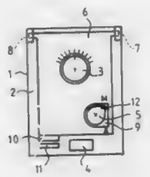
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**4,742,190**

## DEVICE FOR SELECTIVELY PREVENTING ONE OR MORE MODES OF ACTUATING MANUAL CONTROL MEMBERS EQUIPPING AN APPARATUS

**Bruno Jacquet, Rueill Malmaison, France, assignor to La Telemecanique Electrique, France**

**Filed Aug. 13, 1987, Ser. No. 84,729**
**Claims priority, application France, Aug. 14, 1986, 8611736**
**Int. Cl.[4] H01H** *9/22*
**U.S. Cl. 200—50 A** **7 Claims**



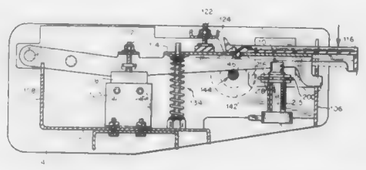

1. A device for selectively and/or partially preventing one or more actuating modes of at least one manual control member equipping one of the faces of the case of an apparatus, said member having multiple functions and being able to pass from a first position corresponding to a first function, to a second position corresponding to a second function and, from one at least of these two positions, to a third position corresponding to a third function, which device includes a cover mounted for pivoting on said case so as to be applied in the closed down position against said face, this cover being formed so as to allow manual access to the control member and including means for allowing this control member to change over from the first two positions to the third position, while preventing it from changing over from one to the other of these first two positions.

**4,742,191**

## KEYBOARD PROXIMITY SWITCH

**William Coleman, Holliswood, and Francis Albani, Floral Park, both of N.Y., assignors to Coleman Electrical Supply Co. Inc., Brooklyn, N.Y.**

**Filed Nov. 21, 1986, Ser. No. 933,701**
**Int. Cl.[4] H02B** *1/08;* **H01H** *9/08*
**U.S. Cl. 200—52 R** **21 Claims**



20. In an operator controlled keyboard having a plurality of at least partially metallic movable keys and a mechanical switch associated with each of said movable keys wherein a first normal position of said movable key produces a first output of said mechanical switch and a second depressed position of said movable key produces a second output of said mechanical switch, the combination with said movable key of a proximity switch wherein said mechanical switch is electrically disconnected from said keyboard and said proximity switch is correspondingly electrically connected to said keyboard, and wherein said first normal position of said movable key produces a first output of said proximity switch and said second depressed position of said movable key produces a second output of said proximity switch.

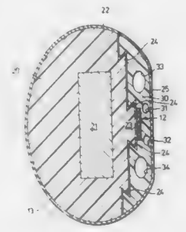
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**4,742,192**

## STEERING WHEEL RIM HORN BLOW MECHANISM

**Aaron B. Levine, Detroit, Mich., and George R. Moore, Glashuetten, Fed. Rep. of Germany, assignors to Saturn Corporation, Troy, Mich.**

**Filed Jun. 1, 1987, Ser. No. 56,232**
**Int. Cl.[4] H01H** *9/00*
**U.S. Cl. 200—61.57** **3 Claims**




1. A steering wheel having a rim containing relatively thin pressure switch for actuating a control circuit having an operable electrical device such as a horn, said switch comprising
a pair of spaced resilient insulator strips extending substantially parallel to each other mounted on a central ridge of said rim extending along an inside edge thereof, said strips having sufficient resiliency to be pressed together out of parallel upon applying localized pressure across the strips; a conductive coating on the inside face of each said strips and operable to make contact to complete the circuit upon pressing together of said strips;
an insulator ribbon sandwiched directly between said strips to space the strips apart, an adhesive coating on both sides of the insulator ribbon adhering to the adjacent conductive coating on said strips to form said switch into an integral unit and spaced, substantially circular openings along said ribbon to allow contact between the conductive coatings through said ribbon past said adhesive coatings when the strips are pressed toward each other; and
elastomeric means overlying said switch along the inside of said rim;
whereby upon applying finger pressure along the inside of the rim, the switch is operated to actuate the control circuit.

2. The steering wheel and pressure switch combination of claim 1, wherein said elastomeric means includes annular voids formed within the body thereof adjacent said switch to provide controlled resiliency upon applying finger pressure to operate the switch.

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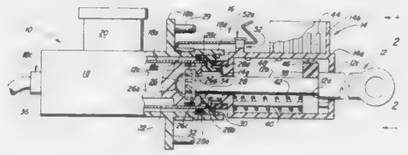


**4,742,193**

## RETAINING DEVICE FOR HYDRAULIC MASTER CYLINDER SWITCH

**Charles A. Kassin, deceased, late of Utica (by Marina Kassin, executrix), and David C. Barker, Utica, all of Mich., assignors to Automotive Products plc, Great Britain**

**Filed Jan. 14, 1987, Ser. No. 3,247**
**Int. Cl.[4] H01H** *3/14*
**U.S. Cl. 200—61.89** **12 Claims**



1. A master cylinder assembly comprising:
(A) a primary housing defining an elongated bore having a forward end and a rearward end, and including an outlet port adjacent said forward end of said bore;
(B) a piston slidably mounted in said bore and operative in response to movement of said piston in said bore toward said forward end thereof to eject fluid under pressure from said forward end of said bore through said outlet port;
(c) an elongated piston rod pivotally connected at the forward end thereof to the rearward end of said piston within said bore and projecting out of said rearward end of said bore at the rear end of said primary housing;
(D) a rigid switch housing slidably and rotatably mounted on said piston rod rearwardly of said primary housing;
(E) spring means biasing said switch housing for forward sliding movement on said piston rod toward the rear end of said primary housing;
(F) switching means within said switch housing actuated in response to sliding movement of said piston rod relative to said switch housing; and
(G) coacting means on said primary housing and on said switch housing operative to angularly locate said switch housing in a predetermined. position of rotation about a lengthwise axis of said piston rod.

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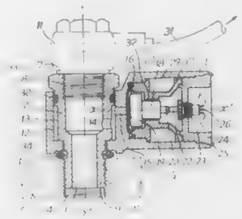
**4,742,194**

## DEVICE FOR PRODUCING AN ELECTRIC SIGNAL INDICATIVE OF PRESSURE IN A FLUID SYSTEM

**Andre Legris, Rennes, France, and Charles Columb, Le Landeron, Switzerland, assignors to Societe Anonyme Styled Legris, Rennes, France**

**Continuation of Ser. No. 706,856, Feb. 7, 1985, abandoned. This application Feb. 2, 1987, Ser. No. 938,161**
**Claims priority, application European Pat. Off., Jun. 19, 1984, 84/00153**
**Int. Cl.[4] H01H** *35/32*
**U.S. Cl. 200—83 J** **13 Claims**

1. A device for producing an electric signal indicative of pressure in a fluid system, said fluid system including a first apparatus and a pipe in fluid communication with said first apparatus, said device comprising:
a first hollow body in fluid communication with at least one of said first apparatus and said pipe through a control inlet defined in said first hollow body;
a second hollow body attached to said first hollow body, said second hollow body having a bore defining first axial cavity with a first internal diameter and a second axial cavity adjacent said first axial cavity with a second internal diameter less than said first internal diameter thus defining an inwardly-protruding lip between said first axial cavity and said second axial cavity;
an elastic membrane disposed within said second hollow body, having one side at least partially defining with said first hollow body a space in fluid communication with said control inlet, and movable by fluid pressure in said control inlet;
a mechanical force transmission member on another side of said membrane opposed to said one side of said membrane, said member having a first axial segment, with a first external diameter less than said first internal diameter and greater than said second internal diameter, disposed in said first axial cavity, and a second axial segment, with a second external diameter less than said second internal diameter, disposed in said second axial cavity, thereby defining a shoulder between said first axial segment and second axial segment, said member being thereby adapted to be movable by said membrane up to a limit where said shoulder contacts said lip;
wherein said bore of second hollow body further defines a substantially conical third axial cavity adjacent said second axial cavity, and an end portion adjacent said third axial cavity, wherein said electrical contactor is supported by said end portion, and wherein said device further comprises a conical spring arranged in said third axial cavity between said end portion and said second axial segment and surrounding said said contactor for urging said mechanical force transmission member toward said membrane;
and an electric contactor electrically connected to a source of electricity and having an element movable between a first position and a second position by said mechanical force transmission member,
whereby said electrical contactor produces said electric signal in accordance with a position assumed by said membrane in response to a pressure at said control inlet.



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**4,742,195**

## HIGH TEMPERATURE HERMETIC SWITCH

**Cal L. Bryant, Bartlett; David W. Vrona, Glen Ellyn; Dennis E. Francoeur, Glendale Heights, and Paul G. Janitch, Lombard, all of Ill., assignors to Magnetrol International Incorporated, Downers Grove, Ill.**

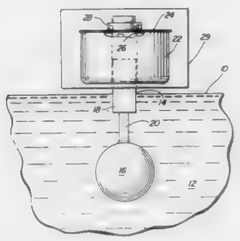
**Filed Dec. 2, 1985, Ser. No. 803,810**
**Int. Cl.[4] H01H** *9/04*
**U.S. Cl. 200—84 C** **11 Claims**

1. An electrical switch comprising:
a base;
a bearing surface on said base;

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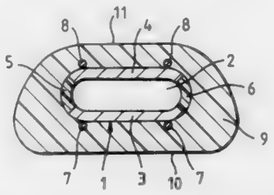
a flapper;
a coil spring under tension connected with said flapper and holding an end of the flapper seated on said bearing surface, said flapper pivoting on said bearing surface between first and second portions;
a switch actuator linearly movable in a direction generally at



right angles to the plane of said flapper and its pivotal axis, said actuator being operably associated with said spring to move the spring and swing the flapper between the first and second positions with an overcentered action;
an electrical contact on said flapper; and
fixed electrical contacts cooperating with said flapper contact in at least one of said first and second positions.

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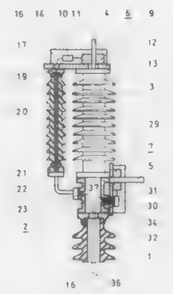
**4,742,196**
**ELONGATE PRESSURE-ACTUATED ELECTRICAL SWITCH**
**David I. Kelly, Wrexham, Wales, assignor to BICC Public Limited Company, London, England**
**Filed Sep. 18, 1987, Ser. No. 98,503**
**Claims priority, application United Kingdom, Sep. 19, 1986, 8622644**
**Int. Cl.[4] H01H** *3/16*
**U.S. Cl. 200—86 R** **18 Claims**



1. An elongate pressure-actuated electrical switch comprising a flexible tubular body of electrically insulating material having within its bore air or other electrically insulating fluid and incorporating at opposed locations around its periphery two sectoral portions of electrically conductive material, each of which sectoral portions extends throughout the radial thickness of the wall of the tubular body; at least one elongate electric conductor which extends lengthwise with respect to and is in electrical contact with one of said electrically conductive sectoral portions and at least one elongate electric conductor which extends lengthwise with respect to and is in electrical contact with the other of said electrically conductive sectoral portions, said electrically conductive sectoral portions having a conductivity less than that of the conductors; and, surrounding the flexible tubular body and elongate conductors, an overall outer sheath of electrically insulating material, which overall sheath has at least one substantially flat surface which is suitable for supporting the elongate electrical switch on a surface and which so positioned with respect to said electrically conductive sectoral portions of the flexible tubular body that one electrically conductive sectoral portion is at a position intermediate of said substantially flat surface of the outer sheath and the other electrically conductive sectoral portion.

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**4,742,197**
**HIGH-VOLTAGE SWITCH**
**Gerhard Mauthe, Birmenstorf, Switzerland, assignor to BBC Brown Boveri Ltd., Switzerland**
**Filed Mar. 4, 1987, Ser. No. 21,646**
**Claims priority, application Switzerland, Mar. 21, 1986, 1156/86**
**Int. Cl.[4] H01H** *33/54, 33/02*
**U.S. Cl. 200—148 B** **12 Claims**

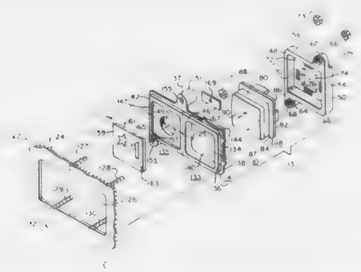


1. A high-voltage switch with a gaseous or liquid insulating medium, with at least one interrupter chamber (**3**, **3***a*) fixed on a central housing (**2**) supported by a hollow insulator column (**1**) with at least one measuring head (**6**, **7**) in the region of the at least one interrupter chamber (**3**, **3***a*), in which at least one sensor (**9**, **29**, **39**) picks up current-proportional measuring signals which can be transmitted at ground potential via at least one optical waveguide (**16**, **36**, **46**) for further processing, wherein
the at least one measuring head (**6**, **7**) is accommodated in a housing (**43**) suitable for fitting outside on the high-voltage switch, and
the at least one optical waveguide (**16**, **36**, **46**) is led pressure-tight through a closure cover (**38**) of a fitting opening into the central housing (**2**).

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**4,742,198**
**PUSH BUTTON ASSEMBLY HAVING AN ACTUATOR SUBASSEMBLY FIXED TO THE INNERSIDE OF A FACE PLATE**
**Adolf H. Martin, Glenview, Ill., and Thomas M. Hennessey, Kenosha, Wis., assignors to Adams Elevator Equipment Co., Skokie, Ill.**
**Filed Dec. 9, 1986, Ser. No. 939,836**
**Int. Cl.[4] H01H** *9/08*
**U.S. Cl. 200—296** **7 Claims**

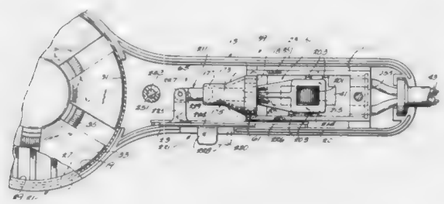
1. A push button assembly, comprising:
a halo;
said halo having first and second sides, a first opening which extends between said first and second sides, and first and second projections on said first and second sides, respectively, which surround said first opening,
a halo adapter;
said halo adapter having first and second sides, a recess, and a wall portion, with said recess extending inwardly from the first side, terminating at said wall portion which is adjacent to the second side,
said halo adapter being nested with said halo, with the second projection on the halo extending into the recess of the halo adapter,
a switch actuator captured between said nested halo and halo adapter to define a subassembly in which said switch actuator is movable between first and second axial limits defined by said halo and halo adapter, respectively,
an electrical switch snugly engaging said halo adapter and biasing said switch actuator to said first axial limit,
said switch actuator being accessible via the first opening in said halo for movement to said second axial limit and simultaneous actuation of said electrical switch,
a face plate having inner and outer major sides and an opening which extends between said sides,



said halo being snugly disposed in said face plate opening, with the first projection of said halo extending into the face plate opening, and with said switch actuator being accessible on the outer major side of said face plate,
and means fixing said subassembly and said electrical switch to the inner side of said face plate, whereby the halo and halo adapter are both stationary, and access is required to the inner side of said face plate to disassemble said subassembly.

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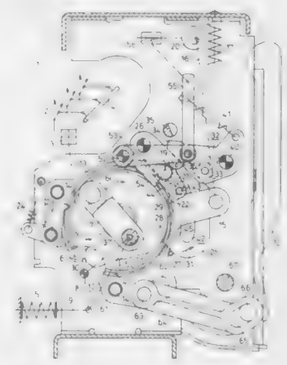
**4,742,199**
**HAND-HELD DRYER WITH WATERPROOF CHAMBER FOR ELECTRICAL SWITCH**
**Matthew L. Andis, and Richard Urbush, both of Racine, Wis., assignors to Outboard Marine Corporation, Waukegan, Ill.**
**Filed Feb. 9, 1987, Ser. No. 12,510**
**Int. Cl.[4] H01H** *9/04*
**U.S. Cl. 200—302.1** **20 Claims**



1. A hand held electrically operated appliance, such as a hair dryer, a hair clipper, a hair blower, a curling iron, or other similar device, said appliance comprising a handle including first and second handle pieces including respective wall means defining blind recesses located in opposing relation to each other, a resilient gasket disposed between said wall means to define, with said recesses, a waterproof switch chamber including therein an electrical switch, said gasket means including means affording water-tight passage into and from said chamber of an appropriate number of electrical leads, actuator means passing in water-tight relation through said gasket into said chamber, being operably connected to said switch, and being manually movable by an operator so that movement of said actuator means causes related movement of said switch between off and on positions, and means for fastening together said handle pieces to press said gasket between said wall means to prevent entry of moisture into said chamber.

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**4,742,200**
**ACTUATING DEVICE FOR A LOW-VOLTAGE CIRCUIT BREAKER WITH A RATCHET WHEEL**
**Ulrich Marquardt, and Ralf Seebold, both of Berlin, Fed. Rep. of Germany, assignors to Siemens Aktienfesellschaft, Berlin and Munich, Fed. Rep. of Germany**
**Filed Nov. 12, 1986, Ser. No. 929,918**
**Claims priority, application Fed. Rep. of Germany, Nov. 18, 1985, 3541093**
**Int. Cl.[4] H01H** *3/30*
**U.S. Cl. 200—325** **7 Claims**



1. An actuating device for a low-voltage circuit breaker comprising a ratchet wheel having teeth, said ratchet wheel being rotated step-wise by a reciprocating arrangement comprising a rotatably mounted carrier and a transport ratchet supported on the carrier, said transport ratchet engaging the teeth of said ratchet wheel, said ratchet wheel provided for cocking an energy accumulator, and further comprising a cam wheel connected to the ratchet wheel, the ratchet wheel adapted to be blocked, with the energy accumulator cocked, by a blocking lever and a latching device cooperating with the blocking lever in a position beyond dead center with respect to the direction of force of the energy accumulator at the ratchet wheel against rotation in the direction of releasing the energy accumulator, the blocking lever being supported tiltably on a fixed pivot between a rest position and a blocking position, the cam wheel and the blocking lever having working surfaces cooperating such that the blocking lever is biased into the blocking position by the cam wheel at a particular point in the rotation of said ratchet wheel when said energy accumulator is sufficiently cocked, the blocking lever further having an operating surface for lifting the transport ratchet from the teeth of the ratchet wheel.

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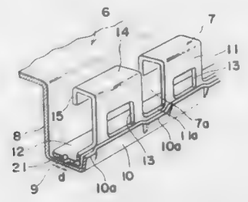
**4,742,201**
**DOOR ASSEMBLY FOR MICROWAVE HEATING APPARATUS**
**Okihiko Nakano, Nara, and Yohzoh Ishimura, Kashihara, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**
**Filed Nov. 19, 1985, Ser. No. 799,737**
**Claims priority, application Japan, Nov. 20, 1984, 59-244966; Nov. 20, 1984, 59-244967; Jan. 14, 1985, 60-4278**
**Int. Cl.[4] H05B** *6/76*
**U.S. Cl. 219—10.55 D** **3 Claims**

1. A heating apparatus employing high frequency electromagnetic wave energy, said apparatus comprising:
a heating chamber in which the high frequency electromag-

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netic wave energy is employed for heating, said heating chamber having an access opening thereto;
a door hinged to said heating chamber for opening and closing over said access opening, the periphery of said door surrounding said access opening when said door is closed,
at least a portion of said periphery comprising an inner side wall extending away from said heating chamber, a bottom wall continuous with and extending from said inner side wall, and an outer side wall continuous with and extending from said bottom wall back toward said heating chamber thereby defining a groove facing and open to said heating chamber; and
a generally elongated metallic element fixed to the periphery of said door in said groove and defining with said groove an attenuator for attenuating electromagnetic wave en-




ergy leaking from said heating chamber out said access opening surrounded by the periphery of said door,
said elongated metallic element comprising a base extending along said bottom wall, a lateral wall continuous with and extending from said base toward said heating chamber and abutting said outer side wall where said outer wall extends from said bottom wall, a rear wall continuous with and extending from said lateral wall toward said inner side wall, and a partition wall continuous with and extending from said rear side wall,
said partition wall, said rear wall, and said lateral wall having a plurality of spaced apart recesses each of which extends continuously through said partition wall and said rear wall and said lateral wall to respective locations spaced on said lateral wall above said base whereby a plurality of projections of said elongated metallic elements are defined between said spaced apart recesses.

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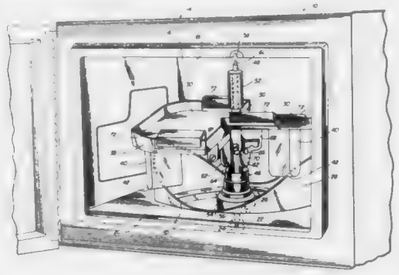
**4,742,202**

## MICROWAVE APPARATUS FOR HEATING CONTAINED LIQUID

**Nancy L. Campbell; John G. Pinto; John A. Drewe, all of San Diego, Calif.; Gerald W. Ghing, Kaneohe, Hi., and Franklin R. Borkat, La Mesa, Calif., assignors to The United State of America as represented by the Secretary of the Navy**

**Filed Jun. 20, 1983, Ser. No. 506,169**
**Int. Cl.⁴ H05B** *6/78*
**U.S. Cl. 219—10.55 F** **4 Claims**

1. An apparatus for thawing containers of frozen liquid comprising:
a microwave oven which has a cavity for receiving the containers of frozen liquid,the cavity having a top and a bottom which are defined by an oven ceiling and an oven floor respectively;
generally circular track means fixedly mounted on said floor within the oven cavity and having a plurality of peaks and valleys;
a plurality of trays for supporting the containers of frozen liquid, each tray having a pair of downwardly and radially extending projections;
means pivotally supporting the trays within the oven cavity with the tray projections in engagement with the track means, the pivotally supporting means including a shaft which extends upwardly within the oven cavity and a universal joint which connects each tray to the shaft at a position above the track means;
said shaft having top and bottom portions which are threaded together so that the shaft can be lengthened or shortened;
the ceiling of the oven having a hole for receiving a top portion of the top portion of the shaft; and



the lengths of the top and bottom shaft portions and the threading of the two sections enabling extension of the top shaft portion into the ceiling hole for support or withdrawal therefrom; and
means located within the oven for rotating the trays with respect to the track means.

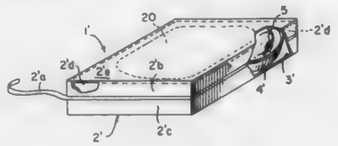
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**4,742,203**

## PACKAGE ASSEMBLY AND METHOD FOR STORING AND MICROWAVE HEATING OF FOOD

**Richard K. Brown, Appleton, and Oscar E. Seiferth, Madison, both of Wis., assignors to James River-Norwalk, Inc., Norwalk, Conn.**

**Division of Ser. No. 738,490, Jun. 21, 1985, Pat. No. 4,612,431, which is a division of Ser. No. 637,057, Aug. 2, 1984, Pat. No. 4,555,605. This application Sep. 16, 1986, Ser. No. 907,973**
**The portion of the term of this patent subsequent to Nov. 26, 2002, has been disclaimed.**
**Int. Cl.⁴ H05B** *6/64*
**U.S. Cl. 219—10.55 E** **4 Claims**




1. A food package assembly for use in heating a predetermined quantity of food in a microwave oven having a support surface, comprising:
(a) heating means for converting microwave energy into heat, said heating means including a microwave interactive layer; and
(b) packaging means for combining together said heating means and the predetermined quantity of food in a package assembly constructed in a manner enabling it to be disposed in a first configuration for shipping and a second configuration for cooking, said package assembly in said first configuration having the quantity of food disposed within said packaging means and said package assembly in said second configuration having the quantity of food positionally rearranged relative to said packaging means and with said quantity of food being supported in heat transfer relation with respect to said microwave interactive layer above an air filled space that is formed by a heating stand portion of said packaging means for promoting even cooking of the food when said portion of the packaging means is situated upon a support surface of a microwave oven;
wherein, for enabling said package assembly to be manipulated from said first configuration to said second configuration, said packaging means comprises an outer package body having a top wall portion interconnected with a bottom wall portion by a plurality of side wall portions, and means for partially severing one of said top and bottom wall portions from the other in a manner enabling removal of said quantity of food from said package body while leaving a hinge-like interconnection between said one of the top and bottom wall portions and a remaining part of the outer package body; said remaining part being comprised of the other of said top and bottom wall portions and side wall portions, and being capable of serving as said heating stand portion upon which said quantity of food is supported in heat transfer relation with respect to said microwave interactive layer.



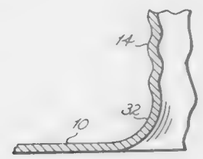
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**4,742,204**

## LEAD WELDING PROCESS, APPARATUS AND PRODUCT

**Clifton H. Canter, Jr., 246 Huntley Dr., and Christopher L. Canter, P.O. Box 1915, both of Lake Placid, Fla. 33852**

**Filed May 2, 1985, Ser. No. 729,655**
**Int. Cl.⁴ B23K** *9/225*
**U.S. Cl. 219—60 R** **3 Claims**




1. A lead (Pb) flashing having an elongated hollow lead cylinder with a circular base meeting a flat lead sheet at a joint, said sheet having a circular opening therein generally coextensive with said circular base of said cylinder, and said joint being at an angle of 45 degrees to said flat sheet and said cylinder and having an overlapped portion of said flat sheet and said cylinder, produced by a process comprising the steps of:
forming a flare on one end of said hollow lead cylinder;
supporting said lead sheet at an angle to a horizontal plane;
said lead sheet having a circular opening therein generally coextensive with said circular base of said cylinder;
placing the flared end of said lead cylinder against said lead sheet concentrically with said circular opening of said lead sheet;
forming a mating flare on said lead sheet by forcing said flared end of said lead cylinder against said lead sheet, whereby said flare on said lead cylinder and said flare on said lead sheet are juxtaposed and have an overlapped portion;
rotating said juxtaposed flat sheet and cylinder;
striking an arc between an electrode and said juxtaposed and overlapped flares in the presence of an inert gas; and
maintaining said arc through a complete revolution of said juxtaposed and overlapped flares, whereby a joint is formed through said overlapped portion.

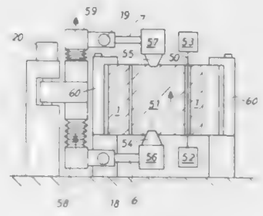
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**4,742,205**

## METHOD AND DEVICE FOR POSITIONING A METALLIC PIECE ON A MACHINE-TOOL, AND USE OF THE METHOD

**Michel Vuichard, Vallery, France, assignor to Charmilles Technologies S.A., Geneva, Switzerland**

**Filed Jul. 3, 1986, Ser. No. 881,892**
**Claims priority, application Switzerland, Jul. 4, 1985, 2896/85**
**Int. Cl.⁴ B23H** *1/00, 7/26*
**U.S. Cl. 219—69 M** **23 Claims**




1. A method for holding and positioning an electrically conductive workpiece on a machine tool, said workpiece being a separate piece to be machined, an offcut portion to be separated from a blank, or a sinking tool to be shaped, said method comprising sinking by electrical discharge machining at least one recess in at least one face of the workpiece by means of an electrode tool having a tip, and holding the workpiece by engaging said tip in the recess.

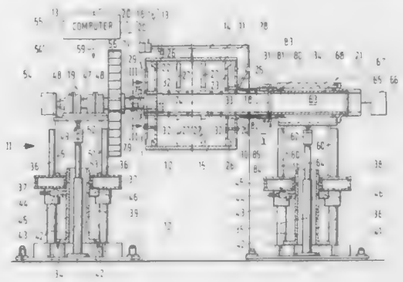
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**4,742,206**

## APPARATUS FOR LASER-MACHINING A BODY HAVING A CYLINDRICAL SURFACE

**Fred Dietterich, Erkenbrechtsweiler, and Dieter Butenuth, Dettingen, both of Fed. Rep. of Germany, assignors to Elcede GmbH, Kirchheim/Teck, Fed. Rep. of Germany**

**Filed Apr. 17, 1987, Ser. No. 39,212**
**Claims priority, application Fed. Rep. of Germany, Apr. 25, 1986, 3614082**
**Int. Cl.⁴ B23K** *26/00*
**U.S. Cl. 219—121 LG** **25 Claims**




1. Laser-machining apparatus comprising a stand having two longitudinally spaced supporting means and longitudinally extending guide means between said supporting means, a laser slidably mounted to said guide means for beam discharge transverse to the longitudinal direction of said guide means, mounting means for supporting a cylindrical-shell workpiece for rotation about its axis, said axis extending longitudinally and being spaced from and parallel to said guide means and said laser-beam discharge being directed toward the outer surface of the workpiece and in the direction toward said axis; said mounting means comprising aligned longitudinally spaced mounting shafts each of which is mounted for rotation in a

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different one of said supporting means, whereby adjacent ends of said shafts are longitudinally spaced, and workpiece-carrier means adapted for removable positioning in the space between said shafts and connectable to the respective adjacent ends of said shafts; rotary-drive means connected to one of said shafts for common rotation of said mounting shafts and of said workpiece-carrier means; linear-drive means for positioning said laser along said guide means; an incremental length-measuring device for indicating the position of said laser along said guide means, and an incremental angle-measuring device for indicating the angular position of said mounting means about said axis of rotation; and a programmable computer connected to control said linear-drive means and said rotary-drive means in accordance with a given program and as a function of the data of said incremental length-measuring and angle-measuring devices.

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**4,742,207**

## MULTILAYER WELDING METHOD

**Seiichiro Nakashima; Kenichi Toyoda, both of Hino; Shinsuke Sakakibara, Komae, and Tatsuo Karakama, Hino, all of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan**

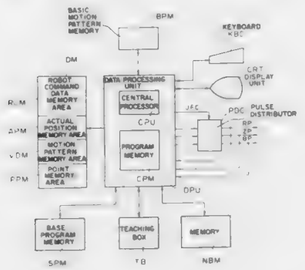
**PCT No. PCT/JP85/00069, § 371 Date Oct. 15, 1985, § 102(e) Date Oct. 15, 1985, PCT Pub. No. WO85/03783, PCT Pub. Date Aug. 29, 1985**

**PCT Filed Feb. 20, 1985, Ser. No. 795,278**

**Claims priority, application Japan, Feb. 20, 1984, 59-029887**

**Int. Cl.⁴ B23K** *9/12*

**U.S. Cl. 219—125.1** **4 Claims**




1. A scaling method in an automatic welding machine equipped with a robot control unit for controlling a robot grasping a welding torch, the robot control unit obtaining taught positions from a taught scaling starting point onward on the basis of taught position data indicative of primary welding points P1, . . . Pn of a welding workpiece and an offset width, to perform multi-layer welding, said method comprising the steps of:

(a) entering position data indicative of any three points on a surface of the workpiece and storing the position data in memory using the robot control unit;

(b) computing the direction of a normal vector n of the workpiece surface and an amount fo shift in the direction based on the position data indicative of the three points on the workpiece surface using the robot control unit; and

(c) correcting scaling points corresponding to the primary welding points on the basis of the direction of the normal vector n and the amount of shift in the direction, using the robot control unit.

**4,742,208**

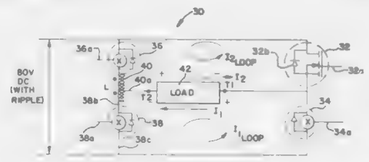
## WELDING SYSTEM WITH ELECTRONIC CONTROL

**John A. Overman, Bolingbrook, Ill., assignor to ESAB Welding Products, Inc., Chicago, Ill.**

**Filed Oct. 14, 1986, Ser. No. 918,014**

**Int. Cl.⁴ B23K** *9/10*

**U.S. Cl. 219—137 PS** **12 Claims**




1. A method of supplying variable output power and an output current to an output electrode and selected, adjacent metal members comprising:

providing a source of varying input voltage and current of a selected period;

transforming the input voltage and current to a selected direct voltage and current;

establishing an output current polarity determining signal with a period related to the input period;

switching the selected direct voltage and current to form the output current only during selected, spaced-apart time intervals within a portion of each period of the polarity determining signal;

varying the output power by adjusting the spaced-apart switching time intervals;

supplying the switched voltage and current to the electrode and the selected metal members; and

forming an electrical loop for supplying output current during other selected, spaced-apart time intervals, to the electrode and the selected metal members such that an arc is maintained between the electrode and the metal members.

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**4,742,209**

## GLOW PLUG FOR DIESEL ENGINE

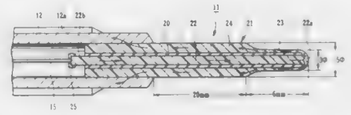
**Sokichi Minegishi; Mitsuke Masaka; Koji Hatanaka, all of Higashimatsuyama; Kenzi Maruta, and Hirohisa Suwabe, both of Kumagaya, all of Japan, assignors to Jidosha Kiki Co., Ltd. and Hitachi Metals, Ltd., both of Tokyo, Japan**

**Filed Jun. 12, 1986, Ser. No. 873,668**

**Claims priority, application Japan, Jun. 27, 1985, 60-139118**

**Int. Cl.⁴ F02N** *17/00;* **F23Q** *7/22*

**U.S. Cl. 219—270** **10 Claims**




1. A glow plug for a diesel engine provided with an elongated ceramic heater retained by an opening end of a hollow holder with one end of said ceramic heater being projected toward the outside, said ceramic heater comprising an electrically insulating tubular section of an insulating ceramic material, and a heating body as a continuous electrically conductive section formed so as to cover the outer peripheral portion, the outermost end portion and the hollow portion of said insulating tubular section with a conductive ceramic material, the thickness of at least the outer peripheral portion of said heating body in the vicinity of said one end of said ceramic heater being thinner than that of other portions thereof, said insulating tubular section and said heating body constituting said ceramic heater being integrally formed with a ceramic material having an insulating property and a conductive property selectable by adjusting the amount of the titanium nitride added into $\beta$- sialon or a sialon consisting of a mixture of $\alpha$- and $\beta$-sialons.



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**4,742,210**

## ELECTRIC HEATING APPARATUS HAVING A UNIVERSAL ELECTRICAL CONNECTOR

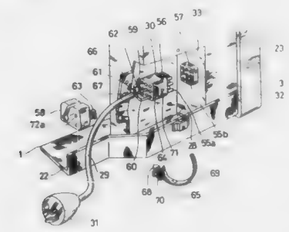
**Yuji Tsuchiyama, Nitta; Yoshiki Ikari, Ashikaga, and Yamada Wazou, Ohizumi, all of Japan, assignors to Sanyo Electric Co., Ltd., Japan**

**Filed Oct. 21, 1986, Ser. No. 921,955**

**Claims priority, application Japan, Oct. 23, 1985, 60-162269[U]; Apr. 30, 1986, 61-65585[U]; Apr. 30, 1986, 61-65586[U]; May 6, 1986, 61-67806[U]**

**Int. Cl.⁴ H05B** *3/62*

**U.S. Cl. 219—541** **4 Claims**




1. An electric heating apparatus having a universal electrical connector comprising

a plurality of electric heaters, at least two supplying cords for supplying electric power to said heaters, a ground cord, a plug with blades;

said blades of the plug fitting a wall receptacle having a configuration corresponding to the maximum current capable of flowing safely through a branch circuit;

a first end of each of said supplying cords and ground cord are connected to each of said blades;

said connector consisting of separable first and second members;

said first member having a plurality of contacts and at least one conductor,

a second end of each said supplying cords and ground cord and at least three said contacts being connected to said first member of said connector,

said conductor electrically short-circuiting some of said contacts selected so as to correspond to a size and arrangement of said blades and forming a part of an electrical circuit for energizing the predetermined heater

said second member having contacts connected only with predetermined contacts of said first member,

said contacts of said second member forming a part of said circuit for energizing said predetermined heaters, and

said predetermined heater can be energized through said connector.

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**4,742,211**

## ELECTRICAL RESISTANCE HEATER

**John F. Gilbert, Calle Santa Marta 6, Javea Provincia de Alicante, Spain**

**Filed Jan. 5, 1987, Ser. No. 476**

**Claims priority, application United Kingdom, Jan. 4, 1986, 8600139**

**Int. Cl.⁴ H05B** *3/44, 3/50*

**U.S. Cl. 219—544** **15 Claims**

1. An electrical resistance heater comprising a planar structure having at least one heating element comprising a casing containing resistance heating wire embedded in a matrix of a material of good thermal conductivity and having an upper radiating surface which is provided with a series of convolutions with lowermost portions which communicate with openings extending through said heater between said convolutions.




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**4,742,212**

## FLEXIBLE HEATING WIRE

**Kazunori Ishii, Nara; Yoshio Kishimoto, Osaka, and Shuji Yamamoto, Nara, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan**

**Division of Ser. No. 609,216, May 11, 1984, Pat. No. 4,575,620. This application Nov. 12, 1985, Ser. No. 797,155**

**Claims priority, application Japan, May 11, 1983, 58-80771; May 18, 1983, 58-86927; May 18, 1983, 58-86928; Oct. 20, 1983, 58-196312; Oct. 20, 1983, 58-196314**

**Int. Cl.⁴ H05B** *3/34*

**U.S. Cl. 219—549** **7 Claims**



1. A flexible heating wire comprising a tubular heating body having a positive temperature coefficient and having inner and outer surfaces, second and third conductive bodies wound on said inner or outer surface of said tubular heating body in spaced relation to each other, a thermally fusible electrically insulative body disposed on said inner or outer surface of said tubular heating body in contact with said second and third conductive bodies and said heating body, and a first conductive body disposed on said thermally fusible electrically insulative body remotely from said second and third conductive bodies, said second and third conductive bodies being electrically contactable with each other to electrically disconnect the heating wire in the event that the thermally fusible electrically insulative body is thermally fused.

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**4,742,213**

## CREDIT CARD READING APPARATUS WITH RELIABLE OPTICAL PATH INTERRUPT MEANS

**Curtis T. Conant, Rancho Palos Verdes, Calif., assignor to American Magnetics Corporation, Carson, Calif.**

**Filed May 23, 1985, Ser. No. 737,197**

**Int. Cl.⁴ G06K** *7/10, 13/067*

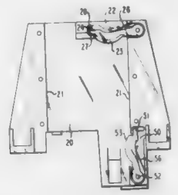
**U.S. Cl. 235—449** **6 Claims**

1. A card reader including a channel-defining support means for receiving a card, first arm means mounted in a first position on a first face of said support means and adapted to pivot about a pivot point to a second position in response to the presence of said card in said channel, said reader also including light path

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defining means on a second face of said support means, said support means including a slot positioned at an end of said arm means remote from said pivot point, said arm means including an orthogonal portion extending from said remote end, said



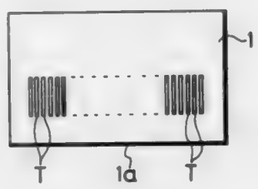
orthogonal portion being adapted to extend through said slot in a manner to interrupt a light path defined by said light path defining means when said arm means is moved to said second position.

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**4,742,214**
**OPTICAL CARD READER**

**Shoei Kobayashi, Shinagawa, Japan, assignor to Sony Corporation, Tokyo, Japan**

**PCT No. PCT/JP86/00005, § 371 Date Sep. 8, 1986, § 102(e) Date Sep. 8, 1986, PCT Pub. No. WO86/04436, PCT Pub. Date Jul. 31, 1986**
**PCT Filed Jan. 10, 1986, Ser. No. 908,700**
**Claims priority, application Japan, Jan. 18, 1985, 60-6855; Jan. 21, 1985, 60-8691**
**Int. Cl.⁴ G06K** *7/14*
**U.S. Cl. 235—454** **5 Claims**



**1.** An optical card reader, comprising a light source for producing a reading light for irradiating a track of an optical card in which information signals are recorded respectively on a plurality of parallel tracks by the arrangement of optically recorded loci, whereby the information signals can be read out from said track, a photo detecting element for reading the information recorded on said track by receiving reflected light from said optical card, a lens for projecting the reflected light from said optical card onto said photo detecting element, scanning means having a scanning period whereby said photo detecting element scans each of said tracks a plurality of times, effective scanning detecting means connected with said detecting element for detecting an effective scanning capable of reading said information signals from said plurality of scannings of said track by said photo detecting element, and extracting means connected with said detecting element and with said effective scanning detecting means for extracting an output signal of said photo detecting element only during one scanning period of said scanning means in response to the output of said effective scanning detecting means, said effective scanning detecting means comprising level detecting means for detecting when the output signal level of said photo detecting element becomes higher than a predetermined level, and delay means for delaying the output of said level detecting means, said delay means effecting a selected delay interval, during said plurality of scannings, in which the level of the output signal of said photo detecting element exceeds said predtermined value in at least one scanning period of said scanning means.

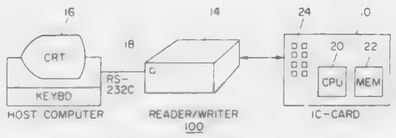
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**4,742,215**
**IC CARD SYSTEM**

**Turpen A. Daughters, Pinole, and Patricia A. McGinnis, San Anselmo, both of Calif., assignors to Personal Computer Card Corporation, New York, N.Y.**

**Filed May 7, 1986, Ser. No. 860,560**
**Int. Cl.⁴ G06K** *19/06*
**U.S. Cl. 235—487** **19 Claims**

**MICROFICHE APPENDIX INCLUDED**
**(2 Microfiche, 145 Pages)**



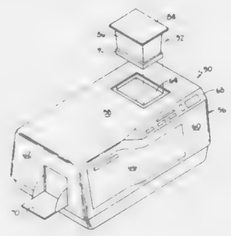

**1.** An IC information card comprising:
input/output means in the card for receiving at least data, commands and keycodes and for providing at least data;
nonvolatile read/write memory means within the card, the memory means having a multiplicity of addressable bit storage locations;
first means within the card responsive to a first command, zone definition data and an entered keycode received by the input/output means for comparing the entered keycode with a first keycode stored in the card and for writing the zone definition data in a first region of the memory means only if the received keycode matches the first keycode, the zone definition data comprising one or more zone definition words each corresponding to a respective data zone in a second region of the memory means, each zone definition word specifying at least the starting address of the corresponding data zone and the size of the corresponding data zone.

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**4,742,216**
**PHOTOGRAPHIC APPARATUS FOR TRANSMISSION ELECTRON MICROSCOPES**

**John B. Morse, Boston, and Joseph A. Stella, Peabody, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.**

**Filed Oct. 23, 1986, Ser. No. 922,259**
**Int. Cl.⁴ H01J** *1/00*
**U.S. Cl. 250—311** **6 Claims**



**1.** Photographic apparatus for use with transmission electron microscopes of diverse styles and in which an assembly of a film sheet and a carrier plate is transported within an evacuated chamber from a supply box, through an exposure station, to a receiver box, the carrier plates and receiver boxes of the respective microscope styles being uniquely configured and dimensioned for each respective microscope style, said apparatus comprising:



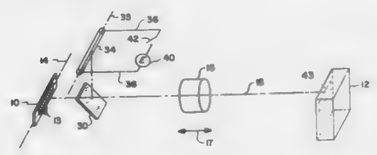
a plurality of film sheet carrier plates including one such carrier plate for each style of microscope with which the photographic apparatus is to be used, each said one such carrier plate having exterior dimensions and configurations required by a specific style of microscope, all of said plurality of carrier plates having a film sheet retention slip of the same configuration;
processor means for receiving all of said plurality of film sheet carrier plates and for converting latent microscope images to which individual film sheets have been exposed to observable images; and
a plurality of adapter means for transfering all such film sheet carriers from the receiver boxes of diversely styled microscopes to said processor means, said adapter means including one such adapter means for each style of microscope with which the photographic apparatus is to be used, each said one of said adapter means including an adapter body having a first surface for mounting on and releasable light tight coupling to a receiver box of one of said microscope styles and an opposite surface for mounting on and releasable light tight coupling to said processor means, and each said adapter body including an opening therein for passage of said carrier plates from said receiver box to said processor means when intercoupled by said adapter body.

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**4,742,217**
**PROJECTION ALIGNMENT AND FOCUSING AID**

**Dennis J. Wilwerding, Littleton, Colo., assignor to Honeywell Inc., Minneapolis, Minn.**

**Filed Jun. 2, 1986, Ser. No. 870,065**
**Int. Cl.⁴ G08C** *9/06*
**U.S. Cl. 250—201** **10 Claims**



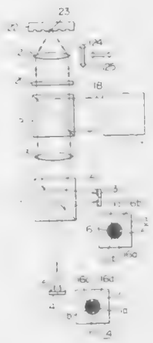
**1.** Apparatus for use with an array of radiation detectors which receive radiation from a remote object, the apparatus operable to provide an indication of the area of the remote object being viewed by the detectors comprising:
a source of radiation in the form of the array; and radiation transmitting means positioned between the detectors and the remote object at a position such that the source is in an optical position descriptive of the position of the array so that radiation from the source is transmitted to form an image on the remote object descriptive of the area; and
control means to terminate the image on the remote object, the radiation detectors thereafter operable to receive radiation from the area for subsequent operation.

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**4,742,218**
**FOCUS ERROR DETECTION APPARATUS UTILIZING FOCUSING AN FRONT AND REAR SIDES OF FOCAL PLANES**

**Shigeru Nakamura, Hachioji; Toshimasa Kamisada, Hiratsuka; Akira Saito, Odawara; Takeshi Maeda, Kokubunji; Yoshito Tsunoda, Mitaka; Toshimitsu Kaku, Sagamihara; Tuyoshi Kato, Hachioji; Masaaki Hishiki, Odawara, and Masateru Watanabe, Kanagawa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Feb. 11, 1986, Ser. No. 828,354**
**Claims priority, application Japan, Mar. 11, 1985, 60-46554; Mar. 29, 1985, 60-63578**
**Int. Cl.⁴ G01J** *1/20;* **G11B** *5/09*
**U.S. Cl. 250—201** **13 Claims**



**1.** A focus error detection apparatus comprising:
optical means for dividing a light coming from a light reflecting source into first and second focused light beams;
first and second photo-detectors disposed respectively on optical paths of said first and said second focused light in such a positional relation that variation in size of received light images of said focused light beams due to focus error appear in directions opposite to each other; and
circuit means for generating a focus error signal at least depending on the difference between outputs of said first and second photo-detectors;
wherein each of said first and second photo-detectors is divided into a first region receiving a central portion of said received light image, a second region and a third region located separately at opposite sides of said first region and receiving peripheral portions of said received light image, each of said first and second photo-detectors having at least two photoelectric transformation portions disposed respectively within said second and third regions, and said circuit means generating said focus error signal on the basis of the outputs of said photoelectric transformation portions.

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4,742,219

## APPARATUS FOR DETECTING THE FOCUSING STATE AND POSITIONAL ACCURACY OF A LIGHT BEAM DIRECTED ONTO AN OPTICAL DISK TRACKING GUIDE IN AN OPTICAL READ/WRITE SYSTEM

Hideo Ando, Tokyo, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

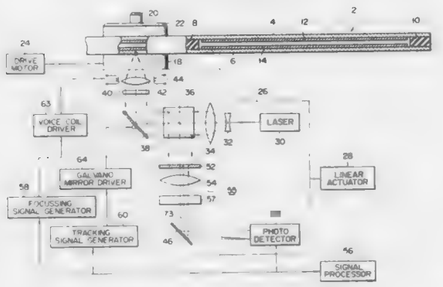
Division of Ser. No. 817,259, Jan. 8, 1986, Pat. No. 4,631,395, which is a continuation of Ser. No. 416,694, Sep. 10, 1982, Pat. No. 4,585,933. This application Aug. 29, 1986, Ser. No. 901,787

Claims priority, application Japan, Sep. 17, 1981, 56-146540; Sep. 17, 1981, 56-146542; Sep. 17, 1981, 56-146543; Oct. 22, 1981, 56-168966

The portion of the term of this patent subsequent to Apr. 29, 2003, has been disclaimed.

Int. Cl.[4] G11B 7/00

U.S. Cl. 250—201 2 Claims




1. An optical system for controlling a light beam which is directed onto a light reflecting surface having a tracking guide, comprising:

means for generating a light beam;

objective lens means for converging said light beam into a converged light beam having a beam waist, and for directing said converged light beam onto said light reflecting surface to produce a beam spot on said tracking guide, said objective lens means being in focus when said beam spot is substantially equal in size to said beam waist and being out of focus when said beam spot is larger than said beam waist, and for directing light reflected from said light reflecting surface, said directed light having a beam spot image with diffraction patterns which result from light reflected from said tracking guide;

means for transferring and deflecting said directed light;

astigmatism lens means, disposed in an optical path of said directed light, for passing said directed light therethrough; and

photodetecting means for receiving the deflected light and detecting the focus and tracking state of said converged light beam on said tracking guide, said photodetecting means including an arrangement having a plurality of photosensitive regions disposed to cause: (1) the beam spot in at least a portion of said deflected light to fall substantially equally on two of said photosensitive regions or equally on two groups of said photosensitive regions when said converged light beam is in focus on said tracking guide, (2) said beam spot in at least a portion of said directed light to fall predominantly into at least one of said photosensitive regions or one group of said photosensitive regions when said converged light beam is out of focus, (3) the diffraction patterns in at least a portion of said directed light to fall on said photodetecting means substantially in the center when said converged light beam is properly tracking said guide, and (4) said diffraction patterns in at least a portion of said directed light to fall off center in said beam spot in at least a portion of said directed light when said converged light beam is not properly tracking said tracking guide.

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4,742,220

## SYSTEM FOR OPTICAL SCANNING OVER A LARGE DEPTH OF FIELD AND OBTAINING HIGH RESOLUTION OF BAR CODES

David Beyor, Auburn, N.Y., assignor to Skan-A-Matic Corp., Elbridge, N.Y.

Filed Sep. 20, 1984, Ser. No. 652,988

Int. Cl.[4] G06K 7/10

U.S. Cl. 250—216 4 Claims



1. Bar code scanning apparatus comprising a photosensor, a plurality of incoherent light sources which project intensely luminous incoherent light on a bar code, and a light receiving system including a rectangular lens stop with the long axis of the lens stop aligned with the long axis of the bars of the bar code, said lens stop cooperating with a convex lens disposed between said lens stop and a rectangular receiving slit which defines an elliptical image on said photosensor to maximize the signal to noise ratio of the receiving system, and provide a large depth of field.

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4,742,221

## OPTICAL COORDINATE POSITION INPUT DEVICE

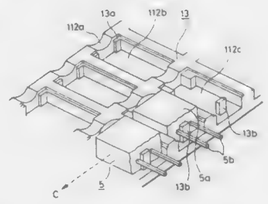
Hiroaki Sasaki; Kazuo Hasegawa, and Junichi Ouchi, all of Furukawa, Japan, assignors to Alps Electric Co., Ltd., Japan

Filed May 19, 1986, Ser. No. 864,703

Claims priority, application Japan, May 17, 1985, 60-105327; Aug. 2, 1985, 60-169690; Sep. 12, 1985, 60-138685[U]; Sep. 4, 1986, 60-134394[U]

Int. Cl.[4] G01V 9/04

U.S. Cl. 250—221 5 Claims




1. An optical coordinate input device comprising: a plurality of light emitting elements arranged in a row; a plurality of light receiving elements arranged in a row opposite the row of light emitting elements so as to form a plurality of light rays from each light emitting element to each corresponding light receiving element;

a holding frame for shielding and holding said row of light receiving elements in proper alignment to receive light from the corresponding light emitting elements, said frame being formed by a front wall having a plurality of light receiving openings each for receiving light ray from a corresponding light emitting element, a row of containing cavities in an interior portion of the frame in back of said front wall wherein a respective light receiving element is inserted in each one of said cavities, and a plurality of pressing portions projecting from a rear wall of said frame each for elastically pressing a rear part of a respective light receiving element into a corresponding cavity so that it is integrally fitted therein for proper alignment of the light receiving element; and

a circuit substrate mounted on the rear wall of said holding frame for electrically connecting respective terminals from each of the light receiving elements to an operating circuit.



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4,742,222

## SELECTIVE OPTICAL DETECTOR APPARATUS UTILIZING LONGITUDINAL CHROMATIC ABERRATION

György Rétfalvy; Péter Sugár, and Zoltán Zorkóczy, all of Budapest, Hungary, assignors to Tavkozlesi Kutato Intezet, Hungary

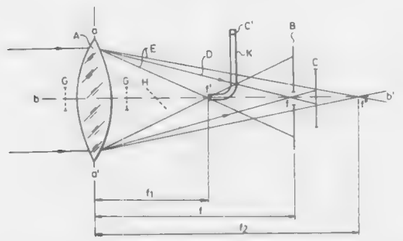
PCT No. PCT/HU85/00047, § 371 Date Mar. 19, 1986, § 102(e) Date Mar. 19, 1986, PCT Pub. No. WO86/01005, PCT Pub. Date Feb. 13, 1986

PCT Filed Jul. 23, 1985, Ser. No. 852,631

Claims priority, application Hungary, Jul. 23, 1984, 2842/84; Yugoslavia, Jul. 22, 1985, 1200

Int. Cl.[4] G01J 3/50

U.S. Cl. 250—226 6 Claims




1. A selective optical detector for detecting light in a predetermined wavelength range and received in a predetermined field of acceptance comprising:

a low reflection housing including an optical collector system exhibiting an essential chromatic aberration;

a sensor element sensitive for light rays of said wavelength range for translating light into electrical signals;

an aperture coupling said sensor element optically with said collector system and having a size and location substantially corresponding to the focal point surface of said light of said wavelength range and received in said field of acceptance;

a closing surface provided with said aperture and located between said collector system and said sensor;

means for directing said optical collector system to convey a narrow BW or monochromatic light emitted by an optical communication apparatus or reflected by a body illuminated by an optical locator via said aperture onto said sensor element;

and a means to move said aperture to said location of said focal point surface in dependence of said wavelength to be detected.

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4,742,223

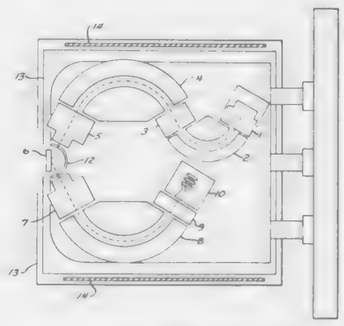
## HIGH RESOLUTION PARTICLE SPECTROMETER

Lawrence L. Kesmodel, Bloomington, Ind., assignor to Indiana University Foundation, Bloomington, Ind.

Continuation of Ser. No. 769,214, Aug. 26, 1985, Pat. No. 4,659,926. This application Oct. 15, 1986, Ser. No. 918,958

Int. Cl.[4] H01J 45/48

U.S. Cl. 250—305 5 Claims



3. A device for detecting with high-resolution the particle energy loss of a sample comprising:

a. monochromator means employing electrostatic deflection for selecting charged particles having substantially the same energy for impingement upon the sample, the monochromator means having a defined deflection plane and at least two stages, wherein the at least two stages operate at substantially the same pass energy;

b. particle source means for producing, collimating and focusing a beam of charged particles both in-plane and out-of-plane relative to the defined plane of the monochromator means; and

c. means for detecting the beam of charged particles after it is deflected from the sample to determine the particle energy loss of the sample.

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4,742,224

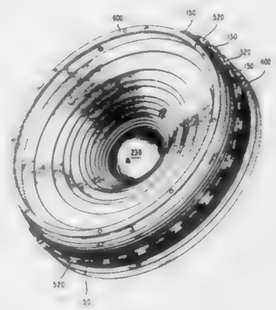
## CHARGED PARTICLE ENERGY FILTER

Steven Chu; Aly Dayem, both of Colts Neck, and Eric H. Westerwick, Aberdeen, all of N.J., assignors to American Telephone and Telegraph Company AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 22, 1986, Ser. No. 944,451

Int. Cl.[4] B01D 59/44; H01J 39/34

U.S. Cl. 250—305 4 Claims



1. Apparatus for creating a hemispherically shaped electric field for filtering charged particles comprising a plurality of

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metal rings concentric along a center line, each ring having a different inner radius from the center line and being insulated from each other of said plurality of metal rings, and means for applying a potential of substantially $V\alpha(1/r)$ to each of said plurality of metal rings where r is said inner radius from the center line.

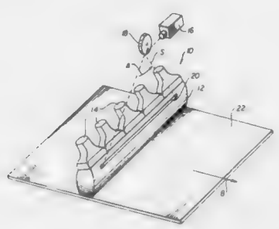
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**4,742,225**

## ELLIPTICAL CYLINDER LIGHT COLLECTOR FOR PHOTOSIMULABLE PHOSPHOR IMAGING APPARATUS

**Yali E. Chan, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Oct. 16, 1986, Ser. No. 919,357**
**Int. Cl.[4] G03C** *5/16*
**U.S. Cl. 250—327.2** **7 Claims**



1. A light collector for collecting and detecting light emitted from a raster scanned photostimulable phosphor sheet, comprising:

a cylindrical mirror box having specularly reflective internal surfaces, said mirror box defining a first opening for passing a beam of stimulating radiation through said mirror box, a second opening for passing the beam to the phosphor sheet and for allowing emitted light to enter the mirror box, and a third opening generally opposite the second opening for allowing emitted light to exit the mirror box; and

light detector means having a light receiving face located at said third opening, said cylindrical mirror box having a truncated elliptical cross section, said second and third openings truncating said elliptical cross section and being defined by first and second planes parallel to the cylinder axis and lying at 70° and 76° respectively to the major elliptical axis, and passing in the vicinity of first and second focal lines of the ellipse such that light emitted from the phosphor sheet in the vicinity of first focal line impinges on said light receiving face of said detector means in the vicinity of said second focal line after experiencing a single reflection.

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**4,742,226**

## RADIONUCLIDE IDENTIFICATION IN LIQUID SCINTILLATION COUNTING

**Stanley J. De Filippis, Naperville, Ill., assignor to Packard Instrument Company, Inc., Downers Grove, Ill.**

**Filed Sep. 13, 1985, Ser. No. 775,880**
**Int. Cl.[4] G01T** *1/204*
**U.S. Cl. 250—328** **10 Claims**

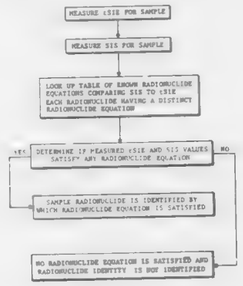
1. A liquid scintillation counting system for use with a test sample containing a radioactive nuclide together with a liquid scintillator such that the identity of a radionuclide may be ascertained as a function of a quench-indicating parameter of the sample, an external source quench-indicating parameter, and known radionuclide equations which comprises:

transducer means for converting energy released by the decay of radionuclides into electrical pulses proportional thereto;

signal processing means connected to said transducer means for eliminating pulses which do not fall within a predetermined time differential window so as to screen out pulses which are not related to the decay of a radionuclide;

quantizing means connected to the signal processing means for converting each pulse into a representative digital signal; and

processing means connected to receive digital signals from the quantizing means, said processing means including storage means for storing a single, predetermined radionuclide equation correlating a quench-indicating parameter of the sample and an external source quench-indicating




parameter for each of a series of desired radionuclides and said processing means storing data representative of an external source quench-indicating parameter of the test sample and a quench-indicating parameter of the test sample, and said processing means including means to determine if the data representative of the external source quench-indicating parameter of the test sample and the quench-indicating parameter of the test sample satisfy any one of the stored radionuclide equations so as to indicate the presence of the radionuclide of the equation that is satisfied.

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**4,742,227**

## MOBILE TYPE INSPECTION APPARATUS

**Toshio Takenaka, Kobe City, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan**

**Filed May 27, 1986, Ser. No. 867,214**
**Claims priority, application Japan, May 29, 1985, 60-114303; Aug. 2, 1985, 60-169734**
**Int. Cl.[4] G01J** *1/00;* **G01T** *1/00*
**U.S. Cl. 250—336.1** **13 Claims**

12. A mobile type inspection apparatus monitoring an environment, said inspection apparatus comprising:

a plurality of detecting devices having means for monitoring a condition within the environment and producing an output containing data as to a monitored condition;

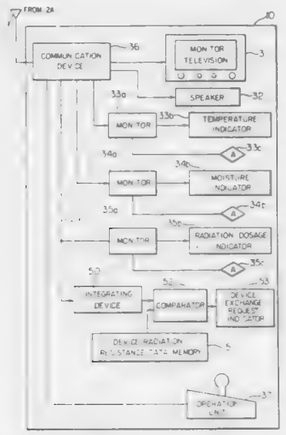
a transmitter transmitting signals representing the data as to the monitored condition produced by the detecting devices and based upon the outputs thereof;

a control means located remotely from the environment being monitored and having a receiver means for receiving the signals from the transmitter and producing output signals representing the data produced by the detecting devices;

said control means including monitor means receiving the output signals and indicating the monitored condition based upon the data produced by the detecting devices; and



said control means further including means receiving the output signals and determining degree of deterioration of




the detecting devices based upon the data produced by the detecting devices.

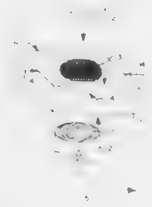
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**4,742,228**

## INFRARED MEASURING APPARATUS AND PROCESS FOR THE CONTINUOUS QUANTITATIVE DETERMINATION OF INDIVIDUAL COMPONENTS OF FLOUR OR OTHER GROUNDABLE FOOD PRODUCTS

**Bruno Bischoff, St. Gallen, Switzerland, assignor to Gebrüder Bühler AG, Uzwil, Switzerland**

**PCT No. PCT/EP85/00170, § 371 Date Dec. 9, 1985, § 102(e) Date Dec. 9, 1985, PCT Pub. No. WO85/04957, PCT Pub. Date Nov. 7, 1985**
**PCT Filed Apr. 15, 1985, Ser. No. 810,337**
**Claims priority, application Switzerland, Apr. 19, 1984, 1964/84; May 8, 1984, 2236/84; Fed. Rep. of Germany, Nov. 15, 1984, 3441856**
**Int. Cl.[4] G01N** *21/01*
**U.S. Cl. 250—341** **31 Claims**



1. In an apparatus for continuously determining parameters of a particulate material product, such as flour or other finely comminuted food product, which apparatus includes a tubular feed line for the product and transport means for transporting and pre-compressing said product during its transport through said feed line, the improvement consisting in that the feed line includes a measuring element containing a sensor for infrared measurement, and further including consolidating means for consolidating said product in the region of said sensor for infrared measurement so as to enable determination of said parameters as a function of sensor response.

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**4,742,229**

## PNEUMATIC DETECTOR FOR NONDISPERSIVE INFRARED GAS ANALYZERS

**Johann Weinel, Karlsruhe, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Jun. 23, 1986, Ser. No. 877,447**
**Claims priority, application Fed. Rep. of Germany, Jun. 28, 1985, 8518894[U]**
**Int. Cl.[4] G01N** *21/61*
**U.S. Cl. 250—343** **6 Claims**



1. A pneumatic detector for a nondispersive infrared gas analyzer having an infrared light source and a measurement chamber containing a gaseous sample, said pneumatic detector comprising:

first means in the form of a first detector chamber for containing a first predetermined amount of a selected gas to be analyzed in the sample;

second means in the form of a second detector chamber for containing a second predetermined amount of said selected gas, said first detector chamber and second detector chamber being connected to one another and disposable colinearly along an axis with said infrared light source and said measurement chamber, said second detector chamber being locatable on a side of said first detector chamber opposite said light source and said measurement chamber upon an alignment of said first and said second detector chamber with said light source and said measurement chamber, said first detector chamber and said second detector chamber being defined in part by end walls transparent to infrared radiation emitted by said light source;

a first gas conductive line communicating at one end with said first detector chamber and at an opposite end with said second detector chamber;

sensor means disposed in said gas conductive line for generating a signal indicative of a gas pressure in said first detector chamber relative to a gas pressure in said second detector chamber;

third means in the form of a third detector chamber for containing a third predetermined amount of said selected gas, said third detector chamber being disposed colinearly with respect to said first detector chamber and said second detector chamber and on a side of said second detector chamber opposite said first detector chamber, said third detector chamber having at least one wall transparent to infrared radiation emitted by said light source, said one wall facing said first detector chamber and second detector chamber;

a second gas conductive line separate from said first gas conductive line and communicating at one end with said second detector chamber and at an opposite end with said third detector chamber so that pressure of said selected gas in said third detector chamber is substantially the same as pressure of said selected gas in said second detector chamber; and

means disposed between said second detector chamber and said third detector chamber for controlling the amount of infrared radiation entering said third detector chamber from said second detector chamber.

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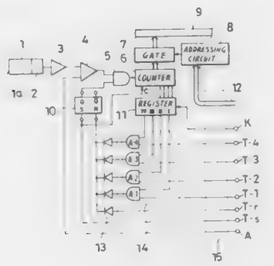


**4,742,230**

## X-RAY IMAGE DETECTING APPARATUS

**Motosada Kiri, Kyoto, Japan, assignor to Shimadzu Corporation, Kyoto, Japan**

**Filed Aug. 29, 1986, Ser. No. 902,215**
**Claims priority, application Japan, Sep. 2, 1985, 60-134818[U]**
**Int. Cl.⁴ G01T** *1/20*
**U.S. Cl. 250—363 S** **5 Claims**




1. An X-ray image detecting apparatus which is constituted with an assembly of unit X-ray detectors and whose X-ray receiving plane consists of a two-dimensional array of X-ray sensors for converting irradiated X-rays to an electric pulse signal, each of which X-ray sensors constitutes each of said unit X-ray detectors together with a counter for counting the number of pulses of said electric pulse signal and means for sending out the output of said counter to an output busline, each of said unit X-ray detectors further comprising:
a gate circuit for allowing said electric pulse signal to be inputted to said counter only in a period inversely proportional to the sensitivity of said X-ray sensor ; and
a gate circuit control means for outputting a pulse signal to make said gate circuit open only in said period.

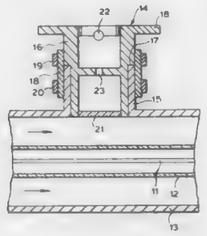
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**4,742,231**

## RADIATION SENSOR

**John D. Bridgen, Staines, England, assignor to Hanovia Limited, Berkshire, England**

**Filed Apr. 18, 1986, Ser. No. 853,410**
**Claims priority, application United Kingdom, Apr. 24, 1985, 8510426**
**Int. Cl.⁴ C02B** *1/32;* **G01J** *3/50*
**U.S. Cl. 250—372** **9 Claims**



1. A water purification system comprising:
a tubular conduit defining an aperture in a side wall thereof, a cylindrical socket mounted on said conduit and surrounding the aperture, said conduit comprising means for containing water to be purified;
a tubular quartz sleeve mounted within the conduit, and a tubular ultraviolet source mounted within said sleeve;
and a radiation sensor assembly comprising:
an elongated cylindrical probe having a window at one end, the end of said probe adjacent the window being shaped such that it is slidably received within said socket;
a shoulder mounted on said probe and spaced away from said window abutting the end of said socket remote from the conduit wherein said probe is dimensioned so as to be supported in said socket, and said window is disposed flush with the interior of said conduit;
a radiation sensor mounted in an end of said probe opposite the window;
focusing means in said probe for providing an incident beam of radiation on said sensor which is greater than the sensitive area of said sensor; and
means for securing the probe to the conduit so that radiation within the conduit can pass through the window and onto the sensor.

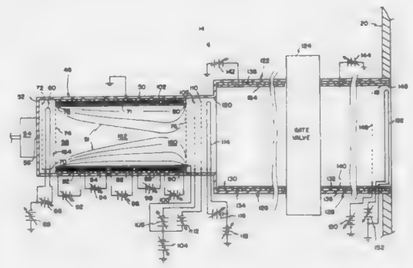
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**4,742,232**

## ION GENERATOR AND ION APPLICATION SYSTEM

**Alan P. Biddle, Euless, Tex.; Nobie H. Stone; David L. Reasoner, both of Huntsville, Ala.; William L. Chisholm, and John M. Reynolds, both of Huntsville, Ala., assignors to United States of America as represented by the Adminstrator, National Aeronautics and Space Administration, Washington, D.C.**

**Filed Mar. 3, 1987, Ser. No. 21,100**
**Int. Cl.⁴ H01J** *27/20*
**U.S. Cl. 250—427** **8 Claims**



1. A system comprising emission means for emitting a beam of ions said emission means comprising:
a cylindrical first housing having an axis extending longitudinally in said first housing and first and second ends, said first housing being closed at said first end and open at said second end through which ions are emitted;
gas insertion means positioned in said closed first end for injecting at least one gas into said first housing;
electron emission means positioned near said first end of said first housing for emitting electrons;
electron repulsion means, including a first grid positioned between said closed first end of said first housing and said first electron emission means for repelling said electrons away from said first end of said first housing;
first biasing means for adjustably applying a negative voltage to said electron emission means and said electron repulsion means with respect to said first housing;
a first cylinder having first and second ends and of a smaller diameter than said first housing, said first cylinder concentrically positioned within said first housing, with said first end of said first cylinder adjacent said first electron emission means;
second biasing means for adjustably applying a positive voltage to said first cylinder with respect to said first housing;
second and third grids connected across said first and second ends, respectively, of said first cylinder and in electrical contact with said first cylinder, said first cylinder and said second and third grids defining a positively biased ionization chamber therein;



a plurality of separately energizable coils around and serially positioned along said first cylinder, whereby, when said coils are energized, a region of magnetic repulsion to electrons is formed in said first cylinder adjacent said second end, and, in combination with said electron repulsion means, forms a region for confining electrons therebetween;
a fourth grid positioned in a region exterior and adjacent said second end of said first cylinder; and
third biasing means for adjustably applying a negative voltage to said fourth grid, said last-named negative voltage being with respect to the positive voltage applied to said first cylinder.

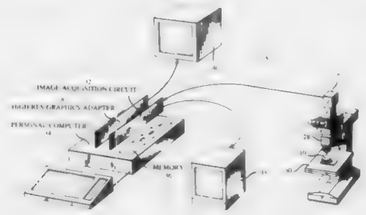
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**4,742,233**

## METHOD AND APPARATUS FOR AUTOMATED READING OF VERNIER PATTERNS

**Birol Kuyel, Pennington, N.J., assignor to American Telephone and Telgraph Company, New York, N.Y.**

**Filed Dec. 22, 1986, Ser. No. 945,049**
**Int. Cl.⁴ G01N** *23/04*
**U.S. Cl. 250—491.1** **13 Claims**




1. A method of fabricating an article comprising the steps of:
forming at least a first vernier pattern on at least a first portion of a body at a known location thereon;
forming at least a second vernier pattern on at least a second portion of said body at a known location thereon so that the second vernier pattern at least partially overlaps said first vernier pattern;
determining the degree of offset between said first and second vernier patterns; and
completing the fabrication of said article when the degree of offset between said first and second vernier patterns is less than a predetermined value, said determining step comprises the steps of:
capturing the image of said first and second vernier patterns;
correlating the intensity of the image of said first and second vernier patterns with the intensity of an image representative of a pair of aligned vernier patterns;
finding where the maximum of the correlated intensities is situated; and
establishing the lateral offset between said first and second vernier patterns in accordance with the distance between said maximum and the center of said first vernier pattern.

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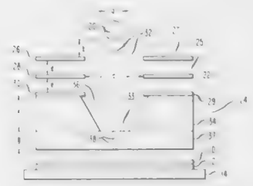
**4,742,234**

## CHARGED-PARTICLE-BEAM LITHOGRAPHY

**Martin Feldman, Berkeley Heights, and Martin P. Lepselter, Summit, both of N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.**

**Continuation of Ser. No. 781,403, Sep. 27, 1985, abandoned. This application May 12, 1987, Ser. No. 54,146**
**Int. Cl.⁴ H01J** *37/26*
**U.S. Cl. 250—492.2** **23 Claims**

1. Charged-particle-beam apparatus adapted to selectively expose the surface of a workpiece, said apparatus comprising elongated particle-emitting means comprising multiple spaced-apart particle-emitting elements approximately centered relative to and adapted to emit particles along multiple respective parallel longitudinal axes of said apparatus,
means including an elongated apertured array responsive to charged particles for forming multiple parallel beams directed at said workpiece surface, each aperture of said array being associated with a respective one of said particle-emitting elements and being approximately centered relative to the longitudinal axis of said associated particle-emitting element,



and means for establishing a substantially uniform magnetic field in the entirety of the space between the bottom of said apertured array and the surface of said workpiece in a direction perpendicular to said workpiece surface and parallel to said longitudinal axes for simultaneously controlling beams emanating from said apertures to propagate approximately along the respective longitudinal axes of said apertures during the entire extent of their propagation in said space and to be focused on the surface of said workpiece in approximate longitudinal alignment with the respective apertures from which the beams emanated.

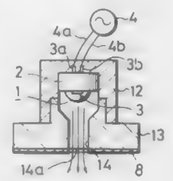
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**4,742,235**

## OPTICAL TREATMENT DEVICE

**Masashi Koji, Tokyo, Japan, assignor to Hoshin Kagaku Sangyosho Co., Ltd. and Photon Co., Ltd., both of Tokyo, Japan**

**Filed Jul. 14, 1986, Ser. No. 885,246**
**Claims priority, application Japan, Jul. 18, 1985, 60-109960[U]**
**Int. Cl.⁴ G01J** *1/00*
**U.S. Cl. 250—504 R** **17 Claims**



1. An optical treatment device comprising:
a generally opaque housing of lightweight and portability capable of being supported on a limb or body portion of the user, said housing having a light transmissive passage extending outwardly therefrom,
a light emission element located in said housing having a face aligned with said passage and through which light radiation is emitted,
a source of current for supplying power to said light emission element and means for attaching said housing directly to the body of the user adjacent the area of the body selected for treatment such that the radiation emitted from face of said light emission element passes through said passage directly onto the skin of the user solely within the selected area of the body.

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**4,742,236**

## FLAME DETECTOR FOR DETECTING PHASE DIFFERENCE IN TWO DIFFERENT WAVELENGTHS OF LIGHT

**Yuichi Kawakami, Nishinomiya, and Hakuzo Tani, Takatsuki, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed Apr. 25, 1986, Ser. No. 856,668**
**Claims priority, application Japan, Apr. 27, 1985, 60-91832; Jul. 18, 1985, 60-156945; Jul. 26, 1985, 60-164037; Jul. 26, 1985, 60-164038; Oct. 25, 1985, 60-237549; Oct. 25, 1985, 60-237550**
**Int. Cl.[4] G08B *17/12***
**U.S. Cl. 250—554** **29 Claims**



1. A flame detector comprising;
first means for receiving light from an area to be detected to produce a first light receiving signal indicating intensity of the received light in a first wavelength range in which radiation energy of a flame is relatively large while the radiation energy of the sun is relatively small;
second means for receiving light from the area to produce a second light receiving signal indicating intensity of the received light in a second wavelength range in which radiation energy of a flame is relatively small while the radiation energy of the sun is relatively large;
first means for integrating the first light receiving signal to produce a first integrating signal indicating the integrated result;
first means for comparing the first light receiving signal with the second light receiving signal to produce a first comparing signal relating to the difference of phase between the first light receiving signal and the second light receiving signal;
second means for integrating, in accordance with the first comparing signal, a portion of the first light receiving signal which portion is different in phase from the second light receiving signal, to produce a second integrating signal;
second means for comparing the first integrating signal with the second integrating signal to produce a second comparing signal indicating the compared result; and
means for detecting the occurrence of flame in accordance with the second comparing signal.

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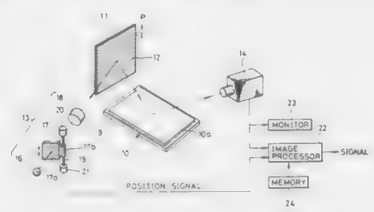
**4,742,237**

## SURFACE CONFIGURATION INSPECTION APPARATUS WITH MOVING GRATING

**Kenji Ozawa, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Apr. 13, 1987, Ser. No. 37,502**
**Claims priority, application Japan, Apr. 11, 1986, 61-82225**
**Int. Cl.[4] G01N *21/86***
**U.S. Cl. 250—560** **8 Claims**

1. A surface configuration inspection apparatus for inspecting a reflective surface of a stationary object on a stage, said apparatus comprising:
a grating having a number of parallel equidistant dark lines with the same width on a transparent plate;
means for moving said grating in a plane parallel to said plate;
means for projecting an image of said grating onto a screen disposed adjacent said stage; and




means for detecting and displaying a pattern of said grating image projected on said screen as reflected by said reflective surface to be inspected.

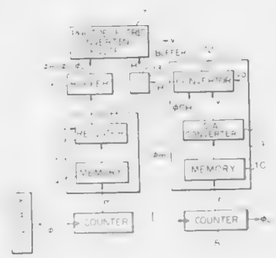
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**4,742,238**

## NON-LINEAR PHOTOELECTRIC CONVERTING APPARATUS WITH MEANS FOR CHANGING DRAINAGE PERFORMANCE

**Yuichi Sato, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 1, 1986, Ser. No. 914,167**
**Claims priority, application Japan, Oct. 2, 1985, 60-220874; Oct. 2, 1985, 60-220875; Oct. 2, 1985, 60-220876**
**Int. Cl.[4] H04N *3/14***
**U.S. Cl. 250—578** **15 Claims**




1. A non-linear photoelectirc converting apparatus comprising;
(a) a photosensing unit for converting a photo signal into an electric signal;
(b) draining means for draining the electric signal produced in said photo sensing unit from the photo sensing unit; and
(c) control means for allowing the photo signal to be converted into the electric signal and accumulated in the photo sensing unit for a predetermined period, and for gradually changing a draining performance of said draining means within said predetermined period.

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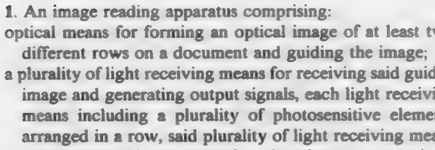
**4,742,239**

## LINE PHOTOSENSOR WITH CROSSTALK SUPPRESSION

**Katsumi Nakagawa, Kawasaki; Toshiyuki Komatsu, Yamato; Masaki Fukaya, Yokohama; Hirofumi Iwamoto, Machida, and Shinichi Seito, Atsugi, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 21, 1986, Ser. No. 842,270**
**Claims priority, application Japan, Mar. 25, 1985, 60-058521**
**Int. Cl.[4] H01L *27/14***
**U.S. Cl. 250—578** **4 Claims**

1. A line photosensor comprising:
a plurality of sensor elements in at least one row on a substrate;
a plurality of extract wiring electrodes extending from the respective sensor elements, said wiring electrodes being wired in an electrically isolated and laminated manner in which said extract wiring electrodes are laminated so that they hold therebetween a laminated structure including, in this order, a first insulating layer, an intermediate electrode layer formed on said first insulating layer, and a second insulating layer formed on said intermediate electrode layer;



a first transistor for obtaining a photocurrent stored in one of said plurality of sensor elements, wherein said first transistor includes said first insulating layer and is connected to one of said extract wiring electrodes; and
a second transistor for obtaining a photocurrent stored in another of said plurality of sensor elements, wherein said second transistor includes a third insulating layer formed on said second insulating layer and is connected to another of said extract wiring electrodes.

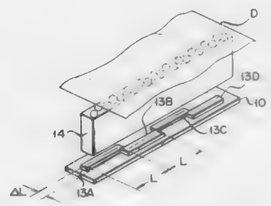
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**4,742,240**

## IMAGE READING APPARATUS WITH IMAGING MEANS IMAGING SEPARATE AND DISTINCT ROWS OF A DOCUMENT

**Eiichi Yamanishi, and Junji Watanabe, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Continuation of Ser. No. 654,092, Aug. 28, 1984, abandoned. This application Mar. 27, 1987, Ser. No. 34,503**
**Claims priority, application Japan, Aug. 31, 1983, 58-159310**
**Int. Cl.[4] H01N *1/04***
**U.S. Cl. 250—578** **20 Claims**




1. An image reading apparatus comprising:
optical means for forming an optical image of at least two different rows on a document and guiding the image;
a plurality of light receiving means for receiving said guided image and generating output signals, each light receiving means including a plurality of photosensitive elements arranged in a row, said plurality of light receiving means being disposed in staggered form in at least two rows in an effective field of view of said optical means, said plurality of light receiving means disposed such that each row of said light receiving means receives an optical image of a different row on said document;
scanning means for moving said optical means and said document relative to each other; and
signal processing means, receiving said output signals, for delaying at least some output signals by at least a period of time required for two rows of said light receiving means to receive light from a single line on said document.

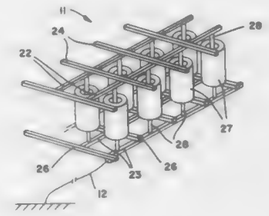


**4,742,241**

## WAVE ENERGY ENGINE

**Kenneth P. Melvin, 934 Park St., Alameda, Calif. 94501**

**Filed Apr. 1, 1986, Ser. No. 846,952**
**Int. Cl.[4] F03B *13/12***
**U.S. Cl. 290—53** **16 Claims**



1. An apparatus for capturing a portion of the wave energy on the surface of a body of water and converting the captured energy to a usable form of power, including a plurality of energy conversion devices, each adapted to convert reciprocal translational motion into another form of usable mechanical energy, structural frame means extending laterally in the water and adapted to secure said energy conversion devices, a large array of flotation devices, each connected to one of said plurality of energy conversion devices, all of said flotation devices together exerting a net buoyant effect on said frame means to support said frame means at the surface of the body of water and each of said flotation devices adapted to interact with the surface waves to impart reciprocal translation motion to said energy conversion devices, means for storing the energy output of said energy conversion devices, means for connecting the power output of said energy conversion devices to an end user, said flotation devices including a plurality of floats, and further including means for tethering portions of said floats to said structural frame means.

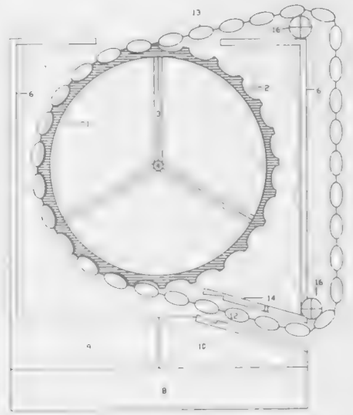
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**4,742,242**

## BUOYANCY ENGINE UTILIZING LINKED LIFTING BODIES

**Dennis Alan De Shon, P.O. Box 3255, Baton Rouge, La. 70821**

**Filed Sep. 23, 1987, Ser. No. 100,110**
**Int. Cl.[4] F03B *9/00***
**U.S. Cl. 290—54** **1 Claim**



1. A buoyancy engine utilizing linked lifting bodies comprising:

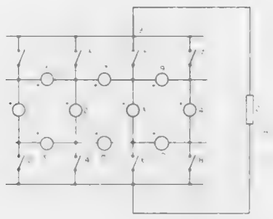
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a wheel, immersed in a vessel containing a liquid, having recesses on its periphery which are designed to contain injected lifting bodies throughout their lifting ascent through the liquid,
said wheel attached to the extreme ends of arms radially connected to a driveshaft,
said wheel positioned at a distance from the driveshaft pivot point so as to increase the moment arm and torque produced,
said driveshaft rotably mounted on sealed bearings in the walls of said vessel, and which is rotated by the upward motion of the wheel resulting from the buoyant force of the air contained in the injected lifting bodies,
said lifting bodies connected in a continuous loop by flexible attaching hinges,
idler pulleys mounted on the outside of said vessel, over which the continuous loop of lifting bodies are routed, after their power producing ascent, and prior to their reintroduction into the vessel,
an injection tube positioned at the bottom of the vessel which introduces the lifting bodies into the vessel and onto the wheel,
said injection tube containing on its inside surface air injectors which inject that amount of air into the vessel which allows the introduction of the lifting bodies, without significant loss of liquid from the vessel,
said air injectors provided with compressed air from a compressor or blower, and which volume of air is metered by a computer controller,
said computer controller programmed with the volume of air to be injected for a given volume of liquid in the vessel,
said vessel sitting on a base,
a generator attached to the driveshaft, which produces electric power from the rotation of the driveshaft.

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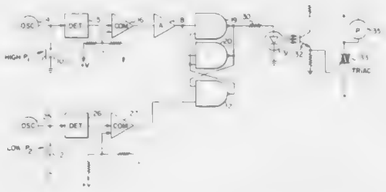
**4,742,243**
**POWER CONSOLIDATION CIRCUIT USING INTERRUPTED CURRENT TECHNIQUES**
**Zivan Zabar, 99-72 66th Rd. Apt. 9N, Forest Hills, N.Y. 11375, and Howard M. Abramowitz, 8 Curtis Ave., West Orange, N.J. 07052**
**Continuation of Ser. No. 480,502, Mar. 30, 1983, abandoned.**
**This application Feb. 6, 1987, Ser. No. 14,192**
**Int. Cl.[4] H02J** *1/00*
**U.S. Cl. 307—81** **2 Claims**



1. A power consolidation circuit for consolidating power from a MHD (Magneto Hydrodynamic) channel, comprising:
a plurality of pairs of electrical nodes, each pair of nodes including a first node of a first electrical polarity and a second node of a second electrical polarity, said pairs of nodes being spaced along said MHD channel, a plurality of vertical sources and a plurality of horizontal sources, representing respectively Faraday and Hall voltages associated with said MHD channel, each respective one of said vertical sources extending between a respective pair of said pairs of nodes and a respective one of said horizontal sources extending between adjacent ones of said first nodes or adjacent ones of said second nodes, said MHD channel being of the type in which interconnection of said first nodes to one another or said second nodes to one another produces undesired internal short circuit currents within said MHD channel;
first and second power bus bars;
a first group of normally open switches, each one of said switches in said first group of switches extending between a respective one of said first nodes and said first power bus bar;
a second group of normally open switches, each one of said switches in said second group of switches extending between a respective one of said second nodes and said second power bus bar; and
said normally open switches being turned on in pairs and sequentially following one another in repeated cycles so that electrical power is derived from said MHD channel in sequence and cyclically through said pairs of nodes, in a manner such that power flows discontinuously from any one of said pairs of nodes and only during a predetermined fraction of a cycle period asociated with said MHD channel at the end of which cycle all said switches will have been turned on.

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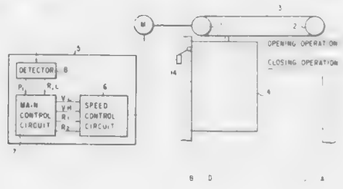
**4,742,244**
**ELECTRONIC FLOAT SWITCH APPARATUS**
**Charles B. Koerner, Port Murray, N.J., assignor to ITT Avionics, Nutley, N.J.**
**Filed Oct. 15, 1986, Ser. No. 919,108**
**Int. Cl.[4] H01H** *35/18*
**U.S. Cl. 307—118** **5 Claims**

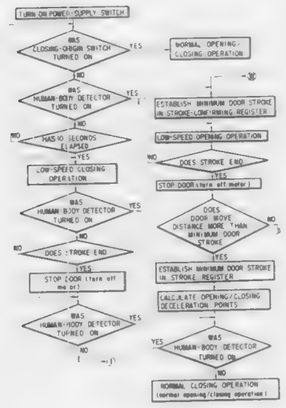


1. An electronic float switch for monitoring a high and low fluid volume in a vessel or storage tank comprising:
a high level probe positioned at a given level in said tank indicative of a high fluid volume and operative to provide a first low impedance when immersed in said fluid,
first means responsive to said first low impedance of said high level probe to provide a first output level when said probe is immersed and a second output level when said probe is not immersed, said first means including a first oscillator capable of providing a first given frequency at an output, with the output of said first oscillator coupled to said high level probe to cause the amplitude of oscillations to decrease when said high level probe is immersed in said fluid, with the output of said first oscillator further coupled to the input of a first detector for providing a first detected voltage according to the level of oscillations, and having an output coupled to one input of a first comparator for comparing said first detected voltage with a first reference voltage to provide at an output of said first comparator said first output level when said high level probe is immersed and said second output level when said high level probe is not immersed,
a low level probe positioned at a lower level in said tank indicative of a low fluid volume and operative to provide a second low impedance when immersed in said fluid,
second means responsive to said second low impedance of said low level probe to provide a third output level when said low level probe is immersed and a fourth output level when said low level probe is not immersed, said second means including a second oscillator capable of providing a second given frequency at an output, with the output of said second oscillator coupled to said low level probe to cause said amplitude of oscillations to decrease when said low level probe is immersed in said fluid, when the output of said second oscillator further coupled to the input of a second detector for providing a second detected voltage according to the level of oscillations, and having an output coupled to one input of a second comparator for comparing said second detected voltage with a second reference voltage to provide at an output of said second comparator said first output level when said low level probe is immersed and said second output level when said low level probe is not immersed,
circuit means coupled to said first and second means and operative to provide a first fixed output level when said first and third output levels are present from both probes and to maintain said level when said third level is provided by said second probe and to provide a second fixed output level when both probes provide said second and fourth output levels, and
control means coupled to a pump motor for activating said motor during said first fixed output level of said circuit means and to deactivate said pump motor during said second fixed output level.

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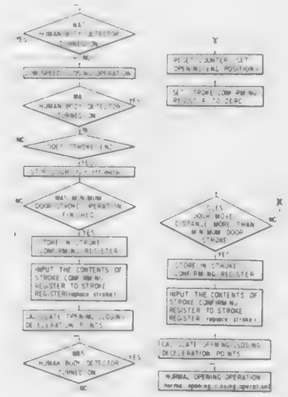
**4,742,245**
**METHOD FOR CONTROLLING AUTOMATIC DOOR IN TURNING-ON TIME OF ITS POWER SUPPLY**
**Yukio Yoshida, Namerikawa; Akiyoshi Takimoto; Kenzo Ono, both of Toyama; Kiyotada Nishikawa, Kurobe, and Toshio Oura, Namerikawa, all of Japan, assignors to Yoshida Kogyo K. K., Tokyo, Japan**
**Filed Dec. 17, 1986, Ser. No. 942,820**
**Claims priority, application Japan, Dec. 28, 1985, 60-298250**
**Int. Cl.[4] E05F** *15/14*
**U.S. Cl. 307—119** **2 Claims**





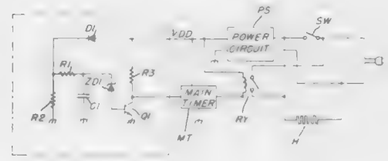
1. A method for controlling an automatic door system comprising the steps of:
moving a door of said automatic door system at a low speed when a first human body detection signal is input to said automatic door system after a power supply swich is turned on, and
moving said door of said automatic door system at a normal operation after said door has traveled a predetermined minimum door stroke at said low speed so that said door travels more than said predetermined minimum door stroke.





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**4,742,246**
**PREHEAT TIMER FOR USE IN OVEN**
**Yuichi Mori, Yamatokoriyama, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan**
**Continuation of Ser. No. 676,888, Nov. 30, 1984, abandoned.**
**This application Feb. 3, 1987, Ser. No. 14,080**
**Claims priority, application Japan, Feb. 25, 1983, 58-31551**
**Int. Cl.[4] H01H** *3/34*
**U.S. Cl. 307—141.4** **5 Claims**



1. A preheating timer, for use in a heating control system of an oven, which controls the preheating time by simulating temperature characteristics of the oven's chamber with appropriate voltage characteristics comprising:
capacitance means for simulating the temperature characteristics of the oven;
diode means, operatively connected to said capacitance means by a charging first resistor, for inhibiting said capacitance means from discharging to a D.C. voltage circuit;
detector means, operatively connected to said capacitance means, for detecting whether a voltage across said capacitance means exceeds a threshold level, said threshold level corresponding to a threshold cooking temperature in the oven, said detection means then transmitting a control signal to a main cooking timer that initiates the operation of said main cooking timer, said detection means includes a series connection of a zener diode and a transistor,
wherein said detection means further includes a third resistance connected between a base and an emitter of said transistor; and
second resistor, operatively connected to the connection of

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said diode means and said first resistor, for discharging said capacitance means when a cooking operation is completed such that the speed of discharge of the voltage of said capacitance will approximate a temperature decrease within the oven chamber, said temperature decrease occurring upon the completion of said cooking operation.

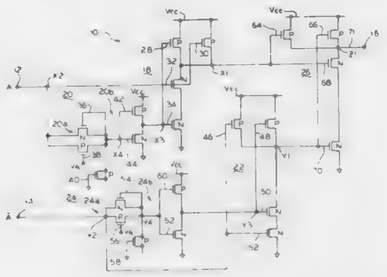
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**4,742,247**

## CMOS ADDRESS TRANSITION DETECTOR WITH TEMPERATURE COMPENSATION

**Bhimachar Venkatesh, Sunnyvale, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.**

**Filed Apr. 26, 1985, Ser. No. 727,502**
**Int. Cl.[4] H03K** *5/153*
**U.S. Cl. 307—231** **14 Claims**



1. A CMOS address transition detector comprising:

first input means having first and second inputs and an output, said first input of said first input means being responsive to a true address transition signal;

said first input means including first and second P-channel MOS transistors having their sources connected to a supply potential, the drains of said first and second P-channel transistors being connected together and defining said output of said first input means, and first and second N-channel MOS transistors, said first N-channel transistor having its drain connected to the drains of said first and second P-channel transistors and its source connected to the drain of said second N-channel transistor, the source of said second N-channel transistor being connected to a ground potential, the gate of said first N-channel transistor being connected to the gate of said second P-channel transistor and defining the first input of said first input means, the gate of said second N-channel transistor being connected to the gate of said first P-channel transistor and defining the second input of said first input means;

first delay means for controlling the pulse width of an output signal of the transition detector, said first delay means having its input coupled to said first input of said first input means and being responsive to the true address transition signal and having its output coupled to said second input of said first input means;

second input means having a first and second input and an output, said first input of said second input means being responsive to a false address transition signal;

said second input means including third and fourth P-channel MOS transistors having their sources connected to the supply potential, the drains of said third and fourth P-channel transistors being connected together and defining said output of said second input means, and third and fourth N-channel MOS transistors, said third N-channel transistor having its drain connected to the drains of said third and fourth P-channel transistors and its source connected to the drain of said fourth N-channel transistor, the source of said fourth N-channel transistor being connected to the ground potential, the gate of said third N-channel transistor being connected to the gate of said fourth P-channel transistor and defining the first input of said second input means, the gate of said fourth N-channel transistor being connected to the gate of said third P-channel transistor and defining the second input of said second input means;

second delay means controlling the pulse width of the output pulse signal of the transition detector, said second delay means having its input coupled to said first input of said second input means and being responsive to the false address transition signal and having its output coupled to said second input of said second input means;

said first delay means being formed of a first RC delay portion and a first inverter portion, said first delay portion including a fifth N-channel MOS transistor, a sixth P-channel MOS transistor, and a seventh P-channel MOS transistor, the sources of said fifth N-channel transistor being connected to the drain of said sixth P-channel transistor and defining the input of said first delay means, the gate and drain of the fifth N-channel transistor being connected together and to the source of the sixth P-channel transistor, the gate of said sixth P-channel transistor being adapted to receive a reference voltage, said sixth P-channel transistor functioning as a temperature compensated active resistor, said seventh P-channel transistor having its source and drain connected together and to the source of said sixth P-channel transistor and its gate connected to the ground potential and functioning as a capacitor;

said first inverter portion having an input coupled to the source of said sixth P-channel transistor and an output defining the output of said first delay means; and

output means for generating at an output terminal the output pulse signal having a pulse width which is substantially constant over a wide temperature range, said output means having a first input coupled to the output of said first input means and being responsive to said first input means when said true address transistion signal makes a low-to-high transition, said output means having a second input coupled to the output of said second input means and being responsive to said second input means when said false address transition signal makes a low-to-high transition, the output pulse signal making a high-to-low transition when either said true or false address transition signal makes the low-to-high transition.

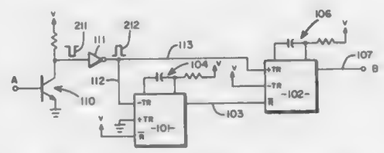
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**4,742,248**

## RANDOM SIGNAL ISOLATION CIRCUIT

**Patrick G. Smith, Shakopee, and B. Hubert Pinckaers, Bloomington, both of Minn., assignors to Detector Electronics Corporation, Minneapolis, Minn.**

**Filed Jun. 25, 1987, Ser. No. 66,191**
**Int. Cl.[4] H03K** *5/22*
**U.S. Cl. 307—234** **4 Claims**



1. A signal selection and isolation circuit having an input terminal adapted for receiving signals in a time domain, each of said signals having a leading edge, a time duration, and a trailing edge, wherein consecutive signals which occur within a first predetermined time window are considered as selectable signals, and consecutive signals which occur outside said first predetermined time window are considered as noise signals, comprising

(a) a first monostable multivibrator circuit having a trigger input connected to said input terminal, said trigger input being responsive to the trailing edge of signals received at said input terminal, and said circuit having a first output means for generating first output signals corresponding to said trailing edge of signals received, and said circuit having a first predetermined time resetting means for limiting the time duration of said first output signals; and

(b) a second monostable multivibrator circuit having a trigger input connected to said input terminal, said trigger input being responsive to the leading edge of signals received at said input terminal, and said circuit having a second output means for generating second output signals, and said circuit having a second predetermined time resetting means for limiting the time duration of said second output signals, and said circuit having a reset input means connected to said first monostable multivibrator first output means, for enabling generation of second output signals by said second circuit only during a time when said first circuit is generating a first output signal.



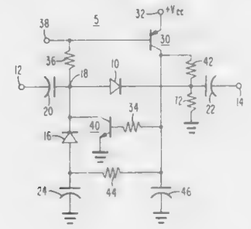
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**4,742,249**

## RF SWITCH WITH DIODE NETWORK AND CONTROL LATCH SHARING COMMON ELEMENT

**Feroz K. Alpaiwalla, and Robert H. Begeman, both of Indianapolis, Ind., assignors to RCA Licensing Corporation, Princeton, N.J.**

**Filed Nov. 25, 1986, Ser. No. 934,965**
**Int. Cl.[4] H03K** *17/60, 17/74*
**U.S. Cl. 307—255** **7 Claims**



1. An RF switch, comprising:

a diode network having a series branch coupled between first and second signal ports and having a shunt branch coupled between a circuit node in said series branch and a source of reference potential;

a latching circuit comprising a pair of transistors having respective control electrodes and conduction paths cross-coupled to provide positive feedback therebetween such that each transistor of said pair controls the conductive state of the other, said latching circuit having a first state in which one transistor of said pair is conductive and a second state in which said one transistor is non-conductive;

circuit means coupling said conduction path of said one transistor in parallel with said shunt branch of said diode network; and

bias means, including a first impedence means coupled between an output electrode of a selected one of said transistors and a point in said series branch and a second impedance means coupled between said output electrode of said selected transistor and a point in said shunt branch, said bias means being responsive to said first state of said latching circuit, for applying forward bias to said shunt branch and reverse bias to said series branch of said diode network and responsive to said second state of said latching circuit for reversing said bias applied to said branches.

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**4,742,250**

## INNER POTENTIAL GENERATING CIRCUIT

**Youichi Tobita, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 18, 1986, Ser. No. 943,054**
**Claims priority, application Japan, Dec. 20, 1985, 60-288205**
**Int. Cl.[4] H03K** *3/01, 3/353, 3/26*
**U.S. Cl. 307—296 R** **1 Claim**



1. An inner potential generating circuit for maintaining, at a prescribed potential, a potential of a substrate of a semiconductor device, comprising:

a substrate potential output terminal connected to said substrate of said semiconductor device,

a first AC power supply means connected to an external power supply for generating an AC voltage, said first AC power supply means including control means for turning said first AC power supply means off,

a main potential generating circuit means connected to said first AC power supply means for charging said substrate potential output terminal with said prescribed potential,

a second AC power supply means connected to said external power supply for generating a continuous AC voltage,

a reference potential generating circuit means connected to said second AC power supply for charging a reference potential point (9*b*) with said prescribed potential, and

a differential amplifying circuit means for comparing the potential of said substrate potential output terminal and the potential of said reference potential point and in response, operating said control means to turn said first AC power supply off when both of said potentials have a predetermined relationship.

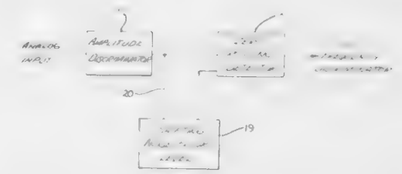
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**4,742,251**

## PRECISE CALL PROGRESS DETECTOR

**Stephen D. Levy, Nevada City, Calif., assignor to Silicon Systems, Inc., Tustin, Calif.**

**Filed Aug. 12, 1985, Ser. No. 764,934**
**Int. Cl.[4] H03K** *5/153*
**U.S. Cl. 307—358** **15 Claims**



1. A circuit for providing a dynamic noise floor level comprising:

level indicating means for providing and output signal when an input signal is greater than a reference signal;

analog to digital converting means for selectively providing

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one of a plurality of digital outputs selectably determined based on the level of said output signal;

selector means having a first and second input, said first input of said selector means coupled to said provided digital output of said analog to digital converting means, said selector means having a selected output of one of said first and second inputs;

storage means coupled to said selector means, said storage means having as output a stored value from said storage means consisting of said selected output of said selector means;

comparator means coupled to said storage means and to said analog to digital converting means, said comparator means for comparing said stored value with said provided digital output;

said selected output of said selector means coupled through a subtractor to said second input of said selector means, for decrementing said selected output by one binary digit;

said comparator means coupled to said selector means such that said selector means selects said second output when said output of said storage means exceeds said provided digital output; and

a digital to analog converter coupled to said storage means, said digital to analog converter having a plurality of noise floor levels as output, one of said plurality of noise floor levels being selected dependent upon said output of said storage means,

whereby a method of providing a dynamic noise floor level is achieved.

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**4,742,252**

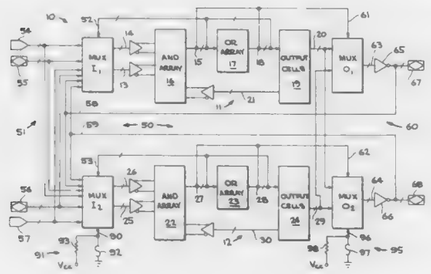
## MULTIPLE ARRAY CUSTOMIZABLE LOGIC DEVICE

**Om Agrawal, San Jose, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.**

**Filed Mar. 29, 1985, Ser. No. 717,640**

**Int. Cl.⁴ H03K** *19/177*

**U.S. Cl. 307—465** **37 Claims**



1. An integrated circuit having a plurality of input pins receiving input signals and a plurality of output pins, comprising:

first programmable array means, coupled to the plurality of input pins, for receiving a plurality of first input terms and generating a plurality of first output terms including a first AND-array receiving the first input terms and generating first product terms, and a first OR-array receiving the first product terms and generating first sum-of-product terms for supply as the first output terms;

second programmable array means, coupled to the plurality of output pins and to the first programmable array means, for receiving the plurality of first output terms and generating a plurality of second output terms for supply to the plurality of output pins including a second AND-array receiving the first output terms and generating second product terms and a second OR-array receiving the second product terms and generating second sum-of-product terms for supply as the second output terms.

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**4,742,253**

## INTEGRATED INSULATED-GATE FIELD-EFFECT TRANSISTOR CIRCUIT FOR EVALUATING THE VOLTAGE OF A NODE TO BE SAMPLED AGAINST A FIXED REFERENCE VOLTAGE

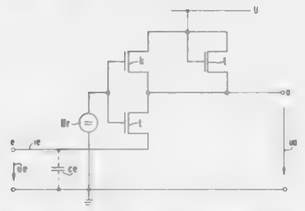
**Burkhard Giebel, Denzlingen, Fed. Rep. of Germany, assignor to ITT Industries, Inc., New York, N.Y.**

**Filed Jan. 25, 1983, Ser. No. 460,957**

**Claims priority, application European Pat. Off., Jan. 30, 1982, 82100657.4**

**Int. Cl.⁴ H03K** *17/687*

**U.S. Cl. 307—530** **8 Claims**



1. Integrated insulated-gate field-effect transistor circuit for evaluating the voltage of a node to be sampled, said circuit including an input and an output and being connectible to a source of operating voltage, said circuit comprising a tansfer transistor connected between said input and said output and forming a drain source current path therebetweeen, said transfer transistor having a gate, a load transistor connected between said output and said source of operating voltage, and a clamping transistor having a gate connected to said transfer transistor gate and having a source and drain connected between said output and said source of operating voltage, said interconnected transfer transistor and clamping transistor gates being directly connected to a source of fixed reference voltage.

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**4,742,254**

## CMOS INTEGRATED CIRCUIT FOR SIGNAL DELAY

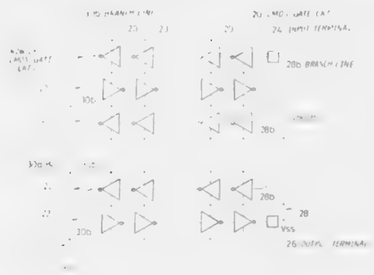
**Norio Tomisawa, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan**

**Filed Oct. 1, 1986, Ser. No. 914,377**

**Claims priority, application Japan, Oct. 7, 1985, 60-221786; Oct. 7, 1985, 60-221787**

**Int. Cl.⁴ H03K** *5/159, 19/094*

**U.S. Cl. 307—606** **12 Claims**



1. A CMOS integrated circuit for signal delay comprising a predetermined number of CMOS gate circuits connected in series between an input terminal and an output terminal to receive an input binary signal at said output terminal and output a replica of the input binary signal at said output terminal which is delayed by a predetermined delay time, said series of CMOS gate circuits being arranged in a folded pattern of more than two rows on an interated circuit substrate, wherein each row of said folded pattern is formed by an odd number of said CMOS gate circuits.

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**4,742,255**

## LINEAR PULSE MOTOR

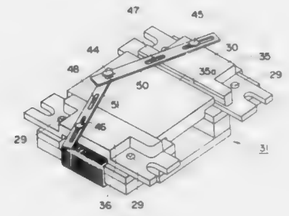
**Hiroshi Nakagawa; Toshiki Maruyama; Masaaki Narihisa; Minoru Maeda, all of Ise, and Tsuyoshi Tanaka, Mie, all of Japan, assignors to Shinko Electric Co., Ltd., Tokyo, Japan**

**Filed Mar. 28, 1986, Ser. No. 845,543**

**Claims priority, application Japan, Mar. 29, 1985, 60-66009; Jun. 19, 1985, 60-133349**

**Int. Cl.⁴ H02K** *41/00*

**U.S. Cl. 310—12** **5 Claims**



1. A linear pulse motor comprising:

a stator;

a movable member, the stator and the movable member each having a face to oppose to each other;

supporting means for supporting the movable member, the supporting means having a plurality of rolling members rotatably mounted thereon, said rolling members being placed between the stator and the movable member to be in rolling contact with the stator and the movable member so that a gap is formed between said opposing faces of the stator and the movable member to thereby enable the movable member to move parallel to the opposing face of the stator along a line of travel thereof, the supporting means being movable on the stator along said line of travel; and

positive motion transferring means for positively transferring movement of the movable member to the supporting means so that the supporting means is in displacement a half of the movable member, whereby the movable member is moved by generating a magnetic flux between said gap when the linear pulse motor is energized.

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**4,742,256**

## SCREW-TIGHTENED STRUCTURE FOR SYNTHETIC RESIN MEMBER

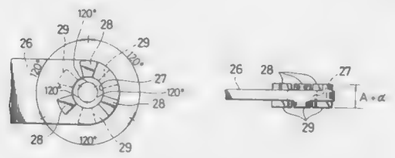
**Shinsaku Tanaka, Tokyo, and Tadao Arata, Inagi, both of Japan, assignors to Tanashin Denki Co., Ltd., Tokyo, Japan**

**Filed Nov. 7, 1986, Ser. No. 927,935**

**Claims priority, application Japan, Jul. 30, 1986, 61-117140[U]**

**Int. Cl.⁴ H02K** *15/14*

**U.S. Cl. 310—51** **8 Claims**



1. A mounting for a motor for attachment to a base of a tape recorder, the mounting being adapted for fastening to the motor by a screw so as to isolate vibrations of the motor from the base, said mounting comprising a through-hole for allowing a drive shaft of the motor to extend therethrough, at least one planar tongue portion defined by a slit in the mounting and provided with a screw insertion hole formed therethrough for attaching the mounting elastically to the motor, at least one first land to be brought into contact with the head of the screw, and at least one second land to be brought into contact with the motor, said first and second lands having different locations on the planar tongue portion as seen in a plan view to provide for distortion of the planar tongue portion upon tightening of the screw.

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**4,742,257**

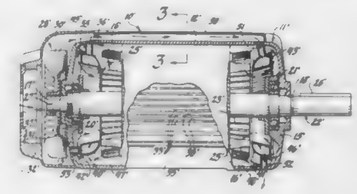
## TOTALLY ENCLOSED FAN COOLED INDUCTION MOTOR WITH IMPROVED COOLING

**Keith H. Carpenter, Kettering, Ohio, assignor to General Motors Corporation, Detroit, Mich.**

**Filed Jan. 29, 1987, Ser. No. 8,233**

**Int. Cl.⁴ H02K** *9/00*

**U.S. Cl. 310—62** **4 Claims**



1. An induction motor comprising a generally cylindrical case having a circumferential portion and a pair of axial ends, a stator with insulation covered windings in the case and a rotor on a shaft rotatable in bearings in the case, the case totally enclosing the stator and rotor with no air communication therethrough, the rotor comprising internal fan means on each axial end thereof, the motor further comprising an external fan mounted on and driven by the shaft projecting from one end of the case and a fan shield surrounding the external fan and directing cooling air driven by the external fan axially over the surface of the case, the motor further comprising, adjacent each axial end of the case:

a hollow toroidal baffle suspended axially between the internal fan means of the rotor and the axial end of the case and radially between the shaft and the circumferential portion of the case, each baffle thereby creating an internal air flow circulation path wherein internal air is driven by the internal fan means radially outward across the ends of the stator windings to the circumferential portion of the case to pick up heat from from the stator windings, axially along the inner surface of the circumferential portion of the case and radially inwardly along the inner surface of the axial end of the case for cooling heat exchange through the case to the cooling air driven by the external fan, over the bearing to pick up heat therefrom and axially back to the internal fan means;

an enclosed air channel extending from the fan shield along the outer surface of the case;

an inlet air duct extending radially inward through the case from the air channel to the hollow toroidal baffle at the axial end of the motor opposite the external fan; and

an outlet air duct extending radially outward through the case from the hollow toroidal baffle diametrically opposite the inlet air duct, whereby cooling air is channeled from the fan at one end of the motor along the outer surface of the case and through the hollow toroidal baffle at the other end for internal heat exchange with the air circulated by the internal fan means.

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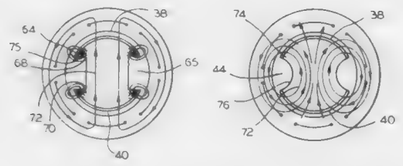


4,742,258

## DRIVEN ROTARY SHAFT SYSTEM USING PERMANENT MAGNETS

Kent L. Earle, Woodridge; John J. Crossetto, Orland Park; Stephen D. Cwian, Chicago, and Anthony D. Jordan, Barrington Hills, all of Ill., assignors to Midwest Dynamometer & Engineering Co., River Grove, Ill.

Filed Aug. 26, 1986, Ser. No. 900,398
Int. Cl.[4] H02K *1/24, 21/14*
U.S. Cl. 310—156 18 Claims




1. A brushless rotor device having a driven shaft and comprising a rotor including a core with a generally cylinderical surface, at least a pair of concave air gaps formed on diametrically opposed sides of said core, whereby the portions of said cylindrical surface which are between said air gaps form pole pieces for said rotor, permanent magnet means mounted on each of said pole pieces for providing at least a pair of magnetic fields in positions to interact with magnetic fields of an adjacent stator, said concave air gaps having contours which generally follow and conform to the contours of flux lines appearing in said core responsive to said permanent magnets.

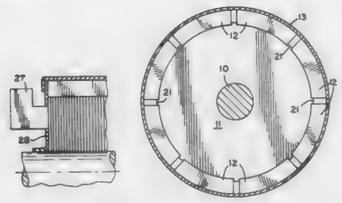
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4,742,259

## PERMANENT MAGNET ROTOR FOR ELECTRIC MOTOR

Edward J. Schaefer, and Thomas K. Antrim, both of Bluffton, Ind., assignors to Franklin Electric Co., Inc., Bluffton, Ind.

Filed May 11, 1987, Ser. No. 48,603
Int. Cl.[4] H02K *15/14, 21/14*
U.S. Cl. 310—156 8 Claims




1. A permanent magnet rotor for an electric motor, comprising an axially extending rotor shaft, a cylindrical rotor core formed on said shaft, a plurality of permanent magnets positioned at angularly spaced positions on the outer periphery of said core, and a thin tubular metal sleeve positioned around said magnets, said sleeve having residual tension and thereby pressing said magnets tightly against said core, said sleeve having a greater axial length than said core and including integral end portions which extend axially beyond the ends of said core, said integral end portions turning radially inwardly and tightly against the outer ends of said magnets.

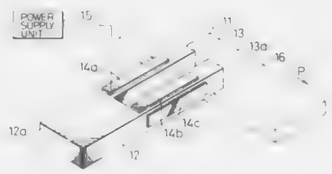
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4,742,260

## PIEZOELECTRICALLY DRIVING DEVICE

Hiroshi Shimizu, 22-12, Yagiyama Hon-cho 1-chome, Sendai-shi, Miyagi 982; Sumio Sugawara, Yonezawa; Takashi Takada, Shijonawate, and Seiki Ishibashi, Osaka, all of Japan, assignors to Hiroshi Shimizu, Miyagi and Matsushita Electric Works, Ltd., Osaka, both of, Japan

Filed Jan. 28, 1987, Ser. No. 7,673
Claims priority, application Japan, Feb. 6, 1986, 61-24706; Sep. 25, 1986, 61-227502
Int. Cl.[4] H01L *41/08*
U.S. Cl. 310—323 10 Claims




1. A piezoelectrically driving device comprising a vibrator including a base part and a driving part of a flexible material and contacting with a contact member for causing therebetween a relative movement, and a power supply unit for providing a high frequency voltage to said vibrator, wherein said driving part comprises at least one pair of pole parts, each pole part being substantially square shaped in section, joined at one end to the base part of the vibrator and contacting said contact member at one side face, the pair of pole parts being disposed mutually in parallel, and piezoelectric elements disposed on at least two adjacent faces of each of said pair of pole parts, the piezoelectric elements causing said pole parts to resonantly vibrate upon application of said high frequency voltage from said power supply unit to said piezoelectric elements, said high frequency voltage being applied to the piezoelectric elements sequentially with a predetermined phase difference, the pole parts vibrating with a mutual phase difference corresponding to the predetermined phase difference, whereby the pole parts alternately contact the contact member.

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4,742,261

## CONSTANT LENGTH STRUT

Wiley F. Rich, Arlington, Va.; Gregory H. Ames, and William A. Williams, Jr., both of Colorado Springs, Colo., assignors to Kaman Aerospace Corporation, Arlington, Va.

Filed Dec. 10, 1986, Ser. No. 940,909
Int. Cl.[4] H01L *41/08*
U.S. Cl. 310—328 14 Claims

1. A constant length structural element, said element comprising:

an axially elongated body having a first end portion and a second end portion disposed axially opposite said first end portion;

a first termination fixed to said first end portion of said body and adapted for attachment to a first external structure with which said element is used;

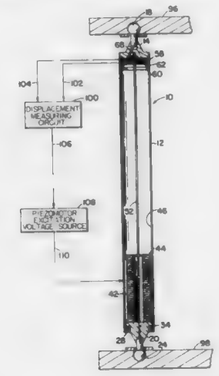
a second termination carried by said second end portion of said body for movement lengthwise of said body and adapted for attachment to a second external structure with which said element is used;

an axially elongated reference element having a substantially fixed length and a first and second end, said first end being attached to one of said terminations for moving with said one termination axially toward and away from the other of said terminations and said second end being supported by means for maintaining said reference element in tension;

sensor means coupled between said reference element and said other termination for sensing axial displacement of said one termination toward and away from said other termination with respect to a reference position, said reference position being the position of said second end of said reference element with respect to said one of said terminations to which said first end of said reference element is attached when said structural element is at an initial length corresponding to a desired constant length between said two terminations;

means responsive to said sensor means for generating an






electrical signal having a magnitude related to the axial displacement of said second termination with respect to said first termination means, and

actuator means coupled between said second termination and said second end portion of said body for driving said second termination toward and away from said first termination in response to said axial displacement electrical signal for providing a corrective displacement maintaining said second termination at a constant distance from said first termination.

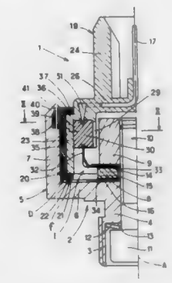
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4,742,262

## ACCELEROMETER, IN PARTICULAR FOR THE DETECTION OF PINKING IN AN INTERNAL COMBUSTION ENGINE

Jacques Ferry, Croix-Nivert, France, assignor to Equipements Automobiles Marchal, France

Filed Apr. 10, 1987, Ser. No. 37,013
Claims priority, application France, Apr. 14, 1986, 86 05271
Int. Cl.[4] H01L *41/08*
U.S. Cl. 310—329 15 Claims




1. An accelerometer comprising:

(a) a body intended to be fixed on a component whose accelerations or vibrations are to be detected;

(b) a seismic mass;

(c) means mounting said seismic mass for movement relative to said body;

(d) piezoelectric means prestressed between said body and said seismic mass and arranged so as to be strained variably by relative movement between said body and said seismic mass;

(e) electrical connector means mounted on said body and having terminal means, said electrical connector means including a mounting skirt constituting an extension thereof;

(f) respective electrically conductive means between each of the opposed faces of the piezoelectric means and the terminal means of said electrical connector means;

(g) electrical insulating means between the piezoelectric means and adjacent parts of the accelerometer; and

(h) damping means mounting said electrical connector means on said body of the accelerometer, said damping means comprising a sleeve element made from a material which is one of the group consisting of elastomeric material and an equivalent material and being capable of reducing or suppressing the mechanical transmission of the vibrations or accelerations from the body of the accelerometer to the electrical connector means, said sleeve element including, adjacent one end thereof, radially outwardly projecting beads capable of being inserted in corresponding recesses provided in the accelerometer body, said sleeve further including in annular portion extending between an internal transverse face of a bottom of the accelerometer body and a transverse end side of said cylindrical skirt of said electrical connector means, and spaced from said internal transverse face such that a gap for axial play is defined between the transverse external face of said annual portion and said internal transverse face of the bottom of the accelerometer body.

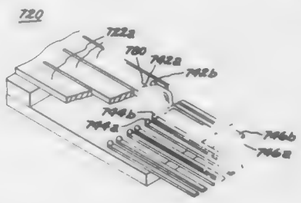
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4,742,263

## PIEZOELECTRIC SWITCH

John D. Harnden, Jr., Schenectady; William P. Kornrumpf, Albany; James E. Kohl, and Michael S. Adler, both of Schenectady, all of N.Y., assignors to Pacific Bell, San Francisco, Calif.

Division of Ser. No. 896,792, Aug. 15, 1987, Pat. No. 4,697,118.
This application Aug. 24, 1987, Ser. No. 88,827
Int. Cl.[4] H01L *41/08*
U.S. Cl. 310—331 5 Claims




1. A piezoelectric relay comprising:

piezoelectric element mounted in a substantially cantilevered manner such that one end is fixed and the other is free to move in a predetermined direction in response to the application of an electric field to said piezoelectric element, said free end having mounted thereon first and second contact means, each of said contact means engaging a corresponding contact means spaced therefrom when said electric field is applied to said piezoelectric element, said piezoelectric element including means for allowing said first contact means to move relative to said second contact means, said allowing means comprising a bifurcation extending therethrough from said free end of said piezoelectric element a predetermined distance into

said piezoelectric element, said bifurcation separating said first and second contact means.

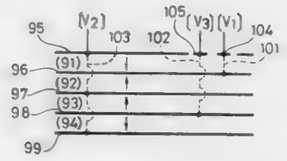
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**4,742,264**

## PIEZOELECTRIC SOUND GENERATOR

**Toshio Ogawa, Nagaokakyo, Japan, assignor to Murata Manufacturing Co., Ltd.**

**Continuation of Ser. No. 824,160, Jan. 30, 1986, abandoned. This application May 6, 1987, Ser. No. 47,588**
**Claims priority, application Japan, Mar. 8, 1985, 60-46897**
**Int. Cl.⁴ H01L** *41/08*
**U.S. Cl. 310—332** **9 Claims**




1. An intermediate product for use in manufacturing a bimorph type piezoelectric sound generator, said product comprising:

(a) a laminated and cofired monolithic sintered body comprising an odd plurality of piezoelectric ceramic layers alternating with a plurality of inner electrodes, said body also having first and second outer electrodes;

(b) said body having at least three electrical connectors formed in respective through-holes, each said through-hole extending through at least one said layer and interconnecting electrodes on opposite sides of said layer, each said through-hole being provided in the vicinity of a vibrational node of said body;

(c) said electrical connectors being selectively interconnectable with each other and with said outer electrodes to provide at least first and second successive connection arrangements;

(d) said first connection arrangement providing terminals for receiving respective predetermined high and low potentials, so as to polarize said odd plurality of said ceramic layers with at least one central ceramic layer in said body remaining non-polarized, and with respective other said ceramic layers forming first and second vibrating regions on respective sides of said non-polarized ceramic layer, corresponding ones of said layers in said first and second vibrating regions being polarized in opposite directions symmetrically about said non-polarized ceramic layer; and

(e) said second connection arrangement providing terminals for receiving respective predetermined high and low potentials, after said layers are polarized as aforesaid, for causing said layers in one of said first and second vibrating regions to expand and causing said layers in the other of said first and second vibrating regions to contract.

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**4,742,265**

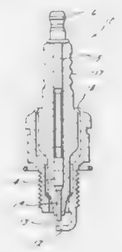
## SPARK PLUG CENTER ELECTRODE OF ALLOY MATERIAL INCLUDING ALUMINUM AND CHROMIUM

**Joseph M. Giachino, Farmington Hills; David W. Hoffman, Ann Arbor; William F. Horn, Plymouth, and Gerald P. Kazmer, Roseville, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.**

**Filed Nov. 12, 1986, Ser. No. 929,702**
**Int. Cl.⁴ H01T** *13/20*
**U.S. Cl. 313—141** **11 Claims**

1. A spark plug for use in providing an ignition spark including:

a center electrode for providing a conductive path and a grounding electrode, spaced from said center electrode, for providing a conductive path so that a spark can be sustained between said center and grounding electrodes, at least a portion of said center electrode comprising an alloy material from an alloy family of M-CrAlY wherein



M is selected from the group consisting of nickel, cobalt, iron and mixtures thereof and Cr is chromium; Al is aluminum; Y is an element selected from the group consisting of yttrium, zirconium, hafnium and titanium.

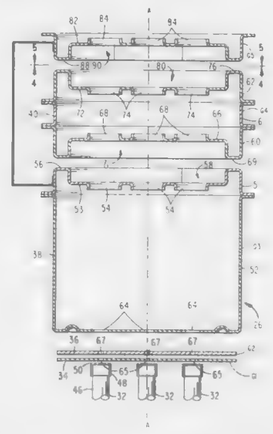
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**4,742,266**

## COLOR PICTURE TUBE HAVING AN INLINE ELECTRON GUN WITH AN EINZEL LENS

**David A. New, Manheim Township, Lancaster County, Pa., assignor to RCA Corporation, Princeton, N.J.**

**Filed Jul. 20, 1987, Ser. No. 75,782**
**Int. Cl.⁴ H01J** *29/62*
**U.S. Cl. 313—414** **4 Claims**



1. In a color picture tube including a neck, a funnel and a faceplate and having an inline electron gun in said neck for generating and directing three inline electron beams, a center beam and two side beams, along initially coplanar paths toward a screen of said tube, said gun including a plurality of spaced electrodes which form a main focus lens for focusing said electron beams, the improvement comprising

said plurality of spaced electrodes which form a main focus lens including three electrodes that form an einzel lens in the path of the electron beams, a first of the einzel lens electrodes includes a first portion having three inline apertures that are set back from a second portion of the first einzel lens electrode that forms a single large aperture through which all three electron beams pass, a second of the einzel lens electrodes includes a first portion having three inline apertures that are set back from a second portion of the second einzel lens electrode that forms a single large aperture through which all three electron beams pass, the second portion of the first einzel lens electrode facing the second portion of the second einzel lens electrode, the second einzel lens electrodes also includes a third portion having three inline apertures that are set back from a fourth portion of the third einzel lens electrode that forms a single large aperture through which all three electron beams pass, a third of the einzel lens electrodes includes a first portion having three inline apertures that are set back from a second portion of the third einzel lens electrode that forms a single large aperture through which all three electron beams pass, and the fourth portion of the second einzel lens electrode facing the second portion of the third einzel lens electrode.



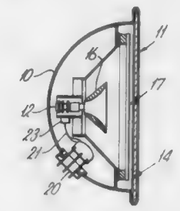
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**4,742,267**

## CATHODE RAY TUBES PROVIDED WITH FLEXIBLE CONNECTORS

**Leslie H. Francis, Horley, and Robert J. Baker, Lower Kingswood, both of England, assignors to U.S. Philips Corp., New York, N.Y.**

**Filed Aug. 7, 1986, Ser. No. 894,182**
**Claims priority, application United Kingdom, Aug. 30, 1985, 8521580**
**Int. Cl.⁴ H01J** *29/90;* **H01B** *7/00*
**U.S. Cl. 313—477 HC** **11 Claims**




1. A cathode ray tube comprising an envelope containing electrically operable components comprising at least means for producing an electron beam within the envelope, electrical leadthrough means extending through the wall of the envelope, and conductor means extending within the envelope and electrically coupled between the leadthrough means and terminals of the electrically operable components characterised in that the conductor means is a flexible circuit comprising at least one film of polyimide on which a plurality of conductive tracks are depsosited.

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**4,742,268**

## HIGH COLOR RENDERING CALCIUM-CONTAINING METAL HALIDE LAMP

**Nancy J. Caruso, Livingston, and Michael H. Masto, Bloomfield, both of N.J., assignors to North American Philips Electric Co., New York, N.Y.**

**Division of Ser. No. 771,483, Sep. 3, 1985, Pat. No. 4,643,690, which is a continuation of Ser. No. 493,176, May 10, 1983, abandoned. This application Oct. 20, 1986, Ser. No. 922,442**
**Int. Cl.⁴ H01J** *61/073, 61/18, 61/30*
**U.S. Cl. 313—620** **4 Claims**

1. A high intensity discharge lamp comprising

an isothermally shaped arc tube enclosing a space,

an ionizable material contained in said space,

at least two electrodes arranged in said space for establishment of an arc between said electrodes, and

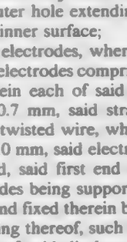
means for connecting said electrodes to a source of electric current,

characterized in that

said ionizable material comprises an additive fill of calcium iodide, thallium iodide, and tin iodide,

said arc tube is substantially ellipsoidal in shape, having circular symmetry about a longitudinal axis which is the major ellipsoid axis,

said electrodes have electrode tips lying substantially along said axis, and spaced so as to define an arc length which is at least 75% of the distance between the ellipsoid foci, and




said arc tube has a size such that, when operated at rated wattage, the cold spot temperature on said arc tube is at least 770° C. when installed in any orientation.

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**4,742,269**

## CERAMIC ENVELOPE DEVICE FOR HIGH-PRESSURE DISCHARGE LAMP

**Hirotsugu Izumiya, and Mikio Kariya, both of Nagoya, Japan, assignors to NGK Insulators, Ltd., Japan**

**Filed Nov. 4, 1985, Ser. No. 794,767**
**Claims priority, application Japan, Nov. 9, 1984, 59-170662[U]; Jul. 5, 1985, 60-103313[U]; Jul. 5, 1985, 60-103314[U]**
**Int. Cl.⁴ H01J** *61/073, 61/36*
**U.S. Cl. 313—624** **18 Claims**




1. A ceramic envelope device for a high-pressure metal vapor discharge lamp, comprising:

a translucent ceramic tube;

a pair of electrically conducting end caps having an inner surface and an outer surface and closing opposite ends of the ceramic tube, each of said end caps having an inner hole extending from said inner surface toward said outer surface and an outer hole extending from said outer surface toward said inner surface;

a pair of discharge electrodes, wherein at least one of said pair of discharge electrodes comprises a plurality of metallic strands, wherein each of said metallic strands has a diameter of 0.2–0.7 mm, said strands being twisted together to form a twisted wire, wherein said twisted wire has a pitch of 3–10 mm, said electrodes having a first end and a second end, said first end of at least one of said discharge electrodes being supported by said inner holes of each end cap and fixed therein by shrinkage of said end cap during sintering thereof, such that said second end of said at least one of said discharge electrodes protrudes from the inner surface of each corresponding end cap in a longitudinally inward direction in the ceramic tube; and

a pair of electric-power lead members, wherein at least one of said pair of lead members comprises a plurality of metallic strands, wherein each of said metallic strands has a diameter of 0.2–0.7 mm, said strands being twisted together to form a twisted wire, wherein said twisted wire

has a pitch of 3–10 mm, said lead members having a first end and a second end, said first end of at least one of said lead members being supported by said outer holes of each end cap and fixed therein by shrinkage of said end cap during sintering thereof, such that said second end of said at least one of said lead members protrudes outwardly from the outer surface of each corresponding end cap, wherein a plurality of radial spaces exists between at least a portion of an outer surface of said at least one of said discharge electrodes and an inner surface of said inner holes and a plurality of radial spaces exists between at least a portion of an outer surface of said at least one of said lead members and an inner surface of said outer holes.

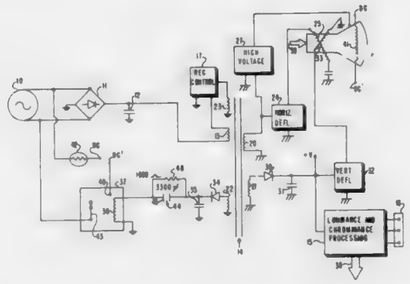
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**4,742,270**

## DEGAUSSING CIRCUIT WITH RESIDUAL CURRENT CUTOFF

**Ronald E. Fernsler, Indianapolis, and George C. Waybright, Carmel, both of Ind., assignors to RCA Corporation, Princeton, N.J.**

**Filed Sep. 30, 1985, Ser. No. 782,243**
**Int. Cl.[4] H01J** *29/06*
**U.S. Cl. 315—8** **4 Claims**



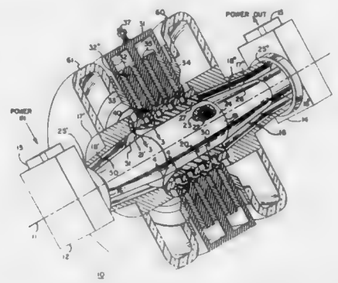

1. A degaussing circuit for a cathode ray tube of a video display apparatus comprising:
- means for providing an alternating current when said video display apparatus is energized;
- a degaussing coil disposed adjacent to said cathode ray tube;
- a switch responsive to the presence of said alternating current for causing said alternating current to flow in said degaussing coil;
- means coupled to said degaussing coil and to said switch and responsive to the flow of said alternating current for decreasing said current flow through said degaussing coil after a first predetermined internal to effect degaussing of said cathode ray tube;
- a capacitor coupled to said switch, said capacitor becoming charged for causing said switch to become nonconductive such that said current flow is terminated in said degaussing coil after a second predetermined interval greater than said first predetermined interval; and
- means for discharging said capacitor when said video display apparatus is deenergized.

**4,742,271**

## RADIAL-GAIN/AXIAL-GAIN CROSSED-FIELD AMPLIFIER (RADAXTRON)

**George H. MacMaster, Lexington, and Lawrence J. Nichols, Burlington, both of Mass., assignors to Raytheon Company, Lexington, Mass.**

**Continuation of Ser. No. 715,803, Mar. 25, 1985, abandoned.**
**This application Apr. 10, 1987, Ser. No. 37,088**
**Int. Cl.[4] H01J** *25/34*
**U.S. Cl. 315—39.3** **25 Claims**




1. A crossed-field amplifier tube for amplifying a microwave signal comprising:
- a coaxial input section for receiving said microwave signal;
- a coaxial output section for providing an amplified said microwave signal;
- a coaxial waveguide having an inner and an outer cylindrical conductor having a common axis connected at each end to said input and output sections;
- the cylindrical outer conductor of said coaxial waveguide being an anode and having at least one ring of axially-extending circumferentially-spaced slots through the wall of said outer conductor to form at least one ring of anode slots;
- cylindrical cathode circumferential rings surrounding and axially aligned with each ring of said anode slots respectively and radially spaced therefrom to form a cylindrical interaction region between each cathode ring and the corresponding ring of anode slots in said outer conductor;
- a magnetic structure providing a periodically reversing axial field in said interaction region at each said ring of anode slots; and
- a microwave filter located between the inner and outer conductors of said coaxial waveguide.

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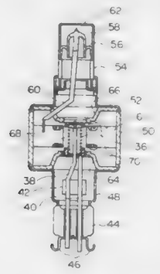
**4,742,272**

## MAGNETRON

**Jiro Kusano, Yokohama; Akikazu Harada, and Seiji Kitakaze, both of Mobara, all of Japan, assignors to Hitachi, Ltd. and Hitachi Device Eng. Co., Ltd., both of Tokyo, Japan**

**Filed Feb. 10, 1987, Ser. No. 12,993**
**Claims priority, application Japan, Mar. 26, 1986, 61-65762**
**Int. Cl.[4] H01J** *23/22*
**U.S. Cl. 315—39.69** **13 Claims**

1. A magnetron comprising:
- a hermetically sealed anode electrode cylinder;
- a plurality of vanes provided in a radial arrangement inside said anode electrode cylinder;
- two pairs of inner and outer strap rings, each pair being fixed to said vanes at each end thereof in the axial direction of said anode electrode cylinder;
- an antenna conductor connected to one of said vanes; and
- a metallic sealing member fixed hermetically to one end of said anode electrode cylinder, said antenna conductor extending to the outside through said metallic sealing member, wherein said inner and outer strap rings have diameters determined on the basis of a relation between an algebraic mean value of diameters of said inner and outer strap rings and an attenuation value of spurious microwave to be prevented from leaking, said algebraic mean value of diameters of said inner and outer strap rings being



substantially 1.75 to 1.95 times the diameter of a space defined by the tips of said vanes in the radial direction of said anode electrode cylinder.



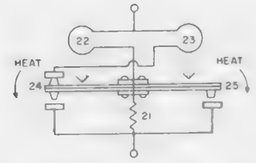
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**4,742,273**

## LONG LIFE INCANDESCENT LAMP

**Herbert E. Goldberg, 195 Heath's Bridge Rd., Concord, Mass. 01742**

**Filed Jul. 23, 1986, Ser. No. 888,391**
**Int. Cl.[4] H01J** *7/44*
**U.S. Cl. 315—65** **5 Claims**




1. A long life incandescent bulb switch comprising:
- terminals connectable to a source of power to supply power to a primary filament and a reserve filament when connected in series across said terminals,
- first sensing means operative to sense the presence or absence of voltage across said terminals,
- second sensing means operative to sense the presence or absence of current through said primary filament,
- switching means comprising a first, normally open shunt across said primary filament and a second, normally closed shunt across said reserve filament,
- said switching means responsive to said first and second sensing means and operative to close said first shunt and open said second shunt only when voltage is present at said terminals and current is absent through said primary filament; whereby the reserve filament is energized only upon failure of the primary filament.

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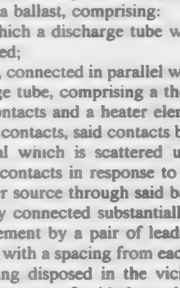
**4,742,274**

## ADJUSTABLE FLASHER PLUG FOR MULTIPLE PURPOSES

**Mei-mei Lin, P.O. Box 10160, Taipei, Taiwan**

**Filed Aug. 18, 1987, Ser. No. 86,796**
**Int. Cl.[4] H01J** *7/44*
**U.S. Cl. 315—72** **6 Claims**

1. An adjustable flasher plug comprising: a plug casing; a pair of conducting pins for connecting two terminals of a power source, a left conducting pin formed with a fork portion on its inner end, and a right conducting pin connected with a wire;
- a heating coil wound around a mica heating medium jacketed on a bimetallic strip having its one end formed as a contact plate operatively contacting said left pin and having its other end connected with said right pin;
- said bimetallic strip having a lower strip end normally biasing said contact plate of said coil rightwardly to contact said left pin and operatively bending leftwardly to release said contact plate of said coil from contacting said left pin, and having an upper strip end;
- a right load circuit having its left end formed as a contact plate normally contacting said upper strip end of said bimetallic strip and having its right end connected with said wire of said right pin;
- a left load circuit having its right end formed as the other contact plate operatively contacting said upper strip end



of said bimetallic strip when bending leftwardly as heated by said coil; an upper cam rotatably provided between said two contact plates of said two load circuits, adapted for adjusting a distance therebetween in terms of an alternative shift frequency of the contacting between said upper strip end with either said left circuit or said right circuit to thereby adjust the flashing frequency of the two load circuits; and
- a lower cam rotatably formed between two fork extensions of said fork portion of said left pin, adapted for adjusting a distance between the fork portion, in terms of a resilient contacting among said contact plate of said coil and said lower strip end of said bimetallic strip with said fork portion of said left pin.

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**4,742,275**

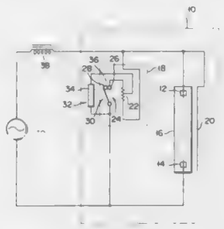
## HIGH PRESSURE METAL VAPOR DISCHARGE LAMP WITH STARTING ELEMENT

**Akira Ito, and Kouzou Kawashima, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Continuation of Ser. No. 786,597, Oct. 11, 1985, abandoned.**
**This application May 1, 1987, Ser. No. 45,232**
**Claims priority, application Japan, Oct. 12, 1984, 59-212560; Dec. 27, 1984, 59-273660**
**Int. Cl.[4] H05B** *39/04*
**U.S. Cl. 315—104** **6 Claims**

1. A high pressure metal vapor discharge lamp connected to a power supply via a ballast, comprising:
- an envelope in which a discharge tube with a pair of electrodes is disposed;
- a starting element, connected in parallel with said electrodes of said discharge tube, comprising a thermal switch having a pair of contacts and a heater element connected in series with said contacts, said contacts being composed of contact material which is scattered upon opening and closing of said contacts in response to a starting current from said power source through said ballast; and
- an insulating body connected substantially in parallel with said starting element by a pair of leads attached to said insulating body with a spacing from each other, said insulating body being disposed in the vicinity of a contact point of said contacts of said thermal switch such that

contact material which is scattered upon opening and closing of said contacts is deposited on said insulating body between said leads so as to form a conductive connection between said leads, wherein a resistance of said insulating body decreases in response to the amount of



said contact material deposited on said insulating body due to repeated operations of said thermal switch, thereby decreasing an equivalent resistance of said insulating body and said starting element so as to decrease a starting voltage of said starting element in response to said starting current from said power source.

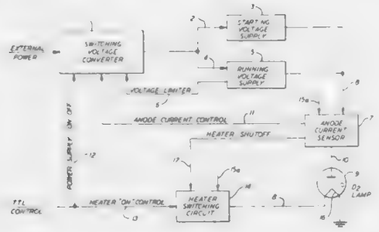
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**4,742,276**

## REGULATED DEUTERIUM ARC SUPPLY SYSTEM

**Yeegee Ku, Bloomingdale, Ill., assignor to The Perkin-Elmer Corporation, Norwalk, Conn.**

**Filed Jul. 25, 1986, Ser. No. 889,536**
**Int. Cl.[4] H05B *41/36***
**U.S. Cl. 315—106** **15 Claims**




1. A power supply system for a deuterium arc lamp comprising, in combination:

a variable output switching voltage converter for generating a pulsed output voltage when energized from an external voltage source;

a voltage multiplier storage circuit driven from said output voltage for supplying starting voltage to the arc in said deuterium lamp;

a rectifier storage circuit driven from said output voltage for supplying running anode arc current to said lamp;

current sensor means coacting with said voltage converter for continuous feedback control of said output voltage in response to anode current level of said deuterium arc lamp; and

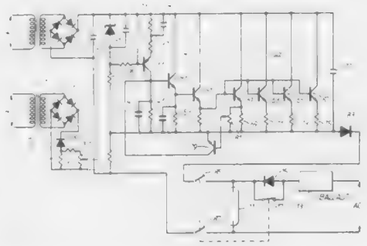
switching means for applying cathode heater current to said arc lamp coincidentally with the energization of said voltage converter from said external voltage source.

**4,742,277**

## PULSE GENERATING APPARATUS FOR XENON LAMP AND LIGHTING METHOD THEREOF

**Masakazu Shibuya, Yokosuka; Yasuki Mori, Yokohama; Yoshiyuki Tokuda, Yokosuka; Yoichiro Mitsuyuki, Tokyo, and Akihiro Kamiya, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Jul. 29, 1987, Ser. No. 79,049**
**Claims priority, application Japan, Jul. 29, 1986, 61-178307**
**Int. Cl.[4] H05B *37/00***
**U.S. Cl. 315—176** **6 Claims**



1. A pulse generating apparatus for a xenon lamp, comprising:

base current means for generating a constant DC current having a first prescribed current level for turning on the xenon lamp; and

pulse current means for adding a pulse current having a second prescribed current level greater than the first current level and a prescribed pulse duration within a prescribed repetition period to the constant DC current, the base current means and pulse current means satisfying the following equations:

$$1.4 \leqq Imax/Imini \leqq 6$$

$$0.2 \leqq t/T \leqq 0.7$$

$$T \leqq 1/40$$

where Imax is the sum of the first prescribed current level and the second prescribed current level, Imini is the first prescribed current level, T is the prescribed repetition period, and t is the prescribed pulse duration.

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**4,742,278**

## SINGLE CONNECTION GAS DISCHARGE DISPLAY AND DRIVER

**Robert E. Iannini, Brook Rd., Mount Vernon, N.H. 03057**

**Filed Jun. 3, 1987, Ser. No. 57,617**
**Int. Cl.[4] H05B *41/16***
**U.S. Cl. 315—248** **41 Claims**



1. In an elongated cold cathode gas discharge tube containing an ionizable gas and power source to ionize the gas to cause illumination thereof, the improvement comprising:



(a) the gas discharge tube having a single cathode element at one end in contact with the gas; and,

(b) the power source being connected to said single cathode element and producing alternating voltage referenced to ground potential and of sufficient frequency to cause the gas to ionize through the natural surrounding capacitance between the ionized gas and ground potential; wherein

the power source producing an increasing voltage ramp output whereby the ionization of the gas in the tube moves as a localized ionization along the tube in a direction away from said single cathode element.

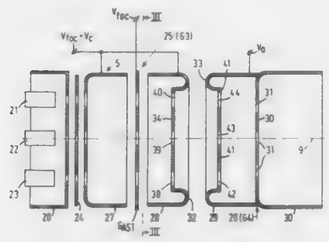
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**4,742,279**

## COLOR DISPLAY TUBE WITH REDUCED DEFLECTION DEFOCUSSING

**Jan Gerritsen, and Joannes C. J. Aerts, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Jan. 12, 1987, Ser. No. 2,065**
**Claims priority, application Netherlands, Jan. 21, 1986, 8600117**
**Int. Cl.[4] H01J *29/58***
**U.S. Cl. 315—382** **9 Claims**



1. A color display tube comprising an envelope containing a luminescent screen, and an electron gun for producing deflectable central and first and second outer in-line electron beams directed toward said screen, characterized in that said electron gun comprises, in succession:

a. a plurality of in-line cathodes for emitting respective ones of the electron beams;

b. first electrode means including a first prefocusing electrode having central and first and second outer apertures for passing the respective electron beams;

c. second electrode means including a plurality of discrete electrodes each having central and first and second outer apertures for passing respective ones of the electron beams, said electrodes including:

(1) a second prefocusing electrode disposed adjacent the first prefocusing electrode, upon application of respective voltages thereto said prefocusing electrodes producing therebetween a prefocusing lens field for prefocusing the electron beams;

(2) a first main-focusing electrode disposed remotely from the first electrode means; and

(3) an auxiliary electrode disposed between the second prefocusing electrode and the first main-focusing electrode, the central and first and second outer apertures in the auxiliary electrode being shaped to produce a quadripolar field for astigmatically affecting the cross-sectional shapes of the electron beams; and

d. third electrode means including a second main-focusing electrode disposed adjacent the first main-focusing electrode and having central and first and second outer apertures for passing respective ones of the electron beams, upon application of respective voltages thereto said main focusing electrodes producing therebetween a main focusing lens field for focusing the electron beams onto the screen;

during operation, said auxiliary electrode having applied thereto a constant voltage and at least said first main-focusing electrode having applied thereto a variable control voltage, variation of said control voltage affecting the astigmatism of the electron beams in a first direction substantially independently of said astigmatism in a direction perpendicular to said first direction.

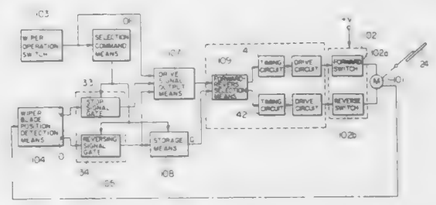
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**4,742,280**

## CONTROL DEVICE FOR WIPER APPARATUS WITH TWO-DIRECTION ROTATABLE MOTOR

**Toshihiro Ishikawa, Kosai; Keiichi Uemura, Kariya; Makoto Aso, Kariya, and Masaaki Fukaya, Kariya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan**

**Filed Feb. 6, 1987, Ser. No. 12,069**
**Claims priority, application Japan, Feb. 14, 1986, 61-30485; Feb. 18, 1986, 61-33176**
**Int. Cl.[4] B60S *1/08***
**U.S. Cl. 318—282** **6 Claims**




1. A control device for wiper apparatus using a two-direction rotatable motor, comprising:

a wiper motor;

means for detecting the position of a wiper blade driven by the wiper motor;

switch means for controlling the current of the wiper motor to reverse the current of the wiper motor;

a wiper operating switch producing a control signal;

control means receiving said control signal, for starting the wiper blade from an accommodation stop position thereof with a starting operation of the wiper operating switch to perform a reciprocating wiping operation within a predetermined range through said switch means and returning the wiper blade to the accommodation stop position again;

said position detecting means including brush means for generating a stop signal when said accomodation stop position is reached;

reversing brush means for generating a reversing signal when the wiper blade reaches a position opposite to two reversing positions and within the predetermined range of the reciprocating wiping operation;

a conductive portion for sliding contact with said brush means and said reversing brush means; and

means for changing relative positions of the conductive portion with respect to said brush means and said reversing brush means with the rotation of the wiper motor;

said control means including:

means for changing an output signal each time the reversing signal from the reversing brush means of the position detecting means is introduced to an input side, producing said output signal at an output side thereof upon operation of the wiper operating switch for commanding the stop of the wiping operation;

storage means for storing the output signal;

forward-reverse selection means receiving the output signal from the storage means and for supplying a selected one of a forward and reversing signal to the switch means in accordance with the output signal of the storage means thereby to command selection of a selected one of forward and reverse drives; and

means connected to the wiper operating switch and the

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position detecting means for generating a drive signal to control the switch means so as to stop the wiper blade at the accommodation stop position in accordance with the stop signal from the position detecting means.

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**4,742,281**

## SPEED CONTROL APPARATUS FOR A DC MOTOR

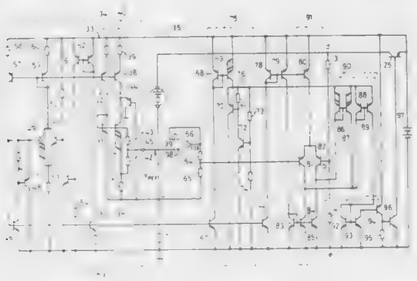
**Hiromitsu Nakano, Hirakata; Mitsuru Yamane, Katano, and Isao Yoshida, Suita, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan**

**Filed Nov. 8, 1985, Ser. No. 796,407**

**Claims priority, application Japan, Nov. 12, 1984, 59-237812; Nov. 12, 1984, 59-237814**

**Int. Cl.⁴ G05G *5/00*; H02P *5/00***

**U.S. Cl. 318—317** **18 Claims**



1. A speed control apparatus for a DC motor comprising:

a bridge circuit including three resistive arms and another arm having a DC motor in-circuit therewith, said bridge circuit for generating a voltage proportional to the speed of rotation of the DC motor across voltage output points of said bridge circuit;

constant voltage generating means which comprises a first transistor which is connected by its collector and base to a first current feeding means and the emitter of said first transistor is connected to a first voltage output point, and a second transistor which is connected by its collector to a second current feeding means and has smaller emitter current densities than that of said first transistor and the emitter of said second transistor is connected through a first resistor to said first voltage output point operated with each other and having different respective emitter current densities, said constant voltage generating means providing a sum of a difference voltage between the base-emitter voltages of the first transistor and the second transistor and a voltage obtained by dividing the base-emitter voltage of the second transistor;

reference voltage generating means for generating a reference voltage as a function of the output of the constant voltage generating means;

a differential amplifier for providing a difference output for the voltage across the voltage output points and the reference voltage;

current control means for controlling current to be fed to the bridge circuit as a function of the voltage across the voltage output points and the reference voltage, thereby to control current of the DC motor in the bridge current;

reference current generating means for generating reference currents for controlling said first current feeding means and said second current feeding means;

means for summing a voltage difference between the base-emitter voltages of said first transistor and said second transistor and a voltage provided by dividing the base-emitter voltage of said second transistor; and

a third transistor connected by its emitter to the collector of said second transistor and by its base to said first voltage output point.

**4,742,282**

## BRAKE PULSE FORMING CIRCUIT FOR A VIDEO TAPE RECORDER

**Ayumu Okutani, Nara, and Yukinori Konushi, Katano, both of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan**

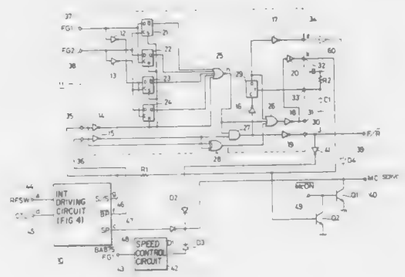
**PCT No. PCT/JP86/00522, § 371 Date May 20, 1987, § 102(e) Date May 20, 1987, PCT Pub. No. WO87/02501, PCT Pub. Date Apr. 23, 1987**

**PCT Filed Oct. 13, 1986, Ser. No. 58,229**

**Claims priority, application Japan, Oct. 15, 1985, 60-157161[U]**

**Int. Cl.⁴ H02P *3/10***

**U.S. Cl. 318—374** **6 Claims**




1. In a video tape recorder having a capstan motor for intermittently driving a tape with a predetermined time interval, a brake pulse forming circuit for forming a brake pulse having a corrected pulse width and applying the same to said capstan motor to brake the capstan motor in a reverse direction during tape traveling, comprising:

means for supplying said capstan motor with a motor driving signal for driving said capstan motor,

means for generating a brake pulse having a constant pulse width and applying the same to said capstan motor at the time of braking said capstan motor in a reverse direction,

means for generating first and second FG signals, out of phase with each other, associated with rotation of said capstan motor,

first latch means for latching a level of said first FG signal at the rising edge of said second FG signal,

second latch means for latching a level of said second FG signal at the rising edge of said first FG signal,

third latch means for latching a level of an inverted signal of said first FG signal at the falling edge of said second FG signal,

fourth latch means for latching a level of an inverted signal of said second FG signal at the falling edge of said first FG signal,

a first gate for outputting a signal indicating reverse detection of said capstan motor in response to the outputs of said first, second, third and fourth latch means,

a second gate for correcting a constant pulse width of said brake pulse so that said brake pulse may be terminated in response to the output of said first gate, and

a third gate for correcting said motor driving signal so that said motor driving signal may be terminated in response to the output of said first gate.

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**4,742,283**

## GUIDANCE SYSTEM FOR INDUCTIVELY COUPLED ELECTRIC VEHICLES

**John G. Bolger, Orinda, and Lung S. Brian Ng, Berkeley, both of Calif., assignors to Inductran Corporation, Berkeley, Calif.**

**Filed Nov. 28, 1986, Ser. No. 936,141**

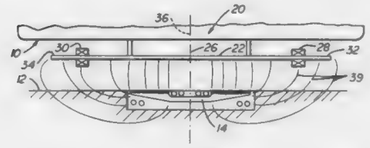
**Int. Cl.⁴ G05D *1/00***

**U.S. Cl. 318—587** **9 Claims**

1. An automatic guidance device for an electrically driven vehicle adapted for use on a prepared roadway having an associated power source including a magnetic circuit containing a ferrous metal core to create a magnetic field, said vehicle having wheels including at least one pair of steerable wheels, a steering actuator connected to said wheels, a power receiving means including a ferrous metal core adapted to inductively couple with said roadway core and furnish power therefrom to a vehicle drive means, said automotive guidance comprising:

an elongated ferrous rod attached to said vehicle in a position substantially perpendicular to the longitudinal center line of said vehicle;

a first pair of sensor coils attached to said ferrous rod at spaced apart locations thereon, said coils being spaced equi-distant from the midpoint of said rod and also inwardly from its opposite ends so that the end portion of said rod extending outwardly from each sensor coil forms



a receiving pole for magnetic flux from said roadway core, said flux being adapted to flow longitudinally through said ferrous rod and thereby produce voltage outputs from said sensor coils, said outputs from said sensor coils being equal when said vehicle is directly above said roadway core;

means for comparing said voltage outputs from said sensor coils to produce an error signal when said vehicle moves laterally away from said roadway core and said outputs are therefore not equal;

means for supplying said error signal to said steering actuator on said vehicle to cause it to maintain the vehicle and its power receiving means substantially directly above said roadway core as said vehicle moves forwardly along it.

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**4,742,284**

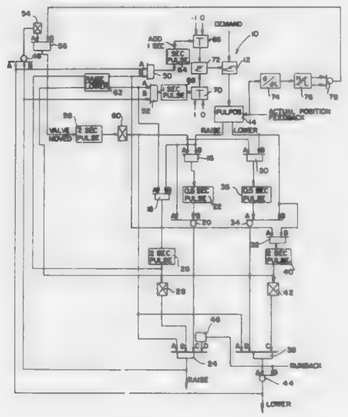
## ADVANCED MOTOR CONTROLLER

**Donald J. Dziubakowski, Seven Hills; Erik P. Kristoffersen, Cleveland Heights, and Ronald J. Teer, Painesville, all of Ohio, assignors to The Babcock & Wilcox Company, New Orleans, La.**

**Filed Dec. 9, 1986, Ser. No. 940,137**

**Int. Cl.⁴ G05B *5/01***

**U.S. Cl. 318—624** **5 Claims**




1. A control device for close positioning or modulating control of a positioning device comprising means for comparing the actual position of the positioning device with the desired position of the positioning device, said comparing means producing an output signal when said actual position of the positioning device differs from said desired position of the positioning device by more than a predetermined value, and means responsive to said output signal produced by said comparing means, said output signal responsive means causing the positioning device to move toward said desired position if a first predetermined period of time has elapsed since the last movement of the positioning device and if a second predetermined period of time has elapsed if the last movement of the positioning device was in a direction opposite to that of said desired position of the positioning device, said output signal responsive means including means for increasing the period of time the positioning device is actuated if the last movement of the positioning device was in a direction opposite to that of said desired position of the positioning device.

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**4,742,285**

## FULL FOLLOW-UP TYPE SERVO-SYSTEM

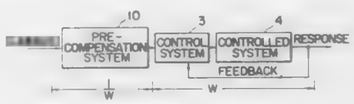
**Yoshinari Sasaki, Shunto, and Jun Fujita, Numazu, both of Japan, assignors to Toshiba Kikai Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 3, 1987, Ser. No. 21,264**

**Claims priority, application Japan, Mar. 14, 1986, 61-56506**

**Int. Cl.⁴ G05D *23/275***

**U.S. Cl. 318—632** **6 Claims**




1. A full follow-up type servo-system wherein when a transfer function of a servo-system comprising a control system and an object to be controlled is designated by W, said control system is preceded by a pre-compensation system with an inverse function 1/W of said transfer function W thereby to input a control command into said pre-compensation system.

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**4,742,286**

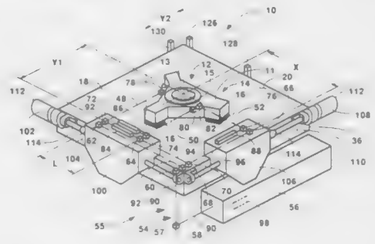
## GAS BEARING X-Y-θ STAGE ASSEMBLY

**Edward H. Phillips, Middletown, Calif., assignor to Micro-Stage, Inc., Chatsworth, Calif.**

**Filed Oct. 29, 1985, Ser. No. 792,436**

**Int. Cl.⁴ G05B *1/06***

**U.S. Cl. 318—640** **13 Claims**



1. An X-Y-θ stage assembly comprising:

a base having a substantially flat surface;

stage means movable along orthogonal X- and Y-axes and rotatable about an orthogonal third axis for holding a workpiece and for moving the workpiece in a plane paral-

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lel to the substantially flat surface, said stage means having a first, second, and third retroreflector, with each retroreflector fixedly mounted thereto;

and control means for controlling movement of said stage means, said control means comprising:

transport means responsive to a first circuit means, said transport means comprising first and second gas bearing slide assemblies which are movable parallel to said Y-axis and X-axis, respectively, over said base;

first interferometer means which is fixedly mounted to said first gas bearing slide assembly and which is separated an optical distance D1 from said first retroreflector, for measuring changes in a first parameter associated with changes in said distance D1, measured along the X-axis, and for providing a first signal corresponding to changes in the distance D1;

second interferometer means which is fixedly mounted to said second gas bearing slide assembly and which is separated an optical distance D2 from said second retroreflector, for measuring changes in a second parameter associated with changes in said distance D2, measured along the Y-axis, and for providing a second signal corresponding to changes in said distance D2;

third interferometer means which is fixedly mounted to said second gas bearing slide assembly and which is separated an optical distance D3 from said third retroreflector, for measuring changes in a third parameter associated with changes in said distance D3, measured along the Y-axis, and for providing a third signal corresponding to changes in said distance D3;

said transport means for moving said first interferometer means parallel to said Y-axis to provide a position reference for said first interferometer means and to provide optical coupling between said first interferometer means and said first retroreflector as said stage moves, and for moving said second and third interferometer means parallel to said X-axis to provide a position reference for said second and third interferometer means and to provide optical coupling between said second and third interferometer means and said second and third retroreflectors, respectively, as said stage moves;

and second circuit means for causing said stage means to move to a preselected X-Y position and a preselected orientation about said third axis in response to said first, second, and third signals.

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**4,742,287**

**MOTOR DRIVING DEVICE FOR PRINTER**

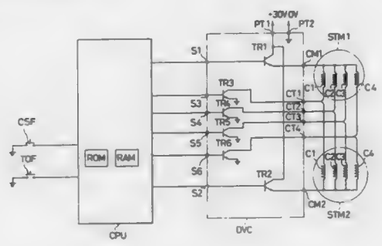
**Takeshi Yokoi, Kagamigahara, and Shuhei Okamori, Nagoya, both of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan**

**Filed Dec. 29, 1986, Ser. No. 947,191**

**Claims priority, application Japan, Dec. 27, 1985, 60-298900**

**Int. Cl.[4] G05B *8/00***

**U.S. Cl. 318—696** **2 Claims**




1. A motor driving device in a printer comprising a first stepping motor having a plurality of phase coils for driving a first driven section and a second stepping motor having a plurality of phase coils similar in number to the phase coils of said first stepping motor for driving a second driven section in which the motor driving device comprises

driving circuit means including a first drive selection element connected to a common terminal of the phase coil of said stepping motor, said first drive selection element selecting and driving said first stepping motor in accordance with a first selection signal, a second drive selection element connected to a common terminal of the phase coils of said second stepping motor said second drive selection element selecting and driving said second stepping motor in accordance with the second selection signal, and a plurality of phase current flowing elements each of which is commonly connected to the respective ends of the same phase coil of said first and second stepping motors for carrying out switching operations for said first and second stepping motors in accordance with phase control signals.

control circuit means for outputting said first and second selection signals to said first and second drive selection elements respectively thereby selecting one of said first and second stepping motors, and for outputting said phase control signals to said phase current flowing elements respectively in a given timing sequence, thereby causing rotation of said selected stepping motor,

memory means for memorizing data which correspond to said outputted phase control signals, thereby recognizing rotation position of said selected stepping motor, said data for the selected motor being adapted to be read from said memory means by said control circuit means when the phase control signals are outputted again subsequent times the same motor is selected.

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**4,742,288**

**CONTROL SYSTEM FOR AC MOTOR/GENERATOR OF SECONDARY AC EXCITATION TYPE**

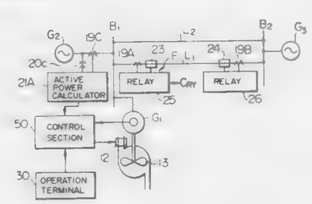
**Osamu Sugimoto, Suita; Tadaatsu Kato, Takarazuka; Hidenori Sawa, Hitachi; Akio Ito, Hitachi; Hiroshi Sugisaka, Hitachi; Haruo Nohara, Hitachi, and Masuo Goto, Hitachi, all of Japan, assignors to Hitachi, Ltd. and The Kansai Elect. Power, both of Tokyo, Japan**

**Filed Oct. 6, 1986, Ser. No. 915,392**

**Claims priority, application Japan, Oct. 8, 1985, 60-222812; Feb. 5, 1986, 61-23162**

**Int. Cl.[4] H02P *1/26***

**U.S. Cl. 318—818** **4 Claims**




1. A control system for controlling the load of a variable-speed AC motor/generator having a primary winding connected to a power system to which at least one synchronous machine is also connected in parallel to said AC motor/generator, said AC motor/generator having a secondary AC excitation winding, said control system comprising:

excitation means connected between said power system and the secondary winding of said AC motor/generator for receiving an AC power from said power system and for producing an AC excitation current having a controlled phase angle which is supplied to the secondary excitation winding of said AC motor/generator for controlling at least an active power produced by said AC motor/generator according to the phase angel of said AC excitation current,



phase angle control means for producing a phase angle signal based on an externally applied output command including at least an active power command indicating a desired active power to be produced by said AC motor/generator and for applying said phase angle signal to said excitation means so as to cause said excitation means to produce said AC excitation current having a phase angle determined by said phase angle signal,

active power detecting means for detecting an AC active power transmitted between said power system and the at least ore synchronous machine connected to said power system in parallel to said AC motor/generator, and

correcting means for correcting said active power command according to a variation of the active power detected by said active power detecting means so that said phase angle signal is produced in accordance with the corrected active power command.

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**4,742,289**

**METHOD FOR THE CYCLICAL TRICKLE CHARGING OF A CHARGEABLE BATTERY INTENDED FOR EMERGENCY OPERATION**

**Tommy Wahlström, Pl 4571, S-434 00 Kungsbacka, Sweden**

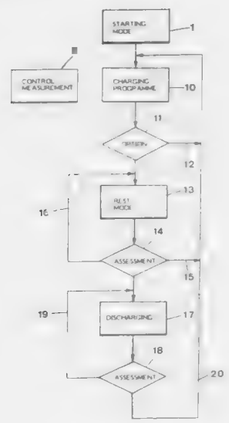
**PCT No. PCT/SE85/00359, § 371 Date May 6, 1986, § 102(e) Date May 6, 1986, PCT Pub. No. WO86/01948, PCT Pub. Date Mar. 27, 1986**

**PCT Filed Sep. 19, 1985, Ser. No. 863,259**

**Claims priority, application Sweden, Sep. 19, 1984, 8404690**

**Int. Cl.[4] H02J *7/00***

**U.S. Cl. 320—14** **5 Claims**




1. A method for reconditioning and cyclically trickle charging by a variable direct current (d.c.) source a chargeable battery, which battery has a specified battery voltage and is particularly intended for emergency operations, said method comprising:

(1) defining a starting mode as a reference condition, which starting mode includes routine control measurements;

(2) charging said battery in conformance with a charging program wherein said battery is charged by said variable d.c. voltage source at a plurality of different voltages for a plurality of different time periods;

(3) measuring said battery voltage after charging and comparing said measured voltage to said specified battery voltage;

(4) selecting one of again charging said battery and thereafter measuring said battery voltage at a measured voltage below said battery voltage, and providing a rest mode when said measured voltage is at least at said specified battery voltage;

(5) continuously measuring said battery voltage during said rest mode and comparing said voltage to a predetermined first battery voltage;

(6) charging said battery with said variable d.c. source according to said charging program to said specified battery voltage when said battery voltage is less than said predetermined first battery voltage;

(7) monitoring continuously the duration of said rest period and comparing the elapsed time to a predetermined time period;

(8) discharging said battery according to a discharge program when the elapsed time is equal to said predetermined time period;

(9) continuously monitoring said battery voltage during said discharge program and comparing said voltage to a predetermined second battery voltage; and,

(10) iterating said charging, measuring and monitoring steps to charge said battery according to said charging program after said monitored battery voltage has decreased below said predetermined second battery voltage.

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**4,742,290**

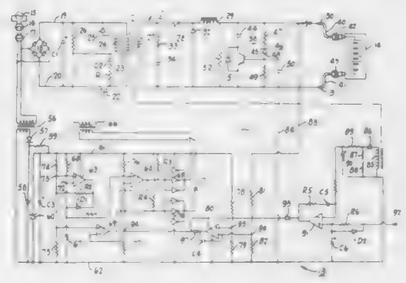
**RECHARGING BATTERY CHARGER**

**Richard C. Sutphin, Cuba, N.Y.; Steven R. Bell, Shinglehouse, Pa., and Kurt Monsell, Portville, N.Y., assignors to Acme Electric Corporation, Olean, N.Y.**

**Filed Jun. 2, 1986, Ser. No. 869,973**

**Int. Cl.[4] H02J *7/00***

**U.S. Cl. 320—21** **9 Claims**



1. A microprocessor controlled battery charger adapted to be connected to a battery to be charged, said battery charger comprising, in combination:

means to read the voltage of the battery;

a microprocessor to establish a charging of said battery by said charger until substantially fully charged and then terminating said charging;

said reading means at least periodically reading the voltage of the battery after the termination of charging and determining if the battery voltage has decreased below a predetermined value;

said microprocessor establishing recharging of the battery at a first charging rate until the rate of change of voltage with time is less than x/100 volts per hour at which time the current is reduced to a second charging rate for a finishing charge of the battery, where x is a positive number; and

selector means to select the values of said first and second charging rates.

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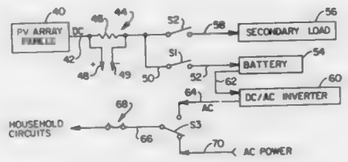


**4,742,291**

## INTERFACE CONTROL FOR STORAGE BATTERY BASED ALTERNATE ENERGY SYSTEMS

**Joseph A. Bobier, St. Mary's, and Gerald E. Brown, Parkersburg, both of W. Va., assignors to Bobier Electronics, Inc., Parkersburg, W. Va.**

**Filed Nov. 21, 1985, Ser. No. 800,556**
**Int. Cl.[4] H02J** *7/00, 9/04*
**U.S. Cl. 320—39** **24 Claims**




1. Interface apparatus for selectively applying power generated by an energy source to a storage battery exhibiting variable battery voltage values including values representing fully charged and predetermined chargeable conditions, said source having given currents and levels of voltage, said apparatus comprising:

charge switch means actuable between open and closed conditions for electrically coupling said storage battery and said source;

first monitoring means for monitoring said source for the presence of said current and having enable and disable conditions in the respective presence and absence thereof;

second monitoring means for monitoring said source for the presence of said source voltage and said storage battery for said voltage values and having an enable signal when said source voltage level is at least equal with a monitored said battery voltage value;

third monitoring means for monitoring said storage battery and having a charge start output when said battery voltage value represents said predetermined chargeable condition; and

control means responsive to said second monitoring means enable signal and to said third monitoring means charge start output to transition from a non-charge condition to a charge condition for actuating said charge switch means to said closed condition for a predetermined sampling interval of time, responsive to said first monitoring means enable condition in the presence of said second monitoring means enable signal and further in the presence of said third monitoring means charge start output to maintain said charge condition said control means being responsive at the termination of said sampling interval in the absence of said first monitoring means enable condition to actuate said charge switch means from said closed condition to said open condition.

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**4,742,292**

## CMOS PRECISION VOLTAGE REFERENCE GENERATOR

**Charles R. Hoffman, Raleigh, N.C., assignor to International Business Machines Corp., Armonk, N.Y.**

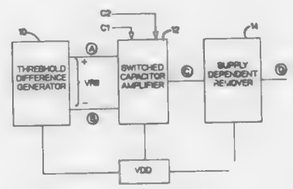
**Filed Mar. 6, 1987, Ser. No. 23,189**
**Int. Cl.[4] G05F** *3/22*
**U.S. Cl. 323—314** **9 Claims**

1. A reference voltage generator circuit for implementation in CMOS technology, said circuit comprising:

a first means for generating a differential voltage;

a second means for amplifying and shifting the differential voltage to provide a single ended voltage; and

a third means for selectively removing unwanted components from said single ended voltage and to provide a reference voltage that is supply and temperature independent; said third means including a voltage follower network having an input node and an output node, a first and a second current mirror networks connected in series to




the voltage follower network wherein the gain of the current mirrors is 2 and 1, respectively.

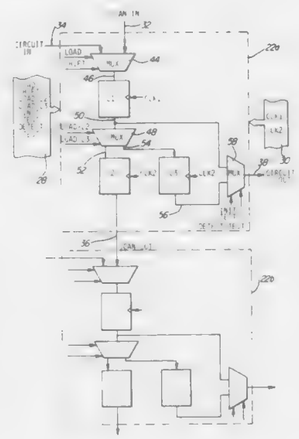
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**4,742,293**

## PSEUDO-MEMORY CIRCUIT FOR TESTING FOR STUCK OPEN FAULTS

**Frances D. Koo, Los Angeles, and Gene W. Lee, Huntington Beach, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Apr. 6, 1987, Ser. No. 34,973**
**Int. Cl.[4] G01R** *31/28*
**U.S. Cl. 324—73 R** **15 Claims**



1. A method of testing for stuck-open faults in integrated circuits having a plurality of combinational logic devices, said method comprising:

loading an initialization test pattern into a first latch in a stage in a chain of shift register stages;

thereafter, loading a detection test pattern into a second latch in each of the stages; and

multiplexing the first and second latches to apply the initialization test pattern and detection test pattern to the combinational logic in quick succession.

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**4,742,294**

## HELIX CURRENT SENSE SYSTEM

**George C. Gallios, Setauket, N.Y., assignor to Venus Scientific Inc., Farmingdale, N.Y.**

**Filed Jul. 16, 1986, Ser. No. 886,809**
**Int. Cl.[4] G01R** *31/24, 19/04*
**U.S. Cl. 324—117 R** **23 Claims**

5. A current sensor for measuring a helix current of a TWT, said sensor comprising:

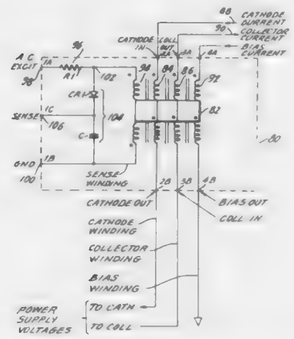
a magnetic sensing device having a magnetic core and first



and second windings thereon for receiving, respectively, a cathode current and a collector current of said TWT, a bias winding for receiving a bias current, and a sense winding having an inductance which is related to a permeability of said magnetic core;

means for generating and controlling said bias current so as to substantially avoid any variation in said permeability of said core due to ambient temperature variations; said means for generating and controlling said bias current comprising:

(1) a magnetic reference device having a magnetic core whose permeability characteristics are closed matched to those of said magnetic core of said magnetic sensing device, said reference device having a reference winding for receiving a constant reference current, a bias




winding for receiving said bias current, and a sense winding whose inductance is related to the permeability of said reference core;

(2) means for sensing the inductance of said sense winding of said magnetic reference core and for producing a feedback electrical output which is representative of said inductance; and

(3) a bias current generator for sensing said feedback electrical output and for producing said bias current, said bias current being controlled so as to cause said feedback electrical output to remain substantially constant irrespective of ambient temperature variations; and

means for sensing the inductance of said sensing winding and for producing an electrical output which is representative of said inductance and of said helix current.

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**4,742,295**

## STATIC CONDUCTIVITY TESTER

**Vance Nahman, Santa Clara, Calif.; Roger Fahlberg, Denver, and James D. Shepherd, Evergreen, both of Colo., assignors to The Gates Rubber Company, Denver, Colo.**

**Filed Oct. 28, 1985, Ser. No. 791,879**
**Int. Cl.[4] G01R** *27/02, 31/02*
**U.S. Cl. 324—133** **3 Claims**

1. A tester for comparing the resistivity or conductivity of an elastomeric article against a predetermined standard to determine its suitability for a specific application, said tester comprising:

a direct current voltage source capable of supplying the tester with a source electrical potential;

means for flowing the electrical current of the testing device through the elastomeric article to be tested;

switching mechanism circuitry with multiple settings that provides a means for selecting one of the settings, each setting selected to trip a switch within the switching mechanism circuitry that corresponds to a particular configuration of electrical components to correspond to a type of test; wherein at least one setting is capable of checking the source electrical potential of the direct current voltage source so that the output indicator will indicate "pass" if the direct current voltage source is holding a voltage sufficient to supply the tester with the source electrical potential necessary to allow the tester to test the elastomeric articles against the predetermined standards;

a comparator network comprising two direct current differential-input comparator amplifiers, each amplifier having a first inverting and second non-inverting input terminal and an output terminal, wherein each of the first inverting input terminals is connected to a reference branch circuit comprising at least one known resistance and the source electrical potential, and wherein each of the second non-inverting input terminals is connected to an input test branch circuit comprising the source electrical potential, the switching mechanism, and the means for flowing the




electrical current; the comparator network serving to compare the potential generated from the reference branch circuit with the potential generated from the input test branch circuit; and

an output indicator comprising a "fail" indication means connected to one of the two comparator amplifiers by way of its output terminal, and a "pass" indication means connected to the other one of the two comparator amplifiers by way of its output terminal; the output indicator to indicate "pass" when the potential generated from the input test branch circuit exceeds the potential generated from the reference branch circuit, and the output indicator to indicate "fail" when the potential generated from the reference branch circuit exceeds the potential generated from the input test branch circuit.

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**4,742,296**

## ARRANGEMENT FOR MEASURING ELECTRICAL POWER

**Jan Petr, Oberwill; Radivoje Popovic, and Thomas Seitz, both of Zug, all of Switzerland, assignors to LGZ Landis & Gyr ZUG AG, Zug, Switzerland**

**Filed Oct. 22, 1986, Ser. No. 922,124**
**Claims priority, application Switzerland, Feb. 10, 1986, 00516/865**
**Int. Cl.[4] G01R** *21/08, 21/133*
**U.S. Cl. 324—142** **42 Claims**

1. An arrangement for measuring electrical power comprising:

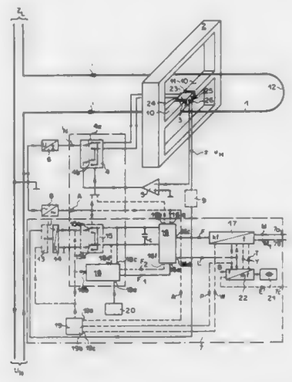
an electrical conductor traversed by an electrical current i,

a Hall element,

a voltage-to-current converter for transforming an electrical voltage $u_N$ into a proportional supply current $i_N$ for said Hall element, said Hall element being adapted to produce an intelligence containing output signal $u_H$ that is proportional to the product ($\pm i \cdot u_N$) of the current i and the voltage $u_N$,

a ferromagnetic core that has at least one air gap and is excited by the current i, said Hall element being arranged in said air gap,

a voltage-to-frequency converter for transforming the Hall element output voltage $\pm u_H$ into a proportional pulse frequency, said voltage-to-frequency converter having an integrator including a capacitor and at least two signal sources, and



switching means for periodically switching an intelligence containing signal component proportional to said signal $\pm u_H$ and for switching said signal sources to compensate an offset voltage.

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**4,742,297**

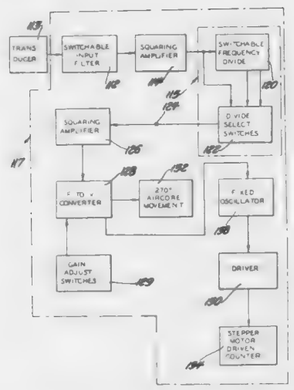
**PROGRAMMABLE CYCLE METER**

**Robert J. Heaton, and Timothy J. O'Rourke, both of Sarasota, Fla., assignors to Teleflex Incorporated, Limerick, Pa.**

**Continuation-in-part of Ser. No. 752,802, Jul. 8, 1985, abandoned. This application Oct. 1, 1986, Ser. No. 913,946**

**Int. Cl.[4] G01D** *3/48*

**U.S. Cl. 324—166** **27 Claims**




**24**. A method of monitoring a cycling member to provide accurate meter readings for various configurations of the cycling member, the steps of: producing an input signal with frequency proportional to cycle speed of a monitored member, filtering out frequencies from the input signal above a predetermined frequency to produce a filtered frequency signal, adjusting the predetermined frequency in relationship to the configuration of the cycling member, changing the filtered frequency signal by a predetermined ratio to produce a repetitive rate adjusted frequency signal, and converting the adjusted frequency signal into a drive signal applied to said display means applied to said display means for indicating cycle rate to provide accurate meter readings for various configurations affecting said cycling member.

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**4,742,298**

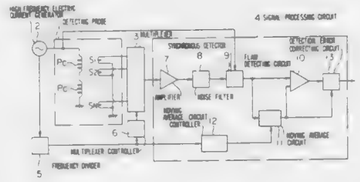
**APPARATUS FOR DETECTING SURFACE FLAW OF PIPELINE BY ELECTROMAGNETIC INDUCTION**

**Seigo Ando, Yokohama, and Toshiaki Hosoe, Yokosuka, both of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan**

**Filed Sep. 16, 1986, Ser. No. 907,840**

**Int. Cl.[4] G01N** *27/82;* **G01R** *33/12*

**U.S. Cl. 324—220** **5 Claims**




**1**. In apparatus for detecting a surface flaw of a pipeline using electromagnetic induction, which comprises:

a pig capable of travelling along a plurality of pipes forming a pipeline;

at least one primary coil mounted on said pig, said primary coil being arranged to interact electromagnetically with said pipeline, and a peripheral surface of said primary coil is spaced apart from a confronting peripheral surface of said pipeline by a prescribed distance to form a clearance space;

a high frequency electric current generator for supplying high frequency electric current to said primary coil to produce an AC magnetic field, wherein a magnetic flux density of said AC magnetic field varies in response to a surface flaw of said pipeline;

a plurality of secondary coils arranged at prescribed intervals in the circumferential direction of said pipeline in said clearance space, so that each of said plurality of secondary coils produces an AC voltage signal proportional to a flux density of an interlinking magnetic flux component, said interlinking component being of said AC magnetic field produced by said primary coil;

a multiplexer mounted on said pig, said plurality of secondary coils being coupled to said multiplexer, and said multiplexer responding to AC voltage signals from said plurality of secondary coils sequentially in order of arrangement of said secondary coils; and

a signal processing circuit comprising; a synchronous detector, moving average circuit means and flaw detecting circuit means; said synchronous detector detecting said AC voltage signals from said plurality of secondary coils and converting said AC voltage signals into DC voltage signals; said moving average circuit means processing said DC voltage signals in a prescribed manner for each of said secondary coils to obtain processed DC voltage signals for each of said secondary coils; and said flaw detecting circuit means sequentially producing a voltage signal proportional to the depth of a detected surface flaw of said pipeline as a function of said DC voltage signals;

the improvement comprising:

said signal processing circuit includes a detection error correcting circuit for amplifying said voltage signal from said flaw detecting circuit means for each of said secondary coils, wherein said detection error correcting circuit includes means for setting an amplification factor of said detection error correcting circuit at a value inversely proportional to a value of said processed DC voltage signals from said moving average circuit means for each of said secondary coils, wherein an error in the voltage signal produced by said flaw detecting circuit means, caused by a fluctuation in distance between each of surface of said pipeline, is corrected.

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**4,742,299**

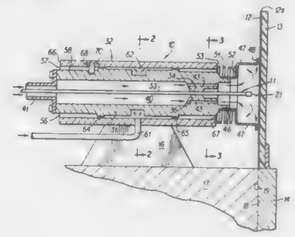
**METHODS OF AND APPARATUS FOR LEVITATING AN EDDY CURRENT PROBE**

**William J. Stone, Kansas City, Mo., assignor to The United States of America as represented by the Department of Energy, Washington, D.C.**

**Filed Oct. 15, 1986, Ser. No. 919,166**

**Int. Cl.[4] G01B** *7/10;* **G01R** *33/12;* **G01N** *27/90*

**U.S. Cl. 324—230** **10 Claims**



**1**. Pointing apparatus for supporting and presenting an eddy current probe normal to and in proximity with a specimen in a vertical plane, the apparatus comprising:

translating base means for movement normal to the specimen plane;

a floatable member having an eddy current probe fixed thereto;

air bearing means, supported on said base means, for levitating said floatable member with respect to the base means in a vertical direction against the force of gravity;

biasing means, cooperating with said air bearing means, for urging said floating member toward the specimen in a horizontal direction; and

pneumatic means for displacing said floating member and probe perpendicular to the specimen against the force of said biasing means, whereby said eddy current probe examines the specimen while displaced therefrom in the horizontal direction and while levitating with respect to the base in the vertical direction.

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**4,742,300**

**HIGH ACCURACY MAPPING OF MAGNETIC FIELDS WITH A FIBER OPTIC INTERFEROMETER**

**James E. Lenz, Brooklyn Park, and Gordon L. Mitchell, New Brighton, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.**

**Division of Ser. No. 453,196, Dec. 27, 1982, Pat. No. 4,634,977. This application Sep. 24, 1986, Ser. No. 911,581**

**Int. Cl.[4] G01R** *33/032;* **G02B** *6/02*

**U.S. Cl. 324—244** **7 Claims**

**1**. A method of determining the direction of a magnetic field at a point in said field, in three-dimensional space, with an interferometer having an output, wherein said interferometer includes an optical fiber sensitive to magnetic fields, comprising:

positioning said optical fiber in said magnetic field so that said point lies on said optical fiber;

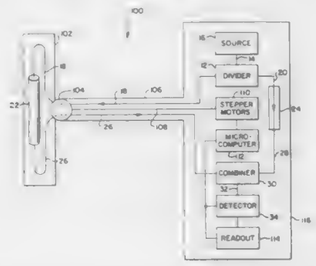
reading a detector, connected to said optical fiber, having an output which indicates the strength of said magnetic field at the position said optical fiber is located;

rotating said optical fiber about said point until said output is a minimum and wherein said direction at said point is perpendicular to elongated dimension of said optical fiber and axis of rotation of said optic fiber is on said point, and

moving said optical fiber from said point of said axis of rotation, while maintaining said output at a minimum, to determine the direction of said magnetic field.

**6**. An apparatus for determining the direction of a magnetic field at a point in said field, in three-dimensional space, with an interferometer having an output, wherein said interferometer includes a sensing optical fiber sensitive to magnetic fields, comprising:

means, connected to said sensing optical fiber, for positioning said sensing optical fiber in said magnetic field so that said sensing optical fiber lies on said point; and




means, connected to said means for positioning, for rotating said sensing optical fiber in a first plane about said point until said output is a minimum and for rotating said sensing optical fiber in a second plane until said output is a minimum, thereby revealing the direction of said magnetic field at said point, which is perpendicular to elongated dimension of said sensing optical fiber.

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**4,742,301**

**MAGNETIC RESONANCE IMAGING METHOD UTILIZING SMALL EXCITATION PULSES**

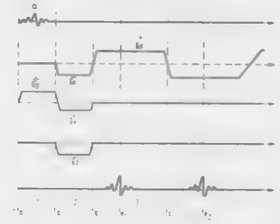
**Peter van der Meulen; Johannes P. Groen, and Johannes J. M. Cuppen, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Jun. 5, 1986, Ser. No. 871,010**

**Claims priority, application Netherlands, Jun. 12, 1985, 8501685; Aug. 14, 1985, 8502249**

**Int. Cl.[4] G01N** *24/08*

**U.S. Cl. 324—309** **18 Claims**



**1**. In a method of determining a nuclear magnetization distribution in a region of a body situated in a steady, uniform magnetic field, said method comprising the steps of:

(a) generating a high frequency electromagnetic excitation pulse so as to cause precessional motion of spin nuclei in the region of the body to thereby produce a resonance signal,

(b) applying at least one magnetic field gradient during a preparation period,

(c) sampling said resonance signal during a measurement period, and

(d) repeating a measurement cycle comprised of steps (a), (b) and (c), the time integral of said preparatory magnetic field gradient having a different value during each repetition of said measurement cycle,

the improvement wherein said excitation pulses used to produce said resonance signals during repetition of said measurement cycle are exclusively $\alpha°$ excitation pulses which rotate the magnetization direction of spin nuclei in said region

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through an angle $\alpha°$, where $\alpha°$ is greater than 0° and less than 90°, and including the step of applying, during said measurement period, a further magnetic field gradient which is inverted with respect to said at least one magnetic field gradient so that said resonance signal is sampled in the presence of said further magnetic field gradient.

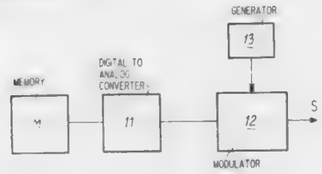
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**4,742,302**

## NUCLEAR MAGNETIC RESONANCE IMAGING INSTALLATION

**Eric Breton, Voisins les Bretonneaux, France, assignor to Thomson-CGR, Paris, France**

**Filed Sep. 11, 1985, Ser. No. 774,732**
**Claims priority, application France, Sep. 14, 1984, 84 14152**
**Int. Cl.⁴ G01R** *33/20*
**U.S. Cl. 324—309** **8 Claims**




1. An installation for imaging by nuclear magnetic resonance (NMR) comprising means for generating a substantially uniform magnetic field in a spatial region, means whereby field gradients having different selected characteristics are superimposed on said magnetic field during successive sequences of data acquisition and radiofrequency emission means for emitting at least one radiofrequency pulse during each sequence, wherein said installation comprises modulating means for providing said radiofrequency pulse with an envelope deduced from the selected-section shape which would result from application of a radiofrequency pulse having an envelope representing the shape of the desired selected-section shape.

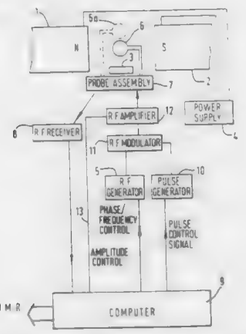
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**4,742,303**

## DEPTH AND REFOCUSING PULSES FOR USE WITH INHOMOGENEOUS RADIOFREQUENCY COILS IN NUCLEAR MAGNETIC RESONANCE SPECTROSCOPY

**Max R. Bendall, 274 Fort Road, Burbank, Queensland, Australia (4123)**

**Continuation-in-part of Ser. No. 516,729, Jul. 25, 1983, abandoned, which is a continuation-in-part of Ser. No. 443,607, Nov. 22, 1982, Pat. No. 4,486,709. This application Sep. 13, 1985, Ser. No. 775,573**
**The portion of the term of this patent subsequent to Dec. 4, 2001, has been disclaimed.**
**Int. Cl.⁴ G01R** *33/20*
**U.S. Cl. 324—309** **28 Claims**




1. A method of obtaining a localized nuclear magnetic resonance spectrum from a sample using a radiofrequency irradiation coil which provides an inhomogeneous radiofrequency field, which method comprises applying to the sample a plurality of radiofrequency pulse sequences, each pulse sequence including an excitation pulse, and at least one other pulse, the pulse sequences differing only in the phase of one or more of the said at least one other pulse, and the phases of at least one of the said at least one other pulse being cycled through all m phase shifts of 360 degrees/m in selected sequences of the said plurality where m is an integer greater than two, the number of sequences in the said plurality being such that a sequence exists for each possible combination of the said phase shifts for each said at least one other pulse, acquiring an NMR signal after each pulse sequence, and combining the NMR signals obtained to produce a localized NMR signal from selected regions of the sample.

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**4,742,304**

## MULTIPLE TUNING NMR PROBE

**Mitchell D. Schnall; John S. Leigh, Jr., both of Philadelphia, and V. Harihara Subramanian, Upper Darby, all of Pa., assignors to Phospho-Energetics, Inc. and Trustees of the Univ. of Pennsylvania, both of Philadelphia, Pa.**

**Filed May 2, 1986, Ser. No. 858,741**
**Int. Cl.⁴ G01R** *33/20*
**U.S. Cl. 324—318** **19 Claims**



1. An NMR probe having an electrical circuit including an alternating current power source, an RF coil driven by said power source, tuning circuit means connected to said RF coil for providing a plurality of resonance frequencies for said RF coil, said tuning circuit means having a transfer function, and a matching impedance means connected to said tuning circuit means for matching the impedance of said tuning circuit to the impedance of said power source,

wherein said RF coil of said probe is multiply-tuned to a plurality of NMR frequencies for concurrent study of nuclei in a sample as concurrently detected by said RF coil, said transfer function having a plurality of poles in accordance with said plurality of NMR frequencies.

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**4,742,305**

## METHOD FOR CONSTRUCTING VERTICAL IMAGES OF ANOMALIES IN GEOLOGICAL FORMATIONS

**Larry G. Stolarczyk, Raton, N. Mex., assignor to Stolar, Inc., Raton, N. Mex.**

**Continuation-in-part of Ser. No. 06/812,625, Dec. 23, 1985, Pat. No. 4,691,166, which is a division of Ser. No. 06/731,741, May 6, 1985, Pat. No. 4,577,153. This application Jun. 16, 1986, Ser. No. 874,593**
**The portion of the term of this patent subsequent to Mar. 18, 2003, has been disclaimed.**
**Int. Cl.⁴ G01V** *3/12, 3/30, 3/38*
**U.S. Cl. 324—334** **7 Claims**

1. A method for imaging geologic anomalies in a vertical plane in underground geological formations comprising:

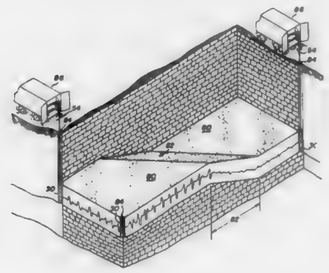
drilling a plurality of downholes about said formation and at locations remote from each other;

placing within a first of said downholes a transmitter having continuous wave transmit capabilities in a medium frequency range of approximately 100 KHz to approximately 800 KHz, the transmitter including a short magnetic dipole antenna for propagation of waves through said seam;

placing within a second of said downholes a receiver having continuous wave receive capabilities in a medium frequency range of approximately 100 KHz to approximately 800 KHz, the receiver including a vertical tuned resonant loop antenna for receiving waves propagated by said transmitter, said receiver further including measuring and recording means for measuring and recording a plurality of characteristics of said received propagated waves;

successively changing the elevation of said transmitter in said first hole to different transmitter stations;





at each transmitter station, transmitting a plurality of transmissions of continuous wave medium frequency waves with spherical spreading and an azimuthal magnetic field component propagated toward and received by said receiver antenna;

measuring a plurality of signal transmission characteristics of the received azimuthal magnetic field components;

calculating a plurality of expected signal transmission characteristics of signals propagated through said formation; and

comparing said calculated signal transmission characteristics with said measured signal transmission characteristics and generating, by tomography reconstruction, geographical representation of said vertical formation therefrom.

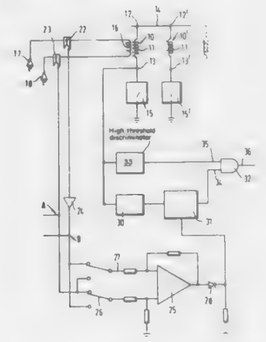
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**4,742,306**

## ENGINE ANALYSERS

**Geoffrey J. Everett, Bucklebury, and Christopher J. Hunt, Somerset, both of England, assignors to FKI Crypton Limited, Sumerset, England**

**Filed Mar. 7, 1986, Ser. No. 837,350**
**Claims priority, application United Kingdom, Mar. 7, 1985, 8505875**
**Int. Cl.⁴ F02P** *17/00*
**U.S. Cl. 324—379** **10 Claims**




1. An apparatus for generating a synchronising signal for a selected cylinder of a multi-cylinder engine having a double ended coil ignition system, said apparatus comprising means for identifying a real ignition pulse at said cylinder, means for identifying an ignition signal on the primary winding of the coil corresponding to that cylinder and means for producing a synchronising signal only when the real ignition pulse coincides with the ignition signal on the primary of the coil.

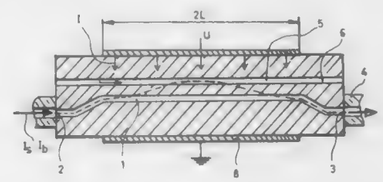
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**4,742,307**

## OPTICAL AMPLIFICATION DEVICE WITH NOISE FILTER FUNCTION

**Lars H. Thylén, Huddinge, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden**

**Filed Sep. 9, 1986, Ser. No. 905,131**
**Claims priority, application Sweden, Sep. 20, 1985, 8504375**
**Int. Cl.⁴ H01S** *3/00*
**U.S. Cl. 330—4.3** **16 Claims**




1. An optical amplification device with noise filter function including a body built up from a plurality of layers of different materials, wherein at least a first one of the layers (**1**, **1***a*, **12**) is a light wave conductor having a first effective index of refraction which varies with wavelength according to a first relationship, at least one further of the layers (**5**, **5***a*, **14**) is a light wave conductor which can amplify a light wave ($I_a$, $I_b$) propagating in this further layer and which has a second effective index of refraction which varies with wavelength according to a second relationship different from the first relationship, the second effective index being substantially equal to the first effective index at a predetermined wavelength intended for amplification, further including drive means (**8**, **8***a*, **16**) for providing an excitation (I, Q) to the at least one further layer, the excitation causing the further layer to become transparent to and to amplify light propagating in the further layer and including light of the predetermined wavelength when the excitation exceeds a predetermined value required to make this further layer (**5**, **5***a*, **14**) transparent to the light wave, and wherein the light wave conductive layers (**1**, **1***a*, **12** and **5**, **5***a*, **14**) are optically coupled so that a directional coupler is created, an interaction length (2L) of which is substantially an even number of coupling lengths (L) for the predetermined wavelength, the further layer amplifying light coupling from the first layer and propagating in the further layer and the first and second relationships being selected so that the optical amplification device filters light passing therethrough.

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**4,742,308**

## BALANCED OUTPUT ANALOG DIFFERENTIAL AMPLIFIER CIRCUIT

**Mihai Banu, Murray Hill, N.J., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Apr. 10, 1987, Ser. No. 37,301**
**Int. Cl.⁴ H03F** *3/45*
**U.S. Cl. 330—258** **7 Claims**

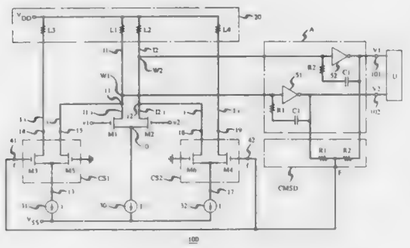
1. An integrated circuit comprising:

(a) an input difference amplifier section having first and second output nodes;

(b) an output amplifier section having first and second input nodes respectively connected to the first and second out-

put nodes of the input section, and having first and second output terminals;

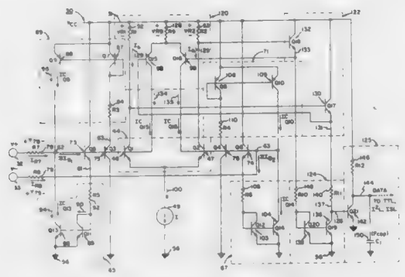
(c) a common mode signal detector, responsive to the voltages developed at the first and second output terminals of the output section, for generating a feedback control signal which is representative of the common mode component of these voltages; and



(d) first and second matched current steering devices, each having a separate control terminal connected to receive the feedback control signal, connected to the first and second output nodes of the input difference amplifier section whereby the first and second current steering devices draw equal first and second currents, respectively, from the first and second output nodes, respectively, in accordance with the feedback control signal.

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**4,742,309**
**LINE RECEIVER**
**John W. Chu, Cupertino, Calif., assignor to Dual-Lite Manufacturing Inc., Naguabo, P.R.**
**Filed Dec. 31, 1986, Ser. No. 948,313**
**Int. Cl.[4] H03F *3/45***
**U.S. Cl. 330—258** **10 Claims**



1. An improved line receiver comprising:

(A) means for receipt of a differential input voltage wherein such voltage may be algebraically combined with a common mode voltage associated with said differential voltage;

(B) input resistors each connected at a first end to said differential input means, for providing a voltage drop;

(C) current summing nodes connected to the second end of each input resistor;

(D) sinking current mirrors connected to each current summing node so as to absorb current flow from the node to ground;

(E) sourcing current mirrors connected to each current summing node so as to provide current to the nodes so that current summing at the nodes is translated into voltage drops that increase the common mode rejection ratio of the line receiver;

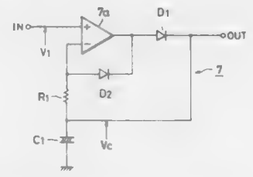
(F) means for differentially amplifying the differential voltage between the input terminals; and

(G) means for receipt of electrical power to energize the receiver;

whereby a high common mode rejection ratio with high input impedance operation is achieved that allows for common node voltages to exceed the receiver's power supply voltage as well as to be less than the receiver's ground potential.

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**4,742,310**
**AUTOMATIC SOUND VOLUME CONTROLLING DEVICE FOR USE IN AUTOMOTIVE VEHICLE**
**Massyuki Kato; Makoto Odaka, and Yoshio Sasaki, all of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan**
**Filed Jul. 16, 1986, Ser. No. 886,295**
**Claims priority, application Japan, Jul. 16, 1985, 60-107564[U]**
**Int. Cl.[4] H03G *3/30***
**U.S. Cl. 330—281** **6 Claims**



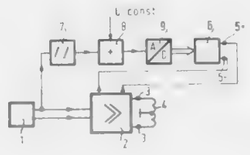
1. An automatic sound volume controlling device for use in a vehicle comprising:

microphone means for detecting a level of ambient noise in a vehicle and converting said running noise level to an electrical signal;

a time constant circuit for smoothing said electrical signal according to a time constant dependent on a direction of change of said electrical signal, whereby said time constant is longer when said ambient noise level has increased that when said ambient noise level has decreased.

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**4,742,311**
**CIRCUIT ARRANGEMENT WITH A LOAD CONNECTED TO THE OUTPUT OF AN AMPLIFIER ESPECIALLY FOR NMR**
**Alfred J. Van der Zwart, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, Tarrytown, N.Y.**
**Filed Aug. 25, 1986, Ser. No. 899,705**
**Claims priority, application Fed. Rep. of Germany, Aug. 28, 1985, 3530637**
**Int. Cl.[4] H03F *1/00***
**U.S. Cl. 330—297** **15 Claims**

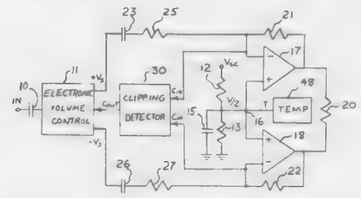


9. A circuit for energizing an inductive load comprising: means for generating a voltage with a waveform comprising first and second generally trapezoidal shaped portions in mirror relation and connected by an approximately constant relatively low voltage portion, a power amplifier having an output for supplying an output voltage to the load and an input for receiving the generated voltage, a voltage generator having an output supplying stepwise variable DC supply voltage to the power amplifier, said voltage generator comprising a plurality of DC voltage sources providing DC voltages of different magnitudes, a switch arrangement for connecting one of the DC voltage sources or a series arrangement of plural DC voltage sources to the output of the voltage generator, and a control circuit responsive to the generated voltage to derive a control signal for controlling the switch arrangement such that the voltage at the voltage generator output follows the input voltage in steps but with a greater amplitude than that of said output voltage of the power amplifier.



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**4,742,312**
**POWER LIMITING AUDIO AMPLIFIER TEMPERATURE PROTECTION CIRCUIT**
**David W. Osburn; David A. LaRosa, both of Kokomo, and James R. Knolinski, West Lafayette, all of Ind., assignors to Delco Electronics Corporation, Kokomo, Ind.**
**Filed May 22, 1987, Ser. No. 52,984**
**Int. Cl.[4] H03F *1/52*; H02H *7/20***
**U.S. Cl. 330—298** **3 Claims**



1. A protection circuit for an audio amplifier of the type having a power supply effective to supply a bias voltage determining the maximum non-clipping audio output voltage, a clipping detector effective to detect clipping in the audio output and generate a signal thereof, a circuit effective to detect the temperature of a component of the audio amplifier and generate a signal thereof and a variable gain circuit providing the input to the audio amplifier, the protection circuit comprising:

first circuit elements responsive to the signal from the temperature detecting circuit to change the bias voltage supplied by the power supply to the amplifier in the direction of smaller maximum non-clipping audio output voltage when the temperature exceeds a predetermined temperature so as to induce clipping in the amplifier when the temperature of the component exceeds the predetermined temperature;

second circuit elements responsive to the signal from the clipping detector to reduce the gain of the variable gain circuit in closed loop to limit the clipping of the amplifier and thus, when clipping is initiated by the first circuit elements in response to a temperature exceeding the predetermined temperature, to reduce the power dissipation of the amplifier and the temperature thereof.

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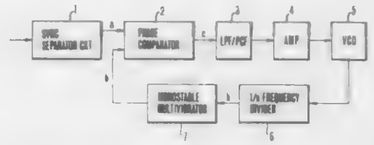
**4,742,313**
**PHASE-LOCKED LOOP CIRCUIT HAVING A MECHANISM FOR PREVENTING ERRONEOUS OPERATION**
**Hisashi Kawai, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**
**Filed Dec. 2, 1986, Ser. No. 936,847**
**Claims priority, application Japan, Dec. 3, 1985, 60-270762**
**Int. Cl.[4] H03L *7/08***
**U.S. Cl. 331—1 A** **13 Claims**

1. A phase-locked loop circuit for obtaining an output in phase with an incoming signal, comprising:

(a) a controllable oscillator having an oscillation output;

(b) pulse generating means arranged to generate a pulse signal of predetermined width in synchronized relationship with the oscillation output of said controllable oscillator;

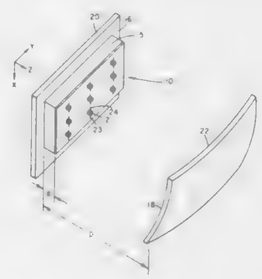
(c) phase comparing means arranged to compare a phase of the incoming signal with a phase of the pulse signal generated by said pulse generating means and to control the oscillation of said controllable oscillator in accordance with a phase difference between them; and



(d) designating means connected with said phase comparing means for designating a specific period of time during which said oscillator is substantially controlled by said phase comparing means at every repeating period of said incoming signal.

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**4,742,314**
**SOLID STATE MILLIMETER WAVE POWER COMBINER**
**James W. Mink, Raleigh, N.C., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**
**Filed Sep. 11, 1986, Ser. No. 908,136**
**Int. Cl.[4] H03B *7/12, 7/14***
**U.S. Cl. 331—56** **15 Claims**



1. Apparatus for combining power of electromagnetic energy sources in the millimeter wave range of the electromagnetic spectrum, comprising in combination:

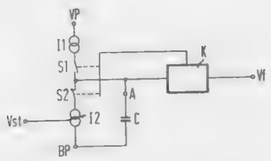
a quasi-optical wave-beam resonator including a pair of mutually separated reflecting surfaces which are dimensionally large in comparison to the operating wavelength of the resonator, one of said reflecting surfaces further being planar and substantially totally reflective of millimeter wave energy, with the other of said reflecting surfaces being curved and partially transparent to millimeter wave energy so that energy can pass therethrough; and

a plurality of millimeter wave energy sources arranged in an array in a common transverse plane between said reflecting surfaces and in relatively close proximity to said one reflecting surface.

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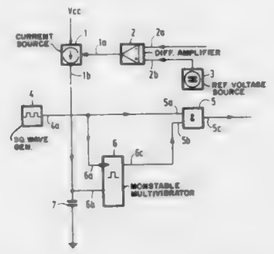
**4,742,315**
**INTEGRATED NMOS CIRCUIT**
**Peter Schreilechner, Ossiach, Austria, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**
**Filed Apr. 28, 1987, Ser. No. 43,836**
**Claims priority, application Fed. Rep. of Germany, Apr. 28, 1986, 3614316**
**Int. Cl.⁴ H03K** *3/00, 3/33*
**U.S. Cl. 331—108 C** **15 Claims**




1. Integrated NMOS circuit, comprising an external connection terminal to be connected to an external component, a control voltage terminal, a supply voltage terminal, a reference voltage terminal, a circuit output terminal, a voltage controlled transistor network having an input connected to said control voltage terminal and an output connected to said external connection terminal, a control device supplied by a voltage source through said supply voltage terminal and said reference voltage terminal, said control device having an input connected to said voltage controlled transistor network and an output fed back to said transistor network and connected to said circuit output terminal, said transistor network including a switchable charging current source and a switchable controlled discharging current source, said switchable controlled discharging current source being controlled by a control voltage connected to said control voltage terminal, said switchable charging current source and said switchable controlled discharging current source being switched by said control device in antivalent manner.

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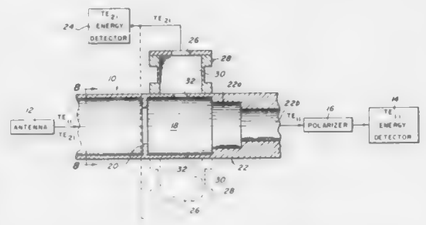
**4,742,316**
**PULSE-WIDTH MODULATOR**
**Thomas Riedger, Eckental, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.**
**Filed Apr. 13, 1987, Ser. No. 37,765**
**Claims priority, application Fed. Rep. of Germany, Jun. 9, 1986, 3619353**
**Int. Cl.⁴ H03K** *9/08*
**U.S. Cl. 332—9 R** **5 Claims**




1. A pulse-width modulator for receiving from a square-wave generator (**3**) a periodic square-wave pulse signal (**4***a*) having a fixed duty cycle and a fixed frequency, and for modulating such square-wave signal in accordance with an input signal (**1***a*), said modulator comprising: a retriggerable monostable multivibrator (**6**); a timing circuit comprising a capacitor (**7**) and a current source (**1**) for charging said capacitor, said current source being controlled by the input signal; and an AND-gate (**5**); the square-wave pulse signal (**4***a*) being applied to a trigger input (**6***a*) of the multivibrator (**6**) and to an input (**5***a*) of the AND-gate (**5**); said multivibrator (**6**) being triggered by falling edges of the square-wave signal, and producing an output signal which is applied to another input (**5***b*) of said AND-gate (**5**).

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**4,742,317**
**MODE COUPLER FOR MONOPULSE ANTENNAS AND THE LIKE**
**Herbert L. Thal, Jr., Wayne, Pa., assignor to General Electric Company, Fairfield, Conn.**
**Filed May 23, 1986, Ser. No. 866,282**
**Int. Cl.⁴ H01P** *5/12*
**U.S. Cl. 333—137** **4 Claims**



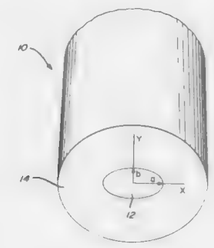

1. A coupler for extracting microwave energy of the $TE_{21}$ mode from a circular waveguide propagating microwave energy in both the $TE_{11}$ and $TE_{21}$ modes, comprising
(a) circular waveguide means adapted for connection at a load end with a $TE_{11}$ mode detector and at a source end to supply means propagating both $TE_{11}$ and $TE_{21}$ modes, respectively;
(b) means defining a resonant $TE_{21}$ cavity within said circular waveguide means, including
(1) annular iris means coaxially arranged on the inner circumferential surface of said circular waveguide means adjacent said source end thereof; and
(2) a transformer section coaxially arranged in said waveguide means in longitudinally spaced relation to said iris means adjacent said load end of said waveguide means, said transformer means being operable to pass the $TE_{11}$ energy and to reflect substantially all of the $TE_{21}$ energy;
(3) a wall portion of said circular waveguide means located between said iris means and said transformer section, said wall portion defining an axial first slot; and
(C) means for extracting $TE_2$; mode microwave energy from said cavity via said slot.

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**4,742,318**
**BIREFRINGENT SINGLE-MODE ACOUSTIC FIBER**
**Cheng-Kuei Jen, Brossard; Gerald W. Farnell, Montreal, both of Canada, and Ahmad Safaai-Jazi, Blacksburg, Va., assignors to Canadian Patents and Development Limited - Societe Canadienne Des Brevets et D'Exploitation Limitee, Ottawa, Canada**
**Filed Mar. 19, 1987, Ser. No. 27,874**
**Claims priority, application Canada, Nov. 18, 1986, 523,255**
**Int. Cl.⁴ H03H** *9/30*
**U.S. Cl. 333—141** **30 Claims**

1. A birefringent single-mode acoustic fiber for propagating linearly polarized shear acoustic waves while preserving linear polarization, comprising
an elongated core region of a solid material in which acoustic waves can be propagated in two orthogonal shear mode components,
a cladding region enclosing all surfaces of said core region except end surfaces thereof, said cladding region being also of a solid material in which acoustic waves can be propagated in two orthogonal shear mode components, and
wherein said core and cladding regions have different shear wave velocities with the shear wave velocity of the core

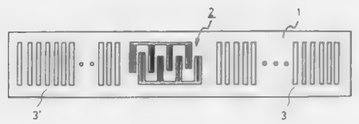





region bein lower than that of the cladding region, at least one of said regions being characterized by at least one birefringent causing factor for breaking degeneracy between said two orthogonal shear mode components and preseving linear polarization thereof throughout the fiber.

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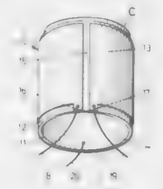
**4,742,319**
**SURFACE-ACOUSTIC-WAVE RESONATOR**
**Takehiko Sone, Furukawa, Japan, assignor to Alps Electric Co., Ltd., Japan**
**Filed Feb. 24, 1987, Ser. No. 17,897**
**Claims priority, application Japan, Jun. 21, 1986, 61-145469**
**Int. Cl.⁴ H03H** *9/64, 9/25*
**U.S. Cl. 333—195** **2 Claims**




1. In a surface acoustic wave resonator comprising a 30–50 degree rotated, Y-axis cut lithium niobate piezoelectric monocrystalline substrate for propagating a surface acoustic wave, a pair of spaced apart reflectors forming a resonant cavity between them on a surface of the substrate for reflecting the surface acoustic wave across the cavity, and a pair of opposing electrodes having interdigitated fingers arranged in the resonant cavity between the reflectors for exciting a surface acoustic wave of a desired wavelength,
the improvement wherein each of said opposing electrodes in formed with a plurality of fingers spaced apart at uniform intervals equal to said wavelength, each of said fingers is bifurcated into two metal strips spaced apart for suppressing subresonance of the surface acoustic wave within said electrodes so that they do not cause inductance, each bifurcated finger of one electrode being paired with a respective bifurcated finger of the other electrode and interdigitated with an equal spacing between fingers, and the number of finger pairs is less than 14.

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**4,742,320**
**RESONATOR STRUCTURE COMPRISING METAL COATED TUBULAR CARRIER AND HAVING SLITS IN THE METAL COATING**
**Heinz Pfizenmaier, Leonberg; Franz Straus, Stuttgart, and Ewald Schmidt, Ludwigsburg, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**
**Continuation of Ser. No. 706,043, Feb. 27, 1985, abandoned. This application Mar. 26, 1986, Ser. No. 843,798**
**Claims priority, application Fed. Rep. of Germany, Mar. 9, 1984, 3408581**
**Int. Cl.⁴ H01P** *7/00*
**U.S. Cl. 333—219** **21 Claims**




1. A microwave resonator structure comprising
a tubular carrier structure (**61**) of solid dielectric material having a tube axis and defining an outer tubular surface of revolution about said axis, and an inner tubular surface of revolution about said axis;
a first metal coating layer (**13**) applied to the outer surface of said tubular carrier structure;
a second metal coating layer (**14**) applied on the inner surface of the tubular carrier structure,
said first metal coating layer (**13**) and said second metal coating layer (**14**) being applied, respectively, only to the respective ones of said tubular surfaces, and said second metal coating layer being separate from said first metal coating layer,
said first and second metal coating layers forming, in combination with the tubular carrier structure, a monolithic unit;
a slit (**15**) at least one having a direction component extending in the direction aligned with respect to the axis of the tubular carrier structure, formed in one of the metal coating layers and separating the respective metal coating layer to define a slit metal coating layer;
first and second connection means (**16, 17**) connected to the slit metal coating layer in regions adjacent the slit; and
terminal means (**20**) connected to the metal coating layer other than said slit metal coating layer.

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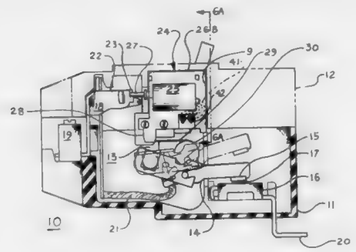
**4,742,321**
**MOLDED CASE CIRCUIT BREAKER WITH ACCESSORY FUNCTIONS**
**Joseph G. Nagy, Hartford; Richard E. Bernier, Watertown, and Gregory T. DiVincenzo, Plainville, all of Conn., assignors to General Electric Company, New York, N.Y.**
**Filed Jun. 25, 1987, Ser. No. 66,384**
**Int. Cl.⁴ H01H** *83/00*
**U.S. Cl. 335—20** **11 Claims**

1. A circuit breaker and accessory unit comprising:
a molded plastic case and cover;
a pair of separable contacts within said case;
an operating mechanism within said case arranged for separating said contacts upon occurrence of an overload condition through said contacts;
a circuit breaker accessory mounted within said cover and arranged for separating said contacts upon command;
a wire conductor connecting with said accessory and passing outside said case and cover for providing external electrical access to said accessory; and

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a strain relief wire support within said case intermediate said accessory and said case for preventing damage to said



accessory when tensile force is applied to said wire conductor said strain relief wire support comprising a planar member having a V-shaped groove therein.

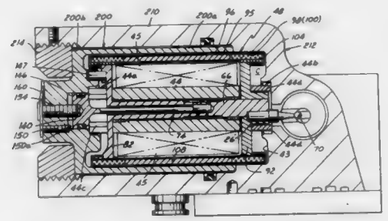
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**4,742,322**

## DIRECT DRIVE SERVOVALVE WITH ROTARY FORCE MOTOR

**D. Dale Johnson, Mount Clemens, and Sydney K. Tew, New Baltimore, both of Mich., assignors to Cadillac Gage Textron Inc., Warren, Mich.**

**Filed Jun. 27, 1986, Ser. No. 879,702**
**Int. Cl.⁴ H01F** *7/08*
**U.S. Cl. 335—272** **20 Claims**



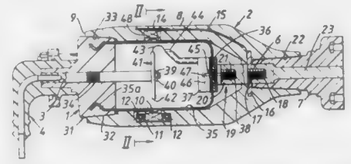
1. A limited angle rotary force motor comprising:
(a) an inner support member disposed in a motor chamber and having a longitudinal bore with multiple angularly spaced apart transverse openings extending from the longitudinal bore
(b) a magnet disposed on the inner support member,
(c) a rotor assembly including a rotor shaft rotatably disposed in the longitudinal bore and having an output portion for exerting motive force, a coil assembly supported from the rotor shaft in spaced relation around the magnet and rotatable in response to an electrical signal input, and multiple coil support arms extending from the rotor shaft for supporting the coil assembly in said spaced relation with each arm extending through a respective one of the transverse openings with angular clearance to permit limited angular rotary movement of the rotor assembly,
(d) an outer pole member spaced from the coil assembly.

**4,742,323**

## FUSE FOR AN ALTERNATING CURRENT POWER CIRCUIT

**Martin C. Oakes, Leeds, England, assignor to Y.S. Securities Limited, Leeds, England**

**Continuation of Ser. No. 887,547, Jul. 17, 1986, Pat. No. 4,692,733. This application Jun. 9, 1987, Ser. No. 61,136**
**Claims priority, application United Kingdom, Jul. 20, 1985, 8518381**
**The portion of the term of this patent subsequent to Sep. 8, 2004, has been disclaimed.**
**Int. Cl.⁴ H01H** *85/04*
**U.S. Cl. 337—158** **8 Claims**



1. An electrical fuse comprising: a housing; first and second electrodes and a connector within said housing; dielectric means for filling at least a portion of the space within said housing between said first and second electrodes; a fusible element electrically connected in a normal current path between said first electrode and said connector through said fuse, said fusible element being configured to interrupt said normal current path upon the occurrence of an over current condition in said fuse; said first and second electrodes being configured to support an electrical arc thereacross following the occurrence of said over current condition; and electromagnetic means for rotating said electrical arc about at least one of said electrodes to assist in extinguishing said electrical arc, said electromagnetic means being disposed in the current path formed when said electrical arc is supported between said first and second electrodes.

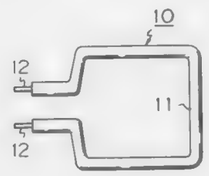
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**4,742,324**

## SHEATH HEATER

**Yoshiaki Shida, Ikoma; Hisao Fujikawa, Nishinomiya; Nobuyuki Maruyama, Amagasaki, and Shunichiro Akiyama, Joetsu, all of Japan, assignors to Sumitomo Metal Industries Ltd., Osaka and Nippon Stainless Steel Co., Ltd., Tokyo, both of, Japan**

**Continuation of Ser. No. 727,217, Apr. 25, 1985, abandoned. This application May 20, 1987, Ser. No. 52,216**
**Claims priority, application Japan, Apr. 27, 1984, 59-85554**
**Int. Cl.⁴ H01C** *1/03*
**U.S. Cl. 338—238** **8 Claims**



1. In a sheath heater for use in an electrical cooking appliance, said sheath heater having an electric heating element and insulating material within a steel sheath heater tube for exposure to high temperature dry-corrosive conditions in the presence of chlorides, the improvement which comprises said steel sheath heater tube consisting essentially of, in % by weight:
C: No more than 0.05%,
Si: 0.1–2.0%, Mn: not more than 2.0%,
Cr: 18–26%, Ni: 16–30%,
at least one element selected from the group consisting of Mo: 0.5–4.0%, W: 0.01–4.00%, and
V: 0.01–4.00%, and
the balance iron and incidental impurities.



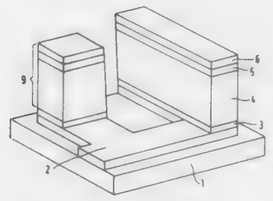
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**4,742,325**

## THIN-FILM CIRCUIT AND METHOD OF MAKING THE SAME

**Siegfried Müller, and Helmut Hanisch, both of Nürtingen, Fed. Rep. of Germany, assignors to Standard Elektrik Lorenz AG, Stuttgart, Fed. Rep. of Germany**

**Filed Feb. 20, 1987, Ser. No. 17,215**
**Claims priority, application Fed. Rep. of Germany, Feb. 20, 1986, 3605425**
**Int. Cl.⁴ H01C** *1/012*
**U.S. Cl. 338—309** **4 Claims**



1. A thin-film circuit with integrated resistors and conductors, comprising:
a substrate;
a patterned resistive layer; and
a patterned multilayer arrangement comprising a diffusion barrier and conductive layers, said conductive layers comprising a lower gold layer, an alloying barrier, and an upper gold layer.

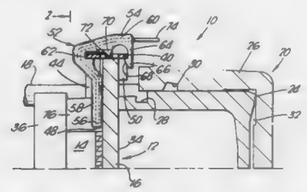
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**4,742,326**

## DISC BRAKE ASSEMBLY HAVING AN ELECTRICAL LINING WEAR INDICATOR

**Gabriel Gregoire, Asnieres Sur Oise; Robert Beilleau, Saint Ouen L'Aumone, and Jean-Marc Dick, Epinay-Sur-Seine, all of France, assignors to General Motors Corporation, Detroit, Mich.**

**Filed Jun. 30, 1986, Ser. No. 880,184**
**Int. Cl.⁴ B60T** *17/22;* **F16D** *66/02*
**U.S. Cl. 340—52 A** **6 Claims**



1. A disc brake assembly having a rotor and a caliper for braking said rotor, said caliper having a laterally spaced pair of mounting pins and a brake pad comprising a backing plate and a layer of friction material carried by said backing plate and slidably mounted on said laterally spaced pair of mounting pins, an anti-rattle spring for said brake pad including a central region engaged over an upper edge of the brake pad and a pair of oppositely extending resilient arms engaged under said respective mounting pins, an electrical lining wear indicator comprising:
a recess formed in the brake pad friction material; an electrical conductor having a covering of electrically insulating material and including a detector portion that extends into said recess and a mounting for said electrical conductor including a support portion that extends over said backing plate and said anti-rattle spring and is fastened on to the anti-rattle spring to maintain said electrical conductor securely in position relative to said backing plate and retain said detector portion in position in said recess so as to be engaged by the rotor upon sufficient friction material wear and detect such wear,
said support portion of said mounting for said electrical conductor including a recess portion arranged to receive a first edge portion of said central region of said anti-rattle spring, and also including a clip portion that is resiliently engageable over a second, opposite edge portion of said central region of said anti-rattle spring, to hold said support portion of said mounting for said electrical conductor securely in position on said anti-rattle spring.

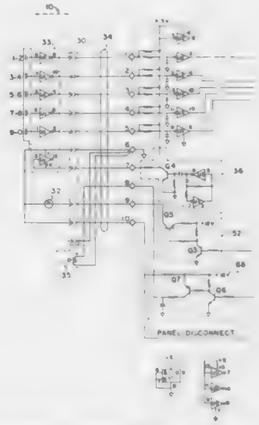
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**4,742,327**

## KEYLESS ACCESS CONTROL AND SECURITY SYSTEM

**James P. Burgess, Camarillo, and Peter Kaufman, Santa Barbara, both of Calif., assignors to Essex-Tec Corporation, Carpinteria, Calif.**

**Filed Dec. 7, 1983, Ser. No. 558,803**
**Int. Cl.⁴ B60R** *25/00*
**U.S. Cl. 340—63** **22 Claims**



1. A piezoelectric touchpad unitary assembly adapted for mounting on a vehicle door, said touchpad assembly comprising a housing having a rear face adapted to bear against said vehicle on the outside thereof, said housing also having an accessible surface provided with plural indicia symbols indicating different areas of the surface which are to be tapped by a user to input commands into the touchpad; a plurality of piezoelectric sensors mounted individually adjacent the said indicia symbols between the latter and said rear face and adapted to emit individual signals at a high impedance level in response to individual tapping of indicia symbols by a user; impedance level conversion means individual to each sensor and located immediately adjacent thereto for converting each of said high impedance level signals to a corresponding low impedance level signal adapted for individual and separate transmission to a remote location; and individual conductor means for connecting the low impedance level signal from each of said impedance level conversion means to a corresponding individual terminal of a multiterminal connector mounted adjacent said rear face, an unshielded multiconductor cable extending from said multiterminal connector to said remote location, said multiconductor cable having connector means for mating with said multiterminal connector and thereby electrically connect-

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ing said individual terminals with respective conductors of said multiconductor cable.

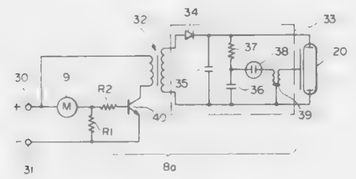
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**4,742,328**

## AUDIO AND VISUAL ALARM DEVICE

**Tatsuya Arai, Kitamoto; Tadashi Ishii, Kunitachi, and Hikoji Iwasaki, Kohnosu, all of Japan, assignors to Kobishi Electric Co., Ltd., Japan**

**Filed Mar. 3, 1986, Ser. No. 835,558**
**Claims priority, application Japan, Mar. 6, 1985, 60-31805[U]**
**Int. Cl.[4] G08B *7/00***
**U.S. Cl. 340—326** **8 Claims**




1. An alarm device comprising:
(a) a gong;
(b) a pair of terminals for being supplied with a DC power;
(c) a DC motor of a commutator type for being energized by said DC power applied to said terminals;
(d) a hammer operatively connected to said motor for striking said gong;
(e) light emitting means having a flash tube;
(f) means for generating a voltage higher than that of said DC power in accordance with a current flowing through said motor;
(g) circuit means having an exciter circuit energized by said high voltage for exciting said flash tube to produce flashes of light,
wherein said means for generating a voltage higher than that of said DC power comprises a shunt circuit provided in a path of said current passing through said motor, a step-up transformer and a transistor, a primary winding of said transformer and said transistor being serially connected between said pair of terminals, said shunt circuit being connected to said transistor in such a manner that said transistor conducts in accordance with a current passing through said shunt circuit, a secondary winding of said transformer being connected to said exciter circuit for energization thereof.

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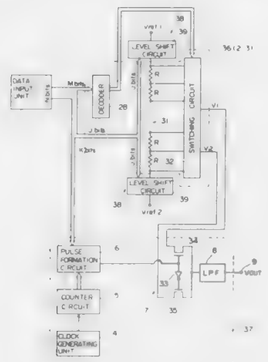
**4,742,329**

## DIGITAL/ANALOG CONVERTER

**Yasuhiro Yamada, Hashima, and Masanori Kajitani, Gifu, both of Japan, assignors to Sanyo Electric Co., Ltd., Japan**

**Filed Jan. 27, 1986, Ser. No. 822,900**
**Claims priority, application Japan, Jan. 28, 1985, 60-14032; Feb. 12, 1985, 60-24785**
**Int. Cl.[4] H03M *1/82***
**U.S. Cl. 340—347 DA** **7 Claims**

1. A digital/analog converter comprising:
a data input unit for introducing digital data of K bits;
first and second potential sources for individually outputting first and second potentials;
a clock generating unit for generating clock pulses;
a $2^K$ notation counter circuit having a K bit counting output for counting the clock pulses provided from said clock generating unit;
a pulse formation circuit jointly responsive to digital data from said data input unit and the counting output from said counter circuit for outputting a pulse signal varied in its pulse width and pulse cycle period corresponding to the contents of said digital data and representing the sum of the pulse widths for a period of $2^K$ clock pulses corresponding to the same, said pulse formation circuit being provided with K AND circuits each receiving as an input one of the bits of said data input unit and one of the bits of said counting output, said bits of said data input unit being applied to said AND circuits with a magnitude order of digits opposite to that of the counting output from said counter circuit;




a circuit for selecting either of said first or second potential corresponding to said pulse signal to compose a selected potential;
the counting output of said counter circuit, except for the lowermost bit, being also provided to delay flip-flops driven by the clock pulses and then being introduced together with the output of each of said flip-flops into each of said AND circuits.

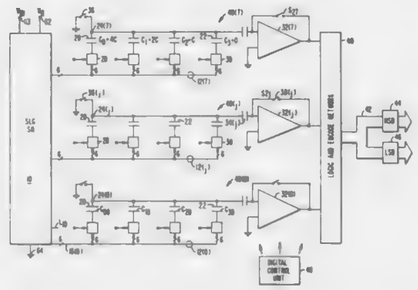
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**4,742,330**

## FLASH A/D CONVERTER USING CAPACITOR ARRAYS

**Joey Doernberg, Berkeley; Paul R. Gray, Orinda, and David A. Hodges, Berkeley, all of Calif., assignors to The Regents of the University of California, Berkeley, Calif.**

**Filed May 1, 1987, Ser. No. 45,349**
**Int. Cl.[4] H03M *1/12***
**U.S. Cl. 340—347 AD** **11 Claims**



1. An ADC, having an ordered set of parallel branches that perform selected functions during a sequence of clock cycles, for generating a digital representation of an input voltage, $V_{in}$, the ADC comprising:
a capacitor array in each parallel branch, with each capacitor in an array having a common plate and an opposite plate, with the common plates of all the capacitors in each array coupled to a common node (CN) associated with the array;
means for charging the common nodes of each capacitor array to $-CV_{in}$, where C is a constant;



means for generating an ordered set of reference voltage levels separated by a selected voltage interval, to define an ordered set of voltage intervals;
means for coupling one of the reference voltage levels in said ordered set of reference voltage levels to the opposite plates of a corresponding one of said capacitor arrays, during a first clock cycle, thereby generating an ordered set of first CN voltage levels at the common nodes of said ordered set of capacitor arrays;
means for identifying an adjacent pair of capacitor arrays, coupled to a given pair of reference voltage levels defining a given reference voltage interval, having first CN voltage levels of opposite polarity with the place of the identified array pair in the ordered set of arrays being an indication of the digital representation of $V_{in}$ and of the given reference voltage interval wherein $V_{in}$ lies.

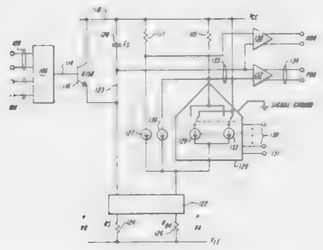
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**4,742,331**

## DIGITAL-TO-TIME CONVERTER

**Jeffrey G. Barrow, Oak Ridge, N.C., and Adrian P. Brokaw, Burlington, Mass., assignors to Analog Devices, Inc., Norwood, Mass.**

**Filed Dec. 23, 1986, Ser. No. 945,654**
**Int. Cl.[4] H03M *1/00***
**U.S. Cl. 340—347 R** **21 Claims**



1. A circuit for converting the value of a digital word into a proportional time delay in response to a trigger signal, said circuit comprising,
a digital-to-analog converter having a first current path and a second current path connected in parallel to a current output, means for drawing a DAC current from said current output, and means responsive to said digital word for changing the magnitude of a first current flowing through said first current path,
means for generating a threshold voltage proportional to said first current,
means responsive to said DAC current for generating a reference voltage,
means responsive to said reference voltage for producing a proportional ramp current, and
means responsive to said trigger signal for generating an increasing ramp voltage whose rate of increase is proportional to said ramp current,
a differential comparator means responsive to said ramp voltage and said threshold voltage for generating an output representative of said time delay.

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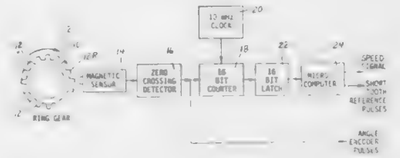
**4,742,332**

## MAGNETIC SHAFT ANGLE ENCODER

**Thaddeus Schroeder, Rochester Hills; Harry J. Bauer, Troy, and Jack H. Beard, Sterling Heights, all of Mich., assignors to General Motors Corporation, Detroit, Mich.**

**Filed Apr. 10, 1987, Ser. No. 37,216**
**Int. Cl.[4] H03M *1/64***
**U.S. Cl. 340—347 P** **5 Claims**

1. A magnetic shaft angle encoder comprising;
a toothed wheel driven by a shaft, the wheel having a plurality of standard teeth and at least one reference tooth,
an inductive pickup adjacent the wheel for emitting an electrical pulse for each standard and reference tooth, the pulse width being dependent on relative tooth size of neighboring teeth,
the standard teeth of the wheel having sufficiently equal size to produce equal width pulses and the reference tooth having a different size to yield different pulse widths for the reference tooth and adjacent standard teeth, and
electrical means for registering all the pulses to track shaft




angle and for analyzing the pulses to detect the reference tooth and identify an index point thereby establishing the rotational position of the shaft,
said electrical means comprising microprocessor means programmed to convert the pulse widths to a shaft speed value for each tooth, calculate a moving average of several recent speed values, compare each new value to the average speed value to detect high and low values, and identify the pattern of low, high, and then low speeds for sequential teeth to detect the reference tooth and determine an index point, thereby establishing the rotational position of the shaft.

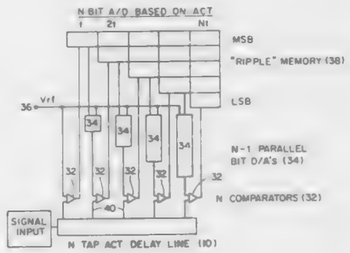
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**4,742,333**

## ANALOG-TO-DIGITAL CONVERTER

**James R. Willhite, 215 West Fremont, Elmhurst, Ill. 60126**

**Continuation-in-part of Ser. No. 801,117, Nov. 22, 1985, abandoned. This application Oct. 14, 1986, Ser. No. 918,418**
**Int. Cl.[4] H03M *1/34***
**U.S. Cl. 340—347 AD** **10 Claims**




1. An analog-to-digital converter, not requiring a clock drive, for converting an analog signal to an N-bit digital signal, the converter comprising:
an N-tap acoustic charge transport delay line for receiving and containing an injected analog signal, with the N taps being spaced apart from one another along the delay line at predetermined intervals and with each tap non-invasively sensing and forming a replica of the amplitude of the analog signal currently passing that tap, and with the delay line including a channel region for propagating the analog signal;
wave means coupled to the delay line, for generating a surface acoustic wave and introducing this wave into the delay line, wherein the surface acoustic wave collects an injected analog signal into charge packets and transports

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the charge packets through the channel region of the delay line;

N reference signal means for supplying N voltage reference signals;

N comparators, each having at least two input terminals and one output terminal, with one input terminal of comparator i (i=1,2, . . . ,N) coupled to the i-th tap of the delay line and a second input terminal of comparator i coupled to the output signal of the i-th reference signal means, for comparing the signals received at these two input terminals and for generating an output signal of comparator i that is an i-th bit of the desired N-bit digital signal;

a shift register array having storage for at least N bits, with the storage for bit i being coupled to the output terminal of comparator i (i=1,2, . . . ,N);

wherein the reference signal for the first comparator is substantially constant and the m-th reference signal (m=2,3, . . . ,N) is determined from the values of bits 1, . . . ,m−1 and from the first comparator reference signal.

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**4,742,334**

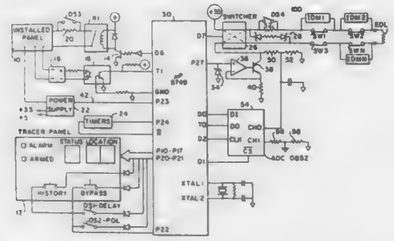
**SINGLE-WIRE LOOP ALARM SYSTEM**

**Rudor M. Teich, South Orange; Keith Guillaume, Edison, and Ram Shalvi, Teaneck, all of N.J., assignors to Tracer Electronics Inc., South Orange, N.J.**

**Filed Aug. 20, 1986, Ser. No. 898,099**

**Int. Cl.⁴ G08B** *26/00*

**U.S. Cl. 340—505** **24 Claims**



1. In an alarm system having a control unit; a wire loop whose two ends terminate at said control unit; a plurality of alarm switches disposed along said loop; a plurality of identification modules connected in parallel with respective ones of said alarm switches; means in said control unit for causing a direct current to flow through said loop and for checking a signal indicative of the voltage drop across said loop to ascertain if an alarm condition exists; means in said control unit responsive to the existence of an alarm condition for generating a series of address codes in the loop to address said identification modules individually; each of said identification modules including means responsive to its individual addressing for changing the voltage drop across said loop in a manner representative of its status; and means in said control unit for monitoring a signal indicative of the voltage drop across said loop to determine the status of an addressed alarm switch means; the improvement comprising means for controlling said control unit to check directly said signal indicative of the voltage drop across said loop in order to ascertain if an alarm condition exists, and means for integrating said signal indicative of the voltage drop across said loop before monitoring thereof by said control unit in order to determine the status of an addressed identification module.

**4,742,335**

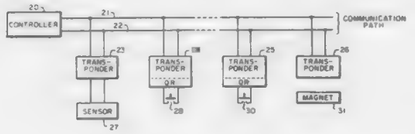
**SEQUENTIAL AND/OR RANDOM POLLING SYSTEM WITH VIRTUALLY INSTANTANEOUS RESPONSE TIME**

**William R. Vogt, Rockaway, N.J., assignor to Baker Industries, Inc., Parsippany, N.J.**

**Filed Jun. 18, 1986, Ser. No. 875,821**

**Int. Cl.⁴ G08B** *26/00, 5/00*

**U.S. Cl. 340—518** **22 Claims**



1. A communication system in which a controller is coupled over a communication path with two or more transponders, at least two of which transponders have different addresses, which controller and transponders communicate by using a polling technique which incorporates time periods to allow communication between the controller and a selected transponder, and means, including the controller, for defining at least one preferred time segment which occurs at a predetermined time in a poll, during which time segment one or more transponders can simultaneously reply to the controller regardless of whether the transponders simultaneously have been specifically addressed by the controller.

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**4,742,336**

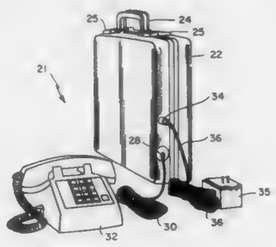
**PORTABLE INTRUSION DETECTION WARNING SYSTEM**

**W. Lawrence Hall, Bangor; George A. Nash, Plymouth, and Harry W. Bailey, Belfast, all of Me., assignors to Hall Security Services, Inc., Brewer, Me.**

**Filed Dec. 4, 1986, Ser. No. 937,970**

**Int. Cl.⁴ G08B** *1/08;* **H04M** *11/04*

**U.S. Cl. 340—539** **12 Claims**



10. A portable intrusion detection warning system for silent surveillance of a space to be monitored comprising:

a portable briefcase carrying case comprising carrying case enclosure elements hinged on one side and fitted with complementary latch elements and lock on the other side for latching and locking the carrying case enclosure elements in closed position, said portable briefcase carrying case being in the configuration of a briefcase with handle means for convenient portability and inconspicuous placement at a desired location;

intrusion detection means removably and replaceably housed in the briefcase carrying case for removal and placement at remote positions in a space to be monitored, said intrusion detection means comprising intrusion sensing means and radio transmitter means for transmitting detection signals to the portable briefcase carrying case upon sensing an intrusion in the monitored space;

radio receiver means housed in the briefcase carrying case for receiving detection signals transmitted from the intrusion detection means;

electronic controller means housed in the portable briefcase carrying case and operatively coupled to receive detection signals from the radio receiver means and deliver actuating signals, said controller means comprising an arming circuit and key switch in the arming circuit for switching the electronic controller means between a non-operating or disarmed condition and an armed condition in which the controller means receives the detection signals and delivers the actuating signals, said key switch being fitted on the briefcase carrying case for access to the key switch with a key from outside the carrying case when the carrying case is closed and locked;

digital communicator means housed in the portable briefcase carrying case and operatively coupled to the controller means for receiving actuating signals and delivering telephone dialing signals, said communicator means comprising a telephone output line and telephone receptacle fitted on the briefcase carrying case for receiving a telephone jack from outside the carrying case when the carrying case is closed and locked for transmitting telephone dialing signals which select a telephone line and for transmitting digital signals over the selected telephone line;

power supply means comprising a power supply receptacle fitted on the briefcase carrying case for receiving a complementary power supply plug from an external power supply source outside the carrying case and power supply lines housed within the briefcase carrying case and coupled between the receptacle and the controller means;

said portable alarm system being operable with the intrusion detection means placed at remote positions by means of the key switch, power supply receptacle and telephone jack accessible from outside the carrying case with the briefcase configuration carrying case locked in closed position with the radio receiver means, electronic controller means, digital communicator means, and power supply means contained within the housing and with the intrusion detection means placed at remote positions for silent surveillance and warning of detection of intrusion in the space to be monitored.

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**4,742,337**

**LIGHT-CURTAIN AREA SECURITY SYSTEM**

**Güenter Haag, Stuttgart, Fed. Rep. of Germany, assignor to Telenot Electronic GmbH, Aalen-Hammerstadt, Fed. Rep. of Germany**

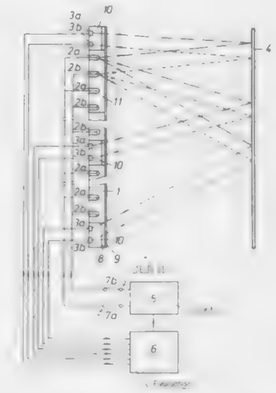
**Filed Aug. 8, 1986, Ser. No. 894,870**

**Claims priority, application Fed. Rep. of Germany, Aug. 28, 1985, 3530646**

**Int. Cl.⁴ G08B** *13/18*

**U.S. Cl. 340—556** **13 Claims**

1. An area-security system consisting of radiation-transmitting and receiving elements arranged in an area to be secured and producing a report if the radiation is influenced within the secured area, characterized by the fact that along one side of the secured area a transmitting/receiving strip is arranged which is subdivided into transmitting regions and receiving regions, each transmitting region consisting of plural transmitting elements arranged alongside of each other and combined in at least two transmitting groups wherein each transmitting group includes at least one transmitting element of each transmitting region; each receiving region consisting of plural receiving elements which are arranged alongside of each other and are combined in at least two groups of receiving elements arrayed with an intervening transmitting group; a multi-channel evaluation means coupled to evaluate the output signals of the respective receiving elements; and a control circuit connected for alternating excitation of the respective transmitting groups, said control circuit also having a synchronizing connection to said evaluation means for coordinating the evaluation (a) of first-group receiving-element responses to reflections from first-group transmitting-element transmissions and (b) of second-group receiving-element responses to reflections from second-group transmitting-element transmissions, the transmitting and receiving elements having such relatively wide responses within the secured area that, for a sufficiently large reflector in said area, plural first-group receiving elements are responsive to reflections of plural first-group transmitting-element transmissions, to the exclusion of second-group transmitting-element transmissions, and plural second-group receiving elements are similarly responsive to reflections of plural second-group transmitting-element transmissions.



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**4,742,338**

**INTRUDER ALARM SYSTEM**

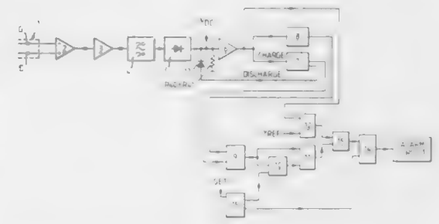
**Roy Baxendale, Harpenden, England, assignor to GEC Avionics Limited, England**

**Filed May 19, 1986, Ser. No. 864,811**

**Claims priority, application United Kingdom, May 17, 1985, 8512419**

**Int. Cl.⁴ G08B** *13/00*

**U.S. Cl. 340—566** **7 Claims**



1. An intruder alarm system comprising: at least one electromechanical transducer for providing electric signals having an amplitude in response to vibrations incident thereon; envelope detector means for deriving a unidirectional waveform signal representing the amplitude of said electric signals; integrating circuit means for deriving a dynamic reference signal from said unidirectional waveform signal; comparator means for comparing said unidirectional waveform signal with said dynamic reference signal; means responsive to an output signal from said comparator means for generating an alarm indication; and means for providing a discharge path between said integrating circuit means and an output of said envelope detector means for preventing said dynamic reference signal from exceeding said unidirectional waveform signal.

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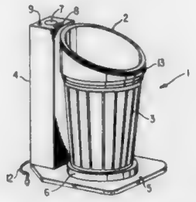


**4,742,339**

## CUTLERY DETECTOR AND ALARM

**Nelson Baziuk, 7860 Tweedsmuir Ave., Richmond, B.C., Canada V7A 1L4**

**Filed Sep. 10, 1986, Ser. No. 905,875**
**Int. Cl.[4] G08B *21/00***
**U.S. Cl. 340—568** **15 Claims**



1. A detector for detecting metal objects in non-metallic material which may be discarded as waste along a predetermined path, comprising:
(a) an electrically operated metal detecting means mounted proximate to the path travelled by the non-metallic material, and including means for shielding said metal detecting means so that it is not sensitive to metal objects located to the exterior of the path travelled by the non-metallic material;
(b) electronic circuitry means connected to the metal detecting means, said circuitry means being activated when a metal object passes along the path proximate to said metal detecting means; and
(c) alarm means which is activated by said circuitry means upon activation of said circuitry means to provide an alarm signalling the passage of a metal object along the path.

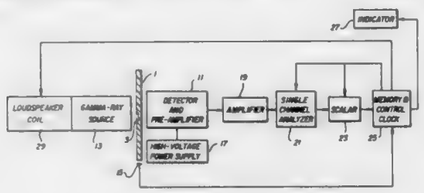
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**4,742,340**

## METHOD AND APPARATUS FOR DETECTING COUNTERFEIT ARTICLES

**Israel Nowik, and Jay L. Hirshfield, both of Jerusalem, Israel, assignors to Isomed, Inc., New Haven, Conn.**

**Filed Dec. 4, 1986, Ser. No. 937,862**
**Int. Cl.[4] G08B *13/18***
**U.S. Cl. 340—572** **16 Claims**




1. A counterfeit detecting apparatus for detecting the authenticity of an article having a label containing an isotope of a chemical element enriched to a predetermined amount, said apparatus comprising;
(a) a housing;
(b) a source of gamma radiation positioned in said housing, said source being subject to the Mossbauer effect, when employed with a particular isotope in the label;
(c) gamma radiation detector means positioned in said housing for detecting radiation from said source;
(d) receiving means in said housing for enabling at least a portion of the article to be inserted therein such that the label is positioned between said source and said detector means;
(e) vibrating means for vibrating said source such that the frequency of the gamma radiation therefrom is shifted;
(f) calculating means coupled to said detector means for calculating the ratio of the number of gamma rays counted by said detector means, during a predetermined period of time, when the article is not positioned by said receiving means ($N_O$) to the number of gamma rays counted by said detector means, during a period of time equal to said predetermined period, when the article is positioned by said receiving means ($N_R$), and for calculating the ratio of the number of gamma rays counted by said detector means, during the predetermined period of time when the article is not positioned by said receiving means ($N_O$), to the number of gamma rays counted during a period of time equal to the predetermined period when said source is vibrated by said vibrating means ($N_E$) and for calculating the ratio $N_R/N_E$; and
(g) output means for providing an output indicating whether $N_R/N_E$ is within a predetermined range.

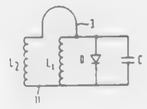
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**4,742,341**

## ELECTROMAGNETIC DETECTION SYSTEM, AS WELL AS A RESPONDER FOR SUCH A SYSTEM

**Johannes H. L. Hogen Esch, Aalten, Netherlands, assignor to N.V. Nederlandsche Apparatenfabriek Nedap, De Groenlo, Netherlands**

**Filed Jun. 13, 1986, Ser. No. 874,005**
**Claims priority, application Netherlands, Jun. 14, 1985, 8501721**
**Int. Cl.[4] G08B *13/18***
**U.S. Cl. 340—572** **21 Claims**



1. An electromagnetic detection system comprising transmission means producing in at least one first detection zone an electromagnetic interrogation field; a plurality of responders having attachment means for attachment to articles to be protected, each including a resonant circuit and an electric circuit and which, if present in said first detection zone, in response to the interrogation field, produce a signal; and detection means associated with said first detection zone adapted to detect the responder and, on detection of the responder to produce a warning signal, characterized in that the responders are designed in such a manner that when the attachment means are removed or when the responder is damaged, at least one frequency determining parameter of the responder is changed in a predetermined manner and that at least one second detection zone is provided wherein responders with the at least one changed frequency determining parameter can be detected; each of said plurality of responders having at least one connection wire extending along the edge of each responder, said wire forming an electric connection between a frequency determining component of the electric circuit of the responder and other frequency determining components of the resonant circuit; and said resonant circuit includes at least two parallel-connected coils and that the connection wire forms a connection between the two coils and that the connection wire also forms one of the coils.

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**4,742,342**

## VIDEO DISPLAY GENERATOR HAVING ALTERNATE DISPLAY MODES

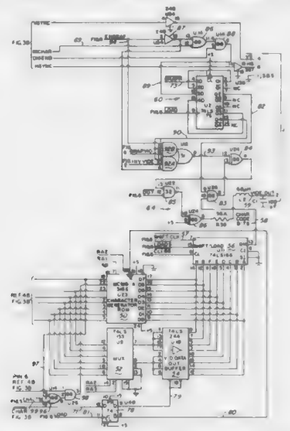
**Dale Chatham, 2202 Dennis Rd., Weatherford, Tex. 76086, and Gerald E. Gaulke, 1308 Timber Valley, Lewisville, Tex. 75028**

**Continuation of Ser. No. 488,743, Apr. 26, 1983, abandoned. This application Sep. 9, 1985, Ser. No. 774,060**
**Int. Cl.[4] G09G *1/16***
**U.S. Cl. 340—723** **8 Claims**

1. In a microcomputer system, a video controller comprising:
a video memory means for storing video data including video character codes and video cell codes,



character generator means responsive to said video character codes for providing dot data signals,
cell generator means responsive to said video cell codes for providing cell data signals,
means coupling the output of the video memory means to the character generator means and to the cell generator means,
control means responsive to said video data for selectively enabling one of said character generator means and said cell generator means,
a shift register means,
means for loading the dot data signals and cell data signals into the shift register means and for shifting the signals therefrom,
output gating means,
means coupling the output of the shift register means to the output gating means,
signal control means having video inverting and video non-inverting states,
and means coupling an output control signal from the signal control means to the output gating means to selectively



perform inversion of the signal to the output gating means from the shift register means,
said signal control means including circuit means having one state indicating inversion and one non-inversion of the character selectively on at least a character-by-character basis,
said output gating means including a logic gate means having a signal input for receiving the serial shift register means signal, and a control input for receiving the control signal from the signal control means
said logic gate means including an exclusive OR gate that enables the character inversion,
said means coupling the output of the video memory means to the character generator means comprising data latch means,
alternate set logic means for controlling data flow content from said data latch means to the character generator means so that an alternate character set can be selectively enabled,
said alternate set logic means including gate means responsive to an alternate set enabling signal and at least one data bit from said data latch means.

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**4,742,343**

## DIGITAL STROKE GENERATOR

**Ciaran O'Donnell, 11 rue Saint Christophe, 75015 Paris, France**

**Filed Dec. 10, 1985, Ser. No. 807,277**
**Claims priority, application France, Dec. 11, 1984, 84 18896**
**Int. Cl.[4] G09G *1/00***
**U.S. Cl. 340—739** **6 Claims**

1. A digital stroke generator for writing a vector in a display memory, said display memory being organized in lines and columns and having a line address input, a column adress input and data input-output, wherein said digital stroke generator comprises:
A. a data bus for transmitting data in the digital stroke generator;
B. an interface circuit having a data input for receiving from remote equipment line and column coordinates data defining the origin coordinates of said vector, octant data defining the general direction of said vector, length data defining the number of pixels of said vector, and Rothman coded data defining the shape of the vector, said interface circuit also having a data output connected to said data bus;
C. a line address register having an incrementation control input, a decrementation control input, a data input connected to said data bus for receiving said line coordinate data, and a data output connected to said line address input of said display memory;
D. a column address register having an incrementation control input, a decrementation control input, a data input connected to said data bus for receiving said column coordinate data and a data output connected to said column address input of said display memory;



E. address control means connected to said data bus and comprising an octant register for receiving said octant data and a direction register for receiving said Rothman coded data, said address control means combining said octant data and said Rothman coded data to supply control signals to the incrementation and decrementation control inputs of said line and column address registers;
F. counting means receiving said length data and supplying a validation signal when the value of said counting means is different from a predetermined value; and
G. clock signal means receiving said validation signal and supplying synchronization signals to synchronize said line address register, said column address register, said address control means and said counting means.

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**4,742,344**

## DIGITAL DISPLAY SYSTEM WITH REFRESH MEMORY FOR STORING CHARACTER AND FIELD ATTRIBUTE DATA

**Banri Nakagawa, Yamato, and Katsuyuki Nojima, Yokohama, both of Japan, assignors to International Business Machines Corp., Armonk, N.Y.**

**Filed Nov. 27, 1985, Ser. No. 802,417**
**Claims priority, application Japan, Dec. 20, 1984, 59-267638**
**Int. Cl.[4] G09G *1/16***
**U.S. Cl. 340—723** **6 Claims**

1. A digital display system comprising:
a raster scan video display device for displaying characters;
a refresh memory including a first portion for storing character data representing characters to be displayed and field attribute data representing attributes of fields of characters to be displayed; and a separate second portion, referred to as an attribute copy table, for storing solely selected field attribute data;
processing means for loading into the first portion of said refresh memory said character data in positions corre-

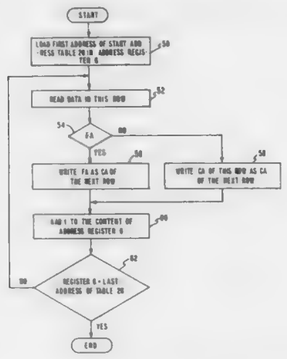
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sponding to the desired positions of the character on the display device, and said field attribute data in positions corresponding to the initial positions of fields of characters on the display device;

means for selecting field attribute data from the field attribute data of said first portion based on a character field carry over from one displayable line of characters to another;

means for copying said selected field attribute data into said attribute copy table in said refresh memory, each entry in




the attribute copy table corresponding to the initial position of a line of characters for display within a field and being a copy of the field attribute data of the end of an immediately preceding line of characters for display within the field; and

display control means for reading the character data, the field attribute data, and the copy field attribute data from the refresh store to generate lines of characters with corresponding attributes on the display device.

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**4,742,345**

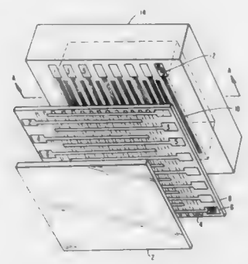
**ELECTROPHORETIC DISPLAY PANEL APPARATUS AND METHODS THEREFOR**

**Frank J. Di Santo, North Hills, and Denis A. Krusos, Lloyd Harbor, both of N.Y., assignors to Copytele, Inc., Huntington Station, N.Y.**

**Filed Nov. 19, 1985, Ser. No. 799,458**

**Int. Cl.[4] G09G** *3/34*

**U.S. Cl. 340—787** **43 Claims**



1. Electrophoretic display panel apparatus comprising:

a planar member;

a first plurality of conductive lines deposited in a first direction on said planar member, each of said first plurality of conductive lines being disposed in parallel on said planar member;

a second plurality of conductive lines disposed in a second direction on said planar member, said second direction being transverse to said first direction, each of said second plurality of conductive lines spacially crossing each of said first plurality of conductive lines to form a plurality of intersections therebetween and each of said second plurality of conductive lines including a plurality of commonly connected, parallel lines segments extending in said second direction to form a plurality of minor intersections with each of said first plurality of conductive lines at each of said plurality of intersections;

means for insulating each of said plurality of commonly connected, parallel line segments in each of said second plurality of conductive lines from each of said first plurality of conductive lines; and

means overlying said planar member and said first and second plurality of conductive lines for establishing a fluid tight panel, said means overlying creating a space above said planar member and said first and second plurality of conductive lines for maintaining an electrophoretic dispersion.

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**4,742,346**

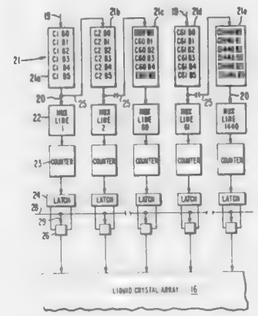
**SYSTEM FOR APPLYING GREY SCALE CODES TO THE PIXELS OF A DISPLAY DEVICE**

**Glynn G. Gillette, Flemington; Roger G. Stewart, Neshanic Station, and John T. Fischer, Princeton, all of N.J., assignors to RCA Corporation, Princeton, N.J.**

**Filed Dec. 19, 1986, Ser. No. 943,709**

**Int. Cl.[4] G09G** *3/36*

**U.S. Cl. 340—793** **2 Claims**




1. A system for applying a plurality of digital grey scale codes to the pixels of a display device composed of an array of pixels arranged vertically in Y columns and horizontally in rows comprising:

shift register means for receiving and storing said grey scale codes for said columns, said shift register means having a plurality of groups, each of said groups having a plurality of segments whereby said shift register means includes Y shift register segments and each segment stores said grey scale codes for a particular column and provides said grey scale codes to said particular column;

a plurality of Y multiplex means individually responsive to said shift register segments for receiving said grey scale codes;

a plurality of counters individually responsive to said multiplex means for receiving said grey scale codes from said shift register segments to set said counters to counts equal to said grey scale codes whereby said counters count down from said counts to zero; and

a plurality of transfer circuit means, each of said transfer circuit means including a latch circuit responsive to one of said counters and a transfer gate responsive to said latch circuit, said transfer gates being conductive when said counters are counting and nonconductive after said counters have counted to zero whereby said transfer gates are conductive in accordance with the grey scale codes received from said shift register segments.



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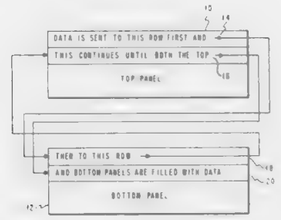
**REFRESHING CIRCUIT FOR MULTI-PANEL DISPLAY**

**Armando Arismendi, Austin, Tex., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Jan. 17, 1986, Ser. No. 820,455**

**Int. Cl.[4] G09G** *1/16*

**U.S. Cl. 340—799** **7 Claims**




1. An addressing circuit for providing character addresses to refresh a plurality of adjacent panels arranged to collectively display a single image, said circuit comprising:

first means for providing a character count across a character line;

second means for providing a character line count for each panel; and,

third means connected to said first and second means for combining the character count and character line count to provide an address for each character successively along a panel scan line successively alternating between the panels on respective scan lines thereof.

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**4,742,348**

**TRIANGULAR MATRIX DEVICE FOR THE ASSIGNMENT OF PRIORITIES**

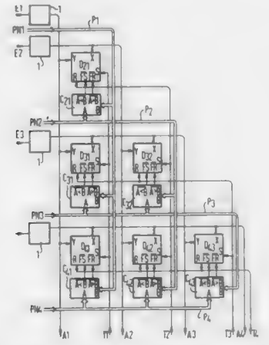
**Wolfgang Wagner, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Sep. 3, 1985, Ser. No. 772,169**

**Claims priority, application Fed. Rep. of Germany, Sep. 5, 1984, 3432656**

**Int. Cl.[4] H04Q** *9/00, 11/04*

**U.S. Cl. 340—825.500** **7 Claims**



1. Device for assigning priorities comprising: a plurality of request channels addressed by request signals, having an equal plurality of output channels arranged with the request channels in form of a triangular matrix, each of the request channels being directly connected to one of said output channels and being indirectly connected to the respective remainder of said plurality of output channels via respective switching elements timingly controlled by rotating control means in a rotating priority sequence by the respective request signal blocking the respective remaining output channels, each switching element having two cross-connected field effect transistors connected between the respective request and output channel.

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**4,742,349**

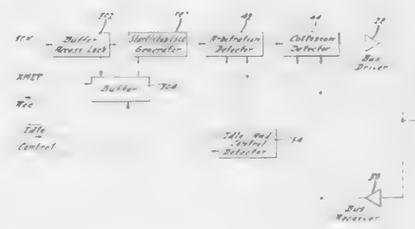
**METHOD FOR BUFFERED SERIAL PERIPHERAL INTERFACE (SPI) IN A SERIAL DATA BUS**

**Frederick O. R. Miesterfeld, Troy; John M. McCambridge, Northville; Ronald E. Fassnacht, Rochester, and Jerry M. Nasiadka, Warren, all of Mich., assignors to Chrysler Motors Corporation, Highland Park, Mich.**

**Filed May 22, 1986, Ser. No. 866,628**

**Int. Cl.[4] H04Q** *9/00*

**U.S. Cl. 340—825.500** **2 Claims**




1. In a communication system for the transmission of messages through a data bus between one or more user microprocessors coupled to the data bus, the user microprocessors having either a serial communication interface (SCI) port or a serial peripheral interface (SPI) port along with a clock port and a input/output port, the user microprocessors being coupled to the data bus by a bus interface integrated circuit with a control line, an idle line and a buffer, a method of transmitting data in a buffered SPI mode of operation comprising:

a bit-wise contention and a deterministic priority access method to (a) resolve contentions among user microprocessors that try to send messages at the same time and to (b) synchronize each data byte and to (c) allow the priority of an ID byte of the message to determine which of a plurality of messages will be sent first in the case of a contention, the determination of which user microprocessor transmits first being made without losing bus time when contention occurs; and

checking to see whether another user microprocessor with higher priority is already transmitting on the data bus by reading the state of the control line, waiting if such is the case;

if no other user microprocessor is already transmitting on the data bus, loading data into the buffer on the bus interface IC;

signaling the data bus that transmission is about to occur by latching the state of the control line to a predetermined state;

checking to see whether a start bit is already on the data bus, waiting at least 2 idle bit times if no start bit is on the data bus before generating a start bit;

sending a signal to the data bus by setting the idle time for predetermined state indicating that the bus is busy;

waiting for the end of the start bit to occur;

sending out two bytes of data to the bus from the buffer separated by bus interface IC-generated start and stop bits if not blocked by the bitwise contention and deterministic priority access method in the bus interface IC;

locking out the user microprocessor from the buffer on the bus interface integrated circuit;

waiting for the second stop bit to occur;

arranging data in the buffer to get the first byte in, such that the most significant byte out to the user microprocessor will be sent first;

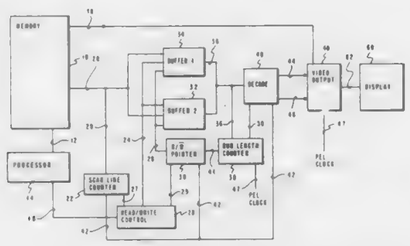
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locking out data on the bus via the bus interface integrated circuit from the buffer;
waiting for the reading of the data;
repeating the previous steps if more data is to be transmitted;
waiting 11 bit times if the data transmission is complete; and
releasing the bus to an idle condition.

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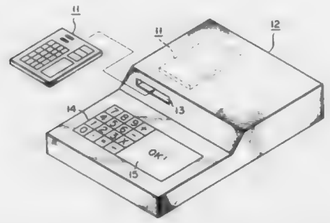
**4,742,350**
**SOFTWARE MANAGED VIDEO SYNCHRONIZATION GENERATION**
**Michael A. Ko, San Jose, Calif., and John S. Muhich, Austin, Tex., assignors to International Business Machines Corporation, Armonk, N.Y.**
**Filed Feb. 14, 1986, Ser. No. 829,357**
**Int. Cl.[4] G09G *1/16***
**U.S. Cl. 340—799** **13 Claims**



6. A system to display an image composed of a plurality of picture element data in accordance with corresponding attribute data, said system comprising:
means for storing said picture element data;
means for storing a plurality of data blocks, each including at least one attribute specification entry for at least one picture element and a specified number of picture elements to be displayed according to the attribute specification entry;
means for forming a continuous stream of video data representing said image from said picture data qualified by said attribute data entries; and
display means for displaying said image from said video data.

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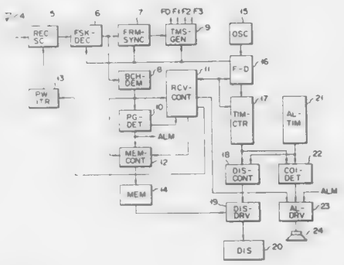
**4,742,351**
**IC CARD SYSTEM**
**Hideo Suzuki, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan**
**Filed Jul. 1, 1986, Ser. No. 880,809**
**Claims priority, application Japan, Jul. 12, 1985, 60-153637**
**Int. Cl.[4] H04Q *1/00***
**U.S. Cl. 340—825.34** **18 Claims**



1. In an IC card system for identifying the validity of an IC card device having at least one integrated circuit (IC) chip, when the IC card device is connected to an external device, the improvement wherein said IC card device comprises:
first memory means contained in said IC card device for storing first identification data of a predetermined number of characters;
input means for inputting second identification data of a predetermined number of characters;
first comparing means for comparing said second identification data, as inputted by said input means, with said first identification data prestored in said first memory means in said IC card device;
output means for outputting the results of the comparison by said first comparing means;
connection terminal means for electrical connection to said external device;
detecting means for detecting the connection state of said IC card device with said external device;
second memory means for storing third identification data for identifying said external device and said IC card device;
transferring means for automatically transferring said third identification data stored in said second memory means to said external device via said connection terminal means; and
control means for controlling said transferring means in accordance with the detection state of said detecting means.

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**4,742,352**
**RADIO COMMUNICATION SYSTEM EQUIPPED WITH ELECTRONIC APPLIANCE**
**Hiroshi Ishii, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan**
**Filed Oct. 7, 1985, Ser. No. 785,164**
**Claims priority, application Japan, Oct. 11, 1984, 59-213046**
**Int. Cl.[4] H04Q *1/00***
**U.S. Cl. 340—825.47** **11 Claims**

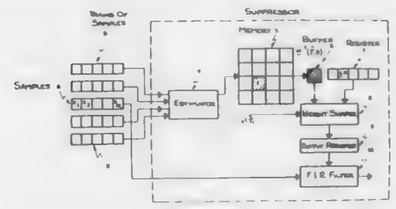


1. A radio communication system including a transmitter end for transmitting transmission data comprised of at least group code data associated with a receiver end and message data to be transmitted, and a plurality of receiver ends for receiving the transmission data from the transmitter end, each said receiver end comprising:
(a) receiving means for receiving the transmission data from the transmitter end when energized by a supply voltage;
(b) a power source for providing said supply voltage;
(c) a clock pulse generator supplied with the voltage from said power source, for generating a reference clock pulse signal;
(d) frequency divider means for frequency-dividing the reference clock pulse signal generated by said clock pulse generator;
(e) group code memory means for storing group code data;
(f) first coincidence detecting means for detecting that a frequency dividing ratio of said frequency divider means coincides with the group code data of said group code memory means, and for producing a corresponding first detection signal;
(g) power supplying means for supplying the voltage from said power source to said receiving means in response to said first detection signal, wherein said power supplying means enables said receiving means to receive the transmission data from the transmitter end;
(h) second coincidence detecting means for detecting a coincidence of the group code data within the transmission data received by said receiving means and the group code data stored in said group code memory means, and for producing a corresponding second detection signal;
(i) control means for processing the message data within the transmission data in response to said second detection signal; and
(j) correcting means for correcting the frequency dividing ratio of said frequency divider means based on the group code data of the received transmission data, and for synchronizing the timing in which voltage is supplied to said receiving means by said power supplying means with the group code data received from said transmitter end.



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**4,742,353**
**DIGITAL PROCESSOR FOR RADAR SIGNALS WHICH CAN PERFORM ADAPTIVE SUPPRESSION OF CLUTTER MEANS OF A PARAMETRIC ESTIMATOR**
**Egidio D'Addio, Naples, and Alfonso Farina, Rome, both of Italy, assignors to Selenia Industrie Elettroniche Associate S.p.A., Rome, Italy**
**PCT No. PCT/IT85/00013, § 371 Date May 27, 1986, § 102(e) Date May 27, 1986, PCT Pub. No. WO86/01001, PCT Pub. Date Feb. 13, 1986**
**Continuation of Ser. No. 865,739, May 27, 1986. This PCT application Jul. 3, 1985, Ser. No. 39,751**
**Claims priority, application Italy, Jul. 27, 1984, 48644 A/84**
**Int. Cl.[4] G01S *13/86***
**U.S. Cl. 342—159** **3 Claims**

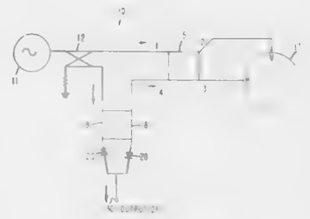


1. A radar signal digital processor which suppresses clutter disturbances and enhances useful signals of given Doppler frequency, comprising:
a finite impulse response filter (**10**);
an estimator of disturbance parameters (**4**);
a memory (**5**) coupled to an output of the estimator (**4**);
a weight synthesizer (**8**) coupled to a second output of the estimator (**4**) for calculating complex weights; and
a register (**9**) for storing the complex weights for output to the finite impulse response filter (**10**).

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**4,742,354**
**RADAR TRANSCEIVER EMPLOYING CIRCULARLY POLARIZED WAVEFORMS**
**Cheng P. Wen, Mission Viejo, and Trang N. Trinh, Torrance, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**
**Filed Aug. 8, 1986, Ser. No. 894,526**
**Int. Cl.[4] G01S *7/42;* H04B *7/10;* H01Q *21/24;* H01P *5/18***
**U.S. Cl. 342—188** **2 Claims**

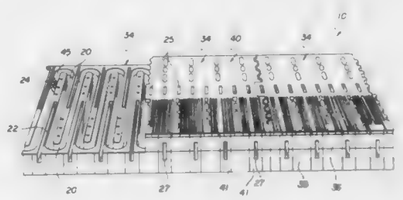
1. A radar transceiver which comprises:
means for generating a signal;
a directional coupler having first, second, third and fourth branch line terminals, said first branch line terminal being electrically coupled to said signal generating means;
a dielectric substrate;
a first linearly polarized antenna including a plurality of essentially parallel first stripline conductors, each stripline conductor having a first plurality of radiating patches spaced about one-half wavelength apart based on the operating frequency of the transceiver, said stripline conductors being coupled to said second branch line terminal;
a second linearly polarized antenna including a plurality of essentially parallel second stripline conductors, each stripline conductor having a second plurality of radiating patches spaced about one-half wavelength apart based on the operating frequency of the transceiver, said stripline conductors of said second antenna being coupled to said third branch line terminal;
said first and second linearly polarized antennas being



mounted on different regions of said substrate and arranged essentially orthogonal to each other, said first linearly polarized antenna being fed a signal from said second branch line terminal and radiating a first signal of a substantially first polarization, and said second linearly polarized antenna being independently fed a second signal from said third branch line terminal and radiating a second independent signal of a substantially second polarization about 90° out-of-phase with said first signal; and
a mixer electrically coupled between said signal generating means and said fourth branch line terminal.

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**4,742,355**
**SERPENTINE FEEDS AND METHOD OF MAKING SAME**
**Ronald I. Wolfson; William G. Sterns; John D. Foglesonger, and Victor M. Petrillo, all of Los Angeles, Calif., assignors to ITT Gilfillan, a Division of ITT Corporation, Van Nuys, Calif.**
**Filed Sep. 10, 1986, Ser. No. 906,060**
**Int. Cl.[4] H01Q *3/22, 13/00;* H01P *1/20***
**U.S. Cl. 342—375** **4 Claims**



1. A method of fabricating high power folded waveguide line feeds including the steps of:
(a) machining mating halves of a first elongate channel into first and second blocks of conductive material;
(b) machining mating halves of a plurality of second channels into said first and second blocks longitudinally parallel with at least a portion of said halves of said first channel thereby providing a plurality of common broadwalls between the respective halves of said first channel and each of said second channels;
(c) machining a plurality of slots in each of said common broadwalls between selective halves of said first and second channels; and
(d) fastening said first and second blocks in alignment such that said halves of said first and second channels mate to

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provide primary and secondary microwave waveguides respectively.

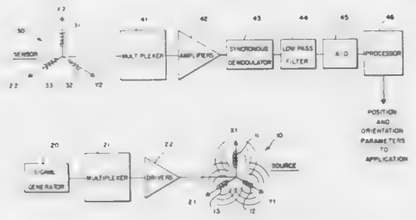
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**4,742,356**

## METHOD AND APPARATUS FOR DETERMINING REMOTE OBJECT ORIENTATION AND POSITION

**Jack Kuipers, Grand Rapids, Mich., assignor to McDonnell Douglas Corporation, St. Louis, Mo.**

**Filed Dec. 9, 1985, Ser. No. 806,669**
**Int. Cl.[4] G01S *5/04*; H04N *7/00***
**U.S. Cl. 342—448** **28 Claims**




1. An apparatus for determining the position and orientation of a remote object relative to a reference coordinate frame comprising:

a plurality of radiating means for radiating electromagnetic energy, said radiating means having independent components defining a reference coordinate frame;

a transmitter means for applying to said plurality of radiating means electrical signals which generate a plurality of radio frequency electromagnetic fields, said electromagnetic fields being distinguishable from one another;

receiving means for receiving said transmitted electromagnetic fields, said receiving means being disposed on a remote object and said receiving means having a plurality of independent components for detecting each of said transmitted electromagnetic fields; and

analyzing means for receiving the output of said receiving means and converting the components of said transmitted electromagnetic fields received by said receiving means into remote object position and orientation relative to said reference coordinate frame, said analyzing means including means for processing the components of said electromagnetic fields with quaternions.

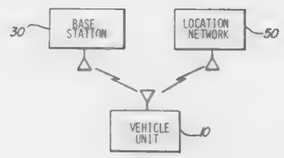
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**4,742,357**

## STOLEN OBJECT LOCATION SYSTEM

**Ernie C. Rackley, 1704 Rockfield, Troy, Mich. 48098**

**Filed Sep. 17, 1986, Ser. No. 908,156**
**Int. Cl.[4] G01S *3/02***
**U.S. Cl. 342—457** **36 Claims**




1. A system for locating a lost or stolen object comprising:

a plurality of object units capable of being operated in more than two different location modes, each object unit associated with a particular one of the objects to be located and having an identification number uniquely identifying the associated object, each object unit having a receiver for receiving locate request messages, a variable frequency transmitter for transmitting messages, and an electronic control for controlling the operation of said receiver and said variable frequency transmitter in response to information contained in said locate request messages, said locate request messages each containing at least one of said identification numbers uniquely identifying the particular one of said plurality of objects as the one to be located, a location code specifying which one of said at least two location modes are to be used to locate the object, and a frequency code specifying the transmission frequency of said variable frequency transmitter, said electronic control have means responsive to said identification number in said locate request message being the same as its own identification number to place said transmitter and receiver in the location mode specified by the mode code, and means to change the transmission frequency of said variable frequency transmitter to the frequency specified by said frequency code;

a location network cooperating with said location request messages and the messages transmitted by said object unit to generate signals and messages to be used to determine said object's location; and

a base station having means responsive to external inputs from transmitting said locate request message and means for generating location data indicative of said object's location in response to the messages transmitted by said object unit and said location network.

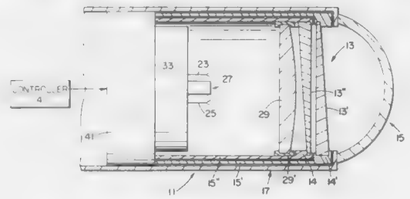
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**4,742,358**

## MULTIFREQUENCY ROTATABLE SCANNING PRISMS

**Peter E. Raber, Milford, and Lester H. Kosowsky, Stamford, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.**

**Filed Oct. 1, 1986, Ser. No. 913,899**
**Int. Cl.[4] H01Q *15/02***
**U.S. Cl. 343—754** **2 Claims**




1. A method of constructing a prism for deflecting electromagnetic radiation in both a first wavelength range about a wavelength $lambda_1$ and a second wavelength range about a wavelength $lambda_2$ by the same final deflection angle D comprising the steps of:

positioning along an optical axis an output subprism made of an output material with an output index of refraction $n_o$ and having an output face and an output intermediate face separated by an output prism opening angle $A_o$;

forming an input subprism from an input material having an input index of refraction $n_i$ and having an input face and an input intermediate face separated by an input prism opening angle $A_i$, with input and output materials being related by the conditions that the value of $n_o$ at the wavelength $lambda_1$, is equal to the value of $n_i$ at the wavelength $lambda_1$, $n_o(lambda_2)=n_i(lambda_1)$, and that $n_i(lambda_2<n_o(lambda_2)<n_i(lambda_1)$ and said input and output prism opening angles are related by the condition that radiation in said second wavelength range approaches said output face at an incident angle of $\sin-^1[\sin(D)/n_o(lambda_2)]$; and

positioning said input intermediate face in close proximity and substantially parallel to said output intermediate face along said optical axis.



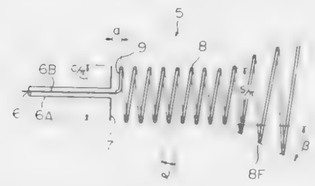
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**4,742,359**

## ANTENNA SYSTEM

**Ken Ishino, Chiba; Hisamatsu Nakano, Tokyo, and Naohisa Gotoh, Kanagawa, all of Japan, assignors to TDK Corporation, Tokyo, Japan**

**Filed Jul. 22, 1986, Ser. No. 889,116**
**Claims priority, application Japan, Aug. 5, 1985, 60-171101; Aug. 5, 1985, 60-171102; Aug. 5, 1985, 60-171103; Aug. 5, 1985, 60-171104; Aug. 5, 1985, 60-171105; Aug. 5, 1985, 60-171106**
**Int. Cl.[4] H01Q *1/36***
**U.S. Cl. 343—895** **12 Claims**




1. An antenna system comprising a reflector, a primary feeder having a helical coil with a pair of ends located at the focal point of said reflector so that the axis of the helical coil coincides essentially with the axis of said reflector, and a feeder line for coupling the antenna with an external circuit, wherein the improvement comprises;

said primary feeder is a backfire helical antenna coupled with said feeder line at its end nearer said reflector and the other end of the backfire helical antenna being free standing,

said feeder line being a coaxial cable,

a conductive matching disc at the junction point of the feeder line and the helical antenna, said matching disc being coupled with the outer conductor of said coaxial cable, and said coil being coupled with the inner conductor of said coaxial cable,

and the wherein following numerical conditions are satisfied:

$$0.5(\lambda) \leqq S \leqq 1.2\ (\lambda)$$

$$3° \leqq (\alpha) \leqq 20°$$

$$0° \leqq (\beta) \leqq 45°$$

$$0 \leqq c \leqq 1.2S$$

where S is the circumference length of one turn of the coil, $(\alpha)$ is the pitch angle of the coil, $(\beta)$ is the flare angle of the coil, and c is the circumference length of the matching disc.

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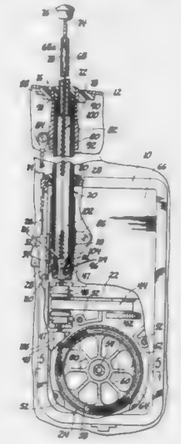
**4,742,360**

## POWER ANTENNA

**David T. Carolus, Dayton; Winston C. Wilder, and Robert E. Evans, both of Centerville, all of Ohio, assignors to General Motors Corporation, Detroit, Mich.**

**Filed Jan. 27, 1986, Ser. No. 822,484**
**Int. Cl.[4] H01Q *1/10***
**U.S. Cl. 343—903** **4 Claims**

1. A power actuated telescoping antenna deployable between extended and retracted positions, comprising, a multi-section telescopic tubular sheath assembly, a length of helically wound push/pull cable fabricated with substantial self bias to a straight figure but resilient in bending, the upper end of said cable being disposed within said sheath assembly and adapted for motion jointly with the telescopic motion of the latter, power-rotatable drive nut means meshed upon said cable and operable upon powered rotation in opposite directions to extend and retract said cable and said sheath assembly, a storage drum receiving the lower end of said cable and including an outer wall, said cable lower end being free of attachment to said drum except by frictional engagement with said outer wall, said drum in all positions of said antenna containing at least a predetermined length of said cable resiliently coiled



against said outer wall of the drum whereby, solely from the frictional engagement of said cable thereagainst, said drum acts as a brake against rotation of said cable upon its own axis during powered rotation of said nut.

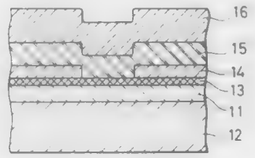
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**4,742,361**

## THERMAL PRINT HEAD

**Takatoshi Ishikawa; Masakazu Kato; Takehiro Takoshima, and Yoshimi Kamijyo, all of Furukawa, Japan, assignors to Alps Electric Co., Ltd., Japan**

**Filed Feb. 7, 1986, Ser. No. 827,796**
**Claims priority, application Japan, Feb. 7, 1985, 60-22188**
**Int. Cl.[4] G01D *15/10*; H01C *1/012*; B05D *1/36***
**U.S. Cl. 346—76 PH** **4 Claims**




1. A thermal head comprising a heat-generating resistor layer, a power feeding conductor layer, and a protecting film, said layers and said film being formed on an electrically insulating substrate, said heat-generating resistor layer being made of an alloy of the elements of tantalum, a rare earth metal, and nitrogen.

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**4,742,362**

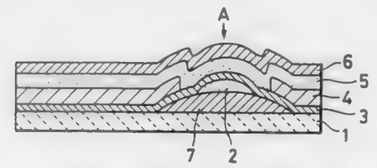
## THERMAL HEAD

**Takehiro Takoshima, and Yoshimi Kamijo, both of Furukawa, Japan, assignors to Alps Electric Co., Ltd., Japan**

**Filed Oct. 22, 1986, Ser. No. 922,044**
**Claims priority, application Japan, Oct. 23, 1985, 60-236844**
**Int. Cl.[4] G01D *15/10*; B05D *1/36*; H01C *1/012***
**U.S. Cl. 346—76 PH** **7 Claims**

1. A thermal head having at least a heat generating resistor layer, a conductor layer, and a protective layer applied successively on an insulating substrate, said heat generating resistor layer being protruded from the insulating substrate in the vicinity of a desired heat generating area by being formed over

a two-stage protruding structure formed on the insulating substrate, said two-stage structure comprising a first protruding portion on the insulating substrate made of heat conductive




material and spanning the heat generating area, and a smaller, glass glaze layer formed on top of a central part of the first protruding portion and disposed centrally in the heat generating area.

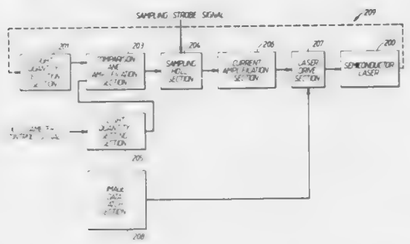
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**4,742,363**

## VARIABLE INTENSITY LIGHT BEAM SCANNING APPARATUS WITH FEEDBACK

**Takashi Shiraishi, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed May 14, 1986, Ser. No. 863,248**
**Claims priority, application Japan, May 31, 1985, 60-119076**
**Int. Cl.[4] G01D *9/42***
**U.S. Cl. 346—108** **9 Claims**




1. A light beam scanning apparatus in which light beams are modulated with large information signals and the modulated light beams are radiated onto a photosensitive body comprising:

a light source for producing light beams in which the light energy distribution displays a normal distribution;

a first means for causing light beams produced by said light source to effect scanning with respect to said photosensitive body in a first direction;

a second means for causing light beams produced by said light source to effect scanning in a second direction which is perpendicular to said first direction;

an image formation means for forming an image constituted by continuous or discontinuous dots on said photosensitive body after scanning in said first and second directions; and

a light quantity detection means for detecting the quantity of light of a light beam produced by said light source and for outputting a voltage proportional to detected light quantity;

a light quantity setting means for producing a reference voltage;

a comparison and amplification means for comparing the output voltage from said light quantity detection means and the reference voltage output by said light quantity setting means and for outputting an analog level voltage corresponding to the voltage from said light quantity setting means;

a sampling hold means for holding output voltage from said comparison and amplification means and for continuously outputting held voltage;

a current amplification means for amplifying the current proportional to the input voltage from said sampling hold means and for outputting an analog level current; and

a light source drive means for lighting said light source by supplying current from said current amplification means thereto in accordance with image information signals and for varying the dot diameter of said light beam.

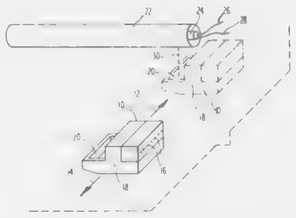
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**4,742,364**

## INK JET APPARATUS AND METHOD EMPLOYING PHASE CHANGE INK

**Arthur Mikalsen, Carmel, N.Y., assignor to Dataproducts Corporation, Woodland Hills, Calif.**

**Continuation of Ser. No. 661,701, Oct. 16, 1984, abandoned.**
**This application Nov. 26, 1986, Ser. No. 935,645**
**The portion of the term of this patent subsequent to Sep. 2, 2003, has been disclaimed.**
**Int. Cl.[4] G01D *9/00, 15/16***
**U.S. Cl. 346—140 R** **11 Claims**



1. a method of operating an ink jet apparatus comprising the following steps:

storing ink in solid state form at a fixed location;

scanning at least one ink jet and an associated reservoir;

sequentially melting portions of said ink; and

periodically moving said at least one ink jet and associated reservoir to said position adjacent said fixed location for receiving sequentially melted portions of ink.

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**4,742,365**

## INK JET APPARATUS

**W. Scott Bartky, Chicago, and A. John Michaelis, Glen Ellyn, both of Ill., assignors to AM International, Inc., Chicago, Ill.**

**Filed Apr. 23, 1986, Ser. No. 855,131**
**Int. Cl.[4] G01D *15/16***
**U.S. Cl. 346—140 R** **2 Claims**

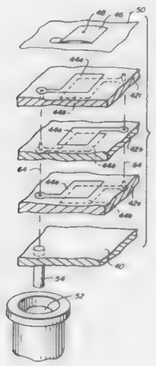
1. In an ink jet print head or the like, wherein a plurality of pumping chambers are provided for receiving ink and individually discharging the ink on demand in droplet form, comprising:

a generally rigid substrate;

a plurality of juxtaposed layers of continuous film of piezoelectric material extending over the substrate;



a continuous orifice plate extending over said juxtaposed layers of continuous piezoelectric film and forming a plurality of orifice membes on the exposed side of the juxtaposed piezoelectric film layers and cooperating therewith to define an array of said plurality of pumping chambers; and



each said layers of piezoelectric film having electrode means electrically coupled on opposite sides of the respective film coincident with a respective orifice member to define a plurality of electrically pulsed ink droplet drive elements operatively associated individually with said plurality of pumping chambers.

a film cartridge receiving chamber defined by said walls of the housing and said side walls of said exposure chamber and open on the back side to provide an access opening, said cartridge receiving chamber including first and second compartments on the opposite sides of said exposure chamber;

spring means formed on the bottom wall of said housing within said first and second compartments and having engaging members;

a film cartridge adapted to be loaded in said cartridge receiving chamber and including film storage and take-up portions to be received in said first and second compartments of the cartridge receiving chamber, respectively, and a film guide portion connecting between said storage and take-up portions; and

two openings formed in said front wall of the housing in alignment with said film storage and take-up portions of the film cartridge, respectively.

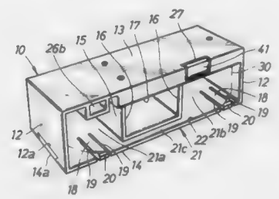
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**4,742,366**

## CAMERA HAVING MEANS FOR RECEIVING A FILM CASSETTE

**Hiroshi Nakazawa, Tokyo, Japan, assignor to Hybrid Corporation, Japan**

**Filed Dec. 24, 1986, Ser. No. 945,977**
**Claims priority, application Japan, Sep. 9, 1986, 61-137282[U]**
**Int. Cl.[4] G03B *17/42, 17/02***
**U.S. Cl. 354—204** **20 Claims**



1. A camera comprising a box-shaped housing open on the back side and including front, end, top and bottom walls;

an exposure chamber formed integrally with said bottom wall at a central area of said bottom wall, having side walls facing said end walls of said housing, and open on the back side to provide an exposure window;

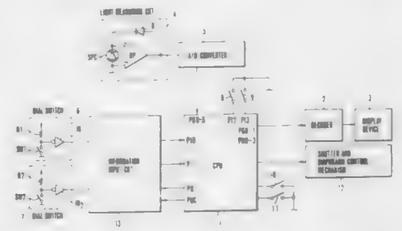
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**4,742,367**

## PHOTOGRAPHIC INFORMATION SETTING DEVICE

**Kenichiro Amano, Tokyo; Yoshihito Harada, Yokohama; Masayoshi Kiuchi, Sagamihara; Ryuichi Kobayashi, and Masaharu Kawamura, both of Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 14, 1986, Ser. No. 918,774**
**Claims priority, application Japan, Oct. 15, 1985, 60-230509; Oct. 17, 1985, 60-232976; Oct. 17, 1985, 60-232977; Oct. 17, 1985, 60-232978**
**Int. Cl.[4] G03B *7/00, 7/091, 17/18***
**U.S. Cl. 354—289.1** **19 Claims**



1. A photographic information setting device for use in providing digital values of such information, comprising:

(a) switch means having ON and OFF states and an operating member movable to change the state of said switch means, said switch means generating an output signal upon each occurrence of state change thereof from OFF to ON and upon each occurrence of state change thereof from ON to OFF;

(b) counter means connected to said switch means for counting digitally occurrences of said switch means output signal; and

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(c) computer means connected both to said switch means and to said coutner means and responsive to said switch means output signal for reading out and storing the digital count value of said counter means.

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**4,742,368**

**Patent Not Issued For This Number**

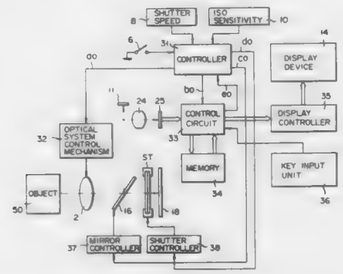
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**4,742,369**

## ELECTRONIC STILL CAMERA

**Hiroshi Ishii; Tatsuyuki Seki, and Eiji Nakazawa, all of Tokyo, Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 839,356, Mar. 13, 1986, abandoned.**
**This application Jul. 28, 1987, Ser. No. 80,162**
**Claims priority, application Japan, Mar. 20, 1985, 60-56973; Apr. 30, 1985, 60-92448; May 7, 1985, 60-96234**
**Int. Cl.[4] G03B** *7/095, 17/00;* **H04N** *5/76*
**U.S. Cl. 354—441** **14 Claims**




1. An electronic still camera, comprising:

optical lens system means including a lens and a diaphragm;

solid-state imaging element means on which an object image incident through said optical lens system means is focused;

image signal storage means having a plurality of memory areas, and coupled to said solid-state imaging element means, for storing in each of said memory areas an image signal corresponding to the object image focused on said solid-state imaging element means;

means for receiving photosensitive film means arranged at a position different from said solid-state imaging element means and on which the object image incident through said optical lens system means is focused;

shutter means arranged in front of said photosensitive film means, and normally closed for preventing the object image incident through said optical lens system means from reaching said photosensitive film means;

switch means;

control means coupled to said switch means, said control means including means for outputting first, second and third control signals when said switch means is operated;

storage control means for controlling the storing of a still image signal, said storage control means including means responsive to said first control signal for causing said image signal storage means to sequentially store in different memory areas still image signals which correspond to respective object image which are incident through said optical lens system means and which are focused on said solid-state imaging element means;

shutter drive means responsive to said second control signal for opening said shutter means so that a still image of the object image, which is incident through said optical lens system means, is formed on photosensitive film means in said receiving means; and

optical system control means responsive to said third control signal for controlling the amounts of light representing an object image which pass through said diaphragm of said control lens system means during the operation of said storage control means and during the operation of said shutter drive means, so that the amount of light representing the object image at the position of said solid-state imaging element means during operation of said storage control means, is substantially equal to the amount of light representing the object image at the position of said receiving means during operation of said shutter drive means.

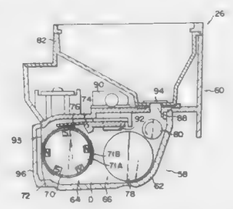
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**4,742,370**

## DEVELOPING DEVICE WITH TONER DENSITY ADJUSTMENT

**Reiji Murakami; Kozo Matsuyama, both of Yokohama; Shouji Takano, Kawasaki; Kazutaka Takahashi, Yamato; Koji Yukinaga, Tokyo, and Motohiko Tanigawa, Kawasaki, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Nov. 19, 1986, Ser. No. 932,345**
**Claims priority, application Japan, Mar. 29, 1986, 61-72177**
**Int. Cl.[4] G03G** *15/00*
**U.S. Cl. 355—3 DD** **15 Claims**



1. A developing device which supplies a toner to an image carrier, having an electrostatic latent image thereon, thereby developing the latent image, comprising:

a casing stored with a developing agent containing the toner and a carrier at a predetermined ratio, said casing having a feed port through which the developing agent is fed to the image carrier;



automatic toner-content adjusting means for keeping the toner content of the developing agent, in the housing, constant, said adjusting means including content detecting means, adapted to detect the toner content of the developing agent and deliver a detection signal, and replenishing means for resupplying the toner, so as to maintain a preset toner content, in response to the detection signal from the detecting means; and

sealing means for hermetically sealing the feed port of the casing, after the casing is loaded with the developing agent used in setting the automatic toner-content adjusting means to the preset toner content, so as to keep the density of the developing agent constant.

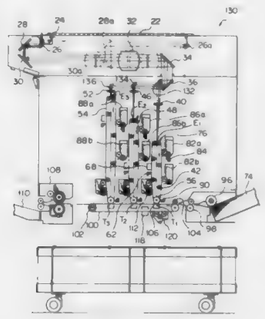
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**4,742,371**

## OPTICAL SYSTEM FOR COLOR COPIER

**Hideya Furuta; Yutaka Koizumi, both of Yokohama; Kazusige Taguchi, Ageo, and Yoshihiro Sakai, Kawasaki, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan**

**Filed May 1, 1987, Ser. No. 44,742**
**Claims priority, application Japan, May 1, 1986, 61-101638; May 1, 1986, 61-101639; May 15, 1986, 61-111238; May 18, 1986, 61-113031; May 18, 1986, 61-113032; May 19, 1986, 61-112474; May 19, 1986, 61-112475; Aug. 12, 1986, 61-189204**
**Int. Cl.[4] G03G** *15/01*
**U.S. Cl. 355—4** **21 Claims**





1. An optical system for an electronic color copier in which latent images representative of an original document image, which is exposed through a slit, and each corresponding to a respective one of different colors are formed electrostatically one on each of at least a first to a third photoconductive elements, said latent images each being developed by a respective one of toner of a color which is associated with said latent image and, then, transferred to a paper in a superposed position, said optical system comprising:

first optical path splitting means disposed in an optical path, along which incoming image light representative of the document image is propagated, for reflecting a part of said light over an entire width of the slit and transmitting a part of said light;

second optical path splitting means located in a position for intercepting said light which is transmitted through said first optical path splitting means, said second optical path splitting means totally reflecting a part of said light; and

third optical path splitting means for totally reflecting a remaining part of the light which is not reflected by said second optical path splitting means;

whereby the light reflected by each of said first to third optical path splitting means is focused onto one of the first to third photoconductive elements which is associated with said optical path splitting means.

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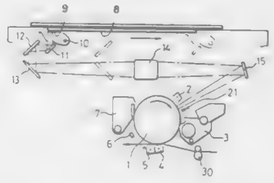
**4,742,372**

## TONER DETECTION METHOD AND DEVICE FOR COPYING MACHINES

**Masanobu Takahashi, Suita, Japan, assignor to Mita Industrial Co., Ltd., Japan**

**Filed Aug. 7, 1986, Ser. No. 894,134**
**Claims priority, application Japan, Aug. 9, 1985, 60-176355; Aug. 9, 1985, 60-176356**
**Int. Cl.[4] G03G** *13/06, 15/06*
**U.S. Cl. 355—14 D** **7 Claims**





2. A device for controlling developed image density in copying machines provided with a developing device, positioned near a photoreceptor, for forming a developed toner image from an electrostatic latent image correponding to an original image formed on the photoreceptor, said device comprising:

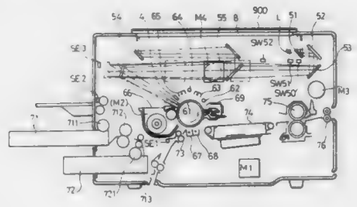
a color recognitio means for identifying the color of toner contained in the developing device and providing output signals indicative thereof,

means for storing optimum development density data according to toner color and providing output signals indicative of the data,

a density detection means for detecting the density of the toner image, and

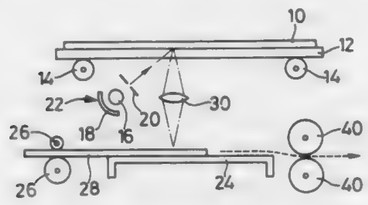
a control means for generating driving signals to control a toner supply device in response to the output signals from the density detection means and the means for storing optimum development density data to maintain optimum toner density regardless of toner color.

4,742,373
COPYING MACHINE
Keiji Nakatani, Toyokawa, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan
Filed Jun. 9, 1987, Ser. No. 59,843
Claims priority, application Japan, Jun. 12, 1986, 61-137144; Jun. 16, 1986, 61-139466
Int. Cl.[4] G03G *15/04*
U.S. Cl. 355—14 R 13 Claims



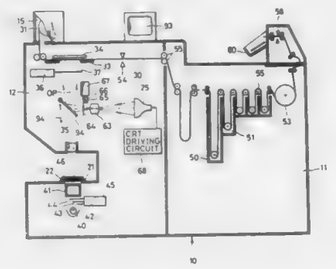
9. A copying machine comprising:
first density designating means for designating a general copied image density of a document;
area designating means for designating a plurarity of particular areas of the document;
second density designating means for designating copied image density, which are different from the general copied image density designated by the first density designating means, for the plurarity of particular areas of the document designated by said area designating means; and
copying means for copying the particular areas of the document in the copied image density designated by said second density designating means and for copying a area outside the particular area of the document in the general density designated by said first density designating means.

4,742,374
COPYING APPARATUS
Takemi Yamamoto; Ryohei Komiya, both of Nagoya, and Naoyuki Hatta, Gamagori, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Japan
Filed Dec. 18, 1986, Ser. No. 943,195
Claims priority, application Japan, Dec. 24, 1985, 60-291159; Mar. 25, 1986, 61-64925
Int. Cl.[4] G03B *27/32, 27/52*
U.S. Cl. 355—27 17 Claims



1. A copying appartus comprising:
a photosensitive paper;
an image-illuminating device for illuminating a surface of an original having images to be reproduced, said image-illuminating device producing a light which is reflected by said surface of the original, the reflected light including rays to which said photosensitive paper is sensitive, whereby latent images are formed on said photosensitive paper by means of selective local exposure of the photosensitive paper to said rays; and
an auxiliary illuminating device for re-exposing said photosensitive paper after said latent images are developed into visible images.

4,742,375
PRINTER PROCESSOR
Mikio Kogane, and Kiichiro Sakamoto, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan
Filed Feb. 10, 1987, Ser. No. 13,279
Claims priority, application Japan, Feb. 10, 1986, 61-25930; Feb. 10, 1986, 61-25931
Int. Cl.[4] G03B *27/72, 27/80*
U.S. Cl. 355—20 18 Claims



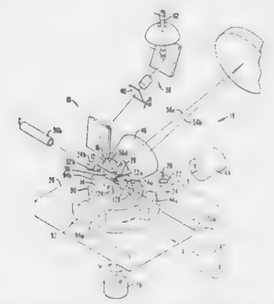
1. A printer processor wherein a photographic paper in an exposure station is exposed and transported to a photographic development processing unit to be developed, comprising:
a main frame having an exposure station and a photographic development processing unit;
a photographic image projection system for projecting a photographic image recorded on a photographic original onto said photographic paper;
a CRT image projection system having a CRT for projecting a CRT image displayed on said CRT onto said photographic paper;
means for selectively optically aligning either one of said photographic image projection system and said CRT image projection system with said exposure station thereby to print one of said photographic image and said CRT image;
a cutter unit for cutting a developed photographic paper into pieces each containing one frame; and
a punching unit for punching out a developed CRT image from said photographic paper and for collecting punched-out waste photographic paper;
wherein both said cutter unit and said punching unit are selectably and detachably mounted on said printer processor main frame.

4,742,376
STEP-AND-REPEAT ALIGNMENT AND EXPOSURE SYSTEM
Edward H. Phillips, P.O. Box 1042, Middletown, Calif. 95461
Continuation of Ser. No. 836,139, Mar. 4, 1986, abandoned, Division of Ser. No. 692,011, Jan. 14, 1985, Pat. No. 4,585,337. This application Nov. 13, 1986, Ser. No. 930,797
Int. Cl.[4] G03B *27/32*
U.S. Cl. 355—77 7 Claims

1. A method for aligning coordinate U and V axes of motion of a three axis stage assembly with respect to an image of a first object, wherein the three axis stage assembly has coordinate X and Y axes of motion, a rotational Ψ axis of rotation about a coordinate Z axis, and a stage mark, and further wherein the image of the first object includes first and second alignment window images, and the stage mark forms a stage mark image which is coplanar with the image of the first object when the stage mark is illuminated by the light from the image of the first object, said method comprising the steps of:

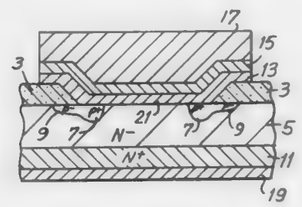


positioning the three axis stage assembly so that the stage mark image is aligned with the first and then the second alignment window images;
determining positional offsets between nominal and best fit locations of the first and second alignment window images in relation to the stage mark image; and



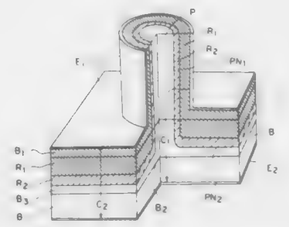
calibrating the three axis stage assembly for movement along coordinate U and V axes of motion as a function of the positional offsets applied to the coordinate X and Y axes of motion.

4,742,377
SCHOTTKY BARRIER DEVICE WITH DOPED COMPOSITE GUARD RING
Willem G. Einthoven, Belle Mead, N.J., assignor to General Instrument Corporation, New York, N.Y.
Division of Ser. No. 703,703, Feb. 21, 1985, Pat. No. 4,638,551, which is a continuation of Ser. No. 422,386, Sep. 24, 1982, abandoned. This application Oct. 23, 1986, Ser. No. 922,532
Int. Cl.[4] H01L *29/48*
U.S. Cl. 357—15 7 Claims



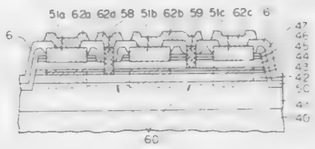
1. A Schottky barrier device comprising
(a) a semiconductor layer whose major portion is of a first conductivity type,
(b) an insulating layer covering one face of the semiconductor layer, the insulating layer having an opening therein,
(c) a conductor layer extending over a portion of the insulating layer including the opening for making contact with said one face of the semiconductor layer, said contact being rectifying where made to the portion of the first conductivity type, and
(d) an asymmetric guard ring in the semiconductor layer at said one face and of the conductivity type opposite the first conductivity type and including an innermost ring portion of a first doping level for forming an inner PN junction portion with the bulk portion of the semiconductor layer, said inner ring portion generally underlying and contacting a portion of the conductor layer, and an outermost ring portion of a second doping level for forming an outer PN junction portion with the bulk portion of the semiconductor layer, said outer ring portion generally underlying and contacting a portion of the insulating layer and said first doping level being higher than said second doping level.

4,742,378
JUNCTION-TYPE SEMICONDUCTOR LIGHT EMITTING DEVICE WITH MESA
Hiromasa Ito, and Humio Inaba, both of Miyagi, Japan, assignors to Japan Represented by President of Tohoku University, Sendai, Japan
PCT No. PCT/JP85/00152, § 371 Date Sep. 30, 1985, § 102(e) Date Sep. 30, 1985, PCT Pub. No. WO85/04531, PCT Pub. Date Oct. 10, 1985
PCT Filed Mar. 28, 1985, Ser. No. 784,890
Claims priority, application Japan, Mar. 28, 1984, 59-58159
Int. Cl.[4] H01L *33/00*
U.S. Cl. 357—17 28 Claims



1. A junction-type semiconductor light emitting device comprising a semiconductor plate portion, a semiconductor column formed on one surface of the plate portion and electrodes provided on each of opposite surfaces of the plate portion, the column having a pn junction formed therein and said column and said pn junction extending perpendicular to the plate portion, the plate portion having a pn junction formed therein and extending parallel to the plate portion, the current density J1 of a circuit through the pn junction in the column being at least 0.1 times the current density J2 of a circuit through the pn junction in the plate portion when a predetermined voltage is applied across the electrodes.

4,742,379
HEMT WITH ETCH-STOP
Yoshimi Yamashita, Sagamihara; Kinjiro Kosemura, Atsugi; Hidetoshi Ishiwari, Ebina; Sumio Yamamoto, Yokohama, and Shigeru Kuroda, Hadano, all of Japan, assignors to Fujitsu Limited, Kanagawa, Japan
Filed Nov. 29, 1984, Ser. No. 676,359
Claims priority, application Japan, Nov. 29, 1983, 58-224650; Nov. 29, 1983, 58-224634
Int. Cl.[4] H01L *29/80*
U.S. Cl. 357—22 10 Claims



1. A semiconductor device which comprises an enhancement-mode transistor and a depletion-mode transistor, has a heterojunction, and utilizes a two-dimensional electron gas, comprising:
a semi-insulating compound semiconductor substrate;
a semiconductor channel layer which is formed on said substrate and in which the two-dimensional electron gas is generated;

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an electron-supply layer formed on said semiconductor layer, which layers form the heterojunction;
a first semiconductor layer formed on said electron-supply layer and having a composition different from said electron-supply layer;
a second semiconductor layer formed on said first semiconductor layer, having a thickness for providing a predetermined difference of the threshold voltage between the enhancement-mode transistor and the depletion-mode transistor, said second semiconductor layer having a composition different from said first semiconductor layer and having an etching rate for a certain etchant the same as that of the composition of said electron-supply layer;
a gate electrode of the depletion-mode transistor located on said electron-supply layer; and
a gate electrode of the enhancement-mode transistor extending into said electron-supply layer by a depth corresponding to the thickness of said second semiconductor layer.

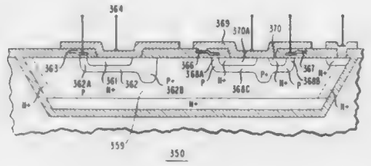
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**4,742,380**

## SWITCH UTILIZING SOLID-STATE RELAY

**Gee-Kung Chang; Adrian R. Hartman, and Harry T. Weston, all of New Providence, N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.**

**Continuation of Ser. No. 646,708, Aug. 31, 1984, abandoned, which is a continuation-in-part of Ser. No. 347,094, Feb. 9, 1982, abandoned. This application Jan. 23, 1987, Ser. No. 9,635**
**Int. Cl.⁴ H01L** *29/78*
**U.S. Cl. 357—23.4** **23 Claims**



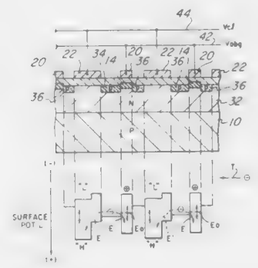
1. A semiconductive switching device comprising a semiconductive body (**350**) including a bulk portion (**359**) of one conductivity type and within said bulk first (**361**) and second (**370**) spaced apart surface source regions of the one conductivity type, first (**362**) and second (**368**) spaced shielding regions of the opposite conductivity type enclosing the first and second source regions, respectively, a first electrode (**364**) making a direct electrical connection to both the first source and first shielding regions, a second electrode (**369**) making a direct electrical connection to both the second source and second shielding regions, a third electrode (**363**) overlying and insulated from a surface portion (**362A**) of the first shielding region remote from the second shielding region for serving as a gate electrode for selectivity inverting said portion of the shielding region and forming a channel therein, a fourth electrode (**367**) overlying and insulated from a surface portion (**368B**) of the second shielding region more remote from the first shielding region for serving as a gate electrode for selectively inverting said portion of the second shielding region for forming a channel therein, a fifth electrode (**366**) overlying and insulated from a surface portion (**368A**) of the second shielding region more adjacent the first shielding region and making a direct electrical connection to the second electrode (**369**), and a connecting region located contiguous with the bulk portion and having a conductance which is sufficient for supplying a relatively low resistance path for charge carriers flowing between the first and second surface source regions via respective portions of the first and second spaced shielding regions underlying the third and fourth electrodes, respectively.

**4,742,381**

## SEMICONDUCTOR CHARGE-COUPLED DEVICE WITH AN INCREASED SURFACE STATE

**Ichiro Fujii, Miho, Japan, assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Filed May 15, 1986, Ser. No. 863,674**
**Claims priority, application Japan, Jun. 21, 1985, 60-136510**
**Int. Cl.⁴ H01L** *29/78, 27/14, 31/00, 29/167*
**U.S. Cl. 357—24** **4 Claims**



1. A semiconductor charge-coupled device comprising:
(a) a layer of a doped semiconductor,
(b) an insulator layer on the doped semiconductor layer,
(c) a plurality of transfer electrodes on the insulator layer, and
(d) an interlevel layer formed over a selected area of said interface between said doped semiconductor layer and said insulator layer to increase the surface state at said interface,
(e) an anti-blooming electrode on said insulator layer substantially in registry with said selected area of said interface between said doped semiconductor layer and said insulator layer and intervening between an adjacent two of said transfer electrodes along the surface of said insulator layer,
(f) first and second doped semiconductor regions in said doped semiconductor layer and doped to the same conductivity type to different dopant densities and located so that said interlevel layer intervenes therebetween along said interface between said doped semiconductor layer and said insulator layer.

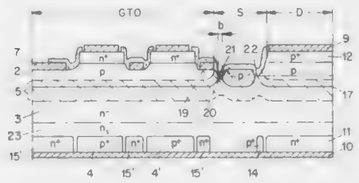
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**4,742,382**

## SEMICONDUCTOR COMPONENT

**André Jaecklin, Ennetbaden, Switzerland, assignor to BBC Brown, Boveri & Company, Limited, Baden, Switzerland**

**Filed Feb. 14, 1986, Ser. No. 829,514**
**Claims priority, application Switzerland, Mar. 20, 1985, 1237/85**
**Int. Cl.⁴ H01L** *29/747, 29/74, 29/06, 29/90*
**U.S. Cl. 357—39** **14 Claims**



1. A semiconductor component comprising:
at least one gate turn-off (GTO) thyristor formed of at least four charge carrier layer of alternating conductivity types, including an $n^+$- type emitter layer adjoining a first surface in a cathode region, a p-type base layer adjoining said $n^+$-type emitter and forming thereby a first pn junction, said p-type base layer adjoining the first surface in a gate electrode region, whereby said surface in said gate electrode region is located lower than said first pn junction, an n-type base layer adjoining said p-type base layer and forming thereby a second pn junction surrounded by a space charge zone, and a p-type emitter layer;
at least one diode spaced apart from said at least one GTO thyristor and being at least formed by said p-type base layer, said n-type base layer and a highly doped n-type diode layer, which forms a diode cathode;
a protective zone separating said diode and said GTO thyristor and comprising said space charge zone, extending from a region including said GTO thyristor to a region including said diode, and a first surface in the region of the protective zone, which is at least as deep as the first surface in the gate electrode region and not deeper than the second pn junction in the GTO thyristor; and
at least one gate electrode region laterally adjoining the protective zone.



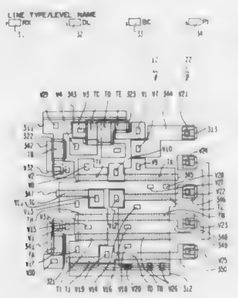
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**4,742,383**

## MULTI-FUNCTION FET MASTERSLICE CELL

**Joseph M. Fitzgerald, Rochester, Minn., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Continuation of Ser. No. 457,324, Jan. 12, 1983, abandoned. This application Dec. 30, 1985, Ser. No. 818,981**
**Int. Cl.⁴ H01L** *27/10, 29/78, 23/52, 29/06*
**U.S. Cl. 357—45** **10 Claims**



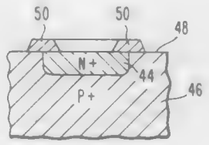
1. A masterslice semiconductor chip carrying an array of repetitive multifunction cells, each having a substantially rectangular boundary, each of said cells comprising:
a first series string of FETs (each having a source, a drain, and a gate electrode) all having the same polarity, said first string being disposed in a first direction;
a second series string of FETs (each having a source, a drain, and a gate electrode) all having said same polarity, said second string also being disposed in said first direction;
a plurality of I/O pads located on said boundary;
a plurality of conductors disposed in a second direction substantially perpendicular to said first direction, each of said conductors connecting the gate of one FET of said first string to the gate of a corresponding FET of said second string and to one of said I/O pads;
a plurality of internal connection points located between adjacent ones of at least some FETs of each of said first and said second strings, said internal connection points being adapted for selective interconnection among themselves and to at least one of said I/O pads;
load means including a plurality of load FETs connected to a supply voltage and to a further plurality of internal connection points, for selective connection to the FETs of said first and second strings.

**4,742,384**

## STRUCTURE FOR PASSIVATING A PN JUNCTION

**Jacques I. Pankove, Princeton, N.J., and Ming L. Tarng, San Diego, Calif., assignors to RCA Corporation, Princeton, N.J.**

**Continuation-in-part of Ser. No. 874,248, Feb. 1, 1978, abandoned. This application Mar. 18, 1983, Ser. No. 476,722**
**Int. Cl.⁴ H01L** *29/34*
**U.S. Cl. 357—52** **4 Claims**



1. In a crystalline semiconductor structure having a PN junction adjacent a surface thereof, the improvement comprising a layer of hydrogenated amorphous silicon disposed on said surface adjacent the PN junction, said hydrogenated layer of amorphous silicon containing between about 5 and about 50 atomic percent of hydrogen.

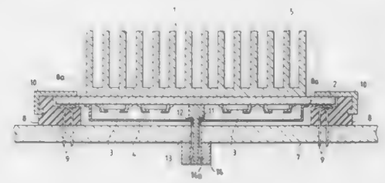
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**4,742,385**

## MULTICHIP PACKAGE HAVING OUTER AND INNER POWER SUPPLY MEANS

**Mitsuo Kohmoto, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed Aug. 5, 1986, Ser. No. 893,209**
**Claims priority, application Japan, Aug. 7, 1985, 60-120259[U]**
**Int. Cl.⁴ H01L** *23/02*
**U.S. Cl. 357—74** **2 Claims**



2. A multichip package comprising:
a substrate;
a plurality of integrated circuit chips mounted on one surface of said substrate;
a plurality of power feed contact pads arranged on an outer portion of said substrate and a plurality of signal feed contact pads arranged on said outer portion and respectively coupled to said chips;
a pair of power feed pins mounted on the center portion of the area of said substrate;
conductive means for uniformly distributing power from said power feed contact pads and said power feed pins to said integrated circuit chips;
a circuit board;
means for securing said substrate on said circuit board;
a plurality of power feed connectors on said circuit board respectively engageable with said power feed contact pads for coupling power from an external power source to said power feed contact pads and a plurality of signal feed connectors on said circuit board respectively engageable with said signal feed contact pads for coupling an external circuit to said chips; and
a pair of sockets on said circuit board engageable respectively with said power feed pins for coupling power from said external source to said power feed pins.

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**4,742,386**

## METHOD AND APPARATUS FOR ENCODING COMPONENT DIGITAL VIDEO SIGNALS SO AS TO COMPRESS THE BANDWIDTH THEREOF, AND FOR DECODING THE SAME

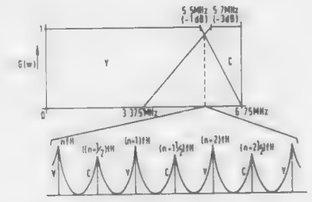
**James H. Wilkinson, Yokohama, Japan, assignor to Sony Corporation, Tokyo, Japan**

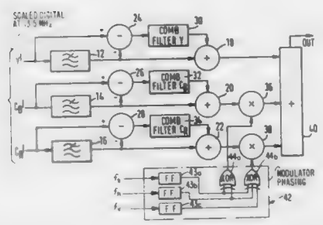
**Filed Mar. 6, 1987, Ser. No. 22,965**

**Claims priority, application United Kingdom, Apr. 2, 1986, 8609081**

**Int. Cl.⁴ H04N** *11/04, 11/16*

**U.S. Cl. 358—13** **15 Claims**




1. A method of encoding a component digital video signal which comprises a luminance signal and first and second color component signals, the color component signals being modulated on the lower sideband of a carrier at the luminance signal Nyquist frequency, the method being characterised by:

alternating line-by-line at a predetermined frequency the phase of the first color component signal;

alternating line-by-line at the predetermined frequency the phase of the second color component signal;

changing the phase relationship between the phase alternation for the first and second color component signals every field so that the instantaneous phases of both color component signals are the same in each alternate field and are opposite in every other field; and

combining the first and second phase-alternating color component signals with the luminance signal to provide the encoded component digital video signal.

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**4,742,387**

## METHOD AND APPARATUS FOR AUTOMATICALLY ESTABLISHING A COLOR BALANCE OF A COLOR TELEVISION MONITOR INCLUDING AN AMBIENT LIGHT SENSING AND DATA COMPENSATING FUNCTION

**Junichi Oshima, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan**

**Filed Mar. 6, 1987, Ser. No. 23,110**

**Claims priority, application Japan, Mar. 17, 1986, 61-58568; Mar. 20, 1986, 61-63175**

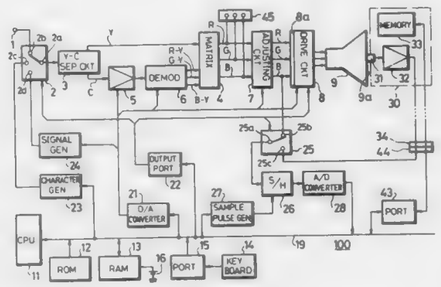
**Int. Cl.⁴ H04N** *9/73*

**U.S. Cl. 358—29** **16 Claims**

1. Apparatus for automatically establishing a color balance of a color television monitor including a color cathode ray tube having a display surface at which a television image is presented, comprising:

adjustable drive means for driving said color cathode ray tube to produce a color image;

sensor means adapted for separable attachment to said display surface for sensing thereat an ambient light brightness when said drive means does not drive said color cathode ray tube and providing ambient light data corresponding to the sensed ambient light brightness;




a source of reference data indicative of a reference color balance of said color image;

compensating means for compensating said reference data with said ambient light data; and

adjusting means for controlling said adjusting drive means in response to the compensated reference data to establish said color balance of said color image independent of said ambient light brightness.

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**4,742,388**

## COLOR VIDEO ENDOSCOPE SYSTEM WITH ELECTRONIC COLOR FILTERING

**David H. Cooper, Saratoga, and Janos L. Hunyady, San Jose, both of Calif., assignors to Fuji Photo Optical Company, Ltd., Omiya, Japan**

**Filed May 18, 1984, Ser. No. 611,617**

**Int. Cl.⁴ H04N** *7/18*

**U.S. Cl. 358—98** **9 Claims**

1. A color video endoscope system for use in displaying an image produced by light reflected from objects inside a cavity on a monitor, comprising:

means for generating and delivering sequential color fields of light;

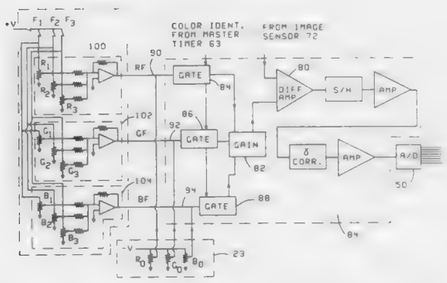
an image sensor having a field of view for sensing light reflected from objects within the cavity and for producing an electrical signal in response to the intensity of light received, the electrical signal having sequential components corresponding to the reflected light;

processing means, electrically coupled to the image sensor for sequentially processing the signal components from the image sensor into a video signal, for presentation of an image on the monitor; and



means electrically coupled to the image sensor signal processing means for altering the signal components in the






processing means so as to alter the color of the image on the monitor.

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**4,742,389**

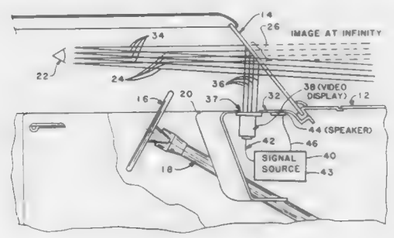
## APPARATUS FOR PROMOTING THE VIGILANCE OF A MOTOR VEHICLE OPERATOR

**Julius Schiffman, 12960 LaSalle La., Huntington Woods, Mich. 48070**

**Continuation of Ser. No. 710,678, Mar. 12, 1985, abandoned. This application Feb. 17, 1987, Ser. No. 15,160**

**Int. Cl.⁴ H04N** *7/18*

**U.S. Cl. 358—103** **17 Claims**




8. An apparatus for use in a ground vehicle having a windshield through which a driver may view conditions in the direction of travel of the ground vehicle, the apparatus comprising:

a signal source for generating a video signal comprising a series of moving visual images constituting a visual program of unpredicatable, new information unrelated to operation of the ground vehicle and a corresponding audio signal constituting an audio program related to said visula program;

a visual display means connected to said signal source for generating a visual display of said video signal;

an optical system optically coupled to said visual display means for presenting said visual display to the driver, the video display presented to the driver utilizing a small fraction of the total windshield area and disposed in a position slightly above the line of sight of the driver toward the direction of travel of the ground vehicle; and

a speaker connected to said signal source for reproducing said audio program,

whereby the driver can observe said visual program and hear said audio program while operating the ground vehicle and observation of said visual program will maintain the field of view of the driver in the proper position for operation of the ground vehicle and the observation of the visual program and hearing of the audio program will maintain the driver in a mental state of vigilance.

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**4,742,390**

## ELEVATABLE OBSERVATION AND TARGET SYSTEM FOR COMBAT VEHICLES

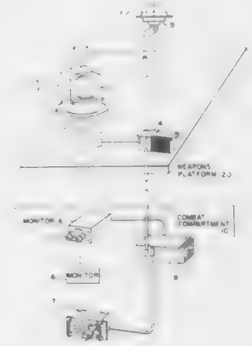
**Erwin Francke, Grobenzell, and Heinrich Adler, Buchloe, both of Fed. Rep. of Germany, assignors to Krauss-Maffei Corporation, Fed. Rep. of Germany**

**Filed Jun. 19, 1985, Ser. No. 746,577**

**Claims priority, application Fed. Rep. of Germany, Jun. 19, 1984, 3422752**

**Int. Cl.⁴ H04N** *7/18*

**U.S. Cl. 358—108** **12 Claims**




1. Combat vehicle observation and targeting system comprising:

a weapons platform;

means for elevating and pivoting said platform;

a line of sight stabilized scanning television camera located on said platform;

means for connecting said camera to a monitor arranged in a combat compartment of said vehicle;

means for remotely controlling elevation, azimuth, and focal width of said camera located in said combat compartment and connected to said camera;

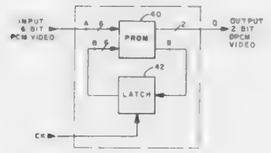
angle indicator means for indicating prevailing vision line coordinates connected to said camera; and

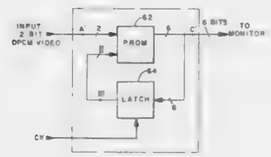
signal processing means connected to said camera for comparing stored visual information with current visual information to detect movements and display them by blending signals at relevant locations into an image displayed on said monitor with said camera means for azimuthally aligning said weapons platform.

## 4,742,391
## DPCM VIDEO SIGNAL COMPRESSION AND TRANSMISSION SYSTEM AND METHOD

**Aladino D. Sorgi, San Diego, and Jerry Zinkovich, Santee, both of Calif., assignors to Cubic Corporation, San Diego, Calif.**

**Filed Jan. 16, 1987, Ser. No. 4,040**
**Int. Cl.[4] H04N** *7/12, 7/13*
**U.S. Cl. 358—133** **6 Claims**



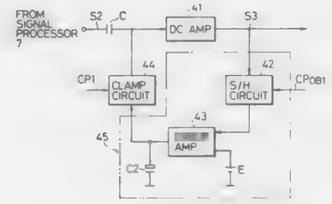




1. A method of differential pulse code modulation compression of a video signal, comprising the steps of:
selecting quantization levels and ranges for a predetermined range of video signals and selecting reconstructed signal levels for each quantization range;
calculating, for each possible combination of each possible value of an incoming video signal in the predetermined range and a feedback signal comprising all possible values in the video signal range, a compressed video difference output signal according to the preselected quantization characteristic and a reconstructed video signal value corresponding to that video difference signal according to the preselected reconstructed signal levels;
storing the calculated input, output and reconstructed signals in the form of look-up tables in an encoder PROM, the tables simulating an encoder quantization function and an encoder reconstructor function, the PROM having a quantizer function input, a feedback input, a quantizer function output, and a reconstructor function output;
connecting the quantizer function input to a source of digital video signals;
connecting the reconstructor function output to the feedback input via a latch for producing one pixel delay in the signal;
controlling the PROM reconstructor function to form, for each incoming pair of video and feedback signals, the corresponding reconstructed video feedback signal and a quantizer function compressed video difference output signal, and to provide the reconstructed video signal at the reconstructor function output and the compressed video difference output signal at the quantizer function output; and
connecting the compressed video difference output signal to a video transmitter.

## 4,742,392
## CLAMP CIRCUIT WITH FEED BACK

**Seiji Hashimoto, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 635,742, Jul. 30, 1984, abandoned. This application Jun. 25, 1987, Ser. No. 65,632**
**Claims priority, application Japan, Aug. 4, 1983, 58-142952; Jan. 7, 1984, 59-1221**
**Int. Cl.[4] H04N** *5/18*
**U.S. Cl. 358—172** **21 Claims**

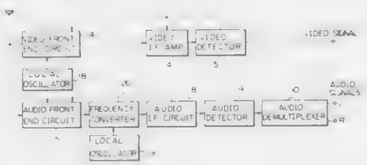



1. A clamp circuit comprising:
clamp means for clamping an input video signal to a predetermined clamp level in an interval corresponding to a first gate signal;
clamp level forming means for extracting a signal which was clamped by said clamp means in an interval corresponding to a second gate signal to form said predetermined clamp level; and
signal generating means for outputting said first and second gate signals in a predetermined level interval in the signal.

## 4,742,393
## SIGNAL RECEPTION SYSTEM FOR TELEVISION RECEIVER

**Yoshiro Sugai, and Hiroyuki Kimura, both of Kawagoe, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan**

**Filed Mar. 29, 1985, Ser. No. 717,880**
**Claims priority, application Japan, Mar. 30, 1984, 59-062603**
**Int. Cl.[4] H04N** *5/52, 5/60*
**U.S. Cl. 358—188** **23 Claims**



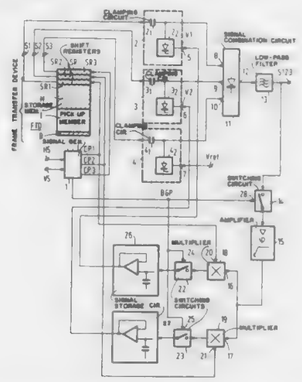

1. A television receiver having a video and audio signal receiving system for producing audio and video signals in response to antenna signals provided from at least one antenna, said system comprising:
local oscillator circuit means for producing first and second local oscillator signals respectively;
first and second front end circuits each adapted to receive as inputs an antenna signal from said at least one antenna and respectively coupled to receive said first and second local oscillator signals, for thereby performing frequency conversion of said antenna signal to produce respective first and second frequency-converted output signals;
video IF amplifier circuit means having an input thereof coupled to receive said first frequency-converted output signal, for selecting and amplifying a video signal component of said first frequency-converted output signal;
audio IF amplifier circuit means having an input thereof coupled to receive said second frequency-converted output signal, for selecting and amplifying an audio signal component of said second frequency-converted output signal, and further producing an audio automatic gain control signal varying in accordance with the level of said audio signal component input thereto, and in which said audio automatic gain control signal is applied at least to said second front end circuit to control a level of amplification provided thereby;
video detector circuit means coupled to receive said video signal component from said video IF amplifier circuit means, for producing therefrom said video signal and a video automatic gain control signal varying in accordance with the level of said video signal component input thereto, and in which said video automatic gain control signal is applied at least to said first front end circuit to control a level of amplification provided thereby; and
audio detector circuit means coupled to receive said audio signal component from said IF amplifier circuit means, for producing therefrom said audio signal.



## 4,742,394
## CAMERA FOR RECORDING TELEVISION, PHOTOGRAPHIC OR CINEMATOGRAPHIC IMAGES

**Pieter B. Dielhof, Eindhoven, Netherlands, assignor to U.S. Philips Corp., New York, N.Y.**

**Filed Sep. 2, 1986, Ser. No. 903,047**
**Claims priority, application Netherlands, Sep. 4, 1985, 8502419**
**Int. Cl.[4] H04N** *5/335*
**U.S. Cl. 358—213.16** **9 Claims**

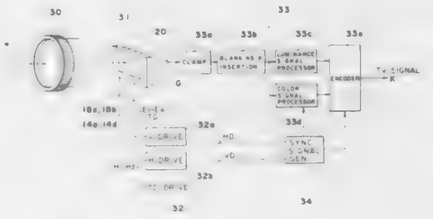



1. A camera, including a solid-state image sensor in the form of a charge transfer device comprising a pick-up member, a storage member and a parallel-in, series-out shift register member having at least two output shift registers each being coupled to a distinct sensor output terminal, said storage and shift register members being shielded from incident light and said pick-up member being shielded from incident light over a strip, the image sensor in said camera being operative under the control of a signal generator for supplying clock pulse signals for obtaining a picture signal having a periodical picture information associated with a scene to be recorded and a periodical dark current information originating from below the said strip and being associated with a signal black level, said picture signal being obtained after a picture information integration period in the pick-up member and a charge transfer period for the transfer between pick-up member and storage member, characterized in that of the sensor output terminals carrying the picture signals one output terminal is coupled via an associated clamping circuit operating at a reference voltage and at least one further output terminal is coupled via an associated clamping circuit operating at a control voltage to an input of a signal combination circuit having an output for the supply of a composite picture signal, which output is coupled to a first input of a signal multiplier circuit having a second input for the supply from the signal generator of the clock pulse signal which is associated with the output shift register which is coupled via the sensor output terminal to the clamping circuit operating at a control voltage, the output of the signal multiplier circuit being coupled to a control voltage input of the said clamping circuit operating at a control voltage via a switching circuit having a switching input for the supply of a black gating pulse signal associated with the periodical dark current information, and a subsequent signal storage circuit.

## 4,742,395
## VIDEO CAMERA APPARATUS HAVING A SOLID-STATE IMAGE SENSOR AND A HIGH SHUTTER SPEED

**Tadashi Nagai, Mino, and Yukihiko Miyawaki, Kadoma, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan**

**Filed Feb. 20, 1986, Ser. No. 831,443**
**Claims priority, application Japan, Feb. 20, 1985, 60-30156; Nov. 2, 1985, 60-246718**
**Int. Cl.[4] H04N** *3/14*
**U.S. Cl. 358—213.19** **9 Claims**




1. A high shutter speed video camera comprising:
an objective lens;
an image sensor means comprising:
a photosensor array means for receiving an image formed by said objective lens, and for producing charge signals representing the image formed thereon; and
a first shift register means for storing said charge signals, and for moving said charge signals in a predetermined direction in response to vertical drive pulses; and
a means for producing a first read pulse signal for effecting a transfer of said charge signals from said photosensor array means to said first shift register means;
a means for producing high speed vertical drive pulses for moving said charge signals in said first shift register means at a high speed until said charge signals are removed from said shift register means; and
a means for producing a second read pulse signal for effecting a transfer of said charge signals from said photosensor array means to said first shift register means,
said first read pulse signal, high speed vertical drive pulses, and second read pulse signal being produced in that order within every vertical blanking period.

## 4,742,396
## CHARGE COUPLED DEVICE IMAGE SENSORS

**Raymond T. Bell, Stanmore, England, assignor to The General Electric Company, p.l.c., England**

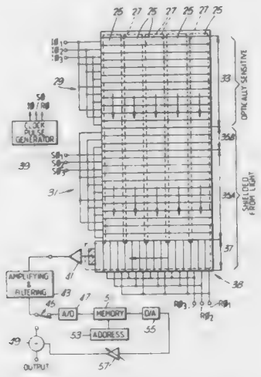
**Filed Jun. 23, 1986, Ser. No. 877,191**
**Claims priority, application United Kingdom, Jul. 17, 1985, 8518067**
**Int. Cl.[4] H04N** *3/14*
**U.S. Cl. 358—213.24** **3 Claims**

1. A frame transfer CCD image sensor comprising: an image section comprising a photo-sensitive portion of an array of CCD channels; a store section comprising a non-photo-sensitive portion of said array of CCD channels; a line read-out section adjacent to the store section; a control electrode structure associated with said image, store and read-out sections;

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and means for applying pulses to the control electrode structure so as to transfer an image charge pattern generated in said image section along the channels into the store section, and to provide electrical signals representing charge stored in said store section by read-out via said read-out section wherein: the store section of the array has several more charge storage locations in each channel than the image sections of the array; said means for applying pulses applies to the electrode structure a sequence of pulses such that after each transfer of an image charge pattern generated in the image section to the store section several lines of charge storage locations in the



store section are left between the image section and the charge pattern transferred to the store section which contain charge resulting only from frame shift smear and are otherwise substantially empty of charge; and means is provided for subtracting electrical signals representing an average of the charges in said several lines of charge storage locations from electrical signals read out from the store section via said read-out section, representing a said image charge pattern generated in said image section, thereby to cancel frame shift smear in said signals representing said image charge pattern, said charges in said several lines being accumulated in the read-out section of the sensor to obtain said average.

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**4,742,397**

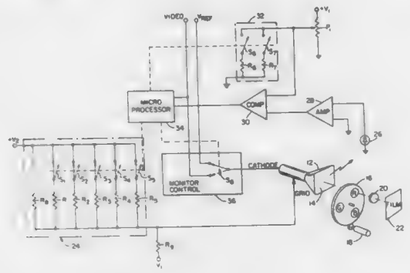
## SYSTEM AND METHOD FOR ADJUSTING IMAGE BRIGHTNESS IN ELECTRONIC PRINTER

**Guillermo S. Ferla, Reading, and Dean Groes, Boston, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.**

**Filed Jan. 16, 1986, Ser. No. 819,128**

**Int. Cl.[4] H04N** *5/76*

**U.S. Cl. 358—244** **13 Claims**



1. An electronic printer for displaying an image for photographic reproduction comprising:

display means for visually displaying the image to be photographed;

photoresponsive means for detecting the intensity of light emanating from said display means and providing an output signal corresponding to the intensity of light so detected;

comparator means for comparing the output signal from said photoresponsive means with a select one of a plurality of different voltage reference signals and providing an output signal indicative of said comparison; and

control means for initially applying a steady state select voltage to said display means in place of an image defining electronic information signal so that said display means displays a substantially uniform light intensity; for thereafter adjusting, if necessary, the light intensity of said display means in response to the output of said comparator means so that the light intensity of said display means corresponds to said one select voltage reference signal; for thereafter applying an image defining electronic information signal in place of said steady state select voltage to said display means so that said display means displays the image to be photographed; for thereafter selecting, if necessary, other ones of said plurality of different voltage reference signals until the output signal from said comparator means meets a select condition; and for thereafter adjusting, if necessary, the light intensity of said display means as a function of the different voltage reference signals selected in the immediately preceding step.

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**4,742,398**

## APPARATUS IN VIDEO DISPLAY TERMINALS

**Bengt Johnsson, Larsbergsvägen 42, S-181 38 Lidingö , Sweden**

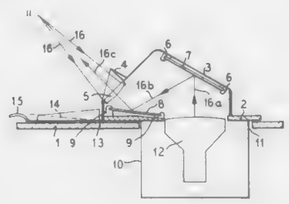
**PCT No. PCT/SE85/00356, § 371 Date May 23, 1986, § 102(e) Date May 23, 1986, PCT Pub. No. WO86/01910, PCT Pub. Date Mar. 27, 1986**

**PCT Filed Sep. 18, 1985, Ser. No. 871,431**

**Claims priority, application Sweden, Sep. 24, 1984, 8404766**

**Int. Cl.[4] H04N** *5/65*

**U.S. Cl. 358—245** **6 Claims**



1. An optical image transfer apparatus comprising:

a video display unit having an image screen;

image transfer means for transferring the image from said image screen to a viewer, said image transfer means having a means for directing the light rays from said image screen, said image transfer means also having a means for transporting said image from said image screen to said means for directing;

casing means having at least two swivellably mounted sections, a first of said at least two sections for enclosing said image transfer means and a second of said at least two sections for enclosing said video display unit, said casing means being capable of screening-off light and radiation from said video display unit whereby said light rays are transmitted outside of said casing means to eliminate eye focusing by the viewer while preventing unauthorized viewing by another and the image is viewed by the viewer as being at infinity in a transverse direction with respect to said video display unit at a comfortable, safe distance from said video display unit.



**4,742,399**

## METHOD OF AND APPARATUS FOR GENERATING HIGH-RESOLUTION BILEVEL IMAGE DATA

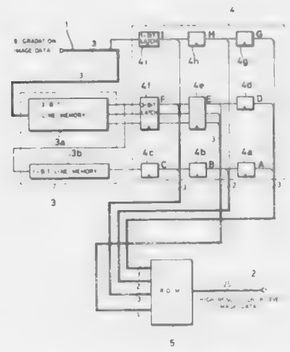
**Hideaki Kitamura, Ibaraki, Japan, assignor to Dainippon Screen Mfg. Co., Ltd., Kyoto, Japan**

**Filed Oct. 6, 1986, Ser. No. 915,680**

**Claims priority, application Japan, Nov. 1, 1985, 60-246792; Jan. 9, 1986, 61-3351**

**Int. Cl.[4] H04N** *1/40*

**U.S. Cl. 358—284** **14 Claims**



1. A method of generating bilevel image pattern data from multi-gradation image data wherein the generated bilevel image pattern data are higher in resolution than the multi-gradation data, said method comprising the steps of:

relating bilevel image pattern data higher in resolution than said multi-gradation image data to combinations of gradation values of central pixels in image regions of a prescribed size and data patterns of all peripheral pixels thereof and storing said high resolution bilevel image pattern data in a memory;

reading a bilevel original in the form of multi-gradation image data; and

outputting from said memory said higher-resolution bilevel image data with respect to each pixel of read multi-gradation image data in response to related gradation values and data patterns of said all peripheral pixels thereof.

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**4,742,400**

## DIGITAL IMAGE PROCESSING DEVICE FOR INTERMEDIATE TONE

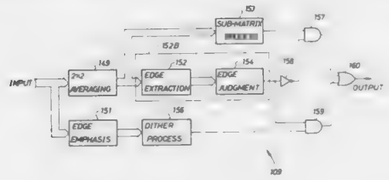
**Katsuhisa Tsuji, Tokyo, Japan, assignor to Ricoh Corporation, Tokyo, Japan**

**Filed Feb. 5, 1987, Ser. No. 12,078**

**Claims priority, application Japan, Feb. 12, 1986, 61-28643; Feb. 12, 1986, 61-28646; Feb. 12, 1986, 61-28644; Feb. 12, 1986, 61-28645**

**Int. Cl.[4] H04N** *1/40*

**U.S. Cl. 358—284** **32 Claims**



1. A digital image processing device for intermediate tone having threshold value tables provided with threshold values different from each other set for each of picture elements in a unit region containing a plurality of picture elements for gradation processing, in which inputted multi-value data are converted into binary data referring to said table and intermediate tone is expressed by adjusting the number of picture elements to be dotted and picture elements not to be dotted within the unit region of the gradation processing, wherein said device comprises;

averaging means for averaging data of a plurality of picture element contained in every first region smaller than said unit region for the gradation processing;

first gradation processing means including edge emphasis processing means for applying edge emphasis processing to data of every picture element and binarizing data outputted from said emphasis processing means with the values of a predetermined threshold value table;

second gradation processing means for conducting processing different from that of said first gradation processing means;

edge judging means by monitoring output data from said averaging means and judging an existence of edge information with every said first region; and

control means for selecting either said first gradation processing means or second gradation processing means according to a result of the judgement of said edge judging means.

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**4,742,401**

## OPTO-ELECTRONIC SCAN HEAD WHICH HAS A HOUSING PORTION AND A HOUSING MEMBER THAT ARE COUPLED TOGETHER BY FIRST AND SECOND GUIDE RODS SO AS TO ALLOW RELATIVE MOTION THEREBETWEEN

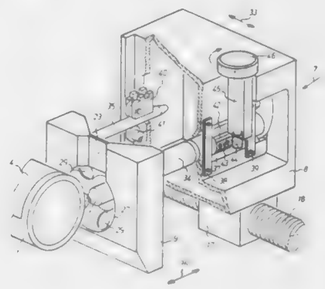
**Klaus Andree; Ralf Balzeit, both of Preetz; Ulrich Parl, Raisdorf, and Lutz Rebetge, Kiel, all of Fed. Rep. of Germany, assignors to Dr. Ing. Rudolf Hell GmbH, Fed. Rep. of Germany**

**Filed Oct. 23, 1986, Ser. No. 922,334**

**Claims priority, application Fed. Rep. of Germany, Oct. 24, 1985, 3537857**

**Int. Cl.[4] H04N** *1/06*

**U.S. Cl. 358—293** **4 Claims**



1. An opto-electronic scan head for point-by-point and line-by-line scanning of originals arranged on an original carrier, comprising:

(a) a scanning system comprising a scanner lens (**11**), a diaphragm (**13**) and at least one opto-electronic transducer (**14**) which are arranged along the optical axis (**12**) of said scanner lens (**11**);

(b) a housing portion (**9**) facing toward said original carrier (**1**) displaceable along said optical axis (**12**), said scanner lens (**11**) mounted in said housing portion (**9**);

(c) a housing member (**8**) mounted away from said original carrier (**1**) and stationary with respect to said optical axis (**12**), said diaphragm (**13**) and said opto-electronic transducer (**14**) mounted on said housing member,

(d) first and second guide rods (**34**, **35**) extending in the

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direction of said optical axis (12) parallel to one another and secured to said displaceable housing portion (9) and said guid rods projecting into said stationary housing member (8);

(e) a friction bearing (37, 38, 39) for sliding and play-free bearing said first guide rod (34) and a roller bearing (40, 41) for guiding said second guide rod (35) and said friction bearing and said roller bearing mounted in said stationary housing member (8);

(f) a toothed rack (43) extending in the direction of said optical axis (12) and secured to said first guide rod (34) which is guided in said friction bearing (37, 38, 39);

(g) a pinion (44), rotatably supported perpendicular to said optical axis (12) and engageable with said toothed rack (42); and

(b) a shaft (45) rotatably mounted in said stationary housing member (8) said pinion (44) mounted on one end of said shaft and a knob (46) mounted on the other end of said shaft, whereby a corresponding variation of the distance of said scanner lens (11) from the surface of said originals carrier (1) is effected by turning said knob (46).

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**4,742,402**

## SEISMOELECTRIC SIGNAL RECORDING DEVICE

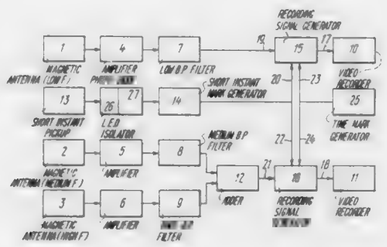
**Gennady A. Sobolev; Vladislav M. Demin; Vladimir F. Los, and Zinovy-Jury Y. Maibuk, all of Moscow, U.S.S.R., assignors to Institute Fiz Iki Zemli Im O Ju Shmidta An SSSR, Moscow, U.S.S.R.**

**PCT No. PCT/SU84/00038, § 371 Date Mar. 7, 1986, § 102(e) Date Mar. 7, 1986, PCT Pub. No. WO86/01002, PCT Pub. Date Feb. 13, 1986**

**PCT Filed Jul. 19, 1984, Ser. No. 847,658**

**Int. Cl.⁴ G11B** *5/00*

**U.S. Cl. 360—6** **4 Claims**




1. A device for recording seismoelectric signals, comprising seismoelectric signal pickups, amplifiers (4–6) connected to said pickups, a magnetic tape recorder (10, 11) for recording respective analog electrical signals, and a time mark generators (25) connected to the magnetic tape recorder (10, 11), characterized in that said device is provided with at least three channels to receive seismoelectric signals in different frequency bands forming a continuous frequency-response characteristic, each channel having a magnetic antenna (1–3) as a seismographic signal pickup, which is series-connected with an amplifier (4–6) and a generator (7–9) of a uniform frequency characteristic in the frequency band corresponding to a particular channel, and which together generating a total frequency-response characteristic which is uniform throughout the frequency band of the seismographic signal being recorded, and is also provided with two video recorders as magnetic recorders (10, 11) the first video recorder (10) being connected to the output of the most low frequency channel for receiving a seismographic signal, while the second video recorder (11) is connected, via an adder (12), to the outputs of all other channels.

**4,742,403**

## DIGITAL DATA SEPARATOR

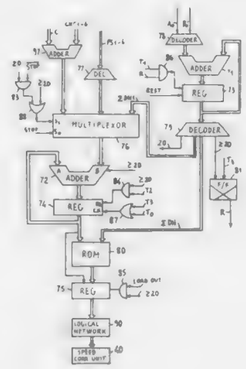
**Bonifacio Troletti, Boario Terme, Italy, assignor to Honeywell Information Systems Italia, Caluso, Italy**

**Filed Sep. 23, 1986, Ser. No. 911,022**

**Claims priority, application Italy, Oct. 10, 1985, 22431 A/85**

**Int. Cl.⁴ G11B** *5/09*

**U.S. Cl. 360—45** **3 Claims**




1. Digital data separator for use with a unit which records pulses representative of information on movable magnetic media affected by speed error, where the read pulses are affected by peak-shift, said separator including a duration measuring unit for supplying a measure of the actual duration of each of the intervals between two subsequent read pulses, a speed error correction unit for changing said actual duration to a corrected duration, a peak-shift recovery unit for attributing to said corrected duration, an interval nominal duration, for detecting the peak-shift of said interval ending pulse and for generating a nominal duration code and a peak-shift code respectively, and a speed error measuring unit periodically measures the media speed error, said speed error measuring unit comprising:

first addition means for summing a nominal duration code of a plurality of subsequent intervals until the total duration of said intervals is equal or greater than a preestablished duration, said first addition means supplying a first code representative of said total duration;

second algebraic addition means having a plurality of inputs coupled to said duration measuring unit for receiving said actual duration of each of the intervals, to said peak-shift recovery unit for receiving said peak-shift code and to said first addition means for receiving said first total duration code by computing the difference between the sum of the actual duration of said plurality of subsequent intervals and their nominal durations, said second algebraic addition means correcting said difference in excess or deduction by summing and subtracting said peak-shift code of the starting pulse of the first of said subsequent intervals and said peak-shift code of the ending pulse of the last of said subsequent intervals, said second addition means supplying a second code representative of said corrected difference; and,

normalization means having inputs coupled to said first and second addition means for receiving said first and said second codes, said normalization means supplying a speed error code from said first and second codes.



**4,742,404**

## MAGNETIC RECORDING/REPRODUCTION APPARATUS

**Yutaka Yunoki, Kunitachi, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan**

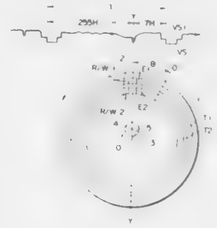
**PCT No. PCT/JP85/00123, § 371 Date Oct. 28, 1985, § 102(e) Date Oct. 28, 1985, PCT Pub. No. WO85/04277, PCT Pub. Date Sep. 26, 1985**

**PCT Filed Mar. 13, 1985, Ser. No. 796,573**

**Claims priority, application Japan, Mar. 13, 1984, 59-47865; Mar. 13, 1984, 59-47866; Mar. 13, 1984, 59-47867; Mar. 13, 1984, 59-47868; Mar. 13, 1984, 59-47869; Mar. 13, 1984, 59-47870**

**Int. Cl.⁴ G11B** *5/03, 5/265*

**U.S. Cl. 360—66** **12 Claims**




1. A magnetic recording/reproduction apparatus, comprising:

an apparatus main body adapted to receive a disk-shaped recording medium having a rotation center and a position detection index in a central portion of the medium to serve as a position index,

sensor means on said apparatus main body and having a detection center for detecting the rotational position of the recording medium in response to relative movement of the position detection index,

a composite magnetic head on the apparatus main body and including a head main body having an erase gap and a read/write gap, said gaps being separated form each other substantially along a moving direction relative to the disk-shaped magnetic recording medium when rotated, said erase gap being at least as wide as said read/write gap, and

wherein said read/write gap is set so as to be positioned on a line passing through the rotation center of said rotating magnetic recording medium and the detection center of said sensor menas, and said erase gap is operative selectively to erase substantially all information recorded in a track commonly aligned with said read/write gap.

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**4,742,405**

## DEVICE FOR STORING AND RETRIEVING CASSETTES

**Shunichi Teranishi, Anjo, Japan, assignor to Aisin Sekik Kabushiki Kaisha, Aichi, Japan**

**Filed Mar. 25, 1986, Ser. No. 844,037**

**Claims priority, application Japan, Mar. 25, 1985, 60-060452**

**Int. Cl.⁴ G11B** *15/68*

**U.S. Cl. 360—92** **3 Claims**

1. A device for storing, retrieving, processing and returning cassettes of the type having a disk therein adapted to have recorded information on opposite sides thereof, comprising:

a base plate;

a semicylindrical casing disposed on said base plate and comprised of a plurality of vertically stacked sector-shaped sections having a common vertical axis, each of said sections being provided with a plurality of cassette storage compartments for storing a plurality of radially disposed cassettes with each cassette disposed in a vertical plane extending radially from said vertical axis;

guide means comprising a support member pivotally mounted on said base plate for rotation about a vertical axis corresponding to the vertical axis of said sectors and a pair of parallel, spaced apart guide rails extending vertically upwardly from said support means;

a first driving means for rotating said support member about said vertical axis to any desired angle;

carrier means including a main body mounted on said guide rails for movement therealong,

a gripper assembly rotatably mounted on said main body including a cassette gripping device movably mounted in said gripper assembly for holding one of said cassettes;

a second driving means for moving said main body of said carrier means in the vertical direction along said guide rails;



a third driving means for moving said cassette gripping device relative to said gripper assembly;

a fourth driving means for rotating said gripper assembly about a horizontal axis relative to said main body during transfer of said carrier means to a loading position for rotating a selected cassette between a vertical and a horizontal disposition;

processing means for receiving a horizontally disposed cassette transferred by said carrier means to record or play back information from one side of a disk in the cassette; and

central control means for controlling said first, second, third and fourth driving means in the proper sequence.

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**4,742,406**

## OPTICAL DETECTOR SYSTEM FOR DETECTING A SPLICE IN AN ENDLESS TAPE

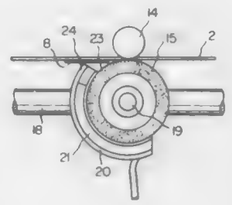
**Yuuichiro Turuda, Tokyo, Japan, assignor to Otari Electric Company, Ltd., Tokyo, Japan**

**Filed Aug. 12, 1986, Ser. No. 895,660**

**Claims priority, application Japan, Apr. 11, 1986, 61-83864**

**Int. Cl.⁴ G11B** *15/08*

**U.S. Cl. 360—93** **8 Claims**




1. In combination with an endless tape recording and playback apparatus for recording or playing back signals on an endless tape contained within a cartidge case, and including a capstan rotating at a predetermined angular velocity and pinch

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roller disposed in contact with said capstan for transporting said endless tape therebetween, an optical detection system for detecting the presence of splicing tape secured upon said endless tape for securing opposite ends if said endless tape together, comprising:

a light emitter for emitting light toward said endless tape having said splicing tape secured thereon;

a light detector for receiving light reflected from said endless tape having said splicing tape secured thereon; and

means for conducting said light from said light emitter toward said endless tape having said splicing tape secured thereon and for conducting said reflected light from said endless tape having said splicing tape secured thereon back to said light detector, said light conducting means being mounted upon said pinch roller.

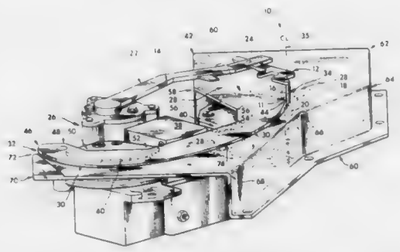
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**4,742,407**

## TAPE THREADING DEVICE

**David E. Smith, Lafayette; Dennis R. Olmsted, and Joseph A. Fryberger, both of Longmont, all of Colo., assignors to Aspen Peripherals, Longmont, Colo.**

**Filed Jun. 11, 1986, Ser. No. 872,931**
**Int. Cl.[4] G11B *15/67***
**U.S. Cl. 360—95** **6 Claims**



1. An automatic tape threading device for transferring a tape leader block and its associated tape from a first predetermined position, over a generally arcuate path which passes a transducer head, to a second predetermined position, said threading device comprising:

a rotatable threader arm comprised of two pivotally connected parts, wherein a torque delivery means is attached to one part and a tape leader block engaging means including an enlarged member portion is attached to the other part, said tape leader block engaging means is oriented substantially normal to the plane of the threader arm and extends through the plane of an overhead cam to engage the enlarged member portion with the tape leader block;

an overhead cam located below a plane defined by the rotatable threader arm and having a generally arcuate contour which guides the tape leader block engaging means, at a point on tape leader block engaging means between the rotatable threader arm and the enlarged member portion of the tape leader block engaging means, from the first predetermined position, past the transducer head, to the second predetermined position; and

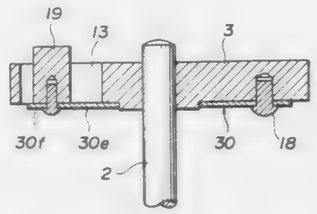
a take up reel having means for coupling with the tape leader block after it reaches the second predetermined position.

**4,742,408**

## DRIVE PIN HOLDING SPRING FOR FLOPPY DISK DRIVE

**Takeshi Kumagai, Kakuda, Japan, assignor to Alps Electric Co., Ltd., Japan**

**Filed Jun. 3, 1986, Ser. No. 870,020**
**Claims priority, application Japan, Jun. 3, 1985, 60-82485[U]**
**Int. Cl.[4] G11B *5/012***
**U.S. Cl. 360—99** **1 Claim**




1. In a floppy disk drive including a disk drive motor having an output shaft, a turntable secured to said output shaft for rotation therewith about a center axis and having a through hole at one location spaced in a radial direction from the center axis, a spring member attached to a bottom side of said turntable, and a disk drive pin provided on said spring member having an upper end which is biased by said spring to project through said through hole above a top side of said turntable for engaging a drive hole formed in a hub portion of a floppy disk placed on said turntable in order to transmit rotation of said turntable to the disk,

the improvement wherein said spring member is formed as a sheet of elastic material having a central hole fitting on a central portion of said turntable, peripheral holes spaced radially from the central hole on one semicircular portion of said sheet for allowing said spring member to be secured by fastening means to said turntable, and a single arcuate spring portion extending from one side of said semicircular portion of said sheet along a circumferential direction to a free end mounting said drive pin at a location opposite from the semicircular portion of said sheet, said drive pin on said free end of said arcuate spring portion thereby being capable of inclining both in the radial direction and in the circumferential direction relative to said center axis of said turntable.

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**4,742,409**

## MAGNETIC DISC UNIT

**Masaru Koyahara; Shigeki Koizumi; Nobuhiro Aisawa; Tetsuo Tomita, and Noriyuki Kawamura, all of Chichibu, Japan, assignors to Canon Denshi Kabushiki Kaisha, Chichibu, Japan**

**Continuation of Ser. No. 486,481, Apr. 19, 1983, abandoned.**
**This application Oct. 1, 1986, Ser. No. 914,541**
**Claims priority, application Japan, Apr. 22, 1982, 57-66291; Jun. 1, 1982, 57-94597**
**Int. Cl.[4] G11B *5/54***
**U.S. Cl. 360—105** **6 Claims**

1. A magnetic disc unit for use with a magnetic recording medium comprising:

a base;

motor means having a spindle rotatably mounted on said base for rotating said magnetic recording medium;

a loading arm having a first end and a second end, said second end being swingably attached to said base;

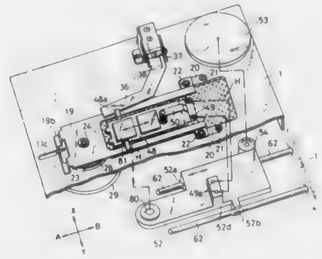
a center cone rotatably attached to the first end of said loading arm, said magnetic recording medium being interposable between said spindle and said center cone;

a button lever having a control button projecting from one end thereof, said button lever being attached to said base and translatable with respect thereto;

a clamping lever rotatably mounted on said base;



linkage means interlocked to said control button and to said clamping lever, whereby depression of said control button translates said button lever to rotate said loading arm via said linkage means and said clamping lever to a first position wherein said center cone engages said spindle with said magnetic recording medium interposed therebetween, further depression of said control button in the same direction as the previous depression translating said button lever to rotate said loading arm via said linkage means and said clamping lever to a second position wherein said center cone is released from said magnetic recording medium and said clamping lever presses said loading arm in the vicinity of said center cone;



a head for recording or reproducing information on or from said magnetic recording medium;

a head loading arm having a first end swingably supported on said base and a second end supported by said loading arm; and

a head arm supported by said head loading arm and carrying said magnetic head, said head loading arm and said head arm moving, in response to the movement of said loading arm to said first position, to a predetermined position where said magnetic head is in contact with said recording medium and said head loading arm and said head arm withdrawing said magnetic head from said magnetic recording medium in response to the movement of said loading arm to said second position.

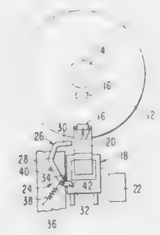
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**4,742,410**

## DISK DRIVE SYSTEM WITH HEAD PROTECTION MECHANISM

**Malcolm G. Smith, Grants Pass, Oreg., assignor to Josephine County Technology, Inc., Grants Pass, Oreg.**

**Continuation of Ser. No. 562,314, Dec. 16, 1983, abandoned.**
**This application Mar. 30, 1987, Ser. No. 32,925**
**Int. Cl.[4] G11B *5/54, 21/22***
**U.S. Cl. 360—105** **3 Claims**



1. A magnetic disk drive system comprising:

a support;

a magnetic disk mounted on the support for rotation with respect thereof;

a carriage shiftably mounted on the support for movement toward and away from the disk between an operative position and a retracted position;

a magnetic read-write head;

a resilient arm coupling the head to the carriage for movement therewith, whereby the head can be moved into and out of an operative location adjacent to the surface of the disk as the carriage moves between its operative position and a retracted position;

a stepper motor coupled to the carriage for moving the same relative to the support; and

an elongated member pivotally mounted on the support and having means permitting the member to move into engagement with the arm to cause the arm to flex and to move the head away from the disk in response to the movement of the carriage into its retracted position, and for subsequently holding the head in spaced relationship to the disk after the carriage has reached its retracted position, said member having means for releasably locking the carriage in its retracted position, said locking means including an end segment having an end face for frictionally engaging an adjacent surface of the carriage when the latter is in said retracted position.

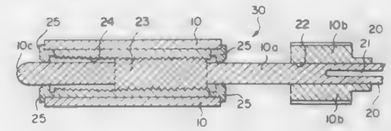
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**4,742,411**

## MAGNETIC HEAD FEED MECHANISM INCLUDING A DUST PREVENTING MEANS

**Motohiko Horio; Naoki Kobayashi; Fujio Okada, and Kouji Kaneko, all of Ohmiya, Japan, assignors to Fuji Photo Optical Co., Ltd., Saitama, Japan**

**Filed Apr. 29, 1986, Ser. No. 857,098**
**Claims priority, application Japan, May 1, 1985, 60-65633[U]**
**Int. Cl.[4] G11B *5/55, 21/08***
**U.S. Cl. 360—106** **3 Claims**



1. A magnetic head feed device for moving a magnetic head for recording information on a magnetic recording disk and/or reproducing information from the magnetic recording disk in a radial direction of the magnetic recording disk, comprising:

a driving force source means for producing, said driving force source means having an output as a rotational motion,

a conversion means for converting the rotational motion of the driving force source means into a resultant linear motion of the magnetic head,

said conversion means including a spur gear rotated by output rotation of the driving force source means, a shaft portion coaxially connected fixedly to said spur gear for rotation therewith, said spur gear having an enlarged diameter portion which has a male thread portion formed on an outer surface thereof, a female thread unit means having an elongated passage through which said enlarged diameter portion of said shaft portion extends, said elongated passage of said female thread unit means being longer that said enlarged diameter portion of said shaft portion, said female thread unit means being fixedly mounted relative to a support from the magnetic head, said female thread unit means having a thread portion which is in threaded engagement with said male thread portion of said shaft portion, said female thread unit means having a pair of lid members mounted on respective ends of said passage, each one of said pair of lid members having a circular central opening through which said shaft portion extends such that said enlarged diameter portion of said shaft portion is movably disposed between said pair

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of lid members such that said shaft portion is supported for movement relative to said female thread unit means.

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**4,742,412**

## MAGNETIC HEAD HAVING DUAL ASYMMETRIC GAPS

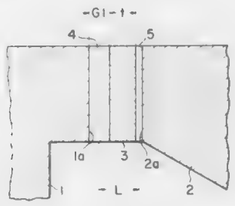
**Toshihiro Kuriyama, 1-8-27 Shinbo, Nagaoka-shi, Niigate-ken, Japan**

**Filed Feb. 25, 1987, Ser. No. 18,927**

**Claims priority, application Japan, Jul. 2, 1986, 61-156788; Aug. 22, 1986, 61-197753**

**Int. Cl.[4] G11B** *5/23, 5/235, 5/265*

**U.S. Cl. 360—119** **3 Claims**




1. A magnetic head having a pair of opposing magnetic end cores and dual gaps formed between the end cores on one surface of the magnetic head facing a recording medium, for recording and reproducing information units spaced on the recording medium by at least a minimum spacing Tmin, comprising:

a first magnetic gap formed adjacent one of the magnetic end cores having a predetermined thickness of Gl and being made of a nonmagnetic thin film;

a second magnetic gap formed adjacent the other of the magnetic end cores having a thickness which is substantially narrower and dimensionally negligible compared to the first gap; and

a magnetic thin film layer formed between the first and second magnetic gaps having a predetermined thickness t, wherein a distance L between centers of the first and second magnetic gap is defined approximately as:

$$L \approx Gl/2 + t,$$

and the thickness Gl of the first magnetic gap and the thickness t of the magnetic thin film layer are selected such that the distance L is larger than Tmin and less than $2 \times$ **Tmin, in order to provide an improved peak shift characteristic for the given minimum spacing Tmin of the information units.**

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**4,742,413**

## MAGNETIC MEMORY INCLUDING A RECORDING DEVICE AND MEDIUM THAT CAN BE MAGNETIZED VERTICALLY

**Herbert Schewe, Herzogenaurach, Fed. Rep. of Germany, assignor to Siemens Akteingesellschaft, Berlin and Munich, Fed. Rep. of Germany**

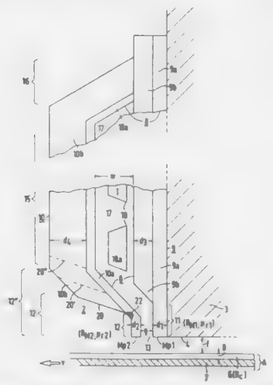
**Filed Dec. 15, 1986, Ser. No. 941,392**

**Claims priority, application Fed. Rep. of Germany, Dec. 20, 1985, 3545361; Feb. 7, 1986, 3603903**

**Int. Cl.[4] G11B** *5/147*

**U.S. Cl. 360—126** **22 Claims**

1. A magnetic memory device including a thin-film magnetic head built up layer-wise on a nonmagnetic substrate and further including a recording medium which is provided with a magnetizable storage layer of a material with predetermined coercivity, into which information can be written along a track by perpendicular (vertical) magnetization of this layer, the magnetic head comprising a magnetic ring head-like conduction body for carrying magnetic flux, the conduction body having two magnet legs, each magnet leg comprising at least one magnetic layer with predetermined magnetic behavior, each magnet leg having a magnet pole facing the recording medium, said magnet poles arranged in tandem as viewed in a direction of relative motion of the head and medium, whereby a gap of predetermined width is formed between said poles, said magnet legs defining outside of a region of the poles a space, through which the turns of a write and/or read coil winding extend, the magnet leg trailing as viewed in the direction of relative motion having an end region forming a first



magnetic pole and the leading magnet leg having an end region forming a second magnetic pole, said magnet legs differing at least in their end regions with respect to their magnetic behavior, the storage layer of the recording medium comprising a material with a coercivity chosen to have a sufficiently high value so that overwriting the storage layer of the recording medium by the magnetic field which can be brought about at the magnetic pole of the trailing magnet leg is substantially eliminated.

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**4,742,414**

## ROTARY MAGNETIC HEAD DEVICE FOR MAGNETIC RECORDING/REPRODUCTION APPARATUS

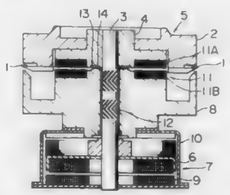
**Kazuo Sakai; Takao Terayama, both of Ibaraki, and Teizo Tamura, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Oct. 28, 1985, Ser. No. 792,272**

**Claims priority, application Japan, Oct. 31, 1984, 59-227740**

**Int. Cl.[4] G11B** *15/60*

**U.S. Cl. 360—130.24** **16 Claims**




1. A rotary magnetic head device for a magnetic recording-/reproducing apparatus, comprising:

a rotatable cylinder assembly having a rotary magnetic head;

a stationary cylinder assembly;

image signal transmitting means having an image signal transmitter mounted on one surface of said rotatable cylinder assembly and an image signal transmitter mounted on one surface of said stationary cylinder assembly which opposes the one surface of said rotatable cylinder assembly; and

a dynamic pressure type bearing means for directly acting upon the one surface of the rotatable and stationary cylinder assemblies having the image signal transmitting means mounted thereon, the dynamic pressure type bearing means including grooves provided in one of the one surface of said rotatable cylinder assembly and the one opposing surface of said stationary cylinder assembly having the image signal transmitting means mounted thereon and cooperating with an opposing surface provided in the other of the one surface of said rotatable cylinder assembly and the one opposing surface of said stationary cylinder assembly having the image signal transmitting means mounted thereon, for generating a dynamic pressure when said rotatable cylinder assembly rotates relative to said stationary cylinder assembly so as to maintain constant a gap between said image signal transmitter of said rotatable cylinder assembly and said image signal transmitter of said stationary cylinder assembly.



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**4,742,415**

## MAGNETIC TAPE CASSETTE HAVING A GUIDED REEL BRAKE PAWL

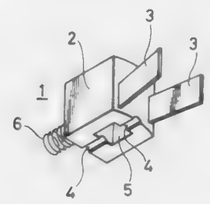
**Kengo Oishi, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed May 6, 1986, Ser. No. 860,387**

**Claims priority, application Japan, May 8, 1985, 60-66847[U]**

**Int. Cl.[4] G11B** *23/02, 15/32*

**U.S. Cl. 360—132** **6 Claims**




1. A tape cassete, comprising:

a cassette case (**10**);

two spaced tape reels (**11**) for winding a tape therearound, each of said reels having a tooth portion (**13**) formed on an outer peripheral edge of a flange thereon;

a brake member (**1**) disposed intermediate said reels for reciprocable sliding movement within said cassette case in a first direction toward said reels and in a second direction away therefrom, said brake member having two engaging pawls (**3**) extending outwardly therefrom for individually engaging said tooth portions upon movement of said brake member in said first direction;

at least one elongated groove (**4**) formed in one of a top or a bottom surface of said brake member and an upper or lower interior surface of said cassette case, respectively, and extending in said directions of sliding movement; and

at least one guide rib (**17**) formed in and projecting outwardly from another of said top or said bottom surface of said brake member and said upper or lower interior surface, extending in said directions of sliding movement, and cooperable with said groove such that said brake member is restrained from lateral translation perpendicular to said directions of sliding movement to thereby maintain said engaging pawls in simultaneous engagement with said tooth portions.

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**4,742,416**

## MAGNETIC TAPE CASSETTE WITH U-SHAPED SLIDE GUARD

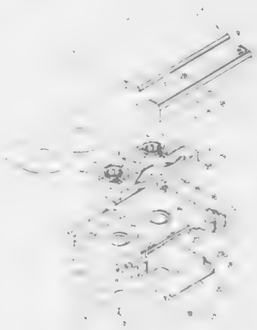
**Kengo Oishi, and Choji Komiyama, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Sep. 27, 1985, Ser. No. 780,759**

**Claims priority, application Japan, Oct. 1, 1984, 59-148793[U]; Oct. 1, 1984, 59-148794[U]**

**Int. Cl.[4] G11B** *23/02*

**U.S. Cl. 360—132** **6 Claims**



1. In a magnetic tape cassette of the type comprising fixedly coupled upper and lower half cases of inverted U-shape transverse cross section and U-shape transverse cross section, respectively, said upper half case including a top wall and integral side walls, said lower half case including a bottom wall and integral side walls, said tape cassette incorporating a pair of hubs on which a magnetic tape is wound, said cassette having a front, an opening partially within said cassette front and extending within said bottom wall through which opening said magnetic tape can be pulled out of said cassette, a guard panel movably mounted on said cassette and adapted to close the part of said opening within said cassette front, a slide guard adapted to close the part of said opening within said bottom wall, and a locking member for locking said hubs, the improvement wherein said slide guard is a plate member which is substantially U-shaped in vertical section and which is slidable on the outer surface of the lower half case, said slide guard including right and left-hand side pieces, extending along the side walls of said cassette lower half case, a longitudinal slit on each side of said cassette defined by at least one of said half case side walls and wherein said side pieces of said slide guard each include an inwardly directed overhang projecting within a respective slit and having an outwardly facing surface confronting an inwardly facing surface of one of said half case side walls to maintain slidable engagement of the U-shaped slide guard with the fixedly coupled upper and lower half cases while preventing lateral separation of the side pieces from said lower half case.

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**4,742,417**

## MAGNETIC TAPE CASSETTE WITH SNAP COUPLED U-SHAPED SLIDE GUARD

**Choji Komiyama, and Kengo Oishi, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Aug. 27, 1985, Ser. No. 769,649**

**Claims priority, application Japan, Aug. 27, 1984, 59-128638[U]**

**Int. Cl.[4] G11B** *23/02*

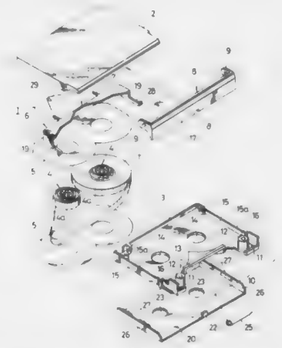
**U.S. Cl. 360—132** **2 Claims**

1. In a magnetic tape cassette comprising fixedly coupled lower and upper half cases of inverted U-shape transverse cross section and U-shape transverse cross section, respectively, said upper half case including a top wall and integral side walls, said lower half case including a bottom wall and

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integral side walls, said fixedly coupled upper and lower half cases including a pair of hubs on which a magnetic tape is wound, said cassette having a front, an opening within said front of said cassette and extending into said lower half case bottom wall, through which opening said magnetic tape can be pulled out of said cassette, a guard panel movably mounted on said cassette and adapted to close the part of the opening within the front of the cassette, a slide guard adapted to close the part of said opening within said bottom wall, and a locking member for locking said hubs, the improvement wherein said slide guard comprises a plate member substantially U-shaped in vertical transverse cross section and having resilient side pieces at both ends which extend along at least the side walls of the lower half case for slidable movement forwardly and backwardly of said cassette, said slide guard being urged towards the front of said cassette, at least one overhang being formed along an upper edge of each side piece of said slide guard, said overhangs projecting inwardly towards each other, at least



one of said half cases defining parallel longitudinal slits within opposite side walls, said overhangs being positioned within respective slits, said overhangs having upper edges which are inclined downwardly and inwardly of the slide guard, said upper edges having upper ends, and wherein the distance between the upper ends of the inclined edges is larger than the distance between the integral side walls of the lower case half whereby, the slide guard may be mounted to the lower half case upon contact of the bottom wall of the lower half case at said side wall with the inclined upper edges of said overhang, thereby flexing said side pieces outwardly away from each other to permit said side pieces to move along the exterior of the side walls of said cassette lower half case whereupon said overhangs are snap fitted into respective slits to complete the mounting of the slide guard to said fixedly coupled upper and lower half casings to facilitate forward and rearward sliding of said slide guard on said magnetic tape cassette via the engagement of the overhangs with the respective slits.

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**4,742,418**

**TAPE CASSETTE WITH MEANS FOR LIMITING MOVEMENT OF REEL BRAKE**

**Kimio Tanaka; Haruo Shiba, and Takateru Satoh, all of Nagano, Japan, assignors to TDK Corporation, Japan**

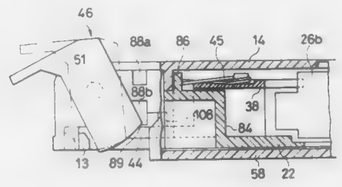
**Continuation of Ser. No. 789,029, Oct. 18, 1985, abandoned. This application Sep. 4, 1987, Ser. No. 94,320**

**Claims priority, application Japan, Oct. 20, 1984, 59-158543**

**Int. Cl.[4] G11B** *23/02, 15/32*

**U.S. Cl. 360—132** **1 Claim**

1. A tape cassette comprising:
- a case including upper and lower case halves, each case half having two side walls substantially parallel to each other, and a back wall interconnecting said side walls;
- a pair of reels housed in said case around which a magnetic tape is wound;
- brake means freely slidably mounted on an inner face of said lower case half for selectively preventing rotation of said tape reels, said brake means having a pair of legs which slide on said inner face of said lower case half along said side walls thereof; and
- control means for limiting the movement of each of said legs of said reel brake means in the width direction of the case between said upper and lower case halves;
- wherein said control means include at least one protrusion formed at a part of each of said side walls of said upper case half and located substantially adjacent to a face of each of said legs which is opposite to another face thereof which slides on the lower case half;
- wherein said protrusions are formed of plastic material integrally with said upper case half;
- wherein said brake means include an elongated plate member adjacent said upper case half and extending substantially parallel to said back wall of said upper case half, a pair of stoppers projecting from a longitudinal back side of said plate member toward said back wall of said upper ase half to stop the rotation of each of said reels, and a pair of bent sections adjacent said respective side walls and extending from respective ends of said plate member towards said lower case half, each of said bent sections having a bottom face which slides on the inner face of said lower case half, each of said legs of said brake means extending from a lower portion of a corresponding one of said bent sections, and the faces of each of said legs and bent sections which slide on said lower case half inner face together forming a unitary continuous sliding surface relative to the lower case half;



wherein each of said side walls of said lower case half includes a first side wall situated adjacent to an outer face of a respective one of said bent sections of said brake means and a second side wall situated adjacent to an inner face of a respective one of said legs of said brake measn so that the movement of the brake means in a lateral direction perpendicular to its sliding direction and parallel to the inner face of said lower case half is limited by said first and second side walls;

wherein each of said side walls of said upper case half includes a main side wall situated adjacent to said bent section of said brake means, a sub-side walls adapted to mate with said second side wall of said lower case half, and a connection wall interconnecting said main and sub-side walls of said upper case half to each other, and wherein said protrusions are each formed at a part of a bottom face of said connection wall;

wherein said case has an opening at a front portion thereof and further including a lid for opening and closing a part of said opening, said lid being pivotally mounted on at least a part of said second side wall of said lower case half and said sub-side wall of said upper case half;

further including slider means for closing and opening a part of said opening, said slider means being freely slidably located at an outer face of said lower case half;

additionally comprising a pair of detector openings situated on a lateral side of said case, an upper opening formed in one of said sub-side walls of said upper case half and a lower detector opening formed between the same sub-side wall and a respective second wall of said lower case half;

said control means protrusions being substantially adjacent to said respective sub-side walls, with a bottom face of each said protrusion lying in a plane situated substantially at the same level as or slightly below a lower edge of said lower detector opening;

whereby said brake legs are prevented from blocking said lower detector opening; and

wherein said control means constitute means for preventing a forward end of said brake legs from lifting and forming a clearance between the inner face of said lower case half and the bottom faces of said brake legs, and preventing the bottom faces of said brake legs from being lifted by a distance above the inner face of said lower case half due to force exerted by a spring urging said brake means in a reel braking direction.



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**4,742,419**

**HUB ASSEMBLY FOR A RECORDING DISC CARTRIDGE**

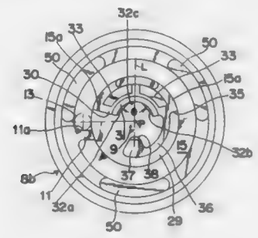
**Yoshitake Kato, Ibaragi, Japan, assignor to Hitachi Maxell, Ltd., Osaka, Japan**

**Continuation of Ser. No. 519,905, Aug. 3, 1983, abandoned. This application Oct. 3, 1986, Ser. No. 914,583**

**Claims priority, application Japan, Aug. 5, 1982, 57-119574[U]; Aug. 12, 1982, 57-122662[U]; Nov. 7, 1982, 57-168267[U]**

**Int. Cl.[4] G11B** *23/03, 5/016, 5/012*

**U.S. Cl. 360—133** **22 Claims**



1. A magnetic recording disc cartridge comprising:
- a magnetic recording disc having a central hole,
- a cartridge case in which said magnetic recording disc is rotatably mounted having a first opening or insertion of a drive unit and a second opening for insertion of a recording head, and
- a hub assembly to which said disc is attached about the periphery of said central hole of said disc, said hub assembly comprising a upper hub member and a lower hub member integrally connected with each other having a receiving hole defined in a central portion thereof having an inner periphery surface for receiving a supporting shaft of said drive unit, at least one annular guide groove concavely formed in upper and lower end surfaces of said upper and lower hub members coaxially with said receiving hole for receiving a drive shaft of said drive unit, which drive shaft is eccentrically located with respect to said supporting of said drive unit, said at least one guide groove being provided with a rib structure formed therein such that when said supporting shaft is rotated, said drive shaft is moved in said at least one guide groove to be engaged with said rib structure thereby rotating said hub assembly and said magnetic disc, said lower hub member being provided with a through hole formed in a central portion thereof having a wall member which projects inwardly from an inner cylindrical surface of said lower hub member which defines said through hole, said wall member having an inner periphery surface defining a part of said inner periphery of said receiving hole which is provided with a pair of flat contact surfaces formed at a predetermined angle to be in line contact with an outer peripheral surface of said supporting shaft, said contact surfaces being symmetrical to a central axis of said hub assembly, and an arcuate resilient member having a contact portion projecting from one side surface of said wall member to a position opposite said inner peripheral surface of said wall member between said flat surfaces having radial resiliency, such that when said supporting shaft of said drive unit is inserted in said receiving hole, said supporting shaft is securely held between said resilient member and said contact surfaces.

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**4,742,420**

**MAGNETIC DISK WITH A POROUS SUBSTRATE**

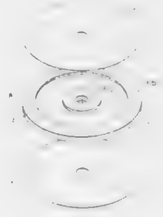
**Kengo Oishi, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Jul. 28, 1986, Ser. No. 889,717**

**Claims priority, application Japan, Aug. 21, 1985, 60-126501[U]**

**Int. Cl.[4] G11B** *5/82*

**U.S. Cl. 360—135** **9 Claims**



1. A recording disk, comprising;
- a porous substrate having on at least one of two principal surfaces a raised inner annular surface and a raised outer annular surface, said surfaces defining a groove therebetween; and
- a flexible recording sheet bonded to said inner and outer annular surfaces to enclose a gas in said groove beneath said sheet.

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**4,742,421**

**MAGNETIC RECORDING DISC HAVING TENSIONED AND ELASTICALLY-SUPPORTED RECORDING SURFACE**

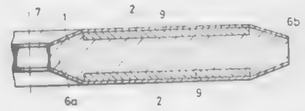
**Kunihira Seto, and Kengo Oishi, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Jul. 28, 1986, Ser. No. 889,715**

**Claims priority, application Japan, Aug. 3, 1985, 60-119605[U]**

**Int. Cl.[4] G11B** *5/82*

**U.S. Cl. 360—135** **6 Claims**



1. A recording disc, comprising:
- a substrate having on at least one principal surface an annular recess formed between two annular rings;
- an annular elastic disc substantially filling said recess and having a height at least as high as a depth of said recess; and
- a flexible recording sheet covering said elastic disc and being bonded to said rings to slightly compress said annular elastic disc such that said bonded flexible recording sheet

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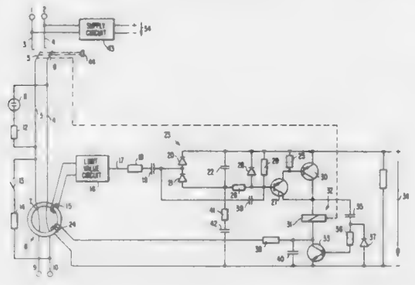
is elastically supported and kept under tension by said annular elastic disc.

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**4,742,422**
**SELF-MONITORING FAULT CURRENT SAFETY SWITCH**

**Burkhard Tigges, Kirchhundem, Fed. Rep. of Germany, assignor to Werner Turck GmbH & Co. KG, Halver, Fed. Rep. of Germany**

**Filed Oct. 20, 1986, Ser. No. 920,421**
**Claims priority, application Fed. Rep. of Germany, Oct. 18, 1985, 3537140**
**Int. Cl.⁴ H02H** *3/08*
**U.S. Cl. 361—45** **4 Claims**



1. A fault current circuit breaker used in monitoring electrical circuits, comprising:
- a total current converter including a primary circuit having outgoing return leads disposed therethrough;
- a secondary winding;
- an electromagnetic retaining device controlled by an electronic limit value circuit and containing a coil, said electronic limit value circuit being connected to said secondary winding; and
- switch contacts controlled by said electromagnetic retaining device for switching off an electrical circuit being monitored when a predetermined fault current is exceeded,
- said electronic limit value circuit, said coil and an evaluation circuit forming an oscillator circuit that generates current pulses which are supplied to an additional winding of said total current converter for simulating a fault current, said current pulses being temporarily stored in said additional winding of said total current converter and causing voltage pulses corresponding to said current pulses at the output of said electronic limit value circuit,
- said voltage pulses controlling said electromagnetic retaining device such that during normal operation, which corresponds to a condition that no actual fault current appears, said current pulses causing a sufficiently short de-energizing of said coil to allow said oscillator circuit to continue oscillating, and such that during an actual fault operation, which corresponds to a condition that an actual fault current appears, said oscillator circuit is interrupted causing said coil to be permanently de-energized, causing said switch contacts to open so as to shut off said primary circuit.

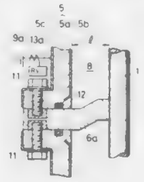
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**4,742,423**
**GAS INSULATED APPARATUS**

**Masao Morishita, Kyoto, Japan, assignor to Nission Electric Company, Limited, Kyoto, Japan**

**Filed Nov. 20, 1986, Ser. No. 932,558**
**Claims priority, application Japan, Nov. 22, 1985, 60-262800**
**Int. Cl.⁴ H02H** *3/14*
**U.S. Cl. 361—47** **4 Claims**

1. A gas insulated apparatus comprising:
- grounded closed vessels accommodating live parts separately from each other for every phase;
- an insulating gas filled in each of said closed vessels for insulating said live part in said closed vessel;
- each of said closed vessels comprises a resistive portion having a resistance value and having highly conductive



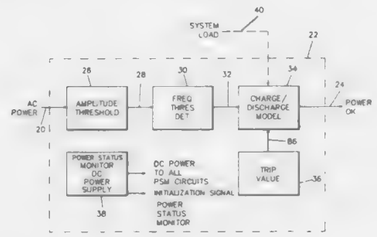
portions covering the inner and outer surfaces of said resistive portion; and
- said resistance value being selected so that a value of a fault current flowing in said closed vessel upon generation of a multi-phase earth fault is smaller than a value of a self-arc-extinction current $I_n$ due to said insulating gas.

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**4,742,424**
**POWER STATUS MONITOR FOR ELECTRONIC SYSTEM**

**Jeffrey A. Kautzer; David C. Yates, both of Waukesha; Gerd Mewitz, New Berlin, and Edward D. Nonnweiler, Milwaukee, all of Wis., assignors to General Electric Company**

**Filed Apr. 28, 1987, Ser. No. 43,646**
**Int. Cl.⁴ H02H** *3/50*
**U.S. Cl. 361—78** **10 Claims**




9. A power monitor for an electronic system comprising:
- means for sensing at least first and second condition of an AC power source for said electronic system;
- means for modelling a charge and a discharge of a DC power supply for said electronic system;
- said means for modelling containing at least first and second values related to first and second times during which at least first and second functions of said electronic system are capable of continuing operation following an occurrence of said at least first and second conditions, respectively;
- means in said means for modelling, responsive to an occurrence of said at least first and second conditions, for modifying said value in a manner related to a charge or discharge of said DC power supply, whereby said value continues to be related to said first and second times; and
- at least first and second threshold means for producing at least first and second signals indicating first and second conditions of unsatisfactory power when said value reaches first and second predetermined thresholds respectively.

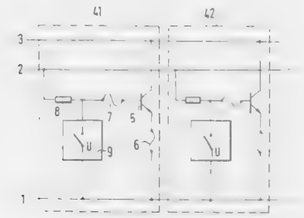


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**4,742,425**
**MULTIPLE-CELL TRANSISTOR WITH BASE AND EMITTER FUSE LINKS**

**Gerhard Conzelmann, Leinfelden-Echterdingen, and Karl Nagel, Gomaringen, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**PCT No. PCT/DE86/00327, § 371 Date May 5, 1987, § 102(e) Date May 5, 1987, PCT Pub. No. WO87/01867, PCT Pub. Date Mar. 26, 1987**
**PCT Filed Aug. 25, 1986, Ser. No. 50,294**
**Claims priority, application Fed. Rep. of Germany, Sep. 11, 1985, 3532383**
**Int. Cl.⁴ H02H** *5/04*
**U.S. Cl. 361—104** **8 Claims**



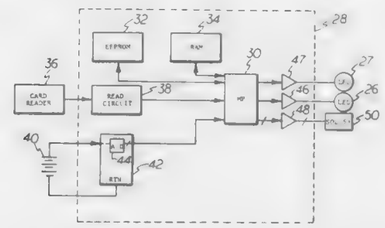
1. Multiple-cell transistor consisting of parallel connections of individual transistor cells provided between respective base, emitter and collector bus bars, wherein a fuse link (6, 7) is connected in the collector-emitter path and in the base connection of each transistor cell, comprising voltage-controlled switches for severing said fuse links in the case of defects, each of said switches being connected between a connection bar (1) and the connection point of a fuse link with said base connection, which is remote of the base.

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**4,742,426**
**ELECTRONIC LOCKING APPARATUS**

**Gary E. Lavelle, Avon, Conn., assignor to Emhart Industries, Inc., Farmington, Conn.**

**Filed Mar. 27, 1987, Ser. No. 31,712**
**Int. Cl.⁴ H01H** *47/00*
**U.S. Cl. 361—171** **18 Claims**



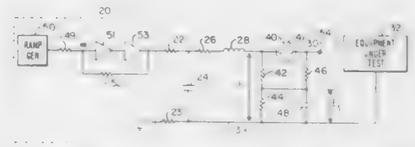

1. An electronic control for an electronic lock having a battery means for powering the lock, means for reading a keycard or other key, a lock operator, and an alarm to indicate a low battery voltage condition, said control comprising:
- means for measuring the voltage of said battery means including means for transmitting a signal indicative of the sensed voltage; and
- processing means for receiving said transmitted voltage signal for activating said lock operator and said alarm when a valid key in inserted in the lock and read by the reading means and the magnitude of the voltage signal transmitted by said transmitting means has decreased to a first predetermined level, said processing means being further operable for activating said alarm but not said lock operator when said valid key has subsequently been inserted and read and the magnitude of the voltage signal transmitted by said transmitting means has decreased to a second predetermined level below said first predetermined level, said battery means at said second predetermined voltage level containing sufficient energy and providing sufficient voltage to drive said lock operator.

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**4,742,427**
**ELECTROSTATIC DISCHARGE SIMULATION**

**Peter L. Richman, Lexington, Mass., assignor to KeyTek Instrument Corp., Wilmington, Mass.**

**Filed Feb. 6, 1986, Ser. No. 826,862**
**Int. Cl.⁴ H05F** *3/04*; **G01R** *29/12*
**U.S. Cl. 361—230** **21 Claims**



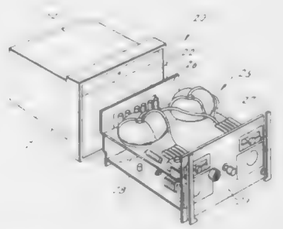

1. In an impulse circuit for delivering, from an electrical charge in charge storage capacitance means, an electrostatic spark discharge across an air gap to equipment under test, the improvement comprising:
- a gas gap in series combination between said air gap and the high energy side of said capacitance means; and
- a divider network, including a resistive impedance connected across at least one of said gaps for apportioning voltages across said gaps upon application of said charge to said combination, so that initial electrical conduction through a first of said gaps leads to a spark discharge across the other of said gaps, and the major flow of current from said capacitance means thus passes first through said other gap and then through said already conducting first gap to produce said spark discharge across said first gap with current waveforms defined primarily by the firing characteristics of said other gap under conditions of overvoltage of said other gap.

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**4,742,428**
**PROTECTIVE RELAY AND DRAWOUT CASE THEREFOR**

**Richard Conrad, Langhorne, Pa., assignor to BBC Brown Boveri Inc., White Plains, N.Y.**

**Filed Jun. 23, 1987, Ser. No. 65,427**
**Int. Cl.⁴ H01H** *9/20*
**U.S. Cl. 361—336** **10 Claims**



1. Relay apparatus including:
- a drawout unit and a housing having an open front through which said drawout unit is insertable into and removable from said housing;
- said housing including a rear wall opposite said open front;

said unit including a control panel at the front thereof and a rear panel opposite said front panel;
a plurality of sets of contact means;
each of said sets comprising cooperating first and second sections that are engaged with one another when said unit is fully inserted within said housing, said first and second sections being separated by removing said unit from said housing;
said first sections of a first and second of said sets being mounted on said rear wall and said second sections of said first and second sets being mounted on said rear panel;
said first and second sets being adapted for connection in respective control power and operating circuits external to said apparatus;
said first section of a third of said sets comprising shorting contact means biased to shorting position, said second section of said third set being operatively constructed to open said shorting contact means by fully inserting said unit into said housing, and said shorting contact means closing automatically upon disengagement of said blade means therefrom while removing said unit from said housing;
said second section of said third set being mounted on said unit;
said first, second and third sets being constructed and operatively mounted so that the first and second sections thereof disengage and engage in sequence as said unit is respectively removed from and fully inserted into said housing;
said sequence being such that upon withdrawal of said unit from said housing said cooperating sections of said first set separate after separation of said cooperating sections of said second set and after said shorting contact means is in said shorting position;
said sequence also being such that upon insertion of said unit into said housing said cooperating sections of said first set engage prior to engagement of said cooperating contacts of said second set and prior to opening of said shorting contact means by said second section of said third set.

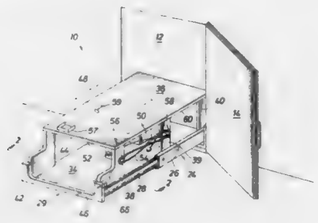
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**4,742,429**

## BATHROOM ELECTRICAL APPLIANCE CADDY

**Robert W. Arrendiell, and Gwendolyn G. Ellis, both of 280 Sugarberry Cir., Houston, Tex. 77024**

**Filed Dec. 16, 1986, Ser. No. 942,270**
**Int. Cl.[4] H05K** *7/14*
**U.S. Cl. 361—391** **8 Claims**



1. In combination with a cabinet located underneath a bathroom lavatory, an electrical appliance-accommodating apparatus, comprising
a base for fitting within a cabinet and including at least two screw holes to permit said base to be firmly secured by the use of wood screws therethrough to the floor of the cabinet,
a sliding support assembly having
a lower horizontal shelf having
electrical power connecting means for connection to a plurality of appliances carried by said support assembly by connection to their respective electrical cords,
said lower shelf also accommodating the coiling of electrical appliance cords of a plurality of appliances carried by said support assembly,
input connection means carried by said assembly for connection inside the cabinet or outside the cabinet when the cabinet door is open,
an upper horizontal shelf for supporting at least a first electrical appliance,
said upper shelf being recessed at its front end to permit at least a second electrical appliance to be accommodated on said lower shelf in front of said upper shelf, and
sliding means, attached to said base and said support assembly to permit said support assembly to be extended from said cabinet to allow access to a first electrical appliance located on said upper shelf and a second electrical appliance located on said lower shelf.

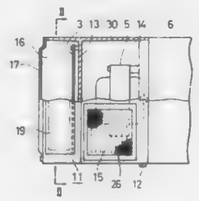
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**4,742,430**

## SEWING MACHINE DRIVING CONTROL BOX

**Tatsuya Sawato, and Yutaka Yamaura, both of Aichi, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Jul. 3, 1986, Ser. No. 882,003**
**Claims priority, application Japan, Jul. 4, 1985, 60-102104[U]**
**Int. Cl.[4] H05K** *1/14*
**U.S. Cl. 361—395** **11 Claims**



1. A sewing machine driving control box including:
a housing which is provided outside of a side surface of a frame of a sewing machine driving motor, an interior of said housing being divided into first and second chambers, said first chamber being closer to said frame than said second chamber, a ventilating opening being provided in said first chamber;
a transformer incorporates in said first chamber of said housing; and
a printed circuit board incorporated in said second chamber of said housing.

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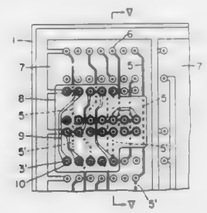
**4,742,431**

## FLEXIBLE CIRCUIT BOARD

**Yutaka Igarashi, Oume, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Division of Ser. No. 644,970, Aug. 28, 1984, abandoned. This application May 20, 1986, Ser. No. 864,836**
**Claims priority, application Japan, Aug. 31, 1983, 58-160121**
**Int. Cl.[4] H05K** *1/02*
**U.S. Cl. 361—398** **4 Claims**

1. A flexible circuit board including:
a flexible nonconductive substrate;
conductive circuit traces partially distributed on at least one surface of said substrate for composing electrical circuits in cooperation with electrical components to be mounted on said substrate, said circuit traces causing said substrate to warp or twist;
at least one dummy conductive trace comprised of the same material as said circuit traces and formed on said substrate for filling a region not occupied by said conductive circuit traces without electrical connection to the circuit traces, said dummy conductive traces substantially equalizing a distribution of conductive traces formed on said substrate for preventing the substrate from warping or twisting by said conductive circuit traces;
said dummy conductive trace and said circuit traces being simultaneously formed on the same surface of said substrate by the same process; and



said dummy trace not electrically connecting to the circuit traces and the electrical components during operation of said electrical circuits.

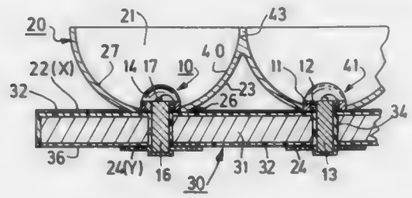
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**4,742,432**

## MATRIX OF LIGHT-EMITTING ELEMENTS AND METHOD OF MANUFACTURING SAME

**Jacques C. Thillays, Herouville, and André Talpied, Ifs, both of France, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Nov. 19, 1985, Ser. No. 799,528**
**Claims priority, application France, Dec. 7, 1984, 84 18731**
**Int. Cl.[4] H05K** *7/08*
**U.S. Cl. 361—400** **2 Claims**



1. A light-emitting matrix comprising:
a thermally conductive generally planar substrate having an upper surface, a lower surface, and an array of holes therethrough, at least said surfaces and inner surfaces of said holes being electrically insulating,
a plurality of thermally and electrically conducting supports disposed in respective holes, each support having an upper end extending above said upper surface, and a lower end extending downwardly at least to said lower surface,
a plurality of lower electrically conducting tracks formed on said lower surface in a pattern, each support having at least a portion of the lower end covered by and electrically connected to a selected one of said lower tracks,
a plurality of insulating rings, each ring disposed around a respective upper end of a support and having a lower ring surface engaging said upper insulating surface,
a plurality of conducting rings, each ring disposed around a respective insulating ring,
a plurality of upper electrically conducting tracks formed on said upper surface in a pattern, each conducting ring being electrically connected to a selected one of said upper tracks,
a plurality of light-emitting elements, each element being disposed on and having an electrical connection to an upper end surface of a respective support, and each element having an electrical connection to the respective conducting ring disposed around said respective support, and
a wafer having an insulating lower surface engaging said substrate and having a corresponding array of openings formed therein, each opening surrounding a respective conducting ring with a small clearance; said wafer having a corresponding array of optical collimation elements formed therein communicating with the openings in the wafer, arranged such that each collimation element has a focus located at the light-emitting element disposed on the support which is within the respective opening.

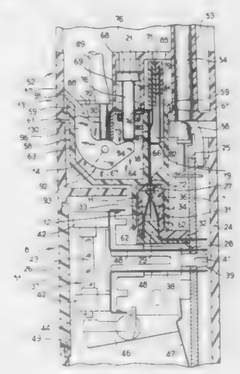
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**4,742,433**

## RANGE OF INPUT/OUTPUT DEVICES FOR AN APPARATUS OF THE PROGRAMMABLE AUTO-CONTROL TYPE.

**Jean Joly, Houilles; Yves Oehlert, Rueil; Jean Neyroud, Domaines; Olivier Penot, Antibes; Jacky Pergent, Carros; Gilbert Barillier, Gattieres, and Bernard Le Blanc, Biot, all of France, assignors to La Telemecanique Electrique, Nanterre, France**

**Division of Ser. No. 691,487, Dec. 6, 1984, Pat. No. 4,692,842.**
**This application Feb. 13, 1987, Ser. No. 14,690**
**Claims priority, application France, Apr. 15, 1983, 83 06175**
**Int. Cl.[4] H05K** *1/18*
**U.S. Cl. 361—412** **2 Claims**



1. A range of input/output devices for use in connecting a central unit of a programmable auto-control to automatic industrial equipment provided with interaction units of the type comprising sensors and actuators (16) each of said input-/output devices including an electronic card and a terminal box comprising a plurality of card terminals which are connected to respective channels of said card, a plurality of outer terminals which are connectible to said interaction units, connecting means (18, 19, 21) provided in the terminal box between the terminals, wherein the electrical channels (17, 23) of the cards are isolated from each other on the cards, and wherein the terminal boxes are of two types, i.e. a first type in which the connecting means comprise only individual connecting means (18) extending between a card terminal and a respective outer terminal so as to connect to the outer terminals the ends of the channels independently from each other through the terminal box, and a second type in which in at least one of said two pluralities of terminals, the terminals are by pairs in which a first terminal of each pair is connected to a corresponding terminal of the other plurality of terminals through an individual connecting means, and second terminals of the pairs are connected to each other through a shunt in the terminal box, whereby there is provided in the input/output devices with the terminal boxes of the second type a plurality of lines including in series an electrical channel, an individual connecting means (18) and in use, an interaction unit, said lines

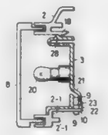
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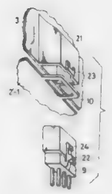


being interconnected with each other by said shunt (19, 21) in said terminal boxes of the second type.

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**4,742,434**
**VEHICULAR LAMP**
**Kazushige Farui, Shizuoka, and Yoshihiro Yamai, Aichi, both of Japan, assignors to Koito Manufacturing Co., Ltd., Tokyo and Toyota Jidosha Kabushiki Kaisha, Aichi, both of, Japan**
**Filed Apr. 23, 1986, Ser. No. 855,061**
**Claims priority, application Japan, Apr. 28, 1985, 60-64068[U]**
**Int. Cl.⁴ B60Q** *1/00*
**U.S. Cl. 362—61** **8 Claims**



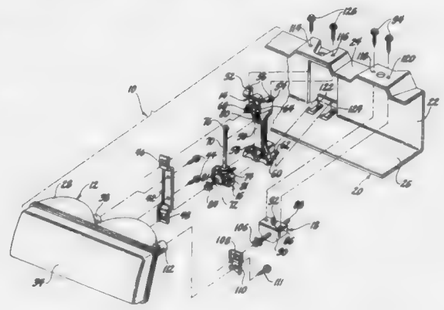


1. A vehicular lamp assembly comprising:
a bulb (20);
a lamp body (2) of open and box shape and formed with stop means (10, 10');
a back cover (3) detachably engaged with said lamp body (2), said back cover (3) including means securing said bulb (20) to said back cover;
a first connector 9 secured to one edge portion of said back cover (3) for applying an electrical current to said bulb 20;
a second connector (9') electrically connected with said first connector (9) and engaging said stop means (10, 10') of said lamp body (2), said second connector (9') having locking means (24, 22') engaging said back cover; and interengageable latch means (18, 28, 18', 26) positioned on said back cover at an edge thereof opposite said one edge portion securing said first connector and engaging said back cover to said lamp body remote from said first and second connectors; said first and second connectors being positioned at the same side of said back cover upon connection therebetween, whereby said back cover is securely engaged with said lamp body by said second connector being brought into connection with said first connector and said second connector is releasably secured to said back cover.

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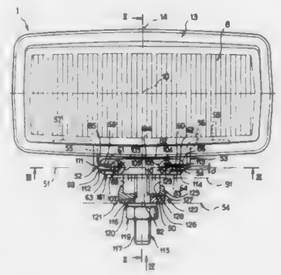
**4,742,435**
**SUPPORT ARRANGEMENT FOR A VEHICLE HEADLAMP**
**Paul D. Van Duyn, Anderson, Ind., and Keith D. Childress, Sterling Heights, Mich., assignors to General Motors Corporation, Detroit, Mich.**
**Filed Jul. 27, 1987, Ser. No. 77,880**
**Int. Cl.⁴ G03B** *17/00;* **F21V** *3/18;* **B60Q** *1/26*
**U.S. Cl. 362—66** **3 Claims**

1. The combination with a headlamp assembly adapted to be mounted to a support panel at the front end of a motor vehicle so as to allow selective adjustable movement of a lamp body about a vertical aim axis and a horizontal aim axis, said support panel including vertically spaced upper and lower substantially horizontal walls, said headlamp assembly including a stanchion connecting said lamp body to said upper and lower walls and allowing said lamp body to be adjusted about said vertical aim axis and said horizontal aim axis, said stanchion including an upstanding body formed with upper and lower mounting arms fastened to said upper and lower walls respectively, a ball stud member rigidly connected to said body portion adjacent said upper mounting bracket for supporting an upper portion of said lamp body, an adjustment mechanism having a gear housing connected to said body portion adjacent said lower mounting arms, a vertically orientated rotatable shaft and a horizontally orientated threaded shaft interconnected within said gear housing so as to cause said threaded shaft to be axially moved relative to said gear housing upon rotation of said vertically orientated shaft, and a ball member formed on one end of said threaded shaft and connected to a lower portion of said lamp body so that the lamp body is adjustably movable about the horizontal aim axis upon rotation of said vertical shaft.



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**4,742,436**
**SPOTLIGHT IN PARTICULAR FOR A MOTOR VEHICLE AND A REFLECTOR AND AN INTERMEDIATE ASSEMBLY PART FOR SUCH A SPOTLIGHT**
**Patrick Hoggett, Villeneuve.Les.Sablons, France, assignor to Cibie Projecteurs, France**
**Continuation of Ser. No. 23,915, Mar. 4, 1987, abandoned, which is a continuation of Ser. No. 825,813, Feb. 4, 1986, abandoned. This application Aug. 19, 1987, Ser. No. 88,464**
**Claims priority, application France, Feb. 4, 1985, 85 01502**
**Int. Cl.⁴ B60Q** *1/02*
**U.S. Cl. 362—80** **19 Claims**

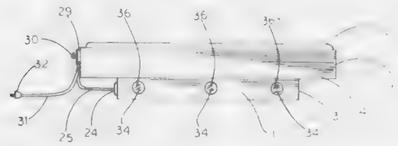


1. A spotlight, in particular for a motor vehicle, said spotlight comprising a rigid reflector having a first optical axis together with means for mounting the reflector on a support, and in particular on a motor vehicle, wherein said means for mounting the spotlight comprise:
two rigid mounting lugs disposed on the outside of said reflector symmetrically to each other about a first plane including said first optical axis, each of said lugs having a first end which is directly fixed to said reflector and a second end which defines a second plane perpendicular to said first plane and parallel to said optical axis, said second ends of said lugs having end surfaces perpendicular said second plane and facing each other and cooperatively forming a wedge shape on opposite sides of and symmetrical with respect to said first plane,
a rigid intermediate assembly part having wedge shaped surfaces perpendicular said plane and on opposite sides of and symmetrical about said first plane and cooperatively complementary to said wedge shaped end surfaces on said lugs,
means for applying mutual thrust between the wedge shaped end surfaces of said lugs and said wedge shaped surfaces on said intermediate part whereby to maintain a fixed relationship of said reflector with respect to said first and second planes regardless of thermal expansion to which said reflector and said intermediate assembly part may be subjected within limits corresponding to normal heating condition when the spotlight is used at ambient temperature; and
means for fixing said intermediate mounting part to said support.



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**4,742,437**
**WATER BED ILLUMINATOR**
**Rick Downey, 131st & 88th Ave., Palos Park, Ill. 60464**
**Filed Dec. 9, 1985, Ser. No. 807,005**
**Int. Cl.⁴ F21V** *33/00*
**U.S. Cl. 362—130** **17 Claims**

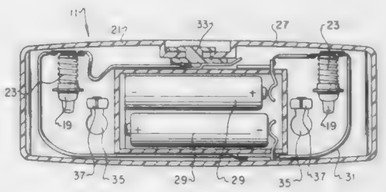


1. An illuminated water bed, comprising a base member having oppositely disposed base side walls, a mattress holder having a bottom wall resting on top of said base member, a water mattress in said holder resting on said bottom wall thereof, said water mattress being a water tight container of transparent flexible sheet material, a plurality of first apertures in said bottom wall of said mattress holder in spaced apart relationship, a first light emitting device positioned between said side walls of said base member and in a first location to transmit light therefrom through a first one of said plurality of said first apertures, and a second light emitting device positioned between said side walls of said base member and in a second location spaced apart from said first location to transmit therefrom through a second one of said plurality of said first apertures, whereby said water mattress is illuminated from light transmitted through said plurality of first apertures.

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**4,742,438**
**PURSE LIGHT**
**Tabitha S. King, Bangor, Me., assignor to LumenAries, Inc., Plano, Tex.**
**Filed Mar. 5, 1987, Ser. No. 21,987**
**Int. Cl.⁴ A45C** *15/06*
**U.S. Cl. 362—156** **5 Claims**

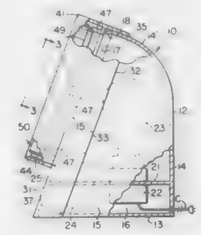
1. A light for the interior of a lady's purse, the light comprising:
a housing, having a translucent front;
a light bulb, mounted within the housing;
a power supply, mounted within the housing, for supplying electrical power to the light bulb;
switch means for turning the light on and off;
a mounting bracket, permanently attached to the interior of the purse; and

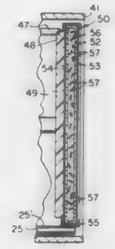


attachment means for temporarily attaching the housing to the mounting bracket.

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**4,742,439**
**DESKTOP KINETIC DISPLAY DEVICE**
**Albert G. Choate, 348 Honeoye Falls, #6 R.D., Honeoye Falls, N.Y. 14472**
**Filed May 21, 1987, Ser. No. 52,372**
**Int. Cl.⁴ F21V** *3/00, 21/30, 5/00*
**U.S. Cl. 362—311** **10 Claims**





2. A desktop device for producing moving, kinetic sculptural lighting effects, comprising
a housing having therein a chamber containing a removable light source,
a diffuser plate positioned over on opening in said housing to be illuminated by said light source,
a light transmissive cell comprising a transparent container having opposed sidewalls each of which has secured thereon one of two different polarizing filters,
said cell being removably mounted in said housing with one side thereof positioned adjacent to and confronting upon said diffuser plate to be illuminated by light passing through said plate from said source, and with the opposite side of said cell facing outwardly of said housing to be visible from the exterior thereof,
said cell having therein a chamber containing a liquid, and a plurality of generally small, birefringent elements dis-

posed in said liquid to move randomly therein upon movement of the cell, and

means in said housing drivingly connected to said cell and operable to effect rotation of said cell about an axis extending transversely of said sides of the cell,

said polarizing filters having their polar axes positioned to provide on opposite sides of said cell intersecting polarized fields which remain fixed relative to one another upon rotation of said cell.

5. A polarized cell for producing kinetic sulptural lighting effects when moved while light is passing therethrough, comprising

a transparent container having a pair of opposed, planar sidewalls,

a liquid substantially filling said container,

a plurality of rather small, light transmissive, birefringent elements in said liquid, and disposed to float randomly in all directions in the liquid as the container is moved, and

a pair of polarizing filters each of which is secured on a different one of the opposed sidewalls of said container with their polar axes positioned to provide intersecting polarized fields on said sidewalls.

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**4,742,440**

## LIGHTING DEVICE WITH ASYMMETRICAL LIGHT BEAM

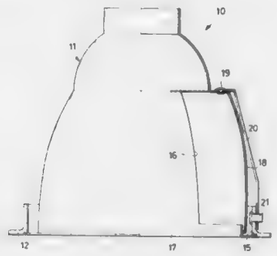
**Giannunzio Guzzini, Recanati, Italy, assignor to iGuzzini Illuminazione S.p.A., Recanati, Italy**

**Filed Jun. 22, 1987, Ser. No. 64,886**

**Claims priority, application Italy, Jul. 29, 1986, 22672[U]**

**Int. Cl.⁴ F21V** *7/00*

**U.S. Cl. 362—346** **5 Claims**



1. Lighting device with an asymmetrical light beam, of the type essentially constituted by a main conical reflector on whose side wall at least an opening is provided, in correspondence of which an additional reflector segment is externally provided, characterized in that said additional reflector segment has the same curvature of the main reflector, and is fastened onto said lighting device by means of a bracket capable of holding said supplementary reflector segment spaced apart from said main reflector.

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**4,742,441**

## HIGH FREQUENCY SWITCHING POWER CONVERTER

**Steven C. Akerson, Kent, Wash., assignor to Heart Interface Corporation, Kent, Wash.**

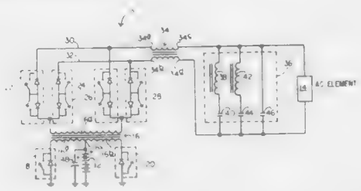
**Filed Nov. 21, 1986, Ser. No. 934,247**

**Int. Cl.⁴ H02P** *13/18*

**U.S. Cl. 363—97** **20 Claims**

1. A swithing power converter circuit usable with a DC element and an AC element, comprising:

selectively bidirectionally operative power converter means having signal controlled switching devices whose selected operations collectively configure said converter means to act in one mode as an inverter capable fo converting DC power supplied by such DC element to AC power usable by such AC element, and in another mode, as a rectifier capable fo converting AC power supplied by such AC element to DC power usable by such DC element, with said switching devices being commonly operable in both of said modes, and



signal means capable of providing pulse with modulated, synchronous control of each of said switching devices, whereby said AC power is pulse width and duty cycle dependent.

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**4,742,442**

## CONTROLLED MAGNETRON POWER SUPPLY INCLUDING DUAL-MODE INVERTER

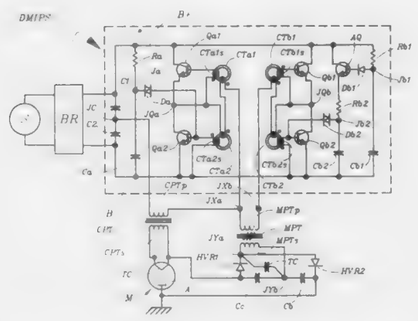
**Ole K. Nilssen, Caesar Dr., Rt. 5, Barrington, Ill. 60010**

**Filed Jun. 17, 1986, Ser. No. 875,073**

**The portion of the term of this patent subsequent to Oct. 13, 2004, has been disclaimed.**

**Int. Cl.⁴ H02M** *7/44*

**U.S. Cl. 363—98** **20 Claims**



1. A power supply for a magnetron having a thermionic cathode with a pair of cathode power input terminals, the magnetron having a pair of main magnetron power input terminals, the power supply comprising:

DC terminals adapted to connect with a source of DC voltage;

first inverter means connected in circuit with the DC terminals and operative, whenever the DC terminals are connected with the source of DC voltage, to provide a first AC voltage at a first set of AC output terminals;

connect and transformer means operative to permit connection of the cathode power input terminals with the first set of AC output terminals and to provide cathode power thereto;

second inverter means connected in circuit with the DC terminals and operative after the provision of an initiating action to an initiating input means, whenever the DC terminals are connected with the source of DC voltage, to provide a second AC voltage at a second set of AC output terminals;

connect, transformation and rectification means operative to permit connection of the main magnetron power input terminals in circuit with both the first set and the second set of AC output terminals, thereby to permit the provision of a current-limited DC voltage to the main magnetron power input terminals from both sets of AC output terminals, but only after the provision of the initiating action;

cathode power being provided irrespective of any power being provided to the main magnetron power input terminals.



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**4,742,443**

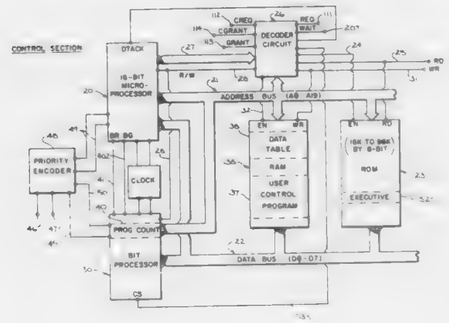
## PROGRAMMABLE CONTROLLER WITH FUNCTION CHART INTERPRETER

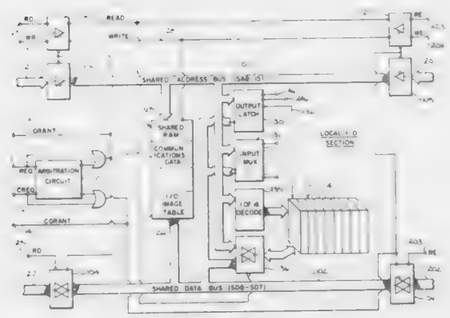
**David R. Rohn, Richmond Heights; Terry L. Dauterman, Chardon, and Ronald E. Schultz, Willoughby, all of Ohio, assignors to Allen-Bradley Company, Milwaukee, Wis.**

**Filed Mar. 28, 1985, Ser. No. 717,221**

**Int. Cl.⁴ G05B** *19/00*

**U.S. Cl. 364—136** **9 Claims**





1. A programmable controller for operating a machine to carry out a plurality of programmed functions, which comprises:

a memory which stores a user control program comprised of a plurality of ladder programs that each include a plurality of instructions which direct the programmable controller to operate the machine to perform a specific function, and a structure chart program that determines the sequence in which the plurality of ladder programs are to be executed to thereby control a machine connected to the programmable controller;

processor means coupled to the memory and being operable to execute the use control program and to thereby perform the functions indicated by the ladder programs, said processor means including:

means coupled to the memory for interpreting the structure chart program to produce an active state list which is stored in said memory and which indicates the order in which the ladder programs are to be executed; and

means coupled to the memory for reading the stored active state list and for executing the ladder programs indicated by the active state list by reading the ladder program instructions from the memory and carrying out the functions indicated thereby to operate the machine.

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**4,742,444**

## METHOD OF OPTIMIZING DRIVE CONTROLS IN MACHINE TOOLS HAVING COMPUTER CONTROL

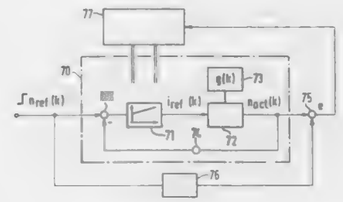
**Horst Gose, and Wolfgang Papiernik, both of Erlangen, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Jul. 18, 1985, Ser. No. 756,788**

**Claims priority, application Fed. Rep. of Germany, Jul. 23, 1984, 3427127**

**Int. Cl.⁴ G06F** *15/46;* **G05B** *15/02, 19/417;* **G05D** *3/12*

**U.S. Cl. 364—157** **3 Claims**



1. A method of optimizing drive controls in machine tools having computer control, comprising the steps of:

(a) inputting a first reference input signal function into an open-loop configuration of the actual drive control system and ascertaining system parameters from the resultant system response;

(b) computing a second reference input signal function and control parameters from the system parameters of step (a) and a desired target system response of a closed-loop configuration of the drive control system;

(c) simulating the closed-loop configuration of the drive control system by using the system parameters and the control parameters;

(d) inputting the second reference input signal function into the simulated drive control system and comparing a simulated system response with the desired target system response;

(e) varying the control parameters for reducing the deviation between the simulated system response and the desired target system response;

(f) repeating steps (d) and (e) until the simulated system response and the desired target system response coincide;

(g) setting the control parameters into a drive control feedback loop of the closed-loop configuration of the actual drive control system; and

(h) inputting the second reference input signal function into the closed-loop configuration of the actual drive control system, comparing the actual drive control system response with the desired target system response, varying the control parameters for reducing the deviation therebetween to a predetermined amount, repeating the comparing and varying steps until the deviation therebetween reaches a predetermined amount, and setting the control parameters into the drive control feedback loop of the actual drive control system.

**4,742,445**

## SUPERVISORY CONTROL COMPUTER SYSTEM OF COMPOUND GENERATING PLANT

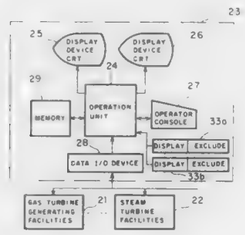
**Takayuki Watanabe, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 23, 1986, Ser. No. 854,899**

**Claims priority, application Japan, Apr. 24, 1985, 60-88111; Apr. 24, 1985, 60-88112**

**Int. Cl.[4] G06F** *15/46, 3/153*

**U.S. Cl. 364—188** **2 Claims**




1. A supervisory control computer system of a compound generating plant, comprising:

(a) a data input/output device for inputting data of gas turbine generating facilities and steam turbine generating facilities of the compound generating plant;

(b) an operation unit for receiving an output from the data input/output device;

(c) a memory connected to the operation unit for storing data of the gas turbine facilities and the steam turbine facilities;

(d) a plurality of display devices for indicting a message, a system diagram or the like based on output from the operation unit;

(e) an operator console for performing the display mode of the display devices through the operation unit; and

(f) indication permission selecting switches of the display devices installed corresponding to each of the generating facilities and connected to the operation unit for preventing a change in the display devices concerning the respective generating facilities.

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**4,742,446**

## COMPUTER SYSTEM USING CACHE BUFFER STORAGE UNIT AND INDEPENDENT STORAGE BUFFER DEVICE FOR STORE THROUGH OPERATION

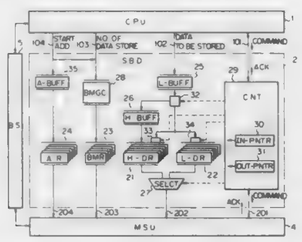
**Tetsuya Morioka; Tsutomu Tanaka, both of Yokohama; Katsumi Onishi, Kawagoe, and Yuji Oinaga, Tokyo, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

**Filed Dec. 17, 1984, Ser. No. 682,309**

**Claims priority, application Japan, Dec. 29, 1984, 58-246104**

**Int. Cl.[4] G06F** *12/06*

**U.S. Cl. 364—200** **17 Claims**




1. A digital computer system, comprising:

a central processing unit having a machine cycle;

a main storage unit;

a buffer storage unit connected between said central processing unit and said main storage unit, receiving data from said central processing unit and storing the data in said main storage unit, reading data from said main storage unit and transmitting the data to said central processing unit, and functioning as an internal memory device for said central processing unit and operating at a high speed access time; and

a store buffer device connected between said central processing unit and said main storage unit, having a higher operating speed than and operating independently of said buffer storage unit, receiving data identical to that stored in said buffer storage unit and control information, from said central processing unit, for the received data from said central processing unit in response to requests from said central processing unit and transferring the received data and control information to said main storage unit, the transfer operation from said central processing unit to said store buffer device and the transfer operation from said store buffer device to said main storage unit being effected during the machine cycle of said central processing unit, and said store buffer device including:

a controller connected between said central processing unit and said main storage unit, and controlling the transfer operations;

data register sets connected to said central processing unit, said controller and said main storage unit, each set including data registers for receiving data to be stored in said main storage unit from said central processing unit;

a byte mark register set connected between said central processing unit and said main storage unit, and including byte mark registers for receiving, from said central processing unit, information designating data to be stored in said data registers; and

an address register set connected between said central processing unit and said main storage unit, and including address registers for receiving a starting storage address in said main storage unit for the data to be stored in said main storage unit from the data registers from said central processing unit.

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**4,742,447**

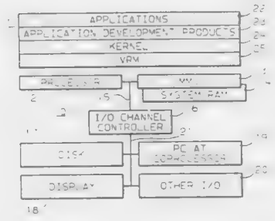
## METHOD TO CONTROL I/O ACCESSES IN A MULTI-TASKING VIRTUAL MEMORY VIRTUAL MACHINE TYPE DATA PROCESSING SYSTEM

**Keith E. Duvall, Georgetown, and Anthony D. Hooten, Round Rock, both of Tex., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Jan. 16, 1986, Ser. No. 819,458**

**Int. Cl.[4] G06F** *13/00, 12/08*

**U.S. Cl. 364—200** **17 Claims**




1. A method for a page segmented virtual memory data processing system having

(1) a main memory including

a first plurality of byte addressable storage locations each of which functions to store one byte of data,

(2) a secondary storage device including



a second plurality of block addressable storage locations each of which functions to store at least one virtual page of data,

(3) a resource manager for creating at least one machine having a UNIX type Operating System {UOS} program which includes,

(a) conventional Unix commands for opening and creating new Unix files,

(b) I/O commands for transferring Unix file data between said device and said main memory, said I/O commands each including,

(i) a file descriptor parameter,

(ii) a buffer pointer parameter, and

(iii) a parameter specifying the number of bytes of data that is to be transferred by each of said commands,

(c) means for storing a Unix offset pointer which designates a byte location in said device from which or to which said file data is transferred by each of said I/O commands, and

(d) I/O subroutines which are run when said I/O commands are executed,

(4) an application program which includes conventional Unix I/O system calls to said I/O commands, and

(5) a memory manager program having,

(a) Load and Store type of instructions each employing a virtual page address for transferring a page of data between said device and said main memory,

(b) a pageable External Page Table {XPT} for relating each said virtual page address to a different one of said block addressable locations,

(c) a non-pageable Internal Page Table {IPT} for relating virtual page addresses to byte addressable locations in said device,

(d) a page fault handling mechanism for resolving a page fault that occurs as a result of said application program executing an instruction involving a virtual page which is not currently stored in said main memory, said mechanism causing said one involved virtual page to be transferred to said device by referencing said XPT to relate said involved virtual page address to a block address where said page is stored,

said method causing said data transfers defined in said I/O system calls to be made under the control of said memory manager and said page fault handling mechanism, rather than said I/O subroutines of said UOS, said method comprising the steps of,

(A) creating a new instruction for said operating system which functions to map a specified Unix file stored in said device to new virtual page addresses in another segment of said virtual memory so as to relate the newly assigned virtual page addresses in said another segment to said corresponding block address in said device,

(B) mapping said specified Unix file to assign said new virtual page addresses in said another segment by executing said new instruction, including the steps of;

(a) establishing a first data structure for storing said map, said first data structure having an entry for each active page of said specified Unix file, each entry including a first field which stores said block address of one said active page and a second field which stores one of said new virtual page addresses in said another segment,

(b) assigning a virtual address to said first data structure from a predetermined segment of said virtual memory,

(c) storing said first data structure in said device, and

(C) dynamically generating another virtual page address within the address range of said another segment during execution of each said I/O commands by translating at least one of said command parameters and said offset point for said specified file to said another virtual page address which is then employed with said first data structure by said memory manager and fault handling mechanism to transfer the virtual pages containing said file data specified by at least one of said parameters, between said main memory and said storage device.

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**4,742,448**

## INTEGRATED FLOPPY DISK DRIVE CONTROLLER

**Wendell B. Sander, Los Gatos, and Robert Bailey, San Jose, both of Calif., assignors to Apple Computer, Inc., Cupertino, Calif.**

**Continuation of Ser. No. 573,067, Jan. 24, 1984, abandoned. This application Dec. 18, 1986, Ser. No. 943,839**

**Int. Cl.[4] G06F** *13/12, 3/06*

**U.S. Cl. 364—200** **8 Claims**



1. An integrated circuit floppy disk drive controller formed in a single semiconductor device for interfacing between a digital computer having an address bus and a data bus, and at least one floppy disk drive, said disk drive controller and said computer being coupled by said data bus, said computer generating a clock signal which is input to said controller, said controller comprising:

state storage means for coupling to said computer by said address bus for storing state commands sent by said computer;

decoder means coupled to said state storage means for decoding state commands stored in said state storage means and generating control signals for controlling the operation of a status register means, a read control means and a write control means based upon said decoded commands;

mode storage means coupled to said decoder means and for coupling to said computer, said mode storage means for storing data sent by said computer indicating modes of operation selected by said computer, said modes of operation including at least one of synchronous/asynchronous reading and writing and fast/slow clock;

said status register means coupled to said decoder means, and for coupling to said floppy disk drive and said computer for storing information regarding the status of said at least one disk drive and the controller for interrogation by said computer, said status being determined by the contents of said mode storage means and said status register means;

said read control means coupled to said mode storage means, and for coupling to said computer and said at least one disk drive for receiving data from said disk drive and sending said data to said computer in a mode of operation as determined by said mode storage means; and

said write control means coupled to said mode storage means, for coupling to said at least one disk drive for receiving data from said computer and sending said data

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to said disk drive in a mode of operation as determined by said mode storage means.

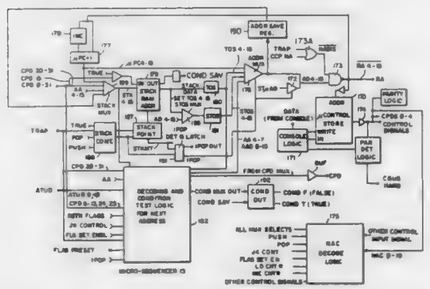
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**4,742,449**

## MICROSEQUENCER FOR A DATA PROCESSING SYSTEM USING A UNIQUE TRAP HANDLING TECHNIQUE

**David I. Epstein, Framingham, and Kenneth D. Holberger, North Grafton, both of Mass., assignors to Data General Corporation, Westboro, Mass.**

**Continuation of Ser. No. 256,926, Apr. 23, 1981, abandoned.**
**This application Oct. 21, 1985, Ser. No. 789,355**
**Int. Cl.[4] G06F** *9/22*
**U.S. Cl. 364—200** **11 Claims**



1. In a data processing system having macroinstruction decoding means for decoding a macroinstruction to provide a sequence of microinstructions comprising one or more microroutines, means for executing said microinstructions, and a microsequencing control means for controlling the provision of said sequence of microinstructions, said microsequencing control means comprising

means responsive to a trap condition, which arises as a result of the execution of said sequence of microinstructions and which prevents the completion of the execution of said sequence, for detecting said trap condition and for interrupting the execution of the microinstruction currently being executed by said executing means when said trap condition occurs;

means responsive to said detecting and interrupting means for handling said trap condition; and

means responsive to the trap condition handling means for permitting said executing means to execute said interrupted microinstruction when said trap condition handling means has resolved said trap condition and to continue the execution of the subsequent microinstructions of said sequence.

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**4,742,450**

## METHOD TO SHARE COPY ON WRITE SEGMENT FOR MAPPED FILES

**Keith E. Duvall, Georgetown; Anthony D. Hooten, Round Rock, and Larry K. Loucks, Austin, all of Tex., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Jan. 16, 1986, Ser. No. 819,455**
**Int. Cl.[4] G06F** *12/08*
**U.S. Cl. 364—200** **6 Claims**

1. A method for facilitating the interchange of data stored in a Unix file between two UNIX processes being run concurrently on two virtual machines in a page segmented virtual memory virtual machine type data processing system having,

(1) a main memory including,

a first plurality of byte addressable storage locations each of which functions to store one byte of data,

(2) a secondary storage device including,

a second plurality of block addressable storage locations each of which functions to store at least one virtual page of data,

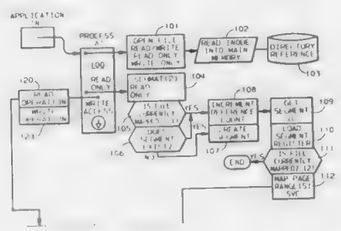
(3) a virtual resource manager for creating at least first and second virtual machines having a UNIX type Operating System {UOS} program which includes,

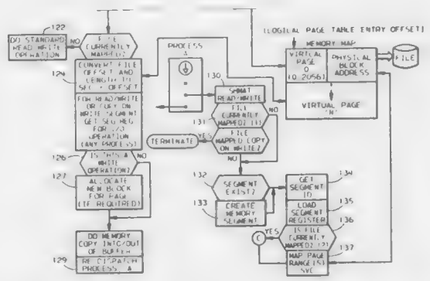
(a) conventional UNIX commands including commands for opening and creating new UNIX files, data transfer commands having parameters for specifying UNIX file data to be transferred between said device and said main memory, a map instruction which functions to map a specified UNIX file stored in said device to virtual pages in another segment of said virtual memory so as to relate the newly assigned page addresses in said another segment to said corresponding block address in said device,

(b) I/O subroutines which run when said transfer commands are executed,

(c) means for storing said map instruction at a virtual address in a predetermined segment of said virtual memory, and

(d) means for storing a UNIX offset pointer,





(4) an application program which includes conventional Unix system calls to said commands, and

(5) a memory manager program having,

(a) Load and Store type of instructions employing a virtual address for transferring a page of data between said device and said main memory,

(b) a page fault handling mechanism for resolving a page fault that occurs as a result of said application program executing one of said Load and Store instructions involving a virtual page which is not currently stored in said main memory. and

(6) means for causing said data transfers defined in said system calls to be made under the control of said memory manager and said page fault handling mechanism, rather than said I/O subroutines of said UOS, including means for dynamically generating another said virtual page address within the address range of said another segment by translating said command parameters and said offset pointer for said specified file in response to each said data transfer command,

said method facilitating said interchange of said data between said two processes being run concurrently by said



first and second virtual machines involving one specified UNIX File, said method comprising the steps of:

(A) creating a shared-copy-on-write (SCOW) command for said UOS which functions to cause a Unix file specified thereby to be mapped to a unique segment by said map instruction, said SCOW command including a first field for storing an indication to distinguish said SCOW command from a conventional copy-on-write command,

(B) executing a system call in a first application program being run by said first virtual machine to said SCOW command to cause said specified file to be mapped to said unique segment,

(C) establishing a map node data structure with said UOS which includes the step of establishing a SCOW segment ID field to store the segment ID of said unique segment,

(D) storing said unique segment ID in said SCOW segment ID field of said map node data structure in response to mapping said specified file,

(E) executing a system call in a second application program to said SCOW command,

(F) checking said map node data structure to determine if said specified file is currently mapped in a mode to be shared, and

(G) running said first and second application programs concurrently whereby data in said specified file that is written by either application program is readily available to be read by the other application program.

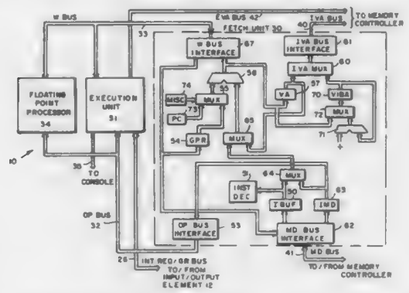
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**4,742,451**

## INSTRUCTION PREFETCH SYSTEM FOR CONDITIONAL BRANCH INSTRUCTION FOR CENTRAL PROCESSOR UNIT

**William F. Bruckert, Hudson; Tryggve Fossum, Northboro; John A. DeRosa, Jr., Princeton; Richard E. Glackemeyer, Bolton; Allan E. Helenius, Westford, and John C. Manton, Marlboro, all of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.**

**Filed May 21, 1984, Ser. No. 612,621**
**Int. Cl.[4] G06F** *9/42*
**U.S. Cl. 364—200** **16 Claims**



1. A fetch unit for use in a processor in a digital data processing system for fetching program instructions and operands from a memory, the memory including a plurality of addressable storage locations for storing program instructions from a first series of program instructions in a first series of successive storage locations, the instructions including a conditional branch instruction which enables the fetch unit to fetch from the memory program instructions from a second series of program instructions stored in a second series of storage locations in response to the occurrence of a predetermined condition in said processor, said fetch unit comprising:

A. A operand retrieval means for initiating the retrieval of operands from the memory, said operand retrieval means including means for calculating the address in memory of an operand;

B. instruction retrieval means for initiating the retrieval of instructions from the memory, said instruction retrieval means including means for calculating the address in memory of an instruction;

C. control means connected to said operand retrieval means and said instruction retrieval means and including means for receiving a signal from the processor indicating the presence or absence of a predetermined condition for controlling the operation thereof, said control means being responsive to the receipt of a conditional branch instruction to enable said operand retrieval means to initiate a retrieval from the memory of an instruction from the second series of program instructions in response to the processor indicating the occurrence of the predetermined condition; and

D. interface means including:

i. means for transmitting address, command and memory control signals to the memory, said command signals including signals for enabling the memory to transfer data signals, including instructions and operands, to said fetch unit, and said memory control signals including an abort signal, the memory not transmitting the contents of the addressed location to the fetch unit in response to the receipt of the abort signal;

ii. means for receiving data signals from the memory, and

iii. means responsive to the signal from the processor indicating the absence of the predetermined condition to enable the transmission of said abort signal to the memory.

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**4,742,452**

## COMPUTER SYSTEM INCLUDING ADDRESS DRIVEN PROGRAM INTERRUPT SYSTEM

**Masayuki Hirokawa, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 493,485, May 11, 1983, abandoned.**
**This application Sep. 9, 1986, Ser. No. 904,838**
**Claims priority, application Japan, May 12, 1982, 57-81981**
**Int. Cl.[4] G06F** *9/00*
**U.S. Cl. 364—200** **4 Claims**



1. A computer system including a program supervisory device, said system comprising:

a central processing unit;

at least two instruction code sources for selectively transmitting instruction codes to said central processing unit;

a system data bus coupled to said central processing unit;

a system address bus coupled to said central processing unit;

said first instruction code source comprising means for storing at least one predetermined instruction code;

said second instruction code source being coupled to said system address bus and comprising a memory for storing therein a plurality of instruction codes at individual addresses thereof, and for supplying instruction codes to said central processing unit over said system data bus in response to addresses supplied from said central processing unit on said system address bus; and

means for selectively coupling said central processing unit, via said system data bus, to either (1) said first instruction code source or (2) said second instruction code source, said coupling means including means operatively coupled

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to said system address bus and responsive only to the addresses carried by said system address bus for generating a signal in response to the appearance on said system address bus of at least one preselected address generated by said central processing unit, and means for selecting a respective instruction code source and for coupling said selected instruction code source to said central processing unit via said system data bus in response to said signal;

said selecting means comprising a multiplexer coupled to said system data bus and receiving as multiplexer inputs the outputs of said first and second instruction code sources; and said signal generating means comprising comparator means for comparing a predetermined interrupt address with addresses placed on said system address bus by said central processing unit, an output of said comparator being applied as a selection control input to said multiplexer.

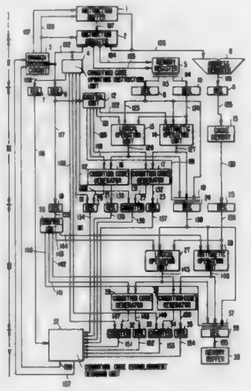
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**4,742,453**

## PIPELINE-CONTROLLED INFORMATION PROCESSING SYSTEM FOR GENERATING UPDATED CONDITION CODE

**Toshiteru Shibuya, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed Jul. 3, 1984, Ser. No. 627,615**
**Claims priority, application Japan, Jul. 6, 1983, 58-122682**
**Int. Cl.⁴ G06F** *9/38*
**U.S. Cl. 364—200** **13 Claims**



1. A pipeline-controlled information processing system for executing programmed instructions, comprising:

means for providing instructions;

a plurality of operation units for performing operations in response to said instructions;

a plurality of condition code generator units connected to said operation units for monitoring operations performed by said operation units and generating condition codes in response to said operations, each condition code generator unit having a counter section and an operating section for operating said counter section in the event of generation of a condition code;

a condition-code-updating instruction discrimination unit connected to said condition code generator units and including means for determining one of said condition code generator units to be used to generate a condition code in response to each of said instructions, and means responsive to said determining means for actuating the counter section of said determined generator unit to produce a count; and

a condition-code-establishment decision unit connected to said condition code generator units and including means for monitoring counts held by the plurality of counter sections and means responsive to said monitoring means for producing a signal indicative of the generation of an updated condition code of the determined condition code generator unit and the updated condition code if an updated condition code has been generated by the determined condition code generator unit.

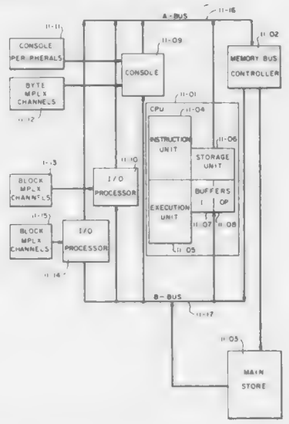
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**4,742,454**

## APPARATUS FOR BUFFER CONTROL BYPASS

**Theodore S. Robinson, Cupertino; Donald L. Hanson, Los Altos Hills, and Gary A. Woffinden, Scotts Valley, all of Calif., assignors to Amdahl Corporation, Sunnyvale, Calif.**

**Filed Aug. 30, 1983, Ser. No. 527,673**
**Int. Cl.⁴ G06F** *13/00*
**U.S. Cl. 364—200** **6 Claims**



1. In a data processing machine having a cache storing lines, including a plurality of bytes, of data at cache locations identified by logical addresses, a mainstore storing lines of data at mainstore locations identified by mainstore addresses, a means for selecting one of a plurality of logical addresses to access a requested set within a line of data from the cache, a transferring means for transferring a line of data from the mainstore in sub-line increments to the cache if the line that includes a requested set is not stored in the cache; and a cache controller, including a translator for identifying mainstore addresses for lines of data stored in cache locations and for identifying mainstore addresses for lines of data that include a byte of data within a requested set identified by a logical address, means connected to said translator for signalling a line present condition indicating whether the line of data that includes the requested set is stored in the cache by comparing the mainstore address of the line stored at the cache location with the mainstore address of the line that includes the requested set, means for allowing access to the cache only in the line present condition when an entire line including a byte of data in the requested set is present in the cache, an improvement comprising:

means, in communication with the means for selecting and the cache controller, for holding a logical address selected by the selecting means requesting a set of data from a line not stored in the cache pending transfer of the line from the mainstore by the transferring means;

means, in communication with the transferring means and with the means for selecting and responsive to a transfer of a sub-line increment or increments including the requested set of data to the cache, for forcing selection of the logical address in the means for holding by the means for selecting without waiting for the entire line to be transferred; and

means, in communication with the cache controller and responsive to the transfer of the sub-line increment or increments including the requested set, for generating a force line present match signal to said line present comparing means, said line present comparing means responsive to said force line present match signal for signalling a line present condition in order to allow access to the cache before the entire line is transferred to the cache.



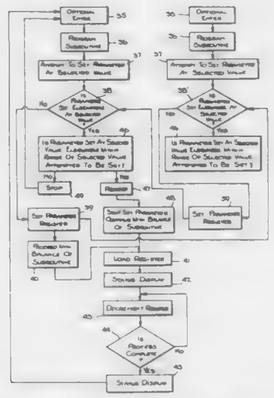
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**4,742,455**

## CONTROL SYSTEM FOR COOKING APPARATUS

**William M. Schreyer, Monroe, Conn., assignor to Food Automation-Service Techniques, Inc., Stratford, Conn.**

**Filed Mar. 17, 1986, Ser. No. 840,362**
**Int. Cl.⁴ G06F** *7/00*
**U.S. Cl. 364—400** **6 Claims**



1. A control system for cooking apparatus comprising means for simultaneously running a plurality of cooking subroutines to cook different products associated with each subroutine, said means including:

a plurality of means for optionally selecting a desired program subroutine such that a plurality of program subroutines for a plurality of optionally selected products can run simultaneously;

means responsive to one of said optionally selected subroutines for attempting to set a parameter of the apparatus at a selected value in accordance with said optionally selected subroutine;

means coupled to said attempting means for determining whether said parameter has been set at said selected value by a previously optionally selected subroutine in the apparatus;

first register means coupled to said determining means for setting said parameter at said selected value;

means for interrupting said one desired program subroutine if the parameter has been set by another previously optionally selected and currently running subroutine and is not within a predetermined operating range of said selected value of the parameter as attempted to be set;

means for proceeding with the balance of said desired optionally selected subroutine;

second register means responsive to said desired optionally selected subroutine for storing timing information relating to the cooking process;

means responsive to said second register means for decrementing said second register means as the cooking process continues; and

means responsive to said second register means for determining whether the cooking process is complete.

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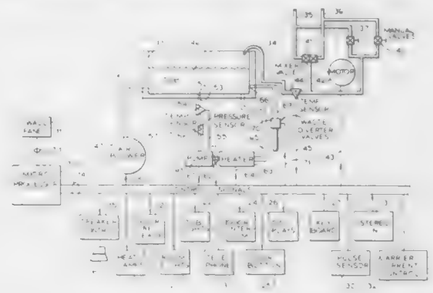
**4,742,456**

## SOUND RESPONSIVE TUBE CONTROL CIRCUIT

**David H. Kamena, Parsippany, N.J., assignor to American Standard Inc., New York, N.Y.**

**Filed Mar. 18, 1983, Ser. No. 476,654**
**Int. Cl.⁴ G06F** *15/46;* **A61H** *33/02;* **H03G** *3/20*
**U.S. Cl. 364—400** **10 Claims**

1. A bath tub control circuit for a bath tub to hold bath water comprising, a bath water pump for regulating water within the bath tub, a microprocessor coupled to said bath water pump for energizing and deenergizing said pump, a voice communi-



cation circuit coupled to said microprocessor and operable at least from the bath tub for selective activation therefrom and for deenergizing said bath water pump through said microprocessor as said voice communication circuit is activated.

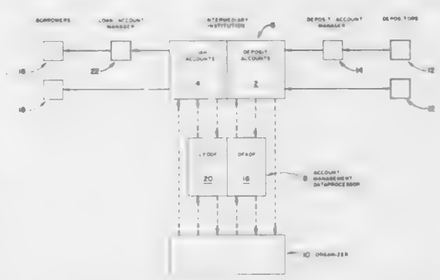
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**4,742,457**

## SYSTEM AND METHOD OF INVESTMENT MANAGEMENT INCLUDING MEANS TO ADJUST DEPOSIT AND LOAN ACCOUNTS FOR INFLATION

**Tomas Leon, and Lewis J. Spellman, both of Austin, Tex., assignors to Trans Texas Holdings Corporation, Austin, Tex.**

**Filed Aug. 27, 1985, Ser. No. 770,493**
**Int. Cl.⁴ G06F** *15/30*
**U.S. Cl. 364—408** **40 Claims**



1. A system for managing deposit and loan accounts comprising:

a deposit account for a term, the deposit account being administered by an institution and having a deposit principal component and a deposit accrual component, the deposit accrual component having a fixed interest component and a variable interest component;

means for determining the rate of inflation;

means for determining the amount in the deposit accrual component, responsive to the rate of inflation;

means for enhancing the deposit principal component responsive to the variable interest component;

means for retiring the deposit account over the term, including

means for retiring the fixed interest component by a first schedule over the term; and

means for retiring the deposit principal component by amortization over the term;

a loan account for a term, the loan account being administered by the institution and having a loan principal component and a loan accrual component;

means for determining the amount in the loan accrual component; and

means for retiring the loan account over the term.

**4,742,458**

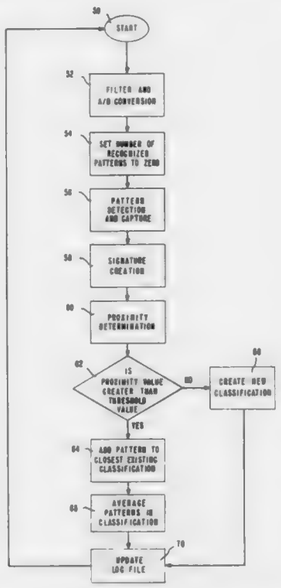
## METHOD AND APPARATUS FOR PERFORMING PATTERN RECOGNITION ANALYSIS

**Robert Nathans, Bellport; Salvador R. Bozzo, and Evan W. Rosen, both of East Setauket, all of N.Y., assignors to Software Plus, Inc., Setauket, N.Y.**

**Filed Oct. 29, 1985, Ser. No. 792,648**

**Int. Cl.⁴ G01R** *23/16*

**U.S. Cl. 364—417** **24 Claims**




1. A method of performing pattern analysis of a digital signal containing at least one waveform, comprising the steps of:

detecting a fiducial point of each waveform of said digital signal, said step of detecting said fiducial point of each waveform including the step of detecting a segment of the respective waveform, which segment has a slope with an absolute value greater than a trigger value, said step of detecting a segment including the steps of forming a delta value for each sampling point of said digital signal by subtracting the value of each sampling point from the value of the sampling point occurring m sampling points previous thereto, determining the average of n highest differences in values between consecutive sampling points in a predetermined interval of said digital signal, obtaining said trigger value based on said average, and detecting a first sampling point having a delta value at least equal to said trigger value as said fiducial point, where m an n are integers;

capturing at least two characteristic features of each waveform of said digital signal;

creating a signature for each waveform based on said captured at least two characteristic features of each waveform;

determining a closest proximity of said signature to one classification of at least one previously determined classification of signatures;

creating a new classification with said signature if said closest proximity has a value less than a predetermined threshold value; and

adding said signature to said one classification if said closest proximity has a value at least equal to said predetermined threshold value.

**4,742,459**

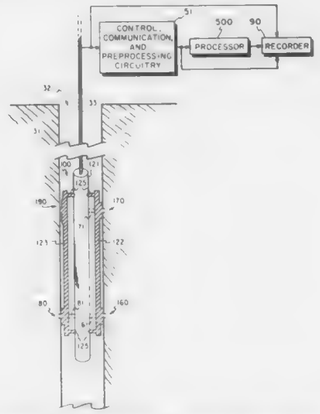
## METHOD AND APPARATUS FOR DETERMINING HYDRAULIC PROPERTIES OF FORMATIONS SURROUNDING A BOREHOLE

**Thomas J. Lasseter, Setagaya, Japan, assignor to Schlumber Technology Corp., New York, N.Y.**

**Filed Sep. 29, 1986, Ser. No. 913,035**

**Int. Cl.⁴ E21B** *47/00, 49/00;* **G06F** *15/20*

**U.S. Cl. 364—422** **40 Claims**




19. Apparatus for determining a hydraulic property of formations surrounding a borehole, comprising:

a logging device moveable through the borehole, said logging device including a source probe and at least one observation probe, said source and observation probes being adapted for contact with the borehole wall;

means for withdrawing fluid from said formations at said source probe;

means for measuring formation pressure response at said source probe and said observation probe as a function of time;

means for selecting a trial value of said hydraulic property of formations;

means for deriving a computed formation pressure response, as a function of time, at said source and observation probes, using said trial value of the hydraulic property;

means for determining the error between the computed formation pressure response at said source and observation probes and the measured formation pressure response at said source and observation probes;

means for modifying the trial value of said hydraulic property; and

means for controlling repetitive operation of said selecting means, deriving means, determining means and modifying means to reduce said error, the ultimately modified trial value representing the determined value of the hydraulic property.

**4,742,460**

## VEHICLE PROTECTION SYSTEM

**Roger D. Hollands, Chippenham, England, assignor to Westinghouse Brake and Signal Company Ltd., United Kingdom**

**Filed May 20, 1985, Ser. No. 736,210**

**Claims priority, application United Kingdom, May 24, 1984, 8413524**

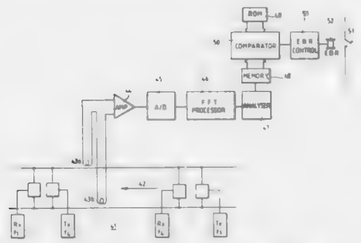
**Int. Cl.⁴ B61L** *3/00*

**U.S. Cl. 364—424** **13 Claims**

1. A vehicle protection system including a vehicle confined to move within said system, which said system comprises:

at least first and second pathways along which said vehicle can travel, multiple electronic circuit sections contiguously positioned along each of said pathways, each of said sections of said first and second pathways having associated therewith a transmission means which are operable for generating and transmitting a signal of a predetermined frequency, with all of said transmission means associated with said first pathway generating and transmitting frequencies in accordance with a first defined sequence of frequencies and all of said transmission means associated with said second pathway generating and transmitting frequencies in accordance with a second defined sequence of frequencies, with said first and second sequence of frequencies being distinguishable from each other;

a third pathway along which said vehicle can travel connected between said first and second pathways, one or more electronic circuit sections contiguously positioned along said third pathway, each of said sections of said third pathway having associated therewith a transmission means which are operable for generating and transmitting



a signal of a predetermined frequency, with all of said transmission means associated with said third pathway generating and transmitting frequencies in accordance with a third defined sequence of frequencies, with said third defined sequence of frequencies being distinguishable from said first and second defined sequence of frequencies; and

a signal receiver and control means carried by said vehicle for receiving said signals transmitted by said transmission means, said signal receiver and control means including a programable means for maintaining a list of said first, second and third defined sequences of frequencies and a means for comparing said sequence of frequencies being received from said transmission means with said list of said sequence of frequencies, with said receiver and control means further being operable for activating a safety function when said received sequence of frequencies is other than one of said sequence of frequencies of said list.



**4,742,461**

## METHOD OF CONTROLLING FRICTIONALLY ENGAGEABLE COUPLINGS OF AN AUTOMATIC TRANSMISSION OF A MOTOR VEHICLE

**Gerhard Eschrich, Gerlingen; Achim Schreiber, Schwieberdingen, and Manfred Schwab, Gerlingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Sep. 30, 1985, Ser. No. 782,052**

**Claims priority, application Fed. Rep. of Germany, Oct. 3, 1984, 3436190**

**Int. Cl.⁴ B60K** *41/08;* **G05D** *13/02, 17/02*

**U.S. Cl. 364—424.1** **34 Claims**

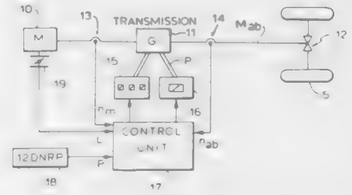
1. Method of electrically controlling an automatic stepwise-operable transmission of a motor vehicle, in which transmission gear shifting is performed by an electrically controllable, hydraulically actuatable and frictionally engageable coupling by use of a pressurized hydraulic medium, comprising the steps of:

storing at least one predetermined reference value of a characterizing magnitude for gear shifting operations, which magnitude is dependent on the duration of slip between frictional elements of a said frictionally engageable coupling;

measuring actual values of said characterizing magnitude;

comparing each said actual value of said characterizing magnitude with a said stored reference value of said characterizing magnitude and deriving therefrom at least one correction value for said at least one reference value and storing said at least one correction value;

modifying the pressure of said hydraulic medium to an extent determined by the magnitude of said at least one




correction value in a sense determined by the sign of said at least one correction value for bringing said actual values of said characteristic magnitude closer to said at least one reference value of said characteristic magnitude, and

thereafter actuating said hydraulically actuatable couplings by said hydraulic medium at said modified pressure determined by a said stored correction value.

**4,742,462**

## APPARATUS FOR CONTROLLING IDLING OPERATION OF AN INTERNAL COMBUSTION ENGINE

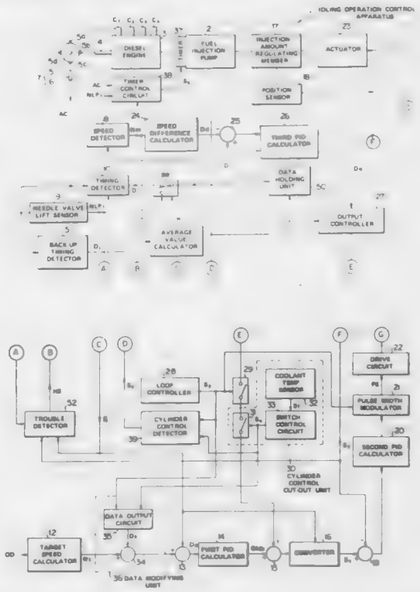
**Kyoichi Fujimori, and Akira Sekiguchi, both of Higashimatsuyama, Japan, assignors to Diesel Kiki Co., Ltd., Japan**

**Filed Sep. 23, 1985, Ser. No. 779,222**

**Claims priority, application Japan, Sep. 22, 1984, 59-197779; Mar. 12, 1985, 60-047409; Mar. 12, 1985, 60-047410; Mar. 12, 1985, 60-047411; Mar. 12, 1985, 60-047412; Mar. 12, 1985, 60-047413**

**Int. Cl.⁴ F02D** *1/02, 41/16;* **F02M** *51/00*

**U.S. Cl. 364—431.08** **17 Claims**




1. In an apparatus for controlling the idling operation of an internal combustion engine including a closed-loop control system having a first output means for producing an average

speed data indicating an average engine speed of a multi-cylinder internal combustion engine, a second output means for producing a target speed data indicating a predetermined target idling engine speed, a first calculating means responsive to said average speed data and said target speed data for producing a first control data relating to the fuel amount to be supplied to said engine so as to obtain said target idling engine speed, and a controlling means responsive to said first control data for controlling a speed regulating means so as to carry out the closed loop control for the idling engine speed; comprising:

a detecting means for producing an operation timing signal of said engine;

a first means responsive to the timing signal from said detecting means for producing a first data relating to outputs of respective cylinders of said engine;

a second means responsive to said first data for repeatedly calculating and producing a differential data for each of the cylinders in succession, the differential data being indicative of the difference between the output of the respective cylinder and the output of a reference cylinder which is predetermined for each cylinder;

a second calculating means responsive to said differential data for calculating and producing a second control data relating to the fuel amount necessary for nullifying the difference indicated by the differential data;

an output control means responsive to the result of the said detecting means for outputting said second control data at a predetermined timing before the subsequent regulation of fuel for each of the cylinders; and

a third means for supplying said second control data to said closed-loop controlling means, wherein said controlling means operates to control said speed regulating means in response to said first and second control data.

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**4,742,463**

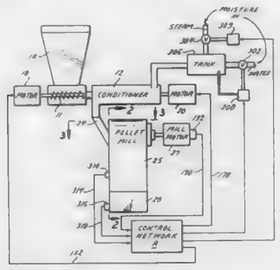
**METHOD AND APPARATUS FOR A PELLET MILL CONTROLLER WITH DIE TEMPERATURE CONTROL**

**Joseph A. Volk, Jr., Creve Coeur, Mo., assignor to Beta Raven Inc., Earth City, Mo.**

**Continuation-in-part of Ser. No. 810,060, Dec. 17, 1985. This application Dec. 24, 1985, Ser. No. 813,244**

**Int. Cl.⁴ G06F *15/46***

**U.S. Cl. 364—468** **69 Claims**




1. An automatic control system for a pelleting apparatus, the pelleting apparatus including a pellet producing means, and means for feeding a supply of a plurality of ingredients to the producing means, one of the ingredients being material and at least one other ingredient having a significant moisture content, the pellet producing means including a rotating die contained within a chamber, the die having a plurality of holes through which a mixture of said ingredients is passed to form pellets, the control system including at least one temperature sensing means, said temperature sensing means being mounted to the pellet producing means to sense the temperature of the die, and means to control the ingredient feeding means in response to said temperature sensing means.

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**4,742,464**

**METHOD OF MAKING A PROSTHESIS, ESPECIALLY A DENTAL PROSTHESIS**

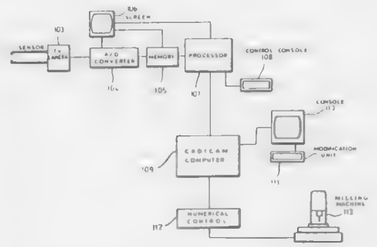
**Francois Duret, Rue Paul Claudel, Le Grand Lemps (Isere), and Christian Termoz, 2, Place Victor Hugo, Grenoble (Isere), both of France**

**Division of Ser. No. 673,655, Nov. 21, 1984, Pat. No. 4,663,720, which is a continuation-in-part of Ser. No. 580,776, Feb. 21, 1984, abandoned, which is a continuation of Ser. No. 262,905, May 12, 1981, abandoned, which is a continuation-in-part of Ser. No. 485,059, Apr. 14, 1983, Pat. No. 4,611,288. This application Sep. 3, 1986, Ser. No. 903,595**

**The portion of the term of this patent subsequent to Sep. 9, 2003, has been disclaimed.**

**Int. Cl.⁴ G06F *15/00*; A61C *9/00***

**U.S. Cl. 364—474** **5 Claims**




1. A method of producing a prosthesis of an organ at a determined organ site, comprising the steps of:

creating an interference pattern containing site data corresponding to a three-dimensional view of said organ site;

scanning said interference pattern to produce digital site data;

processing said digital site data to create machine tool data; and

machining said prosthesis to fit said organ site directly under control of said machine tool data.

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**4,742,465**

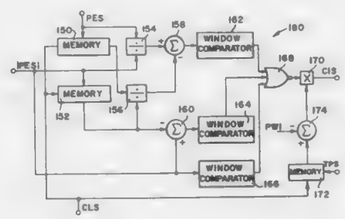
**CONTROL SYSTEM FOR DOSER ACTUATOR HAVING IMPROVED RESOLUTION**

**James M. Eastman, South Bend, Ind., assignor to Allied Corporation, Morristown, N.J.**

**Filed Dec. 23, 1985, Ser. No. 812,050**

**Int. Cl.⁴ G05B *11/01*; F15B *9/09***

**U.S. Cl. 364—167** **6 Claims**




1. In a closed loop control system for an electro-hydraulic actuator having means for generating a position signal representative of the position thereof and being movable in response to a time modulated pulse signal generated as a function of said position signal and a repeating clock signal, said pulse signal being based upon an error signal schedule representative of the difference between the actuator position and a requested actuator position, the time modulated pulse signal including a first threshold component and an error component proportional to said error signal, an augmenter signal generating circuit comprising: first comparator means for sensing non-movement of said actuator in response to a said pulse signal, first threshold correction signal generating means for generating a correction signal proportional to said error signal, said first threshold correction signal generating means including a storage circuit connected to receive and store the output from said control system, and a second summing circuit means being connected to subtract said first threshold component from said stored output for generating said threshold correction signal and first summing circuit means for adding said threshold correction signal to said pulse signal to generate a corrected pulse signal.



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**4,742,466**

**SYSTEM FOR MEASURING PATH COVERAGE REPRESENTED BY THE DEGREE OF PASSAGE OF EXECUTION PATHS IN A PROGRAM**

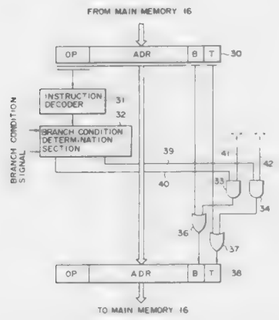
**Masao Ochiai, and Masaharu Nozaki, both of Tokyo, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Feb. 27, 1986, Ser. No. 833,595**

**Claims priority, application Japan, Feb. 28, 1985, 60-39301; Feb. 28, 1985, 60-39302**

**Int. Cl.⁴ G06F *1/00***

**U.S. Cl. 364—200** **6 Claims**




1. A path coverage measuring system, comprising:

a main memory;

a central processing unit connected to said main memory;

means connected to said main memory and said central processing unit for generating a load module, which includes conditional branch instructions each having a flag field which is set to a first state when control has been branched and which is set to a second state when control has been passed without branching;

means connected to said main memory for loading the load module in said main memory as an executable program;

decoding/executing means provided in said central processing unit and connected to said main memory, for decoding an instruction from said main memory, and for changing, when the instruction is a conditional branch instruction, the state of the flag field in the conditional branch instruction, in accordance with a branch condition of the conditional branch instruction; and

means connected to said main memory and said means for loading the load module, for rewriting part or all of the program into the load module, and obtaining a path coverage measurement from the load module after execution, when part or all of the program is unloaded from said main memory.

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**4,742,467**

**AUTOMATED PROGRAMMING SYSTEM FOR MACHINE CREATION OF APPLICATIONS PROGRAM SOURCE CODE FROM NON-PROCEDURAL TERMINAL INPUT**

**Patrick J. Messerich; Ian H. Abel, both of Minneapolis; Victor C. Benda, Edina; Charles E. Clark, Bloomington; Richard A. Ferrera, Burnsville, all of Minn.; Joe O. Ross, Birmingham, Ala.; Peter C. Patton, Cedar Park, Tex., and George E. Sundem, Fridley, Minn., assignors to Analysts International Corporation, Minneapolis, Minn.**

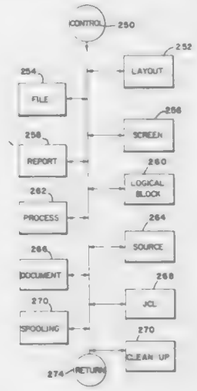
**Continuation of Ser. No. 607,238, May 4, 1984, abandoned. This application Oct. 9, 1986, Ser. No. 917,296**

**Int. Cl.⁴ G06F *9/00, 11/00***

**U.S. Cl. 364—200** **10 Claims**

**MICROFICHE APPENDIX INCLUDED**

**(21 Microfiche, 1968 Pages)**




5. An automated method for developing application programs from user input of non-procedural information describing the application via a terminal to create an application program for a general purpose computer, comprising:

(a) defining data processing functions and decision branches, input and output, and overall procedural flow governing the application program being created by use of interconnected graphic symbols input by the user at the terminal;

(b) defining data files supporting the application program being created, the organization of the data files, and how the data will be referenced by data element name in the data files;

(c) defining the format of display presentations providing a human interface to the application program being created, the input and output characteristics of the display presentations, and the source of the data to be used;

(d) defining the format and content of reports produced by the application program being created and the source of data to be used in the reports; and

(e) interactively modifying the above steps at the terminal as required;

(f) defining the detailed procedural flow of the application program being created, including:

(i) defining the criteria for taking a particular path at each of the decision branches in the application program being created,

(ii) defining where to obtain the various data elements of the application program being created,

(iii) defining the order of the input and output directives required by each of the processing functions of the application program being created; and

(iv) defining how each data element assigned to the processing functions is to be valued; and

(g) creating the source code of the application program being created in a procedural, human readable high-level

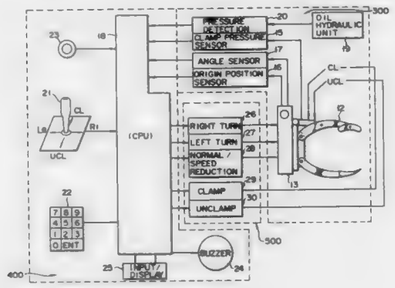
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programmer oriented language from the information provided by the preceding steps.

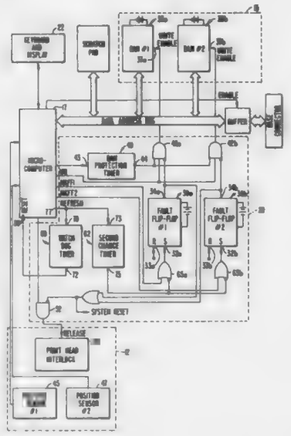
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**4,742,468**
**LIFT TRUCK CONTROL SYSTEM**
**Akira Ohashi, Isehara; Yoshiaki Nishimura, Zama, and Akio Kurakata, Machida, all of Japan, assignors to Yamate Industrial Co., Ltd., Sagamihara, Japan**
**Filed Jun. 16, 1986, Ser. No. 875,053**
**Int. Cl.[4] G06F *15/20*; B66F *9/06***
**U.S. Cl. 364—424** **9 Claims**




1. A lift truck control system comprising:
a clamp for clamping an object to be transported at a controllable pressure;
a rotator for rotating said clamp by a controllable amount;
clamp pressure sensor means, coupled to said clamp, for detecting a clamp pressure data, indicative of a pressure with which said object to be transported is clamped by said clamp;
angle sensor means for detecting a rotator angle data indicative of a rotational angle of said rotator from a reference angle position;
pressure memory means for storing a plurality of clamp pressure data to be set for said clamp, in a plurality of memory areas;
angle memory means for storing a plurality of rotator angle data to be set for said rotator, in a plurality of memory areas;
selector means for selecting one of said plurality of memory areas of said pressure memory means and one of said plurality of memory areas of said angle memory means;
readout means for, in a selection mode, reading out clamp pressure data and rotator angle data from said selected memory areas of said pressure memory means and said angle memory means respectively;
command generating means for generating a clamp command to said clamp, and generating turn commands which include right turn and left turn commands; and
control means, responsive to said clamp command from said command generating means and coupled to said readout means, for comparing said clamp pressure data, read out by said readout means, with said detected clamp pressure data detected by said clamp pressure sensor means and adjusting a pressure of said clamp to have a clamp pressure equal to said readout clamp pressure, and responsive to said turn commands from said command generating means, for comparing said rotator angle data read out by said readout means with said detected rotator angle data detected by said angle sensor means and adjusting an angle of said rotator by commanding said rotator to rotate to an angular position equal to the readout rotator angle.

**4,742,469**
**ELECTRONIC METER CIRCUITRY**
**John G. Haines, Oakland; Albert L. Pion; Elizabeth A. Simon, both of Berkeley, and Christopher M. Mayer, San Mateo, all of Calif., assignors to F.M.E. Corporation, Hayward, Calif.**
**Filed Oct. 31, 1985, Ser. No. 795,139**
**Int. Cl.[4] G06F *15/20, 12/14, 12/16***
**U.S. Cl. 364—466** **8 Claims**




1. In an electronic postage meter having a programmed microcomputer and a functionally non-volatile memory coupled thereto for storing accounting data, the improvement comprising:
timer means, having a trigger input coupled to the microcomputer and having an output coupled to the memory, for preventing writing into the memory except during a predetermined interval following the receipt of a triggering signal at said trigger input;
the microcomputer being programmed to initiate the issuance of said triggering signal to said timer means only immediately prior to the microcomputer's executing an instruction to write into the memory;
said predetermined interval being sufficiently long to permit execution of said instruction to write into the memory, but not significantly longer, whereupon writing to the memory is normally possible only during normal operation and only when occurring under control of said microcomputer.

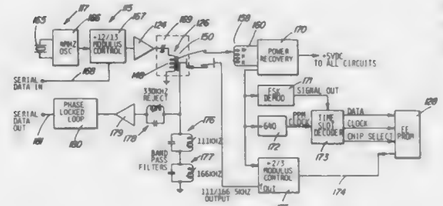
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**4,742,470**
**TOOL IDENTIFICATION SYSTEM**
**Richard O. Juengel, Romeo, Mich., assignor to GTE Valeron Corporation, Troy, Mich.**
**Continuation-in-part of Ser. No. 814,464, Dec. 30, 1985. This application Jul. 25, 1986, Ser. No. 890,187**
**Int. Cl.[4] G06F *15/46*; H04Q *9/00*; H04L *7/06***
**U.S. Cl. 364—474** **11 Claims**

1. A method comprising:
mounting a transponder in a tool, said transponder including a read/write memory having a unique identification code stored therein, the memory requiring clock, chip select, and data operation signals to be applied thereto for proper operation;
placing said tool in a temporary storage device;
wirelessly transmitting from a transceiver an encoded waveform containing sufficient power and encoded operation signals to the transponder to power and operate the memory, the waveform always at least including a repetitively generated clock code impressed therein;



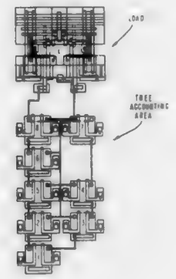
using the clock code impressed in the waveform received by the transponder to define a plurality of time slots;
sensing the waveform during said time slots for the presence of codes associated with said chip select and data signals;
applying decoded chip select, clock and data signals to the memory to read the identification code therein;

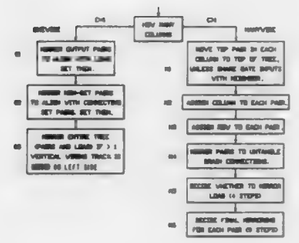



transmitting the identification code from the memory in the transponder to the transceiver;
comparing the identification code with preselected information; and
loading said tool into a machine for performing operations on a workpiece as a result of said comparison.

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**4,742,471**
**METHOD FOR IMPROVING WIRABILITY OF MASTER-IMAGE DCVS CHIPS**
**Ellen J. Yoffa, Mount Kisco, and Peter S. Hauge, Yorktown Heights, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**
**Filed Oct. 31, 1985, Ser. No. 793,595**
**Int. Cl.[4] G06F *15/60***
**U.S. Cl. 364—491** **10 Claims**

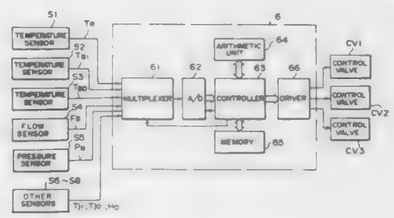


1. A method for improving the wirability of CMOS differential cascode voltage switch logic circuits, comprising a load and a plurality of differential switching pairs, which perform a predetermined Boolean logic function said method being operable to significantly reduce the number of wire crossings in the final logic circuit tree design and to allow as many of the internal tree connections as possible to be made using diffusion wiring, said method comprising; first arranging the tree circuit to be optimized in an input format with the load at the top of the individual differential pairs, arranging said differential pairs in row and column format, initially defining an interconnection wiring pattern dictated solely by the requirements of the Boolean function being performed by the circuit, with the load and all differential pairs arranged with true and complement input, and outputs on the same side,
next locating all of the differential pairs in rows corresponding to their logic level in the Boolean descriptions of the circuit,
next relocating certain differential pairs to shorten interconnections, and
next mirroring certain differential pairs to eliminate line crossings, and finally, mirroring the entire logic circuit so produced whereby input and output connections may be altered to enhance interfacing with adjacent circuitry.

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**4,742,472**
**METHOD AND APPARATUS FOR CONTROLLING POLYMERIZATION REACTION**
**Teruhiko Sugimori; Fumio Suzuki, and Naoyuki Fukahori, all of Hiroshima, Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan**
**Filed Apr. 22, 1985, Ser. No. 725,813**
**Claims priority, application Japan, May 24, 1984, 59-103663**
**Int. Cl.[4] G05D *7/00***
**U.S. Cl. 364—500** **3 Claims**




1. An apparatus for controlling a polymerization reaction comprising:
temperature-detecting means for detecting the temperature in a reactor;
measuring means for measuring a heat release value of polymerization in the reactor;
memory means for storing data representing a target polymerization rate and a degradation rate of a polymerization initiator, said degradation rate being a function of temperature;
computing means for calculating a correction value from predetermined quantities, said quantities including said detected temperature, said heat release value of polymerization, said target polymerization rate and said degradation rate of said polymerization intiator, said quantities being inputted to said computing means during a period equal to or larger than a short time interval, and wherein said short time interval corresponds to a period within which a degree of polymerization increases by 0.1% at said target polymerization rate; and
adjusttting means for adjusting the temperature inside said reactor over said short time interval on the basis of said correction value such that a polymerization rate is brought closer to said target polymerization rate, wherein said adjusting means comprises a reflux condenser heat-eliminating means for controlling a flow rate of monomer or a refrigerant by means of control valves in accordance with said correction value.

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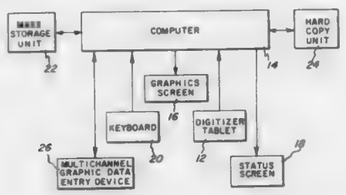


**4,742,473**

## FINITE ELEMENT MODELING SYSTEM

**Joel K. Shugar, 303 Nigara Falls Blvd., Buffalo, N.Y. 14226, and Robert k. Cohen, 244 Hansen Ave., Albany, N.Y. 12208**

**Filed Jul. 16, 1985, Ser. No. 755,683**
**Int. Cl.[4] G06F** *3/37*
**U.S. Cl. 364—518** **32 Claims**




1. Apparatus for facilitating user interaction with a computer aided design or modeling system in which a user makes selections among various processing modes from a menu and enters pictorial data, comprising:

a digitizer tablet having a work surface divided by a boundary into a graphics workspace for entering pictorial data and a menu region for selecting among various processing modes, pointing means which can be positioned at different locations on said surface by a user, and means for providing a position signal identifying the current location on the surface of the pointing means;

display means for displaying alphanumeric information on a status screen; and

computer means for monitoring the position signal from the digitizer tablet and determining from said signal whether the pointing means is entering the graphics workspace or menu region, the computer means in response to said determination controlling, in real time, the display means to automatically provide a menu display on the status screen indicative of modes available for selection by the user when the pointing means enters the menu region, and to substitute a mode-dependent status display for said menu display on said status screen when the pointing means enters the graphics workspace, whereby the display presented on the status screen is automatically correlated with the user's positioning of the pointing means across said boundary.

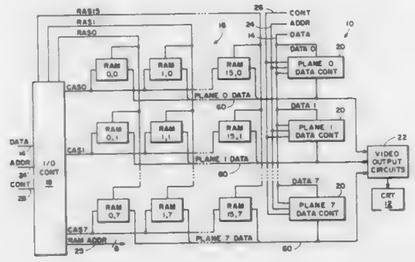
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**4,742,474**

## VARIABLE ACCESS FRAME BUFFER MEMORY

**David L. Knierim, Wilsonville, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.**

**Filed Apr. 5, 1985, Ser. No. 720,662**
**Int. Cl.[4] G11C** *8/00*
**U.S. Cl. 364—521** **9 Claims**




1. A frame buffer memory for storing a plurality of multi-bit pixel data words, comprising:

a memory unit array having a plurality of addressable memory units arranged in a plurality of planes, with a plurality of memory units per plane, the memory units of each of said memory unit planes storing one bit of each of said pixel data words; and

means for addressing memory units of one plane simultaneously without addressing other memory units of said memory unit array, and for alternatively addressing one memory unit in each plane simultaneously without addressing other memory units of said memory unit array.

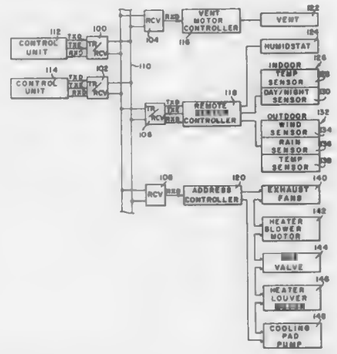
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**4,742,475**

## ENVIRONMENTAL CONTROL SYSTEM

**Frederick P. Kaiser, Orange, and Theodore R. Lapp, Mission Viejo, both of Calif., assignors to IBG International, Inc., Prairie View, Ill.**

**Continuation-in-part of Ser. No. 621,884, Jun. 19, 1984, Pat. No. 4,527,247, which is a continuation of Ser. No. 288,740, Jul. 31, 1981, abandoned. This application Sep. 26, 1984, Ser. No. 655,081**
**The portion of the term of this patent subsequent to Jul. 2, 2002, has been disclaimed.**
**Int. Cl.[4] G06F** *13/12;* **F24F** *7/00*
**U.S. Cl. 364—550** **21 Claims**




1. A control system for varying at least one controlled paramater to control the environment of a greenhouse structure with a plurality of remotely controlled elements, said control system comprising:

a programmed controller for communicating with the plurality of remotely controlled elements over an AC power line;

said programmed controller including a stored control program defining the state of operation of each of said remotely controlled elements during a plurality of parameter stages away from a set point value for said at least one controlled parameter, said control program regulating the operation of said remotely controlled elements during each stage in said defined states to move the actual value of said controlled parameter of the greenhouse toward said set point value;

means for determining the parameter stage corresponding to the actual value of said controlled parameter of the greenhouse; and

means for commanding said remotely controlled elements to operate in accordance with said stored program for said determined stage.

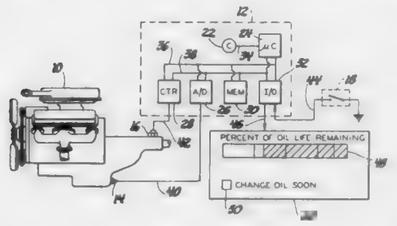


**4,742,476**

## AUTOMATIC ENGINE OIL CHANGE INDICATOR SYSTEM

**Ellen S. Schwartz, Warren; Donald J. Smolenski, St. Clair Shores, both of Mich.; Ann J. Wisehart, Goleta, and Trieu N. Nguyen, Lompoc, both of Calif., assignors to General Motors Corporation, Detroit, Mich.**

**Filed Jan. 27, 1986, Ser. No. 822,526**
**Int. Cl.[4] F01M** *11/10;* **G01N** *25/00*
**U.S. Cl. 364—550** **5 Claims**




1. In a motor vehicle having an engine containing lubricating oil which has a useful life that varies in accordance with engine operating conditions, a method for advising the operator of the vehicle of the need to change the oil, such method comprising the steps of:

periodically computing an effective usage amount in relation to a measure of the actual engine usage and a penalty factor which operates to increase the effective usage amount when the engine operating conditions tend to cause increased degradation of the engine oil, the penalty factor being determined as a sole function of the engine oil temperature as it relates to empirically determined data without regard to the engine load; and

accumulating said periodically computed effective usage amounts, and actuating an indicator for advising the operator that the engine oil should be changed when such accumulated usage amount reaches a predetermined value indicative that the useful life of the engine oil has been substantially attained.

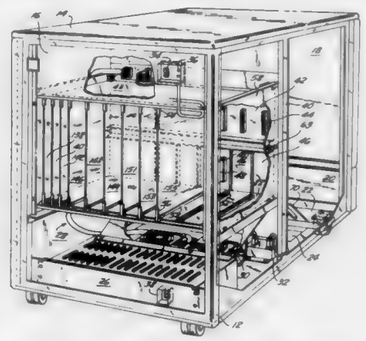
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**4,742,477**

## COMPUTER TERMINAL CONTROLLER AND METHOD

**Darwin E. Phillips; Robert M. DuRoss; Walter J. Conroy, all of Huntsville; Joseph T. Betterton, Jr., Arab, and Alfred H. Glover, Decatur, all of Ala., assignors to SCI Systems, Inc., Huntsville, Ala.**

**Filed Aug. 20, 1984, Ser. No. 642,438**
**Int. Cl.[4] G06F** *1/00;* **H02B** *1/00;* **H05K** *1/14, 7/08*
**U.S. Cl. 364—708** **19 Claims**



1. In a controller device for controlling the transmission of signals between a plurality of input-output ("I/O") terminal devices and a central processing unit ("CPU"), said controller device including a housing, and multiplexing means mounted in said housing for sequentially conducting signals between each of said I/O terminal devices and said CPU, the improvement consisting of a panel which mounts easily on said controller device, a plurality of I/O device connectors mounted on said panel, coupling means in said housing for connecting said I/O device connectors to said multiplexing means, a circuit card holder for holding a circuit card bearing a portion of the circuitry of said multiplexing means needed for adding the I/O device connectors on said panel to said controller device, means for mounting said panel in said housing in alignment with said card holder, and plug coupling means for electrically connecting said circuit card to said panel.

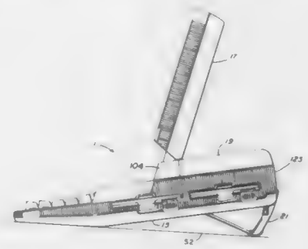
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**4,742,478**

## HOUSING FOR A PORTABLE COMPUTER

**Arthur R. Nigro, Jr., Hopkinton, and Marcel Boudreau, Warren, both of Mass., assignors to Data General Corporation, Westboro, Mass.**

**Filed Sep. 19, 1984, Ser. No. 652,219**
**Int. Cl.[4] G06F** *1/00;* **H05K** *5/00;* **A47B** *21/00*
**U.S. Cl. 364—708** **16 Claims**



1. A portable computer comprising:

a. a housing for resting on a surface, said housing including a base, a front top cover, a rear top cover and a foot door, said base including a bottom wall having a generally flat front section and a generally flat rear section, said generally flat front section being angled relative to said generally flat rear section, said rear top cover being secured to said base, said front top cover being pivotally mounted on said rear top cover, said foot door being mounted on said generally flat rear section and movable from a closed position to an open position for selectively tilting said housing in a forwardly direction, said computer being usable in both said tilted and said untilted positions and resting on said generally flat rear section of said bottom wall when in an untilted position and on said generally flat front section of said bottom wall and said front door when in a tilted position,

b. computer electonic circuitry in said housing,

c. disk drive means in said housing,

d. a keyboard in said housing, and

e. a display monitor in said housing.

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**4,742,479**

## MODULO ARITHMETIC UNIT HAVING ARBITRARY OFFSET AND MODULO VALUES

**Kevin L. Kloker, Arlington Heights, and Miles P. Posen, Chicago, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Mar. 25, 1985, Ser. No. 715,864**
**Int. Cl.[4] G06F** *7/72*
**U.S. Cl. 364—746** **14 Claims**

1. A modulo arithmetic unit for providing an output number as a sum of first and second input numbers, said first input number and output number being within a predetermined

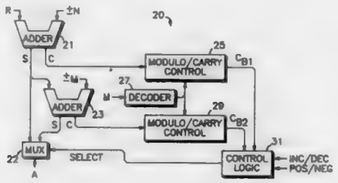
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range having an upper and a lower boundary relative to a selected one of a plurality of predetermined modulus numbers, said second number being positive and having an absolute value less than or equal to the selected modulus number, and said sum approaching or wrapping around the upper boundary, comprising:

first adder means having inputs for selectively receiving the first and second input numbers and adding the first and second input numbers, said first adder means providing a sum number and at least one carry bit of a first carry signal, said sum number representing the linear arithmetic sum of the first and second input numbers;

second adder means having inputs for selectively receiving the first sum number and a range number related to the




selected modulus number and subtracting the range number from the first sum number, said second adder means providing a difference number and at least one bit of a second carry signal, said difference number representing the modulo arithmetic sum of the first and second input numbers; and

control means coupled to both the first and second adder means, for selectively receiving the first and second carry signals, and selectively detecting, in response to the selected modulus number and the first and second carry signals, a wraparound of the upper boundary resulting from the sum of the first and second input numbers to select one of the linear arithmetic sum or the modulo arithmetic sum as the output number.

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**4,742,480**

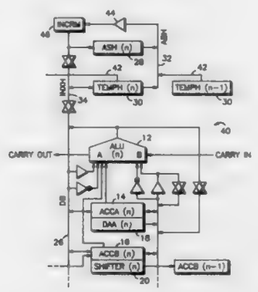
**CYCLE COUNTER/SHIFTER FOR DIVISION**

**Herchel A. Vaughn; Kuppuswamy Raghunathan, and Philip S. Smith, all of Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Jun. 6, 1985, Ser. No. 741,914**

**Int. Cl.[4] G06F** *7/52, 7/38*

**U.S. Cl. 364—764** **6 Claims**




1. In a data processor comprising a central processing unit wherein the central processing unit comprises an address incrementer comprising a plurality of adjacent bit slices, each of said bit slices comprising an address store register and a temporary register, both the address store register and the temporary register connected to an address bus and a data bus, where said address store register and said temporary register are both normally idle during a division operation, the improvement comprising a shift left path from an output of the temporary register of a bit to the address bus of an adjacent bit to permit a number to be shifted to the temporary register of the adjacent bit, which is one shift left cycle, and means for permitting the address store register to count shift left cycles in the temporary register during a divide operation, thereby permitting the absence of a dedicated counter normally used to count shift left cycles during a divide operation.

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**4,742,481**

**ELECTRONIC DICTIONARY HAVING MEANS FOR LINKING TWO OR MORE DIFFERENT GROUPS OF VOCABULARY ENTRIES IN A CLOSED LOOP**

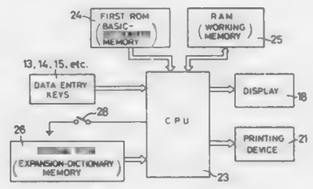
**Motokazu Yoshimura, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Aichi, Japan**

**Filed Apr. 10, 1985, Ser. No. 721,805**

**Claims priority, application Japan, Apr. 13, 1984, 59-75391; Apr. 13, 1984, 59-75392; Apr. 13, 1984, 59-75393; Apr. 19, 1984, 59-79578**

**Int. Cl.[4] G06F** *15/02, 15/40*

**U.S. Cl. 364—900** **15 Claims**




1. An electronic dictionary comprising:

(a) a dictionary memory having a multiplicity of data memory locations identified by respective addresses wherein:

each of said data memory locations comprises a vocabulary memory location and a corresponding address memory location;

said vocabulary memory locations store different vocabulary entries, said vocabulary entries including plural groups of related vocabulary entries and at least one of said related vocabulary entries of each of said groups constituting a corresponding at least one linking vocabulary entry for the corresponding group, each of said linking vocabulary entries being related to a corresponding other of said groups; and wherein, for each of said groups:

each of said corresponding address memory locations for said related vocabulary entries not constituting said at least one linking vocabulary entry of the group stores data designating the address number of the vocabulary memory location at which is stored a predetermined different vocabulary entry of the group which is next to be retrieved; and

the corresponding at least one address memory location for said at least one linking vocabulary entry of the group stores linking data for use in retrieving a predetermined vocabulary entry from said corresponding other of said groups;

(b) input means for designating one of said different vocabulary entries;

(c) search means responsive to said input means for locating the vocabulary memory location at which the vocabulary entry designated by said input means is stored;

(d) retrieval means responsive to said search means for (i) first retrieving the data stored in the corresponding address memory location for said vocabulary memory location located by said search means; and (ii) second retrieving, if said first or subsequently retrieved data is address-number data, the vocabulary entry stored in the vocabulary memory location designated by the retrieved address-number data; and further retrieving the data stored in the corresponding address memory location for the retreived vocabulary entry;

(e) group-linking means responsive to said retrieval means for linking, if said first or subsequently retrieved data is linking data, the currently retrieved group of vocabulary entries with a different group by (i) designating, based on the retrieved linking data, the address number of the vocabulary memory location for said predetermined vocabulary entry from said corresponding other of said groups which is associated with the retrieved linking data; and (ii) causing said retrieval means to retrieve said predetermined vocabulary entry from said corresponding other of said groups; and

(f) display means for displaying each vocabulary entry retrieved by said retrieval means.



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**4,742,482**

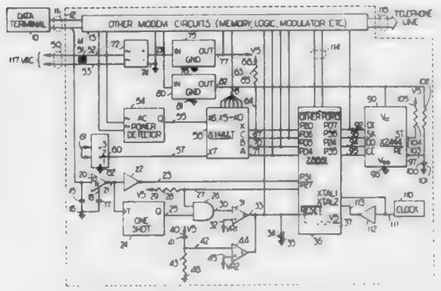
**MODEM CONTROLLER**

**Jeffrey Inskeep, Roswell, and George R. Thomas, Marietta, both of Ga., assignors to Hayes Microcomputer Products, Inc., Norcross, Ga.**

**Filed Oct. 29, 1985, Ser. No. 792,520**

**Int. Cl.[4] G06F** *11/00, 13/00*

**U.S. Cl. 364—900** **28 Claims**




16. Initialization apparatus providing for the automatic forcing of a modem into a predetermined operating state in the event of excessive transients on the output voltage of the power supply of said modem, comprising in combination:

power supply means for providing operating voltage and current to said modem;

high pass filter means connected to said power supply means for providing a filtered transient output signal;

comparator means responsive to said filtered transient output signal and to a first predetermined reference voltage for providing a reset pulse of a predetermined minimum duration; and

control means for controlling the operation of said modem and responsive to said reset pulse for forcing said control means and said modem into said predetermined operating state independent of the present operating state of said control means and said modem.

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**4,742,483**

**LASER PRINTER MAINTENANCE SYSTEM**

**Brian R. Morrell, Randolph, Mass., assignor to Minolta Camera Company, Ltd., Osaka, Japan**

**Filed May 14, 1985, Ser. No. 733,943**

**Int. Cl.[4] G06F** *15/16, 11/00;* **G03G** *15/00*

**U.S. Cl. 364—900** **12 Claims**

1. A multiprocessor controlled laser printer comprising:

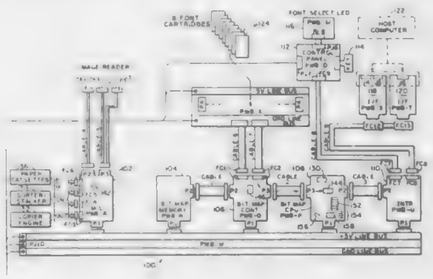
a printer engine for providing laser printed outputs;

modular memory means which include at least one of font data and program data, said program data comprises at least one of an operating system program and a maintenance program, and further including data for identifying said data corresponding to the font data, operating system program data and maintenance program data, respectively;

a bitmap memory;

a printer engine controller processor, which is connected to said printer engine, for controlling said printer engine in accordance with the data included in said modular memory means;

a controller processor, which is connected to said modular memory means and said bitmap memory, for controlling




said bitmap memory and for selectively reading said modular memory means;

common random access memory connected to both said controller processor and said printer engine controller processor providing an exchange of data therebetween; and wherein

said printer engine, said printer engine controller processor, said bitmap memory, and said controller processor for said bitmap memory are operative in response to said maintenance program.

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**4,742,484**

**DATA TRANSMISSION APPARATUS HAVING TWO UNIDIRECTIONAL TRANSMISSION CONNECTION LINES TRANSMITTING DATA FROM SLAVE STATIONS LOCATED DOWNSTREAM TO A MASTER STATION AT HIGH SPEED**

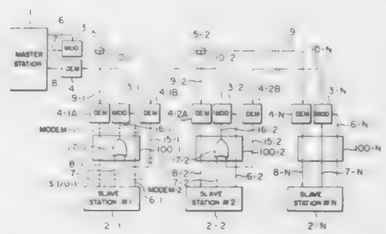
**Takao Yanai, Hitachi; Yoshiaki Takahashi, Mito, and Toshio Ozawa, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Dec. 31, 1984, Ser. No. 687,766**

**Claims priority, application Japan, Dec. 29, 1983, 58-248153**

**Int. Cl.[4] G06F** *3/00*

**U.S. Cl. 364—900** **13 Claims**




1. A data transmission apparatus of a multi-point connection type including a master station connected to a downstream transmission medium through a master modulating means, and a plurality of slave stations each connected to said downstream transmission medium through a respective first slave demodulating means, said master station having means for transmitting a call signal to one of said slave stations through said downstream transmission medium, each slave station also being connected to an upstream transmission medium through re-

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spective slave modulating means, said master station being connected to said upstream transmission medium through a master demodulating means, and each slave station having means for transmitting a response signal through said upstream transmission medium to said master station, said data transmission apparatus further comprising second slave demodulating means provided at each slave station, said upstream transmission medium being connected at one end to said master demodulating means and being arranged to connect in series said slave modulating means of a slave station to said second slave demodulating means of an adjacent upstream slave station, so that a carrier wave propagating on said upstream transmission medium is demodulated in each slave station and then remodulated before being sent to the adjacent upstream slave station to always maintain said carrier wave in an on-state during the period said apparatus remains activated.

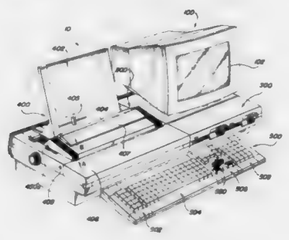
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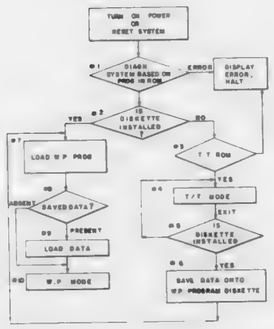
**4,742,485**

## WORD PROCESSOR WITH TYPE THROUGH MODE

**Vincent Carlson, Lexington; Michael N. Fenlon, Newton; Robert P. Mansur, Chelmsford, and Ronald H. Kadomiya, Cambridge, all of Mass., assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed Jul. 9, 1984, Ser. No. 628,733**
**Int. Cl.⁴ G06F *15/20***
**U.S. Cl. 364—900** **4 Claims**






1. A word processor having
a display device for displaying a full or partial page of information about an image, such as characters to be printed,
a keyboard for entering the information to be displayed on the display device,
a first storage device for storing the information displayed on the display device,
a printer that performs its printing operation according to the information stored in the first storage device,
a second storage device in which a storage medium storing a given program for word processing is detachably installed, and
a control unit means including said first storage device and connected to said display device, said keyboard, said printer and said second storage device for controlling external devices including the display device, the keyboard, and the printer according to the program, said control unit comprising:
a discriminating means for ascertaining whether the storage medium is installed in the second storage device when the power supply of the word processor is put into operation; and
a mode control means for selecting a type through mode in which signals are processed in response to the input from the keyboard to permit the printer to perform its printing operation in quick response to the input from the keyboard when the discriminating means has ascertained that the storage medium is not installed; and
wherein, when the printer is controlled in the type through mode and the storage medium is thereafter installed in the second storage device, said control unit means causes the information which was entered by means of the keyboard in the type through mode to be stored in the second storage device in a word processing mode in which the word processor obeys the given program stored in the storage medium.

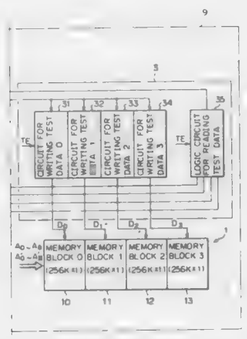
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**4,742,486**

## SEMICONDUCTOR INTEGRATED CIRCUIT HAVING FUNCTION FOR SWITCHING OPERATIONAL MODE OF INTERNAL CIRCUIT

**Yoshihiro Takemae, Tokyo; Shigeki Nozaki, Kuwana; Masao Nakano, Kawasaki; Kimiaki Sato, Tokyo, and Nobumi Kodama, Kawasaki, all of Japan, assignors to Fujitsu Limited, Kanagawa, Japan**

**Filed May 8, 1986, Ser. No. 861,199**
**Claims priority, application Japan, May 11, 1985, 60-098890**
**Int. Cl.⁴ G11C *13/00***
**U.S. Cl. 365—189** **9 Claims**




1. A semiconductor integrated circuit comprising:
an internal circuit;
means for receiving an externally generated chip select signal;
means for receiving an externally generated input signal; and
a voltage detecting circuit for detecting whether or not the potential of said input signal is higher than a predetermined reference potential, said voltage detecting circuit comprising:
a first means for differentially comparing the potential of said input signal with said predetermined reference potential and generating a predetermined output potential in accordance with the results of the comparison,
a second means for detecting a predetermined edge of said chip select signal so as to trigger said first means, and
a third means for latching said output potential of said first means to said third means when said first means is triggered by said second means;
said internal circuit being switched from a first mode of operation to a second mode of operation, or vice versa, in accordance with the output potential of said third means.



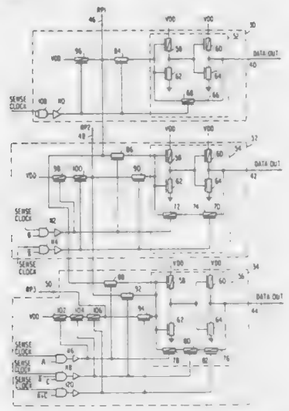
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**4,742,487**

## INHIBIT AND TRANSFER CIRCUITRY FOR MEMORY CELL BEING READ FROM MULTIPLE PORTS

**Kerry Bernstein, Underhill, Vt., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Apr. 15, 1986, Ser. No. 852,465**
**Int. Cl.⁴ G11C *7/00***
**U.S. Cl. 365—189** **8 Claims**



1. An electronic inhibit and transfer circuit for allowing an output port of an electronic read circuit to selectively output a memory signal present on a selected one of a plurality of bit lines, said inhibit and transfer circuit comprising:
a sense latch;
a respective bit line precharge means, coupled to each bit line for precharging said each bit line;
a respective port select means disposed between each bit line and said sense latch; and
clocked control means, responsive to address comparison signals, for applying control pulses to both a bit line precharge means and a port select means which are associated with a selected bit line, said control pulses being applied to said bit line precharge means to stop a precharging operation, and to said port select means to couple the selected bit lines to said sense latch.

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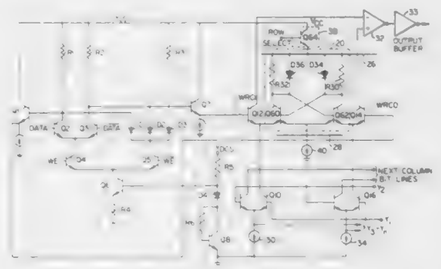
**4,742,488**

## SENSE AMPLIFIER/WRITE CIRCUIT FOR SEMICONDUCTOR MEMORIES

**Thomas H. Wong, Sunnyvale, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.**

**Continuation of Ser. No. 436,743, Oct. 25, 1982, abandoned. This application Jul. 8, 1986, Ser. No. 883,357**
**Int. Cl.⁴ G11C *7/00***
**U.S. Cl. 365—189** **6 Claims**

1. A memory circuit having a circuit supply voltage and a circuit ground, the circuit comprising:
a memory cell; and
a sense amplifier circuit for read/write control of the memory cell, the sense amplifier circuit comprising:
a reference current source;
a write enable transistor providing a data write path and including an emitter terminal connected to said current source, a base terminal providing a write enable select, and a collector terminal;
first and second data select transistors within said write path and including respective first and second emitter terminals connected to the collector of said write enable transistor;
said first data select transistor having a base terminal wherein data indicating a first logic level may be selected and having a collector terminal;
said second data select transistor having a base terminal wherein data indicating a second logic level may be selected and having a collector terminal;
a first output transistor having a base terminal connected to the collector terminal of said first data select transistor and having an emitter terminal forming a first circuit output;
a second output transistor having a base terminal connected to the collector terminal of said second data select transistor having an emitter terminal forming a second circuit output; and
a sense enable transistor providing a data sense path and including an emitter terminal connected to said current source, a base terminal providing a sense enable select; and a collector terminal coupled to said first and second output transistors;
said reference current source comprising:
a first current source transistor having a collector terminal providing a current source output, a base terminal connected to a first reference voltage source, and an emitter terminal; and
a reference level resistor connected between the emitter of said first current source transistor and the circuit ground;
said first reference voltage source comprising:
a second reference voltage node;
a first resistor having one terminal connected to the second reference voltage node;
a reference diode having an anode connected to another terminal of said first resistor and the base of said first current source transistor and having a cathode;
a voltage source transistor having a collector connected to the cathode of said reference diode, having an emitter connected to the circuit ground, and having a base;
a second resistor connected between the collector and the base of the voltage source transistor; and
a second reference voltage source coupled to the second reference voltage node, the second reference voltage source providing a voltage which is independent of the circuit supply voltage.



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**4,742,489**

## INTEGRATED SEMICONDUCTOR MEMORY

**Kurt Hoffmann, Taufkirchen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

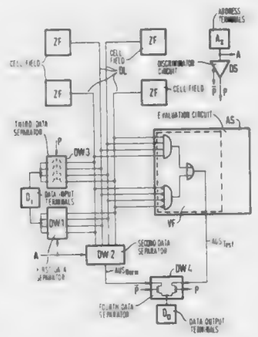
**Filed Dec. 20, 1985, Ser. No. 811,886**
**Claims priority, application Fed. Rep. of Germany, Dec. 28, 1984, 3447761**
**Int. Cl.⁴ G11C *7/00***
**U.S. Cl. 365—201** **13 Claims**

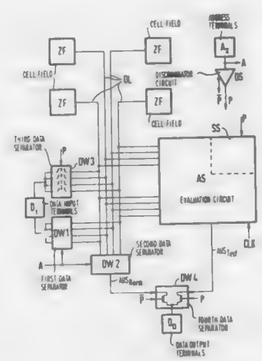
1. Integrated semiconductor memory, comprising n identical memory cell fields each having a data width equal to m, m and n being positive integers, nm data lines, m of said nm data lines being connected with one of said memory cell fields for writing-in and reading-out memory data into and out of said mem-

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ory cell fields, m first data separators each being connected to n of said nm data lines and each having an assigned data input terminal for applying the memory data present at said assigned data input terminal to be written into one of said n data lines of the semiconductor memory as a function of addressing data when written-in, m second data separators each being connected to n of said nm data lines and each having an output for selecting one of said n data lines in response to the addressing data when reading out the memory data present at said n data lines and for appplying the memory data to said outputs of said second data deparators, m data output terminals connected to said outputs of said second data separators for receiving the memory data, first terminal means for providing a control signal, second terminal means for providing a signal complementary to said control signal, evaluation circuits each having an output and each being connected to n of said nm data lines parallel to said respective second data separators for delivering output signals at said outputs of said evaluation circuits, each output signal being in the form of a first logical level if all n data lines connected to one of said evaluation circuits contain the same memory data and for delivering output signals at said outputs of said evaluation circuits in the form of a second logical level if said n data lines connected to one of said evaluation circuits contain different memory data, third data separators connected to said first terminal means and connected between each of said m data input terminals and said n of nm data lines parallel to said first data separators for transferring the memory data to be written into the semiconductor memory in parallel to all of said n data lines in response to said control signal, and m fourth data separators each being connected to said first and second terminal means and each being connected between a respective one of said m data output terminals and said outputs of a respective one of said second data separators and of a respective one of said evaluation circuits for selectively feeding the memory data selected by said second data separators and the output signal generated by said evaluation circuit to said data output terminals in response to said control signal and said complementary signal.





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**4,742,490**

**INTEGRATED SEMICONDUCTOR MEMORY**

**Kurt Hoffmann, Taufkirchen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Dec. 20, 1985, Ser. No. 811,932**

**Claims priority, application Fed. Rep. of Germany, Dec. 28, 1984, 3447762**

**Int. Cl.[4] G11C** *7/00*

**U.S. Cl. 365—201** **15 Claims**

1. Integrated semiconductor memory, comprising n identical memory cell fields each having a data width equal to m wherein n and m are positive integers, nm data lines, m of said nm data lines being connected with one of said memory cell fields for writing-in and reading-out memory data into and out of said memory cell fields, m first data separators each being connected to n of said nm data lines and each having an assigned data input terminal for applying the memory data present at said assigned data input terminal to be written into one of said n data lines of the semiconductor memory as a function of addressing data when written-in, m second data separators each being connected to n of said nm data lines and each having an output for selecting one of said n data lines in response to the addressing data when reading out the memory data present at said n data lines and for applying the memory data to said outputs of said second data separators, m data output terminals connected to said outputs of said second data separators for receiving the memory data, first terminal means for providing a control signal, second terminal means for providing a signal complementary to said control signal, evaluation circuits each having an output and each being connected to said first terminal means and to n of said nm data lines parallel to said respective second data separators for feeding through the memory data read out from said memory cell fields to said outputs of said evaluation circuits and in turn to said data output terminals in response to said control signal, and for activating an error signal to said data output terminals upon the occurrence of at least one faulty memory data, third data separators connected to said first terminal means and connected between each of said m data imput terminals and said n of nm data lines parallel to said first data separators for transferring the memory data to be written into the semiconductor memory in parallel to all of said n data lines in response to said control signal, and fourth data separators each being connected to said first and second terminal means and each being connected between a respective one of said m data output terminals and said outputs of a respective one of said second data separators and of a respective one of said evaluation circuits for selectively feeding the memory data selected by said second data separators and the output signal generated by said evaluation circuit to said data output terminals in response to said control signal and said complementary signal.

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**4,742,491**

**MEMORY CELL HAVING HOT-HOLE INJECTION ERASE MODE**

**Mong-Song Liang, Milpitas, and Tien-Chiun Lee, Sunnyvale, both of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.**

**Filed Sep. 26, 1985, Ser. No. 780,482**

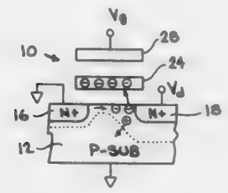
**Int. Cl.[4] G11C** *7/00*

**U.S. Cl. 365—218** **14 Claims**

1. An integrated circuit memory, comprising:



a semiconductor device for storing an electrical charge representing a data bit; and




means for biasing said semiconductor device to operate said semiconductor device in a snap-back mode so that said data bit is erased from said semiconductor device.

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**4,742,492**

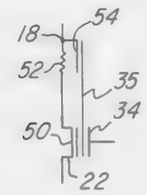
**EEPROM MEMORY CELL HAVING IMPROVED BREAKDOWN CHARACTERISTICS AND DRIVING CIRCUITRY THEREFOR**

**Michael C. Smayling, Missouri City, and Sebastiano D'Arrigo, Houston, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Sep. 27, 1985, Ser. No. 785,309**

**Int. Cl.[4] G11C** *13/00*

**U.S. Cl. 365—218** **11 Claims**




1. An electrically erasable programmable memory comprising:

a plurality of memory cells each comprising:

a floating gate transistor having a floating gate, and having a control gate connected to a word line; and

a row transistor having its gate connected to a row line;

wherein the source-to-drain paths of said floating gate transistor and said row transistor transistor are connected in series between a read line and a column line, so that the floating gate of the floating gate transistor is charged responsive to a voltage applied to its gate which is below the voltage at its source-to-drain path by a predetermined magnitude during such time as said column line floats; and

line driving circuitry coupled to said word line for applying a negative voltage to the control gate relative to ground during the ERASE mode such that the application of a voltage to the read line of no greater than the power supply voltage of the memory causes charging of said floating gate.

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**4,742,493**

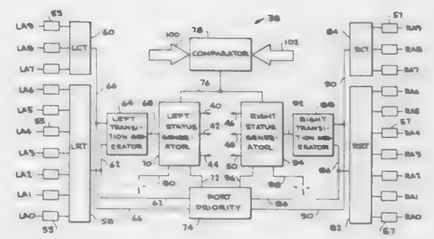
**MULTIPLE PORT MEMORY ARRAY DEVICE INCLUDING IMPROVED TIMING AND ASSOCIATED METHOD**

**Kent D. Lewallen, Cupertino; Moon-Seng Kok, Milpitas; Steve Schumann, Santa Clara, and Wei-Jian Liu, Milpitas, all of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.**

**Filed May 19, 1986, Ser. No. 864,690**

**Int. Cl.[4] G11C** *8/00*

**U.S. Cl. 365—230** **10 Claims**




1. An Integrated circuit device including a memory array comprising a plurality of respective memory locations for storing binary data, each respective memory location corresponding to a respective combination of binary address signals, said device further comprising:

at least two respective port means for receiving respective combinations of binary address signals corresponding to respective locations of said memory array;

transition detection and signal providing means for detecting a change in a respective combination of binary address signals received by either a first or a second of said at least two port means, and for providing a first transition signal in response to a change in a respective first combination of address signals received by said first port means and for providing a second transition signal in response to a change in a respective second combination of address signals received by said second port means; and

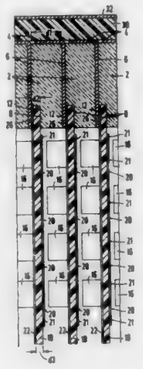
address match means for receiving said first and second combinations of binary address signals and for providing a match signal in response to a match in said first and second combinations; and

status signal providing means for receiving said first and second transition signals and said match signal and for providing a first status signal in an inactive state during a first period of time in response to a provision of said first transition signal whether or not a match signal is received substantially during said first period of time, and for providing a second status signal in an inactive state during a second period of time in response to a provision of said second transition signal whether or not a match signal is received substantially during said second period of time, and for substantially providing either only said first status signal or only said second status signal in an active state in response to a match signal substantially after said first and said second periods of time.

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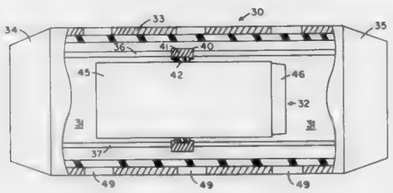


**4,742,494**
**DEVICE FOR READING A TWO-DIMENSIONAL CHARGE IMAGE**
**Fritz Breimesser, Nüremberg; Bernd Granz, Oberasbach, and Bertram Sachs, Erlangen, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**
**Filed Aug. 5, 1987, Ser. No. 82,041**
**Claims priority, application Fed. Rep. of Germany, Aug. 11, 1986, 3627159**
**Int. Cl.[4] G03B** *42/06;* **H04N** *3/14*
**U.S. Cl. 367—7** **6 Claims**



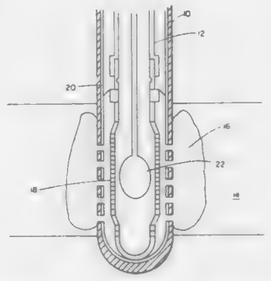
1. A device for reading a two-dimensional charge comprising:
a plurality of stacked slab-shaped support bodies of electrically insulating material forming a stack;
the support bodies being each provided with a plurality of electrodes on a side surface thereof;
the electrodes being arranged in the longitudinal direction one behind the other in such a manner that they form the rows of a matrix in the stack;
the support bodies being each connected detachably to a circuit board;
the circuit board comprising switchable amplifiers and
the electrodes of the support body being each connected electrically to a switchable amplifier on the circuit board associated with the support body.

**4,742,495**
**ACOUSTIC ENERGY TRANSMITTER FOR BOREHOLE LOGGING**
**William L. Medlin, Dallas, and Vasel R. Slover, Jr., Irving, both of Tex., assignors to Mobil Oil Corporation, New York, N.Y.**
**Filed Jan. 27, 1986, Ser. No. 822,506**
**Int. Cl.[4] G01V** *1/40, 1/14*
**U.S. Cl. 367—31** **4 Claims**




1. A low-frequency acoustic transmitter for borehole logging, comprising:
(a) a flexure disc acoustic source,
(b) a pipe having one of its ends open and having said flexure disc acoustic source affixed to the other of its ends,
(c) a hollow cylindrical housing,
(d) a pair of cap members for sealing both ends of said housing,
(e) at least one support member extending through the inner cavity of said housing,
(f) a mounting means comprising an acoustic insulating material for affixing said pipe to said at least one support member so that damping of acoustic energy waves traveling along said pipe from said acoustic source are minimized.
(g) a rubber boot positioned within said housing and surrounding said pipe and said affixed flexure disc acoustic source
(h) oil filling said rubber boot so as to both surround and fill said pipe,
(i) a plurality of openings along the length of said housing to permit the borehole fluid pressure to be transmitted through said rubber boot to the oil inside said pipe and said rubber boot, and
(j) means for electrically exciting said flexure disc source with a tone burst having a frequency near that of the tube wave resonances of said flexure disc source to cause said source to provide a flexure motion into said oil-filled pipe, said pipe providing a resonance cavity and the oil within said pipe providing an acoustic impedance coupling to said flexure disc source so as to generate an acoustic energy tube wave at said resonance frequency.

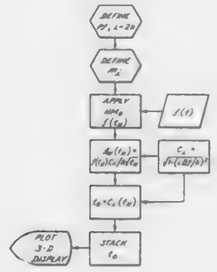
**4,742,496**
**METHOD OF EVALUATING GRAVEL PACKS**
**Alfred R. Jennings, Jr., Plano, and Duane C. Uhri, Grand Prairie, both of Tex., assignors to Mobil Oil Corporation, New York, N.Y.**
**Filed Jan. 3, 1986, Ser. No. 815,969**
**Int. Cl.[4] G01V** *1/00, 1/40*
**U.S. Cl. 367—35** **7 Claims**




1. A method for evaluating gravel pack efficiency within a wellbore comprising:
(a) running an accoustic logging tool into said wellbore through said gravel pack area prior to producing hydrocarbonaceous fluids through said gravel pack;
(b) obtaining via said logging tool an initial log of data regarding the density of said gravel pack;
(c) determining that the density of said gravel pack is sufficient to make an effective gravel pack from said log of data;
(d) producing hydrocarbonaceous fluids and water through said gravel pack which causes the density of said pack to change due to removal of materials from said hydrocarbonaceous fluids and water, which density varies in relationship to the materials removed;
(e) obtaining subsequent logs of data during the production interval which data reflects a change in density and efficiency of said gravel pack, and also results in a reduction in the production of hydrocarbonaceous fluids; and
(f) ceasing the production of hydrocarbonaceous fluids when said production has become substantially reduced and providing for remedial treatment of said gravel pack in relationship to the materials removed as determined by the density from subsequent logs.



**4,742,497**
**METHOD OF PROCESSING SEISMIC DATA**
**Craig Beasley; Ron Chambers, both of Houston, Tex., and Helmut Jakubowicz, Englefield Green, England, assignors to Western Atlas International, Inc., Houston, Tex.**
**Filed Nov. 18, 1985, Ser. No. 799,176**
**Int. Cl.[4] G01V** *1/04*
**U.S. Cl. 367—52** **3 Claims**




1. A method for producing three-dimensional seismic sections, comprising the steps of:
(a) generating a plurality of seismic traces at a plurality of corresponding seismic-signal receiver locations by means of seismic-wave-field generators positioned at a plurality of source locations within an area of survey;
(b) defining a plurality of cells within said area of interest to form a grid along the surface of the earth, each of said plurality of cells having predetermined dimension;
(c) arbitrarily selecting a source location, and a receiver location where a seismic trace is generated, the source location and receiver location being separated by a predetermined offset distance;
(d) defining a line between the source location and receiver location, the line intersecting a plurality of the cells along a midpoint of each cell, and having an unknown azimuth with respect to a direction of geologic dip within the area of survey;
(e) correcting each seismic trace for normal-movement, the correction for normal-moveout derived from the offset distance and a predetermined root-mean-squared velocity;
(f) amplitude weighting each normal-moveout corrected trace for each of said plurality of cells to compensate for geometric spreading between the source and receiver locations;
(g) altering the amplitude-weighted trace for each of said plurality of cells by applying a moveout coefficient, the moveout coefficient being a function of the distance from a predetermined cell to the midpoint between the source location and receiver location and half the offset distance;
(h) stacking the respective altered seismic traces into cells corresponding with the receiver location;
(i) repeating steps (a) through (h) for preselect combinations of source-receiver locations of interest within the survey area; and
(j) displaying the altered stacked seismic traces as a three-dimensional representation of a volume of the earth.

**4,742,498**
**PILOT OPERATED MUD PULSE VALVE AND METHOD OF OPERATING THE SAME**
**C. Dwain Barron, Kingwood, Tex., assignor to Eastman Christensen Company, Salt Lake City, Utah**
**Filed Oct. 8, 1986, Ser. No. 916,957**
**Int. Cl.[4] G01V** *1/40*
**U.S. Cl. 367—85** **12 Claims**



1. Apparatus for creating positive pressure pulses in a stream of drilling mud being circulated through a drill string comprising a restriction in the drill string, a valve member located below the restriction, a cylinder located in the drill string above the restriction, a valve stem connected to the valve member and extending upwardly through the restriction into the cylinder, a piston located in the cylinder and connected to the valve stem, first passage means in the cylinder through which drilling mud upstream of the restriction can enter the cylinder and act against the piston urging it upwardly to move the valve member upwardly toward the restriction to restrict the flow of drilling mud through the seat and create a pressure pulse, second restricted passage means through which drilling mud upstream of the restriction can reach the cylinder above the piston and equalize the pressure across the piston, third passage means through which drilling mud can flow from the cylinder above the piston to the drill string below the restriction, and pilot valve means for opening the third passage means to cause the pressure in the cylinder above the piston to drop below upstream pressure to produce a pressure differential across the piston acting to move the piston upwardly away from the restriction and the valve member upwardly toward the restriction to create a pressure pulse in the drilling mud and to close the third passage means to cause the pressure across the piston to equalize allowing the force of the flowing drilling mud on the valve member to move the valve member downwardly away from the restriction.

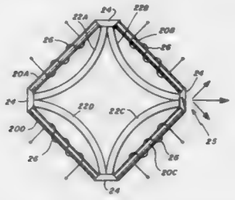
**4,742,499**
**FLEXTENSIONAL TRANSDUCER**
**John L. Butler, Marshfield, Mass., assignor to Image Acoustics, Inc., N. Marshfield, Mass.**
**Filed Jun. 13, 1986, Ser. No. 873,961**
**Int. Cl.[4] H01L** *41/06, 41/04;* **H04R** *17/00, 15/00*
**U.S. Cl. 367—155** **20 Claims**

1. A flextensional polygon transducer comprising,
a hollow resilient housing including at the least three inwardly curved shells each having opposite ends,
a transduction drive means including at the least three drive members each having opposite ends,
means commonly securing ends of the drive members to ends of each of the curved shells at at least three connec-

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tion points corresponding to said at least three shells and drive members,
and means for exciting said transduction drive means to cause the curved shells to move additively with both

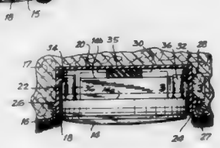


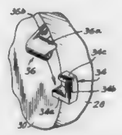
translational and bending motions in the same direction to enhance acoustic output,
said curved shells being disposed inside of the transduction drive means.

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**4,742,500**
**STUFFED ANIMAL WITH BUILT IN TIME KEEPING DEVICE**
**Nunzio A. Luce, 30 Galston Dr., West Windsor, N.J. 08691**
**Filed Feb. 13, 1987, Ser. No. 14,859**
**Int. Cl.[4] G04B** *47/00, 37/00*
**U.S. Cl. 368—10** **3 Claims**



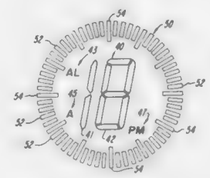




1. A decorative time keeping apparatus, comprising:
a stuffed animal having an outer fabric filled with a soft stuffing material, said outer fabric formed with an opening;
a clock removably secured in the opening of said animal;
a hollow housing fixedly secured to said outer fabric in said opening, said housing including a recess for receiving said clock, and securing means for releasably securing said clock in said recess;
said securing means including at least one catch, and said clock including at least latch releasably engagable with said at least one catch;
said recess having a substantially circular configuration; said clock including at least two substantially parallel latches extending rearwardly therefrom, each latch having a foot at a free end thereof for engagement with a respective catch;
said housing including a rear wall;
there being two catches, each catch having a long leg connected to and extending from said rear wall, a connecting leg connected to and extending transversely from a free end of said long leg, and a short leg connected to and extending from a free end of the connecting leg in substantially parallel relation to said long leg and said short leg being spaced from said rear wall;
said latches being separated by a distance less than the distance between said two catches; and
there being two latches, each including a post connected to said clock and extending rearwardly therefrom, and a foot connected to a free end of said post and extending radially outward therefrom for engagement in a space defined between said long leg, short leg and connecting leg of a respective catch.

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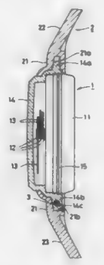
**4,742,501**
**TIME DISPLAY APPARATUS**
**Charles S. Coster, Cambridge, Mass., assignor to By Design Corp., Cambridge, Mass.**
**Filed Jul. 31, 1987, Ser. No. 80,460**
**Int. Cl.[4] G04C** *19/00, 17/02*
**U.S. Cl. 368—82** **20 Claims**



1. A time display apparatus comprising;
a display means including means defining a digital display having two digits, and means defining an analog display comprised of a plurality of display segments disposed circumferentially about said digital display and used for the purpose of one of minute and second display,
display control means including means for controlling the digits of the digital display, and means for controlling the plurality of display segments of the analog display,
and manual selection mode means for controlling said display control means to provide at least two separate modes of control including a normal time mode in which the digital display registers hours and the analog display registers minutes, and a count mode in which the digital display registers minutes and the analog display registers seconds.

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**4,742,502**
**WRISTWATCH**
**Yoshiki Tomoda, Tokyo, Japan, assignor to Seikosha Co., Ltd., Tokyo, Japan**
**Filed Oct. 16, 1986, Ser. No. 919,846**
**Claims priority, application Japan, Feb. 10, 1986, 61-17911[U]**
**Int. Cl.[4] G04B** *37/00*; **A44C** *5/00*
**U.S. Cl. 368—282** **8 Claims**

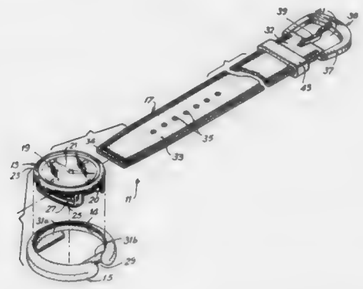


1. A wristwatch comprising a watch body including a movement casing for containing therein a movement, hand shafts protruding from the front face of the movement casing, hands mounted on said hand shafts, and a cover mounted on said movement casing so as to cover said hands; a band having a fitting portion integrally formed therewith, said fitting portion being configured to fit onto said watch body; and coupling means for coupling said watch body to said band when said fitting portion is fitted onto said watch body, said coupling means comprising a pin, two protrusions provided at peripheral opposite portions of said cover, one protrusion being provided with a through hole for receiving therein the pin, and a notch and a groove provided oppositely at the fitting portion so that said watch body can be secured in said fitting portion by inserting said one protrusion into said notch and setting the other protrusion to said groove and then setting said pin through said band and said through hole.



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**4,742,503**
**WATCH ASSEMBLY HAVING INTERCHANGEABLE BEZELS AND COORDINATED INTERCHANGEABLE BANDS**
**Refael Braun, Woodmere; Bernard Fernandez, Douglaston, both of N.Y., and Li T. Wing, Tsuen Wan, Hong Kong, assignors to E. Gluck Corporation, Long Island City, N.Y.**
**Filed May 28, 1987, Ser. No. 55,187**
**Int. Cl.[4] G04B** *37/00*
**U.S. Cl. 368—282** **7 Claims**

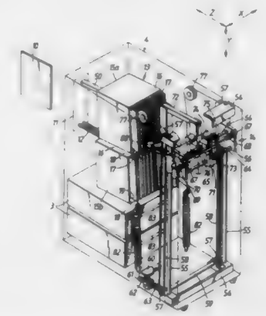


1. A watch assembly comprising:
a case having a front face for displaying the time, a rear face and a rim defining the circumference of said case;
a removable band positioned in overlapping relation to the rear face of said case;
a removable bezel releasably secured around said rim of said case, wherein said bezel includes means for inhibiting movement of said case relative to said bezel in a direction substantially normal to said case and towards said band; and
means for coupling said band to said case so that said band inhibits movement of said case in a direction normal to said case and away fromn said band, said coupling means projecting from the rear face of said case and spaced therefrom to accommodate said band therethrough.

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**4,742,504**
**AUTOMATIC DISK CASSETTE CHANGER**
**Shingo Takasuka, and Yoshiaki Tago, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**
**Filed May 17, 1985, Ser. No. 735,066**
**Claims priority, application Japan, May 17, 1984, 59-99260**
**Int. Cl.[4] G11B** *5/48, 17/00*
**U.S. Cl. 369—36** **11 Claims**

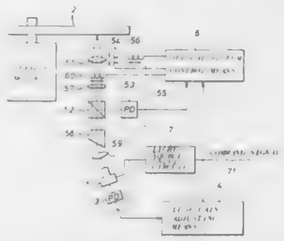
1. An automatic disk changer comprising:
a main body equipped with a loading port formed in a slot shape extending in a predetermined direction for receiving a disk cassette containing an information storing disk oriented in a plane along said predetermined direction;
loading means for loading and unloading said disk cassette via said loading port;
storage means provided in said main body and oriented parallel to the plane along said predetermined direction for storing a plurality of disk cassettes oriented parallel to said plane, said storage means being stationary during operation of the disk changer;



information recording/reproducing means provided in said main body for recording or reproducing information on or from said information storing disk in said disk cassette, said recording/reproducing means being stationary; and
carrying means provided in said main body for carrying said disk cassette between said storage means and said information recording/reproducing means and for loading said disk cassette into said latter means followed by a retraction of said disk cassette for return to said storage means.

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**4,742,505**
**OPTICAL INFORMATION RECORDING AND REPRODUCING MEMORY SYSTEM**
**Toyoaki Takeuchi, Ina; Yoshiaki Ikeda, Hachioji, and Hideyuki Kenjyo, Koganei, all of Japan, assignors to Olympus Optical Company Limited, Tokyo, Japan**
**Filed Nov. 20, 1985, Ser. No. 799,811**
**Claims priority, application Japan, Nov. 21, 1984, 59-246904**
**Int. Cl.[4] G11B** *7/00*
**U.S. Cl. 369—45** **19 Claims**



1. An optical information recording and reproducing memory system having means for recording, reproducing or erasing data information by means of an irradiation of a light beam onto a data storing medium, comprising:
a light source for emitting a light beam from a front end thereof and a light flux from a rear end thereof;
optical system control means including at least one control loop for controlling the light beam emitted from said light source and irradiating the emitted light beam onto a data storing medium;
loop gain adjusting means for adjusting the loop gain of said

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control loop of said optical system control means according to the power of said light beam; and

photo detecting means for detecting the light flux emitted from the rear end of said light source and supplying said loop gain adjusting means with a detected monitor signal.

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**4,742,506**

**TRACKING ERROR DETECTING APPARATUS FOR AN OPTICAL HEAD WITH SKEW ERROR REDUCTION BY USING AN INCLINED HEADER PORTION**

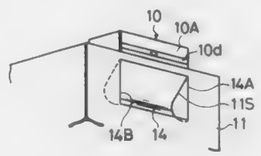
**Atsushi Fukumoto, Tokyo; Kiyoshi Ohsato, and Yasunori Terayama, both of Chiba, all of Japan, assignors to Sony Corporation, Tokyo, Japan**

**Filed Jul. 10, 1985, Ser. No. 753,570**

**Claims priority, application Japan, Jul. 12, 1984, 59-144927; Jul. 13, 1984, 59-145766; Apr. 30, 1985, 60-92814; Apr. 30, 1985, 60-92815**

**Int. Cl.[4] G11B** *7/095, 7/125*

**U.S. Cl. 369—46** **1 Claim**




1. In a tracking error detecting device for an optical reproducing apparatus in which an optical head reads a signal recorded on an optical recording medium, said device comprising semiconductor laser means having a header portion and an end face from which a laser beam is emitted, diffraction grating means for dividing said laser beam into a main beam and two beams at opposite sides, respectively, of said main beam, beam splitter means receiving the three beams from said diffraction grating means to transmit the same therethrough, objective lens means receiving the three transmitted beams for focusing the same onto said recording medium, photodetector means and tracking error signal generating means, said three beams being reflected back from said recording medium to return through said objective lens means to said beam splitter means, the three returned beams being reflected in part by said beam splitter means to be incident on said photodetector means, said photodetector means producing detected outputs in response to the beams incident thereon and said tracking error signal generating means providing a tracking error signal in response to said detected outputs, the returned side beams also being transmitted in part through said beam splitter means and said diffraction grating means to said laser means along respective paths whose lengths, measured from said recording medium, vary with skewing of said recording medium;

characterized in that said header portion includes an inclined portion and in that one of said returned side beams is returned to said end face at a position such as to avoid the reflection of said one returned side beam from said end face, and the other of said returned side beams is incident on said inclined portion so as to be prevented from being reflected therefrom to be incident again on said photodetector means.

**4,742,507**

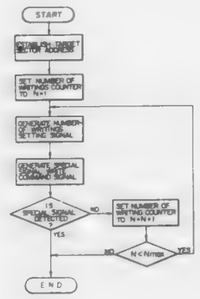
**OPTICAL INFORMATION RECORDING AND REPRODUCING APPARATUS HAVING DEFECTIVE-SECTOR MARKING MEANS**

**Yuzuru Kuroki, Moriguchi; Isao Satoh, Neyagawa; Makoto Ichinose, Sakai, and Tatuo Sugimura, Fukuoka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Jan. 16, 1986, Ser. No. 819,261**

**Int. Cl.[4] G11B** *7/00*

**U.S. Cl. 369—54** **6 Claims**




1. An optical information recording and reproducing apparatus for an optical recording disc having optically-detectable guide tracks divided into a plurality of sectors, said apparatus comprising:

recording/reproducing means for recording and reproducing information sector-by-sector on said disc by a laser beam;

writing means for writing into an information recording area of a particular sector of one of said guide tracks at least one special signal having a different signal pattern from a signal pattern of an information recording signal to be recorded in said information recording area;

special signal detecting means for (i) receiving reproduced information signals from said particular sector, (ii) detecting the special signal from said reproduced information signals, and (iii) detecting whether said special signal has been properly written into said particular sector;

counter means, responsive to said writing means, for providing a counter output signal indicating a number of times said special signal is written into said particular sector;

signal-position setting means for providing a signal to said writing means to set positions within said information recording area of special signals to be written into said sector;

said writing means comprising means for writing said special signal again into said particular sector responsive to said special signal detecting means detecting that said special signal has not been properly written into said particular sector; and

said signal-position setting means comprising means, responsive to said counter output signal from said counter means, for providing signals to said writing means to set positions of said special signal to be written again into said particular sector at different positions from positions at which special signals have already been written in said particular sector.



**4,742,508**

**DISK DRIVING SYSTEM**

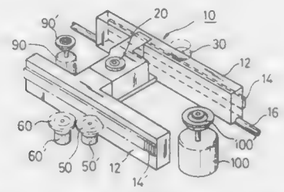
**Seong-Joong Lee, Suwon, and Jae-Young Kho, Seoul, both of Rep. of Korea, assignors to Sam Sung Electronics Co., Ltd., Suwon, Rep. of Korea**

**Filed Aug. 15, 1986, Ser. No. 897,114**

**Claims priority, application Rep. of Korea, Aug. 16, 1985, 85-5931**

**Int. Cl.[4] G11B** *7/085*

**U.S. Cl. 369—265** **2 Claims**




1. An improved disk driving system comprising at least a pickup carriage for carrying an optic pickup reading out the information recorded on the disk and having two slider members at its opposed sides; a pinion engaged with a rack mounted on the side surface of the first slider member of said pickup carriage for axial travelling said pickup carriage along a guide rod in response to rotation of a pinion driving motor; a compact disk driving motor having a compact disk turntable fixed at the end of said motor shaft; and a video disk driving motor having a video disk turntable fixed at the end of said motor shaft, wherein said compact disk driving motor and said video disk driving motor are fixedly installed by certain motor fixing means at the opposite sides of said pick up in a longitudinal axis of said pick up carriage; and a driven pinion is engagably provided on the rack mounted on the side surface of the second of said slider members and coupled to the shaft of the first potentiometer, said first potentiometer generating a pickup positioning signal upon video disk tracking in response to rotation of said driven pinion; and a follower gear is engaged with said driven pinion and coupled to the shaft of the second potentiometer, said second potentiometer generating a pickup positioning signal upon compact disk tracking in response to rotation of said follower gear; and also a compact disk receiving table and a video disk receiving table are respectively provided above said associated turntables.

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**4,742,509**

**DISK ROTATING DEVICE**

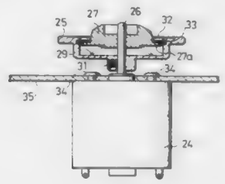
**Masao Okita; Yoshio Matsuwake, and Yukio Matsumoto, all of Furukawa, Japan, assignors to Alps Electric Co., Ltd., Japan**

**Filed Oct. 8, 1986, Ser. No. 916,716**

**Claims priority, application Japan, Oct. 11, 1985, 60-224909**

**Int. Cl.[4] G11B** *19/00, 11/00, 17/00*

**U.S. Cl. 369—270** **10 Claims**




1. In a device for rotating a disk recording medium in a sound or data recording and reproducing apparatus, said device including an electric motor having an output shaft, a spindle fixed to said shaft by fastening means and having an upper surface on which a disk is placed, a disk centering member fitted on said shaft concentrically in a center recess of said spindle and projecting above said surface of said spindle for centering a disk by projecting through a central hole thereof, said disk centering member being biased resiliently by a spring to a projecting position on said shaft relative to said surface of said spindle and being held at the projecting position by retaining means, and a clamp member disposed above said spindle and being movable toward said surface of said spindle for clamping a disk placed and centered thereon,

the improvement wherein said retaining means for said disk centering member comprises said center recess of said spindle having a retaining part, and a washer engaged between said retaining part of said spindle recess and said disk centering member, the latter being biased by said spring against said washer to the projecting position, and

wherein said fastening means for fixing said spindle to said shaft includes a screw threaded in a portion of said spindle against said shaft.

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**4,742,510**

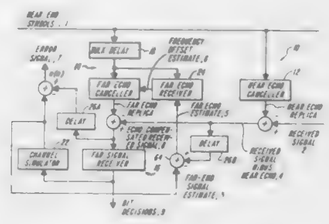
**NEAR AND FAR ECHO CANCELLER FOR DATA COMMUNICATIONS**

**Thomas F. Quatieri, Jr., and Gerald C. O'Leary, both of Lexington, Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.**

**Filed Apr. 4, 1986, Ser. No. 848,723**

**Int. Cl.[4] H04B** *3/22*

**U.S. Cl. 370—32.1** **16 Claims**




1. An arrangement for receiving a far end-generated signal carried on an incoming signal which is affected by a frequency-offset far echo of a near end-generated signal, the arrangement comprising

echo cancelling means for generating an echo-compensated incoming signal estimate as a function of the difference between a far echo estimate and the incoming signal, the far echo estimate being formed by modifying the near end signal to replicate the frequency-offset far echo,

a far end signal receiver connected to the echo cancelling means for generating a far end signal estimate from the echo-compensated incoming signal estimate, and

an echo receiver connected to the echo cancelling means and the far end signal receiver for refining the far echo estimate as a function of the difference between delayed samples of the incoming signal and the far end signal estimate and further including means for estimating the frequency offset of the far echo to refine the far echo estimate.

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**4,742,511**

**METHOD AND APPARATUS FOR ROUTING PACKETS IN A MULTINODE COMPUTER INTERCONNECT NETWORK**

**Douglas A. Johnson, Carrollton, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Jun. 13, 1985, Ser. No. 744,583**

**Int. Cl.[4] H04J** *3/16*

**U.S. Cl. 370—94** **13 Claims**

1. A method for routing user packets in an interconnect

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network, the interconnect network having a plurality on nodes each having a plurality of output lines and packet storage, each user packet having a destination node, the method comprising the steps of:

receiving a number of packets into a first node;

storing the packets;

sensing the destination node of at least one stored packet;

determining a preferred output line for the stored packet, the preferred output line being associated with the shortest nodal travel distance to the destination node, wherein each output line is associated with an input line, including the steps of:

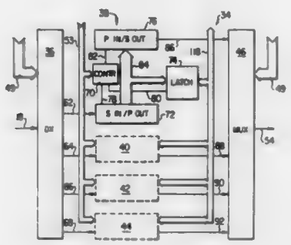
originating a plurality of node distance packets at each node in the network, each node distance packet including a node identity and a distance number originally set to a base value,

transmitting the node distance packets from each node to connected nodes,

receiving the node distance packets by each node from connected nodes via input lines,

at each node, incrementing the distance number of each received node distance packet by a constant,

setting a value of a corresponding nodal distance array member to the distance number from each incremented distance packet, the array member being referred by the



node identity and the output line associated with the input line on which the distance packet was received,

retransmitting from each node to connected nodes the incremented distance packets,

receiving the incremented distance packets by each node,

at each node, further incrementing the distance number of each received incremented distance packet,

at each node, comparing the further incremented distance number of each distance packet to the value of a corresponding array member,

discarding any further incremented distance packet whose distance number equals or exceeds a nonzero value of the corresponding array member to the distance number,

at each node, retransmitting the nondiscarded distance packets to all connected nodes,

repeating the incrementing, comparing, discarding, setting and retransmitting steps until no nondiscarded node distance packets remain;

choosing the array member having the shortest nodal travel distance from all array members referenced by the destination node;

setting the preferred output line of the packet to the output line referencing the chosen array member; and

transmitting the packet on its determined preferred output line.

**4,742,512**

## MULTIPOINT COMMUNICATION SYSTEM HAVING POLLING AND RESERVATION SCHEMES

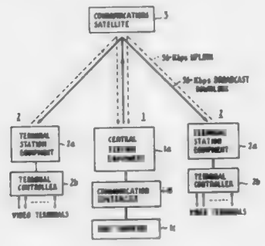
**Fumio Akashi; Kazutomo Kobayashi; Junji Namiki, and Kojiro Watanabe, all of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan**

**Filed Jul. 18, 1986, Ser. No. 887,003**

**Claims priority, application Japan, Jul. 19, 1985, 60-160683; Jul. 22, 1985, 60-162227; Jul. 22, 1985, 60-162228; Jul. 22, 1985, 60-162229; Jul. 22, 1985, 60-162230**

**Int. Cl.[4] H04J** *3/16, 3/06*

**U.S. Cl. 370—96** **11 Claims**



1. A communication system comprising:

first means for establishing a multiple access channel from each of a plurality of terminal stations to a central station and a time-division multiplexed broadcast channel from said central station to said terminal stations;

second means in said central station for sequentially transmitting on said broadcast channel first polling signals for respectively addressing said terminal stations;

third means in each of said terminal stations for receiving a respective one of said first polling signals and transmitting on said multiple access channel a reservation signal if there if a data signal to be transmitted to said central station;

fourth means in said central station for receiving said reservation signal, reserving a time slot in said multiple access channel in accordance with the received reservation signal and transmitting on said broadcast channel a second polling signal to the terminal station from which said reservation signal is received, said second polling signal indicating the length of said reserved time slot; and

fifth means in each of said terminal stations for receiving said second polling signal and transmitting said data signal in said reserved time slot if no further data signal is present or transmitting said data signal along with a second reservation signal in said reserved time slot if a further data signal is present, whereby said fourth means reserves a second tme slot in said multiple access channel.

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**4,742,513**

## ADAPTIVE WINDOW MULTIPLEXING TECHNIQUE

**Gordon E. Reichard, Jr., Rolling Meadows, and Semir Sirazi, Chicago, both of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.**

**Filed Jul. 29, 1985, Ser. No. 760,217**

**Int. Cl.[4] H04J** *3/16*

**U.S. Cl. 370—96** **12 Claims**

1. A data acquisition method for communicating data from a plurality of data sources to a single destination comprising the steps of:

buffering packets of data ready to be communicated by said sources, said buffering occurring at said sources;

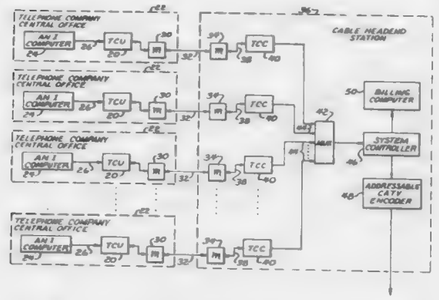
defining a sequence in which said plurality of data sources will be individually addressed;

addressing a first one of said data sources;

permitting said first source to transfer data from its buffer to a multiplexer for a variable time dependent upon the time



required for said data source to transfer all of its data in said buffer; and when said buffer has been emptied, then sequentially addressing each of the remaining data sources and permitting each of them in sequence to transfer data from its respective buffer to said multiplexer for a time



dependent upon the time required for said respective data source to transfer all of its data in said buffer;

buffering data at said multiplexer until said destination is ready to receive data; and

transferring the data buffered at said multiplexer to said destination.

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**4,742,514**

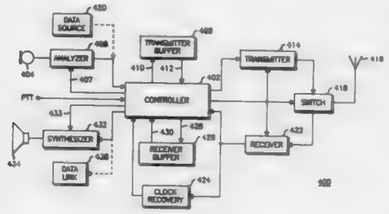
## METHOD AND APPARATUS FOR CONTROLLING A TDM COMMUNICATION DEVICE

**Steven H. Goode, Palatine; Henry L. Kazecki, Des Plaines, and James C. Baker, Hanover Park, all of Ill., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Mar. 25, 1986, Ser. No. 843,961**

**Int. Cl.[4] H04J** *3/18*

**U.S. Cl. 370—109** **15 Claims**



1. A method for controlling a remote communication device to transmit voice or data signals preambled by a data signal in a time division multiplex communication system having at least one primary station and a plurality of remote units, comprising the steps of:

(a) transmitting an activation code to the primary station if the primary station is determined to be inactive;

(b) synchronizing to a signal received from the primary station;

(c) enabling a vo-coding analyzer to vo-code a voice signal at a selected coding rate, V, to provide an information signal;

(d) buffering said information signal to provide a buffered signal;

(e) transmitting said buffered signal preambled by a data signal over a communication channel having a predetermined maximum data rate, C, in accordance with a time division multiplex protocol defining N time slots, where N is a positive integer less than or equal to C/V, where V comprises said selected coding rate, said buffered signal preambled by said data signal being transmitted in at least one of said N time slots at a rate exceeding 2 V.

**4,742,515**

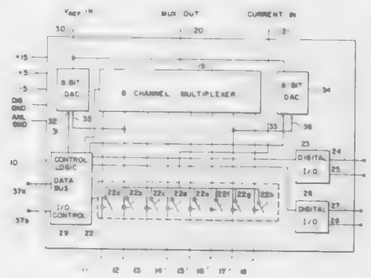
## DATA ACQUISITION AND CONTROL SYSTEM

**Harsha M. Dabholkar, Northbrook, and Gideon Shavit, Highland Park, both of Ill., assignors to Honeywell Inc., Minneapolis, Minn.**

**Filed Jun. 24, 1985, Ser. No. 748,074**

**Int. Cl.[4] H08J** *3/04*

**U.S. Cl. 370—112** **13 Claims**



1. A data acquisition system comprising:

a plurality of input/output lines, each of said input/output lines being capable of receiving either digital or analog signals as input, at least one of said input/output lines being capable of providing an electrical current as an output, and at least one of said input/output lines being capable of providing an electrical voltage as an output;

a multiplexer electrically connected to said input/output lines, for multiplexing signals received on those of said input/output lines receiving signals;

an analog to digital converter for receiving said multiplexed signals and providing a digital representation thereof;

an electrical current source adapted to be electrically connected to at least one of said input/output lines which is capable of providing an electrical current as an output; and

a first electrical voltage source adapted to be electrically connected to at least one of said input/output lines.

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**4,742,516**

## METHOD FOR TRANSMITTING VOICE INFORMATION

**Mikio Yamaguchi, Osaka, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan**

**Filed Jan. 10, 1986, Ser. No. 817,603**

**Claims priority, application Japan, Jan. 14, 1985, 60-3228; Jun. 13, 1985, 60-129018**

**Int. Cl.[4] H04J** *3/24;* **G08B** *5/22*

**U.S. Cl. 370—94** **27 Claims**

1. A method for transmitting information over a system having at least one broadcasting station and a plurality of receivers, comprising the steps of:

composing information packets each of which includes a text portion including a sequence of words and symbols, a classification code signifying the type of text being transmitted and a distinction code indicating which of a plurality of repetitions a particular message is annexed to for each text portion;

converting the information packets into digital signals;

transmitting the digital signals representing said information packets at least once;

receiving the digital signal information packets at said receivers, each of which as preprogrammed therein at least one classification code, the at least one pre-programmed classification code at a particular receiver being changed, added as a new classification code or deleted by a user for signifying the type of text the user wishes to receive at said particular receiver;

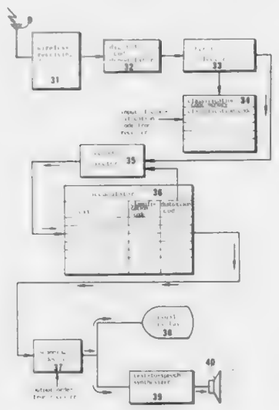
selecting received information packets with a classification

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code corresponding to the pre-programmed classification code at each receiver;

selecting the information packets with a distinction code other than the distinction codes corresponding to already accumulated text portions so that duplication information is not received;



accumulating the selected information packets; and

conveying to a user information corresponding to the text portions of the accumulated information packets by at least one of visually displaying said information and enunciating said information over a speaker at each receiver.

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**4,742,517**

**INTERLEAVING CIRCUIT**

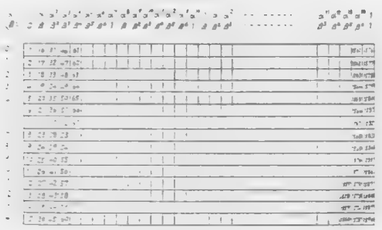
**Yuji Takagi; Isao Satoh, both of Neyagawa, and Tatsuo Sugimura, Kasuya, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan**

**Filed May 13, 1986, Ser. No. 862,814**

**Claims priority, application Japan, May 14, 1985, 60-101823**

**Int. Cl.⁴ G06F *11/10***

**U.S. Cl. 371—2** **5 Claims**



1. An interleaving circuit comprising:

a memory area having (m×n) matrix blocks;

first address generator means for generating a first address sequence of:

$$(R_1, C_1), (R_2, C_1), (R_3, C_1), \ldots, (R_m, C_1),$$

$$(R_1, C_2), (R_2, C_2), (R_3, C_2), \ldots, (R_m, C_2),$$

$$\vdots$$

$$(R_1, C_n), (R_2, C_n), (R_3, C_n), \ldots, (R_m, C_n),$$

where $(R_i, C_j)$ is an address of row i, column j of said memory area, and i and j are positive integers;

second address generator means for generating a second address sequence as:

$$(R_1, C_{J1(k)}) \begin{cases} \text{where } k = 1,2,3, \ldots, n, \text{ and } J_1(k) \text{ are natural} \\ \text{numbers not exceeding } n, \\ J_1(k_1) \neq J_1(k_2), \ (\ k_1, k_2 \epsilon k,\ k_1 \neq k_2) \end{cases}$$

$$(R_2, C_{J2(k)}) \begin{cases} \text{where } k = 1,2,3, \ldots, n, \text{ and } J_2(k) \text{ are natural} \\ \text{numbers not exceeding } n, \\ J_2(k_1) \neq J_2(k_2), \ (\ k_1, k_2 \epsilon k,\ k_1 \neq k_2) \end{cases}$$

$$\vdots$$

$$(R_m, C_{Jm(k)}) \begin{cases} \text{where } k = 1,2,3, \ldots, n, \text{ and } J_m(k) \text{ are natural} \\ \text{numbers not exceeding } n, \\ J_m(k_1) \neq J_m(k_2), \ (\ k_1, k_2 \epsilon k,\ k_1 \neq k_2) \end{cases}$$

, where

under $m_1, m_2 \epsilon (1,2, \ldots, m),\ m_1 \neq m_2$

$k_1, k_2 \epsilon (1,2,3, \ldots, n),$

when $J_{m1}(k_1) = J_{m2}(k_2),\ J_{m1}(k_1 + 1) \neq J_{m2}(k_2 + 1)$

(where " " means "arbitrary")

interleaving means, coupled to said memory area for interleaving information, including:

first storing means, coupled to said first address generator means, for storing product codes in said memory in the order of said first address sequence, said product codes which comprise a first code of code length m and a second code of code length n, where m and n are positive integers, and

first reading means, coupled to said second address generator means, for reading said product codes from said memory in the order of said second address sequence, thereby issuing record data; and

de-interleaving means, coupled to said memory area, for de-interleaving, including:

second storing means, coupled to said second address generator means, for storing demodulated data in said memory area in said order of said second address sequence, and

second reading means, coupled to said first address generator means, for reading said demodulated data memorized by said de-interleaving means in the order of said first address sequence, thereby issuing decoded data.

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**4,742,518**

**FAULT LOCATION SYSTEM FOR A DIGITAL TRANSMISSION LINE**

**Dennis A. Shedd, Lexington, Mass., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed May 27, 1986, Ser. No. 867,212**

**Int. Cl.⁴ H04B *3/46***

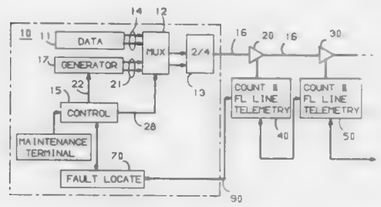
**U.S. Cl. 371—22** **6 Claims**

1. A digital transmission line fault location system including line termination means arranged for transmitting a test code sequence of signals onto the digital transmission line, and line regenerator means located along the digital transmission line for detecting the test code sequence of signals, the fault location system being characterized by

a fault location line.

means interconnected with the line regenerator means for determining and storing a count indicating errors detected in the test code sequence of signals during a predetermined period,

a fault location circuit in the line termination means being arranged for requesting over the fault location line a return transmission of the count indicating detected errors from the determining and storing means, and



the determining and storing means being responsive to the request from the fault location circuit for transmitting to the fault location circuit the count indicating detected errors during the predetermined period.

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**4,742,519**

**APPARATUS FOR DECODING ERROR CORRECTING CODE**

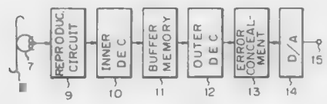
**Takao Abe; Kaichi Tatsuzawa; Hisanori Kominami; Tetsuro Suma; Tetsuo Ogawa, and Hiroki Kotani, all of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan**

**Filed May 20, 1986, Ser. No. 865,126**

**Claims priority, application Japan, May 21, 1985, 60-108880; May 25, 1985, 60-112772**

**Int. Cl.⁴ G06F *11/10***

**U.S. Cl. 371—38** **8 Claims**



3. Apparatus for decoding an error detecting and correcting code produced from digital information data reproduced from a record medium by a playback unit selectively operable in normal and varied playback speed modes, in which a speed signal indicates the selected playback speed mode and the code is a produce code formed of an inner code and an outer code, comprising:

an inner decoder responsive to said digital information data and said error detecting and correcting code for decoding the error detecting and correcting code and producing decoded digital information data and error flag data indicating error conditions of the digital information data;

a memory means connected to have written therein said decoded digital inforamtion data and said error flag data;

memory control means operably connected to said memory means and responsive to said speed signal for controlling writing and reading of said decoded digital information data and said error flag data into and out of said memory means; and

an outer decoder connected to said memory means for decoding the digital information data and the error flag data from said memory means for producing an error corrected digital information signal, in which all errors of an extent determined by said inner and outer codes are corrected.



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**4,742,520**

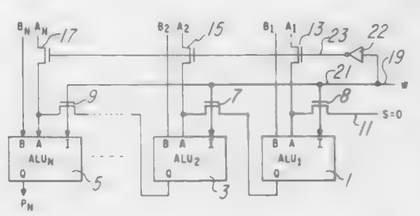
**ALU OPERATION: MODULO TWO SUM**

**Charles C. Hoac, Dallas, and John C. Linn, Richardson, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Sep. 26, 1984, Ser. No. 654,819**

**Int. Cl.⁴ G06F *11/10, 7/38, 7/50***

**U.S. Cl. 371—49** **8 Claims**



1. An ALU system, which comprises:

(a) a plurality of ALU circuits, each ALU circuit including a pair of input terminals and an output terminal,

(b) plural input lines, certain ones of said input lines normally connected to different ones of said input terminals,

(c) plural output lines, each output line connected between a different one of the output terminals of one of said ALU circuits and one of the input terminals of a succeeding one of said ALU circuits to form a series circuit, said series circuit including a first ALU circuit,

(d) first normally closed switch means controlling connection of said one of the input lines to each said ALU circuit,

(e) second normally open switch means controlling connection of said output lines; and

(f) control means coupled to said first and second switch means to simultaneously open said first switch means and close said second switch means, said control means including means to place a predetermined signal on the input terminal thereof controlled by said first swtich means.

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**4,742,521**

**BAR CORD INFORMATION INPUT CONFIRMING METHOD**

**Manabu Nishida, Shizuoka, Japan, assignor to Tokyo Electric Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 754,219, Jul. 12, 1985, abandoned. This application Sep. 4, 1987, Ser. No. 94,094**

**Claims priority, application Japan, Jul. 12, 1984, 59-145055**

**Int. Cl.⁴ G06F *11/10***

**U.S. Cl. 371—54** **2 Claims**



1. The method of confirming bar code information which is

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input to a bar code printer where the bar code information is in accordance with a bar code version, comprising the step of:

manually inputting said bar code information including a plurality of digits and a first check digit;

automatically calculating a value based on said plurality of digits;

comparing said first check digit and said value to determine if they are equal and to confirm that errors are not present in said bar code information;

automatically calculating a second check digit based on said bar code information, if said first check digit is equal to said value, wherein said second check digit is a check digit for checking whether the bar code as read is correct;

storing said first check digit, said second check digit and said value in a RAM having a first check digit area, a second check digit area and a value area; and

printing a label containing said bar code information and said second check digit.

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**4,742,522**

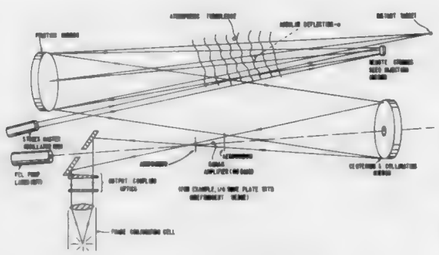
## FREE-ELECTRON LASER SYSTEM WITH RAMAN AMPLIFIER OUTCOUPLING

**Gary J. Linford, Torrance, Calif., assignor to TRW Inc., Redondo Beach, Calif.**

**Filed Jun. 18, 1987, Ser. No. 63,375**

**Int. Cl.⁴ H01S *3/00***

**U.S. Cl. 372—2** **21 Claims**



1. A free-electron laser system, comprising:

a free-electron laser pump beam generator producing a high-power optical output beam in a vacuum environment;

a Raman amplifier cell located in the path of the output beam from the pump beam generator;

means for generating and introducing a Stokes seed beam into the Raman amplifier cell, the seed beam having divergent properties within the cell and having a desired cross-sectional shape and spectral content, wherein the Raman amplifier amplifies the seed beam and generates a high-power output beam of generally the same shape, divergence, phase and spectral content as the seed beam, and wherein unwanted spectral components are unaffected by the amplifier and are closely confined to the pump beam axis;

a pair of gaseous windows through which the output beam enters and leaves the Raman amplifier cell, each window having a stream of gas moving continuously in a direction generally perpendicular to the beam; and

a mirror positioned in the path of the output beam from the Raman amplifier, the mirror functioning to reflect and further direct the output beam, but not the unwanted spectral components.

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**4,742,523**

## SEMI-PASSIVE Q-SWITCH

**Aaron N. Fletcher, P.O. Box 1314, Ridgecrest, Calif. 93555**

**Continuation of Ser. No. 687,799, Dec. 31, 1984. This application Jan. 20, 1987, Ser. No. 5,972**

**Int. Cl.⁴ H01S *3/113***

**U.S. Cl. 372—11** **8 Claims**

1. In a modified Q-switch laser apparatus for generating an effective high peak power output of laser light energy having:

an optical cavity formed by an active lasing medium means and two reflecting elements on either side of said means, said lasing means positioned within said cavity for the production of laser light emission during population inversion thereof, said laser light emission having a wavelength of 1.00 to 1.80 micrometers, and a first pumping energy source coupled to said lasing means for stimulating the population inversion thereof, the improvement comprising:

a light control means interposed between said lasing means and one of said reflecting elements to control said laser light emission, said light control means being a solution of an aromatic polycyclic compound; and

a second pumping energy source coupled to said light control means for exciting the polycyclic aromatic compound from singlet states to triplet states such that when said polycyclic aromatic compound is in the triplet state it absorbs laser light energy of 1.00 to 1.80 micrometers wavelength in the transitions from a first triplet state to a second triplet state until saturation of triplet-triplet absorption occurs, allowing the transmission of laser light energy through said light control means.

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**4,742,524**

## LASER WITH VARIABLE EMISSION WAVELENGTH

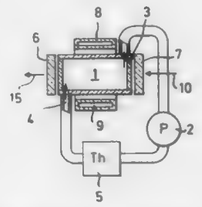
**Gerhard Müller, Aalen-Wasseralfingen, Fed. Rep. of Germany, assignor to Carl-Zeiss-Stiftung, Heidenheim/Brenz, Oberkochen, Fed. Rep. of Germany**

**Filed Dec. 19, 1985, Ser. No. 810,588**

**Claims priority, application Fed. Rep. of Germany, Dec. 24, 1984, 3447311**

**Int. Cl.⁴ H01S *3/10***

**U.S. Cl. 372—20** **15 Claims**




1. A laser with variable emission wave-length consisting of a resonator containing the mixture of a first substance, present as a granulate, together with a second substance, at least one of said substances being laser-active, the dispersion curves of the indices of refraction of said two substances having at least one intersection, and a source of pumping light which emits light at a wavelength or in a wavelength region which is outside any wavelength of intersection of said dispersion curves; the dispersion curve of each of said substances having a course which is dependent on temperature or pressure, and selectively operable means for varying the temperature or pressure of said mixture to thereby select the emission wavelength of the laser.



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**4,742,525**

## COUPLED LASER DIODE ARRANGEMENT

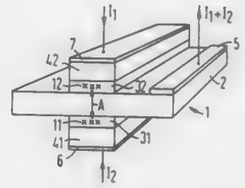
**Jochen Heinen, Haar, and Markus-Christian Amann, Munich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Sep. 6, 1985, Ser. No. 773,018**

**Claims priority, application Fed. Rep. of Germany, Sep. 21, 1984, 3434741**

**Int. Cl.⁴ H01S *3/18***

**U.S. Cl. 372—44** **5 Claims**




1. An arrangement of two coupled laser diodes, comprising:

first and second two-layer structures, each structure having a strip-shaped laser-active zone;

a middle layer;

a first of the two diodes being formed of the first two-layer structure together with the middle layer and a second of the two diodes being formed of the second two-layer structure together with the middle layer;

the first and second two-layer structures being symmetrically constructed relative to the middle layer at opposite sides thereof so that the strip-shaped laser-active zones in each of the two-layer structures are positioned adjacent the middle layer and at a defined spacing directly opposite from each other and in symmetrical manner with respect to the middle layer; and

the middle layer being an epitaxially deposited layer having a precisely dimensioned thickness relative to the two coupled laser diodes being formed.

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**4,742,526**

## SEMICONDUCTOR LASER ARRAY DEVICE

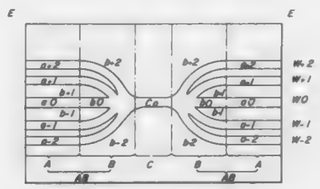
**Sadayoshi Matsui; Mototaka Taneya, and Mitsuhiro Matsumoto, all of Tenri, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Jan. 6, 1986, Ser. No. 816,311**

**Claims priority, application Japan, Jan. 12, 1985, 60-3780; Jan. 16, 1985, 60-6149**

**Int. Cl.⁴ H01S *3/19, 3/13, 3/082***

**U.S. Cl. 372—44** **3 Claims**




1. A semiconductor laser array device comprising an optical waveguide which is composed of a single waveguide disposed in a center portion thereof and a plurality of branching waveguides disposed at each of both end portions thereof, said branching waveguides being positioned symmetrically with respect to a waveguiding direction of laser beams and being parallel to each other near respective facets, said branching waveguides being different in light-path length from one of said facets to said single mode waveguide in the center portion in order that phase shift between adjacent waveguides is the integral multiple of 2 $\pi$ with respect to laser beams propagated in said waveguides, thereby oscillating said laser beams with a 0°-phase shift therebetween.

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**4,742,527**

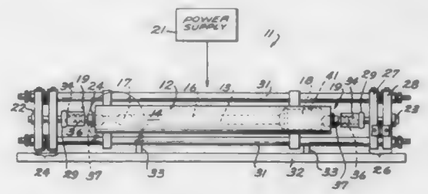
## LASER HAVING BRAZED ANODE

**Rudolf A. Wiedemann, Sunnyvale; Michael R. Love, Mountain View, and Paul A. Lovoi, Saratoga, all of Calif., assignors to Cooper Lasersonics, Santa Clara, Calif.**

**Filed May 17, 1985, Ser. No. 735,560**

**Int. Cl.⁴ H01S *3/097***

**U.S. Cl. 372—87** **16 Claims**




1. In a laser tube defining a containment volume for a lasable medium;

window structures at opposite ends of said tube to permit escape from said tube of optical radiation resulting from lasing action;

and means for exciting said lasable medium, said means including at least one electrically conductive electrode adhered by brazing directly to ceramic of said tube without accommodation for differential thermal expansion between said electrode and said ceramic.

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**4,742,528**

## COMPENSATION FOR POWER FEED LINE WEIGHT IN WEIGHT MEASUREMENT DEVICES

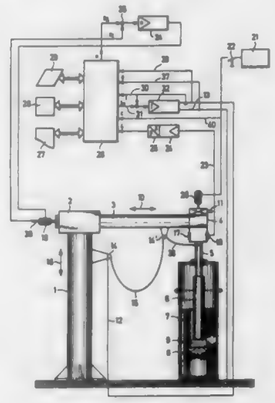
**Otto Stenzel, Gründau, Fed. Rep. of Germany, assignor to Leybold-Heraeus GmbH, Fed. Rep. of Germany**

**Filed Aug. 12, 1986, Ser. No. 895,890**

**Claims priority, application Fed. Rep. of Germany, Aug. 12, 1985, 3528867**

**Int. Cl.⁴ H05B *7/148***

**U.S. Cl. 373—70** **16 Claims**



7. An apparatus for compensating for the influence of the weight of a power feed line in a weight measurement device for the weight of an electrode during melting in electro-slag remelting processes, in vacuum arc furnaces and the like, the

influence varying for each lateral change in position of the electrode, the apparatus comprising:

means for calculating a first function $G=f(t)$, wherein G is the predicted weight of an electrode, the first function including a correction value;

means for calculating a second function $G'=f(t)$, wherein G is the actual weight of the electrode;

means for predicting the weight G of the electrode by utilizing the first function, for each lateral change in position of the electrode during melting, during a time interval $\Delta t$;

means for weighing the electrode during each time interval $\Delta t$ to determine the actual weight, by utilizing the second function; and,

means for determining the difference $\Delta G$ between the predicted weight and the measured weight at the end of each time interval $\Delta t$, each $\Delta G$ being factored into the first function as the correction value for the next subsequent prediction, whereby the actual weight of the electrode can be accurately predicted and current supplied thereto can be precisely controlled to optimize the melting.

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**4,742,529**

## THREE-PHASE ARC FURNACE

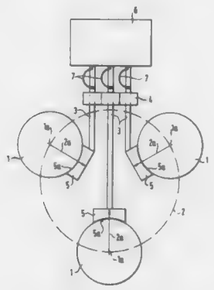
**Thomas H. Taube, Neunkirchen a. Brand, Fed. Rep. of Germany, assignor to C. Conradty Nurnberg GMBH & Co. KG, Fed. Rep. of Germany**

**Filed Jan. 20, 1987, Ser. No. 4,620**

**Claims priority, application Fed. Rep. of Germany, Jan. 23, 1986, 3601989**

**Int. Cl.⁴ H05B** *7/103*

**U.S. Cl. 373—101** **4 Claims**



1. A three-phase electrical arc furnace for smelting of steel, comprising three electrodes symmetrically arranged on a circle for connection to the three phases of a power supply, each of said electrodes being carried by a contact pad, each contact pad being carried by a horizontal carrier arm, said contact pads being arranged centrosymmetrically within said circle.

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**4,742,530**

## RADIO RELAY METHOD AND ITS APPARATUS FOR DIGITAL COMMUNICATION

**Masahisa Kawai, Zama, Japan, assignor to Fujitsu Limited, Japan**

**Continuation of Ser. No. 669,837, Nov. 9, 1984, abandoned. This application Aug. 20, 1986, Ser. No. 898,873**

**Claims priority, application Japan, Nov. 11, 1983, 58-212011**

**Int. Cl.⁴ H04L** *25/52;* **H04B** *3/46*

**U.S. Cl. 375—4** **9 Claims**

1. An apparatus for radio relay for digital communication, for determining whether a received signal received at a relay station comes from a correct route to which said relay station belongs or from an incorrect route, said apparatus comprising:

means for converting an input radio frequency signal into a received intermediate frequency signal (IF), said received IF signal including said received signal and said received signal comprising a main signal and a received auxiliary signal including a received route signal for discriminating said route;

a radio squelch and switching circuit having an input operatively connected to said means for converting;

means for separating said received IF signal into first and second IF signals at the input of said radio squelch and switching circuit;

means for demodulating the received auxiliary signal in the first IF signal;

means for stopping the first IF signal from going to said means for demodulating, when a mean level of said received IF signal decreases to a noise level;

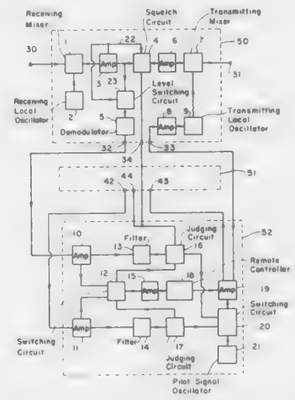
means for detecting the received route signal in said demodulated received auxiliary signal;

means for determining whether said received route signal is correct for said route;

a remote controller for removing and inserting supervisory signals;

an auxiliary signal switching circuit operatively connected to said remote controller and said means for demodulating;

means for making said received auxiliary signal go to said remote controller by turning on said auxiliary signal switching circuit using said means for determining, when said means for determining determines said received route signal is correct;




means for providing a substitute auxiliary signal from said relay station by removing information from said received auxiliary signal and adding a supervisory signal at said remote controller, when said means for determining determines said received route signal is correct;

a transmitting local oscillator;

means for feeding said substitute auxiliary signal to said transmitting local oscillator, when said means for determining determines said received route signal is correct;

a route signal oscillator for generating a substitute route signal;

a route signal switching circuit operatively connected to said route signal oscillator and said transmitting local oscillator;

means for stopping the substitute route signal generated by said route signal oscillator from going to said transmitting local oscillator by turning off said route signal switching circuit using said means for determining when said means for determining determines said received route signal is correct;

a transmitting mixer operatively connected to said radio squelch and switching circuit;

means for making the second IF signal go to said transmitting mixer by controlling said radio squelch and switching circuit using said means for determining, when said means for determining determines said received route signal is correct; and

means for sending said received IF signal with said received route signal and said substitute auxiliary signal to a successive relay station using said transmitting mixer as modulated by said transmitting local oscillator, when said judging circuit judges said received route signal is correct.



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**4,742,531**

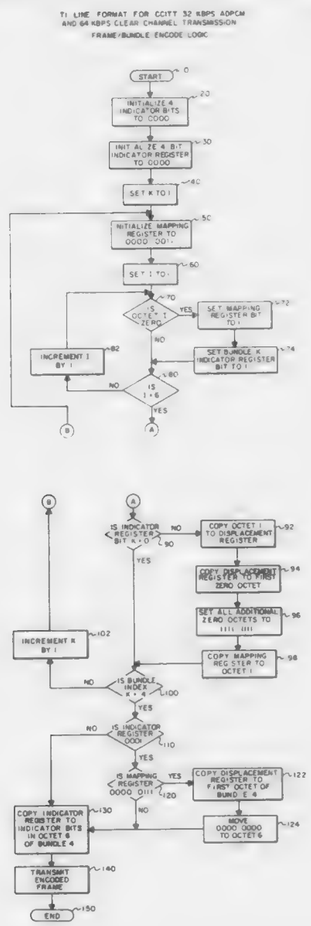
## ENCODING METHOD FOR T1 LINE FORMAT FOR CCITT 32K BIT PER SECOND ADPCM CLEAR CHANNEL TRANSMISSION

**Ernest E. Blondeau, Jr., Phoenix, and Stephen J. Czarnecki, Scottsdale, both of Ariz., assignors to GTE Communication Systems Corporation, Phoenix, Ariz.**

**Filed Sep. 2, 1986, Ser. No. 902,825**

**Int. Cl.⁴ H04B** *14/04*

**U.S. Cl. 375—25** **20 Claims**




1. In a data transmission system having first and second digital switching systems connected via T1 line transmission facilities for bidirectional data transmission, an encoding method of T1 line zero bit suppression comprising the steps of:

grouping a predetermined plurality of channels of a T1 line frame into a bundle;

marking said bundled channels whose contents are all zeroes;

first iterating said step of marking for each of said channels of said bundle;

setting an indication, within said bundle of channels, of a relative location of each all zero channel of said bundle;

replacing said zero contents of all said identified channels of said bundle of said T1 line frame with logic ones;

second iterating said steps of grouping, marking, first iterating, setting and replacing for each of said bundles of said T1 line frame to produce an encoded data frame; and

transmitting said encoded data frame via said T1 line transmission facilities.

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**4,742,532**

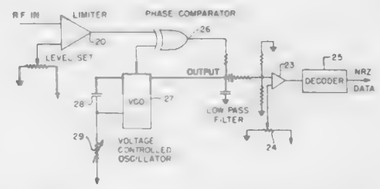
## HIGH SPEED BINARY DATA COMMUNICATION SYSTEM

**Harold R. Walker, 78 Oliver Ave., Edison, N.J. 08817**

**Filed May 8, 1986, Ser. No. 861,049**

**Int. Cl.⁴ H04L** *27/18*

**U.S. Cl. 375—50** **19 Claims**




16. In a high speed data transmission system for transmitting a binary NRZ data signal over a communications path, said signal transmitted as a narrow single sideband signal characterized in that there are distinct phase angle changes in said signal indicative of binary data transitions as from a zero to a one or a one to a zero, said sideband signal as transmitted being completely devoid of a carrier frequency and having only a portion of a sideband containing NRZ information in combination therewith, decoding means for such a single sideband signal, comprising:

a limiter having an input adapted to receive said single sideband signal for providing at an output a limited version of said signal;

a phase change detector means having an input coupled to said output of said limiter and having a voltage controlled oscillator tuned to the approximate center frequency of said sideband signal for providing a signal consisting of pulses at the output indicative of said distinct phase angle changes, and

decoding means coupled to the output of said phase change detector means for restoring a binary NRZ data signal from said pulses.

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**4,742,533**

## SOFT DECISION DIGITAL COMMUNICATION APPARATUS

**Michael Y. Weidner, Phoenix, and Michael F. Durkin, Scottsdale, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Jan. 2, 1987, Ser. No. 232**

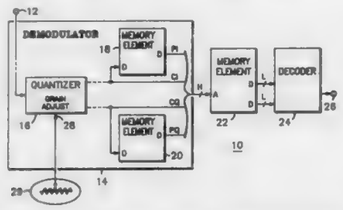
**Int. Cl.⁴ H03K** *9/04*

**U.S. Cl. 375—85** **14 Claims**

8. A method of providing received information to a convolutional decoder in a system that communicates convolutionally encoded data, said method comprising the steps of:

demodulating a received signal so that a quantized output exhibiting a predetermined quantization grain and any one of $2^H$, where H is a positive integer number, possible unique received vector values is provided;

producing, in a memory element with an address input which receives the quantized output, one of $2^L$, where L is a positive integer number, unique soft data values




wherein the one soft data value has approximately the same probability of occurrence as any other of the $2^L$ soft data values at the predetermined quantization grain;

coupling the memory element to the decoder.

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**4,742,534**

**TELEPHONE RECEIVING EQUIPMENT FOR RECOGNIZING PREDETERMINED COMBINATIONS OF VOICE-FREQUENCY SIGNALLING COMPONENTS**

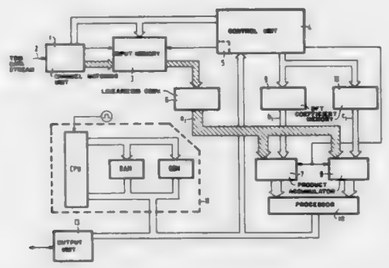
**Robert J. M. Verbeek; Rudolf Van Bokhorst; Hendrikus J. Dekker, and Johannes H. M. Velthof, all of Hilversum, Netherlands, assignors to U.S. Philips Corp., New York, N.Y.**

**Filed Jul. 11, 1986, Ser. No. 884,702**

**Claims priority, application Netherlands, Jul. 12, 1985, 8502008**

**Int. Cl.⁴ H04L** *5/06*

**U.S. Cl. 375—89** **11 Claims**




1. In a telephone receiving equipment for recognizing a number of different combinations of a plurality of nominal voice-frequency signalling components, such signalling components being in a frequency band which is divided into two subgroups; said equipment comprising a plurality of Discrete Fourier Transform (DFT) digital signal-processing devices each having a frequency response characteristic with a main lobe at a frequency corresponding to that of one of the signalling frequency components to be detected by such device, and a processor adapted to process the outputs of the digital signal-processing devices to determine the two signalling frequency components which are received with the greatest strength and to evaluate the outputs of the signal processing devices for the remaining signalling frequency components so as to provide a voice-signal guard function; the improvement characterized in that:

the frequency response characteristic of each of said DFT digital signal-processing devices has a first side lobe and a second side lobe, each lobe having a top, the tops of the first and second side lobes being respectively situated below and above the subgroup frequency band which includes the signalling frequency component to be detected by such device; and

said processor is adapted to (a) successively add the outputs of a number of the signal processing devices so as to derive a sum which is representative of the total energy content of all the received signalling frequency components other than the two of such components which are received with the greatest strength, and (b) compare such sum with a threshold value derived from one of said two signalling components which are received with the greatest strength.

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**4,742,535**

**INVERTER TYPE X-RAY APPARATUS**

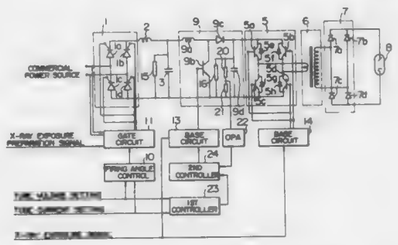
**Hirofumi Hino, Noda; Hideki Uemura, Kashiwa; Kazuo Kaneko, Omiya; Takanobu Hatakeyama, Ryugasaki, and Kazuo Yamamoto, Ibaraki, all of Japan, assignors to Hitachi Medical Corporation, Tokyo, Japan**

**Filed Dec. 23, 1985, Ser. No. 812,845**

**Claims priority, application Japan, Dec. 28, 1984, 59-279737**

**Int. Cl.⁴ H02M** *3/335;* **H05G** *1/20*

**U.S. Cl. 378—105** **16 Claims**




1. An inverter type X-ray apparatus comprising:

rectifying means for converting an AC power signal from an AC power source into an input DC voltage,

a DC-DC converter for converting said input DC voltage into an output DC voltage different from said input DC voltage, said DC-DC converter including voltage control means for controlling said DC-DC converter such that said output DC voltage is higher than said input DC voltage,

an inverter means for inverting said output DC voltage of said DC-DC converter into an AC voltage,

rectifying control means for controlling said rectifying means such that said input DC voltage of said DC-DC converter is increased or decreased based on an output of said rectifying control means,

a high voltage transformer for transforming an output voltage of said inverter into a higher voltage,

a rectifier circuit means for converting an output voltage of said high voltage transformer into an DC voltage, and

an X-ray tube to which an output voltage of said rectifier circuit means is applied.

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**4,742,536**

**TELEPHONE MONITOR CIRCUIT AND METHOD**

**William G. Dewenter, Bellbrook, Ohio, and Stephen D. Neale, Scottsdale, Ariz., assignors to Energy Innovations, Inc., Dayton, Ohio**

**Filed Oct. 24, 1986, Ser. No. 922,874**

**Int. Cl.⁴ H04M** *11/00*

**U.S. Cl. 379—97** **9 Claims**

1. A communication system connected to a pair of telephone conductors which supply telephone service to a telephone subscriber, comprising:

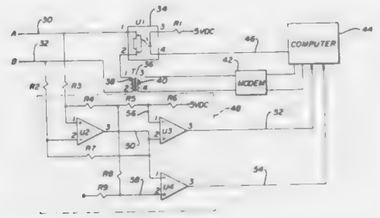
transformer means having a first winding connected to one of said pair of telephone conductors,

a modem connected to a second winding of said transformer means, for communicating over said telephone via said transformer means,

voltage sensor means for sensing the voltage across said telephone conductors and detecting a reduction in the voltage level across said conductors, such reduction indicating an off-hook condition of a susbscriber telephone unit, and

switch means, connected in series between said first winding and the other of said pair of telephone conductors, for






connecting said transformer means to said pair of telephone conductors and for periodically disconnecting said transformer means from said telephone conductors during operation of said modem thereby permitting said voltage sensor means to check for an off-hook condition.

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**4,742,537**

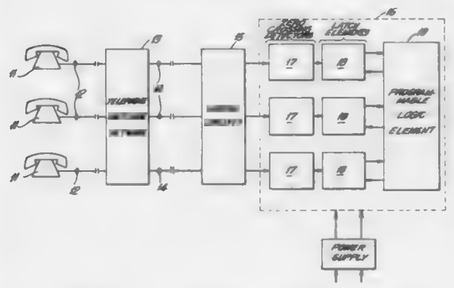
**TELEPHONE LINE MONITORING SYSTEM**

**Robert Jesurum, Stamford, Conn., assignor to Electronic Information Systems, Inc., Stamford, Conn.**

**Filed Jun. 4, 1986, Ser. No. 870,506**

**Int. Cl.⁴ H04M** *1/24, 1/26*

**U.S. Cl. 379—351** **24 Claims**




1. A circuit for characterizing a sound signal by sampling the electrical signal produced by an electroacoustic transducer, comprising:

(a) means for detecting the occurrence of each waveform composing a sampled electrical signal;

(b) means for measuring the wavelength of each waveform detected;

(c) means for counting the number of waveforms within each of a plurality of predetermined wavelength groupings; and

(d) means for characterizing the sound signal based on the counts of waveforms within the plurality of predetermined wavelength groupings and the distribution thereof.

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**4,742,538**

**CURRENT SOURCE AND OFF-HOOK DETECTOR**

**Aleksander Szlam, Marietta, Ga., assignor to Melita Electronic Labs, Inc., Atlanta, Ga.**

**Division of Ser. No. 752,053, Jul. 5, 1985, Pat. No. 4,677,663.**

**This application Jan. 29, 1987, Ser. No. 8,344**

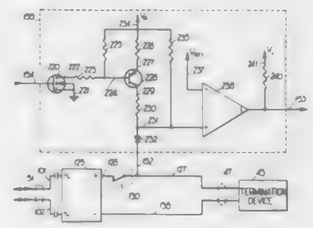
**Int. Cl.⁴ H04M** *1/72*

**U.S. Cl. 379—361** **11 Claims**

1. A current source and off-hook detector for selectively providing internal or external operating voltage and current to a telephone set and for providing an output signal responsive to whether said telephone set is on-hook or off-hook, comprising:

isolation means responsive to a first command signal for selectively connecting a subscriber telephone line to an extension line, said extension line being connected to said telephone set, said subscriber telephone line providing said external operating voltage and current;

first current source means, responsive to a second command signal, for selectively placing said internal operating voltage and current for said telephone set onto said extension line;




voltage comparator means for providing said output signal responsive to a predetermined reference voltage and to the voltage on said extension line;

tone decoder means connected to said extension line and responsive to a predetermined dual-tone multiple-frequency (DTMF) signal from said telephone set for providing a third command signal; and

control means responsive to said output signal and said third command signal for providing said first command signal and said second command signal.

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**4,742,539**

**TELEPHONE LOOP CURRENT MODULATOR**

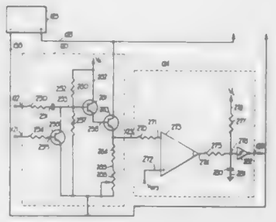
**Aleksander Szlam, Marietta, Ga., assignor to Melita Electronic Labs, Inc., Atlanta, Ga.**

**Division of Ser. No. 752,053, Jul. 5, 1985, Pat. No. 4,677,663.**

**This application Feb. 12, 1987, Ser. No. 14,015**

**Int. Cl.⁴ H04M** *19/02*

**U.S. Cl. 379—377** **14 Claims**



1. For use with a telephone system including a telephone company central office for providing a loop current and a subscriber line which conducts said loop current, a transformerless loop current modulator responsive to an audio input signal for placing audio signals onto said subscriber line by modulating said loop current, comprising:

variable resistance means connected across said subscriber line for modulating said loop current by conducting a variable current corresponding to a bias voltage;

biasing means for providing said bias voltage, said bias voltage biasing said variable resistance means in a linear operating region;

modulating means responsive to said audio input signal for modulating said bias voltage; and

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switching means connected to said biasing means and responsive to a digital command signal for allowing said variable current to be conducted by enabling said variable resistance means.

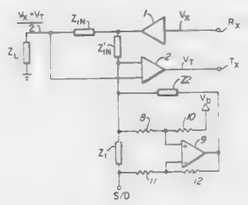
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**4,742,540**

## CIRCUIT FOR SWITCHING BETWEEN BALANCED NETWORKS

**Pierre J. Schingh, Gatineau, Canada, assignor to Mitel Corporation, Ontario, Canada**

**Filed Nov. 14, 1986, Ser. No. 931,410**
**Claims priority, application Canada, Apr. 9, 1986, 506245**
**Int. Cl.[4] H04M** *1/76*
**U.S. Cl. 379—403** **10 Claims**



1. A circuit for switching one of two impedance networks to a line carrying AC signals, comprised of:

(a) unity gain amplifier means having first and second inputs, said first input being connected to the line, said first and second inputs being connected across a first one of said networks, and said first input and an output of said amplifier means being connected across the second of said two networks, and

(b) means for connecting and disconnecting said second input from a source of AC ground,

whereby in the event said second input is connected to the source of AC ground, AC signals carried by the line are applied differentially to said first and second inputs, amplified in said unity gain amplifier means so as to be applied substantially equally across said second network such that said first network is switched to the line, and in the event said second input is disconnected from the source of ground, AC signals carried by the line are applied substantially equally to said first and second inputs, cancelled in said unity gain amplifier means such that the voltage on said output of the amplifier means goes to AC ground level and said second network is switched to the line.

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**4,742,541**

## TELECOMMUNICATIONS INTERFACE WITH PROTECTOR MODULES

**Casimir Cwirzen, Arlington Heights, and Donald F. Jaycox, Deerfield, both of Ill., assignors to Northern Telecom Limited, Montreal, Canada**

**Continuation of Ser. No. 545,171, Oct. 25, 1983, abandoned.**
**This application Oct. 29, 1986, Ser. No. 925,486**
**Int. Cl.[4] H04M** *9/00, 1/15;* **H01R** *13/40, 31/00;* **H02H** *3/22;* **H02G** *3/10*
**U.S. Cl. 379—412** **8 Claims**

1. A telecommunications interface for connection between incoming telephone lines and customer equipment, comprising:

a base for mounting on a support surface and including terminals for connection of incoming telephone lines and a plug-in receptacle electrically connected with said terminals;

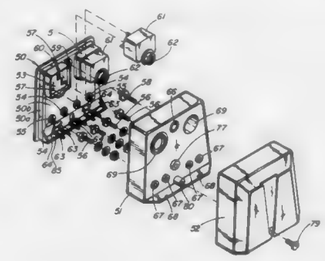
entry means in said base for receiving telephone lines for attachment to said terminals;

at least one plug-in module provided with plug-in means for electrically connecting said module with said plug-in receptacle, the module including a housing on a modular jack supported by said housing;

said modular provided with protector means located in said module housing;

an intermediate cover attached to said base and extending over said module and said terminals, the intermediate cover including an aperture for access to said modular jack;

terminals also mounted on said intermediate cover for also permitting connection of conductors from customer



equipment, and an interconnect cable electrically connected with said with said terminals of the intermediate cover and provided with a modular plug for insertion in the modular jack;

entry means in said intermediate cover for receiving conductors of customer equipment to said modular jack; and

an outer cover extending over said intermediate cover and means for attaching said outer cover to said intermediate cover.

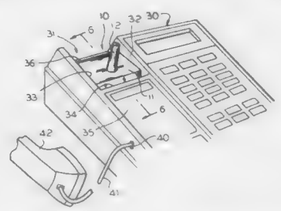
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**4,742,542**

## TELEPHONE SWITCH-HOOK ACTUATOR APPARATUS

**C. Earl Jantzi, 43055 Delany Rd., Zion, Ill. 60099**

**Filed Sep. 17, 1986, Ser. No. 908,216**
**Int. Cl.[4] H04M** *1/06*
**U.S. Cl. 379—441** **7 Claims**



1. A telephone switch-hook actuator apparatus for use with a telephone set incorporating a handheld handset which rests within a handset well through which protrudes a telephone switch-hook whereby said telephone switch-hook actuator apparatus, having a positioned center of mass, serves to operate said telephone switch-hook in place of said handset thereby permitting the use of a remote headset with said telephone set, said telephone switch-hook actuator apparatus comprising:

well plate means having a top surface and a bottom surface positioned within the handset well of said telephone set proximate to said switch-hook whereby said well plate means may be tipped from a horizontal position to a vertical position within said handset well for respectively depressing and releasing said telephone set switch-hook such that said telephone set is deactivated in said respective depressed horizontal position and where said telephone set is activated in said respective released vertical position;

lever means having a first end and a second end where said second end is operably affixed to said well plate means for facilitating the tipping of said well plate means,



said lever means being of such length and affixed to said well plate means so as to releasably retain said well plate means in a substantially vertical position and so as to position said center of mass of said telephone switch-hook actuator apparatus in a manner which facilitates the tipping of said well plate means from said vertical position to said horizontal position.

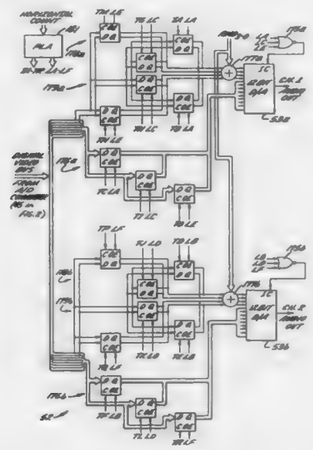
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**4,742,543**

## VIDEO TRANSMISSION SYSTEM

**Jeffrey E. Frederiksen, 603 West Haven Dr., Arlington Heights, Ill. 60005**

**Division of Ser. No. 564,405, Dec. 22, 1983, Pat. No. 4,682,360.**
**This application Jul. 10, 1986, Ser. No. 884,217**
**Int. Cl.[4] G04L** *9/00*
**U.S. Cl. 380—9** **7 Claims**



6. A method of transmitting an audio signal in a composite video signal comprising the steps of:

(a) repetitively digitizing the audio signal to repetititively generate a digital portion and a respective remainder portion, wherein said digitizing is performed by sampling the audio signal at spaced instants in time and quantizing each audio sample to at least sixteen spaced levels to generate the digital portion, the digital portion being the audio sample quantized to four bits of resolution, the respective remainder portion having a value that is approximately the difference between the audio sample and the respective digital portion at the respective spaced instants in time,

(b) transmitting the digital portions and their respective remainder portions as a series of analog samples interlaced with a video signal in said composite video signal, the analog samples representing the remainder portions having substantially more resolution than the resolution of the analog samples representing the digital portions, wherein each digital portion is transmitted as two analog samples each of which is quantized to four levels, and wherein each remainder portion is transmitted as a single analog sample,

(c) receiving the series of analog samples, quantizing the analog samples representing the digital portions to generate quantized values, and adding the quantized values to values of the analog samples representing the respective remainder portions to thereby generate a series of values representing the transmitted audio signal.

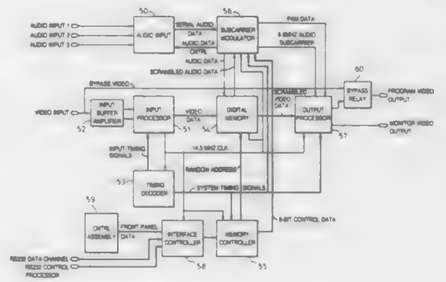
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**4,742,544**

## TELEVISION TRANSMISSION NETWORK WITH SCRAMBLING AND DESCRAMBLING

**Richard A. Kupnicki, 584 Farewell Street, Oshawa, Ontario, Canada L1H 6M8, and Stanley R. Moote, 9 Gervais Drive, Brampton, Ontario, Canada L6Y 2V3**

**Filed Jul. 9, 1984, Ser. No. 629,180**
**Int. Cl.[4] H04N** *7/167;* **H04L** *9/00*
**U.S. Cl. 380—14** **11 Claims**



6. A method for encryption/decryption processing of an input composite video signal which comprises segments of video information within successive time slots in a synchronization framework defined by sychronization information contained by the signal, sid method comprising:

separating said segments of video information from said sychronization framework;

writing said successive segments into locations in a memory device addressed according to a randomly time-varying sequence;

reading said segments from locations in said memory device addressed according to a different sequence, each segment of video information read from an addressed location in the memory being replaced by a next segment to be written into the memory; and

reintegrating said segments into a similar synchronization framework to form an output composite video signal, but with segments in said different sequence.

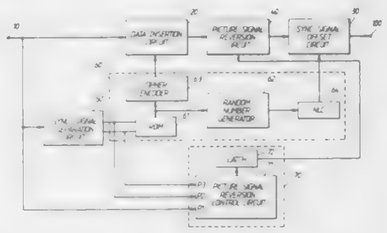
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**4,742,545**

## VIDEO PICTURE SIGNAL SCRAMBLING SYSTEM

**Akinori Masuko, Fukaya, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Sep. 30, 1986, Ser. No. 913,387**
**Claims priority, application Japan, Sep. 30, 1985, 60-214959**
**Int. Cl.[4] H04N** *7/167*
**U.S. Cl. 380—17** **46 Claims**



1. A video signal scrambling system comprising:

detecting means for detecting a brightness level of the picture signal over a predetermined interval;

means coupled to the detecting means for comparing the

brightness level with a first predetermined reference value;

means for generating a control signal; and

scrambling means responsive to the comparing means for inhibiting reversion of the picture signal when the brightness level of the picture signal exceeds the first reference value, and for selectively reversing the picture signal in response to the control signal; and

low level means for comparing the brightness level with a second predetermined reference value lower than the first predetermined reference value and for forcibly reversing the picture signal when the brightness level is less than a second reference value.

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**4,742,546**

## PRIVACY COMMUNICATION METHOD AND PRIVACY COMMUNICATION APPARATUS EMPLOYING THE SAME

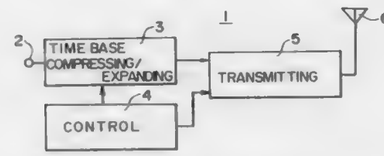
**Satoshi Nishimura, 83 Ozakikita-machi 1-chome, Kagamigahara-shi, Gifu-ken, Japan (504)**

**Filed Sep. 14, 1983, Ser. No. 532,195**

**Claims priority, application Japan, Sep. 20, 1982, 57-164763; May 20, 1983, 58-89500; Jun. 20, 1983, 58-111325**

**Int. Cl.[4] H04L** *9/00*

**U.S. Cl. 380—35** **9 Claims**




1. A privacy communication apparatus comprising:

transmitter means for transmitting a signal and for either only compressing or only expanding the time base of said signal during alternate successive predefined time segments thereof, said transmitter means including transmission clock pulse generating means for generating clock pulses and transmission signal variable delaying means responsive to said clock pulses for performing said alternate compression and expansion of said time base of said signal to be transmitted; and

receiving means for receiving and demodulating said signal transmitted from said transmitting means and for either only expanding or only compressing the time base of said received signal during said alternate time segments that were subject, respectively, to said compression and expansion by said transmitting means, said receiving means including reception clock pulse generating means for generating clock pulses and reception signal variable delaying means responsive to said clock pulses from said reception clock pulse generating means to be controlled for performing said alternate expansion and compression of the time base of said received signal;

wherein said transmission signal and reception signal variable delaying means each provide a delay of one time segment, so that input signal portions occurring during a compressed time segment are expanded to fill the next expanded time segment and input signal portions occurring during an expanded time segment are compressed to fill the next compressed time segment, whereby a signal is restored to its original condition after passing through both the transmission signal and reception signal variable delaying means.

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**4,742,547**

## PATTERN MATCHING APPARATUS

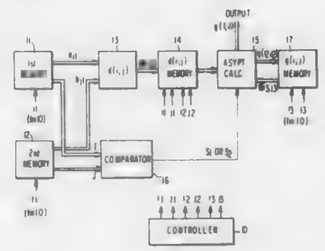
**Takao Watanabe, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Continuation of Ser. No. 910,868, Aug. 24, 1986, abandoned, which is a continuation of Ser. No. 529,826, Sep. 6, 1983, abandoned. This application Jul. 28, 1987, Ser. No. 80,249**

**Claims priority, application Japan, Sep. 3, 1982, 57-153767**

**Int. Cl.[4] G10L** *5/00*

**U.S. Cl. 381—51** **7 Claims**




1. A pattern matching apparatus for speech pattern recognition comprising:

first means for developing a first quantity representing a distance or similarity measure between feature vectors at respective time points (i, j) of first and second patterns, each of said first and second patterns expressed by a time sequence of feature vectors, along time axes;

second means for developing a second quantity which is an integration quantity of said first quantity at integration time point (i, j) on the basis of said first quantity at time points including at least said integration time point and a plurality of second quantities obtained at a plurality of predetermined time points previous to said integration time point (i, j); and

comparison means for comparing lengths I, J of said first and second patterns with each other and producing a signal for selecting said plurality of predetermined time points in said second means in accordance with the result of the comparison.

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**4,742,548**

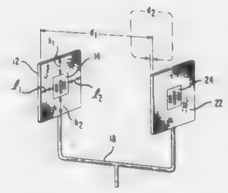
## UNIDIRECTIONAL SECOND ORDER GRADIENT MICROPHONE

**Martin Sessler, Darmstadt, Fed. Rep. of Germany, and James E. West, Plainfield, N.J., assignors to American Telephone and Telegraph Company, New York, N.Y. and Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Dec. 20, 1984, Ser. No. 684,575**

**Int. Cl.[4] H04R** *1/40, 1/02*

**U.S. Cl. 381—92** **13 Claims**



1. A microphone arrangement for use with incident wave energy whose frequency varies from a first to a second frequency, said second frequency being substantially greater than said first frequency and the first and second frequencies respectively corresponding to a first and a second wavelength, said arrangement comprising

a plurality of first order gradient microphones, each microphone having first and second sensing surfaces separated by a first acoustical path, and each microphone providing an output signal;

a plurality of baffles, each baffle receiving at least one associated microphone, each baffle blocking said first acoustical path of each associated microphone and creating a second acoustical path, said second acoustical path being greater than said first acoustical path and substantially less than said second wavelength; and

means for combining the output signals of said microphones to provide a second order directional response pattern for said microphone arrangement.



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**4,742,549**

## PROCEDURE FOR WATCHING OVER THE AREA IN FRONT OF A LIFT

**Nils-Robert Roschier, Vantaa, Finland, assignor to Elevator GmbH, Baar, Switzerland**

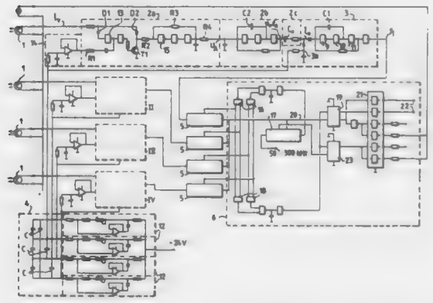
**Filed Oct. 4, 1985, Ser. No. 784,642**

**Claims priority, application Finland, Oct. 5, 1984, 843923**

**The portion of the term of this patent subsequent to Jul. 7, 2004, has been disclaimed.**

**Int. Cl.[4] G06K** *9/00*

**U.S. Cl. 382—1** **11 Claims**



1. A procedure for watching over the area in front of a lift door, of said area being formed with the aid of one-dimensionally or two-dimensionally grouped photoelectric image point pick-ups, from which image signals suitable to be digitally processed are obtained, with a pick-up signal preprocessing means based on mutual interaction of image points from the image point pick-ups, wherein the procedure contains at least the following processing steps of the image signals, in separate image forming channels:

(a) transformation of a current of the image signal to a voltage dependent on its logarithm,

(b) conversion of the above-mentioned voltage to a first pulse signal, of which the frequency depends on the magnitude of said voltage.

(c) combining the pulse signals of the different channels with the aid of an interaction network and supplying the resulting channel-specific signals to an electric charge pump for forming a second pulse signal in a manner known in itself in the art, the frequency of said second pulse signal being over the interaction network dependent on the ratios between the frequencies of the other channels' first pulse signals, and

(d) sensing the difference between the frequencies of the channel-specific second pulse signals for resolving relative changes in intensity of the object being imaged.

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**4,742,550**

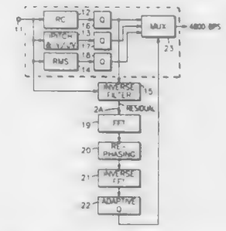
## 4800 BPS INTEROPERABLE RELP SYSTEM

**Bruce Fette, Mesa, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Sep. 17, 1984, Ser. No. 651,010**

**Int. Cl.[4] G10L** *5/00*

**U.S. Cl. 381—36** **17 Claims**




1. A residual excited linear predictive coder having a speech input and a speech output, comprising:

filter means for producing a residual speech signal, said filter means having a first input, a second input and an output, said first input being coupled to said speech input of said RELP;

Fourier transform means for converting said residual signal from a time dependent signal to a phase dependent signal, said Fourier transform means having an input and an output, said input being coupled to said output of said filter means;

phase aligning means for setting all components of said residual speech signal to zero phase, said phase aligning means having an input and an output, said input being coupled to said output of said Fourier transform means;

inverse Fourier transform means for converting said residual speech signal from a phase dependent signal to a time dependent signal, said inverse Fourier transform means having an input and an output, said input being coupled to said output of said phase aligning means;

adaptive positive time quantizer means for quantizing the positive half of said residual speech signal, said adaptive positive time quantizer means having an input and an output, said input being coupled to said output of said inverse Fourier transform means;

linear predictive coder means for producing an reflective coefficient signal, said linear predictive coder means having an input and an output, said input being coupled to said speech input of said RELP;

a first quantizer having an input and an output, said input being coupled to said output of said linear predictive coder and said output being coupled to said second input of said filter means;

pitch voicing means for producing a pitch signal and a voice-/unvoice signal, said pitch voicing means having an input and an output, said input being coupled to said speech input of said RELP;

a second quantizer having an input and an output, said input being coupled to said output of said pitch voicing means;

root-mean-square means for producing an RMS signal of said speech signal, said root-mean-square means having an input and an output, said input being coupled to said speech input of said RELP;

a third quantizer having an input and an output, said input being coupled to said output of said root-mean-square means;

serializing means for serializing the signals from said first, second and third quantizers and said adaptive positive time quantizer means, said serializing means having a first input, a second input, a third input, a fourth input and an output, said first input being coupled to said output of said first quantizer, said second input being coupled to said output of said second quantizer, said third input being

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coupled to said output of said third quantizer, said fourth input being coupled to said output of said adaptive positive time quantizer means and said output being coupled to transmit a coded signal;

deserializer means for deserializing said coded signal received from said serializing means, said deserializer means having an input, a first output, a second output, a third output, a fourth output, and a fifth output, said input being coupled to receive said coded signal;

error correction means for correcting the error caused in transmission of said signal, said error correction means having a first input, a second input, a third input, a first output, a second output and a third output, said first input being coupled to said fourth output of said deserializer means, said second input being coupled to said third output of said deserializer means and said third input being coupled to said second output of said deserializer means;

a first inverse quantizer having an input and an output said input being coupled to said first output of said error correction means;

a second inverse quantizer having an input and an output, said input being coupled to said second output of said error correction means;

a third inverse quantizer having an input and an output, said input being coupled to said third output of said error correction means;

synthesizer means for combining a plurality of signals, said synthesizer means having a first input, a second input, a third input and an output, said first input being coupled to said output of said first quantizer, said second input being coupled to said output of said second quantizer and said output being coupled to said output of said RELP;

an exciter having an input and an output, said input being coupled to said output of said third inverse quantizer;

position determining means for determining the position of each impulse of said signal, said position determining means having an input and an output, said input being coupled to said first output of said deserializing means;

denormalizing means for reconstructing a positive half of said signal, said denormalizing means having an input and an output, said input being coupled to said first output of said deserializing means;

symmetrical means for generating the negative portion of said signal from said positive portion, said symmetrical means having an input and an output said input being coupled to said output of said denormalizing means;

positioning means for placing each impulse of said signal in the proper position, said positioning means having a first input, a second input and an output, said first input being coupled to said symmetrical means and said second input being coupled to said output of said position determining means; and

a switch having a control line, a first pole, a second pole, a first position and a second position, said control line being coupled to said fifth output of said synthesizer, said first pole being coupled to said output of said exciter, said second pole being coupled to said output of said positioning means, said first position coupling said output of said exciter to said third input of said synthesizer and said second position coupling said output of said positioning means to said third input of said synthesizer.

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**4,742,551**

## MULTISTATISTICS GATHERER

**Michael F. Deering, Mountain View, Calif., assignor to Fairchild Camera & Instrument Corporation, Mountain View, Calif.**

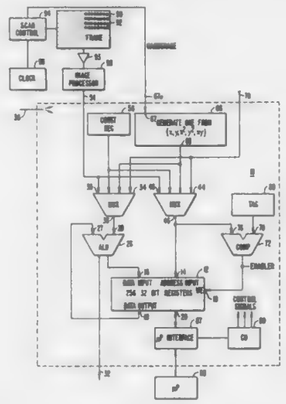
**Filed Oct. 7, 1985, Ser. No. 785,352**
**Int. Cl.⁴ G06K** *9/46*
**U.S. Cl. 382—18** **11 Claims**

1. A statistical gatherer for use in an image processing system of the type that processes a digital image comprising a frame of pixels, with the positions of the lines in the frame indicated by a y coordinate and the position of a pixel in a given line indicated by an x coordinate, and with each pixel a digital value, the statistical gatherer comprising:

an electronic RAM having an address input port for receiving an address signal identifying a selected storage location in said RAM, a data output port for transmitting a read signal encoding the value of a digital word stored in said selected storage location, and a data input port for receiving a write signal encoding the value of a digital word to be stored in the selected storage location;

address signal selection means, having an address select output port coupled to said address input port of said RAM and having a set of address select input ports for receiving signals, said address signal selection means for controllably coupling one of said address select input ports to said address select output port;

means for adding a selected increment to the digital word stored at the selected storage location in said RAM, said increment means having an increment signal input port and a read signal input port coupled to the data output of said RAM;



increment signal selection means, having an increment select signal output port coupled to the increment signal input port of said incrementing means and having a set of increment select input ports, said increment signal select means for controllably coupling one of said increment select signal input ports to said select increment signal output port;

a first pixel input coupled to a first one of said address select input ports and to a first one of said increment select input ports, said first pixel input for receiving a first digital pixel with the location of the first digital pixel in the image frame indicated by coordinates x and y;

means for generating a function output signal at a function output port, with the function output signal encoding a digital function value having a value f(x,y), and with said function output port coupled to a second one of said address select ports and a second one of said increment select ports.

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**4,742,552**

## VECTOR IMAGE PROCESSING SYSTEM

**Barry A. Andrews, Auburn, Wash., assignor to The Boeing Company, Seattle, Wash.**

**Filed Sep. 27, 1983, Ser. No. 536,385**
**Int. Cl.⁴ G06K** *9/36*
**U.S. Cl. 382—41** **78 Claims**

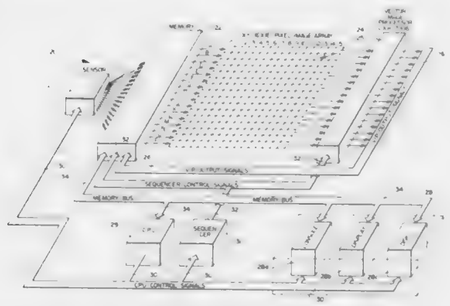
1. The method of processing a two-dimensional XY PIXEL image array containing discrete bits of digitally encoded PIXEL data oriented in "X" rows and "Y" columns, and including a multiplicity of overlapping two-dimensional AB neighborhoods, where "A" and "B" can have any desired whole integer value greater than "1", and wherein each two-dimensional AB neighborhood includes a PIXEL to be processed and data bits representative of neighbor PIXELS and any boundary data bits adjacent the PIXEL to be processed; said method comprising the steps of:

(a) shifting n rows of digitally encoded PIXEL data, where "n" is any whole integer, in column-by-column sequential internally pipelined order through a one-dimensional columnar array of n processing element(s) each including:

(i) a plurality of serially cascaded interconnected latches equal in number to the value of "A" in the two-dimensional AB neighborhood for storing a plurality of discrete bits of digitally encoded data intermediate successive data shifts; and,

(ii) a neighborhood functional processing unit for performing a NEIGHBORHOOD TRANSFORM processing operation;

(b) conveying the digitally encoded data stored in one of the serially cascaded interconnected latches in each of the n processing element(s) and corresponding to each PIXEL



to be processed to the neighborhood functional processing unit on that processing element;

(c) conveying digitally encoded data representative of all neighbor PIXELS and boundary data contained within each two-dimensional AB neighborhood to the neighborhood functional processing unit in each of the n processing element(s);

(d) performing a computational NEIGHBORHOOD TRANSFORM processing operation on the digitally encoded PIXEL data for each PIXEL being analyzed at a given instant of time in the neighborhood functional processing unit in each of the n processing element(s); and,

(e) outputting digitally encoded data representative of the results of each computational NEIGHBORHOOD TRANSFORM processing operation on each PIXEL being processed, with all PIXELS in a given "Y" column of PIXELS and in the n rows being processed in parallel in those instances where n is greater than "1", and with all PIXELS in each of the n rows being processed in internally pipelined sequential order.

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**4,742,553**

## RESOLUTION CONVERSION OF BITMAP IMAGES USING ERROR TERM AVERAGING

**Kathleen Irwin, Bedford, Mass., assignor to Wang Laboratories, Inc., Lowell, Mass.**

**PCT No. PCT/US86/01365, § 371 Date Jun. 26, 1986, § 102(e) Date Jun. 26, 1986, PCT Pub. No. WO88/00377, PCT Pub. Date Jan. 14, 1988**
**PCT Filed Jun. 26, 1986, Ser. No. 5,745**
**Int. Cl.⁴ G06K** *9/42*
**U.S. Cl. 382—47** **20 Claims**

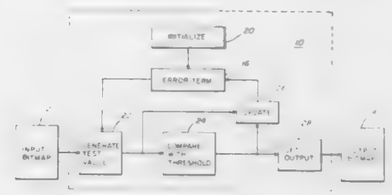
1. A method of converting an image in an input bitmap to an image in an output bitmap, each bitmap being a set of pixels having values, comprising:



(A) defining a mapping between pixels in the input bitmap and pixels in the output bitmap;

(B) providing for storage of an error term;

(C) for each current pixel in the output bitmap, determining an output value as follows:




(1) determining a test value from a combination of the error term and the values of the input pixels mapped to the current output pixel,

(2) determining the output value from the test value, and

(3) updating the error term based on the test value and the output value.

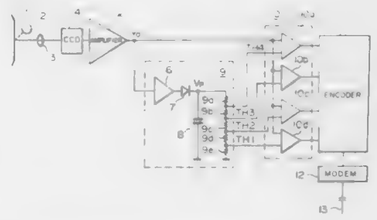
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**4,742,554**

## IMAGE DATA PROCESSOR

**Shin Tsuda, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 615,175, May 30, 1984, abandoned.**
**This application Nov. 17, 1986, Ser. No. 931,929**
**Claims priority, application Japan, Jun. 7, 1983, 58-100179**
**Int. Cl.⁴ G06K** *9/00*
**U.S. Cl. 382—50** **13 Claims**




1. An image data processor comprising:

photoelectric converting means for converting original image data to an electrical image signal;

comparing means for comparing the electrical image signal of one scan line with a plurality of different threshold levels to obtain a plurality of binary time series signals corresponding respectively to each of the threshold levels; and

encoding means for one-dimensionally encoding one of the plurality of the binary time series signals and two-dimensionally encoding the rest of the plurality of the binary time series signals, wherein said encoding means two-dimensionally encodes correlation between said one binary time series signal and the rest of the plurality of the binary time series signals.

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**4,742,555**

## PATTERN PROCESSOR CONTROLLED ILLUMINATOR

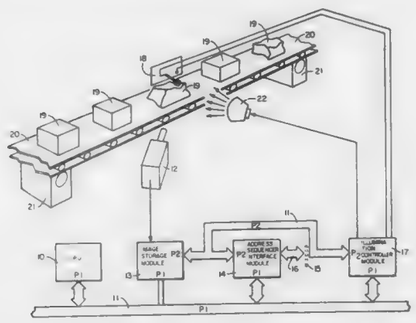
**Steven W. Tonkin, Shoreview, Minn., assignor to Pattern Processing Technologies, Inc., Minnetonka, Minn.**

**Filed Sep. 30, 1986, Ser. No. 913,233**
**Int. Cl.⁴ G06K** *9/38*
**U.S. Cl. 382—50** **8 Claims**

1. A controller for controlling operation of an illumination source for use in intermittently illuminating selected objects to

form images thereof on an image reception surface in an image transducer means which in response provides image signals representing said images with said image signals formed on a basis of being able to be used to reconstruct an image therefrom through periodic scanning by reconstructing means of an image reconstruction surface in a predetermined manner under control of said image signals, said image signals having corresponding first direction scanning and second direction scanning marking pulses therein to coordinate such scanning which marking pulses can be represented by a first scanning direction marking signal and a second scanning direction marking signal, respectively, said image signals being provided to an image signal manipulation system for storage and for manipulation therein with there also being an illuminating request signal provided to said controller which provides an indication in each instance that said illumination source is desired to provide illumination, said image transducer means having at least one predetermined portion of each scanning period during which said image transducer means can fail to properly provide said image signals in response to an image occurring on said image reception plane and during which illumination by said illumination source is to be prevented, said controller comprising:

a controller entry means for receiving a first direction controller signal representing at least some parts of said first scanning direction marking signal, for receiving a second direction controller signal representing at least some parts of said second scanning direction marking signal, and for receiving said illumination request signal;



a preventive delay means for receiving from said controller entry means a first entry signal representing at least some parts of said first direction controller signal and for receiving a second entry signal representing at least some parts of said second direction controller signal, said preventive delay means providing a first prevention signal for indications of any occurrances of any said predetermined portions in said scanning periods, and further providing a second prevention signal containing an indication of any occurrance of any said predetermined portions in said scanning periods that has yet to have occur thereafter a corresponding selected change in said first entry signal; and

a decision and directing means for receiving from said preventive delay means said first and second prevention signals and for receiving from said controller entry means a third entry signal representing at least some parts of said illuminating request signal including said indications therein, said decision and directing means providing an illumination initiation signal at a terminal means thereof adapted for connection to said illumination source, said illumination initiation signal indicating that said illumination source is to provide illumination in a substantially immediate response to said indications in said third entry signal but to do so only after any delay imposed as a result of said indication in said first prevention signal, should any such indication in said first prevention signal be occurring coincident with a said indication in said illumination request signal, and said decision and directing means also providing a storage initiation signal to said image signal manipulation system indicating that said image signal manipulation system is to store said image signals from said image transducer means resulting from such illumination in response to said indication in said third entry signal but only after any delay imposed as a result of any said indication in said second prevention signal, should any such indication in said second prevention signal be occurring coincident with a said indication in said illumination request signal.

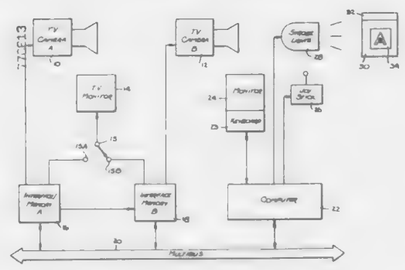
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**4,742,556**

## CHARACTER RECOGNITION METHOD

**Ray E. Davis, Jr., 6 Craig Rd., Old Lyme; Robert G. Foster, 10 Princess Pine Ln., Clinton, both of Conn. 06371; Michael J. Westkamper, Cedar Hill Ln., Salem, Conn. 06415; Dana Duncan, 10-2 Brown's Ln., Old Lyme, Conn. 06371; James R. Hall, 31 Hurd Bridge Rd., Clinton, Conn. 06413, and Dennis L. Nudelman, 28 Paula Ln., Waterford, Conn. 06385**

**Filed Sep. 16, 1985, Ser. No. 776,613**
**Int. Cl.[4] G06K *9/38***
**U.S. Cl. 382—51** **22 Claims**
**MICROFICHE APPENDIX INCLUDED**
**(2 Microfiche, 66 Pages)**



1. A character recognition method comprising the steps of:
(1) acquiring an image from a solid state TV camera, said image comprising a two dimensional array of pixels, said pixels having grey scale values associated therewith;
(2) locating a character within said image by calculating intensity gradients and determining when said intensity gradients exceed predetermined values;
(3) determining the size of said character measured in pixels;
(4) reducing the number of pixels associated with said character by a first determining the number of pixels per dot required to fit said character into a smaller dot matrix and then;
(5) combining the pixels associated with each dot to form a matrix of dot data points having fewer dots than pixels;
(6) generating a grey scale histogram for said dot data points;
(7) using said histogram to determine a threshhold for the grey scale values associated with the dot data points; and
(8) assigning binary values to said dot data points based on said threshhold to form a binary representation of said character.

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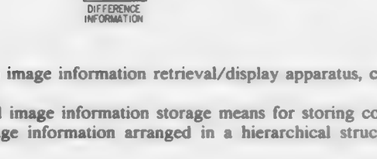
**4,742,557**

## ADAPTIVE CHARACTER EXTRACTION METHOD AND SYSTEM

**Hung S. Ma, Beaconsfield, Canada, assignor to NCR Corporation, Dayton, Ohio**

**Filed Nov. 8, 1985, Ser. No. 796,454**
**Int. Cl.[4] G06K *9/40***
**U.S. Cl. 382—51** **9 Claims**

1. A method of extracting relevant character information from a signal matrix of gray level picture elements comprising the steps of:
extracting the signals representing the gray level picture elements positioned approximately a first equal distance from a pixel of interest representing a first annular ring of picture elements;
extracting the signals representing the gray level picture elements positioned approximately a second equal distance from the pixel of interest representing a second annular ring of picture elements;
analyzing the extracted signals representing the first and the second annular ring of picture elements for like pairs of picture elements;
temporarily establishing the pixel of interest to be of a first binary value when there is at least one pair of picture elements and of a second binary value when there is not;



passing the gray level picture elements from the first and the second annular ring of picture elements as a function of the temporarily established pixels of interest of first binary value to eliminate all gray level picture elements corresponding to a pixel of interest being of a second binary value;
forming a histogram of the passed gray level picture elements; and
utilizing the gray level picture elements of said histogram to establish a threshold point against which the gray level of the pixels of interest are compared to permanently establish the pixel of interest to be of a first binary value when its gray level is below the established threshold and of a second binary value when its gray level is above the established threshold.

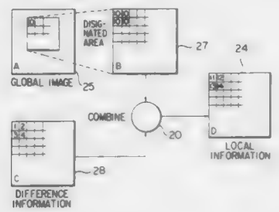
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**4,742,558**

## IMAGE INFORMATION RETRIEVAL/DISPLAY APPARATUS

**Satoshi Ishibashi; Kenji Ogura, both of Kanagawa, and Susumu Yonezawa, Tokyo, all of Japan, assignors to Nippon Telegraph & Telephone Public Corporation, Tokyo, Japan**

**Filed Feb. 7, 1985, Ser. No. 698,927**
**Claims priority, application Japan, Feb. 14, 1984, 59-25731; Mar. 27, 1984, 59-59170; Apr. 20, 1984, 59-79525**
**Int. Cl.[4] G06K *9/36*; G06F *3/153***
**U.S. Cl. 382—56** **14 Claims**



1. An image information retrieval/display apparatus, comprising:
coded image information storage means for storing coded image information arranged in a hierarchical structure having different levels of coded information corresponding to different resolutions of the image, the coded image information at levels excluding a highest level among the different levels in the hierarchical structure being coded difference information obtained such that a difference between the coded image information of a given level and the coded image information of a level adjacent to the given level is coded;
decoding means for decoding the coded image information of a predetermined level which is read out from said coded image information storage means and generating display image information;
displaying means for displaying the display image information decoded by said decoding means;
designating means for designating a desired partial area within an image of the predetermined level which is displayed on said displaying means; and
readout means for reading out from said coded image information storage means at least part of the coded image information which corresponds to the partial area designated by said designating means and which belongs to a level which is at least one lower than the predetermined level,
said decoding means comprising
extracting means for extracting a decoded image information portion from the display image information displayed on said displaying means, the image portion corresponding to the partial area designated by said designating means, and
combining means for combining the information extracted by said extracting means and the difference information of at least one lower level which is read out from said readout means to produce new display image information of the designated partial area,
whereby the hierarchically coded image information is repeatedly retrieved and displayed from the high level to the low level in a manner in which a local image can be reproduced at high speed.

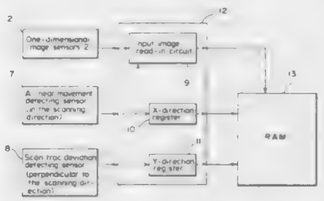
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**4,742,559**

## MANUAL-SCANNING IMAGE READER

**Toshiaki Fujiwara, Nara, and Shigeo Yoneda, Yamatokoriyama, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Aug. 21, 1986, Ser. No. 898,512**
**Claims priority, application Japan, Aug. 21, 1985, 60-183299**
**Int. Cl.[4] G06K *9/22***
**U.S. Cl. 382—59** **2 Claims**



1. A manual-scanning image reader which optically reads images such as characters and figures from a written surface by a manual scanning over said written surface comprising;
sensor means for detecting the amount of movement of said image reader in the scanning direction as a linear movement sensor ;
sensor means for detecting the amount of deviation of said image reader in the direction perpendicular to the scanning direction as a deviation sensor; and
means for reading in image data synchronously with signals output from said linear movement sensor and correct the input image data according to signal output from said deviation sensor before eventually storing it in memory.

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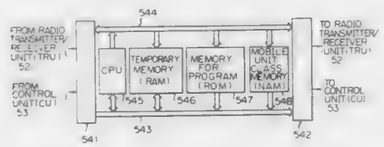


**4,742,560**

## MOBILE RADIO UNIT IN CELLULAR WIDE RANGE MOBILE COMMUNICATION SYSTEM

**Kanji Arai, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan**

**Filed Mar. 14, 1986, Ser. No. 839,867**
**Claims priority, application Japan, Mar. 19, 1985, 60-53222**
**Int. Cl.[4] H04Q** *7/00;* **H04B** *1/00*
**U.S. Cl. 455—33** **1 Claim**




1. A mobile radio unit in a cellular type wide area mobile communication system comprising:

(1) a radio transmitter/receiver unit (TRU) for transmitting and receiving signals;

(2) a means for selecting a channel for transmitting and receiving signals;

(3) a handset composed of a dial and a telephone transmitter/receiver;

(4) a control unit (CU) for controlling a speech path and for controlling said handset;

(5) a first storing means for temporarily storing a service area identification code a mobile unit identification number in a page message received by said TRU;

(6) a second storing means for storing terminating limit indicator information which is set or reset by operation of said handset;

(7) a third storing means for storing a plurality of sets of service area identification codes and a plurality of kinds of mobile unit identification numbers corresponding to the service area identification codes;

(8) a determining means for receiving said service area identification code stored in said first storing means and said service area identification codes stored in said third storing means and for determining whether or not the service area identification code stored in said first storing means is coincident with the service area identification codes stored in said third storing means, and for providing an indication of the result of the determination;

(9) a comparing means for receiving the mobile unit identification number stored in said first storing means and a specified one or a specified plurality of kinds of mobile unit identification numbers stored in said third storing means and for receiving a state of said second storing means and for comparing the mobile unit identification number stored in said first storing means with said specified one or said specified plurality of kinds of mobile unit identification numbers stored in said third storing means for thereby determining whether a call-in is for the mobile unit itself, depending on said state of said second storing means and for providing an indication of the result of the decision;

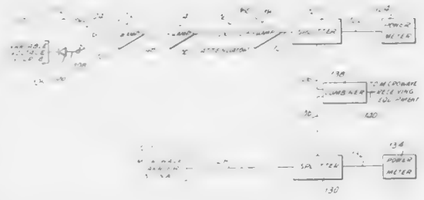
(10) a means for receiving the result of the determinations of the comparing means and determining means and for effecting a terminating response via said TRU when the service area identification code stored in said first storing means is coincident with the service area identification codes stored in said third storing means as determined by said determining means and when said mobile unit identification number stored in said first storing means and said mobile unit identification numbers stored in said third storing means are determined to be coincident by said comparing means.

**4,742,561**

## APPARATUS FOR GENERATING SIGNALS USEFUL FOR TESTING THE SENSITIVITY OF MICROWAVE RECEIVING EQUIPMENT

**M. Scott Tipton, St. James, N.Y., assignor to Home Box Office, Inc., New York, N.Y.**

**Filed Sep. 10, 1985, Ser. No. 774,324**
**Int. Cl.[4] H04B** *17/00*
**U.S. Cl. 455—67** **21 Claims**



1. An apparatus for generating a test signal for evaluating the sensitivity of receiving equipment comprising:

a noise source for generating a first noise signal having undetermined power level;

amplifier means for amplification of the power level of said noise signal and an attenuator means, for adjustment of the power level of said noise signal to a predetermined power level, connected in series between the noise source and a first splitter means;

the first splitter means connected to the output of the series connected amplifier means and attenuator means for splitting said first noise signal into second and third noise signals;

first power level monitoring means connected to the output of said first splitter means having said second noise signal output therefrom for monitoring the power level of said second noise signal;

input means for receiving a first carrier signal having a predetermined power level;

second splitter means connected to said input means for splitting said first carrier signal into second and third carrier signals;

second power level monitoring means connected to the output of said second splitter means having said second carrier signal output therefrom for monitoring the power level of said second carrier signal; and

combiner means connected to the outputs of said first and second splitter means having said third noise signal and said third carrier signal output therefrom, respectively, for combining these signals and outputting a combined signal indicative of said third noise signal and said third carrier signal.

**4,742,562**

## SINGLE-BLOCK DUAL-PASSBAND CERAMIC FILTER USEABLE WITH A TRANSCEIVER

**Richard S. Kommrusch, Schaumburg, Ill., assignor to Motorola, Inc., Schaumburg, Ill.**

**Continuation of Ser. No. 656,121, Sep. 27, 1984, abandoned. This application Jul. 2, 1986, Ser. No. 881,567**
**Int. Cl.[4] H04B** *1/50;* **H01P** *2/05*
**U.S. Cl. 455—78** **31 Claims**

13. (Three Times Amended) A radio transceiver comprising:

(a) a radio receiver having an input;

(b) a radio transmitter having an output;

(c) an antenna; and

(d) a multi-passband filter comprising:

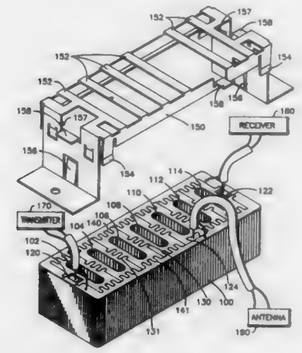
dielectric means comprised of a dielectric material having top, bottom and side surfaces, said surfaces of the dielectric means being substantially covered with a conductive material;



at least three holes, having surfaces substantially covered with a conductive material, extending from the top surface of the dielectric means toward the bottom surface thereof and having openings on the top surface of the dielectric means, said openings being disposed at predetermined distances relative to one another and substantially aligned with one another;

first, second and third coupling means coupled to a first hole, a second hole and a third hole, respectively, of said at least three holes, said first coupling means further being coupled to the output of the radio transmitter, said second coupling means further being coupled to the antenna, and said third coupling means further being coupled to the input of the radio receiver; and

capacitive means including strips of the top surface of the dielectric means which substantially surround each hole, said strips being portions of the top surface which are not covered with said conductive material, said strips having a width for determining the capacitance thereof, and said strips between said holes including substantially sinusoidal shaped portions.

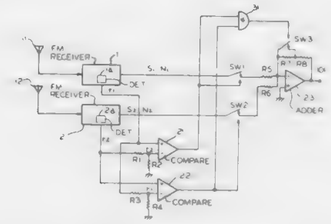



**4,742,563**

## SYSTEM AND METHOD FOR DIVERSITY RECEPTION OF SIGNALS

**Yukio Fukumura, Tokyo, Japan, assignor to NEC Corporation, Japan**

**Filed Jun. 3, 1986, Ser. No. 870,130**
**Claims priority, application Japan, Jun. 11, 1985, 60-125035**
**Int. Cl.[4] H04B** *1/16*
**U.S. Cl. 455—132** **9 Claims**




1. A system for diversity reception of signals with first and second receivers, respectively adapted to recover and output first and second recovered baseband signals, said system comprising:

(a) first and second wave detector means, respectively, in the first and second receivers for generating output voltages corresponding to the strengths of a modulated electromagnetic signal wave reaching the respective receivers;

(b) comparator means coupled to the first and second receivers for detecting and for giving an output detection signal when the difference in output voltages between the first and second wave detectors exceeds a predetermined value;

(c) adder circuit means responsive to the first and second recovered baseband signals for correlating and combining said baseband signals;

(d) first and second switching circuits selectively capable of cutting off the first or second recovered signal to the adder circuit means, and a third switching circuit coupled to adjust the gain of the adder circuit means by selectively reducing it by one half;

(e) means responsive to the comparator means for controlling the first and second switching circuits to cut off only the recovered baseband signal being applied from the receiver having a lower output voltage to the adder circuit means; and

(f) means responsive to an absence of the comparator output detection signal for controlling the first and second switching circuits to cause both the first and second recovered baseband signals to be input to the adder circuit means, and at the same time for controlling the third switching circuit to reduce the gain of the adder circuit by one half;

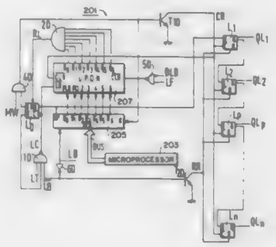
thereby producing a diversity output signal with substantially uniform gain as the output of the adder circuit means.

**4,742,564**

## TUNING ALIGNMENT DATA MEMORY DEVICE FOR TUNING CIRCUITS TUNABLE TO SELECTABLE FREQUENCIES

**Daniel Dumont, Douvres, France, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Apr. 6, 1987, Ser. No. 35,106**
**Claims priority, application France, Apr. 8, 1986, 86 04980**
**Int. Cl.[4] H04B** *11/16, 1/26*
**U.S. Cl. 455—186** **4 Claims**




1. A tuning alignment data memory device for tuning circuits tunable to selectable frequencies in which digital tuning alignment data corresponding to said frequencies are stored in a programmable memory (PROM) associated with said circuits, being selectable by a logic frequency selection circuit and suitable for having the associated digital tuning alignment data correspond to the selectable frequenties, characterized in that the programmable memory comprises for each selectable frequency a write row containing a write information position for a write information element indicating whether tuning data written in this row has been written correctly or not, in that tuning alignment data written in these rows are sequentially arranged in accordance with a predetermined frequency order, in that for each defective write row the digital tuning alignment data of a defective write row are written again in the subsequent write row and in that the logic frequency selection circuit comprises:

a buffer register receiving a first address corresponding to a selected frequency;

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an up/down counter clocked by a first clock signal until it has reached a second address;

a shift register clocked by said first clock signal and acting such that its output sequentially addresses write rows of the programmable memory;

a first logic gate detecting whether the up/down counter has reached said second address and whose output blocks said first clock signal when the second address has been reached; and

a logic detection circuit of said write information element whose output is designed such as to decrement the up/down counter by one step in the case in which said write information element corresponds to a defective write row, such that, for a first address corresponding to a $k^{th}$ frequency, the shift register remains in a position in which it addresses a validly written $k^{th}$ row of the programmable memory, after having sequentially scanned validly written $(k-1)$ first rows and defectively written rows.

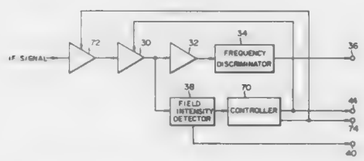
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**4,742,565**

## RADIO RECEIVER WITH FIELD INTENSITY DETECTOR

**Koji Iwahashi, Tokyo, Japan, assignor to NEC Corporation, Japan**

**Continuation-in-part of Ser. No. 632,593, Jul. 19, 1984, abandoned. This application Mar. 23, 1987, Ser. No. 29,367**
**Claims priority, application Japan, Jul. 22, 1983, 58-135012**
**Int. Cl.⁴ H04B** *1/16*
**U.S. Cl. 455—234** **7 Claims**




2. A radio receiver having a field intensity detector, comprising:

at least one intermediate frequency amplifier means having a gain that is incrementally variable in predetermined step amounts and is supplied with an input intermediate frequency signal;

frequency discriminator means for demodulating an output of said intermediate frequency amplifier means;

field intensity detector means responsive to an output of the intermediate frequency amplifier means for producing a dc voltage having a level corresponding to the input level;

control means responsive to said output signal levels of said field intensity detector means for producing a "0" or "1" control signal depending upon whether the level of the output dc voltage of the field intensity detector means does or does not raise above a predetermined level;

output terminal means on the radio receiver for providing the control signal and the output dc voltage of the field intensity detector means; and

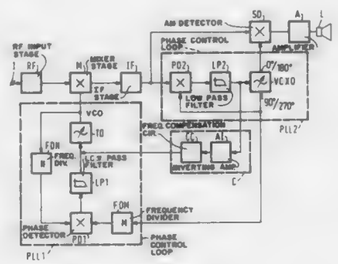
means for changing the gain of the intermediate frequency amplifier means by a selected step amount responsive to said control signal in order to vary the gain thereof in a step-wise manner in response to said control signal.

**4,742,566**

## AM RECEIVER

**Ernst H. Nordholt, Berkel en Rodenrijs, and Hendrikus C. Nauta, Nootdorp, both of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Mar. 10, 1986, Ser. No. 838,224**
**Claims priority, application Netherlands, Mar. 11, 1985, 8500675**
**Int. Cl.⁴ H04B** *1/26;* **H03L** *7/00*
**U.S. Cl. 455—260** **6 Claims**




1. An AM receiver comprising:

a first phase control loop for establishing a tuning frequency including:

(a) a mixer stage for receiving a radio frequency signal and a tuning frequency signal, and producing an IF signal;

(b) a tuning frequency voltage controlled oscillator for providing said tuning frequency signal;

(c) a stable reference signal generator; and

(d) a frequency control means for locking said tuning frequency signal in phase synchronism with said stable reference signal generator including a first loop filter for coupling a control voltage signal to a frequency control input of said voltage controlled tuning oscillator, and means for generating said control voltage as a function of the difference in phase between said stable reference frequency oscillator and said tuning frequency voltage controlled oscillator;

an AM baseband demodulator comprising a second phase control loop having a phase detector for receiving said mixer stage IF signal, and a signal from said reference signal generator, and a second loop filter for coupling an error signal from said phase detector to said reference signal generator, whereby said reference signal generator is phase locked with said IF signal; and,

a coupling circuit for coupling said phase detector error signal to a frequency control input of said tuning frequency voltage controlled oscillator, whereby negative feedback from said reference signal generator to said voltage controlled oscillator results.

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**4,742,567**

## AUTOMOBILE ANTENNA SYSTEM

**Junzo Ohe, and Hiroshi Kondo, both of Aichi, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan**

**Filed Jan. 30, 1986, Ser. No. 824,264**
**Claims priority, application Japan, Feb. 1, 1985, 60-18867**
**Int. Cl.⁴ H04B** *7/00;* **H01Q** *1/32*
**U.S. Cl. 455—277** **7 Claims**

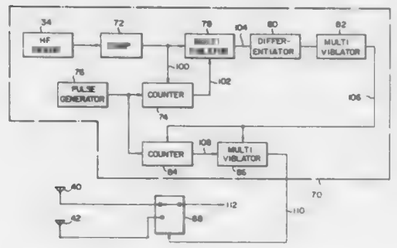
1. An automobile antenna system comprising:

a main antenna provided on a rear portion of a vehicle body;

a sub antenna provided to the rear of said main antenna;

high-frequency pickup means for detecting magnetic flux induced by surface currents on the vehicle body resulting from broadcast waves passing though the vehicle body, said high-frequency pickup means outputting a signal proportional in strength to the magnetic flux detected, said high-frequency pickup means being electrically coupled to said main and sub antennas and being provided on a forward portion of the vehicle body for detecting deflection of an output of said main antenna in advance; and

antenna selecting signal generator means for actuating a switch circuit to select between said main and sub antennas outputs and for selecting said sub antenna output when




an output level of said main antenna is predicted to dip after a predetermined lapse of time T by said high-frequency pickup means output signal dropping below a threshold limit, said sub antenna output being selected for a period D during which the dip in the output level of said main antenna occurs.

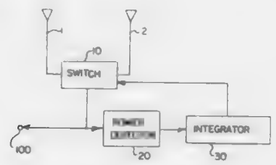
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**4,742,568**

## RECEIVER FOR ANTENNA SWITCHING DIVERSITY SYSTEMS

**Yukitsuna Furuya, Tokyo, Japan, assignor to NEC Corporation, Japan**

**Filed Jun. 10, 1986, Ser. No. 872,502**
**Claims priority, application Japan, Jun. 10, 1985, 60-125430; Jun. 10, 1985, 60-125431; Aug. 26, 1985, 60-187084**
**Int. Cl.⁴ H04B** *1/10*
**U.S. Cl. 455—277** **11 Claims**




1. A receiver for use in switching diversity systems having at least two antennas for reception, comprising:

switching means responsive to an antenna switching signal for switching between said two antennas to produce a received signal;

noise estimating means for producing a first signal indicative of the quantity of noise in the received signal; and

an integrating means adapted to respond to the first signal for integrating the noise to produce a first control signal as said antenna switching signal.

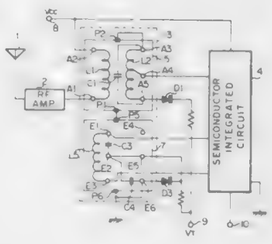


**4,742,569**

## TUNING CIRCUIT FOR AM RECEIVER

**Hajime Yokoyama; Noboru Takada, both of Saitama; Yusuke Okamoto, Yokohama; Makoto Torakawa, Yokohama, and Takashi Ikegame, Yokohama, all of Japan, assignors to Toko, Inc., Tokyo and Matsushita Electrical Industrial Co., Ltd., Osaka, both of, Japan**

**Filed Aug. 6, 1986, Ser. No. 893,641**
**Claims priority, application Japan, Aug. 7, 1985, 60-121056[U]; Jul. 9, 1986, 61-105358[U]; Jul. 14, 1986, 61-107779[U]; Jul. 14, 1986, 61-107780[U]**
**Int. Cl.⁴ H04B** *1/10*
**U.S. Cl. 455—301** **10 Claims**




1. A tuning circuit for an AM receiver, comprising: an antenna tuning circuit having tuning coils and capacitance elements, a local oscillator circuit having an oscillation coil and capacitance elements, a first shield casing for high frequency coils, housing said tuning coils and capacitance elements of said antenna tuning circuit, a second shield casing for high frequency coils, housing said oscillation coil and capacitance elements of said local oscillator circuit, said first and second shield casings being disposed in a row in a common casing and united with each other, and terminal pins connecting said coils and capacitance elements housed in said casings for high frequency coils.

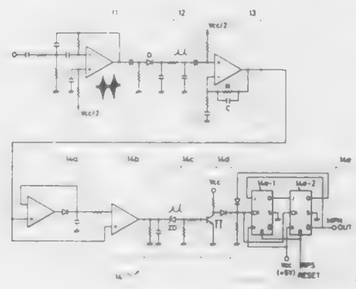
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**4,742,570**

## MULTIPATH NOISE DETECTING CIRCUIT

**Nobuo Ichikawa, Iwaki, Japan, assignor to Alpine Electronics Inc., Japan**

**Filed Aug. 25, 1986, Ser. No. 899,813**
**Claims priority, application Japan, Aug. 23, 1985, 60-128593[U]**
**Int. Cl.⁴ H04B** *1/10*
**U.S. Cl. 455—312** **3 Claims**




1. A multipath noise detecting circuit for detecting multipath noise pulses directly from a signal output of a FM signal demodulator, comprising:

a band pass filter receiving the signal output of the FM signal demodulator having a mean frequency of three times a

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subcarrier frequency of the FM signal for outputting a third harmonic component signal of said FM signal;

an AM detector receiving the third harmonic component output of said band pass filter for detecting and outputting an amplitude detection signal; and

a detector section receiving the amplitude detection signal from said AM detector for detecting multipath noise pulses included therein and outputting a multipath noise detection signal therefrom.

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**4,742,571**

**COUPLING DEVICE BETWEEN A METAL WAVE GUIDE, A DIELECTRIC WAVE GUIDE AND A SEMICONDUCTOR COMPONENT AND A MIXER USING THIS COUPLING DEVICE**

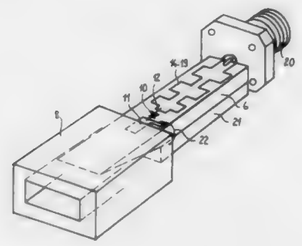
**Yves Letron, Fontenay Aux Roses, France, assignor to Thomson-CSF, Paris, France**

**Filed Jul. 21, 1986, Ser. No. 887,430**

**Claims priority, application France, Jul. 23, 1985, 85 11246**

**Int. Cl.[4] H04B** *1/26;* **H01P** *5/107*

**U.S. Cl. 455—327** **9 Claims**



1. A coupling device between a metal wave guide and a semiconductor component for processing an ultra high frequency input signal inputted via said waveguide, comprising a dielectric wave guide of "isolated image" type, comprising a bar of a first dielectric material having a permittivity $\epsilon_1$ forming , with a surface of a second dielectric material of permittivity $\epsilon_2$, an interface at the level of which is propagated a part of the energy of the signal channelled by the dielectric bar, said dielectric bar including opposed ends, one of which is non-chamfered and overlies said second dielectric material and the other of which is introduced longitudinally into the metal wave guide and zone formed by a chamfer, of length 10 $\lambda_g$, wherein $\lambda_g$ = guided wave length, cut in the dielectric bar, the energy of the signal being coupled to the semiconductor component by means of a microstrip line which forms a transition zone between the dielectric guide and the semiconductor component, at the level of the interface between the two dielectric materials.

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**4,742,572**

**OPTICAL FIBER DATA LINK SYSTEM**

**Makoto Yokoyama, Setoshi, Japan, assignor to Kawamura Electric Industry Co., Ltd., Aichi, Japan**

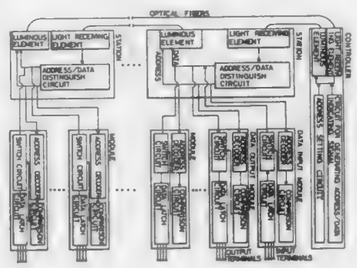
**Filed May 8, 1986, Ser. No. 861,098**

**Claims priority, application Japan, May 17, 1985, 60-106663**

**Int. Cl.[4] H04B** *9/00;* **G05B** *23/02;* **H04J** *3/16*

**U.S. Cl. 455—607** **27 Claims**

1. An optical fiber data link system comprising a controller and at least one station connection to each other by a series of optical fibers which, as a whole, substantially makes a single loop while linking them together, said controller at least including (a) a light receiving element connected to a fiber of said loop for receiving optical signals therefrom and developing an indication responsive thereto, (b) a serial-parallel converter for converting the indication of a parallel signal, (c) a circuit for generating a signal to allow said station operative on said parallel signal to determine which of two signals, i.e., address signal or data signal, has been received thereby, (d) an address setting circuit, (e) a parallel-serial converter and (f) a luminous element for receiving signal data and providing serial optical signals to a fiber of said loop, said station at least including (i) a light receiving element, (ii) a serial-parallel converter, (iii) a circuit for determining which of two signals, i.e., address



signal or data signal has been received by the station, (iv) a parallel-serial converter and (v) a luminous element, said elements (i)–(v) of a station being interconnected for receiving data from a first fiber of said loop, and for transmitting data to a next fiber of said loop, at least one data module being connected to said station, and said at least one data module having an address of its own assigned thereto in advance.

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**4,742,573**

**IDENTIFICATION CARD INCLUDING OPTICALLY POWERED ELECTRONIC CIRCUIT**

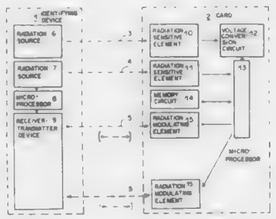
**Radivoje Popovic, Zug, Switzerland, assignor to LGZ Landis & Gyr Zug AG, Zug, Switzerland**

**Filed Apr. 25, 1985, Ser. No. 727,271**

**Claims priority, application Switzerland, May 3, 1984, 2150/84**

**Int. Cl.[4] H04B** *9/00;* **G07D** *7/00*

**U.S. Cl. 455—607** **11 Claims**



10. An identifying device for optically transmitting and receiving information from an identification card comprising powering means operable for producing electrical power from optical radiation, memory means and modulating means operable for modulating a received optical beam and thereafter transmitting the modulated optical beam,

said identifying device comprising

first means for transmitting a first beam of optical radiation to said card for producing electrical power in said powering means,

second means for transmitting a second beam of optical radiation to said card to provide information capable of being stored in said memory means, and

third means for transmitting to and receiving a third beam of optical radiation from said card, said third beam of radiation being transmitted from said third means for modulation in said modulating means and thereafter transmitted from said card back to said third means.

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**4,742,574**

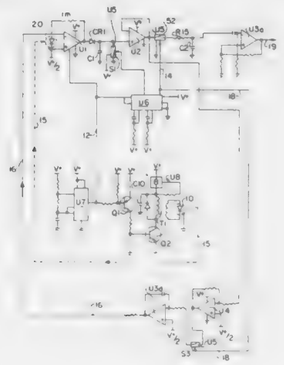
**TWO-WIRE 4-20 MA ELECTRONICS FOR A FIBER OPTIC VORTEX SHEDDING FLOWMETER**

**Jane E. Smith, Mentor, Ohio, and Thomas B. DeWitt, Lexington Park, Md., assignors to The Babcock & Wilcox Company, New Orleans, La.**

**Filed Feb. 3, 1986, Ser. No. 825,415**

**Int. Cl.[4] H04B** *9/00*

**U.S. Cl. 455—608** **13 Claims**



1. A method of processing an optically generated signal to form a two-wire current signal comprising:

generating a control signal having pulses at a selected frequency;

generating current pulses using the control signal and applying them to a light emitter to generate light pulses;

transmitting the light pulses over a transmission line to a light detector to generate a sensor signal, attenuation in the transmission line being varied according to a process variable to modulate the sensor signal.

amplifying the sensor signal using an operational amplifier which is switchable between low and high current modes, the high current mode having a wide bandwidth, the operational amplifier forming an amplified signal having peaks;

switching the operational amplifier to its high current mode only during pulses of said control signal to amplify the sensor signal, the operational amplifier being switched to its low current mode at other times;

sampling and holding the peaks of the amplified signal to form a cyclic peak following signal having a frequency component of the selected frequency;

low-pass filtering the peak following signal to form a cyclic filtered signal which has reduced amplitudes of signals at the selected frequency;

triggering a multivibrator using the filtered signal to form a pulse signal having pulses which are fixed in length and voltage amplitude for each cycle of the filtered signal;

averaging the voltage amplitudes of the pulses in the pulse signal to produce an average voltage signal;

converting the average voltage signal into a two-wire current signal; and

wherein the process variable comprises a pulsing process variable signal having low frequency pulses for low process variable and high frequency pulses for high process variable, the relationship between the frequency of the plurality of pulses and the process variable being nonlinear for low frequency pulses of the process variable signal, the method including establishing a setpoint frequency for the multi-vibrator above which the relationship between the process variable and the frequency of the process variable signal is substantially linear, averaging the voltage of the pulse signal in a nonlinear manner for process variable signals having a frequency below the setpoint to linearize the relationship between process variable and the average voltage below the setpoint frequency, and averaging the voltage of the pulse signal in a linear manner for frequencies of the process variable above the setpoint frequency.

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**4,742,575**

**LIGHT SIGNAL TRANSMISSION/RECEPTION SYSTEM**

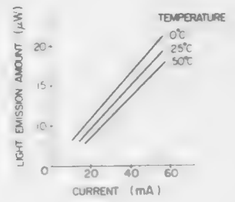
**Setsuo Arita, and Tetsuo Ito, both of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Apr. 4, 1985, Ser. No. 719,909**

**Claims priority, application Japan, Apr. 4, 1984, 59-65774**

**Int. Cl.[4] H04B** *9/00*

**U.S. Cl. 455—608** **4 Claims**




1. A light signal transmission/reception system having a transmitter for converting an electrical signal into a light signal and transmitting said light signal and a receiver for converting said light signal transmitted from said transmitter into an electrical signal comprising: means for substituting a plurality of reference pulse signals with amplitudes of predetermined different levels for any portions of said electrical signal provided at the side of said transmitter; and means provided at the side of said receiver for deriving the amount of change in the amplitude of said reference pulse signals, means for compensating for the magnitude of a received signal by adjusting the gain and the bias of an amplifier circuit in said receiver in accordance with the amount of said change, and means for removing said reference pulse signals from the compensated and received signal, provided at the side of said receiver.

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**4,742,576**

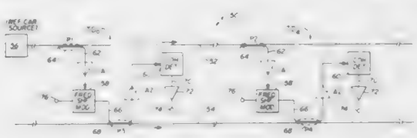
**OPTICAL COMMUNICATION SYSTEM EMPLOYING COHERENT DETECTION AND METHOD**

**Donald H. McMahon, Carlisle, Mass., assignor to Polaroid Corporation, Cambridge, Mass.**

**Filed Dec. 23, 1985, Ser. No. 815,073**

**Int. Cl.[4] H04B** *9/00*

**U.S. Cl. 455—617** **43 Claims**



1. An optical communications system comprising:

means defining an optical pathway for propagating light energy;

means including a reference carrier source for introducing light energy onto said optical pathway at a reference wavelength, said reference carrier source consisting essentially of a single, highly frequency stable and accurate

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optical source for introducing light energy onto said optical pathway for propagation in one direction of travel;

a plurality of terminal devices coupled to said optical pathway and including at least a first terminal device and a second terminal device;

said first terminal device coupled to said optical pathway so as to extract a portion of said light energy at said reference wavelength, said first terminal device including selectively operative means for providing an optical information signal consisting essentially of a part of said extracted portion, said part being frequency shifted at a carrier wavelength coherently related to said reference wavelength, and for introducing said information signal onto said optical pathway;

said second terminal device coupled to said optical pathway so as to extract at least a portion of said light energy at said reference wavelength and at least a portion of said information signal, and said second terminal device including selectively operative means for detecting the information in said information signal by utilizing an optical signal consisting essentially of said extracted portion of both said reference wavelength and said information signal; and

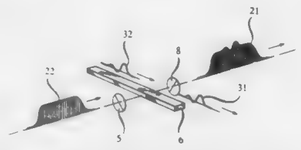
said optical pathway including means for providing substantially equal propagation times for transmisison of both said reference wavelength and said information signal between said first and second terminal devices to provide coherence between said reference wavelength and said information signal.

**4,742,577**

**DEVICE AND METHOD FOR SIGNAL TRANSMISSION AND OPTICAL COMMUNICATIONS**

**Janis A. Valdmanis, Westfield, N.J., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Jun. 6, 1986, Ser. No. 872,239**
**Int. Cl.[4] H04B 9/00**
**U.S. Cl. 455—618** **13 Claims**




12. A method of communication, said method comprising transmitting at least one time-dependent signal, transmission of said signal comprising

(i) generating a sub-nanosecond optical pulse having time-dependent spectral variation,

(ii) electro-optically, magneto-optically, or opto-optically modulating the amplitude of said pulse in time-dependent fashion in correspondence with said time-dependent signal, thereby altering the spectral content of said pulse, and

(iii) determining the spectral content of said pulse as so altered.

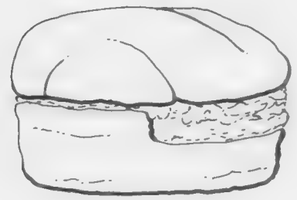


**295,455**

**BURGER BUN OR SIMILAR ARTICLE**

**Paul Han, 5917 Del Paz Dr., Colorado Springs, Colo. 80918**

**Filed Jul. 8, 1985, Ser. No. 752,803**
**Term of patent 14 years**
**U.S. Cl. D1—130**



**295,457**

**CAR BIB**

**Roy R. Weaver, P.O. Box 66157, Houston, Tex. 77266**

**Filed Sep. 23, 1985, Ser. No. 779,130**
**Term of patent 14 years**
**U.S. Cl. D2—226**

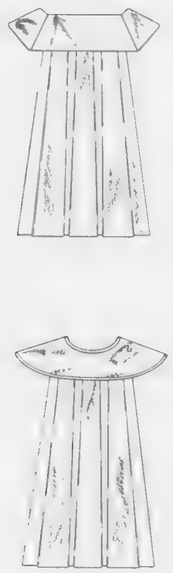


**295,456**

**PROTECTIVE ARTICLE OF CLOTHING**

**Lillian P. Webb Parr, 322 Woodland Way, Greenville, S.C. 29607**

**Filed Sep. 23, 1985, Ser. No. 778,697**
**Term of patent 14 years**
**U.S. Cl. D2—225**

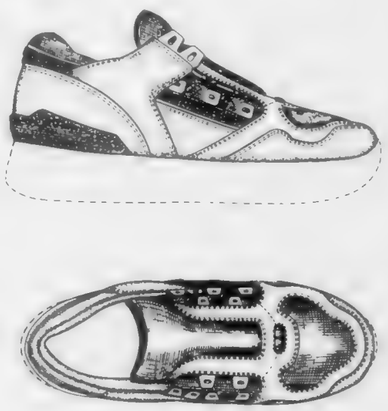


**295,458**

**SHOE UPPER**

**Lawrence Selbiger, Portland, Oreg., assignor to Avia Group International, Inc., Portland, Oreg.**

**Filed Aug. 28, 1987, Ser. No. 90,354**
**Term of patent 14 years**
**U.S. Cl. D2—314**



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295,459
SHOE SOLE
Gary Zaidems, Rohnert Park; John Schelling, Orinda, and Steve Dodds, Novato, all of Calif., assignors to The Donner Mountain Corporation, Sun Rafael, Calif.
Filed Jun. 15, 1987, Ser. No. 61,386
Term of patent 14 years
U.S. Cl. D2—320





295,460
SHOE SOLE
Yoshiaki Hase, Akashi, and Sandg Song, Kobe, both of Japan, assignors to Asics Corporation, Japan
Filed Dec. 31, 1985, Ser. No. 815,448
Claims priority, application Japan, Jul. 31, 1985, 60-32914
Term of patent 14 years
U.S. Cl. D2—320



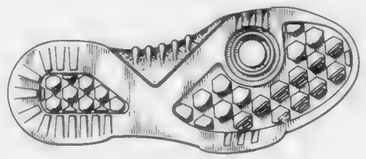


295,461
SHOE SOLE
Yoshiaki Hase, and Masanobu Inohara, both of Akashi, Japan, assignors to Asics Corporation, Japan
Filed Dec. 31, 1985, Ser. No. 815,408
Claims priority, application Japan, Jul. 31, 1985, 60-32913
Term of patent 14 years
U.S. Cl. D2—320





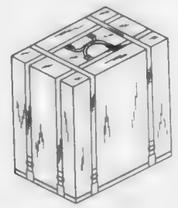
295,462
SHOE OUTSOLE
Paul D. Brown, Hingham, and Tuan N. Le, Cohasset, both of Mass., assignors to Reebok International Ltd., Canton, Mass.
Filed Feb. 6, 1987, Ser. No. 11,718
Term of patent 14 years
U.S. Cl. D2—320







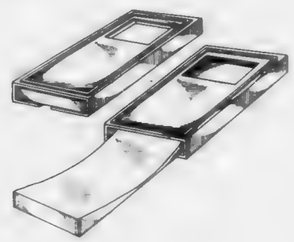
295,463
CARRYING CASE
Trevor I. Baptiste, 383 Grand Ave., Brooklyn, N.Y. 11238
Filed Feb. 12, 1985, Ser. No. 701,031
Term of patent 14 years
U.S. Cl. D3—77



295,464
NAIL BRUSH
Frank Stephens, Dunwoody, Ga., assignor to Plough, Inc., Memphis, Tenn.
Filed Dec. 11, 1985, Ser. No. 807,910
Term of patent 14 years
U.S. Cl. D4—134



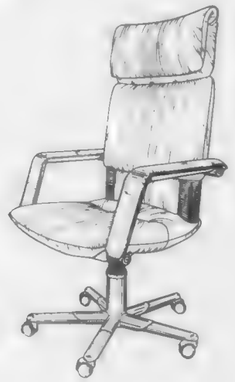
295,465
COMBINATION PHOTOGRAPH HOLDER AND DISPLAY
Alfred A. Anthony, 10 Bradley St., Westport, Conn. 06880
Filed May 20, 1985, Ser. No. 735,644
Term of patent 14 years
U.S. Cl. D6—300



295,466
CHAIR
Mario Bellini, Milan, Italy, assignor to Fehlbaum & Co., Riehen, Switzerland
Filed Jan. 11, 1985, Ser. No. 690,690
Claims priority, application Hague, Jul. 13, 1984, 74 205
The portion of the term of this patent subsequent to Jan. 5, 2002, has been disclaimed.
Term of patent 14 years
U.S. Cl. D6—366



295,467
CHAIR
Mario Bellini, Milan, Italy, assignor to Fehl & Co., Switzerland
Filed Jan. 11, 1985, Ser. No. 690,689
The portion of the term of this patent subsequent to Jan. 5, 2002, has been disclaimed.
Term of patent 14 years
U.S. Cl. D6—366



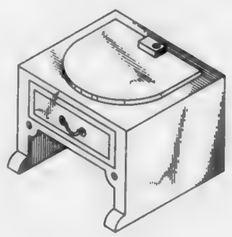
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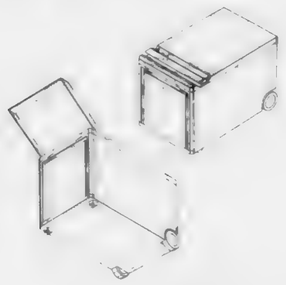
295,468
**CHAIR**
Warren H. Snodgrass, Kentfield, Calif., assignor to Steelcase Inc., Grand Rapids, Mich.
Division of Ser. No. 553,359, Nov. 18, 1983, which is a continuation-in-part of Ser. No. 237,999, Feb. 25, 1981, Pat. No. Des. 271,447. This application Feb. 2, 1987, Ser. No. 10,018
The portion of the term of this patent subsequent to Aug. 28, 1998, has been disclaimed.
Term of patent 14 years
U.S. Cl. D6—373



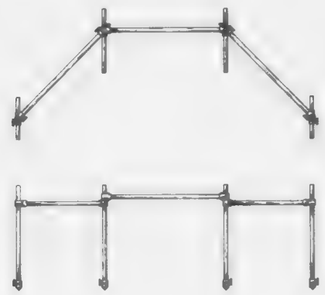
295,469
**REMOTE CONTROL TV TABLE**
Bruce L. Green, 7001 Wolfin St., #2061, Amarillo, Tex. 79106
Filed Oct. 15, 1985, Ser. No. 787,480
Term of patent 14 years
U.S. Cl. D6—436



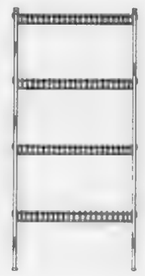
295,470
**MOBILE CABINET FOR OFFICE SUPPLIES**
Klaus Uredat-Neuhoff, Lindern/Oldenburg, Fed. Rep. of Germany, assignor to Inaba Seisakusho Ltd., Tokyo, Japan
Filed Nov. 27, 1985, Ser. No. 807,054
Claims priority, application Japan, Jun. 3, 1985, 60-23038
Term of patent 14 years
U.S. Cl. D6—440



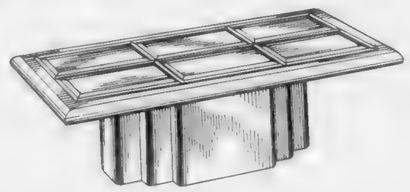
295,471
**MUSICAL INSTRUMENT STAND**
Jon L. Lindskog, Fort Collins, Colo., assignor to Ultimate Support Systems, Inc., Fort Collins, Colo.
Filed Oct. 1, 1985, Ser. No. 782,475
Term of patent 14 years
U.S. Cl. D6—462



295,472
**DESIGN FOR A SHELF UNIT**
Lee Remmers, Ocala, Fla., assignor to Clairson International, Ocala, Fla.
Filed Feb. 25, 1985, Ser. No. 705,502
Term of patent 14 years
U.S. Cl. D6—465



295,473
**TABLE**
Aaron J. Donner, Garrison, N.Y., assignor to Schnadig Corporation, Chicago, Ill.
Filed Feb. 28, 1986, Ser. No. 840,714
Term of patent 14 years
U.S. Cl. D6—480

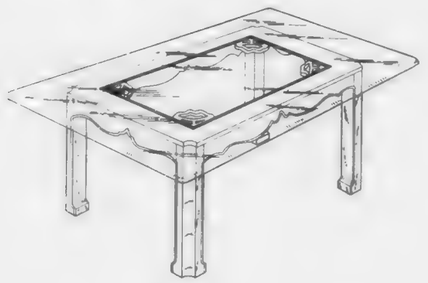




295,474
**OFFICE DESK**
Klaus Uredat-Neuhoff, Lindern/Oldenburg, Fed. Rep. of Germany, assignor to Inaba Seisakusho Ltd., Tokyo, Japan
Filed Nov. 27, 1985, Ser. No. 807,058
Claims priority, application Japan, Jun. 3, 1985, 60-23036
Term of patent 14 years
U.S. Cl. D6—484



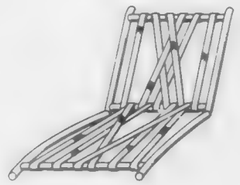
295,475
**TABLE**
Huey T. Keller, High Point, N.C., assignor to Bernhardt Industries, Inc., Lenoir, N.C.
Filed Feb. 26, 1986, Ser. No. 836,620
Term of patent 14 years
U.S. Cl. D6—484



295,476
**SEAT CUSHION FOR AN INFANT**
Deborah L. Halpain, 802 N. Broadway #9, Riverton, Wyo. 82501
Filed Mar. 17, 1986, Ser. No. 845,028
Term of patent 14 years
U.S. Cl. D6—502



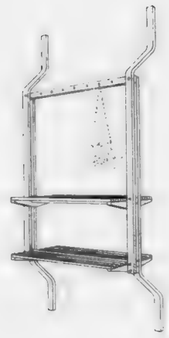
295,477
**COMBINED CHAIR SEAT AND BACKREST UNIT**
Terrance A. Baroody, Orange Park, and Jerry R. Bass, Green Cove Springs, both of Fla., assignors to Baroody Spence Furniture Industries, Inc., Jacksonville, Fla.
Filed May 30, 1984, Ser. No. 615,371
Term of patent 14 years
U.S. Cl. D6—502



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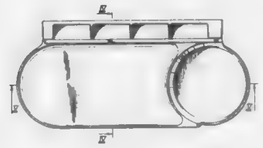


295,478
RECONFIGURABLE SHELF UNIT
Diane E. Helmholdt, and Charles D. Helmholdt, both of 7070 Thornapple River, Caledonia, Mich. 49316
Filed Jul. 2, 1985, Ser. No. 751,075
Term of patent 14 years
U.S. Cl. D6—558



295,479
WALL MOUNTED SHELF FOR BEVERAGE SUPPLIES
Rudolf T. F. Plaut, Cardiff, Great Britain, assignor to Northmace Limited, Cardiff, Great Britain
Filed Jul. 25, 1985, Ser. No. 758,977
Claims priority, application United Kingdom, Apr. 18, 1985, 1026261
Term of patent 14 years
U.S. Cl. D6—574







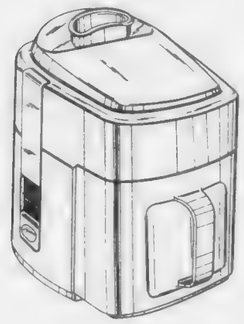
295,480
GOBLET OR SIMILAR ARTICLE
James F. Pomroy, St. Paul, Minn., assignor to Plastics, Inc., St. Paul, Minn.
Division of Ser. No. 662,993, Oct. 19, 1984, which is a continuation-in-part of Ser. No. 568,494, Jan. 5, 1984. This application Aug. 13, 1987, Ser. No. 85,011
Term of patent 14 years
U.S. Cl. D7—11







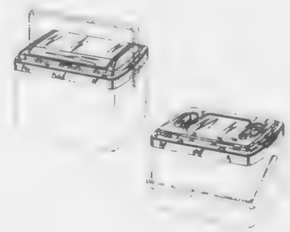
295,481
CENTRIFUGAL FRUIT AND VEGETABLE JUICE EXTRACTOR
Salvador Biarnes Bulto, Barcelona, Spain, assignor to Moulinex, Societe Anonyme, Bagnolet, France
Filed Jun. 27, 1985, Ser. No. 749,404
Claims priority, application France, Jan. 24, 1985, 850277
Term of patent 14 years
U.S. Cl. D7—49



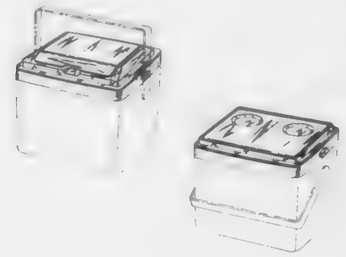
295,482
INSULATING CONTAINER FOR A BOTTLE OR THE LIKE
John M. Bunge, London, England, assignor to Vinicool Limited, Essex, England
Filed Jul. 22, 1985, Ser. No. 757,611
Claims priority, application United Kingdom, Jan. 28, 1985, 1024691
Term of patent 14 years
U.S. Cl. D7—77



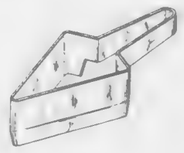
295,483
POCKETED LID FOR COOLER
Richard A. Tarozzi, Gales Ferry, and Charles Formhals, Ledyard, both of Conn., assignors to King-Seeley Thermos Co., Prospect Heights, Ill.
Filed Dec. 18, 1985, Ser. No. 810,273
Term of patent 14 years
U.S. Cl. D7—77



295,484
POCKETED LID FOR COOLER
Richard A. Tarozzi, Gales Ferry, and Charles Formhals, Ledyard, both of Conn., assignors to King-Seeley Thermos Co., Prospect Heights, Ill.
Filed Dec. 18, 1985, Ser. No. 810,274
Term of patent 14 years
U.S. Cl. D7—77



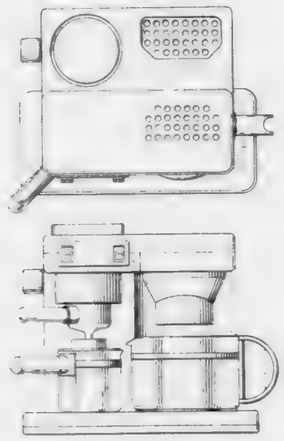
295,485
COMBINED CAKE CUTTER AND SERVER
Patricia A. Ferrin, and Kenneth M. Ferrin, both of Gracy La., East Hampton, N.Y. 11937
Filed May 24, 1985, Ser. No. 737,508
Term of patent 14 years
U.S. Cl. D7—142



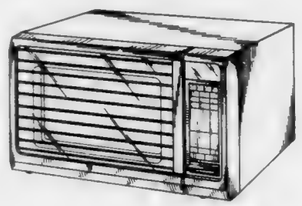
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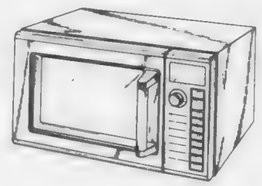
295,486
**COFFEE AND ESPRESSO MAKER**
Arthur Eugster, Romanshorn, Switzerland; Morris G. Grossman, Ft. Lee, N.J.; Alvin B. Finesman, New Canaan, Conn., and Carson E. Ahlman, Hackensack, N.J., assignors to Salton, Inc., North Chicago, Ill.
Filed Apr. 15, 1985, Ser. No. 723,180
Term of patent 14 years
U.S. Cl. D7—309



295,487
**MICROWAVE OVEN**
Masayoshi Kubo; Masuo Ichihara, both of Nara; Katsutoshi Kido, Kyoto, and Tomoyasu Hiratsuka, Nara, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed Jul. 25, 1985, Ser. No. 758,923
Claims priority, application Japan, Jan. 28, 1985, 60-2660
Term of patent 14 years
U.S. Cl. D7—351

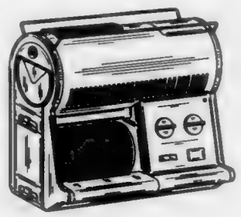


295,488
**MICROWAVE OVEN**
Katsutoshi Kido, Kyoto; Tomoyasu Hiratsuka, and Kensuke Mizuma, both of Nara, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed Oct. 7, 1985, Ser. No. 785,130
Claims priority, application Japan, Apr. 8, 1985, 60-14179
Term of patent 14 years
U.S. Cl. D7—351



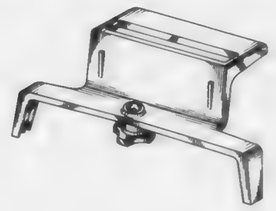


295,489
**COFFEE ROASTER**
Isao Ayukawa, Osaka, Japan, assignor to Sharp Corporation, Osaka, Japan
Filed Apr. 8, 1985, Ser. No. 720,748
Claims priority, application Japan, Oct. 3, 1984, 59-41397
Term of patent 14 years
U.S. Cl. D7—338





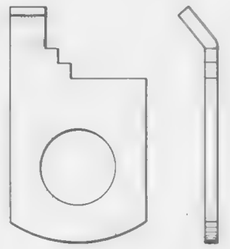
295,490
**COMBINATION HANDLE AND LEG FOR A FRYING PAN**
Norman A. Steinkamp, La Grange Park, Ill., assignor to Sunbeam Corporation, Downers Grove, Ill.
Filed Nov. 1, 1985, Ser. No. 794,349
Term of patent 14 years
U.S. Cl. D7—393



295,491
**GROUND COVER FOR MOISTURE PRESERVATION, WEED PREVENTION OR THE LIKE**
Clarence E. Drumheller, 1400 St. Brides Rd., Chesapeake, Va. 23322
Filed Feb. 11, 1985, Ser. No. 700,090
Term of patent 14 years
U.S. Cl. D8—1



295,492
**LINK INSERT FOR REPAIRING BICYCLE CHAINS**
David J. Jordan, 2505 W. Iola, Broken Arrow, Okla. 74012
Filed Jan. 22, 1985, Ser. No. 693,031
Term of patent 14 years
U.S. Cl. D8—19



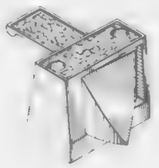
295,493
**COMBINATION SCISSORS AND BLADE COVER**
Antonio Vigano', Milan, Italy, assignor to S.M.A.B. S.r.l., Triuggio, Italy
Filed Apr. 23, 1985, Ser. No. 726,444
Claims priority, application Italy, Nov. 8, 1984, 23729/84[U]
Term of patent 14 years
U.S. Cl. D8—57



295,494
**COMPOUND TOOL**
Ronald W. Bunch, Rte. 2, Box 457, Williamsburg, Ky. 40769
Filed Apr. 30, 1985, Ser. No. 729,035
Term of patent 14 years
U.S. Cl. D8—105



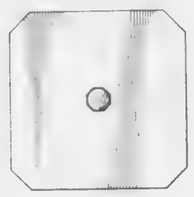
295,495
**DOOR LATCH HANDLE**
George J. Praska, Crystal, Minn., assignor to Wright Products, Inc., Rice Lake, Wis.
Filed Jun. 5, 1985, Ser. No. 741,575
Term of patent 14 years
U.S. Cl. D8—302



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295,496
**FASTENER**
Norman E. Burke, Sudbury, and Robert G. Ridley, Woburn, both of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.
Filed Feb. 21, 1985, Ser. No. 704,354
Term of patent 14 years
U.S. Cl. D8—394



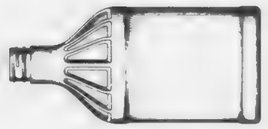
295,497
**BOTTLE**
Scott A. Silvenis, Mauldin, and James L. Ghighi, Greenville, both of S.C., assignors to The Dow Chemical Company, Midland, Mich.
Filed Nov. 1, 1984, Ser. No. 667,176
Term of patent 14 years
U.S. Cl. D9—373



295,498
**BOTTLE**
Scott A. Silvenis, Mauldin, S.C., assignor to The Dow Chemical Company, Midland, Mich.
Filed Nov. 2, 1984, Ser. No. 667,786
Term of patent 14 years
U.S. Cl. D9—373



295,499
**BOTTLE**
Louis B. LeFevre, Houston, Tex., assignor to Conoco Inc., Ponca City, Okla.
Filed Sep. 23, 1985, Ser. No. 780,503
Term of patent 14 years
U.S. Cl. D9—394

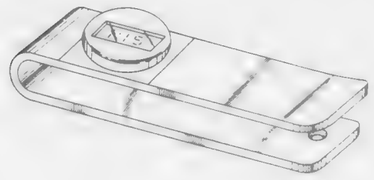


295,500
**TRAY**
William D. Hoenninger, and Paul W. Wilemon, both of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio
Filed Jul. 2, 1985, Ser. No. 751,110
Term of patent 14 years
U.S. Cl. D9—429

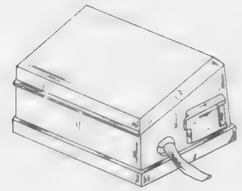




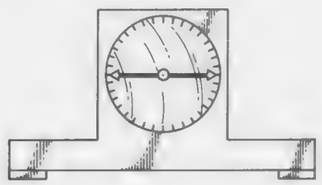
295,501
**TIME CLIP**
Ernest E. Brayford, 6880 Archibald Ave. #84, Alta Loma, Calif. 91701
Filed Oct. 15, 1984, Ser. No. 660,796
Term of patent 14 years
U.S. Cl. D10—31



295,502
**INDOOR/OUTDOOR TIMER ENCLOSURE**
Ranjit Dey, 2465 Dunwin Drive, Unit 11, Mississauga, Ontario, Canada L5L 1T1
Filed Jul. 8, 1985, Ser. No. 752,677
Term of patent 14 years
U.S. Cl. D10—40



295,503
**CENTER OF GRAVITY LEVEL**
Clifton Kinnie, and Earnest Kinnie, both of 10209 S. Saint Lawrence Ave., Chicago, Ill. 60628
Filed Jul. 25, 1985, Ser. No. 758,868
Term of patent 14 years
U.S. Cl. D10—69



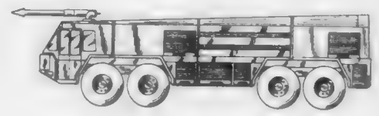
295,504
**TAPE MEASURE WITH DIGITAL DISPLAY**
Nobuyuki Yamamoto, and Tatsuaki Nakai, both of Kyoto, Japan, assignors to Kyoto Measuring Instruments Corporation, Kyoto, Japan
Filed Sep. 11, 1985, Ser. No. 774,812
Term of patent 14 years
U.S. Cl. D10—72



295,505
**JEWELRY CHAIN CLASP**
Theresa I. Watts, and William L. Watts, both of 7451 W. 159th St., Tinley Park, Ill. 60477
Filed Sep. 12, 1985, Ser. No. 775,325
Term of patent 14 years
U.S. Cl. D11—87



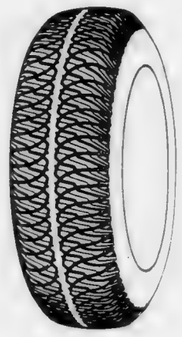
295,506
**AIR CRASH TENDER VEHICLE**
Hermann Staudinger, Neuhofen, Austria, assignor to Konrad Rosenbauer KG, Leoding, Austria
Filed Nov. 5, 1984, Ser. No. 668,474
Term of patent 14 years
U.S. Cl. D12—13



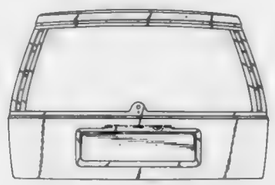
VOL
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295,507
**TIRE**
André E. J. Baus, Bettembourg; Jean F. L. Fontaine, Bürden, and Maurice Graas, Luxembourg, all of Luxembourg, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio
Filed Feb. 27, 1985, Ser. No. 706,360
Claims priority, application Benelux, Oct. 28, 1984, 59488-00
The portion of the term of this patent subsequent to Apr. 5, 2002, has been disclaimed.
Term of patent 14 years
U.S. Cl. D12—146



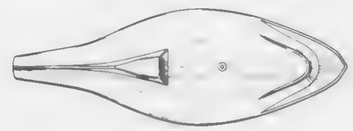
295,508
**REAR LIFT GATE DOOR FOR AN AUTOMOBILE**
Jan Wilsgaard, Kullavik, Sweden, assignor to Aktiebolaget Volvo, Goteborg, Sweden
Filed Jun. 4, 1985, Ser. No. 741,296
Claims priority, application Sweden, Dec. 20, 1984, 84-3409
Term of patent 14 years
U.S. Cl. D12—196



295,509
**WHEEL COVER**
Boyke Boyer, Seefeld, Fed. Rep. of Germany, assignor to Bayerische Mortoren Work Aktiengesellschaft, Munich, Fed. Rep. of Germany
Filed Jul. 25, 1985, Ser. No. 758,960
Claims priority, application Fed. Rep. of Germany, Jan. 29, 1985, MR 16007
The portion of the term of this patent subsequent to Jan. 27, 2001, has been disclaimed.
Term of patent 14 years
U.S. Cl. D12—211



295,510
**HULL OF A SAILING CRAFT**
Terence J. Carter, Wayside, Goldhanger Road, Heybridge, Maldon, Essex CM9 7QU, England
Filed Jan. 15, 1985, Ser. No. 691,538
Claims priority, application United Kingdom, Jul. 16, 1984, 1020949
Term of patent 14 years
U.S. Cl. D12—303

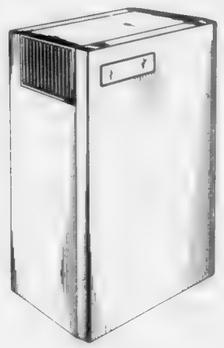




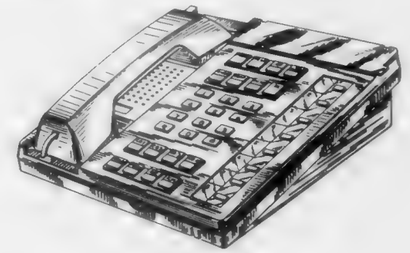
295,511
**BATTERY FOR A PORTABLE TWO-WAY RADIO**
William J. Scheid, and Bruce A. Claxton, both of Coral Springs, Fla., assignors to Motorola, Inc., Schaumburg, Ill.
Division of Ser. No. 664,286, Oct. 23, 1984, Pat. No. Des. 290,842. This application Mar. 30, 1987, Ser. No. 32,199
Term of patent 14 years
U.S. Cl. D13—8

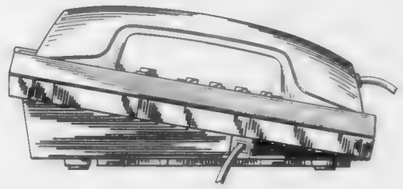


295,512
**COMMUNICATION APPARATUS ENCLOSURE**
Arthur D. Becraft, Colts Neck, and Joseph Girardi, Edison, both of N.J., assignors to American Telephone and Telegraph Company, New York, N.Y. and AT&T Information Systems Inc., Morristown, N.J.
Filed Aug. 13, 1987, Ser. No. 85,092
Term of patent 14 years
U.S. Cl. D14—52



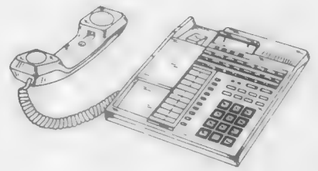
295,513
**TELEPHONE SET**
Wilbert C. Brown, Fairfield, and Philip B. Saba, Trumbull, both of Conn., assignors to TIE/Communications, Inc., Shelton, Conn.
Filed Apr. 13, 1984, Ser. No. 599,779
The portion of the term of this patent subsequent to May 5, 2001, has been disclaimed.
Term of patent 14 years
U.S. Cl. D14—53





295,514
**KEY TELEPHONE SET**
Hiroshi Inaba, Kawasaki, Japan, assignor to Nitsuko Limited, Kawasaki, Japan
Filed Jan. 18, 1985, Ser. No. 692,914
Claims priority, application Japan, Jul. 18, 1984, 59-29641
The portion of the term of this patent subsequent to Aug. 26, 2000, has been disclaimed.
Term of patent 14 years
U.S. Cl. D14—58

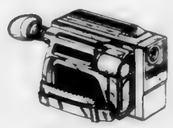




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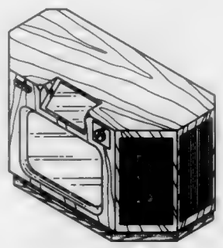
**295,515**
**COMBINED VIDEO CAMERA AND VIDEO TAPE RECORDER**
Sadayoshi Ishida, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan
Filed Oct. 10, 1985, Ser. No. 786,125
Claims priority, application Japan, May 21, 1985, 60-21030
Term of patent 14 years
U.S. Cl. D14—78



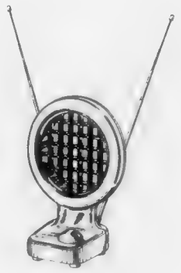


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**295,516**
**COMPUTERIZED TV VIDEO SYSTEM**
Wanda Clophus, and Russell Clophus, Jr., both of 806 Sante Fe St., Keene, Tex. 76059
Filed Aug. 30, 1985, Ser. No. 771,118
Term of patent 14 years
U.S. Cl. D14—79

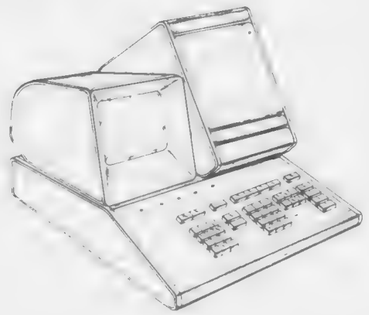


**295,517**
**TELEVISION RECEIVING ANTENNA**
Atsuo Moriyama, and Yutaka Aizawa, both of Omiya, Japan, assignors to Yagi Antenna Co., Ltd., Tokyo, Japan
Filed Jun. 10, 1985, Ser. No. 743,030
Term of patent 14 years
U.S. Cl. D14—88



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**295,518**
**LOTTERY TERMINAL**
Leslie King, Hampstead, Md.; Stephen Albert, Palo Alto; Joe Munsch, Saratoga, both of Calif.; Joe McArdle, Sunnyvale, and Marland Chow, San Jose, both of Calif., assignors to General Instrument Corp., New York, N.Y.
Filed Nov. 8, 1985, Ser. No. 803,982
Term of patent 14 years
U.S. Cl. D14—106



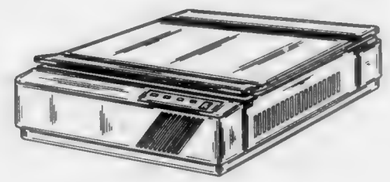


**295,519**
**COMPUTER TERMINAL**
Thomas E. Kimble, Covington, Ky., assignor to Random Corporation, Cincinnati, Ohio
Filed Sep. 23, 1985, Ser. No. 779,072
Term of patent 14 years
U.S. Cl. D14—106



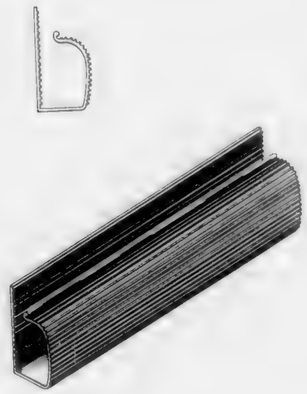
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**295,520**
**SCANNER**
Yoshihisa Ooie, Osaka, Japan, assignor to Sharp Corporation, Osaka, Japan
Filed May 23, 1986, Ser. No. 867,731
Claims priority, application Japan, Nov. 28, 1985, 60-49863
Term of patent 14 years
U.S. Cl. D14—107



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**295,521**
**CONDUIT FOR WIRES OR THE LIKE**
Douglas A. J. Mockett, 2634 Via Rivera, Palos Verdes Estates, Calif. 90274
Filed Feb. 28, 1986, Ser. No. 838,027
Term of patent 14 years
U.S. Cl. D13—13



**295,522**
**BATTERY OPERATED ELECTRIC WATER PUMP**
Norman Martin, Los Angeles, and Hong K. Oh, Canoga Park, both of Calif., assignors to Anavera Corp., Los Angeles, Calif.
Filed Jan. 16, 1986, Ser. No. 819,840
Term of patent 14 years
U.S. Cl. D15—7

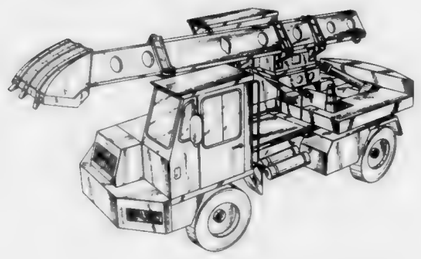




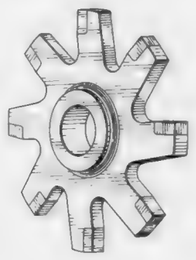
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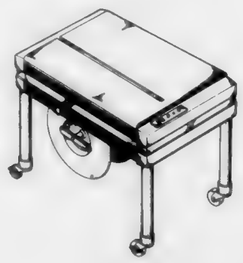
295,523
EXCAVATING MACHINE
John W. Gano, New Philadelphia, Ohio, assignor to The Gradall Company, New Philadelphia, Ohio
Filed Apr. 29, 1985, Ser. No. 728,511
Term of patent 14 years
U.S. Cl. D15—25



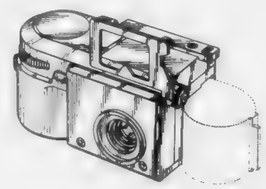
295,524
CUTTER FOR A PAVEMENT ROUTER
Douglas E. Rowan, Caledon East, and John E. Van Wagner, Bolton, both of Canada, assignors to Marathon Equipment Ltd., Weston, Canada
Filed May 23, 1985, Ser. No. 737,061
Claims priority, application Canada, Mar. 15, 1985, 15-03-85-1
Term of patent 14 years
U.S. Cl. D15—28



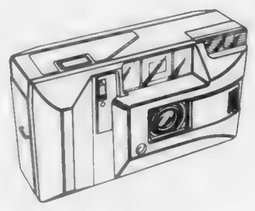
295,525
SEMI-AUTOMATIC STRAPPING MACHINE
Yasunori Sakaki, and Tatsuo Aida, both of Tokyo, Japan, assignors to Strapack Corporation, Tokyo, Japan
Filed Dec. 17, 1985, Ser. No. 809,994
Term of patent 14 years
U.S. Cl. D15—145



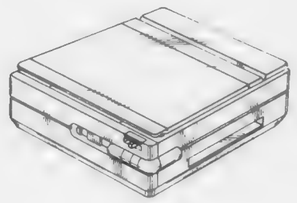
295,526
CAMERA
Toshiyuki Baba, Tokorozawa, Japan, assignor to Siko Co., Ltd., Tokyo, Japan
Filed May 5, 1986, Ser. No. 859,726
Claims priority, application Japan, Feb. 14, 1986, 61-4688
Term of patent 14 years
U.S. Cl. D16—1



295,527
CAMERA
Koichi Soda, Tokyo; Tetsuya Goto, Kanagawa, and Yoichi Shirai, Saitama, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan
Filed Sep. 12, 1985, Ser. No. 775,481
Claims priority, application Japan, Mar. 12, 1985, 60-009735
Term of patent 14 years
U.S. Cl. D16—6

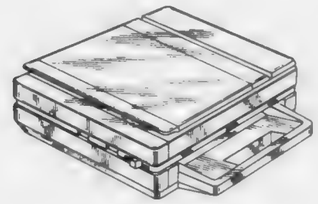


295,528
ELECTROPHOTOGRAPHIC COPIER
Nobuo Masaki, Kawasaki, and Eiko Sekine, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Aug. 9, 1985, Ser. No. 764,005
Claims priority, application Japan, Feb. 14, 1985, 60-5392
Term of patent 14 years
U.S. Cl. D16—31

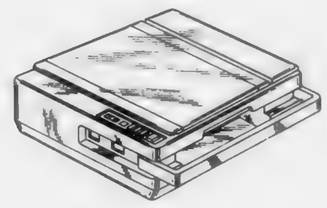




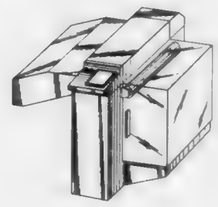
295,529
ELECTROPHOTOGRAPHIC COPIER
Nobuo Masaki, Kawasaki, and Eiko Sekine, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Aug. 9, 1985, Ser. No. 764,003
Claims priority, application Japan, Feb. 14, 1985, 60-5393
Term of patent 14 years
U.S. Cl. D16—31



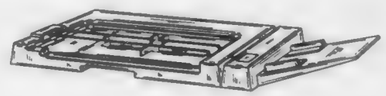
295,530
ELECTROPHOTOGRAPHIC COPIER
Nobuo Masaki, Kawasaki, and Eiko Sekine, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Aug. 9, 1985, Ser. No. 764,000
Claims priority, application Japan, Feb. 14, 1985, 60-5394
Term of patent 14 years
U.S. Cl. D16—31



295,531
PAPER FEEDER FOR COPIERS
Kunio Akiyama, Osaka, Japan, assignor to Sharp Corporation, Osaka, Japan
Filed Mar. 1, 1985, Ser. No. 707,072
Claims priority, application Japan, Sep. 4, 1984, 59-36870
Term of patent 14 years
U.S. Cl. D16—32



295,532
AUTOMATIC ORIGINAL FEEDER FOR COPYING MACHINE
Mikio Kosako, Osaka, Japan, assignor to Sharp Corporation, Osaka, Japan
Filed Mar. 4, 1985, Ser. No. 707,789
Claims priority, application Japan, Sep. 4, 1984, 59-36869
Term of patent 14 years
U.S. Cl. D16—32

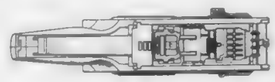


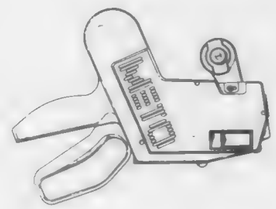
295,533
EYEGLASSES
Max F. Wichers, Viking House, Mooragh Promenada, Isle of Man
Filed Jun. 16, 1986, Ser. No. 875,353
Term of patent 14 years
U.S. Cl. D16—102





295,534
HAND HELD LABELLER
Ansgar Brossard, and Arno Körner, both of Munich, Fed. Rep. of Germany, assignors to Esselte Pendaflex Corporation, Garden City, N.Y.
Filed Jun. 10, 1985, Ser. No. 742,781
Claims priority, application Fed. Rep. of Germany, Dec. 11, 1984, MR23629
Term of patent 14 years
U.S. Cl. D18—19

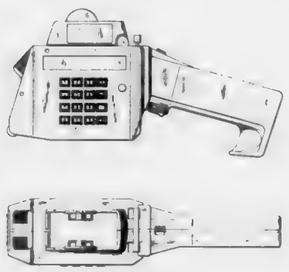




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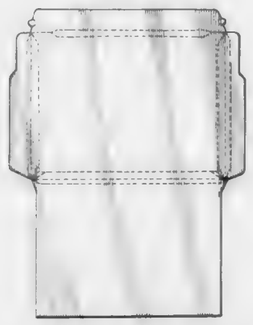


295,535
CASING FOR A HAND HELD LABELLER
Wolfgang Reinke, Rothenberg, Fed. Rep. of Germany, assignor to Esselte Pendaflex Corporation, Garden City, N.Y.
Filed Mar. 25, 1985, Ser. No. 715,382
Claims priority, application Fed. Rep. of Germany, Sep. 26, 1984, MR 23 302
Term of patent 14 years
U.S. Cl. D18—19

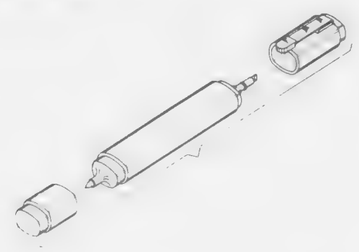




295,536
BLANK FOR EXPANSIBLE ENVELOPE
Hampton E. Forbes, Jr., Newark, Del., assignor to Westvaco Corporation, New York, N.Y.
Filed Jul. 30, 1985, Ser. No. 760,563
Term of patent 14 years
U.S. Cl. D19—3



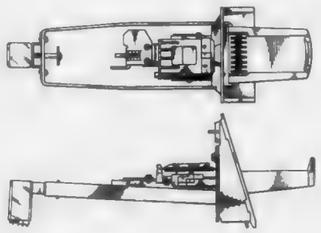
295,537
MARKING INSTRUMENT
Harry Davidson, East Weymouth, and Scott G. Searle, Sudbury, both of Mass., assignors to The Gillette Company, Boston, Mass.
Filed Jun. 11, 1985, Ser. No. 743,236
Term of patent 14 years
U.S. Cl. D19—43



295,538
CHILDREN'S ACTIVITY BOOK
Nada L. Stajan, 50 Lunness Road, Etobicoke, Ontario, Canada (M4W 4M4), and Elizabeth J. Krmelj, 854 Tenth Street, Mississauga, Ontario, Canada L5E 1S6
Filed Jan. 28, 1985, Ser. No. 695,637
Claims priority, application Canada, Nov. 30, 1984, 30-11-84-4
Term of patent 14 years
U.S. Cl. D19—59

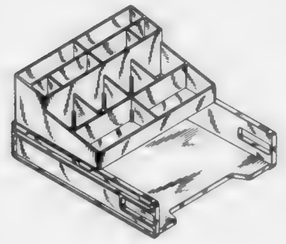



295,539
VERTICAL COIN SLIDE FOR ATTACHMENT TO COIN OPERATED MACHINES
Jim Monfredi, Los Angeles, Calif., assignor to PWS Company, Los Angeles, Calif.
Filed Oct. 15, 1984, Ser. No. 662,439
Term of patent 14 years
U.S. Cl. D20—9

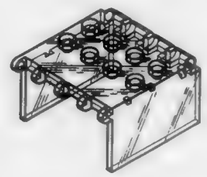




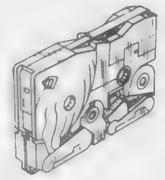
295,540
COMBINED STACKING LETTER TRAY WITH ORGANIZER
Donald B. Rabig, Elizabeth, N.J., assignor to Sterling Plastics Co., Moutainside, N.J.
Filed Sep. 13, 1985, Ser. No. 775,688
Term of patent 14 years
U.S. Cl. D19—92

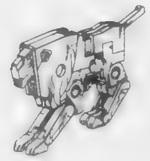


295,541
TOY BUILDING ELEMENT
Jens N. Knudsen, Billund, Denmark, assignor to Interlego A.G., Baar, Switzerland
Filed Nov. 26, 1986, Ser. No. 935,543
Term of patent 14 years
U.S. Cl. D21—108



295,542
RECONFIGURABLE TOY CASSETTE
Takashi Matsuda, Tokyo, Japan, assignor to Takara Co., Ltd., Tokyo, Japan
Filed Aug. 22, 1985, Ser. No. 768,513
Claims priority, application Japan, Mar. 15, 1985, 60-10044
Term of patent 14 years
U.S. Cl. D21—150





295,543
NOVELTY RABBIT FIGURE
Ralph Phillippi, 2216 E. Belmont, Phoenix, Ariz. 85020
Filed Oct. 10, 1985, Ser. No. 786,299
Term of patent 14 years
U.S. Cl. D21—187



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295,544
GOLF CLUB COVER
Elaine R. Rice, 4200-87th St., Urbandale, Iowa 50322
Filed Mar. 1, 1985, Ser. No. 707,378
Term of patent 14 years
U.S. Cl. D21—221



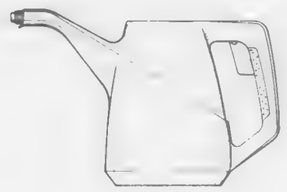
295,545
SURVIVAL GUN STOCK
Dennis L. Bell, Atwood, Kans., assignor to Bell and Carlson, Incorporated, Atwood, Kans.
Filed Mar. 8, 1985, Ser. No. 709,895
Term of patent 14 years
U.S. Cl. D22—103

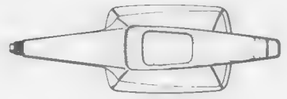


295,546
FISHING SPOON
Hubert J. Marx, Jr., 20827 Pearl, Farmington Hills, Mich. 48024
Filed Jan. 28, 1985, Ser. No. 695,472
Term of patent 14 years
U.S. Cl. D22—129

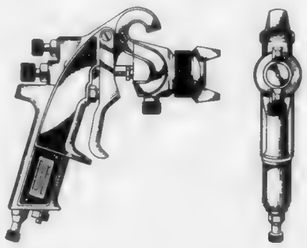


295,547
COMBINED WATERING CAN AND MISTING UNIT
Joseph M. Cunning, Cohasset, Mass., assignor to Blue Mountain Products, Inc., Utica, N.Y.
Filed Aug. 15, 1986, Ser. No. 897,120
Term of patent 14 years
U.S. Cl. D23—212





295,548
SPRAY GUN
Thomas W. Dalton, Los Angeles, Calif., assignor to Sharpe Manufacturing Corporation, Los Angeles, Calif.
Filed Jul. 22, 1985, Ser. No. 757,801
Term of patent 14 years
U.S. Cl. D23—226

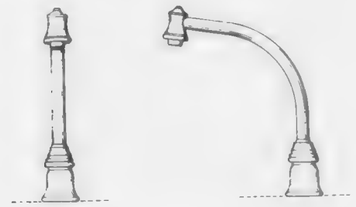


295,549
PROTECTIVE COVER FOR A FAUCET AERATOR
Norman J. MacLeod, 26 Nicole Ave., West Yarmouth, Mass. 02673
Filed Feb. 5, 1985, Ser. No. 698,240
Term of patent 14 years
U.S. Cl. D23—227

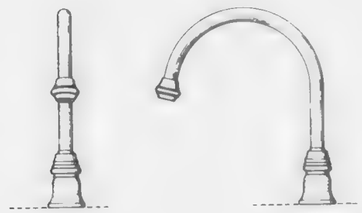




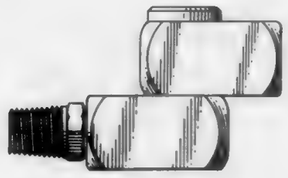
295,550
SPOUT
Holly K. Yost, North Hollywood, Calif., assignor to Price Pfister, Inc., Pacoima, Calif.
Filed May 7, 1986, Ser. No. 860,768
Term of patent 14 years
U.S. Cl. D23—255



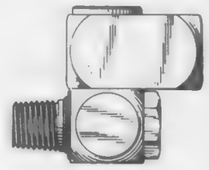
295,551
SPOUT
Holly K. Yost, North Hollywood, Calif., assignor to Price Pfister, Inc., Pacoima, Calif.
Filed May 7, 1986, Ser. No. 860,767
Term of patent 14 years
U.S. Cl. D23—255



295,552
UNIVERSAL PNEUMATIC SWIVEL
Paul W. Huber, Lancaster, N.Y., assignor to Dynabrade, Inc., Tonawanda, N.Y.
Filed Mar. 1, 1985, Ser. No. 707,140
The portion of the term of this patent subsequent to May 3, 2002, has been disclaimed.
Term of patent 14 years
U.S. Cl. D23—264



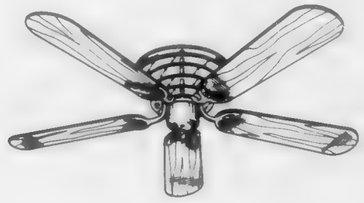
295,553
UNIVERSAL PNEUMATIC SWIVEL
Paul W. Huber, Lancaster, N.Y., assignor to Dynabrade, Inc., Tonawanda, N.Y.
Continuation-in-part of Ser. No. 707,140, Mar. 1, 1985. This application Aug. 19, 1985, Ser. No. 766,588
The portion of the term of this patent subsequent to May 3, 2002, has been disclaimed.
Term of patent 14 years
U.S. Cl. D23—264



295,554
OIL HEATER
Shuzo Sawa, and Matafumi Ikeda, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Sep. 11, 1985, Ser. No. 774,813
Claims priority, application Japan, Mar. 23, 1985, 60-11529
Term of patent 14 years
U.S. Cl. D23—338



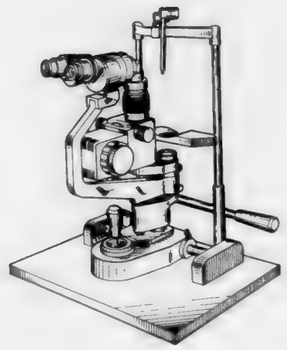
295,555
CEILING FAN
Shelley A. Greenberg, Encino, Calif., assignor to Beverly Hills Trading Company, Inc., Los Angeles, Calif.
Filed Aug. 5, 1987, Ser. No. 81,895
Term of patent 14 years
U.S. Cl. D23—385



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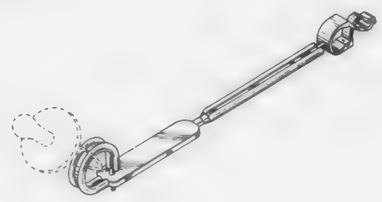
295,556
**SLIT LAMP FOR EXAMINING THE STRUCTURE OF A PATIENT'S EYE**
Edwin A. Speaker, Brockport, N.Y., assignor to Cambridge Instruments Inc., Buffalo, N.Y.
Filed May 28, 1985, Ser. No. 738,796
Term of patent 14 years
U.S. Cl. D24—17



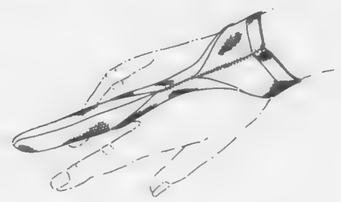
295,557
**LARYNGEAL STENT FOR AIDING IN RECONSTRUCTIVE SURGERY OF THE LARYNX**
Bruce A. Barber, Duxbury, Mass., and Arsen Stegnjajic, New York, N.Y., assignors to Hood Laboratories, Inc., Pembroke, Mass.
Filed Oct. 16, 1985, Ser. No. 787,915
Term of patent 14 years
U.S. Cl. D24—26



295,558
**CLIP FOR A BABY'S PACIFIER**
Rosalie A. Jefferson, and Robert A. Jefferson, both of 1529 Windsor Dr., Desoto, Tex. 75115
Filed Jun. 20, 1985, Ser. No. 746,766
Term of patent 14 years
U.S. Cl. D24—34



295,559
**FINGER BANDAGE PROTECTOR**
Johannes N. Kristensen; Eskild G. Thygesen, both of Ikast, and Erik Grindsted, Copenhagen, all of Denmark, assignors to A/S Tytex, Ikast, Denmark and Mölnlycke AB, Mölnlycke, Sweden
Filed May 20, 1985, Ser. No. 735,489
Claims priority, application Denmark, Nov. 21, 1984, 1048/84
Term of patent 14 years
U.S. Cl. D24—49

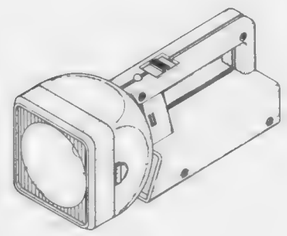


295,560
**MEDICAL LIQUID CONTAINER FOR ENTERAL FEEDING OF PATIENTS**
Robert Bruno, Avon; Stuart R. Kipperman, Easton, and Geoffrey R. Mayer, Trumbull, all of Conn., assignors to Sherwood Medical Company, St. Louis, Mo.
Filed Apr. 30, 1985, Ser. No. 728,872
Term of patent 14 years
U.S. Cl. D24—56

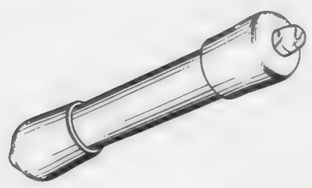




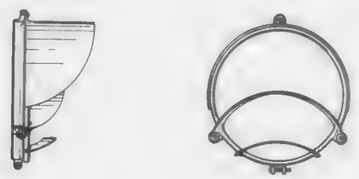
295,561
**HAND-HELD LIGHT**
Meng-Chang Hsiao, 2nd Fl., 171, Chung Hsiao E. Road, Sec. 6, Taipei, Taiwan
Filed Oct. 4, 1985, Ser. No. 784,194
Term of patent 14 years
U.S. Cl. D26—48



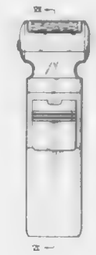
295,562
**FLASHLIGHT**
S. Harry Fazzina, 104 E. Mill Rd., Flourtown, Pa. 19031
Filed Sep. 23, 1985, Ser. No. 778,884
Term of patent 14 years
U.S. Cl. D26—49



295,563
**HEADLIGHT LOUVER**
Joseph J. Speck, 3494 Samuel, Rochester, Mich. 48063
Filed Dec. 5, 1985, Ser. No. 805,185
Term of patent 14 years
U.S. Cl. D26—139

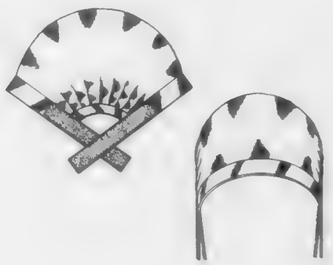


295,564
**ELECTRIC SHAVER CASING**
Yonosuke Iwai, Kadoma, Japan, assignor to Matsushita Electric Works, Ltd., Japan
Filed Apr. 25, 1986, Ser. No. 857,790
Claims priority, application Japan, Nov. 27, 1985, 60-49474
Term of patent 14 years
U.S. Cl. D28—49





295,565
**PROTECTIVE EAR COVERING FOR DOGS, OR SIMILAR ARTICLE**
Garthop Upton, and Rena Upton, both of P.O. Box 206, Arroyo Grande, Calif. 93420
Filed Sep. 9, 1985, Ser. No. 773,941
Term of patent 14 years
U.S. Cl. D30—144

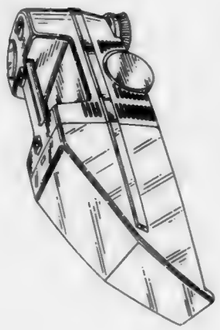


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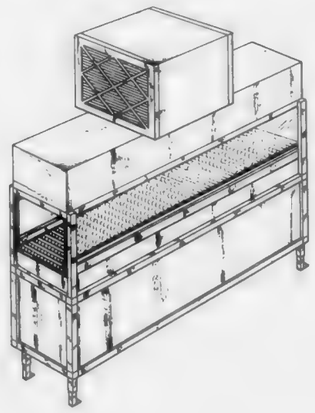
295,566
**COMBINED VACUUM CLEANER AND SCRUBBING BRUSH**

Michael W. Hetherington, Cedar Valley; David P. Garner, Niagara Falls, and Allan D. Millman, Toronto, all of Canada, assignors to Iona Appliances Inc./Appareils Iona Inc., Welland, Canada
Filed Apr. 29, 1985, Ser. No. 728,696
Claims priority, application Canada, Feb. 14, 1985, 14-02-85-6
Term of patent 14 years
U.S. Cl. D32—21



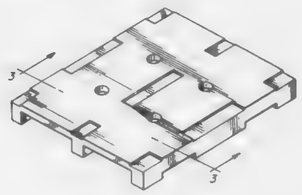
295,567
**COMBINED AIR FILTERATION HOUSING AND CONVEYOR UNIT**

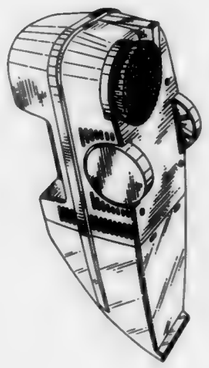
Rutherford L. Cooper, and Brian D. Walter, both of Huntington, Ind., assignors to Shuttleworth, Inc., Huntington, Ind.
Filed Apr. 1, 1985, Ser. No. 718,738
Term of patent 14 years
U.S. Cl. D34—29



295,568
**PALLET**

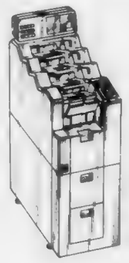
Richard C. Rothwell, Waunakee, Wis., and Kevin D. Rose, Davenport, Iowa, assignors to Oscar Mayer, Madison, Wis.
Filed May 8, 1985, Ser. No. 731,865
Term of patent 14 years
U.S. Cl. D34—38





295,569
**COMBINED BANK NOTE SORTING AND COUNTING MACHINE**

Yoshiaki Nishida, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Sep. 2, 1986, Ser. No. 903,096
Claims priority, application Japan, Mar. 5, 1986, 61-7534
Term of patent 14 years
U.S. Cl. D99—28



# LIST OF PATENTEES

TO WHOM

## PATENTS WERE ISSUED ON THE 3RD DAY OF MAY, 1988

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A-Z Formen- und Maschinenbau GmbH: *See*—
Hilke, Rainer; and Schmaderer, Gerhard, 4,741,683, Cl. 425-47.000.
AB Svensk Filmindustri: *See*—
Alfredsson, Hans; Moller, Bo; Ingelstam, Erik; Ohlsson, Per-Olof; and Vogl, Georg, 4,741,605, Cl. 350-422.000.
AB Volvo Penta: *See*—
Brandt, Lennart H., 4,741,670, Cl. 416-129.000.
Ohlsson, Lars-Erik; Soderbaum, Ulf; and Borgersen, Kjell, 4,741,713, Cl. 440-53.000.
Abbott Laboratories: *See*—
Baker, William R.; and Clark, Jerry D., 4,742,049, Cl. 514-29.000.
Abe, Chiaki; Kanai, Hiroyuki; Ishikawa, Akira; Suzue, Shigetoshi; Takeuchi, Takashi; and Minami, Takahide, to Kao Corporation. Magnetic recording medium. 4,741,959, Cl. 428-403.000.
Abe, Mitsuo: *See*—
Mawatari, Masaaki; Tsuchikawa, Syuji; Kimura, Shinichi; Katsuki, Nobuyuki; and Abe, Mitsuo, 4,742,115, Cl. 525-68.000.
Abe, Shinya: *See*—
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Itoh, Tsutomu; Tateno, Haruo; Nagasaka, Hideo; Yamamoto, Masahiro; Mitsuyoshi, Yusuke; Matsuno, Susumu; Saitoh, Hiroshi; and Kitoh, Masayuki, 4,741,286, Cl. 118-620.000.

Nagashima, Hideyuki, to Nissan Motor Co., Ltd. Seat belt retractor. 4,741,556, Cl. 280-807.000.

Nagashima, Masasumi: *See—*
Nozaki, Mineo; Asakura, Osamu; and Nagashima, Masasumi, 4,741,634, Cl. 400-120.000.

Nagel, Karl: *See—*
Conzelmann, Gerhard; and Nagel, Karl, 4,742,425, Cl. 361-104.000.

Nagy de Nagybaczon, Erno; and Paterson, Alan C., to Tribohesion Limited. Coating process. 4,741,918, Cl. 427-11.000.

Nagy, Joseph G.; Bernier, Richard E.; and DiVincenzo, Gregory T., to General Electric Company. Molded case circuit breaker with accessory functions. 4,742,321, Cl. 335-20.000.

Nahman, Vance; Fahlberg, Roger; and Shepherd, James D., to Gates Rubber Company, The. Static conductivity tester. 4,742,295, Cl. 324-133.000.

Naik, Subhash K.; and Fiedler, Louis J., to Avco Corporation. Erosion-resistant coating system. 4,741,975, Cl. 428-621.000.

Naito, Takashi; Namekawa, Takashi; and Ogihara, Satoru, to Hitachi, Ltd. Ceramic body glass composition for bonding and filling ceramic parts thereof. 4,741,849, Cl. 252-62.600.

Naka, Reishi; and Kuroishi, Kazuyoshi, to Hitachi, Ltd. Rigid polyurethane foam and process for producing the same. 4,742,089, Cl. 521-110.000.

Nakagawa, Banri; and Nojima, Katsuyuki, to International Business Machines Corp. Digital display system with refresh memory for storing character and field attribute data. 4,742,344, Cl. 340-723.000.

Nakagawa, Hiroshi; Maruyama, Toshiki; Narihisa, Masaaki; Maeda, Minoru; and Tanaka, Tsuyoshi, to Shinko Electric Co., Ltd. Linear pulse motor. 4,742,255, Cl. 310-12.000.

Nakagawa, Katsumi; Komatsu, Toshiyuki; Fukaya, Masaki; Iwamoto, Hirofumi; and Seito, Shinichi, to Canon Kabushiki Kaisha. Line photosensor with crosstalk suppression. 4,742,239, Cl. 250-578.000.

Nakagawa, Susumu; Ushijima, Ryosuke; Mano, Eiichi; Ban, Norikazu; and Sanada, Minoru, to Banyu Pharmaceutical Co., Ltd. 3-Isoquinoliniomethyl cephalosporin derivatives. 4,742,053, Cl. 514-202.000.

Nakai, Takahiko: *See—*
Kadono, Yukio; Miyagawa, Minoru; Nakai, Takahiko; and Saotome, Minoru, 4,741,745, Cl. 55-43.000.

Nakajima, Akihiko: *See—*
Asanuma, Tadashi; Ito, Mitsuru; Ito, Kaneo; Funakoshi, Yoshiyuki; and Nakajima, Akihiko, 4,742,131, Cl. 526-61.000.

Nakajima, Toyohei; Okada, Yasushi; Mieno, Toshiyuki; and Oono, Nobuyuki, to Honda Giken Kogyo Kabushiki Kaisha. Method of air/fuel ratio control for internal combustion engine. 4,741,311, Cl. 123-489.000.

Nakamori, Masaharu: *See—*
Matsuura, Masaaki; Nakamori, Masaharu; Honda, Shoichi; Ishida, Yoichi; and Nakanishi, Tetsuya, 4,741,299, Cl. 123-90.310.

Nakamoto, Kouji: *See—*
Yamatsu, Isao; Suzuki, Takeshi; Abe, Shinya; Nakamoto, Kouji; Kajiwara, Akiharu; Fujimori, Tohru; Harada, Koukichi; and Kitamura, Shinichi, 4,742,058, Cl. 514-237.800

Nakamura, Kenichi: *See—*
Yagi, Shizuo; Hirosawa, Yoshiaki; Kawai, Makoto; Yamamoto, Yorihisa; Yoshikawa, Haruhiko; and Nakamura, Kenichi, 4,741,310, Cl. 123-425.000.

Nakamura, Mitsutoshi: *See—*
Iino, Shuji; Hotomi, Hideo; Osawa, Izumi; and Nakamura, Mitsutoshi, 4,741,982, Cl. 430-58.000.

Nakamura, Moritoshi. Masonry wall structure 4,741,140, Cl. 52-427.000.

Nakamura, Osamu: *See—*
Matsumura, Mitsuo; Yamamoto, Hideo; Fukui, Keitaro; Yoshida, Toshihiro; Okayasu, Yoshinobu; Asai, Kunio; and Nakamura, Osamu, 4,742,012, Cl. 437-4.000.

Nakamura, Shigeru; Kamisada, Toshimasa; Saito, Akira; Maeda, Takeshi; Tsunoda, Yoshito; Kaku, Toshimitsu; Kato, Tuyoshi; Hishiki, Masaaki; and Watanabe, Masateru, to Hitachi, Ltd. Focus error detection apparatus utilizing focusing an front and rear sides of focal planes. 4,742,218, Cl. 250-201.000.

Nakanishi, Akira: *See—*
Someya, Shinzo; Koura, Seigo; Ito, Mikio; Nakanishi, Akira; and Nonaka, Yuji, 4,741,756, Cl. 71-90.000.

Nakanishi, Kiyokazu: *See—*
Yamada, Shunzo; Fujita, Satoshi; and Nakanishi, Kiyokazu, 4,741,227, Cl. 74-664.000.

Nakanishi, Tetsuya: *See—*
Matsuura, Masaaki; Nakamori, Masaharu; Honda, Shoichi; Ishida, Yoichi; and Nakanishi, Tetsuya, 4,741,299, Cl. 123-90.310.

Nakanishi, Toru: *See—*
Ueno, Susumu; Nakanishi, Toru; Fushimi, Kenji; Ishikawa, Keiichi; and Emori, Yasuo, 4,741,920, Cl. 427-40.000.

Nakanishi, Toshihide: *See—*
Kino, Kuniki; Nakanishi, Toshihide; and Sugimoto, Masahiro, 4,742,007, Cl. 435-108.000.

Nakano, Hiromitsu; Yamane, Mitsuru; and Yoshida, Isao, to Matsushita Electric Industrial Co., Ltd. Speed control apparatus for a DC motor 4,742,281, Cl. 318-317.000.

Nakano, Hisamatsu: *See—*
Ishino, Ken; Nakano, Hisamatsu; and Gotoh, Naohisa, 4,742,359, Cl. 343-895.000.

Nakano, Masao: *See—*
Takemae, Yoshihiro; Nozaki, Shigeki; Nakano, Masao; Sato, Kimiaki; and Kodama, Nobumi, 4,742,486, Cl. 365-189.000.

Nakano, Okihiko; and Ishimura, Yohzoh, to Matsushita Electric Industrial Co., Ltd. Door assembly for microwave heating apparatus. 4,742,201, Cl. 219-10.55D.

Nakano, Shigeru: *See—*
Takita, Hitoshi; Ishikawa, Nobuo; and Nakano, Shigeru, 4,741,960, Cl. 428-336.000.

Nakano, Takashi: *See—*
Marui, Yoji; Nakano, Takashi; Hayashi, Chozo; Fujita, Tuyosi; and Takagahara, Isamu, 4,742,001, Cl. 435-26.000.

Nakashima, Noriyuki: *See—*
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Nakashima, Seiichiro; Toyoda, Kenichi; Sakakibara, Shinsuke; and Karakama, Tatsuo, to Fanuc Ltd. Multilayer welding method. 4,742,207, Cl. 219-125.100.

Nakata, Kenji, to Sasaki, Hiroshi. Tool holder. 4,741,650, Cl. 408-137.000.

Nakatani, Keiji, to Minolta Camera Kabushiki Kaisha. Copying machine. 4,742,373, Cl. 355-14.00R.

Nakazawa, Eiji: *See—*
Ishii, Hiroshi; Seki, Tatsuyuki; and Nakazawa, Eiji, 4,742,369, Cl. 354-441.000.

Nakazawa, Hiroshi, to Hybrid Corporation. Camera having means for receiving a film cassette. 4,742,366, Cl. 354-204.000.

Nakazyo, Kiyoshi: *See—*
Tani, Tadaaki; Ihama, Mikio; and Nakazyo, Kiyoshi, 4,741,995, Cl. 430-558.000.

Nalco Chemical Company: *See—*
Wetegrove, Robert L.; and Kaesler, Ralph W., 4,742,114, Cl 524-827.000.

Namekawa, Takashi: *See—*
Naito, Takashi; Namekawa, Takashi; and Ogihara, Satoru, 4,741,849, Cl. 252-62.600.
Namiki, Junji: *See—*
Akashi, Fumio; Kobayashi, Kazutomo; Namiki, Junji; and Watanabe, Kojiro, 4,742,512, Cl. 370-96.000.
Nankai Kogyo Kabushiki Kaisha: *See—*
Kitawaki, Kazuya, 4,741,367, Cl. 139-91.000.
Napco Security Systems, Inc.: *See—*
Soloway, Richard; and Farrell, Richard, 4,742,183, Cl. 174-68.500.
Narato, Kiyoshi: *See—*
Azuhata, Shigeru; Higashiyama, Kazutoshi; Narato, Kiyoshi; Kobayashi, Hironobu; Arashi, Norio; Inada, Tooru; Sohma, Kenichi; Ohtsuka, Keizou; Takahashi, Yoshitaka; Koda, Fumio; Masai, Tadahisa; Tanikawa, Masakiyo; and Kawano, Kei, 4,741,279, Cl. 110-347.000.
Narayanan, Kesh S.; Vagarali, Suresh S.; and Swanson, Brian E., to Norton Company. Grinding wheel with combination of fused and sintered abrasive grits. 4,741,743, Cl. 51-309.000.
Narihisa, Masaaki: *See—*
Nakagawa, Hiroshi; Maruyama, Toshiki; Narihisa, Masaaki; Maeda, Minoru; and Tanaka, Tsuyoshi, 4,742,255, Cl. 310-12.000.
Narisawa, Saburo: *See—*
Shimizu, Katsuo; and Narisawa, Saburo, 4,741,787, Cl. 156-64.000.
Narita, Ko; Toyama, Koichi; and Nonaka, Toshihito, to Nippondenso Co. LTD. Ignition system for internal combustion engines. 4,741,319, Cl. 123-609.000.
Narusawa, Haruhiko: *See—*
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Nash, George A.: *See—*
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Nashif, Ahid D.: *See—*
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Nasiadka, Jerry M.: *See—*
Miesterfeld, Frederick O. R.; McCambridge, John M.; Fassnacht, Ronald E.; and Nasiadka, Jerry M., 4,742,349, Cl. 340-825.500.
Nat-Relax S.A.R.L.: *See—*
Rosier, Pascal; and Rosier, Sully-Pierre, 4,741,057, Cl. 5-455.000.
Natarajan, Sesha I.; and Gordon, Eric M., to E. R. Squibb & Sons, Inc. Acylalkylaminocarbonyl substituted amino and imino acid compounds. 4,742,067, Cl. 514-343.000.
Nathans, Robert; Bozzo, Salvador R.; and Rosen, Evan W., to Software Plus, Inc. Method and apparatus for performing pattern recognition analysis. 4,742,458, Cl. 364-417.000.
National Gypsum Company: *See—*
Kossuth, Donald A., 4,741,929, Cl. 427-258.000.
National Research Development Corporation: *See—*
Wickramasinghe, Hemantha K., 4,741,620, Cl. 356-349.000.
National Starch and Chemical Corporation: *See—*
Solarek, Daniel B.; Jobe, Patrick G.; Tessler, Martin M.; Billmers, Robert L.; Lamb, Diane J.; and Tsai, John J., 4,741,804, Cl. 162-175.000.
Natoli, Giuseppe: *See—*
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Natsuaki, Nobuyoshi: *See—*
Ohyu, Kiyonori; Natsuaki, Nobuyoshi; Tamura, Msao; and Wada, Yasuo, 4,742,025, Cl. 437-225.000.
Nauta, Hendrikus C.: *See—*
Nordholt, Ernst H.; and Nauta, Hendrikus C., 4,742,566, Cl. 455-260.000.
NCR Corporation: *See—*
Ma, Hung S., 4,742,557, Cl. 382-51.000.
Neale, Stephen D.: *See—*
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NEC Corporation: *See—*
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Fukumura, Yukio, 4,742,563, Cl. 455-132.000.
Furuya, Yukitsuna, 4,742,568, Cl. 455-277.000.
Iwahashi, Koji, 4,742,565, Cl. 455-234.000.
Kohmoto, Mitsuo, 4,742,385, Cl. 357-74.000.
Saito, Takeshi, 4,741,601, Cl. 350-339.00R.
Shibuya, Toshiteru, 4,742,453, Cl. 364-200.000.
Watanabe, Takao, 4,742,547, Cl. 381-51.000.
Nederlandse Centrale Organisatie Voor Toegepast-Natuurwetenschappelijk Onderzoek: *See—*
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Neff, Jurg: *See—*
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Nehring, John R., to C. R. Bard, Inc. Pulsatile pump. 4,741,678, Cl. 417-395.000.
Neiders, Mirdza E.: *See—*
Genco, Robert J.; Zambon, Joseph J.; Christersson, Lars A.; and Neiders, Mirdza E., 4,741,999, Cl. 435-7.000.
Neier, Benjamin R., to Roto-Mix, Inc. Fluent and nonfluent material mixer. 4,741,625, Cl. 366-196.000.
Neimark, Sheridan: *See—*
Ungar, Israel S.; O'Dell, Robin D.; and Neimark, Sheridan, 4,741,946, Cl. 428-207.000.
Nelson, Gregory O.; Devon, Thomas J.; Puckette, Thomas A.; Stavinoha, Jerome L.; Phillips, Gerald W.; and Vanderbilt, Jeffrey J., to Eastman Kodak Company. Low pressure hydroformylation of dienes. 4,742,178, Cl. 568-454.000.
Nelson, William E.: *See—*
Reaves, Benjamin H.; and Nelson, William E., 4,741,128, Cl. 51-241.00S.
Nestec S. A.: *See—*
Larsson, Inger C.; and Linse-Loefgren, Anna M., 4,741,933, Cl. 426-291.000.
Nestec S.A.: *See—*
Farr, David R.; Magnolato, Daniele; and Loliger, Jurg, 4,741,915, Cl. 426-542.000.
Nestegard, Sander C. Exercise arm for a stationary bicycle. 4,741,527, Cl. 272-73.000.
Neumann, Charles G., to Reynolds Products, Inc. Auger type icemaker. 4,741,173, Cl. 62-298.000.
Nevamar Corporation: *See—*
Ungar, Israel S.; O'Dell, Robin D.; and Neimark, Sheridan, 4,741,946, Cl. 428-207.000.
New, David A., to RCA Corporation. Color picture tube having an inline electron gun with an einzel lens. 4,742,266, Cl. 313-414.000.
Newman, Hugh D., Jr.: *See—*
Smith, Carl R.; Gaterud, Mark T.; Jamiolkowski, Dennis D.; Newman, Hugh D., Jr.; and Shalaby, Shalaby W., 4,741,337, Cl. 128-334.00R.
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NGK Insulators, Ltd.: *See—*
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Izumiya, Hirotsugu; and Kariya, Mikio, 4,742,269, Cl. 313-624.000.
Matsuhisa, Tadaaki; and Kato, Kiminari, 4,741,792, Cl. 156-89.000.
Ogawa, Yutaka; Ogasawara, Takayuki; and Hori, Yoshiaki, 4,741,253, Cl. 92-212.000.
NGK Spark Plug Co., Ltd.: *See—*
Nishio, Hisaharu; and Okumura, Toshio, 4,741,816, Cl. 204-425.000.
Nguyen, Tinh; and Gaul, James M., to ARCO Chemical Company. Copolymeric composition of a functional polysiloxane and a carboxylic acid or salt thereof. 4,742,144, Cl. 528-26.500.
Nguyen, Trieu N.: *See—*
Schwartz, Ellen S.; Smolenski, Donald J.; Wisehart, Ann J.; and Nguyen, Trieu N., 4,742,476, Cl. 364-550.000.
Nichols, Gus. Liquid, solventless, complex polymeric compositions, thermosetting at ambient temperatures through addition polymerization mechanisms. 4,742,147, Cl. 528-75.000.
Nichols, Lawrence J.: *See—*
MacMaster, George H.; and Nichols, Lawrence J., 4,742,271, Cl. 315-39.300.
Nicia, Antonius J. A.; Van Rooy, Theodorus L.; and Haisma, Jan, to U.S. Philips Corporation. Optical multiplexer and demultiplexer. 4,741,588, Cl. 350-96.190.
Nicolet Instrument Corporation: *See—*
Danby, Hal C.; and Beigler, Myron A., 4,741,344, Cl. 128-642.000.
Nigro, Arthur R., Jr.; and Boudreau, Marcel, to Data General Corporation. Housing for a portable computer. 4,742,478, Cl. 364-708.000.
Nihon Parkerizing Company Limited: *See—*
Yamamoto, Tsukasa; Mochizuki, Asao; Shibata, Yoshikazu; Okita, Hiroshi; Ando, Koichi; Okano, Yasuhiro; and Hadate, Keiji, 4,741,863, Cl. 252-547.000.
Nihon Tokushu Noyaku Seizo K. K.: *See—*
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Niigata Engineering Co., Ltd.: *See—*
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Niimi, Takatsune: *See—*
Kondo, Katsumi; Tsutiya, Yasuhiro; Yamazawa, Yasushi; Niimi, Takatsune; and Yamamoto, Takashi, 4,741,223, Cl. 74-552.000.
Nikawa, Yoshio: *See—*
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Nilssen, Ole K. Controlled magnetron power supply including dual-mode inverter. 4,742,442, Cl. 363-98.000.
Nippon Chemical Industrial Co. Ltd.: *See—*
Mita, Muneo; Kashiwase, Kouji; and Osaki, Tetsuya, 4,741,779, Cl. 106-288.00B.
Nippon Gakki Seizo Kabushiki Kaisha: *See—*
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Nippon Kokan Kabushiki Kaisha: *See—*
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Nippon Light Metal Company, Ltd.: *See—*
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Nippon Petrochemicals Company, Limited: *See—*
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Nippon Stainless Steel Co., Ltd.: *See—*
Shida, Yoshiaki; Fujikawa, Hisao; Maruyama, Nobuyuki; and Akiyama, Shunichiro, 4,742,324, Cl. 338-238.000.
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Terayama, Kazukiyo; Oyagi, Yashichi; and Tsukamoto, Yukio, 4,741,934, Cl. 428-35.000.
Nippon Telegraph & Telephone Corporation: *See—*
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Nippon Telegraph & Telephone Public Corporation: *See—*
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Ishikawa, Toshihiro; Uemura, Keiichi; Aso, Makoto; and Fukaya, Masaaki, 4,742,280, Cl. 318-282.000.
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Nishida, Manabu, to Tokyo Electric Co., Ltd. Bar cord information input confirming method. 4,742,521, Cl. 371-54.000.
Nishida, Sumio; Ohsumi, Tadashi; Tsushima, Kazunori; Matsuo, Noritada; Maeda, Kiyoto; and Inoue, Satoru, to Sumitomo Chemical Company, Limited. Pyrazolecarboxamide derivative and fungicide containing it as active ingredient. 4,742,074, Cl. 514-406.000.
Nishida, Tadashi; Kondo, Shinichi; and Matsui, Tetsuji, to Sintokogio Ltd. Method of and apparatus for automatically controlling pressure in holding furnace incorporated in low pressure die-casting system. 4,741,381, Cl. 164-457.000.
Nishikawa, Kiyotada: *See—*
Yoshida, Yukio; Takimoto, Akiyoshi; Ono, Kenzo; Nishikawa, Kiyotada; and Oura, Toshio, 4,742,245, Cl. 307-119.000.
Nishikawa, Koichi. Wave-activated power generating apparatus having a backwardly open duct. 4,741,157, Cl. 60-398.000.
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Nishimura, Kazuaki: *See—*
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Nishimura, Satoshi. Privacy communication method and privacy communication apparatus employing the same. 4,742,546, Cl. 380-35.000.
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Nishimura, Yoshiaki: *See—*
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Nishimura, Yoshio; and Ohga, Syogo, to Kabushiki Kaisha Daikin Seisakusho. Damper disc. 4,741,721, Cl. 464-68.000.
Nishimura, Yoshitaka, to Iron Work Nishimura Co., Ltd. Automatic fire extinguishing system. 4,741,403, Cl. 169-61.000.
Nishimura, Yukuo: *See—*
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Borre, Earl A.; Zievers, James F.; and Schmidt, Henry, Jr., 4,741,841, Cl. 210-785.000.
Zimmer, Ernst, to Kuka Schweissanlagen + Roboter GmbH. Manipulator drive with slip-eliminating adjustment. 4,741,218, Cl. 74-89.200.
Zimmer, John J.; and Pierson, Paul B., to RCA Corporation. Robotic system and end effector. 4,741,567, Cl. 294-2.000.
Zimmerman, Donna F.: *See—*
Hay, James V.; Wexler, Barry A.; and Zimmerman, Donna F., 4,741,758, Cl. 71-90.000.
Zimmerman, Robert L., to Texaco Inc. Anti-caking agent for triethylenediamine. 4,742,168, Cl. 544-351.000.
Zinkovich, Jerry: *See—*
Sorgi, Aladino D.; and Zinkovich, Jerry, 4,742,391, Cl. 358-133.000.
Zorkoczy, Zoltan: *See—*
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ZYP Coatings, Inc.: *See—*
Holcombe, Cressie E., Jr.; and Chapman, Lloyd R., 4,741,775, Cl. 106-20.000.
501 Kubota, Ltd.: *See—*
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# LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 3RD DAY OF MAY, 1988

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Amchem Products, Inc.: *See—*
Binns, Robert E., Re. 32,661, Cl. 252-142.000.

Andiamo, Inc.: *See—*
Myers, Jay E.; and Myers, M. Todd, Re. 32,658, Cl. 206-287.000.

Atkinson, Francis S. Articulated erosion control system. Re. 32,663, Cl. 405-19.000.

Bennett, Simon D.: *See—*
Lindow, James T.; Bennett, Simon D.; and Smith, Ian R., Re. 32,660, Cl. 250-201.000.

Binns, Robert E., to Amchem Products, Inc. Cleaning aluminum at low temperatures. Re. 32,661, Cl. 252-142.000.

Capasso, David R.: *See—*
Pennington, Hugh S., Re. 32,662, Cl. 273-86.00B.

Lindow, James T.; Bennett, Simon D.; and Smith, Ian R., to SiScan Systems, Inc. Confocal optical imaging system with improved signal-to-noise ratio. Re. 32,660, Cl. 250-201.000.

Myers, Jay E.; and Myers, M. Todd, to Andiamo, Inc. Hanging bag with detachable cowl. Re. 32,658, Cl. 206-287.000.

Myers, M. Todd: *See—*
Myers, Jay E.; and Myers, M. Todd, Re. 32,658, Cl. 206-287.000.

Pennington, Hugh S., to Capasso, David R. Image projecting amusement device. Re. 32,662, Cl. 273-86.00B.

SiScan Systems, Inc.: *See—*
Lindow, James T.; Bennett, Simon D.; and Smith, Ian R., Re. 32,660, Cl. 250-201.000.

Smith, Ian R.: *See—*
Lindow, James T.; Bennett, Simon D.; and Smith, Ian R., Re. 32,660, Cl. 250-201.000.

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Beloit Corporation: *See—*
Peel, John D.; and Knight, Paul A., B1 4,578,199, Cl. 210-512.100.

Dill, Hans G.: *See—*
Minahan, Joseph A.; Ralph, Eugene L.; and Dill, Hans G., B1 4,610,077, Cl. 437-2.000.

George, Gary F. Athletic shoe. B1 4,347,674, 5-3-88, Cl. 36-126.000.

Hesston Corporation: *See—*
White, Allen A., B1 4,157,643, Cl. 56-341.000.

Hughes Aircraft Company: *See—*
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Hutson, Harold K., to Knytex Proform. Biased multi-layer structural fabric composites stitched in a vertical direction. B1 4,550,045, 5-3-88, Cl. 428-102.000.

Johnson, James L., to McCreary Tire & Rubber Company. Non-sticking ply end turn-over bladder and method of manufacture thereof. B1 4,381,331, 5-3-88, Cl. 428-224.000.

Knight, Paul A.: *See—*
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Knytex Proform: *See—*
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Lee, Shih-Ying; and Li, Yao-Tzu. Variable capacitance sensor. B1 3,859,575, 5-3-88, Cl. 361-283.000.

Li, Yao-Tzu: *See—*
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Mason, Charlotte G.: *See—*
Mason, Stanley I., Jr.; and Mason, Charlotte G., B1 4,140,889, Cl. 219-10.55E.

Mason, Stanley I., Jr.; and Mason, Charlotte G. Cooking vessel for microwave oven cookery adapted to aid in browning foods by heat from hot, liquid fats. B1 4,140,889, 5-3-88, Cl. 219-10.55E.

McCreary Tire & Rubber Company: *See—*
Johnson, James L., B1 4,381,331, Cl. 428-224.000.

Mezick, James A., to Ortho Pharmaceutical Corporation. Topical treatment of non-inflammatory acne. B1 4,487,782, 5-3-88, Cl. 514-559.000.

Minahan, Joseph A.; Ralph, Eugene L.; and Dill, Hans G., to Hughes Aircraft Company. Process for fabricating a wraparound contact solar cell. B1 4,610,077, 5-3-88, Cl. 437-2.000.

Motorola, Inc.: *See—*
Parker, Norman W., B1 4,184,046, Cl. 381-16.000.

Ortho Pharmaceutical Corporation: *See—*
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Parker, Norman W., to Motorola, Inc. Compatible single sideband system for AM stero. B1 4,184,046, 5-3-88, Cl. 381-16.000.

Peel, John D.; and Knight, Paul A., to Beloit Corporation. Cyclone separators. B1 4,578,199, 5-3-88, Cl. 210-512.100.

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Aizawa, Yutaka: *See—*
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Anavera Corp.: *See—*
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Anthony, Alfred A. Combination photograph holder and display. 295,465, 5-3-88, Cl. D6-300.000.

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Baba, Toshiyuki, to Siko Co., Ltd. Camera. 295,526, 5-3-88, Cl. D16-1.000.

Baptiste, Trevor I. Carrying case. 295,463, 5-3-88, Cl. D3-77.000.

Barber, Bruce A.; and Stegnjajic, Arsen, to Hood Laboratories, Inc. Laryngeal stent for aiding in reconstructive surgery of the larynx. 295,557, 5-3-88, Cl. D24-26.000.

Baroody Spence Furniture Industries, Inc.: *See—*
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Baroody, Terrance A.; and Bass, Jerry R., to Baroody Spence Furniture Industries, Inc. Combined chair seat and backrest unit. 295,477, 5-3-88, Cl. D6-502.000.

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Bayerische Mortoren Work Aktiengesellschaft: *See—*
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Becraft, Arthur D.; and Girardi, Joseph, to American Telephone and Telegraph Company; and AT&T Information Systems Inc. Communication apparatus enclosure. 295,512, 5-3-88, Cl. D14-52.000.

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Bell, Dennis L., to Bell and Carlson, Incorporated. Survival gun stock. 295,545, 5-3-88, Cl. D22-103.000.

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Bellini, Mario. Chair. 295,467, 5-3-88, Cl. D6-366.000.

Bernhardt Industries, Inc.: *See—*
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Beverly Hills Trading Company, Inc.: *See—*
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Blue Mountain Products, Inc.: *See—*
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Brayford, Ernest E. Time clip. 295,501, 5-3-88, Cl. D10-31.000.

Brossard, Ansgar; and Korner, Arno, to Esselte Pendaflex Corporation. Hand held labeller. 295,534, 5-3-88, Cl. D18-19.000.

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Brown, Wilbert C.; and Saba, Philip B., to TIE/Communications, Inc. Telephone set. 295,513, 5-3-88, Cl. D14-53.000.

Bruno, Robert; Kipperman, Stuart R.; and Mayer, Geoffrey R., to Sherwood Medical Company. Medical liquid container for enteral feeding of patients. 295,560, 5-3-88, Cl. D24-56.000.

Bunch, Ronald W. Compound tool. 295,494, 5-3-88, Cl. D8-105.000.

Bunge, John M., to Vinicool Limited. Insulating container for a bottle or the like. 295,482, 5-3-88, Cl. D7-77.000.

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104 4,741,181

**CLASS 68**
12 R 4,741,182
23.7 4,741,183
210 4,741,184

**CLASS 70**
57 4,741,185
100 4,741,186
158 4,741,187
383 4,741,188
456 R 4,741,189
467 4,741,190

**CLASS 71**
79 4,741,754
[illegible] 4,741,755
[illegible] 4,741,756
4,741,757
4,741,758
91 4,741,761
92 4,741,759
4,741,760
4,741,762
4,741,763
4,741,764
93 4,741,765
94 4,741,766
4,741,767
98 4,741,768
123 4,741,769

**CLASS 72**
88 4,741,191
187 4,741,192
201 4,741,193
334 4,741,194
421 4,741,195
427 4,741,196
4,741,197

**CLASS 73**
23.1 4,741,198
46 4,741,199
54 4,741,200
61 R 4,741,201
73 4,741,202
116 4,741,203
4,741,204
4,741,205
118.1 4,741,206
146 4,741,207
155 4,741,208
295 4,741,209
462 4,741,210
4,741,211
600 4,741,212
702 4,741,213
708 4,741,214
861.12 4,741,215
4,741,216
862.35 4,741,217

**CLASS 74**
89.2 4,741,218
104 4,741,219
424.6 4,741,220
424.8 NA 4,741,221
481 4,741,222
552 4,741,223
572 4,741,224
606 R 4,741,225
625 4,741,226
664 4,741,227

**CLASS 75**
23 4,741,770
57 4,741,771
58 4,741,772

**CLASS 81**
53.2 4,741,228
4,741,229

**CLASS 82**
1.2 4,741,230
2 B 4,741,231
2.7 4,741,232

**CLASS 83**
91 4,741,233
421 4,741,387
481 4,741,234
870 4,741,235
876 4,741,236

**CLASS 84**
20 4,741,237
291 4,741,238
322 4,741,239
380 C 4,741,240
403 4,741,241
454 4,741,242

**CLASS 89**
1.34 4,741,243
36.17 4,741,244
41.03 4,741,245

**CLASS 91**
167 R 4,741,246
361 4,741,247
421 4,741,248
443 4,741,249

**CLASS 92**
33 4,741,250
57 4,741,251
103 SD 4,741,252
212 4,741,253
248 4,741,254

**CLASS 98**
1 4,741,255
2.08 4,741,258
2.14 4,741,256
115.3 4,741,257

**CLASS 99**
279 4,741,259
4,741,260
330 4,741,261
449 4,741,262
450.2 4,741,263
483 4,741,264
542 4,741,265

**CLASS 101**
40 4,741,266
93.04 4,741,267
93.28 4,741,268
148 4,741,269

**CLASS 102**
271 4,741,270
501 4,741,271

**CLASS 104**
173.1 4,741,272

**CLASS 105**
4.1 4,741,273
240 4,741,274

**CLASS 106**
[illegible] 4,741,773
19 4,741,774
20 4,741,775
89 4,741,776
[illegible] 4,741,777
287.16 4,741,778
288 B 4,741,779
300 4,741,780
304 4,741,781
309 4,741,782

**CLASS 109**
7 4,741,275
65 4,741,276
77 4,741,277

**CLASS 110**
342 4,741,278
347 4,741,279

**CLASS 114**
39.2 4,741,280
102 4,741,281
103 4,741,282
230 4,741,283
357 4,741,284

**CLASS 118**
415 4,741,285
620 4,741,286

**CLASS 119**
14.08 4,741,287
130 4,741,288
158 4,741,289

**CLASS 122**
4 D 4,741,290
235 MF 4,741,291
379 4,741,292

**CLASS 123**
41.79 4,741,293
43 R 4,741,300
52 B 4,741,296
52 MV 4,741,294
4,741,295
90.16 4,741,297
90.22 4,741,301
90 23 4,741,302
90.31 4,741,299
90 5 4,741,298
192 B 4,741,303
196 A 4,741,305
196 S 4,741,304
198 DB 4,741,306
231 4,741,308
321 4,741,307
366 4,741,309
425 4,741,310
449 4,741,314
463 4,741,315
489 4,741,311
4,741,312
494 4,741,313
4,741,316
520 4,741,317
4,741,318
609 4,741,319

**CLASS 124**
24 R 4,741,320

**CLASS 126**
9 R 4,741,321
25 R 4,741,322
85 R 4,741,323
263 4,741,324
389 4,741,325

**CLASS 128**
1 D 4,741,328
4 4,741,326
6 4,741,327
79 4,741,329
92 YF 4,741,330
200 14 4,741,331
201.23 4,741,332
4,741,333
303.13 4,741,334
320 4,741,335
334 R 4,741,336
4,741,337
399 4,741,338
419 P 4,741,342
419 PS 4,741,339
419 PT 4,741,340
4,741,341
635 4,741,343
642 4,741,344
675 4,741,345
760 4,741,346
800 4,741,347
[illegible] 4,741,348

**CLASS 130**
27 T 4,741,349

**CLASS 131**
84.3 4,741,350

**CLASS 134**
15 4,741,783
38 4,741,784
144 4,741,351

**CLASS 137**
15 4,741,352
119 4,741,353
240 4,741,354
269 4,741,355
272 4,741,356
387 4,741,357
426 4,741,358
505 42 4,741,359
510 4,741,360
559 4,741,361
587 4,741,362
607 4,741,363
625 64 4,741,364
625 65 4,741,365

**CLASS 139**
34 4,741,366
91 4,741,367

**CLASS 141**
18 4,741,368
286 4,741,369

**CLASS 144**
134 A 4,741,370
269 4,741,371

**CLASS 148**
154 4,741,785
320 4,741,786

**CLASS 150**
137 4,741,372

**CLASS 152**
209 R 4,741,373
379.3 4,741,374

**CLASS 156**
64 4,741,787
4,741,788
66 4,741,789
71 4,741,790
72 4,741,791
89 4,741,792
94 4,741,793
247 4,741,795
272.4 4,741,796
429 4,741,794
479 4,741,797
626 4,741,798
643 4,741,799
4,741,800
4,741,801

**CLASS 159**
4 04 4,741,803

**CLASS 160**
84 1 4,741,375

**CLASS 162**
111 4,741,376
175 4,741,804
205 4,741,805

**CLASS 164**
4.1 4,741,377
244 4,741,378
312 4,741,379
341 4,741,380
457 4,741,381
4,741,382
467 4,741,383
514 4,741,384

**CLASS 165**
1 4,741,385
45 4,741,386
4,741,388
4,741,389

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54 4,741,390
56 4,741,391
76 4,741,392
133 4,741,393
153 4,741,394

**CLASS 166**

[illegible] 4,741,395
169 4,741,396
250 4,741,397
266 4,741,398
273 4,741,399
279 4,741,400
300 4,741,401
344 4,741,402

**CLASS 169**

61 4,741,403

**CLASS 173**

17 4,741,404

**CLASS 174**

16 R 4,742,181
52 FP 4,742,182
68 S 4,742,183
73 R 4,742,184

**CLASS 175**

16 4,741,405
340 4,741,406

**CLASS 180**

76 4,741,407
79.1 4,741,408
4,741,409
165 4,741,410

**CLASS 181**

283 4,741,411

**CLASS 187**

8.72 4,741,413
9 R 4,741,412
18 4,741,414
119 4,741,415

**CLASS 188**

72.3 4,741,419
299 4,741,416
352 4,741,417

**CLASS 191**

10 4,741,418
59.1 4,742,185

**CLASS 192**

30 V 4,741,420
58 B 4,741,421
87 11 4,741,422
106.2 4,741,423
107 M 4,741,424

**CLASS 193**

45 4,741,425

**CLASS 194**

261 4,741,426
335 4,741,427

**CLASS 196**

14.52 4,741,806
4,741,807

**CLASS 198**

397 4,741,428
456 4,741,429
778 4,741,430
803.8 4,741,432
844 4,741,431

**CLASS 200**

5 E 4,742,186
11J 4,742,187
16 R 4,742,188
33 R 4,742,189
50 A 4,742,190
52 R 4,742,191
61.57 4,742,192
61.89 4,742,193
83 J 4,742,194
84 C 4,742,195
86 R 4,742,196
148 B 4,742,197
296 4,742,198
302.1 4,742,199
325 4,742,200

**CLASS 202**

248 4,741,808
4,741,809

**CLASS 204**

1.5 4,741,810
28 4,741,811
44.2 4,741,818
129.4 4,741,812
295 4,741,813
299 R 4,741,814
405 4,741,815
425 4,741,816
4,741,817

**CLASS 206**

1.5 4,741,433
38 4,741,434
45.33 4,741,435
178 4,741,436
222 4,741,437
287 Re.32,658
309 4,741,438
316 4,741,439
423 4,741,440
532 4,741,441
597 4,741,442

**CLASS 208**

65 4,741,819
138 4,741,820
251 H 4,741,821
412 4,741,822

**CLASS 209**

44.1 4,741,443
672 4,741,444

**CLASS 210**

96.2 4,741,823
97 4,741,824
170 4,741,825
228 4,741,826
242.3 4,741,827
264 4,741,828
500.23 4,741,829
512.1 B1 4,578,199
635 4,741,830
638 4,741,831
4,741,832
665 4,741,833
4,741,837
683 4,741,834
708 4,741,835
709 4,741,836
710 4,741,838
748 4,741,839
771 4,741,840
785 4,741,841

**CLASS 211**

192 4,741,445

**CLASS 212**

195 B1 3,485,383

**CLASS 215**

247 4,741,446
252 4,741,447
266 4,741,448

**CLASS 219**

10.55 D 4,742,201
10.55 E 4,742,203
B1 4,140,889
10.55 F 4,742,202
60 R 4,742,204
69 M 4,742,205
121 LG 4,742,206
125.1 4,742,207
137 PS 4,742,208
270 4,742,209
541 4,742,210
544 4,742,211
549 4,742,212

**CLASS 220**

1.5 4,741,449
90.4 4,741,450
271 4,741,451
306 4,741,452
315 4,741,453
4,741,454
333 4,741,455
414 4,741,456
466 4,741,457

**CLASS 221**

221 4,741,458

**CLASS 222**

23 4,741,459
55 4,741,460
181 4,741,461
386 4,741,462
590 4,741,463
598 4,741,464

**CLASS 224**

230 4,741,465

**CLASS 227**

4 4,741,466
8 4,741,467

**CLASS 228**

16 4,741,468
49.3 4,741,473
50 4,741,469
148 4,741,470
[illegible] 4,741,471
180.1 4,741,472
190 4,741,474

**CLASS 229**

71 4,741,475

**CLASS 235**

449 4,742,213
454 4,742,214
487 4,742,215

**CLASS 236**

46 R 4,741,476

**CLASS 237**

12.3 A 4,741,477

**CLASS 239**

88 4,741,478
214.25 4,741,479

**CLASS 241**

29 4,741,481
37.5 4,741,482
46.17 4,741,483

**CLASS 242**

18 A 4,741,485
55.2 4,741,486
59 4,741,487
67.3 R 4,741,488
84.1 R 4,741,489
96 4,741,490
107.4 R 4,741,491
129 4,741,492
129.8 4,741,493
158 R 4,741,500
163 4,741,495
199 4,741,496
703 4,741,484

**CLASS 244**

17.13 4,741,501
117 R 4,741,497
130 4,741,498
134 B 4,741,499
172 4,741,502
203 4,741,503

**CLASS 248**

154 4,741,494
286 4,741,504
357 4,741,505
430 4,741,506

**CLASS 249**

91 4,741,507

**CLASS 250**

201 Re.32,660
4,742,217
4,742,218
4,742,219
216 4,742,220
221 4,742,221
226 4,742,222
305 4,742,223
4,742,224
311 4,742,216
327.2 4,742,225
328 4,742,226
336.1 4,742,227
341 4,742,228
343 4,742,229
363 S 4,742,230
372 4,742,231
427 4,742,232
491.1 4,742,233
492.2 4,742,234
504 R 4,742,235
554 4,742,236
560 4,742,237
578 4,742,238
4,742,239
4,742,240

**CLASS 251**

71 4,741,508
172 4,741,509
205 4,741,510

**CLASS 252**

8.514 4,741,843
8.553 4,741,844
8.75 4,741,842
[illegible] 4,741,845
47.5 4,741,846
4,741,847
49.6 4,741,848
62.52 4,741,850
62.6 4,741,849
91 4,741,851
92 4,741,852
96 4,741,853
105 4,741,854
142 Re.32,661
4,741,855
174 4,741,856
184 4,741,857
186 36 4,741,858
299.63 4,741,859
301.21 4,741,860
358 4,741,861
527 4,741,862
547 4,741,863
[illegible] 4,741,864
4,741,865
632 4,741,866

**CLASS 254**

9 C 4,741,512
93 H 4,741,511

**CLASS 256**

21 4,741,513

**CLASS 260**

380 4,741,867
505 R 4,741,868

**CLASS 261**

24 4,741,869
93 4,741,870
153 4,741,871

**CLASS 264**

4.7 4,741,872
25 4,741,873
161 4,741,874
228 4,741,875
346 4,741,876
504 4,741,877

**CLASS 266**

239 4,741,514
266 4,741,515

**CLASS 267**

64.13 4,741,516
64.24 4,741,517
75 4,741,518
140.1 4,741,519
4,741,520
4,741,521

**CLASS 269**

316 4,741,523

**CLASS 271**

208 4,741,524
213 4,741,525
261 4,741,526

**CLASS 272**

73 4,741,527
118 4,741,528
130 4,741,529
134 4,741,530

**CLASS 273**

73 D 4,741,531
86 B Re.32,662
143 R 4,741,532
144 B 4,741,533
157 R 4,741,534
164 4,741,535
200 B 4,741,536
201 4,741,537
243 4,741,538
275 4,741,539
292 4,741,540

**CLASS 277**

26 4,741,541
34 4,741,542
216 4,741,543

**CLASS 280**

92 4,741,545
113 4,741,544
236 4,741,546
242 WC 4,741,547
289 R 4,741,548
405 A 4,741,549
618 4,741,550
642 4,741,551
647 4,741,552
682 4,741,553
703 4,741,554
804 4,741,555
807 4,741,556
808 4,741,557

**CLASS 282**

8 R 4,741,558

**CLASS 285**

45 4,741,559
91 4,741,560
93 4,741,561
137.1 4,741,562

**CLASS 290**

53 4,742,241
54 4,742,242

**CLASS 292**

21 4,741,563
285 4,741,564

**CLASS 294**

1.3 4,741,565
1.4 4,741,566
2 4,741,567
88 4,741,568

**CLASS 296**

1 S 4,741,569
100 4,741,570
107 4,741,571
221 4,741,572
4,741,573

**CLASS 297**

482 4,741,574

**CLASS 298**

12 4,741,575
22 J 4,741,576

**CLASS 299**

1 4,741,577

**CLASS 301**

63 PW 4,741,578

**CLASS 303**

52 4,741,579
105 4,741,580
115 4,741,581

**CLASS 307**

[illegible] 4,742,243
118 4,742,244
119 4,742,245
141.4 4,742,246
231 4,742,247
234 4,742,248
255 4,742,249
296 R 4,742,250
358 4,742,251
465 4,742,252
530 4,742,253
606 4,742,254

**CLASS 310**

12 4,742,255
51 4,742,256
62 4,742,257
156 4,742,258
4,742,259
323 4,742,260
328 4,742,261
329 4,742,262
331 4,742,263
332 4,742,264

**CLASS 312**

257 SK 4,741,582
330 R 4,741,583

**CLASS 313**

141 4,742,265
414 4,742,266
477 HC 4,742,267
620 4,742,268
624 4,742,269

**CLASS 315**

8 4,742,270
39.3 4,742,271
39.69 4,742,272
65 4,742,273
72 4,742,274
104 4,742,275
106 4,742,276
176 4,742,277
248 4,742,278
382 4,742,279

**CLASS 318**

282 4,742,280
317 4,742,281
374 4,742,282
587 4,742,283
624 4,742,284
632 4,742,285
640 4,742,286
696 4,742,287
818 4,742,288

**CLASS 320**

14 4,742,289
21 4,742,290
39 4,742,291

**CLASS 323**

314 4,742,292

**CLASS 324**

73 R 4,742,293
117 R 4,742,294
133 4,742,295
142 4,742,296
166 4,742,297
220 4,742,298
230 4,742,299
244 4,742,300
309 4,742,301
4,742,302
4,742,303
318 4,742,304
334 4,742,305
379 4,742,306

**CLASS 330**

4.3 4,742,307
258 4,742,308
4,742,309
281 4,742,310
297 4,742,311
298 4,742,312

**CLASS 331**

1 A 4,742,313
56 4,742,314
108 C 4,742,315

**CLASS 332**

9 R 4,742,316

**CLASS 333**

137 4,742,317
141 4,742,318
195 4,742,319
219 4,742,320

**CLASS 335**

20 4,742,321
272 4,742,322

**CLASS 337**

158 4,742,323

**CLASS 338**

238 4,742 '24
309 4,742,325

**CLASS 340**

52 A 4,742,326
63 4,742,327
326 4,742,328
347 AD 4,742,330
4,742,333
347 DA 4,742,329
347 P 4,742,332
347 R 4,742,331
505 4,742,334
518 4,742,335
539 4,742,336
556 4,742,337
566 4,742,338
568 4,742,339
572 4,742,340
4,742,341
723 4,742,342
4,742,344
739 4,742,343
787 4,742,345
793 4,742,346
799 4,742,347
4,742,350
825.34 4,742,351
825.47 4,742,352
825.500 4,742,348
4,742,349

**CLASS 342**

159 4,742,353
188 4,742,354
375 4,742,355
448 4,742,356
457 4,742,357

**CLASS 343**

754 4,742,358
895 4,742,359
903 4,742,360

**CLASS 346**

76 PH 4,742,361
4,742,362
108 4,742,363
140 R 4,742,364
4,742,365

**CLASS 350**

96.15 4,741,584
4,741,585
4,741,586
4,741,587
96.19 4,741,588
96.20 4,741,589
96.21 4,741,590
4,741,591
96.23 4,741,592
4,741,593
4,741,594
96.27 4,741,595
96.34 4,741,596
4,741,597



99 4,741,598
269 4,741,599
336 4,741,600
339 R 4,741,601
356 4,741,602
357 4,741,603
362 4,741,604
422 4,741,605
432 4,741,606
522 4,741,607
545 4,741,608
608 4,741,609
619 4,741,610

**CLASS 351**

44 4,741,611
221 4,741,612

**CLASS 353**

38 4,741,613
94 4,741,614

**CLASS 354**

204 4,742,366
289.1 4,742,367
441 4,742,369

**CLASS 355**

3 DD 4,742,370
4 4,742,371
14 D 4,742,372
14 R 4,742,373
20 4,742,375
27 4,742,374
77 4,742,376

**CLASS 356**

73.1 4,741,615
4,741,616
124 4,741,617
152 4,741,618
246 4,741,619
349 4,741,620
376 4,741,621
401 4,741,622

**CLASS 357**

15 4,742,377
17 4,742,378
22 4,742,379
23.4 4,742,380
24 4,742,381
39 4,742,382
45 4,742,383
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29 4,742,387
98 4,742,388
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213.19 4,742,395
213.24 4,742,396
244 4,742,397
245 4,742,398
284 4,742,399
4,742,400
293 4,742,401

**CLASS 360**

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45 4,742,403
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92 4,742,405
93 4,742,406
95 4,742,407
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4,742,410
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126 4,742,413
130.24 4,742,414
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4,742,416
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4,742,418
133 4,742,419
135 4,742,420
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**CLASS 361**

45 4,742,422
47 4,742,423
78 4,742,424
104 4,742,425
171 4,742,426
230 4,742,427
283 B1 3,859,575
336 4,742,428
391 4,742,429
395 4,742,430
398 4,742,431
400 4,742,432
412 4,742,433

**CLASS 362**

61 4,742,434
[illegible] 4,742,435
80 4,742,436
130 4,742,437
156 4,742,438
311 4,742,439
346 4,742,440

**CLASS 363**

97 4,742,441
[illegible] 4,742,442

**CLASS 364**

136 4,742,443
157 4,742,444
167 4,742,465
188 4,742,445
200 4,742,446
4,742,447
4,742,448
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468 4,742,463
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[illegible] 4,742,472
518 4,742,473
521 4,742,474
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201 4,742,489
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218 4,742,491
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230 4,742,493

**CLASS 366**

160 4,741,623
165 4,741,624
196 4,741,625

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31 4,742,495
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52 4,742,497
85 4,742,498
155 4,742,499

**CLASS 368**

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82 4,742,501
282 4,742,502
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**CLASS 369**

36 4,742,504
45 4,742,505
[illegible] 4,742,506
54 4,742,507
265 4,742,508
270 4,742,509

**CLASS 370**

32.1 4,742,510
[illegible] 4,742,511
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96 4,742,512
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112 4,742,515

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49 4,742,520
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**CLASS 372**

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4,742,526
87 4,742,527

**CLASS 373**

70 4,742,528
101 4,742,529

**CLASS 374**

133 4,741,626
200 4,741,627

**CLASS 375**

[illegible] 4,742,530
25 4,742,531
50 4,742,532
[illegible] 4,742,533
89 4,742,534

**CLASS 376**

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301 4,741,879

**CLASS 378**

105 4,742,535

**CLASS 379**

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**CLASS 381**

16 B1 4,184,046
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1 4,742,549
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**CLASS 403**

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223 4,741,648

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114 4,741,649

**CLASS 408**

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209 4,741,651

**CLASS 409**

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**CLASS 410**

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**CLASS 412**

6 4,741,655

**CLASS 414**

24.6 4,741,656
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406 4,741,658
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462 4,741,660
563 4,741,661
686 4,741,662
695.5 4,741,663

**CLASS 415**

98 4,741,664
150 4,741,665
158 4,741,666
191 4,741,667
212 R 4,741,668
213 C 4,741,669

**CLASS 416**

129 4,741,670
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**CLASS 417**

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295 4,741,674
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55 4,741,886
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1.1 4,741,897
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47 4,741,899
85 4,741,900
88 4,741,901
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94.63 4,741,903

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325 4,741,911
438 4,741,912
483 4,741,913
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549 4,741,916
551 4,741,917

**CLASS 427**

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514 4,741,969
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542.8 4,741,972
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558 4,741,974
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694 4,741,977

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144 4,741,979

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17 4,741,980
58 4,741,981
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4,741,983
106 6 4,741,984
175 4,741,985
197 4,741,986
288 4,741,987
312 4,741,988
331 4,741,989
380 4,741,990
399 4,741,991
523 4,741,992
536 4,741,993
549 4,741,994
558 4,741,995
559 4,741,996
562 4,741,997

**CLASS 431**

7 4,741,690
202 4,741,691
258 4,741,692

**CLASS 432**

5 4,741,693
14 4,741,694
121 4,741,695

**CLASS 433**

7 4,741,696
25 4,741,697
173 4,741,698
203.1 4,741,699
229 4,741,700

**CLASS 434**

238 4,741,701

**CLASS 435**

7 4,741,998
4,741,999
4,742,000
26 4,742,001
28 4,742,002
68 4,742,003
70 4,742,004
99 4,742,005
105 4,742,006
108 4,742,007
200 4,742,008

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57 4,742,009
74 4,742,010
518 4,742,011

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2 4,742,027
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245 4,742,026

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63 4,741,703
92 4,741,704
270 4,741,705
318 4,741,706
412 4,741,480
417 4,741,707
483 4,741,708
521 4,741,709
620 4,741,710
4,741,711
683 4,741,712

**CLASS 440**

53 4,741,713
[illegible] 4,741,714
88 4,741,715

**CLASS 441**

4 4,741,716

**CLASS 446**

24 4,741,717
451 4,741,718

**CLASS 450**

30 4,741,719

**CLASS 453**

58 4,741,720

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33 4,742,560
67 4,742,561
78 4,742,562
132 4,742,563
186 4,742,564
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260 4,742,566
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301 4,742,569
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608 4,742,574
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617 4,742,576
618 4,742,577

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111 4,741,723

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202 4,742,053
215 4,742,054
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62 4,742,086
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118 4,742,088
124 4,742,090
163 4,742,091

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[illegible] 4,742,096
407 4,742,097
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174 4,742,103
238 4,742,100
267 4,742,101
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[illegible] 4,742,104
447 4,742,105
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458 4,742,108
[illegible] 4,742,109
538 4,742,110
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241 4,742,175

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435 4,742,166

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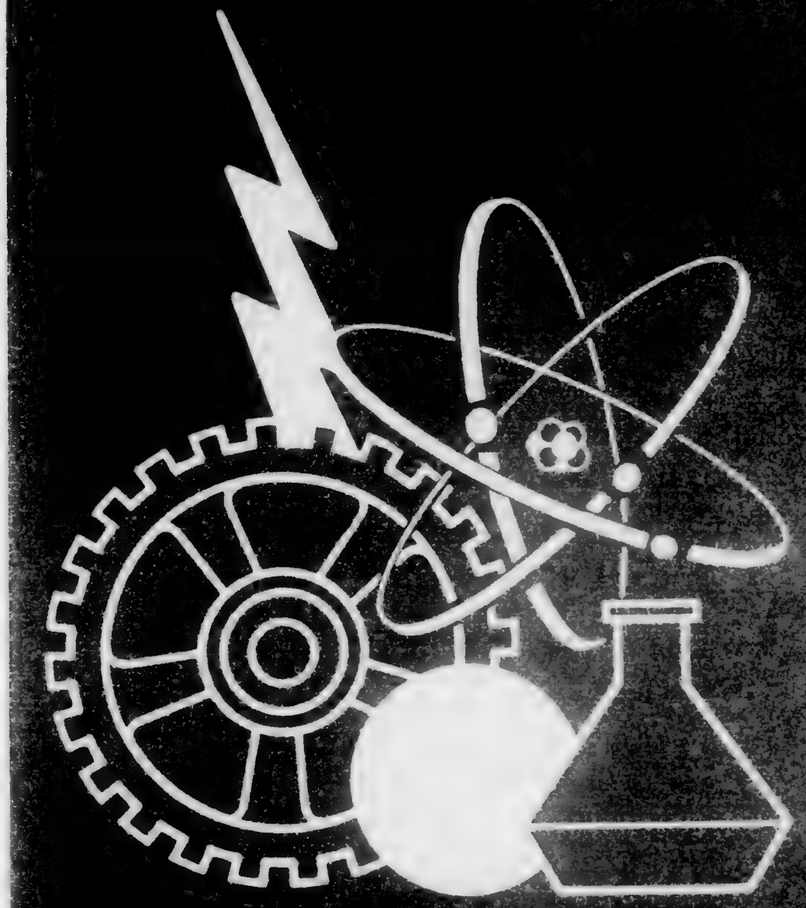
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| Design Patents Granted (295,570) | 1077 |
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Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.T.O.

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# PATENT AND TRADEMARK OFFICE NOTICES

### Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1076 O.G. 3 on Mar. 3, 1987.

For use of the European Patent Office as a Searching Authority for PCT applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as a Preliminary Examining Authority for PCT applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987.

Certain domestic PCT fees for international applications have been changed effective Oct. 5, 1985 in the rule change notice titled "Revision of Patent Fees" published at 1057 O.G. 24 on Aug. 20, 1985.

The Search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar with regard to the German Mark as of Mar. 15, 1988, and was announced in the *Official Gazette* at 1087 O.G. 24 on Feb. 16, 1988.

Domestic PCT Fees for Chapter II, effective July 1, 1987, were announced in the *Official Gazette* at 1079 O.G. 32 on June 16, 1987.

International PCT fees were changed on July 1, 1987 due to a difference in the exchange rate of the U.S. dollar with regard to the Swiss Franc and were announced in the *Official Gazette* at 1079 O.G. 50 on June 23, 1987.

International PCT Chapter II fees which were effective July 1, 1987, were announced in the *Official Gazette* at 1079 O.G. 50 on June 23, 1987. The elimination of multiple handling fees and the supplement to the handling fee under PCT Rule 57 was announced at 1085 O.G. 34 on Dec. 22, 1987.

The withdrawal of the Japanese declaration under PCT Article 64(2)(a), concerning the requirement for a Japanese translation of the international application within 20 months from the priority date when Japan is elected under PCT Chapter II, as from Dec. 8, 1987, was announced at 1085 O.G. 34 on Dec. 22, 1987.

National stage fees effective July 1, 1987, for entering the U.S. Patent and Trademark Office as a designated or elected Office were changed effective July 1, 1987, and were announced in the *Official Gazette* at 1079 O.G. 32 on June 16, 1987.

The current schedule of PCT fees is as follows:

| | |
|---|---|
| Transmittal fee: | 170.00 |
| Search Fee | |
| U.S. Patent and Trademark Office as Searching Authority (ISA) | |
| —No corresponding prior U.S. national application filed: | 520.00 |
| —Corresponding prior U.S. national application filed: | 350.00 |
| —Supplemental search fee, per additional invention | 140.00 |
| European Patent Office as Searching Authority | 1300.00 |
| Preliminary examination fee | |
| U.S. Patent and Trademark Office as Preliminary Examining Authority (IPEA) | |
| —Search fee paid to USPTO as Searching Authority | 370.00 |
| —Additional examination fee, per additional invention | 125.00 |
| —Searching Authority not the USPTO | 570.00 |
| —Additional examination fee, per additional invention | 190.00 |
| International fees | |
| Basic fee: | 485.00 |
| Basic Supplemental fee (for each page over 30): | 10.00 |
| Designation fee per country or region for the first 10 national or regional offices: | 120.00 |
| Designation fee for 11th and subsequent designations: | No Charge |
| Handling fee: | 150.00 |

U.S. National Stage fees

| | Small Entity | Non-small Entity |
|---|---|---|
| U.S. Patent and Trademark Office was Preliminary Examining Authority (IPEA) | 150.00 | 300.00 |
| USPTO was ISA but not IPEA | 170.00 | 340.00 |
| USPTO was neither ISA nor IPEA | 225.00 | 450.00 |
| USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(1) to (4) | 25.00 | 50.00 |
| —For each independent claim in excess of 3 | 17.00 | 34.00 |
| —For each claim in excess of 20 | 6.00 | 12.00 |
| —For each application containing a multiple dependent claim | 55.00 | 110.00 |
| —Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39.1 | 55.00 | 110.00 |
| —Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39.1 | 26.00 | 26.00 |

DONALD J. QUIGG,
Mar. 21, 1988. *Assistant Secretary and Commissioner of Patents and Trademarks.*

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### Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on applications filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Oct. 5, 1985. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the grant.

Attention is drawn to the patents which were issued on May 7, 1985, for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,514,861 through 4,516,272
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months are set forth in 37 CFR 1.20(e) and (h), as amended effective Oct. 5, 1985, which are reproduced below:

37 CFR §1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant . . . $ 225.00"

"(h) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)) . . . . . $ 225.00
By other than a small entity . . . . . $ 450.00"

The amounts of the surcharges as amended effective Oct. 5, 1985, are set forth in 37 CFR 1.20 (k) and (l) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982 . . . . . $ 110.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity (§1.9(f)) . . . . . $ 55.00
By other than a small entity . . . . . $ 110.00"

Section 1.20 paragraph (m) as amended as a result of enactment of Public Law 98–622 effective Nov. 8, 1984, is reproduced below:

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay in payment is shown to the satisfaction of the Commissioner to have been unavoidable . . . . . $ 500.00"

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### Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

*PATENTS WHICH EXPIRED FEBRUARY 21, 1988, DUE TO FAILURE TO PAY MAINTENANCE FEES*

| Patent Number | Serial Number | Issue Date |
|---|---|---|
| 4,432,100 | 06/369,010 | 2/21/84 |
| 4,432,106 | 06/420,266 | 2/21/84 |
| 4,432,108 | 06/309,922 | 2/21/84 |
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| 4,432,113 | 06/356,112 | 2/21/84 |
| 4,432,120 | 06/404,650 | 2/21/84 |
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| 4,432,138 | 06/385,084 | 2/21/84 |
| 4,432,150 | 06/386,713 | 2/21/84 |
| 4,432,154 | 06/355,347 | 2/21/84 |
| 4,432,156 | 06/417,031 | 2/21/84 |
| 4,432,157 | 06/424,325 | 2/21/84 |
| 4,432,158 | 06/470,547 | 2/21/84 |
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| 4,432,168 | 06/262,552 | 2/21/84 |
| 4,432,172 | 06/338,250 | 2/21/84 |
| 4,432,178 | 06/383,530 | 2/21/84 |
| 4,432,184 | 06/240,059 | 2/21/84 |
| 4,432,185 | 06/298,316 | 2/21/84 |
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| 4,433,333 | 06/269,282 | 2/21/84 |
| 4,433,341 | 06/385,965 | 2/21/84 |
| 4,433,349 | 06/282,074 | 2/21/84 |
| 4,433,358 | 06/408,506 | 2/21/84 |
| 4,433,361 | 06/285,128 | 2/21/84 |
| 4,433,385 | 06/224,665 | 2/21/84 |
| 4,433,407 | 06/330,388 | 2/21/84 |
| 4,433,430 | 06/375,004 | 2/21/84 |
| 4,433,436 | 06/264,344 | 2/21/84 |

**Notification of Acceptance of Delayed Payment of Maintenance Fee**
**(35 U.S.C. 41(c); 37 CFR 1.378)**

The patents listed below are considered as not having expired but are subject to the conditions set forth in 35 U.S.C. 41(c)(2), in view of the Petition to Accept Late Payment of the maintenance fees which has been GRANTED BY THE COMMISSIONER OF PATENTS AND TRADEMARKS, as provided for under 35 U.S.C. 41 (c)(1) and 37 CFR 1,378.



| Patent No. | Serial No. | Patent Date | Application Filing Date | Delayed Payment Acceptance Date |
|---|---|---|---|---|
| 4,413,719 | 06/268,022 | 11/8/83 | 5/28/81 | 4/5/88 |
| 4,428,349 | 06/268/093 | 1/31/84 | 5/27/81 | 4/5/88 |

**REISSUE APPLICATIONS FILED**

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.19(a)).

**4,401,796,** Re. S.N. 152,981, Filed Feb. 5, 1988, Cl. 525/340, SOLID-PHASE SYNTHESIS OF POLYNUCLEOTIDES, Keiichi Itakura, Owner of Record: *City of Hope Research Institute, Duarte, Calif.,* Attorney or Agent: Edward S. Irons, et al., Ex. Gp.: 151

**4,443,533,** Re. S.N. 098,763, Filed Sept. 17, 1987, Cl. 430/311, PHOTORESIST CURING METHOD, C. Richard Panico, Owner of Record: *Xenon Corp., Wilmington, Mass.* Attorney or Agent: G. Roger Lee, et al., Ex. Gp.: 158

**4,510,696,** Re. S.N. 146,226, Filed Jan. 20, 1988, Cl. 33/304, SURVEYING OF BOREHOLES USING SHORTENED NON-MAGNETIC COLLARS, Richard F. Roesler, Owner of Record: *NL Industries, Inc., New York, N.Y.,* Attorney or Agent: E. Richard Zamecki, et al., Ex. Gp.: 246

**4,547,240,** Re. S.N. 085,242, Filed Aug. 10, 1987, Cl. 156/85, METHOD OF PREFABRICATING AN ELECTRICAL CONNECTOR, James A. Zilligen, Owner of Record: *FIZ Industries, Inc., Simpsonville, S.C.,* Attorney or Agent: John B. Hardaway III, et al., Ex. Gp.: 326

**4,560,809,** Re. S.N. 137,965, Filed Dec. 23, 1987, Cl. 568/789, ALKYLATION PROCESS, Dixie E. Goins, et al., Owner of Record: *Ethyl Corp., Richmond, Va.,* Attorney or Agent: John F. Sieberth, et al., Ex. Gp.: 126

**4,565,919,** Re. S.N. 141,918, Filed Jan. 11, 1988, Cl. 219/509, CRACK DETECTOR FOR ELECTRICALLY CONDUCTIVE WINDSHIELD, Lowell E. Bitter, et al., Owner of Record: *Donnelly Corp., Holland, Mich.,* Attorney or Agent: Peter P. Price, et al., Ex. Gp.: 214

**4,570,975,** Re. S.N. 154,047, Filed Feb. 9, 1988, Cl. 280/806, WEBBING LOCKING DEVICE, Teruhiko Kawaguchi, et al., Owner of Record: *Kabushiki Kaisha Tokai-Rika-Denki, Seisakusho, Japan,* Attorney or Agent: Roger W. Parkhurst, et al., Ex. Gp.: 316

**4,581,632,** Re. S.N. 072,987, Filed July 14, 1987, Cl. 358/106, OPTICAL INSPECTION APPARATUS FOR MOVING ARTICLES, Malcolm W. Randall, Owner of Record: *Key Technology Inc., Milton-Freewate, Oreg.,* Attorney or Agent: Robert J. St. John, et al., Ex. Gp.: 262

**4,586,602,** Re. S.N. 148,661, Filed Jan. 26, 1988, Cl. 206/3, DETONATING CORD TRANSPORT SYSTEM, David V. Levey, Sr., Owner of Record: *Pengo Industries, Inc., Tarrant, Tex.,* Attorney or Agent: James C. Fails, et al., Ex. Gp.: 241

**4,651,374,** Re. S.N. 146,727, Filed J an. 21, 1988, Cl. 10/140, COMBINED HOLE MAKING AND THREADING TOOL, Manuel C. Turchan, Owner of Record: *Inventor,* Attorney or Agent: R. P. Barnard, et al., Ex. Gp.: 321

**4,676,380,** Re. S.N. 149,047, Filed Jan. 27, 1988, Cl. 209/616, APPARATUS AND METHOD FOR SEGREGATING PARTS, Larry C. Dahlby, Owner of Record: S. C. Johnson & Son, Inc., Racine, Wis., Attorney or Agent: J. William Frank, et al., Ex. Gp.: 312

**4,688,280,** Re. S.N. 159,698, Filed Feb. 24, 1988, Cl. 5/99R, FOLDABLE PLAYPEN ASSEMBLY WITH EASE OF PORTABILITY, Louis M. Kohus, et al., Owner of Record: *Kohusmariol, Inc., Cincinnati, Ohio,* Attorney or Agent: Douglas A. Bin Gham, et al., Ex. Gp.: 358

**REQUESTS FOR REEXAMINATION FILED**

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

**3,808,385,** Reexam. No. 90/001,484, Requested: Apr. 7, 1988, Cl. 200/61.04, MOISTURE RESPONSIVE SWITCH ACTUATOR, Glenn B. Klinefelter, Owner of Record: *Inventor, Mountainside, N.J.,* Attorney or Agent: John J. Lipari, Ex. Gp.: 210, Requester: The Toro Co., Minneapolis, Minn.

**4,027,367,** Reexam. No. 90/001,481, Requested: Apr. 4, 1988, Cl. 428/652, SPRAY BONDING OF NICKEL ALUMINUM AND NICKEL TITANIUM ALLOYS, Henry S. Rondeau, Owner of Record: *Virginia C. Rondeau, Shaker Heights, Ohio,* Attorney or Agent: Renner, Otto, et al., Ex. Gp.: 110, Requester: The Perkin Elmer Corp., Norwalk, Ct.

**4,081,151,** Reexam. No. 90/001,482, Requested: Mar. 29, 1988, Cl. 242/68.5, STACKABLE WINDING CORES FOR MAGNETIC TAPES, Gunter Ender, et al., Owner of Record: *AGFA-Gevaert, AG, Leverkusen, Germany,* Attorney or Agent: Connolly, Bove, et al., Ex. Gp.: 240, Requester: Sunkyong Intl. Inc., Audio Tape Div., Carson, Calif.

**4,555,415,** Reexam. No. 90/001,480, Requested: Apr. 4, 1988, Cl. 427/193, VITREOUS ENAMELS, John L. C. Mumford, Owner of Record: *T.I. Corporate Services Ltd., Birmingham, England,* Attorney or Agent: Joseph W. Berenato, Ex. Gp.: 150, Requester: Owner

**4,646,197,** Reexam. No. 90/001,483, Requested: Mar. 28, 1988, Cl. 361/307, TANTALUM CAPACITOR LEAD WIRE, James Wong, Owner of Record: *Supercon Inc., Shrewsbury, Mass.,* Attorney or Agent: Hayes, Davis, et al., Ex. Gp.: 210, Requester: Owner

**4,664,588,** Reexam. No. 90/001,485, Requested: Mar. 30, 1988, Cl. 414/730, APPARATUS AND METHOD FOR CONNECTING AND EXCHANGING REMOTE MANIPULABLE ELEMENTS TO CENTRAL CONTROL SOURCE, Bruce D. Newell, et al., Owner of Record: *Applied Robotics Inc., Latham, N.Y.,* Attorney or Agent: Fish & Neave, Ex. Gp.: 310, Requester: Owner

**Patents Available for License or Sale**

4,135,596. HOSE TRAY FOR LIQUID TRANSPORTER, *Glen R. Silba,* Rte. 7, Box 357A, Springfield, Mo. 65802

4,435,995. POSITIVE DRIVE DIFFERENTIAL FOR VEHICLE INCLUDING TRACTORS, *Walter E. Welander,* c/o Law Offices of Douglas L. Tschida - Ste. 115, 2819 Hamline Ave. North, St. Paul, Minn. 55113

4,576,178. AUDIO SIGNAL GENERATOR, *David Johnson,* Box 68, 436 E. 69th St., New York, N.Y. 10021

4,709,521. METHOD OF INSERTING A TUBULAR OR BAR SHAPED STRUCTURAL MEMBER TIGHTLY INTO A LOCATION HOLE IN A CONSTRUCTION ELEMENT, *James A. Oliff,* Parkhurst & Oliff, 277 S. Washington St., Alexandria, Va. 22314

4,711,137. MECHANICAL AUTOMATIC TRANSMISSION, *Walter E. Welander,* c/o Law Offices of Douglas L. Tschida, Ste. 115, 2819 Hamline Ave. North, St. Paul, Minn. 55113

4,726,381. DIALYSIS SYSTEM AND METHOD, Contact: Charles S. Sara, Esq., Isaksen, Lathrop, Esch, Hart & Clark, 122 W. Washington Ave., Ste. 1000, P.O. Box 1507, Madison, Wis. 53701-1507

4,741,538. METHOD OF PLAYING A WORD FORMING GAME, *Milton Lewis,* 1721 Eager St., Baltimore, Md. 21205

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### Registration to Practice

The following list contains the names of persons applying for registration to practice before the United States Patent and Trademark Office. These persons have been given provisional recognition pursuant to 37 CFR 10.9(a) to prepare and prosecute patent applications before the Office. Final approval for registration is subject to establishing to the satisfaction of the Director of the Office of Enrollment and Discipline that the person seeking registration is of good moral character and repute.[37 CFR 10.7(a)]. Accordingly, any information tending to affect the eligibility of any of the following applicants on moral, ethical, or other grounds should be furnished the Director, Office of Enrollment and Discipline on or before June 3, 1988:

Aegerter, Richard E., 5619 Williamsburg Blvd., Arlington, Va. 22207
Billion, Richard E., 4130 Rahn Rd., #102, Eagan, Minn. 55122
Boatner, Nathan, 624 S. Grand Ave., 29th Fl., Los Angeles, Calif. 90017
Briggs, Beverly M., 741 W. 4th, Skiatook, Okla. 74135
Burshtein, Sheldon, Blake, Cassels & Graydon, Box 25, Commerce Ct. West, Toronto, Canada M5L 1A9
Carroll, Peter G., 1356 Milton Ave., Walnut Cree, Calif. 94596
Cranfill, Raymond B., 3338A 16th St., San Francisco, Calif. 94114
DeBerardine, Robert, Jones, Day, Raevis & Pogue, 355 S. Grand Ave., Ste. 3000, Los Angeles, Calif. 90071
Doudinkoff, Gregory M., 9647 Shannon La., Manassas, Va. 02110
Fields, Scott J., 1906 Lincoln Dr. East, Ambler, Pa. 19002
Fortin, Jean-Pierre, Nothern Telecom Ltd., P.O. Box 3511, Sta. C, Ottawa, Ont., Canada K1Y 4H7
Foryt, John P., 7344 Lee Hwy., #204, Falls Church, Va. 22046
Frischkorn, David M., 789 N. Park Blvd., Glen Ellyn, Ill. 60137
Giesser, Joanne M., 2 Ogden Pl., #2-B, Morristown, N.J. 07960
Goodwin, Matthew S., 26 Rosemary Ct., Midland, Mich. 48640
Graveline, Tracy-Gene, 5933 Quantrell Ave., #104, Alexandria, Va. 22312
Gzybowski, Michael S., 8318 Uxbridge Ct., Springfield, Va. 22151
Hattori, Ken-Ichi, 2040 Arlington Ter., Alexandria, Va. 22303
Haynes, Gerald D., Chevron Corp., P.O. Box 466, La Habra, Calif. 90633
Hogue, Dale C., Sr., 6604 Anthony Crest Sq., McLean, Va. 22101
Holmes, Jonathan D., 4016 Bentnail Ct., Fairfax, Va. 22032
Hubbuch, David F., 815 S. 18th St., #510, Arlington, Va. 22202
Jakes, John M., 2419 N. Ohio St., Arlington, Va. 22207
Jones, Raymond N., 1426 Legate Rd., N.W., Washington, D.C. 20012
Kachigian, Mark G., 1538 S. Owasso, Tulsa, Okla. 74120
Keane, Patrick C., 12 Trudy Way, Gaithersburg, Md. 20878
Kelly, Michael K., 924 E. Juneau, #616, Milwaukee, Wis. 53202
Korniczky, Paul J., 1635 N. North Park, Chicago, Ill. 60614
Kovalick, Vincent, 8594 Enochs Dr., Lorton, Va. 22079
Lee, Philip J., 11422 Miracle Hills Dr., #440, Omaha, Nebr. 68154
Low, Seth Thomas, 7777 Glen America Dr., #317, Dallas, Tex. 75225
Macey, Harry J., 815 S. 18th St., #201, Arlington, Va. 22202
Mann, Michael A., 15 Holliday Ct., Culumbia, S.C. 29223
Meikle, Andrew D., 613 Abingdon St., Arlington, Va. 22203
Mitrano, Peter P., 4912 Oakcrest Dr., Fairfax, Va. 22030
Moore, Robert W., 7320 Longview Dr., Richmond, Va. 23225
Morreale, Lynn B., 545 W. Roscie, #2, Chicago, Ill. 60657
Pagel, Donald J., Jr., 584 N. 2nd St., #3, San Jose, Calif. 95112
Regehr, Herbert B., 600-1111 Melville St., Vancouver, B.C., Canada V6E 3V6
Scott, Pamela L., 5518 SE. Cornell, Bartlesville, Okla. 74006
Shapiro, Lionel M., 915 Burnt Crest La., Silver Spring, Md. 20903
Spinks, Gerald W., 1706 Fairwind Rd., Houston, Tex. 77062
Stanger, Daniel J., 5843 Lewis La., Falls Church, Va. 22041
Stowe, John, 6125 Pueblo Ct., Burke, Va. 22015
Teschner, Michael H., 1101 New Hampshire Ave., NW., Washington, D,C. 20037
Tobe, Roslyn T., 69 New Street, Willow Grove, Pa. 19090
Vance, James R., 5312-159th Ave., NE., Redmond, Wash. 98052
Verona, Susan E., 2118A Ted-Jim Dr., Warrington, Pa. 18976
Warnock, Russell W., 6420 Old Scott's Ct., Springfield, Va. 22303
Weihrouch, Steven P., 2135 Lee Hwy., Arlington, Va. 22201
Weiss, Lucy C., 4 Basswood La., St. Paul, Minn. 55127
Whitehead, Harold D., Rte. 2, Culpepper, Va. 22701
Wilson, Michael E., 424 SE. Shawnee, Bartlesville, Okla. 74003

CAMERON WEIFFENBACH,
April 7, 1988. *Director, Office of Enrollment and Discipline.*

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### Public Evaluation of Automated Trademark Search System (T-Search)

A limited public evaluation of the automated trademark search system (T-Search) will be conducted beginning in June 1988 for a period of three (3) to six (6) months. Selected participants will be given access to the T-Search system at Patent and Trademark Office facilities in Arlington, Va. Twenty participants will be selected to participate in the evaluation based on the following factors: (1) experience in the use of the PTO's Trademark Public Search Library paper files; (2) types of searches performed in the paper files (e.g., registrability, right-to-use, validity, infringement, collection, comprehensive, dilution, and design searches); (3) familiarity with automated, commercial trademark search systems; (4) ability to participate in a four (4) hour training course covering use of the T-Search system and basic search techniques; (5) willingness to provide feedback regarding system capabilities after each search session on the system and to participate in a debriefing interviews after the program ends; (6) willingness to use T-Search in the normal course of day-to-day work; and, (7) the type of work performed by the participant. The goal is to include professional searchers and parties from law firms and corporate law departments in the evaluation.

Persons who wish to be considered for participation in this evaluation of T-Search should complete a "Nomination Form" available from the Manager of the Trademark Public Search Library in Arlington, Va., or from the address given below. Completed nomination forms should be sent to the following address, and must be postmarked within two calendar weeks of the date of this publication or by May 31, 1988, which ever is later. If possible, all participants will be notified of their selection by June 3, 1988. T-Search training classes are scheduled to begin on-or-about June 7, 1988. To accommodate the schedules of participants, training will be given as follows: (1) one Saturday session; (2) one session during normal PTO business hours; and, (3) one session in the evening. Each session will last four hours. Interested parties should indicate which training time best suits their needs. Specific dates and times for the training will be established after selections are made.

Requests for additional information and/or Nomination Forms should be directed to:

Ms. Betty Andrews,
Office Trademark Program Control
U.S. Patent and Trademark Office
Crystal Plaza 2, Room 3C06
Washington, D.C. 20231



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### Trademark EXPO '88

Applications are being accepted from exhibitors wishing to participate in the Sixth Annual National Trademark Exposition. EXPO '88 will be held on June 25 and 26 in the Main Lobby of the Department of Commerce, 14th St. below Pennsylvania Ave. NW., Washington, D.C.

The Exhibit fee is $300.00. For a brochure or additional information, contact the EXPO '88 Coordinator at (703) 557-3268.

JEFFREY M. SAMUELS,
Apr. 8, 1988 *Assistant Commissioner for Trademarks.*

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## Advisory Committee for Patents and Trademarks

### Notice of Open Meeting

In accordance with Section 10(a) (2) of the Federal Advisory Committee Act (Public Law 92-463), announcement is made of the following Committee Meeting:

The Advisory Committee for Patents and Trademarks will meet from 9:00 a.m. to 4:30 p.m. on May 20, 1988, at the U.S. Patent and Trademark Office in Crystal City, Arlington, Virginia. The meeting will be held in the Commissioner's Conference Room in Crystal Park 2, Room 912.

The agenda for the meeting follows:

(1) Public Access to Automated Search File
(2) Education Outreach -- PROJECT XL

The meeting will be open to public observation; approximately 12 seats will be available for the public on a first-come, first-served basis. If time permits, oral comments by the public of no more than three minutes on each topic within the above agenda will be allowed. Written comments and suggestions will be accepted before or after the meeting on any of the agenda matters.

For further information, contact Donald G. Kelly, Executive Assistant to the Assistant Secretary, Patent and Trademark Office, Crystal Park 2, Suite 906, Washington, DC 20231. Telephone: 703/557-3071.

April 26, 1988
Date

Assistant Secretary and Commissioner
of Patents and Trademarks

# PATENT NOTICES

**Certificates of Correction for the Week of May 10, 1988**

| | | | |
|---|---|---|---|
| Re. 32,310 | 4,668,520 | 4,696,145 | 4,706,254 |
| D. 288,903 | 4,670,028 | 4,696,302 | 4,706,682 |
| D. 290,451 | 4,670,433 | 4,696,338 | 4,706,772 |
| D. 292,603 | 4,670,586 | 4,696,738 | 4,706,922 |
| D. 293,060 | 4,670,903 | 4,696,884 | 4,707,188 |
| 3,720,309 | 4,671,155 | 4,697,237 | 4,707,264 |
| 4,357,287 | 4,671,517 | 4,697,654 | 4,707,806 |
| 4,457,965 | 4,672,302 | 4,698,480 | 4,707,820 |
| 4,490,914 | 4,672,735 | 4,698,566 | 4,707,908 |
| 4,505,778 | 4,674,114 | 4,699,337 | 4,707,935 |
| 4,549,354 | 4,674,857 | 4,699,571 | 4,708,146 |
| 4,552,043 | 4,676,278 | 4,700,080 | 4,708,279 |
| 4,554,114 | 4,676,730 | 4,700,104 | 4,708,859 |
| 4,554,741 | 4,677,390 | 4,700,133 | 4,709,250 |
| 4,562,595 | 4,678,514 | 4,700,171 | 4,709,428 |
| 4,588,585 | 4,679,144 | 4,700,423 | 4,709,536 |
| 4,592,530 | 4,679,331 | 4,700,504 | 4,709,720 |
| 4,608,375 | 4,680,290 | 4,700,510 | 4,709,819 |
| 4,609,559 | 4,680,520 | 4,700,711 | 4,709,915 |
| 4,611,890 | 4,680,521 | 4,700,763 | 4,710,035 |
| 4,617,941 | 4,681,126 | 4,700,877 | 4,710,036 |
| 4,620,664 | 4,681,500 | 4,701,103 | 4,710,127 |
| 4,620,948 | 4,681,892 | 4,701,223 | 4,710,287 |
| 4,622,249 | 4,682,090 | 4,701,247 | 4,710,418 |
| 4,623,258 | 4,682,450 | 4,701,394 | 4,710,475 |
| 4,637,002 | 4,682,872 | 4,701,491 | 4,710,629 |
| 4,642,800 | 4,682,880 | 4,701,778 | 4,711,031 |
| 4,644,922 | 4,682,987 | 4,701,915 | 4,711,062 |
| 4,646,352 | 4,683,767 | 4,701,917 | 4,711,111 |
| 4,646,431 | 4,686,291 | 4,701,951 | 4,711,323 |
| 4,647,024 | 4,686,629 | 4,701,993 | 4,711,455 |
| 4,647,373 | 4,688,055 | 4,702,201 | 4,711,591 |
| 4,649,906 | 4,688,830 | 4,702,242 | 4,711,901 |
| 4,650,583 | 4,689,157 | 4,702,590 | 4,711,995 |
| 4,652,435 | 4,689,232 | 4,702,798 | 4,712,119 |
| 4,653,450 | 4,689,548 | 4,703,092 | 4,713,878 |
| 4,654,527 | 4,690,215 | 4,703,172 | 4,714,670 |
| 4,655,079 | 4,691,028 | 4,703,213 | 4,714,697 |
| 4,656,207 | 4,691,316 | 4,703,323 | 4,714,924 |
| 4,661,293 | 4,692,076 | 4,703,673 | 4,715,167 |
| 4,661,816 | 4,693,892 | 4,703,890 | 4,715,537 |
| 4,663,360 | 4,694,389 | 4,704,170 | 4,716,063 |
| 4,663,361 | 4,694,834 | 4,704,258 | 4,716,245 |
| 4,663,402 | 4,694,862 | 4,704,727 | 4,716,286 |
| 4,664,292 | 4,695,268 | 4,704,839 | 4,717,459 |
| 4,664,815 | 4,695,322 | 4,704,846 | 4,717,823 |
| 4,665,392 | 4,695,502 | 4,705,258 | 4,718,309 |
| 4,666,895 | 4,695,656 | 4,705,360 | 4,723,054 |
| 4,666,923 | 4,695,694 | 4,705,384 | 4,724,161 |
| 4,668,057 | 4,695,841 | 4,705,755 | |
| 4,668,176 | 4,696,060 | 4,706,206 | |

## SPECIAL BOXES FOR MAIL

Special PTO mail box numbers should be used to allow forwarding of particular types of mail to the appropriate areas as quickly as possible. Such mail is forwarded directly to the appropriate area without being opened. Only the specified type of document should be placed in an envelope addressed to one of these special boxes. If any documents other than the specified type identified for each box are addressed to that box, they will be delayed in reaching the appropriate area for which they are intended.

The following special boxes should be used only for their specified purpose. Address mail as follows:

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Washington, D.C. 20231

| | |
|---|---|
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| Box 4 | Mail for the Office of Legislation and International Affairs. |
| Box 5 | "No fee" mail related to trademarks (e.g. amendments to applications and request for extensions of time to file an opposition). Mail directed to the Trademark Trial and Appeal Board should have "Attention TTAB" on the envelope in addition to "Box 5". |
| Box 6 | Mail for the Office of Procurement. |
| Box 7 | Reissue applications for patents involved in litigation and any subsequently filed papers for those applications. |
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| Box AF | Amendments or responses to final rejections in patent applications, submitted under the expedited processing program. |
| Box FWC | Mail related to File Wrapper and Continuations. |
| Box Interference | Communications relating to interferences and applications and patents involved in interferences. |
| Box Issue Fees | Issue Fee Transmittal (PTOL Form 85), advance copy orders and fees associated with these services. |
| Box M. Fee | Correspondence related to a patent that is subject to the payment of a maintenance fee. |
| Box Non-Fee | Non-fee amendments to patent applications. |
| Box Pat. Ext. | Applications for patent term extension. |
| Box PCT | Mail related to applications filed under the Patent Cooperation Treaty. |
| Box Reexam | Mail related to reexamination application. |
| Box SN | Petitions under 37 CFR 1.182 and associated fees prior to receipt of "Filing Receipt", "Notice to File Missing Parts" or " Notice of Incomplete Information Application". |

## Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries

The following libraries, designated as Patent Depository Libraries (PDLs), receive current issues of U.S. Patents and maintain collections of earlier-issued patents. The scope of these collections varies from library to library, ranging from patents of only recent years to all or most of the patents issued since 1790.

These patent collections, which are organized in patent number sequence, are available for use by the public free of charge. Each of the PDLs, in addition, offers supplemental reference publications of the U.S. Patent Classification System, including the *Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions,* and provides technical staff assistance in their use to aid the public, in gaining effective access to information contained in patents. CASSIS (Classification And Search Support Information System); which provides direct, on-line access to Patent and Trademark Office data, is available at all PDLs. Facilities for making paper copies of patents from either microfilm or paper collections are generally provided for a fee.

Since there are variations in the scope of patent collections among the PDLs and in their hours of service to the public, anyone contemplating use of the patents at a particular library is advised to contact that library, in advance, about its collection and hours in order to avert possible inconvenience.

| *State* | *Name of Library* | *Telephone Contact* |
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| Arkansas | Little Rock: Arkansas State Library | (501) 682-2053 |
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| | Sacramento: California State Library | (916) 322-4572 |
| | San Diego Public Library | (619) 236-5813 |
| | Sunnyvale: Patent Information Clearinghouse | (408) 730-7290 |
| Colorado | Denver Public Library | (303) 571-2347 |
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| Delaware | Newark: University of Delaware Library | (302) 451-2965 |
| Dist. of Columbia | Washington: Howard University Libraries | (202) 636-5060 |
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| | Miami–Dade Public Library | (305) 375-2665 |
| Georgia | Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology | (404) 894-4508 |
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| Louisiana | Baton Rouge: Troy H. Middleton Library, Louisiana State University | (504) 388-2570 |
| Maryland | College Park: Engineering and Physical Sciences Library, University of Maryland | (301) 454-3037 |
| Massachusetts | Amherst: Physical Sciences Library, University of Massachusetts | (413) 545-1370 |
| | Boston Public Library | (617) 536-5400 Ext. 265 |
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| Missouri | Kansas City: Linda Hall Library | (816) 363-4600 |
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| Montana | Butte: Montana College of Mineral Science and Technology Library | (406) 496-4222 |
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| Nevada | Reno: University of Nevada-Reno Library | (702) 784-6579 |
| New Hampshire | Durham: University of New Hampshire Library | (603) 862-1777 |
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| New York | Albany: New York State Library | (518) 474-7040 |
| | Buffalo and Erie County Public Library | (716) 846-7101 |
| | New York Public Library (The Research Libraries) | (212) 714-8529 |
| North Carolina | Raleigh: D. H. Hill Library, North Carolina State University | (919) 737-3280 |
| Ohio | Cincinnati & Hamilton County, Public Library of | (513) 369-6936 |
| | Cleveland Public Library | (216) 623-2870 |
| | Columbus: Ohio State University Libraries | (614) 292-6286 |
| | Toledo/Lucas County Public Library | (419) 255-7055 Ext. 212 |
| Oklahoma | Stillwater: Oklahoma State University Library | (405) 624-6546 |
| Oregon | Salem: Oregon State Library | (503) 378-4239 |
| Pennsylvania | Philadelphia, Free Library of | (215) 686-5330 |
| | Pittsburgh, Carnegie Library of | (412) 622-3138 |
| | University Park: Pattee Library, Pennsylvania State University | (814) 865-4861 |
| Rhode Island | Providence Public Library | (401) 521-8726 |
| South Carolina | Charleston: Medical University of South Carolina Library | (803) 792-2371 |
| Tennessee | Memphis & Shelby County Public Library and Information Center | (901) 725-8876 |
| | Nashville: Vanderbilt University Library | (615) 322-2775 |
| Texas | Austin: McKinney Engineering Library, University of Texas at Austin | (512) 471-1610 |
| | College Station: Sterling C. Evans Library, Texas A & M University | (409) 845-2551 |
| | Dallas Public Library | (214) 670-1468 |
| | Houston: The Fondren Library, Rice University | (713) 527-8101 Ext. 2587 |
| Utah | Salt Lake City: Marriott Library, University of Utah | (801) 581-8394 |
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| | Milwaukee Public Library | (414) 278-3247 |

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## PATENT EXAMINING CORPS

**RENE D. TEGTMEYER, Assistant Commissioner**
**JAMES E. DENNY, Deputy Assistant Commissioner**

**CONDITION OF PATENT APPLICATIONS AS OF April 9, 1988**

| PATENT EXAMINING GROUPS | Actual Filing Date of Oldest New Case Awaiting Action |
|---|---|
| **CHEMICAL EXAMINING GROUPS** | |
| GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director | 1-12-87 |
| ORGANIC CHEMISTRY GROUP 120—S. N. ZAHARNA, Director | 9-3-85 |
| SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. F. WHITE, Director | 4-15-87 |
| HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director | 12-9-86 |
| BIOTECHNOLOGY, GROUP 180—S. N. ZAHARNA, Acting Director | 10-24-85 |
| **CHEMICAL EXAMINING GROUPS** | |
| GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director | 1-12-87 |
| ORGANIC CHEMISTRY GROUP 120—S. N. ZAHARNA, Director | 9-3-85 [ |
| BIOTECHNOLOGY, GROUP 180—S. N. ZAHARNA, Acting Director | 10-24-85 |
| **ELECTRICAL EXAMINING GROUPS** | |
| INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—G. GOLDBERG, Director | 4-21-86 |
| SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director | 10-14-85 |
| INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—E. LEVY, Director | 2-6-86 |
| PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX, Director | 11-12-86 |
| ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director | 2-17-87 |
| COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260—S. G. KUNIN, Director | 7-17-86 |
| DESIGN, GROUP 290—K. L. CAGE, Director | 4-17-85 |
| **MECHANICAL EXAMINING GROUPS** | |
| HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director | 3-13-87 |
| MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—VACANT, Director | 10-04-85 |
| MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—VACANT, Director | 2-18-86 |
| SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—D. J. STOCKING, Director | 2-20-87 |
| GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director | 7-1-87 |

**Expiration of patents**: The patents within the range of numbers indicated below expire during April 1988, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,573,336 to 3,576,935, inclusive
Plant Patents ..... Numbers 3,037 to 3,053 inclusive

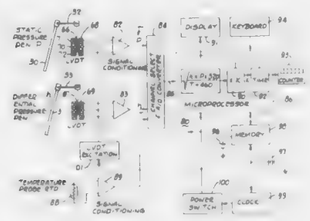


# REEXAMINATIONS

MAY 10, 1988

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in *italics* indicates additions made by reexamination.

**B1 4,414,634 (856th)**
**FLUID FLOW TOTALIZER**
**Timothy R. Louis, Berea; Carl A. Gedeon, Middleburg Heights; Maw H. Lee, Broadview Heights, and Eugene V. Erjavec, Willowick, all of Ohio, assignors to The Scott & Fetzer Company, Cleveland, Ohio**
**Reexamination Request No. 90/000,955, Feb. 10, 1986.**
**Reexamination Certificate for Patent No. 4,414,634, issued Nov. 8, 1983, Ser. No. 284,526, Jul. 17, 1981.**
**Int. Cl.[4] G06F *15/32*; G01F *1/00***
**U.S. Cl. 364—510**



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1–20** are cancelled.

[1. A data totalizer for use with a fluid flow chart recorder, said chart recorder having a movable chart and a first marker to record thereon a first fluid pressure signal and a second marker to record thereon a second signal responsive to the fluid flow, and first and second motors to move the first and second markers, respectively, said data totalizer comprising, in combination:

a first and a second linear variable displacement transformer each having an electrical output and a linearly displaceable element to vary the output;

first and second connecting means connected to said first and second linearly displaceable transformer elements and adapted to be connected to the first and second motors, respectively; and

electronic calculating means connected to the electrical outputs of said first and second transformers to utilize the fluid static pressure and fluid flow signals generated by the outputs of the first and second transformers, respectively, to calculate fluid flow rate.]

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Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 32,664

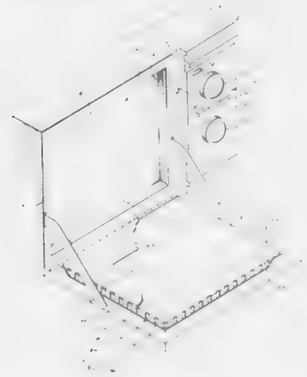
# ENERGY SEAL FOR HIGH FREQUENCY ENERGY APPARATUS

John M. Osepchuk, Concord, and James E. Simpson, Waltham, both of Mass., assignors to Raytheon Company, Lexington, Mass.

Original No. 3,767,884, dated Oct. 23, 1973, Ser. No. 203,227, Nov. 30, 1971. Continuation of Ser. No. 582,324, May 3, 1975, abandoned. Application for reissue Apr. 29, 1983, Ser. No. 488,527

Int. Cl.[4] H05B 6/76

U.S. Cl. 219—10.55 D 41 Claims



5. [The apparatus according to claim 2 wherein at least some of said structural variations are aperiodic] *Heating apparatus comprising:*

*an enclosure;*

*means for energizing said enclosure with energy having at least a predetermined frequency and a plurality of modes;*

*said enclosure comprising at least a wall member having an access opening and a door for said access opening;*

*an energy seal comprising at least portions of said wall and door to define an elongated energy mode supporting structure;*

*said mode supporting structure comprising means for directing substantially all energy propagation entering said seal in a first direction outwardly across said mode supporting structure and means for substantially inhibiting the propagation of said energy at said frequency in directions perpendicular and oblique to said first direction; and*

*said propagation inhibiting and directing means comprising aperiodic structural variations along at least a portion of said mode supporting structure. 90*

* * * * *

The questions raised in reexamination request No. 90/000,945, filed Jan. 29, 1986, have been considered and the results thereof are reflected in this reissue patent which constitutes the reexamination certificate required by 35 U.S.C. 307 as provided in 37 CFR 1.570(e).

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# PLANT PATENTS

## GRANTED MAY 10, 1988

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

6,170

### ROSE PLANT—MEILARCO VARIETY

**Marie-Louise Meilland, Antibes, France, assignor to The Conard-Pyle Company, West Grove, Pa.**

**Filed Mar. 11, 1986, Ser. No. 838,703**
**Int. Cl.[4] A01H** *5/00*

**U.S. Cl. Plt.—9** **1 Claim**

1. A new and distinct variety of Miniature rose plant characterized by the following combination of characteristics:

(a) forms in abundance attractive double blossoms which are pale pink in coloration and of long duration on the plant,

(b) is well suited for pot forcing, and

(c) exhibits a vigorous growth habit which results in the formation of compact and regular vegetation;

substantially as herein shown and described.

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6,171

### ROSE PLANT—MEINOBROC VARIETY

**Marie-Louise Meilland, Antibes, France, assignor to The Conard-Pyle Company, West Grove, Pa.**

**Filed Feb. 27, 1986, Ser. No. 833,611**
**Int. Cl.[4] A01H** *5/00*

**U.S. Cl. Plt.—20** **1 Claim**

1. A new and distinct variety of Hybrid Tea rose plant characterized by the following combination of characteristics:

(a) forms elegant double red blossoms which are vermilion red on the upper surface and cherry red on the under surface,

(b) is particularly well suited for growing under greenhouse conditions,

(c) exhibits a vigorous growth habit, and

(d) exhibits good resistance to fungal diseases;

substantially as herein shown and described.

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6,172

### APPLE TREE

**John V. Creech, Cumberland, Ky., assignor to Columbia and Okanogan Nursery, Inc., Wenatchee, Wash.**

**Filed May 28, 1985, Ser. No. 738,268**
**Int. Cl.[4] A01H** *5/03*

**U.S. Cl. Plt.—43** **1 Claim**

1. A new and distinctive variety of apple tree which is a mutation of the Gala variety (U.S. Plant Pat. No. 3,637) substantially as shown and described, characterized—in comparison with said Gala variety and with the Royal Gala variety (U.S. Plant Pat. No. 4,121—by a brighter and scarlet red color uniformly distributed over substantially the whole area of the fruit, by a smaller calyx and calyx basin, and by a shorter and thicker stem.

6,173

### LILY PLANT NAMED TINY

**Ted T. Kirsch, Myrtle Point, Oreg., assignor to Melridge Inc., Gresham, Oreg.**

**Filed May 8, 1986, Ser. No. 861,242**
**Int. Cl.[4] A01H** *5/00*

**U.S. Cl. Plt.—68** **1 Claim**

1. A new and distinct variety of Oriental hybrid lily, substantially as herein shown and described, characterized by its short stature and silhouette and its moderately large, outwardly facing, richly colored flowers of good substance and form; by its vigorous growth habit and relatively short height; and by its ability for forcing out-of-season to produce reliable pot plant cultivars.

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6,174

### LILY PLANT NAMED HALEY

**Ted T. Kirsch, Myrtle Point, Oreg., assignor to Melridge Inc., Gresham, Oreg.**

**Filed May 8, 1986, Ser. No. 861,243**
**Int. Cl.[4] A01H** *5/00*

**U.S. Cl. Plt.—68** **1 Claim**

1. A new and distinct variety of hybrid Oriental lily, substantially as herein shown and described, characterized by its outwardly facing, richly colored flowers of large size, good substance and form, in a raceme of ascending pedicels, and by its vigorous growth habit and medium height.

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6,175

### LILY PLANT NAMED TUMALO

**Ted T. Kirsch, Myrtle Point, Oreg., assignor to Melridge Inc., Gresham, Oreg.**

**Filed May 8, 1986, Ser. No. 861,246**
**Int. Cl.[4] A01H** *5/00*

**U.S. Cl. Plt.—68** **1 Claim**

1. A new and distinct variety of Oriental hybrid lily, substantially as herein shown and described, particularly characterized by its outfacing pink flowers of large size and by its short stature, the flowers being of good substance and form and distinctively marked with a peach-toned stripe extending along the tepal midribs, and being copiously marked with dark red papillae over a major portion of the tepal length, this plant having abundant foliage of broad leaves of a dark green color and the flowers being carried as a raceme on ascending pedicels.

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6,176

### LILY PLANT NAMED SNOW PRINCE

**Ted T. Kirsch, Myrtle Point, Oreg., assignor to Melridge Inc., Gresham, Oreg.**

**Filed May 8, 1986, Ser. No. 861,247**
**Int. Cl.[4] A01H** *5/00*

**U.S. Cl. Plt.—68** **1 Claim**

1. A new and distinct variety of Oriental hybrid lily, substantially as herein shown and described, characterized particularly by its pure white, unusually large flowers of excellent substance and broad tepalled form, borne on strong, plum-colored stems which have abundant foliage comprising broad leaves of dark green color.

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# PATENTS

## GRANTED MAY 10, 1988

### ERRATA

| For CLASS | See PATENT NO. |
|---|---|
| 182-116 | 4,742,888 |
| 439-161 | 4,743,079 |
| 439-492 | 4,743,080 |
| 439-751 | 4,743,081 |
| 424-447 | 4,743,249 |
| 604-161 | 4,743,265 |
| 137-083 | 4,743,419 |
| 544-111 | 4,743,595 |
| 307-450 | 4,743,957 |
| 363-016 | 4,744,018 |

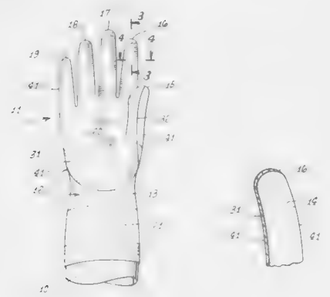
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# PATENTS

GRANTED MAY 10, 1988

## GENERAL AND MECHANICAL

**4,742,578**
**PENETRATION-RESISTANT SURGICAL GLOVE**
**Arnold S. Seid, 427 16th St., Santa Monica, Calif. 90402**
**Filed Dec. 2, 1985, Ser. No. 803,170**
**Int. Cl.[4] A41D** *13/10, 19/00*
**U.S. Cl. 2—2.5** **8 Claims**



**1.** A penetration-resistance surgical glove comprising in combination:

(a) a foundation glove composed of thin, resilient, elastic rubber having a front surface and a rear surface, said foundation glove including stalls for the thumb, fingers and palm of the human hand and a cuff for surrounding the wrist portion of the arm, said foundation glove providing a hermetic seal for covering the hand; and

(b) an overlay of thin, pliable, limp and non-elastic material composed of a large number of tightly interwoven yarns of high strength, said overlay of thin, pliable, limp and non-elastic material being shaped to conform to the front surface of the thumb, fingers and palm portions of said foundation glove, said shaped overlay of thin, pliable, limp and non-elastic material being attached to the front surface of the thumb, fingers and palm portions of said foundation glove without rupture or penetration of the thin, resilient, elastic rubber forming said foundation glove, said overlay of thin, pliable, limp and non-elastic material having a thickness approximately equal to the thickness of the thin, resilient, elastic rubber forming said foundation glove and having a resistance to penetration by sharp-pointed instruments at least three times greater than the resistance to penetration of the thin, resilient, elastic rubber forming said foundation glove.

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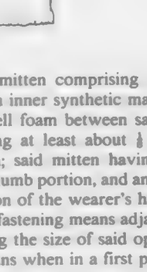
**4,742,579**
**SKI GLOVE**
**Scott Dunford, Salt Lake City, Utah, assignor to Skiears, Inc., Salt Lake City, Utah**
**Continuation-in-part of Ser. No. 926,001, Oct. 31, 1986, Pat. No. 4,698,851. This application Feb. 25, 1987, Ser. No. 18,405**
**The portion of the term of this patent subsequent to Oct. 13, 2004, has been disclaimed.**
**Int. Cl.[4] A41D** *19/00*
**U.S. Cl. 2—160** **18 Claims**

**1.** A glove covering for use in winter sports for protecting a hand against cold weather, said glove comprising:

an outer glove shell configured in size and shape to fully cover only a back side of the hand and including at least one finger section, a palm/wrist section and a thumb section, and having a length extending from a forward finger-tip end of the finger section to a rearward wrist end of the palm/wrist section;

at least one first pocket member configured in the approximate shape of the finger section of the glove shell and being joined therewith at contiguous perimeter edges including the forward finger-tip end of the shell, one side of the first pocket member being transverse and unattached with respect to the approximate juncture of the palm/wrist and finger sections to form a pocket opening accessible from the palm/wrist section of the shell, thereby forming a finger pocket between the shell and the first pocket member;

a second pocket member configured in the approximate shape of the thumb section of the glove shell and being

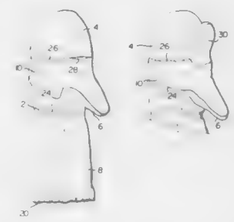


joined therewith at contiguous perimeter edges including a thumb-tip end of the shell, one side of the second pocket member being transverse and unattached with respect to the approximate juncture of the palm/wrist and thumb sections to form a pocket opening accessible from the palm/wrist section of the shell, thereby forming a thumb pocket between the shell and the second pocket member;

the palm/wrist section further including pocket structure at a backhand side thereof for receiving a flexible, thin, heater pack.

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**4,742,580**
**COLD WEATHER HAND PROTECTING EQUIPMENT**
**James G. Phillips, Jr., Pleasant Grove, and Joanne Harlow, Orem, both of Utah, assignors to Burlington Industries, Inc., Greensboro, N.C.**
**Filed Jun. 5, 1987, Ser. No. 58,891**
**Int. Cl.[4] A41D** *19/00*
**U.S. Cl. 2—158** **34 Claims**



**1.** A cold weather mitten comprising an outer synthetic material shell fabric, an inner synthetic material lining fabric, and a layer of open cell foam between said inner and outer fabrics, said layer being at least about ⅛ inch thick over a majority of the mitten; said mitten having a closed finger-receiving end, with a thumb portion, and an open end, defining an opening, for insertion of the wearer's hand for positioning within the mitten; and fastening means adjacent said open end for effectively changing the size of said opening at said open end, said fastening means when in a first position providing a

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relatively small opening that causes the mitten to fit tightly on the wearer's forearm when the wearer has relatively thin sleeve garments on, and when in a second position providing a relatively large opening that causes the mitten to fit more loosely at the wearer's forearm to accommodate relatively thick sleeve garments and snugly engage the thick sleeves.

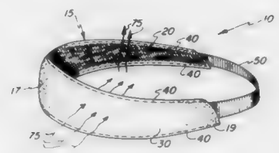
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**4,742,581**

## COOLING BAND SYSTEM

**Daniel H. Rosenthal, 222 N. Pompano Blvd., Pompano Beach, Fla. 33062**

**Filed Apr. 7, 1986, Ser. No. 848,638**
**Int. Cl.[4] A42C *5/00***
**U.S. Cl. 2—181** **8 Claims**



1. A laminated cooling band for a person comprising:
(a) an air pervious heat conductive first sublayer of a screen of a foraminous glass fabric;
(b) an air pervious fabric second sublayer of cotton fabric, said cotton fabric is a moisture absorbent material; and
(c) uniting means for connecting said first sublayer and second sublayer in interfacial contact, said uniting means rendering said first and second sublayers in separably pliable interfacial association but for said uniting means uniting said sublayers into said cooling band;
said first and second sublayers being free of substances affecting the porosity of said glass fabric and said cotton fabric subassemblies and resultant air passage therethrough;
said first sublayer and second sublayers have peripheral edges and are joined at their edges using said uniting means, said edges are aligned, said uniting means being generally arranged parallel to the aligned said edges and closely spaced therefrom; said peripheral edge of said heat conductive first sublayer is exposed to the atmosphere; said laminated cooling band forms part of a cooling band system in the form of an endless loop for lowering the body temperature of a wearer, said first sublayer is the inner surface means for skin contact, said second sublayer comprising the outer surface means for holding water for evaporative cooling.

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**4,742,582**

## SEAT HANDLE ATTACHMENT

**Anthony M. Giallourakis, P.O. Drawer 1307, Tarpon Springs, Fla. 33589**

**Filed Oct. 8, 1986, Ser. No. 916,794**
**Int. Cl.[4] A47K *17/00***
**U.S. Cl. 4—251** **8 Claims**

1. A seat handle attachment, comprising:
(a) a rigid planar member, wherein said planar member has an attachment portion and a handle portion, and wherein said attachment portion is wider than said handle portion for sturdy anchoring and said handle portion is longer than the attachment portion to facilitate handling; and
(b) attachment means permanently affixed to the attachment portion, wherein said attachment means comprises tape made of a compressable sponge-like material having opposite sticky surfaces for sticking to the attachment portion and an underside section of a toilet seat and for compensating for surface differences between a surface of the rigid planar member and a surface of the underside of the toilet seat, and wherein said attachment portion has an oblongated shape to fit within curved contours of a toilet seat, and further has an inward curvilinear edge and outward curvilinear edges, said outward curvilinear edges



being aligned with an outward edge of a toilet seat and further comprises a scent-dispersing means having an impregnated volatile substance which releases slowly, wherein said scent-dispersing means is impregnated in said tape.

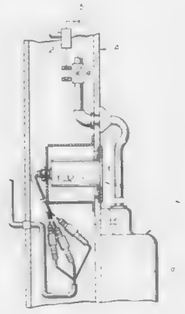
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**4,742,583**

## WATER SUPPLY CONTROL APPARATUS

**Takao Yoshida, and Kiyoshi Fujino, both of Fukuoka, Japan, assignors to Toto Ltd., Fukuoka, Japan**

**Filed Dec. 29, 1986, Ser. No. 947,522**
**Claims priority, application Japan, Dec. 28, 1985, 60-299515**
**Int. Cl.[4] E03D *5/10***
**U.S. Cl. 4—313** **15 Claims**



1. A water supply control apparatus comprising:
a flushing device to be supplied with water;
water supply valve means for controlling the supply of water to said flushing device;
driving signal generator means for selectively generating driving signals of first and second periods, respectively;
sensor means responsive to one, at a time, of said driving signals for detecting whether there is a user of said flushing device at one of said first and second periods, to produce a sensor signal selectively including a user-present signal and a user-absent signal of said one period;
control circuit means responsive to said sensor signal for controlling said water supply valve means; and
said control circuit means including:
first control means having switching means responsive to said user-absent signal for issuing a first switching signal to said driving signal generator means to generate the driving signal of the first period and responsive to said user-present signal for issuing a second switching signal to said driving signal generator means to generate the driving signal of the second period and output means responsive to said sensor signal for issuing a water supply valve control signal;
second control means responsive to said water supply valve control signal for controlling said water supply valve means; and
a battery as a power supply for operating said water supply valve means, said driving signal generator means, said sensor means, and said first and second control means.



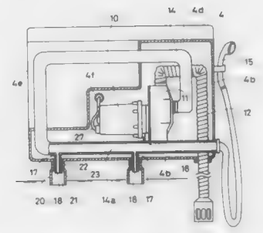
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**4,742,584**

## WATER CURRENT AND AIR BUBBLE GENERATING APPARATUS FOR BATH

**Masaki Abe, Osaka, Japan, assignor to ABE Co., Ltd., Osaka, Japan**

**Continuation of Ser. No. 766,283, Aug. 16, 1985, abandoned. This application Feb. 20, 1987, Ser. No. 17,094**
**Claims priority, application Japan, Sep. 5, 1984, 59-134645[U]; Oct. 22, 1984, 59-159936[U]**
**Int. Cl.[4] A61H *33/02***
**U.S. Cl. 4—542** **7 Claims**



1. A water current and air bubble generating apparatus for bath designed to be used in association with a bathtub to be filled with water to a predetermined water surface level, said water current and air bubble generating apparatus being adapted for generating air bubbles in water in said bathtub and scattering said air bubbles in the whole area of said bathtub, said water current and air bubble generating apparatus comprising:
(a) a motor,
(b) a pump driven by said motor,
(c) a case containing at least said motor and said pump and located outside said bathtub,
(d) a suction pipe having one end extending into said bathtub and the other end coupled to an inlet of said pump,
(e) an outlet pipe having one end coupled to an outlet of said pump, at least a portion of said outlet pipe being located above said predetermined water surface level of said bathtub,
(f) a jet nozzle coupled to said portion of said outlet pipe and positioned a predetermined distance above from said predetermined water surface level for shooting out, at least at a predetermined water flow rate, as jet current, water flowing in said outlet pipe downward to the surface of the water to be filled in said bathtub from said predetermined distance above said predetermined water surface level, said predetermined water flow rate of said jet current and said predetermined distance of said jet nozzle above said predetermined water surface level being selected to generate a large amount of air bubbles in the water when said jet current collides with the water surface at a predetermined water surface level, and
(g) space defining means for defining a space from said jet nozzle to the water surface at said predetermined water surface level in said bathtub, said space defining means extending from said case and being in communication therewith, said space defining means being located to surround said jet current shot out from said jet nozzle to isolate said jet current from the external environment, said space defining means having a lower portion including an opening directed downward and extending into the water in said bathtub for allowing said jet current to be discharged into the water in said bathtub,
(h) the inner diameter of said space defining means being selected to allow the inner wall of said space defining means to surround said jet current with a predetermined gap sufficient enought to allow said jet current to take a sufficient amount of air therein from said case to thrust onto the water surface of said bathtub, causing a sufficient amount of air bubbles in the water of said bathtub,
(i) The length of said space defining means being selected to extend downward into the water in said bathtub to a predetermined depth from the water surface at said predetermined water surface level, thereby to cause almost all of the air bubbles generated in the water to be moved out from said opening into the water in said bathtub,
(j) said water current and air bubble generating apparatus further comprising air passage allowing means for allowing passage of a necessary amount of air for generation of a large amount of air bubbles in said space defining mean, thereby to cause said space defining means to reduce a noise caused when said jet current shot out from said jet nozzle collides with the water surface at said predetermined water surface level.

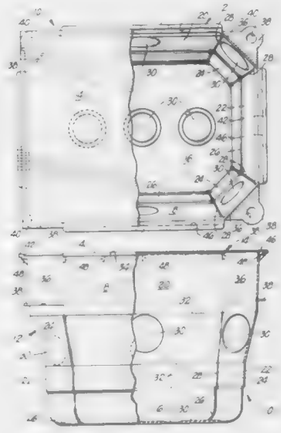
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**4,742,585**

## TUB BOX

**Duane D. Logsdon, 1708 Calavera Dr., Fullerton, Calif. 92631**

**Filed May 1, 1987, Ser. No. 44,748**
**Int. Cl.[4] A47K *17/00***
**U.S. Cl. 4—661** **5 Claims**



1. A tub box structure which includes:
a container having a bottom wall and a top peripheral wall extending upwardly from said bottom wall,
lid means for closing the top of said container,
said peripheral wall including front, back and end walls and corner walls each of which is located at an angle to said front, back and end walls and connecting said front, back and end walls,
said bottom wall and said peripheral wall including a plurality of knockout openings formed therein which are adapted to be used so as to allow a pipe to enter the interior of said container,
said container being larger adjacent to its top than at its bottom and continuously changing in its dimension from its bottom to its top,
the top of said container is larger than said bottom wall so

that said front and rear walls, said end walls and said corner walls all diverge outwardly from said bottom wall,

said container including perforate ears located on said peripheral wall for use in supporting said container in a desired location such that said top is horizontal and lid means for closing the top of said container,

said front and rear walls, said end walls and said corner walls are provided with continuous peripheral beads extending parallel to said bottom wall serving so as to minimize the bending of said front and rear walls, said ends walls and said corner walls,

said container includes peripheral lips at the top of said container extending along the lengths of the front, back and end walls, said lips including notches capable of receiving said lid so as to hold said lid in place against movement relative to said container,

said container and said lid means being formed of a self supporting polymer material which is inert with respect to soil and concrete.

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**4,742,586**

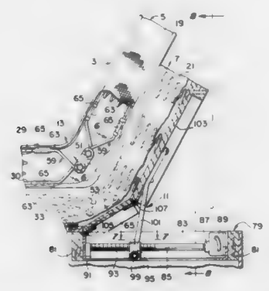
**ELEVATION SYSTEM FOR A BED ASSEMBLY**

**Michael H. Galumbeck, 5577 Vantage Point Rd., Columbia, Md. 21044**

**Continuation of Ser. No. 802,053, Nov. 25, 1985, abandoned. This application Mar. 27, 1987, Ser. No. 31,221**

**Int. Cl.[4] A61G** *7/00*

**U.S. Cl. 5—72** **21 Claims**



**1**. An adjustable bed unit for elevating the end section of a mattress which extends outwardly beyond a first end of an elongate foundation support beneath the mattress from the plane of the remainder of the mattress supported by a support surface of said foundation support which extends in a first plane, said elevation occurring about spaced axes transverse to the longitudinal axis of said mattress to create and maintain an area of said end section adjacent to the juncture of the end section with the remainder of the mattress in a smooth, substantially concave arcuately curved configuration comprising a housing means having a first housing end and a second opposed housing end spaced therefrom, said housing means being configured to fit beneath the end section of said mattress with said first housing end adjacent to the first end of said elongated foundation support, a pivoted end assembly means connected to said housing means to extend in a second plane substantially parallel to said first plane when said housing means is positioned beneath said end section of said mattress, said pivoted end assembly means including an intermediate section having a first section end pivotally connected by a first pivot means to said housing means at said first housing end and a second section end opposite to said first section end, and a head section having a third section end pivotally connected by a second pivot means to said second section end and a free section end spaced therefrom, and elevating means mounted on said housing means within the confines thereof and connected to said pivoted end assembly means for simultaneously moving said intermediate and head sections in the same direction toward or away from said second plane with said free section end being maintained furthermost from said second plane when said end assembly means is moved from said second plane, said elevating means being operable upon initiation of said simultaneous movement of the head and intermediate sections to pivot said intermediate section about said first pivot means and to pivot said head section about said second pivot means to create a first angle between said intermediate section and said second plane and a second angle between said intermediate section and said head section, said elevating means including a unitary rigid yoke means for moving said pivoted end assembly toward and away from said second plane, said rigid yoke means including a first yoke section secured to said pivoted end assembly and a second yoke section extending at a fixed angle to said first yoke section from said first yoke section to a terminal end portion, and drive means connected to said terminal end portion and operative to move said terminal end portion along a path between said first and second housing ends.

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**4,742,587**

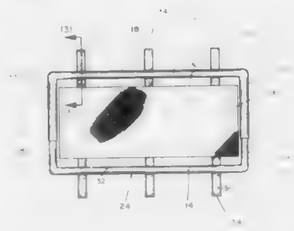
**MEDICAL STRETCHER**

**Arthur J. Dove, 96 Old Colony Ave., Quincy, Mass. 02170**

**Filed Apr. 27, 1986, Ser. No. 42,831**

**Int. Cl.[4] A61G** *1/00*

**U.S. Cl. 5—82 R** **3 Claims**



**1**. A medical stretcher comprising a first frame member a second frame member and a flexible support member, the first and second frame members press fitted together to form a frame, the frame having a first long side and a second long side, the support member having a first side and a second side, the first and second sides each having a series of spaced straps extending therefrom, the straps comprising separable fastener means, the straps extending from the first side engaging the first long side and the straps extending from the second side engaging the second long side, the first and second frame members being formed of a tubular material and each having a first terminal end and a second terminal end, the first terminal end of the first frame member extending within and circumscribed by the first terminal end of the second frame member and the second terminal end of the first frame member (fitted) extending within and circumscribed by the second terminal end of the second frame member, said first and second frame members and the flexible support member being adapted to be disengaged for easy storage.

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**4,742,588**

**LIFTING SLING**

**David R. James, Glenyard, Great Britain, assignor to Impro Limited, Gloucester, England**

**Filed Aug. 7, 1987, Ser. No. 83,636**

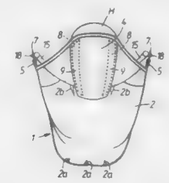
**Claims priority, application United Kingdom, Aug. 15, 1986, #8619894**

**Int. Cl.[4] A61G** *7/10*

**U.S. Cl. 5—83** **11 Claims**

**1**. A one-piece lifting sling for use with an invalid hoist, comprising two upper suspension means having attachment points in a shoulder region of the sling, two lower suspension means adjacent a bottom end of the sling, an upper end head-support extension extending beyond said attachment points of the upper suspension means, at least one pocket extending substantially throughout said extension and for a distance towards said bottom end of the sling beyond a line joining said attachment points, and a removable sheet or strip of substantially rigid but resiliently flexible material which is housed in the pocket so as to form a head support for a supported invalid.





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**4,742,589**

**METHOD FOR CONTINUOUS LIQUID TREATMENT OF A CLOTH**

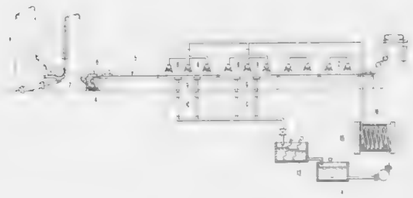
**Yoshikazu Sando, and Hiroshi Ishidoshiro, both of Wakayama, Japan, assignors to Sando Iron Works Co., Ltd., Wakayama, Japan**

**Filed Jul. 18, 1986, Ser. No. 887,993**

**Claims priority, application Japan, Jul. 22, 1985, 60-161670; Jul. 22, 1985, 60-161671**

**Int. Cl.[4] D06M** *1/24, 1/22*

**U.S. Cl. 8—151** **4 Claims**



**1**. A method for continuous liquid treatment of a cloth comprising transporting a cloth soaked with a treating solution continuously and tentering the cloth for expanding the width thereof and while tentering subjecting the cloth successively to wet heat treatment by jetting high temperature hot water at a temperature about 180° C. thereto and then drying the resultant cloth by jetting hot blast thereto.

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**4,742,590**

**BRIDGING KIT**

**Ami Glassman, and Shelomo Yechiely, both of Haifa, Israel, assignors to The State of Israel, Ministry of Defense, Israel Military Industry, Israel**

**Filed Jul. 25, 1986, Ser. No. 889,202**

**Claims priority, application Israel, Sep. 24, 1985, 76487**

**Int. Cl.[4] E01D** *21/00*

**U.S. Cl. 14—1** **3 Claims**

**1**. A method for installing a bridge including at least one bridge unit to span a water obstacle overhead thereof, said bridge to extend from a first bank of the water obstacle to a second bank thereof, comprising the steps of:

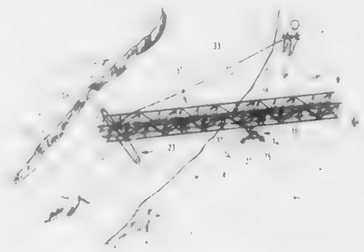
connecting a float to an underside of a forward end portion of said at least one bridge unit;

fixedly positioning a roller unit on said first bank of the water obstacle, said roller unit including at least one roller mounted in a frame;

inserting said float and forward end portion of said at least one bridge unit to which it is connected into the water so that said forward end portion of said one bridge is floatingly supported on the water by said float;

placing a portion of said at least one bridge unit which is spaced from said forward end portion thereof onto said roller of said roller unit which is fixed on said first bank; and

advancing said at least one bridge unit until the floating forward end portion thereof reaches said second bank.



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**4,742,591**

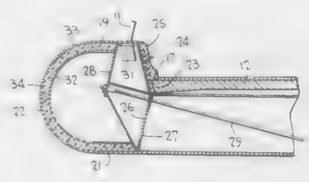
**CABLE STAYED BRIDGE HAVING BOX EDGE BEAMS AND METHOD OF CONSTRUCTION**

**Jean M. Muller, Tallahassee, Fla., assignor to Figg and Muller Engineers, Inc., Tallahassee, Fla.**

**Continuation of Ser. No. 818,970, Jan. 15, 1986, abandoned. This application Oct. 8, 1987, Ser. No. 106,028**

**Int. Cl.[4] E01D** *11/00, 21/04*

**U.S. Cl. 14—1** **9 Claims**



**1**. A cable stayed bridge comprising, a bridge deck having opposing side edges, bridge pylon structure extending above said deck, separate, longitudinally extending, hollow, structural box beams along said side edges of said deck, spaced transverse floor beams spanning said deck therebelow, said floor beams being joined at opposite ends respectively to said box beams, cable stays supporting the bridge from said pylon structure, said cable stays extending between said pylon structure and anchored directly to said box beams at said side edges of said deck, each of said box beams having an inner side wall, spaced top and bottom walls and a spaced outer side wall, said walls defining a hollow space and said box beams providing longitudinal stability and torsional rigidity to the bridge and resistance to buckling, said cable stays having ends extending through said top wall of each of said box beams, anchor means within said hollow space of said box beams engaging said ends of said cable stays for anchoring said cable stays to said box beams, said inner side wall of said box beams being joined to each of said side edgess of said deck at a location between said top and bottom walls to thereby present an upper section of said inner wall which defines a crash barrier wall, said floor beams being joined to said box beams at a lower section of said inner wall thereof.

**6**. A method of constructing a cable stayed bridge comprising:

erecting bridge pylon structure;

supporting bridge deck structure from said pylon structure

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by a plurality of cable stays; said deck structure being formed by assembling together modules each comprising a reinforced concrete bridge deck section and a pair of longitudinal hollow box beam segments along opposite sides of said section,

providing transverse floor beams underlying said deck section and extending between said box beam segments,

before said assembling and suppporting steps, forming each of said modules by applying pretension forces to said pair of segments and applying opposed precompression forces to said section, joining together said pair of segments to opposite ends of said floor beams and to said side edges of said section, and thereafter releasing said applied forces, whereby any long-term concrete strains in said deck section due to shrinkage and creep are avoided;

interconnecting said modules together end-to-end such that said box beam segments of adjoining modules are aligned; and

extending said cable stays from said pylon structure and anchoring said cable stays directly to said pair of box beam segments of said connected modules.

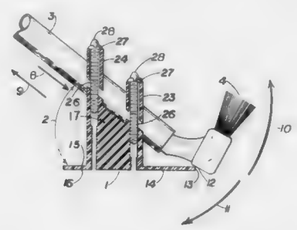
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**4,742,592**

## HYDROFOIL ATTACHMENT FOR POOL CLEANING TOOL

**Thomas J. Addona, Sr., 505 Chestnut Hill Ave., Waterbury, Conn. 06704**

**Continuation-in-part of Ser. No. 902,698, Dec. 5, 1986, abandoned. This application Sep. 14, 1987, Ser. No. 95,633**
**Int. Cl.[4] E04H** *3/20*
**U.S. Cl. 15—1.07** **14 Claims**



1. An attachment for increasing the efficiency of a swimming pool cleaning tool which has a long pole means attached to said tool for cleaning a pool surface at a distance from the operator, comprising:

a. an angled hydrofoil for forcing said tool against said surface by hydrodynamic forces when said tool is moved away from said operator in a first, or scrubbing motion and for forcing said tool away from said surface in a second, or retrieval, motion;

b. pole clamping means for clamping said attachment to said pole means;

c. tool engaging means extending along an edge of said hydrofoil for applying the force generated by said first motion along an extended portion of said tool to apply said force uniformly to the cleaning action and to distribute the stresses more uniformly on said hydrofoil; and

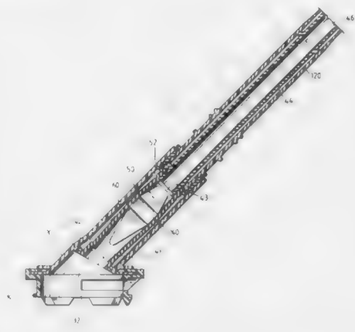
d. pole engaging means extending over an extensive area of said hydrofoil for applying the force generated by said first motion against said pole means to more uniformly apply said force and to distribute the stresses more uniformly on said hydrofoil.

**4,742,593**

## VALVE MEMBER FOR WATER INTERRUPTION POOL CLEANER

**Dieter H. F. Kallenbach, Chartwell, South Africa, assignor to Coxwold (Proprietary) Ltd., Johannesburg, South Africa**

**Filed Jul. 1, 1986, Ser. No. 880,699**
**Int. Cl.[4] E04H** *3/20*
**U.S. Cl. 15—1.7** **12 Claims**



1. A valve member for a water interruption pool cleaner including an operating head having an open mouth to be disposed proximate the surface to be cleaned and an outlet for connection to a flexible hose to permit suction to be applied to the head from the hose to suck water through the head, said valve member defining a water flow passage through the head between the mouth and the outlet and being adapted to transverely contract and expand over at least a portion of its length to create interruptions in water flow to the outlet so as to produce movement of the cleaner along a submerged pool surface, said valve member comprising:

a tubular body of flexible material having a first inlet end adapted to be secured within the head to be in communication with the mouth and a second outlet end adapted to be secured within the head to be in communication with the outlet to the flexible hose;

said body having an intermediate section between the ends assuming a substantially collapsed condition in a localized segment thereof in absence of a pressure differential between the interior and exterior.

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**4,742,594**

## BLACKBOARD ERASER

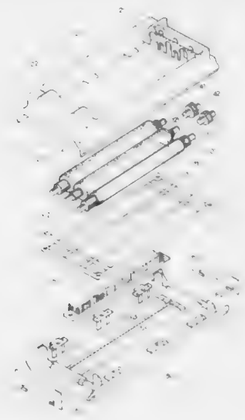
**Jin-Sheng Chen, 34 Ching-Yuen Street, Tsao-Tuen, Nantou Hsein, Taiwan**

**Filed Sep. 5, 1986, Ser. No. 904,352**
**Int. Cl.[4] A47L** *13/38;* **B43L** *21/00*
**U.S. Cl. 15—98** **2 Claims**

1. A blackboard eraser which comprises a housing, a base (30), at the bottom of said housing, at least three plates located on said base, at least three brushes placed on said plates, at least three roller (10), (11), (12), rotatably mounted in said housing and having sponge on their surfaces, each roller positioned to contact one of said brushes, the rollers having an axle, a gear system comprising a pair of first gears at the ends of the axle of each roller, a pair of idle gears connected to said first gears at



one end of said rollers, the gears connected to one of said rollers having a number of teeth smaller than the number of the



teeth of the gears connected to the other two rollers, whereby the rollers have different transmission speed.

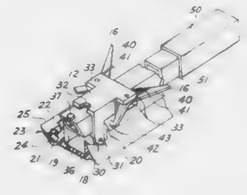
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**4,742,595**

## WINDOW CLEANING DEVICE

**John E. Isaacs, P.O. Box 1126, Pontre Vedra Beach, Fla. 32082**

**Filed Apr. 30, 1987, Ser. No. 44,318**
**Int. Cl.[4] B60S** *1/04*
**U.S. Cl. 15—105** **7 Claims**



1. A window cleaning device comprising in combination:

a cleaning member having spaced, vertically extending legs and an interconnecting base for forming an elongated U-shaped channel, the junction of one leg and the base forming a longitudinally extending scraper portion and the junction of the other leg and the base forming a longitudinally extending open-end slot for receiving a complimentary shaped and slidably insertable squeegee member;

a hollow retainer pivotally mounted on the cleaning member for movement between a first position substantially within the channel and a second position extending without and generally normal to the channel;

a handle lying within the channel and slidably mounted in telescoping relation with the retainer when the latter is in the first position and into an extended position for movement as a unit with the retainer;

means on one end of the handle for engaging the retainer when the latter is in the channel and in the first position and the handle is in the extended position, the handle and the retainer then being movable as a unit into the second position of the retainer; and

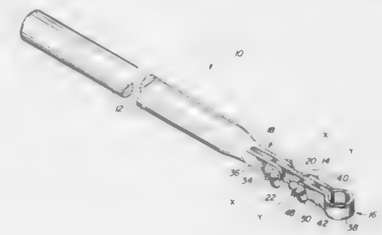
latching means pivotally mounted on the retainer for releasably engaging at least one of the legs of the cleaning member for maintaining the retainer and the handle in the second position to utilize the cleaning member.

**4,742,596**

## TOOL FOR CLEANING AND HIGHLIGHTING AUTOMOTIVE ENGINE TIMING MARKS

**William F. Altman, 6315 N. 25th Ave., Phoenix, Ariz. 85015**

**Filed Mar. 30, 1987, Ser. No. 31,453**
**Int. Cl.[4] A47K** *7/02;* **A46B** *9/10*
**U.S. Cl. 15—210 R** **16 Claims**



1. A tool for holding treating implements for cleaning and highlighting the timing marks of an automotive engine, said tool comprising:

(a) elongated handle means having a mounting pad means on one end;

(b) a linking member having first and second ends with the first end being connected to the mounting pad means of said handle for pivotable rotation about a first pivot axis passing through and normal with respect to the mounting pad means of said handle and the first end of said linking member;

(c) a holding fixture means connected to said second end of said linking member and mounted for pivotable rotation about a second pivot axis parallel to said first pivot axis and passing through said second end of said linking member, said holding fixture including a ring element for holding a treating implement;

(d) first tightening means for locking said linking member in a fixed angular orientation relative to said handle means; and

(e) second tightening means for locking said holding fixture in a fixed angular orientation relative to said linking member.

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**4,742,597**

## PAINT ROLLER APPARATUS

**Daniel P. LaFlamme, 13021 26th NE., Apt K-101, Bellevue, Wash. 98005**

**Filed Aug. 7, 1987, Ser. No. 82,539**
**Int. Cl.[4] B05C** *17/02*
**U.S. Cl. 15—244.2** **3 Claims**



1. Paint roller apparatus comprising:

a handle;

a cylindrical paint roller having a porous outer surface thereon disposed about a longitudinal axis;

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means for rotatably attaching said cylindrical paint roller to said handle about said longitudinal axis;

a first porous annular means disposed around and attached to the outer surface of said roller for extending into grooves in a surface being painted, the axis of said annular means corresponding to said longitudinal axis;

a second porous annular means spaced from the first annular means, said second annular means being disposed around and attached to the outer surface of said roller for extending into a second groove in the surface being painted, the axis of said second annular means corresponding to said longitudinal axis; and

wherein the first and second annular means include frictional means for attaching the first and said second annular means to said surface for adjusting the relative position of the first and second annular means on the outer surface of said roller.

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**4,742,598**

## VERTICAL FILING CABINET HAVING A DEVICE FOR BALANCING AND HOLDING LID IN A SAFETY POSITION

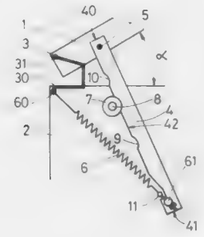
**Alain Bruneau, Montferrand Le Chateau, France, assignor to Alpia S.A., Besancon, France**

**Filed Oct. 9, 1986, Ser. No. 917,656**

**Claims priority, application France, Oct. 22, 1985, 85 16075**

**Int. Cl.⁴ E05F** *1/08;* **E05D** *11/10;* **B65D** *43/24*

**U.S. Cl. 16—286** **2 Claims**




1. A vertical filing cabinet having an open top, a lid, hinges connecting said lid with said cabinet for pivotal movement about a horizontal axis disposed above an upper edge of a rearwall of said cabinet between open and closed position, and a device for controlling the opening and closing of said lid, said device comprising,

a roller rotatably mounted on a side wall of said cabinet for rotation about a horizontal axis disposed forwardly and below the pivotal axis of the lid,

a straight stay having an upper end pivotally connected with said lid forwardly of the pivotal axis of said lid and having an edge engageable with said roller,

a tension spring having an upper end connected with an upper rear portion of said cabinet and a lower end connected with a lower end of said stay, said spring acting on said stay to bias said stay toward said roller and to compensate the weight of said lid,

said stay having in an edge engageable with said roller a first notch positioned to engage said roller when said lid is in fully open position and a second notch engageable with said roller when the lid is in fully closed position,

said tension device being adjustable to overcompensate the weight of said lid so that in a state of equilibrium said spring supports the lid in a partially open position with said roller engaging said stay between said first and second notches.

**4,742,599**

## HINGE BRACKET AND FASTENING PLATE ASSEMBLY FOR USE IN A FURNITURE HINGE

**Luciano Salice, Carimate, Italy, assignor to Arturo Salice S.p.A., Novedrate (Como), Italy**

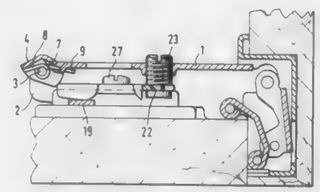
**Filed Jun. 12, 1986, Ser. No. 873,765**

**Claims priority, application Fed. Rep. of Germany, Jun. 12, 1985, 3521051**

**The portion of the term of this patent subsequent to Jun. 23, 2004, has been disclaimed.**

**Int. Cl.⁴ E05D** *5/00*

**U.S. Cl. 16—382** **5 Claims**




1. A hinge bracket and fastening plate assembly for a furniture hinge, said assembly comprising:

(a) a fastening plate adapted to be secured to a furniture part, said fastening plate including a base plate having a pair of laterally spaced slide surfaces, and a cover plate engageable with said base plate and in overlying relationship therewith, said cover plate including a pair of flanges extending in a longitudinal direction and having edges positioned opposite and spaced from said slide surfaces to define track grooves therebetween, a pair of lateral recesses in said cover plate adjacent said flanges, said cover plate including an abutment edge and a slot at an opposite longitudinal end of said cover plate from said abutment edge, and connecting means for securely connecting said cover plate to said base plate;

(b) a hinge bracket including a substantially channel-shaped member having a pair of laterally spaced flanges, said flanges each including an inwardly extending lug, said lugs positioned in opposed relationship and having a length in the longitudinal direction of said hinge bracket to permit said lugs to pass through said lateral recesses in said cover plate and having a height to permit said lugs to slide along said track grooves, and guide means carried by said hinge bracket, for guiding said hinge bracket in a longitudinal direction to permit sliding movement of said hinge bracket relative to said fastening means, and a pivot pin extending between said flanges at one end of said hinge bracket; and

(c) a detent lever pivotally carried on said pivot pin of said hinge bracket, said detent lever including a curved cam face, said cam face engageable with said abutment edge when said hinge bracket is assembled to said fastening plate to firmly hold said hinge bracket in position on said fastening plate, and biasing means for resiliently biasing said cam face of said lever into tight engagement with said abutment edge.

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**4,742,600**

## BAND CLAMP

**Lionel Calmettes, and Michel Andre, both of Romorantin, France, assignors to Etablissements Caillau, Issy-les-Moulineaux, France**

**Filed Feb. 10, 1987, Ser. No. 13,237**

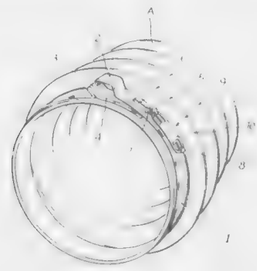
**Claims priority, application France, Feb. 25, 1986, 86 02591; May 9, 1986, 86 06716**

**Int. Cl.⁴ B65D** *63/02*

**U.S. Cl. 24—20 R** **4 Claims**

1. A clamp constituted by a band of metal wound over itself and comprising at one of its ends, called an outer end, and in spaced-apart relationship from the other end, called an inner end, complementary fastening means, the metal band extending beyond the fastening means situated at the inner end by a part which, in an unfastened position of the clamp, extends between the two fastening means, wherein the inner end of the






band ends into a bent-up part generally shaped as an outwardly directed T, whereas the outer end is provided at the back of its fastening means with a longitudinal slot of which the width is at least equal to that of the vertical bar of the T and the length of said longitudinal slot is sufficient to permit said complementary fastening means to be mutually fastened when said bent-up part is engaged in said slot.

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**4,742,601**

## TYING DEVICE

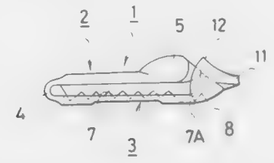
**Akira Furutsu, Tokyo, Japan, assignor to Japan Bano'K Co., Ltd., Tokyo, Japan**

**Continuation-in-part of Ser. No. 755,766, Jul. 17, 1985, abandoned. This application Sep. 10, 1986, Ser. No. 905,419**

**Claims priority, application Japan, Aug. 13, 1984, 59-122856[U]; Dec. 19, 1984, 59-191427[U]; Dec. 19, 1984, 59-191428[U]**

**Int. Cl.⁴ B65D** *77/10*

**U.S. Cl. 24—30.5 R** **18 Claims**




1. A tying device comprising a first part and a second part, each having an essentially rectangular plan view integrally molded from a synthetic resin and joined at a foldable hinge part, said first part being relatively inflexible, having at least one ridge projecting from a planar surface thereof, and terminating, at its unattached end, in a rigid pawl portion projecting from the planar surface opposite said surface from which said ridge projects, said pawl portion having a width less than the width of said first part and being provided, at the unattached end thereof, with a guide pawl in continuation of said pawl portion, said second part being relatively flexible and terminating, at its unattached end, in an engaging portion projecting from the planar surface which is a continuation of said surface from which said ridge projects and which comprises a cavity formed with a guide groove for receiving said guide pawl of said pawl portion of said first part; said hinge part consisting of a thinned portion of molded resin extending across the surface of the device perpendicular to the length of the device at a location which allows the ridge bearing surface of the first part and the continuation surface of the second part to be brought into opposition to each other so that the pawl portion of said first part can be engaged in the engaging portion of said second part.

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**4,742,602**

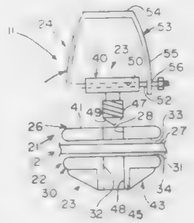
## TARPAULIN SECURING ASSEMBLY

**James W. Horner, P.O. Box 821, Shelby, Mont. 59474**

**Filed Sep. 29, 1987, Ser. No. 102,483**

**Int. Cl.⁴ E04H** *15/64;* **F16G** *11/00*

**U.S. Cl. 24—115 K** **11 Claims**




1. A tarpaulin securing assembly including a first surface contacting portion, a second surface contacting portion, a securing portion and a connecting portion; said first surface contacting portion including a first enlarged planar section disposed in substantially continuous contact with one major surface of a tarpaulin, said planar section including a central opening therethrough; said second surface contacting portion including a second enlarged planar section disposed in substantially continuous contact with an opposite major surface of said tarpaulin, said second planar section including a central opening therethrough, said central openings of said first and second planar sections being axially aligned; said securing portion including a first rotatable fastening member operatively connected with said first planar section, said first fastening member extending outwardly from an exposed major surface of said first planar section and being axially aligned with said central opening thereof, a second rotatable fastening member operatively connected with said second planar section, said second fastening member extending outwardly from an exposed major surface of said second planar section and being axially aligned with said central opening thereof, a threaded finger member extending from said first fastening member through said central openings of said first and second planar sections, said second fastening member including a threaded central passage therethrough axially aligned with said first and second openings, said threaded central passage being engageable with said threaded finger member of said first end member, at least one of said fastening members including a transverse passage therethrough substantially perpendicular to said axis of said central openings of said planar sections; said connecting portion including a bail member pivotally engageable with said transverse passage through said fastening member, said bail member including an elongated first end section extending completely through said transverse passage, a generally U-shaped intermediate section with a central part thereof remote from said first fastening member disposed substantially parallel to said first end section, and a second end section including a free end secured to a free end of said first end section that extends from said transverse passage; whereby a tarpaulin can be secured through bail members of securing assemblies spaced around the periphery of said tarpaulin.

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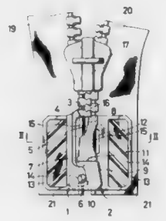


**4,742,603**

## SEPARABLE BOTTOM-END-STOP ASSEMBLY FOR SEPARABLE SLIDE FASTENER

**Kazumi Kasai, Namerikawa, Japan, assignor to Yoshida Kogyo K.K., Tokyo, Japan**

**Filed Jun. 24, 1986, Ser. No. 878,012**
**Claims priority, application Japan, Jun. 26, 1985, 60-97283[U]**
**Int. Cl.[4] A44B** *19/36*
**U.S. Cl. 24—433** **4 Claims**



1. A separable bottom-end-stop assembly for a separable slide fastener including a pair of fastener stringers, each including a stringer tape carrying on a first longitudinal margin a row of coupling elements, the first tape-margin having a bottom end portion devoid of coupling elements, said assembly comprising:

(a) a male member of thermoplastic synthetic resin adapted to be molded on the bottom end portion of the first tape-margin of one stringer, and having a longitudinal projection and a pivot pin;

(b) a female member of thermoplastic synthetic resin adapted to be molded on the bottom end portion of the first tape-margin of the other stringer, and having a longitudinal groove receptive of said projection and a support hole receptive of said pivot pin; and

(c) said male member having at least one first aperture in said projection so as to expose a portion of the first tape-margin of the one stringer to view, said male member having a pair of reinforcing ridges, disposed one on each surface of the stringer tape remotely from a longitudinal edge of said projection.

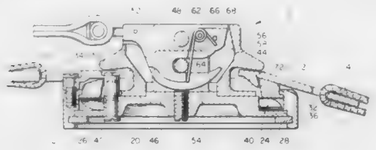
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**4,742,604**

## CENTRAL BELT LOCKING ASSEMBLY

**Bernard Mazelsky, West Covina, Calif., assignor to ARA, Inc., City of Industry, Calif.**

**Filed Jul. 24, 1986, Ser. No. 889,412**
**Int. Cl.[4] A44B** *11/25*
**U.S. Cl. 24—574** **5 Claims**



1. A central belt locking assembly capable of receiving a plurality of belt lugs and lockably retaining same, said belt lock assembly comprising:

a base plate;

an outer ring extending around the periphery of said base plate;

an inner ring concentrically spring mounted on said base plate within said outer ring;

a spring means disposed between said base plate and said inner ring;

a hub movably mounted on said base plate within said inner ring, having an annular channel therein adapted to receive a locking section of a belt lug;

release means operatively coupled to said hub to bias said hub into a first closed position in which said locking section of said belt lug can be slideably engaged and retained, said belt lug in said first closed position prevented from release by a portion of said hub defining said annular channel and by said inner ring spring biased into position to engage said belt lug and prevent disengagement, and a second open position in which said locking section of said belt lug is released by said release means shifting a portion of said hub defining said annular channel thereby moving said belt lug over said inner ring allowing disengagement of said belt lug.

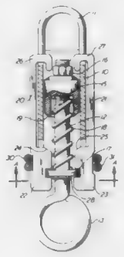
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**4,742,605**

## SAFETY RELEASE DEVICE

**Gerald E. Ritacco, R.F.D. 13, Box 172, Loudon, N.H. 03301**

**Filed Oct. 8, 1986, Ser. No. 916,608**
**Int. Cl.[4] A44B** *11/25, 17/00*
**U.S. Cl. 24—602** **3 Claims**



3. A safety release device comprising a cylindrical housing, a central shaft therein having on one end a spring retainer/trigger and on the other end a capture washer held by a shoulder on said central shaft, a spring between said retainer/trigger and said capture washer, two opposed spring-loaded capture dogs engaging said capture washer and preventing said capture washer and said shaft from being pulled from the housing until released and fastening means one attached to the end of the shaft and another attached to the housing to permit lines to be attached thereto, in operation when a sufficient pull is exerted on said central shaft, said spring compresses allowing said spring retainer/trigger to move toward said capture washer against the action of said spring and in so doing to force said capture dogs apart releasing said capture washer and shaft.

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**4,742,606**

## UNIVERSAL CARTRIDGE TRIMMING DEVICE

**Owen Burby, 109 Hollyberry La., Plainville, Conn. 06062, and Richard Clark, 39 Strong Rd., South Windsor, Conn. 06074**

**Filed Aug. 22, 1986, Ser. No. 899,436**
**Int. Cl.[4] B23P** *15/22*
**U.S. Cl. 29—1.32** **2 Claims**



1. A cartridge case trimming device adaptable to a multiplicy of cartridge sizes comprising a base, case carriage, case



cutting means and a motor; wherein said carriage includes cradle trough, carriage groove, case retainer, hold down means and means for moving case carriage horizontally on supporting rods; wherein said cutting means comprises arbor head slideably and vertically penetrated by plate columns and horizontally penetrated by a rotatable arbor shaft equipped at one end by a chuck capable of attaching thereto a cutter and at the outer end with a tubular flexible coupling, and means for finely adjusting the height of the arbor head; wherein the shaft of said motor is essentially in line with the arbor shaft and connected thereto with the flexible coupling; and wherein said supporting rods, plate columns and motor are essentially permanently attached to said base.

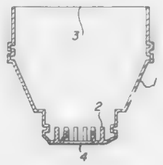
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**4,742,607**

## TRANSMISSION DISASSEMBLY TOOL AND METHOD

**John A. Piscitelli, 126 Key Dr. South, Hallandale, Fla. 33009**

**Continuation of Ser. No. 848,768, Apr. 7, 1986, abandoned. This application Apr. 13, 1987, Ser. No. 37,077**
**Int. Cl.[4] B23P** *19/04*
**U.S. Cl. 29—226** **9 Claims**



1. Transmission disassembly tool, for compressing springs biasing a retainer against a snap ring disposed on a hub within a rear piston casing of a transmission, comprising a surface for supporting the rear piston casing, a rod having a lower free end smaller than the inside diameter of the hub to be passed through the hub from above with the rear piston casing supported on said surface, so that said rod extends above and below the hub, a cap disposed on the retainer, means for locking said cap on said rod above the hub, a pedal separate from said rod, means for detachably connecting said pedal to said lower free end of said rod below the hub after said rod is passed through the hub from above, and means for pivotally attaching said pedal to any substantially vertical surface, whereby depression of said pedal pulls the retainer away from the snap ring.

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**4,742,608**

## METHOD OF RETAINING MOLDED CASE CIRCUIT BREAKERS

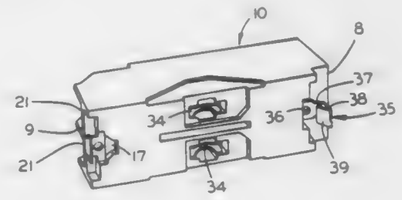
**Andre J. M'Sadoques, and Robert J. Sabatella, both of Southington, Conn., assignors to General Electric Company, New York, N.Y.**

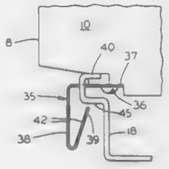
**Division of Ser. No. 767,315, Aug. 19, 1985, Pat. No. 4,670,963, which is a division of Ser. No. 369,372, Apr. 19, 1982, Pat. No. 4,557,047. This application Mar. 20, 1987, Ser. No. 28,367**
**Int. Cl.[4] B23P** *11/02*
**U.S. Cl. 29—453** **2 Claims**

1. A method for retaining a back-fed main circuit breaker within an electric panel box enclosure having a mounting pan therein, said pan having opposite sides with external hook portions thereon, comprising the steps of:

A. providing a spring clip retainer on a portion of a molded case circuit breaker at an end of said case opposite a mounting foot on said case; and

B. inserting said circuit breaker within an electric panel enclosure to engage said mounting foot on said case with an external hook portion on one side of the pan, and then engaging a portion of said spring clip retainer with the





external hook portion on the other side of the mounting pan within said enclosure.

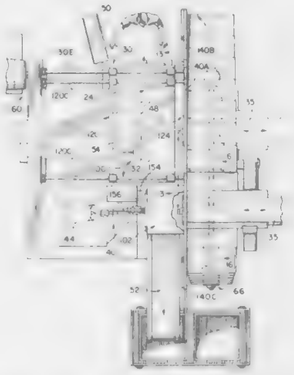
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**4,742,609**

## AUTOMATIC METAL MACHINING CENTER SYSTEM

**Paul J. Neumann, Cincinnati, Ohio, assignor to Manuflex Corporation, Cincinnati, Ohio**

**Filed Oct. 27, 1986, Ser. No. 923,248**
**Int. Cl.[4] B23Q** *3/155, 11/08;* **B23B** *25/04*
**U.S. Cl. 29—568** **28 Claims**



1. A machining center comprising:

a headstock including a rotatably mounted spindle having a longitudinal axis and means connected to rotate said spindle about its said axis,

a workpiece supporting member driven by said spindle,

a bed extending generally at a right angle to said spindle axis and in spaced relation thereto,

a cross slide mounted on said bed,

a ram mounted on said slide parallel to said spindle and having one end thereof facing said headstock,

at least one tool holder on said one end of said ram,

slide drive means for traversing said slide along said bed and ram drive means for moving said ram transversely of said bed to move a tool mounted in said tool holder toward

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and away from a workpiece held in said workpiece supporting member, and

barrier means defining a machine room isolating said headstock, said bed, said cross slide, all of said drive means and all but said one end of said ram from said workpiece supporting member and said tool holder, said room encompassing the range of movement of said one end of said ram.

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**4,742,610**

## METHOD FOR ADJUSTMENT-FREE MANUFACTURE OF AN ELECTROMAGNETIC RELAY

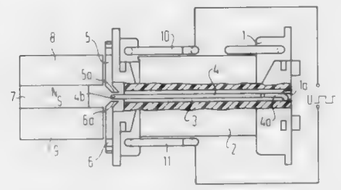
**Rolf-Dieter Kimpel, Berlin, and Josef Schweiger, Munich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Dec. 5, 1986, Ser. No. 938,528**

**Claims priority, application Fed. Rep. of Germany, Dec. 5, 1985, 3543099**

**Int. Cl.[4] H01F** *7/06*

**U.S. Cl. 29—602 R** **16 Claims**



1. A method for adjustment-free manufacturing of an electromagnetic relay having a contact tongue extending lengthwise through a cavity in a body, a fastening end of the contact tongue having lateral fastening tabs lying loosely and with play in grooves in the body, a free end of the contact tongue extending between the pole plates, comprising the steps of:

applying an adhesive to the fastening end of the contact tongue loosely lying in the grooves; and

periodically switching the contact tongue during solidification of the adhesive by an alternating magnetic field generated between the contact tongue and the two pole plates so that the fastening end of the contact tongue moves in the adhesive until the adhesive has hardened.

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**4,742,611**

## BATTERY ASSEMBLY PROCESS AND APPARATUS

**Clarence A. Meadows, Muncie; Phillip E. Grady, Daleville, both of Ind., and Lawrence B. Plant, Milford, Mich., assignors to General Motors Corporation, Detroit, Mich.**

**Filed Jun. 29, 1987, Ser. No. 67,256**

**Int. Cl.[4] H01M** *2/24*

**U.S. Cl. 29—623.1** **24 Claims**

1. A method of joining a set of aligned, upstanding, like-polarity, lead-acid storage battery plate lugs together in a cell element comprising the steps of:

forming a trough about said aligned lugs for receiving and shaping molten lead therein;

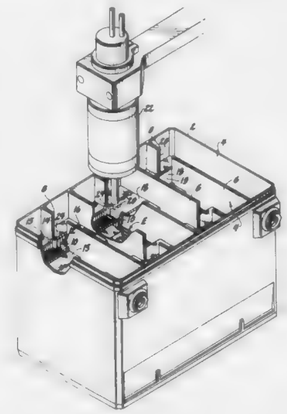
traversing substantially the length of said trough with a molten lead dispensing means having a substantially non-consumable electrode for generating an electric arc, means for substantially shielding said lugs from the said arc, and means for directing a stream of superheated molten lead formed in said arc into said trough;

maintaining an electric arc with said electrode which is of sufficient intensity to melt and superheat lead fed into said arc;

shielding said lugs from said arc;

supplying an ionizable, non-oxidizing gas to said electrode to support said arc in a substantially non-oxidizing atmosphere;

progressively feeding a substantially continuous length of solid lead into said arc for melting and superheating therein to provide a substantially uninterrupted supply of molten lead for effecting said joining;



dispensing a stream of said molten lead onto said lugs during said traversing so as to substantially engulf and cause said lugs to meld with said molten lead in said trough, and

covering said trough with a blanket of substantially non-oxidizing gas during amalgamation.

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**4,742,612**

## METHOD OF MANUFACTURING WIRE HARNESS BY USING NIPPED CONNECTOR AND APPARATUS THEREFOR

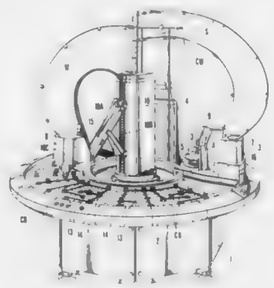
**Kenjiro Dokan; Seiji Inano; Takashi Onoda; Yuji Fujiwara; Yoshiyuki Hiramatsu; Yoshihiro Umeda, and Shinichi Kamo, all of Hamamatsu, Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan**

**Continuation of Ser. No. 748,766, Jun. 25, 1985, abandoned. This application Jan. 30, 1987, Ser. No. 14,145**

**Claims priority, application Japan, Jun. 27, 1984, 59-97587[U]; Jul. 6, 1984, 59-141224; Jul. 13, 1984, 59-106161[U]; Jul. 17, 1984, 59-148744; Jul. 18, 1984, 59-150361; Jul. 20, 1984, 59-150936; Aug. 15, 1984, 59-170758; Aug. 15, 1984, 59-124893[U]; Aug. 15, 1984, 59-124894[U]; Feb. 28, 1985, 60-40209; Feb. 28, 1985, 60-29120[U]; Feb. 28, 1985, 60-40211**

**Int. Cl.[4] B23P** *19/00*

**U.S. Cl. 29—739** **25 Claims**



1. An apparatus for manufacturing a wire harness by using a nipped connector, characterized in that said apparatus comprises:

a work table having an arcuate shape which is horizontally placed on a base and which moves in up and down directions, said work table having a plurality of connector holding tools and wiring/nipping tools disposed in a predetermined pattern;

a robot having a hand which moves in back-and-forth, vertical and horizontal directions, said robot being disposed substantially in the center of said work table and movable within a certain operational range;

a connector setting head means for setting a plurality of nipped connectors in said connector holding tools on said work table;

a wiring/nipping head means for performing wiring between said nipped connectors;

a connector supply source means for supplying said nipped connectors to said connector setting head;

a wire supply source means for supplying wires to said wiring/nipping head;

a binding head means for binding said wire harness arranged on said work table by a binding material pulled form a binding material supply source, said connector setting head means, wiring/nipping head means and binding head means being disposed in said operational range of the robot hand;

a control device means for sequentially controlling the operation of said tools on said work table, up and down operations of said work table, the operation of said connector setting head means, said wiring/nipping head means, said binding head means, and said connector supply source means, to manufacture said wire harness with a desired pattern;

said wiring/nipping means, said connector setting head means, and said binding head means being selectively picked up by said hand so that they are movably actuated under control of said control device within the operational range of said hand.



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**4,742,613**

## CABLE CORE SELF-ALIGNING APPARATUS

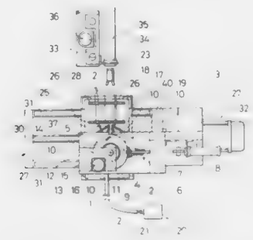
**Shizuka Yamaguchi; Yoshihiko Ueno; Seiji Ohmizu, and Isamu Kinoshita, all of Ichihara, Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan**

**Filed Apr. 10, 1987, Ser. No. 36,746**

**Claims priority, application Japan, Apr. 11, 1986, 61-82288; Apr. 15, 1986, 61-84951; May 20, 1986, 61-115881; Jun. 25, 1986, 61-149911; Jul. 28, 1986, 61-115436[U]; Jul. 30, 1986, 61-177682; Jul. 30, 1986, 61-115953[U]**

**Int. Cl.[4] H01R** *43/04*

**U.S. Cl. 29—759** **15 Claims**



1. A cable core self-aligning apparatus comprising:

core feeding means for holding a plurality of cores, drawn out of an end of a cable, in a line and sequentially feeding said cores;

rotational conveyor means having a conveying rotor for holding and rotationally conveying each of said cores, sequentially fed by said core feeding mechanism, to a core extracting position;

core identifying means for identifying the number of each core conveyed by said rotational conveyor means while that core is being conveyed to said core extracting position;

a core holder having a plurality of core-positioning sections;

core-holder positioning means for setting that of said core-positioning sections which is associated with the number of said core identified by said core identifying means, at said core extracting position when said core holder receives said identified core; and

core handling means for holding and inserting said core reaching said core extracting position by the help of said conveying rotor, into said core-positioning section set by said core-holder positioning means.

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**4,742,614**

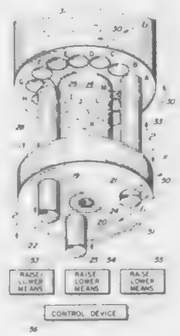
## TURRET INCREMENTER

**James F. Mack, and Ernesto Velarde, both of 3695 E. Industrial Dr., Flagstaff, Ariz. 86002**

**Filed Aug. 4, 1986, Ser. No. 892,442**

**Int. Cl.[4] B23P** *21/00*; **B23B** *7/04*

**U.S. Cl. 29—785** **5 Claims**




1. Apparatus for incrementally advancing an object carried thereon, said apparatus including

(a) a base member;

(b) a turret mounted on said base member for rotation about an axis and including at least three spaced apart sloped surfaces formed on said turret, said object being mounted on said turret;

(c) three plungers each having an elongate axis centerline and a tip and movable along said centerline between at least three operative positions,

(i) a first normal operative position with said tip spaced away from said turret and sloped surfaces,

(ii) a second operative position with the tip of said plunger first contacting said turret at a point on one of said sloped surfaces, said plunger being displaced along said centerline in a first direction of travel from said first to said second operative position, said first direction of travel being parallel to centerline,

(iii) a third operative position with the tip of said plunger continuing to contact said one of said sloped surfaces, said plunger moving said first direction of travel from said second operative position to said third operative position such that said tip slidably moves over said sloped surface to generate a lateral force to rotate said turret about said turret axis in a third direction of travel, said plunger moving from said third to said first operative position in a second direction of travel opposed to said first direction of travel, said surfaces being sloped with respect to said turret axis and said centerlines of said plungers;

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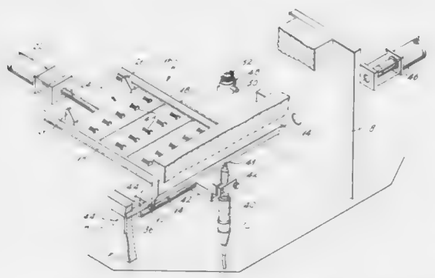


(d) means for movably mounting said plungers to move between said three operative positions and separately contact in a selected sequence said surfaces and produce lateral forces to rotate said turret in said third direction of travel;

said sloped surfaces being spaced apart on said turret such that after one of said plungers is displaced in said first direction of travel from said first to said third operative position to slidably contact a selected one of said surfaces and rotate said turret in said third direction of travel, the remaining two of said plungers are spaced away from said surfaces, and said centerline of the next of said remaining plungers to sequentially contact said turret extends through one of said surfaces other than said selected one of said sloped surfaces.

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**4,742,615**
**ROUTING METHOD AND APPARATUS FOR CUTTING PRINTED CIRCUIT BOARDS**
**Gilbert T. Lopez, Longmont, Colo., assignor to Cencorp, Inc., Boulder, Colo.**
**Filed Jun. 23, 1986, Ser. No. 877,344**
**Int. Cl.[4] H05K** *3/22*
**U.S. Cl. 29—846** **7 Claims**



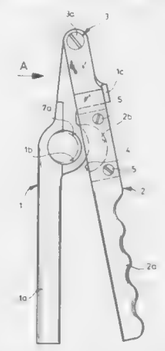
1. In a method of cutting a circuit board with a router, said circuit board having components mounted on at least a first side thereof, the improvement comprising the step of:

routing said board from a second side opposite of said board from said first side, in order to route circuit board portions which are overhung by portions of said components on said first side and thus generally inaccessible to a router from said first side.

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**4,742,616**
**CUTTING DEVICE**
**Troy D. Lippert, Claremore, Okla., assignor to Hilti Aktiengesellschaft, Fürstentum, Liechtenstein**
**Filed Dec. 16, 1986, Ser. No. 942,543**
**Int. Cl.[4] B23P** *19/04;* **B21B** *31/08*
**U.S. Cl. 30—124** **1 Claim**

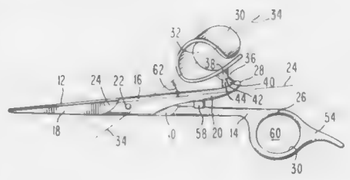
1. A device for cutting a discharge nozzle on a capsule containing a plastic mastic comprising a first and a second elongated lever each having a first end and a second end spaced apart in the elongated direction, said first and second levers each having a first side surface and an opposite second side surface with said first surfaces disposed in facing relation and extending between the first and second ends, said first and second levers being pivotally connected together adjacent the first ends thereof so that said first and second levers can be pivoted between an open position with the second ends of said levers in angularly spaced relation and a cutting position with said first surfaces of first and second levers being in overlapping and contact relation from the pivotal connection toward the second ends, each of said first and second levers having a grip portion adjacent the second ends thereof, said second lever having a cutter removably secured on the first surface thereof and located between said grip thereon and the pivotal connection with said first lever, said first lever having a support bore extending therethrough from the first surface to the second surface for receiving the discharge nozzle to be cut with the support bore being aligned opposite said cutter in the cutting position so that as said first and second cutters are pivoted from the open position to the cutting position with a discharge nozzle extending through said bore beyond said first surface of said first lever and toward said second lever, said cutter at least partly shears off the part of said discharge nozzle extending from said support bore toward said second lever,



said support bore having a circular surface corresponding substantially with the outside diameter of the discharge nozzle to be cut, means for replaceably securing said cutter on said second lever, and said second lever having a receiving chamber formed therein aligned with said cutter for receiving the part of the discharge nozzle severed by the cutter, said receiving chamber extending inwardly from said cutter at said first surface and having a closed base between the first and second surfaces.

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**4,742,617**
**SCISSORS HAVING AN OBLIQUELY ORIENTED THUMB LOOP WITH LIMITED DAMPENED FLEXIBILITY**
**Glenn A. Gauvry, 6100 Henry Ave., Apt. 7-N, Philadelphia, Pa. 19128**
**Filed May 28, 1987, Ser. No. 54,970**
**Int. Cl.[4] B26B** *13/00*
**U.S. Cl. 30—232** **19 Claims**



1. A scissors having an obliquely oriented thumb loop with limited dampened flexibility comprising:

(a) a first member including a first blade means at one end thereof and a first handle means at the other end thereof;

(b) a second member including a second blade means at one end thereof and a second handle means at the other end thereof, said second member being pivotally secured, at a point between said second blade means and said second handle means, to said first member, at a point between said first blade means and said first handle means, with said first and second blade means adjacent to one another to facilitate cutting therebetween, said second handle means



defining a handle axis extending longitudinally therebetween;

(c) a first gripping means secured to said first handle means to facilitate gripping of said first handle means by the fingers of a user;

(d) a second gripping means secured to said second handle means to facilitate securement with limited dampened movement of the thumb of a user with respect to said second handle means, said second gripping means comprising:

(1) a thumb loop positioned adjacent said second handle means and adapted to receive the thumb of a user therein, said thumb loop defining hole means therethrough which defines a central axis extending axially therethrough, said central axis of said thumb loop being oriented at approximately 30 to 60 degrees downwardly in a vertically extending plane and 30 to 60 degrees laterally in a horizontally extending plane with respect to said handle axis of said second handle means; and

(2) a flexible connecting member secured with respect to said thumb loop and with respect to said second handle means to control relative movement therebetween, said flexible connecting member comprising:

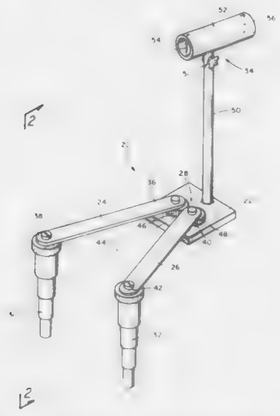
(a) a first end fixedly secured with respect to said thumb loop;

(b) a second end fixedly secured with respect to said second handle means;

(c) a flexible intermediate section located between said first end and said second end to allow flexing of said central axis of said thumb loop approximately 60 degrees in either direction within a vertically extending plane, said flexible intermediate section also allowing flexing of said central axis of said thumb loop approximately 60 degrees in either direction within a horizontally extending plane.

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**4,742,618**
**BISECTOR SIGHTING DEVICE**
**Dennis L. Watkins, Rte. 1, Box 14-E, Fairmont, Okla. 73736, and Steven C. Weast, 1418 N. Central, Enid, Okla. 73701**
**Filed Feb. 4, 1987, Ser. No. 10,796**
**Int. Cl.[4] G01B** *11/20*
**U.S. Cl. 33—299** **6 Claims**



1. A device for visually identifying the bisector of an angle, curve, line or space between two points and for visually identifying any point or points along the bisector, comprising:

a base;

a first arm having a proximal end pivotally connected to the base and a distal end;

a second arm having a proximal end pivotally connected to the base and a distal end, the longitudinal axis of the second arm being generally coplanar with and pivoting coplanarly with the longitudinal axis of the first arm;

indexing means, connected between the first arm and the second arm, for indexing the relative pivotal motion of the first and second arms, the indexing means communicating the pivotal motion of either of the first arm or the second arm into a pivotal motion of the other of the first arm or the second arm, the indexing means pivoting both arms equidistantly and equiangularly relative to a median line between and generally coplanar with the arms in such a manner that the same median line always bisects the angle defined by the longitudinal axes of the two arms, the indexing means including:

a first gear, located near the proximal end of the first arm, the first gear being non-rotatably, fixedly connected to the first arm; and

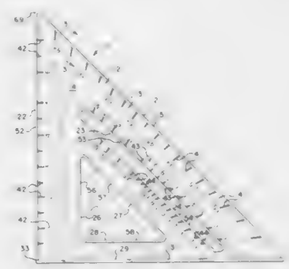
a second gear, located near the proximal end of the second arm, the second gear being non-rotatably, fixedly connected to the second arm, the cogs of the second gear intermeshing with the cogs of the first gear;

at least two connection means, at least one connection means located on each arm, for connecting the arms to the points to be bisected in such a manner that the distance from the connection means on each arm to the apex of the angle created by the longitudinal axes of the arms is equal; and

a sight, connected to the base, the sight superposing the common plane of the first and second arms, the sight being aligned to precisely view and sight along the median bisector line.

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**4,742,619**
**MARKING TOOL WITH WEAR RIMS**
**Ronald C. Swanson, 9240 S. Austin, Oak Lawn, Ill. 60453**
**Filed Sep. 25, 1986, Ser. No. 912,045**
**Int. Cl.[4] B43L** *13/00*
**U.S. Cl. 33—474** **20 Claims**



1. A tool useful for marking and constructed of a flexible material, including:

a flat member having a structural layer of a predetermined shape with first and second parallel surfaces;

said structural layer having external marking edges perpendicular to said first and second parallel surfaces for measuring, aligning and marking;

a first wear rim along said external marking edges extending a uniform distance away from said first parallel surface of said structural layer;

a second wear rim along said external marking edges extending a uniform distance away from said secnd parallel surface of said structural layer;

a plurality of first marking indicia on and extending away from said first parallel surface along said first wear rim;

a plurality of second marking indicia on and extending away from said second parallel surface along said second wear rim;

wherein said first wear rim extends away from said first

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parallel surface a greater distance than said first marking indicia extend away from said first parallel surface; and,

wherein said second wear rim extends away from said second parallel surface a greater distance than said second marking indicia extend away from said second parallel surface.

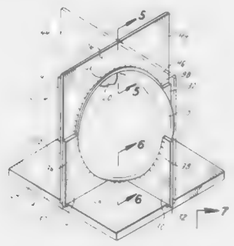
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**4,742,620**

## BOWLING BALL WEIGHT LOCATING METHOD AND APPARATUS

**Robin C. Manker, 160 E. Pennsylvania, S. Jacksonville, Ill. 62650**

**Filed Mar. 11, 1987, Ser. No. 24,777**
**Int. Cl.[4] G01B** *3/14*
**U.S. Cl. 33—510** **17 Claims**



1. A method for locating a manufacturer's reference point on a previously undrilled bowling ball comprising the steps of:

(a) placing a bowling ball with an internal weight, an outer surface and a diameter in a ball cradle,

(b) marking a first arc on the surface of the bowling ball in cooperation with the ball cradle, the first arc defining a first side of the bowling ball and a second side of the bowling ball,

(c) marking a second arc on the surface of the bowling ball in cooperation with the cradle, the second arc perpendicular to the first arc, the second arc defining a finger side of the bowling ball and a thumb side of the bowling ball, the intersection of the first arc and second arc defining a first intersection point as a first reference point,

(d) marking a great circle on the surface of the bowling ball in cooperation with the cradle, the great circle perpendicular to both the first and the second arc, the great circle defining a top half of the bowling ball and a bottom half of the bowling ball,

(e) weighing the bowling ball in a dodo scale, and determining:

1. a relative side weight, the relative side weight corresponding to a difference between a first side weight of the bowling ball and a second side weight of the bowling ball as measured by the dodo scale,
2. a relative finger weight, the relative finger weight corresponding to a difference between a finger side weight of the bowling ball and a thumb side weight of the bowling ball as measured by the dodo scale,
3. a relative top weight, the relative top weight corresponding to a difference between a top half weight of the bowling ball and a bottom half weight of the bowling ball as measured by the dodo scale,

(f) determining a first coordinate and a second coordinate relative to a point defined by the first intersection point and a relationship between the relative side weight, the relative finger weight, the relative top weight, the ball weight and ball diameter,

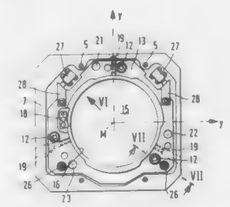
(g) marking a second intersection point on the bowling ball surface, the second intersection point determined by the first coordinate and the second coordinate and the second intersection point determines a manufacturer's reference point.

**4,742,621**

## SAFETY DEVICE ON A QUILL

**Manfred Mayer, Schramberg, and Gerhard Band, Oberndorf, both of Fed. Rep. of Germany, assignors to Mauser-Werke Oberndorf GmbH, Fed. Rep. of Germany**

**Filed Dec. 12, 1986, Ser. No. 940,776**
**Claims priority, application Fed. Rep. of Germany, Dec. 20, 1985, 3545330**
**Int. Cl.[4] G01B** *7/28*
**U.S. Cl. 33—561** **11 Claims**



1. A safety device on a quill for stopping the positioning movement of the quill when a sensing head carried by the quill has a collision with an object, comprising, a quill, a sensing head which can be attached to said quill, a safety device carried between said quill and said sensing head for stopping the movement of said quill when the sensing head has a collision, including a mounting plate fastened to said quill, at least three balls distributed over the circumference of said mounting plate, a bearing plate resting on the balls of said mounting plate, said sensing head being fixable to said bearing plate, at least one quill movement actuation switch positioned adjacent said mounting plate, the switching cam for said at least one quill movement actuation switch offset relative to said balls on the circumference of said bearing plate and actuatable when said bearing plate is deflected relative to said mounting plate.

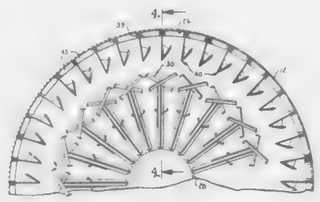
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**4,742,622**

## FLIGHTING FOR HORIZONTAL DRYERS

**Stanley P. Thompson, 700 W. Laurent, Topeka, Kans. 66608**

**Continuation of Ser. No. 745,683, Jun. 17, 1985, Pat. No. 4,628,614, which is a division of Ser. No. 535,572, Sep. 26, 1983, Pat. No. 4,549,699. This application Aug. 26, 1986, Ser. No. 864,138**
**The portion of the term of this patent subsequent to Dec. 9, 2003, has been disclaimed.**
**Int. Cl.[4] B02C** *17/10*
**U.S. Cl. 34—12** **4 Claims**



1. A drying drum coupled with a heat source and means for rotating the drum about its longitudinal axis, said drum being adapted for drying a material which is subject to being comminuted, said drum comprising:

an elongated hollow body disposed with its longitudinal axis disposed in a generally horizontal plane and characterized by an inner surface of generally circular vertical cross section and having a material inlet and material outlet;

a plurality of material distributing vanes coupled with the body and spaced circumferentially around and longitudinally along said surface;

a plurality of circumferentially spaced interference structures coupled with said drum at a location spaced radially inward from said material distributing vanes and spaced longitudinally along the length of the drum;

said interference structure including means for presenting a plurality of sharp intersecting cutting edges which comminute the material gravitating onto said interference structure and against said edges.



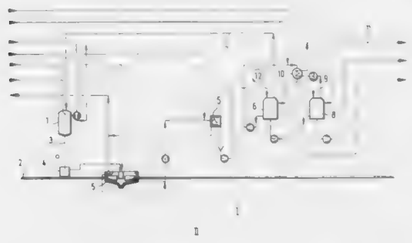
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**4,742,623**

## PROCESS AND EQUIPMENT FOR THE INDIRECT DRYING OF SLUDGE, ESPECIALLY FOR THE DRYING OF WASTEWATER SLUDGE

**Peter Meurer, Herdecke-Ende; Heinrich Steuber; Jürgen Bässler, both of Dortmund; Winfried Liebig, and Ludwig Mühlhaus, both of Iserlohn, all of Fed. Rep. of Germany, assignors to Uhde GmbH, Dortmund, Fed. Rep. of Germany**

**Filed Sep. 12, 1985, Ser. No. 775,424**
**Claims priority, application Fed. Rep. of Germany, Sep. 25, 1984, 3435094; Oct. 30, 1984, 3439607**
**Int. Cl.[4] F26B** *3/04*
**U.S. Cl. 34—15** **12 Claims**



1. A process for the indirect drying of sludge, comprising carrying out the drying in at least three successive concentration stages, wherein the first and third stages are carried out under a vacuum and the second stage is carried out under normal pressure, the first stage being a barometric condenser, the second stage being a mechanical drier, and the third stage being an indirectly heated sludge drier, withdrawing water vapor generated in the sludge drier from the sludge drier by means of the vacuum and conducting the water vapor to the barometric condenser through a return pipeline connecting the sludge drier with the barometric condenser.

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**4,742,624**

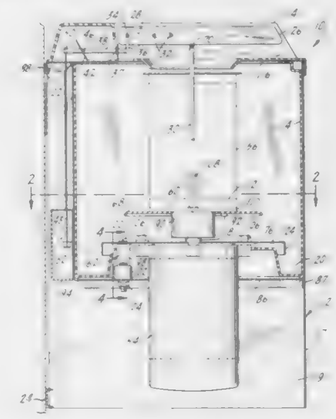
## SPIN DRYER

**William P. Grant, Elgin, Ill., assignor to Extractor Corporation, South Elgin, Ill.**

**Filed Aug. 27, 1986, Ser. No. 900,669**
**Int. Cl.[4] F26B** *11/04*
**U.S. Cl. 34—58** **4 Claims**

1. In an improved spin dryer having in combination a housing means defining an interior cavity and a pivoting lid in combination with a first opening in a first wall of said housing through which the interior cavity is accessible, motor means mounted within the interior cavity and having a power switching means and a rotatable shaft means, spin compartment means for receiving wet articles to be spun dry being connectable to the rotatable shaft means, braking means capable of impeding rotational movement of said spin compartment, the improvement comprising:

a shuttle and bracket assembly in mechanical connection with said pivoting lid wherein the pivoting movement of said lid causes said shuttle to move along an incline defined by said bracket;



means for attaching said shuttle to said switching means wherein the movement of said shuttle causes said switching means to alter power to said motor.

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**4,742,625**

## MOLDED ARTICLE OF FOOTWEAR

**Frank Sydor, 2891A Derry Road East, Unit 8, Mississauga, Ontario, Canada L4T 1A6, and Peter Glogowski, 7230 Darcel Avenue, Apt. #140, Mississauga, Ontario, Canada L4T 3T6**

**Filed Oct. 16, 1986, Ser. No. 920,256**
**Claims priority, application Canada, Oct. 18, 1985, 493255**
**Int. Cl.[4] A43B** *07/08, 03/12*
**U.S. Cl. 36—3 R** **9 Claims**



1. A lightweight article of footwear comprising:

an upper, a sole portion and a heel portion, integrally molded as a unitary article from a moldable composition,

said sole portion including opposed upper and lower surfaces,

said upper comprising a shell arcuately formed over said upper surface,

a seamless, molded connection between said upper and opposed edges of said sole portion,

said heel portion being integrally formed with said sole portion of said lower surface,

a separate molded insole member mounted on said upper surface of said sole portion and extending the length of the footwear,

said insole member having a sole supporting surface.

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a pre-shaped elongated cavity defined in said insole member, said pre-shaped elongated cavity having a cavity floor and a cavity wall extending outwardly from said cavity floor to a cavity opening at said sole supporting surface,

a replaceable pre-shaped arch support member having a plantar support surface and a base surface in opposed relationship,

said pre-shaped arch support member being shaped complementary to said pre-shaped elongated cavity so as to be removably, matingly received in said pre-shaped cavity with said base surface engaging said cavity floor, and said plantar surface closing said cavity opening and forming a continuous exposed surface with said sole supporting surface.

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**4,742,626**
**GOLF SHOE SOLE**
**Guilio Tadiotto, Nurnberg, Fed. Rep. of Germany, assignor to Adidas Sportschuhfabriken Adi Dassler Stiftung & Co. KG, Fed. Rep. of Germany**
**Filed Apr. 16, 1987, Ser. No. 38,991**
**Claims priority, application Fed. Rep. of Germany, Jul. 12, 1986, 8618748[U]**
**Int. Cl.[4] A43B *5/00***
**U.S. Cl. 36—127** **8 Claims**



1. A golf shoe sole comprising: a plurality of inserts for releasably fixing gripping elements, which inserts are arranged in a front portion of the sole in first and second groups along first and second lines adjacent to and approximately following the contour of respective ones of the outside and inside edges of the sole; and further including at least two further inserts arranged beside respective ones of said first and second groups and displaced relative to the respectively associated first and second groups towards the longitudinal center line of the sole, said at least two further inserts thereby constituting a respective group of further inserts, said group of further inserts associated with said group adjacent to said outside edge of the sole being disposed in a region of the sole extending from the outside ball area thereof to the arch portion thereof.

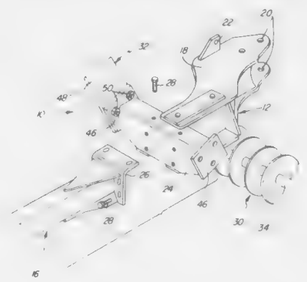
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**4,742,627**
**DIGGING BOOM ASSEMBLY**
**Edgar K. Lindstrom, Wichita, Kans., assignor to J. I. Case Company, Racine, Wis.**
**Filed Sep. 24, 1986, Ser. No. 911,174**
**Int. Cl.[4] E02F *5/06***
**U.S. Cl. 37—86** **1 Claim**

1. A digging boom assembly which is adapted for mounting various lengths of digging chains to a trencher machine, said boom assembly comprising a first boom section attached to said trencher machine and means for mounting a second boom section to said first boom section such that said second boom section may be disconnected from the first boom section and replaced with another boom section of longer or shorter length;

said boom assembly further including auger and crumber attachments connected to said first boom section whereby said second boom section may be disconnected and replaced with another section of longer or shorter length without the need for disassembling said auger and crumber attachments;

said first boom section includes an attachment portion connected to said trencher machine and a transversely disposed mounting portion having top and side surfaces for



attachment of said second boom section, and said means for mounting said second boom section engaging the top and a side surface of said mounting portion, and said auger attachment connected to the underside of said first boom section and including a transverse shaft having a sprocket mounted thereto at a central location for connection with a digging chain; and

said first boom section mounting portion includes end members which are laterally spaced relative to said attachment portion and depending leg portions of said crumber attachment connected to said end members.

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**4,742,628**
**BALLAST RE-DISTRIBUTION UNIT ON A MACHINE TO SHAPE AND RE-DISTRIBUTE RAILWAY ROAD BEDS, AND A SHAPER AND RE-DISTRIBUTION MACHINE THUS EQUIPPED**
**Ivo Cicin-Sain, Bussigny-Laus., Switzerland, assignor to Daniele & C. Officine Mecc. SpA and ITI/CLM Impianti Technici Ind. SpA, both of Buttrio, Italy**
**Filed Dec. 19, 1986, Ser. No. 943,494**
**Claims priority, application Italy, Dec. 23, 1985, 83453 A/85**
**Int. Cl.[4] E02F *5/22***
**U.S. Cl. 37—105** **7 Claims**



1. A ballast re-distribution system for use on a machine to shape and re-distribute railway road beds, comprising:

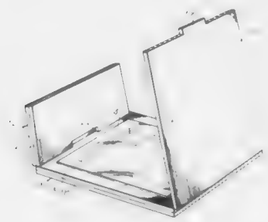
movable screens having terminal ploughs, and chutes for covering railway rails, said movable screens cooperating with said chutes; and

a bladed drum being in a central position of said system between said chutes having an axis of rotation, said axis being substantially horizontal and parallel to the railway line, said bladed drum being powered and being capable of selective rotation in either one of at least two directions, said movable screens and said bladed drum cooperating to re-distribute ballast on the sides of and between said railway rails.



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**4,742,629**
**PICTURE FRAME**
**James C. Koconis, 2463 S. Graham St., Milwaukee, Wis. 53207**
**Filed Nov. 28, 1986, Ser. No. 936,730**
**Int. Cl.[4] G09F *1/12***
**U.S. Cl. 40—152.1** **3 Claims**



1. A picture frame for mounting a picture or the like, said picture frame including a frame member and a backing member, the picture being received against said backing member, said frame member and said backing member being formed of a double sheet material defining a plurality of channels therein between parallel sheets, and means received within at least one of said channels for causing said picture frame to stand on a horizontal surface for displaying a picture in said frame, and a transparent protective panel over said picture, said backing member defining a notch therein, said means received within at least one of said channels for causing said picture frame to stand on a horizontal surface comprising a rigid stand member including a bent portion and a stand portion, said bent portion being received within one of said channels in said backing member so that said stand portion extends outwardly at said notch, said stand portion having a length such that said stand portion will engage the horizontal surface for supporting said picture frame.

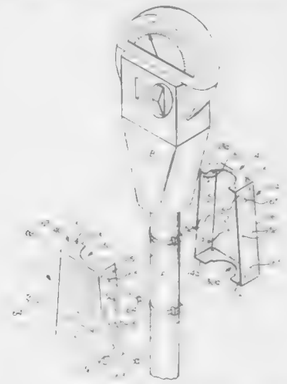
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**4,742,630**
**PARKING METER ADVERTISING DEVICE**
**Francis J. Scumaci, 719 Fernhill Ave., Pittsburgh, Pa. 15226**
**Filed Jul. 25, 1986, Ser. No. 889,496**
**Int. Cl.[4] G09F *7/18***
**U.S. Cl. 40—333** **20 Claims**

1. An advertising box adapted to be attached to a post, said advertising box comprising:

a pair of similarly-shaped, flexible flat panels, each panel including a four-sided center section hingedly connected along a top edge to an upper member, along a bottom edge to a lower member and along each side edge to a side member, wherein said upper, lower and side members are foldable inwardly about said center section and contact along adjacent edges to form an open-sided, half-box assembly;

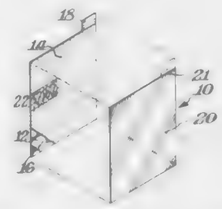
means for fastening together said upper members, said lower members and opposite side members of two half-box assemblies to form a unitary structure about said post; and



means on said upper and lower members for accommodating the shape of said post therebetween.

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**4,742,631**
**TRANSPARENCY MOUNTING DEVICE AND METHOD**
**Alan W. Zimble, c/o Connolly and Hutz, 1220 Market St., P.O. Box 2207, Wilmington, Del. 19899-2207**
**Filed May 13, 1985, Ser. No. 733,637**
**Int. Cl.[4] G09F *1/00***
**U.S. Cl. 40—158 B** **11 Claims**



1. A transparency mounting device, in combination therewith, a support member made of light transmitting material, said support member having a front face and a rear face, an adhesive layer over substantially the entire surface of said front face, said adhesive layer being light transmitting to permit a light to shine through said support member and said adhesive layer, said adhesive layer presenting a low tack surface remote from said support member to permit transparencies to be mounted on said support member and to be readily detached therefrom, a plurality of transparencies secured to said adhesive layer, portions of said adhesive layer including the edges at the periphery of said support member being not covered by any transparency and thereby exposed, a completely removeable cover sheet of the same size and shape as said support member being secured to said support member by contacting said exposed portions of said adhesive layer; and said cover sheet being disposed over and in contact with said transparencies and completely shielding said transparencies to seal and protect said transparencies during storage thereof.

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**4,742,632**

## ENHANCED MATRIX DISPLAYS

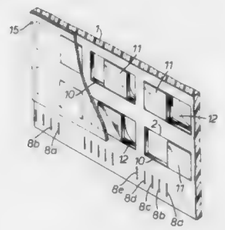
**Hassan P. A. Salam, London, United Kingdom, assignor to Unisplay S.A., Firbourg, Switzerland**

**Filed May 23, 1985, Ser. No. 737,080**

**Claims priority, application United Kingdom, May 23, 1984, 8413139**

**Int. Cl.[4] G09F** *9/00*

**U.S. Cl. 40—449** **5 Claims**



1. A display matrix comprising an array of display elements arranged in rows extending in horizontal and vertical directions, each display element comprising a cell containing a magnetizable display member movable between a plurality of different stable positions within said cell, each row of the rows of display elements which extend in one of said directions being adapted to be actuated by first and second magnet means common to the row, the first and second magnet means being parallely spaced with respect to one another in said one direction and adapted for relative movement across each said display element in the row in turn, said first magnet means being adapted to apply said movable display member a first force acting in the direction from one to another of said stable positions to accelerate said movable member, said second magnet means including a winding for magnetizing it and being adapted to apply to said accelerated movable member a second force orthogonal to said first force and adapted to urge said accelerated member against a portion of said cell to stop movement within the cell of said accelerated movable member, at least one position in said cell at which said display member is brought to rest being dependent on the time of excitation of said winding during said relative movement of said display element and said second magnet means.

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**4,742,633**

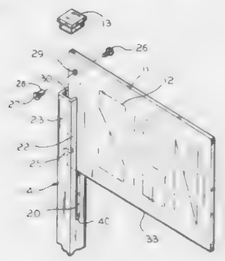
## MODULAR POST-MOUNTED SIGN APPARATUS

**Robert R. Snediker, Winnetka, Ill., assignor to Chicago Show Printing Company, Morton Grove, Ill.**

**Filed Jul. 17, 1986, Ser. No. 886,561**

**Int. Cl.[4] G09F** *15/00*

**U.S. Cl. 40—607** **13 Claims**



1. An improved modular post-mounted sign apparatus for maintaining a sign in a substantially retained fashion while providing for the facilitated assembly, disassembly and storage of said sign apparatus, said improved modular post-mounted sign apparatus comprising:

sign panel means having at least one side portion substantially retained by said post, said sign panel means serving to carry indicia to be displayed thereon;

elongated post means having a first end and a second end,

said post means including an internal cavity extending from said first end of said post means toward said second end of said post means a distance corresponding to at least the length of said side portion of said sign panel means to be retained therewithin, said internal cavity thereby defining a plurality of internal cavity surfaces within said post means,

said post means further having a portion including a slot extending longitudinally from said first end of said post means toward said second end of said post means a distance corresponding to at least the length of said side portion of said retained sign panel means, said slot further having a width substantially corresponding to the thickness of said sign panel means, whereby said post means is capable of telescopically accepting the interpositioning of at least said side portion of said sign panel means into said internal cavity portion of said post means so as to leave the remaining portion of said side panel means protruding outwardly from the said post means through said slot for display of said carried indicia;

retaining pin means operably affixed to said sign panel means side portion telescopically positioned within said internal cavity portion of said post means,

said retaining pin means including a first flange means, a second flange means and a transverse member, said transverse member serving to connect said first flange means and second flange means in a substantially "H" shaped fashion, said transverse member being of such length so as to maintain said first flange means and said second flange means apart from one another in a position where each is thus substantially abutting a respective one of a pair of oppositely disposed internal cavity surfaces adjacent to the portion of said post means which includes said longitudinal slot,

said retaining pin means thereby serving to prevent the passage of said portion of said sign panel means through said longitudinal slot, wherein said sign panel means having said retaining pin means affixed thereto may be alternatively inserted and removed from said internal cavity of said post means only through said first end of said post means,

said retaining pin means being further operably disposed about said side portion of said sign panel means and cooperating therewith so as to constrain said sign panel means from lateral and angular motion relative to said post means;

closure means operably and removably affixed to said first end of said post means to thereby alternatively open and close said first end of said post means to substantially complete the retention and firm support of said sign panel means within said internal cavity of said post means when said closure means is in said alternatively affixed, closed position and permit the removal of said sign panel means through said first end of said post means when said closure means is in said alternatively unaffixed, open position.

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**4,742,634**

## AUTOMATIC SLIDE GUARD

**Armand D. Swenson, P.O. Box 606, Fallbrook, Calif. 92028**

**Filed Mar. 23, 1987, Ser. No. 29,250**

**Int. Cl.[4] F41C** *17/00, 27/00*

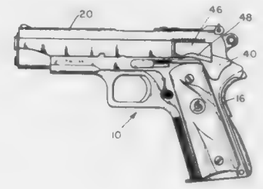
**U.S. Cl. 42—70.01** **6 Claims**

1. An improved safety mechanisms for an automatic pistol having a slide ejecting mechanism comprising;

a moveable safety lock having a first position adapted to prevent movement of a moveable slide associated with an automatic pistol and a second position adapted to allow movement of the slide;

said safety lock mounted for pivotal motion about a shaft adapted to be supported by a handle portion associated with said automatic pistol;

said shaft integrally connected with said safety lock and extending transversely through said handle portion;



a substantially flat slide guard fixedly attached to said safety lock and mounted in a spaced apart relationship substantially opposed to one side of the moveable slide thereby preventing contact between operator's hand and the moveable slide; and

a safety lock lever adapted to be thumb operated and fixedly attached to said slide guard.

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**4,742,635**

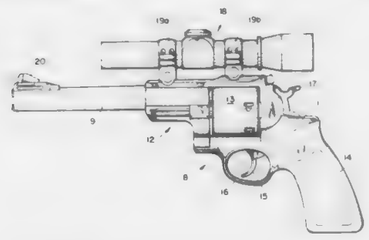
## REVOLVER BARREL AND FRAME INCORPORATING INTEGRAL TELESCOPIC SIGHT MOUNTS

**William B. Ruger, Croydon, N.H., and Lawrence L. Larson, Branford, Conn., assignors to Sturm, Ruger & Company, Inc., Southport, Conn.**

**Filed Nov. 1, 1985, Ser. No. 794,027**

**Int. Cl.[4] F41G** *1/38*

**U.S. Cl. 42—101** **4 Claims**



1. A handgun having a frame and a barrel with a longitudinal axis threadedly engaged together comprising

(a) the frame including an elongated frame shank integrally formed in the frame with a generally annular shank seating surface substantially perpendicular to the barrel axis at the forward end of the shank;

(b) telescopic mount recess means for mounting in the frame shank for carrying telescopic sights;

(c) the barrel carrying a generally annular seating surface substantially perpendicular to the barrel axis for engaging the shank seating surface;

(d) threaded sections on said barrel and such threaded sections extending along a longitudinal distance having a forward end and a rearward end, which longitudinal distance is substantially less than the distance between such threaded sections forward end and the annular shank seating surface frame; and

(e) said threaded sections being located apart from the seating surfaces of said barrel and frame to form a frame portion capable of accommodating such mount recess means for telescopic sights in such a way that the strength of the barrel is not reduced due to the proximity of its threaded sections to the seating surfaces; nor is the strength of the frame reduced by the proximity of the telescopic mount recess means to the barrel threaded sections in the frame.

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**4,742,636**

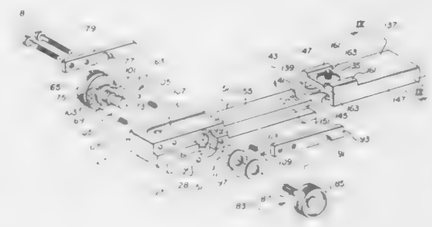
## MOUNT FOR MOUNTING AN OPTICAL SIGHT ON A FIREARM

**Richard E. Swan, East Bridgewater, Mass., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Feb. 11, 1986, Ser. No. 828,461**

**Int. Cl.[4] F41G** *1/38*

**U.S. Cl. 42—101** **7 Claims**



1. A mount for mounting an optical sight on a firearm and for providing elevation adjustment, including;

a first member;

a second member;

one of said first and second members being adapted for connection to the firearm and the other being adapted for connection to the sight;

said first and second members being connected for pivotal movement relative to one another about a first axis to accommodate elevation adjustment;

said first member having reaction means including a cylindrical bore having its axis parallel to said first axis;

elevation adjustment means;

journal bearing means connecting said elevation adjustment means to said second member, said elevation adjustment means including an eccentric portion disposed in said cylindrical bore in said reaction means for reaction with said reaction means; and

said eccentric portion having a barrel-shaped surface and being a close fit within said cylindrical bore, whereby rotation of said elevation adjusting means causes the inclination of said first and second members to one another about said first axis to be adjusted.

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**4,742,637**

## FISHING ARROWHEAD

**John Musacchia, P.O. Box 452, Marathon, Fla. 33050**

**Filed Feb. 24, 1987, Ser. No. 17,690**

**Int. Cl.[4] A01K** *81/00*

**U.S. Cl. 43—6** **11 Claims**

1. A game retaining head for a projectable hunting implement comprising:

an adapter for attaching said head to a hunting implement, said adapter having a forward portion and a rear portion,

a piercing tip provided with attachment means for removably securing said tip to said adapter forward portion,

said adapter provided with a transverse bore disposed substantially intermediate said forward and rear portions,

a barb having a middle bight portion disposed within said adapter bore and a pair of distal legs diverging from said bight portion,

said barb freely rotatable from a game piercing position in which said barb legs lie in a plane substantially in alignment with the longitudinal center line of said adapter to a game retaining position in which said bight portion is

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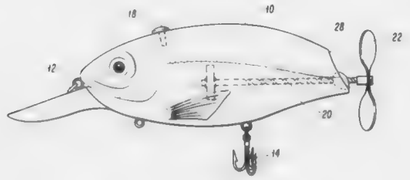


rotated and said barb legs are displaced to an angle from the plane of the longitudinal center line, and
displaceable barb engaging means on said tip normally engageable with said barb following its displacement from said game piercing position to said game retaining position to limit further displacement of said barb and to define the limit of said game retaining position.



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**4,742,638**
**ARTIFICIAL FISHING LURE**
**Donald J. Vobejda, 1263-21st Ave. SW., Cedar Rapids, Iowa 52404**
**Filed Jun. 1, 1987, Ser. No. 56,055**
**Int. Cl.[4] A01K** *85/01*
**U.S. Cl. 43—42.06** **5 Claims**

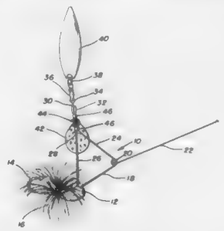


**1**. An artificial lure for fishing comprising a main body having a front and a rear and having a configuration that resembles an object that is attracted to fish, the body defining a chamber that is normally liquid tight and having a closeable opening that provides access to the chamber for filling the chamber with liquid, a rotatable shaft having its inner end mounted inside of said chamber and its outer end extending through the rear of the body to the outside, a propeller secured to the outer end of the shaft so as to be rotatable with the shaft, means formed on said shaft so that as the shaft rotates liquid in the chamber will be controllably discharged to the outside of the body of the lure, a hook affixed to the outside of the body of the lure, and means near the front of the body to provide for attachment of the lure to a fishing line.

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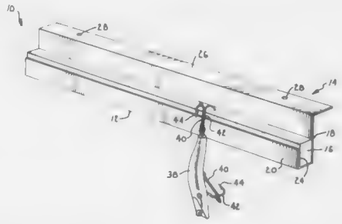
**4,742,639**
**FISHING LURE**
**Robert G. Gunn, Rte. 1, Box 237, Etowah, Tenn. 37331**
**Filed Oct. 28, 1987, Ser. No. 113,456**
**Int. Cl.[4] A01K** *85/00*
**U.S. Cl. 43—42.13** **20 Claims**

**1**. A fishing lure comprising a body member, a hook carried by said body member, a V-shaped wire form having first and second legs integrally joined at a crotch, the end of said first leg remote from the crotch being connected to said body member remote from said hook, means for forming an eyelet at the end of said second leg remote from the crotch, an elongated flexible cable extending through said eyelet and having one end connected to said body member adjacent said end of said first leg, a spinner blade connected to said cable at the end remote from said body member, and fishing line connecting means at said crotch for attachment of a line thereto, whereby variations in tension exerted on a fishing line attached to said lure effects a flexing of said cable and movement of said second leg along said cable.



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**4,742,640**
**LURE HOLDER**
**Michael L. Moore, Independence, Mo., assignor to Moore Fishing Enterprises, Inc., Independence, Mo.**
**Filed Jan. 5, 1987, Ser. No. 401**
**Int. Cl.[4] A01K** *97/06*
**U.S. Cl. 43—57.1** **10 Claims**

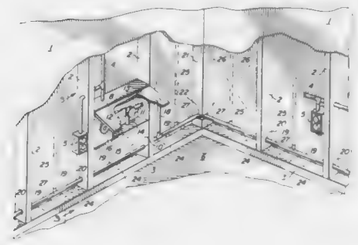


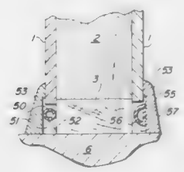
**1**. A fishing lure holder for attachment to a support surface of a boat or the like, the fishing lure including a fishing hook having a shank and a tip, said lure holder comprising:
a support body having structure defining an elongated, upwardly opening, generally U-shaped in cross section trough;
means for mounting said body to the support surface with said trough opening upwardly; and
resilient means formed of synthetic resin material within said trough for permitting embedding of said hook tip therein with the shank of the fishing hook extending downwardly and exteriorally of said trough,
said support body including
an inboard sidewall,
and outboard sidewall, and
a bottom wall intercoupling said sidewalls such that said outboard sidewall tilts slightly inwardly toward said inboard sidewall for slightly compressing said resilient means between said sidewalls in order to non-adhesively hold said resilient means within said trough.

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**4,742,641**
**PERMANENTLY INSTALLED PEST EXTERMINATION SYSTEM**
**David J. Cretti, 2532 KomoMai Dr. #2, Pearl City, Hi. 96782**
**Filed Jan. 12, 1987, Ser. No. 2,427**
**Int. Cl.[4] A01M** *7/00*
**U.S. Cl. 43—132.1** **1 Claim**

**1**. A pest extermination system permanently installed in a building structure, which building structure includes adjoining walls and floors, said extermination system comprising:
**(A)** an exterminating liquid supply subsystem, said supply subsystem comprising:
1. a replaceable reservoir for holding a supply of exterminating liquid;
2. an electrically driven pump having an inlet and an outlet;
3. means coupling said pump inlet to said reservoir for establishing fluid communication therebetween to thereby permit withdrawal of exterminating liquid from said reservoir by said pump; and
4. switch means coupled to a source of electrical energy and to said pump for selectively energizing said pump, said switch means including:
a. first and second timers for cooperatively selectively energizing and deenergizing said pump according to a predetermined schedule;
i. said first timer being adapted to periodically establish the commencement of a system on time; and
ii. said second timer being adapted to respond to the establishment of the commencement of each system on time to establish a period during which said pump is energized; and

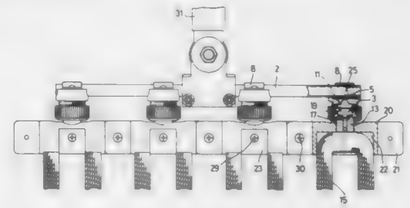




**(B)** an exterminating liquid distribution subsystem, said distribution subsystem comprising:
1. a distribution trunk tube connected to said pump outlet to receive pressurized exterminating liquid withdrawn from said reservoir by said pump;
2. a pressure sensor connected in line with said distribution trunk tube and adapted to sense and indicate normal and abnormal operating pressures; and
3. at least one branch passage coupled to and fed with pressurized exterminating liquid by said distribution trunk tube, said branch passage extending generally horizontally along a wall and being disposed proximate a floor adjoining the wall, said branch passage having a plurality of small generally outwardly directed apertures piercing its wall at intervals along its length to effect nozzles through which pressurized exterminating liquid is dispensed, said branch passage being integrated within a length of trim adapted to improve the appearance of the junction between the wall and the adjoining floor.



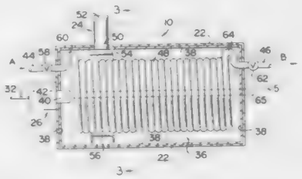
**4,742,642**
**SWABBING DEVICE FOR A HERBICIDE APPLICATOR**
**Kenzo Yamamoto, Wakayama, Japan, assignor to Yamaho Kogyo Co., Ltd., Wakayama, Japan**
**Filed Aug. 12, 1986, Ser. No. 895,902**
**Claims priority, application Japan, Oct. 8, 1985, 60-154938**[U]
**Int. Cl.[4] A01G** *13/00*
**U.S. Cl. 47—1.5** **16 Claims**



**1**. A swabbing device for a herbicide applicator having a supply pipe for supplying a herbicide, said swabbing device comprising a nozzle having a through hole therein, a swabbing member made of fabric material and removably mounted on said nozzle at a point adjacent to one end of said through hole of said nozzle, means for clamping said swabbing member on said nozzle, a branch connection means removably mounted on said supply pipe and formed with a through hole so as to communicate with the inside of said pipe, means removably coupling said nozzle to said branch connection means so that the through hole in said nozzle will communicate with the through hole in said branch connection means, said means for clamping said swabbing member on said nozzle comprising a body having a hole therein in which said nozzle is fitted, said body including a longitudinally extending recess in fluid communication with said hole in said body, said clamping means further including keep plate means for removably securing said swabbing member in said recess of said body.

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**4,742,643**
**WATER HEATING AND DISTRIBUTION SYSTEM**
**James E. Thompson, Jr., Winter Haven, Fla., assignor to Aquaheet, Inc., Dundee, Fla.**
**Continuation of Ser. No. 808,678, Dec. 16, 1985, abandoned, which is a continuation of Ser. No. 678,379, Dec. 5, 1984, abandoned, which is a continuation of Ser. No. 452,321, Dec. 22, 1982, abandoned. This application Jun. 10, 1986, Ser. No. 873,844**
**Int. Cl.[4] A01G** *13/00*; **A47J** *27/00*
**U.S. Cl. 47—2** **18 Claims**



**1**. A water heating and distributing system for freeze protection of vegetation, said system comprising:
an elongated enclosure disposed with its longitudinal axis in horizontal position;
water inlet means for introducing water from a water source into the interior of said enclosure;
water outlet means for removing water from the interior of said enclosure;
water conduit means, comprising a helical coil with a longitudinal axis disposed in horizontal position within said enclosure above the longitudinal axis of said enclosure, for

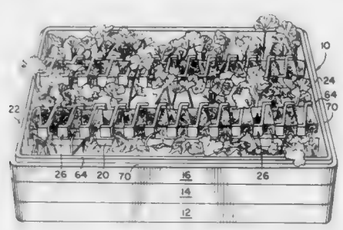
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transporting water from said water inlet means to said water outlet means;
burner means, in communication with the interior of said enclosure, for shooting a flame substantially axially through said helical coil to heat water transported through said coil;
an exhaust aperture formed through said elongated enclosure above the longitudinal axis of said coil;
a baffle comprising an exhaust conduit disposed within said enclosure in fluid communicating relationship with said exhaust aperture and extending therefrom around said coil to define an open distal end below the longitudinal axis of said coil; and
means for generating a protective fog, comprising water delivery means connected downstream of said water outlet means for misting the heated water from said coil through a multiplicity of discharge ports into close proximity with the vegetation to be protected.

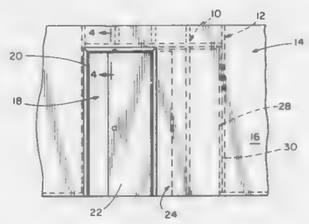
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**4,742,644**
**SHIPPING CONTAINER FOR PLANTS**
**Ernst T. Groth, Apollo Beach, Fla., and Lukas T. Kruesi, Wyhlan, Fed. Rep. of Germany, assignors to Fischer Geraniums U.S.A., Inc., Homestead, Fla.**
**Filed Apr. 27, 1987, Ser. No. 42,918**
**Int. Cl.[4] A01G** *9/02*
**U.S. Cl. 47—84** **11 Claims**




1. A shipping container for shipping plants or the like, comprising:
(a) a bottom supporting frame having side and end walls;
(b) at least one plant frame comprised of side and end walls, support means extending between either said side walls and spaced from said end walls, or extending between said end walls and spaced from said side walls, and a plurality of spaced upright members mounted on and extending upwardly from said support means, each pair of adjacent upright members being spaced so as to define with said support means a compartment for receiving one or more rooted plantlets, said members being configured so as to provide in each pair of adjacent members openings at the sides thereof through which a plant stem can extend in a direction generally parallel the plane of said support means;
(c) cover means positioned over said at least one plant frame, said cover means including side and end walls, and wherein
(d) said supporting frame, at least one plant frame and said cover are dimensioned so that the side and end walls thereof are in alignment when said frames and cover are assembled, with the walls of each of said frames and said cover being formed with interlocking means so that each superimposed component can be snugly received by the component therebelow thereby to provide a relatively sealed container.

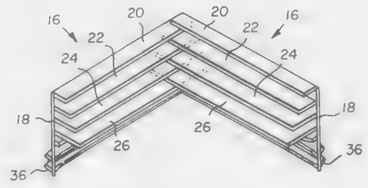
**4,742,645**
**POCKET-DOOR ASSEMBLY**
**James R. Johnston, Spring Lake, Mich., assignor to National Manufacturing Co., Sterling, Ill.**
**Filed Nov. 3, 1986, Ser. No. 926,135**
**Int. Cl.[4] E05F** *11/54*
**U.S. Cl. 49—372** **5 Claims**




1. A pocket door assembly for installation in a frame structure comprising
a vertically disposed door;
a pair of trolley assemblies fixed to an upper edge of said door, said assemblies each including at least one pair of spaced apart rollers;
an integrally formed header member suspended generally horizontally over said door and comprising a central plate portion with a pair of downwardly extending spaced apart tracks receiving said rollers;
a plurality of vertical stud members fixed at their upper ends to said header member and disposed on opposite sides of said header member defining a pocket within which said door is receivable;
said stud members each comprising a channel member;
a plurality of brackets each having a depending leg portion received within a channel member of a respective one of said stud members for connection of said stud members to said header,
said plate portion of said header being configured to define a plurality of laterally projecting edges, and
said brackets are respectively connected to one of said edges.

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**4,742,646**
**PANEL AND FRAME WEATHERSEAL COMBINATION**
**David W. Kehrli, Rochester, N.Y., assignor to Schlegel Corporation, Rochester, N.Y.**
**Filed Feb. 9, 1987, Ser. No. 12,350**
**Int. Cl.[4] E06B** *7/16*
**U.S. Cl. 49—479** **5 Claims**

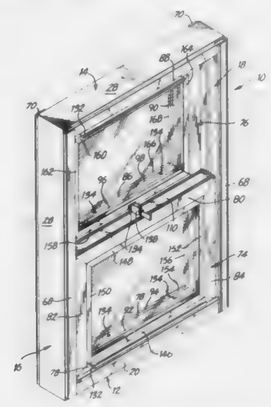



1. A corner seal assembly for sealing a corner of a panel in a complementary corner of a frame defining an opening, the frame having first and second face surfaces at right angles to one another, comprising:
a first longitudinally extending backing strip of generally uniform cross-section throughout its length, the first backing strip having a plurality of spaced-apart longitudinally extending first barrier fins affixed longitudinally along and transversely extending from the first backing strip;
a second longitudinally extending backing strip of a generally uniform cross-section throughout its length, the second backing strip having a plurality of spaced-apart longitudinally extending second flexible barrier fins affixed longitudinally along and transversely extending from the second backing strip; and
means for attaching the first backing strip to the first face surface with one end of the first backing strip abutting the second face surface, and attaching the second backing strip to the second face surface with one end of the second backing strip abutting the first face surface with the first and second barrier fins extending in interdigitated relation.



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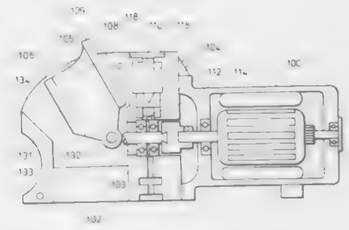
**4,742,647**
**WINDOW CONSTRUCTION AND COMPONENTS**
**Stephen R. Pacca, 150 Overlook Ave., Apt. 15F, Hackensack, N.J. 07601**
**Filed Apr. 20, 1987, Ser. No. 40,034**
**Int. Cl.[4] E06B** *1/04*
**U.S. Cl. 49—505** **13 Claims**




1. A window construction comprising a frame having a first side destined to face indoors and a second side opposite said first side, said frame including first and second parallel side members having peripheral wall portions with oppositely facing parallel outer surfaces spaced a predetermined distance apart and defining a nominal frame width, said first member having inner and outer parallel oppositely facing surfaces perpendicular to and intersecting said outer surface of said first member, an inner longitudinally extending flange portion having a free edge and a flange portion surface confronting said inner surface and defining therewith a longitudinal inner slot adjacent said first side, an outer longitudinally extending flange portion having a free edge and a flange portion surface confronting said outer surface and defining therewith a longitudinal outer slot adjacent said second side, an inner expansion member associated with said inner slot and having a pair of leg portions joined by an arcuate portion, said leg portions being on opposite sides of said inner flange portion with one of said leg portions being in said inner slot and said arcuate portion passing over said free edge, and an outer expansion member associated with said outer slot and having a pair of leg portions joined by an arcuate portion, said leg portions of said outer expansion member being on opposite sides of said outer flange portion with one of said leg portions of said outer expansion member being in said outer slot and said arcuate portion of said outer expansion member passing over said free edge of said outer flange portion, each said expansion member being movable between a closed position in which its said arcuate portion is relatively close to said free edge of its associated flange portion and an open position in which its said arcuate portion extends beyond said plane of said outer surface of said first member, effectively to increase the width of said frame above said nominal width.

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**4,742,648**
**DRILL SHARPENING TOOL**
**Thomas Ketteringham, 15 Church View Rd., Probus, Cornwall, England**
**Continuation of Ser. No. 894,737, Aug. 11, 1986, abandoned, which is a continuation of Ser. No. 673,893, Nov. 21, 1984, abandoned. This application Aug. 17, 1987, Ser. No. 86,206**
**Int. Cl.[4] B24B** *3/24*
**U.S. Cl. 51—98.5** **16 Claims**




1. A twist drill sharpening tool comprising:
a structure supporting a rotatable grindstone having a cylindrically curved surface, said structure including a body having a body portion extending transversely of the axis of said cylindrically curved surface of said grindstone,
a first fixed guide surface on one of said body and a member carried thereby,
a twist drill holder having a longitudinal axis and including retainer means for retaining a twist drill firmly with its axis parallel to said twist drill holder longitudinal axis against relative movement with respect to said holder both parallel to the axis of said drill and around the axis of said drill,
drill position setting means for determining the angular orientation of a twist drill in said twist drill holder whereby to set a twist drill with its tip projecting a predetermined distance from said twist drill holder and in a predetermined angular orientation about its longitudinal axis with respect to said twist drill holder,
a second fixed guide surface on said drill holder for cooperative engagement with said first fixed guide surface whereby to control the advance of said drill in a direction parallel to its own axis towards said grindstone in dependence only on the relative angular orientation of said twist drill holder about its axis with respect to said body of said tool,
a third fixed guide surface on said body and,
a fourth fixed guide surface on said drill holder, said fourth fixed guide surface cooperatively engaging said third fixed guide surface whereby to retain said drill holder and said twist drill carried thereby with its axis in a predetermined angular orientation with respect to the axis of said grindstone and non-adjustably fixed against turning movement about any axis transverse said twist drill holder longitudinal axis whilst allowing said drill holder and said twist drill carried thereby to turn about said longitudinal axis of said twist drill and to be displaced parallel to said longitudinal axis of said twist drill by said cooperative engagement of said first and second fixed guide surfaces whereby to determine the shape of the tip ground on said twist drill, said cooperative engagement of said third and fourth fixed guide surfaces locating said drill holder such that a drill held thereby lies in a plane inclined at a predetermined angle with respect to a plane perpendicular to the axis of

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the cylindrical surface of said grindstone and is retained with the line of contact between the cutting edges of the drill tip and the cylindrical surface of the grindstone extending generally parallel to the axis of said cylindrical surface and off-set by a predetermined non-adjustable distance from a diametral plane of said grindstone parallel to the axis of said drill, whereby sharpening of the drill is effected solely by rotation of the said drill holder about the axis of the drill held thereby.

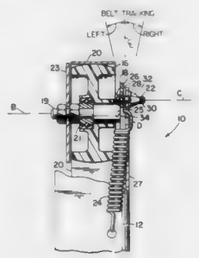
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**4,742,649**

## BELT TRACKING ADJUSTMENT MEANS FOR BELT TYPE ABRADING MACHINE

**Richard W. Fuchs, 17 Deerfield La., Simsbury, Conn. 06070**

**Filed Apr. 9, 1987, Ser. No. 36,710**
**Int. Cl.[4] B24B** *21/20*
**U.S. Cl. 51—135 BT** **7 Claims**




1. A belt tracking adjustment means for a belt type abrading or other machine having a frame, a drive pulley, at least one idler pulley and an endless belt trained over said pulleys, said tracking adjustment means comprising a support member which supports said idler pulley for rotation about an axis fixed relative to said support member, a single screw having a longitudinal axis and which supports said support member for movement relative to said frame about said longitudinal screw axis, said screw axis extending generally parallel to the axes of said idler pulley and said drive pulley so that rotation of said support member in one direction or the other about said screw axis varies the spacing between said idler and drive pulley axes, a spring connected between said support member and said frame biasing said support member in the belt tightening direction about said screw axis, said frame having a substantially flat face opposite said support member located in a plane generally at right angles to said idler pulley axis and said support member having an edge which is held in engagement with said flat frame face by the moments exerted on said support member by said spring and belt, said support member being movable about said edge relative to said frame to vary the inclination of said idler pulley axis relative to the axis of said drive pulley, and said screw including means for adjustably limiting the position of said support member relative to said frame and about said edge in the direction toward which said member is biased about said edge by the moments imposed on it by said belt and said spring.

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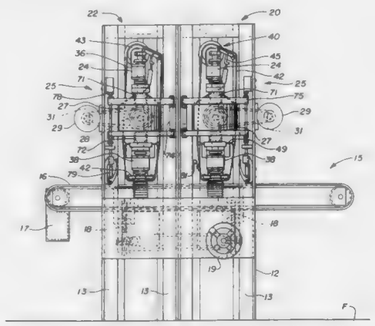
**4,742,650**

## SANDING MACHINE

**H. Richard Sauder, Jr., Narvon, and Norman L. Hahn, New Holland, both of Pa., assignors to Conestoga Wood Specialities, Inc., East Earl, Pa.**

**Filed Nov. 7, 1986, Ser. No. 928,906**
**Int. Cl.[4] B24B** *21/04*
**U.S. Cl. 51—138** **20 Claims**

1. A sanding machine comprising:
a main frame;
a generally horizontal work table mounted on said frame to support work pieces thereon for movement along a first direction;
a subframe movably supported by said main frame for orbital movement relative to said work table;
rotatable sanding means supported by said subframe and movable therewith, said sanding means including a plurality of sander elements spaced apart along a second direction and being operable to engage work pieces on said work table and sand the surface thereof while being orbitally moved with said subframe;



vibrating means operatively engaged with each said sanding element for individual vibration thereof at a frequency greater than said orbital movement while being orbitally moved with said subframe, the operation of each said vibrating means being timed so that the vibratory movement of adjacent sander elements is opposed to one another; and
drive means for operatively powering each said vibrating means, the orbital movement of said subframe, and the rotation of said sanding means.

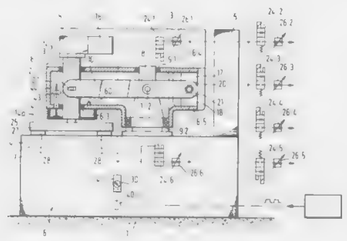
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**4,742,651**

## CONTROL DEVICE FOR THE PROCESSING PRESSURE ON LAPPING, HONING AND POLISHING MACHINES

**Gerhard Wittstock, Uetersen, Fed. Rep. of Germany, assignor to Peter Wolters, Fed. Rep. of Germany**

**Filed Jun. 9, 1986, Ser. No. 872,236**
**Claims priority, application Fed. Rep. of Germany, Jun. 10, 1985, 3520713**
**Int. Cl.[4] B24B** *49/08*
**U.S. Cl. 51—165.9** **13 Claims**



8. A control device for processing pressure on workpiece lapping, honing and polishing machines, comprising:
(a) a tool for effecting the workpiece;
(b) a motor drive having a spindle rotatably supported axially in a bearing construction member and movable in the direction of the axis of the spindle for driving the attached tool;
(c) a double-acting actuation device operatively coupled to a bearing constructional member by resilient means for applying tension by said tool on the workpiece; and
(d) program control means for receiving adjustment signals and for varying the tension of said tool on the workpiece by effecting said double-acting actuation device responsive to said adjustment signals.



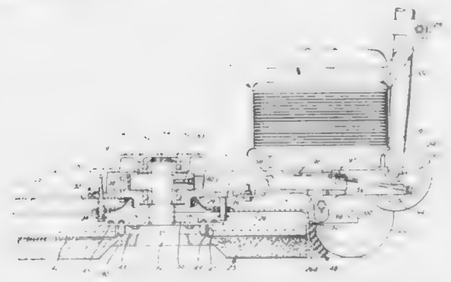
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**4,742,652**

## AIR RESTRAINT DEVICE FOR BURNISHING MACHINE

**Bernard M. Cannan, Wheaton; Richard C. Mulhall, Lisle, both of Ill.; Fredrick B. Brown, Elkhart, and Martin E. Wiese, South Bend, both of Ind., assignors to ServiceMaster Co L.P. and National Union Electric Corporation, both of Downers Grove, Ill.**

**Filed Apr. 20, 1987, Ser. No. 40,273**
**Int. Cl.[4] B24B** *23/02*
**U.S. Cl. 51—177** **12 Claims**



1. In an ultra high speed floor burnishing machine comprising a base, wheels supporting said base, a burnishing disc mounted on a shaft depending from the base, and a motor above the base for driving said disc through said shaft, the improvement comprising a separate housing beneath said base completely enclosing said disc, said housing comprising
an outwardly flaring domed flange surrounding said disc,
a resilient skirt secured to said flange and extending below the lower edge of
said flange for engaging the floor,
an opening in the top of the housing through which said shaft extends,
a flexible diaphragm sealing said opening around said shaft, and
means for suspending said housing from said base which permits the housing to float in response to unevenness in the floor level,
said domed flange being weighted to compress the resilient skirt to prevent air from leaking past the resilient skirt as it moves over irregular floor surfaces.

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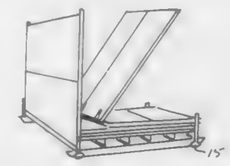
**4,742,653**

## COLLAPSIBLE STRUCTURES

**Valda C. Napier, and Donald S. Napier, both of Surrey Hills, Australia**

**Filed Sep. 3, 1986, Ser. No. 903,380**
**Claims priority, application Australia, Sep. 3, 1985, PH 2265/85**
**Int. Cl.[4] E04B** *1/346*
**U.S. Cl. 52—66** **6 Claims**

1. A collapsible, transportable structure comprising a base having four corners and adapted to be located at a desired site, uprights provided at each of the four corners of the base, said uprights being formed with openings above said base, at least two opposite side walls and a roof supported by said side walls, the side walls being pivoted on pins engageable in said openings at a height above the base sufficient to allow each respective wall or roof to fold down to lie flat against the base and other walls, the roof being hinged to the top of one of said opposite side walls so that it lies flat against that side wall during storage and the initial stages of erection, but is adapted



to swing upwardly of said one side wall to rest on said other side wall.

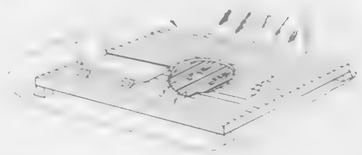
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**4,742,654**

## PROTECTIVE BARRIER FOR A STRUCTURAL BEAM

**John D. Cole, P.O. Box 610, Scottsburg, Oreg. 97473**

**Filed Mar. 19, 1987, Ser. No. 27,947**
**Int. Cl.[4] E04D** *13/00*; **E04B** *1/64, 1/66*
**U.S. Cl. 52—97** **5 Claims**



1. Protective means for installation between superimposed structural members of a building structure the lowermost of said structural members being a beam having a top wall and sides perpendicular thereto, said means comprising,
an elongate body for placement along the upper surface of the beam and having a horizontal top wall and upright side walls for depending disposition adjacent the beam sides,
said top wall defining a recessed area,
a sealant in place along said elongate body within said recessed area and capable of forming a seal about a beam engaging fastener inserted therethrough, said sealant having an upper surface offset above a horizontal plane containing said horizontal top wall of the elongate body, said sealant being displaceable transversely of said top wall during use, and
said elongate body and sealant constituting a barrier to protect the beam from moisture and other beam degrading entities.

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**4,742,655**

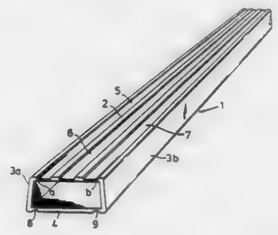
## DEVICE IN CONCRETE STRUCTURES

**Lars P. Kovasna, Bromma, Sweden, assignor to KaBe Industrier AB, Sweden**

**PCT No. PCT/SE86/00129, § 371 Date Nov. 19, 1986, § 102(e) Date Nov. 19, 1986, PCT Pub. No. WO86/05830, PCT Pub. Date Oct. 9, 1986**
**PCT Filed Mar. 24, 1986, Ser. No. 940,759**
**Claims priority, application Sweden, Mar. 29, 1985, 8501581**
**Int. Cl.[4] E04B** *1/41*
**U.S. Cl. 52—98** **1 Claim**

1. An elongated, hollow, one-piece, self-supporting plastic device having a trapezoidal cross-section, which cross-section comprises (1) a pair of converging wall portions, (2) a wall portion connecting said converging wall portions at their converging ends and (3) a covering strip portion parallel to said connecting wall portion and connecting the opposite ends of said converging wall portions, said (2) connecting wall portion having areas of reduced thickness formed therein and adapted to be perforated by rigid members whereby said wall

portion is self-sealing at the area of perforation, said (3) covering strip portion having reduced thickness areas formed therein adjacent to the converging wall portions whereby said



covering strip portion may be manually removed from said trapezoidal cross-section so as to form an elongated, U-shaped plastic device.

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**4,742,656**

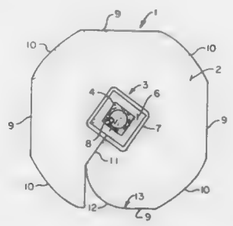
**EARTH ANCHOR WITH MULTI-SIDED BLADE**

**Marion R. Farmer, Germantown, Tenn., assignor to Dixie Electrical Manufacturing Company, Memphis, Tenn.**

**Continuation of Ser. No. 681,665, Dec. 14, 1984, abandoned. This application Nov. 17, 1986, Ser. No. 931,917**

**Int. Cl.[4] E02D** *5/74*

**U.S. Cl. 52—155** **6 Claims**



**1**. An earth anchor for use with a drill tool for embedment within the ground and for resisting pulling or compressing forces tending to urge the anchor from its implanted position, comprising, said earth anchor having a shank portion, a continuous helical blade extending approximately a full flight and affixed to said shank portion and designed for cutting into the ground upon anchor application, said blade being of a substantially flattened multi-sided configuration, and having corners provided between adjacent sides, said corners being arcuate in configuration and blending into the adjacent sides, said blade having a pair of linear cutting edges proximate the lowermost section of its flight, each linear cutting edge having a length of less than one-half the radius at the arcuate corners of the said blade, and an arcuate cutting edge integrally formed between the pair of linear cutting edges, the combined length of said linear and arcuate cutting edges being substantially greater than the radius of the helical blade affixed to said shank portion, and said series of cutting edges extending for substantially less than one-fourth of the dimension of the flight of the continuous blade.

**4,742,657**

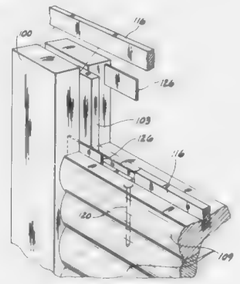
**WALL STRUCTURE AND METHOD OF MAKING**

**Robert D. Veech, 11 Yates Ave., Commack, N.Y. 11725**

**Continuation-in-part of Ser. No. 665,442, Oct. 26, 1984, abandoned. This application Feb. 12, 1986, Ser. No. 828,969**

**Int. Cl.[4] E04B** *1/10*

**U.S. Cl. 52—233** **9 Claims**



**1**. A wall structure comprising:

(a) first and second substantially vertical end members, each of the vertical end members having a vertical dimension substantially greater than its horizontal dimension, having a vertical slot for engaging a vertical spline and having a top end with a horizontal top slot for engaging a top horizontal spline;

(b) at least one substantially vertical intermdiate member having a vertical dimension substantially greater than its horizontal dimension, having opposing first and second vertical slots for engaging vertical splines and having a top end with a horizontal top slot for engaging a top spline;

(c) a first set of a plurality of substantially horizontal, dimensioned members having a horizontal dimension substantially greater than its vertical dimension and having first and second ends, each end having a vertical slot for engaging the vertical spline, said horizontal members of said first set stacked so that the vertical slots at the first ends are aligned and the vertical slots of the second ends are aligned;

(d) a second set of a plurality of substantially horizontal, dimensioned members having a horizontal dimension substantially greater than its vertical dimension and having first and second ends, each end having a vertical slot for engaging a vertical spline, said horizontal members of said second set stacked so that the vertical slots of the first ends are aligned and so that the vertical slots of the second ends are aligned;

(e) a first vertical spline engaging and located in the vertical slot of the first vertical end member and further engaging and locating in the vertical slot of the first end of at least a particular one of the horizontal members of the first set;

(f) a second vertical spline engaging and located within the vertical slot of the second end of at least one of the horizontal members of the first set and further engaging and located within the first vertical slot of the intermediate member;

(g) a third vertical spline engaging and located within the second vertical slot of the intermediate member and further engaging and located within the first end of at least a particular one of the horizontal members of the second set;

(h) a fourth vertical spline engaging and located within the vertical slot of the second end of at least one of the horizontal members of the second set and further engaging and located within the vertical slot of the second vertical end member;

(i) a first top horizontal member having a horizontal dimension substantially greater than its vertical dimension and having first and second ends, each end having a vertical slot engaging the first and second vertical splines, said first top horizontal member having a horizontal slot in the top thereof for engaging a top spline and in registry with the horizontal top slots of the first vertical intermediate member;

(j) a second top horizontal member having a horizontal dimension substantially greater than its vertical dimension and having first and second ends, each end having a vertical slot engaging the third and fourth vertical splines, said second top horizontal member having a horizontal slot in the top thereof for engaging a top spline and in registry with the horizontal slots of the vertical intermediate member and the second vertical end member;

(k) at least one top spline located in and engaging the top horizontal slots of the first and second top horizontal members, of the first and second vertical end members and of the vertical intermediate member;

(l) a first top cap having a slot in the underside thereof which engages the top spline, said first top cap spanning across the vertical intermediate member; and

(m) each of said horizontal members having an upper slot and a lower slot wherein the upper slot of each upper horizontal member is aligned with the lower slot of its adjacent, lower horizontal member which is stacked above it and wherein a horizontal spline is located within the aligned upper and lower slots of adjacent horizontal members and a spline tab is located adjacent to the end of each horizontal spline, said tab engaging the upper and lower slots and the vertical slot of the vertical member adjacent to said upper and lower horizontal members.



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**4,742,658**

**FRAME STRUCTURE**

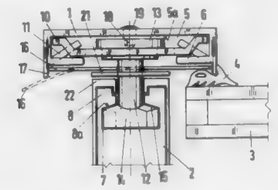
**Hans Emmer, Liestal, Switzerland, assignor to Eltreva AG, Aesch, Switzerland**

**Filed Nov. 3, 1986, Ser. No. 925,958**

**Claims priority, application Fed. Rep. of Germany, Nov. 2, 1985, 3539003**

**Int. Cl.[4] E04B** *2/96*

**U.S. Cl. 52—235** **14 Claims**



**1**. A frame structure comprising first and second compound units provided with mutually facing grooves undercut on either side, wherein said first compound unit can be attached in a desired position to the second compound unit via a detachable coupling, said coupling comprising a turning part which can be turned from the outside manually via a handle around a longitudinal axis by about 90° between a coupling position and a decoupling position, said turning part having at one end a T-head which in the coupling positio positively engages the groove of one of said compound units and at another end anchoring means which positively engage the groove of the other of the compound units, said coupling further comprising an anti-rotation device for locking said turning part in the coupling position, said anchoring means comprising a slide piece which is arranged longitudinally displaceably in the groove of said other compound unit and which bears the turning part, and said handle comprising a resilient element connected securely against rotation to the turning part, said resilient element in the decoupling position extending out from between the two compound units and in the coupling position being engaged under bending stress behind a holder.

**4,742,659**

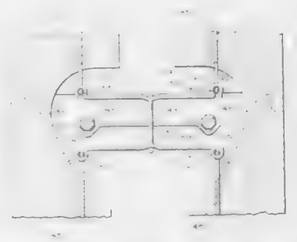
**MODULE SECTIONS, MODULES AND FORMWORK FOR MAKING INSULATED CONCRETE WALLS**

**Serge Meilleur, Beauport, Canada, assignor to Le Groupe Maxifact Inc., Brossard, Canada**

**Filed Apr. 1, 1987, Ser. No. 32,523**

**Int. Cl.[4] E04B** *2/32*

**U.S. Cl. 52—309.12** **10 Claims**



**1**. A formwork module section, made of foam plastic material, said section being adapted to serve as one wall of a module of a formwork used in the molding of an insulated concrete wall, said section comprising:

(a) a panel having an outer face and an inner face, an upper edge and a lower edge;

(b) spaced ribs solid with said panel and projecting from said panel inner face between said edges, each of said ribs having an upper end and a lower end;

(c) insert embedded, each in one of said ribs, said inserts being formed with tie-rod receiving-and-locking apertures, said apertures being located at said upper and lower ends of said ribs and short of said panel upper and lower edges; and

(d) said inserts being channel-shaped members having ends projecting beyond the upper and lower ends of said ribs, each channel-shaped member having a central web formed with holes through said member projecting ends, and said holes defining said tie-rods receiving-and-locking apertures.

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**4,742,660**

**HIGHLY SOUND INSULATING HOLLOW CLAY TILE FOR THE CONSTRUCTION OF FLOORS**

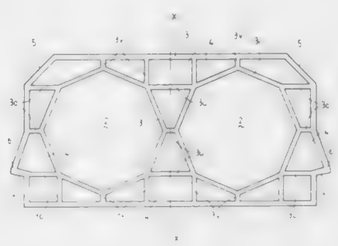
**Giuseppe Vadala' , Via Giovanni XXIII, 4-Roggiano Gravina, Italy**

**Filed Jul. 15, 1986, Ser. No. 885,972**

**Claims priority, application Italy, Jul. 24, 1985, 48403 A/85**

**Int. Cl.[4] E04B** *5/04;* **E04C** *2/04*

**U.S. Cl. 52—606** **5 Claims**



**1**. A highly sound insulating hollow clay tile for the construction of floors, the tile having a parallelepiped outer shape of a substantially rectangular cross section with lateral symmetrically projection portions (**1**,**6**) for the connection of each tile with the adjacent carrying beams of a floor made of rein-

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forced concrete, said tile further having a peripheral wall (3) of a substantially uniform thickness, said peripheral wall (3) comprising upper and lower horizontal wall elements from which extend towards the inside of the tile a plurality of very short vertical partition walls (3*v*) and vertical wall elements from which extend towards the inside of the tile a plurality of horizontal partition walls (3*c*) of very short length, which cooperate to define therebetween a plurality of small sound insulating polygonal cavities (4) of different form and dimension, and, which in combination with other inner inclined longitudinal partitions (3*a*) and with other horizontal partitions (3*u*), defined two large main longitudinal cavities (2), symmetric with respect of a longitudinal vertical center plane (x—x) of each tile, said main cavities (2) occupying the most part of the cross section of the tile, and being thus entirely separated from one another, as well as from the outside by a series of the small sound insulating cavities (4).

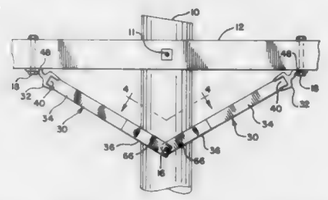
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**4,742,661**

## END FITTING FOR CROSSARM BRACE

**Frederick W. Burtelson, Harvard, Ill., assignor to Joslyn Corporation, Chicago, Ill.**

**Filed Nov. 7, 1986, Ser. No. 928,024**
**Int. Cl.[4] F16B** *7/04;* **E04B** *1/58*
**U.S. Cl. 52—697** **27 Claims**



1. A metal end fitting for structurally interconnecting an end portion of an elongated wooden structural member to a second member, said fitting comprising:

a body having a dovetail recess for receiving said end portion of said wooden structural member, said recess defined by a bight portion adapted to abut an end face of said wooden structural member and a pair of spaced apart legs integrally joining said bight portion and tapered toward one another extending outwardly of said bight portion,

said legs adapted to engage opposite sides of said wooden structural member against tapered dovetail surfaces formed adjacent said end face, and

wherein a degree of taper is provided between said legs extending toward one another that is greater than a degree of taper initially provided between said dovetail surfaces of said structural member adapted to confront said legs, whereby said legs are forcefully biased against confronting dovetail surfaces of said structural member upon assembly of said end fitting onto the end portion of said structural member.

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**4,742,662**

## CEILING TRIM SUPPORT CLIPS

**Owen J. Smith, 820 Park St., Saugatuck, Mich. 49453**

**Filed May 5, 1986, Ser. No. 859,333**
**Int. Cl.[4] E04B** *5/57*
**U.S. Cl. 52—717.1** **12 Claims**

1. A system for masking a grid of ceiling support members each having a generally planar ceiling panel support surface of a preselected width, comprising:

an elongated masking rail having an upper masking surface and a lower surface;

a clip adapted for coupling said masking rail to one of said ceiling support members, said clip having a body with means for securing said clip body to said upper masking surface, a first hanging flange spaced above said body by a first spacing flange and a second hanging flange spaced above said body by a second spacing flange, said first hanging flange and said second hanging flange extending toward each other and laterally spaced to define an access passage therebetween that is narrower than said ceiling support member width, said first spacing flange laterally spaced from said second spacing flange greater than said ceiling support member width and said first spacing flange



spaced from said second hanging flange narrower than said ceiling support member width; and

means on said clip for laterally biasing a ceiling support member received under said hanging flanges toward said first spacing flange, whereby an edge of the ceiling support member is received under said second hanging flange and said clip is then pivoted until said biasing means laterally biases the ceiling support member under said first hanging flange.

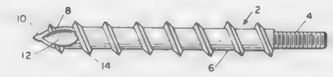
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**4,742,663**

## CONCEALED LOAD DISTRIBUTION MEANS FOR WOODEN BEAMS

**Harlan J. Demers, Orrville, Ohio, assignor to Koppers Company, Inc., Pittsburgh, Pa.**

**Continuation-in-part of Ser. No. 102,634, Dec. 11, 1979, abandoned, which is a division of Ser. No. 883,321, Mar. 3, 1978, abandoned. This application May 7, 1981, Ser. No. 261,593**
**Int. Cl.[4] E04C** *3/30;* **F16B** *35/04*
**U.S. Cl. 52—726** **2 Claims**



1. A wooden laminated beam, which comprises:

A. a laminated beam including at least two beam members laminated together, each beam member having a mating surface in a mating relationship to each other;

B. load distribution means for distributing loads exerted on said load distribution means more uniformly over said laminated beam mating surface which coacts with said load distribution means under a given load condition, said load distribution means embedded within said laminated beam between said mating surfaces such that said load distribution means cannot be withdrawn from said laminated beam said load distribution means comprising a generally circular sphere and an elongated member including:

(i) self-threading tensile elements extending throughout said elongated member;

(ii) a tapered cutting surface at one end of said elongated member;

(iii) an excavation in the region of said tapered cutting surface wherein said sphere being fixably mounted to said tapered cutting surface in close proximity to said excavation, said sphere having a radius smaller than said elongated member.

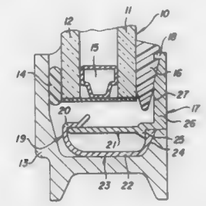


**4,742,664**

## SNAP-IN GLAZING BEAD

**Ryne R. Johnson, Ashville, N.Y., assignor to Hope's Architectural Products, Inc., Jamestown, N.Y.**

**Continuation of Ser. No. 916,940, Oct. 7, 1986, abandoned. This application Oct. 2, 1987, Ser. No. 104,576**
**Int. Cl.[4] E04B** *1/60*
**U.S. Cl. 52—771** **5 Claims**



1. A snap-in apparatus for securing glass to a window frame comprising:

a resilient glazing bead retainer having at least one generally horizontal retaining flange capable of being displaced and having a generally horizontal surface;

means for securing said generally horizontal surface of said retainer to a generally smooth window frame between the window frame and the glass such that a midplane of the glass intersects said generally horizontal surface; and

a generally L-shaped, substantially rigid glazing bead including a generally horizontal projection disposed between said horizontal surface of said retainer and the glass such that the midplane of the glass also intersects said generally horizontal projection for displacing said retaining flange of said retainer to provide a snap-in engagement between said glazing bead and said retainer, and a substantially vertical window retaining flange provided at one end of said horizontal projection having a generally vertical surface for securing the glass into the window frame.

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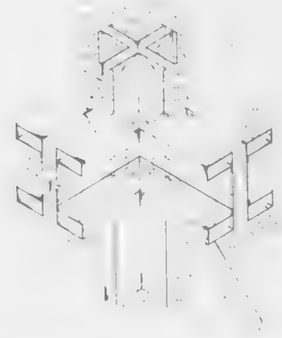
**4,742,665**

## METALLIC SPATIAL FRAMEWORK STRUCTURE COMPOSED OF SINGLE ELEMENTS FOR ERECTING BUILDINGS

**Josef Baierl, Pähl, Fed. Rep. of Germany, assignor to Baierl & Demmelhuber GmbH & Co. Akustik & Trockenbau KG, Pähl, Fed. Rep. of Germany**

**Continuation of Ser. No. 855,815, Apr. 21, 1986, abandoned. This application May 6, 1987, Ser. No. 46,581**
**Claims priority, application Fed. Rep. of Germany, Aug. 20, 1984, 3430612; PCT Int'l Appl., Aug. 20, 1985, PCT/EP85/00425**
**Int. Cl.[4] E04B** *1/00*
**U.S. Cl. 52—276** **7 Claims**

1. A metallic spatial framework structure for a building, or the like, comprising a plurality of individual framing elements including vertical and horizontal components, said vertical components each being of a first substantially identical configuration and said horizontal components each being of a second substantially identical configuration different from said vertical components, spacer means positioned between said various components to maintain selected components in spaced relation when assembled and without metallic interconnection between said selected components to establish a thermal barrier between said selected components in both the vertical and horizontal configuration, inner and outer skins attached to selected vertical and horizontal components to establish inner and outer walls for said building spaced from each other and defining an air space therebetween, said vertical components being arranged in a spaced cruciform configuration with said spacer elements positioned therebetween and connected at opposite ends to said spaced vertical components, said horizontal components being arranged in parallel horizontal pairs directly connected to selected ones of said vertical components and indirectly to selected other vertical components through the medium of said spacer means, each of said horizontal and



vertical components being configured when assembled to provide supporting surfaces for attachment of said inner and outer skins.

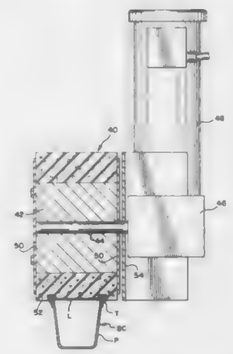
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**4,742,666**

## METHOD AND APPARATUS FOR FORMING TAMPER-EVIDENT CONTAINERS

**Martin J. Mueller, Palm Harbor, and Carl Arndt, Clearwater, both of Fla., assignors to Osgood Industries, Inc., Oldsmar, Fla.**

**Filed Aug. 12, 1987, Ser. No. 84,686**
**Int. Cl.[4] B65B** *53/06;* **B67B** *5/00*
**U.S. Cl. 53—442** **11 Claims**



1. A method of forming tamper-evident, sealed containers, comprising the steps of:

providing a plurality of containers;

providing a plurality of generally annular, heat-shrinkable members;

positioning said heat-shrinkable members in respective association with said containers;

heating said heat-shrinkable members so that the members shrink into conformance with said containers; and

deforming each said heat-shrinkable member with resiliently deformable roller means into further conformance with the respective one of said containers by moving said containers beneath said roller means for engagement of said roller means with each said heat-shrinkable member.

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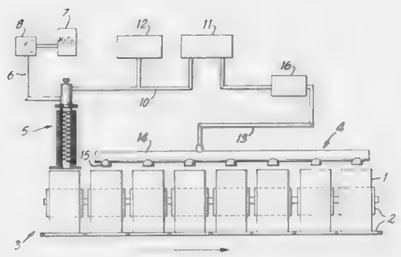


**4,742,667**

## METHOD OF AND APPARATUS FOR STERILIZING PACKAGING MATERIAL, ESPECIALLY CONTAINER-TYPE PACKAGES

**Horst Müller, Westerwaldweg 12, 4020 Mettmann, and Gerhard Deimel, Kolberger Str. 83, 5090 Leverkusen 3, both of Fed. Rep. of Germany**

**Division of Ser. No. 775,103, Sep. 11, 1985, Pat. No. 4,631,173, which is a continuation of Ser. No. 441,143, Nov. 12, 1982, abandoned. This application Sep. 26, 1986, Ser. No. 912,293**
**Claims priority, application Fed. Rep. of Germany, Nov. 14, 1981, 3145274**
**Int. Cl.⁴ A61L *2/20*; B65B *55/10***
**U.S. Cl. 53—167** **11 Claims**



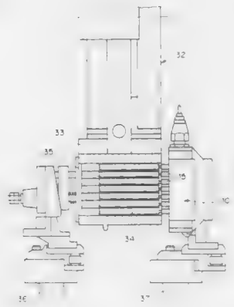
1. In an apparatus for packaging a product in containers and comprising a sterilizing station and conveying means for the intermittent conveyance of containers to the sterilizing station, and an improved means for sterilizing the containers in the sterilizing station comprising:
- a reservoir accommodating a liquid disinfectant,
- a source of compressed air,
- a vaporizing nozzle in communication with the reservoir through a disinfectant-supply line and with the source of compressed air through a compressed-air supply line,
- means for intermittently opening and closing the vaporizing nozzle, whereby the compressed air vaporizes the disinfectant and a mixture of liquid disinfectant in fine droplets and compressed air is ejected in the form of a jet having an axis when the nozzle is open,
- a tube with a longitudinal axis, with an intake end and an output end, and with an inner surface, wherein the tube is positioned with its intake end in flow communication with the nozzle, and the longitudinal axis of the tube is substantially parallel to said axis of the jet and wherein the output end of the tube extends inside a container in the sterilizing station, and
- heating means on the tube for heating the inner surface of the tube to a temperature that is sufficiently high to rapidly evaporate the disinfectant in the mixture, whereby the mixture of disinfectant and compressed air is blown into the intake end of the tube when the vaporizing nozzle is open such that the droplets of disinfectant in the mixture come into contact with the heated inner surface and rapidly evaporate and a mixed flow of compressed air and evaporated disinfectant leaves the output end and enters the container.

**4,742,668**

## CIGARETTE CHECKING DEVICE AND PACKAGING APPARATUS

**Philippe Ecabert, Montignez, Switzerland, assignor to F. J. Burrus SA, Switzerland**

**Filed Sep. 15, 1986, Ser. No. 907,313**
**Claims priority, application Switzerland, Sep. 24, 1985, 4129/85**
**Int. Cl.⁴ B65G *57/09***
**U.S. Cl. 53—494** **6 Claims**



1. A device for checking cigarettes grouped for packaging, comprising:
- a support intended to be positioned at one end of a group of cigarettes;
- a plurality of elongated feelers movable longitudinally and independently of one another on said support;
- one or more light-beam emitting means and one or more light-beam sensing means, said emitting means and sensing means being situated at a fixed location remote from said support;
- a plurality of blocking elements integral with said feelers and including sights capable of forming a path for said light beams;
- two fiber optics conductors respectively extending between the ends of said path and said emitting means and sensing means;
- said support bears twenty said feelers disposed in parallel rows having a middle row and two lateral rows, said support comprising an inlet and an outlet for the fiber optics conductors, said inlet and said outlet being situated at the same end of the rows, and a reflector situated at the other end of the rows, capable of returning a light beam emanating from the inlet of a first optical conductor by following a path parallel to the rows, along an exit path likewise parallel to the rows, and ending at the outlet of a second optical conductor; and
- said blocking elements integral with the feelers forming the lateral rows include at least one opening situated either on the entry path or on the exit path of the light beam, while the blocking elements integral with the feelers of the middle row include at least one opening disposed on the path of the entry beam and the other on the path of the exit beam.

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**4,742,669**

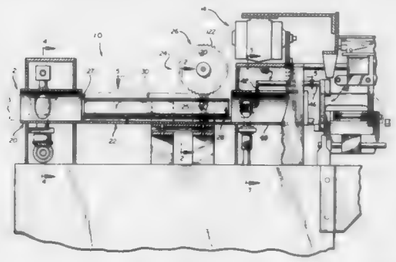
## CAN END COUNTING SYSTEM

**Andrew E. Mojden, Hinsdale, Ill., assignor to Fleetwood Systems, Inc., Countryside, Ill.**

**Filed Sep. 29, 1986, Ser. No. 913,019**
**Int. Cl.⁴ B65B *57/20***
**U.S. Cl. 53—500** **7 Claims**

1. A can end counting system comprising: an elongate trough-like member for receiving and guiding a plurality of can ends in a substantially upright, nested condition, said trough-like member defining generally a longitudinal axis and having an entrance end and an exit end relative to the direction of travel of said can ends therethrough; pusher means adjacent said entrance end of said trough-like member for pushing said can ends therealong; resisting means located along said trough-like member for engaging said can ends in a predetermined fashion for maintaining a controlled degree of resistance of said can ends relative to said pushing means so as to maintain said can ends in said upright and nested condition as they travel through said trough-like member; and counting means located adjacent said exit end of said trough-like member for producing a discrete detectable signal in response to the passage of each can end thereby, such that the discrete signals may be detected and counted to maintain a count of the can ends passing through the counting system; wherein said pushing means comprises a pair of rotatably mounted roller members disposed for contacting the can ends at radially spaced peripheral edge parts thereof, and means for rotatably driving at least one of said rollers in a direction for advancing said can ends along said trough-like member; and wherein said rollers have generally concave surfaces formed for complementary engagement with substantial portions of said can end peripheral edge parts.





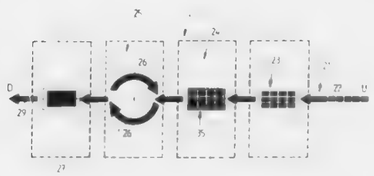
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**4,742,670**

## CARTON OVER PRODUCT PACKAGING APPARATUS

**Robert N. Windsor, 8 Sharon Crescent, Mountain Creek Estate, Mooloolaba, Queensland, and Maxwell C. Dowzer, 32 Maggs Street, Wavell Heights, Queensland, both of Australia**

**Filed Apr. 1, 1987, Ser. No. 33,130**
**Claims priority, application Australia, Apr. 2, 1986, PH 5283**
**Int. Cl.⁴ B65B *43/18*, *35/30*, *7/20***
**U.S. Cl. 53—543** **30 Claims**



1. A carton over product packaging apparatus including infeed means for conveying a plurality of containers to be packaged to a collating zone in which the containers are collated into a plurality of rows, container indexing means for moving the containers in the collating zone from that zone to a packaging zone, a carton erector longitudinally reciprocably movable and adjacent and above the packing zone, said erector removing a carton from a carton supply station and erecting the carton, positioning means vertically reciprocably movable for receiving a carton from said erector and placing it over containers located in the packing zone, carton closure means downstream of the packing zone and including a turntable for receiving cartons from the packing zone and for rotating them through 180 degrees, said closure means including flap closure ploughs for closing top and bottom closure flaps of the carton, said containers progressing longitudinally through the apparatus from an upstream to a downstream end thereof.

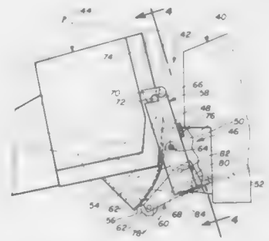
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**4,742,671**

## CROP HARVESTING MACHINE BASE UNIT LIFT MECHANISM PROVIDING AUXILIARY HEIGHT BOOST TO CROP GATHERING ATTACHMENT

**Gary L. Bich, New Holland, Pa., assignor to New Holland Inc., New Holland, Pa.**

**Filed Aug. 17, 1987, Ser. No. 86,456**
**Int. Cl.⁴ A01D *34/04***
**U.S. Cl. 56—15.9** **11 Claims**



1. In a crop harvesting machine having a base unit, a lift mechanism for supporting a crop gathering attachment and being operable for raising and lowering said attachment relative to said base unit, said lift mechanism comprising:
- (a) at least one lift assembly for interconnecting said attachment and said base unit; and
- (b) at least one actuator coupled between said base unit and said lift assembly and being operable to actuate said lift assembly for raising and lowering said attachment relative to said base unit between a fully raised position and a lowered position;
- (c) said lift assembly including
  - (i) a lift arm being mounted to said base unit for pivotal movement relative thereto and being pivotally connectable to said attachment such that selected pivotal movement of said lift arm relative to said base unit causes raising of said attachment, when pivotally connected to said lift arm, from said lowered position to a partially raised position being located at a height between said fully raised position and said lowered position of said attachment, and
  - (ii) a boost arm being connected to said lift arm for pivotal movement relative thereto, engageable with said crop gathering attachment for making moving contact therewith and pivotally connected to said actuator such that said actuator can be operated to initially cause said pivotal movement of said lift arm relative to said base unit to raise said attachment from said lowered position to said partially raised position and to thereafter cause pivotal movement of said boost arm relative to said lift arm to pivot said attachment relative to said lift arm and thereby raise said attachment from said partially raised position to said fully raised position, the provision of said boost arm thereby allowing an auxiliary boost in the height to which said attachment can be lifted above the height which can be attained by said lift arm alone.

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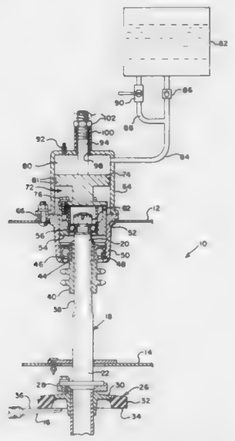


4,742,672

## COTTON PICKER DOFFER ADJUSTMENT ASSEMBLY

Jesse H. Orsborn, Hinsdale, Ill., assignor to J. I. Case Company, Racine, Wis.

Filed Feb. 17, 1987, Ser. No. 15,781
Int. Cl.[4] A01D 46/16
U.S. Cl. 56—41 16 Claims



1. In a cotton picker doffer assembly including picker spindles and a doffer element having doffer pads positioned adjacent to said spindles for removing cotton therefrom, an adjustment mechanism for adjusting the vertical relationship of said doffer element relative to said picker spindles, comprising: a substantially vertical shaft about which said doffer element is attached; means for rotating said shaft which permits said shaft to gravitate downwardly such that as said doffer pads wear they are maintained in continuous contact with said picker spindles; and means for continuously preventing upward movement of said shaft as said shaft gravitates downwardly so as to maintain said doffer pads in contact with said picker spindles, comprising hydraulic piston means operatively connected with said vertical shaft, said piston means being movably positioned in hydraulic cylinder means and defining therewith a cavity of variable volume having a substantially incompressible fluid therein, said piston means being movably in response to downward gravitational movement of said vertical shaft to increase the volume of said fluid in said cavity with the increased volume of the fluid in said cavity acting to prevent reverse movement of said pisston means so that said piston means prevents upward movement of said vertical shaft.

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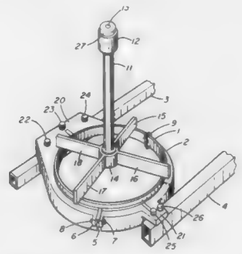
4,742,673

## METHOD OF TESTING TWISTER RING WARP AND APPARATUS THEREFOR

Bernice R. Farmer, Gastonia, N.C., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jun. 15, 1987, Ser. No. 61,647
Int. Cl.[4] D01H 7/54; G01C 9/18, 9/36
U.S. Cl. 57—1 R 6 Claims

1. An apparatus for measuring distortion on a normally, flat, circular twister ring surface comprising a shaft, a plurality of arms attached to and extending radially from said shaft and adapted to rest on said circular twister ring surface, said arms being at least four in number and each arm being spaced equidistant from the arms adjacent thereto on either side thereof, a leveling bubble positioned in the end of said shaft and constructed to measure any deviation of said circular twister ring



surface from a flat surface exhibited when all radially extending arms touch the ring surface.

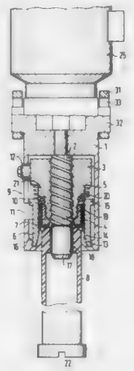
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4,742,674

## BOBBIN DOFFING AND DONNING APPARATUS

Manfred Hauers, Viersen, and Dieter Vits, Neuss, both of Fed. Rep. of Germany, assignors to Zinser Textilmaschinen GmbH, Fed. Rep. of Germany

Filed Oct. 7, 1987, Ser. No. 106,109
Claims priority, application Fed. Rep. of Germany, Oct. 13, 1986, 3634879
Int. Cl.[4] D01H 9/18, 9/00; B66C 1/44
U.S. Cl. 57—275 15 Claims



1. Apparatus for selectively gripping and releasing a roving bobbin for use in doffing and donning a roving bobbin on a winding spindle of a roving machine wherein said bobbin and said winding spindle have mating drive components for establishing drive connection therebetween, said apparatus comprising gripping means arranged for movement into and out of gripping engagement with said bobbin and five means for selectively actuating said movements with said bobbin and drive means for selectively arranged for movement longitudinally with respect to said spindle and said drive means being further arranged for rotational movement with respect to the axis of said spindle for orienting said drive component of said bobbin relative to said mating drive component of said spindle for proper driving connection thereof.

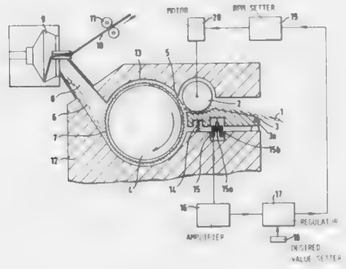


4,742,675

## METHOD AND APPARATUS FOR PRODUCING A UNIFORM, CONTINUOUS FIBER QUANTITY

Ferdinand Leifeld, Kempen, Fed. Rep. of Germany, assignor to Trützschler GmbH & Co. KG, Monchen-Gladbach, Fed. Rep. of Germany

Filed Jul. 1, 1985, Ser. No. 750,766
Claims priority, application Fed. Rep. of Germany, Jul. 10, 1984, 3425345
Int. Cl.[4] D01H 7/895; D01G 23/06
U.S. Cl. 57—412 16 Claims



1. In a method of supplying a continuous fiber quantity to a spinning mechanism of a yarn making apparatus, including the steps of passing a sliver through a clearance defined between a feed roller and a feed table cooperating with the feed roller; advancing the sliver by the feed roller to an opening roller; and advancing fiber from the opening roller to the spinning mechanism; the improvement comprising the following steps:

(a) sensing the thickness of the running sliver between the feed roller and the feed table;

(b) generating an electric signal representing the sensed thickness value;

(c) determining any deviation between desired and sensed thickness values;

(d) generating a setting signal representing the deviation; and

(e) regulating the rpm of the feed roller as a function of the setting signal, whereby the thickness of the sliver admitted to the opening roller from the clearance is rendered uniform.

2. In a yarn making machine assembly including means defining a yarn spinning chamber; a feed table adapted to support a sliver thereon; a feed roller having a periphery defining, with said feed table, a clearance through which the sliver is adapted to pass; motor means connected to said feed roller for rotating said feed roller to advance the sliver through said clearance; an opening roller arranged adjacent said clearance to receive the sliver therefrom and to break up the sliver into fibers and means to advance the fibers into said yarn spinning chamber; the improvement comprising

(a) a sliver thickness sensor including a movable component arranged to be contacted by the sliver in said clearance to execute excursions in response to thickness variations in the sliver running through said clearance;

(b) means for generating an electric signal as a function of the excursions of said component;

(c) regulator means for receiving said electric signal and for emitting a setting signal as a function of a difference between desired and actual thickness values of the sliver;

(d) an rpm-variable motor constituting said motor means; and

(e) means for applying a signal, representing said setting signal, to said motor for varying the rpm thereof to vary the rotational speed of said feed roller, whereby the thickness of the sliver admitted to the opening roller from the clearance is rendered uniform.

4,742,676

## REVERSIBLE HYDROSTATIC TRANSMISSION PUMP WITH DRIVE ENGINE SPEED CONTROL

Walter Kropp, Sulzbach, and Wolfgang Grone, Aschaffenburg, both of Fed. Rep. of Germany, assignors to Linde Aktiengesellschaft, Wiesbaden, Fed. Rep. of Germany

Filed Dec. 13, 1985, Ser. No. 808,614
Claims priority, application Fed. Rep. of Germany, Dec. 24, 1984, 3447406
Int. Cl.[4] F16H 39/46
U.S. Cl. 60—432 5 Claims



1. In a control for a drive assembly such as a power vehicle having a primary power source, an adjusting means for the power source connected with a spring loaded piston movable in an operating cylinder loaded with a control pressure fluid on the side of the piston opposite the spring and a hydrostatic transmission, driven by said power source, which transmission is adjustable in opposite directions of output rotation, a regulating unit for said transmission, a servo piston connected to said regulating unit and slidable in a servo operating cylinder, a control valve controlling the pressure in said servo operating cylinder, a receiver piston connected with said control valve and slidable in a receiving cylinder having pressure chambers on opposite sides of said receiver piston, one of which chambers is capable of being loaded with an arbitrarily adjustable control pressure, first means for applying an arbitrarily adjustable control pressure to said receiver piston chamber, second means for applying a control pressure to the spring loaded piston at the adjusting means for the power source, said second means for applying a control pressure being dependent on the control pressure of the first means, the improvement comprising a final control element on said transmission, a normally closed shut-off valve means having two oppposing elements controlled by the position of the regulating unit for said transmission, said shut-off valve means being connected to the control pressure chambers of the receiving cylinder and engaged by lever means on the final control element for bypassing fluid from one of the receiver chambers, and a connection from said shut-off valve means to the adjusting means of the power source to reduce the speed of said power source until the shut-off valve means closes.

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4,742,677

## CONTROLS FOR HYDROSTATIC DRIVE UNITS

Dietrich Kuchenbecker, Aschaffenburg, Fed. Rep. of Germany, assignor to Linde Aktiengesellschaft, Wiesbaden, Fed. Rep. of Germany

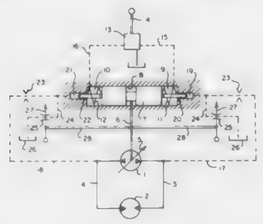
Continuation of Ser. No. 651,593, Sep. 18, 1984, abandoned. This application Mar. 20, 1987, Ser. No. 28,310
Claims priority, application Fed. Rep. of Germany, Sep. 20, 1983, 3333876
Int. Cl.[4] F16H 39/44
U.S. Cl. 60—443 5 Claims

1. In a control or regulator for a hydrostatic drive unit, having a feed line, a final control element in working connec-

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tion with a servo piston sliding in an operating cylinder and loaded by a control pressure on one side, a spring on the other side biasing the servo piston toward the control pressure, and a presssure piston, which is capable of sliding in a pressure cylinder loaded by the feed line pressure of the drive unit



through a branch line, acting on the servo piston parallel to the force of the spring, the improvement comprising control means in said branch line between the feed line and pressure piston including a variable restrictor whereby the pressure acting on the pressure piston is dependent on the setting of the servo-piston in addition to the feed pressure of the drive unit.

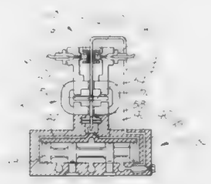
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**4,742,678**

## AIRCRAFT FIBER OPTIC CONTROL DEVICE

**Richard D. Bartholomew, Huntsville, Ala., and Norman P. Huffnagle, Hopkins, Minn., assignors to The Boeing Company, Seattle, Wash.**

**Filed Mar. 16, 1984, Ser. No. 590,151**
**Int. Cl.⁴ F03G** *7/06*
**U.S. Cl. 60—516** **6 Claims**



5. An aircraft fiber optic control device adapted for engaging and moving a high pressure hydraulic supply line in opposite direction, the movement by the device allowing the line to pivot about a pivot point and redirect fluid to opposite supply channels in a servovalve, the device comprising:

a first optical fiber for receiving light energy;

a first gas filled sealed bellow, the first optical fiber connected at one end to the bellow;

a second optical fiber for receiving light energy; and

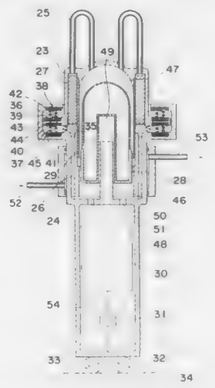
a second gas filled sealed bellow, the second optical fiber connected at one end to the bellow, the second bellow disposed opposite the first bellow with a portion of the supply line received there between the first bellow moving the supply line in one direction when the gas therein is heated by light received by the first optical fiber, the second bellow moving the supply line in the opposite direction when the gas therein is heated by light received by the second optical fiber.

**4,742,679**

## STIRLING ENGINE

**Kenichi Inoda, Hirakata; Terumaru Harada, Moriguchi; Tatsuo Fujita, Hirakata, and Kin-ichi Adachi, Takarazuka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Nov. 13, 1986, Ser. No. 929,808**
**Claims priority, application Japan, Nov. 18, 1985, 60-258031**
**Int. Cl.⁴ F02G** *1/04*
**U.S. Cl. 60—517** **6 Claims**



1. A Stirling engine comprising:

a first wall chamber constituting a part of a vessel in which a working fluid is sealed;

a second wall chamber constituting a part of said vessel;

a third wall chamber constituting a part of said vessel;

a heater means for heating the working fluid through said first wall chamber;

a cooler means for cooling the working fluid through said second wall chamber;

a regenerator provided between a heating space in said vessel which is heated by said heater means and a cooling space in said vessel which is cooled by said cooler means; and

a mechanical means which is driven as a result of movement of and a pressure change in the working fluid,

said third wall chamber comprising a bellows and having a larger thermal resistance than said first and said second wall chambers, said third wall chamber connecting said first wall chamber with said second wall chamber in such a manner that the positional relationship of said first wall chamber relative to said second wall chamber can be changed.

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**4,742,680**

## ANTIBALLISTIC MISSILE TARGETER

**John Mecca, 110 Whittier Dr., San Remo, N.Y. 11754**

**Filed Oct. 15, 1986, Ser. No. 918,334**
**Int. Cl.⁴ F03G** *7/06*
**U.S. Cl. 60—528** **5 Claims**

1. A positioning apparatus comprising:

a. a cylinder;

b. a disk pivotably supported at one end of the cylinder;

c. a plurality of nitinol wires attached about the circumferential edge of the disk and extending and attached to the cylinder at the end opposite of the disk;

d. a source of electric current associated with each wire;

e. whereby selective activation of electric current to each wire causes said wires to expand and contract in a predetermined manner to cause said disk to pivot in a predetermined manner to thereby orient said disk to a predetermined position.





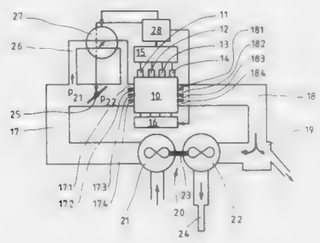
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**4,742,681**

## MULTI-CYLINDER INTERNAL COMBUSTION ENGINE WITH FUEL INJECTION, IN PARTICULAR A TURBO-ENGINE

**Eberhard Haberkern, Unterheinriet; Gerhard Lotterbach, Markgroningen; Jan F. van Woudenberg, Schwiegerdingen, and Udo Zucker, Guglingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Dec. 29, 1986, Ser. No. 947,248**
**Claims priority, application Fed. Rep. of Germany, Jan. 22, 1986, 3601700**
**Int. Cl.⁴ F02B** *33/44*
**U.S. Cl. 60—606** **11 Claims**



1. A multi-cylinder internal combustion engine having fuel injection into cylinders of the engine which comprises, an air intake conduit, a throttle valve in said air intake conduit leading to the cylinders, an exhaust gas conduit leading away from the cylinders, a turbocharger having a compressor disposed in the intake conduit and a turbine driving the compressor disposed in the exhaust gas conduit, a regulating valve having an inlet side and an outlet side in a bypass line that communicates with the intake conduit section between the compressor and the throttle valve, a control means, said control means controlling said regulating valve to open below a predetermined value derived from engine operating characteristics such as at least one of pressure, air throughput in the intake conduit, engine rpm, and turbocharger rpm, said regulating valve having an output furnishing combustion air for providing an additional exhaust gas volume to the exhaust gas conduit to serve as an afterburner, characterized in that upon opening of the regulating valve, said control means functions to ignite only a portion of the cylinders at an extremely late instant of ignition with suitable metering of a fuel injection quantity, and a total fuel quantity determining an additional exhaust gas volume is injected into non-ignited cylinders to pass into the exhaust gas volume unburned.

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**4,742,682**

## ENERGY-SAVING, DIRECT-CONTACT, PARALLEL-FLOW HEAT EXCHANGER

**Gad Assaf, Rehovot, and Lucien Bronicki, Yavne, both of Israel, assignors to Geophysical Engineering Co., Seattle, Wash.**

**Filed Feb. 18, 1982, Ser. No. 349,767**
**Int. Cl.⁴ F03G** *7/00*
**U.S. Cl. 60—641.1** **17 Claims**



1. An energy-saving heat exchanger system comprising:

(a) a vertically oriented tower open at the top and bottom for defining a gas-flow conduit;

(b) a spray-head adjacent the top of the tower for spraying droplets of relatively warm liquid into relatively dry gas entering the tower;

(c) collection means adjacent the bottom of the tower for collecting relatively cooler droplets that traverse the tower;

(d) a gas-flow turbine associated with the tower for producing energy in response to the downward flow of gas through the tower;

(e) a closed heat exchanger connected to said collection means for receiving and heating said cooler droplets to form warmer liquid; and

(f) means for supplying said warmer liquid to said spray head.

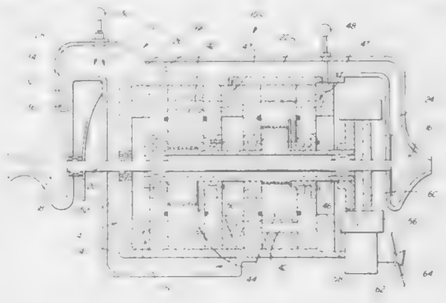
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**4,742,683**

## TURBOCOMPOUND ENGINE

**William W. Heminghous, Theodore, and J. Albert McEachern, Jr., Mobile, both of Ala., assignors to Teledyne Industries, Inc., Los Angeles, Calif.**

**Filed Aug. 18, 1986, Ser. No. 897,331**
**Int. Cl.⁴ F02B** *73/00*
**U.S. Cl. 60—716** **6 Claims**



1. A turbocompound engine comprising

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a diesel cycle rotary internal combustion chamber having a first output shaft,
a turbine engine having a second output shaft,
said first and second shafts being coaxial with said second shaft extending through said first shaft,
means for connecting said output shafts together so that said shafts rotate in synchronism with each other, and
means driven by said connecting means which provides a rotary output from said turbocompound engine,
wherein said turbine engine comprises a turbine, a compressor, a combustor and fluid conduit means for fluidly connecting said combustor in series between said turbine and said compressor, and wherein said internal combustion engine comprises a combustion chamber having an inlet and an outlet, and comprising
means for fluidly connecting said combustion chamber inlet to said fluid conduit means between said compressor and said combustion chamber,
means to fluidly connect said combustion chamber outlet to said combustor, and
valve means for variably dividing fluid flow through said fluid conduit means between said combustor and said combustion chamber inlet.

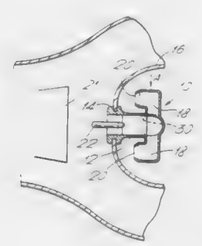
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**4,742,684**

## FUEL VAPORIZERS FOR A GAS TURBINE ENGINE COMBUSTION ENGINE

**Arthur Sotheran, Bristol, England, assignor to Rolls-Royce plc, London, England**

**Continuation of Ser. No. 445,096, Nov. 29, 1982, abandoned. This application Oct. 15, 1984, Ser. No. 660,556**
**Claims priority, application United Kingdom, Dec. 24, 1981, 8138955**
**Int. Cl.[4] F02C** *7/22*
**U.S. Cl. 60—738** **3 Claims**



1. A fuel vaporizer for a gas turbine engine, comprising:
(a) a hollow cylindrical stem having a first end and a second end, said first end defining an inlet and being connected to an upstream wall of a combustion chamber, said second end being closed, said hollow cylindrical stem defining a longitudinal axis;
(b) a first and second branch duct extending along a second axis transverse to said longitudinal axis in diametrically opposite directions at the second end of said hollow cylindrical stem, each said branch duct defining an outlet facing toward the first end of said hollow cylindrical stem;
(c) a fuel injector located within said hollow cylindrical stem having a first and second nozzle for injecting fuel into the hollow cylindrical stem, said nozzles being spaced apart along a third axis substantially perpendicular to both said longitudinal axis and said second axis, said nozzles directing fuel toward an inner wall of the hollow stem; and
(d) baffle means for ensuring substantially equal distribution of said injected fuel to said first and second branch ducts, respectively.

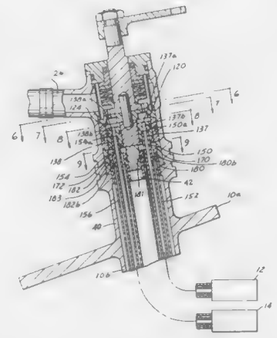
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**4,742,685**

## FUEL DISTRIBUTING AND METERING ASSEMBLY

**Robert M. Halvorsen, Birmingham; Jerome R. Bradley, Sterling Heights, and Gregory F. Long, Canton, all of Mich., assignors to Ex-Cell-O Corporation, Troy, Mich.**

**Filed Nov. 4, 1986, Ser. No. 926,492**
**Int. Cl.[4] F02C** *1/00*
**U.S. Cl. 60—739** **20 Claims**



1. A fuel distributing and metering valve assembly comprising:
(a) a valve body having a fuel inlet and an internal chamber which receives fuel from the inlet,
(b) a movable valve disposed in the chamber and having spaced apart first and second valve orifices for generating first and second fuel flows,
(c) a valve seat disposed in the chamber and having spaced apart first and second seat orifices relative to which the respective valve orifices are moved by movement of the valve to meter the first and second fuel flows,
(d) first and second fuel discharge paths in the chamber downstream of the valve seat for receiving and discharging the respective first and second metered fuel flows including first and second upstream discharge passages spaced apart for receiving the respective first and second metered fuel flows from the respective seat orifices and first and second downstream discharge passages nested longitudinally one within the other and displaced transversely relative to at least one of said first and second upstream discharge passages and including a discharge passage transversely interconnecting said at least one of said first and second upstream discharge passages with the respective one of the first and second downstream discharge passages displaced transversely therefrom, and
(e) means for moving the valve relative to the valve seat.

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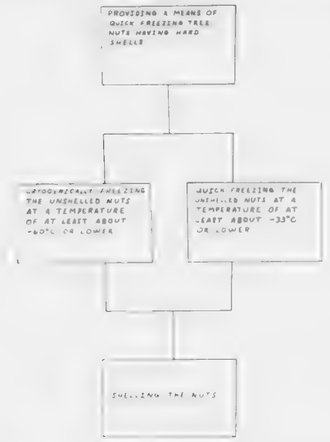
**4,742,686**

## PROCESS FOR INCREASING TREE NUT SHELLING EFFICIENCY

**Douglas P. Cook, 220 Main St., Summerville, W. Va. 26651**

**Filed Feb. 3, 1987, Ser. No. 10,589**
**Int. Cl.[4] F25D** *17/02*
**U.S. Cl. 62—64** **2 Claims**

1. A process for increasing tree nut shelling efficiency comprising the steps of:
A. providing a means of quick freezing tree nuts having hard shells, and then,
B. quick freezing the unshelled nuts at a temperature of at least about −33° C. or lower to minimize ice crystal formation in the cells of the nut kernels whereby the nut kernels become harder than the nut shells, and immediately thereafter,




C. shelling the nuts by conventional mechanical shelling means while the kernels are still harder than the shells, thereby minimizing nut kernel damage.

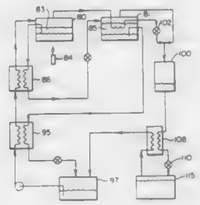
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**4,742,687**

## DUAL COOLING/HEATING PROCESS AND COMPOSITION

**Edward A. Reid, Westerville; F. Bert Cook, Columbus; Edgar M. Purvis, Jr., Troy, and Horatio H. Krause, Jr., Columbus, all of Ohio, assignors to Columbia Gas System Service Corporation, Wilmington, Del.**

**Division of Ser. No. 683,187, Nov. 13, 1984, Pat. No. 4,646,541. This application Dec. 22, 1986, Ser. No. 945,086**
**Int. Cl.[4] F25B** *15/00*
**U.S. Cl. 62—112** **10 Claims**



1. In an absorption refrigeration and/or heating process wherein a highly volatile, chemically and thermally stable refrigerant is alternately absorbed in and expelled from an absorbent solution in a double effect process with condensation and alternate evaporation steps being accomplished at ambient air temperatures, the improvement wherein the refrigerant is ammonia and the absorbent is sodium thiocyanate and the solution is conveyed through a plurality of generators arranged in series and refrigerant is expelled from the solution in each generator.

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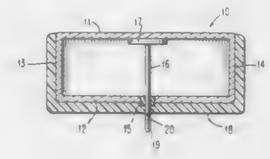
**4,742,688**

## LEVEL INDICATOR FOR CARBON DIOXIDE SNOW IN A COLD BOX

**Julius Rubin, 54 Madison Ave., Franklin Square, N.Y. 11010**

**Filed Mar. 5, 1987, Ser. No. 22,121**
**Int. Cl.[4] F25B** *49/00*
**U.S. Cl. 62—125** **10 Claims**

1. A device for indicating the level of $CO_2$ snow in a cold box that is used to provide refrigeration and is mounted along the ceiling of a vehicle used for the transportation of goods requiring refrigeration, which comprises a shaft extending vertically through a bearing disposed at the bottom wall of said cold box, and a disk attached to the top end of said shaft within



said cold box, said shaft being normal to said disk and having a length greater than the depth of said cold box so that the bottom end of said shaft at all times projects outwardly from said bottom wall of said cold box.

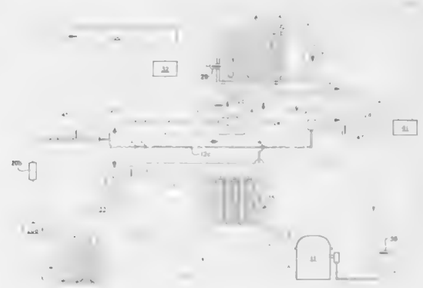
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**4,742,689**

## CONSTANT TEMPERATURE MAINTAINING REFRIGERATION SYSTEM USING PROPORTIONAL FLOW THROTTLING VALVE AND CONTROLLED BYPASS LOOP

**Albert R. Lowes, Auburn, Calif., assignor to Mydax, Inc., Auburn, Calif.**

**Filed Mar. 18, 1986, Ser. No. 840,847**
**Int. Cl.[4] F25B** *41/04*
**U.S. Cl. 62—197** **12 Claims**



1. A vapor-compression refrigeration system utilizing a liquid-gas refrigerant in a closed flow loop for maintaining a substantially constant set point temperature in a body of fluid to be cooled and having a continuously-operating compressor, a condenser downstream of the compressor in a main loop for cooling compressed gas refrigerant, and an evaporator in a first branch of the main loop, for transferring heat from the fluid to be cooled to the refrigerant, the system including a first, smoothly variable, analog refrigerant flow controllable throttling valve in the first branch immediately upstream from the evaporator, a second branch of the main loop bypassing said first throttling valve in said first branch and including a second, smoothly variable, analog refrigerant flow controllable throttling valve, and electrical control means, including first temperature sensor means for sensing temperature of the refrigerant immediately downstream of said first throttling valve, second temperature sensor means for sensing temperature of the body of fluid to be cooled and input means for receiving said set point temperatures for the fluid, said electrical control means for scanning the first and second temperature sensor means and the input means for generating a control value for each said throttling valve for modulating the flow rate of refrigerant through each said throttling valve in response to

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difference between set point temperature and sensed fluid temperature in a manner which enables said compressor to remain in continuous operation.

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**4,742,690**

## APPARATUS AND METHOD FOR CRYOPREPARING BIOLOGICAL TISSUE FOR ULTRASTRUCTURAL ANALYSIS

**John G. Linner, The Woodlands, Tex., assignor to Board of Regents, The University of Texas System, Austin, Tex.**

**Continuation-in-part of Ser. No. 777,083, Sep. 17, 1985, abandoned, which is a continuation of Ser. No. 676,855, Nov. 30, 1984, Pat. No. 4,567,847, which is a continuation-in-part of Ser. No. 525,626, Aug. 23, 1983, Pat. No. 4,510,169. This application Dec. 16, 1986, Ser. No. 942,172**

**Int. Cl.[4] F25D** *23/00*

**U.S. Cl. 62—264** **3 Claims**



1. Apparatus for supporting biological tissue during cryopreparation comprising:

(a) a thermally conductive sample holder including a central aperture and a plurality of tissue reservoirs, at least a portion of the interior surfaces of each of said tissue reservoirs including a spectral material;

(b) a separate reservoir cover adapted to be inserted into each said sample reservoir in said sample holder, each said reservoir being adapted to retain one or more biological tissue samples, each said reservoir cover including a plurality of apertures to enable moisture to flow from said tissue samples;

(c) energy means for supplying radiant energy to said biological tissue contained within said tissue reservoirs, said energy means being sized to fit within said aperture and adapted to supply radiant heat to said biological samples; and

(d) a sensor for sensing the temperature of said sample holder.

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**4,742,691**

## DEHUMIDIFIER

**Robert W. Kennedy, Bridgewater Township, Somerset County, N.J., assignor to White Consolidated Industries, Inc., Cleveland, Ohio**

**Filed Jun. 2, 1986, Ser. No. 869,418**

**Int. Cl.[4] F25D** *23/12*

**U.S. Cl. 62—272** **25 Claims**

1. A portable dehumidifier comprising:

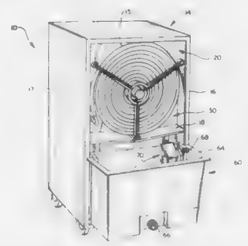
a horizontal base member;

a frame supported by the base member, the frame providing an air flow duct through which air can pass;

a motor-driven fan for inducing the flow of air through the duct;

a condenser/evaporator module having a condenser coil, an evaporator coil, and a retaining means engaging both of the coils to hold the coils in position relative to each other, the retaining means including mounting portions engageable with wall portions of the frame defining said duct, said retaining means positioning and supporting said module within said duct; and

a hermetic refrigeration compressor providing refrigerant to the condenser/evaporator module:



said frame being a one-piece molded plastic member including, as an integral portion thereof, a crosspiece extending generally diametrically across said duct, said module, when mounted in said duct, abutting said crosspiece, to maintain said module in position within said duct said module including a spirally wound springlike condenser coil that is generally compressed between said crosspiece and remaining portions of said module to minimize mechanical vibration of said condenser coil within said duct.

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**4,742,692**

## METHOD OF AIR-CONDITIONING AND SYSTEM FOR THE SAME

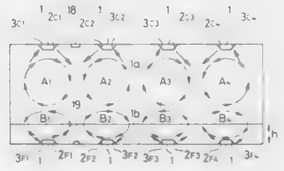
**Yoshiyuki Yoneda, Mito; Tadashi Gotoh; Masanori Yamakawa, both of Hitachi; Masakazu Matsumoto, Kudamatsu, and Hisashi Yamamoto, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Nov. 7, 1986, Ser. No. 927,954**

**Claims priority, application Japan, Nov. 11, 1985, 60-250772**

**Int. Cl.[4] F25D** *17/06*

**U.S. Cl. 62—414** **5 Claims**



1. A method of air-conditioning which forms, in a space to be air-conditioned, a plurality of continually colliding circulating flows of air respectively blown through air outlets of an air-conditioning system disposed at predetermined separated positions within said space, said method comprising: a first step of changing the effective range of at least one of said plurality of circulating flows by means of changes in air flow rate and air flow angle while maintaining continual collision thereof; and a second step of returning said at least one of said circulating flows as effected in the first step to said effective range of said at least one of said circulating flows which obtained before the first step, wherein said first and second steps are successively repeated.



**4,742,693**

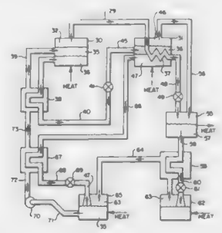
## ABSORPTION REFRIGERATION AND HEAT PUMP SYSTEM

**Edward A. Reid, Jr., Westerville; F. Bert Cook, Columbus; Stephen P. Cremean, Gahanna, all of Ohio; Richard H. Merrick, Newburgh, Ind., and Edgar M. Purvis, Troy, Ohio, assignors to Columbia Gas System Service Corp., Wilmington, Del.**

**Continuation-in-part of Ser. No. 683,187, Nov. 13, 1984, Pat. No. 4,646,541. This application Dec. 22, 1986, Ser. No. 945,090**

**Int. Cl.[4] F25B** *15/00*

**U.S. Cl. 62—476** **14 Claims**



1. In a multiple effect absorption refrigeration and/or heating system including a plurality of generators and a plurality of heat exchanging recuperators, the improvement comprising:

(a) a source of external heat in proximity to at least one of the generator means;

(b) a first generator means constructed as a plurality of coils with the coils juxtaposed one to the next, in a generally annular composite form, with the first generator means surrounding the source of heat;

(c) a first recuperator means comprising a plurality of coils with the coils juxtaposed one to the next, in a generally annular composite form, and with the recuperator means surrounding the first generator means;

(d) a second generator means constructed as a plurality of coils with the coils juxtaposed one to the next, in a generally annular composite form, with the second generator means surrounding the first recuperator means; and

(e) a second recuperator means comprising a plurality of coils with the coils juxtaposed one to the next, in a generally annular composite form, and with the second recuperator means surrounding the second generator means.

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**4,742,694**

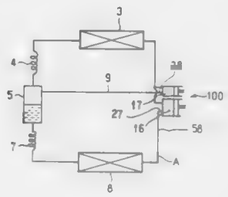
## REFRIGERANT APPARATUS

**Yasushi Yamanaka, Kariya; Kauya Nakagawa, Oobu, and Hisashi Tanaka, Kariya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan**

**Filed Apr. 17, 1987, Ser. No. 39,284**

**Int. Cl.[4] F25B** *1/10*

**U.S. Cl. 62—510** **4 Claims**



1. A refrigerant apparatus, comprising:

a compressor having a plurality of cylinders, a plurality of pistons provided within said cylinders in such a manner that said pistons reciprocate within said cylinders, a single drive shaft functionally connected with each of said pistons so that said pistons reciprocate within said cylinders, a plurality of discharge chambers connected to said cylinders, and a plurality of suction chambers connected to said cylinders, said compressor sucking, compressing and discharging coolant;

a condenser connected to all of said plurality of discharge chambers of said compressor so that the coolant discharged from said compressor to said condenser is condensed;

a first expansion valve means connected to said condenser for reducing the pressure of the coolant downstream from said condenser;

a gas-liquid separator connected to said first expansion valve means so that the coolant introduced into said gas-liquid separator from said first expansion valve means is separated into its gas phase and liquid phase, at least one of said plurality of suction chambers of said compressor being connected to an output which outputs the gas phase;

a second expansion valve means connected to an output of said gas-liquid separator outputting the gas phase of said coolant for reducing the pressure of the coolant passing therethrough; and

an evaporator connected to an output of said second expansion valve means so that the coolant passing through said evaporator is evaporated, the plurality of suction chambers other than said at least one suction chamber being connected to an output of said evaporator.

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**4,742,695**

## BROOCH

**Carl Elsener, Uetlibergstrasse 60, CH-8902 Urdorf, Switzerland**

**Filed Jan. 30, 1986, Ser. No. 824,185**

**Claims priority, application Switzerland, Feb. 14, 1985, 676/85**

**Int. Cl.[4] A44C** *1/00, 15/00*

**U.S. Cl. 63—1.1** **5 Claims**

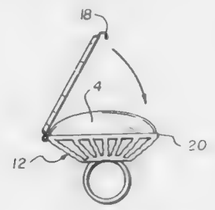


1. A brooch comprising two separable parts (1,2) aligned in a common plane and connected by a hinge (4), the rotational axis (3) of said hinge being arranged perpendicular to the plane of said brooch, said two parts being provided with fastening elements (5–9) arranged diametrically opposite said hinge, a pin (10) rigidly attached to the back of one of said parts of said brooch adjacent to said fastening elements and extending across the back of said brooch, and an eye (11) rigidly attached on the back of the other of said parts of said brooch adjacent said hinge and approximately diametrically opposite the attachment point of said pin, whereby said two parts of said brooch are positively locked by engagement of said fastening elements and said pin is engaged in said eye when said two parts of said brooch are rotated toward one another, and said fastening elements are disengaged and said pin is disengaged from said eye when said two parts of said brooch are rotated away from one another.

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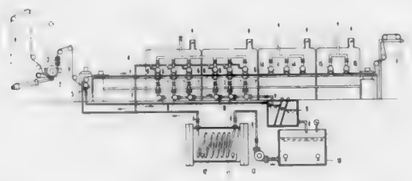
**4,742,696**
**RING WITH REPLACEABLE STONES**
**Mary A. Jenkins, 364 Timberlane Dr., Gretna, La. 70053**
**Filed Mar. 21, 1983, Ser. No. 477,153**
**Int. Cl.[4] A44C** *9/00, 17/02*
**U.S. Cl. 63—15** **1 Claim**



1. An article for securing an interchangeable stone upon a ring bezel or jewelry flat surface comprising:
(a) a base having means for attachment of the ring to the finger of a person;
(b) a plurality of posts radially affixed to and upstanding from said ring base;
(c) a bezel base having an essentially flat extended top secured to the non-base ends of said posts;
(d) an open clamping lid hingedly affixed to one side of said bezel base and being geometrically similar to said bezel base, having an open central area;
(e) a plurality of interchangeable stones of decorative appearance geometrically similar to said bezel base and clamping lid one of which is to be restrained therebetween and exposed to view through the open central area of said lid;
(f) and a hook clasp on the side of said clamping lid remote from said hinge for securing said lid over the stone and removably clamping the stone against the bezel until the wearer desires to change the decorative stone with another.

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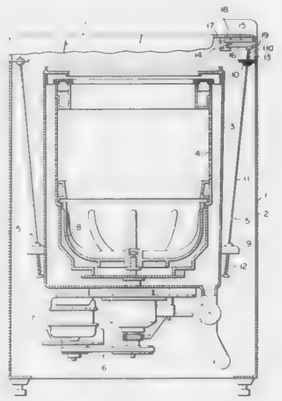
**4,742,697**
**APPARATUS FOR CONTINUOUS WET HEAT TREATMENT OF A CLOTH**
**Yoshikazu Sando, and Hiroshi Ishidoshiro, both of Wakayama, Japan, assignors to Sando Iron Works Co., Ltd., Wakayama, Japan**
**Filed Jul. 25, 1986, Ser. No. 890,833**
**Claims priority, application Japan, Aug. 7, 1985, 60-121355; Aug. 7, 1985, 60-173893**
**Int. Cl.[4] D06B** *5/08*
**U.S. Cl. 68—5 D** **3 Claims**



1. An apparatus for continuous wet heat treatment of a cloth, comprising:
a water tank for applying high temperature hot water to a cloth soaked with a treating solution so as to swell the cloth, and a tenter for transporting the thus swelled cloth while giving tension in the width direction of the cloth, and
three groups of jet nozzles for jetting, respectively, a high temperature and high humidity hot fluid, hot blast and cold blast to the cloth in succession along the direction of transporting the cloth by means of said tenter.

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**4,742,698**
**WASHER-DEHYDRATOR**
**Fumio Torita, Nagoya, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**
**Filed May 14, 1986, Ser. No. 863,149**
**Claims priority, application Japan, May 16, 1985, 60-104495; Jun. 18, 1985, 60-132762**
**Int. Cl.[4] D06F** *23/04, 33/02, 37/24*
**U.S. Cl. 68—12 R** **21 Claims**



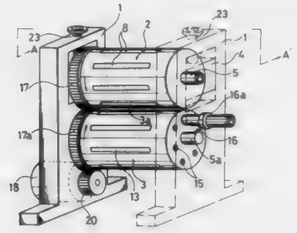
1. A washer-dehydrator comprising:
a casing;
a rotating tub disposed in said casing and adapted to hold an object of dehydration therein;
supporting means for movably supporting said rotating tub against said casing and allowing for vertical movement of said rotating tub;
drive means for rotating said rotating tub;
a weight detector delivering an output signal indicative of a change of electrostatic capacitance corresponding to a change in a weight load of said rotating tub, said weight detector including:
a fixed electrode fixed to said casing,
a movable electrode facing said fixed electrode so that said movable electrode's movement corresponds to said vertical movement of said rotating tub to cause a change in said electrostatic capacitance between said electrodes, and
control means for controlling said drive means in accordance with said output signal from said weight detector to regulate the rotation of said rotating tub.

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**4,742,699**
**APPARATUS FOR COLORING TEXTILE MATERIALS**
**Shuichi Nakahara, Nishinomiya; Toru Koide, Yao; Michinobu Kaimori, Nara; Kenji Kitamura, Suzuka, and Satoshi Matsumoto, Takatsuki, all of Japan, assignors to Kanebo, Ltd., Tokyo, Japan**
**Filed Jan. 30, 1987, Ser. No. 8,884**
**Claims priority, application Japan, Aug. 21, 1986, 61-196533; Sep. 30, 1986, 61-234140**
**Int. Cl.[4] D06B** *1/16*
**U.S. Cl. 68—203** **7 Claims**

1. An apparatus for coloring textile materials characterized by comprising a color supply drum and a color suction drum as vertically juxtaposed with a clearance therebetween for passage of a continuous length of fibrous material, said color supply drum being provided with a plurality of axially- extending color supply means as arranged at predetermined intervals in the circumferential direction thereof and said color suction drum being provided with a plurality of axially-extending color suction means as arranged in the circumferential direction thereof and a rotary drive means for driving said two

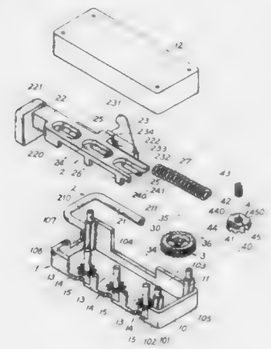




drums in synchronism whereby said color supply means of said color supply drum are successively lined up with said color suction means through said clearance therebetween for passage of the fibrous substrate material.

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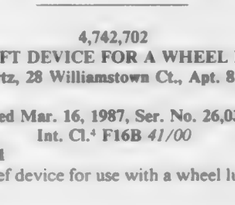
**4,742,700**
**LINEARLY OPERATING SIDE-LOCKED PADLOCK**
**Chong-Kuan Ling, P.O. Box 53-58, Taipei, Taiwan**
**Filed Aug. 24, 1987, Ser. No. 88,568**
**Int. Cl.[4] E05B** *37/14*
**U.S. Cl. 70—25** **6 Claims**



1. A linearly operating side-lock padlock comprising:
a casing including a base generally shaped as a rectangle having plural pivots formed thereon and having a left side wall formed with plural dial openings, a right side wall formed with a longitudinal slot, a lower side wall, and an upper side wall formed with an upper opening and a cover mounted on said base;
a locking means including an U-shaped fixed shackle having its short leg protruding on the upper side wall and having its long leg parallelly formed aside the right side wall, a reciprocating actuator generally shaped as a rectangle having a movable shackle fastener protruding rightwardly thereon for slidingly reciprocating through said longitudinal slot on said right side wall and operatively formed a loop with the long leg of said shackle, plural longitudinal slots formed on said actuator each disposed around each said pivot on said base, plural pairs of extensions formed on both right and left sides if each said slot on the actuator, a restoring spring resiliently retaining said actuator upwardly against said lower side wall of said casing and a button secured to a neck portion of said actuator reciprocating through said opening on said upper side wall;
plural dials each rotatably mounted on each said pivot and partially protruding leftwardly through said dial openings formed on said casing; and plural clutch wheels each rotatably mounted on each said pivot and superimposedly engaged with each said dial as retained by a spring jacketed on said pivot, said wheel formed with two secant recesses operatively engaged with said two extensions formed on said actuator, whereby upon the downward depression of said button of said actuator and upon the rotating of said wheels to allow each said pair of extensions on said actuator passing said secant recesses of said wheel, said movable shackle fastener is separated from said U-shaped shackle to unlock the padlock.

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**4,742,701**
**TRAILER LOCK**
**Donald Scavetto, 106 Hobart Dr., Laurel Springs, N.J. 08021**
**Filed Jun. 18, 1987, Ser. No. 63,498**
**Int. Cl.[4] E05B** *63/14*
**U.S. Cl. 70—121** **6 Claims**



1. In a truck, container, garage or similar structure having a compartment therein and an opening in one wall thereof adapted to be closed by a door and including a door movable between an open and a closed position, the improvement comprising:
a vertically movable elongated rod means carried by said door adjacent an edge thereof;
a plurality of pins pivotally mounted on said rod means;
a plurality of pin apertures in said structure adjacent said door edge and means for guiding said pins into said pin apertures as said rod means moves downwardly to lock said door in said closed position, said guide means guiding said pins out of said pin apertures as said rod means is moved upwardly to allow said door to be opened;
said rod means, said pins and said pin apertures being inaccessible from the exterior of said structure;
a lifting bar rigidly secured to said rod means, said lifting bar being accessible from the exterior of said door and being adapted to be manually moved upwardly or downwardly to thereby move said rod means upwardly or downwardly;
a key lock mechanism carried by said door and located behind the outer surface thereof, said lock mechanism having a locking element movable between a locking position and an unlocked position, said locking element cooperating with said rod means to lock the same downwardly when said locking element is moved into its locking position;
said lock mechanism having a keyhole arranged in an axis which is substantially parallel to the plane of said door, and
a recess within said door, said keyhole being accessible from the exterior of said door through said recess.

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**4,742,702**
**ANTI-THEFT DEVICE FOR A WHEEL LUG NUT**
**Edward P. Swertz, 28 Williamstown Ct., Apt. 8, Cheektowaga, N.Y. 14227**
**Filed Mar. 16, 1987, Ser. No. 26,036**
**Int. Cl.[4] F16B** *41/00*
**U.S. Cl. 70—231** **14 Claims**

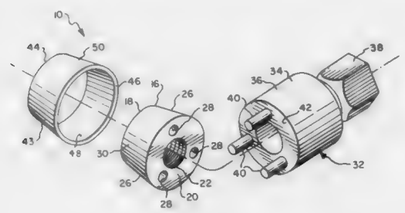
1. An anti-thief device for use with a wheel lug nut having a

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body defining an inner face for facing a wheel rim secured by the lug nut, an opposite outer face and an exterior surface extending between the outer and inner faces, said nut body being frustoconical in shape throughout its entire length so that the inner face is smaller than the outer face, said device comprising:

an elongated sleeve-like body having two opposite inner and outer ends and interior and exterior surfaces extending between said inner and outer ends, said exterior surface being frustoconical in shape throughout its entire length



so that said inner end is smaller than said outer end and said interior surface being shaped complementary to that of the frustoconical form of the exterior surface of the nut, said sleeve-like body being of such a size that said device body can be loosely fitted about and substantially cover the exterior surface of the nut to thereby be retained upon the nut between the wheel rim and the frustoconical configuration of the lug nut and to thereby permit relative rotation between said sleeve-like body and the lug nut if said exterior surface of said sleeve-like body is manipulated with a pipe wrench and the like.

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**4,742,703**

## CYLINDER LOCK AND KEY WITH ROTATING ELEMENTS

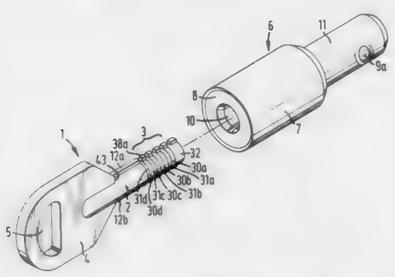
**Norman B. DeWalch, and Donald P. DeWalch, both of 1213 West Loop North, Suite 180, Houston, Tex. 77055**

**Filed Mar. 17, 1986, Ser. No. 839,283**

**Claims priority, application United Kingdom, Apr. 4, 1985, 85-08961**

**Int. Cl.⁴ E05B** *29/02, 19/08*

**U.S. Cl. 70—366** **20 Claims**



1. A key for use with a lock having at least one tumbler therein, comprising:

(a) a handle,

(b) a generally cylindrical shank extending from the handle,

(c) at least one bit rotatably mounted on and coaxial with the axis of the shank;

(d) internal means for limting the degree of rotation of the bit relative to the shank, located at the interface between the shank and bit,

(e) the bits remaining free to rotate relative to the shank, within preset limits, when the key is inserted in the lock, and

(f) means for interlocking the rotation of the bit to the tumbler of the lock.

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**4,742,704**

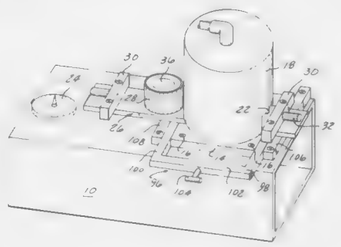
## HYDRAULIC JEWELRY PRESS

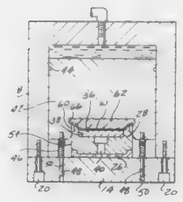
**Robert Wellington, and Louis Bell, both of Albuquerque, N. Mex., assignors to Rio-Grande-Albuquerque, Inc., Albuquerque, N. Mex.**

**Filed Apr. 3, 1987, Ser. No. 33,836**

**Int. Cl.⁴ B21D** *22/10*

**U.S. Cl. 72—57** **6 Claims**





1. A press for pressing a relatively thin metal plate against a die face comprising a stationary base, a vertically disposed hydraulic cylinder fixedly mounted at its lower end upon said base, a piston slidably received within said cylinder, means biassing said piston to a normally maintained rest position adjacent the upper end of said cylinder, means defining a die receiving passage extending diametrically through the lower end of said cylinder, a die having an upwardly facing blank supporting die face and vertically extending side walls, die carrier means mounting said die upon said base for movement along a first fixed path extending through said passage to selectively locate said die in an inactive position outside of said cylinder and a ready position aligned with said cylinder, means defining a die receiving recess in the lower face of said piston extending upwardly into said piston to an upper end, said recess being adapted to slidably receive the side walls of said die, a resilient forming pad mounted within said piston at the upper end of said recess, fluid pressure supply means, and control means operable only when said die is in said ready position for conducting fluid under pressure from said supply means to the upper end of said cylinder to drive said piston downwardly from its rest position to cause said pad to press a blank located upon said die face against said die face. said control means comprising a manually movable valve actuator mounted on said base for movement from an off position to an on position to establish a fluid connection between said supply means and the upper end of said cylinder, and abutment means mounted on said manually movable actuator operable to mechanically block said movement to said on position unless said die is in said ready position.



**4,742,705**

## METHOD AND APPARATUS FOR FORMING SINUOUS LEAD WIRE

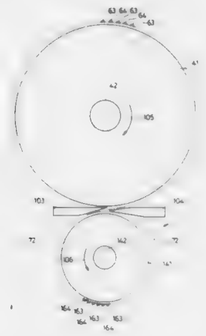
**Kunikazu Nakahara, Kyoto, and Kenichi Watanabe, Ootsu, both of Japan, assignors to Murata Manufacturing Co., Ltd., Japan**

**Filed Dec. 24, 1984, Ser. No. 685,399**

**Claims priority, application Japan, Dec. 29, 1983, 58-248139**

**Int. Cl.⁴ B21F** *01/04*

**U.S. Cl. 72—187** **13 Claims**



1. An apparatus for forming a sinuous lead wire, comprising:

a first pin series composed of a plurality of first pins arranged with an equal pitch,

a second pin series composed of a plurality of second pins arranged with an equal pitch to form a row extending along said first pin series, said second pin series being shifted by a half pitch from said first pin series, and

pin drive means for relatively moving the first and second pins in a direction substantially at right angles to the direction in which the first and second pin series extend, with a material lead wire disposed between said first and second pin series to extend in the direction in which the pin series extend, in such a manner that each said first pin enters between corresponding ones of said second pins;

a third pin series composed of a plurality of third pins arranged with a pitch which is smaller than that of the first and second pins, and

a fourth pin series composed of a plurality of fourth pins arranged with an equal pitch which is the same as that of said third pins to form a row extending along said third pin series and shifted by a half pitch from said third pin series, wherein

said first and second pin series are arranged in two rows circumferentially on the outer periphery of a first rotary body driven for rotation, and the pins included in at least one of said first and second pin series are moved independently of each other to enter between mating pins,

said third and fourth pin series are arranged in two rows circumferentially on the outer periphery of a second rotary body rotated in a direction opposite to the direction of rotation of the first rotary body by a second rotary shaft parallel to said first rotary body, and the pins included in at least one of said third and fourth pin series are movable independently of each other so that the distance between each pin and its mating pin can be changed,

said pin drive means drives the third and fourth pins to relatively move them in a direction substantially at right angles to the direction in which the pin series extend, in such a manner that the distance between each third pin and its mating fourth pin can be changed, and

a material lead wire is continuously transferred from the outer periphery of said first rotary body to the outer periphery of said second rotary body.

**4,742,706**

## STRAIN IMPARTING DEVICE

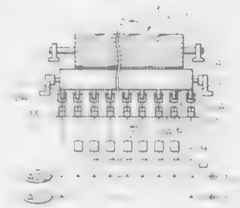
**Eiji Sasaki; Mitsuo Murata; Hisashi Kobayashi; Katsuro Kuroki, all of Kitakyushu; Hisao Kitsunezaki; Kengo Yoshioka, both of Chiyoda, and Mikio Nakamura, Kitakyushu, all of Japan, assignors to Nippon Steel Corporation and Nittetsu Plant Designing Corporation, both of, Japan**

**Filed Apr. 29, 1986, Ser. No. 857,649**

**Claims priority, application Japan, Oct. 14, 1985, 60-226699; Oct. 14, 1985, 60-226700**

**Int. Cl.⁴ B21B** *3/02, 13/14*

**U.S. Cl. 72—197** **1 Claim**



1. A device for imparting strain to a steel sheet by which deformed regions spaced at a desired distance and having a minute linear shape are continuously formed, comprising:

a strain imparting roll having projected portions on the surface thereof;

a press roll provided opposite to said strain imparting roll;

a row of a plurality of groups of first back-up rolls for pressing against said press roll provided with spaces of a desired distance therebetween in a longitudinal direction of the press roll;

a plurality of first fluid pressure cylinders, one connected to each group of the first back-up rolls via a bearing;

a first fluid supply source connected to said first fluid pressure cylinders via a plurality of selective changeover valves, one connected between each said cylinder and said source;

a pair of groups of second back-up rolls provided at both outer ends of said first back-up rolls;

a pair of second fluid pressure cylinders, one connected to each group of the second back-up rolls via a bearing; and

a second fluid supply source connected to said second fluid pressure cylinders.

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**4,742,707**

## DEVICE FOR FORMING A COAXIAL CORRUGATION IN A THIN-WALLED TUBE

**Maximilian Hammer, Windach; Johann Münich, Munich, and Ludwig Röhrl, Pasenbach, all of Fed. Rep. of Germany, assignors to MAN Technologie GmbH, Fed. Rep. of Germany**

**Filed Feb. 19, 1987, Ser. No. 16,549**

**Claims priority, application Fed. Rep. of Germany, Feb. 20, 1986, 3605440**

**Int. Cl.⁴ B21J** *9/18;* **B21D** *39/08*

**U.S. Cl. 72—454** **8 Claims**

1. A device for forming a coaxial corrugation in a thin-walled tube, comprising:

a. A mandril around which a tube is placed;

b. at least one forming member having a female groove therein, into which the tube wall is pressed, said groove being coaxial with said mandril;

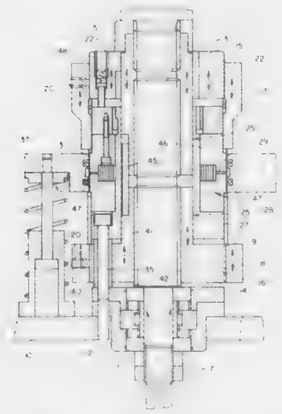
c. jaws arranged around the mandril, said jaws being axially displaceable during the formation of said corrugation, said jaws including thrust rings which axially engage opposite radial ends of the tube; and

d. means for moving said thrust rings axially towards each other during the formation of the coaxial corrugation, said moving means including a coaxially and centrally arranged lead screw with oppositely threaded screw sec-

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tions for driving said thrust rings, and each thrust ring engaging the lead screw at an oppositely threaded screw



section, such that rotation of the thrust screw moves said thrust rings towards each other.

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**4,742,708**

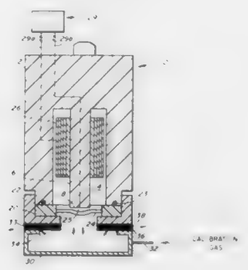
## APPARATUS FOR ELECTROCHEMICAL SENSOR CALIBRATION

**Ronald G. Porter, Anaheim Hills, Calif., assignor to Beckman Industrial Corporation, Santa Ana, Calif.**

**Continuation of Ser. No. 896,082, Aug. 13, 1986, abandoned. This application May 18, 1987, Ser. No. 51,475**

**Int. Cl.[4] G01N** *37/00*

**U.S. Cl. 73—1 G** **1 Claim**



1. An electrochemical gas detection system comprising an electrochemical sensor having a housing defining a reservoir for electrolyte, an anode and a cathode disposed in said reservoir for contact with electrolyte contained therein, said housing having an opening in one surface thereof for communication between the reservoir and the exterior of said housing, a gas permeable, electrolyte impermeable membrane sealing said opening, means connecting said anode and cathode to a source of power and amplification and measurement instrumentation, a calibration system including a body having an interior chamber and open at one end, said body being removably attached to said housing with its open end in alignment with the opening in said housing for communication between the gas permeable, electrolyte impermeable membrane and the body interior to define a calibration chamber for said electrochemical sensor and means including a source of calibration gas for leading said calibration gas into said calibration chamber, the improvement comprising a fabric attachment member carried on said housing surface adjacent the opening therein and a corresponding fabric attachment member disposed on an opposing surface of said body adjacent the opening to the interior thereof, each said fabric attachment member having a surface for cooperation with the surface of the corresponding member to removably secure said housing and said body for calibration of said electrochemical sensor, said attachment members permitting the diffusion of calibration gas from the calibration chamber in the event calibration gas pressure exceeds atmospheric pressure thereby to maintain essentially atmospheric pressure on said gas permeable, electrolyte impermeable membrane during calibration of said electrochemical sensor.

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**4,742,709**

## POWERPLANT SIMULATORS FOR AIRCRAFT

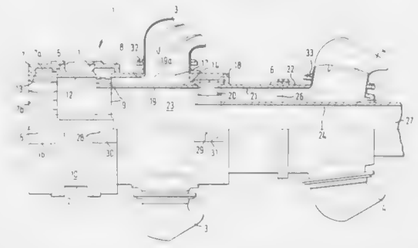
**Robert G. A. Angel, Farnham, United Kingdom, assignor to British Aerospace PLC, London, England**

**Filed Jun. 5, 1987, Ser. No. 58,369**

**Claims priority, application United Kingdom, Jun. 5, 1986, 8613641**

**Int. Cl.[4] G01M** *15/00*

**U.S. Cl. 73—117.1** **6 Claims**



1. A gas turbine powerplant simulator comprising an engine body having a fluid flow intake means connected for fluid flow with at least one exhaust nozzle by way of a duct;

a first injector stage for injecting primary gas from a primary gas source into said duct so as to induce a flow of secondary gas or air from said intake means into said duct to mix with said primary gas; and

at least one second injector stage connected to said duct at a position intermediate the first stage and said at least one exhaust nozzle for injecting primary gas from a primary gas source into said duct;

wherein the said gas sources are mutually independent of one another.

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**4,742,710**

## ARRANGEMENT HAVING AN AIR-MASS METER FOR AN INTERNAL COMBUSTION ENGINE

**Wolfgang Porth, Frankfurt am Main; Wolfgang Weibler; Eckhardt Kern, both of Hofheim; Thomas Hannewald, Griesheim, and Reiner Weingartner, Hofheim, all of Fed. Rep. of Germany, assignors to VDO Adolf Schindling AG, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Oct. 31, 1986, Ser. No. 926,376**

**Claims priority, application Fed. Rep. of Germany, Nov. 2, 1985, 3539015**

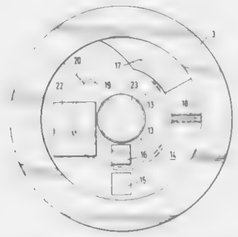
**Int. Cl.[4] G01M** *19/00*

**U.S. Cl. 73—118.2** **21 Claims**

1. In a system having an air-mass meter for an internal combustion engine, in which system a place of measurement of the air-mass meter is located in a measurement tube, said system including a housing, a hollow portion of the housing defining a space which communicates with an intake opening of the internal combustion engine, said system including an air filter having an interior; the improvement wherein

the measurement tube is formed as a substantially circular flow channel around a longitudinal axis of said intake opening, said flow channel extending in a plane normal to said axis and surrounding the space of said portion of the housing, thereby to reduce the height of said housing, said space adjoining said interior of said air filter; and wherein said system further comprises

a division wall which separates said space and said interior of said air filter from each other, said housing and said division wall extending transversely to the longitudinal axis of said intake opening, said mesasurement tube lying outside



of and substantially circumscribing said intake opening to provide an elongated passage for air between said filter and said space, the configuration of said measurement tube constraining air to flow parallel to said plane; and wherein said division wall forms therein an opening which forms an inlet opening of the flow channel, the area of said opening being larger than the cross-sectional area of said flow channel, there being an outlet opening of said flow channel communicating with said space.

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**4,742,711**

## ARRANGEMENT HAVING AN AIR-MASS METER FOR AN INTERNAL COMBUSTION ENGINE

**Wolfgang Porth, Frankfurt am Main; Wolfgang Weibler; Eckhardt Kern, both of Hofheim a. T.; Thomas Hannewald, Griesheim, and Reiner Weingärtner, Hofheim a. T., all of Fed. Rep. of Germany, assignors to VDO Adolf Schindling AG, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Oct. 31, 1986, Ser. No. 926,375**

**Claims priority, application Fed. Rep. of Germany, Nov. 2, 1985, 3539013**

**Int. Cl.[4] G01M** *15/00*

**U.S. Cl. 73—118.2** **21 Claims**



1. In a system having an air-mass meter for an internal combustion engine having an intake opening, there being a place in said system for measurement by the air-mass meter located in a measurement tube, the system further comprising a housing defining an enclosure with a hollow space connected to the intake opening of the internal combustion engine, the improvement comprising

an air filter having an interior; and wherein

said measurement tube is formed a a flow channel which has at least one curved section and one striaght section and connects said interior of said air filter with said hollow space, said flow channel extending in a plane normal to an axis of said intake opening thereby to reduce the height of said housing; and

said measurement place is located in said straight portion of said flow channel; and wherein

said interior of said air filter and of said enclosure are shaped substantially as a flat cylinder, said system further comprising

a divisional wall separating said interior of the said air filter from the interior of said enclosure, said housing and said divisional wall extending traversely of said intake opening, a cross section of said measurement tube being commensurate with said intake opening, said measurement tube lying outside of and substantially circumscribing said intake opening to provide an elongated passage for air between said filter and said intake opening, the configuration of said measurement tube constraining air to flow parallel to said plane.

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**4,742,712**

## SYSTEM FOR MONITORING AIR PRESSURE OF MOTOR VEHICLE

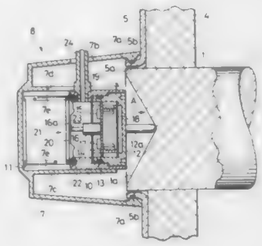
**Sadao Kokubu, Aichi, Japan, assignor to Kabushiki Kaisha Tokai Rika Denki Seisakusho, Aichi, Japan**

**Filed Mar. 19, 1987, Ser. No. 28,182**

**Claims priority, application Japan, Mar. 20, 1986, 61-62827; Nov. 20, 1986, 61-179045[U]; Nov. 28, 1986, 61-183971[U]; Nov. 28, 1986, 61-183970[U]**

**Int. Cl.[4] B60C** *23/02*

**U.S. Cl. 73—146.5** **8 Claims**



7. A system for monitoring air pressure of a vehicle tire which comprises:

first and second oscillating circuits provided on a tire wheel side, oscillating at different frequencies;

a generator provided on the tire wheel side, for generating electric power with the rotation of said tire wheel, which is applied to said first and second oscillating circuits;

a trigger circuit provided on the tire wheel side, said grigger circuit causing said first oscillating circuit to start oscillation when a voltage generated by said generatr exceeds a predetermined value;

a pressure sensor means provided on the tire wheel side, said pressure sensor means causing said second oscillating circuit to start oscillation when the air pressure of said vehicle tire becomes lower than a predetermined value;

a vibration producing means provided on the tire wheel side, and vibrated according to said oscillation frequencies of said first and second oscillating circuits, an vibration output of said vibration producing means being transmitted to a wheel supporting axle shaft; and

a vibration detecting means provided on the axle shaft side to detect the natural vibration of said vibration producing device thereby to determine at least the conditions of said generator and said pressure sensor means.

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**4,742,713**

## ULTRASONIC FLAW DETECTING SYSTEM

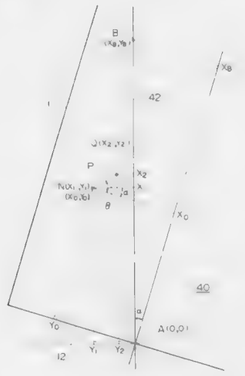
**Akira Abe, Osaka; Isamu Ishida, Tokyo, and Kaneyoshi Katsumata, Yamato, all of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan**

**Continuation of Ser. No. 740,488, Jun. 3, 1985, abandoned. This application Mar. 2, 1987, Ser. No. 21,576**

**Claims priority, application Japan, Jun. 1, 1984, 59-112554; Jun. 1, 1984, 59-112555; Jun. 7, 1984, 59-118671; Jun. 13, 1984, 59-121033; Jun. 18, 1984, 59-124819; Jun. 18, 1984, 59-124820**

**Int. Cl.[4] G01N** *29/00*

**U.S. Cl. 73—620** **8 Claims**



1. A method of locating a flaw position in a weld line of a material to be tested with an ultrasonic scanning unit comprising the steps of:

placing said scanning unit having a probe over said material to be tested at a random angle relative to said weld line, said probe producing probe position data including data of displacements of said probe along an X-axis and a Y-axis and a rotational angle of Θ axis;

aligning a beam index P of said probe with a first reference point A on said weld line of said material to be tested, and reading positional coordinates of said first reference point A in an X and Y coordinate system;

aligning said beam index P of said probe with a second reference point B lying on said weld line a given distance from said first reference point A, and reading the positional coordinates of said second reference point B in said X and Y coordinate system;

transmitting an ultrasonic signal from an ultrasonic flaw detector to said probe and producing flaw detection data on the basis of a reflection echo signal fed back from said probe;

receiving said flaw detection data from said ultrasonic flaw detector and said probe position data from said scanning unit and recording both of said data on an external recording medium; and

processing said data recorded on said external recording medium to locate the flaw position in said weld line of said material to be tested.

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**4,742,714**

## COMPACT PRESSURE GAUGE

**Tien-Tsai Huang, No. 4, Lane 30, Wu-Chuan St., Panchio City, Taiwan**

**Filed Sep. 21, 1987, Ser. No. 98,946**

**Int. Cl.[4] B60C** *23/02;* **G01L** *7/16*

**U.S. Cl. 73—744** **4 Claims**

1. A pressure gauge including:

an outer housing;

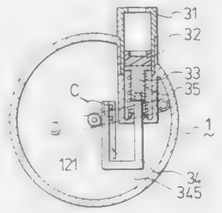
a tubular member fixed on said outer housing and extending into said outer housing, having an inner end wall with an inner end opening, and an outer end wall with an outer end opening which is adapted to communicate with an interior of a hollow article;

a rotating shaft journalled on said outer housing and including a pinion fixed on said rotating shaft, and an indicator secured to said rotating shaft for displaying rotational degree of said rotating shaft;

a movable seal member disposed sealingly in said tubular member for being forced by air pressure in said article;

a rack member, extending into said tubular member through said inner end opening, connected to said movable seal member for being impelled by said movable seal member, having a rack secured to said rack member and extending out of said tubular member for meshing with said pinion of said rotating shaft; and

means for guiding said rack member to maintain engagement between said pinion and said rack;



a spring means for biasing said movable seal member against pressure exerted on said movable seal member;

characterized by: said spring means being a first compression spring sleeved on said rack member within said tubular member, said first compression spring having one end portion which is remote from said movable seal member and which has intimately coiled turns, so as to increase its pressure against said movable seal member; said inner end wall of said tubular member having a stepped cylindrical spring seat thereon for locating one or more additional compression springs together with said first compression spring in said tubular member to sleeve on said rack member when said air pressure in said article is increased; and said rack member being generally U-shaped having generally parallel first and second arms, said first arm extending into said tubular member, said second arm having said rack secured thereto.

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**4,742,715**

## APPARATUS FOR THE MANIPULATION OF PROBES

**Winfried Heinz, Schortens, and Wilhelm Schwarz, Kreuztal, both of Fed. Rep. of Germany, assignors to Fried. Krupp Gesellschaft mit beschränkter Haftung, Essen, Fed. Rep. of Germany**

**Filed Nov. 18, 1986, Ser. No. 932,150**

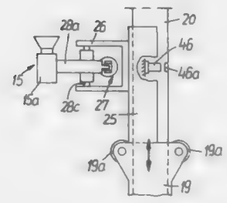
**Claims priority, application Fed. Rep. of Germany, Nov. 19, 1985, 3540946**

**Int. Cl.[4] G01N** *1/00;* **C21B** *7/24*

**U.S. Cl. 73—864.31** **5 Claims**

1. In an apparatus for manipulating a probe which is to be coupled to a vertically movable probe lance, the probe having an upper portion and a lower sample taking head to be inserted into a melt contained in a metallurgical vessel, the lance having a longitudinal axis which is vertically oriented, which apparatus includes a supporting frame, means supporting the frame for pivotable movement about a stationary frame axis between a plurality of operating positions, an openable centering funnel supported by the frame, a lifting carriage supported by the frame for vertical movement relative to the frame, a probe holding clamp supported by the carriage at a location below the funnel, probe separation means, including a probe separation device supported by the frame at a location below the probe holding clamp and pivotable relative to the frame about a separation device axis parallel to the stationary frame axis, for severing the head from the upper portion of the probe and a sample head holding clamp means, supported by the frame at a location below the separation device for clamping the head, the improvement wherein: said funnel is mounted to be vertically movable relative to said frame; and said apparatus further comprises support means connected between said sample head holding clamp means and said frame and supporting said sample head holding clamp means for pivotal movement relative to said frame about a sample head holding clamp axis parallel to the stationary frame axis.





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**4,742,716**

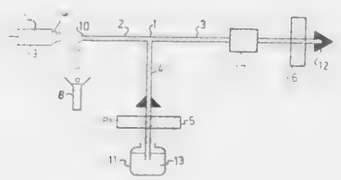
## SAMPLE INTRODUCTION SYSTEM FOR NONSEGMENTED CONTINUOUS FLOW ANALYSIS

**Jaromir Ruzicka, Holte, and Elo Hansen, Lyngby, both of Denmark, assignors to Bifok AB, Sollentuna, Sweden**

**Continuation of Ser. No. 796,093, Nov. 7, 1985, abandoned. This application Jan. 20, 1987, Ser. No. 6,262**

**Int. Cl.[4] G01N** *1/00*

**U.S. Cl. 73—864.81** **9 Claims**



6. A method for introducing a well-defined liquid sample into a non-gas segmented liquid carrier stream of a continuous flow analysis system, wherein said method comprises the steps of:

providing an inlet channel having an inlet end and an outlet end; sample means which is selectively connectable to said inlet channel inlet for introducing liquid sample into said inlet channel;

providing a carrier stream channel having an inlet end and an outlet end;

providing an analyzer channel having an inlet end which is connected to the outlet ends of said inlet channel and carrier stream channel to provide a confluence point through which liquids may flow between the inlet channel, carrier stream channel and analyzer channel;

providing first pumping means which is operable at various pumping speeds for pumping a non-gas segmented liquid carrier stream through said carrier stream channel at various selected volumetric flow rates, said flow rates ranging from zero to various predetermined carrier stream flow rates;

providing second pumping means for pumping non-gas segmented liquid through said analyzer channel at a constant predetermined analyzer stream volumetric flow rate wherein said first pumping means is operable at a first selected pumping speed to provide a carrier stream flow rate that is higher than the analyzer stream flow rate in order to flow carrier liquid from said confluence point through said inlet channel towards said inlet channel inlet end and wherein said first pumping means is operable at a second selected pumping speed to provide a carrier stream flow rate that is lower than the analyzer stream flow rate in order to aspirate non-gas segmented liquid sample into said inlet channel when said sample means is connected to the inlet end of said inlet channel, wherein alternating operation of the first pumping means between said first and second pumping speeds provides aspiration of well-defined liquid sample segments into the liquid carrier stream in said analyzer channel;

operating the first pumping means at said first selected pumping speed for a sufficient time to fill said inlet channel with carrier liquid;

connecting said sample means to said inlet channel; operating the first pumping means at said second selected pumping speed for a sufficient time to provide aspiration of liquid sample past said confluence point and into said analyzer channel; and

operating the first pumping means at said first selected pumping speed against to thereby provide introduction of a well-defined liquid sample into said liquid carrier stream in said analyzer channel.

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**4,742,717**

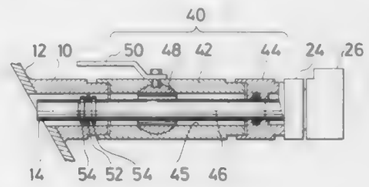
## GAS FLOW RATE MEASURING DEVICE

**Kouji Ichino, Tokyo, Japan, assignor to Kaijo Denki Co., Ltd., Japan**

**Filed May 30, 1986, Ser. No. 868,603**

**Int. Cl.[4] G01F** *1/66*

**U.S. Cl. 73—861.18** **5 Claims**



1. A gas flow rate measuring device comprising:

a probe socket arranged to project through a wall of a pipe through which gas is to flow;

a probe arranged in said probe socket to carry out transmission and reception of an ultrasonic wave;

a probe support fixedly connected at one end thereof to said probe;

a probe coupler connected to the other end of said probe support; and

a gas seal mechanism sealedly arranged between said probe socket and said probe coupler and having a hollow passage formed therein which permits said probe and probe support to move therein;

said gas seal mechanism hermetically sealing said probe socket when said probe is removed from said probe socket; and

ring means fitted on said probe support, said ring means

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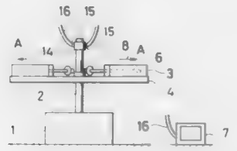
being formed of a flexible material into a shape defining at least three contact sections through which said ring means contact an inner surface of said probe socket and defining spaces between an outer periphery of said ring means and said inner surface of said probe socket.

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**4,742,718**
**APPARATUS FOR MEASURING PARTICLE-SIZE DISTRIBUTION**

**Genji Jimbo, Nagoya, Japan, assignor to Onoda Cement Company, Ltd., Onoda, Japan**

**Filed Oct. 24, 1986, Ser. No. 922,862**
**Claims priority, application Japan, Oct. 29, 1985, 60-241793; Oct. 29, 1985, 60-241794**
**Int. Cl.[4] G01N** *15/02*
**U.S. Cl. 73—865.5** **5 Claims**




1. An apparatus for measuring particle-size distribution of a powder which comprises: a measuring cell for receiving a suspension of particles to be measured, a rotor on which said measuring cell is mounted in a radial direction, a driving unit for rotating said rotor about an axis of rotation, a pair of parallel pressure transmitting tubes extending in a radial direction into said cell, each of said tubes having opposite tip and base ends, said tip ends of said pressure transmitting tubes inserted from the general direction of said axis into said measuring cell with said tip ends at individually different distances from said axis, and a pressure-detecting unit to which said base ends of said pressure transmitting tubes are secured, said pressure detecting unit having a pressure sensitive membrane between said base ends of said tubes for sensing the pressure difference between said tubes, said membrane being adjacent said axis of rotation of said rotor and lying in a plane extending radially thereof, said pressure-detecting unit being electrically connected with a measuring device.

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**4,742,719**
**MIXING PROCESS SIMULATING METHOD AND SYSTEM FOR EVALUATING WEDGE FLOW**

**David C. Bushong, Vassar, and Bernard A. Loomans, Saginaw, both of Mich., assignors to Baker Perkins, Inc., Saginaw, Mich.**

**Filed Feb. 13, 1987, Ser. No. 14,678**
**Int. Cl.[4] G01M** *19/00*
**U.S. Cl. 73—865.9** **13 Claims**

1. In a process simulator for analyzing the forces imposed upon a mixing paddle of a designated configuration, the combination of elements with frame means comprising:

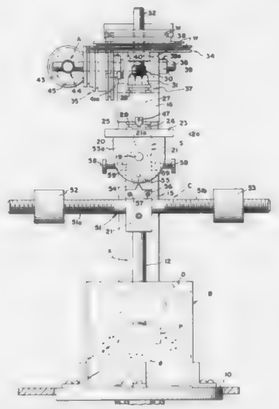
a. a viscous liquid container having an interior wall surface;

b. a shaft supported by said frame means extending into said container;

c. a mixer paddle adapted to be secured rigidly on said shaft within said container and immersed in said liquid, said paddle having a profile surface, radially offset from said container wall surface, such that it lies adjacent the container wall surface at a wedge angle relative thereto, whose characteristics, for the liquid in the container, are to be determined;

d. means for rotating said container wall surface relative to said shaft and paddle;

e. first indicator means provided with a zero force indicator and reactive to torque forces imposed upon said shaft by the liquid dispersed between the said wall surface and the said paddle profile surface to indicate the torque imposed in terms of the zero force as a reference; and



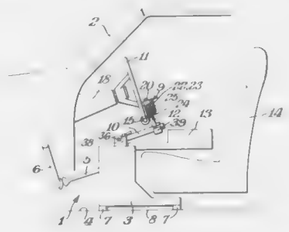
f. second indicator means provided with a zero force indicator and reactive to bending moment applied to said shaft by the said liquid between the said wall surface and the said paddle profile surface to indicate the bending moment imposed in terms of the zero force reference.

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**4,742,720**
**REFERENCE PLATFORM FOR MOTOR VEHICLE OPERATION**

**Karlheinz Storck, Mühltal, Fed. Rep. of Germany, assignor to Carl Schenck AG, Fed. Rep. of Germany**

**Filed Feb. 27, 1987, Ser. No. 20,078**
**Claims priority, application European Pat. Off., Mar. 4, 1986, 86102839.7**
**Int. Cl.[4] G01M** *19/00*
**U.S. Cl. 73—865.9** **9 Claims**



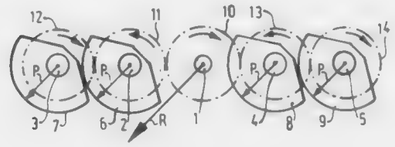
1. A reference platform for lockably positioning and orienting control and/or measuring units within the passenger compartment of a motor vehicle comprising a support plate assembly releasably attached to a vehicle steering wheel at the lower apex thereof, spaced apart guideways connected to the support plate assembly on opposite sides of the lower apex of the steering wheel, a connecting plate movably connected to the support plate assembly, the connecting plate having rollers in engagement with the guideways, a control unit positioned within the passenger compartment, and a holding arm connected between the control unit and the connecting plate for manipulating the steering wheel in response to movements of the control unit.



**4,742,721**
**VIBRATING DEVICE**

**Emile R. J. Pouillon, Lasne, Belgium, assignor to 501 Cribla S.A., Netherlands**

**Filed Mar. 22, 1982, Ser. No. 360,580**
**Claims priority, application Netherlands, Mar. 26, 1981, 8101500**
**Int. Cl.[4] B06B** *1/16*
**U.S. Cl. 74—61** **5 Claims**



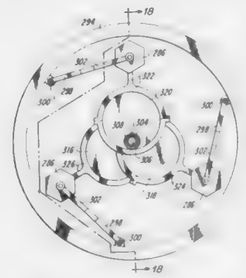

1. A device for imparting vibrational drive to a surface such as a sieve, which comprises a series of parallel shafts disposed in the same plane and means for driving said shafts in unison so that any adjacent pair of shafts rotate in opposite directions, there being an odd number of shafts, an eccentric weight means on all but the central shaft of the series and each eccentric weight means being of the same weight value for summing the centrifugal effects of such weight means in two mutually opposite directions thereof which lie in a particular plane at an acute angle to said same plane, for effecting a summation of moments about the central shaft of said series which is always equal to zero, and for canceling the centrifugal effects of such weight means in two mutually opposite directions which are orthogonal to said particular plane.

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**4,742,722**
**INERTIAL TRANSMISSION**

**Henry W. Wallace, Bradenton, Fla., assignor to Wallace Associated Research, Lakewood, Colo.**

**Division of Ser. No. 726,930, Apr. 25, 1985, Pat. No. 4,608,875, which is a continuation of Ser. No. 420,001, Sep. 20, 1982, abandoned. This application Apr. 28, 1986, Ser. No. 859,196**
**Int. Cl.[4] F16H** *33/08*
**U.S. Cl. 74—64** **3 Claims**




1. A transmission apparatus for converting torque to angular velocity and angular velocity to torque without the use of gears and springs, comprising:

input means including an input shaft rotatable in a selected one of first and second directions;

casing means detachably connected to said input shaft;

output means including an output shaft;

a plurality of mass means dynamically balanced about at least one of said input shaft and said output shaft and movable in unison and cyclically from maximum radii of gyration to minimum radii of gyration and back to maximum radii of gyration relative to at least one of said input shaft and said output shaft, each of said mass means being substantially of the same size and shape and wherein the centers of mass of each of said mass means lies in substantially the same plane;

crank link means interconnected between said input means and said output means, said crank link means connected to each of said mass means to cause each of said mass means to continuously move towards and away from said output shaft to cause a cyclic changing of the moment of inertia of each of said mass means, each of said mass means being immovably attached to said crank link means to prevent relative linear movement therebetween and wherein said crank link means is continuously subject to torque in said first direction when said input shaft is rotating in said first direction and when said input shaft rotation is greater than rotation of said output shaft, said crank link means including:

an eccentric member axially aligned with and coupled to said output shaft,

a plurality of eccentric journal bearings joined to said eccentric member, and

means for pivotally connecting each of said mass means to said casing means;

first one-way clutch means rotatable in a single direction and disposed between said input shaft and said casing means for preventing reversal of power flow from said casing means to said input shaft while permitting power flow from said input shaft to said casing means during rotation of said input shaft in said first direction, said first one-way clutch means also disengaging said casing means from said input shaft during rotation of said input shaft in said second direction whereby reversal of rotation of said input shaft in said second direction causes said rotation to be directly coupled to said output shaft;

second one-way clutch means rotatable in a single direction and disposed between said input shaft and said output shaft for preventing coupling between said input shaft and said output shaft during rotation of said input shaft in said first direction while providing coupling between said input shaft and said output shaft during rotation of said input shaft in said second direction, said second one-way clutch means also providing a means for braking whereby, when reverse power flow exists within the transmission apparatus in which said output shaft is rotating at a greater velocity than said input shaft, said second one-way clutch means permits reverse power flow from said output shaft to said input means; and

third one-way clutch means rotatable in a single direction disposed between said crank link means and said output shaft for preventing reversal of power flow from said output shaft to said crank link means during rotation of said input shaft in said first direction and when said rotation of said input shaft is less than or substantially equal to rotation of said output shaft while said third one-way clutch means permits coupling between said crank link means and said output shaft during rotation of said input shaft in said first direction, said third one-way clutch means also preventing coupling between said crank link means and said output shaft when said input shaft is rotating in said second direction.

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**4,742,723**
**CORE FOR A SYNCHRONIZER BLOCKER RING WITH BENT LUGS**

**Gunter Lanzerath, Heidelberg; Helmut Patzer, Sandhausen, and Rudolf Muller, Ladenburg, all of Fed. Rep. of Germany, assignors to Borg-Warner Automotive, Inc., Troy, Mich.**

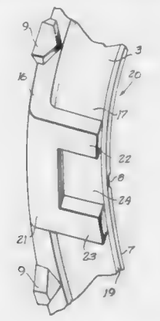
**Filed Jun. 2, 1986, Ser. No. 869,758**
**Claims priority, application Fed. Rep. of Germany, Jun. 3, 1985, 3519811**
**Int. Cl.[4] F16H** *3/38*
**U.S. Cl. 74—339** **8 Claims**

1. Support for a synchronizing ring for gear synchronization with a ring-shaped core having an outer surface and a conical

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contact surface, an outer sprocket and stops for coupling to a synchronizing clutch, characterized by the fact that the stops are formed from lugs which are integrally bonded to a toothed



rim of said outer sprocket for the ring-shaped core, said lugs extending in the same direction as said outer surface of the ring-shaped core, and a free space formed on either side of each lug, preferably by removing the neighboring teeth.

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**4,742,724**

## POWER-ASSISTED GEAR-SHIFT MECHANISM FOR MANUAL TRANSMISSION

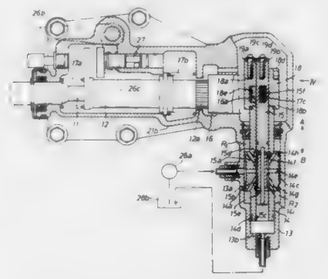
**Shoji Jimbo; Akira Sato; Fumihiro Ushijima; Kenichi Kikuchi; Hideaki Matsui, and Yukio Ohtake, all of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan**

**Filed Jul. 6, 1987, Ser. No. 69,832**

**Claims priority, application Japan, Jul. 4, 1986, 61-158452; Jul. 4, 1986, 61-158451; Jul. 4, 1986, 61-158453; Jul. 4, 1986, 61-103456[U]; Jul. 4, 1986, 61-103458[U]; Jul. 4, 1986, 61-103455[U]; Jul. 4, 1986, 61-103457[U]**

**Int. Cl.⁴ G05G *9/16*; F15B *9/10***

**U.S. Cl. 74—388 R** **12 Claims**



1. A power-assisted gear-shift mechanism for a manual transmission in an automotive vehicle, comprising:

a lateral casing mounted on a housing of said transmission;

a first lateral shaft rotatably mounted within said lateral casing and being operatively connected to a manual shift lever to be rotated in shifting operation of said shift lever; and

a second lateral shaft in the form of a hollow shaft rotatably and axially slidably mounted on said first lateral shaft and being operatively connected to said manual shift lever to be axially moved in selecting operation of said shift lever, said second lateral shaft being integrally provided with a shift-and-select lever which extends into an interior of said transmission housing to be selectively engaged with a plurality of shift heads in axial movement of said second lateral shaft;

wherein the power-assisted gear-shift mechanism is associated with a hydraulic power cylinder assembly which includes a cylinder casing integrally connected to one end of said lateral casing and extending along one side of said transmission housing, said cylinder casing being provided with an inlet port for connection to a source of hydraulic pressure and an outlet port for connection to a fluid reservoir; a hollow piston shaft having a piston part axially slidably disposed within said cylinder casing to subdivide an interior of said cylinder casing into two fluid chambers, said piston shaft being operatively connected at one end thereof to said second lateral shaft to cause rotation of said second lateral shaft in axial movement thereof; and a valve spool axially slidably disposed within said piston shaft and being operatively connected at one end thereof to said first lateral shaft to be displaced by rotation of said first lateral shaft, said valve spool cooperating with the piston part of said piston shaft for selectively directing hydraulic fluid under pressure from said pressure source to said fluid chambers through said inlet port in accordance with relative displacement of said piston shaft and said valve spool.

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**4,742,725**

## MECHANISM FOR APPLYING PRE-LOAD TO BEVEL GEAR DEVICE

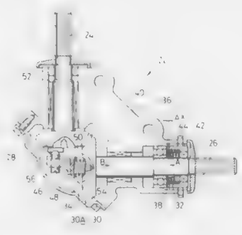
**Junichi Nagai, Toyota, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Japan**

**Filed Jul. 31, 1986, Ser. No. 891,381**

**Claims priority, application Japan, Aug. 2, 1985, 60-118917[U]**

**Int. Cl.⁴ F16H *55/18***

**U.S. Cl. 74—409** **12 Claims**



1. A mechanism for applying a pre-load to a bevel gear device, wherein bevel gears are provided which are fixed to forward ends of shafts crossing each other, respectively, and in mesh with each other, and a turning force applied to one of said shafts is imparted to the other, characterized in that:

at least either one of said shafts is made movable in the axial direction thereof; and

first spring means for applying a first pre-load to said movable shaft in an advancing direction, in which said bevel gears are in mesh with each other, with a first force to bias said movable shaft in the advancing direction and second spring means for applying a second pre-load to said movable shaft in the direction opposite to said first force with a second force weaker than said first force to reduce a tooth surface force between said bevel gears caused by said first force.



**4,742,726**

## ARRANGEMENT TO LIMIT THE AXIAL PLAY OF A MOTOR-DRIVE SHAFT MOUNTED WITH PLAIN BEARINGS

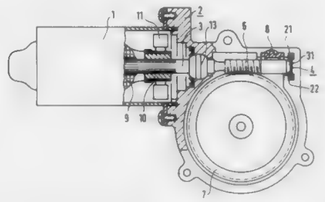
**Peter Adam, Hoechberg; Paul Becker; Anton Heidenfelder, both of Wuerzburg; Olai Ihle, Margetschoechheim, and Werner Schilling, Wuerzburg, all of Fed. Rep. of Germany, assignors to Siemens Aktiengeselischaft, Berlin and Munich, Fed. Rep. of Germany**

**Continuation of Ser. No. 637,409, Aug. 3, 1984, abandoned. This application Sep. 26, 1986, Ser. No. 911,704**

**Claims priority, application Fed. Rep. of Germany, Aug. 11, 1983, 3329120**

**Int. Cl.⁴ F16H *1//16***

**U.S. Cl. 74—425** **4 Claims**



1. In an arrangement to limit axial play of a motor-drive shaft mounted with plain bearings in a housing, for use as a motor transmission shaft of a window-lifter gear motor, with at least one stop element that can be rigidly fixed with respect to the housing at one end face of the shaft at a specified distance on the basis of a comparison between an actual axial clearance and a standard axial clearance, the improvement wherein the stop element is a one-piece disk of appropriate thickness which can be inserted in a pocket that is fixed in the housing with at least one opening in a region where the shaft is stopped by the disk; and the disk is provided, outside its stop face, with elastically deformable clamping elements projecting from a plan containing the stop face, by means of which the disk is rigidly insertable in its final position in a corresponding slit-shaped opening that is fixed in the housing.

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**4,742,727**

## STEERING WHEEL DEVICE

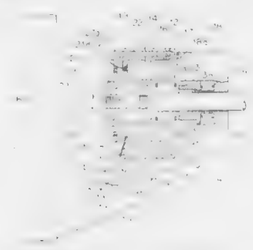
**Shigeo Mizuno; Kazuhisa Kubota, and Takafumi Ichikawa, all of Aichi, Japan, assignors to Kabushiki Kaisha Tokai Rika Denki Seisakusho, Japan**

**Division of Ser. No. 687,272, Dec. 28, 1984, Pat. No. 4,674,352. This application Nov. 28, 1986, Ser. No. 938,323**

**Claims priority, application Japan, Dec. 29, 1983, 58-204071; Dec. 29, 1983, 58-204072; Dec. 29, 1983, 58-204073; Dec. 29, 1983, 58-204074; Dec. 29, 1983, 58-204075; Dec. 29, 1983, 58-204076**

**Int. Cl.⁴ B62D *1/04, 1/16***

**U.S. Cl. 74—484 R** **7 Claims**



1. A steering wheel apparatus comprising:

a steering column **(18)** fixed to a car body;

a steering shaft **(1)** inserted into said steering column axially rotatably therein and having a rear portion projecting out of said steering column **(18)**;

a steering wheel **(2)** having an elongated boss **(3)** fixed to said steering shaft at said rear portion of the steering shaft **(1)**, said elongated boss **(3)** having a front portion **(3*a*)** and a rear portion **(3*b*)**;

a base **(12)** supported around said front portion **(3*a*)** of the elongated boss **(3)**;

means for fixing said base **(12)** to said steering column **(18)** to prevent said base from rotating relative to the steering column;

a locking disc **(14)** provided around said base **(12)**;

means for provisionally coupling said base **(12)** and said locking disc **(14)**;

a pad base **(19)** rotatably supported around said rear portion **(3*b*)** of the elongated boss;

a boss plate **(2*a* )** fixed to said steering wheel **(2)** and said elongated boss **(3)** and extending between said locking disc **(14)** and said pad base **(19)**; and

rotation control means for normally preventing said pad base **(19)** from rotating relative to said locking disc without interference with said boss plate **(2*a*)**.

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**4,742,728**

## OPERATING LEVER FOR A BICYCLE DERAILLEUR

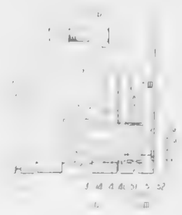
**Masashi Nagano, Osaka, Japan, assignor to Shimano Industrial Company Limited, Osaka, Japan**

**Filed Mar. 10, 1986, Ser. No. 838,121**

**Claims priority, application Japan, Mar. 8, 1985, 60-46932**

**Int. Cl.⁴ G05G *11/00***

**U.S. Cl. 74—488** **2 Claims**



1. An operating lever for a bicycle derailleur, said derailleur including a return spring, said operating lever comprising a fixing member, a lever body, a support means including a lever shaft for supporting said lever body rotatably with respect to said fixing member and a resistance applying means for tightening said fixing member with respect to said lever shaft in a radially inward direction thereof so as to apply a resistance to rotation of said lever body, said resistance having a magnitude sufficient to overcome a spring force of said return spring, said fixing member including a bore for said lever shaft and a slot in continuation of said bore so as to allow said bore to be adjustable in size, said resistance applying means comprising an adjusting screw for reducing said bore in its diameter, said lever shaft being provided on a support member separate from said lever body, and a unidirectional rotary transmission being provided between said support member and said lever body, said unidirectional rotary transmission rotating together with said support member only when said lever body rotates in one direction and freely rotating with respect to said support member when said lever body rotates in the other direction.

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**4,742,729**

## MOTION TRANSMITTING DEVICE BETWEEN TWO COAXIAL ROTATING MEMBERS

**Oscar Cordara, Turin, Italy, assignor to U.T.A.S. S.p.A., Pianezza, Italy**

**Continuation-in-part of Ser. No. 689,714, Jan. 8, 1985, abandoned. This application Dec. 29, 1986, Ser. No. 946,984**
**Claims priority, application Italy, Jan. 10, 1984, 67015 A/84; European Pat. Off., Jan. 8, 1985, 85730001.6; Japan, Jan. 10, 1985, 60-2601**
**Int. Cl.⁴ F16H** *33/00, 1/28*
**U.S. Cl. 74—640** **4 Claims**



1. In a motion reducing device between a motor shaft adapted to be rotated by an electric motor and a driven shaft coaxial with the motor shaft, the said device having: a frame for housing the motor, a stationary rigid disk with an annular portion toothed with a predetermined pitch, a relatively flexible disk secured to the driven shaft provided with a toothed annular portion facing the toothed annular portion of said rigid disk and having a pitch slightly different from the aforementioned predetermined pitch, the flexible disk being located in such a position as to hold its toothed annular portion normally disengaged from the toothed annular portion of the rigid disk, a roller carrying member secured to the motor shaft and carrying at least one roller rotatable on an axis substantially parallel to the plane of the annular portion of the rigid disk to engage the face of the flexible disk opposite its annular portion for causing a sector of the flexible disk to yield in a direction perpendicular to the said plane and to engage a corresponding sector of the annular portion of the rigid disk, the improvement which comprises the provision of:

a cylindrical box having an integral bottom and a cylindrical wall the edge of which defines an opening at the opposite end from said bottom

said bottom being secured to said frame coaxially with said motor shaft and being provided with a circular aperture to receive said shaft,

said rigid disk being so secured to said edge as to close tightly said opening of said box,

said roller carrying member being formed of a support disk parallel to said bottom and including a pair of radially aligned projections for rotatably supporting said at least one roller,

said box housing said flexible disk, said support disk and said at least one roller,

said flexible disk having a hollow portion integral therewith and secured to said driven shaft,

said support disk including

a hub portion secured to said motor shaft and housed within said hollow portion and

a ring portion protruding from the opposite side with respect to said hub and crossing said circular aperture of said bottom,

first gasket means for tightly sealing said ring portion to the periphery of said circular aperture,

said rigid disk having a cylindrical aperture for rotatably supporting said hollow portion, and

second gasket means tightly closing said cylindrical aperture of said hollow portion of said flexible disk,

said box being filled with a liquid lubricant.

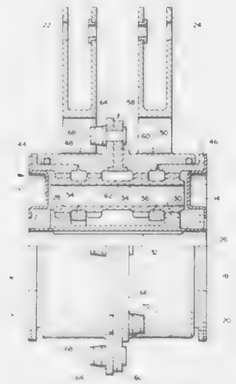
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**4,742,730**

## FAILSAFE ROTARY ACTUATOR

**Rupert I. Dorn, Seattle; John D. Mayer, and Neal A. Nelson, both of Bellevue, all of Wash., assignors to The Boeing Company, Seattle, Wash.**

**Filed Sep. 30, 1982, Ser. No. 428,842**
**Int. Cl.⁴ F16H** *37/06*
**U.S. Cl. 74—674** **8 Claims**



1. A failsafe rotary actuator providing dual, independent load paths between an input drive member and a common output driven member, comprising:

a. an input shaft means journalled for rotation within an actuator housing, said input shaft means adapted to be driven by said input drive member;

b. first and second sun gear means secured in spaced relationship to said input shaft means for rotation therewith;

c. a plurality of planet gear means disposed for orbital rotation with and circulation about said sun gear means;

d. first and second fixed ring gear means disposed for independent engagement with said planet gear means; and

e. first and second output gear means disposed for independent driving contact with said planet gear means, each of said output gear means adapted to be independently coupled to said common output driven member;

wherein a first load path is established between said first sun gear means and said first output gear means across said planet gear means and cooperative engagement thereof with said first fixed ring gear means, and a second load path is established between said second sun gear means and said second output gear means across said planet gear means and cooperative engagement thereof with said second fixed ring gear means, said load paths being independent one from the other such that a failure in one of said load paths does not interrupt the remaining load path between said input drive member and said common output driven member.

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**4,742,731**

## TRANSMISSION RANGE SELECTOR VALVE

**Joseph L. Eldridge, Libertyville, Ill., and Terrance P. Lynch, Sanford, N.C., assignors to Payhauler Corp., Batavia, Ill.**

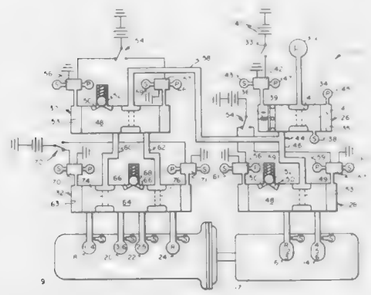
**Filed Dec. 18, 1986, Ser. No. 943,026**
**Int. Cl.⁴ B60K** *20/10, 20/12, 20/14*
**U.S. Cl. 74—745** **10 Claims**

1. A transmission having a range selector valve that eliminates the possibility of unintentional, simultaneous, multiple



gear engagements, said valve operatively connectable to a high-low power shift transmission having high and low settings and a multiple speed power shift main transmission having a plurality of speed/direction settings, said valve comprising:

means for selecting either the high or the low setting of said high-low power shift range transmission;



means for selecting either a first or second group of speed/direction settings of said main transmission, at least one of said groups having at least two speed/direction settings; and

means for selecting a desired speed/direction setting from the selected group of main transmission speed/direction settings.

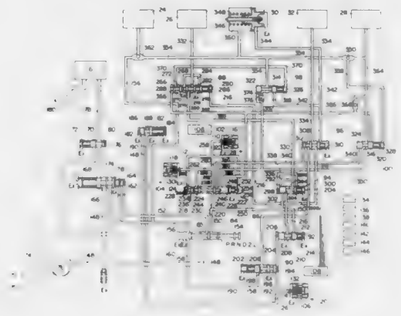
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**4,742,732**

## AUTOMATIC TRANSMISSION SYSTEM FOR A VEHICLE

**Takeo Hiramatsu, Nagaokakyo, Japan, assignor to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Japan**

**Filed Aug. 21, 1986, Ser. No. 899,074**
**Claims priority, application Japan, Aug. 21, 1985, 60-183703**
**Int. Cl.⁴ B60K** *41/18*
**U.S. Cl. 74—866** **12 Claims**



1. An automatic transmission system for a vehicle comprising a gear mechanism for providing three speed ratios including high, medium and low speed ratios between an input shaft and an output shaft by selectively engaging a plurality of frictional engaging elements operated by hydraulic pressure, a hydraulic pressure source for generating a predetermined hydraulic pressure, a hydraulic pressure selecting device capable of selectively supplying hydraulic pressure from said hydraulic pressure source to said frictional engaging element to achieve a specific one of said speed ratios, a hydraulic pressure control device for controlling hydraulic pressure to be supplied to said frictional engaging elements to achieve said medium and low speed ratios, respectively, disposed between the said hydraulic pressure source and said frictional engaging elements to achieve said medium and low speed ratios, respectively, and an electronic control device for controlling said hydraulic pressure selecting device and said hydraulic pressure control device, wherein said medium speed ratio is once achieved and then said low speed ratio is achieved when the transmission is to be shifted from said high speed ratio immediately to said low speed ratio, said electronic control device having a first means for controlling said hydraulic pressure control device to produce a first hydraulic pressure supplied to said frictional engaging element to achieve said medium speed ratio when the transmission is to be shifted from said high speed ratio to said medium speed ratio and a second means for controlling said hydraulic pressure control device a second hydraulic pressure higher than said first hydraulic pressure when the transmission is to be shifted from said high speed ratio directly to said low speed ratio.

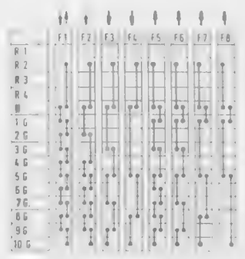
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**4,742,733**

## CONTROL SYSTEM FOR AUTOMATIC CHANGE SPEED TRANSMISSION

**Friedrich Schreiner, Kehlen-Reute, Fed. Rep. of Germany, assignor to Zahnradfabrik Friedrichshafen, AG., Friedrichshafen, Fed. Rep. of Germany**

**PCT No. PCT/EP85/00512, § 371 Date May 23, 1986, § 102(e) Date May 23, 1986, PCT Pub. No. WO86/02112, PCT Pub. Date Apr. 10, 1986**
**PCT Filed Oct. 2, 1985, Ser. No. 878,982**
**Claims priority, application Luxembourg, Oct. 4, 1984, 00302**
**Int. Cl.⁴ B60K** *41/04*
**U.S. Cl. 74—866** **15 Claims**




1. In combination with a gear transmission (1) having a predetermined number of drive ratios (R1–R4, 1G–10G) established during automatic shift between high and low drive ratio limits in a predetermined step change sequence, a method of modifying said automatic shift to accommodate different loading conditions of the transmission, including the steps of:

storing a plurality of programs (F1–F8) corresponding to different sequential step change patterns of shift between said high and low limits respectively assigned to different loading conditions;

determining which one of the loading conditions the transmissio is in;

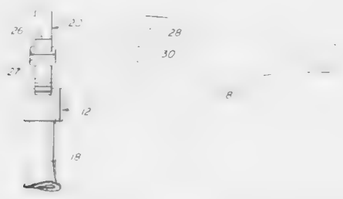
selecting one of the stored programs assigned to the determined one of the loading conditions of the transmission; and

skipping some of the drive ratios during said automatic shift between said high and low limits in accordance with the selected one of the programs to reduce the predetermined number of the drive ratios utilized in dependence on the loading conditions.

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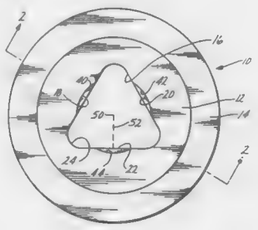
**4,742,734**
**BOTTLE OPENER**
**Albert Hernandez, 465 Ocean Pkwy., Apt. 1-H, Brooklyn, N.Y. 11218**
**Filed Jul. 24, 1987, Ser. No. 77,666**
**Int. Cl.[4] B67B** *7/18*
**U.S. Cl. 81—3.4** **4 Claims**



1. A bottle opener, comprising, a base cap, for being received on a screw cap of a filled bottle to remove said screw cap, an empty bottle engaged with said base cap, providing handle and mechanical advantage means for unscrewing said screw cap of from said filled bottle, and a locking band received in said base cap, for securing said empty bottle to said base cap.

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**4,742,735**
**DRIVER FOR A LOBED COLLAR**
**Edgar L. Stencel, Huntington Beach, Calif., assignor to VSI Corporation, Pasadena, Calif.**
**Continuation-in-part of Ser. No. 849,756, Nov. 9, 1977, Pat. No. 4,260,005. This application Apr. 3, 1981, Ser. No. 250,895**
**Int. Cl.[4] B25B** *13/06*
**U.S. Cl. 81—121.1** **14 Claims**



1. A driver for setting a joint of a threaded collar, a threaded pin, and at least one sheet, the collar having plastically deformable lobes on its longitudinal exterior that upon the existence of a predetermined clamp-up load between the collar and the sheets plastically deform in radial compression and displace material of the collar into void volumes between the collar and the pin to lock the two together and terminate the action of the driver on the collar, the driver comprising:
(a) a body having a rotational axis;
(b) a socket in the body having a plurality of flats that when cut by radial planes normal to the rotational axis fall on the sides of a regular polygon, the flats being parallel to the rotational axis;
(c) the minimum distance between each flat and the rotational axis corresponding substantially to the radius of the collar at the location of the lobes after their plastic deformation; and
(d) means on the body to receive a wrenching torque applied to the driver so that the flats apply the torque to the lobes of the collar.

**4,742,736**
**BAND CLAMP PLIERS**
**Danny L. Williams, Clarinda, Iowa, assignor to Lisle Corporation, Clarinda, Iowa**
**Filed Aug. 22, 1986, Ser. No. 899,247**
**Int. Cl.[4] B25B** *7/02*
**U.S. Cl. 81—303** **12 Claims**



1. Clamp pliers for compressing a band clamp of the type having a T-shape fold, the pliers comprising in combination:
(a) first and second lever arms, each arm having a clamp engaging jaw at one end, a manually grippable handle at the other end, and a socket intermediate the jaw and handle;
(b) a pivot pin connecting the arms intermediate the socket and jaw whereby the jaws are maintained in opposed alignment;
(c) a thrust plate slidably mounted on the pivot pin, the thrust plate including an anvil generally traverse to the axis of the pin and positioned for movement radially toward and away from the pin between the jaws; and
(d) cam means including (i) a camway in each lever arm and (ii) a single follower pin portion having opposed axially aligned pin sections projecting from both sides of the thrust plate and cooperatively engaging the camways, whereby as the arms are pivoted about the pivot pin to move the jaws together, the camways drive the follower pin radially toward the jaws.

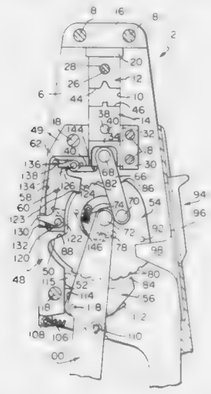
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**4,742,737**
**MULTIPLE STROKE RATCHET HAND TOOL**
**John G. Hatfield, Camp Hill, Pa., assignor to AMP Incorporated, Harrisburg, Pa.**
**Filed Jun. 6, 1986, Ser. No. 871,235**
**Int. Cl.[4] B25B** *7/12*
**U.S. Cl. 81—355** **30 Claims**

1. A hand tool comprising:
support plates;
a ram slidably mounted to the support plates such that the ram is moved between an open position and a closed position;
a ratchet member pivotally mounted to the support plates, the ratchet member being moved between a first position and a second position corresponding to the open and closed position of the ram;
means for moving the ratchet member;
a resilient means attached to the ratchet member at one end and to one of the support plates at the other end such that as the ratchet member is moved, the resilient means is deformed thereby exerting pressure on the ratchet member to return the ratchet member to the first position;



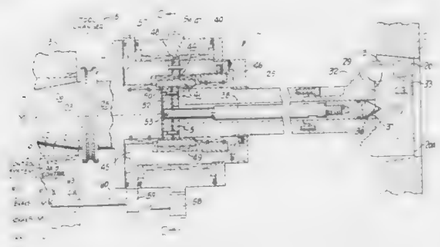
means **66** connecting the ram to the ratchet member so that as the ratchet member is moved, the ram slides from the open position to the closed position;
latching means mounted on the support plates and having a contact portion for engagement with the ratchet member, thereby preventing the resilient means from causing unwanted backward movement of the ratchet member;
a contacting surface provided on the ratchet member such that when the ratchet member reaches the second position, the contacting surface will engage a surface of the



latching means, thereby forcing the contact portion of the latching means to disengage from the ratchet member permitting the resilient means to return the ratchet member to the first position; and
a projection attached to the latching means, the projection extending outward from the support plates, such that upon manual engagement of the projection, the contact portion of the latching means is disengaged from the ratchet member, thereby permitting the resilient means to return the ratchet member to the first position.

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**4,742,738**
**MACHINE ADJUSTABLE BORING BAR ASSEMBLY AND METHOD**
**Kevin O. Strand, Garfield Heights, Ohio, assignor to Erickson Tool Co., Willoughby, Ohio**
**Filed May 28, 1985, Ser. No. 738,462**
**Int. Cl.[4] B23B** *29/034*
**U.S. Cl. 82—1 C** **19 Claims**



14. The method of adjusting the cutting diameter of an adjustable boring bar assembly for use with a rotatable machine tool spindle capable of accepting interchangeable tools, the boring bar assembly having a cutting tool on a transversely movable tool mount on a boring bar body, an externally accessible sleeve being rotatable on the body with a motion transmitting connection between the rotatable sleeve and the movable tool mount, said method including the steps of:
providing in said motion transmission connection planetary gearing with two inputs and with an output connected to move the tool mount, and one of said inputs being connected to said sleeve;
engaging the sleeve with a rotatable reaction member mounted on the stationary part of the machine tool adjacent the spindle;
rotating the machine tool spindle through a given angle in a selected rotational direction; and
acting on said reaction member and acting on the other of said inputs to establish relative rotation between the sleeve and the boring bar body in a selected rotational direction to effect transverse adjustment of the tool mount while the boring bar assembly is mounted in the machine tool spindle and the machine tool spindle is rotated.

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**4,742,739**
**NC LATHE**
**Yoshinori Yamaguchi, Sakuraishi; Hiroshi Yonetani, Narashi, and Naoya Tamada, Koriyamashi, all of Japan, assignors to Kabushiki, Kaisha Moriseiki Seisakusho, Japan**
**Filed Sep. 2, 1986, Ser. No. 902,924**
**Claims priority, application Japan, Feb. 17, 1986, 61-32580**
**Int. Cl.[4] B23B** *17/00*
**U.S. Cl. 82—2 D** **1 Claim**



1. As follows:
A numerical control lathe comprising:
a box-shaped bed;
a headstock mounted on the bed;
a cutting tool unit mounted on the bed;
a workpiece supplying device provided under a main spindle of the headstock unit;
a numerical control unit for controlling the headstock unit, the cutting tool unit and the workpiece supplying device;
wherein the bed comprises a first installation surface and two second installation surfaces;
wherein the first and second installation surfaces are disposed substantially at a right angle to each other, the first installation surface includes a Z-axis and an X-axis crossing at right angle therewith;
wherein the headstock unit comprises a headstock reciprocably movable along the Z-axis on the first installation surface, means for feeding the headstock, means for rotating the main spindle of the headstock unit, and a chuck provided at a top portion of the main spindle; and
wherein the cutting tool unit comprises a tool carrier reciprocably movable along the X-axis on the first installation surface, means for feeding the tool carrier, a turret head pivotally connected to the tool carrier in such a manner so as to enable a revolution around the X-axis, a tool holder

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fixed to the turret head, and an indexing unit for indexing a position of the turret heat.

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**4,742,740**

## AUTOMATIC ROD GUIDE ADJUSTING METHOD FOR A NUMERICALLY CONTROLLED LATHE AND LATHE FOR CARRYING OUT THE METHOD

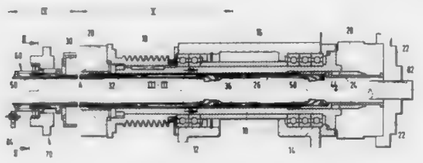
**Heinz Hasslauer, Uhingen; Werner Frey, Ebersbach; Werner Sonnek, Lichtenwald, and Walter Klauss, Adelberg, all of Fed. Rep. of Germany, assignors to Traub AG, Fed. Rep. of Germany**

**Filed Dec. 11, 1986, Ser. No. 940,541**

**Claims priority, application Fed. Rep. of Germany, Feb. 5, 1986, 3603561**

**Int. Cl.⁴ B23B** *13/00*

**U.S. Cl. 82—2.5** **11 Claims**



1. A controlled lathe for turning rods (**82**), said lathe having a rotatable main spindle (**10**) with a hollow interior, means (**18**) on the exterior of said main spindle (**10**) to rotate said main spindle (**10**), an inner tube (**50**) extending into said hollow interior of said main spindle (**10**) and connectable to said main spindle (**10**) for rotation with said main spindle (**10**), a plurality of radially adjustable guide bodies (**58**) mounted on said inner tube (**50**) in said hollow interior of said main spindle (**10**) adapted to guide a rod (**82**) to be turned having a portion located within said hollow interior of said main spindle (**10**), said inner tube (**50**) being axially movable relative to said main spindle (**10**) to move said guide bodies (**58**) in the radial direction according to the cross sectional dimension of a rod (**82**) to be turned, an adjusting member (**60**) mounted on said inner tube (**50**) and rotatable with said main spindle (**10**) during normal operation of the lathe and movable axially relative to said main spindle (**10**) to axially adjust said inner tube (**50**) prior to the beginning of a normal operation of the lathe, said adjusting member (**60**) including a screw thread drive means (**62**), a screw thread drive means (**42**) on said main spindle (**10**) threadedly engaged with said screw thread drive means (**62**) on said adjusting member (**60**) to move said inner tube (**50**) axially, means (**48**) for operatively connecting said adjusting member (**60**) to said main spindle (**10**) for rotational movement with said main spindle (**10**) but not for axial movement relative to said main spindle (**10**) during normal operation of the lathe, a holding device (**70**) for temporarily retaining said adjusting member (**60**) in an angular position of rotation during a controlled rotation of said main spindle (**10**) prior to the beginning of a normal operation of the lathe so that said adjusting member (**60**) can move axially relative to said main spindle (**10**) to adjust said guide bodies (**58**) but cannot rotate with said main spindle (**10**).

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**4,742,741**

## ROTARY SHEETER

**Edwin A. Hallberg, and Gary C. Welsh, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Apr. 7, 1986, Ser. No. 848,543**

**Int. Cl.⁴ B26D** *1/62*

**U.S. Cl. 83—37** **23 Claims**

1. In a method of cutting a continuously moving web of sheet material to provide severed sheet increments of selectable lengths, the steps of

providing frame means for supporting a pair of elongate, generally cylindrical, rotatable roll assemblies lineally coextensively with one another and with fixed axes thereof parallel to each other,

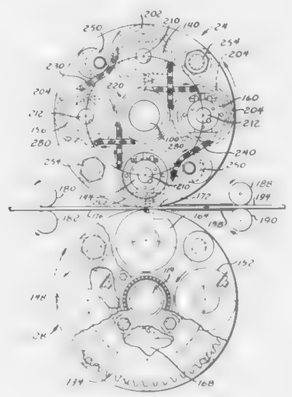
adjusting spatial separation of said roll assemblies with respect to each other to define limited passageway means therebetween for accommodating a web of sheet material moving freely therethrough,

rotatably driving said roll assemblies in unison and at the same rotational velocity and each about a respective one of said fixed axes, but in opposite annular rotational modes as the web moves through the passageway means,

mounting cutter rolls and slot rolls on said roll assemblies as an annular array thereon and within an encircling, bounding marginal zone of each of said roll assemblies,

spacing said cutter rolls and said slot rolls equally and in an alternating sequence, and at equal radial distances from said axes of said assemblies,

pivotally supporting said cutter rolls and said slot rolls for planetary revolution in a ferris-wheel fashion about the fixed axes of the roll assemblies as said roll assemblies rotate, and



establishing and maintaining fixed annular orientation of said cutter rolls and said slot rolls with respect to their own axes as the roll assemblies rotate,

providing actuator means for pivotally arcuately displacing said cutter rolls and said slot rolls,

periodically selectively energizing said actuator means for pivotally shifting said cutter rolls and said slot rolls simultaneously through equal circumferential arcs to establish a functional mode of said cutter rolls and cooperating said slot rolls,

controlling sequential presentation of a knife blade of a cutter roll into an opposedly presented slot of a cooperating slot roll at opposed sides of the passageway as the web passes therethrough, severing the moving web into incremental lineal segments of selectable lengths during travel of said web through the passageway, and driving said roll assemblies at circumferential lineal speeds corresponding to a lineal speed of the web of sheet material moving through the passageway therebetween, thereby obviating any need for maintaining an accumulation loop in the moving web.



**4,742,742**

## APPARATUS FOR SEVERING ELONGATE PRODUCT

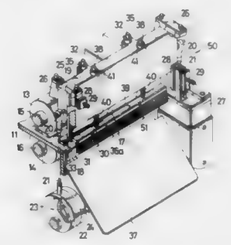
**Kazuo Yokoe, Kurobe, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan**

**Filed Oct. 1, 1986, Ser. No. 914,187**

**Claims priority, application Japan, Oct. 8, 1985, 60-154018[U]; Feb. 14, 1986, 61-19636[U]**

**Int. Cl.⁴ B26D** *1/08*

**U.S. Cl. 83—101** **7 Claims**



1. An apparatus for severing an elongate product, comprising:

a base board for supporting the elongate produduct;

means for feeding the elongate product in a direction on said base board;

a first cutter blade fixedly disposed on an end of said base board;

a second cutter blade movable toward said first cutter for coaction therewith to cut the elongate product into a severed piece;

a first pressure pad movably disposed adjacent to and upstream of said first and second cutter blades with respect to said direction for pressing the elongate product against said base board;

a second pressure pad movably disposed adjacent to and downstream of said first and second cutter blades with respect to said direction for discharging the severed piece off said first and second cutter blades,

a movable holder supporting said second cutter blade, said first and second pressure pads being movably mounted on said movable holder,

a discharge tray disposed downstream of said first and second cutter blades for receiving the severed piece, said first pressure pad comprising at least one first rod slidably supported on said movable holder, a first presser foot, and a first spring disposed around said first rod for normally urging sais presser foot toward said base board, said second pressure pad comprising at least one second dord slidably supported on said movable holder, a presser foot, and a second spring disposed around said second rod for normally urging said second presser foot toward said discharge tray, and a brush mounted on and extending along a downstream edge of said second presser foot for removing static electricity from the elongate product and the severed piece.

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**4,742,743**

## RADIAL SAW ACCESSORY FOR PREVENTING SAWDUST BUILDUP

**William J. Scarpone, 11648 Orange Grove Blvd., Royal Palm Beach, Fla. 33411**

**Filed Apr. 24, 1986, Ser. No. 855,833**

**Int. Cl.⁴ B27B** *5/20;* **B27G** *3/00;* **B23D** *47/00*

**U.S. Cl. 83—104** **11 Claims**

1. An improved radial saw, comprising:

a radially arm supported circular saw slidably engaged to said radial arm;

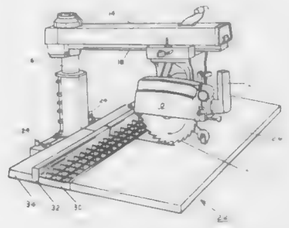
a main sawing table and a rip fence situated below said saw;

means for securing a removable accessory table between said main sawing table and said rip fence;

said accessory table including a plurality of apertures appropriately dimensioned to allow most sawdust to freely drop through;

said accessory table including a plurality of supporting members arranged in a grid-like lattice and forming said plurality of apertures, said supporting members being tapered adjacent upper surfaces thereof so that the upper surface area is minimized thereby allowing sawdust to readily drop through said apertures; and

said rip fence being secured adjacent said accessory table so that sawdust is substantially inhibited from accumulating adjacent said rip fence.



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**4,742,744**

## HOLE PUNCHING DEVICE

**Bo E. Lindberg, Iggebygatan 7, S-720 02 Västerås, Sweden**

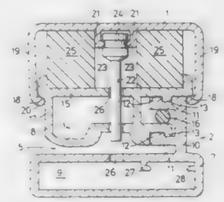
**PCT No. PCT/SE86/00199, § 371 Date Dec. 17, 1986, § 102(e) Date Dec. 17, 1986, PCT Pub. No. WO86/06674, PCT Pub. Date Nov. 20, 1986**

**PCT Filed Apr. 29, 1986, Ser. No. 14,064**

**Claims priority, application Sweden, May 3, 1985, 8502178**

**Int. Cl.⁴ B26F** *1/32*

**U.S. Cl. 83—167** **6 Claims**



1. A device for manually punching holes in paper sheets and the like, including a bottom part (**2**) having a pair of sidewalls (**10,17**) and a hole (**26**), an operative member (**1**) mounted on said bottom part for movement toward and from the same and including two opposed legs (**19**) cooperating with said sidewalls for guiding said operative member as it moves relative to said bottom part, a punch (**22**), means for mounting said punch on said operative member for endwise movement relative to said bottom part and for passing through said hole upon movement of said operative member in the direction toward said bottom part, said device having a sheet inserting slit (**5**) passing between said hole and said punch, spring means (**25**) acting between said operative member and said bottom part for biasing the operative member in the direction away from said bottom part, and means (**18**) for limiting movement of said punch and said operative member in the direction away from said bottom part, said means for mountint said punch on said operative member comprising two opposed parallel flanges on said operative member and having bulbs (**23**), said punch having a circumferential recess adapted to receive said bulbs for movement of said punch longitudinally of said operative mem-

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ber while retaining said punch against movement endwise relative to said operative member.

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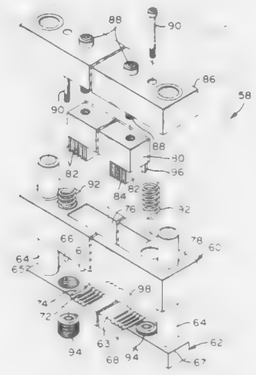
**4,742,745**
**ROTARY CUTTER FOR SHEET MATERIALS, IN PARTICULAR WOOD VENEERS**
**Angelo Cremona, Monza, Italy, assignor to Angelo Cremona & Figlio S.p.A.**
**Filed Sep. 24, 1986, Ser. No. 910,900**
**Claims priority, application Italy, Sep. 25, 1985, 23219[U]**
**Int. Cl.[4] B23D** *25/02*
**U.S. Cl. 83—344** **2 Claims**



1. A rotary cutter for sheet materials, particularly wood veneers, comprising a blade (**11**) controlled to rotate between two supporting rolls (**12, 13**), which are upper and lower respectively and which are also rotary, wherein each of the supporting cylinders (**12, 13**) rests on at least a pair of travelling rolls (**14, 15** and **16, 17**), which can be reciprocally neared and/or distanced through the intermediary of actuating means which cooperate with them.

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**4,742,746**
**REWORKING AND SIZING OF FLAT CONDUCTOR CABLE**
**Billy E. Olsson, New Cumberland, Pa., assignor to AMP Incorporated, Harrisburg, Pa.**
**Filed Apr. 17, 1986, Ser. No. 853,072**
**Int. Cl.[4] B26F** *1/02;* **H02G** *1/12*
**U.S. Cl. 83—387** **8 Claims**



1. Reworking and sizing apparatus for reworking and sizing a flat multiconductor cable, the cable comprising a plurality of side-by-side spaced-apart coplanar parallel conductors, the conductors being embedded in plastic insulating material and having axes which define a conductor plane, the cable having parallel side cable edges and oppositely-facing first and second major cable surfaces, each of the cable surfaces having, in transverse cross section, a series of cylindrical opposed and aligned convex projections with a conductor centrally located in the cable with respect to each pair of opposed projections, the spacing between the axes of adjacent conductors being $d \pm x$ where d is the nominal spacing and x is the spacing tolerance, the span distance between the two outside conductors, which are immediately adjacent to the side cable edges, being $(n-1)d \pm s$ where n is the number of conductors and s is the span tolerance, the span tolerance s being greater than the spacing tolerance x, the apparatus being characterized in that:

the apparatus comprises first and second tooling members and a plurality of punches, the first and second tooling members having tool side edges and opposed first and second tooling members having tool side edges and opposed first and second tool surfaces which extend between the tool side edges, the tooling members being movable between open positions and closed positions,

the first and second tool surfaces each having side-by-side parallel concave depressions which extend parallel to the tool side edges and which conform to the convex projections on the cable surfaces, the depressions on the first and second tool surfaces being in opposed aligned relationship, the center-to-center spacing between adjacent depressions being d, the outside depressions, which are adjacent to the tool side edges, being spaced apart by a distance substantially equal to $(n-1)d$, the first and second tool surfaces being substantially against each other when the tooling members are in the closed positions and being spaced apart when they are in their open positions,

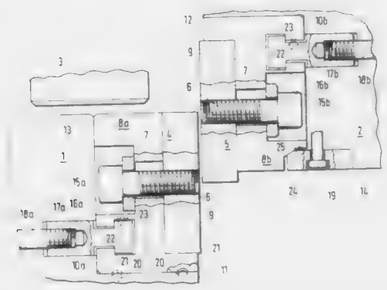
each of the first and second tool surfaces having a plurality of openings extending therein with an opening between each adjacent pair of depressions, the punches being on the first tooling member and extending into the openings in the first tool surface, the punches having leading ends which are proximate to the first tool surface, and are movable through the openings in the first tooling member and into the openings in the second tooling member, and actuating means are provided for sequentially moving the first and second tooling members from their open positions to their closed positions, and thereafter moving the punches through the openings in the first tooling member and into the openings in the second tooling member whereby,

upon placement of a portion of the cable between the first and second tool surfaces with the projections on the cable surfaces in approximate alignment with the depressions on the tool surfaces, and thereafter moving the tooling members to their closed positions, at least some of the conductors will be moved laterally in the conductor plane by the engagement of the concave depressions of the first and second surfaces with the convex projection of the cable so that the conductor will be centrally located between an opposed pair of depressions on the first and second tool surfaces, and upon subsequent movement of the punches through the cable and into the openings in the second tooling member, holes will be punched in the cable between adjacent conductors and the span tolerance s will be reduced.



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**4,742,747**
**ARRANGEMENT FOR SETUP, REPLACEMENT, AND CLAMPING OF CUTTING TOOLS IN A CUTTING MACHINE**
**Alois Kirsch, Günzburg, Fed. Rep. of Germany, assignor to Güunzburger Werkzeugmaschinenfabrik (GWF), Gunzburg, Fed. Rep. of Germany**
**Filed Feb. 24, 1987, Ser. No. 17,705**
**Claims priority, application Fed. Rep. of Germany, Feb. 21, 1986, 3605641**
**Int. Cl.[4] B23D** *35/00*
**U.S. Cl. 83—698** **15 Claims**



1. An arrangement for the set-up, clamping and replacement of cutting tools in a cutting machine such as an upper and lower cutter in a sheet metal plate shears, wherein the improvement comprises a machine support member (**1, 2**), an elongated cutting tool (**4, 5**), an adapter (**8***a*, **8***b*) for mounting said cutting tool, said adapter having a length extending in the elongated direction of said cutting tool and replaceably mounted on said machine support member, means (**6**) for adjustably fastening said cutting tool on said adapter, said adapter having a recess (**16***a*, **16***b*) therein extending across the length of said adapter) an elongated clamping strip (**17***a*, **17***b*) mounted on said machine support member and engageable within said recess (**16***a*, **16***b*) for securing said adapter in a positive manner to said machine support member, said clamping strip being displaceable between a released position for replacing said adapter and a locked position for securing said adapter to said machine support member.

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**4,742,748**
**ELECTRONIC MUSICAL INSTRUMENT ADAPTED FOR SOUNDING RHYTHM TONES AND MELODY-TONES ACCORDING TO RHYTHM AND MELODY PLAY PATTERNS STORED IN A TIMED RELATION TO EACH OTHER**
**Naofumi Tateishi, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan**
**Filed Dec. 22, 1986, Ser. No. 945,082**
**Claims priority, application Japan, Dec. 31, 1985, 60-298989**
**Int. Cl.[4] G10H** *1/42, 7/00*
**U.S. Cl. 84—1.03** **4 Claims**

1. An electronic musical instrument comprising:

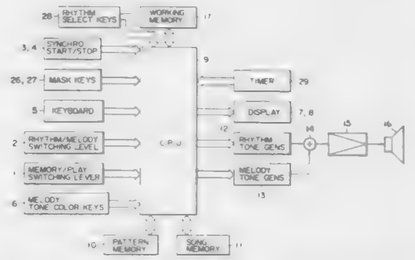
rhythm pattern input means for inputting a rhythm play pattern;

melody pattern input means for inputting a melody play pattern;

pattern memory means for storing said rhythm and melody patterns from said rhythm and melody pattern input means as a single rhythm pattern of desired measure such that said rhythm and melody play patterns are in a timed relation to each other;

readout means for simultaneously and repeatedly reading out said rhythm and melody play patterns from said pattern memory means; and

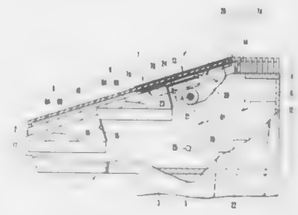
rhythm and melody tone generating means for generating rhythm and melody tones according to said rhythm and




melody play patterns read out from said pattern memory means by said readout means.

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**4,742,749**
**LID STRUCTURE OF ELECTRONIC MUSICAL INSTRUMENT**
**Yasuhiro Kira, and Toshiyuki Yamamura, both of Hamamatsu, Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan**
**Filed Mar. 18, 1987, Ser. No. 27,305**
**Claims priority, application Japan, Mar. 24, 1986, 61-63913; Feb. 6, 1987, 62-24759**
**Int. Cl.[4] G10C** *3/02*
**U.S. Cl. 84—179** **5 Claims**



1. In an electronic musical instrument comprising a lid which is disposed to be vertically pivotal about a pivot and covers a keyboard section and/or an operation panel of a musical instrument body when it is closed,

a lid structure for said electronic musical instrument, wherein said pivot is arranged at a position separated forward from a rear end of said lid and downward from a lower surface of said lid by predetermined distances, respectively, and a rear end portion of said lid is housed, when the lid is opened, in said musical instrument body through an opening formed in an upper surface of said musical instrument body.

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**4,742,750**
**ADJUSTABLE FINE TUNING BRIDGE SYSTEM AND TREMOLO FOR STRINGED MUSICAL INSTRUMENTS**
**David C. Storey, 13801 Gershon Pl., Santa Ana, Calif. 92705**
**Continuation-in-part of Ser. No. 807,315, Dec. 10, 1985, abandoned. This application Jul. 1, 1986, Ser. No. 880,830**
**Int. Cl.[4] G10D** *3/12*
**U.S. Cl. 84—313** **22 Claims**

1. Apparatus for producing a vibrato effect in the strings of a musical instrument, comprising

(a) a tremolo including horizontal and vertical portions, said

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tremolo vertical portion being arranged in a recess contained in the body portion of the instrument and said tremolo horizontal portion being arranged adjacent the upper surface of the instrument body portion, one edge of said tremolo horizontal portion containing at least one recess; and

(b) means pivotally connecting said tremolo with the instrument body portion, said connecting means comprising screw means threadably connected with the instrument body portion, said screw means including a head portion having a sharp circumferential edge, said tremolo recess receiving a portion of said sharp edge and pivoting thereabout, whereby when the instrument strings are connected with said tremolo and when said tremolo is pivoted about said sharp edge, the tension of the strings is varied to produce a vibrato effect.

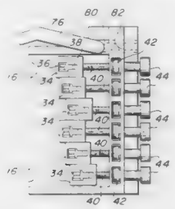
6. An adjustable bridge system for the strings of a musical instrument, comprising

(a) a base;

(b) individually adjustable bridge means connected with said base for supporting the individual instrument strings, respectively, each of said bridge means including

(1) a body portion;

(2) means for adjusting the vertical and longitudinal displacement of said body portion relative to said base;



(3) a first roller rotatably connected with said body portion for supporting an individual string;

(4) a second roller rotatably connected with said body portion on the opposite side of the string from said first roller; and

(5) a hollow threaded tube connected at one end with said body portion for receiving the string.

9. An adjustable bridge system for the strings of a musical instrument, comprising

(a) a base;

(b) individually adjustable bridge means connected with said base for supporting the individual instrument strings, respectively, each of said bridge means including

(1) a body portion;

(2) means for adjusting the vertical displacement of said body portion relative to said base;

(3) a first roller connected with said body portion for supporting an individual string;

(4) means for adjusting the lateral position of said first roller relative to said body portion;

(5) means for adjusting the rotational play of said first roller relative to said base;

(6) a second roller connected with said body portion on the opposite side of the string from said first roller; and

(7) a hollow tube connected at one end with said body portion for receiving the string.

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**4,742,751**

**PERFORMER'S GUITAR STAND**

**Marc C. Cherry, 11421 Herefordshire Way, Germantown, Md. 20875**

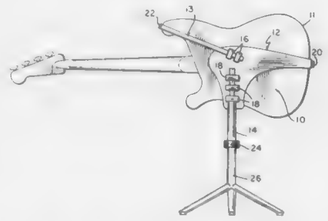
**Filed Apr. 2, 1987, Ser. No. 33,355**

**Int. Cl.[4] G10G** *5/00*

**U.S. Cl. 84—327** **14 Claims**

1. An apparatus for supporting a stringed musical instrument having strap fastening means for receiving and fastening a neck-strap to said instrument, said apparatus comprising:

bracket means for receiving said strap fastening means and supporting said instrument at said strap fastening means; and



substantially rigid attachment means connected to said bracket means and adapted to be connected with support means for supporting said attachment means and said bracket means such that said instrument is in a substantially horizontal playing position.

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**4,742,752**

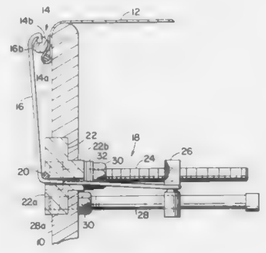
**DRUM HEAD TENSIONING DEVICE**

**David Lubbers, 14 Clark Hill Rd., East Hampton, Conn. 06424**

**Filed Apr. 2, 1987, Ser. No. 33,997**

**Int. Cl.[4] G10D** *13/02*

**U.S. Cl. 84—413** **25 Claims**



1. In a percussion instrument of the type having a drum head stretched across one end of a walled sound chamber, and drum head tensioning means for varying the pitch of the instrument by axially adjusting the location of hoop means surrporting the drum head, the improvement to said tensioning means comprising:

a plurality of fittings arranged in spaced circumaxial relationship around the axis of the head end of said walled chamber, each fitting being spaced below said hoop means, each said fitting having a cable guide portion,

a threaded screw rotatably provided in each said fitting and oriented radially relative to said axis,

a nut threadably supported on each said threaded screw, and

cable means coupled to each said nut and secured to said hoop meas so that rotation of said screw causes the tension to vary in said drum head by adjusting the axial position for the hoop means, said cable means having a portion passing through said cable guide portions.



**4,742,753**

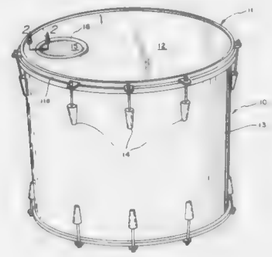
**DRUMHEAD WITH FRAMED APERTURE**

**Zay Speed, 4412 Beechwood Rd., Salt Lake City, Utah 84123**

**Filed Oct. 7, 1987, Ser. No. 106,173**

**Int. Cl.[4] G10D** *13/02*

**U.S. Cl. 84—414** **18 Claims**



1. A drumhead for a drum as a musical instrument, comprising a sheet of flexible drumhead material adapted to be stretched taut in a drumhead tensioning ring as a sound emitting diaphragm; a drumhead tensioning ring in which said sheet is mounted for tensioning; an aperture in said sheet; and a frame secured to said sheet marginally of and surrounding said aperture, said frame being substantially rigid relative to said sheet for substantially reestablishing the integrity of the apertured sheet.

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**4,742,754**

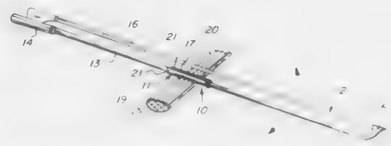
**COL LEGNO BOW GUARD**

**David Janello, 37 Jamaica St., Apt. 3, Boston, Mass. 02130**

**Filed May 1, 1987, Ser. No. 44,664**

**Int. Cl.[4] G10D** *3/16*

**U.S. Cl. 84—453** **4 Claims**



1. A guard for a tapered bow to protect the bow and a set of strings on a tringed musical instrument during col legno playing, said guard comprising:

a sleeve having a hollow, conical interior and a logitudinal slit extending the length of said sleve, said conical interior being of such a diameter and taper to frictionally grip the bow for which it is adapted in the region of impact of the bow on the strings during col legno playing, said sleeve having a length sufficient to extend across the transverse dimension of said set of strings, and

a lining secured to the interior of said sleeve.

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**4,742,755**

**HEATING ATTACHMENT FOR A MUSICAL INSTRUMENT**

**Frederick D. Peterson, 91 Ennis Rd., North Oxford, Mass. 01537**

**Filed Mar. 24, 1987, Ser. No. 29,633**

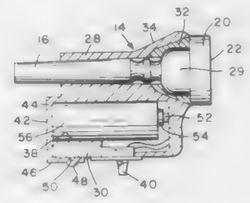
**Int. Cl.[4] G10G** *5/00*

**U.S. Cl. 84—453** **6 Claims**

1. A heating attachment for a musical insrument of the wind type which is sounded by a player's breath and which includes a mouthpiece which has an apertured end surface which is adapted to be engaged by the player's lips, said heating adapter comprising:

(a) a housing which includes a sleeve portion which is adapted to be removably mounted on the mouthpiece of the musical instrument so that the apertured end surface of said mouthpiece is exposed,

(b) at least one electrical heating element within said sleeve portion,



(c) a source of electrical power which is located within said housing, and

(d) electrical circuitry including a switch for selectively connecting said electrical heating element to said source of electrical power.

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**4,742,756**

**APPARATUS FOR FEEDING CARTRIDGES FROM A DRUM MAGAZINE TO A FIRING WEAPON**

**Peter Mannhart, Hochdorf, Switzerland, assignor to Werkzeugmaschinenfabrik Oerlikon-Bührle AG, Zürich, Switzerland**

**Filed Jan. 30, 1987, Ser. No. 8,772**

**Claims priority, application Switzerland, Feb. 4, 1986, 00423/86**

**Int. Cl.[4] F41D** *10/24*

**U.S. Cl. 89—33.02** **4 Claims**



1. An apparatus for feeding cartridges from a drum magazine to a firing weapon, comprising:

a drum magazine containing a predetermined number of sectors;

each one of said predetermined number of sectors containing a row of cartridges;

first conveying means for consecutively outwardly displacing said rows of cartridges from said predetermined number of sectors of said drum magazine;

second conveying means for receiving said cartridges from said rows of cartridges outwardly displaced by said first conveying means and for delivering said cartridges to the firing weapon;

rotary drive means for rotatably driving said drum magazine in a predetermined rotational direction;

each one of said predetermined number of sectors of said drum magazine arriving at a removal location during rotation of said drum magazine in said predetermined rotational direction under the action of said rotary drive means;

said first conveying means outwardly displacing in a predetermined direction said row of cartridges which are associated with said drum magazine sector placed in said removal location;

said first conveying means being arranged at a predetermined inclination formed as a resultant of said predetermined rotational direction of said drum magazine and said predetermined direction in which said row of cartridges is outwardly displaced from said drum magazine sector placed in said removal location;

a return movement blocking device arranged between said first conveying means and said second conveying means for preventing said cartridges from dropping into already emptied sectors of said predetermined number of sectors;

said return movement blocking device containing at least two pivotable flaps;

said at least two pivotable flaps being operatively associated with one another and conjointly forming a substantially funnel-shaped, pivotable channel through which said cartridges are passed by means of said first conveying means from said drum magazine to said second conveying means;

means operatively interconnecting said at least two pivotable flaps; and

a cam plate cooperating with said at least two pivotable flaps for pivoting said at least two flaps.

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**4,742,757**

## LOCKING DEVICE FOR A GUN BARREL OF AN AUTOMATIC WEAPON

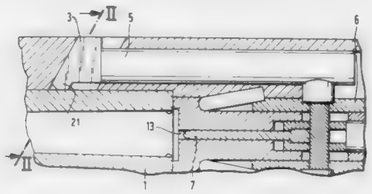
**Erich Matzagg, Oberndorf-Beffendorf; Gerhard Bilger, Lauterbach, and Helmut Mäder, Schramberg, all of Fed. Rep. of Germany, assignors to Mauser-Werke Oberndorf GmbH, Fed. Rep. of Germany**

**Filed Nov. 13, 1986, Ser. No. 930,809**

**Claims priority, application Fed. Rep. of Germany, Nov. 22, 1985, 3541312**

**Int. Cl.[4] F41D** *11/00*

**U.S. Cl. 89—154** **5 Claims**



**1**. A safety lock for a barrel of a machine gun, comprising: a housing, a breechblock carrier in said housing which is slidably movable therewith during the firing of the weapon, a breechblock slidably movable in said housing with said breechblock carrier; a striker pin associated with said breechblock and movable thereby; a barrel for receiving cartridge, said breechblock having a face opposite said barrel, said barrel having a recess defined in the barrel outer surface; and, a slide movable generally radially in respect to said barrel, said slide having a portion engageable with said recess, said slide being movable into a position to block the movement of said breechblock carrier when said slide is not engaged in the barrel recess, the recess being provided on the surface of the barrel at a position so that when the barrel is correctly locked, the recess, associated with the barrel, is positioned so that it may be engaged by said slide.

**4,742,758**

## SELF-LOCKING, FLUID OPERATED ACTUATOR

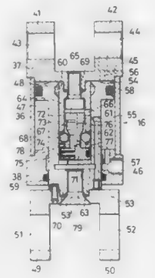
**Francesco Della Rocca, Pomigliano d'Arco, Italy, assignor to Alfa Romeo Auto S.p.A., Naples, Italy**

**Continuation of Ser. No. 796,412, Nov. 8, 1985, abandoned. This application Sep. 4, 1987, Ser. No. 94,085**

**Claims priority, application Italy, Nov. 19, 1984, 23652 A/84**

**Int. Cl.[4] F15B** *15/26*

**U.S. Cl. 92—24** **3 Claims**



**1**. Self-locking fluid-operated actuator for the driving of tools for mechanical operations, said actuator comprising a cylinder having ends closed by respective heads, a double acting working piston sliding under tightness conditions inside said cylinder wherein it defines a first and a second chamber of varible volume, said cylinder being provided with a first and a second port communicating with said variable volume chambers for the passage of pressurized fluid, a stem solid with said working piston and passing through one of said heads, said stem being operatively linked to a tool to be actuated, said cylinder being operatively linked to a tool to be actuated, said actuator being improved by a locking device carried by the other of said heads within said piston and stem operatively linked to actuator means for engaging said locking device with said working piston, under control, when said working piston is in an extended working position to lock said working piston in said extended working position, said actuator means including a control piston, fluid passage means for directing fluid under pressure to act on said control piston to engage said locking device, and said working piston forming valve means for controlling flow of fluid under pressure through said fluid passage means to said control piston whereby said working piston forms control means for actuating said locking means as said working piston advances towards said extended working position.

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**4,742,759**

## CERAMIC INSERT CAST PISTON

**Issei Hayakawa, Nagoya, Japan, assignor to NGK Insulators, Ltd., Japan**

**Continuation of Ser. No. 701,034, Feb. 12, 1985, abandoned. This application Apr. 22, 1987, Ser. No. 41,620**

**Claims priority, application Japan, Feb. 23, 1984, 59-33108**

**Int. Cl.[4] F02F** *3/00*

**U.S. Cl. 92—176** **20 Claims**

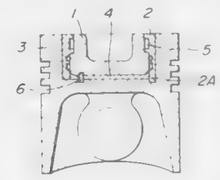
**1**. A ceramic insert cast piston for an internal combustion engine, comprising:

a ceramic head having an outer peripheral portion;

an annular metal ring having an inner peripheral portion and an outer peripheral portion, said inner peripheral portion of the metal ring having at least one annular groove therein and said inner peripheral portion of the metal ring being fitted to the outer peripheral portion of the ceramic head such that at least one annular heat insulating air space is formed between the metal ring and the ceramic head;

a cast metal piston body having an inner peripheral portion and an outer peripheral portion, wherein said ceramic head with said metal ring fitted thereto are located within said inner peripheral portion of the metal piston body; and

a buffer member located between the ceramic head and the metal piston body, wherein said at least one annular heat insulating air space functions to reduce heat transferred to



the ceramic head during casting of the metal piston body therearound, to prevent the ceramic head from being fractured due to thermal shock and to reduce combustion heat transferred to the metal piston body during operation of the internal combustion engine.



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**4,742,760**

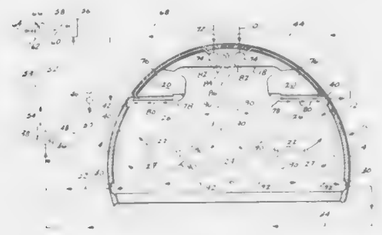
## AIRCRAFT CABIN VENTILATION SYSTEM

**Raymond H. Horstman, Auburn; Damian G. Monda, Seattle; Douglas E. Peash, Enumclaw, and Arthur S. Yorozu, Seattle, all of Wash., assignors to The Boeing Company, Seattle, Wash.**

**Filed Jul. 6, 1987, Ser. No. 70,334**

**Int. Cl.[4] B64D** *13/00*

**U.S. Cl. 98—1** **22 Claims**



**17**. In an aircraft cabin, a method for removing air contaminated by smoke and passenger metabolic exhalants while maintaining an airflow in the cabin that is stable and symmetrical about a central plane extending longitudinally through the cabin, comprising the steps of:

(a) supplying a pressurized ventilation airflow that includes both fresh air and recirculated air through one or more openings disposed generally above a passenger seating area in the cabin, and disturbing that airflow both downwardly and laterally within the cabin;

(b) drawing air from the cabin at a location where the air is heavily contaminated with smoke and passenger metabolic exhalants and venting the heavily contaminated air outside the cabin; and

(c) drawing from an area proximate the floor of the cabin, air that is relatively free of contaminants, and recirculating said relatively contaminant free air back into the cabin.

**4,742,761**

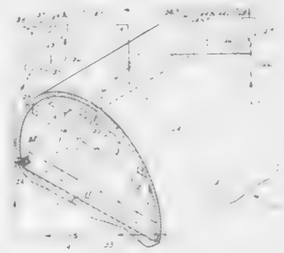
## METHOD AND APPARATUS FOR CONTROLLING THE CONCENTRATION OF CARBON DIOXIDE IN AN AIRCRAFT CABIN

**Raymond H. Horstman, Auburn, Wash., assignor to The Boeing Company, Seattle, Wash.**

**Filed Jul. 20, 1987, Ser. No. 75,555**

**Int. Cl.[4] B64D** *13/04*

**U.S. Cl. 98—1.5** **22 Claims**



**1**. Apparatus for controlling the ventilation of a pressurized enclosed space, comprising:

(a) a carbon dioxide sensor disposed so as to monitor carbon dioxide concentration in the enclosed space;

(b) a valve disposed in a fluid path through which air drawn from the space is selectively vented from the space or recirculated back into it;

(c) air pack means for supplying fresh pressurized air to the space; and

(d) control means, connected to the carbon dioxide sensor, the pressurization means and the valve, for controlling as a function of the concentration of carbon dioxide in the space one of (i) the volume of pressurized fresh air supplied to the space by the pressurization means, and (ii) the volume of air vented from the space through the valve.

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**4,742,762**

## AIR CONDITIONING APPARATUS FOR AUTOMOTIVE VEHICLES

**Toshikazu Ito, Ibaraki, and Takashi Degawa, Mito, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jan. 12, 1987, Ser. No. 2,219**

**Claims priority, application Japan, Jan. 13, 1986, 61-3440**

**Int. Cl.[4] B60H** *1/26*

**U.S. Cl. 98—2.05** **4 Claims**



**1**. An air conditioning apparatus for automotive vehicles, comprising:

a casing formed with an air inlet and air outlets and defining an air passageway between said air inlet and said air outlets;

blower means for introducing air through said air inlet into said casing and delivering the same through said air outlets;

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heater means provided in said air passageway of said casing for heating air introduced into the casing; and

air mix door means for regulating flow rate of air passing through said heater means and flow rate of air bypassing the same, said heater means heating the air flowing therethrough to provide warm air which is mixed with cool air bypassing the heater means to provide conditioned air whose temperature is controlled by varying proportions of the warm air and cool air mixed with each other, wherein a cool air heating passagaeway and a cool air passageway are formed by dividing said air passageway in said casing along a direction of flow of the air introduced into the casing, said cool air heating passageway has a passage portion in which said heater means is mounted, another passage portion bypassing said heater means and said air mix door means mounted therein, said cool air passageway is connected to said air outlets for exclusive use of allowing at least a part of the cool air to bypass said cool air heating passageway and to directly lead the cool air to said outlets, and door means for opening and closing said cool air passageway is provided.

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**4,742,763**

## DEVICE FOR THE DETECTION OF NOXIOUS SUBSTANCES IN THE AIR SUPPLIED TO A COMPARTMENT OCCUPIED BY PEOPLE

**Heinz Hölter; Heinrich Igelbüscher, both of Gladbeck; Heinrich Gresch, Dortmund-Wickede, and Heribert Dewert, Gladbeck, all of Fed. Rep. of Germany, assignors to Heinz Holter, Gladbeck, Fed. Rep. of Germany**

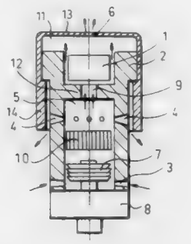
**PCT No. PCT/EP86/00239, § 371 Date Dec. 10, 1986, § 102(e) Date Dec. 10, 1986, PCT Pub. No. WO86/06331, PCT Pub. Date Nov. 6, 1986**

**PCT Filed Apr. 19, 1986, Ser. No. 2,712**

**Claims priority, application Fed. Rep. of Germany, Apr. 23, 1985, 3514588; May 22, 1985, 3518320; Jun. 26, 1985, 3522834**

**Int. Cl.[4] B60H** *3/06*

**U.S. Cl. 98—2.01** **18 Claims**



1. A device for the detection of noxious substances in air being supplied to a compartment occupied by people, said detection device comprising:

a housing centered on an upright axis and adapted to be traversed by an air flow to be analyzed;

a first air chamber formed in said housing;

a second air chamber formed in said housing upstream of said first chamber, said second chamber being cylindrical and centered on said axis;

a sensor disposed in said first chamber;

a measuring slot formed in a wall of said housing separating said first and second chambers, said measuring slot being upstream of said sensor and in registration therewith for directing said air flow against said sensor;

a pulsator disposed in said second chamber for controlling said air flow through said housing to insure a constant air flushing of said sensor;

at least one air inlet formed in said housing and opening into said second chamber upstream of said pulsator for the admission of air into said second chamber; and

at least one first air outlet formed in said housing at one end thereof and opening into said first chamber downstream of said sensor for venting said air flow from said first chamber.

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**4,742,764**

## METHOD AND APPARATUS FOR INSULATING SELECTED AREAS FROM THE SURROUNDING ATMOSPHERE WITH CLEAN-ROOM AIR

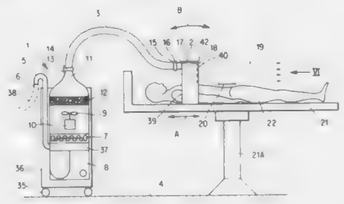
**Zinon Duvlis, Burgdorfer Damm 5, D-3000 Hanover, Fed. Rep. of Germany**

**Filed Aug. 15, 1985, Ser. No. 766,153**

**Claims priority, application Fed. Rep. of Germany, Aug. 16, 1984, 3430089**

**Int. Cl.[4] F24F** *9/00*

**U.S. Cl. 98—36** **34 Claims**



1. A method of insulating from the surrounding atmosphere a selected area which is occupied by a part of or the entire body of a patient on an operating table, comprising the steps of establishing a stream of clean-room air between the selected area and the surrounding atmosphere including causing the stream to flow along a predetermined path and in a predetermined direction substantially tangentially of the selected area; and bundling and confining the stream by thermal stabilization including maintaining the temperature of the stream below that of the surrounding atmosphere without appreciably influencing the temperature in the selected area.

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**4,742,765**

## POWER ROOF VENTILATOR

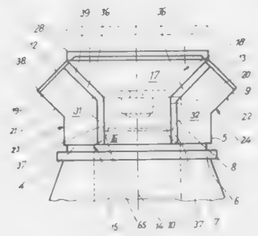
**Bernd Weinert, Ohringen, and Heinz Wieland, Waldenburg, both of Fed. Rep. of Germany, assignors to Wilhelm Gebhardt GmbH, Waldenburg, Fed. Rep. of Germany**

**Filed Dec. 16, 1986, Ser. No. 942,528**

**Claims priority, application Fed. Rep. of Germany, Dec. 21, 1985, 3545684; Dec. 24, 1985, 3546083**

**Int. Cl.[4] F24F** *7/02*

**U.S. Cl. 98—42.02** **15 Claims**



1. A power extractor ventilator for mounting on the outside of a building, comprising:

a centrifugal impellor and a driving motor therefor constituting a motor-impellor unit,

a housing containing said unit,

a plate-like, flat base member joined to said housing,



said housing being rectangular where it is joined to said base member,

said housing having an inlet port at said base member and being adapted to discharge air in a radial direction away from the vicinity of said ventilator from two rectangular oppostie sides thereof through two outlet ports, and having a first pair of first opposite walls extending away from said base member and a second pair of second opposite walls extending away from said base member, such walls representing the sides of a rectangle placed around said motor-impellor unit, said housing furthermore including readily opening side sections with said outlet ports therein at two said opposite sides and a center section therebetween, each of said side sections including one of said first walls and parts of said second walls axially aligned and adjacent to said first walls so that each of said side sections is in the form of a channel extending generally in the direction of the axis of the said unit and opening towards same,

said side sections including said first housing walls pivotally mounted about axes that are at said base member to said base member for pivoting motion between said closed operational state of said ventilator and an open position.

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**4,742,766**

## DYNAMICALLY BALANCED EXHAUST PIPE CAP

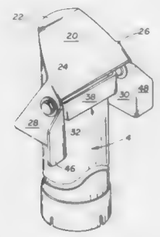
**Jerome G. Davison, 3361 Stoneybrook, Oklahoma City, Okla. 73120, and Gerald E. Hollingshead, 7609 NW. 34th St., Bethany, Okla. 73008**

**Continuation-in-part of Ser. No. 862,131, May 12, 1986, Pat. No. 4,667,582. This application Feb. 27, 1987, Ser. No. 19,632**

**The portion of the term of this patent subsequent to May 26, 2004, has been disclaimed.**

**Int. Cl.[4] F23L** *17/02*

**U.S. Cl. 98—59** **15 Claims**



1. A dynamically balanced protective cap for the exhaust stack of an internal combustion engine comprising:

a tubular element having an open lower end and an open upper end; and

a closure flap assembly pivotally secured to said tubular element, and including:

a closure plate having a major closure portion of relatively large surface area extending across, and closing, said opening at the upper end of said tubular element when said plate is in a closing position;

a pair of horizontally spaced, parallel balancing plates disposed on opposite sides of said tubular element and each having one edge secured to one side edge of said closure plate, said balancing plates projecting from said closure plate downwardly away from said opening at the upper end of said tubular element, and positioned alongside said tubular element; and

a pair of spaced wind vanes located on opposite sides of said tubular element and each secured to one of said balancing plates, and each positioned to extend into the path of air flow extending normal to the axis of said tubular element; and

means pivotally supporting the closure flap assembly on said tubular element for pivotation about an axis extending through said balancing plates wherein a major portion of each of said balancing plates lies on the opposite side of said pivotal axis from said wind vanes.

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**4,742,767**

## COFFEE MAKER

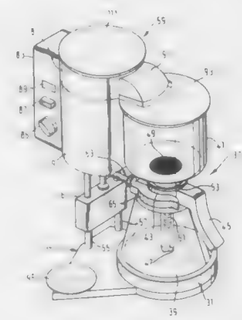
**Morimasa Komatsu; Atuhiko Ono, both of Ichinomiya, and Hisayoshi Uchida, Iwakura, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Oct. 30, 1986, Ser. No. 925,104**

**Claims priority, application Japan, Nov. 5, 1985, 60-247546; Nov. 6, 1985, 60-249519**

**Int. Cl.[4] A47J** *31/043, 31/42*

**U.S. Cl. 99—280** **9 Claims**



1. A coffee maker comprising:

coffee liquid extracting container means for containing water and ground coffee;

base member means including a heater means for heating the water in the coffee liquid extracting container means and a tray means adjacent said heater means; and

holding member means for supporting the coffee liquid extracting container means, and for moving the coffee liquid extracting container means between a first position wherein the coffee liquid extracting container means is in contact with the heater means to a second position wherein the coffee liquid extracting container means is in contact with the tray means.

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**4,742,768**

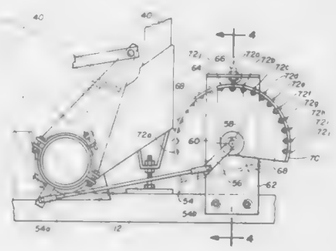
## SYSTEM FOR MONITORING BALE SHAPE IN ROUND BALERS

**Ronald T. Sheehan; Robert M. VanGinhoven, both of Lancaster, and Stephen C. Schlotterbeck, New Holland, all of Pa., assignors to New Holland Inc., New Holland, Pa.**

**Filed Mar. 3, 1987, Ser. No. 21,060**

**Int. Cl.[4] A01D** *39/00;* **B30B** *9/30*

**U.S. Cl. 100—88** **6 Claims**



1. In combination with a round baler having a bale forming

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apron defining a bale forming chamber which is expandable during bale formation, arm means supporting said bale forming apron and being movable as said bale forming chamber expands, a system comprising:

first and second indicator means; and

single bale shape monitor means connected to said arm means for generating a signal in one of said indicator means in response to a predetermined movement of said arm means, said single bale shape monitor means subsequently generating a signal in the other one of said indicator means in response to a further predetermined movement of said arm means said signals being generated alternately by said single bale shaped monitoring means.

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**4,742,769**

## PRINTING CYLINDER AND AXIAL GROOVE FILLER COMBINATION

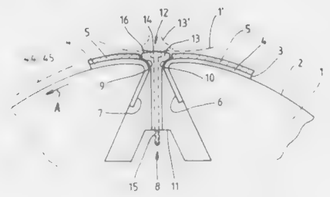
**Reinhard Zeller, Augsburg, Fed. Rep. of Germany, assignor to M.A.N. Roland Druckmaschinen Aktiengesellschaft, Offenbach am Main, Fed. Rep. of Germany**

**Filed Nov. 5, 1986, Ser. No. 927,734**

**Claims priority, application Fed. Rep. of Germany, Nov. 15, 1985, 3540581**

**Int. Cl.⁴ B41F** *13/08*

**U.S. Cl. 101—216** **28 Claims**



**15**. In a printing machine system having

a first cylinder having a drive gear and a cover, said first cylinder (**1**, **19**) having an axial groove (**8**, **24**) defining groove edges (**9**, **10**; **25**, **26**) which define the perimeter of the groove, said groove being adapted for retaining said cylinder cover on said cylinder and defining a base, or root, the cylinder being circumferentially supported by said drive gear, said drive gear defining a theoretical pitch circle (**45**),

wherein the first cylinder defines three adjacent axial zones of about one-third axial length each and

means are provided for improving the running smoothness of said cylinder, comprising

a filler element (**13**, **31**), located in the axial groove, said filler element being of lesser axial length than said cylinder, and located only in the center third axial zone of the cylinder (**1**, **19**),

said filler element being supported on the base (**11**, **30**) of the groove (**8**, **24**) and being further supported on at least one of the groove edges (**9**, **10**; **25**, **26**), said filler element having an outer part-circular contour (**16**, **32**) having a radius of curvature (**44**) which is identical to the theoretical pitch circle (**45**) of the drive gear, with a tolerance of not more than about ±0.05 millimeters; and

wherein said system further includes a second cylinder (**1**,', **19**') having, at least in the region of said lesser axial length, a cylindrical surface (**13**', **31**') to form a counter surface for said filler element (**13**, **31**).

**4,742,770**

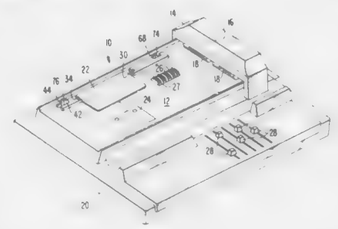
## VARIABLE FIELD CREDIT CARD IMPRINTER WITH DISABLING MECHANISM

**Walter R. Weickert, Petersburg, and Paul J. Foley, Kitchener, both of Canada, assignors to National Business Systems,Inc., Canada**

**Filed Feb. 14, 1985, Ser. No. 701,683**

**Int. Cl.⁴ B41J** *3/04*

**U.S. Cl. 101—269** **3 Claims**



**1**. A platen carriage locking mechanism for a variable information imprinter comprising:

(i) a platen carriage mounted on said imprinter for movement from a starting position, across a customer credit card and a set of moveable digit wheels, to an end position, and from said end position back to said starting position;

(ii) a platen carriage blocking means for blocking movement of said platen carriage from said starting position, and for permitting movement of said platen carriage from said starting position;

(iii) a digit wheel sensing means which provides movement of the credit card after the resetting of at least one digit wheel; and

(iv) said credit card being positioned between said platen carriage blocking means and said digit wheel sensing means to connect said digit wheel sensing means to said platen carriage blocking means so that said platen carriage blocking means is configured to permit movement of said platen carriage from said starting position before imprinting across said customer credit card in response to the resetting of at least one digit wheel.

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**4,742,771**

## POSTAL CODE ENVELOPE PRINTER

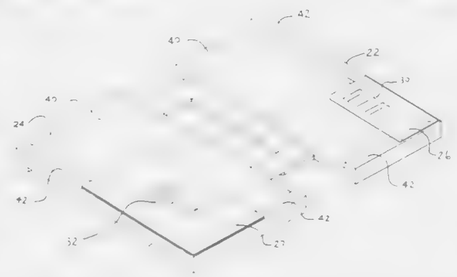
**Lewis A. Heilig, 5785 Sir Walter Scott, Apt. 201, Montreal, Quebec, Canada H4W 1S4**

**Filed Apr. 23, 1987, Ser. No. 41,530**

**Claims priority, application Canada, Apr. 28, 1986, 507799**

**Int. Cl.⁴ B41K** *3/04*

**U.S. Cl. 101—407 BP** **21 Claims**



**1**. A printer for marking an envelope and the like, at a fixed location with respect to one corner of the envelope regardless of envelope size, comprising:



an adjustable jig to hold one end of an envelope, the jig having at least two portions, each portion having a corner slot to position a respective corner of the one end of an envelope, connection means to join the two portions together in sliding relationship so that distance between the corner slots in the two portions can be varied to hold different sized envelopes;

the two portions of the jig each having stencil for producing a mark on separate locations of the envelope each stencil being positioned above the respective separate location on the envelope in the jig, the stencil above each separate location being a fixed distance from the respective corner slot such that each of the separate locations on the envelope to be marked is a fixed distance from the respective corner of the envelope regardless of size of envelope.

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**4,742,772**

## RAPID SETUP PRINTING PRESS WITH QUICK RELEASE PRINTING PLATE RETAINER

**Gregory A. Grose, 6 Creek Cir., Seaford, Va. 23696**

**Division of Ser. No. 877,239, Jun. 23, 1986, abandoned. This application Mar. 23, 1987, Ser. No. 29,051**

**Int. Cl.⁴ B41F** *27/06, 7/22*

**U.S. Cl. 101—415.1** **2 Claims**

**1**. A quick release printing plate retaining apparatus for holding a printing plate on the surface of a plate cylinder comprising:

a first fixed groove in the cylindrical surface of the plate cylinder and oriented parallel to the axis of the plate cylinder into which fits a lip bent on the edge of a printing plate;

a segment of the cylindrical surface of the plate cylinder with a reduced radial dimension forming a depressed surface;

a moveable retainer bar including a second groove, into which fits a lip bent on the edge of a printing plate, parallel to the first fixed groove, the moveable retainer bar located within the depressed surface of the plate cylinder;

force producing means acting upon the moveable retainer bar to move it toward the first fixed groove and to maintain clearance space within the depressed surface on the side of the retainer bar away from the fixed groove;

an actuator bar located within the depressed surface of plate cylinder between the moveable retainer bar and the fixed groove and oriented approximately parallel to the plate cylinder axis;

at least two pair of wing means angularly oriented at complimentary angles to the axis of the plate cylinder and pivotably attached to the actuator bar, each pair having one wing means protruding toward the retainer bar and pivotably attached to it and another wing means protruding toward the first fixed groove and pivotably attached to a fixed surface; and

actuating means capable of producing a force on the actuator bar in the direction parallel to the axis of the plate cylinder from the direction of the apex of the angles formed by the wing means.

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**4,742,773**

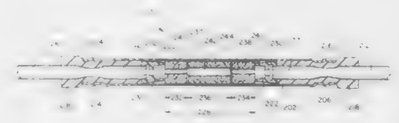
## BLASTING SIGNAL TRANSMISSION TUBE DELAY UNIT

**Stephen W. Bartholomew, Granby, Conn.; Daniel C. Rontey, Lebanon, N.J.; William J. Necker, Collinsville, and Craig F. Adams, Granby, both of Conn., assignors to The Ensign-Bickford Company, Simsbury, Conn.**

**Filed Oct. 3, 1986, Ser. No. 914,785**

**Int. Cl.⁴ C06C** *5/04*

**U.S. Cl. 102—275.3** **6 Claims**



**1**. A transmission tube signal delay assembly comprising:

a delay element containing a delay composition having a preselected combustion time from a first side of said delay element to a second side of said delay element;

a first transition element abutting said delay element at said first side for transferring a transmission tube signal to said delay element;

a second transition element abutting said delay element at said second side for transferring a signal from said delay element to a transmission tube,

each of said transition elements, and said delay element being enclosed in a housing having end openings opposite the first and second transition elements and a length of transmission tube secured in each end opening.

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**4,742,774**

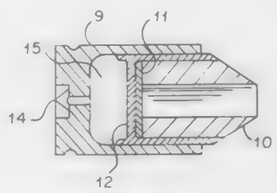
## SMALL ARMS AMMUNITION

**Abraham Flatau, 2004 Stockton Rd., Joppa, Md. 21085**

**Continuation-in-part of Ser. No. 082,264, Oct. 5, 1979, abandoned. This application Jun. 20, 1983, Ser. No. 520,274**

**Int. Cl.⁴ F42B** *11/00*

**U.S. Cl. 102—439** **3 Claims**



**1**. Small arms ammunition consisting essentially of:

primed cartridge case means;

a substantially cylindrical hollow tubular projectile positioned in said cartridge case,

said projectile having a main body portion and a nose portion having an aslantly disposed surface tapering down from said main body portion toward an annular leading edge.

said leading edge having a diameter from ⅓ to ½ of the outer diameter of said substantially cylindrical hollow tubular projectile,

an inner axial concentric passage through said hollow tubular projectile,

said passage having substantially uniform inner diameter corresponding with said leading edge diameter,

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the length of said tubular projectile being between 1.5 to 1.75 times said outer diameter of said tubular projectile,

said main body portion of said hollow tubular projectile means having rotational band means disposed about a peripheral portion thereof, a pusher/obturator means snugly fitted to said main body portion of said hollow tubular projectile having a rear portion thereof disposed within said primed cartridge case means,

said obturator having a flat disc-like body with a peripheral flange leg portion extending circumferentially in the form of an H, and said pusher having a flat disc-like body seated between said flange legs of said obturator body.

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**4,742,775**

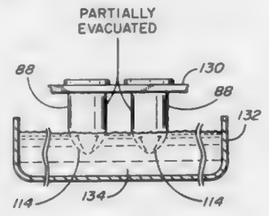
## POWER LOAD FOR UNDERWATER SPEAR GUN

**Paul C. Harris, 8717-191st Pl. SW., Edmonds, Wash. 98020**

**Continuation-in-part of Ser. No. 731,046, May 6, 1985, Pat. No. 4,651,454. This application Dec. 1, 1986, Ser. No. 936,510**

**Int. Cl.[4] F41C** *9/06;* **F42B** *7/00*

**U.S. Cl. 102—456** **2 Claims**




1. A method of sealing a power load for use with an underwater spear gun wherein the power load has a crimped end, the method including partially evacuating the power load, dipping the partially evacuated power load into a sealing compound, and forcing the sealing compound into the crimped end under atmospheric pressure.

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**4,742,776**

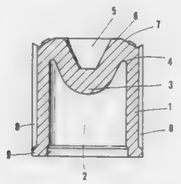
## CARTRIDGE PROJECTILE FOR SMOOTHBORE FIREARMS

**Antonio Scuto, Milan, Italy, assignor to Cervo S.p.A., Italy**

**Filed Apr. 15, 1987, Ser. No. 38,746**

**Int. Cl.[4] F42B** *11/10*

**U.S. Cl. 102—509** **8 Claims**




1. A cartridge projectile for smoothbore firearms comprising:

a hollow cylindrical metal body;

a front end of the body being closed by a concave dome reflexed partially into the hollow body and provided with an external recess whereby the projectile flattens after impact with a target; and

said body having a plurality of externally disposed ribs extending obliquely from said body, said ribs having helical shape and extending from the front end to a rear end of the body.

**4,742,777**

## DOUBLE MONO-CABLE AERIAL TRANSPORTATION SYSTEM

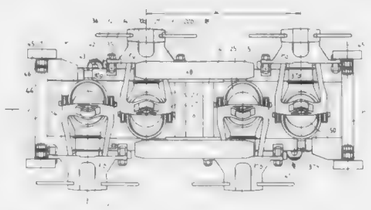
**Serge Tarassoff, Seyssinet, France, assignor to Pomagalski SA, Fontaine, France**

**Filed Jan. 3, 1986, Ser. No. 816,148**

**Claims priority, application Japan, Jan. 4, 1985, 60-000023; Jan. 4, 1985, 60-000024**

**Int. Cl.[4] B61B** *11/00, 12/12*

**U.S. Cl. 104—173.2** **20 Claims**



1. An aerial cable transportation system comprising at least one vehicle including a carriage having a suspension and a plurality of clamping means for disengageably securing the carriage to a pair of endless carrier and traction cables which are parallel to and alongside each other in the horizontal direction, said cables being driven continuously at the same speed and supported by intermediate support and/or compression towers, each of which has a base, a shaft, a horizontal, transverse cross arm, and two series of support and/or compression rollers for the two cables, said clamping means including two pairs of clamps with each of the pairs of clamps being associated with one of the two cables, said two pairs of clamps defining a rigid quadrilateral in the form of a parallelogram which is not a rectangle and which, in the engaged state, favors the synchronous passage of the two cables, said clamps each including a clamp body comprising a generally arch-shaped part mounted on the carriage with its concavity facing downwardly and extending outwardly from the carriage, transversely of the direction of movement thereof, and having an outer end portion defining a stationary jaw for the clamp and an inner end portion, and elastically deformable means for securing said inner end portion of the arch-shaped part to the carriage while permitting a limited play of the arch-shaped part to the carriage on either side of a normal position around a transverse axis, said clamp body being mounted pivotally with respect to the carriage around a horizontal, transverse pin by means of bearings fastened to the carriage, and means mounted on said stationary jaws for extending the stationary jaws in opposite directions along their associated cables, with said extending means of each clamp being spaced from the extending means of the adjacent clamp on the same side of the carriage to provide clearance therebetween.

16. An aerial cable transportation system comprising at least one vehicle including a carriage having a suspension and a plurality of clamping means for disengageably securing the carriage to a pair of endless carrier and traction cables which are parallel to and alongside each other in the horizontal direction, said cables being driven continuously at the same speed and supported by intermediate support and/or compression towers, each of which has a base, a shaft, a horizontal, transverse cross arm, and two series of support and/or compression rollers for the two cables, said clamping means including two pairs of clamps with each of the pairs of clamps being associated with one of the two cables, said two pairs of clamps defining a rigid quadrilateral in the form of a parallelogram which, in the engaged state, favors the synchronous passage of the two cables, said carriage including a chassis formed of two axial side rails and two end cross members extending therebetween, said carriage including two pairs of comfort rollers mounted on the two end cross members freely pivotable around horizontal, transverse shafts for rolling on travel tracks



associated with the intermediate support and/or compression towers, wherein an intermediate support and/or compression tower has two travel tracks for the comfort rollers following generally the profile of passage of the cables while being very slightly moved away from this profile vertically upward or downward except at its end so that upon passing above a tower the carriage, due to its comfort rollers, rolls on the travel tracks, the cable being very slightly spaced from the rollers.

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**4,742,778**

## FLOATING CARRIER TYPE TRANSPORTING SYSTEM

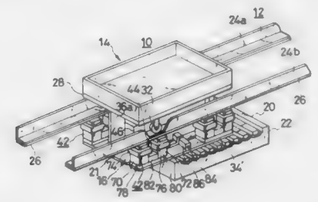
**Mimpei Morishita, Fuchu, and Teruo Azukuzawa, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Mar. 24, 1986, Ser. No. 843,278**

**Claims priority, application Japan, Mar. 25, 1985, 60-58186**

**Int. Cl.[4] B61B** *13/08;* **B60L** *13/06, 13/10*

**U.S. Cl. 104—284** **12 Claims**




10. A floated carrier type transporting system for transporting items to be transported, comprising:

(a) guide rails whose bottom section is formed by a ferromagnetic material;

(b) a carrier which is arranged to run freely along said rails, the carrier comprising a planar support plate, a flat container placed on the support plate for transporting articles to be transported and four wheels attached to four corner positions on a bottom surface of the support plate;

(c) a magnetic supporting device for floating said carrier, said magnetic supporting device comprising at least one electromagnet mounted on said carrier so as to face the bottom surface of said guide rails via a gap, and a permanent magnet which is mounted on said carrier so as to be arranged in the magnetic circuit including the electromagnet, said guide rails, and the gap, in order to supply magnetomotive force needed for floating said carrier, the magnetic supporting device also comprising a truck facing the bottom surface of the support plate via the guide rails, two linking plates arranged perpendicular to the support plate for linking the support plate and the truck and four magnetic supporting units mounted by bolts on seats on four corner positions of the truck so as to face the bottom surface of the guide rails, and so as to be rotatable in a horizontal plane, each magnetic supporting unit comprising two yokes whose top end surface faces the bottom surface via a predetermined gap P, two electromagnets consisting of excitation coils wound around the yokes and a permanent magnet placed between lower side surfaces of the yokes;

(d) a linear induction motor for causing said carrier which is floated by said magnetic supporting device to be guided and run along said guide rails;

(e) a sensor unit for detecting changes in magnetic reluctance and/or magnetomotive force in said magnetic circuit mounted on said carrier;

(f) a control device for controlling excitation current to be flowed in the electromagnets for said magnetic supporting device, based on the output of said sensor unit;

(g) a roll damping device for damping in the rolling which is generated in the carrier that is in a running condition caused by the action of said magnetic supporting device and said linear induction motor; and

(h) said roll damping device comprises, at least, weight means that is mounted swingably relative to said carrier, and a mechanical kinetic energy to heat energy conversion mechanism that includes an elastic connection mechanism that supports said weight means with elasticity.

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**4,742,779**

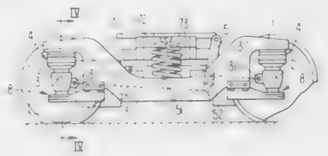
## BOGIE WITH SWIVELING AXLES

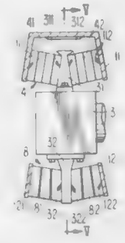
**Jacques Bevand, Creusot, France, assignor to Creusot-Loire, Paris, France**

**Continuation of Ser. No. 404,792, Aug. 3, 1982, abandoned. This application Feb. 11, 1986, Ser. No. 829,841**

**Int. Cl.[4] B61F** *5/38, 3/02*

**U.S. Cl. 105—167** **4 Claims**




1. A bogie comprising a bogie frame pivotally mounted under a body of a rail vehicle, pairs of wheels with each pair having an axle provided with axle boxes adjacent to respective ends of the axle, each of said axle boxes being supported by two resilient support elements, one of which is mounted above and the other below the axle box substantially aligned in a vertical plane containing an axis of an associated axle, each support element being symmetrical in said vertical plane and also in a vertical plane perpendicular to the axis of the associated axle, each support element comprising interleaved plural elastomer and plural metal layers that form a chevron shape in a cross section of the support element in said vertical plane, each support element having means connecting the same to the bogie frame and to one of said axle boxes so as to provide stabilized limited movement of said axle boxes relative to said bogie frame both longitudinally and transversely of said bogie frame, and first and second articulated systems moved by relative rotation of said vehicle body and said bogie frame, each system connecting two axle boxes at a respective side of the bogie frame in such manner as to cause those axle boxes to pivot about vertical axes of symmetry of associated axles and thereby to stress the elastomer of the associated support elements, and each system transmitting traction and braking stress between said axles and said bogie frame.

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**4,742,780**

## LOAD DISTRIBUTION SYSTEM FOR RAILWAY TRUCK

**Ernest Waddington, Bath, Canada, assignor to Urban Transportation Development Corporation Limited, Toronto, Canada**

**Filed Jan. 22, 1985, Ser. No. 693,552**

**Int. Cl.[4] B61F** *5/38*

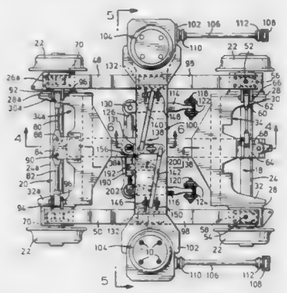
**U.S. Cl. 105—168** **10 Claims**

1. A steerable truck comprising a pair of wheelsets spaced apart along a longitudinal axis of said truck and extending

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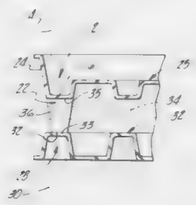
transverse thereto, a pair of side frames disposed on opposite sides of said longitudinal axis and extending between said wheelsets to be supported thereby, connecting means to connect each of said side frames to one of said wheelsets and accommodate relative pivotal movement beween said side frames and said one wheelset about a vertical axis, locating means acting between said side frames and the other of said wheelsets to inhibit lateral movement with respect to said truck of said side frames relative to said one wheelset, a bolster extending laterally between side frames and pivotally supported thereby for rotation about a vertical steering axis, and link means to locate laterally with respect to said truck said



bolster relative to said side frame, said link means including an arm pivotally connected to said bolster for rotation about an axis coincident with said steering axis, a pair of struts pivotally connected to said arm at locations spaced apart along the longitudinal axis and on opposite sides of said steering axis for rotation about a vertical axis, each of said struts being connected to a respective one of said side frames whereby relative longitudinal or lateral movement, with respect to said truck, between said side frames is accommodated by rotation of said arm about said steering axis and loads exerted in a lateral direction with respect to said truck are substantially equally transmitted from said bolster through said arm and struts to said side frames.

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**4,742,781**
**TWIN SHEET PALLET WITH SLEEVE RETAINING CONSTRUCTION**
**Lyle H. Shuert, 817 Fieldstone, Rochester, Mich. 48063**
**Continuation of Ser. No. 677,603, Dec. 3, 1984, abandoned. This application Jan. 9, 1987, Ser. No. 4,266**
**Int. Cl.[4] B65D *19/18***
**U.S. Cl. 108—53.3** **9 Claims**



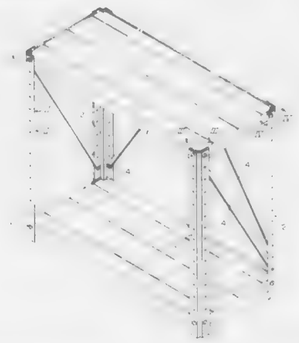
8. A rigid unitary pallet for use with an open top container of the type including a pallet and a container sleeve supported on the pallet, said pallet comprising:

(A) a central portion defining a floor for the container; and

(B) a peripheral portion extending around said central portion and defining a U-shaped upwardly opening groove on the upper face of said pallet for receipt of the lower edge portion of the container sleeve and a U-shaped downwardly opening groove in the lower face of said pallet for receipt of the upper edge portion of the container sleeve of a lower container, said downwardly opening groove generally corresponding in size and configuration to said upwardly opening groove and directly underlying said upwardly opening groove with at least portions of the top wall of said downwardly opening groove constituted by the bottom wall of said upwardly opening groove.

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**4,742,782**
**SHEET METAL SHELVING ASSEMBLY**
**Daniel R. Miller, Cincinnati, Ohio, assignor to Fort Steuben Products Inc., Weirton, W. Va.**
**Continuation of Ser. No. 631,399, Jul. 16, 1984, abandoned. This application Jan. 27, 1987, Ser. No. 9,070**
**Int. Cl.[4] A47B *3/00***
**U.S. Cl. 108—111** **47 Claims**



1. In shelving, comprising,

a plurality of bent sheet metal columns to be vertically arranged in spaced parallel relationship, and each having at least one sheet metal side wall having at least one horizontal aperture, and

at least one bent sheet metal shelf having a main planar support portion to be horizontally arranged within said columns, and an integrally formed generally vertically extending skirt portion having a horizontal aperture therethrough to be aligned with the horizontal aperture in an adjacent one column side wall for receiving a threaded bolt therethrough so that a nut threaded on the bolt will supportingly clamp said shelf on said one column, the improvement of:

said skirt portion including: an upper portion integral at the top in one piece with the sheet metal of said planar support portion; an outer wall portion downwardly depending from said upper portion; a lower portion having one part extending inwardly from the bottom of said outer wall portion, another part extending upwardly from said one part for forming an upwardly facing nut locking surface spaced below said aperture in said skirt portion a distance substantially equal to a minimum nut width as measured perpendicular to the nut axis between a side wall of a central threaded bore of the nut and any adjacent closest outer side wall of the nut; and said aperture in said skirt portion being spaced below the adjacent lowermost surface of said planar support portion, a distance substantially greater than said first mentioned distance, so that a nut may be easily initially threaded onto a bolt passing through aligned apertures in said skirt portion and column side wall so that the nut will not thereafter turn during tightening and will hold against turning only due to positive interference with said nut locking surface.



**4,742,783**
**INCINERATOR COMBUSTION AIR CONTROL**
**Ronald J. LaSpisa, and Thomas J. Hubbard; Merle R. Likins, Jr., all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.**
**Filed Aug. 6, 1987, Ser. No. 82,153**
**Int. Cl.[4] F23N *5/18***
**U.S. Cl. 110—188** **20 Claims**



1. Apparatus comprising:

an incinerator having a combustion zone;

means for supplying a first waste fuel to said combustion zone and for burning said first waste fuel in said combustion zone;

means for supplying combustion air to said combustion zone, wherein said combustion air supports combustion of said first waste fuel;

means for establishing a first signal representative of the theoretical air flow required for combustion of said first waste fuel supplied to said combustion zone, wherein said first signal is responsive to the actual flow rate of said first waste fuel supplied to said combustion zone;

means for establishing a second signal representative of the theoretical air flow required for combustion of said first waste fuel supplied to said combustion zone, wherein said second signal is responsive to the commanded flow rate of said first waste fuel supplied to said combustion zone;

a first select means;

means for providing said first signal and said second signal to said first select means and for establishing a third signal which is equal to the one of said first signal and said second signal representative of the highest air flow rate for said combustion air supplied to said combustion zone;

means for establishing a fourth signal representative of a first excess oxygen factor, wherein said first excess oxygen factor indicates the necessary increase in the magnitude of said third signal to obtain the actual air flow required for complete combustion of said first waste fuel in said combustion zone;

means for changing the magnitude of said third signal based on said fourth signal to establish a fifth signal representative of the air flow required to said combustion zone for complete combustion of said first waste fuel supplied to said combustion zone; and

means for manipulating the flow rate of said combustion air supplied to said combustion zone in response to said fifth signal.

**4,742,784**
**METHODS FOR REDUCING NITROGEN OXIDES EMISSIONS FROM POWER PLANTS FIRED BY VARIOUS COALS**
**Austin N. Stanton, and Leonard J. Keller, both of 1501 N. Cedar St., Bonham, Tex. 75418**
**Filed Sep. 23, 1987, Ser. No. 99,973**
**Int. Cl.[4] F23D *1/00***
**U.S. Cl. 110—347** **5 Claims**

1. In steam boilers burning various classes of coal as pulverized carbonaceous fuels, in which nitrogen oxides are produced in unacceptable concentrations in the exhaust gases therefrom as the result of the inherently poor combustion characteristics of the said pulverized carbonaceous fuels, the wide range of said characteristics, the long combustion time intervals required and the great amounts of excess combustion air required to complete combustion in current combustion programs; the improvement in methods of preparing said fuels and of effecting reduction in said nitrogen oxides in the exhaust gases, comprising:

evacuating the pores and capillary openings of the particular coal structure by heating inert combustion gases, either before or after pulverizing, sufficiently to remove all free water and to remove liquid water and other readily volatilized materials;

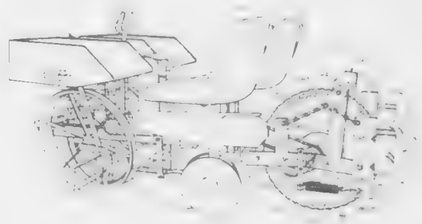
handling and storing the evacuated coal in an inert atmosphere of carbon dioxide to prevent partial oxidation of coal constituents and adsorption or permeation of nitrogen from the air, thereby providing highly reactive fuel, more readily combustible to essentially complete combustion in a very short period of time;

reducing to a minimum the amount of excess air required by said reactive fuels to achieve essentially complete combustion with minimal carbon monoxide generation; and

reducing the volume of the firebox sufficiently to provide the optimum retention time for the reduced volume of gases generated during combustion, compared to the prior art methods, the boiler efficiency is improved because the lesser volume of gases provides longer retention time in the boiler for heat exchange and the amounts of nitrogen oxides and carbon monoxide in the exhaust gases are reduced.

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**4,742,785**
**PLANTING MACHINE WITH GROUND-CONDITIONING DRIVE**
**Howard A. Kolk, 155 W. 39th St., and Robert D. Kolk, 28 W. 39th St., both of Holland, Mich. 49423**
**Filed Sep. 8, 1986, Ser. No. 904,928**
**Int. Cl.[4] A01C *11/00***
**U.S. Cl. 111—3** **1 Claim**



1. A planting machine including a main frame, planting means mounted on said main frame, and drive means for said planting means, said machine including means for establishing a planting path, wherein the improvement comprises:

hitch means adapted for connection to a powered vehicle, and link means pivotally connected to said hitch means

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and to said machine on parallel horizontal axes of articulation, and also including means limiting said articulation;

ground-engaging wheel means mounted on said main frame ahead of said planting means with respect to said path, and adapted to support at least a portion of the weight of said machine, said wheel means having a width selected to engage and condition the ground ahead of said path over a track extending on opposite sides of a line of planting established by said planting means;

a fork frame secured to said main frame and carrying said ground-engaging wheel means, wherein said limiting means includes an upwardly extending arm on said link means and flexible tension-transmitting means connecting the upper extremity of said link means arm and said hitch means at a position above said link means; and

an upwardly-extending arm on said fork frame and flexible tension-transmitting means connecting the upper extremities of said fork frame arm and said link means arm.

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**4,742,786**

**DATA PROCESSING SYSTEM FOR SEWING MACHINE**

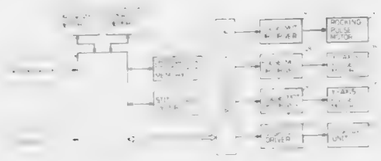
**Miho Hashimoto; Masaaki Yokoe; Yoshikazu Kurono, and Koji Hayashi, all of Nagoya, Japan, assignors to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan**

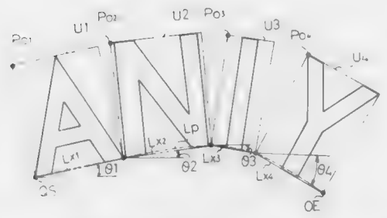
**Filed Nov. 18, 1986, Ser. No. 932,747**

**Claims priority, application Japan, Nov. 20, 1985, 60-261652; Nov. 20, 1985, 60-261653**

**Int. Cl.⁴ D05B *21/00***

**U.S. Cl. 112—121.12** **15 Claims**






1. A data processing system for a sewing machine, comprising:

a needle adapted to be moved upward and downward;

holding means for holding a material to be stitched; and

means for causing a relative movement between said needle and said holding means on the basis of a pattern data indicating a positional relationship therebetween,

wherein the improvement comprises:

first memory means for storing a plurality of unit pattern data related to said relative movement for forming stitching patterns respectively;

pattern selecting means for selecting unit pattern data from said first memory means;

second memory means for storing said selected unit pattern data;

manual designating means for designating a plurality of optional points on a desired curve and generating the coordinate data related to said designated points;

standard line determining means for determining a standard line which passes through said designated points based on said coordinate data; and

computing means for correcting said selected unit pattern data so as to form the stitching pattern, which is stored in said second memory means, along the determined standard line.

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**4,742,787**

**HOOK DRIVE FOR CHAIN STITCH SEWING MACHINES, PARTICULARLY FOR HAND-HOLDABLE ONES**

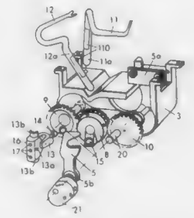
**Ricardo Buzzi, Milan, Italy, assignor to Metalplast S. r. l., Italy**

**Continuation-in-part of Ser. No. 851,277, Apr. 10, 1986, abandoned, which is a continuation of Ser. No. 655,501, Sep. 27, 1984, abandoned. This application Jul. 15, 1987, Ser. No. 73,845**

**Claims priority, application Italy, Jul. 10, 1983, 23187 A/83**

**Int. Cl.⁴ D05B *1/06***

**U.S. Cl. 112—162** **4 Claims**



1. A hook drive for chain stitch sewing machines, in particular for one adapted to be hand-held, comprising a hand-holdable case and, disposed within said hand-holdable case:

a driving motor;

a drive system associated with said motor, including a drive shaft; and

two hooks for forming the loop and knot in a chain stitch, including an upper hook and a lower hook, each having a curvilinear configuration and a hook holding shank supported obliquely in said case; and wherein

i. there is provided a drive system accommodated in said case for operating each of said hooks, said drive system including a driving gear for each hook, a swinging yoke having one end eccentrically articulated like a universal joint to the driving gear, a block hingedly connected at its center to the opposite end of said swinging yoke, said block being rigidly secured to a hook shank, whereby said hook shanks are supported in an axially non-displaceable manner in said case;

ii. one of said driving gears for said hooks is connected to said drive shaft and said gears are in meshing engagement with each other;

iii. a third gear is in meshing engagement with one of said gears supporting a hook shank, and

iv. said three gears are arranged coplanarly.

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**4,742,788**

**MATTRESS PAD AND FITTED BED SHEET**

**Jeffrey S. Dugan, Matthews, N.C., assignor to Springs Industries, Inc., Fort Mill, S.C.**

**Division of Ser. No. 805,319, Dec. 4, 1985, Pat. No. 4,682,379. This application Jul. 27, 1987, Ser. No. 78,513**

**Int. Cl.⁴ D05B *1/00***

**U.S. Cl. 112—262.1** **8 Claims**

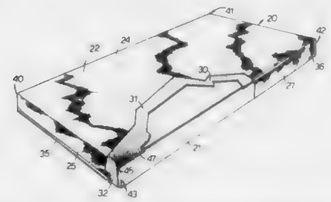
1. A process of making a fitted bed sheet and mattress pad combination comprising:

cutting approximately equal lengths of a rectangular bed sheet from a supply of bed sheet material and a rectangular mattress pad from a supply of mattress pad material with the mattress pad being of smaller width than the bed sheet,

placing the bed sheet is overlying relationship with respect to the mattress pad with the head and foot edges of the bed sheet substantially aligned respectively with the head and foot edges of the mattress pad and with the mattress pad centered between the edge portions of the bed sheet to define side skirts of the bed sheet that extend beyond the side edges of the mattress pad for fitting about a mattress,

folding the side skirts of the bed sheet over onto the central





portion of the bed sheet with the folds aligned with the side edges of the mattress pad,

sewing through the folds of the bed sheet and the side edges of the mattress pad to connect the mattress pad to the bed sheet,

cutting notches in the bed sheet at its corners, and

sewing the side skirts of the bed sheet at the notches to the head and foot portions of the mattress pad and bed sheet at the notches to form the head and foot portions of the mattress pad and bed sheet into head and foot skirts that fit about a mattress.

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**4,742,789**

**METHOD AND APPARATUS FOR REGULATION OF SEAM SHAPE**

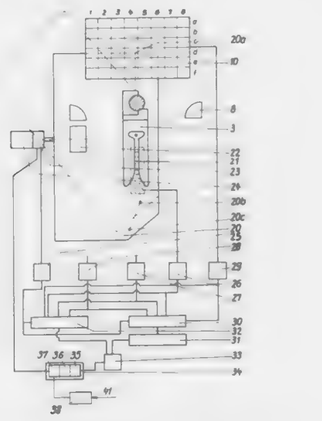
**Karl Pestel; Manfred Kraus, both of Karl Marx Stadt; Jürgen Waldmann, Berlin, and Heinz Holzmann, Karl Marx Stadt, all of German Democratic Rep., assignors to VEB Kombinat Textima, Karl Marx Stadt, German Democratic Rep.**

**Filed Jan. 25, 1982, Ser. No. 342,558**

**Claims priority, application German Democratic Rep., Apr. 6, 1981, 229017**

**Int. Cl.⁴ D05B *19/00, 27/10, 35/10***

**U.S. Cl. 112—262.3** **14 Claims**



9. A process for regulating the shape of a seam in a sewing machine, comprising:

preparing storable data of an ideal path of a seam continually equidistant to the edge of material being sewn by producing and storing first signals corresponding to said ideal path,

sensing an actual path of a seam being produced by sensing said edge to produce second signals corresponding to actual seam shape data,

comparing said first and second signals, and

correcting said actual seam path to conform with said ideal path in response to said comparing step.

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**4,742,790**

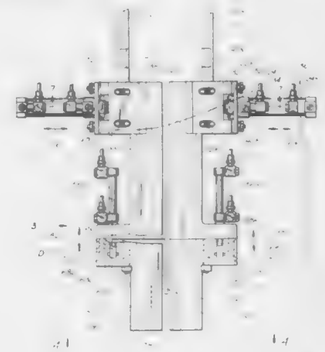
**DART STRETCHER FOR POCKET WELTING MACHINE**

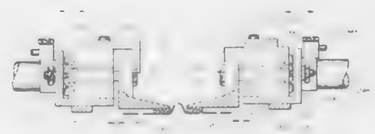
**Richard Wilber, Yarmouth, Me., assignor to The Reece Corporation, Waltham, Mass.**

**Filed Sep. 25, 1987, Ser. No. 100,897**

**Int. Cl.⁴ D05B *21/00, 3/00***

**U.S. Cl. 112—262.3** **17 Claims**





1. An automatic dart stretcher for removal of the fullness of material around a dart seam to faciliate the sewing of a pocket welting proximate thereto, comprising:

a pair of spaced connecting arms;

a first pair of clamping feet, one of said clamping feet being operatively associated with each of said connecting arms;

a second pair of clamping feet operatively associated with said first pair of spaced connecting arms and said first pair of feet; and

means coupling each of said first and second pair of clamping feet movement together in a first direction and the movement of one each said first and said second of feet for movement in a second direction orthogonal to said first direction.

11. A method for automatically eliminating fullness in a garment material located at the end of a dart, comprising:

feeding the garment material to a dart stretcher associated with a sewing machine or sewing the dart;

gripping the material at four spaced points about the edges of the dart formed or cut into the material to be sewn to form the dart and moving the gripped material in orthogo-

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nally related directions by the four spaced gripping points to remove the fullness in the material about the dart.

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**4,742,791**
**Patent Not Issued For This Number**

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**4,742,792**
## COMMUNICATION ARRANGEMENT BETWEEN A SUB-SEA STRUCTURE AND FLOATING VESSEL

**James L. Mank, High Wycombe, England, and Bryson Riddler, Aberdeen, Scotland, assignors to Ferranti Subsea Systems Limited, Edinburgh, Scotland**

**Filed Jul. 11, 1986, Ser. No. 884,596**
**Claims priority, application United Kingdom, Jul. 19, 1985, 8518221**
**Int. Cl.[4] B63B** *35/00*
**U.S. Cl. 114—264** **19 Claims**



1. A communication arrangement between a sub-sea structure and a floating vessel, comprising an elongate flexible communication member having at least one communication channel, deployment means on the vessel operable to deploy the flexible communication member by suspending it from support means movable with respect to the deployment means to determine the length of flexible member deployed, releasable coupling means arranged to couple each communication channel of the flexible communication member to a corresponding channel of a vessel communication system and control means responsive to a first predetermined level of tension in the suspended flexible communication member to deploy a further length of the member and during said deployment to inhibit communication between the channels of the vessel system and the channels of the flexible communication member and after said inhibition of communication between the channels and deployment of said further length of the member responsive to continuation of said tension in the flexible communication member of at least said first predetermined level after deployment of said further length of the member to uncouple the flexible communication member from the vessel system at said coupling means and release the flexible communication member from the deployment means.

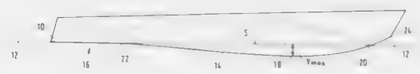
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**4,742,793**
## LIFT-PRODUCING BOAT HULL ESPECIALLY FOR SAILBOATS

**Paul Mader, Klaussnerplatz 20, 1000 Berlin 19, Fed. Rep. of Germany**

**Continuation of Ser. No. 647,267, Sep. 4, 1984, abandoned, which is a continuation of Ser. No. 355,600, Feb. 17, 1982, abandoned. This application Jun. 30, 1986, Ser. No. 880,115**
**Claims priority, application Fed. Rep. of Germany, Jun. 19, 1980, 3022966**
**Int. Cl.[4] B63B** *1/20*
**U.S. Cl. 114—271** **9 Claims**

1. A boat hull the underside of which, in longitudinal vertical planes in at least a central longitudinal zone of the portion of the hull lying below the waterline plane respectively has profiles which each are essentially the profile of the underside of an aircraft wing, each said profile having a downward vertex, the center of gravity of the boat being positioned in such a way that the stern of the boat in an unloaded quiescent condition thereof does not extend substantially below said waterline plane, the chord of each said aircraft wing profile in said vertical planes in said zone lying substantially in said waterline plane and a said downward vertex of each said profile being located, relative to the forward end of the said chord thereof, within a range of less than 40% of the entire chord length, wherein, in accordance to the invention, in said unloaded quiescent condition of the boat, each said aircraft wing profile (**14**) in a said vertical plane in said zone passes tangentially over into the chord at a spacing from the stern from 5 to 25% of the total length of the chord and is continued to the stern in the straight line of said chord, and at the bow, each said aircraft wing profile in a said vertical plane in said zone smoothly joins a rising bow profile in said vertical plane which intersects said waterline plane at an acute angle, the forward intersections of said profiles in said zone with said waterline plane which are respectively located in vertical planes at varying transverse spacings from the vertical longitudinal mid-plane (**38**) of the hull being disposed on one of two lines extending obliquely backwards, respectively on opposite sides of said longitudinal mid-plane, from the forward waterline plane intersection of the profile of said hull in said longitudinal mid-plane.

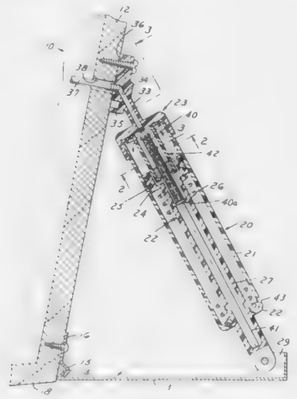


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**4,742,794**
## TRIM TAB INDICATOR SYSTEM

**David Hagstrom, Endwell, N.Y., assignor to Bennett Marine, Inc., Deerfield Beach, Fla.**

**Filed Sep. 8, 1986, Ser. No. 904,672**
**Int. Cl.[4] B63B** *1/22*
**U.S. Cl. 114—286** **9 Claims**



1. A trim tab indicator system comprising a pair of trim members hinged to the stern of a boat,



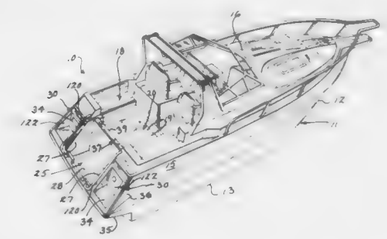
one on each side of the center line of the boat and a hydraulic cylinder individual to each trim member having a first head at one end and a second head at the other end,
and a tubular shaft connected to a piston and extending through the other end of the cylinder,
a bracket has a surface complementary to the transom of the boat and is mounted on the transom,
a tubular coil is fixed to the first head and extends axially within the cylinder,
and a rod of magnetically permeable material is mounted within the tubular shaft for movement therewith with its upper end extending into the coil such that movement of the trim member changes the inductive relationship between the rod and the coil to provide a signal representing the position of the tab,
said coil is provided with lead wires extending through an opening in said bracket directly through the transom when mounted such that the wires are not exposed outside the boat.

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**4,742,795**
## STERN GATE FOR A BOAT HULL

**James P. DePrey; Brian J. Cornell, both of Green Bay, and Niels H. Skjerbek, Marinette, all of Wis., assignors to Cruisers Incorporated, Oconto, Wis.**

**Filed Jan. 2, 1987, Ser. No. 268**
**Int. Cl.[4] B63B** *17/00*
**U.S. Cl. 114—362** **25 Claims**



1. A hull for a boat, comprising:
a lower hull having a bottom below a static waterline and freeboard sides above the waterline;
an aft passenger cockpit having a floor above the waterline;
a lower stern extending across the rear of the lower hull at least partially below the waterline of the boat and joined with the bottom and freeboard sides;
an upper stern extending aft of the lower stern at least partially above the waterline, said upper stern defining a passageway therethrough from the passenger cockpit to aft of the hull, said passageway having a lower forward area;
a gate aft of the passenger cockpit in the passageway; and
hinge means for connecting the gate to the boat to pivot about a horizontal axis;
wherein the gate is pivotable from an open position in which it is folded down substantially flush with the cockpit floor in which position the gate provides access to the cockpit from aft of the hull to a closed position in which the gate is folded up to close off the passageway and form an inside wall of the passenger cockpit;
wherein the gate is hinged to the hull in the lower forward area of the passageway so that the gate pivots toward the front of the boat from the open position to the closed position.

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**4,742,796**
## FENCE WIRE LOCATION MARKER

**Larry L. Halsey, R.F.D., Wymore, Nebr. 68466**

**Filed Oct. 10, 1986, Ser. No. 917,694**
**Int. Cl.[4] G01D** *21/00*
**U.S. Cl. 116—209** **8 Claims**



1. A location indictor or marker for substantially horizontally extending fence wires includes:
(a) a generally planar tab of relatively thin, relatively thin, relatively stiff but resilient and flexible material, the tab being provided with:
(1) a wire-receiving opening through a central portion thereof, the opening having a a minimum transverse dimension not less than the diameter of a wire to be marked but approximating that diameter, and
(2) a slit open from the wire-receiving opening through to the outer periphery of the tab, and operable upon flexing of the tab to be widened sufficiently to provide passage for the wire to be marked into the opening, the composition of the tab being such that when released from flexing the edges of the slit will return to a position so as to retain the wire to be marked within the tab opening until the tab is manually flexed so as to permit the wire to pass out through the slit; and
(b) flexible, easily seen, elongate, cloth-like streamer means attached to the tab; whereby when the diameter of the wire-receiving opening of the tab equals the diameter of the wire, the tab grasps the wire and effectively blocks any tendency of the marker to be moved along the wire by wind; and when the diameter of the wire-receiving opening of the tab is slightly greater than the diameter of the wire, the streamer means, when hit by wind, causes the tab to tilt and pinch the wire between upper and lower edges of the wire-receiving opening and effectively blocks any tendency of the marker to be moved along the wire by the wind between the opening and outer periphery of the tab.

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**4,742,797**
## TEAR DROP SEAL

**Laurence S. Barker, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Jun. 25, 1987, Ser. No. 66,151**
**Int. Cl.[4] G03G** *15/8*
**U.S. Cl. 118—652** **22 Claims**

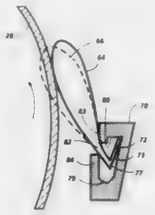
1. A device for sealing a space adjacent a linear portion of a surface comprising a seal holding means, a flexible thin sheet-like member folded over on itself forming a deformed cylinder

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having a generally tear drop shaped cross section two ends of said folded back sheet-like member being held and retained in close proximity by said seal holding means to maintain said tear drop shaped cross section of said folded back sheet-like member, said seal holding means being mountable relative to said surface such that a portion of the deformed cylinder forms at least a line contact seal engagement with said surface.

**11**. In an electrostatographic reproducing apparatus comprising a charge retentive surface movable through an endless path past a series of processing stations to provide a developed image on an image receiving substrate including a developer housing for containing developer material, a rotatable cylindrical donor roll for delivering developer material from said developer housing to said charge retentive surface, said housing and donor roll forming a space therebetween extending in the axial direction of the donor roll and defined by the donor



roll surface and a portion of the developer housing in substantially parallel relationship to said donor roll surface means to seal said space to prevent developer material contained within the housing from escaping therefrom, said sealing means comprising a seal holding means, a flexible thin sheet-like member folded back on itself forming a deformed cylinder having a generally tear drop shape cross section, two ends of said folded back sheet-like member being held and retained in close proximity by said seal holding means to maintain said tear drop shape cross section of said folded back sheet-like member, said seal holding means being mounted to said portion of the developer housing such that a portion of the deformed cylinder is urged against and forms at least a line contact seal engagement with the surface of said donor roll.

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**4,742,798**

**INCUBATOR AND METHOD OF INCUBATION AND HATCHING FISH EGGS AND FRY**

**Roger F. Blackett, Kodiak, Ak., assignor to State of Alaska, Juneau, Ak.**

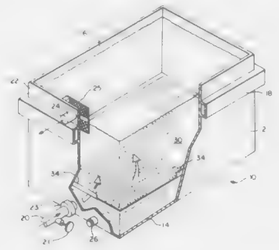
**Filed Feb. 5, 1986, Ser. No. 826,215**
**Int. Cl.[4] A01K** *61/00*
**U.S. Cl. 119—3** **24 Claims**

1. An incubator for hatching fish eggs, comprising:

a housing having a floor and a top, said housing being suitable for holding water;

means, spaced above the floor, for distributing pressure evenly throughout the housing, the housing having an inlet below the pressure distributing means and an outlet above the pressure distributing means;

a biological substrate having openings resting on the pressure distibuting means, the substrate being made from materials suitable for incubating fish eggs; and



means for delivering water under a variable pressure to the inlet so as to create an upwelling flow of water through the incubator.

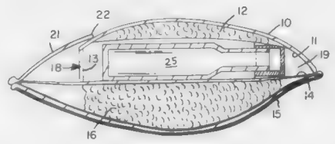
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**4,742,799**

**ANIMAL TRAINING DEVICE**

**Marjorie G. Schlitz, 14410 Cuba Rd., Cockeysville, Md. 21030**

**Filed May 7, 1986, Ser. No. 860,589**
**Int. Cl.[4] A01K** *31/00*
**U.S. Cl. 119—29** **7 Claims**



1. An animal training device for providing comfort and amusement to a puppy, comprising,

a first, generally rectangular hollow body formed of sheet-like pliable material;

a second, generally rectangular holow body formed of sheet-like plitable material, said second body having dimensions generally conforming to the dimensions of said first body;

a first mass of resilient padding material enclosed within said first body;

a second mass of resilient padding material enclosed within said second body; and

means securing said first body to said second body in overlying relationship with three outer edges of said first body being joined along the length thereof to contiguous portions of three outer edges of said second body underlying said first body, the fourth edges of both said first and second bodies being unsecured to one another;

whereby a cavity lying between said first and second bodies is defined by the conjoined edges of said first and second bodies, said cavity being accessible at the fourth edge of said first body for insertion therein of an article intended to give comfort to a puppy.

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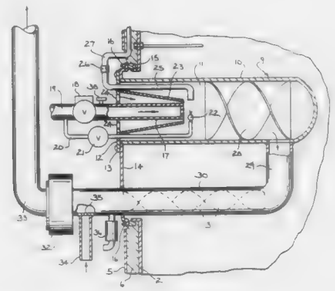


**4,742,800**

**SUBMERSIBLE CHAMBER WATER HEATER**

**John P. Eising, Oconomowoc, Wis., assignor to A. O. Smith Corporation, Milwaukee, Wis.**

**Division of Ser. No. 701,963, Feb. 14, 1985, Pat. No. 4,685,425.**
**This application Mar. 30, 1987, Ser. No. 31,537**
**Int. Cl.[4] G22B** *5/00*
**U.S. Cl. 122—17** **2 Claims**



1. A high efficiency water heating apparatus, comprising a tank to contain water to be heated, heating means for heating water in the tank and comprising a tubular member disposed within the tank in contact with said water, burner means disposed in one end of the tubular member and comprising a burner tube, a venturi disposed concentrically around said burner tube, said venturi having a large diameter end and having a small diameter end disposed adjacent the outlet end of said burner tube, fuel supply means for supplying a combustible fuel to said burner, air supply means for supplying air to the large diameter end of said venturi, said air passing through the small diameter end of said venturi and mixing with said fuel to provide a combustible mixture, baffle means disposed in the opposite end of said tubular member and spaced longitudinally from said burner means, said venturi acting to effectively mix gas and air in the space between said burner means and said baffle means to provide a combustible mixture, ignition means for igniting said mixture and generating waste gases of combustion, and means for discharging said gases of combustion from the opposite end of said tubular member.

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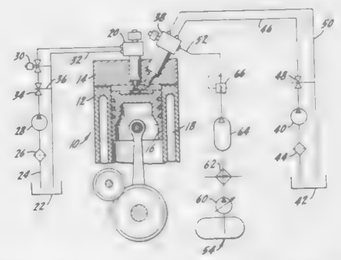
**4,742,801**

**DUAL FUEL MOBIL ENGINE SYSTEM**

**Erik Kelgard, 322-8880 No. 1 Road, Richmond, B.C., Canada V7C 4C3**

**Filed Aug. 13, 1987, Ser. No. 85,640**
**Int. Cl.[4] F02B** *3/00*
**U.S. Cl. 123—27 GE** **5 Claims**

1. In a dual fuel engine constructed to operate on the diesel cycle with diesel fuel only or on gaseous fuel with pilot fuel injection, a cylinder and piston, a diesel fuel injector in the cylinder and a pump therefore for supplying full diesel fuel injection when operating on the diesel cycle or only pilot fuel when operating on the dual fuel cycle, a gaseous fuel injector in the cylinder and a hydraulic actuator therefor for injecting



gaseous fuel under pressure into the cylinder during the dual fuel cycle, a source of gaseous fuel in liquid form, a supply line from the liquid fuel source to the gaseous fuel injector, and a heat exchanger in the supply line for changing the liquid fuel from the source to a gas before it is supplied to the gaseous fuel injector.

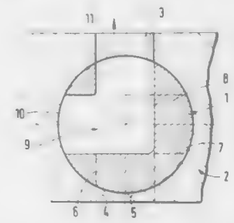
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**4,742,802**

**ROTARY VALVE FOR CONTROL OF THE CYLINDER CHARGE CHANGE OF AN INTERNAL COMBUSTION ENGINE**

**Hermann Kruger, Wolfsburg, Fed. Rep. of Germany, assignor to Volkswagen AG, Wolfsburg, Fed. Rep. of Germany**

**Filed Aug. 14, 1987, Ser. No. 86,106**
**Claims priority, application Fed. Rep. of Germany, Sep. 3, 1986, 3629970**
**Int. Cl.[4] F01L** *7/00*
**U.S. Cl. 123—190 A** **5 Claims**



1. A rotary valve for controlling a cylinder charge change of an internal combustion engine containing a plurality of combustion chambers, the rotary valve comprising: two gas ducts provided so as to be associated with adjacent combustion chambers and so as to extend in a common cross-sectional zone of the rotary valve; and a rotary valve housing having a common gas opening located in said common cross-sectional zone, said two gas ducts being further provided so as to converge in the region of an axis of rotation of the rotary valve into a single common conduit extending in the common cross-sectional zone, the rotary valve having predefined angular positions in

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which said single conduit is in communication with the common gas opening.

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**4,742,803**

## RECIPROCATORY INTERNAL COMBUSTION ENGINE

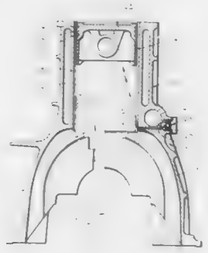
**Christopher J. W. Chiles, Finham, and Robert J. Watkinson, Bournville, both of United Kingdom, assignors to Jaguar Cars Limited, Coventry, England**

**Filed Mar. 2, 1987, Ser. No. 20,529**

**Claims priority, application United Kingdom, Mar. 26, 1986, 8607542**

**Int. Cl.[4] F01M** *1/00, 1/06*

**U.S. Cl. 123—196 M** **6 Claims**



1. A reciprocatory internal combustion engine comprising:
a cylinder block having at least one bore formed therein;
a cylinder liner fitted into each of said at least one bore and defining a cylinder;
a piston slideably mounted in each said cylinder liner;
a combustion chamber to one side of each said piston;
a crank mechanism to the other side of each said piston;
an annular groove provided at mating surfaces of each said cylinder liner and said cylinder block; and
at least one lubricant discharge nozzle provided in each said cylinder liner in communication with said annular groove and opening into the cylinder on the crank side of the piston when the piston is at the combustion chamber end of its stroke, each said lubricant discharge nozzle being angled towards the combustion chamber such as to discharge lubricant onto the crank side of the piston.

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**4,742,804**

## SPARK-IGNITION ENGINE

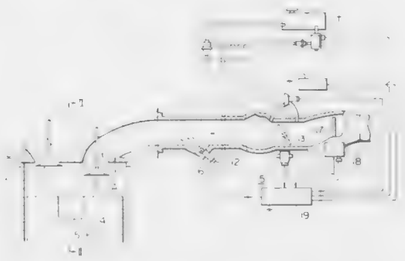
**Shigeo Suzuki, and Toshihiro Ozasa, both of Aichi, Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Aichi, Japan**

**Filed Feb. 5, 1987, Ser. No. 10,991**

**Claims priority, application Japan, Feb. 5, 1986, 61-23166**

**Int. Cl.[4] F02B** *19/12, 19/16*

**U.S. Cl. 123—256** **4 Claims**



1. A spark-ignition engine comprising:
a combustion chamber formed by a cylinder head, a piston and a cylinder block;
a suction mechanism for supplying sucked air into the combustion chamber through an intake port;
fuel supply means disposed in said intake port for supplying fuel to the sucked air to form air-fuel mixture;
a plurality of ignition means for igniting the air-fuel mixture to cause combustion; and
a plurality of cavities for holding the air-fuel mixture therein, said cavities being formed in at least one of the cylinder head and the piston and being in communication with each other through a communication passage, at least one of said cavities and at least a part of said communication passage being formed in the piston, said at least one cavity and said part of communication passage being composed of side walls and a bottom wall,
said plurality of ignition means, said cavities and said communication passage being formed within the diameter of said cylinder and
said plurality of ignition means having ignition portions that face substantially the center of each cavity, thereby igniting the air-fuel mixture within the cavities at plural points.

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**4,742,805**

## INTERNAL COMBUSTION ENGINE

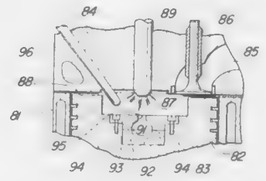
**Yukio Matsushita, and Hiroshi Tomita, both of Hamamatsu, Japan, assignors to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan**

**Filed Aug. 13, 1987, Ser. No. 84,926**

**Claims priority, application Japan, Aug. 14, 1986, 61-191088; Aug. 28, 1986, 61-202278**

**Int. Cl.[4] F02B** *19/00, 75/98*

**U.S. Cl. 123—270** **13 Claims**




1. In a compression ignition internal combustion engine comprising a cylinder having a cylinder bore, a piston reciprocating in said cylinder bore, and a cylinder head fixed relative to said cylinder to define a combustion chamber, said combustion chamber being comprised of a substantially open volume surrounded by a restricted squish area formed by said piston and said cylinder head when said piston is at top dead center, an energy cell of smaller volume than said open volume and communicating therewith, and injection nozzle means for discharging fuel into said open volume and into said energy cell, said energy cell being formed from a material having a substantially lower thermal conductivity than said cylinder head and said piston for retaining heat within said energy cell and means for initiating combustion in the open volume.

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**4,742,806**

## AUXILIARY ENGINE BRAKING SYSTEM

**Earl D. Tart, Jr., 2500 Parliament Dr., Abingdon, Md. 21009, and John B. Gilbert, 115 Marshall Dr., Forest Hill, Md. 21050**

**Filed Sep. 10, 1986, Ser. No. 905,560**

**Int. Cl.[4] F02D** *9/04*

**U.S. Cl. 123—322** **42 Claims**

1. In a vehicle having an engine, a clutch pedal, an accelerator pedal and a shift lever provided with a knob, and wherein the vehicle is equipped with an auxiliary braking system including a primary arming switch and intended to effect engine compression relief and hence decelerate the vehicle at the option of a driver by letting up on the accelerator pedal with the clutch engaged, an improvement which comprises supple-



mental arming switch means mounted at least in part on the knob of the shift lever and in electrical parallel with said primary arming switch for arming the auxiliary braking system for use thereafter at the option of the driver.

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**4,742,807**

## ELECTRONIC CONTROL DEVICE FOR INTERNAL COMBUSTION ENGINE

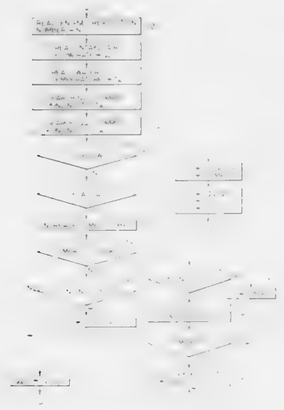
**Masahide Sakamoto, Katsuta; Seiji Suda, Mito; Takeshi Atago, and Masami Nagano, both of Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Aug. 5, 1986, Ser. No. 893,376**

**Claims priority, application Japan, Aug. 5, 1985, 60-171167**

**Int. Cl.[4] F02D** *41/16*

**U.S. Cl. 123—339** **11 Claims**



1. An idle speed control system for an internal combustion engine, comprising:
first means for setting a reference value of intake air flow rate for an idling mode of operation of the internal combustion engine;
second means for measuring the value of air flow rate in the internal combustion engine;
third means for detecting a difference between said air flow rate reference value and said measured value of air flow rate and for producing a control signal on the basis of said difference; and
fourth means for controlling the intake air flow rate of said internal combustion engine according to the value of said control signal.

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**4,742,808**

## METHOD AND SYSTEM FOR RECOGNIZING THE READINESS FOR OPERATION OF AN OXYGEN MEASUREMENT SENSOR

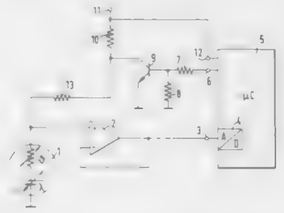
**Thomas Blümel, Schmitten, and Harald Collonia, Beselich-Schupach, both of Fed. Rep. of Germany, assignors to VDO Adolf Schindling AG, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Aug. 14, 1987, Ser. No. 86,100**

**Claims priority, application Fed. Rep. of Germany, Aug. 23, 1986, 3628707; Nov. 3, 1986, 3637304**

**Int. Cl.[4] F02M** *51/00;* **F02D** *41/14;* **G01N** *27/50*

**U.S. Cl. 123—489** **14 Claims**




1. A method for recognizing the readiness for operation of an oxygen measurement sensor which is located in an exhaust pipe of an internal combustion engine and, together with a regulating device, serves to regulate the preparation of a fuel-air mixture for the internal combustion engine, comprising the steps of
measuring the voltage present in the oxygen measurement sensor in succession for two different conditions of load,
calculating the internal resistance from the measurement results; and
comparing the calculated internal resistance with a predetermined value.

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**4,742,809**

## FUEL TANK

**Takaaki Ito, Mishima, and Koji Uranishi, Susono, both of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan**

**Filed Feb. 21, 1986, Ser. No. 831,574**

**Claims priority, application Japan, Feb. 23, 1985, 60-24180[U]**

**Int. Cl.[4] F02M** *37/00*

**U.S. Cl. 123—519** **5 Claims**



1. A fuel tank vapor system comprising:
a fuel tank having an interior portion and an upper wall;
a fuel supply pipe mounted on said fuel tank, said fuel supply pipe having an inlet with a nozzle guide therein for receiving a fuel feed nozzle, said nozzle guide having a first end facing said inlet and a second end opposite said first end;
a closing valve at said second end of said nozzle guide, said closing valve being operable to open in response to the insertion of the fuel feed nozzle and being operable to

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close in response to the withdrawal of the fuel feed nozzle from said nozzle guide, said closing valve preventing vapor communication between said fuel tank interior portion and said fuel inlet when closed;

a first vapor passage having an outlet in said fuel tank interior proximate said upper wall;

a fuel vapor absorbing canister in vapor communication with said interior portion of said fuel tank through said first vapor passage;

a change-over control valve provided in said first vapor passage between said vapor passage outlet and said canister, said control valve having an open position and a closed position, said control valve and said closing valve being actuated simultaneously to each said valve's respective open position in response to the insertion of the fuel feed nozzle in said nozzle quide and said valve being actuated to said closed position in response to the withdrawal of the fuel feed nozzle from said nozzle guide; and

a second fuel vapor passage having an outlet in said interior portion of said fuel tank proximate said upper wall, said second vapor passage being in vapor communication with the interior portion of said fuel supply pipe.

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**4,742,810**

## ULTRASONIC ATOMIZER SYSTEM

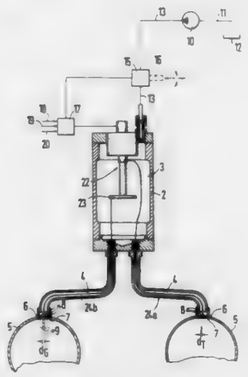
**Klaus Anders, Ostelsheim; Werner Bez, Stuttgart; Arnold Frohn, Stuttgart, and Helmut Schwarz, Vaihingen/Enz, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Jul. 10, 1987, Ser. No. 72,204**

**Claims priority, application Fed. Rep. of Germany, Jul. 23, 1986, 3624892; Apr. 18, 1987, 3713253**

**Int. Cl.[4] F02M** *27/00*

**U.S. Cl. 123—538** **16 Claims**



1. An ultrasonic atomizer system for liquids, in particular for atomizing fuel to be injected into internal combustion engines, having an atomizer housing (2) which receives liquid under pressure and an ultrasonic vibrator (22) acting upon the liquid emerging from the atomizer housing, a plurality of transport lines (4), that communicate with the atomizer housing (2), which carries fluid from the atomizer housing (2) to separate nozzles (6) disposed on the other end of each transport line (4), each of said nozzles having at least one injection port (8), and vibrations originating in the ultrasonic vibrator (22) also act upon the fluid inside each nozzle (6).

**4,742,811**

## IGNITION CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINES

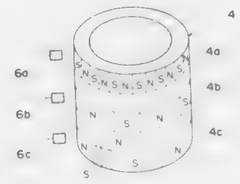
**Yasushi Okada, and Iwao Shimane, both of Wako, both of Japan, assignors to Honda Giken Kogyo K.K., Tokyo, Japan**

**Filed Sep. 17, 1987, Ser. No. 98,016**

**Claims priority, application Japan, Oct. 23, 1986, 61-252752**

**Int. Cl.[4] F02P** *3/04, 1/00, 23/00*

**U.S. Cl. 123—643** **6 Claims**



1. An ignition control system for an internal combustion engine having a plurality of groups of cylinders and a plurality of ignition devices provided for respective ones of said groups of cylinders, comprising: first signal generating means for generating a first signal at a crank angle position of said engine corresponding to each one of said groups of cylinders; second signal generating means for generating a second signal at a crank angle position of said engine corresponding to a top-dead-center position of each one of said cylinders; and distributing means for distributing ignition command signals to said ignition devices, in response to said first and second signals.

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**4,742,812**

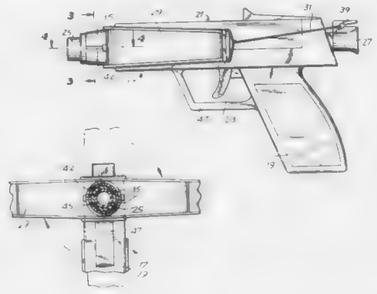
## PISTOL CROSSBOW ASSEMBLY

**Bernard Goodman, Mahwah, N.J., assignor to Largo Toys, Ltd., New York, N.Y.**

**Filed Nov. 24, 1986, Ser. No. 934,184**

**Int. Cl.[4] F41B** *5/00*

**U.S. Cl. 124—25** **9 Claims**



1. A pistol crossbow assembly comprising:

a gun member, said gun member including a frame, a trigger, a handle and a nose portion defining a major plane, said nose portion forwardly extending from said frame and having a longitudinal axis; and a crossbow member, said crossbow member including a bow and a string, the bow being rotatably connected to the nose portion of said gun member to enable pivotal twisting thereabout from a first operative position where said bow and string lie substantially transverse to the major plane of said gun member to a second package position where said bow and string lie substantially along the major plane of said gun member, wherein the assembly further comprises means for preventing movement of said bow along the longitudinal axis of said nose portion.



**4,742,813**

## SUNSHIELD DEVICE

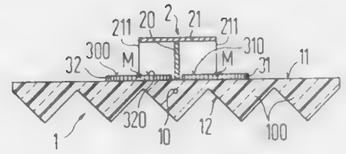
**Horst Riehl, Rodsch; Thomas Nebhuth, Coburg; Christian Bartenbach, Munich, all of Fed. Rep. of Germany, and Martin Klingler, Innsbruck, Austria, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Apr. 29, 1986, Ser. No. 857,730**

**Claims priority, application Fed. Rep. of Germany, Apr. 30, 1985, 3515581**

**Int. Cl.[4] F24J** *2/38*

**U.S. Cl. 126—425** **6 Claims**



1. A sunshield device for a window opening in a facade plane, comprising:

at least one slat formed of light-refractive material arranged in the window opening so as to be rotatable about a longitudinal axis;

the at least one slat having a flat upper side and on its underneath side is provided with prisms arranged one beside another without gaps;

the prisms extending parallel to the longitudinal axis and having the form of an isosceles triangle in a cross-sectional plane at right angles to the longitudinal axis;

a hypotenuse of the triangle being formed by the flat upper side and a catheti forming an inner angle with which a retro-reflection condition is fulfilled;

said at least one slat having on its upper side a signal generator with a shading means for two light sensors, a parameter of the light sensors having an electrical value which is dependent upon a size of an irradiated surface of the respective sensor and an intensity of the radiation;

the shading means being provided with a top panel spaced from the upper side of the slat and which defines opposite longitudinal edges and opposite transverse edges so that given projection of light from above the top panel onto the upper side, a rectangular shading zone is defined on said upper side;

the two light sensors being arranged adjacent to one another on the upper side in such manner that their center points are located on different parallels to the longitudinal axis;

partial surfaces of the sensor surfaces of the two light sensors adjacent one another being located in the shading zone; and

the slat being coupled to a servo-motor which is itself connected to an ouput of an amplifier controlled at its input end in dependence upon a difference between the electrical values of the parameters of the two light sensors.

**4,742,814**

## PROCESS FOR PRODUCTION OF XYLITOL FROM LIGNOCELLULOSIC RAW MATERIALS

**Michael Sinner, Dassendorf; Hans-Hermann Dietrichs, Reinbek; Jürgen Puls, Pinneberg; Werner Schweers, Reinbek, and Karl-Heinz Brachthäuser, Ratingen, all of Fed. Rep. of Germany, assignors to Bau- und Forschungsgesellschaft Thermoform AG, Murten/Fribourg, Switzerland**

**Continuation of Ser. No. 716,650, Mar. 27, 1985, abandoned, which is a division of Ser. No. 521,657, Aug. 10, 1983, Pat. No. 4,520,105, which is a continuation of Ser. No. 257,256, Apr. 24, 1981, abandoned, which is a continuation of Ser. No. 116,207, Jan. 28, 1980, abandoned, which is a continuation of Ser. No. 933,623, Aug. 14, 1978, abandoned. This application Jan. 30, 1987, Ser. No. 9,569**

**Claims priority, application Fed. Rep. of Germany, Aug. 17, 1977, 2737118**

**Int. Cl.[4] D21C** *3/20;* **C13K** *1/02, 13/00*

**U.S. Cl. 127—37** **11 Claims**

1. A process for producing xylitol from vegetable material including hemicelluloses containing a xylane component, said process comprising the steps of:

(a) pretreating said vegetable material with a first solution comprising water and at least one organic solvent selected from the group consisting of lower aliphatic alcohols and lower aliphatic ketones at a temperature of from about 100° to 190° C. and for a period of from about 4 hours to 2 minutes such that less than about 20% by weight of said xylane containing hemicelluloses in said vegetable material are hydrolyzed and go into said first solution leaving a first residue;

(b) separating said first residue from said first solution;

(c) treating said first residue with a second solution comprising approximately equal parts by volume of water and at least one organic solvent selected from the group consisting of lower aliphatic alcohols and lower aliphatic ketones at temperatures of about 120° to 220° C. and for a period of from about 6 hours to 2 minutes, such that said hemicelluloses are split to form soluble carbohydrates which go into said second solution, leaving a cellulose residue;

(d) separating said cellulose residue from said second solution;

(e) after step (d), hydrolysing any oligosaccharides and polysaccharides remaining in said second solution by addition of acid at a temperature not higher than any treatment temperature prior to step (d);

(f) after step (d), distilling said second solution under reduced pressure to separate the organic solvent from said second solution and precipitate lignin in pulverulent form;

(g) recovering xylose from said second solution, and

(h) reducing the xylose to xylitol.

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**4,742,815**

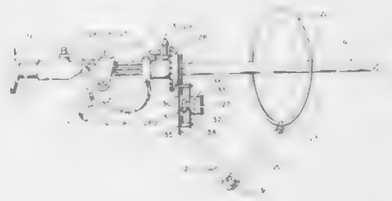
## COMPUTER MONITORING OF ENDOSCOPE

**Champil A. Ninan, and Abraham C. Ninan, both of 707 McArthur Rd., Fayetteville, N.C. 28301-9116**

**Filed Jan. 2, 1986, Ser. No. 815,455**

**Int. Cl.[4] A61B** *1/00*

**U.S. Cl. 128—4** **18 Claims**



1. In an endoscope of the type having a main body including

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a sheath, a working element slidingly disposed within said sheath, and a cutting element mounted on the distal end of said working element, the improvement comprising:

(a) means for attaching said endoscope to the body of a patient to provide a fixed reference point; and

(b) means for measuring the position of said cutting element in relation to said fixed point as the cutting element is moved about the area being explored.

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**4,742,816**

**OPERATION DEVICE FOR ENDOSCOPES**

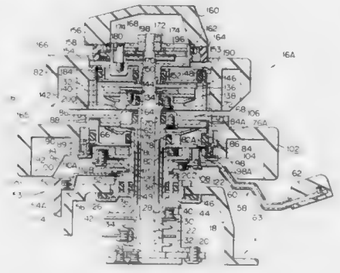
**Akira Suzuki, and Hiroyuki Sasa, both of Tokyo, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed Apr. 28, 1987, Ser. No. 43,832**

**Claims priority, application Japan, May 2, 1986, 61-67230[U]**

**Int. Cl.⁴ A61B *1/00***

**U.S. Cl. 128—4** **5 Claims**



1. An operation device for an endoscope which includes a plurality of operation sections having first and second operation sections, said operation device comprising:

an operation body including a casing having a through hole and a rotation shaft externally extending through said through hole;

a first operation unit for operating said first operation section, said first operation unit having a base section located outside said casing such that it is rotatably mounted on said rotation shaft, and an extension section extending radially from said base section and having a finger-operated member at an outer end portion;

a second operation unit having a base section located outside said first operation unit such that it is rotatably mounted on said rotation shaft, and an extension section extending radially from said basic section and having an intermediate portion bent toward said casing and a button attached to an outer end portion, said rotation path of said button being created over the same plane as that of said finger-operated member such that it is spaced apart from the rotation path of said finger-operated member at a predetermined angle; and

operation means located outside said second operation unit such that it is rotatably mounted on said rotation shaft, said operation means operating the other associated operation sections.

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**4,742,817**

**ENDOSCOPIC APPARATUS HAVING A BENDABLE INSERTION SECTION**

**Masahiro Kawashima, and Yasuhiro Ueda, both of Tokyo, Japan, assignors to Olympus Optical Co., Ltd., Japan**

**Filed Apr. 23, 1986, Ser. No. 854,823**

**Claims priority, application Japan, May 15, 1985, 60-103408; Jul. 25, 1985, 60-164904**

**Int. Cl.⁴ A61B *1/00***

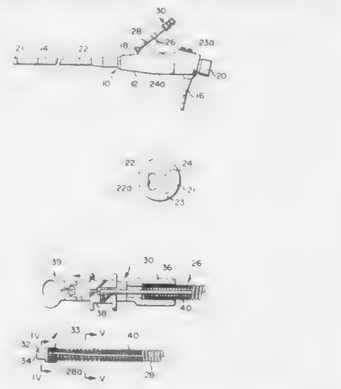
**U.S. Cl. 128—4** **18 Claims**

1. An endoscopic apparatus comprising:

an operating section;

a flexible insertion section extending from the operating section and adapted to be inserted into the body cavity and bent in a predetermined direction, said insertion section including a channel extending from the operating section to the distal end of the insertion section;

a stylet including a sheath removably inserted in the channel and extending to the distal end of the insertion section, said sheath having a bendable portion located in the distal



end portion of the insertion section, and operating means for remotely bending the bendable portion of the sheath from the operating section side to bend the distal end portion of the insertion section; and

positioning means for positioning the bendable portion of the sheath in the distal end portion of the insertion section so that the bendable portion is bent in the predetermined direction.

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**4,742,818**

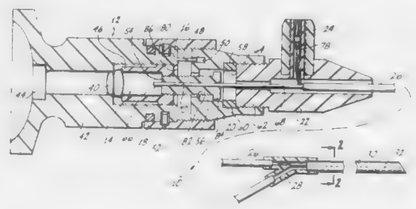
**SOAKABLE EYEPIECE FOR ENDOSCOPES**

**Gregory Hughes, Westminster, and Rick F. Carson, Jr., Orange, both of Calif., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.**

**Filed Oct. 17, 1986, Ser. No. 920,048**

**Int. Cl.⁴ G01B *1/06***

**U.S. Cl. 128—6** **21 Claims**



1. In an endoscope having an eyepiece including a barrel and a stop housing assembly movable axially but not rotatably with respect to each other, said eyepiece being focusable by axially moving said barrel and stop housing with respect to each other through rotation of a screwthreaded rotatable collar circumferentially surrounding at least a portion of said barrel and said stop housing assembly, the improvement comprising liquid-impervious sealing means interposed between said collar and said barrel and between said collar and said stop housing assembly for preventing liquid sterilant from penetrating between said barrel and said stop housing assembly.



**4,742,819**

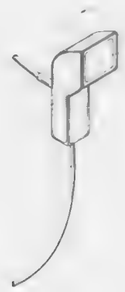
**INTUBATING SCOPE WITH CAMERA AND SCREEN**

**Gordon P. George, 1717 North 1030 West, Orem, Utah 84057**

**Filed Mar. 23, 1987, Ser. No. 29,205**

**Int. Cl.⁴ A61B *1/04***

**U.S. Cl. 128—6** **8 Claims**



1. An intubating scope comprising in combination:

a housing adapted to be hand-held;

screen means contained in said housing;

camera means contained in said housing for transmitting light images to said screen;

semi-malleable hollow tube means connected at one end thereof to said housing;

at least one fiber optic tube disposed within said malleable tube means, said fiber optic tube connected at one end thereof to said camera means for providing light images from the opposite end of said fiber optic tube to said camera means; and

a power source connected to said camera and fiber optic tube.

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**4,742,820**

**DEVICE FOR INTRODUCING A DIAPHRAGM**

**Hannegret Leuchtenberger, Schillerpromenade 32 33, 1000 Berlin 44, Fed. Rep. of Germany**

**PCT No. PCT/DE85/00327, § 371 Date May 20, 1986, § 102(e) Date May 20, 1986, PCT Pub. No. WO86/01708, PCT Pub. Date Mar. 27, 1986**

**PCT Filed Sep. 17, 1985, Ser. No. 879,122**

**Int. Cl.⁴ A61F *5/46***

**U.S. Cl. 128—127** **5 Claims**



1. Device for the insertion of a diaphragm having an elastic membrane and an annular reinforcing bead into a vagina, as well as for the positioning of the diaphragm in front of the womb comprising a hollow insertion rod having a longitudinally slotted open insertion end into which the entire diaphragm can be removably received and a piston extending within the hollow insertion rod and displaceable relative thereto wherein the insertion rod is provided with a single slot terminating in a widened end region and the insertion rod includes:

(a) an outwardly curved base portion running longitudinally along the insertion rod and located opposite the longitudinal slot; and

(b) opposed side members defining a widened edge region, each side member having a first edge integrally attached to the curved base portion and a second edge in opposed relation to the second edge on the opposed side member and defining the longitudinal slot, the side members being outwardly curved, the opposed side members adapted to guidingly hold a portion of the diaphragm reinforcing bead.

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**4,742,821**

**PATIENT RESTRAINT APPARATUS**

**Gerald D. Wootan, 1532 Skyline Circle, Sapulpa, Okla. 74066**

**Filed Jan. 29, 1986, Ser. No. 823,688**

**Int. Cl.⁴ A61F *5/37***

**U.S. Cl. 128—134** **15 Claims**



1. An apparatus for restraining a patient, said apparatus comprising:

body enclosure means with longitudinal and upper and lower edges for extending around and substantially enclosing a body of said patient and having a position in which said patient has freedom of movement within said body enclosure means;

access means on said body enclosure means for providing access to said body of said patient while maintaining substantial enclosure thereof, said body enclosure means and said access means being adaptable for preventing opening of said access means by said patient;

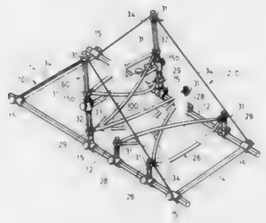
attachment means, connected to said body enclosure means at a location transversely spaced from the longitudinal edges of said body enclosure means, for attaching said body enclosure means to an object without said attachment means restricting movement of said body of said patient within said body enclosure means; and

a plurality of elongated handles, each of said handles being attached at opposite ends thereof to one of the edges of said body enclosure means.

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**4,742,822**
**BUILT AROUND BODY ATTITUDE IMMOBILIZATION AND TRANSPORTATION DEVICE**
**Federico Guerriero, 1212 N. Lake Shore Dr., Chicago, Ill. 60010**
**Filed Feb. 7, 1986, Ser. No. 827,058**
**Int. Cl.[4] A61G** *1/00*
**U.S. Cl. 128—134** **29 Claims**



1. A device for both immobilizing the spinal column of a victim having a suspected spinal fracture and transporting the victim away from the scene of an accident, said device comprising:

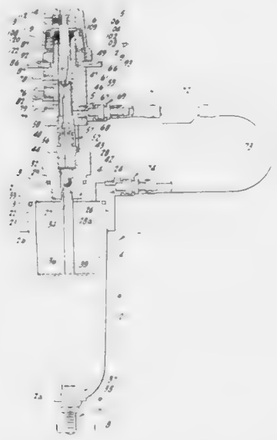
an adjustable frame portion substantially in the shape of a rectangle whose size and configuration is determined by the body attitude of the victim at the scene of the accident;

flexible strap means to support the body weight and to suspend and immobilize the spinal column of the victim in the position found at the accident scene, said flexible strap means being adapted to be selectively positioned and interlaced around the victim within said adjustable frame;

whereby when said flexible strap means to support the body weight and to suspend and immobilize the spinal column of the victim are interlaced within said adjustable frame and around the victim, the victim may be transported with an immobilized spinal column.

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**4,742,823**
**LIQUID INJECTOR FOR WETTING MECHANICALLY DELIVERED INTRAPULMONARY GASSES**
**Forrest M. Bird, P.O. Box 817, Sandpoint, Id. 83864**
**Filed Aug. 29, 1986, Ser. No. 901,890**
**Int. Cl.[4] A61M** *15/00*
**U.S. Cl. 128—203.12** **19 Claims**



1. In a liquid injector for wetting mechanically delivered intrapulmonary gases to the airway of a patient, a reservoir adapted to contain a quantity of liquid, a tube extending downwardly into the reservoir to a level below the level of the liquid in the reservoir, one-way ball check valve means controlling the flow of liquid from the reservoir and through the tube, means forming an orifice in communication with the one-way ball check valve means, means forming a chamber surrounding the orifice and overlying the orifice, an orifice well disposed in the chamber encircling the orifice serving to collect liquid as liquid passes through the orifice, valve means extending downwardly into the orifice for adjusting the flow of liquid from the orifice, means for supplying gas under pressure to the chamber to cause the gas to come in contact with the liquid passing through the orifice in a region above the liquid , means in communication with the chamber including one-way check valve means for delivering gas under pressure to the reservoir above the liquid in the reservoir to apply pressure to the liquid in the reservoir to force the liquid up through the tube and through the orifice into the orifice well, and means adapted to be coupled to the airway of the patient for withdrawing gas from the chamber after liquid has been introduced into the gas to supply wetted gases to the airway of the patient.

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**4,742,824**
**OXYGEN TUBE SUPPORT PATCH**
**Hugh W. Payton, 36 S. Main St., Jeffersonville, Ohio 43128, and Harold G. Wyse, Dayton, Ohio, assignors to Hugh W. Payton, Washington Court House, Ohio**
**Filed Nov. 19, 1986, Ser. No. 932,232**
**Int. Cl.[4] A61M** *15/08*
**U.S. Cl. 128—207.18** **4 Claims**



1. An improved adhesive face patch arrangement for the selective support of an oxygen tube for the application of supplemental oxygen to a patient, comprising:

a patch having a body formed of pliable plastic sheet material generally in the shape of a three-leaf clover having a front petal, a back petal and a bottom petal joined to each other at a central common section of a substantially narrower width compared to the maximum width of each of said petals,

said petals being bendable with respect to each other about said central section to conform to a patient's face contour, and being proportioned to be received on a patient's cheek bone prominence,

a flexible oxygen delivery tube,

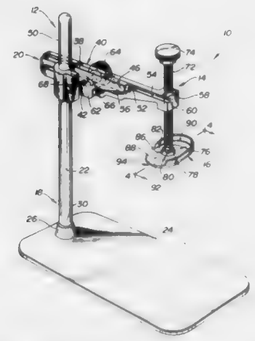
each of said front and back petals having a pair of tube-receiving pedestals proportioned to receive said oxygen tube therebetween and said pair on said front petal set at an angle to said pair on said back petal so that said tube enters one said pair with a downward inclination toward said bottom petal and exits the other said pair with an upward inclination away from said bottom petal defining a relaxed position of said tube,

a single said pedestal on said central common section positioned above said relaxed position of said tube thereon and forming a post over which a portion of the tube at said central common section may be looped for locking said tube in a preadjusted position on said patch, and

medical grade adhesive on said body on the side thereof remote from said pedestals.



**4,742,825**
**ADJUSTABLE COMPRESS APPARATUS**
**Robert F. Freund, Centerville; Lawrence J. Richards, Dayton, and Stanley L. Flowers, West Milton, all of Ohio, assignors to Freund Medical Products, Inc., Dayton, Ohio**
**Filed Sep. 5, 1986, Ser. No. 903,775**
**Int. Cl.[4] A61B** *17/12*
**U.S. Cl. 128—325** **19 Claims**



1. Adjustable compress apparatus for use in applying adjustable pressure to a puncture site on a patient, comprising:

an adjustable stand including

a support frame extending in upright relation and disposable closely adjacent to a patient when reclining on a support surface, said support frame including a base plate and a support post extending upright therefrom;

a patient size adjustment mechanism mounted to said support frame for movement along said support frame to adjust said mechanism to a height greater than that of a puncture site on the patient above the support surface and for movement generally transverse to said support frame to adjust said mechanism to span a range of distances across the patient from the puncture site thereon to said support frame when disposed closely adjacent to the patient, so as to locate a portion of said mechanism in a desired relation overlying the puncture site on the patient, said mechanism including

a clamp member mounted on said support post above said base plate for slidable movement generally vertically along said support post toward and away from said base plate;

an arm member mounted on said clamp member for slidable movement generally horizontally therealong, in transverse relation to said support post and generally parallel relation to said base plate, said arm member having an outer end defining said portion of said patient size adjustment mechanism overlying said base plate; and

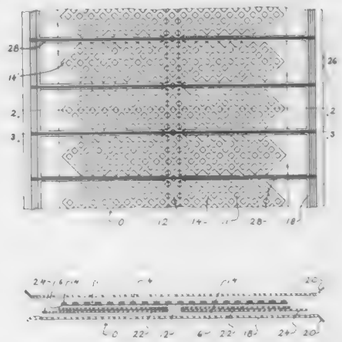
a releasable locking member for fastening said clamp member at any selected vertical position along said support post and said arm member at any selected horizontal position along said clamp member for locating said outer end of said arm member above and in desired relation with a puncture site on a patient positioned between said arm member and base plate and alongside said support post;

a pressure pad defining an attachment socket; and

a pressure adjustment mechanism mounted to said portion of said patient size adjustment mechanism for movement toward and away from the patient, said mechanism having a lower end defining a ball received within said attachment socket and rotatable with respect thereto, said lower end supporting said pressure pad at the puncture site and in pressure contact therewith wherein the amount of the pressure applied to the puncture site by said pad is adjustable upon movement of said pressure adjustment mechanism toward and away the patient.

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**4,742,826**
**CICATRISIVE STRIP WITH BIAS**
**Anthony B. McLorg, 746 Chinoe Rd., Lexington, Ky. 40502**
**Filed Apr. 7, 1986, Ser. No. 850,298**
**Int. Cl.[4] A61B** *17/04, 17/06;* **A61F** *13/00*
**U.S. Cl. 128—335** **13 Claims**

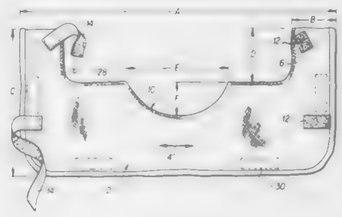


9. A cicatrisive strip suture for spanning a wound and holding a wound closed during healing, comprising:

an elastic sheet material including a central portion for overlying the wound and means for releasably securing said suture to tissue on opposite sides of said wound; said elastic sheet material having raised ridges at least in said central portion, said ridges being substantially convex in cross-section so as to resist peeling and said central portion being substantially transparent so as to form a lens to magnify the wound for better alignment of the wound edges during suture application.

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**4,742,827**
**HEATING PAD**
**Barry Lipton, 11433 Flints Grove La., Gaithersburg, Md. 20878**
**Filed Sep. 19, 1986, Ser. No. 909,332**
**Int. Cl.[4] A61F** *7/00*
**U.S. Cl. 128—380** **10 Claims**



1. A heating pad comprising:

a pad member formed of soft flexible material and including:

(a) a flat, substantially rectangular central portion defining two elongate substantially parallel sides extending along a direction of elongation and two ends shorter than said elongate sides and spaced in the direction of elongation of said central portion, said elongate sides being spaced in a direction transverse to said direction of elongation,

(b) an arcuate cut-out in said central portion, said cut out extending from an intermediate portion of one of said sides towards the other of said sides,

(c) a flat, substantially rectangular extending portion pro-

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jecting from said one of said sides adjacent each of said ends and in said direction substantially transverse to said direction of elongation of said central portion;

means for selectively connecting opposite ones of said ends; and

means for heating the entirety of said central portion of said pad member.

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**4,742,828**

## DISPOSABLE ELECTRODE FOR MONITORING A PATIENT

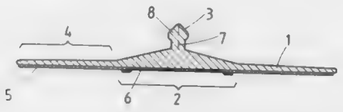
**Holger B. Sundström, Göteborg, Sweden, assignor to Rematra Research, Marketing & Trading Co. S.A., Geneva, Switzerland**

**Continuation of Ser. No. 819,536, Jan. 16, 1986, abandoned. This application Jun. 16, 1987, Ser. No. 63,743**

**Claims priority, application Sweden, Jan. 17, 1985, 8500212; Jan. 17, 1985, 8500213**

**Int. Cl.[4] A61B** *5/04*

**U.S. Cl. 128—640** **7 Claims**




1. A nonmetallic disposable inexpensive electrode, mainly intended to be rapidly fixed on the skin of a patient to achieve noise-free signal detection of signals from the body and including an electrically conductive synthetic resin carrier element, one side of which is provided with an electric contact which is in conductive contact with the carrier element and the other side of which is provided with an adhesive layer and forms the front surface of the carrier element intended to adhere in electrical contact to the skin, wherein the adhesive layer of the front surface of the carrier element has at least one opening wherein is applied a carbon-containing element directly contacting the material of the carrier element, said carbon-containing element is a plate of carbon fibers with carbon fiber ends projecting from the surface of said plate as brushes carrying a relatively large number of carbon particles which facilitates the ion migration between the skin and the carrier element whereby the resistance between the skin and the carrier element is substantially reduced by the interposed carbon fiber plate.

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**4,742,829**

## INTRACAVITARY ULTRASOUND AND BIOPSY PROBE FOR TRANSVAGINAL IMAGING

**Wing Law, Gold River; Wayne Barbour, Rancho Cordova, and Axel F. Brisken, Shingle Springs, all of Calif., assignors to General Electric Company, Milwaukee, Wis.**

**Filed Aug. 11, 1986, Ser. No. 895,343**

**Int. Cl.[4] A61B** *10/00*

**U.S. Cl. 128—660** **5 Claims**

1. An intravaginal ultrasound probe and biopsy needle assembly, said probe comprising:

a rigid elongated body having a central axis,

a transducer assembly having an end boot portion, said end boot portion being enlarged relative to said elongated body and fastened to one end of said body, and a transducer scanning array supported by said end boot portion

a handle extending from an opposing end of said body, conductive means extending through said body and electrically contacting said transducer assembly, and

said biopsy needle assembly including a needle and an elongated guide means for receiving and guiding said needle; said guide means having an axis in parallel alignment with said axis of said elongated body and detachably mounted on said probe said needle assembly being for obtaining tissue and fluid samples,



said transducer assembly having a generally planar emission surface oriented at an acute angle with respect to said axis of said elongated body and said axis of said guide means.

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**4,742,830**

## ULTRASONIC DIAGNOSIS APPARATUS FOR DISPLAYING THE DISTRIBUTION OF SPEED OF MOVEMENT OF AN INTERNAL PART OF A LIVING BODY

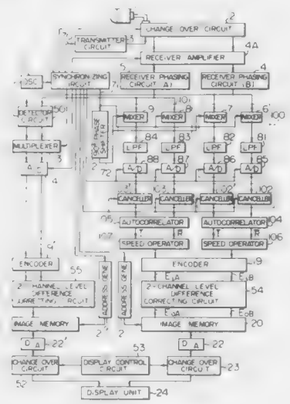
**Satoshi Tamano; Yukio Ito; Shinji Kishimoto, and Yutaka Sato, all of Kashiwa, Japan, assignors to Hitachi Medical Corp., Tokyo, Japan**

**Filed Feb. 6, 1986, Ser. No. 826,671**

**Claims priority, application Japan, Feb. 19, 1985, 60-31148**

**Int. Cl.[4] A61B** *10/00*

**U.S. Cl. 128—663** **7 Claims**




5. An ultrasonic diagnosis apparatus for displaying of distribution of moving speed of an internal part of a living body in a two-dimensional mode, comprising:

(a) means for transmitting a plurality of ultrasonic pulse beams toward an internal moving part of a living body at a constant repetition frequency and receiving the reflected wave of each of said ultrasonic pulse beams from the internal moving part of the living body, said transmitting means comprising an array of vibrator elements;

(b) parallel receiving and phasing means having a plurality of reception directivities for simultaneously receiving and phasing the reflected wave of each of said ultrasonic pulse beams along a plurality of directions from said living body and for providing received wave signals indicative thereto;



(c) converting means for mixing the received and phased reflected wave signals having plural directivities with a set of complex reference signals having a frequency n times (n: an integer) as high as the constant repetition frequency of the transmitted ultrasonic pulse beam and having a complex relation therebetween, thereby converting each of the receive wave signals into complex signals;

(d) multi-channel multiple-cancel complex signal canceller means with feedback for receiving said complex signals, said signal cancelling means being provided in number according to the number of complex signals for removing signal components reflected from a low-speed moving part and a stationary part of the living body contained in said converted complex signals of said received wave signals;

(e) a plurality of autocorrelator means for delaying each of the complex signals from said signal canceller means and for computing the autocorrelations of the complex signals;

(f) speed operator means for computing the speed of the internal moving part of the living body in each of said directions of said received wave signals on the basis of the computed autocorrelations and providing result signals indicative thereof;

(g) picture processing means for processing the computed result signals of said speed operator means to produce a two-dimensional mode picture; and

(h) a display means for displaying the two-dimensional mode picture produced by said picture processing means.

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**4,742,831**

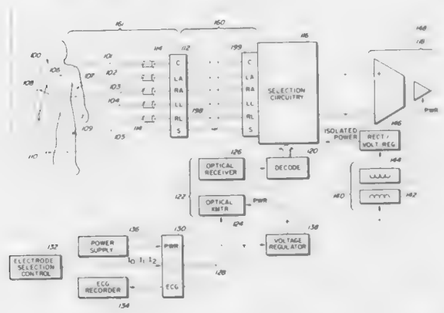
## SELECTION AND ISOLATION APPARATUS FOR USE WITH ECG DEVICE

**Sergiu Silvian, Pasadena, Calif., assignor to Siemens-Pacesetter, Inc., Sylmar, Calif.**

**Filed Nov. 21, 1985, Ser. No. 800,478**

**Int. Cl.[4] A61B** *5/04*

**U.S. Cl. 128—710** **6 Claims**




1. An electrode selection and isolation apparatus for use with an ECG recording device and at least three electrodes connected to a patient, each of said at least three electrodes including means for sensing an ECG analog electrical signal caused by the contraction of the patient's heart muscle, said electrode selection and isolation apparatus comprising:

isolation amplifier means having first and second input terminals, an output terminal and a reference potential, said first and second input terminals being electrically isolated from said output terminal and reference potential, for generating an electrically isolated output signal at the output terminal as measured with respect to the reference potential, that is derived from an input signal applied between the first and second input terminals;

selection means for electrically coupling a selected one of said at least three electrodes to the first input terminal of said isolation amplifier, and for coupling a selected combination of at least two of the remaining at least three electrodes to the second input terminal of said isolation amplifier, in response to a control signal;

external means for generating said control signal;

optical isolation means for optically coupling said control signal generated by said external control signal generating means to said selection means in a way that electrically isolates the external control signal generating means from said selection means; and

means for connecting the output terminal and said reference potential of said isolation amplifier to said ECG recording device;

whereby the ECG recording device and external control signal generating means are completely electrically isolated from the at least three electrodes and the selection means; and

further whereby a selected combination of said at least three electrodes can be selectively coupled to said ECG recording device by generating an appropriate control signal at said external control signal generating means.

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**4,742,832**

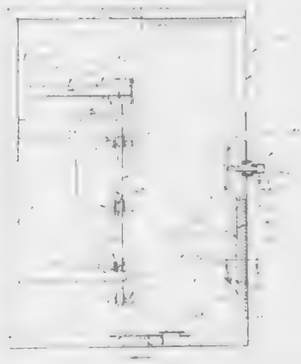
## MUSCLE MEASURING APPARATUS AND METHOD

**Richard Kauffmann, Geminis 4249, Guadalajara, Mexico, and Lutz Kauffmann, Av. Parque Lira 79, Mexico D.F., Mexico 11-850**

**Filed Feb. 12, 1987, Ser. No. 13,913**

**Int. Cl.[4] A61B** *5/10*

**U.S. Cl. 128—774** **10 Claims**

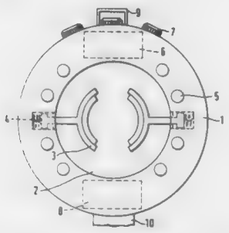


1. Apparatus for evaluating selected muscles of the human anatomy comprising: ground engaging frame means having a pair of parallel vertically upright frame members, force sensor means including measuring means stationarily supported on said frame means, first force transmitting means mounted for movement along a first axis and arranged to transmit muscle applied force to said sensor means, second force transmitting means arranged to transmit muscle applied force along a second axis transverse to said first axis, force transfer means connected to said first and second transmitting means and arranged to cconvert movements of said second transmitting means into movement of said first transmitting means, and patient engageable means associated with each of said transmitting means for engagement by selected areas of the human body whereby the force producing capability of specific muscles associated with said areas is applied to said transmitting and sensor means.

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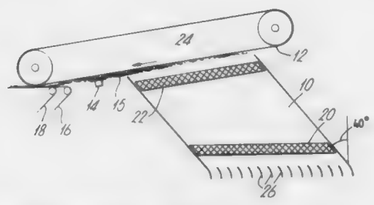
**4,742,833**
**DEVICE FOR TREATING MALE PERSONS SUFFERING FROM URINE INCONTINENCE**
**Shafik Barsom, Hanover, Fed. Rep. of Germany, assignor to Richard Wolf GmbH, Fed. Rep. of Germany**
**Filed Nov. 8, 1985, Ser. No. 796,246**
**Claims priority, application Fed. Rep. of Germany, Jan. 3, 1985, 3500047**
**Int. Cl.[4] A61N** *1/04*
**U.S. Cl. 178—794** **9 Claims**



1. A device for the treatment of male persons suffering from urine incontinence by an electrostimulation, said device comprising a plurality of contacts, at least two electrodes, a carrier, a voltage source, and a pulse generator forming a current source, said pulse generator being operated by said voltage source and having two poles, said carrier having a surface with the contacts being positioned thereon, said contacts being connected to one pole of said two poles, said carrier having an aperture, said aperture having means mounting each of the electrodes in said aperture, said electrodes being connected to the other pole of said two poles so that when a person wears the device with his penis inserted through the aperture and engaged by the electrodes and the contacts of the surface of the carrier engaging the body adjacent the penis, the device will stimulate the bladder closure muscle tissue.

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**4,742,834**
**CIGARETTE MAKING MACHINE**
**Francis A. M. Labbe, Neuilly-sur-Seine, France, assignor to Molins PLC, London, England**
**Filed Jul. 14, 1986, Ser. No. 835,142**
**Claims priority, application United Kingdom, Jul. 12, 1985, 8517647**
**Int. Cl.[4] A24D** *5/14*
**U.S. Cl. 131—84.3** **13 Claims**

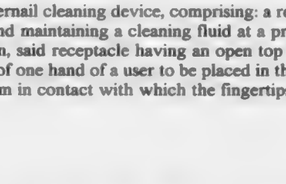


1. A cigarette making machine including a channel, a conveyor at the outlet of said channel, means for pneumatically conveying tobacco through said channel to form a cigarette filler stream on said conveyor by causing air and tobacco to enter the channel through its inlet end, a first louvre through which some of the air entering the channel through its inlet end is drawn from the channel while tobacco continues towards the conveyor, and a second louvre, closer than the first louvre to the outlet end of the channel, through which an additional amount of the air entering the channel is drawn while tobacco continues towards the conveyor.

7. A cigarette making machine comprising means for forming a carpet of tobacco and for conveying the carpet pneumatically through a channel towards a conveyor to form a cigarette filler stream on the conveyor, characterized in that the channel extends around a part-cylindrical surface having an axis inclined to the center line of a first part of the channel conveying the carpet towards the part-cylindrical surface, and that a second part of the channel which is arranged to convey the carpet after it has passed around the part-cylindrical surface has its center line inclined to that of the first part of the channel and to the axis of the part-cylindrical surface.

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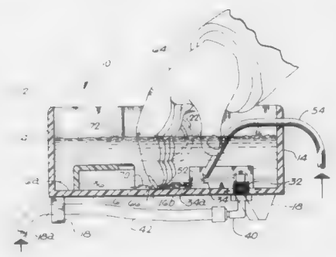
**4,742,835**
**PERMANENT WAVE ROD**
**Michael Boweter, 970 NW. Garfield, No. 22, Corvallis, Oreg. 97330**
**Filed Sep. 15, 1986, Ser. No. 906,956**
**Int. Cl.[4] A45D** *2/12*
**U.S. Cl. 132—39** **2 Claims**



1. A permanent wave rod comprising an elongate body having a cross-sectional shape characterized by a first circular segment having a diameter D, and a second circular segment having a diameter between 0.4 D and 0.8 D and having its center spaced apart from the center of said first circular segment by a distance equal to approximately D/2, and paired sides which tangentially intersect both circular segments, wherein the cross-sectional dimensions of the rod intermediate its extremities is approximately one-half of the cross-sectional dimensions at its extremities and wherein the cross section of the rod intermediate its extremities is not concentric with the cross section of the rod at its extremities.

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**4,742,836**
**FINGERNAIL CLEANING DEVICE**
**Arnold A. Buehler, 9545 Meade Ave., Oak Lawn, Ill. 60453**
**Filed Jun. 23, 1987, Ser. No. 65,352**
**Int. Cl.[4] B08B** *3/02*
**U.S. Cl. 134—182** **6 Claims**

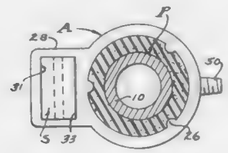


1. A fingernail cleaning device, comprising: a receptacle for receiving and maintaining a cleaning fluid at a predetermined level therein, said receptacle having an open top for enabling the fingers of one hand of a user to be placed in the receptacle and a bottom in contact with which the fingertips of said one hand of a user are placed during cleaning of the fingernails; and a small diameter fluid passageway positioned in the receptacle at an acute angle with relation to the bottom of the receptacle, said passageway being in communication with a source of a cleaning fluid and acting to direct cleaning fluid at a downward angle to the bottom of the receptacle to provide a high-velocity, fan-shaped stream of the cleaning fluid which travels along the bottom of the receptacle in the direction of the fingernails of the user, said predetermined level of fluid in the receptacle acting to provide sufficient fluid pressure above said stream to substantially prevent any splashing of fluid from the receptacle by said stream during cleansing of the nails.



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**4,742,837**
**MULTI PURPOSE HIKING POLE**
**Leif Rise, 7748 Westlawn Ave., Los Angeles, Calif. 90045**
**Filed Oct. 22, 1986, Ser. No. 921,442**
**Int. Cl.[4] A45B** *3/00*
**U.S. Cl. 135—66** **19 Claims**



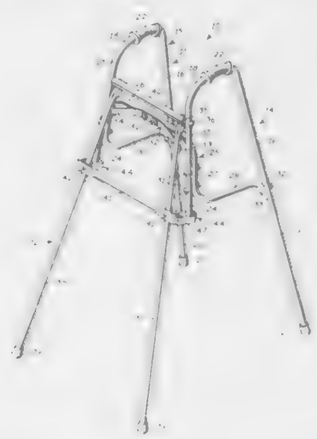
1. A multi purpose mountaineering pole adjustable to hiking conditions, and including;
an elongated pole body with a lowermost ground engaging tip and an upper handle portion,
a depressible elongated grip sleeve coextensively fixed onto the handle portion,
a security strap attached to anchor collar means frictionally engaged over and slidable on the grip elongated sleeve and adapted to be turned and depressed into the grip sleeve for locked engagement therewith when downward pressure is applied to the security strap attached thereto,
and head means terminating the uppermost end of the pole body.

19. The mountaineering pole as set forth in claim 1, wherein the depressible elongated grip sleeve has a cylindrical exterior and wherein the anchor collar means is comprised of a collar rotatably slideable over the depressible elongated grip sleeve and includes circumferentially spaced inwardly projecting lugs to augment frictional positioning engagement of the collar with the elongated grip sleeve, and wherein the head means is comprised of a socket fixed to the upper end of the pole body and with a top face and flange having at least one opening to pass a line over the top face and flange, and a cap removably secured to the socket by a screw fitting and having a bottom face clamping the line to the top face and flange of the socket.

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**4,742,838**
**WALKER**
**Andrejs Muiza, 1811 Sweetbriar Ave., Nashville, Tenn. 37212, and Albert H. Valiquette, 3411 Richard Street, Nashville, Tenn. 37215**
**Filed Sep. 25, 1986, Ser. No. 911,385**
**Int. Cl.[4] A61H** *3/00*
**U.S. Cl. 135—67** **9 Claims**

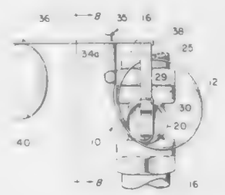
1. A walker comprising:
(a) a main frame having upper and lower portions and front and rear portions comprising a pair of side frame members, each said side frame member having a downward projecting ground-engaging rear leg, and a transverse frame member rigidly connecting said side frame members in transverse spaced relationship, each said rear leg being rigid with respect to the other portions of said main frame,
(b) a front frame member comprising a pair of downward and forward projecting ground-engaging front legs having upper end portions,
(c) means on said upper end portions in pivotal contact with the front portion of said main frame for swinging front-to-rear movement of said front legs about a transverse axis relative to said main frame,



(d) guide means cooperative between said front portion of said main frame and said front legs for limiting the swinging movement of said front legs relative to said main frame between a forward extended position and a rearward contracted position,
(e) spring means fixed to said front portion of said main frame and cooperating with said front legs to normally bias said front legs forward to said extended position, and
(f) hand holds on the upper portion of said main frame.

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**4,742,839**
**SHAKE OR VIBRATION ACTIVATED VALVE OPERATING MECHANISM**
**Robert L. Stock, 746 W. Carlton, Ontario, Calif. 91762**
**Continuation-in-part of Ser. No. 813,857, Dec. 27, 1985, abandoned. This application Aug. 25, 1986, Ser. No. 899,658**
**Int. Cl.[4] F16K** *17/36*
**U.S. Cl. 137—38** **9 Claims**



1. A vibration or shake activated mechanism for operating a valve having a body with inlet and outlet ports and a valve disk rotatably mounted in the valve body for movement between open and closed position, the mechanism comprising:
spring means connected between the valve body and the valve disk to exert biasing force to rotatably urge the valve disk toward its said closed position,

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trigger arm means pivotally mounted at a pivot point for pivotal movement relative to the valve body,

catch means comprising a catch tongue on an inner end portion of the trigger arm means and spaced from said pivot point for engagement with the valve disk to retain the valve disk in its said open position against the urging of said spring,

the trigger arm means and the pivot point providing for vertical and horizontal pivoting of the trigger arm means,

the valve disk having an arm portion defining a corner having mutually perpendicular generally vertical surfaces,

the catch tongue comprising two portions at right angles to each other, one extending generally transversely of the trigger arm means and the other extending longitudinally of the arm, and

an inertial mass mounted on an end portion of the trigger arm means opposite from the catch tongue and spaced from the pivot means in the direction opposite from the catch tongue, the mass providing inertial resistance to such shake or vibration for relative movement between the mass means and the valve body to disengage the catch means from the valve disk to release the valve disk to rotate to its closed position under the urging of said spring.

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**4,742,840**

## ROLL-OVER VALVE FOR MOTOR VEHICLE

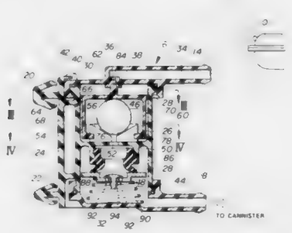
**Teruo Takahashi, Zama; Naotoshi Mitsui, Komoro, and Hideaki Togashi, Sakado, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama and Kabushiki Kaisha Tsuchiya Seisakusho, Tokyo, both of, Japan**

**Continuation of Ser. No. 865,097, May 20, 1986, abandoned. This application Dec. 19, 1986, Ser. No. 943,876**

**Claims priority, application Japan, May 20, 1985, 60-107976**

**Int. Cl.[4] F16K** *17/36*

**U.S. Cl. 137—43** **8 Claims**



1. A roll-over valve for a motor vehicle having a fuel tank and a cannister, comprising:

a valve body adapted for mounting in a substantially upright position in the motor vehicle, said valve body defining a valve chamber, said valve body including an upper inlet communicating with said fuel tank, and an outlet communicating with said canister, said valve body including a partition by which said valve chamber is divided into an upper chamber portion and a lower chamber portion, said upper inlet communicating with said upper chamber portion, and said outlet communicating with said lower chamber portion;

a raised seat disposed in said upper chamber portion below said inlet and including an upper concave conical surface portion;

a freely movable ball movable in said upper chamber portion and resting on said conical surface, the ball being normally positioned at the center of the conical surface when the valve is upright and rolling up the conical surface when the valve is inclined;

a follower for the ball, said follower being arranged within said upper chamber portion for vertical reciprocal movement in said upper chamber portion by said ball as it rolls on the conical seat, said follower including a top member disposed below said upper inlet and above said ball and adapted to close said inlet upon being moved toward said inlet, whereby said ball urges said follower to move said top member toward said inlet thereby closing said inlet upon inclination of said valve, and said top member of said follower is urged to move downwardly by the pressure differential created between said inlet and said upper chamber portion when said ball has rolled down said conical surface upon returning the valve to the upright position; and

valve means for controlling pressure within said upper chamber portion communicating by way of said inlet to said fuel tank, thereby controlling pressure within said fuel tank, said pressure controlling valve means being disposed in said lower chamber portion.

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**4,742,841**

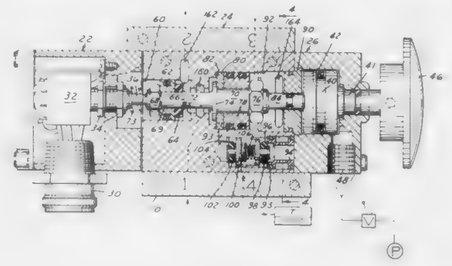
## WATER SHUT-OFF VALVE

**Douglas B. Vonderhaar, Highland, and Donald E. McGeachy, Milford, both of Mich., assignors to Numatics, Incorporated, Highland, Mich.**

**Filed Apr. 10, 1987, Ser. No. 37,023**

**Int. Cl.[4] F16K** *21/04*

**U.S. Cl. 137—115** **10 Claims**



1. In a coolant system for a welding apparatus,

(a) a coolant circuit including a pressure source and a reservoir,

(b) a valve housing in said circuit having two parallel passages, the first passage to pass pressure flow from said pressure source to said circuit, and the second passage to pass return flow from said circuit to said reservoir,

(c) a valve element shiftable in said housing from a first position in which said first passage is open, to a second position in which said first passage is closed and pressure flow is by-passed to said reservoir through said second passage,

(d) a spring-biased first means in said second return passage to maintain a back-pressure in said return passage when coolant is flowing in said circuit,

(e) said valve element having opposed first and second pressure surfaces exposed respectively to pressure in said first passage and to said back pressure, said second surface having a larger effective area than said first surface,

wherein loss of pressure in said second passage causes said pressure on said first surface to shift said valve to said second position by-passing pressure flow to said reservoir.



**4,742,842**

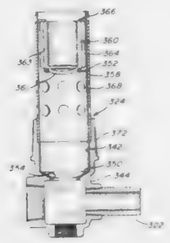
## HYDRO-PNEUMATIC PRESSURE VESSELS

**Claude J. E. Garneau, Ste. Thérèse, Canada, and Walter C. Stethem, San Leandro, Calif., assignors to Hamlet & Garneau Inc., Laval, Canada**

**Continuation-in-part of Ser. No. 825,666, Feb. 3, 1986, abandoned. This application Dec. 1, 1986, Ser. No. 936,595**

**Int. Cl.[4] F16K** *31/22*

**U.S. Cl. 137—172** **3 Claims**



1. A float valve for use in a pipe circuit in which at least two fluids are present, at least one fluid being a liquid, said liquid having a specific gravity greater than said other fluid, the valve comprising a valve body, a valve chamber defined in said body, a valve seat in the bottom of said chamber, an outlet communicating with said chamber through the valve seat and with a pipe circuit, and inlet communicating with the chamber, a float valve member adapted to close the valve when seated on the valve seat, the specific gravity of the valve member being less than the specific gravity of said liquid, the float valve member being in the form of an upwardly opening cup having a bottom portion adapted to sealingly engage said valve seat and prevent fluid from flowing thereby, the open-ended cup allowing liquid to be present therein during operation of the valve such that the valve member will have a specific gravity less than and close to the specific gravity of the first liquid, such that the float member will float in the valve chamber in the presence of said first liquid keeping the valve open and will submerge in the presence of the other fluid to close said valve, the chamber comprising an upright tubular cylindrical member open at its upper end, means within said chamber and engaged between said valve member and the interior of said tubular cylindrical member for guiding said valve member in reciprocating movement toward and away from said valve seat, stop means adjacent the top of said cylindrical member for retraining said float valve member therein, the tubular cylindrical member forming said valve chamber being intermediately perforated to allow fluid to readily pass in and out thereof so that the floatable valve member has substantially instantaneous response to the different specific gravities of the respective liquids.

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**4,742,843**

## AIR AND VACUUM RELIEF VALVE

**Mark R. McClaran, Orange, Calif., assignor to Rain Bird Sprinkler Mfg. Corp., Glendora, Calif.**

**Filed Aug. 19, 1987, Ser. No. 86,976**

**Int. Cl.[4] F16K** *31/22*

**U.S. Cl. 137—202** **12 Claims**

1. In an air and vacuum relief valve of the type including:

a housing having a bottom inlet passageway and a vertically spaced outlet passageway;

a chamber within said housing between said inlet passageway and said outlet passageway;

an entrance from said inlet passageway to said chamber; and

a float body centrally disposed within said chamber and supported for movement between a lower, open position and an upper, closed position closing said outlet passageway, the improvement comprising:

said float body being formed as a hollow, air tight shell having the general shape of an inverted pear with a lower, relatively small diameter bulbous nose portion and an upper cylindrical portion of larger diameter joined with



said lower portion by a smooth, downwardly and inwardly contoured sidewall portion.

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**4,742,844**

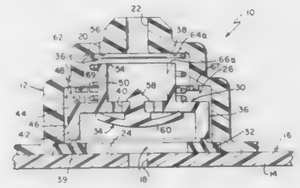
## FLOW CONTROL VALVE

**Emil Szlaga, Connersville, Ind., assignor to Stant Inc., Connersville, Ind.**

**Division of Ser. No. 935,814, Nov. 28, 1986, Pat. No. 4,715,403. This application Oct. 13, 1987, Ser. No. 107,560**

**Int. Cl.[4] F16K** *24/00*

**U.S. Cl. 137—493.2** **3 Claims**



1. A flow-metering pressure-relief valve assembly for vehicle fuel tanks and the like, the assembly comprising

a valve housing having an interior wall configured to define a chamber, inlet opening means for admitting fuel vapor into the chamber, and outlet opening means for exhausting fuel vapor from the chamber, the interior wall providing a first flow-metering surface situated in close proximity to the outlet opening means,

a valve seat attached to the valve housing and situated in the chamber to surround the inlet opening means,

a pressure-relief element in the chamber, the pressure-relief element including a valve member having an inner surface confronting the inlet means, and an upstanding skirt attached to the valve member and having a distal portion extending in an outward direction toward the outlet means in spaced relation to the interior wall of the valve housing, the distal portion providing a second flow-metering surface which cooperates with the first flow-metering surface to define a variable flow-metering orifice therebetween, and

biasing means for yieldably biasing the valve member against the valve seat normally to close the inlet opening means, the second flow-metering surface being moved in relation to the first flow-metering surface in response to relative movement of the valve member and the valve seat to vary the size of the variable flow-metering orifice, the first and second flow-metering surfaces having predetermined shapes that are configured to meter the flow of pressurized fuel vapor through the variable flow-metering orifice in accordance with a predetermined specification matching the flow rate of fuel vapor exhausted through the outlet opening means to the magnitude of the pressure

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exposed to the inner surface of the valve member, the valve housing having a longitudinal axis and including a baffle depending from the interior wall and extending into the chamber in an axially-inward direction toward the valve member, the baffle having a radially inwardly-facing surface providing the first flow-metering surface.

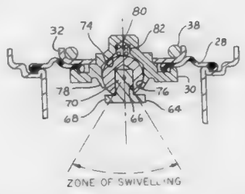
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**4,742,845**

## FUEL PRESSURE REGULATOR VALVE

**David Capoccia, Warren, and Alexander Chadwick, South Lyon, both of Mich., assignors to Weber U.S.A., Inc., Farmington Hills, Mich.**

**Filed Sep. 11, 1987, Ser. No. 95,598**
**Int. Cl.[4] F16K *31/12***
**U.S. Cl. 137—510** **19 Claims**



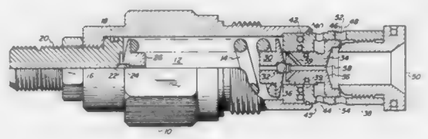

1. In a pressure regulator for a liquid fuel management system wherein a liquid fuel chamber portion of the pressure regulator is communicated to a source of liquid fuel for regulating the pressure thereof, said liquid fuel chamber is separated from a control chamber portion of the pressure regulator by a movable wall, said control chamber comprises means for controlling response of said movable wall to pressure conditions in said liquid fuel chamber such that a pressure regulating effect is imposed on the liquid fuel, said liquid fuel chamber comprises an orifice through which excess liquid fuel passes from said liquid fuel chamber, and said movable wall carries an element which coacts with said orifice in performing the pressure regulating function, the improvement which comprises said element comprising a head and a shank, said head being disposed for coaction with said orifice, and said shank serving to operatively relate said element to a separate spherically contoured element contained in a mounting carried by said movable wall, said spherically contoured element containing a hole having an axis which lies on an imaginary line passing through the geometric center of the spherical contour of said spherically contoured element, said mounting comprising means capturing said spherically contoured element on said mounting in a manner which allows said axis of said hole to coincide with any radial within a conical zone about said geometic center thereby providing a conical zone of swivelling for said spherically contoured element about said geometric center within said mounting, said shank operatively relating said first-mentioned element to said spherically contoured element by fitting within said hole, and said head having at least a portion thereof which is disposed exteriorly of said spherically contoured element and which, by virtue of the operative association of said first-mentioned element with said spherically contoured element, is thereby endowed with the capability of being positioned within said conical zone of swivelling as it coacts with said orifice in performance of the pressure regulating function.

**4,742,846**

## DIRECTING-ACTING, DIFFERENTIAL PISTON RELIEF VALVE

**Ernest A. DiBartolo, Sarasota, Fla., assignor to Sun Hydraulics Corp., Sarasota, Fla.**

**Continuation of Ser. No. 699,904, Feb. 8, 1985, abandoned. This application Jul. 6, 1987, Ser. No. 69,833**
**Int. Cl.[4] F16K *21/10***
**U.S. Cl. 137—514.5** **13 Claims**



1. A direct-acting differential piston relief valve comprising:
a body having a longitudinally extending bore therein;
said bore having first and second ends;
a spring chamber closure secured for longitudinal adjustment to said body at said first end of said bore;
a body extension secured to said body at said second end of said bore;
a valve seat secured to said body extension;
said valve seat defining a valve inlet port;
a plurality of radially extending passages through said body extension adjacent to said valve seat defining a valve outlet port;
a spring chamber in said body defined by said bore, said spring chamber closure and said body extension;
said body extension having a longitudinal bore therethrough forming a piston cylinder;
a piston slideably supported in said piston cylinder forming an interface therewith;
an annular low friction seal in a groove at said interface of said piston and said piston cylinder;
said piston having a head extending radially outwardly from said piston, whereby said piston has a smaller outside diameter than said piston head;
said piston head having a longitudinally extending annular extension thereon;
an inner edge on said piston head annular extension;
said inner edge forming a seal with said valve seat when said inner edge abuts said valve seat, whereby said piston has no piston face area extending radially inwardly of said inner edge upon which low pressure produced by Bernoulli effects can act;
a first spring guide in said spring chamber abutting said spring chamber closure;
a second spring guide in said spring chamber abutting said piston;
a coil spring axially supported in said spring chamber to transmit spring force against first and second spring guides, whereby said spring tends to close said valve;
said first and second spring guides having a spherical surface on one side and a portion fitting within the coils of said spring on the other side transmitting the force exerted by said spring only in the axial direction;
a passage extending through said piston between said spring chamber and said inlet port;
an annular cavity between said piston head and said body extension; and
a plurality of radially extending passages through said body extension from said annular cavity, whereby fluid contained in said annular cavity can be readily expelled.

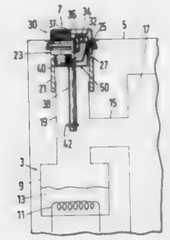


**4,742,847**

## EXCESS PRESSURE VALVE FOR A BOILER OF A STEAMER FOR THE STEAM TREATMENT OF FOOD

**Siegfried Meister, Siemensstrasse 2, 8910 Landsberg/Lech, Fed. Rep. of Germany**

**Continuation of Ser. No. 760,880, Jul. 31, 1985, abandoned. This application Dec. 22, 1986, Ser. No. 945,203**
**Claims priority, application Fed. Rep. of Germany, Aug. 2, 1984, 8423019**
**Int. Cl.[4] A47J *27/16*; F16K *17/12***
**U.S. Cl. 137—533.29** **10 Claims**



1. An excess pressure valve for a boiler of a steamer for the steam treatment of food, which includes a pipe leading outwards from the inside of the boiler and whose external end portions have an annular sealing face, a conical valve body which closes the pipe to the outside and has a packing ring for engaging the sealing face, characterized in that said pipe includes means defining a constriction extending across said pipe and positioned adjacent said annular sealing face; said valve including:
an elongated shaft extending through said constriction means, one end of said shaft having an enlarged portion for engaging said constriction means and limiting movement of the valve body relative to said constriction means, and the other end of said shaft having a reduced diameter intermediate section and a smaller reduced diameter end section; and
said valve body having:
a tapered block member that defines a central aperture constructed to interfit with the intermediate first reduced diameter section and be positioned between the shaft body and said second smaller end section, said block member having a periphery for engaging said pipe;
a collar secured to the smaller end section of the shaft for cooperation in securing the block on the intermediate diameter section;
tubularly-shaped shoulder means for engaging said collar, cooperating in retaining said block in position and defining cap engaging means; and
cap means for engaging said annular face and supporting said valve body in sealing position against said annular face, said cap means including a central aperture for engaging said shoulder means and securing said cap means thereto.

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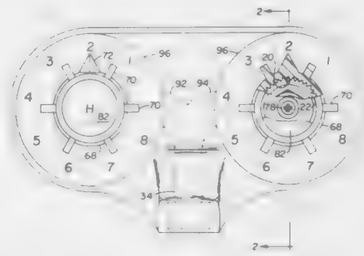
**4,742,848**

## INDEXING CONTROL FOR FLUID FLOW REGULATING VALVES

**Warren L. Black, Rte. 2, Box 23-A, Piney Flats, Tenn. 37686**

**Filed Mar. 6, 1987, Ser. No. 22,658**
**Int. Cl.[4] F16K *37/00***
**U.S. Cl. 137—556.3** **4 Claims**

1. A fluid flow regulating valve assembly comprising elongated valve body means adapted for connection to a water source, valve stem means rotatably threadedly mounted in and projecting outwardly from said body means, annular shoulder means on said body means, facade means having aperture means through which said body means is positioned with said facade means abutting said annular should means, nut means threadedly mounted on said body means and clamping said facade means against said annular shoulder means, knob means affixed to the outer end of said stem means and having axially slotted or ridged inner wall means defining cavity means, flexible finger means having a base adapted for clamping onto



said body means by said nut means, said finger means having a first component extending generally axially of said stem means, and a second component extending generally radially of said stem means, said second component adapted to flexibly, slidably contact said inner wall means as said knob is rotated, for imparting an indexing action thereto.

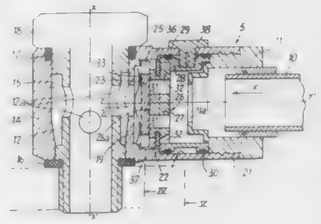
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**4,742,849**

## ANGLED PNEUMATIC CONNECTION INCLUDING MEANS FOR REGULATING A ONE-WAY FLOW

**Pierre Prudhomme, St Germain En Laye; Jean-Luc Burban, Herblay, and Michel Nicholas, Neauphle le Château, all of France, assignors to La Telemecanique Electrique, Nanterre, France**

**Filed Apr. 23, 1987, Ser. No. 41,393**
**Claims priority, application France, Apr. 24, 1986, 86 05946**
**Int. Cl.[4] F16K *3/08***
**U.S. Cl. 137—599.2** **14 Claims**



1. An angled connection for connecting a pneumatic duct to a user apparatus, said connection comprising a first tubular fixing portion for fixing the connection to the apparatus by co-operating with an opening provided through a wall of the apparatus, and a second tubular portion perpendicular to the first and for receiving said duct, said connection including:
an internal passage for pneumatic fluid constituted by the inter-communicating bores of said two tubular portions, said passage being divided into first and second branches;
a constriction device of adjustable cross section being provided in said first branch;
a non-return valve being provided in said second branch;
the connection including the improvements whereby:
said second tubular portion includes an end plate at its end adjacent to said first tubular portion and duct retaining means at its opposite end for retaining said duct;
said two branches are located concentrically and in parallel

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inside the bore of said second tubular portion between said end plate and said duct retaining means;

said two branches are defined:

by means of a wall fixed in said bore and provided with first and second through orifices; and

by means of a plug mounted free to rotate in sealed manner inside the bore about the bore axis and kept in contact one of the surfaces of said fixed wall through which said first orifices pass; said plug possessing:

at least one first through opening uncovering said first orifices to a greater or lesser extent depending on the angular position of the plug inside the bore in order to form said constriction of adjustable cross section; and

at least one second through opening forming, together with said second orifices, said second internal branch of the passage;

a non-return valve co-operating with said second opening and resiliently biased against a seat constituted by one of the surfaces of the plug into which the second opening opens out; and

means accessible from outside said second tubular portion being coupled to said plug in order to rotate said plug in said bore.

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**4,742,850**

**FEMALE COUPLING COMPONENT FORMING PART OF A QUICK COUPLING**

**Thure Ekman, Slalomvägen 12, 541 33 Skövde, Sweden**

**Filed Mar. 12, 1986, Ser. No. 838,856**

**Claims priority, application Sweden, Mar. 13, 1985, 8501234**

**Int. Cl.⁴ F16L** *37/28*

**U.S. Cl. 137—614.05** **15 Claims**



1. A female coupling member of a quick coupling device comprising

an inner member and an outer member coupled to said inner member, said inner member having external and internal walls, said internal walls defining a hollow cavity, said internal wall of said inner member including an outwardly extending projection portion including a seat portion;

a unit member disposed within said hollow cavity including an elongated hub component, and at least two wing-shaped elements extending from said hub component, said unit member arranged for longitudinal displacement within said cavity;

and a sealing sleeve disposed in said cavity between said internal walls and said unit member,

said unit member supporting at its first end a first sealing means and at its second end a second sealing means, said first sealing means interacting with said seat portion of said inner member and outer member and said second sealing means interacting with a seat portion on said sealing sleeve, said at least two wing-shaped elements facilitating centering of said unit member within said cavity and constituting a passageway to lead fluid to said female coupling member, said hub component including a channel extending through the entire length of said hub component and discharging at end surfaces of said first and second sealing means, and at least one pressure elimination means arranged within said channel a small quantity of fluid to be passed to or from a space outside said first sealing member when said female coupling member is connected to a male coupling member.

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**4,742,851**

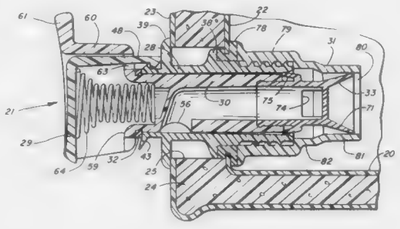
**DRIPLESS FAUCET FOR BEVERAGE CONTAINERS**

**Gene D. Lundblade, Valley Center, Kans., assignor to The Coleman Company, Inc., Wichita, Kans.**

**Filed Jul. 17, 1986, Ser. No. 886,337**

**Int. Cl.⁴ B65D** *3/00*

**U.S. Cl. 137—614.12** **13 Claims**



1. A faucet for a liquid container comprising:

a tubular housing adapted to be mounted in an opening in the container, the tubular housing having an open rear end adapted to be positioned within the container and an open front end adapted to be positioned outside of the container,

a tubular valve slidably mounted within the tubular housing, the valve having a rear end, a front end, and a dispensing opening adjacent the front end, the valve being movable between a closed position in which the dispensing opening is positioned rearwardly of the open front end of the housing and an open position in which the dispensing opening is positioned forwardly of the open front end of the housing, and

a first seal mounted on the valve forwardly of the dispensing opening and sealingly engaging the forward end of the housing when the valve is in the close dposition whereby flow of liquid through the valve is shut off when the seal engages the housing and,

a second seal mounted on the rear end of the valve and sealingly engaging the housing when the valve is in its closed position, and the spacing between the first and second seals is such that the first seal moves out of sealing engagement with the housing before the second seal as the valve moves from the closed positon to the open position.

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**4,742,852**

**FEEDER**

**Harold R. White, New Lenox, Ill., assignor to Alar Engineering Corporation, Mokena, Ill.**

**Filed Feb. 2, 1987, Ser. No. 9,887**

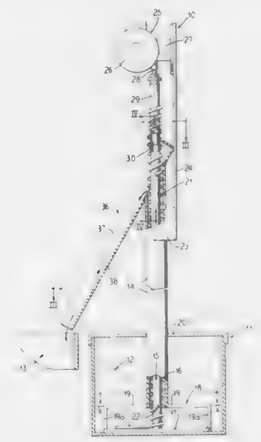
**Int. Cl.⁴ B65B** *3/08*

**U.S. Cl. 141—256** **19 Claims**

1. A self cleaning feeder which comprises elongated spaced concentric means defining an annular passage therebetween along the length thereof, said passage having an inlet and an outlet longitudinally spaced from the inlet, an elongated spaced coil helical wound stretchable spring extending freely through said passage communicating with said inlet and said outlet, means suspending said spring for stretching and contracting in said passage, means rotating said suspended spring in said passage in the direction of winding of the coils to act as an auger conveying material through the passage from the inlet to the outlet, and said spring having a rate causing the rotating coils loaded by the material to alternately contract into wiping engagement with the inner wall of the passage and expand into wiping engagement with the outer wall of the passage.

2. A portable feeder supported by a container housing particulate material and adapted to be placed adjacent a receptacle for the material which comprises means carried by said container defining an annular passage along the length thereof





with an open inlet in the container and an open outlet communicating with the adjacent receptacle, an elongated spaced coil helical wound spring in said passage having coils exposed to the inlet and outlet, and means rotating said spring in the direction of winding of the coil; to convey material between the coils from the container to the receptacle.

16. The feeder of claim 2 wherein the outlet discharges to an inclined chute feeding the material to the receptacle.

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**4,742,853**

**PRECISION ROUTER GUIDE**

**Daniel M. Davison, 2017 E. Sante Fe, Fullerton, Calif. 92631**

**Filed Jul. 14, 1986, Ser. No. 885,174**

**Int. Cl.⁴ B27C** *5/00*

**U.S. Cl. 144—137** **9 Claims**

1. A precision router guide apparatus for use in conjunction with a router for routing out slots in a workpiece comprising:

(a) a plurality of frame members pivotally joined together near their respective extremities to form a parallelogram wherein said frame members are operably disposed in edge-to-edge facing parallel relationship, so that when the router is operably disposed therebetween the opposing edges of the rim of the router's base plate may be guidingly movable therebetween;

(b) securing means for securing at least one of said frame members to the workpiece thereby operably fixing said secured frame member(s) in relatively fixed relationship to said workpiece; and



(c) pivot locking means for locking at least one of the four pivoting joints of the parallelogram.

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**4,742,854**

**FEEDING DEVICE FOR EFFECTING A LONGITUDINALLY DIRECTED RELATIVE MOVEMENT BETWEEN A STEM AND THE DEVICE PROPER**

**Torsten Forslund, Alfta, Sweden, assignor to OSA AB, Alfta, Sweden**

**Filed Apr. 9, 1987, Ser. No. 36,879**

**Claims priority, application Sweden, Apr. 11, 1986, 8601628**

**Int. Cl.⁴ B27L** *1/00*

**U.S. Cl. 144—242 D** **16 Claims**



1. A feeding device for effecting relative longitudinal movement between a stem and said device, said device comprising at least one feeding unit comprising:

an endless feeding element;

at least one rotatable drive wheel for driving said endless feeding element, said drive wheel having a central axis perpendicular to the direction of said longitudinal movement;

an elongated rigid frame having a peripheral edge and being operatively associated with said drive wheel and said endless feeding element, said frame element having an extension at one end thereof;

said endless feeding element comprising a plurality of hingedly interconnected chain-forming links each with associated pin means or idling roller means, said links being movable along the peripheral edge of said rigid frame element and adapted to bear against said frame element, said chain-forming links being adapted to transfer substantially uniformly distributed bearing pressures to a stem along the length of said frame element when bearing against said frame element;

said frame element extension having an oblique peripheral surface extending into said peripheral edge, said oblique peripheral surface extending at least to said central axis of said drive wheel;

said drive wheel being operatively associated with said extension at said one end of said frame element, and comprising a plurality of projecting engaging means having a recess between adjacent engaging means with said projecting engaging means adapted to engage between adjacent pin means or idling roller means;

said oblique peripheral surface having (a) an outer end positioned on a plane corresponding to an inner portion of said recesses and (b) a portion extending outwardly from said center axis of said rotatable drive wheel which merges into said peripheral edge whereby said pin means or idling roller means disengages from said driving wheel upon leaving engagement with said driving wheel.

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**4,742,855**

## WOODWORKING ROUTER

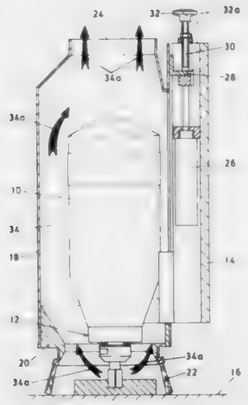
**William R. Hartley, Colne, United Kingdom, assignor to Wadkin plc, Leicester, England**

**Filed Apr. 27, 1987, Ser. No. 42,730**

**Claims priority, application United Kingdom, May 27, 1986, 8612789**

**Int. Cl.[4] B27G** *71/00;* **B23C** *5/02*

**U.S. Cl. 144—252 R** **10 Claims**




1. A woodworking router having an electric motor driven router head mounted on a slide for vertical movement relative to a worktable, wherein a dust collection collar also mounted on the slide surrounds the router head and communicates with a dust extraction dust surrounding and coaxial with the electric motor for the transfer of dust and debris created during routing to factory dust extraction equipment, and means are provided for moving the dust collection collar vertically relative to the router head between a raised position in which the router head is exposed for tool changing and a lowered safety position in which the collar provides a safety guard around the router head.

**4,742,856**

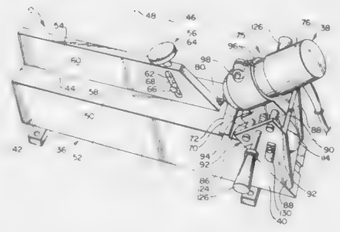
## GROOVE FORMING APPARATUS AND METHOD

**Kenneth L. Hehr, Ferndale, and Ronald J. Morgan, Bellingham, both of Wash., assignors to The Thumbnail Company, Bellingham, Wash.**

**Filed Jun. 26, 1987, Ser. No. 67,278**

**Int. Cl.[4] B27C** *5/02*

**U.S. Cl. 144—371** **20 Claims**




12. An apparatus to form grooves in a pair of first and second frame members, each of which has a mitred end with an end surface slanted at an acute angle to a lengthwise axis of the frame member, said apparatus having a longitudinal axis, a lateral axis, a vertical axis, a front end and a rear end, said apparatus comprising:

a. a base structure having upwardly facing and laterally facing locating surface means defining first and second operating locations where said first and second frame members can be located to be in contact with said surface means so as to position said frame members relative to said vertical and lateral axes in said first and second operating locations, with the end surfaces of the frame members being at forward locations facing upwardly and forwardly, and with the frame members being spaced from one another by a predetermined lateral spacing distance;

b. positioning means mounted proximate to the forward end of the base structure to engage the end portions of the frame members to locate the frame members along the longitudinal axis at the operating locations;

c. a groove forming motor assembly comprising a motor and a bit member, with the bit member being mounted to the motor for rotation about an operating axis slanting downwardly and forwardly, generally perpendicular to a plane occupied by the end surfaces of the frame members;

d. a mounting frame having laterally oriented slide mounting means to which said motor assembly is mounted for lateral movement in either direction from a middle location, the motor assembly being characterized in that when said motor assembly is at the middle location, the bit member is positioned between the end portions of the frame members when in their operating positions;

e. said base structure further comprising a centrally positioned, longitudinally extending positioning plate extending upwardly from an upper positioning surface of said base member, said positioning plate presenting oppositely facing side surfaces which comprise a portion of said locating surface means, said side surfaces being positioned to engage said frame members on opposite sides of said positioning plate so as to position said frame members laterally, the upper positioning surface of the base structure also comprising said locating surface means and being substantially unobstructed in laterally outward directions from said positioning plate so that frame members of varying width dimensions can be properly positioned against the side surfaces of the positioning plate means and on said upper positioning surface,

whereby first and second frame members can be placed on the base structure at the first and second operating locations, with the motor assembly being centrally positioned, and the motor assembly can then be moved laterally from the center position to form the grooves in the frame members.



19. A method to form grooves in a pair of first and second frame members, each of which has a mitred end with an end surface slanted at an acute angle to a lengthwise axis of the frame member:

a. providing an apparatus having a longitudinal axis, a lateral axis, a vertical axis, a front end and a rear end, said method comprising:

b. placing said frame members against upwardly facing and laterally facing locating surface means of a base structure of said apparatus at first and second operating locations where said first and second frame members are located to be in contact with said surface means so as to position said frame members relative to said vertical and lateral axes in said first and second operating locations, with the end surfaces of the frame members being at forward locations facing upwardly and forwardly, and with the frame members being spaced from one another by a predetermined lateral spacing distance;

c. locating said frame members against positioning means mounted proximate to the forward end of the base structure which engage the end portions of the frame members to locate the frame members along the longitudinal axis at the operating locations;

d. providing a groove forming motor assembly comprising a motor and a bit member, with the bit member being mounted to the motor for rotation about an operating axis slanting downwardly and forwardly, generally perpendicular to a plane occupied by the end surfaces of the frame members, and operating said motor to cause rotation of said bit member;

e. providing a mounting frame having laterally oriented slide mounting means to which said motor assembly is mounted, positioning the motor assembly at a middle location where the bit member is positioned between the end portions of the frame members, and then moving the motor assembly laterally in opposite directions to form grooves in the first and second frame members; and

f. said method being further characterized in that said base structure further comprises a centrally positioned, longitudinally extending positioning plate extending upwardly from an upper positioning surface of the base member, said positioning plate presenting oppositely facing side surfaces which comprise a portion of the locating surface means, said method further comprising positioning the frame members on opposite sides of the positioning plate so as to position the frame members laterally, with the upper positioning surface of the base structure also comprising said locating surface means and being substantially unobstructed in laterally outward directions from the positioning plate so that frame members of varying width dixensions can be properly positioned against the side surfaces of the positioning plate means and on the upper positioning surface.

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**4,742,857**

## TIRE PRESSURE SENSOR AND AIR SUPPLY TO MAINTAIN DESIRED TIRE PRESSURE

**Shrikant A. Gandhi, Sunnyvale, Calif., assignor to Techni Guidance, Inc., Santa Clara, Calif.**

**Filed Oct. 7, 1986, Ser. No. 916,847**

**Int. Cl.[4] B60C** *23/00*

**U.S. Cl. 152—418** **8 Claims**

1. Tire pressure control apparatus for regulating tire pressure on a rotating wheel, the apparatus comprising:

housing means disposed to be attached to the wheel and having a chamber therein connected to the tire and having an aperture;

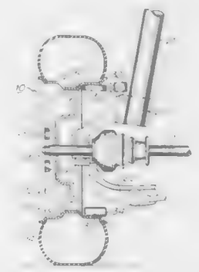
magnet means disposed to slide within the aperture;

resilient bellows means attached about one end thereof to the magnet means and about the other end thereof to the housing means to form a wall of the chamber exposed on one side thereof to air pressure in the tire and on the other side thereof to atmospheric pressure for positioning the magnet means within the aperture in response to air pressure in the tire;

first valve means disposed in said housing means to be actuated by the magnet means at a selected position thereof;

a source of air under pressure carried by the wheel and connected to the first valve means to supply air under pressure to the chamber in response to actuation of the first valve means by the magnet means;

transducer means for mounting in fixed location relative to the rotating wheel in close proximity to the housing means



rotating therewith, said transducer means producing an output indicative of the position of the magnet means in the aperture in response to the rotation thereof relative to the transducer means; and

control means coupled to the transducer means for producing a control signal in response to the output attaining a selected value, said control means supplying the control signal to the transducer means for positioning the magnet means to said selected position for actuating the first valve means to supply air under pressure to the tire.

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**4,742,858**

## HEAVY-LOAD RADIAL TIRE WITH SPECIFIED STEEL BELT STRUCTURE

**Koji Takahira, Nara, Japan, assignor to Toyo Tire & Rubber Company, Ltd., Osaka, Japan**

**Filed Jul. 3, 1986, Ser. No. 881,661**

**Claims priority, application Japan, Jul. 6, 1985, 60-148853**

**Int. Cl.[4] B60C** *9/18, 9/20*

**U.S. Cl. 152—536** **6 Claims**



1. A heavy-load radial tire comprising three belt layers of steel cords including an interior belt layer, an intermediate belt layer and an outermost belt layer, the cords of each belt layer being at a small angle with respect to a tire circumference direction, said belt layers being laminated in a central part of

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the outside of a carcass, wherein the intermediate belt layer which is adjacent to the outermost belt layer has a cord strength which is at least 1.2 times greater than that of the interior belt layer which is adjacent and radially inside said intermediate belt layer, and the end number of said intermediate belt layer is smaller than that of said interior belt layer such that the belt strength of said intermediate belt layer is substantially equal to that of said interior belt layer.

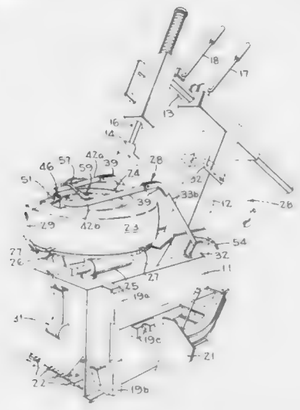
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**4,742,859**

## TIRE CHANGER SAFETY APPARATUS AND METHOD

**Bryce L. Mannen, Conway, Ark., assignor to FMC Corporation, Chicago, Ill.**

**Filed Dec. 5, 1986, Ser. No. 938,215**
**Int. Cl.[4] B60C** *25/00*
**U.S. Cl. 157—1** **26 Claims**



1. Safety means on a tire changer having a tire receiving table mounted on a tire changer support base and an air conduit for conducting tire inflation air, comprising

holding means for restraining a tire-rim assembly on the tire receiving table,

means for fixing said holding means to the support base proximate one side of the tire receiving table,

means for detachably connecting said holding means to the opposite side of the support base, whereby said holding means is disposed for movement between an engaged position overlying the table and a stowed position removed therefrom, and

valve means for alternatively blocking and opening the air conduit at said valve means when said holding means is in said stowed and engaged positions respectively,

wherein said holding means comprises an arm having one free end and a fixed end, said means for fixing comprising means for pivotally attaching said fixed end to the tire changer support base, and said means for detachably connecting comprising means for releasably engaging said free end in said engaged position,

wherein said means for releasably engaging comprises means for actuating said valve means to an open position.

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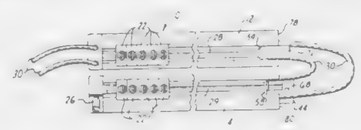
**4,742,860**

## SPLICED VERTICAL BLIND HEAD

**Victor Debs, Staten Island, N.Y., assignor to Levolor Lorentzen, Inc., Lyndhurst, N.J.**

**Continuation-in-part of Ser. No. 120,309, Feb. 11, 1980. This application Jan. 27, 1981, Ser. No. 228,784**
**Int. Cl.[4] E06B** *9/38*
**U.S. Cl. 160—178.1** **8 Claims**

1. In combination: a vertical blind head channel having a first elongated channel part and a separate second elongated channel part of the same cross section as said first part, a tilt rod having a first elongated portion rotatably supported in said first part and also having a second elongated portion separate from said first portion and of the same cross section as said first portion, said second portion being rotatably supported in said second part, first means for removably connecting said first



and second head channel parts in longitudinal alignment and essentially in abutting relationship with each other, and second means for removably connecting said first and second tilt rod portions in axial alignment and essentially in abutting relationship with each other.

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**4,742,861**

## METHOD AND MATERIAL FOR DENTAL STRUCTURES

**Itzhak Shoher, 50 Shlomo-Hamelech St., Tel-Aviv, Israel 64386, and Aharon E. Whiteman, 13 J. L. Perez St., Petach-Tikvah, Israel 49206**

**Continuation-in-part of Ser. No. 723,063, Apr. 7, 1985. This application Dec. 2, 1986, Ser. No. 937,011**
**Int. Cl.[4] B22D** *19/10*
**U.S. Cl. 164—80** **11 Claims**

1. A method for forming reinforcing or repairing a dental restoration comprising forming a material composition of metal particles composed substantially of a high fusing temperature metal component and a low fusing temperature component with the low fusing component being in a minor proportion relative to the high fusing temperature component; adding the material to the dental restoration to be reinforced or repaired; molding the material composition into a predetermined shape; heat treating the material composition at a temperature below the melting temperature of said high fusing temperature metal component and at a temperature level sufficient to cause substantial melting of said low fusing temperature component for forming a porous sponge-like mass of interconnected particles particles of said high fusing temperature metal component; adding particles of a low melting temperature filler to said porous sponge-like mass of metal and heat treating said filler particles to cause said filler particles to melt into the sponge-like mass whereby a solid reinforced structure is formed.

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**4,742,862**

## FOUNDRY CORE SHOOTER

**Andre Weber, Saverne, France, assignor to Kuhn S.A., Saverne, France**

**Filed Feb. 19, 1987, Ser. No. 16,359**
**Claims priority, application France, Feb. 19, 1986, 86 02363**
**Int. Cl.[4] B22C** *19/04*
**U.S. Cl. 164—154** **52 Claims**

1. An apparatus comprising:

means for supporting a plurality of core boxes of same or variable sizes;

a shooting head positioned above said means for supporting;

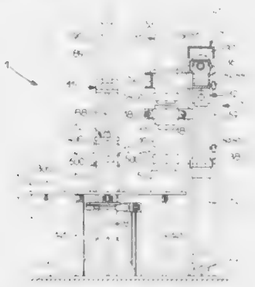
first means for downwardly and upwardly moving said shooting head;

first means for terminating downward movement of said shooting head in response to engagement with a top of a core box supported on said means for supporting;

a gassing head positioned above said means for supporting;



second means for downwardly and upwardly moving said gassing head; and



second means for terminating downward movement of said gassing head in response to engagement with a top of a core box supported on said means for supporting.

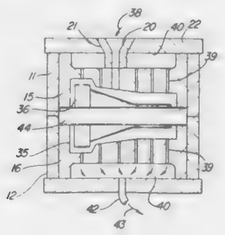
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**4,742,863**

## MOLD FOR SAND CASTING VARYING THICKNESS ARTICLES

**Raymond H. Witt, 28240 Grand River, Farmington, Mich. 48024**

**Division of Ser. No. 882,830, Jul. 7, 1986, Pat. No. 4,674,553. This application Apr. 27, 1987, Ser. No. 42,855**
**Int. Cl.[4] B22C** *9/12*
**U.S. Cl. 164—255** **7 Claims**



1. A sand casting mold for casting molten metal articles of varying thicknesses, comprising:

a permanent mold having a pre-formed casting cavity which is oversized relative to the desired finished external size and shape of the cast article;

a sand liner applied upon the wall of the casting cavity to provide an interior sand wall surface corresponding to the desired finished cast article surface;

said liner having varied thickness portions reversely correlated to the varied thickness sections of the cast article, that is, the liner portions being thicker where the article is thinner and vice-versa, with the liner thicknesses being pre-selected so that the different thickness article sections cool at different rates, i.e. with thicker sections cooling faster than the thinner sections, but with the liner thicknesses being correlated for sufficiently cooling all of the varied thickness sections of the cast article at about the same time to a temperature for removal of the article from the mold.

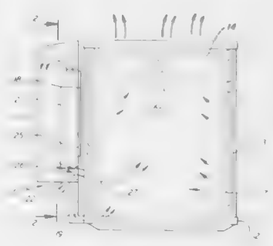
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**4,742,864**

## PASSIVE VENTILATED CONTROL BOX

**Richard J. Duell, Syracuse; Derrick A. Marris, Blossvale; John M. Palmer, Syracuse, and Anthony P. Sardina, Jr., Clay, all of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.**

**Filed Oct. 20, 1986, Ser. No. 920,395**
**Int. Cl.[4] F25B** *49/00;* **H02B** *9/00*
**U.S. Cl. 165—1** **10 Claims**



4. An improved control box of the type containing electronic components to control an air conditioning unit and attached thereto, said air conditioning unit having a coil and a fan for circulating air through the coil, comprising:

a channel disposed within the control box said channel having an inlet opening in one end thereof which is in fluid communication with the ambient air, and an opening in the other end thereof in fluid communication with one end of the control box;

an outlet opening in the other end of the control box, said outlet opening being in fluid flow communication with said control box one end and being otherwise isolated from fluid flow communication with said channel; and

a vent channel connected to said outlet opening to provide fluid flow communication between said outlet opening and the negative pressure area created by operation of the fan whereby electronic components contained in said box are ventilated.

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**4,742,865**

## METHOD OF CONTROLLING AN ENERGY RECOVERY SYSTEM

**Jacob Weitman, Tryffelst. 8, S-611 63 Nykoping, Sweden**

**Filed May 6, 1985, Ser. No. 730,557**
**Claims priority, application European Pat. Off., May 7, 1984, 84850146.6**
**Int. Cl.[4] F24D** *11/00*
**U.S. Cl. 165—18** **8 Claims**



1. A method of controlling an energy recovering system to achieve an increase of the statistical average system recovery

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efficiency, the energy recovering system being of the kind having:

a first source of a first waste process fluid;

at least a first accumulator tank for the first waste process fluid, the heat of which is to be recovered;

a second source of a second fluid to be heated;

a first heat exchanger with a primary side through which the first fluid is passed and a secondary side through which the second fluid is passed;

the method comprising the steps of controlling the input flow of said first fluid to the first accumulator tank such that at any instant the first fluid is admitted to at least the first accumulator tank only if its temperature exceeds a reference temperature derived as a predetermined analytical function of the temperature and volume of the fluid present in the first accumulator tank, and continuously controlling the flow through the primary side of the first heat exchanger in accordance with a parameter which is a second, predetermined analytical function of the volume of the fluid present in the first accumulator tank.

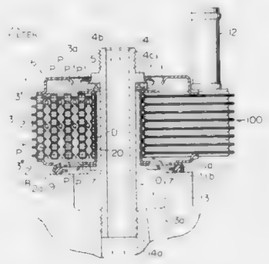
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**4,742,866**

## HEAT EXCHANGER

**Yasutoshi Yamanaka; Teruo Izumida, and Kazuya Nomura, all of Kariya, Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan**

**Filed Jun. 23, 1986, Ser. No. 878,296**
**Claims priority, application Japan, Jun. 25, 1985, 60-138252**
**Int. Cl.[4] F28F *3/04***
**U.S. Cl. 165—38** **9 Claims**



1. A heat exchanger comprising a stack of a plurality of generally planar heat exchanger modules each comprising first and second generally planar plates of a good heat conductive material;

each of said first and second plates of each module including an outer peripherial zone raised from a general plane of the plate;

said first second plates of each module being sealingly secured together along their outer peripheral zones;

the adjacent plates of each adjacent pair of modules having portions disposed radially inwardly of the outer peripheral zones of the plates and sealingly secured together;

the plates of the modules being shaped such that a first space for a first heat exchange fluid is defined in each module and such that a second space for a second heat exchange fluid is defined betweeen the adjacent plates of each adjacent pair of modules;

each module being provided with inlet and outlet for said first fluid;

the inlets of said modules being connected with each other for fluid-flow communication with said first spaces in said modules while the outlets of said modules being connected with each other for fluid-flow communication with said first spaces in said modules;

the first and second plates of each module having ridges projecting toward each other from the opposite inner surfaces of the first space in the module to cooperate to define a first passage for the flow of said first fluid in said first space from said inlet to outlet;

each of the ridges on one of the surfaces of each of said first and second plates of each module providing a groove in the other surface of the plate so that grooves are formed in the opposite inner surfaces of each of the second spaces to cooperate together to define a second passage for the flow of said second fluid;

the ridges and grooves formed on and in each plate providing increased heat exchange surface areas for said first and second fluids;

each of said ridges being formed thereon with a plurality of projections extending into said first space and spaced from each other to cause turbulence in the flow of said first fluid in said first passage; and

the ridges of said first and second plates of each module being disposed in substantially indentical pattern;

the ridges on the first plate of each module being respectively aligned with the ridges on the second plate of the module in the direction of the thickness of the module;

some of the ridges with extend into said first space in each module from the opposite inner surfaces thereof being substantially arcuate and extending in the circumferential direction of and substantially concentrically with respect to an axis to cooperate together to define substantially parallel and arcuate sub-passages extending circumferentially of said axis and spaced from each other radially thereof;

said some ridges on each of said plates being formed thereon with projections extending axialy of said axis into an associated first space, the projections extending from each of said some ridges being spaced circumferentially of said axis whereby said arcuate sub-passages are communicated with each other inthe radial direction os said axis through spaces defined between the circumferentially spaced projections on said some ridges to allow said first fluid to flow radially of said axis from a sub-passage in said first space to a radially adjacent sub-passage therein; and

the projections formed on the adjacent plates of each adjacent pair of modules provinding recesses in the opposite inner surfaces of the second space defined between said adjacent plates, said recesses being staggered in the circumferential direction of said axis to cause said second fluid to flow in each of said second spaces in the substantially circumferential direction of said axis and generally zigzag.

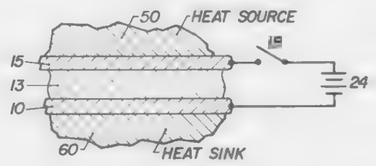
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**4,742,867**

## METHOD AND APPARATUSES FOR HEAT TRANSFER

**Myles A. Walsh, Falmouth, Mass., assignor to Cape Cod Research, Inc., Buzzards Bay, Mass.**

**Filed Dec. 1, 1986, Ser. No. 936,152**
**Int. Cl.[4] F28F *13/00***
**U.S. Cl. 165—96** **5 Claims**




1. A variable thermal switch with a means for controlling heat insulation comprising a surface adapted to face a source of heat, a second surface opposite said first surface and adapted to face a sink for heat, and means for electrochemically producing and removing dendrites positioned between said surfaces.

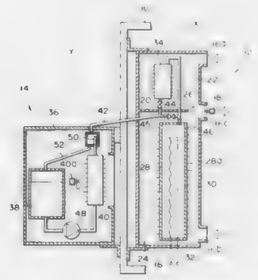


**4,742,868**

## REGENERATIVE HEATING APPARATUS

**Akio Mitani, Yokohama, and Koroku Endo, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Mar. 28, 1986, Ser. No. 845,868**
**Claims priority, application Japan, Mar. 30, 1985, 60-66792**
**Int. Cl.[4] F28D *21/00***
**U.S. Cl. 165—104.12** **12 Claims**



1. A regenerative heating apparatus comprising:

a radiating unit located in a place to be heated, said unit including a radiating container and an adsorbent contained in the container, for adsorbing vapor to generate heat when touched by the vapor and releasing the adsorbed vapor when heated;

electric heating means for heating the adsorbent;

a condenser located in the place to be heated, for condensing the vapor released from the adsorbent when the adsorbent is heated;

a liquid tank containing a working fluid therein;

an evaporator for evaporating the working fluid;

guide means for guiding the working fluid, the guide means including a first pipe for guiding the working fluid from the tank to the evaporator, a second pipe for guiding the fluid from the evaporator to the radiating container, a third pipe for guiding the vapor released from the adsorbent to the condensor, a fourth pipe having one end connected to the condenser and the other end connected to the second pipe, and a fifth pipe having one end connected to the second pipe and the other end connected to the tank, so that fluid from the condenser may be guided to the tank through the fourth pipe, a part of the second pipe and the fifth pipe;

valve means arranged in the guide means between the radiating container and the evaporator, for controlling the passage of the working fluid through the guide means; and

ventilating means for forcedly ventilating the air in the place to be heated, through the region around the radiating container or the condenser, so as to heat the air.

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**4,742,869**

## HEAT AND MASS TRANSFER DEVICE

**Kazushige Nakao; Masaki Ikeuchi; Tsuneo Yumikura, and Eiichi Ozaki, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 21, 1986, Ser. No. 921,182**
**Claims priority, application Japan, Oct. 21, 1985, 60-235704**
**Int. Cl.[4] A23C *3/04***
**U.S. Cl. 165—115** **6 Claims**

1. A heat and mass transfer device for transmitting heat between a fluid flowing within a pipe and a solution flowing on the outside of the pipe which absorbs the vapor of a solvent in the vicinity of that solution or where, heat transmitted from a hot fluid flowing within the pipe to the solution flowing along the outside of the pipe produces a vapor from said solution which surrounds the pipe, said heat and mass transfer device comprising:

a. a pipe oriented vertically for effecting fluid flow therein;

b. at least two fin assemblies fixedly positioned on the outer periphery of said pipe, axially spaced from each other and each defined by at least two axially spaced series of circumferentially spaced fins fixed at one end to the periphery of said pipe and extending outwardly and upwardly at equal angles $\theta$ to the pipe axis and formed of heat conductive material, wherein the fins of each series extend parallel to each other, are spaced at a distance (s) from each other and wherein the fin assemblies are spaced longitudinally along the periphery of the pipe such that the longitudinally adjacent fins of respective fin assemblies are set at



an interval (d) from each other; and wherein, $\theta$ ranges from about 30° to about 80° and wherein the distance d is at least 2 times the distance s;

c. means for applying a liquid to the outside of said pipe for flow vertically under gravity influence over said at least two fin assemblies; and

d. means for flowing a fluid internally within said pipe and thereby effecting improved heat transfer between the internal fluid and the external liquid by periodic pulsation of the external liquid by periodic termination of the balance between surface tension on the liquid contained between the fins which maintains the film attachment state of the liquid and the gravity force acting on said contained liquid which breaks said surface tension.

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**4,742,870**

## HEAT EXCHANGER

**Thomas G. Darone, Reston, Va., and Robert W. Langley, Westminster, Colo., assignors to Cobe Laboratories, Lakewood, Colo.**

**Filed Oct. 29, 1986, Ser. No. 924,605**
**Int. Cl.[4] F28D *7/02***
**U.S. Cl. 165—164** **11 Claims**



1. A heat exchanger comprising

a first section,

a second section, and

a divider,

said first section and said second section being in liquid-sealing juxtaposition with said divider, and

said first section and said second section including wall portions having extremities contacting said divider and relieved portions between corresponding wall portions so as to define each with said divider a corresponding plurality of flow passages, each said flow passage extending from one end of said exchanger to the other, said flow passages including a plurality of straightaway portions and nonstraight portions, the ratio of a length, L, of straightaway portions of said flow passages between said nonstraight portions to a hydraulic diameter, D, of the flow area being no more than 4.

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**4,742,871**

## DEVICE FOR POSITIONING A TOOL WITHIN A WELLBORE FLOW STRING

**Hubert Miffre, Tourves, France, assignor to Societe Nationale Elf Aquitaine (Production), Courbevoie, France**

**Filed Jul. 15, 1986, Ser. No. 885,683**
**Claims priority, application France, Jul. 31, 1985, 85 11682**
**Int. Cl.[4] E21B *23/03***
**U.S. Cl. 166—117.5** **19 Claims**



1. A device for positioning a tool head within a selected one of a plurality of flow strings of a wellbore, comprising a branch assembly fixed in site within the wellbore, said branch assemble including a plurality of flow string communicating means, connecting means positioned above said branch asembly and provided with first tubes communicating with said flow string communicating means of the branch assembly, an intermediate assembly in which are housed second tubes converging at one end thereof towards a single inlet provided in a head of said intermediate assembly, said second tubes communicating at the other end thereof with the first tubes of the connecting assembly, a production tube communicating with said intermediate assembly, orientation means at a location within said production tube; and

a servicing tool adapted to be lowered into said production tube, said servicing tool comprising an upper tool-body section and a lower tool-body section, said upper section provided with means for engaging said orientation means, said servicing tool further comprising means pivotally connected to said lower body section for receiving a tool head, means also connected to said lower body section for pivoting said receiving means in a direction relative to said lower body section and means for selectively adjusting angular relationship between said upper and lower sections so that upon engagement of said upper section with said orientation means, said pivoting direction is angularly aligned with a selected one of said flow string communicating means, said adjusting means including a stud on one of said first and second body sections and a plurality of recesses on the other of said first and second body sections, each recess adapted to receive said stud, said pivoting means including means for urging said receiving means to pivot and means for releasing said urging means, said urging and releasing means carried by said servicing tool.

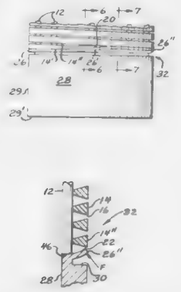
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**4,742,872**

## HELICALLY WRAPPED WIRE SCREEN ASSEMBLY AND FITTING THEREFOR

**Bruce R. Geske, Fridley, Minn., assignor to Signal Environmental Systems Inc., New Brighton, Minn.**

**Filed Aug. 5, 1986, Ser. No. 893,174**
**Int. Cl.[4] E21B *43/08***
**U.S. Cl. 166—231** **2 Claims**



1. An assembly comprising a wire screen assembly and a fitting attached to at least one end of said wire screen assembly, said wire screen assembly including a plurality of closely spaced wire portions defining a plurality of parallel screen slots, said wire portions being rigidly attached to a plurality of underlying support rods and arranged at a non-perpendicular angle to said rods, said wire screen assembly being cut at an angle which is perpendicular to said support rods, said fitting including a body member extending longitudinally in a plane which is at least generally in the same plane as said wire screen assembly and having a flanged end portion integral therewith which is attached to said underlying support rods, said fitting having a groove in one of its planar surfaces which is adjacent to, and defines an inner side wall of said flanged end portion which is generally perpendicular to said one of its planar surfaces, at least a portion of said flange end portion being deformed longitudinally toward said screen assembly and away from said body portion so as to cause the width of any gap between the wire portions of said at least one end of said wire screen assembly and said end fitting to be no greater than the width of the screen slots formed between said wire portions.

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**4,742,873**

## SUBTERRANEAN FLOOD TRACER PROCESS

**Forrest F. Craig, III, Spring, Tex., assignor to Mitchell Energy Corporation, The Woodlands, Tex.**

**Continuation of Ser. No. 731,441, May 6, 1985, abandoned. This application Mar. 11, 1987, Ser. No. 24,768**
**Int. Cl.[4] E21B *47/10***
**U.S. Cl. 166—252** **10 Claims**

1. The method for determining the injection source of carbon dioxide breakthrough at a production well in a subterranean formation penetrated by the production well and at least two injection wells spaced radially about the production well, which comprises:

(a) injecting a carbon dioxide gas mixture into the formation through said injection wells;

(b) injecting a trace quantity of a tracer compound into the formation with said carbon dioxide gas mixture, a different tracer compound being injected in each of said injection wells, wherein the concentration of said tracer compound in said carbon dioxide gas mixture is in the range of 0.5 to 40 parts per billion;

(c) removing an effluent sample periodically from the formation at said production well; and

(d) analyzing said sample to detect the presence of said tracer compound for determining the injection source of said carbon dioxide recovered in said sample.

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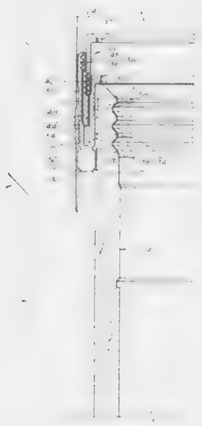


**4,742,874**

## SUBSEA WELLHEAD SEAL ASSEMBLY

**Steven D. Gullion, Houston, Tex., assignor to Cameron Iron Works USA, Inc., Houston, Tex.**

**Filed Apr. 30, 1987, Ser. No. 44,582**
**Int. Cl.[4] E21B *33/035***
**U.S. Cl. 166—348** **4 Claims**



4. A subsea wellhead comprising

a wellhead housing,

a hanger positioned within said housing and having its exterior surface spaced from the interior of the housing,

a sealing assembly positioned between said wellhead housing and said hanger for sealing in the annular space therebetween,

sealing grooves on the interior of said housing,

sealing grooves on the exterior of said hanger and positioned at a level above the housing sealing grooves whereby the sealing assembly seals against the hanger at a level above the level at which it seal against the housing, and wherein said sealing assembly includes

an annular metal seal ring being U-shaped in section with spaced legs and an opening between the legs, and

an energizing ring assembly positioned in the opening of said seal ring including an outer energizing ring having internal lands and grooves,

an inner energizing ring having external lands and grooves mating with the internal lands and grooves of said outer energizing ring,

said inner and outer energizing rings being sized to provide a preselected amount of radial clearance while maintaining the engagement of their lands and grooves.

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**4,742,875**

## MOTOR-DRIVEN HAMMER

**Joseph P. Bell, Tamiami Village, 52 Plunto Cir., N. Fort Myers, Fla. 33903**

**Filed Mar. 19, 1986, Ser. No. 841,261**
**Int. Cl.[4] B25D *1/00***
**U.S. Cl. 173—117** **11 Claims**

1. A hand-held hammer comprising:

a head section and a hammer head mounted for reciprocation in said head section between first and second positions;

a drive motor mounted in said head section and a gear train connected to and driven by said drive motor;

a handle section, supply line means in said handle section connected to said motor for supplying operating energy to said motor, and actuation means connected in said supply line means and including an actuator extending through said handle section for operation by an operator; and

drive coupling means mounted in said head section and coupled between said gear train and said hammer head, said drive coupling measn including a cam and cam follower arrangement for moving said hammer head in a first direction and a spring engaging said hammer head to store energy during movement of said hammer head in said first direction and to release the stored energy when said hammer head reaches its first pposition and drive the hammer head in the second direction,



said cam and cam follower arrangement comprising a cam mounted for rotation by said gear train, said cam including circumferentially-spaced lobes and a peripheral groove, and a cam follower mounted on said hammer head and shaped complemental and biased by said spring to be received in said groove.

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**4,742,876**

## SUBMARINE DRILLING DEVICE

**Hervé Barthelemy, Croissy; Karl Bollinger, Rueil; Michel Brochier, Palaiseau; Maurice Gau, Maurepas, and Yves Legendre, Bazoches les Bray, all of France, assignors to Soletanche, Nanterre, France**

**Filed Oct. 9, 1986, Ser. No. 917,453**
**Claims priority, application France, Oct. 9, 1985, 85 14939**
**Int. Cl.[4] E21B *7/128***
**U.S. Cl. 175—7** **21 Claims**

1. A device for offshore drilling for foundations, comprising:

a drilling unit including a head (**21**) and a body (**22**) interconnected by at least one hydraulic cylinder (**23**), said body being equipped with at least one cutter (**26**), said unit being further equipped with at least on pump (**29**) for discharging cuttings, and with hydraulic motors (**27, 30**) to drive said cutter and said pump,

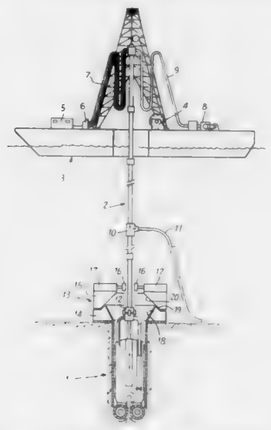
a rigid tubular assembly (**2**) having at least one discharge pipe (**52**) for discharging the cuttings, and pipes (**57**) for feeding said cylinder and said motors with hydraulic fluid,

connecting means (**12**) between the head of said drilling unit and a lower end of said tubular assembly,

support means (**13**), able to be placed onthe seabed in front of the drilling unit, for clamping means (**16**) of said tubular assembly, and

means for suspending the device from a ship (**3**),

means (5) being provided for the furnishing of hydraulic fluid, and connection pipes being provided between said



fluid-furnishing means and an upper end of said tubular assembly.

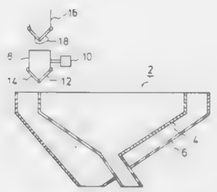
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**4,742,877**

## COMBINATION WEIGHING METHOD

**Shozo Kawanishi, Kobe, Japan, assignor to Yamato Scale Company, Limited, Akashi, Japan**

**Filed Dec. 22, 1986, Ser. No. 944,877**
**Claims priority, application Japan, Apr. 25, 1986, 61-97408**
**Int. Cl.[4] G01G** *19/22*
**U.S. Cl. 177—1** **6 Claims**



**1**. A combination weighing method for successively selecting from a plurality of combinations of weight values of a plurality of product batches such combinations whose total weight values fall within a predetermined range and are as near as possible to a predetermined value, characterized by the steps of selecting from said plurality of weight values a plurality of combinations having their total weight values within said predetermined range, and then selecting from said plurality of selected combinations a pair of combinations having no product batch in common, and having a sum of their total weight values closest to twice said predetermined value.

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**4,742,878**

## WEIGHING MODULE

**Gerald E. Freeman, Darien, and Seymour Feinland, Stamford, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.**

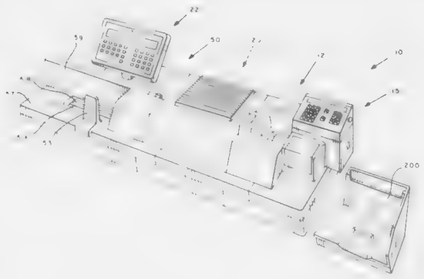
**Filed Sep. 19, 1986, Ser. No. 909,376**
**Int. Cl.[4] G01G** *23/22, 19/00*
**U.S. Cl. 177—25** **12 Claims**

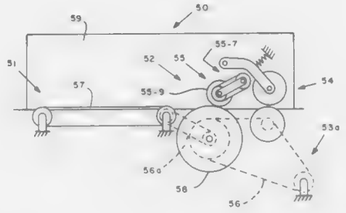
**1**. A weighing module for use in a mailing system for mixed weight mail comprising:

(a) transducer means for producing electrical signals indicative of the vertical forces applied to said weighing module;

(b) processing means for receiving said electrical signals, determining the weight of mail pieces in accordance with said signals and determining the appropriate postage amounts for said mail pieces in accord with said weight, and for transmitting said postage amounts to a postage meter.

(c) transport means for simultaneously transporting said mail pieces onto said weighing module from a feeder module for weighing and for transporting said mail pieces off of





said weighing module for metering after said transmitting of said postage amounts; and,

(d) control means for controlling said transport means, said control means

(d1) energizing said transport means to transport said mail pieces off of said weighing module after said weighing;

(d2) transmitting a signal to said feeder module to feed the next of said mail pieces onto said transport means; and

(d3) transporting said next of said mail pieces on said weighing module and then deenergizing said transport means to halt said next of said mail pieces for weighing.

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**4,742,879**

## APPARATUS FOR MEASURING QUANTITIES OF FIBER FED TO A TEXTILE MACHINE

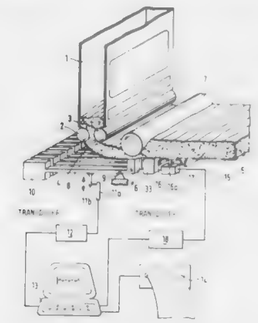
**Ferdinand Leifeld, Kempen, Fed. Rep. of Germany, assignor to Trützschler GmbH & Co. KG, Monchen-Gladbach, Fed. Rep. of Germany**

**Filed Sep. 26, 1986, Ser. No. 911,919**
**Claims priority, application Fed. Rep. of Germany, Oct. 1, 1985, 3534933**
**Int. Cl.[4] G01G** *19/52, 13/04*
**U.S. Cl. 177—50** **5 Claims**

**1**. In an apparatus for measuring a travelling fiber lap prior to introduction thereof into a fiber processing textile machine; a first direction being parallel to a travelling direction of the fiber lap and a second direction being perpendicular to said first direction; said fiber lap having a width being parallel to said second direction; thickness measuring means extending parallel to said second direction for mechanically detecting thickness fluctuations of said fiber lap at a plurality of locations



along the width thereof; first transducer means connected to said thickness measuring means for converting mechanical signals of said thickness measuring means into electric signals representing said thickness fluctuations; computer means connected to said first transducer means for receiving the electric signals from said first transducer means and display means connected to an output of said computer means; the improvement comprising weighing means for continuously determin-



ing the weight of the travelling fiber lap; second transducer means connected to said weighing means and to said computer means for applying thereto signals representing the momentary weight of the fiber lap passing through said weighing means; a first fiber lap advancing means situated upstream of said weighing means as viewed in said first direction for advancing the fiber lap to said weighing means; and a second fiber lap advancing means situated downstream of said weighing means for withdrawing said fiber lap from said weighing means.

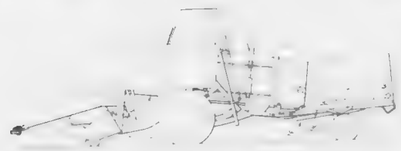
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**4,742,880**

## METHOD AND APPARATUS FOR DETERMINING THE WEIGHT OF BALES ISSUING FROM A CROP BALER

**Thomas G. Schrag, Hesston, Kans.; Charles F. Hood, and Scott A. Morton, both of Ranchester, Wyo., assignors to Hesston Corporation, Hesston, Kans.**

**Filed Apr. 15, 1987, Ser. No. 38,610**
**Int. Cl.[4] G01G** *19/08, 19/40*
**U.S. Cl. 177—136** **10 Claims**



**6**. In combination with a mobile crop baler which produces crop bales as it advances across a field of crops, a system for weighing bales produced by said baler comprising:

a bale-receiving structure coupled with said baler for receiving bales discharged from said baler, said structure including

an electronic scale for receiving a bale thereon and for producing and transmitting a scale signal indicative of the weight of said bale, and

means for positioning said bale on said scale;

a computer operably coupled with said scale for receiving and processing said scale signal and for producing and transmitting a display signal indicative of said bale weight; and

a display panel operably coupled with said computer for receiving said display signal and for producing a visual representation indicative of said bale weight in response to reception of said display signal.

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**4,742,881**

## RADIATOR ATTACHING APPARATUS

**Yuji Kawaguchi, Tokyo; Shinji Chizaki, Wako, and Yoshimasa Misonow, Higashikurume, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 30, 1986, Ser. No. 857,284**
**Claims priority, application Japan, Apr. 30, 1985, 60-63162[U]; Nov. 5, 1985, 60-169154[U]**
**Int. Cl.[4] B60K** *5/12*
**U.S. Cl. 180—68.4** **7 Claims**



**1**. A radiator attaching apparatus for attaching a radiator to a vehicle having a bulkhead frame with an upper frame member for interconnecting front end parts of a pair of right and left side frames and a radiator located in a space defined by the upper frame member of the bulkhead frame and the front end parts of the two side frames, said apparatus comprising:

at least one projection extending upwards from the upper surface of the radiator;

at least one opening in the upper frame member at a position corresponding to the projection; and

a resilient support means position in the opening wherein the projection is resiliently retained in the opening by the resilient support means, said resilient support means including

a bracket having an insertion portion and having a flange on an upper portion, and

a resilient member, said resilient member being mounted on said insertion portion, said resilient member resiliently supporting the projection, said flange being bolted to an upper surface of the upper frame member, said insertion portion being freely insertable from the upper surface of the upper frame member into the opening in the upper frame member.

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**4,742,882**

## MOTOR-DRIVEN POWER STEERING DEVICE

**Yasuo Shimizu; Toshitake Kawai, and Mitsutaka Sugino, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 10, 1987, Ser. No. 24,047**
**Claims priority, application Japan, Mar. 12, 1986, 61-36005[U]; Jul. 16, 1986, 61-109122[U]**
**Int. Cl.[4] B62D** *5/04*
**U.S. Cl. 180—79.1** **8 Claims**

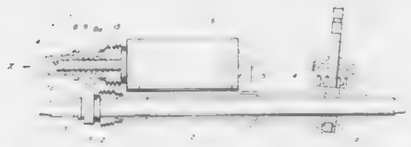
**1**. A motor-driven power steering device comprising:

a rack-and-pinion steering gear mechanism having a housing, and a pinion shaft and a rack shaft which are movably accommodated in said housing, said rack-and-pinion steer-

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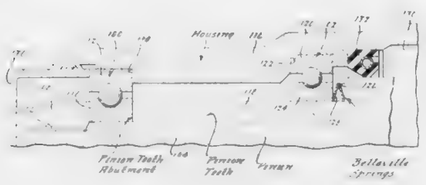
ing gear mechanism being operable to convert rotation of said pinion shaft to axial movement of said rack shaft;
an electric motor mounted on said housing for generating steering assistive torque to be applied to said rack-and-pinion steering gear mechanism;
a screw shaft having a helical groove defined in an outer peripheral surface thereof and extending substantially



parallel to said rack shaft, said screw shaft being rotatably coupled to said motor;
nut means having a helical groove defined in an inner peripheral surface thereof and disposed around said screw shaft, said nut means being non rotatable and coupled to said rack shaft; and
a plurality of balls disposed in and between said helical grooves of said screw shaft and said nut means.

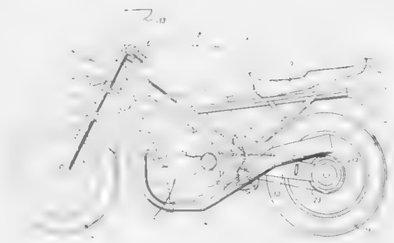
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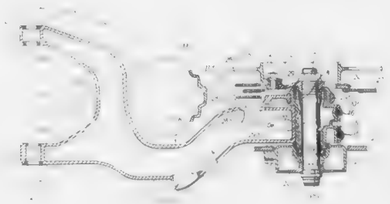
**4,742,883**
**PINION BALL BEARINGS WITH PRELOAD ADJUSTMENT FOR POWER RACK AND PINION STEERING GEARS**
**James J. Duffy, Livonin, Mich., assignor to Ford Motor Company, Dearborn, Mich.**
**Filed Sep. 29, 1986, Ser. No. 912,483**
**Int. Cl.[4] B62D** *3/12*
**U.S. Cl. 180—148** **2 Claims**




1. A power steering rack and pinion steering gear mechanism for controlling dirigible wheels of a vehicle comprising a steering gear housing, a pinion journalled for rotary oscillation in said housing, a rotary valve sleeve connected mechanically to said pinion and rotatably mounted in said housing, an inner valve member in said sleeve connected to a torque input shaft, said inner valve member being mounted for oscillation rotatably with respect to said sleeve when torque is applied to said shaft, a torsion bar connection between said shaft and said pinion, a steering gear rack engageable with said pinion, said means for mounting said pinion in said housing comprising first and second bearings on either side of said rack, each bearing having an inner race and an outer race and bearing elements situated between the races, each outer race engaging a shoulder on said housing and held by said housing in fixed axial position, one with respect to the other, the inner races for said bearing surrounding said pinion, one inner race being situated adjacent a shoulder formed on said pinion, and an adjusting nut threaded on said pinion and engageable with the other inner race whereby axial forces can be applied to said bearings upon adjustment of said nut thereby maintaining said pinion in concentric relationship with respect to said sleeve.

**4,742,884**
**BRAKE DEVICE FOR A MOTORCYCLE**
**Yoshimi Ishikawa, Tokyo, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**
**Filed Jul. 30, 1986, Ser. No. 891,743**
**Claims priority, application Japan, Jul. 30, 1985, 60-168387**
**Int. Cl.[4] B60G** *7/02*
**U.S. Cl. 180—219** **4 Claims**





1. A brake device for a motorcycle, comprising
a rear swing arm, said rear swing arm being hollow and having two sidewalls spaced apart in defining the hollow interior;
a cantilevered rear axle extending from said arm;
a wheel hub rotatably mounted on said axle;
a brake located between said arm and said wheel hub;
an air inlet through one of said vertical sidewalls on a side of said arm opposite to said brake; and
an air outlet through the other said side wall adjacent said brake for cooling thereof.

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**4,742,885**
**FORK STABILIZER FOR MOTORCYCLE**
**Kelly Tidwell, 5842 McFadden suite 0, Huntington Beach, Calif. 92649**
**Filed Jun. 4, 1987, Ser. No. 58,170**
**Int. Cl.[4] B62K** *19/24*
**U.S. Cl. 180—219** **4 Claims**

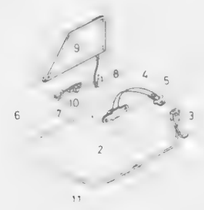


1. A fork stabilizer for the front-end fork assembly of a motorcycle of the type having brackets connected adjacent to the upper ends of the bottom case prongs of the fork assembly, each bracket having a substantially flat upper face substantially parallel to the corresponding face of the other bracket with each bracket having two bracket mounting holes through the face thereof collectively arranged in a predetermined pattern, said fork stabilizer comprising;
an elongate member comprised of unitary metallic material having a substantially solid cross-sectional area, said elongate member having first and second substantially coplanar mounting surfaces adjacent each end thereof, each mounting surface for positioning flat against said upper faces of said fork brackets, said elongate member having a pair of stabilizer mounting holes therethrough adjacent each end thereof and passing through a respective mounting surface, said stabilizer mounting holes being arranged in said predetermined pattern and having a diameter to provide a snug fit with mounting bolts for passing therethrough into the brackets of the fork assembly, said elongate member having first and second ends accurately proportioned and spaced to fit closely between and partially capture the upper ends of the bottom case prongs of the front-end fork assembly of the motorcycle,
whereby the bottom case groups are maintained substantially parallel during braking, turning and other distributing influences by the rigidity of the fork stabilizer in torsion, the entrapment of the upper ends of the prongs of the bottom cases by the fork stabilizer and by the fastening of the fork stabilizer to the brackets with bolts which prevent slippage with respect thereto to prevent the upper ends of the bottom case prongs from at least partially slipping out of the fork stabilizer ends.



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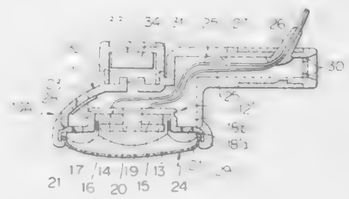
**4,742,886**
**SEAT BELT APPARATUS**
**Yoshimi Sato, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan**
**Filed Feb. 17, 1987, Ser. No. 15,700**
**Claims priority, application Japan, Feb. 17, 1986, 61-30631; Feb. 27, 1986, 61-40168**
**Int. Cl.[4] B60R** *21/10*
**U.S. Cl. 180—268** **4 Claims**



1. A seat belt apparatus for a transportation device, the transportation device having a door with a handle, a locking device and a linking rod operatively linking the handle with the locking device, comprising:
a tongue secureable on one end of a seat belt;
buckle means engageable with the tongue;
means for releasing the tongue from engagement with the buckle means in response to opening of the door, the releasing means comprising a sliding member engageable at one end with the linking rod and at another end with the buckle means, the sliding member being adapted to slide in association with movement of the linking rod during opening of the door, whereby the sliding member operates the buckle means to release the tongue; and
means for preventing the releasing means from releasing the tongue from engagement with the buckle means when the transportation device accelerates or decelerates, comprising:
a pawl adapted to pivot, in response to acceleration or deceleration of the transportation device, about an axis which is transverse to the direction of movement of the transportation device,
an actuator for interconnecting the pawl and the sliding member, the actuator having one end biased in contact with the pawl and being adapted to move the sliding member out of engagement with the linking rod when the pawl pivots in response to acceleration or deceleration, whereby the sliding member does not slide in association with movement of the linking rod during acceleration or deceleration of the transportation device.

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**4,742,887**
**OPEN-AIR TYPE EARPHONE**
**Makoto Yamagishi, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan**
**Filed Feb. 12, 1987, Ser. No. 13,939**
**Claims priority, application Japan, Feb. 28, 1986, 61-28490[U]**
**Int. Cl.[4] H04R** *25/00*
**U.S. Cl. 181—129** **4 Claims**

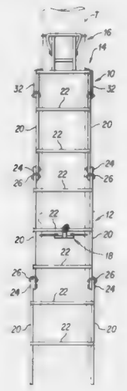


1. An open-air type earphone comprising:
a driver unit including means defining a magnetic circuit, and a diaphragm, and voice coil which form a vibration system:
a housing containing said driver unit and having a sound generation opening to the atmosphere in front of said driver unit, and at least another opening to the atmosphere from said housing behind said driver unit and which has acoustic resistance material extending thereacross;
an elongated duct extending from said housing behind said driver unit and communicating, at one end, with the interior of said housing and, at its other end, with the atmosphere to provide an equivalent mass which is in parallel with an acoustic resistance of said acoustic resistance material and which is effective for reducing the lowest resonance frequency of the earphone;
a casing attached to said housing behind said driver unit; and
means defining a pipe communicating, at its ends, with said housing and said casing, respectively, and having a diameter and a length longer than said diameter of the pipe, a resonant frequency of a resonant circuit constituted by an equivalent mass formed by said pipe and a compliance formed by said casing being selected to be near to a resonant frequency which is determined by a mass of said vibration system and a compliance of said housing in back of said driver unit as to suppress a relatively high frequency peak that would otherwise be formed in the frequency characteristic of the earphone by said reducing of the lowest resonance frequency of the earphone.

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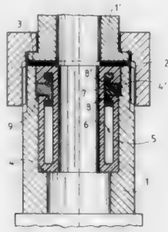
**4,742,888**
**FOLDING LADDER STAND**
**Joseph A. Amacker, Rte. 3, Box 41, Tallulah, La. 71282**
**Filed Dec. 3, 1986, Ser. No. 937,491**
**Int. Cl.[4] A45F** *3/26;* **A01M** *31/02*
**U.S. Cl. 182—116** **22 Claims**



1. A manually-portable combination foldable ladder and tree stand, comprising:
a platform connected to the upper end of said foldable ladder;
means connected to said foldable ladder for attaching said foldable ladder to a tree;
said ladder having a plurality of foldable stages; and
means for folding said combination foldable ladder and tree stand relatively flat so that each of said stages and said platform are in the same plane for transportation of said combination foldable ladder and tree stand.

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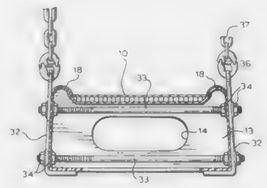
**4,742,889**
**PHONIC DEADENING DEVICE FOR CONDUIT OF SANITARY INSTALLATION**
**Jean-Jacques Rodriguez, Douvaine, France, assignor to Kugler, Fonderie et Robinetterie S.A., Geneva, Switzerland**
**Filed Dec. 22, 1986, Ser. No. 943,320**
**Claims priority, application Switzerland, Feb. 11, 1986, 00547/86**
**Int. Cl.[4] F16L** *55/02*
**U.S. Cl. 181—233** **13 Claims**



1. A device for deadening noise generated by passage of fluid through a tubular conduit, comprising: a tubular elastic element having first and second ends and a central axial opening passing therethrough, an inner cylindrical wall defining said axial opening, an outer cylindrical wall spaced from an concentric and coextensive with said inner wall, first and second annular end elements each sealingly interconnecting said inner and outer cylindrical walls at said first and second ends, respectively, thereby to define an annular air space delimited by said first and second ends and said inner and outer cylindrical walls, said outer cylindrical wall being interrupted, intermediate said first and second ends, by a circumferential, radially inwardly extending annular opening communicating with said annular airspace; and a rigid annular sealing member concentrically confined in said annular airspace, said sealing member having a radially outwardly extending portion disposed in said annular opening.

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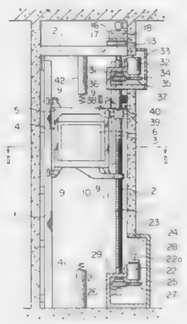
**4,742,890**
**WORK PLATFORM**
**Jakob de Blauw, Don Mills, Canada, assignor to Protective Plastics Limited, Scarborough, Canada**
**Filed Oct. 22, 1987, Ser. No. 111,802**
**Int. Cl.[4] E04G** *5/08*
**U.S. Cl. 182—222** **18 Claims**



1. A work platform comprising a moulded polymeric resin fibre-reinforced generally channel-section shell having a lip flange extending inwardly from each channel side, and comprising tensile elongation resisting reinforcement comprising fibres extending longitudinally at least along marginal zones of the channel base and of the lip flanges adjacent the channel sides, and said channel sides comprising fibrous reinforcement resisting tensile elongation of said sides in the direction perpendicular to said marginal zones, whereby said platform is rendered substantially rigid to bending about axes transverse of said channel structure.

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**4,742,891**
**ELEVATOR SYSTEM**
**Kazushi Kunii, and Terumi Hirabayashi, both of Inazawa, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan**
**Filed Sep. 3, 1986, Ser. No. 903,400**
**Claims priority, application Japan, Sep. 5, 1985, 60-196202; Dec. 5, 1985, 60-273962**
**Int. Cl.[4] B66B** *11/04*
**U.S. Cl. 187—25** **13 Claims**



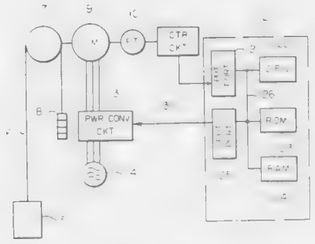
1. An elevator system comprising:
a hoistway;
guide rail means vertically disposed in said hoistway;



an elevator car accommodated in said hoistway and movable in the vertical direction along said guide rail means;
a screw shaft vertically disposed in said hoistway and having a screw thread formed on the outer peripheral surface thereof;
a nut fixedly mounted on said elevator car and adapted to be threadedly engaged with said screw shaft;
an upper and a lower driving means disposed at upper and lower portions of said hoistway for driving upper and lower ends of said screw shaft at the same rotational speed in the same rotational direction such that said nut is moved along said screw shaft thereby to move said elevator car;
means for supporting said screw shaft for displacement within a limited range and preventing vertical displacement beyond said limited range such that, should said upper and lower driving means continue to drive said screw shaft when the upward or downward movement of the car is prevented, only tensile forces act on said screw shaft thereby to prevent buckling; and
means for sensing reaction of said tensile forces acting thereon and for terminating the operation of said driving means actuated by said sensing means to prevent overload.

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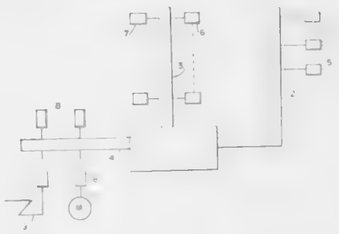
**4,742,892**
**CONTROL APPARATUS FOR ELEVATOR**
**Shigemi Iwata, Inazawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan**
**Filed Mar. 6, 1987, Ser. No. 22,870**
**Claims priority, application Japan, Mar. 7, 1986, 61-49670**
**Int. Cl.[4] B66B** *1/30*
**U.S. Cl. 187—119** **4 Claims**




1. In an elevator system including an induction motor operated under variable-voltage and variable-frequency control by an inverter and a pulse generator means producing a detected speed signal representing rotational frequency of the induction motor, a control apparatus comprising:
(a) compensation means for generating a compensation signal on the basis of an error between a reference speed signal and the detected speed signal,
(b) limit means receiving a compensation signal and producing a slip frequency command signal on the basis of the compensation signal, and comparing the slip frequency command signal with a predetermined reference value so as to provide an output slip frequency command signal with a magnitude not exceeding the reference value, and
(c) current command generation means for generating a current frequency command signal to be delivered to the inverter on the basis of the output slip frequency command signal of said limit means and a rotational frequency signal of said motor.

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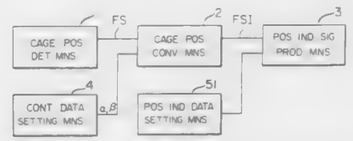
**4,742,893**
**SIGNALLING PROCEDURE FOR A LIFT AND A SIGNALLING SYSTEM**
**Matti Otala, Helsinki; Osmo Ivanto, Hyvinkää; Matti Kähkipuro, Hyvinkää, and Urpo Sten, Hyvinkää, all of Finland, assignors to Elevator GmbH, Baar, Switzerland**
**Filed Apr. 15, 1986, Ser. No. 852,367**
**Int. Cl.[4] B66B** *1/14*
**U.S. Cl. 187—121** **7 Claims**



1. A signalling system for a lift, comprising means for controlling communication including a control system computer and a plurality of individual units of a communication system addressed by the control system computer, said individual units being constituted by call button stations located on each floor or inside the lift car and incorporating the lift call or floor buttons and a desired number of signalling means for indicating the state or position of the lift, each call button station incorporating a micro-processor for control and supervision of the operation of the station and also constituting a communication controller, and all said signalling means being connected via the respective micro-processor to the control system computer by means of digital series loops in such manner that one of the loops connects the devices inside the lift car, while another connects the corresponding devices in the shaft and on each floor, and a third loop provides a connection for external devices.

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**4,742,894**
**APPARATUS FOR CONTROLLING ELEVATOR**
**Hideyo Ujihara, Inazawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan**
**Filed May 6, 1987, Ser. No. 46,427**
**Claims priority, application Japan, May 8, 1986, 61-105556**
**Int. Cl.[4] B66B** *3/02*
**U.S. Cl. 187—136** **9 Claims**




1. An apparatus for controlling an elevator comprising:
control data setting means for setting control data indicative of an environment where the elevator is installed and for generating a control signal representative thereof;
cage position detecting means for detecting position of a cage of the elevator to generate a cage position signal representative thereof;
cage position converter means connected to receive said control signal and said cage position signal for performing a predetermined logical operation to generate a converted cage position signal corresponding to said environment;
position indicator data setting means for setting a position indicator data representing the position of the cage in

response to the converted cage position signal generated by said cage position converter means; and

position indicator signal producing means for producing a position indicator signal on the basis of said converted cage position signal and said position indicator data.

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**4,742,895**

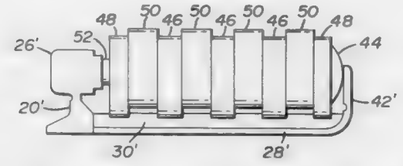
## DISK BRAKE ASSEMBLY

**Lowell D. Bok, Anna, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio**

**Continuation of Ser. No. 874,979, Jun. 16, 1986, abandoned, which is a division of Ser. No. 627,364, Jul. 2, 1964, Pat. No. 4,613,017. This application Sep. 8, 1987, Ser. No. 94,355**

**Int. Cl.⁴ F16D** *55/02, 69/00*

**U.S. Cl. 188—71.7** **4 Claims**




1. A disk brake assembly comrpising a first group of brake disks and a second group of brake disks in axially aligned and interleaved relationship, said disks of said first group being interleaved with said disks of said second group in alternating relationship, each of said disks of said first group and said second group having oppositely disposed wear surfaces, said first group of said disks having a first thickness, said second group of said disks having a second thickness, said first thickness of said first group of said disks being substantially less than said second thickness of said second group of said disks whereby after a predetermined number of brake applications the available wear portions of said first group of said disks are substantially fully worn away at an intermediate overhaul time and the available wear portions of said second group of said disks are not worn away wherein both sides of each of said disks of said first group have available wear portions which are one-half worn compared to the available wear portions of said second group, and both sides of each of said disks of said second group have available wear portions which are not worn whereby said first thickness of said first group of disks is one-half said second thickness of said second group of disks.

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**4,742,896**

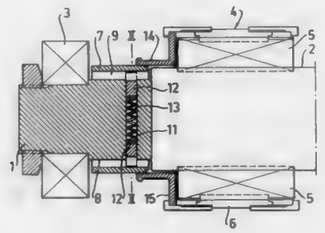
## BRAKE MEANS

**Bo Granbom, 13 Lostigen, S-731 42 Köping, Sweden**

**Filed Jul. 3, 1986, Ser. No. 881,715**

**Int. Cl.⁴ F16D** *63/00*

**U.S. Cl. 188—82.74** **8 Claims**




1. Brake means in a device for converting rotary motion into linear motion by means of a threaded spindle and a member arranged in engagement with the threads thereof, and moving therealong in response to rotation of said spindle, characterized in that the brake means comprises a ring arranged at one end of said spindle for rotation therewith in a first direction and independent rotation therefrom in a second direction, and

a non-rotating collar arranged on the member coaxially with said ring and projecting from said member, the collar coacting telescopically with said ring and radially facing surfaces of the collar and the ring directly engaging each other producing a rotational braking moment sufficient to stop the spindle from rotating in said first direction.

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**4,742,897**

## WHEEL CYLINDER WITH SELF-CONTAINED AUTO-ADJUSTER

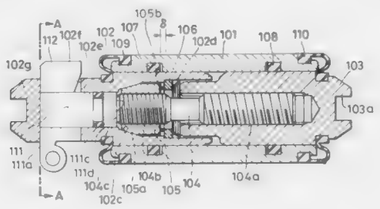
**Hirashita Hiroshi, and Masahiko Uchiyama, both of Saitama, Japan, assignors to Akebono Brake Industry Company, Ltd., Tokyo, Japan**

**Filed Dec. 1, 1986, Ser. No. 936,158**

**Claims priority, application Japan, Nov. 29, 1985, 60-267233; May 29, 1986, 61-122146**

**Int. Cl.⁴ F16D** *65/46*

**U.S. Cl. 188—196 D** **12 Claims**




1. A self-adjusting wheel cylinder for a drum brake including a brake drum and a brake shoe for exerting braking pressure on the drum with a shoe gap formed therebetween, comprising:

(a) cylinder means including an opening therein;

(b) hydraulic piston means including at least one piston slidably mounted in the opening for activating the brake shoe upon movement in one direction, and for releasing the brake shoe upon movement in the other direction; and

(c) multiple adjusting screw means within the cylinder for automatically adjusting the limit of movement of the piston in response to changes in the shoe gap of the brake, the screw means including a spindle having external screw-threads on both ends, said spingle being threadably mounted within the piston to one end thereof and the other end having a pair of multiple drive screws thereon for defining a fixed movement limit of the piston, and nut means for attachment to the multiple drive screws, the nut means being adapted to rotate relative to the spindle when the brake shoe is activated, and the spindle being adapted to rotate relative to the nut means and the piston when the brake shoe is released.

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**4,742,898**

## SHOCK ABSORBER WITH GAS CHARGED RETURN SPRING

**Patrick P. Lee, Orchard Park, N.Y., assignor to Enidine Incorporated, Orchard Park, N.Y.**

**Filed Sep. 17, 1986, Ser. No. 908,170**

**Int. Cl.⁴ F16F** *9/48*

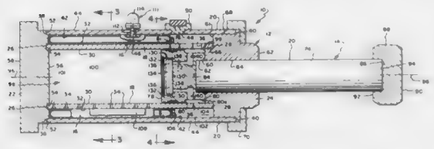
**U.S. Cl. 188—287** **42 Claims**

1. In a shock absorber including housing means defining an elongated cavity for containing hydraulic fluid, an annular cavity surrounding said elongated cavity, and piston means including a head slidably received by said elongate cavity for sliding movement relative to and lengthwise along said elongated cavity and an elongated rod attached to said head, said rod having one end extending from said housing means and movable with said piston head between an extended condition at which a part of said rod extends from said housing means and a retracted condition at which said rod part is retracted within said housing means, the improvement comprising:

means defining a compressible bladder containing fluid under pressure positioned within said annular cavity so as extend along at least a portion of said elongated cavity and leave uncovered a portion of an inner wall of said annular cavity, which uncovered inner wall portion extends along said elongated cavity;

orifice means providing fluid flow communication between said elongated cavity and said annular cavity and located along the path of travel of said piston head and along said uncovered inner wall portion so that as said piston head





slidably moves along within the elongated cavity said piston means progressively registers with said orifice means so that when shock forces act upon said shock absorber said forces move said rod from said extended condition to said retracted condition to progressively close said orifice means and thereby force hydraulic fluid from said elongated cavity into said annular cavity through said orifice means said bladder is forced from an expanded condition to a compressed condition to function as an accumulator and to store energy for returning said rod to said extended condition once forces acting upon said shock absorber are relieved; and

means for spacing said bladder from said orifice means to allow fluid flow through said orifice means into said annular cavity.

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**4,742,899**

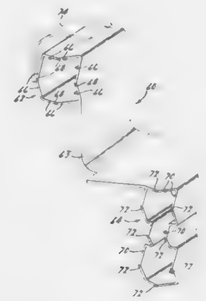
## FIBER REINFORCED TUBULAR COMPONENT

**Peter H. Thornton, Dearborn, Mich., assignor to Ford Motor Company, Dearborn, Mich.**

**Filed May 13, 1985, Ser. No. 733,022**

**Int. Cl.⁴ F16F** *7/12*

**U.S. Cl. 188—377** **25 Claims**



1. A fiber-reinforced plastic tube having at least one substantially planar tube wall comprising axially extending coplanar laminations of fiber-reinforced plastic, wherein at least a portion of the fibers of said coplanar laminations are axially extending fibers of non-oriented material, said planar tube wall having a wall thickness to wall width ratio of at least about 0.02:1, the width of said planar tube wall being measured in a direction substantially perpendicular to said axially extending fibers, said tube being characterized in that one end of said planar tube wall has a bevelled end surface forming at least one apex substantially normal to said coplanar laminations, said bevelled end surface being at an angle of about 5°–40° to a line in the plane of said coplanar laminations and perpendicular to said axially extending fibers thereof.

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**4,742,900**

## CONVERTIBLE SUITCASE TO BE TRANSFORMED INTO A SEATING OR LYING PIECE OF FURNITURE

**Paul Boxhammer, Mauerkircherstrasse 168, 8000 Munich, Fed. Rep. of Germany**

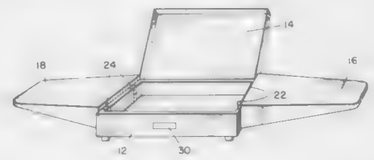
**PCT No. PCT/EP86/00655, § 371 Date Jul. 10, 1987, § 102(e) Date Jul. 10, 1987, PCT Pub. No. WO87/02901, PCT Pub. Date May 21, 1987**

**PCT Filed Nov. 13, 1986, Ser. No. 90,587**

**Claims priority, application Fed. Rep. of Germany, Nov. 14, 1985, 3540436**

**Int. Cl.⁴ A47C** *17/82, 19/22;* **A45F** *4/00*

**U.S. Cl. 190—2** **2 Claims**




1. A convertible suitcase (**10**) to be transformed into a seating or lying piece of furniture, comprising two hingedly connected suitcase shells (**12, 14**) which can be locked in folded condition and at least one head or foot portion (**16,18**) housed in the suitcase (**10**) and pivotably connected to one of the suitcase shells (**12,14**) so that it can be unfolded when the suitcase (**10**) is open, characterized in that

- the two suitcase shells (**12,14**) are adapted to be folded together and locked even if the head and/or foot portion (**16,18**) is unfolded, with the suitcase (**10**) closed, the outside surface of one suitcase shell (**14**) remote from the other suitcase shell (**12**) presents a seating or lying surface (**20**), and
- the unfolded head and/or foot portion (**16,18**) is prevented from being swung back all the way to the lying surface (**20**) by an abutment surface (**26,28**) formed at one of the suitcase shells (**12,14**).

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**4,742,901**

## DEVICE FOR ADJUSTING A CLEARANCE OF A TWIN CLUTCH

**Hiroshi Takeuchi, Higashi, and Koji Kajitani, Neyagawa, both of Japan, assignors to Kabushiki Kaisha Daikin Seisakusho, Osaka, Japan**

**Filed Mar. 2, 1987, Ser. No. 20,977**

**Claims priority, application Japan, Mar. 7, 1986, 61-33399**

**Int. Cl.⁴ F16D** *13/75*

**U.S. Cl. 192—70.25** **1 Claim**

1. A device for adjusting a clearance of a twin clutch comprising;

a flywheel;

a pressure plate;

two clutch disks interposed between the flywheel and the pressure plate;

an intermediate plate disposed between the clutch disks and provided with radial projections;

a support member opposed to he flywheel with the intermediate plate therebetween;

stopper pins extending through holes formed in said projections in an axial direction of the clutch, respectively; and

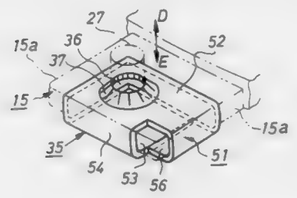
stopper springs fixed to said projections and engaged said stopper pins for allowing movement of said stopper pins

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toward said support member relatively to said intermediate plate and for preventing movement of said stopper pins in the opposite direction relative to said intermediate plate,

each of said stopper springs being made of bent metal sheet and having two end portions and a radially outer portion integrally formed between said two end portions, each of said end portions covering end surfaces of the projection facing in the axial direction and being provided with an aperture, through which said stopper pin is inserted, and




radial lips divided by radial slits extending from the inner periphery of said aperture, said radial lips projecting toward said support member and engaging the stopper pin for preventing said movement of said stopper pins in said opposite direction, each of said springs further includes a side portion integrally formed with and bent relatively to one of said end portions and having a bent end for engaging the end surface of the projection covered by the other of said end portions for preventing axial movement and rattle of said stopper spring.

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**4,742,902**

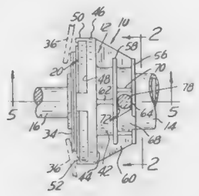
**CLUTCH RELEASE BEARING AND BEARING CARRIER ASSEMBLY**

**Keith V. Leigh-Monstevens, Troy, Mich., assignor to Automotive Products plc, Warwickshire, England**

**Filed Mar. 1, 1984, Ser. No. 585,123**

**Int. Cl.[4] F16D *23/14***

**U.S. Cl. 192—98** **6 Claims**




**1**. A clutch release bearing and bearing carrier assembly comprising a single piece carrier member in the form of a tubular body slidably disposable over a tubular support member, an integral radial flange at an end of said tubular body, said radial flange having an integral edge rim, cut-out portions in said rim forming a plurality of longitudinally projecting retaining resilient lugs between said cut-out portions each having an inwardly radially directed retaining shoulder, and a bearing member at least partially enclosed in a generally annular housing, said housing having a cylindrical wall engaged with said flange, whereby said bearing member is retained within said rim by snap fit behind the retaining shoulder of each of said lubs, and means coupling said carrier member to a clutch control member comprising a peripheral groove at the other end of said tubular body, a projecting member of said clutch control member engaged in said groove for displacement of said tubular body longitudinally along said tubular support member, wherein said groove is defined between a pair of substantially parallel radial flanges and said member projecting from said clutch control member comprises a pin radially engaged between said radiai flanges, and further comprising snap fit means for holding said pin in a predetermined position between said radial flanges defining said groove, a longitudinal abutment wall disposed between said radial flanges defining said groove, at least one ridge projecting from one of said radial flanges defining said groove for locally reducing the width of said groove to less than the diameter of said pin, at least one of said radial flanges defining said groove being elastically deflectable for allowing said pin to be displaced through said groove to an operative position whereby said pin is peripherally engaged with said longitudinal abutment wall.

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**4,742,903**

**DEVICE FOR COIN CHECKING**

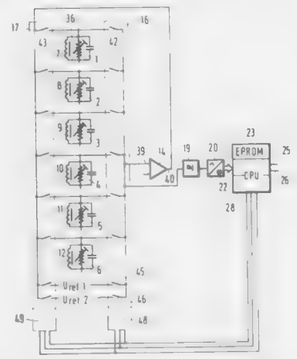
**Bernhard Trummer, Bern, Switzerland, assignor to Autelca AG., Gümligen, Switzerland**

**Filed Jun. 19, 1986, Ser. No. 876,078**

**Claims priority, application Switzerland, Jul. 26, 1985, 3254/85**

**Int. Cl.[4] G07D *5/08***

**U.S. Cl. 194—317** **20 Claims**




**1**. Device for coin checking, characterized by

a coin guide (**31**, **32**) for the coins to be tested;

a plurality of oscillator tank circuits (**1–6**) each having a sensing coil (**7–12**);

said sensing coils (**7–12**) of said tank circuits (**1–6**) are shaped and arranged along said guide (**31–32**), so that different sensing coils are sequentially influenced in dependence of different characteristics of the coin to be tested, when it travels along said guide (**31**, **32**);

an amplifier (**14**);

a switching unit (**16**, **17**), by means of which each of the plurality of oscillator tank circuits (**1–6**) can be connected individually to said amplifier (**14**) for the formation of an oscillator;

a control unit (**28**) controlling said switching unit (**16**, **17**) for sequentially connecting said tank circuits (**1–6**) to said amplifier (**14**);

testing means (**19**) responsive to the oscillator oscillations which (**19**) yields test signals (**P1**, **P2**, **d1**, **d2**, **L**, **S**) for different coin characteristics, corresponding to the influence exerted by the coin to be tested on the sensing coil (**7–12**) of the respective oscillator tank circuit of said plurality of oscillator tank circuits (**1–6**);

a memory (**23**) in which criteria are stored for each of the test signals as obtained with the coin types to be accepted;

and an evaluating unit (**22**) connected to said testing means (**19**) and said memory (**23**) for comparing these test signals with these criteria stored in said memory (**23**), and delivering a coin acceptance signal, in case all test signals obtained for the various coin characteristics of one and the same coin to be tested, correspond to the criteria stored for these characteristics of one and the same acceptable coin.



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**4,742,904**

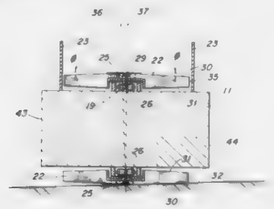
**METHOD AND APPARATUS FOR IMPROVING THE TURNING CAPABILITY OF AN ARTICULATED TRAMMING CONVEYOR**

**Thomas R. Miller, Waynesburg, Pa., assignor to Consolidation Coal Company, Pittsburgh, Pa.**

**Filed Oct. 1, 1986, Ser. No. 914,101**

**Int. Cl.[4] B65G *19/28***

**U.S. Cl. 198—735** **3 Claims**




**1**. An improved apparatus for turning an articulated, self-propelled conveyor adapted either for conveying materials or for movement along the surface of the earth including a plurality of segment means pivotally joined to form an elongated housing which has a longitudinal axis and which has an upper and lower surface, jack means attached to said segment means for selectively lifting or lowering said elongated housing and a conveying means having spaced transverse flights, said conveying means movably attached to said upper and lower surface with means coupling said conveying means from said upper to said lower surface such that when said jack means lowers said housing means to said surface of the earth said conveyor means when moved will propel said housing means along the surface of the earth, and when said jack means raises said housing means, movement of said conveying means will transfer material longitudinally along the upper surface of said elongated housing, an improvement in propelling a portion of said elongated housing in a change of direction to said longitudinal axis comprising:

means to permit, on said surface of said flights in contact with said surface of the earth, tilting the portion of said plurality of segment means negotiating said change in direction, said tilt being toward the radius of said change in direction and wherein each of said plurality of segment means is configured and said each jack means is mounted on said segment means when retracted, to provide clearance between said segment means and said retracted jack means with said surface of the earth as each of said segment means is tilted.

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**4,742,905**

**POWERED ACCUMULATION CONVEYOR**

**Gregory C. Beers, 1504 Verdure Cir., Birmingham, Ala. 35216**

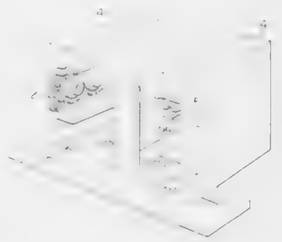
**Filed Oct. 16, 1986, Ser. No. 919,362**

**Int. Cl.[4] B65G *17/24***

**U.S. Cl. 198—779** **1 Claim**

**1**. A workpiece conveyor system for transporting circuit boards or the like comprising:

two laterally spaced rail means having upper portions with opposed downwardly converging sides to permit ease of article loading of the conveyor system, each said rail means is formed of extruded aluminum, each said rail means having two extruded wear tracks connected to the middle of said rail means in vertical alignment with each other, each said rail means having a third extruded wear track connected to the lower portion of said rail means, each of said wear tracks are connected to said rail means by dove tail type connections; an endless roller chain mounted for movement on its conveying run between the two vertically aligned wear tracks which are mounted on the middle portion of each of said rail means and having its return run guided by the third wear track mounted on the lower portion of said rail means, each said endless roller chain having a plurality of pins which extend toward the opposite endless roller chain spaced along the length of said roller chain; each extended pin having a brass sleeve bearing mounted thereon, said brass sleeve freely rotatably mounting a static conducting injection molded article supporting wheel, said wheel is tapered to reduce in diameter in the axial direction away from its supporting endless roller chain; means for driving said endless roller chains so that said wheels will support and convey the article unless the article is stopped by some external force at which time said supporting wheels will rotate relative to the article as the pass under the article while said roller chains are driven.



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**4,742,906**

**BEND SEGMENT FOR THE TRACK OF A CHAIN CONVEYOR**

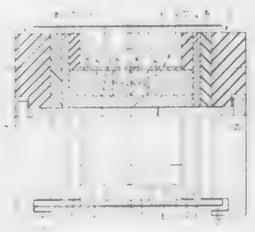
**Jacobus J. Wallaart, 's-Gravenzande, Netherlands, assignor to M.C.C. Nederland B.V., 's-Gravenzande, Netherlands**

**Filed Jul. 1, 1986, Ser. No. 880,826**

**Claims priority, application Netherlands, Jul. 5, 1985, 8501928**

**Int. Cl.[4] B65G *23/18***

**U.S. Cl. 198—805** **6 Claims**



**1**. A bend segment for a chain conveyor comprising a chain movable over a track including one or more bends, said chain being composed of links of a magnetizable material having a substantially rectangular load bearing surface, the successive links in the chain being pivoted together, said bend segment including means for producing a magnetic field to retain the load bearing surface of the links flat on the track, characterized in that the bend segment comprises a pair of rails of a magnetizable material; elongated interconnecting means for the rails, said means being positioned at predetermined distances between both rails; and a synthetic plastics guide strip against the inside of the rail in at least the inner bend of the bend segment; and in that the means for producing a magnetic field comprise annular magnets placed between the rails, around said inter-

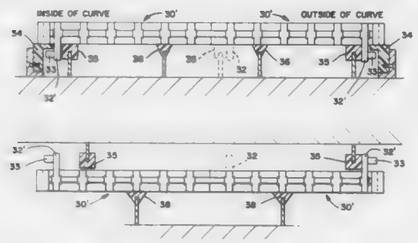
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connecting means, with the magnetic lines of force of the magnetic field produced by the magnets extending through the rails to attract the chain links against the rails.

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**4,742,907**
**PLASTIC CONVEYOR BELT**
**Karl V. Palmaer, Folsom, Calif., assignor to KVP Systems, Inc., Rancho Cordova, Calif.**
**Continuation of Ser. No. 556,938, Dec. 1, 1983, abandoned, which is a continuation-in-part of Ser. No. 383,745, Jun. 1, 1982, abandoned. This application Sep. 5, 1986, Ser. No. 904,773**
**Int. Cl.[4] B65G** *21/16*
**U.S. Cl. 198—831** **6 Claims**




1. An endless integrally driven plastic conveyor belt installation including a curved load bearing flight or section, a correspondingly curved return flight or section and a support structure interposed between said load bearing flight and said return flight, said integrally driven plastic conveyor belt comprising a plurality of similar interdispsersed elongated molded plastic bodies and a plurality of cylindrical rods, each of said plurality of elongated bodies having:

a plurality of first equally spaced projections extending integrally from one side of said elongated body, each of said first projections having an aperture therethrough transversely of said projection, said apertures through said first projections being coaxial with each other;

a plurality of second equally spaced projections extending integrally from the opposite side of said elongated body in symmetric interdigital location with respect to said plurality of first projections, each of said second plurality of projections having a slot therethrough transversely thereof, said slots through said second plurality of projections providing rotational axes in coaxial alignment at the ends thereof remote from said elongated body;

a pair of guide members, one formed integrally with one of said second plurality of projections at each end of said elongated body, each said guide member comprising a plate extending transversely of said elongated body and downwardly from the nonload bearing surface thereof in position to laterally engage a stationary surface below the conveyor belt;

said plurality of first projections of each of said plurality of elongated bodies being interdigited with said plurality of second projections of a differnet one of said plurality of elongated bodies with said apertures and slots respectively through said first and second pluralities of projections in alignment and with a different one of said plurality of rods received therethrough to form said endless integrally driven plastic conveyor belt;

said support structure comprising:

a plurality of wearstrip means engaging and supporting the under side of said load bearing flight of said conveyor belt including a first supporting wearstrip means positioned so that the inside surface of the guide member at the outside of a curve will abut said stationary surface of the first wearstrip means adjacent thereto with the other of said pair of guide members of each elongated body being free of contact with the stationary surface of the other supporting wearstrip means, whereby the lateral position of each elongated body of the conveyor belt is maintained as the belt travels through the curve and the ends of the elongated bodies at the inside of the curve are allowed to freely cluster together without opposing frictional forces.

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**4,742,908**
**BAG WITH SOAKER PAD**
**John S. Thomas, Jr., Langhorne, and John R. Carr, Phoenixville, both of Pa., assignors to Paramount Packaging Corporation, Chalfont, Pa.**
**Continuation-in-part of Ser. No. 677,669, Dec. 3, 1984, Pat. No. 4,619,361, which is a continuation-in-part of Ser. No. 499,586, May 31, 1983. This application May 27, 1986, Ser. No. 867,354**
**The portion of the term of this patent subsequent to Oct. 28, 2003, has been disclaimed.**
**Int. Cl.[4] B65D** *81/26, 81/22*
**U.S. Cl. 206—204** **14 Claims**



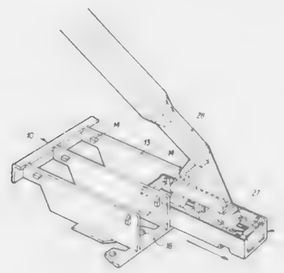

1. A bag for goods comprising a front and rear panel of a thermoplastic material, said panels being integral at a fold line to form a closed end of the bag, the bag being open at the other end to facilitate loading of the bag, pad means for absorbing fluids, said pad means including a non-stick pervious layer, an absorbent layer and a securing means, said absorbent layer being between said non-stick layer and said securing means, said pad means being joined together, said absorbent layer being exposed along an edge of the said pad means, said pad means having a fold line juxtaposed to said first mentioned fold line, so that a first portion of the pad means overlays a portion of the front panel and a second portion of the pad means overlays a portion of the rear panel, said pad means being secured adjacent an end thereof to said front panel, and said second portion of the pad means being secured adjacent an end thereof to said rear panel.

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**4,742,909**
**SHAVING CARTRIDGE RETAINING CASINGS AND STORAGE TRAY THEREFOR**
**Domenic V. Apprille, Jr., 70 Decatur St., Arlington, Mass. 02174; Michael J. Gray, 20 Windward Way, Duxbury, Mass. 02332; Chester F. Jacobson, 10 Pinecone La., Southboro, Mass. 01772, and Ronald P. Weston, 83 Blueberry La., Reading, Mass. 01867**
**Filed May 12, 1987, Ser. No. 48,825**
**Int. Cl.[4] B65D** *83/10*
**U.S. Cl. 206—356** **5 Claims**

1. The combination of a plurality of razor shaving blade assembly units, retaining casings therefor and a flexible plastic storage tray for storing a plurality of said casings in side by side relationship thereon, each of said casings being adapted to retain a unitary shaving blade assembly unit, each shaving blade assembly unit comprising at least one blade and forming a head unit to which the blade is permanently secured and which provides a guard surface, said head unit being detachably engageable with a safety razor handle, each said casing defining a single chamber in which a single head unit may be retained, structure means in each said casing for retaining said head unit, therein against accidental removal in such a manner that a cutting edge of said blade is protected against damage and wherein said head unit is engageable by said handle while said head unit is still within said casing, each said head unit when engaged with said handle being withdrawable from the top of its casing by rocking said handle, said tray comprising slide means securing structure to secure each individual casing

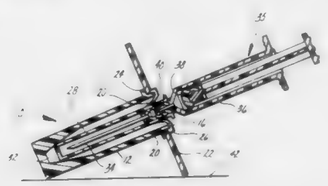




in said tray in said side-by-side relationship, and said tray and slide means being so configured as to permit each of said casings to be slid endwise out of said tray transversely thereof by said handle engaged with said razor head unit such that with said handle engaged with said head an operator may remove said blade unit from said casing or may alternatively slidably remove said blade unit and casing from said tray.

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**4,742,910**
**NEEDLE SHEATH HOLDER**
**Charles R. Staebler, 11111 Shadywood, Brighton, Mich. 48116**
**Filed Jun. 22, 1987, Ser. No. 64,591**
**Int. Cl.[4] A61M** *5/32;* **B65D** *85/20*
**U.S. Cl. 206—365** **5 Claims**



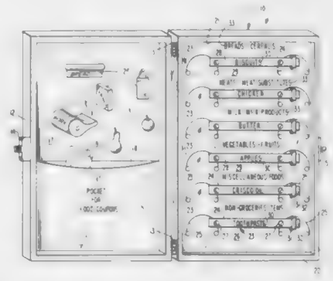

1. For use with a medical needle assembly which includes a base and a needle mounted thereon,

wherein a hollow needle sheath member is telescoped over said needle and frictionally engaged with said base when said needle is not being used as a conduit for fluid, a needle shaft holder comprising a hollow barrel member having an open upper end, a shield member on said barrel member spaced from said open end, and gripper members in said open end shaped to frictionally engage a needle sheath member inserted into said barrel member through said open end so as to grip and retain the needle sheath member in said barrel member.

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**4,742,911**
**GROCERY LIST DEVICE**
**Roosevelt R. Manuel, Rte. 4, Graham Rd., Gray, Ga. 31032**
**Filed Mar. 26, 1987, Ser. No. 30,701**
**Int. Cl.[4] B65D** *85/00*
**U.S. Cl. 206—425** **2 Claims**

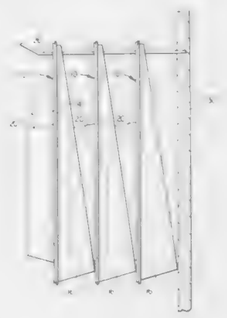
1. A grocery list device, comprising, in combination, a shallow box, a hinged cover on a top thereof for selectively enclosing an interior thereof, a pocket on an inner side of said cover to hold redeemable coupons or stamps, a plurality of record keeping mechanisms inside said box arranged in a row, each said mechanism comprising a set of elongated, flat, stiff strips and a pair of spaced apart, upwardly arched, semi-circular rings mounted at their opposite ends upon a floor of said box, each said strip having a name of a different grocery store



purchaseable item printed on one side thereof, and each said strip having an opening near each opposite end thereof for being received on said pair of rings so that when said strip is pivotally flipped over in one direction, said item name faces upwardly so to be seen, and when oppositely flipped, said name faces downwardly so to not be seen.

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**4,742,912**
**PACKAGE ASSEMBLY**
**Noel Lee, 47 W. Park Dr., Daly City, Calif. 94015**
**Filed Apr. 24, 1987, Ser. No. 42,435**
**Int. Cl.[4] B65D** *21/00*
**U.S. Cl. 206—459** **8 Claims**



1. A package assembly comprising a first plate member defining two opposite planer surfaces, a U-shaped flange extending from the side edges of one of said planer surfaces to form a cavity, said flanges defining a recessed portion extending around said edges, a second plate member defining a planer surface in engagement with the other of said planer surfaces of said first plate member, said second plate member including a protruding portion which, together with said other planer surface of said first plate member, defines an enclosure for the article to be packaged, display means extending between said other planer surface of said first member and said planer surface of said second member, with the margins of said display means extending in said recessed portions of said flanges, the size of said cavity being sufficient to receive the protruding portion of an adjacent assembly when a plurality of assemblies are stacked, or nested, together, and means for securing said plate members together.

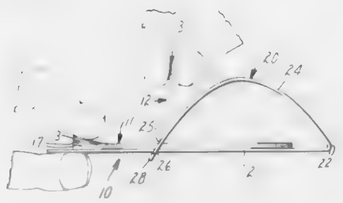
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**4,742,913**
## DISPENSER FOR PREDETERMINED LENGTHS OF TAPE

**John J. Emmel, Blaine; Wayne K. Darvell, North St. Paul, and Wayne K. Dunshee, Maplewood, all of Minn., assignors to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.**

**Filed May 12, 1986, Ser. No. 862,013**
**Int. Cl.[4] B65D** *73/00*
**U.S. Cl. 206—460** **8 Claims**



1. A tape package for use in carrying and dispensing strips of pressure-sensitive adhesive tape, said package comprising:

a stack of strips of pressure-sensitive adhesive tape, each strip having a backing with a coating of pressure-sensitive adhesive on one surface and a tab at one end, said strips being disposed in the stack with the coating of pressure-sensitive adhesive on one strip in contact with the backing of the adjacent strip and the tabs of said strips being disposed at one end of said stack,

a support for the stack of strips having a support surface supporting the bottom strip of the stack of strips throughout the length of said bottom strip,

a cover positioned over the surface of said stack of strips opposite the support surface and having a transverse edge positioned over and transverse to said stack of strips and adjacent said one end of the top strip of tape, said cover being joined to said support at the end opposite said transverse edge and being formed of flexible material such that said cover will bow between said edge and said opposite end during the dispensing of a strip of tape and will have sufficient memory to return to a position parallel to the stack of strips upon dispensing the top strip, and

means for restricting separation of said transverse edge from said position over and transverse to said stack during said dispensing of one strip of tape from the stack.

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**4,742,914**
## PACKAGE

**Stephen Klein, Fort Lee, N.J., assignor to Concept Packaging Inc., Fort Lee, N.J.**

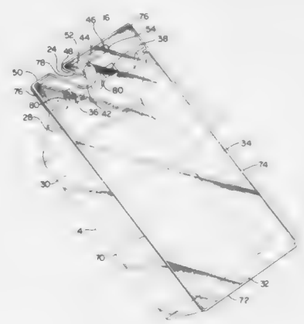
**Filed May 1, 1986, Ser. No. 858,201**
**Int. Cl.[4] B65D** *73/00*
**U.S. Cl. 206—461** **5 Claims**

1. A package for displaying an item contained within the package comprising:

(a) a semi-rigid plastic member for accommodating the item, said receptacle member having a bottom and sides extending upwardly from the bottom and which terminate in a continuous edge;

(b) a flexible plastic cover non-releasably secured to the continuous edge;

(c) means for suspending the package from a rod comprising a continuous extension from one side of the receptacle, a hook configured in the extension having a J-hook configuration and a means for reinforcing the hook in the extension comprising a recess formed in the extension material adjacent the depending point of the hook and extending vertically from the depending point of the hook to the edge of the extension and transversely along the edge of the extension, and further comprising ribs formed between the extension and receptacle;



(d) means for enhancing torsional resistance comprising additional recesses in the extension; and

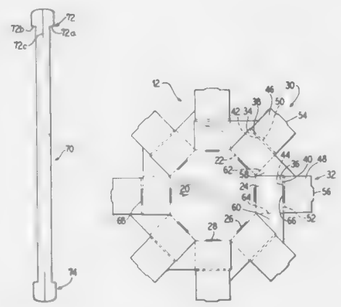
(e) an insert for reinforcing the package.

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**4,742,915**
## FOLDABLE BASKET

**Sam Ringer, 5458 Greenleaf, Skokie, Ill. 60077**

**Filed Oct. 10, 1986, Ser. No. 917,693**
**Int. Cl.[4] B65D** *5/22, 5/46*
**U.S. Cl. 206—575** **7 Claims**



1. In combination, a blank for folding into a basket-like container having a base and upright side walls and a handle for cooperation with said blank and for use in carrying said container;

A. said blank comprising:

1. a central base forming section having a polygonal configuration and means defining a securement slot in the base along each polygonal side edge;

2. a foldable tab-like wall forming section secured to each side of said polygonally-shaped base, each of said wall forming sections including:

(a) an outer wall forming panel which is foldably secured at one end to the base section along a base edge score line, said outer panel having a top edge opposite said base end, and a top edge score line;

(b) a top edge panel section foldably secured along an outer top end to the outer panel section along an outer top edge score line, having an inner top end opposite said outer top end and having an inner top end score line, said inner top edge being shorter than said outer top edge and having lateral side edges which join said inner and outer ends which side edges are tapered;



(c) at least two opposite top edge panels, each defining a handle receiving slot having a predetermined length;

(d) an inner wall forming panel foldably secured at one end to the top edge panel section at the inner top end score line, having an inner bottom end, and defining tab securement means for locking cooperation with the base securement slot;

(e) the inner wall panel having a lateral dimension less than the lateral dimension of the outer wall forming panel; and

(f) a locking panel foldably secured to a side edge of said outer wall forming panel along a side edge score line;

B. elongated handle defining means for carrying the container in a basket-like manner, said handle defining means having enlarged ends, each of which define shoulder portions of a length greater than the predetermined length of the top edge handle receiving slot, each enlarged end having a slit so as to permit the slitted ends to overlap for insertion into a handle receiving slot and to be expanded to a top edge panel section engaging position between said inner and outer panels.

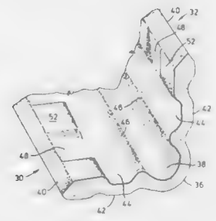
C. each of said wall forming sections adapted to be folded inwardly and upwardly relative to the base along a base score line, said locking panel adapted to be folded along a side edge score line and positioned against an inwardly facing surface of adjacent outer wall forming panel and in overlying relationship thereto, and said inner wall forming panel adapted to be folded inwardly and downwardly so as to overlie a locking panel and position the locking panel between the inner and outer panels, said inner panel tab securement means adapted to interfit with said base securement slot means for holding said inner and outer panels in position and said locking tab between the inner and outer panels.

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**4,742,916**
## CORNER AND EDGE PROTECTORS FOR RECTANGULAR ARTICLES

**Joseph Galea, Burlington, Canada, assignor to Kord Products Limited, Burlington, Canada**

**Filed Jun. 8, 1987, Ser. No. 59,327**
**Int. Cl.[4] B65D** *81/06, 85/30*
**U.S. Cl. 206—586** **3 Claims**



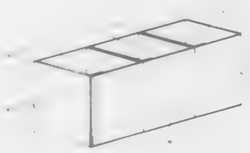
1. In a unitarily moulded pulp protector for application to the external convergence of at least two perpendicular walls of an article to be shipped, the protector comprising walls equal in number to the number of the walls of the article entering the convergence and having lands on their inner surfaces engageable with walls of the article, said lands being located in planes having a convergence substantially coincident with said convergence of the article walls, the walls of the protector being substantially orthogonal and joined to each other by at least one internally concave and externally converx curved wall defining at least one channel within which planes of the lands of the protector walls intersect and within which said convergence occurs, and the walls being moulded to divide said lands into portions by a pattern of grooves on their inner surfaces, corresponding to ridges on their outer surfaces, such as to increase the effective thickness of the walls and increase their ability to space the article from external packaging and from external forces and impacts; the improvement in which said pattern of grooves defined in each inner wall is separated from said convergence by a primary land portion on each inner wall which extends substantially continuously between the convergence and the pattern of grooves, which pattern includes a primary groove extending straight and substantially parallel to an edge of the wall remote from the convergence, continuously across the full width of the wall, the groove being formed within a ridge extending straight across the full width of the external surface of the wall, and those areas of the external surface of the walls of the protector between said last named ridge and the edges of the walls remote from the convergence defining a plurality of separate quadrilateral depressions corresponding to separate quadrilateral secondary land portions on the inner surface of the walls.

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**4,742,917**
## MULTIPLE PACKAGING ARRANGEMENT

**Hans-Joachim W. Bornwasser, Bergneustadt; Ulrich R. Loss, Marienheide, and Gernot Handke, Gummersbach, all of Fed. Rep. of Germany, assignors to Square D Company, Palatine, Ill.**

**Filed Sep. 18, 1986, Ser. No. 908,769**
**Int. Cl.[4] B65D** *43/16, 5/54*
**U.S. Cl. 206—602** **12 Claims**



1. An arrangement for the multiple packaging of components comprising a plurality of individual boxes, each said box having four sides and two ends, one of said ends having a pivotal flap formed therein for sealing said end and the other end comprising an open area communicating with the interior of each said box and opposite said end with said pivotal flap; each said individual box arranged such that said open ends are on a common side and each box having at least one of said sides adjacent another side of another box such that the boxes form a singular array; a U-shaped member having a middle section corresponding in shape to the open areas of the aligned boxes and two end sections projecting from the middle section on opposite sides thereof and at right angles thereto such that the end sections overlap opposite sides of the boxes and the middle section is adjacent and over and open area of each said box, and means for adhering the end sections of the U-shaped member to the sides of the boxes, said U-shaped member having individual score lines formed therein and corresponding with the sides of the individual boxes such that once said U-shaped member is adhered to the boxes, individual boxes or groups of boxes may be broken away from the remaining box or group of boxes by breaking the U-shaped member at the score lines.

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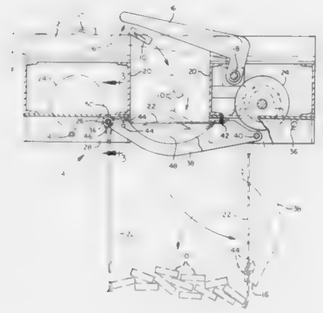


**4,742,918**

## APPARATUS FOR COMPILING SORTED LUMBER

**Ralph D. Doherty, Jacksonville, Fla., assignor to U.S. Natural Resources, Inc., Portland, Oreg.**

**Filed Sep. 29, 1986, Ser. No. 913,028**
**Int. Cl.[4] B07C** *5/14*
**U.S. Cl. 209—517** **3 Claims**



1. A lumber sorting apparatus comprising;

a bin having a pair of lumber confining side walls defining an interior area and an open bottom,

at least a pair of strong flexible straps spanning the open bottom from one side wall to the opposite side wall and having a length substantially longer than said open bottom between the side walls, a reel for each strap that is fixed to one end of the strap and mounted proximate to one side wall on the outside thereof, said reel including means for power winding the strap length onto and off of the reel,

an arm member for each strap having first and second ends, the first end pivotally connected proximate the reel and outside the interior area and said arm member being pivotal about said first end between an upper position and a lower position, guide means on said arm member defining a path for the strap from the reel to the second end of the arm member whereby reeling in of the strap causes drawing of the strap through the arm member,

a fitting fixed proximate the opposite side wall and outside the interior area, a mating member mated to the fitting and fixed a second end of the strap, and releasable fastening means releasably fastening the mating member to the fitting,

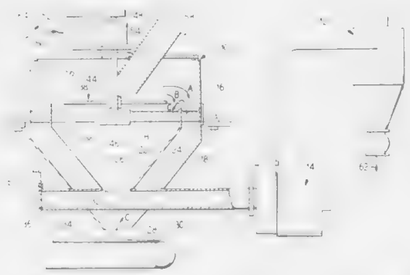
said arm member having an intermediate length portion between said first and second ends, said intermediate portion spanning the width of the open bottom when the arm member is pivoted to its upper position, said arm member at its second end having a seat in which the mating member at the strap end becomes seated for stopping further drawing of the strap through the arm member when the strap is wound on the reel, said arm member thereby being pivoted to its upper position by continued power winding of the reel, the seated position of the mating member on the arm member coordinated with the position of the fitting so as to pivot the mating member of said strap end into mating relationship with the fitting, and said arm member being configured whereby the path of the strap between the ends of the arm member with the strap pulled taut defines a straight reach of the strap above the said intermediate portion of the arm member spanning the open bottom of the bin, and with the arm member so positioned, exposing only the straps to be engaged by lumber pieces dropped into the bin.

**4,742,919**

## ROTATING SEPARATOR

**Arne Eriksson, Pittsfield, Mass., assignor to Beloit Corporation, Beloit, Wis.**

**PCT No. PCT/US86/00718, § 371 Date Apr. 11, 1986, § 102(e) Date Apr. 11, 1986, PCT Pub. No. WO87/06279, PCT Pub. Date Oct. 22, 1987**
**PCT Filed Apr. 11, 1986, Ser. No. 865,812**
**Int. Cl.[4] B07B** *13/11, 7/02*
**U.S. Cl. 209—44.1** **17 Claims**



1. Separator apparatus for separating a mixture of a plurality of particle constituents of different sizes, comprising: chamber means defining a plurality of concentric chambers, each of said chambers comprising an inlet opening for receiving and a discharge opening for discharging a respective particle constituent; a rotor mounted above said plurality of chambers, the inlet opening of the innermost of said concentric chambers being at least partially radially outward from said rotor; drive means connected to and operable to rotate said rotor; feed means for feeding the mixture of a plurality of particle constituents onto said rotor to subject the same to centrifugal forces which discharge the particle constituents over the periphery of said rotor, said rotor effecting an initial separation between larger and smaller particle constituents and discharging said constituents along different paths related to their respective surface area to mass ratios to fall into respectively located ones of said inlet openings of said concentric chambers; and air flow means in communication with said discharge openings of said chambers providing a flow of air for entraining and transporting away the smaller of said particle constituents from the larger of said particle constituents and for influencing the paths of smaller particle constituents toward the innermost of said concentric chambers.

**4,742,920**

## LUMBER SORTING APPARATUS

**Ralph D. Doherty, Jacksonville, Fla., assignor to U.S. Natural Resources, Inc., Portland, Oreg.**

**Filed Sep. 29, 1986, Ser. No. 912,955**
**Int. Cl.[4] B07C** *5/14*
**U.S. Cl. 209—517** **4 Claims**

1. A lumber sorting apparatus comprising;

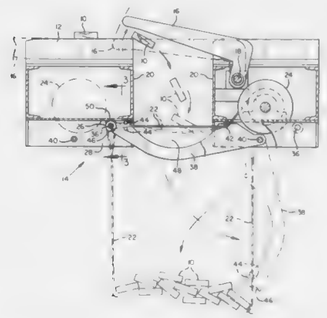
a bin having an open bottom and comprising at least two opposing side walls defining an opening therebetween, at least a pair of strong flexible straps spanning the open bottom from a first of said opposing side walls to the opposite side wall and having a length substantially longer than said opening between the side walls, a reel fixed to one end of each strap and mounted proximate to said first side wall, said reel including means for power winding the strap length onto and off of the reel, an arm member for each strap pivotally connected at one end proximate the reel and being pivoted between a vertical position and a horizontal position, said arm member including guide means defining a path for the strap with the strap projected through the guide means and thereby through the arm member, said strap being drawn through the arm member when winding the strap onto the reel,

a spool having a center opening, said spool fastened to the opposite end of the strap, said arm member having a spool seat at its end opposite the pivotal connection, said spool seat positioned relative to the guide means of the arm member whereby the spool is seated in the spool seat by winding the strap onto the reel, said spool when seated in the spool seat preventing further drawing of the strap through the arm member,

a fitting for receiving the spool, said fitting mounted proximate the opposite side wall, a pin slideably mounted proximate the fitting and power actuated for sliding engagement with the fitting and into the center opening of the spool when received by the fitting, for latching and relatching the spool to the fitting in a first position and unlatching the spool from the fitting in a second position,

said arm member being pivoted through a fixed arc from the vertical to the horizontal position, where upon winding of the strap onto the reel, the spool becomes seated in the spool seat while the arm member is in the vertical position, and continued winding causes the arm member to pivot to the horizontal position to locate the spool in the fitting for relatching.





**4,742,921**

## CONVEYOR SYSTEM

**Wilford Staley, 3rd, c/o Eastern Conveyor Co., Inc., Philadelphia, Pa. 19124**

**Filed Feb. 17, 1987, Ser. No. 15,233**
**Int. Cl.[4] B07C** *5/00*
**U.S. Cl. 209—539** **3 Claims**

1. A conveyor system for transporting articles having coded indicia thereon which comprises

a receiving area for receiving stacks of articles;

said receiving area includes a pair of side rails with a driven conveyor belt therebetween onto which the articles are placed;

a transition area for picking off the article one at a time and changing their orientation;

said transition area includes a pair of side rails with a horizontal surface therebetween; and

stop and transition means against which said articles are propelled;

an upper frame above said transition area horizontal surface;

said stop and transition means includes a plurality of stacked rollers alternately mounted on shafts;

said shafts being mounted to a vertical plate carried by said upper frame; and

a source of air under pressure directed against said articles adjacent said stop means;

said transition area includes a first driven chain carried on said upper frame and having pusher elements in selective contact with at least one of said articles which is against said stacked rollers;

at least two spaced fingers attached to said transition area side rail and extending therealong;

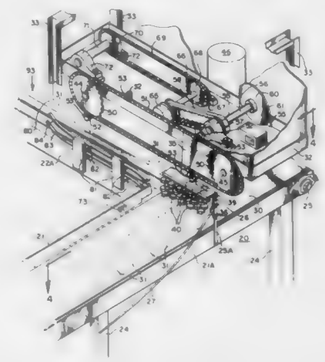
said fingers being curved so that they receive an article in one position and turn it 90° to a new orientation as it is moved therealong; and

a second driven chain in synchronized operation with said first driven chain below said transition area surface having upwardly extending pusher elements to engage said oriented article;

a transporting area which receives the articles from the transition area;

an unloading and storage area which receives the articles from the transporting area; and

said unloading area includes a plurality of stations where said articles are sorted by said coded indicia and removed for storage.

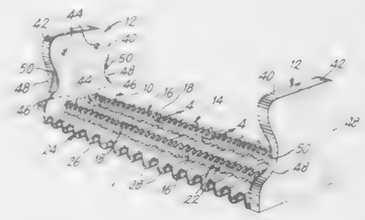


**4,742,922**

## BOOK RACK OF SELECTIVE CAPACITY

**Russell G. Demarest, Jr., 60 Forest Rd., Glen Rock, N.J. 07452**

**Filed Apr. 29, 1987, Ser. No. 43,767**
**Int. Cl.[4] A47B** *65/00*
**U.S. Cl. 211—43** **19 Claims**



1. A book rack of selective capacity, said book rack comprising:

opposed upstanding end members spaced apart from one another longitudinally to define the capacity between the end members; and

a base having an unbroken length extending longitudinally from one to the other of the opposed end members and attached thereto, the base including a plurality of flexible undulations of self-sustaining conformable material, said undulations extending transverse to the longitudinal length of the base and comprising means for enabling selective longitudinal expansion and contraction of the length of the base by bending of the flexible undulations

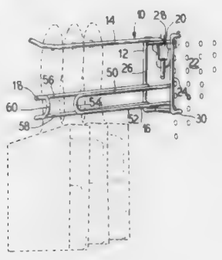
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into self-sustaining conformance with a selected length corresponding to a selected capacity between the end members for selectively varying the longitudinal spacing between the end members to adjust the capacity of the book rack.

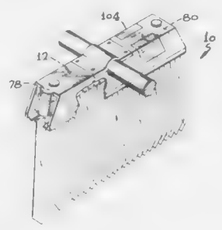
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**4,742,923**
**GRAVITY FED DISPLAY AND DISPENSING APPARATUS**
**Peter W. Calvert, Johnson City, Tenn., assignor to Thomas Industries, Inc., Johnson City, Tenn.**
**Filed Apr. 20, 1987, Ser. No. 40,189**
**Int. Cl.[4] A47F** *7/00*
**U.S. Cl. 211—59.1** **21 Claims**



1. An apparatus for suspending articles from a surface comprising:
a head portion having a front and rear side;
a first arm member having distal and proximal ends, said promixal end being affixed to said head portion on said front side of said head portion, said first arm member having at least one bend defining at least one bent portion near its distal end;
a second arm member having distal and proximal ends, said proximal end being affixed to said head portion on said front side of said head portion spaced a predetermined distance from said first arm member and extending away from said head portion to a point where its distal end is slightly less than the extension of said at least one bend of said first arm member from said head portion;
a third arm member having distal and proximal ends, said proximal end being affixed to said head portion on said front side of said head portion spaced a predetermined distance from said first and second arm members and extending away from said head portion to a point where its distal end is proximate to the extension of said at least one bend of said first arm member from said head portion, said third arm member having a bend near its distal end defining a bent portion which extends in a direction toward said second arm member perpendicular to the direction of said bent portion of said first arm member;
means for affixing said rear side of said head portion to said surface, whereby an article to be suspended hangs from said first arm member and extends between said second and third arm members which restrict the article's transverse movement while said bent portions of said first and third arm members restrict the article's movement in a longitudinal direction with respect to said arm members.

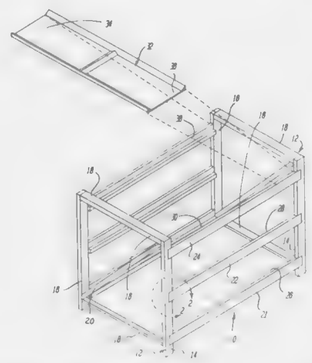
**4,742,924**
**ARTICLE-SUPPORTING WEB-FORMING UNIT**
**Kenneth A. Tarlow, 138 Waterview St., Playa del Rey, Calif. 90293, and Barbara D. Arner, 1901 Polaris Dr., Glendale, Calif. 91208**
**Filed Apr. 2, 1986, Ser. No. 847,163**
**Int. Cl.[4] A47F** *7/00*
**U.S. Cl. 211—60.1** **38 Claims**



1. A web-forming unit comprising:
a panel having inside and outside surfaces;
at least two retainer hooks on said panel, said retainer hooks being U-shaped and being secured to one side of said panel with the inside of said U-shape at least in line with or spaced beyond the side of said panel on which it is secured;
at least first and second openings through said panel, said first and second openings being positioned so that one said hook on an identical unit can pass through both said first and second openings to form said units into a flexible web; and
a barb positioned on each said hook sufficiently far away from the inside of each said U-shaped hook as to be able to pass through said second opening and engage on the surface of said unit adjacent said second opening to inhibit unhooking of each said hook through said first and second openings.

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**4,742,925**
**PAIL STORAGE SHELF AND RACK**
**Joseph E. Henderson, 5422 Spahn Ave., Lakewood, Calif. 90713**
**Filed Apr. 17, 1987, Ser. No. 40,374**
**Int. Cl.[4] A47F** *7/00*
**U.S. Cl. 211—71** **10 Claims**



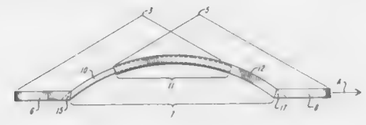
1. In a storage system which includes a rack having a frame of opposite end walls, longitudinal side rails extending therebetween, and shelf supports on inside walls of said side rails, the improved shelving in combination with a plurality of pails having tapered sidewalls, each with a top diameter and a lesser bottom diameter stored thereon, which comprises: a plurality



of storage shelves mounted edge to edge with their opposite ends supported by and extending between said shelf supports and each shelf of said plurality of shelves having elevated side walls along each of its side edges coextensive its length with inclined inside edges and having a flat shelf therebetween with a width approximately equal to said bottom diameter of said pails and a total width substantially equal to said top diameter of said pails, whereby the inclined inside walls of said shelves centers said pails which are placed thereon, in an orderly alignment.

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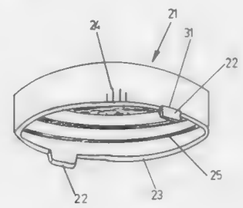
**4,742,926**
**ARCHED CURTAIN ROD**
**Clarence H. Mather, Montclair, N.J., assignor to Arley Merchandise Corporation, Taunton, Mass.**
**Filed May 22, 1987, Ser. No. 53,082**
**Int. Cl.[4] A47F** *5/08*
**U.S. Cl. 211—105.3** **9 Claims**



1. Apparatus for supporting a curtain, comprising:
an elongated support member having end portions adapted to be fixedly positioned and extending along a horizontal reference axis with a predetermined orientation, said support member including an arched portion disposed between said end portions, said arched portion extending along an arc above the horizontal plane passing through said reference axis when said end portions are affixed along said reference axis, and said support member is in said predetermined orientation.

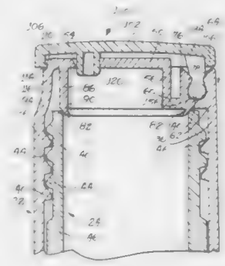
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**4,742,927**
**TAMPER PROOF SEAL FOR A CONTAINER CLOSURE**
**Richard J. Tierney, Caringbah, Australia, and Robert C. Brown, Auckland, New Zealand, assignors to PDL Packaging Limited, New Zealand**
**Filed Dec. 12, 1986, Ser. No. 940,552**
**Claims priority, application Australia, Dec. 13, 1985, PH3865**
**Int. Cl.[4] B65D** *41/34*
**U.S. Cl. 215—216** **12 Claims**



1. A tamper proof seal and container closure device including, in combination;
a seal ring and a closure, said seal ring being generally annular shaped and provided on an inner face thereof with at least one recess and at least one stop, said closure being provided with at least one projection on the lower edge of the closure, said projection being adapted to fit within the recess of the seal so that when the combination seal ring and closure are fitted to a bottle neck the stop on the seal ring locks the seal ring, closure and bottle neck together.

**4,742,928**
**DISPENSING CLOSURE WITH ARTICULATED FLIP-TOP CAP**
**Morris Braun, Chicago, Ill., assignor to W. Braun Company, Chicago, Ill.**
**Filed Jun. 11, 1987, Ser. No. 61,905**
**Int. Cl.[4] B65D** *47/06*
**U.S. Cl. 215—235** **16 Claims**



1. In a container for storage and for the dispensing of products, said container including a floor and a circumambient upstanding wall defining a storage chamber, a generally cylindrical open-top neck integrally formed with and extending upwardly of said walls of said chamber,
a multi-component closure embracing and surmounting said neck, said closure comprising a body including a sleeve formed with means for intercoupling mating engagement with said container adjacent said neck for attaching said closure to said container,
a top wall bridging said sleeve of said closure,
said top wall being integral with said sleeve and being formed with a product-dispensing port extending transversely therethrough and in fluid flow communication with said chamber for dispensing container-stored contents therefrom,
said closure including a pivotally-manipulable cap for sealing said port,
a plug carried by and projecting from an underside of said cap, said plug being hingedly shiftable with said cap and selectively positionable for telescoping sealing penetration into said dispensing port to seal said port during periods of non-delivery of stored contents from said container,
hinge means for pivotally supporting said cap on said closure body for facilitating shifting of said cap between a closed position of said container in which said cap overlies and generally parallels said top wall of said sleeve to present said cap-carried plug into said product-dispensing port in sealing engagement therewith, and an open position in which said cap is pivotally shifted to withdraw said plug from said port to unblock said port and to permit dispensing of container-stored contents therefrom,
the improvement comprising,
mounting means for supporting said cap on said closure body for pivotal displacement through an arcuate quadrant to assume in a product-dispensing mode of said container a stabilized configuration in which said top wall of said sleeve is essentially fully uncovered to permit unimpaired visual monitoring of said dispensing port during delivery of product therefrom,
said mounting means comprising a hinge assembly intercoupling said cap and said body of said closure,
said hinge assembly including wall means extending normally of and depending from said top wall of said sleeve for bounding a hinge-arm-receiving opening, slot means formed in said closure body at laterally spaced positions adjacent a marginal zone of said body and defining an upwardly opening cavity for receiving hinge arms there-

within during pivotal displacement of said cap to a port-exposing open position of said container,

cap-carried hinge arm means for cooperative entry into said slot means, said arm means extending downwardly from said cap at rearward peripheral portion of said cap to project from an underside of said top wall thereof, said arm means being positionally oriented for spatial registry with said slot means for permitting pivotal penetration of said hinge arm means into said slot means,

hinge shaft means for mechanically intercoupling said hinge arm means of said cap with said wall means of said sleeve and for pivotally and hingedly supporting said cap on said sleeve body during manipulative shifting of said cap between a closed configurational, sealing mode and a product-dispensing, open mode of said closure.

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**4,742,929**

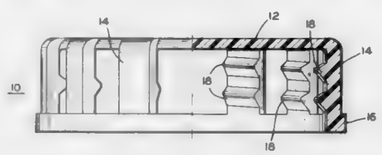
**THREADED CONTAINER CLOSURE**

**Kirit C. Desai, Perrysburg, Ohio, assignor to Owens-Illinois Closure Inc., Toledo, Ohio**

**Filed Mar. 10, 1986, Ser. No. 838,075**

**Int. Cl.[4] B65D *41/04***

**U.S. Cl. 215—332** **4 Claims**



**1**. A closure for a container having a neck portion with an opening therein for dispensing the contents, the neck portion having thread means formed on the external surface thereof, comprising;

(a) top wall means,

(b) a plurality of pillars spaced around the periphery of and depending downwardly from said top wall means,

(c) means connecting the lower ends of said pillars, and

(d) thread means on the interior surface of at least some of said pillars extending inwardly to cooperate with thread means on a neck portion to bring and maintain said top wall means into a sealing relationship with a neck portion,

(e) each of said pillars being tapered from a greater width at the top to a smaller width at the bottom, thereby providing an improved stress resistance at the junction of each of said pillars and said top wall means.

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**4,742,930**

**CLOSURE FOR CONTAINERS**

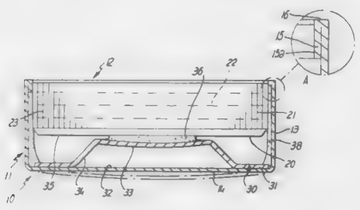
**John Czarnecki, Langho, England, assignor to Decorpart Limited, Nelson, England**

**Filed Mar. 9, 1987, Ser. No. 23,225**

**Claims priority, application United Kingdom, Feb. 26, 1987, 8704568**

**Int. Cl.[4] B65D *41/04***

**U.S. Cl. 215—334** **9 Claims**



**1**. A closure for a container comprising an outer part having a top wall and a depending peripheral skirt having inner and outer surfaces, and inner part having a top wall and a depending peripheral skirt having inner and outer surfaces, the inner surface of the skirt of the inner part having means for attachment to a container, and a separately formed support element between the top walls spacing the walls from each other so as to leave open spaces therebetween and resisting axial movement of the inner part top wall towards the outer part top wall.

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**4,742,931**

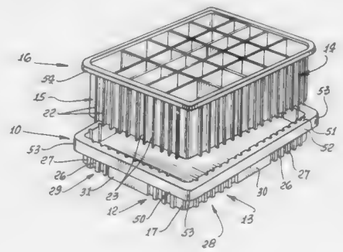
**TOTE BOX TRAY**

**George Bennett, Simi Valley, Calif., assignor to Olympic Plastics, Inc., Los Angeles, Calif.**

**Filed Aug. 17, 1987, Ser. No. 85,896**

**Int. Cl.[4] B65D *21/00***

**U.S. Cl. 220—23.86** **14 Claims**



**1**. A tote box carrier tray, comprising, in combination:

(a) the tray being a single unit and having a bottom wall, two longitudinally spaced and upright end walls, and two laterally spaced and upright side walls,

(b) the tray having approximately 90° curved corner walls each of which connects a side wall to an end wall,

(c) the tray having bumper means which is integral with said side, end and corner walls and projects outwardly from top portions of said walls,

(d) each of the side and end walls forming first vertical and alternating slots and ribs which are spaced apart along the inner side of the wall length for interfitting reception of vertical ribs on a tote box to be received in the tray,

(e) the side and end walls also forming second vertical and alternating slots and ribs which are spaced apart along the outer side of each wall length in two groups,

(f) and the outer side of at least one of said side and end walls also forming an intermediate flat located between said two groups of second slots and ribs, the flat facing outwardly and adapted to carry coding below the level of said bumper means.

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**4,742,932**

**METHOD OF MANUFACTURING HOLLOW SHEET METAL CONTAINERS AND CONTAINERS PRODUCED THEREBY**

**Pedro P. Pedragosa, Calle Pedro No. 26, Santa Coloma De Gramanet (Porv. Barcelona), Spain**

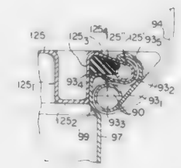
**Filed Feb. 13, 1985, Ser. No. 701,172**

**Claims priority, application Spain, Feb. 15, 1984, 530.099; Sep. 7, 1984, 281.496**

**Int. Cl.[4] B65D *6/34***

**U.S. Cl. 220—67** **8 Claims**

**1**. A sheet metal container having a vertical axis and having side walls that terminate downwardly in a closed bottom and that extend upwardly toward an open top and an upper peripheral rim integral with said side walls of the container at said top, said rim comprising at least three annular folded sections, said sections being interconnected by annular curved portions, said rim being further connected with said side walls by a further annular curved portion, a first of said at least three sections extending from said further annular curved portion at a downward incline away from said axis and being joined by one of said annular curved portions to a second of said at least



three sections which is inclined upwardly away from said axis and terminates in another of said annular curved portions from which a third of said at least three sections is inclined downwardly toward said axis, said first and second sections forming a central upwardly opening hollow region between them.



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**4,742,933**

**CONTAINER OF PLASTICS MATERIAL**

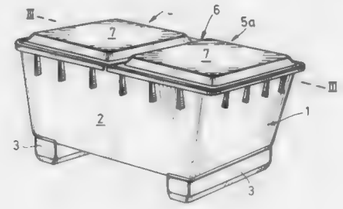
**Klaus Panick, Ahlen, Fed. Rep. of Germany, assignor to Joh. Panick GmbH & Co. KG, Ahlen, Fed. Rep. of Germany**

**Filed Dec. 23, 1986, Ser. No. 945,647**

**Claims priority, application Fed. Rep. of Germany, Jan. 17, 1986, 8601022[U]; Feb. 15, 1986, 8604086[U]**

**Int. Cl.[4] B65D *21/00***

**U.S. Cl. 220—69** **11 Claims**



**1**. A container of plastics material for mortar, comprising a container portion defining a bottom side and a top side having a circumferentially extending rim, at least two essentially symmetrically constructed plastics material covers placed on the top side of the container, integrally formed pegs on the bottom side of the container, and support bars attached to the bottom side by engaging the pegs, wherein the support bars define bores open toward the bottom side of the container, the bores having formed therein a recess defining a shoulder, the pegs comprising fixing means for fixing the pegs in the bores by engaging the shoulder, and wherein the fixing means is a clamping bead formed on the outer rim of the peg.

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**4,742,934**

**CONTAINER STRUCTURE**

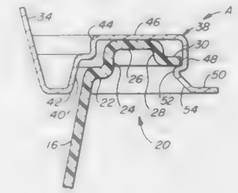
**John T. Michaud, Moraga, and Harvey Hum, San Francisco, both of Calif., assignors to Packaging Corporation of America, Evanston, Ill.**

**Filed Jul. 1, 1986, Ser. No. 880,843**

**Int. Cl.[4] B65D *41/00***

**U.S. Cl. 220—306** **5 Claims**

**1**. A readily openable and relatively spill-proof container for a flowable product comprising a tray of generally polygonal configuration for accommodating the product and having a bottom wall for subtending and supporting the accommodated product, said bottom wall being delimited by upstanding interconnected sidewalls, the latter having upper portions coacting to form a continuous outwardly projecting peripheral seal segment defining an open top for the tray; and a removable reclosable lid of matching polygonal configuration for overlying and closing the tray open top, said lid having a top panel, interconnected side panels delimiting said top panel and depending from the periphery thereof and complemental seal segment projecting outwardly from a lower edge of said interconnected side panels, said lid complemental seal segment being in sealing interlocking engagement with the tray seal segment, when said lid is initially assembled or reassembled on said tray; said tray seal segment having a substantially hat-shaped cross-sectional configuration including an inner flange protruding outwardly from the sidewall upper portions, an inner wall outwardly offset from the sidewall upper portions and extending upwardly from said inner flange, a top wall projecting laterally outwardly from an upper edge of said inner wall, an outer wall depending from an outer edge of said top wall, and a lip projecting outwardly from a lower edge of the outer wall; said lid seal segment having a substantially hat-shaped cross-sectional configuration and including an outwardly stepped continuous inner panel extending upwardly from the lower edge of the interconnected side panels and spaced from the upper portions of the tray sidewalls and the inner flange and inner wall of said tray seal segment and coacting therewith to form an upwardly extending tortuous passage having a lower end communicating with a product-accommodating interior of said tray, a top panel projecting outward from an upper edge of said stepped inner panel and overlying and sealingly engaging the top wall of said tray seal segment and closing off an upper end of the tortuous passage, and an outer panel depending from an outer edge of said top panel and in encompassing relation with the outer wall and lip of said tray seal segment, said outer panel being provided with circumferentially spaced inwardly extending protuberances subtending and interlockingly engaging portions of the lip of said tray seal segment; said protuberances remaining integral with said outer panel while said lid is being assembled or disassembled with respect to said tray.



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**4,742,935**

**PACKAGING CONTAINER**

**Walter Schellenberg, Diepoldsau, Switzerland, assignor to Sandherr Packungen AG, Diepoldsau, Switzerland**

**Filed Jul. 13, 1987, Ser. No. 72,460**

**Claims priority, application Switzerland, Jul. 14, 1986, 02810/86**

**Int. Cl.[4] B65D *39/00***

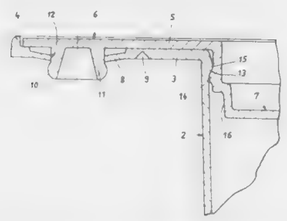
**U.S. Cl. 220—307** **10 Claims**

**1**. A packaging container with a container body and a lid connected to the opening rim by locking fastening means, whereby on one part of the lid rim is shaped an outwardly projecting gripping part, wherein the lid rim is laterally em-

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braced by a rim portion of the container body and wherein the gripping part of the lid is non-detachably fixed to a rim extension of the container body connected to the latter by means of a predetermined breaking point.



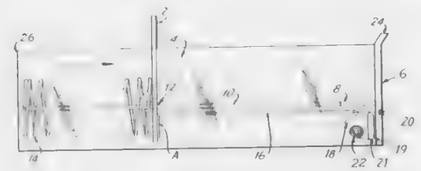
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**4,742,936**

## DISPENSING DEVICE WITH NUMERICAL INDICATOR FOR INVENTORY CONTROL

**Gary Rein, Montclair, N.J., assignor to The Display Equation, Inc., New York, N.Y.**

**Continuation of Ser. No. 819,142, Jan. 15, 1986, abandoned. This application Jul. 9, 1987, Ser. No. 71,605**
**Int. Cl.[4] A47F** *7/28, 1/12*
**U.S. Cl. 221—5** **1 Claim**



1. A dispenser for the storage, display, metering and dispensing of items, comprising:

(a) a trough, for containment of said items;

(b) a shelf forming the bottom of said trough upon which said items are aligned in a row, said shelf having longitudinal slot means disposed substantially along the length of said trough;

(c) an upright platform substantially perpendicular to said shelf, said platform movably disposed within said slot means of said shelf, said platform disposed adjacent to said items;

(d) means for biasing said platform to urge said platform in a direction toward the front end of said trough thereby urging said items in a direction toward said front end;

(e) means for digitally indicating the number of said items stored in said trough, comprising:

(i) a spindle mounted laterally across the width of the trough, said spindle disposed proximate the front end of said trough and under said platform;

(ii) a guide member positioned under said shelf and proximate said spindle;

(iii) an opening in said front end of said trough;

(iv) a pressure plate positioned adjacent to said opening, forming a space between said opening and said pressure plate;

(v) a resiliently self recoiling sheet with numerals depicted thereon, said sheet having a first and second end, said sheet being disposed under said shelf, said first end being attached to said platform, the remainder of said sheet being disposed under said shelf and between said guide member and said shelf and disposed within said space between said pressure plate and said opening, said pressure plate keeping said sheet in a substantiallyvertical position behind said opening, and said second end of said sheet being coiled around said spindle, the movement of said platform controlling the coiling and uncoiling of said sheet around said spindle as items are removed from, or added to the trough; and

(f) numerals spaced along said sheet in calibration with the size of the items stored in the trough, the numeral visible through said opening corresponding to the number of items remaining in the trough.

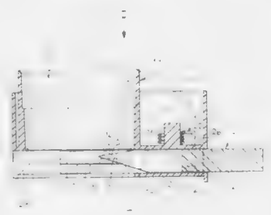
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**4,742,937**

## SEPARATING AND RELEASING DEVICE FOR SINGLE ELEMENTS FOR SINGLE ELEMENTS PARTICULARLY CUPS

**Erik Blom, Lugnasvagen 2, S-542 00 Mariestad, Sweden**

**Continuation of Ser. No. 578,047, Feb. 7, 1984, abandoned. This application Feb. 5, 1986, Ser. No. 827,214**
**Claims priority, application Austria, Feb. 18, 1983, 553/83**
**Int. Cl.[4] B65H** *3/30*
**U.S. Cl. 221—223** **8 Claims**



1. A device for separating and releasing single elements from a pile or stack thereof, particularly cups with a rim, collar, flange or the like projecting from the body of the cups, said device comprising:

a slide member including a first bifurcated portion, a second operating handle portion, and a third portion separating said bifurcated portion from said handle portion, said bifurcated portion comprising opposing arms each having a retaining means and a separating and releasing means, for said elements, said retaining means and said separating and releasing means being disposed on the side of said arms facing each other in substantially horizontal alignment, said separating and releasing means further including an upper side, a lower side, and protrusions extending downwardly from the lower side below the lower plane of the remainder of said slide member, said separating and releasing means lower side facing the upper side of the rim or the like of the lowermost element of said pile or stack and being inclined at a first angle of 10°–60° relative to said lower plane, and said separating and releasing means upper side facing the lower side of the rim or the like of the element above said lowermost element and being inclined relative to said lower plane at a second angle, which is smaller than said first angle, of 2°–45°,

spring means, and

a magazine having an upper surface and a lower surface spaced below said upper surface, said magazine including a first cylindrically shaped portion, having a vertical extent, for holding the pile or stack of said elements, and a second portion surrounding said first portion and including said upper and lower surfaces, said surfaces defining therebetween means for supporting said slide member for sliding movement in a plane below said first portion and in a direction normal to said vertical extent, between a first element supporting position and a second position wherein the lowermost element in the pile or stack is separated and released therefrom, said magazine second



portion including an upstanding boss about which said spring means is secured,

said spring means including ends engaged in said slide member at one side of said boss for normally biasing said slide member to said element supporting position, said spring ends being positionable on the opposite side of said boss when said side member slides to said second position.

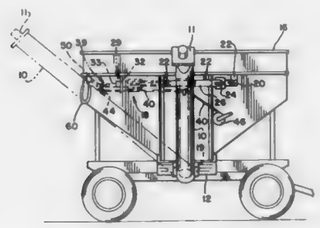
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**4,742,938**

## GRAVITY BOX AND AUGER POSITIONING MECHANISM

**D. Wayne Niewold, 149 N. Market St., Paxton, Ill. 60957**

**Filed Jun. 19, 1986, Ser. No. 876,280**
**Int. Cl.[4] B65G** *33/14*
**U.S. Cl. 222—381** **18 Claims**



1. An auger positioning mechanism for swinging a material conveying auger between two positions, including mounting means for mounting the auger to a material storage container to permit both pivotal and swivelable movement of the auger relative to the container, said mechanism comprising:

support means for supporting the auger at an elevation angle relative to the container and in one of the two positions, said support means comprising an elongate member and first and second coupling means swivelably coupling said elongate member to the container and said auger, respectively; and

powered urging means pivotally coupled between the container and said elongate member for swinging said auger with both said pivotal and swivelable movement between said two positions, said first and second coupling means permitting swivelable movement of said elongate member relative to both the container and said auger as said auger is swinging between said two positions.

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**4,742,939**

## REMOTE SODA-CIRCULATING BEVERAGE DISPENSER

**Longin Galockin, Deerfield, Ill., assignor to Automation Projects Inc., Highland Park, Ill.**

**Continuation of Ser. No. 648,677, Sep. 10, 1984, abandoned. This application Jul. 24, 1986, Ser. No. 888,643**
**Int. Cl.[4] B67D** *5/08, 5/62*
**U.S. Cl. 222—68** **20 Claims**

14. A recirculating beverage dispenser unit comprising a cooling unit, a carbonation unit, an inlet connection between a source of fresh water and said cooling unit, a fresh water valve and spigot, a delivering conduit coupling said fresh water valve and spigot to said cooling unit, at least one mixing valve and spigot coupled by a conduit to said carbonation unit and coupled by another conduit to a source of pressurized syrup, means for circulating carbonated water from and to said at least one mixing valve and spigot to and from said carbonation unit, said carbonation unit being mounted in said cooling unit, said fresh water inlet connection having a valve therein, said carbonation unit having a first float switch therein and said cooling unit having a second float switch therein connected in series with said float switch in said carbonation unit, and the carbonated water circulating means including a three-way valve assembly having an inlet connected to a conduit from said at least one mixing valve and spigot, an outlet coupled to a conduit emptying into said carbonation unit and a second inlet coupled to a conduit that extends into said cooling unit and haa an inlet at the bottom of said cooling unit, whereby said first float switch, when in a lower position, energizes said three-way valve assembly to close said first inlet whereby fresh



water can be suctioned from the bottom of said cooling unit through said three-way valve assembly and into said carbonation unit until said carbonation unit is filled with carbonated water and whereby raising of said second float switch coupled to said valve in said fresh water inlet connection will close said valve to stop the injection of water into said cooling unit when both float switches are in the raised position.

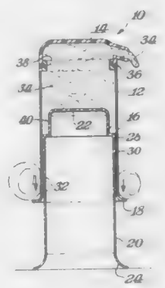
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**4,742,940**

## DISPENSER FOR FLOWABLE MATERIALS

**William T. Wilkinson, Chadds Ford, Pa., assignor to Package Research, Cleveland, Ohio**

**Continuation-in-part of Ser. No. 704,960, Feb. 25, 1985, abandoned. This application Aug. 27, 1986, Ser. No. 900,681**
**Int. Cl.[4] G01F** *11/00*
**U.S. Cl. 222—162** **10 Claims**



1. A dispenser for flowable materials comprising a barrel in the form of a cylindrical sleeve open at its upper end and its lower end, said barrel further comprising a cup shaped cap connected to and closing said upper end of said sleeve, a dispensing spout at the upper end of said cap, a hollow cylindrical plunger telescopically mounted in said barrel, said plunger being open at its lower end and having a closed upper end, peripheral portions on the inner surface of said sleeve and on the outer surface of said plunger being in sliding sealing contact with each other, said closed upper end of said plunger comprising a piston head whereby telescopic movement of said plunger in said barrel forces the flowable material in said barrel out of said dispensing spout, said plunger being of a length longer than the length of said sleeve with said piston head

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extending beyond said sleeve and into said cap when said plunger is fully telescoped into said barrel, said piston head having an annular shoulder and a cylindrical boss portion extending away from said shoulder, said boss portion being of lesser diameter than the remaining portion of said plunger, the outer surface of said boss portion being spaced from the inner surface of said sleeve and of said cap, said dispensing spout being on a peripheral skirt of said cap and extending outwardly beyond said cap and said sleeve, said sleeve having an internal peripheral projection at its said upper end, a peripheral groove in the outer surface at said peripheral projection, a peripheral ledge on the inner surface of said skirt of said cap, said sleeve and said cap and said plunger being made of a molded plastic, said ledge of said cap being snapped into said groove of said sleeve, said upper end of said sleeve having the same outside diameter as the outside diameter of said skirt to present a uniform surface where said cap is secured to said sleeve, and said shoulder being at least as wide as the distance said peripheral projection extends inwardly from the inner surface of said sleeve to permit said outer surface of said boss portion to be telescoped beyond said peripheral projection to maximize the amount of flowable material dispensed from said spout.

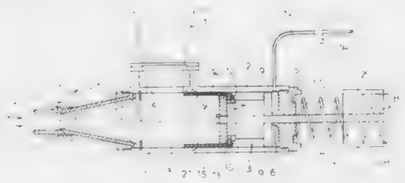
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**4,742,941**

## AUTOMATIC VOLUMETRIC DOSAGE DISPENSER FOR PRODUCTS HAVING A VARYING DEGREE VISCOSITY

**Claude Tastet, Ilot des Bordes, 64940 Moumor, France**

**Filed May 31, 1985, Ser. No. 740,008**
**Int. Cl.⁴ A21C** *5/00*
**U.S. Cl. 222—309** **7 Claims**



1. A dispenser for automatic dosage of products having a varying degree of viscosity, comprising in combination

a hollow body defining a longitudinal chamber, having a discharge opening near one end thereof, and being provided with closing means including a stopper formed with a central hole at the other end of said longitudinal chamber,

a funnel mounted on top of said body and adapted to receive said products, said funnel selectably communicating with said chamber through a passage formed in said hollow body,

product drive means travelling reciprocally in said longitudinal chamber for discharging a product received therein from said funnel through said discharge opening during forward travel of said product drive means towards said discharge opening,

limiting means for limiting the forward and reverse travel of said product drive means,

control means for controlling the forward and reverse travel of said product drive means,

passage shut-off means for closing said passage as said product is being discharged through said discharge opening

said product drive means including

a shaft including a remote end portion, said shaft being slidably received in the central hole of said stopper;

a compression spring interposed between said stopper and said end portion and biasing said shaft toward a retracted initial position,

a first piston secured to said shaft, reciprocally movable along a stroke in said chamber, and abutting said stopper in said initial position, said chamber having a predetermined inner diameter,

a cross-bar having a width smaller than said predetermined inner diameter of said chamber, being formed with a shoulder and abutting said first piston with a side thereof facing said remote end portion,

said passage shut-off means comprising a sleeve slidable in said chamber and being formed with an inwardly bent apertured flange facing said remote end portion, said apertured flange being slidable over said cross-bar, and

a second piston secured to an end of said shaft facing said discharge opening, being slidable within said sleeve, and abutting said apertured flange with a side thereof facing away from said discharge opening,

a resilient split ring expandable in a radial direction, releasably engaging said cross-bar at said shoulder, and making contact with an inner wall of said chamber when said shaft is in said initial position, said apertured flange abutting said split ring in said initial position, and

a circular throat formed in said chamber conically diverging towards said discharge opening, and further comprising

stop means disposed within said chamber near said discharge opening, but allowing passage of said product therethrough,

whereby, upon said control means exerting a force on said first piston in a direction towards said discharge opening and against the force of said spring, said pistons, said cross-bar and said sleeve travel towards said discharge opening until said sleeve impinges on said stop means, said sleeve acting as said passage shut-off means, while said split ring expands radially into said throat freeing said pistons for movement with respect to said inwardly bent apertured flange in a direction towards said discharge opening,

while, upon said force of said control means being removed from said piston, said spring retracts said shaft to said initial position.

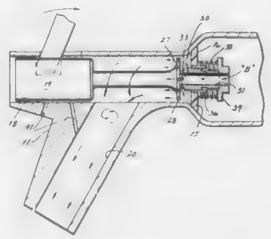
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**4,742,942**

## FOAM PRODUCING MALT BEVERAGE FAUCET

**John H. Dokos, St. Louis; James Teng, Crestwood, both of Mo., and Hines James, Vernon, N.J., assignors to Anheuser-Busch Companies, Inc., St. Louis, Mo.**

**Continuation-in-part of Ser. No. 735,443, May 17, 1985, Pat. No. 4,610,888. This application Jul. 16, 1985, Ser. No. 755,701**
**Int. Cl.⁴ B65D** *25/40*
**U.S. Cl. 222—501** **3 Claims**



1. A faucet for dispensing malt beverages comprising a faucet housing having a discharge port, said faucet housing being connectable to a source of malt beverage, and valve means in the faucet housing shiftable between shut-off, full flow flat beer dispensing and restricted flow foam dispensing positions, said housing including a chamber, a main passage of smaller cross-sectional area than said chamber and connected thereto, an internal shoulder at the connection, and a guide chamber aligned with said main passage and separated from the main chamber by the discharge port, said housing being provided with air inlet means for admitting air into the discharge port to vent the housing when the valve means is in the shut-off position and for incorporation into the malt beverage as it is dispensed after it leaves the said chamber and enters the discharge port when the valve means is in the restricted flow foam dispensing position, said valve means including a guide member shiftable in the guide chamber and loosely positioned therein, a reduced shaft connecting the guide member and a valve seat retaining flange, the flange being freely reciprocable with the meain passage between a position generally concentric with respect to the internal shoulder and a position shifted into the main passage to define a cylindrical chamber, a hollow stem terminating at the flange and positioned in the said chamber, and a valve seat movable with and relative to the stem and adapted to engage the internal shoulder when the valve means is in shut-off and foam dispensing positions, the hollow stem being provided with discharge ports adjacent to the flange, the ports being sealed by the valve seat when the valve is in shut-off and flat beverage dispensing positions and being open when the valve is in foam dispensing position to admit malt beverage transversely into the cylindrical chamber adjacent to the flange, the flange being provided with a series of small orifices therethrough at its periphery whereby the malt beverage discharges from the cylindrical chamber into the main passage and has an increased velocity as it enters the main passage longitudinally from the orifices, said velocity being sufficient to draw air through the air inlet means and past the loosely positioned guide member into the housing and incorporate it into the malt beverage to form a thick, creamy, stable foam.



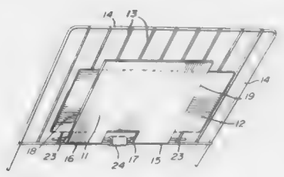
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**4,742,943**

## RETENTION CLAMP FOR SHOPPING CARTS

**Antoine Trubiano, Montreal, Canada, assignor to Cari-All Inc., Quebec, Canada**

**Filed Apr. 15, 1986, Ser. No. 852,287**
**Int. Cl.⁴ G09F** *3/00*
**U.S. Cl. 224—277** **4 Claims**



1. A clamping panel member for attachment to a wire frame of a shopping cart to clampingly retain substantially flat articles, such as advertising papers and magazines between a wire wall section of said cart and said clamping panel member, said clamping panel member applying retention pressure at spaced apart areas of said flat articles captive between said wire wall section and said panel member, said panel member having a pressure-biasing attachment end engageable with straight wire members of said wire frame to maintain said panel member pressure biased against said wire frame to define a clamping jaw for retaining said substantially flat articles in said jaw between said panel member and said wire frame, said panel member being a flat rigid sheet-like member, said pressure biasing attachment end being provided in a lower edge of said panel member and comprising a flat wedging end edge formed in said panel member, a finger extension element extending outwardly of said lower edge in each opposed outer ends of said lower edge of said panel member and engageable with vertical straight wire members, and a clamping bracket maintaining said flat wedging end edge against a horizontal straight wire member of circular cross-section intersected by said vertical straight wire members, said panel member having a cut-out portion adjacent said lower edge intermediate said outer ends, a longitudinal bore in said panel member adjacent said lower edge and extending across said cut-out portion, a metal wire rod disposed in said bore and extending across said cut-out portion and out of each said outer ends to constitute said finger extension element, said metal wire rod extends above said horizontal straight wire, said clamping bracket being disposed about a portion of said horizontal straight wire and wire rod in said cut-out portion and applying retention pressure to bias said wire rod in the direction of said horizontal straight wire member whereby said flat wedging end edge is held against said horizontal straight wire member with said panel member lying in close proximity or on said wire wall section so as to provide a restoring force to said panel member when displaced away from said wire wall section due to the wedging action of said lower edge which applies a separating force between said horizontal straight wire and wire rod.

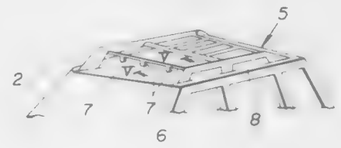
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**4,742,944**

## VEHICLE BODY WITH ROOF CARRIER HAVING SPACED PROJECTIONS FOR REDUCING WIND NOISE

**Nozomi Iida, Fujisawa, and Shigeyuki Hagino, Zama, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Jul. 15, 1985, Ser. No. 754,983**
**Claims priority, application Japan, Jul. 16, 1984, 59-107203[U]**
**Int. Cl.⁴ B62D** *25/00*
**U.S. Cl. 224—316** **4 Claims**



1. A roof carrier for a vehicle, comprising:

a rod-like member positionable transversely to the direction of movement of the vehicle, the rod-like member having means for reducing wind noise comprising:

a plurality of spaced apart projections downwardly extending from the rod-like member, each projection having a transversely extending width and a downwardly extending length, the number of said projections and the width and length of each projection, being sufficient to separate the vortex formed by a Karman vortex sheet which extends from the rod-like member in a direction substantially opposite to the direction of movement of the vehicle, the width of each projection being substantially less than the axial length of the rod-like member.

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**4,742,945**

## METHOD FOR SEGMENTING BUILDING BOARDS AND APPARATUS THEREFOR

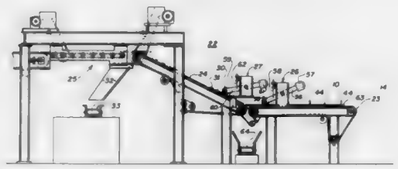
**John R. Garrick, and Karl B. Himmelberger, both of Lancaster, Pa., assignors to Armstrong World Industries, Inc., Lancaster, Pa.**

**Division of Ser. No. 690,980, Jan. 14, 1985, Pat. No. 4,646,955. This application Sep. 8, 1986, Ser. No. 904,329**
**Int. Cl.⁴ B26F** *3/00*
**U.S. Cl. 225—2** **12 Claims**

5. A process for segmenting unitary transversely groove molded building boards, said process comprising the steps of:

providing a segmenting conveyor system comprising in tandem a first conveyor and a second conveyor, the angle of intersection between said first and second conveyors being about 100 degrees to about 160 degrees, said system comprising an adjustably mounted roller assembly disposed above said first conveyor, said assembly being disposed such that it can cooperate with upwardly transversely groove molded building boards moving on said

conveyor system so as to induce said boards to segment along the transverse groove lines;
conveying said boards on said system in a direction from said first conveyor to said second conveyor;
sequentially contacting each board segment with said roller assembly such that each segment which follows a groove line is maintained substantially in the plane of said first conveyor as the segment which precedes said groove line is conveyed onto said second conveyor, whereby said board is induced to segment along said groove line;



said angle of intersection is about 110 degrees to about 155 degrees;
providing said apparatus two assemblies; and
disposing each said roller assembly such that each roller contacts one end of each board segment by the transverse groove line when said segment is centered over a line which bisects the angle of intersection between said first and second conveyors.

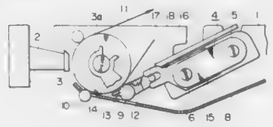
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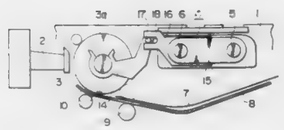
**4,742,946**

**PAPER FEED DEVICE FOR A PRINTER**

**Yoshihiro Hamamichi, Mishima; Takashi Yagi, and Yasuo Domoto, both of Shizuoka, all of Japan, assignors to Tokyo Electric Co., Ltd., Tokyo, Japan**

**Filed Dec. 10, 1985, Ser. No. 806,816**
**Claims priority, application Japan, Dec. 14, 1984, 59-189982[U]; Dec. 14, 1984, 59-189983[U]; Dec. 18, 1984, 59-267224**
**Int. Cl.[4] B41J *11/00*; G03B *1/22***
**U.S. Cl. 226—74** **2 Claims**





1. A paper feed device for a printer, comprising:
a pin feed mechanism positionable in a pushing position for pushing sprocket paper around a platen and a drawing position for drawing sprocket paper from around said platen,
a frame on which said pin feed mechanism is mounted for selective pivotal motion between said pushing position and said drawing position,
a guide plate for guiding sprocket paper to said platen from a position rearwardly of said pin feed mechanism when said pin feed mechanism is in said pushing position,
a pinch roller mounted on said guide plate for movement toward and away from said platen,
a movable guide plate positioned for guiding a cut sheet from between a front face of said pin feed mechanism and said platen to a contact point between said platen and said pinch roller when said pin feed mechanism is in said pushing position,
a pair of arms pivotally supported at opposite side ends of said movable guide plate and mounted for pivotal motion around an axis of said platen, and
supporting means located on opposite sides of said pin feed mechanism, said supporting means being coupled to said movable guide plate to retract said movable guide plate upwardly and out of a path of sprocket paper drawn by said feed mechanism when said pin feed mechanism is selectively moved to said drawing position.

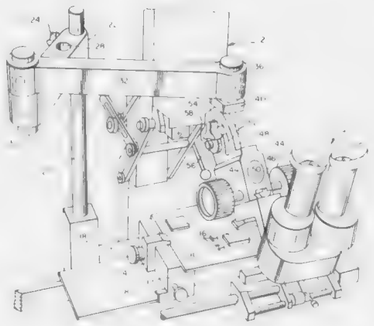
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**4,742,947**

**OPTICAL SYSTEM FOR USE AS STAND ALONE UNIT OR WITH A DEVICE FOR ATTACHING MODULAR ELECTRONIC COMPONENTS TO OR REMOVING THEM FROM A SUBSTRATE**

**Bradford W. Coffman, Norcross, Ga., and Bobby L. Mason, Alexandria, Va., assignors to Pace, Incorporated, Laurel, Md.**

**Filed Oct. 21, 1986, Ser. No. 921,220**
**Int. Cl.[4] B23K *37/00***
**U.S. Cl. 228—105** **28 Claims**



1. An optical system for use with a device for attaching modular electronic components to or removing them from a substrate where each component has a plurality of terminals disposed at the periphery thereof and said substrate includes a plurality of leads respectively associated with said plurality of terminals, comprising:
post means, first arm means vertically adjustably and rotatably mounted on said post means, second arm means rotatably secured to said first arm means, and microscope means mounted on said second arm means, said microscope means being horizontally rotatable and vertically pivotable relative to said substrate for alignment of said terminals with said leads and/or inspection of soldered joints of the leads and terminals;
said component including at least four sides and said device for attaching or removing said components including (a) a source of heated air, (b) a nozzle adapted for surrounding the components but spaced therefrom for directing said heated air to said terminals and leads, and (c) mirror means where at least three of said sides of said component can be viewed through said microscope means via said mirror means to facilitate said alignment and/or inspection while maintaining said microscope means in a substantially horizontally aligned position with respect to said component.

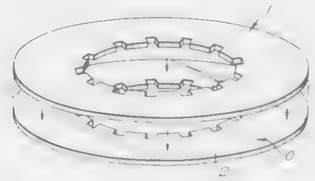


**4,742,948**

**BONDING OF CARBON-BASED COMPONENTS**

**Ronald Fisher, Rugby, and Thomas G. Fennell, Coventry, both of United Kingdom, assignors to Dunlop Limited, United Kingdom**

**Filed Nov. 7, 1985, Ser. No. 795,884**
**Claims priority, application United Kingdom, Nov. 16, 1984, 8428953**
**Int. Cl.[4] B23K *31/00*; F16D *69/00***
**U.S. Cl. 228—119** **15 Claims**



1. A carbon-carbon composite friction disc comprising two or more carbon-carbon composite structural components secured together by a non-structural interface layer of metallic brazing which is fusion-bonded to both of the carbon-carbon composite structural components by pressure and heat only within the brazing range of the brazing material.

14. A method of bonding together two or more carbon-carbon composite structural components of a friction disc comprising applying a layer of high melting point brazing compound between the components, clamping the components together and heating the components in a suitable atmosphere to melt the brazing compound, cooling the components and removing the resulting composite disc from the clamping.

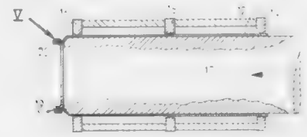
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**4,742,949**

**METHOD AND APPARATUS OF MANUFACTURING A BODY OF A CONTAINER, SAME BODY AND SAME CONTAINER**

**Johannes A. Glerum, Deventer, and Hendrik G. Heyting, Epse, both of Netherlands, assignors to Thomassen & Drijver-Verblifa NV, Netherlands**

**Filed May 29, 1985, Ser. No. 739,020**
**Claims priority, application Netherlands, Jun. 8, 1984, 8401834**
**Int. Cl.[4] B21C *37/08***
**U.S. Cl. 228—156** **11 Claims**



1. The method of making thin wall tubular container body members each having a length L with cover and base portions at their opposite ends and a main body portion joining the cover and base portions having a length l, a wall thickness t and a desired inner diameter d, which comprises the steps of:
(a) cutting sheet metal of thickness T where T is greater than t to provide a sheet metal blank having the thickness T and a length l' which is less than L;
(b) bending the blank transversely into cylindrical form to present an unjoined seam extending longitudinally thereof;
(c) welding the unjoined seam to form a cylindrical blank having the length l', an inner diameter about equal to d, a wall thickness T and a longitudinally extending weld seam which protrudes from the inner and outer surfaces of the cylindrical blank;
(d) fitting the cylindrical blank onto a mandril having a free end portion, a total length of at least L, an outer diameter not greater than d and a longitudinally extending portion which is of the length l and of uniform outer diameter d so that at least a portion of the cylindrical blank which is to become the main body portion of the tubular member extends in the direction from the free end portion of the mandril into overlapping, surrounding relation to the longtiduinally extending portion of the mandril; and
(e) compressing the wall of the cylindrical blank against the outer surface of the mandril with force sufficient to elongate the length of the cylindrical blank axially from the free end portion of the mandril so that that portion of the cylindrical blank which is to become the main body portion of the tubular member completely surrounds the longitudinally extending portion of the mandril and is reduced in wall thickness therethroughout to the value t while imparting the inner diameter d and smooth inner and outer surfaces thereto.

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**4,742,950**

**METHOD OF AND ARRANGEMENT FOR SOLDERING ALUMINUM PARTS**

**Günter Neitz, Detmold, Fed. Rep. of Germany, assignor to Verwaltungsgesellschaft Heinrich Neitz GmbH & Co. KG, Detmold, Fed. Rep. of Germany**

**Filed Mar. 31, 1986, Ser. No. 846,881**
**Claims priority, application Fed. Rep. of Germany, Mar. 30, 1985, 3511854**
**Int. Cl.[4] B23K *31/02, 35/24***
**U.S. Cl. 228—240** **16 Claims**



1. A method of soldering objects, especially aluminum objects, which are provided with respective solder layers, particularly coolers, comprising the steps of
directing a flow of a heated gaseous medium in the course of a soldering operation against the objects to be soldered for the heated gaseous medium to come into intimate heat-transfer contact with the objects and thus to heat the same;
detecting the temperature of the gaseous medium discharged after its contact with the objects;
determining the upper limiting temperature, including continuously obtaining and storing the values of the temperature of the discharged gaseous medium as detected during said detecting step at predetermined time intervals,
forming respective differences between successive ones of such temperature values,
ascertaining an increase in the temperature slope by continuously comparing such differences,
establishing the solder melting termination temperature, which is reached immediately prior to such temperature

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increase, on the basis of the results of said temperature difference forming step, and

setting the upper limiting temperature by several degrees Kelvin about the thus established solder melting termination temperature.

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## CONTAINER FOR BULK FLOWABLE MATERIALS

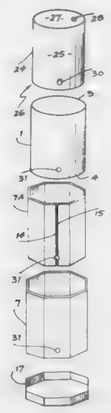
**Stuart Q. Kelly, Camden; Geoffrey M. Maguire, Rosemeadow; Craig Holland, St. Marys; Kevin R. Duell, Montrose; Geoffrey Clark, Berwick; John E. Jones, Boronia Park; Kenneth Green, Blaxland, and Gregory N. Ryan, Linden, all of Australia, assignors to Visy (U.K.) Ltd., England**

**Filed Mar. 20, 1986, Ser. No. 841,584**

**Claims priority, application Australia, Mar. 22, 1985, PG9864**

**Int. Cl.[4] B65D** *5/60, 90/04*

**U.S. Cl. 229—23 R** **20 Claims**



**1**. A container capable of holding over 500 liters of bulk flowable materials comprising an inner tubular member of substantially circular cross-section made of a material adapted to contain bulk flowable materials and to withstand an amount of hoop stress exertable by a bulk flowable material present at or near the volume capacity of said container, the inner tubular member being flexibly deformable in a radial direction when subjected to a distorting force, yet capable of regaining its original configuration after said distorting force is removed, and an outer member of polygonal cross-section substantially co-axially mounted about the inner member, the outer member being the same length as, or longer than, the inner member and being made of a material adapted to withstand column loading when a plurality of such containers are stacked one on top of the other.

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**4,742,952**

## COMPOSITE CARTON

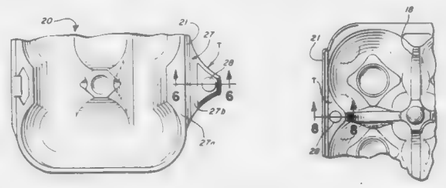
**Kenneth D. Bixler, Lake Forest, Ill.; Daniel E. Keene, Gray, Me., and Fred R. Erxleben, Colts Neck, N.J., assignors to Packaging Corporation of America, Evanston, Ill.**

**Filed Aug. 6, 1986, Ser. No. 893,858**

**Int. Cl.[4] B65D** *43/18, 85/32*

**U.S. Cl. 229—125.36** **13 Claims**

**1**. A composite carton comprising a tray section and a cover section hingedly connected to one side of said tray section and movable relative thereto about a predetermined foldline between open and close positions, said tray and cover sections having complemental open sides disposed in proximate superposed relation when said sections are in a closed position, said sections being formed of dissimilar materials, one section being provided with a laterally projecting marginal portion delimiting the open side thereof, said marginal portion having a plurality of longitudinally spaced means formed therein and offset in one direction from the foldline, the other section being provided with a laterally projecting marginal ledge delimiting the open side thereof, said other section having a first portion extending from said marginal ledge and defining the predetermined foldline, and a second portion extending from said first



portion and coacting with said marginal ledge to sandwich therebetween said one section marginal portion, said second portion being provided with a plurality of longitudinally spaced protruding means fixedly engaging said marginal portion means.

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**4,742,953**

## HINGED COVER CARTON WITH INBOARD LOCKING EXTENSIONS

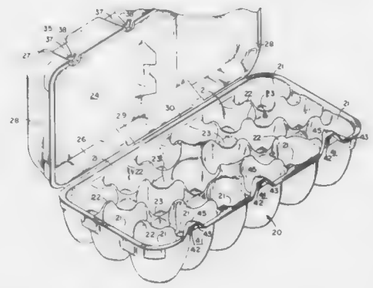
**Kim Jacobs, Farmington, and Raj K. Mangla, Pittsford, both of N.Y., assignors to Mobil Oil Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 831,088, Feb. 20, 1986, Pat. No. 4,625,095, which is a continuation of Ser. No. 630,164, Jul. 12, 1984, abandoned, and a continuation-in-part of Ser. No. 723,715, Apr. 16, 1985, Pat. No. 4,625,906, which is a continuation-in-part of Ser. No. 481,512, Apr. 1, 1983, abandoned. This application Sep. 17, 1986, Ser. No. 908,430**

**The portion of the term of this patent subsequent to Dec. 2, 2003, has been disclaimed.**

**Int. Cl.[4] B65D** *85/32*

**U.S. Cl. 229—2.5 EC** **21 Claims**



**1**. A carton moulded from a sheet of plastic resin material by thermoforming and comprising:

a bottom section having cells for receiving articles to be packaged;

a cover formed integrally with the bottom section and having a top, a front wall, side walls and a back wall which is resiliently hinged at its lower edge to the rear edge of the bottom section;

the front wall of the cover having a plurality of inwardly extending locking flutes with a locking aperture in at least some of said flutes;

the regions between at least some of said cells extending upwardly and terminating at a top edge, said regions forming a recess with the top of each recess being a locking extension corresponding to each locking aperture, each locking extension extending from the rear of a recess forwards to said top front edge, each locking extension



engaging with the lower edge of the corresponding locking aperture when the cover is in the closed position.

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**4,742,954**

## POSTAL CARD

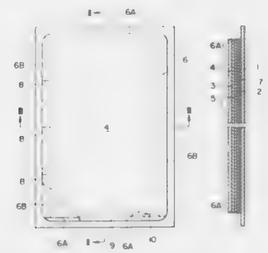
**Shigenary Shishido, Tokyo, Japan, assignor to Sayama Kako Co., Ltd., Tokyo, Japan**

**Filed Jun. 26, 1987, Ser. No. 66,624**

**Claims priority, application Japan, Jun. 28, 1986, 61-99670[U]**

**Int. Cl.[4] B42D** *15/02*

**U.S. Cl. 229—92.8** **8 Claims**



**1**. A postal card having a cover sheet releasably bonded to the printed surface of a card substrate, comprising:

a card substrate **1** on which secret contents are printed,

a transparent protection film **2** made of a thermoplastic resin bonded by means of a transparent pressure sensitive layer **7** to the printed surface of said card substrate **1**,

a cover sheet **4** applied with a lamination film **3** made of a thermoplastic resin different from the thermoplastic resin for said protection film **2**, and

a coupling layer **5** made of the same kind of the thermoplastic resin as that for said lamination film **3** and supplied between the protection film **2** and the lamination film **3** while heated to a temperature within a range from the softening point to the melting point of said resin for releasably coupling the protection film **2** and the lamination film **3**, in which said protection film **2**, said coupling layer **5** and said lamination film **3** are firmly secured with each other at least at a fixing area **6A** of the outer peripheral region **6** and releasing area **6B** is formed at another portion of said outer peripheral region **6**.

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**4,742,955**

## FLIP-TOP PACKET, PARTICULARLY FOR CIGARETTES

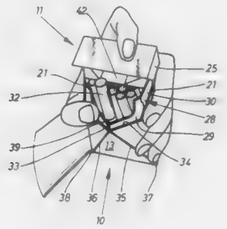
**Jürgen Focke, and Kurt Liedtke, both of Verden, Fed. Rep. of Germany, assignors to Focke & Co. (GmbH & Co.), Verden, Fed. Rep. of Germany**

**Filed Jan. 29, 1987, Ser. No. 8,497**

**Claims priority, application Fed. Rep. of Germany, Feb. 3, 1986, 3603213**

**Int. Cl.[4] B65D** *5/66*

**U.S. Cl. 229—123** **6 Claims**



**1**. A flip-top cigarette packet made of cardboard and having a front wall, rear wall and side walls, a hinged lid pivotably adjoining the top of the rear wall, and a collar which partly projects upwardly out of the packet in an upper region of the front wall and of the side walls and which is surrounded by the hinged lid in the closed position of the packet, said packet characterized:

in that a front wall (**29**) of the collar (**28**) has a central vertical fold line (**33**);

in that two continuation fold lines (**35, 36**) in the packet front wall (**13**) respectively extend from the bottom end of the vertical fold line (**33**) at the top edge (**34**) of the front wall (**13**) to bottom corners (**37, 38**) of the front wall (**13**) of the packet (**10**);

in that supplementary fold lines (**40, 41**) in the collar front wall (**29**) adjoin the bottom end of the vertical fold line (**33**) and extend toward the bottom corners (**37, 38**) in alignment with the continuation fold lines (**35, 36**) of the packet front wall (**13**);

in that all of the fold lines (**33; 35, 36; 40 41**) are pre-shaped grooves on the inside of the packet front wall (**13**) and collar front wall (**29**); and

in that fold lines are formed only in said packet front wall (**13**) and said collar front wall (**29**), said packet rear wall (**15**) and said hinged lid being free of fold lines, whereby squeezing pressure applied to said side walls causes only said packet front wall (**13**) and said collar front wall (**29**) to be outwardly deformed to form an enlarged approximately V-shaped opening to facilitate removal of a cigarette from a full packet, and whereby the packet returns to an un-deformed state upon release of the squeezing pressure.

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**4,742,956**

## ZONE CONTROL APPARATUS FOR CENTRAL HEATING AND/OR COOLING SYSTEMS

**Alex Zelczer, 3840 Severn Rd., Cleveland Hts., Ohio 44118**

**Division of Ser. No. 757,526, Jul. 22, 1985, Pat. No. 4,600,144, which is a division of Ser. No. 554,952, Nov. 25, 1983, Pat. No. 4,545,524. This application Jun. 12, 1986, Ser. No. 873,512**

**Int. Cl.[4] G05D** *23/00*

**U.S. Cl. 236—46 R** **11 Claims**



**5**. A zone control apparatus for central heating and/or cooling systems having a source of conditioned fluid controlled by a thermostat in an energizing circuit for the source of conditioned fluid and respective conduits for directing the conditioned fluid to respective zones for conditioning the environment therein, said apparatus comprising plural flow control means for controlling fluid flow through respective conduits, and an energizing circuit for said flow control means separate and independent from the energizing circuit for the source of conditioned fluid, said energizing circuit for said flow control means including cycle controller means for automatically cycling and actuating independently of the thermostat each flow control means between high and low flow conditions at preselected times thereby to permit and shut-off heating or cooling of respective zones as during their cyclical periods of use and non-use, respectively, and plural selectable switch means each having plural states selectable independently of said cycle controller means, said plural states including a first

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state for commanding a respective flow control means to a high flow condition, a second state for commanding a respective flow control means to a low flow condition, and a third state for allowing automatic cycle control of the respective flow control means by said cycle controller means, each flow control means including a fluid actuated flow control device, said cycle controller means including a cycle control valve having an outlet and a pair of inlet means respectively for connecting to a source of pressurized fluid and pressure relief means, and said selectable switch means including a switching valve having outlet means for connecting to the fluid actuated control device of the respective flow control means and three inlet means respectively for connecting to the outlet of said cycle control valve, the source of pressurized fluid and the pressure relief means.

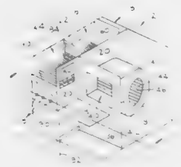
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**4,742,957**

## HEAT RECOVERY VENTILATOR

**Stephen Mentuch, 390 Harvey Avenue, Toronto, Ontario, Canada M6T 4L8**

**Filed Sep. 20, 1985, Ser. No. 778,009**
**Int. Cl.[4] F24F *7/00***
**U.S. Cl. 237—46** **14 Claims**



1. A Heat Recovery Ventilator for use in association with an air duct in a central air distribution system including:
(a) a housing integrally connected to and communicating with said air duct;
(b) an enclosure located within said housing, said enclosure having a ventilation chamber and a fresh air chamber;
(c) heat pipe means located within said enclosure so as to present one end thereof in said ventilation chamber and the other end thereof in said fresh air chamber;
(d) a ventilation conduit means communicating with said ventilation chamber of said enclosure;
(e) fresh air conduit means communicating with said fresh air chamber of said enclosure;
(f) first baffle means extending exteriorally outwardly from said enclosure to said housing said first baffle means presenting an aperture there through;
(g) second baffle means extending generally exteriorally outwardly from said enclosure and said first baffle means below said aperture to present an opening between said second baffle means and said housing, with said opening communicating with said ventilation chamber;
(h) a single blower co-operating with said aperture of said first baffle means and said enclosure so as to:
(i) circulate air through said air duct means of said central air distribution system through said first aperture means;
(ii) introduce fresh air through said fresh air conduit into said fresh air chamber and across one end of said heat pipe means and through said first aperture for mixing with said circulating air;
(iii) ventilate a portion of said circulating air around said second baffle through said opening into said ventilation chamber and across one end of said pipe means to transfer thermal energy between said ventilated air and said fresh air and force said ventilated air through said ventilation conduit and out said distribution system so as to replenish said ventilated air with said fresh air.

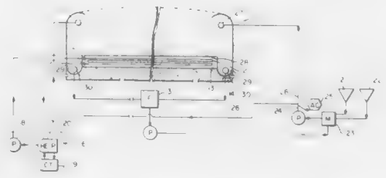
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**4,742,958**

## METHOD FOR MAKING ARTIFICIAL SNOW

**Alfio Bucceri, Newmarket, Australia, assignor to Permasnow (Australasia) Limited, Herston, Australia**

**PCT No. PCT/AU85/00267, § 371 Date Jul. 3, 1986, § 102(e) Date Jul. 3, 1986, PCT Pub. No. WO86/02936, PCT Pub. Date May 22, 1986**
**PCT Filed Nov. 4, 1985, Ser. No. 887,828**
**Claims priority, application Australia, Nov. 6, 1984, PG8003; Apr. 9, 1985, PH0057**
**Int. Cl.[4] A01G *15/00; F25G 1/00***
**U.S. Cl. 239—2.2** **18 Claims**



1. A method for making artificial snow comprising the steps of:
(a) mixing water with a water swellable polymeric material at less than the maximum water retention capacity of the material to form an aqueous gel;
(b) aerating the aqueous gel; and
(c) freezing the aerated gel to form snow crystals.

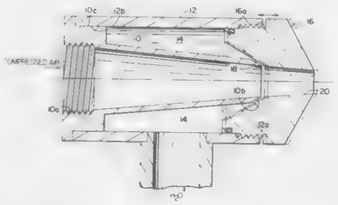
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**4,742,959**

## SNOW GUN

**Yaroslav I. Stanchak, Bethel; Niilo J. Makkonen, Bridgewater Corners, and Victor Waryas, Pittsfield, all of Vt., assignors to Killington Ltd., Killington, Vt.**

**Filed Nov. 20, 1986, Ser. No. 933,227**
**Int. Cl.[4] F25C *3/04; A01G 15/00***
**U.S. Cl. 239—14.2** **16 Claims**



1. In a system for making snow from compressed air and water, an improved nozzle structure comprising means defining a longitudinally extending air passageway with a generally cylindrical inlet end portion adapted for connection with a source of air under pressure,
said air passageway defining means including a cap defining an outlet end portion of said air passageway of smaller cross sectional area than that of said inlet end portion,
said air passageway defining means further including a convergent air nozzle member intermediate said inlet and outlet end portions,
said cap defined outlet end portion of said air passageway having a conical configuration that continues the convergent shape of said air nozzle member,
means for locating/positioning said outlet defining cap longitudinally relative to said convergent air nozzle member to provide an opening between an upstream end of said outlet defining cap and a downstream end of said convergent nozzle member, and
outer housing means defining a water plenum chamber communicating with said opening and adapted for communication with a source of water under pressure to restrict the effective area of the outlet end portion of said air passageway defined by said cap so that the air/water mixture can be closely controlled to optimize performance of the air/water nozzle structure in a wide variety of ambient temperature and humidity conditions.

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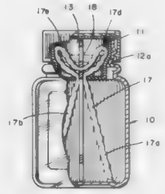


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## WICK DISPENSER

**Francisco P. Bustillo, and Jordi C. Juve, both of Barcelona, Spain, assignors to O'Connor Products Company, Inc., Redford, Mich.**

**Filed May 1, 1986, Ser. No. 858,199**
**Int. Cl.[4] A61L *9/12***
**U.S. Cl. 239—47** **14 Claims**



1. A wick dispenser for volatile liquids including a bottle with a bottom and a mouth, an insert cup in the mouth having an opening in the bottom of the cup, a wick being folded to define a bight traversing the opening and engaging the wick at the outer extremity of the bight, wherein the improvement comprises:
spaced cross bars on said wick carrier, one of said bars engaging the inside of the bight, and the other of said bars being adjacent the outside of the bight, stop means on said wick carrier for limiting the extension of said wick carrier and of the wick to a preselected extended position from the bottle, a different cross bar on said wick carrier located between the folded portions of the wick and engageable with the folded portions to urge them against the structure of the opening when said stop means engages the underside of the insert cup whereby closure of the opening is assisted.

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**4,742,961**

## EXHAUST GAS NOZZLE INCLUDING A COOLING AIR DIVERTER

**Roy R. Starke, Palm Beach Gardens, Fla., assignor to United Technologies Corporation, Hartford, Conn.**

**Filed May 4, 1987, Ser. No. 45,343**
**Int. Cl.[4] B64D *33/04; B63H 11/117***
**U.S. Cl. 239—127.1** **3 Claims**

1. An exhaust gas nozzle for an aircraft gas turbine engine which includes a supply duct for receiving cooling air, said supply duct including a first static seal and a second static seal; a first member movable in response to thrust redirection, including a cooling air passage therein, conduit means connected to said duct, for occasionally directing cooling air thereto, and diverter means for selectively directing said cooling air to either said first member or to said conduit means in response to the position of said first member, said diverter means comprising: a pivotally movable arm assembly having an outer flap, an inner flap and a pivotally mounted floating flap disposed therebetween, said inner and outer flaps independently pivotable about a common hinge with said floating flap pivotable about a second hinge fastened at an outward end of said inner flap, said inner flap including a lug which extends through a lug



access hole in said outer flap, said lug being contactable by said first member for moving said inner flap into engagement with, said first seal, said outer flap being movable out of engagement with said second seal in response to contact with said first member, said floating flap being slidably engageable with said outer flap for preventing cooling air leakage through said lug access hole during movement of said flaps.

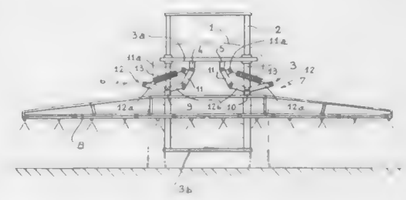
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**4,742,962**

## DEVICE FOR SUSPENSION OF A DISTRIBUTOR BAR FOR SPREADING PLANT-PROTECTIVE LIQUIDS

**Patrick Zanghelli, Belleville sur-Saone, France, assignor to Berthoud S.A., Belleville sur-Saone, France**

**Filed Jun. 5, 1987, Ser. No. 58,801**
**Claims priority, application France, Jun. 13, 1986, 86 08977**
**Int. Cl.[4] B05B *1/20***
**U.S. Cl. 239—167** **5 Claims**



1. In a device for suspension of a distributor bar for spreading plant-protective liquids with respect to a frame supported by a carrier machine and constituted by two assemblies disposed symmetrically with respect to the centre of the distributor bar,
each assembly comprises:
a connecting rod pivoting with respect to the frame by one of its ends;
a bent rocking lever of which the apex is mounted to pivot with respect to the distributor bar, whilst the end of its arm oriented towards the centre is articulated on the second end of the connecting rod;
and a draw spring of which the ends are fastened respectively to the connecting rod and to the end of the second arm of the rocking lever turned outwardly.

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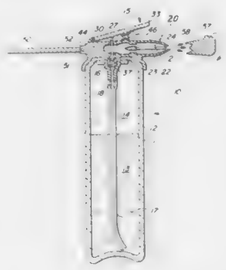


**4,742,963**

## AEROSOL AIRBRUSH

**Douglas A. Marvaldi, 180 N. Park Ave., Winter Park, Fla. 32789**

**Filed Feb. 21, 1986, Ser. No. 831,925**
**Int. Cl.[4] B05B** *1/34*
**U.S. Cl. 239—337** **11 Claims**



1. An aerosol sprayer apparatus for applying liquid cosmetics, and the like, comprising in combination:

a pressurized container having a liquid makeup compound therein under pressure;

a nozzle having a housing and attached to the container and having a flow restrictor and a needle supported on the flow restrictor, the flow restrictor having a plurality of openings therethrough;

valve means for releasing the pressurized liquid in the pressurized container responsive to actuation thereof and being mounted to said container adjacent said nozzle, said valve means having a hinged finger lever mounted for actuating the valve means, said valve means hinged finger lever being hinged to said nozzle housing between a pair of finger lever sides formed in said housing; and

handle means hinged to the nozzle housing and having a first storage position and a second operating position said handle means being pinned to said nozzle housing and swingable from the first position adjacent the pressurized container to a second position and having a latch means for holding said handle in the second position, whereby an aerosol cosmetic applicator uses a pressurized storage container.

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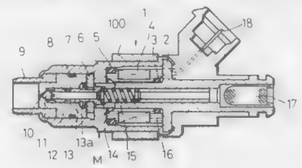
## ELECTROMAGNETIC FUEL INJECTOR

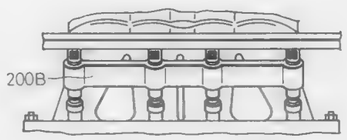
**Hideki Ito; Motohiro Baba; Hitoshi Takeuchi; Toshiro Makimura, and Takaaki Takagi, all of Obu, Japan, assignors to Aisan Kogyo Kabushiki Kaisha, Obu, Japan**

**Filed Oct. 23, 1986, Ser. No. 922,170**
**Claims priority, application Japan, Oct. 30, 1985, 60-243279; Dec. 9, 1985, 60-189486; Dec. 9, 1985, 60-189487**
**Int. Cl.[4] B05B** *15/00, 1/30;* **F02M** *61/14*
**U.S. Cl. 239—397.5** **14 Claims**

1. In an electromagnetic fuel injector with injector nozzle means receivable within an internal combustion engine, said injector comprising a fixed iron core, a solenoid formed by winding a coil around said fixed iron core, an injector casing surrounding said solenoid and formed of a material having high magnetic permeability, a movable iron core inserted between said fixed iron core and said injector casing, a compression spring normally biasing said movable iron core toward said injection nozzle means of said injector, a valve body connected to said movable iron core, a valve housing incorporated in a front portion of said injector casing and slidably supporting said valve body, said valve housing being formed at its front end portion with a valve seat adapted to abut against said valve body, the improvement comprising a radiation member closely fitted in heat conductive engagement on an outer periphery of said injector casing at at least a front portion of said injector casing located outward of said nozzle means for location externally of said engine in order to dissipate heat from said injector.

7. An assembly comprising electromagnetic fuel injectors mounted on a multi-cylinder engine, each injector comprising a fixed iron core, a solenoid formed by winding a coil around said fixed iron core, an injector casing surrounding said solenoid and formed of a material having high magnetic permeability, a movable iron core inserted between said fixed iron core and said injector casing, a compression spring normally biasing






said movable iron core toward an injection nozzle of said injector, a valve body connected to said movable iron core, a valve housing incorporated in a front portion of said injector casing and slidably supporting said valve body, said valve housing being formed at its front end portion with a valve seat adapted to abut against said valve body; and a connection means externally of said engine extending longitudinally between said fuel injectors and in heat conducting intimate engagement therewith for connecting said fuel injectors and radiating heat from said fuel injectors.

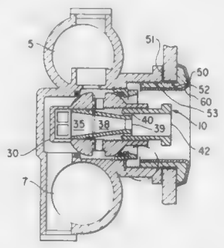
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**4,742,965**

## HYDROTHERAPY FITTING ASSEMBLY

**Robert Messinger, Cranford, and Samuel J. Tobias, Edison, both of N.J., assignors to Hayward Pool Products, Inc., Elizabeth, N.J.**

**Continuation of Ser. No. 668,523, Nov. 5, 1984, abandoned. This application Sep. 16, 1986, Ser. No. 907,960**
**Int. Cl.[4] A61H** *9/00*
**U.S. Cl. 239—417.3** **3 Claims**



1. A hydrotherapy fitting assembly comprising, in combination:

(1) a housing having:

(a) a water inlet;



(b) an air inlet; and

(c) an axial socket for reception of a nozzle, the socket being in fluid flow connection with the water inlet and the air inlet for axial water flow in the socket to the nozzle; the socket having cylindrical outer and inner end portions and an enlarged intermediate portion constituting a circumferential recess;

(2) a nozzle in the socket, receiving the axial flow of water in the socket from the water inlet and air from the air inlet, and projecting them in admixture from the housing as a jet stream;

(3) the nozzle comprising two pieces threadably and fixedly linked together for pivoting and rotating movement together in the socket:

(a) a cylindrical housing piece defining a central chamber having a cylindrical side wall and a closed end wall constituting a valve seat, and a plurality of water inlets extending through the side wall adjacent the closed end wall and constraining water flow therethrough in a direction at an angle to the axial flow in the axial socket; and at least one air inlet extending through the side wall at a central portion thereof; and

(b) a cylindrical plug valve piece having an axial water inlet at one end and an axial water outlet at the other end, threadably mounted in the central chamber of the cylindrical housing piece, and movable axially on the threads in the central chamber of the cylindrical housing between limiting positions extending across and closing off the side water inlets, and fully exposing and opening the side water inlets, with intermediate positions partially exposing and opening the side water inlets; and leaving the air inlet exposed and open in both limiting positions of the valve;

(i) the cylindrical plug valve having a valve portion having solid cylindrical side walls enclosing a through axial passage with an axial inlet at one end, for entry of a flow of water from the side water inlets into the axial inlet in a flow volume according to the exposure of the side water inlets in the open positions of the valve, and constraining such flow in an axial direction, and in the closed position of the valve when against the end wall valve seat closing off the axial inlet; and an axial aspirating water outlet adjacent the air inlet at the other end; the side wall water inlets in the cylindrical housing in cooperation with the axial socket and the axial inlet and axial passage in the cylindrical plug valve constraining water flow therethrough first in an axial direction, then in a direction at an angle thereto, and then again an axial direction, and thereby in an S-curved path;

(ii) the cylindrical plug valve piece having a nozzle portion comprising:

(c) an axial air inlet at the outer periphery of the axial water outlet;

(d) an axial water inlet in flow communication with the aspirating water outlet of the valve portion;

(e) an axial nozzle mixing chamber receiving air from the axial air inlet and water from the axial aspirating water outlet of the valve portion; and

(f) a jet nozzle defining the axial water jet outlet of the plug valve piece and projecting mixed air and water from the nozzle mixing chamber;

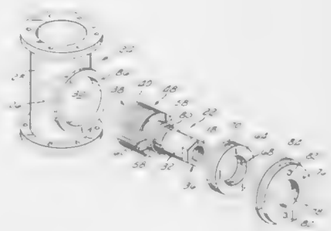
(4) the cylindrical housing piece having an outside wall that is cylindrical at each end and spherical intermediate the ends, with a circumferential recess centrally of the spherical portion, and with the air inlet opening into the recess, the housing being pivotable and rotatable in the socket with the spherical portion in the recess of the socket, for angular and rotated movement of the nozzle among a plurality of positions, and so direct flow through the nozzle.

**4,742,966**

## MEDIA MILL SCREEN ASSEMBLY

**Edward J. Szkaradek, Santa Ana, and John J. Corrigan, Garden Grove, both of Calif., assignors to Morehouse Industries, Inc., Fullerton, Calif.**

**Continuation-in-part of Ser. No. 746,440, Jun. 21, 1985, Pat. No. 4,624,418, which is a continuation-in-part of Ser. No. 627,918, Jul. 5, 1984, abandoned, and a continuation-in-part of Ser. No. 663,049, Oct. 19, 1984, Pat. No. 4,651,935. This application Oct. 4, 1985, Ser. No. 784,865**
**Int. Cl.[4] B02C** *17/16*
**U.S. Cl. 241—69** **14 Claims**



1. A milling apparatus comprising:

a vessel for receiving grinding media and a liquid having small particles therein which are to be milled or reduced in size within the vessel;

a motor driven rotor in said vessel for agitating the grinding media;

a liquid inlet through which said liquid is introduced as the grinding media is agitated by the rotor;

a tubular liquid outlet housing extending radially outward from a passage through said vessel and terminating in an open end;

a plurality of ring-shaped screen elements arranged in a stack within said vessel;

a tubular carrier element extending through said outlet housing, said carrier element defining an interior channel and extending through said stack to support said screen elements so that all of the screen elements can be removed together upon the removal of said carrier, said carrier having one or more windows allowing fluid communication between said vessel and said interior channel, said screen elements surrounding said windows and having slots formed in their axial faces so that the slots and the adjacent screen elements define openings extending between said vessel and said interior channel, said openings being sized to prevent the grinding media from passing into the openings as said liquid flows radially inward through said stack and windows and into said interior channel;

an outlet formed by an end of said carrier which is open and terminates outside of said vessel, liquid exiting the vessel through said outlet; and

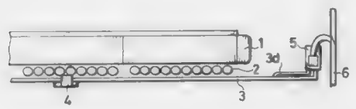
means for removably fastening said carrier element to said outlet housing so that said carrier and screen elements can be quickly and easily removed.

**4,742,967**

## SYSTEM FOR DELIVERING PACKAGES TO AN AUTOMATIC WINDER

**Hiroaki Sanno, Nonoichi; Takaharu Matsuoka, and Kenji Katada, both of Kanazawa, all of Japan, assignors to Murao Boki Kabushiki Kaisha, Kanazawa, Japan**

**Continuation-in-part of Ser. No. 825,485, Feb. 3, 1986, abandoned. This application Jan. 12, 1987, Ser. No. 5,895**
**Claims priority, application Japan, Feb. 15, 1985, 60-28803; Apr. 15, 1985, 60-79908**
**Int. Cl.[4] B65H** *54/26, 67/06*
**U.S. Cl. 242—35.5 A** **4 Claims**




1. A system for delivering cops wound by ring spinning frames to cop magazines in an automatic winder, wherein a leading yarn end is caught and put in an opening of a bobbin in transportation, comprising:
- a disposal machine for processing said leading yarn end and for disposing the leading yarn end of each cop in the opening of its respective bobbin;
- a conveyor having a plurality of guide rails for circulating a plurality of trays for transporting said cops, the conveyor line being connected to said disposal machine and including an upper line for feeding said cops and lower line for returning vacant trays;
- a transfer machine provided on said upper line; and
- means for moving said transfer machine in opposite directions for stopping in front of one of said cop magazines to which the supply of a cop is required, for picking up said cop from said tray and for transferring said cop to said cop magazine.

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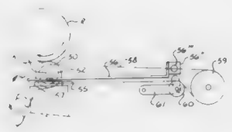
**4,742,968**

## BEAM WINDER AND METHOD OF USING SAME

**William O. Young, Jr., Spartanburg; Mansel A. Jennings, Inman; George H. Lark, and Julian E. Hankinson, Jr., both of Spartanburg, all of S.C., assignors to Young Engineering, Inc., Spartanburg, S.C.**

**Filed May 7, 1986, Ser. No. 860,642**
**Int. Cl.[4] B65H** *17/02, 17/08, 23/00*
**U.S. Cl. 242—65** **33 Claims**





1. An improved winder for producing a roll of web material comprising:
- (a) a support frame;
- (b) a pair of spaced apart arms independently pivotally secured to said frame, said arms having chuck means at outer free ends of same for receiving and supporting a winding core therebetween;
- (c) means for moving said arms about said pivotal connections to properly locate said arms for receiving web thereabout;
- (d) a surface drive roll located across the space between said arms and supported for rotation thereat;
- (e) drive means for at least one of said chucks and for said surface drive roll;
- (f) pressure sensor means associated with said surface drive roll for determining nip pressure generated at two interfaces between said web being wound and said surface drive roll; and
- (g) control means operatively associated with said arm moving means and said sensor means for independently locating each of said arms relative to said drive roll to maintain a predetermined nip pressure at said drive roll interfaces.

28. A method of winding a web onto a core while controlling density of the web on the core comprising the steps of:
- (a) supporting a core between two independently, pivotally mounted support arms, adjacent and contactable with a surface drive roll;
- (b) applying a rotational driving force to said core and said surface drive roll while feeding a web to said surface drive roll in a fashion that said web is forwarded by said surface drive roll onto said core and is wound therearound;
- (c) measuring nip pressure at a plurality of interfaces between the surface drive roll and the roll of web being formed; and
- (d) independently positioning each of said support arms relative to said surface drive roll to maintain nip pressure at each of said interfaces at a predetermined level.

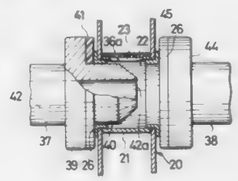
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**4,742,969**

## WINDING OF FLEXIBLE ELONGATE MATERIAL

**Yuichi Masuda, Namerikawa, and Kozo Shimizu, Kurobe, both of Japan, assignors to Yoshida Kogyo K. K., Tokyo, Japan**

**Filed May 5, 1986, Ser. No. 859,490**
**Claims priority, application Japan, May 17, 1985, 60-105576**
**Int. Cl.[4] B65H** *75/00*
**U.S. Cl. 242—67.1 R** **3 Claims**




1. An apparatus for winding a flexible elongate material, comprising:
- (a) a spool for winding thereon the flexible elongate material, including a hollow cylindrical body having an axial hole extending from one end thereof and defined by an annular peripheral wall of said spool body, and a radial opening extending through said annular peripheral wall and communicating with said axial hole;
- (b) a pair of oppositely disposed first and second drive shafts relatively movable toward and away from each other for releasably holding said spool, said first and second drive shafts being rotatable about their own axes to revolve said spool,
- said first drive shaft having at its one end an annular flange engagable with said one end of said spool body and an extension projecting from said annular flange receivable in said axial hole in said spool body,
- said first drive shaft including an axial suction passageway having one end communicative with said axial hole in said school body; and
- (c) holding means associated with said first drive shaft and cooperative with said radial opening in said school body for holding a leading end of the flexible elongate material on said spool body,
- said holding means comprising a vacuum source connected to the other end of said suction passageway for producing a negative pressure in said axial hole, thereby creating a suction force acting around said radial opening.



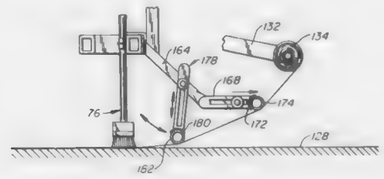
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**4,742,970**

## PAVING FABRIC STRETCHING MECHANISM

**Mounque Barazone, P.O. Box 5217, Cottonwood, Calif. 96022**

**Continuation of Ser. No. 822,201, Jan. 24, 1986, Pat. No. 4,664,332, which is a continuation-in-part of Ser. No. 529,627, Sep. 9, 1983, Pat. No. 4,555,073. This application Apr. 6, 1987, Ser. No. 34,907**
**Int. Cl.[4] E01C** *11/16*
**U.S. Cl. 242—86.52** **1 Claim**




1. A mechanism for stretching and smoothing a sheet of paving fabric material unwinding from a roll, carried by a vehicle, onto a surface comprising:
- a. a leg fixed to the vehicle and extending therefrom;
- b. a first bar intended for engaging one side of the sheet of material;
- c. a second bar intended for engaging the one side of the sheet of material after engagement by said first bar;
- d. means for independently adjustably holding said first bar at a position relative to said leg;
- e. means for independently adjustably holding said second bar at a position relative to said leg;
- f. means for forcing and brushing the one side of the sheet against the surface after engagement of said sheet with said first and second bars.

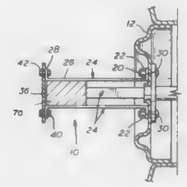
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**4,742,971**

## ATTACHMENT WINCH FOR VEHICLE WHEELS

**John W. Wallace, and Robert B. Wallace, both of Corpus Christi, Tex., assignors to Hub Winch, Inc., Corpus Christi, Tex.**

**Filed Nov. 24, 1986, Ser. No. 933,645**
**Int. Cl.[4] B66D** *3/00*
**U.S. Cl. 242—95** **4 Claims**




1. An attachable winch for vehicle wheels mounted on a vehicle by threaded lugs and lug nuts comprising,
- a plurality of attachable brackets having an elongate body and first and second ends perpendicular to the body,
- said first ends having a first opening sized to fit over a plurality of lug sizes and adapted to be secured to a lug by a lug nut,
- said second ends having a second opening,
- a plate having a plurality of holes positioned radially and circumferentially for alignment with at least three lugs of various vehicles having lugs of differing radial and circumferential positions,
- a plurality of nuts and bolts for securing the second ends to the plate whereby the apparatus may be used with different vehicles having different lug patterns, and
- said holes are positioned to include four first holes spaced a radial distance of approximately 3.25 inches from the center of the plate and positioned 90 degrees apart, four second holes which are positioned a radial distance of approximately 2.75 inches from the center of the plate wherein the second holes are angularly spaced 60 degrees or multiples thereof from each other, three third holes positioned at a radial distance of approximately 2.75 inches from the center of the plate at angular distances of approximately 72 degrees or multiples thereof from each other, and four fourth holes at a radial distance of 2.125 inches from the center of the plate at an angular position of 90 degrees to each other.

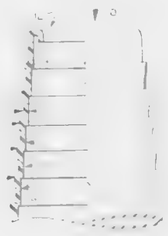
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**4,742,972**

## CARRIER FOR TEXTILE YARN

**Karl H. Rost, and Samuel F. Adams, both of Greenville, S.C., assignors to Sonoco Products Company, Hartsville, S.C.**

**Filed May 13, 1987, Ser. No. 49,118**
**Int. Cl.[4] B65H** *75/10*
**U.S. Cl. 242—118.31** **12 Claims**



7. A carrier for textile yarn characterized by a construction designed to prevent undesirable sloughing-off or migration of the textile yarn during winding and unwinding and to reduce the amount of material needed to construct said carrier while retaining desired crush strength; said carrier comprising:
- an elongate body comprising molded plastic material, a generally conical shape having an inward taper extending at an acute angle to the longitudinal axis of said body, a transverse circular cross-section, and an outside surface for receiving wound textile yarn thereon and an inside surface for mounting said carrier on a spindle of a textile machine for winding and unwinding of the yarn;
- said outside surface comprising consecutive stepped portions extending around said body along said substantially the length of said carrier for defining a generally saw-toothed longitudinal cross-section and yarn carrying areas which prevent undesirable sloughing-off or migration of the textile yarn during winding and unwinding, each of said stepped portions comprising a first surface extending transversely inwardly in the longitudinal direction of said body at an acute angle to the longitudinal axis of said body, a second surface extending from said first surface in the longitudinal direction of said body and generally parallel with the longitudinal axis of said body, and a third

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surface extending from said second surface transversely outwardly of said body at an angle of approximately 90° to the longitudinal axis of said body;

said inside surface comprising consecutive stepped portions extending around said body along substantially the length of said carrier for defining a generally saw-toothed longitudinal cross-section and for cooperating with said outside surface to reduce the amount of material needed to construct said carrier, each of said stepped portions comprising a first surface extending transversely inwardly in the longitudinal direction of said body at an acute angle to the longitudinal axis of said body, and a second surface extending from said first surface transversely outwardly of said body; and

opposing stepped portions of said outside surface and said inside surface being positioned in a generally longitudinally staggered relationship for defining transverse portions in said body of the same radial thickness as would be present if said outside and inside surfaces were of a smooth unstepped configuration to provide reinforcement and crush strength to said carrier.

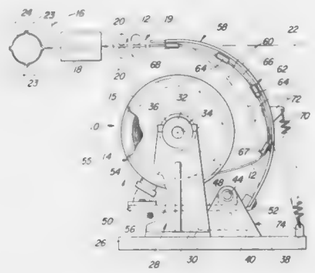
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**4,742,973**

## WIRE FEED CONTROL

**Lawrence Stomski, Sterling Heights, and John Zacharek, Detroit, both of Mich., assignors to Michael Ladney, Grosse Pointe Shores, Mich.**

**Filed May 21, 1987, Ser. No. 52,718**
**Int. Cl.[4] B65H** *59/04*
**U.S. Cl. 242—156** **17 Claims**



**1**. A wire play out control apparatus for delivering a coiled wire strand from a spool having an axis to an intermittent wire strand feeder comprising:

a support;

means for rotatably mounting the spool on the support;

an elongated member including an elongated strand guide for guiding the wire strand along the length of said member, said strand guide having an inlet and an outlet;

means for biasing said strand guide outlet to a predetermined position;

braking means for engaging and disengaging said spool in response to displacement of said strand guide outlet to and from said predetermined position; and

means for mounting said strand guide for movement of the strand guide inlet parallel to the spool axis, whereby the strand guide inlet adjusts for alignment with the spool play out position.

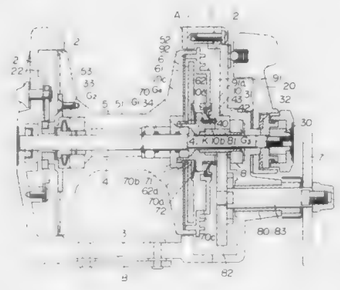
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**4,742,974**

## DRAG MECHANISM FOR A FISHING REEL

**Yoshiyuki Furomoto, Sakai, Japan, assignor to Shimano Industrial Company Limited, Osaka, Japan**

**Filed Jun. 1, 1987, Ser. No. 55,890**
**Claims priority, application Japan, Jun. 17, 1986, 61-93162[U]**
**Int. Cl.[4] A01K** *89/015;* **F16J** *15/32*
**U.S. Cl. 242—217** **6 Claims**



**1**. A fishing reel, comprising:

a spool shaft;

a spool supported rotatably on said spool shaft; and

a drag mechanism comprising:

(i) a drag disc disposed opposite to one axial end face of said spool;

(ii) a drag washer interposed between said axial end face of said spool and said drag disc;

(iii) a cover fixed to said spool, said cover covering an outside surface of said drag disc and said drag washer and having a center through-bore through which said spool shaft passes;

(iv) a sealing member disposed between an inner periphery of said through-bore and said spool shaft passing therethrough; and

(v) a contact resistance changing means for causing said sealing member to have a first contact resistance with said inner periphery of said through-bore and said spool shaft when said drag mechanism is in a non-operating mode and to have a second contact resistance with said inner periphery of said through-bore and said spool shaft when said drag mechanism is in an operating mode, said first contact resistance being less than said second contact resistance.

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**4,742,975**

## MOUNTING STRUCTURE FOR A TURBOJET ENGINE

**Guy R. Pachomoff, Corbeil Essonnes, and Raymond M. L. Rolinat, Avon, both of France, assignors to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation (SNECMA), Paris, France**

**Filed Jun. 9, 1987, Ser. No. 60,026**
**Claims priority, application France, Jun. 10, 1986, 86 08336**
**Int. Cl.[4] B64D** *27/12*
**U.S. Cl. 244—54** **16 Claims**

**1**. An engine mounting structure for attaching a turbojet engine to a support strut of an aircraft comprising:

(a) a plurality of support rods attached to the support strut and the engine so as to normally support the engine;

(b) a safety rod adapted to be interconnected between the support strut and the engine;

(c) attaching means attaching the safety rod to the support strut and the engine such that an end of the support rod is movable between an intermediate position wherein the safety rod does not support any engine weight and extreme positions wherein it supports the at least a portion of the weight of the engine; and,



(d) locking means to lock the end of the safety rod in one of its extreme position.

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**4,742,976**

## RAM AIR TURBINE AND DEPLOYMENT MECHANISM

**Mordehy Cohen, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.**

**Filed Jun. 10, 1985, Ser. No. 743,086**
**Int. Cl.[4] B64D** *41/00*
**U.S. Cl. 244—58** **7 Claims**



**1**. A ram air turbine and deployment mechanism comprising, a rotatable hub assembly wih blade means, a gear housing at the rear of said rotatable hub assembly, a strut connected to said gear housing at an angle thereto and supporting said ram air turbine for movement between a stowed position within an aircraft fuselage and a deployed position with the rotatable hub assembly outside the aircraft fuselage, means mounting the strut for pivotal movement about a pivot axis located within the aircraft fuselage, a generator having a housing defining a major part of the length of the strut, and means for driving the generator by rotation of the rotatable hub assembly including a drive shaft in said gear housing, a rotatable shaft in said strut, and an interconnecting angled gear drive in said gear housing.

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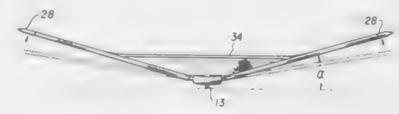
**4,742,977**

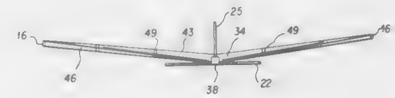
## WING STRUCTURE WITH SELF-INDUCED CAMBER

**Robert L. Crowell, Rte. 6, Box 473B, Boone, N.C. 28607**

**Continuation-in-part of Ser. No. 925,923, Nov. 3, 1986, abandoned. This application Nov. 25, 1986, Ser. No. 934,828**
**Int. Cl.[4] B64C** *3/22*
**U.S. Cl. 244—123** **28 Claims**

**1**. An improved wing having a self-induced camber comprising an aerodynamic dihedral sail structure having a fabric sail tensioned on a supporting frame, said supporting frame comprised of opposing elongated lateral brace members along the leading edge of the wing and an elongated longitudinal brace member positioned intermediate the ends of the lateral braces, first ends of said lateral brace members and a first end of said longitudinal brace member being attached to one another at a common terminus centrally positioned along the leading edge of the wing to define a fixed dihedral angle, the leading edge of said fabric sail being attached to said lateral brace members and a rearwardly disposed portion of said sail being attached to a rearwardly disposed second end of said longitudinal brace member, with said sail extending between laterally disposed second ends of said lateral brace members and said rearwardly





disposed second end of said longitudinal brace member, said lateral and longitudinal brace members being so attached to one another and said sail being so configured and caused to be tensioned over said brace members whereby a dihedral sail is formed having a self-induced camber portion intermediate the laterally disposed ends of the lateral brace members and centrally positioned along only a portion of the leading edge of the wing.

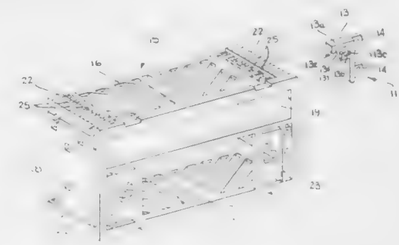
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**4,742,978**

## UNIVERSAL MOUNTING SYSTEM FOR INSTALLING VEHICLE RADIO EQUIPMENT

**Robert J. Ponticelli, 20274 Delita Dr., Woodland Hills, Calif. 91364**

**Filed Jun. 4, 1987, Ser. No. 57,992**
**Int. Cl.[4] G12B** *9/00*
**U.S. Cl. 248—27.1** **6 Claims**



**4**. A system for mounting a radio or the like in a vehicle comprising:

a frame having at least one wall,

a bar member formed in at least two of the corners of said frame, each of said bar members running along a separate wall of said frame, each of said bar members having top, bottom and side walls,

a longitudinal row of apertures being formed in said wall along the inner lower edge of each of said bar members, and

a bracket mounted on each of said bar members, each of said brackets comprising a clamp portion having top, bottom and side walls which fit matingly along the walls of said bar members, said clamp portion further having a tap extending from one end thereof which fits into any one of the apertures of said longitudinal row thereof, said bracket further having attachment portions extending therefrom

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for use in attaching said brackets to a selected portion of said vehicle,

said brackets being slidably positionable along said bar members to a selected position whereat the tabs of said brackets are permitted to snap into one of the apertures formed in said wall to lock the brackets to the frame.

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**4,742,979**

## CABLE HANGER

**William O. Syversten, Village Rd., P.O. Box 623, South Newbury, N.H. 03272; Roland D. Sabourin, 20 Brookside Mobile Ter., Allenstown, N.H. 03275, and Maxwell Matthews, 6 Beaver Brook Cir., Amherst, N.H. 03031**

**Filed Feb. 19, 1987, Ser. No. 16,836**

**Int. Cl.⁴ F16L** *3/08*

**U.S. Cl. 248—65** **5 Claims**



1. A cable hanger comprising a resilient wire configured to be wrapped by hand onto a support wire and having at one end a toe adapted to engage under one side of said support wire, said toe turning into a leg running for a distance along said support wire, the leg then bending and running over the other side of said support wire, then bending and running generally parallel to said support wire, then crossing under said support wire on said one side and flowing into a tight U-bend crossing over said other side, and terminating in an open U-bend adapted to receive a cable.

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**4,742,980**

## POSITIONING DEVICE FOR TEST HEADS

**Helmuth Heigl, Anton-Fahrer-Str. 1, 8208 Pullach-Kolbermoor, Fed. Rep. of Germany**

**Filed Jul. 8, 1986, Ser. No. 883,089**

**Claims priority, application Fed. Rep. of Germany, Jul. 8, 1985, 3524348**

**Int. Cl.⁴ A47G** *29/00*

**U.S. Cl. 248—125** **8 Claims**



1. A positioning device for test heads, and the like, comprising:

an upright stand having leveling means;

a vertically adjustable platform mounted on the stand;

two symmetrically arranged arms mounted on the platform for articulated movement in a horizontal plane, the arms having segments articulated to one another at joints;

a bracket being rotatably mounted to the distal end of each arm; and,

a test head holder tiltably mounted on each bracket for movement about a horizontal axis, a test head being attachable to and between the test head holders,

whereby the test head may be vertically, horizontally and tiltably positioned.

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**4,742,981**

## SURGICAL SUPPORT SYSTEM

**Maurice Converse, 3349 S. Smith Rd., Akron, Ohio 44313**

**Filed Feb. 19, 1987, Ser. No. 16,431**

**Int. Cl.⁴ E04G** *3/08*

**U.S. Cl. 248—231.7** **6 Claims**



1. A surgical support assembly adapted to be suspended above an operating table between standard IV poles comprising telescopic support bar means having a rectilinear cross sectional configuration and identical clamp means secured to opposite ends of said support bar means for adjustably clamping the support bar means at any desired height to a pair of standard IV poles,

wherein said telescopic support bar means is comprised of a main bar having a rectilinear cross sectional configuration and an auxiliary portion telescopically slidable therein to vary the length of the telescopic support bar means and clamping means for holding the main portion and auxiliary portion oat the desired adjusted length position, and

wherein each clamp means is comprised of a substantially C-shaped member having a V-shaped notch on one leg thereof and an abutment member threadably secured to the other leg thereof for clamping a standard IV pole therebetween.

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**4,742,982**

## HANGER FOR CHEMICAL DISPENSER

**Stanley Pilch, Hicksville, and Elliott Subervi, Baldwin, both of N.Y., assignors to Kiwi Brands, Inc., Douglassville, Pa.**

**Filed Jan. 6, 1983, Ser. No. 455,973**

**Int. Cl.⁴ F04G** *5/06;* **E03D** *9/02*

**U.S. Cl. 248—231.8** **7 Claims**

1. A hanger for a toilet tank dispenser consisting essentially of an inner leg member to which a toilet tank dispenser is secured, an angled connector member contiguous to the upper end of said inner leg member, said angled connector member comprising a first section integral with said inner leg member which extends at an angle towards the inner surface of the toilet tank wall and terminates above the upper edge of the toilet tank wall and a second section which extends outwardly from said first section such that at least a portion thereof makes contact with the top surface of said upper edge of the toilet tank wall, and an outer leg member integral with said second section of said angled connector member which extends downwardly therefrom at an angle such that at least a portion of said outer leg member contacts the outer wall of said toilet tank, said inner leg member, said angled connector member, and said outer leg member together creating a clamping force around said toilet tank wall which causes the lower portion of said inner leg member and the dispenser attached thereto to be biased against the inner tank wall.



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**4,742,983**

## SEAT SLIDING DEVICE

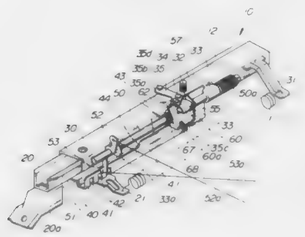
**Masao Nihei, Kanagawa, Japan, assignor to Ohi Seisakusho Co., Ltd., Yokohama, Japan**

**Filed Jul. 17, 1987, Ser. No. 74,761**

**Claims priority, application Japan, Jul. 25, 1986, 61-175427**

**Int. Cl.⁴ B60N** *1/04*

**U.S. Cl. 248—429** **15 Claims**



1. A seat slide device for sliding a seatback-mounted seat on a floor to a desired position, comprising:

two pairs of rail units each including a stationary rail secured to said floor and a movable rail slidably engaged with said stationary rail and mounting thereon said seat;

a latch mechanism including a lock plate formed with a plurality of aligned notches and secured to said stationary rail, an operation shaft carried by said movable rail in a manner to be rotatable about the axis thereof, and a latching plate fixed to said operation shaft to be rotatable therewith, said latching plate being latchingly engaged with one of said notches of the lock plate when said operation shaft is turned in a first given direction; and

a walk-in mechanism including a transmission member which is pivotally supported by said operation shaft and cancels the latched engagement between said latching plate and said lock plate when turned in a second given direction opposite to said first given direction to assume a given angular position, a memory lever which is pivotally supported by said transmission member and acts as a prop for keeping said transmission member at said given angular position when assuming a given condition and a stepped member which is fixed to said stationary rail and causes said memory lever to cancel said given condition when said movable rail assumes a given position relative said stationary rail.

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**4,742,984**

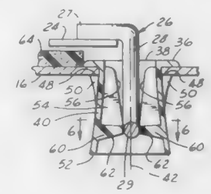
## ATTACHING ARRANGEMENT FOR VEHICLE SEAT CUSHION

**Janice E. Cote, Ann Arbor, and Donald L. Silsbe, Woodhaven, both of Mich., assignors to Chrysler Motors Corporation, Highland Park, Mich.**

**Filed Jul. 24, 1984, Ser. No. 77,272**

**Int. Cl.⁴ F16M** *13/00*

**U.S. Cl. 248—503.1** **1 Claim**



1. In combination with a vehicle floor panel, an attaching arrangement securing a seat cushion frame to said vehicle floor panel, said attaching arrangement comprising; a U-shaped striker having a pair of longitudinally spaced legs depending vertically downwardly from said frame and terminating in a horizontally disposed elongated bight portion, said floor panel having an elongated oval-shaped aperture therethrough defined by parallel side edges joined at each end by arcuate end edges, a one piece anchor member molded of flexible plastic material wherein said anchor member is symmetrical about a vertically disposed longitudinally extending plane, said anchor member having a subsbstantially tubular shaped opened body portion formed with a continuous outwardly directed retaining collar portion on the upper open end thereof, said body portion normally having an oval-shape in horizontal section defining parallel planar opposed wall portions being interconnected at each longitudinal extremity by arcuate end wall portions, said elongated bight portion having a longitudinal extent greater than the longitudinal extent of said planar opposed wall portions but less than said open-ended body portion, said body portion horizontal section conforming to the shape of said floor panel aperture for snug reception therein, each said side wall portion having a pair of parallel elongated cut-outs extending vertically from said upper collar portion a predetermined distance at least one-half the overall height of said body portion defining a pair of spaced vertically disposed spring locking fingers, each said cut-out having its upper closed end terminating in a horizontally disposed slot portion formed in said collar portion into which the free upper end of its associated locking finger extends, each said locking finger being formed with an outwardly projecting horizontally disposed shoulder, each said shoulder having an outer surface that slopes toward said body portion lower open end, such that upon said anchor member body portion being inserted in said floor panel aperture its each side edge engaging its associated pair of shoulder outer sloped surfaces thereby flexing each said locking finger inwardly, whereby upon said collar portion contacting the upper surface of said floor panel each said shoulder sloped surface being released allowing said fingers to snap outwardly whereby the floor panel aperture bounding edge is locked between each said finger horizontally disposed shoulder and the underside of said collar portion thereby locking said anchor member in said aperture, each said side wall inner surface formed with a pair of vertically extending parallel ribs having mutually opposed ramp edges that slope down-

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wardly and inwardly toward said plane of symmetry defining a pair of longitudinally spaced lead-in V-shaped notches, each said pair of ribs symmetrically disposed on one said side wall portion intermediate its associated pair of spring finger cut-outs, each said pair of ribs joined at their lower ends in opposed wedge-shaped base flange portions defining therebetween a longitudinally extending elongated gap having a predetermined transverse dimension normally preventing the passage of said striker bight portion therethrough, said base flange portions each having their undersurface sloped upwardly toward said gap defining a shallow inverted V-shaped locking catch adapted to capture said striker bight portion, whereby upon said striker bight portion being received in said pair of V-shaped notches and being forcefully pushed downwardly resulting in a wedging action causing said body portion intermediate side wall portions to resiliently deform outwardly from said plane of symmetry at said body portion lower open end thereby expanding said elongated gap and allowing said bight portion to snappingly pass therethrough so as to be captured in said inverted V-shaped locking catch, and wherein a layer of resilient foam rubber material located on said floor panel upper surface, and said U-shaped striker vertically extending leg portions of a predetermined length such that upon said bight portion being captured in said locking catch said resilient material is compressed between said frame and said floor panel upper surface, whereby a resultant spring force exerted by said compressed resilient material acts to resiliently bias said striker elongated bight portion upwardly into said catch thereby dampening out vibrations to which said seat cushion frame is subjected, and with said U-shaped striker removed from said anchor member said horizontally disposed slot portions enabling each opposed pair of said finger free upper end to be grasped and forced inwardly thereby allowing the removal of said anchor member from said floor panel aperture.

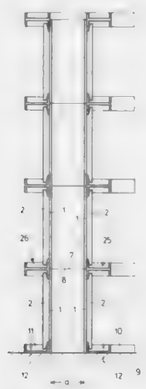
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**4,742,985**

## FORMWORK ASSEMBLY FOR A POURED CONCRETE STRUCTURE

**Hugo Mathis, Bregenz, Austria, assignor to Rund-Stahl-Bau Gesellschaft m.b.H.**

**Filed Nov. 15, 1985, Ser. No. 798,749**
**Claims priority, application Austria, Nov. 16, 1984, 3642/84**
**Int. Cl.[4] E04G** *11/08*
**U.S. Cl. 249—193** **18 Claims**



1. Formwork assembly for constructing structural members of a poured concrete, comprising formwork panels with a concrete forming surface thereof made up of an elastically deformable material, said concrete forming surface being bendable within the elastic limit thereof for fabricating curved formwork panels, said formwork panels having an inside surface defining the concrete formwork surface and an outside surface and having a pair of spaced apart vertically extending opposite first ends, and a pair of spaced apart horizontally extending opposite second ends, each said opposite first end having a similar length, vertically extending support members mounted on said outside surface at each of said opposite first ends and extending approximately for the length of said opposite first ends, each said support member having a lower end and an upper end and girder members extending horizonatally between said spaced apart opposite first ends and combining with said support members for interconnecting vertically adjoining said formwork panels into the formwork assembly, wherein the improvement comprises that said formwork panels are located in a plurality of horizontally extending rows with said horizontally extending rows located one above the other with said second ends of the vertically adjacent said formwork panels being in close relation to one another, the lower and upper ends of said support members combine with the adjacent outside surface at the second ends of said formwork panels on which they are mounted to form a groove section, and the groove sections on vertically adjacent said formwork panels located one above the other combine to form recesses into which said girder members fit for supporting and interconnecting said formwork panels making up the formwork assembly, said girder members project outwardly from said outside surface and have a flange extending vertically and bearing against and in an overlapping manner the outside surface of said formwork panels at the second ends thereof for supporting and shaping said formwork panels, and one of said recesses and said girder members fitted into said recesses having a generally vertically extending wedge shaped surface located within said recesses for securely interconnecting vertically adjacent said formwork panels.

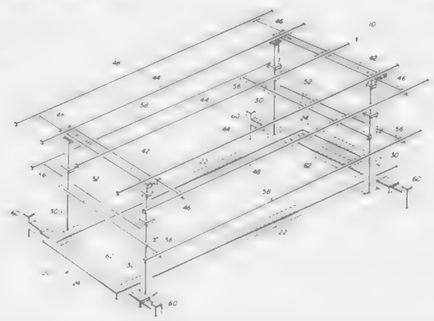
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**4,742,986**

## APPARATUS FOR CONSTRUCTING CONCRETE BUILDINGS

**Ernest Csont, P.O. Box 5107, Winter Park, Fla. 32793**

**Filed Nov. 7, 1985, Ser. No. 796,355**
**Int. Cl.[4] E04G** *1/22, 17/14*
**U.S. Cl. 249—210** **22 Claims**



1. An apparatus on which forms may be mounted for forming the shape of a building during construction and which can thereafter be removed for reuse once the building is formed, comprising:

(a) a framing structure for defining the building shape, said structure having at least four spaced masts, two transverse beams each having at least one telescoping free end and each being transversely mounted respectively on a first and second pair of said masts, and a shape forming beam carried on said free ends of said transverse beams;

(b) means for expanding a dimension of said framing structure to increase a corresponding dimension of the building through outward projection of said shape forming beam by projecting said free ends of said transverse beam outwardly; and

(c) means for varying the shape of said framing structure so that various shaped buildings can be constructed with said framing structure, including means for changing the outward projection of one end of said shape forming beam relative to the other end of said shape forming beam by changing the relative outward projections of said free ends of said transverse beams and pivoting said shape forming beam relative to said free ends, without changing the relative spacing of said masts.



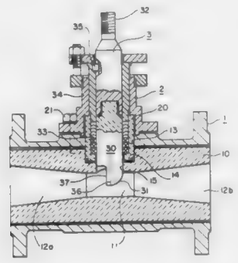
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**4,742,987**

## VALVE

**Shozo Kanamori, Chigasaki; Shigehiro Kawai, Kanagawa, and Seiji Yamaki, Kamakura, all of Japan, assignors to Yamatake-Honeywell Co. Ltd, Tokyo, Japan**

**Continuation of Ser. No. 801,669, Nov. 25, 1985, abandoned, which is a continuation-in-part of Ser. No. 629,521, Jul. 10, 1984, abandoned. This application Apr. 28, 1987, Ser. No. 43,570**
**Int. Cl.[4] F16K** *25/00*
**U.S. Cl. 251—123** **10 Claims**



1. A valve comprising

a flow path in the form of a Venturi tube having a throttle and flow path sections flaring from the opposite sides of said throttle to an inlet and outlet, respectively,

a plug guide means attached to said throttle by a fluid-tight seal and having a uniform diameter internal bore for guiding a cylindrical plug and for providing a fluid-tight seal with the plug during an entire movement of the plug in said guide means and

a cylindrical uniform diameter plug provided in said throttle and said bore in said guide means and selectively movable at right angles to said flow path, said cylindrical plug having an end in said flow path with a semi-spherical valve head with a notch formed in a portion of said valve head to provide a surface at the bottom of said notch normal to the axial direction of said flow and having a length starting at an end of said valve head in said flow path which is less than the diameter of said throttle section while occupying a major portion of the surface of said valve head facing a flow in said flow path whereby a flow rate stabilization in said flow path is produced by said notch in said valve head by eliminating an inversion in the flow rate during opening and closing operations of the valve to provide a reliable and precise flow quantity.

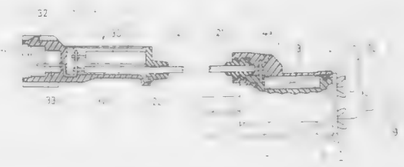
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**4,742,988**

## ELECTRICAL APPARATUS INCLUDING SOLENOID DEVICE AND ENERGIZATION CONTROL CIRCUIT THEREFOR

**Hideo Haneda, Toyota; Mamoru Nakamura, Kariya; Jun Funakawa, Nagoya; Hiroki Oka, Toyota, and Takeshi Nakane, Okazaki, all of Japan, assignors to Aisin Seiki Kabushikikaisha, Japan**

**Filed Jan. 23, 1986, Ser. No. 824,476**
**Claims priority, application Japan, Jan. 23, 1985, 60-7897[U]; Nov. 25, 1985, 60-264135**
**Int. Cl.[4] F16K** *31/06*
**U.S. Cl. 251—129.01** **8 Claims**



1. An electrical apparatus comprising:

a solenoid device for opening and closing a fluid passage formed therein by the movement of a movable core and including a coil wound around a bobbin and a stator core fixed in one end of a center opening of the bobbin;

a connector including a casing member separate from said solenoid device forming an open compartment and connection terminals each having one end extending into the open compartment;

an electrical cable having one end connected to the coil and the other end extended into the open compartment; and

a coil energization control circuit housed within the open compartment, directly connected to the other end of the electrical cable and the connection terminals and coated with synthetic resin injected in the compartment.

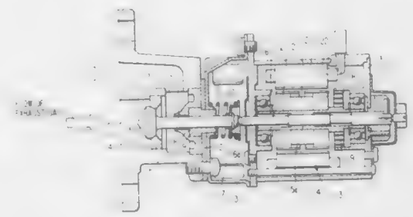
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**4,742,989**

## MOTOR-DRIVEN FLOW RATE CONTROL VALVE DEVICE

**Motonobu Akagi, Anjo, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan**

**Filed Feb. 13, 1987, Ser. No. 14,846**
**Claims priority, application Japan, Feb. 21, 1986, 61-23951[U]**
**Int. Cl.[4] F16K** *31/04*
**U.S. Cl. 251—129.05** **2 Claims**



1. A motor-driven flow rate control valve device comprising: a housing having an inlet and an outlet; a valve disposed in a passage formed in said housing, said valve being adapted to maintain controlled communication between said inlet and said outlet by opening and closing action; a valve shaft so disposed as to be axially slidable in said housing, said valve shaft including a first end thereof linked to said valve; a return spring which has a first end thereof secured to said housing and a second end thereof secured to said second end of said valve shaft, said return spring constantly forcing said valve to move

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in a valve closing direction; and a step motor fixed through a motor housing to said housing, said step motor comprising a rotor equipped with a screw mechanism for converting rotary motion of said step motor into an axial motion of said motor shaft, said motor shaft including an end portion which impinges upon said second end of said valve shaft, and a sprial spring positioned between an end portion of said rotor of said step motor and an end portion of said motor housing wherein impingement surfaces of said motor shaft and said valve shaft are of a spherical configuration and wherein said screw mechanism comprises an internal screw formed on said rotor and a plurality of screw threads formed on said motor shaft and directly engaged with said internal screw.

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**4,742,990**

## GATE VALVE

**Hans Stalder, and Hans Sidler, both of Eschenbach, Switzerland, assignors to Sistag Maschinenfabrik Sidler Stalder AG, Switzerland**

**Filed Jul. 7, 1987, Ser. No. 70,571**
**Claims priority, application Switzerland, Jul. 7, 1986, 2737/86**
**Int. Cl.[4] F16K** *3/316*
**U.S. Cl. 251—32 G** **8 Claims**



1. Housing for a gate valve, particularly for interrupting flow of thick, viscous, finely divided, or granular materials in conveying pipes, said housing having a guide groove preformed therein around a central flow channel for guiding a sliding plate of the valve, said guide being bounded laterally by pairs of guide strips which extend into said flow passage, each guide strip on each side of said sliding plate and on both upstream and downstream sides defining there between a recess having a depth which is less than the depth of the guide groove, each recess has a length which is at least twice the depth of the guide groove.

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**4,742,991**

## LYING TYPE OF JACK STRUCTURE

**Michael Hung, 11th Fl., 624 Ming Chuan E. Rd., Taipei, Taiwan**

**Filed Jul. 7, 1986, Ser. No. 882,528**
**Int. Cl.[4] B66F** *5/04*
**U.S. Cl. 254—8 B** **3 Claims**

1. A lying type hydraulic jack structure for vertically lifting and supporting an object, said jack structure comprising:

a pair of side frames;

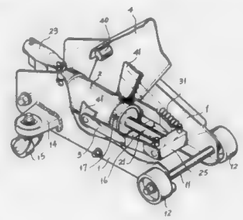
a hydraulic cylinder fixedly mounted to said pair of side frames and extending in a horizontal direction, said hydraulic cylinder having a joint portion on at least one end thereof;

an extendable and retractable extension rod slidably mounted within the hydraulic cylinder and extending therefrom in said horizontal direction to a free end thereof;

a lifting arm pivotably mounted to said pair of side frames at a pivot about which said lifting arm pivots to lift the object vertically;

a pulling rod pivotally mounted at one end thereof to the free end of the extension rod and at the other end thereof to said lifting arm at a location thereon that is spaced from said pivot,

said extension rod extending and retracting to move said pulling rod pivotally mounted at the free end thereof which in turn pivots the lifting rod pivotally connected to said other end thereof about said pivot to lift and lower the object; and



fixing means for immovably fixing said hydraulic cylinder on the jack so as to extend in the horizontal direction relative to said pair of side frames, said fixing means comprising a first support means attached to the cylinder adjacent said one end thereof and a second support means immovable relative to the side frames and attached to the cylinder adjacent the other end thereof for inhibiting the load that is exerted by the object which acts through the lifting arm and the pulling rod from acting on the cylinder at the at least one joint portion; and wherein said second support means comprises a beam attached to said pair of side frames on which the hydraulic cylinder is supported and an arch-shaped plate being attached to the beam and extending over said hydraulic cylinder.

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**4,742,992**

## ROOFING MEMBRANE PULLER

**Thomas H. Allen, 1365 Field Ct., Mount Horeb, Wis. 53572**

**Filed Apr. 7, 1987, Ser. No. 35,438**
**Int. Cl.[4] B25B** *33/00*
**U.S. Cl. 254—199** **11 Claims**

1. A roofing membrane puller for tautly pulling a waterproof membrane over a flat roof, which comprises:

(a) a frame including a front end, a rear end, and two sides;

(b) at least one anchor which maintains the frame in a selected position on the flat roof;

(c) a sheet gripper for gripping the membrane;

(d) a leveraged hand drive which is mounted to the frame and includes a lever which at a lower end is pivotably mounted to the frame and at another end is grasped by an operator's hand to move the lever and apply a force to the lever in a driving direction which is parallel to the longitudinal axis of the frame;

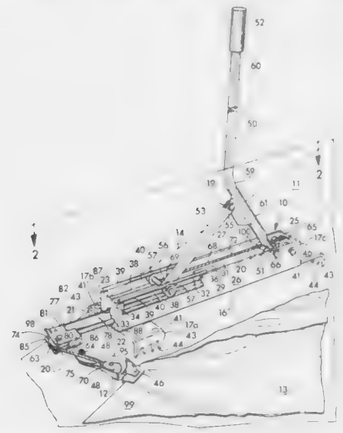
(e) a pulley-cable system for transmitting a pulling force from the leveraged hand drive to the locking gripper to pull the membrane, the system including:

(i) an exit pulley which is in a connected relation to the frame near the front end thereof, the exit pulley defining a groove therearound and connected to be positionable so as to have at least one position in which a turning axis of the exit pulley is perpendicular to the roof;

(ii) a cable including a first end which is connected to the leveraged hand drive and a second end which is connected to the locking gripper, the cable extending from the leveraged hand drive in an initial direction which is generally opposite the driving direction of the lever to define an initial portion of the cable, the cable passing through at least a portion of the exit pulley groove to extend in a final direction to the locking gripper to define a final portion of the cable, the final direction being determined by selected relative positions of the exit pulley and the locking gripper; and

(f) an extender comprising a shaft connecting the exit pulley to the frame, at least a portion of the shaft extenable outwardly from the front end of the frame, the exit pulley being connected to the shaft at an outward end thereof, wherein the frame includes a forward vertical wall and an intermediate vertical wall, each being connected to the sides of the frame and having a hole therein for slidably and pivotably holding the shaft so that the exit pulley can be moved forwardly and rearwardly, and its turning axis pivoted, wherein the roofing membrane puller can be placed near the edge of the roof with the front end thereof directed obliquely toward the edge of the roof so that the extender projects the exit pulley nearly to the roof edge.





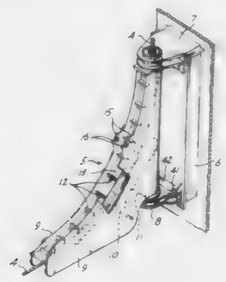
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**4,742,993**

## SELF-ALIGNING QUADRANT FAIRLEAD

**James L. Montgomery, Seattle, Wash.; Geoffrey B. H. Breese, and Peter G. S. Dove, both of Houston, Tex., assignors to Smith Berger Marine, Inc., Seattle, Wash.**

**Filed Sep. 4, 1986, Ser. No. 904,573**
**Int. Cl.[4] B65H** *57/00*
**U.S. Cl. 254—389** **16 Claims**



1. An arcuate fairlead for mooring lines comprising two side plates of generally triangular shape, each of said side plates having a hypotenuse and a tip portion, an arcuate connecting plate adjacent to said hypotenuses of said side plates and secured to said side plates for holding said side plates in spaced parallel relationship, a plurality of trough-shaped guide shoes arranged in a row with their bottoms in engagement with the convex side of said arcuate connecting plate for engagement by a mooring line, shoe-retaining means spaced from the convex side of said arcuate connecting plate and engageable with the trough edges of said guide shoes for limiting movement of said guide shoes away from said arcuate connecting plate, brace bars spaced circumferentially of said arcuate connecting plate and secured between said side plates and said concave side of said arcuate connecting plate for backing said arcuate connecting plate at circumferentially spaced intervals, a further connecting plate located between and connecting said side plates at a location spaced a substantial distance from said arcuate connecting plate for providing ample space for a mooring line between said arcuate connecting plate and said further connecting plate, a first trunnion carried by corresponding tip portions of said side plates, a second trunnion carried by the apex portion of said side plates aligned axially with said first trunnion, first bearing means engageable by said first trunnion, second bearing means engageable by said second trunnion, and means mounting said bearing means rigidly in spaced relationship for holding said trunnion means stably by preventing appreciable edgewise tilting of said side plates while mounting said side plates for swinging about the axis of said trunnions for self-alignment of said guide shoes with a stretch of the mooring line beyond said side plates.

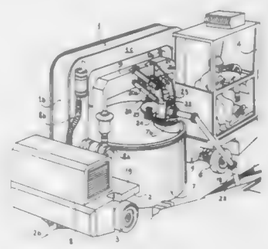
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**4,742,994**

## POWERED VEHICLE FOR OPERATION OF LADLES, IN PARTICULAR FOR TAPPING ALUMINIUM

**Gianfranco Zannini, and Pierandrea Nalesso, both of Limena, Italy, assignors to Techmo Car S.p.A., Limena, Italy**

**PCT No. PCT/EP85/00237, § 371 Date Jul. 21, 1986, § 102(e) Date Jul. 21, 1986, PCT Pub. No. WO86/04839, PCT Pub. Date Aug. 28, 1986**
**PCT Filed May 18, 1985, Ser. No. 905,587**
**Claims priority, application Italy, Feb. 21, 1985, 19602 A/85**
**Int. Cl.[4] C21B** *3/10*
**U.S. Cl. 266—165** **4 Claims**



1. In a powered vehicle adapted for handling ladles for molten metals, molten aluminum and metal alloys, consisting of two opposing trucks linked to each other by a rigid structure for the retaining and transportation of ladles with turnable tapping tube for tapping the molten metal, or crucibles, said structure supporting a ladle lid for said ladles, one of said trucks having motor means and the other a driver's cab, and devices effective to permit sideways movements of the vehicle, the improvement comprising:

a first arcuate main bridge structure positioned in the upper part of the vehicle forming said rigid structure so as to leave the lower part of the vehicle completely free from any bottom structure or connecting frames;

a second arcuate bridge structure vertically slidable along guides formed in the uprights of said main bridge structure by means of hydraulic cylinders;

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protruding elements disposed on the opposite uprights of said additional bridge structure at opposed locations, said protruding elements being adapted to receive, support and securely hold pins protruding from a ladle at diametrically opposed locations thereon, thereby allowing said ladle to be picked up and held with stability inwardly of the uprights of said bridge structure and lifted for transportation;

hook-up means linked at the top of said sliding second bridge structure set pivotally about a vertical axis and adapted to support for rotation the ladle lid with tapping tube.

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**4,742,995**

## APPARATUS FOR INTRODUCING TREATMENT SUBSTANCES INTO LIQUIDS

**Kenneth W. Bates, Chesterfield, Great Britain, assignor to Injectall Limited, Sheffield, England**

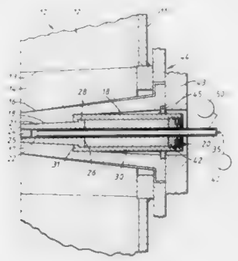
**PCT No. PCT/GB86/00073, § 371 Date Sep. 16, 1986, § 102(e) Date Sep. 16, 1986, PCT Pub. No. WO86/04928, PCT Pub. Date Aug. 28, 1986**

**PCT Filed Feb. 12, 1986, Ser. No. 919,146**

**Claims priority, application United Kingdom, Feb. 15, 1985, 8503927**

**Int. Cl.[4] C21C** *5/48*

**U.S. Cl. 266—270** **22 Claims**



1. An expendable injection cartridge device suitable for installing in a passage through a wall of a melt-containment vessel, for use to deliver injectant into a melt, the device comprising:

an upstream part including a main tubular body or sleeve;

a downstream part including a refractory element fixedly secured inside the main tubular body and projecting from a downstream end thereof, said refractory element being pierced by a through passage to thereby define an extended nozzle,

a melt-impervious, passaage-blocking closure dismountably affixed at a discharge end of the nozzle; and

an injectant delivery pipe which extends through said body and into said passage, said delivery pipe being movable lengthwise of said device forcibly into contact with said closure for dismounting same from the nozzle element to enable injectant fed into said delivery pipe to exit therefrom and discharge into the melt.

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**4,742,996**

## PNEUMATIC STRUT

**Henning Gold, Bingen, Fed. Rep. of Germany, assignor to Audi AG., Ingolstadt, Fed. Rep. of Germany**

**Filed Dec. 19, 1986, Ser. No. 943,947**

**Claims priority, application Fed. Rep. of Germany, Dec. 21, 1985, 3545536**

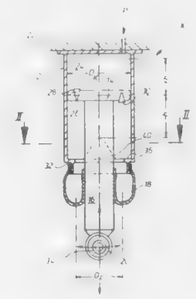
**Int. Cl.[4] F16F** *5/00*

**U.S. Cl. 267—64.24** **10 Claims**

1. A pneumatic spring and dampening strut for use in an automotive vehicle having chassis means and axle means, comprising:

a substantially rigid cylindrical housing having an elongated chamber of substantially circular cross-section therein, said chamber being closed at one of its ends and having an opening at its opposite end;

piston means of a first diameter for dividing said chamber into a first section providing spring action and a second section providing dampening action, said piston means being mounted within said chamber for reciprocal movement of a predetermined amplitude and comprising throttle means for limited bidirectional exchange of gas between said first and second sections during said movement;



piston rod means affixed at one end to said piston means and protruding from said opening of said chamber by its other end; and

rolling bellows means having an effective second diameter and being affixed at one end to said housing adjacent said opening and at its other end to said other end of said piston rod means for enclosing said second section, the ratio of said first diameter relative to said second diameter being from about 1.2 to about 1.6.

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**4,742,997**

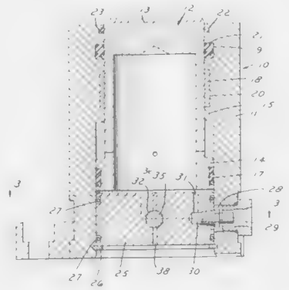
## GAS SPRING WITH SEPARATE CHARGING AND PRESSURE RELIEF VALVES

**Bernard J. Wallis, 2215 Dacosta, Dearborn, Mich. 48128**

**Filed Aug. 26, 1986, Ser. No. 900,602**

**Int. Cl.[4] F16F** *9/02, 7/00;* **F16K** *15/00*

**U.S. Cl. 267—119** **3 Claims**



1. For use in a system comprising a source of pressurized fluid and a plurality of lines extending to a plurality of gas springs,

a gas spring comprising a cylindrical body having a cylinder wall with an axial bore,

a piston rod positioned in said axial bore of said body and having an end closing and projecting beyond one end of the body,

a separate base closing the other end of the body,

said cylindrical body and piston rod having interengaging



portions for limiting relative outward movement of the piston rod with respect to the body,

said gas spring including a radial inlet through the wall of the cylindrical body toward said base,

said base having a first radial passage aligned with and communicating with said radial inlet in said wall,

a one-way valve positioned in said radial passage of said base,

an axial passage in said base extending from the radial passage in said base at the outlet end of said valve to the interior of the cylinder,

a separate bore provided in the base and having closed ends,

a pressure relief piston positioned in the bore,

said separate bore having a first portion having a smaller diameter than a second portion,

said pressure relief piston having a first portion sealingly engaging said first portion of said separate bore and a second portion sealingly engaging the second portion of said bore,

a pressure relief passage in the base extending from the interior of the cylinder and intersecting said bore at said first portion of smaller diameter,

a second passage in said base extending from the second portion of the bore remote from the pressure relief passage and communicating with the radial inlet of the wall of said cylindrical body such that the second portion of said piston is subjected to inlet pressure at all times,

a vent passage in said base intersecting said bore and extending to the exterior of the cylinder,

said first portion of said piston normally closing said vent passage and being operable when the pressure in the cylinder exceeds the inlet pressure by a predetermined value to open the vent passage to the exterior and being operable when the inlet pressure is reduced to open the vent passage to the exterior and thereby reduce the pressure in the cylinder to inlet pressure.

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**4,742,998**

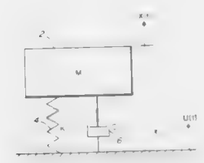
## ACTIVE VIBRATION ISOLATION SYSTEM EMPLOYING AN ELECTRO-RHEOLOGICAL FLUID

**Dale W. Schubert, Sudbury, Mass., assignor to Barry Wright Corporation, Newton Lower Falls, Mass.**

**Continuation-in-part of Ser. No. 716,026, Mar. 26, 1985, abandoned. This application Jul. 31, 1985, Ser. No. 760,863**

**Int. Cl.[4] F16F** *9/00, 15/02*

**U.S. Cl. 267—136** **24 Claims**



1. A viscous damper comprising:

(a) means for deriving a first signal representative of the velocity of relative motion between first and second elements connected by said viscous damper for the reduction of transmitted excitations therebetween;

(b) means for deriving a second signal representative of the velocity of one of said first and second elements;

(c) means for generating a command signal in response to the ratio of said second signal to said first signal; and

(d) means for modulating the damping coefficient of the viscous damper in response to the command signal to approximate the vibration isolation characteristics of a "sky hook" type damper.

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**4,742,999**

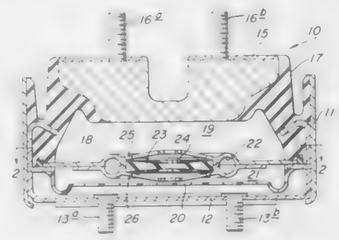
## QUIET ACTING FLUID FILLED VIBRATION ISOLATOR HAVING PREDICTABLE LOW LEVEL HIGH FREQUENCY MINIMUM DYNAMIC STIFFNESS

**Wallace C. Flower, 1635 W. 12th St., Erie, Pa. 16512**

**Filed May 16, 1986, Ser. No. 863,837**

**Int. Cl.[4] F16F** *5/00*

**U.S. Cl. 267—140.1** **11 Claims**



1. In a vibration isolator including opposed fluid filled chambers, an inertia track passageway providing fluid communication therebetween, and a decoupler assembly cooperable with the chambers and the inertia track passageway to provide certain operating characteristics, the improvement wherein the decoupler assembly includes a complementary pair of engaged superimposed plates defining at least a portion of a partition separating said chambers, said plates being formed to provide said inertia track passageway therebetween and to define a perforate decoupler cage located inwardly of said inertia track passageway in fluid communication with said chambers, a flexible decoupler disc mounted in said cage, said decoupler disc having opposite sides confronting said chambers and a periphery with a circumferential bead thereon, said partition plates having converging surfaces surrounding said decoupler disc periphery and engaging said circumferential bead for mounting said decoupler disc for flexure in alternate directions relative to said chambers, said converging partition plate surfaces cooperating with the bead to provide fulcrums at the periphery of the disc for permitting said disc to pivot thereabout and thereby to flex without substantial tension adjacent to its periphery while preventing fluid leakage between the decoupler cage and the inertia track passageway and between the fluid chambers wherein said partition plates are of rigid material construction and define between the decoupler cage and inertia track passageway a tapered joint confronting said decoupler disc periphery, and said decoupler disc is of elastomeric construction and its peripheral bead engages in said joint to seal the same against leakage, said partition plates have confronting surfaces that diverge from the medial plane of the decoupler disc at a plurality of angles in radially spaced regions inwardly of the decoupler disc periphery, and the decoupler disc has raised ribs of radially inwardly decreasing height on opposite sides for operatively engaging said plate surfaces to provide said progressive disc flexure arresting action.

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**4,743,000**

## METHOD AND APPARATUS FOR CONTROLLING SPRING STIFFNESS, IN PARTICULAR IN VEHICLES

**Dean Karnopp, Davis, Calif., assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Apr. 14, 1986, Ser. No. 851,984**

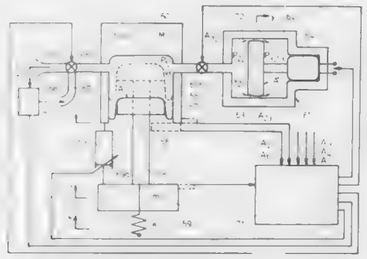
**Claims priority, application Fed. Rep. of Germany, Apr. 12, 1985, 8510760[U]; Jul. 12, 1985, 3524863**

**Int. Cl.[4] F16F** *9/04;* **F16D** *65/52;* **B60G** *11/26*

**U.S. Cl. 267—218** **27 Claims**

1. A semi-active system for controlling the transmission of energy between spaced members comprising a spring means between said members, said spring means includes at least one cylinder, one piston connected with said at least one cylinder

and a fluid pressure chamber therefor, a first rapid switchover valve arranged to be influenced by pressure of said spaced members on said at least one cylinder, a second cylinder unit connected by a fluid pressure connection via said rapid switchover valve to said pressure chamber of said spring means, said



second cylinder unit including a motor driven adjustment member for varying fluid pressure in said pressure chamber, whereby said rapid switchover valve controls a fluid pressure medium under pressure to said pressure chamber and thereby stiffness of said spring means in said system in relation to prevailing load and movement parameters.

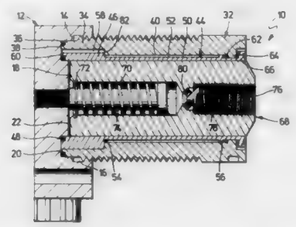
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**4,743,001**

## HYDRAULIC WORK SUPPORT WITH LOCKING PLUNGER

**Roger L. Craft, Emporia, Kans., assignor to Vektek, Inc., Emporia, Kans.**

**Filed Jun. 15, 1987, Ser. No. 61,590**
**Int. Cl.[4] B23Q** *3/10*
**U.S. Cl. 269—22** **10 Claims**



1. A hydraulic work support assembly comprising:
a base having threaded walls defining a recess presenting a bottom;
a housing having a threaded end portion received in said recess and in contact with said threaded walls, said housing also having walls defining a generally cylindrical bore extending along a central reference axis from said end portion and through said housing;
a tubular sleeve received in said bore and having structure at least partially defining an annular chamber between said sleeve and said housing walls defining said bore,
said sleeve having an end portion adjacent said end portion of said housing;
a plunger disposed at least partially within said sleeve;
structure for selectively shifting said plunger in said sleeve in a direction along said axis,
said end portion of said housing and said end portion of said sleeve each being in direct, abutting contact with said bottom of said base,
said end portion of said sleeve including means for establishing a first, generally leak-resistant seal between said sleeve and said base,
said end portion of said housing including means for establishing a second, generally leak-resistant seal between said housing and said base,
said second seal being spaced from said first seal in surrounding relationship to the latter; and
hydraulic means including means disposed in said base between said first seal and said second seal for selectively admitting pressurized hydraulic fluid to said annular chamber for exerting radial pressure on said sleeve and causing said sleeve to gripingly engage said plunger, thereby effectively locking said plunger in a pre-determined location along said axis.

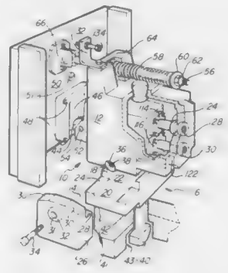
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**4,743,002**

## AUTOMATIC DIE CLAMP

**Klaus R. Menzel, Orchard Lake, Mich., assignor to Schreiber Manufacturing Co., Inc., Rochester Hills, Mich.**

**Filed Mar. 24, 1986, Ser. No. 842,828**
**Int. Cl.[4] B23Q** *3/08*
**U.S. Cl. 269—32** **18 Claims**



1. An automatic clamping mechanism for automatically clamping a tool to a press comprising:
a housing pivotally mounted by a pivotal mounting means to said press such that said housing is pivotable between a first position and a second position;
clamping means operably supported by said housing, said clamping means being engaged with said tool when said housing is in said first position and disengaged from said tool when said housing is in said second position;
control means for operating said clamping means between said first and second positions;
said control means including a wedge means slidably received within said housing operable between a retracted position wherein said housing is in said first position and an extended position wherein said housing is in said second position;
said wedge means including a first set of teeth angled with respect to the horizontal when said housing is in said first position, said teeth positioned along the exterior of one side of said wedge means;
a vertical sliding member adjacent said wedge means having a complimentary second set of teeth along one side thereof interfitting with said first set;
said clamping means affixed to said sliding member;
said sliding member and clamping means vertically moving in response to the interaction of said first and second teeth as said wedge means operates between said retracted position and said extended position;
means for retaining said housing in said first position wherein a positive force is required to pivot said housing to said second postion, said means continually urging said housing to said first position;
whereby, said clamping means operates between a clamped position wherein said tool is clamped to said press and a released position wherein said tool is released.

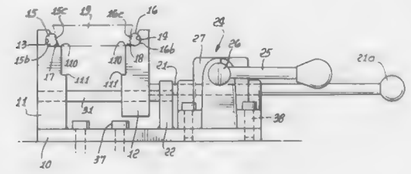


**4,743,003**

## SKI VISE WITH ROTATING JAWS

**Robert W. Dietlein, 3040 Deer Run Rd., Carson City, Nev. 89701**

**Filed Mar. 9, 1987, Ser. No. 23,785**
**Int. Cl.[4] B25B** *1/20*
**U.S. Cl. 269—43** **14 Claims**



1. In a ski holder, the combination comprising
(a) rotatable jaws having a first generally longitudinally extending axis of rotation,
(b) two supports for the jaws having sockets in which the jaws are rotatable about said axes,
(c) and means locating said supports for relative movement so that when a ski is placed between the jaws with its opposite sides positioned to be gripped thereby, the jaws rotatably accommodate to said ski sides as the jaws are relatively closed toward said sides,
(d) said jaws tapering, longitudinally, and,
(e) said sockets tapering, longitudinally, and the jaws loosely interfitting the sockets to allow adjustment of the degree of jaw taper relative to socket taper, in response to forcible closing of the jaws against the ski sides.

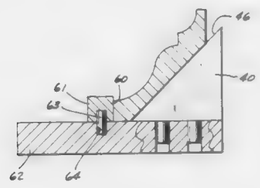
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**4,743,004**

## COPING JIG

**Gary L. Kloss, 3635 S. 85th St., Milwaukee, Wis. 53228, assignor to Gary L. Kloss, Milwaukee, Wis.**

**Continuation-in-part of Ser. No. 831,544, Feb. 14, 1986, abandoned. This application Mar. 12, 1987, Ser. No. 25,431**
**Int. Cl.[4] B25B** *1/08*
**U.S. Cl. 269—296** **6 Claims**



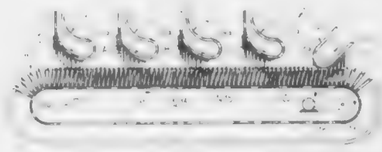
1. A coping jig comprising:
a base having a flat top surface bounded on opposite sides by unobstructed edges;
a pair of support blocks rising from the top surface of the base and each including an inclined support surface extending at an angle of 45° from the top surface, the inclined surfaces of the two blocks lying in a common plane that extends through said edges of the top surface;
and
a means for holding crown molding upon the base and against the support blocks with one rear plane surface of the crown molding resting on the top surface of the base and with the inclined rear surface of the crown molding resting against the inclined support surfaces of the blocks, said holding means being removably mounted on said base and not obstructing said edges of the top surface.

**4,743,005**

## APPARATUS FOR STUFFING INSERTS INTO MULTI-SHEET PRINTED PRODUCTS

**Walter Reist, Hinwil, Switzerland, assignor to Ferag AG, Hinwil, Switzerland**

**Filed Mar. 30, 1987, Ser. No. 31,663**
**Claims priority, application Switzerland, Apr. 4, 1986, 1338/86**
**Int. Cl.[4] B65H** *5/30*
**U.S. Cl. 270—55** **11 Claims**



1. An apparatus for stuffing inserts into multi-sheet printed products, especially newspapers, comprising:
endless revolving drive elements;
a plurality of substantially similar pockets arranged in a closely spaced row;
each of said pockets having an open upper region and serving for the reception of at least one printed product;
said pockets being secured in said closely spaced row to said endless revolving drive elements in a direction extending substantially transverse to the open upper region of the pockets for movement in a predetermined direction of revolving motion;
respective infeed means defining infeed stations for successively infeeding at least one printed product into each of the pockets and thereafter at least one insert into each pocket containing said at least one printed product;
at least one discharge station for removing said at least one printed product and the therein contained at least one insert from each pocket;
said pockets successively moving past said infeed stations and said discharge station;
means provided for each pocket for opening the at least one printed product inserted therein so as to be able to receive the at least one insert subsequently deposited into said at least one open printed product;
an entrainment element arranged in each pocket and serving to receive the at least one printed product deposited into such pocket;
means for controllably displacing each said entrainment element from a first terminal position into a second terminal position in a direction transverse to the predetermined direction of revolving motion of the pockets;
said opening means for opening the printed products comprising a product opening member provided for each pocket;
each said product opening member being stationarily arranged in relation to its related pocket; and
each said product opening member opening the printed product disposed in the associated pocket and entrained by the entrainment element of such pocket during the course of movement of the entrainment element and therewith the printed product from the first terminal position into the second terminal position.

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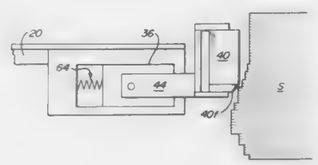


**4,743,006**

## FANNER MAGNET ASSEMBLY

**Fred Bolle, Jr., Milford; John R. Herronen, Linden, and Joseph M. Wright, Fenton, all of Mich., assignors to Tek-Matik, Inc., Hartland, Mich.**

**Filed Mar. 18, 1987, Ser. No. 165**
**Int. Cl.[4] B65H** *3/16*
**U.S. Cl. 271—18.1** **8 Claims**



1. A fanner magnet assembly for fanning stacked metal sheets, said assembly comprising:

(A) a frame structure adapted to be positioned at one side of a stack of metal sheets and defining an elongate guideway extending transversely toward one side face of the stack of sheets;

(B) a carriage mounted for forward and rearward movement along said guideway respectively toward and away from the stack side face;

(C) a magnet assembly mounted on the forward end of said carriage and including a magnet having a leading vertical face adapted to be moved into engagement with the stack side face in response to forward movement of said carriage along said guideway toward the stack;

(D) lost motion means, including a spring interposed between said carriage and said magnet assembly, allowing said magnet assembly to move rearwardly relative to said carriage against the bias of said spring; and

(E) power and control means operative

(1) to move said carriage forwardly along said guideway to move said magnet assembly forwardly and move said magnet face into engagement with the stack side face and thereafter, with continued forward movement of said carriage, to move said magnet assembly rearwardly relative to said carriage against the bias of said lost motion spring, and

(2) thereafter in response to movement of said magnet assembly a first predetermined distance rearwardly relative to said carriage to an initial relative position of said carriage and magnet assembly, to stop the forward movement of said carriage and move said carriage rearwardly relative to said magnet assembly a second predetermined distance, less than said first predetermined distance, to an operative relative position while said magnet face is maintained in engagement with the stack side face by said lost motion spring.

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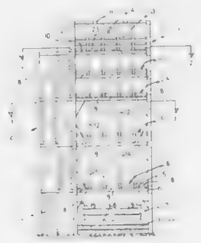
**4,743,007**

## RECREATIONAL DEVICE FOR PRODUCING THE THRILL OF A SERIES OF CONSECUTIVE FREE FALLS

**Alfonso de la Concha-Caceres, Rafael Alducin, Mexico, assignor to Free Motion Designs Corporation, Tex.**

**Filed Dec. 5, 1985, Ser. No. 805,432**
**Int. Cl.[4] A63G** *31/00*
**U.S. Cl. 272—6** **9 Claims**

1. A recreational device for producing the thrill of a series of consecutive free falls comprising an elongated vertical housing having a bottom, side walls and a top, a shock absorbing cushion throughout the bottom of the housing, an inwardly extending deck near the top of the housing, said deck having an area sufficient to accommodate a predetermined number of persons and arranged to provide a launching platform for allowing said persons to jump into the housing, a plurality of horizontal non-woven elastic net means arranged at different and considerably spaced levels within the side walls of the housing, with each of the net means spanning the whole horizontal cross section of the housing, each of the net means comprising from 2 to 4 parallel individual planar non-woven nets closely vertically spaced relative to each other, each individual one of the nets being formed by a plurality of horizontal elastic bands randomly distributed and attached to the interior surfaces of the side walls of the housing, the vertical distance between the uppermost one of the nets of each one of said plurality of net means and the lowermost one of the nets of said one of said plurality being smaller than the vertical distance between the spaced levels of said plurality of net means, whereby the spacing between the nets of each of the net means provides for compensation of the impact produced on each of the net means by a person regardless of the weight of that person and the



height of free fall onto the net means by that person, the upper ones of the individual planar non-woven nets in said net means being sufficiently close to the lower ones thereof to effect said impact compensation by the lower ones catching said upper ones when a sufficiently heavy person landed on said upper ones, said elastic bands being randomly horizontally arranged in said individual nets with a density sufficient to provide spans between the bands of said net means which are sufficiently small to prevent a person jumping onto each said net means from passing through the net means without bouncing on said net means, said elastic bands having an elasticity sufficient to permit persons to manually space the same to work their way through said net means and jump to the next one of said net means located at a considerably lower level, the distance between the spaced levels of said net means selected to produce an entirely free fall between said net means.

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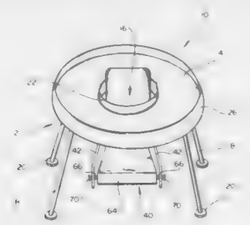
**4,743,008**

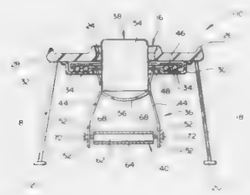
## INFANT EXERCISER

**Daniel R. Fermaglich, and Lois F. Fermaglich, both of 9 Van Duyne Rd., Mountain Lakes, N.J. 07046**

**Filed Dec. 19, 1986, Ser. No. 944,240**
**Int. Cl.[4] A63B** *23/06*
**U.S. Cl. 272—69** **26 Claims**

1. An infant exerciser adapted for use in a substantially stationary location, comprising a frame having an opening therein; mounting means for mounting said frame above a support surface such that said frame is maintained in a substantially horizontal orientation and is substantially immovable relative to the support surface; supporting means for supporting an infant above the support surface with its legs above and out of engagement with the support surface, said supporting means including a seat positioned in said opening in said frame and sized and shaped so as to permit the infant to sit thereon and a treadmill positioned below said seat such that the infant can walk on said treadmill; inhibiting means for inhibiting the movement of said mounting means relative to the support surface, whereby the infant can practice walking or otherwise exercise its legs on said treadmill without actually moving said exerciser along the support surface; and suspending means for suspending said supporting means from said frame such that said seat and said treadmill are conjointly rotatable relative to said frame and hence relative to the support surface, whereby the infant can change its field of view to thereby better interact





with the surrounding environment while continuing to walk or otherwise exercise its legs on said treadmill.

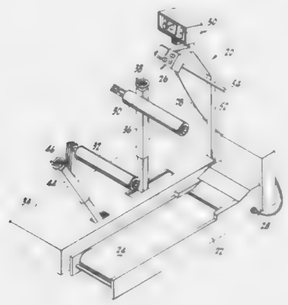
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**4,743,009**

## PELVIC POSTURE TRAINING APPARATUS

**Paxton K. Beale, 161 Alpine Ter., San Francisco, Calif. 94117**

**Filed Nov. 20, 1986, Ser. No. 933,102**
**Int. Cl.[4] A63B** *23/06;* **A61H** *1/02*
**U.S. Cl. 272—69** **8 Claims**



1. Apparatus for training a person to walk with proper pelvic posture comprising:

a treadmill having a walking surface;

mechanical means for directly and controllably imposing a preselected pelvic posture on a person on said treadmill, including

first constraint means for defining the maximum forward position of the abdomen of said person on said treadmill, first vertical support means for supporting said first constraint means and having means for adjusting the vertical position of said first constraint means relative to the vertical position of said walking surface, and first horizontal positioning means for moving said first vertical support means so as to adjust the position of said first constraint means to a selectable horizontal position above said walking surface; and

second constraint means for defining the position of the lower buttocks of said person at a position corresponding to said preselected pelvic posture, and means for adjusting the vertical position of said second constraint means relative to the vertical position of said walking surface; and

control means coupled to said mechanical means for moving one of said constraint means to impose said preselected pelvic posture on a person on said treadmill for a preselected training time period, and for then moving one of said constraint means so as to release said person's pelvis;

whereby a person walking on said treadmill can learn to walk with improved pelvic posture by first walking during said training time period with a preselected pelvic posture, and by thereafter walking without being restrained by said mechanical means while trying to maintain the pelvic posture position learned during said training time period.

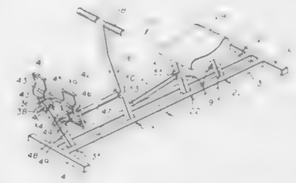
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**4,743,010**

## DYNAMIC POWERED ROWING MACHINE

**Alexander Geraci, 5221 N. Lind Ave., Chicago, Ill. 60630**

**Filed Aug. 11, 1986, Ser. No. 895,137**
**Int. Cl.[4] A63B** *21/00, 69/06*
**U.S. Cl. 272—72** **8 Claims**



1. An exercising apparatus of the rowing machine type, comprising a base frame, a rowing bar pivotally connected at one end to said base frame and having handle means,

a foot pedal assembly shorter than said rowing bar pivotally connected at one end to said base frame at a point forwardly of said rowing bar,

a seat assembly pivotally connected to said base frame at a point rearwardly of said rowing bar,

a first connecting rod member pivotally connected at one end to said foot pedal assembly at a point spaced above the point at which said foot pedal assembly is pivotally connected to said base frame and pivotally connected at its other end to said rowing bar at a point spaced above the point at which said rowing bar is pivotally connected to said base frame, and

a second connecting rod member pivotally connected at one end to said seat assembly at a point spaced above the point at which said seat assembly is pivotally connected to said base frame and pivotally connected at its other end to said rowing bar at a point spaced above the point at which said rowing bar is pivotally connected to said base frame,

whereby when said operator pulls rearwardly on said rowing bar, said foot pedal assembly is forced to move rearwardly thereby applying force to the feet of said operator and permitting said operator to apply a counter foot force to increase the force required to move said rowing bar, and whereby said seat assembly is caused to move rearwardly and upwardly, thereby raising said operator and further increasing the force required to pull said rowing bar rearwardly.

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**4,743,011**

## EXERCISE ROWING MACHINE

**Calvin Coffey, 48 E. Fifth St., Corning, N.Y. 14830**

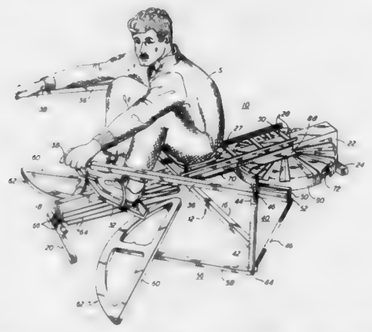
**Filed Jul. 7, 1986, Ser. No. 882,785**
**Int. Cl.[4] A63B** *21/00*
**U.S. Cl. 272—72** **12 Claims**

1. A rowing or sculling exercise machine on which a human subject simulates rowing or sculling motion, the machine imparting a resistance to the rowing or sculling motion similar to

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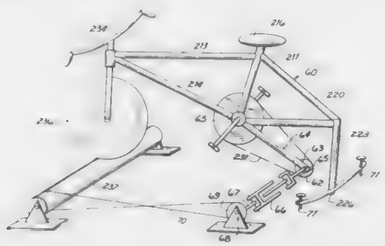
the resistance of a boat being rowed or sculled on water, the machine comprising a generally horizontal frame, a seat, means mounting said seat on said frame and permitting longitudinal motion relative to said frame for at least a limited distance, foot rest means on said frame for positioning the subject's feet, one or more oars each having respective oarlock means mounted laterally of said frame, said oars being pivotal relative to said oarlock means to simulate said rowing or sculling motion; respective cam means mounted to rotate with said oars about respective pivot points and defining an arcuate cam surface; a flywheel journaled on said frame including means imparting a



resistance to rotation thereof; drive chain means including a drive band and a drive member mounted on said flywheel to rotate the same in one direction; a cable affixed to said cam means to ride over the arcuate surface thereof, and connected to one end of said drive band; and resilient return means connected to the other end of said drive band to return said band and said cable when said oars are rotated reversely; the oars, cam means, cable, drive band, flywheel and return means being arranged such that pulling of said oars meets a generally even resistance transmitted thereto from said flywheel through said band, said cable, and said cam means.

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**4,743,012**
**BICYCLE EXERCISING DEVICE**
**Yong N. Kim, 18 Wellington Rd., Greenvale, N.Y. 11548**
**Filed Jul. 23, 1987, Ser. No. 76,941**
**Int. Cl.[4] A63B** *69/16;* **G09B** *9/04*
**U.S. Cl. 272—73** **6 Claims**



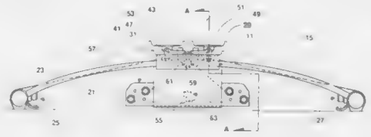
**1**. An improved bicycle type exercising device comprising: a longitudinally oriented frame having front and rear ends, rider supporting means positioned medially of said ends, crank means carried by said frame positioned to be powered by a rider, said frame including a verticlaly oriented stem at said front end thereof, a fork carried by said stem and extending downwardly therefrom, a front wheel carried by said fork, handlebars carried by said fork at an upper end thereof for transmitting a steering motion to said front wheel, a transversely extending elongated roller positioned beneath and engaging said front wheel for rotation therewith, and means for imparting motion to said roller and front wheel; said rear end of said frame having a downwardly extending member and an arcuately shaped transversely oriented rocker having a medial portion interconnected to a lower end of said downwardly extending member, said rocker being adapted to engage a horizontal supporting surface; whereby, during the riding of said device, motion imparted to said handlebars results in said front wheel traversing the length of said roller, said rocker pivoting to permit tilting of said frame in the transverse direction.

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**4,743,013**
**Patent Not Issued For This Number**

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**4,743,014**
**SKI EXERCISING APPARATUS**
**R. Joel Loane, 535 Placitas Ave., Atherton, Calif. 94025**
**Filed Jul. 30, 1987, Ser. No. 80,755**
**Int. Cl.[4] A63B** *69/18*
**U.S. Cl. 272—97** **13 Claims**



**1**. A device for exercising comprising:
a pair of rails positioned in a spaced apart parallel relationship;
brace means for holding said rails in said spaced apart relationship;
platform means for providing a stable riding area for riding along said rails;
first resilient means for providing a first restoring force on said platform means toward the middle of said rails;
second resilient means for providing a second restoring force on said platform means toward the middle of said rails;
adjustment means for adjusting the magnitude of said second restoring force, said adjustment means contacting said second resilient means at at least three points, with a first one of said three points located in a vertical plane on one side of the middle of said rails, with a second one of said three points located in a vertical plane on the other side of the middle of said rails, and with a third one of said three points associated with said platform means and moving therewith.

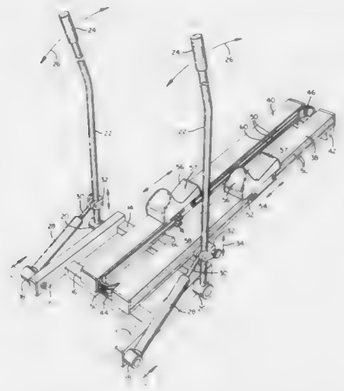
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**4,743,015**
**EXERCISE DEVICE SIMULATING CROSS COUNTRY SKIING**
**Frank E Marshall, Portland, Oreg., assignor to The Fitness Agency, Portland, Oreg.**
**Filed Jul. 28, 1986, Ser. No. 890,098**
**Int. Cl.[4] A63B** *69/18, 21/00*
**U.S. Cl. 272—97** **8 Claims**

**1**. An exercise apparatus simulating cross country skiing comprising: a pair of rails mounted in spaced parallel relationship, a foot pad for each rail that is mounted to the rail for sliding movement along the top of the rail and designed to accommodate the left and right feet of a user, a pair of static bearing members each extended between the two rails at forward and rearward spaced position, each of said static bearing members having outwardly facing convex bearing surfaces, and a flexible interconnecting loop including strap sections and connected at one end to one of the foot pads, extending around one bearing surface and connected to the other of the foot pads, then around the other bearing surface and back to the first foot pad whereby a forward sliding movement of one foot pad causes rearward sliding of the other foot pad and vise versa, said strap sections being drawn over the bearing surfaces



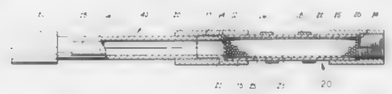
for frictional resistance of the foot pad sliding movement, and loop tightening means including a spring member forming a part of the loop and urging spring biased tightening of the strap against the convex bearing surfaces, said spring member increasing in tension with stretching thereof, and tension adjustment means exposed outside the foot pads for intermittent



adjustment during use by the user including a strap tightener for shortening the effective length of said strap and thereby stretching of said spring member to enable a user to selectively increase the spring tension and and being the sole tensioning adjustment means to increase the frictional engagement of said strap sections against the convex bearing surfaces.

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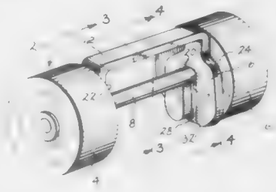
**4,743,016**
**VARIABLE THERAPEUTIC AND EXERCISE WEIGHTS**
**Mary K. Van Derworp, 17840 W. Black Canyon Hwy., #225, and Candida E. Quist, 2121 W. Union Hills Dr., #110, both of Phoenix, Ariz. 85023**
**Filed Oct. 7, 1985, Ser. No. 784,767**
**Int. Cl.[4] A63B** *21/06*
**U.S. Cl. 272—117** **15 Claims**



**1**. A weight system for use in physical activity, comprising:
a plurality of weighted and unweighted members;
each of said plurality of weighted members further comprising a hollow member having apertures at the ends thereof, a resilient liner disposed within and lining the entire interior surface area of said hollow member and weight means disposed within said resilient liner disposed within said hollow member, for providing weight to said hollow member;
each of said plurality of unweighted members further comprising a hollow member having apertures at ends thereof;
wherein each of said plurality of weighted and unweighted members further comprises a metal cap having a plurality of spring flanges extending therefrom, integrally coupled to an interior surface of said apertures of said at least one hollow member having said weight means disposed therein; and
a plurality of coupling members, each of said plurality of coupling members integrally coupled to an end of each of said plurality of weighted and unweighted members, wherein each of said plurality of coupling members removably joins with a corresponding one of said plurality of coupling members.

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**4,743,017**
**DUMBBELL ATTACHMENT**
**Marvin J. Jaeger, 502½ E. Atlantic St., Appleton, Wis. 54911**
**Filed Aug. 20, 1985, Ser. No. 767,527**
**Int. Cl.[4] A63B** *11/00*
**U.S. Cl. 272—122** **21 Claims**

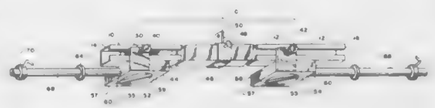


**1**. For a dumbbell having a pair of outer weights connected by a bar extending therebetween, the improvement comprising:
an auxiliary weight member having sufficient weight for use in weight lifting exercises, said auxiliary weight member comprising a pair of end portions and a central portion extending between said end portions, said central portion being laterally offset from the center of said end portions; and
attachment means for removably attaching said auxiliary weight member to said dumbbell and for retaining said auxiliary weight member on said dumbbell without simultaneous gripping of said central portion and said bar by the user, wherein said central portion of said auxiliary member is spaced from said bar when said auxiliary weight member is attached to said dumbbell.

**20**. For a dumbbell having a pair of outer weights connected by a bar extending therebetween, the improvement comprising an auxiliary weight member having sufficient weight for use in weight lifting exercises, said auxiliary weight member adapted for releasable attachment to said bar, and resilient releasable attachment means being mounted to said auxiliary weight member for releasably attaching said auxiliary weight member to said bar, said attachment means being disposed in a slot provided in said auxiliary weight member extending from an outer tip of said auxiliary weight member toward the center of said auxiliary weight member and forming a pocket adapted to receive said bar, said attachment means resiliently retaining said auxiliary weight member on said bar without being gripped by the user and providing quick manual releasable attachment and removal of said auxiliary weight member to and from said bar.

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**4,743,018**
**OFFSET ROTATABLE HANDLE MEMBERS FOR EXERCISING APPARATUS**
**Christopher W. Eckler, P.O. Box 564, Nashua, N.H. 03061**
**Filed Oct. 3, 1986, Ser. No. 915,371**
**Int. Cl.[4] A63B** *13/00*
**U.S. Cl. 272—123** **4 Claims**



**1**. An exercising apparatus comprising;
a crosspiece of fixed length having a pair of opposite ends and provided with a plurality of sides defining a rectangular cross-section having a central cavity,
cable attaching means on the medial portion of said crosspiece,

a pair of handle hanger members each disposed on opposite sides of said cable attaching means,
each said handle hanger member having a central aperture extending through opposite planar faces and bounded by front, rear, inside and outside walls,
clamp means carried by each said hanger member affixing one said planar face of each said hanger member to one said side of said cross-piece with said aperture positioned substantially laterally offset from an adjacent one said side of said crosspiece and maintaining said planar faces and the central axis of said aperture fixed relative said cross-piece,
a stub bar for supporting weights extending outwardly from said outside wall of each said hanger member and having an axis, if extended, passing through and normal to the center axis of said hanger member apertures whereby, said stub bar axes are substantially laterally offset from said cross-piece and a clearance space is provided between said inside walls of said hanger members laterally of said cross-piece and,
hand gripping means mounted in each said hanger member aperture providing a rotatable hand grip for weightlifting whereby, the hands can be rotated while supporting the apparatus with the capability to change hand positions from pronated all the way to supinated in one movement without having to release and regrip said hand gripping means.

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**4,743,019**
**APPARATUS FOR PROPRIOCEPTIVE REEDUCATION AND/OR PHYSICAL TRAINING**
**Bruno J. Lequeux, Rue Devant le Monty, B-4910 Libin, Belgium**
**PCT No. PCT/BE85/00022, § 371 Date Aug. 27, 1986, § 102(e) Date Aug. 27, 1986, PCT Pub. No. WO86/03981, PCT Pub. Date Jul. 17, 1986**
**PCT Filed Dec. 23, 1985, Ser. No. 909,056**
**Claims priority, application Belgium, Dec. 27, 1984, 0/214238**
**Int. Cl.[4] A63B** *21/22*
**U.S. Cl. 272—132** **20 Claims**

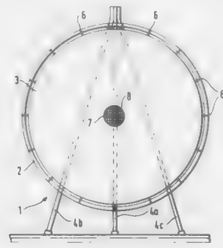


1. Proprioceptive rehabilitation and/or physical training apparatus comprising:
at least one base;
means attached to said base for inclining said base with respect to a support surface;
a turntable rotatably attached to said base and inclinable with said base, said turntable having a plurality of spaced parallel grooves therein, each of said grooves having a pre-selected cross section and means for receiving and retaining fastening accessories having cross sections matching said pre-selected cross section of said grooves; and
adjustable brake means associated with said rotary turntable.

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**4,743,020**
**BALL RETURN AND TARGET DEVICE**
**Julius Meurer, Kuhmarkt 16, 2848 Vechta, Fed. Rep. of Germany**
**Filed Jul. 24, 1986, Ser. No. 889,820**
**Claims priority, application Fed. Rep. of Germany, Jul. 27, 1985, 3526956**
**Int. Cl.[4] A63B** *69/40*
**U.S. Cl. 273—29 A** **11 Claims**

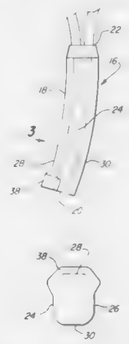
1. A ball-game device, comprising:
a stand;
a frame supported on said stand; and
a baffle wall made of non-yielding material for reflecting a ball surrounded by said frame and supported thereon by at least one flexible fastening element, said baffle wall having



a concave front surface in the form of a spherical indentation, said fastening element permitting yielding of said baffle wall with respect to said frame upon impact by said ball and then returning said baffle to its resting position.

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**4,743,021**
**SPORTS RACKET HAVING ARCUATELY CURVED HANDLE**
**Frank Gonzales, Jr., 33657 Arrowhead, Westland, Mich. 48185**
**Filed Jun. 19, 1986, Ser. No. 875,971**
**Int. Cl.[4] A63B** *49/08*
**U.S. Cl. 273—75** **3 Claims**



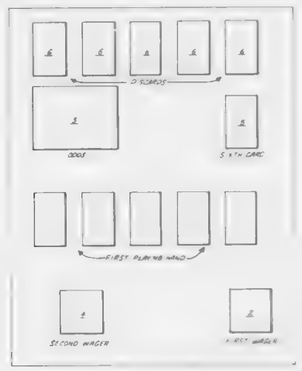
1. A sports racket having a flat hitting portion in a predetermined plane, an elongated neck extending outwardly from the hitting portion, a handle, said handle being attached to a free end of the neck and comprising
an elongated body dimensioned to be gripped by a human hand,
said body being continuously arcuately curved along substantially its entire length so that said body has a concavely curved side, a convexly curved side opposite from the concavely curved side and two spaced apart and parallel planar sides extending in between said concavely curved and said convexly curved sides,
wherein said body is arranged so that each planar side lies in a plane which is substantially parallel with said plane of said flat hitting portion,
an outwardly protruding lip at a free end of said handle, wherein said outwardly protruding lip, when viewed from the free end of said handle and looking along the length of the handle, extends entirely along said concavely curved side of said handle and said lip having its ends terminating respectively at intermediate points of said planar sides of said handle and also at positions closely adjacent said concavely curved side so that the free end of said handle



on said convex side rests within the palm of the hand and so that said lip extends generally transversely with respect to said plane of said flat hitting portion wherein said lip extends less than halfway around an outer periphery of said handle.

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**4,743,022**
**2ND CHANCE POKER METHOD**
**Michael W. Wood, 1106 Willow Brook Ave., Denham Springs, La. 70726**
**Filed Mar. 6, 1986, Ser. No. 837,041**
**Int. Cl.[4] A63F** *1/00*
**U.S. Cl. 273—85 CP** **6 Claims**

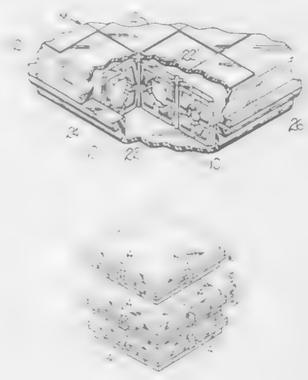


1. A method of playing a casino-type draw poker game using a computer and video screen wherein five card hands are ranked from low to high in order of high card, pair, two-pair, three-of-a-kind, straight, flush, full house, four-of-a-kind and straight flush, which comprises the steps of:
(a) a player registering a first wager with said computer;
(b) said computer randomly generating and displaying five cards from a pool comprising elements corresponding to a standard 52 playing card deck, said five cards forming a first hand;
(c) said player directing said computer to discard up to five cards from said first hand;
(d) said computer randomly generating and displaying a replacement card, from a balance of cards in said pool, for each card discarded from said first hand, said replacement cards and undiscarded cards from said first hand forming a second hand;
(e) said computer comparing a rank of said second hand to an odds chart to determine if said player has lost or won an amount based on said first wager;
(f) said computer offering said player an opportunity to register a second wager if there is a possibility of a third hand having a rank of straight or higher, said third hand being the highest ranking five card hand which can be made using said second hand and a sixth card randomly generated from a balance of cards in said pool;
(g) if a possibility of said third hand having a rank of straight or higher exists, said player electing to terminate said game or to register said second wager with said computer;
(h) if said player registers said second wager, said computer randomly generating said sixth card from a balance of cards in said pool; and
(i) said computer comparing a rank of said third hand to said odds chart to determine if said player has lost or won an amount based on said second wager.

4. A method of playing a casino-type draw poker game wherein five card hands are ranked from low to high in order of high card, pair, two-pair, three-of-a-kind, straight, flush, full house, four-of-a-kind and straight flush, which comprises the steps of:
(a) a player placing a first wager on a playing table;
(b) said player being dealt five random cards from a pool comprising a standard 52 playing card deck, said five cards forming a first hand;
(c) said player choosing to discard up to five cards from said first hand;
(d) said player being randomly dealt a replacement card from a balance of cards in said pool, for each card discarded from said first hand, said replacement cards and undiscarded cards from said first hand forming a second hand;
(e) comparing a rank of said second hand to an odds chart to determine if said player has lost or won an amount based on said first wager;
(f) said player being offered an opportunity to place a second wager if there is a possibility of a third hand having a rank of straight or higher, said third hand being the highest ranking five card hand which can be made using said second hand and a sixth card randomly dealt from a balance of cards in said pool;
(g) if a possibility of said third hand having a rank of straight or higher exists, said player electing to terminate said game or to place said second wager on said playing table;
(h) if said player places said second wager, said player being randomly dealt said sixth card from a balance of cards in said pool; and
(i) comparing a rank of said third hand to said odds chart to determine if said player has lost or won an amount based on said second wager.

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**4,743,023**
**MAZE GAME**
**David L. Collier, Portland, Oreg., assignor to Collier Products, Inc., Portland, Oreg.**
**Filed Oct. 10, 1986, Ser. No. 917,769**
**Int. Cl.[4] A63B** *67/14;* **A63F** *9/06*
**U.S. Cl. 273—113** **6 Claims**



1. A maze game comprising:
(a) at least two hollow container modules, each module containing a maze pathway through its interior, each module including a top tray member and a bottom tray member, each member mounting a plurality of spaced apart grooved posts disposed for axial alignment with the posts of the other tray member when the two members are put together to form a container module, laterally adjacent posts configured to receive between them removable maze-forming panels having edges arranged to be captured in the grooves of the spaced apart posts, whereby a

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maze pathway can be formed by positioning the panels in a selected arrangement,

(b) at least two openings in each module, one opening arranged through the top of the module to permit entrance of an object ball to the interior of the module and the other opening arranged through the bottom of the module to permit

an object ball to exit the module, and

(c) locking means configured to releasably engage each module to secure the modules together in a vertically stacking condition one upon the other, whereby said one opening through the top of the one module is maintained in alignment with the opening through the bottom of the other module disposed on top of the one module, whereby to permit passage of an object ball from the upper module level to the lower module level upon completion of the maze pathway associated with said upper module level.

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**4,743,024**

## AMUSEMENT ARCADE MACHINES FOR USE IN AMUSEMENT AND/OR GAMING OR THE LIKE

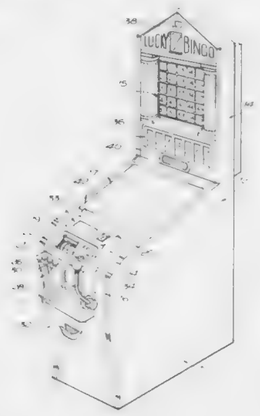
**Arthur E. Helm, Southport, and Stuart J. Keane, Leeds, both of England, assignors to Elton Fabrications Limited, Merseyside, England**

**Filed Dec. 6, 1985, Ser. No. 805,700**

**Claims priority, application United Kingdom, Dec. 8, 1984, 8431070**

**Int. Cl.[4] A63F** *5/04*

**U.S. Cl. 273—143 R** **11 Claims**




1. An amusement machine comprising:

(a) actuator means for operating the machine,

(b) random display means comprising first and second side-by-side display areas, first display means for displaying in the first of the areas one of a first set of symbols, and second display means for displaying in the second of the areas one of a second set of symbols wherein said first and second display means form a multi-character number;

(c) first connecting means operatively connecting the actuator means and random display means for operating the random display means upon actuation of the actuator means to cause the respective symbols of the first set and second set to be repeatedly and sequentially displayed in said first and second areas until stopped in accordance with the play of the machine;

(d) fixed display means comprising a matrix of indications each comprising two side-by-side symbols being a symbol of said first set and a symbol of the second set;

(e) second connecting means operatively connecting the random display means with the fixed display means for displaying in the fixed display means each indication comprising the two symbols of the first and second sets displayed in the said first and second display areas when the display means is operated and then stopped; and

(f) control means for enabling the player selectively to control one of the first and second display means relative to the other so that a player can exercise control over the symbols which are displayed in the random display means in such a manner that either of the displayed characters can be held while the other character is allowed to randomly change.

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**4,743,025**

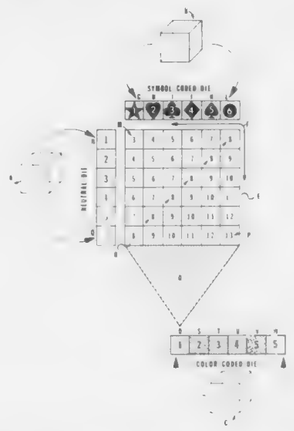
## VISUALLY DIFFERENTIATING THE CODED COMBINATIONS OF THREE DIES

**Robert E. Gramera, 1027 Raleigh St., Denver, Colo. 80204**

**Filed Dec. 4, 1984, Ser. No. 678,117**

**Int. Cl.[4] A63F** *9/04*

**U.S. Cl. 273—146** **2 Claims**




1. A set of three (3) multi-sided dice, comprising a first die having thereon a plurality of flat faces of equal area, all of said faces provided with the same background indicia, each face additionally carrying means representing a numeral, all said represented numerals being different from each other, a second multi-sided die having thereon the same number of flat faces as said first die, each face of said second die carrying means representing a numeral, each face on said second die carrying background indicia different from that on each other face and different from said background indicia on said first die; and a third multi-sided die having thereon the same number of flat faces as said first and second die, each face of said third die carrying means representing a numeral, each face on said third die carrying background indicia different from that on each face of said one of said second or third dice, whereby every possible combination of throws may be visually distinguished even when the numerical total of throws is the same.

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**4,743,026**

## GOLF GAME

**Gordon E. Eady, 151 Ross Street, Renfrew, Ontario, Canada K7V 2H9**

**Filed Apr. 15, 1986, Ser. No. 852,213**

**Claims priority, application Canada, May 23, 1985, 482157**

**Int. Cl.[4] A63B** *67/02;* **A63F** *7/06*

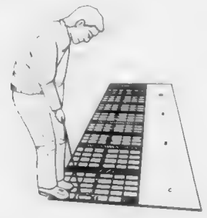
**U.S. Cl. 273—176 F** **7 Claims**

1. A golf game to be used in association with a golf club and a golf ball, the golf game comprising:

(a) a storable flexible medium having markings denoting a playing surface for the game, the surface being divided into a pre-putting region and a putting region by a line of demarcation, the pre-putting region having a tee-off zone proximate to one end thereof and having a series of target zones between the tee-off zone and a second end opposite said one end with the target zones extending parallel to the ends of the pre-putting region, the pre-putting region being also divided longitudinally between its ends such that each target zone has a central portion and at least one lateral portion on each side of the central portion;



(b) at least one chart depicting in plan view a link of a golf course, said at least one chart being divided by longitudinal and lateral lines, the longitudinal lines extending from the tee-off area toward the hole area and dividing said at least one chart into longitudinal divisions corresponding to the central portion and lateral portions of the target zones on the flexible medium, the distance represented by the separation between each adjacent pair of lateral lines having a relationship to the separation between lateral edges of the target zones; and



(c) a series of markers for the at least one chart, the players of the game having mutually distinguishable markers; and whereby the game is played by each player in turn first hitting a ball from the tee-off zone of the pre-putting region of the flexible medium, then placing a marker at the position on the at least one chart corresponding to the longitudinal and lateral position at which the ball comes to rest on the flexible medium, then, according to the position of the marker on the at least one chart, rehitting the ball from the tee-off zone of the pre-putting region of the flexible medium and moving the marker to a position further along the at least one chart according to the new postion at which the ball comes to rest on the flexible medium, then repeating such hitting of the ball until the marker on the at least one chart is within a preselected distance of the hole on the at least one chart, then moving to the putting region of the flexible medium and hitting the ball until it moves within a hole designation in that region, the player then counting the number of hits of the ball required to move their marker to the hole on the at least one chart.

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**4,743,027**

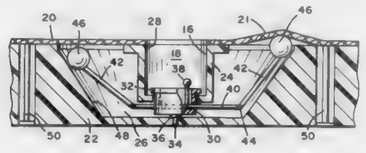
## GOLF PRACTICE PUTTING DEVICE

**Luther G. Simjian, Fort Lauderdale, Fla., assignor to Command Automation, Inc., Fort Lauderdale, Fla.**

**Filed Apr. 2, 1987, Ser. No. 34,478**

**Int. Cl.[4] A63B** *67/02*

**U.S. Cl. 273—178 R** **7 Claims**




1. A golf practice putting device comprising:

a support for providing an inclined ramp portion and an abutting normally level portion;

a mat covering said normally level portion;

an aperture disposed in said mat and support at said normally level portion for receiving therein a golf ball rolling over said normally level portion;

means for engaging the underside of said mat coupled to said support for elevating a localized portion of said mat at said normally level portion for distorting said mat from its normally level position, and

control means, accessible via said aperture coupled to said means for engaging said mat for controlling the elevation of said localized portion.

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**4,743,028**

## GOLF SWING PRACTICE DEVICE

**Keith Harrison, 585 South Road, Moorabbin, Victoria 3189, Australia**

**PCT No. PCT/AU85/00059, § 371 Date Jan. 17, 1986, § 102(e) Date Jan. 17, 1986, PCT Pub. No. WO85/04337, PCT Pub. Date Oct. 10, 1985**

**PCT Filed Mar. 26, 1985, Ser. No. 802,173**

**Claims priority, application Australia, Mar. 26, 1984, PG4246**

**Int. Cl.[4] A63B** *69/36*

**U.S. Cl. 273—183 B** **3 Claims**



1. A golf swing practice device for providing an indication as to the position of a golfer's power arm with respect to a golfer's body during the execution of a golf swing, the practice device comprising:

a main body which is configured so that, in an operative position, it can be disposed between the golfer's power arm and the golfer's body, said main body comprising two parts operatively connected together for limited movement toward and away from one another wherein at least one of said parts has an outer concave surface for contacting the arm;

securing means attached to said main body for securing the practice device to the golfer's power arm;

sensing means comprising a spring loaded switch mounted on said main body between said two parts for movement between a first position and a second position;

biasing means normally biasing said two parts of said main body away from each other whereby said spring loaded switch is allowed to move to one of said positions upon movement of said two parts away from each other and being adapted to be moved to the other of said positions as a result of pressure applied to said parts by a golfer's power arm against the bias of said biasing means; and

indicating means responsive to said spring bias switch being in one of said positions to provide an indication as to which of said positions said spring biased switch is in, said switch and said indicating means being arranged in an electrical circuit.

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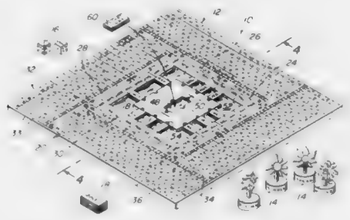


**4,743,029**

## DOCKET DIARY GAME

**Michael Consolatore, 737 7th St., W. Babylon, N.Y. 11704, and Jean Cafarella, 429 39th St., Lindenhurst, N.Y. 11757**

**Filed Sep. 8, 1986, Ser. No. 906,265**
**Int. Cl.[4] A63F** *3/00*
**U.S. Cl. 273—243** **7 Claims**



1. A docket diary game which comprises:
(a) a game board having an inner zone with a plurality of spaces defining a path of travel, indicia representing the twelve months being in random association with respect to each of said spaces an outer zone divided into twelve sections, each corresponding to one of the months of a twelve month calendar, each of the respective sections having a plurality of contiguous positions arranged in a group within the corresponding sections, said positions corresponding to the proper sequence of days in the corresponding month;
(b) a plurality of playing pieces for use by participants of said game, each of said playing pieces of a size to fit in said spaces of said game board;
(c) a random number generator providing numeric designations representing a magnitude of movement for each of said playing pieces along said path of travel;
(d) twelve groups of cards, each group respectively identified with a corresponding one of said twelve months, each card within a group respectively identified with a corresponding one of said days within the corresponding month, whereby there is one card for each position, each card having a question and answer thereon;
(e) an additional group of cards identified as a docket diary, each card of said docket diary having a bonus question and answer thereon;
(f) indicating means on each of said positions for indicating a correct answer for its respective card; and
(g) means for preventing the accidental change of said correct answer by said indicating means due to jarring of said game board.

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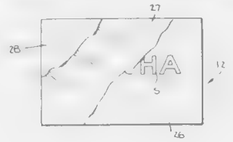
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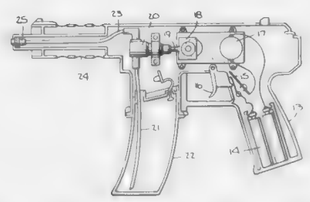
## WATER GUN AND TARGET COMBAT GAME SET

**Robert T. Auer, East Stroudsburg, Pa., and Richard L. Keats, Sands Point, N.Y., assignors to Buddy L Corporation, New York, N.Y.**

**Filed Sep. 3, 1986, Ser. No. 903,151**
**Int. Cl.[4] A63B** *71/02;* **F41B** *9/00;* **F41J** *5/00*
**U.S. Cl. 273—349** **4 Claims**

1. A combat game set comprising:
A. a battery-powered toy water gun having a water pump operated by a direct-current motor connected to the battery by a trigger-actuated switch which when fired by a trigger operation shoots out a beam of ordinary water; and
B. a target wearable by the player having a plaque thereon constituted by a base sheet having a strike symbol printed thereon which is concealed by a masking layer formed by a cover sheet laminated to said base sheet which when dry is effectively opaque and is effectively rendered transparent to expose the symbol only when the making layer is rendered wet by the water beam whereby the exposed strike symbol indicated a hit, said target being dimensioned to shield from water a relatively large area of the player's body, said masking layer, when thereafter dry, again concealing the strike symbol whereby the plaque is repeatedly reusable, said cover sheet being formed by a



transparent sheet whose outer surface is coated with a dispersion of fine acrylic silicate particles that diffuse light when dry, and are rendered transparent when wet.

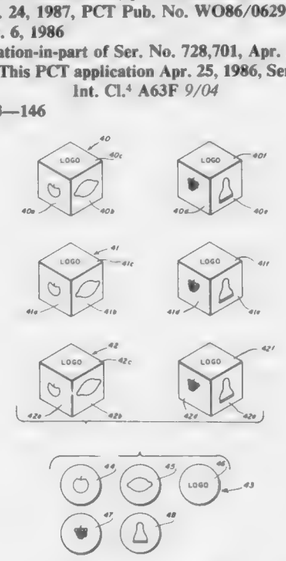
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**4,743,031**

## DICE AND TOKEN GAME APPARATUS

**Stewart M. Lamle, 55 West 86th Street, New York, N.Y. 10024**

**PCT No. PCT/US86/00914, § 371 Date Feb. 24, 1987, § 102(e) Date Feb. 24, 1987, PCT Pub. No. WO86/06292, PCT Pub. Date Nov. 6, 1986**
**Continuation-in-part of Ser. No. 728,701, Apr. 29, 1985, abandoned. This PCT application Apr. 25, 1986, Ser. No. 86,733**
**Int. Cl.[4] A63F** *9/04*
**U.S. Cl. 273—146** **7 Claims**




1. A process of utilizing a game apparatus comprising 3 dice each having 6 sides and 6 tokens, wherein 6 forms of indicia are used on the sides of the dice and no 2 sides of any dice have the same indicia thereon, and wherein each token has a form of indicia thereon which is the same as the indicia used on the dice, the process comprising the steps of:
(1) throwing all 3 dice;
(2) rendering a player a winner if all 3 of the thrown dice show the same indicia;
(3) awarding a player a token if 2 of the thrown dice show the same indicia, wherein the token has the same indicia thereon as on the 2 thrown dice; and
(4) rendering a subsequent player a joint winner with the player in (3) above if the subsequent player throws the dice resulting in 2 of the thrown dice showing the same indicia as in (3) above.

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**4,743,032**

## MULTIPLE TARGET MECHANISM

**Graham F. Summers, and Thomas W. Whittaker, both of Albury, Australia, assignors to ATA Training Aids Pty. Ltd., New South Wales, Australia**

**Filed Jan. 2, 1987, Ser. No. 171**
**Int. Cl.[4] F41J** *5/06, 7/02*
**U.S. Cl. 273—372** **10 Claims**



1. A modular, multiple target mechanism for presenting a multiplicity of targets to a shooter for firearm target practice comprising:
(a) a plurality of modules, each module comprising:
(i) a support;
(ii) an actuating device having a stationary portion, and an extensible and retractable ram;
(iii) first attaching means for attaching the stationary portion to the support;
(iv) a crank arm;
(v) second attaching means attaching the crank arm to the support such that it pivots about an axis;
(vi) third attaching means attaching the ram to the crank arm such that extension and retraction of the ram causes the crank arm to pivot about its axis; and,
(vii) a generally planar target attached to the crank arm such that the plane of the target extends substantially perpendicular to the pivot axis of the crank arm; and,
(b) means to fasten a plurality of modules together such that the pivot axes of the crank arms are coincident.

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**4,743,033**

## DYNAMIC SEAL ASSEMBLY FOR PISTON AND CYLINDER OPERATING IN SUBTERRANEAN WELLS

**Edward L. Guess, Tulsa, Okla., assignor to Baker Oil Tools, Inc., Orange, Calif.**

**Filed Dec. 16, 1985, Ser. No. 809,499**
**Int. Cl.[4] F16J** *9/00, 15/16, 15/46*
**U.S. Cl. 277—27** **2 Claims**

1. A bi-directional dynamic seal for a piston element concentrically mounted in a vertical cylindrical bore of a well tool for axial movement relative thereto, comprising: a first primary seal having a hub portion concentrically and sealably mounted relative to the exterior of said piston element; said first primary seal having a frustroconically shaped, annular skirt portion extending radially and downwardly from said hub portion into sealing engagement with the wall of the well tool defining said cylindrical bore; a second primary seal having a hub portion concentrically and sealably mounted relative to the exterior of the piston element in upwardly sapaced relation to said first primary seal; said second primary seal element having a frustroconically shaped annular skirt portion extending radially and upwardly from the respective hub portion into sealing engagement with the wall of said cylindrical bore; both said first and second primary seal elements being formed from a non-metallic, non-elastomeric sealing material; a metallic secondary seal element comprising a tubular body securable to said piston element intermediate said hub portions of said first and second primary seal elements, the axial end portions of said tubular body respectively defining frustro-conical, annular flexible lip portions respectively snugly surrounding said skirt



portions of said first and second primary seals; each said lip portion having an external cylindrical surface of slightly smaller diameter than said cylindrical bore, whereby the application of a fluid pressure in either direction to said piston element causes one of said primary seals to expand and resiliently expand the adjacent secondary seal to force the external cylindrical surface of the adjacent lip portion into sealing engagement with said cylindrical bore.

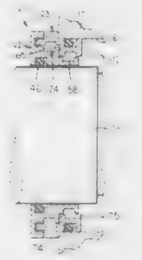
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**4,743,034**

## LABYRINTH BEARING PROTECTOR SEAL

**Kenneth G. Kakabaker, Kalamazoo, and Duane A. Avard, Schoolcraft, both of Mich., assignors to Durametallic Corporation, Kalamazoo, Mich.**

**Filed Mar. 27, 1987, Ser. No. 32,108**
**Int. Cl.[4] F16J** *15/447*
**U.S. Cl. 277—53** **14 Claims**



1. In combination, a shaft rotatable about its longitudinally extending axis, a housing disposed in surrounding relationship to the shaft and defining therein a cylindrical bore which concentrically surrounds the shaft, bearing means coacting between said housing and said shaft for rotatably supporting said shaft, and a bearing protector associated with said cylindrical bore at a location spaced axially outwardly from said bearing means and coacting between said shaft and said housing for sealingly isolating the bearing means from a region

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which is disposed exteriorly of the bearing protector, said bearing protector including a one-piece ring-shaped rotor sealingly and nonrotatably carried on said shaft and disposed for cooperation with a one-piece ring-shaped stator which is sealingly and nonrotatably mounted on said housing at least partially within said cylindrical bore, comprising:

said stator being disposed radially in concentric and surrounding relationship to said rotor, said stator and rotor respectively having first and second annular surface means formed thereon and disposed in concentric and closely adjacent relationship to one another so as to define therebetween an elongate annular pathway which extends axially over a significant extent and at its inner end communicates with a bearing compartment and at its outer end communicates with the exterior region;

said pathway including an inner passageway which is of very narrow width as defined between opposed portions of said first and second annular surface means for inhibiting flow therethrough, said inner passageway having a length which exceeds its width and defining the inner end of said pathway for direct communication with the bearing compartment;

said pathway including an outer passageway which is of extremely narrow width as defined between opposed portions of said first and second annular surface means for inhibiting flow therethrough, said outer passageway having a length which exceeds its width and defining the outer end of said pathway for direct communication with the exterior region;

said pathway including means defining a first annular channel of enlarged radial and axial cross-sectional dimensions for collecting therein lubricant which tends to escape from said bearing compartment, said first channel being disposed for communication between the inner and intermediate passageways, said first channel being defined by a radially opposed pair of first channel-like grooves which are formed in said stator and rotor and which project respectively radially outwardly and inwardly from the respective first and second annular surface means;

said stator having first drain opening means formed therein adjacent a lower side thereof for providing communication between said bearing compartment and the radially outermost portion of the first channel-like groove as defined in said stator;

said pathway including means defining a second annular channel of enlarged radial and axial cross-sectional dimensions for collecting therein contaminants which flow into the pathway from the exterior region, said second channel being disposed for communication between the outer and intermediate passageways, said second channel also being positioned axially outwardly from said first channel and separated therefrom by said intermediate passageway, said second channel being defined by a radially opposed pair of second channel-like grooves as defined in said stator and rotor, said pair of second channel-like grooves extending radially outwardly and inwardly relative to the respective first and second annular surface means;

said stator having second drain opening means formed in a lower portion thereof and providing communication between said exterior region and the radially outer portion of the second channel-like groove as defined in said stator;

said stator including at least axially inner and outer annular portions, said inner annular portion being closely seated within the housing bore, said stator also defining thereon an axially inwardly facing shoulder at the interface between said inner and outer annular portions so that said shoulder abuts an external front face of said housing when said stator is mounted thereon; and

said outer passageway being defined in part by an axially extending annular groove formed in one of said stator and rotor and an axially extending annular flange which is formed on the other of said stator and rotor and is closely accommodated within said annular groove so that said outer passageway includes a generally U-shaped path having generally parallel axially-extending legs which are radially spaced apart so that flow through said outer passageway requires flow through one said leg in one axial direction followed by flow through the other said leg in an opposite axial direction.

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**4,743,035**

## SEAL SYSTEM BETWEEN TWO METAL FLANGES

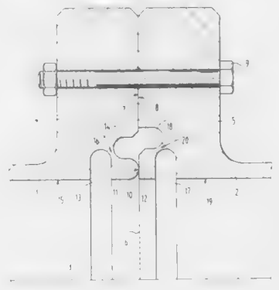
**Leo Van Loom, and Rémy Pilliard, both of Ispra, Italy, assignors to European Atomic Energy Community (EURATOM), Luxembourg**

**Filed Dec. 12, 1986, Ser. No. 941,000**

**Claims priority, application Luxembourg, Dec. 12, 1985, 86209**

**Int. Cl.⁴ F16J *15/02*; F16L *19/02***

**U.S. Cl. 277—214** **2 Claims**



1. In a seal system between two end abutting metal pipe (**1**, **2**) flanges (**4**, **5**) exposed to extreme temperatures, said pipe flanges each having a cylindrical inner surface and a flat end surface, said seal system comprising an elastic annular lip (**11**, **12**) carried by each flange, an axial end point (**10**) of one flange lip in contact with the other flange lip forming a seal line when the flanges are assembled, the improvement wherein;

said lips (**11**, **12**) are integral parts of the flanges (**4**, **5**) and each lip being defined by two grooves (**13**, **14**; **17**, **18**), including one radial groove (**13**, **17**) radially penetrating the cylindrical inner surface (**15**, **19**) of each respective flange and one longitudinal groove (**14**, **18**) being perpendicular to the one radial groove in the flat end surface (**7**, **8**) of each flange, each lip being attached to its respective flange by a thinned area, the thinned area (**16**, **20**) being between and defined by the two respective grooves defining each lip, the elasticity of the lips (**11**, **12**) being provided by the thinned areas, said lip with said axial end point having a bulged area opposite the other lip with said axial end point being the axial end point of said bulge, the radial distance between the axis (**3**) of the flanges and the longitudinal groove (**14**) in the end surface (**7**) of the flange (**4**) having the bulged lip (**11**) is smaller than the radial distance between the axis (**3**) of the flanges and the groove (**18**) in the end surface (**8**) of the other flange (**5**) and wherein the longitudinal distance between the seal line (**6**) and the groove (**13**) in the cylindrical surface (**15**) of the flange (**4**) having the bulged lip is greater than the longitudinal distance between the seal line (**6**) and the groove (**17**) in the cylindrical surface (**19**) of the other flange (**5**).



**4,743,036**

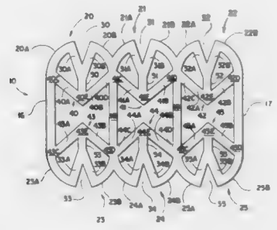
## COMPRESSION SEAL

**John D. Nicholas, Lawrenceville, Ga., assignor to MM Systems Corporation, Tucker, Ga.**

**Filed Apr. 16, 1986, Ser. No. 852,761**

**Int. Cl.⁴ E01C *11/10*; F16J *15/10***

**U.S. Cl. 277—237 R** **8 Claims**



1. An apparatus for sealing a void between adjacent dynamic members having mutually facing vertical walls, said sealing apparatus produced as an elastomeric extrusion of generally rectangular cross-sectional shape having a wall construction comprising;

a plurality of vertical walls disposed in adjacent spaced-apart relation, the outermost vertical walls comprising vertical surfaces of said sealing apparatus which contact said mutually facing vertical walls of said adjacent dynamic members;

convex walls extending between the tops of adjacent vertical walls;

each convex wall having its end portions each merging with a respective top;

downwardly-extending V-shaped walls the upper edges of which are connected to adjacent vertical walls such that the apexes of said V-shaped walls are displaced downwardly in response to lateral compression of said sealing apparatus; and

means for connecting the apexes of said V-shaped walls and a central portion of said convex walls to exert a downward force on the central portion of said convex walls as said sealing apparatus is laterally compressed to negate the tendency of said convex walls to elongate upwardly as said sealing apparatus is laterally compressed, whereby the collapse of said convex walls in response to lateral compression of said sealing apparatus is controlled to form a substantially planar upper surface connecting said adjacent dynamic members.

6. In a compression seal for installation in a void between adjacent dynamic members having mutually facing vertical walls, said compression seal produced as an elastomeric extrusion of generally rectangular cross section having a plurality of substantially vertical wall members and upper wall members connecting the tops of adjacent vertical wall members, an apparatus for controlling the collapse of said upper wall members of said compression seal as said seal is laterally compressed, comprising:

downwardly-extending V-shaped walls the upper edges of which are connected to adjacent vertical walls such that the apexes of said V-shaped walls are displaced downwardly in response to lateral compression of said seal; and

vertical connecting members connecting the apexes of said V-shaped walls and an intermediate portion of said upper wall members, whereby the downward displacement of the apexes of said V-shaped walls is transmitted by said vertical connecting members to exert a downward force upon said intermediate portion of said upper walls to control the collapse of said upper walls and said seal is laterally compressed.

**4,743,037**

## AUTOMATIC LEVELLING SYSTEM

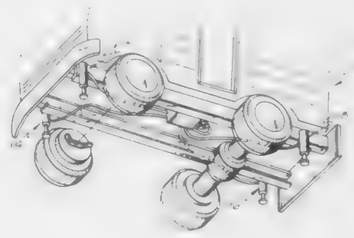
**Paul. E. Hanser, Wilton, Iowa, assignor to HWH Corporation, Moscow, Iowa**

**Continuation-in-part of Ser. No. 605,802, May 1, 1984, Pat. No. 4,597,584. This application Feb. 5, 1986, Ser. No. 826,364**

**The portion of the term of this patent subsequent to Jul. 1, 2003, has been disclaimed.**

**Int. Cl.⁴ B60S *9/00***

**U.S. Cl. 208—6 R** **30 Claims**



1. In combination for use in a vehicle to level the vehicle relative to gravity,

a plurality of jacks each disposed on the vehicle at a strategic position on the vehicle and each being extensible to adjust the vertical disposition of the vehicle at the strategic position,

means operatively coupled to the jacks in the plurality for operating the jacks in a sequence to level the vehicle,

a plurality of bleeder valves each associated with an individual one of the jacks in the plurality,

a relief valve, and

means including the bleeder valves and the relief valve for obtaining an extension until the exertion of a particular pressure by the ground on particular ones of the jacks not previously extended in levelling the vehicle and for thereafter preventing such jacks form being extended,

the bleeder valves associated with the particular valves being opened during the extension of such jacks to obtain the imposition of the particular pressure on such jacks and the relief valve thereafter being opened.

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**4,743,038**

## CARRYING CASE AND CART

**Jay E. Myers, Laguna Beach, Calif.; M. Todd Myers, New York, N.Y., and Siamak Iravantchi, Lawndale, Calif., assignors to Andiamo, Inc., Fountain Valley, Calif.**

**Filed Feb. 12, 1986, Ser. No. 828,769**

**Int. Cl.⁴ B62B *1/04***

**U.S. Cl. 280—40** **12 Claims**

1. A transportable case comprising

two sections,

hinge means interconnecting said sections so that said sections can meet,

said sections having walls cooperable to define an enclosure when said sections so meet,

said walls including a bottom wall for said enclosure,

a duality of spaced receptacles on either side of said bottom wall,

each of said receptacles having walls defining a socket which has an outwardly facing open outer end and which tapers inwardly in cross sectional dimension, and

wheeled cart means including an upstanding portion and two outwardly projecting support members at the lower end of said upstanding portion adapted to enter two of said receptacles on either side of said bottom wall of said

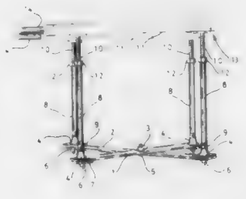
enclosure for lifting said container and transporting the same, said support members and said receptacles having



cooperable detent means for releasably retaining said support members in said receptacles.

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**4,743,039**
**GRAND PIANO ACTION CRADLE**
**James F. Ellis, 125 N. Purdue Ave., Oak Ridge, Tenn. 37830**
**Filed Oct. 14, 1986, Ser. No. 918,044**
**Int. Cl.[4] B62B** *3/02*
**U.S. Cl. 280—42** **1 Claim**



1. In a device for supporting the action of a grand piano, a combination comprising

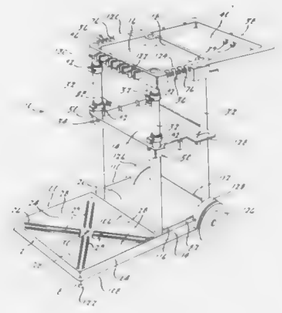
two crossed horizontal members supported at their four ends by casters, pivoted at their common centers by a bolt, and having threaded flanges attached to their upper surfaces,

four vertical supports of tubular material having threaded collars at their lower ends mating with said threaded flanges,

four threaded studs each extending from the upper end of one of said supports, held in place by a tension spring engaged between an eye in the lower end of said threaded stud and a pin inserted through a hole near the lower end of said support, and restrained from fully entering said support by a nut threaded upon said threaded stud and pressing against said upper end of said support, and

two horizontal runners with blind holes in their lower surfaces spaced and fitting over the tops of said studs when said crossed horizontal members are pivoted in an open position.

**4,743,040**
**UTILITY CART**
**Frank Breveglieri, Spring Lake, Mich., and Kenneth F. Streit, Mt. Prospect, Ill., assignors to Geerpres, Inc., Muskegon, Mich.**
**Filed Sep. 29, 1986, Ser. No. 912,567**
**Int. Cl.[4] B62B** *3/02*
**U.S. Cl. 280—47.35** **22 Claims**



1. A manually propelled utility cart comprising:

base means positioned in substantially a horizontal plane, said base means including a utility tray means, lower support engaging means and a mop bucket carrying means, wheeled movement means coupled with said base means for multidirectional horizontal movement of said utility cart along a floor surface;

intermediate tray means positioned above said base means;

top tray means positioned above said base means and including utensil holding means, handle means and upper support engaging means;

vertical structural support means for supporting said intermediate tray means and said top tray means vertically upward from said base means, and said intermediate tray means having adjustable positioning means and being in slidable engagement with said vertical structural support means;

said vertical structural support means including at least one hollow rod structural member engaged and secured in compression between said base means and said top tray means by a compression means and said hollow rod structural member engaged and secured in compression between said upper support engaging means and said lower support engaging means;

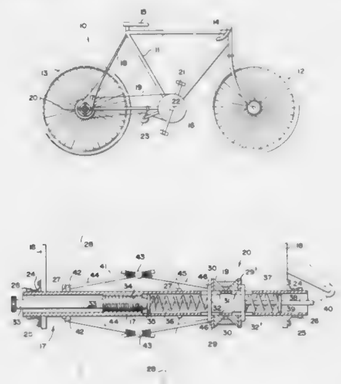
said adjustable positioning means including releasable clamping means for releasably clamping said intermediate tray means in variable vertical positions between said utility tray means and said top tray means;

said utensil holding means including a plurality of clips integrally molded on sides of said top tray means and each of said clips having a pair of resilient clamping arms and a handle securing portion and a modified mop handle engagement means integrally molded on said top tray means facing said mop bucket carrying means;

said modified mop handle engaging means having a pair of resilient clamping arms and a mop handle engaging surface means for engaging a mop handle disposed at an angle.



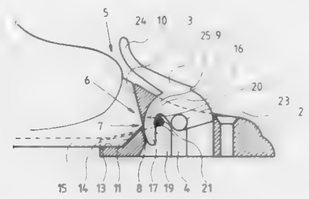
**4,743,041**
**BICYCLE WITH AUTOMATICALLY VARIABLE GEAR RATIO DRIVE**
**Hassan Vazin, P.O. Box 230252, Montgomery, Ala. 36123**
**Continuation-in-part of Ser. No. 628,435, Jul. 6, 1984, abandoned. This application Sep. 19, 1986, Ser. No. 909,197**
**Int. Cl.[4] B62M** *9/06*
**U.S. Cl. 280—236** **8 Claims**



1. A bicycle having a frame and front and rear wheels supported by said frame, said frame including a bifurcated truss for rotatably supporting an axle for said rear wheel, said axle being fixed to said rear wheel for rotation therewith, a pedal assembly intermediate said wheels, a one-way clutch on said pedal assembly, a pulley mounted on said rear wheel axle with said pulley being constituted by two laterally separated segments which are laterally moveable on said axle, belt or chain means interconnecting said pedal assembly with said pulley, an idler for maintaining tension on said belt or chain, the inner sides of said pulley segments being sloped and the outer side portions of said belt or chain mating with said sloping sides so that tension on said belt or chain will cause it to move inwardly on said pulley to increase the gear ratio, centrifugal means rotatable with said axle for increasing the spacing between said pulley segments with increasing bicycle speed to thereby increase the gear ratio spring means associated with said axle to bias said pulley segments together for decreasing the spacing between said pulley segments with decreasing bicycle speed to thereby decrease the gear ratio, and means for adjusting the tension on said spring means.

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**4,743,042**
**SKI FASTENING**
**Jukka Järvinen, Pajutie 7, SF-15540 Villahde, Finland**
**Filed Sep. 19, 1986, Ser. No. 909,845**
**Claims priority, application Finland, Sep. 25, 1985, 853677**
**Int. Cl.[4] A63C** *9/20*
**U.S. Cl. 280—615** **7 Claims**



1. A ski binding for fastening a skiing shoe (**1**) on a ski, said skiing shoe having an eye-like hook member (**4**) on the tip thereof and having a wedge-like exterior configuration when viewed in a vertical plane along the length of the shoe, said binding comprising:

a body part (**2**) to be fastened on the ski, said body part having an aperture through which the hook member extends when the shoe is fixed in said binding, said body part having a surface (**6**) containing said aperture and abutting the shoe tip when the shoe is fixed in said binding, said surface substantially conforming to said shoe tip and having an upwardly and rearwardly slanting oblique supporting surface portion (**10**) above said aperture and a downwardly and rearwardly slanting oblique supporting surface portion (**11**) below said aperture; and

a catch member (**3**) mounted for pivotal movement on said body part, said catch member including an arcuately curved locking claw (**9**) extending from a base portion of said catch member, said locking claw (**9**) having a root (**16**) adjacent said base portion and a tip (**17**), said locking claw tapering in width from said root to said tip in wedge-like fashion in a plane normal to the axis of pivotal movement of said catch member, said locking claw being insertable through said hook member and abutting said body part above and below said aperture when said hook member is extended through said aperture and said catch member is pivoted, thereby to pull said shoe tip tight against said surface of said body part.

**4,743,043**
**REMOVABLE STROLLER GUARD RAIL**
**Louis Shamie, 972 Dean Street, Brooklyn, N.Y. 11238**
**Filed Nov. 19, 1986, Ser. No. 932,914**
**Int. Cl.[4] B62B** *9/24, 9/12*
**U.S. Cl. 280—644** **18 Claims**

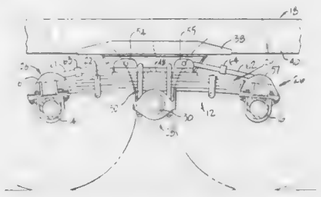


1. A removable foldable guard rail for a collapsible stroller having opposite side tubes, comprising an articulated rail member having opposite ends and a latch assembly pivotally connected to each of said opposite ends of said rail member, each latch assembly having hook means for receiving one of the side tubes for removably connecting the articulated rail member to and across the side tubes, whereby said rail member can be removed from the side tubes, each latch assembly comprising a latch plate pivotally mounted to one of said opposite ends of said articulated rail member, said hook means comprising a curved outwardly open recess in said latch plate and a latch hook pivotally mounted to said latch plate, said latch hook having a curved, inwardly open recess which forms with said outwardly open recess, a closed channel for a side tube of a stroller when said latch hook is pivoted into a closed position on said latch plate.

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**4,743,044**
**DUAL AXLE STABILIZING DEVICE**
**Orfeo J. Bellotti, Rohnert Park, Calif., assignor to Bellotti Patent Registration Company, Santa Rosa, Calif.**
**Filed Jan. 21, 1987, Ser. No. 5,614**
**Int. Cl.[4] B60G *5/00***
**U.S. Cl. 280—680** **4 Claims**

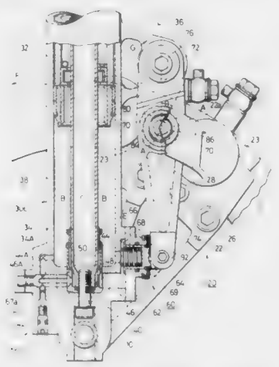


1. In a vehicle suspension system of the type having a load-bearing axial support including means for securing said support to said vehicle and suspension means in the form of leaf-springs coupling said support to wheel axles of said vehicles such that in normal operation said suspension means are pivotable about said support, the improvement in said vehicle suspension system comprising

radius rod members each pivotally coupled between said wheel axles and a leaf-spring member located above said load-bearing axial support, said leaf-spring member comprising a steel plate having a thickness of approximately one inch or greater to resist significant flexure upon movement of said wheel axles conveyed through said radius rods, the combination of said radius rods and leaf-spring member being sufficient to substantially resist the pivoting of said wheel axles about said load-bearing axial support.

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**4,743,045**
**ANTIDIVE APPARATUS FOR A VEHICLE**
**Takao Yoshida, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**
**Filed Jun. 13, 1986, Ser. No. 873,816**
**Claims priority, application Japan, Jun. 14, 1985, 60-128006; Jul. 26, 1985, 60-114961[U]; Jul. 26, 1985, 60-114965[U]**
**Int. Cl.[4] B60G *21/00***
**U.S. Cl. 280—703** **4 Claims**



1. An antidive apparatus for a vehicle including a telescopic front fork having a lower case containing a fluid damper and a front axle mounted to the front fork, comprising:

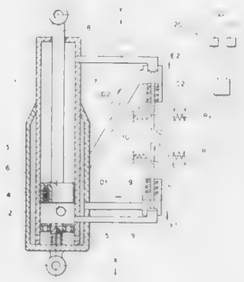
a brake caliper assembly pivotally mounted about said front axle and positioned rearwardly of said front fork;

an actuator assembly extending rearwardly from said front fork including an actuator in said fluid damper to control damping flow and a connecting rod pivotally connected at one end to said case and at the other end of said actuator; and

means intermediate said ends of said connecting rod for coupling said connecting rod to said brake caliper assembly, said coupling means including a pin mounted in one of said brake caliper assembly and said connecting rod and a cylindrical bore in the other thereof for receiving said pin, and an intermediate elliptical cylindrical member between said pin and said cylindrical bore.

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**4,743,046**
**ACTIVE VEHICLE SUSPENSION UNIT**
**Jan R. Schnittger, 135 Putnam Rd., Holden, Mass. 01520**
**PCT No. PCT/SE86/00212, § 371 Date Jan. 9, 1987, § 102(e) Date Jan. 9, 1987, PCT Pub. No. WO86/06807, PCT Pub. Date Nov. 20, 1986**
**PCT Filed May 6, 1986, Ser. No. 12,823**
**Claims priority, application Sweden, May 13, 1985, 8502366**
**Int. Cl.[4] B60G *11/26***
**U.S. Cl. 280—707** **19 Claims**



1. Vehicle suspension system with one or more shock absorbers, each shock absorber comprising,

a hydraulic cylinder, receiving therein hydraulic liquid,

a piston working in said cylinder, partitioning the interior of said cylinder into an upper chamber and a lower chamber,

damping force generating means controlling flow from said upper and lower chambers including adjustable valve means controlled by control means to be in a soft mode to provide soft damping characteristics or in a stiff mode to provide stiff damping characteristics in either the compression stroke or the expansion stroke of said shock absorber,

said control means being responsive to signals from sensors for signaling the vertical speed (y, x) and/or acceleration (x, y) of the vehicle body (y) or the wheel (x), said signal being entered into a signal processor in said control means to impart either of said soft or stiff characteristics by means of said adjustable valve means,

comprising

first valve means providing a variable damping force in the compression stroke, and

second valve means providing a variable damping force in the expansion stroke,

characterized in that

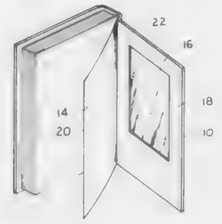
said first valve means include a first controllable valve which is closed to flow during said expansion stroke and which has two states of operation during said compression stroke under the control of said control means, namely on one hand a closed state in which the flow path from said lower chamber is closed to provide a relatively stiff damping mode by the further valve means and, on the other hand an open state in which the flow path from said lower chamber is relatively unrestricted to provide a relatively soft damping mode, and

said second valve means include a second controllable valve means which is closed to flow during said compression stroke and which has two states of operation during said expansion stroke under the control of said control means, namely on one hand a closed state in which the flow path from said upper chamber is closed to provide a relatively stiff damping mode by the further valve means and, on the other hand an open state in which the flow path from said upper chamber is relatively unrestricted to provide a relatively soft damping mode.



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**4,743,047**
**COMBINED BOOK AND MIRROR**
**Robert J. Baer, Honolulu, Hi., assignor to RJB and C Company, Honolulu, Hi.**
**Continuation-in-part of Ser. No. 664,021, Oct. 23, 1984, Pat. No. 4,637,631. This application Dec. 16, 1986, Ser. No. 942,301**
**Int. Cl.[4] B42D *1/00, 3/18, 15/00*; B08B *3/00***
**U.S. Cl. 281—15 R** **1 Claim**



1. A book apparatus comprising,

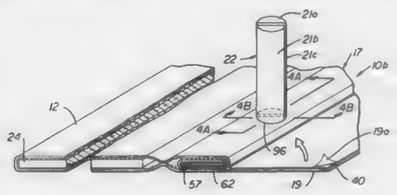
a plurality of pages containing textural material and being bound between front and back covers,

a mirror embedded in the back cover and having a reflective surface substantially coplanar will an inner surface of the back cover,

wherein the last page of the plurality of pages overlying the inner surface of the back cover and is provided with peripheral semitack adhesive for holding the last page over the inner surface of the back cover, whereby the last page is peeled back to uncover the mirror when a reader has turned to the last page of the book, and whereby the last page conceals the mirror until the reader has finished the book.

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**4,743,048**
**MULTI-FOLD ADJUSTABLE BINDER, BOOK, AND METHOD**
**Charles T. Groswith, III, Los Altos, Calif., assignor to Taurus Holdings, Inc., Mountain View, Calif.**
**Filed Oct. 29, 1986, Ser. No. 924,374**
**Int. Cl.[4] B42D *1/00***
**U.S. Cl. 281—21 R** **25 Claims**



1. In combination, a series of two-part fasteners, one part having an elongated post and a headed first end and a second connector part;

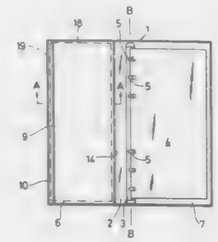
a first folded fastener carrier;

said first carrier comprising a thin flexible sheet material having a first edge multi-folded upon itself to form a multiplayer edge, facing surfaces of said multilayer edge being in abutment, said multilayer edge including apertured internal layers forming first internal recesses for receiving and capturing said fastener headed first ends, an inner layer of said multilayer edge facing said elongated posts being apertured to capture an underside of said headed first end, and an imperforate outer layer overlapping said headed first end; and

a second folded fastener carrier comprising a thin flexible sheet material having a multilayer portion including second internal recesses extending through multiple layers of said multilayer portion for receiving and capturing a second connector part of each of said fasteners, said second connector part being connectible to said elongated post of such fasteners, such that said series of fasteners holds said first and second carriers together in fixed relation.

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**4,743,049**
**FOLDER SYSTEM**
**Olle Wiberg, Storvreta, Sweden, assignor to Esselte Almanacksforlag AB, Solna, Sweden**
**Continuation of Ser. No. 806,272, Dec. 6, 1985, abandoned. This application May 6, 1987, Ser. No. 47,015**
**Claims priority, application Sweden, Dec. 18, 1984, 8406434**
**Int. Cl.[4] B42D *3/00***
**U.S. Cl. 281—31** **5 Claims**



1. A folder system comprising:

a folder having front and back side-piece cover portions of substantially the same size and joined together at a common inner edge having an inside and an outer side;

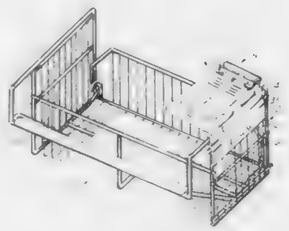
said folder having sheet retaining means attached to the inside of said folder adjacent said common inner edge;

the improvement wherein a first one of said side-piece cover portions includes a pocket attached in separated relationship to said side-piece cover portion adjacent the inside of said folder, said pocket having a dimension substantially the same as said first side-piece cover portion and having a mouth opening along the outer edge of said cover side-piece portion spaced from said common inner edge, substantially parallel thereto and along the length thereof and having a closed inner wall adjacent said inner edge along the length thereof and closed top and bottom walls extending between the respective ends of said closed inner wall and said mouth to form said pocket closed with said mouth forming the opening thereto, said pocket having an outer wall, and adjacent the outer side of said folder and including means to secure a plastic book cover in said pocket, said securing means formed from a plastic film made of a soft and stretchable plastic material for assisting in retaining said plastic book cover in said pocket.

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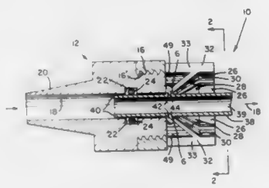
**4,743,050**
**SHOPPING CART CLIPBOARD**
**LaRue D. Small, Woodlyn Hills, Algona, Iowa 50511**
**Filed Jul. 27, 1987, Ser. No. 78,196**
**Int. Cl.⁴ B42F** *7/00*
**U.S. Cl. 281—45** **4 Claims**



1. A clipboard in combination with a shopping cart, the improvement comprising:
a cart bracket including a vertical plate attached to said shopping cart and disposed to extend upwardly therefrom, a horizontal plate extending from the top of said vertical plate, and an elongated slot formed in said horizontal plate near the juncture of said vertical plate and said horizontal plate;
a clipboard assembly including:
a planar surface having a biased clip attached thereto,
a support section extending generally normal to said planar surface,
a return section extending generally normal to said support section and being disposed generally parallel to said planar surface, and
a locking section extending from said return section toward said planar surface and terminating in spaced relationship thereto,
said clipboard assembly being selectively attached to said bracket by extending said locking section, said return section, and said support section through said slot;
said planar surface being relatively movable between a horizontal working position wherein said support section engages the vertical plate of the bracket, and a vertical stored position wherein said support section engages the horizontal plate of the bracket.

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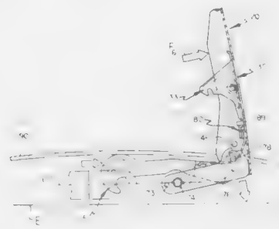
**4,743,051**
**QUICK CONNECT COUPLING ASSEMBLY CAPABLE OF QUICK OR SLOW DISCONNECTION**
**Oscar Proni, 4501 Monroe Ave., Hollywood, Fla. 33023**
**Filed Oct. 23, 1986, Ser. No. 924,992**
**Int. Cl.⁴ F16L** *39/00*
**U.S. Cl. 285—319** **10 Claims**



1. A quick connect fluid coupling assembly designed to be selectively disconnected quickly or slowly, said coupling assembly comprising:
a. a primary body including a centrally disposed, elongated channel extending therethrough coaxially to the longitudinal axis thereof,
b. a retaining member removably and threadedly connected to said primary body and progressively separable therefrom, a passage extending through said retaining member and disposed in aligned, coaxial relation to said channel of said primary body, said progressive separating being defined by a gradual unthreading of said retaining member from said primary body,
c. a conduit removably disposed within said aligned channel and passage and having an open fluid receiving end disposed on the interior of said primary body,
d. seal means mounted within said channel for defining a fluid-tight seal between said conduit and said primary body and disposable in sealing engagement with said conduit when said conduit is positioned along the length of said channel,
e. said open end of said conduit continuously displaceable along the length of said channel upon progressive separation of said retaining element from said primary body and being disposable between said seal means and said retaining member and thereby breaking said fluid tight seal,
f. a stop member formed on said conduit a spaced distance from said open end sufficient for disposition within said passage of said retaining member,
g. said retaining member comprising at least two arms each oppositely disposed in spaced relation to one another and pivotally secured to a remaining portion of said retaining member,
h. each of said arms including at least one finger element secured to an inner surface thereof and each depending from a respective one of said arms at an angular inclination inwardly towards a central longitudinal axis of said passage and towards said primary body,
i. each of said fingers including a free end positioned in engageable relation to said stop member when said stop member is disposed between said primary body and said finger,
j. each of said arms pivotal towards one another upon opposing external force being applied thereto and said respective fingers forced out of engageable relation with said stop member upon said external force being applied.

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**4,743,052**
**TENSION LATCH ASSEMBLY**
**John C. Stammreich, Rancho Palos Verdes, and William R. Bourne, Jr., Anaheim, both of Calif., assignors to Rexnord Inc., Brookfield, Wis.**
**Filed Jan. 24, 1986, Ser. No. 822,171**
**Int. Cl.⁴ E05C** *5/02, 19/14*
**U.S. Cl. 292—113** **3 Claims**

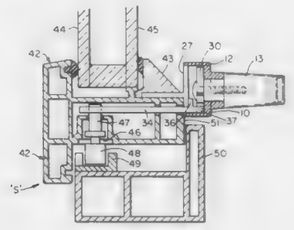


1. A low profile, over-center tension latch assembly constructed for aerodynamic flush-mounting and cooperation with a keeper assembly to draw two bodies together and secure the bodies in rigid relationship, said tension latch assembly comprising:
a handle having a forward, first end and a rearward, second end;
a keeper engaging member having a forward, first end formed so as to engage a keeper assembly, and a rearward, second end opposite said first end;
means for linking said handle to said keeper engaging member, said linking means including a link mechanism having a forward, first end and a rearward, second end, spring means for biasing said handle, means for engaging said handle with said link mechanism such that movement of said handle causes simultaneous movement of said link mechanism, means for pivotally mounting said keeper engaging member second end to said link mechanism second end, and means for pivotally mounting said handle second end to said link mechanism second end, a portion of said link mechanism being adapted for attachment to a mounting located on one of the two bodies; and
means, pivotally mounted on said handle and projecting towards said link mechanism, for locking said handle to said link mechanism when said keeper engaging member is engaged with the keeper assembly;
said means for locking said handle to said link mechanism including a locking element on said link mechanism first end, forward of the mounting, said locking element being constructed to temporarily engage and removably secure a portion of said handle locking means, such that said handle locking means is maintained in an aerodynamically flush relationship with said handle, and said handle is locked to said link mechanism in a position opposing said handle spring means bias.



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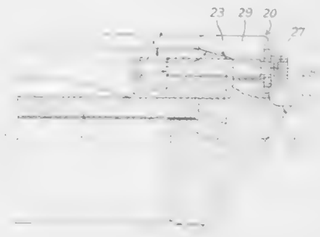
**4,743,053**
**LATCH OPERATING MECHANISM**
**Derek King, 35 Badby Road, Daventry, Northamptonshire, England**
**Filed Dec. 17, 1985, Ser. No. 809,875**
**Int. Cl.⁴ E05C** *19/00*
**U.S. Cl. 292—139** **10 Claims**



1. A latch operating mechanism comprising a body part for mounting on the frame of an openable glazed panel, a rotary handle mounted on the body part by a spindle, a rack member slidably mounted with respect to the body part and driven by a gear within the body part which gear is operably connected to said handle, the rack member having a part projecting from said body part for insertion through an opening in the aforesaid frame and adapted to engage a part of an espanulette mounted therein, the body part having primary attachment locations by which it is adapted to be secured to said frame, said rack member being mounted for movement in a slot provided in said body part characterised in that at least one primary attachment location is provided adjacent each end of said slot, in that said gear is contained within a central portion of the body which projects outwardly beyond one side of a part of the body which includes said slot and in that a notional plane passing through said primary attachment locations is spaced from a substantially parallel notional plane containing the axis of said spindle, said notional plane which passes through said primary attachment locations containing at least that portion of the projecting part of the rack member which is adjacent but external of the body part.

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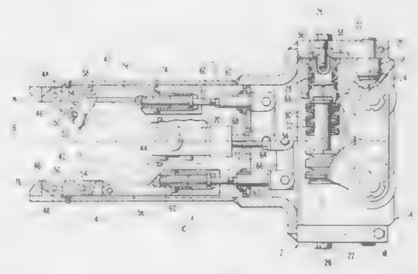
**4,743,054**
**DEVICE FOR THE INSTALLATION AND RETENTION OF A SHUTTER PLATE FOR AN OPENING IN AN ENCLOSURE**
**Claude Lavalerie, L'Isle Adam, France, assignor to Framatome, Courbevoie, France**
**Filed Aug. 11, 1986, Ser. No. 895,624**
**Claims priority, application France, Aug. 9, 1985, 85 12215; Jan. 10, 1986, 86 00308**
**Int. Cl.⁴ E05C** *21/00*
**U.S. Cl. 292—256.67** **21 Claims**



1. Device for the installation and retention of a shutter plate (**11**) for an orifice (**7**, **8**) in an enclosure comprising a carrier ring (**21**, **21***a*, **55**) fixed to the perimeter of an orifice to be shut, wherein the carrier ring (**21**, **21***a*, **55**) has an internal channel (**22**, **22***a*, **56**) with an inclined face (**23**, **23***a*) within which are positioned clamping wedges (**25**, **35**, **60**, **80**) which bear upon the periphery of a shutter plate (**11**) and which, under the effect of locking members (**27**, **37**, **70**), cooperate with the carrier ring (**21**, **21***a*, **55**) and move individually within the channel in a downward radial direction to exert a compressive force on the shutter plate.

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**4,743,055**
**AUTOMATIC GRIPPER FOR GRIPPING AND HOLDING A ROD, ESPECIALLY ON A DRILLING RIG**
**Olivier Dantan, Paris, France, assignor to Brissonneau et Lotz Marine, Carquefou-Nantes, France**
**Filed Jul. 15, 1986, Ser. No. 886,023**
**Claims priority, application France, Jul. 19, 1985, 85 11060**
**Int. Cl.⁴ B66C** *1/42;* **E21B** *19/06*
**U.S. Cl. 294—88** **25 Claims**



1. A gripper for gripping and holding a rod, such as a drilling rod on an oil well drilling rig, transversely to the rod axis, comprising:
a chassis mounted on a movable support and carrying means for gripping the rod in a plane transverse to the rod axis, said chassis being connected to said support by a first connection pivotal on a pivot axis substantially parallel to said plane and by a rupturable second connection which locks said chassis against pivotal movement on said pivot axis, said rupturable connection including pin means rup-

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turable upon being subjected to a predetermined torque applied to said chassis about said pivot axis such that said chassis may then pivot on said pivot axis, friction means mounted to said support and frictionally engaging a surface of said chassis, and means mounted to said support and urging said friction means against said surface of said chassis to frictionally limit pivotal movement of said chassis on said pivot axis upon rupture of said pin means.

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**4,743,056**
**LIFTING TONGS**
**Marc C. Oliason, 8959 Palmetto Ave., Fontana, Calif. 92335**
**Filed Jul. 13, 1987, Ser. No. 72,437**
**Int. Cl.[4] B25J** *15/00*
**U.S. Cl. 294—116** **11 Claims**

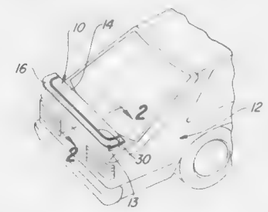


1. Lifting tongs for grasping cylindrical sections of pipe comprising first and second opposing jaws each having an interiorally directed concave gripping surface and an interiorally directed curved cam surface above said gripping surface, first and second mounting plates rigidly joined to said first and second jaws, respectively, and arranged in mutually overlapping, parallel disposition in spaced separation from each other, first and second crank levers each having an upper end adapted for attachment to a lifting means and a lower end forming a cam, fulcrum pins coupling said lower ends of said first and second crank levers to said first and second mounting plates, respectively, in rotatable, eccentric fashion with said cams of said first and second crank levers respectively residing in rolling contact with said cam surface of said first and second jaws, actuating connectors located parallel to and outwardly from said fulcrum connectors and inwardly from said cam surfaces and rotatably connecting said first crank lever to said second mounting plate and said second crank lever to said first mounting plate, and a mounting plate coupling axle located between said crank levers and parallel to said fulcrum connectors to rotatably join said mounting plates together with said crank levers captured therebetween.

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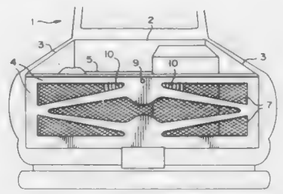
**4,743,057**
**SPOILER CONSTRUCTION AND METHOD**
**Norman S. Loren, Warren, Mich., assignor to Michael Ladney, Grosse Pointe Shores, Mich.**
**Filed May 11, 1987, Ser. No. 48,048**
**Int. Cl.[4] B62D** *37/02*
**U.S. Cl. 296—1 S** **16 Claims**

1. An air spoiler panel of a vehicle comprising:
a first rigid body part having a first exterior surface contour;
a second resiliently deformable body part having a second exterior surface contour complementary to said first exterior surface contour;
means for securing said first body part to said second body part so that said first exterior surface contour lies substantially adjacent said second exterior surface contour, said means including at least one engagement surface integrally formed on at least one of said first and second body parts.



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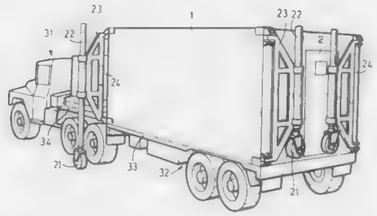
**4,743,058**
**TAILGATE CONSTRUCTION**
**Joseph G. Fedrigo, P.O. Box 3105 Reposo Way, Belmont, Calif. 94002**
**Filed Sep. 4, 1986, Ser. No. 904,110**
**Int. Cl.[4] B62D** *35/00*
**U.S. Cl. 296—1 S** **3 Claims**



1. A low maintenance, vented tailgate construction as a means of reduction of air drag on vehicles with open top cargo carrying compartments, comprising:
(a) a frame of appropriate size and shape to form the periphery of a wall of the cargo carrying compartment of the cargo carrying vehicle;
(b) attachment means for fixing the frame to the cargo carrying vehicle;
(c) an air-permeable screen of appropriate size and shape to fit within the frame so as to form, in conjunction with the frame, an air permeable wall of the cargo carrying compartment;
(d) the air-permeable screen being joined to the interior periphery of the frame so as to be permanently attached to the frame;
(e) a material shield or baffle of appropriate size and shape to fit snugly within the interior perimeter of the frame so as to be able to prevent the loss, in transit, of cargo of such small size as to be capable of passing through the holes in the air-permeable screen;
(f) at least one hinge joining the material shield to one side of the frame so as to enable the material shield to be rotated into a position adjacent to and within the perimeter of the frame in order to prevent cargo loss and to enable rotation of the material shield into a position adjacent to a second wall of the cargo carrying compartment of the cargo carrying vehicle;
(g) latching mechanisms for holding the material shield in position adjacent to and within the perimeter of the frame; and
(h) support ribs joined to the interior periphery of the frame, recessed from the suface of the frame which faces the cargo carrying compartment approximately the thickness of the material shield as a means of supporting the material shield when the tailgate construction is opened for loading cargo into or out of the vehicle.



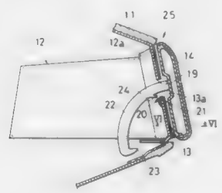
**4,743,059**
**MOBILE SANITARY UNIT**
**Paul Legueu, 85, Avenue de Mazy, 44380 Pornichet, France**
**Filed Jul. 9, 1987, Ser. No. 71,369**
**Claims priority, application France, Jul. 10, 1986, 86 10052**
**Int. Cl.[4] B60P** *3/00*
**U.S. Cl. 296—24 R** **17 Claims**



1. A mobile sanitary unit comprising a sealable aseptic container of standard road and air transport dimensions, medical equipment within said container enabling surgical operations to be performed, electrical supply means for connection to a mobile source of electrical energy, and at least three legs and leg supports mounted in front and rear portions of said container, said legs being mounted for vertical translation in said supports, and said supports being mounted in said container for rotation between a transport position in which said supports are folded against the container walls with said legs retracted within the standard container dimensions, and a deployed position in which said supports project from the container walls and said legs are extended to stand the unit on the ground.

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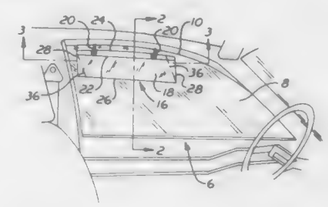
**4,743,060**
**EMERGENCY LOCKING APPARATUS FOR GLOVE BOX LID**
**Osamu Hishida, Fuchu, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan**
**Filed Oct. 10, 1986, Ser. No. 917,486**
**Claims priority, application Japan, Oct. 15, 1985, 60-156454**[U]
**Int. Cl.[4] B62D** *25/12;* **B60R** *7/06*
**U.S. Cl. 296—37.12** **7 Claims**



7. An apparatus for the emergency locking of a lid for a glove compartment defined by a pair of side walls and a bottom wall, said walls defining a front opening of the glove compartment having a generally vertical orientation;
a means for covering said opening including said lid, said lid being pivotally attached adjacent said bottom wall;
each of said side walls including an arm receiving portion defining an arm receiving hole;
pawl hooks disposed on each of said side walls;
means for controlling the movement of said lid comprising:
arm means having a pair of ends, one of said ends being inserted through said arm receiving hole into said arm receiving portion, said arm means including: first engaging means disposed at the other of said ends, said first engaging means engaging said side walls when said lid is in an open position; and second engaging means, disposed between said ends of said arm, said second engaging means preventing the opening of said lid in response to the application of a generally downwardly directed external force of at least a predetermined magnitude to said lid, by engaging with said pawl hooks; and
means for selectively permitting said second engaging means to engage with said pawl hooks in response to said external force, said selective means including a means for pivotally supporting said lid and for selectively releasing said support upon the application of said external force.

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**4,743,061**
**MOTOR VEHICLE SUN SHIELD FOR CURVED SIDE WINDOWS**
**J. Benedict Pompa, 4805 U.S. Alt. 19 N., #412, Palm Harbor, Fla. 34683**
**Filed Jun. 22, 1987, Ser. No. 64,660**
**Int. Cl.[4] B60J** *3/00*
**U.S. Cl. 296—97 R** **4 Claims**



1. A sun shield structurally and functionally adapted to be mounted to the top edge of motor vehicle curved side windows comprising: in combination, a shield panel of rigid plastic film, flexibly conformable but elastic in two mutually perpendicular planes, but not flexible in the third mutually perpendicular plane, having a permanent stiffening and inwardly biasing longitudinal bend near to and parallel to said shield panel's upper edge, and two spring wire mounting clips of minimal functional and frictional cross section disposed on the top edge and inboard of said shield panel's vertical edges, said mounting clips havng one end terminating in two coil loops between which said shield panel's top edge is frictionally engaged, said mounting clips being positively secured, while retaining rotational freedom, to said shield panel by semi-circular projection tabs pressed into said shield panel's surface within the coil loops, the opposite end of said mounting clips being generally U-shaped and aligned radially from said coil loops with the bight portion of the U suitably remote from said shield panel's upper edge and the open end of said mounting clips suitably adapted to smoothly fit over and clamp the top edge of the vehicle side window.

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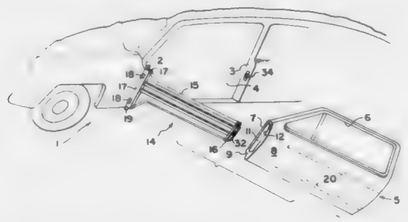
**4,743,062**
**VEHICLE DOOR ASSEMBLY**
**John W. McLaren, Beaverton; Jeffery D. Zawisza, and Walter E. F. Rupprecht, both of Midland, all of Mich., assignors to The Dow Chemical Company, Midland, Mich.**
**Filed Sep. 19, 1986, Ser. No. 909,820**
**Int. Cl.[4] B60J** *5/04*
**U.S. Cl. 296—146** **34 Claims**

1. A vehicle closure and reinforcement assembly comprising a closure having a cavity therein extending from one edge of said closure toward its opposite edge; a reinforcing member slidably accommodated in and occupying said cavity, said

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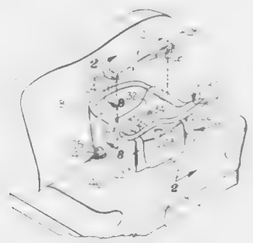
reinforcing member including hinge means at one end thereof for mounting the reinforcing member for swinging move-



ments; and means securing said reinforcing member to said closure.

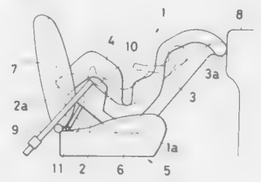
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**4,743,063**
**CONVERTIBLE MULTI-FUNCTION CHILD RESTRAINT SYSTEM**
**James W. Foster, Jr., 3751 Stokes Ave., Charlotte, N.C. 28210**
**Filed Jun. 18, 1987, Ser. No. 64,098**
**Int. Cl.[4] A47C** *13/00*
**U.S. Cl. 297—130** **19 Claims**



1. A convertible multi-function child restraint system comprising, in combination:
- a toddler seat adapted to be mounted on the seat of an automobile, said toddler seat including a seat portion and spaced apart armrest portions extending upwardly from opposite sides of said seat portion, said toddler seat thus being adapted to serve as a booster seat in the automobile for a toddler age child, said toddler seat including latch means cooperating with each of said armrest portions thereof;
- a toddler restraining arm adapted to be mounted between said armrest portions across and above said seat portion when a toddler is positioned in the toddler seat, said toddler restraining arm including respective latch members at opposite ends thereof for detachable connection with the latch means of said armrest portions; and
- an infant carrier positionable in said toddler seat to permit converting the toddler seat for receiving and carrying an infant, said infant carrier including respective latch members on opposite sides thereof for detachable connection with the latch means of said armrest portions to thereby permit easily removing the infant carrier for use in carrying an infant outside of the automobile.

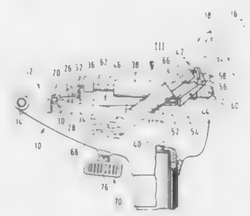
**4,743,064**
**SEAT FOR A CHILD IN CAR**
**Yutaka Takizawa, Ayase, Japan, assignor to Ikeda Bussan Co., Ltd., Ayase, Japan**
**Filed Feb. 20, 1987, Ser. No. 17,244**
**Claims priority, application Japan, Feb. 21, 1986, 61-22966[U]**
**Int. Cl.[4] A47D** *1/10*
**U.S. Cl. 297—250** **4 Claims**



1. A seat for a child in car comprising:
- a seat portion;
- a back portion attached at an angle to the seat portion;
- side supports arranged on both sides of these seat and back portions; and
- a first auxiliary support, including means for pivoting the support about the underside of the seat portion so that it is collapsible from an erected position to a housed position on the underside of the seat portion;
- means for mounting the child's seat on a car seat with its backside directed forward and with it being supported with said first auxiliary support in the erected position rested on the car seat to prevent rotation of the seat in a rearward direction; wherein
- each of said side supports projects from an upper surface of the seat portion to define a pair of respective through-holes between the upper surface of the seat portion and the lower side of each of the side supports for passing a seat belt for the car seat through said through-holes to fix the child's seat onto the car seat; and
- underside of the seat portion includes a recess into which the first auxiliary support can be housed in its housed position, whereby the first auxiliary support can be pivoted into and out of the recess.

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**4,743,065**
**ADJUSTABLE SEAT**
**Hermann Meiller, and Wolfram Jahn, both of Amberg, Fed. Rep. of Germany, assignors to Grammer Sitzsysteme GmbH, Amberg, Fed. Rep. of Germany**
**Filed May 11, 1987. Ser. No. 48,375**
**Claims priority, application Fed. Rep. of Germany, May 24, 1986, 3617539**
**Int. Cl.[4] A47C** *1/024, 3/026*
**U.S. Cl. 297—300** **5 Claims**

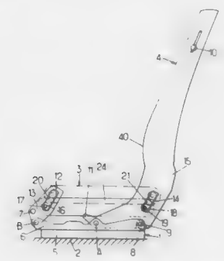


1. A seat comprising a seat carrier means, a seat portion carried on the seat carrier means and adjustable in respect of its inclination, a backrest portion adjustable in respect of its inclination, a first gas spring means having an actuating member and operatively connected to the backrest portion for adjustment of the inclination thereof, at least one second gas spring means having an actuating member and operatively connected to the seat portion for adjustment of the inclination thereof, an actuating lever pivotable about a pivot point in a first direction and in a second direction perpendicular to the first direction, and connecting means operatively connecting the actuating lever to the actuating members of said gas spring means, such that the actuating lever is operable to adjust only the inclination of the backrest portion when the actuating lever is moved in said first direction from a first non-actuating position to a spaced-apart second actuating position, and the actuating lever is operable to adjust only the inclination of the seat portion when the actuating lever is moved in said second direction from a first non-actuating position to a spaced-apart second actuating position, wherein the said actuating lever is adapted to be operated in said first direction when it is in respective ones of said first and second spaced-apart position in said second direction of pivotal movement thereof.



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**4,743,066**
**TILTABLE SEATS FOR VEHICLES**
**Bernard Boisset, Etampes, and Alain Letournoux, St. Jean De Blanc, both of France, assignors to Societe Industrielle Bertrand Faure, Etampes, France**
**Filed Dec. 2, 1986, Ser. No. 937,156**
**Claims priority, application France, Dec. 18, 1985, 85 18777**
**Int. Cl.[4] A47C** *1/022*
**U.S. Cl. 297—339** **1 Claim**



1. A tiltable vehicle seat for a vehicle which has a floor, said vehicle seat having a front edge and a rear edge, comprising:
- a first traverse axis near said rear edge;
- a second traverse axis near said front edge;
- a base adapted for fixation to said floor;
- a back rest portion pivotably secured to said base and adapted for pivoting about said first traverse axis for tilting movement from a vertical position to a forward tilted position;
- a sitting portion positioned between said front edge and said rear edge;
- height adjustment means attached to said sitting portion having:
- a pair of laterally spaced parallel front racks pivotably mounted on said base and adapted for pivoting about said second traverse axis;
- a front cross rod positioned between said front racks;
- a pair of coaxial laterally spaced front pinions rigidly connected to each other by said front cross rod for respectively engaging said front racks;
- a pair of laterally spaced parallel rear racks rigidly fixed to the back rest portion;
- a pair of coaxial laterally spaced rear pinions rigidly connected to each other by a rear cross rod, for respectively engaging said rear racks; and
- a pair of laterally spaced rigid connection members perpendicular to said front and rear cross rods securing to each other said front and rear cross rods; and
- actuating means associated with said height adjustment means for rotating at least one pair of said pinions and arranged to be accessible for a user when said user is sitting on said sitting portion.

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**4,743,067**
**RAPID LOCKING DEVICE FOR AN ARTICULATED SEAT**
**Yves Pipon, and Georges Droulon, both of Flers, France, assignors to A. & M. Cousin & Cie, Flers, France**
**Continuation of Ser. No. 743,071, Jun. 10, 1985, Pat. No. 4,690,458. This application Jun. 11, 1987, Ser. No. 61,031**
**Claims priority, application France, Jun. 15, 1984, 84 09418; May 22, 1985, 85 07699**
**Int. Cl.[4] B60N** *1/02*
**U.S. Cl. 297—379** **2 Claims**



1. Rapid locking device for an articulation mounted on a frame of a seat-back as a complement of a positioning articulation fitting, comprising an outer casing (1) having in its center a central spindle (11) connected to one side of the seat-back frame, said outer casing (1) containing a second casing (6),
- said second casing having a circumference including a plurality of outwardly extending projections (6) being star-shaped and delimiting with said outer casing (1) a housing for at least one swing bar (8) having ends on which are mounted idle rollers (9) with a serrated outer surface, said idle rollers (9) being placed between an outer face of the star-shaped casing (6) and an inner face of the outer casing (1), whereby said idle rollers (9) are, upon an impact, moved by inertia due to their own weight and also to rotation of the outer casing (1) under a pivoting action of the seat-back, which locks the outer casing (1) with respect to the second casing (6) by penetration of the idle rollers (9) inbetween the second casing (6) and the outer casing (1), said second casing (6) being rigidly connected to the seating portion of the seat.

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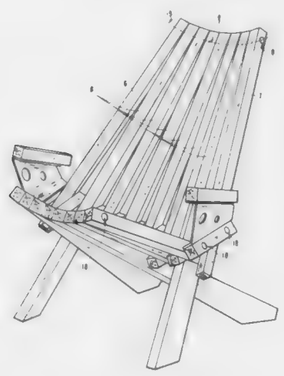
**4,743,068**
**KNOCK-DOWN FURNITURE COUPLING DEVICE**
**Daniel Gomes, P.O. Box 117, Worcester, N.Y. 12197**
**Filed Jul. 22, 1986, Ser. No. 888,763**
**Int. Cl.[4] A47C** *4/08*
**U.S. Cl. 297—440** **14 Claims**

1. An article of knock-down furniture that can be easily assembled by the end user, comprising:
- a plurality of pieces formed to constitute said article of knock-down furniture when said pieces are in an assembled configuration;
- said assembled configuration having at least one contact joint formed by a number of said pieces each having a correspondingly aligned bore therein;
- means, including a flexible non-rigid member passing through said bores, for adjustably stringing together said pieces and for adjustably securing said pieces under compression in a manner to form said assembled configuration of said furniture; and
- wherein said flexible non-rigid member comprises a plastic tube having an interior engagement surface extending at

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least partially therethrough, said tube further having a length sufficiently short for said interior engagement surface to reside entirely within said aligned bores of said number of pieces when in said assembled configuration.



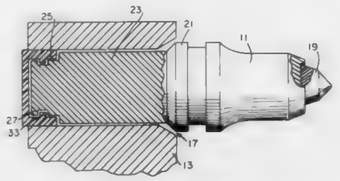
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4,743,069

## ROTATABLE CUTTING BIT

Randall W. Ojanen, Bristol, Tenn., assignor to GTE Products Corporation, Stamford, Conn.

Continuation of Ser. No. 713,711, Mar. 19, 1985, abandoned.
This application Apr. 17, 1987, Ser. No. 39,838
Int. Cl.[4] F21C *25/12*
U.S. Cl. 299—86 1 Claim



1. A cutter bit assembly comprising a forward head portion having rearwardly depending cylindrically shaped shank adapted to be received in a cylindrical bore of a bit holder, said head having a forwardly projecting cutting insert mounted therein and an enlarged section adapted to prevent movement of said head portion into the bore, said shank having a reduced section at adjacent the rearward end forming a shoulder and being concentric with a main portion of said shank, said reduced section including a circumferential ridge projected outwardly in the radial direction, said circumferential ridge being spaced rearwardly from said shoulder at the end of said shank, and end cap mounted for free rotation on said reduced section, said end cap formed of an elastomeric material and having a closed bottom covering the rearward end of said shank, forwardly projecting cylindrical wall depending from said closed bottom, said cylindrical wall having an inner and outer surface, said inner surface being contiguous said reduced section of said shank to permit free rotation of said bit relative said end cap, said outer surface having a slightly larger diameter than the diameter of said cylindrical bore and extending substantially along the entire axial length of said end cap whereby rotational forces and forward forces on said bit along the axial direction are resisted by said end cap, said cylindrical wall portion including an integral ridge projecting inwardly and overlapping said circumferential ridge whereby forward motion along the axial direction of said shank with respect to said cap is resisted.

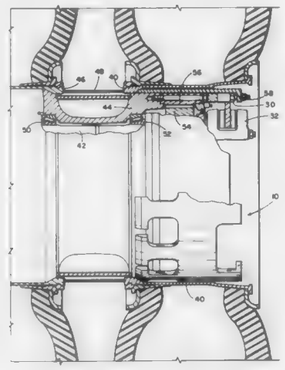
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4,743,070

## TIRE RIM CLAMP

Harlan H. Henke, Burlington, Iowa, and William R. Borthick, Glenpool, Okla., assignors to Unit Rig & Equipment Company, Tulsa, Okla.

Filed Sep. 29, 1986, Ser. No. 913,124
Int. Cl.[4] B60B *25/14*
U.S. Cl. 301—13 SM 1 Claim



1. An improved tire rim clamp for use in the annular area between an inner cylindrical axle housing affixed to an axle hub and an outer cylindrical tire rim for retaining the tire rim onto said axle hub, the tire rim clamp comprising:

(a) a cylindrical, relatively long member adapted to concentrically fit within the annulus created between an outer cylindrical tire rim and an inner cylindrical axle housing, wherein said cylindrical member terminates at a first end in a beveled peripheral surface and a plurality of spaced apart slots extending from said beveled peripheral surface such as to operatively engage with a tire rim during use and, said slots providing for radial deflection of the portions of the cylindrical member adjacent said first end and between said slots during use; and

(b) a circular flange member integrally attached to the other end of said cylindrical member and extending radially inward, said circular flange member containing a plurality of openings distributed around said cylindrical member such as to accept retaining bolts that hold the cylindrical member to an axle hub during use, said flange member and said other end of the cylindrical member contains a plurality of slotted openings to accommodate access to an axle housing.

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4,743,071

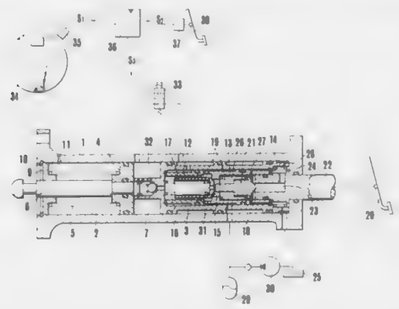
## HYDRAULIC BRAKE SYSTEM FOR VEHICLE

Tadashi Iwamoto, Saitama, Japan, assignor to Akebono Brake Industry Co., Ltd., Tokyo and Akebono Research and Development Centre Ltd., Saitama, both of, Japan

Filed Feb. 20, 1986, Ser. No. 831,343
Claims priority, application Japan, Feb. 26, 1985, 60-37290
Int. Cl.[4] B60T *13/74*
U.S. Cl. 303—3 6 Claims

1. A hydraulic brake system for a vehicle, comprising a fluid pressure source including a reservoir, a cylinder body forming an inner cylinder, a power piston located within said inner cylinder, an inner cylinder member arranged within the inner cylinder and arranged to oppose the power piston, a control chamber located within the inner cylinder between the power piston and the inner cylinder member, a control valve mechanism provided within said inner cylinder member and operative in association with a brake pedal to control the communication between the fluid pressure source and the control chamber, a normally open-type valve provided in a path communi-





cating between the control chamber and the reservoir, and a detection circuit for detecting stoppage of the vehicle and closing the normally open-type valve according to the detection signal when the brake is applied.

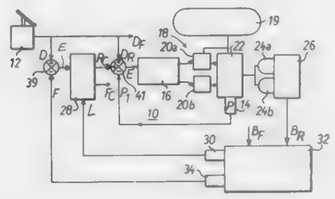
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4,743,072

## VEHICLE BRAKING SYSTEM

Malcolm Brearley, Solihull, England, assignor to Lucas Industries public limited company, Birmingham, England

Filed May 30, 1986, Ser. No. 868,560
Claims priority, application United Kingdom, May 30, 1985, 8513688
Int. Cl.[4] B60T *13/68*
U.S. Cl. 303—15 14 Claims



1. A closed loop vehicle deceleration control system, comprising:

(a) means for generating a driver's demand signal representing a deceleration requirement;

(b) a plurality of pressure control channels for controlling the application of the vehicle brakes; said pressure control channels being themselves controlled by said driver's demand signal fed forward thereto;

(c) means for measuring the vehicle deceleration;

(d) a closed loop feedback circuit which is adapted to produce a deceleration error signal representative of the difference between a deceleration level demanded by the driver and the actual vehicle deceleration;

(e) means for producing a correction signal for the driver's demand signal in dependence upon an integral function of the deceleration error; and

(f) means for adjusting the driver's demand signal in accordance with said correction signal.

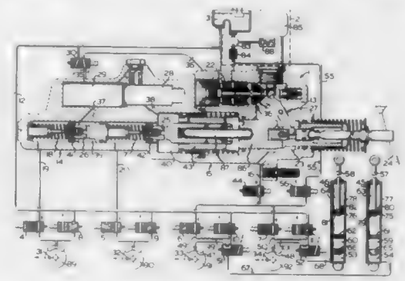
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4,743,073

## HYDRAULIC SYSTEM FOR AUTOMOTIVE VEHICLES

Hubertus V. Gruenberg, Bad Homburg, Fed. Rep. of Germany, assignor to Alfred Teves GmbH, Frankfurt Am Main, Fed. Rep. of Germany

Filed Mar. 30, 1987, Ser. No. 32,167
Claims priority, application Fed. Rep. of Germany, Apr. 17, 1986, 3612944
Int. Cl.[4] B60T *17/18*
U.S. Cl. 303—92 5 Claims



1. A hydraulic system for an automotive vehicle, comprising an auxiliary pressure source including a motor driven pump assembly and a storage and pressure compensation reservoir, adjustable suspension means arranged between a body portion of the vehicle and an axle of the vehicle, said suspension means including a working cylinder, defining a piston chamber, a working piston mounted for movement in said piston chamber, said working piston including means for controlling flow of a pressure medium contained in the piston chamber from one side of the working piston to another side of the working piston, the working piston being connected with a piston rod extending out of one end of the working cylinder, a separating piston in the working cylinder separating the piston chamber from a gas-filled chamber, a pressure chamber filled with said pressure medium and separated from the gas-filled chamber a movable wall, the pressure chamber of the adjustable suspension means being connectible to the auxiliary pressure source by a pressure line, and at least one changeover valve being disposed in the pressure line between said auxiliary pressure source and said pressure chamber of said working cylinder, said auxiliary pressure source connected to a wheel brake of the vehicle through a pressure control valve in a hydraulic brake booster and a pressure modulation valve connected between said pressure control valve and a wheel cylinder of said brake.

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4,743,074

## ANTI-SQUEAL BRAKING SYSTEM FOR AUTOMOTIVE VEHICLE

Hideo Inoue, Kanagawa, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Nov. 20, 1986, Ser. No. 932,498
Claims priority, application Japan, Nov. 25, 1985, 60-264175
Int. Cl.[4] B60T *8/58, 8/64;* F16D *65/14*
U.S. Cl. 303—100 6 Claims

1. An anti-squeal braking system for an automotive vehicle, comprising:

an operator-controlled brake operating member;

a detector device for detecting an operation value of said brake operating member;

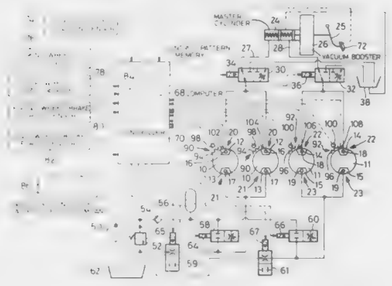
a first brake including a brake rotor, a friction member disposed opposite to said brake rotor, and a hydraulically operated actuator for forcing said friction member against said brake rotor, and thereby restraining rotation of said brake rotor;

a second brake cooperating with said first brake to apply a brake to the vehicle;

a squeal-detecting device operable to generate a squeal signal indicative of one of said brake squeal of said first brake and ultrasonic waves that are generated from said first brake prior to the generation of said brake squeal;

braking-effect detecting means for detecting an actual braking effect applied to the vehicle; and

control means for controlling said first and second brakes, said control means being responsive to said detector device, said squeal-detecting device and said braking-effect detecting means, and including determining means for



determining a desired braking effect that should be applied to the vehicle when said operation value of said brake operating member is detected by said detector device, said control means controlling said first and second brakes in response to said squeal signal so that said first brake is operated without said brake squeal, and said second brake is operated so as to provide a braking effect equal to a difference between an actual braking effect applied to the vehicle by said first brake, and said desired braking effect determined by said determining means.

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**4,743,075**

**COMBINED TRACTION SLIP- AND SLIP-CONTROLLED BRAKE SYSTEM**

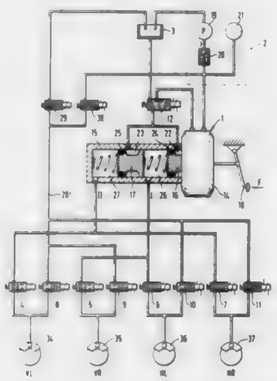
**Juan Belart, Walldorf; Wolfram Seibert, Darmstadt, and Norbert Ocvirk, Offenbach, all of Fed. Rep. of Germany, assignors to Alfred Teves GmbH, Frankfurt am Main, Fed. Rep. of Germany**

**Continuation of Ser. No. 783,552, Oct. 3, 1985, abandoned. This application Apr. 21, 1987, Ser. No. 42,599**

**Claims priority, application Fed. Rep. of Germany, Oct. 19, 1984, 3438401**

**Int. Cl.[4] B60T** *8/44*

**U.S. Cl. 303—114** **3 Claims**



1. A traction slip-and brake slip-controlled brake system for motor vehicles having vehicle wheels with wheel brakes, said system comprising, in combination:

a pedal-actuated hydraulic pressure generator including a hydraulic brake power booster and a tandem master cylinder having first and second pressure chambers;

a first pressure fluid conduit connecting said first chamber to a selected pair of said wheel brakes and a second pressure fluid conduit connecting said second chamber to a second selected pair of said wheel brakes;

a pressure compensating reservoir;

an auxiliary energy supply system including a hydraulic pump having an input connected to said reservoir and an output connected to said power booster and said supply system further including a pressure accumulator connected to said output of said pump;

first and second normally open control valves respectively connected in the pressure fluid conduits between said chambers and said wheel brakes;

first and second normally closed control valves respectively connected between said selected pairs of said wheel brakes and said reservoir;

a first normally open traction slip control valve connected between said normally closed valves and said reservoir;

a first normally closed traction slip control valve connected between said pressure accumulator and the normally closed valves connected to said wheel brakes wherein said master cylinder includes first and second working pistons respectively provided in said first and second chambers and each piston including an annular chamber connected as an input to a three-way/two-position valve and said three-way/two-position valve having a first output connected to said reservoir and a second output connected to said power booster.

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**4,743,076**

**ANTI-SKID BRAKE CONTROL SYSTEMS**

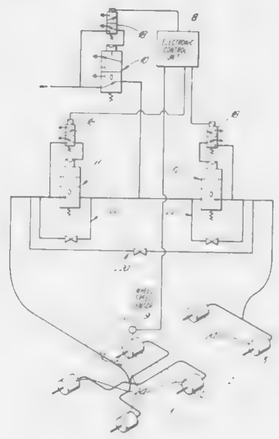
**John W. Davis; Robert C. Leonard, both of Coventry, England, and Eamonn S. Quigley, Dublin, Ireland, assignors to Bendix Limited, Bristol, England**

**Continuation of Ser. No. 692,191, Jan. 17, 1985, abandoned. This application Dec. 15, 1986, Ser. No. 940,205**

**Claims priority, application Ireland, Jan. 17, 1984, 89/84**

**Int. Cl.[4] B60T** *8/00, 15/08*

**U.S. Cl. 303—119** **7 Claims**



1. An anti-skid brake control apparatus for a vehicle, said vehicle including first and second wheel bearing axles, each wheel on each of said axles being provided with a brake and a brake actuator as part of the braking system of said vehicle, wheel speed sensing means fitted on said first axle, the wheels of said first axle having a tendency to lock at a lower braking pressure than the wheels of the second axle, and electronic control means for monitoring signals produced by said wheel speed sensing means and for controlling the anti-skid brake control apparatus in response to said signals, said brake control apparatus comprising:

a brake fluid pressure supply and exhaust valve;

a first isolator valve means for interrupting brake fluid communication between said pressure supply and exhaust valve and the brake actuators of the first axle;

a second isolator valve means for interrupting brake fluid communication between said pressure supply and exhaust valve and the brake actuators of the second axle;

each of said isolator valve means having an inlet and an outlet, said inlets being connected to the brake fluid pressure supply and exhaust valve and said outlets having means for connection to the braking system of the vehicle;

said second isolator valve means, responsive to said electronic control means, for maintaining brake fluid pressure acting on the brake actuators of the second axle, independently of the brake fluid pressure acting on the brake actuators of the first axle, after the detection by the electronic control means of an incipient skid signal from said wheel speed sensing means; and

a restricted passageway means, provided between the first and second isolator valve means, for equalizing brake fluid pressure acting on the brake actuators of the first and second axles after the detection by the electronic control means of a wheel speed recovery signal from the wheel speed sensing means.



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**4,743,077**

**MAGNETIC TAPE CASSETTE BOX**

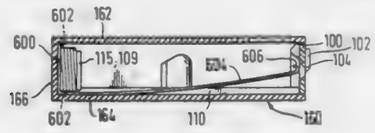
**Klaus Bohnet, Waldachtal, Fed. Rep. of Germany, and Peter Ackeret, Kusnacht, Switzerland, assignors to IDN Inventions and Development of Novelties AG, Switzerland**

**Division of Ser. No. 866,265, May 23, 1986, which is a division of Ser. No. 729,904, May 3, 1985, Pat. No. 4,592,600, which is a continuation of Ser. No. 488,022, Apr. 25, 1983, abandoned. This application Nov. 20, 1986, Ser. No. 932,680**

**Claims priority, application Fed. Rep. of Germany, Apr. 28, 1983, 3215721**

**Int. Cl.[4] A47B** *81/06*

**U.S. Cl. 312—12** **33 Claims**



1. A storing device for storing flat recording media carriers, such as magnetic tape cassettes, comprising:

a housing adapted to receive at least one media carrier, and having a front wall,

said front wall having at least one opening permitting movement of a media carrier between a first inserted position in said housing and a second exposed position permitting removal of the media carrier from said housing,

a transport means for moving a media carrier between said first inserted position and said second exposed position,

said transport means having a media carrier supporting part and a front part exhibiting a surface configured to cover at least partially said opening so as to form part of said front wall when said media carrier supporting part is in said housing,

an indicating means for indicating, when said transport means is in said housing, whether a media carrier is contained therein,

said indicating means comprising a sensing portion adapted to sense the presence of a media carrier and extending, in a first position, into a space defined by said housing to be occupied by the media carrier, and being displaced into a second position when the media carrier is in said inserted position,

said indicating means further comprising a signal flag portion operatively connected to said sensing portion for being displaced between a first position indicating the absence of a media carrier in said housing and a second position indicating the presence of a media carrier in said housing, said signal flag portion being visible in a predetermined area of said front wall in at least one of its said first and second positions, and a displacing means for displacing said sensing portion into its said first position without a media carrier in said inserted position thereof,

at least one of said indicating means portions being mounted in said housing, and

said transport means having apertures through which said indicating means sensing portion is displaced between its said first and second positions.

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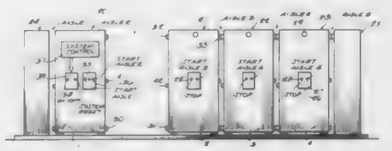
**MOVABLE STORAGE UNIT CONTROL SYSTEM**

**Dean L. Dahnert, Fort Atkinson, Wis., assignor to Spacesaver Corporation, Fort Atkinson, Wis.**

**Division of Ser. No. 909,541, Sep. 8, 1986. This application Aug. 12, 1987, Ser. No. 84,131**

**Int. Cl.[4] H02P** *3/12;* **A47B** *53/00*

**U.S. Cl. 312—201** **2 Claims**



1. A storage system comprising

a plurality of movable storage units,

reversible motor means mounted to said movable units, respectively, for driving each unit selectively in one direction or the opposite direction to open an aisle between a pair of said units,

motor control circuit means for each unit connected to said motor means on the unit,

controller means including processor means on the units, respectively, and conductors interconnecting said controller means,

start switch means on each unit for selecting opening of an adjacent aisle, said switch means connected to said interconnected controller means on the same unit and manually operable to activate one of said processor means in said controller means to produce command signals to which the processor means in at least one other controller means responds by providing command signals to said motor control circuit means for causing said circuit means to turn on one or more motor means for driving one or more units in directions that result in opening the selected aisle,

said motor control means including a left move relay means to which the move left command signal is coupled and a right move relay means to which the move right command signal is coupled,

a dc power source having positive and negative terminals for being coupled to said motor and said motor being a dc motor having an armature and brushes for supplying

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current to said armature for causing the motor to rotate in a direction depending on the direction of current flowing through said armature,

a pair of switch contacts which close in response to energization of said left move relay means to connect one of said brushes to the positive dc source terminal and the other brush to the negative terminal to cause said armature to rotate in one direction and a pair of contacts which close in response to energization of said right move relay means to connect said one brush to said negative terminal and said other brush to said positive terminal to cause said armature to rotate oppositely of said one direction,

a dynamic braking circuit including a series circuit connected across said brushes and including one normally closed switch contact connected to one brush and another normally closed switch contact connected to the other brush and first resistor means connected between said contacts, said one switch contact opening to avoid short circuiting said armature when said left move relay means is energized and closing when said relay is deenergized, said other switch contact opening to avoid short circuiting said armature when said right move relay means is energized and closing when said relay means is deenergized such that said first resistor becomes connected across said armature immediately after either of said relay means are deenergized to cause dynamic braking of said motor,

a series circuit including additional resistor means and a manually operable switch connected across said first resistor means, closing of said switch causing said resistors to be in parallel across said armature to provide more dynamic braking for said motor.

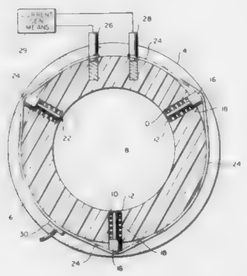
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**4,743,079**

## CLAMPING DEVICE UTILIZING A SHAPE MEMORY ALLOY

**Joseph T. Bloch, Seattle, Wash., assignor to The Boeing Company, Seattle, Wash.**

**Filed Sep. 29, 1986, Ser. No. 913,162**
**Int. Cl.[4] H01R** *13/20*
**U.S. Cl. 439—161** **15 Claims**



1. A clamping device comprising:

(a) a ring member having a central opening symmetrically positioned about an axis of the ring member;

(b) a plurality of apertures extending radially through said ring member;

(c) a plurality of pins, one pin corresponding to each of said plurality of apertures, and each pin positioned at least partially within said corresponding aperture; each pin associated with a spring, said spring biasing said associated pin for movement in one of (1) a first direction, radially outwardly and away from said ring member axis and (2) a second direction, radially inwardly and toward said ring member axis;

(d) a shape memory alloy (SMA) material member having a characteristic of contracting when heated, said SMA material member extending substantially along an outer circumference of said ring member and contacting each pin;

(e) means for heating said SMA material member to cause said SMA material member to contract;

(f) means for securing said SMA material member to said ring member;

wherein said SMA material member contracts when heated to move each of said pins in a direction opposite to the spring bias direction to extend a portion of each pin within the central opening of said ring member, and

wherein an object placed within said central opening of said ring member may be releasably clamped therein by means of said pins.

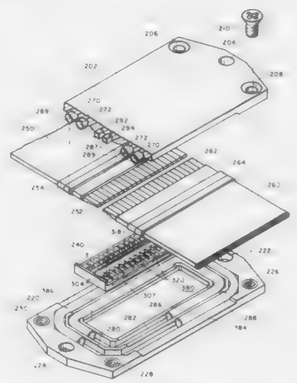
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**4,743,080**

## FLAT CABLE CONNECTOR

**Masseud Siraty, Santa Monica, Calif., assignor to G & H Technology, Inc., Camarillo, Calif.**

**Filed Sep. 25, 1986, Ser. No. 911,979**
**Int. Cl.[4] H01R** *13/52*
**U.S. Cl. 439—492** **12 Claims**



1. A connector for electrically connecting corresponding conduits of two plural-conduit flat electrical cables which connector comprises:

(1) a plurality of elongated electrical conductive means, each having compressive spring-like elements ending at, or substantially at, each end of said conductive means;

(2) a dielectric insert means adapted to maintain said elongated conductive means in a rectilinear array, electrically insulated one from another, with said spring-like elements on two parallel transverse planes;

(3) a first container means for receiving said insert means, said first container means being electrically insulated from said insert means;

(4) a second container means adapted to close with said first container means, said second container means being electrically insulated from said insert means, to electrically connect the corresponding exposed conduit ends of two flat electrical cables when these cables have been inserted into the then-open opposite sides of said container, formed by said two container means, to contact said corresponding elongated electrical conductive means; and

(5) said container having at least one elastomeric member for sealing the interior of said closed container.

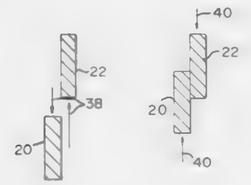


**4,743,081**

## CONTACT ELEMENT

**Robert F. Cobaugh, Elizabethtown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.**

**Continuation of Ser. No. 381,109, May 24, 1982, abandoned. This application Feb. 27, 1987, Ser. No. 20,244**
**Int. Cl.[4] H01R** *13/428*
**U.S. Cl. 439—751** **1 Claim**



1. A contact element of the type having a compliant section consisting of two sheared apart legs extending along a longitudinal axis, characterized in that the legs are pre-stressed by being initially spread apart in opposite directions along the shear plane and then pushed back towards each other along the same shear plane to a predetermined relative position prior to insertion into a hole in a printed circuit board or the like.

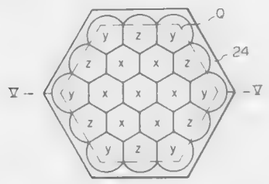
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**4,743,082**

## LIGHT CONDUCTING OPTICAL FIBER BUNDLE

**Kei Mori, 3-16-3-501, Kaminoge, Setagaya-ku, Tokyo, Japan**

**Continuation of Ser. No. 567,976, Jan. 4, 1984. This application May 2, 1986, Ser. No. 861,643**
**Int. Cl.[4] G02B** *6/00;* **F21V** *7/04*
**U.S. Cl. 350—96.10** **7 Claims**



1. The combination comprising a plurality of elongate light conducting cables arranged to form an elongate light conducting member, said light conducting cables each comprising a core and cladding disposed about said core, said cladding having an outer circular configuration, said light conducting member having a light receiving end face which receives optical energy to allow the optical energy to propagate from said light receiving end face to a selected location, each of said cables having a light receiving end section, said light receiving end face of said member being formed by said light receiving end sections of said plurality of cables, said light conducting cables comprising a first, second and third group of light conducting cables, a longitudinal end portion of each of said first group of light conducting cables adjacent to said light receiving end face having six surfaces of a truncated hexagonal pyramid, a longitudinal end portion of each of said second group of light conducting cables adjacent to said light receiving end face having four surfaces of a truncated hexagonal pyramid, said longitudinal end portion of each of said second group of light conducting cables having an outer surface defined by a first portion of said cladding of circular configuration and said four surfaces of a truncated hexagonal pyramid, a longitudinal end portion of each of said third group of light conducting cables adjacent to said light receiving end face having three surfaces of a truncated hexagonal pyramid, said longitudinal end portion of each of said third group of light conducting cables having an outer surface defined by a second portion of said cladding of circular configuration and said three surfaces of a truncated hexagonal pyramid, and bonding means bonding said light conducting cables at at least portions of said surfaces of each of said truncated hexagonal pyramids to thereby stably hold said light conducting cables together at said surfaces adjacent said light receiving end face to form a generally truncated hexagonal pyramid in which the plurality of end sections of said cables form an integrated light receiving end face which defines the smaller end of said generally truncated hexagonal pyramid, said first and second cladding portions of circular configuration defining the outer peripheral surface of said generally truncated hexagonal pyramid and extending from said integrated light receiving end face.

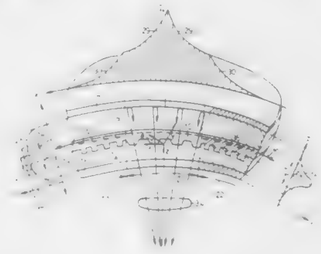
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**4,743,083**

## CYLINDRICAL DIFFRACTION GRATING COUPLERS AND DISTRIBUTED FEEDBACK RESONATORS FOR GUIDED WAVE DEVICES

**Robert M. Schimpe, Prinz-Karl-Strasse 40, D-8130 Starnberg, Fed. Rep. of Germany**

**Filed Dec. 30, 1985, Ser. No. 814,612**
**Int. Cl.[4] G02B** *6/34, 6/00, 27/42, 27/44*
**U.S. Cl. 350—96.19** **37 Claims**



1. In an apparatus for controlling waves including a waveguide configured to confine and guide the energy of propagating waves and comprising at least one wave-transmitting medium having a substantially curviplanar boundary and a diffraction grating formed by a plurality of grating lines configured to scatter wave energy with respect to guided waves having phase fronts extending substantially parallel to said grating lines;

the improvement wherein said grating lines form substantially closed loops consecutively enclosing each other from inner to outer.

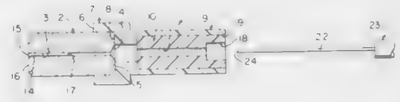
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**4,743,084**

## OPTICAL FIBER CONNECTOR FOR FIELD APPLICATION

**Randy M. Manning, New Cumberland, Pa., assignor to AMP Incorporated, Harrisburg, Pa.**

**Filed May 14, 1986, Ser. No. 863,224**
**Int. Cl.[4] G02B** *6/38*
**U.S. Cl. 350—96.21** **11 Claims**



1. A connector comprising,

a rigid body with an axial bore,

a sleeve encircling the rigid body and having an integral

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sleeve section projecting beyond a rear end of the rigid body,

radially deformable means encircled concentrically by the sleeve section and having an axial passageway aligned with the bore,

an enlarged entrance of the bore recessed in an end of the rigid body and positioned in alignment with the passage,

an optical waveguide secured in the bore of the rigid body and having a first optical face positioned at a front end of the rigid body, and having a second optical face in the connector aligned with the axial passage of the radially deformable means,

the axial passage and the sleeve section having open ends to admit an optical fiber having a distal end finished with an optical face positioned in colinear alignment with the second optical face of the waveguide, and

the radially deformable means being fabricated of a shape memory material constructed for radial reduction of the passage by shape memory reduction to grip an optical fiber admitted in the passage.

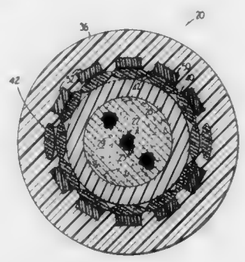
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**4,743,085**

## OPTICAL FIBER CABLE HAVING NON-METALLIC SHEATH SYSTEM

**Artis C. Jenkins, Lithonia, and Parbhubhai D. Patel, Dunwoody, both of Ga., assignors to American Telephone and Telegraph Co., AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed May 28, 1986, Ser. No. 867,643**
**Int. Cl.[4] G02B** *6/44*
**U.S. Cl. 350—96.23** **15 Claims**




1. An optical fiber cable, which comprises:

a core comprising at least one optical fiber;

a tubular member which is made of a dielectric material and which encloses said core;

a jacket which is made of a plastic material and which encloses said tubular member; and

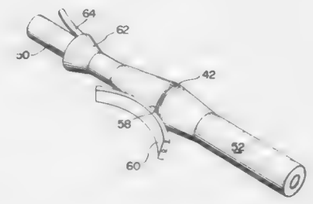
a strength member system which is interposed between said tubular member and said jacket and which comprises strength members made of a dielectric material with a first plurality of said strength members being relatively flexible and with a second plurality thereof having sufficient compressive stiffness and being coupled sufficiently to said jacket to provide a composite which is effective to inhibit contraction of said cable, said first and second pluralities of strength members cooperating to provide said cable with a predetermined tensile stiffness.

**4,743,086**

## COUPLING DEVICE FOR FORMING OPTICALLY EFFICIENT END-TO-END OPTICAL FIBER CONNECTIONS

**John W. Hicks, Jr., Northboro, Mass., assignor to Polaroid Corporation, Cambridge, Mass.**

**Filed Dec. 3, 1984, Ser. No. 677,933**
**Int. Cl.[4] G02B** *6/26*
**U.S. Cl. 350—96.15** **3 Claims**




1. A method of coupling two optical fibers comprising the steps of:

providing an optical fiber segment of selected length having a cross-sectional geometry corresponding to that of the two fibers to be coupled, the cross sectional geometry varying along its length from a minimum through a maximum and to a minimum and including that of the fibers to be coupled;

severing a first end of the optical fiber segment transverse to its longitudinal axis at a point along its length where the cross sectional geometry thereof corresponds with that of a first optical fiber to be coupled;

severing a second end of the optical fiber segment transverse to its longitudinal axis at a point along its length where the cross sectional geometry thereof corresponds with that of a second optical fiber to be coupled;

butt coupling the first and second optical fibers to the respective first and second severed ends of the optical fiber segment; and,

measuring the optical coupling efficiency of the coupled first and second optical fibers.

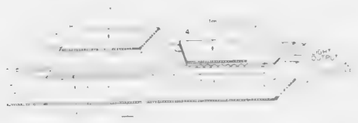
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**4,743,087**

## OPTICAL EXTERNAL MODULATION SEMICONDUCTOR ELEMENT

**Katsuyuki Utaka, Musashino; Shigeyuki Akiba; Yukitoshi Kushiro, both of Tokyo, and Yukio Noda, Yokohama, all of Japan, assignors to Kokusai Denshin Denwa Kabushiki Kaisha, Tokyo, Japan**

**Filed May 30, 1985, Ser. No. 739,477**
**Claims priority, application Japan, Jun. 7, 1984, 59-115585**
**Int. Cl.[4] G02B** *6/34;* **H01S** *3/19*
**U.S. Cl. 350—96.19** **8 Claims**



6. An optical external modulation semiconductor element integrally associated with a distributed feedback (DFP) semiconductor laser, comprising: means external to the DFB laser for defining a waveguide portion integral with said DFB laser having formed therein a diffraction grating of fixed period having a Bragg wavelength substantially equal to the wavelength of an output light from the distributed feedback semiconductor laser and formed along said waveguide portion for guiding unmodulated incident light radiated from the distributed feedback semiconductor laser to be inclined to the direction of travel of the light; means on the waveguide portion for changing at will during operation the refractive index of the waveguide portion in which the diffraction grating is formed for modulating the intensity of output light of the laser, and said means on the waveguide portion comprising voltage application electrodes to which a voltage is applied for changing at will during operation the refractive index of the waveguide portion.



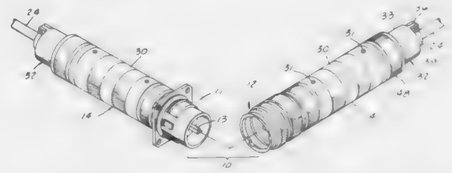
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**4,743,088**

## OPTICAL FIBER RELEASABLE CONNECTOR BACKSHELL

**Marik Balyasny, 7358 Ruffner Ave., Van Nuys, Calif. 91406, and Douglas A. Parker, 2179 Farnworth St., Camarillo, Calif. 93010**

**Filed Dec. 6, 1984, Ser. No. 678,873**
**Int. Cl.[4] G02B** *6/36, 7/26*
**U.S. Cl. 350—96.20** **2 Claims**



1. A backshell arrangement for an optical fiber connector having a hollow connector part shell through which at least one optical fiber of a fiber cable and having cable protective material peeled back passes, comprising:

cable clamping means including a cylindrical shell with an internal shoulder, a grommet received within the cylindrical shell, mounting ear means integral with said cylindrical shell, clamping bar means, and bolt means for securing the clamping bar means to said cylindrical shell;

means for releasably securing the cable protective material to the clamping means including a collar with flared edges located within the clamping means cylindrical shell and one end abutting against the internal shell, and a sleeve threaded onto the cable clamping means for bearing against the collar flared edges;

an extension tube having one end affixed onto the cable securing means; and

mounting sleeve means affixed to both the other end of the extension tube and the end portion of the plug shell, said mounting sleeve means including first and second shells telescopingly secured together, the first shell being received within the open end of the extension tube and the second shell being threaded onto the connector part shell.

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**4,743,089**

## PHOTOELECTRIC OPTICAL FIBER READING APPARATUS

**Kenji Sakakibara, Ichinomiya, and Eiichi Ohta, Handa, both of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan**

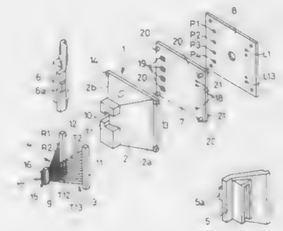
**Filed Apr. 23, 1985, Ser. No. 726,314**
**Claims priority, application Japan, Apr. 28, 1984, 59-87595**
**Int. Cl.[4] G02B** *6/04*
**U.S. Cl. 350—96.24** **8 Claims**

1. An optical reader for photoelectrically reading images on a surface of a medium, comprising:

light emitting elements for emitting beams of light;

light-sensitive means for sensing reflected light from the surface of the medium;

a plurality of light-emitting optical fibers for transmitting the beams of light from the respective light emitting elements to said surface of the medium, first ends of said light-emitting optical fibers opposite to said surface of the medium being positioned in a first row at a predetermined pitch; a plurality of light-receiving optical fibers for transmitting beams of the reflected light from said surface of the medium to said light-sensitive means, first ends of said light-receiving optical fibers opposite to said surface of the medium being positioned in a second row adjacent to and in parallel with said first row, at said predetermined pitch, said first ends of the light-receiving optical fibers being displaced relative to said first ends of the light-emitting



optical fibers along said first and second rows by a distance equal to a half of said predetermined pitch; and

control means for controlling the operations of said light emitting elements, said control means being operable in a first mode wherein said control means activates alternately the light emitting elements corresponding to each pair of the adjacent two light-emitting optical fibers so that the beams of light are emitted alternately from the first ends of said adjacent two light-emitting optical fibers.

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**4,743,090**

## SCREEN ASSEMBLY FOR ELECTROMAGNETIC RADIATION

**Michael J. Reidinger, Erie, Pa., assignor to Tru-Lyte Systems, Incorporated, Erie, Pa.**

**Continuation of Ser. No. 612,041, May 18, 1984. This application Jul. 7, 1987, Ser. No. 70,428**
**Int. Cl.[4] G02B** *6/18*
**U.S. Cl. 350—96.27** **12 Claims**



1. A novel screen assembly comprised of:

a frame member; and

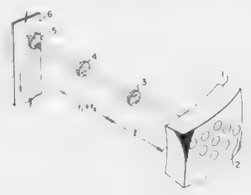
a plurality of optical fibers parallelly-disposed within said frame member and in closed packed relationship and bonded to each other, said optical fibers being of a length of from 0.5 mm to 16 inches thereby forming front and rear surface portions of said frame member, said front surface portion being formed in parallelled relationship to said rear surface portions, said front and rear surface portions having polished surfaces, said screen assembly receiving and projecting light images.

**4,743,091**

## TWO DIMENSIONAL LASER DIODE ARRAY

**Daniel Gelbart, 4616 Garden Grove Drive, Burnaby, B.C., Canada V5G-3V3**

**Filed Oct. 30, 1986, Ser. No. 924,975**
**Int. Cl.[4] G02B** *7/02*
**U.S. Cl. 350—252** **4 Claims**



1. An optical system for recording information on the surface of a light sensitive medium comprising:

a two-dimentional array of laser diodes mounted on a curved substrate and arranged in such a way to converge laser beams of said laser diodes onto an intermediate lens, each laser diode having a separate collimating lens in optical alignment therewith, said collimating lens collecting most of the emitted light from said laser diode;

a lens for imaging said array of laser diodes onto said light sensitive surface;

one or more intermediate lenses placed between said imaging lens and said array of laser diodes in order to reduce the image size, and a means for adjusting the position of each laser diode relative to said collimating lens to deliver a substantial amount of the emitted light from each laser diode to the surface of said medium.

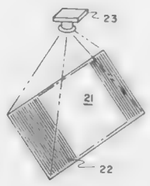
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**4,743,092**

## POLARIZING GRIDS FOR FAR-INFRARED AND METHOD FOR MAKING SAME

**Helmut H. Pistor, Fairfax County, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Nov. 26, 1986, Ser. No. 935,472**
**Int. Cl.[4] G02B** *5/30, 1/00*
**U.S. Cl. 350—370** **10 Claims**



1. In a far-infrared system having a polarized wire grid filter, the improvement wherein said filter comprises:

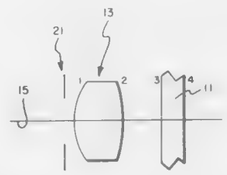
only a sheet of silver diffusion transfer film, exposed to a light image of said grid and developed, so that said grid is formed as a specularly reflecting silver image covered only by a transparent protective layer with a thickness measuring only a small fraction of a wavelength in the far-infrared spectrum.

**4,743,093**

## OPTICAL DISC PLAYER LENS

**Donald E. Oinen, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Continuation-in-part of Ser. No. 776,253, Sep. 16, 1985, abandoned. This application Apr. 23, 1987, Ser. No. 41,808**
**Int. Cl.[4] G02B** *3/02*
**U.S. Cl. 350—432** **1 Claim**



1. A lens for an optical disc player, the lens having an Abbé V number of 57.4 at 589.3 nm and comprising a single biconvex element with a refractive index, $N_{800}$, of 1.8584, both surfaces of which being aspheres conforming to the equation:

$$X + \frac{CY^2}{1 + \sqrt{1 - (K+1)C^2Y^2}} + DY^4 + EY^6 + FY^8 + GY^{10}$$

wherein:

X is the sag of the aspheric surface from a plane reference surface at a radial distance Y from the axis of the lens and K is the conic constant;

D, E. F and G are aspheric higher order coefficients;

C is the radius of the surface in the axial region, and the following values exist:

| | Surface 1 | Surface 2 |
|---|---|---|
| C = | 0.354021 | −0.1557360 |
| K = | 0.0 | −20.4938239 |
| D = | $-0.2909441 \times 10^{-2}$ | 0.0 |
| E = | $-0.5163209 \times 10^{-3}$ | 0.0 |
| F = | $0.5075886 \times 10^{-4}$ | 0.0 |
| G = | $-0.1399892 \times 10^{-4}$ | 0.0 |

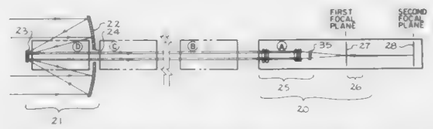
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**4,743,094**

## FINITE CONJUGATE IMAGING SYSTEM

**Romeo I. Mercado, San Jose, Calif., assignor to Lockheed Missiles & Space Company, Inc., Sunnyvale, Calif.**

**Division of Ser. No. 676,295, Nov. 29, 1984. This application Oct. 26, 1987, Ser. No. 112,632**
**Int. Cl.[4] G02B** *9/34*
**U.S. Cl. 350—469** **1 Claim**




1. A finite conjugate imaging system comprising a first lens element made of Hoya LAC7 glass, a second lens element made of calcium fluoride crystal, a third lens element made of Hoya LAC7 glass, and a fourth lens element made of calcium fluoride crystal, said first, second, third and fourth lens elements being disposed consecutively along an optic axis of the system, said first lens element having a surface with a positive radius of curvature of approximately 0.6720 times the focal length of the system and a surface with a positive radius of curvature of approximately 0.5468 times the focal length of the system, said second lens element having a surface with a positive radius of curvature of approximately 0.4522 times the focal length of the system and a surface with a negative radius of curvature of approximately 1.1377 times the focal length of the system, said third lens element having a surface with a positive radius of curvature of approximately 1.9364 times the focal length of the system and a surface with a positive radius of curvature of approximately 0.3054 times the focal length of the system, and said fourth lens element having a surface with a positive radius of curvature of approximately 0.3467 times the focal length of the system and a surface with a negative radius of curvature of approximately 1.2162 times the focal length of the system, said first lens element having a thickness along said optic axis of approximately 0.0684 times the focal length of the system, said second lens element being separated from said first lens element along said optic axis by approximately 0.2014 times the focal length of the system, said second lens element having a thickness along said optic axis of approximately 0.0855 times the focal length of the system, said third lens element being separated from said second lens element along said optic axis by approximately 0.0212 times the focal length of the system, said third lens element having a thickness along said optic axis of approximately 0.0684 times the focal length of the system, said fourth lens element being separated from said third lens element along said optic axis by approximately 0.0252 times the focal length of the system, said fourth lens element having a thickness along said optic axis of approximately 0.0855 times the focal length of the system.



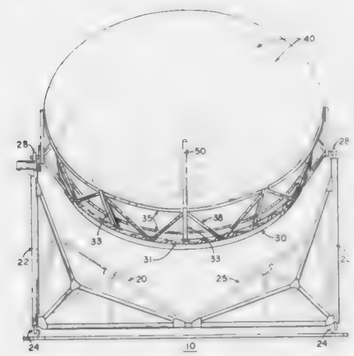
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**4,743,095**

## CLIP FASTENERS FOR PARABOLIC DISH REFLECTOR PANELS

**John A. Dane, 8823 Shellie La., Boise, Id. 83704**

**Filed Jun. 25, 1987, Ser. No. 68,208**
**Int. Cl.[4] F24J** *2/12;* **G02B** *7/18*
**U.S. Cl. 350—613** **5 Claims**



1. In a reflector assembly including a plurality of reflector members adjacently mounted on a support framework, each of said reflector members provided with a plurality of slots, means for affixing said reflector members to said framework comprising:

a multiplicity of clips, each of said clips provided with at least two tabs, each tab insertible through a respective slot of adjacent reflector members for joining adjacent members and each clip provided with an aperture; and

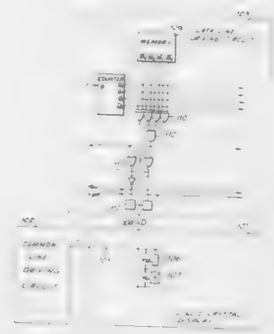
a multiplicity of fasteners, each fastener receivable within said a respective aperture of each of said clips for attachment of each of said clips and hence said reflector members to said framework.

**4,743,096**

## LIQUID CRYSTAL VIDEO DISPLAY DEVICE HAVING PULSE-WIDTH MODULATED "ON" SIGNAL FOR GRADATION DISPLAY

**Yoichi Wakai; Satoru Yazawa; Hiroaki Ikejiri; Yoshiro Uchikawa, and Masahide Isuda, all of Suwa, Japan, assignors to Seiko Epson Kabushiki Kaisha, Tokyo, Japan**

**Filed Jan. 30, 1987, Ser. No. 8,894**
**Claims priority, application Japan, Feb. 6, 1986, 61-24338**
**Int. Cl.[4] G02F** *1/13*
**U.S. Cl. 350—333** **14 Claims**



1. A video liquid crystal display device comprising,

a liquid crystal display including a plurality of column electrodes on a first substrate, a plurality of row electrodes on a second substrate, a liquid crystal material disposed between the substrates, the column electrodes and the row electrodes crossing each other at substantially right angles and in contact with the liquid crystal material, and a plurality of non-linear elements coupled between the electrodes and the liquid crystal material, there being a non-linear element connected to one of the electrodes at each crossing in the active area of the display;

common line driving means coupled to a column electrode for maintaining a voltage between a row electrode and a column electrode at a high level during a selected period and at a low level during a non-selected period; and

data line driving means coupled to a row electrode for providing a pulse-width modulated signal to display a visual element in gray scale, the driving circuit providing an ON pulse which is continuously generated at the rearward portion of the selected period.

12. The method of driving a liquid crystal display device having a plurality of column electrodes on a first substrate, a plurality of row electrodes on a second substrate, the column electrodes and the row electrodes crossing each other at substantially right angles and being in contact with the liquid crystal material, and a plurality of non-linear elements between the electrodes and the liquid crystal material, there being a non-linear element connected to one of the electrodes at each crossing in the active area of the display, the method comprising the steps of:

maintaining the voltage between a column electrode and a row electrode at a high level during a selected period and at a low level during a non-selected period; and

providing a pulse-width modulated signal to a row electrode for displaying a visual element in gray scale, the signal comprising a continuous ON pulse at the rearward portion of the selected period.

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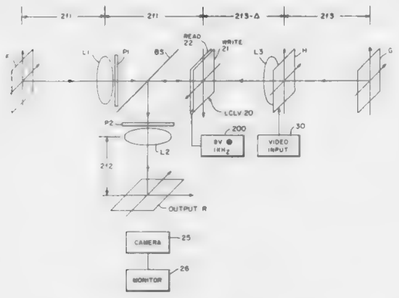


**4,743,097**

## INCOHERENT IMAGE INTENSITY NORMALIZATION, CONTOUR ENHANCEMENT, AND PATTERN RECOGNITION SYSTEM

John L. Johnson; Don A. Gregory, and James C. Kirsch, all of Huntsville, Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 6, 1987, Ser. No. 34,356
Int. Cl.[4] G02F *1/13;* G02B *27/46*
U.S. Cl. 350—337 8 Claims




1. A system comprising a liquid crystal light valve having a read side and a write side, a first image, first and second plane polarizers, first means for transmitting said first image through said first polarizer to the read side in focus for reflection from said read side through said second polarizer, a second image, second means transmitting said second image to the write side out of focus, and detecting means for receiving the reflection after passing through said second polarizer.

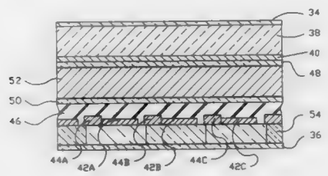
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**4,743,098**

## TFT LC DISPLAY HAVING POLYCHROMATIC GLASS COLOR FILTERS

Jack A. Dickerson; James C. Greeson, Jr.; Charlie C. Kilmer, and Neil M. Poley, all of Raleigh, N.C., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation-in-part of Ser. No. 941,460, Dec. 15, 1986, abandoned. This application Jan. 28, 1987, Ser. No. 8,021
Int. Cl.[4] G02F *1/13*
U.S. Cl. 350—339 F 5 Claims



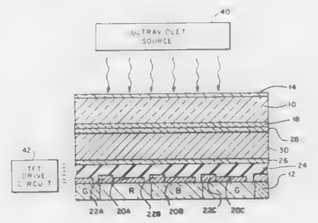

1. In a liquid crystal display device of the type having front and rear glass panels, an array of thin film transistors with associated transparent pel electrodes, a transparent electrode layer and a liquid crystal material interposed between the pel electrodes and the transparent electrode layer, the improvement comprising the use of polychromatic glass in one of the glass panels, said glass having been exposed and developed to provide integral color filter regions aligned with the transparent pel electrodes.

**4,743,099**

## METHOD OF MAKING A TFT LC DISPLAY HAVING POLYCHROMATIC GLASS COLOR FILTERS

Jack A. Dickerson, and Charlie C. Kilmer, both of Raleigh, N.C., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 28, 1987, Ser. No. 7,556
Int. Cl.[4] G02F *1/13*
U.S. Cl. 350—339 F 15 Claims




1. A method of forming color regions in a liquid crystal display device assembly having spaced front and rear glass panels, a transparent, common electrode layer at the inside surface of one of the glass panels, an array of transparent, individually addressable pel electrodes at the inside surface of the other of the glass panels, one of the glass panels being made of a polychromatic glass material, said method comprising the steps of:

filling the cavity defined by the glass panels with a guest-host liquid crystal material;

illuminating the assembly with a light source directed at the non-polychromatic glass panel;

energizing selected pel electrodes to expose selected regions of the polychromatic glass panel for a period of time sufficient to produce a desired hue;

repeating the preceding step with different one of said pel electrodes until different regions of the polychromatic glass panel have been exposed for different periods of time; and

heat treating the assembly to produce desired hues in the exposed regions.

9. A method of making a thin film transistor, liquid crystal display device having color display capability, said method comprising the steps of:

fabricating an assembly including spaced front and rear glass panels, a transparent common electrode layer at the inside surface of one of the glass panels, and an array of transparent, individually addressable pel electrodes at the inside surface of the other of the glass panels, each pel electrode having an associated thin film transistor through which the electrode may be addressed, one of said glass panels being made from a polychromatic material;

filling the cavity defined by the glass panels with a guest-host liquid crystal material;

illuminating the assembly with a light source directed at the non-polychromatic glass panel;

addressing selected electrodes through the associated thin film transistors to expose selected regions of the polychromatic glass panel to the light source for a predetermined period of time;

repeating the preceding step with different ones of the electrodes until different regions of the polychromatic glass panel have been exposed for different periods of time;

draining the liquid crystal material from the cavity;

heat treating the assembly;

refilling the cavity with a suitable permanent liquid crystal material; and

sealing the cavity.

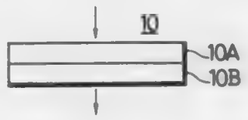


**4,743,100**

## OPTICAL LOW PASS FILTER

Yasuo Nakada, and Masuko Amemiya, both of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Sep. 16, 1985, Ser. No. 776,478
Claims priority, application Japan, Sep. 26, 1984, 59-201355
Int. Cl.[4] G02B *5/30;* H04N *9/097*
U.S. Cl. 350—403 5 Claims




1. An optical low pass filter used in a video camera having a solid state image sensing device and a color separating filter, said optical low pass filter comprising: a first double refraction plate being arranged to separate an incident light ray to an ordinary light ray and an extraordinary light ray which is displaced from said ordinary light ray by a distance d in a direction with an angle substantially equal to $\theta$ relative to the horizontal scanning direction of said solid state image sensing device, wherein cos $2\theta=\sqrt{\frac{1}{3}}$ ($0°<2\theta<90°$), and a second double refraction plate being arranged to separate an incident light ray to an ordinary light ray and an extraordinary light ray which is displaced from said ordinary light ray by a distance d in a direction with an angle substantially equal to $-\theta$ relative to the horizontal scanning direction of said solid state image sensing device, whereby said optical low pass filter has the spatial frequency characteristic having a first trap frequency $u_1$ and a second trap frequency $2u_1$.

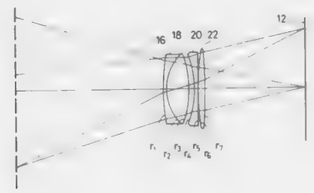
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**4,743,101**

## REAR-ATTACHMENT LENS SYSTEM

Koichi Maruyama, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 3, 1987, Ser. No. 33,705
Claims priority, application Japan, Apr. 4, 1986, 61-78999
Int. Cl.[4] G02B *15/10, 9/14*
U.S. Cl. 350—422 10 Claims




1. A rear-attachment lens system which is mounted between a master lens and an image plane of a camera for the purpose of providing an increased composite focal length, said lens system comprising:

a negative first lens element having a concave surface directed toward the image plane;

a positive second lens element having a convex surface on both sides, said first and second lens elements being cemented together;

a negative third lens element having a concave surface directed toward the master lens; and

a positive fourth lens element having its convex surface directed toward the master lens, a surface of the fourth lens element which is directed toward one of said image plane and master lens being an aspherical surface that has rotation symmetry with respect to an optical axis of said lens system.

**4,743,102**

## ZOOM LENS HAVING MAGNIFICATION FACTORS IN THE RANGE OF 12X TO 24X FOR MICROGRAPHIC APPLICATIONS

Gerhardt H. Pareigat, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Apr. 1, 1987, Ser. No. 33,416
Int. Cl.[4] G02B *15/14, 17/08*
U.S. Cl. 350—423 2 Claims

1. A variable focal length lens systems for use in micrographic projectors and printers comprising lenses according to the following Table:

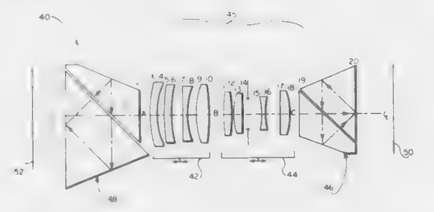
| SURFACE | RADIUS OF CURVATURE | THICKNESS | SEPARATION |
|---|---|---|---|
| S1 | −89.628 | | |
| | | 1.20 | |
| S2 | 24.806 | | |
| | | | 0.98 |
| S3 | −64.012 | | |
| | | 1.20 | |
| S4 | −297.992 | | |
| | | | 2.55 |
| S5 | 43.005 | | |
| | | 2.10 | |
| S6 | −69.773 | | |
| | | | 2.000-27.896 |
| S7 | 97.970 | | |
| | | 2.20 | |
| S8 | −76.200 | | |
| | | | 0.11 |
| S9 | 19.253 | | |
| | | 7.99 | |
| S10 | −29.940 | | |
| | | 6.90 | |
| S11 | 17.797 | | |
| | | | 1.26 |
| S12 | 691.830 | | |
| | | 1.80 | |
| S13 | −45.909 | | |

| SURFACE | TOLERANCE | INDEX OF REFRACTION | DECENTRATION | TILT |
|---|---|---|---|---|
| S1 | 0.10 | 1.83400 | 0.015 | 0.066 |
| S2 | 0.025 | | | |
| S3 | 0.05 | 1.83400 | 0.020 | 0.048 |
| S4 | 0.025 | | | |
| S5 | 0.05 | 1.74077 | 0.015 | 0.063 |
| S6 | | | | |
| S7 | 0.50 | 1.77250 | 0.026 | 0.053 |
| S8 | 0.05 | | | |
| S9 | 0.05 | 1.48749 | 0.020 | 0.053 |
| S10 | 0.05 | | | |
| S11 | 0.03 | 1.64769 | | |
| S12 | 0.05 | 1.77250 | 0.015 | 0.060 |
| S13 | | | | |

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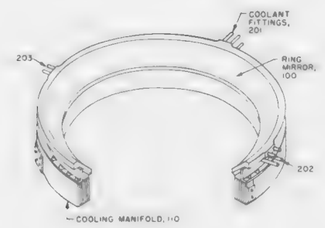
**4,743,103**
**LENSES FOR PHOTOGRAPHIC PRINTERS**
**Lee R. Estelle, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**
**Filed May 29, 1986, Ser. No. 868,981**
**Int. Cl.[4] G02B** *17/02*
**U.S. Cl. 350—445** **5 Claims**



1. A lens device capable of rotating the image relative to the object, including
lens elements for creating an inverted image of the object, and
means for rotating the image relative to the object through a predetermined angle, the rotating means including a first reflective device for rotating and reverts the image and a second reflective device for negating image reversion effected by the first reflective device, the first and second reflective devices being situated one in each of the air gaps between the lens elements and the object and image planes, respectively.

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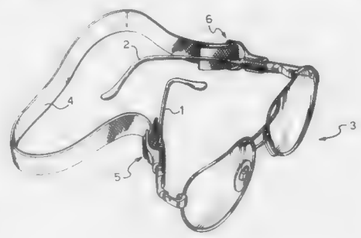
**4,743,104**
**VARIABLE AREA MANIFOLDS FOR RING MIRROR HEAT EXCHANGERS**
**Albert Eng, and Donald R. Senterfitt, both of Jupiter, Fla., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**
**Filed Oct. 14, 1986, Ser. No. 917,933**
**Int. Cl.[4] G02B** *5/08, 7/18*
**U.S. Cl. 350—610** **4 Claims**




1. A laser ring mirror assembly comprising:
an annular ring mirror;
a variable area cooling manifold which is fixed beneath said annular ring mirror to support and cool it with minimized azimuthal temperature variations, said variable area cooling manifold housing a plurality of sets of cooling passages with inlet and outlet fittings which conduct coolant, each set having first and second cooling passages placed in proximity to each other, said first cooling passage having a flow direction opposite of that of said second cooling passage, said opposite direction thereby contributing to an azimuthal thermal balance about said manifold's circumference to minimize thermal distortions in said annular ring mirror; and
adjustment means which is housed in said variable area cooling manifold and connected with said annular ring mirror to position it at variable depths from said plurality of sets of cooling passages, said adjustment means thereby allowing users of said laser ring mirror assembly to adjust its thermal cooling characteristics.

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**4,743,105**
**DEVICE FOR SECURING THE ENDS OF A STRAP DETACHABLY TO EYEGLASSES LEGS**
**Vittorio Tabacchi, Pieve Di Cadore, Italy, assignor to Optifashion S.r. L., Pieve Di Cadore, Italy**
**Filed May 1, 1986, Ser. No. 858,610**
**Claims priority, application Italy, May 3, 1985, 21719/85[U]**
**Int. Cl.[4] G02C** *3/00*
**U.S. Cl. 351—156** **6 Claims**

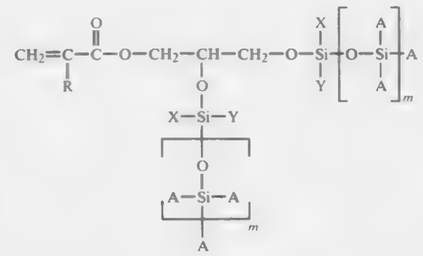


1. Apparatus for securing the ends of a strap detachably to temples of an eyeglass frame, the apparatus comprising a pair of sleeve elements, one locatable on a portion of each temple coaxially therewith, each sleeve element having an exposed outside surface, and a pair of connectors, each connector comprising a partial-tubular portion and a second portion element, each second portion element being connectable to one end of the strap, each of said partial-tubular portions having an inside surface conforming with the outside surface of said sleeve wherewith it is detachably engageable by snap action.

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**4,743,106**
**HIGHLY OXYGEN PERMEABLE CONTACT LENS MATERIALS AND COMPOSITIONS THEREOF**
**Nick N. Novicky, Calgary, Canada, assignor to Maureen J. Devou, Alberta, Canada**
**Filed Jun. 30, 1986, Ser. No. 880,668**
**Int. Cl.[4] G02C** *7/04;* **C08F** *230/08*
**U.S. Cl. 351—160 R** **2 Claims**

1. An oxygen permeable contact lens consisting essentially of an organic polymer selected from the group consisting of organosiloxanylalkoxy ester monomer of acrylic and methacrylic acid which has the structural formula:

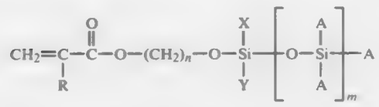


wherein A is $C_1$ to $C_6$ alkyl, cycloalkyl or phenyl, X and Y are $C_1$ to $C_6$, alkyl, cyclic or phenyl groups and/or groups of the following structure:





m being an integer from 1 to 5 and R is methyl group or hydrogen; and an organosiloxanylalkoxy ester monomer of acrylic or methacrylic acid having the following structural formula:



n being an integer from 1 to 3, wherein X and Y are $C_1$ to $C_6$, alkyl, cyclic or phenyl groups or groups of the following structure:



m being an integer from 1 to 5 and R is methyl group or hydrogen, wherein the contact lens has an oxygen permeability of about $91\times10^{-11}$ ($cm^2$/sec) (ml $O_2$/ml$\times$mmHg) at 35° C.

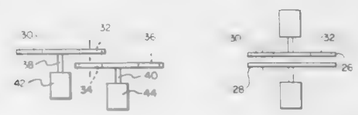
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**4,743,107**
**OPHTHALMOLOGICAL DIAGNOSIS METHOD AND APPARATUS**
**Yoshihisa Aizu, Machida, and Kouji Ogino, Hino, both of Japan, assignors to Kowa Company Ltd., Aichi, Japan**
**Filed Feb. 19, 1987, Ser. No. 16,285**
**Claims priority, application Japan, Feb. 25, 1986, 61-38240; Mar. 27, 1986, 61-67339**
**Int. Cl.[4] A61B** *3/10, 5/02;* **G01P** *3/36*
**U.S. Cl. 351—221** **46 Claims**



1. An ophthalmological diagnosis method comprising the steps of illuminating a region of the eye with a laser beam of prescribed diameter to produce a laser speckle pattern formed by light scattered by blood cells within the tissue of the eye, detecting movement of the laser speckle pattern as fluctuation in the light intensity of the speckles at an observation point and producing a speckle signal corresponding to the detected movement, obtaining the power spectrum distribution of the speckle signal, evaluating the power spectrum distribution configuration from the results of a calculation of the mean frequency thereof and determining the blood flow state in the tissue from the results of the evaluation.

**4,743,108**
**DYNAMIC SHUTTER MECHANISM**
**Richard M. Vogel, and Mark D. Fiscella, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**
**Filed Dec. 29, 1986, Ser. No. 947,322**
**Int. Cl.[4] G03B** *9/10*
**U.S. Cl. 352—216** **5 Claims**



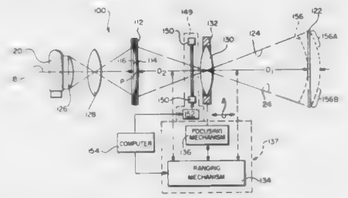
1. In a video imaging system including an imaging device for converting an optical image into a video signal having vertical and horizontal synchronizing signals, dynamic shutter mechanism apparatus comprising:
a first shutter disc having an aperture which is alignable with said imaging device;
a second shutter disc having an aperture which alignable with said imaging device;
said first disc shutter having first and second sets of indicia circumferentially disposed about said first shutter disc;
said second shutter disc having first and second sets of indicia disposed about the circumference of said second shutter disc;
first and second motor means for respectively rotating said first and second shutter discs;
first and second motor drive amplifier means for respectively driving said first and second motor means;
means for applying a reference speed voltage to said first and second motor drive amplifier means;
first detector means for detecting the first and second sets of indicia on said first shutter disc to produce first and second signals $S_1$ and $S_2$ having frequencies which are a function of the rotational speed of said first shutter disc;
first phase detector circuit means for comparing said first signal $S_1$ with the vertical sync signal $S_V$ to produce a first correction voltage applied to said motor driver amplifier means to phase lock the first shutter disc to said vertical sync signal;
a second phase detector circuit means for comparing a signal $S_H$ which is a function of said horizontal sync signal $S_H$ for producing a second correction signal which is applied to said first motor driver amplifier to phase lock said first disck to said horizontal sync signal;
second detector means for detecting the third and fourth sets of indicia on said second shutter disc to produce third and fourth signals $S_3$ and $S_4$ which are a function of the speed of rotation of said second shutter disc;
third phase detector means for comparing said vertoca; signal $S_V$ and said third signal $S_3$ to produce a third correction voltage applied to said second motor driver amplifier to phase lock the rotational speed of said second disc to said vertical sync signal $S_V$;
a fourth phase detector circuit for comparing the fourth signal $S_4$ produced by said second detector means with the signal $S_H$ derived from said horizontal sync signal and for producing a fourth correction signal applied to said second motor driver amplifier; and
means for producing a signal $S_5$ which is a function of the scene brightness of an image on said imaging device, said signal $S_5$ being applied to said second motor driver amplifier such that said second motor drives said second shutter disc in synchronism with said first shutter disc, but such that said shutter discs are displaced rotationally with respect to each other so that the relative aperture of aligned apertures of said first and second shutter discs is varied to allow more or less light to fall on said imaging device as a function of the scene brightness.

**4,743,109**

## SLIDE PROJECTOR WITH AUTOMATIC SLIDE WARPAGE COMPENSATION

**Donald M. Harvey, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Sep. 4, 1987, Ser. No. 92,989**
**Int. Cl.[4] G01B** *3/00*
**U.S. Cl. 353—101** **12 Claims**



1. A projector comprising:
means for supporting a transparency generally in a plane, said transparency typically exhibiting warpage such that the center of said transparency is displaced from said plane by a pop distance;
means for measuring said pop distance;
means for projecting light through said transparency;
means including a lens having a preselected f-number for focusing the light projected through said transparency onto a viewing plane; and
means responsive to said pop distance for varying the f-number of said lens so as to improve the focus of said transparency at said viewing plane.

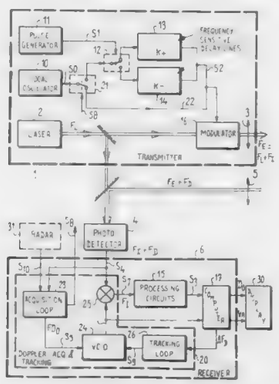
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**4,743,110**

## LASER TELEMETRY AND DOPPLER MEASUREMENT SYSTEM WITH PULSE COMPRESSION

**Georges Arnaud, Orsay; Léon P. Robin, Massy; Jean L. Meyzonnette, Jouy-en-Josas, and Bertrand Remy, Issy-les-Moulineaux, all of France, assignors to Thomson CSF, Paris, France**

**Filed Mar. 26, 1984, Ser. No. 593,305**
**Claims priority, application France, Mar. 29, 1983, 83 05142**
**Int. Cl.[4] G01C** *3/08;* **G01P** *3/36*
**U.S. Cl. 356—5** **10 Claims**



1. Apparatus for laser telemetry and Doppler measurement with pulse compression, comprising:
transmission means for (a) providing a periodic, pulsed transmission laser wave having a pair of pulses, each pulse of said pair being frequency modulated on both sides of a mean frequency $F_E$, and (b) providing a reference laser wave having a frequency $F_L$;
photomixer means adapted for superheterodyne reception of said reference laser wave and a return laser signal which is the transmission laser wave reflected from a target, said return laser signal having a Doppler shift frequency $F_D$, and for providing a beat signal having a frequency $F_I+F_D$, where $F_I$ is an intermediate frequency of value $F_I=F_E-F_L$;
transposition means for frequency transposing said beat signal and providing a transposed signal to compensate for said Doppler shift, said transposition means first providing a coarse compensation signal having a frequency $F_{DO}$ which is substantially equal to $F_D$, said transposition means then providing an automatic fine compensation signal which compensates for a Doppler difference value $\Delta F_D$ which exists beteeen $F_D$ and $F_{DO}$; and
processing means for receiving said transposed signal and for providing an output signal indicative of a distance to said target and said Doppler shift frequency $F_D$ of said target.

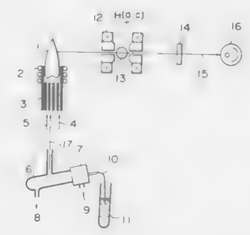
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**4,743,111**

## EMISSION SPECTROCHEMICAL ANALYZER

**Hideaki Koizumi, Katsuta, Japan, assignor to Hitachi, Ltd., Tokyo, Japan**

**Filed Sep. 7, 1984, Ser. No. 648,261**
**Claims priority, application Japan, Sep. 9, 1983, 58-165198**
**Int. Cl.[4] G01N** *21/73*
**U.S. Cl. 356—316** **8 Claims**



1. An emission spectrochemical analyzer including a light emitting part where a sample is introduced into inductively coupled plasma for emitting an atomic emission line therefrom, an atomic absorption part in which a desired element is introduced and is disposed on the path of the atomic emission line from the light emitting part and applied with a magnetic field, and a measuring part for measuring the intensity of the atomic emission line having passed through the atomic absorption part, wherein the pressure of the inner atmosphere of the atomic absorption part is increased to enlarge the width of an atomic absorption line of the desired element.

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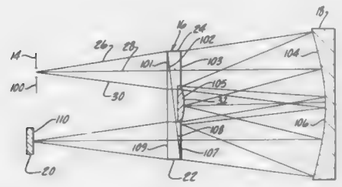
**4,743,112**

## IMAGING SPECTROMETER

**Elliot M. Burke, Garfield, N.J., assignor to Santa Barbara Research Center, Goleta, Calif.**

**Filed Jul. 18, 1986, Ser. No. 886,707**
**Int. Cl.[4] G01J** *3/36, 3/14*
**U.S. Cl. 356—326** **7 Claims**

1. An imaging spectrometer adapted to receive an image from an optical slit and spectrally disperse said image comprising:
a concave reflective first mirror spaced from said slit,
a focal plane assembly,
a prism assembly including a pair of prism elements, said prism elements assembled such that they define first and second parallel surfaces, and
a second mirror whereby light rays from said slit pass through said first and second prism surfaces and are spectrally dispersed, said dispersed rays being reflected from said first mirror, to said second mirror, and again from said first mirror, such that said dispersed rays again pass



through said first and second prism surfaces where said dispersion is increased and said rays are then directed onto said focal plane.

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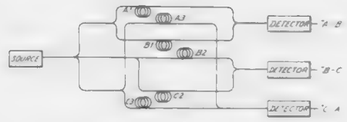


**4,743,113**

## OPTICAL FIBER INTERFEROMETER NETWORK

**Paul Jubinski, Houston, Tex., assignor to Western Atlas International, Inc., Houston, Tex.**

**Filed Aug. 29, 1985, Ser. No. 770,761**
**Int. Cl.[4] G01B** *9/02*
**U.S. Cl. 356—345** **18 Claims**



1. An optical-fiber gradiometer comprising:
a plurality of optical-fiber sensors grouped in an array, optically coupled in parallel;
means for launching a train of pulses of radiant energy, each said pulse having a desired width in the time domain, into said optical-fiber sensors for modulation by a quantity to be measured;
means for receiving the train of modulated pulses from said optical-fiber sensors;
means for recombining the received train of pulses from any two sensors in all combinations thereof, to form a sequence of interference patterns; and
means for quantitatively detecting said interference patterns.

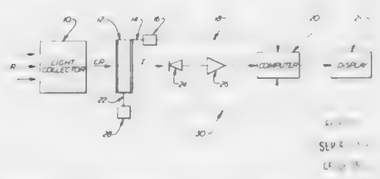
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**4,743,114**

## FABRY-PEROT SCANNING AND NUTATING IMAGING COHERENT RADIOMETER

**Robert Crane, Jr., Westport, Conn., assignor to The Perkin-Elmer Corporation, Norwalk, Conn.**

**Filed Jul. 11, 1986, Ser. No. 884,695**
**Int. Cl.[4] G01J** *3/45*
**U.S. Cl. 356—346** **7 Claims**



1. Apparatus for determining the direction and wavelength of coherent radiation or coherent absence of radiation in the presence of incoherent ambient radiation which comprises:
a Fabry-Perot etalon having a first surface positioned to receive incoming radiation and a second surface, the distance between said surfaces being such that the optical path difference between the transmitted portions of radiation incident on said first surface is substantially grater than the coherence length of incoherent radiation but substantially less than the coherence length of the coherent radiation;
means for rotating said etalon an equal amount at different angular velocities about each of two mutually perpendicular axes of rotation;
position indicating means to provide a position signal proportional to the angle of rotation of said Fabry-Perot etalon about each of said axes of rotation;
detecting means for detecting the variable signal component caused by the varying constructive and destructive interference of the combined coherent radiation components across the entire area of the wavefront emanating from said Fabry-Perot etalon; and
processing means for processing said position signals and said variable signal components through electronic signal processing components to detect, determine direction and wavelength of the coherent energy or coherent absence of energy.

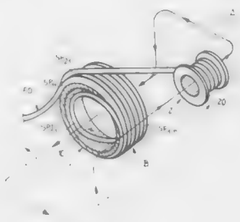
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**4,743,115**

## METHOD OF COILING AN OPTICAL FIBER GYROSCOPE AND AN OPTICAL FIBER COIL THUS OBTAINED

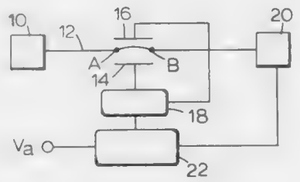
**Hervé Arditty, Marly le Roi; Jean P. Bettini, Perthes; Serge Botti, Viroflay; Philippe Graindorge, Magny les Hameaux, and Hervé Lefevre, Paris, all of France, assignors to Thomson-CSF, Paris, France**

**Filed Jun. 20, 1986, Ser. No. 876,400**
**Claims priority, application France, Jun. 21, 1985, 85 09499**
**Int. Cl.[4] G01B** *9/02*
**U.S. Cl. 356—350** **10 Claims**



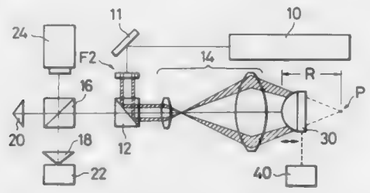
1. A method of coiling a gyroscope of the SAGNAC interferometer type comprising a ring formed of a multilayer optical fiber coil, comprising at least:
a preliminary step for coiling a length of optical fiber required for forming said coil on at least one intermediate spool;
a first step for coiling a first layer of turns on a cylindrical support comprising a central channel of circular section, so as to form a helical winding with constant pitch by unwinding the optical fiber from the intermediate spool;
a second step consisting in introducing said intermediate spool inside the central channel, forming a single turn spirally on the inner wall of the central channel, wound in the same direction as the turns of the first layer, and removing the intermediate spool from the central channel through the end opposite the introduction end;
and a third step for coiling an additional layer of turns by winding the optical fiber in the same direction as the turns of the underlying layer, and using the interturn spaces of this layer as channel for guiding and positioning the optical fiber.

4,743,116
**MICROBENDING OPTICAL FIBER ACCELEROMETER AND GYROSCOPE**
**Eric Udd, 14311 Tropicana La., Huntington Beach, Calif. 92647; Philip M. Gretzkowski, 31 Greenbough, Irvine, Calif. 92714, and Keith H. Wanser, 17604 'A' Van Buren, Huntington Beach, Calif. 92647**
**Filed Oct. 7, 1985, Ser. No. 785,335**
**Int. Cl.[4] G01B** *9/02*
**U.S. Cl. 356—350** **27 Claims**




1. A solid state accelerometer, comprising:
(a) a light source means for providing a light beam input;
(b) an optical fiber connected to the light source means for receiving the light beam input;
(c) a support means for suspending the optical fiber between two points under a predetermined tension;
(d) a vibrating means for vibrating the optical fiber at a frequency f between the two points of the support means; and
(e) a detection means for detecting acceleration induced amplitude modulation of the light beam at the output of the optical fiber including electrical circuitry means for indicating the quantity of acceleration present.

4,743,117
**DEVICE FOR OPTICALLY MEASURING ASPHERIC SURFACE**
**Junichi Kitabayashi, Machida, and Toshio Kanoh, Tokyo, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan**
**Filed Jan. 20, 1987, Ser. No. 4,490**
**Claims priority, application Japan, Jan. 20, 1986, 61-009380**
**Int. Cl.[4] G01B** *9/02*
**U.S. Cl. 356—353** **3 Claims**




1. A device for optically measuring an aspheric surface, comprising:
a fringe-scanning shearing interferometer for applying a wavefront of illuminating light to the aspheric surface and optically measuring the aspheric surface based on light reflected by the aspheric surface along a measurement optical path;
a plurality of ring filters having respective different light-transmitting areas and successively positionable, one at a time, in the illuminating light and outside of said mearsurement optical path for applying divided portions of said wavefront of illuminating light successively to the aspheric surface; and
means for measuring the radius of curvature of the wave-front of illuminating light applied to the aspheric surface.

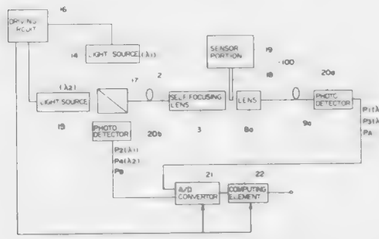
4,743,118
**METHOD OF DETECTING ORIGIN OF SHEAR AND MEASURING AMOUNT OF SHEAR IN SHEARING INTERFEROMETER SYSTEMS**
**Keishin Tsuchiya; Junichi Kitabayashi, and Toshio Kanoh, all of Tokyo, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan**
**Filed Mar. 31, 1986, Ser. No. 846,115**
**Claims priority, application Japan, Apr. 4, 1985, 60-071280; Apr. 22, 1985, 60-086042; May 2, 1985, 60-094977**
**Int. Cl.[4] G01B** *9/02*
**U.S. Cl. 356—353** **7 Claims**



6. A method of detecting the origin of a shear of a reference light beam from a basic light beam in a shearing interferometric system, said system comprising a light detector and a shearing member, comprising the steps of:
removing the reference light beam so that only the basic light beam falls on said light detector;
displacing the light detector unit the basic light beam falls on the center of the light detector;
removing the basic light beam and reinstating the reference light beam so that only the reference light beam falls on the light detector; and
displacing said shearing member until the reference light beam falls on the cetner of the light detector.

4,743,119
**OPTICAL MEASURING APPARATUS**
**Yoshiaki Ida, Amagasaki, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**
**Filed Aug. 11, 1986, Ser. No. 895,666**
**Claims priority, application Japan, Aug. 22, 1985, 60-186263; Jan. 24, 1986, 61-14072**
**Int. Cl.[4] G01B** *11/00, 11/14;* **G01D** *5/34;* **H01J** *5/16*
**U.S. Cl. 356—372** **17 Claims**

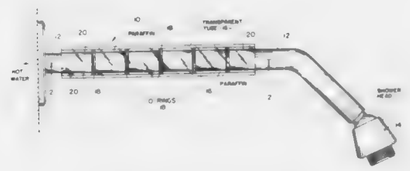
1. An optical measuring apparatus, comprising shielding means made from a substance, which is permeable to a light having a first wave length and shields a light having a second wave length different from the first wave length, changing a ratio of shielding said light having the second wave length in correspondence to a physical quantity to be measured, said shielding means being comprised of a sensor portion responding to the physical quantity and shifting means being connected with the sensor portion and changing a ratio of shielding said light having the second wave length by shifting in correspondence to a responding degree of the sensor portion, said shifting means being a semiconductor, two light sources for radiating said light having the first wave length and said light having the second wave length to be supplied said shielding means through the same one transmission path, a photo-detector for receiving the light having the second wave length, which passed by said shielding means without being shielded, and the light having the first wave length, which passed



through or by said shielding means, through the same one transmission path, and a calculating means for calculating a ratio of an optical output corresponding to said light having the second wave length to an optical output corresponding to said light having the first wave length on the basis of an output from said photo-detector to calculate said physical quantity.

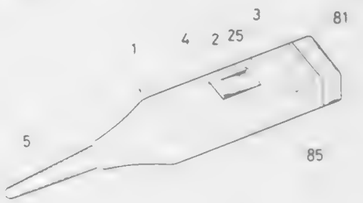


4,743,120
**WATER TEMPERATURE SENSOR FOR FAUCET OR SHOWER**
**John G. Bowen, Valley View Cottage, Newgrounds, Godshill, Fordingbridge, Hampshire, England**
**Filed Mar. 13, 1987, Ser. No. 25,585**
**Int. Cl.[4] G01K** *11/06*
**U.S. Cl. 374—147** **5 Claims**



1. A fluid temperature sensor for displaying indications of the temperature of a fluid flowing through a conduit, including: a transparent outer tubular member surrounding the conduit; a plurality of annular members mounted between the conduit and the transparent tubular member and axially spaced from one another along the conduit to form individual compartments, with said transparent outer tubular member forming the outer wall of said compartments; a plurality of inner indicator tubes surrounding said conduit and individually positioned between successive pairs of said annular members, said inner tubes forming respective inner walls for the compartments; and an opaque solid material contained in each of said compartments and having a melting point different from the melting point of said material in the other of said compartments, to melt and become transparent at a particular temperature to reveal the corresponding inner indicator tube through said transparent tubular member and to be contained in the particular compartment by the outer tubular member and corresponding inner indicator tube and by the corresponding pair of said annular members.

4,743,121
**CLINICAL ELECTROTHERMOMETER**
**Tatsuo Takagi, and Toshiaki Takagi, both of Fujinomiya, Japan, assignors to Terumo Kabushiki Kaisha, Tokyo, Japan**
**Continuation of Ser. No. 763,471, Aug. 7, 1985, abandoned. This application Dec. 2, 1986, Ser. No. 935,617**
**Claims priority, application Japan, Aug. 13, 1984, 59-169088**
**Int. Cl.[4] G01K** *7/00, 1/00*
**U.S. Cl. 374—163** **7 Claims**




1. A clinical electrothermometer, comprising:
an elongated casing having a tapered extension at one end,
a probe element mounted to the tip of said extension for sensing a temperature,
electronic circuit means electrically connected to said probe element and including display means for displaying the sensed temperature, and
a battery for supplying electrical power to said circuit means, said circuit means and said battery being housed in said casing,
wherein said casing comprises:
an elongate window member of a transparent synthetic resin including a contacting surface portion, and a window portion facing said display means, said transparent resin being selected from the group consisting of a styrene resin, polyolefin resin, acrylic resin, cellulose ester resin, and polyester resin, and
an elongate body member of an opaque synthetic resin fusible to the contacting surface portion of said window member,
said window member, except for the window portion, and said body member being joined together into a distinctive, one-piece and liquid-tight unit by multi-color injection molding,
said body member and said window member together forming said casing, wherein the contacting surface portion of said window member coextends with and is fused to a substantial surface area portion of said body member.

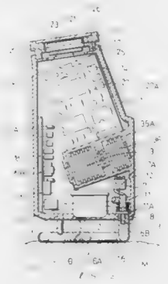
4,743,122
**INFRARED-RAY TEMPERATURE MEASURING APPARATUS**
**Masaru Yamano, Hirakata; Yukinori Kuwano, Katano; Toshiaki Yokoo, Osaka; Kenichi Shibata; Kousuke Takeuchi, both of Hirakata, and Toshiharu Tanaka, Higashiosaka, all of Japan, assignors to Sanyo Electric Co., Ltd., Japan**
**Filed Dec. 20, 1985, Ser. No. 811,806**
**Claims priority, application Japan, Dec. 24, 1984, 59-201800[U], Oct. 7, 1985, 60-223290**
**Int. Cl.[4] G01K** *1/14*
**U.S. Cl. 374—208** **16 Claims**

1. An infrared-ray temperature measuring apparatus for measuring the temperature of a portion of an object, said apparatus comprising:
a housing,
an infrared sensor adapted to provide an output signal in response to infrared radiation detected by said sensor,
a distance keeping member,
a temperature measuring circuit,
temperature measurement control switch means for controlling the initiation of a temperature measurement,

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a display unit, and
a power source,
said housing having an opening formed at one end thereof,
said infrared sensor being disposed in said housing opposite to said opening,
said distance keeping member being located out of sight of said infrared sensor and maintaining said infrared sensor a predetermined distance away from the portion the temperature of which is to be measured, said distance keeping member having an element adapted to maintain an angle defined by the center of the line of sight of said infrared



sensor and the portion the temperature of which is to be measured at nearly a constant value,
said temperature measuring circuit responsive to the output signal from said infrared sensor for providing an output signal representing the temperature of the portion,
said temperature measurement control switch means including a temperature measurement initiation switch for initiating temperature measurement when said distance keeping member contacts the portion to be measured,
said display unit receiving the output signal from said temperature measuring circuit to display the temperature of the portion.

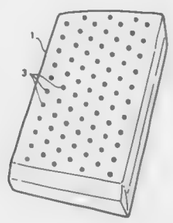
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**4,743,123**

**PLASTIC BAG AND CLOSED PLASTIC BAG WITH LASER-FORMED VENTING PERFORATIONS**

**Heinrich Legters, and Bernhard Lodder, both of Hardenberg, Netherlands, assignors to Wavin B.V., Netherlands**

**Continuation of Ser. No. 705,029, Feb. 25, 1985, abandoned. This application Jul. 11, 1986, Ser. No. 884,887**
**Claims priority, application Netherlands, Feb. 24, 1984, 8400578**
**Int. Cl.[4] B65D** *33/01*
**U.S. Cl. 383—103** **10 Claims**



1. A plastic bag of a polyolefin material having a bag foil wall for packing loosely poured material comprising venting perforations having a size of 50 μm to 100 μm in the bag foil wall, wherein the perforations have smooth edges, which have been formed by laser radiation, the diameter of the perforations being less than or substantially equal to the wall thickness of the foil, said foil wall thickness being between 50 and 250 μm, the distance between the individual perforations being at least 5 mm and such that the tensile strength of the foil is substantially the same as the tensile strength of such a foil which has not been provided with perforations, and
the loosely poured material to be packed is a powder-like material and comprises particles of less than 50 μm, whereby said powder-like material is unable to pass through said bag perforations.

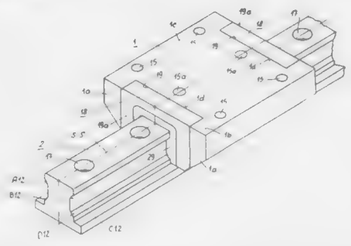
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**4,743,124**

**ANTI-FRICTION BEARING**

**Günter Blaurock, Niederwerrn, Fed. Rep. of Germany, assignor to Deutsche Star GmbH, Schweinfurt, Fed. Rep. of Germany**

**Filed Aug. 4, 1986, Ser. No. 893,195**
**Claims priority, application Fed. Rep. of Germany, Aug. 2, 1985, 3527886; Jun. 19, 1986, 3620571**
**Int. Cl.[4] F16C** *29/06*
**U.S. Cl. 384—45** **55 Claims**



1. An anti-friction bearing comprising a rail; a bearing main body which is mounted on and adapted to be moved axially along the rail; at least one pair of bearing member circuits which are formed in the bearing main body and in the rail, each bearing member circuit of the pair having a rectilinear, load-transmitting bearing member row in engagement with an axially parallel, load-absorbing track of the bearing main body and with an axially parallel, load-absorbing track of the rail, a bearing member row running in the reverse direction and two curved bearing member rows therebetween; end plates having deflection surfaces for the curved bearing member rows and the end plates being made integral with axially parallel retaining webs corresponding in length to one-half of the axial length of said bearing main body which webs are located in alignment with one another and abut each other at their ends, the retaining webs securing the load-transmitting bearing member rows in engagement with the load-absorbing tracks of the bearing main body; the two load-transmitting bearing member rows of the two bearing member circuits of the pair being secured in engagement with the respective track of the bearing main body by a single group of two retaining webs which are in alignment with one another and which are common to the load-transmitting bearing member rows of said pair of bearing member circuits, each of said single group of two retaining webs being provided on a portion of a respective end plate and being arranged between the load-transmitting bearing member rows of said pair of bearing member circuits, each of said single group of two retaining webs being provided with two retaining tracks (**A14**, **B14**), said retaining tracks (**A14**, **B14**) transitioning continuously without interruption of web material into respective deflection surfaces (**22**) of the respective end plate (**18**).

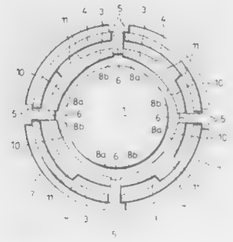


**4,743,125**

**AERODYNAMIC SLIDE BEARING**

**Uwe Dammel, Nauheim, and Bernd Domes, Wehrheim, both of Fed. Rep. of Germany, assignors to Kloeckner-Humboldt-Deutz AG, Fed. Rep. of Germany**

**Filed Dec. 1, 1986, Ser. No. 936,370**
**Claims priority, application Fed. Rep. of Germany, Dec. 14, 1985, 3544392**
**Int. Cl.[4] F16C** *32/06*
**U.S. Cl. 384—99** **26 Claims**



1. An aerodynamic slide bearing for a high speed shaft having an elastic and dampening structure nonrotatably mounted in an outer casing, which has at least one dampening chamber between the elastic and dampening structure and the outer casing, and wherein a plurality of converging lubrication pockets are provided between the elastic and dampening structure and the shaft, characterized by: said elastic and dampening structure is divided, in the circumferential direction of the slide bearing, into at least two separate substructures, said substructures having shaft supporting bearing surfaces with fixed contours creating said converging lubrication pockets, wherein said substructures are individually supported at their circumferentially opposite ends on said outer casing and a separate damping chamber is provided radially between each substructure and the interior of said outer casing, and wherein, in the unstressed condition of said slide bearing, the radial depth of said lubrication pocket is at its maximum and the radial depth of said dampening chamber is between 0.2 and 10 percent of the value of the diameter of the shaft supported by said slide bearing.

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**4,743,126**

**HYDRODYNAMIC BEARINGS, AND SECONDARY ASSEMBLIES FOR PRODUCING SAID BEARINGS**

**Jacques Soum, and Christian Malabre, both of Paris, France, assignors to ABG Semca, Paris, France**

**Division of Ser. No. 496,824, May 23, 1983, Pat. No. 4,616,388. This application May 29, 1986, Ser. No. 868,801**
**Claims priority, application France, May 24, 1982, 82 09476**
**Int. Cl.[4] F16C** *32/06*
**U.S. Cl. 384—105** **4 Claims**

1. A self-contianed cartridge assembly adapted for insertion into the shell of a hydrodynamic bearing comprising
a succession of sheet foil members,
each foil member including in turn an end heel portion, an intermediate securing portion and a functional portion having a free end,
the succession of foil members being assembled in a circular overlapping relationship with the end heel portion of each member overlapping the securing portion of the preceding member of the succession and fixed thereto, the functional portions of the succession defining a circularly clylindrical internal surface adapted to serve as the functional floating surface of the bearing, and the free end of



each functional portion forming a discontinuity zone adapted for creating a hydrodynamic effect.

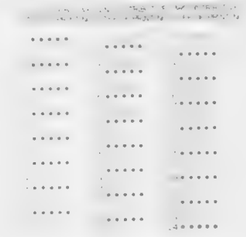
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**4,743,127**

**DEVICE FOR DISTRIBUTIVE DOT PRINTING FOR PRINTER**

**Masaru Uematsu, Kawasaki, Japan, assignor to Fujitsu Limited, Kanagawa, Japan**

**Continuation of Ser. No. 813,442, Dec. 26, 1985, abandoned. This application Aug. 14, 1987, Ser. No. 86,252**
**Claims priority, application Japan, Dec. 28, 1984, 59-276348**
**Int. Cl.[4] B41J** *29/38, 3/12*
**U.S. Cl. 400—54** **5 Claims**



1. A device for distributive dot printing for a printer comprising:
printing head means having a plurality of head pins arranged in a vertical direction, said plurality of head pins being divided into a plurality of step divisions;
print medium means on which printing by said printing head means is carried out;
carriage means carrying said printing head means for transporting said printing head means in a horizontal direction;
carriage transportation control means for causing said printing head means to carry out a plurality of printing actions for each row of said head pins; and
head pin selection means for selecting predetermined head pins in said plurality of step divisions, said head pins being equally vertically spaced apart in each said step division across an entire row of said head pins in each printing action to cause said printing head means to carry out distributive dot printing per each printing action, different pins located with a same interval in each step division as selected, supplemental printing of dots being carried out in a space between the dots printed in the preceding printing action.

**4,743,128**

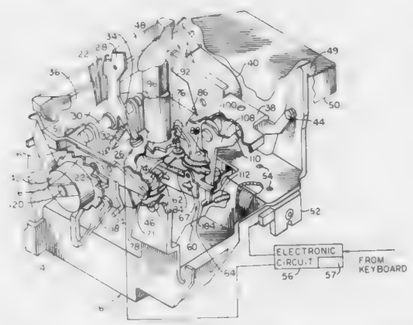
## PRINT HAMMER SOLENOID CONDITIONED SINGLE SOLENOID RIBBON AND TAPE FEED SYSTEM

**Kenneth D. Vought, and Hans W. Mueller, both of Cortland, N.Y., assignors to Smith Corona Corporation, Cortland, N.Y.**

**Filed Dec. 10, 1986, Ser. No. 940,314**

**Int. Cl.[4] B41J** *23/34, 29/36*

**U.S. Cl. 400—184** **8 Claims**




1. A ribbon feed system for typewriters having a keyboard with character keys and a correction key, an error correction tape, a print ribbon, a print hammer solenoid, and a ribbon feed solenoid, the ribbon feed system comprising:

feed means connected to the ribbon feed solenoid for feeding the print ribbon and for feeding the error correction tape;

means operably connecting the print hammer solenoid to the feed means; and

means including an electronic circuit responsive to depression of any of the character keys, thereby energizing the print hammer solenoid, for conditioning the feed means to feed the print ribbon and for thereafter energizing the ribbon feed solenoid to feed the print ribbon.

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**4,743,129**

## PASSBOOK PRINTER

**Alain Keryhuel, Yerville, and Pierre Dupuis, Barentin, both of France, assignors to Unisys Corporation, Blue Bell, Pa.**

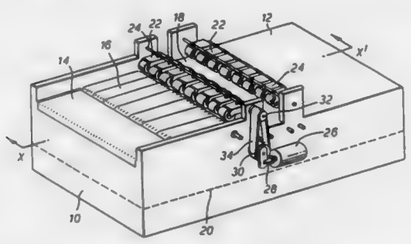
**PCT No. PCT/GB85/00209, § 371 Date Apr. 11, 1986, § 102(e) Date Apr. 11, 1986, PCT Pub. No. WO85/05325, PCT Pub. Date Dec. 5, 1985**

**PCT Filed May 17, 1985, Ser. No. 796,028**

**Claims priority, application United Kingdom, May 18, 1984, 8412707**

**Int. Cl.[4] B41J** *13/32*

**U.S. Cl. 400—582** **22 Claims**



1. A passbook printer comprising a barrier, a horizontally positioned conveyor belt, a transport apparatus and a printhead assembly, said passbook printer further including means for raising said barrier in response to the placing of an open passbook on said conveyor belt, means for operating said conveyor belt for a predetermined period of time, whereby said conveyor belt conveys said passbook towards said barrier and into engagement with said barrier with an edge of said passbook aligned with the barrier; means for lowering said barrier, whereby said passbook becomes free to pass thereover; means for operating said transport apparatus for engaging said passbook and transporting said passbook a selectable distance along a path towards said printhead assembly;

said printhead assembly comprising a sensor, means for moving said sensor across said path and detection means, responsive to said sensor, for detecting the transverse position of said passbook;

said detection means further including means for detecting a first predetermined mark and a second predetermined mark on said passbook and means for measuring the respective distances, transverse to said path, between said point whereat said detection means detects said passbook and the point whereat said detection means detects said first mark, and between said first and second marks, in order to determine which edge of said passbook has become aligned with said barrier;

said printhead assembly further comprising a printhead for printing a visible record at a selectable distance transversely to said path from the point whereat said sensor detected said passbook.

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**4,743,130**

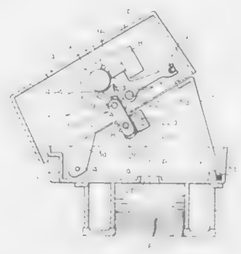
## APPARATUS TO FACILITATE INITIAL PAPER LOADING

**Koichi Katagiri; Satomi Nanaumi, and Toshimasa Fujiwara, all of Tokyo, Japan, assignors to Copal Company Limited, Tokyo, Japan**

**Filed Apr. 11, 1986, Ser. No. 850,482**

**Int. Cl.[4] B41J** *11/30*

**U.S. Cl. 400—613.2** **12 Claims**



1. Device for printing a continuous fan-folded paper web in a printer capable of supplying said paper web from the bottom of said printer, comprising:

a lower housing member having a first feed-in opening at the bottom surface thereof;

an upper housing member swingably mounted on said lower housing member so as to be swung upwardly with respect to said lower housing member thereby selectively assuming a closed position close to said lower housing member for the printing operation and an opened position for permitting said paper web to be threaded therein;

a main printing mechanism mounted in said upper housing member and including a carriage mounting thereon a printing head and a platen;

a second feed-in opening formed in the bottom surface of said upper housing member, said second feed-in opening assuming a position located on a substantially vertical line defined by said first feed-in opening and the printing portion of said platen when said upper housing member assumes said closed position; and

a pin-tractor mechanism mounted in said upper housing member and positioned between said platen and said first feed-in opening of said lower housing member for pushingly feeding said fan-folded paper web along said substantially vertical line into said printing portion of said platen, said pin-tractor mechanism having paper holding members engaging with pins of said pin-tractor mechanism for movably holding longitudinal side edges of said paper web, the portion of said pin-tractor mechanism where said paper holding members are located extending outwardly from said second feed-in opening toward said lower housing member.



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**4,743,131**

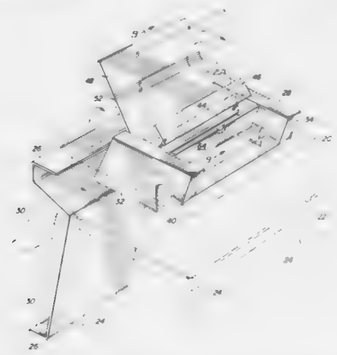
## TRACTOR FEED CONTINUOUS PAPER SYSTEM FOR PRINTERS

**J. Dwayne Atwell, 114 W. Erie Dr., Tempe, Ariz. 85282**

**Filed Aug. 6, 1986, Ser. No. 893,708**

**Int. Cl.[4] B41J** *11/58, 15/04*

**U.S. Cl. 400—613.2** **15 Claims**



1. A continuous paper feed system for use in conjunction with a printer positioned on a support surface, comprising:

a blank paper storage portion capable of being secured to a rear portion of said support surface and residing generally therebelow; and

a printed paper receiving portion capable of resting on said printer, said paper receiving portion being angularly adjustable with respect to the plane of said surface, said receiving portion comprising:

first and second side members capable of being positioned on first and second sides of said printer;

a receiving bin pivotally coupled between said first and second side members, said receiving bin including an upwardly inclined back portion having a front surface and upper and lower edges, and a lip coupled to said lower edge and extending substantially orthogonally therefrom; and

guide means coupled to opposite ends of said receiving bin for directing paper exiting said printer to said receiving bin, said front surface including a plurality of transverse grooves intermediate said upper and lower edges for engaging an upper edge of the paper and directing it to said lip.

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**4,743,132**

## PAPER FEED DEVICE

**Masaru Chikata; Takashi Yagi, and Takeji Tsuchiya, all of Shizuoka, Japan, assignors to Tokyo Electric Co., Ltd., Tokyo, Japan**

**Filed May 18, 1987, Ser. No. 50,575**

**Claims priority, application Japan, May 20, 1985, 61-115421; Dec. 4, 1986, 61-289673**

**Int. Cl.[4] B41J** *11/58, 13/03*

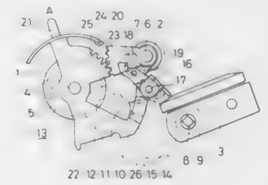
**U.S. Cl. 400—629** **7 Claims**

1. A paper feed device, comprising:

a transport gear connected in a coaxial relationship to a transport roller for transporting paper, said transport roller being interposed in a paper transporting route;

a change-over arm for following a rotating motion of a bidirectionally rotatable platen to make a rocking motion within a predetermined fixed range after the direction of rotation of said platen is reversed; and

an idler gear mounted for rotation at a rocking free end of said change-over arm and connected to be normally rotated by power transmitted from said platen, said idler gear being selectively brought into meshed engagement with said transport gear in response to a rocking motion of said change-over arm.



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**4,743,133**

## INKED RIBBON CARTRIDGE

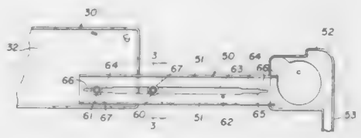
**Ward L. Karns, Waynesboro, Va., assignor to General Electric Company, Lynchburg, Va.**

**Division of Ser. No. 429,002, Sep. 30, 1982, Pat. No. 4,630,948.**

**This application Jul. 14, 1986, Ser. No. 884,918**

**Int. Cl.[4] B41J** *32/02*

**U.S. Cl. 400—208.1** **20 Claims**



1. An inked ribbon cartridge for a printing device, said cartridge comprising:

a source of printing ribbon,

an elongated housing for storing said printing ribbon;

said housing having an exit port at one end thereof through which said printing ribbon exits from said housing,

a first finger extending laterally from an entrance port located at the other end of said housing, said first finger communicating with the interior of said housing for passing said printing ribbon from the exterior of said housing to said interior via said entrance port,

an arm extending longitudinally from said one end of said housing and being longitudinally extendable therefrom, said arm carrying a laterally extending second finger spaced longitudinally from said first finger,

said second finger passing the printing ribbon exiting from said exit port to said exterior, said ribbon being available for printing in the exterior region between said fingers, and

means for maintaining said first and second fingers in a desired, fixedly aligned position to facilitate ribbon printing, said means including rigid transverse flanges on said arm which is permanently but slidably attached to an external lower surface of the housing at a side portion disposed nearest said first finger.

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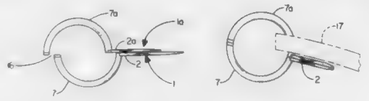


**4,743,134**

## SLIDING LOOSE-LEAF BINDER

**William Reinherz, 9093 Page Ave. NE., Elk River, Minn. 55330, and Thomas Schleich, 155 Gleahaven Rd., Wayzata, Minn. 55391**

**Filed Sep. 18, 1987, Ser. No. 98,233**
**Int. Cl.[4] B42F** *13/16*
**U.S. Cl. 402—56** **5 Claims**



1. A loose-leaf binder for retaining leaves of paper comprised of:
(a) a top member including a generally rectangular platform;
(b) a first plurality of half-rings fastened at one diametric end to said platform at spaced locations along one longitudinal edge thereof, said half-rings projecting outwardly from said edge so that substantially all of said platform is located outside of the inside diameter of said half-rings;
(c) a base member including a generally rectangular platform;
(d) a second plurality of half-rings fastened at one diametric end to said platform at spaced locations along one longitudinal edge thereof, said second plurality of half-rings projecting outwardly from said edge of said base member platform so that substantially all of said base member platform is located outside of the inside diameter of said second plurality of half-rings; and
(d) means for coupling said top member to said base member such that said half-rings fastened to said top member are in planar alignment with said half-rings fastened to said base member, said means permitting said top and base members to be slid with respect to each other between a first position wherein a gap exists between the free ends of the aligned half-rings for inserting or removing leaves of paper and a second position in which said free ends of said aligned half-rings mate to form a plurality of closed rings which retain said leaves of paper.

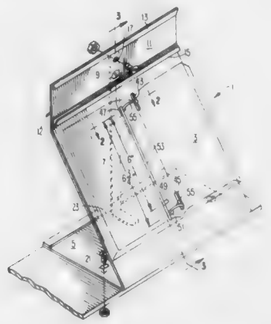
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**4,743,135**

## CATALOG AND MAGAZINE HOLDER

**James E. Gauntlett, 3105 Shrewsbury Lane, Riva, Md. 21140**

**Filed May 4, 1987, Ser. No. 45,554**
**Int. Cl.[4] F16M** *13/00*
**U.S. Cl. 402—70** **17 Claims**



1. A holder kit for catalogs, magazines and the like, comprising:
(a) a base having a generally first horizontal portion and a second angled portion connected thereto;
(b) means for retaining a catalog, magazine or the like on said angled portion;
(c) a generally vertical member extending from at least one of said portions;
(d) means for selectively mounting said base on shelf uprights, shelves, step-out bars and the like wherein said mounting means includes:
(1) means including said base for mounting the holder on a shelf or the like;
(2) a U-shaped hook member connectable to said generally vertical member for mounting the holder on a step-out bar or the like; and
(3) a generally L-shaped member connectable to said vertical member and having a plurality of tabs thereon for mounting the holder on a shelf upright or the like.

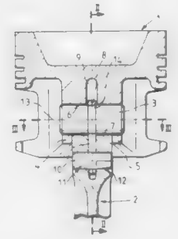
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**4,743,136**

## TRACTION-AND PRESSURE-TRANSMITTING LINK JOINT BETWEEN TWO COMPONENT PARTS EXECUTING JOINT MOVEMENTS, IN PARTICULAR PISTON ROD AND CONNECTING ROD

**Hermann Danckert, Wolfsburg, Fed. Rep. of Germany, assignor to Volkswagen AG, Wolfsburg, Fed. Rep. of Germany**

**Filed May 6, 1987, Ser. No. 47,424**
**Claims priority, application Fed. Rep. of Germany, May 6, 1986, 3615258**
**Int. Cl.[4] F16J** *1/16*
**U.S. Cl. 403—150** **4 Claims**



1. An improved tension-and pressure-transmitting link joint between two component parts executing joint movements, in particular between the piston rod and the connecting rod, of an internal combustion engine, the link joint having a pin arranged perpendicular to the direction of pressure and tension, on which pin are supported bearing regions of both component parts which are opposite one another relative to the pin axis, which regions each extend only over a part of the pin circumference and together over less than 360° thereof, whereby holding-together of the pin and the two component parts is ensured by at least one ring surrounding the pin, the improvement comprising one of the component parts being provided so as to laterally enclose a bearing region of the other component part in a fork-like manner by means of eye-like mountings for the pin, the bearing region of the other component part as well as a bearing region of the one components part which is opposite the bearing region of the other component part relative to the pin axis being provided with corresponding cavities extending from the pin so as to accommodate the ring, a tension pin traversing the cavity in the other component part substantially parallel to the pin axis and tapering in the direction toward one of its ends, said ring being supportd solely by oppositely-directed surfces of the pin and the tension pin.

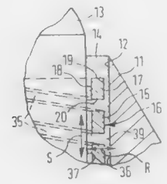


**4,743,137**

## TOOL HAVING A HARD METAL PART WITH A SOLDER AND LINING TYPE CONNECTION

**Anton Bucher; Peter Simon, both of Rickenbach, Switzerland, and Wilhelm King, Lauterbach, Fed. Rep. of Germany, assignors to Siku GmbH, Switzerland**

**Division of Ser. No. 654,683, Sep. 26, 1984, Pat. No. 4,668,118. This application Sep. 29, 1986, Ser. No. 912,843**
**Claims priority, application Fed. Rep. of Germany, Sep. 26, 1983, 3334815**
**Int. Cl.[4] F16B** *11/00*
**U.S. Cl. 403—268** **15 Claims**



1. A tool with at least one wear-resistant hard metal part which serves to process production pieces and which is firmly connected to a metallic carrier having a central bore by solder located in at least one solder aperture between said metallic carrier and said hard metal part, the improvement comprising: partial areas of said solder aperture (**41**) being provided with a surface layer (**40**) which is non-binding with said solder, and at least one predetermined weak point in said solder aperture (**41**) formed by non-adhesion of said solder to said partial areas of said solder aperture provided with said surface layer (**40**).

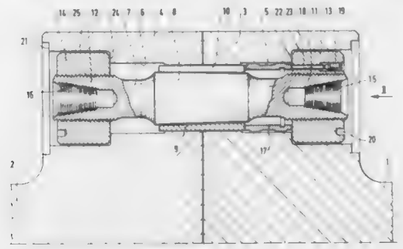
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**4,743,138**

## DEVICE FOR COUPLING TWO FLANGED SHAFT ENDS

**Pierre Goy, Sarcelles, France, assignor to Alsthom, Paris, France**

**Division of Ser. No. 832,203, Feb. 24, 1986, Pat. No. 4,685,188. This application Apr. 6, 1987, Ser. No. 34,513**
**Int. Cl.[4] F16D** *9/00;* **F16B** *2/14*
**U.S. Cl. 403—337** **1 Claim**



1. Coupling device for coupling two flanged shafts end-to-end having abutting flanges with aligned bores therein, said device comprising a cone-shaped taper pin bolt having a conical shank with opposite small and large diameter ends, an expandable cylindrical sleeve within said aligned bores and concentrically about said taper pin bolt conical shank, said sleeve having internally a conical surface matching said conical shank of the pin bolt, said pin bolt being provided with a nut and a tractive grip at each end, and an axially movable standoff provided concentrically about said pin bolt between the nut on the pin bolt and the small end of the conical shank and the sleeve, said standoff having one end bearing upon said sleeve and another end facing said nut and being urged axially toward said sleeve by means of screws traversing said nut and respectively abutting axially aligned pins contacting the other end of said standoff, and said sleeve being longitudinally slit.

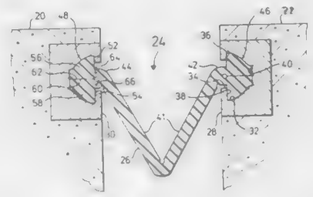
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**4,743,139**

## EXPANSION JOINT

**Graham G. Spavin, Scarborough, Canada, assignor to Stelenco Limited, Thornhill, Canada**

**Filed Jan. 23, 1987, Ser. No. 6,192**
**Int. Cl.[4] E01C** *11/02*
**U.S. Cl. 404—65** **6 Claims**



1. An expansion joint for use between adjacent sections of a roadway or the like, comprising an elongate, resilient seal for extending along a gap between said sections, and first and second seal retainers adapted to be secured to the respective said roadway sections on opposite sides of said gap, each said retainer having an elongate cavity which is of uniform cross-sectional shape throughout its length and which has an opening for receiving the seal and respective, flat internal shoulders on opposite sides of said opening, said seal being of substantially uniform crosssectional shape throughout its length and including a web permitting expansion and contraction of the seal in the direction of its width, and respective marginal portions each including an enlarged ear capable of being installed in and substantially filling said retainer cavity, each said ear comprising first and second parts which are both flexibly coupled to said web and which have respective abutting faces extending outwardly from the web to outer faces of the ear parts remote from the web, said parts having respective flat external shoulders for engagement with the internal shoulders of the cavity, and said abutting faces being shaped to normally deflect said parts angularly outwardly about respective axes extending generally longitudinally of the seal towards said shoulders, while permitting the ear to be compressed for fitting into said cavity, whereby, in the installed condition, the shoulders on the ear are biassed against the shoulders of the cavity.

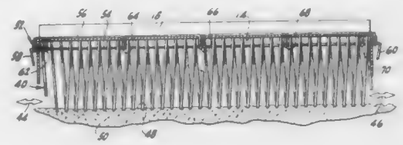
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**4,743,140**

## TEXTURING DEVICE FOR WET CONCRETE

**Victor A. Maletic, 3330 Meadowbrook Rd., Antioch, Calif. 94509**

**Filed Jul. 3, 1985, Ser. No. 751,554**
**Int. Cl.[4] E01C** *23/02*
**U.S. Cl. 404—89** **10 Claims**



1. A device for texturing the surface of freshly poured concrete used in conjuction with a kinetic source comprising:
a. a platform having a first surface and a second surface;
b. a plurality of closed loops spaced along and extending outwardly from said platform first surface, each of said closed loops possessing flexibility transversely in multiple directions relative to the freshly poured concrete;

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c. means for connecting said plurality of closed loops to said platform, to permit limited transverse movement of each closed loop relative to the adjacent closed loop, said connecting means including a connecting rod engaging the internal periphery of each closed loop adjacent said first surface of said platform to permit rotation of each closed loop immediately about said rod.

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**4,743,141**

**OFFSHORE TRUSS WORK TYPE TOWER STRUCTURE**

**Per A. Simensen, Loevenstad, and Gunnar H. Eide, Sandvika, both of Norway, assignors to Saga Petroleum A.S., Norway**

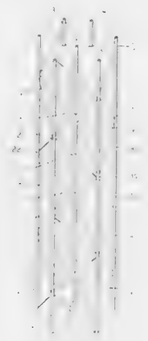
**PCT No. PCT/NO85/00057, § 371 Date Jul. 18, 1986, § 102(e) Date Jul. 18, 1986, PCT Pub. No. WO86/01845, PCT Pub. Date Mar. 27, 1986**

**PCT Filed Sep. 18, 1985, Ser. No. 878,979**

**Claims priority, application Norway, Sep. 19, 1984, 843746**

**Int. Cl.⁴ E02B *17/00***

**U.S. Cl. 405—195** **7 Claims**



1. Offshore truss work type tower structure consisting of a plurality of outer legs and at least one internal leg, all legs being arranged vertical and parallel and interconnected by truss bracings joined with the legs at nodal points, comprising said truss bracings connected with outer legs being arranged diagonally to and at the same angle to each leg, all of said truss bracings extending between two legs having no further connections than with said two legs, each nodal point on an outer leg being arranged at a vertical level in the middle between two nodal point levels on adjacent legs, six truss bracings thereby being diagonally connected at each nodal point on outer legs consisting of two truss bracings from each adjacent leg and two from said internal leg, wherein said two truss bracings diagonally connected with said internal leg are of equal length.

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**4,743,142**

**PRECOATED CORROSION-RESISTANT STEEL PIPE PILES FOR MARINE USE, AND STRUCTURE THEREOF**

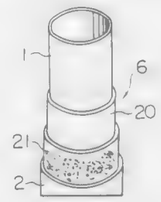
**Motoo Shiraishi, Tokyo; Mansei Tanaka, Chiba; Minoru Nakamura, and Koichi Sato, both of Tokyo, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan**

**Continuation-in-part of Ser. No. 633,422, Jul. 19, 1984, abandoned. This application Jun. 10, 1986, Ser. No. 872,915**

**Int. Cl.⁴ E02D *5/60***

**U.S. Cl. 405—216** **2 Claims**

1. A marine structure comprising a corrosion resistant steel pipe piling consisting of, in sequence, a top head portion, a splash zone portion, a tidal zone portion and a bottom portion extending into a riprap layer on the sea bed, and a concrete slab supported by said piling, said piling being provided with a coating material comprising in sequence, a primer layer, an adhesive layer and a polyethylene resin layer, said coating material being applied over said top head portion, a splash zone portion, a tidal zone portion and bottom portion to at least the point where said bottom portion enters said riprap layer, and wherein said polyethylene resin layer comprises a polyethylene resin, carbon black, and a phenolic antioxidant, said polyethylene resin being a copolymer consisting of polyethylene and a member selected from the group of vinyl acetate, butene, and hexene, said copolymer having a density of 0.915–0.970 g/cm³ and a melt index of 0.05–0.5 g/10 minutes.




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**4,743,143**

**POWDER FLOW-RATE MEASURING AND CONTROLLING APPARATUS**

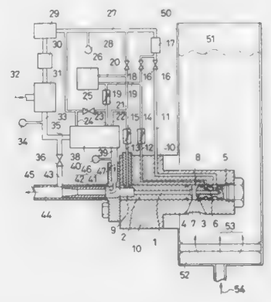
**Hideo Nagasaka, 2-21-33, Minamitakano-machi, Hitachi-city, Ibaraki-prefec., Japan**

**Filed Sep. 12, 1986, Ser. No. 907,058**

**Claims priority, application Japan, Sep. 17, 1985, 60-204978**

**Int. Cl.⁴ B65G *53/66***

**U.S. Cl. 406—14** **10 Claims**



1. A powder flow-rate measuring apparatus which is characterized by comprising a detecting pipe line having an inlet and an outlet, a nozzle for blowing a conveying gas into said inlet of detecting pipe line, means for measuring a flow rate of said conveying gas fed to said nozzle, means for controlling a flow rate of said conveying gas, means for introducing a powder into said inlet of detecting pipe line, and a device for detecting the pressure difference between a pressure at an inlet side pressure detecting port arranged upstream the outlet of said nozzle and a pressure at an outlet side pressure detecting port arranged at said outlet of detecting pipe line.

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**4,743,144**

**FACE MILLING CUTTING TOOL**

**Hiroshi Shikata, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

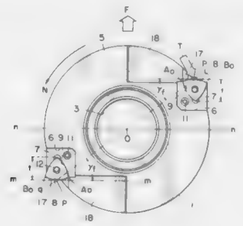
**Filed Oct. 10, 1986, Ser. No. 917,904**

**Claims priority, application Japan, Oct. 11, 1985, 60-226200**

**Int. Cl.⁴ B23C *5/20***

**U.S. Cl. 407—42** **8 Claims**

1. A face milling cutting tool, comprising a cutter body with cutting tips mounted thereon, each cutting tip being of substantially flat shape with at least one cutting edge of convexly curved shape and having at one part of its peripheral surface a rake surface, each cutting tip being so tangentially mounted that a front clearance face thereof is positioned at an axial relief angle relative to the surface of a workpiece being machined and each cutting tip being so mounted that the radial rake angle formed by the tangent line passing through the midpoint of the curved cutting edge of the tip and the line connecting the midpoint and the center of the cutter body has a value between −15 degrees to −60 degrees.



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**4,743,145**

**QUICK CHANGE DRILL CHUCK SYSTEMS**

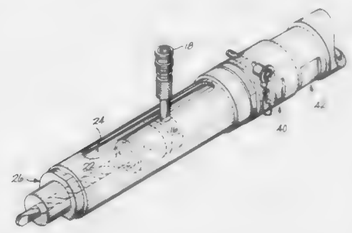
**Daniel A. Hendricks, Bothell, and Paul J. Shemeta, Seattle, both of Wash., assignors to The Boeing Company, Seattle, Wash.**

**Filed Nov. 26, 1986, Ser. No. 935,370**

**The portion of the term of this patent subsequent to Feb. 17, 2004, has been disclaimed.**

**Int. Cl.⁴ B23B *45/14*; B23Q *11/10***

**U.S. Cl. 408—59** **2 Claims**



1. In combination:

a quick change drill chuck including a chuck portion and an adapter portion, said quick change drill chuck adapted for positioning ball elements within dimples circumferentially disposed about the central axis of said adapter portion of a tool;

a fluid inducer system having an inducer body member and a fluid inducer connector extending in a radial direction with respect to said central axis of said adapter portion of a tool;

said adapter portion of a tool having an oil hole coaxially disposed about said central axis of said adapter portion;

said inducer body portion having a chamber coaxially disposed within said inducer body portion, said chamber coupled between said fluid inducer connector and said oil hole thereby permitting fluid flow therebetween; and,

a tubular shaped nosepiece member circumferentially disposed about said central axis of said adapter portion of a tool, said tubular shaped nosepiece member including a slot thereby permitting extension of said fluid inducer connector therethrough.

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**4,743,146**

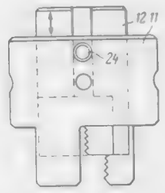
**TOOL FOR CUTTING EXTERNAL THREADS**

**Naum L. Khmelnitsky; Albert M. Boyarunas; Anatoly V. Kyzgzmin; Vitaly F. Drozhin; Dmitry E. Belyavsky; Gennady V. Grinvald, and Viktor P. Kirienko, all of Kharkov, U.S.S.R., assignors to Kharkovsky Filial Golovnogo Spetsialnogo Proizvodstvennogo Konstruktorsko-Tekhnologicheskogo Bjuro Po Ratsionalnomu Primeneniju Rezhuschego Instrumenta "Orgpriminstrument" , Kharkov, U.S.S.R.**

**Filed Sep. 2, 1986, Ser. No. 902,710**

**Int. Cl.⁴ B23G *5/04***

**U.S. Cl. 408—221** **6 Claims**




1. A tool for cutting external threads having the form of a round die, said tool comprising:

a main housing in the form of an annulus having arcuate thread cutting chasers,

a portion of said chasers being secured at an end face of said main housing,

outer and inner surfaces of said portion coinciding with outer and inner cylindrical surfaces of said main housing,

said thread cutting chasers having at least one end being offset toward a central axis of said die and extending a distance toward said axis equal to the height of the chaser, and

at least one additional housing being arranged coaxially within said main housing and having an outer diameter substantially equal to the inside diameter of said housing, said additional housing having thread chasers interposed between the chasers of said main housing and having substantially the same pitch diameter as the chasers of the main housing.

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**4,743,147**

**AUTOMATIC LOADER FOR MACHINE TOOLS**

**Ettore Bettocchi, Porretta Terme, Italy, assignor to Metalcastello srl, Bologna, Italy**

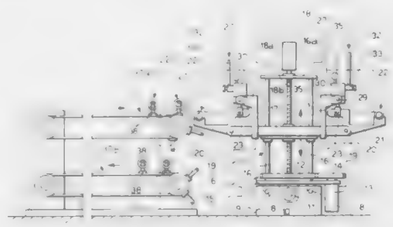
**PCT No. PCT/EP86/00068, § 371 Date Oct. 28, 1986, § 102(e) Date Oct. 28, 1986, PCT Pub. No. WO86/05132, PCT Pub. Date Sep. 12, 1986**

**PCT Filed Feb. 13, 1986, Ser. No. 935,411**

**Claims priority, application Italy, Feb. 28, 1985, 67214 A/85**

**Int. Cl.⁴ B23F *23/04***

**U.S. Cl. 409—7** **3 Claims**



1. An automatic loader for gear shaving machines having a

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rotary cutter in the form of a toothed wheel rotated about a first horizontal axis and means for supporting a toothed gear to be shaved for rotation about a second horizontal axis which is situated below the first axis and is inclined to the first axis so that the gear to be shaved will mesh with and be pressed against said cutter in a working position, said loader comprising moveable feed means for raising the gear to be shaved to the working position, a rocker arm supporting said gear at a first end with said arm being pivotally secured to the feed means, and adjustable resilient means attached to said rocker arm for permitting angular displacement of said arm relative to the feed means if, as a result of the moveable member approaching the cutter, the gear fails to mesh with the cutter, characterized in that:

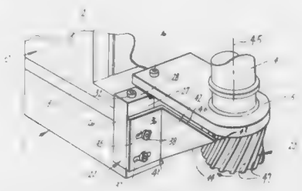
said moveable feed member means comprises a first slide having guide holes, a first electric motor actuating the first slide in a vertical direction, vertical guides disposed in said guide holes in said first slide, said first slide advancing the gear along the vertical guides towards the cutter, a second slide supporting said vertical guides, a second electric motor actuating said second slide along a third horizontal axis perpendicular to said second horizontal axis,

the rocker arm being centrally articulated about a fourth horizontal axis to said first slide, said resilient means comprising a gas spring acting on a second end of the rocker arm and acting as a shock absorber, an adjustable pressure regulator connected to said gas spring for allowing the influx of compressed gas therein, said regulator allowing adjustment of the pressure of the gas in the gas spring independent of the weight of the gear, and an adjustable vent valve connected to said gas spring for venting the gas into the atmosphere,

an electrical switch disposed on said first slide which is operable by the rocker arm as a result of a predetermined angular displacement of the rocker arm, said switch being inserted in a circuit controlling said first and second electric motors, wherein if as a result of the raising of the first slide, the teeth of the gear come into contact with the teeth of the cutter, the rocker arm is angularly displaced against the bias of the resilient means to cause closure of said electrical switch; the closure of said switch causes the stopping of the movement of the first slide towards the cutter, the lowering of said first slide, a horizontal movement of the second slide through a predetermined distance corresponding to a fraction of the distance between two consecutive teeth of the gear and a subsequent raising of the first slide until meshing of the gear and cutter is accomplished.

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**4,743,148**
**CHIP BREAKER**
**Ira H. Wahlbeck, Davenport, Iowa, assignor to Jancy Engineering Company, Davenport, Iowa**
**Filed May 27, 1987, Ser. No. 54,802**
**Int. Cl.[4] B23C 9/00; B23B 47/34**
**U.S. Cl. 409—137** **7 Claims**



1. A chip breaker for use with a rotary cutter having a center line axis for performing a metal cutting operation on a workpiece by advancing the rotary cutter into the face of a workpiece, the rotary cutter being of the type provided with a plurality of cutting teeth spaced circumferentially around the leading end of the rotary cutter and a plurality of spiral flutes extending upwardly from the rotary cutter leading end around the outer periphery of the rotary cutter, comprising:

(a) a chip breaker plate having a chip breaker front edge;

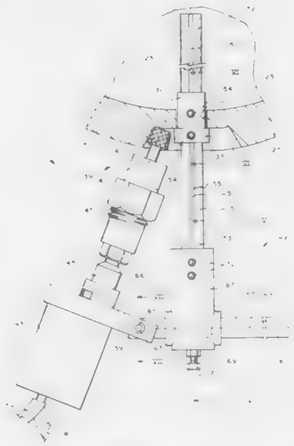
(b) means for supporting the chip breaker plate in a vertical position closely adjacent a rotary cutter;

(c) said chip breaker plate being disposed closely adjacent to the face of a workpiece; and

(d) said chip breaker plate chip breaker front edge sloping rearwardly and downwardly at an acute angle and terminating at the bottom end of the chip breaker plate, whereby when the rotary cutter is rotated, chips cut by the rotary cutter move axially upward through the spiral flutes of the rotary cutter and flare radially outward into engagement with the sloping chip breaker front edge and are broken and separated from the rotary cutter and deposited away from the rotary cutter work area.

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**4,743,149**
**HEADER TUBE TOOL**
**Samuel C. Geise, Memphis, Tenn., assignor to Specialty Tool Co., Inc., Memphis, Tenn.**
**Filed Mar. 13, 1987, Ser. No. 25,378**
**Int. Cl.[4] B23C 3/02**
**U.S. Cl. 409—179** **5 Claims**



1. A tool for removing material from a body about the circumference of an aperture through the body; said tool comprising:

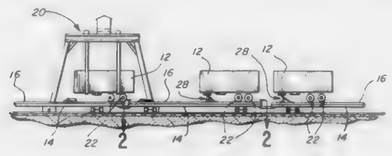
(a) guide means for fitting into said aperture through said body, said guide means having a major axis which is maintained in substantial alignment with the longitudinal axis of said aperture through said body when said guide means is fitted into said aperture;

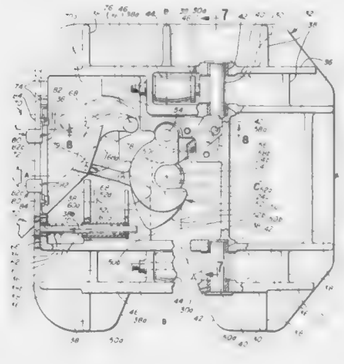
(b) cutting means for selectively cutting material from said body about the circumference of said aperture through said body; and

(c) attachment means attaching said cutting means to said guide means for arranging said cutting means at a specific location relative to said longitudinal axis of said guide means; said guide means including a bushing member for being inserted into at least a portion of said aperture through said body, said bushing member having substantially the same cross-sectional shape and size as at least a portion of said aperture through said body for insuring that the longitudinal axis of said bushing member is substantially aligned with the longitudinal axis of at least a portion of said aperture through said body and for allowing said bushing member to rotate within said aperture through said body.



**4,743,150**
**ELEVATABLE HITCH ASSEMBLY WITH LATERAL SLOT FOR TRAILER ON FLATCAR**
**Emil J. Hlinsky, Oak Brook, Ill., assignor to Holland Company, Chicago Heights, Ill.**
**Continuation of Ser. No. 890,880, Jul. 28, 1986, abandoned, which is a continuation of Ser. No. 614,103, May 24, 1984, abandoned. This application Apr. 27, 1987, Ser. No. 42,891**
**Int. Cl.[4] B60P 7/13, 3/07**
**U.S. Cl. 410—64** **10 Claims**





1. A fifth wheel plate structure for a elevatable hitch assembly for anchoring a semi-trailer van kingpin to a railroad car for rail transit of the van on the car,

said fifth wheel plate structure comprising, for improving the restraint exercised on the van kingpin against loadings acting forwardly and rearwardly of the car during rail transit, a bed plate including an upwardly facing bearing surfacing having a relative large planar area for load supportive engagement with the van when the van rests on the hitch assembly fifth wheel plate structure and that defines a kingpin receiving opening and front, rear and side bed portions forming the perimeter of said fifth wheel plate structure,

with said bed plate front and rear portions at and adjacent the fifth wheel structure kingpin receiving opening including integral, thrust resisting, bed structures that are fixed relative to said bed,

said front and rear plate bed structure portions defining front and rear stop surfaces at the fifth wheel structure kingpin receiving opening that are in opposed relation forwardly and rearwardly of the hitch assembly bed plate, and that are configured to together define a kingpin receiving pocket that receives the van kingpin in close fitting relation thereto when the kingpin is received therein, and that are backed up by said fixed bed structures, respectively,

said bed plate further defining a kingpin entry slot extending to and between the said bed kingpin receiving pocket from and through one of the bed plate side portions,

said bed plate kingpin entry slot having its mouth open at the side of the fifth wheel structure that said bed one side portion is on and extending substantially laterally of the forward and rearward thrusts to be resisted when the van is in rail transit,

said bed plate entry slot being proportioned to pass the van kingpin along the length thereof between said stop surfaces at the kingpin receiving pocket and said one side portion of said bed, and through said bed one side portion,

and a latch mechanism for latching the van kingpin to said bed plate,

said latch mechanism comprising:

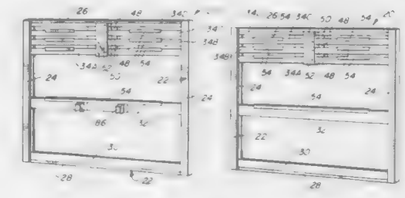
latch means operatively connected to said bed plate below said bearing surfacing of same and including a latch member defining latch surfacing proportioned to, in the closed position thereof, latchingly engage the kingpin across said plate entry slot when the kingpin is disposed within said pocket,

said latch member being articulated to said bed plate for shifting forwardly and rearwardly of said bed plate relative to said pocket when thrust loadings acting forwardly and rearward of the car are experienced during the rail transit,

whereby said stop surfaces are respectively backed up by said bed plate structures and resist said forwardly and rearwardly acting thrust loadings to the substantial exclusion of said latch member.

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**4,743,151**
**STRUCTURE AND METHOD FOR UNITIZING AND BRACING A LOAD IN A TRAILER**
**Robert W. Haberkorn, 8809 Prestwick La., Orland Park, Ill.**
**Continuation-in-part of Ser. No. 660,362, Oct. 12, 1984, abandoned. This application Oct. 27, 1986, Ser. No. 923,626**
**Int. Cl.[4] B60P 7/14**
**U.S. Cl. 410—121** **9 Claims**



1. A method of attaching a gate to a horizontal load bearing surface to brace a load on the load bearing surface comprising the steps of:

providing a gate with top and bottom regions and having a load engaging face, a mounting face facing oppositely to said load engaging face and an upwardly facing surface at the bottom region of the gate;

placing the gate on the load bearing surface with the load engaging face against a load on the load bearing surface;

placing a bracket against the upwardly facing gate surface;

attaching the bracket to the load bearing surface while exerting a force on the bottom region of the gate in a first direction towards said load;

providing first and second elongate long leg supports each with spaced ends;

fixing one end of each of the first and second leg supports against the mounting face of the gate at first and second spaced locations at the top region thereof and the other end of each of the first and second leg supports against the load bearing surface at laterally spaced positions, with each laterally spaced position spaced from the mounting face, while exerting a force in said first direction on the top region of the gate;

providing an elongate short leg support with spaced ends; and

fixing one end of the short leg support against the mounting face of the gate at a third location below said first and second locations and above said load bearing surface and the other end of the short leg support against the load

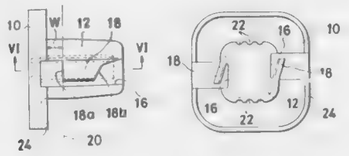
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bearing surface at a position spaced from the gate mounting face while exerting an upward force on said gate, whereby said gate is rigidly mounted against the load on said load bearing surface to positively brace said load against movement in a direction opposite to said first direction.

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**4,743,152**
**SCREW GROMMET**
**Hiromichi Nakayama, Nagoya, and Kunihiro Fukuhara, Toyota, both of Japan, assignors to Nifco Inc., Yokohama, Japan**
**Continuation of Ser. No. 772,311, Sep. 4, 1985, abandoned. This application Feb. 13, 1987, Ser. No. 15,559**
**Claims priority, application Japan, Sep. 7, 1984, 59-136062[U]**
**Int. Cl.[4] F16B** *37/04*
**U.S. Cl. 411—182** **5 Claims**

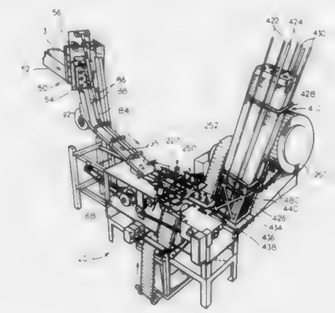



1. A one-piece screw grommet of plastic resin construction comprising a transverse flange and a noncircular leg extending from said flange for insertion in a complementary aperture in a panel, said flange and said leg having a screw-receiving bore along the axis of said leg, said leg having a plurality of integral flange-like projections each joined thereto along a line substantially parallel to the axis of said leg and cantilevered tangentially outwardly therefrom and having an outer edge substantially parallel to said line, said leg having relieved areas beneath said projections, said projections folding into said relieved areas upon insertion of said leg through a complementary aperture in a panel and thereafter springing out into projecting position beneath said panel, each said projectoin having a tapering entering end to effect such folding, said tapering entering end having first a shallow taper followed by a steeper taper and each said projection having a trailing end substantially perpendicular to said axis and spaced from said flange to grip a panel between said projection and said flange, the outer surface of said leg being formed with axial grooves having an arcuate sectional profile.

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**4,743,153**
**METHOD AND APPARATUS FOR STACKING ARTICLES**
**Robert F. Kontz, Toledo, Ohio, assignor to Owens-Illinois Plastic Products Inc., Toledo, Ohio**
**Filed Aug. 29, 1986, Ser. No. 901,846**
**Int. Cl.[4] B65G** *57/30*
**U.S. Cl. 414—31** **21 Claims**

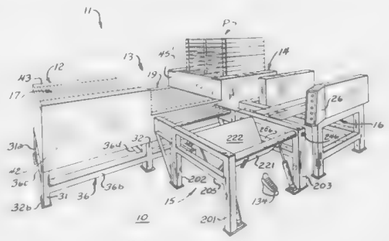
1. Apparatus for stacking articles, comprising;
(a) an upright guideway for receiving a plurality of articles and maintaining them in a stacked relationship,
(b) support means disposed on the periphery of said guideway for engaging an article in said guideway to support said article as well as other such articles stacked thereon, said support means including means permitting passage of articles upwardly past said support means through said guideway but preventing passage of articles downwardly past said support means,
(c) lifting rack means having article engaging means disposed below said support means on the periphery of said guideway for lifting a plurality of articles from above an initial entry position in said guideway to a level at which the lowermost article in said lifting rack means is engaged by said support means, articles previously engaged by said support means being pushed upwardly in said guideway and combined with articles received from said lifting rack means in a stack in said guideway, and



(d) means for successively elevating articles into article engaging position in said lifting rack means until a plurality of such articles are stacked in said lifting rack means.

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**4,743,154**
**PALLET INSPECTION AND REPAIR SYSTEM**
**Raymond E. James, and Donald Karner, both of Chicago, Ill., assignors to American Pallet Systems, Inc., Melrose Park, Ill.**
**Filed Jun. 9, 1986, Ser. No. 871,855**
**Int. Cl.[4] B65G** *59/06, 60/00*
**U.S. Cl. 414—33** **40 Claims**



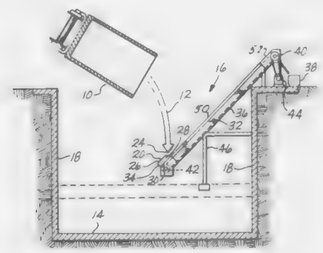
13. A pallet destacking apparatus for destacking a vertical stack of pallets comprising: pallet dispenser means; pallet discharge conveyor means and control means;
said pallet dispenser means including a vertically reciprocating pallet lift means for receiving the stack of pallets while the lift means is positioned at a pallet transfer height; lift drive means for lowering said lift means vertically from the pallet transfer height to a pallet suspension height at a lower horizontal level, and to drive said lift means vertically between said pallet suspension height and a pallet discharge height at a level lower than said pallet suspension height; pallet suspension means, and suspension drive means; said control means energizing said suspension drive means when said lift means is lowered to said pallet suspension height to cause said pallet suspension means to suspend the pallets above the one of the pallets which is the lowest pallet of the stack at the pallet suspension height while said lift means is driven from said pallet suspension height to said pallet discharge height, and said control means energizing said pallet discharge conveyor means when said lift means is driven to said discharge height to discharge said one pallet carried by said lift means.

21. A pallet inspection table for use with pallet transport apparatus for inspecting the top and bottom surfaces of a pallet, said pallet inspection table comprising: support means; a foldable table top; and actuating means; said support means including first and second side rails extending in parallel spaced relationship and supported above floor level, said table top having a forward edge, a rearward edge, a pair of side edges, and means defining a folding axis which extends between its side edges defining forward and rearward table top portions, fixed mounting means pivotally mounting said forward edge of said table top to said support means between said side rails thereof and movable mounting means mounting said rearward edge of said table top to said support means between said side rails thereof; said actuating means mounted to said support means and connected to said table top for driving said table top portions between first and second positions including a pallet receiving position in which said table top portions extend coplanar to one another in a generally horizontal plane and a pallet inspection position in which said table top is folded along said folding axis and said table top portions extend at an angle relative to one another defining a cradle for one end of a pallet being inspected.



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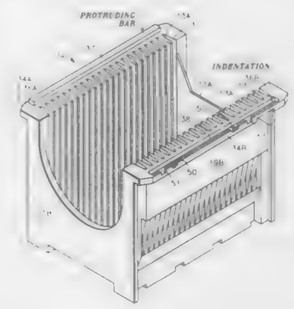
**4,743,155**
**CHIP SAMPLING UNIT**
**Gerald G. Carey, Paris, Tex.; Curtis W. Stacey, Idabel, and Bernie M. Baldwin, Valliant, both of Okla., assignors to Weyerhaeuser Company, Tacoma, Wash.**
**Filed Jun. 20, 1986, Ser. No. 876,511**
**Int. Cl.[4] B65F** *9/00*
**U.S. Cl. 414—356** **5 Claims**




1. A wood chip sampling unit for sampling wood chips from a descending flow of wood chips to a chip receiving area comprising
a conveyor,
means for moving said conveyor at a lineal speed of at least one foot per second,
means spaced from and covering said conveyor to prevent unwanted chips from entering said conveyor,
a sampling bin attached to the upper face of said conveyor covering means,
said sampling bin having an upper opening for receiving said wood chips,
a lower side opposite said upper opening,
a front face extending between said upper opening and said lower side,
side faces extending between said upper opening and said lower side, and
a rear opening to said conveyor opposite said front face, said rear opening allowing the chips to move from said bin to said conveyor.

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**4,743,156**
**DUMP TRANSFER WAFER CARRIER**
**Grace K. Raffay, Tempe; Debra A. Mattingly, Mesa; Marlo E. Smith, Tempe; Dufrasne, Brenda R., Chandler; Louise Wood, Gilbert; Jill M. Hickman, Scottsdale; Steven L. Dunavant, Gilbert; Pamela D. Quillen; Frances A. Mott, both of Chandler; Barbara J. Byas, Mesa; Hope Riggers, Phoenix, and Alice D. Booth, Mesa, all of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.**
**Filed May 9, 1986, Ser. No. 861,473**
**Int. Cl.[4] B65B** *21/02*
**U.S. Cl. 414—405** **10 Claims**




1. A wafer basket for holding an dump-transferring wafers, comprising:
a substantially rectangular box wherein one of the sides of said box is open for eceiving wafers whose major faces are oriented in a direction substantially perpendicular to said open side;
slot means inside said box and accessible from said open side for receiving and moveably retaining said wafers when said box is in an upright position and releasing said wafers when said box is in an inverted position;
rim means located at the periphery of said open side having elongated first and second flat faces oriented along first and second edges of said open side, wherein said flat faces are substantially parallel to said open side;
elongated ridge means protruding from said first flat face and aligned along said elongated first flat face;
elongated groove means recessed into said second flat face and aligned along said elongated second flat face;
drain means extending from a bottom of said groove means through said rim means for allowing liquid collected in said groove means to escape; and
wherein said eleongated ridge and groove means are located so that when first and second faces of a first wafer basket are placed in contact with second and first faces of a second, substantially identical wafer basket, then the ridge and groove means of said first wafer basket engage the groove and ridge means of said second wafer baskket and the slot means of said first and second wafer baskets are aligned.

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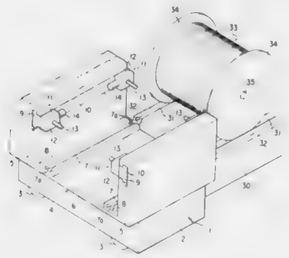
**4,743,157**
**VEHICLE WITH GOODS LOADING/UNLOADING APPARATUS**
**Yoshiaki Takatsuki, Kurobe, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan**
**Filed Dec. 12, 1986, Ser. No. 940,958**
**Claims priority, application Japan, Dec. 13, 1985, 60-190969[U]**
**Int. Cl.[4] B60P** *3/00*
**U.S. Cl. 414—498** **3 Claims**

1. A goods loading/unloading apparatus, comprising a U-shaped body consisting of a flat, rectangular bottom surface portion serving as a bed, and a pair of upstanding wall mem-

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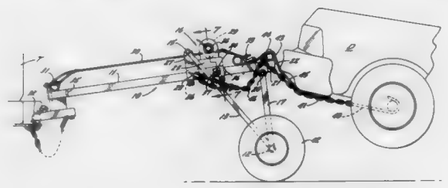
bers formed integrally and extending upwardly from the two longitudinal ends of the bottom surface portion in a manner of being in parallel and opposed relationship with each other; a pair of arm members extending horizontally at opposite upper positions on the inner surfaces of both the upstanding wall members, respectively, said arm members being supported at said positions by both the upstanding wall members so as to be slidably moved therealong in the horizontal direction; goods supporting units each mounted on each longitudinal end of each of the pair of arm members and having a goods support member which is engageable with the goods and disengageable therefrom; arm actuator means adapted to slidably move both the arm members; wherein said arm actuator means comprises



a rack fixedly secured to the lower part of each of the arm members so as to extend longitudinally of the latter; a pair of pinions fixedly mounted on a pair of support shafts journalled at a predetermined space interval on each of said upstanding wall members, said pinions being arranged to mesh with their respective racks, and rotatable bidirectionally; a pair of pulleys fixedly mounted on their respective pinion support shafts so as to be rotated in synchronism with the rotation of the pinion; a drive shaft extending under the bottom surface portion of said body of the goods loading/unloading apparatus and between both said upstanding wall members; and a drive pulley fixedly secured to said drive shaft so as to transmit the driving power through a power transmission means to said pair of pulleys.

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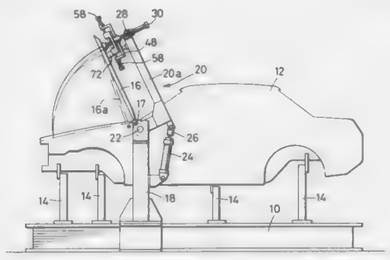
**4,743,158**
**PORTABLE TOWING TRAILER**
**Edward A. Hodges, 4425 Creemore Dr., Charlotte, N.C. 28213**
**Filed Jan. 5, 1987, Ser. No. 413**
**Int. Cl.[4] B60P** *3/06*
**U.S. Cl. 414—563** **5 Claims**



1. A portable vehicle tow trailer small enough and light enough for one person to put it in and out of a pickup truck, said trailer comprising an elongated beam, a coupling at the front end of the beam for attachment to a tow vehicle, means at the other end of the beam for attaching and supporting one end of a disabled vehicle, a wheeled axle extending transversely of the beam, means for lowering the rear end of the beam below its front end while the front end of the beam is connected to a tow vehicle, means for elevating the rear end of the beam above its front end to tow a disabled vehicle, a tow bar at the rear end of the beam, means for attaching a disabled vehicle to the tow bar, a carriage slidably mounted on the beam, a winch having a sheave fixed to the carriage for movement therewith, a cable extending about the sheave and the ends of the cable being fixed to the front and rear ends of the beam, a push arm extending between the carriage and the axle, a support arm extending between the axle and the rear end portion of the beam, and means to activate the winch to wind up cable from one end of the beam and pay off cable to the other end of the beam and move the carriage relative to the beam, whereby movement is imparted to the push arm and to the support arm to selectively adjust the beam to a retracted position or to an extended towing position.

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**4,743,159**
**DEVICE FOR PIVOTING PIVOTABLE MEMBER BETWEEN CLOSED AND OPEN POSITIONS**
**Tadakazu Inamori, Toyoto, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan**
**Filed Mar. 28, 1986, Ser. No. 845,533**
**Int. Cl.[4] B66C** *1/00*
**U.S. Cl. 414—737** **14 Claims**



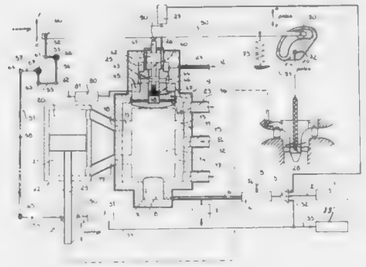
1. A device for pivoting a pivotable member about a first axis between its closed and open positions, comprising:
- a pivot arm pivotally supported about a second axis, said second axis being parallel to said first axis and substantially aligned with said first axis as viewed in an axial direction of said first and second axes;
- means for pivotally supporting said pivot arm about said second axis, said supporting means being spaced apart from the pivotable member in the axial direction of said first and second axes;
- an arm actuator for pivoting said pivot arm;
- a first mechanism attached to a free end of said pivot arm and supporting at least one member which is movable in a direction normal to a circular arc path taken by said free end of said pivot arm;
- connecting means attached to said movable member for removably connecting said pivot arm to said pivotable member; and
- positioning means for positioning said movable member at a predetermined position in said normal direction upon connection of said pivot arm to said pivotable member, said positioning means permitting said movable member to be moved in said normal direction after connection of said pivot arm to said pivotable member.

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**4,743,160**
**PROCESS AND DEVICE FOR LIMITING THE OVERSPEED OF A LOW HEAD HYDROELECTRIC GENERATING SET**
**Lucien Megnint, 46 Boulevard Foch, and Paul Jarriand, 117 Cours Jean-Jaurès, both of FR 38000 Grenoble, France**
**Filed Sep. 11, 1985, Ser. No. 774,697**
**Claims priority, application France, Sep. 18, 1984, 84 14259**
**Int. Cl.[4] F04D** *15/00*
**U.S. Cl. 415—33** **4 Claims**

1. A process for limiting the overspeed operation of a low head hydroelectric generating set of the type which includes a hydraulic turbine with adjustable distribution valves and adjustable wheel vanes, comprising the steps of:
- (a) normally adjusting the valves for each adjustment of the vanes so as to maintain the valves and vanes in a relative predetermined optimal adjustment at given pressure heads, and
- (b) limiting the adjustment of the valves for each adjustment of the vanes when the pressure head through the turbine reaches a predetermined pressure head which is slightly

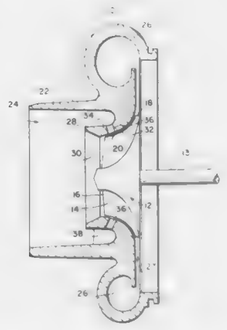




below the normal minimum operating pressure head within a range of adjustments defined between a limitation conjugation line which defines the optimum adjustments of the vanes and valves at said predetermined pressure head and the conjugation line which defines the optimum adjustments of the vanes and the valves at the normal minimal operating pressure head through the turbine wherein the pressure head at which the limitation conjugation line is taken is within about 5% of the normal minimal operating pressure head.

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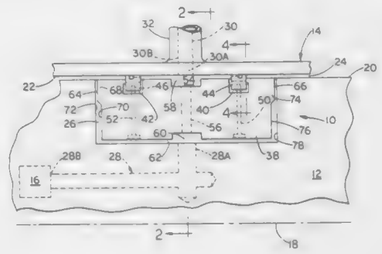
**4,743,161**
**COMPRESSORS**
**Frank B. Fisher, Meltham, and Paul J. Langdon, Holmfirth, both of England, assignors to Holset Engineering Company Limited, Turnbridge, England**
**Filed Dec. 23, 1986, Ser. No. 945,713**
**Claims priority, application United Kingdom, Dec. 24, 1985, 8531739; Jan. 15, 1986, 8600884**
**Int. Cl.[4] F04D** *29/42*
**U.S. Cl. 415—53 R** **10 Claims**



1. A compressor for compressing gas, said compressor comprising an impeller wheel including a plurality of vanes each of which includes a leading edge, a trailing edge and an outer free edge, said wheel being mounted for rotation within a housing and operable between choked flow and a surge line, the housing including an inner wall and an outer wall, at least part of the inner surface of the inner wall being in close proximity to, and of similar contour to, the outer free edges of the vanes, and forming an inlet to said impeller wheel in a region adjacent the leading edges of said vanes, said outer wall forming a gas intake surrounding said inner wall and extending in an axial direction, means for forming a chamber between said inner and outer walls in a region at least partly surrounding said vanes and connected to said gas intake, and means for providing a bidirectional flowpath through said inner wall between said chamber and the inner surface of said inner wall whereby gas may pass in both directions between the area swept by the vanes and the chamber via the flowpath means to broaden the range of operation between choked flow and the surge line for said compressor.

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**4,743,162**
**FLUID TRANSFER SEAL FOR TRANSFERRING FLUID ACROSS A ROTATING BOUNDARY**
**Adam N. Pope, Cincinnati, Ohio, assignor to General Electric Company, Cincinnati, Ohio**
**Continuation-in-part of Ser. No. 836,001, Mar. 4, 1986, abandoned. This application Aug. 10, 1987, Ser. No. 83,884**
**Int. Cl.[4] F04D** *29/08*
**U.S. Cl. 415—170 R** **5 Claims**



1. A fluid transfer system for a gas turbine engine, the engine having a stator and a coaxial rotor positioned for rotation about at least a portion of an axial extent of the stator, the fluid transfer system comprising:
- at least one annular channel formed about a circumference of the axial extent of the stator adjacent the rotor;
- means coupled to the stator for supplying pressurized fluid to said channel;
- an annular seal carrier disposed within said channel, said carrier having an outer circumferential slot facing the rotor and an inner circumferential slot facing the stator and a plurality of spaced apertures extending through said carrier from said inner slot to said outer slot, an annular land formed on each axially opposite side edges of said carrier, each land facing a corresponding radial wall of said channel, said carrier having an edge-to-edge dimension such that spacing between each land and its adjacent channel radial wall is such as to restrict fluid flow past each land to a predetermined minimum rate;
- first and second outer circumferential grooves formed about said carrier on opposing sides of said outer circumferential slot;
- first and second annular sealing rings, each of said rings being positioned in a corresponding one of said grooves;
- means for coupling fluid from said outer circumferential slot to each of said grooves, the fluid pushing each ring into sealing relationship with a side of its corresponding groove and into sealing relationship with the rotor for containing fluid within boundaries defined by said rings; and
- means in the rotor adjacent said carrier for receiving fluid from said outer circumferential slot.

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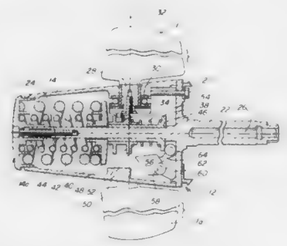


**4,743,163**

## RAM AIR TURBINE CONTROL SYSTEM

**Albert L. Markunas, Roscoe, and Mordehy Cohen, Rockford, both of Ill., assignors to Sundstrand Corporation, Rockford, Ill.**

**Filed Nov. 22, 1985, Ser. No. 800,796**
**Int. Cl.⁴ F01D** *7/02*
**U.S. Cl. 416—44** **15 Claims**



1. A blade pitch control mechanism for a ram air driven turbine blade mounted for rotation on a hub assembly having a central axis, comprising:

a governor control member, including a seat, mounted on a portion of the hub assembly for reciprocation along said central axis;

first biasing means acting on said governor control member in a first axial direction;

a governor slide member mounted for reciprocation along the central axis;

said blade having means secured thereto in mating engagement with said governor slide member;

second biasing means acting between the governor slide member and the seat of the governor control member for biasing the governor slide member opposite said first axial direction to thereby cause the blade to assume a coarse pitch when the blade and hub assembly are in storage and to allow the blade to move to fine pitch during start-up; and

flyweight means supported on the hub assembly and directly engaging the governor control member independently of the governor slide member for acting against the first biasing means to control blade pitch and govern turbine speed after start-up.

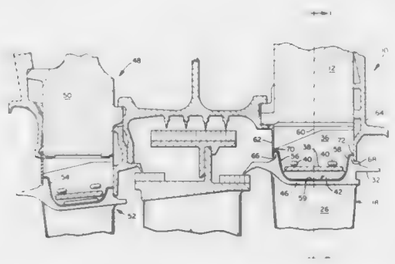
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**4,743,164**

## INTERBLADE SEAL FOR TURBOMACHINE ROTOR

**Robert R. Kalogeros, Glastonbury, Conn., assignor to United Technologies Corporation, Hartford, Conn.**

**Filed Dec. 29, 1986, Ser. No. 947,295**
**Int. Cl.⁴ F01D** *5/30*
**U.S. Cl. 416—193 A** **5 Claims**



1. A means for sealing a damper cavity formed between first and second adjacent rotor blades secured to the periphery of a turbomachine rotor assembly turning about an axis of rotation, each rotor blade including

a radially inward root portion for engaging a rotor disk,

a radially outward airfoil portion for operatively contacting an annular, axially flowing stream of a working fluid,

a radially intermediate platform portion extending axially beyond the rotor disk on each side thereof and circumferentially toward a corresponding platform extending from a next adjacent blade for forming an axially extending gap therebetween,

the blade platform portions further configured to define, in cooperation with the rotor and the adjacent blade root portions, said damper cavity radially inward thereof, said damper cavity extending the axial depth of the rotor disk and including, in axial cross section, a generally concave radially outward boundary defined by the undersides of the adjacent blade platforms, and wherein the sealing means comprises:

a sheet metal seal, disposed within said damper cavity and fitting closely against the radially outward boundary thereof, the seal extending circumferentially across the gaps and overlapping the adjacent blade platform undersides, and

the seal and platform further shaped to define a concave radially outward cavity boundary wherein the interior axial cavity dimension increases with inward radial displacement.

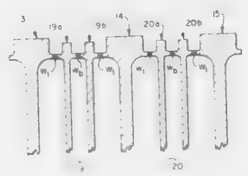
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**4,743,165**

## DRUM ROTORS FOR GAS TURBINE ENGINES

**William R. Ulrich, Lake Park, Fla., assignor to United Technologies Corporation, Hartford, Conn.**

**Filed Oct. 22, 1986, Ser. No. 921,729**
**Int. Cl.⁴ F01D** *5/06*
**U.S. Cl. 416—198 A** **12 Claims**



1. A drum rotor for a turbomachine which comprises a first disk, a second disk, and a seal therebetween, the seal comprising a first annular seal subdetail and a second annular seal subdetail, wherein the disks have a superalloy composition different from the seal alloy composition, and wherein an inertia weld joins the alloy of the first disk to the alloy of the first seal subdetail, an inertia weld joins the alloy of the second disk to the alloy of the second seal subdetail, and a high energy beam weld joins the alloy of the first seal subdetail to the alloy of the second seal subdetail.

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**4,743,166**

## BLADE ROOT SEAL

**Sidney B. Elston, III; Robert J. Corsmeier, and Melvin Bobo, all of Cincinnati, Ohio, assignors to General Electric Company, Cincinnati, Ohio**

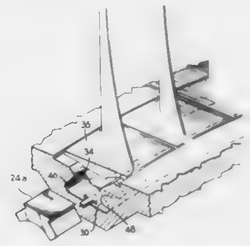
**Filed Dec. 20, 1984, Ser. No. 684,435**
**Int. Cl.⁴ F01D** *5/30*
**U.S. Cl. 416—215** **7 Claims**

1. A rotor assembly comprising:

a disk with a circumferential blade retaining slot disposed therein;



a blade including an airfoil and root separated by a platform, wherein said root is mountable within said slot and wherein said platform extends circumferentially beyond said root to first and second opposite ends; and



a seal generally contacting said slot and platform and extending circumferentially from said root to said first end, wherein said seal is generally conformal in axial cross section with a radially outer portion of said root.

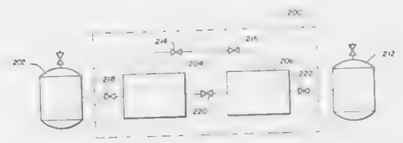
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**4,743,167**

## DEVICES FOR THE SORPTION, STORAGE AND RELEASE OF HYDROGEN ISOTOPES

**Daniele Martelli; Fabrizio Doni, and Claudio Boffito, all of Milan, Italy, assignors to S.A.E.S. Getters S.p.A., Milan, Italy**

**Filed May 16, 1986, Ser. No. 863,941**
**Claims priority, application Italy, May 24, 1985, 20881 A/85**
**Int. Cl.⁴ F04B** *37/02*
**U.S. Cl. 417—51** **8 Claims**



1. A device for the sorption, storage and release of hydrogen isotopes comprising:

A. a first gas-tight container having therein non-evaporable getter material which permanently sorbs active gases and reversibly sorbs hydrogen isotopes at low pressures and whose hydrogen isotope equilibrium pressure is analytically described by an equation of the form;

$$\log p = A + \log q^2 - \frac{B}{T}$$

where

p=hydrogen isotope equilibrium pressure in pascal

q=concentration of hydrogen isotope in the non-evaporable getter material in $Pa.m^3.kg^{-1}$

T=temperature of the non-evaporable getter material in K

A,B=are constants which depend on the composition of the non-evaporable getter material and the hydrogen isotope, for hydrogen isotope concentrations in the non-evaporable getter material of less than $3\times10^3$ $Pa.m^3.kg^{-1}$; and

B. an inlet in the first gas-tight container; and

C. a second gas-tight container having therein a non-evaporable compressor material having a non-linear log p versus log $q^2$ characteristic such that at ambient temperatures it is capable of sorbing hydrogen isotopes released by the getter material when the getter material is heated to elevated temperatures and which itself releases hydrogen isotopes upon heating at a substantially constant pressure higher than that at which the non-evaporable getter material releases the hydrogen isotope; and

D. a conduit between the first container and the second container; and

E. a valve in the conduit; and

F. an outlet for the second container.

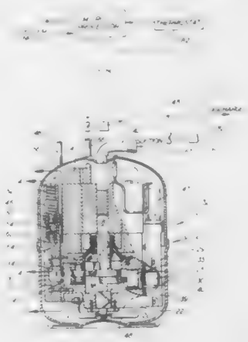
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**4,743,168**

## VARIABLE CAPACITY COMPRESSOR AND METHOD OF OPERATING

**Donald Yannascoli, Fayetteville, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.**

**Filed Mar. 25, 1983, Ser. No. 479,044**
**Int. Cl.⁴ F04B** *49/08*
**U.S. Cl. 417—53** **13 Claims**



1. A method for obtaining a plurality of different outputs from a compressor comprising the steps of:

rotating a crankshaft to drive at least two pistons having different cylinder displacements; and

selectively controlling flow to the suction side of at least two piston cylinders having different cylinder displacements to selectively unload and reload the cylinders to vary compressor output according to demand.

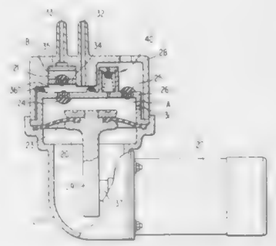
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**4,743,169**

## DIAPHRAGM-TYPE VACUUM PUMP DEVICE

**Jun Funakawa, Nagoya, and Hiroaki Morioka, Okazaki, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan**

**Continuation of Ser. No. 769,468, Aug. 26, 1985, abandoned.**
**This application Jun. 2, 1987, Ser. No. 58,708**
**Claims priority, application Japan, Aug. 25, 1984, 59-177131; Aug. 25, 1984, 59-177132**
**Int. Cl.⁴ F04B** *49/00, 39/00, 45/00*
**U.S. Cl. 417—306** **5 Claims**



1. A diaphragm-type vacuum pump device for generating a required vacuum, comprising:

a motor;

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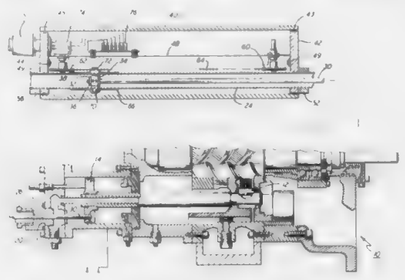
a first housing having a diaphragm mechanically positioned therein connected to and movable by said motor;
a second housing connected to said first housing and having an inlet port connected to an intake chamber;
a third housing positioned in said second housing and having a pumping chamber formed therein wherein a volume of said pumping chamber is changed by movement of said diaphragm;
a first check valve mounted on said third housing and in communication with said intake chamber for drawing air from said intake chamber into said pumping chamber in response to said movement of said diaphragm;
a second check valve mounted on said third housing for discharging air from said pumping chamber to atmosphere in response to said movement of said diaphragm; and
orifice means formed in said third housing for continuously communicating said pumping chamber with atmosphere wherein said orifice means is in direct communication with said pumping chamber and has a constant predetermined opening area; and
an exhaust check valve positioned within said second housing wherein said second housing includes an exhaust chamber formed therein for communication with an engine intake manifold and said intake chamber via said exhaust check valve so that vacuum of said engine intake manifold is communicated with said intake chamber.

3. A diaphragm-type vacuum pump device for generating a required vacuum, comprising:
a motor;
a first housing having a diaphragm mechanically positioned therein connected to and movable by said motor;
a second housing connected to said first housing and having an inlet port connected to an intake chamber;
a third housing positioned in said second housing and having a pumping chamber formed therein wherein a volume of said pumping chamber is changed by movement of said diaphragm;
a first check valve mounted on said third housing and in communication with said intake chamber for drawing air from said intake chamber into said pumping chamber in response to said movement of said diaphragm;
a second check valve mounted on said third housing for discharging air from said pumping chamber to atmosphere in response to said movement of said diaphragm;
relief valve means mounted on said third housing for communicating said pumping chamber with atmosphere when a pressure difference between a level of vacuum in said pumping chamber and atmospheric pressure reaches a predetermined value;
orifice means formed in said third housing for continuously communicating said pumping chamber with atmosphere, said orifice means being in direct communication with said pumping chamber and having a constant predetermined opening area; and
an exhaust check value positioned within said second housing wherein said second housing includes an exhaust chamber formed therein for communication with an engine intake manifold and said intake chamber via said exhaust check valve so that vacuum of said engine intake manifold is communicated with said intake chamber.

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**4,743,170**
**SLIDE VALVE POSITION INDICATOR AND MAGNETIC COUPLER**
**Arthur J. Marshall, Etters, Pa., assignor to FES, INC., York, Pa.**
**Filed Sep. 3, 1987, Ser. No. 92,827**
**Int. Cl.[4] F04B** *49/02*
**U.S. Cl. 417—310** **3 Claims**

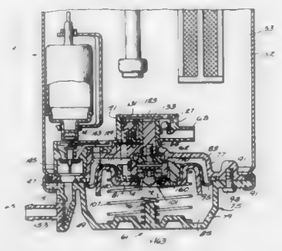
1. In a screw compressor having a chamber with a hydraulically actuated piston within the chamber for positioning a slide valve responsive to a microprocessor to control the capacity of the compressor, the improvement comprising:
a nonmagnetic, closed tube in fluid communication with said chamber;
rod means having a first end secured to said piston and a second end within said tube so that said rod means moves in said tube responsive to reciprocating movement of said piston;
first magnetic means secured to said second end of said rod



means so as to be movable with said rod means in said tube;
second magnetic means surrounding said tube and magnetically coupled to said first magnetic means so as to be moveable therewith; and
linear to rotary motion converting means coupled to said second magnetic means whereby linear movement of said second magnetic means produces a rotary output.

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**4,743,171**
**MARINE INSTALLATION INCLUDING FUEL/OIL MIXING DEVICE**
**J. Michael Mahoney, Briston, Wis., assignor to Outboard Marine Corporation, Waukegan, Ill.**
**Filed Oct. 20, 1986, Ser. No. 921,223**
**Int. Cl.[4] F02B** *33/02*
**U.S. Cl. 417—349** **25 Claims**

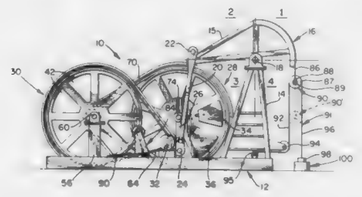


1. An oil storing, oil pumping, and fuel/oil mixing assembly comprising an upper wall having therein an opening which is adapted to afford filling of oil into said assembly, an endless wall depending from said upper wall to partially define an oil reservoir communicating with said opening, and an oil pumping and fuel/oil mixing device secured to said depending wall to form the bottom of said oil reservoir, said device including a housing, a movable wall dividing said housing into inlet and outlet chambers adapted to have a pressure differential therebetween, said wall having therethrough a passage communicating between said inlet and said outlet chambers, said device further including a first inlet communicating between said inlet chamber and said oil reservoir, a second inlet communicating with said inlet chamber and adapted to communicate with a fuel source, an outlet communicating with said outlet chamber for delivering the fuel/oil mixture, a valve seat adjacent said passage, a valve member movable along an axis in a first direction and toward said valve seat to a seated position for preventing fluid flow through said passage, and said valve member being movable in an opposite second direction and away from said valve seat to an unseated position for permitting fluid flow through said passage, and means for moving said valve member away from said valve seat with a snap action and including a magnet located, relative to said valve member, in said first direction, said magnet being movable along said axis and relative to said valve member between a first position and a second position spaced in said second direction from said first position, means for exerting on said magnet, when said valve member is seated, a magnetic force biasing said magnet in said first direction and to said first position, means for preventing movement of said magnet in said second direction beyond said second position, means for exerting on said magnet a second force biasing said magnet in said second direction, and means for increasing said second force, when said valve member is seated, until said second force is greater than said magnetic force.



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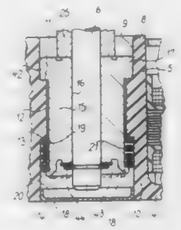
**4,743,172**
**BELT DRIVEN PUMPING UNIT**
**Jerry L. Watson, Odessa, Tex., assignor to Grooves & Lands, Inc., Midland, Tex.**
**Continuation of Ser. No. 550,452, Nov. 8, 1983, abandoned, which is a continuation-in-part of Ser. No. 237,533, Feb. 23, 1981, abandoned. This application Mar. 9, 1987, Ser. No. 20,220**
**Int. Cl.[4] F04B** *9/04*
**U.S. Cl. 417—362** **15 Claims**



1. A pumping unit comprising:
a motor, a flywheel sheave, a crank sheave, a Samson post, a walking beam, and a horsehead connected to said walking beam;
shaft means mounting said flywheel sheave for low friction rotation thereof, a relatively small sheave connected to said flywheel sheave for driving said crank sheave; another shaft means mounting said crank sheave for low friction rotation;
an endless drive means by which said motor drives said flywheel sheave; a second endless drive means by which said small sheave drives said crank sheave counter clockwise (horsehead at right) when said motor is rotated counter clockwise (similarly viewed);
a bridle means for said horsehead adapted for connection to a polished rod by which a downhole pump can be stroked;
Samson post journal means by which said walking beam is mounted in journaled relationship relative to said Samson post such that one end of the walking beam can be moved in a vertical plane to impart vertical reciprocatory motion into the bridle;
a wrist pin attached to said crank sheave, said wrist pin being radially spaced from said shaft means of said crank sheave, said wrist pin being connected to be rotated in a circle by said crank sheave, means including a pitman arm having one journaled end connected to said crank and an opposite end connected in journaled relationship by tail bearing means to the end of the walking beam which is opposite from the horsehead;
said Samson post journal means being located between said bridle means and said opposed end of said pitman arm,
means by which the relative location of said crank sheave shaft, wrist pin, opposite end of said pitman arm, and Samson post journal means are disposed relative to one another to oscillate said opposite end of said pitman arm and said horsehead to produce motion of said polished rod having a high delayed peak velocity profile
whereby, said motor drives the flywheel sheave which in turn drives the crank sheave, and the crank sheave rocks the walking beam which reciprocates the bridle in a vertical plane, thereby causing the bridle to reciprocate in a manner to produce an elongated pump stroke of high efficiency,
said tailbearing means moving in the NNW octant (FIG. 17) as the walking beam moves from rod downstroke to rod upstroke,
said pitman arm having a length less than twice the vertical distance from said another shaft means mounting said crank sheave to said Samson post journal means (FIG. 15),
the vertical through said tailbearing means, when said tailbearing means, said another shaft means, and said wrist pin are aligned, passing through said wrist pin's circle closer to said another shaft means than to the vertical tangent to said wrist pin's circle nearest the vertical through said Samson post journal means.

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**4,743,173**
**SLIDE BEATING UNIT FOR SMALL SIZE FAN**
**Guenter Wrobel, Villingen-Schwenningen, Fed. Rep. of Germany, assignor to Papst-Motoren GmbH & Co. KG, St. Georgen, Fed. Rep. of Germany**
**Filed May 8, 1985, Ser. No. 731,880**
**Claims priority, application Fed. Rep. of Germany, May 9, 1984, 3417127**
**Int. Cl.[4] F04D** *29/00;* **F16C** *27/00*
**U.S. Cl. 417—354** **30 Claims**



1. A small fan which is constructed as a compact axial fan, comprising a central driving motor means having a rotatable shaft retained by way of a flange means and a bearing support tube means, a rotor secured to the driving motor, and housing means for the fan forming a flow duct that surrounds the rotor, bearing support means for the shaft of the driving motor constructed as one-piece sliding bearing unit, said sliding bearing unit being radially fixed at least within an axial partial area of the bearing support tube means by a sliding seat, and wherein said sliding seat is obtained by a spring means acting to produce a bias force between the slide bearing unit and the bearing support tube.

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**4,743,174**

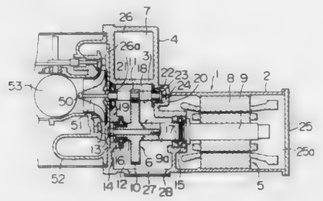
## CENTRIFUGAL COMPRESSOR

**Kazou Sato, Kitaibaraki; Michiaki Ida, Ibaraki; Masatosi Terasaki, Ibaraki; Masaki Kurimoto, Kashiwa, and Shigeo Sugimoto, Ibaraki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Continuation of Ser. No. 789,019, Oct. 18, 1985, abandoned. This application Sep. 12, 1986, Ser. No. 907,132**

**Int. Cl.**[4] **F04B** *17/00, 35/00*

**U.S. Cl. 417—365** **2 Claims**



1. A centrifugal compressor comprising:

a drive motor accommodated in a motor casing frame section and comprising a stator and a rotor;

a multiplying gear mechanism accommodated in a gear casing frame section and comprising a multiplying gear and a pinion meshing with said multiplying gear, said multiplying gear mechanism being connected at an input side thereof with said drive motor;

an impeller connected with said multiplying gear mechanism;

a rotor shaft for mounting said rotor in said motor casing frame section rotatably supported by a single bearing mounted on said gear casing frame section and extended into said gear casing frame section;

a gear shaft for mounting said multiplying gear rotatably supported at one end thereof by another single bearing mounted on said gear casing frame section opposite to said first mentioned bearing, said gear shaft and said rotor shaft being directly coupled with each other between said multiplying gear and said first-mentioned bearing to constitute a first shaft;

a second shaft for mounting said pinion rotatably supported at both ends thereof by bearings mounted on said gear casing frame section;

a side opening for said drive motor provided at said motor casing frame section;

a side plate for sealingly closing said opening;

a further side opening for said pinion provided on said gear casing frame section;

a further side plate for sealingly closing said further opening;

an access opening for said multiplying gear provided on said gear casing frame section; and

a closure plate for sealingly closing said access opening; and

wherein said motor casing frame section is integrally formed with said gear casing frame section.

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**4,743,175**

## REEL ASSEMBLY FOR DEWATERING APPARATUS

**Alfred L. Gilmore, North Mackay, Australia, assignor to Legra Engineering Pty. Ltd., Queensland, Australia**

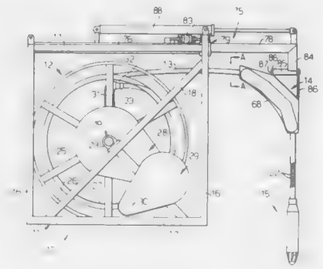
**Filed Aug. 23, 1985, Ser. No. 769,011**

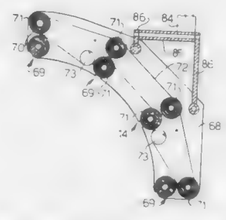
**Claims priority, application Australia, Mar. 15, 1984, PG4100**

**Int. Cl.**[4] **E21B** *43/00*

**U.S. Cl. 417—361** **9 Claims**

1. Apparatus for removing water or other liquid from a bore hole or the like, said apparatus including a reel assembly, flexible discharge conduit means wound about said reel assembly, said conduit means being connected at its free end to submersible pump means, means for mounting said reel assembly for rotation so that said pump means and conduit means may be lowered into said bore hole or raised therefrom and there being provided a roller assembly operatively engaged with said conduit means and adapted to guide said conduit means between said reel assembly and said bore hole, said reel assembly including a plurality of pairs of diametrically opposed rollers, the rollers of each said pair having a concave outer surface conforming substantially to the outer surface of said conduit means, the rollers in each said pair cooperating to substantially surround said conduit means so as to circumferentially support





said conduit means, said pairs of rollers being arranged along an arc to deflect said conduit means from said reel assembly and align said conduit means with said bore hole, drive means connected to at least one roller in each said pair of rollers, said drive means being operative to cause rotation of said rollers in a direction to assist in unwinding said conduit means from said reel assembly for lowering said pump assembly and said conduit means into said bore hole.

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**4,743,176**

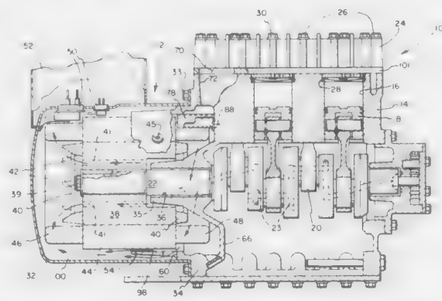
## GAS FLOW SYSTEM FOR A COMPRESSOR

**Emanuel D. Fry, Tecumseh, Mich., assignor to Tecumseh Products Company, Tecumseh, Mich.**

**Filed Jun. 18, 1986, Ser. No. 877,000**

**Int. Cl.**[4] **F04B** *17/00, 39/06*

**U.S. Cl. 417—368** **12 Claims**



1. A gas flow arrangement for a compressor including a crankcase, a crankshaft, a cylinder head including a suction opening, an electric driving motor having a rotor, a stator having first and second end windings and a casing for said electric motor secured to an end wall of said crankcase, said end walls sealing said motor casing from said crankcase interior, said arrangement comprising:

a suction gas inlet mounted on said compressor crankcase;

a first passage in said crankcase and wall connecting said suction gas inlet with the interior of said motor casing;

a second passage in said crankcase end wall connecting said suction opening to the interior of said motor casing;

a baffle arranged in said motor casing between said first and second passages and separating said first and second passages to prevent flow of gas directly from said first passage to said second passage, said baffle including at least one aperture therein, said aperture having a smaller cross sectional area than the cross sectional area of said inlet passage, thereby causing a portion of gas to flow from said first passage past said first end windings and through said baffle apertures, and thereby causing the remaining portion of said gas to flow around said second end windings;

a collecting space for collecting and recombining said first and remaining portions of gas, said second passage connecting said collecting space to said suction opening.



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**4,743,177**

## ENCLOSED TYPE COMPRESSOR AND METHOD FOR ASSEMBLING THE SAME

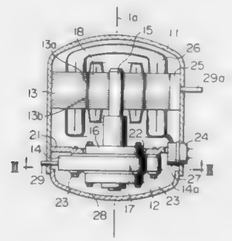
**Masao Ozu, Fuji, and Tsuneo Monden, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

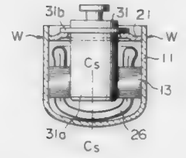
**Continuation of Ser. No. 829,120, Feb. 14, 1986, abandoned, which is a division of Ser. No. 706,624, Feb. 28, 1985, Pat. No. 4,584,750. This application Apr. 21, 1987, Ser. No. 40,714**

**Claims priority, application Japan, Feb. 28, 1984, 59-36482**

**Int. Cl.**[4] **104B** *39/12*

**U.S. Cl. 417—360** **12 Claims**





1. An enclosed type compressor comprising:

a casing having an integrally closed top and an opening formed at the bottom end thereof;

an electric motor having a stator and a rotor, said stator being secured to an internal surface of said casing adjacent to said closed top;

an air gap of substantially uniform width formed between said rotor and said stator;

a compressor pump assembly provided adjacent said bottom end of said casing so as to be driven by said electric motor through a driving shaft; and

means for centering said rotor with reference to an internal surface of said stator irrespective of the orientation of said rotor with said casing, said centering means including a center-adjusting plate having a central portion formed with a through hole and an outer peripheral portion secured to the internal surface of said casing such that said center-adjusting plate is permanently fixed perpendicularly to a central axis of said stator defined with reference to said internal surface of said stator without reference to said internal surface of said casing or to the position of said rotor with respect to said stator, said center-adjusting plate fixedly mounting said compressor pump assembly at a position where an exact centering of said rotor coupled with said driving shaft is consistently and repeatedly attained with reference to said internal surface of said stator.

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**4,743,178**

## NON-LINEAR ELECTROMAGNETIC VIBRATION FLUID COMPRESSION DEVICE

**Cao P. Sheng, 33/5 Jiao Tong Rd., Shanghai, China**

**Filed Mar. 12, 1986, Ser. No. 838,853**

**Claims priority, application China, Apr. 1, 1985, 85102855**

**Int. Cl.**[4] **F04B** *17/04*

**U.S. Cl. 417—410** **18 Claims**



1. A non-linear, electromagnetic vibration, fluid compression device comprising:

a non-linear electromagnetic vibration device having a first vibrating part including,

an electromagnetic armature, and

an electromagnetic coil mounted about said armature;

a second vibrating part including,

a generally U-shaped electromagnetic core mounted about said armature and said coil, a free end portion of said armature extends into said generally U-shaped electromagnetic core to a posture wherein the free end of the armature is adjacent to but spaced from a base portion of said generally U-shaped electromagnetic core;

means for operably connecting said first vibrating part to said second vibrating part to permit relative motion between said first vibrating part and said second vibrating part;

said means for operably connecting said first and second vibrating parts including,

at least a first generally rectangular, nonlinear, bellows plate spring means wherein one portion of said spring means is rigidly affixed to said first vibrating part and another portion of said spring means is rigidly affixed to said second vibrating part; and

said non-linear, bellows plate spring means comprising a plurality of non-linear, bellows plate springs and each spring being composed of a plurality of mutually parallel waveforms between a central portion rigidly affixed to one of said first and second vibrating parts and edge portions rigidly affixed to the other of said first and second vibrating parts;

electrical power means connected to said electromagnetic coil for supplying electrical current pulses to said coil and electromagnetically inducing movement of said

armature within said core in opposition to a nonlinear restoring spring force of said at least one generally rectangular, non-linear bellows plate spring operably extending between said first vibrating part and said second vibrating part, whereby a resonant, non-linear electromagnetic vibration may be induced between said first vibrating part and said second vibrating part;

a first reciprocating-type compression cylinder including a piston received therein for reciprocating motion,

said piston being operably connected to one of said first and second vibrating parts, and

said cylinder being operably connected to the other of said first and second vibrating parts;

whereby relative oscillating motion of said first and second vibrating parts induced via action of said non-linear, bellows plate spring means is converted to reciprocating piston motion in said first compression cylinder.

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**4,743,179**

**ELECTROMAGNETICALLY ACTIVATED PISTON PUMP**

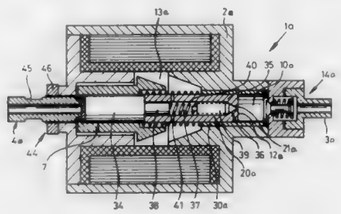
**Peter Waas; Bernhard Matschull, both of Munich; Wolfgang Baeuml, Eichenau; Wolfgang Beck, and Siegfried Piegsa, both of Munich, all of Fed. Rep. of Germany, assignors to Webasto-Werk W. Baier GmbH & Co., Gauting, Fed. Rep. of Germany**

**Filed Feb. 13, 1986, Ser. No. 829,082**

**Claims priority, application Fed. Rep. of Germany, Feb. 13, 1985, 3504789**

**Int. Cl.⁴ F04B** *17/00*

**U.S. Cl. 417—415** **29 Claims**



1. Electromagnetically activated piston pump of the type for use in the metered supply of fuel to burner devices, comprising a piston connected with an armature and arranged in a housing for reciprocal movement, an electromagnetic coil disposed about said armature, a return spring in biasing relation to said armature and piston, and flow passage means, including an armature compartment, for channeling a fluid flow from a suction side inlet to a pressure side outlet of the piston pump, via said armature compartment, the armature compartment being disposed between the armature and the electromagnetic coil; wherein a suction valve having an outlet leading into a suction chamber is arranged in an inlet line; wherein the electromagnetic coil is a means for producing a piston working stroke, during which said piston forms a means for displacing a fluid medium from the suction chamber via a relief valve to the armature compartment; wherein the return spring is a means for producing a piston delivery stroke, during which the piston forms a means for expelling the fluid medium from the armature compartment to the pump outlet with the relief valve in a flow blocking position; and wherein the suction valve is a means for filling of the suction chamber with the fluid medium at the beginning of the piston delivery stroke.

**4,743,180**

**REVERSIBLE GEAR-TYPE PUMP**

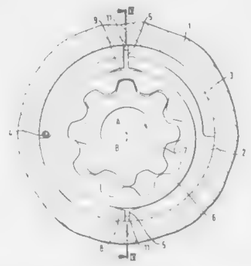
**Kurt Sickenger, Aulendorf, Fed. Rep. of Germany, assignor to Schwabische Huttenwerke GmbH, Aalen-Wasseralfingen, Fed. Rep. of Germany**

**Filed Dec. 8, 1986, Ser. No. 938,898**

**Claims priority, application Fed. Rep. of Germany, Dec. 9, 1985, 3543488**

**Int. Cl.⁴ F04C** *2/18, 15/04*

**U.S. Cl. 418—32** **7 Claims**



1. A reversible gear type pump providing constant fluid delivery comprising:

a housing with a pressure outlet,

an externally toothed inner rotor,

an internally toothed outer rotor surrounding the inner rotor,

an eccentric ring having an eccentric bore receiving said outer rotor, said eccentric ring being rotatble 180° between first and second positions and having at least one radial slit,

means biasing a surface of said eccentric bore into frictional engagement with the outer surface of said outer rotor,

a pressure chamber adjacent said slit in each of said first and second positions of said rotatable eccentric ring, and

a pressure line connecting said pressure chamber to said pressure outlet,

whereby fluid pressure in said pressure outlet in excess of a predetermined value will operate in said pressure chamber to expand said eccentric ring and release said frictional engagement between said outer surface of said outer rotor and said eccentric bore.

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**4,743,181**

**SCROLL-TYPE FLUID MACHINE WITH SEAL TO AID LUBRICATION**

**Akira Murayama; Hiroaki Kuno; Naoshi Uchikawa; Takahiro Tamura, and Takao Mizuno, all of Shimizu, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jan. 16, 1986, Ser. No. 819,260**

**Claims priority, application Japan, Jan. 23, 1985, 60-8982**

**Int. Cl.⁴ F04C** *18/04, 29/02*

**U.S. Cl. 418—55** **15 Claims**

1. A scroll compressor for an air conditioning machine, the scroll compressor comprising:

a compressor portion having a compression chamber defined by an orbiting scroll member and a stationary scroll member housed in an upper portion of a vertical type hermetically closed cylindrical vessel, said orbiting and stationary scroll members each having a spiral wrap and being assembled together with said spiral wraps meshing with each other;

a motor disposed in a lower portion of said hermetically closed vessel and connected to said compressor portion through a driving shaft;

an oil sump portion formed at a bottom portion of said hermetically closed vesesl below said motor;

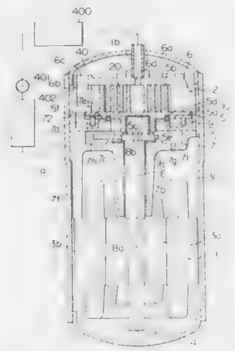


oil feeding pump means provided in said driving shaft and having a suction port immersed in said oil sump;

said hermetically closed vessel communicating with a low pressure side of a refrigerating cycle to form a low pressure chamber in said hermetically closed vessel, said compressor portion drawing a refrigerant gas into said low pressure chamber of said hermetically closed vessel, compressing the same and discharging the compressed gas out of said hermetically closed vessel;

a first frame facing a lower surface of said orbiting scroll member;

a sealing member disposed radially outwardly of a bearing means for coupling the driving shaft of the scroll compressor and a bearing means for supporting the driving shaft so that the bearing means are exposed to a lower pressure, said sealing member being disposed between said first frame and the lower surface of said orbiting scroll member



with surfaces thereof being in slidable contact with said frame and the lower surface of said orbiting scroll member;

a chamber provided in said hermetically closed vessel separate from said low pressure chamber by said sealing member and accommodating therein a member for preventing rotation of said orbiting scroll member about its own axis;

a second frame having at least one bearing for supporting said driving shaft between said first frame and said motor and supporting a stator of said motor secured to said second frame; and

a passage means provided through an end plate of said orbiting scroll member for introducing the refrigerant gas whcih is in mid course of being compressed in said compression chamber into said separated chamber from said low pressure chamber to maintain said separated chamber at an intermediate pressure between a suction pressure and a discharge pressure of said scroll compressor.

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**4,743,182**

**ROTATING PISTON COMPRESSOR WITH THIN-WALLED RADIALLY-RESILIENT PISTON**

**Hans-Peter Schabert, Erlangen, Fed. Rep. of Germany, assignor to Kraftwerk Union Aktiengesellschaft, Mülheim/Ruhr, Fed. Rep. of Germany**

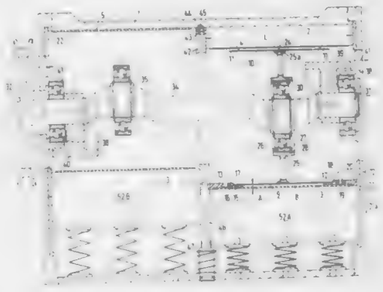
**Filed Aug. 21, 1986, Ser. No. 898,696**

**Claims priority, application Fed. Rep. of Germany, Aug. 26, 1985, 3530436**

**Int. Cl.⁴ F04C** *18/356, 27/00*

**U.S. Cl. 418—57** **12 Claims**

1. Rotating piston compressor, comprising a cylinder having a first given diameter, a slider part disposed in said cylinder, said cylinder having a suction port and a discharge port disposed at opposite sides of said slider part, a thin-walled, radially-resilient piston with a circular cross section and a second given diameter when unstressed being disposed in said cylinder, a radial support for said piston in the form of a rotationally symmetrical thin-walled shell formed of permanently elastic material having one end connected to said piston and another end, a body with a circular periphery holding said other end of said shell, and a drive shaft connected to said body for moving



said piston with an eccentricity being larger than one half of the difference between said first and second given diameters, forming means for ovalizing said piston and said shell producing contact pressure between said cylinder and said piston leading to increased tightness.

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**4,743,183**

**ROTARY VANE COMPRESSOR WITH DISCHARGE FLUID TO FRONT AND REAR SHAFT BEARINGS AND VANE SLATS**

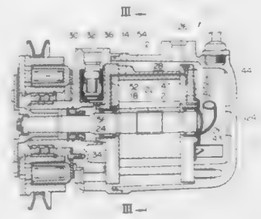
**Kazuhiro Irie, Yokohama, and Mikio Tanino, Hadano, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Aug. 1, 1986, Ser. No. 892,091**

**Claims priority, application Japan, Aug. 5, 1985, 60-171042**

**Int. Cl.⁴ F04C** *18/344, 29/02*

**U.S. Cl. 418—76** **2 Claims**



1. A rotary compressor comprising:

a rotor housing having an inner peripheral wall, a pair of axially opposite forward and rearward open ends and a discharge port;

a pair of front and rear heads arranged at said forward and rearward open ends of said rotor housing to hold there between the same;

a rotor rotatable within said rotor housing;

a plurality of vanes retractably installed on said rotor for contact with said inner peripheral wall of said rotor housing;

a plurality of rotor vane slots for applying back pressure on said vanes so a to urge the same against said inner peripheral wall of said rotor housing, said rotor vanes slots being elongated axially of said rotor to have forward and rearward ends;

a rotor shaft extending through said rotor housing and installing thereon said rotor to rotate therewith;

a pair of front and rear bearings respectively installed on said front and rear heads and carrying thereon said rotor shaft;

said front head having an intake port through which fluid is

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drawn into said rotor housing and discharged therefrom through said discharge port of said rotor housing after being increased in pressure as said rotor rotates;

first back pressure supply conduit means for conveying part of fluid discharged from said discharge port to said rearward ends of said rotor vane slots through said rear bearing;

second back pressure supply conduit means for conveying part of fluid discharged from said discharge port to said forward ends of said rotor vane slots and said front bearing without conveying same through said rear bearing and said rearward ends of said rotor vane slots;

said first back pressure supply conduit means comprises a first refrigerant gas passage provided to said rear head and having an end opening outside of said rear head and the other end in communication with said rearward ends of said rotor vane slots through said rear bearing, and a vane back pressure control valve disposed in said first refrigerant gas passage for controlling back pressure to be supplied to said rotor vane slots in such a manner that said back pressure in said rotor vane slots is maintained lower than a predetermined value; and

said second back pressure supply conduit means comprises a bypass passage formed in said rotor housing and having an end in communication with said first refrigerant gas passage at a place downstream of said back pressure control valve and the other end located at said forward open end of said rotor housing and a second refrigerant gas passage formed in said front head and having an end in communication with said other end of said bypass passage and the other end in communication with said forward ends of said rotor vane slots and said front bearing.

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**4,743,184**

**ROTARY COMPRESSOR WITH HEATING PASSAGE BETWEEN DISCHARGE CHAMBER AND SHAFT SEAL**

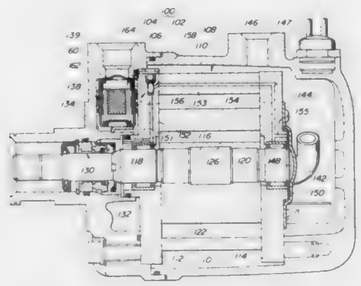
**Seiji Sumikawa; Haruhiko Takada, both of Saitama; Mikio Tanino, Hatano, and Kazuhiro Irie, Yokohama, all of Japan, assignors to Nissan Motor Co., Ltd. and Diesel Kiki Co., Ltd., both of, Japan**

**Filed Dec. 5, 1986, Ser. No. 938,435**

**Claims priority, application Japan, Dec. 6, 1985, 60-274608**

**Int. Cl.⁴ F04C** *18/344, 29/04, 29/02*

**U.S. Cl. 418—84** **9 Claims**



1. In a rotary compressor

a drive shaft;

a rotor operatively mounted on said drive shaft, said rotor including a plurality of vanes operatively disposed therewith;

a cam ring disposed about said rotor in a manner which operatively cooperates with said vanes;

first and second end members disposed with said cam ring in a manner which enclose said rotor in said cam ring;

means defining an induction port in said first end member and an induction chamber proximate said first end member and fluidly communicated with the interior of said cam ring via said induction port;

means defining an exhaust chamber and an exhaust port, said exhaust chamber being in fluid communication with the interior of said cam ring via said exhaust port;

a first bearing for rotatably supporting said drive shaft, said first bearing being disposed in said first end member;

a second bearing for rotatably supporting said drive shaft, said bearing being disposed in said second end member;

a seal disposed about said drive shaft, said seal defining a seal chamber between said seal and said first end member, said seal chamber being located proximate said first bearing; and

means for transferring hot compressed coolant vapor from said exhaust chamber to said seal chamber, said transferring means comprising:

a passage structure which leads from said exhaust chamber and opens into said seal chamber, said passage structure providing fluid communication between said seal chamber and said exhaust chamber; and

a valve which controls the fluid communication between said seal chamber and said exhaust chamber, said valve being arranged to cut off fluid communication between said seal chamber and said exhaust chamber when the pressure in said exhaust chamber exceeds a predetermined level.

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**4,743,185**

**CORROSION RESISTANT MERCURY-FREE ZINC ANODE BATTERY**

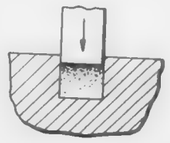
**Viet Vu, Milwaukee, and Paul F. Hettwer, Greenfield, both of Wis., assignors to Sab Nife Inc., Lincoln, R.I.**

**Division of Ser. No. 839,716, Mar. 14, 1986, Pat. No. 4,649,093.**

**This application Feb. 27, 1987, Ser. No. 19,671**

**Int. Cl.⁴ B22F** *1/00*

**U.S. Cl. 419—23** **23 Claims**



1. A method for the manufacture of a zinc anode battery in which corrosion of the zinc electrode and the evolution of hydrogen gas therefrom during discharge of the battery are substantially suppressed, comprising the steps of providing a given volume of zinc powder, said volume having a density less than about 6.5 g/cc, compacting the given volume of zinc powder into an anode for a zinc anode battery with a volume smaller than the given volume, said anode having a density of about 6.5 g/cc or greater, and making a zinc anode battery using said compacted zinc anode.

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**4,743,186**

**MELT SPINNING APPARATUS**

**Heinz Schippers, Remscheid, Fed. Rep. of Germany, assignor to Barmag AG, Remscheid, Fed. Rep. of Germany**

**Filed Aug. 29, 1986, Ser. No. 902,306**

**Claims priority, application Fed. Rep. of Germany, Aug. 31, 1985, 3531265; Sep. 19, 1985, 3533381**

**Int. Cl.⁴ B29D** *31/00*

**U.S. Cl. 425—72.2** **3 Claims**

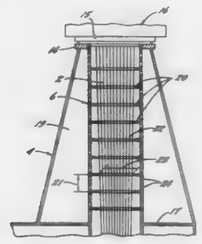
1. A melt spinning apparatus for extruding and spinning a synthetic material to form a plurality of filaments, and comprising

melt spinning means including a spinning nozzle for continuously extruding a plurality of synthetic filaments downwardly through said spinning nozzle, and with said plurality of filaments having a generally circular cross sectional outline,

a spinning tube disposed below said spinning nozzle and so that the extruded filaments pass through said tube, with said spinning tube including a tubular wall and an end portion adjacent said spinning nozzle which has a plurality of perforations extending radially through said wall, and means for guiding the advancing filaments in a converging generally conical arrangement as they pass through said spinning tube,

blowing chamber means surrounding said perforated end portion of said spinning tube for supplying a cooling medium thereto and such that the cooling medium passes through said perforations and into the interior of said tube so as to cool the extruded filaments, and





guide means positioned within said perforated end portion of said spinning tube for guiding at least a substantial portion of the cooling medium which enters through said perforations so as to flow in a generally radial direction into contact with the extruded filaments, said guide means comprising a plurality of flat annular rings which are fixed to the interior of said spinning tube and in a perpendicular relationship to the axis thereof, with said annular rings being disposed coaxially in said spinning tube and in an axially spaced apart relation along the length of said end portion, and with each of said rings defining a circular inner opening which closely conforms to the circular cross sectional outline of the extruded filaments passing therethrough, and with the diameters of said openings decreasing as the distance from said spinning nozzle increases and so that each of the diameters is only slightly greater than the cross sectional outline of the adjacent portion of the extruded filaments.

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**4,743,187**

**APPARATUS FOR THE PRODUCTION OF FIBER WEB REINFORCED PLASTIC LAMINATES**

**Konrad Schermutzki, Remseck, Fed. Rep. of Germany, assignor to Santrade Ltd., Lucerne, Switzerland**

**Filed Oct. 24, 1986, Ser. No. 922,999**

**Claims priority, application Fed. Rep. of Germany, Nov. 14, 1985, 3540389**

**Int. Cl.⁴ B29C** *43/22, 43/48*

**U.S. Cl. 425—73** **16 Claims**

1. Apparatus for producing a fiber web-reinforced plastic laminate, comprising:

a heated compression zone including upper and lower endless belts,

first feeder means for sprinkling resin powder onto an upper flight of at least said lower belt at a location upstream of said compression zone,

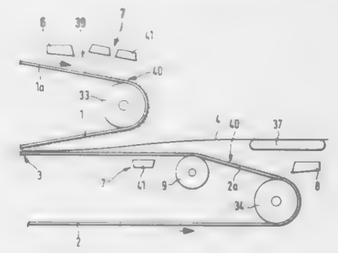
first heater means for heating said upper flight and causing said resin powder to adhere to said upper flight prior to entry thereof into said compression zone,

means for advancing an impregnable fibrous reinforcing web,

second feeder means for sprinkling resin powder onto an upper surface of said web upstream of said compression zone,

fiber-applying means for sprinkling cut reinforcing fibers onto said upper surface of said web downstream of said second feeder means and upstream of said compression zone,

vibrating means disposed downstream of said fiber-applying means and upstream of said compression zone for vibrating said web, said vibrating means comprising a vertically



moving arm disposed over said upper surface and arranged to be repeatedly impacted against said powder-carrying upper surface to beat such powder into said fibrous web, and

second heater means for heating said web to cause resin powder applied to said web to adhere thereto,

said web-advancing means arranged to introduce said web into said compression zone such that said web, said reinforcing fibers, said resin on said upper flight, and said resin in said web are compressed together under the influence of heat to form a reinforced plastic laminate.

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**4,743,188**

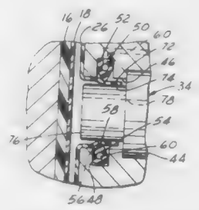
**APPARATUS FOR SEALING A POUR HEAD IN A MOLD FOR FORMING COMPOSITE PRODUCTS**

**John D. Gray, New Durham; William Hagar, Barrington, both of N.H., and Laurent Gaudreau, S. Berwick, Me., assignors to Davidson Textron Inc., Dover, N.H.**

**Filed Jun. 19, 1987, Ser. No. 63,826**

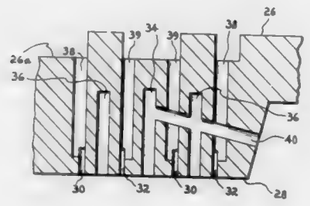
**Int. Cl.⁴ B29C** *45/16, 45/57*

**U.S. Cl. 425—123** **15 Claims**



1. Apparatus for manufacturing a composite plastic structure comprising: mold means including a cavity part and a lid part joined together to form a cavity with a mold surface, a preformed shell supported by the mold surface of said cavity part and including an integrally formed sleeve thereon, said cavity part having an opening extending therethrough for supportingly receiving the outside diameter of said sleeve to define a pour head access port to said mold cavity, a pour head selectively received with the sleeve, and means for seletively applying a radial clamping pressure on said sleeve against said pour head to prevent escape of foam material poured through said head into the cavity during a molding process.

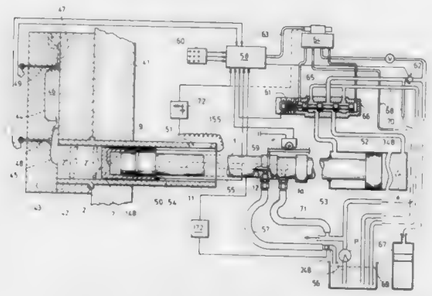
**4,743,189**
**SPINNERET FOR A CO-SPUN FILAMENT WITHIN A HOLLOW FILAMENT**
**Harry V. Samuelson, Chadds Ford, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**
**Filed Jun. 27, 1986, Ser. No. 879,571**
**Int. Cl.[4] B29C *47/20***
**U.S. Cl. 425—131.5** **4 Claims**



1. A one piece spinneret for the production of a hollow filament containing within itself a cospun filament comprising: a plate having upper and lower surfaces connected by a capillary, said capillary being formed of two concentric annular passages, a central cavity concentrically located within the inner annular passage, and a second cavity located between said annular passages, a plurality of supports bridging said annular passages at angular locations around said annular passages, said supports extending through said annular passages and being radially aligned at said angular locations and a bore leading from said lower surface through two aligned bridge members to said cavities.

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**4,743,190**
**INJECTION UNIT FOR INJECTION MOLDING OR DIE-CASTING**
**Daniel Brunnschweiler, Oberuzwil; Alfred Hagmann, Speicher; Leo Iten; Leo Strotz, both of Wil, and Walter Uhlmann, Mörschwil, all of Switzerland, assignors to Gebruder Buhler AG, Uzwil, Switzerland**
**Filed Oct. 17, 1986, Ser. No. 920,132**
**Claims priority, application Switzerland, Oct. 24, 1985, 04574/85**
**Int. Cl.[4] B29C *45/77***
**U.S. Cl. 425—149** **25 Claims**



1. An injection unit for injecting molten material into a cavity, beginning with a pre-filling phase, in which the molten material is shot through an entrance of a cavity, followed by a filling phase, which lasts until the cavity is filled up and the resistance of the material against further injection increases, and thereafter for maintaining the molten material in the cavity under pressure during a squeezing phase, said injection unit comprising;

injection sleeve means for receiving said molten material;

injection ram means movable within said injection sleeve means;

drive cylinder means;

drive piston means movable within said drive cylinder means and being releasably connected to said injection ram means to form a ram unit;

control means for controlling the movement of said ram unit during said phases, said control means including

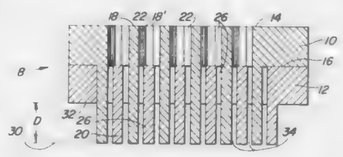
control valve means connected to said drive cylinder means and assuming a predetermined filling initiating position at the transition from the pre-filling phase to the filling phase, and assuming a predetermined squeeze initiating position at the transition from the filling phase to the squeezing phase to achieve a deceleration of said ram unit of a predetermined deceleration characteristic;

damping means arranged on said ram unit for absorbing shocks arising from the kinetic energy of masses which are decelerated at least at the transition from the filling phase to the squeezing phase, said damping means allowing a relative movement of said injection ram means with respect to said drive piston means; and

signal transfer means interconnecting said damping means and said control valve means for changing over the latter to one of said initiating positions within a predetermined response time.

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**4,743,191**
**MULTI-PIECE DIE FOR FORMING HONEYCOMB STRUCTURES**
**Tai-Hsiang Chao, Mount Prospect, Ill., assignor to Allied-Signal Inc., Morristown, N.J.**
**Filed Apr. 2, 1987, Ser. No. 33,274**
**Int. Cl.[4] B29C *47/00***
**U.S. Cl. 425—190** **8 Claims**



1. A multi-piece die for forming multi-channeled extrudable structures having at least 100 channels per square inch from extrudable material said die comprising:

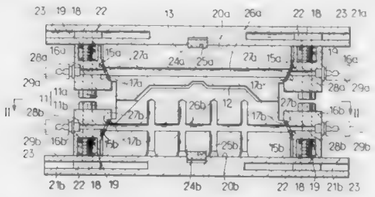
(a) a first die body having a first inlet face, a first outlet face, and an integrally formed first set of channel forming pins and webs interconnecting said channel forming pins, said channel forming pins having a uniform spacing between all of said pins over said first outlet face and a length extending from said inlet face past said outlet face, said webs providing the only attachment to said channel forming pins and said channel forming pins and webs defining a first regular pattern of cavities through said die body;

(b) a second die body superimposed in part above said first die body having a second inlet face, a second outlet face adjacent said first inlet face, and an integrally formed second set of channel forming pins and interconnecting webs, the pins in said second set having the same spacing as the pins in said first set and a length extending from said second inlet face through said cavities past said second outlet face, the webs in said second set providing the only attachment to the pins in said second set, and the pins and webs of said second set defining a second regular pattern of cavities through said second die body; and

(c) means for securing said first die body to said second die body such that said first and second cavities provide linear flow passages for passing said extrudable material through said die.



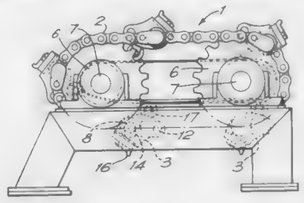
**4,743,192**
**RESIN INJECTION METAL MOLD UNIT**
**Masahiro Higuchi, Tama, Japan, assignor to Sankyo Oilless Industry, Inc., Tokyo, Japan**
**Filed Jun. 12, 1987, Ser. No. 60,885**
**Claims priority, application Japan, Dec. 16, 1986, 61-192443[U]**
**Int. Cl.[4] B29C *45/66, 45/73***
**U.S. Cl. 425—192 R** **3 Claims**



1. Resin injection metal mold unit comprising, in combination, a metal mold consisting of a first mold section defining a cavity and a second mold section defining a core, each section having chamfers at at least two selected opposite points and a mold temperature controlling fluid channel extending between said at least two points, a stationary metal mold supporting member and a movable metal mold supporting member, said members being adapted to releasably hold the cavity defining section and the core defining section of the metal mold in opposing relationship, each supporting member having a plurality of slidable clamping members for engaging an associated mold section by said at least two selected opposite points, each clamping member having a clamping slant in complementary relationship with a respective chamfer of the associated mold section, and a fluid channel opening at the surface of the clamping slant, such that the fluid channel of each clamping member is put in communication with the mold temperature controlling fluid channel of each mold section of the metal mold when the metal mold is fixed to the stationary and movable supporting members with the clamping members.

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**4,743,193**
**TILE MAKING MACHINES**
**David R. Brittain, Crowborough, United Kingdom, assignor to Marley Tile A.G., Switzerland**
**Filed Nov. 19, 1986, Ser. No. 932,309**
**Claims priority, application United Kingdom, Nov. 19, 1985, 8528396**
**Int. Cl.[4] B65G *49/00***
**U.S. Cl. 425—253** **17 Claims**



12. Apparatus for propelling a succession of pallets in a longitudinal direction, comprising a plurality of pawls for pushing the pallets forward on a pallet guide means, the pawls being spaced at intervals on an endless drive member having a portion extending substantially parallel to said pallet guide means, each said pawl being arranged to follow a circuit during which the pawl engages one of said pallets to push it along the guide means and disengages from the pallet further down the guide means, the circuit followed by each pawl being controlled by at least one associated cam follower cooperating with longitudinally extending cam means, the cam means comprising first and second cam surfaces having respective longitudinal profiles for causing the pawls to follow first and second circuits, and the apparatus further comprising means for effecting relative movement between the cam followers and said first and second cam surfaces to select the pawl circuit appropriate for the type of pallets to be propelled.

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**4,743,194**
**COOLING SYSTEM FOR GASIFIER BURNER OPERATING IN A HIGH PRESSURE ENVIRONMENT**
**Robert J. Stellaccio, Spring, Tex., assignor to Texaco Inc., White Plains, N.Y.**
**Filed Mar. 13, 1987, Ser. No. 25,437**
**Int. Cl.[4] F23N *5/24*; F23D *11/36***
**U.S. Cl. 431—23** **6 Claims**



1. Multi-phase cooling system for a burner used in a high pressure reactor having a combustion chamber, wherein said burner is positioned in said combustion chamber to deliver a stream of fuel thereto, and said burner includes a cooling element which circulates a liquid coolant from a pressurized source thereof, disposed in heat exchange contact with the burner,

a first cooling circuit communicated with said cooling element to circulate a high pressure stream of the liquid coolant therethrough from said high pressure source thereof during operation of the high pressure reactor,

a second cooling circuit communicated with said burner cooling element and being selectively actuated to introduce a second liquid coolant stream from a second high pressure source thereof into said cooling element at a pressure in excess of the operating pressure within said reactor combustion chamber,

flow control valve means communicating said first and second cooling circuits respectively with said cooling element, said flow control valve means being selectively actuatable to discontinue flow of coolant liquid from said first cooling circuit to said burner cooling element, and to concurrently communicate said second cooling circuit with said cooling element at such time as the latter becomes sufficiently defective as to leak coolant liquid into said combustion chamber.

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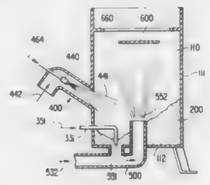


**4,743,195**

## COMBUSTION APPARATUS FOR FORCIBLY CIRCULATING A HEATING MEDIUM IN A COMBUSTION APPARATUS

**Tomoshi Hodate, Kasukabe, and Haruyoshi Nitta, Yono, both of Japan, assignors to Kashiwa Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 717,018, Mar. 28, 1985, Pat. No. 4,662,839. This application Nov. 21, 1986, Ser. No. 933,120**
**Claims priority, application Japan, Apr. 12, 1984, 59-73514; Apr. 25, 1984, 59-83303; May 31, 1984, 59-112100**
**The portion of the term of this patent subsequent to May 5, 2004, has been disclaimed.**
**Int. Cl.[4] F23D** *19/00*
**U.S. Cl. 431—170** **1 Claim**



1. A combustion apparatus comprising:
an upright type combustion chamber having a bottom;
conduit means extending below and along said bottom of said combustion chamber and having a nozzle which passes upwardly through said bottom and opens into said combustion chamber;
an intake port provided in said bottom at a position spaced from said nozzle and communicated with said conduit means at a position upstream of said nozzle,
a heating medium contained in said combustion chamber and forming a naturally-formed, substantially conical shape having a apex at said intake port, wherein the opening of said nozzle projects from said conically shaped heating medium, whereby particles of the heating medium which are ejected from said nozzle, via said conduit means and said intake port, roll along said conical shape of said heating medium and fall into said intake port;
a fuel supplying pipe extending into said combustion chamber from the exterior thereof and opening in said intake port; and
a pilot burner placed in said combustion chamber at a position above said heating medium and directed toward said conically shaped heating medium.

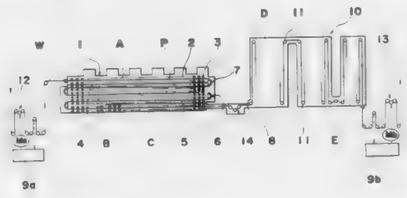
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**4,743,196**

## CONTINUOUS ANNEALING FURNACE FOR A STRIP

**Masayuki Imose, Kawanishi; Yuji Fujiwara, Ikoma, and Yoshito Sakaguchi, Kyoto, all of Japan, assignors to Chugai Ro Co., Ltd., Osaka, Japan**

**Filed Jun. 4, 1986, Ser. No. 870,429**
**Claims priority, application Japan, Jun. 10, 1985, 60-125527; Jun. 10, 1985, 60-125528; Jun. 10, 1985, 60-125529**
**Int. Cl.[4] F27D** *15/02;* **F27B** *9/28*
**U.S. Cl. 432—59** **2 Claims**



1. A continuous annealing furnace for a strip comprising:
a horizontally arranged first treating furnace having inlet and outlet portions, a floating type supporting means therein for supporting the strip in a floating state, means therein for heating the strip, and means therein for soaking the strip;
a vertically arranged second treating furnace having inlet and outlet portions, means therein for overaging the strip, means therein for cooling the strip, and a plurality of roll members therein for supporting the strip and being connectively disposed, through a connecting portion, at said outlet portion of said first treating furnace; and
a plurality of bridle roll means respectively located at said inlet portion of said first treating furnace, said connecting portion and said outlet portion of said second treating furnace to regulate tension exerted on the strip;
whereby during operation of said furnace the strip is at least heated up to and soaked at an annealing temperature in a floating state within said first treating furnace, and is subjected to an annealing treatment by being caused to sequentially pass through said first and subsequent second treating furnaces, with a lower tension being exerted on the strip in said first treating furnace than in said second treating furnace by controlling said bridle roll means.

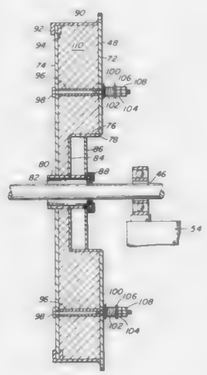
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**4,743,197**

## HIGH TEMPERATURE FAN PLUG APPARATUS

**William M. Bloom, Pittsburgh, Pa., assignor to Allegheny Ludlum Corporation, Pittsburgh, Pa.**

**Filed May 8, 1987, Ser. No. 47,966**
**Int. Cl.[4] F27B** *9/28*
**U.S. Cl. 432—59** **7 Claims**



1. In a heating apparatus having a housing and a plug assembly forming a side wall closure for a fan to operate in the housing, said plug assembly including the combination of:
inner and outer face plates spaced apart by spacers extending therebetween to form a heat insulative cavity, one of said face plates being exposed to rapidly changing temperatures in said housing while forming part of a side wall closure therefor;
fastening means for clamping said outer and inner face plates against said spacers;
hub means carried by said inner and outer face plates for rotatably sealing a drive shaft for said fan; and
means secured to one of said inner and outer face plates for slidably supporting an outer peripheral portion of the other of said face plates during rapid radial expansion thereof.



**4,743,198**

## PERIODONTAL SCALER

**Joycelyn I. Kennedy, 1615 Perkins Road, Baton Rouge, La. 70808**

**Filed Aug. 1, 1986, Ser. No. 891,570**
**Int. Cl.[4] A61C** *17/00*
**U.S. Cl. 433—143** **11 Claims**



1. A periodontal scaler comprising:
(a) an elongated handle,
(b) an offset shaft portion of regular tapering crosssection attached to one end of said handle which is offset from the central longitudinal axis of said handle at an angle of about 28° to about 32° and which has a length of about 6 to 10 millimeters,
(c) a shank portion located at the opposite end of said shaft portion from said handle and offset from the central longitudinal axis of said shaft portion back toward the central longitudinal axis of said handle and located generally in the plane of both said handle and said shaft portion with an offset from the central axis of said shaft portion of from about 32° to about 34°, said shank portion having a regular, tapering cross-section, which tapers at a rate less than said shaft portion and being of a length which is at least as long as said shaft portion, but not more than 2.5 times as long as said shaft portion and not of sufficient length to meet the central longitudinal axis of said handle, and
(d) a curved blade portion attached to the end of said shank portion opposite from said shaft portion located in a plane orthogonal to the plane of said handle, shank portion and shaft portion in which the curve of said curved blade portion circumscribes at least a quarter of a circular path, having a cutting edge on the inside portion of said curved blade portion and ending in a tapered, rounded point.

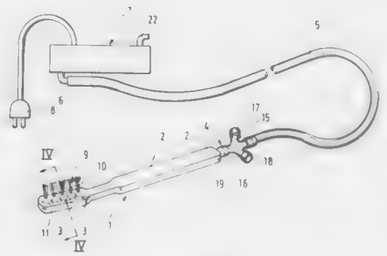
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**4,743,199**

## METHOD AND TOOTH BRUSH FOR THE REMOVAL OF PLAQUE FROM TEETH AND GUMS

**Anette Weber, and Hans G. Weber, both of Topferplatz 7, 4350 Recklinghausen, Fed. Rep. of Germany**

**Filed Dec. 16, 1985, Ser. No. 809,519**
**Claims priority, application Fed. Rep. of Germany, Dec. 19, 1984, 3446272**
**Int. Cl.[4] A61K** *5/00*
**U.S. Cl. 433—216** **1 Claim**



1. A method for the removal of plaque from teeth and gums in the oral cavity, comprising supplying bristles of a tooth brush during cleaning of teeth with an ozone-air mixture fed by said bristles into the oral cavity, the ozone-air mixuture being rubbed in and massaged immediately through the bristles at a target spot in the oral cavity, said target spot being a tooth stem or a tooth gum, wherein said ozone-air mixture has ozone-concentration of more than 0.2 mg per $lm^3$ of air and is distributed in the oral cavity simultaneously with a dentifrice having solid particles through which undesired high ozone concentration at spots outside a target spot in the oral cavity is neutralized.

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**4,743,200**

## FIBER OPTIC COUPLED HELMET MOUNTED DISPLAY SYSTEM

**Brian L. Welch, Westmount, Canada, and Joseph A. LaRussa, Yorktown Heights, N.Y., assignors to CAE Electronics, Ltd., Montreal, Quebec, Canada**

**Filed Nov. 13, 1984, Ser. No. 670,913**
**Int. Cl.[4] G09B** *9/08;* **G09G** *3/02*
**U.S. Cl. 434—43** **7 Claims**



1. A fiber optic helmet mounted display system for producing a replica of an image derived from an image source for observation by an observer, comprising:
a first relay lens having an input;
fiber optic cable means having an input end and an output end;
said first relay lens being disposed between said source and the input end of said fiber optic cable means;
a second relay lens disposed at the output end of said fiber optic cable means; and
a wide angle eyepiece;
said second relay lens being disposed between the output end of said fiber optic cable means and said wide angle eyepiece;
whereby said fiber optic cable means transmits said image from said image source to said eyepiece;
whereby to produce said replica of said image in the line of sight of said observer and, said replica appearing to originate at a distance.

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**4,743,201**

## MOVEABLE ELECTRICAL CONTACT PLUNGER

**Walter E. Robinson, and Anthony W. Lumbis, both of Watertown, N.Y., assignors to General Signal Corporation, Stamford, Conn.**

**Filed May 8, 1987, Ser. No. 47,095**
**Int. Cl.[4] H01R** *39/00*
**U.S. Cl. 439—10** **4 Claims**



1. A moveable contact plunger assembly having a plunger

with a shoulder which fits in abuttment with a mating shoulder in an aperture of a dielectric connector block, a follower element arranged for electrical contact with the plunger and a spring arranged to allow axial deflection of the plunger relative to the follower element and of the follower element relative to the dielectric block shoulder, the improvement which comprises:

the plunger having a contact pin, a hollow crimping area and a spring barrel;

a wire crimped at one end in the crimping area of the plunger and connected at the other end to the follower element so as to provide electrical continuity between the plunger and the follower element; and

the follower element and the spring barrel being arranged with the spring to allow axial deflection of the follower element relative to the dielectric block.

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**4,743,202**

## CURRENT-CARRYING BUILDING ELEMENT

**Erik Bach, Billund, Denmark, assignor to Interlego A.G., Baar, Switzerland**

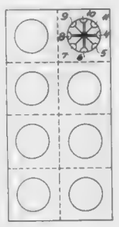
**PCT No. PCT/DK85/00073, § 371 Date May 1, 1986, § 102(e) Date May 1, 1986, PCT Pub. No. WO86/01342, PCT Pub. Date Feb. 27, 1986**

**PCT Filed Aug. 2, 1985, Ser. No. 852,669**

**Claims priority, application Denmark, Aug. 3, 1984, 3767/84**

**Int. Cl.[4] A63H** *33/04*

**U.S. Cl. 439—53** **7 Claims**



1. A building element for a building set, said element comprising a plurality of contiguous module units, at least some of which have a coupling stud protruding co-axially with a central axis of the module unit so that the mutual centre-to-centre distance of the coupling studs is equal to a multiple of the module measure, said element further comprising complementary coupling tubes for cooperation with coupling studs on an adjacent element for coupling the elements together mechanically in a plurality of possible mutual angular positions, said element having a first current path connected to first contact areas designed to establish electrical connection with first contact areas in an adjacent element, said element also having a second current path electrically insulated from the first current path and connected to second contact areas designed to establish electrical connection with second contact areas in an adjacent element, characterized in that the first and the second contact areas are disposed in respective first and second angle sectors which do not ovelrap each other irrespective of mutual angular rotations corresponding to the said possible angular positions of possible mechanical coupling, and said contact areas are provided which are disposed around adjacent central axes in mutually different angle sectors.

**4,743,203**

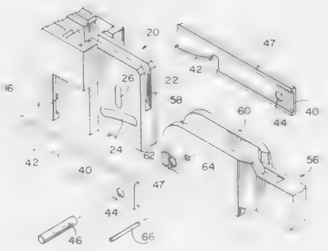
## CAMMING MEANS FOR USE WITH A LOW INSERTION FORCE CONNECTOR

**Dimitry G. Grabbe, Middletown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.**

**Filed May 7, 1987, Ser. No. 47,232**

**Int. Cl.[4] H01R** *9/09*

**U.S. Cl. 439—260** **4 Claims**



1. A camming means for use with a low insertion force connector having a housing with terminals provided therein, the terminals being moveable from an open position to a closed position, the camming means comprising:

a first slot means provided in a support member, the support member being attached to the housing of the connector;

a second slot means provided in the support member, the second slot means positioned proximate the first slot means;

actuating means having opening means extending therethrough, a first opening means being in alignment with the first slot means, and a second opening means being in alignment with the second slot means, the actuation means being movable from an open position to a closed position;

a plurality of cam slide means extending through slot means provided in the housing of the connector. an end of each cam slide means being positioned proximate the actuating means, the end having an opening extending therethrough, the opening being in alignment with the second opening means and the second slot means, the cam slide means being movable between a first position and a second position, the first position corresponding to the open position of the actuating means and the second position corresponding to the closed position of the actuating means;

pins provided to act as cam followers, a first pin extending through the first slot means and the first opening means, and maintained therein, a second pin extending through the second slot means, the second opening means, and the opening, and maintained therein;

whereby as the actuating means is moved between the open position and the closed position, the cam slide means is forced to move between the first position and the second position, causing the pins to slidably move with respect to the support member.

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**4,743,204**

## AUXILIARY BOLT-OPERATED CONNECTION FOR PANELBOARD CIRCUIT BREAKER

**Thomas L. Fromm, Charlottesville, Va., and Terry L. Tiede, Earlysville, Va., assignors to Cooper Industries, Houston, Tex.**

**Filed Oct. 3, 1986, Ser. No. 914,854**

**Int. Cl.[4] H01R** *13/639*

**U.S. Cl. 439—265** **16 Claims**

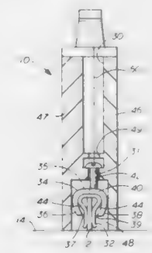
1. A device for making an electrical connection to a terminal, comprising:

a case;

a terminal clip having legs mounted within said case for engaging the terminal;



clamping means mounted in said case in operative relationship with said terminal clip, said clamping means comprising a clamp having an intermediate portion and inwardly converging arms extending from the intermediate portion, said arms straddling the legs of said terminal clip;



means mounted in said case for engaging said clamping means and urging said terminal clip into tighter engagement with the terminal.

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**4,743,205**

## FEMALE COAXIAL CONNECTOR AND METHOD OF MAKING THE SAME

**Ikujiro Mitani; Fumio Kobayashi, and Norihide Kawanami, all of Tokyo, Japan, assignors to Hirose Electric Co., Ltd., Tokyo, Japan**

**Filed Mar. 27, 1987, Ser. No. 30,591**

**Claims priority, application Japan, Apr. 6, 1986, 61-128040**

**Int. Cl.[4] H05K** *1/00*

**U.S. Cl. 439—78** **8 Claims**



1. A female coaxial connector comprising:

a central female terminal;

a dielectric body for supporting said central female terminal;

a cylindrical conductive shell made of a sheet of metal so as to have a top opening for receiving a columnar connecting portion of a mating male coaxial connector and a bottom opening for receiving said dielectric body;

a female contacting portion provided within said top opening and having at least one pair of spring contact fingers extending toward each other in a circumferential direction of said conductive shell; and

a cylindrical protective member made of a sheet of metal so as to surround at least said female contacting portion for protecting it.

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**4,743,206**

## CHILD-SAFE OUTLET PLATE

**Karl Imhoff, 7538 31st Ave., Kenosha, Wis. 53142**

**Filed Nov. 10, 1986, Ser. No. 928,513**

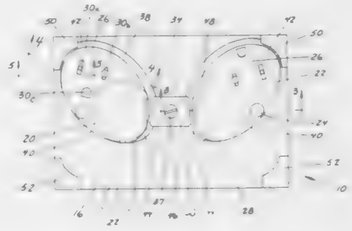
**Int. Cl.[4] H01R** *13/44*

**U.S. Cl. 439—137** **20 Claims**

1. In a child-safe outlet cover for wall-mounted electric receptacles with slots for receiving plug prongs, the improvement comprising:

a main plate having a wall-adjacent inner surface and an opposite outer surface and defining a receptacle opening;

a shield on the main plate outer surface having first and second portions, the shield being movable between a non-use position, in which the second portion covers the opening and the first portion extends from the opening, and a use position, in which the first portion covers the opening and the second portion extends from the opening;



the first portion defining prong openings aligned with the slots in the use position, the first shield portion being substantially fully exposed in both the use and the non-use positions such that all said prong openings are fully accessible in the shield non-use position;

means biasing the shield to the non-use position; and

means engaging a prong opening in the shield in its non-use position whereby manual movement of the shield is precluded apart from disenggement of the engagement means from the shield.

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**4,743,207**

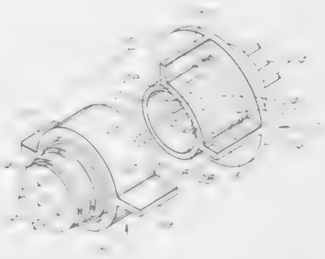
## SPACE COMPATIBLE ELECTRICAL CONNECTOR

**Thomas A. Clark, Santa Monica, Calif., assignor to G & H Technology, Inc., Santa Monica, Calif.**

**Filed Mar. 16, 1987, Ser. No. 25,988**

**Int. Cl.[4] H01R** *13/625*

**U.S. Cl. 439—317** **6 Claims**



1. An electrical connector including first and second connector parts which can be locked and unlocked by one hand, comprising:

the first connector part includes a metal shell having an open end for receiving an end portion of the second connector part therewithin, and first and second platelike members affixed to the metal shell outer surface at angularly spaced apart points and extending outwardly away from the shell outer surface;

the second connector part including a metal shell, an end portion of which metal shell is dimensioned to enable receipt within an end portion of the first connector part;

means carried by said first and second connector parts coacting to lock the connector parts to one another upon relative rotation of the connector parts in a first direction and

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to unlock the connector parts upon relative rotation in the opposite direction said means including,

an actuator plate affixed to the outer surface of the second connector part having a central portion spaced from and generally parallel to the said shell, and two end portions which extend outwardly away from the central portion, said end portions of the actuator plate being separated an amount less then that between the platelike members on the first connector part;

said connector parts being locked together by gripping an actuator plate end portion and a platelike member with one hand forcing them toward each other, and said connector parts being unlocked by gripping the other actuator plate end portion and other platelike member with one hand and forcing them toward one another.

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**4,743,208**

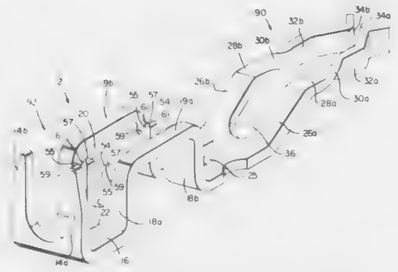
## PIN GRID ARRAY ELECTRICAL CONNECTOR

**Lawrence P. Weisenburger, Kernersville, N.C., assignor to AMP Incorporated, Harrisburg, Pa.**

**Continuation-in-part of Ser. No. 776,690, Sep. 19, 1985, abandoned. This application Jul. 21, 1986, Ser. No. 887,841**

**Int. Cl.[4] H01R** *4/24*

**U.S. Cl. 439—398** **18 Claims**



1. An electrical connector for interconnecting electrical signals, the connector comprising:

a housing having terminal receiving cavities therein; and

a plurality of terminals, disposed in said cavities, having an insulation displacement portion comprising plate means having a contiguous radiused portion, said plate means including a slot profiled to terminate a conductor of an insulated wire and finger portions separated from said radiused portion thereby defining free ends which lie substantially in the plane of said plate means, adjacent to the radiused portion and flanking the conductor receiving slot, the finger portions having edges aligned with, and colinear with, edges of the conductor receiving slot, whereby the finger portions effectively increase the slot length without increasing the height of said terminal.

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**4,743,209**

## COMPARTMENTALIZED SPLICE CASE

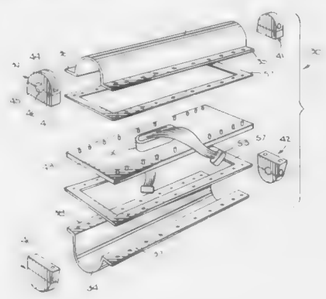
**Alan L. Gittle, New Brunswick, N.J., assignor to Penn Central Telecommunications Company, Woodcliff Lake, N.J.**

**Filed May 21, 1986, Ser. No. 865,297**

**Int. Cl.[4] H01R** *13/52*

**U.S. Cl. 439—521** **18 Claims**

1. A splice case for enclosing and protecting field spliced connections between the conductors of a plurality of cables, said case comprising in combination a multipart housing having housing parts that provide walls for enclosing said spliced connections, common-wall partition means for dispositon between adjacent housing parts for subdividing said housing into a plurality of separate compartments the interiors of which are hermetically isolated one from the other when the housing assembled, means for separably securing said housing parts to said common-wall partition means with each said housing part being individually and selectively separable from said common-wall partition means for enabling access to one of said compartments while all other compartments remain sealed, a plurality of mutually insulated electrically conductive elements mounted on said partition means and passing therethrough without interruption from one of said compartments



to another of said compartments while hermetically sealed to said partition means, entry means included in said housing walls for accommodating entry to said housing of external cables, and means within said housing for selectively establishing connection between said electrically conductive elements and conductors of a cable entering said splice case.

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**4,743,210**

## PASS-THROUGH TERMINAL ARRANGEMENT

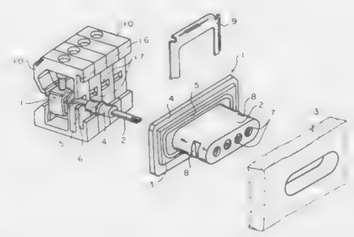
**Wolfgang Schild, Herford, and Horst Conrad, Detmold, both of Fed. Rep. of Germany, assignors to C. A. Weidmüller GmbH & Co., Detmold, Fed. Rep. of Germany**

**Filed Nov. 17, 1986, Ser. No. 931,334**

**Claims priority, application European Pat. Off., Nov. 21, 1985, 85114819.7**

**Int. Cl.[4] H01R** *13/73*

**U.S. Cl. 439—559** **8 Claims**



1. A pass-through terminal arrangement to be mounted on and extend through a mounting opening of a wall of a casing in a mounted position thereof, comprising

a plurality of terminals each including a terminal housing and a current bar having a projecting portion which extends out of said terminal housing and, in the mounted position, through the mounting opening into the interior of the casing;

a plurality of sealing components each mounted on and surrounding a section of said projecting portion of one of said current bars;

a mounting flange including a flange frame and a pass-through block rigid with said flange frame, at least partially received in the mounting opening in the mounted position, and having a plurality of pass-through openings each for sealingly accommodating at least said section of one of said current bars and said sealing component mounted thereon,

means for connecting said plurality of terminal housings in a row to said flange frame;

means for securing said mounting frame to the wall in the mounted position; and

sealing means interposed between said flange frame and the wall in the mounted position.



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**4,743,211**

## CONNECTING DEVICE FOR IGNITION SYSTEM OF MOTOR VEHICLE

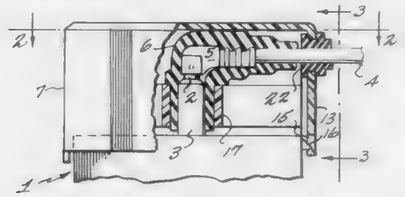
**Akihiko Hirata, Kohza, and Yuji Watanabe, Suzuka, both of Japan, assignors to Sumitomo Wiring Systems, Yokkaichi, Japan**

**Filed Mar. 24, 1986, Ser. No. 842,989**

**Claims priority, application Japan, Mar. 23, 1985, 60-58692; Mar. 23, 1985, 60-41787**

**Int. Cl.[4] H01R** *33/74*

**U.S. Cl. 439—686** **2 Claims**



1. An electrical conductor housing device for an ignition apparatus of a motor vehicle with ignition cables, said device comprising:

an electrically non-conductive inverted cup-shaped first housing member with a number of openings in a side wall thereof through which a number of ignition cable end portions extend;

said ignition cable end portions having at least one electric terminal attached thereto, each ignition cable end portion being covered by an L-shaped hood member of elastic material having a first end and a second end; and

an electrically non-conductive second housing member comprising a plate having upper and lower surfaces with a plurality of circular openings therein, each circular opening having an upwardly protruding cylindrical frame member associated therewith, said second housing member engaging said first housing member such that each of said frame members surroundingly engages a second end of said L-shaped hood members, thereby orienting each of said second ends of said L-shaped hood members in a downward direction with respect to the inside of said first housing member.

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**4,743,212**

## TELEPHONE CONNECTOR BLOCK WITH CORROSION CREEP INHIBITING MEANS

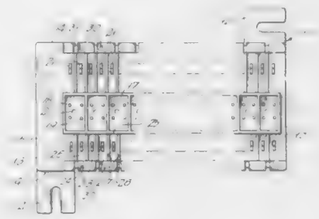
**Helmuth Neuwirth, Garden City, N.Y., assignor to Dorta Systems Corp., Syosset, N.Y.**

**Filed Feb. 6, 1984, Ser. No. 577,029**

**Int. Cl.[4] H01R** *9/24*

**U.S. Cl. 439—722** **2 Claims**

1. In a quick clip type telephone connector block, including a base element and at least one row of juxtaposed quick clip connectors for the interconnection of wire conductors forming parts of individual subscriber circuits, the improvement comprising: a pair of parallel mounting studs of rectangular cross-section integrally mounted upon the surface of said base element and extending laterally therefrom, a single quick clip connector being partially enclosed within each of said mounting studs such that the free operative ends of said connectors project outwardly therefrom for the engagement of a related conductor; said mounting studs being spaced apart from each other to form a gap therebetween of the order of at least 0.050 inches in width; whereby, upon the formation of corrosion



upon adjacent quick clip terminals due to exposure to the ambient atmosphere, the path of creep corrosed material must travel over the surface of adjacent studs forming said gap before reaching an adjacent terminal.

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**4,743,213**

## SELF-HALT DEVICE FOR WATER CRAFT

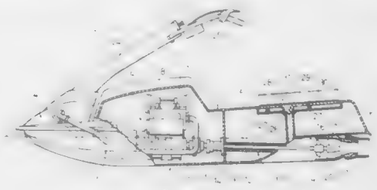
**Hiroshi Nishida, Miki, Japan, assignor to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan**

**Filed Feb. 27, 1987, Ser. No. 20,074**

**Claims priority, application Japan, Mar. 28, 1986, 61-70550**

**Int. Cl.[4] B63H** *11/00*

**U.S. Cl. 440—1** **12 Claims**



11. A self-halt device for a water-jet power-driven water craft, said water craft comprising an elongate buoyant hollow hull that is defined by a bottom, stern, and sidewalls, a deck mounted on top of said hull, an engine compartment defined in said hull, a water passage defined in said bottom, an engine mounted in said engine compartment, said engine comprising an air inlet and an exhaust line, and an output shaft, a propulsion system comprising a propeller shaft operatively connected at one end thereof to said output shaft and a propeller mounted at a rear portion of said bottom and connected to the opposite end of said propeller shaft, said propulsion system being so disposed in said water passage that said propeller rotates to discharge at said stern in a jet water that is introduced into said water passage, a steering system for steering said water craft, and a platform mounted on top of said deck and adapted for a user to stand or sit on when operating said water craft, said self-halt device comprising:

sensor means mounted in said water craft, said sensor means being capable of generating a signal in response to the user being thrown off the water craft during the cruising;

a duct for conveying gaseous fluids defined in said hull, and extending into said water passage; and

a valve installed in said duct and operatively connected to said sensor means, said valve being actuated to move between a first position wherein said valve closes said duct and, in response to said signal from said sensor, a second position wherein said valve opens said duct allowing said gaseous fluid to enter said water passage so that said propeller rotates on the introduced said gaseous fluids

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within said passage, bringing said water craft to an immediate stop.

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**4,743,214**
**STEERING CONTROL FOR TOY ELECTRIC VEHICLES**
**Yang Tai-Cheng, 14, Lane 616, Chang-Teh Rd., Taipei, Taiwan**
**Filed Sep. 3, 1986, Ser. No. 903,256**
**Int. Cl.[4] A63H** *17/395, 33/26*
**U.S. Cl. 446—129** **11 Claims**



1. A steering control for a toy electric vehicle, wherein the vehicle includes a body, a first pair of steerable wheels which are attached to the body to rotate and move the body and which also are steerable together; a second wheel, a rotation axle for the second wheel; an electric motor drivingly connected with the second wheel for rotating the second wheel for moving the vehicle;

a disk carrying a helical gear thereon, the disk being rotatable through driving the helical gear; a worm on the rotation axle of the second wheel in driving connection with the helical gear for driving the helical gear for rotating the disk as the second wheel rotates;

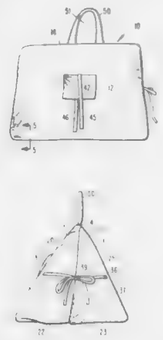
electrically controllable means connected with the first wheels for selectively steering the first wheels in a first direction and in an opposite second direction as the electrically controllable means is operable between a first condition and a second condition;

a first switch connected with the electrically controllable means for being closed to operate the electrically controllable means to the first condition for steering the first wheels in the first direction;

a second switch connected with the electrically controllable means for operating the electrically controllable means to the second condition for steering the first wheels in the second direction;

at least one direction adjustment rod disposed on the disk and being mounted to rotate along with the disk, the direction adjustment rod being pivotable, relative to the disk, to at least first, second, and third positions; in its first position, the direction adjustment rod being oriented for engaging the first switch when the direction adjustment rod is rotated past that switch by the disk, in its second position, the direction adjustment rod being oriented to engage the second switch, whereby the direction adjustment rod is effective for activating the electrically controllable means to steer the first wheels in the respective one of the first and second directions dependent upon which one of the first and second switches is operated by the direction adjustment rod.

**4,743,215**
**MULTI-USE DOLL PLAYHOUSE**
**Mickie C. Emmons, Indianapolis, Ind., assignor to The Kamper Family, Inc., Indianapolis, Ind.**
**Filed Jun. 27, 1986, Ser. No. 879,251**
**Int. Cl.[4] A63H** *3/52, 33/30;* **E04H** *15/58*
**U.S. Cl. 446—478** **8 Claims**



1. A multi-use doll playhouse comprising:

a body of generally triangular cross-section with an opening at a front end, having a bottom wall and a left and right side wall, each of generally rectangular shape, said side walls being attached to the bottom wall at opposite edges of the bottom wall, and said side walls being joined at the top edge of each side wall to form an apex, said body further having a back wall of triangular shape attached at its perimeter to the bottom wall and to each side wall;

said apex having a central portion;

a flexible handle affixed to said body at the central portion of said apex;

flap means arranged to cover said opening at one end of the body when in a closed position and movable to an open position substantially exposing said opening;

at least one of said side walls having window means therein, said window means having an open and a closed position;

said flap means including:

a left triangular flap having a hypotenuse and affixed at its hypotenuse to the front edge of the left side wall;

a right triangular flap having a hypotenuse and affixed at its hypotenuse to the front edge of the right side wall;

each of said triangular flaps having a second edge which, when the flaps are in the closed position, is vertical and loosely abuts the second edge of the other flap;

each of said triangular flaps having a third edge which, when the flaps are in closed position, is horizontal and loosely abuts the front edge of said bottom wall, to substantially close the front opening in the playhouse;

a left tie-down arrangement including a left exterior ribbon attached near the front edge of the outer surface of the left side wall, and a left interior ribbon attached near the front edge of the inner surface of the left side wall in generally the same location as said left exterior ribbon, each of said exterior and interior ribbons having sufficient length to be tied around and restrain said left triangular flap when said flap is gathered upon itself toward the left wall;

a right tie-down arrangement including a right exterior ribbon attached near the front edge of the outer surface of the right side wall, and a right interior ribbon attached near the front edge of the inner surface of the right side wall in generally the same location as said right exterior ribbon, each of said right exterior and right exterior ribbons having sufficient length to be tied around and restrain said right triangular flap when gathered upon itself toward the right wall; and

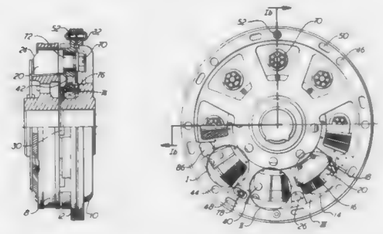
each of said left exterior and right exterior ribbons having sufficient length to extend horizontally across the front opening of the playhouse, and to be tied together in front of the opening when the flap means is in the closed position;

each of said bottom wall, left side wall, and right side wall including a resilient core with quilt batting on both sides of said core with an outer covering to cover each of said quilt batting.

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**4,743,216**
**ROTARY SAFETY COUPLING FOR TRANSMITTING LARGE TORQUES**
**Qin B. Chen; Mao G. Yin, both of Chengdu, and Qin D. Zhou, Chongqing, all of China, assignors to Chengdu Seamless Steel Tupe Plant, China**
**Filed Mar. 25, 1986, Ser. No. 843,995**
**Claims priority, application China, Apr. 1, 1985, 85101485**
**Int. Cl.[4] F16D** *3/68*
**U.S. Cl. 464—17** **30 Claims**



1. A rotary safety coupling for the transmission of large torques, comprising:

a first coupling half;

a second coupling half;

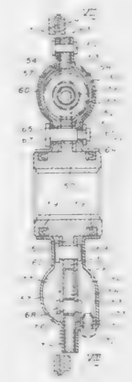
an intermediate disk disposed between said first coupling half and said second coupling half, said intermediate disk being connected to said second coupling half by means of safety pins;

a plurality of cantilever arms fixed to said intermediate disk and having projecting portions extending therefrom towards said first coupling half, said cantilever arms taking the form of wedges with shoulders;

a plurality of elastic components made of rubber, each of said elastic components having a first cross-section in the form of a wedge having inner and outer arcs in the form of circles concentric with a coupling axis, said first cross-section being parallel to the direction of power transmission, each of said elastic components having a second cross-section in the form of a ring provided with a centrally located hole, said second cross-section being perpendicular to the direction of force transmission; and

means on said first coupling half for receiving said elastic components and the projecting portions of said cantilever arms, the projecting portion of each of said cantilever arms being disposed between at least two of said elastic components, said elastic components being disposed in a prestressed condition in said receiving means, whereby play is eliminated in reversals of force transmission between said first coupling half and said second coupling half, said receiving means includes a plurality of angularly equispaced wedge-shaped cavities in said first coupling half.

**4,743,217**
**DAMPER DISC HAVING SEALED SPRING CHAMBERS**
**Hiromi Tojima, and Kouji Kajitani, both of Hirakata, Japan, assignors to Kabushiki Kaisha Daikin Seisakusho, Osaka, Japan**
**Continuation of Ser. No. 852,274, Apr. 15, 1986, abandoned, which is a division of Ser. No. 418,771, Sep. 16, 1982, Pat. No. 4,601,676. This application Feb. 2, 1987, Ser. No. 6,336**
**Claims priority, application Japan, Feb. 28, 1980, 55-24883; Mar. 14, 1980, 55-32905**
**Int. Cl.[4] F16D** *3/14, 3/80*
**U.S. Cl. 464—27** **1 Claim**



1. A damper disc comprising:

a spline hub;

a radial flange formed at the hub;

a pair of cases rotatably mounted on the spline hub and connected to facings at the radially outer end thereof, each one of said pair of cases being disposed on opposite sides of the flange;

an annular member, rotatable with respect to said radial flange, and disposed radially outside of said radial flange, wherein said annular member is fixed between said pair of cases and has openings extending radially inward, each opening presenting radially inwardly extending edges of said annular member;

circumferentially spaced plural compressible coil spring assemblies operatively connecting the annular member and the flange together, wherein said coil spring assemblies are disposed in said openings of said annular member, at least one of said coil spring assemblies including axially aligned and concentric first and second coil springs, said first coil spring disposed within said second coil spring;

a pair of covers fixed to said radial flange with each cover disposed on an opposite side of said flange, said pair of covers surrounding said spring assemblies and having shoulder surfaces corresponding to each spring assembly, said pair of covers being disposed within said cases, said pair of covers forming a sealed spring chamber around each of said spring assemblies and having only sealed narrow spaces connecting the spring chambers together; and

spring seats disposed at both ends of each spring assembly such that opposing spring seats bear upon at least one corresponding shoulder surface of each cover and at least one corresponding radially inwardly extending edge of said annular member, said chambers being filled with oil, so that the oil provides a resistance force to the moving spring seats and said chambers are only slightly larger in crosssection than said spring seats to enable said spring seats to function as hydraulic pistons.

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**4,743,218**

## INTERENGAGED VANE COUPLING WITH CIRCUMFERENTIALLY ARRANGED RESILIENT PADS

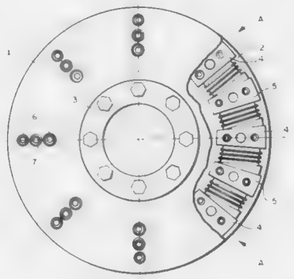
**Joseph H. Aubrey, Barrow-in-Furness; Jeremy J. H. Smith, Windermere, and John D. P. Banahan, Barrow-in-Furness, all of United Kingdom, assignors to Vickers Shipbuilding & Engineering Limited, Cumbria, United Kingdom**

**Filed Sep. 24, 1986, Ser. No. 910,913**

**Claims priority, application United Kingdom, Oct. 4, 1985, 8524498; Aug. 13, 1986, 8619754**

**Int. Cl.[4] F16D** *3/64*

**U.S. Cl. 464—76** **5 Claims**



1. A flexible coupling device for transmitting torque between first and second rotational members, and to accommodate misalignment between said first and second members, said device comprising:

a first annular member which is securable to said first rotational member for rotation therewith about a first common axis;

a second annular member which is securable to said second rotational member for rotation therewith about a second common axis, said first and second axes being substantially coaxial; and

first and second sets of load-transmitting members removably mounted on said first annular member and said second annular member respectively, the load-transmitting members of each set being circumferentially spaced from each other and each load-transmitting member of one set being interengaged with a respective load-transmitting member of the other set so as to transmit drive between the load-transmitting members;

a plurality of circumferentially spaced resilient pads arranged one between each load-transmitting member of one set and the respective interengaged load-transmitting member of the other set; and

a plurality of circumferentially spaced end pieces arranged one between each pad of one set and the respective interengaged load-transmitting member of the other set; in which:

each resilient pad has one tightly bonded to a first end surface of a respective load-transmitting member of one set and has its other end tightly bonded to a surface of an end piece having another surface which abuts against, and is free to move axially and radially with respect to, a second end surface of an adjacent load-transmitting member of the other set when in driving engagement with said second end surface of the adjacent load-transmitting member, whereby there is provided a plurality of integral load-transmitting assemblies, each comprising one of said load-transmitting members, one of said pads, and one of said end pieces;

each pad comprises a substantially parallel-sided flexible member which is formed of a plurality of resilient elements which are separated by, and tightly bonded to, a plurality of less resilient elements to form a generally parallel laminar assembly; and

wherein the load-transmitting assemblies of each set together form a generally annular interlocking array and, in each assembly, the second end surface of the load-transmitting member and said another surface of the end piece each lie substantially in planes passing through the axis of rotation of the respective annular member.

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**4,743,219**

## DEFORMABLE DRIVE SHAFT

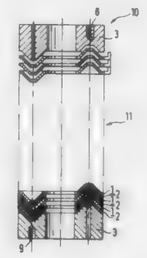
**Carl Heynemann, Taufkirchen, and Otto Richter, Munich, both of Fed. Rep. of Germany, assignors to Metzeler Kautschuk GmbH, Munich, Fed. Rep. of Germany**

**Filed Jun. 5, 1986, Ser. No. 871,071**

**Claims priority, application Fed. Rep. of Germany, Jun. 5, 1985, 3520251**

**Int. Cl.[4] F16C** *1/02;* **B60K** *17/22*

**U.S. Cl. 464—96** **5 Claims**



1. Deformable drive shaft, comprising drive side and driven side connections and a flexible intermediate section interconnecting said connections, said flexible intermediate section being formed of an alternating sequence of disc-shaped formed rigid segments and disc-shaped flexible segments, said formed rigid segments having surfaces on opposite sides thereof, each of said surfaces having alternatingly disposed funnel-shaped projections and funnel-shaped depressions formed thereon along an imaginary circle, said flexible segments being formed of elastomer material vulcanized between said formed rigid segments, said flexible segments having a thickness defining a distance between said formed rigid segments through which said funnel-shaped projections of a given formed rigid segment extend into and interlock with adjacent respective funnel-shaped depressions of the next formed rigid segment, and said funnel-shaped projections and depressions having ends with openings formed therein being filled with said elastomer material of said flexible segments interlocking said flexible segments.

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**4,743,220**

## REVERSIBLE DRIVE

**Joseph E. Berrios, 975 NW. 114th Ave., Coral Springs, Fla. 33065**

**Filed May 8, 1987, Ser. No. 47,277**

**Int. Cl.[4] F16H** *11/00*

**U.S. Cl. 474—7** **6 Claims**

1. In a reversible drive having a prime mover with a rotary output shaft, the combination of:

an endless flexible belt-like drive member driven in one direction by said prime mover;

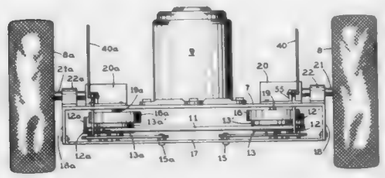
a rotary cylinder;

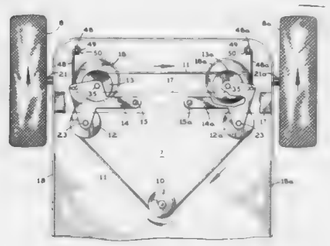
an inside drive roller inside said cylinder and operatively connected to be driven by said belt-like drive member;

an outside drive roller outside said cylinder and operatively connected to be driven by said belt-like drive member;

and a shiftable support carrying said inside and outside drive rollers and selectively operable (a) to position said inside roller in driving engagement with the inside of said cylinder and to position said outside roller out of driving engagement with the outside of said cylinder, or (b) to position said inside roller out of driving engagement with the inside of said cylinder and to position said outside drive roller in driving engagement with the outside of said cylinder.







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**4,743,221**

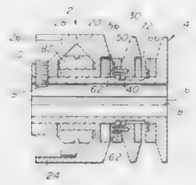
## CENTRIFUGAL CLUTCH BELT TIGHTENING ASSEMBLY

**Marvin E. Whiteman, 1923 Sprinbrook La., Boise, Id. 83706**

**Filed Mar. 20, 1987, Ser. No. 28,538**

**Int. Cl.[4] F16H** *11/06*

**U.S. Cl. 474—13** **10 Claims**



1. A variable speed centrifugal clutch belt tightening assembly for transmitting power equally to at least a pair of belts, comprising

(a) a spindle driven for rotation about a longitudinal axis, said spindle including a hollow cylindrical portion having an axis corresponding with said longitudinal axis and an annular flange portion extending outwardly from one end of said cylindrical portion;

(b) a clutch plate connected with the other end of said spindle cylindrical portion for rotation therewith;

(c) means mounted on said spindle between said spindle flange portion and said clutch plate for transmitting rotational drive forces from said spindle to at least a pair of belts, said belt drive transmission means including

(1) a clutch drum slidably connected with said spindle cylindrical portion and including means connected with said clutch plate for rotatably driving said clutch drum about said longitudinal axis with said clutch plate;

(2) spacer means freely mounted on said spindle cylindrical portion in spaced relation between said clutch drum and said spindle flange portion for defining annular recesses for receiving the belts, respectively; and

(3) means for displacing said clutch drum in the longitudinal direction toward said spacer means and said spindle flange portion to compress said spacer means evenly against the belts, whereby the rotation of said spindle is evenly transmitted to the belts to drive the belts at equal speeds.

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**4,743,222**

## SPEED CONTROL DEVICE FOR A BICYCLE

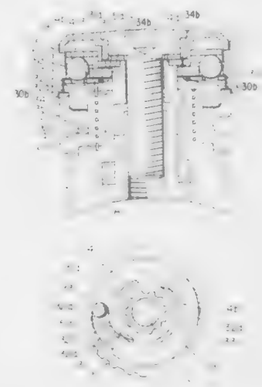
**Masashi Nagano, Izumi, Japan, assignor to Shimano Industrial Company Limited, Osaka, Japan**

**Filed Jul. 30, 1986, Ser. No. 890,722**

**Claims priority, application Japan, Aug. 2, 1985, 60-171320; Jul. 25, 1986, 61-176406**

**Int. Cl.[4] F16H** *9/10, 9/02*

**U.S. Cl. 474—56** **17 Claims**



1. A speed control device for a bicycle, comprising:

a fixing member;

a lever body supported rotatably to said fixing member;

a positioning mechanism provided with (i) a positioning member rotatable integrally with said lever body relative to said fixing member and comprising a first positioning portion having a plurality of engaging portions corresponding to a first number of speed change stages, a second positioning portion having a larger number of engaging portions than said engaging portions of said first positioning portion, said engaging portions of said second positioning portion corresponding to a second number of speed change stages, (ii) at least one engaging member non-rotatable with said lever body and engageable with each of said engaging portions, and (iii) an urging means biasing said engaging member toward said engaging portions; and

a switching means, for causing said engaging member to selectively engage with one of said first positioning portion and said second positioning portion to change a number of speed change stages set by said positioning mechanism between said first number and said second number.

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**4,743,223**

## SPEED RATIO CONTROL SYSTEM FOR A CONTINUOUSLY VARIABLE TRANSMISSION FOR VEHICLE

**Setsuo Tokoro; Tomoyuki Watanabe; Takashi Hayashi, all of Susono, and Takashi Shigematsu, Mishima, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan**

**Filed Jun. 3, 1986, Ser. No. 870,182**

**Claims priority, application Japan, Jun. 3, 1985, 60-120073**

**Int. Cl.[4] F16H** *11/02*

**U.S. Cl. 474—69** **8 Claims**



1. A speed ratio control system for a continuously variable transmission, wherein said control system controls an oil flow rate to a hydraulic servo of a V-shaped pulley device on an input or an output side so that a speed ratio between the input and the output sides can be continuously changed, said oil flow rate being controlled by a flow control valve continuously variable with a control voltage or current, said system comprising:

means for seeking a deviation between a target value and a measured value, said values corresponding to speed ratios of said continuously variable transmission; and

means for making a correction so that said deviation and a rate of change per unit time of said speed ratio will have a linear relationship over the entire area of control, said correction being made at least in accordance with operational characteristics of said flow control valve.

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**4,743,224**

## AUTOMATIC BELT TENSIONER

**Hiroshi Yoshikawa, Mitaka; Naoto Muto, Fuchu, and Kohichi Fukunaga, Hoya, all of Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed May 20, 1987, Ser. No. 52,674**

**Claims priority, application Japan, May 24, 1986, 61-78359[U]**

**Int. Cl.[4] F16H** *7/12*

**U.S. Cl. 474—101** **3 Claims**

1. An automatic belt tensioner comprising:

a substantially vertically disposed cylindrical body having an axial chamber;

a shaft having an external thread and rotatably mounted in the axial chamber of the body;

a torsion spring provided between the body and the shaft so as to urge the shaft in a rotational direction;

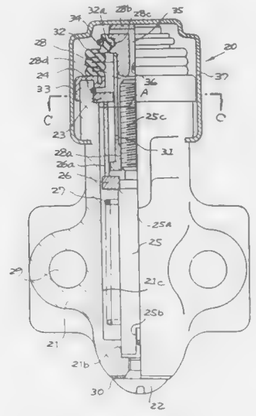
a cylindrical rod having an axial bore and an internal thread engaged with the external thread of the shaft,

an upper end of the rod being projected from the body so as to be operatively connected to a tension pulley for a belt;

holding means for holding the rod so as to permit axial movement of the rod;

means for circulating oil between the axial chamber of the body and the bore of the rod at a portion above the internal thread of the rod;

sealing means provided between the body and the rod for preventing the oil from leaking out of the rod;



the torsion spring and both the threads being arranged to project the rod by the rotation of the shaft urged by the torsion spring.

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**4,743,225**

## AUTO-TENSIONER FOR TIMING-BELT

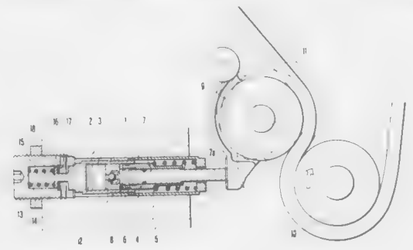
**Yoshio Okabe, Ciryu, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan**

**Filed Aug. 20, 1985, Ser. No. 767,423**

**Claims priority, application Japan, Aug. 29, 1984, 59-130836[U]**

**Int. Cl.[4] F16H** *7/12*

**U.S. Cl. 474—133** **1 Claim**



1. An auto-tensioner for timing-belts, comprising:

a cylindrical body slidably supported by a base member,

a plunger slidably inserted into said cylindrical body,

a piston slidably inserted into said plunger, one end of said piston protruding from one end of said cylindrical body to contact an idler pulley for giving tension to the timing belt by hydraulic pressure, and

a spring accommodated in a spring box formed in said base member, said spring pushing another end of said cylindrical body in the same direction as said piston pushing the idler pulley, wherein said spring has a spring force as large as allowable within the range not exceeding an endurance limit of the timing belt.



**4,743,226**

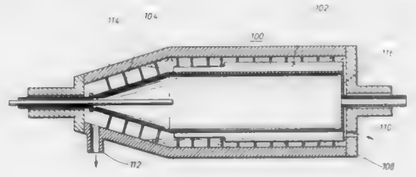
## HIGH CAPACITY CONTINUOUS SOLID BOWL CENTRIFUGE

**Roger W. Day, and Charles N. Grichar, both of Houston, Tex., assignors to Geosource Inc., Houston, Tex.**

**Filed Apr. 29, 1983, Ser. No. 490,195**

**Int. Cl.[4] B04B** *1/20*

**U.S. Cl. 494—53** **12 Claims**



1. A solid bowl centrifuge for separating a solids/liquid mixture having a solids end and an effluent end, said centrifuge comprising:

conveyor structure adapted to rotate at a differential speed with respect to the bowl, said conveyor structure including:

a plurality of substantially longitudinal vanes each having first and second ends, said longitudinal vanes being increased in size form the solids end to the effluent end of said centrifuge, and said second ends being disposed proximate said effluent end; and

helical flight structure disposed generally about said plurality of substantially longitudinal vances, said flight structure including flights reduced in size from the solids end to the effluent end of the centrifuge, said flight structure and said vanes cooperating to define a plurality of substantially longitudinal channels.

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**4,743,227**

## COLUMN FOR CONTINUOUS PARTICLE FRACTIONATION APPARATUS UTILIZING CENTRIFUGAL FIELD

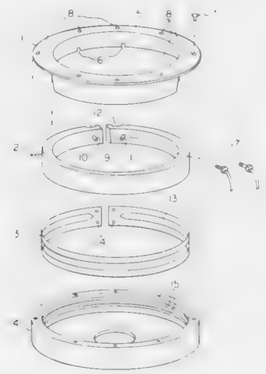
**Makoto Takeuchi, Tokyo, Japan, assignor to JEOL Ltd., Tokyo, Japan**

**Filed Jun. 12, 1987, Ser. No. 62,155**

**Claims priority, application Japan, Jun. 17, 1986, 61-141154; Nov. 27, 1986, 61-182443**

**Int. Cl.[4] B04B** *1/04*

**U.S. Cl. 494—85** **6 Claims**



1. Apparatus defining a column for use in continuous particle fractionation utilizing a centrifugal field comprising:

a column base constituting an outer frame having a cylindrical flange;

a variable diameter intermediate ring for being positioned within the cylindrical flange of the column base having an inclined inner surface, said ring being radially cut to form a circumferential slot;

a tightening ring for being positioned within the intermediate ring having an inclined outer surface, the inclined outer surface abutting the inclined inner surface of the intermediate ring to expand the intermediate ring;

a ribbon-like spacer having a cutout portion extending along its length, said spacer being captured between the cylindrical flange and the intermediate ring to thereby define the axial wall of an annular separation channel;

an inlet port and an outlet port which are formed in the intermediate ring near the slot to introduce and discharge fluid to said separation channel; and

whereby when the tightening ring is forced into the intermediate ring the spacer is compressed between the intermediate ring and the cylindrical flange.

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**4,743,228**

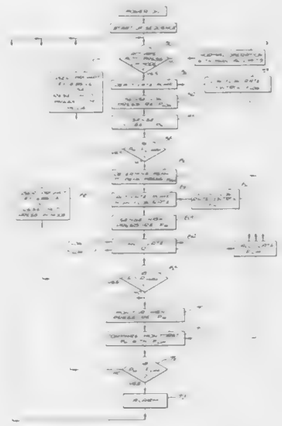
## FLUID FLOW MONITORING METHOD AND SYSTEM

**Robert D. Butterfield, San Diego, Calif., assignor to Ivac Corporation, San Diego, Calif.**

**Filed Aug. 18, 1986, Ser. No. 897,618**

**Int. Cl.[4] A61M** *5/16*

**U.S. Cl. 604—50** **21 Claims**



1. A system for monitoring the pressure of parenteral fluid in a fluid delivery system which includes a pump, tubing for transmitting pumped fluid to a cannula adapted to be inserted into a patient's blood vessel, the pressure monitoring system comprising:

(a) means to control the rate of fluid flow through the delivery system to the patient at a predetermined low flow rate ($F_{Low}$) and at a predetermined high flow rate ($F_{Hi}$);

(b) means to sense the fluid pressure within the fluid delivery system;

(c) means to determine the difference in fluid pressure within the fluid delivery system during periods of the predetermined low flow rate and during period of the predetermined high flow rate;

(d) means to determine the difference between the predetermined high flow rate and the predetermined low flow rate;

(e) means to determine the resistance (R) of the fluid delivery system to fluid flow therethrough from the ratio of the fluid pressure difference to the fluid flow rate difference;

(f) means to calculate a pressure limit ($P_{Lim}$) from the product of resistance (R) and the high flow rate ($F_{Hi}$);

(g) means to compare the fluid pressure sensed within the

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fluid delivery system during a monitoring period with the calculated pressure limit ($P_{Lim}$); and

(h) means to generate an alarm signal when the pressure sensed exceeds the calculated pressure limit.

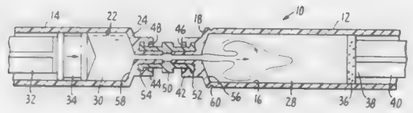
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**4,743,229**

## COLLAGEN/MINERAL MIXING DEVICE AND METHOD

**George Chu, Sunnyvale, Calif., assignor to Collagen Corporation, Palo Alto, Calif.**

**Filed Sep. 29, 1986, Ser. No. 912,985**
**Int. Cl.[4] A61B** *5/10*
**U.S. Cl. 604—82** **9 Claims**



1. A method of making a collagen-based bone repair preparation, comprising:

providing a first and a second syringe each having a hollow barrel substantially closed at one end and open at a second end, said first syringe containing a quantity of a particulate mineral material and said second syringe containing a quantity of reconstituted fibrillar atelopeptide collagen, wherein said first syringe is provided with an air escape means comprising a plunger rod having a porous disk at said one end, said plunger rod being slidably insertable into said first syringe;

aligning said first and second syringes so that said substantially closed ends of each of said syringes are proximate; and

injecting said fibrillar collagen from said second syringe into said first syringe by applying longitudinal pressure on said plunger rod while maintaining said porous disk in contact with said fibrillar collagen, so that a relatively homogeneous collagen-mineral mixture is provided within said first syringe.

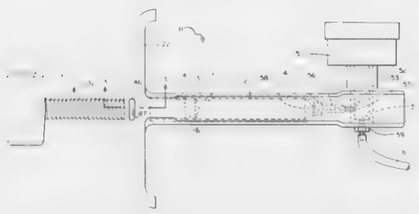
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**4,743,230**

## INFLATING AND DEFLATING DEVICE FOR BALLOON DILATATION CATHETERS

**Richard A. Nordquest, Del Mar, Calif., assignor to Advanced Cardiovascular Systems, Inc., Mountain View, Calif.**

**Filed Sep. 5, 1985, Ser. No. 772,715**
**Int. Cl.[4] A61M** *5/00*
**U.S. Cl. 604—97** **5 Claims**



1. In an inflating and deflating device for a balloon dilatation catheter, a housing, a syringe carried by the housing, the syringe having an outlet adapted to be connected to the catheter, the syringe comprising a container and a piston slidably mounted in the container, the syringe also including a rigid plunger connected to the piston and extending out of the housing, said plunger having tapered helical threads formed thereon to provide an elongate ratchet, a pawl movable between rachet-engaging and rachet-disengaging positions, yieldable means carried by the housing and engaging the pawl and yieldably urging the pawl into its rachet-engaging position, and means carried by the housing and engaging the pawl for moving the pawl out of engagement with the ratchet to release the ratchet, the pawl and the ratchet being formed so that when the syringe contains a liquid, the plunger can be pushed inwardly by hand so that the tapered threads cause the pawl to be cammed outwardly against the force of the yieldable means to cause the piston to provide a desired pressure on the liquid in the container or alternatively the plunger can be rotated with the pawl in engagement with the threads to cause gradual movement of the piston to gradually increase or decrease the pressure on the liquid in the container.

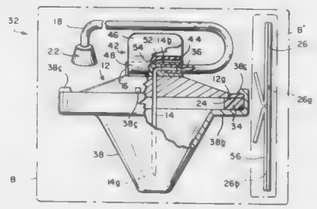
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**4,743,231**

## DRUG ADMINISTRATION NEEDLE UNIT

**Donald A. Kay, Sharon, and Per Troein, Foxboro, both of Mass., assignors to Pharmacia Nutech, Walpole, Mass.**

**Filed Jul. 6, 1987, Ser. No. 70,172**
**Int. Cl.[4] H61M** *5/00*
**U.S. Cl. 604—180** **11 Claims**



1. A drug administration needle or cannula set comprising

A. a rigid base having

(1) an upper surface

(2) a relatively flat smooth undersurface area, and

(3) a low profile;

B. a tubular needle or cannula having one end that is pointed and an opposite end that is secured to the base at the middle thereof so that the needle projects from the base generally perpendicular to the base undersurface area;

C. a flexible tube having one end secured to the base in fluid communication with said opposite end of the needle or cannula;

D. a handle;

E. coacting means on the base upper surface and on the handle for releasably connecting the handle to the base; and

F. a sheetlike dressing, said dressing having

(1) an adhesive surface,

(2) an area that is appreciably larger than that of the base undersurface, and

(3) means defining an opening in the dressing so that when the dressing is draped over the upper surface of the base with said flexible tubing projecting through said opening, the dressing lies flat against the base upper surface with a relatively wide annular edge margin of the dressing extending beyond the periphery of the base.

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**4,743,232**

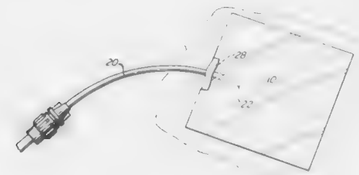
## PACKAGE ASSEMBLY FOR PLASTIC FILM BANDAGE

**Robert J. Kruger, Arlington Heights, Ill., assignor to The Clinipad Corporation, Guilford, Conn.**

**Filed Oct. 6, 1986, Ser. No. 915,564**
**Int. Cl.[4] A61M** *25/02*
**U.S. Cl. 604—180** **10 Claims**

1. A package assembly for a plastic film bandage, which comprises:

a plastic film bandage having skin adhesive on one side thereof; a support sheet removably attached to the other side opposed to said one side of said plastic film bandage and extending beyond the edge of said bandage in at least one area; a tube communicating across an edge of said bandage, a portion of said tube being positioned against said one side thereof; means for anchoring said tube into the above-described position; peel-away protection sheet means releasably attached to said bandage and covering the one side of said bandage and that portion of said tube



which is positioned against said one side; and hinge means attaching said support sheet and at least a portion of said peel-away protection sheet means at a peripheral position spaced from said bandage, whereby upon opening, at least a portion of said protection sheet means may be removed and may serve as a grippable extension of said support sheet as the bandage is applied to a patient.



**4,743,234**

## SYRINGE MAGNIFIER

**Norbert Leopoldi, Chicago, and William P. Heinrich, McHenry, both of Ill., assignors to The Cloverline, Inc., Chicago, Ill.**

**Filed May 18, 1987, Ser. No. 50,776**
**Int. Cl.[4] A61M** *5/00*
**U.S. Cl. 604—187** **5 Claims**



1. A syringe magnifier made from a crystal clear plastic material comprising a generally elongated solid member having a generally rounded outer magnifying surface, a generally rounded inner surface forming a recess extending lengthwise of the member, and an integral retaining clip having an undercut lip extending along an edge of said recess, and a complementally opposed updercut lip extending along an opposite edge of said recess.

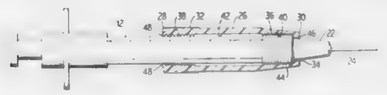
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**4,743,233**

## SAFETY CAP SYRINGE

**Michael B. Schneider, Springfield, Ill., assignor to Schneider Medical Technologies, Inc., Chicago, Ill.**

**Continuation of Ser. No. 824,259, Jan. 23, 1986, abandoned. This application Dec. 22, 1986, Ser. No. 942,811**
**Int. Cl.[4] A61M** *5/32*
**U.S. Cl. 604—192** **15 Claims**



1. A hypodermic syringe for giving injections, comprising:

a hollow barrel having first and second opposite ends;

a plunger slidably movable within said barrel and extending from said first barrel end;

a hypodermic needle mounted extending axially outward from said second opposite end of said barrel and said barrel;

a sleeve encircling a portion of said barrel and slidably movable between a first position being characterized by said needle projecting from said sleeve and a second position being characterized by said needle being contained within said sleeve; and

a first rotationally locking engaging means for engagement between said sleeve and said barrel and selectively rotationally fastenable to securely maintain said sleeve in said second position, said first engaging means preventing accidental movement of said sleeve from said second position;

an end of said sleeve extending in the direction of said hypodermic needle being tapered inwardly to provide clearance during use of said syringe when said sleeve is in said first position;

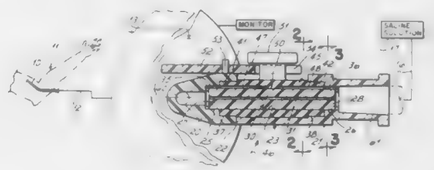
whereby accidental contact with said needle is prevented by said sleeve when in said second position.

**4,743,235**

## FLUSH CONTROL DEVICE

**Charles C. Waldbillig, Columbus, and Jon F. Short, London, both of Ohio, assignors to Medex, Inc., Hilliard, Ohio**

**Filed Sep. 5, 1986, Ser. No. 903,730**
**Int. Cl.[4] A61M** *5/00*
**U.S. Cl. 604—250** **2 Claims**



1. A device for controlling the flow of liquid to a catheter in a blood vessel comprising:

two axially-aligned end caps that are joined together to form a casing, said end caps having liquid passages therein,

an elongated capillary tube having opposing ends supported in respective end caps,

and a flexible resilient sleeve surrounding said capillary tube, said sleeve having its ends fitted into said end caps and in liquid communication therewith,

said sleeve having an axially-extending groove interrupted by a central dam which is in engagement with said capillary tube,

said sleeve being in contact with said capillary tube everywhere along the length of said sleeve except for said groove,

said sleeve having a pull tab for pulling said dam away from said tube,

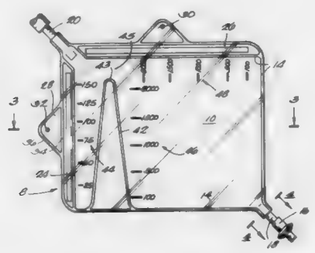
whereby liquid normally flows slowly from one end cap through said capillary to said other end cap and when said dam is pulled away, said liquid flows rapidly along said axially-extending groove from one end cap to the other.

**4,743,236**

## COMBINATION URINE METER AND URINARY DRAINAGE BAG AND THE METHOD OF USE

James G. Manschot, Eagle, Wis., assignor to Plastronics, Inc., Racine, Wis.

Continuation-in-part of Ser. No. 735,399, May 17, 1985, abandoned. This application Sep. 24, 1986, Ser. No. 910,878
Int. Cl.[4] A61M *1/00*
U.S. Cl. 604—323 9 Claims



1. A combination urine meter and urinary drainage bag comprising:

a sealed container having an inlet means through which urine can flow into the interior of said container, said sealed container including a front and back sheet of fluid impervious flexible material sealed along the edges thereof, said sealed container having a top edge, a bottom edge and two side edges;

a drainage tube in fluid communication with said inlet means,

a first hanger means mounted on the top edge of said container for hanging said container in a meter operating position;

stiffener means comprising a first stiffener member mounted along the top edge of said container and a second stiffener member mounted along said side edge of said container, said inlet means located in a corner of said sealed container between the ends of said first and second stiffener members;

a barrier means for dividing the interior of the container into a urine metering compartment and a urine collection compartment, said barrier means comprised of a seal line between said front and back sheets which extends from the bottom edge of said sealed container at an angle to a point spaced from the top edge of said container and then curves downwardly at an angle to said bottom edge of said container;

said inlet means on said container positioned so that urine flowing therethrough when said container is in its meter operating position will flow into and be collected in said urine metering compartment;

passageway means interconnecting said urine metering compartment with said urine collection compartment, said passageway means defined by the space between the top portion of said seal line and the top edge of said sealed container;

said passageway means serving to allow flow of urine from said metering compartment to said urine collection compartment when the meter is rotated from its meter operating position, said passageway means further serving to allow flow of urine from said inlet into said urine collection compartment when said meter is in its urine drainage operating position; and

a drainage outlet means located in the lower portion of said urine collection compartment; and

a second hanger means mounted on a side edge of said container for hanging said container in a urinary drainage operating position wherein urine will flow directly from said inlet means into said urine collection compartment when said container is in said urinary drainage operating position.

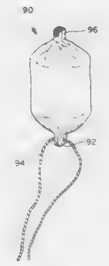
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**4,743,237**

## CONTAINER HAVING SECURELY-ATTACHED HANDLING CORD AND METHOD AND APPARATUS FOR PRODUCING THE CONTAINER

Douglas D. Sweere, Neenah, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.

Filed Dec. 18, 1986, Ser. No. 943,569
Int. Cl.[4] A61F *13/16*
U.S. Cl. 604—358 8 Claims



1. A container comprising a thermoplastic outer gauze covering, a filler and a handling cord wherein said cord is sealed to said container by melting and fusing said thermoplastic gauze to said cord.

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**4,743,238**

## WETNESS INDICATING HOT-MELT ADHESIVES

Herman Colon, Monsey, N.Y., and Albery Maletsky, Franklin Lakes, N.J., assignors to Malcolm Nicol & Co., Lyndhurst, N.J.

Continuation-in-part of Ser. No. 839,943, Mar. 17, 1986, Pat. No. 4,681,576. This application Jul. 14, 1987, Ser. No. 70,206
The portion of the term of this patent subsequent to Jul. 21, 2004, has been disclaimed.
Int. Cl.[4] A61F *13/16, 13/18, 13/20;* C08J *23/00*
U.S. Cl. 604—361 45 Claims

1. A wetness indicating hot-melt adhesive composition comprising:

(A) 20 to 70 wt.% of total polymer components, said polymer components comprising about 28 to 100 wt.% of water sensitive polymer selected from vinyl pyrrolidone homopolymer, vinyl pyrrolidone/vinyl acetate copolymer, or a mixture thereof, any balance comprising at least one polymer selected from the group consisting of ethylene/vinyl acetate copolymer, ethylene/acrylic acid copolymer and polyamide;

(B) 25 to 60 wt. % of an acidic composition selected from the group consisting of

(a) at least one free monobasic saturated or unsaturated fatty acid having an acid number above 137,

(b) at least one rosin acid having an acid number above 130, and

(c) a combination of said free monobasic saturated or unsaturated fatty acid and said rosin acid;

(C) 0 to 40 wt.% of water soluble wax;

(D) 0 to 60 wt.% of glycerol monostearate;

(E) 0 to 55 wt.% of hydrogenated castor oil;

(F) 0 to 15 wt.% of polyalkylene wax;

(G) 0 to 60 wt.% of compatible plasticizer; and

(H) a wetness indicating agent capable of causing the composition to change color in response to the presence of moisture, in an amount effective to provide the composition with a readily visible color when wet, which is distinct from the color when dry.

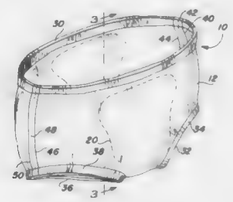


**4,743,239**

## DISPOSABLE BRIEF HAVING AN AREA OF RELATIVELY THIN ABSORBENT MATERIAL AND AN AREA OF RELATIVELY THICK ABSORBENT MATERIAL

Shelley K. Cole, 4505 W. North La., Glendale, Ariz. 85302

Filed Nov. 7, 1986, Ser. No. 928,021
Int. Cl.[4] A61F *13/16*
U.S. Cl. 604—385 R 8 Claims



1. A disposable training brief comprising, in combination:

outer impermeable layer means;

first absorbent layer means, including a first relatively thin outer absorbent layer and a first relatively thin inner absorbent layer, substantially coextensive with the outer impermeable layer;

second absorbent layer means including a relatively thick absorbent layer secured to the first absorbent layer means and disposed between the first outer absorbent layer and the first inner absorbent layer for providing a relatively highly absorbent layer;

waist band means for securing the training brief to a user;

leg band means through which the user's legs extend;

perforation means extending from the leg band means to the waist band means through the outer impermeable layer means for tearing the outer impermeable layer means for removing the training brief in case of an accident by the user, and

side zones on the outer impermeable layer means adjacent to the perforation means at which the first absorbent layer means terminates.

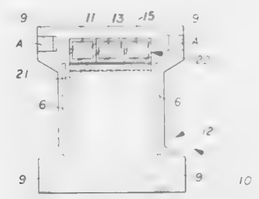
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**4,743,240**

## DISPOSABLE DIAPER SYSTEM

Monica Powell, Takoma, Wash., assignor to Robert Dohlke, Spanaway, Wash.

Filed Jan. 30, 1987, Ser. No. 8,755
Int. Cl.[4] A61F *13/16*
U.S. Cl. 604—385 R 18 Claims



1. A diaper for use with babies, toddlers or the like comprising in combination:

a substantially rectangular blank having tab portions at corners thereof whereby parallel lines between adjacent tab portions define longitudinal and latitudinal edges thereof, two longitudinal edges having a narrowed area provided with an elastic edge so as to accommodate the leg area of the baby, and said latitudinal edges oriented to circumscribe the waist area a baby,

said rectangular blank formed from a plurality of layers including an absorbent layer and a plastic outer l

and a protective bag integrally formed with said diaper whereby an interior of said bag can be grasped by a person changing said diaper and the entire diaper can be pulled within said bag thereby inverting said bag to totally encapsulate a soiled diaper,

wherein said diaper bag has an interior and an exterior, and said exterior is interposed between said absorbent layer and said plastic outer layer, and said bag interior when inverted encapsulates the entire diaper.

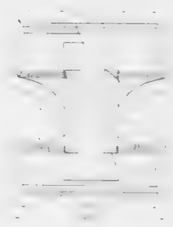
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**4,743,241**

## DISPOSABLE ABSORBENT UNDERPANTS

Takamitsu Igaue, Kawanoe, and Kohji Inoue, Ehime, both of Japan, assignors to Uni-Charm Corporation, Ehime, Japan

Filed Apr. 14, 1987, Ser. No. 38,143
Claims priority, application Japan, Apr. 15, 1986, 61-87590; Apr. 15, 1986, 61-87591
Int. Cl.[4] A61F *13/16*
U.S. Cl. 604—385 A 11 Claims



1. Disposable absorbent underpants including a main body of underpants comprising a water-permeable topsheet destined to be in contact with wearer's skin, a water-impermeable backsheet located on a side opposite to the topsheet and an absorbent core sandwiched between these two sheets, and elastic members adapted to form elastic gathers in a waist band and a pair of leg-holes, respectively, wherein said pair of leg-holes are defined by corresponding cutaway areas formed in laterally opposite sides of a crotch area as viewed in a developed condition of said main body; wherein said elastic members associated with said leg-holes surround the corresponding cutaway areas except the outer edges thereof as viewed in the developed condition of said main body; and wherein said main body is assembled by folding said main body along a mid-line dividing said main body into vertically contiguous two halves back onto itself and then joining these two halves folded back onto each other along laterally opposite side edges of the folded main body.

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**4,743,242**

## DISPOSABLE DIAPER WITH REFASTENABLE TAPE SYSTEM

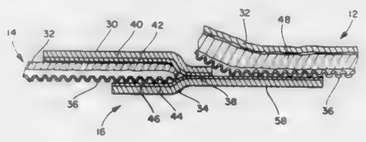
Herbert E. Grube; Michael A. Sciaraffa, both of Outagamie County; Mark L. Kaspar, and Leonard M. Kaczmarzyk, both of Winnebago County, all of Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Continuation of Ser. No. 637,929, Aug. 6, 1984, Pat. No. 4,655,761. This application Mar. 17, 1987, Ser. No. 7,057
The portion of the term of this patent subsequent to Apr. 7, 2004, has been disclaimed.
Int. Cl.[4] A61F *13/16*
U.S. Cl. 604—389 8 Claims

1. A refastenable garment comprising moisture-impermeable embossed backing sheet and a refastenable pressure-sensitive adhesive fastening tape wherein:

(1) said fastening tape comprises:

a polypropylene polymer having a matte finished outer surface,
a smooth inner adhesive-coated surface,
(2) said embossed backing sheet comprises:



a film thickness of about 1.2 to about 1.7 gauge,
(3) said tape and said backing have:
a 180 degrees peel of between about 400 and about 575 grams per inch at a 300 mm/min peel speed.

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**4,743,243**
**NEEDLE WITH VENT FILTER ASSEMBLY**
**Vincent L. Vaillancourt, 14 Bunyan Dr., Livingston, N.J. 07039**
**Continuation-in-part of Ser. No. 567,877, Jan. 3, 1984, abandoned. This application Sep. 25, 1985, Ser. No. 779,935**
**Int. Cl.[4] A61B** *19/00*
**U.S. Cl. 604—405** **4 Claims**



1. A needle with a vent filter assembly for use in the aspiration of a drug solution from a supply into a syringe after an outer needle shield is removed so that an injecting needle is exposed and ready for use with an attached syringe containing said drug solution and for the injection of said drug solution into a patient, this vent filter assembly including:
(a) a metal injecting needle of conventional construction and configuration and fixedly attached to a hub portion conventionally formed with a recess adapted to mount on the discharge end of a syringe;
(b) a large barrel shaped tubular vent housing of molded plastic and having an open rear end and front end and a through passageway for the injection needle, the rear end formed with a rear bore extending inwardly from the rear end, with said bore sized and adapted to extend a short distance inwardly from termination of the rear end and adapted to be slideably mounted on the forward end of said needle hub, and in which there are provided and formed a plurality of inwardly-extending ribs which engage and secure a tubular filter membrane in a desired intermediate position within said molded housing, said ribs on their inner extents providing a guideway for the insertion of and withdrawal of the injecting needle, this tubular vent housing having its midportion formed with a plurality of through apertures providing for passage of air from the exterior to the interior and from the interior to the exterior through said secured filter membrane, and configuring these ribs so that at their rearward face each rib terminates in a formed surface to provide a stop abutment surface, these abutment surfaces positioned a short distance inward from the rear termination of the vent housing;
(c) a hydrophobic filter membrane of a tubular configuration having an interior diameter larger than the needle hub and held in position in the midportion of said housing so that all air from and to said supply is caused to pass through said filter;
(d) a rigid cannula portion which is molded with and hub is molded and is an integral part of the vent housing, said cannula sized and positioned so as to provide a forward reduced diameter portion of the housing, this cannula providing a slide guide and surrounding wall member for said injecting needle, said cannula and said injecting needle providing an annular space therebetween sufficient for a pathway along which air can and does flow, said rigid cannula, when said tubular vent housing is in mounted condition, having its entering end terminating before a sharpened end portion of the injecting needle, said sharpened end and rigid cannula sized so as to pierce a stopper and the like of a vial;
(e) a resilient O-ring mountable in said rear bore and sized to engage said bore and the abutting surface of the molded ribs, and in mounted condition to be substantially within said bore, said O-ring providing for hermetically sealing the hub of the injecting needle and the tubular vent housing to prevent an unwanted flow of air while with manipulation being able to separate and withdraw the injecting needle from the rigid cannula;
(f) a plurality of shallow exterior grooves formed in the larger barrel portion of the tubular vent housing, said grooves extending from the formed vent filter apertures to a forward end of said larger barrel portion housing, these shallow grooves providing air flow paths to and from the filter, and
(g) a thin, tubular shrink-wrap retainer which is positioned and with heat is affixed to the larger barrel portion of the molded tubular vent housing and with said shrink-wrap open to the front so that said shallow grooves are open to the front of the housing, with said shrink-wrap providing an exterior protective member of and for the outwardly-exposed surface of the filter membrane, and with the rear end of the shrink-wrap extending rearwardly of the tubular vent housing so that when the shrink-wrap film is affixed this extending portion is caused to be turned inwardly and transversely on the outer surface of said tubular vent housing this shrink-wrap portion extending sufficiently inward to provide a retaining means for the mounted O-ring seal, the retained O-ring stopped in its forward travel by the abutment surfaces formed on the inwardly-extending ribs, and in mounted and retained condition said O-ring engages the bore of the housing and the needle hub portion to effect and provide a seal of said passageway so there is provided a protected pathway for air to pass to and from the outside atmosphere to the interior of said tubular vent housing, with said filter removing unwanted contaminants from said air pathway.

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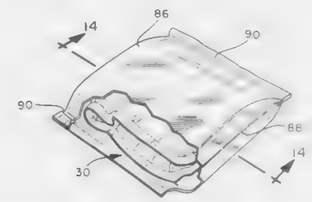
**4,743,244**
**WATER ABSORBING POLYMER COMPOSITIONS AND ARTICLES PREPARED THEREFROM**
**Bi LeKhac, West Chester, Pa., assignor to Arco Chemical Company, Newtown Square, Pa.**
**Continuation-in-part of Ser. No. 750,727, Jun. 28, 1985, abandoned. This application Apr. 11, 1986, Ser. No. 851,072**
**Int. Cl.[4] A61F** *13/16;* **C08L** *71/00, 71/02*
**U.S. Cl. 604—376** **17 Claims**

7. An article of manufacture having excellent water and electrolyte absorption capacity comprising a cured water-absorbing polymer composition and a means for supporting said composition to present said composition for absorption usage, wherein said polymer composition comprises a blend of: (a) from about 20 to about 80 weight percent a copolymer containing from about 25 to about 75 mole percent recurring units of at least one $\alpha,\beta$-unsaturated monomer bearing at least one pendant unit selected from the group consisting of a carboxylic acid unit, a carboxylic acid salt unit, a carboxylic acid anhydride unit, a carboxylic acid imide unit, a carboxylic acid amide unit and a carboxylic acid ester unit and from about 75 to about 25 mole percent recurring units of a copolymerizable monomer; and, (b) from about 80 to about 20 weight percent a polyether derived from $C_2$ to $C_{10}$ alkylene oxides, wherein from about 20 to about 65 percent of the total pendant units introduced through the $\alpha,\beta$-unsaturated monomer must either be carboxylic acid units or must be converted to carboxylic acid units and from about 35 to about 80 percent of the pendant units must either be carboxylic acid salt units or must be converted to carboxylic acid salt units and wherein at least a portion of the oxide groups on the polyether are interacted with the carboxyl hydrogen atoms on the pendant carboxylic acid units such that the copolymer and the polyether are associated through hydrogen bonds.



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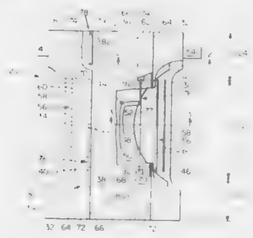
**4,743,245**
**LABIAL SANITARY PAD**
**Frederich O. Lassen, Winnebago County; Robert J. Peerenboom, and Cheri L. Schultz, both of Outagamie County, all of Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.**
**Division of Ser. No. 707,338, Mar. 1, 1985, Pat. No. 4,631,062, which is a continuation-in-part of Ser. No. 654,927, Sep. 27, 1984, abandoned, and a continuation-in-part of Ser. No. 612,506, May 21, 1984, abandoned. This application Jul. 30, 1986, Ser. No. 891,701**
**Int. Cl.[4] A61F** *13/16*
**U.S. Cl. 604—385 R** **2 Claims**



1. A packaged sanitary napkin, said napkin comprising an anatomically, generally self-conforming labial pad configured for disposition within the vestibule of a wearer and for at least partially occluding the same respecting fluid flow therefrom, said napkin comprising a posterior region having a central zone adapted to yield a raised profile for projection within said vestibule and an anterior region merging with said posterior region for generally external disposition about the forward vulvar region of said wearer, said napkin including a top, body-contacting surface divided centrally by a longitudinal axis; wherein said napkin is folded about said longitudinal axis with said top surface lying outwardly, said napkin being disposed within a sealed polymeric packaging film while in a folded configuration.

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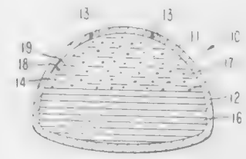
**4,743,246**
**ABSORBENT ARTICLE HAVING DUAL WAIST CUFFS**
**Michael I. Lawson, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio**
**Division of Ser. No. 786,926, Oct. 11, 1985, Pat. No. 4,695,278. This application Jul. 6, 1987, Ser. No. 69,917**
**Int. Cl.[4] A61F** *13/16*
**U.S. Cl. 604—385 A** **18 Claims**



1. An integral disposable absorbent article comprising:
a liquid pervious topsheet;
a liquid impervious backsheet associated with said topsheet;
an absorbent core disposed between said topsheet and said backsheet;
an elastically contractible gasketing cuff disposed adjacent each end edge of the absorbent article to form waistcuffs,
a barrier cuff disposed adjacent each of said gasketing cuffs, each of said barrier cuffs having a proximal edge and a distal edge; and
a spacing means associated with each of said barrier cuffs for spacing said distal edge away from the top surface of said topsheet, whereby a channel is formed to improve the containment characteristics of the article in the waist regions.

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**4,743,247**
**PROCESS FOR MANUFACTURING DOSAGE FORM**
**Patrick S. Wong, Hayward, Calif., assignor to ALZA Corporation, Palo Alto, Calif.**
**Continuation of Ser. No. 639,982, Aug. 13, 1984, abandoned. This application Mar. 31, 1986, Ser. No. 846,403**
**Int. Cl.[4] A61K** *9/22*
**U.S. Cl. 604—892.1** **4 Claims**



1. An article of manufacture useful as a dosage form for dispensing a beneficial agent formulation, the article comprising:
(a) a shaped wall comprising in at least a part a semipermeable composition permeable to the passage of an exterior fluid, the wall surrounding and forming:
(b) a compartment comprising an internal empty space, a layer of a wax and a layer of a hydrogel; and,
(c) means in the wall for communicating the exterior of the article of manufacture with the compartment.

3. A process for manufacturing a dispensing device provided with an internal empty space for receiving beneficial agent formulation, the process comprising:
(a) forming a layer of wax;
(b) surrounding the layer of wax with a wall comprising in at least a part a semipermeable composition;
(c) forming at least one passageway in the wall connecting the exterior with the interior of the device;
(d) heating the wax; and,
(e) draining the wax through a passageway from the device, thereby providing an internal empty space in the device.

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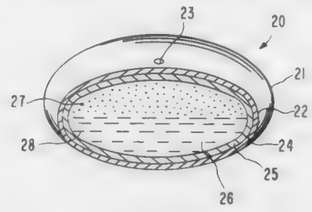
**4,743,248**
**DOSAGE FORM FOR DELIVERING ACID SENSITIVE BENEFICIAL AGENT**
**Marc L. Bartoo, Seattle, Wash.; Patrick S. L. Wong, Hayward; Felix Theeuwes, Los Altos, Calif., and Brian Barclay, Sunnyvale, Calif., assignors to ALZA Corporation, Palo Alto, Calif.**
**Filed Aug. 11, 1986, Ser. No. 895,551**
**Int. Cl.[4] A61K** *9/22*
**U.S. Cl. 604—892.1** **10 Claims**

1. A dosage form for dispensing a beneficial agent formulation to an environment of use, the dosage form comprising:
(a) a first wall that permits the passage of fluid and comprises means for keeping its chemical integrity in a first fluid environment exhibiting a pH less than 5 and for losing its chemical integrity in a second fluid environment exhibiting a pH greater than 5;

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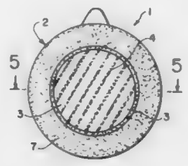
(b) a second wall that permits the passage of fluid and comprises means for keeping its chemical integrity in a first fluid environment exhibiting a pH less than 5 and for keeping its chemical integrity in a second environment exhibiting a pH greater than 5;
(c) a compartment formed by the first wall and the second wall with the first wall surrounding and facing the inside of the compartment and the second wall surrounding the first wall and facing the environment of use;




(d) a beneficial agent formulation in the compartment, which agent formulation forms with fluid that enters the compartment a fluid environment exhibiting a pH less than 5;
(e) at lease one passageway through the walls for dispensing the beneficial agent formulation from the dosage form to the environment of use over time; and,
(f) wherein, fluid from the environment exhibiting a pH greater than 5 enters the dosage form causing the first wall at the end of the dispensing of the beneficial agent to lose its chemical integrity for facilitating discharge of the dosage form from the environment of use.

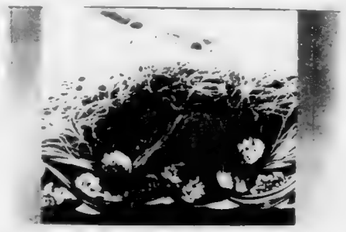
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**4,743,249**
**DERMAL AND TRANSDERMAL PATCHES HAVING A DISCONTINUOUS PATTERN ADHESIVE LAYER**
**Frederic D. Loveland, Suffern, N.Y., assignor to Ciba-Geigy Corp., Ardsley, N.Y.**
**Continuation of Ser. No. 829,636, Feb. 14, 1986, abandoned. This application Jun. 10, 1987, Ser. No. 61,024**
**Int. Cl.[4] A61F** *7/02*
**U.S. Cl. 424—447** **28 Claims**




1. In a dermal or transdermal drug delivery system comprising a drug occlusive backing layer, a drug reservoir thereon and a first adhesive to affix (1) said drug reservoir and occlusive backing layer to (2) a patient such that drug contained in said reservoir can be delivered by said system to said patient, and a removable drug occlusive layer on said adhesive, the improvement comprising said first adhesive being in a discrete, discontinuous pattern in a region which, when said patch is applied to said patient, constitutes a reservoir-patient contact area, said first adhesive being present in said region to a degree which results in at least 10% of said region to no more than about 60% of said region having said first adhesive thereon, such that at least 20% of the entire surface area which will contact said patient once said patch is applied to said patient has an adhesive thereon; said drug being insoluable in said adhesive.

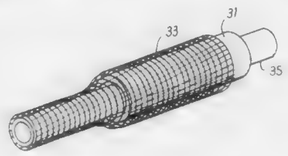
**4,743,250**
**ARTIFICIAL BLOOD VESSEL AND METHOD OF MANUFACTURE**
**Hideaki Kitagawa, Kyoto; Koji Watanabe, Otsu, and Miyoshi Okamoto, Takatsuki, all of Japan, assignors to Toray Industries, Inc., Tokyo, Japan**
**Filed Oct. 9, 1985, Ser. No. 785,662**
**Claims priority, application Japan, Oct. 15, 1984, 59-214410**
**Int. Cl.[4] A61F** *2/06*
**U.S. Cl. 623—1** **4 Claims**



1. A method of manufacturing an artificial blood vessel of fabric having a woven, braided or knitted fabric structure which comprises forming the fabric into the shape of a tube, inserting a spacer into the tube, and applying a high fluid pressure uniformlly against a surface of the said tube-shaped fabric structure with the spacer inserted therin, the application of the fluid pressure being such that fibers on the said surface are randomly intertwined with said fabric structure.

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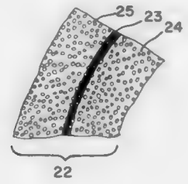
**4,743,251**
**VEIN PROTHESIS AND METHOD FOR PRODUCING SAME**
**Jean-Aubert Barra, Brest, France, assignor to Henry Bocquee and Jacques Gardette, both of Rungis, France, part interest to each**
**Continuation-in-part of Ser. No. 613,394, May 22, 1984, abandoned. This application Mar. 5, 1985, Ser. No. 708,425**
**Claims priority, application France, Dec. 8, 1983, 83 19695**
**Int. Cl.[4] A61F** *2/06*
**U.S. Cl. 623—1** **7 Claims**




1. A method for producing a prothesis for implanting in a human patient so as to form a bypass or arteries such as aorto-coronary bypass, said prothesis comprising a living vein which is taken from the patient and a multi-perforated flexible sheath surrounding the vein, said method comprising taking a vein from the patient, surrounding said vein with a multi-perforated flexible sheath, said sheath having an inside diameter which is so chosen that, after implantation, said vein is constrained by said sheath so that its outside diameter is maintained by said sheath at a value less than the maximum possible diameter of said vein and that its inside diameter is substantially or very close to the receiver artery diameter.



**4,743,252**
**COMPOSITE GRAFTS**
**John B. Martin, Jr.; David C. MacGregor, and Leonard Pinchuk, all of Miami, Fla., assignors to Corvita Corporation, Miami, Fla.**
**Filed Jan. 13, 1986, Ser. No. 818,483**
**Int. Cl.[4] A61F** *2/06*
**U.S. Cl. 623—1** **9 Claims**




1. A porous biocompatible composite graft that is resistant to the passage of fluids through its walls, comprising:
a plurality of layers of biocompatible polymeric fiber material, said fiber layers having been formed by extrusion of a fiber-forming polymer through an orifice to form an elongated fiber that was wound on a mandrel to form a plurality of windings defining said plurality of layers, said plurality of windings defining a non-woven generally porous graft body having overlying fibers that intersect one another to form at least one porous wall of a predetermined thickness that is conducive to tissue ingrowth thereinto;
a generally cylindrical generally non-absorbable non-porous membranc sheath formed in place with respect to the mandrel and at least one of said plurality of layers of the generally porous graft body;
said generally cylindrical generally non-absorbable non-porous membrane sheath was formed in place from a polymeric membrane-forming composition; and
said generally non-absorbable, non-porous membrane sheath is generally interposed between generally consecutive ones of said layers of the generally porous graft body in order to thereby define an internal cylindrical portion of the generally porous graft body and an external cylindrical portion of the generally porous graft body.

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**4,743,253**
**SUTURE RINGS FOR HEART VALVES AND METHOD OF SECURING SAME TO HEART VALVES**
**Ross E. Magladry, 90 Stebbins Rd., Somers, Conn. 06071**
**Filed Mar. 4, 1986, Ser. No. 835,887**
**Int. Cl.[4] B23P** *17/00;* **B21D** *39/00*
**U.S. Cl. 623—2** **1 Claim**



1. A method of securing a suture ring to an implantable heart valve comprising providing an implantable heart valve having a valve body providing a blood flow passageway and occluder means mounted on the valve body for opening and closing the passageway, said valve body having an external, circumferential surface, providing a finished suture ring subassembly comprising a continuous, ductile, electrically conductive compression ring which is dimensioned slightly larger than said circumferential surface of said heart valve body and a fabric layer secured around said compression ring, positioning said finished suture ring subassembly about said heart valve body with said electrically conductive compression ring facing said external, circumferential surface of said valve body and said fabric layer of said subassembly interposed between the compression ring and the circumferential surface of the valve body, and electromagnetically deforming said compression ring so that said compression ring securely clamps said circumferential surface of said valve body with said fabric layer therebetween while permitting relative rotational movement of said suture ring and said heart valve body in a direction along said circumferential surface of the valve body.

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**4,743,254**
**SMALL INCISION INTRAOCULAR LENS**
**James M. Davenport, Laguna Niguel, Calif., assignor to American Hospital Supply Company, Deerfield, Ill.**
**Filed Jan. 31, 1985, Ser. No. 697,215**
**Int. Cl.[4] A61F** *2/16*
**U.S. Cl. 623—6** **12 Claims**



1. An intraocular lens implantable in an eye comprising:
an optic having an optical axis and being elongated in a direction generally transverse to the optical axis whereby the optic has elongated sides;
glare-reducing means coupled to said optic for reducing glare resulting from light in a zone which extends along at least one of the elongated sides of the optic when the intraocular lens is implanted;
said glare-reducing means being deformable to permit a reduction in an overall dimension of the intraocular lens for implantation;
fixation means for fixing the intraocular lens in the eye;
said glare-reducing means including a first glare-reducing section extending along said one elongated side of the optic and a joining section which joins said first glare-reducing section to the optic, said optic having opposite ends and said joining section projecting beyond one of said ends to form a lead in to facilitate implantation; and
said joining section including a tab coupled to said optic and extending outwardly beyond said one end of the optic and a web coupled to said tab at a location spaced outwardly of said one end of the optic.

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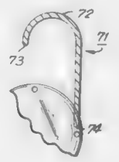
**4,743,255**
**RADIOPAQUE INTRA-OCULAR LENS IMPLANT**
**David S. Bardenstein, 13330 Sherwood Dr., Huntington Woods, Mich. 48235**
**Filed Oct. 20, 1986, Ser. No. 921,353**
**Int. Cl.[4] A61F** *2/16*
**U.S. Cl. 623—6** **7 Claims**

1. A device for implantation in the eye comprising:
an intra-ocular lens; and
at least one support member attached to the lens, the support member comprising a filament of a synthetic polymer and

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containing an X-ray detectable substantially radiopaque material selected from the group consisting of iodide,




bromide and barium salts, the support member being adapted to secure the lens in a position within the eye.

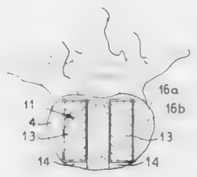
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**4,743,256**

## SURGICAL PROSTHETIC IMPLANT FACILITATING VERTEBRAL INTERBODY FUSION AND METHOD

**John W. Brantigan, 2108 Bramblewood La., Fremont, Nebr. 68025**

**Continuation of Ser. No. 784,112, Oct. 4, 1985, abandoned. This application Jan. 22, 1987, Ser. No. 5,785**
**Int. Cl.⁴ A61F** *2/44*
**U.S. Cl. 623—17** **6 Claims**




1. The method of fusing together adjoining vertebrae bodies having spaced opposed faces with a disc space therebetween and peripheral hard cortex bone surrounding soft cancellous bone which comprises cutting transverse opposed channels in said spaced opposed faces open at one end to the sides of the adjoining vertebrae bodies and defined by both hard cortex bone and soft cancellous bone, inserting through said open ends of the transverse channels an inert rigid plug spanning the disc space, bottoming opposite ends of the plug in said channels at least partially on said hard cortex bone to provide a rigid strut spanning and maintaining said disc space, providing irregular non-yielding surfaces on said plug, and facilitating bone ingrowth around said surfaces in bonded relation therewith.

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**4,743,257**

## MATERIAL FOR OSTEOSYNTHESIS DEVICES

**Pertti Törmälä, Tampere; Pentti Rokkanen, Helsinki; Juha Laiho; Markku Tamminmäki, both of Tampere, and Seppo Vainionpää, Helsinki, all of Finland, assignors to Materials Consultants Oy, Tampere, Finland**

**Filed May 8, 1986, Ser. No. 861,201**
**Claims priority, application Finland, May 8, 1985, 851828**
**Int. Cl.⁴ A61F** *2/02;* **C08L** *67/04*
**U.S. Cl. 623—16** **16 Claims**

1. Surgical, osteosynthesis composite material which is at least partially absorbable in living tissue characterized in that the osteosynthesis material comprises an absorbable polymer or copolymer matrix which is reinforced with absorbable polymeric reinforcement elements which have the same chemical element percentage composition as does the matrix.

**4,743,258**

## POLYMER MATERIALS FOR VASCULAR PROSTHESES

**Yoshito Ikada; Hiroo Iwata, both of Uji, and Masakazu Suzuki, Kyoto, all of Japan, assignors to Japan Medical Supply Co., Ltd., Hiroshima and Yoshito Ikada, Uji, both of, Japan**

**Filed Apr. 12, 1985, Ser. No. 722,669**
**Claims priority, application Japan, Apr. 27, 1984, 59-87432**
**Int. Cl.⁴ A61F** *2/02, 2/54*
**U.S. Cl. 623—1** **7 Claims**

1. A material for vascular prostheses which comprises a polymeric web as a base material and one or more water-soluble and substantially nonionic polymers attached to the surface by graft polymerization or chemical reaction with a reactive group of said surface of said base material in an amount of from 1 to 100 $\mu g/cm^2$, whereby IgG protein adsorbed to the surface is less than 0.4 $\mu g/cm^2$.

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**4,743,259**

## USE OF DEMINERALIZED BONE MATRIX IN THE REPAIR OF SEGMENTAL DEFECTS

**Mark E. Bolander, Washington, D.C., and Gary Balian, Charlottesville, Va., assignors to The University of Virginia Alumni Patents Foundation, Charlottesville, Va.**

**Filed Oct. 29, 1986, Ser. No. 924,513**
**Int. Cl.⁴ A61F** *2/28;* **A61K** *35/12;* **A01N** *1/02*
**U.S. Cl. 623—16** **1 Claim**



1. The process of grafting material from milled bone, comprising,

augmenting the bone proteins of a first quantity of milled bone by dialyzing from solution guanidine-extracted bone proteins from a second quantity of milled bone, adding the extracted bone proteins extracted from the second quantity of milled bone to the first quantity of milled bone, removing unbound bone proteins from the augmented first quantity, and lyophilizing the augmented first quantity of milled bone,

coating the augmented first quantity of milled bone with anti-coagulated plasma containing plasma proteins, and

removing unbound plasma proteins from the coated augmented first quantity of milled bone by rinsing.

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**4,743,260**

## METHOD FOR A FLEXIBLE STABILIZATION SYSTEM FOR A VERTEBRAL COLUMN

**Charles V. Burton, 148 W. Lake St., Excelsior, Minn. 55331**

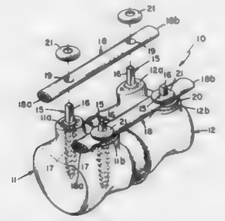
**Filed Jun. 10, 1985, Ser. No. 742,923**
**Int. Cl.⁴ A61B** *17/58*
**U.S. Cl. 623—17** **5 Claims**

1. A method of stabilizing a portion of a vertebral column without fusion, the vertebral column having a first and second vertebra, the first vertebrae being adjacent the second vertebra, each vertebra having a posterior vertebral element, said method comprising:

(a) making an incision to expose the first and second vertebrae;

(b) removing the posterior vertebral element of each of the vertebrae, leaving first and second pedicles of the first vertebra and first and second pedicles of the second vertebra;

(c) anchoring a strong, non-metallic stabilization means stiff enough to stabilize the vertebral column but flexible enough to permit at least limited normal movement of the



vertebral column having a first and second end to the posterior vertebral elements of adjacent vertebrae, wherein when anchored said stabilization means stabilizes, without the use of fusion, the vertical column while still providing flexibility so that forces on the stabilization means are dissipated throughout thereby reducing force concentration.



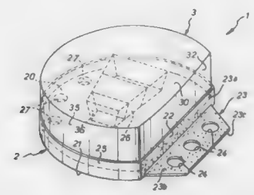
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**4,743,261**

## TIBIAL COMPONENT FOR UNICOMPARTMENTAL KNEE PROSTHESIS FOR A CEMENTNESS IMPLANTATION

**Jean-Alain Epinette, 27 rue Lamandin, 62700 Bruay-en-Artois, France**

**Filed Jan. 27, 1987, Ser. No. 6,783**
**Claims priority, application France, Jan. 27, 1986, 86 01078**
**Int. Cl.⁴ A61F** *1/24*
**U.S. Cl. 623—20** **27 Claims**



1. A tibial component for a unicompartmental knee prothesis adapted for cementless implantation, said tibial component comprising a metal base member having an overall configuration comprising a segment of a circular disc including a part cylindrical peripheral portion and a chordal portion,

said base member having generally flat upper and lower faces and a generally flat lateral face coinciding with the chordal portion and perpendicular to the upper and lower faces, the lower face being adapted to bear against a notch surface in the plate of the tibia generally perpendicular to the longitudinal direction of the tibia and the lateral face being adapted to bear against a notch surface extending parallel to the longitudinal direction of the tibia along the intercondylar eminence,

a plate member of polymer material having an upper and lower face for forming a lining for supporting a corresponding condylar component,

means on said base member for fixing said plate member thereto,

at least one projection from said lateral face adapted to be driven under the intercondylar eminence,

said base member having at least one passage adjacent to be driven under the intercondylar eminence,

said base member having at least one passage adjacent its part cylindrical peripheral portion, pinning means being adapted to be received in said passage and to penetrate into subjacent bone,

at least part of the surface of said base member which is adapted to be brought into contact with bone of the tibia having a porous metal covering adapted to be invaded by spongy bone ingrowth.

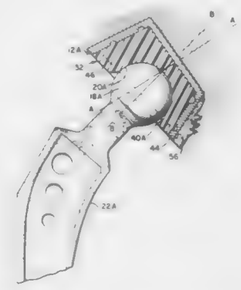
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**4,743,262**

## ACETABULAR CUP PROSTHESIS

**Raymond G. Tronzo, 255 Clarke Ave., Palm Beach, Fla. 33480**

**Continuation-in-part of Ser. No. 616,100, Jun. 1, 1984, Pat. No. 4,681,589. This application Mar. 24, 1987, Ser. No. 29,849**
**Int. Cl.⁴ A61F** *2/34*
**U.S. Cl. 623—22** **8 Claims**



1. An acetabular cup prothesis comprising a body extending generally longitudinally and terminating into front and rear surfaces, said front surface extending substantially transversely to said body; and

at least one fin for securing said cup to a prepared acetabulum cavity, said fin having a length extending generally longitudinally from said front surface toward said rear surface continuously along said body throughout the entire length of said fin, and said fin being configured so as to extend radially outwardly beyond the perimeter of said front surface and said body so as to engage with the cavity thereby securing said cup.

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**4,743,263**

## ADAPTABLE ISOELASTIC HIP-ENDOPROSTHESIS

**Miroslav Petrtyl; Rudolf Pavlansky, and Jaroslav Valenta, all of Prague, Czechoslovakia, assignors to Ceske vysoke uceni technicke, Prague, Czechoslovakia**

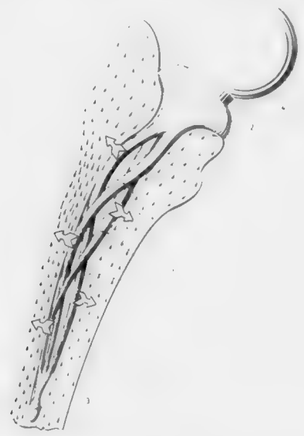
**Filed Sep. 24, 1985, Ser. No. 779,655**
**Claims priority, application Czechoslovakia, Nov. 9, 1984, 8553-84**
**Int. Cl.⁴ A61F** *2/32*
**U.S. Cl. 623—23** **3 Claims**

1. Adaptable isoelastic hip endoprosthesis for insertion into a prepared cavity comprising a joint part connected to a shaft of the endoprosthesis, said shaft of the endoprosthesis being composed of at least two spirally twisted elastic rods having a turn larger than the diameter of said cavity whereby upon insertion of said shaft into said cavity prestresses said elastic rods in a

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radial direction thereby allowing said rods to adjust to the anatomical shape of said cavity; wherein the spirally twisted



elastic rods have a variable cross section and are provided at their lower end with stabilization bodies.

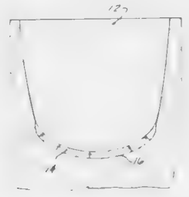
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**4,743,264**

**EXTERNAL PROTHESIS WITH MAGNETIC FIELD**

**Carole J. Sherva-Parker, Route 1, Box 152, Thief River Falls, Minn. 56701**

**Filed Feb. 5, 1987, Ser. No. 11,304**
**Int. Cl.[4] A61F** *2/78*
**U.S. Cl. 623—33** **13 Claims**



1. An external prosthesis comprised of a synthetic body member having a concave socket formed at an end thereof, said socket being sized to receive the stump of a residual limb with an internal prosthesis installed thereon, said external prosthesis having an external surface and a magnetically active layer disposed atop at least a portion of the external surface located at a stump receiving portion.

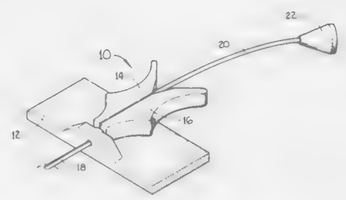
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**4,743,265**

**ARTICULATED CATHETER PLACEMENT DEVICE**

**Craig M. Whitehouse, Branford; Allan Burt, East Haven, and Clement M. Catalano, Jr., Clinton, all of Conn., assignors to DIJ Catheter Corp, Branford, Conn.**

**Filed Apr. 23, 1986, Ser. No. 855,524**
**Int. Cl.[4] A61M** *5/00*
**U.S. Cl. 604—161** **21 Claims**




1. A catheter placement device which comprises:

a splittable hollow needle adapted to slidably receive a portion of said catheter therein and having a proximal end formed with a first bifurcation and a second bifurcation;

a first handle having a body portion, a first end attached to said first bifurcation and a second end formed as an extension from said body portion;

a second handle having a body portion, a first end attached to said second bifurcation and a second end formed as an extension from said body portion; and

means to support said first and second handles for movment between an engaged position wherein said respective body portions are juxtaposed to present said respective extensions in a flared relationship, and a disengaged position wherein said respective extensions are juxtaposed to separate said first ends of said respective body portions into a flared relationship to distance said respective first ends and their attached bifurcations from each other to split said needle and disjoin said needle from said catheter.



**4,743,266**

**PROCESS FOR PRODUCING SMOOTH-DRY CELLULOSIC FABRIC WITH DURABLE SOFTNESS AND DYEABILITY PROPERTIES**

**Robert J. Harper, Jr., Metairie, La., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.**

**Filed Sep. 9, 1986, Ser. No. 905,208**
**Int. Cl.[4] D06P** *5/00;* **D06M** *13/34*
**U.S. Cl. 8—181** **28 Claims**

1. A process for producing a dyed, durably soft, smooth-dry cellulose fabric comprising:

(a) padding a cellulose-containing fabric with a sufficient amount of an aqueous finishing solution comprising sufficient concentrations of N-methylol crosslinking agent, acid catalyst and alkyl bishydroxyethyl quaternary to impart smooth-dry performance, dye receptivity and durable softness properties to the fabric;

(b) drying and during the padded fabric for sufficient time at sufficient temperature to interact components of the finish with the cellulosic-containing fabric and thereby produce a smooth-dry cellulosic fabric with durable softening and dyeability properties; and,

(c) dyeing the fabric of step (b) with a cellulosic or anionic dye in a mildly acidic dyebath.

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**4,743,267**

**PROCESS FOR IMPROVING POLYMER FIBER PROPERTIES AND FIBERS PRODUCED THEREBY**

**Michael E. Dyer, Cleveland, Tenn., assignor to International Yarn Corporation of Tennessee, Cleveland, Tenn.**

**Continuation-in-part of Ser. No. 390,732, Jun. 21, 1982, abandoned, which is a continuation-in-part of Ser. No. 296,656, Aug. 27, 1981, abandoned, which is a continuation-in-part of Ser. No. 273,713, Jun. 15, 1981, abandoned, which is a continuation-in-part of Ser. No. 223,056, Jan. 7, 1981, abandoned. This application Sep. 29, 1982, Ser. No. 426,498**
**Int. Cl.[4] D06M** *13/34*
**U.S. Cl. 8—194** **23 Claims**

1. A method of treating polymer fibers selected from the group consisting of polyester and arcylic polymers to improve the hygroscopic, dye receptive and other surface properties of the fibers, comprising the steps of:

(a) contacting the fibers in the absence of a polymerization initiator with an aqueous solution heated to a temperature between about 60°–100° C., containing at least one unsaturated monomer under acidic conditions, and agitating said solution for about 10 minutes to allow uniform disposal and intimate contact of the monomer with the fiber surfaces;

(b) thereafter initiating polymerization of the monomer on the fibers by means of a polymerization initiator for the monomer; and

(c) continuing the polymerization of the monomer on the fiber until substantial polymerization has occurred to modify surface properties of the fibers.

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**4,743,268**

**DISPERSANT COMPOSITION FOR AZO DYESTUFFS CONTAMINATED WITH SOLUBLE COPPER IMPURITIES**

**Peter Dilling, Isle of Palms, S.C., assignor to Westvaco Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 859,384, May 5, 1986, Pat. No. 4,715,864. This application Jun. 17, 1986, Ser. No. 875,204**
**Int. Cl.[4] C09B** *67/00*
**U.S. Cl. 8—557** **13 Claims**

1. A dispersant composition for an azo dye system contaminated with soluble copper impurities comprising an amine lignosulfonate salt and ethylenediaminetetraacetic acid.

**4,743,269**

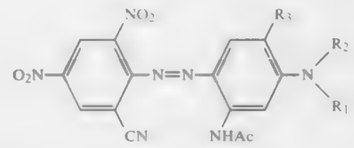
**PROCESS FOR PREPARING NAVY DYEINGS ON POLYESTER FIBERS USING MIXTURE OF BLUE AND RED AZO DYES**

**Wolfgang Haebler, Odenthal; Heinz Geiger, Bergisch Gladbach; Hans-Günter Otten, Leverkusen, and Horst Brandt, Odenthal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Dec. 16, 1986, Ser. No. 942,138**
**Claims priority, application Fed. Rep. of Germany, Dec. 20, 1985, 3545459**
**Int. Cl.[4] C09B** *67/22;* **D06P** *3/36, 1/04*
**U.S. Cl. 8—639** **5 Claims**

1. Process for preparing wash-fast navy dyeings on fibre materials which consist wholly or partly of polyester, after thermal treatment, characterized in that

(a) as the blue component at least one dyestuff of the formula



in which

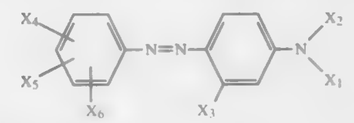
Ac denotes an acyl radical,

$R_1$ denotes an alkyl or alkoxyalkyl radical,

$R_2$ denotes $R_1$ or an aralkyl radical and

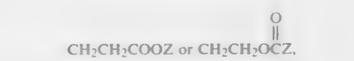
$R_3$ denotes $R_1$, hydrogen, an alkoxy radical or together with $R_2$—an alkylene group,

(b) as the red component at least one dyestuff of the formula



in which

$X_1$ stands for a radical of the formula



$X_2$ stands for $X_1$, alkyl or $CH_2CH_2CN$,

$X_3$ stands for H or alkyl,

$X_4$ stands for $NO_2$ or COOZ,

$X_5$ stands for H, Cl or Br and

$X_6$ stands for $X_5$,

where

Z denotes alkyl, said alkyl radicals having 1–4 C-atoms.

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**4,743,270**

**FILLING MAT-IMMOBILIZED-ELECTROLYTE BATTERIES**

**Charles P. McCartney, Jr., Yorktown, and Robert L. Galyen, Jr., Anderson, both of Ind., assignors to General Motors Corporation, Detroit, Mich.**

**Filed May 27, 1987, Ser. No. 54,800**
**Int. Cl.[4] H01M** *10/16*
**U.S. Cl. 29—623.1** **4 Claims**

1. In a method of assembling a mat-immobilized-electrolyte Pb-acid storage battery comprising the principal steps of assembling a galvanic cell element stack containing a compressible, absorbent mat sandwiched between positive and negative polarity electrodes, compressing said element so as to com-

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press said mat to a predetermined thickness, inserting said compressed element into a container, and impregnating said element with a predetermined quantity of sulfuric acid sufficient to coat substantially the entire surface area of said mat and said electrodes, the improvement comprising:

dispensing said predetermined quantity of acid into said container prior to said inserting of said element; and

thereafter inserting said element into said container and therein progressively immersing said element in said acid at a sufficiently slow rate as to cause the initial pickling reaction to occur substantially in the region of the electrolyte front wicking into the element and such that the gases generated during pickling are vented through the as-yet unimmersed portions of the mat and the heat generated during pickling is carried to the top of the element by the electrolyte advancing upwardly therethrough for ready dissipation from atop thereof.

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**4,743,271**

## PROCESS FOR PRODUCING A CLEAN HYDROCARBON FUEL

**James K. Kindig, Englewood, and James E. Reynolds, Golden, both of Colo., assignors to Williams Technologies, Inc., Tulsa, Okla.**

**Continuation-in-part of Ser. No. 467,382, Feb. 17, 1983, abandoned. This application May 2, 1984, Ser. No. 606,847**

**Int. Cl.[4] C10L** *9/02, 9/06*

**U.S. Cl. 44—621** **23 Claims**

1. A process for producing a coal product from coal and coal derivatives, said coal product having a mineral matter content of less than about 5 percent by weight comprising the steps of:

(a) contacting coal of a size less than about an inch with an aqueous HF acid leach to solubilize at least a portion of said mineral matter;

(b) separating the spent HF leachate and impurities dissolved therein from the coal;

(c) contacting said coal from step (b) with an aqueous HCl acid leach;

(d) separating the spent HCl leachate and the impurities dissolved therein from the coal;

(e) removing pyrite from said leached coal to produce a coal product substantially free of pyrite;

(f) treating said coal product to remove any halogens present as volatile halides;

(g) regenerating acids by contacting said acid leachate in the presence of added $SO_2$ and oxygen with water vapor under reaction conditions selected to regenerate an acid selected from the group consisting of HF and HCl and to form a residue comprising the oxides of Al and Fe and the sulfates of one or more of the group consisting of Ca, K, and Na; and

(h) recycling said regenerated acids to the respective leaches.

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**4,743,272**

## GASOLINE SUBSTITUTE FUEL AND METHOD FOR USING THE SAME

**Theodor Weinberger, 515 N. Church St., Charlotte, N.C. 28202**

**Continuation of Ser. No. 578,131, Feb. 8, 1984, abandoned. This application Oct. 14, 1986, Ser. No. 918,027**

**Int. Cl.[4] C10L** *1/18*

**U.S. Cl. 44—53** **14 Claims**

1. A gasoline fuel substitute comprising (i) greater than fifty volume percent of an anhydrous alcohol mixture wherein at least fifty volume percent of said mixture is methanol and/or ethanol and wherein the other alcohol components of said mixture are selected from an aliphatic or aromatic alcohol having up to about twelve carbon atoms and containing 1–4 hydroxy groups, and (ii) a minor amount, but at least about thirty volume percent, of a ketone/ether mixture having at least one ketone component and at least one ether component and wherein all components of said ketone/ether mixture are selected from the group consisting of ketones containing up to twelve carbon atoms and 1–2 keto oxygens and ethers containing up to twelve carbon atoms and 1–3 ether oxygens the fuel substitute being at least substantially anhydrous.

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**4,743,273**

## FUEL COMPOSITION AND METHOD FOR CONTROL OF ENGINE OCTANE REQUIREMENTS

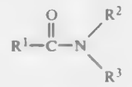
**Michael C. Croudace, Huntington Beach; Timothy Wusz, Anaheim, and Stephen Brass, Fullerton, all of Calif., assignors to Union Oil Company of California, Los Angeles, Calif.**

**Filed Aug. 15, 1986, Ser. No. 897,015**

**Int. Cl.[4] C10L** *1/18, 1/22*

**U.S. Cl. 44—71** **84 Claims**

1. A fuel composition comprising a hydrocarbon liquid boiling within the gasoline range having dissolved therein an octane requirement increase-inhibiting amount of a combination of compounds comprising (1) a gasoline soluble ketone selected from the group consisting of cycloalkanones and aromatic ketones and (2) a gasoline-soluble amide selected from the group consisting of formamides and acetamides having the formula



wherein $R^1$ is hydrogen or methyl radical, and $R^2$ and $R^3$ are gasoline solubilizing organic radicals, said gasoline solubilizing radicals containing between them a total of between 2 and 20 carbon atoms.

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**4,743,274**

## ORAL COMPOSITION AND ABRASIVE THEREFOR

**Toshiyuki Ozawa, Chigasaki; Osamu Uotani, Chiba, and Rieko Hayashi, Odawara, all of Japan, assignors to Lion Corporation, Tokyo, Japan**

**Division of Ser. No. 566,681, Dec. 29, 1983, Pat. No. 4,587,120. This application Jan. 30, 1986, Ser. No. 824,198**

**Claims priority, application Japan, Dec. 29, 1982, 57-228601; Dec. 29, 1982, 57-228602**

**Int. Cl.[4] B24D** *3/02*

**U.S. Cl. 51—309** **12 Claims**



1. An abrasive suitable for use in dentifrice compositions consisting of calcium hydrogenphosphate anhydride whose crystallite has an average size of 300 to 3,500 angstroms as measured by X-ray diffractometry.

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**4,743,275**

## ELECTRON FIELD GENERATOR

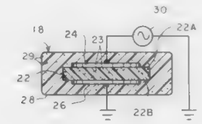
**G. Patrick Flanagan, P.O. Box 2285, Sedona, Ariz. 86336**

**Filed Aug. 25, 1986, Ser. No. 899,713**

**Int. Cl.[4] B03C** *3/12, 3/41*

**U.S. Cl. 55—2** **13 Claims**

1. Apparatus for generating an electric field of the type comprising a solid dielectric member sandwiched between first and second electrodes and a high voltage, high frequency energy source connected between said electrodes, the improvement wherein said dielectric member comprises,




a dielectric material having a plurality of discrete, conductive members dispersed therein.

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**4,743,276**

## METHOD OF SEPARATING CARBON MONOXIDE AND CARBON MONOXIDE ADSORBENT USED IN THIS METHOD

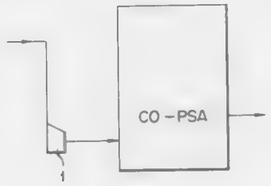
**Taisuke Nishida, Tokyo; Kazuo Tajima, Hiratsuka; Yo Osada; Osamu Shigyo, both of Yokohama, and Hiroaki Taniguchi, Kuki, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 751,038, Jul. 1, 1985, abandoned. This application Dec. 31, 1986, Ser. No. 948,394**

**Claims priority, application Japan, Jul. 4, 1984, 59-138771; Jul. 4, 1984, 59-138772; Apr. 8, 1985, 60-72696; Apr. 8, 1985, 60-72697**

**Int. Cl.[4] B01D** *53/04*

**U.S. Cl. 55—68** **11 Claims**




1. A method of recovering carbon monoxide in a gas mixture containing at least carbon monoxide and carbon dioxide, comprising:

selectively adsorbing carbon monoxide in the gas mixture on a Cu(I) adsorbent supported on a zeolite carrier selected from the group consisting of Y-type zeolite and mordenite-type zeolite and having a silica/alumina ratio of not more than 10, an effective pore diameter of not less than 0.38 nm (3.8A) and capable of adsorbing carbon monoxide, the adsorption temperature being 80° C. to 250° C.;

separating the adsorbed carbon monoxide; and

recovering the separated carbon monoxide.

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**4,743,277**

## ISOLATED FEEDTHROUGH

**Wolfgang Hartmann, Frankfurt am Main, Fed. Rep. of Germany, assignor to Metallgesellschaft AG, Frankfurt am Main, Fed. Rep. of Germany**

**Continuation of Ser. No. 842,477, Mar. 21, 1986, abandoned. This application Aug. 24, 1987, Ser. No. 89,915**

**Claims priority, application Fed. Rep. of Germany, Mar. 27, 1985, 3511059**

**Int. Cl.[4] B03C** *3/76*

**U.S. Cl. 55—112** **3 Claims**

1. In an electrostatic precipitator having a housing formed with a housing wall:

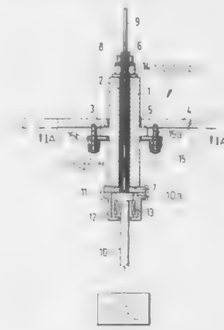
an electrode supporting member in said housing; and

an insulated feedthrough extending through said wall into a space within said housing for supplying electric power to said space and rapping blows to electrodes therein on said electrode supporting member, the improvement wherein said feedthrough comprises:

a cylindrical insulator formed with a central through bore and extending through an opening of said housing wall and integrally formed with a flange secured to the housing wall in sealing relationship with an inside surface thereof;

means in said space including an annular plate surrounding said insulator and affixed to said wall along said inside surface thereof for pressing said flange integrally formed on said insulator against said inside surface all around said opening;

a conductive tubular bushing disposed in said through bore



and having a flange firmly connected to an inner end thereof, said bushing being provided at an outer end with a screw-connected clamping element axially clamping said bushing against said insulator, said bushing conducting electric current through said insulator;

a rod extending through and longitudinaly movable in said bushing for transmitting impact rapping to said electrode supporting member in said space;

a clamping device provided with a sealing compensator having means for forcing said supporting member against said flange of said bushing; and

wherein said means for pressing includes spring elements including at least one spring braced against said plate to compensate differential thermal expansions of interconnected parts of the feedthrough. maintain contact pressure required for sealing, and attenuate transmission to the insulator of rapping blows applied to said rod.

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**4,743,278**

## PASSIVE PROPELLANT MANAGEMENT SYSTEM

**Tso-Ping Yeh, Fremont, Calif., assignor to Ford Aerospace & Communications Corporation, Detroit, Mich.**

**Filed Jun. 16, 1986, Ser. No. 874,971**

**Int. Cl.[4] B01D** *19/00*

**U.S. Cl. 55—159** **16 Claims**

1. A propellant management system for a spacecraft liquid propellant tank, comprising:

a hollow tank containing a liquid propellant and a pressurant gas ullage;

an outlet port, centered in a half of the tank, for expelling from the tank liquid propellant but not pressurant gas, wherein relatively large operational accelerations pass through the outlet port;

several elongated channels for communicating liquid propellant to the outlet port from regions within the tank, including a half of the tank opposed to the outlet port half; wherein

the channels are relatively more open within regions of the

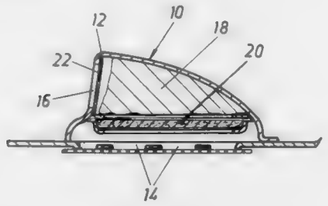
tank where pressurant gas ullage is expected to be present during operation of the spacecraft, compared with regions




within the tank where liquid propellant is expected to be present during operation of the spacecraft.

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**4,743,279**
**FILTER**
**Ingemar B. G. Kvist, Begoniegatan 18, S-434 00 Kungsbacka; Göran A. I. Johansson, Scheelegatan 16 D, S-416 60 Göteborg, and Kaj U. I. Hönig, Ö. Förstadsgatan 19 A, S-211 31 Malmö, all of Sweden**
**Continuation of Ser. No. 838,114, Mar. 10, 1986, abandoned. This application Aug. 28, 1987, Ser. No. 91,360**
**Claims priority, application Sweden, Mar. 15, 1985, 8501284**
**Int. Cl.[4] B01D** *53/04*
**U.S. Cl. 55—316** **5 Claims**

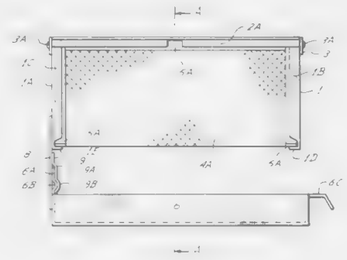


**1**. An improved filter designed to be mounted on existing motor vehicles on the normally open fresh air entrance thereof, said filter being constructed as a cartridge for external mounting on said fresh air entrance so as to cover the openings thereof, said cartridge comprising an outer housing defining an outlet for convering the openings of the vehicle fresh air entrance, an inlet opening and a filter chamber between said inlet opening and said outlet and said cartridge permanently containing a coarse filter designed to trap particles in the air entering into said motor vehicle, and a chemical action filter arranged to cleanse said air from pollution gases.

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**4,743,280**
**AIR FILTER APPARATUS**
**Phillip M. Pappas, 12309 Hodges St., Houston, Tex. 77085**
**Filed Mar. 24, 1986, Ser. No. 842,925**
**Int. Cl.[4] B01D** *46/12, 46/42*
**U.S. Cl. 55—429** **3 Claims**

**1**. An air filter apparatus comprising two elongated substantially V-shaped mesh filters held in place side by side by front and rear housing closures, said closures being spaced apart by two parallel outwardly formed angle members attached to opposite top edges of the front and rear housing closures, a removable V formed cross member disposed to seal and retain abutting inner edges of the filters, the removable cross member having outer flanged portions with bolts holding said flanged portions against the front and rear closures, a formed member welded to lower inwardly formed angle portions of the front and rear closures, inverted V angles welded to the front and rear closures so as to support and contain the inner facing sides of the V-shaped filters, and the rear housing closure having an attached support member extending downwardly therefrom, an overlying clip member secured to the support member and



having a lateral half round formed portion engaging a mating laterally formed half round portion of an upwardly extending back of a slidably removable pan positioned to receive grease and moisture from the vertices of the two V-shaped filters without impeding air flow through the vertices.

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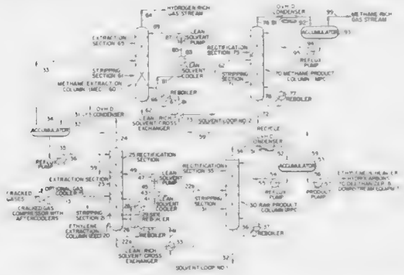
**4,743,281**
**FILTER PANEL ASSEMBLY**
**Robert W. Kennedy, Bridgewater, and Howard J. Tyler, Marlboro, both of N.J., assignors to White Consolidated Industries, Inc., Cleveland, Ohio**
**Filed Mar. 27, 1987, Ser. No. 30,665**
**Int. Cl.[4] B01D** *46/00*
**U.S. Cl. 55—493** **18 Claims**



**6**. A filter panel assembly comprising a mounting frame having an aperture, an air permeable panel having front and back sides and first and second parallel spaced apart edges, an air filter releasably mounted to the back side of said panel, said back side being toward said frame, and mounting means for pivotally releasably mounting said panel to said frame to cover said aperture, said mounting means comprising first releasable interconnection means between the panel and frame for permitting limited movement of the panel toward and away from the frame independently of the relative angular orientation therebetween, and permitting limited angular displacement of the panel about an axis parallel to said first and second edges, said mounting means further comprising first and second releasable catch means for selectively holding said first and second edges respectively to said frame while permitting angular displacement of said panel with respect to said frame about axes parallel to said first and second edges.



**4,743,282**
**SELECTIVE PROCESSING OF GASES CONTAINING OLEFINS BY THE MEHRA PROCESS**
**Yuv R. Mehra, Odessa, Tex., assignor to Advanced Extraction Technologies, Inc., Houston, Tex.**
**Continuation-in-part of Ser. No. 828,996, Feb. 13, 1986, Pat. No. 4,696,688, and Ser. No. 828,988, Feb. 13, 1986, Pat. No. 4,680,042, each is a continuation-in-part of Ser. No. 808,463, Dec. 13, 1985, Pat. No. 4,692,179, which is a continuation-in-part of Ser. No. 784,566, Oct. 4, 1985, Pat. No. 4,617,038, which is a continuation-in-part of Ser. No. 759,327, Jul. 26, 1985, Pat. No. 4,623,371, which is a continuation-in-part of Ser. No. 758,351, Jul. 24, 1985, Pat. No. 4,601,738, which is a continuation-in-part of Ser. No. 637,210, Aug. 3, 1984, Pat. No. 4,578,094, which is a continuation-in-part of Ser. No. 532,005, Sep. 14, 1983, Pat. No. 4,526,594, which is a continuation-in-part of Ser. No. 507,564, Jun. 24, 1983, Pat. No. 4,511,381, which is a continuation-in-part of Ser. No. 374,270, May 3, 1982, Pat. No. 4,421,535. This application Apr. 21, 1986, Ser. No. 854,383**
**Int. Cl.[4] F25J** *3/00*
**U.S. Cl. 62—17** **57 Claims**



**45**. A process for treating a feed stream of gases containing hydrogen, methane, and $C_2=+$ hydrocarbons which has been compressed, cooled, sweetened, and dehydrated, comprising the following steps:

A. contacting said feed stream with a stream of a lean preferential physical solvent to produce a hydrogen-rich overhead product stream and a rich solvent bottoms stream;

B. regenerating said bottoms stream to produce said lean solvent stream for recycling to said contacting step and to produce a second overhead stream of methane and said $C_2=+$ hydrocarbons;

C. contacting said second overhead stream with a second lean solvent stream to produce a methane-rich overhead product stream and a second rich solvent bottoms stream; and

D. regenerating said second bottoms stream to produce a second overhead product stream comprising said $C_2=+$ hydrocarbons and to produce a second lean solvent stream for recycling to said contacting of said Step C.

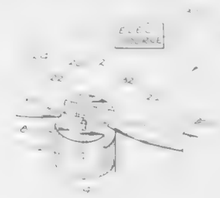
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**4,743,283**
**ALTERNATING CURRENT ARC FOR LENSING SYSTEM AND METHOD OF USING SAME**
**Leslie M. Borsuk, Los Alamitos, Calif., assignor to ITT Corporation, New York, N.Y.**
**Filed Jan. 13, 1987, Ser. No. 2,886**
**Int. Cl.[4] C03B** *37/075, 23/09;* **G02B** *6/00*
**U.S. Cl. 65—2** **5 Claims**

**1**. A method for forming an end portion of an optical fiber into a lens comprising:

establishing a pair of electrodes with their tips on opposite sides of said fiber end portion, and with said fiber end portion lying on an imaginary line connecting said electrode tips;

establishing an arc between said electrode tips, and continuing said arc at a sufficient average current and time to melt



said end portion into a lens of a diameter at least about 25% greater than the

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**4,743,284**
**RIBBON SEVERING SUPPORT**
**Raymond J. Mouly, Pittsburgh, and Dewitt W. Lampman, Gibsonia, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.**
**Filed Dec. 29, 1986, Ser. No. 947,252**
**Int. Cl.[4] C03B** *13/08*
**U.S. Cl. 65—113** **58 Claims**



**1**. An apparatus for cutting a glass ribbon advancing along a movement path comprising:

an upstream support means mounted along said path;

a downstream support means mounted along said path;

means moveable from an upstream position to a downstream position between said upstream and said downstream support means to support said ribbon as said ribbon advances along said path;

means to heat said advancing glass ribbon to define a line of cut, said line of cut heated to the softening point temperature of said glass;

means to advance said heating means along said path in a fixed relationship with said advancing ribbon;

means to sever said ribbon along said line of cut; and

means to advance said severing means along said path in a fixed relationship with said line of cut.

**39**. A method of severing advancing glass along a selected line of cut comprising:

heating said advancing glass along a desired line of cut to a temperature sufficient for severing;

moving a first support means with said glass to support said glass as said glass advances during said heating step;

severing said glass along said heated line of cut as said glass advances; and

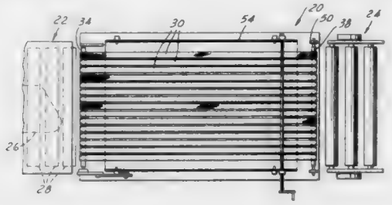
moving a second support means with said glass to support said glass as it advances during said severing step.

**4,743,285**

## GLASS BENDING APPARATUS WITH RETRACTABLE BELTS AND METHOD FOR USING SAME

**Harold E. McKelvey, Northville, Mich., assignor to Shatterproof Glass Corp., Detroit, Mich.**

**Filed Jul. 30, 1986, Ser. No. 891,948**
**Int. Cl.[4] C03B** *23/025*
**U.S. Cl. 65—107** **20 Claims**



1. A method of sequentially bending glass sheets, comprising the following steps:

heating a sheet of glass in a furnance to a temperature at which it becomes plastic;

transporting the glass sheet from the furnace to a tempering apparatus horizontally along a first axis while freely supporting the glass on a conveyor formed of a plurality of continuous belt segments, said belt segments when viewed along the first axis forming a curved support, sagging the softened glass into a curved shape; and

retracting the belts to an initial position to receive the next sheet of glass to be supported on the same continuous belt segments thereby preventing the glass from being marred by irregularities caused by belt joints.

8. An apparatus for bending glass sheets which have been heated to a softened state and for transporting the glass sheets in the softened, bent condition to a cooling device, said apparatus comprising:

a conveyor means for carrying the softened glass sheet generally horizontally along a first axis, said conveyor means formed of a plurality of belts arranged adjacent in generally parallel relationship to said first axis;

inlet guide means for supporting the conveyor belts to form a glass inlet;

outlet guide means for supporting the conveyor belts to form a curved glass outlet with said conveyor means extending between said inlet and outlet guide means to establish a glass supporting surface;

drive means for advancing the conveyor means and the glass supported thereon from the region of the inlet guide means to the region of the outlet guide means during which movement the glass sags to conform with the curvature of the outlet guide means; and

retractor means for retracting the conveyor to an initial position in order to receive another sheet of glass.

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**4,743,286**

## MOVING MECHANISM FOR USE IN A GLASSWARE MANUFACTURING MACHINE OF THE INDIVIDUAL SECTION TYPE

**Hermann H. Nebelung, Zurich, Switzerland, assignor to Emhart Industries, Inc., Farmington, Conn.**

**Continuation of Ser. No. 887,145, Jul. 17, 1986, Pat. No. 4,695,307. This application Jul. 24, 1987, Ser. No. 77,267**
**Claims priority, application United Kingdom, Jul. 24, 1985, 8518717**
**Int. Cl.[4] C03B** *9/335*
**U.S. Cl. 65—242** **2 Claims**

1. A glassware manufacturing machine of the individual section type comprising:

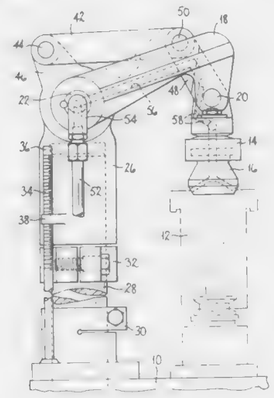
at least one operative member such as a baffle,

parallelogram linking means including four links for supporting said operative member at a vertical orientation throughout its displacement,

support column means,

sleeve means adapted to be secured on said support column means,

means for changing the position of said sleeve means on said column means,



means for pivotally mounting one end of one of said parallelogram links on said sleeve means including

a drive shaft secured to an end of said one link,

rotary hydraulic motor means mounted on said sleeve means,

said motor means having a rotatable output shaft coaxial with the axis of said drive shaft for threadedly engaging with and rotatably driving said drive shaft.

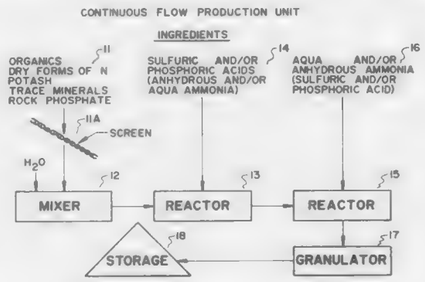
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**4,743,287**

## FERTILIZER AND METHOD

**Elmo C. Robinson, P.O. Box 27, Paragonah, Utah 84760**

**Continuation-in-part of Ser. No. 653,542, Sep. 24, 1984, abandoned, Continuation-in-part of Ser. No. 428,102, Sep. 29, 1982, abandoned. This application Aug. 19, 1986, Ser. No. 897,798**
**Int. Cl.[4] C05F** *13/00*
**U.S. Cl. 71—12** **7 Claims**




7. A method for producing humic acid fertilizer, comprising the steps of

(a) selecting at least one organic material from the group of low humic acid materials including livestock and poultry manure, sewage sludge, separated garbage, cotton gin trash, fruit cannery wastes, vegetable cannery wastes, nut cannery wastes, wood and paper pulp wastes, spent mushroom compost, methane and alcohol solid wastes, lignite, leonardite, humate, and coal, said organic material being at least 30% by dry weight of the finished product for dry granular production and 10–25% by dry weight of the finished product for slurry production and having a high content of one of lignin and cellulose;

(b) analyzing said organic material to determine the composition of major inorganic elements of nitrogen, phosphate, potash, and sulfur,

(c) mixing trace amounts up to 1% by weight of said major elements with said organic material to produce a specific formula combination of said major elements in the finished fertilizer product;

(d) adding a measured quantity of water to the mixture of organic material and major elements to produce a moisture content of 12–30% by weight;

(e) depositing the mixture in a reactor and sealing said reactor to the atmosphere;

(f) blending with the mixture within said reactor a measured quantity of a base material having a first pH level to drastically change the pH of the mixture, thereby resulting in hydrolization of the mixture and an increase in temperature and pressure within said reactor;

(g) blending a measured quantity of an acid material having a second pH level opposite said first pH level with said mixture within said reactor to adjust the pH level of the mixture to that of the final fertilizer;

(h) maintaining a pressure of up to 30 psi and a pressure of up to 280° F. within said reactor to assist in hydrolysis of the mixture to form within the mixture a new molecular structure including molecular clusters of inorganic chemicals that surround larger humic acid molecules; and

(i) processing the finished fertilizer mixture to a desired consistency.

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**4,743,288**

## TREATMENT OF SOIL

**Pierre Hirsbrunner, Les Monts-de-Corsier, Switzerland, assignor to SAREA AG, Cham, Switzerland**

**Continuation-in-part of Ser. No. 532,074, Sep. 14, 1983, abandoned. This application Jul. 18, 1984, Ser. No. 632,130**
**Claims priority, application European Pat. Off., Aug. 29, 1983, 83108486-8**
**Int. Cl.[4] C05C** *9/02*
**U.S. Cl. 71—28** **14 Claims**

1. A process for treating soil for temporarily resisting atmospheric erosion and being advantageous for plant growth comprising applying a film on the surface of the soil of an aqueous solution, having a pH between 2 and 5, of a formaldehyde-based pre-condensate, an acidic condensation initiator and a polysaccharide capable of forming a gel with divalent metal ions present in the soil.

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**4,743,289**

## LIGNOSULFONATE AS GRANULATION AID-PARTICLE HARDENER

**J. C. Mickus, Bloomington, Minn.; Cecil P. Harrison, Florence, and Cullen G. Tittle, Tuscumbia, both of Ala., assignors to Tennessee Valley Authority, Muscle Shoals, Ala.**

**Filed Aug. 10, 1987, Ser. No. 83,332**
**Int. Cl.[4] C05D** *9/00*
**U.S. Cl. 71—61** **13 Claims**

1. An improved process for utilizing both by-product crystalline A/S and a new and novel granulation aid-particle hardener to substantially effect the economical attributes of the production of high-purity granular A/S product of predetermined, closely controlled particle size eminently suitable for either subsequent direct application to soil systems, or for utilization in fertilizer bulk blending operations comprising the steps of:

(a) maintaining in an inclined rotating rotary ammoniator-granulator-type drum a rolling bed of discrete particles therein of crystalline by-product A/S and recycle material, with recycle material introduced therein from step (e) infra;

(b) continuously introducing into the upper end of said inclined rotating drum a stream of crystalline by-product A/S and recycle material;

(c) continously introducing into said inclined rotating drum separate streams of sulfuric acid-A/S solution and ammonia beneath the surface and near the center of the rolling granulation bed, with respect to its depth, the relative proportion of said sulfuric acid and said ammonia introduced into said rotating drum granulator being maintained so as to yield a mole ratio of $NH_3SO_4$ in said granulator A/S product ultimately removed therefrom in the range from about 1.80 to about 1.95;

(d) continuously introducing into the upper end of said inclined rotating drum fines and crushed oversize ammonium sulfate product recycled thereto from a later-mentioned sizing step;

(e) admixing said by-product crystalline A/S and said recycle material with sulfuric acid-A/S solution and ammonia in predetermined portions and for a time sufficient so as to effect agglomeration by both the chemical reaction and rolling action imparted by the rotating drum to said mixture of dry crystalline by-product A/S and recycle material;

(f) maintaining the materials introduced into said inclined rotating drum at a temperature and for a time sufficient to effect therein the agglomeration of granules of crystalline ammonium sulfate of size sufficient to range from between about 40 percent to about 90 percent minus 5- plus 9-mesh Tyler screen series.

(g) continuously discharging at least a portion of the granular material resulting from step (f) supra from the lower end of said inclined rotating drum and introducing same into drying means;

(h) maintaining the material introduced into said drying means at a temperature and for a time sufficient therein to reduce the moisture content thereof to the range of from about 0.1 percent to about 1.5 percent by weight and subsequently introducing same into cooling means;

(i) contacting the material in said cooling means with countercurrent flow of ambient temperature air for a time sufficient therein to reduce temperature of the A/S material therein to the range of from about 200° F. to about 260° F.; and

(j) subsequently removing the resulting cooled material from said cooling means in step (i) supra, and introducing into sizing means wherefrom product A/S granules ranging from about minus 5- to plus 9-mesh Tyler are recovered and withdrawn to storage and wherefrom undersize and crushed oversize are recycled to said feed-end of said inclined rotating granulation drum; the improvement in combination therewith for enhancing the physical characteristics of the resulting A/S product, which improvement comprises the addition to said drums of a stream of predetermined amounts of granulation aid-particle hardener material selected from the class of wood constituents known as lignosulfonates.

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**4,743,290**

## THIOPHENESULFONAMIDE HERBICIDES

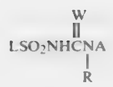
**Joel R. Christensen, Wilmington; John Cuomo, Newark, and George Levitt, Wilmington, all of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 852,739, Apr. 21, 1986, abandoned, which is a continuation-in-part of Ser. No. 739,074, May 29, 1985, abandoned. This application Nov. 26, 1986, Ser. No. 935,504**
**Int. Cl.[4] A01N** *43/54;* **C07D** *409/12, 409/14*
**U.S. Cl. 71—90** **89 Claims**

1. A compound having the formula:

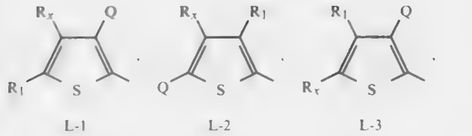
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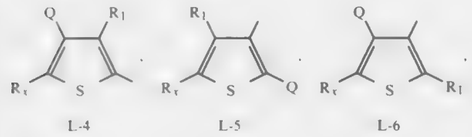


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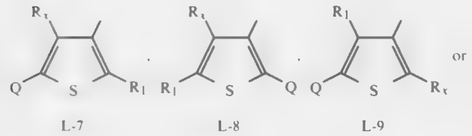
wherein
L is



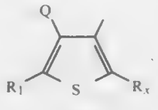
L-1 L-2 L-3



L-4 L-5 L-6

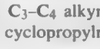


L-7 L-8 L-9 or



L-10

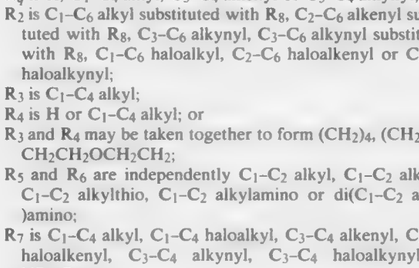
R is H or $CH_3$;
W is O or S;
$R_1$ is $R_1'$ or $R_1''$;
$R_x$ is H or halogen;
$R_1'$ is H, $C_1$–$C_3$ alkyl, $C_1$–$C_3$ haloalkyl, halogen, nitro, $C_1$–$C_3$ alkoxy, CN, $C_1$–$C_3$ haloalkoxy or $C_1$–$C_3$ haloalkylthio;
$R_1''$ is $SO_2NR_aR_b$, $C_1$–$C_3$ alkylthio, $C_1$–$C_3$ alkylsulfinyl, $C_1$–$C_3$ alkylsulfonyl, $CO_2R_c$ or $C(O)NR_gR_h$;
$R_a$ is H, $C_1$–$C_4$ alkyl, $C_2$–$C_3$ cyanoalkyl, methoxy, ethoxy or $C_3$–$C_4$ alkenyl;
$R_b$ is H or $C_1$–$C_3$ alkyl; or
$R_a$ and $R_b$ may be taken together to form $(CH_2)_3$, $(CH_2)_4$, $(CH_2)_5$ or $CH_2CH_2OCH_2CH_2$;
$R_c$ is $C_1$–$C_4$ alkyl, $C_3$–$C_4$ alkenyl, $C_3$–$C_4$ alkynyl, $C_2$–$C_4$ haloalkyl, $C_2$–$C_3$ cyanoalkyl, cyclopropylmethyl or $C_2$–$C_4$ alkoxyalkyl;
$R_g$ is H or $C_1$–$C_3$ alkyl;
$R_h$ is $C_1$–$C_3$ alkyl;
Q is $Q_1$ or $Q_2$;
$Q_1$ is $ER_2$, $NR_3R_4$,



$OSO_2R_7$, CN, $SO_2NHR_{21}$,



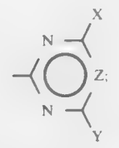
$SO_2NR_{22}NR_{23}R_{24}$ or $C_1$–$C_4$ alkyl substituted with $R_8$;
E is O, S, SO or $SO_2$;
$W_1$ is O or S;
J is O, S, NH, $NCH_3$, $CH_2$ or a single bond;
$Q_2$ is $SO_2NH_2$, $SO_2NR_iR_j$, $CO_2R_k$, $C(O)NR_mR_n$, $C_1$–$C_3$ alkylthio, $C_1$–$C_3$ alkylsulfinyl, $C_1$–$C_3$ alkylsulfonyl, halogen, CHO or $CR_p{=}NOR_q$;
$R_i$ is $C_1$–$C_4$ alkyl, $C_2$–$C_3$ cyanoalkyl, methoxy, ethoxy or $C_3$–$C_4$ alkenyl;
$R_j$ is $C_1$–$C_3$ alkyl or
$R_i$ and $R_j$ may be taken together to form $(CH_2)_5$ or $CH_2CH_2OCH_2CH_2$;
$R_k$ is $C_1$–$C_4$ alkyl, $C_3$–$C_4$ alkenyl, $C_3$–$C_4$ alkynyl, $C_2$–$C_4$ haloalkyl, $C_2$–$C_3$ cyanoalkyl, cyclopropylmethyl or $C_2$–$C_4$ alkoxyalkyl;
$R_m$ is H or $C_1$–$C_3$ alkyl;
$R_n$ is $C_1$–$C_3$ alkyl;
$R_p$ is H, $C_1$–$C_4$ alkyl or $C_1$–$C_4$ haloalkyl;
$R_q$ is H, $C_1$–$C_4$ alkyl, $C_3$–$C_4$ alkenyl or $C_3$–$C_4$ alkynyl;
$R_2$ is $C_1$–$C_6$ alkyl substituted with $R_8$, $C_2$–$C_6$ alkenyl substituted with $R_8$, $C_3$–$C_6$ alkynyl, $C_3$–$C_6$ alkynyl substituted with $R_8$, $C_1$–$C_6$ haloalkyl, $C_2$–$C_6$ haloalkenyl or $C_3$–$C_6$ haloalkynyl;
$R_3$ is $C_1$–$C_4$ alkyl;
$R_4$ is H or $C_1$–$C_4$ alkyl; or
$R_3$ and $R_4$ may be taken together to form $(CH_2)_4$, $(CH_2)_5$ or $CH_2CH_2OCH_2CH_2$;
$R_5$ and $R_6$ are independently $C_1$–$C_2$ alkyl, $C_1$–$C_2$ alkoxy, $C_1$–$C_2$ alkylthio, $C_1$–$C_2$ alkylamino or di($C_1$–$C_2$ alkyl)amino;
$R_7$ is $C_1$–$C_4$ alkyl, $C_1$–$C_4$ haloalkyl, $C_3$–$C_4$ alkenyl, $C_3$–$C_4$ haloalkenyl, $C_3$–$C_4$ alkynyl, $C_3$–$C_4$ haloalkynyl or $NR_{19}R_{20}$;
$R_8$ is $OR_9$, $S(O)_nR_{10}$, $CO_2R_{10}$, $SO_2NR_{11}R_{12}$, $NR_{11}R_{12}$, $CONR_{11}R_{12}$, $C(O)R_{13}$,



CN, SCN, SH, $NO_2$ or $N_3$;
$R_9$ is H, $C_1$–$C_4$ alkyl, $C_3$–$C_4$ alkenyl, $C_3$–$C_4$ alkynyl, $C_1$–$C_4$ haloalkyl, $C_3$–$C_4$ haloalkenyl, $C_3$–$C_4$ haloalkynyl, $C_2$–$C_4$ alkylcarbonyl, $C_1$–$C_4$ alkylsulfonyl, $C_2$–$C_4$ alkoxyalkyl, $C_2$–$C_4$ alkylthioalkyl or $C_2$–$C_4$ cyanoalkyl;
$R_{10}$ is $C_1$–$C_4$ alkyl, $C_3$–$C_4$ alkenyl, $C_3$–$C_4$ alkynyl, $C_1$–$C_4$ haloalkyl, $C_3$–$C_4$ haloalkenyl, $C_3$–$C_4$ haloalkynyl, $C_2$–$C_4$ alkoxyalkyl, $C_2$–$C_4$ alkylthioalkyl or $C_2$–$C_4$ cyanoalkyl;
$R_{11}$ is H or $C_1$–$C_3$ alkyl;
$R_{12}$ is H, $C_1$–$C_4$ alkyl, $C_1$–$C_4$ haloalkyl, $C_3$–$C_6$ cycloalkyl, $C_2$–$C_4$ alkoxyalkyl, $C_2$–$C_4$ alkylthioalkyl, $C_2$–$C_4$ cyanoalkyl, $C_1$–$C_3$ alkoxy, $C_3$–$C_4$ alkenyl or $C_3$–$C_4$ alkynyl; or
$R_{11}$ and $R_{12}$ may be taken together to form $(CH_2)_3$, $(CH_2)_4$, $(CH_2)_5$ or $CH_2CH_2OCH_2CH_2$;
$R_{13}$ is H, $C_1$–$C_4$ alkyl or $C_1$–$C_4$ haloalkyl;
$R_{14}$ is $C_1$–$C_2$ alkyl;
$R_{15}$ is H or $CH_3$;
$R_{16}$ is H, $C_1$–$C_4$ alkyl, $C_3$–$C_4$ alkenyl or $C_3$–$C_4$ alkynyl;
$R_{17}$ is $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkoxy, $C_1$–$C_4$ alkylthio, $C_1$–$C_4$ alkylamino or di($C_1$–$C_4$ alkyl)amino;
$R_{19}$ is H, $C_1$–$C_3$ alkyl, $C_3$–$C_4$ alkenyl or $C_3$–$C_4$ alkynyl;
$R_{20}$ is H or $C_1$–$C_3$ alkyl; or
$R_{19}$ and $R_{20}$ may be taken together to form $(CH_2)_4$, $(CH_2)_5$ or $CH_2CH_2OCH_2CH_2$;

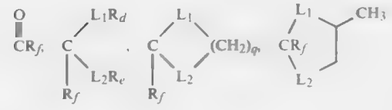


$R_{21}$ is $C_1$–$C_4$ alkyl, $C_1$–$C_3$ haloalkyl, $C_2$–$C_3$ cyanoalkyl, cyclopropyl, $C_3$–$C_4$ alkenyl, $C_3$–$C_4$ alkynyl, $C_2$–$C_4$ alkoxyalkyl or $C_1$–$C_2$ alkoxy;
$R_{22}$ is H or $C_1$–$C_4$ alkyl;
$R_{23}$ is H or $C_1$–$C_4$ alkyl;
$R_{24}$ is H, $C_1$–$C_4$ alkyl, $C_3$–$C_4$ alkenyl, $C_3$–$C_4$ alkynyl, $C_1$–$C_4$ haloalkyl or phenyl which may be optionally substituted with $R_{25}$; or
$R_{23}$ and $R_{24}$ may be taken together to form $(CH_2)_4$, $(CH_2)_5$ or $CH_2CH_2OCH_2CH_2$;
$R_{25}$ is H, $CH_3$, Cl, F, Br, $NO_2$, $CF_3$, CN or $OCH_3$;
m is 1 or 2;
n is 0, 1 or 2;
$W_2$ and $W_3$ are independently O or S;
A is



A-1

X is H, $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkoxy, $C_1$–$C_4$ haloalkoxy, $C_1$–$C_4$ haloalkyl, $C_1$–$C_4$ haloalkylthio, $C_1$–$C_4$ alkylthio, halogen, $C_2$–$C_5$ alkoxyalkyl, $C_2$–$C_5$ alkoxyalkoxy, amino, $C_1$–$C_3$ alkylamino or di($C_1$–$C_3$ alkyl)amino;
Y is H, $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkoxy, $C_1$–$C_4$ haloalkoxy, $C_1$–$C_4$ haloalkylthio, $C_1$–$C_4$ alkylthio, $C_2$–$C_5$ alkoxyalkyl, $C_2$–$C_5$ alkoxyalkoxy, amino, $C_1$–$C_3$ alkylamino, di($C_1$–$C_3$ alkyl)amino, $C_3$–$C_4$ alkenyloxy, $C_3$–$C_4$ alkynyloxy, $C_2$–$C_5$ alkylthioalkyl, $C_2$–$C_5$ alkylsulfinylalkyl, $C_2$–$C_5$ alkylsulfonylalkyl, $C_1$–$C_4$ haloalkyl, $C_4$–$C_5$ cycloalkyl, $C_2$–$C_4$ alkynyl, cyano,



or $N(OCH_3)CH_3$;
q is 2 or 3;
$L_1$ and $L_2$ are independently O or S;
$R_d$ and $R_e$ are independently $C_1$–$C_2$ alkyl;
$R_f$ is H or $CH_3$;
Z is CH;
and their agriculturally suitable salts; provided that
(a) when X is Cl, F, Br or I, then Y is $OCH_3$, $OC_2H_5$, $N(OCH_3)CH_3$, $NHCH_3'$, $N(CH_3)_2$ or $OCF_2H$;
(b) when E is O or S and $R_9$ is H, then $R_2$ is other than $CH_2OR_9$;
(c) when W is S, then R is H and Y is $CH_3$, $OCH_3$, $OC_2H_5$, $CH_2OCH_3$, $C_2H_5$, $CF_3$, $SCH_3$, $OCH_2CH{=}CH_2$, $OCH_2C{\equiv}CH$, $OCH_2CH_2OCH_3$, $CH(OCH_3)_2$ or



(d) the total number of carbon atoms in $R_1$ and Q is less than or equal to 10;
(e) when $Q_1$ is



then X and Y are other than $OCF_2H$ or $SCF_2H$;
(f) when $R_1$ is $R_1'$ then L is L-1, L-3, L-5, L-6, L-8 or L-10;
(g) the total number of carbon atoms in $R_{22}$, $R_{23}$ and $R_{24}$ is less than or equal to 10;
(h) when $R_{21}$ is $C_1$–$C_4$ alkyl, $C_2$–$C_3$ cyanoalkyl, $C_1$–$C_2$ alkoxy or $C_3$–$C_4$ alkenyl, then X and Y are other than $OCF_2H$ or $SCF_2H$;
(i) when Y is CN and $R_1'$ is H, F, Cl or $CH_3$, then $R_{21}$ is other than $C_1$–$C_3$ alkyl;
(j) when $R_1$ is $R_1'$ then Q is $Q_1$;
(k) when $R_1$ is $R_1''$ then Q is $Q_1$ or $Q_2$;
(l) when $Q_2$ is halogen then $R_x$ is halogen;
(m) when $R_1''$ is $SO_2NR_aR_b$, $CO_2R_c$ or $C(O)NR_gR_h$ when Q is $SO_2NHR_{21}$,



$SO_2NR_{22}NR_{23}R_{24}$, $SO_2NH_2$, $SO_2NR_iR_j$, $CO_2R_k$, $C(O)NR_mR_n$ or CHO then L is L-1, L-2, L-5 or L-6; and
(n) when $Q_2$ is halogen then L is L-2, L-4, L-5, L-6, L-7 or L-9.

74. A method for controlling the growth of undesired vegetation which comprises applying to the locus to be protected an effective amount of a compound of claim 1.

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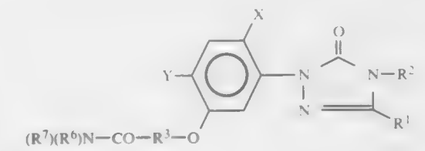
4,743,291

## HERBICIDAL ARYL TRIAZOLINONES

Lester L. Maravetz, Westfield, N.J., assignor to FMC Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 807,382, Dec. 10, 1985, abandoned, and a continuation-in-part of Ser. No. 824,696, Oct. 21, 1985, and a continuation-in-part of Ser. No. 666,933, Oct. 31, 1984, abandoned. This application May 5, 1986, Ser. No. 861,647
Int. Cl.[4] C07D 249/12; A01N 43/653
U.S. Cl. 71—92 12 Claims

1. A herbicidal compound of the formula



in which
X is Br, Cl, F or $CF_3$;
Y is Br, Cl, F, $CH_3$, $CH_2F$, or a radical of the formula $R^8OCH_2$—, $R^8SCH_2$—, $R^8SOCH_2$— or $R^8SO_2CH_2$— where $R^8$ is $C_1$–$C_3$ alkyl, $C_2$–$C_5$ alkenyl, $C_3$–$C_5$ alkynyl, phenyl, or phenyl substituted with halogen or with alkyl or haloalkyl of less than 6 carbon atoms;
$R^3$ is alkylene or haloalkylene of less than 6 carbon atoms;
$R^1$ is halogen, alkyl of 1 to 5 carbon atoms, haloalkyl of 1 to 5 carbon atoms, alkoxyalkyl of 2 to 6 carbon atoms, cyanoalkyl of 2 to 6 carbon atoms, benzyl, alkylthio of 1 to 3 carbon atoms, alkylsulfinyl of 1 to 3 carbon atoms, alkylsulfonyl of 1 to 3 carbon atoms, or alkylthioalkyl, alkylsulfinylalkyl, or alkylsulfonylalkyl of 1 to 3 carbon atoms independently with respect to each alkyl;
$R^2$ is alkyl of 1 to 5 carbon atoms, haloalkyl of 1 to 5 carbon

atoms, alkenyl of 2 to 5 carbon atoms, alkynyl of 3 to 5 carbon atoms, cyanomethyl, cyanoethyl, thiocyanomethyl, or a group of the formula -alkylene-$Y^1$-$R^5$ in which said alkylene group has 1 to 5 carbon atoms, $Y^1$ is oxygen or $S(O)_r$ in which r is 0–2, and $R^5$ is alkyl of 1 to 5 carbon atoms, alkenyl of 2 to 5 carbon atoms, or alkynyl of 3 to 5 carbon atoms;

$R_6$ is an arylsulfonyl group wherein the aryl is selected from the group consisting of phenyl, isoxazolyl, thienyl, benzofuran, dihydrobenzofuran, naphthyl, benzodioxole, anthraquinone, and 1,4-naphthoquinone, said group being unsubstituted or having one or more substituents selected from halogen, nitro, amino, fluorosulfonyl, alkyl, haloalkyl, aminoalkyl, dialkylaminoalkyl, haloalkoxy, alkoxy, alkenyloxy, haloalkenyloxy, alkynyloxy, cyanoalkoxy, epoxyalkoxy, dialkylaminoalkoxy, alkoxyalkoxy, alkoxyalkylthio, cyano, aminocarbonyloxy, alkylaminocarbonyloxy, dialkylaminocarbonyloxy, acylamino, alkoxycarbonyl, aminocarbonyl, alkylaminocarbonyl, dialkylaminocarbonyl, and hydroxycarbonyl in which any aikyl, alkenyl or alkynyl moiety has less than 6 carbon atoms; and $R_7$ is hydrogen, a salt forming group, cycloalkyl and alkyl, alkenyl, or alkynyl having less than 6 carbon atoms.

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**4,743,292**

## HERBICIDAL SULFONAMIDES

**James V. Hay, Newark; Barry A. Wexler, Wilmington, both of Del., and Donna F. Zimmerman, Landenberg, Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 768,158, Aug. 26, 1985, abandoned, which is a continuation-in-part of Ser. No. 680,549, Dec. 11, 1984, abandoned. This application Oct. 10, 1986, Ser. No. 917,929**

**Int. Cl.**[4] **C07D** *403/12, 403/14;* **A01N** *43/54*

**U.S. Cl. 71—92** **18 Claims**

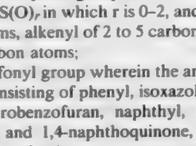
**1**. A compound of the formula:



I

wherein

L is



R is H or $CH_3$;

$W_3$ is O or S;

n is 0 or 1;

$R_1$ is H, $C_1$–$C_3$ alkyl, $C_1$–$C_3$ haloalkyl, halogen, nitro, $CH_2CN$, $CH_2OCH_3$, $CH_2SCH_3$, CN, $C_1$–$C_3$ alkoxy, $SO_2NR^IR^{II}$, $C_1$–$C_3$ alkylthio, $C_1$–$C_3$ alkylsulfinyl, $C_1$–$C_3$ alkylsulfonyl or $CO_2R^{III}$;

$R^I$ is H, $C_1$–$C_4$ alkyl, $C_2$–$C_3$ cyanoalkyl, methoxy or ethoxy;

$R^{II}$ is H, $C_1$–$C_4$ alkyl or $C_3$–$C_4$ alkenyl; or

$R^I$ and $R^{II}$ may be taken together as $—(CH_2)_3—$, $—(CH_2)_4—$, $—(CH_2)_5—$ or $—CH_2CH_2OCH_2CH_2—$;

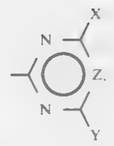
$R^{III}$ is $C_1$–$C_4$ alkyl, $C_3$–$C_4$ alkenyl, $C_3$–$C_4$ alkynyl, $C_2$–$C_4$ haloalkyl, $C_2$–$C_4$ cyanoalkyl, $C_5$–$C_6$ cycloalkyl, $C_4$–$C_7$ cycloalkylalkyl or $C_2$–$C_4$ alkoxyalkyl;

$R_2$ is $C_1$–$C_3$ alkyl;

W is $W_1$;

$W_1$ is $C_2$–$C_8$ alkenyl substituted with 1–5 atoms of F, Cl or Br;

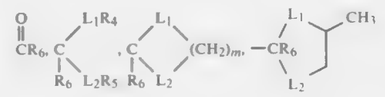
A is



A-1

X is H, $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkoxy, $C_1$–$C_4$ haloalkoxy, $C_1$–$C_4$ haloalkyl, $C_1$–$C_4$ haloalkylthio, $C_1$–$C_4$ alkylthio, halogen, $C_2$–$C_5$ alkoxyalkyl, $C_2$–$C_5$ alkoxyalkoxy, amino, $C_1$–$C_3$ alkylamino or di($C_1$–$C_3$ alkyl)amino;

Y is H, $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkoxy, $C_1$–$C_4$ haloalkoxy, $C_1$–$C_4$ haloalkylthio, $C_1$–$C_4$ alkylthio, $C_2$–$C_5$ alkoxyalkyl, $C_2$–$C_5$ alkoxyalkoxy, amino, $C_1$–$C_3$ alkylamino, di($C_1$–$C_3$ alkyl)amino, $C_3$–$C_4$ alkenloxy, $C_3$–$C_4$ alkynyloxy, $C_2$–$C_5$ alkylthioalkyl, $C_1$–$C_4$ haloalkyl, $C_3$–$C_5$ cycloalkyl, $C_2$–$C_4$ alkynyl,



or $N(OCH_3)CH_3$;

m is 2 or 3;

$L_1$ and $L_2$ are independently O or S;

$R_4$ and $R_5$ are independently $C_1$–$C_2$ alkyl;

$R_6$ is H or $CH_3$;

Z is CH;

and their agriculturally suitable salts; provided that

(a) when X is Cl, F, Br or I, then Y is $OCH_3$, $OC_2H_5$, $N(OCH_3CH_3$, $NHCH_3$, $N(CH_3)_2$ or $OCF_2H$;

(b) the W substituent and the sulfonylurea bridge are on adjacent carbon atoms;

(c) the sulfonylurea bridge is bonded at the 3- or 5-position;

(d) when $W_3$ is S, then R is H, and Y is $CH_3$, $OCH_3$, $OC_2H_5$, $CH_2OCH_3$, $C_2H_5$, $CF_3$, $SCH_3$, $OCH_2CH{=}CH_2$, $OCH_2C{=}CH$, $OCH_2CH_2OCH_3$ or $CH(OCH_3)_2$;

(e) when the total number of carbon atoms of X and Y is greater than four, then the number of carbons of $R_1$ must be less than or equal to two and the number of carbons of W must be less than or equal to four.

**13**. A method for controlling the growth of undesired vegetation which comprises applying to the locus to be protected an effective amount of a compound of claim 1.

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**4,743,293**

## 1-VINYLTRAIAZOLE COMPOUNDS AND PLANT GROWTH AND FUNGICIDAL COMPOSITION

**Wolf Reiser; Wilfried Draber; Karl H. Büchel, all of Wuppertal; Klaus Lürssen, Bergisch-Gladbach; Paul-Ernst Frohberger, Leverkusen, and Volker Paul, Solingen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Continuation of Ser. No. 577,287, Feb. 6, 1984, abandoned, which is a division of Ser. No. 294,603, Aug. 20, 1981, Pat. No. 4,486,218, which is a continuation of Ser. No. 112,891, Jan. 17, 1980, abandoned. This application Jul. 30, 1986, Ser. No. 894,437**

**Claims priority, application Fed. Rep. of Germany, Feb. 16, 1979, 2906061; Sep. 22, 1979, 2938422**

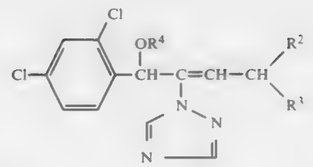
**The portion of the term of this patent subsequent to Mar. 6, 2001, has been disclaimed.**

**Int. Cl.**[4] **C07D** *249/08;* **A01N** *43/653;* **A61K** *31/41*

**U.S. Cl. 71—92** **26 Claims**

**1**. 1-Vinyltriazole compounds of the formula





wherein

each of $R^2$ and $R^3$ is alkyl with 1 to 4 carbon atoms, the total number of carbon atoms being at least 3;

or $R^2$ and $R^3$, together with the carbon atom to which they are bonded, represent cyclohex-3-enyl or cyclohexyl; and

$R^4$ is hydrogen or the acyl radical $—COR^{10}$ in which $R^{10}$ is methyl or phenyl;

and acid addition salts and metal salt complexes thereof.

**26**. The 1-vinyltriazole compound which is 1-(bicyclo-[2,2,1]-hept-2-en-5-yl)-3-(2,4-dichlorophenyl)-2-(1,2,4-triazol-1-yl)-prop-1-en-3-ol.

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**4,743,294**

## N'-(SUBSTITUTED-1,3,5-TRIAZIN-2-YL)-N''-AMINO-N'''-(SUBSTITUTED-BENZENESULPHONYL)-GUANIDINES AS HERBICIDES

**Hans-Joachim Diehr; Christa Fest, both of Wuppertal; Rolf Kirsten, Monheim; Joachim Kluth, Langenfeld; Klaus-Helmut Muller, Düsseldorf; Theodor Pfister, Monheim; Uwe Priesnitz, Solingen; Hans-Jochem Riebel, Wuppertal; Wolfgang Roy, Langenfeld; Hans-Joachim Santel, Cologne; Robert R. Schmidt, Bergisch-Gladbach, all of Fed. Rep. of Germany; Koichi Moriya, Hachioji, Japan; Ludwig Eue, Leverkusen, and Klaus Lürssen, Bergisch-Gladbach, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

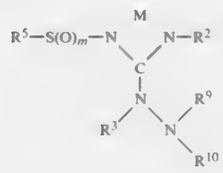
**Continuation-in-part of Ser. No. 769,222, Aug. 23, 1985, and a continuation-in-part of Ser. No. 853,822, Apr. 18, 1986, which is a division of Ser. No. 578,345, Feb. 9, 1984, Pat. No. 4,602,938. This application Apr. 22, 1987, Ser. No. 41,260**

**Claims priority, application Fed. Rep. of Germany, Mar. 4, 1983, 3307679; Sep. 23, 1983, 3334455; Aug. 30, 1984, 3431925; May 17, 1985, 3517821**

**Int. Cl.**[4] **A01N** *43/66;* **C07D** *251/46, 251/22, 401/12*

**U.S. Cl. 71—93** **5 Claims**

**1**. A guanidine derivative of the formula

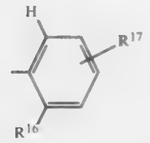


in which

m represents the number zero, 1 or 2,

$R^5$ represents alkyl having up to 6 carbon atoms which is optionally substituted by halogen; or

$R^5$ represents further the radical



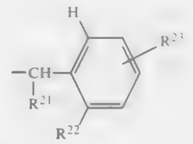
wherein

$R^{16}$ and $R^{17}$ are identical or different and represent hydrogen, halogen, cyano, nitro, $C_1$–$C_6$-alkyl (which may be substituted by fluorine, chlorine, bromine, cyano, carboxyl, $C_1$–$C_4$-alkoxy-carbonyl, $C_1$–$C_4$-alkylaminocarbonyl, di-($C_1$–$C_4$-alkyl)-amino-carbonyl, hydroxyl, $C_1$–$C_4$-alkoxy, formyloxy, $C_1$–$C_4$-alkylcarbonyloxy, $C_1$–$C_4$-alkoxycarbonyloxy, $C_1$–$C_4$-alkylamino-carbonyloxy, $C_1$–$C_4$-alkylthio, $C_1$–$C_4$-alkylsulphinyl, $C_1$–$C_4$-alkylsulphonyl, di-($C_1$–$C_4$-alkyl)-aminosulphonyl, $C_3$–$C_6$-cycloalkyl or phenyl), $C_2$–$C_6$-alkenyl (which may be substituted by fluorine, chlorine, bromine, cyano, $C_1$–$C_4$-alkoxycarbonyl, carboxyl or phenyl), $C_1$–$C_4$-alkoxy (which may be substituted by fluorine, chlorine, bromine, cyano, carboxyl, $C_1$–$C_4$-alkoxy-carbonyl, $C_1$–$C_4$-alkylthio, $C_1$–$C_4$-alkylsulphinyl or $C_1$–$C_4$-alkylsulphonyl), $C_3$–$C_6$-alkenoxy (which may be substituted by fluorine, chlorine, bromine, cyano or $C_1$–$C_4$-alkoxy-carbonyl), $C_3$–$C_6$-alkinoxy or the radical $—S(O)_p—R^{18}$, wherein p represents the numbers zero, 1 or 2 and $R^{18}$ represents $C_1$–$C_4$-alkyl (which may be substituted by fluorine, chlorine, bromine, cyano or $C_1$–$C_4$-alkoxy-carbonyl), $C_3$–$C_6$-alkenyl, $C_3$–$C_6$-alkinyl, $C_1$–$C_4$-alkoxy, $C_1$–$C_4$-alkylamino or di-($C_1$–$C_4$-alkyl)-amino, or

$R^{16}$ and $R^{17}$ (which are identical or different) represent phenyl or phenoxy, $C_1$–$C_4$-alkylcarbonylamino, $C_1$–$C_4$-alkoxy-carbonylamino, $C_1$–$C_4$-alkylamino-carbonylamino, di-(-$C_1$–$C_4$-alkyl)-amino-carbonylamino or the radical of $—CO$-$R^{19}$, wherein $R^{19}$ represents $C_1$–$C_6$-alkyl, $C_1$–$C_6$-alkoxy, $C_3$–$C_6$-alkenoxy, $C_1$–$C_4$-alkylthio, $C_1$–$C_4$-alkylamino or di-($C_1$–$C_4$-alkyl)-amino (which may be substituted by fluorine and/or chlorine), or

$R^{16}$ and $R^{17}$ represent $C_1$–$C_4$-alkylsulphonyloxy, di-($C_1$–$C_4$-alkyl)-aminosulphonylamino or the radical $—CH{=}N—R^{20}$, wherein $R^{20}$ represents $C_1$–$C_6$-alkyl (which may be substituted by fluorine, chlorine, cyano, carboxyl, $C_1$–$C_4$-alkoxycarbonyl, $C_1$–$C_4$-alkylthio, $C_1$–$C_4$-alkylsulphinyl or $C_1$–$C_4$-alkylsulphonyl), benzyl (which may be substituted by fluorine or chlorine), $C_3$–$C_6$-alkenyl or $C_3$–$C_6$-alkinyl (which may be substituted by fluorine or chlorine), phenyl (which may be substituted by fluorine, chlorine, bromine, $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy, trifluoromethyl, trifluoromethoxy or trifluoromethylthio, $C_3$–$C_6$-alkenoxy, $C_3$–$C_6$-alkinoxy, benzyloxy or $C_1$–$C_6$-alkoxy (which may be substituted by fluorine and/or chlorine, or $R^{16}$ and $R^{17}$ represent amino, $C_1$–$C_4$-alkylamino, di-($C_1$–$C_4$-alkyl)-amino, phenylamino, $C_1$–$C_4$-alkyl-carbonylamino, $C_1$–$C_4$-alkoxycarbonylamino or $C_1$–$C_4$-alkyl-sulphonylamino, or represent phenylsulphonylamino (which may be substituted by fluorine, chlorine, bromine or methyl);

$R^5$ represents further the radical



wherein

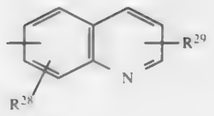
$R^{21}$ represents hydrogen or $C_1$–$C_3$-alkyl and

$R^{22}$ and $R^{23}$ are identical or different and represent hydrogen, fluorine, chlorine, bromine, nitro, cyano, $C_1$–$C_4$-alkyl (which may be substituted by fluorine and/or chlorine), $C_1$–$C_4$-alkoxy (which may be substituted by fluorine and/or chlorine), carboxyl, $C_1$–$C_4$-alkoxycarbonyl, $C_1$–$C_4$-alkylsulphonyl or di-($C_1$–$C_4$-alkyl)-aminosulphonyl; chlorine), and di-($C_1$–$C_4$-alkyl)-aminosulphonyl or $C_1$–$C_4$-alkoxy-carbonyl;

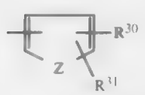
$R^5$ represents further the radical

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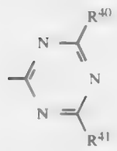




wherein
$R^{28}$ and $R^{29}$ are identical or different and represent hydrogen, fluorine, chlorine, bromine, $C_1$–$C_4$-alkyl (which may be substituted by fluorine and/or bromine), $C_1$–$C_4$-alkoxy (which may be substituted by fluorine and/or chlorine), $C_1$–$C_4$-alkylthio, $C_1$–$C_4$-alkylsulphinyl or $C_1$–$C_4$-alkylsulphonyl (which may be substituted by fluorine and/or chlorine) or di-($C_1$–$C_4$-alkyl)-aminosulphonyl; or
$R^5$ represents further the radical



wherein
$R^{30}$ and $R^{31}$ are identical or different and represent hydrogen, fluorine, chlorine, bromine, cyano, nitro, $C_1$–$C_4$-alkyl (which may be substituted by fluorine and/or chlorine), $C_1$–$C_4$-alkoxy (which may be substituted by fluorine and/or chlorine), $C_1$–$C_4$-alkylthio, $C_1$–$C_4$-alkylsulphinyl or $C_1$–$C_4$-alkylsulphonyl (which may be substituted by fluorine and/or chlorine) or di-($C_1$–$C_4$-alkyl)-aminosulphonyl; or $C_1$–$C_4$-alkoxy-carbonyl, and
Z represents oxygen, sulphur, or the grouping N—$Z^1$, wherein
$Z^1$ represents hydrogen, $C_1$–$C_4$-alkyl (which may be substituted by fluorine, chlorine, bromine or cyano), $C_3$–$C_6$-cycloalkyl, benzyl, phenyl (which may be substituted by fluorine, chlorine, bromine or nitro), $C_1$–$C_4$-alkylcarbonyl, $C_1$–$C_4$-alkoxy-carbonyl or di-($C_1$–$C_4$-alkyl)-aminocarbonyl;
$R^2$ represents the radical



wherein
$R^{40}$ and $R^{41}$ are identical or different and represent $C_1$–$C_4$-alkyl (which may be substituted by fluorine and/or chlorine), or $C_1$–$C_4$-alkoxy (which may be substituted by fluorine and/or chlorine);
$R^3$ represents hydrogen, $C_1$–$C_4$-alkyl (which may be substituted by fluorine, chlorine, bromine, cyano, hydroxy or $C_1$–$C_2$-alkoxy), $C_3$–$C_6$-cycloalkyl, $C_3$–$C_6$-alkenyl, $C_3$–$C_6$-alkinyl, or benzyl (which may be substituted by fluorine, chlorine or methyl),
$R^9$ represents hydrogen or $C_1$–$C_4$-alkyl and
$R^{10}$ represents $C_1$–$C_4$-alkyl (which may be substituted by fluorine, chlorine, bromine, cyano, $C_1$–$C_4$-alkoxy or $C_1$–$C_4$-alkoxy-carbonyl), $C_3$–$C_6$-alkenyl, $C_3$–$C_6$-alkinyl, $C_3$–$C_6$-cycloalkyl (which may be interrupted by a —$SO_2$ bridge), benzyl or phenylethyl (which may be substituted by fluorine, chlorine or methyl), phenyl (which may be substituted by fluorine, chlorine, bromine, nitro, cyano, $C_1$–$C_4$-alkyl, trifluoromethyl, $C_1$–$C_4$-alkoxy, trifluoromethoxy, $C_1$–$C_4$-alkyl-carbonyl, benzoyl, $C_1$–$C_4$-alkoxycarbonyl, $C_1$–$C_4$-alkyl-sulphonyl or phenylsulphonyl (which may be substituted by fluorine, chlorine, bromine or methyl), or
$R^9$ and $R^{10}$ together represent $C_4$–$C_6$-alkane-diyl (which may be interrupted by an oxygen bridge); and
M represents hydrogen, one equivalent of sodium, potassium, magnesium, calcium, aluminium, manganese, iron, cobalt or nickel, an ammonium radical which is optionally substituted by $C_1$–$C_6$-alkyl (which may be substituted by chlorine), $C_3$–$C_6$-alkenyl, $C_3$–$C_6$-alkinyl and/or benzyl (which may be substituted by fluorine, chlorine or methyl), or —in the case in which M is bonded to the same nitrogen atom as $R^2$—also represents $C_1$–$C_6$-alkyl (which may be substituted by fluorine, chlorine or cyano), $C_3$–$C_6$-alkenyl, $C_3$–$C_6$-alkinyl or benzyl or an acid adduct thereof.

**5**. A method of controlling the growth of plants which comprises administering to such plants or to a habitat in which they are grown or to be grown a plant growth regulating effective amount of a compound or adduct according to claim **1**.

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**4,743,295**

## HERBICIDAL SULFONAMIDES

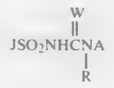
**Wallace C. Petersen, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Division of Ser. No. 856,781, May 2, 1986, Pat. No. 4,675,045, which is a continuation-in-part of Ser. No. 740,029, May 31, 1985, abandoned. This application Mar. 20, 1987, Ser. No. 28,397**

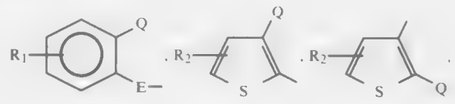
**Int. Cl.**[4] **C07D** *251/46, 401/12;* **A01N** *43/66, 43/70*

**U.S. Cl. 71—93** **56 Claims**

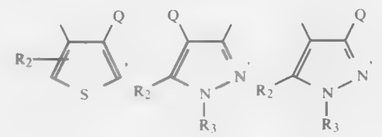
**1**. A compound of the formula



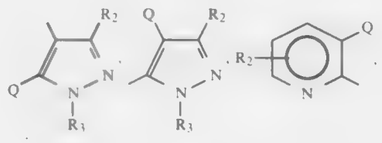
wherein
J is



J-1 J-2 J-3



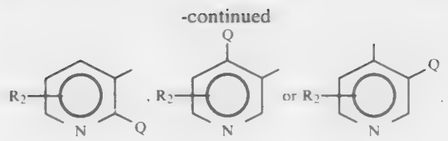
J-4 J-5 J-6



J-7 J-8 J-9



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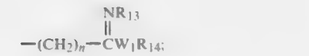


J-10 J-11 J-12

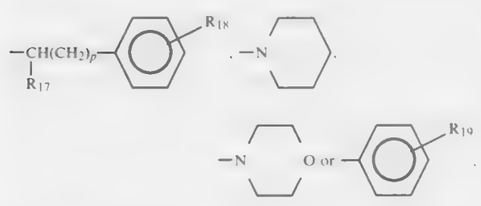
W is O or S;
R is H or $CH_3$;
E is a single bond or —$CH_2$—;
Q is $Q_2$ or $Q_3$;
$Q_2$ is



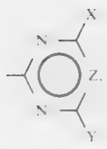
$Q_3$ is



n is 0 or 1;
$W_1$ is O or S;
$R_1$ is H, $C_1$–$C_4$ alkyl, $C_1$–$C_3$ haloalkyl, Cl, Br, F, $NO_2$, $C_1$–$C_3$ alkoxy, $SO_2NR_aR_b$, $C_1$–$C_3$ alkylthio, $C_1$–$C_3$ alkylsulfinyl, $C_1$–$C_3$ alkylsulfonyl, CN, $CO_2R_c$, $C_1$–$C_3$ haloalkoxy, $C_1$–$C_3$ haloalkylthio, $CH_2OCH_3$, $CH_2SCH_3$, $CH_2CN$, $NH_2$, $NHCH_3$ or $N(CH_3)_2$;
$R_2$ is H, Cl, Br, $C_1$–$C_4$ alkyl, $C_1$–$C_3$ alkoxy or $C_1$–$C_3$ alkylthio;
$R_3$ is H, $C_1$–$C_4$ alkyl, $C_3$–$C_4$ alkenyl or phenyl;
$R_a$ is H, $C_1$–$C_4$ alkyl, $C_2$–$C_3$ cyanoalkyl or $C_1$–$C_3$ alkoxy;
$R_b$ is H, $C_1$–$C_4$ alkyl or $C_3$–$C_4$ alkenyl; or
$R_a$ and $R_b$ may be taken together as $(CH_2)_3$, $(CH_2)_4$, $(CH_2)_5$ or $CH_2CH_2OCH_2CH_2$;
$R_c$ is $C_1$–$C_4$ alkyl, $C_3$–$C_4$ alkenyl, $C_3$–$C_4$ alkynyl, $C_2$–$C_4$ haloalkyl, $C_2$–$C_3$ cyanoalkyl, $C_5$–$C_6$ cycloalkyl, $C_4$–$C_7$ cycloalkylalkyl or $C_2$–$C_4$ alkoxyalkyl;
$R_{13}$ is $C_1$–$C_4$ alkyl;
$R_{14}$ is $C_1$–$C_4$ alkyl;
$R_{15}$ is H, $C_1$–$C_6$ alkyl, $C_2$–$C_3$ alkyl substituted with $C_1$–$C_3$ alkoxy or phenoxy, $C_3$–$C_6$ alkenyl, $C_3$–$C_6$ alkynyl, $C_3$–$C_6$ cycloalkyl, $C_5$–$C_6$ cycloalkenyl, $C_4$–$C_7$ cycloalkylalkyl, $C_5$–$C_6$ cycloalkyl substituted with $CH_3$ or $OCH_3$, $CH_2CN$, $CH_2CH_2CN$, $OCH_3$, $OC_2H_5$, $N(CH_3)_2$,

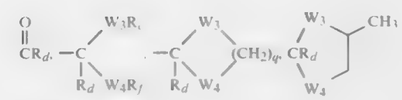


$R_{16}$ is H, $C_1$–$C_6$ alkyl, $CH_2CH{=}CH_2$, $CH_2CN$ or $CH_2CH_2CN$; or
$R_{15}$ and $R_{16}$ may be taken together to form $(CH_2)_3$, $(CH_2)_4$, $(CH_2)_5$, $(CH_2)_6$, $CH_2CH{=}CHCH_2$, $CH_2CH_2OCH_2CH_2$ or $CH_2CH_2N(CH_3)CH_2CH_2$;
$R_{17}$ is H or $CH_3$;
$R_{18}$ is H, $C_1$–$C_3$ alkyl, Cl, Br, $OCH_3$ or $OC_2H_5$;
$R_{19}$ is H, $C_1$–$C_4$ alkyl, $OCH_3$, F, Br, Cl, $CF_3$, CN, $NO_2$, $SO_2CH_3$, $SCH_3$ or $N(CH_3)_2$;
p is 0 or 1;
A is



A-1

X is H, $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkoxy, $C_1$–$C_4$ haloalkoxy, $C_1$–$C_4$ haloalkyl, $C_1$–$C_4$ haloalkylthio, $C_1$–$C_4$ alkylthio, $C_2$–$C_5$ alkoxyalkoxy, amino, $C_1$–$C_3$ alkylamino or di($C_1$–$C_3$)alkylamino;
Y is H, $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkoxy, $C_1$–$C_4$ haloalkoxy, $C_1$–$C_4$ haloalkylthio, $C_1$–$C_4$ alkylthio, $C_2$–$C_5$ alkoxyalkyl, $C_2$–$C_5$ alkoxyalkoxy, amino, $C_1$–$C_3$ alkylamino, di($C_1$–$C_3$)alkylamino, $C_3$–$C_4$ alkenyloxy, $C_3$–$C_4$ alkynyloxy, $C_2$–$C_5$ alkylsulfinylalkyl, $C_1$–$C_4$ haloalkyl, $C_2$–$C_5$ alkylsulfonylalkyl, $C_3$–$C_5$ cycloalkyl, $C_2$–$C_4$ alkynyl, $C_2$–$C_5$ alkylthioalkyl,



or $N(OCH_3)CH_3$
$W_3$ and $W_4$ are independently O or S;
q is 2 or 3;
$R_d$ is H or $CH_3$;
$R_e$ is $C_1$–$C_2$ alkyl;
$R_f$ is $C_1$–$C_2$ alkyl;
Z is N;
and their agriculturally suitable salts; provided that
(a) when W is S, then R is H, and Y is $CH_3$, $OCH_3$, $OC_2H_5$, $CH_2OCH_3$, $C_2H_5$, $CF_3$, $SCH_3$, $OCH_2CH{=}CH_2$, $OCH_2CCH$, $OCH_2CH_2OCH_3$, $CH(OCH_3)_2$ or



(b) X or Y is other than $C_1$ haloalkoxy;
(c) the combined total number of carbon atoms of $R_{15}$ and $R_{16}$ is less than or equal to 10;
(d) when $R_{15}$ is $CH_2CN$ or $CH_2CH_2CN$, then $R_{16}$ is $CH_2CN$ or $CH_2CH_2CN$;
(e) when $R_{15}$ is $OCH_3$ or $OC_2H_5$, then $R_{16}$ is H or $CH_3$;
(f) when E is —$CH_2$—, then n is 0; and
(g) when the total number of carbon atoms of X and Y is greater than four, then the number of carbons of $R_1$ is less than or equal to two, the number of carbons of $R_2$ is less than or equal to two, and the number of carbons of Q is less than or equal to four.

**46**. A method for controlling the growth of undesired vegetation which comprises applying to the locus to be protected an effective amount of a compound of claim **1**.

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**4,743,296**

## HETEROCYCLICALLY FUSED PYRIDINE COMPOUNDS AS HERBICIDES

**Dieter Dürr, Bottmingen; Hans-Georg Brunner, Lausen, and Henry Szczepanski, Wallbach, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

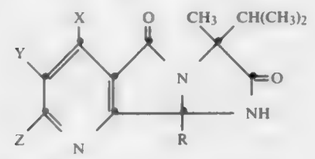
**Continuation-in-part of Ser. No. 837,977, Mar. 10, 1986, abandoned. This application Dec. 1, 1986, Ser. No. 936,214**

**Claims priority, application Switzerland, Mar. 12, 1985, 1111/85; Dec. 20, 1985, 5451/85**

**Int. Cl.**[4] **A01N** *43/40, 43/42;* **C07D** *471/14*

**U.S. Cl. 71—94** **12 Claims**

1. A pyridine compound of formula I



(I)

wherein each of X, Y and Z independently of one another is hydrogen or a $C_1$–$C_4$alkyl group, or two adjacent substituents together also form a saturated or unsaturated 3- or 4-membered alkylene chain or alkenylene chain, each of which chains may in turn be substituted by one to four $C_1$–$C_4$alkyl groups; R is a $C_1$–$C_4$alkylthio or $C_1$–$C_4$alkoxy group, each of which groups is substituted in the alkyl moiety by halogen, hydroxy, $C_1$–$C_4$alkoxy, $C_1$–$C_4$alkylthio, $C_1$–$C_4$alkylsulfinyl, $C_1$–$C_4$alkylsulfonyl, cyano, $C_1$–$C_4$alkoxycarbonyl, $C_1$–$C_4$alkylcarbonyl, carboxy, carbamoyl, $C_1$–$C_4$alkylcarbamoyl, di($C_1$–$C_4$alkyl)carbamoyl or carbanilido; R is also a $C_3$–$C_4$alkenylthio or $C_3$–$C_4$alkynylthio group, the alkenyl and alkynyl moieties being unsubstituted or substituted in the manner indicated for the above alkyl groups.

7. A herbicidal and plant growth regulating composition which contains, as active ingredient a herbicidally or plant growth regulatingly effective amount of a compound according to claim 1, together with a carrier or other adjuvant.

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**4,743,297**

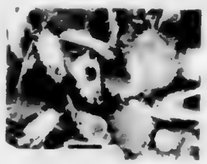
## PROCESS FOR PRODUCING METAL FLAKES

**Nelson E. Kopatz, Sayre; Jack E. Vanderpool, Laceyville, both of Pa.; Philip E. Stermer, Waverly, N.Y., and Howard H. Shaw, Monroeton, Pa., assignors to GTE Products Corporation, Stamford, Conn.**

**Filed Apr. 3, 1987, Ser. No. 33,708**

**Int. Cl.**[4] **B22F** *9/04*

**U.S. Cl. 75—0.5 B** **6 Claims**



1. A process for producing metal flakes, said process comprising:

(a) entraining metal powder particles in a carrier gas and passing said powder particles through a high temperature zone at a temperature above the melting point of said powder particles to melt at least about 50% by weight of said powder particles; and

(b) resolidifying the resulting high temperature treated material by impacting said material against a substrate and thereafter contacting said material with a non-oxidizing gas selected from the group consisting of nitrogen, argon, hydrogen, helium, and combinations thereof, to remove said material from said substrate in the form of flakes.

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**4,743,298**

## PROCESS AND APPARATUS FOR SEPARATING MERCURY AND RED PHOSPHORUS FROM ONE ANOTHER

**Hannsjörg Ulrich, Erftstadt, and Achim Gassen, Hürth, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Oct. 22, 1986, Ser. No. 921,757**

**Claims priority, application Fed. Rep. of Germany, Nov. 5, 1985, 3539163**

**Int. Cl.**[4] **C22B** *3/00*

**U.S. Cl. 75—121** **3 Claims**

1. A process for separating a mixture of mercury and red phosphorus into its constituents, the mixture being obtained by flowing an aqueous solution having at least one mercury salt dissolved in it through a layer of granular red phosphorus in a column arranged in upright position and provided, close to its lower end, with means supporting the layer of red phosphorus, which comprises: forcing a non reactive gas selected from the group consisting of nitrogen, carbon dioxide, air and mixtures thereof from below under a pressure of 1.05 to 1.5 bars over a period of 5 to 30 minutes through said means and layer of red phosphorus thereon, the mercury/red phosphorus-mixture covered with solution and provided with flow deflecting paths becoming lifted up; collecting, over a period of 5 to 30 minutes on the supporting means, the mercury dropping from the mixture so lifted ; forcing the non reactive gas from above under a pressure of 1.05 to 2.0 bars over a period of 1 to 20 seconds into contact with said mixture; and ultimately collecting the mercury running down from the supporting means.

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**4,743,299**

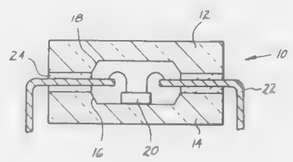
## CERMET SUBSTRATE WITH SPINEL ADHESION COMPONENT

**Michael J. Pryor, Woodbridge; Eugene Shapiro, Hamden, and Deepak Mahulikar, Meriden, all of Conn., assignors to Olin Corporation, New Haven, Conn.**

**Filed Mar. 12, 1986, Ser. No. 838,967**

**Int. Cl.**[4] **C22C** *29/12;* **H02G** *13/08*

**U.S. Cl. 75—235** **9 Claims**




1. A composite material for a component for a package to encase an electronic device, comprising:

an aluminum or aluminum alloy forming a matrix of said composite material;

ceramic particles distributed within said matrix; and

a spinel comprising the interface between the matrix and the ceramic particles, said spinel being chemically bonded both to said aluminum or aluminum alloy matrix and to said ceramic particles, said spinel comprising said ceramic and a binder selected from the group consisting of Mg, Li, Cr, Ca, Be, MgO and mixtures thereof;

said composite material further comprising:

from about 50 to about 65 volume % of said aluminum or aluminum alloy, an effective amount of up to about 10 volume % of said binder, and the balance essentially said ceramic particles; and

said composite material having a thermal conductivity of about 40 to about 120 W/m-°K. for improved heat transfer through said component.



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**4,743,300**

## POLYFLUOROPOLYETHERS HAVING PENDANT PERFLUOROALKOXY GROUPS

**Steven P. Brinduse, Minneapolis; Anthony B. Clinch, Woodbury; Daniel K. McIntyre, St. Paul; Allen L. Noreen, Lake Elmo, and Mark J. Pellerite, Woodbury, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Aug. 29, 1986, Ser. No. 902,315**

**Int. Cl.**[4] **B28B** *7/36;* **C07C** *179/02*

**U.S. Cl. 106—38.22** **30 Claims**

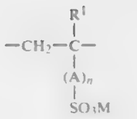
1. Perfluoropolyether compositions comprising (1) normally liquid peroxidic poly(perfluorooxyalkylene) compositions comprising a mixture of peroxidic poly(perfluorooxyalkylene) compounds, each compound comprising a backbone of randomly distributed, perfluorooxyalkylene units represented by the formulas $—CF_2O—$,



and —O—, which, when bonded to an —O— of any of the perfluorooxyalkylene units, forms a peroxy group, —O—O—, which imparts the peroxidic characteristics to the composition, and backbone-pendant perfluoroalkoxy groups, the terminal ether oxygen atoms of which are bonded to carbon atoms of the

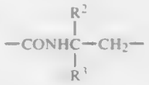


backbone units; (2) derivatives of the poly(perfluorooxyalkylene) compositions comprising a mixtures of non-peroxidic polyfluoropolyether compounds; and (3) derivatives of the non-peroxidic polyfluoropolyether compounds comprising functional and non-functional polyfluoropolyether compounds.



(I)

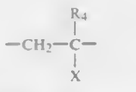
wherein $R^1$ is a hydrogen atom or a lower alkyl group, A is $—CH_2—$, $—CONHCH_2—$,



wherein $R^2$ and $R^3$ are a hydrogen atom or a lower alkyl group and can be the same or different, or

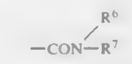


n is 0 or an integer of 1, and M is a hydrogen atom, alkali metal or ammonium, and containing units represented by the formula II:



(II)

wherein $R_4$ is a hydrogen atom or a lower alkyl group, X is $CONH_2$, $COOR_5$ wherein $R_5$ is a lower alkyl group or a lower hydroxyalkyl group, or



wherein $R^6$ and $R^7$ are the same or different lower alkyl group or one of $R^6$ and $R^7$ is a hydrogen atom and the other is a lower alkyl group, or $R^6$ and $R^7$ form 5- or 6-member rings together with nitrogen atoms bonded thereto, with or without oxygen atoms.

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**4,743,301**

## CONCRETE COMPOSITION FOR UNDERWATER USE

**Koichi Ito; Masaharu Sakuta; Yasuhiko Yoshioka, all of Tokyo; Tadahiro Kaya, Kanagawa; Tsunetoshi Shioya, Kanagawa; Hiroyuki Yamakawa, Kanagawa, and Yoshifumi Shimoyama, Kanagawa, all of Japan, assignors to Takenaka Komuten Co., Ltd., Osaka; Takenaka Doboku Co., Ltd. and Sankyo Chemical Industries, Ltd., both of Tokyo, all of, Japan**

**PCT No. PCT/JP84/00390, § 371 Date Jul. 26, 1985, § 102(e) Date Jul. 26, 1985, PCT Pub. No. WO85/00802, PCT Pub. Date Feb. 28, 1985**

**PCT Filed Jul. 31, 1984, Ser. No. 725,116**

**Claims priority, application Japan, Aug. 18, 1983, 58-149685; Jul. 11, 1984, 59-142407; Jul. 11, 1984, 59-142406**

**The portion of the term of this patent subsequent to Aug. 2, 2002, has been disclaimed.**

**Int. Cl.**[4] **C04B** *24/16*

**U.S. Cl. 106—90** **8 Claims**

1. A concrete composition for underwater use consisting essentially of cement, aggregate, water and about 0.1 to 4% by weight, based on the weight of the cement, of a water soluble vinyl polymer containing vinyl units represented by the formula I:

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**4,743,302**

## LOW MELTING GLASS COMPOSITION

**Maurice E. Dumesnil, Los Altos Hills, and Leo Finkelstein, San Francisco, both of Calif., assignors to VLSI Packaging Materials, Inc., Los Altos Hills, Calif.**

**Continuation-in-part of Ser. No. 871,503, Jun. 6, 1986, abandoned, which is a continuation-in-part of Ser. No. 830,853, Feb. 19, 1986, abandoned. This application Jan. 20, 1987, Ser. No. 5,040**

**Int. Cl.**[4] **C03C** *3/12, 3/21, 14/00, 8/24*

**U.S. Cl. 106—1.23** **46 Claims**

1. A low melting glass composition comprising in weight percent calculated on an oxide basis:

(a) PbO: 30% to 55%,

(b) $V_2O_5$: 30% to 55%,

(c) $Bi_2O_3$: 0.1% to 18%,

(d) $P_2O_5$, $Nb_2O_5$, $Ta_2O_5$ or combinations thereof: 0.1% to 10%,

(e) ZnO, BaO, SrO, or combinations thereof: 0.1% to 10%

wherein the combined weight percent of (c)+(d)+(e) is in the range of 0.3% and 20%, and with the proviso that (a) may be replaced partially up to 25% by weight with cesium oxide.

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16. The glass of claim 1 mixed with up to 90% by weight, based on the mixture, of silver or gold powder.

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**4,743,303**

## AQUEOUS DISPERSIONS, A PROCESS FOR THEIR PREPARATION AND THE USE OF THE DISPERSIONS AS SIZING AGENTS

**Ulla Helmer, Solna, and Randi Johansen, Bromma, both of Sweden, assignors to Casco Nobel AB, Stockholm, Sweden**

**Filed Jul. 2, 1986, Ser. No. 881,325**
**Int. Cl.[4] C08J *3/02*; B32B *9/06***
**U.S. Cl. 106—236** **26 Claims**

1. An aqueous dispersion that contains
(a) water,
(b) at least one dispersing agent selected from the group consisting of anionic and cationic dispersing agents, and
(c) a dispersed phase in the form of a plurality of individual particles, each of said individual particles being composed of a mixture of
(1) 10–96% by weight of a hydrophobing rosin material, and
(2) a synthetic cellulose reactive sizing agent selected from the group consisting of a hydrophobing carbamoyl chloride or a ketene dimer or an acid anhydride.

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**4,743,304**

## ASPHALT ANTISTRIPPING AGENTS CONTAINING ORGANIC AMINES AND PORTLAND CEMENT

**Dennis W. Gilmore, Fairfield, and Thomas G. Kugele, Cincinnati, both of Ohio, assignors to Morton Thiokol, Inc., Chicago, Ill.**

**Filed Dec. 14, 1983, Ser. No. 561,382**
**Int. Cl.[4] C08L *95/00***
**U.S. Cl. 106—281 N** **14 Claims**

1. A process for improving the physical properties of bitumen/aggregate compositions, said process comprising:
a. adding an antistripping agent to bituminous material in an amount at least about 0.05% by weight based on the weight of the bituminous material, said antistripping agent being selected from the group consisting of imidazolines, polyamines, alkoxylated polyamines, aminocarboxylic esters, amide-amines, and mixtures thereof;
b. adding Portland cement to aggregate in an amount at least about 0.25% by weight based on the weight of the aggregate; and
c. blending the products of steps a. and b.

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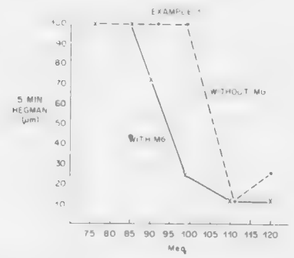
**4,743,305**

## ORGANOCLAYS

**Neil T. Doidge, Gonzales, Tex.; Howard Goodman, and Andrew R. Fugler, both of St. Austell, United Kingdom, assignors to ECC International Limited, Great Britain**

**Continuation-in-part of Ser. No. 727,022, Apr. 25, 1985, Pat. No. 4,623,398. This application Nov. 12, 1986, Ser. No. 930,279**
**The portion of the term of this patent subsequent to Nov. 18, 2003, has been disclaimed.**
**Int. Cl.[4] C04B *14/00*, *33/00***
**U.S. Cl. 106—308 N** **9 Claims**

1. A process for preparing an organoclay which is readily dispersible in an organic medium, which process comprises:
(a) mixing an aqueous suspension of a smectite clay with a quaternary ammonium compound capable of rendering the smectite clay organophilic in proportions such that there are present from 75 to 110 milliequivalents of quaternary ammonium cation per 100 g of dry smectite clay;
(b) subjecting the mixture formed in step (a) to high shear mixing for a time sufficient to dissipate in the mixture at




least 100 KJ of energy per kg. of dry solids in the mixture; and
(c) dewatering the product of step (b).

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**4,743,306**

## ORGANOPHILIC COMPOSITIONS

**Walter B. Jepson, and Howard Goodman, both of St. Austell, England, assignors to ECC International Limited, Great Britain**

**Filed Dec. 12, 1986, Ser. No. 940,988**
**Claims priority, application United Kingdom, Dec. 19, 1985, 8531254**
**Int. Cl.[4] C04B *14/00***
**U.S. Cl. 106—308 N** **7 Claims**

1. An organophilic composition, which comprises a mixture of a smectite clay and finely divided silica, the mixture having been treated with a quaternary ammonium compound which has at least one alkyl radical having from 10 to 24 carbon atoms and which is capable of rendering the smectite clay organophilic, and the finely divided silica constituting at least 5% by weight of the mixture of smectite clay, finely divided silica and quaternary ammonium compound.

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**4,743,307**

## APPARATUS FOR PROCESSING SUGAR CANE

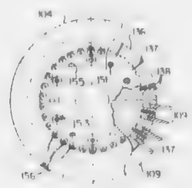
**William Mason, 16103-86 Ave., Edmonton, Canada**

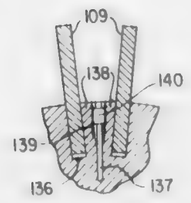
**Continuation of Ser. No. 565,612, Dec. 27, 1983, Pat. No. 4,572,741, which is a continuation of Ser. No. 295,092, Aug. 21, 1981, abandoned. This application Feb. 24, 1986, Ser. No. 832,353**
**The portion of the term of this patent subsequent to Feb. 25, 2003, has been disclaimed.**
**Int. Cl.[4] C13C *1/04*; B26D *1/12***
**U.S. Cl. 127—2** **4 Claims**

1. A milling drum comprising an elongated cylindrical body, a plurality of blade receiving slots formed in and extending longitudinally of said body for receiving milling blades, a milling blade positioned in each of said blade receiving slots, an additional slot formed in said body between each adjacent pair of said blade receiving slots, whereby the sides of said blade receiving slots may be flexed toward and away from each other for releasably securing said milling blades therein, means in said additional slots for causing said flexing of said sides for gripping said blades and securing said blades in said blade receiving slots, end plates for accurately positioning said blades in said body; said end plates including teeth extending longitudinally along a portion of said body and along the radially outermost edges of said blades when said end plates are in position on the ends of said body; said end plates further



including an inclined annular hub adjacent the inner edge of said teeth, whereby when the radially outermost edges of said








blades contact said inclined hub, said blades are forced against said teeth to accurately position said blades.

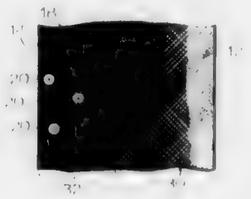
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**4,743,308**

## CORROSION INHIBITION OF METAL ALLOYS

**Piran Sioshansi, Bedford, and Ward D. Halverson, Cambridge, both of Mass., assignors to Spire Corporation, Bedford, Mass.**

**Filed Jan. 20, 1987, Ser. No. 4,599**
**Int. Cl.[4] C23C *14/00***
**U.S. Cl. 148—4** **3 Claims**



1. A process of passivating the electrochemically active surface of a metal alloy comprising:
(a) providing a workpiece formed of said metal alloy, said metal alloy being a combination of chromium, nickel, iron, carbon, cobalt, and either molybdenum or manganese and silicon in lieu of molybdenum;
(b) forming a coating of a biocompatible element on the surface of said workpiece, said coating being formed by physical vapor deposition and to a thickness in the range from about 20 nm to about 200 nm, and said biocompatible element being one of a group consisting of platinum, gold and palladium;
(c) exposing said coated surface of said workpiece to an ion beam so as to drive a plurality of atoms of said biocompatible element from said coating, together with a plurality of ions from said ion beam, into said surface of said workpiece at a distance ranging from about 0.2 to about 200 nanometers, said ion beam including ions from one of a group consisting of ionized nitrogen, tantalum, argon, neon, helium and krypton; and
(d) removing the remainder of said coating from said surface of said workpiece

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**4,743,309**

## METHOD FOR ZONE HEAT TREATMENT OF A METALLIC WORKPIECE

**Peter Jongenburger, Baden, Switzerland, assignor to BBC Brown, Boveri & Company, Limited, Baden, Switzerland**

**Filed Dec. 15, 1986, Ser. No. 941,794**
**Claims priority, application Switzerland, Dec. 19, 1985, 5427/85**
**Int. Cl.[4] C21D *1/00***
**U.S. Cl. 148—13.1** **5 Claims**




1. A method of zone heat treatment of a metallic workpiece, which has a cross-section defining a profile radius of at least 10 mm, comprising:
passing the workpiece successively in a feed direction through a zone of differing temperatures, including,
a first passing step in which the workpiece is passed through a first temperature zone in which the temperature as a function of displacement of the workpiece in the feed direction initially rises steeply,
a second passing step in which the workpiece is passed through a second temperature zone in which the temperature as a function of displacement of the workpiece in the feed direction passes through a flat maximum, and
a third passing step in which the workpiece is passed through a third temperature zone in which the temperature as a function of displacement of the workpiece in the feed direction falls with a small slope

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**4,743,310**

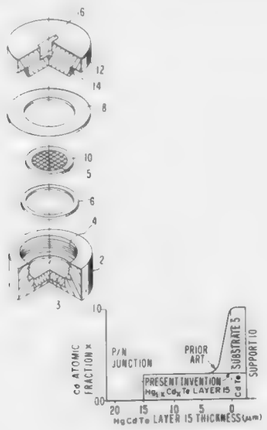
## HGCDTE EPITAXIALLY GROWN ON CRYSTALLINE SUPPORT

**Robert E. Kay, Newport Beach; Hakchill Chan, Corona del Mar; Fred Ju, Huntington Beach, and Burton A. Bray, Laguna Niguel, all of Calif., assignors to Ford Aerospace & Communications Corporation, Detroit, Mich.**

**Continuation-in-part of Ser. No. 880,435, Jun. 30, 1986, abandoned, which is a division of Ser. No. 769,816, Aug. 26, 1985, Pat. No. 4,655,848. This application Feb. 2, 1987, Ser. No. 10,028**
**Int. Cl.[4] H01L *21/363***
**U.S. Cl. 148—33** **9 Claims**

1. A layer of $Hg_{1-x}Cd_xTe$ epitaxially grown and firmly

bonded onto a crystalline support other than cadmium telluride, wherein:




the $Hg_{1-x}Cd_xTe$ is a single vertically and laterally uniform layer of a single pure carbonless composition having a thickness of 0.7 microns to 30 microns; and $0<x<1$.

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**4,743,311**

**METHOD OF PRODUCING A METALLIC PART**

**Ludwig Schultz, Bubenreuth, and Karl Wohlleben, Erlangen, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Aug. 8, 1986, Ser. No. 894,929**

**Claims priority, application Fed. Rep. of Germany, Aug. 13, 1985, 3529019**

**Int. Cl.[4] H01F *1/02***

**U.S. Cl. 148—103** **26 Claims**

1. In a method for manufacturing a metallic part including the steps of:

forming an intermediate product of at least a first alloy component in powder form and of a second alloy component in powder form wherein at least one of said first and second alloy components has magnetic properties and wherein each alloy component in the intermediate product has at least one dimension of not greater than about 1 um in extent, wherein said step of forming said intermediate product includes a compacting step;

and transforming the intermediate product into a metal alloy part by a diffusion reaction at a predetermined elevated temperature;

the improvement comprising:

producing a crystalline mixture powder by milling a mixture of at least said first alloy component powder and said second alloy component powder and terminating the milling at a time at which the particles of the produced mixture powder are formed of a predominantly layer-like structure of the alloy components each layer of said layer-like structure having a thickness of said dimension of not greater than 1 μm;

thereafter subjecting the produced particles of the mixture powder to a magnetic field at a time when the powder particles have mobility thereby aligning the powder particles by said magnetic field with the direction of said magnetic field coinciding with the direction of said compacting;

ultimately effecting said compacting step by compacting and deforming the produced mixture powder of particles aligned by said magnetic field to form said intermediate product having a predetermined shape.

**4,743,312**

**METHOD FOR PREVENTING RECRYSTALLIZATION DURING HOT ISOSTATIC PRESSING**

**John M. Eridon, Whitehall, and Ranes P. Dalal, N. Muskegon, both of Mich., assignors to Howmet Corporation, Greenwich, Conn.**

**Filed Apr. 20, 1987, Ser. No. 39,683**

**Int. Cl.[4] C21D *1/78***

**U.S. Cl. 148—131** **10 Claims**

1. A method of hot isostatically pressing a cast material, said method comprising the steps of:

heating said material to an elevated temperature;

exposing said material to a pressure below the pressure which will cause void closure in said material;

subsequent to said material reaching said elevated temperature, applying a predetermined pressure to said material, said predetermined pressure being sufficiently high to close voids in said material; and

subjecting said material to elevated temperature and high pressure to densify said material without inducing significant recrystallization in said material.

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**4,743,313**

**AMORPHOUS ALLOY FOR USE IN MAGNETIC HEADS**

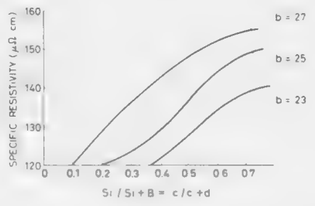
**Akihiro Makino; Mikio Nakashima, both of Nagaoka; Tadashi Sasaki, Koide, and Koichi Mukasa, Nagaoka, all of Japan, assignors to Alps Electric Co., Ltd., Japan**

**Filed Nov. 12, 1985, Ser. No. 797,238**

**Claims priority, application Japan, Nov. 12, 1984, 59-236731; Apr. 20, 1985, 60-83601; Jun. 10, 1985, 60-124161**

**Int. Cl.[4] C22C *19/07***

**U.S. Cl. 148—403** **5 Claims**




1. An amorphous alloy for use in magnetic heads, wherein 1.0–2.0 atm% Cr and an amount up to 4.0 atm% Ru are added to an alloy having the following composition formula:

$$(Fe_{1-a}, Co_a)_{100-b}(Si_cB_d)_b$$

where

a=0.93–0.95

b=23–27 atomic %

c/(c+d)=0.55–0.65.

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**4,743,314**

**HIGHLY CORROSIVE-RESISTANT AMORPHOUS ALLOY OF NI-CU-TI WITH TA AND/OR NB.**

**Koji Hashimoto, 2-25-5 Shogen, Izumi Miyagi; Kimikado Miura, Chiba; Katsuhiko Asami, and Asahi Kawashima, both of Miyagi, all of Japan, assignors to Mitsui Engineering & Shipbuilding Co., Ltd., Tokyo and Koji Hashimoto, Miyagi, both of, Japan**

**Filed Sep. 21, 1987, Ser. No. 99,371**

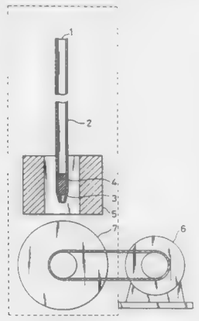
**Claims priority, application Japan, Sep. 24, 1986, 61-225677**

**Int. Cl.[4] C22C *19/03***

**U.S. Cl. 148—403** **1 Claim**

1. A highly corrosion-resistant amorphous alloy which consists of Ti, Ni and one or two elements selected from the group of Ta and Nb, with the balance being substantially Cu, wherein either 5 atomic% or more Ta or 15 atomic% or more Nb should be contained, the total content of Ti and said one or two elements from Ta and Nb being 30 to 62.5 atomic%, the content of Ni being 0.6–4 times of Ta and/or Nb and the content of Cu being 0.6–4 times of Ti.





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**4,743,315**

**$NI_3AL$ ALLOY OF IMPROVED DUCTILITY BASED ON IRON SUBSTITUENT**

**Shyh-Chin Huang, Latham; Keh-Minn Chang, and Alan I. Taub, both of Schenectady, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Continuation-in-part of Ser. No. 647,328, Sep. 4, 1984, abandoned. This application Aug. 29, 1986, Ser. No. 901,852**

**Int. Cl.[4] C22C *19/03***

**U.S. Cl. 148—429** **7 Claims**




1. As a composition of matter, a γ' nickel aluminide base alloy of the following composition

$$(Ni_{1-x}Al_x)_{99-y}Fe_yB_1)$$

wherein x of the above formula is between 0.21 and 0.26 and wherein y in the above formula is between 5 and 15,

said aluminide being rapidly solidified and having an $L1_2$ type crystal structure.

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**4,743,316**

**RAPIDLY SOLIDIFIED ZIRCONIUM MODIFIED NICKEL ALUMINIDE OF IMPROVED STRENGTH**

**Alan I. Taub; Keh-Minn Chang, both of Schenectady, and Shyh-Chin Huang, Latham, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Filed Oct. 3, 1985, Ser. No. 783,724**

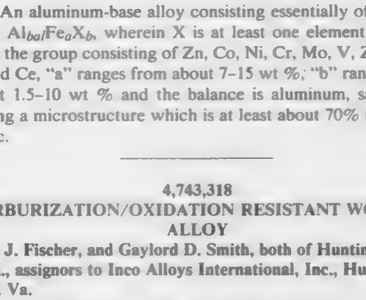
**Int. Cl.[4] C22C *19/00***

**U.S. Cl. 148—429** **18 Claims**

1. A nickel aluminide of improved strength comprising

a rapidly solidified zirconium modified nickel aluminide having an L12 type crystal structure and having a composition according to the formula:

$$(Ni_{1-x}Al_{x-y}Zr_y)_{100-z}B_z$$




wherein x is less than 0.25, y is less than 0.025 and wherein the boron concentration, z, is between 0.10 and 2.0.

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**4,743,317**

**ALUMINUM-TRANSITION METAL ALLOYS HAVING HIGH STRENGTH AT ELEVATED TEMPERATURES**

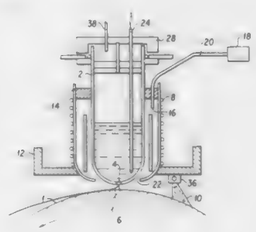
**David J. Skinner, Flanders; Paul A. Chipko, Madison, and Kenji Okazaki, Basking Ridge, all of N.J., assignors to Allied Corporation, Morris Township, Morris County, N.J.**

**Continuation-in-part of Ser. No. 538,650, Oct. 3, 1983, abandoned. This application Jul. 19, 1984, Ser. No. 631,261**

**The portion of the term of this patent subsequent to Dec. 29, 2004, has been disclaimed.**

**Int. Cl.[4] C22C *21/00***

**U.S. Cl. 148—437** **19 Claims**



1. An aluminum-base alloy consisting essentially of the formula $Al_{bal}Fe_aX_b$, wherein X is at least one element selected from the group consisting of Zn, Co, Ni, Cr, Mo, V, Zr, Ti, Y, Si and Ce, "a" ranges from about 7–15 wt %; "b" ranges from about 1.5–10 wt % and the balance is aluminum, said alloy having a microstructure which is at least about 70% microeutectic.

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**4,743,318**

**CARBURIZATION/OXIDATION RESISTANT WORKED ALLOY**

**John J. Fischer, and Gaylord D. Smith, both of Huntington, W. Va., assignors to Inco Alloys International, Inc., Huntington, W. Va.**

**Filed Sep. 24, 1986, Ser. No. 910,887**

**Int. Cl.[4] C22C *38/00, 38/44***

**U.S. Cl. 148—442** **11 Claims**

1. A highly (i) oxidation and (ii) carburization resistant alloy at temperatures as high as 1800°–2000° F. and further characterized by (iii) good stress-rupture properties at such temperatures while also manifesting (iv) hot and (v) cold workability

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together with good (v) ductility, (vi) structural stability and (vii) weldability, said alloy in the worked condition having an average grain size of from ASTM 00 to about ASTM 2 and consisting essentially of 32 to 38% nickel, about 15 to less than 19% chromium, about 2 to 4% aluminum, at least 0.07 to 0.15% carbon, from 1.5 to 3.5% molybdenum, about 0.2 to about 0.8% titanium, 0.003 to 0.02% boron, 0.05 to 0.25% zirconium, at least 1 to 5% cobalt and the balance iron.

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**4,743,319**

## METHOD OF AND APPARATUS FOR MAKING SELF STICKING NOTE PADS

**Bernd Ramcke, Hamburg, Fed. Rep. of Germany, assignor to E.C.H. Will (GmbH & Co.), Hamburg, Fed. Rep. of Germany**

**Filed Dec. 16, 1986, Ser. No. 942,194**

**Claims priority, application Fed. Rep. of Germany, Dec. 17, 1985, 3544507**

**Int. Cl.[4] B32B** *31/18*

**U.S. Cl. 156—64** **15 Claims**




1. A method of making self-sticking note pads with overlaping partially coherent sheets having a first size, comprising the steps of establishing and maintaining a source of a paper web and advancing the web from the source along a predetermined path; applying adhesive to one side of the web in a first portion of the path; subdividing the web into panels having a second size which is a multiple of said first size, including cutting across a leader of the web in a second portion of the path; gathering the panels into stacks immediately following said subdividing step; applying a cover to one side of each stack; trimming at least one edge of each stack; subdividing each stack into a plurality of pads; and packing the pads.

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**4,743,320**

## METHOD OF HEAT SEALING A THERMOPLASTIC DRUM AND LID AND ARTICLE OF MANUFACTURE

**Mark D. Shaw, Ponte Vedra Beach, Fla., assignor to Bondico, Inc., Jacksonville, Fla.**

**Continuation-in-part of Ser. No. 638,556, Aug. 7, 1984, Pat. No. 4,586,624. This application Nov. 5, 1985, Ser. No. 795,227**

**Int. Cl.[4] B65B** *7/28*

**U.S. Cl. 156—69** **20 Claims**

1. A method of welding a thermoplastic lid to a thermoplastic drum having a longitudinal axis to seal the contents of the drum therein comprising the steps of:

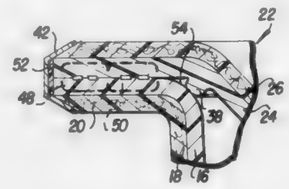
providing at least one resistance wire encapsulated in a thermoplastic sheath;

inserting said encapsulated wire between confronting surface of said lid and drum;

applying pressure to at least one of the lid and drum in a direction parallel to the drum axis so as to compress the encapsulated wire between said confronting surfaces;

passing a predetermined electrical current through said resistance wire to heat the wire and melt the thermoplastic sheath;

continuing said pressure applying step to squeeze the melted thermoplastic sheath material radially inwardly and outwardly and urge the confronting surfaces of the drum and lid in closer proximity to each other and to said wire; and;




melting at least a portion of the confronting surfaces of said drum and lid adjacent the resistance wire so as to intermingle the thermoplastic material of the drum with the thermoplastic material of the lid and thereby weld the drum and lid together at the confronting surfaces thereof.

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**4,743,321**

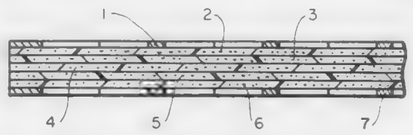
## DEVICES COMPRISING PTC CONDUCTIVE POLYMERS

**Pravin L. Soni, Union City; Peter H. Van Konynenburg, Palo Alto; Mark Wartenberg, San Jose; Randolph W. Chan, Sunnyvale, and Stephen M. Jacobs, Cupertino, all of Calif., assignors to Raychem Corporation, Menlo Park, Calif.**

**Filed Oct. 4, 1985, Ser. No. 784,288**

**Int. Cl.[4] B32B** *31/26*

**U.S. Cl. 156—85** **18 Claims**




1. A heat-recoverable electrical device which comprises

(1) a first component which is composed of a cross-linked conductive polymer and which is heat-recoverable;

(2) a second component which is composed of a conductive polymer exhibiting PTC behavior; and

(3) electrodes which can be connected to a source of electrical power;

the electrodes and the first and second components being such that, when the electrodes are connected to a suitable source of electrical power, current passes through the first and second components so that the device recovers; and the second component having at least one of the following characteristics

(a) it is substantially free from cross-linking;

(b) it has been cross-linked by irradiation to a dosage of less than 6 Mrads;

(c) when the first component has been cross-linked by irradiation, the second component has been cross-linked by irradiation to a dosage which is at least 2 Mrads below the dosage used to cross-link the first component; and

(d) it has an $M_{100}$ value at a temperature 15° C. above its crystalline melting temperature which is at most 0.65 times the $M_{100}$ value, at the same temperature, of a sample of the same material, having a thickness of 40 mils, which has been irradiated on one surface with a 2.7 MeV electron beam to a dosage of 10 Mrads.



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**4,743,322**

## MOLDING OF ELASTOMERIC MATERIAL COMPONENTS

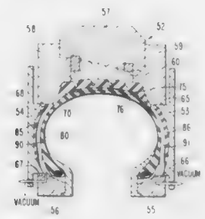
**Eric Holroyd, Near Knutsford; James N. McGlashen, Near Wigan, and Ronald H. Pointon, Formby, all of England, assignors to Apsley Metals Limited, United Kingdom**

**Continuation-in-part of Ser. No. 566,990, Dec. 30, 1983, abandoned. This application May 13, 1986, Ser. No. 862,642**

**Claims priority, application United Kingdom, Jan. 15, 1983, 8301099; Jan. 9, 1986, 8600452**

**Int. Cl.[4] B29D** *30/06;* **B29C** *35/00*

**U.S. Cl. 156—123** **14 Claims**




1. A method for assembling a vehicle tire comprising:

(a) filling a pair of discrete annular tire sidewall molds with uncured sidewall compound to form two tire sidewalls, said filling being done where the sidewall molds are separated from any other mold components, said sidewall mold having generally axially extending sealing surfaces;

(b) bringing the sidewall molds filled with sidewall compound into sealing engagement with a tire curing mold having mating generally axially extending sealing surfaces and containing an assembly of a pre-shaped tire carcass and a tread, retaining each sidewall mold in sealing engagement with the tire curing mold by means of said sealing surfaces while holding each sidewall therein in spaced relationship with the tire carcass to define a cavity therebetween;

(c) then pumping air from said cavity, and

(d) moving the sidewall molds so as to position the sidewalls in pressing engagement with the assembly to form a complete unvulcanized tire.

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**4,743,323**

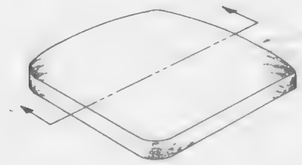
## METHOD OF MOLDING A COMPOSITE ARTICLE

**Siebolt Hettinga, 2123 NW. 111th St., Des Moines, Iowa 50322**

**Filed Nov. 4, 1986, Ser. No. 926,723**

**Int. Cl.[4] B29C** *45/14*

**U.S. Cl. 156—160** **10 Claims**



1. The method of molding a composite article having a stretchable fabric material stretched in tension across a central opening defined by a continuous plastic frame structure, the method comprising the steps of:

(a) providing a male mold and a female mold which on being clamped together form a mold cavity for the frame structure,

(b) supporting the fabric material across the open side of the male mold,

(c) clamping the two molds together so that the female mold engages and stretches the fabric material in tension of the male mold concurrently with locating the perimetral portion of the fabric material within the mold cavity,

(d) injecting a plastic material into the mold cavity in bonding securement with the perimetral portion of the fabric material, and then

(e) removing the article from the mold, with the bonding of the fabric perimetral portion with the frame structure maintaining the fabric material in tension across said central opening.

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**4,743,324**

## PRINTING PLATE MOUNTER

**Donald R. Boyce, Simpsonville; Thomas O'Neal Harrelson, Fountain Inn, and Tony R. Phillips, Easley, all of S.C., assignors to W. R. Grace & Co., Cryovac Div., Duncan, S.C.**

**Filed Aug. 20, 1986, Ser. No. 898,291**

**Int. Cl.[4] B41L** *29/12*

**U.S. Cl. 156—215** **19 Claims**



1. An apparatus for mounting a flexible printing plate on a printing cylinder comprising;

(a) a table comprising two separable sections forming a planar surface;

(b) means for aligning the position of the printing plate on the table in order to accurately mount the printing plate on the cylinder;

(c) means for separating said sections;

(d) means for moving said printing cylinder between said sections for receiving said plate; and

(e) means for adhering the printing plate to the printing cylinder.

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**4,743,325**

## METHOD OF STICKING FILM SHEET ON PANEL SURFACE

**Eiichi Miyake, Osaka, Japan, assignor to Hakuto Co., Ltd., Tokyo and Sanei Giken Co., Ltd., Osaka, both of, Japan**

**Division of Ser. No. 607,114, May 1, 1984, Pat. No. 4,659,419. This application Sep. 17, 1986, Ser. No. 908,233**

**Claims priority, application Japan, May 11, 1983, 58-82241; Oct. 3, 1983, 58-184659**

**Int. Cl.[4] B32B** *31/18, 31/20*

**U.S. Cl. 156—250** **1 Claim**

1. A method of sticking a film sheet, cut from a continuous film web having a leading end, onto the surface of a panel having a forward end and a rearward end, comprising the steps of:

tacking the leading end of the continuous film web to the forward end of the panel;

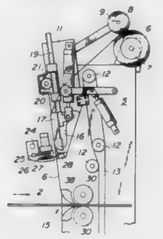
sticking the continuous film web onto the surface of the panel in a continuous operation from the forward end to the rearward end of the panel while supplying the continuous film web along a predetermined path to the panel in a given direction and at a given speed; and

cutting across the continuous film web during the continuous operation to cut the continuous film web into a film

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sheet and to provide a trailing end of the film sheet that will coincide with the rearward end of the panel without any interruption in said continuous operation by moving a



cutter across the continuous film web while moving the cutter in the same given direction and at the same given speed as is the continuous film web when supplied to the panel along the predetermined path.

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**4,743,326**

**METHOD AND APPARATUS FOR MAKING PACKAGING MEANS HAVING REINFORCING STRIPS**

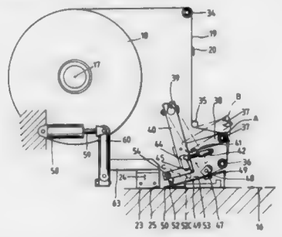
**Wilhelm Reil, Bensheim, Fed. Rep. of Germany, assignor to Tetra Pak Developpement S.A., Switzerland**

**Continuation of Ser. No. 725,034, Apr. 19, 1985, abandoned, which is a division of Ser. No. 431,921, Sep. 30, 1982, Pat. No. 4,526,314. This application Oct. 20, 1986, Ser. No. 919,570**

**Claims priority, application Fed. Rep. of Germany, Oct. 10, 1981, 3140336**

**Int. Cl.**[4] **B32B** *31/18, 31/20, 27/10*

**U.S. Cl. 156—251** **10 Claims**



**1**. A method of operating upon a continuous web of blanks for the production of a plurality of packaging means, the blank web being formed of a coated foldable sheet material, each of the blanks of the blank web including first and second surfaces and a plurality of bending lines, said bending lines being restricted to only a portion of each of said blanks, said bending lines further having a width and a height, and defining a pattern, said pattern being repeated upon each of said blanks, said method comprising the steps of:

intermittently advancing the blank web along a blank web path;

intermittently advancing a plastic film web along a film web path to adjacent said first surface of the blank web;

locating first and second sealing jaws on opposite sides of said web path for passage of said web and film therebetween, said first sealing jaw defining a first planar sealing surface parallel to said first surface of said blank web and said second sealing jaw defining a second planar sealing surface parallel to said second surface of the blank web;

said first sealing surface of said first sealing jaw having defined therein a plurality of grooves, said grooves being formed to correspond to said pattern of the bending lines, each of said grooves having a width and depth greater than said width and height of the corresponding bending line;

heating said first sealing jaw;

moving at least one of said first and second sealing jaws away from said web path and toward said web path to selectively exert pressure upon said blank and film webs, whereby said film is sealed to said blank in the portion of the blank surrounding said bending lines, but with said film being unsealed along said bending lines; and

severing the portion of the film web adjacent to the blank web from the remainder of the film web, said severing including defining a severing edge on said first sealing jaw, and moving said film web slightly in a reverse direction following engagement of said first and second sealing jaws, whereby said film web is severed from a portion of the film disposed between said sealing jaws.

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**4,743,327**

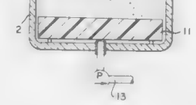
**ADHESIVE BONDING OF FLUOROPOLYMERS**

**Abel DeHaan, Pembrook Pines; Richard D. Krug, Miami, and Gyan S. Pande, Davie, all of Fla., assignors to Cordis Corporation, Miami, Fla.**

**Continuation of Ser. No. 621,105, Jun. 15, 1984, abandoned. This application Jul. 22, 1986, Ser. No. 889,289**

**Int. Cl.**[4] **B05D** *3/06;* **B29C** *65/02, 65/48, 65/54*

**U.S. Cl. 156—272.6** **5 Claims**



**1**. A method for forming a multi-layered medical article having a substrate with a chemically inert surface, comprising:

inserting a medical substrate having an inert fluoropolymer surface into a glow discharge reaction chamber;

developing low pressure vacuum conditions within said glow dishcarge reaction chamber;

pretreating the inert fluoropolymer surface in said reaction chamber and under said low pressure vacuum conditions with an inert gas glow discharge plasma to form a pretreated surface, said inert gas being selected from the group consisting of argon, helium and neon;

thereafter subjecting a hydrocarbon monomer to low pressure glow discharge plasma deposition conditions by flowing a hydrocarbon monomer into and by applying energy within the reaction chamber under said low pressure vacuum conditions and adherently forming a thin plasma deposited hydrocarbon film onto the pretreated surface of the substrate, said adherent thin plasma deposited film including the hydrocarbon subjected to plasma deposition conditions, said step of adherently forming the thin plasma deposited film includes post-treating the plasma deposited polymer with an inert gas glow dishcarge plasma;

applying an adhesive layer onto the thin plasma deposited film; and

contacting another substrate with the adhesive layer in order to form the multi-layered medical article wherein the inert fluoropolymer surface of the substrate is bonded to said another substrate through the thin plasma deposited hydrocarbon film and the adhesive layer.



**4,743,328**

**METHOD AND APPARATUS FOR MANUFACTURING A CUSHIONING MEMBER**

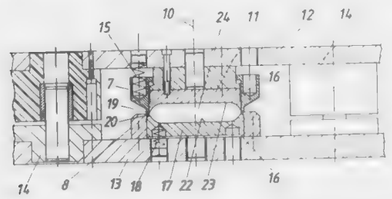
**Gerhard Zwirner, Haan, Fed. Rep. of Germany, assignor to Gebr. Happich GmbH, Fed. Rep. of Germany**

**Filed Oct. 14, 1986, Ser. No. 918,836**

**Claims priority, application Fed. Rep. of Germany, Oct. 18, 1985, 3537169**

**Int. Cl.**[4] **B32B** *31/18*

**U.S. Cl. 156—274.4** **13 Claims**



**1**. A method of wrapping a cushioning member having two main surfaces with a web of wrapping material formed of two blanks, comprising the steps of:

(a) placing each of the blanks adjacent to a respective one of the main surfaces of the cushioning member, the peripheral portions of the two blanks forming respective flanges which project peripherally from the cushioning member;

(b) clamping the flanges between first and second opposed web electrodes and applying energy thereto, so as to weld the flanges together and form an inward-directed weld bead by a flow of web material from the weld toward the cushioning member;

(c) locating a support member against one of the main blanks;

(d) locating a punch facing the other one of the blanks;

(e) retaining the flanges clamped between the electrodes;

(f) operating the punch, while the flanges are clamped between the electrodes, to separate and move the cushioning member away from the flanges by engaging and thereby severing the flanges immediately adjacent to the cushioning member; and

(g) supporting the cushioning member with the support member while the cushioning member is moving away from the flanges.

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**4,743,329**

**PROCESS FOR MANUFACTURING OF COMPOSITE PIPES**

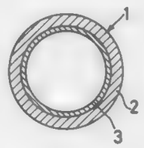
**Ryosuke Hata, Osaka, Japan, assignor to Sumitomo Electric Industries, Ltd., Japan**

**Filed Feb. 20, 1986, Ser. No. 831,348**

**Claims priority, application Japan, Feb. 22, 1985, 60-34800**

**Int. Cl.**[4] **B32B** *31/00*

**U.S. Cl. 156—287** **14 Claims**



**1**. A process for producing a composite pipe comprising steps of arranging a lead pipe in an outer pipe made of plastic with some gap therebetween, and expanding the lead pipe by sealing a pressure medium in said lead pipe until it gets into close contact with the inner wall of said outer pipe to form a lead layer.

**4,743,330**

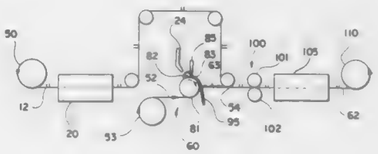
**METHOD AND APPARATUS FOR COATING AND BONDING A SECONDARY CARPET BACKING**

**John G. Tillotson, 1300 Tiarco Dr., Dalton, Ga. 30720**

**Continuation-in-part of Ser. No. 729,698, May 2, 1985, Pat. No. 4,661,380. This application Feb. 13, 1987, Ser. No. 14,699**

**Int. Cl.**[4] **B32B** *31/08, 31/12*

**U.S. Cl. 156—324** **15 Claims**



**4**. A process for forming a carpet product having a tufted primary backing fabric and a secondary backing fabric laminated to the back thereof, comprising the steps of:

forming an adhesive into a layer on the surface of a rotating roller;

transporting successive portions of said secondary backing fabric against said roller in a direction opposite to the direction of rotation of said roller to transfer said layer of adhesive from said roller to a first surface of said secondary backing fabric at a contact point;

transporting said backing fabric nontangentially away from said roller at said contact point; and

bringing the adhesive-coated first surface of said secondary backing fabric into intimate contact with the back of said tufted primary backing fabric to form a laminated carpet product.

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**4,743,331**

**SPIN-WELDING APPARATUS**

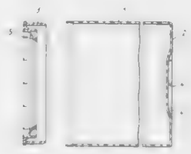
**Keith E. Nuttall, and Kenneth R. Clark, both of Oxfordshire, England, assignors to Metal box, p.l.c., United Kingdom**

**Filed May 16, 1986, Ser. No. 864,143**

**Claims priority, application United Kingdom, May 24, 1985, 8513240**

**Int. Cl.**[4] **B29C** *65/06*

**U.S. Cl. 156—358** **6 Claims**



**1**. Spin welding apparatus for welding together opposed surfaces of thermoplastics components which are assembled together prior to welding, comprising a spin welding head for spinning one of the components relative to the other and a low inertia DC servo motor operatively connected to the spin welding head, wherein the drive of the servo motor is governed by a programmable logic controller means programmed for consecutively providing (a) initial slow speed spinning to ensure correct take-up of drive to one of the components and arrest of the other component, (b) rapid acceleration of said one component to weld process speed, (c) maintenance of process speed for a required period, and (d) final rapid deceleration and stopping of the motor.

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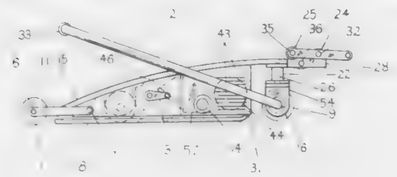


**4,743,332**

## HOT PLATE WELDING DEVICE FOR BONDING ROOFING MEMBRANES

**William E. Black, 2509 Manor Oak Dr., Modesto, Calif. 95355**

**Filed Dec. 12, 1986, Ser. No. 941,728**
**Int. Cl.[4] B44C** *7/00*
**U.S. Cl. 156—359** **8 Claims**



**1**. A hot plate welding device for applying partially overlapping asphalt membrane type heat sealable roofing material completely without the use of any type of open flame for any portion of the application process comprising:

(a) a frame having a front and rear portion thereof;

(b) a portability means for moving said frame along the length of a roll of roofing material rolled out onto a roof surface said frame having the ability to move between said rolled out roll of roofing material and said roof surface while said frame is moved therealong;

(c) a means for reducing the amount of friction incurred from the frame moving along forcing itself between material and the roof surface such friction being reduced sufficiently to eliminate any pleating or distortion of the materials original shape;

(d) a means for heating the entire underlying surface of said rolled out roll of roofing material while said frame moves therealong, said heating being sufficient enough to cause a watertight seal when the roofing material is brought into contact with the roofs surface;

(e) a means for heating that seam portion of a previously applied roll of roofing material, that when the heated surface of said rolled out roll of roofing material is applied would overlap and come in contact with said seam portion of the previously applied roofing material said heating being sufficient to create a watertight seal at the point where the two rolls of material overlap;

(f) a means to press the entire surface of said rolled out roll of roofing material down against the roof surface after the said material has been heated the pressure being sufficient enough to aid in sealing said rolled out roofing material to the roof surface even though the roof surface may not be entirely flat;

(g) a means to control speed according to material application temperature such that if the temperature is not sufficient to apply said rolled out roll of roofing material properly the speed of the frame would be slowed down in such a manner as to wait for the material to rise to the proper application temperature;

(h) a steering means that allows the frame to be guided by an operator to insure proper alignment of the frame to the rolled out roll of roofing material;

(i) a means to pre-heat the roof surface where the rolled out roll of roofing material is to be applied just prior to the application of said rolled out roll of roofing material, said means comprising a compartment between the heater platen and roof surface enclosed on four sides by an insulating means and a air handling device which directs air into said compartment area against the bottom side of the heater platen, the air thereby becoming heated by said platen which in turn heats the compartment volumetric area and results in heating the roof surface by means of convection as the seam heater platen applies heat to the seam of the adjacent roll of asphalt material, said preheating being sufficient enough to eliminate the possibility that the roof surface might act to cool the roof material being applied and ruin the watertight seal that would normally result.

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**4,743,333**

## SPLICING DEVICE FOR HEAT SEALABLE MATERIAL

**Frederick Forthmann, 688 Pascack Rd., Washington Township, Glouster County, N.J. 07675**

**Filed Jul. 31, 1986, Ser. No. 892,331**
**Int. Cl.[4] B32B** *31/20, 31/26, 31/18*
**U.S. Cl. 156—359** **6 Claims**



**1**. A device for connecting two layers of heat meltable material together, comprising:

a toothed member having a face with at least one row of teeth that are spaced apart by a gap width in said row, each of said teeth having a thickness across said row, a width parallel to said row and a length from said face of said toothed member;

a ribbed member having a face with at least one rib, said rib having a length from said face and a thickness, said rib defining at least one groove for receiving said at least one row of teeth; drive means for driving said toothed member and said ribbed member together and for closing each said row of teeth to engage in a respective groove; and

heating means connected to said toothed member for heating said toothed member sufficiently to melt the heat meltable material, said rib and tooth thickness being selected to establish a clearance between said rib and said row of teeth when said toothed and ribbed members are moved against each other the edges of said teeth in said thickness dimension of said teeth are bevelled, said toothed member including three rows of teeth separated from each other by a gap each with a gap thickness, said ribbed member having a pair of ribs defining a central groove therebetween for a central one of said rows of teeth and an outer groove on a side of each rib opposite from said central groove for receiving outer ones of said rows of teeth, each rib having a rib thickness selected to establish clearances between said ribs and said teeth with said toothed and ribbed members engaged against each other.

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**4,743,334**

## DOUBLE SIDED LAMINATING MACHINE

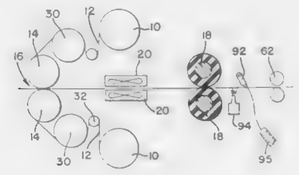
**Karl Singer, Palatine, Ill., assignor to D&K Custom Machine Design, Inc., Palatine, Ill.**

**Continuation-in-part of Ser. No. 830,852, Feb. 19, 1986, abandoned. This application Sep. 3, 1986, Ser. No. 903,391**
**Int. Cl.[4] B30B** *3/04, 15/34*
**U.S. Cl. 156—499** **6 Claims**

**1**. A continuous laminating system for double laminating an article comprising a pair of laminating rollers in contact with each other to form a nip through which an article to be laminated is fed; a pair of laminating film supply rolls, each supplying a continuous strip of laminating film with heat activatable adhesvie thereon into said nip, and means for circulating a heated liquid through said laminating rollers for maintaining exposed surfaces of said laminating rollers at a temperature



sufficient to activate said adhesive, said exposed surfaces consisting of a roughened surface of chromium having peaks and



valleys with said valleys being filled with a coating of synthetic resin polymer and said peaks being exposed.

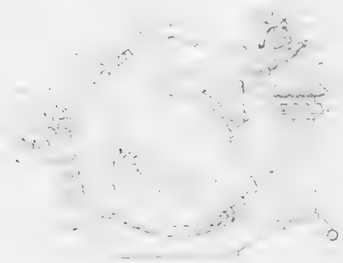
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**4,743,335**

## DEVICE FOR THE CONTINUOUS FEEDING OF A RIBBON SHAPED MATERIAL TO A PROCESSING MACHINE

**Heinz Krappitz, Reinbek; Heinrich Krodel, Bayreuth; Johannes Wolfrum, Himmelkron; Rainer Sittkus, Wielenbach, and Rolf Becker, Neukeferloh, all of Fed. Rep. of Germany, assignors to B.A.T. Cigarettenfabriken GmbH, Fed. Rep. of Germany**

**Filed Sep. 4, 1986, Ser. No. 903,956**
**Claims priority, application Fed. Rep. of Germany, Sep. 5, 1985, 3531731**
**Int. Cl.[4] B32B** *31/18*
**U.S. Cl. 156—502** **16 Claims**



**1**. In a device for continuous feeding of a ribbon shaped material to a processing machine, complete with a swingable bobbin-carrier, mounted on bearings to a base frame so as to swivel about a carrier axle, with at least two spindles for the reception of each bobbin, each being situated parallel to the carrier axle at the same radial distance therefrom, a bobbin cutting off station with a cut-off device adjustable to be in operational position either near the carrier axle or to be in a resting position away from the carrier axle, said cut-off device having an adjustable knife, parallel to the carrier axle, capable of cutting through at least one ribbon layer and including a catching device for the free ribbon end, and a glue station to bind the ribbon end of an unrolling bobbin to the beginning end of a new bobbin which is to be unrolled, the improvement wherein the cutting off mechanism (**50**) as an adjustable splaying finger (**62**) which is generally parallel to the carrier axle (**16**) on the outer circumference of the bobbin (**20**) and adjacent with the knife (**68**), the splaying finger (**62**) being insertable as the bobbin (**20**) rotates under the ribbon near the outer circumference of the bobbin; each spindle (**18**) on the bobbin carrier (**14**) being fitted with a ribbon holding device (**24**) for the free ribbon ends, and the glue station (**112**) being situated near the circle of rotation (**36**) of the bobbin carrier (**14**), the bobbin carrier (**14**) being rotatable to cause the ribbon holding device (**24**) to bring a free end of a ribbon of a new bobbin from the cutting station (**38**) radially under the unrolling ribbon (**22**) adjacent the glue station (**112**) where the beginning end of the ribbon of the new bobbin can be connected to the ribbon of the unrolling bobbin.

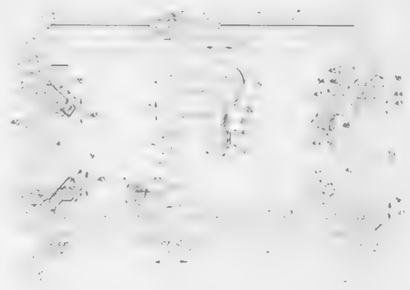
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**4,743,336**

## DEVICE FOR MOUNTING FLEXIBLE SPACERS ON GLASS SHEETS

**William White, Oberengstringen, Switzerland, assignor to Peter Lisec, Amstetten-Hausmening, Austria**

**Filed Nov. 17, 1986, Ser. No. 930,937**
**Claims priority, application Switzerland, Nov. 18, 1985, 04909/85**
**Int. Cl.[4] B32B** *31/18*
**U.S. Cl. 156—522** **8 Claims**



**1**. A device for mounting elongated flexible spacers for insulating glass on a glass sheet, comprising a vertical beam, means mounting the beam for horizontal movement along a glass sheet to which an elongated flexible spacer is to be applied, a slide movable vertically on the beam, a storage reel for a rolled up length of said spacer, a feeding roller pair between which said spacer moves upon leaving the storage reel, a pressure pad for pressing said spacer against a glass sheet, means mounting the feeding roller pair and the pressure pad on the slide for vertical swinging movement about an axis perpendicular to the glass sheet, and severing means carried by the slide for cutting off an applied length of the spacer.

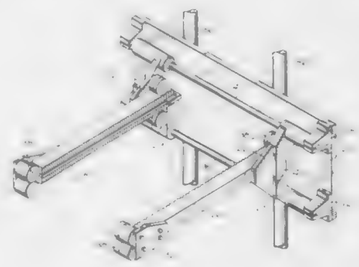
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**4,743,337**

## JAWS FOR A BAG FORMER

**Michael J. Moran, Raleigh, and James M. Suttle, Durham, both of N.C., assignors to USM Corporation, Farmington, Conn.**

**Filed Oct. 3, 1986, Ser. No. 915,281**
**Int. Cl.[4] B30B** *15/34*
**U.S. Cl. 156—583.1** **7 Claims**



**1**. An apparatus for sealing a web of material to form a bag comprising:

(a) two pairs of opposed cantilevered jaw members;

(b) means mounting each pair of jaw members in cantilev-

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ered fashion for up and down movement independent of the up and down movement of the other of said pair of jaw members and for movement of each jaw member of each pair toward the other jaw member of said pair; and

(c) electromagnetic means mounted on and co-acting between each jaw member of each said pair to apply pressure between said jaw members of each said pair as said opposed jaw members are moved toward one another so as to enhance the pressure applied to a web of material interposed between said cantilevered jaw members.

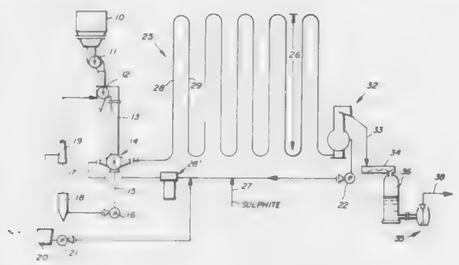
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**4,743,338**

## METHOD OF REMOVING AIR FROM LIGNOCELLULOSIC MATERIAL BY PASSING THE MATERIAL THROUGH CONDUIT PATHS OF DIFFERENT DIAMETERS

**Robert J. Prough, Glens Falls, N.Y., assignor to Kamyr, Inc., Glens Falls, N.Y.**

**Filed May 19, 1986, Ser. No. 864,219**
**Int. Cl.[4] D21B *1/02*; D21C *1/10***
**U.S. Cl. 162—25** **9 Claims**




1. A method of removing air from comminuted cellulosic fibrous material in a continuous manner, comprising the steps of:

(a) continuously passing the material, entrained in liquid, in a plurality of vertically disposed paths so that the material is subjected to varying pressure pulsations as it moves up and down in the vertically disposed paths;

(b) controlling the residence time of the material in the paths so that the residence time during each pressure build-up pulsation is greater than it is during each pressure reduction pulsation, so that the air is pumped out of the material, step (b) being practiced by controlling the diameter of a conduit in which the material passes in said vertical paths so that the cross-sectional area of the conduit is significantly greater in the portions thereof where the material is passing downwardly than in the portions thereof where the material is passing upwardly; and

steps (a) and (b) being practiced so that the material is subjected to at least five pressure pulsation build-up and reduction cycles.

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**4,743,339**

## METHOD FOR CONTROLLING THE DIGESTION OF PULP BY IR SPECTROSCOPY

**Oskar Faix, Schützenstrasse 40, 2057 Reinbek; Ulrich Welkener, Weddestrasse 92, 2000 Hamburg 74, and Rudolf Patt, Lohbrügger Str. 3a, 2057 Reinbek, all of Fed. Rep. of Germany**

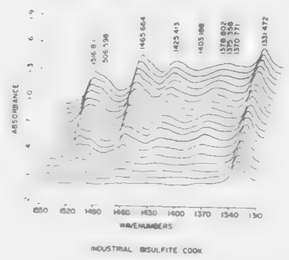
**Filed Jul. 25, 1986, Ser. No. 889,222**
**Claims priority, application Fed. Rep. of Germany, May 13, 1986, 3616051**
**Int. Cl.[4] D21C *7/12***
**U.S. Cl. 162—49** **10 Claims**

1. A process for controlling the digestion of pulp which comprises:

(a) subjecting samples of the cooking liquor in the digestion being controlled as the cooking operation proceeds to infra-red spectroscopy at wavenumbers ranging from about 1400 to about 1550 $cm^{-1}$ to produce absorbance curves of the spectra;

(b) determining base-line corrected band heights or integrals of the absorbance curves of the spectra to the extent needed to establish an IR-data set for each sample;

(c) obtaining the relationship between the IR spectra of samples of cooking liquor obtained from previous digestions and analytically determined kappa numbers of pulps contained in said previously obtained samples;




(d) correlating said IR-data sets with said previously obtained relationship to determine the kappa number of the pulp in the said samples of the cooking liquor being digested; and

(e) using said correlation for optimizing the digestion process by stopping the delignification process when the IR data in said IR-data sets establishes, via the said correlation, that the desired kappa number has been obtained.

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**4,743,340**

## HIGH-TEMPERATURE ZIRCONIA INSULATION AND METHOD FOR MAKING SAME

**George E. Wrenn, Jr., Clinton; Cressie E. Holcombe, Jr., Knoxville, and John Lewis, Jr., Oak Ridge, all of Tenn., assignors to Martin Marietta Energy Systems Inc., Oak Ridge, Tenn.**

**Continuation-in-part of Ser. No. 489,922, Apr. 29, 1983, abandoned. This application Dec. 20, 1985, Ser. No. 810,899**
**Int. Cl.[4] D21H *5/18*; D21J *7/00***
**U.S. Cl. 162—152** **5 Claims**

1. A method for fabricating a porous thermal insulting self-supporting composite structure comprising the steps of:

a. partially stabilizing zirconia fibers with a stabilizing agent selected from the group consisting of yttria, calcia and magnesia in a way such that the grain structure of zirconia fiber is maintained in the cubic phase thereby preventing destructive crystallographic phase transformations;

b. vacuum molding an aqueous slurry of the zirconia fibers over a perforated mandrel to form a structure of the desired configuration;

c. removing excess water from the zirconia molded fiber structure;

d. saturating the molded structure of zirconia fibers with an aqueous solution of zirconyl nitrate in an amount equivalent to at least 0.30 gram of zirconia per gram of zirconia fiber;

e. heating the zirconyl nitrate saturated molded structure to temperatures sufficient to set the zirconyl nitrate, to drive off the nitrate portion of the molecule, and to convert the remaining zirconyl ion to zirconia;

f. removing the mandrel, and

g. thereafter, heating the zirconyl nitrate bonded molded fiber structure to a temperature adequate to fuse the fibers at the nexi thereof throughout the body of the structure with the zirconia derived from the zirconyl nitrate composite structure consisting essentially of a single oxide free from addtional phases.

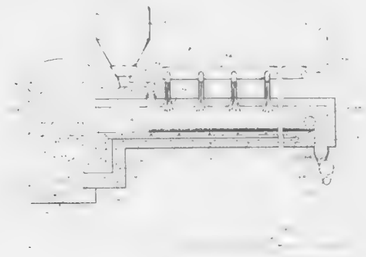


**4,743,341**

## APPARATUS FOR THE PYROLYSIS OF HYDROCARBON CONTAINING MATERIALS

**Kenneth W. Hladun, Narberth, Pa., assignor to Harry S. Allen and John L. Buzzi, both of Piscataway, N.J.**

**Filed Jul. 27, 1983, Ser. No. 517,659**
**Int. Cl.[4] C10B *1/06, 47/26***
**U.S. Cl. 202—99** **9 Claims**



1. Apparatus for the pyrolsis of hydrocarbon containing materials comprising:

a horizontally extending pyrolysis chamber including a moving bath of molten material at the bottom thereof;

means adjacent a first end of said chamber for feeding raw hydrocarbon containing material onto said bath;

means adjacent the second end of said chamber for removing spent material from said bath after it has traveled on the bath for substantially the length of said chamber;

exhaust means for recovering hydrocarbon containing gases from said chamber;

a furnace adjacent the first end of said chamber for heating said molten material to form said bath;

said furnace including a plurality of openings in a wall thereof adjacent the lower portion of said furnace and including a plurality of removable burners passing through said openings so as to be submerged within said molten material;

means associated with said burners for directing compressed air into said furnace through one of said openings when one of said burners is removed so as to prevent said molten material from flowing out of said furace through said opening;

a layer of molten salt supported on top of the molten material within said furnace for removing pollutants from the combustion gases passing up through said molten material from said burners, and

tap means in a wall of said furnace for removing spent salt therefrom.

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**4,743,342**

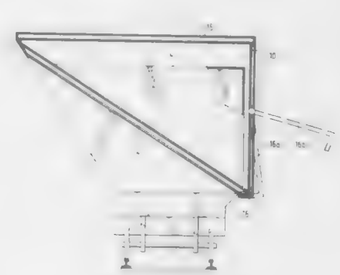
## COKE QUENCHING APPARATUS

**Georg Pollert, Essen; Friedrich Orywal, Heiligenhaus; Claus Meyer-Wulf, Bochum, and Martin Reinke, Dortmund, all of Fed. Rep. of Germany, assignors to Bergwerksverband GmbH, Essen, Fed. Rep. of Germany**

**PCT No. PCT/EP86/00147, § 371 Date Dec. 17, 1986, § 102(e) Date Dec. 17, 1986, PCT Pub. No. WO86/05507, PCT Pub. Date Sep. 25, 1986**
**PCT Filed Mar. 15, 1986, Ser. No. 939,163**
**Claims priority, application Fed. Rep. of Germany, Mar. 23, 1985, 3510678**
**Int. Cl.[4] C10B *39/14***
**U.S. Cl. 202—227** **1 Claim**

1. An apparatus for the quenching of coke which comprises an upwardly open coke receptacle having a sloping bottom wall inclined toward one side of said receptacle, closely spaced vertical internal walls, a vertical side wall opposite said one side and end walls, each of said walls being provided with passages for a cooling fluid, said vertical side wall of said receptacle including an opening for discharging quenched coke;

an L-shaped flap swingably mounted on said vertical side wall of said receptacle and having a leg portion provided with a passage for a cooling fluid and a foot portion underhanging said bottom wall in a closed position of said flap, said foot portion being provided with apertures for the discharge of quench water from said receptacle upon a partial displacement of said flap out of said closed position thereof to a drain position wherein said opening remains closed to drain quench water from coke in said receptacle through said apertures, said flap being swingable upwardly from said drain position in which quench water is drained to discharge coke from said receptacle;



a cover slidable over said receptacle for covering same and formed with cooling passages for a cooling fluid; and

inlet means for supplying said passages with cooling fluid.

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**4,743,343**

## METHOD OF REGENERATING ALCOHOL-BASED ANTIFREEZING LIQUID

**Tadaaki Sakai, 39-8 Yamadanishi 3-chome, Suita-shi, Osaka, Japan**

**Filed Dec. 31, 1986, Ser. No. 948,331**
**Int. Cl.[4] B01D *3/02*; C07C *29/80***
**U.S. Cl. 203—22** **7 Claims**



1. A method of regenerating an alcohol-based antifreezing liquid comprising the step of introducing a alcohol-based antifreezing liquid containing water into an evaporator vessel, heating the liquid to such a temperature as will not cause any change in the properties of components of the liquid other than alcohol while feeding air into the liquid, thereby generating alcohol vapor and water vapor, the step of cooling the vapors to a temperature at which the alcohol vapor is not subject to condensation, whereas the water vapor is subject to condensation, and discharging the resulting water from the evaporation vessel, and the step of introducing the vapor from which the water vapor has been removed by condensation into a con-

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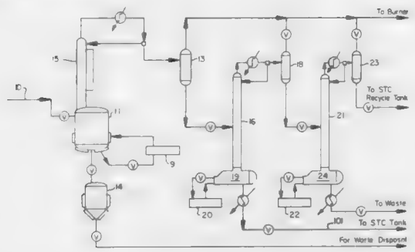
denser and cooling the vapor to a lower temperature, thereby condensing the alcohol vapor.

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**4,743,344**
**TREATMENT OF WASTES FROM HIGH PURITY SILICON PROCESS**

**William C. Breneman, Vancouver, Wash.; Chi-Cheng Yang, Beaverton, Oreg., and Gunnar Henningsen, Birmingham, Ala., assignors to Union Carbide Corporation, Danbury, Conn.**

**Filed Mar. 26, 1986, Ser. No. 844,361**
**Int. Cl.[4] B01D** *3/00*
**U.S. Cl. 203—81** **1 Claim**




1. A method for the treatment of a waste slurry which includes silicon, iron and aluminum metal particles, chlorides of iron and aluminum, silicon tetrachloride (STC) and trichlorosilane (TCS), materials having boiling points which are intermediate STC and TCS, and materials having boiling points which are lower than STC and TCS, with said STC and TCS being, in the aggregate, the predominant constituents of the slurry, comprising:

(a) feeding the said waste slurry to a first separation column, to provide STC, TCS, materials boiling lower than STC and TCS, and materials boiling intermediate STC and TCS as overhead from said frist separation column, and to provide silicon, iron, aluminum metal particles and chlorides of iron and aluminum as bottoms in said first separation column which is passed to a waste storage vessel;

(b) condensing the overhead from the first separation column and passing this condensed overhead to a second separation column in which (i) STC is recovered as bottoms and (ii) materials boiling lower than STC, including TCS and materials boiling intermediate STC and TCS are recovered as overhead;

(c) condensing the overhead from the second separation column and passing this condensed overhead to a third separation column in which (i) TCS is recovered as overhead and (ii) materials boiling intermediate STC and TCS are recovered as a bottoms waste stream.

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**4,743,345**
**APPARATUS FOR AND METHOD OF OPERATING A HYGROMETER IN A REPETITIVE BATCH TITRATION MODE**

**Walter F. Gerdes, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.**

**Filed Jul. 29, 1985, Ser. No. 760,207**
**Int. Cl.[4] G01N** *27/42*
**U.S. Cl. 204—1 T** **8 Claims**

1. A method for determining the moisture content of a gas stream having a low level of moisture, comprising the steps of:

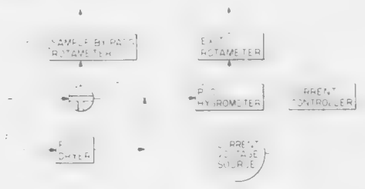
substantially absorbing the moisture from a measurable volume of gas stream with a hygroscopic material;

electrolyzing a large portion of the moisture within the hygroscopic material at a steady rate with an electrolysis current that is generated by a constant voltage source connected to a current controller, the electrolysis current being limited to a predetermined value by the current controller until the voltage source can no longer maintain the current at the predetermined value; and

passing the electrolysis current through the hygroscopic material at a decreasing level until the current drops to a predetermined low value.

6. An apparatus for determining the moisture content of a gas stream having a low level of moisture, comprising:

means for substantially absorbing the moisture from a measurable volume of the gas stream with a hygroscopic material;



means for passing an electrolysis current through the hygroscopic material at a predetermined value including a constant voltage source connected to a current controller for maintaining the current at the predetermined value during electrolysis of a large portion of the moisture within the hygroscopic material; and

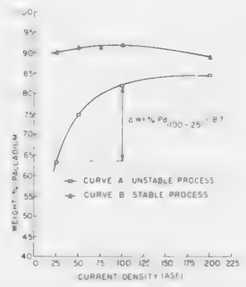
means for passing the electrolysis current through the hygroscopic material at a decreasing level until the current drops to a predetermined low value.

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**4,743,346**
**ELECTROPLATING BATH AND PROCESS FOR MAINTAINING PLATED ALLOY COMPOSITION STABLE**

**Arthur H. Graham, and Kenneth B. Keating, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Jul. 1, 1986, Ser. No. 880,872**
**Int. Cl.[4] C25D** *3/56*
**U.S. Cl. 204—23** **14 Claims**




1. An electroplating bath for plating a coating of palladium-nickel alloy on an electrically conductive substrate and which is capable of maintaining the palladium content of the plated alloy substantially constant, said bath comprising a palladium salt, a nickel salt and at least about 15 parts per million of iodine ions.

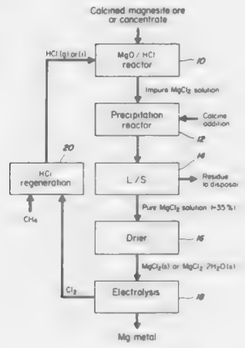
7. A process for plating a coating of palladium-nickel alloy on an electrical terminal using the bath of claim 1 wherein a plating current density in the range of between about 10 amps/sq.ft. to about 150 amps/sq. ft. is applied to the electrical terminal.



**4,743,347**
**PRODUCTION OF PURE $MGCL_2$ SOLUTION SUITABLE FOR THE PRODUCTION OF MAGNESIUM METAL FROM AN IMPURE MAGNESITE ORE OR CONCENTRATE**

**G. Bryn Harris, Kirkland; John G. Peacey, Lancaster, and Serge Monette, Longueuil, all of Canada, assignors to Pamour Inc., Timmins, Canada**

**Filed May 11, 1987, Ser. No. 48,643**
**Claims priority, application Canada, May 29, 1986, 510355**
**Int. Cl.[4] C25B** *1/00*
**U.S. Cl. 204—60** **6 Claims**




1. Process for producing a substantially pure, concentrated $MgCl_2$ solution suitable for subsequent molten salt electrolysis to magnesium metal from an impure magnesite ore or concentrate comprising:

(a) calcining a magnesite ore or concentrate at a temperature greater than 600° C. to decompose most of the magnesite and form a reactive magnesia;

(b) dissolving said reactive magnesia with either concentrated hydrochloric acid or hydrogen chloride gas with the addition of a surface active wetting agent to produce an impure concentrated $MgCl_2$ solution; and

(c) reacting said impure concentrated $MgCl_2$ solution with a minimum of excess magnesia to increase the pH of the solution to at least 5.5 to precipitate undesirable impurities from solution and produce a substantially pure $MgCl_2$ solution.

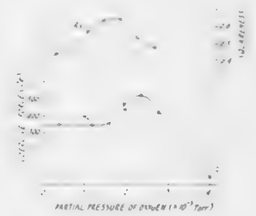
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**4,743,348**
**MAGNETIC MEDIUM FOR HORIZONTAL MAGNETIZATION RECORDING AND METHOD FOR MAKING SAME**

**Toshio Ando, Fujisawa; Toshikazu Nishihara, Zama, and Akihiro Kimura, Sagamihara, all of Japan, assignors to Victor Company of Japan, Ltd., Japan**

**Division of Ser. No. 792,046, Oct. 28, 1985, Pat. No. 4,711,810.**
**This application Aug. 18, 1987, Ser. No. 87,700**
**Claims priority, application Japan, Oct. 29, 1984, 59-225830; Nov. 12, 1984, 59-236598**
**Int. Cl.[4] C23C** *14/00*
**U.S. Cl. 204—192.2** **6 Claims**

1. A method for making a magnetic medium for horizontal magnetization recording which comprises subjecting a Co-Cr target to vapor deposition in an atmosphere of oxygen gas with a partial pressure of $1\times10^{-3}$ to $3\times10^{-3}$ Torr. at a sputtering rate of about 0.05 to 0.15 μm/minute to form, on a non-magnetic substrate, a magnetic recording film of an amorphous Co-Cr alloy containing from 5 to 15 atomic percent of oxygen.



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**4,743,349**
**ELECTRICALLY CONDUCTIVE FIBROUS WEB SUBSTRATE AND CATHODIC ELEMENT COMPRISED THEREOF**

**Jean Bachot, Fontenay Aux Roses, and Jean Grosbois, L'Isle Adam, both of France, assignors to Atochem, Paris la Defense, France**

**Continuation of Ser. No. 623,409, Jun. 22, 1984, abandoned. This application Sep. 12, 1986, Ser. No. 906,435**
**Claims priority, application France, Jun. 22, 1983, 83 10291**
**Int. Cl.[4] C25B** *9/00, 11/06, 11/12;* **D04H** *1/58*
**U.S. Cl. 204—242** **41 Claims**

1. A bonded, coherent fibrous web substrate including a fibrous web matrix which comprises a plurality of fibers, at least a portion of which comprising electrically conductive fibers, and a binder consisting of a fluorine-containing polymer, said plurality of fibers being coherently bonded together with said fluorine-containing polymer, and said web substrate having a resistivity of up to about 0.4 Ω cm.

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**4,743,350**
**ELECTROLYTIC CELL**

**David W. Cawlfield; James M. Ford, and Kenneth E. Woodard, Jr., all of Cleveland, Tenn., assignors to Olin Corporation, Cheshire, Conn.**

**Continuation-in-part of Ser. No. 892,518, Aug. 4, 1986. This application Dec. 19, 1986, Ser. No. 944,273**
**Int. Cl.[4] C25B** *9/00, 15/08*
**U.S. Cl. 204—255** **33 Claims**



18. An electrolytic cell having a top and a bottom and an anolyte and a catholyte flowing therethrough, comprising in combination

(a) a plurality of adjacently positioned bipolar electrodes each comprising an anode backplate with an anode surface connected thereto and a cathode backplate connectable to a cathode surface;

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(b) a plurality of porous cathode plates each having a first surface and an opposing second surface, the opposing second surface being adjacent the cathode backplate;
(c) a cation exchange membrane intermediate each pair of adjacently positioned anode surfaces and cathode plate first surfaces; and
(d) separator means intermediate each anode surface and membrane to prevent the membrane from touching the adjacent anode surface, the separator means further having a frame portion about its exterior and an hydrophilically treated mesh portion interiorly connected thereto adjacent each anode surface and membrane.

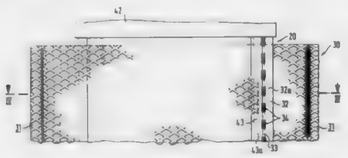
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**4,743,351**

## COATED VALVE METAL ANODE FOR ELECTROLYTIC EXTRACTION OF METALS OR METAL OXIDES

**Konrad Koziol, Röthenbach a.d. Pegnitz, and Erich Wenk, Nüremberg, both of Fed. Rep. of Germany, assignors to Conradty GmbH & Co. Metallelektroden KG, Fed. Rep. of Germany**

**Filed Feb. 20, 1985, Ser. No. 703,547**
**Claims priority, application Fed. Rep. of Germany, Feb. 24, 1984, 3406823**
**Int. Cl.[4] C25B** *1102, 11/10;* **C25C** *7/02;* **C25D** *17/10*
**U.S. Cl. 204—280** **12 Claims**



1. Electrode, in particular anode of coated valve metal for electrolytic extraction of metals or metal oxides, comprising:
at least one current distributor assembled from two profile members and a core which is arranged between the profile members, and is of a metal which is a good electrical conductor and is in electrical connection with the profile members; and
an active part which is mechanically and electrically connected to the current distributor, wherein
each said profile member comprises a cross-piece and two limbs of unequal length extending from respective ends thereof at right angles in opposite directions,
the two profile members are assembled in such manner that the shorter limb of the one member lies in the region of the free end of the longer limb of the other profile member, whereby projecting flanges result, and
the active part is connected to the current distributor via said flanges.

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**4,743,352**

## SODIUM ION-SELECTIVE ELECTRODE SYSTEM AND METHOD FOR MAKING AN ION-SELECTIVE ELECTRODE

**John M. Watkins-Pitchford, Ann Arbor, Mich., assignor to The University of Michigan, Ann Arbor, Mich.**

**Filed Sep. 17, 1986, Ser. No. 908,263**
**Int. Cl.[4] G01N** *27/30*
**U.S. Cl. 204—406** **20 Claims**

1. An arrangement for monitoring concentration of sodium ions in a fluid, the arrangement comprising:
elongated body means having a lumen therein;
porous ceramic means arranged at one end of said elongated body means for closing said lumen of said elongated body means;
ion-selective membrane means for covering at least a portion of said porous ceramic means outside of said lumen of said elongated body means, said ion-selective membrane means being formed of N,N'-dibenzyl-N,N'-diphenyl-1,2-phenylenedioxydiacetamide suspended in a substantially inert vehicle; and
sensor electrode means arranged in said lumen of said elongated body means and arranged in the vicinity of said porous ceramic means for detecting a potential.

8. A method of forming an ion-selective membrane, the method comprising the steps of:
combining N,N'-dibenzyl-N,N'-diphenyl-1,2-phenylenedioxydiacetamide with a plasticizer in a substantially airtight container to form a mixture;
adding dissolved PVC to said first mixture to form a second mixture;
evaporating said second mixture to increase its viscosity; and
casting said viscous second mixture onto a porous member to form the ion-selective membrane.

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**4,743,353**

## OXIDATION PROCESS

**Pauline B. Ting, Brea, and Howard D. Simpson, Irvine, both of Calif., assignors to Union Oil Company of California, Los Angeles, Calif.**

**Division of Ser. No. 595,260, Mar. 30, 1984, Pat. No. 4,568,450, which is a division of Ser. No. 409,583, Aug. 19, 1982, Pat. No. 4,455,390. This application Feb. 3, 1986, Ser. No. 825,201**
**Int. Cl.[4] C07C** *37/00*
**U.S. Cl. 208—3** **19 Claims**

1. A catalytic oxidation process wherein a hydrocarbon oil is oxidized by contact with a particulate catalyst under oxidation conditions, said catalyst comprises a composition prepared by the method comprising the steps of:
(1) impregnating support particles with an aqueous impregnating solution comprising one or more dissolved Group VIB metal components and citric acid, wherein said solution has a pH less than 1.0; and
(2) calcining the impregnated support particles.

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**4,743,354**

## PROCESS FOR PRODUCING A PRODUCT HYDROCARBON HAVING A REDUCED CONTENT OF NORMAL PARAFFINS

**John W. Ward, Yorba Linda, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.**

**Continuation-in-part of Ser. No. 593,439, Mar. 26, 1984, Pat. No. 4,648,958, which is a continuation-in-part of Ser. No. 531,924, Sep. 13, 1983, Pat. No. 4,517,074, which is a division of Ser. No. 084,761, Oct. 15, 1979, Pat. No. 4,419,271. This application Oct. 10, 1986, Ser. No. 916,196**
**The portion of the term of this patent subsequent to Mar. 10, 2004, has been disclaimed.**
**Int. Cl.[4] C10G** *65/12*
**U.S. Cl. 208—59** **40 Claims**

1. A process for converting a waxy hydrocarbon feedstock containing a substantial proportion of hydrocarbonaceous material boiling above about 650° F. into a product hydrocarbon having a reduced content of normal paraffins as compared to said feedstock which comprises:
(a) contacting said waxy hydrocarbon feedstock with a dewaxing catalyst in a dewaxing zone under conditions such that the normal paraffin content of said feedstock is reduced;
(b) contacting the effluent from said dewaxing zone with a hydrocracking catalyst in the presence of hydrogen in a hydrocracking zone under conditions such that a further reduction in the normal paraffin content of said feedstock is effected; and
(c) recovering said product hydrocarbon having a reduced content of normal paraffins from the effluent of said hydrocracking zone.



**4,743,355**

## PROCESS FOR PRODUCING A HIGH QUALITY LUBE OIL STOCK

**John W. Ward, Yorba Linda, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.**

**Continuation of Ser. No. 593,439, Mar. 26, 1984, Pat. No. 4,648,958, which is a continuation-in-part of Ser. No. 531,924, Sep. 13, 1983, Pat. No. 4,517,074, which is a division of Ser. No. 84,761, Oct. 15, 1979, Pat. No. 4,419,271. This application Jun. 2, 1986, Ser. No. 869,552**
**The portion of the term of this patent subsequent to Mar. 10, 2004, has been disclaimed.**
**Int. Cl.[4] C10G** *65/12*
**U.S. Cl. 208—59** **36 Claims**

23. A process for converting a waxy hydrocarbon feedstock into a high quality lube oil stock which comprises:
(a) contacting said waxy hydrocarbon feedstock with molecular hydrogen in the presence of a hydrotreating catalyst in a hydrotreating zone under conditions such that the concentration of organosulfur and organonitrogen components is reduced;
(b) contacting the effluent from said hydrotreating zone with molecular hydrogen in the presence of a hydrodewaxing catalyst in a hydrodewaxing zone under conditions such that the pour point of the hydrotreated feedstock from step (a) is reduced, wherein said hydrodewaxing catalyst comprises at least one hydrogenation component selected from the group consisting of a Group VIB metal component and a Group VIII metal component on a support selected from the group consisting of (1) a mixture of a porous refractory oxide and a crystalline silica polymorph and (2) a mixture of a porous refractory oxide and a crystalline zeolite having ZSM-5 zeolite structure.
(c) contacting the effluent from said hydrodewaxing zone with molecular hydrogen in the presence of a hydrocracking catalyst in a hydrocracking zone under conditions such that a further reduction in pour point is effected, wherein said hydrocracking catalyst comprises at least one hydrogenation component selected from the group consisting of a Group VIB metal component and a Group VIII metal component on a support comprising silica-alumina dispersed in a matrix of gamma alumina; and
(d) recovering a high quality lube oil stock from the effluent of said hydrocracking zone.

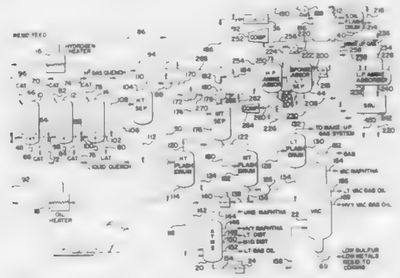
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**4,743,356**

## INCREASING RESID HYDROTREATING CONVERSION

**David J. Söderberg, Naperville, Ill.; Norman K. McDaniel, Dickinson, and Norman R. Woods, League City, both of Tex., assignors to Amoco Corporation, Chicago, Ill.**

**Filed Sep. 24, 1986, Ser. No. 911,102**
**Int. Cl.[4] C10G** *47/00*
**U.S. Cl. 208—101** **13 Claims**



1. A resid conversion process, comprising the steps of:
feeding relatively high sulfur resid oil to a reactor train comprising a series of three ebullated bed reactors;
conveying a catalyst to said reactor train;
injecting feed gases comprising hydrogen and methane into said ebullated bed reactors;
converting said resid oil to lower boiling liquid products by contacting and ebullating said resid oil in said reactor train of three ebullated bed reactors with said feed gases in the presence of said catalyst at a temperature ranging from about 700° F. to about 850° F. at a pressure ranging from about 2,550 psia to about 3,050 psia, at a hydrogen partial pressure ranging from about 1,600 psia to about 2,300 psia, to produce an upgraded product stream containing upgraded resid oil and effluent tail gases comprising hydrogen, hydrogen sulfide, ammonia, water, methane and other light hydrocarbon gases;
substantially separating said upgraded resid oil from said effluent tail gases in at least one separator; thereafter
feeding said separated upgraded resid oil to an atmospheric tower;
separating said separated upgraded resid oil in said atmospheric tower into at least one stream of naphtha, at least one stream of distillate, a stream of atmospheric gas oil, and a stream of atmospheric resid oil;
feeding said atmospheric resid oil to a vacuum tower;
separating said atmospheric resid oil in said vacuum tower into an overhead stream of vacuum gases, a stream of vacuum naphtha, at least one stream of vacuum gas oil, and a bottom stream of vacuum resid oil;
cooling said effluent tail gases;
reacting said effluent tail gases with water to form soluble ammonium bisulfide;
conveying said water-reacted tail gases containing ammonium bisulfide to a sponge oil absorber;
feeding lean sponge oil at an initial sponge oil flow rate to a sponge oil absorber;
extracting a substantial amount of light hydrocarbon gases from said water-reacted tail gases in said sponge oil absorber with said lean sponge oil to form sponge oil effluent gases and rich sponge oil;
withdrawing said ammonium bisulfide from said sponge oil absorber;
discharging said rich sponge oil from said sponge oil absorber;
separating light hydrocarbon gases from said rich sponge oil to produce lean sponge oil and recycling said lean sponge oil to said sponge oil absorber;
conveying said sponge oil effluent gases to an amine absorber;
feeding lean amine to said amine absorber;
absorbing a substantial amount of hydrogen sulfide from said sponge oil effluent gases with said lean amine in said amine absorber to produce upgraded effluent tail gases comprising about 70% to about 80% by volume hydrogen and about 20% to about 30% by volume methane;
substantially increasing the flow rate of lean sponge oil into the sponge oil absorber to substantially increase the concentration of hydrogen in said feed gases to at least about 84% by volume;
compressing said upgraded tail gases to increase the hydrogen partial pressure of said upgraded tail gases;
recycling said compressed gases to said reactors as part of said feed gas;
blending said compressed gases with fresh makeup gases comprising at least about 95% by volume hydrogen to form said feed gases; and
increasing the conversion of said resid oil to lower boiling liquid products in said train of three ebullated bed reactors by about 4% to about 10% by decreasing the feed rate of said feed gases into said train of three ebullated bed reactors by about 15% to about 25% while simultaneously producing said upgraded tail gases with said lean amine and increasing the flow rate of lean sponge oil to said sponge oil absorber to produce at least 84% by volume hydrogen in said feed gases; and while
simultaneously substantially maintaining the hydrogen partial pressure and said temperature in said reactors.

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**4,743,357**

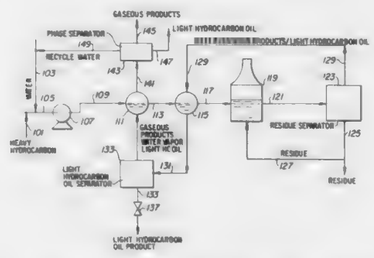
## CATALYTIC PROCESS FOR PRODUCTION OF LIGHT HYDROCARBONS BY TREATMENT OF HEAVY HYDROCARBONS WITH WATER

**Kundanbhai M. Patel. Landing; Andiappan K. S. Murthy, Lake Hiawatha, and Alex Y. Bekker, Teaneck, all of N.J., assignors to Allied Corporation, Morris Township, Morris County, N.J.**

**Continuation of Ser. No. 565,329, Dec. 27, 1983, abandoned. This application Dec. 26, 1985, Ser. No. 813,357**

**Int. Cl.⁴ C10G** *13/06, 11/18*

**U.S. Cl. 208—113** **13 Claims**




1. A process for catalytic conversion of heavy hydrocarbons having an API gravity at 25° C. of less than about 20 into light hydrocarbons having an API gravity at 25° C. of greater than about 20 and substantially free of vanadium and nickel values which comprises:

(a) contacting, in a reaction zone, said heavy hydrocarbons having an API gravity at 25° C. of less than about 20 with a liquid comprising water in the presence of an effective amount of a catalytic material consisting essentially of at least one member selected from the group consisting of oxides, sulfides of sulfates of iron, in the absence of externally added hydrogen, at a temperature between about 340° C. and 480° C. and at a pressure between about 1350 kPa and about 15,000 kpa;

(b) maintaining the reaction zone under said temperature and pressure in the absence of externally added hydrogen, for a time sufficient to produce a residue and a vapor phase comprising said light hydrocarbons, a gaseous product and a liquid comprising water;

(c) withdrawing the residue and said vapor phase from the reaction zone;

(d) separating said vapor phase into said gaseous product, said liquid comprising water, and said light hydrocarbons; and

(e) recovering said light hydrocarbons.

12. A process for catalytic conversion of heavy hydrocarbons into light hydrocarbons which comprises:

(a) contacting, in a reaction zone, heavy hydrocarbons having an API gravity at 25° C. of less than about 20 with a liquid comprising water in the presence of an effective amount of a catalytic material comprising at least one member selected from the group consisting of ammonium carbonate and formic acid, in the absence of externally added hydrogen, at a temperature between about 340° C. and 480° C. and at a presure between about 1350 kPa and about 15,000 kPa;

(b) maintaining the reaction zone under said temperature and pressure in the absence of externally added hydrogen, for a time sufficient to produce a residue and a vapor phase comprising light hydrocarbons having an API gravity at 25° C. of greater than about 20 and substantially free of vanadium and nickel values, gaseous product and a liquid comprising water;

(c) withdrawing the residue and said vapor phase from the reaction zone;

(d) separating said vapor phase into said gaseous product, said liquid comprising water, and said light hydrocarbons having an API gravity at 25° C. of greater than about 20 and substantially free of vanadium and nickel values; and

(e) recovering said light hydrocarbons.

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**4,743,358**

## METHOD FOR SUPPRESSING THE HARMFUL EFFECTS OF METAL CONTAMINANTS ON HYDROCARBON CONVERSION CATALYSTS USING A STRONTIUM COLLOID SYSTEM

**Edwin L. Kugler, Glen Gardner, and Richard P. Rhodes, Westfield, both of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.**

**Continuation-in-part of Ser. No. 743,593, Jun. 11, 1985, abandoned. This application Dec. 10, 1986, Ser. No. 940,001**

**Int. Cl.⁴ C10G** *11/00*

**U.S. Cl. 208—120** **23 Claims**

1. In a catalytic hydrocarbon conversion process in which a hydrocarbon feedstock having an average boiling temperature above 316° C. and containing one or more metal contaminants is contacted with a conversion catalyst in a reaction zone at a temperature between about 450° C. and about 600° C. wherein at least a portion of said feedstock is converted to lower boiling hydrocarbon products and coke contaminated catalyst is formed on which at least a portion of said metal contaminants has been deposited, wherein said coke contaminated catalyst is regenerated in a regeneration zone under regeneration conditions by contact with an oxygen-containing regeneration gas thereby forming a regenerated catalyst, and wherein a non-colloidal strontium compound is introduced into said process to react with and suppress the deleterious effects of said metal contaminants on said regenerated catalyst, the improvement which comprises introducing into said process a strontium colloid system comprising a strontium compound in an amount sufficient to obtain enhanced activity maintenance of said regenerated catalyst and increased conversion of said feedstock to liquid hydrocarbon products relative to that obtained if said strontium compound had been introduced as a non-colloidal strontium compound.

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**4,743,359**

## REFORMING AND RELATED PROCESSES

**Pauline B. Ting, Brea, and Howard D. Simpson, Irvine, both of Calif., assignors to Union Oil Company of California, Los Angeles, Calif.**

**Division of Ser. No. 595,260, Mar. 30, 1984, Pat. No. 4,568,450, which is a division of Ser. No. 409,583, Aug. 19, 1982, Pat. No. 4,455,390. This application Jan. 31, 1986, Ser. No. 825,058**

**Int. Cl.⁴ C10G** *35/04*

**U.S. Cl. 208—134** **47 Claims**

1. A catalytic reforming process wherein a hydrocarbon oil is reformed by contact with a particulate catalyst under reforming conditions, said catalyst comprises a composition prepared by the method comprising the steps of:

(1) impregnating support particles with an aqueous impregnating solution comprising one or more dissolved Group VIB metal components and citric acid, wherein said solution has a pH less than 1.0; and

(2) calcining the impregnated support particles.

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**4,743,360**

## PROCESS FOR REMOVING BASIC NITROGEN COMPOUNDS FROM GAS OILS

**Michel Melin, Seneffe; Jacques F. Grootjans, Leefdaal, and Andre Vanderlinden, Brussels, all of Belgium, assignors to Labofina, S.A., Brussels, Belgium**

**Filed Oct. 23, 1986, Ser. No. 922,470**

**Claims priority, application Luxembourg, Oct. 24, 1985, 86141**

**Int. Cl.⁴ C10G** *21/00*

**U.S. Cl. 208—254 R** **9 Claims**

1. A process for removing basic nitrogen compounds from gas oils, comprising treating said gas oils at a temperature of 45° to 85° C. with a homogeneous solvent mixture comprising a dilute aqueous acid solution and an alcohol having from 1 to 6 carbon atoms, the volume ratio of alcohol to dilute aqueous acid solution being between 90/10 and 10/90, the volume ratio of solvent mixture to gas oils being between 0.5 and 5.



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**4,743,361**

## MANIPULATION OF PARTICLES

**Cornelius J. Schram, Bedford, England, assignor to Internationale Octrooi Maatschappij "Octropa" BV, Rotterdam, Netherlands**

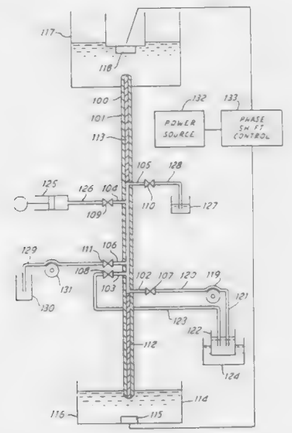
**PCT No. PCT/GB84/00368, § 371 Date Jun. 20, 1985, § 102(e) Date Jun. 20, 1985, PCT Pub. No. WO85/01892, PCT Pub. Date May 9, 1985**

**PCT Filed Oct. 31, 1984, Ser. No. 751,736**

**Claims priority, application United Kingdom, Oct. 31, 1983, 8328990; May 11, 1984, 8412148**

**Int. Cl.⁴ B03B** *5/00*

**U.S. Cl. 209—1** **13 Claims**




1. An apparatus for separating one or more particle types carried in a fluid flow comprising a flow chamber, spaced ultrasonic energy sources arranged to establish a pattern of nodes therein by interference between their outputs defining a standing wave, an axis of the standing wave pattern extending perpendicular to the nodes

means for controlling said sources so as to produce drifting of the standing wave along the axis of the wave pattern,

fluid inlet and outlet means for the liquid flow carrying said particles, said inlet and outlet means being disposed relative to said standing wave such that the fluid in the chamber flows through said standing wave transversely to the axis thereof,

the outlet means comprising at least two openings that are spaced in the direction of said axis whereby particles of a chosen type, in dependence upon their displacement relative to the liquid imposed by the standing wave energy, are delivered to a predetermined opening.

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**4,743,362**

## PROCESS AND DEVICE FOR CONTROLLING THE ELECTROSTATIC SEPARATION OF CRUDE POTASH SALTS IN ELECTROSTATIC FREE FALL SEPARATORS

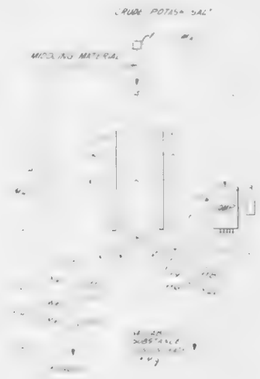
**Oskar Pfoh, Ahnatal; Christian Radick, Vellmar, and Helmut Thenert, Heringen, all of Fed. Rep. of Germany, assignors to Kali und Salz Aktiengesellschaft, Kassel, Fed. Rep. of Germany**

**Filed Sep. 17, 1985, Ser. No. 776,956**

**Claims priority, application Fed. Rep. of Germany, Sep. 18, 1984, 3434190**

**Int. Cl.⁴ B03C** *7/12*

**U.S. Cl. 209—127.4** **7 Claims**




1. Process of the electrostatic separation of crushed, chemically conditioned and triboelectrically changed crude potash salt having $K_2O$ and NaCl constituents, in a free fall electrostatic separator including an upright negative electrode and an upright positive electride for generating the electrostatic field therebetween, and two flow splitting blades pivotably supported below said electrodes and each including a computer controlled drive, said crude potash salt after its passage through the electrostatic field being separated into a valuable substance concentrate accumulating below the lower end of the positive electrode, a residue accumulating below the lower end of the negative electrode, and a middling component whose free fall is substantially unaffected by the electrostatic field, comprising the steps of measuring the amount ($M_A$) of the charged crude potash salt measuring the content ($X_P$) of $K_2O$ and the content ($W_R$) of kieserit in the residue, measuring the the amount ($M_R$) of the residue, measuring the content ($X_{WR}$) of $K_2O$ in the valuable substance concentrate, measuring the amount ($M_M$) of the middling component discharged between said blades, and applying the measured data ($M_A$, $X_R$, $W_R$, $M_R$, $X_{WK}$) to a process computer which computes from the measured data the amount ($M_{WK}$) of the valuable substance concentrate and the content ($W_A$) of kieseret in the charged crude potash salt, and generates output signals for automatically controlling via said drives the angular position of said flow splitting blades as a function of the measured and computed data so as to obtain a desired separating effect.

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**4,743,363**

## CLASSIFYING CYCLONE

**David S. Darrow, Portville, N.Y., assignor to The Dexter Corporation, Windsor Locks, Conn.**

**Filed Sep. 25, 1986, Ser. No. 911,475**

**Int. Cl.⁴ B07B** *4/02*

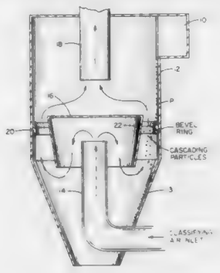
**U.S. Cl. 209—138** **9 Claims**

1. Cyclone classifying apparatus for separating fine particles from coarser particles suspended in a gaseous medium, said apparatus comprising,

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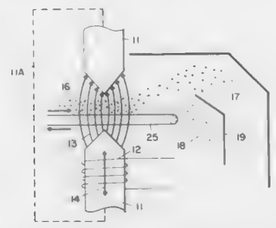
a housing,
an inlet which introduces a gas-particle suspension into said housing tangentially so as to form a separating vortex in which said particles move under inertial forces, and without the influence of rotating baffles, to the wall of said housing and then fall downwardly,
an outlet generally located on the upper portion of said housing, for carrying away unwanted exhaust containing said fine particles from said device,
means for directing classifying air in an axial direction generally upwardly toward said outlet, said means comprising a classifying air inlet and an air deflector, wherein said air




deflector is shaped to direct said classifying air upwardly through an annulus formed between said air deflector and said wall of said housing, and
means for redirecting particles on the wall of said housing into the path of said classifying air, said means comprising an annular deflecting ring protruding from said wall of said housing in the path of said separated particles falling along said wall, said annular ring being positioned adjacent said annulus at a location where said classifying air is travelling upwardly in a nonturbulent flow insufficient to entrain said coarser particles, and said ring having a beveled top to deflect said particles on the wall inwardly.

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**4,743,364**
**MAGNETIC SEPARATION OF ELECTRICALLY CONDUCTING PARTICLES FROM NON-CONDUCTING MATERIAL**
**Demos T. Kyrazis, 1708 Chacoma Pl., SW., Albuquerque, N. Mex. 87104**
**Filed Mar. 16, 1984, Ser. No. 590,183**
**Int. Cl.[4] B03C** *1/00, 1/22*
**U.S. Cl. 209—212** **19 Claims**

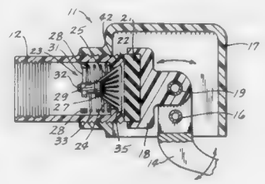


1. A separator apparatus for separating conductive material from nonconductive material, comprising,
a supply of conductive and nonconductive particulate material with neither type of material being magnetic material;
means for moving conductive and non-conductive material from said supply through a predetermined zone;
first magnetic means for producing a gradient field in a predetermined direction across said predetermined zone; and
second magnetic means for producing a rapidly time varying magnetic field having at least a substantial component aligned with said gradient field across said zone to induce magnetic dipoles in said conductive material to shift the position of the conductive material relative to the nonconductive material and thereby separate the two types of material.

15. A method of separating electrically conductive material from electrically nonconductive material where neither type of material is magnetic material, comprising the steps of:
supplying a mixture of non-magnetic conductive material and non-magnetic nonconductive material to a work station;
applying a relatively high frequency magnetic field in a predetermined direction to said mixture in a predetermined zone at said work station thereby to create magnetic dipoles on said electrically conductive material;
applying a relatively steady magnetic field to said mixture in said predetermined zone with at least a substantial component of said magnetic field being oriented in the same predetermined direction, thereby to create a magnetic force on the conductive materials which are magnetic dipoles to displace said conductive material; and
providing means for segregating the electrically conductive materials from the electrically nonconductive materials.

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**4,743,365**
**VALVE FILTER MECHANISM**
**Wayne B. Noland, 340 Crescent Dr., Carlisle, Iowa 50047**
**Continuation of Ser. No. 769,432, Aug. 26, 1985, abandoned. This application Aug. 21, 1986, Ser. No. 898,949**
**Int. Cl.[4] B01D** *35/02, 35/22*
**U.S. Cl. 210—106** **5 Claims**

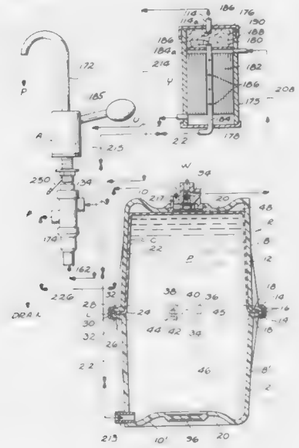


1. A fluid filter mechanism comprising:
a conduit for permitting fluid to flow therethrough in one direction, said conduit having means defining an inlet and means defining an outlet:
a valve seat disposed in said conduit between the inlet and the outlet;
a filter member having a sealing surface thereon reciprocally disposed in said conduit and having a first position in sealing contact with said valve seat and a second position spaced from said valve seat for permitting fluid flow from the inlet to the outlet around said filter member when said filter member is in the second position thereof;
means for biasing said filter member in an upstream direction to said first position thereof whereby the sealing surface thereon would be in sealing contact with said valve seat;
filter means disposed on an upstream portion of said filter member for permitting fluid to flow through said filter member to said outlet when said filter member is in the first position thereof when the flow of fluid through the conduit is slow for holding solid particles in the fluid on the upstream portion of said filter means, said filter means being disposed upstream of the sealing surface on said filter member whereby when the flow of fluid through the conduit is increased, the differential pressure across the filter member and filter means will move the filter member and filter means to the second position thereof to cause more flow along and around the filter means than through it, whereby the solid particles will be flushed off of said filter means during such increased flow conditions;
flow control valve means connected to said conduit downstream from said filter member for regulating the flow through said conduit, said valve means including a valve member, said valve member having a closed position against said valve seat, a completely open position spaced a predetermined distance from said valve seat and a partially open position being spaced a distance from said valve seat but less than said predetermined distance from said valve seat; and
float means for controlling the position of said flow control valve means depending upon the level of the float means.



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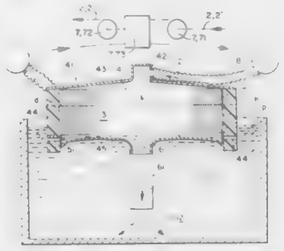
**4,743,366**
**CONTROL VALVE ASSEMBLY FOR PURIFIED WATER SUPPLY SYSTEM**
**Bruce D. Burrows, 25,145 W. Ave. Stanford, Valencia, Calif. 91355**
**Continuation of Ser. No. 545,880, Jul. 23, 1984, Pat. No. 4,595,497. This application Apr. 4, 1986, Ser. No. 848,351**
**The portion of the term of this patent subsequent to Jun. 17, 2003, has been disclaimed.**
**Int. Cl.[4] B01D** *13/00*
**U.S. Cl. 210—110** **7 Claims**



1. A purified water supply system, for use in providing purified water from a supply of feed water under pressure, said system comprising:
a reservoir tank having a pliable barrier dividing the interior thereof into a reject water chamber and a purified water chamber, said reject water chamber being separated by said barrier from said purified water chamber;
a reverse osmosis unit for receiving and processing feed water to produce purified water and reject water;
a control valve mounted on said reservoir tank and including a valve body defining a feed water inlet for connection to the supply of feed water and a feed water outlet for connection of feed water to said reverse osmosis unit, and a valve member within said valve body for movement between first and second positions respectively preventing and permitting flow of feed water from said feed water inlet to said feed water outlet, said valve member including a first portion of relatively small cross sectional area exposed to the pressure of feed water at said feed water inlet and a pressure plate of substantially larger cross sectional area disposed within said reject water chamber in a position for contact by said barrier to displace said valve member toward said first position when said purified water chamber reaches a substantially full condition;
means for delivering purified water from said reverse osmosis unit to said purified water chamber; and
dispensing valve means movable between open and closed positions, said dispensing valve means in said open position including means for communicating said purified water chamber to a dispensing outlet for use and for communicating reject water from said reverse osmosis unit to said reject water chamber at a substantial flow rate, whereby the reject water within said reject water chamber acts through said barrier against the purified water within said purified water chamber to force the purified water therein to flow to said dispensing outlet,
said dispensing valve means in said closed position further including means for preventing communication between said purified water chamber and said dispensing outlet and for coupling said reject water chamber to a drain substantially without back pressure applied to said reject water chamber, whereby the pressure of the feed water acting against said first portion of said valve member normally maintains said valve member in said second position to permit flow of feed water to said reverse osmosis unit and resultant production of purified water supplied to said purified water chamber to fill said purified water chamber with minimum back pressure and simultaneous discharge of reject water from said reject water chamber until said purified water chamber reaches the substantially full condition and said barrier contacts said pressure plate of said valve member to displace said valve member toward said first position throttling the flow of feed water from said feed water inlet to said feed water outlet.

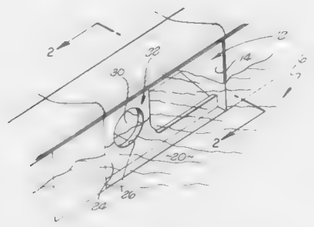
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**4,743,367**
**CONTACT APPARATUS**
**Sten Zeilon, Heimdalsgatan 21, S-261 62 Glumslöv, Sweden**
**PCT No. PCT/SE86/00260, § 371 Date Feb. 4, 1987, § 102(e) Date Feb. 4, 1987, PCT Pub. No. WO86/07287, PCT Pub. Date Dec. 18, 1986**
**PCT Filed Jun. 5, 1986, Ser. No. 31,016**
**Claims priority, application Sweden, Jun. 7, 1985, 8502821**
**Int. Cl.[4] B01F** *3/04*
**U.S. Cl. 210—150** **7 Claims**



1. A contact apparatus, comprising a contact body (3) of spaced surface material (31), means for wetting said body with a liquid (1) and means for exposure of the wetted body to a gas (2) characterized in that said apparatus also comprises an open bath (11) of said liquid (1), airtight chambers (4, 4*a*, 4*b*) partly immersed in said bath (11), said chambers (4, 4*a*, 4*b*) enclosing said contact body (3), chamber openings (5, 6) for liquid communication between said bath (11) and a free space of said chambers (4, 4*a*, 4*b*) and said body (3), and a driving device (7) for cyclically forced injection and ejection respectively of gas to and from said free space through gas conduits (8).

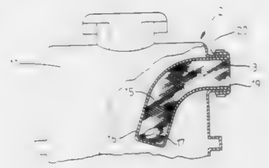
**4,743,368**
**SWIMMING POOL SKIMMING AND VACUUMING SYSTEM**
**Harvey W. Gates, P.O. Box 40, Bloomington, Calif. 92316**
**Filed Oct. 6, 1986, Ser. No. 915,708**
**Int. Cl.[4] E04H** *3/20*
**U.S. Cl. 210—163** **7 Claims**



6. A swimming pool skimming and vacuuming system comprising:
- a passage plate inserted in a plane transverse to the axis of a water passage defining an opening interconnecting a skimmer well to a pool, said passage plate having a skimmer weir integrally formed therewith for drawing off scum from the upper surface of said pool, said passage plate being secured along a plane transverse to the axis of said water passage, and being recessed in said water passage from the entrance interconnecting said pool and said skimmer well; and
- means for simultaneous skimming and vacuuming a pool comprising an aperture formed in on one side of said passage plate connecting a vacuum hose from said pool to said skimmer well.

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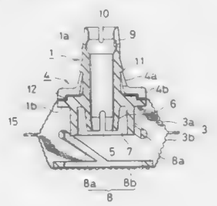
**4,743,369**
**COOLING SYSTEM FILTER**
**Theodore C. Geermans, 19 Roselea St., Caulfield South., Victoria, Australia (3162), and Robert C. Geermans, 13 Glengarry Ave., Burwood, Victoria, Australia (3125)**
**PCT No. PCT/AU86/00096, § 371 Date Dec. 15, 1986, § 102(e) Date Dec. 15, 1986, PCT Pub. No. WO86/06002, PCT Pub. Date Oct. 23, 1986**
**PCT Filed Apr. 14, 1986, Ser. No. 6,675**
**Claims priority, application Australia, Apr. 15, 1985, PH00147/85**
**Int. Cl.[4] B01D** *29/04*
**U.S. Cl. 210—167** **12 Claims**



1. A radiator and filter combination for an engine, the combination comprising a radiator having a header tank and a core which is disposed below said header tank, said core comprising a plurality of tubes, the radiator further including an inlet hose leading to said header tank for delivering coolant to the radiator and an outlet pipe for discharging coolant from the radiator; the combination further comprising an inlet pipe formed on said header tank, a filtering device comprising an elongated tubular flexible bag member which at least in part is formed of a mesh material through which coolant can be filtered, said flexible bag member having an open end and a closed end, said flexible bag member including means for attachment of the open end to the inlet pipe, said flexible bag member extending into the header tank so that the closed end and a major portion of the flexible bag member is disposed within said header tank.

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**4,743,370**
**FILTER FOR FUEL TANK**
**Akira Mizusawa, Yokohama, Japan, assignor to Nifco Inc., Yokohama, Japan**
**Filed Dec. 29, 1986, Ser. No. 946,811**
**Claims priority, application Japan, Jan. 17, 1986, 61-3964[U]**
**Int. Cl.[4] B01D** *35/02*
**U.S. Cl. 210—168** **2 Claims**



1. A fuel tank filter comprising: a sack-like net member having an opening, a mounting member for mounting said net member on a suction pipe, shape-retaining means extending from said mounting member and engagable with said net member to prevent collapse thereof into said mounting member, said mounting member including a cylindrical mounting portion provided on the peripheral surface thereof with a locking portion and a flange-like fastening portion, and a mounting cover for mounting said opening of said net member on said mounting member, said mounting cover including a cylindrical lock portion fitted on said mounting portion and engaged with said locking portion and a clamping portion brought into contact with the upper surface of said fastening portion, said net member being undetachably mounted on said mounting member by passing said opening of said net member about said mounting portion to be put on the upper surface of said fastening portion, then fitting said lock portion on said mounting portion to superpose said clamping portion on said opening of said net member in clamping relation therewith, thereby clamping said opening of said net member between the lower surface of said clamping portion and the upper surface of said fastening portion and, at the same time, engaging an opening of said lock portion with said locking portion.

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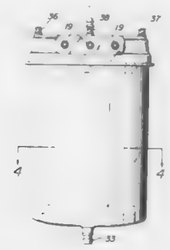
**4,743,371**
**BLOOD FILTER**
**Frank M. Servas, San Juan Capistrano; Robert F. Gremel, Huntington Beach, and Timothy C. Ryan, Laguna Hills, all of Calif., assignors to Shiley, Inc., Irvine, Calif.**
**Continuation of Ser. No. 483,375, Apr. 8, 1983, abandoned. This application Feb. 28, 1986, Ser. No. 837,334**
**Int. Cl.[4] B01D** *29/04*
**U.S. Cl. 210—188** **24 Claims**

1. A combined cardiotomy defoamer, filter and reservoir device for removing air bubbles and undesirable particulate matter from a surgical field said device accommodating substantial blood flow for extended periods of time with minimal pressure increase in said device between the blood inlet and outlet of said device, comprising:
- a first annular tube of reticulated porous sponge material treated with anti-foam compound for removing gas bubbles from said blood;
- a second annular tube of a non-woven depth filter media surrounding and directly adjacent said first annular tube for providing a first stage filter for larger particulate matter;
- a third annular tube of a reticulated porous sponge material



untreated with any anti-foam material surrounding and closely proximate said second annular tube for providing a porous spacing between the external surface of said second annular tube and a downstream second stage filter to provide multiple fluid paths between the exterior surface of said first stage filter and said second stage filter;
- a fourth annular tube surrounding and closely proximate said third annular tube, said fourth annular tube comprised of a screen filter having a sufficiently small pore size to enhance the filtration efficiency of the first stage filter by trapping substantially all remaining undesirable particulate matter;

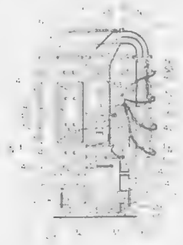
said third annular tube of reticulated porous sponge material



having a pore size greater than the pore size of both said second and fourth annular tubes; and
- a generally hollow housing surrounding said first, second, third and fourth annular elements, said housing and annular elements sharing a common vertically oriented longitudinal axis, said blood inlet extending through an upper end of said housing and in communication with the interior of said first annular tube, an annular reservoir chamber surrounding said fourth annular tube for receiving the filter blood after it has been filtered through said fourth annular tube, an air vent located at said housing upper end for venting air separated from the blood in said device; and said blood outlet located at a lower end of said housing and in commnication with said reservoir chamber.

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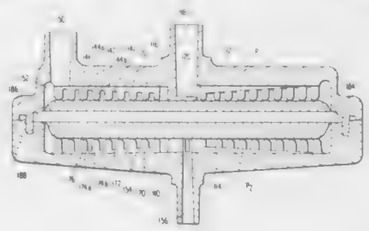
**4,743,372**
**ULTRAFILTRATION MEMBRANE CARTRIDGE SEPARATION SYSTEM**
**Masahiko Kumagai, Ebina, and Takeshi Yokomizo, Yokohama, both of Japan, assignors to Sanki Engineering Co., Ltd. 4-1, Tokyo, Japan**
**Filed Mar. 24, 1986, Ser. No. 842,917**
**Claims priority, application Japan, Mar. 26, 1985, 60-059581**
**Int. Cl.[4] B01D** *13/00, 27/08*
**U.S. Cl. 210—195.2** **6 Claims**



1. An ultrafiltration system using membrane cartridges comprising:
- a vertical water pump casing defining a flow path for water therethrough and having upper and lower end portions;
- inlet and outlet means for water in said pump casing;
- a submersible axial-flow pump mounted in said casing comprising a pump motor and an impeller connected to said motor for being rotatably driven by said motor to pump water through said casing;
- a plurality of separate upper fluid flow conduits having uper portions substantially radially extending from and connected in fluid flow relationship with said upper end portion of said casing and downwardly extending distal end portions;
- a corresponding plurality of separate lower fluid flow conduits having lower portions substantially radially extending from and connected in fluid flow relationship with said lower end portion of said casing and upwardly extending distal end portions;
- a plurality of separate filtration cartridge housings spaced radially outwardly with respect to said pump casing and spaced with respect to each other, each housing being hollow and having opposite ends connected respectively in fluid flow relationship with said distal ends of said fluid flow conduit and corresponding lower fluid flow conduits, so that said casing, upper and lower fluid flow conduit and cartridge housings comprise a plurality of separate fluid flow circuits for water pumped by said pump;
- hatch means on each cartridge housing for providing access to the interior of each housing and for passing filtration cartridges therethrough; and
- at least one box-shaped ultrafiltration cartridge detachably mounted in the hollow interior of at least one of said cartridge housings for filtering water flowing through said at least one cartridge housing.

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**4,743,373**
**CHROMATOGRAPHY COLUMN**
**Vish Rai, Wallingford; Nils Dailey, N. Guilford; Kenneth Southall, Wethersfield; Timothy Webster, Norfolk; Gordon Leeke, Glastonbury, and Chaokang Chu, West Hartford, all of Conn., assignors to Cuno Incorporated, Meriden, Conn.**
**Continuation of Ser. No. 723,691, Apr. 16, 1985, Pat. No. 4,675,104, which is a continuation-in-part of Ser. No. 693,904, Jan. 23, 1985, abandoned, which is a continuation of Ser. No. 505,532, Jun. 17, 1983, Pat. No. 4,496,461. This application Sep. 4, 1986, Ser. No. 903,914**
**The portion of the term of this patent subsequent to Jan. 29, 2002, has been disclaimed.**
**Int. Cl.[4] B01D** *15/08*
**U.S. Cl. 210—198.3** **50 Claims**



1. A chromatography column for effecting chromatographic separation of at least two components of a sample flowing therethrough comprising:
- (1) a housing, said housing comprising:
  - (a) an inlet housing member, and
  - (b) an outlet housing member,

said inlet housing member and said outlet housing member defining a radially, outwardly expanding stationary phase chamber; and
- (2) a stationary phase within said radially, outwardly expanding chamber, said stationary phase comprising:

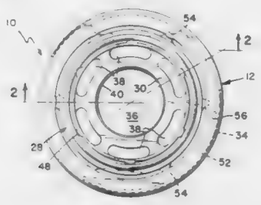
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(a) a plurality of layers of a swellable fibrous matrix in sheet form having chromatographic functionality and being effective for chromatographic separation, and
(b) a spacer means between each layer of said swellable fibrous matrix having open areas and separating said layers for controlling swelling of the matrix and enhancing the distribution of sample flowing through the stationary phase,
wherein said stationary phase chambers and said stationary phase coact to provide substantially uniform radial distribution of sample across said stationary phase.

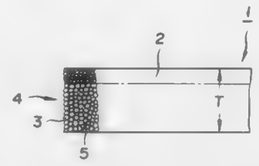
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**4,743,374**
**HIGH-STRENGTH FILTER WITH IMPROVED FATIGUE RATING**
**Jack Stifelman, Bloomington, Minn., assignor to Donaldson Company, Inc., Minneapolis, Minn.**
**Continuation-in-part of Ser. No. 840,434, Mar. 14, 1986, abandoned. This application Jul. 6, 1987, Ser. No. 69,711**
**Int. Cl.[4] B01D** *27/08*
**U.S. Cl. 210—440** **10 Claims**




10. A spin-on fluid filter of improved burst and fatigue strength, which comprises:
a generally cylindrical housing having opposite open and closed ends;
a generally cylindrical filter element disposed within said housing, said filter element having opposite open and closed ends;
a rigid unitary cover disposed in the open end of said housing, said cover having opposite open and closed ends;
said cover including a hub extending substantially into said housing to define a central first flow opening, a surrounding circular rim, and a plurality of radial ribs interconnecting the hub and rim to define offset second flow openings;
the outer end of said cover including inner and outer circular grooves in the rim surrounding the second flow openings, with the outer groove including a plurality of circumferentially spaced-apart radial projections therein;
the open end of said housing surrounding and being folded inwardly over the periphery of the rim into an interlocking fold of generally P-shaped cross-section deformably engaging said projections in the outer groove in the outer end of said cover to secure said cover and housing against both separation and rotation;
the circumferential periphery of the rim of said cover being smooth and free of radial projections;
a first seal engaged between said cover and housing;
a second seal engaged between the open end of said filter element and the inner end of said cover;
a third seal disposed in the inner groove in the outer end of said cover; and
means on said cover for removably mounting the filter.

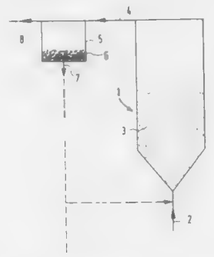
**4,743,375**
**FLAT PERMEABLE MEMBRANE**
**Yukio Seita, Fuji, and Makoto Emi, Fujinomiya, both of Japan, assignors to Terumo Corporation, Tokyo, Japan**
**Filed Nov. 8, 1985, Ser. No. 796,433**
**Claims priority, application Japan, Aug. 29, 1985, 60-188480; Nov. 9, 1984, 59-236180**
**Int. Cl.[4] B01D** *13/00*
**U.S. Cl. 210—500.36** **15 Claims**




1. A flat permeable polyolefin membrane comprising a polyolefin containing a crystal seed forming agent, said membrane having a thickness of 10 to 500 μm and having in one surface thereof as a filtering surface a compact layer formed of intimately bound fine polyolefin particles and possessed of fine pores and in the interior and the other surface thereof a layer formed of an aggregate of fine discrete polyolefin particles of an average diameter in the range of 0.01 to 5 μm so adjoined as to form fine labyrinthically continuing through pores and which, therefore, established communication between the opposite surfaces of said membrane, said membrane having a shrinkage of not more than 6.0% after a heat treatment performed at 121° C. for 120 minutes.

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**4,743,376**
**WATER PURIFICATION BY A FLUIDIZED BED**
**Samuel Elmaleh, Castelnau Le Lez, and Alain Grasmick, Montpellier, both of France, assignors to Mornex Limited, London, England**
**Filed May 20, 1985, Ser. No. 735,862**
**The portion of the term of this patent subsequent to May 7, 2002, has been disclaimed.**
**Int. Cl.[4] C02F** *1/54, 3/00*
**U.S. Cl. 210—617** **9 Claims**

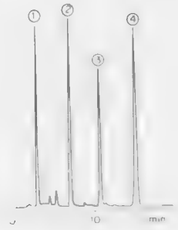



1. A process for separating microscopic particles including inorganic suspended matter in water comprising the steps of:
(a) providing said water with sufficient bacteria which secretes a flocculating agent including polysaccharides serving to flocculate said bacteria and said microscopic particles and passing the water through unsaturated granular material in a fluidized bed to flocculate said bacteria and said microscopic particles and form flocculated aggregates,
(b) collecting flocculated aggregates downstream from the fluidized bed, and
(c) subjecting the water to a suitable liquid/solid separation technique,
to produce separately a liquid effluent which is partially purified from its pollution and solid aggregates of the flocculated particles, wherein the ratio of the velocity of said effluent to the minimum velocity of the fluidized material is between 1.1 and 15, the particle size of the granular material in the fluidized bed is between about 50 μm and 1 cm, and the density of the granular material is between 0.8 and 3 g/cm$^3$.

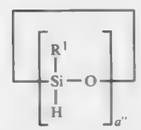


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**4,743,377**
**PACKING MATERIAL FOR LIQUID CHROMATOGRAPHY**
**Yutaka Ohtsu; Hiroshi Fukui; Motokiyo Nakano; Okitsugu Nakata; Taketoshi Kanda; Isao Tanaka; Osamu Shirota, and Junichi Koyama, all of Yokohama, Japan, assignors to Shiseido Company Ltd., Tokyo, Japan**
**Filed Jun. 30, 1986, Ser. No. 880,757**
**Claims priority, application Japan, Jul. 2, 1985, 60-143857; Jun. 24, 1986, 61-146204**
**Int. Cl.[4] B01D** *15/08*
**U.S. Cl. 210—635** **29 Claims**




29. A method for making a reversed phase liquid chromatographic separation of components contained in a liquid sample which comprises contacting the liquid sample with a chromatographic column containing a packing material comprising particles having a silicone polymer film coated substantially the entire surface thereof, said process comprising the steps of:
(a) bringing a cyclic silicone compound having the general formula (VI):




(VI)

wherein $R^1$ represents a lower alkyl or aryl group, and a'' is an integer of 3 to 100, into contact with particles, whereby the silicone compound is polymerized on substantially the entire surface of the particles, and
(b) carrying out an addition reaction of a vinyl compound having the general formula (III):

$$R^8—CH=CH=R^9 \quad \text{(III)}$$

wherein $R^8$ represents hydrogen or alkyl group having 1 to 20 carbon atoms and $R^9$ represents hydrogen, both of $R^8$ and $R^9$ represents alkyl group having 1 to 20 carbon atoms, or $R^8$ represents phenyl group substituted with alkyl group having 1 to 20 carbon atoms and $R^9$ represents hydrogen; to unreacted Si—H groups, thereby producing the particles having the silicone polymer film coated on substantially the entire surface thereof, said silicone polymer having the general formula (IV):

$$[(R^1SiO_{(3/2)})_x(R^1HSiO)_y(R^1R^7SiO)_z]_u \quad \text{(IV)}$$

wherein $R^1$ has the meaning as given above, $R^7$ represents a residue of the addition reaction of the vinyl compound of the general formula (III), u is an integer for making a molecular weight of the polymer more than 150,000, and x', y' and z have the following relationships:

$x'+y'+z=1$,

$0<x'\leqq 0.5$

$0<y'\leqq 0.4$, and

$0.5\leqq z<1.0$.

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**4,743,378**
**RAPID VAPOR TRANSPORT THROUGH UNWETTED POROUS BARRIERS**
**Douglas L. Ford, Eastwood, Australia, assignor to Memtec Limited, New South Wales, Australia**
**PCT No. PCT/AU86/00081, § 371 Date Nov. 17, 1986, § 102(e) Date Nov. 17, 1986, PCT Pub. No. WO86/05706, PCT Pub. Date Oct. 9, 1986**
**PCT Filed Mar. 27, 1986, Ser. No. 945,672**
**Claims priority, application Australia, Mar. 28, 1985, PG9948; Apr. 4, 1985, PH0018**
**Int. Cl.[4] E01D** *13/00*
**U.S. Cl. 210—640** **15 Claims**



1. A method of increasing the rate of transport of volatiles through an unwetted porous barrier, comprising enabling aerodynamic transport through the porous barrier by:
(a) subjecting the unwetted porous barrier to a vacuum for a time sufficient to remove any permanent gas from the pores,
(b) admitting a non-wetting liquid to the barrier either before or during the application of the vacuum, and
(c) releasing the vacuum, whereby the non-wetting liquid forms films or bubbles which seal the pores to create a low pressure region within each pore which is filled with vapor of the non-wetting liquid.

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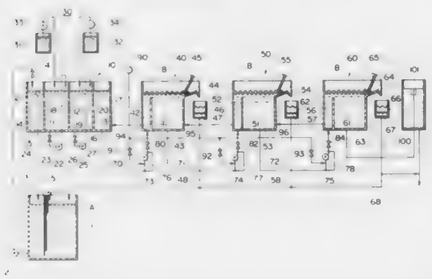
**4,743,379**
**FLOTATION DEVICE**
**Kazutoyo Sugihara, 964-38, Niihashi, Gotenba City, and Yasuhide Kinoda, 2-3-16, Matsugaoka, Kugenuma, Fujisawa City, both of Japan**
**Filed Jul. 3, 1986, Ser. No. 881,594**
**Int. Cl.[4] B01D** *21/01*
**U.S. Cl. 210—705** **19 Claims**

1. An apparatus for the separation of a heavy metal from water containing said heavy metal, comprising means for providing an alternative to chemical preciptation, electroplating and hydroxide floculation, and for improving the separation of said heavy metal from said water, said means including in combination:
means defining a flow of said water, including a conditioning

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tank having a first upstream chamber and a second chamber downstream from said first chamber;
means connected to said flow defining means for supplying sulfide to at least one of said first and second chambers;
means connected to said flow defining means for supplying a floc-separating material to at least the other of said second and first chambers; said material being capable of associating with precipitant formed from said sulfide and said heavy metal so as to form a floc separable by air flotation from said water;
means connected to said flow defining means downstream of said second chamber for supplying air to said water;
means connected to said flow defining means immediately downstream of said air supplying means for pumping said water and said supplied air; and
floc-separating means connected to said flow defining means downstream of said pump.

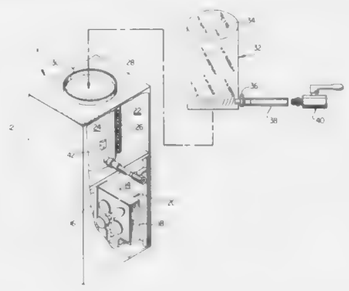


11. A method of separating a heavy metal from water containing said heavy metal, comprising: providing an alternative to chemical precipitation, electroplating and hydroxide flocculation, and improving the separation of said heavy metal from said water, by
disposing said water in a means for defining a flow of said water;
supplying sulfide and a floc-separating material to said water in said flow defining means, said floc-separating material being capable of associating with precipitant formed from said sulfide and said heavy metal so as to form a floc separable by air flotation from said water;
thereafter supplying air to said water in said flow defining means;
pumping said water and supplied air in said flow-defining means to a floc-separating means; and
separating from said water a floc formed by said sulfide, said floc-separating material, and said air, in said floc-separating means.

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**4,743,380**
**SOLVENT RECOVERY SYSTEM**
**Edwin H. Royse, Dallas, Tex., assignor to Royse Manufacturing Company, Inc., Dallas, Tex.**
**Filed Jun. 3, 1987, Ser. No. 57,494**
**Int. Cl.[4] B01D** *21/00*
**U.S. Cl. 210—737** **4 Claims**

1. A process comprising separating dissolved material from a solution for use in a flexographic plate producing process, by, refrigerating the solution in a container to separate the material and solution;



drawing the purified solution from the container, leaving the material in the container as residue.

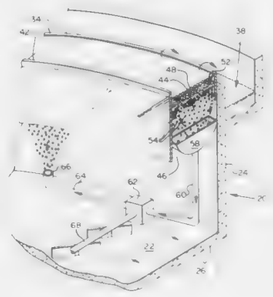
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**4,743,381**
**PROCESS FOR OXIDIZING A CYANIDE COMPOUND**
**Randy A. Bull, Hopewell, N.J., assignor to FMC Corporation, Philadelphia, Pa.**
**Filed Jul. 1, 1987, Ser. No. 68,371**
**Int. Cl.[4] C02F** *1/58*
**U.S. Cl. 210—759** **4 Claims**

1. A process for oxidizing a cyanide ion in an aqueous medium comprising incorporating hydrogen peroxide into the aqueous medium and contacting the medium with a solid catalyst, the catalyst comprising a transition metal selected from the group consisting of silver, copper and nickel on a metal oxide base having a surface area of at least 10 square meters per gram, said metal oxide being selected from the group consisting of aluminum oxide and silicon oxide and mixtures thereof.

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**4,743,382**
**METHOD AND APPARATUS FOR SEPARATING SUSPENDED SOLIDS FROM LIQUIDS**
**Kenneth J. Williamson, Corvallis, Oreg., and Perry L. McCarty, Stanford, Calif., assignors to The State of Oregon Acting by and through the State Board of Higher Education on Behalf of Oregon State University, Eugene, Oreg.**
**Continuation of Ser. No. 485,134, Apr. 20, 1983, abandoned, which is a continuation of Ser. No. 333,788, Dec. 23, 1981, abandoned, which is a continuation of Ser. No. 175,778, Aug. 6, 1980, abandoned. This application Jul. 28, 1987, Ser. No. 78,607**
**Int. Cl.[4] B01D** *21/06, 23/10, 23/24*
**U.S. Cl. 210—786** **8 Claims**



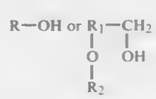
5. An apparatus for removing solids from liquid water or liquid waste comprising:
a clarifier tank including a bottom and sidewall means which define a settling zone wherein liquid is partially clarified by gravitational separation of suspended solids from the liquid;
inlet means for delivering a stream of liquid with suspended solids into the settling zone;
outlet means comprising a horizontal weir which extends along the top of at least a portion of the sidewall means and which is the uppermost extension of that portion of the sidewall means;
a generally vertical baffle means extending along and spaced from the weir to define a compartment with an inlet and an outlet located so that liquid partially clarified in the settling zone flows through the compartment;
located within the compartment, a bed of cleanable particulate media of less density than the liquid, the bed being positioned in such a manner that the partially clarified liquid flows through the bed, so that solids in the partially clarified liquid collect in pores of the bed and are separated from the liquid;
means for retaining the media within the compartment; and
cleaning means for mechanically removing a portion of the particulate media from the bottom of the bed and circulating the removed media through a volume of liquid in the clarifier tank, upstream of the bed, to dislodge the collected solids and for redepositing the removed media on the bottom of the bed after the solids are dislodged.



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**4,743,383**
**DRILLING FLUID ADDITIVES FOR USE IN HARD BRINE ENVIRONMENTS**
**Wayne S. Stewart, Coffeyville, Kans.; George G. Dixon, Bartlesville, Okla.; John M. Elsen, Tulsa, Okla., and Billy L. Swanson, Delaware, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.**
**Filed Nov. 24, 1986, Ser. No. 934,388**
**Int. Cl.[4] C09K** *7/02*
**U.S. Cl. 252—8.51** **17 Claims**

1. A drilling fluid additive comprising:
(a) from 30–70 weight percent of a liquid hydrocarbon;
(b) from 2–20 weight percent of an anionic surfactant, wherein said anionic surfactant is selected from the group consisting of petroleum sulfonates, alcohol sulfates, and ethoxylated alcohol sulfates;
(c) from 2–20 weight percent of an alcohol, wherein said alcohol is represented by one of the following formulas;



wherein R is an alkyl group containing from 2 to 5 carbon atoms; $R_1$ is an alkylene group containing from 1 to 4 carbon atoms and $R_2$ is an alkyl group containing from 2 to 5 carbon atoms;
(d) from 1–25 weight percent of a sulfonated asphalt, and;
(e) from 1–15 weight percent of a biopolymer wherein said biopolymer is produced by the action of at least one microorganism selected from the group consisting of *Xanthomonas campestris, Xanthomonas phaseoli, Xanthomonas mulvacearn, Xanthomonas carotae, Xanthomonas translucens, Xanthomonas hederae, Xanthomonas papavericoli, Hansenula holstii, Arthrobacter viscous, Methylomonas mucosa, Erwinia tahitica* and *Azobacter indicus.*

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**4,743,384**
**CARBOXYMETHYL GUAR BASED DRILLING FLUIDS**
**Cheng-Fa Lu; Carl A. Lukach, both of New Castle County, Del., and Robert R. Pas, Earls Court, United Kingdom, assignors to Aqualon Company, Wilmington, Del.**
**Filed May 13, 1986, Ser. No. 862,746**
**Int. Cl.[4] C09K** *7/02*
**U.S. Cl. 252—8.514** **20 Claims**

1. A drilling fluid composition consisting essentially of (a) an aqueous medium selected from the group consisting of fresh and tap water, natural and synthetic sea water, and natural and synthetic brine; and (b) a carboxymethyl guar having a D.S. of from 0.1 to 0.4, said drilling fluid having an apparent viscosity of 10–30 cps, plastic viscosity of 5–20 cps, yield point of 10–60 lbs/100 $ft^2$, 10 sec Gel Strength of 5–20 lbs/100 $ft^2$, 10 min Gel Strength of 10–30 lbs/100 $ft^2$, and fluid loss of less than 15 ml/30 min.

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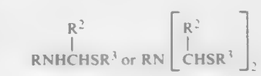
**4,743,385**
**OIL RECOVERY AGENT**
**Howard P. Angstadt, Media, Pa.; Donald F. Rugen, Wilmington, Del., and John L. Cayias, Richardson, Tex., assignors to Sun Refining and Marketing Company, Philadelphia, Pa.**
**Continuation-in-part of Ser. No. 673,814, Nov. 21, 1984, abandoned, which is a continuation-in-part of Ser. No. 564,545, Dec. 22, 1983, abandoned. This application Feb. 18, 1986, Ser. No. 830,608**
**Int. Cl.[4] E21B** *43/22*
**U.S. Cl. 252—8.554** **4 Claims**

1. An improved method for the enhanced recovery of oil from subterranean formations whereby steam is injected into said formations, the improvement comprising incorporating in the steam an effective amount of a mixture comprising about a 1:0.05–0.5:2.0 weight ratio of a $C_{14-20}$ alkyl toluene sulfonate, a $C_{14-20}$ ethylbenzene sulfonate, or a $C_{14-20}$ alkyl benzene sulfonate and a hydrotrope selected from the group consisting of alkali metal xylene sulfonates, alkali metal toluene sulfonates, alkali metal cumene sulfonates, alkali metal benzene sulfonates, alkali metal isethionantes, alkali metal butane sulfonates and alkali metal hexane sulfonates.

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**4,743,386**
**GREASE COMPOSITIONS CONTAINING PHENOLIC- OR THIO-AMINE BORATES AND HYDROXY-CONTAINING SOAP THICKENERS**
**John P. Doner, Sewell; Andrew G. Horodysky, Cherry Hill, and John A. Keller, Jr., Pitman, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.**
**Continuation-in-part of Ser. No. 682,579, Dec. 17, 1984, abandoned, which is a continuation of Ser. No. 445,883, Dec. 1, 1982, abandoned, which is a continuation-in-part of Ser. No. 638,609, Aug. 7, 1984, Pat. No. 4,571,248, which is a division of Ser. No. 456,880, Jan. 10, 1983, Pat. No. 4,486,321. This application Aug. 27, 1985, Ser. No. 769,826**
**The portion of the term of this patent subsequent to Dec. 4, 2001, has been disclaimed.**
**Int. Cl.[4] C10M** *139/00*
**U.S. Cl. 252—49.6** **29 Claims**

1. A grease composition comprising a lubricating component, a thickener including at least in part a hydroxy-containing thickener, and a borated mercaptan amine aldehyde condensation product having the structural formula, before being borated,



wherein R is H or a $C_1$ to $C_{20}$ hydrocarbyl group, $R^1$ is a $C_2$ to $C_5$ alkylene group, $R^2$ is H or a $C_1$ to $C_8$ hydrocarbyl group and $R^3$ is a $C_8$ to $C_{30}$ straight-chain or branched chain hydrocarbyl

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group, the hydroxy-containing thickener and borated mercaptan, amine aldehyde condensation product being present in sufficient quantities to effect an increase in the dropping point of said grease.

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**4,743,387**
**POLYOXYALKYLENE DIAMIDES AS LUBRICANT ADDITIVES**

**Gerassimos Frangatos, Haddonfield, and Robert H. Davis, Pitman, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 467,527, Feb. 17, 1983, abandoned. This application Jan. 16, 1985, Ser. No. 691,792**
**Int. Cl.⁴ C10M** *133/16*
**U.S. Cl. 252—51.5 A** **4 Claims**

**1**. A non-aqueous lubricant composition possessing improved demulsification protection against the formation of oil and water emulsions comprising a major amount of an oil of lubricating viscosity or grease prepared therefrom and from about 0.01% to about 10% by weight of a polyoxyalkylenediamide prepared by reacting in a molar ratio of from 2 to 1 to about 1 to 2, of a bulky three dimensional carboxylic acid selected from the group consisting of abietic, naphtoic, cholic, cholanic, desoxycholic, glucuronic, galacturonic, and mannuronic acids and a polyoxyalkylenediamine having from about 2 to about 8 carbon atoms in the alkylene portion and a molecular weight of from about 1000 to about 3000

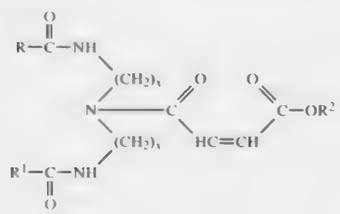
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**4,743,388**
**COMPLEX AMIDE CARBOXYLATE LUBRICANT RUST INHIBITOR ADDITIVE FOR METAL WORKING FLUIDS**

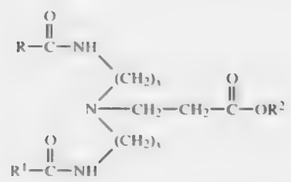
**Curtis S. Lege, Chalfont, Pa., assignor to Westvaco Corporation, New York, N.Y.**

**Filed Jul. 21, 1986, Ser. No. 887,872**
**Int. Cl.⁴ C10M** *173/00, 133/16*
**U.S. Cl. 252—51.5 A** **59 Claims**

(I)



(II)



**1**. An improved aqueous metalworking fluid system selected from the group consisting of synthetic and semi-synthetic systems wherein the improvement comprises an additive providing both corrosion inhibition and lubrication selected from the group consisting of a fatty acid substituted, carboxylated bis-amidoamine and salts thereof.

**2**. The composition of claim **1** wherein the formula of the fatty acid substituted, carboxylated bis-amidoamine is



wherein R and $R^1$ are aliphatic chains of from 14 to 20 carbon atoms, $R^2$ is a hydrogen, an alkanolamine or an inorganic cation, and x is an integer from 2 to 3.

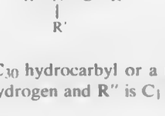
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**4,743,389**
**N-ALKYL AMIDES AS FRICTION-REDUCERS FOR LUBRICANTS AND FUELS**

**Milton Braid, Haddonfield, and Andrew G. Horodysky, Cherry Hill, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.**

**Filed Nov. 30, 1982, Ser. No. 445,644**
**Int. Cl.⁴ C10M** *129/00*
**U.S. Cl. 252—51.5 A** **15 Claims**

**1**. A lubricant composition comprising a major proportion of an oil of lubricating viscosity or a grease prepared therefrom and a minor effective proportion of a friction-reducing or friction-modifying additive selected from the group consisting of formamides having the following general formula



where R is $C_{10}$ to $C_{30}$ hydrocarbyl or a mixture of $C_{10}$-$C_{20}$ hydrocarbyl, R′ is hydrogen and R″ is $C_1$ alkyl.

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**4,743,390**
**Patent Not Issued For This Number**

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**4,743,391**
**METHOD FOR OXIDATIVELY DEGRADING AN OLEFINIC POLYMER**

**Chester D. Gordon, El Sobrante, and Gian L. Fagan, Benicia, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.**

**Filed Mar. 28, 1983, Ser. No. 479,380**
**Int. Cl.⁴ C01M** *7/16*
**U.S. Cl. 252—55** **12 Claims**

**1**. A method of oxidatively degrading an olefinic polymer with essentially no introduction of molecular oxygen from a separate source into the reaction medium during the oxidation reaction which comprises oxidizing an olefinic polymer derived from olefinically unsaturated hydrocarbons in a solvent in the presence of an oxidant mixture of a peroxide and hydroperoxide wherein said oxidant mixture is present in sufficient amount to effect molecular weight degradation of said olefinic polymer and the mole ratio of peroxide to hydroperoxide is in the range of from 3.2 to 1 to 0.4 to 1.

**11**. The product obtained according to the method of claim **1**.

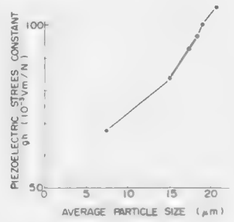
**12**. A lubricating oil composition comprising an oil of lubricating viscosity and a viscosity index improving amount of the product of claim **11**.



**4,743,392**
**PIEZOELECTRIC COMPOSITE MATERIAL**

**Hirofumi Ozeki, and Hideo Sobue, both of Nagoya, Japan, assignors to NGK Spark Plug Co., Ltd., Japan**

**Filed Aug. 7, 1986, Ser. No. 894,312**
**Claims priority, application Japan, Aug. 7, 1986, 60-174617**
**Int. Cl.⁴ C04B** *35/00*
**U.S. Cl. 252—62.9** **5 Claims**




**1**. A piezoelectric composite material comprising:
an elastic organic matrix and piezoelectric ceramic powder having the chemical formula:

$$Pb_{1+x}TiO_{3+x}$$

where x is a number between 0.0068 and 0.07, and wherein said piezoelectric composition is present in an amount of from about 40 to 80% by volume.

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**4,743,393**
**ANTIFREEZE CONCENTRATES AND COOLANTS CONTAINING HETEROPOLYMOLYBDATE COMPOUNDS**

**Stanley T. Hirozawa, Birmingham, Mich., assignor to BASF Corporation, Parsippany, N.J.**

**Filed Jun. 6, 1986, Ser. No. 871,292**
**Int. Cl.⁴ C09K** *5/00*
**U.S. Cl. 252—75** **12 Claims**

**1**. A polyhydroxy alcohol-based antifreeze concentrate for engines containing aluminum parts comprising:

(a) an effective corrosion inhibiting amount of a heteropolymolybdate compound having the following structural formula:

$$[X^{n+}Mo_{12}O_{40}]^{(8-n)-}$$

where $X^{n+}=P^{+5}$ or $Si^{+4}$;

(b) a buffer compound in an amount such that the reserve alkalinity (RA) of the antifreeze concentrate is at least 10;

(c) from 0.1 to 1.0 weight percent of a nitrate, said weight percent based upon the total weight of the concentrate;

(d) water; and

(e) one or more polyhydroxyl alcohols such that the weight ratio of water to polyhydroxyl alcohol is from 0.1:100 to 10:100.

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**4,743,394**
**CONCENTRATED NON-PHOSPHATE DETERGENT PASTE COMPOSITIONS**

**Edward J. Kaufmann, 3704 Andalucia Ct., San Ramon, Calif. 94583; Gregory van Buskirk, 893 Richard La., Danville, Calif. 94526; Robert J. Iliff, 4303 Redwood Dr., Oakley, Calif. 94561, and Chihae Yang, 3920 Vineyard Ave., Pleasanton, Calif. 94566**

**Continuation-in-part of Ser. No. 592,660, Mar. 23, 1984, abandoned. This application Feb. 20, 1986, Ser. No. 831,774**
**Int. Cl.⁴ C11D** *1/72, 3/12, 17/00*
**U.S. Cl. 252—90** **29 Claims**

**1**. A phase stable concentrated non-phosphate paste detergent composition which is rapidly soluble in cold water comprising, by weight:

(a) about 10-50% of at least one nonionic surfactant having a pour point less than about 65° F.;

(b) about 5-70% of at least one water insoluble zeolite builder;

(c) about 0-70% of at least one water soluble non-phosphate builder; and

(d) less than about 10% added water as the only phase stabilizer;

wherein the ratio of (b+c): a is greater than or equal to about 1.0; and

wherein the ratio of b:a is less than about 2.0 said paste having a dissolution/dispersion rate in water at about 70° F. such that the paste dissolves within about 12 minutes or less with gentle or regular agitation.

**17**. A paste detergent as in claim **1** packaged in a water soluble film prepared from at least one film forming polymer of a size to make convenient unit dosage packets.

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**4,743,395**
**THICKENED ACID CLEANER COMPOSITIONS CONTAINING QUATERNARY AMMONIUM GERMICIDES AND HAVING IMPROVED THERMAL STABILITY**

**David H. Leifheit, Cincinnati, Ohio, assignor to The Drackett Company, Cincinnati, Ohio**

**Filed Sep. 12, 1986, Ser. No. 907,569**
**Int. Cl.⁴ C11D** *1/62, 7/08*
**U.S. Cl. 252—106** **38 Claims**

**1**. An aqueous, thickened acid cleaner composition consisting essentially of on a weight basis:

(a) from about 3 to about 25% hydrochloric acid;

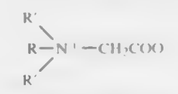
(b) an acid compatible organic thickener agent in an amount effective to provide a viscosity of about 25 centipoise or greater, said organic thickener agent in said effective amount being unsuitable to provide a composition exhibiting thermal stability absent a phase stabilizing amount of a phase stabilizing surfactant;

(c) a germicidally effective amount of a quaternary ammonium compound having the chemical structure $[R_1R_2R_3R_4N]^+X^-$, wherein $R_1$ is an alkyl of from 12 to 18 carbons; $R_2$ is a benzyl or alkyl benzyl, said alkyl having 1 to about 3 carbons; $R_3$ is an alkyl of from 1 to about 3 carbons, and X is a halide anion,

(d) a phase-stabilizing amount of a phase-stabilizing surfactant selected from the group consisting of

(i) alkyl betaines having the formula

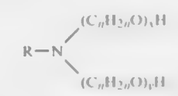
(II)



wherein R is an alkyl of from about 12 to 16 carbons and R′ is methyl or ethyl

(ii) alkoxylated tertiary amines having the formula

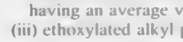
(III)



wherein R is an alkyl or alkenyl of from about 12 to about 14 carbons, n is an integer of 2 to 3, and x and y are integers of from 1 to about 5, the sum of x and y having an average value of from about 2 to about 5;

(iii) ethoxylated alkyl phenol having the formula

(IV)



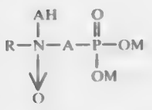
wherein R is an alkyl of 6 to 10 carbon and n has a value

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such that the HLB of the material is about 13 or less, and

(iv) is a phosphate ester of an amine oxide having the formula



(V)

wherein R is an alkyl of from 12 to 18 carbons; A is $(C_nH_{2n}O)_m$, n having a value of from 2 to about 3 and m having a value of from 1 to about 5, and M is hydrogen or an alkali metal or ammonium cation, and

(e) water,

said organic thickener agent being a material other than the phase-stabilizing surfactant (d).

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**4,743,396**

## PUMPABLE MAGNESIUM HYDROXIDE SLURRIES

**Dodd W. Fong, Naperville, and Daniel V. Diep, Aurora, both of Ill., assignors to Nalco Chemical Company, Naperville, Ill.**

**Filed May 15, 1987, Ser. No. 49,891**

**Int. Cl.⁴ F17D** *1/17*

**U.S. Cl. 252—313.1** **2 Claims**

1. An aqueous 50% or higher by weight magnesium hydroxide slurry having a reduced Brookfield viscosity which contains from 0.1–5% by weight based on the weight of said slurry of a sulfomethylated polyacrylamide having from 2–30 mole percent of sulfomethyl groups and having a molecular weight of from 5,000–30,000.

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**4,743,397**

## HOMOGENOUS STABILIZER COMPOSITIONS FOR VINYL HALIDE POLYMERS

**Robert E. Quinn, Cleveland, Ohio, assignor to The Lubrizol Corporation, Wickliffe, Ohio**

**Division of Ser. No. 811,210, Dec. 20, 1985, Pat. No. 4,661,544. This application Nov. 17, 1986, Ser. No. 931,770**

**Int. Cl.⁴ C09K** *15/32*

**U.S. Cl. 252—400.61** **13 Claims**

1. A process for preparing liquid homogeneous stabilizer compositions for vinyl halide polymers which comprises heating a non-homogeneous mixture comprising

(A) at least one epoxidized glyceride wherein the glyceride is represented by the formula



wherein $R_1$, $R_2$ and $R_3$ are each independently hydroxy or fatty acid groups of from about 12 to about 30 carbon atoms with the proviso that at least one of $R_1$, $R_2$ and $R_3$ is a fatty acid group,

(B) at least one hydrocarbon-soluble

(B-1) basic alkali or alkaline earth metal salt of an alkyl phenol having a metal ratio of at least 3,

(C) a hydrocarbon diluent, at an elevated temperature until the mixture is homogeneous.

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**4,743,398**

## THERMOCHROMIC COMPOSITION

**Andrew V. Brown, San Jose, and Wendell W. Moyer, Atherton, both of Calif., assignors to Raychem Corporation, Menlo Park, Calif.**

**Division of Ser. No. 496,689, May 20, 1983. This application Apr. 22, 1986, Ser. No. 855,026**

**Int. Cl.⁴ C09K** *3/00;* **C09D** *5/08*

**U.S. Cl. 252—408.1** **14 Claims**

1. A liquid temperature indicating composition comprising:

(a) a binder;

(b) folic acid; and

(c) an effective amount of an activator for irreversibly changing the color of the composition at a temperature less than 230° C., the color change being substantially complete over a 10° C. temperature range, the activator comprising an acid that has a pK of less than 4.2 and that is solid in the binder at room temperature, both before and after the composition dries.

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**4,743,399**

## ADHESIVE COMPOSITIONS FROM ARYLCYCLOBUTENE MONOMERIC COMPOSITIONS

**Robert A. Kirchhoff, and Jo Ann Gilpin, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

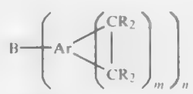
**Division of Ser. No. 771,052, Aug. 30, 1985, which is a continuation-in-part of Ser. No. 644,836, Aug. 27, 1984, abandoned. This application Jan. 20, 1987, Ser. No. 5,189**

**Int. Cl.⁴ H01B** *1/06*

**U.S. Cl. 252—512** **5 Claims**

1. A die attach adhesive composition comprising:

(a) a functionally effective amount of an arylcyclobutene monomeric composition comprising an arylcyclobutene monomer of the formula:



wherein

B is a direct bond; a polyvalent inorganic moiety; a polyvalent organic moiety containing one or more heteroatoms comprising oxygen, sulfur, nitrogen, silicon, or phosphorous; or at least one aromatic moiety;

Ar is a substituted or unsubstituted aromatic moiety;

R is separately in each occurrence hydrogen, an electron-withdrawing substituent, or an electron-donating substituent; and

m and n are integers of 1 or more, provided that when B is a direct bond, n is 2; and

(b) a conductive amount of an electrical conductive metal composition.

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**4,743,400**

## PROCESS FOR PREPARING RETINOYL CHLORIDES

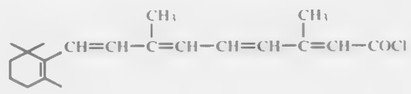
**Cynthia A. Maryanoff, Solebury Township, Bucks County, Pa., assignor to McNeilab, Inc., Ft. Washington, Pa.**

**Filed Sep. 22, 1986, Ser. No. 909,794**

**Int. Cl.⁴ C07C** *175/00*

**U.S. Cl. 260—408** **16 Claims**

1. A process for preparing a retinoyl chloride of formula (I):

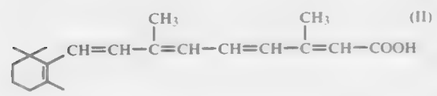


(I)



comprising the steps of:

(a) reacting in an inert organic solvent a mixture of a retinoic acid of formula (II):



(II)

and at least about a stoichiometric amount of dimethylchloroformamidinium chloride previously isolated as a solid, and

(b) optionally isolating the retinoyl chloride from the inert organic solvent.

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**4,743,401**

## CONVERSION OF AN ALLYLIC ETHER TO ITS CORRESPONDING ACETAL

**Biau-Hung Chang, West Chester, and Ronnie M. Hanes, Milford, both of Ohio, assignors to National Distillers and Chemical Corporation, New York, N.Y.**

**Filed Oct. 3, 1986, Ser. No. 914,905**

**Int. Cl.⁴ C11C** *3/02;* **C07C** *41/54*

**U.S. Cl. 260—410.9 R** **25 Claims**

1. A process for converting the ether group of an allylic ether to its corresponding acetal comprising contacting an allylic ether selected from the group consisting of an alkyl n-alkoxy-(n-2)-alkenoate and 1,1,n-trialkoxy-(n-2)-alkene, where n is an integer equal to the number of carbon atoms in the alkenoate or alkene main chain independent of any substitution thereon by one or more alkyl groups, an alkanol and a catalytically effective amount of a cobalt compound whereby an acetal selected from the group consisting of alkyl n,n-dialkoxyalkanoate and 1,1,n,n-tetra-alkoxyalkane, respectively, where n has the meanings given above, is formed.

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**4,743,402**

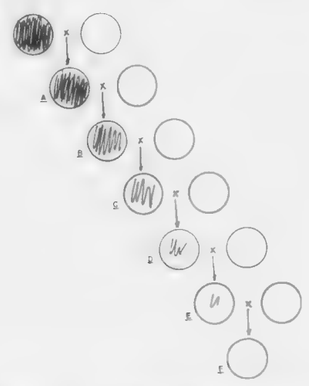
## NOVEL SUNFLOWER PRODUCTS AND METHODS FOR THEIR PRODUCTION

**Gerhardt N. Fick, Breckenridge, Minn., assignor to SIGCO Research Inc., Breckenridge, Minn.**

**Division of Ser. No. 672,359, Nov. 16, 1984, Pat. No. 4,627,192. This application Aug. 26, 1985, Ser. No. 769,502**

**Int. Cl.⁴ C11B** *1/10*

**U.S. Cl. 260—412.2** **13 Claims**



1. A sunflower oil containing, relative to the total fatty acid content of said oil, approximately 80% or greater of oleic acid, said oil having a ratio of linoleic acid content to oleic acid content of less than about 0.09.

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**4,743,403**

## PROCESS FOR PREPARING ORGANO-SULFONIUM HALIDES

**Sreeramulu Nagubandi, New City, N.Y., assignor to Stauffer Chemical Co., Westport, Conn.**

**Filed Mar. 1, 1984, Ser. No. 584,972**

**Int. Cl.⁴ C07C** *149/06*

**U.S. Cl. 260—543 H** **11 Claims**

1. A process for preparing an organo-sulfonium halide comprising:

reacting an alkylhaloformate with an organo-sulfide forming the organo-sulfonium halide.

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**4,743,404**

## PROCESS FOR PREPARING ALKYL-SULPHONYL CHLORIDES AND ARYLALKYL-SULPHONYL CHLORIDES

**Margherita Barbero, Bra; Iacopo Degani, Turin; Rita Fochi, Turin, and Valeria Regondi, Turin, all of Italy, assignors to Consiglio Nazionale Delle Ricerche, Rome, Italy**

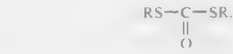
**Filed Jan. 20, 1987, Ser. No. 4,413**

**Claims priority, application Italy, Jan. 24, 1986, 19179 A/86**

**Int. Cl.⁴ C07C** *143/70*

**U.S. Cl. 260—543 R** **4 Claims**

1. Process for preparing sulphonyl chlorides of formula $RSO_2Cl$, wherein R is alkyl or arylalkyl, characterized in that gaseous chlorine is introduced into an aqueous dispersion of a dithiocarbonate of formula



wherein R is as specified above, kept at a temperature of between 0° and +10° C.

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**4,743,405**

## APPARATUS FOR INJECTING A GAS INTO A LIQUID FLOW

**Pedro L. Durao, and Adonai A. Pessoa, both of Rio de Janeiro, Brazil, assignors to Liquid Carbonic Industrias S/A, Rio de Janeiro, Brazil**

**Filed Aug. 15, 1986, Ser. No. 896,632**

**Claims priority, application Brazil, Aug. 16, 1985, PI6850391-9[U]**

**Int. Cl.⁴ B01F** *5/04*

**U.S. Cl. 261—76** **1 Claim**




1. Apparatus for injecting gas into a liquid flow, comprising:

a conduit for containing a flowing liquid, said conduit including in sequence, separate converging, bottleneck, and diverging sections, said converging section having a fluid-receiving inlet and said converging, bottleneck and diverging sections joined end-to-end without concordance radii between the sections, to produce a turbulence effect in liquid flowing through said conduit, said converging section increasing the rate of flow of liquid from a point upstream of the converging section, and said bottleneck section having a reduced diameter compared to that of the converging section;

a generally cylindrical outer wall having upstream and downstream ends joined to said converging and diverging sections, respectively, said outer wall disposed about said

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bottleneck section so as to form therewith an annular chamber elongated in the downstream direction, said outer wall having means for connection to a pressurized source of gas for introducing the gas into the chamber;

said bottleneck section further including a wall defining a portion of said annular chamber, said wall containing a plurality of needle-mounting holes extending therethrough and inclined in the downstream direction; and

a plurality of rigid hollow needles mounted in said wall generally throughout the length of said chamber, said needles inclined in the downstream direction and extending varying amounts into the interior of the bottleneck section so as to inject gas from said chamber at different points within the liquid flow.

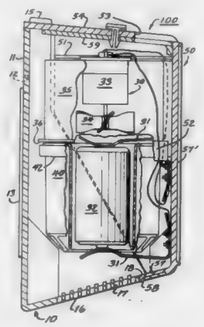
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**4,743,406**

## SELF-CONTAINED AIR FRESHENER AND CARTRIDGE THEREFOR

**Robert L. Steiner, Chicago, and Thomas R. Bajek, LaGrange Park, both of Ill., assignors to Steiner Company, Inc., Chicago, Ill.**

**Filed Jan. 15, 1987, Ser. No. 3,193**
**Int. Cl.⁴ B01F** *3/04*
**U.S. Cl. 261—30** **23 Claims**



1. A disposable air freshening or deodorizing cartridge for use in supporting a battery within a self-contained air freshener apparatus comprising

a cylindrical outer wall and a battery positioning cylindrical inner wall positioned concentric within said outer wall,

first spacer means extending transversely between and connected to a first end of said outer wall and a first end of said inner wall for concentrically spacing said inner and outer walls one from the other forming an opening for an air passageway therebetween,

said battery positioning cylindrical inner wall extending a length greater than said cylindrical outer wall,

a battery support ring carried by a second end of said outer wall and positioned transverse to a second free end of said battery positioning inner wall,

said battery support ring extending a width sufficient to form at least a partial closure of said free end of said battery positioning inner wall, and

connecting means extending between said second end of said outer wall and said support ring forming a tapered end of the cartridge and an opening for said air passageway between said inner and outer walls.

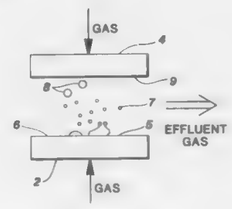
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**4,743,407**

## EXTERNALLY PRESSURIZED POROUS CYLINDER FOR MULTIPLE SURFACE AEROSOL GENERATION AND METHOD OF GENERATION

**Charles T. Apel; Lawrence R. Layman, and David L. Gallimore, all of Los Alamos, N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Nov. 21, 1986, Ser. No. 933,439**
**Int. Cl.⁴ B01F** *3/04*
**U.S. Cl. 261—99** **13 Claims**




1. A device for generating an aerosol, comprising in combination:

a. a gas permeable cylinder having an open end and a sustantially closed end;

b. means for introducing a liquid into at least a portion of said gas permeable cylinder; and

c. a sleeve disposed substantially around said cylinder defining a volume for containing a low pressure gas, whereby the gas is forced through the gas permeable cylinder making contact with the liquid and forming small bubbles which burst to aerosolize the liquid.

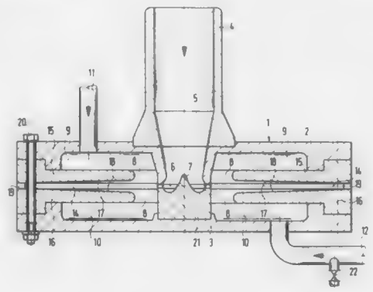
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**4,743,408**

## DEVICE FOR INTRODUCING A GAS INTO LIQUID

**Hans-Otto Schwarze, c/o. Hosch Fördertechnik GmbH, Königswall 16-18, D-4350 Recklinghausen, Fed. Rep. of Germany**

**PCT No. PCT/EP85/00571, § 371 Date Aug. 11, 1986, § 102(e) Date Aug. 11, 1986, PCT Pub. No. WO86/02577, PCT Pub. Date May 9, 1986**
**PCT Filed Oct. 28, 1985, Ser. No. 892,026**
**Claims priority, application Fed. Rep. of Germany, Oct. 27, 1984, 3439464**
**Int. Cl.⁴ B01F** *3/04*
**U.S. Cl. 261—123** **15 Claims**



1. A device for continuously introducing a gas, in particular air, into a liquid, in particular water, for water activation and purification, flotation, deinking units or the like, comprising a fixed nozzle for the liquid, one or more gas discharge openings downstream of the nozzle communicating with gas feed conduits, and a diffuser downstream of the gas discharge openings, characterized in that said liquid nozzle is in the form of a



substantially circular annular gap sized to accelerate liquid flow with a horizontally extending central plane and the gas discharge openings are in the form of annular openings of a respective air chamber, which openings open above and below the annular gap, and that the diffuser comprises two mutually oppositely disposed boundary surfaces at respective sides of the liquid which issues from the annular gap, and the mutual spacing of which, over a flow path from the interior outwardly, having regard to the enlargement due to the increasing peripheral area with increasing diameter, is so selected that the overall enlargement corresponds to that of a diffuser which is circular in cross-section, with an aperture angle of from 2° to 6°.

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**4,743,409**

## PROCESS FOR PREPARING A SUBSTRATE FOR OPTICAL RECORDING MEDIA

**Shigeru Nomura, Itami; Tetsuo Kadoya, Tokyo, and Takeo Kinoshita, Osaka, all of Japan, assignors to Sekisui Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan**

**Continuation-in-part of Ser. No. 867,590, May 27, 1986, abandoned, Continuation of Ser. No. 671,079, Nov. 13, 1984, abandoned. This application Jun. 10, 1986, Ser. No. 872,914**
**Int. Cl.⁴ B29D** *11/00*
**U.S. Cl. 264—1.3** **2 Claims**

1. A process for preparing a substrate for optical recording media free from birefringence which comprises injection-molding a polyvinylacetal resin resulting from acetalization of polyvinylalcohol to a degree of at least 60 mole % with at least one alicyclic aldehyde wherein the polyvinyl acetal resin temperature in injection molding is 270° to 300° C., the polyvinylalcohol has a degree of polymerization of 100 to 2,500 and the polyvinyl alcohol has a degree of saponification of at least 95 mole %.

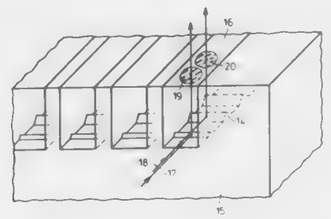
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**4,743,410**

## METHOD FOR MANUFACTURING A FLAT ILLUMINATION UNIT

**Hartmut Grethen; Werner Nickel, and Udo Scheer, all of Berlin, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Mar. 28, 1986, Ser. No. 845,567**
**Claims priority, application Fed. Rep. of Germany, Mar. 29, 1985, 3512093; European Pat. Off., Mar. 13, 1986, 86730042.8**
**Int. Cl.⁴ B29D** *11/00*
**U.S. Cl. 264—1.4** **21 Claims**



15. A method of making a flat illumination unit, comprising the steps of:

making a bottom press die by the steps of

incising a plurality of parallel grooves into a substrate line-by-line to a predetermined depth and a predetermined spacing relative to one another corresponding to the cross sectional dimensions of light guide elements to be produced in the illumination unit, making a first form impression of the grooved side of the substrate, and making a second form impression of the first form impression to be used for pressing a carrier plate;

prior to incising the grooves, incising a plurality of parallel notches in columns into the substrate perpendicular to the line direction of the grooves;

pressing a carrier plate with the bottom press die to produce a plurality of spaced parallel grooves in a substrate to a predetermined depth and a predetermined width equal to the cross sectional dimensions of light guide elements to be formed in the illumination unit; and

filling the grooves with the transparent material.

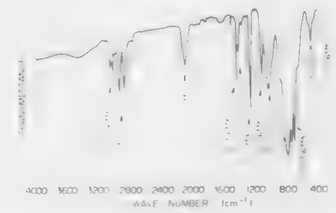
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**4,743,411**

## PROCESS FOR PRODUCING SHAPED SILICON CARBIDE ARTICLE FROM A POLYCARBOSILASTYRENE COPOLYMER

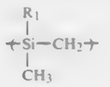
**Keizo Shimada, Iwakuni; Toshihiro Aoyama, Nagareyama, and Hidetsugu Yoshida, Iwakuni, all of Japan, assignors to Teijin Limited, Osaka, Japan**

**Filed Aug. 12, 1986, Ser. No. 895,803**
**Claims priority, application Japan, Aug. 16, 1985, 60-179359; Aug. 27, 1985, 60-186593; Oct. 9, 1985, 60-223839**
**Int. Cl.⁴ C07F** *7/02*
**U.S. Cl. 264—22** **16 Claims**

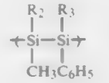



1. A process for producing a molded silicon carbide article, comprising the steps of:

molding a feed comprising a polycarbosilastyrene copolymer comprising recurring carbosilane units of the formula;



wherein $R_1$ represents a member selected from the group consisting of a hydrogen atom and a methyl radical, and recurring silastyrene units of the formula;



wherein $R_2$ and $R_3$, respectively, represent, independently from each other, a member selected from the group consisting of a hydrogen atom and methyl and phenyl radicals, and having a number averge molecular weight of at least 1,000, to a predetermined form;

applying a heat treatment to the molded polycarbosilastyrene copolymer article to provide a cross-linked, non-fusible polycarbosilastyrene copolymer article; and then sintering the cross-linked, non-fusible polycarbosilastyrene copolymer article at an elevated temperature to provide a molded, sintered silicon carbide article.

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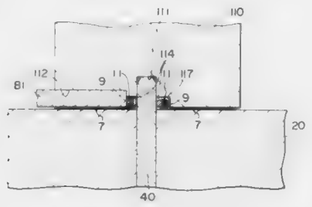


**4,743,412**

## SPACE PORTION PROCESSING METHOD AND APPARATUS FOR A SLIDE FASTENER CHAIN

**Kazuki Kuse, Toyama, Japan, assignor to Yoshida Kogyo K.K., Tokyo, Japan**

**Continuation-in-part of Ser. No. 763,417, Aug. 7, 1985, abandoned. This application Feb. 2, 1987, Ser. No. 11,358**
**Claims priority, application Japan, Aug. 21, 1984, 59-173784**
**Int. Cl.[4] B29C** *65/08;* **B29D** *5/00*
**U.S. Cl. 1264—23** **9 Claims**




1. A space portion processing method for a slide fastener chain as a preprocessing before attaching parts forming a separable end stop such as a retainer pin and a separable pin a the space poriton of slide fastener chain formed by cutting and removing a row of elements for a certain length from a row of coil-like continuous fastener elements of thermoplastic resin attached around a core cord along each of the facing side edges of a pair of fastener tapes, characterized in that after said space portion is detected and positioned and said slide fastener chain is held on a bed, fusion of the element cut edges at the end of said space portion into said tapes and press-forming of said core cords are carried out simultaneously by using the same pressing means;

said step of simultaneously carring out the fusion of the cut element edges and press-forming said core cord comprising press-forming the side faces of first portions of said core cord by means of a pair of right and left side jaws provided such as to be movable toward said core cord from both sides of said space portion, said first portion of the core cord thereby being forced to swell upwardly, and

at the same time, pressing said space portion from the upper side by means of an ultrasonic wave horn having first pressing surfaces for pressing the element cut edges at the end of said space portion, second pressing surfaces for pressing the upper surface of said first portions of core cord and third pressing surfaces for pressing the side faces of second portions excluding said first portions of the core cord, whereby said element cut edges are fused into said tapes, said upwardly swelled first portions are deformed such as to assume predetermined heights and said second portions are deformed such as to assume predetermined widths.

5. A space portion processing apparatus for preprocessing a slide fastener chain before attaching parts forming a separable end stop such as a retainer pin and a separable pin at the space portion of a slide fastener chain formed by cutting and removing a row of elements for a certain length from a row of coil-like continuous fastener elements of thermoplastic resin attached around a core cord along each of the facing side edges of a pair of fastener tapes, comprising:

a chain transfering means for moving said slide fastener chain formed with said space portion along a bed;

a space portion detecting means for detecting said space portion of said slide fastener chain and for stopping said chain transferring means;

a positioning stopper which projects into said space portion from the top surface of said bed for preventing the movement of said slide fastener chain;

a chain pulling means positioned on the downstream side of said positioning stopper in terms of the direction of travel of said slide fastener chain and adapted to grip and pull with predetermined pulling force said slide fastener chain in the downstream direction;

a tape holding means positioned on the upstream side of said space portion in terms of the direction of travel of said slide fastener chain and adapted to push said fastener tape portions of said slide fastener chain onto said bed;

a pair of right and left side jaws provided such as to be movable toward said core cord from both sides of said space portion so as to press-form the side faces of first portions of said core cord at said space portion, said first portions being thereby forced to swell upwardly; and

an ultrasonic wave horn having first pressing surfaces for pressing the element cut edges at the end of said space portion, second pressing surfaces for pressing the upper surface of said first portions of the core cords, and third pressing surfaces for pressing the side faces of second portions excluding said first portions of the core cord, said horn being provided such as to be movable downward toward said space poriton, whereby said element cut edges are fused into said tapes, said upwardly swelled first portions are deformed such as to assume predetermined heights and said second portions are deformed such as to assume predetermined widths.

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**4,743,413**

## METHOD OF MANUFACTURING THERMOSTABLE PIECES MADE FROM COMPOSITE MATERIALS AND THE PIECES THUS OBTAINED

**Jean P. Galichon, 16 avenue Hoche, 75008 Paris, France**

**Filed Jul. 23, 1986, Ser. No. 889,114**
**Int. Cl.[4] B05D** *1/24;* **B29C** *47/02*
**U.S. Cl. 264—24** **11 Claims**

1. A method of manufacturing thermostable composite material pieces from rovings of fibrous materials having a coating of thermoplastic resin, comprising the steps of:

incorporating in the roving a powder of a synthetic resin having reactive groups chosen to be able to react with reactive groups of the thermoplastic resin coating at a temperature not exceeding 170° C., said powder being incorporated within the roving at 5 to 25% of the weight of the roving;

coating the powder charged roving with the thermoplastic resin in an extruder at a temperature not exceeding 180° C.;

rapidly cooling the coated roving so as to obtain a roving of great flexibility; and,

placing the coated roving in a mold and treating the coated roving under pressure at a temperature not exceeding 170° C., so as to obtain a composite material whose heat deformation temperature is at least 150° C.

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**4,743,414**

## COMPOSITE WALL FORMING PROCESS

**David A. Sudrabin, Delray Beach, Fla., assignor to Fibrestone Inc., LaBelle, Fla.**

**Filed May 21, 1986, Ser. No. 865,459**
**Int. Cl.[4] B28B** *1/16*
**U.S. Cl. 264—35** **11 Claims**



9. The method of making a fiber reinforced shell of a composite wall which comprises the steps of (1) forming on a moving belt a continuous panel strip by depositing by spraying under pressure from separate spray nozzles concrete and chopped up fiber reinforcing on said moving belt; (2) depositing on the continuous panel strip a plurality of spaced flex-tie members; (3) rolling by rollers having their axes extending transversely of the continuous panel strip to smooth out the upper surface of the continuous panel strip; (4) subjecting the fiber reinforced shell to accelerated curing; and (5) cutting the continuous panel strip while the belt is moving to provide a plurality of panels of convenient size for use.



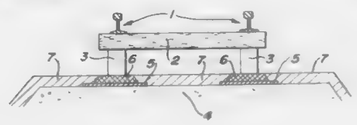
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**4,743,415**

## PROCESS FOR SEALING RAILROAD STRUCTURES

**Pierre A. Crouzet, Cully, Switzerland, assignor to Syncrete S. A., Switzerland**

**Filed Mar. 19, 1987, Ser. No. 27,904**
**Claims priority, application Fed. Rep. of Germany, Mar. 22, 1986, 3609825**
**Int. Cl.[4] E01B** *1/00*
**U.S. Cl. 264—35** **7 Claims**




1. Process for sealing of railroad structures comprising the following stages:

(a) the track is cleared of ballast material and the ties are placed on blocks.

(b) the railroad structure surface is prepared and cleaned,

(c) each block is removed and prefabricated concrete elements are placed in the spots where the blocks were placed and then the blocks are again inserted between the laid prefabricated elements and the ties,

(d) then the spaces between the prefabricated elements are filled by on site pouring with concrete and

(e) after drying the blocks are removed and the track is reballasted and levelled.

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**4,743,416**

## MELT SPINNING PROCESS OF AROMATIC POLYESTER

**Hiroaki Sugimoto, Takatsuki; Toshiyuki Kobashi, and Seiji Takao, both of Okayama, all of Japan, assignors to Sumitomo Chemical Company, Limited and Japan Exlan Company, Ltd., both of Osaka, Japan**

**Filed Dec. 5, 1985, Ser. No. 804,823**
**Claims priority, application Japan, Dec. 10, 1984, 59-261573; Dec. 11, 1984, 59-261236; Dec. 11, 1984, 59-261237**
**Int. Cl.[4] D01D** *5/08*
**U.S. Cl. 264—40.3** **5 Claims**

1. A process for stably melt spinning aromatic polyester showing optical anisotropy in the molten state over a long period of time, comprising the steps of:

(a) controlling the pressure of the polyester in a screw-type extruder having a tip outlet to obtain a tip outlet pressure of at least 15 $Kg/cm^2$ G;

(b) melt spinning the polyester through a nozzle outlet having a hole size of 0.15 mm or less and a ratio (l/d) of the whole length (l) to the whole diameter (d) of said nozzle being 0.8 or more, said nozzle being connected to said tip outlet;

(c) controlling the extrusion pressure at the nozzle portion to obtain at least 3 $Kg/cm^2$ G and an atmospheric temperature $T_N$ at the nozzle outlet to a degree satisfying the following formula:

$$T_F\text{-}(100) \leqq T_N \leqq T_F$$

wherein $T_F$ is the flowing temperature of the aromatic polyester.

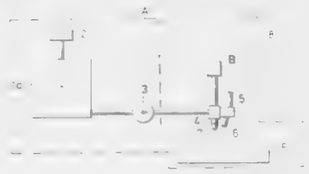
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**4,743,417**

## METHOD FOR THE MANUFACTURE OF PRODUCT COMPRISING FOAMED PLASTIC MATERIAL AND USING A LOW-PRESSURE CHAMBER

**Terje Bakkelunn, Norrköping, Sweden, assignor to Rovac Technology, Inc., Kinna, Sweden**

**PCT No. PCT/SE84/00287, § 371 Date May 13, 1985, § 102(e) Date May 13, 1985, PCT Pub. No. WO85/01238, PCT Pub. Date Mar. 28, 1985**
**PCT Filed Aug. 31, 1984, Ser. No. 734,947**
**Claims priority, application Sweden, Sep. 12, 1983, 8304872**
**Int. Cl.[4] B29C** *67/22, 39/12;* **C08J** *9/04*
**U.S. Cl. 264—45.1** **18 Claims**




1. A method for manufacturing a plastic article comprising at least two foamed layers which have different densities comprising:

(a) mixing together in a first zone an unsaturated polyester and a foaming agent, said foaming agent being present in a first concentration and said first zone being maintained at a first pressure;

(b) providing a curing agent for said unsaturated polyester in the mixture of unsaturated polyester and foaming agent to provide a first sprayable mixture;

(c) spraying said first sprayable mixture into a second zone and onto the outer surface of an open mold which is within said second zone, and said second zone being maintained at a second pressure which is less than said first pressure in said first zone to form, on said mold, a first plastic layer having a first density;

(d) forming and spraying into said second zone and onto said first plastic layer formed in step (c), a second sprayable mixture of unsaturated polyester and foaming agent which had been mixed together in said first zone together with a curing agent for said unsaturated polyester, said second sprayable mixture containing said foaming agent in a second concentration sufficiently different from the concentration of foaming agent in said first sprayable mixture to produce a second layer of plastic bonded to said first layer, said second layer having a density which is different from the density of said first layer.

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**4,743,418**

## PROCESS FOR CHARGE MODIFYING A MICROPOROUS MEMBRANE

**Robert G. Barnes, Jr., Meriden; Chaokang Chu, East Hartford; George T. Emond, Southington, all of Conn., and Asit K. Roy, Seguin, Tex., assignors to Cuno Incorporated, Meriden, Conn.**

**Continuation of Ser. No. 268,543, May 29, 1981, Pat. No. 4,473,475. This application Aug. 17, 1984, Ser. No. 642,211**
**The portion of the term of this patent subsequent to Sep. 25, 2001, has been disclaimed.**
**Int. Cl.[4] B01D** *13/00*
**U.S. Cl. 264—48** **22 Claims**

1. A process for cationically charge modifying a skinless hydrophilic organic polymeric microporous filter membrane having an internal microstructure throughout said membrane comprising bonding a charge modifying amount of a cationic

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charge modifying agent to substantially all of the membrane microstructure through an aliphatic polyepoxide cross-linking agent having a molecular weight of less than about 500, wherein the charge modifying agent is selected from the group consisting of:

(i) aliphatic amines which are polyamines having at least one primary amine or at least two secondary amines; and

(ii) aliphatic amines having at least one secondary amine and a carboxyl or hydroxyl substituent,

whereby a skinless hydrophillic organic polymeric microporous filter member is produced having a charge modifying amount of a cationic charge modifying agent bonded to substantially all of the membrane microstructure.

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**4,743,419**

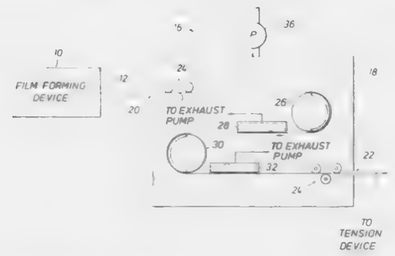
## ON-LINE FILM FLUORINATION METHOD

**Thomas R. Bierschenk, Round Rock, Tex., assignor to The Dow Chemical Company, Midland, Mich.**

**Continuation-in-part of Ser. No. 707,764, Mar. 4, 1985, abandoned. This application Nov. 7, 1986, Ser. No. 928,234**

**Int. Cl.**[4] **B29C** *71/00;* **C08F** *8/20, 8/22;* **C08J** *7/00*

**U.S. Cl. 264—83** **10 Claims**




1. A method of fluorination of a continuous extruded polyethylene film having at least a specified width comprising the steps of:

(a) continuously feeding the polyethylene film after formation along a fixed path wherein the film is deployed to a specified width and travels along such a path;

(b) passing the film around a pervious means comprising a curving film contact surface and the film wraps at least partially therearound; and the surface spans the width of the film;

(c) injecting under positive pressure a flow of gas including gaseous fluorine mixed with an inert gas through said pervious means to impinge on the surface of the film to fluorinate the film to thereby change the surface characteristics of the film;

(d) moving the film past said pervious means in the presence of a continuous flow of fluorine to thereby treat a specified length of film;

(e) wherein the step of exposing said film to fluorine occurs in an isolated atmosphere subject to evacuation of surplus fluorine or fluorine compounds from the isolated atmosphere; and

(f) the film is exposed to fluorine for a time at least about 0.1 second up to about 2.0 seconds.

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**4,743,420**

## METHOD AND APPARATUS FOR INJECTION MOLDING A THIN-WALLED PLASTIC CAN

**Herbert V. Dutt, Sarasota, Fla., assignor to Sun Coast Plastics, Inc., Sarasota, Fla.**

**Filed Sep. 16, 1986, Ser. No. 907,936**

**Int. Cl.**[4] **B29C** *45/00, 45/36*

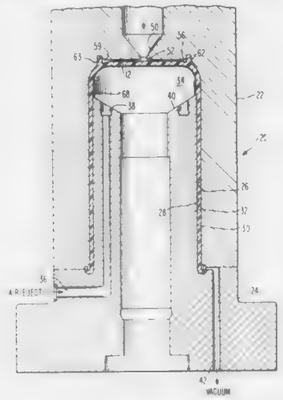
**U.S. Cl. 264—102** **18 Claims**

1. The method of producing injection molded articles having a relatively long flow path, comprising:

forming a mold cavity having a bottom wall portion, a very thin side wall portion, and a transition wall portion between the bottom and side wall portions;

forming in the region of the bottom wall portion of the mold cavity a plurality of radial flow channels extending from a central injection hub radially outwardly to said transition wall region;

forming in the region of the side wall portion of the mold cavity and between the outer ends of each pair of adjacent radial channels a longitudinal flow channel extending from said transition wall region to the end of said cavity opposite to the location of said injection hub;




causing fluid thermoplastic material to flow from said injection hub at a high pressure, said material initially flowing radially outwardly along said radial flow channels, through said transition wall region and along said longitudinal flow channels, said initial flow providing a balanced pressure around the circumference of said mold cavity to stabilize the mold; and

causing said thermoplastic material thereafter to flow laterally from said radial flow channels into said bottom wall and transition wall portions of said cavity and to flow laterally from said longitudinal flow channels into said thin side wall portion of said cavity, whereby a thin-walled container is formed in said cavity.

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**4,743,421**

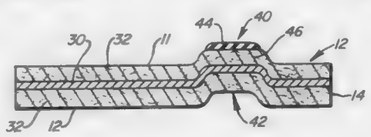
## METHOD OF MAKING GASKET HAVING ROLLER COATED SECONDARY SEALS

**Donald J. McDowell, Riverside, and Jerry Zabel, Buffalo Grove, both of Ill., assignors to Fel-Pro Incorporated, Skokie, Ill.**

**Filed Apr. 20, 1987, Ser. No. 40,033**

**Int. Cl.**[4] **B29C** *59/02*

**U.S. Cl. 264—129** **6 Claims**



1. A method of making a gasket comprising the steps of

providing a main gasket body defining at least one opening therein, and having first and second major sealing surfaces,

forming at least one peak which projects from one major sealing surface, and

roller coating only said peak with a sealant material and then curing same thereby to provide a sealing bead on said peak.

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**4,743,422**

## METHOD FOR MANUFACTURING A SEALING BODY FOR A PIPE JOINT

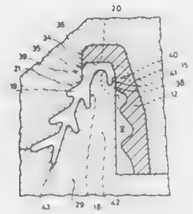
**Erling Kalriis-Nielsen, Violvej 5, 8450 Hammel, Denmark; Johannes J. Laarhoven, Scholtensdijk 16, 7771 CV Hardenberg, and Johannes H. Beune, Zoom 79, 5061 RB Oisterwijk, both of Netherlands**

**Filed Jan. 14, 1986, Ser. No. 818,830**

**Claims priority, application Netherlands, Jan. 14, 1985, 8500073; Jan. 14, 1985, 8500074; May 24, 1985, 8501500**

**Int. Cl.**[4] **B29C** *45/44;* **B28B** *7/10*

**U.S. Cl. 264—255** **6 Claims**



1. Method for manufacturing a sealing body, particularly for a pipe joint, comprising a retaining ring of thermoplastic material, which is to be fastened on the end portion of a pipe part, and a sealing ring disposed coaxially to said retaining ring and bonded thereto, which method comprises the following steps moulding the retaining ring by injection moulding in a first mould cavity bounded by a first portion of a first mould part surface defining the outer surface of the retaining ring and a second mould part surface defining the inner surface of the retaining ring, opening the first mould cavity by moving part the first and second mould part surfaces in axial direction, while the moulded retaining ring remains on the second mould part surface, removing the retaining ring from the second mould part surface by means of a stripper means and placing it back against the first portion of the first mould part surface which is still situated axially opposite the second mould part surface, replacing the second mould part surface by a third mould part surface and forming a second mould cavity situated next to the retaining ring and bounded by a portion of the surface of the retaining ring, a second portion of the first mould part surface and the third mould part surface, moulding the sealing ring in the second mould cavity, the sealing ring thus being bonded to the retaining ring, opening the second mould cavity, and removing the sealing body from the mould.

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**4,743,423**

## NEUTRON SHIELD PANEL ARRANGEMENT FOR A NUCLEAR REACTOR PRESSURE VESSEL

**Robert L. Turner, Reston, Va.; Kimchinh Tran, Pittsburgh, Pa.; Stephan L. Abbott, Monroeville, Pa.; Leonard R. Golick, Trafford, Pa.; David E. Boyle, Kiski Township, Armstrong County, Pa., and Theodore A. Meyer, Penn Township, Westmoreland County, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Sep. 28, 1984, Ser. No. 655,953**

**Int. Cl.**[4] **G21C** *11/00*

**U.S. Cl. 376—287** **27 Claims**

1. A shield panel for use in a nuclear reactor comprising a reactor vessel susceptible to embrittlement when bombarded with high energy neutrons and a nuclear core mounted within said reactor vessel, said reactor vessel having a longitudinal axis and an inner surface surrounding said longitudinal axis, said nuclear core emitting high energy neutrons which impinge on the inner surface of said reactor vessel, said shield panel comprising:

a canister containing a completely enclosed interior space, said canister being mountable between the inner surface of said reactor vessel and said nuclear core in a region wherein said reactor vessel is susceptible to a higher rate of embrittlement than the remaining portion of said vessel when bombarded with high energy neutrons emitted from said nuclear core;

and

a substance consisting essentially solely of a heavy metal and hydrogen filling the interior space of said canister.

4. A nuclear reactor comprising:

a reactor vessel susceptible to embrittlement when bombarded with high energy neutrons;

a nuclear core mounted within said reactor vessel, said reactor vessel having a longitudinal axis and an inner surface surrounding said longitudinal axis, said nuclear core emitting high energy neutrons which impinge on the inner surface of said reactor vessel;

and

a shield panel mounted between the inner surface of said reactor vessel and said nuclear core in a region wherein said reactor vessel is susceptible to a higher rate of embrittlement than the remaining portion of said vessel when bombarded with high energy neutrons emitted from said nuclear core, said shield panel comprising a canister containing a completely enclosed interior space an a substance consisting essentially solely of a heavy metal and hydrogen filling the interior space of said canister.



16. In a nuclear reactor including a reactor vessel susceptible to embrittlement when bombarded with high energy neutrons and a nuclear core mounted within the reactor vessel, the nuclear core emitting high energy neutrons which impinge on the reactor vessel, a method for shielding a selected region of the vessel against bombardment from high energy neutrons emanating from the nuclear core comprising:

identifying a region of the reactor vessel which is susceptible to a higher rate of embrittlement than remaining portions of the vessel when bombarded with high energy neutrons emitted from the nuclear core;

providing a shield panel corresponding in size to the identified region and formed of a canister containing a completely enclosed interior space and a substance consisting essentially solely of a heavy metal and hydrogen filling the interior space of such canister; and

mounting the shield panel between the reactor vessel and the nuclear core in the identified region of the reactor vessel.

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**4,743,424**

## NUCLEAR REACTOR INSTALLATION

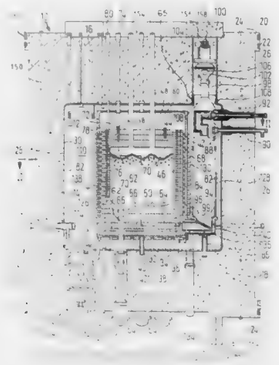
**Claus Elter, Bad Durkheim; Josef Schoening, Hambruecken; Winfried Wachholz, Winheim/Gorxheimer Tal, and Ulrich Weicht, Weinheim, all of Fed. Rep. of Germany, assignors to Hochtemperatur-Reaktorbau GmbH, Fed. Rep. of Germany**

**Continuation of Ser. No. 677,981, Dec. 4, 1984, abandoned. This application Oct. 1, 1986, Ser. No. 914,535**

**Claims priority, application Fed. Rep. of Germany, Dec. 9, 1983, 3344527**

**Int. Cl.[4] G21C** *7/12, 15/18, 13/02*

**U.S. Cl. 376—381** **21 Claims**



**1**. A nuclear reactor installation comprising:

a prestressed concrete pressure vessel having a cavity, a base and a roof;

a liner for lining said cavity;

a circular base plate comprising segments which are centered about a central reference point;

radially displaceable double supports disposed on the base of said pressure vessel which function to support said segments of said circular base plate;

a gas-cooled, high-temperature pebble bed nuclear reactor comprising an internal space for containing spherical fuel elements, a base reflector on the bottom of the reactor, a side reflector on the sides of the reactor, and a top reflector;

a plurality of core rods arranged for insertion into and retraction from said fuel elements-containing internal space;

first rod drive means for inserting and retracting said core rods in a concerted manner to the same height in said fuel element-containing internal space, said height being less than the height of the fuel elements;

a plurality of reflector rods arranged for insertion into and retraction from said side reflector;

second rod drive means for inserting and retracting said reflector rods;

a plurality of uniformly distributed fuel element outlet tubes for removing the spherical fuel elements so that the fuel elements only make one pass through the nuclear reactor disposed in said reflector;

a plurality of fuel elements inlet tubes for introducing the fuel elements into said internal space;

a thermal side shield which surrounds said side reflector and which defines a gap between itself and the side reflector;

an annular, cylindrical interstitial space defined between said liner and said thermal side shield;

a plurality of first passages distributed uniformally leading through the roof of said pressure vessel into said interstitial space including passage orifices leading into said interstitial space;

first blowers arranged in said first passages having outlet orifices opening into said first passages;

first upright heat exchanging means for utilizing the heat generated by the reactor which comprises a heat transfer medium, suspending means for securing said heat exchanging means and connecting lines which lead radially outward through the pressure vessel, wherein said connecting lines are disposed at a height corresponding to said suspending means; said heat exchanging means being aligned with said first passage;

second passages extending lengthwise from said interstitial space through the base of the pressure vessel and offset with respect to the first passages, said second passages exhibiting second passage orifices leading to said interstitial space;

second upright heat exchanging means which comprise a heat transfer medium, which is aligned with said second passage and which function to remove residual heat from the reactor;

second blowers disposed in said second passages having outlet orifices within said second passages and associatd with said second heat exchanging means; and

elastic radial supports which serve to support said side reflector and which prevent rotational movements between the side reflector and the thermal side shield.

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**4,743,425**

## METHOD OF PRODUCING FERROUS SINTERED ALLOYS WITH SUPERIOR ABRASION RESISTANCE

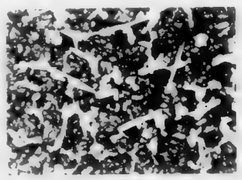
**Shigemi Ohsaki; Sumio Kamino, both of Hiroshima, and Minoru Nitta, Chiba, all of Japan, assignors to Mazda Motor Corporation and Kawasaki Steel Corp., both of, Japan**

**Filed Sep. 3, 1987, Ser. No. 92,530**

**Claims priority, application Japan, Sep. 8, 1986, 61-211177**

**Int. Cl.[4] B22F** *1/00*

**U.S. Cl. 419—16** **12 Claims**



**1**. A method of producing ferrous sintered alloys comprising the steps of;

preparing mixed alloy powder containing Fe-P-C eutectic alloy powder which is obtained by quenching a melted metal mixture to solidify the same and includes phosphorus within the range of 2.0% to 3.0% by weight, carbon not more than 4.0% by weight, and one of molybdenum within the range of 8.0% to 11.0% by weight and boron within the range of 0.5% to 3.0% by weight, graphite so selected that the sum total of the graphite and the carbon included in the Fe-P-C eutectic alloy powder constitutes a part within the range of 5% to 8% by weight of the sum total of the graphite and the Fe-P-C eutectic alloy powder, and ferroalloy powder containing chromium within the range of 11% to 14% by weight and so selected as to constitute a part within the range of 30% to 70% by weight of the whole mixed alloy powder,

causing said mixed alloy powder to be subjected to compression molding to have a green compact in a predetermined shape, and

sintering said green compact to have a ferrous sintered alloy containing compound carbides in a matrix structure thereof.



**4,743,426**

## HOT WORK TOOL STEEL

**David E. Wert, Reading, and Raymond M. Hemphill, Wyomissing, both of Pa., assignors to Carpenter Technology Corporation, Reading, Pa.**

**Filed Jun. 18, 1986, Ser. No. 875,648**

**Int. Cl.[4] C22C** *38/22, 38/24*

**U.S. Cl. 420—111** **10 Claims**

**1**. A deep air hardenable alloy steel having a high hardness capability, improved room temperature toughness when air cooled in large section sizes, good temper resistance up to 1100° F., and exceptional wear resistance, said alloy steel, in weight percent, consisting essentially of

| | w/o |
|---|---|
| Carbon | 0.35–0.60 |
| Manganese | 1.0 Max. |
| Silicon | 2.0 Max. |
| Chromium | 5.7–7.0 |
| Molybdenum | 1.65–2.2 |
| Vanadium | 0.6–1.1 |

and the balance essentially Iron.

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**4,743,427**

## HIGH POTENT AND HIGH ELECTROCONDUCTIVE COPPER ALLOY SUITABLE FOR FIN MATERIAL OF HEAT-EXCHANGER

**Hiroshi Horikawa, Nikko; Norimasa Satou, Utsunomiya; Akihiro Ooguri, Imaichi, and Kenichi Omata, Nikko, all of Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan**

**Filed Sep. 25, 1986, Ser. No. 911,361**

**Claims priority, application Japan, Sep. 26, 1985, 60-213287**

**Int. Cl.[4] C22C** *9/04*

**U.S. Cl. 420—477** **5 Claims**

**1**. A highly electroconductive copper alloy having improved tensile strength and corrosion resistance consisting essentially of 0.003 to 1.0 wt.% of Zn, and 0.005 to 0.1 wt.% of Mg with the remainder being Cu, and wherein said alloy contains an amount of oxygen of not more than about 100 ppm.

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**4,743,428**

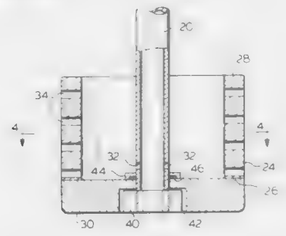
## METHOD FOR AGITATING METALS AND PRODUCING ALLOYS

**Dale L. McRae, Fruitvale; Robert D. H. Willans, Irail, and Eric L. Mawer, Fruitvale, all of Canada, assignors to Cominco Ltd., Vancouver, Canada**

**Filed Aug. 6, 1986, Ser. No. 893,843**

**Int. Cl.[4] C22C** *1/00*

**U.S. Cl. 420—590** **11 Claims**




**1**. A method for the agitation of a melt of a base metal or alloy whereby dross formation is reduced which comprises the steps of establishing a melt of base metal or alloy in a vessel; submerging a rotatable device in said melt; said rotatable device comprising a hollow cylinder having a side wall with an upper end and a lower end, said cylinder being open at the upper end and closed at the lower end, said side wall having an array of equispaced openings adapted to allow said melt to pass through said openings, and said cylinder having a diameter relative to the diameter of the vessel in the range of about 1.5:1 to about 3.5:1; rotating said cylinder at a predetermined speed in the range of about 100 to about 600 revolutions per minute sufficient to draw at least a partial vortex in said melt into said rotatable device, causing said melt to flow into the top of said device and out through said side wall openings; and withdrawing melt from said vessel.

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**4,743,429**

## OXYGEN GENERATOR WITH A PRESSURE TANK AND A CARTRIDGE HOLDER FOR COMBUSTIBLE OXYGEN CARTRIDGES

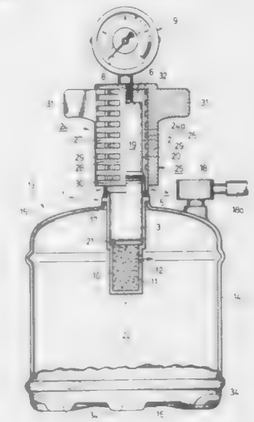
**Helmut Rothenberger, Falkenstein, Fed. Rep. of Germany, assignor to Rothenberger GmbH & Co. Werkzeuge-Maschinen KG, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Oct. 30, 1986, Ser. No. 925,824**

**Claims priority, application Fed. Rep. of Germany, Oct. 31, 1985, 3538764**

**Int. Cl.[4] B01J** *7/00*

**U.S. Cl. 422—120** **11 Claims**



**1**. An oxygen generator for combustible cartridges yielding oxygen in the burning state, comprising:

a pressure tank having an interior, and

a cartridge holder which is connected with the pressure tank and which is divided by a gas-tight separable joint into two halves each having an interior, and the cartridge holder comprising a lower partial housing which is connected by means providing good thermal conductivity in the region of the separable joint to the pressure tank and having means defining an unplugged opening providing communication of the interior of the lower partial housing with the interior of the pressure tank, the unplugged opening being small in proportion to the inside cross section of the lower partial housing of the cartridge holder, and an upper partial housing which is superimposed directly above the pressure tank onto the lower partial housing and which includes means for cooling the upper partial housing.

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**4,743,430**
**I C ENGINE POWERED PORTABLE FOAM GENERATOR**

**Bruce A. Spielholz, Smyrna, Ga., assignor to Bio-Tek Industries, Inc., Atlanta, Ga.**

**Filed Aug. 23, 1985, Ser. No. 768,877**
**Int. Cl.[4] B29D** *27/00*
**U.S. Cl. 422—133** **9 Claims**



**1**. A portable foam generator including a mounting base, a rotary input air compressor and a rotary input liquid pump supported from said base, motor means mounted to said base and including rotary power output means drivingly connected to said compressor and said liquid pump, said air compressor including a compressed air outlet and said liquid pump including a liquid inlet and a pressurized liquid outlet, a liquid suction line having a first end connected to said liquid inlet and a second end for communication with a source of liquid foamable by the admixing of air under pressure therewith, a compressed air line having a first end connected to said air outlet and a second end including a discharge nozzle, a liquid discharge line having a first end connected to said liquid outlet and a second end opening into said compressed air line, and a by-pass and liquid dry-out line having a first end connected to said liquid suction line and and a second end connected to said liquid discharge line and including a variable flow control valve serially connected therein.

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**4,743,431**
**FLUIDIZATION AID INCLUDING LOW BULK DENSITY FLUIDIZATION AID**

**Edward F. Brooks, Hermosa Beach, Calif., assignor to TRW Inc., Redondo Beach, Calif.**

**Division of Ser. No. 845,666, Mar. 28, 1986, which is a continuation-in-part of Ser. No. 696,670, Jan. 30, 1985, Pat. No. 4,583,299, and a continuation-in-part of Ser. No. 684,484, Dec. 20, 1984, Pat. No. 4,591,334, and a continuation-in-part of Ser. No. 738,203, May 24, 1985, and a continuation-in-part of Ser. No. 620,996, Jun. 15, 1984, Pat. No. 4,650,657, which is a continuation-in-part of Ser. No. 339,778, Jan. 15, 1982, abandoned, which is a continuation of Ser. No. 188,201, Sep. 18, 1980, abandoned, said Ser. No. 696,670, is a continuation-in-part of Ser. No. 684,484, , and a continuation-in-part of Ser. No. 620,996, said Ser. No. 684,484, is a continuation-in-part of Ser. No. 620,996. This application Nov. 4, 1986, Ser. No. 926,757**
**The portion of the term of this patent subsequent to Apr. 22, 2003, has been disclaimed.**
**Int. Cl.[4] B01J** *8/18;* **F26B** *3/08;* **F27B** *15/00*
**U.S. Cl. 422—139** **17 Claims**

**1**. A method for fluidizing a cohesive material in a mixed fluidized bed, the cohesive material having a mean particle size of from about 0.1 to about 120 microns and a particle density of from 0.1 to 4 g/cm$^3$, the method comprising the steps of:

(a) combining the cohesive material with tendrillar carbonaceous material in a mass ratio of tendrillar carbonaceous material to cohesive material of from about 1:9 to about 4:1, the tendrillar carbonaceous material having a bulk density of from about 0.01 to about 0.7 g/cm$^3$ and comprising an agglomeration of tendrils having a diameter of from about 0.01 to about 1 micron and a length to diameter ratio of from about 5:1 to about 1000:1; and

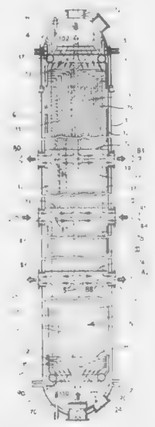
(b) passing a fluidizing gas through the combined particulate solid and tendrillar carbonaceous material at a sufficient velocity to fluidize the particulate solid and the tendrillar carbonaceous material.

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**4,743,432**
**VERTICAL REACTOR FOR THE GENERATION OF METHANOL**

**Frohmut Vollhardt, Oberhausen, Fed. Rep. of Germany, assignor to M.A.N. Maschinenfabrik Augsburg-Nürnberg, Fed. Rep. of Germany**

**Filed Oct. 16, 1985, Ser. No. 787,654**
**Claims priority, application Fed. Rep. of Germany, Nov. 16, 1984, 3441917**
**Int. Cl.[4] B01J** *8/02*
**U.S. Cl. 422—196** **8 Claims**



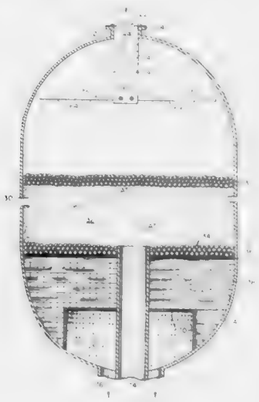
**1**. An upright methanol generator reactor, comprising an exterior cylindrical jacket, a cylindrical heat exchanger having an outer wall of tubes arranged within said pressure jacket, a plurality of separate superjacket catalyst beds in said heat exchanger within said outer wall of tubes, a plurality of gas-permeable bottoms, including a lowermost bottom, respective ones of said bottoms being located below and supporting respective catalyst beds, a substantially horizontal gas-impermeable partition arranged spaced from and below each of the bottoms except the lowermost bottom, dividing the interior into separate gas flow compartments surrounding each bed and not in fluid communication with each other and fluid inflow and outflow openings extending through the jacket and communicating with the respective adjacent compartments at locations adjacent each partition.



**4,743,433**
**CATALYTIC REACTOR SYSTEM**

**Fritz A. Smith, Rye, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.**

**Filed Oct. 15, 1982, Ser. No. 434,664**
**Int. Cl.[4] B01J** *3/02*
**U.S. Cl. 422—220** **10 Claims**



**1**. A fixed bed catalytic reactor having a porous bed of catalyst particles contained in a closed reactor shell, comprising

inlet means for introducing a downwardly flowing mixed stream of gas and liquid reactants;

phase separator means for receiving said mixed stream from said inlet means and directing liquid onto the porous catalyst bed, said separator means being disposed within the reactor shell between said inlet means and said porous catalytic bed;

said separator means comprising an upper foraminous wall having a series of gas outlets permitting a substantially-gaseous phase to escape outwardly from the separator means into an upper reactor portion, and lower liquid distribution means for receiving a stream of substantially liquid phase and dividing said liquid phase into a plurality of spaced-apart liquid streams directed toward the porous catalyst bed; and

means for recovering gaseous and liquid reaction products from the reactor shell.

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**4,743,434**
**APPARATUS FOR TREATMENT OF SUSPENDED PARTICLES WITH A LIQUID IN COUNTERCURRENT**

**Henricus A. C. Thijssen, Son, and Gerardus J. Arkenbout, Zeist, both of Netherlands, assignors to Nederlandsche Centrale Organisatie Voor Toegepast Natuurwetenschappelijk Onderzoek, The Hague, Netherlands**

**Division of Ser. No. 506,330, Jun. 21, 1983, Pat. No. 4,597,768.**
**This application Apr. 2, 1986, Ser. No. 847,259**
**Claims priority, application Netherlands, Jun. 22, 1982, 8202518**
**Int. Cl.[4] B01D** *9/02*
**U.S. Cl. 422—251** **10 Claims**

**1**. An apparatus for treatment of suspended particles with a liquid in countercurrent, comprising:

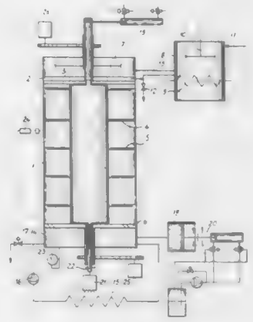
a container means having a closed space and an axis therethrough;

axially spaced defining means within said closed space for defining a contact zone with a substantially open, uniform cross-section, a mixing zone at one end of said contact zone, and a reslurry zone at the other end of said contact zone, wherein the defining means includes: flow control means between said mixing zone and said contact zone, including valves moveable between open and close, for permitting the transport of suspension between said mixing zone and said contact zone when said valves are open and for blocking the transport of at least some particles in the suspension, but permitting the transport of liquid between said mixing zone and said contact zone, when said valves are closed, and means between said contact zone and said reslurry zone for removing particles from said contact zone to said reslurry zone;

inlet means communicating with said mixing zone for supplying suspension to said container means;

outlet means for removing liquid from said container means through said flow control means;

means for removing particles from, and for supplying a washing liquid to, said reslurry zone;



means for establishing an alternating flow axially through said contact zone;

means for opening said valves when the flow through said contact zone is directed toward said reslurry zone, and for closing said valves when the flow is directed toward the mixing zone;

a plurality of stirring means mounted in said contact zone and separated from each other in the axial direction, which stirring means stir in planes perpendicular to said axis; and

means for controlling the volume fraction of solid matter in the contact zone for maintaining the volume fraction between 0.20 and 0.55.

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**4,743,435**
**METHOD FOR CLEANING EXHAUST GASES**

**Koichi Kitahara, and Takashi Shimada, both of Kanagawa, Japan, assignors to Japan Pionics., Ltd., Tokyo, Japan**

**Filed Mar. 13, 1985, Ser. No. 711,135**
**Int. Cl.[4] B01D** *53/34*
**U.S. Cl. 423—210** **6 Claims**

**1**. A method for cleaning an exhaust gas containing at least one toxic hydride component selected from the group consisting of arsine, phosphine, diborane and hydrogen selenide in hydrogen or nitrogen, which comprises contacting the toxic hydride component with a molded cleaning agent having a composition consisting essentially of (1) cupric oxide and (2) at least one metal oxide selected from the group consisting of silicon oxide, aluminum oxide and zinc oxide and having a density of from about 1.5 to about 3.5 g/ml at atmospheric temperature, said composition having a metal atomic ratio M/(M+Cu) in the range of from about 0.03 to about 0.55, wherein Cu represents a number of gram atom of copper and M represents a total number of gram atom silicon, aluminum and/or zinc, to remove said toxic hydride component from the exhaust gas wherein the toxic hydride is oxidized by the reaction between the hydride and the at least one metal oxide and fixed by the cleaning agent.

**4,743,436**

## METHODS FOR PREVENTING AMMONIUM BISULFATE FORMATION DURING THE NONCATALYTIC REDUCTION OF NITRIC OXIDE

**Richard K. Lyon, Pittstown, N.J., assignor to Energy and Environmental Research Corporation, Irvine, Calif.**

**Filed Apr. 8, 1987, Ser. No. 35,753**

**Int. Cl.[4] C01B** *21/00, 17/00*

**U.S. Cl. 423—235** **24 Claims**

**1**. A process for minimizing the formation of $NH_4HSO_4$ in a combustion effluent having NO, at least 1 ppm $SO_3$, and at least 1 ppm ammonia, the process comprising the step of contacting the combustion effluents with methanol, in an amount such that the mole ratio of the methanol to the sum of NO and $SO_3$ is in the range of from about 0.8 to about 2.0, at a temperature in the range from about 500° C. to about 950° C., said methanol reducing the $SO_3$ in the combustion effluent to $SO_2$, thereby minimizing the formation of $NH_4HSO_4$.

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**4,743,437**

## ZEOLITE NU-13 AND PROCESS FOR ITS PREPARATION USING PIPERAZINE COMPOUNDS

**Thomas V. Whittam, Darlington, England, assignor to Imperial Chemical Industries PLC, London, England**

**Continuation of Ser. No. 351,489, Feb. 23, 1982, abandoned. This application Aug. 14, 1984, Ser. No. 640,783**

**Claims priority, application United Kingdom, Feb. 23, 1981, 8105654**

**Int. Cl.[4] C01B** *35/10, 33/28;* **B01J** *29/28*

**U.S. Cl. 423—277** **12 Claims**

**1**. A synthetic zeolite material having a molar composition expressed by the formula:

$$0 \text{ to } 4M_2O{:}0.1 \text{ to } 2.5Y_2O_3{:}100XO_2{:}0 \text{ to } 35H_2O$$

where M is sodium, ammonium or hydrogen, Y is one or more of aluminium, gallium, boron, iron, chromium, vanadium, molybdenum, arsenic, antimony and manganese, X is silicon and/or germanium and $H_2O$ is water of hydration additional to water notionally present when M is hydrogen and having an X-ray diffraction pattern as set out in Table 1.

**3**. A method of making synthetic zeolite material as defined in claim **1** which comprises reacting on aqueous mixture comprising at least one oxide $XO_2$, at least one oxide $Y_2O_3$ and at least one piperazine compound wherein the aqueous mixture has the molar composition:

$XO_2/Y_2O_3$: 40 to 1000
$MOH/XO_2$: $10^{-3}$ to 0.4
$Q/XO_2$: 0.01 to 5
$H_2O/XO_2$: 10 to 100
$MZ/XO_2$: 0.1 to 10

wherein X and Y have the meanings given in claim **1**, Q is a piperazine compound, M in MOH is sodium or ammonium, M in MZ is sodium, ammonium or hydrogen and Z is a strong acid radical.

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**4,743,438**

## PROCESS FOR PRODUCING PHOSPHORIC ACID FROM LOW PURITY PHOSPHATE ROCK

**George A. Kennedy, and James R. Lehr, both of Florence, Ala., assignors to Tennessee Valley Authority, Muscle Shoals, Ala.**

**Continuation-in-part of Ser. No. 655,012, Sep. 27, 1984, now Defensive Publication No. 105,603. This application Mar. 16, 1987, Ser. No. 26,092**

**Int. Cl.[4] C01B** *25/16*

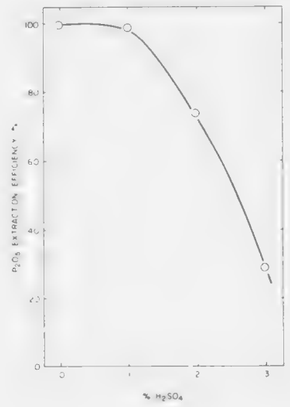
**U.S. Cl. 423—320** **6 Claims**

**1**. In an improved process for recovering phosphate values contained in relatively low purity phosphate rock feed material comprising the steps of sequentially reacting said phosphate rock with phosphoric acid to produce a solution of calcium phosphate in phosphoric acid and a solid phase mixture comprising undissolved impurity minerals, calcium fluoride, calcium sulfate, fluosilicate compounds, and mixtures thereof; separating the resulting solution and solid phases; reacting said solution with sulfuric acid to effect the formation, in wet-process phosphoric acid production means, of calcium sulfate and phosphoric acid; and separating said calcium sulfate from said phosphoric acid product, the improvement in combination therewith comprising the additional steps of:

(a) removing phosphoric acid from said wet-process phosphoric acid production means and mixing same with a solution of calcium phosphate in phosphoric acid to prepare an acid mixture adjusted so as to contain in amounts up to about 1.5 percent soluble sulfate (expressed as $H_2SO_4$) and between about 20 to 50 percent $P_2O_5$ by weight;

(b) reacting said acid mixture from step (a) supra with said phosphate rock feed material at a temperature ranging from about 45° C. to about 65° C. and for a period of time ranging from about 10 minutes to about 60 minutes to produce a slurry comprising a solution of calcium phosphate in phosphoric acid and a solid phase of undissolved and insoluble impurity compounds;

(c) separating said solution and said solid phases in step (b) supra;




(d) recycling a portion of said solution of calcium phosphate in phosphoric acid recovered in step (c) supra to said acid soluble sulfate concentration adjustment of step (a) supra;

(e) returning the remainder of said calcium phosphate-phosphoric acid solution recovered in step (c) supra to said phosphoric acid production means and blending same with acid and phosphate rock inputs thereto together with the phosphate values contained in said calcium phosphate-phosphoric acid solution to effect conversion to phosphoric acid product;

(f) washing said solid material separated in step (c) supra to recover therefrom adhering calcium phosphate-phosphoric acid solution; and

(g) returning the wash liquor recovered in step (f) supra to said phosphoric acid production means and effecting the incorporation thereof into the calcium sulfate filter cake washing and acid recycle operations therein;

said process characterized by the fact that the extraction efficiency of reacting said phosphoric acid on said phosphate rock to produce said calcium phosphate solution in phosphoric acid is at least as great as about 90 percent.



**4,743,439**

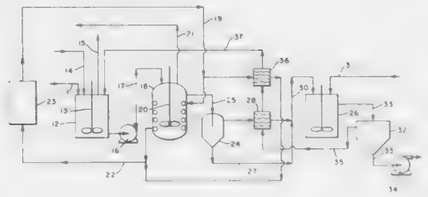
## WET CALCINATION OF ALKALI METAL BICARBONATES IN HYDROPHOBIC MEDIA

**Douglas F. Ready, Hopatcong, N.J., assignor to General Chemical Corporation, Parsippany, N.J.**

**Filed Jan. 16, 1984, Ser. No. 571,325**

**Int. Cl.[4] C01D** *15/08, 17/00, 7/37*

**U.S. Cl. 423—421** **19 Claims**



**1**. A calcination process for the preparation of sodium carbonate which comprises the steps of:

(a) preparing a suspension of particles of sodium bicarbonate, sodium sesquicarbonate or a mixture thereof in one or more water-immiscible carrier liquids in which said sodium bicarbonate, sodium sesquicarbonate or said mixture is substantially insoluble; and

(b) heating said suspension under atmospheric pressure for a time and at a temperature sufficient to promote conversion of all or a portion of the sodium bicarbonate, sodium sesquicarbonate, or mixture into sodium carbonate; and

(c) separating said sodium carbonate from said water-immiscible carrier liquids.

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**4,743,440**

## SKIN COMPOSITION

**Martin Callingham; Dwaipayan Chaudhuri, both of London; Kenneth V. Curry, Camberley; Barry G. Pike, Wokingham, and Michael B. Taylor, Old Headington, all of England, assignors to Lever Brothers Company, New York, N.Y.**

**Continuation of Ser. No. 33,581, Apr. 26, 1979, abandoned, which is a continuation-in-part of Ser. No. 930,780, Aug. 2, 1978, abandoned, which is a continuation of Ser. No. 842,769, Oct. 17, 1977, abandoned, which is a continuation of Ser. No. 520,124, Nov. 1, 1974, abandoned. This application Jul. 29, 1981, Ser. No. 288,084**

**Claims priority, application United Kingdom, Nov. 8, 1973, 7351815**

**Int. Cl.[4] A61K** *7/32, 9/12*

**U.S. Cl. 424—46** **7 Claims**

**1**. A substantially non-aqueous fluid antiperspirant composition consisting essentially of a solid phase and a non-aqueous liquid phase for dispensing as a spray onto human skin to provide a non-toxic, non-irritant, dry-to-the-touch, non-sticky deposit,

the solid phase of the composition comprising from about 1% to about 95% by weight of chemically modified cellulose in particulate form, and

the non-aqueous liquid phase of the composition comprising:

(a) from 1% to about 99% by weight of a liquefied propellant to produce an aerosol spray; and

(b) from 0% to 99% by weight of a carrier, other than a propellant, for the chemically modified cellulose,

the chemically modified cellulose being characterized by its capacity for absorbing an amount of moisture at least equal to its own weight after deposition of the composition onto the skin.

**4,743,441**

## COSMETIC COMPOSITION

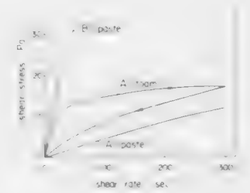
**Yoshinori Takema, Tokyo; Rikio Tsushima, Wakayama; Yutaka Yasuda, Kaizuka, and Yoshinao Kono, Wakayama, all of Japan, assignors to Kao Corporation, Tokyo, Japan**

**Continuation of Ser. No. 662,623, Oct. 19, 1984, abandoned. This application Sep. 15, 1986, Ser. No. 907,160**

**Claims priority, application Japan, Oct. 28, 1983, 58-202273**

**Int. Cl.[4] A61K** *7/00, 9/00, 7/04, 7/021, 7/06, 7/035;* **C08F** *16/06*

**U.S. Cl. 424—47** **6 Claims**



**1**. A method of cosmetically treating skin, comprising:

applying to the skin of a subject to be cosmetically treated, a cosmetic formulation containing from 1 to 40 weight percent of a copolymer consisting of 98–80 mole % of vinyl alcohol monomer units and 2–20 mole % of linear or branched alkyl vinyl ether monomer units having from 1 to 6 carbon atoms.

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**4,743,442**

## SKIN CARE COMPOSITION

**Helmut Raaf, Bockenau; Rudolf Bimczok, Mainz-Finthen, and Ingrid Ittel, Ingelheim, all of Fed. Rep. of Germany, assignors to Blendax-Werke R. Schneider GmbH & Co., Mainz, Fed. Rep. of Germany**

**Continuation of Ser. No. 630,402, Jul. 13, 1984, abandoned. This application Nov. 27, 1985, Ser. No. 802,388**

**Claims priority, application Fed. Rep. of Germany, Aug. 2, 1983, 3327840**

**Int. Cl.[4] A61K** *7/40, 7/42, 7/48, 9/12*

**U.S. Cl. 424—47** **13 Claims**

**1**. A skin care composition in the form of a cream, lotion, gel, emulsion, solution or aerosol spray comprising a mixture of salts selected from the group consisting of chlorides, sulphates, phosphates, citrates, lactates, glycerophosphates, gluconates, edetates, tartrates, malates, mandelates, benzoates, salicylates, phytates, cinnamates and amino acid salts, the improvement comprising a mixture of said salts in concentrations such that said composition comprises a mixture of cations in the following concentrations:

Sodium: 0.01–5.0% by weight,
Potassium: 0.01–3.0% by weight,
Magnesium: 0.01–2.0% by weight,
Calcium: 0.01–2.0% by weight, and
Zinc: 0.01–1.0% by weight,

calculated on the total composition.

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**4,743,443**

## TRI-COLOR LIPSTICK AND METHOD OF MAKING SAME

**Arthur Pisani, and Robert Pisani, both of Kinnelon, N.J., assignors to Cavalla, Inc., Hackensack, N.J.**

**Filed May 4, 1987, Ser. No. 45,573**

**Int. Cl.[4] A61K** *7/00*

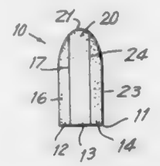
**U.S. Cl. 424—63** **3 Claims**

**1**. An improved lipstick comprising a cylindrical body of lipstick material having a principal longitudinal axis, said body

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comprising three planar laminae in mutually parallel abutted relation, the planes of which are parallel to said longitudinal




axis, said laminae each being of a different color with respect to that of an immediately adjacent lamina.

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**4,743,444**

**ANTIPERSPIRANT AND DEODORANT STICKS**

**Patrick C. McCall, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio**

**Filed Feb. 20, 1986, Ser. No. 832,092**

**Int. Cl.⁴ A61K** *7/32, 7/34, 7/36, 7/38*

**U.S. Cl. 424—65** **9 Claims**

**1**. In a transparent deodorant or antiperspirant stick composition comprising:

(a) from about 10% to about 97% of a liquid base material selected from the group consisting of monohydric alcohols, polyhydric alcohols and water and mixtures thereof; and

(b) from about 1% to about 10% of a benzylidene sorbitol;

(c) from about 10% to about 50% of one or more astringent salts or deodorant active materials

wherein the improvement comprises the addition of from about 1% to about 15% of a $C_{14}$–$C_{16}$ fatty alcohol.

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**4,743,445**

**METHOD FOR TREATMENT OF ESSENTIAL (HEMORRHAGIC) THROMBOCYTHEMIA**

**Francis Delwiche, Genval; Jocelyn Flament-Grivegnee; Diamond Gangji, both of Brussels; Rita Monsieur, Kester; Pierre Stryckmans, Meise; Thierry Velu, Waterloo, and Joseph Wybran, Brussels, all of Belgium, assignors to Boehringer Ingelheim International GmbH, Fed. Rep. of Germany**

**Filed Jul. 25, 1985, Ser. No. 758,729**

**Int. Cl.⁴ A61K** *45/02*

**U.S. Cl. 424—85** **9 Claims**

**1**. A method for treating essential thrombocythemia, said method comprising administering an effective amount of human alpha-type interferon to a human having essential thrombocythemia.

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**4,743,446**

**LIVER FLUKE ANTIGENS DERIVED FROM JUVENILE FASCIOLO ORGANISMS**

**Clive E. Bennett, Shirley, England, assignor to National Research Development Corporation, England**

**PCT No. PCT/GB85/00594, § 371 Date Aug. 5, 1986, § 102(e) Date Aug. 5, 1986, PCT Pub. No. WO86/03680, PCT Pub. Date Jul. 3, 1986**

**PCT Filed Dec. 20, 1985, Ser. No. 897,534**

**Claims priority, application United Kingdom, Dec. 21, 1984, 8432401**

**Int. Cl.⁴ A61K** *39/00;* **G01N** *33/53*

**U.S. Cl. 424—85** **25 Claims**

**1**. An antigen specific to the juvenile state of Fasciola and extracted from juvenile Fasciola organisms by separating said juvenile organisms from metacercarial cysts of Fasciola, raising an antiserum to the juvenile organisms, absorbing this antiserum with antigens extracted from adult Fasciola organisms, thereby forming an adult antigen—adult antibody complex and leaving other components of the antiserum unabsorbed, separating immunoglobulin components of the unabsorbed antiserum from the adult antigen - adult antibody complex, insolubilising the immunoglobulins, purifying crude juvenile Fasciola antigens by reacting them with the insolubilised immunoglobulins to form an antigen-antibody complex and liberating a juvenile-specific antigen from the complex.

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**4,743,447**

**COMPOSITION FOR DISINFECTING CONTACT LENSES**

**Daniel Le Rouzic, Ermont, and Eric J. Laforte, Paris, both of France, assignors to L'Air Liquide Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude, Paris, France**

**Continuation of Ser. No. 820,380, Jan. 21, 1986, abandoned. This application Apr. 23, 1987, Ser. No. 41,611**

**Claims priority, application France, Jan. 30, 1985, 8501301**

**Int. Cl.⁴ A61K** *33/40*

**U.S. Cl. 424—130** **16 Claims**

**1**. A disinfecting composition for daily treatment of flexible contact lenses comprising a stable aqueous solution having equilibrium concentration of from about 0.01 to about 0.04 peracetic acid, from about 1 to about 3% by weight of hydrogen peroxide, and sufficient acetic acid for equilibrium.

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**4,743,448**

**ORGANIC CARRIER WITH INTEGRATED ACTIVE SUBSTANCES**

**Müfit Bahadir, Zolling; Gerd Pfister, Freising, and Friedhelm Korte, Attenkirchen, all of Fed. Rep. of Germany, assignors to Gesellschaft für Strahlen- und Umweltforschung mbH, Neuherberberg, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 660,316, Oct. 12, 1984, abandoned. This application Nov. 24, 1986, Ser. No. 935,077**

**Claims priority, application Fed. Rep. of Germany, Oct. 15, 1983, 3337592**

**Int. Cl.⁴ A01N** *25/10;* **A01C** *1/04;* **C08K** *5/00*

**U.S. Cl. 424—405** **12 Claims**

**1**. An article of manufacture in the form of a sheet, web, or fabric for use in growing plants, said article comprising an organic carrier matrix and at least one active substance formulated integrally within said organic carrier matrix whereby a time controlled release of said at least one active substance from said composition of matter is obtained by a diffusion controlled migration of said at least one active substance through said organic carrier matrix to the surface of said article; wherein said organic carrier matrix comprises one or more organic polymer, wherein said at least one active substance comprises one or more agents selected from the group consisting of plant protection agents, plant growth promoters, plant growth inhibitors, synergists, adjuvants, and mixtures thereof, and wherein said article is stable under plant growing conditions, contains no pro-oxidant constituent, and is removed after one growing season or part thereof.

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**4,743,449**

**DRUG-CONTAINING LIPID VESICLE PREPARATION AND METHOD FOR PREPARING THEM**

**Hiromitsu Yoshida, Kyoto; Jiro Fujisaki, Amagasaki, and Seiji Sawai, Neyagawa, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan**

**Filed Sep. 10, 1984, Ser. No. 648,961**

**Claims priority, application Japan, Sep. 12, 1983, 58-168824**

**Int. Cl.⁴ A61K** *39/02, 39/12, 39/18*

**U.S. Cl. 424—420** **10 Claims**

**1**. A method for the preparation of a drug-containing lipid vesicle preparation comprising adding an aqueous solution or suspension to a phospholipid which contains a lipophilic surfactant to form a mixture, stirring said mixture whereby lipid vesicles are formed, then dispersing said vesicles in a dispersion medium to form an emulsion.

**10**. A drug-containing lipid vesicle emulsion preparation comprising aggregations of lipid vesicles comprising



a. an inner aqueous phase in the form of an aqueous solution or suspension containing a drug therein, and

b. a membrane of phospholipid containing a lipophilic surfactant enclosing said aqueous phase,

said vesicles dispersed in an aqueous solution of at least one hydrophilic surfactant or in an oily ointment base and constituting an emulsion.

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**4,743,450**

**STABILIZED COMPOSITIONS**

**Michael Harris, Hackettstown; Gerard Hokanson, Long Valley; Kuchi Murthy, Morris Plains; Robert Reisch, Haledon, and Frank Waldman, Wayne, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.**

**Filed Feb. 24, 1987, Ser. No. 17,962**

**Int. Cl.⁴ A61K** *31/195, 31/40, 31/27, 31/505*

**U.S. Cl. 424—440** **17 Claims**

**1**. A pharmaceutical composition which contains:

(a) a drug component which comprises a suitable amount of an ACE inhibitor which is susceptible to cyclization, hydrolysis, and discoloration,

(b) a suitable amount of an alkali or alkaline earth metal carbonate to inhibit cyclization and discoloration, and

(c) a suitable amount of a saccharide to inhibit hydrolysis.

**14**. A candy formulation containing the composition of claim **1**.

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**4,743,451**

**ALCOHOL PRODUCTION**

**Vladimir Kalina, Lausanne, Switzerland, assignor to Nestec S.A., Vevey, Switzerland**

**Filed Aug. 11, 1986, Ser. No. 895,270**

**Claims priority, application Switzerland, Sep. 5, 1985, 3831/85**

**Int. Cl.⁴ C12G** *1/02*

**U.S. Cl. 426—15** **14 Claims**

**1**. A process for the microaerobic production of alcohol by continuously fermenting must in a fermentation vat, wherein fresh must is continuously injected into the vat, fermented must and yeast are continuously run off from the vat and yeast present in the must and yeast run-off is recycled into the vat, comprising limiting assimilable phosphate in the fermenting must to a concentration which maintains the yeast active but inhibits growth of yeast in the vat, and continuously injecting fresh yeast into the vat to regenerate and maintain the activity of the yeast in the vat.

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**4,743,452**

**METHOD FOR PRODUCING FROZEN YEAST-LEAVENED DOUGH**

**Lisa V. Felske, Eastchester, N.Y., and Roy F. Silva, Norwalk, Conn., assignors to Stauffer Chemical Company, Westport, Conn.**

**Continuation-in-part of Ser. No. 869,477, Jun. 2, 1986, which is a continuation-in-part of Ser. No. 755,871, Jul. 17, 1985, abandoned. This application Jun. 2, 1986, Ser. No. 869,478**

**The portion of the term of this patent subsequent to Feb. 19, 2002, has been disclaimed.**

**Int. Cl.⁴ A21D** *8/00*

**U.S. Cl. 426—19** **22 Claims**

**1**. A method for producing a frozen, no proof, yeast leavened dough which comprises preparing a yeast-containing dough, said yeast-containing dough additionally comprising a hydrocolloid in an amount sufficient to increase the volume of the dough, and from about 0.25% to about 3% of a fermentation time reducer, said fermentation time reducer being prepared by a process comprising fermenting a mixture of flour, sugar in an amount ranging from 0 to about 10% by weight based on the weight of the flour, from about 55 to about 250 parts water per 100 parts flour and a yeast of the species *Saccharomyces cerevisiae* in an amount sufficient and for a minimum of 12 hours, said period of time being sufficient to decrease the pH of the mixture to a pH below 4.75: and drying the fermented mixture to a moisture content of from about 4.5% to about 9.0% under conditions such that a major amount of the volatile components of the mixture with the exception of water remain in the fermentation aid product after drying, and freezing the dough without substantial proofing of the dough prior to freezing.

**19**. A frozen nonproofed yeast-containing dough additionally comprising a hydrocolloid in an amount sufficient to increase the volume of the dough and from about 0.25% to about 3% of a fermentation time reducer, said fermentation time reducer is prepared by a process comprising fermenting a mixture of flour, sugar in an amount ranging from 0 to about 10% by weight based on the weight of the flour, from about 55 to about 250 parts water per 100 parts flour and a yeast of the species *Saccharomyces cerevisiae* in an amount sufficient and for a minimum of 12 hours, said period of time being sufficient to decrease the pH of the mixture to a pH below 4.75: and drying the fermented mixture to a moisture content of from about 4.5% to about 9.0% under conditions such that a major amount of the volatile components of the mixture with the exception of water remain in the fermentation aid product after drying, said dough being substantially unproofed prior to freezing, said frozen dough being capable of baking without a dense core after thawing without a separate proofing stage.

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**4,743,453**

**FERMENTATION OF WHEY TO PRODUCE PROPIONIC ACID**

**William P. Ahern; Dale F. Andrist, and Lawrence E. Skogerson, all of Rochester, Minn., assignors to Stauffer Chemical Co., Westport, Conn.**

**Filed Nov. 13, 1984, Ser. No. 671,140**

**The portion of the term of this patent subsequent to Jun. 30, 2004, has been disclaimed.**

**Int. Cl.⁴ A23C** *29/02;* **C12P** *39/00, 7/52;* **C12R** *1/01*

**U.S. Cl. 426—41** **8 Claims**

**1**. In a process for functionalizing whey containing from about 0.5% to about 18% by weight whey solids by sterilizing the whey and then fermenting the whey with a propionic acid-producing organism to produce propionic acid, the improvement comprising:

(a) forming a pre-fermentation broth of whey containing from about 0.5% to about 18% by weight whey solids and yeast extract; and

(b) fermenting the pre-fermentation broth with a galactose and glucose utilizing lactic acid-producing organism or mixture of galactose and glucose utilizing lactic acid-producing organisms to ferment the lactose in the whey to lactic acid;

(c) neutralizing the fermented lactic acid containing pre-fermentaiton broth with a divalent metallic ion hydroxide; and

(d) sterilizing the neutralized, fermented lactic acid containing pre-fermentation broth and fermenting the broth with a propionic acid-producing organism to produce propionic acid.

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**4,743,454**

**HAY PRESERVATIVE**

**Nancy J. Tomes, West Des Moines, Iowa, assignor to Pioneer Hi-Bred International, Inc., Des Moines, Iowa**

**Filed Jul. 28, 1986, Ser. No. 891,260**

**Int. Cl.⁴ A23K** *3/00*

**U.S. Cl. 426—61** **12 Claims**

**1**. A hay preservative composition, especially for high moisture hay consisting essentially of, in combination:

a small but heat reducing effective amount of 4–75% by weight of said hay preservative composition of an inorganic salt mixture of zinc oxide, magnesium oxide and a water soluble copper ion source having a weight ratio of 100:10:1 to 100:20:1; and

a small but heat reducing effective amount of 25–96% of said

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hay preservative composition of an organic acid, or a water soluble salt form thereof, selected from the group consisting of acetic acid, propionic acid, and sorbic acid.

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**4,743,455**

## METHOD FOR MAKING POTATO CHIPS

**David A. Nichols, 10916 Dakota Ct., Burnsville, Minn. 55337, assignor to David A. Nichols, Burnsville; William H. McCombs, Minneapolis and Gregory J. Frank, Maple Grove, all of, Minn.**

**Filed Dec. 29, 1986, Ser. No. 946,814**
**Int. Cl.[4] A23L** *1/217*
**U.S. Cl. 426—233** **15 Claims**

1. A process for preparing potato chips from potatoes having an elevated sugar content, said process comprising slicing said potatoes to a thickness of between about 0.05 and 0.075 inches, the sugar content of said slices being sufficiently high to result in unsatisfactory potato chips upon conventional potato chip frying, immersing said potato slices in a hot water bath for a period of time sufficient to remove at least 50% of the surface sugar in said slice, adjusting the temperture of said water and the residence time in said bath below the point at which significant starch granule rupture occurs, said time and temperature being high enough to provide sugar removal from the surfaces of said slices sufficient to result in light colored fried potato chips, frying said slices in hot oil to provide potato chips having a uniform light golden color.

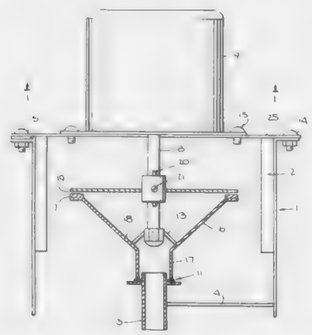
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**4,743,456**

## APPARATUS AND METHOD FOR APPLYING A UNIFORM COATING TO FOOD

**Paul F. Spadafora, Montville; James R. Davis, Boonton, and Jim Blandine, Kingwood, all of N.J., assignors to Nabisco Brands, Inc., Parsippany, N.J.**

**Filed Dec. 30, 1986, Ser. No. 947,679**
**Int. Cl.[4] A23B** *7/16;* **B05C** *5/00;* **B05D** *3/12*
**U.S. Cl. 426—293** **8 Claims**



1. An apparatus for applying a uniform coating of a viscous particulate-containing material onto the surfaces of pieces of food comprising:

(a) covered, apertured cylindrical housing means;

(b) means for transporting a viscous, particulate-containing feedstream coaxially positioned in the interior of the housing;

(c) inverted frustoconical reservoir means coaxially, receivably and rotatably connected to the transporting means at its lower rim and having along the circumference of its upper rim a sequential pattern of serrations, the upper rim further serving to support reservoir covering means;

(d) rotatable shaft means coaxial to the feed means and reservoir means and extending through an aperture in the housing and reservoir covering means so as to rigidly connect with the lower portion of the reservoir means;

(e) segmented shroud means circumferentially positioned within the interior of the housing means;

(f) driving means engagingly connected to the shaft means so that when activated the shaft, and therefore the reservoir, rotates so as to centrifugally propel feed stream particles upwardly along the sides of the reservoir, thereby causing those particles to impinge upon the serrations of the upper rim of the reservoir, resulting in a radial spray of coating material containing uniform-sized particulates which impinges upon the sides of the segmented shroud which directs the spray outwardly from the interior of the apertured housing means and coats pieces of food transported externally to the housing means.

8. A method for applying a uniform coating of a particulate-containing material onto the surfaces of pieces of food comprising:

(a) transporting upwardly through means comprising feedpipe a viscous, particulate-containing feedstream;

(b) receiving the particulate-containing feedstream into the lower end of an inverted frustoconical reservoir positioned within an apertured cylindrical housing and coaxially and rotatably connected to the feedpipe at its lower rim and having along the circumference of its upper rim a sequential pattern of serrations and a cover which is rigidly attached to the upper rim of the reservoir;

(c) generating a coating spray containing uniform-size particulates by rotating the reservoir by means of a motor-driven shaft coaxial to the feedpipe and attached to the lower end of the reservoir, thereby imparting a centrifugal force to the feedstream particles which propels those particles upwardly along the sides of the reservoir and causes them to radially impinge against the serrations located along the circumference of the upper rim of the reservoir;

(d) conveying the coating spray outwardly from the interior of the housing and onto pieces of food transported externally relative to the housing by means of a conveyor belt so that those pieces of food are uniformly coated with the particulate-containing coating material.

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**4,743,457**

## TREATMENT OF FRUIT AND VEGETABLE MATERIAL

**Ulrich Wissgott, La Tour-de-Peilz, and Alexis Berberat, Corseaux, both of Switzerland, assignors to Nestec S.A., Vevey, Switzerland**

**Continuation-in-part of Ser. No. 699,172, Feb. 7, 1985, abandoned. This application Oct. 30, 1985, Ser. No. 792,797**
**Int. Cl.[4] A23B** *7/14*
**U.S. Cl. 426—321** **25 Claims**

1. A process for treating a food selected from the group consisting of fruits and vegetables containing red pigment precursors to inhibit formation of a reddish coloration of the food which occurs during heat processing of the food comprising adding protein, which is in a substantially water-soluble form, to the food for contacting red pigment precursors, in an amount effective to inhibit the formation of reddish coloration of the food by the pigment precursors during heat processing.



**4,743,458**

## SOFT CANINE BISCUIT CONTAINING DISCRETE MEAT AND/OR MEAT BY-PRODUCT PARTICLES AND METHOD FOR MAKING SAME

**Gary Gellman, Pomona, N.Y.; George A. Erfurt, Morristown, and James E. Roe, Wayne, both of N.J., assignors to Nabisco Brands, Inc., Parsippany, N.J.**

**Continuation of Ser. No. 614,367, May 29, 1984, Pat. No. 4,534,989, which is a continuation-in-part of Ser. No. 549,353, Nov. 7, 1983, Pat. No. 4,534,990, which is a continuation-in-part of Ser. No. 341,970, Jan. 22, 1982, Pat. No. 4,454,164. This application May 21, 1985, Ser. No. 736,245**
**Int. Cl.[4] A23K** *1/00*
**U.S. Cl. 426—549** **12 Claims**

1. A dry soft canine biscuit consisting essentially of discrete, visually-apparent, dehydrated particles, which contain meat and/or meat by-product, distributed substantially uniformly throughout said biscuit, the remaining portion of said biscuit being substantially free of meat particle color and containing a major portion of at least one farinaceous material, said biscuit having a water activity of 0.70 or less, and a water content of 15 weight percent or less, based on upon the total weight of said dry soft canine biscuit, said particles being present in an amount of about 3 to about 25 weight percent, based on the total weight of said dry soft canine biscuit, said particles having a water activity which is equal to or less than the remaining portions of said biscuit, and said particles being non-expanded, of sufficient size to be discrete and visually apparent, substantially of a size which passes through a U.S. No. 4 Mesh screen and stays on a U.S. No. 8 Mesh screen, and having a water content of 12 to 20 weight percent, based on the total weight of said dehydrated particles whereby said biscuit having been made from a soft dough containing a humectant.

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**4,743,459**

## CANINE BISCUIT CONTAINING DISCRETE MEAT AND/OR MEAT BY-PRODUCT PARTICLES AND METHOD FOR MAKING SAME

**Gary Gellman, Pomona, N.Y.; George A. Erfurt, Morristown, and James E. Roe, Wayne, both of N.J., assignors to Nabisco Brands, Inc., Parsippany, N.J.**

**Continuation of Ser. No. 614,601, May 29, 1984, Pat. No. 4,551,343, which is a continuation-in-part of Ser. No. 549,352, Nov. 7, 1983, Pat. No. 4,546,001, which is a continuation-in-part of Ser. No. 341,969, Jan. 22, 1982, Pat. No. 4,454,163. This application May 21, 1985, Ser. No. 736,246**
**The portion of the term of this patent subsequent to May 10, 2005, has been disclaimed.**
**Int. Cl.[4] A23K** *1/00*
**U.S. Cl. 426—549** **10 Claims**

1. Dry hard canine biscuit consisting essentially of discrete, visually-apparent, dehydrated particles, which contain meat and/or meat by-product, distributed substantially uniformly throughout said biscuit, the remaining portion of said biscuit being substantially free of meat particle color containing a major portion of at least one farinaceous material, said biscuit having a water activity of 0.70 or less, and a water content of 15 weight percent or less, based upon the total weight of said dry hard canine biscuit, said particles being present in an amount of about 3 to about 25 weight percent, based on the total weight of said dry hard canine biscuit, said particles having a water activity which is equal to or less than the remaining portions of said biscuit, and said particles being non-expanded, of sufficient size to be discrete and visually apparent, substantially of a size which passes through a U.S. No. 4 Mesh screen and stays on a U.S. No. 8 Mesh screen, and having a water content of 12 to 20 weight percent, based on the total weight of said dehydrated particles.

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**4,743,460**

## SOFT CANINE BISCUIT CONTAINING DISCRETE PARTICLES OF MEAT AND OTHER MATERIALS AND METHOD FOR MAKING SAME

**Gary Gellman, Summit; George A. Erfurt, Lawrenceville, and James E. Roe, Wayne, all of N.J., assignors to Nabisco Brands, Inc., Parsippany, N.J.**

**Continuation of Ser. No. 549,353, Nov. 7, 1983, Pat. No. 4,534,990, which is a continuation-in-part of Ser. No. 341,970, Jan. 22, 1982, Pat. No. 4,454,164. This application May 21, 1985, Ser. No. 736,247**
**Int. Cl.[4] A23K** *1/00*
**U.S. Cl. 426—549** **18 Claims**

1. Dry soft canine biscuit consisting essentially of discrete, visually apparent dehydrated particles, which contain (i) meat and/or meat by-product and (ii) farinaceous material and/or textured vegetable protein distributed substantially uniformly throughout said biscuit, the remaining portion of said biscuit being substantially free of meat particle color and containing a major portion of at least one farinaceous material, said biscuit having a water activity of 0.70 or less, and a water content of 15 weight percent or less, based upon the total weight of said dry soft canine biscuit, said particles being present in an amount of about 3 to about 25 weight percent, based on the total weight of said dry soft canine biscuit, said particles having a water activity which is equal to or less than the remaining portion of said biscuit, and said particles being non-expanded or partially expanded, of sufficient size to be discrete and visually apparent, substantially of a size which passes through a U.S. No. 4 Mesh screen and stays on a U.S. No. 14 Mesh screen, and having a water content of 12 to 20 weight percent, based on the total weight of said dehydrated particles whereby said biscuit having been made from a soft dough containing humectant.

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**4,743,461**

## CANINE BISCUIT CONTAINING DISCRETE PARTICLES OF MEAT AND OTHER MATERIALS AND METHOD FOR MAKING SAME

**Gary Gellman, Summit; George A. Erfurt, Lawrenceville, and James E. Roe, Wayne, all of N.J., assignors to Nabisco Brands, Inc., Parsippany, N.J.**

**Continuation of Ser. No. 549,352, Nov. 7, 1983, Pat. No. 4,546,001, which is a continuation-in-part of Ser. No. 341,969, Jan. 22, 1982, Pat. No. 4,454,163. This application May 21, 1985, Ser. No. 736,375**
**The portion of the term of this patent subsequent to Jun. 12, 2001, has been disclaimed.**
**Int. Cl.[4] A23K** *1/00*
**U.S. Cl. 426—549** **19 Claims**

1. Dry hard canine biscuit consisting essentially of discrete, visually apparent dehydrated particles, which contain (i) meat and/or meat by-product and (ii) farinaceous material and/or textured vegetable protein, distributed substantially uniformly throughout said biscuit, the remaining portion of said biscuit being substantially free of meat particle color and containing a major portion of at least one farinaceous material, said biscuit having a water activity of 0.70 or less and a water content of 15 weight percent or less, based upon the total weight of said dry hard canine biscuit, said particles being present in an amount of about 3 to about 25 weight percent, based on the total weight of said dry hard canine biscuit, said particles having a water activity which is equal to or less than the remaining portions of said biscuit, and said particles being non-expanded or partially expanded and being of sufficient size so as to be discrete and visually apparent, substantially of a size which passes through a U.S. No. 4 Mesh screen and stays on a U.S. No. 8 Mesh screen and having a water content of 12 to 20 weight percent, based on the total weight of said dehydrated particles.

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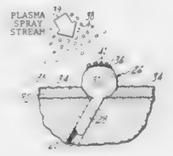


**4,743,462**

## METHOD FOR PREVENTING CLOSURE OF COOLING HOLES IN HOLLOW, AIR COOLED TURBINE ENGINE COMPONENTS DURING APPLICATION OF A PLASMA SPRAY COATING

**Thomas J. Radzavich, Higganum; Donald G. Nordstrom, Meriden, and Keith D. Sheffler, Wethersfield, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.**

**Filed Jul. 14, 1986, Ser. No. 885,556**
**Int. Cl.[4] B05D** *3/08*
**U.S. Cl. 427—34** **14 Claims**




1. A method for applying a desired thickness of an overlay coating to the surface of a component having a plurality of small, spaced apart perforations in said surface, comprising the steps of:

(a) disposing in each perforation a fugitive plug which is volatilizable at a temperature less than the temperature of the coating process, wherein each plug has a head portion which is enlarged relative to the diameter of its respective hole and which abuts the component surface and which projects above the surface a distance greater than at least twice the desired coating thickness;

(b) applying the desired thickness of the overlay coating to the component surface, wherein the heat of the coating process causes only a portion of the head of each plug to volatilize, which volatilization interferes with the deposition of the coating on each plug head, and wherein the head of each plug protrudes above the surface of the coating at the completion of the coating process; and

(c) completely removing the plugs from the component at the completion of the coating process, wherein the perforations are thereby opened and substantially free of coating.

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**4,743,463**

## METHOD FOR FORMING PATTERNS ON A SUBSTRATE OR SUPPORT

**Avigdor M. Ronn, Great Neck; Leonard F. Hurysz, and Alan P. Van Kerkhove, both of Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Feb. 21, 1986, Ser. No. 831,786**
**Int. Cl.[4] B05D** *3/06;* **D06P** *5/20*
**U.S. Cl. 427—53.1** **12 Claims**

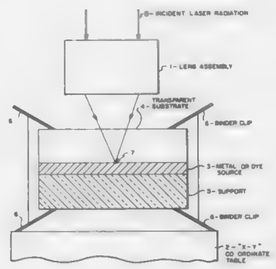
1. A method of forming a predetermined pattern on a substrate at atmospheric pressure, comprising the steps of:

(a) providing a laser beam having sufficient power to vaporize a specified pattern-forming material;

(b) providing an assembly comprising (i) a substrate which is transparent to the laser and which forms an intimate contact interface with (ii) a smooth layer of the selected pattern-forming material;

(c) focusing the laser beam through the substrate at or near the interface of the patternforming material and the substrate to locally vaporize the pattern-forming material; and

(d) moving the substrate and the laser beam relative to each other according to the predetermined pattern to selectively deposit the patternforming material on the substrate according to the predetermined pattern.



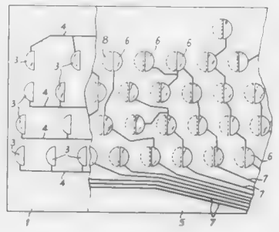

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**4,743,464**

## PROCESS FOR MANUFACTURING CAPACITIVE KEYBOARDS AND NEW KEYBOARDS OBTAINED BY THIS PROCESS

**Jean L. Larguier, Chemin des Canaux, 30 230 Caissargues, and Daniel Duchalet, Cayweth, "Au Colombier", 82240 Septfonds, both of France**

**PCT No. PCT/FR85/00025, § 371 Date Dec. 6, 1985, § 102(e) Date Dec. 6, 1985, PCT Pub. No. WO85/03605, PCT Pub. Date Aug. 15, 1985**
**PCT Filed Feb. 13, 1985, Ser. No. 787,882**
**Claims priority, application France, Feb. 13, 1984, 84 02135**
**Int. Cl.[4] B05D** *5/12*
**U.S. Cl. 427—58** **10 Claims**



1. Process for manufacturing capacitive keyboards of the type comprising, on each side of an insulating material of small thickness, two matrix arrangements, one in lines and the other in columns, of areas associated two by two for forming capacitive studs able to be subjected to the influence of a key for causing a metal armature to draw near thereto, characterized by the succession of steps consisting in applying, on one face (2) of a relatively rigid insulating support (1), a first matrix arrangement of areas (3) with their respective conducting tracks (4) in lines (or columns), in applying a thin insulating layer (5) to this face thus provided with this arrangement such that the thickness of said insulating layer on said areas of said first matrix arrangement is less than or equal to 20 microns, then in positioning on said insulating layer (5) said second matrix arrangement of areas (6) with their respectively conducting tracks (7) disposed in columns (or in lines) whereby a capacitive coupling of respective areas of said two matrix arrangements with little hinderance by said insulating layer is provided.

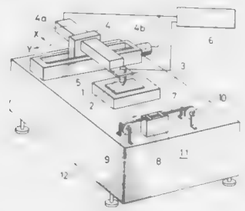


**4,743,465**

## METHOD AND APPARATUS FOR DRAWING THICK FILM CIRCUIT

**Keiji Saeki; Shinichi Kudo, and Hachiro Nakatsuji, all of Osaka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan**

**PCT No. PCT/JP85/00198, § 371 Date Feb. 12, 1986, § 102(e) Date Feb. 12, 1986**
**PCT Filed Apr. 15, 1985, Ser. No. 817,856**
**Claims priority, application Japan, Apr. 17, 1984, 59-76934**
**Int. Cl.[4] B05D** *5/12*
**U.S. Cl. 427—96** **21 Claims**



1. A method for drawing a thick film circuit on a substrate by discharging a paste from a tank having a discharge hole, said method including a waste drawing step wherein waste drawing of a portion of the paste from the tank through the discharge hole is performed at a waste drawing section after a predetermined interval of non-drawing of said paste whereby the paste is prevented from clogging the discharge hole, said waste drawing section being disposed at a place other than the substrate and said discharge hole being moved from the substrate to said waste drawing section in response to an elapse of the predetermined interval of non-drawing of the paste.

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**4,743,466**

## CORROSION INHIBITION OF IRON AND ITS ALLOYS

**Henry J. Gysling, and Joseph S. Yudelson, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Jun. 5, 1987, Ser. No. 58,306**
**Int. Cl.[4] C25D** *00/00;* **B05B** *7/00*
**U.S. Cl. 427—127** **5 Claims**

1. A method for protecting metallic iron and iron alloys against oxidative corrosion which comprises treating the iron or iron alloy with an organic liquid solution of a salt of the bis(triphenylphosphoranylidene)ammonium cation and a non-corrosive passivating anion.

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**4,743,467**

## METHOD FOR PREPARING MAGNETIC RECORDING MEDIUM

**Ryuji Shirahata, and Akio Yanai, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Continuation of Ser. No. 9,068, Jan. 27, 1987, abandoned, which is a continuation of Ser. No. 579,322, Feb. 13, 1984, abandoned.**
**This application Sep. 8, 1987, Ser. No. 96,203**
**Claims priority, application Japan, Feb. 14, 1983, 58-22373**
**Int. Cl.[4] H01F** *10/02*
**U.S. Cl. 427—132** **10 Claims**

1. A method for preparing a magnetic recording medium, comprising the steps of:

charging a ferromagnetic material in an evaporator;

irradiating the ferromagnetic material with an electron beam having a beam current density of between 0.1 A/cm$^2$ and 0.6 A/cm$^2$ to evaporate the material; and



vapour depositing the evaporated material on a continuously traveling support to form the recording medium.

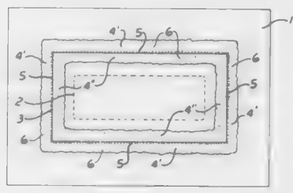
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**4,743,468**

## METHOD FOR REPAIRING A RUPTURE IN A METAL OR PLASTIC SURFACE

**Rene C. Jimenez, Tampa, Fla., assignor to Renbec International Corp., Tampa, Fla.**

**Filed Feb. 4, 1987, Ser. No. 10,724**
**Int. Cl.[4] B32B** *35/00*
**U.S. Cl. 427—140** **58 Claims**



1. A method for repairing a rupture in a metal or plastic surface in which opposing edges of said rupture are spaced at least ¼ inch from each other comprising the steps of:

(a) applying over said rupture a covering patch of metal or plastic sheet material of appropriate size and shape to cover the said rupture and to cover at least ¼ inch of the area of said surface and adjacent to said rupture;

(b) applying over the edge of said covering patch a layer of an alpha-cyanoacrylate being liquid at 20° C. and having the formula $CH_2$=C(CN)—COOR wherein R is a hydrocarbon radical selected from the group consisting of aliphatic, aromatic and cycloaliphatic hydrocarbon groups of 1–10 carbon atoms and alkoxy, chloro and fluoro derivatives of said hydrocarbon groups in which alkoxy groups there are 1–4 carbon atoms therein, said layer covering the adjacent areas of said covering patch and said ruptured surface each for a distance of at least ¼ inch from the edge of said covering patch and all around said patch; and

(c) spreading on said layer of alpha-cyanoacrylate a layer of a powdered solid selected from the group consisting of (i) a compound having hydroxyl, carboxylate or both hydroxyl and carboxylate groups therein and (ii) rubber.

**4,743,469**

## METHOD OF APPLYING ADHESIVE TO CONTAINERS IN LABELING MACHINES

**Reiner Lehmann, Nottuln, Fed. Rep. of Germany, assignor to Langguth GmbH & Co., Münster, Fed. Rep. of Germany**

**PCT No. PCT/DE86/00272, § 371 Date Mar. 19, 1987, § 102(e) Date Mar. 19, 1987, PCT Pub. No. WO87/00507, PCT Pub. Date Jan. 29, 1987**

**PCT Filed Jun. 28, 1986, Ser. No. 41,103**

**Claims priority, application Fed. Rep. of Germany, Jul. 23, 1985, 3526178**

**Int. Cl.[4] B05D** *5/10*

**U.S. Cl. 427—208.2** **3 Claims**

1. A method of applying an adhesive, such as hotmelt, to discrete containers which are in labeling machines and are to be labeled, comprising the steps of contactlessly applying to containers beads of adhesive by means of a nozzle applicator, and distributing each adhesive bead over a wide area of the respective container by means of a pressurized gas stream after application of the adhesive to the container, said distributing step including directing each pressurized gas stream at least substantially concentrically to the respective bead.

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**4,743,470**

## SPREADING PASTES CONTAINING POLYURETHANE PLASTICS AND A PROCESS FOR THE PRODUCTION OF POLYURETHANE COATINGS PERMEABLE TO WATER VAPOR

**Klaus Nachtkamp, New Martinsville, W. Va.; Wilhelm Thoma, Leverkusen, Fed. Rep. of Germany; Josef Pedain, Cologne, Fed. Rep. of Germany; Walter Schröer, and Rolf Langel, both of Leverkusen, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Bayerwerk, Fed. Rep. of Germany**

**Filed Feb. 18, 1986, Ser. No. 829,892**

**Claims priority, application Fed. Rep. of Germany, Mar. 2, 1985, 3507467; Jun. 22, 1985, 3522464**

**Int. Cl.[4] D06M** *15/564, 15/568, 15/572, 15/576, 15/653*

**U.S. Cl. 427—246** **10 Claims**

1. A process for the production of a coating permeable to water vapor on a fabric or leather substrate which comprises applying an optionally pigmented spreading paste comprising a multiphase mixture of

(A) about 5 to 50% by weight of a hydrophobic polyurethane and/or polyurethane urea wherein a synthesis component comprising a member selected from the group consisting of silicone resins, polyethers containing aromatic segments, polyesters containing aromatic segments and perfluorocarbon resins is used in an amount sufficient for said polyurethane and/or polyurethane urea to contain about 1 to 30% by weight of said synthesis component,

(B) 0 to about 30% by weight of a hydrophobic polyurethane and/or polyurethane urea which has not been synthesized with said synthesis component,

(C) about 4.5 to 50% by weight of an organic solvent suitable for solubilizing components (A) and (B),

(D) 0 to about 40% by weight of an organic non-solvent which will not solubilize components (A) and (B),

(E) 0 to about 10% by weight of a polymer which does not contain either urethane or urea groups and which does contain a carboxyl group completely or partly neutralized with a base,

(F) about 10 to 70% by weight of water and

(G) 0 to about 5% by weight of a crosslinking agent, hydrophobicizing agent or stabilizer, to a fabric or leather substrate by the direct or transfer method and subsequently curing the coating using the technique of evaporation coagulation.

10. The coated substrate produced in accordance with claim 1.

**4,743,471**

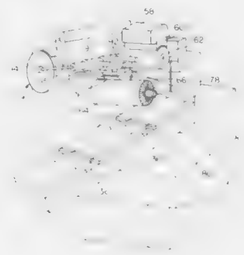
## METHOD FOR RANDOM COLORING OF ROOF TILES

**Peter P. Shills, III, Riverside, Calif., assignor to Monier Roof Tile Inc., Orange, Calif.**

**Filed May 21, 1987, Ser. No. 52,429**

**Int. Cl.[4] B05D** *5/06*

**U.S. Cl. 427—262** **9 Claims**



1. A process for coloring a plurality of roof tiles consisting of applying a plurality of colors to each of the plurality of roof tiles in a randomly varying manner so that the pattern of plural colors formed thereby on any one of the roof tiles is never exactly duplicated on another roof tile.

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**4,743,472**

## PROCESS FOR PRODUCTION OF FLAT MOLDING INSERTS SUCH AS GASKETS

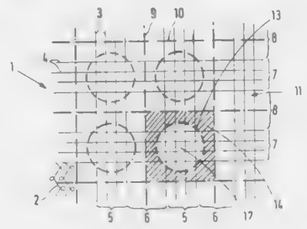
**Christian Wilkens, Heusenstam, Fed. Rep. of Germany, assignor to Karl Mayer Textilmaschinenfabrik GmbH, Obertshausen, Fed. Rep. of Germany**

**Filed Sep. 19, 1985, Ser. No. 777,518**

**Claims priority, application Fed. Rep. of Germany, Oct. 10, 1984, 3437087**

**Int. Cl.[4] B05D** *3/12*

**U.S. Cl. 427—292** **28 Claims**



1. A process for the formation of articles such as gaskets from embedding material and a flat textile panel, said panel being divisible into useful areas corresponding to said articles and areas outside said useful areas comprising the steps of:

locating said reinforcement threads in the areas of the textile panel corresponding to the useful areas in greater thickness and density than in the majority of the areas of the panel remaining outside the useful areas;

producing said textile panel from a ground pattern having the reinforcement threads inlaid thereinto;

separating the useful areas from said textile panel; and

embedding said embedding material into the appropriate useful areas corresponding to said articles.



**4,743,473**

## METHOD OF PRESERVING WOOD WITH LANTHANIDE DERIVATIVES

**Peter S. Gradeff, Pottersville, and John F. Davison, Edison, both of N.J., assignors to Rhone-Poulenc Inc., Monmouth Junction, N.J.**

**Filed Feb. 20, 1987, Ser. No. 17,159**

**Int. Cl.[4] B05D** *1/18, 3/00*

**U.S. Cl. 427—297** **17 Claims**

1. A method of preserving wood comprising the steps of

(a) immersing wood into a composition comprising an aqueous solution of one or more lanthanide derivatives; and

(b) maintaining elevated pressure for a period of time sufficient to permanently bond the lanthanide to the wood.

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**4,743,474**

## COATING PROCESS AND MOISTURE-CURABLE ORGANOPOLYSILOXANE COMPOSITIONS THEREFOR

**Gary R. Homan, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.**

**Continuation-in-part of Ser. No. 520,793, Aug. 5, 1983, abandoned. This application Apr. 30, 1984, Ser. No. 605,315**

**Int. Cl.[4] B05D** *3/02*

**U.S. Cl. 427—387** **22 Claims**

1. An organopolysiloxane fluid, stable in the absence of moisture and having the formula

$$Z^1Me_2SiO(Me_2SiO)_x(MeDSiO)_xSiMe_2{}^1$$

wherein

Me denotes a methyl radical,

D denotes $-Q^1SiMe_a(OMe)_{3-a}$,

a has a value of 0 or 1,

x has an average value of at least about 50,

x+y has a value of from about 100 to about 400,

y has an average value of from 1 to about (x+y)/4,

and a value of from 1 to about 3600/(x+y) when the value of x+y is 120 or more

and the organopolysiloxane fluid contains an average of at least 3 D radicals per molecule and wherein each $Z_1$ denotes a D radical and $Q_1$ denotes an alkylene radical having from 2 to about 10 carbon atoms.

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**4,743,475**

## DRYWALL COATING COMPOSITION

**Robert H. Negri, Palatine, and Peter M. Attard, Elk Grove, both of Ill., assignors to United States Gypsum Company, Chicago, Ill.**

**Filed Feb. 9, 1987, Ser. No. 12,493**

**Int. Cl.[4] C08K** *3/34;* **B05D** *3/02*

**U.S. Cl. 427—387** **9 Claims**

1. A method for equalizing the porosity and concealing differences in texture of a joint compound reinforced drywall comprising blending a dry powder consisting essentially of:

from about 16% to about 24% calcium carbonate,

from about 20% to about 30% kaolin,

from about 3% to about 5% attapulgus clay,

from about 8% to about 12% mica,

from about 16% to about 24% sodium potassium aluminum silicate,

from about 4.5% to about 10% vinyl acetate/ethylene copolymer,

from about 1% to about 3% of a water soluble cellulose ether,

a 2% aqueous solution of which has a viscosity of from about 5000 to about 50,000 cps at a shear rate of 2 $sec^{-1}$ and a viscosity of from about 50 to about 90 cps at a shear rate of 10,000 $sec^{-1}$,

and a dispersant;

dispersing the dry powder in a sufficient amount of water to make a paint containing from about 60% to about 70% water by weight, and coating the drywall with the paint.

**4,743,476**

## METHOD FOR PRODUCING THERMOPLASTIC ARTICLES HAVING ANTI-STATIC ARMOR

**Jack V. Miller, 700 N. Auburn Ave., Sierra Madre, Calif. 91024**

**Filed May 28, 1985, Ser. No. 738,302**

**Int. Cl.[4] B05D** *1/18*

**U.S. Cl. 427—430.1** **8 Claims**

1. A process for producing thermoplastic articles having anti-static armor comprising immersing the article in a solution comprising an organic solvent for the thermoplastic material and at least one dissolved metallic salt for a time sufficient for the dissolved metallic salt to penetrate the surface of the article to a select depth.

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**4,743,477**

## OPTICAL NOVELTY SIMULATING A CONTAINERIZED RAINBOW

**Warren R. Beaver, 34 Second St. W., Kalispell, Mont. 59901**

**Filed Mar. 24, 1987, Ser. No. 29,544**

**Int. Cl.[4] B44F** *1/04, 9/00*

**U.S. Cl. 428—13** **7 Claims**

1. An article of manufacture that optically simulates a containerized rainbow, comprising, in combination:

a peripherally defined cylindrical container having a top and a bottom to define an enclosed chamber, said cylindrical container being formed of light transmitting material and having at least one surface that diffuses light passing therethrough;

a planar panel, formed of structurally joined strips of translucent light filtering material to produce rainbow colors, carried and extending vertically within the container chamber said panel passing no light therethrough except through the light filtering elements.

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**4,743,478**

## BROAD BAND CAMOUFLAGE SCREEN HAVING A FREQUENCY DEPENDENT RADAR ATTENUATION

**Gunter Pusch, Neckargemund, Fed. Rep. of Germany, assignor to Klaus-Werner Pusch, Lachen, Switzerland**

**Continuation-in-part of Ser. No. 718,080, Apr. 1, 1985, Pat. No. 4,640,851. This application Oct. 24, 1986, Ser. No. 922,721**

**The portion of the term of this patent subsequent to Feb. 3, 2004, has been disclaimed.**

**Int. Cl.[4] F41H** *3/00, 3/02;* **B32B** *3/10*

**U.S. Cl. 428—17** **10 Claims**



1. A camouflage material having a wide-band effect ranging from the visual portion of the spectrum up through the radar region of the spectrum, said material comprising a base layer consisting of woven strips of polyethylene material forming rectangles or squares whose long dimension is smaller than $\frac{1}{4}$ lambda of the largest radar wavelength used for reconnaissance systems and larger than $\frac{1}{4}$ lambda of the radar wavelength used for homing missiles and bullets; an intermediate homogeneous metal layer on said base layer reflective in the

range of terrestrial thermal radiation as well as in the radar region of the spectrum and having a specific surface resistivity of not more than 0.5 to 10 ohms per square; and an outer camouflage paint layer applied on said reflective metal layer, said paint containing coloring matter having reflective properties in the visible and near IR spectral regions that are similar to the natural background and containing a binder having high transparency characteristics in the spectral regions of the atmospheric windows II (3–5 μm) and III (8–14 μm); wherein the emissivity of the camouflage paint in windows II and III varies over the surface of the material and varies between 50 and 90% in window II and between 60 and 95% in window III and wherein the metal is selected from the group consisting of aluminum, copper, zinc and its alloys.

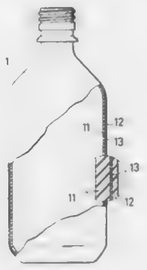
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**4,743,479**

## MULTI-LAYERED VESSELS AND METHOD FOR MOLDING THE SAME

**Yoshinori Nakamura; Hiroyuki Orimoto, and Kouichi Sato, all of Sakakimachi, Japan, assignors to Nissei ASB Machine Co., Ltd., Japan**

**Filed Apr. 8, 1986, Ser. No. 849,556**
**Claims priority, application Japan, Apr. 12, 1985, 60-78015**
**Int. Cl.⁴ B65D *23/00***
**U.S. Cl. 428—35** **4 Claims**



1. A multi-layered vessel, comprising:
a vessel body defined by a peripheral wall which forms the vessel, the peripheral wall comprising at least three superposed wall layers and including at least an inner wall layer, an outer wall layer and an intermediate layer disposed between the inner and outer wall layers, the vessel body being formed by blow or orientation blow molding from an injection molded multi-layered parison, the inner and outer wall layers comprising a first resin and the intermediate layer comprising a second different resin having substantially improved gas barrier or heat resisting characteristics as compared to the first resin, the second resin being flowed into the first resin to separate the first resin and to form it into the inner and outer wall layers, the wall thickness of the intermediate layer being smaller than the outer wall layer and the wall thickness ratio of the inner wall layer to the outer wall layer being greater than 2.3:1.

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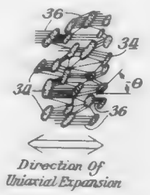
**4,743,480**

## APPARATUS AND METHOD FOR EXTRUDING AND EXPANDING POLYTETRAFLUOROETHYLENE TUBING AND THE PRODUCTS PRODUCED THEREBY

**Michael L. Campbell; Benjamin G. Williams; Rob G. Riffle, and Charles E. Biggerstaff, all of Flagstaff, Ariz., assignors to W. L. Gore & Associates, Inc., Newark, Del.**

**Filed Nov. 13, 1986, Ser. No. 930,411**
**Int. Cl.⁴ D02G *3/00***
**U.S. Cl. 428—36** **22 Claims**

1. An extruded and expanded tube of a porous material consisting essentially of polytetrafluorethylene (PTFE) said tube having a longitudinal axis and tube wall having an inside radius and an outside radius, which PTFE material has a microstructure characterized by elongated nodes, each node having a longitudinal axis and a transverse axis, which nodes are interconnected by fine fibrils, substantially all of said longitudinal axes of said nodes at at least one radial position within said tube wall being oriented at an angle between about 85 degrees and about 15 degrees with respect to said longitudinal axis of said tube.



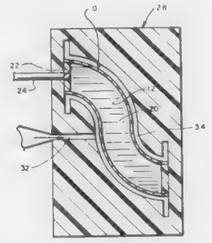

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**4,743,481**

## MOLDING PROCESS FOR ARTICLES HAVING AN IRREGULAR SHAPED INTERNAL PASSAGE

**James T. Quinlan, Massillon; James I. Seeley, New Philadelphia, both of Ohio; Christopher H. Corbett, Auburn Hts., Mich., and Thomas A. Marcincavage, Guernsey, Ohio, assignors to Flex Technologies, Inc., Midvale, Ohio**

**Filed Nov. 26, 1986, Ser. No. 937,117**
**Int. Cl.⁴ B28B *7/18*; B29C *63/44***
**U.S. Cl. 428—36** **16 Claims**



11. A molded plastic article having a complex internal passage made by the steps comprising:
forming a plurality of thermoplastic preforms having internal surfaces which when combined substantially match the complex internal passage of the article;
loading said plurality of preforms in a predetermined pattern into a mold with said internal surfaces forming said complex internal passage;
molding a plastic material on said preform; and
forming said article having said preforms remaining as an integral part thereof whereby said internal surfaces of the preforms form said internal passage of the molded article.

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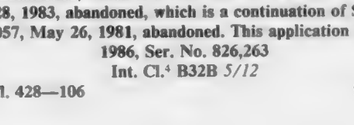
**4,743,482**

## PROTECTIVE FLAP FOR THE SEAM IN NEEDLE-FELTS FOR INDUSTRIAL USE

**Jörgen Johansson, Skogsvägen 43; Göran Nohlgren, Blåbärsvägen 21, and Erik Nyholm, Skogsvägen, all of Högsjö, Sweden**

**Filed Oct. 7, 1986, Ser. No. 916,367**
**Claims priority, application Sweden, Oct. 11, 1985, 8504734**
**Int. Cl.⁴ B32B *3/00***
**U.S. Cl. 428—57** **7 Claims**

1. In a press felt for use on a papermaking machine, the press felt having a substrate, a releasable seam extending substantially transversely to the direction of movement of the press felt on the machine, a layer of wadding on the substrate, and a disengageable protective flap in the wadding covering the seam, the improvement wherein the protective flap comprises:



at least one layer of longitudinal fibers wherein said fibers extend substantially in the direction of movement of the felt and overlie the seam.

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**4,743,483**

## NAPPED SHEET HAVING A PATTERN THEREON AND METHOD FOR ITS PRODUCTION

**Hisao Shimizu, Otsu; Koji Watanabe, Kusatsu, and Miyoshi Okamoto, Takatsuki, all of Japan, assignors to Toray Industries, Inc., Otsu, Japan**

**Filed Dec. 2, 1986, Ser. No. 937,093**
**Claims priority, application Japan, Dec. 5, 1985, 60-273816; Dec. 23, 1985, 60-287825; Mar. 4, 1986, 61-45162**
**Int. Cl.⁴ B32B *3/02, 33/00***
**U.S. Cl. 428—89** **20 Claims**



1. A napped sheet having a sharp, non-random pattern on at least one surface, said surface being composed of a nap area and a reversed nap area on which nap ends are extending into the inner part or through the opposite surface of the sheet, the width of the intermediate zone between the two areas being not more than 1 mm.

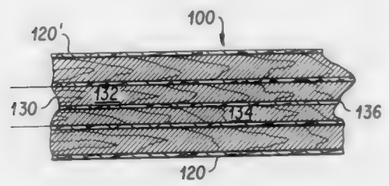
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**4,743,484**

## LAMINATED VENEER LUMBER (LVL)

**Earl H. Robbins, P.O. Box 668, Eugene, Oreg. 97440**

**Continuation-in-part of Ser. No. 685,205, Dec. 24, 1984, Pat. No. 4,569,873, which is a continuation of Ser. No. 526,803, Oct. 21, 1983, abandoned, which is a continuation of Ser. No. 470,336, Feb. 28, 1983, abandoned, which is a continuation of Ser. No. 267,057, May 26, 1981, abandoned. This application Feb. 5, 1986, Ser. No. 826,263**
**Int. Cl.⁴ B32B *5/12***
**U.S. Cl. 428—106** **9 Claims**




1. A laminated veneer lumber, comprising:
spaced facing exposed panels, each of said panels comprising an exposed veneer sheet and a layer of adhesively-bonded biomass particles adhered to said exposed veneer sheet, of said panels disposed such that the grain in one exposed veneer sheet of one panel lies substantially parallel with the grain in the exposed veneer sheet of the other panel; and
an intermediate panel comprising a layer of veneer sheeting sandwiched between layers of adhesively-bonded biomass particles disposed substantially parallel and coextensive with the exposed veneer sheets, with the grain of the layer of intermediate veneer sheeting being substantially perpendicular to the grains of the exposed veneer sheets said intermediate panel being bonded to each of said spaced facing panels by an adhesive layer.

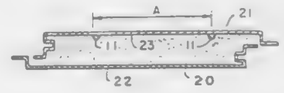
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**4,743,485**

## VENTED COMPOSITE FOAM PANEL

**Raymond M. L. Ting, 318 Holiday Dr., Pittsburgh, Pa. 15237**

**Continuation-in-part of Ser. No. 877,412, Jun. 23, 1986. This application Apr. 16, 1987, Ser. No. 38,968**
**Int. Cl.⁴ B32B *3/00, 3/18*; E04C *1/00***
**U.S. Cl. 428—109** **7 Claims**




1. In a building panel wall assembly formed from individual building panels, installed in side-by-side relationship, each panel having two exterior metal skins adhesively connected to a structural foam core along the inner surfaces of said exterior metal skins, said foam core having exposed perimeters along the ends and the sides of said panel, wherein each panel is of a construction formed by depositing liquid foam resin between said two exterior metal skins restrained in a jig during the curing period; the improvement comprising at least one gas venting channel formed near said inner surface of one of said exterior metal skins, said gas venting channel starting near the central region of said panel and running continuously to a termination point at one of said exposed foam core perimeters.

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**4,743,486**

## PRODUCT AND METHOD OF PRODUCING A PLASTICS MATERIAL MESH STRUCTURE

**Frank B. Mercer, Blackburn, and Keith F. Martin, Wiswell, both of Great Britain, assignors to P.L.G. Research Limited, Blackburn, England**

**Filed Apr. 14, 1986, Ser. No. 851,737**
**Claims priority, application United Kingdom, Apr. 12, 1985, [illegible]**
**Int. Cl.⁴ B32B *3/10*; B29C *55/00***
**U.S. Cl. 428—134** **11 Claims**

1. A method of producing a plastics material mesh structure, comprising providing a starting material which has a pattern of holes or depressions whose centers are on a notional square or rectangular grid and wherein respective said holes or depressions have peripheries defined by curves or straight lines with smooth transitions from one curve or straight line to another, which pattern defines strand-forming zones between holes or depressions which are adjacent in a direction at right angles to a stretching direction, each strand-forming zone having, as considered in said stretching direction, a first part followed by a second part followed by a third part, said first and third parts being of less width than said second part, said respective widths being as measured in a direction at right angles to said stretching direction, and stretching said starting material in said stretching direction to stretch out and molecularly orientate said strand-forming zones to form molecularly-orientated

strands, said strand-forming zones yielding initially at said first and third parts and said second parts being subsequently stretched out and molecularly orientated.

**11**. A molecularly-orientated plastics material mesh structure which has been formed by stretching an integral starting material having a pattern of holes or depressions whose centers are on a notional square or rectangular grid, which mesh structure comprises strands which have been molecularly-orientated from end to end and extend substantially parallel to a direction in which said starting material has been stretched to form said mesh structure, and which mesh structure, on shrinking back to the starting material, forms a material which has a pattern of holes or depressions defining zones which formed the strands, each of which zones have, as considered in at least one shrink-back direction, a first part followed by a second part followed by a third part, said first and third parts being of less width than said second part, the respective widths being as measured in a direction at right angles to said at least one shrink-back direction, and wherein respective said holes or depressions have peripheries defined by curves or straight lines with smooth transitions from one curve or straight line to another.



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**4,743,487**

**MAGNETIC RECORDING MEDIUM**

**Shinji Saito; Chiaki Mizuno; Hiroshi Ogawa; Noburo Hibino, and Yasuo Tamai, all of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Japan**

**Filed Jan. 7, 1986, Ser. No. 816,872**

**Claims priority, application Japan, Jan. 8, 1985, 60-1106**

**Int. Cl.⁴ G11B** *5/70, 5/704*

**U.S. Cl. 428—141** **6 Claims**

**1**. A magnetic recording medium comprising a flexible nonmagnetic support and a magnetic recording layer which contains a ferromagnetic cobalt-containing iron oxide and is provided on the support, in which said nonmagnetic support has a heat shrinkage ratio of not higher than 1.5% and a surface of a center line average height in the range of 0.01 to 0.1 μm on both sides and said magnetic recording medium has a heat shrinkage ratio of not higher than 1%, the heat shrinkage ratio being determined after allowing to stand at 110° C. for four hours.

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**4,743,488**

**LAMINATED ARTICLE AND METHOD OF FORMING THE SAME**

**Wallace R. Jones, Waite Hill Village; Robert A. Isaksen, Chardon, and Paul A. Krieger, North Ridgeville, all of Ohio, assignors to Excello Specialty Company, Cleveland, Ohio**

**Filed Oct. 31, 1986, Ser. No. 925,224**

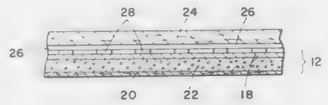
**Int. Cl.⁴ B32B** *3/26, 7/14, 31/00*

**U.S. Cl. 428—198** **9 Claims**

**9**. A laminated article comprising:

a first flexible thin sheet of foam material having first and second faces with fabric joined to extend across at least said first face;

a second sheet of flexible material joined the extend across said second face of said first sheet by a pressure sensitive adhesive applied to said second face of said first sheet in a manner to prevent significant absorption of said adhesive by said first sheet, said pressure sensitive adhesive applied




in a regular, discontinuous pattern having a multiplicity of open areas separated by pressure sensitive adhesive whereby the breathability and flexibility of said laminated article is not adversely affected by said pressure sensitive adhesive.

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**4,743,489**

**MULTILAYER WIRING SUBSTRATE**

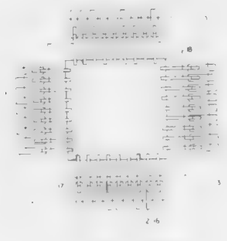
**Shinichi Hasegawa, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed Nov. 5, 1986, Ser. No. 927,175**

**Claims priority, application Japan, Nov. 6, 1985, 60-247150**

**Int. Cl.⁴ B32B** *3/00, 17/06, 9/00, 15/00*

**U.S. Cl. 428—210** **1 Claim**



**1**. A multilayer wiring substrate for mounting a plurality of electronic circuit elements comprising:

a plurality of wiring layers having wirings to be connected to said electronic circuit elements;

a plurality of insulating layers including an organic material for providing insulation between said wiring layers;

a plurality of pads formed on the uppermost one of said insulating layers and connected to wiring members by pressure bonding; and

at least one buffer member provided beneath said pads and made of a ceramic material to prevent pressure applied during bonding of said wiring members to said pads from affecting said wiring layers.

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**4,743,490**

**COUNTERFEIT-RESISTANT MAGNETIC RECORDING TAPE**

**Richard E. Fayling, White Bear Lake, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

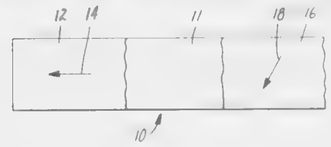
**Filed Feb. 24, 1986, Ser. No. 832,141**

**Int. Cl.⁴ G11B** *5/70*

**U.S. Cl. 428—212** **16 Claims**

**1**. Magnetic video recording tape comprising a flexible backing carrying a faceside magnetic recording layer and a backside surface layer comprising electrically conductive particles in a nonmagnetic binder, wherein the improvement comprises:

the backside layer includes ferromagnetic particles, the $H_c$ of which is sufficiently high that they are not affected by the recording of signals onto the magnetic recording layer, and the $B_r$ of which is sufficiently low that when recorded




in a distinctive magnetic pattern, their fields do not interfere with signals of the magnetic recording layer.

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**4,743,491**

**PERPENDICULAR MAGNETIC RECORDING MEDIUM AND FABRICATION METHOD THEREFOR**

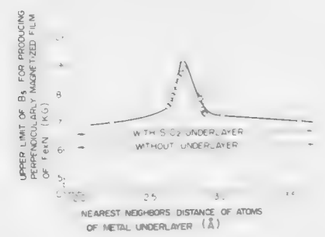
**Seiichi Asada, Kyoto; Hiroyuki Suzuki, Kokubunji; Toshio Niihara, Hachioji; Kazuetsu Yoshida, Kodaira; Masaaki Futamoto, Kanagawa; Yukio Honda, Fuchu; Norikazu Tsumita, Higashiyamato, and Kazuo Shiiki, Kanagawa, all of Japan, assignors to Hitachi, Ltd. and Hitachi Maxell, Ltd., both of Tokyo, Japan**

**Filed Nov. 1, 1985, Ser. No. 793,772**

**Claims priority, application Japan, Nov. 2, 1984, 59-230226; Nov. 2, 1984, 59-230227**

**Int. Cl.⁴ G11B** *7/24*

**U.S. Cl. 428—213** **33 Claims**




**1**. A method for fabricating a perpendicular magnetic recording medium in which a magnetic thin film whose main component is iron nitride having perpendicular magnetic anisotropy, a nitrogen content of 20 to 32 atom % and a saturation flux density of 0.2 $Wb/m^2$ to 1.0 $Wb/m^2$ is formed on an electrically conductive underlayer deposited on a non-magnetic substrate by physical evaporation in an Ar stream, a stream of mixed gas of Ar and nitrogen, a nitrogen stream, or a stream of mixed gas of hydrogen and one of said gases, by using iron or iron nitride as starting material, said electrically conductive layer having a thickness of at least 0.01 μm, an electrical resistivity not greater than $1\times10^{-1}$ Ωcm and in which the distance between nearest neighbor atoms is 0.25 nm to 0.32 nm.

**5**. A perpendicular magnetic recording medium comprising:

a non-magnetic substrate;

an electrically conductive underlayer deposited on said non-magnetic substrate, said electrically conductive underlayer having a thickness of at least 0.01 μm, an electrical resistivity not greater than $1\times10^{-1}$ Ωcm and in which the distance between nearest neighbor atoms is 0.25 nm to 0.32 nm; and

a magnetic thin film formed on said electrically conductive underlayer, whose main component is iron nitride having perpendicular magnetic anisotropy, wherein the content of nitrogen in said magnetic thin film is 20 to 32 atom % and said magnetic thin film has a saturation magnetic flux density of 0.2 $Wb/m^2$ to 1.0 $Wb/m^2$.

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**4,743,492**

**TWO LAYER COATING SYSTEM FOR POLYVINYL FLUORIDE COATINGS**

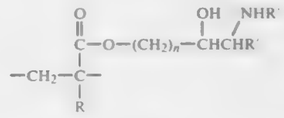
**Joseph D. C. Wilson, II, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Jun. 20, 1986, Ser. No. 876,406**

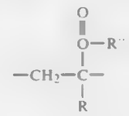
**Int. Cl.⁴ B32B** *15/08, 11/04*

**U.S. Cl. 428—216** **3 Claims**

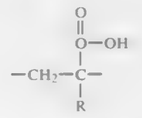
**1**. A composite comprising a metal substrate, intimately adhered to said substrate a layer from 0.1–0.5 mil in thickness which is a blend comprising 65–95 weight percent of a copolymer comprising 1–10 weight percent repeating units of the structure



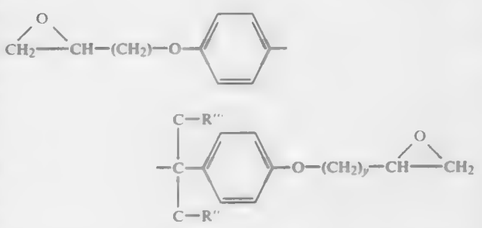
wherein n is 1–6, —R is —H or $—CH_3$ and —R′ and R′ are independently H or alkyl groups having 1–6 carbon atoms, 75–99 weight percent repeating units of the structure



where —R″ is an alkyl group having 1–18 carbon atoms, and 0–15 weight percent repeating units of the structure



with 5–35 weight percent of an epoxy compound of the structure



where —R‴ is —H or —F and x and y are independent integers from 1–18; and a topcoat from 0.1–30 mils in thickness which consists essentially of polyvinyl fluoride.

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**4,743,493**

**ION IMPLANTATION OF PLASTICS**

**Piran Sioshansi, Bedford, and Richard W. Oliver, Acton, both of Mass., assignors to Spire Corporation, Bedford, Mass.**

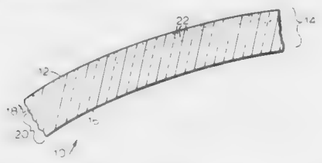
**Filed Oct. 6, 1986, Ser. No. 915,414**

**Int. Cl.⁴ B32B** *27/08;* **B44C** *5/08*

**U.S. Cl. 428—217** **5 Claims**

**1**. An inflexible plastic material with improved surface characteristics, including increased surface hardness and increased surface resistance to chemical attack, comprising:

(a) a layer formed of said inflexible plastic material of one of a group of plastic materials comprising the polycarbonates, the acrylics, a combination of polycarbonates and acrylics, and ultra high molecular weight polyethylenes;
(b) said layer composed of at least two integral stratums: a thin stratum and a thick stratum contiguous therewith, wherein said thin stratum has a thickness from about 0.1 to about 5 micrometers;




(c) said thin stratum being ion implanted with an ion beam of energetic ions, wherein said implanted ions within said thin stratum impart to said layer said increased surface hardness and said increased surface chemical resistance; said implanted ions comprising aluminum, magnesium, silicon, titanium, yttrium, fluorine and chlorine ions.

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**4,743,494**

## PROCESS FOR PRODUCING HYDROPHILIC POLYOLEFIN NONWOVEN FABRIC

**Masato Komatsu; Kiyotada Narukawa, both of Saitama, and Noboru Yamamoto, Tokyo, all of Japan, assignors to Toa Nenryo Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 1, 1986, Ser. No. 936,410**
**Int. Cl.[4] B05D** *1/08*
**U.S. Cl. 428—224** **15 Claims**

**1**. A nonwoven fabric of fibers of polyolefin, said fibers having a diameter of less than 50 microns, said fabric having a basis weight of 5 to 200 grams/$m^2$, said polyolefin containing more than 0.1 parts and no more than 2 parts by weight hindered amine compound per 100 parts by weight polyolefin, said fabric being plasma treated to impart a durable hydrophilic nature and being capable of being penetrated by water.

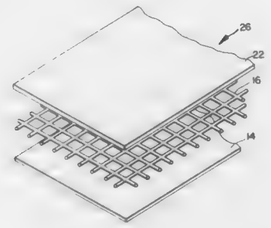
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**4,743,495**

## SEAT CUSHION FIRE BLOCKING FABRIC

**Harish N. Lilani, Plymouth Meeting, and John W. Weber, Sr. deceased, late of Norristown, both of Pa. (by John Weber Jr., executor), assignors to Amatex Corporation, Norristown, Pa.**

**Filed Feb. 17, 1987, Ser. No. 15,172**
**Int. Cl.[4] B32B** *1/04*
**U.S. Cl. 428—234** **5 Claims**




**1**. A nonwoven, multiplied flame resistant fabric comprised of:
at least two felted plies, each ply being further comprised of fibers selected from the group consisting of aramid fibers, polybenzimidazole fibers, and phenolic fibers, wherein the combined percentage by weight of said aramid and phenolic fibers is approximately 80% by weight of said felted ply with the aramid fibers being present in the range of about 10% to 60% and the phenolic fibers being present in the range of about 20% to 70%.; and
the plies are united into a single fabric by fibers which are needled from the respective ply into the other ply.

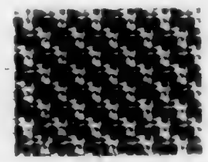
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**4,743,496**

## SCREENS AND METHOD OF MAKING THE SAME

**Wolfgang Wrasidlo, La Jolla, and Frieder K. Hofmann, Oceanside, both of Calif., assignors to Brunswick Corporation, San Diego, Calif.**

**Filed Dec. 30, 1985, Ser. No. 814,301**
**Int. Cl.[4] B32B** *7/00*
**U.S. Cl. 428—254** **23 Claims**



**1**. A polymer fabric mesh made of strands of synthetic material having openings defined by said strands in which the improvement comprises:
said strands being further defined by a continuous, smooth, curved polymer layer extending between and connecting said strands, said polymer layer having been produced by (1) placing some of said polymer material in solution, (2) allowing said polymer solution to flow so as to cover, surround, extend between, and connect said strands and (3) drying said polymer solution so as to produce said layer.

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**4,743,497**

## LAMINATED PUNCTURE SEALING COMPOSITE AND PREPARATION THEREOF

**Agmund K. Thorsrud, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Continuation of Ser. No. 763,726, Aug. 8, 1985, abandoned. This application Sep. 30, 1986, Ser. No. 913,295**
**Int. Cl.[4] B32B** *11/10, 25/10;* **B60C** *21/08, 21/14*
**U.S. Cl. 428—286** **14 Claims**

**1**. A laminate comprising:
(a) a first stratum of non-woven fabric adhered to
(b) a second stratum of sealing composition comprising:
(1) asphalt,
(2) an alkadiene-vinylarene copolymer present in an amount in the range of about 5 to about 50 parts by weight per 100 parts of asphalt,
(3) a hydrocarbon resin present in an amount in the range of about 1 to about 30 parts by weight per 100 parts of asphalt, and
(4) silica present in a range of about zero to about 100 parts by weight per 100 parts of asphalt, said second stratum pressure adhered to
(c) the inside of a tire carcass.

**13**. A process for sealing a tire from punctures comprising adhering to the inside of said tire along the crown of said tire a strip of material consisting of (1) a layer of non-woven fabric and (2) a layer of a composition comprising:
(a) asphalt,
(b) an alkadiene-vinylarene copolymer present in the amount ranging from about 5 to about 50 parts by weight per 100 parts of asphalt,
(c) a hydrocarbon resin present in an amount ranging from about 0 to about 30 parts by weight per 100 parts of asphalt,
(d) silica present in an amount ranging from about 0 to about 100 parts by weight per 100 parts of asphalt wherein said composition is placed next to said tire.

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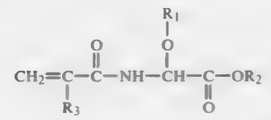
**4,743,498**

## EMULSION ADHESIVE

**Thomas J. Kedrowski, Vadnais Heights, and Nicholas C. Lehman, Maple Grove, both of Minn., assignors to H.B. Fuller Company, St. Paul, Minn.**

**Filed Mar. 31, 1986, Ser. No. 846,287**
**Int. Cl.[4] D04H** *1/58*
**U.S. Cl. 428—288** **13 Claims**

**1**. A nonwoven fabric comprising an adhesively bonded assembly made of at least one web of loosely assembled randomly arranged nonwoven fibers using a bonding adhesive which comprises, in an aqueous emulsion, a polymer derived from:
(a) about 2 to 98 wt-% of a vinyl monomer;
(b) about 0.1 to 50 wt-% of an alkylacryl amido glycolate alkyl ether of the formula



wherein $R_1$ and $R_2$ are independently $C_{1\text{-}6}$ alkyl or cycloalkyl and $R_3$ is hydrogen or methyl; and
(c) about 0.1 to 20 wt-% of a vinyl monomer having a free crosslinking reactive hydrogen in the form of a hydroxyl group, and amino group, or mixtures of such vinyl monomers;
wherein the amount of each monomer is based on the total polymer weight.

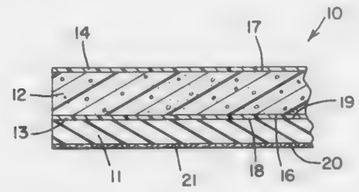
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**4,743,499**

## HYDROCOLLOID LAMINATE

**Robert W. Volke, Garrettsville, Ohio, assignor to Variseal Corporation, Parkman, Ohio**

**Filed May 20, 1987, Ser. No. 51,591**
**Int. Cl.[4] B32B** *3/26, 9/00;* **A61L** *15/00*
**U.S. Cl. 428—317.3** **7 Claims**




**1**. A hydrocolloid laminate comprising:
a lower layer of hydrocolloid adhesive;
an upper layer of flexible open-cell polymer foam;
first film layer interposed between said adhesive layer and said polymer foam layer; and
second film layer provided on said polymer foam layer on the side opposite said first film layer.

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**4,743,500**

## MAGNETIC RECORDING MEDIUM

**Takahito Miyoshi, and Masaaki Fujiyama, both of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Japan**

**Filed Oct. 14, 1986, Ser. No. 918,261**
**Claims priority, application Japan, Oct. 12, 1985, 60-227433**
**Int. Cl.[4] G11B** *5/708*
**U.S. Cl. 428—323** **9 Claims**

**1**. A magnetic recording medium comprising a non-magnetic support and a magnetic recording layer provided on said support, said magnetic recording layer comprising a ferromagnetic metal powder having a specific surface area of not less than 45 $m^2/g$ and an inorganic powder having a Mohs' scale of hardness of not less than 5 which are dispersed in a binder, wherein
5–40 particles of said inorganic powder are arranged in the magnetic recording layer per (10 $\mu m)^2$ of the surface area of said recording layer in such manner that a portion of each inorganic particle is exposed on of the surface of the magnetic recording layer; and
the average content of said inorganic powder in a portion of said recording layer within depth of 0.1 $\mu m$ from the surface thereof is higher than that in other portion of the magnetic recording layer.

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**4,743,501**

## MAGNETIC RECORDING MEDIUM

**Kenichiro Eguchi; Kazuhiro Kuroda, and Ryoichi Awano, all of Nagano, Japan, assignors to TDK Corporation, Tokyo, Japan**

**Filed Nov. 26, 1986, Ser. No. 935,517**
**Claims priority, application Japan. Nov. 27, 1985, 60-266334; Dec. 6, 1985, 60-274570; Oct. 3, 1986, 61-235892**
**Int. Cl.[4] G11B** *5/714*
**U.S. Cl. 428—328** **19 Claims**

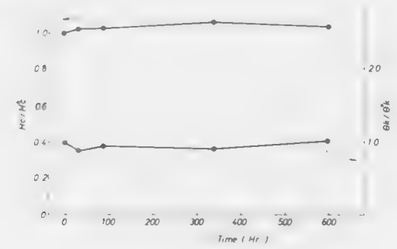
**1**. In a magnetic recording medium comprising a substrate having a pair of opposed major surfaces and a magnetic recording composition comprising a binder and a magnetic powder having a BET value of 30 to 60 $m^2/g$ and a pH value of 7 to 10 applied to at least one major surface of said substrate,
the improvement wherein said binder is comprised of a copolymer comprising (A) vinyl chloride, (B) a hydroxyl group-containing vinyl monomer, (C) a polar group-containing monomer, and optionally (D) a vinyl acetate as component units, wherein the hydroxyl group of said hydroxy group-containing vinyl monomer (B) is not directly attached to the vinyl group, and the polar group-containing monomer (C) contains 0.01 to 15% by weight of at least one polar group selected from residues and salts of carboxylic acid, phosphoric acid, sulfuric acid, and sulfonic acid, and an amino group and an ammonium group.

**10**. In a magnetic recording medium comprising a substrate having a pair of opposed major surfaces and a magnetic coating composition comprising a binder and a magnetic powder having a BET value of 30 to 60 $m^2/g$ and a pH value of 7 to 10 applied to at least one major surface of said substrate,
the improvement wherein said binder is comprised of a copolymer comprising (A) vinyl chloride, (B) a hydroxyl group-containing vinyl monomer, (C) a polar group-containing monomer, and optionally (D) a vinyl acetate as component units, wherein the hydroxyl group of said hydroxy group-containing vinyl monomer (B) is not directly attached to the vinyl group, and the polar group-containing monomer (C) contains 0.01 to 15% by weight of at least one polar group selected from residues and salts of carboxylic acid, phosphoric acid, sulfuric acid, and sulfonic acid, and an amino group and an ammonium group and also contains an epoxy group.

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**4,743,502**
**MAGNETO-OPTICAL MEDIUM**
**Toshihiko Yoshitomi, Yokohama; Yoshimitsu Kobayashi, Tokyo; Jun Sasaki, Machida, and Yukio Watanabe, Yokohama, all of Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo, Japan**
**Filed Jul. 9, 1986, Ser. No. 883,817**
**Claims priority, application Japan, Jul. 10, 1985, 60-151506**
**Int. Cl.[4] G11B** *7/24*
**U.S. Cl. 428—336** **7 Claims**




1. A magneto-optical medium comprising a magnetic layer, a protective layer of a binary mixed oxide comprising aluminum oxide and one oxide selected from the group consisting of tantalum oxide, niobium oxide, titanium oxide, zirconium oxide and tungsten oxide, and a base plate, wherein the respective content of tantalum oxide and niobium oxide is 3 to 80 mol%, the respective content of titanium oxide and zirconium oxide is 20 to 95 mol% and the contents of tungsten oxide is 5 to 80 mol% based on said mixed oxide.

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**4,743,503**
**TITANATE/ORGANOSILANE COMPOSITIONS**
**Chia-Cheng Lin, Gibsonia, and Thomas G. Rukavina, Lower Burrell, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.**
**Filed Dec. 23, 1985, Ser. No. 812,666**
**Int. Cl.[4] C09J** *7/02*
**U.S. Cl. 428—353** **12 Claims**

1. A laminated product comprising:
a. a rigid substrate selected from the group consisting of glass, polyacrylates and polycarbonates;
b. an elastomeric interlayer adhered to said substrate; and
c. between said polymeric substrate and said elastomeric interlayer, a primer comprising titanate/organosilane copolymer consisting essentially of the reaction product of a titanium alkoxide and an organosilane of the general formula $R_xSi(OR')_{4-x}$ wherein R is an orgnaic radical and R' is an alkyl radical.

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**4,743,504**
**POLYESTER YARNS PRODUCED BY HIGH SPEED MELT-SPINNING PROCESSES**
**Paul L. I. Carr, Harrogate, United Kingdom, assignor to Imperial Chemical Industries Limited, London, England**
**Continuation of Ser. No. 270,297, Jun. 4, 1981, abandoned. This application Sep. 14, 1983, Ser. No. 531,975**
**Claims priority, application United Kingdom, Jun. 14, 1980, 8020665**
**Int. Cl.[4] D02G** *3/00*
**U.S. Cl. 428—364** **6 Claims**

1. A spun polyester yarn containing ethylene terephthalate as the main or only recurring unit having a percentage crystallinity ($\beta \times 10^2$) of less than 20, a birefringence ($\Delta n$) of at least $50 \times 10^{-3}$, a function A greater than 28 and a function $B \geqq 16$ where

$$A = \frac{\Delta n \times 10^3 (IV)}{(dpf)^{\frac{1}{2}}}$$

and $B = (A - 100\beta)$ and wherein IV is the intrinsic viscosity of the spun yarn, $\Delta n$ is the birefringence of the spun yarn and (dpf) is the filament decitex of the spun yarn.

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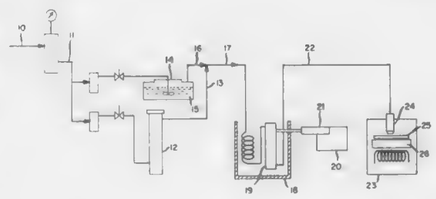
**4,743,505**
**ELECTROCONDUCTIVE COMPOSITE FIBER AND PROCESS FOR PREPARATION THEREOF**
**Setsuo Yamada, Ashiya; Fumiki Takabayashi; Yoshiyuki Sasaki, both of Takatsuki, and Katsuyuki Kasaoka, Ibaraki, all of Japan, assignors to Teijin Limited, Osaka, Japan**
**Filed Aug. 12, 1986, Ser. No. 895,791**
**Claims priority, application Japan, Aug. 27, 1985, 60-186595; Apr. 18, 1986, 61-88180**
**Int. Cl.[4] D02G** *3/00*
**U.S. Cl. 428—373** **16 Claims**



1. An electroconductive core-sheath composite fiber comprising a core comprising a low temperature flowing polymeric material containing an electroconductive substance and a sheath formed of a fiber-forming polymer, which surrounds the core, wherein the core is completely covered with the sheath, the electric resistance of the surface of the fiber is lower than $10^{10}$ Ω/cm, and the ratio of the electric resistance (Ω/cm) of the surface to the internal electric resistance between the sections is lower than $10^3$ and wherein discharge marks having a diameter smaller than 2 microns, which are formed by a high-voltage discharge treatment, are scattered along the direction of the axis of the fiber, and at least one discharge mark is present per 1 mm of the length in the direction of the fiber axis.

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**4,743,506**
**TIN OXIDE COATED ARTICLE**
**David A. Russo, Edison, N.J., and Georg H. Lindner, Vlissingen, Netherlands, assignors to M&T Chemicals Inc., Woodbridge, N.J.**
**Continuation-in-part of Ser. No. 784,279, Oct. 4, 1985, abandoned, which is a continuation-in-part of Ser. No. 705,595, Feb. 26, 1985, abandoned, which is a continuation-in-part of Ser. No. 687,065, Dec. 28, 1984, abandoned. This application Jul. 18, 1986, Ser. No. 888,552**
**Int. Cl.[4] B32B** *9/00*
**U.S. Cl. 428—389** **9 Claims**



1. A tin oxide coated article comprising a transparent, haze-free tin oxide coating directly on a substrate selected from the group consisting of glass, ceramics, solid state materials, metals, an elemental filaments, wherein said tin oxide coating is formed by deposition from a liquid coating composition comprising an organotin compound which is an alkyltin trichloride, a dialkyltin dichloride, an alkyldichlorotin acetate, an alkylchlorotin diacetate, or an ester tin trichloride, and a haze-reducing additive which is a fluorocarboxylic acid or anhydride said tin oxide coated article having less than 1% haze.



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**4,743,507**
**NONSPHERICAL MICROPARTICLES AND METHOD THEREFOR**
**Elias I. Franses, 3732 Capilano Dr.; James M. Caruthers, 1210 Western, and Kathleen M. Keville, 1155 Anthrop Dr. #3, all of West Lafayette, Ind. 47906**
**Filed Sep. 12, 1986, Ser. No. 906,505**
**Int. Cl.[4] B32B** *5/16;* **B29B** *9/10;* **B29C** *55/04, 55/12*
**U.S. Cl. 428—402** **26 Claims**



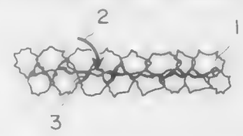
1. A method for producing nonspherical polymer particles which comprises:
dispersing spherical particles of a polymeric material having a glass-to-rubber transition temperature or melting point significantly greater than room temperature into a second material capable of forming a polymer matrix, said polymeric material and said polymer matrix having dissimilar chemical properties:
forming the dispersion of spherical particles into a shape and polymerizing the matrix-forming material to form a shaped particle/matrix composite material comprising the spherical particles embedded in an elastic polymer matrix;
heating the particle/matrix composite material to a temperature greater than the glass-to-rubber transition temperature or melting temperature of the spherical particles;
applying an axial strain to axially extend the heated particle/matrix composite material to form nonspherical particles in the extended matrix composite;
cooling the composite material while maintaining the composite material in its axially extended condition;
treating the composite material with an elastic polymer dissolution medium to selectively effect dissolution of the elastic polymer matrix and release of the nonspherical particles; and
recovering said nonspherical particles from said dissolution medium.

11. The nonspherical particles prepared in accordance with the method of claim 1.

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**4,743,508**
**GRINDSTONE-POLYMER COMPOSITE FOR SUPER COLLOID MILL AND MANUFACTURING METHOD THEREOF**
**Tsuneo Masuda, No. 12-24, Hon-cho 1-chome, Kawaguchi-shi, Saitama-Ken, Japan**
**Filed Mar. 17, 1986, Ser. No. 840,172**
**Int. Cl.[4] B32B** *9/00*
**U.S. Cl. 428—408** **3 Claims**

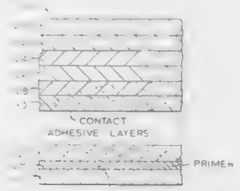
1. A grindstone-polymer composite for a super colloid mill characterized in that, in the inner void pores of a porous vitrified grindstone for a super colloid mill, thermoplastic and thermosetting polymers are allowed to grow and to fill up the wall surface of the void pores within a range of 30 to 60% of




total volume of void pores in said grindstone so as 70 to 40% of void pores in the grindstone for super colloid mill remain and the volume fraction Vp thereof lies within a range of 0.09 to 0.21.

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**4,743,509**
**FURNITURE VENEER AND METHOD OF MAKING SAME**
**Vladimiro Kokrhanek, Vigevano, Italy, assignor to Industria & Moda di A. Pesek, Vigevano, Italy**
**Continuation-in-part of Ser. No. 883,002, Apr. 7, 1986, abandoned, which is a continuation of Ser. No. 651,805, Sep. 18, 1984, abandoned. This application May 28, 1987, Ser. No. 55,033**
**Claims priority, application Italy, Jul. 10, 1983, 23186 A/83**
**Int. Cl.[4] B32B** *21/14, 27/40*
**U.S. Cl. 428—425.1** **21 Claims**




18. A veneer which provides the appearance of a prized wood comprising the final product formed by fusing with heat and pressure an intermediate product formed by joining together without heat or pressure the two thermoplastic contact adhesive layers of
(a) a common wood veneer having a non-thermoplastic surface with a thermoplastic multicomponent reactive contact adhesive layer thereon, and
(b) a hot stamping foil having a thermo-adhesive surface with a thermoplastic contact adhesive layer thereon.

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**4,743,510**
**METHOD OF PREVENTING THE BUILD-UP OF STATIC ELECTRICITY IN LAMINATED CORK FLOOR-TILES AND AN ANTI-STATIC CORK FLOOR-TILE**
**Josef Nemeth, Kungälv, Sweden, assignor to Wicanders AB, Alvangen, Sweden**
**Filed Sep. 5, 1986, Ser. No. 903,932**
**Claims priority, application Sweden, Jan. 7, 1986, 8600069**
**Int. Cl.[4] B32B** *9/04*
**U.S. Cl. 428—455** **20 Claims**

1. A method of preventing build-up of static electricity in laminated cork floor-tile comprising a layer of granular cork, a binder bonding the granular cork layer, a wear surface provided on one side of the granular layer, and moisture barrier on the side of said granular layer opposite to said wear surface, the method comprising the steps of incorporating an agent adapted to reduce electrical resistance in the binder including in the cork layer, incorporating an agent adapted to reduce electrical resistance in the moisture barrier and incorporating an anti-static agent in the wear surface.

19. A laminated cork floor-tile including a layer of granular

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cork, a binder bonding the granular cork layer, a wear surface provided on one side of the granular layer, and a moisture barrier provided on the side of said granular layer opposite to said wear surface, in which the binder in the cork layer contains an agent adapted to reduce electrical resistance, the wear surface includes an antistatic agent, and the moisture barrier contains an agent adapted to reduce electrical resistance.

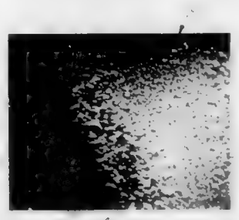
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**4,743,511**

## GRADED REFRACTORY CERMET ARTICLE

**Harold G. Sowman, Stillwater, and David R. Kaar, Minneapolis, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Division of Ser. No. 809,067, Dec. 13, 1985, Pat. No. 4,713,300. This application Sep. 21, 1987, Ser. No. 99,081**
**Int. Cl.⁴ B22F** *3/00*
**U.S. Cl. 428—547** **11 Claims**



1. A process for making a shaped, graded cermet article comprising the steps:
   a. providing an aqueous solution containing soluble metal salts, carboxylates, and oxide sols, dispersible colloids, or mixtures thereof,
   b. concentrating said mixture to a viscous concentrate,
   c. shaping the resulting viscous concentrate into a desired formed article,
   d. gelling the formed article to provide a green non-refractory shaped article,
   e. drying and firing said green article at a temperature sufficient to convert it to a refractory ceramic article, and
   f. heating said fired article in a reducing atmosphere to provide said shaped cermet article,

said article being a shaped, non-fused, cermet article comprising at least one continuous ceramic phase and containing at least one metal phase of discrete particles separated from each other, the ratio of ceramic/metal being controlled and gradually and continuously varied over the depth of the article so as to provide an article wherein the density of metal is greatest in all the exterior surface portions and decreases towards the innermost portions.

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**4,743,512**

## METHOD OF MANUFACTURING FLAT FORMS FROM METAL POWDER AND PRODUCT FORMED THEREFROM

**David T. Marlowe; Gregory J. Del Corso, both of Sinking Spring; Robert E. Carnes, Reading; David Esposito, Wernersville; William J. Burns, II, Reading; Edward F. Holland, Temple, and David L. Strobel, Reading, all of Pa., assignors to Carpenter Technology Corporation, Reading, Pa.**

**Filed Jun. 30, 1987, Ser. No. 68,447**
**Int. Cl.⁴ B22F** *3/00*
**U.S. Cl. 428—552** **36 Claims**

1. A method of forming a flat article having a predeterminted width from metallic powder comprising the steps of:
   providing blended metallic powder a major proportion by weight of which are particles of a first constituent and a minor proportion by weight of which are particles of a second constituent, said first constituent having a melting point substantially higher than said second constituent and being only partially soluble in said second constituent, said second constituent being substantially insoluble in said first constituent, said first constituent having a compressibility defined as the ratio of its green density to its apparent density with said green density being determined from particles that are die pressed with a force of 80 ksi, said compressibility being equivalent to at least about 2 when said flat article is not greater than about 4 inches wide and being indexed upwardly when the article width is increased, said blended metallic powder having a flowability defined as the angle of repose of the blended powder which has been freely flowed onto a horizontal surface, said flowability being equivalent to an angle of repose not greater than about 76° from the horizontal when said flat article is not wider than about 4 inches and said flowability being indexed upwardly when the article width is increased;
   compacting the blended metallic powder to a flat form composed of a plurality of particles of said blended metallic powder;
   deoxidizing the blended metallic powder particles; and
   sintering said flat form at liquid phase sintering temperature for a time sufficient to fully densify the form.

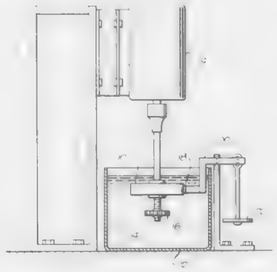
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**4,743,513**

## WEAR-RESISTANT AMORPHOUS MATERIALS AND ARTICLES, AND PROCESS FOR PREPARATION THEREOF

**David M. Scruggs, San Juan Capistrano, Calif., assignor to Dresser Industries, Inc., Dallas, Tex.**

**Filed Jun. 10, 1983, Ser. No. 503,174**
**Int. Cl.⁴ B32B** *15/18, 15/00*
**U.S. Cl. 428—668** **1 Claim**



1. An article of manufacture having a structure which is highly wear resistant, comprising:
   a substrate; and
   a piece of material positioned to protect said substrate from wear, said piece of material being at least partly amorphous, the amorphous portion having a hardness greater than about 1600 VHN, whereby the structure of said article is highly wear resistant, and wherein the amorphous material consists essentially of the chemical composition $X_rY_sB_t$, where X is at least one element selected from the group consisting of titanium, vanadium and niobium, Y is at least one element selected from the group consisting of cobalt, nickel, and iron, and r, s, and t are weight percentages wherein r ranges from about 32 to about 48, s ranges from about 44 to about 63, t ranges from about 5 to about 8, and the sum of r, s, and t is substantially 100.

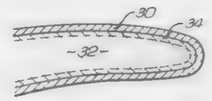


**4,743,514**

## OXIDATION RESISTANT PROTECTIVE COATING SYSTEM FOR GAS TURBINE COMPONENTS, AND PROCESS FOR PREPARATION OF COATED COMPONENTS

**Thomas E. Strangman, Phoenix, and Steven J. Vonk, Scottsdale, both of Ariz., assignors to Allied-Signal Inc., Los Angeles, Calif.**

**Filed Jun. 29, 1983, Ser. No. 509,284**
**Int. Cl.⁴ B05D** *1/08;* **B32B** *15/00;* **C22C** *19/05*
**U.S. Cl. 428—678** **22 Claims**




1. A composition of a coating for protecting a component of a gas turbine from damage at elevated temperatures, consisting essentially of an alloy of ingredients in about the following weight percentages:

| | |
|---|---|
| chromium | 15–35 |
| aluminum | 8–20 |
| tantalum | 1–10 |
| tantalum + niobium | 1–10 |
| silicon | 0.1–1.5 |
| hafnium | 0.1–1.5 |
| yttrium | 0–1 |
| cobalt | 0–10 |
| nickel | balance totalling 100 percent |

13. A process for protecting a gas turbine component from the adverse effects of elevated temperature operation, comprising the steps of:
   furnishing a coating starting material; and
   applying the coating starting material to the surface of the component so that the composition of the coating in place on the component is an alloy consisting essentially of the following weight percentages of ingredients:

| | |
|---|---|
| chromium | 15–35 |
| aluminum | 8–20 |
| tantalum | 1–10 |
| tantalum + niobium | 1–10 |
| silicon | 0.1–1.5 |
| hafnium | 0.1–1.5 |
| yttrium | 0–1 |
| cobalt | 0–10 |
| nickel | balance totalling 100 percent |

19. A component prepared in accordance with claim 13.

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**4,743,515**

## CEMENTED CARBIDE BODY USED PREFERABLY FOR ROCK DRILLING AND MINERAL CUTTING

**Udo K. R. Fischer, Vällingby; Erik T. Hartzell, Älvsjö , and Jan G. H. Akerman, Hägersten, all of Sweden, assignors to Santrade Limited, Lucerne, Switzerland**

**Filed Oct. 25, 1985, Ser. No. 791,556**
**Claims priority, application Sweden, Nov. 13, 1984, 8405667; Aug. 14, 1985, 8503804**
**Int. Cl.⁴ B32B** *15/04*
**U.S. Cl. 428—698** **18 Claims**

1. A cemented carbide body preferably for rock drilling and mineral cutting comprising at least two layers comprising a core of cemented carbide and a surface layer of cemented carbide surrounding said core wherein both the surface layer and the core contain WC (alpha-phase) with a binder phase (beta-phase) based upon at least one of cobalt, nickel or iron,




and wherein the core layer further contains eta-phase and the surface layer is a diffusion layer free of eta-phase.

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**4,743,516**

## INTEGRATED POWER PLANT AND METHOD FOR OPERATING THE PLANT

**Yoshiki Noguchi; Nobuo Nagasaki; Youichi Hattori, all of Hitachi; Kenji Yokosuka, Katsuta, and Shigehisa Sugita, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Engineering Co., Ltd., Ibaraki, both of, Japan**

**Filed May 22, 1987, Ser. No. 52,872**
**Claims priority, application Japan, May 23, 1986, 61-117520**
**Int. Cl.⁴ H01M** *8/06, 8/14*
**U.S. Cl. 429—16** **14 Claims**




1. An integrated power plant which comprises a gas turbine power plant composed of a compressor, a gas turbine combustor, a gas turbine and a generator, the compressor, the gas turbine and the generator being coaxially connected to one another, a fuel cell combined with a fuel gas reformer, a fuel gas conduit for supplying a fuel gas to the anode of the fuel cell being provided as connected to the anode through the fuel gas reformer, an anode off-gas conduit for leading an anode-off gas to the gas turbine combustor being provided between the anode and the gas turbine combustor, and a cathode off-gas conduit for discharging a cathode off-gas to the outside of the plant being provided at the cathode of the fuel cell.

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**4,743,517**

## FUEL CELL POWER PLANT WITH INCREASED REACTANT PRESSURES

**Ronald Cohen, West Hartford, and Richard F. Buswell, Glastonbury, both of Conn., assignors to International Fuel Cells Corporation, South Windsor, Conn.**

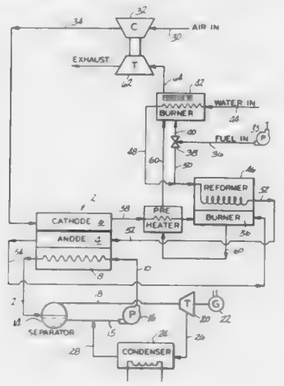
**Filed Aug. 27, 1987, Ser. No. 90,303**
**Int. Cl.⁴ H01M** *8/06, 8/04*
**U.S. Cl. 429—17** **15 Claims**

1. A fuel cell power plant system comprising:
   (a) a power section comprising a plurality of fuel cells form-

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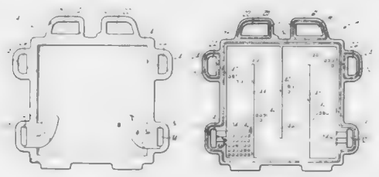
ing a stack, each of said cells having an anode side and a cathode side;
(b) means for cooling said stack with a water coolant, said means for cooling including a water circulating loop and heat exchange means in said stack through which the water coolant flows, said water circulating loop including a steam separator for separating coolant steam from a steam-water mixture exhausted from said heat exchange means;
(c) a turbogenerator operated by steam from said steam separator for generating a portion of the electrical power produced by said power plant system;
(d) means for recirculating water from said steam separator back to said heat exchange means in said stack;
(e) reformer means for catalytically converting raw hydrocarbon fuel to a hydrogen rich fuel gas suitable for fueling the anode side of the fuel cells;




(f) boiler means for producing steam having a temperature of at least about 400° F.;
(g) means for transporting steam from said boiler means at a pressure greater than about 200 psi to said reformer means;
(h) means for admitting raw hydrocarbon fuel to said system, said means for admitting including duct means for transporting the raw hydrocarbon fuel to said reformer means for admixture with said steam from said boiler means prior to entering said reformer means;
(i) means for transferring hydrogen rich fuel gas from said reformer means to said anode side of said fuel cells at a pressure of at least about 200 psi; and
(j) means for supplying an oxidant gas at a pressure of at least about 200 psi to said cathode side of said fuel cells.

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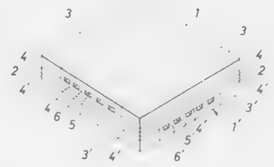
**4,743,518**
**CORROSION RESISTANT FUEL CELL STRUCTURE**
**William E. Romanowski, Rockville, Conn., assignor to International Fuel Cells Corporation, South Windsor, Conn.**
**Filed Mar. 4, 1987, Ser. No. 21,826**
**Int. Cl.[4] H01M** *8/04*
**U.S. Cl. 429—34** **10 Claims**



1. A fuel cell comprising:
(a) an oxygen distribution plate having a central recessed oxygen flow path portion surrounded by a peripheral raised boss, said boss having at least one oxygen inlet groove formed therein for transfer of oxygen across said boss and into said oxygen flow path portion;
(b) an electrode plate having a central cathode part surrounded by a peripheral frame formed from a material which will corrode with continued exposure to high purity oxygen, said distribution plate and said electrode plate being disposed in contiguous relationship with said boss abutting said frame and said oxygen flow path portion overlying said cathode part;
(c) means forming an oxygen manifold for distributing oxygen to said oxygen inlet groove; and
(d) protective means sandwiched between said boss and said frame operable to prevent oxygen flowing through said oxygen inlet groove from contacting said material forming said frame.

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**4,743,519**
**FUEL CELL ELECTRODE SUBSTRATE PROVIDED WITH PERIPHERAL SEALERS**
**Hisatsugu Kaji, Iwaki, and Kuniyuki Saitoh, Abiko, both of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan**
**Filed Oct. 14, 1986, Ser. No. 918,110**
**Claims priority, application Japan, Oct. 25, 1985, 60-238683**
**Int. Cl.[4] H01M** *4/96*
**U.S. Cl. 429—36** **8 Claims**



1. An electrode substrate provided with peripheral sealers for a fuel cell, comprising
two porous and carbonaceous electrodes respectively provided with flow channels of the reactant gas, said electrodes being joined to the both surfaces of a separator via a flexible graphite sheet so that said flow channels in one of said electrodes are perpendicular to those in another said electrode and said separator having the extended part which extends beyond a periphery of said electrode which is parallel to said flow channels in said electrode and
each peripheral sealer on the side of said electrode parallel to said flow channels therein, which comprises a gas impermeable and compact carbon material, said peripheral sealer being joined to said extended part of said separator via a flexible graphite sheet,
the whole composite materials being formed into one body of carbon by calcination thereof under a reduced pressure and/or in an inert atmosphere or both.

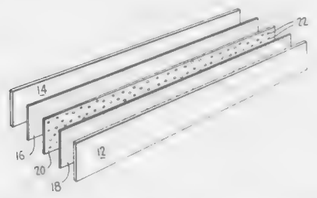
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**4,743,520**
**SELF-LIMITING ELECTROCHEMICAL CELL**
**Martin G. Rosansky, Montvale, N.J., assignor to Power Conversion, Inc., Elmwood Park, N.J.**
**Filed Nov. 18, 1986, Ser. No. 932,044**
**Int. Cl.[4] H01M** *2/14*
**U.S. Cl. 429—94** **13 Claims**

1. An electrochemical cell comprising a housing, an anode, a cathode, an electrolyte between and in contact with each of said anode and cathode, a microporous separator containing electrolyte adjacent to each of said anode and cathode, and a stationary barrier positioned between said microporous separators, said barrier being non-electrolyte and non-ion-permeable



and having preselected openings substantially uniformly distributed in from about 60% to 1% of the total surface area to

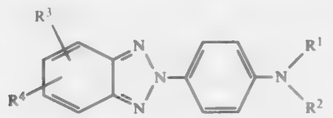



permit electrolyte passage and ion-transfer throught said openings in said barrier in controlled amounts, thereby providing said cell with self-limiting current characteristics.

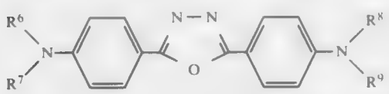
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**4,743,521**
**ELECTROPHOTOGRAPHIC MATERIAL WITH MXITURE OF CHARGE TRANSPORT MATERIALS**
**Gerhard Hoffmann, Otterstadt; Reinhold J. Leyrer, Ludwigshafen, and Peter Neumann, Wiesloch, all of Fed. Rep. of Germany, assignors to Basf Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**
**Filed Apr. 14, 1986, Ser. No. 851,247**
**Claims priority, application Fed. Rep. of Germany, Apr. 19, 1985, 3514182**
**Int. Cl.[4] G03G** *5/09, 5/14, 5/06*
**U.S. Cl. 430—56** **5 Claims**

1. An electrophotographic recording material composed of (A) a conductive base and (B) an electrophotographic layer of organic materials comprising binder, charge-carrier and charge-transporting compounds, wherein the electrophotographic layer (B) contains, as charge-transporting compounds, a mixture of one or more compounds of the formula




and one or more compounds of the formula




in a weight ratio of from 9:1 to 0.6:1, and, in the formulae, $R^1$ and $R^2$ independently of one another are each $C_1$–$C_6$-alkyl, allyl or phenyl-$C_1$–$C_4$-alkyl or are each phenyl which is unsubstituted or substituted by $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy and/or halogen, $R^3$ and $R^4$ independently of one another are each hydrogen, $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy or halogen and $R^6$, $R^7$, $R^8$ and $R^9$ independently of one another are each $C_1$–$C_4$alkyl, phenyl-$C_1$- or -$C_2$-alkyl or cyclohexyl.

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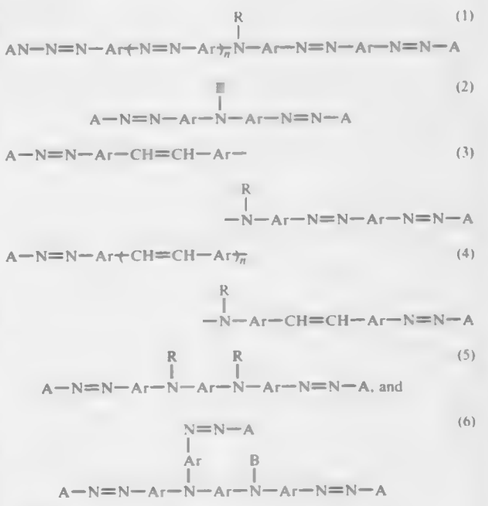
**4,743,522**
**PHOTOSENSITIVE MEMBER WITH HYDROGEN-CONTAINING CARBON LAYER**
**Shuji Iino, Hirakata; Hideo Hotomi, Suita; Izumi Osawa, Ikeda, and Mitsutoshi Nakamura, Osaka, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**
**Filed Sep. 10, 1986, Ser. No. 905,528**
**Claims priority, application Japan, Sep. 13, 1985, 60-204154; Sep. 19, 1985, 60-207897; May 17, 1986, 61-112847**
**Int. Cl.[4] G03G** *5/14*
**U.S. Cl. 430—58** **7 Claims**

1. A photosensitive member comprising:
an electrically conductive substrate;
an adhesive layer on said substrate comprising amorphous carbon containing hydrogen, said adhesive layer comprising at least one element selected from silicon, germanium and aluminum, and having a thickness of about 0.01 μm to 0.5 μm;
a charge transporting layer comprising amorphous carbon containing hydrogen, said hydrogen being contained in an amount of about 0.1 to 67 atomic percent based on the amount of all atoms contained in said charge transporting layer and said charge transporting layer having a relative dielectric constant of about 2.0 to 6.0; and
a charge generating layer.

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**4,743,523**
**PHOTOSENSITIVE MEMBER FOR ELECTROPHOTOGRAPHY**
**Masataka Yamashita, Kawasaki; Takao Takiguchi, Tokyo; Shoji Umehara, Fuchu; Masakazu Matsumoto, Yokohama, and Shozo Ishikawa, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**
**Filed Mar. 27, 1986, Ser. No. 844,887**
**Claims priority, application Japan, Apr. 2, 1985, 60-69721; Apr. 2, 1985, 60-69722; Apr. 26, 1985, 60-690452; May 1, 1985, 60-92286; May 15, 1985, 60-101513; May 24, 1985, 60-110097**
**Int. Cl.[4] G03G** *5/06, 5/14*
**U.S. Cl. 430—59** **17 Claims**

1. A photosensitive member for electrophotography comprising a photosensitive layer containing an azo pigment selected from those represented by the following formulas (1)–(6):




wherein R is alkyl, aralkyl, or acyl, each capable of having a substituent; Ar is an arylene or heterocyclic group; each capable of having a substituent; A is a coupler residue group having

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a phenolic OH group; B is hydrogen, nitroso, or an alkyl, aralkyl, aryl or acyl group capable of having a substituent; and n is 0 or 1; said azo pigment being (i) in a charge generation layer of a functionally separated photosensitive layer comprising said charge generation layer and a charge transportation layer or (ii) admixed with a charge transporting binder material; wherein said charge transporting binder material is a charge transporting binder or a mixture of a charge transporting substance and a binder.

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**4,743,524**

## DIAZOTYPE COMPOSITION WITH A NON-MIGRATING YELLOW COUPLER OF CONTROLLED COUPLING ENERGY

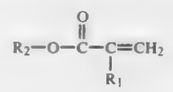
**Peter Muller; Henry Mustacchi, both of Port Washington, and Leonard Kreicas, Long Island, all of N.Y., assignors to Andrews Paper & Chemical Co., Inc., Port Washington, N.Y.**

**Filed Oct. 17, 1986, Ser. No. 919,970**
**Int. Cl.[4] G03C** *1/58*
**U.S. Cl. 430—182** **4 Claims**

1. A light-sensitive diazo coating composition which comprises;

a mixture of

(A) an azo coupler which is a compound of the formula:



(I)

wherein $R_1$ is selected from the group consisting of hydrogen or lower alkyl and wherein $R_2$ is selected from the group consisting of acetoacetyloxyalkyl, in a proportion sufficient to couple the diazonium compound (B) described below;

(B) a light-sensitive diazonium compound; and

(C) a stabilizing proportion of an acid stabilizer.

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**4,743,525**

## LITHOGRAPHIC PRINTING PLATE EXCELLENT IN PRINTING ENDURANCE

**Kazuyoshi Yamamoto; Eiji Kanada; Kyonosuke Yamamoto, and Satoshi Katano, all of Nagaokakyo, Japan, assignors to Mitsubishi Paper Mills, Ltd., Tokyo, Japan**

**Filed Oct. 24, 1986, Ser. No. 923,138**
**Claims priority, application Japan, Oct. 25, 1985, 60-239163**
**Int. Cl.[4] G03C** *5/54*
**U.S. Cl. 430—204** **4 Claims**

1. A lithographic printing plate material which comprises

a support;

at least an undercoat layer, a silver halide emulsion layer and a catalytic layer containing physical development nuclei provided in this order on said support and which utilizes silver complex diffusion transfer process; and

at least one of the undercoat layer and the silver halide emulsion layer contains lime treated gelatin in which the concentration of calcium ions is 1000 ppm or less.

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**4,743,526**

## ALLOY HAVING VARIABLE SPECTRAL REFLECTANCE AND INFORMATION RECORDING MATERIAL MAKING USE OF THE SAME

**Hisashi Ando; Tetsuro Minemura, both of Hitachi; Isao Ikuta, Iwaki; Yosimi Katou, and Mituo Nakamura, both of Takahagi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Dec. 2, 1985, Ser. No. 803,640**
**Claims priority, application Japan, Dec. 3, 1984, 59-255306**
**Int. Cl.[4] G03C** *1/72*
**U.S. Cl. 430—270** **8 Claims**

1. An information recording medium made of an alloy with variable spectral reflectance having a composition which consists essentially of 30 to 46 wt % of Zn, not greater than 15 wt % in total of at least one element selected from the group consisting of Mg, Ti, V, Cr, Fe, Al, Sn, Y, In, Cu, Sm and Ga, and the balance Ag and incidental impurities, said alloy being able to have different crystal structures at room temperature, one of said different crystal structures being obtained at room temperature after being held in the solid state at a first temperature above the room temperature, and another of said different crystal structures being obtained at room temperature after being held in the solid state at a second temperature lower than said first temperature.

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**4,743,527**

## DRY PRESENSITIZED PLATE INCLUDING AN OVERLYING SILICONE RUBBER LAYER

**Susumu Yoshida, Shizuoka; Hiroshi Takahashi, Fujieda; Hisashi Aoki; Kiyohiro Kondow, both of Annaka, and Tetsuya Mayuzumi, Kawagoe, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa and Shin-etsu Chemical Co., Ltd., Tokyo, both of, Japan**

**Filed Dec. 26, 1985, Ser. No. 813,430**
**Claims priority, application Japan, Dec. 27, 1984, 59-276507**
**Int. Cl.[4] G03C** *1/495;* **G03F** *7/02*
**U.S. Cl. 430—272** **12 Claims**

1. A presensitized plate for use in making a planographic printing plate requiring no dampening water which comprises a metal support having provided thereon, in order, a light-sensitive layer comprising a photodimerizable resin and a silicone rubber layer comprising an organo-polysiloxane cured with a crosslinking agent comprising a combination of an organohydrogen polysiloxane with a reactive silane compound having a carbon-carbon double bond to which a silicon atom is not directly linked.

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**4,743,528**

## ENHANCED IMAGING COMPOSITION CONTAINING AN AZINIUM ACTIVATOR

**Samir Y. Farid, Rochester; Neil F. Haley, Fairport; Roger E. Moody, and Donald P. Specht, both of Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Nov. 21, 1986, Ser. No. 933,657**
**Int. Cl.[4] G03C** *1/76*
**U.S. Cl. 430—281** **20 Claims**

1. An imaging composition consisting essentially of

an organic component chosen from the class consisting of monomers, oligomers, and polymers each containing ethylenic unsaturation and capable of selective hardening by addition at the sites of ethylenic unsaturation,

an effective amount of a quaternized azinium salt activator,

a concentration sufficient to increase response of the photoresist to light of a photosensitizer having a reduction potential which in relation to the reduction potential of said azinium salt activator is at most 0.1 volt more positive, and

an image enhancing amount of benzene substituted with an electron donating amino group and one or more groups capable of imparting a net Hammett sigma value electron withdrawing characteristic of at least +0.20 volt to said benzene ring.

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**4,743,529**

## NEGATIVE WORKING PHOTORESISTS RESPONSIVE TO SHORTER VISIBLE WAVELENGTHS AND NOVEL COATED ARTICLES

**Samir Y. Farid, Rochester; Neil F. Haley, Fairport; Roger E. Moody, and Donald P. Specht, both of Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Nov. 21, 1986, Ser. No. 933,658**
**Int. Cl.[4] G03C** *1/76*
**U.S. Cl. 430—281** **29 Claims**

1. A negative working photoresist responsive to imaging radiation of a wavelength longer than 550 nm consisting essentially of

an organic film forming component chosen from the class consisting of monomers, oligomers, and polymers each containing ethylenic unsaturation and capable of selective immobilization by addition at the site of ethylenic unsaturation and

coinitiators for ethylenic addition comprised of

an effective amount of a quaternized azinium salt activator and

a concentration sufficient to increase response of the photoresist to light of a photosensitizer which is a dye having its principal absorption peak at a wavelength shorter than 550 nm and having a reduction potential which in relation to that of said azinium salt activator is at most 0.1 volt more positive, with the further proviso that, when said dye is a keto dye, it exhibits when excited by imaging radiation an intersystem crossing efficiency to a triplet state of less than 10 percent.



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**4,743,530**

## NEGATIVE WORKING PHOTORESISTS RESPONSIVE TO LONGER WAVELENGTHS AND NOVEL COATED ARTICLES

**Samir Y. Farid, Rochester; Neil F. Haley, Fairport; Roger E. Moody, and Donald P. Specht, both of Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Nov. 21, 1986, Ser. No. 933,660**
**Int. Cl.[4] G03C** *1/76*
**U.S. Cl. 430—281** **25 Claims**

1. A negative working photoresist responsive to imaging radiation of a wavelength longer than 550 nm consisting essentially of

an organic film forming component chosen from the class consisting of monomers, oligomers, and polymers each containing ethylenic unsaturation and capable of selective immobilization by addition at the site of ethylenic unsaturation and

coinitiators for ethylenic addition comprised of

an effective amount of a quaternized azinium salt activator and

a concentration sufficient to increase response of the photoresist to light of a photosensitizer which is a dye having its principal absorption peak at a wavelength longer than 550 nm and having a reduction potential which in relation to that of said azinium salt activator is at most 0.1 volt more positive.

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**4,743,531**

## DYE SENSITIZED PHOTOGRAPHIC IMAGING SYSTEM

**Samir Y. Farid, Rochester; Neil F. Haley, Fairport; Roger E. Moody, and Donald P. Specht, both of Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Nov. 21, 1986, Ser. No. 933,712**
**Int. Cl.[4] G03C** *1/72*
**U.S. Cl. 430—281** **24 Claims**

1. A photographic imaging system consisting essentially of an imaging dye or precursor thereof,

a hardenable organic component chosen from the class consisting of monomers, oligomers, and polymers each containing ethylenic unsaturation and capable of selective immobilization by addition at the sites of ethylenic unsaturation and

coinitiators for ethylenic addition comprised of

an effective amount of a quaternized azinium salt activator and

a concentration sufficient to increase response of the photoresist to light of a photosensitizer which is a dye exhibiting a reduction potential which in relation to that of said azinium salt activator is at most 0.1 volt more positive, with the further proviso that, when said photosensitizer is a keto dye having its principal absorption peak at a wavelength shorter than 550 nm, it exhibits when excited by imaging radiation an intersystem crossing efficiency to a triplet state of less than 10 percent, said photosensitizer being chosen to exhibit a maximum absorption peak in a different portion of the spectrum than said imaging dye or its precursor.

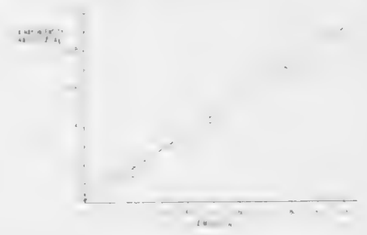
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**4,743,532**

## SILVER HALIDE PHOTOGRAPHIC EMULSION HAVING SPECIFIC RELATIVE STANDARD DEVIATION OF THE SILVER CHLORIDE CONTENT

**Yoshinori Shibata, and Tadashi Ito, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Sep. 10, 1986, Ser. No. 905,816**
**Claims priority, application Japan, Sep. 12, 1985, 60-202275**
**Int. Cl.[4] G03C** *1/02*
**U.S. Cl. 430—564** **12 Claims**



1. A silver halide photographic emulsion having a composition of the formula:

$$AgBr_{1-x-y}Cl_xI_y$$

wherein x is a molar fraction satisfying the formula $0<x\leqq 0.6$, and y is a molar fraction satisfying the formula $0\leqq y\leqq 0.01$, wherein the relative standard deviation of the silver chloride content of individual silver halide grains is not more than about 20%.

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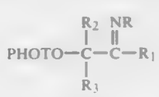
**4,743,533**

## PHOTOGRAPHIC SYSTEM UTILIZING A COMPOUND CAPABLE OF PROVIDING CONTROLLED RELEASE OF PHOTOGRAPHICALLY USEFUL GROUP

**Roger A. Boggs, Wayland; John B. Mahoney, Tewksbury; Avinash C. Mehta, Belmont; William C. Schwarzel, Billerica, and Lloyd D. Taylor, Lexington, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.**

**Filed Mar. 31, 1986, Ser. No. 846,584**
**Int. Cl.[4] G03C** *1/08, 7/26, 1/02, 1/06*
**U.S. Cl. 430—564** **34 Claims**

1. A photographic element comprising a support and at least one layer thereon containing a silver halide emulsion having associated therewith a compound represented by the formula



FORMULA A

wherein R is —OH, —$OR_4$, —$NH_2$, —$NHR_5$ or —$NR_4R_6$; $R_1$ is hydrogen, —$NH_2$, alkyl, substituted alkyl, aryl or substituted aryl; $R_2$ and $R_3$ each independently is hydrogen, alkyl, aralkyl or aryl; $R_4$ is a group which is capable of being removed upon contact with a base; $R_5$ is an activating group which is capable of rendering a neighboring hydrogen atom acidic; $R_6$ is an electron withdrawing group which is capable of stabilizing the negative charge on the nitrogen atom which is produced upon removal of $R_4$ upon contact with alkali; and PHOTO is a photographically useful group.

**4,743,534**

## PREFORMED SILVER HALIDES FOR PHOTOTHERMOGRAPHIC SYSTEM

**Oanh V. Pham, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Continuation of Ser. No. 556,578, Nov. 30, 1983, abandoned. This application Nov. 8, 1985, Ser. No. 796,725**

**Int. Cl.⁴ G03C** *1/02*

**U.S. Cl. 430—619** **3 Claims**

1. A photosensitive material consisting essentially of radiation-sensitive silver halide grains and a dry binder resin entrapping said grains said binder resin of said photosensitive material capable of being dissolved so that said photosensitive material can be added directly to a photothermographic system comprising a light-insensitive reducible metal compound and a reducing agent therefor, said silver halide grains having been formed by a process wherein ionizable silver salt and ionizable halide are introduced into a solution comprising said binder resin and an inert organic solvent to form initial silver halide nuclei, and additional ionizable silver salt and additional ionizable halide are introduced into said solvent in at least one incremental addition at such a rate that additional silver halide nuclei will not form more rapidly than the initial silver nuclei can grow.

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**4,743,535**

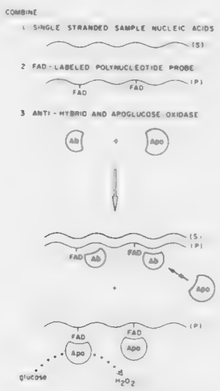
## HYBRIDIZATION ASSAY EMPLOYING LABELED PROBE AND ANTI-HYBRID

**Robert J. Carrico, Elkhart, Ind., assignor to Miles Inc., Elkhart, Ind.**

**Filed Nov. 7, 1984, Ser. No. 668,255**

**Int. Cl.⁴ C12Q** *1/68;* **G01N** *33/537, 33/542*

**U.S. Cl. 435—6** **46 Claims**




1. A method for detecting a particular polynucleotide sequence in a test sample containing single stranded nucleic acids, comprising the steps of:

(a) forming a hybrid between any of the particular polynucleotide sequence to be detected in the sample and a labeled nucleic acid probe comprising a label and at least one single stranded base sequence that is substantially complementary to the sequence to be detected, the hybrid having epitopes for an antibody reagent which does not bind substantially to single stranded nucleic acids,

(b) contacting any hybrid that is formed with the antibody reagent, the label in the labeled probe providing a detectable response which is measurably different when the labeled probe is comprised in a hybrid that is bound by the antibody reagent compared to when not comprised in such a hybrid, and

(c) measuring the detectable response as a function of the presence of the sequence to be detected in the sample.

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**4,743,536**

## METHOD FOR ENZYME IMMUNO-DETERMINATIONS IN HETEROGENEOUS PHASE

**George R. Evanega, Carmel, Ind., and Winfried Albert, Pähl, Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany**

**Filed Dec. 16, 1981, Ser. No. 331,339**

**Claims priority, application Fed. Rep. of Germany, Dec. 23, 1980, 3048884**

**Int. Cl.⁴ G01N** *33/535, 33/546*

**U.S. Cl. 435—7** **8 Claims**

1. In a method for the determination of a component of the reaction between a specific binding protein and a substance bindable therewith by incubating a sample solution with a determined amount of binding component in insoluble form in the presence of a reagent containing a known amount of one of the binding components in enzyme-labeled form and determining the activity of the enzyme remaining in the liquid phase, the improvement comprising:

separating the liquid phase from the solid phase by centrifuging, and

determining the activity of the enzyme remaining in the liquid phase in a centrifuge rotor during or after said separation of liquid or solid phase by centrifuging whereby the solid phase and the liquid phase are still in contact with one another.

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**4,743,537**

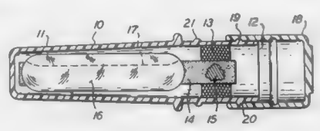
## BIOLOGICAL INDICATOR FOR STERILIZATION PROCESSES

**Patrick J. McCormick, and John R. Scoville, Jr., both of Henrietta, N.Y., assignors to Castle Company, Rochester, N.Y.**

**Continuation-in-part of Ser. No. 820,354, Jan. 21, 1986, Pat. No. 4,717,661. This application Dec. 24, 1986, Ser. No. 942,506**

**Int. Cl.⁴ C12M** *1/24*

**U.S. Cl. 435—296** **5 Claims**




1. A sterility indicator which comprises:

(a) a means defining an elongated outer compartment having liquid impermeable and substantially non-gas absorptive walls, said compartment having a closed end and a first opening at a distal end thereof and at least one additional opening covered with a heat stable, gas transmissive and bacteria-impermeable material disposed at least partially around the perimeter of said outer compartment allowing sterilant vapor to pass through and into said outer compartment and located near said first opening, with a predetermined number of viable microorganisms suitable for monitoring steam sterilization being confined within said outer compartment adjacent said additional opening, and a predetermined number of viable microorganisms suitable for monitoring gas sterilization being confined within said outer compartment away from said additional opening and opposite said distal end:

(b) a closure member normally closing said first opening and movable to a second position to also close said additional opening; and

(c) an inner compartment containing a nutrient medium disposed within said outer compartment with said nutrient medium being out of direct contact with said microorganisms, said inner compartment being adapted to open in response to external pressure thereby permitting said nutrient medium to contact said microorganisms.



**4,743,538**

## TEST FOR RHEUMATIC FEVER AND MONOCLONAL ANTIBODIES USEFUL THEREFOR

**John B. Zabriskie, and Daniel R. Buskirk, both of New York, N.Y., assignors to The Rockefeller University, New York, N.Y.**

**Filed Apr. 17, 1985, Ser. No. 724,076**

**Int. Cl.⁴ C07K** *15/04;* **C12N** *5/00;* **G01N** *33/554*

**U.S. Cl. 435—7** **7 Claims**

1. A monoclonal antibody derived from hybridoma cell line HB8783 or a subclone thereof which reacts specifically with the complementary rheumatic fever associated antigen on human B-lymphocytes, but not with known HLA antigens of the A, B, C, DR-1 through DR-8 loci on human B-lymphocytes.

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**4,743,539**

## SPECIFIC ANTIBODY TO THE NATIVE FORM OF 2'5'-OLIGONUCLEOTIDES, THE METHOD OF PREPARATION AND THE USE AS REAGENTS IN IMMUNOASSAYS OR FOR BINDING 2'5-OLIGONUCLEOTIDES IN BIOLOGICAL SYSTEMS

**Julian Gordon, 307 E. Sheridan, Lake Bluff, Ill. 60044, and Michael A. Minks, 47 Carroll Avenue, Olivedale, Randburg, South Africa**

**PCT No. PCT/EP84/00062, § 371 Date Nov. 9, 1984, § 102(e) Date Nov. 9, 1984, PCT Pub. No. WO84/03444, PCT Pub. Date Sep. 13, 1984**

**PCT Filed Mar. 6, 1984, Ser. No. 672,266**

**Claims priority, application United Kingdom, Mar. 10, 1983, 8306617**

**Int. Cl.⁴ C12Q** *1/68;* **G01N** *33/53, 33/577;* **C08G** *77/04*

**U.S. Cl. 435—6** **5 Claims**

1. A specific antibody to 5'-terminal mono-, di- or triphosphorylated (2'-5')adenyl-adenosine oligonucleotides of formula 5'-(phospho)$_m$(adenylyl 2'-5')$_n$ adenosine with m being an integer of from 1 to 3 and n being an integer of from 2 to 50, provided that said antibody has a greater affinity for the 5'-phosphorylated than the 5'-hydroxyl form of said (2'-5')adenyl-adenosine oligonucleotides.

2. A method for the assay of 5'-terminal mono-, di- or triphosphorylated (adenylyl 2'-5')$_n$ adenosine, in biological materials or extracts therefrom, comprising contacting the antibody of claim 1 in any one of the three following methods of immunological analysis: (a) by determination of free or bound ligand or (b) determination of free or bound antibody or (c) determination of antibody-ligand interaction by means of a signal which is modulated by the antibody-antigen reaction.

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**4,743,540**

## METHOD FOR DIAGNOSIS OF SUBCLASSIFICATIONS OF COMMON VARIED IMMUNODEFICIENCY DISEASE GROUP

**Peter Ralph, Purdys, N.Y., and Osamu Saiki, Nara, Japan, assignors to Memorial Sloan-Kettering Cancer Center, New York, N.Y.**

**Filed Sep. 27, 1983, Ser. No. 536,283**

**Int. Cl.⁴ C12Q** *1/68, 1/04;* **G01N** *33/53, 33/566*

**U.S. Cl. 435—6** **4 Claims**

1. Method for differential diagnosis of subclasses in common varied immunodeficiency disease group which comprises

(a) contacting human peripheral blood B-cell specimens with stimulatory mitogen factor cowan I or the F(ab')$_2$ fragment of anti-Ig mu antibody chain;

(b) assaying for Sig expression, cell proliferation and differentiation to immunoglobulin screting cells; and

(c) identifying the elements of SIg expression, cell proliferation and differentiation with a B-cell common varied immunodeficiency subclass wherein;

subclass I contains B cells which exhibit the elements of SIg expression, cell proliferation and differentiation to immunoglobulin secreting cells producing essentially only IgM,

subclass II contains B cells which exhibit only the element of cell proliferation, without SIg expression and without differentiation to immunoglobulin secreting cells,

subclass III contains B cells which exhibit only the elemnt of SIg expression with failure to prolierate and no differentiation to immunoglobulin secreting cells, and

subclass IV contains B cells which fail to exhibit the elements of SIg expression, proliferation and differentiation to immunoglobulin secreting cells.

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**4,743,541**

## LUMINESCENT SUBSTRATE PREPARATION AND ITS USE IN SPECIFIC BINDING ASSAYS

**Keith W. Higgins, Santa Clara; Christopher R. Brown, San Mateo, and John F. Burd, Sunnyvale, all of Calif., assignors to Mast Immunosystems, Inc., Palo Alto, Calif.**

**Filed Jul. 17, 1985, Ser. No. 756,039**

**Int. Cl.⁴ C07D** *237/30;* **G01N** *33/535, 33/543*

**U.S. Cl. 435—7** **13 Claims**

1. A process for improving the luminescent duration and output of ligand-free phthalylhydrazide derivatives serving as luminescent substrates in peroxidase catalyzed reactions comprising the steps of repeatedly dissolving and recrystallizing the derivatives until sulphide and hydrazine levels are less than about 100 ppm.

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**4,743,542**

## METHOD FOR FORESTALLING THE HOOK EFFECT IN A MULTI-LIGAND IMMUNOASSAY SYSTEM

**Henry A. Graham, Jr., Annandale, and Peter Lisi, Somerville, both of N.J., assignors to Ortho Diagnostic, Raritan, N.J.**

**Filed Apr. 11, 1985, Ser. No. 722,566**

**Int. Cl.⁴ G01N** *33/546, 33/577*

**U.S. Cl. 435—7** **9 Claims**

1. In an immunoassay for the detection of a ligand wherein a first ligand binding partner specific for the ligand to be detected is immobilized by attachment to an insoluble surface and is reacted with a second ligand binding partner specific for the ligand to be detected, said second ligand binding partner having a detectable label and forming a sandwich complex with said first binding partner in accordance with the presence or absence of the ligand to be detected, the improvement comprising:

(a) providing a haptenated first ligand binding partner and an insoluble isotactic surface means capable of reacting with and immobilizing said haptenated first binding partner; and

(b) adding to said reactants either additional non-haptenated first ligand binding partner or non-labeled second ligand binding partner or a combination thereof, so as to bind excess ligand to be detected and permit formation of an increased number of sandwich complexes thereby increasing the dynamic range of detection sensitivity to said immunoassay.

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**4,743,543**

## METHOD FOR ENHANCING AND/OR ACCELERATING IMMUNOASSAY DETECTION OF HUMAN CARCINOMA TUMOR ASSOCIATED ANTIGEN IN A PATHOLOGY SAMPLE

**Kenneth H. Kortright, Cooper City, Fla., assignor to Hialeah Corporation, Coulter, Fla.**

**Filed Sep. 9, 1985, Ser. No. 774,070**

**The portion of the term of this patent subsequent to Nov. 24, 2004, has been disclaimed.**

**Int. Cl.⁴ G01N** *33/53, 33/566, 33/577*

**U.S. Cl. 435—7** **5 Claims**

1. An immunoassay method for detecting a human carcinoma associated antigen in a pathology sample of cells, comprising:

A. treating the sample of human carcinoma cells prepared for assay with neuraminidase to digest a carbohydrate residue affixed to an antigenic site on the membrane of the cell of the sample, thereby exposing antigen sites to monoclonal antibody binding;

B. contacting said cells with labelled monoclonal antibody which will bind specifically to said antigen sites to produce detectable labelled complexes at varying stages of carcinoma development; and

C. assaying said sample for detecting the presence of labelled complexes,

wherein the antigen of said site is identified as KC-4 antigen and the monoclonal antibody is IgG3 isotype or IgM isotype derived from the hybrid murine cell lines having American Type Culture Collection Nos. HB 8709 or HB 8710, respectively.

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**4,743,544**

## METHOD FOR MEASURING SUBSTANCES BY ENZYME IMMUNOASSAY

**Yuzaburo Namba, Saitama; Tohru Naraki; Takashi Sawada, both of Gifu; Toyohiro Kitamura, Chiba; Minoru Tohda, Gifu, and Tomiaki Morimoto, Tokyo, all of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 349,255, Feb. 16, 1982, abandoned. This application May 14, 1984, Ser. No. 609,530**

**Claims priority, application Japan, Feb. 18, 1981, 56-21366**

**Int. Cl.[4] G01N** *33/53, 33/566, 33/543*

**U.S. Cl. 435—7** **3 Claims**

1. In a method for simultaneously assaying a plurality of specimens for a given substance by enzyme immunoassay which comprises the steps of:

(a) reacting a plurality of specimens of a substance to be assayed with a solid phase material which is capable of being immunochemically specifically reacted with the substance to be assayed in said specimens;

(b) separating the reaction mixture in the step (a) into a solid phase and a liquid phase;

(c) reacting the solid phase of step (b) with an enzyme-labelled product of a material which is capable of being immunochemically specifically reacted with the substance to be assayed;

(d) separating the reaction mixture in the step (c) into a solid phase and a liquid phase;

(e) reacting the solid phase or the liquid phase of step (d) with a substrate for the enzyme in the step (c); and

(f) measuring the optical density of the reaction mixture of step (e);

wherein the improvement comprises in step (a), the respective specimens are successively contacted with said solid phase material, under cooling conditions at a temperature ranging from 0° C. to 15° C., followed by incubating all the specimens simultaneously at a temperature ranging from room temperature to 45° C., prior to step (b).

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**4,743,545**

## HOLLOW POROUS MICROSPHERES CONTAINING BIOCATALYST

**Leonard B. Torobin, Materials Technology Corporation, Tower Place/Suite 1425, 3340 Peachtree Rd., NE., Atlanta, Ga. 30026**

**Continuation-in-part of Ser. No. 639,126, Aug. 9, 1984, Pat. No. 4,671,909, which is a continuation-in-part of Ser. No. 428,923, Sep. 30, 1982, Pat. No. 4,548,196, which is a continuation of Ser. No. 103,113, Dec. 13, 1979, abandoned, which is a division of Ser. No. 59,296, Jul. 20, 1979, abandoned, which is a continuation-in-part of Ser. No. 937,123, Aug. 28, 1978, abandoned, and Ser. No. 944,643, Sep. 21, 1978, abandoned. This application Oct. 3, 1984, Ser. No. 657,090**

**The portion of the term of this patent subsequent to Jan. 20, 2004, has been disclaimed.**

**Int. Cl.[4] C12P** *1/00;* **C12N** *11/14;* **G01N** *33/551;* **C07K** *17/14*

**U.S. Cl. 435—41** **44 Claims**

1. A bioreactor comprising rigid hollow porous microspheres of substantially uniform diameter of 200 to 10,000 microns and of substantialy uniform wall thickness of 1 to 1000 microns, the walls of said microspheres comprise sintered together particles which define interconnecting voids within the walls, said microspheres having a single hollow central void forming intracapsular space in the interior of the microspheres and inner and outer microsphere wall surfaces, said interconnecting voids are continuous and extend from the outer wall surface to the inner wall surface, said walls have substantially uniform void content and said interconnecting voids are substantially uniformly distributed in the walls of the hollow microspheres, said walls including entrance means through which biocatalyst can be introduced into the intracapsular space, biocatalyst within the intracapsular space and fluid permeable means extending across said entrance means for immobilizing the biocatalyst within the intracapsular space, said entrance means being larger than the maximum dimension of said biocatalyst.

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**4,743,546**

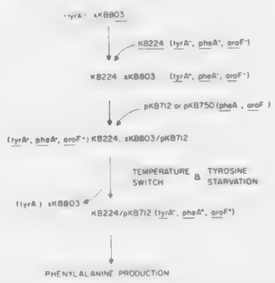
## CONTROLLED GENE EXCISION

**Keith C. Backman, Bedford, and Ramaswamy Balakrishnan, Framingham, both of Mass., assignors to Biotechnica International, Inc., Cambridge, Mass. and H. J. Heinz Company, Pittsburgh, Pa.**

**Filed Feb. 13, 1985, Ser. No. 701,091**

**Int. Cl.[4] C12P** *13/22, 21/00, 21/02;* **C12N** *15/00, 1/20, 7/00*

**U.S. Cl. 435—108** **30 Claims**




1. An *Escherichia coli* bacterial cell which undergoes controllable excision of a genetically engineered, chromosomally located DNA segment, wherein said cell comprises:

DNA encoding lambdoid int and xis genes, operably positioned to be transcribed under the control of an external stimulus, wherein said external stimulus causes excision of a chromosomally located DNA segment, and a gene function is lost thereby from said cell and wherein said chromosomally located DNA segment, when excised, is incapable of replication, and wherein said DNA segment comprises a pair of lambdoid phage att sites, positioned at opposite ends thereof and a gene determining a function in said cell, and wherein said function is lost in the absence of said chromosomally located DNA segment.

13. A method of producing a desired compound comprising:

culturing the *E. coli* cells of claim 1 to a desired population density;

controlling said external stimulus that causes excision of said gene from the chromosomes of members of said *E. coli* cell population;

culturing cells in a medium wherein said cells have said gene excised from their chromosomes;

recovering said compound produced thereby.

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**4,743,547**

## METHOD OF PRODUCING L-PHENYLALANINE

**Takanori Kitamura; Yoichi Matsumoto, and Noriaki Yoshimura, all of Kurashiki, Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan**

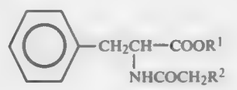
**Filed Apr. 9, 1986, Ser. No. 849,859**

**Claims priority, application Japan, Apr. 9, 1985, 60-76126; May 15, 1985, 60-104735; Jun. 5, 1985, 60-123393; Aug. 30, 1985, 60-192441**

**Int. Cl.[4] C12P** *13/22;* **C07P** *41/00*

**U.S. Cl. 435—108** **29 Claims**

1. A method of producing L-phenylalanine which comprises bringing, in the presence of water, an N-acylphenylalanine alkyl ester in L form into contact with an aminoacylase capable of hydrolyzing said N-acylphenylalanine alkyl ester in L form into L-phenylalanine, to thereby cause formation of L-phenylalanine, said N-acylphenylalanine alkyl ester having the formula




wherein $R^1$ is a lower alkyl group and $R^2$ is a hydrogen atom, a lower alkyl group or a halogen atom.

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**4,743,548**

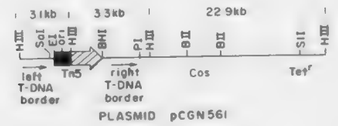
## PLANT CELL MICROINJECTION TECHNIQUE

**Anne Crossway, and Daniel Facciotti, both of Davis, Calif., assignors to Calgene, Inc., Davis, Calif.**

**Continuation-in-part of Ser. No. 654,606, Sep. 25, 1984, abandoned. This application Aug. 1, 1985, Ser. No. 761,735**

**Int. Cl.[4] C12N** *15/00, 5/02*

**U.S. Cl. 435—172.3** **8 Claims**




1. A method for genetically modifying a plant cell capable of proliferation, said method comprising:

preculturing a protoplast of said cell in a nutrient medium for a time sufficient to regenerate sufficient cell wall to provide a stabilzed protoplast;

while holding said stabilized protoplast by means of a holding pipette, injecting nucleic acid by means of a micropipette through the membrane of said stabilized protoplast into the cytoplasm or an organelle of said stabilized protoplast, wherein said nucleic acid is capable of replication in a plant cell; and

growing said injected protoplast in a nutrient medium, whereby said nucleic acid is replicated and microcalli are formed.

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**4,743,549**

## HYDROGEN PEROXIDE-FORMING SARCOSINE OXIDASE

**Ulrich Mayr, Rosenheim; Hans Möllering, Tutzing; Joachim Siedel, Bernried, and Hans Seidel, Tutzing, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim-Waldhof, Fed. Rep. of Germany**

**Filed May 28, 1986, Ser. No. 868,262**

**Claims priority, application Fed. Rep. of Germany, May 29, 1985, 3519218**

**Int. Cl.[4] C12N** *9/06;* **C12Q** *1/26;* **C12R** *1/01, 1/14, 1/465, 1/625*

**U.S. Cl. 435—191** **4 Claims**

1. Hydrogen peroxide-forming sarcosine oxidase, obtained from Streptomycetaceae and at 25° C. in 0.15 mol/liter potassium phosphate (pH 7.9), in the presence of surface-active substances, still shows after 2 days an activity of at least 40% of the initial activity.

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**4,743,550**

## METHOD FOR IMPROVING THE PARTITION COEFFICIENT IN ENZYME-CONTAINING SYSTEMS HAVING AT LEAST TWO PHASES

**Kavssery P. Ananthapadmanabhan, Spring Valley, N.Y., and Errol D. Goddard, Haworth, N.J., assignors to Union Carbide Corporation, Danbury, Conn.**

**Continuation-in-part of Ser. No. 728,241, Apr. 29, 1985. This application Nov. 12, 1985, Ser. No. 799,329**

**Int. Cl.[4] C12N** *9/52, 9/00, 9/50, 9/54, 9/56*

**U.S. Cl. 435—220** **36 Claims**

1. A method for increasing the partition coefficient in an enzyme-containing aqueous bi-phase system wherein said bi-phase system comprises polyethylene glycol, said method comprising providing said system with a compound selected from the group consisting of polyacids, salts of polyacids, carboxymethyl cellulose and the copolymer of maleic anhydride and vinyl ether, said compounds being provided in quantities sufficient to increase the partition coefficient of said enzyme within said system.

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**4,743,551**

## PURIFICATION OF MICROBIAL RENNET FROM *MUCOR MIEHEI*

**Sethuraman Subramanian, Elkhart, Ind., assignor to Miles Inc., Elkhart, Ind.**

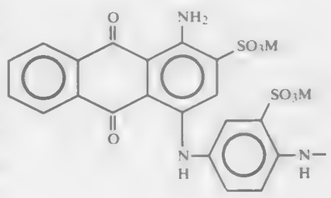
**Filed Nov. 5, 1984, Ser. No. 668,404**

**Int. Cl.[4] C12N** *9/64*

**U.S. Cl. 435—226** **10 Claims**

1. A method for the purification of a culture filtrate obtained by filtering the aqueous nutrient medium formed during the submerged fermentation of an organism of the species *Mucor miehei* therein which filtrate contains microbial rennet together with other proteins as impurities which method comprises:

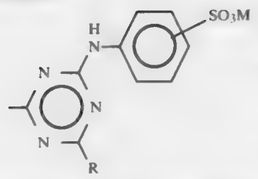
(a) contacting the culture filtrate with an affinity ligand of the formula:



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where M is a monovalent or divalent cation and R is a solubilizing moiety or a moiety which insolubilize the ligand without affecting its affinity characteristics, at a pH below 4.0 to cause the selective adsorption of the microbial rennet to the ligand thereby forming a ligand/microbial rennet complex;

(b) separating the ligand/microbial rennet complex from the other protein impurities; and

(c) recovering the microbial rennet from the ligand microbial rennet complex.

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**4,743,552**

**METHOD FOR GROWTH IN TISSUE CULTURE OF NORMAL COLONIC EPITHELIAL CELLS AND METHOD FOR DETERMINATION OF PRENEOPLASTIC COLOR CELLS**

**Eileen A. Friedman, and Martin Lipkin, both of New York, N.Y., assignors to Sloan-Kettering Institute for Cancer Research, New York, N.Y.**

**Filed Sep. 26, 1984, Ser. No. 655,090**

**Int. Cl.[4] C12N** *5/00;* **C12Q** *1/02*

**U.S. Cl. 435—240.23** **2 Claims**

1. Method for monolayer culture of normal human colonic epithelial crypt cells in tissue culture which comprises:

(a) digesting said cells with a mixture of enzymes initially at an elevated temperature of about 37° C. for about 10 minutes and then at a lower temperature of about 25° C. for between about 30 minutes and about 60 minutes with an enzyme mixture no more than one-fifth the quantity used for colonic tumor cells comprising enzymes selected from the group consisting of hyaluronidase, collagenase and neuraminidase, wherein said enzyme mixture comprises an approximate ratio consisting of 300 units hyaluronidase to 600 units collagenase to 4 units neuraminadase per 1–3 cubic millimeter biopsy;

(b) mixing the digested cells with an amount of a growth medium sufficient to allow plating of the cell growth medium mixture; and

(c) plating the cell growth medium mixture on an adhesive material, thereby creating a monolayer culture of normal human colonic epithelial cells.

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**4,743,553**

**SYNTHETIC GENES FOR BOVINE PARAINFLUENZA VIRUS**

**John M. Rice, Westerville, Ohio, assignor to W. R. Grace & Co., New York, N.Y.**

**Filed Jul. 18, 1984, Ser. No. 632,106**

**Int. Cl.[4] C12N** *1/20, 15/00;* **C07H** *21/04*

**U.S. Cl. 435—253** **12 Claims**

1. A synthetic gene or DNA fragment characterized in that it:

(a) codes for a bovine parainfluenza type-3 viral protein, and

(b) comprises a double-stranded DNA gene which is a copy of the viral RNA gene coding for said protein.

7. The host cell *E. coli* comprising the double-stranded DNA gene of claim 1.

**4,743,554**

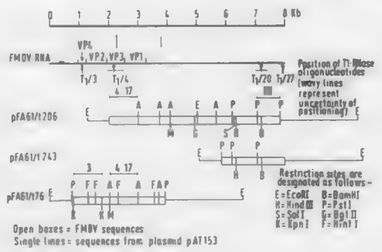
**RECOMBINANT DNA EXPRESSION VECTOR ENCODING FOR FOOT AND MOUTH DISEASE VIRUS PROTEINS**

**John C. Boothroyd, 7 Westgate Road, Beckenham, Kent; George A. M. Cross, 37a The Grove, Biggin Hill, Westerham, Kent; Michael D. Highfield, 107 South Eden Park Road; Michael D. Winther, Flat 3a, South Eden Park Road, both of Beckenham, Kent; David J. Rowlands, Tile House, 98 Busbridge Lane, Godalming, Surrey; Fred Brown, "Syndal" Glaziers Lane, Normandy, Surrey, England, and Timothy J. R. Harris, 70 Minley Road, Cove, Farnborough, Hants, all of England**

**Continuation of Ser. No. 299,884, Sep. 8, 1981. This application May 1, 1985, Ser. No. 728,464**

**Int. Cl.[4] C12N** *1/00, 15/00, 1/20;* **A61K** *39/00*

**U.S. Cl. 435—253** **3 Claims**




1. A recombinant DNA molecule comprising an expression vector DNA sequence and a nucleotide sequence coding for a polypeptide of foot and mouth disease virus (FMDV) serotype A functionally linked to a heterologus promoter, said polypeptide consisting essentially of (i) FMDV capsid protein $VP_1$, being the capsid protein the gene for which is located closest to the 3'-end of the FMDV genome, alone or together with the whole or part of FMDV capsid protein $VP_3$, the gene for which is adjacent to that of $VP_1$, or (ii) an antigenic determinant of either of said proteins that is capable of eliciting an immune response to FMDV in a mammal.

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**4,743,555**

**BIOLOGICALLY PURE CULTURE OF *STREPTOMYCES SANDAENSIS* NO. 6897**

**Masanobu Kohsaka, Sakai; Hiroshi Terano, Toyonaka; Tadaaki Komori, Takatsuki; Morita Iwami, Takarazuka; Michio Yamashita, Takarazuka; Masashi Hashimoto, Takarazuka; Itsuo Uchida, Kyoto, and Shigehiro Takase, Nishinomiya, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan**

**Division of Ser. No. 743,616, Jun. 11, 1985, Pat. No. 4,645,765. This application Sep. 30, 1986, Ser. No. 913,478**

**Claims priority, application United Kingdom, Jun. 25, 1984, 8416141; Apr. 24, 1985, 8510378**

**Int. Cl.[4] C12N** *1/20;* **C12P** *17/18;* **C12R** *1/465*

**U.S. Cl. 435—253** **2 Claims**

1. A biologically pure culture of the microorganism *Streptomyces sandaensis* No. 6897 or a mutant thereof, said culture being capable of yielding an antitumor and antimicrobial compound in recoverable amount upon fermentation.

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**4,743,556**

**PETRI DISH**

**Klon R. Ervin, Glen Arm, Md., assignor to Curtin Matheson Scientific, Inc., Houston, Tex.**

**Filed May 15, 1987, Ser. No. 50,112**

**Int. Cl.[4] C12M** *1/22*

**U.S. Cl. 435—297** **18 Claims**

1. A petri dish for receiving a solidifiable liquid media, comprising:



a first component having a bottom wall having top and bottom surfaces and an upstanding circumferentially extending side wall at the periphery of the bottom wall, said bottom wall having a circumferentially extending trough formed in the top surface adjacent the intersection of the side wall and the periphery of the bottom wall, said trough



comprising means for receiving and distributing solidifiable liquid media during filling of the dish to assist in even spreading of the solidifiable liquid media across the bottom wall of the dish to ensure formation of a uniform media meniscus at the juncture of the side and bottom walls and for retaining the solidified media in place.

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**4,743,557**

**COMPOSITION HAVING REGULATED OCCURENCE OF OPACITY AND CLARITY AT SELECTED TEMPERATURES AND METHOD OF MAKING THE SAME AND ALSO USE OF THE COMPOSITION**

**Maj-Britt I. Tiru, and Mandayam O. Tiru, both of Avstyckningsv. 86, Järfälla, Sweden S-17543**

**Continuation of Ser. No. 587,679, filed as PCT SE 83/00237, Jun. 8, 1983, published as WO84/00212, Jan. 19, 1984, abandoned. This application Jun. 5, 1986, Ser. No. 873,290**

**Claims priority, application Sweden, Jul. 2, 1982, 820/4093**

**Int. Cl.[4] G01K** *11/12*

**U.S. Cl. 436—2** **21 Claims**

1. A composition having opacity below a selected temperature interval and clarity above the temperature interval, wherein said composition consists essentially of

(A) at least one component I having a melting point higher than the temperatures in the temperature interval;

(B) at least one component II in which component I is soluble, said component II having a melting point lower than the temperatures in the temperature interval; and

(C) at least one surface active agent;

wherein component I is present in an amount sufficient for the composition to exhibit opacity on cooling and clarity on warming within a temperature range and the temperature range is greater than said temperature interval; and

wherein said composition has opacity within the temperature range when said surface active agent is absent, and said surface active agent is present in said composition in an amount sufficient to narrow the temperature range within which said composition has opacity to said temperature interval.

11. A method of determining the interval of temperatures at which a composition reversibly exhibits opacity and clarity, wherein said method comprises

(A) providing at least one component II having a melting point lower than said temperature interval;

(B) adding to component II a known amount of at least one component I, which is soluble in component II and which has a melting pont higher than said temperature interval;

wherein component I is present in an amount sufficient for the composition to exhibit opacity on cooling and clarity on warming within the temperature interval; and

(C) alternately heating and cooling the resulting composition over a range of temperatures and observing the interval of temperatures, corresponding to the known amount of component I, within which the composition reversibly exhibits opacity and clarity.

**4,743,558**

**METHOD OF PERFORMING MEDICAL ANALYSIS ON A SAMPLE OF LIQUID BY MEANS OF AT LEAST ONE LIQUID REAGENT, AND APPARATUS FOR PERFORMING THE METHOD**

**Jean Guigan, 9, rue Jean Mermoz, 75008 Paris, France**

**Filed Oct. 22, 1985, Ser. No. 790,011**

**Claims priority, application France, Oct. 26, 1984, 84 16447**

**Int. Cl.[4] G01N** *21/07*

**U.S. Cl. 436—45** **5 Claims**



1. A method of performing medical analysis on a sample a liquid by means of at least one liquid reagent using a compartmented container, said container comprises: a sample storage receptacle,

a storage chamber for a liquid sample, connected to said storage receptacle,

a calibrated cell,

an overflow chamber,

an analysis vat,

a capillary duct connecting said storage chamber to one end of said calibrated cell,

a capillary duct connecting the other end of said calibrated cell to said overflow chamber;

a plurality of storage chambers for liquid reagents, disposed around a pouring chamber,

capillary ducts extending in different angular orientations to each other and connecting said pouring chamber to said calibrated cell and to said reagent storage chambers,

means communicating said pouring chamber to said analysis vat;

a lid closing off said container, said lid being fitted both with said sample storage receptacle which communicates directly with said sample storage chamber and which is situated there above, and with a removable stopper which enters into said pouring chamber and closes orifices defined by the ends of said capillary ducts communicating therewith; and

means to position said container on a turntable of a centrifuge with the container axis offset from the axis of rotation of said turntable and in a plurality of predetermined positions which differ from one another by rotations of the container about its own axis, relative to the turntable and through a given angle;

said method comprising the steps of:

initially disposing liquid reagents in respective ones of said reagent storage chambers,

inserting said sample into said sample storage receptacle and then flowing said sample under gravity into said sample storage chamber,

removing said stopper and placing said container on said centrifuge turntable and performing a plurality of centrifuging operations in succession, with the angular position of the container relative to the direction of centrifugal force being selected each time from said predetermined positions and as a function of the angular orientation of the

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capillary duct concerned so as to cause said sample to pass successively from said sample storage chamber into said calibrated cell, and then from said calibrated cell into said pouring chamber and into said analysis vat, and then to cause each reagent to pass from its storage chamber into said pouring chamber and into said analysis vat.

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**4,743,559**

## METHOD FOR THE DETERMINATION OF REDOX REACTIONS USING IODATE TO ELIMINATE ASCORBIC ACID INTERFERENCE

**Laszlo Koevér, Walter Rittersdorf, and Wolfgang Werner, all of Mannheim, Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany**

**Continuation of Ser. No. 779,594, Sep. 24, 1985, abandoned, which is a continuation of Ser. No. 246,807, Mar. 23, 1981, abandoned. This application Dec. 15, 1986, Ser. No. 941,406**

**Claims priority, application Fed. Rep. of Germany, Mar. 29, 1980, 3012368**

**Int. Cl.⁴ G01N** *1/00, 31/22, 33/15;* **C12Q** *1/28*

**U.S. Cl. 436—175** **1 Claim**

1. Method for detecting an analyte with the aid of a redox reaction in a test system in the presence of ascorbic acid as an interfering reducing agent comprising adding to a test system which contains a redox agent system which reacts to form a visually or photometrically detectable or assessable color an amount of soluble iodate which is in excess of the amount necessary to remove said ascorbic acid, reacting said ascorbic acid with said iodate at a pH of from 5 to 9, and detecting said redox reaction in the presence of excess iodate ions.

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**4,743,560**

## SOLID PHASE ASSAY

**Robert L. Campbell, Durham; Daniel B. Wagner, Raleigh, and James P. O'Connell, Chapel Hill, all of N.C., assignors to Becton Dickinson and Company, Franklin Lakes, N.J.**

**Filed Mar. 26, 1984, Ser. No. 593,411**

**The portion of the term of this patent subsequent to Oct. 27, 2004, has been disclaimed.**

**Int. Cl.⁴ G01N** *33/533, 33/543, 33/544, 33/548*

**U.S. Cl. 436—501** **34 Claims**

1. A process for assaying for an analyte, comprising:

contacting a binder supported on a test area of a solid support with analyte and a tracer, said binder being a specific binder for at least the analyte, said tracer being comprised of a ligand labeled with a liposome, said liposome including a detectable marker which is not visible, said ligand being bound to one of the binder on the support or the analyte bound to the binder on the support, said test area being formed of a material having a surface area for supporting the binder and said binder being supported in the test area in a concentration of at least 1 ug/cm and at which tracer may be determined without lysis of the liposome; and

determining the tracer bound in said test area as a measure of analyte in a sample.

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**4,743,561**

## LUMINESCENT ASSAY WITH A REAGENT TO ALTER TRANSMITIVE PROPERTIES OF ASSAY SOLUTION

**Mark R. Shaffar, North Chicago, Ill., assignor to Abbott Laboratories, Abbott Park, Ill.**

**Filed Mar. 5, 1985, Ser. No. 708,472**

**The portion of the term of this patent subsequent to Jan. 22, 2002, has been disclaimed.**

**Int. Cl.⁴ C12Q** *1/66, 1/28;* **G01N** *21/76, 33/53*

**U.S. Cl. 436—501** **6 Claims**

1. A method for determining a ligand in a sample suspected of containing the ligand, which method comprises:

(a) combining to form an assay solution

(i) said sample;

(ii) a luminescent reagent;

(iii) a reagent system which in the presence of the ligand to be determined is capable of providing a change in the transmittive properties of the assay solution within a wavelength band that overlaps the emission wavelength band of light produced by the luminescent reagent;

(b) activating the luminescent reagent; and

(c) measuring the intensity of light emitted by the assay solution as a measure of the presence or amount of the ligand in the sample.

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**4,743,562**

## PURIFIED HUMAN CYTOMEGALOVIRUS PROTEIN

**Lucy E. Rasmussen, Menlo Park, and Thomas C. Merigan, Portola Valley, both of Calif., assignors to The Board of Trustees of the Leland Stanford Junior University, Stanford, Calif.**

**Filed Aug. 21, 1984, Ser. No. 642,828**

**Int. Cl.⁴ C12N** *5/00, 15/00;* **A61K** *39/245, 39/42*

**U.S. Cl. 436—518** **5 Claims**

1. A method of determining the presence of human CMV neutralizing antibodies in a sample of human serum comprising:

(a) incubating the sample with a purified human CMV virion protein having:

(1) a molecular weight of approximately 86,000 daltons as measured by SDS-PAGE; and

(2) in vivo immunizing activity eliciting virus neutralizing antibody, said protein being substantially free of other CMW proteins, and derivatives of said protein, as determined by the binding of said protein to monoclonal antibody Ig6 or a functional equivalent thereof that recognizes the same antigen as Ig6 under conditions that permit antigen-antibody binding; and

(b) detecting the presence of immune complexes in the incubate.

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**4,743,563**

## PROCESS OF CONTROLLING SURFACE DOPING

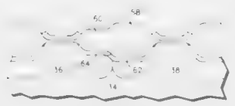
**James R. Pfiester; John R. Alvis, both of Austin, Tex., and Orin W. Holland, Oak Ridge, Tenn., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed May 26, 1987, Ser. No. 53,917**

**Int. Cl.⁴ H01L** *21/265, 21/22, 17/00*

**U.S. Cl. 437—024** **10 Claims**





1. A process for isolating between devices in a CMOS integrated circuit which comprises the steps of:

providing a silicon substrate having a surface, said surface having a region of N-type conductivity and a region of P-type conductivity;

forming a layer of oxidation resistant material overlying active areas of each of said regions;

implanting boron into portions of said surface not overlaid by said oxidation resistant material including said region of N-type conductivity and said region of P-type conductivity;

selectively implanting halogen ions into a portion of said region of N-type conductivity, said portion of said region being a subset, less than the whole, of said portions implanted with boron;

and thermally oxidizing said substrate to form an oxide between said active areas.



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**4,743,564**

## METHOD FOR MANUFACTURING A COMPLEMENTARY MOS TYPE SEMICONDUCTOR DEVICE

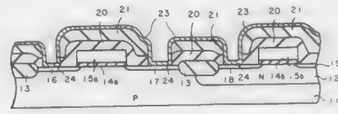
**Masaki Sato, Kawasaki, and Kazuyoshi Shinada, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan**

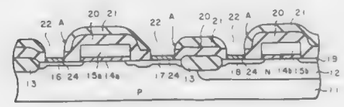
**Filed Dec. 24, 1985, Ser. No. 813,142**

**Claims priority, application Japan, Dec. 28, 1984, 59-276138; Jul. 25, 1985, 60-164612**

**Int. Cl.⁴ H01L** *21/425, 21/441*

**U.S. Cl. 437—24** **12 Claims**





1. A method for manufacturing a complementary MOS semiconductor device on a semiconductor substrate having a well region formed in a portion of the surface of said substrate, the mthod comprising the sequential steps of:

forming a structure having a first conductive diffusion region containing a first conductive impurity in the surface of said semiconductor substrate, a second conductive duffusion region containing a second conductive impurity in said well region of said semiconductor substrate, and a gate electrode on each of said conductive diffusion regions;

forming a silicate glass insulation layer containing one of said first and second conductive impurities overlying said semiconductor substrate, said well region, said conductive diffusion regions, and said gate electrodes;

opening a contact hole by selectively removing a portion of said insulation layer overlying said first conductive diffusion region and a portion of said insulation layer overlying said second conductive diffusion region;

forming at least one metal layer on the surfaces of said first and second conductive duffusion region exposed by said contact holes, said metal being selected from the group consisting of metal and metal silicide;

heating said semiconductor substrate to melt at least part of said insulation layer and form a tapered portion thereof adjacent said contact hole; and

forming a wiring layer on said metal layer in said contact hole.

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**4,743,565**

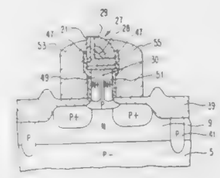
## LATERAL DEVICE STRUCTURES USING SELF-ALIGNED FABRICATION TECHNIQUES

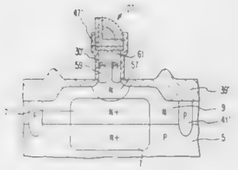
**George R. Goth, Poughkeepsie, and Shashi D. Malaviya, Fishkill, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Division of Ser. No. 674,439, Nov. 23, 1984, abandoned, which is a division of Ser. No. 248,918, Mar. 3, 1981, Pat. No. 4,508,579. This application Mar. 10, 1986, Ser. No. 837,934**

**Int. Cl.⁴ H01L** *29/56, 29/70*

**U.S. Cl. 437—32** **15 Claims**





1. A process for forming a semiconductor device of tightly controlled width, comprising the steps of:

providing a body of a first conductivity type semiconductive material;

providing a first insulating layer on said semiconductive material;

providing a first layer of material over one portion of said insulating layer leaving another portion of said insulation layer exposed said first layer having a substantially vertical surface extending between said one and another portions;

providing a second layer of material conformally over said first layer of material and said exposed insulating layer;

anisotropically etching said conformal second layer of material forming a stud of said second material abutting said vertical surface of said first layer of material with the width of said stud defined by the thickness of said conformal second layer of material;

removing said first layer of material;

forming a protrusion of said semiconductive material on a pedestal thereof with the width of said protrusion defined by the width of said stud and said protrusion having opposing vertical sidewalls by anisotropically etching said first insulating layer and said body of semiconductive material surrounding said stud using said stud as a mask;

forming an oxidation-resistant insulator layer on said vertical sidewalls and on the semiconductor material surrounding said protrusion;

etching to recess said semiconductor material not masked by said oxidation-resistant layer;

forming dielectric isolation in said recess by thermal oxidation thereof;

selectively etching said oxidation-resistant layer to form localized contact openings therein; and

making electrical contact via said openings to opposing vertical sidewalls of said protrusion of semiconductive material;

whereby a semiconductor device of tightly controlled width protruding from said body is formed.

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**4,743,566**

## METHOD OF MANUFACTURING A SEMICONDUCTOR DEVICE, IN WHICH A SILICON SLICE IS LOCALLY PROVIDED WITH FIELD OXIDE WITH A CHANNEL STOPPER

**Jozef J. J. Bastiaens, and Marcus A. Sprokel, both of Eindhoven, Netherlands, assignors to U.S. Philips Corp., New York, N.Y.**

**Filed Jun. 2, 1986, Ser. No. 869,482**

**Claims priority, application Netherlands, Jun. 14, 1985, 8501720**

**Int. Cl.**[4] **H01L** *21/76*

**U.S. Cl. 437—70** **14 Claims**



**1**. A method of manufacturing a semiconductor device comprising the steps of

(a) forming an oxidation mask locally on a surface of a silicon slice;

(b) providing a layer portion of said surface laterally adjacent to said oxidation mask with atoms of dopant;

(c) subjecting said silicon slice to a first oxidizing heat treatment which forms a field oxide layer on said layer portion adjoining said oxidation mask and which forms a channel stopper zone beneath said field oxide layer by diffusion of said atoms of said dopant into said silicon slice, said channel stopper zone being extended in the lateral direction for a similar amount as said field oxide;

(d) removing said oxidation mask from said surface of said silicon slice by etching;

(e) subjecting said silicon slice to a second oxidizing heat treatment to form a gate oxide at said surface of said silicon slice where said oxidation mask has been removed; and

(f) subjecting said silicon slice to a further etching treatment to etch away a part of said field oxide layer, said field oxide layer becoming thinner and smaller in a lateral direction,

wherein said silicon slice between said first and said second oxidizing heat treatment is subjected to an additional oxidizing heat treatment, and subsequent etching is carried out to etch away silicon oxide formed by said additional oxidizing heat treatment.

**4,743,567**

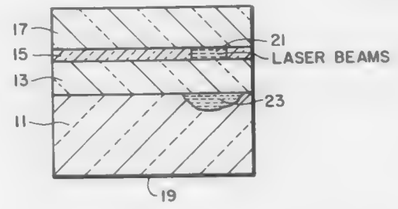
## METHOD OF FORMING THIN, DEFECT-FREE, MONOCRYSTALLINE LAYERS OF SEMICONDUCTOR MATERIALS ON INSULATORS

**Ranjana Pandya, Cold Spring, and Andre M. Martinez, Wappingers Falls, both of N.Y., assignors to North American Philips Corp., New York, N.Y.**

**Filed Aug. 11, 1987, Ser. No. 84,657**

**Int. Cl.**[4] **H01L** *21/265, 21/225*

**U.S. Cl. 437—84** **15 Claims**




**1**. A method of forming a thin, defect free, monocrystalline layer of a semiconductor material on an insulator, said method comprising,

(a) depositing a thin polycrystalline or amorphous layer of a semiconductor material on an insulating substrate having a softening point at least about 10° C. below the melting point of said semiconductor material and a slope of its viscosity versus temperature curve of less than zero and greater than negative infinity to form a layered structure;

(b) heating said layered structure from a zone heating source in such a manner so as to provide a convex solid-liquid interface in said layer of said semiconductor material while scanning said layered structure relative to said zone heating source and heating said substrate at its annealing point; and

(c) controlling the scanning speed of said layered structure relative to said zone heating source so as to cause said convex solid-liquid interface to move along said layer of semiconductor material while the surface of the substrate opposing the semiconductor material is liquified under said convex solid-liquid interface.

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**4,743,568**

## MULTILEVEL INTERCONNECT TRANSFER PROCESS

**Thomas E. Wood, Chandler, Ariz., assignor to Motorola Inc., Schaumburg, Ill.**

**Filed Jul. 24, 1987, Ser. No. 77,476**

**Int. Cl.**[4] **H01L** *21/283, 21/316*

**U.S. Cl. 437—189** **14 Claims**

**1**. A method of processing and transferring multilevel interconnect lines for use in a module having a plurality of electrical contacts incorporated therein comprising the steps of:

providing a substrate;

forming a separation layer on said substrate;

forming multilevel interconnect lines on said separation layer;

separating, at least partially, said substrate and said multilevel interconnect lines;

adhering said multilevel interconnect lines and a module having a plurality of electrical contacts in a predetermined relationship; and

electrically connecting said multilevel interconnect lines and said plurality of electrical contacts of said module.

**10**. A method of processing and transferring multilevel interconnect lines for use in a module having a plurality of electrical contacts incorporated therein comprising the steps of:

providing a substrate having a first surface and a second surface;

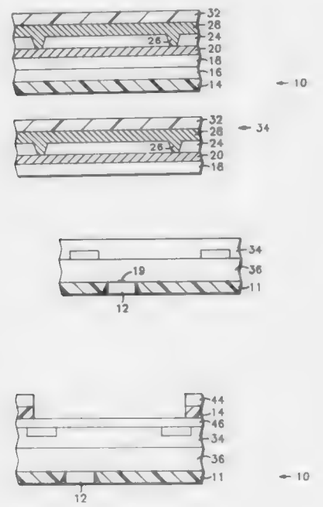


forming a boron nitride layer on said first surface of said substrate;

bonding stabilizing means on said second surface of said substrate;

removing the portions of said substrate left exposed by said stabilizing means;

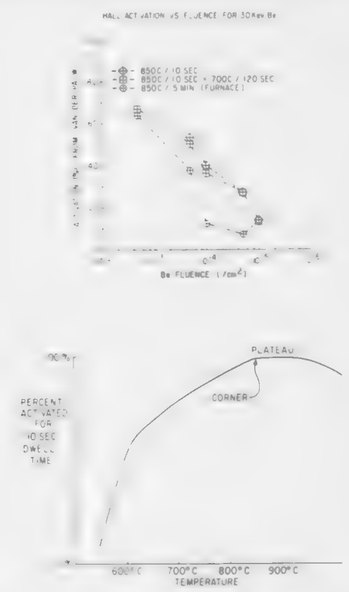
forming multilevel interconnect lines on said boron nitride layer;




adhering said multilevel interconnect lines including said boron nitride layer and said stabilizing means to a module having a plurality of electrical contacts, said multilevel interconnect lines and said module being in a predetermined relationship; and

electrically connecting said multilevel interconnect lines and said module.

second time, said second temperature less than the minimum for significant diffusion of said dopant, and said second time sufficient to eliminate most defects created by said implanting.




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**4,743,569**

## TWO STEP RAPID THERMAL ANNEAL OF IMPLANTED COMPOUND SEMICONDUCTOR

**Donald L. Plumton, Dallas; Liem T. Tran, Garland, and Walter M. Duncan, Dallas, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Apr. 20, 1987, Ser. No. 40,420**

**Int. Cl.**[4] **H01L** *21/265*

**U.S. Cl. 437—247** **3 Claims**

**1**. A method of doping compound semiconductor material, comprising the steps of:

(a) implanting dopants into a semiconductor material body;

(b) rapidly heating said body to a first temperature for a first time, said first temperature about the electrical activation corner temperature of said dopant in said semiconductor material for said first time; and

(c) rapidly heating said body to a second temperature for a

**4,743,570**

## METHOD OF THERMAL TREATMENT OF A WAFER IN AN EVACUATED ENVIRONMENT

**Lawrence T. Lamont, Jr., Mountain View, Calif., assignor to Varian Associates, Inc., Palo Alto, Calif.**

**Continuation of Ser. No. 366,433, Apr. 7, 1982, Pat. No. 4,680,061, which is a division of Ser. No. 106,343, Dec. 21, 1979. This application Jul. 10, 1987, Ser. No. 72,194**

**Int. Cl.**[4] **H01L** *21/263*

**U.S. Cl. 437—248** **7 Claims**

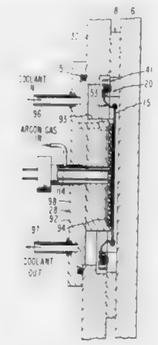
**1**. The method of treating a wafer-like article in a vacuum chamber comprising the steps of:

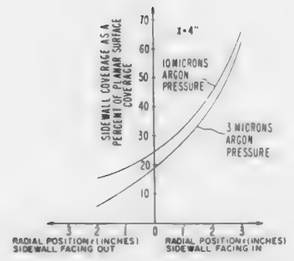
positioning the article and a heat exchanging structure at a station within the vacuum chamber;

engaging the article and said heat exchanging structure to be in pressing contact,

and maintaining a gas under pressure which is substantially less than atmospheric pressure between the article and said structure to facilitate the conduction of heat between the article and said structure by said gas, said gas being

inhibited from flowing from between said structure and article while said article and said structure are in contact-




ing relationship and said heat conduction by said gas is being facilitated.

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**4,743,571**

**POLYCRYSTALLINE SINTERED BODIES ON A BASE OF SILICON NITRIDE WITH HIGH FRACTURE TOUGHNESS AND HARDNESS**

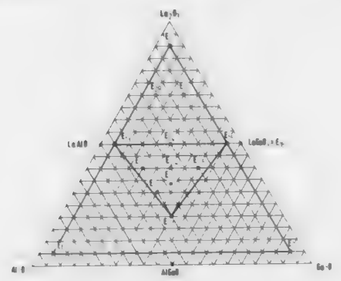
**Detlef Steinmann, Buchenberg; Alfred Lipp, Bad Worishofen; Hubert Thaler, and Dietrich Lange, both of Kempten, all of Fed. Rep. of Germany, assignors to Elektroschmelzwerk Kempten GmbH, Munich, Fed. Rep. of Germany**

**Filed Feb. 26, 1987, Ser. No. 19,487**

**Claims priority, application Fed. Rep. of Germany, May 23, 1986, 3617282**

**Int. Cl.[4] C04B** *35/58*

**U.S. Cl. 501—97** **10 Claims**



**1**. Polycrystalline sintered bodies of great fracture toughness and hardness consisting essentially of at least 66% by weight of a crystalline silicon nitride phase, of which at least 90% by weight is present in the beta-modification, and up to 34% by weight of secondary, intergranular grain boundary phases based on oxides, carbides and/or nitrides, of which at least one is crystalline, and wherein at least 25% by weight of the intergranular, secondary grain boundary phases consists essentially of a quasi-ternary crystalline compound of $Ga_2O_3$—$La_2O_3$—$Al_2O_3$, the quantitative portions of which in % by mole in the ternary system $Ga_2O_3$—$La_2O_3$—$Al_2O_3$ are determined by the triangular surface with the corners

$E_1$=5%$Ga_2O_3$—5%$La_2O_3$—90%$Al_2O_3$

$E_2$=90%$Ga_2O_3$—5%$La_2O_3$—5%$Al_2O_3$

$E_2$=5%$Ga_2O_3$—90%$La_2O_3$—5%$Al_2O_3$ of the FIGURE,

and the quasi-ternary crystalline compound is prepared from gallium oxide, lanthanum oxide and aluminum oxide prior to producing the polycrystalline sintered bodies and wherein at least 1% by weight of the sintered body is the quasi-ternary crystalline compound.

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**4,743,572**

**MAGNESIA-ALUMINA-ALUMINUM PHOSPHATE CATALYST AND CATALYST PRODUCT THEREOF**

**Philip J. Angevine; Pochen Chu, both of West Deptford, N.J.; Thomas F. Degnan, Yardley, Pa., and Garry W. Kirker, Washington Township, Gloucester County, N.J., assignors to Mobil Oil Corporation, New York, N.Y.**

**Filed Dec. 5, 1986, Ser. No. 938,476**

**Int. Cl.[4] B01J** *29/06, 27/14*

**U.S. Cl. 502—64** **18 Claims**

**1**. In a method for preparing an amorphous magnesia-alumina-aluminum phosphate catalyst support comprising the steps of (a) forming an aqueous solution of aluminum, magnesium and phosphoric acid, (b) precipitating amorphous magnesia-alumina-aluminum phosphate by the addition of ammonia to the solution, (c) separating the precipitate and (d) calcining the precipitate,

the improvement which comprises precipitating the amorphous magnesia-alumina-aluminum phosphate in the presence of a source of an organic cation having a size equal to or larger than 2 Angstroms.

**2**. The method according to claim **1**, wherein the source of the organic cation is an amine, quaternary ammonium or quaternary phosphonium compound.

**4**. The method according to claim **1**, further comprising incorporating a Group VIII metal in the magnesia-alumina-aluminum phosphate catalyst support by impregnating the support with a soluble salt of the metal.

**5**. The method of claim **1**, further comprising mixing the amorphous magnesia-alumina-aluminum phosphate catalyst support with a zeolite.

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**4,743,573**

**CATALYST FOR THE SELECTIVE DECOMPOSITION OF CUMENE HYDROPEROXIDE**

**Ugo Romano, Vimercate; Mario G. Clerici, San Donato Milanese; Giuseppe Bellussi, Piacenza, and Franco Buonomo, San Donato Milanese, all of Italy, assignors to Enichem Sintesi S.p.A., Palermo, Italy**

**Filed Apr. 22, 1986, Ser. No. 854,527**

**Claims priority, application Italy, Apr. 23, 1985, 20458 A/85**

**Int. Cl.[4] B01J** *29/06*

**U.S. Cl. 502—64** **14 Claims**

**1**. A catalyst for the selective decomposition of cumene hydroperoxide into phenol and acetone, comprising oxide forms of silicon, aluminum, and boron constituting crystals having a structure of zeolite, wherein aluminum and boron replace silicon in the crystalline structure of silica, and the crystals are interconnected with each other by oligomeric silica.

**4**. The catalyst according to claim **1**, which, after calcination at 550° C. and cooling to room temperature, corresponds to the general formula:

$0.017–0.0025Al_2O_3.0.1–0.005B_2O_3.SiO_2.0.2–0.5H_2O$.

**5**. A process for the preparation of the catalyst according to claim **1**, comprising the steps of:



preparing zeolite crystals wherein aluminum and boron replace silicon in the crystalline structure of silica; and interconnecting said crystals, by dispersing said crystals in a solution obtained by hydrolyzing a tetraalkyl silicate in an aqueous solution of tetraalkyl ammonium hydroxide for 1 to 2 hours at a temperature of 60°–70° C. to form a suspension, atomizing said suspension, to obtain microspheres having an average diameter of 5 to 1000 μm, and calcining said microspheres at a temperature of 500° to 600° C. for 2–10 hours.

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**4,743,574**

**CATALYST FOR HYDROTREATMENT OF DISTILLATES OF PETROLEUM AND METHOD FOR THE PREPARATION OF SAME**

**Alfredo L. Morales, and Juan J. Garcia, both of San Antonio de Los Altos, Venezuela, assignors to Intevep, S.A., Caracas, Venezuela**

**Filed Jan. 9, 1986, Ser. No. 817,367**

**Int. Cl.[4] B01J** *21/02, 27/14, 27/188, 27/19*

**U.S. Cl. 502—206** **21 Claims**

**1**. A method for the production of a catalyst useful in the hydrotreatment of distillates of petroleum containing sulfulr and nitrogen which comprises:

(a) providing a support base prepared by adding a compound selected from the goup consisting of phosphorus and boron in an amount of between 0.2 to 1% by weight calculated as an oxide to a peptized alumina gel to obtain a support base of aluminum phosphate or aluminum borate having the tetrahedral sites of alumina blocked by the phosphorus or boron;

(b) first impregnating said support base with a solution containing a metal selected from Group VIB of the Periodic Table of Elements to deposit a concentraiion of said Group VIB metal of between 10 and 20% by weight calculated as oxide on said support base; and

(c) second impregnating the first impregnated support bse with a solution containing a metal selected from Group VIII of the Periodic Table of Elements to deposit a concentration of said Group VIII metal of between 0.5 and 2.0% by weight calculated as oxide on said support base such that small crystals of $CoMoO_4$ are disbursed on the surface of said support base thereby increasing catalytic activity of the catalyst.

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**4,743,575**

**PREPARATIVE PROCESS FOR METHANE CONVERSION AGENTS**

**John A. Jaecker, Homewood, Ill., assignor to Atlantic Richfield Company, Los Angeles, Calif.**

**Division of Ser. No. 601,136, Apr. 16, 1984, Pat. No. 4,568,785. This application Jan. 2, 1986, Ser. No. 802,300**

**Int. Cl.[4] B01J** *21/14, 23/18, 23/14, 23/34*

**U.S. Cl. 502—241** **14 Claims**

**8**. In an improved composition of matter comprising:

(a) at least one reducible oxide of at least one metal, which oxide is reduced and produces higher hydrocarbon products and water when contacted with methane at a selected temperature in the range of about 500° to about 1000° C. and

(b) a support associated with said oxide, the improvement which comprises employing as the support a material selected from the group consisting of magnesia, silica and mixtures thereof, the surface of at least a portion of said support being sintered.

**12**. The composition of claim **8** wherein said reducible oxide is selected from the group consisting of manganese, tin, indium, germanium, antimony, lead, bismuth, and mixtures thereof.

**13**. The composition of claim **8** wherein said agent comprises additionally a promoting amount of at least one promoter selected from the group consisting of alkali metals and compounds thereof.

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**4,743,576**

**CATALYST FOR THE PRODUCTION OF SYNTHESIS GAS OR HYDROGEN AND PROCESS FOR THE PRODUCTION OF THE CATALYST**

**Michael Schneider, Ottobrunn-Riemerling; Karel Kochloefl, Moosburg, and Ortwin Bock, Landshut-Kumhausen, all of Fed. Rep. of Germany, assignors to Sud Chemie Aktiengesellschuft, Munich, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 665,757, Oct. 29, 1984, Pat. No. 4,613,584. This application Apr. 30, 1986, Ser. No. 858,063**

**Claims priority, application Fed. Rep. of Germany, May 8, 1985, 3516580**

**Int. Cl.[4] B01J** *21/06, 23/02, 23/10, 23/40*

**U.S. Cl. 502—242** **8 Claims**

**1**. A catalyst for the production of synthesis gas or hydrogen from aqueous methanol, which comprises:

A. a catalytically-active, Group VIII noble metal component;

B. a carrier material consisting essentially of:

1. at least one metal oxide, wherein the metal is selected from the group consisting of cerium and titanium, and

2. from 1–10% by weight of an oxide of zirconium or lanthanum.

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**4,743,577**

**CATALYST COMPOSITION**

**Hobe Schroeder, Warrenville, and Ricky L. Wittman, Montgomery, both of Ill., assignors to Amoco Corporation, Chicago, Ill.**

**Filed Oct. 14, 1986, Ser. No. 918,390**

**Int. Cl.[4] B01J** *21/06, 23/72, 23/89*

**U.S. Cl. 502—326** **17 Claims**

**1**. A catalyst composition consisting essentially of a first catalytic metal selected from the class consisting of palladium and rhodium and extended as a thin surface layer upon a second support metal selected from the class consisting of titanium, nickel and alloys comprising one or more of said support metals, and afforded as a porous, sintered substrate, wherein the first metal is present at a level of 0.1–10 weight percent, calculated as the elemental first metal and based on the weight of the catalyst composition.

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**4,743,578**

**CERAMIC STRUCTURES**

**Peter J. Davidson, Darlington, England, assignor to Imperial Chemical Industries PLC, London, England**

**Filed Nov. 3, 1986, Ser. No. 925,911**

**Claims priority, application United Kingdom, Nov. 13, 1985, 8528031**

**Int. Cl.[4] B01J** *32/00, 35/04*

**U.S. Cl. 502—439** **7 Claims**

**1**. A self-supporting structure disposed within a containing vessel and comprising a plurality of discrete interlocking units, each unit consisting of a ceramic material having a plurality of channels therethrough, and

having the general shape of a right prism of polygonal cross section having rectangular prism faces,

having at least one upper projection extending from the upper part of the unit, each upper projection corresponding to a rectangular prism face, said units being disposed such that each unit that is disposed adjacent the walls of the containing vessel has an upper projection resting upon a supporting surface of the containing vessel, and

each one unit that is not adjacent the walls of the containing vessel has an upper projection resting upon a lower projection extending from the lower part, and corresponding to a rectangular prism face, of the unit that is adjacent to said one unit and is between said one unit and the wall of the containing vessel,

the individual units being capable of sufficient movement relative to one another that expansion or contraction of the individual units can be accommodated, whereby expansion or contraction of the units relative to the vessel has the cummulative effect of causing variation in the extent of bowing of the structure.

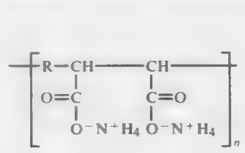
**4,743,579**
**RECORDING SHEET HAVING A CHLORINATED ALPHA-OLEFIN SOLVENT**
**Robert A. Fetters, Chillicothe, Ohio, assignor to The Mead Corporation, Dayton, Ohio**
**Filed Mar. 18, 1987, Ser. No. 27,376**
**Int. Cl.[4] B41M** *5/16, 5/22*
**U.S. Cl. 503—213** **10 Claims**

1. A recording sheet comprising a support having a layer of microcapsules on the surface thereof, said microcapsules containing a substantially colorless electron donating color former and a chlorinated alpha-olefin as a solvent for said color former.

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**4,743,580**
**HEAT-SENSITIVE RECORDING MATERIALS**
**Norikazu Kasamatsu, Kawasaki; Masao Matsukawa, Tokyo, and Hirokazu Hirata, Kamifukuoka, all of Japan, assignors to Sanyo-Kokusaku Pulp Co., Ltd., Tokyo, Japan**
**Filed Sep. 12, 1986, Ser. No. 906,501**
**Claims priority, application Japan, Mar. 24, 1986, 61-63974**
**The portion of the term of this patent subsequent to Nov. 11, 2003, has been disclaimed.**
**Int. Cl.[4] B41M** *5/18*
**U.S. Cl. 503—214** **3 Claims**

1. A heat-sensitive recording material comprising a sheet substrate applied thereon with a heat-sensitive, color-developing layer containing as the main components a colorless or light-colored leuco dye, a developer for permitting said dye to develope a color by heating and a binder, in which the binder used as an ammonium salt of a diisobutylene/maleic anhydride copolymer is expressed in terms of the following general formula:

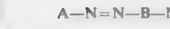


wherein R stands for a diisobutylene group,
a part of said ammonium salt being substituted and modified by an ammonium salt comprising a primary, secondary or tertiary ethanol amine.

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**4,743,581**
**THERMAL TRANSFER PRINTING**
**Peter Gregory, Bolton, England, assignor to Imperial Chemical Industries PLC, London, England**
**Filed Sep. 22, 1986, Ser. No. 909,849**
**Claims priority, application United Kingdom, Oct. 1, 1985, 852454**
**Int. Cl.[4] B41M** *5/26*
**U.S. Cl. 503—227** **10 Claims**

1. A thermal transfer printing sheet comprising a substrate having a coating comprising an azo dye and a binder in which the azo dye is of the formula:



wherein:
A is the residue of a diazotisable phenylamine or naphthylamine, A—$NH_2$, carrying not more than one unsaturated electron withdrawing group;
B is an optionally substituted thiophen-2,5-ylene or thiazol-2,5-ylene group; and
E is the residue of an aromatic coupling component E—X wherein X is a group displaceable by a diazotised aromatic amine.

**4,743,582**
**N-ALKYL-OR N-ARYL-AMINOPYRAZOLONE MEROCYANINE DYE-DONOR ELEMENT USED IN THERMAL DYE TRANSFER**
**Steven Evans, Rochester, and Helmut Weber, Webster, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**
**Continuation-in-part of Ser. No. 915,451, Oct. 6, 1986, abandoned. This application Jun. 8, 1987, Ser. No. 59,443**
**Int. Cl.[4] B41M** *5/26*
**U.S. Cl. 503—227** **20 Claims**

10. In a process of forming a dye transfer image comprising imagewise-heating a dye-donor element comprising a support having thereon a dye layer comprising a dye dispersed in a polymeric binder and transferring a dye image to a dye-receiving element to form said dye transfer image, the improvement wherein said dye comprises a 3-(N-alkyl- or N-aryl-amino)-2-pyrazolin-5-one merocyanine dye, said merocyanine dye being capable of transfer by diffusion to a dye-receiving element upon the application of heat and being incapable of substantial photolysis, said merocyanine dye being substituted or unsubstituted on the bridging methine carbon atoms.

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**4,743,583**
**SUSTAINED RELEASE PROTEIN COMPOSITIONS AND METHOD FOR MAKING**
**Tully J. Speaker, and Tycho J. Speaker, both of Philadelphia, Pa., assignors to Temple University, Philadelphia, Pa.**
**Filed Jul. 20, 1987, Ser. No. 75,092**
**Int. Cl.[4] C07K** *1/02, 1/14, 3/24, 3/28*
**U.S. Cl. 514—4** **18 Claims**

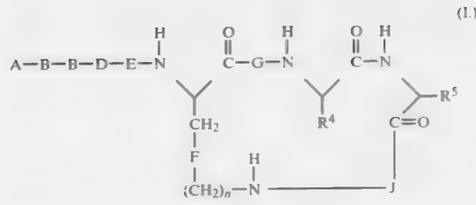
1. Microparticulate material, consisting essentially of the reaction product of an emulsion of:
(a) a partially hydrophilic, partially lipophilic, polyfunctional Lewis acid in an aqueous solution, said solution comprising a continuous phase; and
(b) a Lewis base dissolved in a non-aqueous solvent complex, said non-aqueous solvent complex comprising:
(1) a water immiscible, non-denaturing solvent; or
(2) a water miscible, protein non-denaturing solvent, rendered viscid and temporarily water immiscible by the inclusion therein of a high concentration of a protein solute; or
(3) a combination of water immiscible solvent and a water-miscible protein non-denaturing solvent, said non-aqueous solvent complex comprising a discontinuous droplet phase, said continuous aqueous phase surrounding the droplets of said discontinuous phase,
wherein, said Lewis acid and said Lewis base and said non-aqueous solvent are adapted by reaction of said Lewis acid and said Lewis base at the phase interface of the surfaces of said droplets to form enclosed cellular structures comprising a microparticulate material containing said core material in said closed structures, in a manner to permit controlled release of the core material through the microparticle wall,
wherein said core material is a polypeptide having nominally from 14 to 1000 amino acids and is soluble in said non-aqueous, protein non-denaturing solvent and wherein said core material is diffusable through said microparticulate wall.

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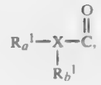
**4,743,584**
**C-TERMINAL AMIDE CYCLIC RENIN INHIBITORS CONTAINING PEPTIDE ISOSTERES**
**Joshua S. Boger, Westfield, N.J., assignor to Merck & Co., Inc., Rahway, N.J.**
**Filed Oct. 7, 1986, Ser. No. 916,265**
**The portion of the term of this patent subsequent to Nov. 27, 2001, has been disclaimed.**
**Int. Cl.[4] A61K** *37/43;* **C07K** *5/12*
**U.S. Cl. 514—11** **9 Claims**

1. A cyclic peptide of the formula:

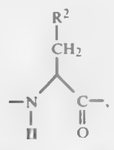


(I.)


wherein:
A is hydrogen or



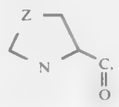
where
X is —O—, —O—CH—, —CH—O—, —CH—, —NH—CH—, or —S—CH—; and
$R_a^1$ and $R_b^1$ may be the same or different and are hydrogen; $W—(CH_2)_p—$ m $W—(CH_2)_p$, $—CH=CH—(CH_2)_{p'}$, where W is $C_1$–$C_4$-alkyl; hydrogen; phenyl; naphthyl; $C_3$-$C_7$-cycloalkyl, or $C_3$-$C_7$-cycloalkyl, phenyl or naphthyl substituted with up to five members independently selected from the group consisting of $C_1$-$C_6$-alkyl, trifluoromethyl, hydroxy, $C_1$-$C_4$-alkoxy, and halo;
p is 0 to 5; and p′ and p″ are independently 0 to 2; except that where X is —O—, only one of $R_a^1$ or $R_b^1$ is present;
B is absent, glycyl, sarcosyl, or



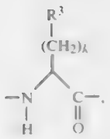
where $R^2$ is hydrogen; $C_1$–$C_4$-alkyl; hydroxy-$C_1$–$C_4$-alkyl; methylthiomethyl; indolyl; 4-imidazolyl; amino-$C_2$–$C_4$alkyl;



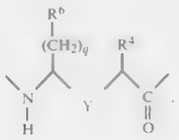
where $R^8$ is hydrogen, $C_1$–$C_4$-alkyl, hydroxy, or $C_3$–$C_7$-cycloalkyl; quanidyl-$C_2$–$C_3$-alkyl; or unsubstituted or mono- or disubstituted phenyl or naphthyl, where the substituent(s) is/are independently selected from the group consisting of $C_1$–$C_4$-alkyl, trifluoromethyl, hydroxy, $C_1$–$C_4$-alkoxy, and halo;
D is absent, —S— or



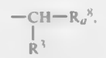
where Z is $—(CH_2)_m—$ and m is 1 or 2;
E is absent or



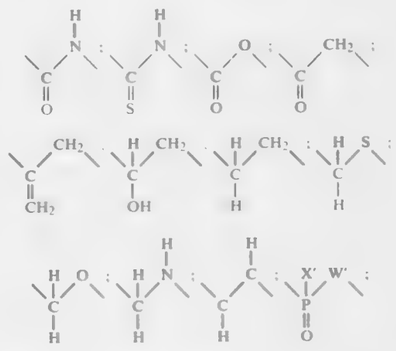
where k is 1 to 4; and $R^3$ is hydrogen; $C_1$–$C_4$-alkyl; indolyl; or unsubstituted or mono-, or disubstituted phenyl, naphthyl, phenyl-$C_1$–$C_4$-alkyl, or naphthyl-$C_1$–$C_4$-alkyl where the substituent(s) is/are independently selected from the group consisting of $C_1$–$C_4$-alkyl, trifluoromethyl, hydroxy, $C_1$–$C_4$-alkoxy, and halo;
F is absent, —$CH_2$—, —S—, or —O—;
n is 0 to 3;
G is



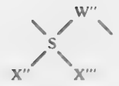
where $R^6$ is $C_3$–$C_6$-alkyl; or unsubstituted or mono-, or disubstituted $C_3$–$C_7$-cycloalkyl, phenyl or naphthyl, where the substituent(s) is/are independently selected from the group consisting of $C_1$–$C_4$-alkyl, trifluoromethyl, hydroxy, $C_1$–$C_4$-alkoxy, and halo; q is 1 to 4; $R^4$ is hydrogen; or



where $R^3$ is hydrogen; $C_1$–$C_4$-alkyl; indolyl; unsubstuted or mono-, or disubstituted phenyl, naphthyl, phenyl-$C_1$–$C_4$-alkyl, or naphthyl-$C_1$–$C_4$-alkyl, where the substituents(s) on the phenyl or naphthyl is/are independently selected from the group consisting of $C_1$–$C_4$alkyl,, trifluoromethyl, hydroxy, $C_1$–$C_4$alkoxy, and halo; and $R_a^8$ is hydrogen; $C_1$–$C_4$-alkyl; hydroxy; or $C_3$–$C_7$-cycloalkyl; and
Y is



wherein X′ is hydroxy; amino; or mono- or di-$C_1$–$C_4$-alkylamino; and W′ is absent; —O—, —NH—, or —$CH_2$—;



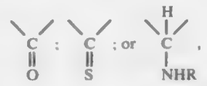
where X″ and X‴ are independently absent or



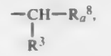
and W‴ is absent, $-CH_2-$, or



where $R^8$ is hydrogen or $C_1$–$C_3$-alkyl;



wherein R is hydrogen; $C_1$–$C_4$-alkyl; formyl; $C_1$–$C_4$-alkanoyl; phenoyl; $C_1$–$C_4$-alkoxy-carbonyl; or phenoxy-carbonyl; $R^5$ is hydrogen;



where $R^3$ and $R_a{}^8$ are as defined above; or $-(CH_2)_{n'}-R^9$, where n′ is 0 to 4, and $R^9$ is guanidyl-$C_2$–$C_3$-alkyl; amino-$C_1$–$C_4$-alkyl; or an unsubstituted or mono or disubstituted heterocycle, wherein the heterocycle represents a 5- or 6-membered ring or benzofused 5- or 6-membered ring, where the one or two heteroatoms are independently selected from N, O, S, NO, SO, or quaternized N, and the substitutent(s) is/are independently selected from the group consisting of $C_1$–$C_6$alkyl, hydroxy, trifluoromethyl, $C_1$–$C_4$alkoxy, halo, phenyl, naphthyl, phenyl-$C_1$–$C_4$-alkyl, naphthyl-$C_1$–$C_4$-alkyl, amino, and mono- or di-$C_1$–$C_4$-alkylamino;

J is absent or glycyl; and wherein all of the asymmetric carbon atoms have an S configuration, except for those in the B, D and Y portion of G substituents, which may have either an S or an R configuration; and pharmaceutically-acceptable salts thereof.

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**4,743,585**

## RENIN INHIBITORS

**James P. Hudspeth; James S. Kaltenbronn; Elizabeth A. Lunney; Joseph T. Repine; W. Howard Roark; Michael A. Stier; Francis J. Tinney; Peter W. K. Woo, all of Ann Arbor, Mich., and Ernest D. Nicolaides, Ramona, Calif., assignors to Warner-Lambert Company, Morris Plains, N.J.**

**Filed Nov. 21, 1986, Ser. No. 920,330**

**Int. Cl.**[4] **A61K** *37/02;* **C07K** *5/08, 5/10, 7/06*

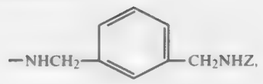
**U.S. Cl. 514—17** **8 Claims**

1. A peptide selected from the group consisting of

BOC—PHE[CH═CH]GLY—STA—LEU—$NHCH_2Ph$,
IVA—PHE[CH═CH]GLY—STA—LEU—$NHCH_2Ph$,
BOC—PHE[CH═CH]GLY—PHSTA—LEU—$NHCH_2Ph$,
BOC—PHE[CH═CH]GLY—CYSTA—LEU—$NHCH_2Ph$,
BOC—TRP[CH═CH]GLY—STA—LEU—$NHCH_2Ph$,

BOC—PHE[CH═CH]GLY—CYSTA—LEU—

-continued



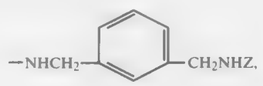
BOC—PHE[CH—CH]GLY—STA—LEU—$NHCH_2Ph$,

IVA—PHE[CH—CH]GLY—STA—LEU—$NHCH_2Ph$,

BOC—PHE[CH—CH]GLY—PHSTA—LEU—$NHCH_2Ph$,

BOC—PHE[CH—CH]GLY—CYSTA—LEU—$NHCH_2Ph$,

BOC—PHE[CH—CH]GLY—CYSTA—LEU—



BOC—PHE[CH—CH]GLY—CYSTA—LEU—



BOC—PHE[CH—CH—CH—CH—C]STA—LEU—$NHCH_2Ph$,

BOC—PHE[CH—CH]GLY—STA—LEU—$NHCH_2Ph$,

BOC—CYCLOHEXALA[CH—CH]GLY—STA—

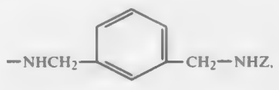
—LEU—$NHCH_2Ph$,

BOC—TRP[CH—CH]GLY—STA—LEU—$NHCH_2Ph$,

BOC—PHE[CH—CH═CH—C]STA—LEU—$NHCH_2Ph$,

BOC—PHE[CH—CH═CH—C]—CYSTA—LEU—$NHCH_2Ph$,

BOC—PHE[CH—CH═CHC]—CYSTA—LEU—



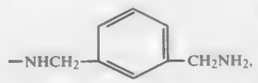
BOC—PHE[CH—$CH_2$]GLY—STA—LEU—$NHCH_2Ph$,



-continued

BOC—PHE[CH—$CH_2$]GLY—CYSTA—LEU—$NHCH_2Ph$,

BOC—PHE[CH—$CH_2$]GLY—CYSTA—LEU—



Z—LEU[CH—$CH_2$]GLY—STA—LEU—$NHCH_2Ph$,

Z—LEU[CH—$CH_2$]LEU—STA—LEU—$NHCH_2Ph$,

IVA—PHE—HIS—

—CYCLOHEXALA[CH—$CH_2$]GLY—$NHCH_2Ph$,

IVA—PHE—HIS—

—CYCLOHEXALA[CH—$CH_2$]GLY—LEU—$NHCH_2Ph$,

BOC—PHE[CH—$CH_2$]HIS—STA—LEU—$NHCH_2Ph$,

BOC—PHE[CH—$CH_2$]HIS—STA—LEU—$NHCH_2Ph$,
(isomer)

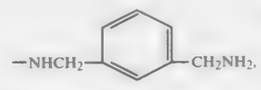
IVA—LEU[C—$CH_2$]PHE—STA—LEU—$NHCH_2Ph$,

Z—LEU[CH—$CH_2$]PHE—STA—LEU—$NHCH_2Ph$,

Z—LEU[C—$CH_2$]PHE—STA—LEU—$NHCH_2Ph$,

BOC—PHE[$CH_2CH_2$]GLY—STA—LEU—$NHCH_2Ph$,

BOC—PHE[$CH_2CH_2$]GLY—CYSTA—LEU—



IVA—PHE[$CH_2S$]PHE—STA—LEU—$NHCH_2Ph$,
BOC—PHE[$CH_2SO$]PHE—STA—LEU—$NHCH_2Ph$,

$HO_2C(CH_2)_3C$—PHE[$CH_2S$]PHE—STA—LEU—$NHCH_2Ph$,

IVA—PHE[$CH_2S$]GLY—STA—LEU—$NHCH_2Ph$,

BOC—PHE[C—$CH_2$]GLY—STA—LEU—$NHCH_2Ph$,

IVA—PHE[C—$CH_2$]GLY—STA—LEU—$NHCH_2Ph$,

-continued

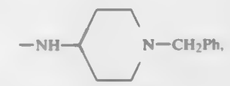
Z—PHE[C—$CH_2$]PHE—STA—LEU—$NHCH_2Ph$,

BOC—CYCLOHEXYLALA[C—$CH_2$]LEU—

—STA—LEU—$NHCH_2Ph$,

IVA—VAL[$CH_2NH$]VAL—STA—OEt,
IVA—VAL[$CH_2NH$]VAL—STA—$NHCH_2Ph$,
IVA—VAL[$CH_2NH$]VAL—STA—LEU—$NHCH_2Ph$,
BOC—PHE—VAL—STA—LEU[$CH_2NZ$]$CH_2Ph$,
IVA—PHE—HIS—STA—LEU[$CH_2NZ$]$CH_2Ph$,
IVA—PHE—HIS—STA—LEU[$CH_2NH$]$CH_2Ph$,
BOC—PHE[$CH_2NH$]PHE—STA—LEU—$NHCH_2Ph$,

BOC—D-PHE($Me^5$)[$CH_2NH$]HIS—STA—LEU—



BOC—PHE[$CH_2NH$]HIS(BOM)—STA—LEU—$NHCH_2Ph$,
BOC—PHE[$CH_2NH$]HIS—STA—LEU—$NHCH_2Ph$,
IVA—PHE—HIS—LEU[$CH_2NH$]LEU—$NHCH_2Ph$,
IVA—PHE—HIS[$CH_2NH$]STA—LEU—$NHCH_2Ph$,
BOC—PHE[$CH_2NOH$]PHE—STA—LEU—$NHCH_2Ph$,
BOC—CYCLOHEXYLALA[$CH_2NH$]HIS—
—STA—LEU—$NHCH_2Ph$,
BOC—PHE[$CH_2NOH$]HIS—STA—LEU—$NHCH_2Ph$,
IVA—PHE—HIS—
—CYCLOHEXYLALA[$CH_2NH$]LEU—$NHCH_2Ph$,
IVA—ILE[$CH_2NH$]VAL—STA—LEU—$NHCH_2Ph$,
IVA—ILE[$CH_2NH$]VAL—STA—LEU—$NHCH_2Ph$ (isomer),
IVA—ILE[$CH_2NH$]ILE—STA—LEU—$NHCH_2Ph$,
BOC—PHE[$CH_2NH$]HIS—PHSTA—LEU—$NHCH_2Ph$,

IVA—PHE—HIS—LEU[CH—$CH_2$]LEU—$NHCH_2Ph$,

Z—NAPHTHYLALA—HIS—
—CYCLOHEXYLALA[CHOHCH$_2$]GLY—
—NH—$CH_2CH(CH_3)CH_2CH_3$,

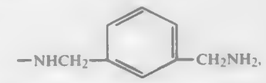
IVA—PHE—HIS—CYCLOHEXYLALA[CH—$CH_2$]LEU—

—$NHCH_2Ph$,

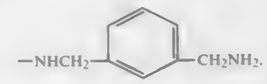
BOC—CYCLOHEXYLALA[CH—$CH_2$]LEU—STA—LEU—

—$NHCH_2Ph$,

IVA—PHE—HIS—CYCLOHEXYLALA[CHOHCH$_2$]GLY—

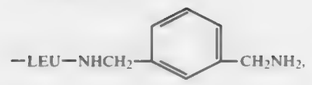


IVA—PHE—HIS—CYCLOHEXYLALA[CHOHCH$_2$]LEU—



IVA—PHE—HIS—CYCLOHEXYLALA[CHOHCH$_2$]GLY—

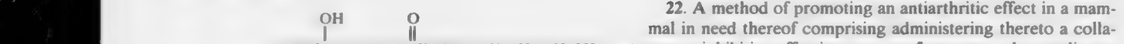
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—LEU—NHCH$_2$— —CH$_2$NH$_2$,

BOC—PHE[CH$_2$NH]HIS—CYSTA—LEU—NHCH$_2$Ph,

BOC—PHE—HIS—



—PHE[CHCH=CHC]NHCH$_2$CH(CH$_3$)CH$_2$CH$_3$, and

BOC—PHE—HIS—

—PHE[CHOHCH$_2$]GLY—NHCH$_2$CH(CH$_3$)CH$_2$CH$_3$.

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**4,743,586**

## METHOD OF TREATING HYPERTENSION USING SUBSTITUTED IMIDAZO[1,5-D]1,2,4-TRIAZIN-1(2H)-ONES

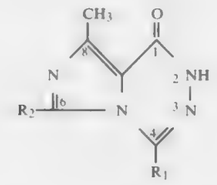
**Peter S. Chan, Suffern, N.Y., assignor to American Cyanamid Company, Stamford, Conn.**

**Filed Oct. 29, 1986, Ser. No. 924,395**

**Int. Cl.[4] A61K** *31/53;* **C07D** *487/04, 401/14*

**U.S. Cl. 514—243** **13 Claims**

**1**. A method of treating hypertension in a mammal which comprises administering to said mammal a hypotensive amount of a compound selected from those of the formula:



wherein $R_1$ is selected from the group consisting of hydrogen and alkyl($C_1$–$C_3$) and $R_2$ is selected from the group consisting of hydrogen, 2-pyridinyl, 3-pyridinyl, 1-naphthalenyl and 4-methylphenyl.

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**4,743,587**

## HYDROXAMIC ACID BASED COLLAGENASE INHIBITORS

**Jonathan P. Dickens; David K. Donald, both of High Wycombe; Geoffrey Kneen, West Wycombe, and William R. McKay, High Wycombe, all of England, assignors to G. D. Searle & Co., Chicago, Ill.**

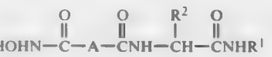
**Continuation-in-part of Ser. No. 774,491, Sep. 10, 1985, Pat. No. 4,599,361. This application Jul. 7, 1986, Ser. No. 880,130**

**The portion of the term of this patent subsequent to Jul. 8, 2003, has been disclaimed.**

**Int. Cl.[4] C07C** *83/10;* **A61K** *31/085, 31/165, 31/185*

**U.S. Cl. 514—575** **24 Claims**

**1**. A compound of the formula



wherein

$R^1$ is $C_1$–$C_6$ alkyl;

$R^2$ is $C_1$–$C_6$ alkyl, benyl, hydroxybenzyl, benzyloxybenzyl, ($C_1$–$C_6$ alkoxy)benzyl, or benzyloxy($C_1$–$C_6$ alkyl);

a is a chiral center with optional R or S stereochemistry;

A is a



group or a—($CR^3$=$CR^4$)— group wherein b and c are chiral centers with optional R or S stereochemistry; $R^3$ is hydrogen, $C_1$–$C_6$ alkyl, phenyl, or phenyl ($C_1$–$C_6$ alkyl); and $R^4$ is hydrogen or $C_1$–$C_6$ alkyl, phenyl ($C_1$–$C_6$ alkyl), cycloalkyl, or cycloalkyl ($C_1$–$C_6$ alkyl).

**22**. A method of promoting an antiarthritic effect in a mammal in need thereof comprising administering thereto a collagenase inhibiting effective amount of a compound according to claim **1**.

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**4,743,588**

## COMPOSITIONS AND METHODS OF ENHANCING TRANSDERMAL AND TRANSMEMBRANE PENETRATION SYSTEMIC AGENTS

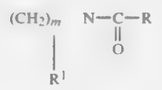
**Dorla Mirejovsky, Irvine, and Harun Takruri, Laguna Niguel, both of Calif., assignors to Allergan Pharmaceuticals, Inc., Irvine, Calif.**

**Filed Jun. 13, 1984, Ser. No. 620,229**

**Int. Cl.[4] A61K** *31/70, 31/56, 31/16*

**U.S. Cl. 514—24** **12 Claims**

**1**. A topical composition for enhancing the transdermal and transmembrane penetration of pharmacologically active substances which are systemically active in the blood stream which comprises an effective amount of said substance and from about 0.1 to 100% of a compound having the structural formula:



in which:

m is 4 to 9;

$R^1$ is hydrogen or an alkyl group having from 1 to 8 carbon atoms; and

R is a straight or branched chain alkyl group having from 1 to 20 carbon atoms.

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**4,743,589**

## TREATMENT OF ENDOMETRIOSIS

**Fernand Labrie, Quebec, Canada, and Jean-Pierre Raynaud, Paris, France, assignors to Roussel UCLAF, Paris, France, by said Jean-Pierre Raynaud**

**Division of Ser. No. 468,932, Feb. 23, 1983, Pat. No. 4,472,382, which is a division of Ser. No. 189,168, Sep. 22, 1980, abandoned. This application Jun. 18, 1984, Ser. No. 621,421**

**Claims priority, application France, Sep. 21, 1979, 7923545**

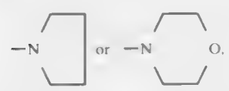
**Int. Cl.[4] A61K** *37/02*

**U.S. Cl. 514—15** **10 Claims**

**1**. A method for the treatment of endometriosis in female mammals consisting essentially of administering to female mammals an amount of a peptide of the formula

p Glu-His-Trp-Ser-Tyr-X-Y-Arg-Pro-Z (I)

wherein (a) Z is Gly-$NH_2$, Y is Leu and X is Gly, (b) Z is Gly-$NH_2$, Y is Leu, X is DN Leu, DN Val, D Abu (α-aminobutyric acid), D Phe, D Ser, D Thr, D Met, D Pgl, D Lys, Leu, Ile, Nle, Val, N Val, Met, Phe, D Leu, D Arg, D Ser (tbu), D Thr (tbu), D Cys (tbu), D Asp (O tbu), D Glu (Otbu), D Orn (boc), D Lys (boc), D Trp, Trp, 2-methyl Ala, D Tyr, ε-lauryl-D Lys, a-dextran-D Lys, (c) Z is NH-cyclopropyl-or NH-Alk wherein Alk is alkyl of 1 to 3 carbon atoms, Y is Leu and X is D Ser (tbu), D Thr (tbu), D Asp (Otbu), D Glu (Otbu), D Orn (boc), D Lys (boc), (d) Z is —NH—$CH_3$, —NH—$CH_2$—$CH_3$, NH—$CH_2$—$CH_2$—$CH_3$, —NH—$CH_2$—$CH_2$—OH,



Y is Leu and X is Gly, (e) Z is —NH—$CH_2$—$CH_3$, Y is Leu and X is D Trp, D Leu, D Ala, D Ser (tbu), D Tyr, D Lys, Ala, (f) Z is Gly-$NH_2$ or —NH—$CH_2$—$CH_3$, Y is NαMe Leu and X is Gly, (g) Z is —NH—cyclopropyl, Y is Leu and X is D Leu or (h) Z is Gly—$NH_2$, —NH—cyclopropyl or NHAlk′ wherein Alk′ is alkyl of 1 to 3 carbon atoms, Y is Ser (but), Cys (but), Asp (Obut), Glu (Obut), Orn (boc), Lys (boc) and X is Gly sufficient to treat endometriosis.

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**4,743,590**

## IN VITRO AND IN VIVO TREATMENT OF CANCER CELLS AND TREATMENT OF VIRUSES WITH A TRIPEPTIDE COMPOUND

**Augusto DeBarbieri, Via Morosini 36, Milano, Italy, and Julius G. Bekesi, 493 Warwick Ave., Teaneck, N.J. 07666**

**Continuation of Ser. No. 654,477, Sep. 26, 1984, abandoned, which is a continuation-in-part of Ser. No. 621,796, Jun. 18, 1984, Pat. No. 4,540,683, which is a continuation-in-part of Ser. No. 468,036, Feb. 23, 1983, Pat. No. 4,508,710, which is a continuation-in-part of Ser. No. 455,477, Jan. 4, 1983, abandoned, which is a continuation-in-part of Ser. No. 311,646, Oct. 15, 1981, Pat. No. 4,428,875, which is a continuation-in-part of Ser. No. 173,621, Jul. 30, 1980, Pat. No. 4,314,999, which is a continuation-in-part of Ser. No. 929,237, Jul. 31, 1978, Pat. No. 4,216,208. This application Mar. 24, 1986, Ser. No. 842,373**

**The portion of the term of this patent subsequent to Apr. 2, 2002, has been disclaimed.**

**Int. Cl.[4] A61K** *37/02;* **C12N** *5/02*

**U.S. Cl. 514—18** **16 Claims**

**1**. The method of treating tumor cells comprising:

culturing the tumor cells with L-PAM, methotrexate, or cisplatin whereby the tumor cells become resistant to L-PAM, methotrexate, or cisplatin; administering to the tumor cells in vitro at a therapeutically effective dose for treating tumor cells a tripeptide compound, selected from the group consisting of:

(a) 3-(p-fluorophenyl)-L-alanyl-3-[m-bis(2-chloroethyl)-aminophenyl]-L-alanyl-L-methionine

(b) 3-[m-bis(2-chloroethyl)aminophenyl]-L-alanyl-3-(p-fluorophenyl)-L-alanyl-L-methionine

(c) 3-(p-fluoropheny)-L-alanyl-L-methionyl-3-[m-bis(2-chloroethyl)aminophenyl]-L-alanine

(d) 3-[m-bis(2-chloroethyl)aminophenyl]-L-alanyl-L-methionyl-3-(p-fluorophenyl)-L-alanine

(e) L-methionyl-3-(p-fluorophenyl)-L-alanyl-3-[m-bis(2-chloroethyl)aminophenyl]-L-alanine

(f) L-methionyl-3[m-bis(2-chloroethyl)aminophenyl]-L-alanyl-3-(p-fluorophenyl)-L-alanine.

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**4,743,591**

## COMPOSITION FOR ANIMALS

**Mitsuru Fukushima; Yoshinori Hattori, both of Shizuoka; Takeo Shimura, Yono, and Manabu Kozasa, Omiya, all of Japan, assignors to Toyo Jozo Company, Shizuoka, Japan**

**Continuation of Ser. No. 672,418, Nov. 16, 1984, abandoned. This application Dec. 24, 1986, Ser. No. 946,664**

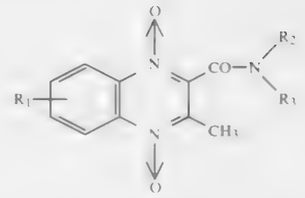
**Claims priority, application Japan, Dec. 1, 1983, 58-228257**

**Int. Cl.[4] A61K** *31/70, 31/71*

**U.S. Cl. 514—30** **14 Claims**

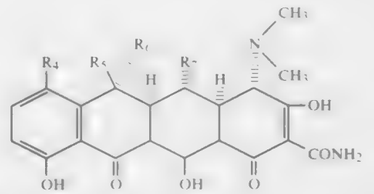
**1**. A composition which comprises compound (A) selected from the group consisting of (I) and (II), said (I) being quinoxaline-di-N-oxide compounds having the formula (I):

(I)



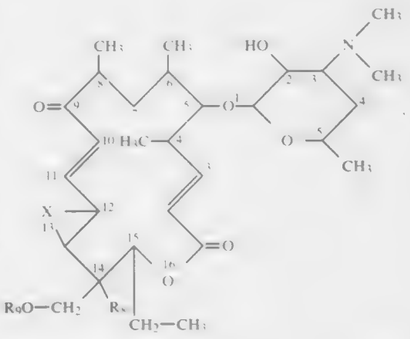
wherein $R_1$ represents hydrogen atom, chlorine atom, a lower alkyl group of 1 to 4 carbon atoms or an alokoxy group of 1 to 4 carbon atoms, $R_2$ and $R_3$ each represent hydrogen atoms, hydroxyl groups or alkyl groups of 1 to 4 carbon atoms which may be substituted with alkoxy, carboalkoxy, monoalkylamino or dialkylamino group or $R_3$ represents cyclohexyl group or $R_2$ and $R_3$ together with the nitrogen atom to which $R_2$ and $R_3$ bond may form a 5-membered or 6-membered heteroring, said 5-membered or 6-membered heteroring may be substituted with alkyl group of 1 to 4 carbon atoms, said alkyl group being further substituted or not with hydroxy, methoxy or acetoxy group; and said (II) being tetracycline antibiotics having the formula (II) and non-toxic salts thereof:

(II)

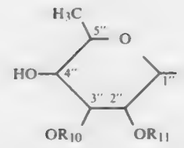


wherein $R_4$ represents hydrogen atom, chlorine atom or dimethylamino group, $R_5$ represents hydrogen atom or hydroxyl group, $R_6$ represents hydrogen atom or methyl group, $R_5$ and $R_6$ together may form methylene group and $R_7$ represents hydrogen atom or hydroxyl group; and mycinamicin antibiotics (B) having the formula (III) and non-toxic salts thereof:

(III)



wherein X represents epoxy group or a direct linkage, $R_8$ represents hydrogen atom or hydroxyl group and $R_9$ represents hydrogen atom, or hexose ring represented by the following formula [IV]:



[IV]

wherein $R_10$ represents hydrogen atom or a lower alkyl group and $R_11$ represents hydrogen atom or a lower alkyl group; the ratio A/B being in the range of 1:10 to 10:1.

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**4,743,592**

## METHOD OF COMBATING SOIL PESTS OF PLANTS BY EMPLOYING ACTIVE MACROLIDE SUBSTANCES INJECTED INTO SAID PLANTS

**Alan R. Jutsum, Berkshire, England, assignor to Imperial Chemical Industries PLC, London, England**

**Continuation of Ser. No. 681,623, Dec. 14, 1984, abandoned. This application Jul. 28, 1986, Ser. No. 890,887**

**Claims priority, application United Kingdom, Jan. 18, 1984, 8401750**

**Int. Cl.[4] A01N** *43/02, 43/04*

**U.S. Cl. 514—30** **3 Claims**

1. In a process for the cultivation of a living plant rooted in plant parasitic nematode infested soil which comprises treating the plant with a nematicidal composition having as active ingredient a nematicidally effective amount of a macrolide substance selected from the group consisting of C-076 and B-41 antibiotic substances in association with an aqueous liquid diluent which may also comprise a surface active agent, the improvement which comprises injecting or infiltrating the said composition into the stem of the plant at a position intermediate to the soil level and the aerial foliage of the plant, whereby a nematicidally effective amount of the macrolide substance is translocated downwardly to the roots of the plant and nematode damage is thereby controlled.

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**4,743,593**

## 9,11-O-METHYLENE DERIVATIVES OF 9-DIHYDROERYTHROMYCIN

**Eric Hunt, Betchworth, England, assignor to Beecham Group p.l.c., England**

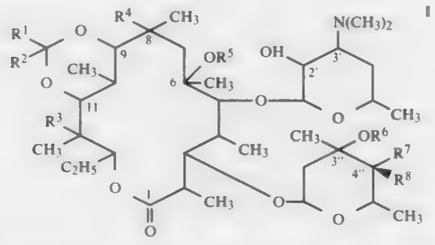
**Filed Dec. 6, 1985, Ser. No. 806,026**

**Claims priority, application United Kingdom, Dec. 8, 1984, 8431055; Sep. 24, 1985, 8523580; Oct. 5, 1985, 8524620**

**Int. Cl.[4] A61K** *31/70;* **C07H** *17/8*

**U.S. Cl. 514—29** **25 Claims**

17. A method of treating bacterial infections in humans and animals which comprises administering to a human or animal in need thereof an antibacterially effective amount of a compound of the formula (I):



I

a pharmaceutically acceptable acid addition salt thereof or a pharmaceutically acceptable ester thereof wherein:

$R^1$ and $R^2$ are the same or different and each is hydrogen, an unsubstituted or substituted hydrocarbon moiety of up to 18 carbon atoms, an unsubstituted or substituted 5- or 6-membered heterocyclyl having one heteroatom selected from the group consisting of oxygen and sulphur, or $R^1$ and $R^2$ together form an unsubstituted or substituted divalent hydrocarbon group of up to 18 carbon atoms, or an unsubstituted or substituted alkyleneoxyalkylene or alkylenethioalkylene moiety containing up to 12 carbon atoms in each alkyl moiety;

$R^3$ is hydrogen or hydroxy;

$R^4$ is hydrogen, fluoro or hydroxy;

$R^5$ and $R^6$ are the same or different and each is hydrogen or methyl;

one of $R^7$ and $R^8$ is hydrogen, hydroxy, alkoxy of up to 12 carbon atoms, alkanoyloxy of up to 12 carbon atoms, amino, substituted amino or a moiety of the formula $R^9—SO_2—O—$ and the other of $R^7$ and $R^8$ is hydrogen, or $R^7$ and $R^8$ together form an oxo moiety, an oxime moiety or a substituted oxime moiety; and

$R^9$ is an unsubstituted or substituted hydrocarbon, oxahydrocarbon, thiahydrocarbon or azahydrocarbon of up to 18 carbon atoms;

when any of the above specified moieties are substituted, the substituents are selected from the group consisting of heterocyclyl, amino, alkanoylamino of 1 to 6 carbon atoms in the alkyl moiety, mono-, di- or trialkylamino of 1 to 6 carbon atoms in each alkyl moiety, hydroxy, alkoxy of 1 to 6 carbon atoms, alkoxy-substituted alkoxy of 1 to 6 carbon atoms in each alkoxy moiety, aryloxy, mercapto, alkylthio of 1 to 6 carbon atoms in the alkyl moiety, heterocyclylthio, arylthio, sulphamoyl, carbamoyl, substituted carbamoyl, amidino, guanidino, nitro, chloro, bromo, fluoro, carboxy or a salt or ester thereof, alkanoyloxy of 1 to 6 carbon atoms in the alkyl moiety, arylcarbonyloxy, heterocyclylcarbonyloxy, acyl and acyloxy, in combination with a pharmaceutically acceptable carrier.

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**4,743,594**

## ANTIBIOTIC, ANTITUMOR COMPOUNDS AND THEIR USE

**Ann C. Horan, Summit, N.J.; Jerzy Golik, Syracuse; James A. Matson, Fayetteville, both of N.Y., and Mahesh G. Patel, Verona, N.J., assignors to Schering Corporation, Kenilworth, N.J.**

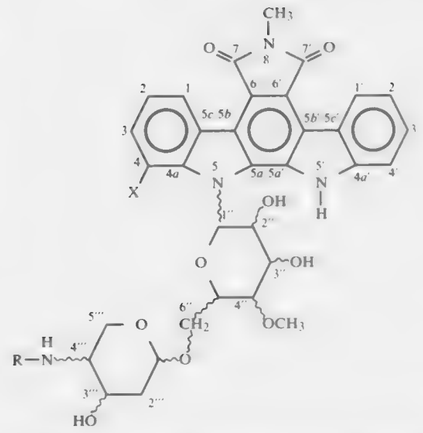
**Filed Sep. 17, 1984, Ser. No. 651,498**

**Int. Cl.[4] A61K** *31/71;* **C07H** *17/00;* **C12P** *19/28*

**U.S. Cl. 514—43** **13 Claims**

7. A method of treating susceptible bacterial infections which comprises administering to a host in need of such treatment a compound represented by formula 1:





I

wherein X is H or Cl; and R is H or $CH_3$; and wavy lines in formula 1 represent bonds to two six-membered sugar rings and signify that substituents to each of the two six-membered sugar rings may be in any of the possible stereochemical configurations; or a pharmaceutical composition thereof in an amount sufficient to treat such infections.

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**4,743,595**

## PROCESS FOR PREPARING 2-AMINO-5-NITROPHENOL DERIVATIVES

**Isamu Itoh; Mitsunori Ono; Hidetoshi Kobayashi, and Kazuyoshi Yamakawa, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Jun. 12, 1985, Ser. No. 743,956**

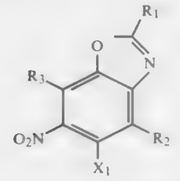
**Claims priority, application Japan, Jun. 14, 1984, 59-122460**

**Int. Cl.[4] C07C** *149/42, 87/60, 91/40, 103/87*

**U.S. Cl. 544—111** **17 Claims**

1. A process for preparing 2-amino-5-nitrophenol derivatives which comprises the steps of:

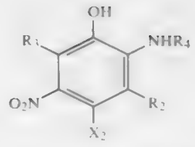
(1) subjecting a benzoxazole derivative of the formula (I) to a nucleophilic substitution reaction at the 5 position of the benzoxazole derivative



(I)

wherein $R_1$ represents a group bonding through a carbon atom having the number of substitution of hydrogen atoms of 0 or 1, or a group bonding through a hydrogen atom-free nitrogen atom, $R_2$ and $R_3$ independently represent a hydrogen atom or a group capable of substitution onto the aromatic ring, and $X_1$ represents a chlorine or bromine atom, thereby obtaining a corresponding benzoxazole derivative, and

(2) opening the oxazole ring of the benzoxazole derivative to obtain a 2-amino-5-nitrophenol derivative of the formula (II)



(II)

wherein $R_2$ and $R_3$ have, respectively, the same meanings as defined above, and $R_4$ represents a hydrogen atom or a $—COR_1$ group in which $R_1$ has the same meaning as defined above, and $X_2$ represents a nucleophilic group.

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**4,743,596**

## ANTI-ARTHRITIC PREPARATION

**Alfred R. Lapin, 6805 Old Alex Ferry Rd., Clinton, Md. 20735**

**Filed Jun. 16, 1987, Ser. No. 62,626**

**Int. Cl.[4] A61K** *31/56, 31/62, 31/415*

**U.S. Cl. 514—161** **6 Claims**

1. An anti-arthritic preparation consisting essentially of aspirin in the range of 81 to 960 mg., phenylbutazone in the range of 50 to 150 mg., prednisone in the range of 1 to 50 mg., and methocarbamol in the range of 500 to 1000 mg.

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**4,743,597**

## COMPOSITION COMPRISING AN OXYGENATED CHOLESTEROL AND USE THEREOF FOR TOPICAL TREATMENT OF DISEASES

**Norman B. Javitt, 501 E. 79th St., New York, N.Y. 10021, and Richard B. Stoughton, P.O. Box 1264, Rancho Sante Fe, Calif. 92067**

**Filed Jan. 27, 1986, Ser. No. 822,878**

**Int. Cl.[4] A61K** *31/56*

**U.S. Cl. 514—182** **24 Claims**

1. A method for treating an animal suffering from a proliferative or inflammatory skin disease comprising topically administering to the skin of said animal an amount of an oxygenated chlolesterol having a hydroxy, keto or carboxylic acid in the 26 position or a pharmaceutically acceptable derivative thereof containing said hydroxy, keto or carboxylic acid in the 26 position, effective to treat said proliferative or inflammatory skin disease.

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**4,743,598**

## ANTIBACTERIAL 2-(AZACYCLOALKYL) PENEMS

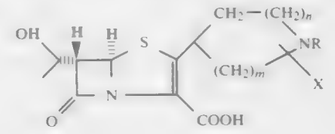
**Ashit K. Ganguly, Upper Montclair; Viyyoor M. Girijavallabhan, Parsippany; Adriano Afonso, West Caldwell, and Jay Weinstein, Upper Montclair, all of N.J., assignors to Schering Corporation, Kenilworth, N.J.**

**Filed Dec. 6, 1982, Ser. No. 446,928**

**Int. Cl.[4] A61K** *31/43;* **C07D** *499/00*

**U.S. Cl. 514—192** **12 Claims**

1. A compound of the formula:



wherein

m is 0–2;

n is 1–3; and

X is a hydrogen, lower alkyl, lower alkoxy, amino, hydroxy, lower alkylthio, or carboxy group;

R is amidino or



wherein R′ is hydrogen or $C_1$–$C_3$ alkyl;
or a pharmaceutically acceptable salt or a metabolizable ester thereof, in racemic or optically active form.

**12**. A method of preventing bacterial infections in warm-blooded animals in need of said treatment which comprises administering thereto an antibacterial effective amount of a compound of claim **1**.

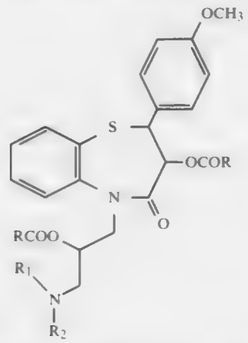
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**4,743,599**
**1,5-BENZOTHIAZEPINE DERIVATIVES AND COMPOSITIONS CONTAINING THEM**

**Jean-Claude Muller, Morsang-sur-Orge, and André Dumas, Palaiseau, both of France, assignors to Synthelabo, Paris, France**

**Filed Apr. 14, 1987, Ser. No. 38,152**
**Claims priority, application France, Apr. 15, 1986, 86 05346**
**Int. Cl.**[4] **A61K** *31/55;* **C07D** *281/10, 417/06*
**U.S. Cl. 514—211** **7 Claims**

**1**. A compound, in the form of pure optical isomer, diastereoisomer or mixture thereof having the formula (I)



(I)

in which R denotes hydrogen or $C_1$–$C_4$ alkyl and $R_1$ and $R_2$, which may be the same or different, each denote $C_1$–$C_4$ alkyl or $R_1$ and $R_2$ together denote a tetramethylene or pentamethylene group, or a pharmacologically acceptable acid addition salt thereof.

**7**. A calcium antagonistic composition which contains, as active ingredient, an effective amount of a compound as claimed in claim **1** in association with a pharmaceutically acceptable excipient.

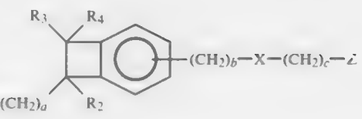
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**4,743,600**
**BENZOCYCLOBUTENE AMINOALKYLENE ETHERS AND THIOETHERS, PHARMACEUTICAL COMPOSITIONS AND USE**

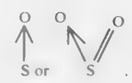
**Donald E. Kuhla, Doylestown; Henry F. Campbell, Lansdale, and William L. Studt, Harleysville, all of Pa., assignors to Rorer Pharmaceutical Corporation, Fort Washington, Pa.**

**Division of Ser. No. 798,697, Nov. 1, 1985, Pat. No. 4,639,442, which is a continuation-in-part of Ser. No. 664,222, Oct. 23, 1984, Pat. No. 4,558,719, which is a continuation-in-part of Ser. No. 604,813, Apr. 27, 1984, Pat. No. 4,638,001, which is a continuation-in-part of Ser. No. 489,702, Apr. 29, 1983, Pat. No. 4,529,723. This application Jul. 28, 1986, Ser. No. 891,197**
**The portion of the term of this patent subsequent to Mar. 3, 2004, has been disclaimed.**
**Int. Cl.**[4] **A61K** *31/41, 31/54;* **C07D** *285/10, 417/06*
**U.S. Cl. 514—212** **24 Claims**

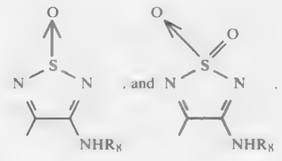
**1**. A compound of the formula



wherein:
a is 1 or 2;
b is 0 or 1;
c is 2, 3 or 4;
X is oxygen, sulfur,



Z is —$NHR_7$;
$R_1$ is —$NR_5R_6$;
$R_2$, $R_3$, and $R_4$ are each independently hydrogen, lower alkyl, allyl, arylloweralkyl wherein aryl is phenyl or substituted phenyl, loweralkoxycarbonyl or lower alkyl substituted by hydroxy, loweralkoxycarbonyl or $NR_5R_6$;
$R_5$ and $R_6$ are each independently H or alkyl, or both together with the nitrogen to which they are attached form a 5, 6 or 7-membered ring which may include one to three additional hetero atoms of N, O or S;
$R_7$ is selected from the group consisting of



and



$R_8$ is H or lower alkyl;
or a pharmaceutically acceptable salt thereof.

**22**. A method for decreasing acid secretion in the gastrointestinal tract of mammals by administering thereto an antisecretory effective amount of a compound according to claim **1**.

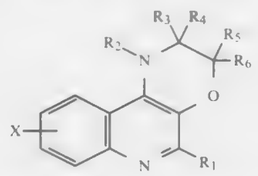
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**4,743,601**
**DIHYDRO-1,4-OXAZINO(2,3-C)QUINOLINES**

**Karl Schonafinger, Alzenau, Fed. Rep. of Germany, and Helen H. Ong, Whippany, N.J., assignors to Hoechst-Roussel Pharmaceuticals Inc., Somerville, N.J.**

**Filed Jul. 13, 1987, Ser. No. 72,832**
**Int. Cl.**[4] **A61K** *31/535, 31/54;* **C07D** *498/04, 513/20*
**U.S. Cl. 514—229.8** **25 Claims**

**1**. A compound having the formula



where X is hydrogen, loweralkyl, loweralkoxy, hydroxy, halogen, nitro or trifluoromethyl; $R_1$ is hydrogen or loweralkyl; $R_2$ is hydrogen, loweralkyl, arylloweralkyl or —$(CH_2)_mR_7$ wherein m is 1, 2 or 3 and $R_7$ is cyano or amino; $R_3$ and $R_4$ are independently hydrogen or loweralkyl; $R_5$ and $R_6$ are independently hydrogen or loweralkyl, or $R_5$+$R_6$ taken together with the carbon atom to which they are attached constitute a cyclobutane, cyclopentane, cyclohexane, cycloheptane, pyrrolidine, piperidine, morpholine or thiomorpholine ring, or $R_5$ is hydrogen and $R_6$ is aryl or —$CH_2OR_8$ wherein $R_8$ is hydrogen, loweralkyl or loweralkylcarbonyl, or a pharmaceutically acceptable acid addition salt thereof.

**25**. A method of treating a patient in need of memory enhancement which comprises administration of an effective memory enhancing amount of a compound as defined in claim **1**.



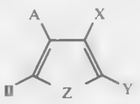
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**4,743,602**
**THIOPHENE CYCLOPROPYL AMINE COMPOUNDS, COMPOSITIONS AND FUNGICIDAL USE**

**Paul A. Worthington, and Vivienne M. Anthony, both of Maidenhead, England, assignors to Imperial Chemical Industries PLC, London, England**

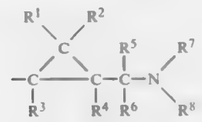
**Filed Jun. 30, 1987, Ser. No. 69,603**
**Claims priority, application United Kingdom, Jul. 16, 1986, 8617378; Oct. 1, 1986, 8623568**
**Int. Cl.**[4] **C07D** *333/20, 413/08;* **A01N** *43/10, 43/84*
**U.S. Cl. 514—231.5** **7 Claims**

**1**. Compounds having the general formula:



(I)

and stereoisomers thereof, wherein one of X and Y, but not both, is a group of the formula (II):



(II)

and the other of X and Y is hydrogen atom, a halogen atom, or an alkyl, alkoxy, cycloalkyl, cycloalkylalkyl, alkynyl, optionally substituted aryl, optionally substituted aralkyl, optionally substituted aralkoxy, optionally substituted aryloxy, or haloalkyl group, or a



group wherein $R^9$, $R^{10}$ and $R^{11}$ are alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkylalkyl or aryl, Z is a sulphur atom, A and B have the same significance as X or Y excluding a group of formula (II), $R^1$, $R^2$, $R^3$ and $R^4$ each represent a hydrogen atom, a halogen atom or an alkyl group containing from 1 to 4 carbon atoms, $R^5$ and $R^6$ each represent a hydrogen atom or an alkyl group containing from 1 to 4 carbon atoms and $R^7$ and $R^8$ each represent an alkyl group containing from 1 to 4 carbon atoms or $R^7$ and $R^8$ together with the adjacent nitrogen atom form a heterocyclic ring which may optionally contain an additional hetero atom; and acid addition salts thereof.

**6**. A fungicidal composition comprising a compound or salt thereof as claimed in any of claims **1** to **5** and, optionally, a carrier or diluent.

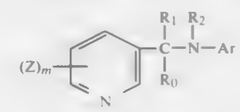
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**4,743,603**
**DERIVATIVES OF 2-(3-PYRIDYL)-2-PHENYLAMINOACETIC ACID AND THEIR USE AS ANTIFUNGALS IN THE FIELD OF ARGRICULTURE**

**Jean P. Bulot, Dardilly, France, assignor to Rhone-Poulenc Agrochimie, Lyons, France**

**Continuation-in-part of Ser. No. 670,318, Nov. 13, 1984, abandoned. This application May 27, 1986, Ser. No. 867,786**
**Claims priority, application France, Nov. 24, 1983, 83 18976**
**Int. Cl.**[4] **A01N** *43/40;* **C07D** *213/63, 213/55, 213/57*
**U.S. Cl. 514—235.5** **15 Claims**

**1**. A compound of the general formula (I):



(I)

in which
$R_0$ denotes a radical chosen from the radicals —CN, —COOH,
$CONH_2$ and the radical —$COOR_4$ in which $R_4$ denotes a lower alkyl radical,
$R_1$ denotes the hydrogen atom, lower alkyl radical, which is unsubstituted or substituted with halogen, hydroxy, lower alkoxy or lower alkylthio; lower cycloalkyl radical, which is unsubstituted or substituted with halogen, hydroxy, lower alkoxy or lower alkylthio; phenyl radical, which is unsubstituted or substituted with halogen or lower alkyl; aralkyl radical, which is unsubstituted or substituted with halogen;
$R_2$ denotes the hydrogen atom or a lower alkyl radical which is unsubstituted or substituted with halogen, hydroxy. lower alkoxy or lower alkylthio, provided that $R_1$ and $R_2$ do not simultaneously denote the hydrogen atom;
Z denotes a halogen atom or a lower alkyl radical, lower alkoxy radical or lower alkylthio radical;
m is equal to 0, 1, 2, 3 or 4 it being understood that when m is greater than 1 the substituents Z may be either identical or different;
Ar denotes a phenyl radical which is unsubstituted or substituted with halogen, lower alkyl, lower cycloalkyl, lower alkenyl, lower alkylthio, cyano, nitro, hydroxy, carboxy, lower alkoxy carbonyl, carbamoyl, N-alkyl carbamoyl, N,N-dialkyl carbamoyl, N-piperidinyl carbonyl, N-pyrolidinyl carbonyl, N-azepinyl carbonyl, N-morpholinyl carbonyl, N-1-piperazinyl carbonyl or phenyl,
and salts obtained by reaction of the compound according to the Formula (I) with a suitable acid or base, as well as stereoisomeric forms of this compound, alone or intermixed.

**12**. An antifungal composition for agricultural use which comprises as an active ingredient, a fungicidally effective amount of a compound according to one of claims **1** to **3** or **4** in association with an agriculturally acceptable inert support or surface active agent, therefor.

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**4,743,604**
**OXAZOLIDINES AND COMPOSITIONS CONTAINING THE SAME**

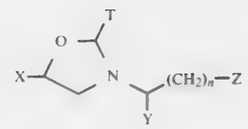
**Leo Alig, Kaiseraugst, and Marcel Müller, Frenkendorf, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

**Filed Nov. 1, 1984, Ser. No. 667,186**
**Claims priority, application Switzerland, Nov. 10, 1983, 6070/83; Sep. 20, 1984, 4499/84**
**Int. Cl.**[4] **A61K** *31/495;* **C07D** *413/10, 413/12*
**U.S. Cl. 514—252** **16 Claims**

**1**. Oxazolidines of the formula

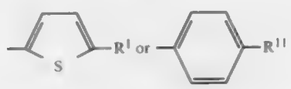
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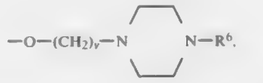


I

wherein
n is the number 1 or 2,
T is lower-carbalkoxy,
X is phenoxymethyl or phenyl optionally monosubstituted by fluorine, chlorine, trifluoromethyl or lower-alkoxy,
Y is hydrogen or methyl,
Z is a group of the formula

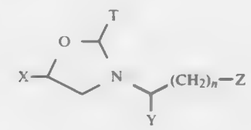


$R^1$ is lower-alkyl, optionally N-mono-lower-alkylated or N-di-lower-alkylated aminomethyl or a group $—C(O)R^2$, $—C(R^3)═CH—(CH_2)_m—C(O)R^2$, $—C(H,R^3)—(CH_2)_{m+1}—C(O)R^2$, $—C(H,R^3)—(CH_2)_p—OH$ or $—C(R^3)═CH—C(CH_3)═CH—COOCH_3$,
$R^{11}$ is hydroxy, lower-alkoxy, lower-alkanoyloxy, sulphamoyl, benzyloxy or phenoxy or a group $R^1$, $—O—(CH_2)_q—OH$, $—O—(CH_2)_q—COOR^4$ $—O—(CH_2)_q—O—(CH_2)_t—R^5$ or,



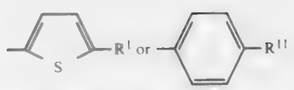
$R^2$ is hydroxy, lower-alkyl, lower-alkoxy, dimethylaminoethoxy, lower-alkoxycarbonylethyl or optionally mono-lower-alkylated or di-lower-alkylated amino,
$R^3$ is hydrogen or methyl,
$R^4$ is lower-alkyl,
$R^5$ is hydrogen, lower-alkyl or phenyl optionally para-substituted by fluorine, chlorine, lower-alkyl or lower-alkoxy,
$R^6$ is lower-alkyl or phenyl optionally para-substituted by fluorine, chlorine, lower-alkyl or lower-alkoxy,
m and p are whole numbers of 0 to 6,
v is a whole number of 2 to 4,
q and t are whole numbers of 1 to 6,
and physiologically compatible salts thereof.

**14**. An animal feed composition comprising feed to which there is admixed a suitable quantity of a compound of the formula

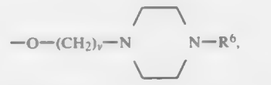


I

wherein
n is the number 1 or 2,
T is lower-carbalkoxy,
X is phenoxymethyl or phenyl optionally monosubstituted by fluorine, chlorine, trifluoromethyl or lower-alkoxy,
Y is hydrogen or methyl,
Z is a group of the formula



$R^1$ is lower-alkyl, optionally N-mono-lower-alkylated or N-di-lower-alkylated aminomethyl or a group $—C(O)R^2$, $—C(R^3)═CH—(CH_2)_m—C(O)R^2$, $—C(H,R^3)—(CH_2)_{m+1}—C(O)R^2$, $—C(H,R^3)—(CH_2)_p—OH$ or $—C(R^3)═CH—C(CH_3)═CH—COOCH_3$,
$R^{11}$ is hydroxy, lower-alkoxy, lower-alkanoyloxy, sulphamoyl, benzyloxy or phenoxy or a group $R^1$, $—O—(CH_2)_q—OH$, $—O—(CH_2)_q13$ $COOR^4$ $—O—(CH_2)_q—O—(CH_2)_t—R^5$ or,



$R^2$ is hydroxy, lower-alkyl, lower-alkoxy, dimethylaminoethoxy, lower-alkoxycarbonylethyl or optionally mono-lower-alkylated or di-lower-alkylated amino,
$R^3$ is hydrogen or methyl,
$R^4$ is lower-alkyl,
$R^5$ is hydrogen, lower-alkyl or phenyl optionally para-substituted by chlorine, fluroine, trifluoromethyl, lower-alkyl or lower-alkoxy,
$R^6$ is lower-alkyl or phenyl optionally para-substituted by fluorine, chlorine, lower-alkyl or lower-alkoxy,
m and p are whole numbers of 0 to 6,
v is a whole number of 2 to 4,
q and t are whole numbers of 1 to 6, or a physiologically compatible salt thereof.

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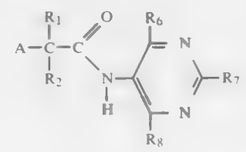
**4,743,605**

**SATURATED FATTY ACID AMIDES AS INHIBITORS OF ACYL-COA:CHOLESTEROL ACYLTRANSFERASE**

**Milton L. Hoefle, Ann Arbor; Ann Holmes, Dexter, and Bruce D. Roth, Ann Arbor, both of Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.**

**Division of Ser. No. 017,960, Feb. 24, 1987, Pat. No. 4,716,175.**
**This application Oct. 1, 1987, Ser. No. 103,316**
**Int. Cl.[4] A61K** *31/505;* **C07D** *239/46, 239/34, 239/28*
**U.S. Cl. 514—269** **4 Claims**

**1**. A compound having the formula



wherein
A is an unbranched hydrocarbon group having from one to twenty carbon atoms and which may optionally have from one to three carbon-carbon double bonds;
$R_1$ is hydrogen, alkyl of from one to four carbon atoms or phenylmethyl:
$R_2$ is alkyl of from one to four carbon atoms or phenylmethyl; or
$R_1$ and $R_2$ when taken together with the carbon atom to which they are attached form a saturated carbocyclic ring of from three to seven carbon atoms;
$R_6$ is alkoxy of from one to four carbon atoms; and
$R_7$ and $R_8$ are independently hydrogen or alkoxy of from one to four carbon atoms.



**3**. A pharmaceutical composition useful for inhibiting the intestinal absorption of cholesterol comprising an ACAT-inhibitory effective amount of a compound as defined by claim **1** in combination with a pharmaceutically acceptable carrier.

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**4,743,606**

**3-[2-(3',5'-DI-T-BUTYL-4'-HYDROXYPHENYL)ETHENYL]PYRIDINE HAVING ANTI-INFLAMMATORY AND ANTI-ARTHRITIC PROPERTIES**

**Edward S. Lazer, Trumbull, Conn., assignor to Boehringer Ingelheim Pharmaceuticals, Inc., Ridgefield, Conn.**

**Filed Mar. 25, 1986, Ser. No. 843,898**
**Int. Cl.[4] C07D** *213/30;* **A61K** *31/44*
**U.S. Cl. 514—277** **2 Claims**

**1**. A method for treating inflammation in an individual in need thereof which comprises administering a therapeutically effective amount of 3-[2-(3',5'-di-t-butyl-4'-hydroxyphenyl)ethenyl]pyridine to said individual.

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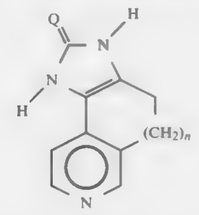
**4,743,607**

**CARDIOTONIC TRICYCLIC IMIDAZOLONES**

**Winton D. Jones; George P. Claxton; Richard A. Schnettler, and Richard C. Dage, all of Cincinnati, Ohio, assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio**

**Filed May 29, 1987, Ser. No. 55,666**
**Int. Cl.[4] A61K** *31/47;* **C07D** *471/04*
**U.S. Cl. 514—293** **13 Claims**

**5**. A method of treating heart failure in a patient in need thereof which comprises administering to the patient a cardiotonically effective amount of a compound of the structure:



wherein
Q is a divalent sulfur or oxygen atom; and
n is 0 or the integer 1 or 2
or a pharmaceutically acceptably salt thereof.

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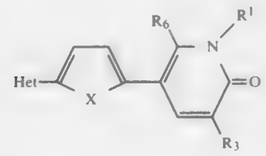
**4,743,608**

**PYRIDONE-PYRIDYL-IMIDAZOLYL AND TRIAZOLYL COMPOUNDS AND THEIR USE AS CARDIOTONIC AGENTS**

**William C. Faith, Ambler; Henry F. Campbell, Lansdale, and Donald E. Kuhla, Doylestown, all of Pa., assignors to Rorer Pharmaceutical Corporation, Fort Washington, Pa.**

**Filed Jul. 15, 1986, Ser. No. 885,895**
**Int. Cl.[4] A61K** *31/345, 31/41;* **C07D** *401/14*
**U.S. Cl. 514—333** **11 Claims**

**1**. A compound of the formula:



where
Het is imidazol-1-yl or 1,2,4-triazol-1-yl,
x is $—CH═N—$ or $—N═CH—$;
$R_1$ and $R_6$ are H or lower alkyl; and
$R_3$ is H, lower alkyl, lower alkoxy lower alkyl, hydroxy lower alkyl cyano, carbamoyl, lower alkyl carbamoyl, formyl, $—CH_2NH_2$ or amino;
or a pharmaceutically acceptable salt thereof.

**10**. A method for increasing cardiotonic contractility in a patient requiring such treatment which comprises administering to such patient an effective amount of a compound according to claim **1**.

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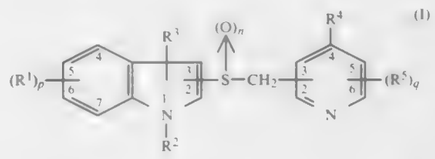
**4,743,609**

**INDOLE DERIVATIVES HAVING GASTRIC AND ANTISECRETORY AND CYTOPROTECTIVE PROPERTIES, AND PHARMACEUTICAL PREPARATIONS CONTAINING SAME**

**Masaaki Hosoi, Kawasaki; Fumio Nakano, Okazaki; Kenji Matsuyama, Ichikawa; Hiroshi Takeshita, Ichikawa; Kenji Niiyama, Ichikawa, and Susumu Nakagawa, Okazaki, all of Japan, assignors to Banyu Pharmaceutical Co., Ltd., Tokyo, Japan**

**Filed Feb. 10, 1986, Ser. No. 827,898**
**Claims priority, application Japan, Feb. 12, 1985, 60-23585; Nov. 14, 1985, 60-253643**
**Int. Cl.[4] C07D** *401/12;* **A61K** *31/405*
**U.S. Cl. 514—339** **29 Claims**

**1**. A compound of the formula (I)



(I)

wherein $R^1$ is a hydrogen atom, a halogen atom, a lower alkyl group, a trifluoromethyl group, a lower alkoxy group, a lower alkanoyl group or a lower alkoxycarbonyl group; $R^2$ is a hydrogen atom or a lower alkyl group; $R^3$ is a hydrogen atom, a lower alkyl group, a lower alkoxy group or a lower alkylthio group; $R^4$ is a hydrogen atom, a lower alkyl group, a lower alkoxy group, a halogen atom, a hydroxy group, a lower alkoxycarbonyl group, a phenyl-$(C_1$–$C_4)$alkyloxy group, or a group of the formula $—NR^aR^b$ where $R^a$ and $R^b$ are the same or different and each are a hydrogen atom or a lower alkyl group, or $R^a$ and $R^b$ taken together with the adjacent nitrogen atom form a heterocyclic group selected from the group consisting of a pyrrolidino group, a piperdino group, a morpholino group, a thiomorpholino group or a piperazino group of which the heterocyclic group is unsubstituted or substituted with a lower alkyl group; $R^5$ is a hydrogen atom, a lower alkyl group, a lower alkoxy group, a phenyl-$(C_1$–$C_4)$alkyl group or a naphthyl$(C_1$–$C_4)$alkyl group or a phenyl-$(C_1$–$C_4)$alkyloxy group; and n is an integer of zero or 1, p is an integer of 1, 2, 3 or 4; and q is an integer of 1, 2 or 3, or pharmaceutically acceptable salt of said compound.

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**4,743,610**

**N-[ω(3-PYRIDINYL)ALKYL]BENZAMIDES, USEFUL AS THROMBOXANE SYNTHETASE ENZYME AND/OR CARDIOPROTECTIVE AGENTS**

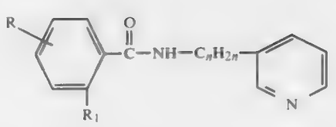
**William B. Wright, Jr., Woodcliff Lake, and Andrew S. Tomcufcik, Old Tappan, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.**

**Filed Mar. 16, 1987, Ser. No. 26,224**
**Int. Cl.[4] A61K** *31/44;* **C07D** *213/55*
**U.S. Cl. 514—357** **17 Claims**

**1**. A compound of the formula:

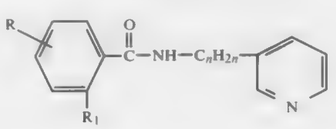
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wherein n is an integer from 2–5 inclusive, R is hydrogen, alkyl having from one to four carbon atoms, halogen, trifluoromethyl, alkoxy having from one to four carbon atoms or nitro; $R_1$ is amino, alkylamino having from one to four carbon atoms or carboxy, or pharmaceutically acceptable salts thereof.

16. A thromboxane sythetase enzyme inhibiting composition of matter in dosage unit form comprising from about 10 mg to about 700 mg of a compound of the formula:



wherein n is an integer from 2–5 inclusive; R is hydrogen, alkyl having from one to four carbon atoms, halogen, trifluoromethyl, alkoxy having from one to four carbon atoms or nitro; $R_1$ is amino, alkylamino having from one to four carbon atoms or carboxy or pharmaceutically acceptable salts thereof and a pharmaceutically acceptable carrier.

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**4,743,611**

## NAPHTHALENYLSULFONYLIMIDAZOLIDINEDIONES AND THEIR THIOXO ANALOGS USEFUL AS ALDOSE REDUCTASE INHIBITORS

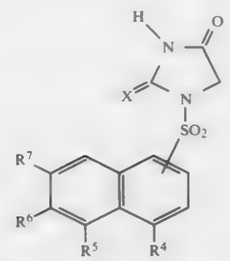
**Michael S. Malamas, Plainsboro, and Kazimir Sestanj, Monmouth Junction, both of N.J., assignors to American Home Products Corp., New York, N.Y.**

**Continuation-in-part of Ser. No. 881,377, Jul. 2, 1986, abandoned. This application Feb. 9, 1987, Ser. No. 12,592**

**Int. Cl.**[4] **A61K** *31/415;* **C07D** *403/30*

**U.S. Cl. 514—390** **25 Claims**

1. A compound of the formula (I)



(I)

wherein $R^4$, $R^5$, $R^6$ and $R^7$ are hydrogen, halogen, trifluoromethyl, methoxy or dimethylamine and X is oxygen or sulfur and the pharmaceutically acceptable salts thereof.

25. A method of preventing or relieving neuropathy, nephropathy, retinopathy or cataracts in a diabetic mammal, which comprises administering to said mammal an alleviating or prophylactic amount of a compound of claim 1.

**4,743,612**

## PRODRUG DERIVATIVES OF THE CARDIOTONIC AGENT 4-ETHYL-1,3-DIHYDRO-5-(4-(2-METHYL-1H-IMIDAZOL-1-YL)BENZOYL)-2H-IMIDAZOL-2-ONE, COMPOSITION CONTAINING THEM, AND METHOD OF USING THEM TO TREAT CARDIAC FAILURE

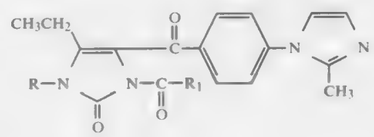
**Paul W. Erhardt, Long Valley, and Alfred A. Hagedorn, III, Edison, both of N.J., assignors to Berlex Laboratories, Inc., Cedar Knolls, N.J.**

**Filed Oct. 17, 1986, Ser. No. 920,086**

**Int. Cl.**[4] **A61K** *31/415;* **C07D** *233/70, 401/14*

**U.S. Cl. 514—392** **31 Claims**

1. A compound of the formula:



wherein

R is H or



$R_1$ is phenyl or a $C_1$–$C_5$ straight or branched chain alkyl optionally substituted by a hydroxy, or phenyl group;

or a pharmaceutically acceptable acid addition salt thereof.

30. The method for orally treating cardiac failure in a mammalian host having a chronic condition in which therapeutic benefit is derived from elicitation of a cardiotonic effect which comprises orally administering to said host a non-toxic cardiotonically effective amount of a compound of claim 1.

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**4,743,613**

## ESTER PRODRUGS OF DOPAMINE-β-HYDROXYLASE, INHIBITORS, COMPOSITION CONTAINING THEM, AND METHOD OF USING THEM TO INHIBIT DOPAMINE-β-HYDROXYLASE ACTIVITY

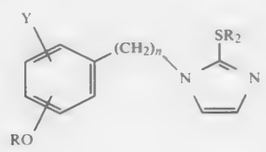
**James S. Frazee, Sewell; Carl Kaiser, Haddon Heights; Lawrence I. Kruse, Haddonfield, all of N.J., and Stephen T. Ross, Berwyn, Pa., assignors to SmithKline Beckman Corporation, Philadelphia, Pa.**

**Filed Apr. 8, 1986, Ser. No. 849,333**

**Int. Cl.**[4] **A61K** *31/415;* **C07D** *233/84*

**U.S. Cl. 514—398** **16 Claims**

1. A compound of the formula:



in which:

Y is hydrogen, halogen, $C_{1-4}$ haloalkyl, or any accessible combination thereof of up to four substituents;

R is



wherein $R_1$ is hydrogen or $C_{1-3}$ alkyl;



$R_2$ is R or $C_{1-4}$ alkyl;

n is 0–4; or

a pharmaceutically acceptable acid addition salt or hydrate thereof.

13. A method of inhibiting dopamine-β-hydroxylase activity in mammals, which comprises:

administering internally to a subject in need of the inhibition an effective amount of a compound of claim 1.

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**4,743,614**

## AMINO ACID DERIVATIVES AND PROCESSES FOR PREPARATION THEREOF

**Hiroshi Terano, Ibaraki; Yasuhisa Tsurumi, Osaka; Hiroyuki Setoi; Masashi Hashimoto, both of Ibaraki, and Masanobu Kohsaka, Sakai, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan**

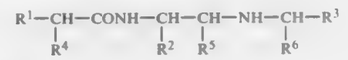
**Filed Mar. 4, 1986, Ser. No. 859,587**

**Claims priority, application United Kingdom, Mar. 4, 1985, 8505481; Aug. 22, 1985, 8521016; Nov. 18, 1985, 8528367**

**Int. Cl.**[4] **A61K** *31/165, 31/195, 31/405, 31/415*

**U.S. Cl. 514—400** **9 Claims**

1. A compound of the formula:



wherein

$R^1$ is amino or a protected amino group,

$R^2$ is hydrogen, carboxy or a protected carboxy group,

$R^3$ is hydrogen, carboxy or a protected carboxy group,

$R^4$ is lower alkyl, amino(lower)alkyl, protected amino(lower)alkyl,, carbamoyl(lower)alkyl or protected carbamoyl(lower)alkyl,

$R^5$ is hydrogen or lower alkyl, and

$R^6$ is hydrogen, hydroxyphenyl(lower)alkyl, imidazolyl(-lower)alkyl or indolyl(lower)alkyl, and pharmaceutically acceptable salts thereof.

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**4,743,615**

## SUBSTITUTED PYRAZOLIN-5-ONES, COMPOSITION CONTAINING, AND METHOD OF USING THEM TO COMBAT FUNGI

**Klaus Jelich, Wuppertal; Wilhelm Brandes, Leichlingen; Gerd Hänssler, and Paul Reinecke, both of Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

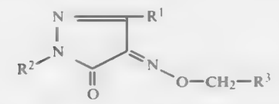
**Filed Oct. 31, 1986, Ser. No. 925,184**

**Claims priority, application Fed. Rep. of Germany, Nov. 12, 1985, 3539995**

**Int. Cl.**[4] **A01N** *43/56;* **C07D** *231/46*

**U.S. Cl. 514—404** **17 Claims**

1. A substituted pyrazolin-5-one of the formula



in which

$R^1$ and $R^2$ independently of one another each represents hydrogen, or represent in each case straight-chain or branched alkyl, alkenyl, alkinyl, cyanoalkyl, hydroxyalkyl, alkoxyalkyl, alkylthioalkyl, alkoxycarbonyl, hydroxycarbonylalkyl, alkoxycarbonylalkyl, aminocarbonylalkyl, alkylaminocarbonylalkyl or dialkylaminocarbonylalkyl with in each case up to 8 carbon atoms in the individual alkyl, or alkenyl, alkinyl or alkoxy parts, or represents oxiranylalkyl which has 1 to 4 carbon atoms in the straight-chain or branched alkyl part and is optionally substituted by alkyl with 1 to 4 carbon atoms, or represents a 1,1-dioxotetrahydrothien-3-yl, or represents aralkyl which has 1 to 4 carbon atoms in the straight-chain or branched alkyl part and 6 to 10 carbon atoms in the aryl part and is optionally monosubstituted or polysubstituted by identical or different substituents, or represents aryl which has 6 to 10 carbon atoms and is optionally substituted, the optional substituents on the various aryl parts being independently selected from the group consisting of halogen, cyano, nitro, hydroxyl, in each case straight-chain or branched alkyl, alkoxy, dioxyalkylene, alkylcarbonyloxy and alkylthio with in each case up to 4 carbon atoms, straight-chain or branched halogenoalkyl, halogenoalkoxy and halogenoalkylthio with in each case up to 4 carbon atoms and up to 9 identical or different halogen atoms and phenyl, and

$R^3$ represents in each case straight-chain or branched halogenoalkyl, halogenoalkenyl or halogenoalkinyl with in each case up to 12 carbon atoms and 1 to 8 identical or different halogen atoms, or represents cycloalkyl or cycloalkylalkyl with 3 to 7 carbon atoms in the cycloalkyl part and, where appropriate, 1 to 7 carbon atoms in the straight-chain or branched alkyl part, in each case substituted by substituents. independently selected from the group consisting of halogen, straight-chain or branched alkyl with 1 to 4 carbon atoms and straight-chain or branched halogenoalkyl with 1 to 4 carbon atoms and 1 to 9 identical or different halogen atoms.

16. A method of combating fungi which comprises applying to such fungi or to a fungus habitat a fungicidally effective amount of a compound according to claim 1.

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**4,743,616**

## NOVEL BIOLOGICALLY ACTIVE COMPOUND HAVING ANTI-PROLYL ENDOPEPTIDASE ACTIVITY

**Takaharu Tanaka; Naoki Higuchi; Masayuki Saitoh, and Masaki Hashimoto, all of Osaka, Japan, assignors to Suntory Limited, Osaka, Japan**

**Filed Jul. 30, 1985, Ser. No. 760,411**

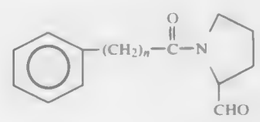
**Claims priority, application Japan, Jul. 31, 1984, 59-160994**

**The portion of the term of this patent subsequent to Oct. 20, 2004, has been disclaimed.**

**Int. Cl.**[4] **A61K** *31/40;* **C07D** *207/08*

**U.S. Cl. 514—423** **9 Claims**

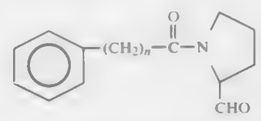
1. An N-acylpyrrolidine derivative of formula (I):



(I)

wherein n is a number of 1 to 4.

2. A pharmaceutical composition containing as the active ingredient a pharmaceutically effective amount of an N-acylpyrrolidine derivative of formula (I):



(I)

wherein n is a number of 1 to 4; together with a pharmaceutically acceptable excipient or carrier.

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**4,743,617**

## HETEROCYCLYL-2-PROPYN-1-AMINES

**Thomas M. Bargar, Zionsville; Lawrence C. Creemer, Indianapolis, both of Ind., and James R. McCarthy, Cincinnati, Ohio, assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio**

**Continuation of Ser. No. 19,103, Feb. 26, 1987, abandoned. This application Aug. 31, 1987, Ser. No. 91,338**

**Int. Cl.**[4] **A61K** *31/38, 31/34;* **C07D** *333/12, 307/02*

**U.S. Cl. 514—438** **18 Claims**

1. A compound of the formula

$$Het\text{-}C{\equiv}C\text{-}CH_2\text{-}NH_2$$

wherein Het is 2- or 3-thienyl or 2- or 3-furyl, each Het ring optionally being substituted with from 1 to 3 moieties selected from the group consisting of lower alkyl of from one to about six carbon atoms, alkoxy of from 1 to about 6 carbon atoms, alkylthio of from 1 to about 6 carbon atoms, fluoro, bromo, chloro, carboxylic acid and hydroxymethyl and the pharmaceutically acceptable acid addition salts thereof.

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**4,743,618**

## SUBSTITUTED 2-AMINOTETRALINS

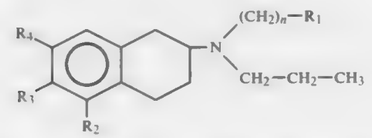
**Alan S. Horn, Noordhorn, Netherlands, assignor to Nelson Research & Development Co., Irvine, Calif.**

**Continuation-in-part of Ser. No. 811,768, Dec. 20, 1985, Pat. No. 4,657,925, and a continuation-in-part of Ser. No. 839,976, Mar. 17, 1986, which is a continuation-in-part of Ser. No. 640,685, Aug. 13, 1984, Pat. No. 4,564,628, which is a continuation-in-part of Ser. No. 455,144, Jan. 3, 1983, abandoned, said Ser. No. 811,768, is a continuation-in-part of Ser. No. 640,685, Aug. 13, 1984, Pat. No. 4,564,628, which is a continuation-in-part of Ser. No. 455,144, Jan. 3, 1983, abandoned. This application Jul. 28, 1986, Ser. No. 891,262 The portion of the term of this patent subsequent to Jan. 14, 2003, has been disclaimed.**

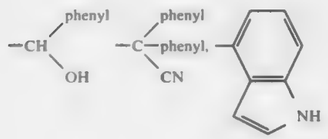
**Int. Cl.**[4] **A61K** *31/38, 31/34;* **C07C** *9/06;* **C07D** *211/70*

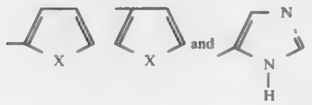
**U.S. Cl. 514—438** **10 Claims**

1. Optically active or racemic compounds having the general formula



wherein $R_2$, $R_3$ and $R_4$ are each selected from the group consisting of H and OA; A is selected from the group consisting of hydrocarbyl radicals, n is 2 or 3 and $R_1$ is selected from the group of radicals consisting of 3-pyridyl,





and further substituted derivatives thereof wherein the substituents are selected from the group consisting of hydroxy, nitro, azido, sulfate, sulfamido, halogen, hydrocarbyl and hydrocarbyl radicals, wherein said hydrocarbyl radicals are substituted with atoms selected from the group consisting of halogen, nitrogen, oxygen and sulfur and phosphorus and said hydrocarbyl radicals comprise from 1 to 12 carbon atoms, wherein X is oxygen or sulfur, and wherein at least one of $R_2$, $R_3$ and $R_4$ is H and at least one of $R_2$, $R_3$ and $R_4$ is not H, and $R_2$ and $R_4$ are not both OA and pharmaceutically acceptable salts thereof.

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**4,743,619**

## METHOD OF TREATING HEPATITIS

**Paul P. Hung, Bryn Mawr, Pa., assignor to American Home Products Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 770,807, Aug. 29, 1985, Pat. No. 4,631,290. This application Aug. 25, 1986, Ser. No. 900,012**

**Int. Cl.**[4] **A61U** *31/21, 31/26;* **A61K** *39/12, 39/29*

**U.S. Cl. 514—450** **7 Claims**

1. A method of treating an animal infected by hepatitis B virus comprising administering to such infected animal an amount of the rifamycin derivative 4-deoxo-N,3-ethylidenimino-4-(methylsulfonyl)amino-rifamycin SV, said amount being effective to reduce the effects of said hepatitis B virus.

7. A rifamycin derivative selected from a group consisting of

(b) 3-amino-4-deoxo-4-[(4-aminophenyl)sulfonyl]amino-rifamycin SV,

(c) 4-O-(n-butylsulfonyl)-3-[(1-piperidinylimino)methyl]-rifamycin SV,

(d) 4-O-(n-butylsulfonyl)-3-[(4-morpholinylimino)methyl]-rifamycin SV,

(e) 3-[(dimethylhydrazono)methyl]-4-O-[(3-phenylpropyl)-sulfonyl]-rifamycin SV, and

(f) 4-deoxo-N,3-ethylidenimino-4-(methylsulfonyl)amino-rifamycin SV.

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**4,743,620**

## FORMULATION FOR THE CONTROL OF NEMATODES

**Byron Hodgin, 631 White Pine Tree Rd., Venice, Fla. 33595**

**Division of Ser. No. 775,415, Sep. 12, 1985, Pat. No. 4,616,036. This application Jun. 10, 1986, Ser. No. 872,509**

**Int. Cl.**[4] **A01N** *47/40, 47/46, 47/48*

**U.S. Cl. 514—515** **1 Claim**

1. An agricultural formulation for the control of nematodes consisting of a D-limonene solvent and between about 15 and about 20 parts by weight of chloropicrin and also between about 15 and about 25 parts by weight of methyl isothiocyanate.

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**4,743,621**

## ESTER OF ACETYL CARNITINE, PROCESSES FOR ITS PREPARATION AND PHARMACEUTICAL COMPOSITIONS CONTAINING IT

**Claudio Cavazza, Rome, Italy, assignor to SIGMA-TAU Industrie Farmaceutiche Riunite S.p.A., Rome, Italy**

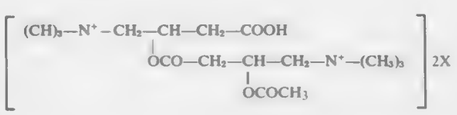
**Filed Jun. 20, 1985, Ser. No. 746,731**

**Claims priority, application Italy, Jul. 4, 1984, 48503 A/84**

**Int. Cl.**[4] **C07C** *101/18;* **A61K** *31/22*

**U.S. Cl. 514—547** **4 Claims**

1. A compound of the formula:



in which X is the anion of a pharmaceutically acceptable acid.



**4,743,622**

## CERTAIN DIARYL-PENTANE DERIVATIVES HAVING PESTICIDAL PROPERTIES

**Helga Franke; Heinrich Franke; Hans-Rudolf Krüger, and Hartmut Joppien, all of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Fed. Rep. of Germany**

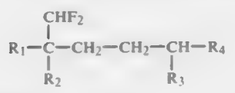
**Filed Feb. 11, 1986, Ser. No. 828,289**

**Claims priority, application Fed. Rep. of Germany, Feb. 14, 1985, 3505370**

**Int. Cl.**[4] **C07C** *43/225, 43/257;* **C07D** *213/64;* **A01N** *39/00*

**U.S. Cl. 514—717** **11 Claims**

1. An aromatic alkane derivative of the formula



(I)

in which

$R_1$ is phenyl or phenyl substituted by a member of the group consisting of $C_{1-4}$ alkyl, halo-$C_{1-4}$ alkyl, phenyl-$C_{1-4}$ alkyl, $C_{2-4}$ alkenyl, halo-$C_{2-4}$ alkenyl, phenyl-$C_{2-4}$ alkenyl, $C_{2-4}$ alkynyl, halo-$C_{2-4}$ alkynyl, phenyl-$C_{2-4}$ alkynyl, $C_{1-4}$ alkoxy, halo-$C_{1-4}$ alkoxy, phenyl-$C_{1-4}$ alkoxy, $C_{2-4}$ alkenyloxy, halo-$C_{2-4}$ alkenyloxy, phenyl-$C_{2-4}$ alkenyloxy, $C_{2-4}$ alkynyloxy, halo-$C_{2-4}$ alkynyloxy, phenyl-$C_{2-4}$ alkynyloxy, methylsulfonyloxy, fluoromethylsulfonyloxy and halo,

$R_2$ is hydrogen or $C_{1-4}$ alkyl,

$R_3$ is hydrogen or ethynyl, and

$R_4$ is phenyl or pyridyl or one of these groups substituted by one or more of $C_{1-6}$ alkyl, halo-$C_{1-6}$ alkyl, phenyl-$C_{1-6}$ alkyl, $C_{1-6}$ alkyl interrupted by an O-, N- or S- atom, $C_{2-4}$ alkenyl, halo-$C_{2-4}$ alkenyl, phenyl-$C_{2-4}$ alkenyl, $C_{1-4}$ alkoxy, halo-$C_{1-4}$ alkoxy, phenyl-$C_{1-4}$ alkoxy, $C_{2-4}$ alkenyloxy, halo-$C_{2-4}$ alkenyloxy, phenyl-$C_{2-4}$ alkenyloxy, $C_{2-4}$ alkynyloxy, halo-$C_{2-4}$ alkynyloxy, phenyl-$C_{2-4}$ alkynyloxy, phenoxy, halophenoxy or halo.

8. A method of controlling pests which comprises applying to the locus thereof, an effective pesticidal amount of an aromatic alkane derivative according to claim 1.

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**4,743,623**

## PROCESS FOR FOAMING POLYMERIC COMPOSITIONS WITH ORGANIC AZO COMPOUNDS AND COMPOSITIONS ASSOCIATED THEREWITH

**Richard A. Wolf; Edwin J. Wilson, and Philip J. Brondsema, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Aug. 12, 1987, Ser. No. 84,667**

**Int. Cl.**[4] **C08J** *9/10*

**U.S. Cl. 521—95** **8 Claims**

1. In a process for foaming a thermoplastic polymer in a liquid state, wherein a foaming amount of blowing agent is mixed with the polymer and subsequently the composition is heated to temperature at which the blowing agent decomposes, the improvement comprising using as a blowing agent an azo compound with an aromatic moiety bridged to one or more aliphatic moieties by azo groups, said azo group being directly bound to the aromatic ring of the aromatic moiety and said moieties being chosen such that the decomposition temperature of the azo compound is above about 200° C. and is a temperature at which the polymer composition is liquid and stable.

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**4,743,624**

## PROCESS FOR THE PRODUCTION OF FLAME-RETARDANT POLYURETHANE PRODUCTS

**David H. Blount, 6728 Del Cerro Blvd., San Diego, Calif. 92120**

**Filed Jun. 11, 1987, Ser. No. 60,492**

**Int. Cl.**[4] **C08J** *9/00*

**U.S. Cl. 521—106** **12 Claims**

1. The process of preparing a flame retardant foamed polyurethane products which process comprises of mixing and reacting:

(A) A salt-forming basic compound selected from the group consisting of alkali metal compounds selected from the group consisting of compounds containing sodium, potassium, lithium, rubidium, cesium and mixtures thereof, except for alkali metal sulfate compounds, alkali metal halide compounds and alkali metal, alkaline earth metal compounds selected form the group consisting of compounds containing calcium, magnesium, barium, strontium and mixtures thereof, except for alkaline earth metal sulfate, alkaline earth metal halides and alkaline earth metal nitrates, metal compounds selected from the group consisting of compounds containing beryllium, copper, zinc, aluminum, tin, titanium, zirconium, lead, arsenic, antimony, bismuth, molybdenum, tungsten, manganese, iron, nickel, cobalt and mixtures thereof, except for metal sulfates, and metal halide and metal nitrates, ammonia compounds selected form the group consisting of ammonia, ammonium carbonate, amino compounds, amines, ammonia salts of organic acid, quaternary ammonium hydroxides, ammonium silicate and mixtures thereof except for ammonium salts of sulfuric acid, nitric acid and acid halides and mixtures thereof in the amount of 1 to 300 parts by weight;

(B) salt-forming acidic compounds selected from the group consisting of phosphorous-containing compounds, halogen-containing compounds, and mixtures thereof in the amount of 1 to 100 parts by weight;

(C) compound containing one or more active hydrogen that will react with a polyisocyanate compound in the amount of 1 to 200 parts by weight;

(D) compounds containing at least two isocyanate groups in the amount of 50 to 100 parts by weight,

the said mixing will be carried out in such a way that components (A) and (B) are reacted in (C) or (D) or in both (C) and (D) before (C) and (D) are reacted,

(E) up to 50 percent by weight of an inert liquid, boiling in the range of −25° C. to 80° C., is included in the reaction mixture as blowing agent and the reaction proceeds with concomitant foaming.

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**4,743,625**

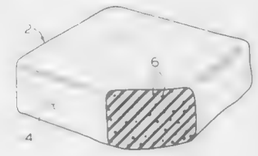
## FIRE RETARDANT MIXTURE FOR PROTECTION OF SUITABLE COMPOSITE PRODUCTS

**Lubomir Vajs, 5580 Sheppard Ave. E., Toronto, Ontario, Canada (M1B 2L3), and Daniel M. Pettit, 146 Connaught Cr., Bolton, Ontario, Canada (L0P 1A0)**

**Continuation-in-part of Ser. No. 889,273, Jul. 25, 1986, Pat. No. 4,663,226. This application May 4, 1987, Ser. No. 45,519**

**Int. Cl.**[4] **C08J** *9/00;* **C09K** *21/14*

**U.S. Cl. 521—122** **19 Claims**




2. A plastic foam product having dispersed therein fire retarding materials, said fire retarding materials comprising

a known carbon base intumescent material which produces a protective cellular foam layer when exposed to combustion temperatures, and

a vitrifying agent which locks the intumescent cellular foam layer when exposed to a temperature sufficient to activate said vitrifying agent.

**4,743,626**

## LIQUID CARBODIIMIDE-URETONIMINE MODIFIED POLYMETHYLENE POLYPHENYLENE POLYISOCYANATES AND POLYURETHANE FOAMS MADE THEREFROM

**Thirumurti Narayan, Grosse Ile, Mich., assignor to BASF Corporation, Parsippany, N.J.**

**Filed Sep. 14, 1987, Ser. No. 95,680**
**Int. Cl.[4] C08G** *18/14*
**U.S. Cl. 521—160** **9 Claims**

1. A method for the preparation of a storage stable liquid carbodiimide-uretonimine modified polymethylene polyphenylene polyisocyanate composition, containing a high two-ring methylene bis(phenylisocyanate) content and having a viscosity comparable to polymeric methylene bis(phenylisocyanate), comprising:

(a) catalyzing polymeric MDI with a catalytically effective amount of a carbodiimide-uretonimine linkage promoting catalyst at a temperature sufficient to promote the formation of said linkages until an isocyanate content of about 25 percent is obtained;

(b) deactivating the carbodiimide-uretonimine linkage catalyst; and,

(c) blending the product of (b) with a two-ring methylene bis(phenylisocyanate) in an amount sufficient to raise the two-ring isocyanate content to about 60 percent of the total ring content;

whereby said liquid carbodiimide-uretonimine modified polyisocyanate composition has a viscosity comparable to standard polymeric MDI.

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**4,743,627**

## LIQUID ISOCYANURATE-MODIFIED POLYMETHYLENE BIS(PHENYLISOCYANATE) COMPOSITIONS CONTAINING A HIGH TWO-RING METHYLENE BIS(PHENYLISOCYANATE) CONTENT

**Thirumurti Narayan, Grosse Ile, and Peter T. Kan, Plymouth, both of Mich., assignors to BASF Corporation, Parsippany, N.J.**

**Filed Sep. 14, 1987, Ser. No. 95,679**
**Int. Cl.[4] C08G** *18/14*
**U.S. Cl. 521—160** **8 Claims**

1. A method for the preparation of a highly stable liquid isocyanurate-containing polyisocyanate composition containing a high two-ring methylene bis(phenylisocyanate) content, comprising:

(a) trimerizing polymeric MDI in the presence of a catalytically effective amount of a trimerization catalyst to effect the conversion of isocyanate to isocyanurate to form an isocyanurate-containing polyisocyanate;

(b) deactivating the trimerization catalyst; and,

(c) blending the isocyanurate-containing polyisocyanate with a methylene bis(phenylisocyanate) to form a final product having a viscosity comparable to standard viscosity polymeric MDI and a two-ring content of at least about 60 percent by weight of the composition,

whereby the final product is useful in the preparation of lighter colored foams, than those possible with standard polymeric MDI.

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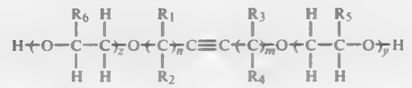
**4,743,628**

## POLYURETHANE FOAMS INCORPORATING ALKOXYLATED AROMATIC DIAMINE AND ACETYLENIC GLYCOL

**James B. Conkey, Catasauqua, and Glenn A. Taylor, Allentown, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.**

**Filed Aug. 6, 1986, Ser. No. 893,857**
**Int. Cl.[4] C08G** *18/30*
**U.S. Cl. 521—163** **20 Claims**

1. In a polyurethane foam formulation comprising an organic polyisocyanate, polyol, blowing agent and crosslinker system, the improvement which comprises including a crosslinker system of an alkoxylated aromatic diamine and an acetylenic glycol represented by the formula:



wherein y and z range from 0–6 but the sum of y and z does not exceed 7; m and n combined range from 1 to 10, and $R_1$, $R_2$, $R_3$, $R_4$, $R_5$ and $R_6$ are hydrogen or methyl groups and may be like or unlike in the structure.

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**4,743,629**

## CROSSLINKED POLYETHERURETHANE MEMBRANES USEFUL IN BLOOD ELECTROLYTE SENSORS

**Mutlu Karakelle, and Richard J. Zdrahala, both of Dayton, Ohio, assignors to Becton, Dickinson and Company, Franklin Lakes, N.J.**

**Filed Jul. 2, 1987, Ser. No. 69,453**
**Int. Cl.[4] C08G** *18/48*
**U.S. Cl. 521—175** **10 Claims**

1. A semipermeable membrane comprising a crosslinked polyetherurethane composition having a hard segment of from 20 to 50%, said composition comprising a product from the reaction of a diisocyanate, polyethylene oxide, a chain extending diol of from 2 to 10 carbon atoms and a trihydroxy crosslinking agent of 2 to 10 carbon atoms, said membrane absorbing from 50 to 120% of its dry weight of water.

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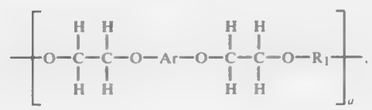
**4,743,630**

## POLY(ESTER-ETHER-CARBONATE)

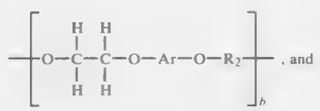
**William R. Darnell, Weber City, Va., and Winston J. Jackson, Jr., Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Continuation-in-part of Ser. No. 760,801, Jul. 31, 1985, Pat. No. 4,623,675. This application Aug. 4, 1986, Ser. No. 892,651**
**Int. Cl.[4] C08G** *63/62*
**U.S. Cl. 521—180** **4 Claims**

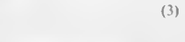
1. A composition of matter comprising a mixture of the following repeating units:



(1)

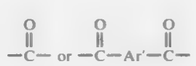


(2)



(3)

wherein a, b, and c are each integers of a magnitude such as to result in an inherent viscosity of said composition of about 0.05–2.00, wherein said inherent viscosity is determined at 25° C. in a 40/25/35 weight mixture of p-chlorophenol/phenol/1,1,2,2-tetrachloroethane at a concentration of 0.1 g/100 mL; Ar is arylene having 6–30 carbon atoms; $R_1$, $R_2$, and $R_3$ are each

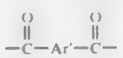


wherein Ar′ is arylene of 6–16 carbon atoms; and





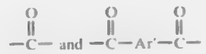
is present in amounts of greater than 0 to less than 100% and



is present in amounts of greater than 0 to less than 100%, with the proviso that $R_2$ is



or a mixture of



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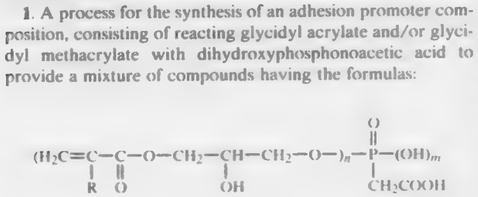
**4,743,631**

## ACRYLATED PHOSPHONOACETIC ACIDS AS ADHESION PROMOTERS, METHOD FOR MAKING, AND CURABLE COATINGS FOR METAL

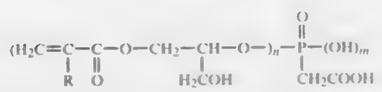
**Alberto Greco, Dresano; Renato Butturini, Induno Olona, and Sergio Arrighetti, S. Donato Milanese, all of Italy, assignors to Enichem Sintesi S.p.A., Palermo, Italy**

**Filed Sep. 6, 1985, Ser. No. 773,418**
**Claims priority, application Italy, Sep. 20, 1984, 22734 A/84**
**Int. Cl.[4] C07F** *9/02*; **C08F** *230/02, 283/01, 283/02*
**U.S. Cl. 522—107** **16 Claims**

1. A process for the synthesis of an adhesion promoter composition, consisting of reacting glycidyl acrylate and/or glycidyl methacrylate with dihydroxyphosphonoacetic acid to provide a mixture of compounds having the formulas:

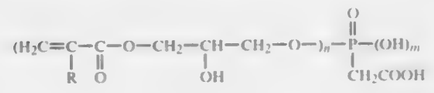


and

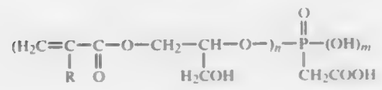


wherein R is, independently, hydrogen or methyl; n is 1 or 2; and m is 0 or 1.

12. An adhesion promoter composition comprising a mixture of compounds having the formulas:



and



wherein R is, independently, hydrogen or methyl; n is 1 or 2; and m is 0 or 1.

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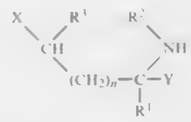
**4,743,632**

## POLYETHERURETHANE UREA POLYMERS AS SPACE FILLING TISSUE ADHESIVES

**N. Nash Marinovic, Groton, Conn., assignor to Pfizer Hospital Products Group, Inc., New York, N.Y.**

**Filed Feb. 25, 1987, Ser. No. 18,546**
**Int. Cl.[4] C08G** *18/32*
**U.S. Cl. 523—118** **68 Claims**

1. A space filling tissue adhesive which comprises a polyetherurethane urea polymer formed by reaction of a purified diisocyanate polyetherurethane prepolymer with an aqueous solution comprising, for each mol of diisocyanate prepolymer, substantially one mol of a chain extending compound of the formula



wherein

n is zero or an integer from 1–8;

X is —OH, —NHC(NH)$NH_2$ or —NHR;

Y is hydrogen or —COOH;

R is hydrogen or ($C_1$–$C_3$)alkyl;

$R^1$ is hydrogen or ($C_1$–$C_3$)alkyl; and

$R^2$ and $R^3$ are taken separately, and

$R^2$ is hydrogen or ($C_1$–$C_3$)alkyl; and

$R^3$ is hydrogen or ($C_1$–$C_3$)alkyl; or

$R^2$ and $R^3$ are taken together and are —$CH_2$—, with the proviso that when $R^2$ and $R^3$ are so taken, n is 1, 2 or 3;

or a pharmaceutically acceptable cationic or acid addition salt thereof; said purified prepolymer having been previously formed by reacting di(4-isocyanatophenyl)methane, di(4-isocyanatocyclohexyl)methane, 1,4-diisocyanatocyclohexane, 4-(4-isocyanatocyclohexyl)cyclohexyl isocyanate, di(4-isocyanatophenyl)ether or di(4-isocyanatocyclohexyl)ether with a polypropyleneglycol or polytetramethyleneglycol of average molecular weight in the range of about 650–5000; and comprised predominantly of individual molecules consisting of said reactants in 2:1 molar ratio, respectively.

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**4,743,633**

## COMPOSITIONS AND METHODS FOR REDUCING THE PERMEABILITY OF UNDERGROUND STRATA

**Martin Navratil; Mark S. Mitchell, both of Scarborough, and Mojmir Sovak, Toronto, all of Canada, assignors to Borden Company Limited, West Hill, Canada**

**Continuation of Ser. No. 590,034, Mar. 15, 1984, abandoned. This application Jul. 15, 1985, Ser. No. 746,540**
**Claims priority, application Canada, Nov. 18, 1983, 441430**
**Int. Cl.[4] E02B** *3/12*
**U.S. Cl. 523—130** **8 Claims**

1. A gelable composition for use in reducing the permeability of high permeability segments of strata, said composition being an aqueous gelable solution having a pH of at least about 9.0 and consisting essentially of an alkaline material which is capable of providing said pH, a lignin-containing extract derived from the black liquor by mild acid precipitation, said black liquor derived as a by-product of the separation of cellulosics from ligninous material in the Kraft and Soda pulping processes of manufacturing paper products, and a source of formaldehyde selected from the group consisting of hexamethylenetetramine, paraformaldehyde, an aqueous formaldehyde solution and a formaldehyde-donating phenol-formaldehyde resole resin, the weight ratio of lignin to formaldehyde available in said source for reaction with said lignin-containing

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extract is 2:1–10:1, the total weight of said alkaline material, lignin extract and source of formaldehyde being from about 5 to about 30 percent by weight of said solution, said composition being a liquid having a viscosity not in excess of about 30 mPa.s. at 20° C. when first formed, and said viscosity remaining substantially unchanged for a relatively long period of time prior to a very rapid increase to form a gel of substantial mechanical strength, said composition being stable and undergoing minimal viscosity changes for at least 30 days upon storage at 25° C. or below, being capable of flowing substantial distances into said segments from the point of injection before gelling and undergoing a transformation to a solid gel over at least part of the temperature range of about 50° to about 150° C. within a period of from about one hour at 150° C. and high solids content up to about 1,000 hours at 50° C. and low solids content, said solid gel being stable to prolonged exposure to brine, residual oil and flooding liquids and further being stable over the full temperature range.

7. A gelable composition for use in reducing the permeability of high permeability segments of strata, said composition being an aqueous gelable solution having a pH of about 2 to about 11 and consisting essentially of an aqueous soluble sulfonated derivative of lignin derived as a by-product of the Acid Sulfite and Neutral Sulfite processes in the pulp and paper industry separation of ligninous material from the cellulosics used in the manufacture of paper products, and a gelling agent selected from the group consisting of tannins and a source of formaldehyde selected from the group consisting of hexamethylenetetramine, paraformaldehyde, and aqueous formaldehyde solution, the weight ratio of said sulfonated derivative of lignin to said gelling agent is 1:1–5:1 if said gelling agent is tannin or 2:1–10:1 if said gelling agent is a source of formaldehyde and said ratio is based on the amount of formaldehyde available in said source for reaction with said sulfonated derivative of lignin, the total weight of said sulfonated derivative and said gelling agent being from about 3 percent to about 15 percent by weight of said solution, said composition being a liquid having a viscosity not in excess of about 30 mPa.s. at 20° C. when first formed, and said viscosity remaining substantially unchanged for a relatively long period of time prior to a very rapid increase to form a gel of substantial mechanical strength, said composition being stable and undergoing minimal viscosity changes for at least 30 days upon storage at 25° C. or below, being capable of flowing substantial distances into said segments from the point of injection before gelling and undergoing a transformation to a solid gel over at least part of the temperature range of about 150° to about 250° C. within a period of from about one hour at 250° C. and high solids content up to about 100 hours at 150° C. and low solids content, said solid gel being stable to prolonged exposure to brine, residual oil and flooding liquids and further being stable over the full temperature range.

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**4,743,634**

## MOLDED NON-ASBESTOS FRICTION MEMBER CONTAINING DIATOMACEOUS EARTH

**James R. Royer, Mount Joy, Pa., assignor to Raymark Industries, Inc., Manheim, Pa.**

**Filed Jan. 22, 1986, Ser. No. 821,397**

**Int. Cl.⁴ C08J** *5/14*

**U.S. Cl. 523—150** **12 Claims**

1. In an extrusible, asbestos-free composition for forming a friction member for use in a substantially dry environment comprising a substantially homogeneous wet plastic mixture comprising substantially non-porous fibrous material, friction modifiers and inert fillers, heat-hardenable binder and an organic solvent in an amount to enable the plastic mixture to be extrusible, the improvement which comprises including in said plastic mixture diatomaceous earth having a particle size including agglomerates such that at least 10 percent by weight thereof, is retained on a 325 mesh screen, the amount of diatomaceous earth present being sufficient to permit gases generated during curing of the binder to escape from said mixture to provide a substantially blister-free friction element.

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**4,743,635**

## FRICTION MATERIAL AND METHOD OF MAKING SUCH MATERIAL

**Mitsuhiko Nakagawa, and Fumiaki Nitto, both of Itami, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan**

**Division of Ser. No. 799,404, Nov. 19, 1985, Pat. No. 4,678,818. This application Feb. 2, 1987, Ser. No. 15,151**

**Claims priority, application Japan, Dec. 13, 1984, 59-263641**

**Int. Cl.⁴ C08K** *3/08, 3/04*

**U.S. Cl. 523—155** **6 Claims**

1. A method for manufacturing a friction material, comprising the following steps:

(a) separately preparing a combination of graphite and one or more metal or metal alloy which is softer than steel in such a way that the graphite and metal alloy enter into an intimate bond with each other,

(b) providing friction causing fibers and a binder as a matrix material,

(c) embedding said combination of already intimately bonded graphite and metal or metal alloy and said friction causing fibers in said binder matrix material, and

(d) molding and curing said binder matrix material for forming said friction material.

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**4,743,636**

## SEALING COMPOUND COMPRISING CORK POWDER AND TALC FILLERS

**Bruno Bersano, Epalinges, Switzerland, assignor to W. R. Grace & Co., Lexington, Mass.**

**Filed May 9, 1986, Ser. No. 861,170**

**Claims priority, application Fed. Rep. of Germany, May 28, 1985, 3519053**

**Int. Cl.⁴ C08K** *3/00;* **C09K** *3/10;* **F16J** *15/00;* **C08L** *23/06*

**U.S. Cl. 524—16** **9 Claims**

1. A sealing compound for use on container closures consisting of:

a. From about 75 to about 95 parts by weight of polyethylene;

b. From about 10 to about 20 parts by weight of a styrene-isoprene-styrene block copolymer; and

c. From about 15 to about 50 parts by weight of a mixture of fillers consisting of talc and cork powder.

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**4,743,637**

## FLAME RETARDANT COMPOUNDS AND THERMOPLASTIC COMPOSITIONS CONTAINING THE SAME

**Robert J. Axelrod, Glenmont, N.Y.; Donald B. G. Jaquiss, Pittsfield, Mass., and John A. Tyrell, Mt. Vernon, Ind., assignors to General Electric Company, Selkirk, N.Y.**

**Filed Aug. 1, 1986, Ser. No. 892,344**

**Int. Cl.⁴ C08K** *5/34*

**U.S. Cl. 524—94** **27 Claims**

1. A flame retardant thermoplastic composition comprising

(a) a normally flammable thermoplastic resin; and

(b) an effective, flame retardant amount of either

(i) a polyalkylene oxide or a derivative thereof end-capped with brominated phthalimide groups and being of the formulae

$$R{-}R^1{-}O{-}R^1)_nR \quad \text{(I)},$$

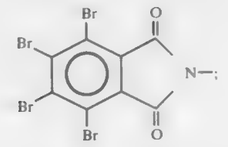
$$(R{-}R^1{-}O{-}R^1)_n{\cdot}NH)_2C{=}O \quad \text{(II)}$$

or

$$(R{-}R^1{-}OR^1)_n{\cdot}CH_2)_3C{-}R^2 \quad \text{(III)}$$

wherein R is





$R^1$ is alkylene of from about 2 to about 6 carbon atoms, $R^2$ is alkyl of from about 1 to about 6 carbon atoms; n is from about 4 to about 40; n′ is from about 3 to about 15; n″ is from about 1 to about 10; or

(ii) a combination of a compound of formulae (I), (II) or (III) or a mixture of any of them and an inorganic or organic antimony-containing compound.

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**4,743,638**

## RAPID CRYSTALLIZING POLYPHENYLENE SULPHIDE COMPOSITIONS

**Peter Bier, Pittsburgh, Pa.; Klaus Reinking, Wermelskirchen, Fed. Rep. of Germany; Ludwig Bottenbruch, and Erhard Tresper, both of Krefeld, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Feb. 26, 1987, Ser. No. 19,475**

**Claims priority, application Fed. Rep. of Germany, Mar. 8, 1986, 3607714**

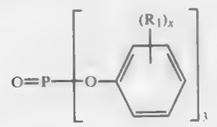
**Int. Cl.⁴ C08K** *5/52*

**U.S. Cl. 524—141** **4 Claims**

1. Highly crystalline, rapid-crystallizing, thermoplastic compositions consisting of

(a) 70–99.5% by weight of polyphenylene sulphide having a melt viscosity of at least 5 Pascal-seconds, measured at 306° C. under a shearing stress of $10^3$ Pascal units and

(b) 0.5–30% by weight, relative to (a) and (b) of an aromatic phosphoric acid ester of the formula (I)



(I)

in which

$R_1$ represent one or more identical or different $C_1$–$C_{24}$-aliphatic, $C_3$–$C_{13}$-cycloaliphatic and/or $C_6$–$C_{18}$-aromatic radicals and

x represents the number 0, 1, 2, 3, 4 or 5.

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**4,743,639**

## ARYLENE SULFIDE POLYMERS OF IMPROVED IMPACT STRENGTH

**Yeon F. Liang, Florence, S.C., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Division of Ser. No. 875,815, Jun. 18, 1986, Pat. No. 4,708,983. This application Jun. 2, 1987, Ser. No. 57,407**

**Int. Cl.⁴ C08K** *5/54*

**U.S. Cl. 524—188** **18 Claims**

1. A composition comprising about 100 parts by weight of at least one poly(arylene sulfide) and about 6 to about 20 parts by weight of at least one non-resinous, normally liquid polysiloxane having a molecular weight in the range of from about 100,000 to about 400,000 and having the repeating unit



wherein each R is a monovalent hydrocarbyl radical having from 1 to 8 carbon atoms, individually selected from the group consisting of alkyl, cycloalkyl, alkylcycloalkyl, aryl and alkaryl.

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**4,743,640**

## ALPHA, BETA-UNSATURATED CARBONYL-CONTAINING CARBONATE STABILIZERS FOR CHLORINATED POLYMERS

**Hermann O. Wirth, Bensheim, and Klaus-Peter Michaelis, Lindenfels/Odenwald, both of Fed. Rep. of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

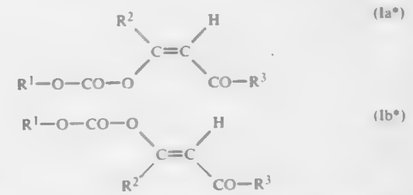
**Filed Oct. 20, 1986, Ser. No. 920,622**

**Claims priority, application Switzerland, Oct. 30, 1985, 4659/85**

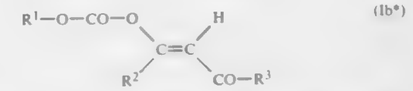
**Int. Cl.⁴ C08K** *5/58, 5/01*

**U.S. Cl. 524—280** **6 Claims**

1. A composition comprising a chlorinated polymer selected from the group consisting of polyvinylchloride, post-chlorinated polyvinylchloride, chlorinated polyolefins, graft polymers of polyvinylchloride and ethylene-vinylacetate, graft polymers of polyvinylchloride and acrylonitrile-butadiene-styrene, graft polymers of polyvinylchloride and methyl methacrylate-butadiene-styrene, polyvinylchloride/vinyl acetate copolymer, polyvinylchloride/vinylidene chloride copolymer, polyvinylchloride/trans-dichloroethene copolymer, polyvinylchloride/ethylene copolymer, polyvinylchloride/propylene copolymer, polyvinylchloride/butylene copolymer, polyvinylchloride/maleic anhydride copolymer, polyvinylchloride/acrylic acid copolymer, polyvinylchloride/fumaric acid copolymer and polyvinylchloride/itaconic acid copolymer, and an amount which is effective for stabilizing against heat and light degradation of a compound of formulas Ia* and Ib*

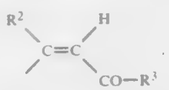


(Ia*)

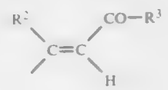


(Ib*)

wherein $R^1$ is $C_1$–$C_{22}$alkyl, phenyl or phenyl which is substituted by one or two $C_1$–$C_9$alkyl groups, or is $C_5$–$C_7$cycloalkyl or a group of formula IIa or IIb,

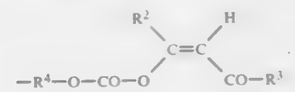


(IIa)



(IIb)

or $R^1$ is a group of formula IIIa or IIIb

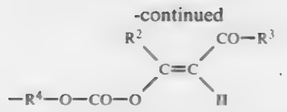


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(IIIb)

and $R^2$ and $R^3$ are each independently of the other $C_1$–$C_{20}$alkyl, phenyl or phenyl which is substituted by one or two $C_1$–$C_9$alkyl groups, or are $C_5$–$C_7$cycloalkyl, and $R^4$ is $C_2$–$C_{12}$alkylene.

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**4,743,641**

**POLYCARBONATE RESIN COMPOSITION**

**Tatsuji Shizawa, Ichihara; Naoki Nonagase, Nishinomiya, and Kenji Ozawa, Ichihara, all of Japan, assignors to Idemitsu Petrochemical Co., Ltd., Tokyo, Japan**

**Filed Jan. 12, 1987, Ser. No. 2,171**

**Claims priority, application Japan, Feb. 6, 1986, 61-22956**

**Int. Cl.[4] C08L** *69/00;* **C08K** *5/10*

**U.S. Cl. 524—317** **15 Claims**

1. A polycarbonate resin composition which comprises

(A) a polycarbonate resin derived from a divalent phenol and a carbonate precursor and containing from 10 to 6,000 parts per million of phenolic residues,

(B) a partial ester of an aliphatic saturated monovalent carboxylic acid and a polyhydric alcohol in amount of from 0.001 to 0.5 part by weight per 100 parts by weight of the component (A) and

(C) a mixture of one or more of an aliphatic higher monohydric alcohol in amount of from 0.003 to 1.0 part by weight per 100 parts by weight of the component (A).

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**4,743,642**

**COLOR BALANCED RUBBER-REINFORCED PLASTIC**

**James A. Yanacek; Robert J. Donald, both of Midland, and Christopher S. Murphy, Troy, all of Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Sep. 8, 1986, Ser. No. 905,106**

**Int. Cl.[4] C08L** *55/02;* **C08K** *5/08*

**U.S. Cl. 524—358** **20 Claims**

1. A composition comprising a rubber-reinforced plastic composition containing an FR additive being capable of inhibiting ignition or burning characteristics of the plastic composition, and a fadeable, yellow color balancer, said color balancer being selected from the group consisting of an organic dye and an organic pigment, and being present in an effective amount within the range of 0.001 and 0.1 weight percent, whereby the overall color shift ΔE of the composition is reduced upon exposure to light having as a component, ultraviolet light.

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**4,743,643**

**DISPERSION OF ADDITION (CO)POLYMERS IN AN ORGANIC LIQUID**

**Roelof Buter, Dieren, Netherlands, assignor to Akzo nv, Arnhem, Netherlands**

**Continuation of Ser. No. 756,258, Jul. 18, 1985, abandoned. This application Nov. 20, 1986, Ser. No. 933,334**

**Claims priority, application Netherlands, Jul. 20, 1984, 8402305**

**Int. Cl.[4] C08F** *279/06, 2/14;* **C08K** *5/01, 5/56*

**U.S. Cl. 524—396** **16 Claims**

1. A stable dispersion of addition (co)polymers in an inert relatively non-polar organic hydrocarbon liquid, the dispersed particles embracing both a (co)polymer and a polymer containing an ethylenically unsaturated monomer, characterized in that the (co)polymers are substantially composed of:

a. 5 to 100 mole % of styrene and/or methyl styrene; and

b. 0 to 95 mole % of alkyl methacrylate having 1 or 2 carbon atoms in the alkyl group and/or alkoxyalkylene methacrylate having 1 or 2 carbon atoms in the alkoxy group and the alkylene group;

and that they are grafted to a non-functionalized polymer of a number average molecular weight of 2,000 to 10,000, at least 60% by weight of which consists of butadiene, the weight percentage of the butadiene-containing polymer being 20 to 200% of that of the (co)polymer and the sum of this percentage and the percentage styrene and/or methyl styrene in the copolymer being higher than or equal to 50, said dispersion containing solid particles having a number average molecular weight in the range of 60,000 to 1,000,000 which dispersion dry at room temperature to yield essentially a smooth film having a high gloss.

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**4,743,644**

**STABILIZED-ALUMINA FILLED THERMOPLASTICS**

**Richard S. Skipper, Cirencester, and Richard J. Penneck, Lechlade, both of England, assignors to Raychem Limited, United Kingdom**

**Continuation of Ser. No. 794,930, Nov. 4, 1985, abandoned, which is a continuation-in-part of Ser. No. 701,457, Feb. 14, 1985, abandoned, which is a continuation of Ser. No. 600,194, Apr. 13, 1984, abandoned, which is a continuation of Ser. No. 405,220, May 5, 1982, abandoned, which is a continuation of Ser. No. 202,698, Oct. 31, 1980, abandoned, said Ser. No. 794,930, is a continuation-in-part of Ser. No. 714,047, Mar. 19, 1985, abandoned, which is a continuation of Ser. No. 600,193, Apr. 13, 1984, abandoned, which is a continuation of Ser. No. 405,227, Aug. 5, 1982, abandoned, which is a continuation of Ser. No. 202,700, Oct. 31, 1980, abandoned. This application Mar. 23, 1987, Ser. No. 30,282**

**Claims priority, application United Kingdom, Nov. 3, 1979, 7938155; Nov. 3, 1979, 7938148; Jul. 12, 1980, 8022866**

**Int. Cl.[4] C08K** *3/22*

**U.S. Cl. 524—437** **36 Claims**

1. A water stabilized polymeric composition suitable for use as electrical insulation comprising (a) a polymer, (b) 5 to 80%, based on the weight of the composition, of a hydrated alumina filler, and (c) a sodium-reactive antimony V compound in an amount effective to improve the water stability of the composiiton, the composition having less than 15% by weight halogen content.

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**4,743,645**

**COMPOSITION FOR MAKING CIRCUIT BOARD SUBSTRATES AND ELECTRICAL CONNECTORS**

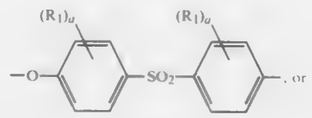
**James E. Harris, Piscataway, and Lloyd M. Robeson, Whitehouse Station, both of N.J., assignors to Amoco Corporation, Chicago, Ill.**

**Continuation of Ser. No. 736,782, May 22, 1985, abandoned, which is a division of Ser. No. 516,863, Jul. 25, 1983, Pat. No. 4,520,067, which is a continuation of Ser. No. 391,422, Jun. 23, 1982, abandoned. This application May 5, 1986, Ser. No. 859,229**

**Int. Cl.[4] C08L** *81/06*

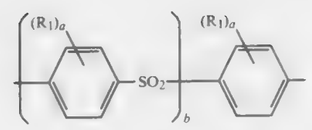
**U.S. Cl. 524—456** **11 Claims**

1. A composition useful for making circuit board substrates and electrical connectors comprising a blend of: (A) from about 40 to about 90 weight percent of a poly(ether sulfone) having repeating units of the following formula:



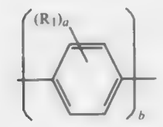
repeating units of the following formula:





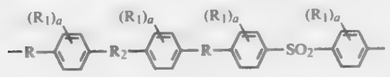
(I)

and

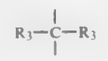


(II)

wherein b is independently an integer of 1 to 3, units (I) and (II) are attached to each other by an —O— bond, and (B) from about 10 to about 60 weight percent of a polysulfone having repeating units of the following formula:



wherein R is selected from O and S, each $R_1$ is independently a halogen atom, an alkyl group of from 1 to 4 carbon atoms and an alkoxy group of from 1 to 4 carbon atoms, a is an integer of 0 to 4 and $R_2$ is a divalent connecting radical of the formula:



wherein $R_3$ is independently selected from lower alkyl, aryl and halogen substituted groups thereof.

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**4,743,646**

**THERMOPLASTIC RESIN COMPOSITION**

**Tetsuji Miura; Koichi Sato, and Norio Yagi, all of Machida, Japan, assignors to Denki Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 12, 1986, Ser. No. 838,819**

**Int. Cl.[4] C08K** *3/04, 3/40;* **C08L** *51/00, 51/08*

**U.S. Cl. 524—504** **8 Claims**

1. A thermoplastic resin composition comprising:

(I) from 40 to 98 parts by weight of a thermoplastic resin comprising:

(A) from 10 to 90% by weight of an imide-modified copolymer obtained by reacting a composition consisting of a polymer and a primary aromatic amine said polymer prepared by copolymerizing (a) from 60 to 100% by weight of a monomer mixture comprising from 40 to 80% by weight of an aromatic vinyl monomer, from 25 to 50% by weight of an unsaturated dicarboxylic acid anhydride and from 0 to 30% by weight of a vinyl monomer copolymerizable therewith, to (b) from 0 to 40% by weight of a rubber polyer component, to convert from 80 to 100 mol % of acid anhydride group in the polymer to imido groups;

(B) from 10 to 90% by weight of a graft copolymer prepared by copolymerizing (a) from 20 to 95% by weight of a monomer mixture comprising from 40 to 80% by weight of an aromatic vinyl monomer, from 0 to 40% by weight of a vinyl cyanide monomer and from 0 to 40% by weight of a vinyl monomer copolymerizable therewith, to (b) from 5 to 80% by weight of a rubber polymer component; and

(C) from 0 to 80% by eight of a copolymer prepared by polymerizing from 40 to 80% by weight of an aromatic vinyl monomer, from 0 to 40% by weight of a vinyl cyanide monomer and from 0 to 40% by weight of a vinyl monomer copolymerizable therewith; and,

(II) from 2 to 60 parts by weight of at least one fiber selected from the group consisting of glass fiber, carbon fiber and aramide fiber.

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**4,743,647**

**PREPREG RESIN FROM AROMATIC BISMALEIMIDE AND ETHYLENICALLY UNSATURATED COREACTANT**

**Linda A. Domeier, Somerville, N.J., assignor to Amoco Corporation, Chicago, Ill.**

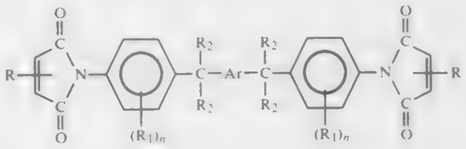
**Division of Ser. No. 761,432, Aug. 2, 1985, Pat. No. 4,654,407. This application Dec. 18, 1986, Ser. No. 944,431**

**Int. Cl.[4] C08F** *122/40*

**U.S. Cl. 524—516** **13 Claims**

1. A composition comprising:

(a) a bismaleimide of the formula:



wherein Ar represents an aromatic nucleus; R is hydrogen, halogen or alkyl and $R_1$ is independently-selected alkyl or halogen groups; $R_2$ represents an alkyl group of from 1 to 12 carbon atoms; and n has a value of from 0 to 4; and

(b) a liquid co-reactant selected from the group consisting of, copolymerizable allylic compounds, copolymerizable vinylic compounds, copolymerizable acrylic compounds, and mixtures thereof.

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**4,743,648**

**NOVEL POLISH COMPOSITIONS**

**Michael P. L. Hill, Hoeilaart, Belgium, and Luc J. R. Vandamme, Barry, Wales, assignors to Dow Corning, Ltd., Barry, Wales**

**Filed Apr. 24, 1986, Ser. No. 855,249**

**Claims priority, application United Kingdom, May 17, 1985, 8512483**

**Int. Cl.[4] C09G** *1/12, 1/16*

**U.S. Cl. 524—731** **7 Claims**

1. A polish composition in the form of a water-in-oil emulsion comprising (1) 30 to 85 percent by weight of a discontinuous phase comprising water, (2) 0.2 to 10 percent by weight of a polydiorganosiloxane-polyoxyalkylene copolymer having the formula

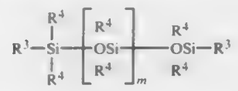
—Z(Me)2SiO{(Me)2SiO}x{(Me)(R)SiO}y{(-Me)(QR')SiO}zSi(Me)2Z—

wherein Me denotes a CH3— radical, Q denotes a polyoxyalkylene radical having the formula — (OCH2CH2)-p(OCHCH3CH2)qOR", R denotes an alkyl radical having from 6 to 16 carbon atoms, R' denotes an alkylene radical linking Q to the silicon atom, R" is selected from a hydrogen atom and an alkyl radical having from 1 to 4 inclusive carbon atoms, Z denotes a monovalent radical selected from the group consisting of hydrocarbon radicals having from 1 to 16 carbon atoms and QR'—radicals, there being an average of at least one QR'—radical and at least one R radical per molecule and the average values of x, y, z, p and q being such that $p \geqq q$, p+q has a value sufficient to provide a radical weight for Q of from 600 to 3500, $x < 3y$, x+y+z has a value of from 30 to 400 and the total weight of Q radicals in the polydiorganosiloxane-polyox-

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yalkylene copolymer does not exceed a value of about ⅓ of the total weight of the polydiorganosiloxane-polyoxyalkylene cpolymer and (3), a continuous phase comprising (a) 1 to 15 percent by weight of a silicone component, which is a substantially linear polydiorganosiloxane represented by the formula



wherein R3 and R4 groups are selected from methyl radicals, alkoxy radicals, alkoxyalkoxy radicals, hydroxy radicals and alkyl radicals, having as substituents attached thereto, at least one group selected from amino and amine salt groups, at least 50% of the total number of the groups being methyl radicals, and m has a value of from 20 to 2000, and (b) 0.5 to 40 parts by weight of a hydrocarbon component with a boiling point between 80° and 250° C., the weight percents being based on the total composition.

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**4,743,649**

## FILMS OF LINEAR ETHYLENE POLYMER AND HIGH IMPACT POLYSTYRENE

**David V. Dobreski, Fairport, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.**

**Filed Sep. 2, 1986, Ser. No. 902,718**
**Int. Cl.[4] C08L** *51/04, 23/18, 23/20*
**U.S. Cl. 525—86** **14 Claims**

**1**. A film comprising a linear copolymer of ethylene and an alpha-olefin having 4 to 10 carbon atoms having a density of less than 0.94 which has blocking tendencies in film form and from 1 up to about 15 weight percent of an impact polymer which is an impact polystyrene or impact poly(para-methylstyrene) containing 1 to 20 weight percent of rubber; said film having reduced blocking compared to a film containing said copolymer of ethylene and the same amount of polystyrene.

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**4,743,650**

## THERMOPLASTIC MOLDING BLENDS OF POLYCARBONATES AND POLYURETHANES

**Omar M. Boutni, Mt. Vernon, Ind., assignor to General Electric Company, Mt. Vernon, Ind.**

**Filed Oct. 31, 1986, Ser. No. 925,680**
**Int. Cl.[4] C08L** *53/00*
**U.S. Cl. 525—92** **9 Claims**

**1**. A thermoplastic resin composition, which consists essentially of;

a thermoplastic, aromatic polycarbonate; and

a thermoplastic, polyurethane resin, characterized by high impact resistance, high flexural modulus, and a heat deflection temperature of at least 50° C. at 18.6 kg/cm$^2$ which comprises the product of reaction of

(a) methylenebis (phyenyl isocyanate);

(b) a polyether triol having an average functionality of at least 1.9, a glass transition temperature (Tg) of less than 20° C., and a molecular weight in the range of about 500 to about 20,000; and

(c) at least one chain extender having a functionality from 2 to 3 and a molecular weight from about 50 to about 400; said polyurethane being further characterized in that the proportion by weight of said polyether triol (b) in said polyurethane is from about 2 to about 25 percent and the overall ratio of isocyanate groups to active hydrogen groups in said reactants employed to prepare said polyurethane is in the range of 0.95:1 to about 1.05:1; said polycarbonate and said polyurethane in admixture together in a weight ratio of from about 65:35 to about 95:5 (polycarbonate: polyurethane).

**4,743,651**

## RESIN COMPOSITION OF POLYPHENYLENE ETHER AND POLYAMIDE

**Nobuhiro Shibuya; Yoshihiro Sobajima, and Hironari Sano, all of Mie, Japan, assignors to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan**

**Filed Nov. 20, 1986, Ser. No. 932,873**
**Claims priority, application Japan, Nov. 26, 1985, 60-265358**
**Int. Cl.[4] C08L** *53/00*
**U.S. Cl. 525—92** **24 Claims**

**1**. A resin composition prepared by melt-kneading a mixture comprising (1) from 50 to 97% by weight, based on the total amount of components (1) and (2), of resin component comprising (a) a polyphenylene ether resin and (b) a polyamide resin, (2) from 3 to 50% by weight, based on the total amount of components (1) and (2), of (c) a block copolymer of an aromatic vinyl compound and butadiene, and (3) from 0.01 to 30 parts by weight, per 100 parts by weight of the total amount of components (1) and (2), of (d) a compound having an unsaturated group and a polar group in the molecule thereof, said polyamide resin (b) being present in an amount of from 30 to 90 parts by weight per 100 parts by weight of the total amount of the polyphenylene ether resin (a) and the polyamide resin (b), and said block copolymer (c) having a Brookfield viscosity of from 600 to 25,000 cps in a 25% by weight toluene solution at 25° C.

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**4,743,652**

## ELASTOMERIC COPOLYMER OF AROMATIC VINYL COMPOUNDS AND BUTADIENE

**Nobuyuki Yoshida, Ichihara; Yasushi Okamoto, Ibaraki; Akio Imai; Tomoaki Seki, both of Ichihara; Hiroshi Furukawa, Ashiya, and Yuichi Saito, Nishinomiya, all of Japan, assignors to Sumitomo Chemical Co., Ltd., Osaka and Sumitomo Rubber Industries, Ltd., Kobe, both of, Japan**

**Continuation of Ser. No. 704,453, Feb. 22, 1985, abandoned. This application Feb. 2, 1987, Ser. No. 5,400**
**Claims priority, application Japan, Feb. 24, 1984, 59-34946**
**Int. Cl.[4] C08F** *8/42*
**U.S. Cl. 525—105** **5 Claims**

**1**. An elastomeric copolymer of an aromatic vinyl compound and butadiene prepared by a solution polymerization method, which has a glass transition temperature of not less then −50° C. and contains polymer chains coupled by an appropriate trifunctional or tetrafunctional coupling agent, and in which 3.5% to 18.6% by weight of all the polymer chains have a molecular weight which is equal to 5 times or more the molecular weight $M_L$ possessed by the highest number of uncoupled polymer chains in the copolymer, said molecular weight $M_L$ being represented by the top of the peak which corresponds to the uncoupled polymer chains in a high performance liquid chromatogram of said elastomeric copolymer.

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**4,743,653**

## TWO COMPONENT POLYURETHANE COATING

**Syuhei Numata, Hirakata; Masanori Ohiwa, Toyonaka; Toshihiro Maekawa, Suita; Akio Kashihara, Hirakata, and Tadafumi Miyazono, Takatsuki, all of Japan, assignors to Nippon Paint Co., Ltd., Osaka, Japan**

**Filed Jun. 12, 1987, Ser. No. 61,208**
**Claims priority, application Japan, Jun. 12, 1986, 61-136964; Jun. 12, 1986, 61-136966**
**Int. Cl.[4] C08G** *75/04*
**U.S. Cl. 525—125** **7 Claims**

**1**. A two component polyurethane coating consisting of a principal component (A) comprising a hydroxyl group containing film-forming resin, crosslinked polymer particles and a solvent for said film-forming resin, and a hardener component (B) comprising a polyisocyanate compound, which is characterized by using as said crosslinked polymer particles the composite resin particles each comprising a particulate crosslinked polymer core and a number of substantially linear polymer chains coupled with said core in either way of chemical bonding, semi-interpenetration or both of them, the solid weight ratio of said hydroxyl group containing film-forming resin to said composite resin particles being 99/1 to 40/60 and the equivalent ratio of isocyanate groups in the hardener component (B) to hydroxyl groups in the principal component (A) (if the linear polymer chains contain hydroxyl groups, the sum of said hydroxyl groups and those of the hydroxyl group containing film-forming resin) being 0.5 to 2.0.



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**4,743,654**

## SINGLE PHASE BLENDS OF POLYCARBONATE AND POLYMETHYL METHACRYLATE

**Thein Kyu, and Jeanne M. Saldanha, both of Akron, Ohio, assignors to University of Akron, Akron, Ohio**

**Filed Nov. 13, 1986, Ser. No. 930,296**
**Int. Cl.[4] C08L** *69/00*
**U.S. Cl. 525—148** **15 Claims**

**1**. A clear, transparent, single phase polymer blend of a polycarbonate and a polyalkyl methacrylate, said blend consisting essentially of from about 10 to about 80 percent by weight of a polycarbonate homopolymer and from about 90 to about 20 percent by weight of polyalkyl methacrylate, wherein said alkyl radical contains from one to about 10 carbon atoms, based on the weight of total polymer solids, said blend having a lower critical solution temperature.

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**4,743,655**

## NARROW MOLECULAR WEIGHT POLYESTER OLIGOMERS AND METHOD OF PREPARATION

**Roy C. Williams, Orchard Park, N.Y., assignor to NL Chemicals, Inc., New York, N.Y.**

**Continuation-in-part of Ser. No. 854,105, Apr. 21, 1986, Pat. No. 4,659,778. This application Apr. 20, 1987, Ser. No. 41,045**
**Int. Cl.[4] C08F** *8/00;* **C08L** *67/00;* **C08G** *63/12*
**U.S. Cl. 525—172** **6 Claims**

**1**. A polyester composition having an average molecular weight of greater than 450 comprising a most prevalent compound having a main polyester chain containing at least 17 and fewer than 52 carbon atoms and at least 6 and fewer than 18 oxygen atoms, at least 40 weight percent of the molecules of said composition having a molecular weight within 50% of the average molecular weight of the composition; less than 50 weight percent of the molecules of the composition having a molcular weight greater than 150% of the average molecular weight of the composition and less than 15 weight percent of the molecules of the composition having a molecular weight less than 50% of the average molecular weight of the composition, said polyester composition containing at least 1.6 equivalents of unreacted hydroxy groups or at least 1.6 equivalents of unreacted carboxy groups per mole; at least 5% of the molecules containing at least one side chain branch resulting from a trimellitic anhydride residue, and said composition containing at least four equivalents of ester links in the main chains of the molecules per mole of composition, said composition containing side groups selected from hydrogen and halogenated and unhalogenated groups attached to the main chain through a carbon atom, each of said unhalogenated side groups containing no more than six carbon atoms and no more than one oxygen atom and each of said halogenated side groups containing no more than nine carbon atoms.

**4,743,656**

## ELASTOMERIC COMPOSITION OF EPDM AND ETHYLENE-NITRILE POLYMERS

**Donald E. Wingrove, Cheshire, Conn., assignor to Uniroyal Chemical Company, Inc., Middlebury, Conn.**

**Continuation-in-part of Ser. No. 703,290, Feb. 20, 1985, which is a continuation-in-part of Ser. No. 624,160, Jun. 25, 1984, abandoned. This application Dec. 12, 1985, Ser. No. 808,208**
**Int. Cl.[4] C08L** *9/02*
**U.S. Cl. 525—211** **18 Claims**

**1**. An elastomeric composition produced by curing a blend comprising:

(A) ethylene/alphaolefin/nonconjugated polyene terpolymer: and

(B) acrylonitrile/conjugated diene copolymer; wherein the weight ratio of component (A) to component (B) is between about 10.90 and about 90:10; employing a curing agent comprising:

(i) between about 0.2 and about 5 grams of sulfur per 100 grams of Components (A) and (B);

(ii) between about 0.1 and about 5 grams per 100 grams of Components (A) and (B) of a sulfur cure accelerator; and

(iii) an amount of a peroxide curative such that between about 0.5 and about 200 gram atoms of sulfur per mole of peroxide are present.

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**4,743,657**

## METHOD FOR PREPARING POLYMER BOUND STABILIZERS MADE FROM NON-HOMOPOLYMERIZABLE STABILIZERS

**John W. Rekers, Spartanburg, S.C., and Gerald Scott, Lichfield, England, assignors to Milliken Research Corporation, Spartanburg, S.C.**

**Filed Mar. 17, 1986, Ser. No. 839,926**
**Int. Cl.[4] C08F** *271/02*
**U.S. Cl. 525—281** **14 Claims**

**1**. A method for preparing a polymer bound stabilizer which comprises reacting a stabilizer precursor molecule containing a reactive double bond with substituents selected from carboxylic acids, esters, amides and imides on the one and two positions which is not readily homopolymerizable with a preformed polymer selected from polyolefin homopolymers and copolymers, rubber modified polyolefins, polystyrene, rubber modified polystyrene, polyvinylchloride, polyamides, polyesters, and acrylonitrile-butadiene-styrene terpolymers in the presence of a free radical.

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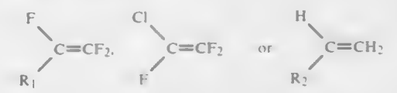
**4,743,658**

## STABLE TETRAFLUOROETHYLENE COPOLYMERS

**John F. Imbalzano, Elkton, Md., and Dewey L. Kerbow, Vienna, W. Va., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Oct. 21, 1985, Ser. No. 789,893**
**Int. Cl.[4] C08F** *8/20, 16/24*
**U.S. Cl. 525—326.4** **5 Claims**

**1**. A melt-fabricable, nonelastomeric, copolymer of recurring units of tetrafluoroethylene, between about 1 and 10 weight percent units of at least one perfluoro(alkyl vinyl)ether where the alkyl group contains 1–8 carbon atoms, which can contain up to about 5 weight percent units of a comonomer selected from the formula



wherein $R_1$ is $-R_f$ or $-R_fX$ in which $R_f$ is a perfluoroalkyl radical of 1–12 carbon atoms, and X is H or Cl; and $R_2$ is $-R_f$ or $-R_f-X$, where $-R_f-$ is a perfluoroalkylene diradical of 1–12 carbon atoms in which the attaching valences are at each

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end of the chain, which copolymer is substantially free of end groups that can react or decompose to emit HF, said copolymer characterized by having

(a) less than 6 endgroups of $—CF_2CH_2OH$, $—CONH_2$ and —COF per $10^6$ carbon atoms and

(b) an extractable fluoride level of 3 ppm or less by weight.

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**4,743,659**

## CHEMICAL MODIFICATION OF POLYDIACETYLENE CRYSTALS

**Daniel J. Sandman, Acton, and Boris S. Elman, Allston, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.**

**Division of Ser. No. 751,631, Jul. 3, 1985, Pat. No. 4,681,920.**
**This application Apr. 17, 1987, Ser. No. 39,244**
**Int. Cl.[4] C08F** *8/22*
**U.S. Cl. 525—356** **2 Claims**

1. A method for preparing crystalline brominated poly-1,6-di-(N-carbazolyl)-2,4-hexadiyne comprising contacting single crystals of poly-1,6-di-(N-carbazolyl)-2,4-hexadiyne with a mixture of liquid bromine and carbon tetrachloride, wherein the mixture contains from 70 to 100 weight percent liquid bromine, for a period of time sufficient to form crystalline brominated poly-1,6-di-(N-carbazolyl) -2,4-hexadiyne having at least two bromine atoms per repeat unit and characterized by a Fourier transform infrared spectrum including absorption at 795±5, 835±5, and 865±5 $cm^{-1}$.

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**4,743,660**

## WATER-DISPERSIBLE QUATERNIZED AMINOAMIDE-MODIFIED WAXES USEFUL AS TEXTILE FINISHING AGENTS

**Bernard Danner, Riedisheim, France, and Eckart Schleusener, Reinach, Switzerland, assignors to Sandoz Ltd., Basel, Switzerland**

**Filed Jul. 10, 1986, Ser. No. 884,164**
**Claims priority, application Fed. Rep. of Germany, Jul. 13, 1985, 3525116**
**Int. Cl.[4] C03C** *19/22;* **B05D** *3/02*
**U.S. Cl. 525—382** **32 Claims**

1. A quaternized aminoamide-modified wax obtainable by amidating, with a polyamine containing a single primary amino group, a carboxy group-containing oxidized hydrocarbon wax which are non-saponified or partially saponified, and quaternizing at least one amino group of the resulting aminoamide-modified wax.

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**4,743,661**

## POLY (PHENYLENE ETHERS) AND THEIR PREPARATION

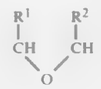
**Konrad Mitulla, Ludwigshafen; Juergen Hambrecht, Heidelberg; Helmut Tesch, Birkenheide; Burghard Schmitt, Worms, and Hansjoachim Maeder, Battenberg, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Continuation of Ser. No. 802,203, Nov. 25, 1985, abandoned.**
**This application Aug. 5, 1986, Ser. No. 892,473**
**Claims priority, application Fed. Rep. of Germany, Dec. 4, 1984, 3444099**
**Int. Cl.[4] C08F** *283/08*
**U.S. Cl. 525—396** **8 Claims**

1. An uncrosslinked polyphenylene ether derivative formed by reacting, at a temperature of between 20 and 250° C.,

(a) a high molecular weight poly(phenylene ether) from a monohydric phenol, which possesses alkyl substituents in the two ortho-positions but not in the para-position and may possess alkyl substituents in the meta-position, and is obtained by an oxidative coupling reaction with oxygen at from 10 to 50° C. in the presence of a catalyst complex of a copper salt and an organic amine, in the presence from 1 to 20 parts by weight of a solvent per part by weight of the monomeric phenol, and in the presence or absence of an activator, and subsequent termination of the reaction and removal of the catalyst component by the addition of sufficient amounts of chelating and/or salt-forming agents, with

(b) an epoxide of the formula (I)



(I)

where $R^1$ and $R^2$ can be identical or different and are each alkyl, cycloalkyl, aryl, aryloxy, alkoxy or carboxyalkyl, each of which may contain a further epoxide group, or $C_3$–$C_{20}$-alkyl-substituted amino, or $R^1$ is hydrogen and $R^2$ is one of the above groups, or $R^1$ and $R^2$ form part of a cycloalkyl ring.

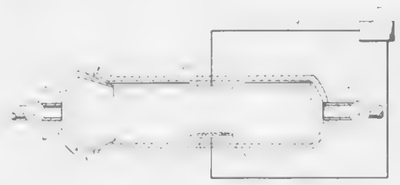
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**4,743,662**

## INFUSIBLE PRECERAMIC POLYMERS VIA PLASMA TREATMENT

**Jonathan Lipowitz, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.**

**Filed Nov. 3, 1986, Ser. No. 926,168**
**Int. Cl.[4] C08F** *283/00;* **C08G** *77/04;* **C04B** *35/56;* **B05D** *3/06*
**U.S. Cl. 525—474** **19 Claims**



1. A method of rendering shaped preceramic polymers infusible prior to pyrolysis, which method comprises treating a shaped preceramic polymer with a plasma of a gas selected from the group consisting of $NH_3$, $N_2$, $H_2$, $H_2O$, $O_2$, $BCl_3$, diborane, silanes, boranes, methylamine, hydrazine, and methane for a time sufficient to render the preceramic polymer infusible wherein the treatment temperature is sufficiently low so that the preceramic polymer remains unfused during the treatment step.

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**4,743,663**

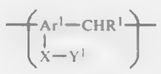
## AROMATIC OLIGOMERS

**Michael E. B. Jones, Chester, and John G. Carey, Appleton, both of England, assignors to Imperial Chemical Industries PLC, London, England**

**Filed May 14, 1985, Ser. No. 733,920**
**Claims priority, application United Kingdom, May 14, 1984, 8412264; Jan. 28, 1985, 8502040**
**Int. Cl.[4] C08F** *283/00;* **C08L** *283/12;* **C08G** *8/04;* **G03C** *1/727*
**U.S. Cl. 525—539** **13 Claims**

1. A composition comprising an oligomer, which is linear or branched, which

(a) comprises on average at least one in-chain residue of the general formula



and;



(b) has one or more pendant and/or terminal acyloxymethyl groups;

wherein $Ar^1$ is an aromatic group or a substituted aromatic group;

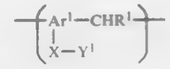
$R^1$ is hydrogen or a hydrocarbyl group;

X is a group which activates $Ar^1$ to electrophilic attack; and

$Y^1$ is an organic residue bearing a carboxyl substituent.

12. A composition comprising an oligomer, which is linear or branched, which

(a) comprises on average at least one in-chain residue of the general formula



and;

(b) has one or more pendant and/or terminal acyloxymethyl groups;

wherein $Ar^1$ is an aromatic group or a substituted aromatic group;

$R^1$ is hydrogen or a hydrocarbyl group;

X is a group which activates $Ar^1$ to electrophilic attack; and

$Y^1$ is an organic residue bearing a carboxyl substituent; and an additional polymerizable olefinically unsaturated monomer which is copolymerizable with said oligomer, the acyloxy group being derived from a polymerisable olefinically unsaturated carboxylic acid.

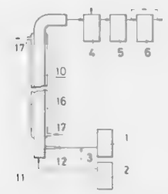
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**4,743,664**

## PROCESS FOR PRODUCING α,β-UNSATURATED CARBOXYLIC ACID POLYMER

**Tadashi Matui, and Hidetaka Tobita, both of Wakayama, Japan**

**Filed Nov. 19, 1986, Ser. No. 932,316**
**Claims priority, application Japan, Nov. 21, 1985, 60-262252**
**Int. Cl.[4] C08F** *4/08, 20/06*
**U.S. Cl. 526—64** **10 Claims**




1. A process for producing a polymer of at least one α,β-unsaturated carboxylic acid or salt thereof wherein (a) at least one monomer comprising one or more α,β-unsaturated carboxylic acids or salts thereof as essential components are polymerized or copolymerized with (b) at least one other hydrophilic monomer copolymerizable with (a),

by supplying (a), (b) and a hydrogensulfite from one side of a reaction column and

simultaneously supplying an oxygen-containing gas concurrently with (a) and (b) to said reaction column to form a film stream of (a) and (b) on the inner wall of said reaction column by means of the gas stream of said oxygen-containing gas to effect polymerization.

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**4,743,665**

## PROCESS FOR PRODUCING α-OLEFIN POLYMERS

**Toshio Sasaki; Masaaki Katao, both of Ichihara; Kiyoshi Kawai, Chiba, and Akinobu Shiga, Ichihara, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan**

**Division of Ser. No. 841,629, Mar. 20, 1986, Pat. No. 4,672,050.**
**This application Jan. 9, 1987, Ser. No. 1,857**
**Claims priority, application Japan, Mar. 25, 1985, 60-59792; Jun. 14, 1985, 60-130572**
**Int. Cl.[4] C08F** *4/64*
**U.S. Cl. 526—119** **1 Claim**

1. A process for producing alpha-olefin polymers which comprises homopolymerizing or copolymerizing alpha-olefins in the presence of a catalyst system comprising:

(A) a solid catalyst component containing a trivalent titanium compound, which is obtained by reducing a titanium compound represented by the general formula $Ti(OR^1)_nX_{4-n}$ (wherein $R^1$ is a hydrocarbon group having 1 to 20 carbon atoms, X is a halogen atom, and n is a number satisfying $0<n\leqq4$) with an organo magnesium compound in the presence of an organo silicon compound having Si—O bonds of the formula:

$Si(OR^3)_mR^4_{4-m}$,

$R^5(R^6SiO)_pSiR^7_3$ or

$(R^8SiO)_q$

(wherein $R^3$ is a hydrocarbon group having 1 to 20 carbon atoms, $R^4$, $R^5$, $R^6$, $R^7$ and $R^8$ are each a hydrocarbon group having 1 to 20 carbon atoms or a hydrogen atom, mm is a number satisfying $0<m\leqq4$, p is an integer of 1 to 1,000, and q is an integer of 2 to 1,000);

and then treating the resulting solid product with a mono- or poly-carboxylic acid ester compound and a mixture of a dialkyl ether compound and titanium tetrachloride;

(B) an organo aluminum compound; and

(C) an organo silicon compound having Si—$OR^2$ bonds which is an alkoxysilane compound represented by the general formula $R^{17}{}_\alpha Si(OR^2)_{4-\alpha}$ (wherein $R^2$ and $R^{17}$ are each a hydrocarbon group having 1 to 20 carbon atoms and α is a number satisfying $0\leqq\alpha\leqq3$) and/or an organic carboxylic acid ester, at a temperature of −30° C. to 200° C. under a pressure of 3 to 100 atm.

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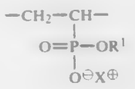
**4,743,666**

## WATER-SOLUBLE COPOLYMERS WITH PENDANT PHOSPHONIC, SULPHONIC AND AMIDE GROUPS

**Friedrich Engelhardt, Frankfurt; Klaus Kühlein, Kelkheim; Juliane Balzer, Frankfurt; Walter Dürsch, Königstein, and Hans-Jerg Kleiner, Kronberg, all of Fed. Rep. of Germany, assignors to Cassella Aktiengesellschaft, Leverkusen am Main, Fed. Rep. of Germany**

**Continuation of Ser. No. 754,354, Jul. 11, 1985, abandoned, which is a continuation of Ser. No. 554,898, Nov. 25, 1983, abandoned. This application Jul. 14, 1986, Ser. No. 885,208**
**Claims priority, application Fed. Rep. of Germany, Dec. 9, 1982, 3245541; Dec. 24, 1982, 3248031**
**Int. Cl.[4] C08F** *230/02*
**U.S. Cl. 526—240** **3 Claims**

1. Water-soluble copolymers containing a statistical distribution of 1–86% by weight of structural units of the formula



9–80% by weight of units of the formula



5-90% by weight of units of the formula



and up to a total of 30% by weight of one or more units of the formulae



wherein
$R^1$ is alkyl having 1 to 4 carbon atoms;
$R^2$ and $R^5$ independently of one another are each hydrogen or methyl;
$R^3$ and $R^4$ independently of one another are each hydrogen, methyl or ethyl, or together $R^3$ and $R^4$ are trimethylene or pentamethylene; and
$X^{\oplus}$ is $H^{\oplus}$ or a cation.

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**4,743,667**

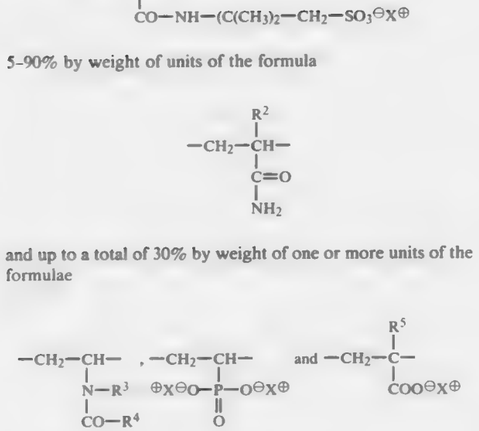
## CONTACT LENS MATERIAL

**Yutaka Mizutani; Tatsuo Harata, both of Nagoya, and Naokatsu Tanahashi, Gifu, all of Japan, assignors to Nippon Contact Lens, Inc., Japan**

**Filed Jul. 22, 1986, Ser. No. 888,924**
**Claims priority, application Japan, Sep. 3, 1985, 60-193139**
**The portion of the term of this patent subsequent to Jul. 22, 2003, has been disclaimed.**
**Int. Cl.[4] C08F** *20/22, 30/08*
**U.S. Cl. 526—245** **9 Claims**

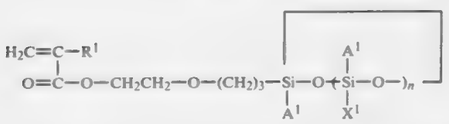
1. An oxygen-permeable, solvent-resistant, dimensionally stable, hard contact lens material consisting essentially of a copolymer formed by free radical polymerization of

(a) at least one multifunctional organosiloxane monomer represented by the formulas:

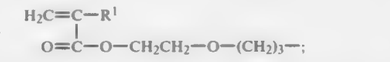


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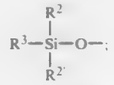
and



wherein "$X^1$"-"$X^7$" are selected from the class consisting of $C_1$-$C_6$ alkyl groups, cyclic alkyl groups, phenyl groups and "Y" groups, at least one of "$X^1$"-"$X^7$" being "Y" group; "Y" is a group of the following structure:

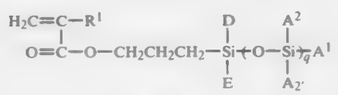


"$R^1$" is hydrogen or methyl radical; "$A^1$"-"$A^{12}$" are selected from the class consisting of $C_1$-$C_6$ alkyl groups, cyclic alkyl groups, phenyl groups and "Z" groups; "Z" is a group of the following structure:

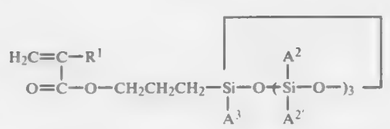


"$R^2$", "$R^{2'}$" and "$R^3$" are selected from the class consisting of $C_1$-$C_6$ alkyl groups, cyclic alkyl groups and phenyl groups; "k", "k'", "l", "l'", "m", "m'" and n are integers from 0 to 10; and mixture thereof,

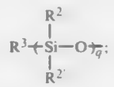
(b) at least one monofunctional organosiloxane monomer represented by the formulas:



and



wherein "$R^1$" is hydrogen or methyl radical; "$A^1$", "$A^2$", "$A^{2'}$" and "$A^3$" are selected from the class consisting of $C_1$-$C_6$ alkyl groups and phenyl groups; "D" and "E" are selected from the class consisting of $C_1$-$C_6$ alkyl groups, phenyl groups and the following groups:



"$R^2$", "$R^{2'}$" and "$R^3$" are selected from the class consisting of $C_1$-$C_6$ alkyl groups and phenyl groups; "q" is an integer from 1 to 3; and mixture thereof,

(c) at least one comonomer selected from the class consisting of $C_1$-$C_{10}$ alkyl, cyclic alkyl or substituted phenyl esters of acrylic, methacrylic acids and itaconate esters and cross-linking agents.



**4,743,668**

## N-ACETOACETYL (METH)ACRYLAMIDE POLYMERS

**Dodd W. Fong, Naperville, and Jeffrey R. Cramm, Winfield, both of Ill., assignors to Nalco Chemical Company, Naperville, Ill.**

**Filed Mar. 17, 1987, Ser. No. 26,599**
**Int. Cl.[4] C08F** *20/58*
**U.S. Cl. 526—304** **8 Claims**

1. A vinyl polymer containing at least 1 mole percent of N-acetoacetylacrylamide monomer.

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**4,743,669**

## ACID CATALYZED ORGANIC REACTIONS

**Donald C. Young, Fullerton, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.**

**Division of Ser. No. 453,496, Dec. 27, 1982, which is a continuation-in-part of Ser. No. 442,296, Nov. 17, 1982, Ser. No. 444,667, Nov. 26, 1982, Ser. No. 331,001, Dec. 15, 1981, Pat. No. 4,402,852, Ser. No. 330,904, Dec. 15, 1981, Pat. No. 4,404,116, Ser. No. 318,629, Nov. 5, 1981, Pat. No. 4,445,925, Ser. No. 318,368, Nov. 5, 1981, Pat. No. 4,447,253, and Ser. No. 318,343, Nov. 5, 1981, Pat. No. 4,397,675. This application Oct. 3, 1985, Ser. No. 783,526**
**The portion of the term of this patent subsequent to Apr. 23, 2002, has been disclaimed.**
**Int. Cl.[4] C08H** *5/04;* **C08F** *20/42;* **B01J** *23/00;* **C08L** *89/00*
**U.S. Cl. 527—200** **13 Claims**

1. A method for carrying out an acid-catalyzed reaction of an organic compound selected from the group consisting of polysaccharides, polyesters, and combinations thereof with a reactant selected from the group consisting of water, alcohols, thiols, and combinations thereof, which method comprises the step of conducting said reaction in the presence of a catalytically active amount of a combination of urea and sulfuric acid comprising the monourea adduct of sulfuric acid, wherein the molar ratio of said urea to said sulfuric acid is about ¼ to less than 2.

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**4,743,670**

## METHOD FOR PRODUCING SILICONE RUBBER POWDER

**Keiji Yoshida; Koji Shimizu, both of Ichihara, and Mitsuo Hamada, Kisarazu, all of Japan, assignors to Toray Silicone Co., Ltd., Tokyo, Japan**

**Filed Sep. 14, 1987, Ser. No. 95,794**
**Claims priority, application Japan, Sep. 22, 1986, 61-224500**
**Int. Cl.[4] C08G** *77/06*
**U.S. Cl. 528—15** **5 Claims**

1. A method for preparing a finely divided cured silicone rubber powder exhibiting a volume resistivity greater than $10^{13}$ ohm-cm, said method comprising (1) forming a dispersion of a heat-curable liquid silicone rubber composition in water maintained at a temperature of from 0° to 25° C. and in the absence of surfactants, (2) dispersing the resultant dispersion into a liquid maintained at a temperature of at least 50° C. to obtain said cured silicone rubber in the form of said finely divided powder, and (3) isolating said powder from said liquid.

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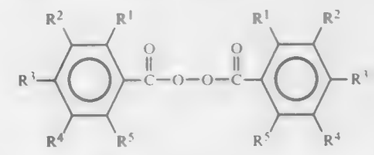
**4,743,671**

## PROCESS AND AGENT FOR CROSS-LINKING ORGANOPOLYSILOXANES

**Maximilian Dorn, Pullach; Erwin Rossberger, Grossdinghartting; Josef Weinmaier, Pullach, and Eberhard Hägel, Icking, all of Fed. Rep. of Germany, assignors to Peroxid-Chemie GmbH, Hoellriegelskreuth, Fed. Rep. of Germany**

**Filed Feb. 10, 1987, Ser. No. 12,989**
**Claims priority, application Fed. Rep. of Germany, Feb. 10, 1986, 3604174; Oct. 7, 1986, 3634171**
**Int. Cl.[4] C08G** *77/06*
**U.S. Cl. 528—24** **17 Claims**

1. A process for cross-linking an organopolysiloxane comprising: admixing with an organopolysiloxane at least one compound of the general formula



(I)

in which the symbols $R^1$, $R^2$, $R^3$, $R^4$, and $R^5$, each independently of one another, means as follows: $R^1$ and $R^5$ are the same or different and signify alkoxycarbonyl radicals with 2 to 4 carbon atoms in the alkyl moiety, fluorine or hydrogen, $R^2$ and $R^4$ are the same or different and signify alkyl radicals with 2 to 8 carbon atoms or hydrogen, $R^3$ signifies an alkyl radical with 1 to 8 carbon atoms or a hydrogen, at least 2 symbols and at most 4 symbols per benzene ring represent hydrogen atoms; and heating the mixture.

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**4,743,672**

## SAG RESISTANT, TWO COMPONENT URETHANE ADHESIVES

**Anil B. Goel, Worthington, Ohio, assignor to Ashland Oil, Inc., Ashland, Ky.**

**Filed Feb. 26, 1987, Ser. No. 19,167**
**Int. Cl.[4] C08G** *18/32*
**U.S. Cl. 528—44** **9 Claims**

1. A two component polyurethane adhesive comprising a first component comprising a polyisocyanate prepolymer and a second component comprising a polyol, a poly(alkylene oxide) polyamine containing two or more primary amine groups and having a molecular weight of from about 400 to about 10,000 and a polyurethane catalyst.

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**4,743,673**

## HYDROPHILIC CARBOXY POLYURETHANES

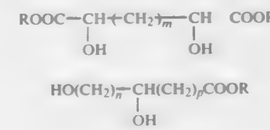
**Christian W. Johnston, and John M. Teffenhart, both of Neshanic Station, N.J., assignors to Tyndale Plains-Hunter, Ltd., Princeton, N.J.**

**Filed Dec. 19, 1986, Ser. No. 944,667**
**Int. Cl.[4] C08G** *18/30*
**U.S. Cl. 528—60** **37 Claims**

1. A hydrophilic polyurethane ester intermediate consisting essentially of the reaction product of

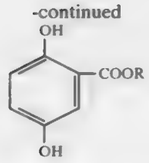
(A) a polyol component comprising at least one of
(a) an alkylene glycol,
(b) a long chain polyoxyalkylene glycol, and
(c) a linear polyester diol derived from the condensation of one or more diols with one or more dibasic acids;

(B) a carboxylic acid ester component comprising at least one of
(a) a hydroxy carboxylic acid ester selected from at least one of



and

-continued



wherein R is an aliphatic group, m and p independently are integers of from 0 to 12, and n is an integer of from 1 to 12; and

(b) an amino acid ester having at least two active hydrogen atoms; and

(C) an organic isocyanate or isocyanate precursor containing at least two NCO groups;

the ratio of NCO to active hydrogen atoms in the reaction mixture being from 0.5/1 to 1/1.

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**4,743,674**

## AROMATIC POLYESTERS, PROCESSES FOR THEIR PREPARATION, AND THEIR USE FOR THE PREPARATION OF MOLECULARLY REINFORCED POLYMERS

**Walter Heitz, Kirchhain; Uwe Kampschulte, Voerde; Ludwig Bottenbruch, Krefeld; Dieter Freitag, Krefeld, and Hans-Rudolf Dicke, Krefeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

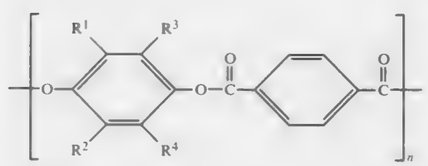
**Filed Dec. 9, 1986, Ser. No. 939,945**

**Claims priority, application Fed. Rep. of Germany, Dec. 18, 1985, 3544694**

**Int. Cl.[4] C08G** *63/60*

**U.S. Cl. 528—176** **5 Claims**

1. Polyesters of the formula (I)



(I)

in which

the radicals $R^1$ and $R^4$, independently of one another, represent hydrogen; an arylalkyl-, arylalkylether-, arylalkylthioether radical having 2, 3, 4, 5, 6, 7, 8, 9 or 10 carbon atoms in the alkyl chain which is unbranched and is substituted on the ω-carbon atom at the end of this chain with an unsubstituted aryl radical containing 6 to 24 carbon atoms and

n represents an integer from 5 to 2000, with the proviso that one of the radicals $R^1$ to $R^4$ must always be other than hydrogen.

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**4,743,675**

## THERMOTROPIC CHOLESTERIC LIQUID CRYSTALLINE POLYPEPTIDE COMPRISING ALPHA-BENZYL GLUTAMATE-ALPHA-ALKYL GLUTAMATE COPOLYMER

**Junji Watanabe, Yokohama, Japan, assignor to Nippon Oil Company, Limited, Tokyo, Japan**

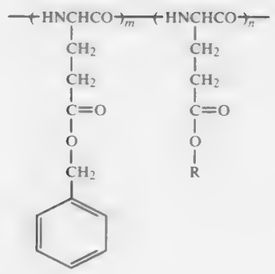
**Filed May 28, 1986, Ser. No. 868,285**

**Claims priority, application Japan, Jun. 10, 1985, 60-124367**

**Int. Cl.[4] C08G** *69/10*

**U.S. Cl. 528—328** **2 Claims**

1. A thermotropic cholesteric liquid crystalline γ-benzyl glutamate-γ-alkyl glutamate copolymer consisting essentially of repeating units represented by the general formula (I)



(I)

wherein;

R is $C_{10-30}$ alkyl group, m and n are $50<m+n<2,000$ and $m/n=70–40/30–60$, and benzyl ester unit and alkyl ester unit are either both L-forms or both D-forms.

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**4,743,676**

## METHOD FOR PREPARING POLYCARBONATE OF CONTROLLED MOLECULAR WEIGHT FROM AROMATIC BISCHLOROFORMATE

**James M. Silva, Clifton Park, N.Y., and Robert A. Pyles, Evansville, Ind., assignors to General Electric Company, Schenectady, N.Y.**

**Filed May 7, 1987, Ser. No. 46,768**

**Int. Cl.[4] C08G** *63/62*

**U.S. Cl. 528—371** **20 Claims**

1. A method for preparing a linear aromatic polycarbonate of controlled molecular weight which comprises the steps of:

(A) reacting an aromatic bischloroformate composition with a monohydroxyaromatic compound or salt thereof in an essentially phosgene-free reaction system also comprising water, a substantially inert, substantially water-insoluble organic liquid and an alkali or alkaline earth metal base, to produce a partially capped bischloroformate composition; and

(B) contacting said partially capped bischloroformate composition with an interfacial polycarbonate formation catalyst and an aqueous alkali metal or alkaline earth metal base to form said linear aromatic polycarbonate.

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**4,743,677**

## CALCITONIN GENE RELATED PEPTIDE DERIVATIVES

**Toshiharu Noda, Shizuoka; Nobutaka Fujii, Hirakata; Kaoru Morita, and Masayuki Hori, both of Shizuoka, all of Japan, assignors to Toyo Jozo Co., Ltd., Tagata, Japan**

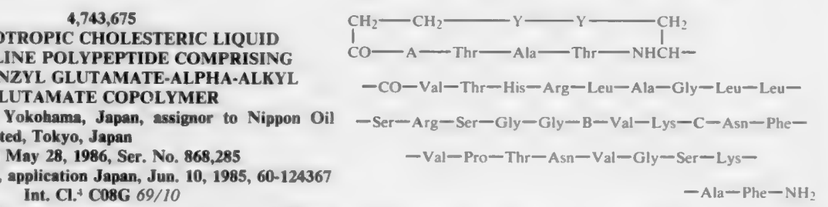
**Filed Aug. 5, 1986, Ser. No. 893,267**

**Claims priority, application Japan, Aug. 9, 1985, 60-175340**

**Int. Cl.[4] C07K** *7/36*

**U.S. Cl. 530—307** **3 Claims**

1. A peptide represented by the following formula:



wherein Y means a sulfur atom or methylene group, A stands for Asp or Asn, B denotes Val or Met and C is Asn or Ser, or a salt thereof.



**4,743,678**

## METHOD AND PRODUCTS FOR DETECTION OF HUMAN T CELL LEUKEMIA VIRUS

**Myron E. Essex, Sharon, and Tun-Hou Lee, Newton, both of Mass., assignors to President and Fellows of Harvard College, Cambridge, Mass.**

**Continuation-in-part of Ser. No. 489,187, Apr. 27, 1983, abandoned. This application Apr. 13, 1984, Ser. No. 598,673**

**Int. Cl.[4] C07K** *15/04*

**U.S. Cl. 530—350** **2 Claims**

1. An essentially purified and essentially isolated human T-cell leukemia virus type I envelope glycoprotein having a molecular weight of approximately 61,000–65,000 daltons, of which approximately 46,000–48,000 daltons is the unglycosylated moiety, said glycoprotein being present in cells infected with human T-cell leukemia virus.

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**4,743,679**

## PROCESS FOR PRODUCING HUMAN EPIDERMAL GROWTH FACTOR AND ANALOGS THEREOF

**Charles M. Cohen, Medway, Mass., and Roberto Crea, Bulingame, Calif., assignors to Creative Biomolecules, Inc., Hopkinton, Mass.**

**Filed Feb. 24, 1986, Ser. No. 832,337**

**Int. Cl.[4] C07K** *13/00, 7/10;* **C12N** *15/00*

**U.S. Cl. 530—350** **6 Claims**

1. A fused peptide compound having the formula:

X-Glu-EGF

wherein X is a leader sequence oligopeptide which serves to promote expression of said fused peptide compound in a selected cellular host, Glu is a linking glutamyl residue, and EGF is the amino acid sequence of an epidermal growth factor or an active analog thereof comprising between 42 and 53 amino acids, wherein the sequence of the first 42 amino acids of said analog is homologous with that of a native epidermal growth factor, said EGF being attached at its N-terminal end to said linking Glu residue, and said linking Glu residue being attached to the C-terminal end of said leader sequence oligopeptide, said peptide compound being cleavable by Staph A protease to separate X from EGF to produce an active EGF having at least 42 amino acids.

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**4,743,680**

## METHOD FOR PURIFYING ANTIHEMOPHILIC FACTOR

**Rita W. Mathews, and Alan J. Johnson, both of New York, N.Y., assignors to New York University, New York, N.Y.**

**Filed Feb. 1, 1985, Ser. No. 697,267**

**Int. Cl.[4] C07G** *7/00;* **A61K** *35/14, 35/16;* **C07K** *3/20*

**U.S. Cl. 530—383** **24 Claims**

1. In a process for purifying a protein that has antihemophilic factor activity by column chromatography in a column behaving predominantly as an ion-exchange chromatography column comprising the stages of:

(a) equilibrating said chromatography column;

(b) loading a sample containing said protein on said column, causing said protein to adsorb onto said column;

(c) washing said column;

(d) eluting said adsorbed protein from said column by causing it to desorb from said column; and

(e) recovering said protein in purified form; the improvement comprising the step of:

adding to the column a substance consisting essentially of an effective amount for selectively increasing the electrostatic forces on the surface of said protein and concomitantly decreasing the hydrophobicity of said protein of a hydration additive selected from the group consisting of sugars and polyhydric alcohols during at least one of said stages (a), (b), and (c) thereby promoting the adsorption of said protein on said column.

**4,743,681**

## HYBRID CELL LINE FOR PRODUCING MONOCLONAL ANTIBODY TO A HUMAN T CELL ANTIGEN, ANTIBODY, AND METHODS

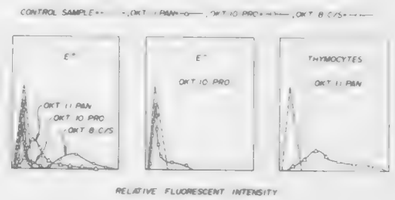
**Patrick C. Kung, Bridgewater, and Gideon Goldstein, Short Hills, both of N.J., assignors to Ortho Pharmaceutical Corporation, Raritan, N.J.**

**Division of Ser. No. 432,457, Oct. 4, 1982, Pat. No. 4,614,720, which is a division of Ser. No. 110,510, Jan. 8, 1980, Pat. No. 4,364,937. This application Aug. 29, 1984, Ser. No. 645,197**

**The portion of the term of this patent subsequent to Dec. 21, 1999, has been disclaimed.**

**Int. Cl.[4] C12P** *21/00;* **C12N** *15/00;* **A61K** *39/395;* **C07K** *15/04*

**U.S. Cl. 530—387** **4 Claims**




1. Mouse monoclonal antibody which reacts with a same antigen as the monoclonal antibody produced at ATCC CRL8027.

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**4,743,682**

## METHODS FOR CONTROLLING THE VISCOSITY OF PROTEIN HYDROLYSATES

**Eldon C. Lee, New Milford, Conn., assignor to Nestec S.A., Vevey, Switzerland**

**Continuation of Ser. No. 675,435, Nov. 27, 1984, Pat. No. 4,668,772. This application Dec. 31, 1986, Ser. No. 948,243**

**The portion of the term of this patent subsequent to May 26, 2004, has been disclaimed.**

**Int. Cl.[4] C07K** *1/12, 3/10;* **C09H** *9/00*

**U.S. Cl. 530—407** **2 Claims**

1. A method for decreasing the viscosity of a protein hydrolysate which comprises reducing the calcium content of the protein hydrolysate.

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**4,743,683**

## IMIDAZOLE AZO DYES

**Paul Tschopp, Düdingen, Switzerland, assignor to Ciba-Geigy AG, Basel, Switzerland**

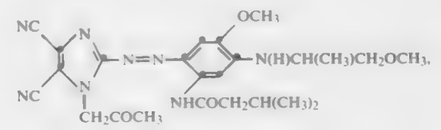
**Division of Ser. No. 757,550, Jul. 19, 1985, Pat. No. 4,661,437. This application Dec. 3, 1986, Ser. No. 938,986**

**Claims priority, application Switzerland, Jul. 27, 1984, 3659/84**

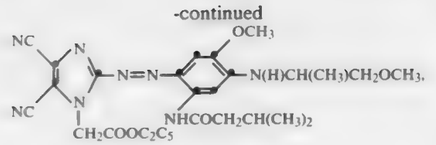
**Int. Cl.[4] C07C** *107/00;* **C09B** *29/036, 29/09, 29/24*

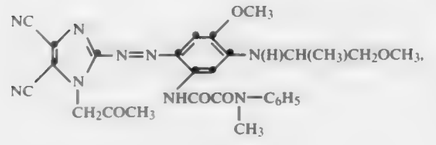
**U.S. Cl. 534—753** **1 Claim**

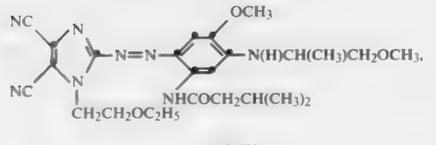
1. A compound of the formula

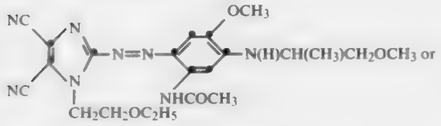


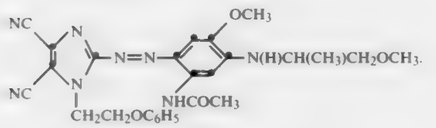
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**4,743,685**

**2-OXO-1-[[(SUBSTITUTED SULFONYL)AMINO]CARBONYL]AZETIDINES**

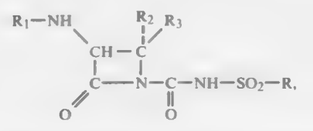
**Hermann Breuer, Schoenhofen; Uwe D. Treuner, Etterzhausen, both of Fed. Rep. of Germany; William H. Koster, Pennington, and Robert Zahler, Princeton, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.**

**Continuation-in-part of Ser. No. 780,479, Sep. 26, 1985, abandoned. This application Sep. 15, 1986, Ser. No. 907,441**

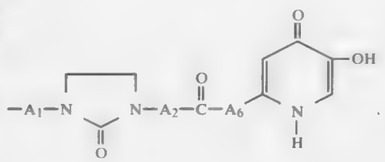
**Int. Cl.**[4] **C07D** *401/12, 401/14, 417/14;* **A61K** *31/425*

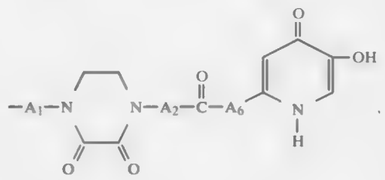
**U.S. Cl. 540—363** **26 Claims**

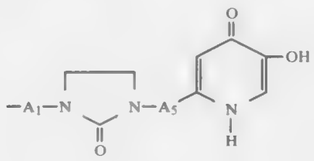
1. A compound having the formula



or a pharmaceutically acceptable salt thereof wherein R is







atom; Y represents a group shown by $—NR^4R^5$ when (B) represents an oxygen atom (wherein $R^4$ and $R^5$ each represents a hydrogen atom, an alkyl group which may be substituted with an alkoxy group, a phenoxy group, a halogen atom, an alkoxycarbonyl group, a cyano group or a tetrahydrofuryl group, an alkenyl group, a cyclohexyl group, an aryl group, an aralkyl group, or as $—NH^4R^5$, a 5-membered or 6-membered nitrogen-containing heterocyclic ring formed by bonding $R^4$ and $R^5$), or Y represents a group shown by $—OR^6$ when (B) represents a group shown by —NH— (wherein $R^6$ represents a hydrogen atom, or an alkyl group); Z represents a metal atom, or an amine base; l represents a real number of 0 to 0.2; m represents a real number of 1 to 4; and n represents a real number of 0 to 2.

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**4,743,684**

**REACTIVE PHTHALOCYANINE DYES**

**Toshio Niwa, Kanagawa; Kiyoshi Himeno, Fukuoka; Toshio Hihara, and Kanzi Shimizu, both of Kanagawa, all of Japan, assignors to Mitsubishi Chemical Industries, Tokyo, Japan**

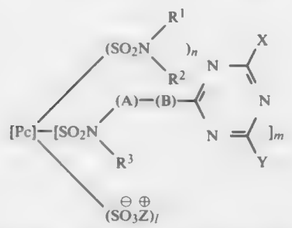
**Filed Aug. 16, 1985, Ser. No. 766,312**

**Claims priority, application Japan, Aug. 16, 1984, 59-170741**

**Int. Cl.**[4] **C09B** *47/04*

**U.S. Cl. 540—126** **20 Claims**

1. A reactive phthalocyanine dye which is substantially water-insoluble and is represented by general formula (I)

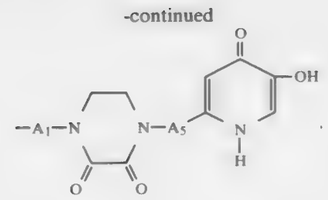


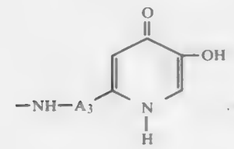
(I)

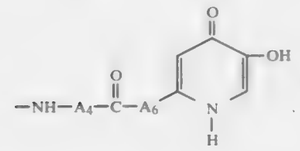
wherein [Pc] represents a copper phthalocyanine residue or a nickel phthalocyanine residue; $R^1$, $R^2$, and $R^3$ each represents a hydrogen atom, an alkyl group which may be substituted with an alkoxy group, a phenoxy group, a halogen atom, an alkoxycarbonyl group, a cyano group or a tetrahydrofuryl group, a cyclohexyl group, an allyl group, or a phenyl group which may be substituted with a lower alkyl group; (A) represents an alkylene group, a phenylene group, or a group shown by $—R^7—O—R^8—$ (wherein $R^7$ and $R^8$ each represents an alkylene group); (B) represents an oxygen atom, or a group shown by —NH—; X represents a fluorine atom, or a chlorine



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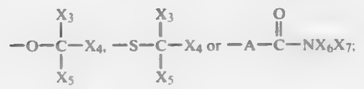




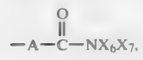


$R_1$ is an acyl group derived from a carboxylic acid;

$R_2$ and $R_3$ are the same or different and each is hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, phenyl, substituted phenyl or a 4, 5, 6 or 7- membered heterocycle or one of $R_2$ and $R_3$ is hydrogen and the other is azido, halomethyl, dihalomethyl, trihalomethyl, alkoxycarbonyl, 2-phenylethyenyl, 2-phenylethynyl, carboxyl, $—CH_2X_1$, $—S—X_2$, $—O—X_2$,



$X_1$ is azido, amino, hydroxy, carboxyl, alkoxycarbonyl, alkanoylamino, phenylcarbonylamino, (substituted pheynyl) carbonylamino, alkylsulfonyl-oxy, phenylsulfonyloxy, (substituted phenyl)-sulfonyloxy, phenyl, substituted phenyl, cyano,



$—S—X_2$, or $—O—X_2$;

$X_2$ is alkyl, substituted alkyl, phenyl, substituted phenyl, phenylalkyl, (substituted phenyl) alkyl, alkanoyl, phenylalkanoyl, (substituted phenyl) alkanoyl, phenylcarbonyl, (substituted phenyl) carbonyl, or heteroarylcarbonyl;

one of $X_3$ and $X_4$ is hydrogen and the other is hydrogen or alkyl, or $X_3$ and $X_4$ when taken togehter with the carbon atom to which they are attached form a cycloalkyl group;

$X_5$ is formyl, alkanoyl, phenylcarbonyl, (substittuted phenyl) carbonyl, phenylalkylcarbonyl, (substituted phenyl)alkylcarbonyl, carboxyl, alkoxycarbonyl, aminocarbonyl, (substituted amono) carbonyl, or cyano;

$X_6$ and $X_7$ are the same or different and each is hydrogen, alkyl, phenyl or substituted phenyl, or $X_6$ is hydrogen and $X_7$ is amino, substituted amino, alkanoylamino or alkoxy, or $X_6$ and $X_7$ when taken together with the nitrogen atom to which they are attached form a 4, 5, 6 or 7-membered heterocycle;

A is $—CH=CH—$, $—(CH_2)_m—$, $—(CH_2)_m—O—$, $—(CH_2)_m—NH—$or $—CH_2—S—CH_2—$;

m is 0, 1 or 2;

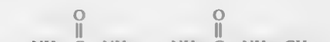
$A_1$ is a single bond,

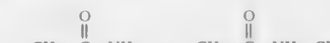


$A_2$ is a single bond, —NH—, $—CH_2—CH_2—NH—$, or



$A_3$ is $—(CH_2)_p—$,





$A_4$ is —NH—, $—(CH_2)_p—$, $—(CH_2)_y—NH—$,



$A_5$ is a single bond, $—CH_2—$, $—NH—CH_2—$, —N=CH—, or



$A_6$ is a single bond, $—CH=CH—$ or $—(CH_2)_t—$;

p is 0 or 1;

y is 2, 3 or 4;

q is 0 or 1;

t is 1, 2, 3 or 4; and

X is hydrogen, carboxyl or carbamoyl;

wherein the term "substituted alkyl" refers to alkyl groups substituted with azio, amino, halogen, hydroxy, carboxy, cyano, alkoxycarbonyl, aminocarbonyl, alkanoyloxy, alkoxy, phenyloxy, (substituted phenyl)oxy, mercapto, alkylthio, phenylthio, (substituted phenyl)thio, alkylsulfinyl or alkylsulfonyl groups;

the term "substituted phenyl" refers to a phenyl group substituted with 1, 2 or 3 amino, halogen, hydroxyl, trifluoromethyl, alkyl of 1 or 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, alkanoyloxy, aminocarbonyl, or carboxy groups;

the term "substituted amino" refers to a group having the formula $—NX_8X_9$ wherein $X_8$ is hydrogen, alkyl, phenyl, substituted phenyl, phenylalkyl or (substituted phenyl)alkyl, and $X_9$ is alkyl, phenyl, substituted phenyl, phenylalkyl, (substituted phenyl) alkyl, hydroxy, cyano, alkoxy, phenylalkoxy or amino;

the term "heteroaryl" refers to pyridinyl, furanyl, pyrrolyl, thienyl, 1,2,3-triazolyl, 1,2,4-triazolyl, imdazolyl, thiazolyl, thiadiazolyl, pyrimidinyl, oxazolyl, triazinyl, teterazol, tetrazolyl or one of the above groups substituted with one or more halogen, hydroxy, nitro, amino, cyano, trifluoromethyl, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, alkylsulfonyl, phenyl, substituted phenyl, 2-furfurylideneamino, benzylideneamino, or substituted alkyl wherein the alkyl group has 1 to 4 carbon atoms, groups;

the term "a 4,5,6, or 7-membered heterocycle" refers to pyridinyl, furanyl, pyrrolyl, thienyl, 1,2,3-triazolyl, 1,2,4-triazolyl, imidazolyl, thiazolyl, thiadiazolyl, pyrimidinyl, oxazolyl, triazinyl, teterazolyl, azetidinyl, oxetanyl, thietanyl, piperidinyl, piperazinyl, imidazolylidinyl, oxazolidi-

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nyl, pyrrolidinyl, tetrahydropyrimidinyl, dihydrothiazolyl or hexahydroazepinyl or one of the above groups substituted with one or more oxo, halogen, hydroxy, nitro, amino, cyano, trifluorometehyl, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, alkylsulfonyl, phenyl, substituted phenyl, 2-furfurylideneamino, benzylideneamino, or substituted alkyl wherein the alkyl group has 1 to 4 carbon atom, groups.

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**4,743,686**

## PROCESS FOR THE ISOMERIZATION OF ASOCAINOL

**Wolfram Geibel, Emmendingen, and Wolfgang Herrmann, Merzhausen, both of Fed. Rep. of Germany, assignors to Godecke Akt., Berlin, Fed. Rep. of Germany**

**Filed Nov. 17, 1986, Ser. No. 931,118**

**Claims priority, application Fed. Rep. of Germany, Nov. 28, 1985, 3541994**

**Int. Cl.**[4] **C07D** *313/00*

**U.S. Cl. 540—479** **7 Claims**

1. A process for the isomerization of asocainol isomers at the six position which comprises:

(a) dissolving asocainol isomers in an acid selected from the group consisting of hydrochloric acid, sulphuric acid, phosphoric acid, boric acid, trifluoroacetic acid, and acetic acid, with or without a polar solvent;

(b) adding a catalytic amount of from 1 to 50 Mol% of a salt selected from the group consisting of lithium chloride, sodium chloride, lithium bromide, sodium bromide, potassium chloride, and potassium bromide and an oxidation agent selected from the group consisting of air, hydrogen peroxide or a peracid or a salt with oxidizing activity selected from the group consisting of a cupric or ferric salt to the solution;

(c) heating the above solution to between 60° to 118° C. to give isomerization of 55 to 65% of (+)-asocainol and 35 to 45% of R,S-asocainol.

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**4,743,687**

## PYRIDAZO (1,2-A) (1,2) DIAZEPINE DERIVATIVES

**Geoffrey Lawton, Hitchin, and Sally Redshaw, Stevenage, both of England, assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

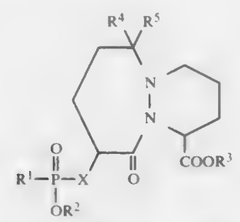
**Filed Jun. 23, 1986, Ser. No. 877,085**

**Claims priority, application United Kingdom, Jul. 1, 1985, 8516604; Apr. 18, 1986, 8609591**

**Int. Cl.**[4] **C07D** *487/04, 237/04;* **A61K** *31/50, 31/55*

**U.S. Cl. 540—487** **21 Claims**

1. A compound of the formula



I

wherein $R^1$ is hydroxy, alkyl, aralkyl, aralkoxy-alkyl, hydroxyalkyl, amino-alkyl, acylamino-alkyl, monoalkylamino-alkyl, dialkylamino-alkyl, alkoxycarbonylamino-alkyl, halo-alkyl, carboxy-alkyl, alkoxycarbonyl-alkyl, alkoxy or aralkoxy; $R^2$ and $R^3$ each are hydrogen, alkyl or aralkyl; $R^4$ and $R^5$ each are hydrogen or $R^4$ and $R^5$ together are oxo; and X is oxygen, $—NR^6—$ or $—(CH_2)_n—$; $R^6$ is hydrogen, alkyl or aralkyl; and n is zero, 1 or 2,

and racemates, enantiomers, diastereoisomers or pharmaceutically acceptable salts thereof.

**4,743,688**

## POLY-2,2,6,6-TETRAMETHYL PIPERIDYL AMINO SPIRO GLYCOL ETHER-1,3,5-TRIAZINES

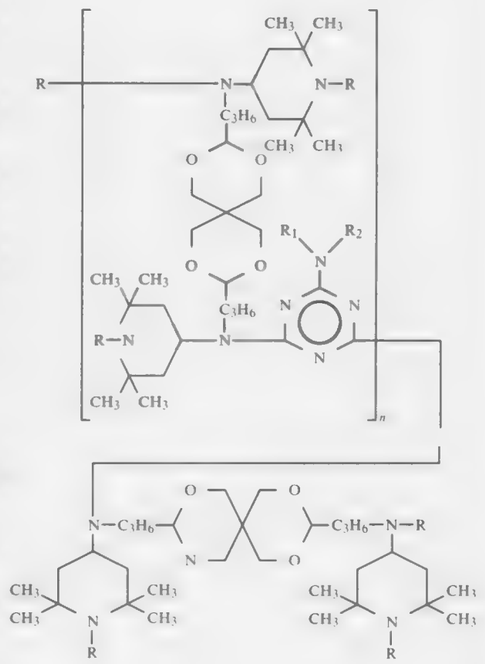
**Motonobu Minagawa, Koshigaya; Yutaka Nakahara, Okegawa; Toshihiro Shibata, Omiya, and Etsuo Tobita, Urawa, all of Japan, assignors to Adeka Argus Chemical Co., Ltd., Urawa, Japan**

**Filed Sep. 2, 1986, Ser. No. 902,380**

**Int. Cl.**[4] **C07D** *251/54*

**U.S. Cl. 544—113** **14 Claims**

1. Poly 2,2,6,6-tetramethyl piperidyl amino spiro glycol ether-1,3,5-triazines having the formula:



in which:

R is selected from the group consisting of hydrogen, alkyl having from one to about eighteen carbon atoms, hydroxyalkyl having from two to about six carbon atoms; epoxyalkyl having from three to about eight carbon atoms; alkaryl having from seven to about eighteen carbon atoms; acyl having from two to about eight carbon atoms; and oxyl;

each of $R_1$ and $R_2$ is selected from the group consisting of hydrogen, alkyl having from one to about eighteen carbon atoms; hydroxyalkyl having from two to six carbon atoms; alkoxyalkyl having a total of from three to eight carbon atoms; dialkylaminoalkyl containing a total of up to ten carbon atoms; aryl and alkylaryl having from six to twenty-four carbon atoms and alkylene forming a heterocyclic ring including the nitrogen atom in the ring and having from four to seven carbon atoms and no or one oxygen atom; and

n is a number from 2 to about 40 representing the average number of units enclosed by the brackets.



**4,743,689**

## ANTIBIOTIC DERIVATIVE OF ADENINE

**Nobuyoshi Shimada, Tokyo; Shigeru Hasegawa, Saitama; Takashi Harada; Takayuki Tomizawa, both of Tokyo, and Akio Fujii, Kanagawa, all of Japan, assignors to Nippon Kayaku Kabushiki Kaisha, Tokyo, Japan**

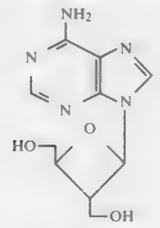
**Filed Nov. 8, 1985, Ser. No. 796,114**

**Claims priority, application Japan, Nov. 20, 1984, 59-243172**

**Int. Cl.**[4] **C07D** *473/34;* **A61K** *31/52*

**U.S. Cl. 544—277** **1 Claim**

1. An antibiotic NK84-0218 of the formula:



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**4,743,690**

## NITROARYL CARBONYL COMPOUNDS, NITRODIHYDROARYL CARBONYL INTERMEDIATES THERETO, AND PROCESSES

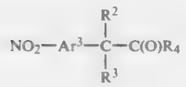
**Thaliyil V. Rajanbabu, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Division of Ser. No. 606,631, May 3, 1984, Pat. No. 4,659,862. This application Jan. 16, 1987, Ser. No. 3,960**

**Int. Cl.**[4] **C07C** *87/127*

**U.S. Cl. 546—147** **19 Claims**

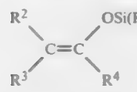
1. A process for making a nitroaryl carbonyl compound of the formula



comprising (a) mixing a nitroaryl compound of the formula

$Ar'NO_2$

with a silane of the formula



under anhydrous conditions: (b) cooling the mixture to a temperature below about −20° C.; (c) adding a flouride-containing compound that will provide flouride ions under reaction conditions, said compound selected from tris(dialkylamino)sulfonium difluorotrimethylsilicate and n-butylammonium flouride; (d) adding bromine as an electrophilic compound; and (e) heating the mixture; wherein:

$R^1$, individually, is $C_{1-4}$ alkyl or phenyl, provided that no more than one of $R^1$ is phenyl;

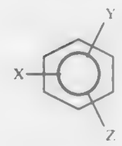
$R^2$ and $R^3$, individually, are H, $C_{1-12}$ hydrocarbyl, $C_{2-12}$ heteroacyclic radical or $C_{3-8}$ heterocyclic radical, wherein the heteroatoms are selected from ether oxygen and tertiary nitrogen;

$R^4$ is $C_{1-12}$ hydrocarbyl or $C_{1-12}$ hydrocarbyloxy; or

$R^3$ and $R^4$ can be taken together to form a member of the group $CH_2CH_2O$, $(CH_2)_n$, and $CH_2CH_2N(CH_3)CH_2$ when $R^2$ is H;

n is 4, 5, or 6;

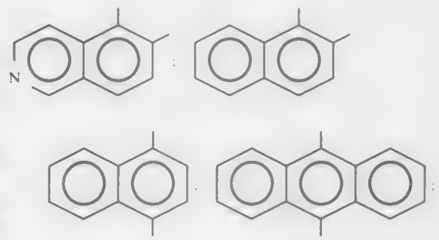
Ar' is an aryl radical selected from 6-aza-1-naphthyl; 1-naphthyl; 9anthryl; and

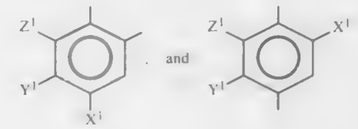


wherein:

X, Y, and Z are independently selected from H, F, Cl, Br, $CF_3$, CN, benzoyl, pyridyl, $R^5$, $OR^5$, and $CO_2R^6$; provided that when two or more of X, Y, and Z are other than H, they are independently selected from F, Cl, Br, $CH_3$, $C_2H_5$, and $OR^7$; and that when X, Y, and Z are all other than H; one of each of said groups are located ortho, meta and para to $NO_2$, or two of said groups are ortho and one is meta to $NO_2$;

$Ar^3$ is a divalent radical selected from





and



wherein:

$X^1$, $Y^1$, and $Z^1$ are independently selected from H, F, Cl, Br, $CF_3$, CN, benzoyl, pyridyl, $R^5$, $OR^5$, and $CO_2R^6$; provided that when two or more of $X^1$, $Y^1$, and $Z^1$ are other than H, they are independently selected from F, Cl, Br, $CH_3$, $C_2H_5$, and $OR^7$;

$R^5$ is $C_{1-12}$ hydrocarbyl optionally substituted with Cl, $OCH_3$, or $CO_2R^6$;

$R^6$ is $C_{1-4}$ alkyl; and

$R^7$ is $C_{1-4}$ alkyl.

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**4,743,691**

## 2-HALOMETHYL DERIVATIVES OF 2-AMINO ACIDS

**Philippe Bey, Strasbourg, and Michel Jung, Illkirch-Graffenstaden, both of France, assignors to Merrell Dow France et Cie, Strasbourg, France**

**Continuation-in-part of Ser. No. 53,937, Jul. 2, 1979, abandoned, which is a continuation of Ser. No. 814,765, Jul. 11, 1977, abandoned. This application Jun. 25, 1982, Ser. No. 392,052**

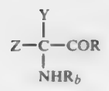
**Int. Cl.**[4] **C07C** *101/24;* **C07D** *211/76*

**U.S. Cl. 546—243** **14 Claims**

1. A compound of the formula:

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wherein:

Z is γ-guanidinopropyl or $R_aNH(CH_2)_n$— wherein $R_a$ is hydrogen, $(C_1–C_4)$alkylcarbonyl, or the group



wherein $R_1$ is $(C_1–C_4)$alkyl, benzyl, or p-hydroxybenzyl;

Y is $—CH_2F$ or $—CH_2Cl$;

$R_b$ is hydrogen or $(C_1–C_4)$alkylcarbonyl; and

R is hydroxy or $(C_1–C_8)$alkoxy;

or a pharmaceutically acceptable salt thereof; or an individual optical isomer thereof; with the provisos that:

(a) when Z is γ-guanidinopropyl, Y is $—CH_2F$, $R_b$ is hydrogen, and R is hydroxy;

(b) when Y is $—CH_2Cl$, Z is $R_aNH(CH_2)_n$— wherein $R_a$ is hydrogen and n is 3 or 4, and $R_b$ is hydrogen; and

(c) when $R_b$ is $(C_1–C_4)$alkylcarbonyl, Z is $R_aNH(CH_2)_n$— wherein $R_a$ is hydrogen and n is 3 or 4, and R is hydroxy.

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**4,743,692**

**N-(PYRIDINYLALKYL)-THIENO-OR BENZO-ISOTHIAZOL-3-AMINE DERIVATIVES**

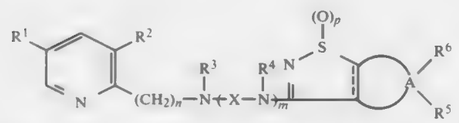
**Daniel M. Teller, Devon; Donald P. Strike, St. Davids; Arthur A. Santilli, Havertown, and Guy A. Schiehser, Malvern, all of Pa., assignors to American Home Products Corporation, New York, N.Y.**

**Filed Sep. 30, 1986, Ser. No. 913,876**

**Int. Cl.[4] C07D** *513/04*

**U.S. Cl. 546—270** **14 Claims**

1. A compound of formula:



in which

A is a 3,4-; 3,2-; or 2,3-fused thieno-moiety or a benzo-moiety;

X is alkylene of 2 to 5 carbon atoms;

$R^1$ is hydrogen, bromo or methyl;

$R^2$ is methoxy when $R^1$ is hydrogen, methyl when $R^1$ is bromo, and bromo when $R^1$ is methyl;

$R^3$ is hydrogen or alkyl of 1 to 6 carbon atoms;

$R^4$ is hydrogen or alkyl of 1 to 6 carbon atoms;

$R^5$ is hydrogen when A is thieno, and when A is benzo $R^5$ is hydrogen, alkyl of 1 to 6 carbon atoms, halo or alkoxy of 1 to 6 carbon atoms;

$R^6$ is hydrogen when A is thieno, and when A is benzo $R^5$ is hydrogen, alkyl of 1 to 6 carbon atoms, halo, alkoxy of 1 to 6 carbon atoms, amino, nitro, sulfamoyl or pyridinyl;

m is one of the integers 0 or 1;

n is one of the integers 3, 4 or 5;

p is one of the integers 0, 1 or 2; and

the dotted line in the thiazole ring represents unsaturation necessary to complete the 3,2- or 2,3- thieno-ring;

or a pharmaceutically acceptable salt thereof.

**4,743,693**

**PROCESS FOR THE PREPARATION OF A STABLE MODIFICATION OF TORASEMIDE**

**Fritz Topfmeier, Heidelberg, and Gustav Lettenbauer, Lampertheim, both of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany**

**Filed Aug. 11, 1986, Ser. No. 895,355**

**Claims priority, application Fed. Rep. of Germany, Aug. 17, 1985, 3529529**

**Int. Cl.[4] C07D** *213/70;* **A61K** *31/44*

**U.S. Cl. 546—291** **6 Claims**

1. A process for the preparation of torasemide in the pure modification I (monoclinic, space group $P2_1/c$, metling point 162° C.) from torasemide of modification II (monoclinic, space group P2/n, melting point 169° C.), comprising stirring a suspension of torasemide of modification II in water with at least a catalytic amount of modification I, to rearrange the torasemide in modification II into torasemide of modification I.

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**4,743,694**

**DIASTEREOCONTROLLED SYNTHESIS OF 2-AMINO ALCOHOLS**

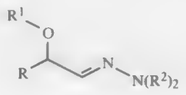
**David A. Claremon, Audubon, Pa., assignor to Merck & Co., Inc., Rahway, N.J.**

**Filed Apr. 11, 1986, Ser. No. 851,073**

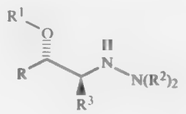
**Int. Cl.[4] C07D** *327/00, 333/36;* **C07C** *109/12, 109/16*

**U.S. Cl. 549—4** **8 Claims**

1. A process for the preparation of threo-2-amino alcohols which comprises the diastereo-selective addition of an organolithium reagent of formula $R^3$-Li to an aldehyde hydrazone of formula:



in an ethereal solvent at −20° to 0° C. in an inert atmosphere to produce the threo compound of formula:



wherein:

R is

(1) $C_{1-8}$ lower alkyl, either unsubstituted or substituted with phenyl or naphthyl which in turn can be substituted with:
(a) $C_{1-3}$alkyl,
(b) hydroxy-$C_{1-3}$alkyl, or
(c) $C_{1-3}$alkoxy-$C_{1-3}$alkyl;

(2) phenyl, either unsubstituted or substituted with:
(a) $C_{1-3}$alkyl,
(b) hydroxy-$C_{1-3}$alkyl, or
(c) $C_{1-3}$alkoxy;

$R^1$ is

(1) $C_{1-5}$alkyl,
(2) phenyl-$C_{1-3}$alkyl,
(3) $C_{1-3}$alkoxy-$C_{1-3}$alkyl,
(4) benzyloxy-$C_{1-3}$alkyl,
(5)





wherein $R^4$ and $R^5$ are independently $C_{1-5}$alkyl, and $R^6$ is $C_{1-5}$alkyl, or phenyl-$C_{1-3}$alkyl;

$R^2$ is $C_{1-3}$alkyl or phenyl; and

$R^3$ is

(1) $C_{1-6}$alkyl, either unsubstituted or substituted with $C_{1-3}$alkoxy, $C_{1-3}$alkylthio, or tri($C_{1-4}$alkyl)silyl,

(2) $C_{1-6}$alkenyl, either unsubstituted or substituted with $C_{1-3}$alkoxy, $C_{1-3}$alkylthio or tri($C_{1-4}$alkyl)silyl,

(3) phenyl,

(4) furyl, or

(5) thienyl;

followed by catalytic hydrogenolysis of the $R^1$- and the $—N(R^2)_2$ group.

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**4,743,695**

**TEDANOLIDE**

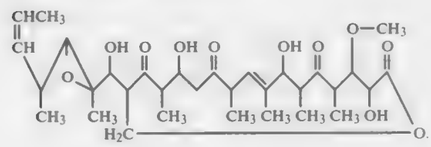
**Francis J. Schmitz, Norman, Okla.; Sarath P. Gunasekera, Vero Beach, Fla.; M. Bilayet Hossain; Dick van der Helm, both of Norman, Okla., and Gopichand Yalamanchili, St. Louis, Mo., assignors to The Board of Regents for the University of Oklahoma, Norman, Okla.**

**Continuation-in-part of Ser. No. 577,705, Feb. 8, 1984, abandoned. This application Jan. 27, 1987, Ser. No. 7,347**

**Int. Cl.[4] C07D** *313/00*

**U.S. Cl. 549—271** **2 Claims**

1. A compound of the formula:



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**4,743,696**

**HYDROQUINONE DERIVATIVES AND A PROCESS FOR THEIR PREPARATION**

**Richard Barner, Witterswil, and Josef Hübscher, Seon, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

**Division of Ser. No. 768,789, Aug. 23, 1985, Pat. No. 4,675,421. This application Mar. 5, 1987, Ser. No. 22,303**

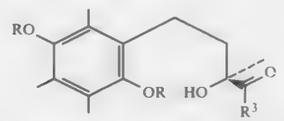
**Claims priority, application Switzerland, Aug. 28, 1984, 4117/84; Jul. 11, 1985, 3000/85**

**Int. Cl.[4] C07D** *309/02;* **C07C** *69/612*

**U.S. Cl. 549—420** **2 Claims**

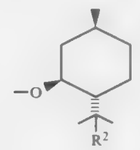
1. Compounds of the general formula

III-A



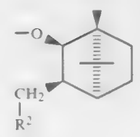
wherein R and $R^3$ have the significance wherein R represents an ether protecting group; and $R^3$ represents a residue of the formula

(f)

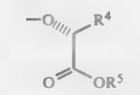


-continued

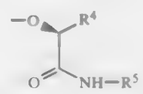
(g)



(h)



(i)



in which $R^2$ signifies phenyl; $R^4$ signifies methyl or phenyl and $R^5$ signifies lower alkyl, aryl or aryl-lower alkyl, wherein aryl signifies phenyl and naphthyl.

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**4,743,697**

**PROCESS FOR PREPARING 7-OXABICYCLOHEPTANE AMINO-ALCOHOL INTERMEDIATES USEFUL IN MAKING THROMBOXANE $A_2$ RECEPTOR ANTAGONISTS AND NOVEL INTERMEDIATES PROCUCED THEREIN**

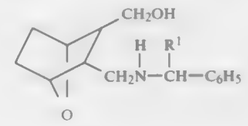
**John K. Thottathil, Trenton, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.**

**Division of Ser. No. 870,564, Jun. 4, 1986, Pat. No. 4,687,865. This application May 21, 1987, Ser. No. 52,296**

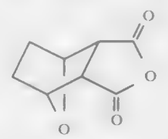
**Int. Cl.[4] C07D** *493/08*

**U.S. Cl. 549—463** **2 Claims**

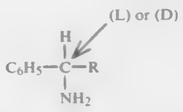
1. A method for preparing an optically active 7-oxabicycloheptane compound of the structure



in the form of the (D) isomer or the (L) isomer, wherein $R^1$ is $CH_2OH$ or alkyl, which comprises reacting mesoanhydride



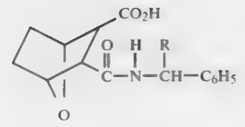
with an optically active amine of the structure



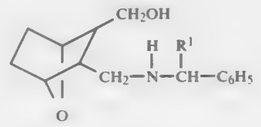
wherein R is alkyl, $CH_2OH$, $CO_2H$ or $CO_2$alkyl to form the acid

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which is a mixture of the (D) isomer and the (L) isomer; separating the (D) isomer from the (L) isomer; and reducing the desired acid isomer in the form of the (D) isomer or (L) isomer by treatment with a reducing agent to form the alcohol



which is in the form of the desired (D) or (L) isomer, wherein $R^1$ is $CH_2OH$ when R is $CO_2H$, $CO_2$alkyl or $CH_2OH$ and $R^1$ is alkyl when R is alkyl.

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**4,743,698**

## ACRYLIC EMULSION COPOLYMERS FOR THICKENING AQUEOUS SYSTEMS AND COPOLYMERIZABLE SURFACTANT MONOMERS FOR USE THEREIN

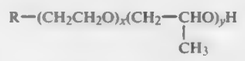
**Charles G. Ruffner, and John M. Wilkerson, III, both of Hamilton County, Tenn., assignors to Alco Chemical Corp., Chattanooga, Tenn.**

**Division of Ser. No. 782,571, Oct. 1, 1985, Pat. No. 4,600,761, which is a continuation-in-part of Ser. No. 719,768, Apr. 4, 1985, abandoned. This application Jan. 17, 1986, Ser. No. 819,834**

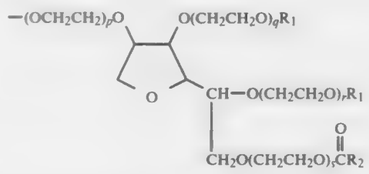
**Int. Cl.[4] C07D** *307/20*

**U.S. Cl. 549—478** **7 Claims**

1. A nonionic urethane compound which is the urethane reaction product of a monoethylenically unsaturated monoisocyanate with a nonionic surfactant of the formula:



in which x is an integer of from 0 to 150 and y is an integer of from 0 to 50 where R is a sorbitan fatty ester of the formula:



where each of p, q, r and s is an integer and the sum of said integers is from 0 to 100, $R_1$ is H or $—COR_2$ and $R_2$ is alkyl, alkylphenyl, or dialkylphenyl having 5 to 30 carbon atoms.

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**4,743,699**

## HOMOGENEOUS CATALYTIC SYSTEM AND A PROCESS FOR THE PREPARATION OF SAME

**Philip R. Page, Parede, and Ivan Villax, Lisboa, both of Portugal, assignors to Plurichemie Anstalt, Liechtenstein**

**Continuation-in-part of Ser. No. 458,068, Jan. 14, 1983, Pat. No. 4,550,096. This application May 13, 1985, Ser. No. 732,952**

**Claims priority, application Portugal, Jan. 19, 1982, 74303; Dec. 30, 1982, 76061; Dec. 28, 1984, 79774**

**The portion of the term of this patent subsequent to Oct. 29, 2002, has been disclaimed.**

**Int. Cl.[4] C07F** *15/00;* **C07C** *103/19*

**U.S. Cl. 556—23** **14 Claims**

1. A process for the preparation of a homogeneous stereospecific rhodium complex hydrogenation catalyst, of a uniform and well defined composition, containing rhodium, a hydrazine and triphenylphosphine, as well as an anion, comprising reacting a rhodium salt with a hydrazine, or a salt thereof, having the formula $R'_1R'_2N.NR'_3R'_4$, wherein $R'_1$, $R'_2$, $R'_3$ and $R'_4$ are lower alkyl groups or hydrogen, in the presence of triphenylphosphine, or by reacting a complex of rhodium and triphenylphosphine with said hydrazine or salt thereof, eventually in the presence of an excess of triphenylphosphine, characterized by the fact that the reaction is carried out in a mixture of a degassed organic solvent, miscible in the reaction, and eventually water, at a temperature between 0° C. and the reflux temperature of the reaction medium for between 20 minutes and 5 hours, under an inert atmosphere, and the isolation of the catalyst is carried out by cooling when the complex so formed is little soluble in the cold reaction mixture, or by slow addition of a degassed inert non-solvent and by cooling when the complex prepared is soluble in the reaction mixture, followed by filtration and drying under an inert atmosphere.

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**4,743,700**

## PROCESS FOR FLUORINATING 1-PHENYL-2-AMINO-1,3-PROPANEDIOL COMPOUNDS

**Giancarlo Jommi, Milan; Dario Chiarino, Monza, and Roberto Pagliarin, San Giorgio Su Legnano, all of Italy, assignors to Zambon S.p.A., Vicenza, Italy**

**Filed Feb. 1, 1985, Ser. No. 697,568**

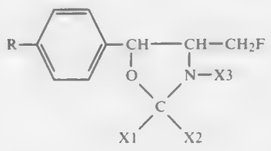
**Claims priority, application Italy, Feb. 3, 1984, 19435 A/84**

**Int. Cl.[4] C07D** *263/04, 103/40*

**U.S. Cl. 548—216** **9 Claims**

1. A process for preparing a compound of formula

(III)



wherein

R is a methylthio, methylsulfoxy, methylsulfonyl or nitro group; and

X1 is hydrogen, 1–6 carbon alkyl, 1–6 carbon haloalkyl, 3–6 carbon cycloalkyl, phenyl or 1–6 carbon phenylalkyl, which phenyl ring may be substituted by one or two halogen atoms, 1–3 carbon alkyl, 1–3 carbon alkoxy or nitro groups; or

X1 together with X2 is an oxygen atom or an alkylene having from 2–5 carbon atoms; and

X2 is hydrogen, 1–6 carbon alkyl, 1–6 carbon haloalkyl, 3–6 carbon cycloalkyl or phenyl which may be substituted by one or two halogen atoms, 1–3 carbon alkyl, 1–3 carbon alkoxy or nitro groups; or

X2 together with X1 is an oxygen atom or an alkylene having from 2–5 carbon atoms; or

X2 is covalently linked to X3; and

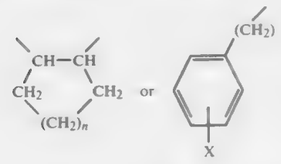
X3 is hydrogen or —CO—R4 wherein



R4 is hydrogen, 1–6 carbon alkyl, 1–6 carbon haloalkyl, 3–6 carbon cycloalkyl, phenyl or 1–6 carbon phenylalkyl, which phenyl ring may be substituted by one or two halogen atoms, 1–3 carbon alkyl, 1–3 carbon alkoxy or nitro groups; or

R4 together with X2 is

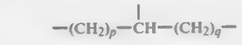
$—(CH_2)_m—CH=CH—$, $—(CH_2)_m—CH_2—CH_2—$,



wherein

n is 1 or 2; m is 0 or 1; X is hydrogen, a halogen atom, 1–3 carbon alkyl, 1–3 carbon alkoxy or nitro groups; or

R4 together with X2 and X1 is a chain of formula



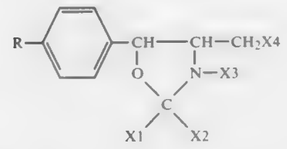
where

p is 3 or 4 and q is 1 or 2; or

X3 is covalently linked with $X_2$;

which process comprises reacting one mole of a compound of formula

(II)



wherein

R, X1, X2 and X3 are as is defined above, and wherein

X4 is $—O—SO_2R6$ wherein R6 is methyl, trifluoromethyl, phenyl, p-methyl-phenyl, 2,4,6-trimethyl-phenyl, 2-naphthyl or 2-pyridyl

with from 1 to 15 moles of a non gaseous inorganic fluoride in a polyglycol having at least 4 alkylidene oxide units at a temperature of from 40° to 150° C. and retaining said compound of formula III formed in the reaction mixture until completion of the reaction.

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**4,743,701**

## PROCESS FOR THE PREPARATION OF ORGANO N-HYDROXYIMIDATES

**Chempolil T. Mathew, Randolph, N.J., assignor to Allied Corporation, Morristownship, N.J.**

**Filed Dec. 10, 1986, Ser. No. 940,148**

**Int. Cl.[4] C07C** *119/18*

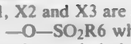
**U.S. Cl. 558—7** **27 Claims**

1. A process which comprises:

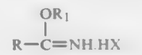
(a) reacting an organonitrile of the formula



with an organic alcohol of the formula

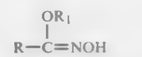


and with a hydrogen halide (HX) wherein X is selected from the group consisting of Cl, Br and I, in the presence of an organic solvent, under anhydrous conditions, at a temperature low enough to maintain the hydrogen halide in solution to form a solid slurry of an organoimidate hydrohalide of the formula



and

(b) reacting said organoimidate hydrohalide with a hydroxylamine salt and ammonia gas, in the presence of an organic solvent, under anhydrous conditions, to produce the corresponding organo N-hydroxyimidate of the formula



wherein R and $R_1$ are, individually, substituted or unsubstituted alkyl, cycloalkyl, aryl or aralkyl, wherein permissible substituents are those which are non-reactive to the hydroxylamine salt reactant.

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**4,743,702**

## PREPARATION OF ALIPHATIC DINITRILES

**Wolfgang Hoelderich, Frankenthal; Hubert Lendle, Ludwigshafen; Peter Magnussen, Bad Durkheim; Hans Leitner, Frankenthal; Jost H. Manegold, Lambsheim, and Wolfgang Leitenberger, Mannheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Filed Mar. 13, 1986, Ser. No. 839,161**

**Claims priority, application Fed. Rep. of Germany, Mar. 26, 1985, 3510876**

**Int. Cl.[4] C07C** *120/08*

**U.S. Cl. 558—311** **9 Claims**

1. A process for preparing a $C_2$–$C_{12}$ alkylenedinitrile which comprises:

reacting a $C_2$–$C_{12}$ alkylenedicarboxylic acid with excess ammonia at from 200° to 500° C. in the presence of a zeolite having a pentasil structure selected from the group consisting of borosilicate and iron silicate.

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**4,743,703**

## HERBICIDAL 4-FLUOROALKYL-4'-NITRODIPHENYL ETHERS

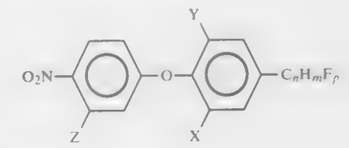
**Colin Swithenbank, Perkasie, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.**

**Continuation-in-part of Ser. No. 312,456, Oct. 19, 1981. This application Sep. 19, 1983, Ser. No. 533,275**

**Int. Cl.[4] C02C** *79/46*

**U.S. Cl. 560—21** **20 Claims**

1. A compound of the formula:



wherein

n is an integer of from 2 through 5,

m is an integer of from 0 through 2n,

p is an integer of from 1 through 2n+1, and wherein m+p=2n+1,

X is a hydrogen atom, a halogen atom, a trifluoromethyl group, a ($C_1$–$C_4$)alkyl group, or a cyano group,

Y is a hydrogen atom, a halogen atom, or a trifluoromethyl group, and

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Z is a hydroxy group, an alkoxy group having up to 6 carbon atoms, an alkyl group having up to 4 carbon atoms, a halogen atom, an amino group, an alkylthio group having up to 4 carbon atoms, a cyano group, a carboxy group, a carbalkoxy group having up to 4 carbon atoms in the alkoxy moiety, a carboxyalkyl group having up to 4 carbon atoms, a carbalkoxyalkyl group having up to 6 carbon atoms, an alkanoyloxy group having up to 4 carbon atoms, or a carbamoyloxy group having up to 6 carbon atoms.

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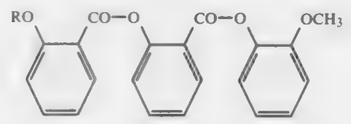
**4,743,704**

## ESTERS OF SALSALATE WITH GUAIACOL, FOR TREATING PHLOGISTIC BRONCHOPNEUMOPATHIES

**Marino Nicolini, Padova, Italy, assignor to FINTECO Srl, Italy**

**Filed Jun. 19, 1987, Ser. No. 63,995**
**Claims priority, application Italy, Jul. 3, 1986, 21021 A/86**
**Int. Cl.[4] C07C *69/76***
**U.S. Cl. 560—066** **20 Claims**

1. Esters of salsalate with guaiacol for treatment of phlogistic bronchopneumopathies, having the following general formula:




(I)

in which R is H or $CH_3CO$.

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**4,743,705**

## PREPARATION OF ACRYLATE ESTERS

**Dennis A. Hucul, and Kathryn A. Eickholt, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Continuation of Ser. No. 636,055, Jul. 30, 1984, abandoned. This application Mar. 13, 1986, Ser. No. 839,314**
**Int. Cl.[4] C07C *67/36***
**U.S. Cl. 560—207** **25 Claims**

1. A vapor phase process for the preparation of an α-substituted acrylate ester which comprises contacting (a) a haloalkene, wherein the halogen is substituted on an olefinic carbon atom which is further substituted with a $C_{1\text{-}10}$ alkyl, $C_{3\text{-}10}$ cycloalkyl, $C_{6\text{-}10}$ aryl, $C_{7\text{-}10}$ alkaryl, $C_{7\text{-}10}$ aralkyl, cyano, or trihalomethyl group; (b) an alcohol or an ether; and (c) carbon monoxide in the presence of a heterogeneous catalyst which comprises palladium, platinum, nickel, ruthenium or rhodium, on a support, wherein the catalyst has a metal dispersion of between about 50 and 95 percent, under conditions such that an α-substituted acrylate ester and a hydrocarbyl halide is prepared wherein the catalyst productivity is 0.06 g of product per gram of catalyst per hour or greater; wherein the catalyst is impregnated by incipient wetness by heating the support to a temperature of between about 75° C.–150° C. and contacting the support with a sufficient amount of an aqueous hydrochloric acid solution of a palladium, platinum, nickel, ruthenium or rhodium salt with a pH of about 3.0 or lower to provide the desired loading and dispersion, wherein the aqueous solution is at a temperature of between about 50° C.95° C. at the time of contacting; and the catalyst is activated by hydrogen gas over the catalyst at a temperature of between about 150° C.–350° C. for a period of time sufficient to reduce a significant amount of the metal salt on the support.

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**4,743,706**

## PREPARATION OF UNSATURATED ACIDS AND ESTERS BY OXIDATIVE CONDENSATION

**Andrew T. Guttmann, Maple Heights, and Robert K. Grasselli, Chagrin Falls, both of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio**

**Continuation of Ser. No. 423,771, Sep. 27, 1982, abandoned, which is a continuation of Ser. No. 194,647, Oct. 6, 1980, abandoned. This application Oct. 22, 1984, Ser. No. 663,822**
**Int. Cl.[4] C07C *67/317***
**U.S. Cl. 560—214** **27 Claims**

1. A process for the production of unsaturated esters which comprises reacting in the vapor phase at a temperature of 200° C. to 500° C. a first reactant selected from saturated esters and anhydrides having 2 to 14 carbon atoms, a second reactant selected from primary and secondary alcohols and di-alkyl ethers, and oxygen, in the presence of an oxidation catalyst, said catalyst having the empirical formula:

$$A_aB_bC_cPO_x$$

where
A=alkali metal, alkaline earth metal, Tl, or mixtures thereof;
B=Fe, Co, Ni, Cr, Mn, Cu, Ag, Pt, Pd, Rh, Ru, or mixtures thereof;
C=Sc, Y, La, rare earth metals, Th, U, Nb, Si, Ge, Ta, Mo, W, Bi, Sb, Te or mixtures thereof;
where
a=0–1.5;
b=0.01–3.0;
c=0–2.0;
x=the number of oxygens required to satisfy the valence requirements of the other elements present.

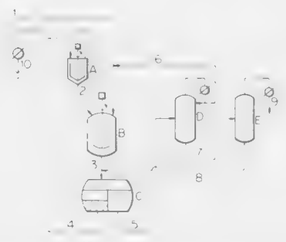
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**4,743,707**

## PROCESS FOR PURIFYING ALLYL ALCOHOL

**Shinya Matsuhira, Oita, Japan, assignor to Showa Denko Kabushiki Kaisha, Tokyo, Japan**

**Filed Jun. 20, 1986, Ser. No. 876,588**
**Int. Cl.[4] C07C *29/86, 33/03, 29/80***
**U.S. Cl. 568—919** **4 Claims**




1. A process for purifying allyl alcohol, consisting essentially of adding at least one potassium salt selected from the group consisting of dipotassium hydrogenphosphate, potassium phosphate, potassium pyrophosphate, and potassium tripolyphosphate to an aqueous solution of allyl alcohol to separate the solution into an aqueous phase and an organic phase, and removing the aqueous phase.



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**4,743,708**

## PROCESS FOR THE SEPARATION OF $C_{10}$ AROMATIC ISOMERS

**Daniel D. Rosenfeld, Houston, and Lawrence G. Daniel, Crosby, both of Tex., assignors to Exxon Chemical Patents Inc., Linden, N.J.**

**Continuation-in-part of Ser. No. 716,208, Mar. 26, 1985, abandoned. This application Mar. 24, 1986, Ser. No. 843,220**
**Int. Cl.[4] C07C *7/13***
**U.S. Cl. 585—828** **45 Claims**

1. An adsorptive separation process for separating paradiethylbenzene from a hydrocarbon feedstream containing a mixture of $C_{10}$ aromatic isomers comprising:
(a) contacting said hydrocarbon feedstream with a bed of an adsorbent of zeolite beta;
(b) withdrawing from said bed of adsorbent a raffinate stream containing less of the paradiethylbenzene;
(c) desorbing the paradiethylbenzene to effect displacement thereof by passing through the bed a desorbent selected from the group consisting of paraffins, ethyltoluene, polycyclic hydrocarbons and mixtures thereof; and
(d) withdrawing from the adsorbent bed an extract stream containing paradiethylbenzene.

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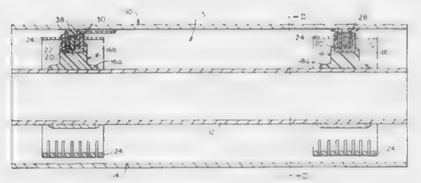


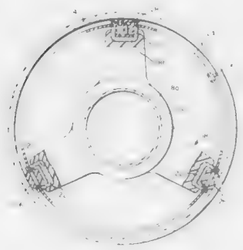
4,743,709

## GAS INSULATED TRANSMISSION LINE WITH SUPPORT INSULATOR HARDWARE ARRANGEMENTS

Jeffry R. Meyer, Penn Hills Township, Allegheny County, Pa.; Albert P. Munroe, Southborough, Mass.; Melvyn D. Hopkins, Grafton, Mass.; Gary K. Bowman, Westboro, Mass., and Richard E. Kane, Northborough, Mass., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 30, 1987, Ser. No. 114,476
Int. Cl.[4] H02G *5/06*; H01B *9/06*
U.S. Cl. 174—28 5 Claims





1. A gas insulated transmission line comprising:
a central conductor spaced from an outer conductive sheath with a gaseous insulating medium therebetween;
insulating support means supporting said inner conductor within said outer sheath, said support means comprising a solid insulator having an inner portion attached to said inner conductor and an outer portion;
said outer portion of said solid insulator having a recess, a metal insert lining said recess;
a metal interconnector having a base portion within said insert in conductive engagement therewith and a strap portion extending away from said insert;
fastener means securing said base portion of said interconnector to said insert;
an insulating standoff button disposed within a recess of said interconnector base portion and bearing against said outer sheath; and
said strap portion of said interconnector having an extremity affixed to said outer sheath.

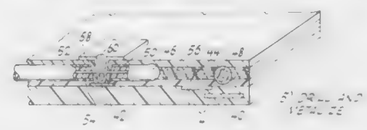
4. A gas insulated transmission line comprising:
a central conductor spaced from an outer conductive sheath with a gaseous insulating medium therebetween;
insulating support means supporting said inner conductor within said outer sheath, said support means comprising a solid insulator having an inner portion attached to said inner conductor and an outer portion;
said outer portion of said solid insulator having a recess, a metal insert lining said recess;
an axle pin secured to said metal insert, a roller body of a semi-rigid insulating material having a central portion of substantially cylindrical configuration disposed on said axle pin, said roller body having edges bearing against said outer sheath and deforming under load to conform to said outer sheath.

4,743,710

## COAXIAL INTERCONNECTION BOARDS

Leonard Shieber; J. Philip Plonski, both of Huntington; Michael Vignola, Bayville, and Benjamin G. Chin, Westbury, all of N.Y., assignors to Kollmorgen Technologies Corporation, Dallas, Tex.

Filed Oct. 18, 1985, Ser. No. 788,834
Int. Cl.[4] H05K *1/00*
U.S. Cl. 174—68.5 5 Claims



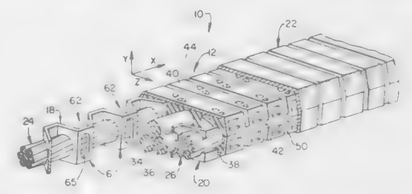
2. A wire scribed circuit board comprising: an insulating planar substrate provided with a conductive ground plane parallel to said substrate; a plurality of terminal points on said circuit board;
at least one elongated preformed signal conductor surrounded by an insulating coating extending along its length and a conductive shield external to said insulating coating to form a coaxial conductor, said coaxial conductor being mounted on the surface of said planar substrate;
each terminal point surrounding by an area which is free of any conductive material other than the conductive material of any said signal conductor communciating with the terminal point;
said ground plane comprising a conductive encapsulating layer for electrically connecting said conductive shield to said grinned plane; and
said coaxial conductor being adhered to the surface of said planar substrate following a predetermined path between selected said terminal points and being terminated within said areas free of conductive material other than the conductive material of said at least one signal conductor.

4,743,711

## CABLE HAVING HAULING, ELECTRICAL AND HYDRAULIC LINES AND ELONGATED TENSILE ELEMENTS

Ernest G. Hoffman, Middlefield, Conn., assignor to Harvey Hubbell Incorporated, Orange, Conn.

Division of Ser. No. 714,272, Mar. 21, 1985, Pat. No. 4,644,094.
This application Oct. 23, 1986, Ser. No. 922,419
The portion of the term of this patent subsequent to Feb. 17, 2004, has been disclaimed.
Int. Cl.[4] H01B *7/18*
U.S. Cl. 174—109 6 Claims



1. An elongated cable structure having a longitudinal axis and a substantially rectangular cross-sectional shape with a top, a bottom and opposite sides, comprising:
a pair of elongated tensile elements of high tensile strength for supporting the cable structure in tension and having their longitudinal axes extending substantially parallel to one another and to said longitudinal axis of said cable structure and being bendable along said longitudinal axis of said cable structure, said tensile elements being spaced

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laterally apart and adjacent a different one of the opposite sides of the cable structure;

a plurality of adjacent force-transmitting members of rigid transverse cross section on each of said tensile elements;

each of said force-transmitting members having transverse arcuate portions enclosing and engaging peripheral portions of said tensile elements whereby said tensile elements are retained against displacement by said force-transmitting members; and

means, bendable about an axis transverse to said longitudinal axis, coupling said force-transmitting members in series relationship.

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**4,743,712**

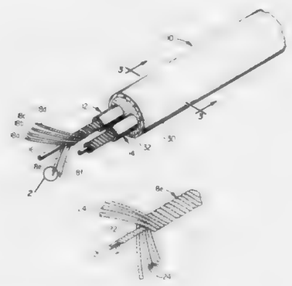
**SIGNAL CABLE ASSEMBLY WITH FIBROUS INSULATION AND AN INTERNAL CORE**

**Noel Lee, 47 W. Park Dr., Daly City, Calif. 94015**

**Filed Mar. 30, 1987, Ser. No. 32,331**

**Int. Cl.[4] H01B** *11/00*

**U.S. Cl. 174—113 C** **4 Claims**



1. A cable assembly, comprising:

a core,

a plurality of bundles of electrical conductors wrapped around said core, each bundle comprising:

a central conductor of a relatively large diameter,

a strand of dielectric material wrapped around said central conductor, and

a plurality of wire strands each of a relatively small diameter wrapped around said wrapped central conductor; and insulation means extending around said bundles;

said strand of dielectric material, said wire strands and said bundles being wrapped in the same direction.

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**4,743,713**

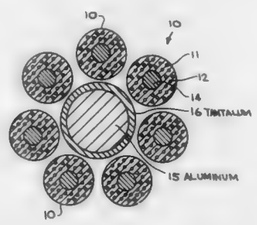
**ALUMINUM-STABILIZED NB3SN SUPERCONDUCTOR**

**Ronald M. Scanlan, Livermore, Calif., assignor to United States Department of Energy, Washington, D.C.**

**Filed Feb. 10, 1984, Ser. No. 578,897**

**Int. Cl.[4] H01B** *12/00;* **H01L** *39/24*

**U.S. Cl. 174—128 S** **18 Claims**




1. An aluminum-stabilized $Nb_3Sn$ superconductive material for use in a superconductor, said material consisting essentially of:

a plurality of composite units, each unit consisting of:

a member of a first conductive material having a hollow central section and a plurality of openings therein,

a plurality of niobium rods positioned in said openings of said member, and

a tin rod located in said hollow central section of said member;

a member of a second conductive material;

said plurality of composite units being located about and spaced from said member of a second conductive material; and

diffusion barrier means located intermediate said member of a second conductive material and said plurality of composite units.

7. A method for fabricating an aluminum stabilized $Nb_3Sn$ superconductor comprising the steps of:

positioning a plurality of Nb-Cu-Sn composite components in spaced relation with respect to an aluminum member by locating the composite components around an outer surface of the aluminum member;

positioning diffusion barrier material intermediate the composite components and the aluminum member;

co-drawing down the thus assembled assembly to form a conductor;

forming the conductor in a configuration; and

heating the thus formed conductor to convert components thereof to form a superconductor phase without causing melting of the aluminum member.

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**4,743,714**

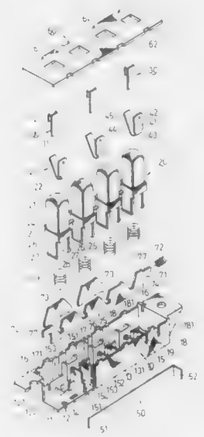
**MULTIPLE PUSHBUTTON SWITCH AND INTERLOCK ASSEMBLY**

**Hai-Yuan Chien, 81, Hsien Ho Street, Taichung, Taiwan**

**Filed Jun. 10, 1987, Ser. No. 60,332**

**Int. Cl.[4] H01H** *9/20*

**U.S. Cl. 200—5 E** **8 Claims**



1. A multiple pushbutton switch comprising:

a lower insulative housing including

a generally planar base portion, having

four walls extending upwardly therefrom and generally normal thereto, and having

a plurality of equally spaced guiding groove couples, upright supporting members with wire holes and retaining members also located thereon extending normal to said base portion,

two opposite sliding slots respectively provided on inner surfaces of a first pair of left and right opposite walls of said four walls, and

a retaining seat provided on an inner surface of a rear wall of said four walls, and

a slit provided on a top edge of a front wall of said four walls;

an interlock engaging mechanism including

a latch bar comprising an elongated member having a plurality of equally spaced upright portions and haviing all but the left-hand and right-handmost upright portions including a laterally extending nose portion, each said nose portion having an inclined upper surface and a generally horizontal undersurface,

a spring member for biasing said latch bar toward one of said sliding slots of said housing,

a plurality of lockouts positioned on said retaining seat of said housing, each lockout comprising a generally triangularly shaped planar member, the base of said lockout resting on and being movable along the base of said housing;

a plurality of pushbuttons each having a pushrod, each pushrod having a head portion on its top end and a stopping block adjacent to its bottom end and two legs extending downwardly from an undersurface of said stopping block, each leg having a hook portion on its bottom end and a recess formed between said two legs, an actuating bar and a separating bar respectively extending laterally from the rear surface and side surface of said stopping block;

a spring disposed about each said recess of said pushbutton intermediate the stopping block thereon and the base of said housing, each spring member biasing its associated pushbutton upwardly;

a plurality of selecting contact plates each having a mounting portion secured on one of said supporting members of said housing;

a plurality of J-shaped contacting springs, a first arm of each contacting spring having an engaging portion secured on one of said retaining members and a second arm of each contacting spring having a contact portion which is in alignment with an associated one of said contact plates;

an L-shaped contact plate positioned within said retaining members and slit of said housing, a first plate of said L-shaped contact plate contacting the first arms of each of said J-shaped contacting springs and the second plate of the contact plate exposed through said slit;

a cover member mounted on said lower insulative housing, said cover member having a plurality of apertures located in an upper surface thereof through which the pushrods of said pushbuttons normally extend.

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**4,743,715**

**DRAW-IN AND DRAW-OUT MECHANISM OF AN ELECTRICAL CIRCUIT BREAKER WITH MAIN AND AUXILIARY CIRCUITS**

**Alain Gerbert-Gaillard, Tullins, and Jean-Pierre Nebon, St. Martin-le-Vinoux, both of France, assignors to Merlin Gerin, Grenoble, France**

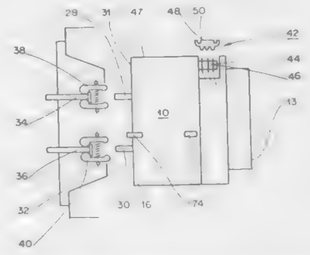
**Filed Feb. 4, 1987, Ser. No. 10,822**

**Claims priority, application France, Feb. 10, 1986, 86 01880; Feb. 10, 1986, 86 01881**

**Int. Cl.[4] H01H** *9/20*

**U.S. Cl. 200—50 AA** **10 Claims**

1. A reversible draw-in and draw-out mechanism for an extractible multipole electrical circuit breaker, equipped with main circuits with terminals and auxiliary circuits associated with a connection device having fixed connectors and interacting movable connectors, the circuit breaker being mounted on a movable mechanical support inside a fixed chassis in the form of a housing having a front opening, two opposite side walls, and a fixed rear support panel for connection of the main terminals of each pole, the mechanical support of the circuit breaker being guided by means of a pair of slide plates symmetrically fixed to the side walls of the chassis, and extending parallel in the longitudinal draw-in direction, said mechanism comprising an operating device associated with a movement transmission system capable of occupying a first "drawn-in" position in which the main ad auxiliary circuits of the circuit breaker are connected, a second "test" position in which the main circuits are disconnected and the auxiliary circuits are connected, and a third "drawn-out" position in which the main and auxiliary circuits are disconnected, wherein the fixed connectors of the auxiliary circuits connection device are securedly united to the circuit breaker and the movement transmission system of the reversible mechanism comprises a first mechanical link between the operating device and a drive




device of the movable connectors of the connection device during the actuation phase corresponding to the interval provided between the second and third positions, and a second mechanical link between the operating device and a coupling device of the movable mechanical support of the circuit breaker during another actuation phase corresponding to the interval provided between the second and first positions, the assembly being arranged so that the first mechanical link is active when the second mechanical link is broken, and the second mechanical link is active when the first mechanical link is broken, thereby enabling the fixed and movable connectors of the auxiliary circuits to be connected or disconnected when the circuit breaker remains immobile.

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**4,743,716**

**PRESSURE SENSOR**

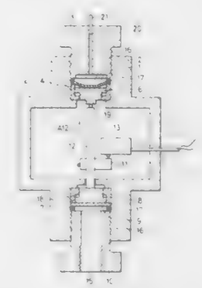
**Ichiro Tsukioka, Chiba, Japan, assignor to Kogyo Keiki Kabushiki Kaisha, Tokyo, Japan**

**Filed Feb. 24, 1987, Ser. No. 17,349**

**Claims priority, application Japan, Sep. 30, 1986, 61-149853**[U]

**Int. Cl.[4] H01H** *35/34*

**U.S. Cl. 200—83 Y** **7 Claims**



1. A fluid pressure sensor comprising:

means for sensing a change in pressure of a fluid including a pair of spaced axially aligned chambers, a flexible diaphragm in each chamber dividing it into inner and outer portions and forming a fluid tight seal between said por-

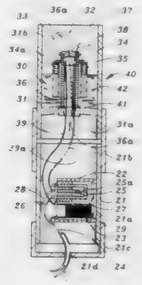
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tions; a piston in the inner portion of each of said chambers seated against the adjacent one of said diaphragms and movable axially of said chambers; a rigid, incompressible means of fixed length extending between and engaging both of said pistons whereby axial movement of one piston will be transmitted to the other piston; means sealing a fixed quantity of gas under pressure in the outer portion of one of said chambers port means through which fluid under pressure can be introduced into the outer portion of the other of said chambers; fluid pressure generated forth acting on said diaphragms in said chambers being the only forces acting axially directly or indirectly on said pistons and said rigid means; signal generating means responsive to a shift in the axial position of said rigid means due to the occurrence of a change in the fluid pressure in the outer portion of said other chamber.

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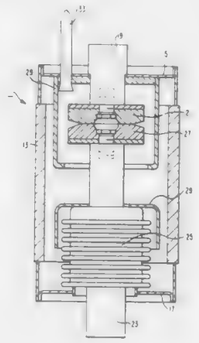
**4,743,717**
**APPARATUS FOR STOPPING ELECTRICALLY DRIVEN WATERING SYSTEM**
**Loyal F. Petersen, P.O. Box 207, Osmond, Nebr. 68765**
**Filed Oct. 2, 1987, Ser. No. 103,682**
**Int. Cl.[4] H01H** *35/18*
**U.S. Cl. 200—84 C** **8 Claims**



1. An apparatus for stopping an electrically driven watering system when a predetermined amount of rain has fallen, comprising:
- a cylindrical casing mounted at a fixed point in the vicinity of said watering system, said casing being open at its upper end and having a bottom;
- a cylinder for catching rain having a bottom with a concentric circular opening therein, said cylinder being concentrically affixed to the upper end of said casing;
- a vertically oriented hollow stem hermetically affixed to the bottom of said rain-catching cylinder within the opening therein so as to extend upwardly therefrom and to permit communication with the interior of said casing;
- a cap hermetically affixed atop said stem, said cap having a horizontal retainer ring;
- an electrode affixed within said stem at its upper end, said electrode having a first conductor affixed thereto;
- a reed of ferrous-magnetic material supported from the lower interior of said stem and extending at its upper end adjacent said electrode so as to contact it unless pulled away therefrom, said reed having a second conductor affixed to its lower end;
- a ring-shaped permanent magnet affixed within a collar, the combined specific gravity of said magnet and collar being less than that of rainwater, said collar being mounted around said stem below said retainer ring and having an interior diameter greater than that of the exterior diameter of said stem, yet not so great so as not to be restrained thereon by said retainer ring;
- a normally open relay switch mounted within said casing, one lead of the coil of said switch being connected to said first conductor and the other lead of said coil being connected to said second conductor, said relay switch being connected in series to the power supply of said watering system; and
- a power source for supplying electric current to said first and second conductors and to the contacts of said relay switch, and means for connecting said power source to said conductors and contacts.

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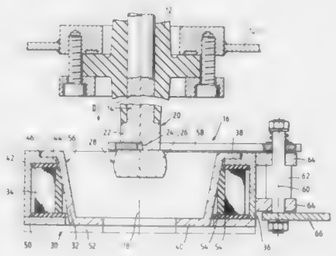
**4,743,718**
**ELECTRICAL CONTACTS FOR VACUUM INTERRUPTER DEVICES**
**Vincent J. Santilli, Corning, N.Y., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**
**Filed Jul. 13, 1987, Ser. No. 72,317**
**Int. Cl.[4] H01H** *33/66*
**U.S. Cl. 200—144 B** **14 Claims**



1. A porous briquette, useful as a vacuum interrupter contact after sintering, containing a powder mixture comprising 50 to 75 weight percent copper, 15 to 30 weight percent chromium, 2.5 to 15 weight percent bismuth and 0.5 to 7.5 weight percent chromic oxide.

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**4,743,719**
**ARC INTERRUPTER**
**James Spooner, Sunderland, England, assignor to Northern Engineering Industries plc, New Castle upon Tyne, England**
**Filed Feb. 27, 1987, Ser. No. 19,943**
**Claims priority, application United Kingdom, Mar. 25, 1986, 8607398**
**Int. Cl.[4] H01H** *33/18*
**U.S. Cl. 200—147 R** **13 Claims**

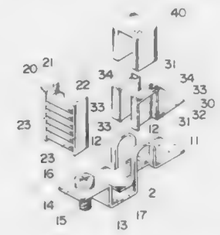


1. An arc interrupter comprising fixed and movable contacts, a fixed electrode which comprises a tube having flanges at each end thereof, at least one of said flanges extending outwardly from said fixed electrode, first and second coaxial arcing surfaces separated by an annular gap provided, respectively, by one of said contacts and said electrode, said first arcing surface being closer to the common axis of said arcing surfaces than said second arcing surface, an arc-driving coil surrounding said electrode, said coil being coaxial with said arcing surfaces and being electrically connected at one end to said electrode whereby said coil is included in series with said arcing surfaces in an arc current path at least during a later part of the opening of a main current path formed by said contacts in a make position and ferromagnetic material which forms part of a magnetic circuit produced by said coil when said coil is a part of said arc current path, said ferromagnetic material being arranged in overlapping relationship with said one flange of said fixed electrode thereby to support said one flange of said fixed electrode against distortion.



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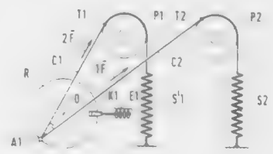
**4,743,720**
**CURRENT LIMITING CIRCUIT INTERRUPTER**
**Akira Takeuchi; Hideo Hisamoto; Takanobu Tanaka; Akihiko Hirao; Yoichi Aoyama; Junichi Matsuda, and Takehiko Okada, all of Kadoma, Japan, assignors to Matsushita Electric Works, Ltd., Japan**
**Filed Nov. 10, 1986, Ser. No. 928,362**
**Claims priority, application Japan, Nov. 25, 1985, 60-264253; May 26, 1986, 61-120703**
**Int. Cl.[4] B23K** *9/32*
**U.S. Cl. 200—147 R** **15 Claims**



1. A current limiting circuit interrupter comprising:
- a pair of main contacts comprising a stationary contact and moveable contact mounted for relative movement along a path between a closed position in which the contacts are in mutual engagement and an open position in which the contacts are separated to defined an arc gap therebetween, arcing in said arc gap occurring along an arc path between the contacts as the contacts are moved from the closed position to the open position upon occurrence of an over-current condition;
- magnetic winding means provided in immediate adjacent proximity to the stationary contact and energized by a current flow through the contacts for producing within the winding thereof internal lines of magnetic force which extend transversely of the arc path to directly act on the arc formed between the contacts at the stationary contact whereby driving the arc in one direction for elongation thereof during the initial stage of contact separation in which the art path is relatively shorter so that the arc is totally under the influence of the internal lines of magnetic force; and
- magnetic flux diverting yoke means adjacent the path of movement of the moveable contact and positioned to be magnetically coupled with the magnetic winding means for diverting therealong the external lines of the magnetic force generated by and passing outside of the winding of the magnetic winding means in order to prevent the external line of magnetic force from adversely acting on the arc and to permit only the internal lines of the magnetic force to act on the arc in such a manner as to continuously drive the arc in series and in the same direction in the subsequent stage of contact separation where the arc path is elongated as the contacts are separated to extend past the region which is totally under the influence of the internal lines of magnetic force.

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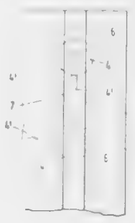
**4,743,721**
**CIRCUIT BREAKER ACTUATOR DEVICE**
**Edmond Thuries, Pusignan; Jean-Paul Masson, Villeurbanne; Michel Perret, Tramole, all of France, and Satoru Yanabu, Tokyo, Japan, assignors to Alsthom, Paris, France**
**Filed Feb. 24, 1987, Ser. No. 17,420**
**Claims priority, application France, Feb. 21, 1986, 86 02409**
**Int. Cl.[4] H01H** *5/04*
**U.S. Cl. 200—153 SC** **5 Claims**



1. A circuit breaker actuator device for actuating a circuit breaker having moving circuit breaker members, said device comprising an operating wheel mounted for rotation about its axis whose rotation drives said moving circuit-breaking members, said wheel being connected to a first spring by a first chain passing over a first pulley and fixed to a first point close to the periphery of said wheel, a retractable retaining member engaging said wheel periphery to hold the wheel fixed when the spring is loaded by means of said retaining member which is retracted to allow the wheel to rotate, said device further including a second spring connected by a second chain passing over a second pulley and fixed to a second point on said wheel, the center of said wheel being situated, when both springs are loaded, between a length of the first chain connecting the first point to the first pulley and a length of the second chain connecting a second point to the second pulley, and wherein the second spring applies a force which is less than the force applied by the first spring, whereby once the retaining means are released, the first spring rotates the wheel against the action of the second spring until the second length of chain passes to the other side of the center of the wheel whereby the second spring participates in driving the wheel along with the first spring so that its driving force is added to that of the first spring.

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**4,743,722**
**TOUCH CONTACT SWITCH WITH ARCHED SWITCHING FILM**
**Jurgen Oelsch, Hohenroth, Fed. Rep. of Germany, assignor to Preh Elektrofeinmechanische Werke Jakob Preh Nachf. GmbH & Co., Bad Neustadt/Saale, Fed. Rep. of Germany**
**Continuation of Ser. No. 616,480, Jun. 1, 1984, abandoned. This application Nov. 7, 1986, Ser. No. 928,724**
**Claims priority, application Fed. Rep. of Germany, Jun. 3, 1983, 3320116**
**Int. Cl.[4] H01H** *3/12*
**U.S. Cl. 200—159 B** **16 Claims**



1. A touch contact switch having a switching chamber and

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a flexible, elastic switching film extended over said chamber, a first electrical contact surface located within said switching chamber and a second contact surface located on said switching film, said contact surfaces being positioned to contact each other when said switching film is pressed, characterized in that said switching film has a plurality of punctiform deformations which constitute permanent bends independent of the pressing down of said switching film, said switching film being slightly arched away from said first contact surface as a consequence of said bends.

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**4,743,723**

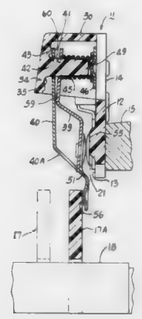
## SWITCH ASSEMBLY WITH UNITARY CONTACT GUIDE

**Lee A. Seabeck, Mentor, Ohio, assignor to Torg Corporation, Bedford, Ohio**

**Continuation of Ser. No. 843,240, Mar. 24, 1986, abandoned. This application May 18, 1987, Ser. No. 54,100**

**Int. Cl.[4] H01H** *1/50*

**U.S. Cl. 200—250** **23 Claims**



1. A switch assembly comprising, in combination:
an insulative base, tower, cap, and guide means of one piece of the same insulative material, said insulative base having a first surface and defining an aperture;
a first stationary contact;
means securing said first contact to said insulative base with said first contact disposed on said first surface of said insulative base;
said insulative tower extending from said first surface of said base;
said insulative cap disposed above said aperture in said insulative base;
said tower cap having a facing surface facing said first surface of said insulative base;
an anchor axis substantially perpendicular to said insulative base and extending from said tower cap facing surface toward said base aperture;
a movable contact blade having an anchor end surrounding said anchor axis;
a spring acting between said insulative base and said movable blade adjacent said anchor axis;
a first movable contact carrier on said movable contact blade for make-and-break engagement with said first stationary contact;
said insulative guide means for guiding movement of said movable contact blade for alignment of said first movable contact with said first stationary contact; and
actuator means actuable on said movable contact blade to actuate same toward said insulative base first surface against the urging of said spring to actuate said first movable contact relative to said first stationary contact for said make-and-break cooperation.

**4,743,724**

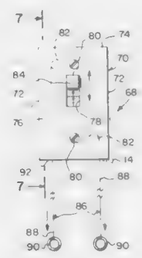
## WALL SWITCH EXTENSION OPERATOR

**Robert S. Goodwin, Jr., P.O. Box 1129, Meridian, Miss. 39301, and George Spector, 233 Broadway, Rm 3815, New York, N.Y. 10007**

**Filed Nov. 10, 1986, Ser. No. 929,080**

**Int. Cl.[4] H01H** *17/02*

**U.S. Cl. 200—331** **1 Claim**



1. An extension control apparatus adapted to be mounted over a wall switch mounted within a wall, the wall switch having a moveable lever extending outwardly therefrom, said lever having an end, said apparatus comprising:
(a) a housing including a pair of side walls, an upper wall and a front wall having an aperture therein through which the lever of the wall switch extends, said housing also including an open bottom;
(b) a pair of upper and lower vertically aligned mounting screws for securing said housing to the wall over said wall switch;
(c) a pair of transverse guide posts, one of said guide posts is mounted fully within said housing parallel to said mounting screws and to one side of said mounting screws, while the other of said guide posts is mounted fully within said housing parallel and to an opposite side with respect to said one of said guide posts;
(d) a cap placed over said end of the lever said cap having a top and bottom; and
(e) means connected to said cap and guided by said posts for selectively moving the lever upwardly and downwardly to operate the wall switch, wherein said means include a pair of spaced parallel cords wherein one of said cords is connected to a top of said cap around said upper mounting screws and an upper of said guide posts and downwardly therefrom through an open bottom of said housing while other of said cords is connected to a bottom of said cap around said lower mounting screw and a lower of said guide posts and downwardly therefrom through said open bottom of said housing.

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**4,743,725**

## COAXIAL LINE MICROWAVE HEATING APPLICATOR WITH ASYMMETRICAL RADIATION PATTERN

**Per O. G. Risman, Härryda, Sweden, assignor to Skandinavisk Torkteknik AB, Gothenburg, Sweden**

**Filed Dec. 8, 1986, Ser. No. 938,906**

**Claims priority, application Sweden, Dec. 5, 1985, 8505774**

**Int. Cl.[4] H01P** *3/06;* **H05B** *6/72*

**U.S. Cl. 219—10.55 F** **6 Claims**

1. A microwave applicator means for the transmission and asymmetrical angularly and axially directed radiation of microwave energy input thereto, for use in preformed holes in masonry and the like for heating and dehumidifying areas around the holes, comprising:
a coaxial transmission line having an axial component z and including an inner conductor disposed at a position r=0 where r is the radial component of the coaxial transmission line, an outer conductor disposed concentrically around the inner conductor, and an electrical insulator of fixed dielectric value disposed between the inner and outer conductors; and
radiating element means formed circumferentially in the coaxial line for radiating said microwave energy in an asymmetrical pattern with respect to the axial component z and the angular co-ordinate of the coaxial line, said radiating element means being in the form of a circumferential discontinuity having a diameter 2r cut in the outer





conductor and defined by a pair of cut edges in the outer conductor which edges are non-parallel to one another, thereby forming an open circumferential area in the outer conductor between said pair of cut edges, the length of said open area along the z axis between said pair of cut edges varying with the angular co-ordinate of the coaxial line as a function having one maximum value and one minimum value.

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**4,743,726**

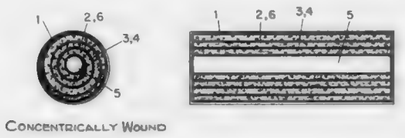
## MICROWAVE ACTIVATED HEATING ELEMENT

**Thomas E. Hughes, P.O. Box 634, Fairhope, Ala. 36533, and Calvin L. Seals, 908 Daphine Circle, Daphne, Ala. 36526**

**Filed Oct. 14, 1986, Ser. No. 918,729**

**Int. Cl.[4] H05B** *6/64*

**U.S. Cl. 219—10.55 F** **14 Claims**



CONCENTRICALLY WOUND

1. A microwave activated heating element comprising:
an outer structure affording a housing and accommodating the passage of high frequency microwaves;
a flexible cellular core for receiving and suspending water in a cooled or heated state while allowing the passage of high frequency microwaves, said core being dimensioned for reception within said housing and for distribution of the water such that the water may thoroughly saturate and lie suspended in the cellular core to receive high frequency microwave energy whereby the rapid buildup of water temperature is effected; and
a heat and flame resistant flexible rubber element having a predetermined thickness and conformal with the water saturated cellular core to facilitate the reception of high frequency microwave energy.

**4,743,727**

## TURNTABLE DRIVE UNIT FOR A MICROWAVE OVEN

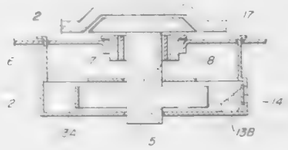
**Whang Joon-Yoen, Kyungsangnam-Do, Rep. of Korea, assignor to Goldstar Co., Ltd., Seoul, Rep. of Korea**

**Filed Apr. 14, 1987, Ser. No. 38,057**

**Claims priority, application Rep. of Korea, Apr. 14, 1986, 864945[U]**

**Int. Cl.[4] H05B** *6/78*

**U.S. Cl. 219—10.55 F** **6 Claims**



1. A turntable drive unit comprising:
a turntable platform for supporting a food product to be heated,
a spring box disposed below said turntable platform,
a shaft member in operative engagement at one end with said turntable platform with the other end thereof extending into said spring box,
a first shape memory alloy spring attached to said shaft member within the spring box,
an aperture disposed in said spring box, said aperture provided with a door member, and
a second shape memory alloy spring attached to said door member whereby upon an increase in the temperature of the spring box containing the first shape memory alloy spring, the said first shape memory alloy spring causes the turntable platform to rotate in one direction and upon further increasing of the temperature of the spring box, the second shape memory alloy spring opens the door member for cooling the spring box, said cooling of the spring box causing the first shape memory alloy spring to rotate in the opposite direction.

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**4,743,728**

## DUAL PATH AIR CIRCULATION SYSTEM FOR MICROWAVE OVENS

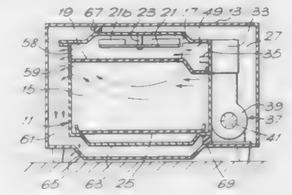
**Makoto Nagafusa, Nagoya; Yoshitoshi Hirate, Komaki, and Minoru Takagi, Tsushima, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed May 12, 1987, Ser. No. 48,881**

**Claims priority, application Japan, May 31, 1986, 61-126368; May 31, 1986, 61-126369**

**Int. Cl.[4] H05B** *6/64*

**U.S. Cl. 219—10.55 R** **6 Claims**



1. A microwave cooking apparatus comprising:
outer casing means having a bottom surface;
heating compartment means for receiving food to be cooked, the heating compartment means having a reflecting zone and a cooking zone;
means for generating microwaves radiated to the reflecting zone in the heating compartment means;

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rotatable reflecting means in the reflecting zone for reflecting the microwaves onto the food in the cooking zone;

fan means for supplying air under pressure into the heating compartment means, the fan means including duct means separating the supplied air into at least a first flow path communicating a portion of the air to the reflecting zone for rotating the reflecting means, and into a second flow path by-passing the reflecting zone and communicating a portion of the air to the cooking zone for ventilating the cooking zone;

air intake opening means provided in the bottom surface of the outer casing means for communicating air from the outside of the cooking apparatus to the fan means; and

exhausting passage means for exhausting air from the heating compartment means to the outside of the cooking apparatus, the exhausting passage means including outward convex portion means provided on the bottom surface of the outer casing means for directing the exhausted air away from the air intake opening means.

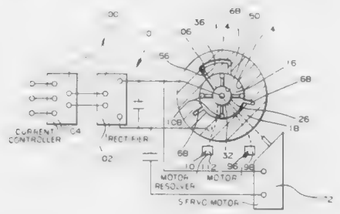
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**4,743,729**

**APPARATUS FOR ELECTRICAL DISCHARGE MACHINING OF A CIRCUMFERENTIAL SECTION FROM A BORE IN A METALLIC CYLINDER**

**William S. Beal, Winter Springs, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Jul. 6, 1987, Ser. No. 69,569**
**Int. Cl.[4] B23H** *7/10, 7/06*
**U.S. Cl. 219—69 W** **13 Claims**




1. An apparatus for the electrical discharge machining of a circumferential section from the wall of a bore in a metallic cylinder, said wall of said bore having a pair of spaced, radially outwardly extending circumferential grooves therein comprising:

a housing;

wire electrode guide means disposed within said housing;

means for continuously feeding a wire electrode to said wire electrode guide means;

means associated with said wire electrode guide means for moving a said wire electrode radially into and out of an axial groove extending between said circumferential grooves in said wall of said bore;

means associated with said wire electrode guide means for moving a said wire electrode, when a said wire electrode is disposed within said axial groove in said wall of said bore, between a first position in which the distance along said wall of said bore between the point where a said wire electrode enters and leaves said axial groove is the same as the distance between said circumferential grooves, and a second position in which the distance along said wall of said bore between the point where a said wire electrode enters and leaves said axial groove is greater than the distance between said circumferential grooves;

means for providing an electrical discharge through a said wire electrode; and

means for rotating said housing circumferentially within said bore.

**4,743,730**

**DEVICE FOR STRAIGHTENING AND CUTTING METALLIC WIRE**

**Francois Martin, and Roland Martin, both of Valleiry, France, assignors to Charmilles Technologies S.A., Geneva, Switzerland**

**Filed Sep. 15, 1986, Ser. No. 907,832**
**Claims priority, application Switzerland, Sep. 16, 1985, 4018/85**
**Int. Cl.[4] B23H** *7/10;* **B21F** *1/02, 11/00;* **C21D** *9/62*
**U.S. Cl. 219—69 W** **14 Claims**



1. A device for straightening and forming a needle like point on a conductive metallic wire, said device comprising; a pair of spaced-apart electrical conductive members connected across a source of electrical current, said pair of conductive members supporting a section of said conductive wire stretched between said pair of conductive members, said pair of conductive members electrically contacting said conductive metallic wire to apply an electrical current to said conductive wire for resistance heating of said conductive wire; and a heat shield disposed at a predetermined location intermediary between said pair of conductive members, said heat shield surrounding at least partially in radial direction a portion of said segment of said conductive wire joining said pair of conductive members, said heat shield having a length substantially less than said segment of electrode wire whereby the amount of heat lost within said portion through convection and radiation by said segment of said conductive wire stretched between said pair of conductive members and heated by the current delivered by said source is reduced causing thus a rupture by constriction of said portion of said wire within said shield and forming said needle-like point on each end of said portion of wire ruptured and heat straightening said segment of conductive wire between said conductive members.

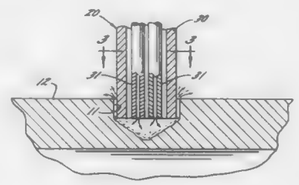
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**4,743,731**

**DISINTEGRATING ELECTRODES**

**Gene E. Seuring, 5697 Hadden Pl., Rockford, Ill. 61111, and Richard C. Lindsay, Rte. 3, Oregon, Ill. 61061**

**Filed Jul. 30, 1987, Ser. No. 79,696**
**Int. Cl.[4] B23K** *9/24;* **B23H** *1/04*
**U.S. Cl. 219—69 R** **14 Claims**



1. An electrode for forming a hole in a metal workpiece, said electrode comprising a rigid and electrically conductive tubular sheath adapted to be connected to a voltage source, said sheath having a working end adapted to be positioned adjacent said workpiece and having an opposite end adapted to communicate with a source of liquid coolant, a cluster of rigid and electrically conductive tubes fixed within the working end portion of said sheath and adapted to communicate with said source of liquid coolant, the coolant being delivered to the working end of said sheath and to said workpiece through said tubes, and flow spaces within said sheath between said tubes for also delivering coolant to the working end of said sheath and to said workpiece.



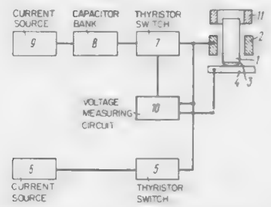
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**4,743,732**

**METHOD OF ELECTRIC-ARC CONDENSER-DISCHARGE PERCUSSION STUD WELDING**

**Jury S. Alpatiev; David M. Kaleko; Georgy F. Kolesnik; Nikolai N. Oseledko, and Natalia A. Chvertko, all of Kiev, U.S.S.R., assignors to Institute Electrosvarki Im. Eo Patona, Kiev, U.S.S.R.**

**Filed May 6, 1987, Ser. No. 47,871**
**Int. Cl.[4] B23K** *9/20*
**U.S. Cl. 219—99** **1 Claim**




1. A method of electric-arc condenser-discharge percussion stud welding, comprising the steps of:

prepositioning a stud to be welded on an article;

retracting the stud from the article, while igniting an auxiliary electric arc between the end of the stud and the article;

moving the stud towards the article;

while moving the stud towards the article, measuring the voltage drop across the auxiliary electric arc, measuring the sum of the electrode voltage drops at the end of the stud and at the article, and determining the difference between these two values, and subtracting from the value of the voltage drop across the auxiliary electric arc the sum of the electrode-adjoining voltage drops at the end of the stud and at the aticle;

initiating the discharge of a welding current supply condenser means when the value of said difference varies in an amount equal to 10 to 90 percent of its initially obtained value;

introducing the stud to be welded into the molten metal of the article; and

butting the end of the stud to be welded and the article to form a welded joint.

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**4,743,733**

**METHOD AND APPARATUS FOR REPAIRING METAL IN AN ARTICLE**

**Paul P. Mehta, Fairfield; Robert R. Otten, and Ernest B. Cooper, Jr., both of Cincinnati, all of Ohio, assignors to General Electric Company, Cincinnati, Ohio**

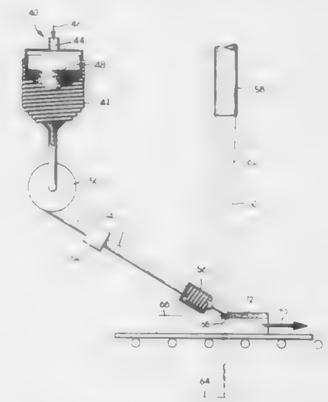
**Filed Oct. 1, 1984, Ser. No. 655,775**
**Int. Cl.[4] B23K** *26/00*
**U.S. Cl. 219—121 LF** **8 Claims**

1. In a method for repairing an article having an article portion of a metallic material, the steps of:

concurrently applying to the article portion a laser beam and a powder comprising metal powder;

the metal powder being of a composition substantially the same as the metallic material of the article portion;

the laser being applied, at a laser beam spot, to the powder and the article portion beneath the powder in a power density range of $10^4$ to $10^6$ watts per square centimeter to melt both the metal powder and material of the article portion to generate a molten interaction zone from the metal powder and the metallic material of the article portion, while



maintaining an interaction time in the range of 0.005–2 seconds between the beam and the powder and article portion beneath the powder thereby reducing the heat affected zone in the article portion and providing a repair layer on the article portion consolidated from the powder and metallic material of the portion.

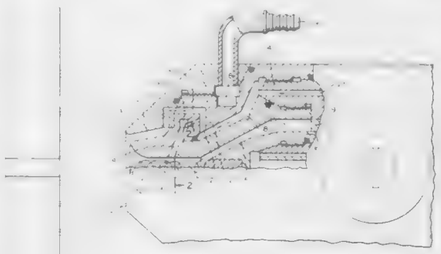
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**4,743,734**

**NOZZLE FOR PLASMA ARC TORCH**

**Dimo T. Garlanov, and Sergey I. Angelov, both of Sofia, Bulgaria, assignors to N P K za Kontrolno Zavarachni Raboti, Sofia, Bulgaria**

**Filed May 15, 1985, Ser. No. 734,443**
**Int. Cl.[4] B23K** *9/00*
**U.S. Cl. 219—121 PP** **2 Claims**



1. Nozzle for plasma arc torch including an internal forming nozzle and an external forming nozzle mounted one within the other and fixed to a plasma arc torch housing in such a way as to form a first and a second gap, the first gap being between the plasma arc torch cathode and an internal forming nozzle in which an internal vortex generator is mounted, an external vortex generator fitted in the second gap, the second gap being connected to races machined in the plasma arc torch housing and a forming race machined in the front part of the internal forming nozzle, said nozzle comprising an intermediate nozzle mounted between the internal nozzle and the external forming nozzle and between the intermediate nozzle and the internal forming nozzle there is formed a third gap, said second gap being formed between said third gap and the external forming nozzle, in the front part of the intermediate forming nozzle

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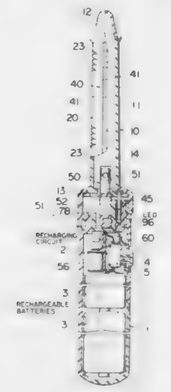
there is disposed a second forming race coaxial with the forming race of the internal forming nozzle where a common forming race is formed, in the contact surfaces of the second gap and the internal forming nozzle there is an intermediary vortex generator having tangential races connected by their one ends with the common forming race and by their other ends are connected to an external circular race connected by a pipe connection, the second gap is connected to the races in the housing by means of the external vortex generator connecting the races of the intermediate forming nozzle and third gap.

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**4,743,735**
**ELECTRIC HAIR CURLER WITH DETACHABLE HANDLE CONTAINING RECHARGEABLE BATTERIES AND CHARGER**

**Yoshinori Abura; Eiji Tsuji; Kenji Okuyama, and Shuhei Ochi, all of Hikone, Japan, assignors to Matsushita Electric Works, Ltd., Japan**

**Division of Ser. No. 697,934, Feb. 4, 1985, Pat. No. 4,641,010. This application Jul. 15, 1986, Ser. No. 885,837**
**Claims priority, application Japan, Feb. 15, 1984, 59-26518**
**Int. Cl.[4] H05B** *3/00;* **H01M** *10/46;* **A45D** *1/04, 2/36*
**U.S. Cl. 219—222** **5 Claims**

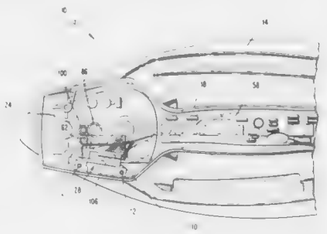



1. A hair curler comprising,
an elongated barrel having a front end, a rear end and an electrical heater for curling hair wound thereon;
a detachable handle having a front end detachably connected to the rear end of said barrel for supporting the barrel;
said electrical heater of said barrel having first electrical connection means at the rear end of said barrel which is adapted to detachably connect with first cooperating electrical connection means in the front end of said handle;
the handle having rechargeable electric battery means connected to said first cooperating electrical connection means for supplying current to the heater and a battery charger carried by said handle and connected to said battery means for charging the battery means;
the handle further having second electrical connection means, in the front end of said handle and connected to said battery charger for connecting the charger to an external source of power, and being accessible only when the handle is detached from the barrel, said second electrical connection means being movable from a first position where it projects from one side of the handle, when said handle is detached from said barrel, to a second position where it is stored within the handle when the handle is supporting the barrel.

**4,743,736**
**SWITCHING APPARATUS FOR AN APPLIANCE CONTROL CIRCUIT**

**Harry Albinger, Jr., Monroe, and Michael J. Marchetti, Bridgeport, both of Conn., assignors to Black & Decker, Inc., Newark, Del.**

**Filed Dec. 31, 1984, Ser. No. 687,842**
**Int. Cl.[4] D06F** *75/26*
**U.S. Cl. 219—250** **20 Claims**



1. An iron, comprising:
a sole plate;
a housing attached to said sole plate;
a heater operable when energized to heat said sole plate;
control means mounted within said housing for controlling energization of said heater;
a temperature select knob mounted on said housing;
means connecting said temperature select knob to said control means; and
a control switch assembly mounted within said housing for generating input signals to said control means, said control switch assembly comprising:
a plurality of output terminals,
a base of electrically insulating material,
a movable contact member,
a pair of conductive members each electrically connected to one of said output terminals and having a plurality of extending conductive fingers, said conductive members being mounted on said base such that fingers of one of said conductive members are in proxmity to fingers of the other of said conductive members, and said conductive members are electrically isolated from each other,
means biasing said movable contact member into engagement with said fingers such that movement of said movable contact member is operable to alternately electrically connect and disconnect fingers of one of said conductive members with fingers of the other of said conductive members; and
conductors electrically connecting said output terminals to said control means, and means coupling said connecting means to said movable contact member;
whereby movement of said temperature select knob is operable to supply an interrupting control signal to said control means.

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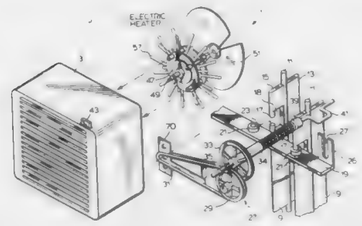
**4,743,737**
**OSCILLATING LOUVER ELECTRIC FAN HEATER**

**Arthur K. Tateishi, Apt. 202, 25 Warrender Avenue, Toronto, Ontario, Canada M9B 5Z4**

**Continuation-in-part of Ser. No. 831,190, Feb. 20, 1986. This application Feb. 6, 1987, Ser. No. 11,886**
**Int. Cl.[4] F24H** *3/04;* **H05B** *1/00;* **F04D** *25/10;* **F24F** *13/16*
**U.S. Cl. 219—368** **5 Claims**

1. A fan heater comprising a stationary housing with a front surface having an air outlet and a back surface having an air inlet, a louver blade assembly having a plurality of oscillating louver blades located at the front surface of said housing for directional control of air movement out of said housing through said air outlet, a drive system for oscillating the louver blade assembly and comprising plastic gears and a rubber drive belt located rearwardly in the housing located in a path of cool air flowing into the housing through the air inlet at the back surface thereof and a rotatable plastic connecting shaft extending forwardly from said plastic gears to said louver blade assembly; means associated with said shaft for converting rotary movement of said shaft to oscillating movement of said louver blades, an electric heater in said housing for providing hot air be heating air flowing through the housing from said air inlet to said air outlet, a fan blade in said housing for causing the flow of air therethrough and a motor in said housing for directly rotating said fan blade and being operatively connected by said drive belt to said gears for rotating said shaft to cause oscillation of said louver blades, said fan blade being





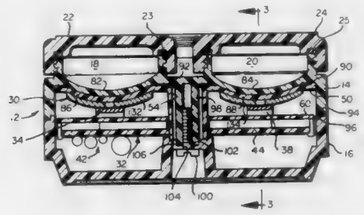
positioned forwardly of said heater which is in turn located forwardly of said rubber drive belt and plastic gears, said rubber drive belt being separated from said heater by a heat shield, said heater being arranged such that said fan blade moves the hot air forwardly away from the heater out through the air outlet at said front surface of said housing past said louver blades away from said rubber drive belt and plastic gears while drawing cooling air in through said air inlet at said back surface of said housing to said plastic gears and rubber drive belt, and said plastic gears and said plastic connecting shaft being located laterally outwardly from said heater to prevent heat related damage to said drive system for said louver blade assembly.

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**4,743,738**
**CONTACT LENS DISINFECTOR**

**Francis E. Ryder, Arab; Rowland W. Kanner, Guntersville, and Fred E. Williams, Arab, all of Ala., assignors to Ryder International Corporation, Arab, Ala.**

**Filed Feb. 9, 1987, Ser. No. 12,432**
**Int. Cl.[4] H05B** *3/14*
**U.S. Cl. 219—521** **11 Claims**



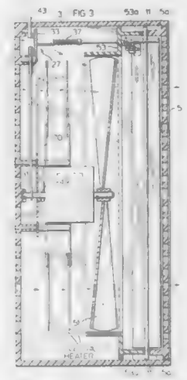
1. A contact lens disinfecting apparatus comprising: a housing including an upper housing part and a lower housing part; receptacle means defined in said upper housing part for receiving at least one contact lens and a quantity of liquid; heating means mounted in said housing and responsive to electrical energy for generating heat energy and configured and located for applying said heat energy to said receptacle means; electrical circuit means mounted in said lower housing part and coupled with said heating means for supplying electrical energy thereto; electrical connector means electrically coupled with said circuit and mounted to said housing for connection to mating electrical connector means for energizing said circuit means; and shield means interposed between said receptacle means and both said heater means and said electrical circuit means and defining collecting means and draining means for collecting and directing outwardly of the housing any liquid which may escape or otherwise occur beneath the receptacle means, so as to prevent said liquid from contacting either of said heater means or said electrical circuit means.

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**4,743,739**
**OSCILLATING LOUVER ELECTRIC FAN HEATER**

**Arthur K. Tateishi, 25 Warrender, Apt. 202, Toronto, Ontario, Canada**

**Filed Feb. 20, 1986, Ser. No. 831,190**
**Int. Cl.[4] F24H** *3/04;* **H05B** *1/00;* **F04D** *25/10;* **F24F** *13/16*
**U.S. Cl. 219—368** **6 Claims**

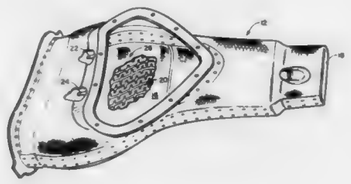


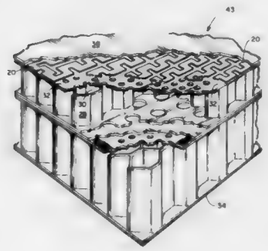
1. A fan heater comprising a stationary housing having a front surface with an air outlet and a back surface with an air inlet, a louvre blade assembly having a series of oscillatable louvre blades located adjacent said air outlet at said front surface for providing multi-directional air flow from said air outlet, a drive system in said housing for said louvre blade assembly, said drive system comprising lightweight plastic gear means and a rubber drive belt positioned adjacent said back surface and a rotatable lightweight plastic connecting shaft extending forwardly from said gear means to means associated with said louvre blade assembly for converting rotation of said shaft to oscillation of said louvre blades, said back surface being vented through said air inlet for outside air movement to said drive system, electric air heating means in said housing for heating the air interiorly of said housing flowing from said air inlet to said air outlet, a fan blade in said housing for circulating the flow of heated air and a motor in said housing for operating both said fan blade and said drive belt for said gear means, said plastic gear means and said connecting shaft being located laterally outwardly away from said electric air heating means to avoid direct exposure to heat therefrom, said fan blade being positioned between said louvre blade assembly and said plastic gear means and rubber drive belt to move the heated air forwardly away from said electric air heating means to said louvre blades and away from said plastic gear means and rubber drive belt and to draw in the outside air through the air inlet of said back surface of said housing to cool said plastic gear means and rubber drive belt for preventing heat related damage thereto.

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**4,743,740**
## BURIED ELEMENT DEICER
**James M. Adee, San Diego, Calif., assignor to Rohr Industries, Inc., Chula Vista, Calif.**
**Filed Oct. 7, 1985, Ser. No. 785,383**
**Int. Cl.**[4] **H05B** *3/10;* **H01C** *3/12;* **B22B** *31/00;* **B64D** *15/00*
**U.S. Cl. 219—548** **8 Claims**



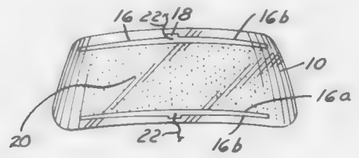


1. Acoustic attenuation and ice-protection material used for aircraft structures which are exposed to the sound of jet engines, other noise producing mechanisms and ice buildup, said material having a predetermined flow-through resistance, comprising:
(a) a honeycomb core having a plurality of endwise directed cells;
(b) an unperforated facing sheet secured to the edges of said cells along one side of said honeycomb core;
(c) a perforated facing sheet secured to the edges of said cells along the other side of said honeycomb to form a Helmholz resonator structure with said unperforated facing sheet and said honeycomb core;
(d) a perforated heating element secured to said perforated facing sheet, perforations in said facing sheet being in alignment with perforations in said heating element; and
a thin sheet of porous material secured to said perforated heating element on the side thereof remote from said perforated facing sheet.

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**4,743,741**
## ELECTRICALLY HEATED, GLASS VISION UNIT
**Kevin J. Ramus, Dearborn, Mich., assignor to Ford Motor Company, Dearborn, Mich.**
**Filed Sep. 11, 1986, Ser. No. 906,002**
**Int. Cl.**[4] **H05B** *3/16;* **H01C** *1/012;* **B05D** *5/12;* **E32B** *3/00*
**U.S. Cl. 219—543** **4 Claims**

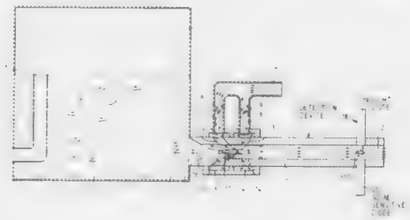
1. An electrically heated glass vision unit which comprises:
a first glass substrate of generally curved configuration;
a pair of electrically conductive bus bars bonded to said first glass substrate at opposite edges of said first glass substrate, said pair of bus bars having inboard edges facing one another and outboard edges facing away from said inboard edges thereof; said inboard edges of said pair of bus bars being spaced equally distant from one another throughout their entire extent;
a conductive coating bonded in part to said first glass substrate and in part to said bus bars, said conductive coating extending between and over said equally distant facing edges of said bus bars whereby when electrical current is applied to said bus bars, a uniform flow of current takes place from one of said bus bars to the other of said bus bars



so that a uniformly developed heat pattern is established between said bus bars; and
means for defining a protective layer over said conductive coating and said bus bars.

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**4,743,742**
## COUNTING DEVICE FOR FISH, ESPECIALLY SMOLT
**Kare Espedalen, Grensegaten 5, N-3290 Stavern, Norway**
**Filed Aug. 22, 1986, Ser. No. 899,423**
**Claims priority, application Norway, Sep. 3, 1985, 853459**
**Int. Cl.**[4] **G06M** *11/00*
**U.S. Cl. 235—1 R** **10 Claims**

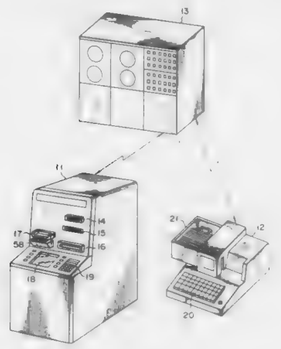


1. In a device for counting fish, the improvement comprising:
a pipe having one, fish-inlet end for connection to a vessel with fish to be counted and an opposite, outlet end;
flow means connected to the pipe between its ends for flowing water towards both ends of the pipe, the flow towards the outlet end of the pipe having the higher velocity; and
a device for detecting each fish passing through the pipe at the outlet end of the pipe, whereby the fish may be counted.

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**4,743,743**
## TRANSACTION APPARATUS
**Kunio Fukatsu, Ebinn, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**
**Filed Mar. 24, 1986, Ser. No. 843,394**
**Claims priority, application Japan, Mar. 30, 1985, 60-66826**
**Int. Cl.**[4] **G06F** *15/30*
**U.S. Cl. 235—379** **9 Claims**

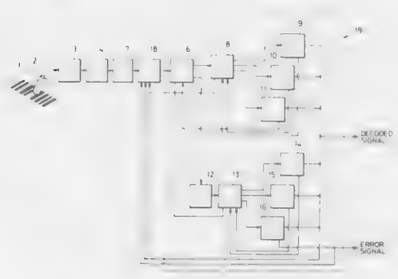
1. A transaction apparatus comprising:
deposit medium receiving means with a single opening portion for receiving at least one of a check having check information and a bill as a deposit medium having bill information;
reading means for reading the check information and the bill information from said check and bill;
examination means for examining the bill and check received by said deposit medium receiving means, on the basis of said check information and said bill information; and



storage means for storing the bill and check having been accepted by said examination means.

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**4,743,744**
## BAR CODE READER
**Koji Nakase, and Junichi Ouchi, both of Furukawa, Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan**
**Filed Jul. 2, 1986, Ser. No. 881,200**
**Claims priority, application Japan, Jul. 9, 1985, 60-151914**
**Int. Cl.**[4] **G06K** *7/10*
**U.S. Cl. 235—472** **1 Claim**

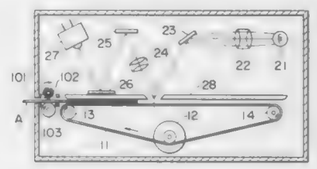


1. A bar code reader comprising in series a counting circuit outputting a counter value corresponding to a signal detected by an optical head, a code converter for converting said counter value into a multilevel image signal, a memory circuit for storing said multilevel signal input from said code converter and an automatic discriminating and decoding circuit for reading said multilevel signal stored in said memory circuit, discriminating and decoding.

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**4,743,745**
## OPTICAL MEMORY CARD READER
**Kenjiro Kachi, Tsurugashima, and Tetsuya Honda, Shiki, both of Japan, assignors to Kabushiki Kaisha Nippon Coinco, Tokyo, Japan**
**Filed Dec. 2, 1986, Ser. No. 937,066**
**Claims priority, application Japan, Dec. 5, 1985, 60-187579**[U]
**Int. Cl.**[4] **G06K** *13/00*
**U.S. Cl. 235—482** **5 Claims**

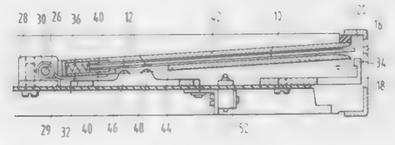
1. An optical memory card reading device comprising:
card feed means for feeding a card inserted into a card insertion inlet of said device into said device;
an optical reader for illuminating the memory surface of the optical memory card thus fed with light rays and receiving the reflected light rays from the memory surface by a light receiving element;
a circuit for converting the information read out from said optical reader into an electrical signal which in turn is



analyzed to detect the contents in the memory of said card; and
a card cleaning means disposed adjacent to said card insertion inlet for cleaning the memory surface of said card.

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**4,743,746**
## RECEIVING UNIT FOR A DATA CARD CONTAINING AN ELECTRONIC CIRCUIT
**Werner Murschall, Leopoldshoehe, and Gerd Neumann, Paderborn, both of Fed. Rep. of Germany, assignors to Nixdorf Computer AG, Paderborn, Fed. Rep. of Germany**
**Filed Nov. 18, 1985, Ser. No. 799,121**
**Claims priority, application Fed. Rep. of Germany, Dec. 11, 1984, 3445185**
**Int. Cl.**[4] **G06K** *7/00*
**U.S. Cl. 235—486** **5 Claims**



1. Receiving unit for receipt of a data card containing an electronic circuit for an apparatus to be put into operation by means of the data card, said receiving unit having a push-in frame with a receiving compartment therein for the data card, said frame being pivotable between an input/output position and an operating position in which the receiving compartment is inaccessible and in which contact elements of the receiving unit, through an opening in the push-in frame, rest against contact elements of the data card, locking means for fixing the push-in frame in its operating position and biasing means for biasing the push-in frame to the input/out position; said receiving unit comprising:
a face plate having an input/output slot therein for receipt and discharge of said data card, said push-in frame being positioned behind said face plate with said receiving compartment aligned with said input/output slot when said push-in frame is in the input/output position so that said card can be inserted into said push-in frame through said input/output slot;
an elastically deflectable restoring unit arranged in said receiving compartment opposite said face plate biasing said data card in the direction of said face plate;
a catch projection fixed to said face plate a spaced distance from said input/output slot, said catch projection overlapping said data card when said push-in frame is pivoted to said operating position to retain said data card in said operating position, said elastically deflectable restoring unit biasing said data card under said catch projection to maintain said overlap for keeping said data card in said operating position;

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an opening in said face plate extending through said face plate and catch projection, said opening being adjacent said data card when said push-in frame and data card are in said operating position, said data card being accessible through said opening to be pushed against said elastically deflectable restoring unit to move said data card away from said catch projection to thereby release said data card and said push-in frame being biased to said input/output position, said elastically deformable restoring unit biasing said data card into said input/output slot upon reaching said input/output position.

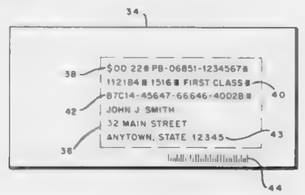
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**4,743,747**

## POSTAGE AND MAILING INFORMATION APPLYING SYSTEM

**Guy L. Fougere, Easton, Conn.; Kevin D. Hunter, Redbank, N.J.; Ronald P. Sansone, Weston, and Alfred C. Schmidt, Jr., Wilton, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.**

**Continuation-in-part of Ser. No. 762,994, Aug. 6, 1985. This application Feb. 25, 1986, Ser. No. 832,802**
**Int. Cl.[4] G06K** *19/06*
**U.S. Cl. 235—494** **8 Claims**




1. A system including a computer for providing self authentication on a mail piece, comprising:

a card

means for providing communication between said card and the computer

encryption means supported by said card and operative to derive an encrypted message based upon recipient address information,

means for communicating recipient address information to said encryption means, and

means for placing onto a mail piece an encrypted message derived from said recipient address information by said encryption means such that a relationship between said recipient address information and said encrypted information can be used to authenticate said mail piece.

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**4,743,748**

## THREE-DIMENSIONAL DISPLAY SYSTEM WITH A FEEDBACK CONTROL LOOP SENSITIVE TO THE INSTANTANEOUS POSITIONING OF A FLEXIBLE MIRROR MEMBRANE

**Thomas P. O'Brien, 682 Deerpath Dr., Deerfield, Ill. 60015**

**Filed Aug. 9, 1985, Ser. No. 764,116**
**Int. Cl.[4] G01J** *1/20*
**U.S. Cl. 250—201** **4 Claims**

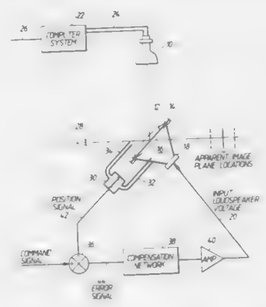
1. A three-dimensional display system comprising:

(a) a volumetric display mechanism including a flexible mirror membrane from which images may be reflected and means for positioning said membrane in response to an input signal;

(b) control means for generating a command signal indicative of the desired positioning of said membrane;

(c) sensing means for detecting the actual positioning of said membrane and for generating a position signal indicative of said actual positioning of said membrane; and

(d) feedback means, responsive to said command signal and said position signal, for generating an error signal indicative of the difference between said desired positioning of said membrane and said actual positioning of said membrane and for applying said error signal to said volumetric display mechanism as said input signal.




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**4,743,749**

## SELF COMPENSATING CIRCUIT FOR MEASURING RAPIDLY OCCURRING OPTOELECTRONICALLY DETECTABLE EVENTS

**Reed H. Grundy, Murrysville, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.**

**Continuation-in-part of Ser. No. 772,977, Sep. 5, 1985, Pat. No. 4,610,707. This application Aug. 25, 1986, Ser. No. 899,568**
**Int. Cl.[4] G01J** *1/32*
**U.S. Cl. 250—205** **2 Claims**



1. A self compensating circuit comprising a first circuit having a light emitter and a light detector forming a first light path, means to produce a signal representing the intensity of the detected light, means to amplify said signal to produce a second signal, a second circuit having a second light emitter and a second light detector forming a second light path, means to produce a third signal representing the intensity and the detected light from said second light emitter, means to amplify said third signal to produce a fourth signal, said first and second light paths being electrically out of phase so that the sum of the second and fourth signal from the light outputs from the light detectors are a constant, means to feed the said second and fourth signals through a slowly reacting circuit means which produces a fifth signal, said fifth signal, when fed to said first and second circuits and their associated light emitters to thereby maintain the flux of each of said light emitters constant as the slow reacting circuits is subjected to rapid changes in each of the light fluxes of each light emitter caused by short interruptions of those light fluxes.



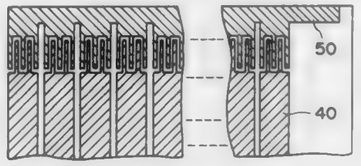
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**4,743,750**

## PROCESS FOR FORMING PHOTOSENSOR FROM SI(X) PRECURSOR AND ACTIVATED HYDROGEN

**Toshiyuki Komatsu, Yamato; Masaki Fukaya, Yokohama, and Satoshi Itabashi, Atsugi, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 9, 1986, Ser. No. 849,877**
**Claims priority, application Japan, Apr. 16, 1985, 60-80862**
**Int. Cl.[4] H01J** *40/14*
**U.S. Cl. 250—211 R** **4 Claims**




1. A method of manufacturing a photosensor having a substrate, a photoconductive layer formed on said substrate and containing amorphous silicon, a pair of electrodes electrically connected to said photoconductive layer and a light receiving section having a predetermined area for applying light to said photoconductive layer, wherein said photoconductive layer is formed by producing a precursor (SiX) including at least silicon atoms and halogen atoms and an active seed (H) including hydrogen atoms, at the region outside of a layer forming spatial region where said photoconductive layer is formed, and next by introducing said precursor and said active seed into said layer forming spatial region.

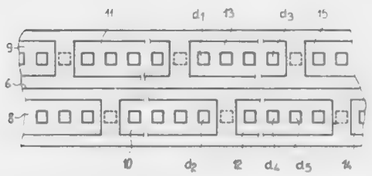
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**4,743,751**

## DEVICE FOR THE OPTICAL ABUTMENT OF PHOTOSENSITIVE DETECTORS

**Marc Arques, Grenoble, and Jean P. Moy, St. Egreve, both of France, assignors to Thomson-CSF, Paris, France**

**Filed Apr. 16, 1986, Ser. No. 852,715**
**Claims priority, application France, Apr. 30, 1985, 85 06570**
**Int. Cl.[4] H01J** *40/14*
**U.S. Cl. 250—211 R** **12 Claims**




1. A device for the optical abutment of strips of photosensitive detectors comprising:

two prisms joined together to form a semireflecting face therebetween and two external faces;

at least two strips of photosensitive detectors mounted on an external face of each prism extending at right angles to one another for producing outputs corresponding to incident illumination, said strips having a given minimal length and being separated from the adjacent strip by a gap much smaller than said minimal length, the strips on one of the external faces being displaced in relation to the strips on the other external face so that the gap on one face is located in front of a portion of the strip on the other face, and the gap on the other face is located in front of a portion of the strip of said one face;

means for adding the signals from the two detectors mounted on different prisms disposed one above the other.

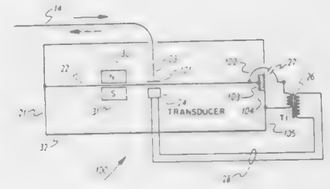
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**4,743,752**

## FIBER OPTIC REMOTE SENSOR

**Everett O. Olsen; Christopher R. Brown, both of Wrentham, and Gordon W. Chitty, Norfolk, all of Mass., assignors to The Foxboro Company, Foxboro, Mass.**

**Continuation of Ser. No. 607,532, May 7, 1984, abandoned. This application Jan. 28, 1987, Ser. No. 8,209**
**Int. Cl.[4] G01D** *5/28;* **G01L** *1/10*
**U.S. Cl. 250—227** **34 Claims**




1. Self-sustaining resonant oscillator apparatus energized solely by radiant energy carried by an optical pathway, comprising:

(a) vibratable mechanical resonator;

(b) motive means for vibrating said mechanical resonator;

(c) single optical pathway means for communicating radiant energy from a first point to a second point;

(d) radiant energy source means located apart from said resonant element apparatus, said radiant energy source means providing radiant energy to said optical pathway at said first point;

(e) terminal end means for terminating said optical pathway at the second point, located adjacent said resonant element, such that the radiant energy exiting said optical pathway is directed toward said resonant element;

(f) transducer means for converting optical energy to electrical energy, located opposite said resonant element from said terminal end of said optical pathway, in which the transducer, resonant element, and terminal end means are displaced one from the other with the resonant element positioned at least partially between said terminal end means and said transducer means;

(g) electrical communications means for communicating electrical current from said transducer means to said motive means;

wherein said motive means for vibrating said resonant element is energized solely by said transducer means, and said resonator means is vibrated transversely back and forth between said transducer means and said terminating end means such that radiant energy exiting the terminating end means is first at least partially blocked from reaching said transducer means and alternately strikes said transducer means.

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**4,743,753**

## METHOD AND APPARATUS FOR CARRYING OUT FIBER OPTIC TIME DOMAIN REFLECTOMERY WHEREIN GOLAY COMPLEMENTARY SEQUENCES ARE APPLIED

**John Cheng, Portland; Jeffrey H. Goll, Lake Oswego, and J. Nelson Edwards, Bend, all of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.**

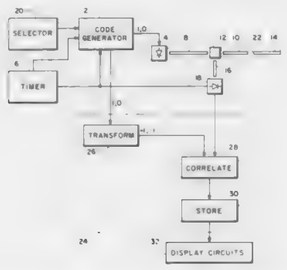
**Filed Sep. 5, 1986, Ser. No. 903,916**
**Int. Cl.[4] G01N** *21/00*
**U.S. Cl. 250—227** **7 Claims**

1. A method of carrying out a measurement on a medium that propagates energy in a selected form, comprising applying

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power in said selected form to the medium, the level at which power is applied varying as a function of time in accordance with the elements of at least two Golay complementary sequences where one kind of element is represented by a first non-negative power level and the other kind of element is




represented by a second non-negative power level and successive elements of each sequence are applied at uniform intervals, receiving power emitted in said selected form from the medium and correlating the level at which power is emitted with the level at which power was applied.

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**4,743,754**

**LENGTH- OR ANGLE-MEASURING ARRANGEMENT**

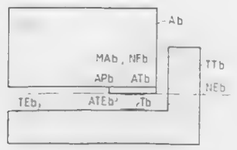
**Alfons Ernst, Traunreut, Fed. Rep. of Germany, assignor to Dr. Johannes Heidenhain GmbH, Traunreut, Fed. Rep. of Germany**

**Filed Jun. 18, 1987, Ser. No. 64,994**

**Claims priority, application Fed. Rep. of Germany, Jun. 25, 1986, 3621236**

**Int. Cl.[4] G01D** *5/34;* **H01J** *3/14;* **G01B** *11/00*

**U.S. Cl. 250—237 G** **4 Claims**




1. In a length- or angle-measuring arrangement for measuring the relative position of two objects, in which graduation in a graduation plane of a graduation carrier connected with one of said objects lies outside the neutral plane of the graduation carrier and is scanned by means of a scanning graduation in a scanning graduation plane of a scanning unit connected with the other of said objects, the improvement which comprises, arranging the scanning graduation plane (ATEa; ATEb) with the scanning graduation (ATa; ATb) of the scanning unit (Aa; Ab) in the neutral plane (NEa; NEb) of the graduation carrier (TTa; TTb).

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**4,743,755**

**METHOD AND APPARATUS FOR MEASURING AZIMUTH AND SPEED OF HORIZONTAL FLUID FLOW BY A BOREHOLE**

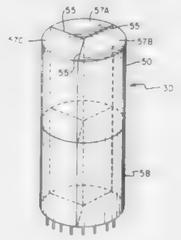
**Thomas M. Williams, Houston, Tex., assignor to Texaco Inc., White Plains, N.Y.**

**Filed Dec. 23, 1985, Ser. No. 812,201**

**Int. Cl.[4] G01V** *5/00*

**U.S. Cl. 250—266** **29 Claims**

1. Well logging apparatus comprising:
a sonde;
a neutron source within said sonde;
a gamma ray detection assembly within said sonde, said gamma ray detection assembly includes
a segmented scintillation crystal, and
a segmented photomultiplier tube optically coupled to said segmented crystal, and said gamma ray detection assembly being displaced from said neutron source longitudinally along said sonde with the segments of the




crystal and the photomultiplier tube being disposed symmetrically about the longitudinal axis of said sonde; and
an additional gamma ray detector within said sonde displaced longitudinally along said sonde from said gamma ray detection assembly and said neutron source and disposed generally along the longitudinal axis of said sonde.

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**4,743,756**

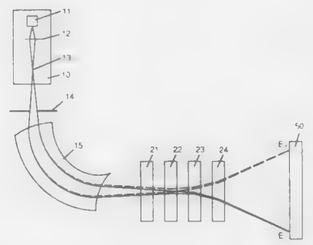
**PARALLEL-DETECTION ELECTRON ENERGY-LOSS SPECTROMETER**

**Ondrej L. Krivanek, Oakland, Calif., assignor to Gatan Inc., Pleasanton, Calif.**

**Filed Aug. 10, 1987, Ser. No. 83,629**

**Int. Cl.[4] H01J** *49/44*

**U.S. Cl. 250—305** **11 Claims**




1. An apparatus for producing and detecting an energy spectrum of electrons, comprising:
(a) a means for producing a beam of electrons of various energies;
(b) an energy-dispersing device dispering said beam into an energy spectrum of small energy dispersion;
(c) a parallel detection means detecting a range of energies of said spectrum simultaneously;
(d) a plurality of variable-power quadrupole lenses, of which at least two are strong quadrupole lenses having focal lengths which are shorter than the distance from said energy -dispersing device to the one of said quadrupole lenses which is closest to said energy-dispersing device,



said quadrupole lenses being disposed between said energy-dispersing device and said detecting means, and projecting a focused and magnified image of said spectrum onto said detection means; and
(e) a means for changing the strength of said quadrupole lenses such that the energy dispersion and width of the focused spectrum are freely adjustable and independent.

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**4,743,757**

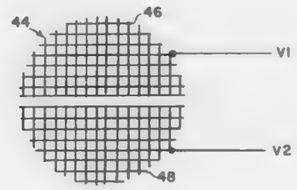
**SECONDARY ELECTRON EMISSION CONTROL IN ELECTRON MICROSCOPES**

**Vincent J. Coates, Palo Alto, Calif., assignor to Nanometrics Incorporated, Sunnyvale, Calif.**

**Filed Oct. 30, 1986, Ser. No. 924,806**

**Int. Cl.[4] H01J** *37/04*

**U.S. Cl. 250—310** **4 Claims**




2. In an electron microscope having an electron beam adjusting means at a reference potential for focusing an electron beam on a specimen, secondary emission electron detection means including a scintillator at a high positive potential for detecting secondary emission electrons released by an electron bombarded specimen, and a low voltage grid interposed between the scintillator and the specimen for attracting released secondary emission electrons, the improvement comprising:
a split grid formed of first and second co-planar grids interposed between the specimen and the low voltage grid means for applying a first positive potential to the first grid in said co-planar grids and applying to the second grid of said co-planar grids a second positive potential variable above and below the potential on said first grid.

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**4,743,758**

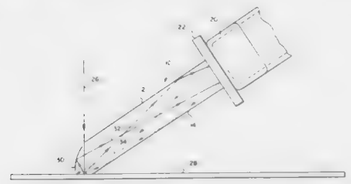
**LIGHT COLLECTOR FOR PHOTO-STIMULABLE PHOSPHOR IMAGING APPARATUS**

**Yali E. Chan; John C. Boutet; Robert W. Kulpinski, all of Rochester; Anthony R. Lubinsky, Webster, and James F. Owen, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Oct. 14, 1986, Ser. No. 917,935**

**Int. Cl.[4] G01T** *1/105*

**U.S. Cl. 250—327.2** **10 Claims**



1. A light collector for collecting and detecting emitted light from a raster scanned photo-stimulable phosphor sheet in a photo-stimulable phosphor image apparatus is characterized by:
a generally rectangular mirror box having relatively wide plane mirrors on the top and bottom, relatively narrower mirrors on the two opposite sides, and two opposite open ends, one of said open ends being arranged adjacent the scan line on the photostimulable phosphor sheet;
a plurality of photomultiplier tubes having light receiving faces arranged at the other open end of the mirror box; and
an elongated mirror arranged opposite said one open end of said mirror box for directing light emitted from said phosphor sheet into the open end of said mirror box.

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**4,743,759**

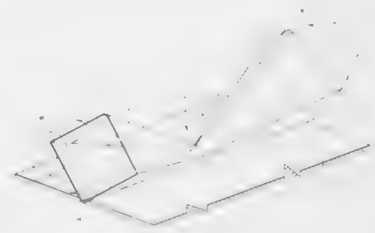
**LIGHT COLLECTOR FOR PHOTO-STIMULABLE PHOSPHOR IMAGING SYSTEM**

**John C. Boutet, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Oct. 14, 1986, Ser. No. 917,936**

**Int. Cl.[4] G01T** *1/105*

**U.S. Cl. 250—327.2** **5 Claims**



3. A mirror box light collector for collecting and detecting light emitted from a photo-stimulable phosphor sheet scanned by a beam of stimulating radiation, characterized by:
a. a bottom roof-mirror extending the width of the photo-stimulable phosphor sheet, and defining a slot along the peak of the roof-mirror for passing a scanning beam to the surface of the photo-stimulable phosphor sheet and for allowing light emitted by the photo-stimulable phosphor sheet to enter the collector,
b. a top roof-mirror positioned over the bottom roof-mirror to define a mirror box having a nearly square cross-section, said top roof-mirror defining a slot along its peak with its centerline coplanar with the centerline of the slot is said bottom roof-mirror, said slot defined by said top roof-mirror being as wide as or wider than said slot defined by said bottom roof-mirror, for passing a scanning beam through the mirror box to said slot in said bottom roof-mirror said top and bottom roof-mirrors being tapered so that the nearly square cross-section of the mirror box is largest at at least one end of the mirror box;
c. photodetector means having a light receiving face located at the large end of the mirror box, for receiving light emitted by the photo-stimulable phosphor sheet and generating an electrical signal in response thereto; and
d. a light trap adjacent the slot in the bottom roof-mirror for preventing reflected stimulating radiation from being re-reflected onto the stimulable phosphor so as to reduce predischarge of the stimulable phosphor.

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**4,743,760**

**METHOD AND APPARATUS FOR METERING FLOWABLE PARTICULATES**

**Alan F. Giles, St. Neots, Great Britain, assignor to Thomas J. Lipton, Inc., Englewood Cliffs, N.J.**

**Filed Jun. 25, 1986, Ser. No. 878,136**

**Claims priority, application United Kingdom, Jun. 26, 1985, 8516181**

**Int. Cl.[4] G01F** *13/00;* **G01V** *9/04;* **B07C** *5/02*

**U.S. Cl. 250—222.2** **8 Claims**

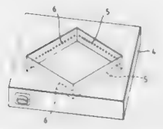
4. An apparatus for metering flowable particulates compris-

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ing a frame member having at least one radiation source for transmitting parallel radiation beams and having a plurality of detectors for receiving said beams, feeding means for separately feeding the particulates at a uniform speed as a flow through said beams, means for conducting information about obstructions of the beams between the sources and the detec-





tors to a computing means, the computing means being adapted to compute therefrom a value which represents the total amount of particulate material present in the array of beams and to totalize these values with time and means for monitoring the flow of particulates beyond the beams in dependence on this totalized value.

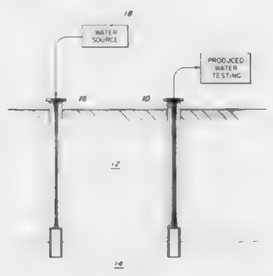
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**4,743,761**

## NATURAL TRACER FOR SECONDARY RECOVERY WATER INJECTION PROCESS

**Arne Raheim, Ski, and Philip C. Smalley, Hagan, both of Norway, assignors to Conoco Inc., Ponca City, Okla.**

**Filed Dec. 19, 1986, Ser. No. 944,287**
**Int. Cl.[4] G01V** *9/02*
**U.S. Cl. 250—259** **4 Claims**




1. A process for determining injection water breakthrough in a water injection enhanced oil recovery operation utilizing natural strontium isotope ratios comprising the steps of:
(a) determining the natural strontium isotope ratio for water present in an oil bearing formation;
(b) determining the natural strontium isotope ratio for an injection water source;
(c) injecting water from said injection water source through an injection well into the oil bearing formation to displace oil and water from said formation through a production well;
(d) monitoring the natural strontium isotope ratio of water produced from said oil bearing formation through said production well; and
(e) comparing the monitored natural strontium isotope ratio with the known natural strontium isotope ratio for water present in said oil bearing formation and determining a change in the monitored ratio towards the natural strontium isotope ratio of the injection water.

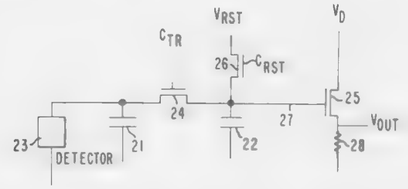
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**4,743,762**

## NOISE IMMUNE INFRARED READOUT CIRCUITRY AND TECHNIQUE

**Steve D. Gaalema, Encinitas; Mary J. Hewitt, Santa Barbara, and Arthur L. Morse, Hawthorne, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Continuation-in-part of Ser. No. 683,983, Dec. 20, 1984. This application Aug. 12, 1986, Ser. No. 895,649**
**Int. Cl.[4] G01T** *1/22*
**U.S. Cl. 250—336.1** **3 Claims**




1. A method of obtaining a signal from a radiation detector comprising the steps of:
conductively coupling together a first capacitor and a second capacitor;
resetting the first capacitor and the second capacitor to a predetermined voltage potential;
conductively uncoupling the first capacitor from the second capacitor;
integrating on the first capacitor for a predetermined interval of time an output signal from a radiation detector to produce a detector signal voltage potential across the first capacitor;
determining the magnitude of a quiescent voltage potential across the second capacitor, the quiescent voltage potential being a function of the predetermined voltage level;
conductively coupling together the first and the second capacitors;
equilibrating the detector signal voltage potential and the quiescent voltage potential to obtain a difference voltage potential; and
determining the magnitude of the difference voltage potential, the magnitude of the difference voltage potential being a function of an amount of radiation incident upon the radiation detector during the predetermined interval of time.

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**4,743,763**

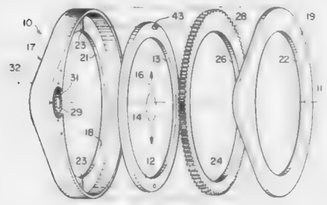
## ARTICLE MOUNTING AND POSITION ADJUSTMENT STAGE

**Ronald W. Cutburth, Tracy, and Leonard L. Silva, Livermore, both of Calif., assignors to The United States of America as repesented by the United States Department of Energy, Washington, D.C.**

**Filed Sep. 26, 1986, Ser. No. 911,844**
**Int. Cl.[4] G02B** *7/02*
**U.S. Cl. 250—239** **19 Claims**

1. An adjustment stage for selectively adjusting the position of an object transverse to an axis through a hole in said stage, comprising:
a ring adapted for mounting said object, said ring having a pair of spaced apart locating pins extending therefrom and a third locating pin extending therefrom;
a housing for holding said ring and having first and second end walls with beam transmission holes therein coincident with said axis, the first end wall having a keyway therein adjacent said ring extending transverse to said axis for





receiving said pair of locating pins to permit reciprocal movement of said ring along a path defined by said transverse keyway;
a ring gear having an eccentric keyway on one side thereof adjacent said ring for receiving the third locating pin; and
means for rotating said ring gear to thereby move said ring and mounted object along said path.

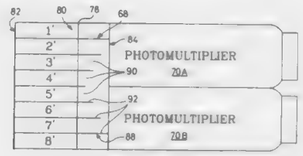
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**4,743,764**

## TWO DIMENSIONAL PHOTON COUNTING POSITION ENCODER SYSTEM AND PROCESS

**Michael E. Casey; Ronald Nutt, and Terry D. Douglas, all of Knoxville, Tenn., assignors to Computer Technology and Imaging, Inc., Knoxville, Tenn.**

**Filed Dec. 4, 1984, Ser. No. 677,931**
**Int. Cl.[4] G01T** *1/20*
**U.S. Cl. 250—363 S** **9 Claims**




1. A two dimensional photon position encoder system, including a scintillation detector which enhances the spatial resolution of the situs of the origin of photons incident thereon, position encoder system comprising:
a plurality of scintillator material members which interact with incident gamma rays to produce a quantifiable number of photons;
a tuned light guide having a plurality of optical barriers of predetermined lengths which define slots, each of said slots being operatively associated with one of said scintillator material members whereby photons exiting said scintillator material members enter an operatively associated slot in said slotted light guide, said slots having a preselected depth to control the distribution of photons along the axial and transaxial dimensions of said slotted light guide; and
means operatively associated with said light guide at a location remote from said scintillator material members for detecting the distribution of said photons at preselected locations on said slotted light guide whereby said gamma rays produce optical photons which are distributed by said tuned light guide in a controlled statistical pattern and are detected by said means for detecting the distribution of said photons.

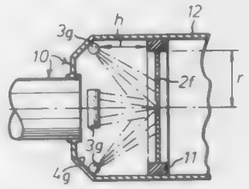
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**4,743,765**

## ARRANGEMENT OF A SIGHTING MARK AND A LIGHT-PRODUCING SOURCE OF ENERGY THEREFOR

**John A. I. Ekstrand, Löberöd, Sweden, assignor to Interaims Aktiebolag, Malmo, Sweden**

**Continuation of Ser. No. 777,196, Sep. 18, 1985, abandoned. This application Jul. 10, 1987, Ser. No. 72,156**
**Claims priority, application Sweden, Sep. 19, 1984, 8404685**
**Int. Cl.[4] F21K** *2/00*
**U.S. Cl. 250—467.1** **5 Claims**



1. In a telescopic sighting tube, a luminous sighting arrangement, comprising a reflective sighting mark mounted within said sighting tube and substantially centered on a longitudinal axis of said sighting tube, and at least one light-producing source in the form of a capsule enclosing a $\beta$-ray producing substance $\beta$-ray to light connecting substance, said capsule being mounted in said sighting tube at a point on a circle centered on said longitudinal axis of said sighting tube, at a radial distance of at least 1r from said longitudinal axis and at an axial distance of between 1r and 2r from a plane perpendicular to said longitudinal axis and passing through the center of said sighting mark, where r is the radius from the center of said sighting mark to the periphery of a light opening in the sighting tube at the level of said plane, with means being provided for directing light from said capsule to said sighting mark, said sighting mark reflecting light produced by said capsule and thereby appearing luminous within said sighting tube.

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**4,743,766**

## METHOD OF DRAWING A DESIRED PATTERN ON A TARGET THROUGH EXPOSURE THEREOF WITH AN ELECTRON BEAM

**Mamoru Nakasuji, Yokohama, and Izumi Kasahara, Numazu, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki and Toshiba Machine Co., Ltd., Tokyo, both of, Japan**

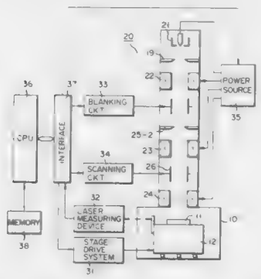
**Continuation of Ser. No. 784,048, Oct. 4, 1985, abandoned. This application Jul. 17, 1987, Ser. No. 75,268**
**Claims priority, application Japan, Oct. 9, 1984, 59-211965; Sep. 3, 1985, 60-194115**
**Int. Cl.[4] H01J** *37/302*
**U.S. Cl. 250—492.2** **7 Claims**

1. An electron beam exposure method for selectively exposing a target to a desired pattern through irradiating of the target surface with an electron beam comprising the steps of:
exposing the area of the target surface corresponding to either a pattern or a background other than the pattern with an electron beam; and
exposing an area of the target surface other than the aforesaid area with an electron beam;
the exposure of the pattern area at a predetermined first dose being performed by setting first unit of exposed area, having a certain size constituting the pattern and using an electron beam having a first spot size corresponding to said first unit of exposed area; and wherein
the exposure of the background area at a predetermined second dose is controlled by a stored pattern which is

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stored by using a fewer number of bits to define the exposed surface than is used to define the exposed surface during the exposure of the pattern area and wherein said




background exposure is performed by setting the second unit of exposed area, having N (N>1) times the size of the first unit of exposed area.

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**4,743,767**

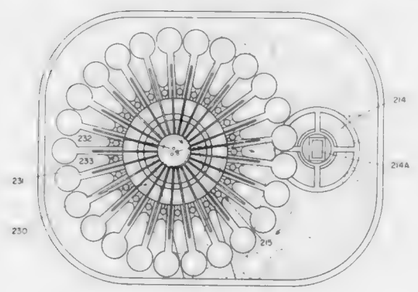
**SYSTEMS AND METHODS FOR ION IMPLANTATION**

**Frederick Plumb, Horsham; Christopher Wright, Findon; Nicholas J. Bright, Cowfold; Derek Aitken, Dorking, and Bernard Harrison, Copthorne, all of England, assignors to Applied Materials, Inc., Santa Clara, Calif.**

**Continuation-in-part of Ser. No. 774,110, Sep. 9, 1985. This application Sep. 9, 1986, Ser. No. 905,719**

**Int. Cl.**[4] **H01J** *37/317*

**U.S. Cl. 250—492.2** **5 Claims**



1. In a method for accurately measuring the dose of ions implanted into a workpiece in an ion implantation system, the steps of:

generating an ion beam characterized by beam current stability;

directing said ion beam along a prearranged path toward a beam collecting means;

scanning a workpiece through said ion beam in a prearranged combined relatively fast scan directional motion and a relatively slow scan directional motion, with said workpiece entirely leaving said path of said ion beam at the end of the slow scan directional motion;

measuring ion beam current on said beam collecting means at the end of each slow scan directional motion of said workpiece;

calculating average ion beam current striking said workpiece during each slow scan directional motion as the average of two successive ion beam current measurements before and after said slow scan directional motion;

calculating ion dose delivered to said workpiece based on the calculated average ion beam current; and

controlling the ion beam to a selected current level designed to provide a selected total ion dose based upon the calculated ion dose.

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**4,743,768**

**METHOD AND APPARATUS FOR MEASURING NON-LINEARITY OF A PATTERN EDGE**

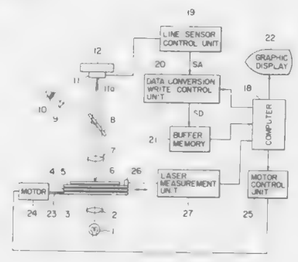
**Tomohide Watanabe, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan**

**Filed Jan. 3, 1986, Ser. No. 815,927**

**Claims priority, application Japan, Jan. 9, 1985, 60-1766**

**Int. Cl.**[4] **C06K** *9/03*

**U.S. Cl. 250—556** **13 Claims**




1. A method of measuring non-linearity of a pattern edge comprising the steps of:

disposing a pattern to be measured so that a photosensitive picture element column in a light-receiving unit is substantially parallel with a pattern edge of an image of said pattern to be measured;

moving said light-receiving unit or said image of the pattern to be measured so that said photosensitive picture element column in said light-receiving unit traverses said pattern edge of the image of the pattern to be measured in a manner substantially perpendicular thereto;

memorizing a signal indicative of light received by said photosensitive picture element column at each of a plurality of predetermined moving distances of said light-receiving unit or said pattern to be measured;

determining a pattern edge postion per each photosensitive picture element by making use of said signal indicative of the received light thus memorized; and

computing a non-linearity of the pattern edge on the basis of the determined pattern edge positions.

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**4,743,769**

**NON-CONTACTING MEASURING APPARATUS FOR MEASURING A DISPLACEMENT IN DEPENDENCE ON THE INCIDENCE OF A LASER BEAM ON A LASER BEAM DETECTOR**

**Max Schwaiger, Ostermiething, and Heinz Rieder, St. Pantaleon, both of Austria, assignors to RSF-Electronik Gesellschaft m.b.H., Tarsdorf, Austria**

**Filed Sep. 3, 1986, Ser. No. 903,464**

**Claims priority, application Austria, Sep. 11, 1985, 2654/85**

**Int. Cl.**[4] **G01B** *11/00*

**U.S. Cl. 250—560** **10 Claims**

1. A non-contacting measuring apparatus comprising

(a) a frame bounding a measuring area and including one leg extending in a first direction and two legs extending in a second direction perpendicularly to the first direction, the one leg rigidly connecting the two legs,

(b) first and second tracks extending in the two legs in the second direction on opposite sides of the measuring area,

(c) a laser beam transmitter having a beam transmitting element for projecting a laser beam in a predetermined scanning plane across the measuring area in the first direction,

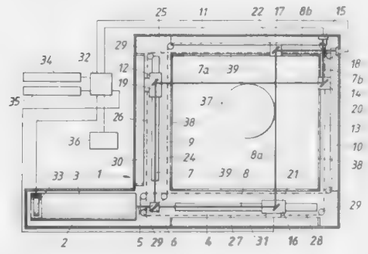


(1) the beam transmitting element being guided along the first track in the second direction,

(d) a laser beam receiver having a beam receiving element adapted to receive the laser beam projected in the scanning plane in the first direction by the beam transmitting element,

(1) the beam receiving element being guided along the second track in the second direction, and the laser beam receiver including

(2) a detector adapted to receive the projected laser beam and to generate an electric signal indicating the incidence and non-incidence of the projected laser beam on the detector,



(e) a scanning mechanism operable to cause the projected laser beam to scan an object intersected by the scanning plane in the measuring area and comprising means for moving the beam transmitting and receiving elements in the second direction along the tracks relative to the object, and

(f) a length-measuring system coupled to at least one of the elements for measuring the extent of the relative movement in the second direction, the length-measuring system including

(1) measuring circuitry controlling the electric signal.

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**4,743,770**

**PROFILE-MEASURING LIGHT PROBE USING A CHANGE IN REFLECTION FACTOR IN THE PROXIMITY OF A CRITICAL ANGLE OF LIGHT**

**Chia S. Lee, Cerritos, Calif., assignor to Mitutoyo Mfg. Co., Ltd., Tokyo, Japan**

**Filed Sep. 22, 1986, Ser. No. 909,926**

**Int. Cl.**[4] **G01B** *11/24*

**U.S. Cl. 250—560** **17 Claims**



1. A profile-measuring light probe comprising:

irradiating means for irradiating a subject to be measured with a focussed spot of light at an angle of 90° or less;

an objective lens for forming an image of the focussed spot in the proximity of an image plane, the objective lens defining an optical axis;

a relay lens having a focus on the image plane, for converting diffused light from the image of the focussed spot into a generally parallel ray;

a window plate including an entrance prism having an angle $\beta$ defined between a face of the prism parallel to the image plane and a face of the prism acutely inclined relative to the image plane, the entrance prism taking in a generally parallel ray emitted from relay lens; a flat glass supported at an angle of inclination $\alpha$ defined between an inclined face of the glass and the optical axis and having a refractive index n, for subjecting the taken-in generally parallel ray to multiple internal reflections and transmitting same; and an exit prism for outputting the generally parallel ray thus transmitted to the outside, with said angles $\alpha$ and $\beta$ being set to substantially satisfy the following relationship

$$\alpha \simeq 90° - \arcsin(1/n)$$

$$\beta = \arcsin(1/n); \text{ and}$$

a position detector for receiving the generally parallel ray from said window plate, measuring the distribution of light quantity and outputting the measured result to the outside.

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**4,743,771**

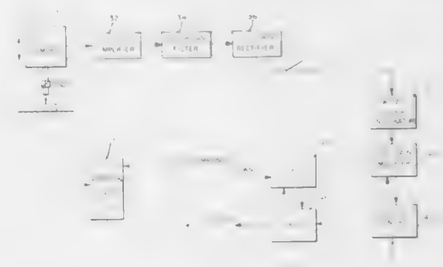
**Z-AXIS HEIGHT MEASUREMENT SYSTEM**

**Jack Sacks, Thousand Oaks, and Ralph Weisner, Canoga Park, both of Calif., assignors to View Engineering, Inc., Simi Valley, Calif.**

**Filed Jun. 17, 1985, Ser. No. 745,192**

**Int. Cl.**[4] **G01N** *21/86;* **G01V** *9/04;* **G01C** *3/08*

**U.S. Cl. 250—560** **7 Claims**



1. A non-contact Z-axis probe for making height measurements comprising:

an optical system for projecting a given image from a reticle through a beamsplitting mirror to form a projected image on a selected area that is aligned with the beamsplitting mirror along the Z axis, said reticle being located a fixed distance from said beamsplitting mirror;

a video camera and said optical system mounted for movement in the Z direction and adapted to move in the Z direction,

said camera located a fixed distance from said beamsplitting mirror along the Z axis for viewing said projected image,

said video camera continuously scanning reflected energy from said projected image while said camera is moved in the Z axis for generating an output signal that varies in amplitude as a function of distance from said selected area,

and a computer for statistically evaluating the output signal to determine the theoretical maximum amplitude of a focus indicating characteristic of the output signals and correlating that theoretical maximum amplitude with the position of said camera as a function of height of camera above said selected area.

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**4,743,772**

## METHOD FOR DETERMINING THE POSITION OF AN OBJECT IN AN AUTOMATED PRODUCTION PROCESS AND A DEVICE FOR CARRYING OUT THE METHOD

**Eberhard Häfele, Rosenheim, and Rüdiger Wilde, Munich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Feb. 26, 1986, Ser. No. 833,620**

**Claims priority, application Fed. Rep. of Germany, Feb. 28, 1985, 3507116**

**Int. Cl.[4] G01B** *11/00*

**U.S. Cl. 250—561** **6 Claims**



3. Device for determining the position of an object located on a carrier relative to a normal position, in an automated production process, comprising a light source for generating a focused light beam directed toward the object and its immediate surroundings, a light receiver having a given receiving range, a deflection device for deflecting the object relative to its immediate surroundings forming differently aligned reflection surfaces and causing a ray of light reflected by the object to be directed into the light receiver and of remaining rays of light to be directed outside said given receiving range of the receiver.

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**4,743,773**

## BAR CODE SCANNER WITH DIFFUSION FILTER AND PLURAL LINEAR LIGHT SOURCE ARRAYS

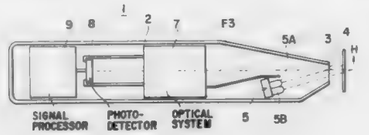
**Yukio Katana; Masao Goto, and Ichiro Sekiguchi, all of Tokyo, Japan, assignors to Nippon Electric Industry Co., Ltd., Tokyo, Japan**

**Filed Aug. 21, 1985, Ser. No. 768,076**

**Claims priority, application Japan, Aug. 23, 1984, 59-175714; Aug. 23, 1984, 59-127859[U]; Aug. 23, 1984, 59-127860[U]; Nov. 30, 1984, 59-182860[U]; Feb. 4, 1985, 60-14381[U]**

**Int. Cl.[4] G06K** *7/10*

**U.S. Cl. 250—566** **6 Claims**




1. A bar code scanner, housed in a lightproof enclosure at one end of which an opening is formed, said scanner having a scan head for illuminating a bar code facing said opening from a light source disposed inside said opening, a photodetector provided within said enclosure and positioned to receive light reflected from a bar code in front of said opening, said photodetector comprising a CCD image sensor or a plurality of photodetecting elements, said photodetector converting the light into an electrical signal, and means for processing the electrical signal, for thereby identifying said bar code,

said opening of the scan head being defined by a straight front central portion of said enclosure and right and left lateral portions, said right and left lateral portions joining the opposite ends, respectively, of the front central portion at an obtuse sweepback angle.

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**4,743,774**

## METHOD AND APPARATUS FOR OPTICAL DETECTION OF INFORMATION

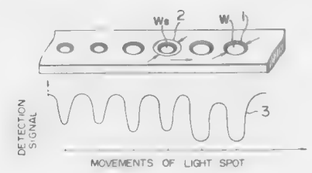
**Takeshi Maeda, Kokubunji; Shigeru Nakamura, Hachioji; Hisataka Sugiyama, Kokubunji; Kazuo Shigematsu, Saitama, and Atsushi Saito, Ichikawa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Feb. 12, 1986, Ser. No. 828,719**

**Claims priority, application Japan, Mar. 22, 1985, 60-55834**

**Int. Cl.[4] G06K** *7/10*

**U.S. Cl. 250—570** **20 Claims**




1. An apparatus for optical detection of information comprising:

a recording medium in which an array of pits are formed in a predetermined direction to record information;

light irradiation means for irradiating a reproduction light spot onto said recording medium;

means for generating a signal indicative of intensity of light modulated by said pits and coming from said recording medium;

differentiation means for generating a differential signal of said light intensity signal;

first means, connected to said differentiation means, for producing from said differential signal a signal indicative of zero points of said differential signal;

second means, connected to said differentiation means, for producing from said differential signal a signal indicative of the presence of said pits; and

third means responsive to the output signals of said first and second means to detect positions of said pits.

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**4,743,775**

## ABSORPTION GAUGE FOR DETERMINING THE THICKNESS, MOISTURE CONTENT OR OTHER PARAMETER OF A FILM OF COATING

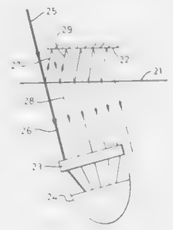
**Roger F. Edgar, Maldon, England, assignor to Infrared Engineering, Ltd., Essex, England**

**Filed Oct. 1, 1986, Ser. No. 915,882**

**Claims priority, application United Kingdom, Nov. 19, 1985, 8528448**

**Int. Cl.[4] G01N** *21/86;* **G01V** *9/04*

**U.S. Cl. 250—571** **7 Claims**



1. Apparatus for determining or controlling a parameter or



parameters which represent the thickness, moisture content, composition, or other property of a film or coating capable of transmitting radiation, comprising:

(a) means for defining a sample zone in which a sample of a film or coating can be received;

(b) means for deriving a plurality of beams of radiation of differing spectral compositions;

(c) optical directing means for directing a plurality of said beams to said sample whereby said beam is divided by said sample into a transmitted part transmitted by said sample, and a reflected part reflected from said sample;

(d) reflector means for reflecting said reflected part of said beams through said sample;

(e) a first radiation detector which receives the transmitted part of said beams and produces a signal "a" in response thereto, and a second radiation detector which receives the reflected part of said beams, reflected only once by said sample, and produces a signal "b" in response thereto;

(f) processing means for processing said signals "a" and "b" to provide a resultant signal $a/(1-b/a)$ or a signal proportional thereto, said resultant signal being processed in order to provide a first set of electrical signals representing the separate intensities of the beams of different spectral compositions as received by said first and second radiation detectors; and

(g) means for providing at least one second signal representing the ratio of at least two of the signals of said first set of electrical signals.

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**4,743,776**

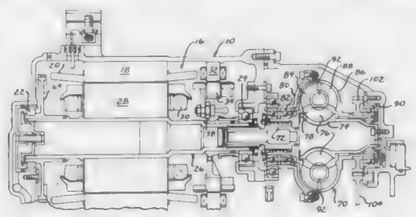
## STARTER-GENERATOR FOR ENGINES

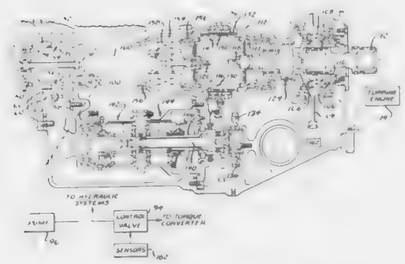
**Thomas Baehler; Victor Benson, and Wayne Flygare, all of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.**

**Filed Sep. 2, 1986, Ser. No. 902,598**

**Int. Cl.[4] F02N** *11/04*

**U.S. Cl. 290—31** **11 Claims**





1. A starter-generator for an engine comprising:

a dynamoelectric machine alternatively operable as a motor or as a generator and having a rotor;

a hydraulic torque converter including a housing containing an impeller and a turbine, said impeller being connected to said rotor to be driven thereby when said dynamoelectric machine is operated as a motor.

means for selectively filling said housing with hydraulic fluid to couple said impeller and said turbine;

a controlled speed drive unit having an input adapted to be connected to an engine, an output adapted to be connected to said rotor and control means interconnecting the input and the output to provide a desired speed relation between the two;

a first overrunning clutch interconnecting said turbine and said input for allowing said input to overrun said turbine but not the reverse; and a second overrunning clutch interconnecting said rotor and said output for allowing said rotor to overrun said output but not the reverse;

whereby an engine (a) may be started by said dynamoelectric machine when operated as a motor via a power train including said torque converter and said first overrunning clutch and (b) may drive the dynamoelectric machine as a generator and at desired speeds via a second power train including said controlled speed drive unit and said second overrunning clutch.

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**4,743,777**

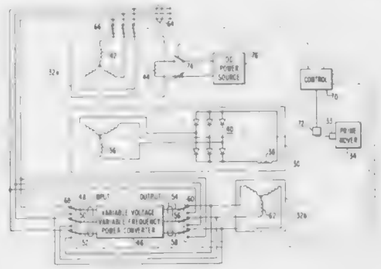
## STARTER GENERATOR SYSTEM WITH TWO STATOR EXCITER WINDINGS

**William J. Shilling, Lima, and Donal E. Baker, Elida, both of Ohio, assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Mar. 7, 1986, Ser. No. 837,122**

**Int. Cl.[4] F02N** *11/08;* **H02K** *23/52;* **H02P** *9/04*

**U.S. Cl. 290—46** **6 Claims**



1. A starter-generator system comprising:

a dynamoelectric machine having a stator and a rotor which is mounted for rotation with respect to said stator;

a main field winding;

an exciter armature winding;

means for rectifying an output from said exciter armature winding to provide DC excitation for said main field winding;

said main field winding, exciter armature winding, and means for rectifying being mounted for rotation with said rotor;

a main armature winding mounted on said stator and magnetically coupled to said main field winding.

a distributed AC exciter field winding mounted on said stator;

a distributed DC exciter field winding mounted on said stator;

said AC and DC exciter field windings being magnetically coupled to said exciter armature winding;

a variable voltage, variable frequency power converter having an input and an output;

means for alternatively connecting said main armature winding to the output of said variable voltage, variable frequency power converter when said dynamoelectric machine is operated as a motor and connecting said main armature winding to the input of said variable voltage, variable frequency power converter when said dynamoelectric machine is operated as a generator;

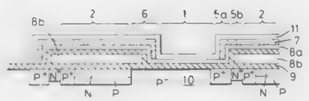
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means for supplying power to the input of said variable voltage, variable frequency power converter when said dynamoelectric machine is operated as a motor;
means for supplying external AC power to said AC exciter field winding when said dynamoelectric machine is operated as a motor;
means for supplying external DC power to said DC exciter field winding when said dynamoelectric machine is operated as a generator.

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**4,743,778**
**SOLID-STATE AREA IMAGING DEVICE HAVING INTERLINE TRANSFER CCD**
**Norihiko Takatsu; Yoshio Nara, both of Tokyo, and Tetsuya Yamamoto, Hasuda, all of Japan, assignors to Nippon Kogaku K. K., Tokyo, Japan**
**Continuation of Ser. No. 840,921, Mar. 18, 1986, abandoned. This application Jan. 23, 1987, Ser. No. 9,625**
**Claims priority, application Japan, Mar. 25, 1985, 60-60270; Jul. 22, 1985, 60-161430; Jul. 22, 1985, 60-161431**
**Int. Cl.[4] H03K** *3/42;* **H01L** *29/78, 27/14;* **H04N** *3/14*
**U.S. Cl. 307—311** **8 Claims**



1. A solid state image pick-up device for producing a picture signal, said device comprising:
a semiconductor substrate made of a predetermined chemical element;
photoelectrical conversion means provided with a plurality of light receiving portions disposed on said semiconductor substrate, each of said light receiving portions having a layer of an oxide of said predetermined chemical element, said layer being arranged on said semiconductor substrate, each of said light receiving portions generating charges corresponding to the intensity of incident light thereon;
electrode means disposed on a side of said semiconductor substrate opposite to said layer of each of said light receiving portions;
supplying means for supplying a potential for said electrode means;
control means for causing said supplying means to supply a potential of a first value and a potential of a second value for said electrode means alternatively and for controlling a period in which said supplying means supplies the potential of said second value for said electrode means, the potential of said first value being higher than the potential of said semiconductor substrate, the potential of said second value being lower than the potential of said semiconductor substrate, said supplying means supplying said electrode means with the potential of said first value to cause each of said plurality of light receiving portions to store said charges in an interface between said layer and said semiconductor substrate, said supplying means supplying said electrode means with the potential of said second value to cause each of said plurality of light receiving portions to discharge the stored charges into said semiconductor substrate;
horizontal transfer means for transferring charges externally of said device:
vertical transfer means for transferring charges to said horizontal transfer means;
transfer gate means for transferring said stored charges in said interface to said vertical transfer means;
start means for generating a start signal, said control means causing said supplying means to supply the potential of said second value for a first predetermined period in response to said start signal;
timer means responsive to said start signal for counting a second predetermined period which is shorter than said first predetermined period and for generating a timing signal; and
means responsive to said timing signal for causing said transfer gate means to transfer said charges stored in said interface to said vertical transfer means.

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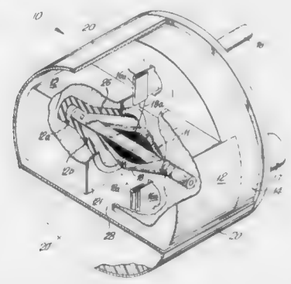
**4,743,779**
**ADJUSTABLE THRESHOLD WINDOW CIRCUIT**
**Richard L. Valley, Nashua, N.H., assignor to Unitrode Corporation, Lexington, Mass.**
**Continuation of Ser. No. 613,102, May 23, 1984, abandoned. This application Mar. 20, 1987, Ser. No. 29,353**
**Int. Cl.[4] H03K** *5/153, 5/24;* **G01R** *19/165*
**U.S. Cl. 307—356** **10 Claims**



1. An adjustable window circuit responsive to means for providing a control voltage, comprising:
a voltage comparator having an upper threshold input, a lower threshold input and an input for receiving a signal to be compared;
an upper reference voltage source providing an upper reference voltage greater than a midvoltage reference signal to said comparator upper threshold input;
a lower reference voltage source providing a lower reference voltage less than a midvoltage reference signal to said comparator lower threshold input;
first means for selectively adjusting said upper and lower reference voltages according to said control voltage; and
second means for selectively adjusting said upper and lower reference voltages according to said signal to be compared, providing hysteresis, wherein
said upper reference voltage and said lower reference voltage are greater and lesser than said midvoltage reference signal,
the value of said upper and lower reference voltages has a greater difference with regard to said midvoltage reference signal when said signal to be compared is within said upper and lower reference voltages providing a widened voltage window,
the value of said upper and lower reference voltages has a lower difference with regard to said midvoltage reference signal when one of said upper and lower reference voltages is exceeded by said signal to be compared, thus providing a narrowed voltage window, and wherein
said second means for selectively adjusting provides a selected amount of hysteresis according to the difference between the upper and lower reference voltages.



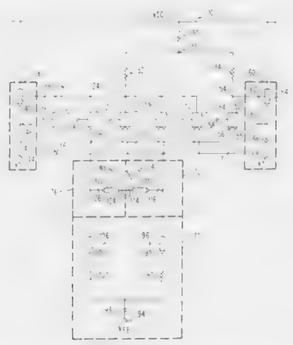
**4,743,780**
**PULSE GENERATOR WITH SHIELDED WIEGAND WIRE**
**John E. Opie, Stony Creek, Conn., assignor to Echlin Inc., Branford, Conn.**
**Filed Apr. 14, 1987, Ser. No. 38,010**
**Int. Cl.[4] H03K** *3/45*
**U.S. Cl. 307—419** **8 Claims**



1. A pulser for use in the generation of a pulse in response to a changing magnetic field comprising:
a Wiegand wire module including a Wiegand wire segment and a pick-up coil wound on said segment, said module having first and second end portions,
ferro-magnetic shunt means surrounding at least first and second ends of said module, said shunt means including a high reluctance zone adjacent to the center of said module and a lower reluctance zone adjacent to the ends of said module,
said shunt means being shaped to collect and guide flux that is incident on said pulser to said high reluctance zone causing leakage flux to be coupled to the center portion of said Wiegand wire.

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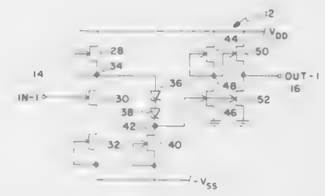
**4,743,781**
**DOTTING CIRCUIT WITH INHIBIT FUNCTION**
**Harsaran S. Bhatia, Hopewell Junction, N.Y.; Harry J. Jones, Austin, Tex., and Shashi D. Malaviya, Hopewell Junction, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**
**Filed Jul. 3, 1986, Ser. No. 882,058**
**Int. Cl.[4] H03K** *19/013, 19/086, 17/04, 17/60*
**U.S. Cl. 307—455** **19 Claims**



1. A dotting circuit for switching applications which provides true and complementary outputs simultaneously, comprising:
a voltage source;
a first input switch with a first and second ends and a control input connected to a first input line;
a second input switch with a first and second ends, and a control input connected to a second input line;
first resistance means connected between said voltage source and the first ends of said first and second input switches for generating a voltage drop when current passes therethrough;
means connected to said said first ends of said first and second input switches for obtaining a complement output voltage therefrom;
a first reference switch with a first and second ends and a control input;
a second reference switch with a first and second ends and a control input;
second resistance means connected between said voltage source and the first ends of said first and second reference switches for generating a voltage drop when current passes therethrough;
means connected to said first ends of said first and second reference switches for obtaining a true output voltage therefrom;
current source means for providing an approximately constant current;
first control means for connecting said current source means to the second ends of said first input switch and said first reference switch, and including a first control input for receiving a first logic signal for permitting or inhibiting said first control means from providing current to said first input switch and said first reference switch; and
second control means for normally connecting said current source means to the second ends of said second input switch and said second reference switch, and including means for inhibiting the provision of current to said second input switch and said second reference switch if, and only if, said first control means is providing current to said first input switch and said first reference switch,
wherein said switches and said control means are comprised of transistors; and
further comprising at least one third input transistor with a first end and a double second end, with its first end connected to the first ends of said first and second input switches, and with one second end thereof connected to the second ends of said first input switch and said first reference switch, and with the other second end thereof connected to the second ends of said second input switch and said second reference switch.

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**4,743,782**
**GaaS LEVEL-SHIFT LOGIC INTERFACE CIRCUIT**
**Roderick D. Nelson, Minneapolis, Minn.; Peter C. T. Roberts, Colorado Springs, Colo., and Tho T. Vu, Fridley, Minn., assignors to Honeywell Inc., Minneapolis, Minn.**
**Filed Nov. 9, 1984, Ser. No. 670,107**
**Int. Cl.[4] H03K** *17/30, 17/687*
**U.S. Cl. 307—475** **5 Claims**




1. A solid state monolithic integrated circuit, comprising:
a substrate of a material selected from the group consisting of gallium arsenide and indium phosphide;
an input node;
means for converting the logic levels of digital input signals having a first voltage swing to second digital signals hav-

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ing a second voltage swing, wherein said second voltage swing has a larger magnitude than said first voltage swing, said converting means is integral with said substrate and receives only one digital input signal at a time, and said converting means includes two cascaded single input stages, with each of said stages including a switching metal-semiconductor field effect transistor (MESFET) having a control gate, wherein said control gate of the first of said stages is connected to said input node, and the output of the first of said stages is applied to said gate of said MESFET in the second of said stages to control the flow of current in said MESFET in said second of said stages; and

means for amplifying said second digital signals, coupled to said second of said stages.

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**4,743,783**

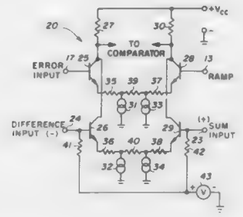
## PULSE WIDTH MODULATOR CIRCUIT FOR SWITCHING REGULATORS

**Tim D. Isbell, San Jose, and Walter R. Davis, Sunnyvale, both of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.**

**Division of Ser. No. 571,274, Jan. 16, 1984, Pat. No. 4,634,892. This application Aug. 25, 1986, Ser. No. 1,321**

**Int. Cl.[4] H03K** *5/22;* **H03B** *19/00;* **H03F** *3/45*

**U.S. Cl. 307—498** **2 Claims**




1. A circuit for signal summing useful in pulse width modulators, said circuit comprising:

first and second power supply terminals connectable to a source of operating power;

a first transistor having a base coupled to a first signal voltage source, an emitter coupled to one terminal of a first scaling and linearizing resistor, and a collector coupled to one terminal of a first load element;

a second transistor having a base coupled to a second voltage signal source, an emitter coupled to one terminal of a second scaling and linearizing resistor, and a collector coupled to one terminal of a second load element;

means for coupling the other terminals of said first and second load elements to said first power supply terminal;

means for coupling the other terminals of said first and second scaling and linearizing resistors respectively through first and second constant current devices to said second power supply terminal;

a third transistor having a collector coupled to said collector of said first transistor, an emitter coupled to one terminal of a third scaling and linearizing resistor, and a base coupled to a third voltage signal source;

a fourth transistor having a collector coupled to said collector of said second transistor, an emitter coupled to one terminal of a fourth scaling and linearizing resistor, and a base coupled to a fourth voltage signal source;

means for coupling the other terminals of said third and fourth scaling and linearizing resistors respectively through third and fourth constant current devices to said second power supply terminal whereby said first and third voltage signal sources are summed in said first load element and said second and fourth voltage signal sources are summed in said second load element.

**4,743,784**

## SENSE AMPLIFIER CIRCUIT

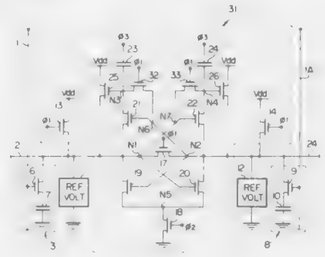
**Takashi Obara, and Shouji Kaneko, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan**

**Filed Jul. 8, 1986, Ser. No. 883,215**

**Claims priority, application Japan, Jul. 8, 1985, 60-150402**

**Int. Cl.[4] G01R** *19/00;* **H03K** *3/26;* **G11C** *7/00*

**U.S. Cl. 307—530** **7 Claims**




1. A sense amplifier circuit for amplifying a differential voltage between first and second sense nodes applied with different voltages, comprising:

a first cross coupled circuit including first and second field effect transistors having source-drain paths coupled between the first and second sense nodes and a common node, respectively, and having gates respectively coupled to the second and first sense nodes, and discharge means coupled between said common node and a reference voltage terminal for operatively discharging charges at said common node in response to a sense control signal;

a second cross coupled circuit including third and fourth field effect transistors having source-drain paths coupled between the first and second sense nodes and first and second control nodes, respectively, and having gates coupled to the second and first sense nodes, respectively;

a pulling circuit including first and second capacitors coupled between said first and second control nodes and a drive node, respectively, said drive node receiving a pull up control signal;

a load circuit including fifth and sixth field effect transistors having source-drain paths between the first and second sense nodes and a second voltage source, respectively, and having gates connected to the first and second control nodes, respectively; and

a balancing circuit including seventh, eighth and ninth field effect transistors, the seventh and eighth field effect transistors having source-drain paths coupled between the first and second sense nodes and the second and first control nodes, respectively, the ninth field effect transistor having a source-drain path coupled between the first and second sense nodes, the seventh, eighth and ninth field effect transistors being rendered conductive in response to a precharge control signal applied to control inputs thereof.

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**4,743,785**

## FET PULSE CONTROL APPARATUS WITH FAST RISE TIME AND CONSTANT PULSE LEVEL

**Walter E. Milberger, Severna Park, and Charles S. Kerfoot, Pasadena, both of Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Mar. 4, 1987, Ser. No. 21,852**

**Int. Cl.[4] H03K** *17/687, 3/017*

**U.S. Cl. 307—571** **10 Claims**

1. A high voltage pulse apparatus, comprising:

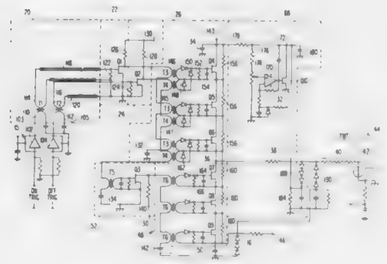
means referenced to a low potential reference level for receiving control pulses;

first switch means referenced to a high potential reference level, said first switch means having an output terminal and being responsive to said control pulses for generating a fast rise time output pulse at said output terminal;

second switch means referenced to said high potential referenced level and coupled to said first switch means for terminating said output pulse;

means for coupling said control pulse receiving means to said first and second switch means; and





clamp means coupled to said output terminal for maintaining a constant voltage of said output pulse during the duration of said output pulse wherein said clamp means comprises means for maintaining said constant voltage with respect to a predetermined reference level.

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**4,743,786**

## ROTATIONAL POSITION DETECTION DEVICE

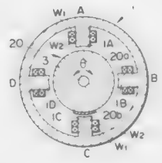
**Wataru Ichikawa, Tokyo; Yuji Matsuki, Saitama, and Takeo Maruyama, Tokyo, all of Japan, assignors to Kabushiki Kaisha SG, Tokyo, Japan**

**Filed Nov. 19, 1985, Ser. No. 799,608**

**Claims priority, application Japan, Nov. 20, 1984, 59-243362; Aug. 26, 1985, 60-185911**

**Int. Cl.[4] H02K** *39/00*

**U.S. Cl. 310—111** **10 Claims**




1. A rotational position detection device comprising a stator section including winding means for producing a secondary output signal, said winding means being excited by one or more primary AC signals, and a rotor section disposed in such a manner that it is capable of performing relative rotational displacement with respect to said stator section,

said winding means comprising a plurality of primary windings and secondary winding means, said respective primary windings being exited by primary AC signals which are shifted in phase from each other, and wherein signals derived by phase shifting said primary AC signals in response to the rotational position of said rotor section are produced from said secondary winding means,

said rotor section comprising an electrically conductive substance portion provided in a predetermined pattern, wherein the conductive substance portion changes its position relative to the winding means in conjunction with rotational displacement of the rotor section and an eddy current corresponding to a relative rotational position of said rotor section with respect to said stator section flows in said electrically conductive substance portion and the secondary output signal is produced by said winding means, wherein the pattern of the conductive substance portion is configured such that the secondary output signal varies in correspondence with the relative rotational position of the conductive substance pattern of the rotor with respect to the stator section, the secondary output signal thereby being indicative of the rotor position at every rotational position of the rotor.

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**4,743,787**

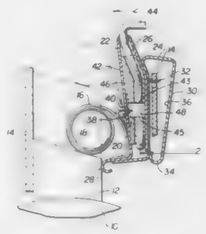
## BRUSH WEAR INDICATOR HAVING VARIABLE LIGHT ENERGY CONDUCTOR PATH

**James E. Bunner, and Kenneth R. Reynolds, both of Erie, Pa., assignors to General Electric Company, Salem, Va.**

**Filed Nov. 13, 1986, Ser. No. 930,286**

**Int. Cl.[4] H02K** *13/00*

**U.S. Cl. 310—242** **20 Claims**



1. A brush wear indicator assembly for a dynamoelectric machine comprising, in combination:

a brush holder;

at least one brush located within said holder;

brush biasing means in contact with said brush and operating to force the brush against an electrically conductive member of said machine;

a source of light energy and a detector of light energy;

light energy conductor means, coupled between said source and said detector, having a region of separation to provide a pair of exposed inner ends adjacent said biasing means, said exposed inner ends defining a path for light energy conduction; and

shutter means, actuated by the movement of said biasing means in response to brush wear, located at said region of separation and being operable to alter said path between a state of light energy conduction and a state of non-conduction whereby at a wear position of said brush said detector detects a worn bush condition.

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**4,743,788**

## INPUT FREQUENCY CONTROL DEVICE FOR SURFACE ACOUSTIC WAVE MOTOR

**Tadao Takagi, Yokohama; Shigemasa Sato, Tokyo, and Kazuo Hakamada, Kawasaki, all of Japan, assignors to Nippon Kogaku K. K., Tokyo, Japan**

**Filed Nov. 12, 1986, Ser. No. 929,351**

**Claims priority, application Japan, Nov. 20, 1985, 60-260754**

**Int. Cl.[4] H01L** *41/08*

**U.S. Cl. 310—316** **13 Claims**

1. A surface-wave driven motor comprising:

a stator including piezoelectric means vibrated by an AC voltage applied thereto by electrode means and an elastic member having a surface for generating a surface-wave in response to the vibration of said piezoelectric means;

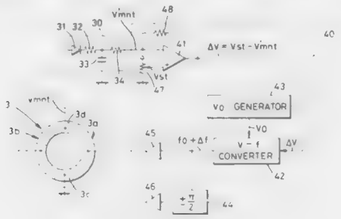
a movable member maintained in contact with said surface of said elastic member and adapted to be moved by said surface-wave;

voltage detection means for detecting a monitor voltage generated in said piezoelectric means from a monitor area of said piezoelectric means electrically insulated from said electrode means; and

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frequency control means for controlling the frequency of said AC voltage in such a manner that said monitor voltage reaches a predetermined value lower than a maximum




cutput voltage corresponding to the resonance frequency of said stator, in a frequency band higher than said resonance frequency.

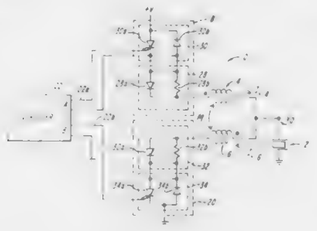
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**4,743,789**

**VARIABLE FREQUENCY DRIVE CIRCUIT**

**William L. Puskas, P.O. Box 1676, N. Pleasant St., New London, N.H. 03257-1676**

**Filed Jan. 12, 1987, Ser. No. 2,732**
**Int. Cl.[4] H01L *41/08***
**U.S. Cl. 310—316** **37 Claims**



1. An AC power system, comprising:

A. a capacitive element, said capacitive element being characterized by a predetermined capacitance C, said capacitive element having a first terminal and a second terminal, said second terminal being coupled to a first reference potential,

B. a first inductive element characterized by a first predetermined inductance L1 and a second inductive element characterized by a second predetermined inductance L2, each of said inductive elements having a first terminal and a second terminal, said first and second inductive elements being mutually coupled whereby a current flowing from said first terminal of one inductive element to the second terminal of said one inductive element induces a similarly directed current between said first and second terminals of the other inductive element,

C. means for coupling both of said second terminals of said inductive elements to said first terminal of said capacitive element, whereby said first inductive element is electrically resonant with said capacitive element substantially at a resonant frequency $f_{r1}(=1/T_{r1})$ and said second inductive element is electrically resonant with said capacitive element substantially at a resonant frequency $f_{r2}(=1/T_{r2})$,

D. a first drive network including a first multi-state switch network and a first blocking network coupled in series with said first inductive element between a second reference potential and said capacitive element,

E. a second drive network including a second multi-state switch network and a second blocking network coupled in series with said second inductive element between a third reference potential and said capacitive element,

wherein said second potential is greater than said third potential, and

wherein said first drive network and said first inductive element provide a unidirectional current flow path characterized by a first relatively low impedance from said second potential to said capacitive element when said first switch network is in a first state, and provide a unidirectional current flow path characterized by a second relatively low impedance from said capacitive element to said second potential when said first switch network is in a second state. wherein said first relatively low impedance is lower than said second relatively low impedance,

wherein said second drive network and said second inductive element provide a unidirectional current flow path characterized by a third relatively low impedance from said capacitive element to said third potential when said second switch network is in a first state, and provide a unidirectional current flow path characterized by a fourth relatively low impedance from said third potential to said capacitive element when said first switch network is in a second state, wherein said third relatively low impedance is lower than said fourth relatively low impedance, and

further comprising:

F. control means for:

i. cyclically switching said first switch network between its first and second states at a frequency $f(=1/T)$, where $(T_{r1}/2)+(T_{r2}/2)$ is less than or equal to T whereby said first switch network is in its first state for a period substantially equal to $T_{r1}/2$ at the beginning of each cycle and is in its second state for the remainder of each cycle, and

ii. cyclically switching said second switch network between its first and second states at said frequency f, whereby said second switch network is in its first state for a period substantially equal to $T_{r2}/2$ at the beginning of each cycle and is in its second state during the remainder of each cycle, wherein the start time for each cycle of said second switch network is offset by at least $T_{r1}/2$ and less than $T_{r1}/2+D$ from the start time for each cycle of said first switch network, where D is substantially equal to $T-(T_{r1}/2)-(T_{r2}/2)$,

whereby an AC voltage at frequency f is impressed across said capacitive element.

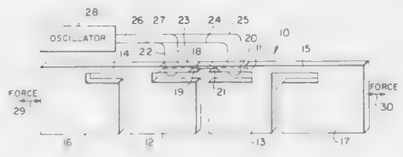
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**4,743,790**

**FORCE SENSING VIBRATING BEAM RESONATOR**

**William C. Albert, Boonton, N.J., assignor to Crystal Gage Inc., Franklin Lakes, N.J.**

**Filed Apr. 14, 1987, Ser. No. 38,235**
**Int. Cl.[4] H01L *41/08***
**U.S. Cl. 310—321** **7 Claims**




1. A force sensitive vibrating beam resonator adapted to be formed from a rectangular blank of piezoelectric material comprising a vibratory beam, means for causing the beam to vibrate, a unitary isolator mass at each end of the beam, each unitary mass being positioned at one side of its associated beam end, an isolator spring connected to each of the isolator masses, and a mount at the end of each isolator spring.

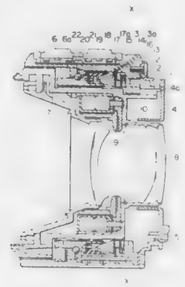


**4,743,791**

**VIBRATION WAVE MOTOR**

**Tohru Kawai, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 31, 1986, Ser. No. 925,217**
**Claims priority, application Japan, Nov. 27, 1985, 60-266785**
**Int. Cl.[4] H01L *41/08***
**U.S. Cl. 310—323** **7 Claims**



1. A vibration wave motor comprising:

(a) vibration means having an electro-mechanical energy conversion element, for generating a travelling vibration wave when electrical signals are applied to the conversion element;

(b) movable member arranged to be frictionally driven by the vibration means; and

(c) cone-shaped, disc spring means arranged to be in a press-contact relationship between said vibration means and said movable member.

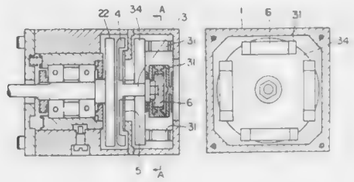
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**4,743,792**

**PIEZOELECTRIC MOTOR**

**Tsutomu Ueyama, Yawata, Japan, assignor to Dainippon Screen Mfg. Co., Ltd., Kyoto, Japan**

**Filed Dec. 22, 1986, Ser. No. 946,917**
**Claims priority, application Japan, Dec. 23, 1985, 60-290087**
**Int. Cl.[4] H01L *41/08***
**U.S. Cl. 310—328** **11 Claims**




1. A piezoelectric motor, comprising: means for driving said motor, comprising a plurality of electrostrictive elements; a disk-shaped precessional movement plate member, connected to said electrostrictive members and supported so as to perform a precessional movement without rotation on its axis by coaction with the electrostrictive elements; a rotary plate member, driven rotationally at a reduced speed corresponding to a circumferential difference between circular paths described by contact, under pressure at a selected precessional angle with a peripheral portion of said precessional movement plate member, during precessional movement of the precessional movement plate member; and an output shaft operatively connected to said rotary plate member, whereby deformations of said electrostrictive elements cause the precessional movement plate member to perform said precessional movement which causes the contacting rotary plate member and output shaft to rotate at a reduced speed.

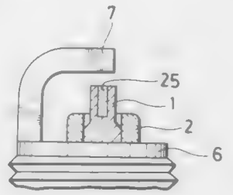
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**4,743,793**

**SPARK PLUG**

**Akihiro Toya; Takashi Yamaguchi; Junichi Kagawa, and Kazunori Yokota, all of Nagoya, Japan, assignors to NGK Spark Plug Co., Ltd., Aichi, Japan**

**Filed May 15, 1986, Ser. No. 863,506**
**Claims priority, application Japan, Mar. 28, 1986, 61-68545**
**Int. Cl.[4] H01T *13/36, 13/39***
**U.S. Cl. 313—141** **12 Claims**




1. A spark plug, comprising at least one center electrode; and at least one ground electrode spaced apart from and opposed thereto and defining a gap therebetween for causing a spark discharge to occur across said gap; wherein at least one of said center and ground electrodes has on a discharge-related surface area thereof noble metal powder bonded ultrasonically in the form of a thin layer.

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**4,743,794**

**CATHODE-RAY TUBE HAVING AN ION TRAP**

**Martinus H. L. M. Van Den Broek, and Jan Zwier, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Continuation of Ser. No. 793,884, Nov. 1, 1985, abandoned. This application May 26, 1987, Ser. No. 56,268**
**Claims priority, application Netherlands, Nov. 21, 1984, 8403537**
**Int. Cl.[4] H01S *29/74***
**U.S. Cl. 313—424** **4 Claims**



1. A cathode-ray tube comprising an evacuated envelope containing, along a longitudinal axis of the envelope, an electron-beam-producing means and a target for impingement by the electron beam, said electron-beam-producing means comprising, in succession:

(a) a semiconductor cathode having an electron-emitting region disposed transversely of said axis;

(b) a first electrode disposed adjacent the cathode and having an opening through which the axis passes, said open-

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ing extending sufficiently far from said axis to pass electrons emitted from the electron-emitting region of said cathode; and

(c) a second electrode positioned relative to the first electrode to cooperate therewith in producing a positive electron lens for converging the emitted electrons into a narrowing electron beam, said second electrode having an opening through which the axis passes, said opening extending sufficiently far from said axis to pass the electron beam but, when viewed in projection along the axis, not extending sufficiently far from said axis to encompass the electron-emitting region of the cathode, said second electrode being configured on a side thereof remote from the first electrode to proximately effect production of electric field lines shaped such that:

(1) near the axis, any positive ions generated in the tube are accelerated substantially parallel to said axis such that ones of said ions passing through the opening in the second electrode miss the electron-emitting region of the cathode; and

(2) farther from the axis, positive ions generated in the tube are accelerated away from the axis and the opening in the second electrode.

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**4,743,795**

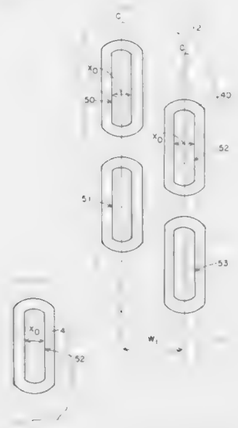
## MULTI-GRADED APERTURE MASKS

**Roland Thoms, Mullheim, Fed. Rep. of Germany, assignor to BMC Industries, Inc., St. Paul, Minn.**

**Division of Ser. No. 630,776, Jul. 13, 1984, Pat. No. 4,632,726. This application Jun. 13, 1986, Ser. No. 874,098**

**Int. Cl.⁴ H01J** *29/07*

**U.S. Cl. 313—402** **7 Claims**



1. An aperture mask with a center and a peripheral region, said aperture mask having a grade side and a cone side with a plurality of openings of substantially the same size located therein, each of said plurality of openings having a grade side partially etched region and a cone side partially etched region surrounding each of said plurality of openings, said grade side partially etched region surrounding each of said plurality of openings decreasing from the center of the mask to the periphery of the mask while the partially etched region surrounding each of said cone side openings increases from the center of the mask to the periphery of the mask.

**4,743,796**

## ELECTRON GUN FOR REDUCTION OF GLIMMER

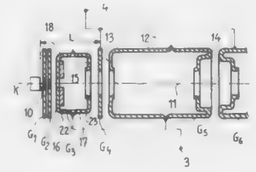
**Jacques Baudry, Ecully; Olivier Trinchero, Lyons, and Gérard Proudhon, Venissieux, all of France, assignors to Videocolor, Montrouge, France**

**Filed May 6, 1986, Ser. No. 860,233**

**Claims priority, application France, Aug. 14, 1985, 85 12419**

**Int. Cl.⁴ H01J** *29/06, 29/62*

**U.S. Cl. 313—414** **18 Claims**



1. Electron gun for a cathode ray tube, especially for color television, the electrostatic lenses of which comprise an electrode $G_4$ that remains at a high voltage after the shut-down of the tube power supply, wherein, in order to reduce the effect upon a K cathode of the high voltage remaining on the said electrode $G_4$ after shut-down of the power supply, the gun comprises means for imparting to the distance between the cathode and a equipotential surface constituting the limit of the influence zone of the voltage induced by the first high voltage electrode ($G_4$) a value such that the high voltage remaining on said electrode ($G_4$) after shut-down of the power supply has a small effect upon the cathode, said means including masking means that form a part of an electrode of the electron gun of intermediary position between the high voltage electrode and the cathode.

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**4,743,797**

## FLAT CATHODE RAY DISPLAY TUBES WITH INTEGRAL GETTER MEANS

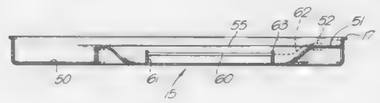
**David L. Emberson, and Adrian Caple, both of Purley, England, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Sep. 8, 1986, Ser. No. 904,438**

**Claims priority, application United Kingdom, Sep. 11, 1985, 8522542**

**Int. Cl.⁴ H01J** *29/94, 31/12*

**U.S. Cl. 313—422** **7 Claims**



1. A flat cathode ray display tube comprising an envelope having a front wall comprising a flat, optically transparent faceplate carrying a screen and a rear wall opposite the front wall, means for producing an electron beam disposed adjacent the rear wall, the electron beam producing means being arranged to direct an electron beam substantially parallel to the faceplate and over the rear wall of the envelope, a reversing lens which turns the electron beam so that it travels in the opposite direction parallel to the faceplate, a deflector arrangement for deflecting the turned beam towards the screen, and getter means located in the envelope, characterized in that the getter means is located laterally of the electron beam producing means adjacent the rear wall of the envelope in at least one recess formed in the rear wall of the envelope and defined at least in part by an elongate rib of the rear wall, the wall of the recess shielding the electron beam producing means directly from the getter means.



**4,743,798**

## FLAT CATHODE RAY TUBE HAVING FLEXIBLE, WOVEN CONDUCTORS

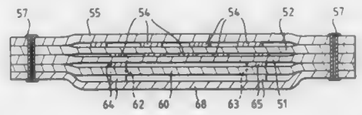
**Derek Washington, Wallington, England, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Jul. 13, 1987, Ser. No. 72,318**

**Claims priority, application United Kingdom, Jul. 23, 1986, 8617963**

**Int. Cl.⁴ H01J** *29/70*

**U.S. Cl. 313—422** **9 Claims**



1. A cathode ray tube having an envelope containing electrically operable components comprising at least means for producing an electron beam, and flexible conductor means extending between leadthrough means in the wall of the envelope and terminals of the electrically operable components for supplying power thereto, wherein the conductor means comprises a flexible circuit of at least one film of insulative material on which a plurality of conductive tracks are provided, a further film or superposed films of insulative material secured to the said at least one film to form a single assembly, and at least one separate, flexible and elongate conductor element for connection between the leadthrough means and the terminal which is woven through spaced apertures formed in the further film or superposed films and carried thereby.

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**4,743,799**

## LOW PRESSURE ARC DISCHARGE LIGHT SOURCE UNIT

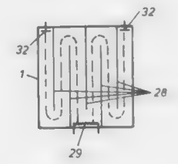
**Helmut M. Loy, Nuremberg, Fed. Rep. of Germany, assignor to GTE Products Corporation, Danvers, Mass.**

**Filed Nov. 10, 1986, Ser. No. 929,298**

**Claims priority, application European Pat. Off., Nov. 21, 1985, 85114813.0**

**Int. Cl.⁴ H01J** *1/62, 63/04*

**U.S. Cl. 313—493** **12 Claims**



1. A low pressure arc discharge light source unit for unipolar or bipolar operation comprising a vacuum-tight flat essentially two-dimensional glass envelope having two planar areas essentially parallel to each other at a predetermined distance and having two opposing ends, said envelope being translucent at at least one side thereof, a rare fill gas and a quantity of mercury therein, at least three electrodes opposed to each other within the envelope and connected to electrical conductors, at least two parallel separating walls within the envelope located between the planar areas with at least one of the separating walls having a pair of ends with one end thereof extending up to and joining with one of the opposing ends of the envelope and the other end thereof being separated from the other opposing end of the envelope such that at least two discharge spaces are provided with one of the discharge spaces having a multiple arc length, and a fluorescent coating disposed on the inner side of the envelope and including at least two fluorescent phosphors of different spectral power distribution, each of the discharge spaces being coated with a different fluorescent phosphor.

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**4,743,800**

## ARRAY OF LIGHT EMITTING ELEMENTS FOR ELECTROPHOTOGRAPHIC PRINTER

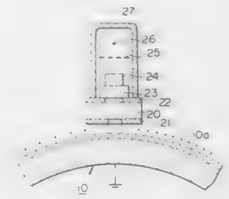
**Yoshiyuki Mimura; Akitoshi Toda, and Yasuo Isono, all of Hachioji, Japan, assignors to Olympus Optical Co., Ltd., Japan**

**Filed Jan. 22, 1986, Ser. No. 821,420**

**Claims priority, application Japan, Jan. 25, 1985, 60-010976**

**Int. Cl.⁴ H01J** *63/04, 63/06, 5/16*

**U.S. Cl. 313—497** **12 Claims**



1. An array of light emitting elements for an electrophotographic printer comprising:

a dot anode array including a transparent insulating substrate on which a multitude of dot anodes are disposed in an array, each dot anode is formed of a transparent material and having phosphor located thereon;

a thermionic emission cathode disposed in opposing relationship with the dot anode array for irradiating the phosphors on the dot anodes with low speed electron beams;

a grid disposed between the cathode and the dot anode array for selectively developing an accelerating electric field between the grid and the dot anodes when an appropriate biasing voltage is applied to said grid;

a faceplate disposed in surrounding relationship with the dot anode array, the thermionic emission cathode and the grid, the faceplate being vacuum sealed to the insulating substrate; and

the transparent insulating substrate having opposite sides to each of which is applied a respective slit mask having openings formed therein which are disposed at a pitch equal to the pitch of dots in the dot anode array so that radiation emitted by the phosphor may be projected through the dot anode and through the slit masks of the transparent insulating substrate.

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**4,743,801**

## LIGHT-EMITTING ELECTROLUMINESCENT DEVICE

**Meiso Yokoyama; Makoto Takahashi, and Hiroshi Ohkawa, all of Nagaoka, Japan, assignors to Nippon Seiki Co. Ltd., Niigata, Japan**

**Continuation of Ser. No. 806,775, Dec. 9, 1985, abandoned. This application Feb. 27, 1987, Ser. No. 20,223**

**Claims priority, application Japan, Dec. 28, 1984, 59-275747**

**Int. Cl.⁴ H05B** *33/04, 33/06*

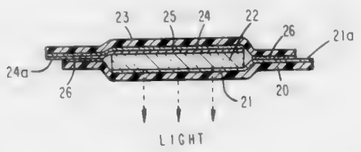
**U.S. Cl. 313—512** **4 Claims**

1. An EL device comprising a transparent electrode directly on a moistureproofing member made of a light-transmitting sheet member, a light-emitting layer provided on said transparent electrode for emitting light, a back electrode made of a sheet-like member provided on said light-emitting layer, and a protection member provided on the outside of said back electrode and bonded with said moistureproofing member substantially only at a periphery of said light-emitting layer and with bonding material between said protection member and moistureproofing member, said transparent electrode and said back electrode each including an electrode terminal (*21a,24a*) of

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unitary, integral construction with its associated electrode and projecting beyond the periphery of said light-emitting layer,




said electrode terminals being established by securing the sheet and sheet-like members forming the electrode together so they are partially offset with respect to each other.

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**4,743,802**

**TUNGSTEN HALOGEN INCANDESCENT LAMP WITH ARC PREVENTING FILL**

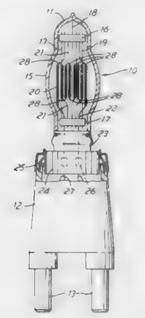
**Ian Connor, Leicester, and Roger A. Hume, Melton Mowbray, both of England, assignors to Thorn EMI plc, London, England**

**Continuation of Ser. No. 574,611, Jan. 27, 1984, abandoned. This application Jun. 2, 1986, Ser. No. 870,665**

**Claims priority, application United Kingdom, Jan. 29, 1983, 8302494**

**Int. Cl.[4] H01K** *1/50*

**U.S. Cl. 313—579** **7 Claims**



**1**. A tungsten halogen electric incandescent filament lamp comprising a lamp envelope of quartz material having a fill comprising halogen and an inert gas, the halogen being present in a range to provide between 2 microgrammes per milliliter and 70 microgrammes per milliliter of halogen and the inert gas being present at a filling pressure between 0.5 and 5 atmospheres at 20° C., and in addition to any hydrogen present as part of the halogen there is included hydrogen gas in the quantity between 0.05% and 1% by pressure at 20° C. whereby sufficient hydrogen is retained within the quartz envelope to prevent arcing.

**4,743,803**

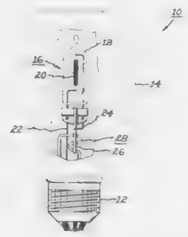
**GENERAL SERVICE TUNGSTEN-HALOGEN INCANDESCENT LAMP HAVING IMPROVED FILAMENT SHOCK RESISTANCE**

**Robert M. Lanese, Cleveland Heights; Dean R. Tener, Cuyahoga Falls; Charles F. Hickey, III, and Nicholas E. Korenowski, both of Euclid, all of Ohio, assignors to General Electric Company, Schenectady, N.Y.**

**Filed May 15, 1987, Ser. No. 50,271**

**Int. Cl.[4] H01K** *1/18*

**U.S. Cl. 313—579** **15 Claims**



**1**. A general service tungsten-halogen incandescent lamp comprising:

(a) an electrically conductive base;

(b) an outer envelope having a centerline and formed of a light-transmissive material;

(c) an inner envelope containing a fill of a halogen compound and having an axially aligned tungsten filament which is effective when operative as having a predetermined range of characteristic natural frequencies $\Omega_z$, said filament being connected between a pair of inner leads which extend out of one end of said inner envelope;

(d) means for electrically connecting said pair of inner leads to said electrically conductive base;

(e) mounting means, forming part of said means for electrically connecting said pair of inner leads and disposing said inner envelope within said outer envelope, said mounting means having a predetermined range of characteristic natural frequencies $\Omega_y$;

said characteristic natural frequencies $\Omega_z$ of said operative filament and said characteristics natural frequencies $\Omega_y$ of said mounting means being interrelated by the following relationship;

the ratio of $\Omega_z/\Omega_y$ being less than about 0.3 and greater than about 1.4.

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**4,743,804**

**E-BEAM IONIZED CHANNEL GUIDING OF AN INTENSE RELATIVISTIC ELECTRON BEAM**

**Charles A. Frost; Brendon B. Godfrey; Paul D. Kiekel, and Steven L. Shope, all of Albuquerque, N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Apr. 25, 1986, Ser. No. 855,529**

**Int. Cl.[4] H05H** *1/03*

**U.S. Cl. 315—5.14** **11 Claims**

**1**. Apparatus for guiding a pulse of high energy electrons having a radius $r_b$, said apparatus including:

means for containing an ionizable gas;

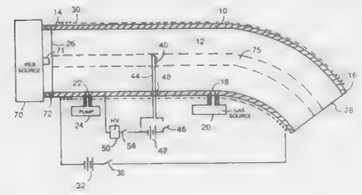
electron impact ionization means for generating an ionized channel through said gas, said channel having radius $r_c < r_b$ and satisfying the relationship: $1 > f_e > \gamma^{-2}$

wherein $f_e = n_c r_c^2 / n_b r_b^2$ and $n_c$ is the ion density, $n_b$ is the beam density, and $\gamma =$ the Lorentz factor;

said ionization seans consisting of:



low-energy means for generating low-energy electrons within said means for containing; and



magnetic means for generating a magnetic field to guide and confine said low energy electron beam.

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**4,743,805**

**ANODE ASSEMBLY OF MAGNETRON AND METHOD OF MANUFACTURING THE SAME**

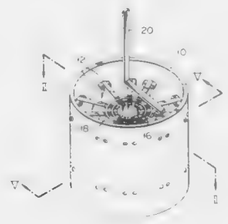
**Kousuke Takada, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Sep. 5, 1986, Ser. No. 903,726**

**Claims priority, application Japan, Sep. 9, 1985, 60-198926; Sep. 9, 1985, 60-198927**

**Int. Cl.[4] H01J** *25/587*

**U.S. Cl. 315—39.75** **9 Claims**



**1**. An anode assembly of magnetron, comprising:

an anode cylinder having a pluraltiy of projections protruding from an inner surface thereof each projection being formed by pressing part of a wall of the anode cylinder from an outer side toward an inner side

a plurality of plate-like anode vanes radially extending from said inner surface of said anode cylinder toward a center thereof and provided at predetermined angular intervals along a circumferential direction of said anode cylinder, each of said vanes havign a connecting end portion with four corners engaged with the inner surface of said anode cylinder, four projections being provided per anode vane so as to engage with the four corners of the connecting end portion of the anode vanes, said connecting end portion being mechanically fixed to said inner surface of said anode cylinder by caulking said projections engged therewith, and being electrically connected to said anode cylinder by soldering and

a plurality of strap rings, fixed to said anode vanes, for electrically short-circuiting every other ones of said anode vanes, respectively.

**4,743,806**

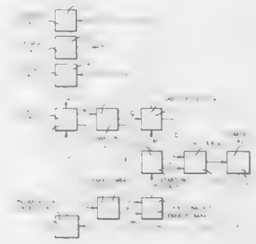
**PROCESS AND ARRANGEMENT TO IRRADIATE SOLID STATE MATERIALS WITH IONS**

**József Gyulai; László Királyhidi; István Krafcsik, and Péter Riedl, all of Budapest, Hungary, assignors to MTA Kozponti Fizikai Kutato Intezete, Budapest, Hungary**

**Continuation of PCT HU85/00025, Apr. 19, 1985, published as WO85/04983, Nov. 7, 1985. This application filed Dec. 19, 1985, Ser. No. 825,368**

**Int. Cl.[4] H01J** *7/24*

**U.S. Cl. 315—111.81** **1 Claim**



**1**. Apparatus for ion irradiation of solid state materials in a pulsed operation, comprising a charging unit having a pair of outputs, wherein one of the outputs of said charging unit is connected to an input of a pulse generator, the other output of the charging unit is connected to an input of a source magnet energy bank for charging said energy bank; another input of the source magnet energy bank is connected to an output of a sparking unit for receiving an actuating signal therefrom, and an output of the source magnet energy bank is connected to an input of a starter unit, and an output of the starter unit is connected to an input of an ion source, another input of the ion source is connected to another input of the pulse generator, the output of the pulse generator is connected to the second input of the ion source, further comprising a control unit (27) having outputs connected to an input of said sparking power supply unit (25) and the charging unit (26) consisting of current generators, and an output of the charging unit (26) is connected to one of the input of a voltage limiter (28) for limiting the voltage of the charging unit output to a preset value, said voltage limiter is connected to one of the inputs of the control unit (27) for comparing actual and preset voltage values, further the output of the ion source (21) is connected to the input of a target unit (211) and the output of said target unit is connected, via a unit (29) for controlling the extent of the implantation, and further to the other input of the control unit (27) for continuing or discontinuing the irradiation operation, and the other output of the pulse generator (22) is connected to the input of a display unit (210) for monitoring the implantation apparatus, whereby ion irradiation in said target unit is carried out in a pulsed fashion at energy levels and for a period of time set by said control unit and said implantation control unit.

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**4,743,807**

**LASER ACTIVATED DIFFUSE DISCHARGE SWITCH**

**Loucas G. Christophorou, and Scott R. Hunter, both of Oak Ridge, Tenn., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Apr. 30, 1987, Ser. No. 44,178**

**Int. Cl.[4] H01J** *7/24;* **H05B** *37/02*

**U.S. Cl. 315—150** **6 Claims**

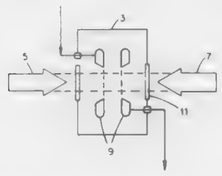
**1**. A process for fast switching of a gas from a conducting state to an insulating state comprising:

in the absence of light, introducing an electron source to a gas mixture of a buffer gas contained in said switch that is an inert, nonelectron attaching, hign vapor pressure gas with the lowest excited state lying at energies above the laser photon energy and a compound which attaches electrons when electronically exicted, said mixture being

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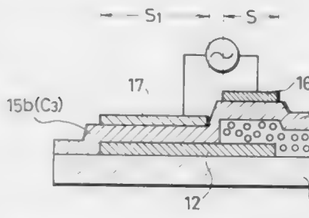
in a gas chamber containing two electrodes, thereby creating an conducting environment within said chamber;
removing said electron source;
directing a laser light at said gas mixture thereby affecting the attachment of low energy electrons, wherein said electron attachment is caused by the molecules of said



compound, first, being optically excited to a high lying optically allowed transition state, second, being internally converted to the lowest optically allowed state, third, undergoing intersystem crossing to the triplet state, remaining in the triplet for a relatively long time and capturing low energy electrons efficiently while in the triplet state.

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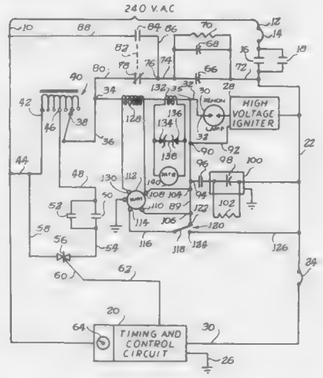
**4,743,808**
**MULTI-LAYER ELECTROLUMINESCENT ELEMENT**
**Ken-ichi Mitsumori, Furukawa, Japan, assignor to Alps Electric Co., Ltd., Japan**
**Filed Feb. 24, 1987, Ser. No. 17,990**
**Claims priority, application Japan, Jun. 27, 1986, 61-152072**
**Int. Cl.[4] G09G** *3/10;* **H01J** *1/62*
**U.S. Cl. 315—169.3** **2 Claims**




1. A multi-layer thin film electroluminescent element comprising:
a transparent conductive film of a given area provided on a transparent substrate;
an electroluminescent layer provided directly or indirectly ia an insulative layer on said transparent conductive layer overlapping a first portion of the area of said trasnparent conductive layer;
a first voltage applying electrode provided via a first insulating layer on said electroluminescent layer;
a second voltage applying electrode provided on said transparent conductive layer via a second insulating layer overlapping a second portion of the area of said transparent conductive layer where said electroluminscent layer does not extend, the overlapping area of the second portion of said transparent conductive layer and the second voltage applying electrode being layer by a ratio of about 1.5 or more than the overlapping area of the first portion of said transparent conductive layer and the first voltage applying electrode; and
an alternating voltage source for applying an alternating voltage between said first and second voltage applying electrodes in order to produce an electric field between said first and second voltage applying electrodes and said transparent conductive layer as an equivalent potential surface,
whereby said electroluminescent layer emits light, a reduced driving voltage is required compared to the case where the second voltage applying electrode overlaps an area substantially equal to that of the first voltage applying electrode, and the multi-layer EL element is configured to allow voltage applying leads to the electrodes to be led out from a back side of the element.

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**4,743,809**
**XENON LAMP CIRCUIT**
**Victor H. Vlahos, Lake Zurich, Ill., assignor to Atlas Electric Devices Company, Chicago, Ill.**
**Filed Jul. 28, 1987, Ser. No. 78,547**
**Int. Cl.[4] H05B** *37/02*
**U.S. Cl. 315—209 R** **3 Claims**




1. A Xenon lamp circuit for use in testing materials, such as for fading qualities, comprising a pair of conductors for connection to an AC power supply, a Xenon lamp having a pair of terminals, means connecting one of said terminals to one of said conductors, an inductor having first, second and third connectors, means connecting said first connector to the other of said conductors, means connecting said third connector to the other of said Xenon lamp terminals, means including controlled conducting means connected from said second connector to one of said first and third connectors, and means for controlling said controlled conducting means to effect more or less shunting of said inductor between said one and said second conductor to control power input to said Xenon lamp, and further including capacitor means, means connecting said capacitor means substantially in parallel with said lamp for a predetermined time during ignition of said lamp, and means subsequently connecting at least a part of said capacitor means across said conductors for power factor control.

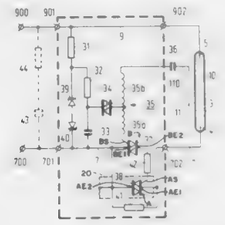
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**4,743,810**
**CIRCUIT ARRANGEMENT FOR OPERATING A HIGH-PRESSURE DISCHARGE LAMP**
**Johny A. J. Daniels, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**
**Filed Oct. 31, 1985, Ser. No. 793,527**
**Claims priority, application Netherlands, Nov. 6, 1984, 8403365**
**Int. Cl.[4] H05B** *41/36, 41/22*
**U.S. Cl. 315—221** **10 Claims**

1. A matching circuit for coupling a discharge lamp to a pair of terminals for a source of lamp supply voltage, said matching circuit comprising: first and second input terminals for connection to said pair of supply voltage terminals, first and second output terminals for connection to terminals of the lamp, a thyristor type semiconductor switching element connected in series with said output terminals across said first and second



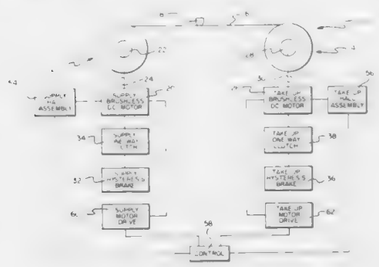
input terminals of the matching circuit such that first and second main electrodes of the switching element are electrically connected to the second output terminal and to the second input terminal, respectively, a voltage divider connected across said first and second input terminals, a controlled switch having first and second poles connected to a control electrode of the thyristor type switching element and to the second main electrode of the thyristor type switching element, respectively, whereby a control current for the thyristor type switching



element will flow through a junction between the first main electrode and the control electrode thereof and via the first and second poles of the controlled switch, and means coupling a control terminal of the controlled switch to an output terminal of the voltage divider so as to control operation of the controlled switch by means of an output signal from the voltage divider, wherein said coupling means includes a voltage-breakdown element and a primary winding of a transformer having a secondary winding for coupling an ignition pulse to an auxiliary electrode of the discharge lamp.

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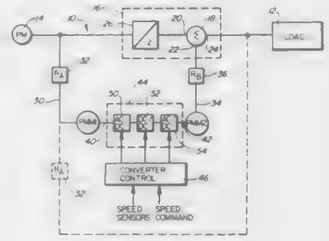
**4,743,811**
**ADAPTIVE CONTROL SYSTEM FOR REEL TO REEL WEB TRANSPORT APPARATUS**
**Andrew S. Katayama, San Diego, Calif., assignor to Eastman Kodak Company, Rochester, N.Y.**
**Filed Sep. 21, 1987, Ser. No. 98,647**
**Int. Cl.[4] B65H** *59/38;* **G11B** *15/46*
**U.S. Cl. 318—7** **5 Claims**



1. An apparatus for transporting a web between supply and takeup reels comprising:
a supply brushless direct current (DC) motor connected to said supply reel;
a takeup brushless DC motor connected to said takeup reel;
a supply Hall device assembly mounted on said supply motor for producing supply Hall signals;
a takeup Hall device assembly mounted on said takeup motor for producing takeup Hall signals;
control means for producing from said supply Hall signals and said takeup Hall signals, both commutation control signals and servo voltage signals for controlling the rotation of said supply and takeup motors to effect transport of said web between said supply and takeup reels;
wherein each of said Hall device assemblies includes at least two angularly spaced Hall devices and wherein said Hall signals produced by said Hall devices are out of phase with each other such that the period between changes in signal value between two consecutive Hall signals is a measure of the radial velocity of the respective motor; and
wherein said control means applies a correction factor to said Hall periods to correct for any misplacement in the angular position of said Hall devices.

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**4,743,812**
**BOOST/BUCK DC/DC CONVERTER**
**Bryan W. Dishner, Roscoe, Ill., assignor to Sundstrand Corporation, Rockford, Ill.**
**Filed Dec. 23, 1986, Ser. No. 946,086**
**Int. Cl.[4] H02P** *9/00*
**U.S. Cl. 318—14** **12 Claims**




1. An electrically-compensated constant speed drive for developing constant speed motive power from variable speed motive power developed by a prime mover, comprising:
a differential speed summer having first and second input shafts and an output shaft which develops the constant speed motive power, the first input shaft being coupled to the prime mover;
first and second permanent magnet machines each having a motive power shaft and electrical power windings wherein the motive power shaft of the first permanent magnet machine is coupled to either one of the first input shaft and the output shaft of the differential speed summer and wherein the motive power shaft of the second permanent magnet machine is coupled to the second input shaft of the differential speed summer; and
a power converter interconnecting the electrical power windings of the first and second permanent magnet machines for controlling the flow of power between such windings, the power converter including a bi-directional DC/DC converter which acts only as a boost converter when power flow is from one permanent magnet machine to the other machine and which acts as a buck converter when power flow is from the other machine to the one machine.

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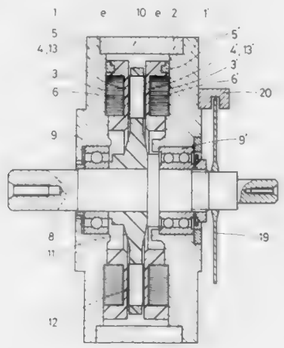
**4,743,813**
**DIRECT CURRENT MOTOR WITH ELECTRONIC COMMUTATION CIRCUIT AND ENCODER-CONTROLLED WINDING POWER**
**Giampiero Tassinario, Florence, Italy, assignor to Mavilor Systemes S.A.**
**Filed Oct. 15, 1986, Ser. No. 919,018**
**Claims priority, application Switzerland, Oct. 15, 1985, 4440/85**
**Int. Cl.[4] H02K** *29/10*
**U.S. Cl. 318—138** **10 Claims**

1. Direct current motor without commutator, with electronic communication, with permanent magnet excitation, provided with a rotor carrying p pairs of permanent magnets and a stator provided with at least one winding, the powering

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of the coils of the winding being able to be controlled by an encoder synchronized with the rotor by mechanical means, through an electronic commutation circuit including a plurality of sensors arranged along the periphery of the encoder detecting the angular position of the rotor, the number of said plurality of sensors is odd and equal to 2N +1, N being a positive integer, the number of connection terminals M of the winding to which the supply voltage is selectively applied is equal to multiple of 2N +1 including 2N +1, the number of commutations per complete revolution of the rotor is equal to 2p (2N +1) and during each commutation the connection between one of the terminals of the voltage source and at least one of the connection terminals of the winding is maintained, characterized in that the commutation circuit (G, G') is designed to operate in two commutation modes, the choice of mode being made by a control unit (UC) according to the requirements of the load, the two modes are:



during each commutation operation, two switches connected to two sensors acting on two consecutive connection terminals are simultaneously operated, one disconnecting the consecutive connection terminal connected to the other terminal of the voltage source while the second switch connects the other consecutive connection terminal to the other terminal of the voltage source; and

in each commutation state, three switches connect three connection terminals to the voltage source, two consecutive connection terminals being connected to the same terminal of the voltage source and, during each commutation, two switches acting on two non-consecutive terminals are operated such that each of the terminals of the voltage source is alternatively connected to two consecutive connection terminals.

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**4,743,814**

**STATIC POWER CONVERSION FOR ADDING DC MOTORS**

**Edwin W. Sankey, 645 Leetonia Rd., Marion, Ohio 43302**

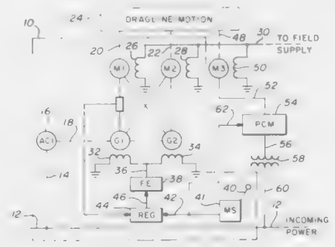
**Filed Feb. 6, 1987, Ser. No. 11,535**

**Int. Cl.[4] H02P** *7/34;* **H02K** *7/20*

**U.S. Cl. 318—140** **8 Claims**

1. In apparatus having a material handling device movable in at least first and second motions and having a power line and at least one motor-generator set coupled to said power line for providing power to drive at least said first motion, said motor-generator set having field exitation windings provided with electrical current and at least a first motion control means for producing an output signal coupled to said generator field exitation windings for varying said current therethrough to control the power to said at least first motion, the improvement comprising:

a. an additional D.C. electrical motor mounted on said apparatus and mechanically coupled to said at least first motion for providing additional power concurrently with said at least one motor-generator set to drive said at least first motion, and



b. static power conversion means coupled between said additional motor and said power line for converting said power line voltage to a variable DC armature supply voltage for said additional motor.

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**4,743,815**

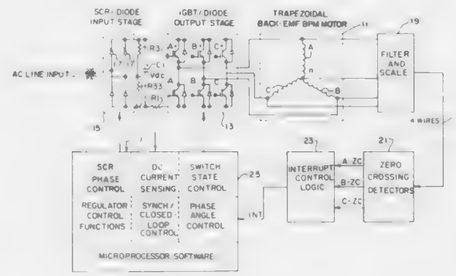
**BRUSHLESS PERMANENT MAGNET MOTOR SYSTEM**

**David E. Gee, and J. Stephen Thorn, both of Florissant, all of Mo. 63033, assignors to Emerson Electric Co., St. Louis, Mo.**

**Filed Sep. 1, 1987, Ser. No. 91,759**

**Int. Cl.[4] H02P** *6/02*

**U.S. Cl. 318—254** **37 Claims**




1. A control system for a multi-phase brushless permanent magnet motor having a stator with at least one phase winding per phase of the motor, a rotor mounted for rotation in the stator, said rotor having a plurality of permanent magnet poles so that rotation of the rotor with respect to the stator generates a back EMF in the phase windings of the stator, and motor terminals for each phase adapted to be connected to a power source, comprising:

means for periodically generating signals representing the relative position of the rotor with respect to the stator;

means for decoding the periodically generated signals to determine the presence of the rotor at one of a plurality of predetermined rotary positions with respect to the stator;

said decoding means including means for generating an interrupt signal in response to the presence of the rotor at one of the plurality of predetermined rotary positions with respect to the stator;

electrically controllable switch means connected to the phase windings to control the flow of current therethrough;

microprocessor control means responsive to the interrupt signal for controlling in a closed loop manner the switch means to commutate the phase windings of the motor a predetermined time after receipt of the interrupt signal, said microprocessor control means also being responsive to the speed of the motor to start the motor in an open loop mode and to shift commutation to the closed loop mode once the motor reaches a predetermined speed.

29. A method for controlling a multi-phase brushless permanent magnet motor having a stator with at least one phase winding per phase of the motor, a rotor mounted for rotation in the stator, said rotor carrying a plurality of permanent magnets so that rotation of the rotor with respect to the stator generates a back EMF in the phase windings of the stator, zero crossing detecting means for detecting when the back EMF crosses motor netural zero motor terminals for each phase, and electrically controllable switch means connected between a power source and the phase windings to control the flow of current therethrough, comprising the steps of:

sensing the back EMF of each phase and in response thereto periodically generating signals representing the relative position of the rotor with respect to the stator;

decoding the periodically generated signals to determine the presence of the rotor at one of a plurality of predetermined rotary positions with respect to the stator;

generating an interrupt signal in response to the presence of the rotor at one of the plurality of predetermined rotary positions with respect to the stator;

starting the motor in an open loop mode;

once a predetermined motor speed has been reached, shifting from said open loop mode to a closed loop mode of operation; and

controlling the switch means in a closed loop to commutate the phase windings of the motor a predetermined time after receipt of the interrupt signal once the predetermined motor speed has been reached.



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**4,743,816**

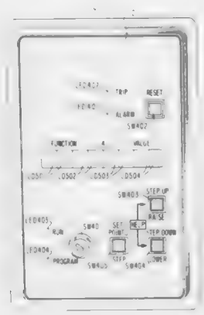
**MICROPROCESSOR BASED MOTOR PROTECTIVE RELAY WITH TRANSITION CONTROL**

**Edward C. Prather, Hendersonville, N.C., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Mar. 31, 1987, Ser. No. 32,908**

**Int. Cl.[4] H02P** *1/28*

**U.S. Cl. 318—455** **4 Claims**



1. Motor control apparatus of the kind that is utilized in starting an electric motor, comprising:

multi-stage motor starter means for interconnecting power lines for said motor to said motor in stages, wherein a lower voltage is connected to said motor in a first stage and a higher voltage is connected to said motor in a subsequent stage;

microprocessor means interconnected with said motor starter means for placing said motor starter means in said first stage upon command;

command means interconnected with said microprocessor means for initiating a start condition for said motor;

motor current monitor means interconnected with said power lines and said microprocessor means for sensing a motor current level in said power lines;

memory means interconnected with said microprocessor means for having stored therein a first predetermined current value which is indicative of a started motor, said microprocessor means comparing said sensed power line current with said first predetermined current value for indicating that said motor has started if said sensed current has exceeded said first predetermined current value, said memory means having stored therein a second predetermined current value which is greater than the full load current of said motor, said microprocessor means comparing said sensed power line current with said second predetermined current value after said motor has started for causing said motor starter means to switch to said subsequent stage when said sensed power line current first falls below said second predetermined current value after said motor has started.

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**4,743,817**

**ELECTROMAGNETIC SERVO UNIT**

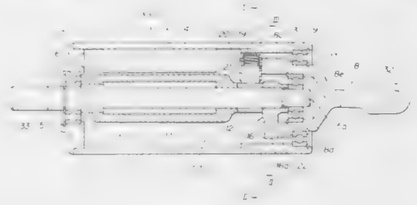
**Yasuo Shimizu, Utsunomiya, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Continuation-in-part of Ser. No. 745,154, Jun. 17, 1985, abandoned. This application Oct. 3, 1986, Ser. No. 914,527**

**Claims priority, application Japan, Jun. 22, 1984, 59-129583; Jun. 22, 1984, 59-129587**

**Int. Cl.[4] B62D** *5/04*

**U.S. Cl. 318—488** **10 Claims**



1. An electromagnetic servo unit, comprising:

an outer casing;

a first shaft and a second shaft both rotatably supported by said casing;

an electric motor having an armature coaxially fixed on said second shaft and a field arranged inside said casing;

torque detection means for detecting torque applied to either of said first shaft and said second shaft, said torque detecting means includes

a part of said first shaft in said casing,

a part of said second shaft in said casing;

elastic means interposed between said part of said first shaft and said part of said second shaft; and

control means for receiving a detection signal from said torque detecting means, said control means for starting and controlling said electric motor,

wherein

said torque detecting means is arranged inside said casing; and

said first shaft and said second shaft are mutually actuatably engaged with each other within said casing through said torque detecting means.

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**4,743,818**

**MICROPROCESSOR BASED MOTOR PROTECTIVE RELAY WITH ROTOR TEMPERATURE DETECTOR**

**Bruce R. Quayle, Asheville, and Edward C. Prather, Hendersonville, both of N.C., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Mar. 31, 1987, Ser. No. 32,909**

**Int. Cl.[4] H02H** *7/08;* **G05D** *23/00*

**U.S. Cl. 318—473** **13 Claims**

1. Apparatus which performs an operation as a function of

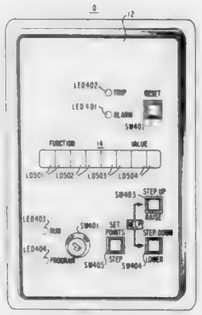
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the temperature $T_{Rn}$ of a rotating rotor at a given instant of time comprising:

temperature sensing means for determining the temperature $T_S$ of a stator which is mechanically associated with said rotating rotor;

current sensing means for digitally sampling the electrical



current I flowing in the windings of said stator at a sampling rate $\beta$, where current I is electromagnetically associated with said rotating rotor;

digital calculating means interconnected with said temperature sensing means and said current sensing means for determining said rotor temperature $T_{Rn}$ according to the following relationship:

$$T_{Rn} = T_{R(n-1)} + \frac{\delta}{\beta}(K_1 I^2 + K_2 T_S - K_3 T_{R(n-1)})$$

where:

$\delta = \beta \Delta t$

$\Delta t$ = the time between the preceding time said stator temperature was determined and said given instant of time,

$T_{R(n-1)}$ = the rotor temperature of said preceding time,

$K_1$, $K_2$ and $K_3$ are constants; and means interconnected with said digital calculating means for performing said operation as a function of $T_{Rn}$.

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**4,743,819**

**INDUSTRIAL ROBOT**

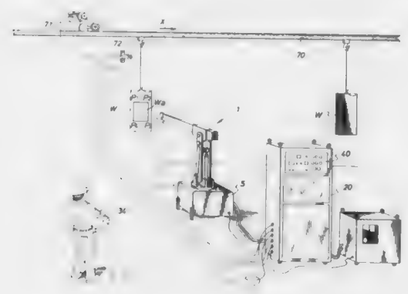
**Junji Hashizume, Yokohama, Japan, assignor to Tokico Ltd., Kawasaki, Japan**

**Filed Oct. 6, 1986, Ser. No. 915,542**

**Claims priority, application Japan, Oct. 18, 1985, 60-232773**

**Int. Cl.⁴ G05B** *19/42*

**U.S. Cl. 318—368** **6 Claims**



1. An industrial robot comprising:

a main body having a plurality of movable members connected to one another at their respective joints,

detection means for detecting relative positions between the moveable members at each of the joints and for outputting position signals based thereon,

designation circuit means for designating position signals from the detection means upon a teaching operation,

memory means for sequentially storing the position signals designated by said designation circuit,

digital interpolation means for executing an interpolation based on at least four read out position signals from said memory means in order to determine a required number of desired positions on a flat area delineated by lines joining points corresponding to said four position signals and for outputting a calculation result signal based upon said determination;

servo means for positioning each of said movable members of the robot main body using, during a playback operation, said calculation result signal from said digital interpolation means as target values and said position signals from said detection means as current values, and

interpolation selection means for variably selecting a number of interpolation positions on said flat area for which an interpolation is to be executed by said digital interpolation means.

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**4,743,820**

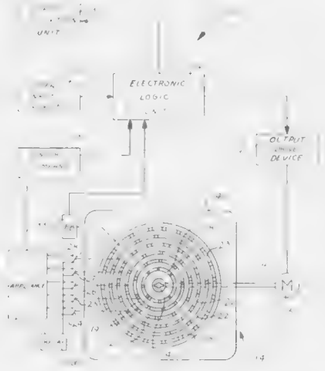
**ELECTRONIC APPLIANCE CONTROL**

**Wayne Veach, 7413 Rolling River Pkwy., Bellevue, Tenn. 37221**

**Continuation of Ser. No. 325,232, Nov. 27, 1981. This application Nov. 25, 1985, Ser. No. 801,601**

**Int. Cl.⁴ G05B** *19/06*

**U.S. Cl. 318—578** **4 Claims**




1. A controller for an appliance having a plurality of selectively energizeable electromechanical components, comprising:

input means for operator selection of a desired cycle of operation of said appliance;

a motor;

switching means coupled to be driven by said motor and having a plurality of timing cams on a rotating member for controlling the operation of a plurallity of switches for applying power to energize said components; and

sequencing means for selectively advancing said switching means including:

means for applying power to said motor;

means on said rotating member for defining incremental positions around said rotating member;

means for detecting movement of said rotating member from one of said positions to the next adjacent position;

means separate from said rotating member and responsive to the selected operation cycle for defining a program for said rotating member which includes a series of operating steps each including a number of incremental positions to be moved and a time delay of operation; and

means for operating said power applying means to move said rotating member a defined number of incremental positions in accordance with said program.



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**4,743,821**

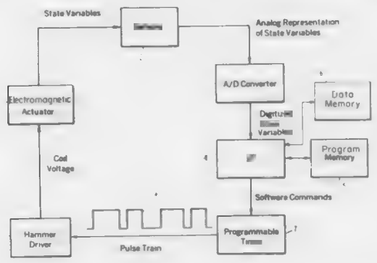
**PULSE-WIDTH-MODULATING FEEDBACK CONTROL OF ELECTROMAGNETIC ACTUATORS**

**Shawn A. Hall, Pleasantville, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Oct. 14, 1986, Ser. No. 918,447**

**Int. Cl.⁴ G05B** *11/28*

**U.S. Cl. 318—599** **7 Claims**




1. A system for controlling the dynamics of an electromagnetic actuator having a related armature, coil and driver, in which the armature moves by activation of the related driver which energizes the related coil in response to a pulsed, driver-control waveform signal, certain aspects of the armature motion being affected by disturbances which cause the trajectory of the armature to depart from an ideal trajectory which the armature should follow, the system comprising:

transducer means (2,34,53) for sensing at least one state variable and providing an output responsive thereto;

digitizing means (3), connected to said transducer means, for digitizing the transducer means output and providing a digital transducer output signal;

memory (6) for storing digital reference values defining an ideal trajectory;

computer means (4), connected to said digitizing means (3) and to said memory (6), arranged to compare the digital transducer output signal with the digital reference values, and to provide a control signal which causes the driver-control waveform signal to be pulse-width modulated in response to the comparison;

a programmable timer (7), connected to said computer means, for producing, responsive to the control signal, a pulse-width modulated, driver-control waveform signal; and

actuation means, including the related coil, connected to said programmable timer for energizing the coil in response to the pulse-width modulated, driver-control waveform signal,

whereby the trajectory of the armature is urged, by the driver-control waveform signal, to substantially follow the ideal trajectory.

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**4,743,822**

**SERVO MOTOR CONTROL METHOD AND APPARATUS**

**Shigeru Futami, Ibaragi; Yasuhiko Kaku, Saitama, and Yoichi Yamamoto, Fukuoka, all of Japan, assignors to Yaskawa Electric Mfg. Co., Ltd., Fukuoka, Japan**

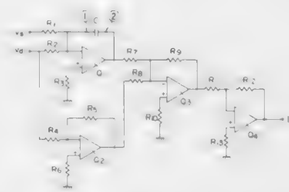
**PCT No. PCT/JP85/00701, § 371 Date Oct. 10, 1986, § 102(e) Date Oct. 10, 1986, PCT Pub. No. WO86/03904, PCT Pub. Date Jul. 3, 1986**

**PCT Filed Dec. 21, 1985, Ser. No. 898,562**

**Claims priority, application Japan, Dec. 22, 1984, 59-271552; Dec. 22, 1984, 59-271553; Dec. 22, 1984, 59-271554; Jan. 24, 1985, 60-012125**

**Int. Cl.⁴ G05B** *11/42*

**U.S. Cl. 318—610** **11 Claims**



1. A method for controlling a servo motor control apparatus having a position feedback control loop, a speed feedback control loop, a motor current feedback loop, controller means which include at least a proportional element and an integrating element within said speed feedback loop, and means for producing a speed command voltage responsive to the motor speed;

said method comprising setting a value of said integrating element of said controller means to zero or reversing its polarity at the moment that said speed command of the motor becomes negative or positive after passing through zero.

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**4,743,823**

**METHOD AND DEVICE FOR CORRECTING BACKLASH**

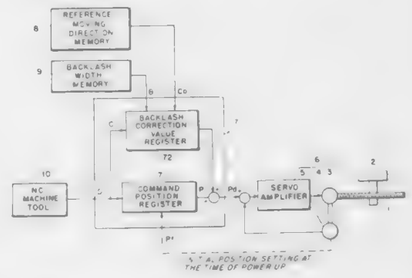
**Jun Fujita, Numazu, Japan, assignor to Toshiba Machine Co., Ltd., Tokyo, Japan**

**Filed Oct. 17, 1986, Ser. No. 920,122**

**Claims priority, application Japan, Oct. 17, 1985, 60-232104**

**Int. Cl.⁴ G05B** *11/01*

**U.S. Cl. 318—630** **6 Claims**




1. A method of correcting a backlash serving as a principal cause of an error occurring between a position detected by an absolute position detector having a detecting portion provided on the side of a driving means and a position of a driven member moved by said driving means, comprising the steps of:

storing a backlash width;

storing a reference moving direction;

issuing a movement command immediately after a power up;

moving said driven member in response to said movement

command a predetermined amount to a target position when the moving direction of said driven member coincides with a stored reference moving direction; and

moving said driven member by an amount equal to the value of the backlash width in addition to the predetermined amount in response to said movement command when the moving direction is the reverse of the reference moving direction.

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**4,743,824**

## METHOD AND APPARATUS FOR CONTROLLING A MOTOR

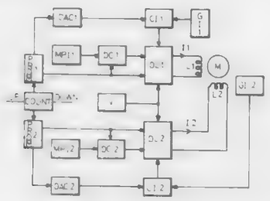
**Per C. Andersson, Sollentuna, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden**

**Filed Feb. 6, 1987, Ser. No. 11,638**

**Claims priority, application Sweden, Apr. 18, 1986, 8601802**

**Int. Cl.[4] H02P** *8/00*

**U.S. Cl. 318—696** **18 Claims**



1. An apparatus for controlling current (I, I1, I2) through a stator winding (L, L1, L2) in a motor (M), which motor is connected to a power source ($V, V_{MM1}, V_{MM2}$) via a drive circuit (DL, DL1, DL2), which drive circuit comprises switches controllable such as to enter into conducting and blocking states, which apparatus comprises actual value means (GI1, RG1, RF1, CF1, GI2, RG2, RF2, CF2) for generating an actual value corresponding to the actual current, comparison means (CI1, CI2, OP10, OP20) for comparing the actual value with a desired value (I1R, I2R), which desired value varies at least from time to time and has a magnitude which successively increases during certain time periods and successively decreases during other time periods, which apparatus comprises control means for controlling the states of the switches into different combinations of states for causing the actual value to approach the desired value, which control means and which drive circuit are arranged such as to provide the possibilty of controlling the state of the switches into any of three different combinations of states, whereby in a first of the three combinations of states energy is supplied from the power source to the stator winding via at least one conducting switch in the drive circuit, whereby in a second of the three combinations of states no substantial energy is supplied to the stator winding from the power source, whereby in a third of the three combinations of states a current in the stator winding may be reduced substantially more rapidly than it would be reduced in the second of the combinations of states during equivalent conditions, characterized by means (MP11, MP12. LEVEL11, LEVEL12, DC1, DC2, DCOMP1, DCOMP2) for sensing the desired value time sequence and for restricting in time the possibility of the control means to control the states of the drive circuit switches so that the switches enter into the third combination of state in response to the result (CD1, CD2) of the sensing of the desired value time sequence.

**4,743,825**

## SYNCHRONOUS MOTORS AND A CONTROL SYSTEM THEREOF

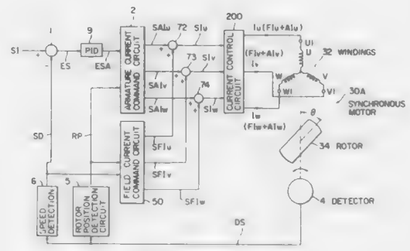
**Masayuki Nashiki, Nagoya, Japan, assignor to Kabushiki Kaisha Okuma Tekkosho, Aichi, Japan**

**Continuation of Ser. No. 650,675, Sep. 13, 1984. This application Nov. 26, 1986, Ser. No. 935,188**

**Claims priority, application Japan, Sep. 27, 1983, 58-182341; Sep. 27, 1983, 58-18234; Oct. 27, 1983, 58-201799; Oct. 27, 1983, 58-201800**

**Int. Cl.[4] H02P** *5/40*

**U.S. Cl. 318—723** **16 Claims**




1. A synchronous motor and a control system therefor, which comprises:

a three-phase synchronous motor which has a stator having windings and a rotor which is winding-free, said stator being of a right circular cylindrical shape so as to have a transverse section which is circular; said stator having slots which are symmetrically provided in an inner circular side thereof and having armature windings and field windings which are wound around said slots independently from each other and have symmetrical three-phase windings; said rotor comprising a salient-pole structure having a plurality of magnetic poles and composed of a magnetic material; the number of magnetic poles being equal to twice that of a positive integer; and

a control system comprising a rotor position detection means for detecting a position of said rotor; a speed detection means for detecting a rotational speed of said rotor; a PID compensation means for compensating for a deviation between a speed command input and a speed signal detected by said speed detection means; an armature current command means for receiving a compensated speed command from said PID compensation means and a position signal detected by said rotor position detection means as an input and for generating a three-phase armature current command in response thereto; a field current command means for receiving said detected speed and position signals as inputs thereto and for generating a three-phase field current command in response thereto; an armature current control means for receiving said armature current command as an input thereto and for supplying armature current to said armature windings in response thereto; and a field current control means for receiving said field current control command as an input thereto and for supplying field current to said field windings in response thereto.



**4,743,826**

## PUMPING-UP GENERATOR/MOTOR SYSTEM AND METHOD OF OPERATION OF THE SAME

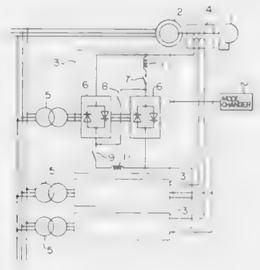
**Akira Bando; Kenichi Ono; Hiroshi Kashiwazaki; Hiroshi Sugisaka, all of Hitachi; Eiji Haraguchi, Ibarakai, and Hiroto Nakagawa, Mishima, all of Japan, assignors to Hitachi, Ltd. and The Kansai Elect. Power Co., both of, Japan**

**Filed Apr. 16, 1986, Ser. No. 852,742**

**Claims priority, application Japan, Apr. 17, 1985, 60-80176**

**Int. Cl.[4] H02P** *7/42*

**U.S. Cl. 318—762** **4 Claims**




1. A pumping-up generator/motor system comprising a water turbine, a wound-rotor induction generator/motor means connected to said water turbine, said generator/motor means being selectively drivable in a generator motor or a motor mode with a center of operating speed range of the generator/motor means in the generator mode being set near its synchronous speed and the center of the operating speed range in the motor mode being set substantially higher than the synchronous speed, at least one cyclo-converter including a plurality of converter units and connected to a secondary winding of said generator/motor means for controlling a rotational speed of the generator/motor means driven in the motor mode and an output frequency of the generator/motor means driven in the generator mode, and a mode changer for selectively changing the connection of the converter units of each cyclo-converter such that said converter units are connected in parallel to each other in the generator mode and in series in the motor mode.

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**4,743,827**

## VARIABLE SPEED PUMPING-UP ELECTRICAL POWER SYSTEM

**Junichi Shiozaki; Takao Kuwabara; Akira Bando, all of Hitachi; Kenichi Ono, Kodaira; Akihiro Sakayori, Hitachi; Ichiro Hitomi, Katsuta; Masahiro Minato, Takamatsu, and Shigeaki Hayashi, Suita, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Apr. 29, 1987, Ser. No. 44,789**

**Claims priority, application Japan, Apr. 30, 1986, 61-99844**

**Int. Cl.[4] H02P** *5/40*

**U.S. Cl. 318—798** **4 Claims**

1. A variable speed pumping-up electrical power system comprising:

a variable speed electrical machine;

a frequency converter connected between said variable speed electrical machine and an a.c. power system;

a pump/turbine driven by said variable speed electrical machine;

a speed detector detecting the rotation speed of said pump-/turbine;

a power detector detecting effective power supplied to said variable speed electrical machine from said a.c. power system;

a frequency converter controller controlling said frequency converter so as to eliminate any error between the value of effective power detected by said power detector and the value of effective power commanded by an externally-applied effective power command signal, a frequency detector detecting the frequency of said a.c. power system, a frequency controller comparing the frequency



detected by said frequency detector with a frequency setting to generate a correction signal for correcting said effective power command signal, and means for correcting the value of the externally commanded effective power by said correction signal.

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**4,743,828**

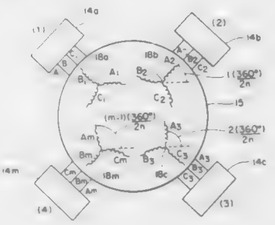
## ELECTRIC DRIVE SYSTEM

**Thomas M. Jahns, Schenectady, N.Y., and Vytautas Janonis, Cleveland, Ohio, assignors to Gould Inc., Rolling Meadows, Ill.**

**Continuation-in-part of Ser. No. 659,508, Oct. 10, 1984, abandoned, which is a continuation of Ser. No. 298,550, Sep. 2, 1981, abandoned. This application Nov. 6, 1985, Ser. No. 795,691**

**Int. Cl.[4] H02P** *5/40*

**U.S. Cl. 318—810** **12 Claims**




1. An electric drive system comprising:

a DC power source;

a multiphase AC motor, said motor having: N stator winding phases, where N is a multiple of three, and m stator winding sets, where m is at least two; said stator winding sets being constructed to provide the highest possible value of stator slot leakage inductance per phase for a given stator geometry;

wherein the stator winding coil sides located in the stator slots for each winding of each set are wound such that each slot contains coil sides belonging only to the same phase;

a plurality of inverters connected one each to said winding sets from said DC power source;

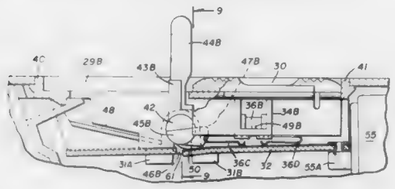
means for controlling said inverters to excite said winding sets successively, and

a propulsion means driven by said motor.

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**4,743,829**
**PLUG-IN DEVICE WITH SLIDE COVER OVER PLUG PRONGS**
**Kenneth R. Fenne, Glen Ellyn; Wayne D. Steward, Aurora, and Witalij Didyk, Addison, all of Ill., assignors to Pittway Corporation, Northbrook, Ill.**
**Continuation of Ser. No. 748,304, Jun. 24, 1985, Pat. No. 4,647,832, which is a continuation-in-part of Ser. No. 634,774, Jul. 26, 1984, abandoned. This application Mar. 2, 1987, Ser. No. 20,700**
**The portion of the term of this patent subsequent to Mar. 3, 2004, has been disclaimed.**
**Int. Cl.[4] H02J** *7/00;* **H01M** *10/46*
**U.S. Cl. 320—2** **8 Claims**

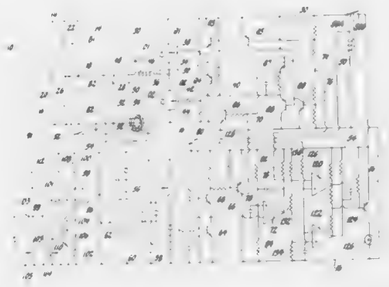


1. In a rechargeable device including a battery-operated unit, a rechargeable battery for the operation thereof, a recharging circuit coupled to the rechargeable battery, and a common casing for the unit and the battery and the circuit, the improvement comprising: a set of electrical prongs adapted for electrical coupling to an associated power source, means mounting said prongs on the casing for a first type of movement between a retracted position and an extended position for coupling to the associated power source, conductive means electrically connecting said prongs to the recharging circuit when said prongs are disposed in the extended position thereof, displaceable means disposable in first and second and third positions, said displaceable means in the first position thereof exposing said prongs, said displaceable means in the second position thereof substantially covering said prongs in the retracted position thereof, said conductive means electrically connecting the battery to the battery-operated unit when said displaceable means is disposed in the third position thereof, and means carrying said displaceable means on said casing for a second type of movement among said first and second and third positions, said first and second types of movement being different from each other.

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**4,743,830**
**DUAL VOLTAGE ELECTRICAL SYSTEM**
**Leroy E. Lakey, Anderson, Ind., assignor to General Motors Corporation, Detroit, Mich.**
**Filed Jan. 20, 1987, Ser. No. 4,486**
**Int. Cl.[4] H02J** *7/14*
**U.S. Cl. 320—6** **7 Claims**

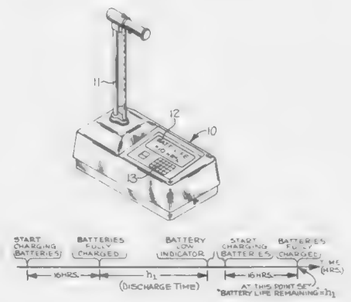
1. A dual voltage electrical system comprising, a source of direct voltage comprising a generator having direct voltage output terminals, first and second batteries, means connecting said batteries in series across said direct voltage output terminals whereby said batteries can be charged in series from said generator, control means connecting said batteries operative in one mode of operation to charge said first battery from said second battery and operative in a second mode of operation to charge said second battery from said first battery, said control means comprising switching means connected between a respective battery and a battery current supply circuit means, said switching means when conductive connecting one battery to said circuit means, said circuit means operative to supply current to another battery when a switching means is operated nonconductive, and means responsive to the relative terminal voltages of said batteries for selecting one of said first and second modes of operation, said last-named means operative to



select a mode of operation wherein the battery having the lower terminal voltage is charged from the other battery.

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**4,743,831**
**APPARATUS AND METHOD FOR INDICATING REMAINING BATTERY LIFE IN A BATTERY POWERED DEVICE**
**James E. Young, Youngsville, N.C., assignor to Troxler Electronic Laboratories, Inc., Research Triangle Park, N.C.**
**Filed Sep. 12, 1986, Ser. No. 906,543**
**Int. Cl.[4] H02J** *7/00;* **G08B** *21/00*
**U.S. Cl. 320—48** **7 Claims**

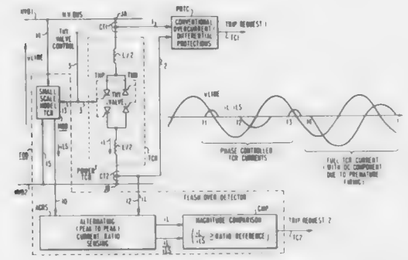



1. In a battery powered system which includes a portable battery powered device and a battery connected to said device for supplying electrical power thereto, the combination therewith of an apparatus for predicting the remaining useful life of the battery during the normal use discharge cycle of the battery, said apparatus comprising
- data storage means for storing a predetermined value representing the total number of usable hours expected to be obtained from a fully charged battery during a normal use discharge cycle,
- means for counting the number of hours of actual use of the battery,
- means for comparing the number of hours of actual battery use with said stored predetermined value to determine the number of hours of usable battery life remaining,
- means for displaying the thus determined remaining usable battery life, and
- means operable in response to the occurrence of a full discharge cycle of the battery in normal use updating said data storage means to store therein as said predetermined value for the expected useful life of the battery in the next normal use discharge cycle, the value for the number of hours of use actually obtained from the battery in the current discharge cycle, so that subsequent predictions of the battery life will be based upon the immediate past history of actual battery life.



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**4,743,832**
**PROTECTION SYSTEM FOR THYRISTOR-CONTROLLED REACTORS**
**Michael B. Brennen, Pittsburgh, and Laszlo Gyugyi, Penn Hills, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**
**Continuation-in-part of Ser. No. 942,882, Dec. 17, 1986. This application Jan. 30, 1987, Ser. No. 8,976**
**Int. Cl.[4] G05F** *1/70;* **H02J** *2/18*
**U.S. Cl. 323—211** **12 Claims**

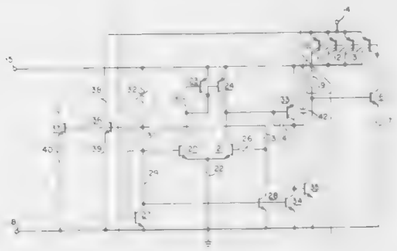


1. In a static VAR generator including first and second reactors connected in series between two transmission lines; at least two static power switches being mounted in antiparallel fashion between said first and second reactors; and means for controlling for conduction said static power switches alternately for each polarity with a selected phase angle established relative to the peak value of the AC voltage existing between said transmission lines, for generating with said first and second reactors a controlled reactive current iL added to said transmission lines for VAR compensation; the combination of:
- integration means for outputting an output in response to an input thereof;
- simulator means responsive to said controlling means for operatively connecting the input of said integration means to said transmission lines to derive from the voltage thereof an output current initiated concurrently with said controlled reactive current iL;
- means responsive to said output current for disconnecting said simulator means from said transmission lines when said output current goes to zero magnitude;
- whereby said output current is a current iLS simulating said reactive current iL;
- means responsive to at least one of said first and second reactors for deriving a signal representative of said reactive current iL;
- divider means responsive to said reactive current iL representative signal and to said output current for deriving a signal representative of the ratio iL/iLS;
- means responsive to said ratio representative signal for deriving a command signal when said ratio representative signal exceeds a predetermined critical level; and
- means responsive to said command signal for shutting down the static VAR generator.

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**4,743,833**
**VOLTAGE REGULATOR**
**William A. Johnson, Minneapolis, Minn., assignor to Cross Technology, Inc., Eden Prairie, Minn.**
**Filed Apr. 3, 1987, Ser. No. 34,431**
**Int. Cl.[4] G05F** *1/618*
**U.S. Cl. 323—224** **18 Claims**

1. A voltage regulating system for providing a regulated voltage of a selected value between a system output terminating region and a system reference terminating region if a source of sufficient voltage is electrically connected between first and second system input terminating regions, said system comprising:
- a shunt regulator means electrically connected between said system output terminating region and said system reference terminating region, said shunt regulator means being capable of passing selected shunt currents between said system output termination region and said system reference termination region in response to voltages occurring therebetween;
- a series regulator means comprising: a first pass means having a first terminating region electrically connected to said first system input terminating region, and having a second terminating region electrically connected to said system output terminating region, and having a control region therein by which said first pass means is capable of being directed, through electrical energization thereof, to effectively provide a conductive path of a selected conductivity between said first pass means first and second terminating regions with said conductivity of said conductive path increasing with increases in any voltage differences occurring between said first pass control region and said first system input terminating region; and
- a control means having an input and having an output which is electrically connected to said first pass means control region, said control means being capable of providing control signals at said control means output in response to signals provided at said control means input; and
- a current sensing means capable of sensing said shunt currents and providing shunt current indicating signals at an output thereof indicating magnitudes of said shunt currents, said current sensing means output being electrically connected to said control means input.



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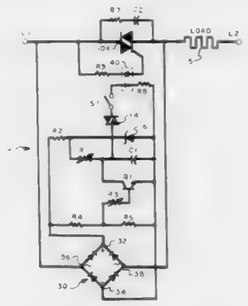
**4,743,834**
**CIRCUIT FOR CONTROLLING AND REGULATING POWER INPUT TO A LOAD FROM AN AC VOLTAGE SUPPLY**
**Richard M. Rice, Augusta County, Va., assignor to Reynolds Metals Company, Richmond, Va.**
**Filed Jun. 18, 1987, Ser. No. 64,973**
**Int. Cl.[4] G05F** *1/40*
**U.S. Cl. 323—239** **15 Claims**

1. A circuit for controlling power input to a load from an AC voltage supply comprising a thyristor having its anode and its cathode connected in series with said load and said voltage supply, a capacitor and at least a first resistor connected in parallel with the anode and the cathode of said thyristor, said capacitor being connected to the cathode side of said thyistor, with the electrical node between said capacitor and said at least one resistor being connected through a sharp triggering device

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to the gate of said thyristor, and a transistor having its emitter and collector connected in parallel to said capacitor, said



transistor having its base connected to the anode side of said thyristor through at least a second resistor.

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**4,743,835**

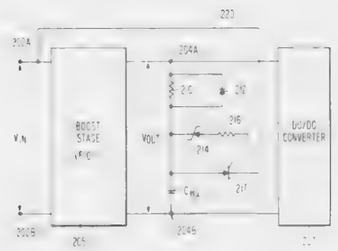
**OUTPUT HOLD-UP CIRCUIT FOR A STEP-UP VOLTAGE REGULATOR**

**Bertrand Bossé, and Thomas Gati, both of Chomedey-Laval, Canada, assignors to Unisys Corporation, Blue Bell, Pa.**

**Filed Sep. 3, 1987, Ser. No. 92,421**

**Int. Cl.[4] G05F** *1/569*

**U.S. Cl. 323—266** **15 Claims**



1. In a voltage regulator having an input for receiving a DC input voltage and an output for furnishing a DC output voltage to a load, improved means for sustaining the output voltage within a predetermined tolerance during fault conditions comprising:

energy storage means; and

coupling means coupled to the energy storing means, the input and output of the regulator and the load, the coupling means operative, during fault-free operation of the regulator and load, to couple the energy storage means for charging to a predetermined voltage level, the coupling means further operative, upon an occurrence of a fault condition at the regulator input, to couple the energy storage means across the regulator input.

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**4,743,836**

**CAPACITIVE CIRCUIT FOR MEASURING A PARAMETER HAVING A LINEAR OUTPUT VOLTAGE**

**Richard R. Grzybowski, Meriden, and Paul N. Marshall, Avon, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.**

**Filed Dec. 6, 1985, Ser. No. 805,685**

**Int. Cl.[4] G01R** *27/26, 11/52*

**U.S. Cl. 324—60 CD** **6 Claims**



1. A capacitive electrical circuit for measuring a parameter, comprising:

timing circuitry for providing first, second and third clock signals, and for providing a periodic square wave signal;

a capacitive integrating circuit having an integrator, discharge circuitry, a reference capacitor and a sensing capacitor responsive to the external parameter, one of said capacitors responsive to said square wave signal and the other to its inverse, said square wave signal providing alternative charging and discharging of said reference capacitor and said sensing capacitor, said reference and sensing capacitors providing a charge difference signal indicative of the difference in magnitude of the charge stored therein, said integrator responsive to a reference signal and to said charge difference signal for integrating said charge difference signal and providing an integrated output signal indicative of the magnitude of said charge difference, said discharge circuitry discharging said integrator each half cycle of said square wave signal in response to said first clock signal;

sampling circuit means including first and second sampling means for alternatively sampling, in alternate half cycles of said square wave signal, said integrated output signal from said capacitive integrating circuit in response to said second and third clock signals, respectively, and providing first and second sampled signals; and

a differential amplifier, responsive to said reference signal, and responsive to said first and second sampled signals, for providing from the difference in magnitudes therebetween, a linear signal having a magnitude proportional to the magnitude of the capacitance of said parameter responsive sensing capacitor.

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**4,743,837**

**CIRCUIT FOR MEASURING CAPACITANCE BY CHARGING AND DISCHARGING CAPACITOR UNDER TEST AND ITS SHIELD**

**Michael Herzog, Witterswil, Switzerland, assignor to Flowtec AG, Switzerland**

**Filed Dec. 11, 1986, Ser. No. 940,504**

**Claims priority, application Fed. Rep. of Germany, Dec. 13, 1985, 3544187**

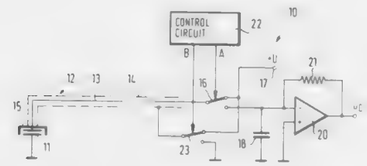
**Int. Cl.[4] G01R** *27/26*

**U.S. Cl. 324—60 CD** **3 Claims**

1. Capacitance measuring circuit comprising a switchover means which alternately and periodically with a predetermined switchover frequency connects the measured capacitance for charging to a constant voltage and for discharging to



a storage capacitor whose capacitance is large compared with the measured capacitance and whose terminal voltage is held substantially at a constant reference potential by a controlled discharge current, the magnitude of the discharge current being proportional to the measured capacitance and represent-



ing the measured value, characterized by a further switchover means which with the switchover frequency periodically and alternately connects a shield associated with the measured capacitance to potentials which correspond substantially to the constant voltage and the reference potential respectively.

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**4,743,838**

**CAPACITANCE DISPLACEMENT MEASURING INSTRUMENT HAVING WAVE SHAPED SUBELECTRODES AND MULTIPLEXER**

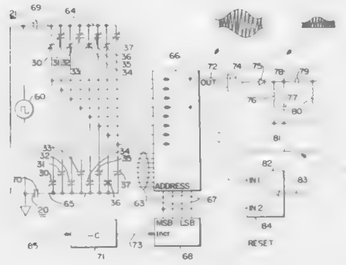
**Joseph S. Eckerle, Redwood City, Calif., assignor to Mitutoyo Mfg. Co., Ltd., Tokyo, Japan**

**Filed Oct. 26, 1984, Ser. No. 665,534**

**Claims priority, application Japan, Oct. 27, 1983, 58-201673**

**Int. Cl.[4] G01R** *27/26;* **G08C** *19/10*

**U.S. Cl. 324—61 R** **14 Claims**



1. A capacitance type displacement measuring instrument, wherein a change in electric capacitance between electrodes due to relative displacement between two members movable relative to each other is detected on the basis of a change in phase of a detection signal, and a relative displacement between the two members is measured from said change in phase, said measuring instrument comprising:

square-wave generating means for generating square wave signals;

two transmitting electrodes provided on one of said members movable relative to each other in the moving direction thereof, to which said square wave signals from the square wave generating means are applied in inverted phase;

two wave pattern electrodes provided on the other of said members movable relative to each other in the moving direction thereof, the base portions of which are opposed to said two transmitting electrodes, respectively, and the forward end portions of which are formed into complementary wave patterns, said two wave pattern electrodes having a specified pitch, each wave pattern electrode including a set of subelectrodes, separated and insulted from one another in the moving direction;

receiving electrodes provided in plural number on said one of said members in the moving direction thereof, and opposed to the forward end portions of said two wave pattern electrodes, said receiving electrodes having a pitch smaller than said specified pitch of said wave patten electrodes;

a multiplexer for successively taking in signals directly from each of said receiving electrodes;

demodulating means for processing amplitude-modulated square wave signals outputted from said multiplexer into a waveform corresponding to the wave pattern on said wave pattern electrodes; and

phase detecting means for detecting the phase of the demodulated signal outputted from the demodulating means.

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**4,743,839**

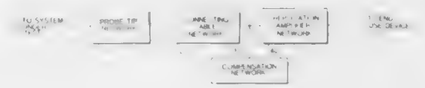
**WIDE BANDWIDTH PROBE USING POLE-ZERO CANCELLATION**

**Kenneth Rush, Colorado Springs, Colo., assignor to Hewlett Packard Company, Palo Alto, Calif.**

**Continuation of Ser. No. 648,901, Sep. 7, 1984, abandoned. This application Dec. 19, 1986, Ser. No. 945,202**

**Int. Cl.[4] G01R** *31/02*

**U.S. Cl. 324—72.5** **12 Claims**



1. A probe apparatus for detecting first electronic signals in a system under test and replicating said first signals for an end use device, comprising:

detection means for detecting said first electronic signals and producing second electronic signals in response to said first signals, said detection means having a transmission zero in the frequency response at a preselected frequency;

compensation means, having a first end and a second end, said first end of compensation means connected to ground, for compensation of said transmission zero of said detection means, said compensation means having a transmission pole in the frequency response at a frequency substantially equal to said preselected frequency;

replication means, having a first end, a second end, and a third end, connectable to said end use device at said first end of replication means, said second end of replication means connected to ground, for replicating said first electronic signals in response to said second electronic signals for use in said end use device; and

cable means, having a first end, a second end, and a third end, connected to said detection means at said first end of cable means and connected to said second end of said compensation means and said third end of said replication means at said second end of cable means and connected to ground at said third end of cable means, for transferring said second electronic signals from said detection means to said replication means and said compensation means, wherein said cable means comprises a transfer means, having a characteristic impedance, for transferring said second electronics signals within said cable means and a termination means for terminating said transfer means in said characteristic impedance of said transfer means and for transferring said second electronic signals from said transfer means to said replication means and said compensation means.

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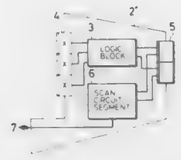


**4,743,840**

## DIAGNOSING METHOD FOR LOGIC CIRCUITS

**Yoshio Sato; Toshifumi Ishii, and Shun Ishiyama, all of Hadano, Japan, assignors to Hitachi Computer Engineering Co., Ltd., Kanagawa and Hitachi, Ltd., Tokyo, both of, Japan**

**Filed Nov. 26, 1986, Ser. No. 935,259**
**Claims priority, application Japan, Nov. 26, 1985, 60-263743**
**Int. Cl.[4] G01R** *31/00*
**U.S. Cl. 324—73 R** **9 Claims**




1. In a method for testing a logic circuit which comprises a plurality of partial circuits each including a logic block having an input side and an output side, an input side data holding stage including a plurality of circuit elements for holding information data received and being operatively connected to said logic block input side for transmitting the information thereto, an output side data holding stage including at least one circuit element operatively connected to said logic block output side for receiving and holding information data therefrom and a scan circuit segment associated with and operatively connected in each partial circuit for inputting and outputting diagnostic data, the improvement comprising the steps of:
within each partial circuit, actuating the scan circuit segment and inhibiting operation of the logic block;
scanning-in predetermined diagnostic input data directly into said output side data holding stage by said scan circuit segment while maintaining any information data that may be present at the input side data holding stage circuit elements and its condition thereof as indeterminate;
reading out the content of the output side data holding stage via said scan circuit segment as diagnostic data for said scan circuit segment; and
repeating the above said steps until all of said partial circuits have been diagnosed.

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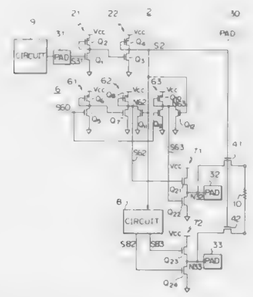
**4,743,841**

## SEMICONDUCTOR INTEGRATED CIRCUIT INCLUDING CIRCUIT ELEMENTS EVALUATING THE SAME AND HAVING MEANS FOR TESTING THE CIRCUIT ELEMENTS

**Atsushi Takeuchi, Kawasaki, Japan, assignor to Fujitsu Limited, Kanagawa, Japan**

**Filed May 16, 1986, Ser. No. 863,900**
**Claims priority, application Japan, May 20, 1985, 60-107827**
**Int. Cl.[4] G01R** *31/28*
**U.S. Cl. 324—73 R** **7 Claims**

1. A semiconductor integrated circuit comprising:
at least one integrated circuit;
at least one evaluating circuit element for evaluating said integrated circuit; and
a testing means for testing said at least one integrated circuit by testing said at least one evaluating circuit element, said testing means including
a plurality of bonding pads connected to said at least one integrated circuit and said at least one evaluating circuit element,
selective means for selectively connecting between said at least one integrated circuit and said plurality of bonding pads during normal operation of said at least one integrated circuit, and said selective means for selectively connecting between at least one evaluating circuit element and said bonding pads connecting to said at least one integrated circuit during testing of said at least one evaluating circuit element, and
switching means provided between said plurality of bonding pads and said at least one evaluating circuit element, said




switching means for switching the connection between said plurality of bonding pads and said at least one evaluating circuit element in response to a control signal to enable said testing means to test said at least one evaluating circuit element.

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**4,743,842**

## TRI-STATE CIRCUIT TESTER

**Joseph A. Langone, Greenlawn, and Michael Ugenti, Melville, both of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.**

**Filed Mar. 11, 1987, Ser. No. 24,486**
**Int. Cl.[4] G01N** *27/42;* **H03K** *5/153*
**U.S. Cl. 324—73 R** **5 Claims**




1. A circuit for testing a tri-state digital device having a signal input for logic 1 and logic 0 levels, the device also having a tri-state enable input, the testing circuit comprising:
first and second reference voltage points;
voltage dividing means having a center contact connected to an output of the device and further having outer contacts connected to respective reference voltage points;
first and second comparators each having a first input connected to a corresponding reference voltage point and a second input connected to the center point; and
individual terminal means at the outputs of the comparators which carry
logic 0 levels at both terminals when a logic 0 is present at the signal input,
logic 1 levels at both terminals when a logic 1 is present at the signal input,
logic 0 at one terminal and logic 1 at the other terminal when an enable signal is present at the tri-state enable input.

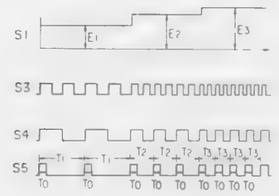


**4,743,843**

## DISPLAY SIGNAL GENERATOR DEVICE

**Hideaki Tada, Nagoya, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan**

**PCT No. PCT/JP85/00478, § 371 Date Apr. 22, 1986, § 102(e) Date Apr. 22, 1986, PCT Pub. No. WO86/01594, PCT Pub. Date Mar. 13, 1986**
**PCT Filed Aug. 30, 1985, Ser. No. 860,191**
**Claims priority, application Japan, Aug. 31, 1984, 59-181699**
**Int. Cl.[4] G01R** *1/00*
**U.S. Cl. 324—114** **3 Claims**




1. A display signal generating device having a digital to frequency converter for converting digital data representing the level of a signal to be displayed into a frequency signal in the form of a pulse train, said device comprising a frequency divider for dividing the frequency of the output signal of the digital to frequency converter to output a signal for a digital display unit, and a pulse generator for providing a predetermined pulse width in the signal of the frequency divider to output a signal for an analog display unit from the signal of the frequency divider.

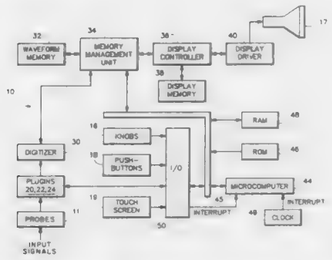
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**4,743,844**

## SELF-ADJUSTING OSCILLOSCOPE

**Ronald P. Odenheimer, Portland, Oreg., and Kim Hastings, Ardmore, Pa., assignors to Tektronix, Inc., Beaverton, Oreg.**

**Filed Dec. 19, 1986, Ser. No. 944,302**
**Int. Cl.[4] G01R** *13/00, 15/08*
**U.S. Cl. 324—121 R** **10 Claims**




1. In an oscilloscope comprising an amplifier having adjustable gain for amplifying a time varying input signal to produce a n output signal, comparator means for producing a first trigger status signal when the amplifier output signal rises above a first trigger level and for producing a second trigger status signal when the amplifier output signal falls below a second trigger level, and control means for adjusting said amplifier gain and for detecting assertion of said first and second trigger status signals, a method for said control means for adjusting said amplifier gain, the method comprising the steps of:
a. adjusting said amplifier gain to a predetermined initial value that is between a maximum and minimum amplifier gain and applying said time varying input signal as input to said amplifier;
b. iteratively increasing the amplifier gain when neither of said first and second trigger status signals are detected until at least one of said first and second trigger status signals are detected; and
c. iteratively decreasing the amplifier gain when at least one of said first and second trigger status signals is detected until neither of said first and second trigger status signals are detected.

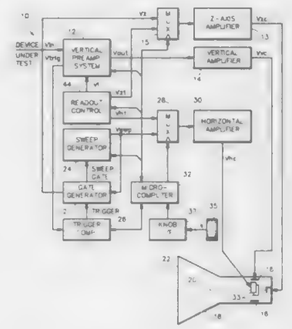
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**4,743,845**

## OSCILLOSCOPE-BASED SIGNAL LEVEL MEASUREMENT SYSTEM

**Calvin D. Diller, Hillsboro, and Douglas C. Stevens, Portland, both of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.**

**Filed Sep. 17, 1986, Ser. No. 908,551**
**Int. Cl.[4] G01R** *13/20*
**U.S. Cl. 324—121 R** **10 Claims**




1. For an oscilloscope having means for amplifying an input signal to produce an output signal, having means responsive to said output signal for displaying a waveform on a screen wherein points on said waveform are displayed at positions along an axis of said screen representing magnitudes of said input signal, and having indicating means for indicating a position along said axis according to the value of position data, a method for determining a particular position data value which would cause said indicating means to indicate a position along said axis representing a particular magnitude, the method comprising the steps of:
determining a change in value of position data which would cause said indicating means to shift the position it indicates from a first to a second position along said axis, said first and second positions representing different known magnitudes of said input signal;
determining one value of said position data which would cause said indicating means to indicate a position along said axis representing a predetermined magnitude of said input signal; and
determining said particular position data value according to a combination of the particular magnitude to be represented, the determined change in value of position data, and the determined one value of position data.

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**4,743,846**

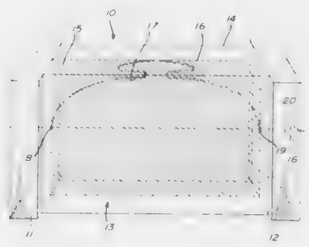
## RECTANGULAR SHUNT WITH MEASUREMENT COMPENSATION SYSTEM

**Marc Leclerc, Boucherville; Ryszard Malewski, St-Lambert, and Jean-Paul Thivierge, Longueuil, all of Canada, assignors to Hydro-Quebec, Quebec, Canada**

**Filed Mar. 18, 1987, Ser. No. 27,254**
**Int. Cl.[4] H01C** *7/00;* **G01R** *19/00, 1/20*
**U.S. Cl. 324—126** **6 Claims**

1. A measurement shunt of substantially rectangular cross-section and having a compensating circuit to reduce the skin and proximity effects of the shunt, said compensating circuit

being characterized by an optimized path of a measuring circuit which reduces the difference between a measured current based on the potential produced across the shunt during the passage of a current therethrough and the current applied to



the shunt, the said path extending from the center at an input end of the resistive material of the shunt and progressing towards the outer surface of the resistive material in a non-monotonic path.

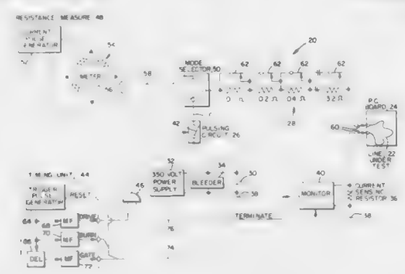
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**4,743,847**

## PRINTED CIRCUIT CONDUCTOR TEST SYSTEM

**James E. Frushour, Endwell, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Division of Ser. No. 718,466, Apr. 1, 1985, Pat. No. 4,697,142.**
**This application Jun. 17, 1987, Ser. No. 63,138**
**Int. Cl.[4] G01R** *31/02*
**U.S. Cl. 324—158 R** **18 Claims**



1. A method for testing current capacity of a printed line conductor in a printed circuit board comprising:

constructing a series resistance path with a conductor to be tested, said resistance path including a current sensing resistor;

establishing a time frame for monitoring a test of the conductor;

applying a test current pulse via said resistance path to said conductor within said time frame;

monitoring the amplitude of current flowing in the sensing resistor during said time frame to determine a condition of current conduction in said conductor; and

regulating the current pulse in accordance with said condition; and

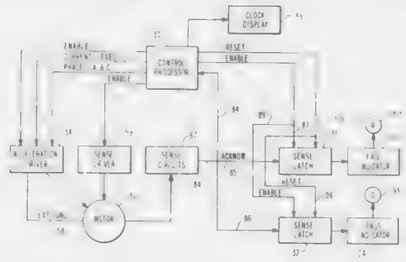
wherein said applying of a pulse includes a step of charging a capacitor with a predetermined amount of energy sufficiently small to prevent damage to said circuit board, said applying of a pulse including a step of imparting sufficient energy to said current pulse to induce burnout of a constricted cross section of a printed line conductor in a printed circuit board, said applying of a pulse further including a step of generating a voltage pulse by discharging a capacitor into said resistance path.

**4,743,848**

## METHOD OF TESTING A STEPPING MOTOR

**David L. Krimm; William R. Yount, both of Lexington, and James O. Stidham, deceased, late of Winchester, all of Ky. (by G. Wayne Littrell, executor), assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Jul. 17, 1986, Ser. No. 886,506**
**Int. Cl.[4] G01R** *31/02*
**U.S. Cl. 324—158 MG** **20 Claims**



1. A method of testing a stepping motor having a plurality of windings and a rotor to determine the presence of friction in excess of a predetermined amount or a shorted winding including:

applying a predetermined current to the windings of the motor;

commutating the motor windings to effect, with the predetermined current, acceleration of the rotor of an acceptable motor to a final predetermined velocity;

removing the predetermined current after a selected period of time sufficient for the rotor of an acceptable motor to reach the final predetermined velocity;

and sensing the presence or absence of a back electromotive force after the predetermined current is removed, the presence of the back electromotive force indicating an acceptable motor and the absence of the back electromotive force indicating friction in excess of the predetermined amount or a winding short.

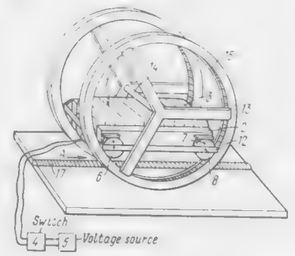
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**4,743,849**

## MAGNETIZING DEVICE FOR RECORDING FLAW FIELDS IN THE PROCESS OF MAGNETOGRAPHIC INSPECTION

**Alexei E. Novikov, Minsk, U.S.S.R., assignor to Belorusky Politekhnichesky Institute, Minsk, U.S.S.R.**

**Filed Apr. 28, 1986, Ser. No. 856,344**
**Int. Cl.[4] G01N** *27/85;* **H01F** *13/00*
**U.S. Cl. 324—213** **7 Claims**




1. A magnetizing device for recording flaw fields in the process of magnetographic inspection, comprising: a two-pole electromagnet having a working pole surface intended for contacting the surface of an object under inspection; four rollers rotatably mounted in pairs on each of the two poles of said electromagnet, each having a rotation axle defining a rotation axis, the rotation axes of said rollers all being arranged in one plane parallel to said working pole surface of said electromagnet; two ring-shaped guides each having a circular inner surface and each having a circular outer surface for rolling along the object under test, said ring-shaped guides being rigidly secured together in parallel relation to each other by a bar for simultaneous rotation of said ring-shaped guides, each of said guides being associated with one of said pairs of said rollers, said circular inner surfaces of each of said ring-shaped guides engaging the outer surfaces of the respective associated pair of rollers whereby said electromagnet moves progressively along the surface of the object under inspection at a set distance therefrom when said guides rotate.



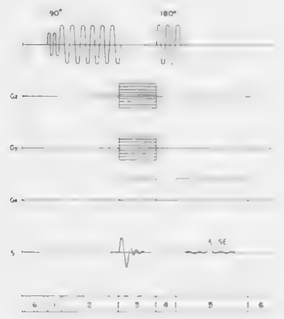
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**4,743,850**

## METHOD OF MAPPING THE NUCLEAR MAGNETIC PROPERTIES OF AN OBJECT TO BE EXAMINED

**Raimo Sepponen, Helsinki, Finland, assignor to Instrumentarium Corp., Finland**

**Continuation of Ser. No. 738,850, May 29, 1985, abandoned.**
**This application Sep. 17, 1987, Ser. No. 97,253**
**Claims priority, application Finland, Jun. 7, 1984, 842292**
**Int. Cl.[4] G01R** *33/20*
**U.S. Cl. 324—309** **8 Claims**



1. A method for determining the spatial distribution of an NMR responsive substance in a selected volume of an object to be examined and the relaxation time in the rotating frame of reference ($T_1\rho$) of nuclei of the substance, said method comprising the steps of:

applying an external magnetic field to the selected volume of the object;

exciting the nuclei in the selected volume of the object by a first electromagnetic pulse for generating a nuclear magnetization in the selected volume transverse to the direction of the external magnetic field;

applying a second electromagnetic pulse to the selected volume, said second pulse being oscillatory and having a phase selected such that the magnetic component of the pulse is directed parallel to the direction of the processing transverse nuclear magnetization, the relaxation obtained during this second pulse occurring in a rotating reference frame and being characterized by the relaxation time $T_1\rho$;

applying magnetic field gradient pulses sequenced with said electromagnetic pulses in accordance with a selected magnetic resonance imaging technique;

collecting the NMR signals from said selected volume related to the density of the nuclei and to the relaxation in the rotating reference frame ($T_1\rho$);

repeating the foregoing steps; and

constructing a map containing relaxation time in the rotating frame ($T_1\rho$) data.

**4,743,851**

## APPARATUS AND METHOD FOR CREATING NON-ORTHOGONAL MAGNETIC RESONANCE IMAGING

**Arthur J. Lim, Menlo Park; Michael H. Buonocore, Redwood City, and Craig H. Barratt, Mountain View, all of Calif., assignors to Resonex, Inc., Sunnyvale, Calif.**

**Continuation of Ser. No. 769,939, Aug. 27, 1985, abandoned.**
**This application Aug. 25, 1987, Ser. No. 89,941**
**Int. Cl.[4] G01R** *33/20*
**U.S. Cl. 324—309** **17 Claims**



1. A method for generating gradient waveforms for a plurality of axes for driving the gradient coils of a magnetic resonance imaging apparatus to provide a selected image of a subject, each axis corresponding to the direction of a spatial linear field gradient produced by one of the gradient coils, comprising the following steps:

(a) providing a plurality of matrix multiplying functions, at least two of each of said matrix multiplying functions being associated with each of at least two gradient coils, for forming a matrix which is a function of the orientation of said image, said image being capable of being rotated at least in two orthogonal directions by variation of said matrix functions;

(b) for a particular magnetic resonance imaging apparatus for each axis associated with a gradient coil and said associated multiplying functions providing for each said multiplying function an associated gradient waveform corrected for non-idealities in said apparatus related to said axis of said gradient coil;

(c) storing each of said corrected gradient waveforms;

(d) providing an analog electrical signal for driving a selected gradient coil by multiplying said matrix functions associated with a said coil with said associated waveforms and

(e) adding the products.

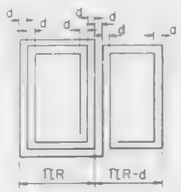
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**4,743,852**

## COIL FOR NMR PROBE

**Hiroshi Ikeda, Tokyo, Japan, assignor to Jeol Ltd., Tokyo, Japan**

**Continuation of Ser. No. 714,580, Mar. 21, 1985, abandoned.**
**This application Apr. 14, 1987, Ser. No. 50,502**
**Claims priority, application Japan, Mar. 30, 1984, 59-62674**
**Int. Cl.[4] G01R** *33/20*
**U.S. Cl. 324—318** **8 Claims**




1. An NMR probe coil wound on the curved surface of a

cylindrical sample region and consisting of a plurality of non-magnetic and electrically conductive straight portions extending parallel to the axis Z of the cylinder and arc-shaped, non-magnetic and electrically conductive portions which connect the straight portions in series and which produce an RF magnetic field in the direction of an X axis perpendicular to the axis Z, the straight portions being arranged in pairs with each pair being joined by an arc-shaped portion, one straight portion of each pair being on the opposite side of a plane defined by the X and Z axes from the other straight portion in the pair, and one pair intersecting the Y axis, the number of pairs of the straight portions being $2n+1$, where n is an integer equal to or greater than 1, the straight portions being in two groups within which they are substantially equally spaced apart from each other on the curved surface of the cylinder, said straight portions being arranged on the curved surface of the cylinder such that they are substantially symmetrical with respect to the axis Z.

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**4,743,853**

## NUCLEAR SPIN TOMOGRAPH

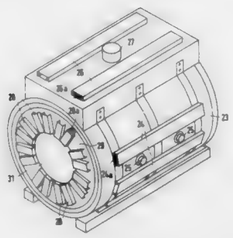
**Georg Frese, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Jun. 10, 1985, Ser. No. 742,811**

**Claims priority, application Fed. Rep. of Germany, Jul. 2, 1984, 3424304**

**Int. Cl.⁴ G01R** *33/08*

**U.S. Cl. 324—320** **8 Claims**



1. A nuclear spin tomograph device for the analysis of partial regions from the interior of a test object, the device comprising a housing for receiving said test object therein, coils surrounded by said housing, said coils applying magnetic primary and gradient fields to the test object, an antenna means positioned inside said housing for transmitting radio frequency magnetic excitation pulses toward said test object and for receiving signals representing a deflection of the atomic nuclei of the test object from their equilibrium position, said deflection caused by the radio-frequency magnetic excitation pulses, data processing means connected to said antenna for analysing the signals received by the antenna, and means for homogenizing the magnetic primary field, said homogenization means comprising a plurality of iron plates applied on parts of the housing surrounding the coils, the iron plates being of predetermined form, size, arrangement and number so as to homogenize said primary magnetic field within a desired degree of accuracy, the plates requiring no application of electrical currents.

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**4,743,854**

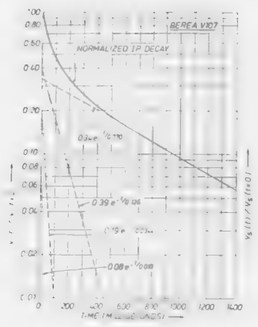
## IN-SITU INDUCED POLARIZATION METHOD FOR DETERMINING FORMATION PERMEABILITY

**Harold J. Vinegar, and Monroe H. Waxman, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.**

**Division of Ser. No. 591,140, Mar. 19, 1984, Pat. No. 4,644,283. This application Oct. 31, 1986, Ser. No. 925,586**

**Int. Cl.⁴ G01V** *3/20, 3/38*

**U.S. Cl. 324—366** **26 Claims**




1. A method for the in-situ determination of permeability of a formation, comprising the steps of:

logging the formation of interest with a time dependent induced polarization logging tool to produce transient induced polarization measurements;

converting the transient induced polarization measurements obtained by the logging tool to an induced polarization formation response function;

determining the pore size distribution from the induced polarization response function; and

determining the permeability from the pore size distribution.

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**4,743,855**

## METHOD OF AND APPARATUS FOR MEASURING THE STATE OF DISCHARGE OF A BATTERY

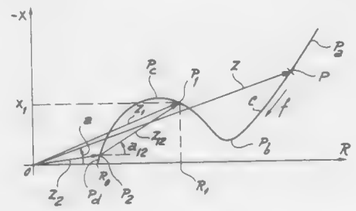
**Jean-Paul Randin, Potat-Dessus 13, 2016-Cortaillod; Frédy Zuellig, Saint-Germain 2, 2800-Delemont, and Claude-Eric Leuenberger, Grand Chézard 5, 2054 Chezard, all of Switzerland**

**Continuation of Ser. No. 675,908, Nov. 28, 1984, abandoned. This application Nov. 3, 1986, Ser. No. 926,838**

**Claims priority, application France, Dec. 12, 1983, 83 19979**

**Int. Cl.⁴ G01N** *27/46*

**U.S. Cl. 324—430** **5 Claims**




1. A method of measuring the state of discharge of a battery having an internal impedance, which comprises:

(a) measuring a first internal complex impedance of the battery at a first frequency;

(b) measuring a second internal complex impedance of the battery at a second frequency;

(c) determining the complex difference between said internal complex impedances; and



(d) determining the argument of said complex difference, said argument being representative of the state of discharge of the battery.

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**4,743,856**

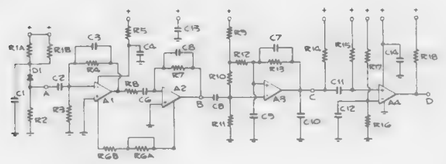
## DIGITAL OPTICAL RECEIVER CIRCUIT

**John M. Keating, Northridge, Calif., assignor to Simulaser Corporation, City of Industry, Calif.**

**Continuation of Ser. No. 535,899, Sep. 26, 1983, abandoned. This application Apr. 18, 1986, Ser. No. 854,058**

**Int. Cl.⁴ H03K** *5/22;* **H01J** *40/14*

**U.S. Cl. 328—111** **10 Claims**



1. In a digital optical receiver: means for receiving pulses of light which may vary in strength over a wide range and providing electrical input pulses having amplitudes corresponding to the strength of the light pulses, means including an amplifier which is driven into saturation by larger ones of the input pulses for producing pulses of predetermined maximum amplitude in response to the input pulses, means for delivering an output pulse in response to the leading edge of the first pulse of predetermined maximum amplitude produced in response to each of the input pulses, and means responsive to the trailing edges of the pulses of predetermined maximum amplitude for preventing the delivering of another output pulse for a predetermined time after each of the trailing edges.

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**4,743,857**

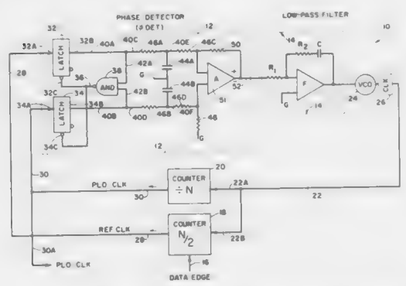
## DIGITAL/ANALOG PHASE-LOCKED OSCILLATOR

**Scott E. Childers, Owasso, Okla., assignor to Telex Computer Products, Inc., Tulsa, Okla.**

**Continuation of Ser. No. 601,509, Apr. 18, 1984, abandoned. This application Mar. 13, 1986, Ser. No. 840,527**

**Int. Cl.⁴ H03L** *7/18*

**U.S. Cl. 329—50** **1 Claim**




1. A phase-locked oscillator adapted to be locked in phase with the data edge of an input signal which comprises a series of bit pulses, both ones and zeros, comprising:

(a) free running clock means responsive to a voltage controlled oscillator, the frequency of said derived clock being N times the bit frequency of said input signal;

(b) first counter means controlled to read up to N/2 and to provide a first electric pulse, said first electric pulse being coincident with the middle transition of each one bit;

(c) second counter means controlled to read up to N and to provide a second electric pulse, and to reset and to start counting again, said first and second counters being responsive respectively to the data edges of said input signal and the output of said derived clock means;

(d) first and second latches each having an input terminal, an output terminal and a reset terminal and adapted to be set respectively by said first and second electric pulses;

(e) an amplifier having a first and a second input and an output;

(f) a balanced resistor-capacitor networks comprising a first and second resistor in series between said first latch output terminal and said amplifier first input, a third and fourth resistor in series between said second latch output terminal and said amplifier second input, a first capacitor between the juncture of said first and second resistor and ground, and a second capacitor between the juncture of said third and fourth resistor and ground;

(g) and AND gate having two input terminals and an output terminal, the input terminals being connected to said output terminals of said latches, the output terminal being connected to said reset terminals of said latches, the voltage at said output of said amplifier being detemined by relative amount of time each latch is conductive;

(h) a filter of selected bandwidth having an input and an output, the input being connected to said amplifier output; and

(i) a voltage controlled oscillator having an input connected to said filter output and an output connected to said clock means, the clock being connected to said second counter means.

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**4,743,858**

## R. F. POWER AMPLIFIER

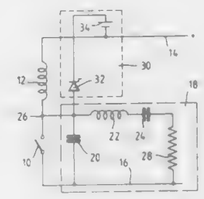
**Jeremy K. A. Everard, Horley, England, assignor to U.S. Philips Corp., New York, N.Y.**

**Filed Jun. 20, 1986, Ser. No. 876,543**

**Claims priority, application United Kingdom, Jun. 26, 1985, 8516109**

**Int. Cl.⁴ H03F** *3/38, 3/217*

**U.S. Cl. 330—10** **5 Claims**



1. An r.f. power amplifier comprising a switching device having a pair of main electrodes, and a load network capable of adjusting the relative phase of the voltages across and the currents flowing between said main electrodes, wherein the amplifier comprises semiconductor means for limiting the peak voltage swing across said main electrodes by storing charge in response to charging of capacitance in parallel with said main electrodes attempting to drive the voltage across said main electrodes to above a predetermined value and releasing the stored charge in response to discharging of said capacitance subsequently attempting to reduce said voltage once again.

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**4,743,859**

## AMPLIFYING CIRCUIT ARRANGEMENT HAVING MEANS FOR DISTORTION CORRECTION

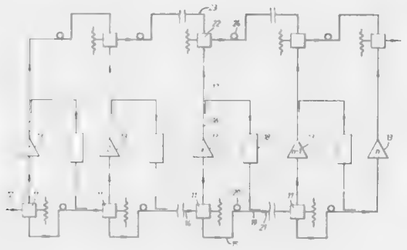
**Boleslaw M. Sosin, Chelmsford, United Kingdom, assignor to The Marconi Company Limited, Stanmore, England**

**Filed May 1, 1987, Ser. No. 44,720**

**Claims priority, application United Kingdom, May 16, 1986, 8611965**

**Int. Cl.[4] H03F *1/32***

**U.S. Cl. 330—54** **9 Claims**



1. An amplifying circuit arrangement including a plurality of discrete amplifiers connected between successive points of an input delay line and corresponding points of an output delay line; the discrete amplifiers forming a series which is fed in order by a plurality of power dividers positioned along the input line so as to share the power of an input signal between the amplifiers, the outputs of the amplifiers being connected to said output line by a corresponding plurality of power combiners; means for separately sampling the output signals of each of a plurality of said amplifiers and utilising the sampled signals for modifying the input signal on said input line and which is fed to subsequent amplifiers in said series so that the distortions of said sampled amplifiers are compensated by the subsequent amplifiers.

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**4,743,860**

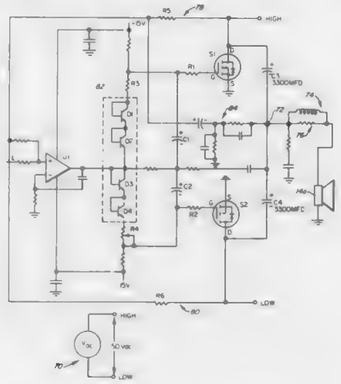
## AUDIO POWER AMPLIFIER

**James M. Dziagwa, Addison, Ill., assignor to Seeburg Phonograph Corporation, Addison, Ill.**

**Filed Mar. 10, 1987, Ser. No. 24,253**

**Int. Cl.[4] H03F *3/217***

**U.S. Cl. 330—251** **15 Claims**



1. An audio power amplifier circuit comprising:
a source of reference potential;
a double-ended floating power supply including first and second power supply outputs;
an input circuit for receiving an audio input signal;
first and second switches connected between the first power supply output and the source of reference potential and between the second power supply output and the source of reference potential, respectively, each switch being coupled to the input circuit, wherein the switches are alternately operated in response to the audio input signal to alternately couple the first and second power supply outputs to the source of reference potential;
first and second series-connected capacitors coupled between the first and second power supply outputs having a junction therebetween; and
a load coupled between the junction and the source of reference potential wherein the alternate coupling of the power supply outputs to the source of reference potential alternately charges and discharges the capacitors to produce an audio output signal across the load whereby the audio output signal comprises an amplified version of the audio input signal.

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**4,743,861**

## FREQUENCY RESPONSE COMPENSATION CIRCUIT

**Stephen A. Jove, Watsonville; Klaas B. Klaassen, San Jose; Jacobus C. L. VanPeppen, San Jose, and Chon N. Vo, San Jose, all of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Oct. 27, 1986, Ser. No. 923,777**

**Int. Cl.[4] H03F *3/45*; H03G *3/30***

**U.S. Cl. 330—260** **2 Claims**



1. A circuit, having no reactive elements, for the compensation of the frequency response of an input signal having a high frequency roll off comprising:
a forward gain stage having a generally flat frequency response over a range extending beyond the high frequency roll off of the input signal and comprising a pair of NPN transistors, a pair of collector resistors, a pair of emitter resistors and a first current source connected between the emitter resistors; and
a reverse gain stage coupled to the forward gain stage in negative feedback mode and comprising a pair of PNP transistors, a pair of emitter resistors, a pair of base resistors and a second current source connected between the reverse gain stage emitter resistors, said PNP transistors having a transition frequency value and said second stage resistors having resistance values defining the high frequency roll off of said reverse gain stage as approximately equal to the high frequency roll off of the input signal;
whereby the gain of said forward gain stage is depressed by said coupled reverse gain stage at frequencies below the high frequency roll off of the input signal and the bandwidth of the signal at the output of the compensation circuit is thereby increased with respect to the bandwidth of the input signal.



**4,743,862**

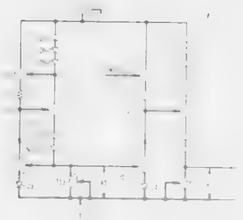
## JFET CURRENT MIRROR AND VOLTAGE LEVEL SHIFTING APPARATUS

**Norman R. Scheinberg, South River, N.J., assignor to Anadigics, Inc., Warren, N.J.**

**Filed May 2, 1986, Ser. No. 858,797**

**Int. Cl.[4] H03F *3/16***

**U.S. Cl. 330—277** **12 Claims**



10. A voltage level shifter apparatus including a current mirror connected across a power supply having a first and second terminal and a plurality of JFETs each including a gate, source and drain, said voltage level shifter apparatus comprising:
first current path means for conducting a current I1, said first current path means including a first JFET source is connected to said second terminal;
second current path means for conducting a current I2, said second current path means including a second JFET whose gate is connected to the gate of said first JFET and whose source is also connected to said second terminal;
biasing means for biasing said first JFET into saturation, said biasing means including a third JFET and a first diode means, wherein the drain of said first JFET is connected to the gate of said third JFET and the source of said third JFET is connected by said first diode menas to the gate of said first JFET;
first resistor means connected in said first current path means between the drain of said first JFET and said first terminal of the power supply;
second resistor means connected in said second current path means between the drain of said second JFET and said first terminal of said power supply;
variable voltage input means connected between said second resistor means and said first terminal of said power supply;
output circuit terminal means connected to the junction between the drain of said second JFET and said second resistor means,
wherein when said JFET is biased into saturation said second current I1 will be substantially equal to said first current I1.

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**4,743,863**

## DEVICE TO INCREASE THE DYNAMIC RATIO OF AN AMPLIFIER CIRCUIT, ESPECIALLY THAT OF AN ON-BOARD MLS RECEIVER

**Jean L. Cassany, Chaville, and Jean P. Margala, Maurepas, both of France, assignors to LMT Radio Professionnelle, Boulogne Billancourt, France**

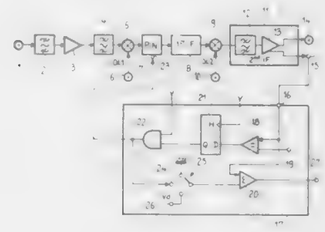
**Filed Jul. 1, 1986, Ser. No. 880,742**

**Claims priority, application France, Jul. 4, 1985, 85 10200**

**Int. Cl.[4] H03G *3/10***

**U.S. Cl. 330—284** **5 Claims**

1. A device to increase the dynamic ratio of an amplifier comprising:
a switchable attenuator coupled to the output of said amplifier;
switching means coupled to the switching input of said attenuator and said amplifier for turning on said attenuator when the signal inputted to said amplifier exceeds a predetermined value; and
a corrective network also coupled to the output of said amplifier and to said switching means such that said corrective network during the time that said switchable attenuator is turned on adds to the output of said amplifier a variable voltage, whose absolute value is equal to the product of the slope of said amplifier and the attenuation of said switched attenuator



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**4,743,864**

## POWER SAVING INTERMITTENTLY OPERATED PHASE LOCKED LOOP

**Junichi Nakagawa, Tokorozawa; Yoshitomo Kuwamoto, Yokosuka; Hidefumi Kimura; Hideaki Watanabe, both of Katsuta, and Masanori Ienaka, Takasaki, all of Japan, assignors to Hitachi, Ltd and Hitachi Video Engineering, Inc., both of Tokyo, Japan**

**Filed Oct. 23, 1986, Ser. No. 922,300**

**Claims priority, application Japan, Oct. 23, 1985, 60-235262; Mar. 14, 1986, 61-54800**

**Int. Cl.[4] H03L *7/18***

**U.S. Cl. 331—1 A** **18 Claims**



1. A phase-locked oscillator comprising:
a phase-locked loop which includes a reference oscillator, a reference frequency divider for dividing the output of said reference oscillator, a voltage-controlled oscillator, a first frequency divider for dividing the output of said voltage-controlled oscillator, a phase comparator for comparing respective phases of the output of said reference frequency divider and the output of said first frequency divider, and a loop filter generating a control voltage from the output of said phase comparator, said control voltage being applied to said voltage-controlled oscillator;
a first switch for interrupting intermittently an electric power supplied from an electric power source to at least one of said reference oscillator, said reference frequency divider, said first frequency divider, said phase comparator and said loop filter;
a second switch for interrupting intermittently said control voltage in synchronism with said first switch;
a control voltage hold circuit located between said second switch and said voltage-controlled oscillator for holding said control voltage at a time when said second switch is changed from ON-state to OFF-state;

a detecting circuit for detecting a transient at which said first switch is changed from an OFF-state to an ON-state; and an initial state setting circuit responsive to a detecting operation of said detecting circuit for initializing said reference frequency divider and said first frequency divider.

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**4,743,865**

## QUARTZ-CRYSTAL MICROWAVE OSCILLATOR OF THE COMMON-EMITTER TRANSMISSION TYPE WITH TWO TRANSISTORS AND A PREDETERMINED LOADED Q FACTOR

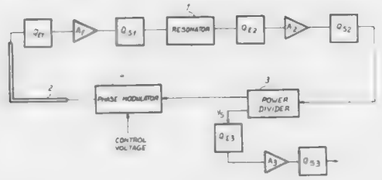
**Jacques Chauvin, Pontarlier, France, assignor to Compagnie d'Electronique et de Piezoelectricite Cepe, Argenteuil, France**

**Filed Jul. 9, 1987, Ser. No. 71,466**

**Claims priority, application France, Jul. 9, 1986, 86 09975**

**Int. Cl.[4] H03B** *5/36*

**U.S. Cl. 331—116 R** **10 Claims**




1. A quartz-crystal microwave oscillator which is capable of operating at frequencies within the range of 750 to 1500 MHz and the feedback loop of which satisfies the Barkhausen conditions, wherein:

the feedback loop includes at least the following elements placed in series and in this order: a first matching quadripole, a first amplifying stage, a second matching quadripole, a resonator, a third matching quadripole, a second amplifying stage, a fourth matching quadripole and a power divider;

the amplifying stages each have one transistor mounted with a common emitter connection;

the matching quadripoles make it possible to match the input and output impedances of the amplifying stage with the other elements of the feedback loop;

the resonator is constituted mainly by a quartz crystal;

the power divider serves to collect the output signal of the oscillator for onward transmission to a utilization circuit.

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**4,743,866**

## WIDE RANGE OSCILLATOR

**Max W. Muterspaugh, Indianapolis, Ind., assignor to RCA Corporation, Princeton, N.J.**

**Filed Nov. 26, 1986, Ser. No. 935,438**

**Int. Cl.[4] H03B** *5/00*

**U.S. Cl. 331—117 FE** **9 Claims**

1. Apparatus comprising:

an amplifying device having a conduction path terminated in first and second electrodes and a control electrode for controlling the conduction of said conduction path;

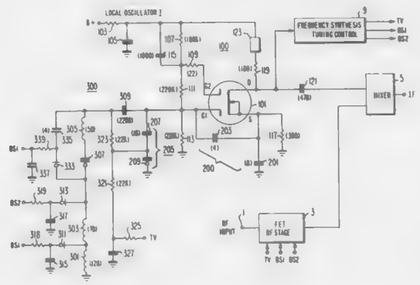
oscillation conditioning means including a signal path coupled between said control electrode and said first electrode for conditioning said amplifying device to oscillate in a predetermined range;

frequency determining means including a first controllable capacitance means responsive to a tuning control signal and an inductance element coupled in series between said control electrode and a point of reference potential for determining the particular frequency of oscillation of said oscillator;

output means for deriving an output signal at said oscillation frequency at said second electrode; and

tuning control means for generating said tuning control signal;

said oscillation conditioning means including a second controllable capacitance means also responsive to said tuning control signal directly connected between said control




input and said point of reference potential exclusive of said signal path and without any intervening element having significant impedance in said predetermined range for ensuring that said amplifying device oscillates throughout said predetermined range.

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**4,743,867**

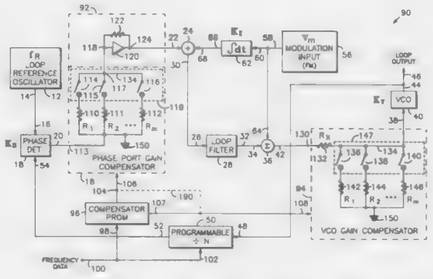
## COMPENSATION CIRCUITRY FOR DUAL PORT PHASE-LOCKED LOOPS

**Joe M. Smith, Scottsdale, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Aug. 3, 1987, Ser. No. 80,936**

**Int. Cl.[4] H03C** *3/08, 3/09;* **H03L** *7/08*

**U.S. Cl. 332—16 R** **15 Claims**




1. A dual port phase-locked loop including a phase detector having an output terminal, a phase modulation summing circuit having a first input terminal for receiving phase modulation, a second input terminal and an output terminal, a frequency modulation summing circuit having an input terminal for receiving frequency modulation and an output terminal, a voltage controlled oscillator circuit having a control terminal and a divide-by-N circuit providing a changeable divider ratio, wherein the improvement comprises:

phase port gain compensator means having input, control and output terminals, said input terminal of said phase port gain compensator means being coupled to the output terminal of the phase detector, said output terminal of said phase port gain compensator means being coupled to the second input terminal of the phase modulation summing circuit;

compensator control means having a control terminal and at least one output terminal, said output terminal of said compensator control means being coupled to said control terminal of said phase port gain compensator means; and



conductive means coupled to said control terminal of said compensator control means for providing first control signals thereto, said compensator control means being responsive to said first control signals to provide second control signals to said phase port gain compensator means which responds to said second control signals to compensate the phase-locked loop for undesirable changes therein otherwise caused by changes in the divider ratio.

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**4,743,868**

## HIGH FREQUENCY FILTER FOR ELECTRIC INSTRUMENTS

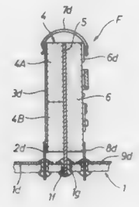
**Taisei Katoh, Aichi; Toru Yamazaki, Kariya, and Toshiki Saburi, Anjo, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan**

**Filed Apr. 3, 1986, Ser. No. 847,533**

**Claims priority, application Japan, Apr. 3, 1985, 60-70389; May 15, 1985, 60-102873**

**Int. Cl.[4] H04B** *3/28*

**U.S. Cl. 333—12** **15 Claims**



1. A strip-line high frequency filter adapted for use in combination with an internal electronic circuit element, of the flat-plate type such as a hybrid integrated circuit element or a transistor array, arranged to be carried on a circuit board of an insulation material and to be connected to an external electric circuit, the high frequency filter comprising:

a flat electrode plate having first and second surfaces and mounted on said circuit board to be grounded;

an insulation substance layer integrally formed on the first surface of said electrode plate, said insulation substance layer being made of a dielectric material whose dielectric constant decreases or increases in accordance with an increase or a decrease of wireless frequency applied thereto; and

an electrode strip integrally formed on said insulation substance layer for connection to said external electric circuit;

wherein said internal electronic circuit element is integrally provided on the second surface of said electrode plate to be carried in place and connected to said electrode strip.

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**4,743,869**

## CONSTANT RESISTANCE LOSS/SLOPE FILTER CIRCUIT

**Kenneth A. Thompson, Lockport, and Kenneth Hohhof, Glen Ellyn, both of Ill., assignors to Rockwell International Corporation, El Segundo, Calif.**

**Filed Oct. 3, 1986, Ser. No. 915,165**

**Int. Cl.[4] H03H** *7/03*

**U.S. Cl. 333—28 R** **6 Claims**

1. A loss/slope filter circuit comprising:

a plurality of cascaded circuit sections having a circuit input and a circuit output, each of said circuit sections having;

means for providing a fixed resistive pad;

means for providing a slope equalizer;

means for switching a section input and a section output between said fixed resistive pad means and said slope equalizer means;

each of said means for providing a fixed resistive pad having a different predetermined value of loss and each of said



means for providing a slope equalizer having a different predetermined value of slope.

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**4,743,870**

## LONGITUDINAL MODE FIBER ACOUSTIC WAVEGUIDE WITH SOLID CORE AND SOLID CLADDING

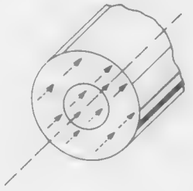
**Cheng K. Jen, Brossard, Canada; Ahmad Safaai-Jazi, Blacksburg, Va.; Jean F. Bussière, St. Bruno, and Gerald W. Farnell, Montreal, both of Canada, assignors to Canadian Patents and Development Ltd., Ottawa, Canada**

**Filed Sep. 23, 1986, Ser. No. 910,539**

**Claims priority, application Canada, Oct. 3, 1985, 492228**

**Int. Cl.[4] H03H** *9/30*

**U.S. Cl. 333—147** **6 Claims**



1. An elastic waveguide having a longitudinal axis for propagating acoustic waves therealong comprising:

a core region having a central longitudinal axis parallel to the longitudinal axis of the waveguide, the core being of material in which bulk elastic waves can be propagated; and

a cladding region enclosing all surfaces except end surfaces of the core region, the cladding region being of material in which bulk elastic waves can be propagated;

the materials of the core and cladding regions being selected so that the relation between the bulk longitudinal wave velocities of the core and cladding regions are of the form

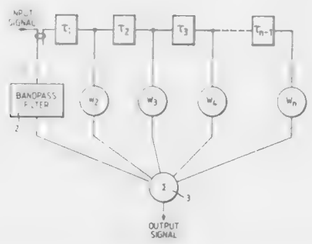
$$0 < \frac{V_{L2} - V_{L1}}{V_{L1}} << 1$$

where $V_{L1}$ and $V_{L2}$ are respectively the bulk longitudinal wave velocities of the core and cladding regions, and the propagation of the energy of the acoustic waves is mostly confined within the core region in a mode in which principal particle displacement is substantially parallel to the central longitudinal axis of the waveguide.

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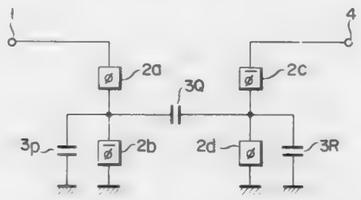
**4,743,871**
**ADAPTIVE FILTER**
**Jeffrey Graham Searle, Stansted Mountfitchet, United Kingdom, assignor to STC PLC, London, England**
**Filed Feb. 12, 1987, Ser. No. 14,236**
**Claims priority, application United Kingdom, Feb. 21, 1986, 8604344**
**Int. Cl.[4] H03H** *15/00, 21/00*
**U.S. Cl. 333—166** **3 Claims**




1. A constrained adaptive filter which prevents the formation of nulls at a frequency of interest comprising:
a signal input;
a signal output;
a main signal path connected to said signal input;
a non-adaptive filter having an output, the non-adaptive filter having a passband including the frequency of interest and the non-adaptive filter being connected in the main signal path;
a secondary signal path coupled to said signal input, the secondary signal path including a tapped delay line;
means for weighting outputs of the tapped delay line;
summing means to which the weighted outputs of the tapped delay line and the non-adaptive filter output are applied,
the summing means having an output connected to said signal output; and
a control loop coupled between said signal output and the weighting means to control weights applied to said weighting means to the outputs of the tapped delay line whereby to form nulls at interference frequencies outside of said passband.

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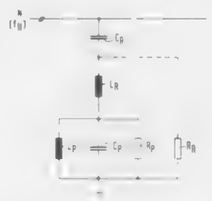
**4,743,872**
**SWITCHED CAPACITOR CIRCUIT**
**Hiroshi Tanimoto, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**
**Filed Sep. 19, 1986, Ser. No. 909,161**
**Claims priority, application Japan, Sep. 30, 1985, 60-216491**
**Int. Cl.[4] H03H** *7/01*
**U.S. Cl. 333—173** **5 Claims**




1. A switched capacitor circuit provided with an input signal terminal and an output signal terminal which comprises:
first and second switches connected in series between said input signal terminal and a first fixed potential terminal and third and fourth switches connected in series between said output signal terminal and said first fixed potential terminal, said first switch being controlled by a first clock pulse having a first phase, said second switch being controlled by a second clock pulse having a second phase reversed from said first phase, said third switch being controlled by one of said first and second clock pulses, and said fourth switch being controiled by the other of said first and second clock pulses;
a capacitor circuit including at least two serial capacitors connected between the junction of said first and second switches and the junction of said third and fourth switches and at least one parallel capacitor connected between the junction of said two serial capacitors and said first fixed potential terminal; and
highly resistive element means connected between the junction of said two serial capacitors and a second fixed terminal.

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**4,743,873**
**HIGHPASS FILTER OF A FILTER ARRANGEMENT FOR A THREE-PHASE NETWORK CONNECTED TO CONVERTERS**
**Walter Schultz, Kleinsendelbach; Ute Touchy, and Kurt Krüger, both of Erlangen, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**
**Filed Oct. 15, 1986, Ser. No. 919,196**
**Claims priority, application Fed. Rep. of Germany, Nov. 11, 1985, 3539950**
**Int. Cl.[4] H03H** *7/06*
**U.S. Cl. 333—175** **2 Claims**




1. A high pass filter of a filter arrangement for a three phase network having resistors, inductors and capacitors for two harmonics connected to converters connected to the network, said high pass filter comprising a first capacitor and a first inductor connected in series, said first capacitor and first inductor further connected in series with a shunt path comprising a first resistor, a second capacitor and a second inductor connected in parallel and further comprising a second resistor coupled across said first inductor and said shunt path, said high pass filter forming a double high pass filter tuned to any two different frequencies having two resonance frequencies and quality factors such that due to the first resistor in the shunt path, in a critical harmonic range of low order, at most only a slight resonance peak between the network and filter arrangement occurs, the first resistor in the shunt path having a low loss for other frequencies outside said critical harmonic frequency range of low order.

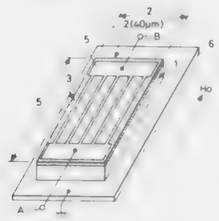
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**4,743,874**
**MAGNETOSTATIC WAVE TUNABLE RESONATOR**
**Yasuaki Kinoshita, Hachioji, and Satoshi Sugawara, Sendai, both of Japan, assignors to Hitachi, Ltd. and Hitachi Video Eng. Inc., both of Tokyo, Japan**
**Filed Apr. 17, 1987, Ser. No. 39,290**
**Claims priority, application Japan, Apr. 18, 1986, 61-88032**
**Int. Cl.[4] H01P** *7/06*
**U.S. Cl. 333—219** **4 Claims**

1. A magnetostatic wave tunable resonator comprising:
a conductive plane;



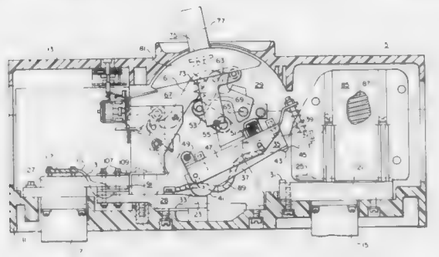
a GGG (gadolinium/gallium/garnet) single crystalline substrate mounted on said conductive plane;
a YIG (yttrium/iron/garnet) single crystalline film formed on said GGG substrate;
bonding electrode films formed on said YIG film;
a plurality of fine stripe electrodes formed on said YIG film, and connected to said bonding electrode films,




wherein said stripe electrodes and said bonding electrode films are formed by a chemical etching method based on photolithography;
whereby magnetostatic waves excited in said YIG film propagate therethrough, are reflected by straight edges of said YIG film, and are resonated, and wherein an applied magnetic field is changed to vary a resonance frequency.

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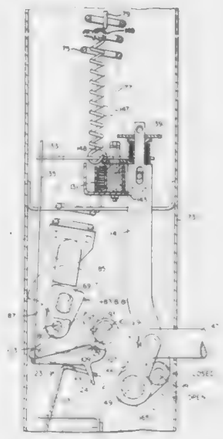
**4,743,875**
**CIRCUIT BREAKER HAVING A DIRECT CURRENT MEASURING SHUNT**
**William J. Murphy, Monroeville, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**
**Filed Jul. 22, 1986, Ser. No. 888,306**
**Int. Cl.[4] H01H** *73/00, 73/12, 75/00, 83/06*
**U.S. Cl. 335—18** **2 Claims**



1. A circuit breaker having a direct-current measuring shunt, comprising:
a housing having line and load terminals;
conductor means extending between the terminals and including a pair of conductors having adjacent end portions;
a circuit breaker structure supported in the housing and including a pair of separable contacts for opening and closing an electric circuit in the conductor means;
an electronic current measuring sensor interconnecting the adjacent end portions of the pair of conductors;
the current measuring sensor including a laminated body having first and second conductors and an intermediate element composed of an electrically resistance alloy having a resistivity of from about 100 nL·m to about 1500 nΩ·m, and having a temperature coefficient of resistance of from about −50 ppm/°C. to about +50 ppm/°C.;
the intermediate element being disposed between and metallurgically bonded to facing sides of the first and second conductors;
the first and second conductors being electrically connected to an electronic metering circuit for measuring the millivolt drop across the intermediate element;
the adjacent end portions of the pair of conductors overlap and the current measuring sensor being disposed between the end portions in good electrical contact therewith;
the first and second conductor blocks consist of a metal selected from the group consisting of aluminum, copper, gold, platinum, and silver;
the first and second conductor blocks consist of copper;
the intermediate element of electrically resistance alloy is a copper-base alloy including at least one metal selected from the group consisting of manganese and nickel-base alloys;
the metallurgical bond between the intermediate element and the first and second conductor blocks is a brazing alloy of high silver content;
each conductor block comprises a potential terminal near the intermediate element, which terminals are electrically connected to the electronic metering circuit; and
the current measuring sensor is compression mounted between the first and second conductors.

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**4,743,876**
**CIRCUIT INTERRUPTER WITH UNDERVOLTAGE TRIP MECHANISM**
**Stanislaw A. Milianowicz, Monroeville, and Charles K. Wallace, Penn Hills Township, Allegheny County, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**
**Filed Jul. 24, 1987, Ser. No. 77,254**
**Int. Cl.[4] H01H** *83/17, 73/00*
**U.S. Cl. 335—20** **7 Claims**



1. A circuit breaker for interrupting current through a power line when voltage on the line drops below a predetermined value, comprising:
(1) a pair of separate contacts movable between open and closed positions;
(2) a circuit breaker operating mechanism including an operating shaft rotatable between open and closed positions of the contact; and
(3) a crankshaft for actuating said mechanism and movable between open and closed positions of the contacts;
(4) opening spring means coupled with the crankshaft for opening the contacts;
(5) a first trip latch for releasably latching said mechanism in the closed position;
(6) an undervoltage linkage connected to the trip latch;
(7) voltage-responsive means for retaining the linkage in the contact-closed position so long as the voltage on the

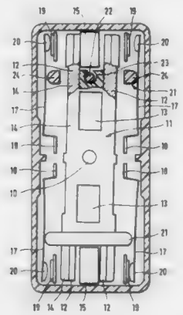
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power line remains above a predetermined value and including an armature;
(8) biasing means biasing the armature in a direction to cause release of the trip latch; and
(9) a second linkage extending between the operating shaft and the armature for closing the armature when the contacts are in the open position.

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**4,743,877**
**ELECTROMAGNETIC RELAY**
**Johannes Oberndorfer, Hofsingelding, Fed. Rep. of Germany, and Kenji Ono, Osaka, Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan**
**Filed May 29, 1986, Ser. No. 867,949**
**Claims priority, application Fed. Rep. of Germany, May 29, 1985, 3519256; Jun. 10, 1985, 3520773**
**Int. Cl.[4] H01H** *67/02*
**U.S. Cl. 335—128** **6 Claims**

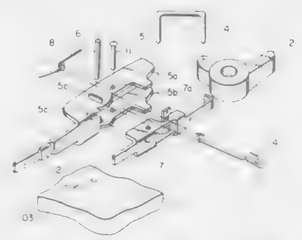


1. A bistable electromagnetic relay comprising:
a coil producing a magnetic flux,
an elongate armature piviotally mounted and movable by the magnetic flux between two end positions,
a fixed contact,
a movable contact spring extending substantially parallel to said armature, and
a separate actuator movable relative to said armature with a play which is effective particularly in the direction of movement of said armature to prevent the armature from becoming stuck in a neutral middle position, said contact spring resiliently abutting said actuator in one of said end positions and during part of the movement of said armature.

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**4,743,878**
**CIRCUIT INTERRUPTER**
**Hirotoshi Ohishi; Hiroshi Fujii; Hiroaki Fujihisa; Yoshiaki Kobayashi, and Kiyoshi Matsuura, all of Fukuyama, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan**
**Filed Apr. 29, 1986, Ser. No. 857,092**
**Claims priority, application Japan, May 1, 1985, 60-64257[U]; May 1, 1985, 60-64258[U]**
**Int. Cl.[4] H01H** *9/00*
**U.S. Cl. 335—172** **4 Claims**

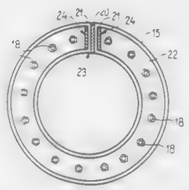
1. In a circuit interrupter having a base with a stationary contact, a toggle link mechanism including an operating handle supported by the base for manually operating the circuit interrupter and a link rotatably connected at one end to the operating handle ; a movable member pivotally supported on the base and having a movable contact on one pivoting end portion; a latch lever pivotally suported on the base for latching the link so that the movable member and the link are normally connected to hold the movable member against the force of a biasing means so that the contacts are in engagement, and an overcurrent trip means including a plunger actuated responsive to a large overcurrent to strike and pivot the latch lever so as to release the link from the movable member to move and separate the contacts, the improvement comprising:
means for pivotally supporting the latch lever and the movable member on the base, allowing both bodily movement and pivotal movement only of the movable member;
said supporting means including a pin fixed to the base extending through a circular hole in the latch lever and through a hole in the movable member which is elongated



to allow bodily movement thereof without separating the contacts, and pivotal movement thereof separating the contacts by the biasing means after a delay determined by the length of the elongated hole upon pivotal movement of the latch lever by the plunger striking the latch lever responsive to large overcurrent, releasing the link from the movable member, whereby any impact force due to the plunger striking the latch lever is transmitted to the base through the pin.

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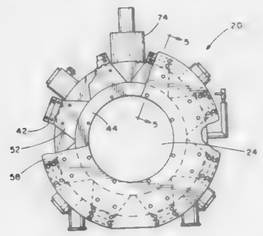
**4,743,879**
**SOLENOIDAL MAGNET WITH HIGH MAGNETIC FIELD HOMOGENEITY**
**Guy Aubert, Grenoble, France, assignor to Thomson-CGR, Grenoble, France**
**PCT No. PCT/FR86/00136, § 371 Date Jan. 6, 1987, § 102(e) Date Jan. 6, 1987, PCT Pub. No. WO86/06869, PCT Pub. Date Nov. 20, 1986**
**PCT Filed Apr. 22, 1986, Ser. No. 14,048**
**Claims priority, application France, May 10, 1985, 85 07151**
**Int. Cl.[4] H01F** *5/00*
**U.S. Cl. 335—299** **5 Claims**



1. A solenoidal magnet with high magnetic field homogeneity including several coils of the same inner and outer diameter, spaced apart along a common longitudinal axis, wherein
said coils are connected together in series by first conductors disposed parallel to said axis and extending respectively in the spaces between said coils;
second conductors are disposed longitudinally in the vicinity of said first conductors; and
the second conductors are connected to third conductors disposed over the length of each coil so as to distribute a current flow substantially uniform over a cylindrical surface coaxial to said axis;
said second and third conductors being interconnected and connected together as a whole in series with said coils so as to ensure the current return to an axial end of said magnet.



**4,743,880**
**MRI MAGNET SYSTEM HAVING SHIELD AND METHOD OF MANUFACTURE**
**Bruce C. Breneman; John R. Purcell, both of San Diego, and Sibley C. Burnett, Cardiff, all of Calif., assignors to GA Technologies Inc., San Diego, Calif.**
**Filed Sep. 28, 1987, Ser. No. 101,518**
**Int. Cl.[4] H01F** *7/00*
**U.S. Cl. 335—301** **11 Claims**



1. A method of manufacturing a magnet system for providing a localized, substantially homogeneous, high strength magnetic field, suitable for medical magnetic resonance imaging, at a predetermined location within a bore of the magnet, said method comprising the following steps:
A. mapping the magnetic field distribution inside the bore of an existing magnet, which does not have a shield of ferromagnetic material, providing the desired field and having a single coil made up of thousands of turns of small superconductive wire with the number of turns functioning to aid in establishing a field of at least a predetermined strength, and the precise placement of the turns aiding in establishing a substantially homogeneous field at said predetermined location;
B. installing a shield of ferromagnetic material about said existing magnet;
C. remapping the magnetic field distribution inside the bore of the existing magnet with said shield installed;
D. determining the changes in the magnetic field distribution resulting from the presence of said shield;
E. calculating the positioning of turns in a single coil substantially identical to that of the coil of said existing magnet except with the number and/or positioning of turns changed to provide a substantially homogeneous high strength magnetic field at a predetermined location in the bore of a magnet to be formed with a shield installed which is substantially identical to the shield installed about said existing magnet;
F. manufacturing a magnet with a single coil according to the calculations of step E; and
G. installing about the manufactured magnet a shield of ferromagnetic material which is substantially identical to that installed about said existing magnet.

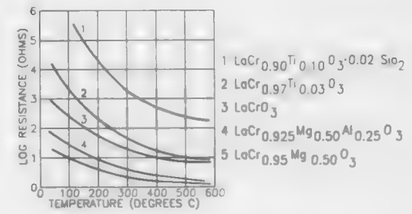
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**4,743,881**
**CERAMIC TEMPERATURE SENSOR**
**Wei-Yean Howng, Albuquerque, N. Mex., assignor to Motorola, Inc., Schaumburg, Ill.**
**Continuation-in-part of Ser. No. 732,358, May 8, 1985, Pat. No. 4,647,895. This application Aug. 15, 1986, Ser. No. 896,797**
**Int. Cl.[4] H01C** *3/04*
**U.S. Cl. 338—25** **27 Claims**

1. A devioe suitable for monitoring temperature comprising a ceramic sensing element having opposed, generally planar surfaces and electrical leads operably associated with the opposed surfaces, said ceramic having a composition represented by the formula:

$$La_aCr_bSn_wMe_xSi_yO_3$$

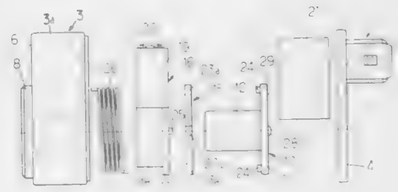
wherein
$0.97 \leqq a \leqq 1.06$, preferably $a \leqq 1.01$, when $w > 0$
$b+w+x+y=1$
Me=Ti, Al or Mg




$0 < w \leqq 0.5$, when Me=Al or Mg
$0.05 < w \leqq 0.5$, when Me=Ti or when x=0
$0 \leqq x \leqq 0.2$
$0 < y < 0.2$

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**4,743,882**
**ROTARY POTENTIOMETER SENSOR FOR DETECTING THE ANGULAR POSITION OR MOVEMENT OF A ROTARY SHAFT**
**Jean-Fernand Simon, 6 Rue Claude Matrat, 92130 Issy Les Moulineaux, France**
**Filed Apr. 20, 1987, Ser. No. 40,106**
**Claims priority, application France, Apr. 25, 1986, 86 06049**
**Int. Cl.[4] H01C** *1/02*
**U.S. Cl. 338—184** **10 Claims**



1. A rotary potentiometer sensor for detecting the position or movement of a rotary shaft, which includes, for the homocinetic transmission of the rotation of said shaft to the rotary part or rotor of the sensor a joint of the Oldham type with, on the one hand, three rotary parts, namely a first part carried and driven in rotation by said shaft, a second part adapted for rotating inside the sensor of which it forms the rotary part or rotor and a third part, called intermediate part, disposed between the first and second parts and, on the other hand, means provided on these three parts for providing the homocinetic rotational drive of the intermediate part by the first part and of the second part by the intermediate part, while allowing free angular movement between the axis of said shaft and the axis of the rotating part or rotor of the sensor, wherein it includes a case of a general cylindrical shape containing said rotating shaft and the three rotating parts of said joint, this case having two lateral faces one of which is completely closed by a cover integral with the case and the other of which has passing therethrough a circular tube integral with the case and whose internal bore receives, with a clearance at least equal to the maximum error of concentricity which may be reasonably envisaged, said first rotating part which covers the free end of the said shaft and whose peripheral surface is surrounded, with said clearance, by said second rotating part and said intermediate rotating part.

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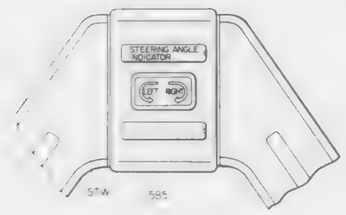


**4,743,883**

## STEERING ANGLE INDICATING SYSTEM FOR A VEHICLE

**Tomohisa Yoshimi, Gamagori; Yuji Takeo, Toyokawa, and Yoshio Shinoda, Aichi, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan**

**Filed May 23, 1985, Ser. No. 737,086**
**Claims priority, application Japan, May 28, 1984, 59-108190**
**Int. Cl.[4] B60Q *1/00***
**U.S. Cl. 340—52 R** **12 Claims**




1. A steering angle indicating system for a vehicle equipped with a steering wheel which has a horn switch, comprising:

a plurality of rotational angle sensor means, each for generating a turn angle signal indicative of a turn angle of said steering wheel;

indicating means, responsive to said turn angle signals from said rotational angle sensor means, for computing a turn direction and a turn angle of said steering wheel and indicating a result of the computation; and

a power supply circuit and said indicator means supplied with electric power from a load side of said horn switch disposed in said steering wheel and including means for maintaining electric power for a predetermined time period after a stimulus; said stimulus including at least one of a time when said horn switch is actuated and a time when the power supply voltage on a load side of said horn switch decreases, said sensors, said indicating means and said power supply circuit being arranged within said steering wheel.

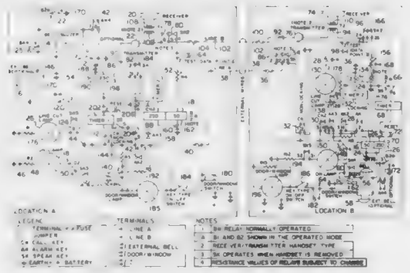
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**4,743,884**

## POINT TO POINT TELEALARM

**Cleve L. Parkins, 54 Cunningham Ave., Uniondale, N.Y. 11553**

**Filed Dec. 1, 1986, Ser. No. 936,518**
**Int. Cl.[4] G08B *25/00***
**U.S. Cl. 340—297** **10 Claims**




1. A point to point telealarm comprising:

(a) a handset at each of two locations with control unit;

(b) electrical interconnections between said locations;

(c) an ON lamp at each of said locations;

(d) a bell at each of said locations,

(e) a call key at each of said locations, such that when a call key at one location is activated by an initiating operator, said ON lamp at an initiator's location lights and said bell at a respondents location sounds, while said ON lamp at the respondents location is extinguished, thereby alerting said respondent operator that a call has been initiated;

(f) a reset key at each of said locations, such that when said bell is activated at the respondents location by the use of said call key by said initiating operator, said respondent operator being signalled can reset his own bell in preparation for verbal communications;

(g) a speak key at each of said locations, such that when both said initiating operator and said respondent operator lift their respective handsets, said speak keys are activated completing an electrical pathway between said headsets; and,

(h) an alarm key at each of said locations whereby said alarm keys lock in a closed position once activated, wherein when said alarm key is activated by an initiating operator, said initiating operator's ON lamp and bell are optionally not activated ensuring a silent alarm; said respondent's bell is activated; and said respondents said reset key is inoperative as respondent's bell will remain activated until said initiating operator un-locks his alarm key.

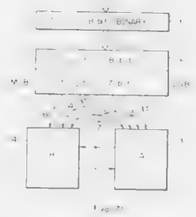
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**4,743,885**

## CYCLIC TYPE D/A CONVERTER HAVING ERROR DETECTION AND CORRECTION SYSTEM

**Osamu Kobayashi; Yoshiaki Shimizu, both of Yokohama, and Kunihiko Gotoh, Kunitachi, all of Japan, assignors to Fujitsu Limited, Kanagawa, Japan**

**Filed Aug. 10, 1987, Ser. No. 83,399**
**Claims priority, application Japan, Aug. 9, 1986, 61-187080; Aug. 19, 1986, 61-192073**
**Int. Cl.[4] H03M *1/66***
**U.S. Cl. 340—347 DA** **10 Claims**



1. A cyclic type D/A converter having an error detection and correction system comprising:

a code conversion means for converting a binary code to a multi-states code;

a digital-to-analog conversion means operatively connected to said code conversion means for converting said multi-states code to an analog value;

a detection means operatively connected to said digital-to-analog conversion means for converting said analog value to a digital code; and

a control means operatively connected to said code conversion means, digital-to-analog conversion means and detection means, for calculating a voltage difference between said analog value at a predetermined code value and another analog value adjacent to said predetermined code value, and for calculating a differential non-linearity error from said voltage difference based on said digital code, in order to obtain error and correction values of capacitors forming said digital-to-analog conversion means.



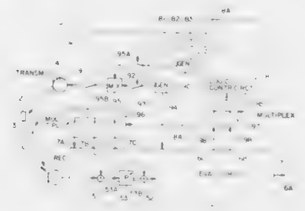
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**4,743,886**

## TESTING APPARATUS FOR INTRUSION DETECTORS

**Peter Steiner, Jona; Rudolf Genähr, Männedorf, and David Siegwart, Meilen, all of Switzerland, assignors to Cerberus AG, Männedorf, Switzerland**

**PCT No. PCT/EP85/00035, § 371 Date Sep. 23, 1985, § 102(e) Date Sep. 23, 1985, PCT Pub. No. WO85/03589, PCT Pub. Date Aug. 15, 1985**
**PCT Filed Feb. 7, 1985, Ser. No. 783,222**
**Claims priority, application Switzerland, Feb. 13, 1984, 760/84**
**Int. Cl.[4] G08B *29/00, 13/18***
**U.S. Cl. 340—514** **6 Claims**



1. An apparatus for testing an intrusion detector for responsiveness to detector-specific useful and spurious signals of an environmental origin, comprising:

a test signal generator for generating test signals;

an electronic evaluation circuit having a predetermined number of inputs and a predetermined number of outputs;

said electronic evaluation circuit containing a predetermined number of circuit components each of which is associated with at least one of said predetermined number of inputs and at least one of said predetermined number of outputs of said electronic evaluation circuit;

a first switching arrangement operatively interconnecting said test signal generator and said predetermined number of inputs of said electronic evaluation circuit;

said first switching arrangement selectively applying said test signals generated by said test signal generator to desired ones of said pedetermined number of inputs and thus to desired ones of said predetermined number of circuit components of said electronic evaluation circuit;

a logic control circuit;

a second switching arrangement operatively interconnecting said predetermined number of outputs of said electronic evaluation circuit and said logic control circuit;

said second switching arrangement selectively coupling-out resultant signals generated by said desired circuit components of said electronic evaluation circuit in response to the selective application of said test signals to said desired circuit components;

said logic control circuit controlling the operation of said first and second switching arrangements;

said logic control circuit having stored therein a predetermined number of reference signals associated with said desired circuit components in said electronic evaluation circuit, and receiving through said second switching arrangement said resultant signals generated by said electronic evaluation circuit due to the selective application of said test signals to said desired circuit components, for comparison with said stored reference signals;

indicating means operatively connected to said logic control circuit; and

said indicating means indicating a fault in said electronic evaluation circuit when said comparison between said resultant signals and the associated stored reference signals yields a deviation in excess of a predetermined deviation.

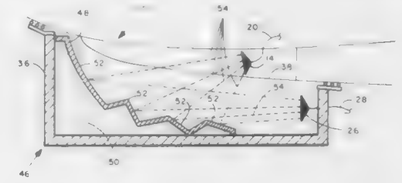
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**4,743,887**

## FAULT LOCATING SYSTEM AND METHOD

**Robert G. Pothier, Amherst, N.H., assignor to Sanders Associates, Inc., Nashua, N.H.**

**Filed Nov. 7, 1983, Ser. No. 549,100**
**Int. Cl.[4] G08B *1/00;* G01R *27/04;* H01Q *1/32***
**U.S. Cl. 340—531** **49 Claims**



27. A low-loss coupler for coupling a signal between a first antenna and a second antenna comprising:

a member having a plurality of radiation reflective surfaces disposed to receive and reflect a substantial portion of the radiation pattern of an output signal from a first antenna onto a second antenna; and

an anechoic housing within which said member is disposed.

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**4,743,888**

## DEVICE FOR DETECTING A TRAILER COUPLED ONTO A TRACTOR VEHICLE

**Wolfgang Hilpert, Stuttgart, and Gerhard Komander, Aich Wald, both of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany**

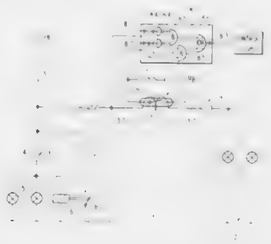
**Filed Jun. 23, 1986, Ser. No. 877,365**
**Claims priority, application Fed. Rep. of Germany, Jun. 22, 1985, 3522481**
**Int. Cl.[4] G08B *21/00***
**U.S. Cl. 340—540** **3 Claims**

1. A device for detecting when a trailer is coupled onto a vehicle, with a first switch and a relay connected to said first switch and which can be activated by the first switch being provided in the vehicle, by means of which switch lights of the tractor vehicle can be switched via a first line connected between said first switch and said switch lights and corresponding lights of the trailer can be switched via a second line connected between said first switch and said trailer lights, with an input of a logic means connected to a branching point in said

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second line, said branch point being located between an electrical source and said trailer lights, a resistance being connected between a battery voltage and said branch point, said resistance being of high value compared with the resistance of said trailer lights, said logic means transmitting a signal at its output when the trailer is electrically coupled to the vehicle and when said resistance is connected between said battery voltage and the branching point, wherein



the first switch is also at battery voltage in a closed condition and a switch contact of the relay bridges the resistance, a coil of a second switch is switched into the second line between the branching point and the trailer lights, which second switch is also connected between battery voltage and a second input of the logic element.

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**4,743,889**

**APPARATUS FOR MONITORING THE STATUS OR CONDITION OF SLIDING OR GLIDING COMPONENTS**

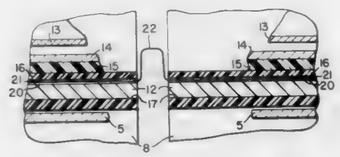
**Helmut Paulus, Herzogenrath, and Karl-Heinz Paar, Aachen, both of Fed. Rep. of Germany, assignors to H. Krantz GmbH & Co., Aachen, Fed. Rep. of Germany**

**Filed Dec. 9, 1986, Ser. No. 939,705**

**Claims priority, application Fed. Rep. of Germany, Dec. 14, 1985, 3544246**

**Int. Cl.[4] G08B *21/00***

**U.S. Cl. 340—540** **9 Claims**



1. An apparatus for monitoring the condition of sliding components, comprising first and second means for carrying said sliding components, said first and second means being movable relative to each other, electrical loop conductor means for said monitoring, electrical insulating means enclosing said loop conductor means for normally electrically insulating said loop conductor means from said first and second means, power supply means for providing electrical power, electrically operable switch means connected to said power supply means through said loop conductor means to form a closed circuit when said loop conductor means operates normally, warning circuit means including a warning signal device electrically connected to said switch means for providing a warning signal when said loop conductor means is not operating normally, and wherein said first means comprise a guide rail system, wherein said second means comprise an endless sprocket chain for travelling along said guide rail system, said sliding components comprising stationary slide support members secured to said guide rail system, and moving sliding elements secured to said endless sprocket chain, said loop conductor means being secured to said stationary slide support members in a serial manner so that the loop conductor means passes along a plurality of stationary slide support members one after the other, said switch means comprising means for energizing said warning signal device in said warning signal circuit means.

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**4,743,890**

**DEACTIVATABLE SECURITY LABEL FOR ANTI-THEFT SYSTEMS**

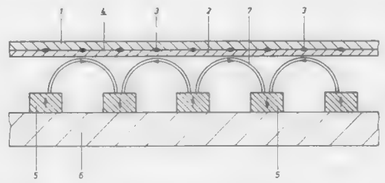
**Hans-Rainer Hilzinger, Langenselbold; Paul Reinhard, and Reiner Dinter, both of Bruchkoebel, all of Fed. Rep. of Germany, assignors to Vacummschmelze GmbH, Fed. Rep. of Germany**

**Filed Nov. 24, 1986, Ser. No. 933,864**

**Claims priority, application Fed. Rep. of Germany, Dec. 21, 1985, 3545647**

**Int. Cl.[4] G08B *13/24***

**U.S. Cl. 340—551** **8 Claims**



1. In a deactivatable security label for anti-theft systems, wherein a low-coercivity label can alter an alternating magnetic field generated in a test zone to trigger an alarm, said label being composed of at least first and second strips of ferromagnetic material arranged close to one another with at least the first strip being composed of a low-coercivity material having a high permeability and a low coercive field strength and the second strip exhibiting a high coercive field strength and being magnetizable so that the occurring fringe field permeates the first strip in mutually opposite directions in adjacent sections, the improvements comprising the strips forming the security label being firmly connected to one another to form a laminate, said second strip having the high coercive field strength being composed of a cobalt-based alloy which additionally contains a material selected from a group consisting of nickel and a combination of nickel and iron, a coercive field strength of the second strip being in a range of between 20 and 50 A/cm given a remanence induction of more than one Tesla and that a series of differently polarized magnets serve for deactivation of the security label to oppositely magnetize the security label in sections.

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**4,743,891**

**Patent Not Issued For This Number**

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**4,743,892**

**ON-SITE PERSONAL MONITORING SYSTEM**

**Frank T. Zayle, Englewood, Colo., assignor to Family Communications, Inc., Englewood, Colo.**

**Filed Jan. 8, 1987, Ser. No. 1,400**

**Int. Cl.[4] G08B *21/00***

**U.S. Cl. 340—573** **14 Claims**

1. A monitoring system for determining the presence or absence of a monitored person at a particular site at a particular time of day, said system comprising:

(a) an on-site subscriber station means situated at the particular site, said on-site station means comprising:

i. a settable clock means for maintaining and displaying time and day;

ii. a signal time-set means for retaining an entered pre-set time therein and associated with a warning signal means for emitting an on-site warning signal for a period of time beginning at the pre-set time entered into said warning signal time-set means;

iii. a manually operable switch means associated with the signal means for manually deactivating the signal means during the period of time the signal therefrom is being emitted; and

iv. an automatic communications means for calling a central station means and associated with the warning signal means and activatable by said warning signal means when the warning signal means is not manually deactivated during the period of time the warning signal therefrom is being emitted; and

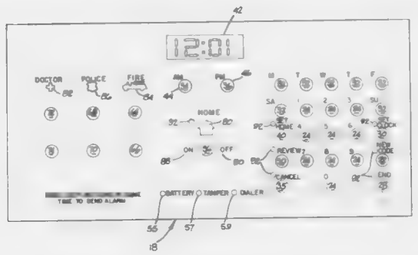
(b) a central station means for receiving calls by the communications means and situated remotely from the on-site station means, said central station means comprising:

i. data storage means for storing data relating to the monitored person;

ii. data display means for displaying said data related to the monitored person;

iii. data interpretation means associated with the data storage means and the data display means and in communication with and activatable by a call from the automatic communications means of the on-site station means for receiving and interpreting a call from said automatic communications means, retrieving corresponding data from the data storage means and displaying said data on the data display means.





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**4,743,893**

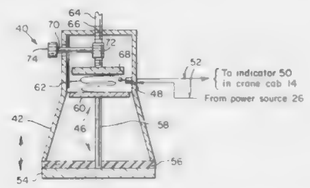
**EQUI CRANE ANTI-TIPPING DEVICE**

**Anthony Gentile, 3 Orleans Ct., Commack, N.Y. 11725, and George Spector, 233 Broadway, Rm. 3615, New York, N.Y. 10007**

**Filed Jun. 4, 1986, Ser. No. 870,492**

**Int. Cl.[4] G08B *21/00***

**U.S. Cl. 340—685** **4 Claims**



1. A crane anti-tipping device comprising a stabilizer foot in combination with adjustable means mounted in said foot responsive to ground bearing pressure to activate a sensor in said foot indicating excessive ground bearing pressure due to excessive crane inclination, wherein an indicator is provided in the crane cab electrically connected to said sensor.

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**4,743,894**

**OWNER IDENTIFICATION SYSTEM FOR ELECTRONIC EQUIPMENT, PARTICULARLY AUTOMOTIVE AUDIO EQUIPMENT**

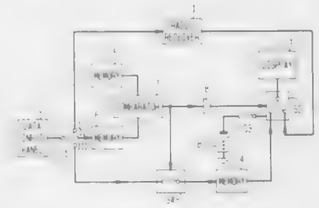
**Harald Bochmann, Hanover, Fed. Rep. of Germany, assignor to Blaupunkt-Werke GmbH, Hildesheim, Fed. Rep. of Germany**

**Filed Nov. 19, 1986, Ser. No. 932,732**

**Claims priority, application Fed. Rep. of Germany, Mar. 1, 1986, 3606737**

**Int. Cl.[4] G08B *5/00, 13/00, 29/00***

**U.S. Cl. 340—691** **15 Claims**



1. Owner identification system for electronic equipment, particularly automotive audio equipment, wherein the electronic equipment (**1**) includes

a memory means (**4, 5, 6**);

an alphanumeric input means (**2**) for entering alphanumeric input data into the memory means of the equipment, and

an output display device (**3**) for indicating alphanumeric data,

comprising, in accordance with the invention,

a non-volatile memory (**4**) forming part of the memory means;

switch means (S1–S4) for coupling the alphanumeric input means to the non-volatile memory (**4**) for entering alphanumeric personal recognition data into the memory; and

a recall switch means (S2) selectively

(1) connecting the non-volatile memory (**4**) to the display means for displaying said personal recognition data, or

(2) connecting the display means to an output of the electronic equipment for displaying data pertinent to the operation of said electronic equipment.

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**4,743,895**

**CAPACITIVE SWITCHES**

**Peter W. Alexander, Exning, England, assignor to Phosphor Products Co. Ltd., Poole and TI Corporate Services Limited, Birmingham, both of, England**

**Filed Apr. 5, 1985, Ser. No. 720,309**

**Claims priority, application United Kingdom, Apr. 5, 1984, 8408847**

**Int. Cl.[4] G09G *3/00***

**U.S. Cl. 340—712** **25 Claims**

1. A combined capacitive switch and display unit, comprising:

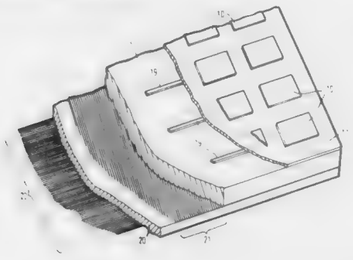
a layer of dielectric material;

a first electrode disposed adjacent one surface of the layer of dielectric material;

a second electrode disposed on the opposite side of the layer of dielectric material from the first electrode and in superimposed relationship with the first electrode;

a conductive pad disposed on the opposite side of the layer of dielectric material from the first electrode and in superimposed relationship with the first electrode said first and

second electrodes and said conductive pad being arranged so that the switch may be switched between first and second states, in one of said first and second states a signal transfer factor between the first and second electrodes being significantly different from the signal transfer factor in the other of said first and second states, the conductive pad and the layer of dielectric material being made from transparent materials;



a display medium disposed on the rear surface of the first electrode; and

a display electrode disposed on the rear surface of the display medium, in superimposed relationship to the first electrode, wherein the display medium provides a display in response to an electric field which may be established between the first electrode and the display electrode.

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**4,743,896**

**ELECTRODE PATTERN FOR A LIQUID CRYSTAL DISPLAY**

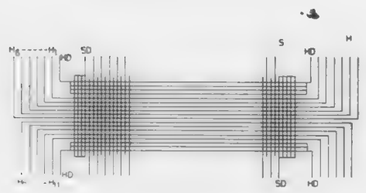
**Sadakatsu Hashimoto, Nara, and Shintaro Hashimoto, Ikoma, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Continuation of Ser. No. 856,435, Apr. 22, 1986, abandoned, which is a continuation of Ser. No. 504,862, Jun. 16, 1983, abandoned. This application Aug. 18, 1987, Ser. No. 86,507**

**Claims priority, application Japan, Jun. 17, 1982, 57-104888**

**Int. Cl.**[4] **G09G** *3/36*

**U.S. Cl. 340—784** **2 Claims**



1. A matrix display panel comprising:

first and second spaced apart non-conductive substrates;

an active display material disposed between said first and second substrates;

a plurality of active display scan electrodes disposed on said first substrate, arranged in parallel and spaced apart from each other by a first predetermined distance;

a plurality of active display signal electrodes disposed on said second substrate, arranged in parallel and spaced apart by a second predetermined distance, each of said active display signal electrodes orthogonally intersecting each of said active displat scan electrodes; P1 the orthogonally intersecting portions of said active display signal electrodes and active display scan electrodes defining an active display portion of said panel, said panel further including a visible non-display portion;

a plurality of dummy display scan electrodes disposed on said first substrate in said non-display portion of said panel, a plurality of said dummy display scan electrodes being arranged adjacently with each other and in parallel to said active display scan electrodes in each of a top and a bottom portion of said visible non-display portion having said active display portion therebetween and being spaced apart from each other and from said active display scan electrodes;

a plurality of dummy display signal electrodes disposed on said second substrate in said non-display portion of said panel, a plurality of said dummy display signal electrodes being arranged adjacently with each other and in parallel to said active display signal electrodes in each of first and second side portions of said visible non-display portion having said active display portion therebetween and being spaced apart from each other and from said active display signal electrodes;

said dummy display signal electrodes being commonly connected together, said dummy display scan electrodes being also commonly connected together;

said active display scan electrodes and dummy display scan electrodes being uniformly distributed across said first substrate over the entirety of said active display portion and non-display portion of said panel;

said active display signal electrodes and dummy display signal electrodes being uniformly distributed across said second substrate over the entirety of said active display portion and non-display portion of said panel;

said active display scan and display signal electrodes being driven to develop a desired pattern on said active display portion of said panel, nonenergized portions of said active display portion having their corresponding active display scan electrodes and active display signal electrodes being driven with an erase waveform;

said dummy display signal electrodes and said dummy display scan electrodes being continuously driven by said erase waveforms to develop an appearance equivalent to nonenergized portions of said display.

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**4,743,897**

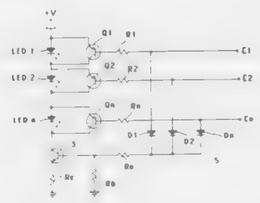
**LED DRIVER CIRCUIT**

**Ricardo Perez, Gent, Belgium, assignor to Mitel Corp., Kanata, Canada**

**Filed Oct. 9, 1985, Ser. No. 785,653**

**Int. Cl.**[4] **G09G** *3/32*

**U.S. Cl. 340—813** **18 Claims**



1. An LED driver circuit, powered by a supply voltage, for controlling selective illumination of a plurality of series connected LEDs, comprising:

(a) a current source for regulating and transmitting drive current to said LEDs,

(b) external means for generating logic level enable and disable control signals,

(c) control means for receiving said control signals and selectively enabling and disabling predetermined ones of the LEDs in response thereto, and



(d) disable means, responsive to the logic levels of the control signals, for disabling said current source in the event all of said series connected LEDs are disabled,

whereby, in response to the logic levels of the control signals, said LEDs conduct constant current therethrough when one or more of said series connected LEDs is enabled and said LEDs draw no current when all of said series connected LEDs are disabled.

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**4,743,898**

**PROGRAMMABLE ELECTRONIC LOCK**

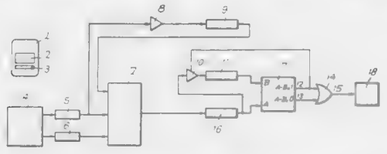
**Juan A. Imedio, San Sebastian, Spain, assignor to Talleres de Escoriaza, S.A., Spain**

**Continuation of Ser. No. 698,112, Feb. 4, 1985, abandoned. This application Apr. 23, 1987, Ser. No. 42,561**

**Claims priority, application France, Feb. 7, 1984, 84 01855**

**Int. Cl.**[4] **G06F** *7/04;* **G06K** *7/01*

**U.S. Cl. 340—825.31** **8 Claims**



1. A programmable electronic lock system, comprising:

a support (1) having a card code and a shift code;

a card code register (5);

a shift code register (6);

reader means (4) for reading the codes of the support and temporarily storing them respectively in the card and shift code registers (5,6);

a system code register (9) having a system code;

computing means (7) receiving the card, shift and system codes from the registers (5, 6, 9) thereof and using the system and shift codes for converting the card code into a key code;

a key code register (16) for temporarily storing the key code;

a lock code (11) having a lock code;

a control gate (10) for, when actuated, updating the lock code of the lock code register (11) as a function of the value of the key code then stored in the key code register (16);

a comparator (17) receiving the key and lock codes from the registers (16, 11) thereof and having first and second outputs (12, 13) for producing a signal at the first output (12) in response to identity of the key code to the lock code increased by one unit, the signal at the first output (12) actuating the control gate (10), and producing a signal at the second output (13) in response to identity between the key and lock codes;

an OR gate (14) connected to the first and second outputs (12, 13) of the comparator (17) and having an output (15), the OR gate (14) producing a signal on the OR gate output in response to the signal at the first or second output (12, 13) of the comparator (17); and

electro-mechanical locks means (18) responsive to the signal at the output (15) of the OR gate (14) for opening.

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**4,743,899**

**DECODER/MULTIPLEXER CIRCUIT INCLUDING MULTI-EMITTER TRANSISTORS**

**Simon Szeto, South San Francisco, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.**

**Filed Sep. 17, 1986, Ser. No. 908,478**

**Int. Cl.**[4] **H04Q** *3/52;* **H03K** *19/086*

**U.S. Cl. 340—825.860** **10 Claims**

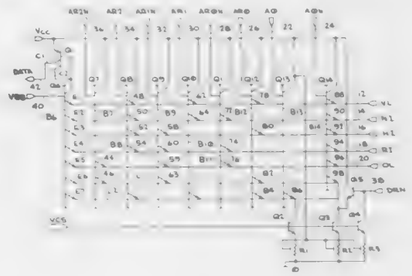
1. A decoder/multiplexer circuit for selecting one of a plurality of input signals comprising:

a plurality of substantially parallel input lines;

a plurality of input signals, each one of said plurality of input signals being connected to one end of a corresponding one of said input lines;

a plurality of decode transistors, each formed with a collector, a long base strip, and a preselected number of emitters;

an output line coupled to the other end of each of said input lines;



a plurality of address input signals being connected to said bases of said plurality of decode transistors;

each of the collectors of said decode transistors being commonly formed in a large epitaxial pocket, each of said base strips being formed with the selected number of emitters for connection to certain ones of said input lines; and

said decode transistors being responsive to said address signals for passing each one of said input signals in accordance with an address code to said output line.

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**4,743,900**

**DEVICE FOR RELEASING CONTROL SIGNALS FOR A MACHINE TOOL**

**Josef Röhrle, Hessdorf, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Jul. 24, 1986, Ser. No. 890,007**

**Claims priority, application Fed. Rep. of Germany, Aug. 12, 1985, 3528922**

**Int. Cl.**[4] **G08C** *19/16*

**U.S. Cl. 340—870.01** **8 Claims**



1. A device for track-wise releasing of control signals associated with binary states in dependence on a travel distance signal of a travel distance measuring device of a machine tool, where a functional relationship between the travel distance

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signal and each track of control signals can be predetermined by a control mechanism, addresses corresponding to the travel distance signal being released by the travel distance measuring device, an electronic write/read memory being provided coupled to the measuring device which can be addressed by these addresses for releasing respectively associated data, said data including the control signals to be supplied to a processing device, there being provided in the write/read memory, for each track of data, a sequence of three possible characterizing signals, a first of which indicates a beginning of one state, a second of which indicates a beginning of another state, and a third of which indicates a continued presence of the one or the other state, the write/read memory being coupled to translator means which can be addressed by the characterizing signals, said translator means operating so as to control switching between control signals whereby from the beginning of the first of the characterizing signals to the beginning of the second of the characterizing signals, switching between control signals is performed, and further comprising initializing means in said control mechanism for writing respective data into the write/read memory under address control.

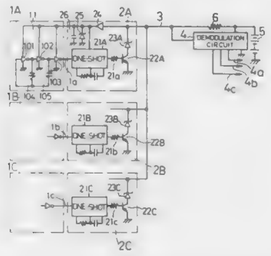
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**4,743,901**

## SIGNAL TRANSMISSION SYSTEM

**Kouichi Yamanoue, Nishio, and Junji Kitagawa, Okazaki, both of Japan, assignors to Nippon Soken, Inc., Nishio, Japan**

**Filed Apr. 2, 1986, Ser. No. 847,270**
**Claims priority, application Japan, Apr. 3, 1985, 60-70598**
**Int. Cl.[4] G08C *19/04***
**U.S. Cl. 340—870.11** **14 Claims**



1. A signal transmission system comprising:

a plurality of sensors, each sensing the variation of a physical quantity and outputting a sensor signal;

a single signal line;

a plurality of modulation circuits of the same number as said sensors, each of said plurality of modulation circuit outputting a pulse output of a predetermined pulse width different from those of another pulse output from another one of said plurality of modulation circuits for varying the voltage drop to said single signal line by predetermined different values in response to said sensor signal outputted by each of said plurality of sensors; said plurality of sensors being connected to input portions of respective modulation circuits; and one end of said single signal line being connected to each of output portions of said plurality of modulation circuits thereby to transmit a plurality of pulse outputs from said plurality of modulation circuits; and

a single demodulation circuit for detecting the different pulse widths and voltage drops caused by said plurality of pulse outputs of said single signal line thereby to obtain said sensor signal of each of said plurality of sensors, the other end of said single signal line being connected to said single demodulation circuit.

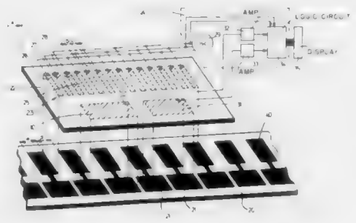
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**4,743,902**

## MEASURING DEVICE FOR CAPACITIVE DETERMINATION OF THE RELATIVE POSITION OF THE TWO WITH RESPECT TO ONE ANOTHER MOVABLE PARTS

**Nils I. Andermo, Taby, Sweden, assignor to Stiftelsen Institutet for Mikrovagsteknik vid Tekniska Hogskolan, Stockholm, Sweden**

**Continuation of Ser. No. 558,427, Dec. 6, 1983, abandoned, which is a continuation of Ser. No. 272,072, Jun. 9, 1981, Pat. No. 4,420,754, which is a continuation of Ser. No. 964,961, Nov. 30, 1978, abandoned. This application Dec. 12, 1986, Ser. No. 942,016**
**Claims priority, application Sweden, Dec. 9, 1977, 7714010**
**Int. Cl.[4] G08C *19/10***
**U.S. Cl. 340—870.37** **3 Claims**



1. A measuring device for capacitative determination of the relative position of two relatively movable parts with respect to one another comprising a slide provided with a number of groups of supply electrodes distributed along the direction of relative movement, each of the groups having n number of supply electrodes, n being an integer greater than 2; signal generator means having n number of signal outputs, each of the supply electrodes in each group being connected to a respective one of said signal outputs whereby all supply electrodes are supply with voltages according to a cyclic pattern, the slide also being provided with at least one receiving electrode; a signal processing unit connected to at least one receiving electrode; a scale being provided with a single electronic pattern comprising internally galvanically isolated scale electrodes, each scale electrode comprising two mutually galvanically connected parts, one being a detecting part and being located close to the area of the scale over which the supply electrodes of the slide can be moved, the other of the two parts being a transferring part and being located close to the area over which the at least receiving electrode of the slide can be moved, whereby the position of the slide along the scale determines the signal from the at least one receiving electrode which is derived from at least two adjacent supply electrode signals and the position of the slide with respect to the scale can be determined by the identification in the signal processing unit of the phase position of said signal from the receiving electrode.

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**4,743,903**

## PERIPHERAL VISION ARTIFICIAL HORIZON DEVICE AND ASSOCIATED METHODS

**Edwin W. Morley, Mississauga, Canada, assignor to The Garrett Corporation, Los Angeles, Calif.**

**Division of Ser. No. 441,196, Nov. 12, 1982, Pat. No. 4,616,226. This application Dec. 19, 1985, Ser. No. 811,986**
**Int. Cl.[4] G01C *9/02***
**U.S. Cl. 340—980** **10 Claims**

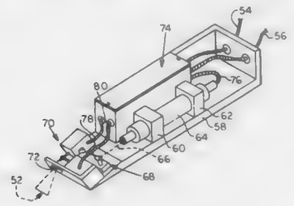
1. A peripheral vision artificial horizon device for projecting light upon a surface in front of a pilot such that said light is perceived as a light bar the position and attitude of which are analogous to a true horizon, said device comprising: a light source providing a light beam, scanning means receiving said light beam for scanning said light beam upon said surface to form a projection perceived as a light bar analogous in position and attitude to a true horizon, and means for adjusting the position of said light beam as received by said scanning means in a first plane and also in a second plane mutually perpendicular with said first plane;

wherein said adjusting means includes light communicating means intermediate said light source and said scanning means for communicating said light beam therebetween;

wherein said light communicating means includes at least a first reflector receiving said light beam from said light source and reflecting said light beam to said scanning means, first means for pivoting said first reflector about a first axis coincident with said light beam so as to move said light beam as received by said scanning means in said first plane, and second means for pivoting said first reflector about a second axis coincident with said light beam and mutually perpendicular with said first axis so as to move said light beam as received by said scanning means in said second plane;

wherein said device includes a chassis member, said light source and said scanning means being rigidly secured to said chassis member, said first means including a post member which is pivotally secured to said chassis member for movement about said first axis, said post member defining a toe portion having a substantially V-shaped





end, said V-shaped end being received between and engaged by a first pair of set screws which are threadably carried by a flange member securable to said chassis member, movement of said first pair of set screws being effective to pivot said post member about said first axis, said post member carrying a mirror holder member, said mirror holder member carrying said first reflector, said second means comprising said post member and said mirror holder member pivotally cooperating to define said second axis, said second axis being mutually perpendicular with said first axis and coincident with a reflective surface of said first reflector, said first axis and said second axis intersecting substantially at said reflective surface, said mirror holder member carrying a lever member pivotal therewith, said lever member defining a foot portion having a substantially V-shaped end, said V-shaped end of said foot portion being received between and engaged by a second pair of set screws which are threadably carried by said flange member, movement of said second pair of set screws being effective to pivot said mirror holder member and said first reflector about said second axis, first locking means for locking said post member in a selected pivotal position relative to said chassis member, and second locking means for locking said mirror holder member in a selected pivotal position relative to said post member.

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**4,743,904**

## MILITARY COUNTERMEASURES PASSIVE SIGNATURE CANCELLATION SYSTEM

**Thomas P. Morton, Lewisville, Tex., and Marcus L. Foster, Palm Bay, Fla., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed May 22, 1986, Ser. No. 870,064**
**Int. Cl.[4] G01S *7/38*; F41H *3/00*; F41J *9/13***
**U.S. Cl. 342—14** **2 Claims**

1. A radiometric countermeasures system installable on a military tank to defeat a passive millimeter wave sensor in a guidance system on an enemy missile: said system comprising an oscillator source of mm waves; a variable attenuator (**12**) connected to the oscillator to adjust the power level of the oscillator output signal; a circular polarizer (**20**) connected to the attentuator; a stationary non-scanning antenna (**16**) positioned on an upper surface of the tank, said antenna being connected to the polarizer to broadcast mm wave radiation to the ambient atmosphere in which the military tank is located; and means (**18**) for adjusting the attenuation of the attentuator



such that total mm wave emission from the tank and from the antenna is substantially equal to the naturally-occurring mm wave radiaton emitted by the background scenery in the vicinity of the tank; said antenna including a dielectric lens of oblate upwardly-facing hemispheric construction, said lens having a vertical height that is less than its horizontal radius measured normal to its height, to provide a variable power distribution pattern of greater intensity directly overhead and lesser intensity toward the horizon.

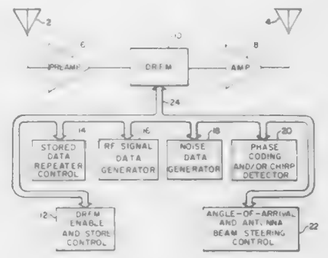
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**4,743,905**

## ELECTRONIC COUNTER MEASURE SYSTEM UTILIZING A DIGITAL RF MEMORY

**Richard J. Wiegand, Severna Park, Md., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Aug. 16, 1985, Ser. No. 766,305**
**Int. Cl.[4] G01S *7/38***
**U.S. Cl. 342—14** **3 Claims**




1. An electronic countermeasure active jamming system comprising:

antenna means for receiving and transmitting high frequency electromagnetic signals;

a digital radio frequency memory;

first control means for enabling said memory to store binary data corresponding to the received signal;

second control means for activating said memory to output the stored data for constructing a signal to be applied to the transmitting antenna means;

an RF signal data generator which generates one-bit binary logic values for storage in the digital memory, with the data being at a high logic state when the RF signal to be generated is equal to or greater than a predetermined level and at a low logic state when less than said predetermined

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level, and wherein the generated RF signal data corresponds to an RF signal having constant frequency and phase with respect to time;

an RF noise data generator which generates one-bit binary logic values for storage in the digital memory, with the data being at a high logic state when the RF signal to be generated is equal to or greater than a predetermined level and at a low logic state when less than said predetermined level, said values corresponding to an RF noise signal having time varying frequency and phase with respect to time; and

a detector for detecting phase coding and chirp modulation of the received signals and for analyzing the frequency spectrum of the received signal memory data to determine if the received signal was frequency modulated.

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**4,743,906**

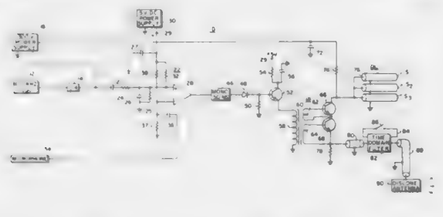
## TIME DOMAIN RADIO TRANSMISSION SYSTEM

**Larry W. Fullerton, Huntsville, Ala., assignor to Charles A. Phillips, Ardmore, Tenn., a part interest**

**Continuation-in-part of Ser. No. 677,597, Dec. 3, 1984. This application Jun. 3, 1986, Ser. No. 870,177**

**Int. Cl.[4] G01S *13/04***

**U.S. Cl. 342—27** **19 Claims**



**1**. A time domain radar system comprising:

a transmitter comprising:

signal generating means for generating a series of trigger signals at spaced times,

a wideband transmitting antenna positioned for transmission into free space,

a source of D.C. power,

switching means responsive to said trigger signals and coupled to said source of D.C. potential and coupled to said transmitting antenna for abruptly switching between different states of a potential on said transmitting antenna, and transmitting a series of spaced, A.C., carrierless burst signals, each of which is generally monocyclic, into free space; and

a radio receiver comprising:

receiving means for receiving and providing an output responsive to wideband signals received from space between the times of transmission of said A.C. carrierless burst signals from said transmitting antenna,

detection signal generating means responsive to timing signals for locally generating time spaced local signals, each local signal including a single polarity up to the duration of one polarity of a said transmitted monocyclic burst signal as received,

timing means responsive to the times of transmissions of said series of said burst signals for generating, as a set, successive said timing signals and coupling them to said detection signal generating means, each said timing signal of a set occurring at a selected like time after the transmission of a said burst signal, wherein a said selected time is representative of the transit time from said transmitting antenna to a target at a selected distance and back to said receiving means,

output signal mixing and integration means responsive to a said output from said receiving means and a said local burst signal for providing an output signal which is a function signal from mixing a said output of said receiving means and a local burst signal and integrating this function signal for the discrete period of said local signal, and

integration means responsive to a successive set of output signals from said signal mixing and integration means responsive to a series of transmissions from said transmitting antenna, each of said last-named output signals being for an identical time of transmitted burst signal travel, for providing an integrated signal, said integrated signal being indicative of the presence of signals having been reflected from a target at a selected distance.

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**4,743,907**

## RADAR SYSTEM OPERATING IN TWO FREQUENCY BANDS

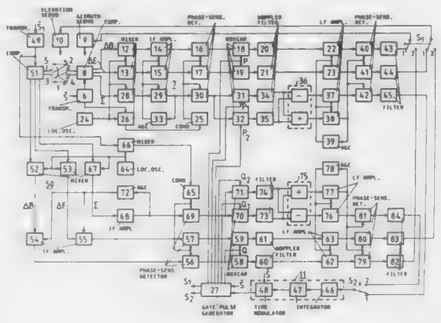
**Bernard Gellekink, Ootmarsum, Netherlands, assignor to Hollandse Signaalapparaten B.V., Hengelo, Netherlands**

**Filed May 5, 1986, Ser. No. 860,945**

**Claims priority, application Netherlands, May 23, 1985, 8501469**

**Int. Cl.[4] G01S *13/42, 13/72***

**U.S. Cl. 342—59** **4 Claims**



**1**. A radar system capable of automatically tracking targets which are at sufficiently low altitudes to produce echoes which are reflected by the earth's surface, said radar system comprising:

(a) an antenna system suitable for operating in first and second frequency bands, the first frequency band corresponding with longer wavelengths more suitable for angular tracking at longer ranges and the second frequency band corresponding with shorter wavelengths more suitable for angular tracking at shorter ranges;

(b) means for controlling the direction of the antenna system to effect target tracking;

(c) a first radar apparatus electrically coupled to the antenna system and operable in the first frequency band to effect angular tracking at the longer ranges, said first radar apparatus including a first receiver for producing signals representative of the ranges and directions of targets at the longer ranges;

(d) a second radar apparatus electrically coupled to the antenna system and operable in the second frequency band to effect angular tracking at the shorter ranges, said second radar apparatus including a second receiver for producing signals representative of at least the directions of targets at the shorter ranges;

(e) signal processing means for deriving, from the signals produced by the first radar apparatus, first antenna direction error signals for targets at the longer ranges and target range information;

said signal processing means also deriving, from the signals produced by the second radar apparatus, second antenna direction error signals for targets at the shorter ranges; and



(f) control means coupled to the first and second radar apparatus, to the signal processing means, and to the means for controlling the direction of the antenna;

said control means effecting timing of pulse transmissions by the first and second radar apparatus, effecting alternate application of the signals from the first and second radar apparatus to the signal processing means, and effecting control of the antenna direction for longer and shorter range targets in response to the first and second antenna direction error signals, respectively.

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**4,743,908**

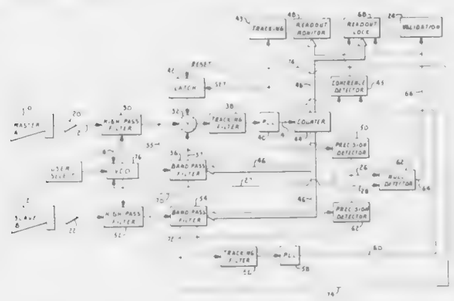
## TARGET POSITION RADAR

**John R. Brassfield, Prairie Village; Roger A. Jones, Iola; Edward W. Sergent, and Joseph C. Winkler, both of Chanute, all of Kans., assignors to M. P. H. Industries, Inc., Chanute, Kans.**

**Filed Nov. 4, 1985, Ser. No. 794,787**

**Int. Cl.[4] G01S *9/02***

**U.S. Cl. 342—113** **15 Claims**



**1**. In a Doppler traffic radar, a method of producing signal information in the radar receiver indicative of the relative position of one of a plurality of spaced-apart targets moving at different speeds, said method comprising the steps of:

(a) providing an antenna having first and second relative power density radiation patterns which diverge from each other at an angle selected to cause the patterns to overlap in a predetermined interrelationship;

(b) transmitting radio frequency energy in a manner to cause simultaneous presence in said patterns of transmitted energy of the same frequency;

(c) receiving a return signal from said one target in response to said first pattern and providing therefrom a first Doppler signal having an amplitude proportional to the relative power density characteristic of said first pattern;

(d) receiving said return signal from said one target in response to said second pattern and providing therefrom a second Doppler signal having the same frequency as said first Doppler signal and having an amplitude proportional to the relative power density characteristic of said second pattern; and

(e) detecting the amplitudes of said first and second Doppler signals, whereby their amplitude relationship indicates the position of said one target in the overlapped radiation patterns.

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**4,743,909**

## METHOD AND APPARATUS FOR SETTING DIRECTION OF A PARABOLIC ANTENNA RELATIVE TO A COMMUNICATING SATELLITE

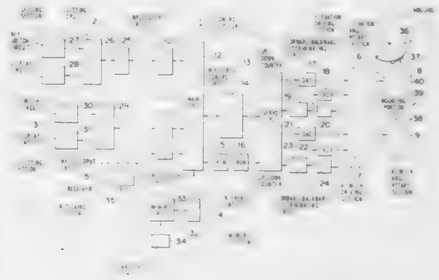
**Akihiro Nakamura; Takeo Horiuchi; Makoto Maruyama, and Toshiaki Inoue, all c/o Nagano Nihon Musen Kabushiki Kaisha, 1463 Nishi-Tsuruga-machi, Oaza-Tsuruga, Nagano-shi, Nagano-ken, Japan**

**Continuation of Ser. No. 634,994, Jul. 27, 1984. This application Sep. 4, 1987, Ser. No. 96,226**

**Claims priority, application Japan, Mar. 17, 1984, 59-51744**

**Int. Cl.[4] H01Q *3/00***

**U.S. Cl. 342—359** **5 Claims**



**1**. An apparatus for setting the direction of a parabolic antenna with respect to a broadcasting satellite comprising:

a parabolic antenna having an elevation driving section and an azimuth driving section to drive the parabolic antenna toward the broadcasting satellite;

a control section connected to the elevation driving section to control the elevation angle of the parabolic antenna and connected to the azimuth driving section of the antenna to control the azimuth angle of the parabolic antenna;

a memory section connected to the control section to be read out and to deliver the information concerning elevation angle, the azimuth angle and constants for the broadcasting satellite to the control section;

a setting section connected to the control section through an input/output circuit to input to the control section various information signals;

a selecting section connected to the control section through the input/output circuit to appoint and to select the desired satellite; and

a receiving section connected to the control section through the input/output circuit to input information concerning the elevation angle and the azimuth angle of the parabolic antenna;

wherein said control section is adapted to receive the latitude and longitude of the point at which the antenna is situated, as well as the longitude of the satellite to be aimed at, and to calculate the elevation angle and the azimuth angle of the antenna for the desired satellite.

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**4,743,910**

## FREQUENCY DOMAIN, PULSE COMPRESSION RADAR APPARATUS FOR ELIMINATING CLUTTER

**Richard M. Hill, La Habra; Richard D. Parton, Fullerton, and James H. Sawyers, Santa Ana, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Dec. 16, 1986, Ser. No. 943,275**

**Int. Cl.[4] G01S *13/28***

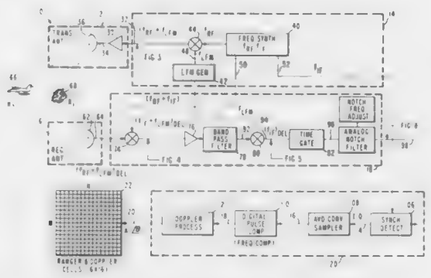
**U.S. Cl. 342—159** **20 Claims**

**1**. Frequency domain, pulse compression CW (continuous wave) radar apparatus, which comprises:

(a) means for providing CW signals at a radio frequency, $f_{RF}$, and at an intermediate frequency, $f_{IF}$;

(b) means for providing a sawtooth, linear frequency modulation (LFM) ramp signal having a variable ramp fre-

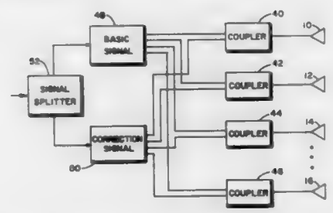
quency, $f_{LFM}$, and means for combining the $f_{LFM}$ signal with the $f_{RF}$ signal to thereby provide a CW radar signal having a frequency, $(f_{RF}+f_{LFM})$;
(c) means for transmitting the CW $(f_{RF}+f_{LFM})$ radar signal;
(d) means for receiving time-delayed CW radar return signals which comprise reflections of said radar signal from clutter at a clutter range and from a target at a target range;
(e) means for downconverting the time-delayed, clutter and target return signals received by the receiving means to said intermediate frequency for processing;
(f) means for extracting the $f_{LFM}$ signal from the time-delayed, intermediate frequency clutter and target return signals to provide, in a frequency-time domain, a first, analog, rectangular wave signal corresponding to the



reflected clutter signal from the clutter range and a second, analog, rectangular wave signal corresponding to the reflected target signal from the target range;
(g) filtering means connected for receiving the first and second rectangular wave signals and having at least one frequency notch for filtering out said first rectangular wave clutter signal while passing the second rectangular wave target signal when the frequency characteristics of said first and second rectangular wave signals are different from one another; and
(h) processing means connected for receiving the second rectangular wave target signal output from the filtering means and for the processing thereof to provide conventional target range and doppler cell data relating to target range and velocity.

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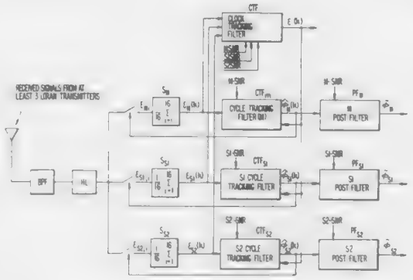
**4,743,911**
**CONSTANT BEAMWIDTH ANTENNA**
**Gary E. Evans, Trappe, Md., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**
**Filed Mar. 3, 1986, Ser. No. 835,675**
**Int. Cl.[4] H01Q** *19/06*
**U.S. Cl. 342—375** **15 Claims**




1. An array antenna system which exhibits a constant beamwidth in at least one plane while operating over a wide frequency range, said antenna comprising:
a plurality of spaced antenna elements;
first means for coupling the antenna elements to a basic signal circuit;
second means for coupling the antenna elements to a correction signal circuit; and
splitting means for coupling a common signal circuit to the basic and correction signal circuits, with the value of the coupling between the common, the basic, and the correction signal circuits being dependent upon the frequency of the coupled signals.

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**4,743,912**
**METHOD OF AND APPARATUS FOR REDUCING CYCLE SLIPPAGE ERRORS IN LORAN-C AND SIMILAR RADIO-FREQUENCY SIGNAL RECEPTION, PARTICULARLY IN VEHICLES UNDERGOING ACCELERATION**
**Pere Enge, Bedford, and Robert Goddard, Stoneham, both of Mass., assignors to Megapulse Inc., Bedford, Mass.**
**Filed Jun. 24, 1985, Ser. No. 747,986**
**Int. Cl.[4] G01S** *1/24*
**U.S. Cl. 342—390** **12 Claims**



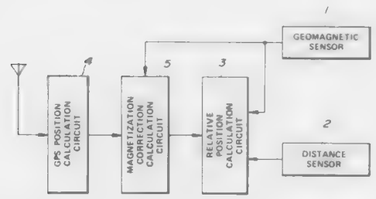

1. A method of obviating cycle-locking slippage errors in reception of Loran-C and similar radio-frequency signals caused by receiver location acceleration effects and other distortion effects simulating the same, that comprises, receiving the radio-frequency signals and producing data therefrom by sampling and tracking the cycles of the signals with a time-constant filter sufficiently fast to accommodate for the largest acceleration to be experienced by the receiver location to avoid cycle slippage in locating a predetermined cycle zero crossing, and independently post-filtering a data output of said time-constant filter sufficiently slowly to smooth the data and without interaction with said sampling.

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**4,743,913**
**HYBRID NAVIGATION SYSTEM FOR DETERMINING A RELATIVE POSITION AND DIRECTION OF A VEHICLE AND METHOD THEREFOR**
**Hideo Takai, Yokohama, Japan, assignor to Nissan Motor Company, Limited, Japan**
**Filed Feb. 18, 1987, Ser. No. 15,999**
**Claims priority, application Japan, Feb. 19, 1986, 61-32897; Feb. 19, 1986, 61-32898**
**Int. Cl.[4] G01C** *17/38*
**U.S. Cl. 342—457** **15 Claims**

1. A system mounted on a moving object for determining a position and direction of the moving object relative to a destination, comprising:
(a) first means for receiving a navigation electromagnetic wave, calculating coordinate positions of the moving object on the earth on the basis of the received electromagnetic wave, and deriving a running direction of travel in which the moving object advances with respect to an orientation of the geomagnetic field as a reference direction on the basis of the calculated coordinate positions;
(b) second means for detecting a direction of the moving object with respect to the orientation of the geomagnetic field and an intensity of the geomagnetic field on the moving object;
(c) third means for correcting a detection result of the second means to compensate for an error due to an effect of magnetization of a body of the moving object itself on the basis of the running direction data derived from the first means;

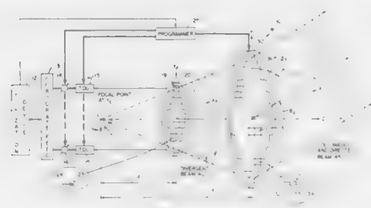





(d) fourth means for detecting a distance by which the moving object has moved; and
(e) fifth means for calculating the relative position and direction of the moving object on the basis of the detection result of the fourth means and corrected detection result of the second means derived from the third means.

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**4,743,914**
**SPACE FED ANTENNA SYSTEM WITH SQUINT ERROR CORRECTION**
**Jack J. Schuss, Sharon, and Jerome D. Hanfling, Framingham, both of Mass., assignors to Raytheon Company, Lexington, Mass.**
**Filed Apr. 14, 1986, Ser. No. 852,041**
**Int. Cl.[4] H01Q** *3/46*
**U.S. Cl. 343—754** **12 Claims**

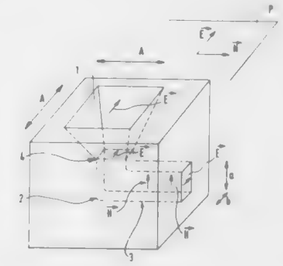


1. A space fed antenna system comprising:
lens means for collimating and directing R.F. energy into a planar wave in a predetermined direction;
radiating means, disposed between the lens means and the focal point of the lens means, for illuminating the lens means with R.F. energy having a diverging wavefront, the diverging wavefront having a focal point; and
control means, coupled to the radiating means, for maintaining coincidence of the focal point of the diverging wavefront with the focal point of the lens means.

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**4,743,915**
**FOUR-HORN RADIATING MODULES WITH INTEGRAL POWER DIVIDER/SUPPLY NETWORK**
**Emmanuel Rammos, Creteil, and Bernard M. Bizery, Paris, both of France, assignors to U.S. Philips Corporation, New York, N.Y.**
**Filed Jun. 3, 1986, Ser. No. 870,275**
**Claims priority, application France, Jun. 4, 1985, 85 08398**
**Int. Cl.[4] H01Q** *13/02*
**U.S. Cl. 343—776** **9 Claims**

1. A unit module for an antenna for rectilinearly-polarized waves, said unit module comprising:
(a) four horn-type radiating elements having square apertures parallel to a reference plane P and arranged in a rectangular array, said horn-type radiating elements being formed in a common plate of material of predetermined thickness and having uniformly-increasing cross-sectional areas through at least a part of said thickness from respective throats thereof to said square apertures thereof;
(b) a waveguide supply network for propagating $TE_{01}$-mode waves, said network being disposed in the modules beneath the horn-type radiating elements and including a power divider network and means for connecting said power divider network to the throats of the horn-type radiating elements;
said power divider network including a plurality of rectangular waveguide sections arranged with respect to planes Q and Q' which are perpendicular to the reference plane P and to each other, the plane Q bisecting the module into two equal parts and the plane Q' bisecting the module into larger and smaller parts, each of said waveguide sections having a pair of opposing sidewalls of width (b) extending parallel to the reference plane P and having a pair of opposing side walls of width (a) extending perpendicularly to said reference plane P, where $(a)>(b)$, where $(a)=\lambda_c/2$, and where $\lambda_c$ is the waveguide cut-off wavelength, said waveguide sections including:
1. a first section forming a central bar of a first T-shaped power divider, said first section curvilinearly extending from the periphery of the unit module where both sidewalls of width (a) lie on the side of the plane Q'



defining the larger part of the module, and extending past the plane Q to a region of the module where both side walls of width (a) lie on opposite sides of the plane Q';
2. a second section forming a top bar of the first T-shaped power divider and forming at opposite ends thereof central bars of respective second and third T-shaped power dividers, said second section curvilinearly extending from a central portion thereof, which is connected to the first section, to said opposite ends where the respective sidewalls of width (a) lie on opposite sides of the plane Q;
3. a third section forming a top bar of the second T-shaped power divider and extending from a central portion thereof, which is connected to the second section, to opposite ends thereof in the vicinity of the throats of first and second ones of the horn-type radiating elements; and
4. a fourth section forming a top bar of the third T-shaped power divider and extending from a central portion thereof, which is connected to the second section, to opposite ends thereof in the vicinity of the throats of third and fourth ones of the horn-type radiating elements;
said means for connecting the power divider network to the throats of the horn-type radiating elements comprising a first group of four elbow-shaped rectangular waveguide sections for connecting the ends of the third and fourth

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waveguide sections to respective throats of the horn-type radiating elements.

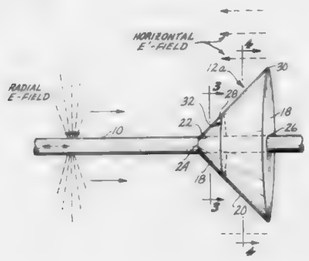
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**4,743,916**

## METHOD AND APPARATUS FOR PROPORTIONAL RF RADIATION FROM SURFACE WAVE TRANSMISSION LINE

**Greg A. Bengeult, Auburn, Wash., assignor to The Boeing Company, Seattle, Wash.**

**Filed Dec. 24, 1985, Ser. No. 813,049**
**Int. Cl.[4] H01Q** *13/00, 1/36*
**U.S. Cl. 343—785** **19 Claims**




1. A radio frequency transmission and radiation system comprising:

a surface wave transmission line adapted for transmission of a radio frequency surface wave along said line;

an annular electrically conductive radiator extending outwardly from and surrounding a predetermined length of said surface wave transmission line; said annular electrically conductive radiator having a first end region upon which said radio frequency surface wave impinges, at least a portion of said first end region increasing in cross-sectional area relative to distance along said surface wave transmission line taken in the direction in which a radio frequency surface wave travels along said surface wave transmission line said first end region including a surface wave transmitting window through which said surface wave transmission line passes, said surface wave transmitting window being dimensioned for passage of a predetermined portion of the energy in a radio frequency surface wave transmitted along said line with said predetermined portion remaining coupled to said line, said annular electrically conductive radiator radiating substantially all of said energy other than said predetermined transmitted portion; and,

dielectric support means for supporting said annular electrically conductive radiator in coaxial spaced-apart relationship with said surface wave transmission line.

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**4,743,917**

## APPARATUS AND METHOD FOR A PORTABLE ROLL-OUT ANTENNA

**Craig M. Huntsman, West Valley City, and John F. Marshall, Orem, both of Utah, assignors to Eyring Research Institute, Inc., Provo, Utah**

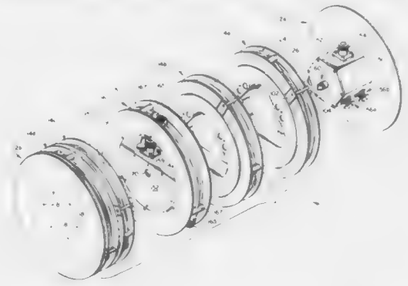
**Filed Sep. 23, 1985, Ser. No. 779,259**
**Int. Cl.[4] H01Q** *1/12*
**U.S. Cl. 343—877** **57 Claims**

1. A portable roll-out antenna system comprising:

first carrier means for carrying a first conductor such that said first conductor can be selectively wound onto said first carrier means when transporting said antenna system, and such that said first conductor can be selectively unwound from said first carrier means when setting up said antenna system for use in transmitting and receiving radio signals;

second carrier means for carrying a second conductor such that said second conductor can be selectively wound onto said second carrier means when transporting said antenna system, and such that said second conductor can be selectively unwound from said second carrier means when setting up said antenna system for use in transmitting and receiving radio signals; and

means for selectively locking and unlocking said first and second carrier means together such that a compact, transportable assembly is formed when said first and second conductors are wound up and said carrier means are locked together, and such that a rapidly deployable antenna system is formed when said carrier means are unlocked and said first and second conductors are unwound, said means for locking and unlocking comprising means for electrically connecting one end of said first and second conductors to a remote transmitter/receiver.



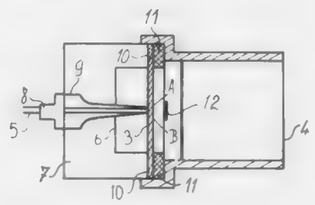
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**4,743,918**

## ANTENNA COMPRISING A DEVICE FOR EXCITATION OF A WAVEGUIDE IN THE CIRCULAR MODE

**Jean Rannou, Antony; Emile Pouderous, Boulogne, and Pascal Gilbert, Cachan, all of France, assignors to Thomson-CSF, Paris, France**

**Filed Jan. 9, 1985, Ser. No. 689,848**
**Claims priority, application France, Jan. 13, 1984, 84 00500**
**Int. Cl.[4] H01Q** *1/36*
**U.S. Cl. 343—895** **10 Claims**




1. An antenna system comprising a circular wave guide having first and second ends, radiating means having an input end and comprising a double spiral conductor positioned outside and adjacent the first end of the wave guide for exciting unidirectionally said wave guide with wave energy of circular polarization for travel through said wave guide and exiting at its second end, and transmission line means for supplying electromagnetic wave energy in a transverse electromagnetic mode to the input end of said radiating means.

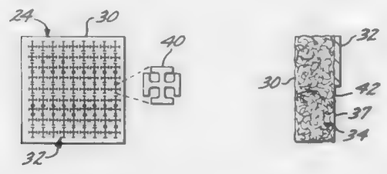


**4,743,919**

## MICROWAVE FREQUENCY SELECTIVE SURFACE HAVING FIBROUS CERAMIC BODY

**Stanley S. Chang, Palos Verdes Estates, and Hui Bau, Hermosa Beach, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Oct. 7, 1986, Ser. No. 916,355**
**Int. Cl.[4] H01Q** *15/14, 15/16*
**U.S. Cl. 343—914** **17 Claims**




1. A frequency selective surface for selectively reflecting microwave radiation, comprising:

a body of a cellular ceramic material wherein a plurality of ceramic fibers are bonded together at their points of intersection to form a rigid structure having open cells dispersed therethrough and a reflecting face, and

a metallic grid on said reflecting face, said grid being a repeating pattern of elements, which pattern passes a first frequency and reflects a second frequency of incident microwave radiation.

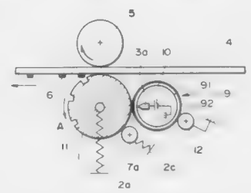
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**4,743,920**

## THERMAL TRANSFER RECORDING METHOD AND APPARATUS

**Koichi Tohma, Kawasaki; Naoki Kushida; Yasuyuki Tamura, both of Yokohama; Tetsuo Hasegawa, Tokyo, and Hisao Yaegashi, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Jul. 22, 1986, Ser. No. 887,914**
**Claims priority, application Japan, Jul. 31, 1985, 60-168788; Dec. 25, 1985, 60-295311**
**Int. Cl.[4] G01D** *15/10;* **B41J** *3/20*
**U.S. Cl. 346—71** **17 Claims**




1. A thermal transfer recording method comprising the steps of:

applying heat or electric energy directly to a peripheral surface of an ink roll at a predetermined position thereof, said ink roll having a peripheral surface comprising a heat-transferable ink layer, thereby to form a melted or softened pattern of said heat-transferable ink;

causing the peripheral surface of said ink roll to contact a recording medium at a position spaced from the predetermined position to transfer the melted or softened ink pattern onto the recording medium; and

smoothing the peripheral surface of said ink roll, wherein said layer of heat-transferable ink has a thickness allowing for application of heat or electric energy to form another melted or softened pattern after smoothing.

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**4,743,921**

## INFORMATION SIGNAL REPRODUCING APPARATUS HAVING A TRACKING CONTROL SYSTEM

**Junichi Sato, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Japan**

**Filed May 16, 1986, Ser. No. 864,017**
**Claims priority, application Japan, May 22, 1985, 60-108442; May 22, 1985, 60-108443**
**Int. Cl.[4] G01D** *15/00*
**U.S. Cl. 346—74.2** **23 Claims**



1. An information signal reproducing apparatus for reproducing information signals from a recording medium on which many recording tracks are formed in parallel to each other, comprising:

(a) a reproducing head arranged to reproduce said information signals from said recording medium;

(b) first means for generating a first control signal for tracking control on the basis of a signal reproduced by said reproducing head from a first track which is one of said many tracks;

(c) second means for generating a second control signal for tracking control on the basis of signals reproduced by said reproducing head from a second track and a third track neighboring said first track on both sides thereof; and

(d) control means for controlling the tracking action of said reproducing head according to said first and second control signals.

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**4,743,922**

## INK JET SINGLE-NOZZLE PRINTING HEAD

**Luc Regnault, and Jean-Louis Reynaud, both of Bourg Lès Valence, France, assignors to Imaje S.A., Bourglès Valence, France**

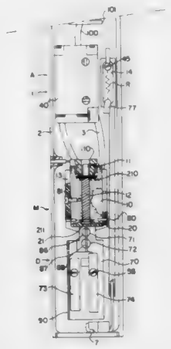
**PCT No. PCT/FR85/00317, § 371 Date Jul. 11, 1986, § 102(e) Date Jul. 11, 1986, PCT Pub. No. WO86/02885, PCT Pub. Date May 22, 1986**
**PCT Filed Nov. 7, 1985, Ser. No. 893,298**
**Claims priority, application France, Nov. 13, 1984, 84 17404**
**Int. Cl.[4] G04D** *15/18*
**U.S. Cl. 346—75** **8 Claims**

1. A single nozzle ink jet printing head (1) of the type including a supply circuit (100), means for breaking up the jet and ejecting the drops, means for charging and deflecting these latter; characterized in that a signal amplifier (40), a modulation body (10) orientable through two angles ($\alpha$) and ($\beta$) in two perpendicular planes, a support block (70) in which are integrated the charge (71) and charge control (72) electrodes and

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the deflection electrodes (73) and (74) are mounted in a monolithic piece (2), this latter serving both for shielding the amplifier (40) and for supporting the modulation body (10) and the support block (70).

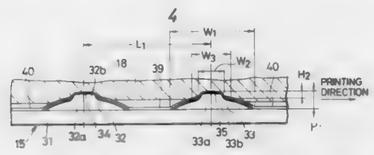


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**4,743,923**
**THERMAL HEAD**

Yasuo Nishiguchi; Tsuyoshi Yasutomi, both of Kokubu; Ryoichi Shiraishi, Kagoshima; Akira Sasaki; Yoshihito Takahashi, both of Hitachi; Katsumasa Mikami, Naka; Masafumi Suzaki, and Akiyoshi Hakoyama, both of Hitachi, all of Japan, assignors to Kyocera Corporation, Kyoto and Hitachi, Ltd., Tokyo, both of, Japan

Filed Dec. 15, 1986, Ser. No. 941,644
Claims priority, application Japan, Dec. 20, 1985, 60-285549; May 9, 1986, 61-104606
Int. Cl.[4] G01D *15/10*
U.S. Cl. 346—76 PH 7 Claims

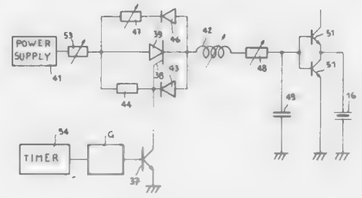



1. A thin film type thermal head comprising a head substrate member, a partial projected glaze portion mounted on said head substrate member, a plurality of heating resistor elements provided on said partial projected glaze portion, each of said plurality of heating resistor elements having two electrode end portions, each of said plurality of heating resistor elements having a uniform thin thickness, a common electrode provided on said partial projected glaze portion, and an individual control electrode provided on said partial projected glaze portion, said partial projected glaze portion having at least two projected portions of different height, and said plurality of heating resistor elements having a portion thereof disposed on at least the highest projected portion of said partial projected glaze portion with the two electrode end portions of each of said plurality of heating resistor elements being disposed on parts of said partial projected glaze portion other than the highest projected portion thereof.

**4,743,924**
**CONTROL CIRCUIT FOR AN INK JET PRINTING ELEMENT AND A METHOD OF DIMENSIONING AND MANUFACTURE RELATING THERETO**

Alessandro Scardovi, Ivrea, Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy

Filed May 2, 1986, Ser. No. 858,692
Claims priority, application Italy, May 2, 1985, 67401 A/85
Int. Cl.[4] G01D *15/16*
U.S. Cl. 346—140 R 21 Claims




1. In an on-demand ink jet printing element comprising a chamber normally filled with ink and closed at one end by a capillary nozzle, an ink reservoir connected to another end of said chamber, and an electric voltage transducer operable for causing a variation of the pressure of the ink in said chamber, said chamber having a characteristic acoustic frequency defining a characteristic time requested by a pressure wave caused by said variation to return to the starting point in the chamber upon being acoustically reflected between said ends,

the combination of a signal generator for generating a logic signal for causing the emission of an ink droplet from said chamber through said nozzle, an electric control circuit operable in response to said logic signal for generating a voltage pulse for each droplet to be emitted, said voltage pulse controlling said transducer to cause a pressure wave in said chamber such as to emit a droplet, and adjustable means included in said circuit for defining the duration and form of said voltage pulse in such a way as to provide at least one reflection suppressing pulse wave formed by a primary portion causing the emission of the droplet and a secondary portion symmetrical to the primary portion and delayed with respect to the primary portion by a time equal to an even multiple of said characteristic time, whereby the acoustic reflection waves of the pressure wave producing the emission of the droplet are suppressed.

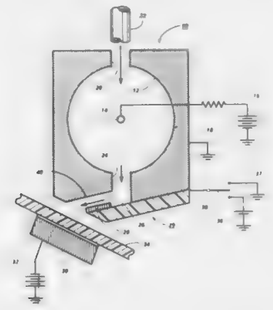
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**4,743,925**
**MODULATION ELECTRODES HAVING IMPROVED CORROSION RESISTANCE**

Nicholas K. Sheridon, Saratoga, and Henry W. Sang, Jr., Santa Clara, both of Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed Apr. 24, 1987, Ser. No. 42,128
Int. Cl.[4] G01D *15/00*
U.S. Cl. 346—159 8 Claims

1. A marking array for use with a marking apparatus, said marking array comprising an electrically insulating substrate upon which are formed a plurality of active semiconductor devices, a plurality of marking electrodes, and electrically conductive metallic lines for interconnecting input signals to said marking electrodes via said active semiconductor devices, the improvement characterized in that said marking electrodes



are formed of an alloy of aluminum and copper, and wherein said copper is in the range of 0.5–4%.

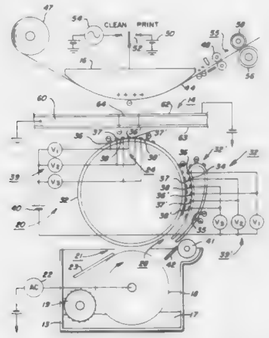


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**4,743,926**
**DIRECT ELECTROSTATIC PRINTING APPARATUS AND TONER/DEVELOPER DELIVERY SYSTEM THEREFOR**

Fred W. Schmidlin, Pittsford, and Nero R. Lindblad, Ontario, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Dec. 29, 1986, Ser. No. 946,937
Int. Cl.[4] G01D *15/10*
U.S. Cl. 346—159 13 Claims




1. Printing apparatus including a toner delivery system, said toner delivery system comprising:

means for separating a quantity of charged toner into it positively and negatively charged components prior to the presentation of the toner to a development zone, said separating means comprising charged toner conveyor structure including means for creating at least one electrostatic travelling wave pattern for effecting movement of said charged toner.

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**4,743,927**
**PRINTING APPARATUS**

Ichiro Sasaki, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

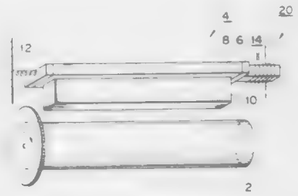
Filed Dec. 15, 1986, Ser. No. 941,380
Claims priority, application Japan, Dec. 16, 1985, 60-282605
Int. Cl.[4] G01D *15/14*
U.S. Cl. 346—160 8 Claims

8. An LED printer comprising a rotary photosensitive drum, cleaning means for making a surface of said photosensitive drum to be in an initial state, charging means for charging the surface of said photosensitive drum, exposing means for exposing the charged surface of said photosensitive drum to form a latent image of information carried by light given by said exposing means, developing means for make said latent image visible by toner attached thereto, transfer means for transferring the visible image from said photosensitive drum onto a recording medium, and fixing means for fixing the visible image on said recording medium, in which said exposing means comprising:

an LED array disposed to be in opposition to said photosensitive drum and controlled to emit light so as to expose said photosensitive drum to form said latent image thereon, said LED array being provided with a plurality of LED elements arranged to be aligned at intervals larger than a pitch of exposure density previously set so as to expose said photosensitive drum;

means for controlling said LED elements to emit light when said LED elements are disposed at predetermined exposure positions as said LED array moves; and

means for moving said LED array to reciprocate in such a direction that the light emitted from said LED elements are radiated on a predetermined linear position on the surface of said photosensitive drum.

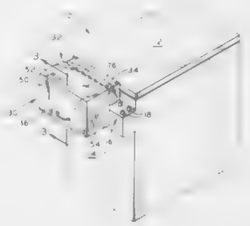



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**4,743,928**
**DAYLIGHT CASSETTE ADAPTER FOR FILM PROCESSOR**

Rickie L. Young, Kendallville, Ind., assignor to The Howard Company, Inc., Fort Wayne, Ind.

Filed Jan. 5, 1987, Ser. No. 530
Int. Cl.[4] G03D *13/06*
U.S. Cl. 354—310 8 Claims



1. A daylight cassette adapter for use with a film processing apparatus, said apparatus including an enclosed space for receiving a cassette and a feed aperture for receiving photographic sheet material from the cassette, said adapter comprising:

a housing for forming an enclosure and including a first portion having substantially the same width as the enclosed cassette receiving space of a processing apparatus, said first portion having an aperture therein adapted to be sealingly disposed in registry with the cassette enclosed space of said processing apparatus to prevent light from entering said enclosure, said housing including a second

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portion having a greater width than said first portion and adapted to receive cassettes thereinto;
a cover operatively associated with said housing for sealingly closing said enclosure to enable loading of cassettes into said enclosure when said cover is in the open position and to prevent light from entering said enclosure in the closed position of said cover.

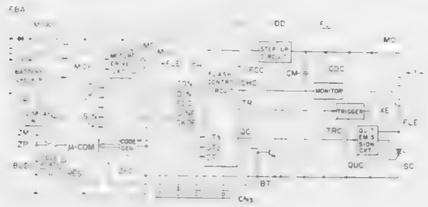
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**4,743,929**

## FLASH DEVICE FOR USE IN PHOTOGRAPHY

**Nobuyuki Taniguchi, Tondabayashi; Keiji Yamazaki, Sakai; Hiroshi Hosomizu, Nara; Makoto Kamiya, Sakai, and Kenji Tsuji, Amagasaki, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed Dec. 20, 1985, Ser. No. 811,876**
**Claims priority, application Japan, Dec. 25, 1984, 59-278594; Dec. 26, 1984, 59-281761; Dec. 26, 1984, 59-281762; Dec. 26, 1984, 59-281763**
**Int. Cl.[4] G03B** *15/05*
**U.S. Cl. 354—127.1** **4 Claims**



1. A flash device for use in photography comprising:
light emitting means (XE) for emitting a flash light;
changing means (FLE) for changing the angle of the cone of said light emitting means to a desired angle;
driving means (MCF, MD) for driving said changing means;
display means for displaying data representative of a required position of the changing means; and
blinking means for blinking said display during said changing means being moved by said driving means and for stopping to blink the display when said changing means is moved to the required position.

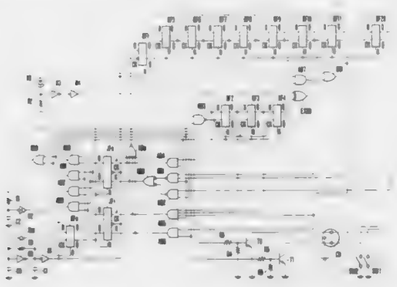
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**4,743,930**

## RECEIVER OF CAMERA REMOTE CONTROL SYSTEM

**Toshihiko Satoh, Tokyo, Japan, assignor to Canon Kabushiki Kaisha**

**Filed Dec. 16, 1986, Ser. No. 942,539**
**Claims priority, application Japan, Dec. 19, 1985, 60-286161**
**Int. Cl.[4] G03B** *17/40*
**U.S. Cl. 354—267.1** **6 Claims**



1. A receiver of a camera remote control system including a transmitter arranged at a remote position to transmit a control signal and a receiver arranged at a camera to receive said control signal to control the operation of the camera, said control signal being in the form of a plurality of cycles of pulses, each cycle including the pulses repeating at a predetermined recurrence rate and a predetermined period, comprising:
(a) first signal forming means arranged to form a first signal when it received the control signal from the transmitter;
(b) a timer circuit arranged to generate an output signal when a predetermined time has lapsed after forming said first signal; and
(c) means connected to the camera and arranged to feed said first signal to the camera as a first operating signal for effecting a preparatory operation of the camera and to feed the output signal of the timer circuit to the camera as a release signal for effecting a releasing operation of the camera; and
(d) a decision circuit for determining if the received pulses in the respective cycles are in consistent state, wherein said first signal forming means is arranged to form said first signal when it is decided by said decision circuit that the received pulses in the respective cycles are in consistent state.

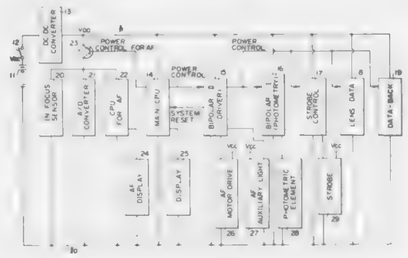
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**4,743,931**

## APPARATUS FOR DELIVERING DISTANCE INFORMATION OF CAMERA

**Minoru Matsuzaki, Hachioji; Youji Watanabe, Sagamihara; Junichi Itoh, Hachioji; Masato Miyazawa, Nagano, and Toru Komatsu, Okaya, all of Japan, assignors to Olympus Optical Company, Ltd., Tokyo, Japan**

**Filed Nov. 25, 1986, Ser. No. 934,841**
**Claims priority, application Japan, Dec. 5, 1985, 60-275251; Jun. 30, 1986, 61-154880; Jul. 1, 1986, 61-154622**
**Int. Cl.[4] G03B** *3/00*
**U.S. Cl. 354—400** **54 Claims**



1. An apparatus for delivering distance information of a camera having a taking lens comprising:
drive means for driving the taking lens;
counter means;
reset means for resetting the counter means when the taking lens has reached a reference position;
memory means for storing data which is specific to each particular taking lens and which is used in the conversion of a count in the counter means into an absolute distance; and
calculation means for calculating an absolute distance on the basis of the specific data and the count by inputting the count upon termination of driving of the taking glens by said drive means.

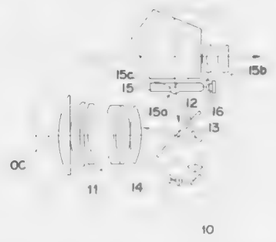


**4,743,932**

## FOCUS DETECTION DEVICE FOR A CAMERA

**Toru Matsui, Sakai, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed Jun. 24, 1986, Ser. No. 877,781**
**Claims priority, application Japan, Jun. 24, 1985, 60-138454; Jun. 24, 1985, 60-138455; Jun. 24, 1985, 60-138456**
**Int. Cl.[4] G03B** *3/00*
**U.S. Cl. 354—403** **16 Claims**



1. A camera with an objective lens means comprising:
a refocusing means for forming two images by refocusing an image in a focal plane of the objective lens which is arranged behind said focal plane;
a light bundle restricting means for splitting a light bundle passing through the objective lens into two, said restricting means being arranged near the refocusing means and providing a pair of apertures arranged at positions substantially symmetric with respect to the optical axis of the objective lens;
a light receiving means for receiving two images formed by said refocusing means,
a focus detecting means for detecting whether an objective image is focused on the focal plane according to outputs of said light receiving means; and
a light projecting means for projecting light beams against an object at an angle inclined to the optical axis in a plane defined by said optical axis and a line substantially perpendicular to a center line connecting centers of said two apertures of the light bundle restricting means.

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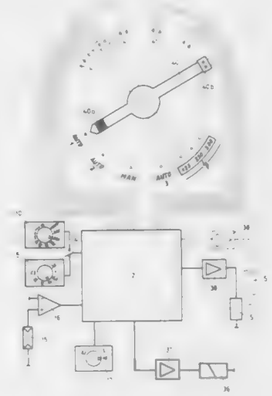
**4,743,933**

## CAMERA AND METHOD FOR TAKING FLASH PHOTOGRAPHS USING AN ELECTRONIC FLASH

**Waldemar Rentschler, Wildbad, Fed. Rep. of Germany, assignor to Prontor-Werk, Alfred Gauthier GmbH, Wildbad Im Schwarzwald, Fed. Rep. of Germany**

**Continuation of Ser. No. 273,011, Jun. 12, 1981, abandoned, which is a continuation of Ser. No. 51,786, Jun. 25, 1979, abandoned. This application Feb. 3, 1983, Ser. No. 463,583**
**Claims priority, application Fed. Rep. of Germany, Jun. 24, 1978, 2827811**
**Int. Cl.[4] G03B** *15/03*
**U.S. Cl. 354—422** **16 Claims**

1. Camera for taking photographs using an electronic flash, of the type having a film window at which the film material is locatable, and a focal plane shutter movable from an initial closed position to a completely open position at the film window, comprising
a lens assembly therefor provided with a lens opening and incorporating an aperture forming diaphragm system movable between a closed diaphragm position and an open diaphragm position of selectively variably sized working aperture at the lens opening, and
control means, operatable when taking photographs using an electronic flash and after the focal plane shutter has been moved to completely open position for complete exposure of the film window thereat, and arranged for cooperating coaction sequentially
for effecting interim movement of the diaphragm system to an open position of selectively variably sized working aperture at the lens opening to expose the film material locatable at the film window for a selectively brief interval of exposure time through the lens opening and thereafter back to the closed diaphragm position, while the focal plane shutter remains at completely open position, and
for synchronizing the ignition of the electronic flash with the



initial achievement of the open position selectively variably sized working aperture for completion of the flash ignition during such brief interval of exposure time and prior to movement of the diaphragm system back to the closed diaphragm position and also prior to movement of the focal plane shutter back to the initial closed position, whereby to take a flash photograph during such brief interval of exposure time.

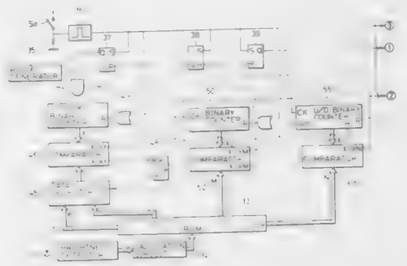
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**4,743,934**

## EXPOSURE CONTROL APPARATUS FOR CAMERAS

**Yutaka Yoshida, and Masashi Takamura, both of Tokyo, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Jan. 6, 1987, Ser. No. 1,022**
**Claims priority, application Japan, Jan. 6, 1986, 61-40**
**Int. Cl.[4] G03B** *7/097*
**U.S. Cl. 354—439** **12 Claims**



1. In an exposure control apparatus having shutter sectors for opening and closing an exposure aperture of a camera, and a stepping motor for driving the shutter sectors, said shutter sectors being opened when said stepping motor rotates in a forward direction and being closed when said stepping motor rotates in a reverse direction, said shutter sectors moving relative to each other during a first stage which terminates when an exposure aperture first appears between them; the improvement comprising:

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means for calculating an exposure value in accordance with object brightness; and

means for controlling the rotation speed of said stepping motor such that said stepping motor is rotated in a forward direction at a first speed that varies inversely as said object brightness during said first stage, and after said first stage said stepping motor is rotated at a higher constant second speed not associated with said exposure value.

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**4,743,935**

**CAMERA SHUTTER CONTROL DEVICE**

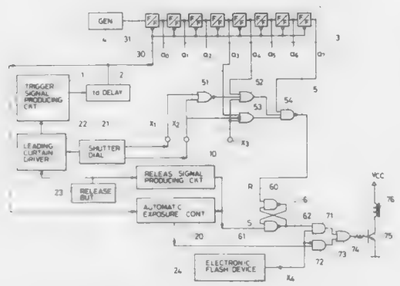
**Mikio Takemae, No. 3-409, Nagataminamidai 1-chome, Minami-ku, Yokohama-shi, Kanagawa, Japan**

**Continuation of Ser. No. 670,737, Nov. 13, 1984, abandoned. This application Sep. 12, 1986, Ser. No. 906,656**

**Claims priority, application Japan, Nov. 14, 1983, 58-213560**

**Int. Cl.[4] G03B** *7/093*

**U.S. Cl. 354—456** **7 Claims**




1. A camera comprising:

(a) a shutter having a first member for opening said shutter and a second member for closing said shutter, the time during which said shutter is open being the shutter speed;

(b) a shutter release button;

(c) means responsive to the operation of said shutter release button for opening said shutter by releasing said first member at a first release time;

(d) means for changing said shutter speed to adjust the duration of a first predetermined time period starting at a reference time instant and ending at said first release time, said reference time instant following activation of said shutter release button by a first fixed length of time;

(e) means for generating a first detection signal at the completion of a second fixed length of time which begins at said reference time instant;

(f) means for generating a second detection signal at the completion of a second predetermined time period which begins at the generation of said first detection signal and has a duration substantially equal to said first predetermined time period; and

(g) means responsive to said second detection signal for closing said shutter by releasing said second member.

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**4,743,936**

**TRANSPORT HAVING COMPENSATION FOR MATERIAL PACKING**

**Jan Bares, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Aug. 14, 1987, Ser. No. 85,504**

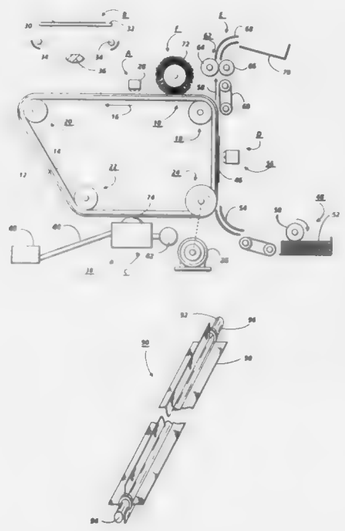
**Int. Cl.[4] G03G** *15/08*

**U.S. Cl. 355—3 DD** **16 Claims**

1. An apparatus arranged for use in an electrophotographic printing machine for moving developer material from a storage container located at one end of a duct to a developer unit located at the other end thereof, including:

an elongated member disposed interiorly of the duct;

means for moving said elongated member to fluidize the developer material in the duct, said elongated member, in response to the torque applied thereon by packing of the developer material, deflecting so that continued movement of said elongated member reduces the torque applied thereon by returning the developer material to the storage container; and



means for normally advancing the fluidized developer material in the duct from the storage container located at one end of the duct to the developer unit located at the other end of the duct.

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**4,743,937**

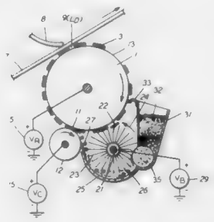
**APPARATUS FOR CHARGING TONER PARTICLES**

**Robert G. Martin, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Dec. 12, 1983, Ser. No. 560,691**

**Int. Cl.[4] G03G** *15/00, 15/08*

**U.S. Cl. 355—3 DD** **77 Claims**



8. An apparatus for simultaneously metering, charging and transporting non-magnetic insulating toner particles comprising in operative relationship a metering roll means, an optional trim blade means for said metering roll means, a toner supply reservoir means containing therein weakly charged insulating toner particles possessing about an equal number of positive and negative charges thereon, a transporting means, a tribo-electrically active coating contained on said transporting means, a drive roll means, an idler means, a tensioning means,



an imaging means, a voltage source means for the drive roll means, and the transporting means, said metering roll means moving in a rotational direction opposite to the direction of movement of the transporting means, which apparatus further includes therein a brush device for delivering toner particles to a charging nip situated between the means for charging the toner particles and the means for transporting the toner particles, said brush having flexible bristles that are flexed as they enter a toner containing means and return to their initial, unflexed position as they exit the toner containing means such that toner particles contained on the bristles become airborne and thereby enter the charging nip.

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**4,743,938**

**COLOR IMAGE FORMING APPARATUS**

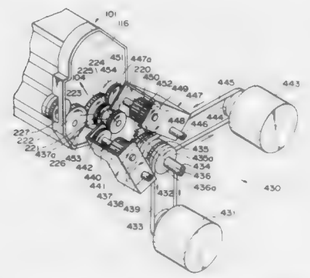
**Akio Ohno, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 9, 1985, Ser. No. 785,618**

**Claims priority, application Japan, Oct. 16, 1984, 59-216935; Oct. 20, 1984, 59-220869; Oct. 30, 1984, 59-226655**

**Int. Cl.[4] G03G** *15/06, 15/01*

**U.S. Cl. 355—3 DD** **17 Claims**



1. A color image forming apparatus, comprising:

a latent image bearing member;

means for developing a latent image formed on said latent image bearing member, including a plurality of developing units and a rotatable assembly for carrying the plurality of developing units, said developing units each having means for carrying developer and supplying the developer to the latent image, wherein at least one of said developing units is selectively movable to a developing position for developing the latent image; and

driving means for driving said developer carrying means, said driving means being common to all of the developer carrying means of said plurality of developing units, and being actable on the developing unit placed at the developing position to apply a driving force only to the thus placed developing unit, wherein said developing units each include a first gear operatively connected to said developer carrying means and where in said driving means includes a second gear operatively conenctable to said first gear to drive said developer carrying means.

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**4,743,939**

**INTERMEDIATE TRANSFER APPARATUS**

**Jessica B. Dulmage, Fairport, and Henry R. Till, Rochester, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Jun. 1, 1987, Ser. No. 56,164**

**Int. Cl.[4] G03G** *13/14, 13/10, 15/14, 15/10*

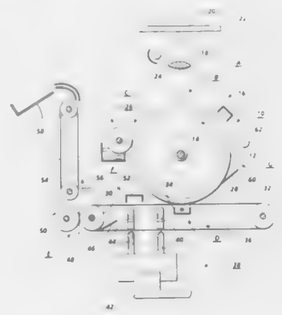
**U.S. Cl. 355—3 TR** **14 Claims**

1. An apparatus for transferring a liquid image having at least a liquid carrier with toner particles dispersed therein from a member to a copy sheet, including:

an intermediate member positioned to have at least a portion thereof adjacent the member in a transfer zone;

a transfer liquid coated on said intermediate member, said transfer liquid having a higher viscosity than the viscosity of the liquid carrier;

means, located in the transfer zone, for attracting the liquid image from the member to the transfer liquid on said intermediate member;



means for removing liquid carrier from the transfer liquid on said intermediate member; and

means for transferring the toner particles from the transfer liquid on said intermediate member to the copy sheet in image configuration.

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**4,743,940**

**THERMAL FIXING ROLLER FOR USE IN A COPYING MACHINE AND METHOD FOR MANUFACTURING THE SAME**

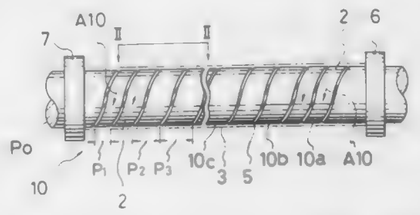
**Hideo Nagasaka, Hitachi; Tsutomu Itoh, Tokyo; Manabu Shimoizumi, Ichikawa; Hiroshi Saitoh, Funabashi; Kenzo Yanagida, Ichikawa; Kazunori Fujita, Funabashi, and Masayuki Kitoh, Higashikurume, all of Japan, assignors to Onoda Cement Company, Ltd., Ibaraki, Japan**

**Filed Sep. 15, 1987, Ser. No. 96,735**

**Claims priority, application Japan, Sep. 22, 1986, 61-224333; Dec. 29, 1986, 61-310092; Dec. 29, 1986, 61-310093**

**Int. Cl.[4] G03G** *15/00*

**U.S. Cl. 355—3 FU** **26 Claims**




19. A thermal fixing roller for use in a copying machine in which a belt-like heat-generating resistor and a groove are formed in a spiral shape on a surface of a cylindrical insulator layer and an anti-adhesion layer is provided on the surface of these, characterized in that a cross-section configuration of said groove taken along a plane containing an axis of said insulator layer is formed in a rectangular shape.

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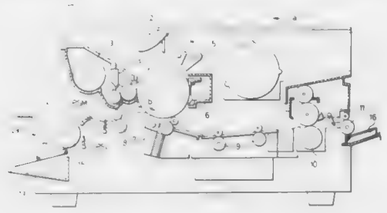


**4,743,941**

## COPYING APPARATUS CAPABLE OF FEEDING COPY PAPER MANUALLY

**Yoshiaki Takano, Toyokawa, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed Nov. 25, 1986, Ser. No. 934,635**
**Claims priority, application Japan, Dec. 7, 1985, 60-274335**
**Int. Cl.[4] G03G *15/00***
**U.S. Cl. 355—3 SH** **14 Claims**



1. A copying apparatus comprising:
a. a manual paper feeding opening for manual paper feeding mode;
b. a paper transporting passage from the manual paper feeding opening to an image forming portion;
c. a plurality of paper sensor means provided on the paper transporting passage;
d. a display means for displaying the inserting state of a copy paper fed through the manual paper feeding opening; and
e. a control means for driving said display means according to the detection signals of said paper sensor means.

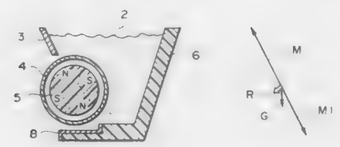
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**4,743,942**

## MAGNETIC DEVELOPER CONVEYING DEVICE

**Akira Yamamoto, Tokyo, and Haruhisa Honda, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 938,446, Dec. 5, 1986, abandoned. This application Aug. 31, 1987, Ser. No. 94,030**
**Claims priority, application Japan, Dec. 10, 1985, 60-275956**
**Int. Cl.[4] G03G *15/09***
**U.S. Cl. 355—3 DD** **20 Claims**



1. A device for conveying a magnetic developer, comprising:
a non-magnetic sleeve for carrying the magnetic developer;
a resin magnet stationarily disposed in said sleeve, said magnet being of a mixture of a resin material and a magnetic material, and extending in a direction of a length of said sleeve, said magnet having first and second magnetic field generating portions;
first and second magnetic members disposed outside said sleeve extending in the direction of the length of said sleeve, wherein said first and second magnetic members are spaced apart from each other and are so disposed that a magnetic force applied to said magnet by a magnetic force between the first magnetic field generating portion and said first magnetic member reduces a resultant force to said magnet by gravity and by a magnetic force between the second magnetic field generating portion and said second magnetic member.

**4,743,943**

## RENEWABLE FUSER WICK

**Lawrence Adams, Jr., Longmont, and Reid W. Gunnell, Berthoud, both of Colo., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Jan. 12, 1987, Ser. No. 2,543**
**Int. Cl.[4] G03G *15/20***
**U.S. Cl. 355—3 FU** **33 Claims**



1. In a pressure fuser having a rotating roll which forms a pressure fusing nip to an adjacent member, wherein a toner image is fused to a substrate as the substrate passes through said fusing nip with the toner thereon engaging the surface of said roll, and wherein a toner release agent is applied to the surface of said roll, an improved wick assembly for applying said release agent to said roll, comprising:
a wick having a number of layers of cloth material, each layer being adapted to hold said release agent and to engage the surface of said roll;
manually releasable means, distinct from said wick layers, operating to hold said wick layers together so that only the outermost layer may engage the surface of said roll, whereby manual operation of said releasable means allows only the outermost layer to be removed, thereby exposing the adjacent underlayer;
an assembly for holding said wick with its outermost layer in engagement with the surface of said roll; and
a supply of toner release agent connected to said wick.

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**4,743,944**

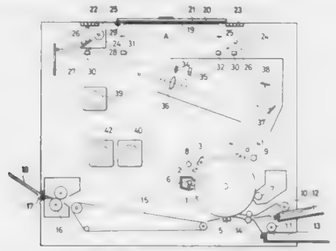
## IMAGE PROCESSING APPARATUS WITH VARIABLE MAGNIFICATION

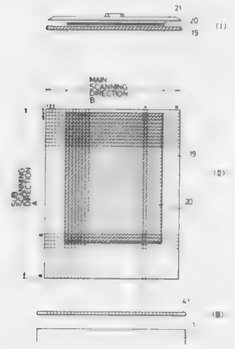
**Masahiro Tomosada; Hideki Adachi, both of Kawasaki; Tadashi Suzuki, Yokohama; Naoyuki Ohki, Tokyo, and Masanori Miyata, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 745,225, Jun. 17, 1985, abandoned. This application Aug. 17, 1987, Ser. No. 86,243**
**Claims priority, application Japan, Jun. 21, 1984, 59-126380; Jun. 21, 1984, 59-126381; Jun. 21, 1984, 59-126382; Jun. 21, 1984, 59-126383; Jun. 21, 1984, 59-126384; Jun. 21, 1984, 59-126386**
**Int. Cl.[4] G03G *15/00***
**U.S. Cl. 355—14 R** **12 Claims**

1. An image processing apparatus, comprising:
detection means for automatically detecting the image area of an image on a document having a document area;
input means for inputting a size of a recording sheet; and
determination means for determining a magnification in accordance with the image area detected by said detection means and the size of the recording sheet.







5. An apparatus according to claim 1, wherein said detection means detects the image area on the basis of a density of an image of the document.

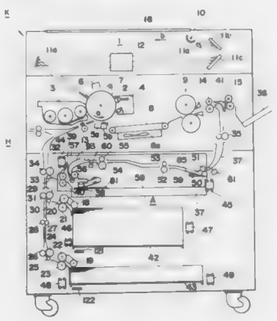
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**4,743,945**

## COPYING APPARATUS WHICH FORMS IMAGES PLURAL TIMES ON THE SAME COPY PAPER

**Masazumi Ito, Toyohashi, and Yoshihiro Hanada, Toyokawa, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed Jul. 8, 1986, Ser. No. 883,144**
**Claims priority, application Japan, Jul. 9, 1985, 60-153117**
**Int. Cl.[4] G03G *15/00*; G03B *27/32***
**U.S. Cl. 355—14 SH** **9 Claims**



1. A copying apparatus comprising:
a first sheet feed means for storing sheets to be copied and feeding them one by one therefrom;
an image forming means for forming a copied image on the sheets fed by the first sheet feed means;
a second sheet feed means for receiving the copied sheets and re-feeding them one by one thereform to the image forming means, said second sheet feed means having first and second inlets provided at different places from each other for receiving the copied sheets, a tray member for supporting the received sheets and an outlet through which the received sheets are refed, wherein the received status of the sheets on said tray member received through said first inlet is reversed in front and rear side from the sheets received through said second inlet;
means for aligning the sheets received through said first inlet at a first position and for aligning the sheets received through said second inlet at a second position;
a first transport means for transporting the copied sheets from the image forming means to said first inlet of the second sheet feed means;
a second transporting means for transporting the copied sheets from the image forming means to said second inlet of the second sheet feed means;
a change-over means for selectively sending the sheets to the first or second transport means;
a first mode designating means for designating a duplex mode where images are formed on both sides of a sheet;
a second mode designating means for designating a composite mode wherein images are formed plural times on the same surface of a sheet; and
a control means for controlling the change-over means and the sheet aligning means in accordance with mode selection by the mode designating means.

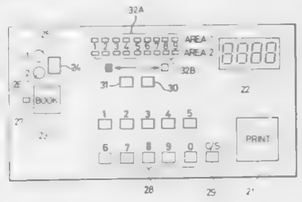
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**4,743,946**

## COPYING MACHINE DESIGNED TO SUCCESSIVELY COPY TWO DIFFERENT DOCUMENTS ON DIFFERENT RECORDING MEDIUM SURFACES

**Kadotaro Nishimori, and Yutaka Irie, both of Toyokawa, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed Oct. 1, 1986, Ser. No. 914,078**
**Claims priority, application Japan, Oct. 22, 1985, 60-234513**
**Int. Cl.[4] G03G *15/00, 27/32***
**U.S. Cl. 355—14 C** **18 Claims**



1. A copying apparatus comprising:
means for mounting thereon an original document to be copied;
process means for copying a first portion of said original document on a first recording medium surface and a second portion of said original document on a second recording medium surface;
input means for inputting first data relating to copying condition for copying the first portion of the original document and for inputting second data relating to copying condition for copying the second portion of the original document;
first entry means for storing said first data in a second memory means;
second entry means for storing said second data in a second memory means;
control means for controlling said process means to effect copying of the first portion of the original document based on said first data and to effect copying of the second

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portion of the original document based on said second data; and

third entry means for storing said first data in said first memory means and for storing said first data in said second memory means as said second data.

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**4,743,947**

## COPYING MACHINE FOR PRODUCING MARGINS OF CONSTANT WIDTH

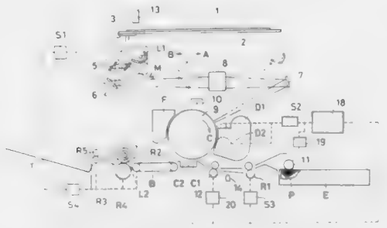
**Haruo Yamamoto, Osaka, Japan, assignor to Mita Industrial Co., Ltd., Osaka, Japan**

**Filed Nov. 26, 1986, Ser. No. 936,481**

**Claims priority, application Japan, Nov. 30, 1985, 60-270469**

**Int. Cl.⁴ G03G** *15/00*

**U.S. Cl. 355—14 R** **6 Claims**



1. A copying machine comprising a document table for placing an original thereon, a photoconductive drum, an optical system movable relative to the document table for exposing the original to light to form an electrostatic latent image of the original in variable magnification on the drum at an image forming station, a white color member attached to the table for covering the leading end portion of the original from the exposing light, means for developing the latent image, means for transporting copy paper to a transfer station, means for transferring the developed image from the photoconductive drum to the copy paper brought into contact with the drum at the transfer station, means for fixing the transferred image to the copy paper, detection means for producing an output upon detecting that the boundary between the white color member and the original has been exposed to light by the optical system, timer means for measuring a specified period of time from the time the detection means produces the output and drive means for initiating the paper transporting means into operation in response to an input from the timer means, the distance of transport of the copy paper from the transporting means to the transfer station being smaller than the distance from the image forming station to the transfer station along the periphery of the photoconductive drum and the total period of time ($t_1$), which is the time measured by the timer plus the time to transport the copy paper from the transporting means to the transfer station, being shorter than the period of time for rotating the drum from the image forming station to the transfer station ($t_2$), the difference between $t_1$ and $t_2$ resulting in the formation of a margin on the copy paper, whereby a margin of constant width is formed without readjusting the feed timing of the copy paper even if the copy magnification is varied.

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**4,743,948**

## RECORDING AND PROJECTING APPARATUS

**Shuichi Ohtsuka, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Dec. 23, 1986, Ser. No. 945,911**

**Claims priority, application Japan, Dec. 23, 1985, 60-289870**

**Int. Cl.⁴ G03B** *27/32*

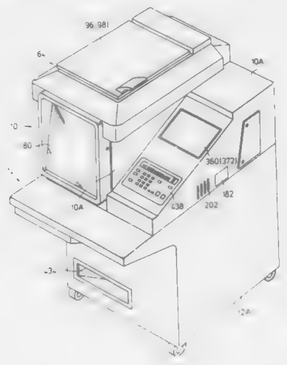
**U.S. Cl. 355—27** **18 Claims**

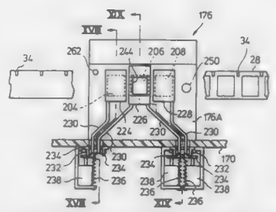
1. A recording and projecting apparatus employing a film using a photosensitive material which is sensitized by heating and developed after exposure by reheating, said apparatus comprising:

(a) marks to be detected which are provided on said film, said marks corresponding to the respective positions of images formed on said film;

(b) detecting means for detecting said marks; and

(c) driving means for disposing a desired image frame on said





film at a predetermined position on the basis of the detection effected by said detecting means, whereby a necessary image frame is allowed to face a processing position accurately;

a processing head provided with a reheating section for heating said film prior to exposure, an exposing section for exposing said film, and a developing section for heating said film after exposure.

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**4,743,949**

## INFRARED OPTICAL-ELECTRONIC DEVICE

**Hans Zogg, Weiherackerstrasse, 1 CH-8114 Dänikon, Switzerland**

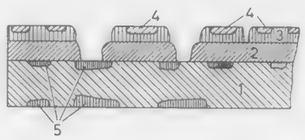
**PCT No. PCT/CH85/00110, § 371 Date Mar. 6, 1986, § 102(e) Date Mar. 6, 1986, PCT Pub. No. WO86/00756, PCT Pub. Date Jan. 30, 1986**

**PCT Filed Jul. 9, 1985, Ser. No. 855,748**

**Claims priority, application Switzerland, Jul. 10, 1984, 3460/84**

**Int. Cl.⁴ H01L** *29/161, 27/14*

**U.S. Cl. 357—16** **10 Claims**



1. Optical-electronic component with at least one infrared sensitive optical-electronic transducer that conducts or emits infrared radiation, comprising a semiconductor substrate, an



intermediate layer epitaxially group grown on the substrate, a narrow-gap semiconductor layer epitaxially grown on said intermediate layer, and an optical-electronic transducer integrated in said narrow-gap semiconductor layer, said intermediate layer at its interfaces with said semiconductor substrate and said narrow-gap semiconductor layer providing lattice constants which lie between, or in proximity of, those of the semiconductor substrate or, respectively, those of the narrow-gap semiconductor, said semiconductor substrate consisting of a material selected from the group consisting of Si, Ge, $Ga_xAl_{1-x}As$ with $0 \leqq x \leqq 1$, InP, GaSb, InSb and CdTe and, and the intermediate layer consisting of $Ca_xSr_yBa_zCd_{1-x-y-z}F_2$ with $0 \leqq x \leqq 1$, $0 \leqq y \leqq 1$ and $0 \leqq z \leqq 1$.

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**4,743,950**

## THYRISTOR WITH SWITCHABLE EMITTER SHORT CIRCUIT

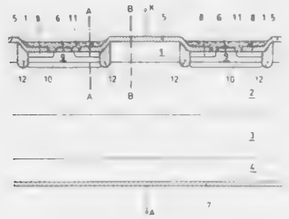
**Peter Roggwiller, Riedt, Switzerland, assignor to BBC Brown, Boveri & Company, Limited, Baden, Switzerland**

**Filed Dec. 12, 1986, Ser. No. 940,921**

**Claims priority, application Switzerland, Dec. 12, 1985, 5305/85**

**Int. Cl.⁴ H01L** *29/06*

**U.S. Cl. 357—20** **9 Claims**





1. Thyristor having a switchable emitter short circuit, comprising:

a sequence of layers comprising a p-type emitter layer, an $n^-$-type base layer, a p-type base layer and an $n^+$-type layer serving as a cathode emitter layer; and

a bipolar transistor for short-circuiting the $n^+$-type emitter layer, said bipolar transistor monolithically integrated into said sequence of layers and externally controllable;

wherein the $n^+$-type emitter layer comprises a regular arrangement of a plurality of individual hexagonal elements lying in a common plane, and each individual hexagonal element is surrounded by the bipolar transistor and is separated thereby from the other elements.

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**4,743,951**

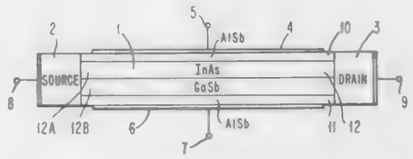
## FIELD EFFECT TRANSISTOR

**Chin-An Chang, Peekskill; Leroy L. Chang, Goldens Bridge; Leo Esaki, Chappaqua, and Emilio E. Mendez, Croton-on-Hudson, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Mar. 8, 1982, Ser. No. 355,942**

**Int. Cl.⁴ H01L** *29/80*

**U.S. Cl. 357—22** **2 Claims**




1. In a field effect transistor of the type wherein current in a channel is influenced by a signal applied to a gate eletrode positioned on each side of said channel, the improvement comprising a multilayer epitaxial channel region between said gate electrodes wherein the layer adjacent said gate electrodes is of the material AlSb and the central conductive portion of said channel being of a material taken from the group of InAs and GaSb and their alloys.

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**4,743,952**

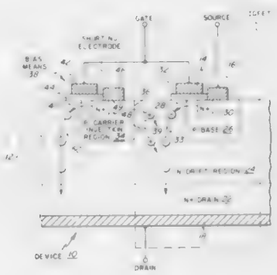
## INSULATED-GATE SEMICONDUCTOR DEVICE WITH LOW ON-RESISTANCE

**Bantval J. Baliga, Clifton Park, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Filed Apr. 4, 1983, Ser. No. 482,075**

**Int. Cl.⁴ H01L** *29/78*

**U.S. Cl. 357—23.4** **20 Claims**



1. An insulated-gate semiconductor device with low on-resistance, comprising:

(a) an insulated-gate field-effect transistor including, in successive arrangement, a drain region, a drift region, a base region and a channel region; said base region being of one conductivity type and said drain and drift regions being of the opposite conductivity type; and further including a plurality of external contacts for connection of said device into a circuit; a drain electrode attached to said drain region and ohmically connected to a first one of said external contacts, a source electrode attached to said base region and ohmically connected to a second one of said external contacts and a gate electrode ohmically connected to a third one of said external contacts and insulatingly spaced from said channel region to determine the conductive state of said channel region in response to bias voltage thereon;

(b) a carrier injection region adjoining said drift region and being of the one conductivity type so as to form a P-N

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junction with said drift region, said carrier injection region being free of ohmic connections to said external contacts; and

(c) bias means connected to said carrier injection region and effective during the on state of the semiconductor device for forward biasing said P-N junction by an amount sufficient to induce injection of one type carriers from said carrier injection region, across said P-N junction, and into said drift region, thereby reducing the on-resistance of said drift region and of the semiconductor device.

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**4,743,953**

**RANDOM ACCESS MEMORY CELL WITH MIS CAPACITOR HAVING INSULATOR OF OXIDE OF DOPED METAL**

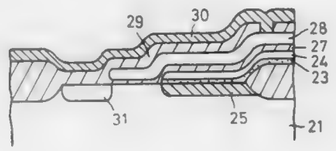
**Nobuo Toyokura, Kawasaki, and Masao Taguchi, Sagamihara, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

**Continuation of Ser. No. 713,588, Mar. 20, 1985, which is a continuation of Ser. No. 327,476, Dec. 4, 1981. This application Aug. 6, 1986, Ser. No. 894,509**

**Claims priority, application Japan, Dec. 29, 1980, 55-189056**

**Int. Cl.⁴ H01L** *29/78, 29/34*

**U.S. Cl. 357—23.6** **9 Claims**




4. A semiconductor device, comprising:

a substrate of a first conductivity;

a first layer formed on said substrate and comprising an oxide of a doped metal and having a reduced grain size of the metal oxide as compared to the metal oxide doped after oxidation;

a second layer formed over said first layer and comprising a material capable of withstanding a diffusion process of at least 900° C.; and

a region of a second conductivity opposite to the first conductivity formed in said substrate by diffusion of the impurity in said first layer into said substrate.

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**4,743,954**

**INTEGRATED CIRCUIT FOR A CHEMICAL-SELECTIVE SENSOR WITH VOLTAGE OUTPUT**

**Richard B. Brown, Salt Lake City, Utah, assignor to University of Utah, Salt Lake City, Utah**

**Filed Jun. 7, 1985, Ser. No. 742,721**

**Int. Cl.⁴ H01L** *27/04*

**U.S. Cl. 357—25** **28 Claims**

1. An integrated circuit for a miniaturized solid-state chemical sensor, said integrated circuit comprising:

a semiconductor substrate;

a plurality of layers formed on said substrate so as to define a plurality of transistors configured as an amplifier, two of said transistors comprising field-effect input transistors with essentially identical dimensions and gate electrodes;

a chemical-selective membrane;

a membrane definition layer applied over said layers defining said amplifier, said membrane definition layer comprising a well for receiving said chemical-selective membrane, said well being formed in sufficient proximity to said gate electrode of at least one of said input transistors such that said chemical-selective membrane is separated from said gate electrode by no greater distance than the largest dimension of said input transistors;

means formed on said substrate for electrically connecting said chemical-selective membrane to said gate electrode of one of said input transistors; and

said gate electrode of said other input transistor being electrically connected to said output of said amplifier to provide a unity-gain buffer.

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**4,743,955**

**PHOTOELECTRIC CONVERTING DEVICE**

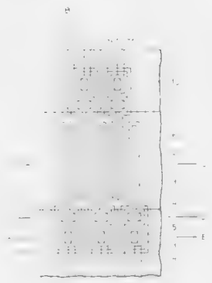
**Shigeyuki Matsumoto, Atsugi, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 25, 1986, Ser. No. 855,682**

**Claims priority, application Japan, May 1, 1985, 60-92291**

**Int. Cl.⁴ H01L** *27/14, 31/10*

**U.S. Cl. 357—30** **2 Claims**



1. A photoelectric converting device comprising a plurality of photoelectric converting cells which are arranged and each of which has:

a semiconductor transistor consisting of two main electrode regions formed of a semiconductor of one conductivity type and a control electrode region formed of a semiconductor of the opposite conductivity type; and

a capacitor for controlling a potential of said control electrode region in the floating state,

wherein each of said photoelectric converting cells accumulates carriers generated due to an incident light into said control electrode region and controls an output by a voltage generated due to said accumulated carriers by controlling the potential of said control electrode region in the floating state through the capacitor,

and each of said photoelectric converting cells consists of a first portion having a high photoelectric converting efficiency and a second portion including at least an electrode of said capacitor and an electrode of the other main electrode regions, and a width of said first portion is formed narrower than a width of said second portion and said first portion is arranged in a line.

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**4,743,956**

**OFFSET BENDING OF CURVACEOUSLY PLANAR RADIATING LEADFRAME LEADS IN SEMICONDUCTOR CHIP PACKAGING**

**Michael A. Olla, Denton; Linn C. Garrison, Dallas; Robert H. Bond, Denton, and Harold Trammell, Tarrant, all of Tex., assignors to Thomson Components-Moster Corporation, Carrollton, Tex.**

**Filed Dec. 15, 1986, Ser. No. 941,691**

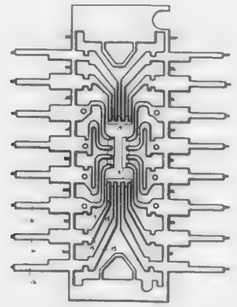
**Int. Cl.⁴ C23F** *1/02;* **B44C** *1/22;* **H01L** *23/48, 29/44*

**U.S. Cl. 357—70** **4 Claims**

3. A leadframe fabricated from a flat ribbon of conductive material and defining a pattern comprising a predetermined plurality of outwardly radiating leads and a central perimeter for interconnecting said leads, said outwardly radiating leads being in groups each directed along planar perpendicular coordinates and whereby, said inner leads including 180 degree



turns in the plane of said leadframe, characterized in that successive adjacent bends and straightening bends are made in each of said leads within said perimeter, whereby said leads are offset bends with a predetermined substantially equal spring



constant in each of said leads and whereby effective bonding to corresponding semiconductor chip pads and each bend is made at a lead perpendicular to the direction of the lead along planar coordinates and where the lead at which it is directed is the same direction as the lead as a whole.

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**4,743,957**

**LOGIC INTEGRATED CIRCUIT DEVICE FORMED ON COMPOUND SEMICONDUCTOR SUBSTRATE**

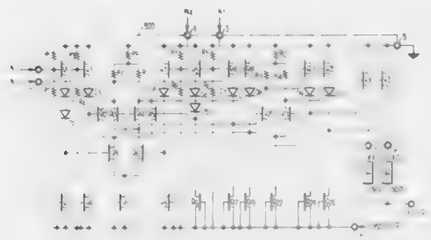
**Hiromitsu Hirayama, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed May 2, 1986, Ser. No. 858,984**

**Claims priority, application Japan, May 2, 1985, 60-94905**

**Int. Cl.⁴ H03K** *17/30, 19/094;* **H01L** *29/80*

**U.S. Cl. 307—450** **1 Claim**



1. A gallium arsenide integrated circuit device comprising:

a first power terminal supplied with a ground voltage;

a second power terminal supplied with a negative voltage substantially equal to −5.2V;

first, second, third and fourth input terminals;

first and second output terminals;

a latch circuit including:

a first resistor connected between said first power terminal and a first node;

a second resistor connected between said first node and a second node;

a third resistor connected between said first node and a third node;

a first Schottky gate field effect transistor having a drain-source path connected between said second node and a fourth node;

a second Schottky gate field effect transistor having a drain-source path connected between said second node and a fifth node;

a third Schottky gate field effect transistor having a drain-source path connected between said third and fifth nodes;

a fourth Schottky gate field effect transistor having a drain-source path connected between said third and fourth nodes;

a fifth Schottky gate field effect transistor having a drain-source path connected between said fourth node and a sixth node;

a sixth Schottky gate field effect transistor having a drain-source path connected between said fifth node and said sixth node; and

a seventh Schottky gate field effect transistor having a drain-source path connected between said sixth node and said second power terminal;

said device further comprising:

a first level-shift circuit coupling said first input terminal to a gate of said fifth transistor;

a second level-shift circuit coupling said second input terminal to a gate of said first transistor;

a third level-shift circuit coupling said third input terminal to a gate of said fourth transistor;

a fourth level-shift circuit coupling said fourth input terminal to a gate of said sixth transistor;

a fifth level-shift circuit coupling said second node to a gate of said third transistor;

a sixth level-shift circuit coupling said third node to a gate of said second transistor;

a buffer amplifier including first and second input ends connected to the gates of said second and third transistors, respectively, and first and second output ends;

an eighth Schottky gate field effect transistor having a gate connected to said first output end of said buffer amplifier and a drain-source path connected between said first power terminal and said first output terminal; and

a ninth Schottky gate field effect transistor having a gate connected to said second output end of said buffer amplifier and a drain-source path connected between said first power terminal and said second output terminal;

a threshold voltage of each of said first to seventh transistors being within a range from −0.2V to −0.3V and the threshold voltage of each of said eighth and ninth transistors being within a range from −0.6V to −0.9V; whereby first and second output signals each having a logic high level of about −0.7V and an logic low level of about −1.9V are derived respectively from said first and second output terminals when each of said first and second output terminals is connected via a load resistor of 50Ω to a power source of −2.0V.

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**4,743,958**

**MULTIPLE TELEVISION STANDARDS INPUT SELECTOR AND CONVERTOR**

**Richard S. Bannister, Grass Valley, and James E. Blecksmith, Nevada City, both of Calif., assignors to The Grass Valley Group, Inc., Grass Valley, Calif.**

**Filed Oct. 6, 1986, Ser. No. 915,821**

**Int. Cl.⁴ H04N** *11/22, 7/01, 5/262*

**U.S. Cl. 358—11** **9 Claims**

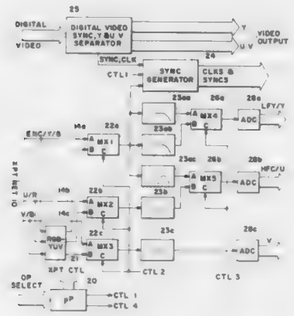
1. A multiple television standards input selector and convertor to which is input a plurality of types of video input sources having different standard television formats comprising:

means for selecting one video input source from among the plurality of video input sources;

means for converting the video signal from the selected video input source to an output video signal having a predetermined standard television format; and

means for controlling the selecting and converting means

according to the standard television format of the selected video input source such that the transition to the selected




video input source occurs within a single vertical interval between fields of the video signal.

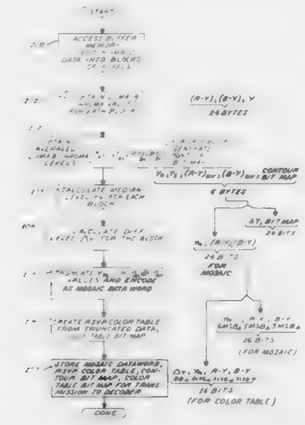
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**4,743,959**

**HIGH RESOLUTION COLOR VIDEO IMAGE ACQUISITION AND COMPRESSION SYSTEM**

**Jeffrey E. Frederiksen, 603 West Haven Dr., Arlington Heights, Ill. 60005**

**Filed Sep. 17, 1986, Ser. No. 908,316**
**Int. Cl.[4] H04N** *7/12, 11/06*
**U.S. Cl. 358—11** **28 Claims**




**1**. A color video image acquisition and compression process for encoding and decoding color images, said process comprising the steps of:

acquiring digital data representing luminance and chrominance components of a color video image,

dividing the digital data representing the color video image into data sets representing blocks of the color image, each block containing a plurality of pixels each of which has a luminance value Y and a plurality of chrominance values,

calculating the average luminance value Yav for all pixels in the block,

determining a representative luminance value **Y1** within a range extending between the maximum and average luminance values of pixels having luminance values above the average value Yav in each block, and determining a representative luminance value **Y0** within a range extending between the minimum and average luminance values of pixels having luminance values below the average luminance value Yav in each block,

generating picture shape information for each of said blocks by identifying and encoding a contour associated with said representative luminance values **Y0** and **Y1**, said contour representing clusters of pixels having the same representative luminance value **Y0** or **Y1**,

comparing said encoded contour for each block with a series of predetermined encoded contours and selecting the predetermined encoded contour which corresponds most closely to the actual contour encoded for the block,

transmitting to a decoder encoded data comprising said representative luminance values **Y1** and **Y0**, corresponding chrominance values, and the selected predetermined encoded contour for each block, and

decoding the transmitted data to reproduce the original color image.

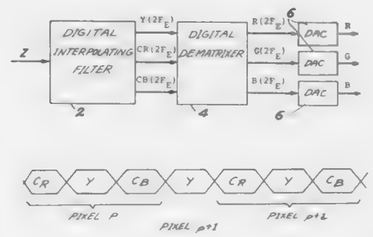
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**4,743,960**

**CIRCUIT FOR PRODUCING ANALOG SIGNALS OF PRIMARY COLORS OF A TELEVISION SIGNAL FROM ITS DIGITAL LUMINANCE AND CHROMINANCE COMPONENTS**

**Gérard Duvic; Michel Veillard, both of Rennes; Laurent Paris, and Patrice Senn, both of Grenoble, all of France, assignors to Etat Francais, Les Moulineaux and Telediffusion de France, Montrouge, both of, France**

**Filed Jun. 3, 1986, Ser. No. 870,128**
**Claims priority, application France, Jun. 4, 1985, 85 08406**
**Int. Cl.[4] H04N** *11/04, 9/67*
**U.S. Cl. 358—13** **7 Claims**




**1**. A circuit for producing primary color signals of a television signal from the digital luminance and chrominance components thereof, wherein said circuit comprises in cascade: a digital interpolating filter receiving a multiplexed digital signal of said components in which the luminance signal is sampled at frequency $F_E$ and the chrominance signals at a frequency $F'_E$, a submultiple of $F_E$, the filter supplying a digital luminance signal and over-sampled digital chrominance signals at the same frequency $2F_E$, a digital dematrixer receiving the digital signal supplied by the filter and supplying digital primary color signals, a system of three digital-analog converters, each receiving a digital primary color signal and producing analog primary color signals.

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**4,743,961**

**DIGITAL CHROMINANCE SIGNAL PROCESSING SYSTEM**

**Yuji Kobayashi, and Tsutomu Takamori, both of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan**

**Continuation of Ser. No. 818,208, Jan. 13, 1986, abandoned. This application Apr. 22, 1986, Ser. No. 854,508**
**Claims priority, application Japan, Jan. 31, 1985, 60-017130**
**Int. Cl.[4] H04N** *9/64*
**U.S. Cl. 358—40** **3 Claims**

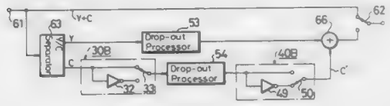
**1**. A phase control circuit for an input digital chrominance



signal which is sampled with a sampling frequency of $2mf_{SC}$ wherein m is an integer and $f_{SC}$ is a color subcarrier frequency, comprising:

decoder means for converting said input digital chrominance signal into digital chrominance components, said decoder means including first inverting means for inverting said input digital chrominance signal, and first switch means for switching between said input digital chrominance signal and an output of said inverting means at a first switching rate of $mf_{SC}$ to sequentially produce said digital chrominance components multiplexed in a time-division manner at the output thereof;

single transmitting line means for transmitting the multi-




plexed digital chrominance components from said decoder means; and

encoder means for converting said digital chrominance components into an output digital chrominance signal, said encoder means comprising second inverting means for inverting said digital chrominance components from said single transmitting line means, and second switch means for switching between the output of said second inverting means and said digital chrominance components from said single transmitting line means at a second switching rate of $mf_{SC}$, with the relative switching phases of said first and second switch means being controlled for determining the phase of said output digital chrominance signal.

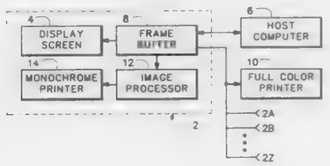
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**4,743,962**

**METHOD OF CREATING A REPRESENTATION OF A COLORED IMAGE**

**Robert A. McCormick, Aloha, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.**

**Filed Jun. 8, 1987, Ser. No. 59,310**
**Int. Cl.[4] H04N** *1/46*
**U.S. Cl. 358—75** **5 Claims**




**1**. A method of creating a representation of a colored image on a sensation-receiving member using a sensation-generating device that resolves the sensation-receiving member into a plurality of raster lines and resolves each raster line into a plurality of elementary areas and selectively applies one of m different sensation levels, where m is a positive integer, to each of said elementary areas, said method comprising the steps of:

(a) resolving the image into a plurality of raster lines and resolving each raster line into a plurality of pixels, each pixel being adjacent to at least one other pixel in its raster line and adjacent to at least one pixel in each adjacent raster line, and creating a succession of sequences of digital words in which each word is associated with a pixel of the image and has one of n possible values, where n is a positive integer greater than m, representing a color of the pixel, consecutive words in each sequence being associated with adjacent pixels in a raster line and consecutive sequences in said succession being associated with adjacent raster lines, and each pixel corresponding in its location in the image to a location of one of said elementary areas of the sensation-receiving member,

(b) for each of the n possible values for each digital word, determining a measure of a number of words in the succession of sequences that have that value,

(c) for a set of colors represented respectively by values such that the number yielded in step (b) for each value is not zero, determining a measure of a number of times respective pixels having those colors are adjacent each other in the image,

(d) identifying a set of colors for which the number yielded in step (c) is zero and assigning one of said m different sensation levels to the colors of that set, and

(e) using the sensation-generating device to generate a representation of the image by applying said one sensation level at each elementary area of the sensation-receiving member of which the location corresponds to the location in the image of a pixel of which the color is represented by one of the colors in the set identified in step (d).

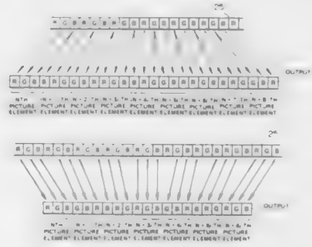
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**4,743,963**

**APPARATUS FOR MAGNIFYING OR REDUCING A COLOR IMAGE IN WHICH SEQUENTIALLY-STORED RGB DATA ARE SELECTIVELY READ OUT FROM A MEMORY IN ACCORDANCE WITH PREVIOUSLY-DETERMINED READ CONTROL DATA**

**Yasuo Abuyama, Ebina, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Apr. 25, 1986, Ser. No. 855,705**
**Claims priority, application Japan, Apr. 30, 1985, 60-93142**
**Int. Cl.[4] H04N** *1/393, 1/46*
**U.S. Cl. 358—77** **11 Claims**




**1**. A color picture apparatus comprising:

reading means having a number of reading elements for optically scanning a color picture image to form picture image data, each of said picture image data comprising a plurality of distinct color data, each of said plurality of distinct color data representing a different color;

memory means for storing said color data formed by said reading means, with each of said color data being stored in a distinct addess of said memory means;

magnification/reduction degree setting means for setting a magnification or reduction degree necessary to enlarge or reduce the size of said color picture image;

write control means for supplying a write address to said memory means to control writing of said color data formed by said reading means into said memory means such that said color data are stored in a predetermined sequence of addresses of said memory means; and

read control means for supplying a read address to said memory means to selectively control reading of each individual one of said color data from said memory means, said read control means comprising read address updating means for performing updating operations on said read address supplied to said memory means including an oper-

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ation of repeating the same read address or an operation of supplying a read address representing the skipping of skipping at least one address of said memory means according to the magnification or reduction degree, respectively, set by said magnification/reduction degree setting means.

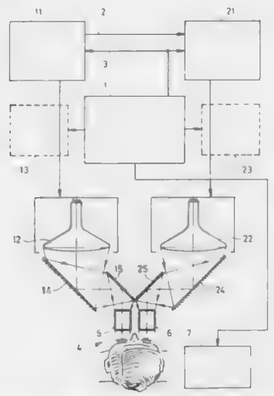
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**4,743,964**

## METHOD AND DEVICE FOR RECORDING AND RESTITUTION IN RELIEF OF ANIMATED VIDEO IMAGES

**Jean-Claude Allard, Bourg La Reine, and Christian Saunier, Ermont, both of France, assignors to Giravions Dorand, Suresnes, France**

**Filed Aug. 7, 1985, Ser. No. 763,348**
**Claims priority, application France, Aug. 10, 1984, 84 12694**
**Int. Cl.[4] H04N** *13/00, 15/00*
**U.S. Cl. 358—88** **5 Claims**



1. A method for recording real animated images and restituting the same in combination with synthetic images inserted therein, comprising the steps of recording an animated scene, viewed simultaneously at two different angles, in the form of separate video signals each on a different one of two videodisks which thus contain after recording a sequence of left-hand animated images and a sequence of right-hand animated images respectively; forming synthetic images or symbols in electronic form; restituting said animated images from said video signals in combination with the synthetic images converted from said electronic form thereof in synchronism as respective visual display images on two corresponding visual display monitors; and reflecting the display images respectively to the left eye and to the right eye of a viewer.

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**4,743,965**

## STEREOSCOPIC TELEVISION PICTURE TRANSMISSION SYSTEM

**Mitsuho Yamada; Haruo Isono, and Minoru Yasuda, all of Tokyo, Japan, assignors to Nippon Hoso Kyokai, Tokyo, Japan**

**PCT No. PCT/JP86/00232, § 371 Date Dec. 31, 1986, § 102(e) Date Dec. 31, 1986, PCT Pub. No. WO86/06914, PCT Pub. Date Nov. 20, 1986**
**PCT Filed May 6, 1986, Ser. No. 10,195**
**Claims priority, application Japan, May 7, 1985, 60-96285**
**Int. Cl.[4] H04N** *13/00, 7/12*
**U.S. Cl. 358—88** **16 Claims**

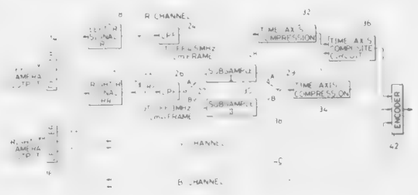
1. A stereoscopic television picture transmission system, characterized by comprising:

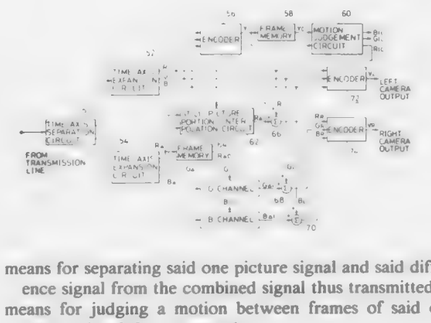
means for obtaining a picture signal with respect to one of right and left pictures in stereoscopic television;

means for obtaining a difference signal between a right picture signal for the right picture and a left picture signal for the left picture;

means for effecting sub-Nyquist sampling of said difference signal at a frame period relating to a critical frequency for stereoscopic visual perception in a direction of depth to obtain a sampled difference signal;

means for combining said one picture signal with said sampled difference signal to form a combined signal and for transmitting said combined signal;





means for separating said one picture signal and said difference signal from the combined signal thus transmitted;

means for judging a motion between frames of said one picture signal thus separated;

means responsive to a result of judgement of a motion by said judging means for effecting interframe interpolation of a difference signal thus separated; and

means for combining said separated one picture signal with said interframe interpolated difference signal, to obtain the other picture signal of said right and left picture signals.

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**4,743,966**

## ENDOSCOPE APPARATUS FOR IMAGING INTERNAL PORTIONS OF A PATIENT'S BODY

**Satoshi Matsuo, Ootawara, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Jan. 8, 1987, Ser. No. 1,566**
**Claims priority, application Japan, Jan. 10, 1986, 61-3152**
**Int. Cl.[4] H04N** *7/18*
**U.S. Cl. 358—98** **10 Claims**

1. An endoscope apparatus in which image data is obtained at an object portion in a body cavity that is pulsating at irregular rates and the image data is stored sequentially, comprising:

image pickup means for obtaining image data of the object portion in the body cavity;

storage means for storing sequentially the image data obtained by said image pickup means;

display means for displaying the image data stored in said storage means;

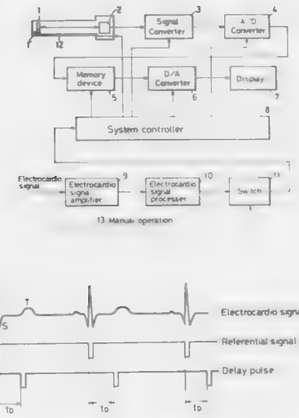
illuminating means for illuminating the object portion in the body cavity for said image pickup means;

means for generating a delay signal corresponding to the latest phase of pulsation in the object portion in accordance with a pulsation detecting signal; and

control means for controlling said illuminating means, storage means, and display means such that light is periodically emitted from said illuminating means, a writing



operation of said storage means is interrupted, and the image data retained in said storage means is displayed as a





frozen image on said data displayed means in accordance with the delay signal.

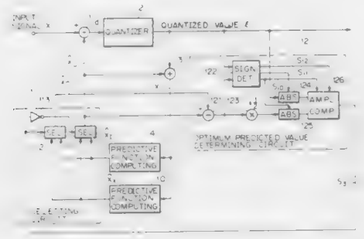
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**4,743,967**

## DIFFERENTIAL CODING APPARATUS HAVING AN OPTIMUM PREDICTED VALUE DETERMINING CIRCUIT

**Yuuji Takenaka, Kawasaki; Toshihiro Homma, Yokohama, and Kiichi Matsuda, Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

**Filed Mar. 13, 1987, Ser. No. 25,671**
**Claims priority, application Japan, Mar. 14, 1986, 61-57301**
**Int. Cl.[4] H04N** *7/137*
**U.S. Cl. 358—136** **13 Claims**



1. A differential coding apparatus comprising:

predicted value producing means for producing a plurality of predicted values with respect to input data; and

determining means for determining an optimum predicted value from said plurality of predicted values;

wherein a process at the predicted value producing means and a process at the determining means are carried out in parallel, and one of said predicted values is selected as the optimum predicted value in accordance with the determined result.

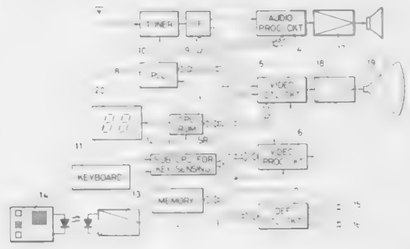
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**4,743,968**

## ELECTRONIC APPARATUS CONTROL SYSTEM

**Takao Mogi; Masayuki Suematsu, both of Tokyo, and Kosuke Fujita, Kanagawa, all of Japan, assignors to Sony, Tokyo, Japan**

**Filed Feb. 24, 1986, Ser. No. 831,876**
**Claims priority, application Japan, Mar. 5, 1985, 60-043384**
**Int. Cl.[4] H04N** *5/44*
**U.S. Cl. 358—147** **2 Claims**



1. A control system for electronic apparatus operating on a television signal having a plurality of controllable operational circuits, comprising:

a control circuit including a control program stored in a memory;

an internal bus system including a clock line and a data line connected between said control circuit and said plurality of controllable operational circuits; and

in which said control circuit includes means for transmitting data over said data line of said bus system to said controllable circuits sequentially only during vertical blanking intervals of said television signal, means for receiving a data request signal from a predetermined one of said operational circuits, and means for selecting said predetermined one of the controllable operational circuits for the transmission of said data with priority over other ones of said controllable operational circuits upon transmission of said data request signal which is transmitted over said data line at a time other than during said vertical blanking interval.

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**4,743,969**

## CORRELATOR

**Alwin F. G. Habeck; Walter H. Demmer, both of Hamburg; Jürgen Ruprecht, Oststeinbek, and Detlef W. K. Oldach, Hamburg, all of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.**

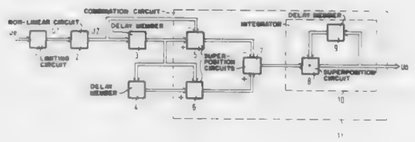
**Filed Feb. 21, 1986, Ser. No. 832,290**
**Claims priority, application Fed. Rep. of Germany, Feb. 23, 1985, 3506449**
**Int. Cl.[4] H04N** *5/08, 5/10*
**U.S. Cl. 358—153** **20 Claims**

1. A correlator comprising a cascaded chain of a first delay member and at least a second delay member, the first of which receives an input signal comprising pulses in periodical intervals and being present as a series of digital sampling values, and a combination circuit for linearly combining the input signal of the first delay member and the output signals of all delay members and for generating by the occurrence of a pulse a correlator output signal assuming an extreme value, characterized in that a pulse and a pulse-free interval, respectively are associated with each delay member, in that the delay members succeed each other in the same manner as the pulses and pulse-free intervals occur, in that all but at most one delay member

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at the beginning or end of the chain are suitable for storing just all sampling values of the associated pulse of pulse-free interval, and in that the combination circuit additionally comprises an integrator for integrating the linearly combined signal.



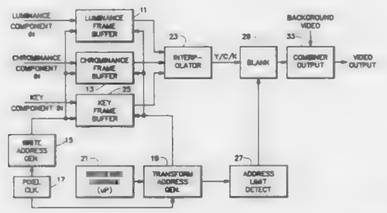

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**4,743,970**

**PICTURE TRANSFORMATION MEMORY**

**Ronnie D. Barnett, and Richard A. Jackson, both of Nevada City, Calif., assignors to The Grass Valley Group, Inc., Grass Valley, Calif.**

**Filed Oct. 20, 1986, Ser. No. 920,560**
**Int. Cl.[4] H04N** *5/272*
**U.S. Cl. 358—183** **6 Claims**




1. A picture transformation memory of the type having three field stores making up a frame store such that one field store is being written into while the other two are being read out to provide a full frame video output comprising:

a plurality of banks making up each field store, the banks for each field store having a total capacity to store one complete field of input digitized video data; and

means for accessing in parallel the video data stored in the plurality of banks such that, when a given pixel of the video data is requested for access, neighboring pixels from each bank are automatically accessed to produce a multi-pixel output for input to an interpolator.

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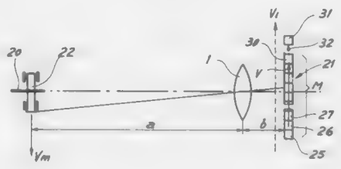
**4,743,971**

**APPARATUS FOR TIMING SPORTING EVENTS**

**Heinz Hügli, Neuchâtel, Switzerland, assignor to Compagnie des Montres Longines, Switzerland**

**Filed Nov. 3, 1986, Ser. No. 926,066**
**Claims priority, application France, Nov. 4, 1985, 85 16423**
**Int. Cl.[4] H04N** *3/14*
**U.S. Cl. 358—213.26** **3 Claims**

1. An apparatus for timing sporting events including a motion picture camera installed at a fixed position and having a lens, the axis of which is directed onto a line to be crossed by competitors so as to record the events occuring on said line, said camera comprising a bidimensional photosensitive charge coupled device including a multiplicity of sensors arranged in rows and columns, the rows being in a direction parallel to said line and the columns in the direction of the running of the course and a pulse generator for controlling the transfer of charges from sensor to sensor along the columns, the frequency of the pulses being adjusted to effect substantial correspondence between the speed of charge transfer and the speed of the image moving over the device, a shift register being arranged at the end of the columns so as to receive in parallel information from said columns and to transmit it in response to a clock signal in series to an output circuit so as to reconstitute row by row the image received by the device, the pulses furnished by the generator controlling the charge transfers being employed as a time base at a time scale corresponding to the events being recorded, said scale being blended into the image resulting from said events.



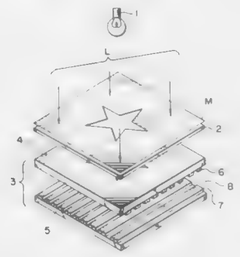

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**4,743,972**

**IMAGE INPUT APPARATUS**

**Yachiyo Makihara, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Nogoya, Japan**

**Filed Jun. 30, 1987, Ser. No. 68,440**
**Claims priority, application Japan, Jun. 30, 1986, 61-151607**
**Int. Cl.[4] H04N** *3/14*
**U.S. Cl. 358—213.11** **4 Claims**




1. An image input apparatus comprising:

an original mount;

a liquid crystal panel disposed under said original mount, said liquid crystal panel having a liquid crystal and a photo absorption agent sealed in said liquid crystal panel;

electrodes arranged in a matrix on each of upper and lower opposite surfaces of said liquid crystal panel; and

a light source disposed above said original mount so as to emit light onto an original mounted on said original mount so that light from said original is projected onto said crystal panel so as to make said liquid crystal panel to store picture image information on said original as a change in phase of said liquid crystal, said picture image information stored in said liquid crystal panel being electrically read out by said electrodes.



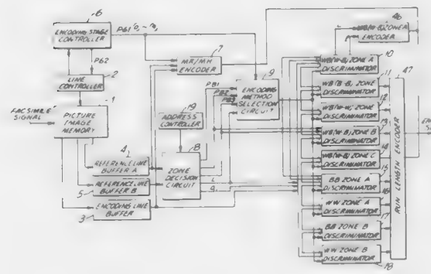
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**4,743,973**

**ENCODING METHOD FOR FACSIMILE SIGNAL**

**Toshiaki Endo, Tanashi, and Yasuhiro Yamazaki, Hiratsuka, both of Japan, assignors to Kokusai Denshin Denwa Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 519,662, Aug. 2, 1983, abandoned. This application Jul. 24, 1986, Ser. No. 886,952**
**Claims priority, application Japan, Aug. 4, 1982, 57-135967**
**Int. Cl.[4] H04N** *1/41*
**U.S. Cl. 358—260** **3 Claims**




1. In an encoding method for facsimile signal, wherein data on a field of lines of input facsimile signals are selectively encoded according to a predetermined encoding method between lines which are encoded by skipping over a predetermined number of lines, and wherein data of one of the thus skipped over lines is encoded by making reference to the data of lines already encoded which are preceding and subsequent to said one skipped over line, and wherein the lines of an entire picture are arranged in successive groups each having a plurality of lines, a method of encoding data of a skipped line including the steps of:

skipping corresponding lines in each group to designate skipped and non-skipped lines to be encoded in each group, each group comprising at least one skipped line bounded by a preceding non-skipped line and a succeeding non-skipped line;

first encoding the non-skipped lines in each of said groups to produce a rough image of the entire picture, said step of encoding including determining boundary zones of black and white regions in said picture by the arrangement of white and black picture elements in successive in non-skipped lines;

secondly, after encoding the non-skipped lines in all of said groups of the entire picture, encoding data of one skipped line in each of said groups on the basis of a boundary zone between a black picture elemental zone and a white picture elemental zone in accordance with a predetermined encoding process to produce a better image of the entire picture, said encoding of a skipped line being based on locations of black and white picture elements in non-skipped lines preceding and subsequent to each skipped line in each one of said groups;

repeating said encoding step for skipped lines lying between previously encoded lines in successive ones of said groups to provide a still higher quality image of the entire picture; and, if there be remaining uncoded skipped lines, repeating said encoding step for the remaining uncoded skipped lines in said field based on data of adjacent coded lines to provide a still better quality image of the entire picture, the amount of said repeating being selectable to provide a desired quality of facsimile transmission signal.

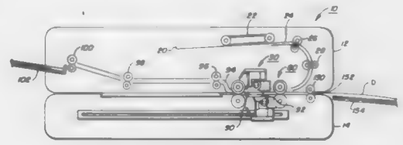
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**4,743,974**

**DUAL SCANNING ARRAY RASTER INPUT SCANNER**

**Dan F. Lockwood, Ontario, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Dec. 18, 1986, Ser. No. 943,280**
**Int. Cl.[4] H04N** *1/04*
**U.S. Cl. 358—285** **12 Claims**



1. A dual mode raster input scanner having a first mode of operation for scanning either or both sides of a moving document passing through a scanning station, and a second mode of operation for scanning one side of a stationary document on a scanning platen, comprising:

said scanning station, for scanning in said first mode, includes first and second scanning elements, each element including a scanning array of photosensitive sensors for detecting light reflected from a document;

said scanning platen for supporting said stationary document manually placed thereon for scanning in said second mode;

a document input;

document transport means for moving said moving document to be scanned from said input to said scanning station and to an output along a document path during the first mode of operation;

said first and second scanning elements supported closely adjacent and opposite each other on opposite sides of said document path with said scanning elements supporting said scanning arrays slightly offset from one another in said first mode for scanning substantially simultaneously both sides of said moving doucment as it passes through said scanning station; and

means for supporting one of said first and second scanning elements in scanning position closely adjacent the other one of said scanning elements at said scanning station in said first mode of operation and for scanning movement across said scanning platen in said second mode of operation.

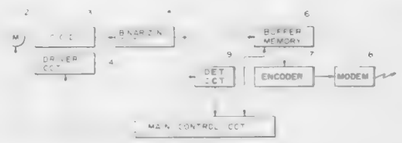
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**4,743,975**

**IMAGE PROCESSING APPARATUS**

**Kazuya Ijuin, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 27, 1986, Ser. No. 844,892**
**Claims priority, application Japan, Apr. 1, 1985, 60-66601; Apr. 1, 1985, 60-66602; Apr. 1, 1985, 60-66603; Apr. 2, 1985, 60-68494; Apr. 2, 1985, 60-68495**
**Int. Cl.[4] H04M** *1/17*
**U.S. Cl. 358—288** **31 Claims**




1. An image rpocessing apparatus comprising:

reading means for reading an image by sequentially repeating main scan and subscan:

memory means for storing image data associated with the image read by said reading means;

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processing means for processing the image data stored in said memory means;

detecting means for detecting whether a read image corresponding to one main scan represents a monotonous image pattern or not; and

control means for controlling said reading means to temporarily interrupt its reading operation by suspending the sub-scan in response to an output from said detecting means when an amount of the image data stored in said memory means exceeds a predetermined value.

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**4,743,976**

## IMAGE READ APPARATUS WITH RECIPROCATING DOCUMENT PLACING PLATE

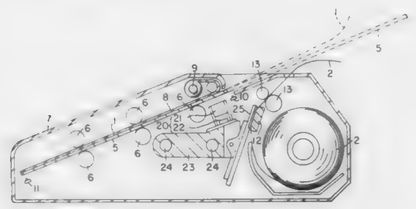
**Noboru Katakabe, Uji; Yuji Nakamura; Atsushi Sogami, both of Hirakata, and Yoshio Horiike, Katano, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Mar. 27, 1986, Ser. No. 845,119**

**Claims priority, application Japan, Mar. 29, 1985, 60-63408; Mar. 29, 1985, 60-63409**

**Int. Cl.[4] H04N** *1/12, 1/04, 1/10*

**U.S. Cl. 358—293** **17 Claims**



1. An image read apparatus comprising:

a document placing plate for placing thereon a document and movable reciprocatively, said document placing plate being movable reciprocatively between a second position at which said document placing plate projects outwardly from said image read apparatus to thereby enable said document to be placed thereon and a first position at which said document placing plate is housed completely within said image read apparatus;

document placing plate driving means for moving said document placing plate; and

image read means for reading image information on said document.

3. An image read apparatus comprising:

a document placing plate for placing thereon a document and movable reciprocatively;

document holding means for causing said document to be pressed over its entire surface onto said document placing plate, said document holding means comprising a flexible sheet housed within said image read apparatus;

document placing plate driving means for moving said document placing plate; and

image read means for reading image information on said document.

4. An image read apparatus comprising:

a document placing plate for placing thereon a document and movable reciprocatively;

document holding means for causing said document to be pressed over its entire surface onto said document placing plate;

document placing plate driving means for moving said document placing plate; and

image read means for reading image information on said document;

wherein said document holding means comprises an endless belt capable of movement together with said document placing plate during movement of said document placing plate.

**4,743,977**

## VTR HAVING MAGNETIC-HEAD ARRAY CAPABLE OF RECORDING/REPRODUCING SIGNALS OF A PLURALITY OF RECORDING SYSTEMS

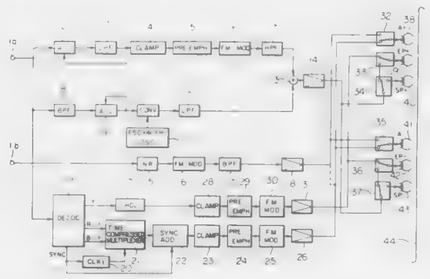
**Atsushi Yoshioka, Katsuta; Kuniaki Miura, Ibaraki; Kazunori Kotani; Michio Masuda, both of Katsuta; Yasufumi Yumde, and Takao Aria, both of Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Aug. 29, 1986, Ser. No. 901,803**

**Claims priority, application Japan, Sep. 2, 1985, 60-191902**

**Int. Cl.[4] H04N** *9/80, 5/782;* **G11B** *5/02*

**U.S. Cl. 358—310** **10 Claims**



1. A magnetic recording/reproducing apparatus of the helical scan type comprising:

an arrangement of pairs of rotary magnetic heads disposed circumferentially on a rotary body;

means for selecting one of a first recording system and a second recording system different from said first recording system so that it is possible to record/reproduce a video signal including luminance and chrominance information onto/from a plurality of tracks on a magnetic tape in the selected one of said first and second recording systems, whereby a color subcarrier quadrature modulated by said chrominance information is recorded onto a first track together with an FM carrier frequency-modulated by said luminance information at the same time in said first recording system, while a first carrier frequency-modulated by said luminance information and a second carrier frequency-modulated by said chrominance information are recorded onto a second track and a third track adjacent to said second track respectively;

said arrangement of pairs of rotary magnetic heads including;

a first pair of rotary magnetic heads constituted by a first and a second magnetic heads circumferentially separated from each other by 180 degrees ($\pi$ rad) on said rotary body, said first pair of rotary magnetic heads recording said FM carrier and said color subcarrier onto said first track in a first mode where said magnetic tape runs at a first tape speed in said first recording system, and said first pair of rotary magnetic heads recording said first carrier onto said second track at a second tape speed different from said first tape speed in said second system; and

a second pair of rotary magnetic heads constituted by a third and a fourth magnetic heads circumferentially separated from each other by 180 degrees ($\pi$ rad) on said rotary body, said third magnetic head being arranged adjacently to said first magnetic head, said fourth magnetic head being arranged adjacently to said second magnetic head, each of said third and fourth heads being disposed at a position different in height from that of each of said first and second magnetic heads, said second pair of rotary magnetic heads being arranged to record said second carrier onto said third track at said second tape speed in said second system.



**4,743,978**

## RECORDING/REPRODUCTION SYSTEM WITH A FINE PICTURE QUALITY FOR A HELICAL SCAN-TYPE VIDEO TAPE RECORDER

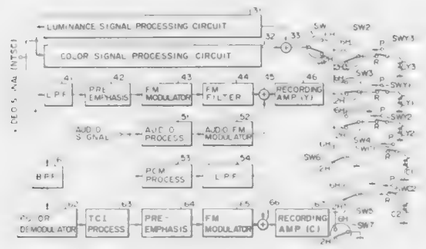
**Shigeo Tanaka, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Dec. 9, 1986, Ser. No. 939,886**

**Claims priority, application Japan, Dec. 10, 1985, 60-275914**

**Int. Cl.[4] H04N** *9/80, 5/782;* **G11B** *5/02*

**U.S. Cl. 358—310** **47 Claims**



1. A recording/reproduction system with a fine picture quality for a helical scan-type video tape recorder, comprising:

select means for selecting a recording mode or a reproduction mode;

a video signal supply source for supplying a composite video signal;

mode select means for selecting a first mode or a second mode, said first mode being provided for recording the video signal in a first recording format in which a luminance signal component and a color signal component of the video signal are recorded in different tracks, said second mode being provided for recording the video signal in a second recording format in which the frequency-modulated luminance signal and the low-frequency converted color sub-carrier signal are superposed and recorded into a single track;

first signal processing means for separating, in said first mode, the luminance signal component from the supplied video signal, and producing the separated luminance signal component;

second signal processing means for separating, in said first mode, the color signal component from the supplied composite video signal, and producing the separated color signal component;

third signal processing means for separating, in said second mode, the color sub-carrier signal and the frequency-modulated luminance signal from the supplied composite video signal, for converting the separated color sub-carrier signal into low frequencies, for superposing the separated, low-frequency converted color sub-carrier signal on the frequency-modulated luminance signal, and for producing the superposed signal;

a rotating member around which a video tape is wound in the recording mode or the reproduction mode;

first and second heads of a first azimuth angle, which are disposed on said rotating member;

third and fourth heads of a second azimuth angle different from said first azimuth angle, which are disposed on said rotating member;

a fifth head disposed on said rotating member at the position rotated 180° from said first head, and having the second azimuth angle different from that of said first head;

means for selectively supplying the signals supplied from said first to third signal processing means to said first to fifth heads according to said first and second modes in a record mode, said selectively supplying means supplying, when said first mode is selected, the output signal of either said first or said second signal processing means to said first and second heads, while at the same time supplying to said third and fourth heads the output signal of either said first or said second signal processing means, which is different from that supplied to said first and second heads, and said selectively supplying means supplying, when said second mode is selected, the output signal from said third signal processing means to said first and fifth heads;

means for selectively outputting signals supplied from said first to fifth heads according to said first and second modes in a reproduction mode, said selectively outputting means outputting, when said first mode is selected, the output signals which are alternately output from said first and second heads, as a first signal, while at the same time outputting the output signals which are alternately output from said third and fourth heads, as a second signal, and said selectively supplying means supplying, when said second mode is selected, the output signals which are alternately output from said first and fifth heads, as a third signal;

fourth signal processing means which receives said first and second signals, superposes them, and outputs the superposed signal as a video signal; and

fifth signal processing means which receives said third signal, separates a luminance signal component and a low-frequency converted color sub-carrier signal from said third signal, frequency-converts the separated low-frequency converted color sub-carrier signal, superposes the frequency-converted color sub-carrier signal to the separated luminance signal component, and outputs the superposed signal as a composite video signal.

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**4,743,979**

## SYSTEM FOR PLAYING VIDEO INFORMATION RECORDING DISKS, CAPABLE OF SPECIAL PLAYBACK MODE OPERATION WITH A CLV DISK

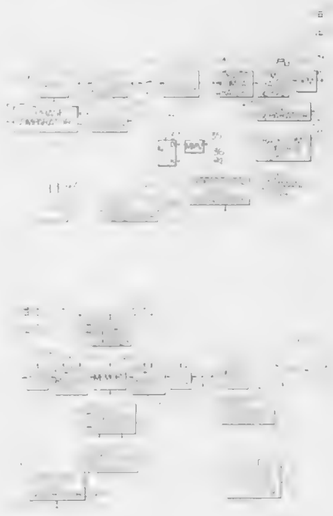
**Takashi Okano, and Toru Akiyama, both of Tokorozawa, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan**

**Filed Apr. 4, 1986, Ser. No. 848,264**

**Claims priority, application Japan, Apr. 5, 1985, 60-073044**

**Int. Cl.[4] H04N** *5/95*

**U.S. Cl. 358—339** **2 Claims**



1. A video information playback system for playing information from an information carrying disk having recording tracks comprising:

a disk playing part which comprises,
driving means for rotating said information carrying disk,
reading means for reading information from said information carrying disk to produce a read video signal, and
time base control means connected to said driving means for controlling a driving speed of said driving means to correct a time base fluctuation of said read video signal in response to a phase difference between a playback synchronizing signal contained in said read video signal and a predetermined reference signal;
oscillator means for generating a reference oscillation signal;
clock signal generating means for generating A/D and D/A conversion clock signals from said reference oscillation signal and write and read clock signals synchronized in phase with said reference oscillation signal;
reference signal generating means for generating said predetermined reference signal used in said disk playing part as a signal synchronized in phase with said write and read clock signals; and
a video memory part which comprises,
analog to digital converting means for converting said read video signal produced by said disk playing part into a digital signal to be memorized, using said A/D conversion clock signal,
memory means for storing said digital signal,
writing means for writing said digital signal in said memory means in accordance with said write clock signal,
reading means for reading said digital signal from a memory area of said memory means other than a memory area at which writing of said digital signal is taking place, in accordance with said read clock signal, and
digital to analog converting means for converting said digital signal read from said memory means into an analog signal which is to be produced as an output video signal using said D/A conversion clock signal.

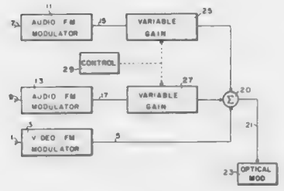
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**4,743,980**

## AUDIO CARRIER AMPLITUDE CONTROL FOR VIDEODISC RECORDER

**W. Ray Dakin, Huntington Beach, Calif., assignor to Optical Disc Corporation, Cerritos, Calif.**

**Filed Jan. 13, 1986, Ser. No. 817,866**
**Int. Cl.[4] H04N** *5/76*
**U.S. Cl. 358—342** **9 Claims**




1. In a recorder for videodiscs including: means for generating a primary carrier signal and at least one secondary carrier signal, means for frequency modulating each of said carrier signals to represent a respective channel of information, and means for summing said modulated carrier signals together and recording the sum on a videodisc, the improvement comprising:
memory means for storing pre-entered instructions regarding increasing and decreasing the amplitude of said at least one secondary carrier signal and for storing selected time points of the input signal at which the amplitude of said at least one secondary carrier signal is to be altered;
control means for selectively altering the amplitude of said at least one secondary carrier signal during recording, such that the relative amplitudes of the carrier signals in the sum of signals to be recorded are altered; and
means for sensing the occurrence of the selected time points of the input signal and for activating said control means.

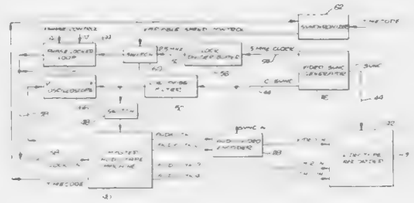
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**4,743,981**

## SYSTEM FOR SYNCHRONIZING AUDIOTAPE AND VIDEOTAPE MACHINES

**David W. Spencer, Valencia, and Gregory S. Kadorian, Simi Valley, both of Calif., assignors to Walt Disney Productions, Burbank, Calif.**

**Filed Jan. 31, 1986, Ser. No. 824,637**
**Int. Cl.[4] G11B** *5/86*
**U.S. Cl. 360—15** **7 Claims**



1. A method for synchronizing an audio tape machine with a video tape machine while recording audio from an audio tape onto a video tape comprising the steps of:
recording a first composite video synchronization signal on said audio tape, said first composite video synchronization signal containing both vertical and horizontal synchronization signals;
recording a first SMPTE type time code on said audio tape;
recording a second SMPTE type time code on said video tape;
generating a second composite video synchronization signal, said second composite video synchronization signal containing both vertical and horizontal synchronization signals;
generating a clock signal;
coarsely adjusting the speed of said audio tape machine with respect to the speed of said video tape machine responsive to the synchronization of the signals of said first SMPTE type time code and said second SMPTE type time code;
accurately synchronizing the speed of said audio tape machine with said video tape machine subsequent to said coarse adjustment of the speed of said audio tape machine by adjusting the frequency of said clock signal to synchronize first, the phase of said vertical synchronization signal of said first composite video synchronization signal with the phase of said vertical synchronization signal of said second composite video synchronization signal, and second, the phase of said horizontal synchronization signals of said first and second composite video synchronization signals; and,
recording audio signals from said audio tape onto said video tape.



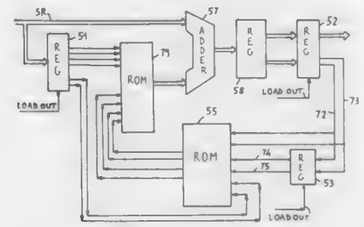
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**4,743,982**

## DIGITAL DATA SEPARATOR

**Bonifacio Troletti, Darfo-Boario Terme, Italy, assignor to Honeywell Information Systems Italia, Italy**

**Filed Sep. 23, 1986, Ser. No. 910,706**
**Claims priority, application Italy, Oct. 10, 1985, 22430 A/85**
**Int. Cl.[4] G11B** *5/09*
**U.S. Cl. 360—45** **3 Claims**




1. A digital data separator for use with apparatus for recovering binary information recorded on a movable media applied to an input channel, such separator comprising a measurement unit of an actual duration of an interval N between two subsequent read pulses n+1 and n, a measurement unit of the media speed error, a speed error recovery unit for converting said actual interval duration into a duration corrected as to speed error and expressed by a binary code and a peak-shift recovery unit for receiving said binary code and discriminating components of peak-shift which affect the duration expressed by said code from a nominal duration which is attributed to said interval N, said peak-shift recovery unit comprising:
first register means coupled to said input channel to receive and store a first binary code related to an interval N−1 and a preceding interval N;
second register means for storing a second binary code representing a nominal duration $DN_{N-1}$ of said interval N−1;
third register means coupled in cascade with said second register means, said third register means for storing a third code representing a nominal duration $DN_{N-2}$ of an interval N−2, preceding said N−1 interval;
circuit means having a plurality of inputs connected to said first, second and third register means for receiving at the same time, said first, second and third codes, said circuit means providing a fourth binary code representing said peak-shift of said read pulse n−1;
arithmetic means having a number of first inputs coupled to said channel for receiving a fifth code related to interval N, a number of second inputs connected to said circuit means for receiving said fourth code, said arithmetic means providing a sixth binary code representing the nominal duration of said interval N, corrected as to speed error and said peak-shift of read pulse n−1; and,
discriminating means coupled to said arithmetic means for receiving said sixth code and for producing a seventh code representing the nominal duration $DN_N$ of said N interval, said discriminating means being connected to apply said sixth code to said second register means.

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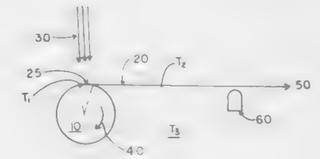
**4,743,983**

## RECOVERING DATA FROM MAGNETIC RECORDING TAPE ADHERED AFTER LONG STORAGE

**Albert Hadamek, Houston, Tex., assignor to Texaco Inc., White Plains, N.Y.**

**Filed Jul. 31, 1986, Ser. No. 891,040**
**Int. Cl.[4] G11B** *5/00*
**U.S. Cl. 360—55** **8 Claims**

1. A method for recovering data from a supply of spooled magnetic recording tape, said tape comprising a continuous film support comprising a first side with a continuous magnetic layer comprising magnetic metal powder dispersed through a polyurethane binder and a second side free of a magnetic layer wherein during storage, adjacent layers of tape have adhered causing; on unspooling of freed tape, transfer of magnetic layer to said second side in amounts sufficient to break the continuity of said magnetic layer thereby preventing recovery of data contained thereon; said method comprising the steps of:
a. heating the second side of an adhered, spooled tape segment in an amount sufficient to break adhesion between




said magnetic layer and said second side, and less than the amount to reach the heat distortion temperature of the film support,
b. simultaneously drawing tape from the spooled supply to break residual adhesion between said magnetic layer and said second side, and to remove the tape segment from said heating
thereby maintaining the continuity of the magnetic layer and recovery data.

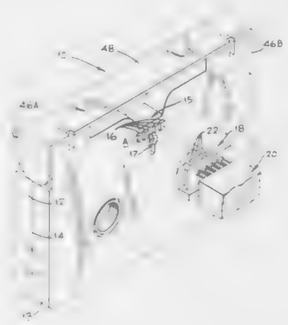
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**4,743,984**

## SCHEME FOR ENCODING A MAGNETIC TAPE CASSETTE

**Dennis M. Ryan, Redwood City, Calif., assignor to Ampex Corporation, Redwood City, Calif.**

**Filed Sep. 25, 1985, Ser. No. 779,907**
**Int. Cl.[4] G11B** *15/04, 23/02*
**U.S. Cl. 360—60** **7 Claims**



1. In a series of magnetic tape cassettes of varying sizes, each size cassette receivable in a single record/reproduce apparatus for play, a coding mechanism comprising:
a single symmetric array of discrete sending means disposed on each size cassette of the series with respect to reference points common to each cassette for transmitting cassette information to the apparatus;
said alignment including a record inhibit device; and
means for activating selected ones of the sending means, to designate a specific code for a selected cassette, the array of said sending means aligned with and accessible to a complementary array of sensors provided on a signal sensing mechanism associated with the apparatus, said sensor array including a sensor responsive to cassette information generated by the record inhibit device, said

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array of sensors to transmit the designated code to the apparatus.

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**4,743,985**

**IN A VIDEO TAPE RECORDER HAVING ROTARY RECORDING, AUXILIARY AND ERASING HEADS, A CIRCUIT FOR SHORT CIRCUITING THE AUXILIARY HEAD DURING ERASING**

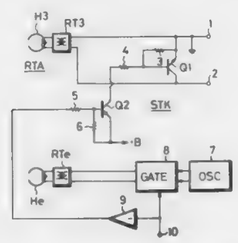
**Masahiro Shibata, Tokyo; Tatsuo Tsujibayashi; Hiroyuki Sato, both of Kanagawa, and Yoshinori Machida, Tokyo, all of Japan, assignors to Sony, Tokyo, Japan**

**Filed Jun. 3, 1986, Ser. No. 870,184**

**Claims priority, application Japan, Jun. 19, 1985, 60-133279**

**Int. Cl.[4] G11B** *15/12, 15/14*

**U.S. Cl. 360—61** **1 Claim**




1. A helical scan tape recorder for recording signals in a plurality of skewed recording tracks on a record tape comprising: recording head means; auxiliary head means; erasing head means; tape guide means including a rotary body having the record tape wrapped on the periphery thereof, said rotary body carrying said recording head means, auxiliary head means and erasing head means; rotary transformer means for transmitting signals to said recording head means, auxiliary head means and erasing head means rotating with said rotary body and including a first section associated with said erasing head means and a second section having a primary winding connected to said auxiliary head means and a stationary secondary winding having its ends connected to output terminals; erase signal generating means including oscillating means, gate means connected between said oscillating means and said first rotary transformer section for applying an oscillating output of said oscillating means as said erase signal to said erasing head means when said gate means is enabled, and means for applying an erase timing control signal to said gate means for enabling the latter; and short circuit means responsive to said erase timing control signal for short circuiting said auxiliary head means whenever said gate means is enabled for applying said erase signal from said erase signal generating means to said erasing head means by way of said rotary transformer means, said short circuit means including an NPN-type transistor having an emitter-collector path connected between said output terminals for short circuiting the auxiliary head means when said NPN-type transistor is turned on, and means for turning on said NPN-type transistor including a PNP-type transistor having an emitter-collector path connected between a power source and a base electrode of said NPN-type transistor, and inverting means for applying an inverted version of said erase timing control signal to a base electrode of said PNP-type transistor, whereby said NPN-type transistor is turned on when said erase timing control signal is at a level for enabling said gate means.

**4,743,986**

**INSERTION-EJECTION MECHANISM IN A MAGNETIC TAPE-CASSETTE APPARATUS**

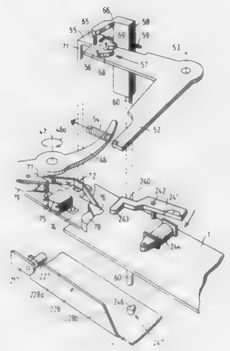
**Karl Klös-Hein, Ruttershausen, Fed. Rep. of Germany, assignor to U.S. Philips Corp., New York, N.Y.**

**Filed Nov. 15, 1985, Ser. No. 798,645**

**Claims priority, application Fed. Rep. of Germany, Nov. 15, 1984, 3441804**

**Int. Cl.[4] G11B** *5/008, 15/00, 17/00*

**U.S. Cl. 360—96.5** **15 Claims**



1. A magnetic-tape-cassette apparatus, comprising:

a lever pivotally mounted in the apparatus for loading and ejecting a cassette inserted into the apparatus,

means for coupling said lever to the cassette, said lever and means being arranged such that said lever is pivoted in a loading direction during insertion of the cassette, and said cassette is ejected in response to pivoting of the lever in an ejection direction opposite said loading direction,

an axially movable control rod, motor means for moving said rod over a given travel in first and second directions, and means for pivoting said lever in said ejection direction responsive to movement of said rod over a first portion of said travel in said first direction,

an electrical switch having a switching arm movable between an activated and an inactivated position, and means for turning on and turning off said motor means responsive to movement of said arm to said activated and inactivated positions of said switch respectively, and

means for moving said switching arm to said activated position responsive to a cassette being inserted into a first position in which the lever has been pivoted in said loading direction partway from a loading position to an operating position,

characterized by comprising a position-sensing delay element, and means responsive to and including said position-sensing delay element for maintaining said switching arm in said activated position during ejection movement of said cassette past said first position to a second position, and turning said motor off when the cassette reaches the second position

whereby during ejection of a cassette said motor means is turned off only after the cassette has passed the position in which the motor is turned on during insertion.



**4,743,987**

**LINEAR ACTUATOR FOR A MEMORY STORAGE APPARATUS**

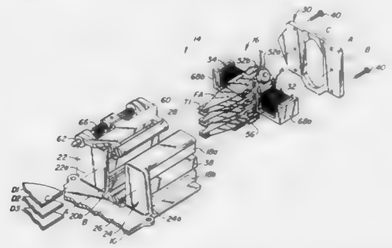
**Paul L. Farmer, San Martin; Frank C. Gibeau, Los Altos; Stanley F. Brown, Cupertino, and Garold W. Plonczak, Santa Clara, all of Calif., assignors to Atasi Corporation, San Jose, Calif.**

**Continuation of Ser. No. 549,869, Nov. 7, 1983, which is a continuation of Ser. No. 352,943, Feb. 26, 1982, Pat. No. 4,414,594. This application Apr. 12, 1985, Ser. No. 722,254**

**The portion of the term of this patent subsequent to Nov. 10, 2003, has been disclaimed.**

**Int. Cl.[4] G11B** *5/55, 5/012, 21/08*

**U.S. Cl. 360—106** **32 Claims**



1. A transducer actuator assembly for a memory apparatus comprising: a carriage; means for mounting at least one transducer at one end of the carriage; means adjacent the periphery of the media of the memory apparatus for guiding the carriage for movement along a desired linear path of travel relative to the media; a pair of symmetrically disposed electromagnetic motors juxtaposed in immediate proximity to the periphery of the media to optimize a minimum length of said actuator assembly and for reciprocating the carriage to position the transducer to a desired track location on the media including drive coil means mounted to and extending laterally from each of opposed lateral sides of the carriage for forming at least two identical flat active winding sections that are respectively symmetrically arranged outboard of the carriage about a plane that extends through the center of the carriage and that is parallel to the carriage linear direction of travel, at least two identical pairs of flat permanent magnets stationarily mounted to the memory apparatus juxtaposed in immediate proximity to the edge of the media at the opposed sides of the carriage, and a rectangular central pole sandwiched between and spaced from each of the pairs of flat magnets on each of the opposite sides of the carriage, wherein said each central pole and each of the pairs of magnets form two planar air gaps in a parallel array between flat facing surfaces of said flat magnets that respectively register with said two coil sections, such that when said drive coil means is energized, motive forces are applied generally along two transversely spaced lines that are symmetrical about said center plane of the carriage.

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**4,743,988**

**THIN-FILM MAGNETIC HEAD**

**Kazuhiro Sato, Sagamihara; Togo Nishiyama, Yokohama, and Katsuhiko Oguri, Fujisawa, all of Japan, assignors to Victor Company of Japan, Ltd., Japan**

**Filed Jan. 28, 1986, Ser. No. 823,252**

**Claims priority, application Japan, Feb. 1, 1985, 60-18092; Feb. 5, 1985, 60-15216[U]**

**Int. Cl.[4] G11B** *5/147*

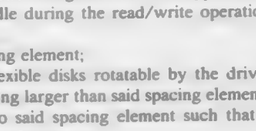
**U.S. Cl. 360—126** **10 Claims**

1. A thin-film magnetic head comprising:

a first core portion having an insulative island of inorganic material embedded in a base substrate upon which subsequent layers are deposited;

a first coil section embedded in said island, the first coil section and the island forming a flat common surface with said substrate;

a gap-forming insulating layer on said flat common surface;




a second core portion on said gap-forming layer, said second core portion being in magnetically conductive relation with said first core portion; and

a second coil section connected to said first coil section to form a coil therewith.

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**4,743,989**

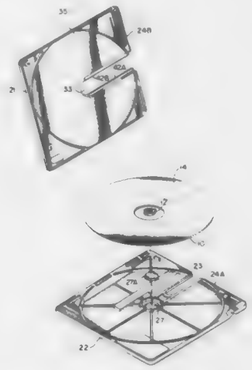
**PLURAL MAGNETIC DISK ASSEMBLY**

**Randall C. Bauck; David E. Jones, both of Layton, and Robert D. Freeman, Roy, all of Utah, assignors to Iomega Corporation, Roy, Utah**

**Filed Apr. 21, 1986, Ser. No. 854,292**

**Int. Cl.[4] G11B** *23/03, 15/64*

**U.S. Cl. 360—133** **33 Claims**



1. A magnetic storage device of the type which is rotated by a drive spindle during the read/write operation, said device comprising:

(a) a spacing element;

(b) two flexible disks rotatable by the drive spindle, said disks being larger than said spacing element and coaxially joined to said spacing element such that said disks are spaced at the center;

(c) a single Berroulli surface for said two disks, said single Bernoulli surface juxtaposed to a first of said disks such that said first disk is stabilized by said Bernoulli surface when said disks are rotated by the drive spindle; and

(d) evacuating means for allowing passage of air radially outward from between said first disk and the second of said disks such that said second disk is stabilized by said first disk when said disks are rotated by said drive spindle.

20. A method for stabilizing at least two coaxially spaced and joined magnetic disks wherein the central space between said disks is in fluid communication with the atmosphere surrounding said disks, said method comprising:

(a) juxtaposing one of said disks and a single Bernoulli surface whereby said single Bernoulli surface is used for said two disks;

(b) rotating said disks at a speed sufficient to induce movement of air surrounding said disks into the central space

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between said disks and then radially outward to the atmosphere surrounding said disks; and

(c) coupling each of said disks with substantially opposed tranducer.

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**4,743,990**

## TEST CASSETTE FOR MEASURING CAPSTAN AZIMUTH ANGLES

**Sabine Werner, Hüttenberg, Fed. Rep. of Germany, assignor to U.S. Philips Corp., New York, N.Y.**

**Continuation-in-part of Ser. No. 916,921, Oct. 9, 1986. This application Dec. 18, 1986, Ser. No. 944,300**

**Claims priority, application Fed. Rep. of Germany, Oct. 16, 1985, 3536777**

**Int. Cl.[4] G11B** *5/02, 23/04*

**U.S. Cl. 360—137** **5 Claims**

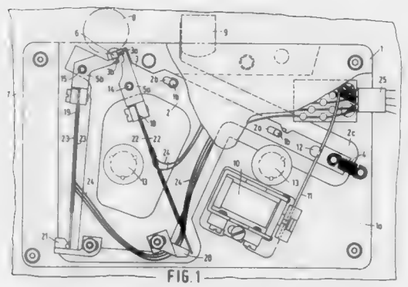


FIG. 1

1. A test cassette with electrical transmission of measured values, for measuring the position of an element in a magnetic-tape-cassette apparatus, comprising at least one measurement sensor including an electrical measuring element for supplying a value which provides an indication of the position of said element in the apparatus,

characterized by comprising a reference sensor, and

means for mounting said sensors such that, when said cassette is present in a magnetic-tape-cassette apparatus having a capstan, said sensors together sense the azimuth position of the capstan, the azimuth position relative to the reference sensor being derived electrically from said measurement value.

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**4,743,991**

## LID APPARATUS FOR DISK INSERTION OPENING OF DISK PLAYER

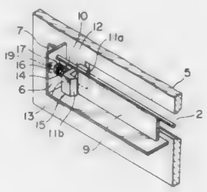
**Tsuneo Akiyama, Yokohama, Japan, assignor to Shintom Kabushiki Kaisha, Kanagawa, Japan**

**Filed Jan. 14, 1987, Ser. No. 3,071**

**Claims priority, application Japan, Jan. 14, 1986, 61-4254**

**Int. Cl.[4] G11B** *17/04, 33/02*

**U.S. Cl. 360—97** **5 Claims**



1. A disk player that will receive removably a record jacket having a disk therein, characterised in that the disk player is provided with a housing including a front panel with an insertion opening for said jacket, a lid member adapted to said insertion opening, said lid member being pivotally supported so that said lid member can be moved between the close position that prevents said jacket from being passed through said insertion opening and the open position that allows said jacket to be passed through said insertion opening, and being normally energized to be in said close position, and a control member supported movably between a lock position where said lid member is restrained in said close position and a release position where free movement of said lid member is secured, said control member having a stopper member engageable with said lid member in said lock position and a cam follower section engageable with a corner section of said jacket, the corner section of said jacket acts as a cam for said cam follower section and when said cam follower section is moved by said cam upon insertion of said jacket, said stopper section together with said cam follower is retracted to said release position.

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**4,743,992**

## MAGNETIC TAPE CASSETTE

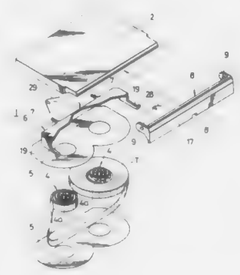
**Choji Komiyama, and Kengo Oishi, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Aug. 27, 1985, Ser. No. 769,648**

**Claims priority, application Japan, Aug. 27, 1984, 59-128637[U]**

**Int. Cl.[4] G11B** *23/04*

**U.S. Cl. 360—132** **9 Claims**



1. A magnetic tape cassette comprising: a pair of hubs (**4**) on which a magnetic tape (T) is wound, said wound magnetic tape having substantially planar first and second surfaces, first and second planar friction sheets (**5**) disposed within the cassette in individual contact with the first and second substantially planar surfaces of said wound magnetic tape, respectively, a displaceable locking member (**6**) for locking said hubs against rotation, first and second rectangular case halves (**2, 3**) secured together and sandwiching the hubs, magnetic tape, friction sheets and locking member therebetween, said first and second case halves defining a cassette housing having three closed sides and one open side (**10**) to enable access to said magnetic tape, a recess defined in said lower case half contiguous with said open side of said housing, an elongate guard panel (**8**) pivotally mounted to said housing for closing said open side thereof, and a rectangular slide guard (**20**) slidably mounted to said second case half for movement towards and away from said open housing side between a first position whereat said lower case half recess is closed and a second position whereat said recess is openly exposed, spring means (**25**) for urging said slide guard towards said first position, and a plurality of spaced protrusions (**21**), upstanding from an inner surface of a main, base portion of said slide guard and in slidable engagement with a surface of said second half case which faces away from said first half case, for reducing sliding friction between said slide guard and said second case half.



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**4,743,993**

## PLATE SPRING ASSEMBLY FOR A MAGNETIC RECORDING DISK CARTRIDGE

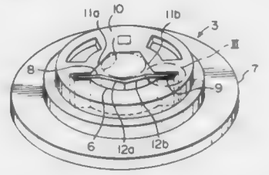
**Shozo Ommori, and Kengo Oishi, both of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Japan**

**Filed May 19, 1986, Ser. No. 864,209**

**Claims priority, application Japan, May 20, 1985, 60-74657[U]**

**Int. Cl.[4] G11B** *23/03, 5/012, 5/016, 3/70*

**U.S. Cl. 360—133** **3 Claims**



1. A magnetic recording disk cartridge comprising a mangetic recording disk accommodated for rotation in a casing about a central axis and provided with a center core having a central opening into which a compressible recording/reproducing spindle having an outer peripheral surface is insertable, said spindle is rotatable about a rotational axis and is inserted within the central opening to be drivingly engaged with the center core wherein said center core includes a core block provided with the central opening and a pair of slits which are generally in a vertical plane away from the rotational axis of the spindle and each have a notch portion, the pair of slits formed in a wall portion of the core block define the central opening and are spaced from each other by a predetermined distance; and a resilient plate spring which extends across the central opening and opposite end portions thereof, each having bifurcated free and portions that are fitted into the notch portion of the slits and held therein so that the plate spring can be resiliently deformed in a direction radial to the magnetic recording disk when the spindle is fitted into the central opening and the outer peripheral surface of the spindle is compressed inwardly under the resiliency of the plate spring so that the rotational axis of the spindle coincides with the central axis of the magnetic recording disk.

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**4,743,994**

## ARRANGEMENT FOR POSITIONING A RECORDING DISC OF A DISC CARTRIDGE

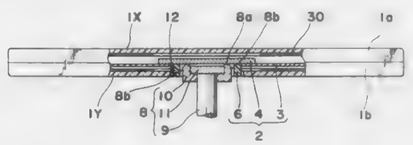
**Yoshitake Kato, Ibaragi, and Hiroshi Maruyama, Toride, both of Japan, assignors to Hitachi Maxell, Ltd., Osaka, Japan**

**Filed Feb. 14, 1986, Ser. No. 829,217**

**Claims priority, application Japan, Feb. 16, 1985, 60-27547; Feb. 16, 1985, 60-27548; Mar. 19, 1985, 60-53297; Sep. 9, 1985, 60-197748**

**Int. Cl.[4] G11B** *23/03*

**U.S. Cl. 360—133** **17 Claims**



1. A disc cartridge comprising:

a cartridge case;

a recording disc assembly rotatably accommodated in said cartridge case, said recording disc assembly including a disc having a central hole and an inner peripheral edge,

a disc support plate having a first face, a contacting surface on the central portion of said first face for detachably contacting a disc drive assembly, and a disc securing surface on the outer peripheral portion of said first face to which said inner peripheral edge of said recording disc is secured thereby supporting said recording disc, and

an annular positioning rib means for regulating the position of said recording disc assembly in a radial direction, said annular positioning rib means being formed coaxial to said disc support plate and secured to said first face of said disc support plate, and said annular positioning rib means having an outer cylindrical wall that is secured within said central hole of said recording disc,

wherein said contacting surface and said securing surface of said disc support plate are coplanar.

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**4,743,995**

## DISK FILE WITH IN-HUB MOTOR

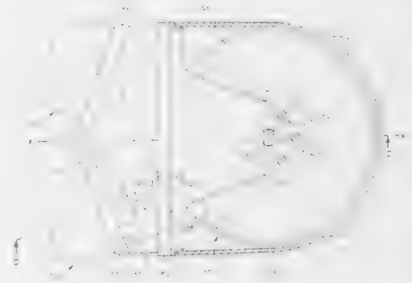
**Frank E. Castle, Winchester; Colin P. Hatchett, Southampton; Michael R. Hatchett, Chandlers Ford, and John S. Heath, Winchester, all of England, assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Oct. 14, 1986, Ser. No. 918,184**

**Claims priority, application United Kingdom, Oct. 31, 1985, 85307881**

**Int. Cl.[4] G11B** *5/012*

**U.S. Cl. 360—98** **12 Claims**



1. A disk file comprising:

a disk stack subassembly, the subassembly further comprising

a non-rotatable central spindle,

a hub supported for rotation about said spindle by two bearings at or near the opposite ends thereof, the hub being spaced from the spindle to define a cavity,

an internal electric motor within said cavity for rotating said hub, the motor having stator means mounted on the spindle and rotor means mounted within and on the hub, and

a plurality of disks mounted externally on the hub;

a rigid box frame having upper and lower spaced-apart walls and open to at least one side;

means for rigidly securing opposite ends of the non-rotatable spindle to respective upper and lower walls of the box frame proximate the open side thereof, whereby structural rigidity of the box frame is improved by the secured spindle and the disk stack subassembly is partially enclosed by the box frame;

at least one actuator for positioning read/write heads radially of the disks;

means for mounting the actuator on the box frame opposite to said open side supporting the spindle; and

a cover mating with the box frame on its open side so as to completely enclose the disk stack subassembly.

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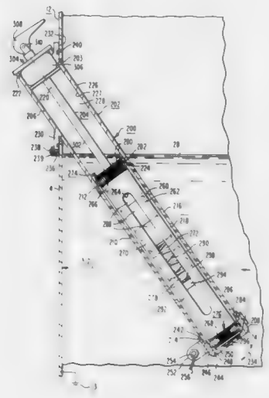


**4,743,996**

## ELECTRICAL DISTRIBUTION APPARATUS HAVING FUSED DRAW-OUT SURGE ARRESTER

**William J. Book, Jefferson City, Mo., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Continuation of Ser. No. 866,013, May 22, 1986, abandoned. This application Jul. 17, 1987, Ser. No. 75,188**
**Int. Cl.[4] H02H** *7/04*
**U.S. Cl. 361—39** **4 Claims**



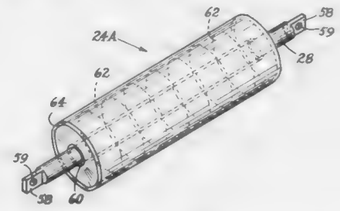
1. Electrical distribution apparatus, comprising:
an electrically grounded metallic tank,
an electrical element in said tank,
said tank having an opening therein,
and an arrester assembly including a housing, and a removable draw-out device in said housing,
said arrester housing extending into said tank via said tank opening,
said arrester housing including first and second insulatively spaced metallic means,
said draw-out device including an insulative tubular member, first and second spaced electrical contacts, a surge arrester, and a fuse,
said insulative tubular member having first and second ends, and an opening which extends between its ends, with said insulative tubular member supporting said first and second spaced electrical contacts,
said surge arrester and said fuse being integrally mounted within the opening of said insulative tubular member, and serially connected between said first and said second spaced electrical contacts,
said first metallic means of said housing mechanically mounting said housing to said tank and electrically connecting the first electrical contact of said draw-out device to said grounded metallic tank,
said second metallic means of said housing electrically connecting the second electrical contact of said draw-out device to said electrical element,
said fuse being sized to open the electrical circuit from the electrical element to the grounded metallic tank upon failure of said surge arrester to recover from a voltage surge.

**4,743,997**

## HIGH-VOLTAGE SYSTEMS SURGE ELIMINATORS FOR TRANSMISSION LINES AND DISTRIBUTION STATION PROTECTION

**Roy B. Carpenter, Jr., 9444 Tierra Blanca, Whittier, Calif. 90603**

**Filed Dec. 22, 1986, Ser. No. 944,183**
**Int. Cl.[4] H02H** *9/04*
**U.S. Cl. 361—118** **2 Claims**




1. A high-voltage surge eliminator for the protection of high-voltage electric circuits against the effects of transients and atmospheric discharges, including those caused by lightning and switching transients, having a typical high-energy surge arrestor and a low-energy, metal-oxide arrestor, separated by a surge interceptor
comprising:
a low-capacitance reactance reactor type high-voltage surge interceptor
having a conductor core of an electrically conductive material and an electric conductor, selectively,
a first cylindrical tubing of an electrically nonconductive material enveloping said conductor core and said electric conductor, respectively,
at least one toroidally-shaped member of a first configuration placed upon said first tubing,
said toroidally-shaped member
formed from a tape of a magnetically conductive material, shaped from a magnetic material,
formed from an electrically conductive, short-circuited winding, selectively,
a second cylindrical tubing of an electrically nonconductive material enveloping said at least one toroidally-shaped member,
said toroidally-shaped member in a manner that does not introduce any electric capacity between the input-and-output terminals of said surge interceptor.

**4,743,998**

## GROUNDING SYSTEM

**Cheng-Hsun Wu, No. 181 Chin Hwa Road 4 Sec, Tuinan, Taiwan**

**Filed Sep. 16, 1986, Ser. No. 908,063**
**Int. Cl.[4] H02H** *3/16*
**U.S. Cl. 361—42** **6 Claims**

1. A ground system comprising:
a ground wire;
automatic shut-off means; and
wire connecting means, said wire connecting means including
a case having a bottom with a central hole,
a tube having an upper and lower part, said lower part of said tube having a plurality of closely bored holes,
said upper part of said tube being connected to said central hole in the bottom of said case,
release electrode having a plurality of grids welded around itself, said release electrode being placed inside said tube,
connecting wire having first and second ends, said first end linked to said ground wire and said second end connected to said release electrode,
a set of leakage detectors for sensing leaking current,



cord wire connecting said leakage detectors and said automatic shut-off means,
a lid having holes through which said cord wire and said first end of said connecting wire extend outward, said lid covering said case, and
fastening means for fastening said lid to said case,



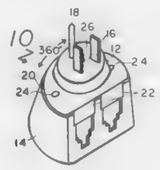
said tube being buried under ground which contains ground water, said ground water flowing through said plurality of holes into said tube to contact said release electrode to release current leakage through said release electrode into the water.

**4,743,999**

## ROTARY TELEPHONE LINE SURGE PROTECTOR AND SYSTEM

**Edward L. Hames, Peterborough, N.H., assignor to Curtis Manufacturing Company, Inc., Peterborough, N.H.**

**Filed Feb. 13, 1987, Ser. No. 14,301**
**Int. Cl.[4] H02H** *9/04*
**U.S. Cl. 361—56** **11 Claims**




1. A rotary surge protector, which surge protector comprises in combination:
(a) a first and a second housing, said second housing for rotary movement about a central axis with respect to the first housing;
(b) the first housing comprising:
(i) an electrically conductive grounding prong extending outwardly from the housing and in use to be inserted into the grounding receptacle of an electrical outlet;
(ii) a non-conductive securing means on the first housing to secure the first housing to the said electrical outlet;
(iii) an electrically conductive grounding plate about the central axis and in an electrically conductive relationship with the electrically conductive grounding prong;
(c) the second housing comprising:
(i) a plurality of signal receptacle means to receive in an electrical communicating manner a signal input jack from an incoming signal source whose signal is subject to surge protection and a signal output jack to send a surge-protected outgoing signal;
(ii) a surge protecting circuitry means to receive and dissipate any electrical overvoltage received through the receptacle means from said incoming signal source;
(iii) a plurality of electrically conductive rotary arms about the central axis for rotary movement with the movement of the second housing, the arms extending laterally outward and tension-biased into a frictional and electrically conductive relationship at all times with said grounding plate; and
(iv) an electrically conductive pin means to secure the rotary arms through the second housing and extending into the central axis in the first housing to permit the rotary movement of the second housing relative to the first housing whereby any electrical incoming signal surges from an incoming line received by the receptacle means is transmitted to the surge protecting circuitry and through the rotary arms, the pin means to secure the rotary arms, the grounding plate and grounding prong to earth ground.

**4,744,000**

## ELECTRICAL CAPACITOR HAVING IMPROVED DIELECTRIC SYSTEM

**Marco J. Mason, Racine; Gary A. Gauger, Franklin; Paul F. Hettwer, Greenfield, all of Wis., and William M. Hurst, Greenwood, S.C., assignors to Cooper Industries, Inc., Houston, Tex.**

**Filed Jul. 29, 1987, Ser. No. 79,067**
**Int. Cl.[4] H01G** *4/22;* **H01B** *3/48*
**U.S. Cl. 361—315** **10 Claims**



1. An electrical capacitor comprising an outer casing and capacitor packs disposed within the casing having alternate layers of metal foil and a solid dielectric material, said solid dielectric material being impregnated with a dielectric liquid composition comprising:
(a) 5 to 95% by weight of Phenyl xylyl ethane (PXE); and
(b) 95 to 5% by weight of Phenyl tolyl methanes (PTM).

**4,744,001**

## CONTACT ARRANGEMENT FOR INSERTABLE POWER SWITCHES

**Henning Krafft, and Klaus Grahlmann, both of Neumünster, Fed. Rep. of Germany, assignors to Licentia Patent-Verwaltungs-GmbH, Frankfurt am Main, Fed. Rep. of Germany**

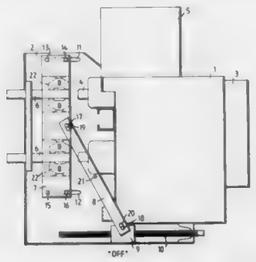
**Filed Jun. 26, 1987, Ser. No. 66,431**
**Claims priority, application Fed. Rep. of Germany, Jun. 28, 1986, 3621748; Jan. 26, 1987, 3702199; Feb. 23, 1987, 3705728**
**Int. Cl.[4] H02B** *1/04*
**U.S. Cl. 361—338** **13 Claims**

1. In a contact arrangement for connecting an insertable power switch to a switching system having a fixed portion which includes a fixed carrier for supporting the power switch, the fixed system portion and the power switch each having respective connecting lugs, the power switch having an auxiliary circuit and being insertable into a predetermined position in the carrier, and the switching system including contact members for effecting an electrically conductive connection between the connecting lugs of the fixed system portion and the connecting lugs of the power switch, and drive means for moving the contact members into predetermined contact positions, the improvement wherein: said contact arrangement

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comprises a contact frame which carries said contact members and is movable between OFF, TEST and ON operating positions, and a spindle drive which is fixed in the fixed system portion below the location of the power switch; said contact frame is movable to positively connect the connecting lugs of the fixed system portion and the power switch in the TEST and ON positions when the power switch is in the predetermined position in the carrier; said contact arrangement further comprises a plug-in contact which is positively moved together with said contact frame for providing electrical connections to the auxiliary circuit of the power switch; and said contact frame comprises a cover plate which, in the various operating positions of said frame, positively assures a cover for the connecting lugs of the fixed system portion to secure those lugs against contact by operating personel and tools.



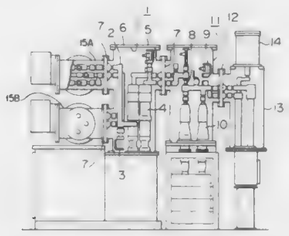
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**4,744,002**

## COMPACT-TYPE GAS-INSULATED SWITCHGEAR APPARATUS

**Haruji Nakano, Hitachiota, and Kazuaki Oishi, Hitachi, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Apr. 1, 1987, Ser. No. 32,593**
**Claims priority, application Japan, Apr. 1, 1986, 61-72437**
**Int. Cl.[4] H02B** *1/04*
**U.S. Cl. 361—341** **3 Claims**



1. A compact-type gas-insulated switchgear apparatus comprising a circuit breaker including a vertical cylindrical casing including arranged therein a breaker on the same axis as the cylindrical casing and a bus-side connecting conductor connected to a lower terminal of the breaker and arranged substantially in parallel to the breaker, a cylindrical cable head casing connected to an upper terminal of the breaker through an insulating spacer and including a disconnector, a ground switch and a cable head, and main buses connected to the bus-side connecting conductor through a second insulating spacer and juxtaposed vertically along the axis of the cylindrical casing;

wherein said disconnector and the ground switch include movable contacts respectively operated through a link device from an axial end of the cable head casing to perform the switching operation along different axes parallel to the center line of the cable head casing, stators arranged opposedly to the movable contacts of the disconnector and the ground switch, and a connecting conductor arranged in a plane substantially perpendicular to the center line of the casing and having mounted thereon said movable contacts and said stators, and a connecting opening is formed in the cable head casing at a part thereof corresponding to the end of the connecting conductor opposite to the disconnector, said cable head being formed at the other axial end of the cable head casing.

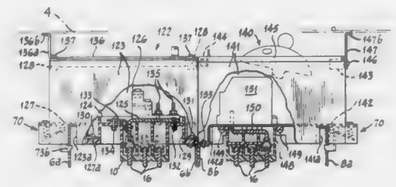
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**4,744,003**

## POWER DISTRIBUTION PANELBOARD

**Howard E. Koslosky, Wild Rose; John E. Swedowski, Milwaukee; Robert J. Clarey, Brookfield; Allan E. Grams, Elm Grove, and Frank Navratil, Thiensville, all of Wis., assignors to Eaton Corporation, Cleveland, Ohio**

**Filed Apr. 7, 1987, Ser. No. 35,405**
**Int. Cl.[4] H02B** *1/04*
**U.S. Cl. 361—363** **19 Claims**



1. A power distribution panelboard comprising:

a box-shaped enclosure having an open front;

a panel mounted within said enclosure parallel to a rear wall thereof, said panel having forwardly extending mounting rails along opposed vertically disposed sides thereof;

insulator means mounted to said panel between said mounting rails;

a plurality of bus bars supported by said insulators and extending vertically in their lengthwise dimension parallel to said mounting rails;

locating means on at least one of said mounting rails for defining vertical mounting increments along said rails;

a plurality of devices from a group comprising enclosed lug connector devices, enclosed fusible switch devices and non-enclosed molded case circuit breaker devices mounted transversely across said mounting rails in variably selectable combinations and arrangements, each of said devices effecting a plug-on electrical connection with said bus bars with each said device seated firmly against said mounting rails and each having a respective height corresponding to a multiple of said increments;

means on said devices cooperable with said locating means positioning a respective device on a multiple increment segment of said panel;

one of said devices being a main device having incoming electrical power supply wires connected to wiring terminals of said device and supplying electrical power to said bus bars through said plug-on electrical connection of said device with said bus bars; and

at least one of said devices being an enclosed fusible switch device and at least another one of said devices being a non-enclosed molded case circuit breaker device.

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**4,744,004**

## ELECTRICITY METER WITH SOLID-STATE CIRCUITS

**Scott H. Hammond, Columbus, Ohio, assignor to Transdata, Inc., Tyler, Tex.**

**Filed May 27, 1987, Ser. No. 54,629**
**Int. Cl.[4] H02B** *9/00*
**U.S. Cl. 361—372** **16 Claims**

1. An electricity meter, comprising:



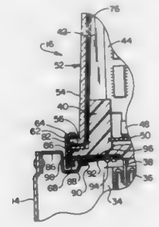
housing means including a condutive path to a neutral reference;

fixed socket component means supported upon said housing means and connectable with a monitored source of power;

meter socket component means having electrical connectors removably connected with said fixed socket component means, having a circular base connector portion and a meter support portion extending therefrom;

a solid-state meter circuit supported upon said meter support portion and electrically coupled with said meter socket component means electrical connectors for evaluating said source of power and providing electrical parameter outputs including a visual readout display forwardly disposed from said base connector portion;

an electrically insulative, transparent cover having a generally cylindrical body portion extending from a circular rearward edge portion to a forwardly disposed face and positioned over said meter circuit to effect the enclosure thereof while providing visual access to said visual readout through said forwardly disposed face;



electrically conductive ring connector means positioned over said cover circular rearward edge and rotatably engageable with said meter socket means for coupling said cover thereto;

electrically conductive metallic barrier means positioned within said cover adjacent said generally cylindrical body portion for reflecting sunlight, and dissipating electromagnetic field and radio frequency phenomena;

first electrical conducting means for electrically coupling said barrier means with said ring connector means;

second electrical conducting means coupled with said meter socket component means and effecting electrical connection between said ring connector means and said housing means path to a neutral reference with said cover and ring connector portion and said meter socket component means connected with said fixed socket component means.

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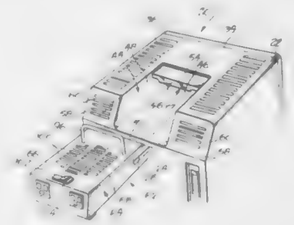
**4,744,005**

## FAN FOR COOLING COMPUTER

**Dean L. Milani, Highland Park, Ill., assignor to Medical Research Laboratories, Inc., Niles, Ill.**

**Filed Nov. 14, 1986, Ser. No. 931,243**
**Int. Cl.[4] H05K** *7/20*
**U.S. Cl. 361—384** **6 Claims**

1. An accessory ventilating device for use with an electronic apparatus such as a computer having an enclosure including a top wall, a pair of side walls, a front wall and a rear wall, said top wall having an open topped trough therein opening at said rear wall, said trough having a ventilating aperture opening to the interior of said enclosure, and a handle overlying an inner end of said trough, said device comprising: a housing detachably received and fitting in said trough and having an end portion fitting at least in part beneath said electronic apparatus handle portion and a first aperture communicating with said trough ventilating aperture, said housing having a second aperture, and a fan unit in said housing for drawing air in through one of said housing apertures and blowing it out through the other of said housing apertures to facilitate air circulation through the interior of said electronic apparatus enclosure.



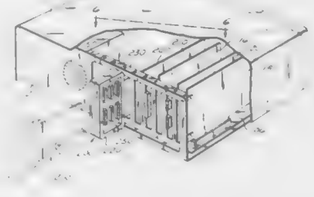
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**4,744,006**

## APPARATUS FOR EXPANDING THE INPUT/OUTPUT CAPABILITIES OF A PERSONAL COMPUTER

**Robert H. Duffield, 5742 Honors Dr., San Diego, Calif. 92122**

**Filed Jul. 10, 1986, Ser. No. 884,185**
**Int. Cl.[4] H01R** *23/68*
**U.S. Cl. 361—413** **27 Claims**



1. An apparatus for interconnecting a female connector defining an expansion slot in a computer with a plurality of input/output connectors, comprising:

a male connector having a male portion for mechanical insertion into said expansion slot, said male connector further having a plurality of electrical contacts arranged so that, in an inserted position when the male connector is inserted in the expansion slot, the male and the female connectors are electrically connected;

a printed circuit board electrically connected to said male connector so that in the inserted position, the printed circuit board is electrically connected to said female expansion slot connector, said printed circuit board further having a sufficient length so that in the inserted position, an extended portion of the printed circuit board extends through an opening in an outer frame of the computer;

a plurality of input/output connectors electrically connected to said extended portion of the printed circuit board; and

an enclosure surrounding said extended portion of the printed circuit board, said enclosure including means for electromagnetic shielding, and including an attachment portion having means for mechanically interconnecting said enclosure with the outer frame of the computer.

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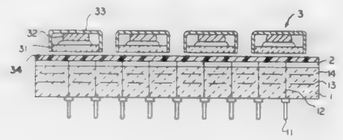


4,744,007

## HIGH DENSITY LSI PACKAGE FOR LOGIC CIRCUITS

Toshihiko Watari, and Junzo Umeta, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Continuation of Ser. No. 593,126, Mar. 26, 1984, abandoned.
This application Aug. 14, 1986, Ser. No. 896,348
Claims priority, application Japan, Mar. 29, 1983, 58-52944; Apr. 26, 1983, 58-73293; Apr. 26, 1983, 58-73294
Int. Cl.[4] H05K 7/20
U.S. Cl. 361—386 3 Claims



1. A multi-chip package comprising:

an alumina ceramic substrate with an upper and under surface and having, on its under surface, a plurality of input and output pins disposed in a grid pattern and, inside of the substrate, at least one power supply and at least one ground wiring layer and a plurality of through-hole wires for conductively connecting each of said input and output pins on the under surface of the substrate to the upper surface of the substrate;

a plurality of thin-film conductive wiring layers disposed over the upper surface of said alumina ceramic substrate, each of said wiring layers including a plurality of conductive wirings;

a plurality of insulating films disposed over the upper surface of the alumina substrate, at least one of said insulating films being a high-molecular-weight organic polymer having a dielectric constant relatively lower than alumina sandwiched between a first wiring layer and a second wiring layer of said plurality of thin-film conductive wiring layers for insulating the wirings of said first wiring layer from the wirings of said second wiring layer and having a plurality of via-holes for conductively connecting said first wiring layer to said second wiring layer, another of said insulating films forming a top layer over said wiring layers and having a plurality of surface terminal pads formed thereon for connection to leadless chip carriers positioned above the top layer, said another of said insulating films having a plurality of via-holes for connecting said pads to said conductive wirings, and a second other of said insulating films provided on said upper surface of said alumina ceramic substrate and having a plurality of via-holes for connecting said conductive wirings to said plurality of through-hole wires in the alumina ceramic substrate, said plurality of insulating films and plurality of conductive wiring layers being so structured that each of said through-hole wires in the alumina ceramic substrate and each of said surface terminal pads can be mutually connected in any desired combination through said thin-film conductive wiring layers and via holes; and

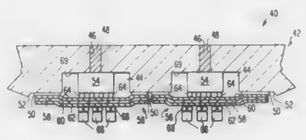
a plurality of leadless chip carriers positioned above the top layer, each carrier including an IC chip disposed face down within said carrier and said chip having a plurality of flexible leads, a chip carrier substrate having a plurality of chip carrier terminals disposed in a grid pattern on its under surface for connection to said surface terminal pads and a plurality of bonding pads on its upper surface for connection to said flexible leads, and a chip carrier cover made of a highly heat-conductive material, wherein the die of the chip is directly connected to said chip carrier cover by a highly heat-conductive adhesive.

4,744,008

## FLEXIBLE FILM CHIP CARRIER WITH DECOUPLING CAPACITORS

Vincent J. Black, Apalachin; Ronald S. Charsky, Binghamton, and Leonard T. Olson, Endwell, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 931,813, Nov. 18, 1986, abandoned.
This application Sep. 11, 1987, Ser. No. 97,322
Int. Cl.[4] H05K 7/20
U.S. Cl. 361—386 15 Claims



1. An electronic packaging structure comprising:

a second level electronic package having one opening therein for accommodating a semiconductor chip and having circuitry for electrical connection to the semiconductor chip; and

a circuitized thin film structure having a semiconductor chip mounted on one side of the thin-film structure and at least one decoupling capacitor mounted on an opposite side of the thin-film structure which is electrically connected to input/output contacts of said semiconductor chip, said thin-film structure is mounted on the second level electronic package with the semiconductor chip positioned in the opening of the second level package and with the circuitry on said thin-film structure connected to the circuitry on the second level electronic package to electrically interconnect the input/output contacts of said semiconductor chip to the circuitry on the second level electronic package.

4,744,009

## PROTECTIVE CARRIER AND SECURING MEANS THEREFOR

Dimitry G. Grabbe, Middletown, and Iosif Korsunsky, Harrisburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Oct. 31, 1986, Ser. No. 926,024
Int. Cl.[4] H05K 1/14
U.S. Cl. 361—398 6 Claims

1. In combination:

a substrate having contact areas thereon;

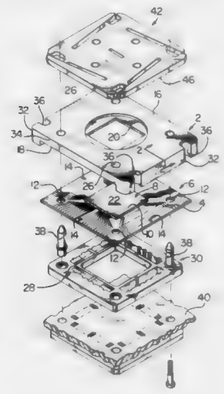
a chip carrier socket having a first surface and a second surface, a recess extending from the first surface, contact passages extending from the first surface to the second surface, contacts positioned in the contact passages, posts extending outward from the first surface, the second surface being adjacent the contact areas of the substrate, such that the contacts of the socket are in electrical engagement with the contact areas of the substrate;

a protective carrier having a chip carrier and flexible circuitry with leads therein secured to the protective carrier in such a manner that any dimensional changes of the circuitry and the protective carrier, due to different coefficients of expansion of the circuitry and protective carrier, will maintain the center of each in coincidence, giving the circuitry and the protective carrier a reliable and accurate reference point, facilitating the positioning of the protective carrier onto the socket and ensuring that the leads will align with the contacts of the socket; and

a securing and pressure means with integral resilient means,



and securing and pressure means having openings provided adjacent the resilient means, the openings align with the posts of the socket such that the openings and the



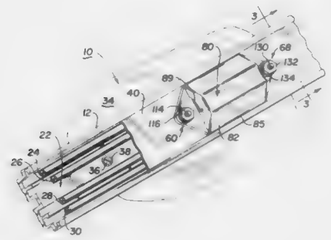
resilient means cooperate with the posts to provide and maintain the contact force required to ensure the leads of the protective carrier are maintained in electrical engagement with the contacts of the sockets.

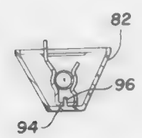
4,744,010

## ELECTRICAL COMPONENT MOUNTING APPARATUS WITH ISOLATED CONDUCTORS

Donald H. Witte, 7331 Oakbluff, Dallas, Tex. 75240

Filed Aug. 8, 1986, Ser. No. 894,666
Int. Cl.[4] H05K 7/02
U.S. Cl. 367—417 20 Claims





1. Electrical component mounting apparatus for enabling the energization of electrical components when said apparatus is operatively connected to an energy source, said electrical component mounting apparatus comprising:

a strip member having a plurality of spaced-apart grooves running longitudinally of the strip member and opening at a first face thereof, each spaced-apart groove structured to accept an electrically conductive member positioned in each spaced apart groove;

a face cover member of electrically nonconductive material, said face cover member structured to be positionable to cover said opening of said plurality of spaced-apart grooves, said face cover member including a predetermined plurality of apertures formed therein and located therein such that each predetermined one of said predetermined plurality of apertures is positioned over a predetermined different one of said plurality of spaced-apart grooves when said face cover member is positioned to cover said opening of said plurality of spaced-apart grooves, said face cover member including positioning means to assure that adjacent face cover members are properly oriented and positioned with respect to each other;

a module structure removably mounted to said strip member, said module structure including means removably mounting an electrical lamp thereon, said module structure further including means removably connecting said electrical lamp between a predetermined plurality of the electrical conductive members when said electrical conductive members are operatively positioned in said spaced-apart groove, said means removably connecting extends through respective said predetermined plurality of apertures formed in said face cover member; and

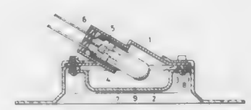
means removably mounting said module structure to said strip member.

4,744,011

## AUTOMOBILE LAMP

Kenji Tomita; Kikuo Iguchi, both of Shizuoka, and Yoshihiro Yamai, Aichi, all of Japan, assignors to Koito Manufacturing Co., Ltd., Tokyo and Toyota Jidosha Kabushiki Kaisha, Aichi, both of, Japan

Filed Apr. 23, 1986, Ser. No. 854,980
Claims priority, application Japan, Apr. 27, 1985, 60-64697[U]
Int. Cl.[4] B60Q 1/00
U.S. Cl. 362—80 4 Claims



1. An automobile lamp comprising: a lamp housing, a lens, a gasket fitted between said lamp housing and said lens, a bulb socket including means for conducting out bulb leads, a rubber cover crowning said bulb socket and also serving to form bushings for said leads, an air passageway being formed between said bulb socket and said rubber cover, said air passageway communicating with a lamp chamber through said bulb socket and said conducting means, said rubber cover comprising a body tightly in contact with the outer periphery of said bulb socket, first and second bushings projecting outwardly from a body wall of said body and tightly fitted around respective ones of said leads, at least one guide member projecting inwardly from a bottom wall of said body and inserted into said conducting member, a skirt having a diameter slightly larger than a diameter of said body and a stop projecting slightly inwardly from said bottom wall of said body and contacting an end of an outlet of said conducting member.

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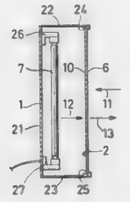


**4,744,012**

## LIGHTING ASSEMBLAGE

**Lars A. Bergkvist, Västmansvägen 16, S-890 23 Själevad, Sweden**

**PCT No. PCT/SE85/00436, § 371 Date Jun. 24, 1986, § 102(e) Date Jun. 24, 1986, PCT Pub. No. WO86/03045, PCT Pub. Date May 22, 1986**
**PCT Filed Nov. 5, 1985, Ser. No. 881,039**
**Claims priority, application Sweden, Nov. 6, 1984, 8405563**
**Int. Cl.[4] F21V** *9/16;* **G09F** *13/20*
**U.S. Cl. 362—84** **5 Claims**



1. A lamp unit comprising a box-like body which is provided with at least one aperture covered with at least one sheet of material transparent to visible light, and which houses a light source, where the side **(10)** of said sheet **(6)** facing inwardly of the body **(1)** is at least partially covered with a layer of a substance which fluoresces when irradiated with ultraviolet light and where said light source **(7,8,9)** is arranged to transmit ultraviolet light characterized in that said at least one sheet **(6)** is made of a material transparent to visible light but impermeable to ultraviolet radiation, in that the substance comprises at least one paint which fluoresces when irradiated with ultraviolet light, thereby giving a visible light but which paint is transparent or dark when irradiated by visible light, and in that an image is applied to said sheet **(6)** by said paint which fluoresces in a visible colored light, whereby the image only is visible to an observer when the light source radiates ultraviolet light.

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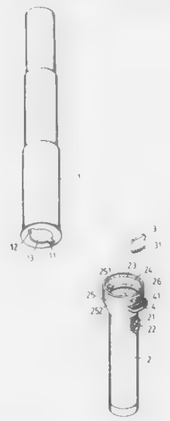
**4,744,013**

## ILLUMINABLE AND SOUNDABLE BATON

**Juhon Lee, 5th Fl., No. 11-4, Valley 2, Lane 198, Yuan Tong Road, Chung Ho City, Taipei Hsien, and Fon-San Kao, 1st Fl., No. 21, Lane 475, Hsin Ming Road, Nei-Hu District, Taipei City, both of Taiwan**

**Filed Mar. 19, 1987, Ser. No. 27,729**
**Int. Cl.[4] F21L** *15/14*
**U.S. Cl. 362—109** **1 Claim**

1. An illuminable and soundable baton comprising:
(a) a telescopic cylinder formed of translucent material, the cylinder including a plurality of hollow sleeve members and a bottom, a light hole provided on the bottom of the cylinder, the periphery of the light hole including a pair of opposed recesses;
(b) a handle portion including a head, a substantially annular ring-shaped cap installed on the head of the handle portion, the cap including a pair of opposed protuberances extending inwardly from the inner side of the cap and in a direction perpendicular to the longitudinal axis of the handle portion, the pair of protuberances being configured for engagement within the pair of recesses on the bottom of the cylinder, whereby relative rotation of the cylinder and handle portion permits their detachable engagement;
(c) a bulb covered with glass and installed at the head of the handle portion for lighting up the sleeve members and rendering the cylinder visible;
(d) a receiving seat disposed on the outer side of the cap, with an adjacent corresponding portion of the cap being provided with a plurality of holes;
(e) the handle portion including a bottom cavity, a battery positioned in the bottom cavity and a sounder chip inserted into the receiving seat, the sounder chip being provided with a plurality of contact points on the bottom thereof; and
(f) a contact switch installed on the handle portion for controlling conduction of electric current from the battery to



the contact points of the sounder chip, whereby when the contact switch is closed, the sounder chip is caused to sound, with the sound being amplified by means of cavity sympathetic vibration through the plurality of holes in the cap.

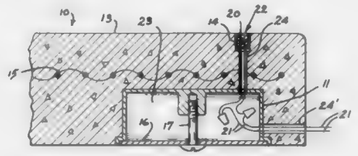
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**4,744,014**

## LOW VOLTAGE LIGHTING SYSTEM

**Edward H. Harris, Henderson, Nev., assignor to Creations by Harris, Inc., Henderson, Nev.**

**Filed Jan. 5, 1987, Ser. No. 613**
**Int. Cl.[4] F21S** *1/02*
**U.S. Cl. 362—145** **15 Claims**



1. A low voltage light system comprising
at least one stepping-stone;
at least one recessed groove in the upper face of said stepping stone;
a light source removably inserted within said recessed groove, said light source comprising
a flexible, substantially transparent tube;
a low voltage light source within said tube; and
electrical leads extending from said light source, through said stepping stone and exiting therefrom, for connecting said light source to an external power source.

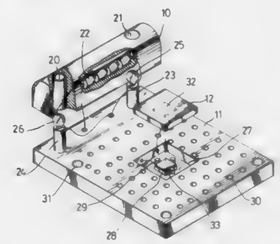


**4,744,015**

## MAT-TYPE ENTRANCE LAMP

**Aling Lai, 7F-1, No. 11, Lane 233, Min Chuan Rd., Taichung, Taiwan**

**Filed Jul. 21, 1987, Ser. No. 77,144**
**Int. Cl.[4] F21S** *1/14*
**U.S. Cl. 362—153** **1 Claim**



1. A mat-type entrance lamp comprising a lamp base, a mat member and a switch platform; said lamp base attached to one end of said mat member; said lamp base having two through holes and a battery room containing four batteries; said mat member having two posts with bulbs to fit in the through holes of said lamp base; said mat member having a number of mud-wiping holes, a recess with three rubber supports, and a first contact plate lower than the rubber side supports; said switch platform, having a second contact plate on the bottom sized to fit in the recess, and, resting on the rubber supports is spaced above said first contact plate; said battery room, lamp bulbs and contact plates being electrically connected in such a way that when a person stands on the switch platform, it will be lowered to allow the contact plates to close an electrical circuit and cause the lamp to produce light in the dark.

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**4,744,016**

## MEANS IN A SOLARIUM

**Jan Lindberg, Ställdalen, Sweden, assignor to Extend Handelshus Aktiebolag, Orebro, Sweden**

**PCT No. PCT/SE86/00294, § 371 Date Feb. 27, 1987, § 102(e) Date Feb. 27, 1987, PCT Pub. No. WO87/00257, PCT Pub. Date Jan. 15, 1987**
**PCT Filed Jun. 18, 1986, Ser. No. 33,105**
**Claims priority, application Sweden, Jul. 1, 1985, 8503258**
**Int. Cl.[4] F21V** *21/14*
**U.S. Cl. 362—131** **9 Claims**

1. In a solarium comprising a canopy containing light-emitting units and a holder for said canopy, said canopy comprising a number of rigid elongate bodies located side by side and parallel to each, said bodies being articulated with respect to each other with each body being pivotable about an axis parallel to the longitudinal direction of the body, each body including, along the length thereof, at least one of said light-emitting units with cooperating reflector means, said holder comprising a guide-rail assembly and mounting means on each body cooperating with said guide-rail assembly, said bodies being displaceable along the guide-rail assembly substantially perpendicular thereto, said guide-rail assembly including a section forming a storage position for selectively receiving said bodies, the guide-rail assembly including a portion extending beyond



said storage position, said portion being selectively removable from the section forming the storage position.

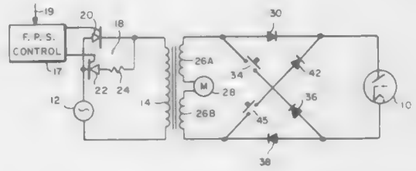
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**4,744,017**

## HIGH TENSION POWER SUPPLY WITH MEANS FOR PREVENTING TRANSFORMER SATURATION

**John K. Grady, 43 Slough Rd., Harvard, Mass. 01451**

**Filed Aug. 24, 1987, Ser. No. 88,702**
**Int. Cl.[4] H02M** *7/155*
**U.S. Cl. 363—8** **13 Claims**

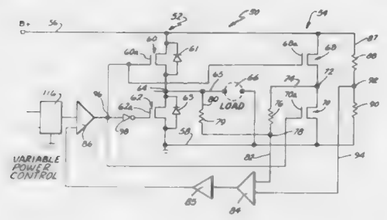



1. In a power supply for producing high voltage pulses for operating an x-ray tube, said supply having a high voltage step-up transformer with primary and secondary windings, means for connecting said secondary winding to an x-ray tube to be operated, and means for generating a periodic sequence of pulses, each of said pulses consisting of a single cycle of alternating current consisting of a first and a second half cycle, there being an average voltage in the primary winding for each half cycle the improvement comprising
means connected between said pulse generating means and said transformer primary winding for connecting said pulse generating means to said primary winding during said first half cycle so that an average current flow is established in said primary winding during said first half cycle, and
means connected between said pulse generating means and said transformer primary winding for limiting the current flow in said transformer primary winding during said second half cycle so that the average voltage in said primary winding during said second half cycle is substantially equal to the average voltage during said first half cycle.

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**4,744,018**
**REGULATED POWER SUPPLY**
**Larry Eccleston, Marshall, Mich., assignor to Progressive Dynamics, Inc., Marshall, Mich.**
**Filed Sep. 29, 1986, Ser. No. 912,626**
**Int. Cl.[4] H02M** *3/335*
**U.S. Cl. 363—16** **14 Claims**

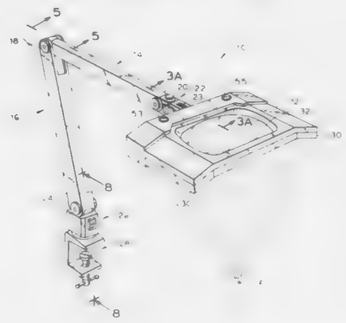



1. A voltage-agile, controlled output, regenerative feedback power supply control circuit, comprising in combination: a power source input; a circuit ground conductor; a first controllable switch means connected between said power source input and a power output point for said circuit, for supplying a selective amount of output power to a load connected to said output point; and a second controllable switch means connected between said circuit output point and said circuit ground conductor, for selectively completing a regenerative power feedback path when switched to a conductive condition; said first and second controllable switch means each having a control terminal for receiving control signals operative to selectively change the conduction state of the associated switch means; output control means for producing control signals of variable effective magnitude and thereby selectively varying the circuit power output; circuit means for operatively connecting said control terminals of said first and second switch means to said output control means in a manner to apply mutually different representations of said control signals to said first and second switch means respectively such that the latter operate separately and under different conditions, a first such condition providing circuit output power excitation to a load connected to said output point and a second such condition providing regenerative power feedback to said power source input; and circuit means for comparing the power output actually supplied by said first controllable switch means to circuit power output under no-load conditions, and for changing said control signal as a function of said comparison to compensate for actual load conditions by controlling said circuit output power accordingly.

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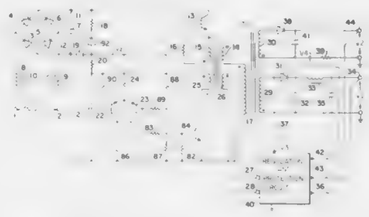
**4,744,019**
**COUNTERBALANCED ARM ASSEMBLY**
**Jessan C. Krogsrud, Oslo, Norway, assignor to Jac Jacobsen A/S, Oslo, Norway**
**Filed Sep. 12, 1986, Ser. No. 906,302**
**Int. Cl.[4] F21V** *21/18*
**U.S. Cl. 362—402** **12 Claims**

1. In a counterbalanced arm assembly, including a mounting bracket and a first arm pivotally connected to said mounting bracket, the improvement comprising means for balancing said first arm including an inner arm located within said first arm and pivotally connected to said bracket along a second pivot axis; said bracket including a pair of spaced bearing surfaces; a spring carrier having a pair of spaced bearing surfaces respectively located to selectively engage said bearing surfaces of the bracket; a tension spring operatively engaged between said bracket and said spring carrier to bias said bearing surfaces of the carrier and bracket into engagement when the first arm is in a substantially vertical position; and means on said spring carrier for engaging the inner surfaces of said first arm whereby pivotal movement of the first arm from the vertical position causes said engaging means to transmit a counterbalancing force from said spring to said first arm to hold the first arm to whatever position it is moved to.




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**4,744,020**
**SWITCHING MODE POWER SUPPLY**
**Gian P. Cavagnolo, Milan, Italy, assignor to Honeywell Information Systems Italia, Caluso, Italy**
**Filed May 7, 1987, Ser. No. 46,769**
**Claims priority, application Italy, May 22, 1986, 20527 A/86**
**Int. Cl.[4] H02M** *3/335*
**U.S. Cl. 363—21** **3 Claims**



1. A switching mode power supply having a power transformer with a primary power winding and a secondary power winding and current flowing in said primary power winding induces a voltage in said secondary power winding, having a DC voltage source, and having a driving transistor with base, collector and emitter terminals, said transistor emitter being connected in series with said primary winding, the output of said secondary power winding being connected to a rectifier and output filter, and said driving transistor is cyclically turned on and off to cyclically connect said DC voltage source to said primary power winding, and there is a regulated voltage at the output of said output filter, characterized in that said power supply comprises:

a control transformer having an activation winding, a primary control winding, a secondary regeneration winding, a metering and deactivation winding, said primary control winding being series connected to said primary power winding,

a resistor series connected between the base of said transistor and one terminal of said regeneration winding, the emitter of said transistor being connected to the other terminal of said regeneration winding, and voltages are induced in said regeneration winding to turn said transistor on and off,

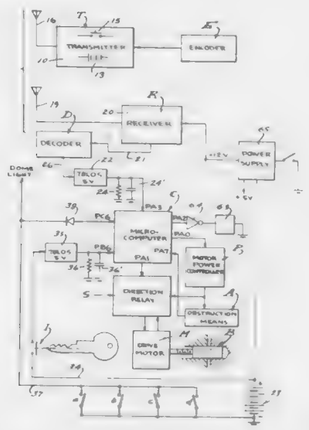
first circuit means powered by said DC voltage source for generating a sequence of first voltage pulses having a preestablished frequency, said first pulses being applied to said activation winding, to induce in said regeneration winding corresponding voltage pulses which turn-on said transistor and cause current to flow through said transistor and the serial connected primary power winding, said transistor being kept on by a voltage induced in said regeneration winding responsive to said current flowing in said primary control winding, and

second circuit means powered by the voltage induced in said secondary power winding, said second circuit means having an output connected to said metering and deactivating winding and applying to said metering winding a second voltage pulse opposed to a voltage induced in said metering winding by the current flowing in said primary control winding, and when the voltage induced in said metering winding exceeds a threshold value, said second voltage pulse induces a reverse biasing voltage in said regenerating winding for switching off said transistor.



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**4,744,021**
**COMPUTER CONTROLLED DEADBOLTS**
**Brickton D. Kristy, 515 Ocean Ave., Apt. 608, Santa Monica, Calif. 90402**
**Filed Feb. 1, 1986, Ser. No. 825,335**
**The portion of the term of this patent subsequent to Feb. 4, 2003, has been disclaimed.**
**Int. Cl.[4] G06F** *15/20;* **H01H** *47/32*
**U.S. Cl. 364—141** **17 Claims**




1. A computer programed lock system for power positioning of at least one deadbolt into closed and opened positions in a door jamb and including;

a radio transmitter including encoder means switched to place a distinct code signal on a carrier wave,

a radio receiver tuned to said carrier wave and including decoder means responsive to justify said distinct code signal and produce sequentially distinct voltage signals,

computer means having means therein responsive to the sequentially distinct voltage signals and a first program means activated thereby to produce and hold a power-up signal and alternately a motor direction "open" and "close" signal, and having a second program means responsive to at least one deadbolt position sensor to drop the power-up signal,

a power control means responsive to the first program means of the computer producing the power-up signal to energize a motor circuit.

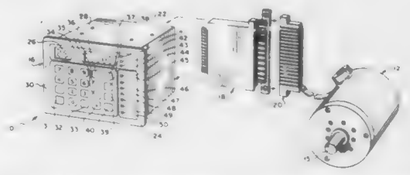
a direction means responsive to the first program means of the computer means producing alternately the motor "open" and "close" signal and including a signal responsive switch energizing a relay between motor "open" and motor "close" positions,

a reversible motor for moving the deadbolt between "open" and "close" positions in response to the relay positions,

and the deadbolt position sensor responding to a position thereof and the second program means of the computer means responsive thereto to limit said position of the deadbolt by dropping the motor circuit and stopping the motor.

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**4,744,022**
**PROGRAMMABLE CONTROL APPARATUS INCLUDING AN ABSOLUTE POSITION TRANSDUCER**
**Shalabh Kumar, Kildeer, and Duane Edgar, Schaumburg, both of Ill., assignors to Autotech Corporation, Carol Stream, Ill.**
**Filed Jun. 3, 1985, Ser. No. 740,669**
**Int. Cl.[4] G06F** *15/46*
**U.S. Cl. 364—142** **26 Claims**



1. A high speed programmable control apparatus including an absolute position transducer which is capable of being coupled to a machine and which has electrical circuitry for generating output signals indicative of and related to the machine position, a programming unit including a microcomputer, visual display means and a data input keyboard, and a plurality of programmable memory output devices (PMPOD) each containing a memory having a portion of a changing transducer output as part of its address and at least one output switching device coupled to said programming unit, each PMPOD being coupled to said microcomputer and to at least one controlled device, said position transducer being coupled to said PMPODS directly or through said programming unit and said control apparatus including means for addressing all PMPODS at the same time with the changing transducer output, each PMPOD being responsive to the changing transducer output.

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**4,744,023**
**PROCESSOR ACCESS CONTROL ARRANGEMENT IN A MULTIPROCESSOR SYSTEM**
**Lawrence A. Welsch, Naperville, Ill., assignor to American Telephone and Telegraph Company, AT&T Information Systems, Holmdel, N.J.**
**Filed Dec. 16, 1985, Ser. No. 808,951**
**Int. Cl.[4] G06F** *15/16*
**U.S. Cl. 364—200** **13 Claims**

1. An arrangement for interconnecting a plurality of processors in a multiprocessor system, comprising an interconnecting bus for transferring origination and destination addresses, data words and control messages, and a plurality of bus interface circuits connected to said bus, said bus interface circuits each having a unique identification address associated therewith, including a bus interface circuit comprising:

a receive buffer for storing data messages accompanying a destination address corresponding to said associated address occurring on said bus and for genernating receive buffer status signals;

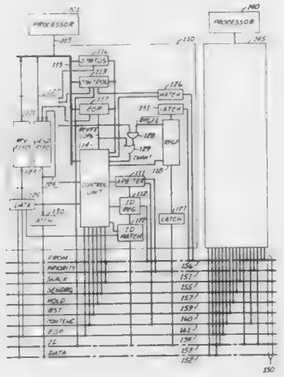
an address buffer for storing identification addresses and for generating address buffer status signals;

control means responsive to said receive buffer status signals indicating an overload condition and a destination address corresponding to said associated address occurring on said bus to store an origination address occurring on said bus in said address buffer and responsive to said receive buffer

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and address buffer status signals for fetching one of said identification addresses from said address buffer and transmitting said one of said identification addresses on said bus together with a retransmission request control message



when said receive buffer status signals indicate that said receive buffer is ready to receive additional data words and said address buffer status signals indicate that addresses are present in said address buffer.

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**4,744,024**

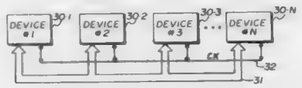
## METHOD OF OPERATING A BUS IN A DATA PROCESSING SYSTEM VIA A REPETITIVE THREE STAGE SIGNAL SEQUENCE

**Hanan Potash, La Jolla, and Melvyn E. Genter, San Diego, both of Calif., assignors to Burroughs Corporation, Detroit, Mich.**

**Continuation of Ser. No. 412,281, Aug. 27, 1982, abandoned, which is a continuation of Ser. No. 135,638, Mar. 31, 1980, abandoned. This application Jul. 23, 1984, Ser. No. 633,662**

**Int. Cl.[4] G06F** *13/00*

**U.S. Cl. 364—200** **6 Claims**



**1**. A method of operating a bus in a data processing system over which a plurality of devices send messages, poll signals, and bid signals to each other; said method including the steps of:

broadcasting a poll signal on said bus from the device which received the last message to all of said devices as an immediate response to the received message if the message was received error free;

immediately responding to said poll signal by transmitting a prioritized bid signal on said bus from each device which has a message to send to all of said devices and, as another immediate response to said poll signal, setting an indicator in the device which sent the last message on said bus indicating the message that it sent was received error free and can be discarded;

sending a message, immediately after the bid signal transmission, to a selectable device on said bus from the device that transmitted the highest prioritized bid signal;

repeatedly performing the above steps such that said message, poll signal, and bid signals immediately follow one another from different devices on said bus in a repetitive three signal cycle so long as messages are received error free.

**4,744,025**

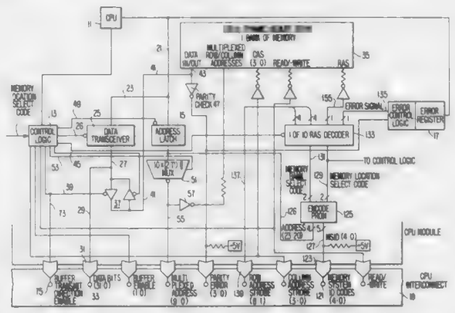
## ARRANGEMENT FOR EXPANDING MEMORY CAPACITY

**Jesse B. Lipcon, Harvard, and Barry A. Maskas, Marlboro, both of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.**

**Continuation of Ser. No. 729,610, May 2, 1985, abandoned. This application Feb. 26, 1987, Ser. No. 21,522**

**Int. Cl.[4] G06F** *12/06*

**U.S. Cl. 364—200** **7 Claims**



**1**. A self-configuring memory circuit which is accessed by a central processing unit generating address signals for said memory circuit, the memory circuit comprising:

interconnect means for transferring configuration signals from a plurality of separate memory modules to the central processing unit serially through said modules, each of said modules receiving from said interconnect means one of said configuration signals and each providing to said interconnect means another one of said configuration signals;

each of said plurality of memory modules being serially connected to said interconnect means at locations which are in increasing distance from the central processing unit, and each of said memory modules being capable of having one of a plurality of memory sizes and including

means for receiving from said interconnect means one of said configuration signals as a prior configuration signal specifying a cumulative size of all of said memory modules more distant from the central processing unit along said interconnect means, said prior configuration signal being generated by an adjacent one of said memory modules more distant from the central processing unit on said interconnect means or being equal to a preset value for the memory module most distant from the central processor unit, and said prior configuration signal being composed of a first plurality of bits capable of representing all of the possible cumulative sizes for said more distant memory modules,

means for generating a size signal identifying the one of said plurality of memory sizes of the memory module, said size signal being composed of a second plurality of bits,

means for combining the size signal and the prior configuration signal to form a present configuration signal in compacted form being composed of a total number of bits no greater than the sum of said first and second pluralities of bits, said combining means including logic circuit elements coupled to receive the size signal and the prior configuration signal and generating a compacted present configuration signal, and

means for providing the compacted present configuration signal to said interconnect means; and

interface means, coupled between the central processing unit and said interconnect means, for receiving the present configuration signal provided from the memory module least distant from the central processing unit for encoding



said transferred present configuration signal with said address signals from said central processing unit to select ones of said memory modules for access by the central processing unit.

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**4,744,026**

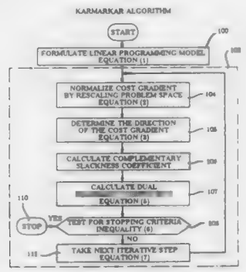
## METHODS AND APPARATUS FOR EFFICIENT RESOURCE ALLOCATION

**Robert J. Vanderbei, Red Bank, N.J., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Apr. 11, 1986, Ser. No. 851,120**

**Int. Cl.[4] G06F** *15/20;* **H04Q** *3/66;* **H04M** *7/00*

**U.S. Cl. 364—402** **15 Claims**




**1**. A method for allocating available industrial facilities among the users of said facilities so as to reduce the total cost of providing said facilities, said method comprising the steps of:

tentatively and iteratively reassigning said available facilities to said users in accordance with the Karmarkar algorithm so as to reduce said total costs at each said reassignment, each said reassignment being determined by normalizing the previous assignment with respect to constraints on said allocations,

during each said reassignment, adjusting the direction of changes in said previous assignments under the assumption that at least one of said constraints increases in value without limit,

terminating said iterative reassigning steps when said costs are reduced to a preselected threshold to form a final reduced cost assignment, and

allocating said facilities in accordance with the final reduced cost assignment.

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**4,744,027**

## METHOD AND APPARATUS FOR OPTIMIZING SYSTEM OPERATIONAL PARAMETERS

**David A. Bayer, New York, N.Y.; Narendra K. Karmarkar, North Plainfield, and Jeffrey C. Lagarias, Summit, both of N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Aug. 22, 1986, Ser. No. 899,191**

**Int. Cl.[4] G06F** *15/20;* **H04Q** *3/66;* **H04M** *7/00*

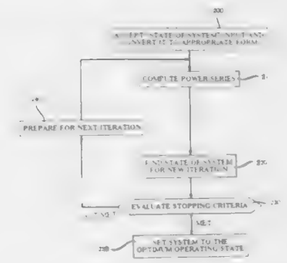
**U.S. Cl. 364—402** **12 Claims**

**1**. Apparatus for optimizing the operating state of a communications network comprising:

a plurality of sensors for developing signals representative of present operating state of said network, said signals being related to controllable parameters of said network;

first processor, responsive to said sensors, for transforming said signals onto a multi-dimensional space such that said operational state of said communications network is at essentially the center of said multi-dimensional space and said constraints form a polytope in said space;

second processor, responsive to said first processor, for computing a path in said space characterized by a power series of order greater than one, along which values of said signals in said space represent a state of said communications network that is monotonically improving with distance from said center; and



third processor, reponsive to said second processor, for selecting a point on said curve, developing a modified set of signals corresponding to said selected point and controlling said parameters of said communication network in accordance with said modified set of signals.

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**4,744,028**

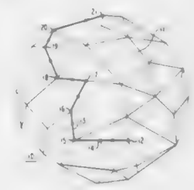
## METHODS AND APPARATUS FOR EFFICIENT RESOURCE ALLOCATION

**Narendra K. Karmarkar, Somerset, N.J., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Apr. 19, 1985, Ser. No. 725,342**

**Int. Cl.[4] G06F** *15/20;* **H04Q** *3/66;* **H04M** *7/00*

**U.S. Cl. 364—402** **36 Claims**



**1**. A method for allocating the available telecommunication transmission facilities among the subscribers demanding service at a particular time so as to reduce the total cost of operating said transmission facilities, where the available transmission facilities, the subscribers, and the total cost are related in a linear manner, said method comprising the steps of:

tentatively and iteratively reassigning said available telecommunications transmission facilities to said subscribers so as to reduce said total costs at each said reassignment, each said reassignment being determined by normalizing the previous assignment with respect to constraints on said allocations,

terminating said iterative reassigning steps when said costs are below a preselected threshold, and

allocating said transmission facilities in accordance with the reduced cost assignment.

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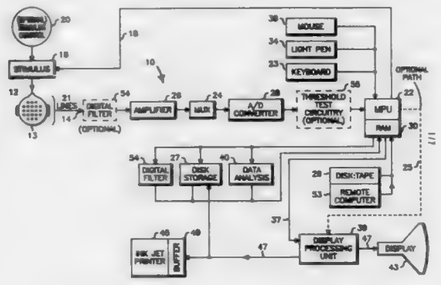


**4,744,029**

## BRAIN ELECTRICAL ACTIVITY ANALYSIS AND MAPPING

**Gabriel Raviv, Des Plaines, and Gil Raviv, Deerfield, both of Ill., assignors to Bio-Logic Systems Corporation, Northbrook, Ill.**

**Filed Aug. 31, 1984, Ser. No. 646,614**
**The portion of the term of this patent subsequent to Mar. 10, 2004, has been disclaimed.**
**Int. Cl.[4] A61B *5/04*; G06F *15/42***
**U.S. Cl. 364—417** **29 Claims**




**1**. An apparatus for displaying a topographical map of brain electrical activity sensed by a plurality of electrode sensors disposed on a patient's head, wherein said electrode sensors provide an associated plurality of input activity signals, said apparatus comprising

processing means responsive to said input activity signals for providing an amplified and digitized form of said plurality of input activity signals;

threshold means responsive to said amplified and digitized input activity signals for comparing a predetermined condition with said input activity signals and for activating the continuing measurement and storage of said amplified and digitized input activity signals responsive to having attained said predetermined condition;

means for storing said amplified and digitized input activity signals responsive to activation by said threshold means;

computer means for providing a video output responsive to said amplified and digitized input activity signals; and

means for displaying said topographical maps of said brain electrical activity responsive to said video output.

**10**. A distributed system for displaying a topographical map of brain electrical activity remotely sensed by a plurality of electrode sensors disposed on a patient's head, each of said plurality of electrode sensors adapted to provide a plurality of input activity signals and each said electrode sensor selectable as an active and a reference electrode sensor, said system further comprising;

processing means responsive to said input activity signals for providing an amplified and digitized form of said plurality of input activity signals and having a feature of interest included therein;

memory means for storing said amplified and digitized form of said input activity signals;

montage means responsive to said stored input activity signals for identifying said feature of interest in said stored signals by carrying out an iterative analysis of said stored input activity signals, said iterative analysis comprising selection of at least one said active electrode sensor and at least one said reference electrode sensor from said plurality of electrode sensors, forming a difference input activity signal by subtraction of said stored input activity signal for said active electrode sensor from said stored input activity signal associated with said reference electrode sensor, storing each of said difference input activity signals in said memory means, and outputting said stored difference input activity signals;

computer means for providing a video output responsive to said stored difference input activity signals;

means for displaying said topographical maps of brain electrical activity responsive to said video output; and

recycle means for returning to said iterative analysis to generate a new set of said difference input activity signals corresponding to selection of a new one of said active and said reference electrode sensors and continuing said iterative analysis and displaying said topographical maps until completion of said identification of said feature of interest.

**13**. An apparatus for displaying a topographical map of brain electrical activity of a patient and performing on-line analysis by user defined digital filtering of input activity signals arising from said brain electrical activity, comprising:

sensor means responsive to said brain electrical activity and disposed on a patient's head for providing changeable amplitude sign input activity signals;

processing means responsive to said changeable amplitude sign intput acitivity signals for providing an amplified and digitized form of said input activity signals;

digitial filter means for filtering said digitized form of said input acitivity signals, said digital filter means being modifiable by the user to allow on-line analysis of the effect of said filter means;

means for providing a video output responsive to said filtered form of said amplified and digitized input activity signals; and

means responsive to said video output for displaying the digitally filtered form of said input activity signals during the collection of said input activity signals.

**18**. A system for sensing brain electrical activity and displaying one or more topographical maps of said brain electrical activity, comprising:

apparatus for communicating changeable amplitude sign brain electrical activity data, said apparatus being responsive to sensed and processed data from a plurality of electrode sensors disposed on the head of said patient, wherein said plurality of electrode sensors provide an associated plurality of said changeable amplitude sign brain electrical activity data;

computer means for providing a video output responsive to said communicated brain electrical activity data;

means for displaying said topographical map of said brain electrical activity, responsive to said video output; and

color code means for simultaneously displaying with said topopgraphical map a set of colors associated with said topographical map and each color of said set of colors being displayed only if said color is present in said associated topographical map.

**19**. An apparatus for displaying a plurality of topographical maps representative of a patient's brain electrical activity over a given evoked potential response spectrum time period, comprising:

sensor means disposed on the head of the patient for providing evoked potential signals responsive to said brain electrical activity sensed during said given time period;

means responsive to said evoked potential signals for providing an amplified and digitized form of said evoked potential signals;

means for providing a video output responsive to said evoked potential signals, said video output including interpolated evoked potential signals for positions between the locations of said sensor means;

processing means for mathematically operating on said evoked potential signals obtained during selected portions of said given time period such that each one of said topographical maps represents a visual summary of said evoked potential signals for a different selected portion of said given time period, and such that said plurality of maps together represents a visual summary of said evoked potential for the entirety of said given time period, said plurality of maps also including substantially all of said brain electrical activity sensed during said given time period; and

means responsive to said video output for simultaneously displaying a plurality of said topographical maps.

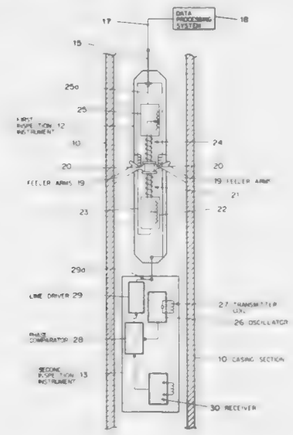


**4,744,030**

## METHOD AND APPARATUS FOR MEASURING INTERNAL CASING WEAR

**Norman R. Carlson, and James C. Barnette, both of Houston, Tex., assignors to Western Atlas International, Inc., Houston, Tex.**

**Filed Apr. 29, 1986, Ser. No. 858,412**
**Int. Cl.[4] G01V *1/40***
**U.S. Cl. 364—422** **13 Claims**




**1**. A method of identifying the presence of internal casing wear in a casing section under inspection by passing a first and second inspection instrument through said casing section and submitting the outputs of said first and second inspection instruments to a process of analysis comprising the steps of:

(a) deriving a first and second data series from the output of said first inspection instrument;

(b) deriving a third data series from the output of said second inspection instrument;

(c) selecting a first point from said first, second, and third data series corresponding to a first location within said casing;

(d) calculating a first point-pair corresponding to said first location within said casing;

(e) determining the vertical separation of the upper point of said first point-pair and the lower point of said first point-pair; and

(f) analyzing said vertical separation to determine whether internal casing wear is present at said first location within said casing.

**2**. A method of identifying the presence of internal casing wear in a casing section under inspection comprising:

(a) passing a first inspection instrument through said casing section;

(b) passing a second inspection instrument through said casing section;

(c) deriving a first, second and third data series from the output of said first and second inspection instruments;

(d) selecting a first point of said first, second and third data series corresponding to a first location of said casing sections;

(e) analyzing said first point of said first, second and third data series to determine the presence of casing wear at said first location; and

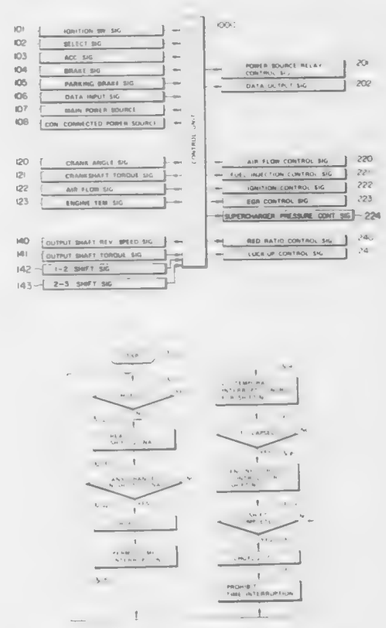
(f) repeating steps (d) through (e) for all locations of said casing section where analysis for the presence of casing wear is desired.

**4,744,031**

## METHOD OF AND APPARATUS FOR ALLEVIATING SHIFT SHOCKS OF AUTOMATIC TRANSMISSION

**Hitoshi Takeda, and Sadao Takase, both of Yokohama, Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Feb. 25, 1985, Ser. No. 698,377**
**Claims priority, application Japan, Feb. 23, 1984, 59-31463**
**Int. Cl.[4] B60K *41/08*; G06F *15/20*; G05D *17/02***
**U.S. Cl. 364—424.1** **12 Claims**




**7**. A method of alleviating shocks occurring when an automatic transmission shifts from one reduction ratio to another reduction ratio, the automatic transmission having a torque converter, with a lock-up clutch, drivingly connected to an engine, the torque converter performing a lock-up action when the lock-up clutch is engaged, said method comprising the steps of:

detecting a shift command occurring in the automatic transmission and generating a shift command signal, said shift command causing an actual shifting operation in the automatic transmission;

interrupting the lock-up action of the torque converter when a predetermined condition is satisfied after generation of said shift command signal;

determining a variation trend in engine revolution of the engine after generation of said shift command signal and before the interruption of lock-up action of the torque converter and generating an engine revolution variation trend signal;

estimating an engine revolution of the engine which is to appear during the interruption of lock-up action of the torque converter based on said engine revolution variation trend signal and generating an estimated engine revolution signal;

measuring an actual engine revolution of the engine during the interruption of lock-up action of the torque converter and generating an actual engine revolution signal;

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determining a time lapsed from an instant when said shift command signal is generated to an instant when said actual engine revolution signal substantially agrees with said estimated engine revolution signal and generating a time signal;

subtracting a predetermined time from said time indicated by said time signal to give a delay time and generating a delay time signal indicative of said delay time; and

varying the output torque of the engine upon lapse of said delay time indicated by said delay time signal so as to alleviate shocks occurring during an actual shifting operation.

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**4,744,032**

**TRANSMISSION RATIO CONTROL APPARATUS OF TOROIDAL TYPE INFINITELY VARIABLE TRANSMISSION**

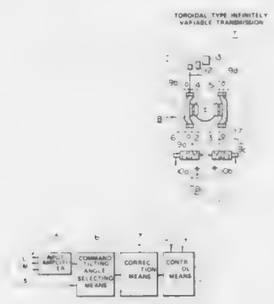
**Yasuhiko Miyaura, Gumma, and Hisashi Machida, Maebashi, both of Japan, assignors to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan**

**Filed Jul. 19, 1985, Ser. No. 757,079**

**Claims priority, application Japan, Jul. 20, 1984, 59-150760**

**Int. Cl.[4] G05D** *17/02;* **F16H** *15/08;* **B60K** *41/18*

**U.S. Cl. 364—424.1** **5 Claims**




1. A transmission ratio control apparatus of a toroidal type infinitely variable transmission comprising:

input disk and output disk mounted in a housing rotatably and coaxially, said input disk and output disk cooperating with each other to form a toroidal cavity therebetween;

a plurality of power rollers disposed in said toroidal cavity formed by both said disks;

a trunnion for each of said plurality of power rollers, each said trunnion rotatably supporting each said power roller and being movable and pivotable with respect to a pivot axis line which is at right angles to a rotation axis of each said power roller;

driving means for moving each said trunnion in a pivot axis direction;

a tilting angle detector for detecting a tilting angle of one of said plurality of power rollers;

command tilting angle selecting means, based on external input signals, for selecting a command tilting angle and for outputting a command value signal;

means for correction using said command value signal of said command tilting angle selecting means and said detection signal of said tilting angle detector, in order to make linear a transmission ratio with respect to said tilting angle; and

control means for controlling tilting of said plurality of power rollers by outputting a control signal which controls said driving means, said control signal being outputted based on a correction value of said correction means and said detection signal of said tilting pivot angle detector and based on said command tilting angle.

**4,744,033**

**ELECTRONIC DISPLAY SYSTEM**

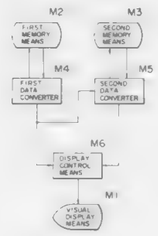
**Michima Ogawa, Nagoya; Toshio Yasui, Anjo, and Kenzo Ito, Okazaki, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan**

**Filed Apr. 29, 1986, Ser. No. 857,172**

**Claims priority, application Japan, Apr. 30, 1985, 60-94615**

**Int. Cl.[4] G06F** *15/50*

**U.S. Cl. 364—443** **5 Claims**




1. An electronic map display system for displaying a map, comprising:

first memory means for storing a plurality of point data indicative of points on the map, said point data stored with reference to a predetermined coordinate system;

second memory means for storing a target point data, indicative of a target point, said target point data indicating a positional relationship between said target point and at least two specific points on the map, each said specific point being one of said points on the map that has point data indicative thereof stored in said first memory means;

designating means for commmanding a scale of the map to be displayed;

first display control means, coupled to receive said point data from said first memory means and coupled to said designating means, for forming lines connecting said point data and converting said point data of said first memory means and said lines into first display data at a scale based on said scale commanded by said designating means;

second display control means for converting said target point data of said second memory means into second display data in accordance with a shape of a line connecting said at least two specific points; and

display means, coupled to receive said first and second display data, for displaying a map based thereon.

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**4,744,034**

**CONTRACT ESTIMATING SYSTEM UTILIZING A BAR CODE RULER**

**Irving Milstein, Margate, N.J., assignor to Judith Titton, Margate, N.J.**

**Filed Oct. 4, 1985, Ser. No. 784,338**

**Int. Cl.[4] G06F** *3/033;* **G06K** *21/06*

**U.S. Cl. 364—464** **9 Claims**

1. A ruler comprising:

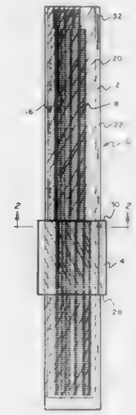
an elongated substantially thin ruler member having a length which is substantially longer than its width;

at least a substantial length of said ruler member being divided into a plurality of equally spaced increments;

each of said increments being identified by a different machine readable number visible from the upper surface of said ruler member;

a slide member carried by said ruler member and covering a portion of the upper surface of said ruler member, said slide member being slidable along at least said substantial length of said ruler member and including a leading edge which is adapted to be arranged adjacent any selected one of said machine readable numbers;

said leading edge having a substantial enough thickness to act as a guide for a hand held pen like sensor which can be drawn across the width of said ruler member against said edge in order to read the number adjacent to which said edge has been arranged.



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**4,744,035**

**INSPECTING TEXTILE PRODUCTS**

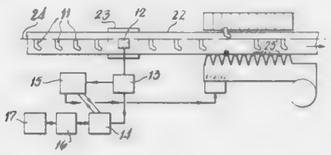
**Abdullah Hashim, Leicester, United Kingdom, assignor to National Research Development Corporation, London, England**

**Filed Jul. 16, 1984, Ser. No. 631,212**

**Claims priority, application United Kingdom, Jul. 16, 1983, 8319281; Oct. 22, 1983, 8328280**

**Int. Cl.[4] G06F** *15/46;* **B07C** *5/00*

**U.S. Cl. 364—470** **25 Claims**




1. A method for processing textile items having elongate portions defining intersecting bisectors, said items being supplied as a collection of imperfectly matched such items, comprising the steps of

(a) consistently orienting said items,

(b) optically capturing data representing at least salient dimensional features of said consistently oriented items as a function of at least the lengths of said bisectors,

(c) comparing said data automatically with reference data, said reference data including lengths of said bisectors for sets of said items,

(d) effecting a selection process in accordance with the result of such comparison, and

(e) segregating said selected items into sets of matched items by said comparison and selection processes.

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**4,744,036**

**MICROPROCESSOR CONTROLLED HYDRAULIC SYSTEM FOR CLAMPING A DIE TO A PRESS**

**Douglas L. Van Tiggelen, Douglassville, Pa., assignor to Dana Corporation, Toledo, Ohio**

**Filed Oct. 17, 1986, Ser. No. 920,571**

**Int. Cl.[4] G06F** *15/46*

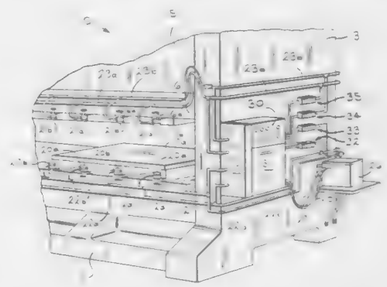
**U.S. Cl. 364—476** **8 Claims**

1. In a press having a bolster, a ram movable relatively to the bolster, and hydraulic clamping means for selectively securing upper and lower die halves respectively to the ram and the bolster, the hydraulic clamping means including a plurality of hydraulically actuated clamps connected through conduit means to a source of pressurized fluid, a system for controlling the operation of the hydraulic clamping means comprising:

first pressure sensor means responsive to the pressure level in the conduit means for generating an output signal when said pressure level is less than a first predetermined level;

second pressure sensor means responsive to the pressure level in the conduit means for generating an output signal when said pressure level is less than a second predetermined level, said second predetermined level being less than said first predetermined level; and

means responsive to said output signals of said first and second pressure sensor means for attempting to increase the pressure level in the conduit means when said pressure level is less than said first predetermined level and greater than said second predetermined level.



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**4,744,037**

**POLYNUCLEOTIDE SYNTHESIZING APPARATUS**

**Akihiko Niina, Yokohama, and Harumi Kamimoto, Kamakura, both of Japan, assignors to Nippon Zeon Co. Ltd., Tokyo, Japan**

**Filed Jul. 15, 1985, Ser. No. 754,755**

**Claims priority, application Japan, Jul. 20, 1984, 59-149642**

**Int. Cl.[4] G06F** *15/46;* **C12N** *15/00*

**U.S. Cl. 364—497** **6 Claims**



1. A polynucleotide synthesizing apparatus, comprising:

a storing section for storing fluid chemicals necessary for polynucleotide synthesis;

a reactor in which said fluid chemicals react to effect polynucleotide synthesis, said reactor having an inlet and an outlet;

fluid supply and discharge means for supplying fluid chemicals in said storing section to said reactor and for discharging said fluid chemicals from said reactor;

control means for controlling said fluid supply and discharge means, said control means comprising a programmable controller including a storage unit in which supply

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amount and supply/discharge sequence information for said fluid chemicals is stored;
a base sequence input unit connected with said programmable controller and containing information for controlling a supply order of raw materials to said reactor, said fluid supply and discharge means being controlled by said information in said storage unit and said information in said base sequence input unit;
an address display which represents a position from a synthesis initiating terminal of a nucleotide;
a plurality of base indicating lamps which indicate a type of nucleotide base;
a control unit which controls said address display and base indicating lamps in response to base sequence data in said storage unit; and
a memory pack comprising semiconductor memory devices in which a control program and/or maintenance program is stored, said memory pack being replaceable with said storage unit of said programmable controller.

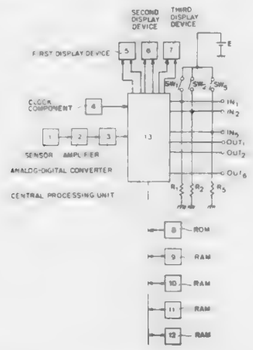
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**4,744,038**

## FIRE DETECTOR EQUIPPED WITH A SENSOR

**Yoshiaki Okayama, Tokyo, Japan, assignor to Nohmi Bosai Kogyo Co. Ltd., Tokyo, Japan**

**Filed Oct. 29, 1984, Ser. No. 666,071**
**Claims priority, application Japan, Nov. 1, 1983, 58-203658**
**Int. Cl.[4] G08B *17/10*; G01K *7/00***
**U.S. Cl. 364—557** **5 Claims**




5. A fire detector, comprising:
a sensor for detecting a physical quanitity such as heat, light or smoke;
said sensor having a signal output level which changes in response to changes in said physical quantity;
processing means constantly monitoring changes in said signal output level and generating an alarm when said signal output level exceeds a predeterminate reference level;
first storage means for storing a time at which the processor means generates an alarm and selectively at least any one of (i) a value of said signal output level of said sensor at such time or (ii) a maximum value of said signal output level attained during an alarm state;
second storage means for storing successive signal output levels of said sensor and the associated moments of time of the occurrence of such signal output levels during prescribed time intervals until the alarm is generated; and
display means for selectively displaying said stored times and said stored signal output levels.

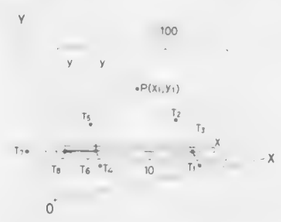
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**4,744,039**

## ROBOT WITH SELF TEACHING OF A LINEAR REFERENCE POSITION

**Hayao Suzuki, and Yoshiharu Matsuoka, both of Tokyo, Japan, assignors to Seiko Instruments & Electronics Ltd., Tokyo, Japan**

**Filed Jul. 23, 1985, Ser. No. 758,046**
**Claims priority, application Japan, Jul. 23, 1984, 59-152560**
**Int. Cl.[4] G06F *15/00***
**U.S. Cl. 364—513** **7 Claims**




1. In a robot control system having a robot hand movable along a plane according to position data determined in terms of an absolute coordinate system related to the plane for acting on a workpiece which is arbitrarily positioned on the plane and which is provided with a linear reference pattern: sweeping means for sweeping the hand along a predetermined locus on the plane according to programmed position data; detecting means mounted on the hand for movement therewith relative to the plane for detecting the linear reference pattern whenever the hand crosses the linear reference pattern during the sweep movement of the hand to produce a corresponding detection signal; reading means operative in response to the detection signal for reading from the sweeping means position data representative of a plurality of crossing points between the locus and the linear reference pattern in terms of the absolute coordinate system; and processing means for processing the read position data to determine a position of the workpiece relative to the plane.

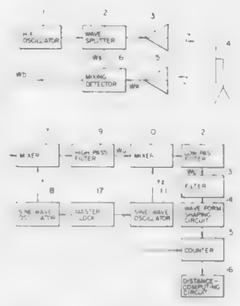
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**4,744,040**

## DISTANCE MEASUREMENT METHOD MAKING USE OF ELECTROMAGNETIC WAVE AND SYSTEM THEREFOR

**Yutaka Kawata; Takuya Kusaka, and Hiroshi Imada, all of Kobe, Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan**

**Continuation of Ser. No. 601,584, Apr. 18, 1984, abandoned. This application Dec. 19, 1986, Ser. No. 943,874**
**Claims priority, application Japan, Apr. 21, 1983, 58-70808**
**Int. Cl.[4] G01S *13/00, 7/04*; G08B *21/00***
**U.S. Cl. 364—561** **4 Claims**




1. A method for measuring a distance to a target by transmitting a frequency-modulated electromagnetic wave to the target, receiving a reflected wave from the target, mixing the thus-received wave and the thus-transmitted wave into a beat transmitted wave into a beat wave and then detecting the beat wave, which comprises:
mixing the beat wave with a sine wave having a frequency $f_1$ and extracting an upper sideband wave of a plurality of sideband waves of the resultant mixed wave, and then mixing the thus extracted upper sideband wave with a sine wave having a frequency $f_2$ and extracting a lower sideband wave of said plurality of sideband waves of said resulting mixed wave, so that phase modulation is applied to the beat wave according to the relationship: $1/|f_1-f_2|$;
counting the number of peaks of the thus-phase modulated beat wave for the period $1/|f_1-f_2|$ of the phase modulation; and thereafter,
computing the distance to the target on the basis of the result of counting the number of peaks.



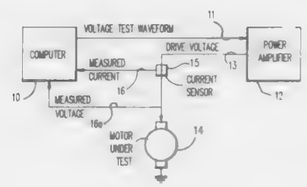
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**4,744,041**

## METHOD FOR TESTING DC MOTORS

**Timothy L. Strunk, and Glenn S. Westerman, both of Lexington, Ky., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Mar. 4, 1985, Ser. No. 707,709**
**Int. Cl.[4] G01P *3/42*; G06F *15/332***
**U.S. Cl. 364—565** **10 Claims**




1. A method for testing a direct current motor based upon current time response comprising the steps of:
generating a voltage test waveform having steady state components at a plurality of levels, one of said levels being in the order of magnitude of a rated voltage of said direct current motor, said voltage test waveform being in both polarities for exercising said motor under test in a plurality of its operating regions, said regions being defined in terms of the polarity of current and velocity of said motor and quadrants, at least one of said quadrants being defined as plus current and clockwise motor shaft rotation;
applying said waveform to drive said direct current motor under test and measuring current into the motor under test as a result of said voltage test waveform;
sampling values of said current measured at a plurality of selected times, and;
performing a Fourier transform on approximate steady-state current of said current measured to determine its power-spectral-density and determining frequency at which maximum power is used to thereby determine velocity of the motor.

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**4,744,042**

## TRANSFORM PROCESSOR SYSTEM HAVING POST PROCESSING

**Gilbert P. Hyatt, P.O. Box 846, Cypress, Calif. 90630**

**Continuation-in-part of Ser. No. 160,872, Jun. 19, 1980, Pat. No. 4,491,930, which is a continuation-in-part of Ser. No. 490,816, Jul. 22, 1974, Pat. No. 4,209,853, which is a continuation-in-part of Ser. No. 522,559, Nov. 11, 1974, Pat. No. 4,209,852, which is a continuation-in-part of Ser. No. 550,231, Feb. 14, 1975, Pat. No. 4,209,843, which is a continuation-in-part of Ser. No. 754,660, Dec. 27, 1976, Pat. No. 4,486,850, which is a continuation-in-part of Ser. No. 812,285, Jul. 1, 1977, Pat. No. 4,371,953, which is a continuation-in-part of Ser. No. 844,765, Oct. 25, 1977, Pat. No. 4,523,290, which is a continuation-in-part of Ser. No. 889,301, Mar. 23, 1978, Pat. No. 4,322,819. This application Nov. 30, 1984, Ser. No. 676,769**
**The portion of the term of this patent subsequent to Dec. 4, 2001, has been disclaimed.**
**Int. Cl.[4] G06F *15/332***
**U.S. Cl. 364—726** **48 Claims**



1. A transform processor system comprising:
a time domain circuit for generating time domain signal samples;
a transform processor for processing the time domain signal samples to generate transforms, each transform having a plurality of frequency domain signal samples; and
a post processor for integrating the frequency domain signal samples, said post processor including an adder for adding each of the plurality of the frequency domain signal samples in one of the transforms generated with said transform processor to a corresponding one of the plurality of the frequency domain signal samples in a different one of the transforms generated with said transform processor to obtain a plurality of integrated frequency domain signal samples.

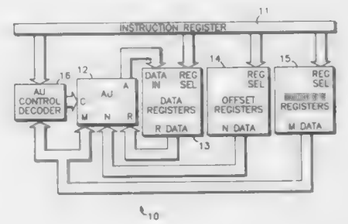
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**4,744,043**

## DATA PROCESSOR EXECUTION UNIT WHICH RECEIVES DATA WITH REDUCED INSTRUCTION OVERHEAD

**Kevin L. Kloker, Arlington Heights, Ill., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Mar. 25, 1985, Ser. No. 715,863**
**Int. Cl.[4] G06F *7/38, 7/72***
**U.S. Cl. 364—736** **13 Claims**




1. A data execution unit comprising:
an arithmetic unit (AU) for performing selected operations on first and second operands in one of a plurality of arithmetic formats and providing a resultant thereof;
an arithmetic unit control coupled to the arithmetic unit for selectively controlling the operation to be performed by said AU;
first means for providing said first operand to said arithmetic

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unit in response to an operand selection portion of an instruction;

second means for providing the second operand to said arithmetic unit, said second means providing the second operand to said arithmetic unit in response to the same operand selection portion of the instruction; and

third means for providing a third operand to said arithmetic unit in response to the same operand selection portion of the instruction, said third operand being used by the arithmetic unit control to select one of the plurality of arithmetic formats.

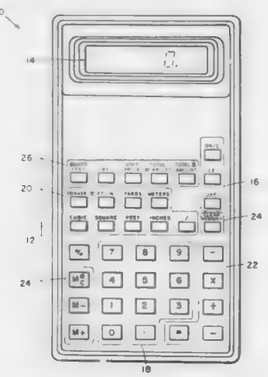
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**4,744,044**

## HAND-HELD CALCULATOR FOR DIMENSIONAL CALCULATIONS

**Howard H. Stover, Pasadena; Kenneth E. Alexander, Villa Park, both of Calif., and Fred P. Alexander, Stateline, Nev., assignors to Electronic Teacher's Aids, Inc., Orange, Calif.**

**Filed Jun. 20, 1986, Ser. No. 876,488**
**Int. Cl.[4] G06F** *11/00, 7/38*
**U.S. Cl. 364—737** **8 Claims**



1. A calculator comprising:

input means for inputting measurements including a dimension power indicative of the order of at least certain measurements;

storage means for storing at least two inputted measurements;

function means for performing selected functions on the stored measurements to produce an output measurement, said function means including first checking means for checking the dimension powers of the stored measurements for compatibility with each other for certain functions, said function means further including power function means for generating an output dimension power based on the stored dimension powers and the selected function, said function means further including second checking means for checking the output dimension power to determine whether it is acceptable; and

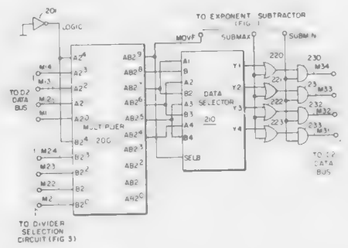
display means for displaying the output measurement including power display means for displaying selected ones of the output dimension powers, said display means being responsive to said first and second checking means and including means for displaying an error signal when the dimension powers of the stored measurements are incompatible or when the output dimension power is unacceptable.

**4,744,045**

## DIVIDER CIRCUIT FOR ENCODED PCM SAMPLES

**Jeffrey P. Mills, Oak Park, and Max S. MacRander, Warrenville, both of Ill., assignors to GTE Communication Systems Corporation, Phoenix, Ariz.**

**Filed Dec. 31, 1984, Ser. No. 687,874**
**Int. Cl.[4] G06F** *7/52, 7/38*
**U.S. Cl. 364—765** **15 Claims**



1. A divider circuit for use in a digital signal processing system which includes a source of pulse code modulation (PCM) samples and a source of divisor numbers, each sample and number having a sign bit, a plurality of exponent bits and a plurality of mantissa bits, said divider circuit comprising:

a read-only-memory (ROM) connected to said source of divisor numbers and operated in response to each of said numbers to provide the reciprocal thereof;

an adder circuit connected to said source of PCM samples and said ROM; and

a multiplier circuit connected to said source of PCM samples and said ROM;

said adder circuit being operated to add said exponent bits of said divisor reciprocal to said PCM sample exponent bits and provide a plurality of summation signals representative of the results of said addition;

said multiplier circuit being operated to multiply said mantissa bits of said divisor reciprocal by said PCM sample mantissa bits and provide a plurality of multiplication signals representative of the results of said multiplication;

whereby said adder circuit and said multiplier circuit effectuate division of said PCM sample by said divisor;

and said adder circuit is further operated in response to said summation signals having a value in excess of a predetermined threshhold to provide an exponent overflow signal.

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**4,744,046**

## VIDEO DISPLAY TERMINAL WITH PAGING AND SCROLLING

**Mark J. Foster, Stevensville, Mich., assignor to Zenith Electronics Corporation, Glenview, Ill.**

**Filed Nov. 2, 1984, Ser. No. 667,790**
**Int. Cl.[4] G06F** *3/14*
**U.S. Cl. 364—900** **8 Claims**

1. In a video display terminal having a multi-page video memory wherein data are stored in addressable locations in a plurality of immediately adjacent pages in said video memory for presentation on a video display, a paging and scrolling system for displacing the displayed contents of entire selected pages in a first mode of operation and for displacing line-by-line the displayed contents of a selected one of said adjacent pages in said video memory in a second mode of operation, said system comprising:

processing means responsive to user-initiated inputs for generating a mode control signal and a first video memory page select address representing a selected one of said adjacent pages in the video memory;

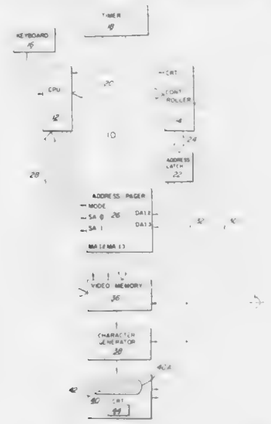
control means coupled to said processing means for generating a second video memory page select address and video RAM addresses respectively representing one of said



immediately adjacent pages in the video memory and a plurality of sequentially ordered video memory addresses within said immediately adjacent pages;

address latch means coupled to said control means and to said video memory for providing said video RAM addresses to said video memory and for outputting said second video page select address; and

address pager means connecting said processing means and said address latch means to the video memory and responsive to said mode control signal for providing said first video memory page select address and said video RAM addresses to the video memory in said first mode of operation and for providing said second video memory page select address and said video RAM addresses to the video memory in said second mode of operation, wherein said selected one of said adjacent pages of the video memory wraps around itself in said second scrolling mode of operation.



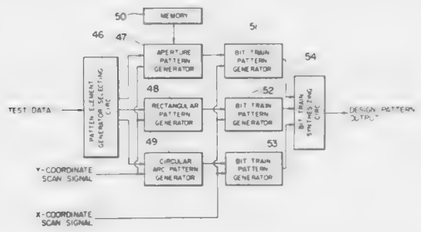
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**4,744,047**

## PATTERN TEST APPARATUS INCLUDING A PLURALITY OF PATTERN GENERATORS

**Keiichi Okamoto; Toshimitsu Hamada, and Mineo Nomoto, all of Yokohama, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Oct. 31, 1985, Ser. No. 793,219**
**Claims priority, application Japan, Nov. 1, 1984, 59-228983; Apr. 19, 1985, 60-82384**
**Int. Cl.[4] G06F** *11/00, 15/70;* **G01R** *31/28;* **G06K** *9/00*
**U.S. Cl. 364—900** **6 Claims**



1. A pattern test apparatus comprising:

(a) imaging means for providng an image of an object under test by scanning said object using light in X-axis and Y-axis directions and for outputting a digital video signal of said image;

(b) detecting means for detecting X and Y coordinates of said imaging means as said image is being scanned;

(c) a design pattern generator including;

converting means for converting design data including specific position coordinates of an aperture pattern used in manufacturing said object under test and specific position coordinates of a starting point and an end point of said aperture pattern, into test data in accordance with a predetermined order of patterns on said object under test, said test data including aperture data which contains a code indicating a pattern type and specific position coordinates of said aperture pattern, rectangular data which contains a code indicating a rectangular pattern and coordinate data corresponding to predetermined positions on said rectangular pattern,

a memory for storing at least one of said aperture patterns as two dimensional image data with respect to said specific position coordinates thereof,

aperture pattern generating means for reading out of said memory and said two dimensional image data, for converting said two dimensional image data into aperture pattern generating area data based on said specific position coordinates and for generating a bit train pattern corresponding to said aperture pattern generating for each scanning line in an X axis direction when said X and Y coordinates detected by said detecting means correspond to said converted aperture pattern generating area data,

rectangular pattern generating means including a first arithmetic and comparing circuit for calculating starting point coordinates and end point coordinates of each side of said rectangular pattern based on inputted coordinate data representing said rectangular pattern and for generating a bit train pattern corresponding to said rectangular pattern for each scanning line in the X axis direction when said X and Y coordinates detected by said detecting means correspond to said starting point coordinates and end point coordinates calculated by said first arithmetic and comparing circuit,

selecting means for selecting said aperture pattern generating means and said rectangular pattern generating means based on the order of said aperture data and said rectangular data designated by said converting means and for inputting said aperture data and said rectangular data to said aperture pattern generating means and said rectangular pattern generating means respectively, and

a bit train synthesizing circuit for synthesizing a design pattern through a logic operation of said bit train pattern corresponding to said aperture pattern obtained from said aperture pattern generating means and said rectangular pattern obtained from said bit train pattern corresponding to said rectangular pattern generating means; and

(d) comparing means for comparing said digital video signal obtained from said imaging means with said design pattern obtained from said design pattern generator.

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**4,744,048**

## DISPLAY CONTEXT SWITCHING ARRANGEMENT

**David R. Blanset, Middletown, N.J.; David A. Butterfield, Sylmar, Calif.; Kenneth M. Keverian, Westfield, N.J.; Charles S. Kline, Sherman Oaks, and Gerald J. Popek, Los Angeles, both of Calif., assignors to American Telephone and Telegraph Company, New York, N.Y.; AT&T Information Systems Inc., Morristown, N.J. and Locus Computing Corporation, Santa Monica, Calif.**

**Filed Oct. 9, 1985, Ser. No. 785,843**
**Int. Cl.[4] G06F** *3/14*
**U.S. Cl. 364—900** **3 Claims**

1. A computer of the type adapted to concurrently execute at least first and second programs which respectively generate first and second streams of screen data respectively representing first and second images, said computer comprising

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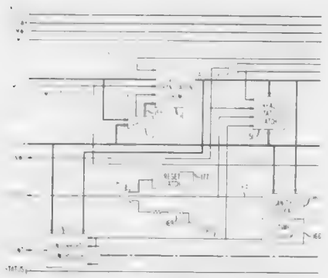


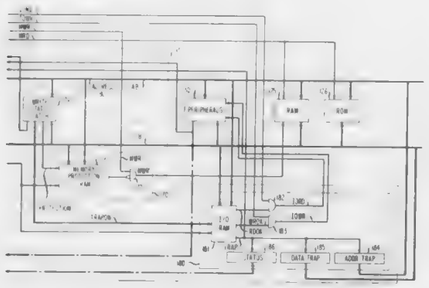
an address bus and a data bus,

a screen buffer comprised of a plurality of memory locations having respective addresses, each of said programs being adapted to provide on said address bus the addresses of individual ones of said screen buffer memory locations while concurrently providing screen data associated with those addresses on said address bus,

display means for displaying images representative of data stored in said screen buffer,

an alternate screen buffer having a plurality of addressable memory locations each corresponding to a respective one of said screen buffer memory locations,





translation means interposed between said address bus, on the one hand, and said screen buffer and alternate screen buffer, on the other hand, and operative for translating each of said screen buffer memory location addresses on said address bus to the address of the corresponding memory location in said alternate screen buffer, and

means operative while said second program is executing for enabling the operation of said translation means if it is desired to have said display means display said first image and for disabling the operation of said translation means if it is desired to have said display 30 means display said second image.

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**4,744,049**

## MICROCODE TESTING OF A CACHE IN A DATA PROCESSOR

**John Kuban; Douglas B. MacGregor; Robert R. Thompson, and David S. Mothersole, all of Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.**

**Continuation of Ser. No. 660,586, Oct. 15, 1984, abandoned. This application Sep. 17, 1987, Ser. No. 97,277**

**Int. Cl.[4] G06F** *9/00*

**U.S. Cl. 364—900** **1 Claim**

1. In a microcoded data processor having:

an address port for providing instructions and data addresses;

an operand port for receiving instructions and data operands;

an instruction cache for temporarily storing instruction operands received via the operand port; and

a tag cache for temporary storing the instruction addresses of each of the instruction operands stores in the instruction cache;

a method for recursively testing the operation of the instruction and tag caches, comprising the steps of:

providing as a data address a first value as one of said data addresses via said address port;

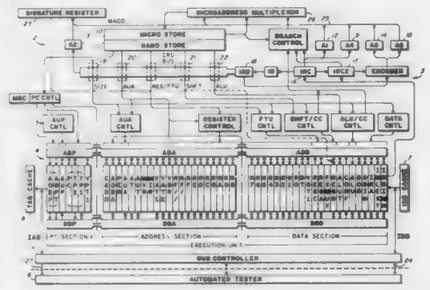
receiving as a data operand a second value as one of said data operands via said operand port;

using said second value to access said instruction cache via said tag cache;

when on a first condition that an instruction address having said second value is not stored in said tag cache then;

(1) providing said second value as an instruction address via said address port;

(2) receiving a third value as one of said instruction operands via the operand port;



(3) storing said third value in said instruction cache as one of said instruction operands concurrent with storing said second value in said tag cache as a respective instruction address; and

(4) substituting said third value for said first value during the next recursion; and

when on a second condition that an instruction address having said second value is stored in said tag cache, then;

(1) substituting for said first value during the next recursion the third value stored as an instruction operand in said instruction cache which corresponds to the instruction address stored in the tag cache having said second value;

whereby the instruction and tag caches may be tested by:

(1) providing a predetermined sequence of said second and third values to said data processor via said operand port, and

(2) comparing each of said first values provided by said data processor via said address port to selected ones of said second and third values via said operand port;

so that the instruction and tag caches are tested by using only the address and operand ports.

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**4,744,050**

## METHOD FOR AUTOMATICALLY REGISTERING FREQUENTLY USED PHRASES

**Toshio Hirosawa, Machida; Tutomu Itoh, Hachioji; Tetsuzou Uehara, Tokyo, and Junichi Kurihara, Hachioji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jun. 26, 1985, Ser. No. 748,907**

**Claims priority, application Japan, Jun. 26, 1984, 59-129950**

**Int. Cl.[4] G06F** *15/38*

**U.S. Cl. 364—900** **9 Claims**

1. In a text processor comprising input means for inputting a character string comprised of characters of a first type, macro table containing therein as pairs a phrases comprised of characters of a second type and macro codes corresponding to each phrase and comprised of character strings of characters of the first type, and conversion means for effecting a first conversion by searching said macro table based upon the input character string and selecting a phrase from among the phrases contained in the macro table corresponding to the character string inputted by said input means when the input character string is equal to one of the macro codes already contained in said macro table, and for effecting a second conversion by generating a single-character of the second type or a phrase comprised of characters of the second type, both having the same reading as that represented by the input character string when the input character string is not equal to any of the macro codes contained in the macro table;

a method for automatically registering frequently used phrases and macro codes therefor into said macro table, comprising steps of:

(a) repeatedly storing into a phrase table, phrases each generated by said second conversion for the input character



string at least when a generated phrase is different from any of the phrases already stored in said phrase table;

(b) incrementing frequency-of-occurrence-data signals of each of the phrases already stored in the phrase table each time a phrase, the same as a phrase already stored in the phrase table, is generated by said second conversion;

(c) selecting, at predetermined timings, at least one phrase of the phrases already stored in the phrase table which satisfies a predetermined condition as to frequency of occurrence in order for the phrase to be registered in the macro table, in accordance with the frequency-of-occurrence-data signal of the phrases already stored in the phrase table;

(d) determining a macro code for the selected phrase so that the determined macro code differs from any of macro codes already registered in said macro table;

(e) registering as a pair the selected phrase and the determined macro code in the macro table; and

(f) indicating the selected phrase and the determined macro code to an operator of the text processor.

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**4,744,051**

## MAGNETIC BUBBLE MEMORY DEVICE

**Toshihiro Sato, Hachioji; Tadashi Ikeda, Kanagawa; Ryo Suzuki, Hachioji, and Teruaki Takeuchi, Kokubunji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jul. 8, 1985, Ser. No. 752,587**

**Claims priority, application Japan, Jul. 9, 1984, 59-140514; Nov. 21, 1984, 59-244437; Jan. 16, 1985, 60-4058**

**Int. Cl.[4] G11C** *19/08*

**U.S. Cl. 365—36** **10 Claims**

1. A magnetic bubble memory device comprising:

a minor loop for storing information therein, said minor loop being formed by implanting ions in a desired portion of a magnetic film for magnetic bubbles, said minor loop comprising at least one inside turn of a propagation track, straight propagation tracks adjacent to each other being connected by said at least one inside turn, at least one outside turn of another straight propagation track being



disposed between said connected adjacent straight propagation tracks so as to face said at least one inside turn;

a major line or loop for reading or writing information; and

a connecting portion between said minor loop and said major line or loop.

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**4,744,052**

## HYBRID MAGNETIC BUBBLE MEMORY DEVICE

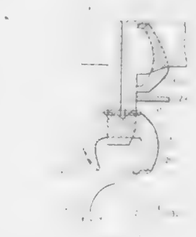
**Naoki Kodama, Tachikawa; Takashi Toyooka, Sayama; Teruaki Takeuchi, Kokubunji; Masatoshi Takeshita; Ryo Suzuki, both of Hachioji, and Shinzo Matsumoto, Mobara, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jun. 25, 1986, Ser. No. 878,248**

**Claims priority, application Japan, Jul. 3, 1985, 60-144599; Feb. 17, 1986, 61-30836**

**Int. Cl.[4] G11C** *19/08*

**U.S. Cl. 365—36** **10 Claims**



1. A magnetic bubble memory device comprising:

minor loop means for storing therein information, said minor loop means being composed of a first type magnetic bubble propagation means formed by implanting ions in a desired portion of a magnetic bubble film and a second type magnetic propagation means formed of a soft magnetic material pattern, said second type magnetic propagation means providing a minor loop corner where a bubble propagation direction on said first type magnetic bubble propagation means is changed, said minor loop corner having two ends respectively superposed on two ion-implanted regions composed of said first type magnetic bubble propagation means;

major line means or major loop means for reading and writing information and being formed of soft magnetic material patterns;

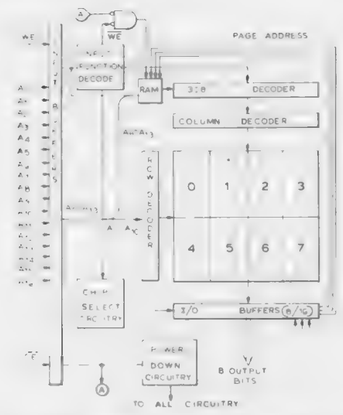
connecting means between said minor loop means and said major line means or said major loop means, said connecting means being composed of a part of said minor loop corner and at least one soft magnetic material pattern and being disposed in non-ion implanted-implanted region; and

a hairpin conductor pattern superposed on/under said part

of said minor loop corner where said part of said minor loop corner is disposed in a non-implanted region.

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**4,744,053**
**ROM WITH MASK PROGRAMMABLE PAGE CONFIGURATION**
**Craig J. Luhrmann, Bayville, N.Y., assignor to General Instrument Corp., New York, N.Y.**
**Filed Jul. 22, 1985, Ser. No. 757,337**
**Int. Cl.[4] G11C** *15/00, 8/00, 13/04*
**U.S. Cl. 365—49** **6 Claims**



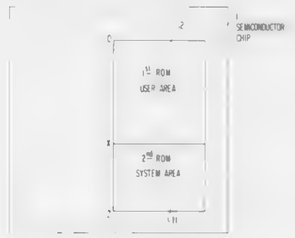

**1**. A read only memory comprising a matrix array of data storage means, address signal input buffer means having a plurality of address signal inputs adapted to receive address signals and a plurality of address signal outputs, address signal decoder means having a plurality of address signal inputs operably connected to said input buffer means address signal outputs and decoder outputs operably connected to said matrix, said decoder being effective, in response to address signals applied at said address signal inputs, to select individual data storage means, data bus means, means, operatively connected to said matrix, for transferring data from the selected storage means to said data bus means, said address signal decoder means being mask programmable into a selected one of several configurations, each of said configurations defining one or more sub-arrays of said matrix and requiring a particular number of address signal inputs, each of said sub-arrays being separately addressable in accordance with said address signals, said address input buffer means being mask programmable to alter the number of address signal outputs to match the number of address signal inputs required by the selected configuration of said decoder means.

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**4,744,054**
**SEMICONDUCTOR DEVICE WITH A MEMORY CIRCUIT**
**Kazuhide Kawata, and Hiroyuki Suzuki, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan**
**Filed Feb. 15, 1985, Ser. No. 702,288**
**Claims priority, application Japan, Feb. 16, 1984, 59-27473**
**Int. Cl.[4] G11C** *11/40*
**U.S. Cl. 365—104** **7 Claims**

**5**. A single chip microcomputer having an on-board read only memory, comprising;

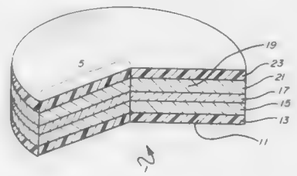
first and second ROM memories within the address space of said microcomputer and formed on said chip, said first ROM memory defining a user memory area and being of the type wherein information is written in accordance with whether or not a transistor formed at a location where a word line crosses a bit line is connected to said bit line, and wherein said second ROM memory defines a system memory area and comprises a memory of the type having first type transistors activated in response to an address signal applied to a word line and second type




transistors non-activated in response to an address signal, said first and second type transistors being selectively formed according to the information to be stored.

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**4,744,055**
**ERASURE MEANS AND DATA STORAGE SYSTEM INCORPORATING IMPROVED ERASURE MEANS**
**Michael Hennessey, Detroit, Mich., assignor to Energy Conversion Devices, Inc., Troy, Mich.**
**Continuation-in-part of Ser. No. 752,742, Jul. 8, 1985, Pat. No. 4,667,309. This application Aug. 28, 1985, Ser. No. 770,137**
**The portion of the term of this patent subsequent to May 19, 2004, has been disclaimed.**
**Int. Cl.[4] G11C** *13/00*
**U.S. Cl. 365—113** **19 Claims**




**1**. A method of doing one or more of writing data into, reading data out of, or removing data from a state changeable, chalcogenide memory medium, comprising the steps of:

(a) applying projected beam energy to the medium to change a discrete portion of the medium from a solid state of first order through a high mobility intermediate state, to a solid state of second order; and

(b) applying projected beam energy to the medium to change the discrete portion of the medium from the solid state of second order through a high mobility intermediate state, back to the solid state of first order.

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**4,744,056**
**STABLE HIGH DENSITY RAM**
**James Yu; Hong-Gee Fang; Moon-Yee Wang, all of San Jose, and Robin W. Cheung, Cupertino, all of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.**
**Filed Feb. 28, 1986, Ser. No. 835,081**
**Int. Cl.[4] G11C** *11/00*
**U.S. Cl. 365—154** **69 Claims**

**1**. A memory cell (**104**) within an active region (**462**:A) of an integrated circuit substrate (**460**) for an X-Y array memory device (**100**) and accessed by flip-flop Y metal bit leads and an X metal word line (**476**:WL) from the device, and powered by first and second metal voltage busses (**476**:Vss **476**:Vdd) disposed parallel to said X metal word line comprising:



a binary memory cell having a flip section and an adjacent flop section, and a power end (**314**:E) and an access end (**326**:E);

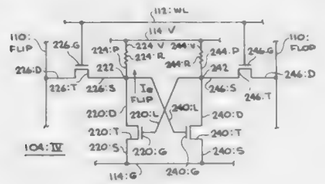
a first voltage node (**414**:G) located at the power end of the cell and formed in the active region thereof;

first voltage contact means for coupling the first voltage and (**414**:G) to the first voltage buss;

a second voltage node positioned at the power end of the cell for coupling with the second voltage buss;

a pulldown node (**422 442**) within each section and formed in the cell active region;

a pulldown resistor means (**424**:R **444**:R) in each section coupled between the pulldown node and the second voltage node means;



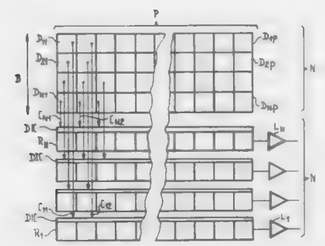

a pulldown transistor (**220**:T **240**:T) within each section having a drain (**420**:D **440**:D) included in the pulldown node, and having a source (**420**:S **440**:S) included in the first voltage node, and having a gate (**420**:G **440**:G) responsive to the voltage of the pulldown node in the other section of that cell for establishing mutually exclusive bistate operation of the cell;

a pass transistor (**226**:T **246**:T) within each section positioned at the access end of the cell and having a source (**226**:S **246**:S) included in the pulldown node, and having a drain (**226**:D **246**:D) formed in the cell active region, and having a gate (**226**:G **246**:G);

contact means for coupling each pass transistor drain to one of the Y bit leads and each pass transistor gate to the X word line for that section.

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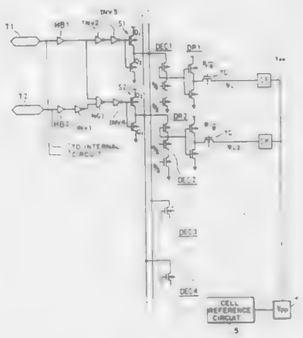
**4,744,057**
**MULTILINEAR CHARGE TRANSFER ARRAY**
**Pierrick Descure, Biviers; Guy Moiroud, Grenoble; Jean Louis Coutures, St. Egreve, and Jean Luc Berger, Grenoble, all of France, assignors to Thomson-CSF, Paris, France**
**Filed Feb. 15, 1985, Ser. No. 701,948**
**Claims priority, application France, Feb. 21, 1984, 84 02573**
**Int. Cl.[4] G11C** *13/00*
**U.S. Cl. 365—183** **22 Claims**




**1**. A multilinear charge transfer array formed by N lines of P photosensitive detectors, wherein each photosensitive detector is connected directly by a connection to an input of a multiplexing and reading system comprising N×P inputs and an output, the signals obtained at the output of the array being fed to a processing device outside the strip, and wherein, when each line of the array receives successively the radiation to be detected due to a scanning, said scanning having a direction B which forms an angle with respect to a line formed by detectors having same ranks in successive lines.

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**4,744,058**
**SEMICONDUCTOR PROGRAMMABLE MEMORY DEVICE AND METHOD OF WRITING A PREDETERMINED PATTERN TO SAME**
**Hiromi Kawashima, Kawasaki, and Hideki Arakawa, Yokohama, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan**
**Filed Nov. 14, 1986, Ser. No. 930,399**
**Claims priority, application Japan, Nov. 20, 1985, 60-260493**
**Int. Cl.[4] G11C** *13/00*
**U.S. Cl. 365—189** **12 Claims**




**12**. A method of writing a checkerboard pattern in a memory matrix of a semiconductor programmable memory device having a plurality of word lines and a plurality of bit lines, comprising the following steps in sequence:

(a) selecting all of the word lines and all of the bit lines at the same time, then erasing all bits in said memory matrix, and writing data of a first logic level to all of the memory cells;

(b) selecting all of the word lines at the same time, and writing to all of the bit lines alternately data of a second logic level and data of the first logic level;

(c) selecting alternate word lines simultaneously, and writing data of the first logic level to all of the bit lines; and

(d) selecting every other word line simultaneously, and writing to all of the bit lines the inverse data pattern of step (b).

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**4,744,059**
**APPARATUS AND METHOD FOR REDUCING WRITE RECOVERY TIME IN A RANDOM ACCESS MEMORY**
**Roger V. Rufford, Redwood City, Calif., assignor to Fairchild Camera and Instrument Corporation, Mountain View, Calif.**
**Filed Dec. 18, 1985, Ser. No. 810,955**
**Int. Cl.[4] G11C** *7/00*
**U.S. Cl. 365—189** **13 Claims**

**1**. In a memory including an array of memory cells organized into a plurality of memory words, and including means responsive to a write enable signal for writing a data word appearing at memory input data lines to a selected memory word when said write enable signal is in a first state, and for coupling the data word stored in a selected memory word to memory output data lines when said write enable signal is in a second state, said means for coupling a data word stored in a selected memory word to said output data lines including sense amplifier means for amplifying said stored data word, an apparatus for reducing the write recovery time of said memory comprising:

means responsive to said write enable signal being in said

first state for decoupling said data word coupling means from said output data lines;

second data path means for coupling said data word appearing at said input data lines to said output data lines beginning at a time at least by when said write enable signal changes from said first state to said second state; and

means for overriding said second data path means when the output of said sense amplifier means matches the data state of the data word stored in said selected memory word.

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**4,744,060**

**BIPOLAR-TRANSISTOR TYPE RANDOM ACCESS MEMORY HAVING REDUNDANCY CONFIGURATION**

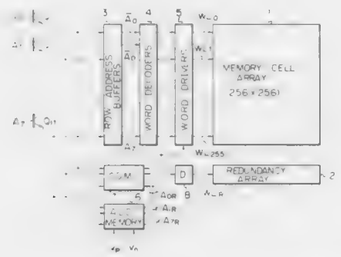
**Yoshinori Okajima, Kawasaki, Japan, assignor to Fujitsu Limited, Kawasaki, Japan**

**Filed Oct. 17, 1985, Ser. No. 788,567**

**Claims priority, application Japan, Oct. 19, 1984, 59-218707; Nov. 20, 1984, 59-243340**

**Int. Cl.[4] G11C** *7/00*

**U.S. Cl. 365—200** **30 Claims**




**1**. A semiconductor memory device including bipolar-transistors, comprising:

a memory cell array;

a redundancy memory cell array;

means for receiving an address signal;

means, operatively connected between said means for receiving an address signal and said memory cell array, for selecting a memory cell from said memory cell array in accordance with said address signal from said address receiving means;

means, operatively connected to said means for receiving an address signal, for storing a defective address of a defective memory cell of said memory cell array, said defective address storing means comprising a plurality of 1-bit memory circuits of a diode type, each circuit corresponding to each bit of said defective address; and

means, operatively connected to said means for storing a defective address and said means for receiving an address signal, for comparing said address signal from said means for receiving an address signal with said defective address from said means for storing a defective address so as to disable said memory cell selecting means and for selecting said redundancy memory cell array when said address signal coincides with said defective address.

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**4,744,061**

**DYNAMIC SEMICONDUCTOR MEMORY DEVICE HAVING A SIMULTANEOUS TEST FUNCTION FOR DIVIDED MEMORY CELL BLOCKS**

**Yoshihiro Takemae; Kimiaki Sato, both of Tokyo; Masao Nakano, and Tomio Nakano, both of Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

**Filed Nov. 20, 1984, Ser. No. 673,510**

**Claims priority, application Japan, Nov. 25, 1983, 58-220553**

**Int. Cl.[4] G11C** *29/00*

**U.S. Cl. 365—201** **8 Claims**



**1**. A dynamic semiconductor memory device comprising:

a plurality of blocks of memory cells, said block being separated from each other;

a plurality of write means, respectively, operatively connected to said memory cell blocks, for writing data thereinto;

a simultaneous write enable circuit for a test mode, connected to said plurality of write means, for simultaneously performing a write operation upon said plurality of memory cell blocks via said plurality of write means;

a plurality of data output menas, respectively, operatively connected to said memory cell blocks, for storing data read out of said memory cell blocks, each of said data output means having true and complementary output signal lines;

a pair of output means, one of said output means being driven by the true output signal lines of said data output means, the other of said output means being driven by the complementary output signal lines of said data output means;

means, connected to said pair of means, for transmitting an external output signal corresponding to the logic level of said pair of output means;

a pair of output data buses connected to said pair of output means; and

a data output buffer connected to said pair of output data buses, said pair of output means being connected to said output data buses for simultaneously transmitting all the read data of said data output means to said output data buses, said data output buffer being a push-pull type which reaches a high impedance state when read data of one of said pair of output means is different from read data of one of said pair of output means during a test mode.



**4,744,062**

**SEMICONDUCTOR INTEGRATED CIRCUIT WITH NONVOLATILE MEMORY**

**Hideo Nakamura, Tokyo, and Terumi Sawase, Sayama, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Apr. 23, 1986, Ser. No. 854,889**

**Claims priority, application Japan, Apr. 23, 1985, 60-86797; Apr. 26, 1985, 60-90268; Jul. 3, 1985, 60-144719**

**Int. Cl.[4] G11C** *11/40, 13/00*

**U.S. Cl. 365—228** **7 Claims**



**6**. A semiconductor integrated circuit including:

a plurality of electrically erasable and programmable nonvolatile memory elements arranged in a matrix;

a first means for accessing a selected one element within said plurality of memory elements in accordance with an address signal specified with respect to said matrix, said address signal being generated from a processing unit;

a second means for transmitting data between said plurality of memory elements and said processing unit, said second means temporarily latching said data;

a third means for latching said address signal from said processing unit;

a fourth means for controlling said second and third means in response to control signals from said processing unit; and

a fifth means for delaying a programming/erasing control signal of said control signals for a period of time during which reading of data from said selected one element within said nonvolatile memory elements can be accomplished, wherein said processing unit gives a first instruction to read a present command from said nonvolatile memory elements, a second instruction to read an operand from said nonvolatile memory elements, a third instruction to write the result of calculation of said operand into said nonvolatile memory elements and a fourth instruction to read a subsequent command from said nonvolatile memory elements, and wherein said semiconductor integrated circuit executes said instructions in the order of said first instruction, said second instruction, then said fourth instruction and thereafter said third instruction.

**4,744,063**

**STATIC MEMORY UTILIZING TRANSITION DETECTORS TO REDUCE POWER CONSUMPTION**

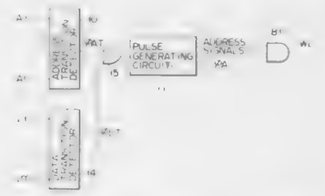
**Takayuki Ohtani; Takayasu Sakurai, both of Tokyo; Mitsuo Isobe, Yokohama, and Tetsuya Iizuka, Funabashi, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed May 24, 1984, Ser. No. 613,614**

**Claims priority, application Japan, May 31, 1983, 58-96113**

**Int. Cl.[4] G11C** *8/00*

**U.S. Cl. 365—233** **6 Claims**




**1**. A static memory receiving a plurality of address signals and multiple bit input data for storage and having data-reading and data-writing cycle times, said memory comprising:

a first power source;

a second power source;

input detecting means for detecting changes of said address signals and of said multiple bit input data;

pulse signal generating means for generating a pulse signal when said input detecting means detects a change of one of said address signals or mulitple bit input data, the width of said pulse signal being longer than the data-reading and data-writing cycle times; and

circuit means, responsive to said pulse signal, for causing a penetrating direct current to flow between said first and second power sources through circuit elements in said circuit means for a period of time corresponding to the width of said pulse signal.

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**4,744,064**

**METHOD AND APPARATUS FOR SEISMIC EXPLORATION**

**Philip A. Hughes, Houston, Tex., assignor to Exxon Production Research Company, Houston, Tex.**

**Filed Jul. 20, 1984, Ser. No. 633,165**

**Int. Cl.[4] G01V** *1/22*

**U.S. Cl. 367—22** **30 Claims**



**1**. A system for seismic exploration of an earth formation, including:

a host digitizing system capable of generating a first plurality of digital measurements each corresponding to seismic energy received from the formation over a first time interval, and a second plurality of digital measurements each corresponding to seismic energy received from the formation over a second time interval;

a digital array former for simultaneously deriving a plurality of preselected arrays of said measurements; and

a host recording system for storing said plurality of derived arrays;

wherein the digital array former includes an input bus interconnected to the host digitizing system, an output bus interconnected to said host recording system, and a plurality of parallel processing elements each having an input

interconnected to the input bus and an output interconnected to the output bus, each parallel processing element also having storage means for storing array forming data functionally related to the formation of those arrays to be formed in said processing element, and an array forming element for forming arrays in functional response to the stored array forming data, said storage means including buffer means for storing the second plurality of measurements incoming on the input bus while simultaneously delivering to the array forming element the first plurality of measurements.

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**4,744,065**

## REINFORCING DEVICE IN THE INNER PORTION OF SEISMIC CABLES

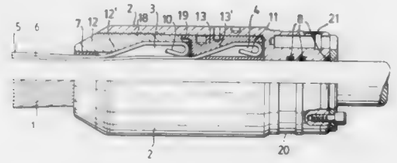
**Thor Higraff; Julius Bendiksen, both of Tertnes, and Jan-Åge Langeland, Garnes, all of Norway, assignors to Geco A.S., Kjorbokollen, Sandvika, Norway**

**Filed Feb. 2, 1987, Ser. No. 9,812**

**Claims priority, application Norway, Feb. 14, 1986, 860564**

**Int. Cl.[4] H04B *11/00*; H01B *7/12*; B63B *21/04***

**U.S. Cl. 367—191** **17 Claims**



1. A reinforcing device for fastening an end of a seismic cable, wherein the cable has at least two outer layers of armoring for absorbing stretch loads on the cable, comprising:

a casing member through which the cable extends;

two securing chambers within said casing, the end of each armoring layer being separated and extending into a separate one of said securing chambers;

the end portion of at least one of said armoring layers being bent back upon itself in a respective securing chamber;

at least one substantially cylindrical hollow insert member within said releasably connected to said casing member;

an internal conical surface on said at least one insert member forming part of said securing chamber in which said bent-back end portion of at least one of said armoring layers is disposed, said conical surface engaging against said at least one armoring layer to thereby prevent relative withdrawal movement of said at least one armoring layer with respect to said casing; and

seal means between said casing member and said cable for sealing the interior of said casing and said securing chambers from the ambient environment.

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**4,744,066**

## QUARTZ ANALOG MOVEMENT WITH LAVET STEPPING MOTOR AND LARGE ENERGY CELL

**Herbert Schwartz, Wurmberg, Fed. Rep. of Germany, assignor to Timex Corporation, Waterbury, Conn.**

**Filed Jul. 6, 1987, Ser. No. 69,782**

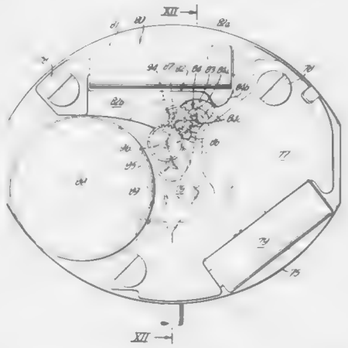
**Int. Cl.[4] G04B *19/00, 19/02***

**U.S. Cl. 368—76** **15 Claims**

1. In a movement for a timepiece having an energy cell, a stepping motor, a timekeeping circuit connected to said energy cell and supplying driving pulses to said stepping motor, a frame, and a bridge spaced from said frame for rotatably supporting gear wheel assemblies therebetween, the improvement comprising:

a rotor for said stepping motor comprising permanent magnet, pinion and spindle, said stepping motor spindle being rotatably mounted on said frame,

a stator for said stepping motor comprising magnetically permeable plate means aligned with said rotor permanent magnet and defining a circumferential gap with said rotor for passage of magnetic flux between said stator and said rotor,



a first intermediate wheel assmbly comprising gear, pinion and first spindle having an axis of rotation, at least said first spindle being comprised of non-magnetic material, said gear of said first intermediate wheel assembly engaged with the pinion of said rotor, and non-magnetic bearing means rotatably mounting said first spindle such that its axis extends through said circumferential gap.

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**4,744,067**

## ANALOG ELECTRONIC WATCH

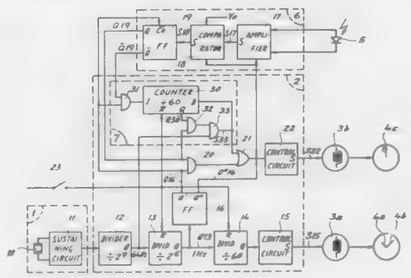
**Claude-Eric Leuenberger, Grand Chézard 5, CH-2054 Chezard, Switzerland**

**Filed Oct. 9, 1986, Ser. No. 917,134**

**Claims priority, application Switzerland, Oct. 11, 1985, 04408/85**

**Int. Cl.[4] G04B *19/04***

**U.S. Cl. 368—80** **3 Claims**



1. An electronic watch having hours, minutes and seconds hands for indicating the time, comprising:

an oscillator for supplying a time-base signal;

a time-keeping circuit for receiving said time-base signal and a detection signal which is able to assume two logic levels, said time-keeping circuit being arranged to permanently issue a first control signal and to issue a second control signal only when said detection signal is at a particular logic level;

a first motor for driving the hours and minutes hands in response to the first control signal;

a second motor for driving the seconds hand in response to the second control signal;

a photoelectric sensor arranged to receive light impinging on the watch and to issue a signal representative of the intensity of said light; and

a detection circuit connected to said sensor for issuing said detection signal which is arranged to assume a first logic level when the intensity of the light is below a predetermined threshold and a second logic level when said light intensity is above said threshold, said time-keeping circuit issuing the second control signal only when said detection signal is at its second logic level so that said second motor drives the seconds hand only when said detection signal is at its second logic level and energy consumption for the watch is automatically reduced when said light intensity is below said threshold.



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**4,744,068**

## TIMEPIECE SETTING ARRANGEMENT INCLUDING A SAFETY LOCK

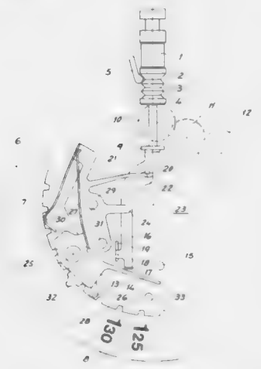
**Francois Niklès, Cressier, and Cyril Vuilleumier, Bienne, both of Switzerland, assignors to ETA SA Fabriques d'Ebauches, Granges, Switzerland**

**Filed May 22, 1987, Ser. No. 53,197**

**Claims priority, application Switzerland, May 26, 1986, 02110/86**

**Int. Cl.[4] G04B *27/02***

**U.S. Cl. 368—190** **9 Claims**



1. A timepiece setting arrangement including a stem bearing a crown and adapted to be brought from a pushed-in rest position to a drawn-out working position and a contactor comprising a blade adapted to come into repeated contact with at least one contact stud thereby to act on an an electrical circuit when the stem is rotated while in its drawn-out position and further comprising a lock controlled by the stem and arranged to limit the blade travel when said stem is in the pushed-in position thereby to prevent said blade from coming into contact with said stud when a shock is applied to the timepiece, said contactor comprising a lever pivoting about an axis and including an addition to said blade a feeler cooperating with a toothed part operated by the stem when said stem is in its drawn-out position and a return spring urging said feeler against the teeth of said toothed part so as to permit said blade to make electrical contact with said stud each time that said feeler passes onto a tooth and to be separated from said stud when the feeler is located in the gap separating two teeth, said lock being removed from the field of action of said blade when said stem is in the drawn-out position.

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**4,744,069**

## OPTICAL DISC APPARATUS WITH ACCESS SYSTEM HAVING OBJECT LENS CONTROL

**Toshio Sugiyama, Aichi, and Hideo Suenaga, Toyokawa, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Feb. 13, 1986, Ser. No. 829,066**

**Claims priority, application Japan, Feb. 15, 1985, 60-26208; Feb. 15, 1985, 60-26209**

**Int. Cl.[4] G11B *7/08, 7/095***

**U.S. Cl. 369—32** **10 Claims**



1. An optical recording medium accessing apparatus arranged so that a light beam from a laser light source is focused by an object lens of an optical system and irradiated on an optical recording medium having thereon a mirror surface with at least one non-pit portion and tracks of a plurality of pits for recording data, and that a reflected beam from the recording medium is irradiated on an optical detector means, said optical detector means reproducing a signal recorded on the rercording medium, and tracking servo means responsive to said optical detector means for maintaining a position of said object lens at an optical center axis of the optical system, wherein said optical detector means comprises:

at least two adjacent photoelectric transducers providing outputs indicative of the reflected beam incident thereon;

means for producing a signal indicative of at least a difference between the outputs from said transducers;

means of detecting the position of said object lens in a direction perpendicular to said tracks in cooperation with said difference producing means, said detection means including sampling means for sampling the difference signal when said light beam is irradiated only on a non-pit portion of said mirror surface; and

means forming a feedback loop for enabling positioning of said object lens at said optical center axis.

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**4,744,070**

## OPTICAL DISK AND METHOD OF TRACKING THE SAME

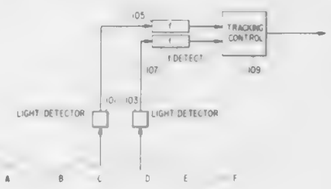
**Yoshinari Takemura, Osaka; Kazuaki Obara, Kadoma, and Michiyoshi Nagashima, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed May 3, 1985, Ser. No. 729,933**

**Claims priority, application Japan, May 7, 1984, 59-90520**

**Int. Cl.[4] G11B *7/095***

**U.S. Cl. 369—44** **6 Claims**




1. A tracking method for an optical disk formed to have adjacent tracks in the form of grooves, each of said grooves having two slanted surfaces respectively disposed on opposite

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sidewalls of said groove, the depth of a first plurality of said groove which constitutes every other one of said grooves being varied at a frequency f and the depth of a second plurality of grooves which constitute the remaining grooves being substantially constant, said method comprising the steps of:

irradiating two successive slanted surfaces of said optical disk with two independently driven focussed spots of light to perform one of a recording and reproducing operation independently on said two successive slanted surfaces,

detecting the magnitude of respective frequency components from beams reflected from said two successive slanted surfaces corresponding to said two spots of light, and

controlling the position of said two spots of light relative to said optical disk so that the magnitudes of the detected frequency components corresponding to said two spots of light are equal to each other.

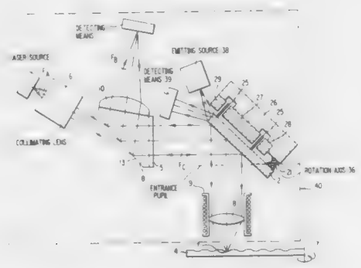
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**4,744,071**

## OPTICAL HEAD IN A DEVICE FOR RECORDING AND READING A DATA CARRIER

**Claude Bricot; Michel Chaboche; Patrick Volleau; Dominique Leterme, and Jean-Pierre Le Merer, all of Paris, France, assignors to Thomson-CSF, Paris, France**

**Continuation of Ser. No. 473,013, Mar. 7, 1983, Pat. No. 4,607,356. This application Jan. 21, 1986, Ser. No. 820,220**
**Claims priority, application France, Mar. 9, 1982, 82 03938**
**The portion of the term of this patent subsequent to Aug. 19, 2003, has been disclaimed.**
**Int. Cl.⁴ G11B *7/095***
**U.S. Cl. 369—44** **8 Claims**




1. An optical head for a data recording and reading device, said device including a data carrier having at least one data track and a laser source emitting a beam, said optical head comprising:

a reflecting mirror mounted for rotation about a rotation axis for reflecting said beam;

a lens having an entrance pupil lying in a plane, said lens receiving said beam from said reflecting mirror through said entrance pupil to project an illumination spot on said data carrier and for collecting radiation from said data carrier; and

photodetector means for receiving said radiation from said lens;

said rotation axis lying in said entrance pupil plane.

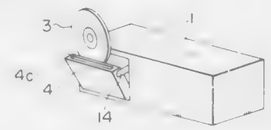
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**4,744,072**

## RECORDED SIGNAL REPRODUCING OR PLAYBACK APPARATUS

**Shinichi Tamaki, and Hideyuki Takahashi, both of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan**

**Filed Apr. 12, 1982, Ser. No. 367,516**
**Claims priority, application Japan, Apr. 14, 1981, 56-54200[U]**
**Int. Cl.⁴ G11B *17/04***
**U.S. Cl. 369—75.2** **6 Claims**




1. A signal reproducing apparatus for reproducing signals recorded on a disc, comprising:

a body (**1**) of said apparatus;

a holder (**4**) which is selectively opened or closed with respect to said body;

a disc receiving portion (**28**) for receiving the disc, said portion being selectively opened or closed with respect to said body when said holder is opened or closed;

a disc setting base (**8**) for rotating the disc, said setting base being retracted from and projected into said disc receiving portion in association with said opening and closing;

clamper means (**6**) mounted on said holder for clamping the disc onto the disc setting base;

first means comprising a spring member (**5**) for biasing said clamper means to move away from said disc receiving portion when said holder is opened; and

second means comprising cam means (**9**) received in said holer, said cam means being mechanically linked to said holder and said body and being mechanically movable to a clamping position thereof by the closing of said holder for making said clamper means to project into said disc receiving portion when said holder is closed.

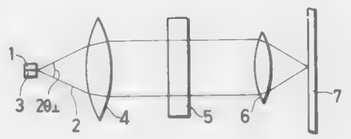
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**4,744,073**

## RECORDING/REPRODUCING OPTICAL SYSTEM UTILIZING SEMICONDUCTOR LASER LIGHT SOURCE AND ANAMORPHIC IMAGING ELEMENT

**Mikio Sugiki, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan**

**PCT No. PCT/JP85/00195, § 371 Date Dec. 11, 1985, § 102(e) Date Dec. 11, 1985, PCT Pub. No. WO85/04978, PCT Pub. Date Nov. 7, 1985**
**PCT Filed Apr. 12, 1985, Ser. No. 816,128**
**Claims priority, application Japan, Apr. 18, 1984, 59-77891**
**Int. Cl.⁴ G11B *7/00***
**U.S. Cl. 369—112** **1 Claim**




1. A recording/reproducing optical system, which comprises a semiconductor laser causing single transverse mode oscillation and having beam radiation angles of $\theta\perp$ and $\theta\,\|\,$ in planes normal and parallel to an active layer, respectively; a collimator lens having a focal length $f_C$; an anamorphic optical element having a magnification ratio of $1{:}\beta$ in two directions



crossing each other at right angles; and an objective lens having a focal length $f_0$, a numerical aperture $NA_0$ and an aperture $2A_0$, and in which ratios $A_0/W\perp$ and $A_0/W\,\|\,$ of the apertures to diameters $2W\perp$ and $2W\,\|\,$, on the planes normal and parallel to said active layer, of beams which are emitted from said semiconductor laser, pass through said collimator lens and said anamorphic optical element and are incident to said objective lens have the following relations with predetermined values $fi\perp$ and $fi\,\|\,$:

$$A_0/W\perp \leqq fi\perp$$

$$A_0/W\,\|\, \leqq fi\,\|\,$$

coupling efficiency $\eta$ has the following relation with a predetermined value $\eta_d$:

$$\eta \geqq \eta_d$$

and, optical recording/reproducing is performed by the beams, characterized in that $M=f_c/f_0$ and $\beta$ satisfy the following relations:

$$M \geqq NA_0/(\sin\theta\perp \cdot fi\perp)$$

$$M\cdot\beta \geqq NA_0/(\sin\theta\,\|\, \cdot fi\,\|\,)$$

$$M^2\cdot\beta \leqq 0.74NA_0^2/(\sin\theta\perp \cdot \sin\theta\,\|\, \cdot \eta_d^2)$$

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**4,744,074**

## DISK-TYPE RECORDING MEDIUM

**Ryoichi Imanaka, Hirakata, and Masatsugu Tanji, Moriguchi, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**PCT No. PCT/JP85/00488, § 371 Date Apr. 30, 1986, § 102(e) Date Apr. 30, 1986, PCT Pub. No. WO86/01630, PCT Pub. Date Mar. 13, 1986**
**PCT Filed Sep. 2, 1985, Ser. No. 862,223**
**Claims priority, application Japan, Sep. 4, 1984, 59-185503**
**Int. Cl.⁴ G11B *7/24***
**U.S. Cl. 369—278** **4 Claims**



1. A disk-type recording medium, comprising a disk having curved tracks thereon around the center thereof which are radially regularly spaced from one another for storing information thereon, each track having elongated information storage pregrooves, ridges or protrusions therealong and having identifying signal depressions, ridges or protrusions therealong, the information storage pregrooves, ridges or protrusions having changed condition portions corresponding to information signals, and the discrete identifying signal depressions, ridges or protrusions being disposed along the tracks at positions other than positions neighboring the identifying signal depressions, ridges or protrusions on adjacent tracks, and which positions further neighbor information storage pregrooves, ridges or protrusions on adjacent tracks.

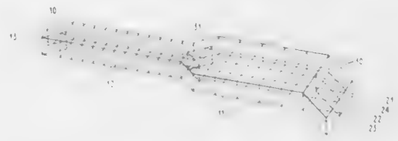
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**4,744,075**

## MULTICHANNEL WAVELENGTH MULTIPLEXER/DEMULTIPLEXER

**Carl F. Buhrer, Framingham, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.**

**Filed Apr. 2, 1987, Ser. No. 33,275**
**Int. Cl.⁴ H04B *9/00*; H04J *1/08*; G02B *5/30***
**U.S. Cl. 370—3** **3 Claims**



1. In an n channel birefringent multiplexer/demultiplexer comprising $\log_2 n$ sequential networks of birefringent crystal elements, wherein n represents the number of optical wavelength channels capable of being multiplexed/demultiplexed and $\log_2 n$ is an integer greater than one, a combination of polarizing beam splitters,

a first of said beam splitters being oriented before the first of said sequential networks,

another of said beam splitters being oriented after the last of said sequential networks, and

solely one such beam splitter being oriented between adjacent said sequential networks of birefringent crystal elements, such that,

upon application of an input beam to said first beam splitter, horizontally and vertically polarized components thereof are separated thereat, independently traverse all of said sequential networks of said birefringent crystal elements, and are recombined to form output beams solely upon reaching said another beam splitter after said last of said sequential networks.

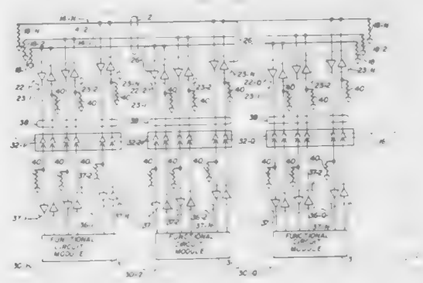
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**4,744,076**

## BUS STRUCTURE HAVING CONSTANT ELECTRICAL CHARACTERISTICS

**John G. Elias, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Aug. 6, 1986, Ser. No. 893,880**
**Int. Cl.⁴ H04J *3/02*; H04B *3/00***
**U.S. Cl. 370—85** **6 Claims**



1. In an electronic system of the type having a communications bus disposed on a bus support substrate, the bus having determinable impedance and time delay characteristics associated therewith, the bus having at least a first, a second and a third transceiver array connected thereto, the system having a

first and a second functional circuit module respectively disposed on separate support substrates and respectively removably connectable to the bus support substrate and respectively communicable with the bus through the first and the second transceiver arrays, wherein the improvement comprises the transceiver arrays being positioned on the bus support substrate whereby the impedance and time delay characteristics of the bus remain substantially constant regardless of the absence or presence of a third functional circuit module connected to the third transceiver array.

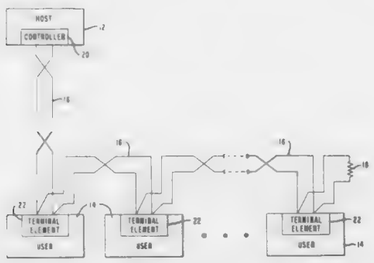
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**4,744,077**

**LINK FLOW CONTROL IN TIME SLOT PROTOCOL DATA TRANSMISSION OF A DATA PROCESSING NETWORK**

**Richard J. Fadem, Roslyn Heights, and David C. Speyer, Northport, both of N.Y., assignors to NCR Corporation, Dayton, Ohio**

**Filed Dec. 5, 1986, Ser. No. 938,691**
**Int. Cl.[4] H04J** *3/02*
**U.S. Cl. 370—85** **8 Claims**




1. In a communication network having a host computer and a plurality of users, wherein characters of data are sent from said host computer to said users in designated time slots in a time frame and a keystroke is sent from a designated one of said users to said host computer in a designated time slot in said time frame, said communications network comprising:

data bus means connected between said host computer and said users, said data bus means for transmitting data between said host computer and said users;

host receive queue means in at least one of said users connected to said data bus means for receiving and storing characters of data from said host computer in a succession of time frames;

first threshold means responsive to the characters of data in said host receive queue means for generating a first link flow control command responsive to the storage of a set number of characters of data in said host receive queue means;

link flow control transmitting means connected to said data bus means for transmitting said first link flow control command over said data bus means to said host computer in a designated time slot of a designated time frame; and

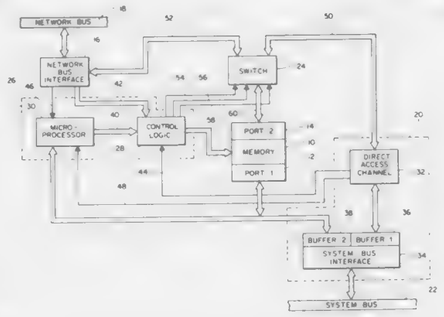
storage means connected to said data bus means in said host computer for storing said first link flow control command for processing by said host computer such that said host computer may detect said first link flow control command and stop sending characters of data to said host receiver queue means responsive thereto.

**4,744,078**

**MULTIPLE PATH MULTIPLEXED HOST TO NETWORK DATA COMMUNICATION SYSTEM**

**George P. Kowalczyk, Ft. Lauderdale, Fla., assignor to Gould Inc., Rolling Meadows, Ill.**

**Filed May 13, 1985, Ser. No. 733,173**
**Int. Cl.[4] G06F** *13/00;* **H04J** *3/02*
**U.S. Cl. 370—85** **5 Claims**




1. A host-to-network data communication system for transferring data between a system bus of a host computer and a network bus of a local area network, comprising: system bus means for coupling to a system bus of a host computer for exchange of digital data therewith; a system-multiplexer bus coupled to said system bus means for transfer of digital data to and from said system means; a multiplexer-switch coupled to said system-multiplexer bus for allowing said system-multiplexer bus to be selectively coupled to other portions of said communication system; network bus means for coupling to a network bus for exchange of digital information therebetween; a network-multiplexer bus coupled between said network bus means and said multiplexer-switch to carry digital data between said network bus means and said multiplexer-switch; a memory having a first port and a second port, said first port being connected to a memory-system bus, said second port being connected to a memory-multiplexer-switch bus, said memory transferring digital information from its first port through said system bus means to said system bus, said memory sending and receiving digital information through its second port via said multiplexer-switch either to and from said network bus means or to and from said system bus means; wherein said multiplexer-switch is configured to allow direct communication between said system bus means and said network bus means through said multiplexer switch, network bus means and said multiplexer-switch to carry digital data between said network bus means and said multiplexer switch.

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**4,744,079**

**DATA PACKET MULTIPLEXER/DEMULTIPLEXER**

**John Csapo, Glenview; Gary L. Schlechte, Naperville, and Victor F. Williams, Oak Park, all of Ill., assignors to GTE Communication Systems Corporation, Phoenix, Ariz.**

**Filed Oct. 1, 1986, Ser. No. 913,923**
**Int. Cl.[4] H04J** *3/24, 3/04*
**U.S. Cl. 370—94** **8 Claims**

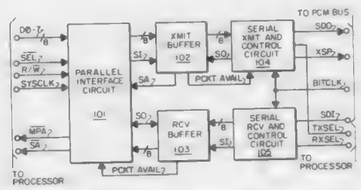
1. A data packet multiplexer/demultiplexer for use in a system including a processor and a pulse code modulation (PCM) bus, said processor being operated to send and receive parallel output and input data, respectively, and said PCM bus being operated to transmit and receive serial input and output data, respectively, said data packet multiplexer/demultiplexer comprising:

parallel interface means connected to said processor and operated in response to said parallel output data from said processor to provide stored parallel output data;

buffer means connected to said parallel interface means and operated to store a predetermined quantity of said stored parallel output data and provide a corresponding predetermined quantity of parallel output buffer data and an associated output packet available signal; and

serial interface means connected between said buffer means and said PCM bus, and operated in response to said output packet available signal to retrieve said predetermined quantity of parallel output buffer data, convert it to a corresponding predetermined quantity of serial output data and transmit said predetermined quantity of serial output data to said PCM bus;






said serial interface means being further operated in response to said serial input data to convert it to parallel input buffer data;

said buffer means being further operated to store a predetermined quantity of said parallel input buffer data and provide a corresponding predetermined quantity of stored parallel input data and an associated input packet available signal;

said parallel interface means being further operated in response to said input packet available signal to retrieve said predetermined quantity of stored parallel input data and provide a corresponding predetermined quantity of said parallel input data.

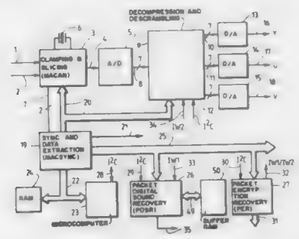
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**4,744,080**

**APPARATUS FOR RECEIVING DIGITAL SOUND/DATA INFORMATION**

**Peter R. Brennand, London, and Bruce Murray, Slough, both of England, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Feb. 27, 1986, Ser. No. 833,633**
**Claims priority, application United Kingdom, Mar. 12, 1985, 8506323; Nov. 15, 1985, 8528229**
**Int. Cl.[4] H04J** *3/24;* **H04L** *9/00*
**U.S. Cl. 280—21** **6 Claims**




1. A receiver for receiving and demodulating sound/data information for a number of services transmitted in digital form by means of a packet multiplex system where each packet comprises a header portion and a data portion, the header portion containing an address unique codes for which are allocated to each service with one address allocated to packets whose data portion contains service identification to facilitate the reception of a service in accordance with a user's choice, the data portion of sound/data service packets being subjected to scrambling and containing either sound/data information or control information as to the coding scheme for such sound-/data information, said receiver comprising a plurality of service recovery devices connected to a common packet bus for the recovery of a plurality of services, a recovery device being adapted to respond at any one time to an address code present in the packet header of packets for a selected service and to recover that service in accordance with the corresponding coding scheme, characterized in that said receiver additionally comprises means remote from said recovery devices for centrally receiving and interpreting all the packets carrying the service identification address to produce therefrom service addresses and for applying to one or more service recovery devices the or each respective service address for the or each user selected service, and means also remote from said recovery devices for centrally receiving and interpreting control information when present in said packets for said selected service or services and for applying to the associated recovery device or devices the coding interpretation information required as to the coding scheme for that or each selected service, and in that a packet encryption recovery device is connected to said common packet bus for the production of periodic initialization words in response to packets containing decryption information, said initialization words being applied to a service recovery device for controlling the descrambling of scrambled sound/data information, said means for centrally receiving and interpreting packets carrying the service identification address providing the or each address for the packet encryption recovery device.

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**4,744,081**

**FRAME FIND CIRCUIT AND METHOD**

**Kenneth M. Buckland, Ottawa, Canada, assignor to Northern Telecom Limited, Montreal, Canada**

**Filed May 18, 1987, Ser. No. 50,658**
**Int. Cl.[4] H04J** *3/06*
**U.S. Cl. 370—100** **14 Claims**



1. A method of detecting a frame word in a multiplexed serial data stream, comprising word-interleaved frames each comprising n words each of m consecutive bits, where n and m are integers, comprising the steps of:

monitoring groups each of m consecutive bits of the data stream thereby to detect the frame word; and

controlling the relative displacement of the successive monitored groups of m consecutive bits in dependence upon detection of the frame word, said relative displacement being m bits for at least one frame following detection of the frame word, and otherwise being a predetermined displacement of p bits, where p is a plural integer which is not an integral multiple of m;

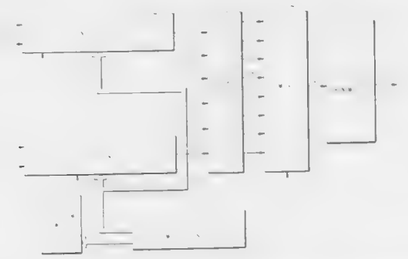
wherein m, n, and p are such that the lowest common multiple of p and the integer remainder of mn/p is the product of p and said remainder.

**4,744,082**

## MULTIPLEXER APPARATUS HAVING NBMB CODER

**Hiroshi Fujimura, and Kiyoaki Kawai, both of Tokyo, Japan, assignors to Nippon Electric Co., Ltd., Tokyo, Japan**

**Filed Mar. 8, 1983, Ser. No. 473,393**
**Claims priority, application Japan, Mar. 9, 1982, 57-35823**
**Int. Cl.[4] H04J** *3/04*
**U.S. Cl. 370—112** **9 Claims**



1. A time-division multiplexing apparatus for combining a plurality of input channel data bit streams into a single high output bit stream, comprising:

means for synchronizing each of n asynchronous input channel data bit streams each corresponding to respective input channels by stuffing control bits into said n asynchronous input channel data bit streams to produce n parallel synchronized bit streams, each of said n asynchronous input channel data bit streams being independent of each other;

means responsive to said n parallel synchronized bit streams for digital-to-digital converting a word of mutually corresponding parallel n bits, appearing at the same time, of said n parallel synchronized bit streams into another word of parallel m bits according to an nBmB coding rule to produce m synchronized bit streams, where m is greater than n; and

for time-division multiplexing said m synchronized bit streams into an nBmB single high-speed output bit stream reflecting the time-division multiplexing of said n parallel input channel data bit streams originating in different data sources.

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**4,744,083**

## SATELLITE-BASED POSITION DETERMINING AND MESSAGE TRANSFER SYSTEM WITH MONITORING OF LINK QUALITY

**Gerard K. O'Neill, Princeton, and Leslie O. Snively, Rocky Hill, both of N.J., assignors to Geostar Corporation, Washington, D.C.**

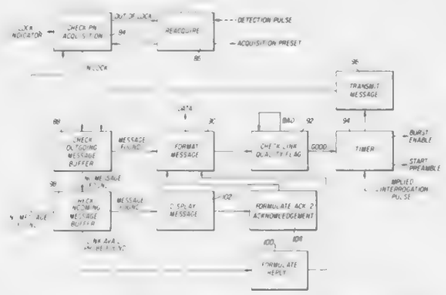
**Filed Sep. 14, 1984, Ser. No. 650,493**
**Int. Cl.[4] G06F** *11/10*
**U.S. Cl. 371—22** **30 Claims**

1. A radio communication system comprising:

a central station for transmitting interrogation signals over a radio communication link which is subject to variations in signal propagation quality;

a remote transceiver for receiving interrogation signals from the central station over said radio communication link, and for transmitting reply signals to the central station in response to the interrogation signals; and

control means in said remote transceiver for measuring the quality of the radio communication link between the central station and the remote transceiver, and for allowing the transmission of a reply signal by the transceiver only



when said communication link has at least a predetermined minimum quality.

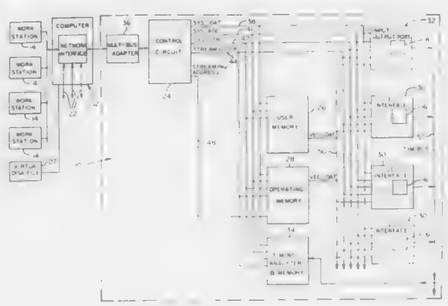
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**4,744,084**

## HARDWARE MODELING SYSTEM AND METHOD FOR SIMULATING PORTIONS OF ELECTRICAL CIRCUITS

**Ronald R. Beck, Banks; Michael E. Stanbro, Tigard, and Eric J. Thomsen, Aloha, all of Oreg., assignors to Mentor Graphics Corporation, Beaverton, Oreg.**

**Continuation of Ser. No. 832,838, Feb. 27, 1986, abandoned, which is a continuation-in-part of Ser. No. 707,497, Mar. 1, 1985, abandoned. This application Jul. 8, 1987, Ser. No. 70,598**
**Int. Cl.[4] G01R** *31/28;* **G06F** *11/00*
**U.S. Cl. 371—23** **38 Claims**



1. In a simulation system which includes plural workstations for independently and simultaneously simulating the response of electronic circuits to applied test data, a hardware modeling system for simulating the response of a plural pin circuit element by evaluating the behavior of an actual circuit element upon recognition by a workstation that the circuit element in an electronic circuit being simulated at the workstation corresponds to an actual circuit element in the hardware modeling system, the hardware modeling system comprising:

hardware modeling circuit means including input means for receiving input test data from the workstation, stimulus signal generation means coupled to the input means for converting the input test data into evaluation stimuli corresponding to the input test data, application means coupled to the stimulus signal generation means for applying the evaluation stimuli to the actual circuit element, resultant test data retrieval means coupled coupled to the actual circuit element for receiving output signals from the actual circuit element and for converting the output signals to resultant test data, the output signals being generated by the actual circuit element in response to the applied evaluation stimuli, and output means coupled to the retrieval means for receiving the resultant test data; and

network interface means for coupling the plural workstations to the hardware modeling circuit means so as to provide concurrent access by each of the workstations to the hardware modeling circuit means, said network interface means comprising means for coupling the workstations to the input means and for transferring input test data from a workstation to the input means upon recognition that the plural pin circuit element being stimulated at the workstation corresponds to an actual circuit element in the hardware modeling system, the network interface means also comprising means coupling the output means to the workstations and for transfering resultant test data from the output means to the workstation following completion of a simulation, the network interface means thereby comprising means for interfacing the workstations to the hardware modeling circuit means so as to permit sharing of the hardware modeling circuit means among the workstations for concurrent circuit simulations by the workstations.



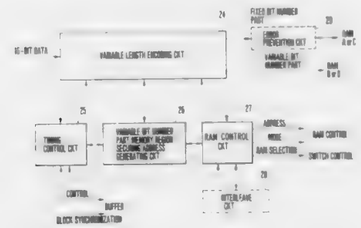
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**4,744,085**

## DATA PROCESSING DEVICE

**Tsutomu Fukatsu, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha**

**Filed Apr. 11, 1986, Ser. No. 851,130**
**Claims priority, application Japan, Apr. 13, 1985, 60-77574**
**Int. Cl.[4] G06F** *11/00*
**U.S. Cl. 371—30** **14 Claims**



1. An encoding device for encoding an information signal, comprising:

(a) means for forming first data consisting of a fixed number of bits which are obtained by coarsely quantizing levels of said information signal;

(b) means for forming second data consisting of a variable number of bits including data obtained by more finely quantizing the levels of said information signal than in forming said first data; and

(c) means for outputting said first data and said second data in a time sharing manner.

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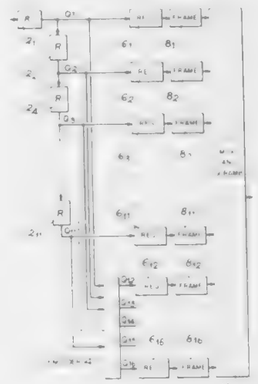
**4,744,086**

## PROCESS FOR THE TRANSMISSION IN BLOCKS OF DIGITAL INFORMATION WORDS WITH ERROR CORRECTION CAPABILITY

**Alain Komly, Paris; Michel Maillard, Maintenon; Alain Vialevieille, Versailles, and Alain Weisser, Clamart, all of France, assignors to Etablissement Public de Diffusion dit Telediffusion de France, France**

**Filed Jun. 4, 1986, Ser. No. 870,703**
**Claims priority, application France, Jun. 5, 1985, 85 08481**
**Int. Cl.[4] G06F** *11/10*
**U.S. Cl. 371—40** **15 Claims**

1. A process for the transmission in blocks of digital information words, each word having a length of $n_1$ bits, in which $n_1$ is an integer, said process comprising successively adding to the information words to be transmitted words of an error correcting code and words of an error detecting code, wherein the error correcting code is a Hamming code by means of which k redundancy words are added to each sequence of $n_2-k$, $n_2$ being an integer greater than k, consecutive information words, said $n_2-k$ information words forming with the K redundancy words a set of words called the linked set, each redundancy word having $n_1$ bits and, for each order i, in which $1 \leqq i \leqq n$, the k bits of order i of the redundancy words are redundancy bits of the $n_2-k$ bits of order i of the $n_2-k$ information words, said coding being performed by Hamming matrix, whose column vectors are chosen in such a way as to permit the correction of a given subset of possible errors and the error detecting code is applied to sequences of information words or to sequences of redundancy words, the words of a same sequence belonging to different linked sets, each transmitted block comprising a plurality of sequences of $n_2-k$ information words and the associated error detecting and correcting code words.



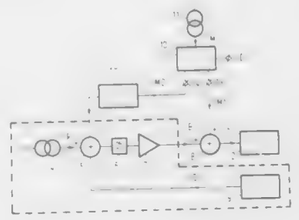
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**4,744,087**

## DEVICE FOR DRIVING A LASER

**Antonius J. A. Nicia, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Nov. 7, 1986, Ser. No. 928,147**
**Claims priority, application Netherlands, Jun. 11, 1986, 8601510**
**Int. Cl.[4] H01S** *3/00*
**U.S. Cl. 372—38** **9 Claims**



1. A device for driving a laser with a digital input signal, comprising:

quiescent-current means for applying to the laser a quiescent current which is controlled by a negative feedback current proportional to the light output of the laser thereby to stabilize the light output of the laser at a level which corresponds to one of two possible values of the digital input signal,

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a modulation device having input means that receive said digital input signal and means for applying to said laser a drive current modulated by the digital input signal, and

a compensation device for applying a compensation current to the quiescent current means in order to compensate for a d.c. component of the drive current, which component varies with the duty cycle of the digital input signal, characterized in that the quiescent-current means stabilize the light output of the laser at a level corresponding to a high value of the digital input signal,

said modulation device comprises a converter for converting the digital input signal into two drive currents that have equal amplitudes but are in phase opposition, and

one drive current is applied to the laser and the other drive current is supplied to the compensation device.

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**4,744,088**

## SEMICONDUCTOR LASER ARRAY WITH FOCUSED EMISSION

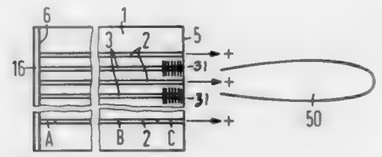
**Jochen Heinen, Haar, and Christian Hanke, Munich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Mar. 13, 1987, Ser. No. 25,579**

**Claims priority, application Fed. Rep. of Germany, Mar. 20, 1986, 3609485**

**Int. Cl.⁴ H01S** *3/19*

**U.S. Cl. 372—50** **12 Claims**




1. An improved semiconductor laser array in a semiconductor body, the improvement comprising:

a sequence of laser active strips for generating laser emissions disposed next to one another;

means provided at every second one of said laser active strips in said sequence of laser active strips for preventing emission of the laser radiation by reflection, said emission preventing means being provided in the region of an end face of said semiconductor body so that the laser emission from said laser array is only a single emission lobe from said end face of said semiconductor body.

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**4,744,089**

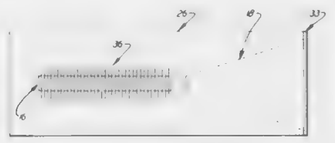
## MONOLITHIC SEMICONDUCTOR LASER AND OPTICAL AMPLIFIER

**Andrew H. Montroll, Reston, Va., and Steven H. Macomber, Bethel, Conn., assignors to The Perkin-Elmer Corporation, Norwalk, Conn.**

**Filed May 19, 1986, Ser. No. 864,348**

**Int. Cl.⁴ H01S** *3/19*

**U.S. Cl. 372—50** **8 Claims**



1. An integrated semiconductor radiation generating device comprising:

distributive feedback laser diode means including a first active region wherein a laser beam is generated;

optical power amplifier means optically coupled to said distributed feedback laser diode means and having an entrance width substantially equal to and coplanar with the exit of said distributed feedback laser diode means;

said optical power amplifier means including a second active region for expanding and amplifying said laser beam prior to emission from said power amplifier means;

means connected to said distributive feedback laser diode means and said optical power amplifier means for supplying pumping current to each independently of the other.

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**4,744,090**

## HIGH-EXTRACTION EFFICIENCY ANNULAR RESONATOR

**Robert J. Freiberg, Mission Viejo, Calif., assignor to TRW Inc., Redondo Beach, Calif.**

**Filed Jul. 8, 1985, Ser. No. 752,985**

**Int. Cl.⁴ H01S** *3/083, 3/08*

**U.S. Cl. 372—94** **16 Claims**



1. An annular resonator for a high-energy laser, the resonator having high extraction efficiency, and comprising:

an axicon having coaxial outer and inner conical reflector elements, the outer conical reflector element being positioned to receive an annular beam passing through an annular gain region and to reflect the annular beam toward the inner element as a generally radial beam;

a scraper mirror coaxial with the axicon, for receiving a cylindrical beam from the inner conical reflector element, reflecting a feedback beam back to the inner conical reflector element, and for allowing an out-coupled beam to pass out of the resonator; and

a rear mirror system, for everting a received annular beam received from the axicon and reflecting it back along an annular path, the rear mirror system also including means for inverting the received annular beam about its optical axis, such that the outermost rays in the annular beam received from the axicon are reflected as the innermost rays, and vice versa;

and wherein the inner conical reflector element is positioned to intercept and compact no more than about half of the radial beam reflected from the outer conical reflector element, wherein the remaining portion not intercepted passes diametrically across the outer conical reflector element and makes two further passes through the gain region before being intercepted and compacted by the inner conical reflector element, and wherein light in the feedback beam makes a total of at least four passes through the gain region before becoming available for out-coupling from the resonator.



**4,744,091**

## MIRROR ASSEMBLY FOR GAS LASER

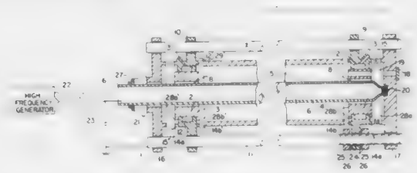
**Wolfram Gorisch, Aschaffenburg; Rainer Nitsche, Offenbach; Walter Skrlac; Dieter Wendt, both of Bruchköbel; Walter Wohlfart, Kleinostheim; Volker Ernst, Olching; Walter Kirchner, Türkenfeld, and Volker Weyer, Emmering, all of Fed. Rep. of Germany, assignors to W. C. Heraeus GmbH, Hanau, Fed. Rep. of Germany**

**Filed Oct. 21, 1986, Ser. No. 921,965**

**Claims priority, application Fed. Rep. of Germany, Nov. 26, 1985, 3541744**

**Int. Cl.⁴ H01S** *3/08*

**U.S. Cl. 372—107** **20 Claims**



1. In a gas laser having a reflecting body with a reflecting surface, excitation space means for defining an excitation space opposite said reflecting surface of said reflecting body, and exciting means for exciting said gas in said excitation space, an improved mirror assembly comprising:

a mirror having a reflecting surface facing the opening in said excitation space;

a radial flange about the mirror and having two axial sides with the reflecting surface of the mirror on one axial side of the radial flange;

at least one spacer bar means projecting from said excitation space means and engaging said radial flange for supporting said flange at least one of axially slidably and tiltably;

a first bellows sealingly connecting the one axial side of said radial flange to said opening of said excitation space means;

a backplate immovably connected to said spacer bar on the other axial side of said radial flange; and

a second bellows sealingly connecting said other axial side of said radial flange to said backplate.

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**4,744,092**

## TRANSPARENT ERROR DETECTION IN HALF DUPLEX MODEMS

**William L. Betts, St. Petersburg, and Kenneth Martinez, Pinellas Park, both of Fla., assignors to Paradyne Corporation, Largo, Fla.**

**Filed Jul. 5, 1985, Ser. No. 752,401**

**Int. Cl.⁴ H04L** *1/00*

**U.S. Cl. 375—7** **6 Claims**



1. A modem for transmitting a plurality of streams of data bits over a communication channel in a half-duplex mode, said streams being separated by intermediate time periods $T_D$, said modem comprising:

encoding means for encoding said streams of data bits into corresponding streams of data communication signals;

preamble means connected to said encoding means for generating preamble signals for transmission over said communication channel prior to the streams of data communication signals;

timer means connected to said preamble means for detecting the time period $T_D$ between each successive stream of data bits and for disabling said preamble means if said $T_D$ is less than a preset threshold value; and

parity word generating means having an input from a data terminal equipment module and generating a parity word corresponding to a previous transmission prior to the stream of data communication signals, said parity word being sent to a switch which controls data and said parity word transmission over said channel;

and wherein said encoding means comprises a randomizer and a differential encoder for storing data further comprising clock signal generating means connected to said randomizer and said differential encoder which allow clocking signals to reach said randomizer and differential encoder and said parity word generating means when communication data signals are transmitted whereby the data in said randomizer and said differential encoder and in said parity word generating means remains unchanged while communication data signals are not transmitted.

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**4,744,093**

## METHOD OF DETECTING PHASE PULSE SIGNALS FROM AN AC DISTRIBUTION LINE

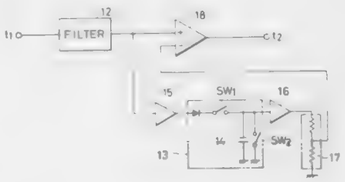
**Yukio Arai; Masatoshi Takagi, both of Saitama, and Akihiko Koyama, Tokyo, all of Japan, assignors to Osaki Electric Co., Ltd., Tokyo, Japan**

**Continuation-in-part of Ser. No. 567,087, Dec. 30, 1983, abandoned. This application Jun. 13, 1986, Ser. No. 874,227**

**Claims priority, application Japan, Jan. 10, 1983, 58-2043**

**Int. Cl.⁴ G08B** *23/00*

**U.S. Cl. 375—76** **4 Claims**




1. A method of detecting the levels of phase pulse signals, superimposed on a voltage wave of an a.c. distribution line by a receiver coupled to the distribution line whereby a pilot channel and a plurality of subsequent channels are established by dividing one cycle of the a.c. voltage wave into predetermined phase angular widths, comprising the steps of:

filtering the a.c. voltage wave on the distribution line to separate from the a.c. voltage wave, phase pulse signals and a pilot signal, said pilot signal having a predetermined phase angle width with a predetermined phase angle reference point, wherein the a.c. voltage wave acts as the reference;

inserting said pilot signal into the pilot channel and said phase pulse signals into the channels subsequent to said pilot channel;

establishing a predetermined reception threshold level for the reception of said phase pulse signals at a preset lower level than the peak level of the pilot signal in the pilot channel; and

comparing the phase pulse signals received with said recep-

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tion threshold level to thereby detect as signal pulses in channels subsequent to the pilot channel, waveforms of a level higher than the reception threshold level.

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**4,744,094**

## BPSK DEMODULATOR WITH D TYPE FLIP/FLOP

**Daniel S. McCarren, Schaumburg, Ill., assignor to Zenith Electronics Corporation, Glenview, Ill.**

**Filed Dec. 12, 1986, Ser. No. 940,822**
**Int. Cl.[4] H04L** *27/22*
**U.S. Cl. 375—81** **5 Claims**



**1**. A BPSK demodulator comprising:

means receiving a carrier modulated with data in BPSK form;

a PLL source of clock signal that is 90° displaced with respect to said carrier;

demodulation means comprising a D flip-flop having one input for receiving said carrier, another input for receiving said clock signal and an output for producing said data; and

gate means supplied with said data and with said carrier for supplying a locking signal to said PLL.

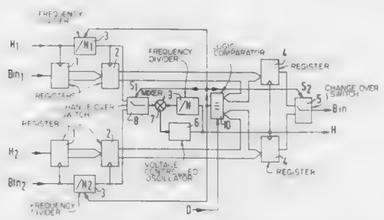
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**4,744,095**

## DIVERSITY CHANNEL DATA RECEIVER WITH AUTOMATIC ALIGNMENT OVER A ±3.5-BIT RANGE

**Jean-Francois R. Cornet, and Patrick Clément, both of Brive, France, assignors to Telecommunications Radioelectriques et Telephoniques T.R.T., Paris, France**

**Continuation of Ser. No. 658,087, Oct. 5, 1984, abandoned. This application Aug. 11, 1986, Ser. No. 895,528**
**Claims priority, application France, Oct. 7, 1983, 83 15989**
**Int. Cl.[4] H04L** *1/02*
**U.S. Cl. 375—100** **9 Claims**



**1**. An arrangement for ensuring the automatic correction of the relative positions of serial data signals transmitted via first and second channels through which the same digital information is conveyed, but with a phase delay which may amount to a few bits, comprising

first and second buffer means for storing a given plurality of bits received from the respective channel, each said buffer means comprising a write input for said bits received from the respective channel, and a buffer read output,

a respective write clock for each of said channels, each write clock being the input clock for the respective buffer means and providing a respective stream of input clock pulses, and

a data signal switch for connecting an arrangement output to the read output of one of said buffer means and, responsive to a command to switch to the other channel, for switching said arrangement output to the read output of the other of said buffer means,

characterized in that said first and second buffer means each comprises a storage device having a respective storage read output, and a respective storage write input, and a write generator connected to the respective storage write input for providing a storage write signal in a normal mode dependent on the respective write input, at a respective storage write frequency, each of said generators being selectively operable in a search mode in which the storage write frequency is varied by phase shifting each successive storage write signal,

the arrangement further comprising means for comparing one of said read outputs from said first buffer means with the corresponding one of said read outputs from said second buffer means and determining whether or not they are identical, and

means, responsive to receipt of a command to switch to the other channel and a determination that said ones of said read outputs are not identical, for switching the generator of said other of said buffer means to the search mode, and returning the generator of said other buffer means to the normal mode upon determination that said ones of said read outputs are identical, and

said data signal switch comprises means for switching the arrangement output from being dependent on the storage read output of the one storage device to being dependent on the storage read output of the other storage device, responsive to receipt of a switching command and said determination that said ones of said read outputs are identical.

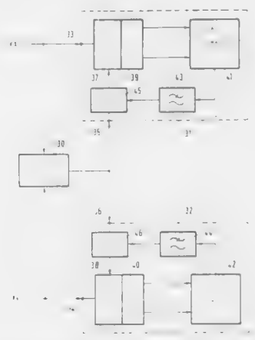
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**4,744,096**

## CLOCK RECOVERY CIRCUIT

**Pierre Roux, Courbevoie, France, assignor to Alcatel Thomson Faisceaux Hertziens, Levallois Perret Cedex, France**

**Filed Jan. 20, 1987, Ser. No. 4,409**
**Claims priority, application France, Jan. 20, 1986, 86 00700**
**Int. Cl.[4] H03D** *3/24*
**U.S. Cl. 375—120** **7 Claims**



**1**. A clock recovery circuit having two inputs for receiving the in-phase and quadrature paths respectively from a demodulator, said clock recovery circuit comprising a first module which includes a phase lock loop and provides an output having a spectrum line at the clock frequency, said clock recovery circuit further comprising two second clock recovery modules, each second clock recovery module having a first input connected to a respective one of the two demodulated paths and a second input connected to the output from the first module, each of said second modules comprising, in succession from said first input, a sampled threshold device for providing the sign of the signal conveyed by the corresponding path and the sign of the error, a phase estimator circuit connected to the output of the sampled threshold device for providing an estimate of the phase error between the input signal and the recovered clock, a filter circuit connected to the output of the phase estimator for providing a filtered control signal, and a voltage controlled phase shifter circuit controlled by said filtered control signal and connected to shift the phase of the signal applied to the second input prior to its application to the threshold device.



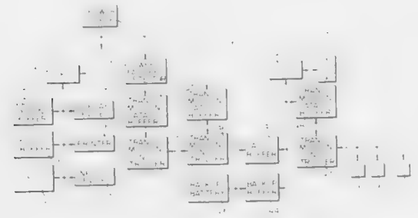
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**4,744,097**

## DATA TRANSMISSION SYSTEM

**Kazuyoshi Haruhara, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan**

**Filed Sep. 15, 1986, Ser. No. 907,678**
**Claims priority, application Japan, Sep. 20, 1985, 60-208303**
**Int. Cl.[4] H04B** *1/38;* **G06F** *11/00*
**U.S. Cl. 375—7** **11 Claims**



**1**. A data transmission system, comprising:

a data transmitter/receiver for receiving data and transmitting reception data, said data transmitter/receiver including storage means for storing the reception data and for keeping the reception data as transmitted data after the reception data is transmitted;

a buffer memory, connected to said data transmitter/-receiver, for storing transmitted data; and

a data processor for reading out data from said buffer memory and processing readout data, said data processor being adapted to receive, through the buffer memory, the transmitted data again from said data transmitter/receiver in response to an operation of a power supply circuit upon recovery from an abnormal state to a normal state,

said data transmitter/receiver further comprises:

a backup power supply circuit, connected to said storage means, for backing up the data stored in said storage means; and

transmission control means, connected to said storage means and said data processor, for transmitting data read out from said storage means to said data processor, causing said storage means to store again the data as the transmitted data, and for transmitting the transmitted data again to said data processor in response to an abnormal voltage recovery signal obtained upon recovery from said abnormal state to said normal state of a power supply voltage associated with said data processor.

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**4,744,098**

## ROULETTE CALCULATOR

**Walter A. Grabowski, 1115 The Woods, Cherry Hill, N.J. 08003**

**Filed Oct. 27, 1986, Ser. No. 923,809**
**Int. Cl.[4] A63B** *71/06;* **A63F** *5/00*
**U.S. Cl. 377—5** **6 Claims**



**1**. A roulette calculator for recording and visually displaying the occurrence and number of winning numerals during the progress of play of the roulette game comprising:

a display board including a keyboard having a plurality of keys laid out in the format of a roulette playing table and the respective keys thereof numbered corresponding to a roulette playing table;

visual display means adjacent each key of the keyboard adapted to visually display numerals from zero to a finite number; and

count indication and advancing means operatively coupled to said keyboard keys and said visual display means for advancing and continuously displaying the count of a given visual display numeral associated with a respective key one integer for each successive key stroke of said respective key on said keyboard.

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**4,744,099**

## X-RAY DIAGNOSTIC APPARATUS COMPRISING RADIATION FILTERS

**Gerd Huettenrauch, Uttenreuth, and Hans-Peter Seubert, Heroldsbach, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

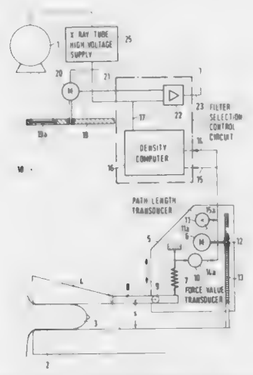
**Filed Oct. 26, 1984, Ser. No. 664,970**
**Claims priority, application Fed. Rep. of Germany, Nov. 3, 1983, 3339775**
**Int. Cl.[4] G21K** *3/00*
**U.S. Cl. 378—157** **4 Claims**

**1**. An x-ray diagnostic apparatus comprising x-ray generator means for supplying x-ray energy along a ray path, a plurality of radiation filters mounted for selective positioning in the ray path, positioning means for shifting one of the plurality of radiation filters into the ray path, density sensing means for forming an electric density signal which is dependent upon the density of a radiography subject disposed in said radiation path, said positioning means including a motor and a control circuit coupled with said density sensing means for controlling

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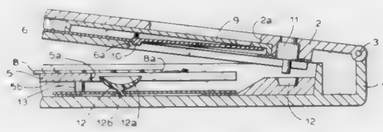
said motor such that upon receipt of a density signal from said density sensing means said control circuit activates the motor




corresponding to the received density signal for selecting one of said filters suitable to the sensed density.

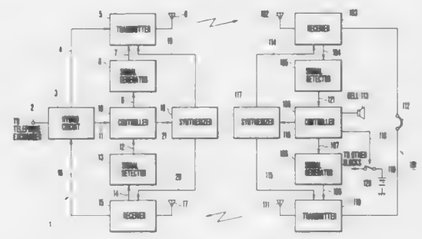
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**4,744,100**
**X-RAY SHEET FILM CASSETTE**
**Walter Bauer, Munich; Manfred Schmidt, Kirchheim, and Heinz Korsa, Munich, all of Fed. Rep. of Germany, assignors to Agfa-Gevaert AG, Leverkusen, Fed. Rep. of Germany**
**Filed Jul. 10, 1986, Ser. No. 884,287**
**Claims priority, application Fed. Rep. of Germany, Aug. 1, 1985, 3527549**
**Int. Cl.[4] G03B** *42/04*
**U.S. Cl. 378—187** **14 Claims**



**1**. An X-ray film cassette, comprising a bottom part and a cover part which are turnable relative to one another and lockable with one another; a suction cup in the bottom part of said cassette, said suction cup having a concave surface and a convex surface, said concave surface facing said cover part, said suction cup being integral or contiguous with an adjoining pedestal, said pedestal being attached to said bottom part; means for guiding a film sheet, during its insertion into said cassette, between said bottom part and said cover part and above a common upper edge of said concave and convex surfaces such that, when a new film sheet is being inserted into the cassette, the film sheet travels above and is unhindered by said suction cup, said means for guiding comprising a guiding surface; spring element means for lifting said guiding surface above said common upper edge while the film sheet is being inserted, said spring element means being compressible in the direction normal to the major surface of said bottom part such that when the cover is closed it presses said new film sheet downwardly against said guiding surface, compressing said spring element means and bringing the new film sheet into engagement with said suction cup such that, during opening of the cassette, the film sheet is retained in said bottom part by said suction cup and does not adhere to and move with said cover part.

**4,744,101**
**CORDLESS TELEPHONE SYSTEM**
**Noboru Saegusa, Tokyo, Japan, assignor to NEC Corporation, Japan**
**Filed May 18, 1987, Ser. No. 51,486**
**Claims priority, application Japan, May 31, 1986, 61-124702**
**Int. Cl.[4] H04Q** *7/04*
**U.S. Cl. 379—61** **2 Claims**




**1**. A cordless telephone system constituted by a switching station connected to a telephone exchanger and at least one telephone set connected to said switching station via a plurality of radio channels;

said switching station comprising means for scanning the radio channels, means, responsive to a calling signal from said telephone exchanger, for selecting a nonused radio channel, signal generating means for calling a telephone set, means for detecting a response signal from said telephone set, means for changing the number of radio channels to be scanned in accordance with a frequency of use of the radio channels, and means for sending a signal representing a changed number of radio channels; and

each telephone set comprising means for scanning the radio channels, means for detecting the calling signal and the signal representing the number of channels from said switching station, and means for sending a response signal to said switching station.

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**4,744,102**
**CROSSBAR LINE HUNTING ARRANGEMENT**
**Frederick H. Koster, P.O. Box 97, Granite Springs, N.Y. 10527**
**Filed Jan. 27, 1986, Ser. No. 823,030**
**Int. Cl.[4] H04M** *3/42*
**U.S. Cl. 379—215** **8 Claims**



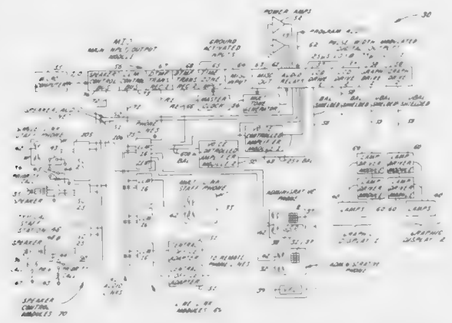
**5**. In a crossbar switching system having a number group translator which is seized by a switch-controlling marker to convert the directory number of called line to the physical location of that line's primary appearance on the crossbar switch frame, the improvement comprising

means responsive to the called line being busy for reseizing the number group to retranslate the original called number, and

means responsive to the said reseizing of the number group for modifying one of the elements of the physical location information furnished by said translation.



**4,744,103**
**COMPUTER CONTROLLED MULTI-LINK COMMUNICATION SYSTEM**
**James E. Dahlquist, Palatine; Peter C. Holtermann, Chicago, and Carl P. Rau, Mount Prospect, all of Ill., assignors to Rauland-Borg Corporation, Chicago, Ill.**
**Filed Nov. 27, 1985, Ser. No. 803,133**
**Int. Cl.[4] H04M** *3/22;* **H04Q** *1/30, 3/545, 3/64*
**U.S. Cl. 379—247** **20 Claims**



**13**. In an administrative communication system the combination comprising at least one dialable administrative telephone having dialing means, a plurality of dialless staff stations, and a control computer for supervising connections between the administrative telephone and staff stations, the administrative telephone being dialed to establish communication between a selected staff station and the administrative telephone, and the staff stations having switches for requesting communication with the administrative telephone, the control computer having means for scanning said switches to determine stations requesting communication, and at least one remote display being connected to said central computer and being provided for displaying numbers corresponding to the stations requesting communication, wherein binary data including said numbers are transmitted as a pulse-width modulated binary signal from said control computer to said remote display so that said remote display can be located at least one thousand feet from said control computer.

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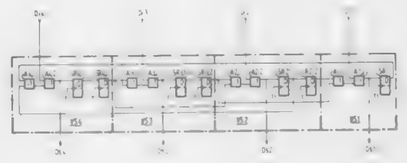
**4,744,104**
**SELF-SYNCHRONIZING SCRAMBLER**
**Reginhard Pospischil, Graefelfing, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**
**Filed May 31, 1985, Ser. No. 739,700**
**Claims priority, application Fed. Rep. of Germany, Jun. 4, 1984, 3420801**
**The portion of the term of this patent subsequent to May 5, 2004, has been disclaimed.**
**Int. Cl.[4] H04L** *9/00*
**U.S. Cl. 380—44** **8 Claims**

**8**. A self-synchronizing scrambler for scrambling a digital signal of four parallel bits comprising:

a first scrambler stage having a first modulo-2 adder, a second modulo-2 adder having an input connected to the output of said first modulo-2 adder in said first scrambler stage and having another input for receiving a lowest-order one of said parallel bits, and a shift register having an input connected to the output of said second modulo-2 adder in said first scrambler stage;

a second scrambler stage having a first modulo-2 adder, a second modulo-2 adder having an input connected to the output of said first modulo-2 adder in said second scrambler stage and having another input for receiving a next-highest order one of said parallel bits, a first shift register having an input connected to the output of said second modulo-2 adder in said second scrambler stage, and a second shift register having an input connected to the output of said first shift register in said second scrambler stage, said second shift register in said second scrambler stage having an output connected to an input of said first modulo-2 adder in said first scrambler stage;

a third scrambler stage having a first modulo-2 adder having an input connected to the output of said shift register in said first scrambler stage, a second modulo-2 adder having an input connected to the output of said first modulo-2 adder in said third scrambler stage and having another input for receiving a next-highest order one of said parallel bits, a first shift register having an input connected to the output of said second modulo-2 adder in said third scrambler stage, and a second shift register having an input connected to the output of said first shift register in said third scrambler stage, said second shift register having an output connected to an input of said first modulo-2



adder in said second scrambler stage and to another input of said first modulo-2 adder in said first scrambler stage; and

a fourth scrambler stage having a first modulo-2 adder having an input connected to the output of the shift register in said first scrambler stage and having another input connected to the output of the first shift register in the second scrambler stage, a second modulo-2 adder having an input connected to the output of said first modulo-2 adder in said fourth scrambler stage and having another input for receiving a highest order one of said parallel bits, a first shift register having an input connected to the output of the second modulo-2 adder in said fourth scrambler stage, and having a second shift register having an input connected to the output of said first shift register in said fourth scrambler stage and having an output connected to another input of said first modulo-2 adder in said third scrambler stage and to another input of the first modulo-2 adder in the second scrambler stage,

each of said scrambler stages having an output signal tapped at the output of the second modulo-2 adder in each stage, and each of said shift registers being supplied with a clock signal having a frequency which is one-fourth of the frequency of said digital signal, each of said shift registers delaying the input signal thereof by one clock pulse of said clock signal.

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**4,744,105**
**RECEIVER USING OPTICAL FEEDBACK**
**Bryon L. Kasper, Lincroft, N.J., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.**
**Filed Jul. 21, 1986, Ser. No. 887,356**
**Int. Cl.[4] H04B** *9/00*
**U.S. Cl. 455—619** **4 Claims**

**1**. A receiver comprising an amplifier having an input termi-

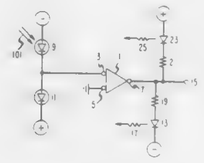
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nal and an output terminal, a current source being connected to said input terminal, a first photodetector being connected to said input terminal, a first light source being connected to said output terminal, a first optical path coupling said first photodetector and said first light source, said current source comprising a second photodetector;

a second light source connected to said output terminal; and

a second optical path, said second path optically coupling said second light source and said second photodetector.





295,570
**EDIBLE CONTAINER FOR CONFECTION**
Mary L. Muello, 50 School St., Northboro, Mass. 01532
Continuation of Ser. No. 517,246, Jul. 25, 1983, abandoned. This application Aug. 15, 1986, Ser. No. 896,328
Term of patent 14 years
U.S. Cl. D1—116



295,572
**HAIR COAT**
Carl S. Stornello, 35 River Dr. South, Ste. 1809, Jersey City, N.J. 07302
Filed Feb. 19, 1985, Ser. No. 702,915
Term of patent 14 years
U.S. Cl. D2—199



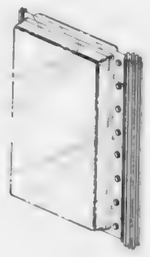
295,571
**BRASSIERE**
Toshiko Taniyama, White Plains, N.Y., assignor to Playtex Apparel, Inc., Stamford, Conn.
Filed Dec. 23, 1985, Ser. No. 812,877
Term of patent 14 years
U.S. Cl. D2—24

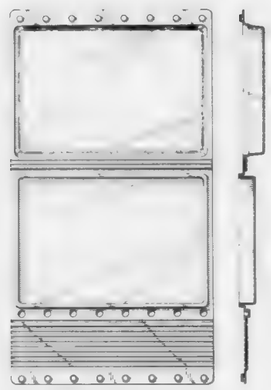


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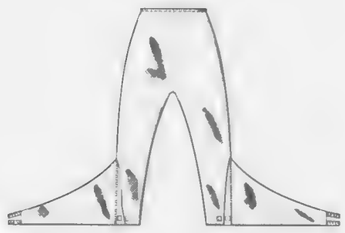
295,573
**VIDEO CASSETTE HOLDER**
Robert K. Williams, Ste. 201, 5100 Edina Industrial Blvd., Minneapolis, Minn. 55435
Filed Apr. 8, 1985, Ser. No. 721,234
Term of patent 14 years
U.S. Cl. D3—35





295,574
**CLOTHING BOTTOM DESIGN**
Walter A. Campbell, 744 NE. 113th St., Miami, Fla. 33161
Filed Feb. 25, 1985, Ser. No. 704,812
Term of patent 14 years
U.S. Cl. D2—28





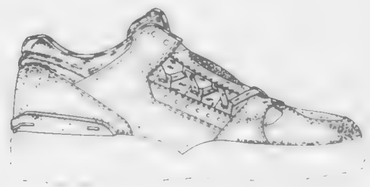


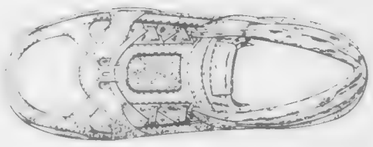
295,575
**CLOTHING TOP DESIGN**
Walter A. Campbell, 744 NE. 113th St., Miami, Fla. 33161
Filed Feb. 25, 1985, Ser. No. 704,811
Term of patent 14 years
U.S. Cl. D2—208



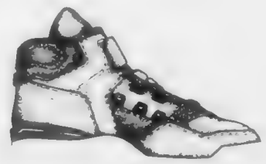


295,576
**SHOE UPPER**
Lawrence Selbiger, Portland, Oreg., assignor to AVIA Group International, Inc., Portland, Oreg.
Filed Sep. 2, 1987, Ser. No. 92,279
Term of patent 14 years
U.S. Cl. D2—314





295,577
**SHOE UPPER**
Lawrence Selbiger, Portland, Oreg., assignor to AVIA Group International, Inc., Portland, Oreg.
Filed Sep. 2, 1987, Ser. No. 92,275
Term of patent 14 years
U.S. Cl. D2—314

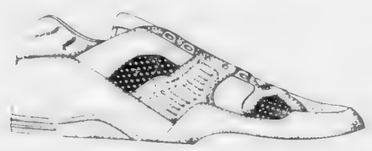




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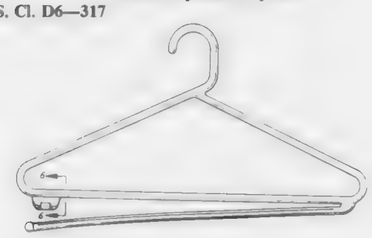


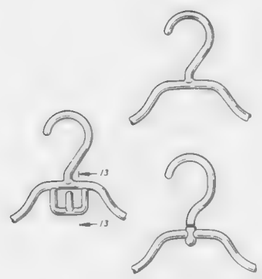
295,578
SHOE UPPER
James K. Tong, Beaverton, Oreg., assignor to AVIA Group International, Inc., Portland, Oreg.
Filed Sep. 10, 1987, Ser. No. 94,804
Term of patent 14 years
U.S. Cl. D2—314



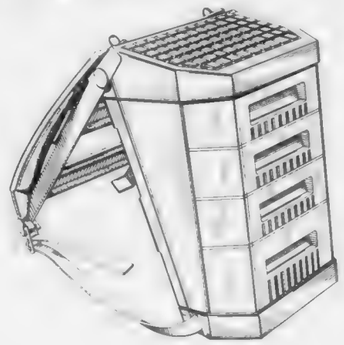


295,579
HANGER FOR PANTS, SKIRTS OR THE LIKE
William D. Arnold, St. Louis County, Mo., assignor to Lee-Rowan Company, St. Louis, Mo.
Filed Feb. 18, 1986, Ser. No. 833,755
Term of patent 14 years
U.S. Cl. D6—317

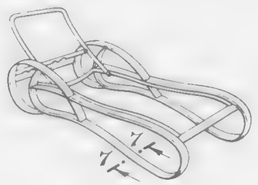




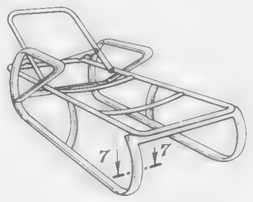
295,580
COMBINED BACKPACK AND SEAT
Timothy D. Thomas, R.R. 5, Box 391, Huron, S. Dak. 57350
Filed Aug. 19, 1985, Ser. No. 767,120
Term of patent 14 years
U.S. Cl. D6—336



295,581
CHAISE LOUNGE OR SIMILAR ARTICLE
Michael Mallin, Atlanta, Ga., assignor to Mallin Company, Los Angeles, Calif.
Filed Nov. 14, 1985, Ser. No. 804,971
Term of patent 14 years
U.S. Cl. D6—361



295,582
LOUNGE CHAIR FRAME OR SIMILAR ARTICLE
Marks M. Conn, Moorpark, Calif., assignor to Mallin Company, Los Angeles, Calif.
Filed Nov. 14, 1985, Ser. No. 805,136
Term of patent 14 years
U.S. Cl. D6—361





295,583
CHAIR FRAME OR SIMILAR ARTICLE
Marks M. Conn, Moorpark, Calif., assignor to Mallin Company, Los Angeles, Calif.
Filed Nov. 14, 1985, Ser. No. 805,140
Term of patent 14 years
U.S. Cl. D6—364



295,584
CHAIR FRAME OR SIMILAR ARTICLE
Marks M. Conn, Moorpark, Calif., assignor to Mallin Company, Los Angeles, Calif.
Filed Nov. 14, 1985, Ser. No. 805,138
Term of patent 14 years
U.S. Cl. D6—365



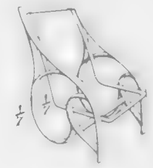
295,585
CHAIR
George C. Mulhauser, Paramus, N.J., assignor to Design Institute America, Inc., Montpelier, Ohio
Filed Apr. 7, 1986, Ser. No. 850,874
Term of patent 14 years
U.S. Cl. D6—372



295,586
CHAIR FRAME OR SIMILAR ARTICLE
Marks M. Conn, Moorpark, Calif., assignor to Mallin Company, Los Angeles, Calif.
Filed Nov. 14, 1985, Ser. No. 805,137
Term of patent 14 years
U.S. Cl. D6—373



295,587
CHAIR FRAME OR SIMILAR ARTICLE
Michael Mallin, 460 Ferry Landing N.W., Atlanta, Ga. 30328, assignor to Michael Mallin, Los Angeles, Calif.
Filed Nov. 14, 1985, Ser. No. 805,143
Term of patent 14 years
U.S. Cl. D6—379



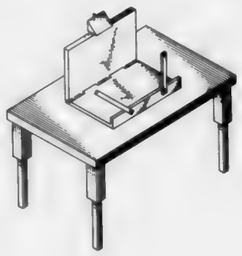
295,588
STACKABLE TRAY
Karl L. Heitlinger, and Horst Ottenwälder, both of Schwäbisch-Gmünd, Fed. Rep. of Germany, assignors to Grammer Sitzsysteme GmbH, Amberg, Fed. Rep. of Germany
Filed Nov. 5, 1985, Ser. No. 804,128
Claims priority, application Fed. Rep. of Germany, Jul. 30, 1985, MR II/360
Term of patent 14 years
U.S. Cl. D6—380

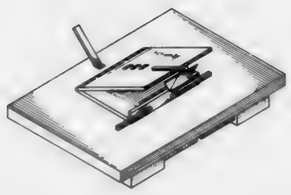


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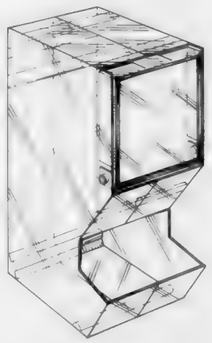


295,589
FOLDABLE TABLE, BOOK REST AND LIGHT COMBINATION
Wilma Walker, 3707 Company St., College Station, Ark. 72053
Filed Oct. 15, 1985, Ser. No. 787,478
Term of patent 14 years
U.S. Cl. D6—399

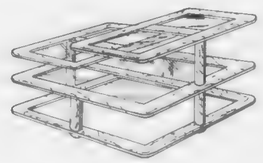




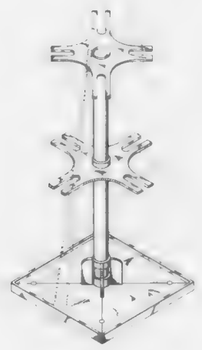
295,590
GRAVITY FILM FEED DISPENSER OR SIMILAR ARTICLE
Milton J. Merl, New City, and John C. Mercer, Bronx, both of N.Y., assignors to Marlboro Marketing, New York, N.Y.
Filed Jul. 12, 1984, Ser. No. 630,454
Term of patent 14 years
U.S. Cl. D6—408



295,591
ADJUSTABLE TABLE
Lester Beall, Jr., Denver, N.C., assignor to CM Furniture Co., Maiden, N.C.
Filed Sep. 24, 1985, Ser. No. 779,574
Term of patent 14 years
U.S. Cl. D6—430

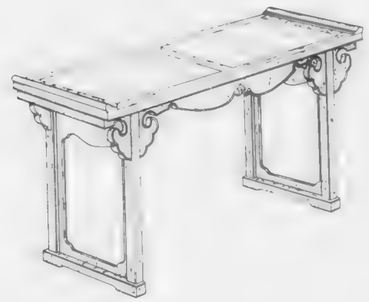


295,592
SKI RACK
Richard G. Brace, Two Maple La., Dover, Mass. 02030
Filed Dec. 2, 1985, Ser. No. 803,841
Term of patent 14 years
U.S. Cl. D6—457

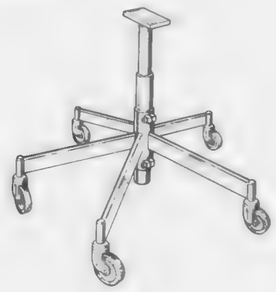




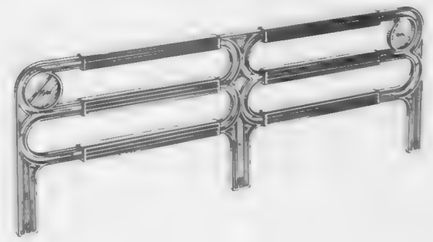
295,593
TABLE
Huey T. Keller, High Point, N.C., assignor to Bernhardt Industries, Inc., Lenoir, N.C.
Filed Nov. 22, 1985, Ser. No. 806,242
Term of patent 14 years
U.S. Cl. D6—484



295,594
CHAIR BASE OR SIMILAR ARTICLE
Stephan du Rées, Lidingö , Sweden, assignor to Mercado Rehabilitering, Stockholm, Sweden
Filed May 28, 1985, Ser. No. 737,858
Claims priority, application Sweden, Nov. 28, 1984, 843179; Nov. 28, 1984, 843180; Nov. 28, 1984, 843181; Nov. 28, 1984, 843182
Term of patent 14 years
U.S. Cl. D6—498



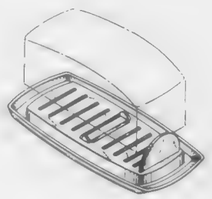
295,595
SAFETY SIDE RAIL FOR A CHILD'S BED
Mordechai Lipski, 11 Kashani Street, Tel Aviv, Israel
Filed Apr. 4, 1985, Ser. No. 719,748
Claims priority, application Israel, Dec. 31, 1984, 10259
Term of patent 14 years
U.S. Cl. D6—505



295,596
MODULAR BEVERAGE COOLER
Robert E. Schaffer, 62 Pleasant St., Newton Centre, Mass. 02159
Filed Jul. 1, 1985, Ser. No. 750,207
Term of patent 14 years
U.S. Cl. D7—70



295,597
DISH FOR BUTTER
Ronald DeVito, 394 Somerville Pl., Yonkers, N.Y. 10703
Filed Aug. 29, 1985, Ser. No. 770,451
Term of patent 14 years
U.S. Cl. D7—84



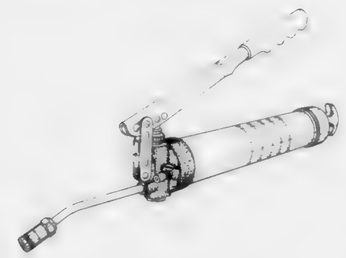
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295,598
GAS LIGHTER
Yukinobu Takase, Hasudashi, Japan, assignor to Iwatani Sangyo Kabushiki Kaisha, Osaka, Japan
Filed Jul. 12, 1985, Ser. No. 754,138
Term of patent 14 years
U.S. Cl. D7—416



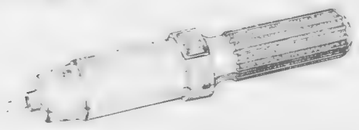
295,599
DUAL MODE GREASE GUN
Jerry D. Shew, Niles, Ill., assignor to Stewart Warner Corporation, Niles, Ind.
Filed May 1, 1985, Ser. No. 729,225
Term of patent 14 years
U.S. Cl. D8—14.1



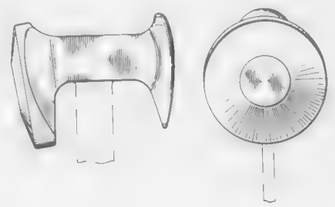
295,600
ADJUSTABLE TORQUE WRENCH
Bosko Grabovac, Arcadia, Calif., assignor to Consolidated Devices Inc., City of Industry, Calif.
Filed Jul. 11, 1985, Ser. No. 753,955
Term of patent 14 years
U.S. Cl. D8—24



295,601
CORDLESS SCREWDRIVER
Kenneth N. Svetlik, Schaumburg, Ill., assignor to Skil Corporation, Chicago, Ill.
Filed Jun. 12, 1985, Ser. No. 744,127
Term of patent 14 years
U.S. Cl. D8—61



295,602
HAMMER HEAD
Randall S. Williamson, 4216 New Rd., Williamson, N.Y. 14589
Filed Nov. 5, 1986, Ser. No. 928,108
Term of patent 14 years
U.S. Cl. D8—78



295,603
LIFTING HANDLE FOR TOILET SEATS
Anthony M. Giallourakis, P.O. Drawer 1307, Tarpon Springs, Fla. 33589
Filed Dec. 18, 1985, Ser. No. 810,344
Term of patent 14 years
U.S. Cl. D8—307



295,604
LIFTING HANDLE FOR TOILET SEATS
Peter K. Purdy, 2648 NW. 87th, Seattle, Wash. 98117
Filed Dec. 13, 1985, Ser. No. 808,580
Term of patent 14 years
U.S. Cl. D8—307

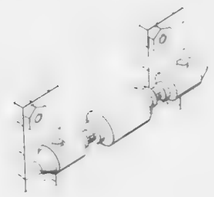




295,605
LEVER ADAPTER FOR DOOR KNOBS
Norbert Leopoldi, Chicago, Ill., assignor to The Cloverline, Inc., Chicago, Ill.
Filed Dec. 12, 1984, Ser. No. 680,776
Term of patent 14 years
U.S. Cl. D8—321



295,606
LOCK FOR DOUBLE DOORS
Talmadge Ault, 18130 State Rd., North Royalton, Ohio 44133
Filed Feb. 14, 1986, Ser. No. 834,023
Term of patent 14 years
U.S. Cl. D8—330



295,607
SHOWER HOOK
George Rademacher, East Brunswick, N.J., and Brigitte Beier, Valhalla, N.Y., assignors to International Inventory Control Corporation, East Brunswick, N.J.
Filed Sep. 22, 1986, Ser. No. 910,168
Term of patent 14 years
U.S. Cl. D8—367



295,608
BOTTLE FOR PERFUME
Maria L. Tonduti, Milan, Italy, assignor to Hanorah Italiana S.p.A., Milan, Italy
Filed May 21, 1985, Ser. No. 736,639
Term of patent 14 years
U.S. Cl. D9—315



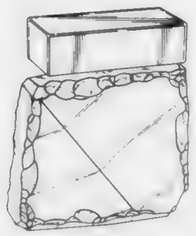
295,609
CONTAINER
Michael Papa, Windsor Locks, Conn., assignor to Monsanto Company, St. Louis, Mo.
Filed Jul. 30, 1985, Ser. No. 760,516
Term of patent 14 years
U.S. Cl. D9—349



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295,610
COMBINED BOTTLE AND CAP
Serge Mansau, Neuilly sur Seine, France, assignor to Lever Brothers Company, New York, N.Y.
Filed Sep. 3, 1985, Ser. No. 772,089
Claims priority, application United Kingdom, Mar. 1, 1985, 1025333
Term of patent 14 years
U.S. Cl. D9—367



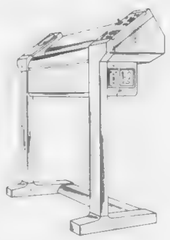
295,611
PLASTIC CONTAINER FOR FLUIDS
Phillip F. Warren, Iona, N.Y., and Frank R. Orizondo, Springfield, Mo., assignors to The R. T. French Co., Rochester, N.Y.
Filed Aug. 12, 1985, Ser. No. 764,406
Term of patent 14 years
U.S. Cl. D9—378



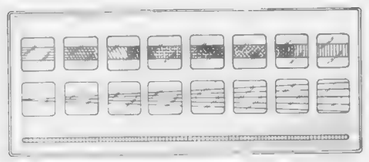
295,612
CONTAINER WALL
Akiho Ota, Funabashi, Japan, assignor to Yoshino Kogyosho Co., Ltd., Tokyo, Japan
Filed Jul. 30, 1985, Ser. No. 760,419
Term of patent 14 years
U.S. Cl. D9—392



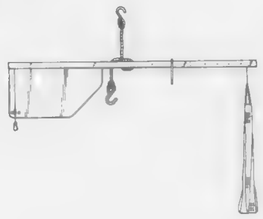
295,613
GRAPHICS PLOTTER
Howard M. C. Tanner, Salt Lake City, Utah, assignor to Optical Computers, Inc., Salt Lake City, Utah
Filed Jul. 25, 1985, Ser. No. 758,815
Term of patent 14 years
U.S. Cl. D10—46



295,614
WATER TEMPERATURE AND FLOW REGULATOR PANEL
Joseph Touch, 7231 Timberleaf, San Antonio, Tex. 78238
Filed Apr. 22, 1985, Ser. No. 725,942
Term of patent 14 years
U.S. Cl. D10—53



295,615
WILDERNESS SCALE
John H. Marto, 404 S. Eagle St., Oshkosh, Wis. 54901
Filed Aug. 5, 1985, Ser. No. 762,334
Term of patent 14 years
U.S. Cl. D10—90



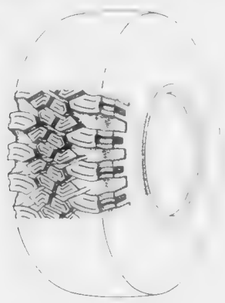


295,616
INSECT FIGURINE
Leal Smith, 4931 E. 40th, Indianapolis, Ind. 46226
Division of Ser. No. 684,362, Dec. 20, 1984, Pat. No. Des. 289,270. This application Jan. 20, 1987, Ser. No. 4,696
Term of patent 14 years
U.S. Cl. D11—158

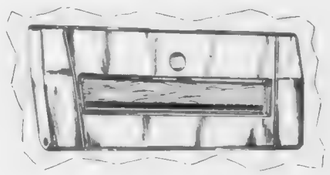




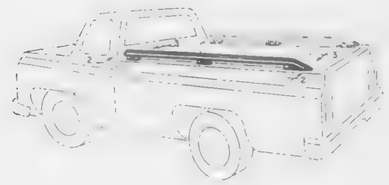
295,617
TIRE
Mark A. Sedlack, Cuyahoga Falls, Ohio, assignor to The Uniroyal Goodrich Tire Company, Akron, Ohio
Filed Oct. 4, 1985, Ser. No. 784,443
Term of patent 14 years
U.S. Cl. D12—147



295,618
GLOVE BOX DOOR
Warwick M. Whitley, II, Panama City, Fla., assignor to Attwood Corporation, Lowell, Mich.
Filed May 6, 1985, Ser. No. 730,793
Term of patent 14 years
U.S. Cl. D12—155



295,619
SIDE RAIL
Gary L. Reeve, LaGrange, Ind., assignor to Sparkomatic Corporation, Milford, Pa.
Filed Apr. 29, 1985, Ser. No. 728,179
Term of patent 14 years
U.S. Cl. D12—155



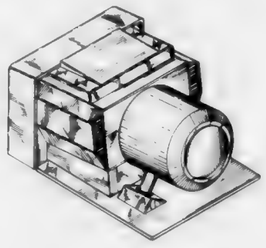
295,620
VAN TOP LUGGAGE CARRIER OR SIMILAR ARTICLE
Delbert O. Littrell, Vandalia, Mich., assignor to Bivouac Industries, Inc., Vandalia, Mich.
Filed May 14, 1985, Ser. No. 733,788
Term of patent 14 years
U.S. Cl. D12—157



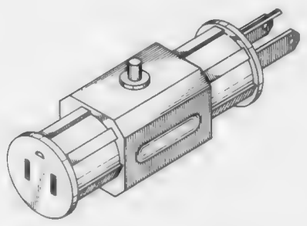
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295,621
**ENGINE DRIVEN GENERATOR**
Mark S. Lent, Golden Valley, and Paul W. Haverly, Coon Rapids, both of Minn., assignors to Onan Corporation, Minneapolis, Minn.
Filed Aug. 5, 1985, Ser. No. 762,908
Term of patent 14 years
U.S. Cl. D13—1



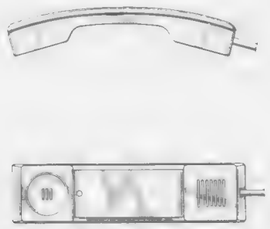
295,622
**ELECTRICAL PLUG SOCKET SWITCH**
Bert M. Good, and Evelyn F. Good, both of 10121 Russell Ave., Garden Grove, Calif. 92643
Filed Apr. 28, 1986, Ser. No. 857,816
Term of patent 14 years
U.S. Cl. D13—28



295,623
**TELEPHONE SET**
Paul Gilberton, Saint-Ouen l'Aumone, France, assignor to Thomson-CSF Telephone, Colombes, France
Filed Dec. 5, 1985, Ser. No. 805,541
Claims priority, application France, Jun. 18, 1985, 85 2856
Term of patent 14 years
U.S. Cl. D14—53



295,624
**TELEPHONE HANDSET**
Antonio Lopez Garcia, Madrid, Spain, assignor to AMPER, Madrid, Spain
Filed Jun. 11, 1986, Ser. No. 873,770
Claims priority, application Spain, Dec. 19, 1985, 109.660
Term of patent 14 years
U.S. Cl. D14—63



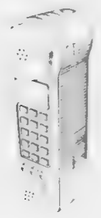
295,625
**CORDLESS PORTABLE RADIO TELEPHONE**
Katsuhito Watanabe, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan
Filed Sep. 15, 1986, Ser. No. 907,683
Claims priority, application Japan, Sep. 5, 1986, 61-34744
Term of patent 14 years
U.S. Cl. D14—64



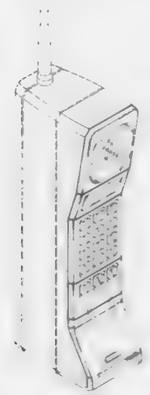




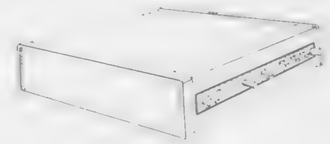
295,626
**CORDLESS PORTABLE RADIO TELEPHONE**
Katsuhito Watanabe, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan
Filed Sep. 15, 1986, Ser. No. 907,684
Claims priority, application Japan, Sep. 5, 1986, 61-34743
Term of patent 14 years
U.S. Cl. D14—64

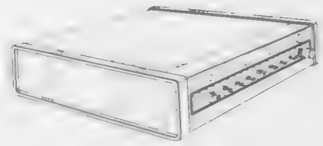


295,627
**PORTABLE TELEPHONE OR SIMILAR ARTICLE**
Albert L. Nagele, Wilmette, Ill., assignor to Motorola, Inc., Schaumburg, Ill.
Continuation-in-part of Ser. No. 858,255, Apr. 28, 1986, abandoned, which is a division of Ser. No. 545,410, Oct. 25, 1983, Pat. No. Des. 284,759. This application Mar. 11, 1987, Ser. No. 24,729
Term of patent 14 years
U.S. Cl. D14—66

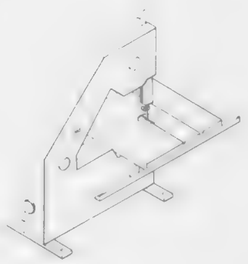


295,628
**ELECTRONIC CONTROL FOR VIDEO MONITORING SYSTEM**
Paul C. Mooney, Northbrook, Ill., assignor to Quick-Set, Incorporated, Northbrook, Ill.
Filed Aug. 27, 1985, Ser. No. 769,941
Term of patent 14 years
U.S. Cl. D14—99





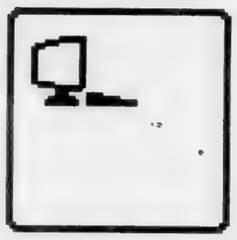
295,629
**BANDSAW**
Donald J. Emslie, Guelph, Canada, assignor to Pentair Canada, Inc, Guelph, Canada
Filed Sep. 9, 1985, Ser. No. 773,695
Claims priority, application Canada, Aug. 9, 1985, 09-08-85-1
Term of patent 14 years
U.S. Cl. D15—134



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295,630
ICON FOR USER PROFILE OR THE LIKE
Doris E. Wells-Papanek; William L. Verplank, both of Menlo Park, and Norman L. Cox, Mountain View, all of Calif., assignors to Xerox Corporation, Stamford, Conn.
Filed Dec. 9, 1985, Ser. No. 806,579
Term of patent 14 years
U.S. Cl. D18—27



295,631
ICON FOR DIVIDERS OR THE LIKE
Doris E. Wells-Papanek; William L. Verplank, both of Menlo Park, and Norman L. Cox, Mountain View, all of Calif., assignors to Xerox Corporation, Stamford, Conn.
Filed Oct. 28, 1985, Ser. No. 791,853
Term of patent 14 years
U.S. Cl. D18—27




295,632
ICON FOR WASTEBASKET OR THE LIKE
Doris E. Wells-Papanek; William L. Verplank, both of Menlo Park, and Norman L. Cox, Mountain View, all of Calif., assignors to Xerox Corporation, Stamford, Conn.
Filed Oct. 28, 1985, Ser. No. 791,844
Term of patent 14 years
U.S. Cl. D18—27



295,633
ICON FOR PC EMULATION OR THE LIKE
Doris E. Wells-Papanek; William L. Verplank, both of Menlo Park, and Norman L. Cox, Mountain View, all of Calif., assignors to Xerox Corporation, Stamford, Conn.
Filed Oct. 28, 1985, Ser. No. 791,852
Term of patent 14 years
U.S. Cl. D18—27

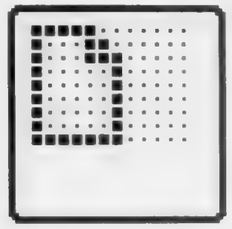



295,634
ICON FOR APPLICATION PROGRAM OR THE LIKE
Doris E. Wells-Papanek; William L. Verplank, both of Menlo Park, and Norman L. Cox, Mountain View, all of Calif., assignors to Xerox Corporation, Stamford, Conn.
Filed Oct. 28, 1985, Ser. No. 791,849
Term of patent 14 years
U.S. Cl. D18—27






295,635
ICON FOR ICON EDITOR OR THE LIKE
Doris E. Wells-Papanek; William L. Verplank, both of Menlo Park, and Norman L. Cox, Mountain View, all of Calif., assignors to Xerox Corporation, Stamford, Conn.
Filed Dec. 9, 1985, Ser. No. 807,043
Term of patent 14 years
U.S. Cl. D18—27



295,636
ICON FOR LOADER OR THE LIKE
Doris E. Wells-Papanek; William L. Verplank, both of Menlo Park, and Norman L. Cox, Mountain View, all of Calif., assignors to Xerox Corporation, Stamford, Conn.
Filed Dec. 9, 1985, Ser. No. 806,728
Term of patent 14 years
U.S. Cl. D18—27



295,637
ICON FOR BROKEN DOCUMENT OR THE LIKE
Doris E. Wells-Papanek; William L. Verplank, both of Menlo Park, and Norman L. Cox, Mountain View, all of Calif., assignors to Xerox Corporation, Stamford, Conn.
Filed Dec. 9, 1985, Ser. No. 806,299
Term of patent 14 years
U.S. Cl. D18—27



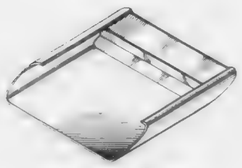


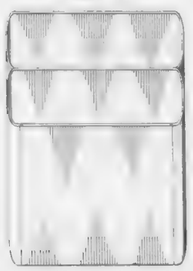
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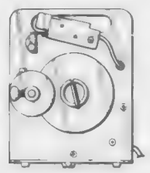
295,638
**FILE ASSEMBLY**
Mel Evenson, San Pedro, Calif., assignor to Eldon Industries, Inc., Inglewood, Calif.
Filed Mar. 25, 1985, Ser. No. 715,345
Term of patent 14 years
U.S. Cl. D19—90

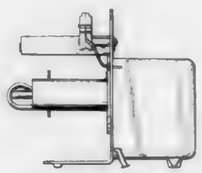




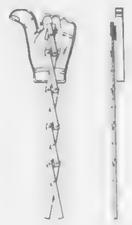


295,639
**LABEL DISPENSER**
Allen H. Oglander, St. Louis County, and Richard E. Shannon, Eldon County, both of Mo., assignors to Commercial Mailing Accessories, Inc., St. Louis, Mo.
Filed Apr. 8, 1985, Ser. No. 721,179
Term of patent 14 years
U.S. Cl. D20—2





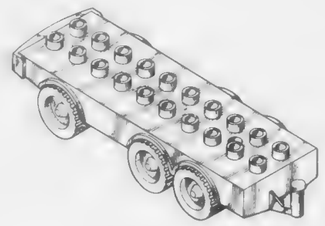
295,640
**SET OF HAND SIGNALS**
Earl J. Breault, 4905 San Marque Cir., Carmichael, Calif. 95608
Continuation-in-part of Ser. No. 500,560, Jun. 2, 1983, abandoned. This application Dec. 17, 1985, Ser. No. 810,269
Term of patent 14 years
U.S. Cl. D21—100



295,641
**TOY BUILDING ELEMENT**
Erling T. Dideriksen, Billund, Denmark, assignor to Interlego A.G., Baar, Switzerland
Filed Nov. 26, 1986, Ser. No. 935,564
Term of patent 14 years
U.S. Cl. D21—108

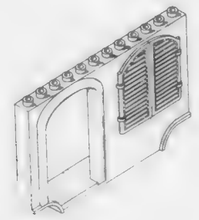


295,642
**TOY VEHICLE CHASSIS**
Flemming H. Olsen, Espergaerde, Denmark, assignor to Interlego A.G., Baar, Switzerland
Filed Nov. 26, 1986, Ser. No. 935,567
Term of patent 14 years
U.S. Cl. D21—108

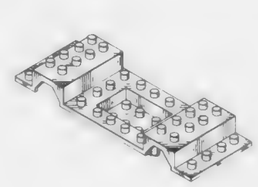




295,643
**SIMULATIVE TOY CONSTRUCTION PIECE**
Philip M. Kushner, Belsager, Denmark, assignor to Interlego A.G., Baar, Switzerland
Filed Nov. 26, 1986, Ser. No. 935,550
Term of patent 14 years
U.S. Cl. D21—108



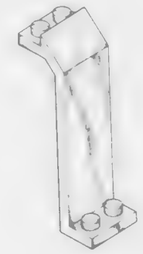
295,644
**TOY INTERCONNECTING CHASSIS BLOCK OR THE LIKE**
Tokuo Takahashi, Tokyo, Japan, assignor to Kawada Co., Ltd., Tokyo, Japan
Filed Jul. 22, 1985, Ser. No. 757,348
Claims priority, application Japan, Mar. 27, 1985, 60-011947
Term of patent 14 years
U.S. Cl. D21—108



295,645
**TOY BUILDING ELEMENT**
Jens N. Knudsen, Billund, Denmark, assignor to Interlego A.G., Baar, Switzerland
Filed Nov. 26, 1986, Ser. No. 935,575
Term of patent 14 years
U.S. Cl. D21—108



295,646
**TOY BUILDING ELEMENT**
Jens N. Knudsen, Billund, Denmark, assignor to Interlego A.G., Baar, Switzerland
Filed Nov. 26, 1986, Ser. No. 935,568
Term of patent 14 years
U.S. Cl. D21—108



295,647
**TOY CONSTRUCTION PIECE**
Jens N. Knudsen, Billund, Denmark, assignor to Interlego A.G., Baar, Switzerland
Filed Nov. 26, 1986, Ser. No. 935,566
Term of patent 14 years
U.S. Cl. D21—108



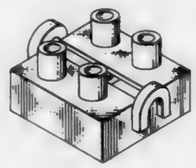
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**TOY BUILDING ELEMENT**
Jens N. Knudsen, Billund, Denmark, assignor to Interlego A.G., Baar, Switzerland
Filed Nov. 26, 1986, Ser. No. 935,699
Term of patent 14 years
U.S. Cl. D21—108



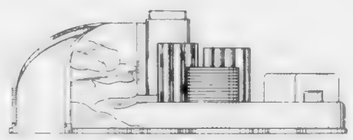
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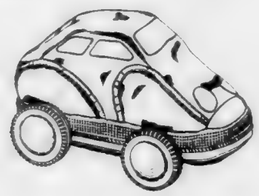
295,649
**TOY INTERCONNECTING WHEEL AND AXLE BLOCK OR THE LIKE**
Tokuo Takahashi, Tokyo, Japan, assignor to Kawada Co., Ltd., Tokyo, Japan
Filed Jul. 22, 1985, Ser. No. 757,347
Claims priority, application Japan, Mar. 27, 1985, 60-011943
Term of patent 14 years
U.S. Cl. D21—108



295,650
**TOY PLAYGROUND**
Augusto Argandona, East Aurora, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.
Filed Nov. 1, 1985, Ser. No. 794,058
Term of patent 14 years
U.S. Cl. D21—114



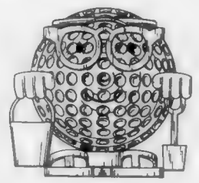
295,651
**TOY VEHICLE**
nee Robinson Chammah, 16 Redwing Place, Don Mills, Ontario, Canada M3C 2A8
Filed Oct. 10, 1985, Ser. No. 786,017
Claims priority, application Italy, Apr. 19, 1985, 21573/85[U]
Term of patent 14 years
U.S. Cl. D21—128



295,652
**ROBOTIC-HUMANOID TOY ASSEMBLY**
Teruo Kitamura, Tokyo, Japan, assignor to Takara Co., Ltd., Tokyo, Japan
Filed Jan. 28, 1986, Ser. No. 823,386
Claims priority, application Japan, Dec. 13, 1985, 60-51844
Term of patent 14 years
U.S. Cl. D21—150

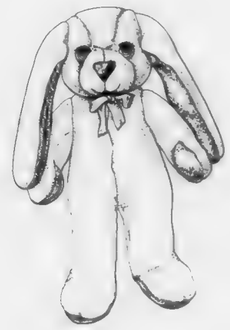


295,653
**NOVELTY GOLF BALL FIGURE**
George M. Colclasure, 4020 Will Rogers Pkwy., Ste. 700, Oklahoma City, Okla. 73108
Continuation-in-part of Ser. No. 779,625, Sep. 24, 1985. This application Aug. 24, 1987, Ser. No. 88,854
Term of patent 14 years
U.S. Cl. D21—155





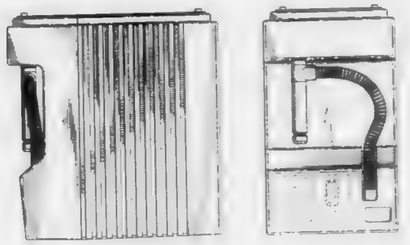
295,654
**ANIMATED STUFFED RABBIT**
Kathy Henn, 9388 Oakhurst Rd., Seminole, Fla. 33542, and Babs Ray, 1424 Rowewood Dr., Chattanooga, Tenn. 37421
Filed Oct. 21, 1985, Ser. No. 789,644
Term of patent 14 years
U.S. Cl. D21—187



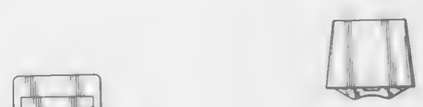
295,655
**CABLE GUARD FOR COMPOUND ARCHERY BOWS**
Robert E. Stinson, 7292 Peaceful Valley Rd., Acme, Mich. 49610
Filed Apr. 29, 1985, Ser. No. 728,106
Term of patent 14 years
U.S. Cl. D22—107



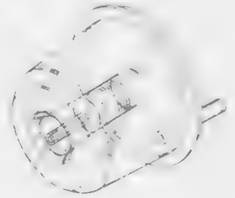
295,656
**WATER PURIFIER**
Graham Bond, High Wycombe, and A. Van Tullekin, London, both of England, assignors to Elga Ltd., United Kingdom
Filed Mar. 13, 1986, Ser. No. 844,290
Claims priority, application United Kingdom, Sep. 13, 1985, 1029186
Term of patent 14 years
U.S. Cl. D23—207



295,657
**MAGNETIC FLUID CONDITIONER**
Gale M. Weisenbarger, 140 Woodland Dr., Eaton, Ohio 45320, and John C. Moran, 3124 Lake Ave., Fort Wayne, Ind. 46805
Filed Feb. 6, 1986, Ser. No. 827,054
The portion of the term of this patent subsequent to Feb. 26, 1999, has been disclaimed.
Term of patent 14 years
U.S. Cl. D23—207



295,658
**FILTER FOR THE RECOVERY OF EMBRYOS IN ANIMAL ARTIFICIAL INSEMINATION PROCESSES**
Mark Anderson, R.R. 2, Elmwood, Wis. 54740
Filed Apr. 10, 1985, Ser. No. 721,759
Term of patent 14 years
U.S. Cl. D23—209



295,659
**PUMP SPRAYER PRESSURE TANK**
Gerald W. Born, Eldora, Iowa, assignor to Quality Products, Inc., Eldora, Iowa
Filed Feb. 22, 1985, Ser. No. 704,179
Term of patent 14 years
U.S. Cl. D23—225



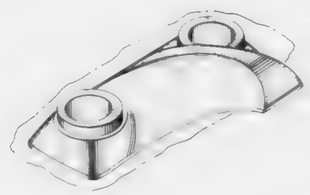
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295,660
COMBINED HANDLE AND STEM FOR AN AIR PUMP
Michele A. Chiarella, Via Vall'Orba 22, 6927 Lugano, Switzerland
Filed May 15, 1985, Ser. No. 734,058
Term of patent 14 years
U.S. Cl. D23—231



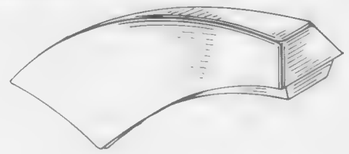
295,661
FAUCET SHELL
Herbert V. Kohler, Jr., Kohler, Wis., and Paul P. Kolada, Bexley, Ohio, assignors to Kohler Co., Kohler, Wis.
Filed Jan. 16, 1986, Ser. No. 819,876
Term of patent 14 years
U.S. Cl. D23—241

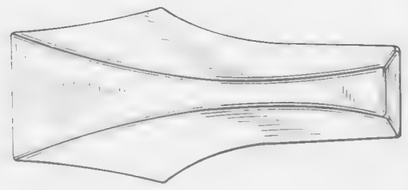


295,662
SPOUT
Herbert V. Kohler, Jr., Kohler, Wis., assignor to Kohler Co., Kohler, Wis.
Filed Jan. 16, 1986, Ser. No. 819,897
Term of patent 14 years
U.S. Cl. D23—255

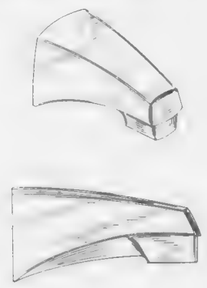


295,663
SPOUT
Herbert V. Kohler, Jr., Kohler, Wis., and Paul P. Kolada, Bexley, Ohio, assignors to Kohler Co., Kohler, Wis.
Filed Jan. 16, 1986, Ser. No. 819,877
Term of patent 14 years
U.S. Cl. D23—235



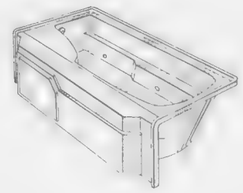


295,664
SPOUT
Herbert V. Kohler, Jr., Kohler, Wis., and Paul P. Kolada, Bexley, Ohio, assignors to Kohler Co., Kohler, Wis.
Filed Jan. 16, 1986, Ser. No. 819,875
Term of patent 14 years
U.S. Cl. D23—255





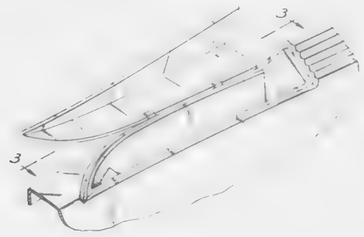
295,665
BATHTUB
Kenneth J. Salach, Naperville, Ill., assignor to National Fiber Glass Products, Div. of G.K.L. Corp., Romeoville, Ill.
Filed Jul. 12, 1985, Ser. No. 754,090
Term of patent 14 years
U.S. Cl. D23—277



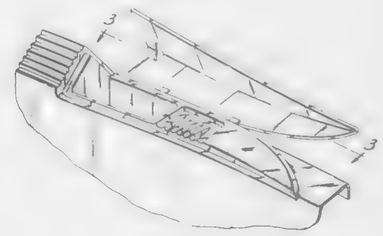
295,666
BATHTUB
William H. Griffiths, St. Albans, England, assignor to Bonsack Baths (London) Limited, England
Filed Jun. 19, 1985, Ser. No. 746,382
Claims priority, application United Kingdom, Jan. 4, 1985, 1024199
Term of patent 14 years
U.S. Cl. D23—281



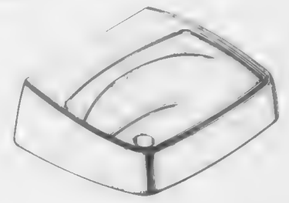
295,667
COVERED WELL FOR BATHTUBS
Harvey E. Diamond, 12953 Woodbridge St., Studio City, Calif. 91604
Division of Ser. No. 641,315, Aug. 16, 1984. This application Dec. 29, 1986, Ser. No. 947,951
Term of patent 14 years
U.S. Cl. D23—281



295,668
COVERED WELL FOR BATHTUBS
Harvey E. Diamond, 12953 Woodbridge St., Studio City, Calif. 91604
Division of Ser. No. 641,315, Aug. 16, 1984. This application Dec. 29, 1986, Ser. No. 947,920
Term of patent 14 years
U.S. Cl. D23—281



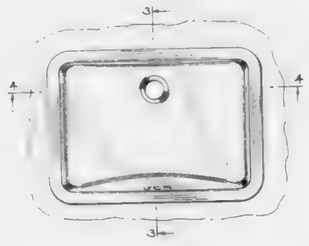
295,669
LAVATORY
Paul P. Kolada, Bexley, Ohio, assignor to Kohler Co., Kohler, Wis.
Filed Jul. 23, 1986, Ser. No. 888,506
Term of patent 14 years
U.S. Cl. D23—294



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295,670
LAVATORY
Mary J. Reid, Sheboygan, and Ronald D. Olson, Brown Deer, both of Wis., assignors to Kohler Co., Kohler, Wis.
Filed May 30, 1986, Ser. No. 869,116
Term of patent 14 years
U.S. Cl. D23—294



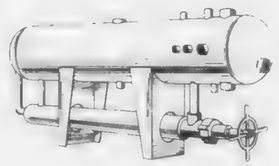
295,671
LAVATORY
Herbert V. Kohler, Jr., Kohler, Wis., assignor to Kohler Co., Kohler, Wis.
Filed Jan. 16, 1986, Ser. No. 819,898
Term of patent 14 years
U.S. Cl. D23—294



295,672
LAVATORY PEDESTAL
Mary J. Reid, Sheboygan, Wis., assignor to Kohler Co., Kohler, Wis.
Filed Jan. 9, 1986, Ser. No. 817,342
Term of patent 14 years
U.S. Cl. D23—308



295,673
NATURAL GAS PURIFICATION UNIT
Roger J. Anderson, 860 Summit Rd., Santa Barbara, Calif. 93108, and Jeffrey R. Anderson, 1735 San Gabriel, Ventura, Calif. 93004
Filed Jul. 22, 1985, Ser. No. 757,268
Term of patent 14 years
U.S. Cl. D23—355

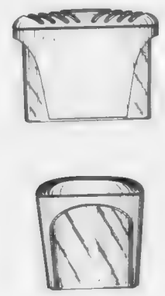


295,674
AIR-FILTER
Yoshinari Ogasawara, Kasugai, and Syunzi Tukamoto, Inazawa, both of Japan, assignors to CKD Kabushiki Kaisha, Komaki, Japan
Filed Jul. 3, 1986, Ser. No. 882,623
Claims priority, application Japan, Feb. 5, 1986, 3781/1986
Term of patent 14 years
U.S. Cl. D23—365

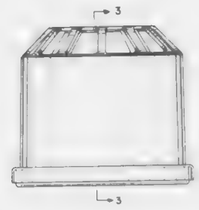




295,675
AIR FRESHENER
Scott W. Demarest, Racine County, Wis., assignor to S. C. Johnson & Son, Inc., Racine, Wis.
Filed Aug. 20, 1986, Ser. No. 898,292
Term of patent 14 years
U.S. Cl. D23—366



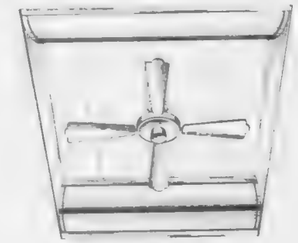
295,676
AIR FRESHENER CARTRIDGE
Robert L. Steiner, Chicago, and Thomas R. Bajek, LaGrange Park, both of Ill., assignors to Steiner Company, Inc., Chicago, Ill.
Filed Sep. 10, 1986, Ser. No. 905,645
Term of patent 14 years
U.S. Cl. D23—366



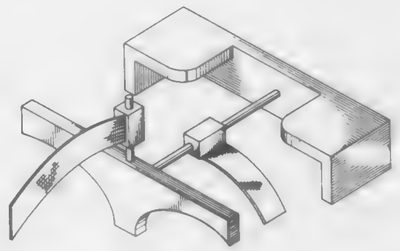
295,677
WARMER UNIT FOR FRAGRANCE DIFFUSION
David L. Grimes, Greensboro, N.C., assignor to Potpourri Press, Inc., Greensboro, N.C.
Filed May 28, 1986, Ser. No. 867,748
Term of patent 14 years
U.S. Cl. D23—366



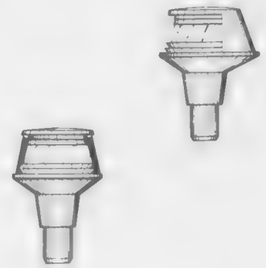
295,678
COMBINED CEILING FAN AND RECESSED LIGHTING FIXTURE
John McVey, 4255 Bayridge Ct., Spring Hill, Fla. 33526
Filed Oct. 4, 1985, Ser. No. 784,027
Term of patent 14 years
U.S. Cl. D23—377



295,679
LOCATOR FOR POINTS OF INSULIN INJECTIONS
Paul D. Jose, P.O. Box 246, Fort Davis, Tex. 79734
Filed Sep. 18, 1985, Ser. No. 777,416
Term of patent 14 years
U.S. Cl. D24—8



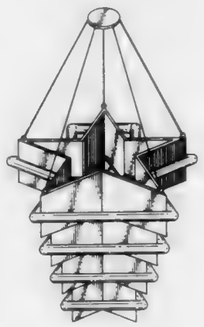
295,680
COMBINATION SIDE LIGHT FOR BOATS
Warrick M. Whitley, II, Lynn Haven, Fla.
Filed Nov. 4, 1985, Ser. No. 794,419
Term of patent 14 years
U.S. Cl. D26—28



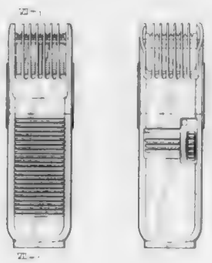
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295,681
NEON SWAG LAMP
James T. Snyder, and Beverly A. Snyder, both of 1890 Phalen Pl., Maple Wood, Minn. 55109
Filed Aug. 30, 1985, Ser. No. 771,113
Term of patent 14 years
U.S. Cl. D26—78



295,682
HAIR CLIPPER CASING
Yonosuke Iwai, and Kazuyoshi Yonesawa, both of Kadoma, Japan, assignors to Matsushita Electric Works, Ltd., Japan
Filed May 16, 1986, Ser. No. 864,101
Claims priority, application Japan, Nov. 20, 1985, 60-48643
Term of patent 14 years
U.S. Cl. D28—53

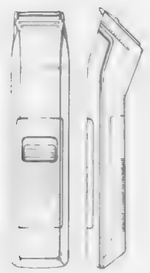




295,683
TABLET
John R. Kirk, McKeesport, Pa., assignor to McNeilab, Inc., Fort Washington, Pa.
Filed Aug. 12, 1985, Ser. No. 764,807
Term of patent 14 years
U.S. Cl. D28—2



295,684
BEARD AND MOUSTACHE TRIMMER
Ronald L. Muller, Old Saybrook, Conn., assignor to North American Philips Corp., New York, N.Y.
Filed Feb. 27, 1986, Ser. No. 836,562
Term of patent 14 years
U.S. Cl. D28—53



# LIST OF PATENTEES

TO WHOM

## PATENTS WERE ISSUED ON THE 10TH DAY OF MAY, 1988

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. & M. Cousin & Cie: *See—*
Pipon, Yves; and Droulon, Georges, 4,743,067, Cl. 297-379.000.
A. O. Smith Corporation: *See—*
Eising, John P., 4,742,800, Cl. 122-17.000.
Abbott Laboratories: *See—*
Shaffar, Mark R., 4,743,561, Cl. 436-501.000.
Abbott, Stephan L.: *See—*
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Abe, Akira; Ishida, Isamu; and Katsumata, Kaneyoshi, to Omron Tateisi Electronics Co. Ultrasonic flaw detecting system. 4,742,713, Cl. 73-620.000.
ABE Co., Ltd.: *See—*
Abe, Masaki, 4,742,584, Cl. 4-542.000.
Abe, Masaki, to ABE Co., Ltd. Water current and air bubble generating apparatus for bath. 4,742,584, Cl. 4-542.000.
ABG Semca: *See—*
Soum, Jacques; and Malabre, Christian, 4,743,126, Cl. 384-105.000.
Abura, Yoshinori; Tsuji, Eiji; Okuyama, Kenji; and Ochi, Shuhei, to Matsushita Electric Works, Ltd. Electric hair curler with detachable handle containing rechargeable batteries and charger. 4,743,735, Cl. 219-222.000.
Abuyama, Yasuo, to Kabushiki Kaisha Toshiba. Apparatus for magnifying or reducing a color image in which sequentially-stored RGB data are selectively read out from a memory in accordance with previously-determined read control data. 4,743,963, Cl. 358-77.000.
Ackeret, Peter: *See—*
Bohnet, Klaus; and Ackeret, Peter, 4,743,077, Cl. 312-12.000.
Adachi, Hideki: *See—*
Tomosada, Masahiro; Adachi, Hideki; Suzuki, Tadashi; Ohki, Naoyuki; and Miyata, Masanori, 4,743,944, Cl. 355-14.00R.
Adachi, Kin-ichi: *See—*
Inoda, Kenichi; Harada, Terumaru; Fujita, Tatsuo; and Adachi, Kin-ichi, 4,742,679, Cl. 60-517.000.
Adam, Peter; Becker, Paul; Heidenfelder, Anton; Ihle, Olai; and Schilling, Werner, to Siemens Aktiengesellschaft. Arrangement to limit the axial play of a motor-drive shaft mounted with plain bearings. 4,742,726, Cl. 74-425.000.
Adams, Craig F.: *See—*
Bartholomew, Stephen W.; Rontey, Daniel C.; Necker, William J.; and Adams, Craig F., 4,742,773, Cl. 102-275.300.
Adams, Lawrence, Jr.; and Gunnell, Reid W., to International Business Machines Corporation. Renewable fuser wick. 4,743,943, Cl. 355-3.0FU.
Adams, Samuel F.: *See—*
Rost, Karl H.; and Adams, Samuel F., 4,742,972, Cl. 242-118.310.
Addona, Thomas J., Sr. Hydrofoil attachment for pool cleaning tool. 4,742,592, Cl. 15-1.070.
Adee, James M., to Rohr Industries, Inc. Buried element deicer. 4,743,740, Cl. 219-548.000.
Adeka Argus Chemical Co., Ltd.: *See—*
Minagawa, Motonobu; Nakahara, Yutaka; Shibata, Toshihiro; and Tobita, Etsuo, 4,743,688, Cl. 544-113.000.
Adidas Sportschuhfabriken Adi Dassler Stiftung & Co. KG: *See—*
Tadiotto, Guilio, 4,742,626, Cl. 36-127.000.
Advanced Cardiovascular Systems, Inc.: *See—*
Nordquest, Richard A., 4,743,230, Cl. 604-97.000.
Advanced Extraction Technologies, Inc.: *See—*
Mehra, Yuv R., 4,743,282, Cl. 62-17.000.
Advanced Micro Devices, Inc.: *See—*
Szeto, Simon, 4,743,899, Cl. 340-825.860.
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Afonso, Adriano: *See—*
Ganguly, Ashit K.; Girijavallabhan, Viyyoor M.; Afonso, Adriano; and Weinstein, Jay, 4,743,598, Cl. 514-192.000.
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Bauer, Walter; Schmidt, Manfred; and Korsa, Heinz, 4,744,100, Cl. 378-187.000.
Ahern, William P.; Andrist, Dale F.; and Skogerson, Lawrence E., to Stauffer Chemical Co. Fermentation of whey to produce propionic acid. 4,743,453, Cl. 426-41.000.
Air Products and Chemicals, Inc.: *See—*
Conkey, James B.; and Taylor, Glenn A., 4,743,628, Cl. 521-163.000.
Aisan Kogyo Kabushiki Kaisha: *See—*
Ito, Hideki; Baba, Motohiro; Takeuchi, Hitoshi; Makimura, Toshiro; and Takagi, Takaaki, 4,742,964, Cl. 239-397.500.
Aisin Seiki Kabushiki Kaisha: *See—*
Akagi. Motonobu, 4,742,989, Cl. 251-129.050.
Funakawa, Jun; and Morioka, Hiroaki, 4,743,169, Cl. 417-306.000.
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Aisin Seiki Kabushikikaisha: *See—*
Haneda, Hideo; Nakamura, Mamoru; Funakawa, Jun; Oka, Hiroki; and Nakane, Takeshi, 4,742,988, Cl. 251-129.010.
Aitken, Derek: *See—*
Plumb, Frederick; Wright, Christopher; Bright, Nicholas J.; Aitken, Derek; and Harrison, Bernard, 4,743,767, Cl. 250-492.200.
Aizu, Yoshihisa; and Ogino, Kouji, to Kowa Company Ltd. Ophthalmological diagnosis method and apparatus. 4,743,107, Cl. 351-221.000.
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Akebono Brake Industry Company, Ltd.: *See—*
Hiroshi, Hirashita; and Uchiyama, Masahiko, 4,742,897, Cl. 188-196.00D.
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Akerman, Jan G. H.: *See—*
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Akiba, Shigeyuki: *See—*
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Akiyama, Toru: *See—*
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Akiyama, Tsuneo, to Shintom Kabushiki Kaisha. Lid apparatus for disk insertion opening of disk player. 4,743,991, Cl. 360-97.000.
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Buter, Roelof, 4,743,643, Cl. 524-396.000.
Alar Engineering Corporation: *See—*
White, Harold R., 4,742,852, Cl. 141-256.000.
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Evanega, George R.; and Albert, Winfried, 4,743,536, Cl. 435-7.000.
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Alco Chemical Corp.: *See—*
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Alexander, Kenneth E.: *See—*
Stover, Howard H.; Alexander, Kenneth E.; and Alexander, Fred P., 4,744,044, Cl. 364-737.000.
Alexander, Peter W., to Phosphor Products Co. Ltd.; and TI Corporate Services Limited. Capacitive switches. 4,743,895, Cl. 340-712.000.
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Alfred Teves GmbH: *See—*
Belart, Juan; Seibert, Wolfram; and Ocvirk, Norbert, 4,743,075, Cl. 303-114.000.
Gruenberg, Hubertus V., 4,743,073, Cl. 303-92.000.
Alig, Leo; and Muller, Marcel, to Hoffmann-La Roche Inc. Oxazolidines and compositions containing the same. 4,743,604, Cl. 514-252.000.
Allard, Jean-Claude; and Saunier, Christian, to Giravions Dorand. Method and device for recording and restitution in relief of animated video images. 4,743,964, Cl. 358-88.000.
Allegheny Ludlum Corporation: *See—*
Bloom, William M., 4,743,197, Cl. 432-59.000.
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Alpatiev, Jury S.; Kaleko, David M.; Kolesnik, Georgy F.; Oseledko, Nikolai N.; and Chvertko, Natalia A., to Institute Electrosvarki Im. Eo Patona. Method of electric-arc condenser-discharge percussion stud welding. 4,743,732, Cl. 219-99.000.

Alpia S.A.: *See—*
Bruneau, Alain, 4,742,598, Cl. 16-286.000.

Alps Electric Co., Ltd.: *See—*
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Altman, William F. Tool for cleaning and highlighting automotive engine timing marks. 4,742,596, Cl. 15-210.00R.

Alvis, John R.: *See—*
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ALZA Corporation: *See—*
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American Home Products Corporation: *See—*
Hung, Paul P., 4,743,619, Cl. 514-450.000.
Malamas, Michael S.; and Sestanj, Kazimir, 4,743,611, Cl. 514-390.000.
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American Hospital Supply Company: *See—*
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Farid, Samir Y.; Haley, Neil F.; Moody, Roger E.; and Specht, Donald P., 4,743,528, Cl. 430-281.000.
Farid, Samir Y.; Haley, Neil F.; Moody, Roger E.; and Specht, Donald P., 4,743,529, Cl. 430-281.000.
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Hallberg, Edwin A.; and Welsh, Gary C., to Dow Chemical Company, The. Rotary sheeter. 4,742,741, Cl. 83-37.000.
Halsey, Larry L. Fence wire location marker. 4,742,796, Cl. 116-209.000.
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Halvorsen, Robert M.; Bradley, Jerome R.; and Long, Gregory F., to Ex-Cell-O Corporation. Fuel distributing and metering assembly. 4,742,685, Cl. 60-739.000.
Hamada, Mitsuo: *See—*
Yoshida, Keiji; Shimizu, Koji; and Hamada, Mitsuo, 4,743,670, Cl. 528-15.000.
Hamada, Toshimitsu: *See—*
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Hamamichi, Yoshihiro; Yagi, Takashi; and Domoto, Yasuo, to Tokyo Electric Co., Ltd. Paper feed device for a printer. 4,742,946, Cl. 226-74.000.
Hambrecht, Juergen: *See—*
Mitulla, Konrad; Hambrecht, Juergen; Tesch, Helmut; Schmitt, Burghard; and Maeder, Hansjoachim, 4,743,661, Cl. 525-396.000.
Hames, Edward L., to Curtis Manufacturing Company, Inc. Rotary telephone line surge protector and system. 4,743,999, Cl. 361-56.000.
Hamlet & Garneau Inc.: *See—*
Garneau, Claude J. E.; and Stethem, Walter C., 4,742,842, Cl. 137-172.000.
Hammer, Maximilian; Munich, Johann; and Rohrl, Ludwig, to MAN Technologie GmbH. Device for forming a coaxial corrugation in a thin-walled tube. 4,742,707, Cl. 72-454.000.
Hammond, Scott H., to Transdata, Inc. Electricity meter with solid-state circuits. 4,744,004, Cl. 361-372.000.
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Bornwasser, Hans-Joachim W.; Loss, Ulrich R.; and Handke, Gernot, 4,742,917, Cl. 206-602.000.
Haneda, Hideo; Nakamura, Mamoru; Funakawa, Jun; Oka, Hiroki; and Nakane, Takeshi, to Aisin Seiki Kabushikikaisha. Electrical apparatus including solenoid device and energization control circuit therefor. 4,742,988, Cl. 251-129.010.
Hanes, Ronnie M.: *See—*
Chang, Biau-Hung; and Hanes, Ronnie M., 4,743,401, Cl. 260-410.90R.
Hanfling, Jerome D.: *See—*
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Hanke, Christian: *See—*
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Hankinson, Julian E., Jr.: *See—*
Young, William O., Jr.; Jennings, Mansel A.; Lark, George H.; and Hankinson, Julian E., Jr., 4,742,968, Cl. 242-65.000.
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Hanser, Paul. E., to HWH Corporation. Automatic levelling system. 4,743,037, Cl. 208-6.00R.
Hanssler, Gerd: *See—*
Jelich, Klaus; Brandes, Wilhelm; Hanssler, Gerd; and Reinecke, Paul, 4,743,615, Cl. 514-404.000.
Harada, Takashi: *See—*
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Harada, Terumaru: *See—*
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Haraguchi, Eiji: *See—*
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Harata, Tatsuo: *See—*
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Harlow, Joanne: *See—*
Phillips, James G., Jr.; and Harlow, Joanne, 4,742,580, Cl. 2-158.000.
Harper, Robert J., Jr., to United States of America, Agriculture. Process for producing smooth-dry cellulosic fabric with durable softness and dyeability properties. 4,743,266, Cl. 8-181.000.
Harrelson, Thomas O'Neal: *See—*
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Harris, Edward H., to Creations by Harris, Inc. Low voltage lighting system. 4,744,014, Cl. 362-145.000.
Harris, G. Bryn; Peacey, John G.; and Monette, Serge, to Pamour Inc. Production of pure $MgCl_2$ solution suitable for the production of magnesium metal from an impure magnesite ore or concentrate. 4,743,347, Cl. 204-60.000.
Harris, James E.; and Robeson, Lloyd M., to Amoco Corporation. Composition for making circuit board substrates and electrical connectors. 4,743,645, Cl. 524-456.000.
Harris, Michael; Hokanson, Gerard; Murthy, Kuchi; Reisch, Robert; and Waldman, Frank, to Warner-Lambert Company. Stabilized compositions. 4,743,450, Cl. 424-440.000.
Harris, Paul C. Power load for underwater spear gun. 4,742,775, Cl. 102-456.000.
Harris, Timothy J. R.: *See—*
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Harrison, Bernard: *See—*
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Harrison, Cecil P.: *See—*
Mickus, J. C.; Harrison, Cecil P.; and Tittle, Cullen G., 4,743,289, Cl. 71-61.000.
Harrison, Keith. Golf swing practice device. 4,743,028, Cl. 273-183.00B.
Hartley, William R., to Wadkin plc. Woodworking router. 4,742,855, Cl. 144-252.00R.
Hartmann, Wolfgang, to Metallgesellschaft AG. Isolated feedthrough. 4,743,277, Cl. 55-112.000.
Hartzell, Erik T.: *See—*
Fischer, Udo K. R.; Hartzell, Erik T.; and Akerman, Jan G. H., 4,743,515, Cl. 428-698.000.
Haruhara, Kazuyoshi, to Casio Computer Co., Ltd. Data transmission system. 4,744,097, Cl. 375-7.000.
Harvey, Donald M., to Eastman Kodak Company. Slide projector with automatic slide warpage compensation. 4,743,109, Cl. 353-101.000.
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Hasegawa, Shigeru: *See—*
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Hasegawa, Shinichi, to NEC Corporation. Multilayer wiring substrate. 4,743,489, Cl. 428-210.000.
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Tohma, Koichi; Kushida, Naoki; Tamura, Yasuyuki; Hasegawa, Tetsuo; and Yaegashi, Hisao, 4,743,920, Cl. 346-71.000.
Hashim, Abdullah, to National Research Development Corporation. Inspecting textile products. 4,744,035, Cl. 364-470.000.
Hashimoto, Koji; Miura, Kimikado; Asami, Katsuhiko; and Kawashima, Asahi, to Mitsui Engineering & Shipbuilding Co., Ltd.; and Hashimoto, Koji. Highly corrosive-resistant amorphous alloy of Ni-Cu-Ti with Ta and/or Nb. 4,743,314, Cl. 148-403.000.
Hashimoto, Masaki: *See—*
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Hashimoto, Masashi: *See—*
Kohsaka, Masanobu; Terano, Hiroshi; Komori, Tadaaki; Iwami, Morita; Yamashita, Michio; Hashimoto, Masashi; Uchida, Itsuo; and Takase, Shigehiro, 4,743,555, Cl. 435-253.000.
Terano, Hiroshi; Tsurumi, Yasuhisa; Setoi, Hiroyuki; Hashimoto, Masashi; and Kohsaka, Masanobu, 4,743,614, Cl. 514-400.000.
Hashimoto, Miho; Yokoe, Masaki; Kurono, Yoshikazu; and Hayashi, Koji, to Brother Kogyo Kabushiki Kaisha. Data processing system for sewing machine. 4,742,786, Cl. 112-121.120.
Hashimoto, Sadakatsu; and Hashimoto, Shintaro, to Sharp Kabushiki Kaisha. Electrode pattern for a liquid crystal display. 4,743,896, Cl. 340-784.000.
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Hashimoto, Sadakatsu; and Hashimoto, Shintaro, 4,743,896, Cl. 340-784.000.
Hashizume, Junji, to Tokico Ltd. Industrial robot. 4,743,819, Cl. 318-368.000.
Hasslauer, Heinz; Frey, Werner; Sonnek, Werner; and Klauss, Walter, to Traub AG. Automatic rod guide adjusting method for a numerically controlled lathe and lathe for carrying out the method. 4,742,740, Cl. 82-2.500.
Hastings, Kim: *See—*
Odenheimer, Ronald P.; and Hastings, Kim, 4,743,844, Cl. 324-121.00R.
Hata, Ryosuke, to Sumitomo Electric Industries, Ltd. Process for manufacturing of composite pipes. 4,743,329, Cl. 156-287.000.
Hatchett, Colin P.: *See—*
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Hatchett, Michael R.: *See—*
Castle, Frank E.; Hatchett, Colin P.; Hatchett, Michael R.; and Heath, John S., 4,743,995, Cl. 360-98.000.
Hatfield, John G., to AMP Incorporated. Multiple stroke ratchet hand tool. 4,742,737, Cl. 81-355.000.
Hattori, Yoshinori: *See—*
Fukushima, Mitsuru; Hattori, Yoshinori; Shimura, Takeo; and Kozasa, Manabu, 4,743,591, Cl. 514-30.000.
Hattori, Youichi: *See—*
Noguchi, Yoshiki; Nagasaki, Nobuo; Hattori, Youichi; Yokosuka, Kenji; and Sugita, Shigehisa, 4,743,516, Cl. 429-16.000.
Hauers, Manfred; and Vits, Dieter, to Zinser Textilmaschinen GmbH. Bobbin doffing and donning apparatus. 4,742,674, Cl. 57-275.000.
Hay, James V.; Wexler, Barry A.; and Zimmerman, Donna F., to Du Pont de Nemours, E. I., and Company. Herbicidal sulfonamides. 4,743,292, Cl. 71-92.000.
Hayakawa, Issei, to NGK Insulators, Ltd. Ceramic insert cast piston. 4,742,759, Cl. 92-176.000.
Hayashi, Koji: *See—*
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Hayashi, Rieko: *See—*
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Hayashi, Shigeaki: *See—*
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Hayashi, Takashi: *See—*
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Hayward Pool Products, Inc.: *See—*
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Hehr, Kenneth L.; and Morgan, Ronald J., to Thumbnail Company, The. Groove forming apparatus and method. 4,742,856, Cl. 144-371.000.
Heidenfelder, Anton: *See—*
Adam, Peter; Becker, Paul; Heidenfelder, Anton; Ihle, Olai; and Schilling, Werner, 4,742,726, Cl. 74-425.000.
Heigl, Helmuth. Positioning device for test heads. 4,742,980, Cl. 248-125.000.
Heilig, Lewis A. Postal code envelope printer. 4,742,771, Cl. 101-407.0BP.
Heinen, Jochen; and Hanke, Christian, to Siemens Aktiengesellschaft. Semiconductor laser array with focused emission. 4,744,088, Cl. 372-50.000.
Heinrich, William P.: *See—*
Leopoldi, Norbert; and Heinrich, William P., 4,743,234, Cl. 604-187.000.
Heinz, Winfried; and Schwarz, Wilhelm, to Fried. Krupp Gesellschaft mit beschrankter Haftung. Apparatus for the manipulation of probes. 4,742,715, Cl. 73-864.310.
Heitz, Walter; Kampschulte, Uwe; Bottenbruch, Ludwig; Freitag, Dieter; and Dicke, Hans-Rudolf, to Bayer Aktiengesellschaft. Aromatic polyesters, processes for their preparation, and their use for the preparation of molecularly reinforced polymers. 4,743,674, Cl. 528-176.000.
Helm, Arthur E.; and Keane, Stuart J., to Elton Fabrications Limited. Amusement arcade machines for use in amusement and/or gaming or the like. 4,743,024, Cl. 273-143.00R.
Helmer, Ulla; and Johansen, Randi, to Casco Nobel AB. Aqueous dispersions, a process for their preparation and the use of the dispersions as sizing agents. 4,743,303, Cl. 106-236.000.
Heminghous, William W.; and McEachern, J. Albert, Jr., to Teledyne Industries, Inc. Turbocompound engine. 4,742,683, Cl. 60-716.000.
Hemphill, Raymond M.: *See—*
Wert, David E.; and Hemphill, Raymond M., 4,743,426, Cl. 420-111.000.
Henderson, Joseph E. Pail storage shelf and rack. 4,742,925, Cl. 211-71.000.
Hendricks, Daniel A.; and Shemeta, Paul J., to Boeing Company, The. Quick change drill chuck systems. 4,743,145, Cl. 408-59.000.
Henke, Harlan H.; and Borthick, William R., to Unit Rig & Equipment Company. Tire rim clamp. 4,743,070, Cl. 301-13.0SM.
Hennessey, Michael, to Energy Conversion Devices, Inc. Erasure means and data storage system incorporating improved erasure means. 4,744,055, Cl. 365-113.000.
Henningsen, Gunnar: *See—*
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Hernandez, Albert. Bottle opener. 4,742,734, Cl. 81-3.400.
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Geibel, Wolfram; and Herrmann, Wolfgang, 4,743,686, Cl. 540-479.000.
Herronen, John R.: *See—*
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Herzog, Michael, to Flowtec AG. Circuit for measuring capacitance by charging and discharging capacitor under test and its shield. 4,743,837, Cl. 324-60.0CD.
Hesston Corporation: *See—*
Schrag, Thomas G.; Hood, Charles F.; and Morton, Scott A., 4,742,880, Cl. 177-136.000.
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Hettwer, Paul F.: *See—*
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Hewitt, Mary J.: *See—*
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Hewlett Packard Company: *See—*
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Heynemann, Carl; and Richter, Otto, to Metzeler Kautschuk GmbH. Deformable drive shaft. 4,743,219, Cl. 464-96.000.
Heyting, Hendrik G.: *See—*
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Hibino, Noburo: *See—*
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Hickey, Charles F., III: *See—*
Lanese, Robert M.; Tener, Dean R.; Hickey, Charles F., III; and Korenowski, Nicholas E., 4,743,803, Cl. 313-579.000.
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Hicks, John W., Jr., to Polaroid Corporation. Coupling device for forming optically efficient end-to-end optical fiber connections. 4,743,086, Cl. 350-96.150.
Higgins, Keith W.; Brown, Christopher R.; and Burd, John F., to Mast Immunosystems, Inc. Luminescent substrate preparation and its use in specific binding assays. 4,743,541, Cl. 435-7.000.
Highfield, Michael D.: *See—*
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Higraff, Thor; Bendiksen, Julius; and Langeland, Jan-Åge, to Geco A.S., Kjorbokollen. Reinforcing device in the inner portion of seismic cables. 4,744,065, Cl. 367-191.000.
Higuchi, Masahiro, to Sankyo Oilless Industry, Inc. Resin injection metal mold unit. 4,743,192, Cl. 425-192.00R.
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Hill, Michael P. L.; and Vandamme, Luc J. R., to Dow Corning, Ltd. Novel polish compositions. 4,743,648, Cl. 524-731.000.
Hill, Richard M.; Parton, Richard D.; and Sawyers, James H., to Hughes Aircraft Company. Frequency domain, pulse compression radar apparatus for eliminating clutter. 4,743,910, Cl. 342-159.000.
Hilpert, Wolfgang; and Komander, Gerhard, to Daimler-Benz Aktiengesellschaft. Device for detecting a trailer coupled onto a tractor vehicle. 4,743,888, Cl. 340-540.000.
Hilti Aktiengesellschaft: *See—*
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Hilzinger, Hans-Rainer; Reinhard, Paul; and Dinter, Reiner, to Vacummschmelze GmbH. Deactivatable security label for anti-theft systems. 4,743,890, Cl. 340-551.000.
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Hiramatsu, Takeo, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Automatic transmission system for a vehicle. 4,742,732, Cl. 74-866.000.
Hiramatsu, Yoshiyuki: *See—*
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Hirata, Akihiko; and Watanabe, Yuji, to Sumitomo Wiring Systems. Connecting device for ignition system of motor vehicle. 4,743,211, Cl. 439-686.000.
Hirata, Hirokazu: *See—*
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Hirate, Yoshitoshi: *See—*
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Hirayama, Hiromitsu, to NEC Corporation. Logic integrated circuit device formed on compound semiconductor substrate. 4,743,957, Cl. 307-450.000.
Hirosawa, Toshio; Itoh, Tutomu; Uehara, Tetsuzou; and Kurihara, Junichi, to Hitachi, Ltd. Method for automatically registering frequently used phrases. 4,744,050, Cl. 364-900.000.
Hirose Electric Co., Ltd.: *See—*
Mitani, Ikujiro; Kobayashi, Fumio; and Kawanami, Norihide, 4,743,205, Cl. 439-78.000.
Hiroshi, Hirashita; and Uchiyama, Masahiko, to Akebono Brake Industry Company, Ltd. Wheel cylinder with self-contained auto-adjuster. 4,742,897, Cl. 188-196.00D.
Hirozawa, Stanley T., to BASF Corporation. Antifreeze concentrates and coolants containing heteropolymolybdate compounds. 4,743,393 Cl. 252-75.000.
Hirsbrunner, Pierre, to Sarea AG. Treatment of soil. 4,743,288, Cl. 71-28.000.
Hisamoto, Hideo: *See—*
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Hishida, Osamu, to Nissan Motor Co., Ltd. Emergency locking apparatus for glove box lid. 4,743,060, Cl. 296-37.120.
Hitachi Computer Engineering Co., Ltd.: *See—*
Sato, Yoshio; Ishii, Toshifumi; and Ishiyama, Shun, 4,743,840, Cl. 324-73.00R.
Hitachi Engineering Co., Ltd.: *See—*
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Asada, Seiichi; Suzuki, Hiroyuki; Niihara, Toshio; Yoshida, Kazuetsu; Futamoto, Masaaki; Honda, Yukio; Tsumita, Norikazu; and Shiiki, Kazuo, 4,743,491, Cl. 428-213.000.
Bando, Akira; Ono, Kenichi; Kashiwazaki, Hiroshi; Sugisaka, Hiroshi; Haraguchi, Eiji; and Nakagawa, Hiroto, 4,743,826, Cl. 318-762.000.
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Ito, Toshikazu; and Degawa, Takashi, 4,742,762, Cl. 98-2.050.
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Kodama, Naoki; Toyooka, Takashi; Takeuchi, Teruaki; Takeshita, Masatoshi; Suzuki, Ryo; and Matsumoto, Shinzo, 4,744,052, Cl. 365-36.000.
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Maeda, Takeshi; Nakamura, Shigeru; Sugiyama, Hisataka; Shigematsu, Kazuo; and Saito, Atsushi, 4,743,774, Cl. 250-570.000.
Murayama, Akira; Kuno, Hiroaki; Uchikawa, Naoshi; Tamura, Takahiro; and Mizuno, Takao, 4,743,181, Cl. 418-55.000.
Nakamura, Hideo; and Sawase, Terumi, 4,744,062, Cl. 365-228.000.
Nakano, Haruji; and Oishi, Kazuaki, 4,744,002, Cl. 361-341.000.
Nishiguchi, Yasuo; Yasutomi, Tsuyoshi; Shiraishi, Ryoichi; Sasaki, Akira; Takahashi, Yoshihito; Mikami, Katsumasa; Suzaki, Masafumi; and Hakoyama, Akiyoshi, 4,743,923, Cl. 346-76.0PH.
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# LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 10TH DAY OF MAY, 1988

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Osepchuk, John M.; and Simpson, James E., to Raytheon Company. Energy seal for high frequency energy apparatus. Re. 32,664, Cl. 219-10.55D.

Raytheon Company: *See*—
Osepchuk, John M.; and Simpson, James E., Re. 32,664, Cl. 219-10.55D.

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Osepchuk, John M.; and Simpson, James E., Re. 32,664, Cl. 219-10.55D.

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Gedeon, Carl A.: *See*—
Louis, Timothy R.; Gedeon, Carl A.; Lee, Maw H.; and Erjavec, Eugene V., B1 4,414,634, Cl. 364-510.000.

Lee, Maw H.: *See*—
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Louis, Timothy R.; Gedeon, Carl A.; Lee, Maw H.; and Erjavec, Eugene V., to Scott & Fetzer Company, The. Fluid flow totalizer. B1 4,414,634, 5-10-88, Cl. 364-510.000.

Scott & Fetzer Company, The: *See*—
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Anderson, Jeffrey R.: *See*—
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Anderson, Mark. Filter for the recovery of embryos in animal artificial insemination processes. 295,658, 5-10-88, Cl. D23-209.000.

Anderson, Roger J.; and Anderson, Jeffrey R. Natural gas purification unit. 295,673, 5-10-88, Cl. D23-355.000.

Argandona, Augusto, to Quaker Oats Company, The. Toy playground. 295,650, 5-10-88, Cl. D21-114.000.

Arnold, William D., to Lee-Rowan Company. Hanger for pants, skirts or the like. 295,579, 5-10-88, Cl. D6-317.000.

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Selbiger, Lawrence, 295,577, Cl. D2-314.000.
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Steiner, Robert L.; and Bajek, Thomas R., 295,676, Cl. D23-366.000.

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Bernhardt Industries, Inc.: *See*—
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Bonsack Baths (London) Limited: *See*—
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Born, Gerald W., to Quality Products, Inc. Pump sprayer pressure tank. 295,659, 5-10-88, Cl. D23-225.000.

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Diamond, Harvey E. Covered well for bathtubs. 295,668, 5-10-88, Cl. D23-281.000.

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12 R 4,742,698
203 4,742,699

CLASS 70
25 4,742,700
121 4,742,701
231 4,742,702
366 4,742,703

CLASS 71
12 4,743,287
28 4,743,288
61 4,743,289
90 4,743,290
92 4,743,291
4,743,292
4,743,293
93 4,743,294
4,743,295
94 4,743,296

CLASS 72
57 4,742,704
187 4,742,705
197 4,742,706
454 4,742,707

CLASS 73
1 G 4,742,708
117.1 4,742,709
118.2 4,742,710
4,742,711
146.5 4,742,712
620 4,742,713
744 4,742,714
861.18 4,742,717
864.31 4,742,715
864.81 4,742,716
865.5 4,742,718
865.9 4,742,719
4,742,720

CLASS 74
61 4,742,721
64 4,742,722
339 4,742,723
388 R 4,742,724
409 4,742,725
425 4,742,726
484 R 4,742,727
488 4,742,728
640 4,742,729
674 4,742,730
745 4,742,731
866 4,742,732
4,742,733

CLASS 75
0.5 B 4,743,297
121 4,743,298
235 4,743,299

CLASS 81
3.4 4,742,734
121.1 4,742,735
303 4,742,736
355 4,742,737

CLASS 82
1 C 4,742,738
2 D 4,742,739
2.5 4,742,740

CLASS 83
37 4,742,741
101 4,742,742
104 4,742,743
167 4,742,744
344 4,742,745
387 4,742,746
698 4,742,747

CLASS 84
1.03 4,742,748
179 4,742,749
313 4,742,750
327 4,742,751
413 4,742,752
414 4,742,753
453 4,742,754
4,742,755

CLASS 89
33.02 4,742,756
154 4,742,757

CLASS 92
24 4,742,758
176 4,742,759

CLASS 98
I 4,742,760
1.5 4,742,761
2.01 4,742,763
2.05 4,742,762
36 4,742,764
42.02 4,742,765
59 4,742,766

CLASS 99
280 4,742,767

CLASS 100
88 4,742,768

CLASS 101
216 4,742,769
269 4,742,770
407 BP 4,742,771
415.1 4,742,772

CLASS 102
275.3 4,742,773
439 4,742,774
456 4,742,775
509 4,742,776

CLASS 104
173.2 4,742,777
284 4,742,778

CLASS 105
167 4,742,779
168 4,742,780

CLASS 106
1.23 4,743,302
38.22 4,743,300
90 4,743,301
236 4,743,303
281 N 4,743,304
308 N 4,743,305
4,743,306

CLASS 108
53.3 4,742,781
111 4,742,782

CLASS 110
188 4,742,783
347 4,742,784

CLASS 111
3 4,742,785

CLASS 112
121.12 4,742,786
162 4,742,787
262.1 4,742,788
262.3 4,742,789
4,742,790

CLASS 114
264 4,742,792
271 4,742,793
286 4,742,794
362 4,742,795

CLASS 116
209 4,742,796

CLASS 118
652 4,742,797

CLASS 119
3 4,742,798
29 4,742,799

CLASS 122
17 4,742,800

CLASS 123
27 GE 4,742,801
190 A 4,742,802
196 M 4,742,803
256 4,742,804
270 4,742,805
322 4,742,806
339 4,742,807
489 4,742,808
519 4,742,809
538 4,742,810
643 4,742,811

CLASS 124
25 4,742,812

CLASS 126
425 4,742,813

CLASS 127
2 4,743,307
37 4,742,814

CLASS 128
4 4,742,815
4,742,816
4,742,817
6 4,742,818
4,742,819
127 4,742,820
134 4,742,821
4,742,822
203.12 4,742,823
207.18 4,742,824
325 4,742,825
335 4,742,826
380 4,742,827
640 4,742,828
660 4,742,829
663 4,742,830
710 4,742,831
774 4,742,832

CLASS 131
84.3 4,742,834

CLASS 132
39 4,742,835

CLASS 134
182 4,742,836

CLASS 135
66 4,742,837
67 4,742,838

CLASS 137
38 4,742,839
43 4,742,840
115 4,742,841
172 4,742,842
202 4,742,843
493.2 4,742,844
510 4,742,845
514.5 4,742,846
533.29 4,742,847
556.3 4,742,848
599.2 4,742,849
614.05 4,742,850
614.12 4,742,851

CLASS 141
256 4,742,852

CLASS 144
137 4,742,853
242 D 4,742,854
252 R 4,742,855
371 4,742,856

CLASS 148
4 4,743,308
13.1 4,743,309
33 4,743,310
103 4,743,311
131 4,743,312
403 4,743,313
4,743,314
429 4,743,315
4,743,316
437 4,743,317
442 4,743,318

CLASS 152
418 4,742,857
536 4,742,858

CLASS 156
64 4,743,319
69 4,743,320
85 4,743,321
123 4,743,322
160 4,743,323
215 4,743,324
250 4,743,325
251 4,743,326
272.6 4,743,327
274.4 4,743,328
287 4,743,329
324 4,743,330
358 4,743,331
359 4,743,332
4,743,333
499 4,743,334
502 4,743,335
522 4,743,336
583.1 4,743,337

CLASS 157
1 4,742,859

CLASS 160
178.1 4,742,860

CLASS 162
25 4,743,338
49 4,743,339
152 4,743,340

CLASS 164
80 4,742,861
154 4,742,862
255 4,742,863

CLASS 165
1 4,742,864
18 4,742,865
38 4,742,866
96 4,742,867
104.12 4,742,868
115 4,742,869
164 4,742,870

CLASS 166
117.5 4,742,871
231 4,742,872
252 4,742,873
348 4,742,874

CLASS 173
117 4,742,875

CLASS 174
28 4,743,709
68.5 4,743,710
109 4,743,711
113 C 4,743,712
128 S 4,743,713

CLASS 175
7 4,742,876

CLASS 177
1 4,742,877
25 4,742,878
50 4,742,879
136 4,742,880

CLASS 178
794 4,742,833

CLASS 180
68.4 4,742,881
79.1 4,742,882
148 4,742,883
219 4,742,884
4,742,885
268 4,742,886

CLASS 181
129 4,742,887
233 4,742,889

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**CLASS 182**

116 4,742,888
222 4,742,890

**CLASS 187**

25 4,742,891
119 4,742,892
121 4,742,893
136 4,742,894

**CLASS 188**

71.7 4,742,895
82.74 4,742,896
196 D 4,742,897
287 4,742,898
377 4,742,899

**CLASS 190**

2 4,742,900

**CLASS 192**

70.25 4,742,901
98 4,742,902

**CLASS 194**

317 4,742,903

**CLASS 198**

735 4,742,904
779 4,742,905
805 4,742,906
831 4,742,907

**CLASS 200**

5 E 4,743,714
50 AA 4,743,715
83 Y 4,743,716
84 C 4,743,717
144 B 4,743,718
147 R 4,743,719
4,743,720
153 SC 4,743,721
159 B 4,743,722
250 4,743,723
331 4,743,724

**CLASS 202**

99 4,743,341
227 4,743,342

**CLASS 203**

22 4,743,343
81 4,743,344

**CLASS 204**

1 T 4,743,345
23 4,743,346
60 4,743,347
192.2 4,743,348
242 4,743,349
255 4,743,350
280 4,743,351
406 4,743,352

**CLASS 206**

204 4,742,908
356 4,742,909
365 4,742,910
425 4,742,911
459 4,742,912
460 4,742,913
461 4,742,914
575 4,742,915
586 4,742,916
602 4,742,917

**CLASS 208**

3 4,743,353
6 R 4,743,037
59 4,743,354
4,743,355
101 4,743,356
113 4,743,357
120 4,743,358
134 4,743,359
254 R 4,743,360

**CLASS 209**

1 4,743,361
44.1 4,742,919
127.4 4,743,362
138 4,743,363
212 4,743,364
517 4,742,918
4,742,920
539 4,742,921

**CLASS 210**

106 4,743,365
110 4,743,366
150 4,743,367
163 4,743,368
167 4,743,369
168 4,743,370
188 4,743,371
195.2 4,743,372
198.3 4,743,373
440 4,743,374
500.36 4,743,375
617 4,743,376
635 4,743,377
640 4,743,378
705 4,743,379
737 4,743,380
759 4,743,381
786 4,743,382

**CLASS 211**

43 4,742,922
59.1 4,742,923
60.1 4,742,924
71 4,742,925
105.3 4,742,926

**CLASS 215**

216 4,742,927
235 4,742,928
332 4,742,929
334 4,742,930

**CLASS 219**

10.55 D Re.32,664
10.55 F 4,743,725
4,743,726
4,743,727
10.55 R 4,743,728
69 R 4,743,731
69 W 4,743,729
4,743,730
99 4,743,732
121 LF 4,743,733
121 PP 4,743,734
222 4,743,735
250 4,743,736
368 4,743,737
4,743,739
521 4,743,738
543 4,743,741
548 4,743,740

**CLASS 220**

23.86 4,742,931
67 4,742,932
69 4,742,933
306 4,742,934
307 4,742,935

**CLASS 221**

5 4,742,936
223 4,742,937

**CLASS 222**

68 4,742,939
162 4,742,940
309 4,742,941
381 4,742,938
501 4,742,942

**CLASS 224**

277 4,742,943
316 4,742,944

**CLASS 225**

2 4,742,945

**CLASS 226**

74 4,742,946

**CLASS 228**

105 4,742,947
119 4,742,948
156 4,742,949
240 4,742,950

**CLASS 229**

2.5 EC 4,742,953
23 R 4,742,951
92.8 4,742,954
123 4,742,955
125.36 4,742,952

**CLASS 235**

1 R 4,743,742
379 4,743,743
472 4,743,744
482 4,743,745
486 4,743,746
494 4,743,747

**CLASS 236**

46 R 4,742,956

**CLASS 237**

46 4,742,957

**CLASS 239**

2.2 4,742,958
14.2 4,742,959
47 4,742,960
127.1 4,742,961
167 4,742,962
337 4,742,963
397.5 4,742,964
417.3 4,742,965

**CLASS 241**

69 4,742,966

**CLASS 242**

35.5 A 4,742,967
65 4,742,968
67.1 R 4,742,969
86.52 4,742,970
95 4,742,971
118.31 4,742,972
156 4,742,973
217 4,742,974

**CLASS 244**

54 4,742,975
58 4,742,976
123 4,742,977

**CLASS 248**

27.1 4,742,978
65 4,742,979
125 4,742,980
231.7 4,742,981
231.8 4,742,982
429 4,742,983
503.1 4,742,984

**CLASS 249**

193 4,742,985
210 4,742,986

**CLASS 250**

201 4,743,748
205 4,743,749
211 R 4,743,750
4,743,751
222.2 4,743,760
227 4,743,752
4,743,753
237 G 4,743,754
239 4,743,763
259 4,743,761
266 4,743,755
305 4,743,756
310 4,743,757
327.2 4,743,758
4,743,759
336.1 4,743,762
363 S 4,743,764
467.1 4,743,765
492.2 4,743,766
4,743,767
556 4,743,768
560 4,743 769
4,743,770
4,743,771
561 4,743,772
566 4,743,773
570 4,743,774
571 4,743,775

**CLASS 251**

32 G 4,742,990
123 4,742,987
129.01 4,742,988
129.05 4,742,989

**CLASS 252**

8.51 4,743,383
8.514 4,743,384
8.554 4,743,385
49.6 4,743,386
51.5 A 4,743,387
4,743,388
4,743,389
55 4,743,391
62.9 4,743,392
75 4,743,393
90 4,743,394
106 4,743,395
313.1 4,743,396
400.61 4,743,397
408.1 4,743,398
512 4,743,399

**CLASS 254**

8 B 4,742,991
199 4,742,992
389 4,742,993

**CLASS 260**

408 4,743,400
410.9 R 4,743,401
412.2 4,743,402
543 H 4,743,403
543 R 4,743,404

**CLASS 261**

30 4,743,406
76 4,743,405
99 4,743,407
123 4,743,408

**CLASS 264**

1.3 4,743,409
1.4 4,743,410
22 4,743,411
23 4,743,412
24 4,743,413
35 4,743,414
4,743,415
40.3 4,743,416
45.1 4,743,417
48 4,743,418
83 4,743,419
102 4,743,420
129 4,743,421
255 4,743,422

**CLASS 266**

165 4,742,994
270 4,742,995

**CLASS 267**

64.24 4,742,996
119 4,742,997
136 4,742,998
140.1 4,742,999
218 4,743,000

**CLASS 269**

22 4,743,001
32 4,743,002
43 4,743,003
296 4,743,004

**CLASS 270**

55 4,743,005

**CLASS 271**

18.1 4,743,006

**CLASS 272**

6 4,743,007
69 4,743,008
4,743,009
72 4,743,010
4,743,011
73 4,743,012
97 4,743,014
4,743,015
117 4,743,016
122 4,743,017
123 4,743,018
132 4,743,019

**CLASS 273**

29 A 4,743,020
75 4,743,021
85 CP 4,743,022
113 4,743,023
143 R 4,743,024
146 4,743,025
4,743,031
176 F 4,743,026
178 R 4,743,027
183 B 4,743,028
243 4,743,029
349 4,743,030
372 4,743,032

**CLASS 277**

27 4,743,033
53 4,743,034
214 4,743,035
237 R 4,743,036

**CLASS 280**

21 4,744,080
40 4,743,038
42 4,743,039
47.35 4,743,040
236 4,743,041
615 4,743,042
644 4,743,043
680 4,743,044
703 4,743,045
707 4,743,046

**CLASS 281**

15 R 4,743,047
21 R 4,743,048
31 4,743,049
45 4,743,050

**CLASS 285**

319 4,743,051

**CLASS 290**

31 4,743,776
46 4,743,777

**CLASS 292**

113 4,743,052
139 4,743,053
256.67 4,743,054

**CLASS 294**

88 4,743,055
116 4,743,056

**CLASS 296**

1 S 4,743,057
4,743,058
24 R 4,743,059
37.12 4,743,060
97 R 4,743,061
146 4,743,062

**CLASS 297**

130 4,743,063
250 4,743,064
300 4,743,065
339 4,743,066
379 4,743,067
440 4,743,068

**CLASS 299**

86 4,743,069

**CLASS 301**

13 SM 4,743,070

**CLASS 303**

3 4,743,071
15 4,743,072
92 4,743,073
100 4,743,074
114 4,743,075
119 4,743,076

**CLASS 307**

311 4,743,778
356 4,743,779
419 4,743,780
450 4,743,957
455 4,743,781
475 4,743,782
498 4,743,783
530 4,743,784
571 4,743,785

**CLASS 310**

111 4,743,786
242 4,743,787
316 4,743,788
4,743,789
321 4,743,790
323 4,743,791
328 4,743,792

**CLASS 312**

12 4,743,077
201 4,743,078

**CLASS 313**

141 4,743,793
402 4,743,795
414 4,743,796
422 4,743,797
4,743,798
424 4,743,794
493 4,743,799
497 4,743,800
512 4,743,801
579 4,743,802
4,743,803

**CLASS 315**

5.14 4,743,804
39.75 4,743,805
111.81 4,743,806
150 4,743,807
169.3 4,743,808
209 R 4,743,809
221 4,745,810

**CLASS 318**

7 4,743,811
14 4,743,812
138 4,743,813
140 4,743,814
254 4,743,815
368 4,743,819
455 4,743,816
473 4,743,818
488 4,743,817
578 4,743,820
599 4,743,821
610 4,743,822
630 4,743,823
696 4,743,824
723 4,743,825
762 4,743,826
798 4,743,827
810 4,743,828

**CLASS 320**

2 4,743,829
6 4,743,830
48 4,743,831

**CLASS 323**

211 4,743,832
224 4,743,833
239 4,743,834
266 4,743,835

**CLASS 324**

60 CD 4,743,836
4,743,837
61 R 4,743,838
72.5 4,743,839
73 R 4,743,840
4,743,841
4,743,842
114 4,743,843
121 R 4,743,844
4,743,845
126 4,743,846
158 MG 4,743,848
158 R 4,743,847
213 4,743,849
309 4,743,850
4,743,851
318 4,743,852
320 4,743,853
366 4,743,854
430 4,743,855

**CLASS 328**

111 4,743,856

**CLASS 329**

50 4,743,857

**CLASS 330**

10 4,743,858
54 4,743,859
251 4,743,860
260 4,743,861
277 4,743,862
284 4,743,863

**CLASS 331**

1 A 4,743,864
116 R 4,743,865
117 FE 4,743,866

**CLASS 332**

16 R 4,743,867

**CLASS 333**

12 4,743,868
28 R 4,743,869
147 4,743,870
166 4,743,871
173 4,743,872
175 4,743,873
219 4,743,874

**CLASS 335**

18 4,743,875
20 4,743,876
128 4,743,877
172 4,743,878
299 4,743,879
301 4,743,880

**CLASS 338**

25 4,743,881
184 4,743,882

**CLASS 340**

52 R 4,743,883
297 4,743,884
347 DA 4,743,885
514 4,743,886
531 4,743,887
540 4,743,888
4,743,889
551 4,743,890
573 4,743,892
685 4,743,893
691 4,743,894
712 4,743,895
784 4,743,896
813 4,743,897
825.31 4,743,898
825.860 4,743,899
870.01 4,743,900
870.11 4,743,901
870.37 4,743,902
980 4,743,903

**CLASS 342**

14 4,743,904
4,743,905
27 4,743,906
59 4,743,907
113 4,743,908
159 4,743,910
359 4,743,909
375 4,743,911
390 4,743,912
457 4,743,913

**CLASS 343**

754 4,743,914
776 4,743,915
785 4,743,916
877 4,743,917
895 4,743,918
914 4,743,919

**CLASS 346**

71 4,743,920
74.2 4,743,921
75 4,743,922



76 PH 4,743,923
140 R 4,743,924
159 4,743,925
4,743,926
160 4,743,927

**CLASS 350**

96.10 4,743,082
96.15 4,743,086
96.19 4,743,083
4,743,087
96.20 4,743,088
96.21 4,743,084
96.23 4,743,085
96.24 4,743,089
96.27 4,743,090
252 4,743,091
333 4,743,096
337 4,743,097
339 F 4,743,098
4,743,099
370 4,743,092
403 4,743,100
422 4,743,101
423 4,743,102
432 4,743,093
445 4,743,103
469 4,743,094
610 4,743,104
613 4,743,095

**CLASS 351**

156 4,743,105
160 R 4,743,106
221 4,743,107

**CLASS 352**

216 4,743,108

**CLASS 353**

101 4,743,109

**CLASS 354**

127.1 4,743,929
267.1 4,743,930
310 4,743,928
400 4,743,931
403 4,743,932
422 4,743,933
439 4,743,934
456 4,743,935

**CLASS 355**

3 DD 4,743,936
4,743,937
4,743,938
4,743,942
3 FU 4,743,940
4,743,943
3 SH 4,743,941
3 TR 4,743,939
14 C 4,743,946
14 R 4,743,944
4,743,947
14 SH 4,743,945
27 4,743,948

**CLASS 356**

5 4,743,110
316 4,743,111
326 4,743,112
345 4,743,113
346 4,743,114
350 4,743,115
4,743,116
353 4,743,117
4,743,118
372 4,743,119

**CLASS 357**

16 4,743,949
20 4,743,950
22 4,743,951
23.4 4,743,952
23.6 4,743,953
25 4,743,954
30 4,743,955
70 4,743,956

**CLASS 358**

11 4,743,958
4,743,959
13 4,743,960
40 4,743,961
75 4,743,962
77 4,743,963
88 4,743,964
4,743,965
98 4,743,966
136 4,743,967
147 4,743,968
153 4,743,969
183 4,743,970
213.11 4,743,972
213.26 4,743,971
260 4,743,973
285 4,743,974
288 4,743,975
293 4,743,976
310 4,743,977
4,743,978
339 4,743,979
342 4,743,980

**CLASS 360**

15 4,743,981
45 4,743,982
55 4,743,983
60 4,743,984
61 4,743,985
96.5 4,743,986
97 4,743,991
[illegible] 4,743,995
[illegible] 4,743,987
126 4,743,988
132 4,743,992
133 4,743,989
4,743,993
4,743,994
137 4,743,990

**CLASS 361**

39 4,743,996
42 4,743,998
56 4,743,999
118 4,743,997
315 4,744,000
338 4,744,001
341 4,744,002
363 4,744,003
372 4,744,004
384 4,744,005
386 4,744,007
4,744,008
398 4,744,009
413 4,744,006

**CLASS 362**

80 4,744,011
[illegible] 4,744,012
109 4,744,013
131 4,744,016
145 4,744,014
153 4,744,015
402 4,744,019

**CLASS 363**

8 4,744,017
16 4,744,018
21 4,744,020

**CLASS 364**

141 4,744,021
142 4,744,022
200 4,744,023
4,744,024
4,744,025
402 4,744,026
4,744,027
4,744,028
417 4,744,029
422 4,744,030
424.1 4,744,031
4,744,032
443 4,744,033
464 4,744,034
470 4,744,035
476 4,744,036
497 4,744,037
510 B1 4,414,634
513 4,744,039
557 4,744,038
561 4,744,040
565 4,744,041
726 4,744,042
736 4,744,043
737 4,744,044
765 4,744,045
900 4,744,046
4,744,047
4,744,048
4,744,049
4,744,050

**CLASS 365**

36 4,744,051
4,744,052
49 4,744,053
104 4,744,054
113 4,744,055
154 4,744,056
183 4,744,057
189 4,744,058
4,744,059
200 4,744,060
201 4,744,061
228 4,744,062
233 4,744,063

**CLASS 367**

22 4,744,064
191 4,744,065
417 4,744,010

**CLASS 368**

76 4,744,066
80 4,744,067
190 4,744,068

**CLASS 369**

32 4,744,069
44 4,744,070
4,744,071
75.2 4,744,072
112 4,744,073
278 4,744,074

**CLASS 370**

3 4,744,075
85 4,744,076
4,744,077
4,744,078
94 4,744,079
100 4,744,081
112 4,744,082

**CLASS 371**

22 4,744,083
23 4,744,084
30 4,744,085
40 4,744,086

**CLASS 372**

38 4,744,087
50 4,744,088
4,744,089
94 4,744,090
107 4,744,091

**CLASS 374**

147 4,743,120
163 4,743,121
208 4,743,122

**CLASS 375**

7 4,744,092
4,744,097
76 4,744,093
81 4,744,094
100 4,744,095
120 4,744,096

**CLASS 376**

287 4,743,423
381 4,743,424

**CLASS 377**

5 4,744,098

**CLASS 378**

157 4,744,099
187 4,744,100

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61 4,744,101
215 4,744,102
247 4,744,103

**CLASS 380**

44 4,744,104

**CLASS 383**

103 4,743,123

**CLASS 384**

45 4,743,124
99 4,743,125
105 4,743,126

**CLASS 400**

54 4,743,127
184 4,743,128
208.1 4,743,133
582 4,743,129
613.2 4,743,130
4,743,131
629 4,743,132

**CLASS 402**

56 * 4,743,134
70 4,743,135

**CLASS 403**

150 4,743,136
268 4,743,137
337 4,743,138

**CLASS 404**

65 4,743,139
89 4,743,140

**CLASS 405**

195 4,743,141
216 4,743,142

**CLASS 406**

14 4,743,143

**CLASS 407**

42 4,743,144

**CLASS 408**

59 4,743,145
221 4,743,146

**CLASS 409**

7 4,743,147
137 4,743,148
179 4,743,149

**CLASS 410**

[illegible] 4,743,150
121 4,743,151

**CLASS 411**

182 4,743,152

**CLASS 414**

31 4,743,153
33 4,743,154
356 4,743,155
405 4,743,156
498 4,743,157
563 4,743,158
737 4,743,159

**CLASS 415**

33 4,743,160
53 R 4,743,161
170 R 4,743,162

**CLASS 416**

44 4,743,163
193 A 4,743,164
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415 4,743,179

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55 4,743,181
57 4,743,182
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16 4,743,425
23 4,743,185

**CLASS 420**

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477 4,743,427
590 4,743,428

**CLASS 422**

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251 4,743,434

**CLASS 423**

210 4,743,435
235 4,743,436
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421 4,743,439

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46 4,743,440
47 4,743,441
4,743,442
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65 4,743,444
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4,743,446
130 4,743,447
405 4,743,448
420 4,743,449
440 4,743,450
447 4,743,249

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72.2 4,743,186
73 4,743,187
123 4,743,188
131.5 4,743,189
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190 4,743,191
192 R 4,743,192
253 4,743,193

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15 4,743,451
19 4,743,452
41 4,743,453
61 4,743,454
233 4,743,455
293 4,743,456
321 4,743,457
549 4,743,458
4,743,459
4,743,460
4,743,461

**CLASS 427**

34 4,743,462
53.1 4,743,463
58 4,743,464
96 4,743,465
127 4,743,466
132 4,743,467
140 4,743,468
208 2 4,743,469
246 4,743,470
262 4,743,471
292 4,743,472
297 4,743,473
387 4,743,474
4,743,475
430.1 4,743,476

**CLASS 428**

13 4,743,477
17 4,743,478
35 4,743,479
36 4,743,480
4,743,481
57 4,743,482
89 4,743,483
106 4,743,484
109 4,743,485
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212 4,743,490
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217 4,743,493
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234 4,743,495
254 4,743,496
286 4,743,497
288 4,743,498
317.3 4,743,499
323 4,743,500
328 4,743,501
336 4,743,502
353 4,743,503
364 4,743,504
373 4,743,505
389 4,743,506
402 4,743,507
408 4,743,508
425.1 4,743,509
455 4,743,510
547 4,743,511
552 4,743,512
668 4,743,513
678 4,743,514
698 4,743,515

**CLASS 429**

16 4,743,516
17 4,743,517
34 4,743,518
36 4,743,519
94 4,743,520

**CLASS 430**

56 4,743,521
58 4,743,522
59 4,743,523
182 4,743,524
204 4,743,525
270 4,743,526
272 4,743,527
281 4,743,528
4,743,529
4,743,530
4,743,531
564 4,743,532
4,743,533
619 4,743,534

**CLASS 431**

23 4,743,194
170 4,743,195

**CLASS 432**

59 4,743,196
4,743,197

**CLASS 433**

143 4,743,198
216 4,743,199

**CLASS 434**

43 4,743,200

**CLASS 435**

6 4,743,535
4,743,539
4,743,540
7 4,743,536
4,743,538
4,743,541
4,743,542
4,743,543
4,743,544
41 4,743,545
108 4,743,546
4,743,547
172.3 4,743,548
191 4,743,549
220 4,743,550
226 4,743,551
240 23 4,743,552
253 4,743,553
4,743,554
4,743,555
296 4,743,537
297 4,743,556

**CLASS 436**

2 4,743,557
45 4,743,558
175 4,743,559
501 4,743,560
4,743,561
518 4,743,562

**CLASS 437**

24 4,743,564
32 4,743,565
70 4,743,566
84 4,743,567
024 4,743,563
189 4,743,568
247 4,743,569
248 4,743,570

**CLASS 439**

10 4,743,201
53 4,743,202
78 4,743,205
137 4,743,206
161 4,743,079
260 4,743,203
265 4,743,204
317 4,743,207
398 4,743,208
492 4,743,080
521 4,743,209
559 4,743,210
686 4,743,211
722 4,743,212
751 4,743,081

**CLASS 440**

1 4,743,213

**CLASS 446**

129 4,743,214
478 4,743,215

**CLASS 455**

619 4,744,105

**CLASS 464**

17 4,743,216
27 4,743,217
76 4,743,218
96 4,743,219

**CLASS 474**

7 4,743,220
13 4,743,221
56 4,743,222
69 4,743,223
101 4,743,224
133 4,743,225

**CLASS 494**

53 4,743,226
85 4,743,227

**CLASS 501**

97 4,743,571

**CLASS 502**

64 4,743,572
4,743,573
206 4,743,574
241 4,743,575
242 4,743,576
326 4,743,577
439 4,743,578

**CLASS 503**

213 4,743,579
214 4,743,580
227 4,743,581
4,743,582

**CLASS 514**

4 4,743,583
11 4,743,584
15 4,743,589
17 4,743,585
18 4,743,590
24 4,743,588

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| 29 | 4,743,593 | 717 | 4,743,622 | 731 | 4,743,648 | 176 | 4,743,674 | | CLASS 548 | 161 | 4,743,265 |
| 30 | 4,743,591 | | CLASS 521 | | CLASS 525 | 328 | 4,743,675 | 216 | 4,743,700 | 180 | 4,743,231 |
| | 4,743,592 | 95 | 4,743,623 | 86 | 4,743,649 | 371 | 4,743,676 | | | | 4,743,232 |
| 43 | 4,743,594 | 106 | 4,743,624 | 92 | 4,743,650 | | CLASS 530 | | CLASS 549 | 187 | 4,743,234 |
| 161 | 4,743,596 | 122 | 4,743,625 | | 4,743,651 | 307 | 4,743,677 | 4 | 4,743,694 | 192 | 4,743,233 |
| 182 | 4,743,597 | 160 | 4,743,626 | 105 | 4,743,652 | 350 | 4,743,678 | 271 | 4,743,695 | 250 | 4,743,235 |
| 192 | 4,743,598 | | 4,743,627 | 125 | 4,743,653 | | 4,743,679 | 420 | 4,743,696 | 323 | 4,743,236 |
| 211 | 4,743,599 | 163 | 4,743,628 | 148 | 4,743,654 | 383 | 4,743,680 | 463 | 4,743,697 | 358 | 4,743,237 |
| 212 | 4,743,600 | 175 | 4,743,629 | 172 | 4,743,655 | 387 | 4,743,681 | 478 | 4,743,698 | 361 | 4,743,238 |
| 229.8 | 4,743,601 | 180 | 4,743,630 | 211 | 4,743,656 | 407 | 4,743,682 | | CLASS 556 | 376 | 4,743,244 |
| 231.5 | 4,743,602 | | CLASS 522 | 281 | 4,743,657 | | CLASS 534 | 23 | 4,743,699 | 385 A | 4,743,241 |
| 235.5 | 4,743,603 | | | 326.4 | 4,743,658 | 753 | 4,743,683 | | CLASS 558 | | 4,743,246 |
| 243 | 4,743,586 | 107 | 4,743,631 | 356 | 4,743,659 | | CLASS 540 | 7 | 4,743,701 | 385 R | 4,743,239 |
| 252 | 4,743,604 | | CLASS 523 | 382 | 4,743,660 | 126 | 4,743,684 | 311 | 4,743,702 | | 4,743,240 |
| 269 | 4,743,605 | | | 396 | 4,743,661 | 363 | 4,743,685 | | CLASS 560 | | 4,743,245 |
| 277 | 4,743,606 | 118 | 4,743,632 | 474 | 4,743,662 | 479 | 4,743,686 | 21 | 4,743,703 | 389 | 4,743,242 |
| 293 | 4,743,607 | 130 | 4,743,633 | 539 | 4,743,663 | 487 | 4,743,687 | 066 | 4,743,704 | 405 | 4,743,243 |
| 333 | 4,743,608 | 150 | 4,743,634 | | CLASS 526 | | CLASS 544 | 207 | 4,743,705 | 892.1 | 4,743,247 |
| 339 | 4,743,609 | 155 | 4,743,635 | 61 | 4,743,664 | 111 | 4,743,595 | 214 | 4,743,706 | | 4,743,248 |
| 357 | 4,743,610 | | CLASS 524 | 119 | 4,743,665 | 113 | 4,743,688 | | CLASS 568 | | CLASS 623 |
| 390 | 4,743,611 | 16 | 4,743,636 | 240 | 4,743,666 | 277 | 4,743,689 | 919 | 4,743,707 | 1 | 4,743,250 |
| 392 | 4,743,612 | 94 | 4,743,637 | 245 | 4,743,667 | | CLASS 546 | | CLASS 585 | | 4,743,251 |
| 398 | 4,743,613 | 141 | 4,743,638 | 304 | 4,743,668 | 147 | 4,743,690 | 828 | 4,743,708 | | 4,743,252 |
| 400 | 4,743,614 | 188 | 4,743,639 | | CLASS 527 | 243 | 4,743,691 | | CLASS 604 | | 4,743,258 |
| 414 | 4,743,615 | 280 | 4,743,640 | 200 | 4,743,669 | 270 | 4,743,692 | 50 | 4,743,228 | 2 | 4,743,253 |
| 423 | 4,743,616 | 317 | 4,743,641 | | CLASS 528 | 291 | 4,743,693 | 82 | 4,743,229 | 11 | 4,743,254 |
| 438 | 4,743,617 | 358 | 4,743,642 | 15 | 4,743,670 | | | 97 | 4,743,230 | | 4,743,255 |
| | 4,743,618 | 396 | 4,743,643 | 24 | 4,743,671 | | | | | 16 | 4,743,257 |
| 450 | 4,743,619 | 437 | 4,743,644 | 44 | 4,743,672 | | | | | | 4,743,259 |
| 515 | 4,743,620 | 456 | 4,743,645 | 60 | 4,743,673 | | | | | 17 | 4,743,256 |
| 547 | 4,743,621 | 504 | 4,743,646 | | | | | | | | 4,743,260 |
| 575 | 4,743,587 | 516 | 4,743,647 | | | | | | | 20 | 4,743,261 |
| | | | | | | | | | | 22 | 4,743,262 |
| | | | | | | | | | | 23 | 4,743,263 |
| | | | | | | | | | | 33 | 4,743,264 |

## CLASSIFICATION OF DESIGNS

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D1— | 116 | 295,570 | 408 | 295,590 | 349 | 295,609 | 99 | 295,628 | | 295,647 | 281 | 295,666 |
| D2— | 24 | 295,571 | 430 | 295,591 | 367 | 295,610 | D15— 134 | 295,629 | | 295,648 | | 295,667 |
| | 28 | 295,574 | 457 | 295,592 | 378 | 295,611 | D18— 27 | 295,630 | | 295,649 | | 295,668 |
| | 199 | 295,572 | 484 | 295,593 | 392 | 295,612 | | 295,631 | 114 | 295,650 | 294 | 295,669 |
| | 208 | 295,575 | 498 | 295,594 | D10— 46 | 295,613 | | 295,632 | 128 | 295,651 | | 295,670 |
| | 314 | 295,576 | 505 | 295,595 | 53 | 295,614 | | 295,633 | 150 | 295,652 | | 295,671 |
| | | 295,577 | D7— 70 | 295,596 | 90 | 295,615 | | 295,634 | 155 | 295,653 | 308 | 295,672 |
| | | 295,578 | 84 | 295,597 | D11— 158 | 295,616 | | 295,635 | 187 | 295,654 | 355 | 295,673 |
| D3— | 35 | 295,573 | 416 | 295,598 | D12— 147 | 295,617 | | 295,636 | D22— 107 | 295,655 | 365 | 295,674 |
| D6— | 317 | 295,579 | D8— 14.1 | 295,599 | 155 | 295,618 | | 295,637 | D23— 207 | 295,656 | 366 | 295,675 |
| | 336 | 295,580 | 24 | 295,600 | | 295,619 | D19— 90 | 295,638 | | 295,657 | | 295,676 |
| | 361 | 295,581 | 61 | 295,601 | 157 | 295,620 | D20— 2 | 295,639 | 209 | 295,658 | | 295,677 |
| | | 295,582 | 78 | 295,602 | D13— 1 | 295,621 | D21— 100 | 295,640 | 225 | 295,659 | 377 | 295,678 |
| | 364 | 295,583 | 307 | 295,603 | 28 | 295,622 | 108 | 295,641 | 231 | 295,660 | D24— 8 | 295,679 |
| | 365 | 295,584 | | 295,604 | D14— 53 | 295,623 | | 295,642 | 235 | 295,663 | D26— 28 | 295,680 |
| | 372 | 295,585 | | | 63 | 295,624 | | 295,643 | 241 | 295,661 | 78 | 295,681 |
| | 373 | 295,586 | 321 | 295,605 | 64 | 295,625 | | 295,644 | 255 | 295,662 | D28— 2 | 295,683 |
| | 379 | 295,587 | 330 | 295,606 | | 295,626 | | 295,645 | | 295,664 | 53 | 295,682 |
| | 380 | 295,588 | 367 | 295,607 | 66 | 295,627 | | 295,646 | 277 | 295,665 | | 295,684 |
| | 399 | 295,589 | D9— 315 | 295,608 | | | | | | | | |

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| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| P— | 9 | 6,170 | | | | | | | |
| | 20 | 6,171 | 43 | 6,172 | 68 | 6,173 | 6,174 | 6,175 | 6,176 |

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(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

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| 01 : 4,742,678 | 4,743,048 | 4,743,783 | 4,743,736 | 4,742,947 | 4,743,812 |
| 4,742,683 | 4,743,052 | 4,743,811 | 4,743,747 | 4,743,036 | 4,743,829 |
| 4,742,905 | 4,743,056 | 4,743,838 | 4,743,780 | 4,743,085 | 4,743,860 |
| 4,743,041 | 4,743,058 | 4,743,851 | 4,743,836 | 4,743,330 | 4,743,869 |
| 4,743,097 | 4,743,080 | 4,743,856 | 10 : 4,742,631 | 4,743,430 | 4,743,959 |
| 4,743,438 | 4,743,088 | 4,743,861 | 4,743,290 | 4,743,545 | 4,744,005 |
| 4,743,726 | 4,743,094 | 4,743,880 | 4,743,292 | 15 : 4,742,641 | 4,744,022 |
| 4,743,738 | 4,743,116 | 4,743,899 | 4,743,295 | 4,743,047 | 4,744,023 |
| 4,743,906 | 4,743,140 | 4,743,910 | 4,743,346 | 16 : 4,742,823 | 4,744,029 |
| 02 : 4,742,798 | 4,743,207 | 4,743,919 | 4,743,384 | 4,743,095 | 4,744,043 |
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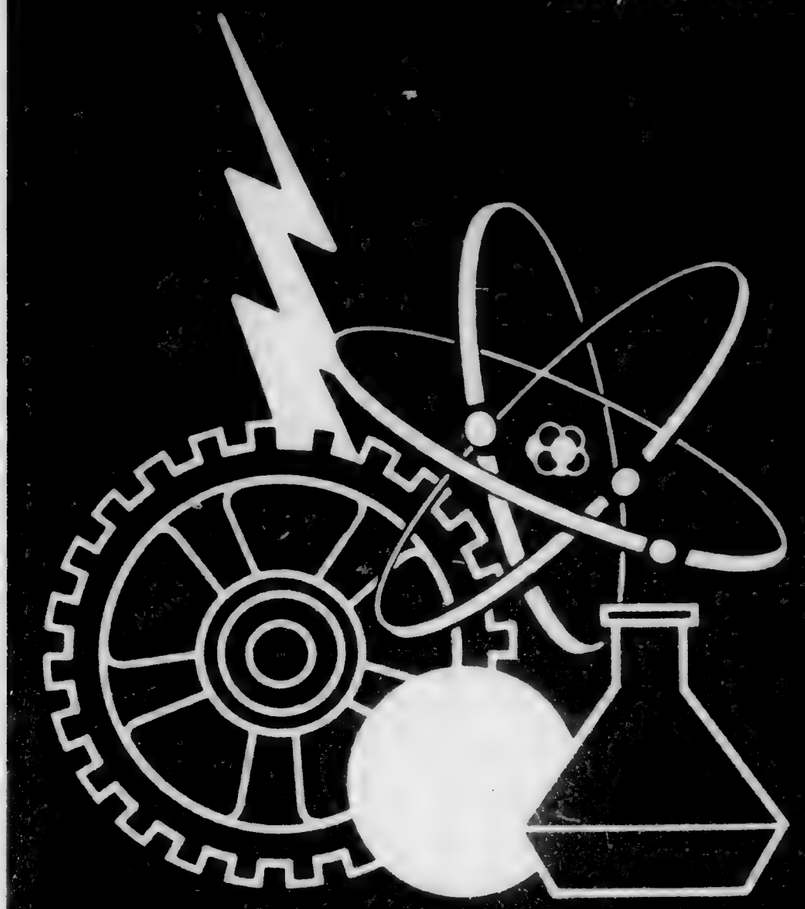
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# PATENT AND TRADEMARK OFFICE NOTICES

### Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1076 O.G. 3 on Mar. 3, 1987.

For use of the European Patent Office as a Searching Authority for PCT applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as a Preliminary Examining Authority for PCT applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987.

Certain domestic PCT fees for international applications have been changed effective Oct. 5, 1985 in the rule change notice titled "Revision of Patent Fees" published at 1057 O.G. 24 on Aug. 20, 1985.

The Search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar with regard to the German Mark as of Mar. 15, 1988, and was announced in the *Official Gazette* at 1087 O.G. 24 on Feb. 16, 1988.

Domestic PCT Fees for Chapter II, effective July 1, 1987, were announced in the *Official Gazette* at 1079 O.G. 32 on June 16, 1987.

International PCT fees were changed on July 1, 1987 due to a difference in the exchange rate of the U.S. dollar with regard to the Swiss Franc and were announced in the *Official Gazette* at 1079 O.G. 50 on June 23, 1987.

International PCT Chapter II fees which were effective July 1, 1987, were announced in the *Official Gazette* at 1079 O.G. 50 on June 23, 1987. The elimination of multiple handling fees and the supplement to the handling fee under PCT Rule 57 was announced at 1085 O.G. 34 on Dec. 22, 1987.

The withdrawal of the Japanese declaration under PCT Article 64(2)(a), concerning the requirement for a Japanese translation of the international application within 20 months from the priority date when Japan is elected under PCT Chapter II, as from Dec. 8, 1987, was announced at 1085 O.G. 34 on Dec. 22, 1987.

National stage fees effective July 1, 1987, for entering the U.S. Patent and Trademark Office as a designated or elected Office were changed effective July 1, 1987, and were announced in the *Official Gazette* at 1079 O.G. 32 on June 16, 1987.

The current schedule of PCT fees is as follows:

| | |
|---|---|
| Transmittal fee: | 170.00 |
| Search Fee | |
| U.S. Patent and Trademark Office as Searching Authority (ISA) | |
| —No corresponding prior U.S. national application filed: | 520.00 |
| —Corresponding prior U.S. national application filed: | 350.00 |
| —Supplemental search fee, per additional invention | 140.00 |
| European Patent Office as Searching Authority | 1300.00 |
| Preliminary examination fee | |
| U.S. Patent and Trademark Office as Preliminary Examining Authority (IPEA) | |
| —Search fee paid to USPTO as Searching Authority | 370.00 |
| —Additional examination fee, per additional invention | 125.00 |
| —Searching Authority not the USPTO | 570.00 |
| —Additional examination fee, per additional invention | 190.00 |
| International fees | |
| Basic fee: | 485.00 |
| Basic Supplemental fee (for each page over 30): | 10.00 |
| Designation fee per country or region for the first 10 national or regional offices: | 120.00 |
| Designation fee for 11th and subsequent designations: | No Charge |
| Handling fee: | 150.00 |

U.S. National Stage fees

| | Small Entity | Non-small Entity |
|---|---|---|
| U.S. Patent and Trademark Office was Preliminary Examining Authority (IPEA) | 150.00 | 300.00 |
| USPTO was ISA but not IPEA | 170.00 | 340.00 |
| USPTO was neither ISA nor IPEA | 225.00 | 450.00 |
| USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(1) to (4) | 25.00 | 50.00 |
| —For each independent claim in excess of 3 | 17.00 | 34.00 |
| —For each claim in excess of 20 | 6.00 | 12.00 |
| —For each application containing a multiple dependent claim | 55.00 | 110.00 |
| —Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39.1 | 55.00 | 110.00 |
| —Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39.1 | 26.00 | 26.00 |

DONALD J. QUIGG,
*Assistant Secretary and Commissioner of Patents and Trademarks.*

Mar. 21, 1988.

### Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on applications filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Oct. 5, 1985. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the grant.

Attention is drawn to the patents which were issued on May 14, 1985, for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,516,273 through 4,517,684
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months are set forth in 37 CFR 1.20(e) and (h), as amended effective Oct. 5, 1985, which are reproduced below:

37 CFR §1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant . . . $ 225.00"

"(h) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)) . . . . . $ 225.00
By other than a small entity . . . . . $ 450.00"

The amounts of the surcharges as amended effective Oct. 5, 1985, are set forth in 37 CFR 1.20 (k) and (l) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982 . . . . . $ 110.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity (§1.9(f)) . . . . . $ 55.00
By other than a small entity . . . . . $ 110.00"

Section 1.20 paragraph (m) as amended as a result of enactment of Public Law 98–622 effective Nov. 8, 1984, is reproduced below:

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay in payment is shown to the satisfaction of the Commissioner to have been unavoidable . . . . . $ 500.00"

### Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

*PATENTS WHICH EXPIRED FEBRUARY 28, 1988, DUE TO FAILURE TO PAY MAINTENANCE FEES*

| Patent Number | Serial Number | Issue Date |
|---|---|---|
| 4,433,442 | 06/367,253 | 2/28/84 |
| 4,433,449 | 06/408,530 | 2/28/84 |
| 4,433,451 | 06/222,261 | 2/28/84 |
| 4,433,455 | 06/323,229 | 2/28/84 |
| 4,433,462 | 06/322,024 | 2/28/84 |
| 4,433,467 | 06/316,968 | 2/28/84 |
| 4,433,484 | 06/305,971 | 2/28/84 |
| 4,433,488 | 06/355,497 | 2/28/84 |
| 4,433,492 | 06/250,571 | 2/28/84 |
| 4,433,499 | 06/509,588 | 2/28/84 |
| 4,433,501 | 06/333,650 | 2/28/84 |
| 4,433,505 | 06/296,163 | 2/28/84 |
| 4,433,512 | 06/361,445 | 2/28/84 |
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| 4,433,538 | 06/253,397 | 2/28/84 |
| 4,433,543 | 06/256,778 | 2/28/84 |
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| 4,433,549 | 06/407,269 | 2/28/84 |
| 4,433,550 | 06/372,787 | 2/28/84 |
| 4,433,555 | 06/447,180 | 2/28/84 |
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| 4,433,636 | 06/346,396 | 2/28/84 |
| 4,433,637 | 06/272,194 | 2/28/84 |
| 4,433,640 | 06/251,868 | 2/28/84 |
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| 4,433,649 | 06/325,117 | 2/28/84 |
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| 4,433,843 | 06/305,191 | 2/28/84 |
| 4,433,847 | 06/361,678 | 2/28/84 |
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| 4,433,864 | 06/409,173 | 2/28/84 |
| 4,433,870 | 06/268,564 | 2/28/84 |
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| 4,433,875 | 06/408,440 | 2/28/84 |
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| 4,434,045 | 06/336,977 | 2/28/84 |
| 4,434,057 | 06/347,684 | 2/28/84 |
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| 4,434,064 | 06/260,531 | 2/28/84 |
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| 4,434,228 | 06/370,242 | 2/28/84 |
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| 4,434,347 | 06/294,411 | 2/28/84 |
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| 4,434,378 | 06/318,742 | 2/28/84 |
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| 4,434,443 | 06/286,488 | 2/28/84 |
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| 4,434,458 | 06/305,036 | 2/28/84 |
| 4,434,467 | 06/248,825 | 2/28/84 |
| 4,434,481 | 06/397,936 | 2/28/84 |
| 4,434,484 | 06/382,173 | 2/28/84 |
| 4,434,496 | 06/281,687 | 2/28/84 |
| 4,434,500 | 06/323,228 | 2/28/84 |
| 4,434,508 | 06/317,913 | 2/28/84 |

### REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.19(a)).

**4,136,148,** Re. S.N. 156,265, Filed Feb. 11, 1988, Cl. 264/291, WEBBED HARNESSING DEVICE, Arthur W. Joyce, Owner of Record: *Dennison Manufacturing Co., Framingham, Mass.,* Attorney or Agent: George E. Kersey, et al., Ex. Gp.: 137

**4,324,182,** Re. S.N. 152,927, Filed Feb. 5, 1988, Cl. 102/217, APPARATUS AND METHOD FOR SELECTIVELY ACTIVATING PLURAL ELECTRICAL LOAD AT PREDETERMINED RELATIVE TIMES, Ian J. Kirby, et al., Owner of Record: *Imperial Chemical Industries Ltd., London, England,* Attorney or Agent: Paul N. Kokulis, et al., Ex. Gp.: 221

**4,373,071,** Re. S.N. 152,982, Filed Mar. 2, 1988, Cl. 525/375, SOLID-PHASE SYNTHESIS OF POLYNUCLEOTIDES, Keiichi Itakura, Owner of Record: *City of Hope, Duarte, Calif.,* Attorney or Agent: Edward S. Irons, Ex. Gp.: 151

**4,424,250,** Re. S.N. 129,400, Filed Nov. 25, 1987, Cl. 428/198, CARPET FACED TEXTILE PANEL, Ronald W. Adams, et al., Owner of Record: *Gates Formed Fibre Products, Inc., Auburn, Mass.,*Attorney or Agent: Jack E. Ebel, Ex. Gp.: 154

**4,567,448,** Re. S.N. 149,033, Filed Jan. 27, 1988, Cl. 331/125, VARIABLE FREQUENCY OSCILLATOR, Masayuki Ikeda, Owner of Record: *Seiko Epson Corp., Tokyo, Japan,* Attorney or Agent: Harold I. Kaplan, et al., Ex. Gp.: 252

**4,571,446,** Re. S.N. 156,905, Filed Feb. 17, 1988, Cl. 136/244, PHOTOELECTRIC CONVERSION PANEL AND ASSEMBLY THEREOF, Shunpel Yamazaki, Owner of Record: *Semiconductor Energy Laboratory Co. Ltd., Tokyo, Japan,* Attorney or Agent: Gerald J. Ferguson, et al., Ex. Gp.: 114

**4,572,388,** Re. S.N. 162,294, Filed Feb. 24, 1988, Cl. 215/252, TAMPER INDICATION SCREW CAP, David M. Wright, et al., Owner of Record: *Sunbeam Plastics Corp., Evansville, Ind.,* Attorney or Agent: Ernest I. Gifford, et al., Ex. Gp.: 241

**4,572,930,** Re. S.N. 154,878, Filed Feb. 11, 1988, Cl. 200/5R, MULTIPLE SWITCH USING A ROTARY ACTUATOR, Toshio Kakuta, Owner of Record: *Hosiden Electronics Co. Ltd., Osaka, Japan,* Attorney or Agent: Aaron B. Retzer, et al., Ex. Gp.: 214

**4,576,592,** Re. S.N. 165,682, Filed Mar. 8, 1988, Cl. 604/80, DUAL SOURCE PARENTERAL INFUSION APPARATUS, Hal C. Danby, Owner of Record: *Critikon, Inc., Tampa, Fla.,* Attorney or Agent: Robert L. Minier, et al., Ex. Gp.: 336

**4,576,853,** Re. S.N. 166,373, Filed Mar. 10, 1988, Cl. 428/181, MULTI-LAYER PLEATED TEXTILE FIBER PRODUCT, Edward A. Vaughn, et al., Owner of Record: *C. H. Masland & Sons,* Attorney or Agent: Arthur R. Crawford, et al., Ex. Gp.: 157

**4,603,767,** Re. S.N. 163,872, Filed Mar. 3, 1988, Cl. 192/106.2, CLUTCH PLATE HAVING TWO STAGE TORSION DAMPING MEANS, Marcel Blond, Owner of Record: *Valeo, Paris, France,* Attorney or Agent: Charles E. Brown, Ex. Gp.: 352

**4,612,053,** Re. S.N. 163,014, Filed Mar. 2, 1988, Cl. 106/35, COMBINATIONS OF SPARINGLY SOLUBLE CALCIUM PHOSPHATES IN SLURRIES AND PASTES AS MINERALIZERS AND CEMENTS, Walter E. Brown, et al., Owner of Record: *American Dental Association Health Foundation, Washington, D.C.,* Attorney or Agent: George B. Newitt, et al., Ex. Gp.: 115

**4,615,803,** Re. S.N. 163,633, Filed Mar. 3, 1988, Cl. 210/455, FLUID FILTER, Frederick E. Tarala, Owner of Record: *North American Filter Corp., Newark, N.J.,* Attorney or Agent: George W. Shaw, et al., Ex. Gp.: 136

**4,620,720,** Re. S.N. 163,918, Filed Mar. 3, 1988, Cl. 280/666, STRUT TYPE SUSPENSION FOR AUTOMOBILE, Mamoru Sakata, Owner of Record: *Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan,* Attorney or Agent: James E. Armstrong, III, et al., Ex. Gp.: 316

**4,637,236,** Re. S.N. 154,354, Filed Feb. 10, 1988, Cl. 70/458, KEY AND RETAINER CARD COMBINATION, Donald F. Almblad, Owner of Record: *Inventor,* Attorney or Agent: James Van Santen, et al., Ex. Gp.: 358

**4,637,696,** Re. S.N. 155,474, Filed Feb. 12, 1988, Cl. 351/41, BINOCULAR EYEGLASSES FOR IMAGE MAGNIFICATION, Vaughn D. Wilkin, Owner of Record: *Inventor,* Attorney or Agent: John E. Kelly, et al., Ex. Gp.: 257

**4,645,264,** Re. S.N. 162,401, Filed Feb. 29, 1988, Cl. 298/14, MOTORIZED DUMPING VEHICLE, Donald R. Morrison, Owner of Record: *Inventor,* Attorney or Agent: B. B. Olive, Ex. Gp.: 317

**4,660,698,** Re. S.N. 162,658, Filed Feb. 29, 1988, Cl. 192/45, ONE WAY CLUTCH, Osamu Miurs, Owner of Record: *Tok Bearing Co., Tokyo, Japan,* Attorney or Agent: Howard C. Miskin, et al., Ex. Gp.: 352

**4,684,415,** Re. S.N. 161,937, Filed Feb. 29, 1988, Cl. 437/228, CORE ANNIHILATION METHOD OF HG 1-XCDXTE, John H. Tregilgas, Owner of Record: *Texas Instruments Inc., Dallas, Tex.,* Attorney or Agent: Jay M. Cantor, et al., Ex. Gp.: 114

**4,684,415,** Re. S.N. 161,945, Filed Feb. 29, 1988, Cl. 437/228, CORE ANNIHILATION METHOD OF HG 1-XCDXTE, Jeffrey D. Beck, Owner of Record: *Texas Instruments Inc., Dallas, Tex.,* Attorney or Agent: Jay M. Cantor, et al., Ex. Gp.: 114

**4,701,388,** Re. S.N. 165,115, Filed Mar. 7, 1988, Cl. 264/1.4, INSTANT FILM UNIT WITH COLORING MEANS, Kazuyuke Yoshimura, et al., Owner of Record: *Fuji Photo Film Co., Ltd., Kanagawa, Japan,* Attorney or Agent: Robert J. Patch, Ex. Gp.: 137

**4,716,027,** Re. S.N. 164,771, Filed Mar. 4, 1988, Cl. 423/225, METHOD FOR SIMULTANEOUSLY SCRUBBING CEMENT KILN EXHAUST GAS AND PRODUCING USEFUL BY-PRODUCTS THEREFROM, Garrett L. Morrison, Owner of Record: *Passamaquoddy Tribe, Thomaston, Me.,* Attorney or Agent: W. R. Hulbert, Ex. Gp.: 113

### REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

**3,947,827,** Reexam. No. 90/001,491, Requested: Mar. 28, 1988, Cl. 340/173, DIGITAL STORAGE SYSTEM FOR HIGH FREQUENCY SIGNALS, Joseph L. Dautremont, et al., Owner of Record: *Whittaker Corp., Los Angeles, Calif.,* Attorney or Agent: Spensley, Horn, et al., Ex. Gp.: 330, Requester: Owner

**4,140,387,** Reexam. No. 90/001,490, Requested: Apr. 8, 1988, Cl. 355/014, APPARATUS FOR PRODUCING COLLATED COPIES FROM TWO SIDED ORIGINALS, Gary B. Gustafson, Owner of Record: *Eastman Kodak Co., Rochester, N.Y.,* Attorney or Agent: Unknown, Ex. Gp.: 210, Requester: Owner

**4,551,120,** Reexam. No. 90/001,489, Requested: Apr. 6, 1988, Cl. 474/135, BELT TENSIONER, Henry W. Thomey, Owner of Record: *Dyneer Corp., Westport, Conn.,* Attorney or Agent: Michael Sand & Co. LPA, Ex. Gp.: 350, Requester: Cushman, Darby, et al., Washington, D.C.

**4,557,683** Reexam. No. 90/001,488, Requested: Apr. 12, 1988, Cl. 425/147, ROTARY PLASTICATOR RAM INJECTION MACHINE, Gregory W. Mecker, Owner of Record: *USM Corp., Farmington, Conn.,* Attorney or Agent: Aubrey C. Brine, Ex. Gp.: 130, Requester: Joseph D. Evans, Alexandria, Va.

**4,596,718,** Reexam. No. 90/001,486, Requested: Apr. 6, 1988, Cl. 427/34, VACUUM PLASMA COATING APPARATUS, Heiko Gruner, Owner of Record: *Plasmainvent AG, Zug, Switzerland,* Attorney or Agent: Fitzpatrick, Cella, et al., Ex. Gp.: 150, Requester: Beveridge, De Grandi, et al., Washington, D.C.

**4,733,884,** Reexam. No. 90/001,487, Requested: Mar. 28, 1988, Cl. 280/661, CAMBER ADJUSTMENT DEVICE, Craig R. Pettibone, et al., Owner of Record: *Specialty Products, Inc., Longmont, Colo.,* Attorney or Agent: William P. O'Meara, Ex. Gp.: 310, Requester: Owner

### Service by Publication

A petition to cancel the registration identified below having been filed, and the notice of such proceedings sent by registered mail to registrant at the last known

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address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrant listed herein, its assigns or legal representatives, shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

"We Care America, Inc., Chesterfield, Mo., Reg. No. 1,230,752, for the mark 'We Care America', Canc. No. 16,557."

ERMA S. BROWN,
*Administrator*
*of the Trademark Trial*
*and Appeal Board.*
For JEFFREY M. SAMUELS,
*Assistant Commissioner*
*for Trademarks.*

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**Public Advisory Committee for Trademark Affairs**

**Notice of Open Meeting**

In accordance with Section 10(a)(2) of the Federal Advisory Committee Act (Public Law 92-463), announcement is made of the following Committee meeting:

The Public Advisory Committee for Trademark Affairs will meet from 10:00 a.m. until 4:00 p.m. on June 7, 1988, at the U.S. Patent and Trademark Office in Room 912 of Bldg. 2, Crystal Park, located at 2121 Crystal Dr., Arlington, Va.

The agenda for the meeting is as follows:

(1) Implementation of Proposed Intent-to-Use Legislation
(2) Automation Activities
(3) Application Processing and Prosecution

The meeting will be open to public observation; approximately twelve (12) seats will be available for the public on a first-come first-served basis.

If time permits, oral comments by the public of three (3) minutes on each topic within the above agenda will be allowed. Written comments and suggestions will be accepted before or after the meeting on any of the matters discussed.

Copies of the minutes will be availa ble upon request.

For further information, contact Carlisle E. Walters, Office of the Assistant Commissioner for Trademarks, Room CPK2-910, Patent and Trademark Office, Washington, D.C. 20231 Telephone: 703-557-7464.

DONALD J. QUIGG,
Apr. 20, 1988. *Assistant Secretary and*
*Commissioner of Patents*
*and Trademarks.*

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**Notice of Examination for Registration**

**Wednesday, Oct. 12, 1988**

Pursuant to the provisions of 37 CFR §§10.5, 10.6 and 10.7, an examination for persons seeking registration before the United States Patent and Trademark Office as patent attorneys and agents will be held on *WEDNESDAY, OCT. 12, 1988*. The deadline for filing applications along with the $250 fee and all necessary showings required by 37 CFR §§10.7(a) and (b) is *Aug. 1, 1988*.

With the exception of those persons who actively served four years or more in the examining corps of the United States Patent and Trademark Office for whom the examination may be waived, all persons recognized for practice before the Patent and Trademark Office in patent cases must, pursuant to the above noted rules, pass the examination. Note that passing the examination does not qualify one for recognition for practice before the Patent and Trademark Office in trademark cases. Such recognition is governed by 37 CFR §10.14 which does not require the passing of an examination.

Effective Apr. 15, 1988, the following changes in policy regarding the admission of applicants to the examination will be implemented:

1. There will be no limit on the number of times the registration examination may be taken.
2. An applicant who has failed three prior morning sections or three prior afternoon sections of the examination and who desires to retake the examination, will no longer be required to make a showing of a period of study for at least one year.
3. The examination consists of two parts, a morning section and an afternoon section. To pass the examination, an applicant must pass both sections. An applicant who passes one section of any examination given on or after Apr. 7, 1987, but who fails the other section, will not be required to retake the section passed, *provided* the applicant takes and passes the section failed in one of the next three examinations regularly scheduled by the Patent and Trademark Office. If the applicant does not pass the section failed within 18 months after failing the section, the applicant must retake both sections of the examination. No extensions of time will be granted except in extraordinary circumstances, e.g. an accident or hospitalization just prior to the examination which prevented the applicant from taking the examination.

Under 37 CFR §10.7(b), persons seeking registration must submit "satisfactory proof of . . . sufficient basic training in scientific and technical matters . . . ." The initial submissions of persons not having degrees in recognized subject areas, e.g. physics, chemistry, biology or engineering, are sometimes inadequate, and must be supplemented before such persons can be approved to take an examination. To afford adequate time to present any supplemental showing, it is recommended that such persons file their applications early, preferably *at least two months* before Aug. 1, 1988 deadline. Supplemental showings of qualifications and applications received after Aug. 1, 1988 will be considered only in connection with admission to the Apr. 1989 examination.

The examination is administered under the supervision of the Office of Personnel Management and is given at specific locations throughout the United States where the Office of Personnel Management conducts examinations.

Application blanks may be obtained from the Office of Enrollment and Discipline, Suite 810, Crystal Park 1, 2011 Crystal Dr., Arlington, Va. or by mail addressed to Box OED, U.S. Patent and Trademark Office, Office of Enrollment and Discipline, Washington, D.C. 20231.

CAMERON WEIFFENBACH,
Apr. 19, 1988. *Director, Office of*
*Enrollment and Discipline.*

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**Patent Term Extended Under 35 USC 156**

A certificate extending the term with respect to the following patent was issued under the provisions of 35 USC 156 on Apr. 21, 1988.

Patent No. 4,428,744, granted Jan. 31, 1984, to Richard L. Edelson, Owner of Record: Frederic A. Bourke, Jr.; Eleanor F. Bourke; Richard L. Edelson and The Edelson Trust, Title: METHOD AND SYSTEM FOR EXTERNALLY TREATING THE BLOOD, Classification: 604–6, Product Trade Name: THERAKOS UVAR SYSTEM, Term Extended: 652 days



**Department of Commerce**
**Patent and Trademark Office**
**37 CFR Part 10**

**[Docket No. 40788-8069]**

**Practice Before the Patent and Trademark Office**

*Agency*: Patent and Trademark Office, Commerce.
*Action*: Final rule; correction.
*Summary*: On Feb. 6, 1985, final rules regarding the representation of others before the Patent and Trademark Office were issued. (50 FR 5172, Feb. 6, 1985.) This notice makes a technical correction to the second sentence in §10.157(a) to reflect the Local Rule designation currently used by the U.S. District Court for the District of Columbia.
*For Further Information Contact*: Nancy C. Slutter by telephone at [703] 557-4035 or by mail marked to her attention and addressed to Box 8, Commissioner of Patents and Trademarks, Washington, D.C. 20231.
*Supplementary Information*: Part 10-Representation of Others Before the Patent and Trademark Office

1. The authority citation for 37 CFR Part 10 continues to read as follows:

*Authority*: 5 U.S.C. 500; 15 U.S.C. 1123; 35 U.S.C. 6, 31, 32, 41.

2. Section 10.157(a) [Corrected]

The reference in §10.157, paragraph (a), the second sentence, to "1-26" is corrected to read "213".

DONALD W. PETERSON,
Apr. 13, 1988. *Deputy Assistant Secretary*
*and Deputy Commissioner of*
*Patents and Trademarks.*

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# PATENT NOTICES

## Certificates of Correction for the Week of May 17, 1988

| | | | |
|---|---|---|---|
| Re. 31,752 | 4,675,533 | 4,698,563 | 4,707,493 |
| Re. 32,541 | 4,675,838 | 4,698,876 | 4,707,803 |
| D. 292,319 | 4,676,952 | 4,699,036 | 4,707,826 |
| 3,937,893 | 4,677,478 | 4,699,141 | 4,707,979 |
| 3,996,565 | 4,678,733 | 4,699,219 | 4,708,177 |
| 4,257,623 | 4,680,272 | 4,699,366 | 4,708,361 |
| 4,332,288 | 4,680,539 | 4,699,398 | 4,708,470 |
| 4,419,559 | 4,680,623 | 4,699,503 | 4,709,068 |
| 4,461,738 | 4,680,674 | 4,699,700 | 4,709,242 |
| 4,512,082 | 4,681,715 | 4,699,888 | 4,709,302 |
| 4,513,681 | 4,683,196 | 4,699,910 | 4,709,319 |
| 4,515,187 | 4,683,233 | 4,700,099 | 4,709,443 |
| 4,526,173 | 4,684,350 | 4,700,284 | 4,709,724 |
| 4,547,051 | 4,684,576 | 4,700,294 | 4,709,753 |
| 4,580,346 | 4,684,735 | 4,700,319 | 4,709,875 |
| 4,584,402 | 4,685,610 | 4,700,412 | 4,709,970 |
| 4,599,002 | 4,685,955 | 4,700,799 | 4,710,278 |
| 4,599,962 | 4,686,085 | 4,700,933 | 4,710,352 |
| 4,601,100 | 4,686,273 | 4,701,416 | 4,710,471 |
| 4,608,166 | 4,686,484 | 4,702,332 | 4,710,674 |
| 4,609,367 | 4,687,304 | 4,702,655 | 4,711,002 |
| 4,609,694 | 4,688,454 | 4,702,799 | 4,711,164 |
| 4,610,665 | 4,689,171 | 4,702,982 | 4,711,674 |
| 4,612,228 | 4,689,343 | 4,702,997 | 4,711,830 |
| 4,615,544 | 4,689,473 | 4,703,038 | 4,712,125 |
| 4,617,339 | 4,689,499 | 4,703,103 | 4,712,195 |
| 4,624,520 | 4,690,118 | 4,703,507 | 4,712,207 |
| 4,627,428 | 4,690,559 | 4,703,779 | 4,712,277 |
| 4,631,663 | 4,691,008 | 4,703,825 | 4,712,462 |
| 4,634,846 | 4,691,054 | 4,703,981 | 4,712,864 |
| 4,642,266 | 4,691,618 | 4,704,136 | 4,713,033 |
| 4,651,006 | 4,691,776 | 4,704,174 | 4,713,273 |
| 4,654,233 | 4,692,630 | 4,704,363 | 4,713,464 |
| 4,654,731 | 4,692,937 | 4,704,470 | 4,713,957 |
| 4,655,089 | 4,693,249 | 4,704,837 | 4,714,140 |
| 4,655,626 | 4,693,253 | 4,704,938 | 4,714,556 |
| 4,656,072 | 4,694,008 | 4,705,368 | 4,714,724 |
| 4,657,531 | 4,694,119 | 4,705,466 | 4,714,831 |
| 4,659,668 | 4,694,362 | 4,705,494 | 4,715,243 |
| 4,660,579 | 4,694,871 | 4,705,720 | 4,715,272 |
| 4,665,555 | 4,694,911 | 4,705,730 | 4,715,474 |
| 4,666,322 | 4,695,007 | 4,705,799 | 4,716,150 |
| 4,666,589 | 4,695,205 | 4,706,083 | 4,716,175 |
| 4,666,937 | 4,696,453 | 4,706,170 | 4,716,640 |
| 4,668,813 | 4,696,867 | 4,706,178 | 4,716,924 |
| 4,670,584 | 4,696,905 | 4,706,214 | 4,717,636 |
| 4,670,618 | 4,697,619 | 4,706,461 | 4,717,781 |
| 4,670,840 | 4,697,768 | 4,706,533 | 4,720,023 |
| 4,671,493 | 4,697,887 | 4,706,577 | 4,720,551 |
| 4,671,846 | 4,698,097 | 4,706,636 | |
| 4,672,618 | 4,698,151 | 4,706,753 | |
| 4,674,916 | 4,698,243 | 4,706,929 | |

## Disclaimers

4,280,106.—*Donald R. Scifres*, Los Altos; *Robert D. Burnham*, Los Altos Hills; *William Streifer*, Palo Alto, all of Calif. STRIPED SUBSTRATE PLANAR LASER. Patent dated July 21, 1981. Disclaimer filed Mar. 3, 1988, by the assignee, *Xerox Corp.*

Hereby enters this disclaimer to claims 1-7 of said patent.

4,302,729.—*Robert D. Burnham*, Los Altos Hills; *Donald R. Scifres*, Los Altos; *William Streifer*, Palo Alto, all of Calif. CHANNELED SUBSTRATE LASER WITH DISTRIBUTED FEEDBACK. Patent dated Nov. 24, 1981. Disclaimer filed Mar. 3, 1988, by the assignee, *Xerox Corp.*

Hereby enters this disclaimer to claim 1 of said patent.

4,499,966.—*William G. Milne; Minoru Saruwatari*, both of Calgary, Canada. EMERGENCY ESCAPE SYSTEM. Patent dated Feb. 19, 1985. Disclaimer filed Mar. 7, 1988, by the assignee, *Tundra Holdings Ltd.*

Hereby enters this disclaimer to claims 1 and 14 of said patent.

4,570,298.—*Kenneth E. Tribbett*, Austin, Minn. DUAL EXTRUSION APPARATUS. Patent dated Feb. 18, 1986. Disclaimer filed Mar. 7, 1988, by the assignee, *Geo. A. Hormel & Co.*

The term of this patent subsequent to Feb. 11, 2003, has been disclaimed.

4,628,440.—*Davis R. Thompson*, Fife, Scotland. ELECTRICAL APPLIANCE CONTROL. Patent dated Dec. 9, 1986. Disclaimer filed Mar. 9, 1988, by the assignee, *Pico Electronics Ltd.*

Hereby enters this disclaimer to claims 22-27 of said patent.





## SPECIAL BOXES FOR MAIL

Special PTO mail box numbers should be used to allow forwarding of particular types of mail to the appropriate areas as quickly as possible. Such mail is forwarded directly to the appropriate area without being opened. Only the specified type of document should be placed in an envelope addressed to one of these special boxes. If any documents other than the specified type identified for each box are addressed to that box, they will be delayed in reaching the appropriate area for which they are intended.

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| Box 10 | Orders for certified copies of patent and trademark applications. |
| Box 11 | Electronic Ordering Service (EOS). |
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| Box Interference | Communications relating to interferences and applications and patents involved in interferences. |
| Box Issue Fees | Issue Fee Transmittal (PTOL Form 85), advance copy orders, corrected drawings and fees associated with these services. |
| Box M. Fee | Correspondence related to a patent that is subject to the payment of a maintenance fee. |
| Box Non-Fee | Non-fee amendments to patent applications. |
| Box Pat. Ext. | Applications for patent term extension. |
| Box PCT | Mail related to applications filed under the Patent Cooperation Treaty. |
| Box Reexam | Mail related to reexamination application. |
| Box SN | Petitions under 37 CFR 1.182 and associated fees prior to receipt of "Filing Receipt", "Notice to File Missing Parts" or " Notice of Incomplete Information Application". |

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## Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries

The following libraries, designated as Patent Depository Libraries (PDLs), receive current issues of U.S. Patents and maintain collections of earlier-issued patents. The scope of these collections varies from library to library, ranging from patents of only recent years to all or most of the patents issued since 1790.

These patent collections, which are organized in patent number sequence, are available for use by the public free of charge. Each of the PDLs, in addition, offers supplemental reference publications of the U.S. Patent Classification System, including the *Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions,* and provides technical staff assistance in their use to aid the public, in gaining effective access to information contained in patents. CASSIS (Classification And Search Support Information System); which provides direct, on-line access to Patent and Trademark Office data, is available at all PDLs. Facilities for making paper copies of patents from either microfilm or paper collections are generally provided for a fee.

Since there are variations in the scope of patent collections among the PDLs and in their hours of service to the public, anyone contemplating use of the patents at a particular library is advised to contact that library, in advance, about its collection and hours in order to avert possible inconvenience.

| *State* | *Name of Library* | *Telephone Contact* |
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| | Birmingham Public Library | (205) 226-3680 |
| Alaska | Anchorage Municipal Libraries | (907) 261-2907 |
| Arizona | Tempe: Noble Library, Arizona State University | (602) 965-7140 |
| Arkansas | Little Rock: Arkansas State Library | (501) 682-2053 |
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| | Sacramento: California State Library | (916) 322-4572 |
| | San Diego Public Library | (619) 236-5813 |
| | Sunnyvale: Patent Information Clearinghouse | (408) 730-7290 |
| Colorado | Denver Public Library | (303) 571-2347 |
| Connecticut | New Haven: Science Park Library | (203) 786-5447 |
| Delaware | Newark: University of Delaware Library | (302) 451-2965 |
| Dist. of Columbia | Washington: Howard University Libraries | (202) 636-5060 |
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| | Miami–Dade Public Library | (305) 375-2665 |
| Georgia | Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology | (404) 894-4508 |
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| Kentucky | Louisville Free Public Library | (502) 561-8614 |
| Louisiana | Baton Rouge: Troy H. Middleton Library, Louisiana State University | (504) 388-2570 |
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| Massachusetts | Amherst: Physical Sciences Library, University of Massachusetts | (413) 545-1370 |
| | Boston Public Library | (617) 536-5400 Ext. 265 |
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| | Detroit Public Library | (313) 833-1450 |
| Minnesota | Minneapolis Public Library & Information Center | (612) 372-6570 |
| Missouri | Kansas City: Linda Hall Library | (816) 363-4600 |
| | St. Louis Public Library | (314) 241-2288 Ext. 390 |
| Montana | Butte: Montana College of Mineral Science and Technology Library | (406) 496-4222 |
| Nebraska | Lincoln: Engineering Library, University of Nebraska-Lincoln | (402) 472-3411 |
| Nevada | Reno: University of Nevada-Reno Library | (702) 784-6579 |
| New Hampshire | Durham: University of New Hampshire Library | (603) 862-1777 |
| New Jersey | Newark Public Library | (201) 733-7815 |
| New Mexico | Albuquerque: University of New Mexico Library | (505) 277-5441 |
| New York | Albany: New York State Library | (518) 474-7040 |
| | Buffalo and Erie County Public Library | (716) 846-7101 |
| | New York Public Library (The Research Libraries) | (212) 714-8529 |
| North Carolina | Raleigh: D. H. Hill Library, North Carolina State University | (919) 737-3280 |
| Ohio | Cincinnati & Hamilton County, Public Library of | (513) 369-6936 |
| | Cleveland Public Library | (216) 623-2870 |
| | Columbus: Ohio State University Libraries | (614) 292-6286 |
| | Toledo/Lucas County Public Library | (419) 255-7055 Ext. 212 |
| Oklahoma | Stillwater: Oklahoma State University Library | (405) 624-6546 |
| Oregon | Salem: Oregon State Library | (503) 378-4239 |
| Pennsylvania | Philadelphia, Free Library of | (215) 686-5330 |
| | Pittsburgh, Carnegie Library of | (412) 622-3138 |
| | University Park: Pattee Library, Pennsylvania State University | (814) 865-4861 |
| Rhode Island | Providence Public Library | (401) 521-8726 |
| South Carolina | Charleston: Medical University of South Carolina Library | (803) 792-2371 |
| Tennessee | Memphis & Shelby County Public Library and Information Center | (901) 725-8876 |
| | Nashville: Vanderbilt University Library | (615) 322-2775 |
| Texas | Austin: McKinney Engineering Library, University of Texas at Austin | (512) 471-1610 |
| | College Station: Sterling C. Evans Library, Texas A & M University | (409) 845-2551 |
| | Dallas Public Library | (214) 670-1468 |
| | Houston: The Fondren Library, Rice University | (713) 527-8101 Ext. 2587 |
| Utah | Salt Lake City: Marriott Library, University of Utah | (801) 581-8394 |
| Virginia | Richmond: Virginia Commonwealth University Library | (804) 367-1104 |
| Washington | Seattle: Engineering Library, University of Washington | (206) 543-0740 |
| Wisconsin | Madison: Kurt F. Wendt Library, University of Wisconsin -Madison | (608) 262-6845 |
| | Milwaukee Public Library | (414) 278-3247 |



## PATENT EXAMINING CORPS

**RENE D. TEGTMEYER, Assistant Commissioner**

**JAMES E. DENNY, Deputy Assistant Commissioner**

**CONDITION OF PATENT APPLICATIONS AS OF April 9, 1988**

| PATENT EXAMINING GROUPS | Actual Filing Date of Oldest New Case Awaiting Action |
|---|---|
| **CHEMICAL EXAMINING GROUPS** | |
| GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director | 1-12-87 |
| ORGANIC CHEMISTRY GROUP 120—S. N. ZAHARNA, Director | 9-3-85 |
| SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. F. WHITE, Director | 4-15-87 |
| HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director | 12-9-86 |
| BIOTECHNOLOGY, GROUP 180—S. N. ZAHARNA, Acting Director | 10-24-85 |
| **ELECTRICAL EXAMINING GROUPS** | |
| INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—G. GOLDBERG, Director | 4-21-86 |
| SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director | 10-14-85 |
| INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—E. LEVY, Director | 2-6-86 |
| PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX, Director | 11-12-86 |
| ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director | 2-17-87 |
| COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260—S. G. KUNIN, Director | 7-17-86 |
| DESIGN, GROUP 290—K. L. CAGE, Director | 4-17-85 |
| **MECHANICAL EXAMINING GROUPS** | |
| HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director | 3-13-87 |
| MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—VACANT, Director | 10-04-85 |
| MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—VACANT, Director | 2-18-86 |
| SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—D. J. STOCKING, Director | 2-20-87 |
| GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director | 7-1-87 |

**Expiration of patents:** The patents within the range of numbers indicated below expire during April 1988, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents . . . . . Numbers 3,573,336 to 3,576,935, inclusive

Plant Patents . . . . . Numbers 3,037 to 3,053 inclusive

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Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 32,665

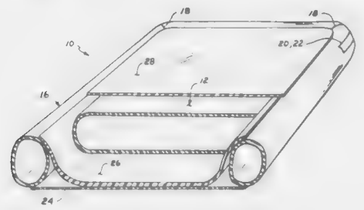
## FLOATATION SLEEP SYSTEM

**Philip J. Santo, 12 Mountain Rd., Rochester, N.Y. 14525**

**Original No. 4,513,463, dated Apr. 30, 1985, Ser. No. 475,332, Mar. 14, 1983. Continuation-in-part of Ser. No. 450,022, Dec. 15, 1982, abandoned. Application for reissue Jul. 29, 1985, Ser. No. 760,244**

**Int. Cl.**[4] **A47C** *27/10;* **A61G** *7/04*

**U.S. Cl. 5—452** **15 Claims**




*15. A floatation sleep system having a body-supporting bladder and a marginal perimeter support for such bladder, said system comprising:*

*means, formed of a flexible dimensionally stable material, including first and second portions, said first portion defining a cavity for receiving a body-supporting bladder and said second portion defining a chamber for receiving a marginal perimeter support for such bladder, said first and second portions being structurally interrelated such that said first portion is suspended by said second portion, so that when a bladder is received in said first portion and a marginal perimeter support is received in said second portion, the weight of said bladder exerts a force through said first portion on said second portion to hold said marginal perimeter support in effective support relation to said bladder.*

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Re. 32,666

## DEVICE FOR DEBONING MEAT

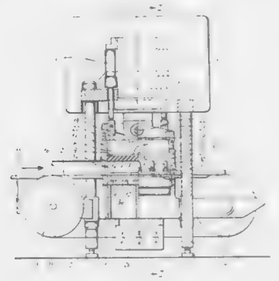
**Gerardus H. J. Ketels, AD Grave, Netherlands, assignor to Protecon B.V., Oss, Netherlands**

**Original No. 4,594,751, dated Jun. 17, 1986, Ser. No. 486,948, Mar., 1983. Application for reissue Jun. 22, 1987, Ser. No. 64,949**

**Claims priority, application Netherlands, Jul. 15, 1981, 8103360; Jan. 11, 1982, 8200076**

**Int. Cl.**[4] **A22C** *17/04*

**U.S. Cl. 17—1 G** **29 Claims**



1. In a press for compressively removing meat from a piece of bone with meat attached comprising a pair of relatively movable platens supported for relative reciprocation and adapted to receive a piece of bone with meat attached therebetween, the improvement comprising at least one of said platens having a first portion thereof conforming in shape generally to the shape of said bone, and a second surrounding portion, said first portion being adapted to apply a lesser force for a given degree of press travel than said second portion for applying the compressive force [substantially only] to the meat *surrounding the perimeter of the bone in a plane perpendicular to the direction of platen relative movement and to the meat around the bone* without crushing the bone for shearing the meat from the bone while held in said press.

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Re. 32,667

## GATED KNOCK DETECTOR FOR INTERNAL-COMBUSTION ENGINES

**Richard E. Staerzl, Fond du Lac, Wis., assignor to Brunswick Corporation, Skokie, Ill.**

**Original No. 4,667,637, dated May 26, 1987, Ser. No. 817,131, Jan. 8, 1986. Application for reissue Sep. 9, 1987, Ser. No. 94,721**

**Int. Cl.**[4] **F02P** *5/155;* **G01L** *23/22*

**U.S. Cl. 123—435** **17 Claims**



*16. A knock detection and prevention circuit for an internal-combustion engine, comprising:*

*transducer means for converting audio signals indicative of engine combustion and occurring within a combustion chamber of the engine into an electrical signal which is characterized, for each engine cycle, by one phase during which any detonation is likely to occur and by another phase during which detonation is unlikely to occur.*

*means for sequentially sampling and filtering from said respective phases separate segments of said electrical signal whereby separate filtered-sample signals are produced from the sampling of said respective phases,*

*means for comparing the amplitude of the filtered-sample signal from a sequentially first segment of said electrical signal, with amplitude of the filtered-sample signal from a sequentially second segment of said electrical signal, and*

*means responsive to a difference in the amplitude of said first and second filtered-sample signals for increasing the rate of fuel supply to the combustion chamber of the internal combustion engine.*

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**Re. 32,668**

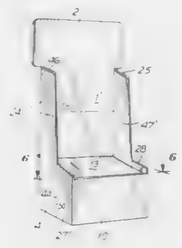
## FOLDABLE DISPLAY STAND

**Irving Smith, c/o Arrow Art Finishers, 2020 White Plains Rd., Bronx, N.Y. 10462**

**Original No. 4,570,805, dated Feb. 18, 1986, Ser. No. 663,388, Oct. 22, 1984. Continuation-in-part of Ser. No. 310,078, Oct. 9, 1981, Pat. No. 4,493,424. Application for reissue Nov. 6, 1986, Ser. No. 927,549**

**Int. Cl.**[4] **A47F** *5/11*

**U.S. Cl. 211—149** **21 Claims**



*9. A foldable display stand erectable, when unfolded, from a collapsed condition to an erect display condition, comprising:*

*a shelf movable from a first position in the collapsed condition, to a load-bearing second position in the erect display condition of the stand;*

*shelf support means movable from a shelf non-supporting position in the collapsed condition, to a shelf supporting position in which the shelf support means lies underneath the shelf and supports the shelf from below the shelf in the erect display condition;*

*means on the shelf support means for directly biasing the shelf support means toward the shelf supporting position when the stand is unfolded from the collapsed condition; and*

*means for translating the movement of the shelf support means toward the shelf supporting position, for automatically moving the shelf to the load-bearing second position.*

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**Re. 32,669**

## ENERGY AMPLIFIER APPARATUS

**Lonnie L. Angle, 2207 E. McDowell, Mesa, Ariz. 85203**

**Original No. 4,278,405, dated Jul. 14, 1981, Ser. No. 5,210, Jan. 22, 1979. Application for reissue Apr. 10, 1986, Ser. No. 850,168**

**Int. Cl.**[4] **F04F** *3/00, 5/08*

**U.S. Cl. 417—150** **17 Claims**

1. Energy amplifier apparatus, comprising in combination:

a flow of water,

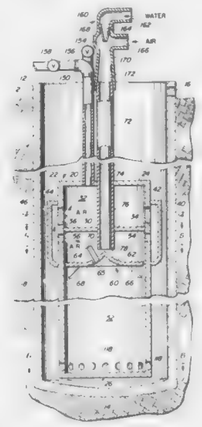
eductor means for entraining air in the flow of water;

first pipe means connected to [the] *said* eductor means for transporting the flow of water and entrained air from [the] *said* eductor means *to an outlet of said first pipe means*;

cylinder means connected to [the] *said* first pipe means for receiving the flow of water and entrained air and spaced apart downwardly from [the] *said* eductor means to allow the flow of water to compress the entrained air as the water flows in [the] *said* first pipe means to [the] *said* cylinder means;

separator chamber means disposed in [the] *said* cylinder means and into which [the] *said* first pipe means extends for receiving the flow of water and the compressed entrained air and having a cylinder wall [and], a first bulkhead and a second bulkhead, *said first and second bulkheads being* secured to [the] *said* cylinder wall;

cone means disposed *in said separator chamber beneath and* adjacent the *outlet of said* first pipe means [in the separator chamber means] and spaced apart from [the] *said* first bulkhead [and the], *said* second bulkhead and [from the] *said* cylinder wall [and], the water and entrained and compressed air [flows] *flowing* onto [the] *said* cone means for [separating] *separation of* the entrained and compressed air from the water;



second pipe means *in fluid communication with said separator chamber at an elevation above said cone means* for transporting the *separated and* compressed air from [the] *said* cylinder means; [and]

aperture means *disposed* in [the] *said* separator chamber means *at an elevation below said cone means* through which the water flows out of [the] *said* separator chamber means; *and*

*means for discharging the water flow from said aperture means at an elevation below said eductor means and above said separator chamber means.*

# PLANT PATENTS

## GRANTED MAY 17, 1988

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

**6,177**

### ROSE PLANT—MEIJETTE VARIETY

**Marie-Louise Meilland, Antibes, France, assignor to The Conard-Pyle Company, West Grove, Pa.**

**Filed Mar. 11, 1986, Ser. No. 838,661**

**Int. Cl.**[4] **A01H** *5/00*

**U.S. Cl. Plt.—8** **1 Claim**

1. A new and distinct variety of Miniature rose plant characterized by the following combination of characteristics:

(a) forms in abundance attractive double blossoms which are mimosa yellow in coloration and of long duration on the plant, and

(b) exhibits a vigorous growth habit which results in the formation of compact and regular vegetation;

substantially as herein shown and described.

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**6,178**

### MAGNOLIA HYBRID CV. MONLAND

**Robert Eiland, Millbrook, Ala., assignor to Monrovia Nursery Company, Azusa, Calif.**

**Filed Aug. 29, 1985, Ser. No. 770,860**

**Int. Cl.**[4] **A01H** *5/00*

**U.S. Cl. Plt.—51** **1 Claim**

1. A new and distinct selection of Magnolia as substantially shown and described herein, characterized particularly as to novelty by the unique combination of continuously heavy blooming due to a unique blooming pattern, longer foliage which forms a dense crown, a growth habit which is wide spreading and few to no fruit cones produced.

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**6,179**

### BEGONIA PLANT NAMED JANE

**Soeren Hvid, Aarup, Denmark, assignor to L. Daehnfeldt A/S, Odense, Denmark**

**Filed Mar. 10, 1986, Ser. No. 838,072**

**Int. Cl.**[4] **A01H** *5/00*

**U.S. Cl. Plt.—68** **1 Claim**

1. A new and distinct cultivar of *Begonia hiemalis* plant named Jane, as shown and described, and particularly characterized by its compact growth, small leaves with a reddish green color and fully filled flowers in a nice rose color; floriferous habit and by its excellent keeping qualities.

**6,180**

### BEGONIA PLANT NAMED INA

**Soeren Hvid, Aarup, Denmark, assignor to L. Daehnfeldt A/S, Odense, Denmark**

**Filed Mar. 10, 1986, Ser. No. 838,078**

**Int. Cl.**[4] **A01H** *5/00*

**U.S. Cl. Plt.—68** **1 Claim**

1. A new and distinct cultivar of *Begonia hiemalis* plant named Ina, as shown and described, and particularly characterized by its vigorous, compact growth habit, almost white tepals that fade into very light pink; floriferous habit and by its excellent keeping qualities.

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**6,181**

### BEGONIA PLANT NAMED KATHE

**Soeren Hvid, Aarup, Denmark, assignor to L. Daehnfeldt A/S, Odense, Denmark**

**Filed Mar. 10, 1986, Ser. No. 838,079**

**Int. Cl.**[4] **A01H** *5/00*

**U.S. Cl. Plt.—68** **1 Claim**

1. A new and distinct cultivar of *Begonia hiemalis* plant named Kathe, as shown and described, and particularly characterized by its medium-sized, heavily filled rose pink flowers, fast propagation, rapid flowering and its resistance to powdery mildew.

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**6,182**

### BEGONIA PLANT NAMED BAVARIA

**Soeren Hvid, Aarup, Denmark, assignor to L. Daehnfeldt A/S, Odense, Denmark**

**Filed Mar. 10, 1986, Ser. No. 838,080**

**Int. Cl.**[4] **A01H** *5/00*

**U.S. Cl. Plt.—68** **1 Claim**

1. A new and distinct cultivar of *Begonia hiemalis* plant named Bavaria, as shown and described, and particularly characterized by its medium-sized, heavily filled rose flowers, pleasantly contrasting with the darker medium green foliage, compact and vigorous growth habit and by its excellent keeping qualities.

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# PATENTS

## GRANTED MAY 17, 1988

### ERRATA

| For CLASS | See PATENT NO. |
|---|---|
| 029-426 | 4,744,132 |
| 244-114 | 4,744,529 |
| 241-101 | 4,744,531 |
| 424-003 | 4,744,760 |
| 434-099 | 4,744,783 |
| 029-566 | 4,744,799 |
| 134-100 | 4,744,955 |
| 368-180 | 4,745,590 |

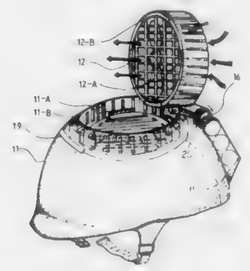
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# PATENTS

GRANTED MAY 17, 1988

## GENERAL AND MECHANICAL

**4,744,106**
**ENGINEERING CAP WITH STRUCTURE OF FAN DEVICE**
**Gong S. Wang, 2nd F., No. 71-15 Tong-Ping Rd., Tai-Ping Shiang, Tai-Chung Hsien, Taiwan**
**Filed Feb. 19, 1987, Ser. No. 16,416**
**Int. Cl.[4] A42C *5/04***
**U.S. Cl. 2—171.3** **11 Claims**




1. A protective engineering safety cap device including means for removing heat comprising in combination

a cap having a top portion, sides and an open bottom, which together define an inner compartment, said top portion having an opening defined by walls in said cap, said opening being in communication with said inner compartment;

a cover having at least a portion with a circumference sized and shaped so as to fit in said top portion opening in close proximity to said opening walls;

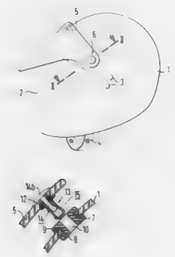
a motor driven fan mounted in said cover;

means for pivotably attaching said cover to said cap such that said cover can be positioned between a first closed position in which said cover closes said opening, and a second, opening position; and

means for removably retaining said cover in said closed position.

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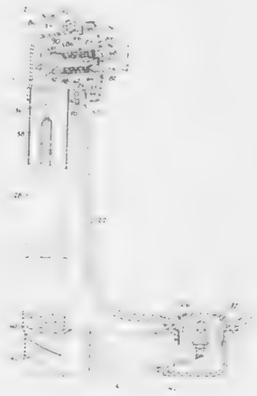
**4,744,107**
**SAFETY HELMET AND DETACHABLE ACCESSORY**
**Artur Föhl, Auf der Halde 28, 7060 Schorndorf, Fed. Rep. of Germany**
**Filed Mar. 18, 1985, Ser. No. 713,019**
**Claims priority, application Fed. Rep. of Germany, Mar. 16, 1984, 3409786**
**Int. Cl.[4] A42B *3/02***
**U.S. Cl. 2—422** **7 Claims**




1. Safety helmet, comprising a helmet shell, at least one accessory, and at least one plug connection for connecting said accessory to said helmet shell being detachable with a given opening force, each plug connection including an elastic plug having a socket formed therein and being fixed in an opening formed in said helmet shell, and a plug nipple fastened to said accessory being insertible and rotatably lockable in said socket, said plug nipple being in the form of a sleeve-shaped part attached by a press fit to said accessory.

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**4,744,108**
**BATHTUB DRAIN APPARATUS**
**Erwin Schmidt, Kenosha, Wis., assignor to Frost Company, Kenosha, Wis.**
**Filed Feb. 12, 1987, Ser. No. 13,938**
**Int. Cl.[4] E03C *1/24, 1/22***
**U.S. Cl. 4—199** **18 Claims**



1. A rotary bathtub drain control mechanism for mounting at a tub overflow opening, comprising:

a fixed body forming a cavity extending therethrough from a front opening to a back opening;

means for securing the fixed body to the tub at the overflow opening;

a rotational member extending in axial alignment through the cavity and having a rear portion behind the back opening and a forward portion in front of the front opening, said rotational member being axially movable to a limited extent with respect to the fixed body;

linkage attachment means on the rear portion of the rotational member in non-axial postion;

first and second cooperating contact surfaces on the fixed body and rotational member, respectively, in axially-facing contact with each other, said contact surfaces having different axially-extending engagment characteristics at different radial positions; and

means axially biasing the first and second contact surfaces together at all rotational positions of the rotational member,

whereby the cooperating contact surfaces serve to mark different functional positions of the rotational member with respect to the fixed body.

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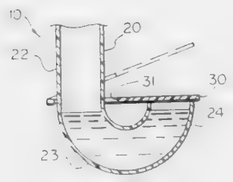
**4,744,109**

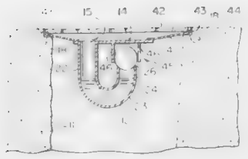
## GAS-SEALING INSERT FOR FLOOR DRAINS

Greaville K. Yuill, 1441 Pembina Highway, Winnipeg, Manitoba, Canada R3T 2C4

Filed Jun. 18, 1986, Ser. No. 875,496
Claims priority, application Canada, Apr. 16, 1986, 506813
Int. Cl.[4] A47K *1/14*
U.S. Cl. 4—287 7 Claims







1. A drop-in insert for a floor drain having an opening and a pipe extending substantially vertically downwardly from said opening at least for a predetermined distance, said insert comprising:

a cover for seating at said drain opening and for sealing said opening except for at least one hole extending through the cover;

tubing suspended below said cover and dimensioned to project into said pipe by a distance no greater than said predetermined distance, said tubing at one end thereof sealingly encircling said at least one hole in the cover and having an outlet at an opposite end and a water trap located between said one and said opposite ends; and

an automatically closing gas-sealing valve located at said outlet, which valve is openable by the pressure of water when passing through said tubing;

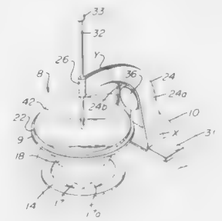
wherein the cover has an enlarged, annular, gas-impermeable, flexible membrane attached thereto.

**4,744,110**

## AUTOMATIC DRAIN SEALER

Dino Ippoliti, 422 Main St. Washington #3, Harleysville, Pa. 19438

Filed Mar. 20, 1986, Ser. No. 842,124
Int. Cl.[4] A47K *1/14*
U.S. Cl. 4—295 12 Claims



1. An apparatus for preventing insect and gas infestation into an enclosure from a drain located within a receptacle for retaining a liquid comprising:

(a) a sewer line for connection to said drain and for expelling said liquid therein;

(b) means for sealing said drain comprising first and second circular coupled parts, said first part being decoupled from said second part for blocking said drain when liquid is to be retained within said receptacle, and said second part being bouyant so as to float on a liquid surface;

(c) means attachable to or detachable from said receptacle to provide a reformable clamp means having distal and proximal ends wherein said reformable clamp means is detached at said proximal end from said receptacle after said first part has been decoupled from said second part and utilized to block said drain opening, and said reformable clamp means being reattached at said proximal end to said receptacle when said first part has been recoupled to said second part and when liquid is being expelled from said receptacle;

(d) means provided by said reformable clamp at said distal end for slidably aligning said first and second recoupled parts over said drain, wherein when said liquid is completely expelled from said receptacle said respective first and second recoupled parts will automatically block and seal said drain to prevent insects and gases from entering said enclosure from said sewer line.

**4,744,111**

## KNOCK-DOWN COMMODE

Duane T. Tegg, and Perry M. Domaas, both of Brooklyn Center, Minn., assignors to Satellite Industries, Inc., Minneapolis, Minn.

Filed Jun. 26, 1986, Ser. No. 879,031
Int. Cl.[4] E04H *1/12;* A47K *11/02*
U.S. Cl. 4—460 9 Claims

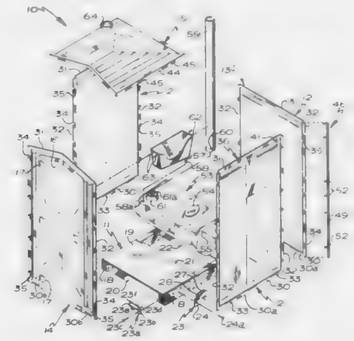
1. A knock-down portable toilet structure comprising a generally rectangular-shaped base, a roof, vertical, generally rectangular-shaped side walls, front wall, and rear wall, said roof, and each of said side, front, and rear walls being formed of molded plastic material, and each side, front, and rear wall, respectively, having a substantially horizontal lower edge portion said structure housing a holding tank to receive excrement and a toilet seat and lid covering a receiving opening in the top of said tank,

quick disconnect means on said base engaging cooperating means on the lower edge portion of each said side, front, and rear walls, respectively, to permit ready attachment of the vertical walls to the base and permitting ready detachment therefrom,

each side, front, and rear wall having opposed vertical edge portions flaring outwardly from the general plane of each wall, each vertical edge portion of each wall having a plurality of similar, vertically spaced apart, vertically extending outwardly and upwardly opening slots therein, the vertical edge portion of one of said vertical walls being disposed in contiguous relation to the vertical edge on an adjacent wall so that a slot in the vertical edge portion of one wall is disposed in mating relation with a slot in the contiguous end portion of an adjacent wall,

a plurality of substantially identical vertically disposed elongate U-shaped resilient clamping members formed of plastic material, each U-shaped clamping member including a pair of legs interconnected by an integral bight portion, said bight portion being slightly cambered inwardly and said legs converging slightly towards each other from the bight portion thereof to impart a resiliency to the U-shaped member, a plurality of vertically spaced





apart pins extending between and secured to the legs of each U-shaped clamping member, the pins of each U-shaped clamping member engaging in the mating slots of the contiguous vertical edge portions of a pair of adjacent vertical walls and cooperating with the slots to cause the legs of the U-shaped clamping members to engage and clamp the contiguous edge portions together, each vertical side, front, and rear wall having a substantially horizontal upper edge portion, and

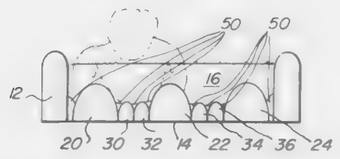
quick disconnect locking means on the upper edge portion of each of said vertical front, rear, and side walls, respectively, engaging cooperating means on said roof adjacent the peripheral edge portion of the latter to permit ready attachment of the roof to the vertical side, front, and rear walls to permit ready attachment and detachment of the roof to the vertical walls.

**4,744,112**

## COLLAPSIBLE SOLAR-HEATED HOT TUB

Wiley E. Keesling, Jr., 524 Bradley St., Santa Paula, Calif. 93060

Filed Aug. 20, 1986, Ser. No. 898,455
Int. Cl.[4] A47K *3/06*
U.S. Cl. 4—585 7 Claims



1. A solar-heated portable hot tub for use in areas where bathing facilities are not available, comprising:

an inflatable side rim-portion defining the circumferential wall of the hot tub, said side rim-portion having means formed therein for the reception of forced air for inflating said side rim-portion;

a bottom portion upon which rests a bather when taking a bath in the tub, said bottom portion being joined to lower portions of said side rim portion such that said side rim portion projects upwardly beyond said bottom portion to define therein a water-holding chamber in which a bather takes a bath;

said bottom portion comprising means projecting upwardly and shaped concavely to allow for a bather to be seated therein, said means comprising a first longitudinally extending rib having a substantially convex shape facing upwardly, at least one second longitudinally extending rib having a convex shape facing upwardly less than said first rib, and a third rib similar to said first rib and parallel thereto, said second rib being sandwiched between said first and third ribs to define said substantially concave shape;

said first, second and third ribs being colored black for absorbing heat from the sun for heating water placed in the tub;

an insulating cover for closing off the tub, said cover being substantially clear to allow penetration of the sun's rays and having insulating qualities to keep the heat thereunder;

at least a pair of longitudinally extending sections, each having a series of holes formed therein for allowing air forced therethrough to penetrate into said water-holding chamber to create bubbles;

said first, second and third ribs defining a pair of upper longitudinally extending spaces therebetween at a lower elevation than the upper surface portions of the convex shapes of said ribs, said pair of longitudinally extending sections being mounted in said pair of longitudinally extending spaces such that said series of holes of each said section lies in a plane spaced below the the upper surface portions of the convex shape of said ribs so that a bather does not block the escape of air through said series of holes.

**4,744,113**

## TOILET TRAINING AID AND METHOD

Judy J. Kogut, 147 All Angels Hill Rd., Wappingers Falls, N.Y. 12590

Filed Apr. 21, 1986, Ser. No. 853,989
Int. Cl.[4] A47K *17/00, 13/18, 13/14*
U.S. Cl. 4—661 6 Claims



1. A training aid for use with a toilet, comprising:

a disposable sheet of liquid permeable, porous paper having means for liquid activated viewing and for permitting visual observation of a normally latent graphic design

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therein that is not visible when said sheet is dry and is only visible when said sheet is wet, said sheet having a size and shape to fit over the mouth of said toilet; and

means for attaching said sheet of paper over the mouth of the toilet bowl to the rim thereof such that said sheet becomes wetted by a child urinating thereon wherein said graphic design becomes visible thereby attracting the attention of the child, said disposable sheet of liquid permeable, porous paper having sufficient porosity to permit the passage of liquid urine therethrough while maintaining sufficient integrity to permit visible observation of said graphic design.

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**4,744,114**

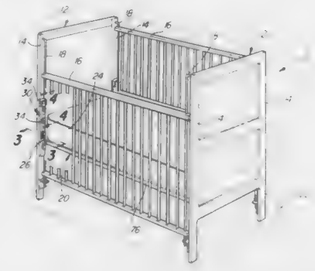
**CRIB CONSTRUCTION INCLUDING HANGER BRACKET**

**Danny Simpson, Seymour; William S. Suvak, Salem, and Steven L. Speck, Seymour, all of Ind., assignors to Lear Siegler Seymour Corp., Seymour and Smith Cabinet Mfg. Co., Salem, both of, Ind., a part interest**

**Filed Nov. 7, 1986, Ser. No. 928,927**

**Int. Cl.[4] A47D** *9/00*

**U.S. Cl. 5—11** **28 Claims**



**1**. A crib assembly (**10**) comprising: a bedstead (**12**) including end post means (**14**) at each corner for supporting a spring frame (**20**) above a floor (**22**); spring frame means (**20**) for supporting a mattress (**24**) thereon; and hangers (**26**) connected to said spring frame means (**60**); and hanger support means (**30**) fixedly secured to each of said end post means (**14**) for supporting each of said hangers (**26**) at a position on said end post means (**14**), said hanger support means (**30**) including a base portion (**32**) and at least one hook (**34**) extending from said base portion (**32**) and defining a hanger receiving space (**40**) between said hook (**34**) and said base portion (**32**); and releasable hanger retaining means (**42**) extending from said base portion (**32**) towards said hook (**34**) and over said hanger receiving space (**40**) for releasably retaining said hangers (**26**) on said hook (**34**) and within said hanger receiving space (**26**); said hanger retaining means (**42**) including an arm portion (**44**) having a neutral position wherein said arm (**44**) extends from said base portion (**32**) to said hook (**34**) and over said hanger receiving space, said arm (**44**) being pivotally connected relative to said base portion (**32**) for being forced into said hanger receiving space (**40**) during insertion of a hanger (**26**) into said space (**40**), said hanger retaining means (**42**) further including biasing means for biasing said arm (**44**) back towards said neutral position, said assembly (**10**) including abutment means for abutting against said arm (**44**) when said arm (**44**) is in said neutral position and preventing said arm (**44**) from pivoting away from said base portion (**32**) beyond said neutral position.

**4,744,115**

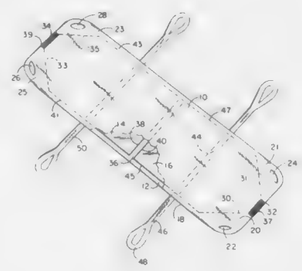
**PATIENT MOVER**

**Robert L. Marchione, 38 Kenrick St., Brighton, Mass. 02135**

**Filed Aug. 24, 1987, Ser. No. 88,966**

**Int. Cl.[4] A61G** *7/08, 1/00*

**U.S. Cl. 5—81 R** **3 Claims**



**1**. An apparatus for moving a patient from one supporting surface to another supporting surface, comprising:

a first substantially rectangular rigid panel having two parallel sides and parallel outer and inner ends;

a second substantially rectangular rigid panel having two parallel sides and parallel outer and inner ends positioned with its inner end aligned with and spaced apart a short distance from the inner end of said first panel;

a lower cover sheet of substantially rectangular low-friction material of a size when placed under said first and second panels as to extend beyond the sides and ends of said panels when aligned thereunder, said cover sheet having rounded corners;

an upper cover sheet of material substantially the size of said lower cover sheet positioned on top of said first and second panels, said upper and lower cover sheets being attached to one another at their periphery beyond the sides and edges of said first and second panels and through the space defined between the inner ends of said panels;

the corners of the outer ends of said first and second panels being cut to form angular edges allowing portions of said cover sheets to contact one another at such outer end corners to form cover sheet spatial contact areas which have no panel members therebetween;

four hand-hold apertures each defined at the corners of said device in said cover sheet spatial contact areas, said hand-holds adapted for grasping by the user; and

a pair of releasable mating attachment means each positioned at both ends of a cover sheet and at the outer ends of each panel between the areas of the panel angular edge cuts, said apparatus being adapted to fold at a seam formed between said first and second panels, said seam being formed by said upper and lower cover sheets where they extend over the space defined between the inner ends of said first and second panels, said device further adapted for said attachment means to mate and releasably hold said folded structure together when folded along said seam for storage and handling of said device, said attachment means being releasable for said device to be unfolded for usage.

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**4,744,116**

**STRETCHER**

**Masoud M. Shirazi, Flat 3, 23 St. Peters Road, Leicester, LE2 1DF, Leicestershire, England**

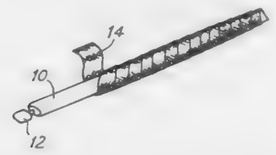
**Filed Dec. 10, 1986, Ser. No. 940,054**

**Claims priority, application United Kingdom, Dec. 14, 1985, 8530843**

**Int. Cl.[4] A61G** *1/00*

**U.S. Cl. 5—82 R** **11 Claims**

**1**. A pole for a stretcher comprising a foraminous tube impregnated with a fluid-curable resin, a fluid-impervious outer tube, containing the foraminous tube, means for inflating the



foraminous tube and means for introducing resin-curing fluid into the formanimous tube.

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**4,744,117**

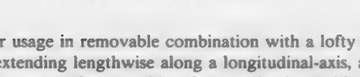
**PROP-LIKE POSITIONING DEVICE FOR HEMISIDE RECLINING PERSONS**

**Helen Inez Bond, Rural Route #1, Fremont, Dodge County, Nebr. 68025**

**Continuation-in-part of Ser. No. 651,346, Sep. 17, 1984, abandoned, which is a continuation-in-part of Ser. No. 422,824, Sep. 24, 1982, abandoned. This application Oct. 29, 1986, Ser. No. 924,363**

**Int. Cl.[4] A47C** *20/00, 20/02*

**U.S. Cl. 5—431** **19 Claims**



**1**. For usage in removable combination with a lofty pillow means extending lengthwise along a longitudinal-axis, a launderable support that provides, in combination with a said pillow means, a prop-like positioning device for a directionally longitudinally reclining person, said launderable support comprising:

(A) a flexible fabric apron member extending directionally laterally lengthwise along a substantially horizontal lateral-axis, said apron having a pair of broad planar surfaces including a lower-surface adapted to be superimposed upon a horizontal reclining surface and an upper-surface adapted to support in transversely extending relationship thereto the longitudinally extending torso of a hemiside reclining person;

(B) a longitudinally extending flexible casing adapted to removably surround a said pillow means loftily overlying said apron member and being attached to said underlying apron member along a vertical plane extending substantially along said longitudinal-axis; and

(C) longitudinally extending pockets-forming sheeting means intervening between the attached apron and casing, said pockets-forming sheeting means on at least one lateral side of the casing providing a plurality of longitudinally extending distinct pockets, each of said distinct pockets being vertically-open and having two longitudinally separated closed ends, whereby for a hemiside reclining person facing away from said pillow means casing, at least two said laterally sequentially spaced distinct pockets intervene between the person's spinalside and the pillow means casing.



**4,744,118**

**DISPOSABLE FITTED CRIB OR BED SHEET**

**Audrey T. Lunt, 6371 Vermont Hill Rd., South Wales, N.Y. 14139**

**Continuation-in-part of Ser. No. 932,612, Nov. 20, 1986, Pat. No. 4,704,753. This application May 4, 1987, Ser. No. 45,288**

**Int. Cl.[4] A47G** *9/00*

**U.S. Cl. 5—487** **5 Claims**



**1**. A fitted sheet for covering a standard crib or bed mattress having predetermined length, width and height dimensions, said sheet being developed from a single rectangular blank of non-woven, synthetic plastic fabric material which is ultrasonically sealable whose sides are folded in along parallel longitudinal fold lines to form a folded-in sheet whose width substantially corresponds to that of the mattress and whose length exceeds that of the mattress to an extent necessary to define the ends of the fitted sheet, the blank being cut from a continuous web after it has run through a folding station to fold in the sides, each corner of the folded-in sheet being thereafter ultrasonically seamed simultaneously in an ultrasonic seaming station along a diagonal line to form a triangular flap which, when the sides of the folded-in sheet are folded over the sides of the mattress, defines a right angle corner that fits against the corresponding corner of the mattress, the flap then lying against the end of the fitted sheet.

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**4,744,119**

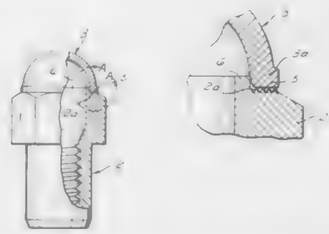
**METHOD OF MAKING A TWO-PIECE CAPPED LUG NUT**

**Shigeru Omori, Unagidani Mishinomachi, Minamiku, Osaka, Japan**

**Continuation of Ser. No. 799,396, Nov. 19, 1986, abandoned. This application Mar. 19, 1987, Ser. No. 27,625**

**Int. Cl.[4] B21D** *53/24*

**U.S. Cl. 10—86 C** **6 Claims**



**1**. A process for making a two-piece capped nut from a nut having a horizontal top surface and a cap having a bottom edge, which comprises the steps of:

(a) forming serrations on said horizontal top surface of the nut to be capped;

(b) forming a centering projection on said top surface of said nut;

(c) assembling said cap to said nut, said cap having a bottom opening complementary to said centering projection of

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said nut, to center said cap onto said nut, the bottom edge of said cap resting on said serrated top surface of said nut; and

(d) welding said cap onto said nut, under pressure along the adjacent bottom edge of said cap and said serrated top surface of said nut, whereby molten metal produced during the welding operation flows only into the serrations of said top surface to create a relatively strong weld.

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**4,744,120**

## SHOE SUPPORT FOR SHOE UPPER CONFORMING MACHINE

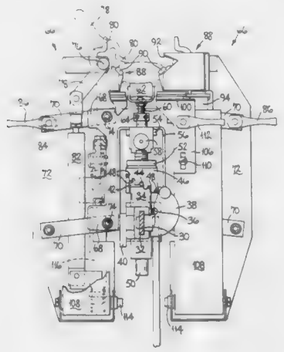
**Marinus E. Schuurmans, Waalwijk, Netherlands; Frank Bramley, Glenfield, and Kingsley J. Tutt, Birstall, both of United Kingdom, assignors to British United Shoe Machinery Limited, Leicester, England**

**Filed Mar. 6, 1987, Ser. No. 22,853**

**Claims priority, application United Kingdom, Mar. 8, 1986, 8605766**

**Int. Cl.[4] A43D** *21/12, 21/16*

**U.S. Cl. 12—105** **26 Claims**



1. A shoe support for supporting a shoe, comprising an upper on a last, for a shoe upper conforming operation to be performed thereon, said support comprising:

shoe holding means by which the forepart portion of the shoe can be held, said shoe holding means comprising a toe pad and presser means engagable with the shoe bottom for co-operating with said toe pad, and

gripper means by which the upper of the shoe thus clamped can be drawn heightwise about the last in a direction away from the last bottom and also lengthwise in a direction away from the heel end of the shoe thus to tension the upper about its last, wherein the gripper means comprises two grippers arranged at opposite sides of the shoe, and the presser means comprises two presser members, one associated with each gripper,

and wherein each presser member is mounted for movement in a direction heightwise of the shoe on a support which is itself also mounted for movement in a direction heightwise of the shoe, said support also supporting the gripper associated with the presser member for movement relative to the latter in a direction lengthwise of the shoe, the shoe support also comprising

first power means for effecting heightwise movement of the presser member to bring it into engagement with a shoe bottom and thereafter, through its mounting on the support, for effecting heightwise movement of said support, and thus of the associated gripper, and

second power means for effecting movement of the gripper lengthwise of the shoe.

**4,744,121**

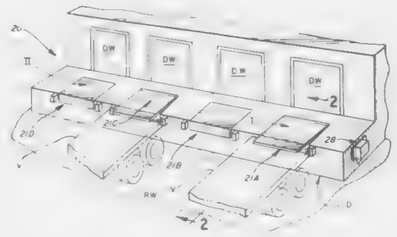
## LOADING DOCK AND HYDRAULIC SYSTEM THEREFOR

**Michael A. Swessel; Lynn O. Grunewald, both of Cudahy, and Norbert Hahn, So. Milwaukee, all of Wis., assignors to Rite-Hite Corporation, Milwaukee, Wis.**

**Filed Feb. 20, 1987, Ser. No. 17,316**

**Int. Cl.[4] E01D** *1/00*

**U.S. Cl. 14—71.7** **4 Claims**



1. In a loading dock installation having a plurality of separate relatively spaced dock levelers operable independently of one another, each leveler including a hingedly mounted ramp, an extension member hingedly mounted on a peripheral segment of the ramp adjacent a front wall of the loading dock for movement between an extended position and a normally depending position, and hydraulically actuated power means associated with each ramp and the extension member connected thereto for effecting selective movement of the ramp from a substantially horizontal cross-traffic position wherein the extension member is in the normal depending position to a predetermined upwardly inclined position whereupon the extension member is hydraulically actuated to the extended position; the improvement comprising a hydraulic system having a common source of pressurized hydraulic fluid in communication with all of said dock levelers and remotely located relative thereto; a primary high pressure hydraulic line means extending from said source to each leveler; and an independently adjustable control valve means for each leveler interposed said primary high pressure hydraulic line means and the power means for said leveler and associated extension member, said valve means including a primary valve having a first port communicating with said primary high pressure hydraulic line means, a second port communicating with a ramp sequence valve, the latter being adapted to communicate with the ramp power means of a selected leveler, and a third port adapted to communicate with a drain line, said control valve means normally assuming a first position of adjustment wherein said second and third ports are interconnected and said first port is blocked, each control valve means being adapted to be selectively moved independently to a second position of adjustment wherein said first and second ports are interconnected and said third port is blocked whereby the power means of the selected leveler is actuated effecting independent movement of the ramp thereof to the predetermined upwardly inclined position and movement of the extension member to an extended position when the ramp assumed a predetermined upwardly inclined position.

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**4,744,122**

## SCRUBBING APPARATUS FOR VEHICLES

**Carl C. Beer, Philadelphia, Pa., and Sherman L. Larson, Palmyra, N.J., assignors to Sherman Industries, Inc., Palmyra, N.J.**

**Filed Jan. 14, 1987, Ser. No. 3,130**

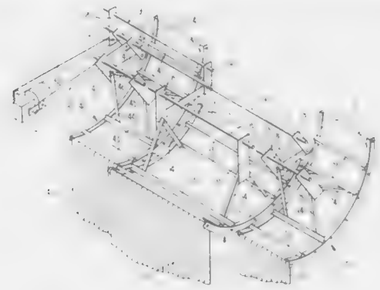
**Int. Cl.[4] B60S** *3/04*

**U.S. Cl. 15—97 B** **11 Claims**

1. Scrubbing apparatus for vehicles comprising a frame having an open passageway therethrough for a vehicle, at least



three scrubbing baskets supported in transverse side-by-side relation on said frame above said passageway defining one inner basket and two outer baskets, each of said scrubbing baskets including a pair of lengthwise spaced-apart members supporting in depending position therefrom a plurality of transverse scrubbing curtains arranged in generally parallel spaced



relationship lengthwise of the apparatus, means pivotally supporting each basket at an overhead pivot point for swinging oscillatory lengthwise movement, reciprocatory members attached to said baskets, and motor drive means for so driving said reciprocatory members that the oscillations of said inner basket are out of phase with the oscillations of said two outer baskets, said outer baskets oscillating in phase with each other.

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**4,744,123**

## DEVICE FOR SCRAPING THE OUTER SURFACE OF A TUBE

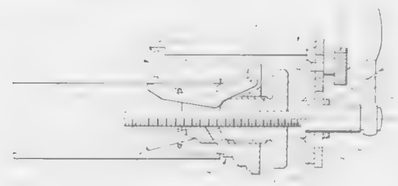
**Patrick Le Testu, Saint Pierre d'Irube; Dominique Pfeiffer, Nanteuil le Haudoin; Michel Cochetel, Savigny sur Orge, and Jean-Michel Longeau, Villeneuve sur Yonne, all of France, assignors to Gaz de France, Paris and Sensco S.A.R.L., Sens, both of, France**

**Filed Sep. 15, 1986, Ser. No. 907,427**

**Claims priority, application France, Sep. 19, 1985, 85 13902**

**Int. Cl.[4] B08B** *9/02*

**U.S. Cl. 15—104.04** **5 Claims**



1. A device for scraping at least a portion of the outer circumferential surface at and near the end of a pipe having a circular or essentially circular cross-section, said device comprising:

an expansible chuck for coaxially securing said device at said end of said pipe;

a drive shaft coaxially mounted on said chuck;

a plate member immovably secured to and perpendicular to the axis of said drive shaft;

a movable disc member movably mounted adjacent to and parallel to said plate member;

securing means for securing said disc member to said plate member in a plurality of radially adjustable positions;

operating and adjustment means secured to said disc and extending essentially parallel to said drive shaft for placement near said outer surface of said pipe; and

scraping means mounted on said operating and adjustment means, said scraping means comprising a scraping blade, feeler means for contacting the outer surface of said pipe, and a bevelling blade for bevelling said end of said pipe.

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**4,744,124**

## MUSIC TOOTH BRUSH

**Kuo-Hsien Wang; Feng-Lin Huang, and Wuein-Hwa Ho, all of Keelung, Taiwan, assignors to Tech Zeal Industrial Company, Ltd., Taiwan**

**Filed Jan. 27, 1987, Ser. No. 6,762**

**Int. Cl.[4] A46B** *9/04*

**U.S. Cl. 15—105** **2 Claims**




1. A music tooth brush comprising:

a brush hair stock having a hollow portion therein, a grip handle bar attached to the brush hair stock for holding the stock;

a touch switch in the hollow portion; the touch switch including an upper touch plate and a stationary contact surface normally spaced from the upper touch plate; the upper touch plate and the stationary contact surface being movable together into contact; the upper touch plate having a bent, arcuate, elastic back;

a music IC connected with the contacting upper touch plate for being actuated by the contacting of the upper touch plate with the stationary contact surface; a sound generating plate connected with the music IC for being operated as the music IC is actuated; and a battery connected with the music IC and the sound generating plate for powering them;

the hollow portion having an opening; a protrusion extending from the opening of said hollow portion exteriorly of the opening; the arcuate, elastic back being directly pressed by the protrusion from the opening; and

a brush hair board having a top side carrying hair and having a bottom; means for positioning the bottom of the brush hair board for enabling the hair board to be moved, by pressure applied to the hairs, for the hair board to move the upper touch plate and the contact surface into contact, and the arcuate back normally pushing the contact surface and upper touch plate apart, wherein the positioning means comprises a plurality of positioning pins and a corresponding plurality of positioning openings inside the brush hair board, the positioning pins locating the brush hair board at an initial position furthest removed from the stationary contact surface, and wherein a contact is provided on the upper touch plate and is arranged so that when pressure is applied to the hairs, the contact on the upper touch plate engages the lower stationary contact surface, thereby closing a circuit including the IC, the battery, and the sound-generating plate to generate sound.

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**4,744,125**

## DOOR CLOSER TRANSMISSION INCLUDING AN ECCENTRIC PINION

**Georg Scheck, Tiefenbronn; Ralf Storandt, Leonberg, and Fritz Feucht, Renningen, all of Fed. Rep. of Germany, assignors to GEZE GmbH, Fed. Rep. of Germany**

**Filed Jul. 3, 1986, Ser. No. 881,819**

**Claims priority, application Fed. Rep. of Germany, Jul. 5, 1985, 3524185; European Pat. Off., Apr. 28, 1986, 86105855.0**

**Int. Cl.[4] E05F** *3/14*

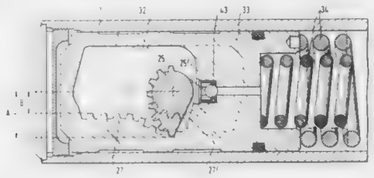
**U.S. Cl. 16—53** **6 Claims**

1. In a door closer comprising a housing; a piston guided in said housing for linear movement therein over a predetermined

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range; spring means for biasing said piston into an end position, a closer axle; means rotatably journalling said closer axis in said housing; coupling means mechanically coupling said piston to said closer axle and including first and second meshing gears, with said first gear being drivingly coupled to said closer axle and said second gear being drivingly coupled to said piston, whereby rotary movement of said closer axle during door opening produces linear movement of said piston and stressing of said spring means, with the stress of said spring means depending on the position of said piston within said predetermined range; wherein said first gear is an eccentric toothed pinion having a first rolling curve providing a lever arm which varies in dependence on the rotational position of said first gear; wherein said second gear has a second rolling curve complementary to said first rolling curve, and wherein said meshing first and second gears provide a transmission ratio which varies as a result of said varying level arm over said



range of linear movement of said piston thereby providing, in conjuction with the instantaneous value of said stress, a predetermined door closing characteristic, the improvement wherein said rolling curve of said eccentric toothed pinion comprises first, second and third curcular portions which merge directly into one another, with each said circular portion having a different respective radius and a different respective origin and with said origins of said circular portions being displaced relative to one another; and wherein said first rolling curve portion is associated with a largest angle of opening of the door closer, has a first radius and is followed by said second rolling curve portion which has a second radius substantially greater than said first radius and which continues said first rolling curve portion, and wherein said third rolling curve portion adjoins and continues said second rolling curve portion, is associated with smaller opening angles of said door closer and has a third radius which is smaller than the radius of said first rolling curve portion.

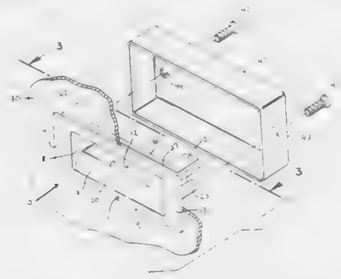
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**4,744,126**

**COMBINED PULL AND CARRY HANDLE**

**Robert H. Bisbing, Springfield, Pa., assignor to Southco, Inc., Concordville, Pa.**

**Filed Oct. 30, 1986, Ser. No. 925,743**
**Int. Cl.[4] B25G *1/00***
**U.S. Cl. 16—124** **11 Claims**



**1**. A combined pull and carry handle comprising:
(a) a one-piece rectangular part of molded plastic construction having a face portion, a pair of side walls in spaced-apart relation rearwardly extending from said face portion at substantially right angles to the plane of said face portion, a beveled wall extending upwardly and rearwardly from said face portion and terminating in a rearwardly extending bottom wall, said bottom wall being connected to said side walls and forming substantially right angles therewith, wherein the plane of said bottom wall is substantially perpendicular to the plane of said face portion, an upper surface comprising a cross-bar disposed adjacent to said face portion having a channel therein disposed in parallel spaced relation to said face portion, said side walls having outwardly turned appendages at the upper edge thereof, said appendages being disposed coplanar with the upper surface of said face portion and said cross-bar, a pair of cylindrical member rearwardly extending from a rear surface of said face portion and substantially parallel to said side walls, a bore in each of said cylindrical members, wherein said one-piece part has a opening therethrough defined by said cross-bar, said side walls, said bottom wall and said beveled wall; and
(b) a rectangular metal cap having a pair of holes therein corresponding in location to said cylindrical members of said one-piece part, said cap being larger than said one-piece part in the vertical direction, and being secured to said one-piece part by a pair of screws disposed through said holes in said cap and in threaded engagement with the bore of said cylindrical members of said one-piece part.

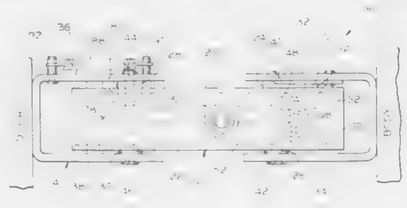
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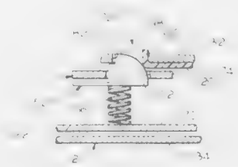
**4,744,127**

**DOOR HINGE**

**Cami L. Shadley, Jackson, Mich., assignor to ITT Corporation, New York, N.Y.**

**Filed Aug. 11, 1986, Ser. No. 895,046**
**Int. Cl.[4] E05D *15/50, 3/08***
**U.S. Cl. 16—232** **9 Claims**





**1**. A hinge comprising:
a first mounting bracket adapted to be fixed to a support body and a second mounting bracket adapted to be fixed to a door;
an intermediate member, one end of the intermediate member being pivotably mounted to said first mounting bracket for relative rotation about a first pivot axis and the other end of the intermediate member being pivotably mounted to said second mounting bracket for relative rotation about a second pivot axis; and
locking means for locking said intermediate member to said second mounting bracket when said intermediate member pivots about said first pivot axis between a closed position and an intermediate position and for locking said intermediate member to said first mounting bracket when said second mounting bracket pivots about said second pivot axis between the intermediate position and a fully open position, said locking means having releasing means for unlocking said intermediate member from the mounting bracket to which it is locked at the intermediate position whereby said intermediate member and said second mounting bracket can pivot about the first pivot axis between the closed and intermediate position and the second mounting bracket can pivot about the second pivot axis between the intermediate and fully open positions.



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**4,744,128**

**APPARATUS FOR MOLDING A FOOD PRODUCT**

**Hiroji Ikeuchi, and Kiyoaki Ikeuchi, both of Akashi, Japan, assignors to Kabushiki Kaisha Ikeuchi Tekkosho, Akashi, Japan**

**Filed Jul. 27, 1987, Ser. No. 78,261**
**Claims priority, application Japan, Jan. 6, 1987, 62-815**
**Int. Cl.[4] A22C *7/00***
**U.S. Cl. 17—32** **6 Claims**



**1**. Apparatus for molding a food product, comprising two mold halves having opposite ends, each of said halves further having inner and outer surfaces, said inner surfaces having mold cavities formed therein, cam means for securing together said ends of said halves, and each of said halves having a tensioned rod mounted thereon on said outer surface, said rods having ends secured to said opposite ends of said halves and engaging said outer sides of said halves between said outer ends.

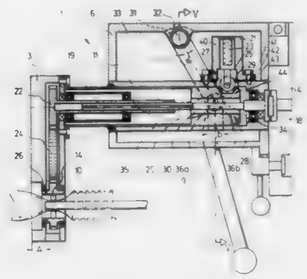
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**4,744,129**

**HOLDING DEVICE**

**Hans-Ernst Weerth, Ränkle, Fed. Rep. of Germany, assignor to Albert Handtmann Maschinenfabrik GmbH & Co. KG, Biberach an der Riss, Fed. Rep. of Germany**

**Filed Jan. 16, 1987, Ser. No. 3,797**
**Claims priority, application Fed. Rep. of Germany, Jan. 31, 1986, 3603001**
**Int. Cl.[4] A22C *11/10***
**U.S. Cl. 17—33** **13 Claims**



**1**. A machine for filling sausage into an endless sausage skin and for twisting off individual sausages comprising a twist-off nozzle over which the sausage skin is fed, gear means for rotating the nozzle, a brake ring, a brake ring housing rotatably supporting the brake ring around the free end of the twist-off nozzle in its operating position, gear means in the housing for rotating the brake ring in synchronism with the speed of rotation of the twist-off nozzle, and displacement means for mounting said brake ring housing to the machine for movement of the brake ring toward and away from its operating position so that the free end of the nozzle is freely accessible, said displacement means comprising a guide tube mounted to the machine, a support tube connected to the brake ring housing and rotatably and slidably mounted in the guide tube, a guide plate mounted to the guide tube and having two opposed guiding edges, at least two guide elements adjustably mounted on the support tube so that one element is guided by one edge of the guide plate and the other element by the opposite guide edge so that the guide elements are guided by the guide plate in a play free manner, said guiding edges having a first section where movement of the guide elements along the edges carries out a first longitudinal displacement movement of the support tube relative to the guide tube and of the brake ring away from the nozzle and a second section where further movement of the guide elements along the edges carries out a combined longitudinal and pivotal movement of the support tube relative to the guide tube and of the brake ring relative to the nozzle, and a lever mounted to the machine and acting on the support tube for translating the guide elements along the edges of the guide plate.

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**4,744,130**

**METHOD AND DEVICE FOR PRODUCING A CONE-SHAPED MEAT PRODUCT**

**Moshe N. Epstein, Olympia Fields, and Peter Parthenis, Inverness, both of Ill., assignors to Grecian Delight, Inc., Rosemont, Ill.**

**Filed Feb. 17, 1987, Ser. No. 15,368**
**Int. Cl.[4] A22C *7/00***
**U.S. Cl. 17—45** **13 Claims**



**13**. A method of producing a frusto-conical shaped meat product having a varying cross-sectional diameter wherein there is a means for supplying ground meat under pressure into a frusto-conical mold casing that can be opened to remove said ground meat, said mold casing conforming to the shape and cross-section of a desired meat product, and a pneumatic inflatable resilient piston that slidably and sealingly engages the inner sides of the mold casing as meat supplied to said casing and forces the mold casing to move relative to said flexible resilient piston from a first position to a second position where said piston is removed from said mold casing, comprising the steps of:
supplying ground meat to bags under pressure;
supporting and encasing the bag in said frusto-conical mold casing;
inflating said resilient inflatable piston when initiating supplying of said ground meat to said mold casing, causing said mold casing to move axially and relative to said inflatable resilient piston from said first position to said second position in order to allow said ground meat to fill up said bag and conform to the inner periphery of said mold casing,
tightly packing the ground meat in said mold casing by

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keeping said resilient inflatable piston sealingly and slidably biased against and conforming to the inner periphery of said mold casing as said meat is being fed to the mold casing under pressure, and opening said mold casing whereby said meat is removed therefrom.

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**4,744,131**

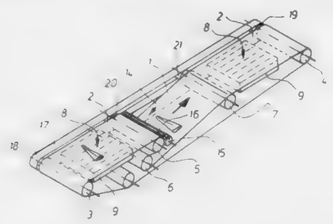
## APPARATUS FOR HANDLING FISH FILLETS FOR THE PURPOSE OF QUALITY INSPECTION

**Franz Hartmann, Bad Oldesloe, and Klaus Matern, Lübeck, both of Fed. Rep. of Germany, assignors to Nordischer Maschinenbau Rud. Baader GmbH+C KG, Lubeck, Fed. Rep. of Germany**

**Division of Ser. No. 881,119, Jul. 2, 1986, Pat. No. 4,706,336. This application Oct. 8, 1987, Ser. No. 106,857**

**Int. Cl.[4] A22C** *25/00*

**U.S. Cl. 17—55** **19 Claims**



1. An apparatus for handling fillets of fish for the purpose of detecting fillet deficiencies in the form of at least one of processing faults and parasites (numatodes) by visual inspection, said apparatus comprising;

a fillet supporting surface;

said fillet supporting surface being light transparent and having a low light absorption;

at least one light source below said fillet supporting surface;

a screen below said fillet supporting surface;

said screen including means to permit said at least one light source to illuminate an underside of said fillet supporting surface and to prevent direct passage of light therefrom to a position alongside said fillet supporting surface, such that looking at said apparatus from a position alongside said fillet supporting surface leave said at least one light source concealed from direct sight, whereby said fillets appear as bright objects against a darker background.

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**4,744,132**

## LOCK RING ASSEMBLY AND DISASSEMBLY METHOD

**George O. Greene, Glenpool; Jimmy G. Foster, and Jim Hein, both of Tulsa, all of Okla., assignors to Unit Rig & Equipment Company, Tulsa, Okla.**

**Filed Nov. 10, 1986, Ser. No. 928,834**

**Int. Cl.[4] B23P** *19/00*

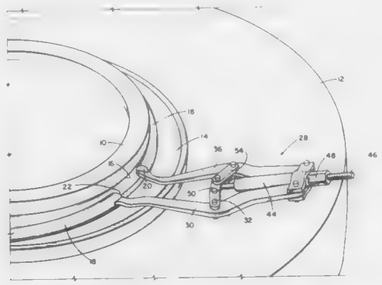
**U.S. Cl. 29—426.6** **2 Claims**

1. With a wheel rim having a removeable tire receiving flange thereon, the rim having a circumferential recess therein and a split lock ring having juxtaposed ends, the lock ring being removeably positionable in said recess providing means, when the lock ring is in place in the recess, of retaining the flange on the rim and when the lock ring is removed from said recess of permitting the flange to be removed from the rim, a method of permitting the safe and convenient removal of the lock ring from the rim circumferential recess, comprising:

providing slots in each of said ends of said lock ring, the slots being in a common plane, the bottom of each slot being concave;

positioning the forward end portions of an expansion tool simultaneously into the slots in the lock ring, the forward end portions having convex surfaces which matingly engage the concave bottom surfaces of the lock ring slots;

forcing the forward ends of the expansion tool apart, the convex portions thereof pivoting in the lock ring concave



notch bottom surfaces to expand the diameter of the lock ring; and

removing the expanded lock ring from the rim circumferential recess while the tool retains the lock ring in an expanded diameter condition.

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**4,744,133**

## FLUID-TIGHT SLIDE FASTENER STRINGER

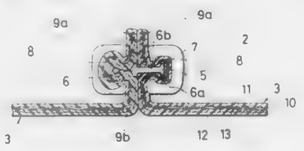
**Noritaka Tsubata, Uozu; Koichi Tanikawa, Toyama, and Kozo Watanabe, Kurobe, all of Japan, assignors to Yoshida Kogyo K. K., Tokyo, Japan**

**Filed Mar. 11, 1987, Ser. No. 24,531**

**Claims priority, application Japan, Mar. 14, 1986, 61-37979[U]; Mar. 18, 1986, 61-39607[U]**

**Int. Cl.[4] A44B** *19/32*

**U.S. Cl. 24—389** **4 Claims**



1. A fluid-tight slide fastener stringer comprising:

(a) a fluid-tight tape including a ground fabric of textile material as a core, and front and rear fluid-tight layes of elastic material covering front and rear surfaces of said ground fabric;

(b) a series of discrete coupling elements mounted on said tape along an inner longitudinal margin thereof, each of said coupling elements having a generally I shape having a base portion, a leg poriton and a head portion;

(c) said inner longitudinal margin of said tape being folded so as to provide therealong first and second contact portions engageable with corresponding first and second portions of a fluid-tight tape of a like companion stringer to effect a fluid-tightness between such two tapes, and a folded portion disposed between said first and second contact portions and extending around said base portion of each of said coupling elements;

(d) a series of generally C-shaped clamping strips each surrounding in clenched form said folded portion of said tape over said base portion of a respective one of said coupling elements; and

(e) said tape having a formed layer as a component of said elastic material extending in and through at least said first and second contact portions and said folded portion, said foamed layer being disposed at least in said rear fluid-tight layer at an inner side thereof in contact with said rear surface of said fabric.



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**4,744,134**

## SAFETY BELT BUCKLE, PARTICULARLY FOR AUTOMOBILES

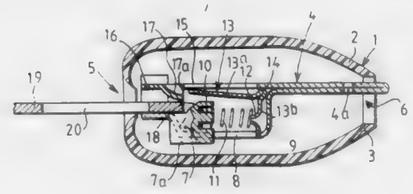
**Joseph Bétencourt, Point-De-Roide, France, assignor to Aciers et Outillage Peugeot, Audincourt, France**

**Filed Nov. 18, 1986, Ser. No. 931,833**

**Claims priority, application France, Nov. 20, 1985, 85 17172**

**Int. Cl.[4] A44B** *11/25*

**U.S. Cl. 24—653** **7 Claims**



1. A buckle particularly for an automobile safety belt, intended to fix in a movable manner a side thereof to a fixed point of the body of the vehicle, comprising a hook assembly and a bolt (**19**) connected to the side to be fixed, the hook assembly comprising housed in a housing (**1**), a body (**4**) intended to be fixed to a holding means connected to the vehicle, which defines a passage and a sliding plane for said bolt, means for locking the bolt in the buckle, composed of a part (**17**) projecting from body (**4**) extending into said passage and intended to be engaged in a cavity (**20**) of bolt (**19**) in the locked position thereof, bolt release control means, means for ejection thereof and means (**7**) for holding the bolt (**19**) in the locked position on said projecting part (**17**) of the body (**4**), composed by a slider (**7**) mounted to be movable by said bolt during its introduction into body (**4**) in the general direction of movement of the bolt, said slider being acted upon a resilient recall component (**11**) and cooperating in the locked position of the bolt with body (**4**) and a corresponding surface of the bolt to maintain same in position, under the action of said resilient component, said slider (**7**) being mounted to be be movable in said body (**4**) under the action of release control means between the holding position and a release position of the bolt, in which it cooperates with said ejection means to eject the bolt from the buckle, said ejection means being composed of said resilient recall component (**11**), one end of which takes support against the slider (**7**) and the other against a bolt release component (**13**) which is articulated in body (**4**) to release the bolt by disengaging the cavity (**20**) thereof from the projecting part (**17**) of body (**4**) following an action exerted on the slider (**7**) by the bolt release control means, wherein the release component (**13**) is composed by a component having two branches (**13***a*, **13***b*) extending at approximately 90° from one another, one of which (**13***b*) cooperates with the resilient component (**11**) and the other (**13***a*) with a corresponding surface of the bolt, in order to release same, and an articulation surface (**14**) cooperating with the body.

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**4,744,135**

## ALIGNMENT ADJUSTMENT TOOL FOR A VEHICLE DOOR

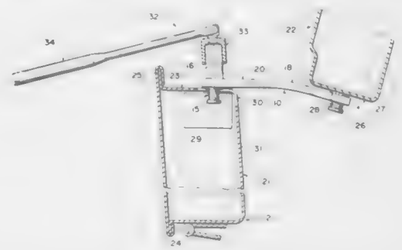
**Jacques Roels, 506 Pittsburg Avenue, Selkir, Manitoba, Canada R1A 0A9**

**Filed Dec. 1, 1986, Ser. No. 936,392**

**Int. Cl.[4] B23P** *19/04*

**U.S. Cl. 29—267** **6 Claims**

1. An alignment adjusting tool for use with a vehicle door in a vehicle of the type comprising a door mounted on vertical hinges along one side of an opening so as to pivot from an open position to close the opening, the opening including a face opposite the hinges and facing inwardly toward the hinges, a door lock striker pin extending outwardly from the face toward the hinges, the door including a face arranged with the door closed to lie closely adjacent and substantially parallel to said face of said opening and a lock recess in said face of said door for receiving said door lock striker pin into a lock mechanism within the door in a locking action, the tool comprising a first and a second side face, the tool member having an upper edge, a lower edge and a forward edge, a recess defined in said forward edge and shaped to be received onto said door lock striker pin at a base of the door lock striker pin adjacent said face so as to extend at least partly therearound a tool pin member rigidly mounted on and extending outwardly from said first



side face of the tool member at a position thereon spaced from said recess by a distance greater than the distance between said door lock striker pin and an outer edge of said face of said opening, said tool pin member being shaped substantially the same as the door lock striker pin so as to be engageable with said lock mechanism, said tool member being shaped such that with said recess engaged over said door lock striker pin, said tool pin member can engage into said lock mechanism and lever means including a first portion extending outwardly from said second side surface in a direction generally opposite to said tool pin member and a second portion extending from said position in a direction generally away from said forward edge and inclined from said first portion so as to intersect a straight line joining said recess and said tool pin member.

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**4,744,136**

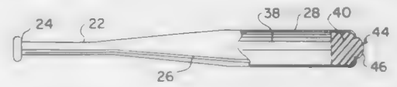
## PROCESS FOR MANUFACTURING END WEIGHTED BATS

**Ronald Foreman, Narberth, and Anthony Daddario, Limerick, both of Pa., assignors to Ten Pro Corporation, Pheonexville, Pa.**

**Continuation-in-part of Ser. No. 791,371, Oct. 22, 1985, abandoned, which is a continuation of Ser. No. 556,450, Nov. 30, 1983, abandoned. This application Nov. 17, 1986, Ser. No. 931,144**

**Int. Cl.[4] B23P** *11/02*

**U.S. Cl. 29—451** **14 Claims**



1. A method of making bats having a striking section for use in ball games, comprising the steps of:

forming a hollow metal tube;

placing a resilient and compressible weight plug into the tube, the weight plug having a resilient body, the body being dimensioned larger than the internal dimension of the hollow metal tube, the weight plug having a knob protruding therefrom toward a first end of the tube;

partially closing the first end of said tube and defining an end hole therein that is smaller than the protruding knob; and

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directing a stream of pressurized gas against the weight plug opposite the knob to force the weight plug against the partially closed first end, and
to force the said knob through the said end hole.

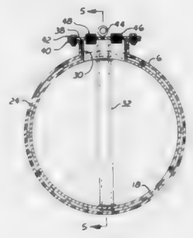
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**4,744,137**

## METHOD OF MAKING DOUBLE WALL STORAGE TANK FOR LIQUIDS

**David T. Palazzo, P.O. Box 290676, Tampa, Fla. 33687**

**Division of Ser. No. 884,481, Sep. 11, 1986, abandoned, and a continuation-in-part of Ser. No. 775,140, Sep. 12, 1985, Pat. No. 4,640,439, and a continuation-in-part of Ser. No. 818,258, Jan. 13, 1986, Pat. No. 4,644,627. This application Jun. 11, 1987, Ser. No. 43,634**
**Int. Cl.[4] B23P** *9/00*
**U.S. Cl. 29—455 R** **11 Claims**



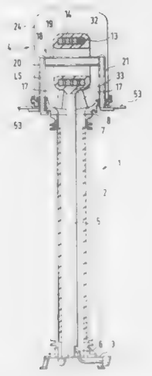
1. A method of manufacturing a rigid, double wall tank for storage of liquids from a rigid, single wall, cylindrical inner tank the outer surface of which has cylindrical sidewall portions of predetermined axial length and diameter and end portions extending generally transverse to said sidewall portions, said method comprising the steps of
forming a male mold having a cylindrical configuration generally similar to the configuration of said inner tank, with the cylindrical sidewall outer portions of said mold having a diameter greater than said inner tank sidewall diameter, said mold cylindrical sidewall surface having a plurality of depressions each extending generally radially inwardly of said mold sidewall outer portions an average distance generally equal to half the difference between said diameter of said mold sidewall outer portions and said inner tank diameter;
removably applying a moldable and hardenable material over said mold cylindrical sidewall portions and the depressions therein to form a substantially rigid sheath portion of a material that is substantially liquid tight and conforms generally to said mold sidewall surface and the depression therein, whereby is formed a cylindrical sheath portion having a generally cylindrical inner surface with a plurality of projecting extending generally radially inwardly thereof in general conformity with the mold depressions;
removing said cylindrical sheath portion from said mold;
introducing said cylindrical sheath portion over said inner tank with said projections engaging said inner tank cylindrical sidewall portions, whereby the radially inward projections of the sheath space the cylindrical inner surface of the cylindrical sheath portion from the outer surface of the inner tank to permit passage of liquid therebetween; and
applying to the axial extremities of said cylindrical sheath portion substantially rigid and liquid tight sheath end portions overlying said inner tank end portions and extending generally transverse to said cylindrical sheath portion, whereby is formed a liquid tight sheath enclosing the inner tank, thus defining a double wall tank.

**4,744,138**

## METHOD OF MANUFACTURING A HIGH-VOLTAGE CURRENT TRANSFORMER

**Norbert Preissinger, Litzendorf, and Teofil Bogdan, Bamberg, both of Fed. Rep. of Germany, assignors to MWB Messwandler-Bau Aktiengesellschaft, Bamberg, Fed. Rep. of Germany**

**Continuation of Ser. No. 929,513, Nov. 12, 1986, Pat. No. 4,701,738. This application Aug. 11, 1987, Ser. No. 83,825**
**Claims priority, application Fed. Rep. of Germany, Nov. 15, 1985, 3540547; Mar. 13, 1986, 3608391**
**Int. Cl.[4] H01F** *7/06*
**U.S. Cl. 29—606** **1 Claim**



1. Method for manufacturing a high-voltage current transformer comprising:
mounting a secondary system, which comprises at least one annular core with a secondary winding, on a sealing plate;
positioning a U-shaped primary lead through said annular core with the base of the primary lead running at least approximately parallel to the axis of said core and mounting at least one of the legs of said primary lead extending through an opening in the sealing plate and connecting it seal tight as well as permanently with the sealing plate, whereby the base of the primary lead comes to rest centrally with respect to said core;
mounting said sealing plate with assembled secondary system and primary lead sealed tight on an insulating column with secondary leads connected in a plug-in manner to a lead tube in the column; and,
securing a hood over said secondary system and primary lead to said sealing plate in a seal tight and permanent fashion.

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**4,744,139**

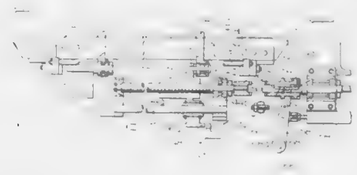
## APPARATUS FOR AUTOMATICALLY ADJUSTING THE WORKTABLE OF AN ELECTRONIC COMPONENTS INSERTION MACHINE

**Keizo Shinano, Kodaira, and Yoshinobu Inoue, Hachioji, both of Japan, assignors to Citizen Watch Company, Ltd., Tokyo, Japan**

**Filed Feb. 14, 1986, Ser. No. 829,502**
**Claims priority, application Japan, Feb. 15, 1985, 60-19035[U]**
**Int. Cl.[4] H05K** *3/30*
**U.S. Cl. 29—741** **7 Claims**

2. An apparatus for automatically fixing a printed circuit board by use of positioning pins to a predetermined position on a movable worktable disposed in association with an insertion head of an electronic components insertion machine, comprising:
reference positioning pin means to be fixed in a first reference hole formed at one end of a printed circuit board fed onto said worktable;
shiftable positioning pin means to be fixed in a second reference hole formed at the other end of said printed circuit board;
means for actuating both said reference and said shiftable positioning pin means so as to be fixed in and released from said reference holes; and
means for automatically shifting said shiftable positioning pin means toward and away from said reference positioning pin means in response to a change in a size of said printed circuit board prior to feeding thereof onto said worktable, said automatic shifting means comprising origin point detecting means for detecting a point of origin of





said shiftable positioning pin means, a feed screw means meshed with said shiftable positioning pin means and rotated under numerical control for controlling a shifting movement of said shiftable positioning pin means, said feed screw means comprising a threaded screw member rotatably mounted on said worktable and having at an end thereof a mechanical coupling portion capable of being engaged with a numerically controlled drive source when said worktable is positioned at a predetermined position under said insertion head, an a guide means arranged in parallel with said screw member for guiding a shifting movement of said shiftable positioning pin means.

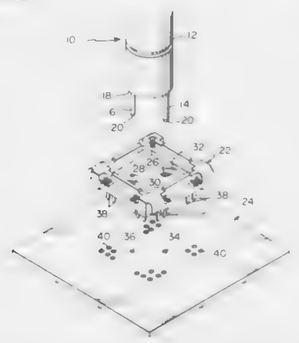
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**4,744,140**

## ALIGNMENT AND INSERTION TOOL FOR CONNECTORS

**Edward J. Bright, Elizabethtown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.**

**Filed Nov. 26, 1982, Ser. No. 444,404**
**Int. Cl.[4] H05K** *3/30*
**U.S. Cl. 29—741** **1 Claim**



1. An alignment and insertion tool for mounting connectors having depending leads onto printed circuit boards having lead-receiving holes, said tool comprising:
a. a handle; and
b. two pins mounted in and extending from an end of the handle in a predetermined spacing relative to each other, with each pin being dissimilar in diameter relative to the other, said spacing and diameters being identical to the spacing and diameters of holes extending through a connector and through a circuit board on which the connector is to be mounted so that upon inserting the pins through the holes in the connector and then inserting the pins into the holes on the circuit board, each lead depending from the connector is automatically in correct alignment with the proper lead-receiving hole in the circuit board into which it is to be received and which may then be inserted by pushing on the handle.

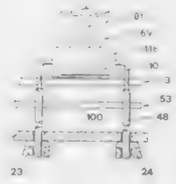
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**4,744,141**

## APPARATUS FOR AUTOMATICALLY INSERTING LEADS ON ELECTRICAL AND/OR ELECTRONIC COMPONENTS INTO CORRESPONDING HOLES IN A SUBSTRATE

**Mario Musiani, Bologna, Italy, assignor to Arcotronics Italia S.p.A., Bologna, Italy**

**PCT No. PCT/GB85/00529, § 371 Date Oct. 20, 1986, § 102(e) Date Oct. 20, 1986, PCT Pub. No. WO86/03369, PCT Pub. Date Jun. 5, 1986**
**PCT Filed Nov. 20, 1985, Ser. No. 923,837**
**Claims priority, application Italy, Nov. 20, 1984, 3628 A/84**
**Int. Cl.[4] H05K** *3/30*
**U.S. Cl. 29—741** **4 Claims**



1. An apparatus for inserting the leads of an electrical or electronic component having parallel leads into holes in a substrate comprising:
means for horizontally supporting the substrate at an operation location;
first and second carriages;
means for horizontally displacing said carriages towards and away from each other below the substrate, each of said carriages including:
a bushing
means for displacing said bushing upwardly into engagement with the substrate;
a needle,
said bushing including means for supporting said needle for vertical sliding movement relative thereto;
means for displacing said needle relative to said bushing from a lowered position below the top surface of said bushing to an elevated position a distance selected so that said needle will extend above the substrate when the bushing is engaging the substrate;
said bushing including an opening at the top thereof selectively configured so that the displacement of said carriage in a selected direction will result in the lead received by said opening and having a predetermined length will be bent up against the substrate.

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**4,744,142**

## CABLE GUIDE ASSEMBLY FOR USE WITH ELECTRICAL CONNECTOR APPLYING MACHINES

**Charles E. Shields, 655 Woodland, Crystal Lake, Ill. 60014**

**Filed Oct. 27, 1986, Ser. No. 923,768**
**Int. Cl.[4] H01R** *43/04;* **B23P** *19/00*
**U.S. Cl. 29—749** **7 Claims**

1. An apparatus for applying an electrical connector to flat multiconductor cable, which includes:
supply means for carrying and dispensing flat multiconductor cable;
drive means for receiving cable from the supply means delivering cable to a connector applying station;

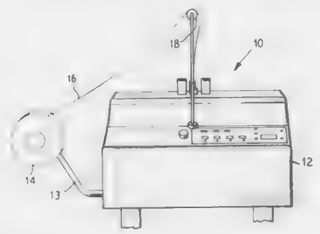
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a connector applying station including a pair of spaced sections for receiving connector sections and advancing and applying the connector sections to the cable; and

said drive means mounted in a housing positioned between the supply means and connector applying section;

wherein the improvement comprises there being further provided guide means for laterally positioning said cable in said




connector applying station between said sections, said guide means comprising entry guide means positioned between the supply means and the drive roller means for engaging the cable and providing lateral alignment and exit guide means positioned between the drive roller means and connector applying sections for engaging the cable and accurately laterally positioning the same.

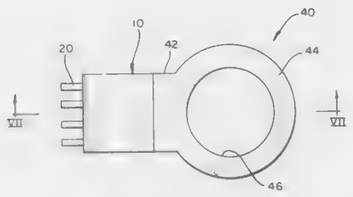
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**4,744,143**

**COVERING FOR AN ELECTRICAL CONNECTOR**

**Amir-Akbar Sadigh-Behzadi, Van Nuys, Calif., assignor to Thomas & Betts Corporation, Bridgewater, N.J.**

**Filed Apr. 25, 1986, Ser. No. 856,074**
**Int. Cl.[4] H01R *9/09*; H05K *3/30***
**U.S. Cl. 29—837** **7 Claims**




1. A method of sealing exposed portions of electrical elements of an insulative electrical connector housing from external environmental contact; said method comprising the step of:

forming a sealing member directly onto said housing and said exposed portions, said sealing member being non-adhesively bonded to said housing to admit ready removal of said sealing member from said housing.

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**4,744,144**

**OSCILLATING RAZOR**

**Charles M. Lowery, Sr., Bastrop, and Jimmie George, Mer Rouge, both of La., assignors to Wellington Investments, Inc., Dallas, Tex.**

**Filed Apr. 2, 1986, Ser. No. 847,305**
**Int. Cl.[4] B26B *21/38***
**U.S. Cl. 30—45** **12 Claims**

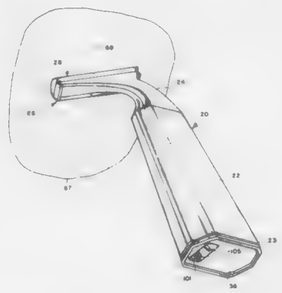
1. An oscillating razor for wet shaving comprising:

a rigid, elongated, generally tubular housing having an interior, a longitudinal central axis, a base portion, and a neck spaced apart from said base portion;

a spaced apart receptacle secured to said neck for mounting a standard blade cartridge to facilitate shaving;

eccentric means rotatably disposed within said tubular housing of said razor for vibrating same;

motor means disposed within said housing for rotating said eccentric means, said motor means establishing an axis of rotation generally aligned with with said central axis; and,



battery means disposed within said housing for powering said motor means, said battery means having a longitudinal axis which intersects said housing axis within said housing and which defines an acute angle greater than zero degrees between it and said housing axis.

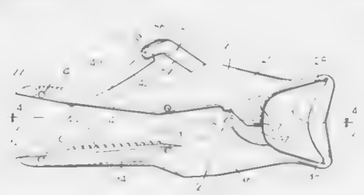
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**4,744,145**

**HAIR PARTING AND GRASPING CUTTER**

**Ben G. Lee, 2136 Weatherly Pl., Fullerton, Calif. 92633**

**Continuation-in-part of Ser. No. 913,962, Oct. 1, 1986. This application Dec. 31, 1986, Ser. No. 947,840**
**Int. Cl.[4] B26B *13/00***
**U.S. Cl. 30—134** **6 Claims**



1. A hair parting and grasping cutter providing hairdressing means such as parting, grasping, lifting and cutting a person's hair by one hand operation comprising:

an elongated frame having an elongated upper portion and an elongated lower portion, each of said upper and lower portions consisting in sequence of a frontwardly pointed front portion, an elongated are portion having a vertical slot along said arm portion, an elongated handle portion providing means for stopping at the closing and opening limits thereof, and an elongated spring portion forcing to spread said upper and lower portions, joined to a real end of said frame forming a one-piece body of said frame, whereby said front portions are inserted perpendicularly to said hair to part a section of said hair, and said arm portions are closed by squeezing a user's hand on said handle portions to grasp said parted hair;

an elongated upper shear pivotable attached to near the front end of said upper arm portion within said upper slot by means for fastening members, having a blade cutting edge along the bottom edge of said upper shear;

spring member means seated between the front end of said upper shear and the rear end of said upper front portion of said frame, forcing said upper shear upwardly;

an elongated lower shear fixedly attached to a side wall of said lower slot by means for fastening members, having a



blade cutting edge along the top edge of said lower shear at the corresponding side to said blade cutting edge of said upper shear, whereby the rear end of said upper shear is pressed downwardly by a finger tip of said user's hand causing said blade cutting edges of said upper and lower shears to be contacted and overlapped with one another to cut said hair therebetween.

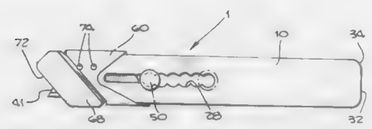
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**4,744,146**

**ADJUSTABLE-BLADE SAFETY KNIFE WITH CARTON-CUTTING GUIDE**

**Gregory G. Schmidt, Newport Beach, Calif., assignor to Pacific Handy Cutter, Inc., Costa Mesa, Calif.**

**Continuation-in-part of Ser. No. 830,980, Feb. 19, 1986, abandoned. This application Dec. 4, 1986, Ser. No. 938,366**
**Int. Cl.[4] B26B *1/08***
**U.S. Cl. 30—162** **11 Claims**




1. An improved, adjustable-blade safety knife of the type having a one-piece, elongated handle and a keeper plate and cutting blade assembly having top and bottom edges, in which a continuous, longitudinally-extending recess is provided in the handle and coextensive thereof forms a web between thicker edge portions, the recess extending laterally into the edge portions to form opposed, longitudinally-extending top and bottom slots, each slot having a pair of oppositely-faced sidewalls, one of which sidewalls is adjacent and coplaner to the inside wall of the web, between which sidewalls are slidably-retained the top and bottom edges, respectively, of said keeper plate and cutting blade assembly, the blade having a central aperture and being constrianed to slide in side-by-side relationship with the keeper plate within the slots by the engagement of a laterally-extending tang on the top edge of the plate within one of a plurality of notches in the top edge of the blade, the assembly being adjustably-retractable in and out of the forward end of the handle through a plurality of locked positions by movement of a cammed button member acting in cooperation with a spring arm formed integrally of the keeper plate and a notched slot through the web, wherein the improvement comprises:

the provision of at least one indentation in said keeper plate in the side thereof opposite and blade to form a detent on the side thereof adjacent to said blade, said detent being located to protrude laterally through said central aperture of said blade immediately below the upper edge of said aperture such that said blade is supported from below by said detent;

wherein said handle further contains a longitudinally-extending groove in said inside wall of said web, adjacent to said blade, intermediate of said slots and opposed to said detent to clear said laterally-protruding detent;

a hat-shaped retainer clip having a U-shaped body facing the handle web and laterally extending side flanges, top and bottom edges of said clip being slidably-retained in said handle top and bottom slots, respectively, and a height normal to said web slightly greater than the width of said top and bottom slots such that said clip is retained in place in said handle when said clip is inserted into said recess from said handle rear end; and

wherein said handle further includes a laterally-extending pin immediately rearward of a rearwardmost of said blade and keeper positions to define a spare-blade retaining space within said handle between said pin and said clip.

**4,744,147**

**SCISSORS WITH INTEGRATED FINGER LOOPS AND STOP**

**Jimmie D. Modin, 728 S. 10th, Salina, Kans. 67401**

**Filed Nov. 17, 1986, Ser. No. 931,257**
**Int. Cl.[4] B26B *13/00***
**U.S. Cl. 30—254** **1 Claim**



1. An apparatus for cutting hair comprising a first cutting member having a first shank and a first cutting edge, said first cutting member terminates at one end in a first cutting point, and said first shank terminates at an end in a structure defining a thumb loop;

a second cutting member having a second shank with a pair of shank sides and a second cutting edge and pivotally secured to said first cutting member, said second cutting member terminates at one end in a second cutting point and said second shank terminates at one end in a structure defining a finger loop having integrally bound thereto and extending therefrom a finger brace with a generally arcuate shape, and said second cutting member additionally includes a structure defining a pointer loop bound to one shank side of said second shank and spaced on said second shank from said finger loop; a bearing surface integrally bound to the other shank side at a point immediately opposed to said pointer loop, said bearing surface protrudes away from said other shank side in a direction away from said pointer loop;

said first cutting member has a mid-point between its ends, and said second cutting member has a mid-point between its ends, and said first cutting member and said second cutting member are pivotally secured to each other at their respective mid-point;

said first shank has a threaded aperture extending entirely through its structure between its mid-point and the thumb loop, an adjusting screw means extends rotatably through said threaded aperture in said first shank and engages said bearing surface in order to regulate the alignment of said first cutting point and said second cutting point with respect to each other; and

said finger loop has a finger loop center and said pointer loop has a pointer loop center such that a plane through said finger loop center and said pointer loop center is generally horizontal in order for the apparatus for cutting hair to be generally balanced when held by the user.

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**4,744,148**

**CIRCULAR CUTTER BLADE WITH CHAIN SAW EDGE**

**Kermit E. Brown, MPI 14R Orchard La., Underwood, Wash. 98651**

**Filed Dec. 4, 1986, Ser. No. 938,072**
**Int. Cl.[4] B26B *7/00***
**U.S. Cl. 30—276** **1 Claim**

1. A portable cutting tool arranged to be carried by a person comprising:

a frame portion,

a power unit on said frame portion,

depending shaft means extending from said power unit and having a threaded botton end,

a pair of equal diameter separate circular blades having a flat configuration with a tooth-free peripheral edge,

aligned shaft connecting apertures in said plates arranged for

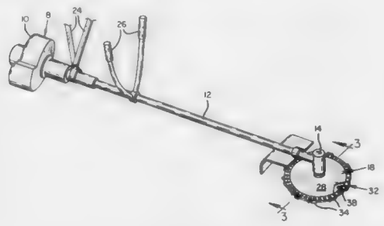
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securing said plates in tight abutting concentric relation with each other by nut means threadedly secured to said threaded bottom end,

a chain saw chain on the periphery of said plates of the type having cutter links and connecting links with tang portions projecting oppositely from said cutter links,

said chain being mounted on said peripheral edges with said cutter links and connecting links resting on said peripheral edges and with said tang portions of said connecting links extending radially inwardly between said plates,



said tang portions being clamped frictionally between said plates by the force of said shaft supported nut means against said plates,

said plates being sprung outwardly toward their periphery by the thickness of said tang portions when said nut means is clamped tightly against said plates such that said frictional clamping engagement with said tang portions connects said chain to said plates for rotation therewith,

and second aligned aperture means in said plates offset from center and arranged to receive a bolt for holding said plates together when removed from said shaft means.

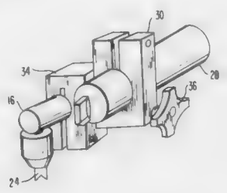
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**4,744,149**

**MARKER HOLDING DEVICE FOR AN ICE SCRIBE**

**Nicolas A. Perna, 13976 New Braddock Rd., Centreville, Va. 22020**

**Filed Mar. 18, 1987, Ser. No. 27,460**
**Int. Cl.[4] B43L *9/04*; F16L *3/08***
**U.S. Cl. 33—27.03** **1 Claim**



1. A clamping device which adjustably positions a first member relative to a second member comprising:

a first metal clamping block having an aperture therein for reception of a first member, said aperture normally having a diameter that is slightly smaller than the diameter of a first member to be inserted into said aperture, and said first metal clamping block including means to temporarily enlarge said aperture so that a first member can be easily inserted into, or removed from said aperture;

a second metal clamping block pivotably attached to said first metal clamping block for securing the clamping device to a second member, said second metal clamping block having an aperture disposed therein for reception of a second member and normally having a diameter that is slightly smaller than the diameter of a second member, and means to temporarily enlarge said aperture in said second metal clamping block so that a second member can be easily inserted into, or removed from, the aperture; and,

means to fix the position of said first metal clamping block relative to said second metal clamping block in at least a first and a second position.

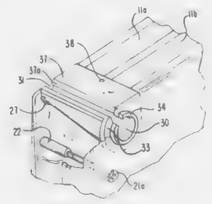
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**4,744,150**

**CONTAINER FOR TAPE RULER WITH MANUAL PENCIL SHARPENER**

**Dwayne A. Horvath, 202 Front St., Dunnelen, N.J. 08812**

**Filed Dec. 16, 1986, Ser. No. 942,255**
**Int. Cl.[4] G10B *3/10***
**U.S. Cl. 33—138** **6 Claims**



1. In combination tape measuring device readily usable in a variety of measuring applications and a pencil sharpener for sharpening the writing end of a pencil including,

a. a housing assembly having interior and exterior surfaces and defining a chamber;

b. elongated tape measuring means retractably mounted in said housing assembly for movement in and out of said chamber;

c. bracket means in the housing assembly in predetermined spaced relation to the tape measuring means; and

d. a pencil sharpening unit operatively connectible to said bracket means for mounting the pencil sharpening unit in communication with the exterior of said housing assembly to enable pencil shavings to escape from said pencil sharpening unit.

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**4,744,151**

**SURVEYING EQUIPMENT**

**Walter W. Wisniewski, P.O. Box 5254, Carefree, Ariz. 85377**

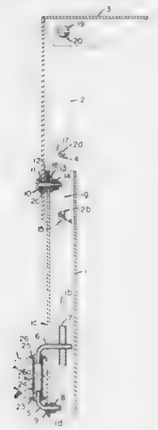
**Filed Mar. 30, 1987, Ser. No. 10,960**
**Int. Cl.[4] G01B *3/04, 5/08, 5/12***
**U.S. Cl. 33—173** **4 Claims**

1. A device for use on one end of a measuring rod for measuring remotely located pipe, said device comprising:

(a) A first elongated member having a distal end and a proximal end;

(b) Clamping means on the proximal end of said first elongated member for demountable attachment to the one end of the measuring rod, said first elongated member being in a normal relationship with the measuring rod when attached thereto by said clamping means;

(c) A second elongated member having a proximal end which is pivotably mounted on the distal end of said first elongated member for movement in an arcuate path with the movement being in the plane normal to said measuring rod; and



(d) A foot depending from the distal end of said second elongated member.

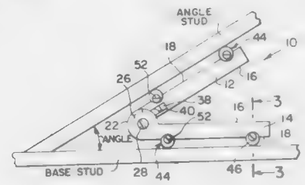
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**4,744,152**

**TOOL FOR MEASURING ANGLES ON VARIOUS ARTICLES**

**Daniel Roach, 1230 St Lawrence Ave., Bronx, N.Y. 10472, and George Spector, 233 Broadway RM 3815, New York, N.Y. 10007**

**Filed Jan. 16, 1987, Ser. No. 4,194**
**Int. Cl.[4] B43L *7/00***
**U.S. Cl. 33—471** **3 Claims**




1. A protractor quadrant tool accessory for measuring angles on various articles, which comprises:

(a) first and second similar flat arms, each of said arms having inner and outer parallel straight edges, said first arm having a circular lower hub at distal end and said second arm having a similar upper hub at distal end, wherein said hubs are concentric and having spaced parallel outer faces forming coplanar extensions of said arms;

(b) means for securing said hubs pivotally;

(c) calibrated indicia on said hubs for measuring said angles further comprising pairs of guides, each of which includes:

(a) a cylindrical housing with top and bottom surfaces having a slot parallel to said surfaces to fit upon said outer parallel straight edges; and

(b) a securement bolt threaded into said top to extend transversely into said slot for securing said pairs of guides on said outer parallel straight edges so as to contact the article being measured to stabilize said tool accessory when measuring said angle and the like.



**4,744,153**

**METHOD AND APPARATUS FOR DETERMINING THE THICKNESS OF SHIM REQUIRED FOR PROPERLY LOADING AND POSITIONING THE BEARING ASSEMBLY OF A MARINE PROPULSION DEVICE DRIVE SHAFT**

**William E. Brand, Kenosha, Wis., assignor to Outboard Marine Corporation, Waukegan, Ill.**

**Filed Sep. 22, 1986, Ser. No. 910,445**
**Int. Cl.[4] B23P *19/04***
**U.S. Cl. 33—517** **26 Claims**



1. An apparatus for use with a device including a wall surface, and a removable, rotatable shaft having thereon a reference point and a bearing assembly, the bearing assembly including a surface supported by the wall surface with a shim between the bearing assembly surface and the wall surface, and with a fixed distance between the wall surface and the reference point when the bearing assembly is axially loaded in the device, said apparatus measuring the required thickness of the shim without inserting the shaft into the device, and said apparatus comprising a frame, means on said frame for axially loading the bearing assembly with the shaft out of the device, and means on said frame for measuring the existing distance between the bearing assembly surface and the reference point, whereby the thickness of the shim is determined by comparing said existing distance to the fixed distance.

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**4,744,154**

**MEASURING AND CONTROLLING THE MOISTURE CONTENT OF HAIR**

**Heribert Bollinger, Worms; Siegfried Hollmann, Darmstadt, and Detlef Mattinger, Hünfeld, all of Fed. Rep. of Germany, assignors to Wella Aktiengesellschaft, Darmstadt, Fed. Rep. of Germany**

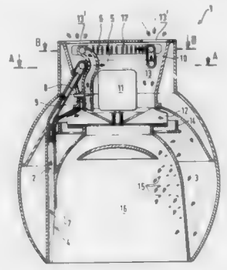
**PCT No. PCT/EP85/00457, § 371 Date May 12, 1986, § 102(e) Date May 12, 1986, PCT Pub. No. WO86/01696, PCT Pub. Date Mar. 27, 1986**
**PCT Filed Sep. 11, 1985, Ser. No. 870,767**
**Claims priority, application Fed. Rep. of Germany, Sep. 11, 1984, 3433246**
**Int. Cl.[4] F26B *20/22***
**U.S. Cl. 34—3** **16 Claims**

1. A method of measuring and controlling the moisture content of hair during an automatic drying process using a hair drying hood provided with a heater, a fan for drawing in ambient fresh air, and an air humidity sensor arranged in a duct for recirculating the drawn-in air, comprising the steps of measuring from the beginning of the drying process momentary values of air humidity signals detected by said sensor at equal measuring time intervals; computing at equal evaluation time intervals mean values of the measured momentary values;

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computing differential values from said mean values; comparing respective differential values with a predetermined refer-



ence value; and generating a first stop signal when a differential value falls below said reference value.

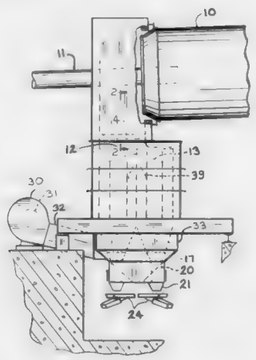
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**4,744,155**

**APPARATUS FOR REMOVING DUST FROM PYROPROCESSED PARTICULATE MATERIAL**

**Lee H. Niems, Flossmoor, Ill., assignor to Kennedy Van Saun Corporation, Danville, Pa.**

**Filed Dec. 22, 1986, Ser. No. 944,973**
**Int. Cl.[4] F26B** *17/10*
**U.S. Cl. 34—57 R** **9 Claims**



1. Apparatus for removing dust particles from pyroprocessed particulate material comprising in combination a rotary kiln having an exit from which such material is discharged in the form of a stream wherein the finest size fraction of said material is segregated on the side of said stream closest to the discharge edge of said kiln,

a collection region for such particulate material below said kiln discharge exit,

pneumatic dust collector means comprising a nozzle having a negative pressure opening located at said kiln exit adjacent the zone where said stream is discharged and closely adjacent the path of said stream on the side where the finest size fraction of the stream is segregated,

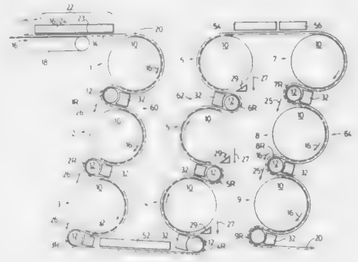
said nozzle having sufficient negative pressure and being sufficiently close to said stream (discharge zone) path to selectively effect withdrawal of dust particles from a stream of particles dropping in said path before deposition of particles of said stream in said collection region.

**4,744,156**

**DRIER FELTING ARRANGEMENT**

**Ralph J. Futcher, Beaconsfield, Canada, assignor to Valmet-Dominion Inc., Lachine, Canada**

**Division of Ser. No. 802,728, Nov. 29, 1985, Pat. No. 4,677,762. This application Feb. 9, 1987, Ser. No. 13,019**
**Claims priority, application Canada, Dec. 10, 1984, 470741**
**Int. Cl.[4] F26B** *13/08*
**U.S. Cl. 34—114** **1 Claim**



1. A web transfer between a pair of felts comprising a first felt and a second felt, a web to be transferred from the first felt to the second felt, a transfer zone wherein said felts are in substantially parallel and face-to-face relationship supporting a web therebetween, said transfer zone being free of any means other than the two felts for the transfer of the web from the first felt to the second felt, the web to be transferred being initially carried on an outer surface of said first felt, a blow box having a working surface located adjacent an inner face of said second felt to direct flow of air along the working surface of said blow box adjacent said inner face of said second felt thereby to reduce the pressure adjacent said inner face and induce flow of air through said second felt to apply suction forces to said web and to adhere said web to said second felt thereby effecting transfer of said web from said first felt to said second felt.

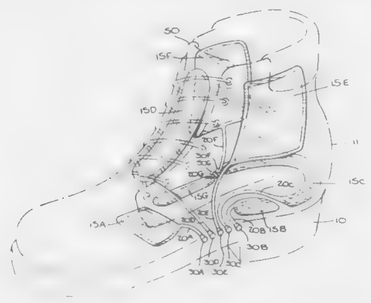
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**4,744,157**

**CUSTOM MOLDING OF FOOTGEAR**

**Benjamin B. Dubner, 84 Marcus Ave., New Hyde Park, N.Y. 11040**

**Filed Oct. 3, 1986, Ser. No. 915,669**
**Int. Cl.[4] A43B** *7/14, 13/38*
**U.S. Cl. 36—88** **7 Claims**



1. Apparatus for providing footgear with comfortable individualized molded support, said apparatus comprising a plurality of independent flexible impervious liquid proof bag structures for retaining a non-setting free flowing fluid; each bag structure having a conduit extending therefrom terminating in a port constructed to maintain closure of said element while permitting selective insertion or withdrawal of said non-setting fluids said bag structure being located in the footgear with respect to the foot of the wearer to provide individual areas of the foot with external pressure and support said bags and connecting parts being secured to an overriding innersole, said overriding innersole having means for adherence to the sole and upper of said footgear.



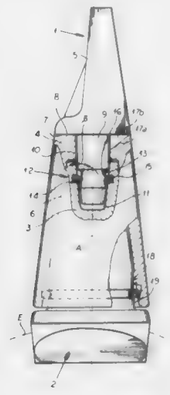
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**4,744,158**

**EXCAVATOR TOOTH ASSEMBLY FOR EARTH MOVING EQUIPMENT**

**Rütger Berchem, Geisenkirchen, and Georg Prokscha, Recklinghausen, both of Fed. Rep. of Germany, assignors to Berchem & Schaberg GmbH, Gelsenkirchen, Fed. Rep. of Germany**

**Filed Oct. 29, 1986, Ser. No. 924,618**
**Claims priority, application Fed. Rep. of Germany, Oct. 29, 1985, 3538354**
**Int. Cl.[4] E02F** *9/28*
**U.S. Cl. 37—142 R** **1 Claim**



1. A digging tool assembly for an exacavator, comprising:

an adapter adapted to be mounted upon said excavator and formed with an adapter head constituted as a male frustoconical plug formation, said plug formation having a recess opening at an end thereof; and

a tooth separate from said adapter but mounted thereon, said tooth comprising:

a tooth base constituted as a socket formation of female frustoconical configuration form-fittingly receiving and completely enveloping said plug formation,

a tooth tip separate from but affixed to said tooth base and having a working end,

a fastening pin formed on said tooth tip on an end thereof opposite said working end and encircled by a supporting shoulder integrally formed in said tooth tip at said opposite end,

a hole formed in said tooth base in alignment with said recess and encircled by a supporting shoulder of said tooth base abutting said supporting shoulder of said tooth tip, said pin extending through said hole into said recess, and received with play in said recess and snugly received in said hole,

securing means in said recess engaging said pin for holding said assembly together, said securing means including an indexing groove formed in said pin, an indexing grooved formed in a wall of said recess, and a prestressed elastically deformable fastening ring partly received in each of said grooves and resting upon a frustoconical pressing surface engaging said ring at an acute angle to said wall,

mutually engaging complementary anti-rotation elements formed in said shoulders preventing said tip from rotating about an axis of said pin relative to said base, and

second securing means including an indexing groove formed in an outer wall of said head, an indexing groove formed in an inner wall of said base, and a prestressed elastically deformable fastening ring partly received in each of said grooves.

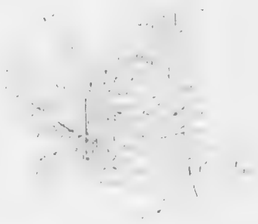
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**4,744,159**

**READILY DETACHABLE MOUNTING FOR A WING PLOW**

**Bertrand Houle, Drummondville, Canada, assignor to Tenco Machinery Ltd., Valérien, Canada**

**Continuation-in-part of Ser. No. 721,660, Apr. 10, 1985, abandoned. This application Sep. 3, 1986, Ser. No. 903,193**
**Int. Cl.[4] E01H** *5/06*
**U.S. Cl. 37—231** **5 Claims**



1. In a land vehicle comprising a chassis and a mechanism mounted to the chassis for detachably mounting a plow assembly to the vehicle, wherein the mechanism comprises in combination a first upstanding frame mounted to said chassis, the first upstanding frame including a lower and upper portion and elongated guide means provided on the first frame, a first sub-frame pivotally mounted to the lower portion of the first upstanding frame, hydraulic means for moving the first sub-frame in an arc about a pivot axis at said lower portion of the first upstanding frame between an extended position and a retracted position, said elongated guide means engaging said first sub-frame when said first sub-frame is in a retracted position, said first sub-frame having a free end mounting an engagement member remote from the pivot axis and flared aligning members extending away from said free end of said first sub-frame, said plow assembly including second frame means mounting a plow blade and said second frame means including a second sub-frame including an upper portion and a lower portion, with the upper portion in the form of at least a downwardly open hook member adapted to receive the engagement member on the free end of the first sub-frame and locking means associated with the lower portions of the first and second sub-frames for locking the first and second sub-frames together when the engagement member on the first sub-frame is engaged within the upper portion hook member of the second sub-frame and the first sub-frame is in a retracted position.

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**4,744,160**

**FABRIC PRESSING MACHINE USING SUPERHEATED STEAM**

**George M. Elliott, Alpharetta, and Michael P. Adams, Woodstock, both of Ga., assignors to Astechnologies, Inc., Roswell, Ga.**

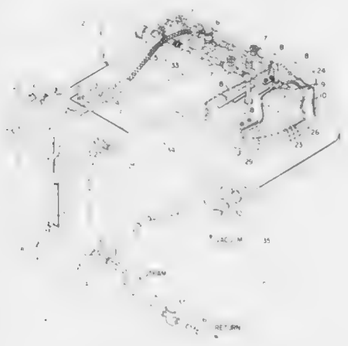
**Filed Sep. 10, 1986, Ser. No. 905,406**
**Int. Cl.[4] D06F** *71/34*
**U.S. Cl. 38—15** **17 Claims**

1. In a machine for pressing and smoothing fabric comprising a hollow perforated steam plate mounted for closing against the fabric to be pressed, steam supply means for delivering steam to the interior of said plate at a pressure high enough to cause the steam to be ejected from the holes in said plate, and means apart from the steam for preheating the plate, the improvement wherein the steam supply means includes a

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superheater means to deliver the steam at a pressure in the range of about 40 to 90 psig and at a temperature higher than that of the plate and at least about 100 Fahrenheit degrees



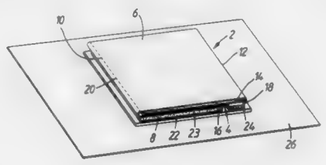
above the saturation temperature corresponding to the pressure of the steam resulting in the avoidance of the formation of moisture condensation on the plate.

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**4,744,161**
**LABEL**

David J. Instance, Guinea Hall, Sellindge, Kent, United Kingdom

Filed Jun. 5, 1987, Ser. No. 58,894
Claims priority, application United Kingdom, Jun. 11, 1986, 8614240
Int. Cl.[4] G09F *3/02, 3/10*
U.S. Cl. 40—2 R 2 Claims



1. A label for attachment to a container, the label comprising a longitudinal strip which is divided into a series of panels by a plurality of transverse fold lines, the strip being folded about the transverse fold lines so that one end panel and the adjacent panel form rear and front cover panels, respectively, which envelope the remaining panel or panels of the folded strip, the rear cover panel of the strip being shorter in the longitudinal direction than at least the front cover panel and a third panel, which is adjacent the front panel, extending beyond the free end of the rear cover panel and having a rearwardly directed over-lapping portion; and a support web to which is adhered the rear face of the rear cover panel, the over-lapping portion being releasably adhered to the support web so as to maintain the folded label in a closed configuration, the arrangement being such that the label can be opened by detaching the over-lapping portion from the support web.

**4,744,162**
**CONTAINER AND CLIP ASSEMBLY**

Masayuki Okazaki, Gihu, Japan, assignor to Sanko Co. Ltd., Gihu, Japan

Filed Aug. 5, 1986, Ser. No. 893,210
Claims priority, application Japan, Jan. 17, 1986, 61-5742[U]
Int. Cl.[4] G09F *3/00*
U.S. Cl. 40—312 4 Claims



1. A storage box having walls defining an interior space to receive materials to be stored, said storage box including a card sandwiching arrangement associated with one of the exterior walls of said storage box which will hold a card adjacent one exterior wall of said storage box so that information on the card can be read to identify the materials contained within the interior of said storage space, said card sandwiching arrangement comprising
(a) a flange (24) extending outwardly from one side (21) of said box (B),
(b) a frame-like elastic holding plate (10, 12, 13) that is shaped and sized so that a portion of the holding plate (10, 12, 13) can resiliently press a card (C) against one exterior side (21) of the box (B),
(c) first engaging means (17, 18) located on a portion of said frame-like elastic holding plate (10, 12, 13),
(d) second engaging means (26, 27, 28 and 29) located on said side wall (21),
side first (17,18) and second (26, 27, 28, 29) engaging means being shaped and sized so that when they are interengaged they will lock together to thereby hold said frame-like holding plate (10, 12, 13) in a pressing relationship against one exterior side (21) of the box (B).

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**4,744,163**
**SEVEN BAR MODULE**

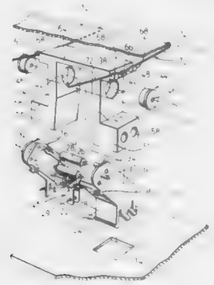
John Browne, Georgetown, and Thomas Wales, Rexdale, both of Canada, assignors to Nei Canada Limited, Toronto, Canada

Filed Apr. 30, 1986, Ser. No. 857,498
Int. Cl.[4] G09F *9/00*
U.S. Cl. 40—449 3 Claims

1. Display or indicating device defining a viewing direction including:
a support,
a display or indicating element on said support rotatably mounted on said support to rotate on an axis of rotation relative thereto, and surrounded by a background when viewed in the viewing direction,
a display surface on said element designed to contrast with the background when displayed in the viewing direction,
means limiting rotation of said display element to rotation through a predetermined angle between a first limiting position where said display surface is displayed in the viewing direction and a second limiting position where said display surface is not visible in the viewing direction,
a pair of substantially parallel longitudinally extending cores of magnetic material, extending generally parallel to said rotation axis and between first and second free ends,



an electrical energizing coil corresponding to each core for magnetizing the latter,
first and second permanent magnets mounted on and rotatable with said display element,
the pair of first free ends and the pair of second free ends each being designed, when each pair is of mutually opposite magnetic polarity, to define a magnetic flux path of reversible polarity between each pair of free ends,



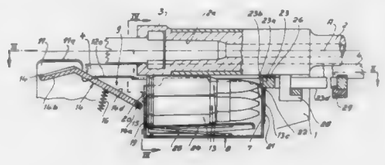
each of said flux paths including a locus of one of said magnets over said rotational range and being arranged so that, for a given polarity each flux path exerts, a torque in one sense over the range of movement, between two limiting positions, of the corresponding permanent magnet, and so that said torque is in the same sense for both magnets,
each said permanent magnet comprising a layer of permanently magnetized high remanence material adjacent the core ends and a layer of soft iron or low remanence material remote from the core ends.

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**4,744,164**
**CARTRIDGE FEEDING DEVICE FOR REPEATING RIFLE**

Benedikt Rieger, Altenmünster-Hegnenbach, Fed. Rep. of Germany, assignor to Dynamit Nobel Aktiengesellschaft, Troisdorf, Fed. Rep. of Germany

Filed Nov. 24, 1986, Ser. No. 934,541
Claims priority, application Fed. Rep. of Germany, Nov. 23, 1985, 3541430
Int. Cl.[4] F41C *13/00*
U.S. Cl. 42—18 16 Claims



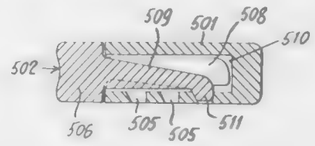
1. A cartridge feeding device for a rifle, having a barrel, a breech casing, a magazine well provided therein, in front of a rearward end of the barrel underneath the rearward end for receiving a magazine box for holding a plurality of cartridges, said magazine box having a withdrawal opening in a rear wall thereof, two guide strips being mounted at the breech casing to be displaceable in the direction of the barrel axis and carrying a breech mechanism, and a loading plate pivotable about a pivot axis arranged transversely to the barrel axis below a moving zone of the breech mechanism, said loading plate comprising a supporting surface for a cartridge and being pivotable upward into a loading position under the effect of a spring, characterized in that a guide housing is arranged to the rear of the magazine well, said guide housing exhibiting, in a zone behind a breech head, an upper opening extending over one cartridge length and, in a rearward half of said opening, two mutually opposed holding lips in the manner of magazine lips, mutual spacing between said lips being smaller than a diameter D of a case of a cartridge; that the loading plate is mounted in the guide housing to be pivotable about a pivot axis provided at a front end of the housing and is arranged in the proximity of the magazine well; that the magazine box exhibits at the top an opening extending over an entire length of the box and, in a zone of the opening in the magazine box, two mutually opposed magazine lips; that a slide is provided in an upper zone of the magazine well, said slide being connected to the guide strips extending transversely to the barrel axis and being located at a level of an uppermost cartridge; said slide in a locking position of the breech mechanism, being disposed in front of a projectile tip of the uppermost cartridge, and coming into contact, during a backward movement of the breech mechanism with the projectile tip of the uppermost cartridge, pushing the cartridge rearwardly out of the magazine box into the guide housing.

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**4,744,165**
**TRIGGER**

Giovanni Garofalo, Rapallo, Italy, assignor to AMF Mares S.p.A., Rapallo, Italy

Filed Jun. 9, 1987, Ser. No. 59,849
Claims priority, application Italy, Jun. 18, 1986, 15193B/86[U]
Int. Cl.[4] F41C *19/00*
U.S. Cl. 42—69.01 3 Claims




1. A portable shooting weapon comprising:
a releasable firing mechanism comprising trigger means operable by a finger of a shooter for operating said firing mechanism;
said trigger means comprising a first, downwardly extending body portion fulcrumed to the shooting weapon, wherein the first body portion has a front side with a recess therein;
a second body portion formed at one side with a sliding portion that penetrates said recess in said first body portion; said sliding portion being formed by two or more guiding extensions at least one of which comprises a resilient member provided with a sidewise projection;
and wherein said recess in said first body portion of said trigger means is provided sidewise with two or more slots capable of engagingly receiving said projection so as to releasably lock said second body portion of said trigger means to said first body portion of said trigger means in a selected adjustment position.

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**4,744,166**
**FIRING MECHANISM WITH INTEGRATED SAFETY DEVICE FOR FIREARMS**

Ennio Mattarelli, Bologna, Italy, assignor to Dynamit Nobel AG, Troisdorf, Fed. Rep. of Germany

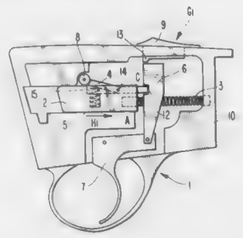
Filed Dec. 4, 1986, Ser. No. 938,015
Claims priority, application Italy, Dec. 10, 1985, 3638 A/85
Int. Cl.[4] F41C *19/00, 17/00*
U.S. Cl. 42—69.01 6 Claims

1. A firing mechanism with a safety device for a firearm and operable by way of a striker member arranged in a frame, the striker member being movable into an uncocked position, under the influence of the force of a compression spring, after a trigger lever, locking the striker member in a cocked posi-

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tion, has been placed into a release position, and with at least one trigger with an associated rocker arm characterized in that the striker member is fashioned as a slide and is displaceable in a longitudinal direction of the the mechanism from a rearward cocked position to a forward uncocked position; the trigger lever is fashioned to be angled, curved, or the like non-linear configuration and is pivoted on a support located on the striker member so that a portion of the trigger lever extends in the longitudinal direction and the trigger lever is pivotable about



the support in such a way that, in the cocked position, a rear end of the trigger lever is secured by the rocker arm and a front end of the trigger lever rests on a stop fixedly formed within the frame and locks the striker member in the cocked position, this locking action being releasable by freeing the rear end of the trigger lever by way of operation of the at least one trigger and associated rocker arm and pivoting the trigger lever in such a way that resting of the front end on the stop is eliminated.

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**4,744,167**

**STABILIZED WEEDLESS SCENT-EMITTING FISHING LURE**

George Steele, East Greenbush, N.Y., assignor to Kustom Anglers Inc., East Greenbush, N.Y.

Filed Oct. 15, 1986, Ser. No. 919,009
Int. Cl.[4] A01K *83/00*
U.S. Cl. 43—42.06 2 Claims



1. An artificial fishing lure comprising:
a keeled hydrofoil weight having means for attaching additional other paraphernalia thereto;
a hook attachable to said weight having thereon an attaching ring at the hook shank base for attaching artificial and natural lures thereto;
a weed shield comprised of a spongeonous mass removably placable on the shank of said hook in registry with the barbs of said hook so that said barbs rest on the periphery of said shield and further comprising porous, resilient material adapted to absorb fish scent and to readily compress when struck by a fish and to resist weed entanglement, and further said mass having a single passageway therethrough coextensive with the central axis of said mass whereby said mass is fitted over the shank of a hook and rested in the curved portion of said hook so that said mass surface is in registry with the barbs of said hook shielding said barbs from weed entanglement; and
a multi-leafed skirt attachable to said weight for covering said shield, whereby said skirt trailing over said mass affords added resistance to weed entanglement without resisting penetration by the barbs of said hook when said lure is struck by a fish.

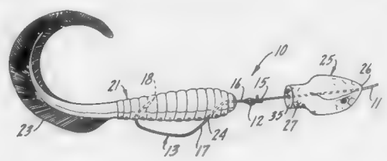
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**4,744,168**

**ARTIFICIAL FISHING LURE**

Bingham A. McClellan, Traverse City, Mich., assignor to McClellan Industries, Inc., Traverse City, Mich.

Filed Jul. 11, 1986, Ser. No. 884,551
Int. Cl.[4] A01K *85/00*
U.S. Cl. 43—42.24 11 Claims



1. An artificial fishing lure for attachment to a fishing line having a predetermined diameter, said lure comprising:
(A) a fish hook having a curved portion ending in a barb, an eye and a straight shank portion of predetermined length extending from said eye toward said curved portion, said eye having a predetermined width, and said eye and said straight shank portion being in the same horizontal plane;
(B) a flexible, synthetic plastic worm having a front end and a tail end, said worm being Texas-rigged on said hook such that said barb has been passed through and out of said front end and then been reinserted into the body of said worm adjacent said front end, said barb being imbedded and concealed with said worm, said hook eye and a part of said straight shank portion protruding ahead of said front end;
(C) a floating head having a front end and rear end, said head being made from closed-cell, resilient synthetic plastic foam, said head being wider than it is thick and having an interior hole of predetermined width passing longitudinally there through, said width of said hole being larger than said diameter of said line but being substantially smaller than said width of said eye, said fishing line passing through said hole and being tied to said eye within said hole adjacent said rear end of said head, said eye and said protruding part of said shank portion being inserted into said hole so that said eye deforms the interior said head and is tightly gripped by the inside surface of said hole in said horizontal plane so as to prevent movement of said head, the widest dimension of said eye being aligned with the widest dimension of said head, and a major part of said curved portion of said hook being below said plane, said curved portion acting as a keel weight located below said worm for maintaining said lure in its fish attracting position.

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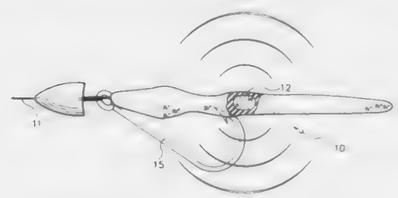
**4,744,169**

**FISHING LURE**

George A. Nochta, 8654 Atlas View Dr., Santee, Calif. 92071

Filed Dec. 22, 1986, Ser. No. 944,194
Int. Cl.[4] A01K *85/00*
U.S. Cl. 43—42.31 25 Claims

1. An artificial fishing lure, comprising:
a bait-shaped, generally solid lure body of soft, flexible plastics material;
a sound producing device embedded and completely enclosed within the soft plastics material of the lure body, the device having at least one chamber having a generally circular outer periphery and an axial length less than its outer diameter;
a single ball located within the chamber, the axial length of the chamber being not greater than twice the diameter of the ball;



the chamber comprising means for constraining the ball against rattling against the walls of the chamber and for guiding the ball to roll around the walls of the chamber with movement of the body.

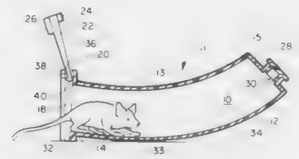
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**4,744,170**

**SMALL ANIMAL TRAP WITH TRANSVERSE LOCKING SLOT ON GATE**

Cornelius Chow, 5643 Dessert View Dr., La Jolla, Calif. 92037

Filed Mar. 16, 1987, Ser. No. 25,985
Int. Cl.[4] A01M *23/18, 23/06*
U.S. Cl. 43—61 9 Claims



1. An animal trap comprising:
a container having an open end for permitting entry by an animal to be trapped and a normally closed end, said container having a longitudinally curvilinear bottom surface, said open end is not elevated when the trap is in position for trapping said animal and is gradually elevated by the end-to-end rolling of said container along said bottom surface by the weight of said animal traveling within said container toward the normally closed end; and
a translatable gate adapted to remain open when the open end of said container is not elevated and pivots toward said closed end and then translates downwardly to a closed normally open end position when said open end is elevated a predetermined amount, said gate includes a transverse locking slot positioned adjacent to the bottom thereof which engages the upper surface of said container adjacent to said open end thereof.

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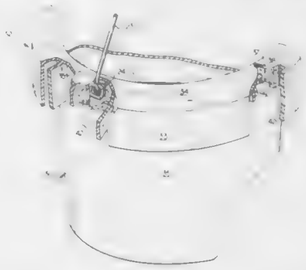
**4,744,171**

**HANGING POT SUSPENSION SYSTEM**

William G. Hilliard, Box 2, N.C. 61, Whitsett, N.C. 27377

Filed Feb. 24, 1986, Ser. No. 832,397
Int. Cl.[4] A01G *9/02*
U.S. Cl. 47—67 9 Claims

1. A hanger for plant and flower hanging containers of the type having a basket or pot with an annular inverted, slotted, U-shaped rim around the circumference of the top wall portion which defines an annular recess underlying said rim, said hanger comprising:
(a) a hook means having at least three elongated metallic wire members depending therefrom for connecting said hook means to the U-shaped rim of said container;
(b) said wire members extending downwardly and outwardly from said hook means and terminating in free ends spaced equidistantly apart;
(c) a protuberance integrally preformed from the metallic wire material itself on the free end of each of said metallic wire members prior to insertion into a basket or pot;
(d) each of said protuberances comprising an eyelet formed by bending the free end of wire around in at least one loop, said loop being so shaped as to form a plane, said plane



formed by said loop, with the corresponding wire member in the relaxed position, lies perpendicular to an imaginary line passing from an imaginary point centrally located between said free ends of said hanger outwardly through said protuberance;
(e) whereby said protuberances are more easily inserted through a selected one of said slots and releasably retained therein without torsional stress.

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**4,744,172**

**APPARATUS FOR RECIPROCALLY MOVING WINDOW PANEL**

Shizuya Miyauchi, Shimizu, Japan, assignor to Koito Seisakusho Co., Ltd., Tokyo, Japan

Filed Nov. 17, 1986, Ser. No. 930,939
Claims priority, application Japan, Nov. 22, 1985, 60-262989; Oct. 13, 1986, 61-242547
Int. Cl.[4] E05F *11/42*
U.S. Cl. 49—349 14 Claims



1. An apparatus for reciprocally moving a window panel in vertical direction, comprising:
stationary guide means extending along a predetermined path including a linear portion which extends generally in vertical directions,
a displaceable member for supporting said window panel, said displaceable member being supported on said linear

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portion of said guide means and displaceable in the vertical directions relative to said linear portion, and

driving means for driving said displaceable member with at least a part thereof being arranged on said guide means along the same direction as the moving direction of said displaceable member, and with at least a part thereof releasably engaging with a part of said displaceable member, said driving means including a series of mutually meshing gear trains rotatably mounted on said guide means and a reciprocally rotating driving source connected to said gear trains, said gear trains including a plurality of gears rotating in the same direction and remaining gears rotating in the opposite direction, with at least a part of said gears rotating in the same direction engaging with at least a part of said displaceable member.

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**4,744,173**

## MOVABLE FLUSH WINDOW SYSTEM ESPECIALLY FOR A MOTOR VEHICLE DOOR

**Gerard Mesnel, Carrieres-sur-Seine, and Francois Mesnel, Neuilly-sur-Seine, both of France, assignors to Mesnel S.A., Carrieres-sur-Seine, France**

**Filed May 13, 1987, Ser. No. 49,113**
**Claims priority, application France, Oct. 3, 1986, 86 13816**
**Int. Cl.[4] E05F** *11/38*
**U.S. Cl. 49—374** **15 Claims**



1. A movable flush window system, comprising:

(a) two panels connected together forming a structure having a window aperture with a window receiving side and at least one window contacting side;

(b) a movable window comprising two substantially non-parallel panes, said window being retractable between said two panels through said window receiving side of said aperture;

(c) means for engaging said window at the periphery thereof, said engaging means being disposed along said window contacting side of said aperture;

(d) means for spacing said two panes such that the spacing thereof decreases from a base of said panes to an upper part of said panes, said spacing means receiving said engaging means so as to guide and seal the closure of said window in said aperture.

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**4,744,174**

## MOVABLE FLUSH WINDOW SYSTEM ESPECIALLY FOR A MOTOR VEHICLE DOOR

**Gerard Mesnel, Carriers-sur-Siene, and Francois Mesnel, Neuilly-sur-Seine, both of France, assignors to Mesnel S. A., Carriers-sur-Seine, France**

**Filed May 13, 1987, Ser. No. 49,102**
**Claims priority, application France, Oct. 3, 1986, 86 13815**
**Int. Cl.[4] B60J** *5/04;* **E05F** *11/38*
**U.S. Cl. 49—374** **12 Claims**

1. A movable flush window system, comprising:

(a) two panels connected together forming a door having a window aperture with a window receiving side and plurality of window contacting sides;

(b) a movable window comprising two substantially parallel panes, said window being retractable through said window receiving side of said aperture to a position between said two panels;

(c) means for engaging said window at the periphery



thereof, said engaging means being disposed along the window contacting sides of said aperture;

(d) means for spacing apart said two panes, said spacing means receiving said engaging means so as to guide and seal said window in said aperture.

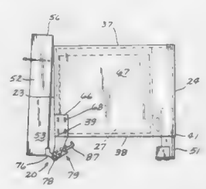
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**4,744,175**

## VENDING MACHINE DOOR CLOSURE MECHANISM

**Henry J. Albright, West Des Moines; Paul L. Hawkins, and Randy E. Harwood, both of Guthrie Center, all of Iowa, assignors to Fawn Engineering Corp., Des Moines, Iowa**

**Filed Aug. 25, 1986, Ser. No. 900,180**
**Int. Cl.[4] E05D** *11/00*
**U.S. Cl. 49—383** **5 Claims**



1. In a vending machine having a cabinet open at the front and having laterally spaced sidewalls, one or more product carrying and dispensing shelves movable from a position within the cabinet to a position extended at least partially outwardly of and through the cabinet front, a door having a face and a product delivery drawer secured to its inner lower side for receiving product vended from one of the shelves, the door pivotally movable from one position closing the cabinet open front to another position wherein the interior of the cabinet is accessible, an improved door closure mechanism comprising:

plate means secured to the cabinet and extended over the door adjacent an outer corner thereof;

flange means secured to the door and pivotally connected to said plate means at a first pivot point adjacent said outer corner; and

panel means having a length substantially equal that of the door and forming one end of the door adjacent said outer corner, said panel means extended at right angles to the width of said door having a movable interlocking relationship at one side edge thereof with the cabinet and having a hinged connection at an opposite side edge thereof with an edge of said door at said outer corner, whereby upon movement of the door from a closed position to an open position said panel means is movable relative to the cabinet while maintaining its interlocked relationship therewith and preventing normal access to the interior of the cabinet through said door at that said end thereof;

and further wherein said plate means comprises a plate secured to the cabinet and extended forwardly thereof over the door, said plate extends forwardly beyond the face of the door;

said panel means comprises a substantially rectangular panel having a length substantially equal that of the door, said panel having a relatively flat portion intermediate said opposed side edges which portion is disposed in-line with the adjacent sidewall of the cabinet;

said hinged connection forms a second pivot point, also at said outer corner and which moves arcuately about said first pivot point upon movement of the door.



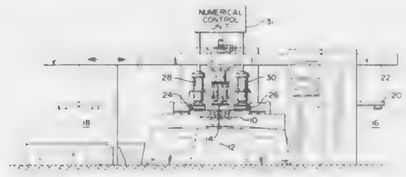
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**4,744,176**

## NC-CONTROLLED EDGE GRINDING MACHINE

**E. Theodor Sack, Ratingen-Hösel; Gottfried Strauss, Heiligenhaus, and Klaus Glittenberg, Erkrath, all of Fed. Rep. of Germany, assignors to Glasstemp of Toledo, Inc., Perrysburg, Ohio**

**Filed Nov. 25, 1985, Ser. No. 801,297**
**Int. Cl.[4] B24B** *49/00*
**U.S. Cl. 51—165.71** **4 Claims**



1. Glass-grinding machine for machining the edges of glass planes, particularly vehicle panes, construction glass and furniture glass, with a turntable arranged with a vertical turning axis and exhibiting a clamping device for the positioned anchorage of each respective glass pane to be machined, with at least two grinding wheels arranged near the turntable circumference with a vertical axis of rotation, the relative position of which, with respect to the turntable axis, is automatically adjustable in conformity with the contour of the glass pane to be machined as a function of the turning position of the turntable, and with a charging device and a discharging device for the glass panes to be machined and having been machined respectively, characterised in a means mounting each of said two grinding wheels for movement along an axis directed toward the turning axis of said turntable, numerical control means for controlling said movement along said axis as a function of said turntable position, said mounting means being arranged staggered at an acute angle relative to said turntable circumference and to each other.

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**4,744,177**

## VIBRATORY ABRADER

**Roland Braun, Winnenden; Bernd Kaiser, Hohengehren, and Siegfried Stämmele, Leutenbach, all of Fed. Rep. of Germany, assignors to Licentia Patent-Verwaltungs-GmbH, Frankfurt, Fed. Rep. of Germany**

**PCT No. PCT/DE85/00285, § 371 Date Jun. 6, 1986, § 102(e) Date Jun. 6, 1986, PCT Pub. No. WO86/01761, PCT Pub. Date Mar. 27, 1986**
**PCT Filed Aug. 23, 1985, Ser. No. 865,723**
**Claims priority, application Fed. Rep. of Germany, Sep. 8, 1984, 3433094; May 17, 1985, 3517766**
**Int. Cl.[4] B24B** *23/04*
**U.S. Cl. 51—170 MT** **14 Claims**

1. A vibratory abrader, comprising:

a housing;

an abrading plate;

elastic elements elasticly connecting said abrading plate to said housing; and

means for driving said abrading plate in orbital motion with respect to said housing, said driving means including

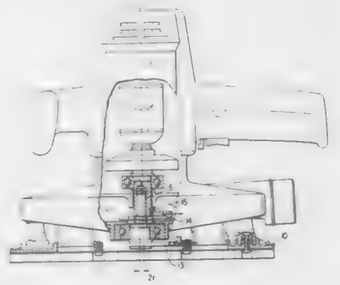
a drive motor having an armature shaft driven by said motor in rotation about an armature axis,

an eccentric pin having a pin axis, mounted to said armature shaft eccentrically with respect to said armature axis,

an eccentric drive member eccentrically disposed with respect to said armature axis and said pin axis so as to be eccentrically rotated with respect to said armature axis by said eccentric pin with rotation of said armature shaft and said eccentric pin therewith about said armature axis,

a ball bearing on said housing connected to said eccentric drive member so as to transmit eccentric movement of said eccentric drive member to said abrading plate through said bearing, said housing and said elastic elements, and

a compensating weight on said eccentric drive member;



said armature shaft and said eccentric drive member being swivelable relative to each other about pin axis, said armature shaft and said eccentric drive member having respective abutments thereon limiting the relative swivel movement of said armature shaft and said eccentric drive member to 180° between a first position adopted during rotation of said armature shaft in a first direction, in which the eccentricity of said eccentric drive member with respect to said armature axis is the sum of the eccentricity of said eccentric drive member with respect to said pin axis and the eccentricity of said eccentric pin with respect to said armature axis so that the eccentric drive member has an enlarged eccentric swing, and a second position adopted during rotation of said armature shaft in a second direction opposite said first direction, in which the eccentricity of said eccentricity drive member with respect to said armature axis is the difference between the eccentricity of said eccentric drive member with respect to said pin axis and the eccentricity of said eccentric pin with respect to said armature axis so that the eccentric drive member has a reduced eccentric swing.

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**4,744,178**

## GRINDING DEVICE

**Mohammad Afshar, Dublin, Ireland, assignor to Institute for Industrial Research and Standards, Dublin, Ireland**

**Filed Sep. 25, 1986, Ser. No. 911,326**
**Int. Cl.[4] B24B** *19/00*
**U.S. Cl. 51—241 G** **11 Claims**

1. A hand-held grinding device for grinding a drill bit or other tool, the device comprising:

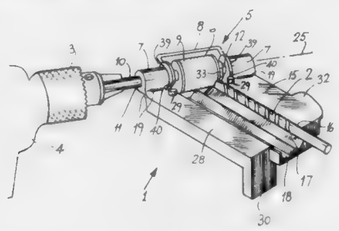
a grinding wheel supporting body member,

a shaft rotatably mounted in the supporting body member for rotation about a rotational axis,

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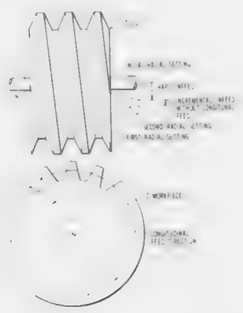
the shaft having a free end for attachment to a chuck,
a grinding wheel mounted on the shaft and having a peripheral grinding surface,
a tool guide member having a groove means to receive and direct a tool for the grinding wheel, the guide member being configured for gripping in one hand with a user's thumb holding a tool in the guide means,



the tool guide member being pivotally mounted to the grinding wheel supporting body member for pivotal movement about a pivot axis,
the pivot axis between the tool guide member and the grinding wheel supporting body member being spaced apart from and substantially parallel to the rotational axis of the grinding wheel.

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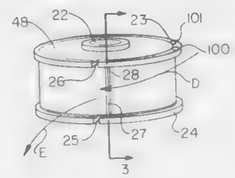
**4,744,179**
**PROCESS FOR CONTROLLING TOOL INFEED AT MACHINING START OF A GEAR CUTTING MACHINE**
**Peter Möckli, Schaffhausen, Switzerland, assignor to Reishauer AG, Zurich, Switzerland**
**Filed Jun. 18, 1986, Ser. No. 875,840**
**Claims priority, application Switzerland, Jul. 1, 1985, 2808/85**
**Int. Cl.[4] B24B** *1/00*
**U.S. Cl. 51—287** **9 Claims**



1. Process for controlling a tool infeed prior to the start of machining a workpiece on a gear cutting machine which operates in a continuous gear shaping process comprising the steps of:
(a) aligning the tool and workpiece prior to the infeed of the tool into semi-machined teeth of the workpiece wherein the rotation of the tool is automatically coupled to the rotation of the workpiece;
(b) feeding the tool radially in rapid traverse into tooth spaces of the workpiece without any contact being made to a first setting;
(c) incrementally feeding the tool in intervals of at least one revolution of the workpiece and in amounts of one feed tep at a time until a second setting of the tool is reached wherein the tool makes contact with the workpiece for the first time and that thereupon the machining process commences;
(d) moving the rotating tool in a longitudinally back and forth stroke over the width of the workpiece; and
(e) feeding the tool radially by one feed step at least at one end of the longitudinal stroke.

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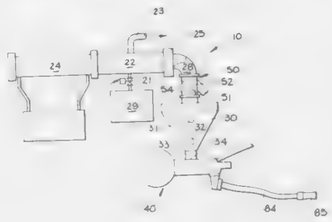
**4,744,180**
**SANDING WHEEL**
**Theodore Voorhees, 331 Greenacres Dr., Anderson, Calif. 96007**
**Filed Aug. 20, 1986, Ser. No. 899,069**
**Int. Cl.[4] B24D** *17/00*
**U.S. Cl. 51—358** **5 Claims**



1. A sanding wheel, comprising:
a substantially cylindrically shaped body having a top surface, a bottom surface and a cylindrical surface bounded by said top and bottom surfaces;
a contoured abrasive strip extending around and substantially covering said cylindrical surface of said body, and
quick installation and removal means consisting substantially of first and second circumferential rings attached to said substantially cylindrically shaped body, said first circumferential rings being positioned so that a first slot is formed between said first circumferential ring and said cylindrical surface proximate to said top surface, and said second circumferential ring being positioned so that a second slot is formed between said second circumferential ring and said cylindrical surface proximate to said bottom surface, and
wherein said contoured abrasive strip slides into said first and second slots and is held in position against said cylindrical surface by said first and second circumferential rings.

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**4,744,181**
**PARTICLE-BLAST CLEANING APPARATUS AND METHOD**
**David E. Moore, 212 Southampton Rd., Louisville, Ky. 40223, and Newell D. Crane, 5988 Woodridge Dr., Milford, Ohio 45150**
**Filed Nov. 17, 1986, Ser. No. 931,604**
**Int. Cl.[4] B24B** *1/00;* **B24C** *1/00;* **B08B** *7/00*
**U.S. Cl. 51—436** **22 Claims**



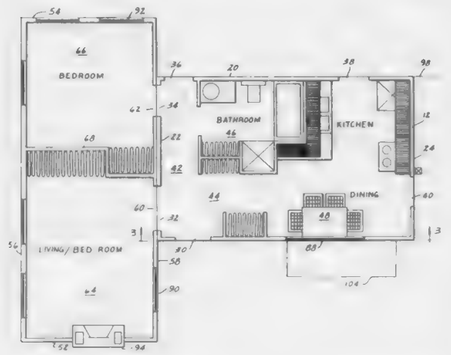
1. An improved particle-blast cleaning apparatus featuring



sublimable pellets as the particulate media, said apparatus comprising:
(a) a source of sublimable pellets;
(b) housing means having spaced pellet receiving and discharge stations;
(c) pellet feeder means for transporting said pellets from said receiving station to said discharge station, said pellet feeder means further comprising a plurality of reciprocating feeder bars each having a transport bore formed therein to receive said pellets for lateral transport between said receiving and discharge stations and arranged to be reciprocated in a staggered manner to provide a relatively uniform rate of transport and discharge of such pellets;
(d) means for providing gravity flow of said pellets to said transport bores at said receiving station;
(e) a discharge nozzle; and
(f) means for supplying a pressurized transport gas at said discharge station for conveying said pellets from said discharge station to said discharge nozzle.

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**4,744,182**
**MODULAR BUILDING STRUCTURE AND METHOD**
**Sheldon Shacket, Southfield, and Robert Helfman, Franklin, both of Mich., assignors to Trus-Us, Inc., Royal Oak, Mich.**
**Filed Feb. 28, 1983, Ser. No. 470,276**
**Int. Cl.[4] E04H** *1/00*
**U.S. Cl. 52—79.8** **13 Claims**




1. Building structure constructed at a remote location as a plurality of separate rectangular stationary units each having four complete exterior walls extending around the complete exterior periphery thereof a floor and a roof and transported to a building site and connected together at the building site comprising a separate stationary, but transportable prefabricated core unit having four complete exterior walls extending around the complete exterior periphery thereof, a floor and a roof and including bathroom and kitchen facilities having utilities therein and a plurality of separate entry and exit openings therein and one or more separate stationary but transportable prefabricated other building units each having four complete exterior walls extending around the complete exterior periphery thereof, a floor and a roof and including at least two entry and exit openings therein and no bathroom or kitchen facilities therein juxtaposed with the core unit with adjacent exterior walls in surface to surface contact with the entry and exit openings in the other units aligned with entry and exit openings in the core unit and connected together with the core unit at the building site to form a single building wherein the separate building units all have different roof levels to facilitate connection thereof without joining their roofs.

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**4,744,183**
**LID OPENER**
**Joseph A. Kruger, Warsaw, Ind., assignor to CTB, Inc., Milford, Ind.**
**Filed Jan. 20, 1987, Ser. No. 5,482**
**Int. Cl.[4] E05F** *11/00;* **B65D** *43/26*
**U.S. Cl. 52—192** **10 Claims**



1. A lid opener apparatus for use with a relatively large storage bin of substantial height and width, and having a peripheral sidewall portion, a top wall portion, an opening in an upper surface of said top wall portion substantially inwardly spaced from the sidewall portion, and a lid hingedly mounted to the top wall for selectively covering and exposing said opening; said lid opener apparatus comprising: handle means for gripping by an operator to operate the apparatus; means mounting and supporting said handle means relative to said bin at a given height convenient for manipulation thereof by an operator; said mounting means including elongate link means pivotally mounted at a first end thereof to said handle means and pivotally supported at said given heights relative to said bin at a second, opposite end thereof, a first elongate substantially rigid rod-like member also pivotally mounted to said first end of said link means and extending upwardly therefrom to an area adjacent said top wall portion; a second elongate substantially rigid rod-like member pivotally coupled at one end thereof to said lid and extending outwardly of said lid generally in a direction of a side thereof which is hingedly mounted to said top wall and to an area adjacent an uppermost end of said first rod-like member; bell crank means having three mounting portions thereon arranged in a generally triangular configuration, said three mounting portions being respectively pivotally coupled to the respective adjacent ends of said first and second elongate rod-like members and to said bin at a part hereof adjacent the area thereof at which said sidewall portion and said top wall portion meet, to thereby translate generally vertical motion of said first rod-like member into a generally horizontal motion of said second rod-like member for opening and closing said lid about the hingedly mounted portion thereof.

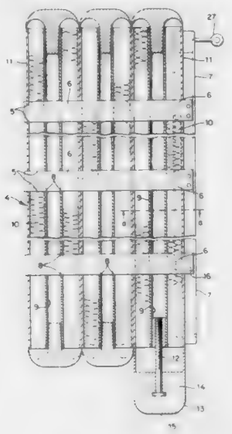
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**4,744,184**
**PARTITION**
**Walter Kramer, Steinen, Fed. Rep. of Germany, assignor to Plattex GmbH, Steinen, Fed. Rep. of Germany**
**Filed Oct. 16, 1986, Ser. No. 920,258**
**Claims priority, application Fed. Rep. of Germany, Oct. 16, 1985, 3536829**
**Int. Cl.[4] E04H** *1/00*
**U.S. Cl. 52—227** **25 Claims**
1. A partition, particularly a mobile upright partition for use

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in offices and other establishments, comprising a plurality of substantially rod-shaped elongated parallel components disposed side by side and including a plurality of intermediate components and first and second outer components flanking said intermediate components, each of said components having a transversely extending passage and said passages being at least substantially aligned with each other; coupling means including a flexible coupling element extending through said passages and having first and second end portions adjacent said



first and second outer components, respectively; first and second means for securing said end portions to the respective outer components so that said components can be moved relative to each other into and out of a common plane; and feet provided on at least some of said components and arranged to be placed into contact with a floor or another support, one of said feet being disposed in the region of each of said securing means and said feet being separably affixed to the respective components.

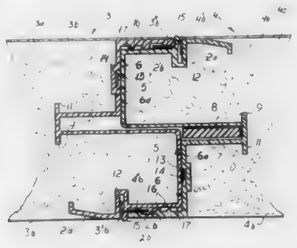
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**4,744,185**

**EDGE PROFILE FOR INSULATING PANEL**

**Philippe Lamberet, Onjard, Bage La Ville, Ain, and Georges Robin, Mezeriat, both of France, assignors to Philippe Lamberet, Bage La Ville, France**

**Filed Jan. 21, 1986, Ser. No. 820,934**
**Claims priority, application France, Jan. 22, 1985, 85 01243**
**Int. Cl.[4] E04C** *1/30, 2/00*
**U.S. Cl. 52—309.11** **4 Claims**



1. A profile member adapted to form an edge of an insulating panel for coupling with an identical but inversely positioned coupling member of an adjoining insulating panel, said profile member being generally of S transverse cross section and being formed unitarily with:

a rib lying parallel to a groove so that said rib is engageable in the groove of the other profile member and the groove receives a rib of the other profile member, and a fold of flattened rectangular cross section adapted to extend inwardly with respect to a panel formed with the profile member and opening toward the other profile member for receiving a flat rectangular-section metal insert so that said fold is closed when the profile member is interfitted with the other profile member, said fold being formed at a base thereof with a pair of oppositely projecting flanges engageable in a body of foam material adapted to be molded around said fold, said rib being bounded on a lateral side of said profile member with a flange formed with a laterally outwardly open fold adapted to receive a right angle bent edge of a sheet metal facing of a panel formed with the profile member, said groove being bounded by a lateral flange cooperating witht he lateral flange of the other profile member bounding the rib thereof to form a groove into which an edge of a sheet metal facing bent around the lateral flange bounding the groove through 180° can extend, the lateral flange bounding said groove being formed with at least one lip projecting toward a base of said groove and engageable with an array of teeth formed on a lateral flange of the other profile member bounding the rib thereof to enable interlocking of said profile members.

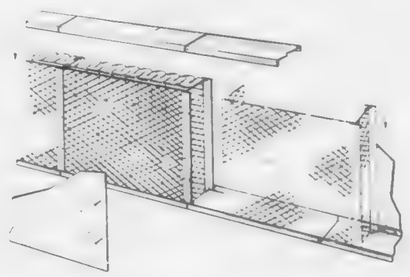
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**4,744,186**

**FIREPROOF BUILDING PANELS**

**Terry M. Smith, 102 Walker Rd., Washington Crossing, Pa. 18977, and Hugh W. Smith, 1007 Castle Ridge Rd., Austin, Tex. 78746**

**Filed Mar. 4, 1987, Ser. No. 21,400**
**Int. Cl.[4] E04B** *1/74*
**U.S. Cl. 52—404** **14 Claims**



1. A fireproof building panel capable of maintaining its structural integrity upon prolonged exposure to temperatures up to about 1800° F. comprising:

panel-shaped high temperature ceramic fiber insulating material having an inner face facing an area to be insulated from heat and an outer face facing toward said temperatures;

a stainless steel expanded metal support frame attached to the outer face of said insulating material;

a cold rolled steel expanded metal support frame attached to the inner face of said insulating material;

a support housing surrounding the outer edges of said insulating material and said frame, said support housing being attached to said frame; and

a wallboard panel covering the outer side of said insulating material and secured to said support housing.

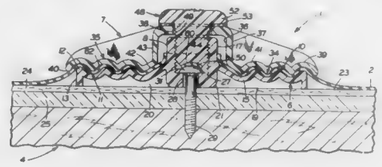


**4,744,187**

**MECHANICAL ROOF FASTENER**

**Scott D. Tripp, Indianapolis, Ind., assignor to The Firestone Tire & Rubber Company, Akron, Ohio**

**Filed Jan. 27, 1987, Ser. No. 7,059**
**Int. Cl.[4] E04D** *3/36*
**U.S. Cl. 52—410** **22 Claims**



1. A penetrating, fastening and sealing device for both mechanically securing a flexible elastomeric sheet to the upper surface of a roof, and sealingly engaging said sheet, said device including:

(a) a rigid lower retainer having a bottom surface and an upper surface, said upper surface being formed with a hole and an upstanding central boss surrounding said hole, said boss having an internally threaded surface, and a plurality of annular concentric alternating grooves and ridges formed in said upper surface and extending about the central boss;

(b) anchoring means for securing the lower retainer to the upper surface of the roof;

(c) a rigid upper retainer having a bottom surface and an upper surface and formed with a central hole, said bottom surface having a plurality of annular concentric alternating grooves and ridges extending concentrically about the central hole, said grooves and ridges being located within respective ridges and grooves formed on the top surface of the lower retainer to provide a series of alternating annular gripping zones and unloading zones for the elastomeric sheet secured therebetween, said upper and lower grooves and ridges being smooth concave in cross section with said ridges having smaller radii of curvature than that of said grooves whereby annular spaces are formed between adjacent annular gripping zones to provide said annular unloading zones; and

(d) separate fastener means extending through the hole formed in the upper retainer and engaged with the internally threaded surface of the lower retainer for drawing said retainers against each other to sealingly secure the elastomeric sheet between the cooperating ridges and grooves of said retainers to provide said alternating zones, said fastener means having a frangible upper portion which separates from the fastener means upon a certain sealing force being exerted against the elastomeric sheet.

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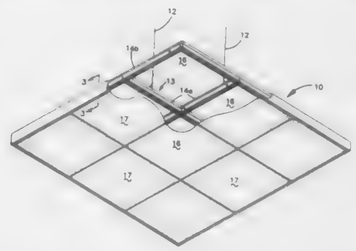
**4,744,188**

**SUSPENDED ISLAND CEILING SYSTEM**

**Greg M. Ahren, Lakewood, Ohio, assignor to Donn Incorporated, Westlake, Ohio**

**Filed May 15, 1987, Ser. No. 49,838**
**Int. Cl.[4] E04B** *5/52;* **E04C** *2/38*
**U.S. Cl. 52—484** **12 Claims**

1. A suspension ceiling island structure comprising a grid of interconnected runners cooperating to define a rectangular island assembly and defining within said island assembly a plurality of rectangular openings, panels supported within said openings by said grid, said grid including perimeter runners extending along the edges of said grid, said runners providing a central web, a stiffening bulb along the upper side of said web, an oppositely extending panel supporting flange means along the lower side of said web, said perimeter runners being interconnected at longitudinally spaced locations to perpendicularly extending inner runners, and generally channel-shaped border trim members mounted on said perimeter runners enclosing the perimeter of said grid and providing a finished border on said island, said border members providing an outer base wall and a pair of vertically spaced generally horizontally extending legs joined to said base wall, the upper of said legs engaging the upper surface and one side of the bulb of an



associated perimeter runner, the lower of said legs engaging the lower surface and one side of said flange means of an associated perimeter runner, said runners also providing corner openings, and corner connectors fitting into said corner openings at adjacent ends of said border members and operating to interconnect said border members at said corners.

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**4,744,189**

**REMOVABLE WALL PANEL**

**William J. Wilson, Pasadena, Md., assignor to Snap-Wall, Inc., Baltimore, Md.**

**Filed Aug. 14, 1986, Ser. No. 896,271**
**Int. Cl.[4] E04C** *1/40*
**U.S. Cl. 52—511** **9 Claims**



1. In combination with an existing wall in a home or office, wherein the existing wall comprises an uninterrupted structural surface, a totally reusable decorative wall panel consisting of a covering adapted to be easily installed on to said existing wall by a simple pushing action and just as easily removed by a simple pulling action away from the wall, said panel comprising a generally rectangular board having four respective corners and further having front and rear surfaces and respective side and end edges joining at respective corners of the board, thereby forming a core to provide structural rigidity, the board comprising an acoustical board, thereby providing noise reduction in the home or office, the board further being tackable, thereby accommodating the posting of notes or other papers thereon, a fabric for the front surface of the board and having respective portions wrapped around and contacting all of the side and end edges thereof and further being secured to the rear surface of the board, a plurality of quick-disconnect fibrous fasteners associated with the rear surface of the board and arranged thereon substantially inwardly adjacent to the respective wrapped-around portions of the fabric at the respective corners of the board, each of the quick-disconnect fibrous fasteners having a depth and each fastener comprising first and second sections, the respective first sections being secured to the rear surface of the board, and

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the respective second sections being secured to the wall in substantial alignment with the respective first sections on the board, such that when the respective first and second sections of the quick-disconnect fibrous fasteners are in meshing engagement, the panels are secured in place being spaced from the wall, but may be removed therefrom by manually pulling the panels away from the wall such that the respective first and second sections of the plurality of quick-disconnect fibrous fasteners are disengaged, whereby the panel is easy to install or to remove, so that a succession of panels may be installed adjacent to each other to provide a substantially total covering for the existing wall, and whereby the panel is totally reusable in other homes or offices as a covering for an existing wall therein.

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**4,744,190**

## SPACING RETAINER INCLUDING LOCKING MEANS FOR REINFORCEMENTS

**Paul Couwenbergs, Scheibenbergstrasse 17, 7500 Karlsruhe, Netherlands, and Andreas Holterhus, Hauptstrasse 21, 4441 Spelle, Fed. Rep. of Germany**

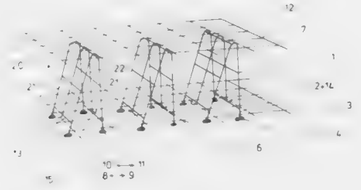
**PCT No. PCT/EP86/00121, § 371 Date Nov. 4, 1986, § 102(e) Date Nov. 4, 1986, PCT Pub. No. WO86/05538, PCT Pub. Date Sep. 25, 1986**

**PCT Filed Mar. 7, 1986, Ser. No. 943,179**

**Claims priority, application Fed. Rep. of Germany, Mar. 11, 1985, 8506996[U]**

**Int. Cl.⁴ E04C** *5/18, 5/06*

**U.S. Cl. 52—650** **14 Claims**



1. A spacer element of a space element arrangement for retaining a reinforcement containing two structural steel fabrics arranged parallel to and spaced from each other, said spacer element comprising:

a predetermined number of angle elements made of a resilient material and defining a top and free ends;

at least one locking element made of resilient material and defining a top and free ends;

a strut interconnecting said predetermined number of angle elements and said at least one locking element at said tops thereof;

struts interconnecting said predetermined number of angle elements and said at least one locking element close to the free ends and on predetermined sides thereof;

each one of said free ends of said at least one locking element being bent in a predetermined direction from said predetermined side of said at least one locking element such as to form a locking part for forming a locking connection with an associated member of an associated one of the two structural steel fabrics;

each one of said structs which interconnect said predetermined number of angle elements and said at least one locking element close to said free ends and on predetermined sides thereof, extending on one of said predetermined sides of said at least one locking element and from which one predetermined side said locking parts is bent off; and

each one said locking parts of said at least one locking element and an associated one of said struts cooperating such that said associated member of said associated structural steel fabric is locked between said locking part and said cooperating associated strut.

**4,744,191**

## APPARATUS FOR THE ANCHORAGE OF SLABS

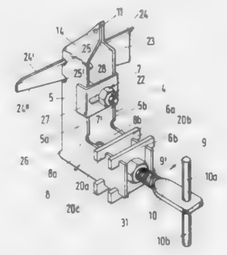
**Siegried Fricker, 30-34 Wurmberger Strasse, 7135 Wiernsheim, Fed. Rep. of Germany**

**Filed Aug. 26, 1986, Ser. No. 900,406**

**Claims priority, application Fed. Rep. of Germany, Aug. 28, 1985, 3530694**

**Int. Cl.⁴ E04F** *13/08*

**U.S. Cl. 52—702** **14 Claims**



1. An apparatus for the anchorage of loads such as slabs or the like to an anchorage base, comprising:

(a) a holder assembly comprised of a pair of separately formed, spaced, angular shaped holders, each holder comprising a flat vertical holding strut adapted to be positioned generally perpendicular to the surface of the anchorage base, and an integrally formed flat, generally horizontal supporting strut extending generally perpendicular to said vertical strut toward the load to be supported, said holders being spaced from and generally parallel to each other, said vertical holding struts including rearwardly projecting means in the lower regions thereof for contacting said anchorage base;

(b) means for securely bracing said holders in their spaced, parallel position, said bracing means comprising a pair of spaced, parallel bearing plates positioned between and secured to said horizontal supporting struts;

(c) anchoring means operatively connected to said holders for anchoring the same to said base; and

(d) generally horizontally outwardly extending load support means operatively connected to said bearing plates and thus to said horizontal supporting struts of said holders, said load support means being adapted to support such loads and transfer, through said bearing plates and said holders, the force thereof to said anchorage base.

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**4,744,192**

## TENSION TIE

**Alfred D. Commins, Danville, Calif., assignor to Simpson Strong-Tie Company, Inc., San Leandro, Calif.**

**Filed May 11, 1987, Ser. No. 48,090**

**Int. Cl.⁴ E04I** *3/8;* **E02D** *27/00*

**U.S. Cl. 52—714** **8 Claims**

1. A wood-to-concrete or wood tension tie for holding a wood frame member subject to a design load in tension to a tension attachment member held by a wood or concrete building member comprising:

a. an elongated strap member having a planar face formed with attachment openings adapted for receipt of shear attachment members therethrough for connection to said wood frame member and a connection rivet opening adjacent one end;

b. connection means dimensioned for receipt in said connection opening of said strap member;

c. continuous seat member having a thickness sufficient to form a relatively rigid structure formed with a seat opening adapted for receipt therethrough of said tension attachment member anchored to said wood or concrete



building member and for holding said tension attachment member without deforming under selected design loads;

d. a first side member having a generally triangular shape in a plane positioned at a right angle to said planar face of said enlongated strap member integrally connected to a first portion of said seat member and forming a generally right angle therewith further rigidizing said seat member;

e. a first back member having a planar face positioned in a plane parallel to said planar face of said elongated strap member and having a length substantially greater than the length of said seat member integrally connected to said first side member and forming a generally right angle therewith and formed with a spaced first connection opening adapted for receipt therethrough of said connection means;

f. a second side member having a generally triangular shape in a plane positioned at a right angle to said planar face of said elongated strap member and integrally connected to a second portion of said seat member disposed on opposite sides of said seat opening and forming a generally right angle to said seat member further rigidizing said seat



member, and said second side member is generally parallel to said first side member;

g. a second back member having a planar face positioned in a plane parallel to said planar face of said first back member and said elongated strap member and having a length substantially greater than the length of said seat member and integrally connected to said second side member and forming a generally right angle therewith, and said second back member is substantially parallel and closely adjacent to said first back member, and is formed with a second connection opening adapted for receiving said connection means, and at least a portion of said second back member overlaps a portion of said first back member wherein said second connection opening in said overlapping portion of said second back member is in alignment with said first connection opening in said first back member; and

h. said connection member holds said first and second back members together and connects said strap member to said first and second back members and transfers said design load in shear substantially evenly to said first and second overlapped back members.

**4,744,193**

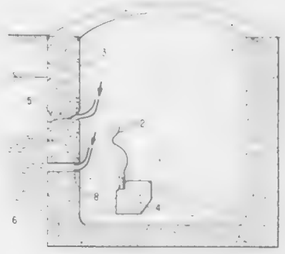
## METHOD OF SEALING WATER LEAKAGE IN CONCRETE STRUCTURES

**Toshio Hatsuzaki, Kanagawa; Yoshihiko Ogawa, Tokyo; Toshio Hiramatsu, Tokyo; Hideo Senga, Tokyo, and Takehiko Tokoro, Saitama, all of Japan, assignors to Taisei Corporation and Nisshinboseki Kabushiki Kaisha, both of Tokyo, Japan**

**Filed Nov. 6, 1986, Ser. No. 927,469**

**Int. Cl.⁴ E02D** *31/02, 37/00*

**U.S. Cl. 52—744** **5 Claims**



1. A method of sealing water leakage in concrete structures which comprises: injecting a grouting mixture consisting essentially of (1) an organic polyisocyanate compound and/or a prepolymer having terminal isocyanate residues, which is derived from a reaction of an organic polyisocyanate with a polyhydroxyl compound and (2) 2-pyrrolidone into openings or cracks at a leaking site of a concrete structure and curing said grouting mixture by hydration reaction to form polyurethane foam to stop the water leakage.

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**4,744,194**

## METHOD OF LAYING TILE-LIKE FLOORING MEMBERS ON A FLOOR

**Tone Yasuyoshi, Yokohama, Japan, assignor to Saami Co., Ltd., Tokyo, Japan**

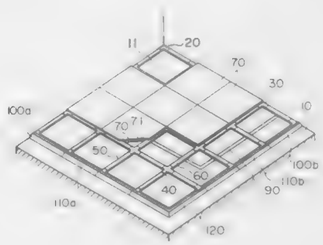
**PCT No. PCT/JP85/00454, § 371 Date Apr. 14, 1986, § 102(e) Date Apr. 14, 1986, PCT Pub. No. WO86/01246, PCT Pub. Date Feb. 27, 1986**

**PCT Filed Aug. 16, 1985, Ser. No. 858,440**

**Claims priority, application Japan, Aug. 20, 1984, 59-173045**

**Int. Cl.⁴ E04B** *1/00*

**U.S. Cl. 52—747** **26 Claims**



1. A method of laying tile-like flooring members on a floor surface comprising the following steps:

forming on said floor surface an interconnected framework of a plurality of plate like frame members having the same thickness as each other to provide an array of recesses with said frame members directly contacting and being supported along a substantial portion of their lengths by said floor surface, wherein ends of said frame members are connected by providing each of said ends of said frame members with connecting step portions, providing said

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connecting step portions with projections and openings and inserting said projections of said frame members into said openings of said frame members adjacent thereto;

laying in each said recess a tile-like flooring member having on its undersurface a projection for snugly engaging each said recess and each flooring member being supported across its length and width dimensions by said floor surface; and

providing projecting edges on said flooring members extending over the frame members to engage each other and together form a continuous floor covering.

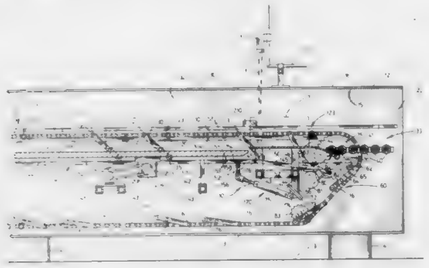
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**4,744,195**

## APPARATUS FOR DISCRIMINATELY TREATING CONTAINERS AND THE LIKE

**Gerald W. Reed, 39806 Kings River Dr., Kingsburg, Calif. 93631**

**Filed Nov. 25, 1986, Ser. No. 934,918**
**Int. Cl.[4] B65B** *57/14, 1/22*
**U.S. Cl. 53—52** **9 Claims**



1. In a machine for handling containers and the like of different characteristics and having a continuous conveyor for conveying said containers along a path of travel through at least one work station, an apparatus for discriminately treating the containers comprising a plurality of individual arms borne by said conveyor and individually depending therefrom in predetermined operational attitudes, each arm mounting a support, the arms movable between first attitudes wherein said containers are not borne by said supports during movement along the path of travel and second attitudes wherein said containers are borne by said supports during movement along the path of travel; control means mounted on the machine for individually selectively placing said arms in the first and second attitudes; and means borne by the machine for individually detecting the characteristics of the containers and operating said control means to place the arms for each container detected in the first or second attitudes appropriate for the characteristics of said container.

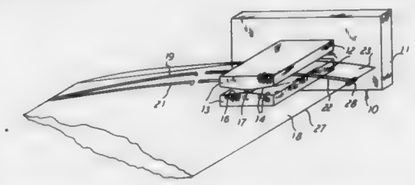
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**4,744,196**

## DEVICE FOR INTERLOCKING TONGUE-AND-GROOVE TYPE BAG

**Michael S. Gallo, 1310 N. Memorial Dr., Racine, Wis. 53404**

**Filed Jan. 2, 1987, Ser. No. 107**
**Int. Cl.[4] B65B** *7/06*
**U.S. Cl. 53—371** **11 Claims**



1. A device for joining together the mating sealing strips of a tongue-and-groove type bag, comprising a planar extending base portion, two arms extending in cantilever mounting from said base portion to extend therefrom in the direction transverse to the plane of said base portion, each of said arms having a surface thereon spaced from and facing said surface on the opposite one of said arms to thereby present two spaced-apart and mutually facing surfaces with a gap therebetween, said surfaces being disposed to be spaced-apart a maximum dimension at one of the respective edges thereof and being spaced-apart a minimum dimension less than said maximum dimension at a location between said surfaces spaced from said edges, and all being arranged for permitting moving a bag of the tongue-and-groove type parallel to said plane and between said surfaces in the direction from said edges to said location, said maximum dimension being greater than the total thickness of the joined sealing strips of said tongue-and-groove, said minimum dimension being no greater than the thickness of the mated sealing strips of said tongue-and-groove bag, and said arms being of an elastic material for flexing toward and away from each other under the influence of said sealing strips being slid therebetween.

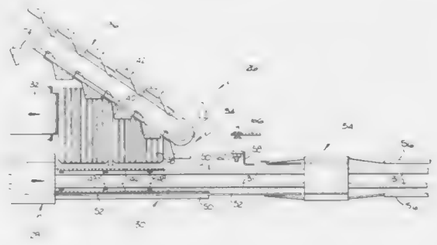
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**4,744,197**

## TRAY CARTON END FLAP AUXILIARY SEALER

**Peter M. Conforto, Monroe, La., and Maxon L. Day, Cudahy, Wis., assignors to Manville Corporation, Denver, Colo.**

**Filed Jul. 27, 1987, Ser. No. 77,834**
**Int. Cl.[4] B65B** *49/12*
**U.S. Cl. 53—397** **8 Claims**



1. In a machine for packaging articles in a tray carton comprising a bottom panel, side panels and end panels foldably connected to the bottom panel and end flaps foldably connected to the ends of the side panels:

means for conveying tray carton blanks downstream of the machine, the bottom panels of the blanks being supported by the conveying means, the end panels of the blanks being in their horizontal unfolded condition, and the side panels of the blanks being folded upwardly from the bottom panels and comprising the leading and trailing portions of the blanks;

means for moving articles to be packaged onto the bottom panel of the moving tray carton blanks;

means for folding the end flaps of the moving tray carton blanks toward each other;

means for applying glue to either the end panels or the end flaps of the moving tray carton blanks; and

normally stationary means for folding the end panels up against the end flaps;

a portion of the normally stationary folding means being mounted for movement toward and away from the end flaps of a tray carton blank; and

means for moving said portion of the normally stationary means toward the end flaps of a tray carton blank when the means for conveying the blanks downstream of the machine has stopped, whereby said portion of the normally stationary means will move the end panels of a stationary tray carton blank into contact with the end flaps thereof to adhere the end panels to the end flaps to complete the formation of a tray carton from the stationary tray carton blank.

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**4,744,198**

## ROLL WRAPPING HEAD STORAGE AND DELIVERY APPARATUS AND METHOD

**Stephen K. Hood, Hoquiam; Joseph Norkoski, Cosmopolis, and Halan P. Arnold, Aberdeen, all of Wash., assignors to Engerprises International, Inc., Hoquiam, Wash.**

**Filed Aug. 21, 1986, Ser. No. 898,530**
**Int. Cl.[4] B65B** *61/00*
**U.S. Cl. 53—415** **27 Claims**



1. Head storage and delivery apparatus for moving an individual head from stacks of heads to a placement location on a package wrapping header or crimper, comprising:

a storage rack assembly;

a plurality of vertically spaced storage racks in the storage rack assembly for holding the heads;

a pickup mechanism for lifting an individual head from any rack while in the storage rack assembly and delivering the head to a platen separate from the storage rack; and

a transfer arm for lifting the head from the platen and placing the head at the placement location.

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**4,744,199**

## VACUUM PACKAGING

**Raymond Gannon, London, United Kingdom, assignor to FGL Projects Limited, London, United Kingdom**

**Filed Feb. 10, 1986. Ser. No. 828,059**
**Claims priority, application United Kingdom, Feb. 12, 1985, 8503545; May 28, 1985, 8513385**
**Int. Cl.[4] B65B** *31/02, 31/06*
**U.S. Cl. 53—434** **9 Claims**

1. A process for packaging goods which comprises: placing the goods in an unsealed first container having at least one deformable wall, a semi-rigid opposing wall, and a valve integrally formed at least in part from said deformable wall and the opposing wall, said deformable wall being resilient, having a first stable position wherein the valve is opened and a second stable position wherein the deformable wall is in intimate contact with the opposing wall and the valve is closed; placing the container in a second container having substantially non-deformable walls; forming a vacuum separately in both said first and second containers while the valve is opened; and squeezing the deformable wall from its first stable position to the second stable position to close the valve and to interrupt the flow of fluids from the interior to the exterior of said first chamber, said valve remaining in its closed position by means of the resiliency of the deformable wall.

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**4,744,200**

## THERMOPLASTIC BAG PACK WITH SINGLE TAB SUSPENSION

**Gordon L. Benoit, Jr., Macedon, and R. Stuart Smith, Jr., Palmyra, both of N.Y., assignors to Mobil Oil Corporation, New York, N.Y.**

**Filed Oct. 30, 1986, Ser. No. 925,751**
**Int. Cl.[4] B65D** *33/14;* **B65B** *35/50, 43/04*
**U.S. Cl. 53—447** **1 Claim**

1. A method of forming a bag pack of thermoplastic film bags each of which has only a single suspension-bonding tab coplanar with its rear wall comprising:

(a) providing a plurality of gusseted end-sealed tubes, each tube having a front wall, a rear wall and gusseted side walls said walls having top and bottom regions;

(b) removing from only the top region of said front wall of each tube a region at least corresponding in area to the suspension bonding top of said rear wall;

(c) stacking a plurality of these structures in registration;

(d) removing from the top regions of each of said front and rear walls sufficient film to leave a bag mouth opening, only a single suspension-bonding tab coplanar with said rear wall, and a pair of double film handles located at opposite ends of said bag mouth;

(e) bonding said tabs together;

(f) forming in said tabs pre-weakened severance lines for removal of individual bags from said pack; and

(g) forming a suspension orifice in said tabs.



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**4,744,201**

## STAGING APPARATUS AND METHOD

**Robert V. Total, Sun Prairie, and Timothy G. Mally, Oregon, both of Wis., assignors to Oscar Mayer, Madison, Wis.**

**Filed Jan. 30, 1986, Ser. No. 823,898**
**Int. Cl.[4] B65B** *35/30*
**U.S. Cl. 53—448** **6 Claims**



4. A method for staging an inflow of a plurality of products into a staged outflow of groups of products, which staged outflow groups are of a desired pattern and wherein said products consist of compiled, separable slices, said method comprising:

onfeeding a flow of a plurality of products having onfeed flow characteristics different from a desired patterned grouping of products, which desired patterned grouping includes a specific number of products having specific spacing therebetween, said onfeeding step being alternately onto one of a multiplicity of generally paralleled staging lines;

indexing said onfeeding flow of products upstream of the multiplicity of generally parallel staging lines;

receiving the onfeed flow of products onto the staging line and translating the products along an elongated conveyor-like pathway thereof;

regulating movement of the staging line to the extent that the products of the onfeed flow are repositioned with respect to each other into the desired patterned grouping

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of a specific number of products having a specific spacing therebetween wherein said regulating movement procedure includes indexing one of the staging lines through an onfeed mode and generally simultaneously moving another of the staging lines through said off-feeding step; and

off-feeding the grouping of products from the staging line onto a takeaway conveyor assembly, and moving the takaway conveyor assembly at a selected speed at which the grouping of products are fed onto the takeaway conveyor assembly to said desired patterned grouping of the specific number of products having the specific spacing therebetween.

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**4,744,202**

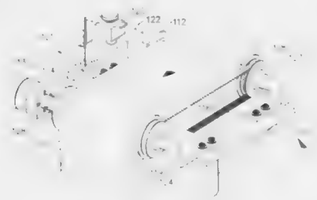
## APPARATUS AND METHOD FOR MAINTAINING UNIFORM, REGISTRATION IN A PACKAGING MACHINE

**Richard D. Wylie, Gaffney, S.C., assignor to Milliken Research Corporation, Spartanburg, S.C.**

**Continuation of Ser. No. 931,274, Nov. 14, 1986, abandoned. This application Jun. 26, 1987, Ser. No. 67,426**

**Int. Cl.[4] B65B** *9/12, 9/20, 41/18, 57/04*

**U.S. Cl. 53—451** **11 Claims**



1. A method for controlling the registration of pre-printed package stock in a form-fill-seal packaging machine in which individual packages are formed in substantially continuous fashion, said package stock being drawn through said machine by the advancing action of moving sets of opposed jaws, said method comprising the steps of:

(a) supplying a quantity of package stock having registration indicia placed thereon at spaced intervals;

(b) guiding said package stock into said machine via a path in which said stock comes into operable contact with a linear motion inhibiting element prior to contacting said opposed jaws, said element having adjustable linear motion inhibiting action with respect to said stock;

(c) detecting the position of said registration indicia on said stock;

(d) adjusting the inhibiting action of said element in accordance with the position of said indicia, thereby adjusting the tension on that portion of said stock between said element and said opposed jaws.

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**4,744,203**

## MACHINE FOR VACUUM-SEALING A PACKAGE

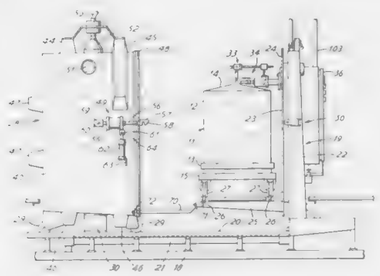
**Ian P. Brockwell, Edinn, Minn., and Andrew M. Lockyer, Norton-Sub-Hamdon, England, assignors to Alfa-Laval Cheese Systems Limited, Somerset, England**

**Filed Mar. 10, 1987, Ser. No. 24,018**

**Int. Cl.[4] B65B** *31/00*

**U.S. Cl. 53—512** **3 Claims**

3. A machine for vacuum-sealing a mass of cheese in an envelope of heat sealable plastics material which forms an internal lining in a cheese box mounted on a wheeled dolly, the envelope having an open end which projects out of the cheese box, the machine comprising a frame providing an upright wall having a sealing surface thereon, a hollow casing mounted on the frame for movement towards and away from said sealing surface on the wall, the casing being open at the end facing said wall and the casing being movable between an open position in which the casing is spaced from the wall and a closed position in which the open end of the casing abuts the sealing surface on the wall and cooperates therewith to define a closed chamber, latch means operable to clamp the casing to the wall to provide an air tight seal therebetween, support means mounted on said wall for support of the wheeled dolly and cheese box, the support means, wheeled dolly and cheese box being accommodated within said chamber when the casing is in the closed position, gripper mechanism mounted on said wall for holding open the open end of the envelope, first welding mechanism mounted on said wall, second welding mechanism mounted on the casing in the interior thereof and adapted to cooperate with the first welding mechanism to seal the open end of the envelope, said gripper mechanism and said first welding mechanism being mounted on a part of the wall which is surrounded by



said sealing surface, and control valve means operable selectively to connect the chamber to a source of vacuum or to atmosphere, wherein said support means comprises a cantilever structure mounted on a part of the wall which is surrounded by said sealing surface and transverse rails mounted on the cantilever structure, the transverse rails being adapted to support the wheeled dolly with the wheels thereof in rolling engagement with the transverse rails, further rails are aligned with said transverse rails for rolling the dolly and cheese box onto and off said transverse rails when the casing is in the open position, and the casing comprises two side walls, a back wall, a roof, a floor, a ramp between the floor and the back wall, and a walkway which has one side thereof pivotally connected to said cantilever structure and the other side thereof supported on the floor of the casing, the arrangement being such that the walkway traverses along the floor of the casing, onto the ramp and then rides up the back wall into an upright position upon movement of the casing from its open position to its closed position.

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**4,744,204**

## APPARATUS FOR STORING PERISHABLES SUCH AS MEAT

**Jürgen Schlegel, Umkirch, Fed. Rep. of Germany, assignor to Vesten AG, Stans, Switzerland**

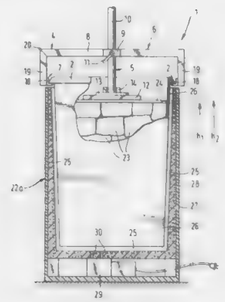
**Continuation-in-part of Ser. No. 559,231, Dec. 8, 1983, Pat. No. 4,659,578. This application Feb. 13, 1987, Ser. No. 14,791**

**Claims priority, application Fed. Rep. of Germany, Dec. 23, 1982, 8236195[U]; European Pat. Off., May 20, 1983, 83105018.2; Fed. Rep. of Germany, Jul. 3, 1986, 8617814[U]**

**Int. Cl.[4] B65B** *63/00*

**U.S. Cl. 53—526** **28 Claims**

24. Apparatus for temporary storage of pieces of meat, comprising a vessel having a bottom wall and an open top for admission and withdrawal of meat, said vessel including a reinforced portion in the region of said open top; a cover which is insertable into the vessel by way of said open top so as to overlie the meat therein; and means for applying pressure to the cover from above so as to pressurize the meat by urging the cover toward the bottom wall of the vessel, said pressure applying means comprising a carrier on said vessel, a pressurizing member mounted on said carrier for movement toward and away from the bottom wall, a pressure applying member cooperating with said pressurizing member and abutting the cover from above when the cover is received in said vessel, and



means for moving the pressurizing member relative to the carrier, said carrier including a substantially U-shaped member having a web and two legs depending from the web and having means for coupling the carrier to said reinforced portion, each of said coupling means comprising a rail arranged to engage the reinforcing portion from below and a rotary member arranged to overlie the reinforced portion at a level above the respective rail.

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**4,744,205**

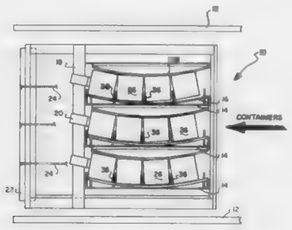
## CASE PACKING HEAD

**Timothy F. Probst, North Canton, Ohio, assignor to Figgie International, Richmond, Va.**

**Filed Nov. 14, 1986, Ser. No. 930,781**

**Int. Cl.[4] B65B** *35/44, 39/02, 5/06*

**U.S. Cl. 53—539** **19 Claims**




1. A case packing head, comprising:

first means for receiving and aligning containers in a plurality of rows, said rows being spaced and separated from each other; and

second means for separating said containers in each said row from each other within said row, said second means comprising arcuate plates defining a curved path for said containers to travel in each said row, said paths being defined by concentrically spaced pairs of said arcuate plates.



**4,744,206**

## APPARATUS FOR APPLYING HEAT-SHRINKABLE PLASTIC SLEEVES TO CONTAINERS

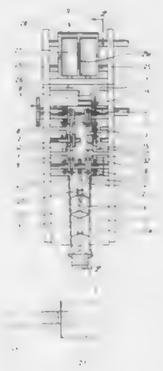
**Horst Winter, Neutraubling, Fed. Rep. of Germany, assignor to Krones AG Hermann Kronseder Maschinenfabrik, Neutraubling, Fed. Rep. of Germany**

**Filed Sep. 16, 1987, Ser. No. 97,125**

**Claims priority, application Fed. Rep. of Germany, Sep. 21, 1985, 3533758**

**Int. Cl.[4] B65B** *11/00*

**U.S. Cl. 53—585** **12 Claims**



1. Apparatus for applying shrinkable film sleeves to moving containers, comprising:

a withdrawal and creasing device (**19**) having an inlet to which a flattened and creased longitudinally creased film (**26**) is fed and an outlet from which said tube with additional creases emerges,

a cutting device (**1**) including rotating (**16**) and cooperating stationary (**18**) blades between which said creased tube passes for being cut into individual generally flat tubular sleeves (**6**),

drawing means including adjacent translationally driven pairs of flexible members (**3,4**) formed in closed loops having means for engaging said film tube (**26**) immediately before said tube is cut so as to advance the resulting sleeve (**6**) after it is cut,

sleeve opening means including laterally spaced apart longitudinally extending members (**30, 34, 35**) defining a channel that converges from an inlet to an outlet into which inlet said sleeves are discharged from said drawing means and along which channel said sleeves are moved while at least two opposed creases therein are supported on said converging members, and means (**5, 20, 34, 35, 38**) for engaging said sleeves adjacent said inlet and for moving said sleeves to said outlet to cause said sleeves to be open at the outlet for being applied to a container.

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**4,744,207**

## PROGRAMMABLE COMPACTOR FOR COTTON HARVESTER

**Michael J. Hanley, Chicago; Gary L. Wells, Downers Grove, and Robert M. Fachini, Naperville, all of Ill., assignors to J. I. Case Company, Racine, Wis.**

**Filed Aug. 25, 1986, Ser. No. 899,614**

**Int. Cl.[4] A01D** *46/08*

**U.S. Cl. 56—16.6** **3 Claims**

1. In a self-propelled cotton harvester having, drive transmission means, driven cotton picking means, blower means and a basket for receiving the picked cotton blown thereinto,

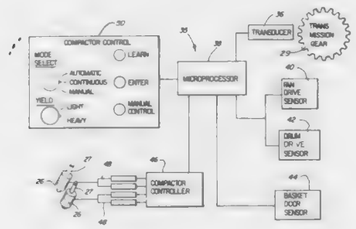
compactor means pivotally mounted in said basket;

cylinder means operationally associated with said compactor means; and

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programmable control means operatively associated with said cylinder means programmable to initiate automatic continuous operation of said compactor means at substantially the same point in each successive load of picked cotton in said basket which comprises transmission sensor means operatively associated with said drive transmission means, a cotton picking sensor means operatively associated with said cotton picking means and blower sensor means operatively associated with said blower means, whereby said control means is programmed responsive to revolutions of said transmission means signalled by said transmission sensor means, and is initiated and stopped respectively by activation and de-activation of both said cotton picking sensor means and said blower sensor means.



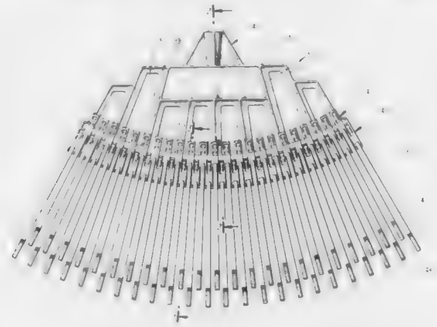

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**4,744,208**

**RAKE HEAD**

George E. King, Greensboro, N.C., assignor to The Disston Company, Greensboro, N.C.

Filed Dec. 24, 1986, Ser. No. 946,201
Int. Cl.[4] A01D *7/02, 7/08*
U.S. Cl. 56—400.16 17 Claims



1. A rake head comprising:
a substantially planar, support member defining a first plane;
means for attaching a rake handle provided on a first edge of said support member and disposed within said first plane;
first means for attaching a plurality of tines provided on said support member disposed along a second edge of said support member, said second edge being generally opposite from said means for attaching said rake handle;
a first plurality of tines secured in said first attaching means and extending generally in said first plane and radiating in a direction away from said second edge, said tines of said first plurality having their free ends bent in a common direction;
second means for attaching a plurality of tines arranged on said support member; and
a second plurality of tines secured in said second means for attaching a plurality of tines at an angle relative to said first plurality of tines, and extending in a second plane oriented at an angle to said first plane, each of said tines of said second plurality of tines extending between adjacent tines of said first plurality of tines and passing through said first plane outside of said second edge; a separation of said pluralities of tines being provided to form two substantially identical rows of raking tines, said tines of said second plurality having their free ends bent in the same common direction as said tines of said first plurality so that said free ends of said first and second pluralities can simultaneously engage the ground.

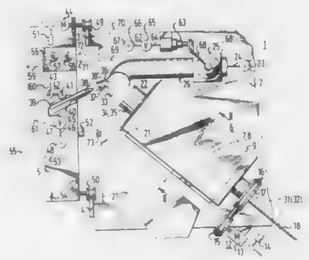
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**4,744,209**

**DEVICE FOR REMOVING RESIDUAL FIBER PARTICLES ON THE PERFORATED FRICTION SURFACES OF AN OE-FRICTION SPINNING MACHINE**

Heinz-Georg Wassenhoven, Monchen-Gladbach, Fed. Rep. of Germany, assignor to W. Schlafhorst & Co., Monchen-Gladbach, Fed. Rep. of Germany

Filed Jan. 17, 1986, Ser. No. 820,191
Claims priority, application Fed. Rep. of Germany, Jan. 23, 1985, 3502118
Int. Cl.[4] D01H *7/885, 1/12*
U.S. Cl. 57—301 18 Claims



1. OE-friction spinning machine in combination with a residual fiber removal device, the OE-friction spinning machine comprising perforated friction walls having inner and outer surfaces from which the residual fibers are to be removed by the residual fiber removal device, a suction device including a suction source, a controllable cut-off element connected to said suction source, a suction tube section connected between said cut-off element and said inner surfaces of said friction walls; and the residual fiber removal device comprising a compressed air source, and a controllable compressed air connection connected to said compressed air source and disposed in said suction tube section.

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**4,744,210**

**METHOD AND DEVICE FOR PRODUCING A TWISTED THREAD FROM SPINNING FIBERS**

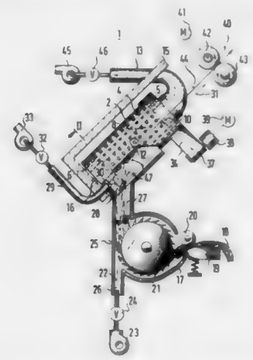
Hans Raasch, and Theo Lembeck, both of Mönchengladbach, Fed. Rep. of Germany, assignors to W. Schlafhorst & Co., Mönchengladbach, Fed. Rep. of Germany

Filed Jul. 15, 1985, Ser. No. 755,271
Claims priority, application Fed. Rep. of Germany, Jul. 14, 1984, 3425980
Int. Cl.[4] D01H *7/898, 1/135*
U.S. Cl. 57—401 17 Claims

1. Method of producing a twisted thread from spinning fibers by friction spinning, which comprises moving two friction elements of a friction spinning machine in opposite directions defining a spinning wedge therebetween, at least of the friction elements having a perforated, wall, feeding spinning fibers into the spinning wedge in a given direction with a transporting air current, continuously withdrawing a twisted thead from the spinning wedge in said given direction, sucking a first part of the transporting air current through the perforated wall of at least one of the friction elements, sucking a second part of the transporting air parallel to the spinning wedge, parallel to the thread and opposite to the given direction in which the thread is withdrawn and the fibers are fed into the spinning wedge, and amplifying the sucking of the first part of the transporting air current in the given direction in which the twisted thread is withdrawn.

6. Friction spinning device for producing a twisted thread from spinning fibers, comprising two friction elements moving in opposite directions and defining a spinning wedge therebetween having a front and a rear, at least one of said friction elements having a perforated wall, a first suction device disposed behind said perforated wall, said first suction device having a suction port formed therein directed against said spinning wedge, a fiber feeding device for feeding fibers to said spinning wedge in a given direction, a thread withdrawal device for withdrawing a thread from said spinning wedge in said given direction, and a second suction device having a suction port formed therein at an end of said spinning wedge disposed upstream as seen in said given thread withdrawal direction, said first suction device including means for increasing the suction force along said spinning wedge from the rear toward the front.





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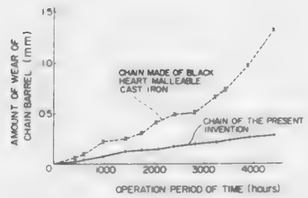
**4,744,211**

**DETACHABLE CHAIN AND METHOD OF PRODUCING THE SAME**

Tetuo Abe, Kitakyushu, Japan, assignor to Hitachi Metals, Ltd., Tokyo, Japan

Filed Feb. 24, 1986, Ser. No. 832,395
Claims priority, application Japan, Feb. 25, 1985, 60-36084
Int. Cl.[4] B22D *25/02;* F16G *15/04*
U.S. Cl. 59—85 2 Claims






2. A method of forming a detachable chain comprising integrally constructed chain links disposed to detachably receive one another and form said chain, said method comprising the steps of:
forming said chain links by casting a nodular graphite cast iron composition characterized by the inclusion of about 3.5 to about 3.7 wt % C, about 2.0 to about 2.5 wt % Si, about 0.3 to about 0.4 wt % Mn, and about 0.03 to about 0.05 wt % Mg;
holding said chain links at a temperature of about 870° C. for about two hours;
quenching said chain links to a temperature of about 380° C. and holding said chain links at said temperature for about one hour; and
cooling said chain links to room temperature so that said chain links have a matrix comprised of a mixture of austenite and bainite and improved wear resistance properties.

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**4,744,212**

**METHOD OF CONTROLLING A PFBC PLANT IN THE EVENT OF OPERATIONAL DISTURBANCE IN THE GAS TURBINE UNIT AND A PFBC PLANT WITH EQUIPMENT FOR SUCH CONTROL**

Mats Andersson; Kenneth Arvidsson; Peter Halse; Lennart Hjalmarsson, all of Finspong, and Göran Tjellander, Norrköping, all of Sweden, assignors to ASEA AB, Sweden

Filed Jan. 27, 1987, Ser. No. 7,226
Claims priority, application Sweden, Jan. 24, 1986, 8600313; Sep. 24, 1986, 8604034
Int. Cl.[4] F02C *3/26*
U.S. Cl. 60—39.02 7 Claims



1. A method of controlling a PFBC power plant comprising
a bed vessel enclosed within a pressure vessel and surrounded by compressed combustion air, said bed vessel containing a bed of fluidizable particulate material with combustible material therein,
a gas turbine-compressor unit, a supply conduit leading combustion gases from the bed vessel to the turbine of the unit to drive the same, a first cut-off valve in the supply conduit,
an outlet conduit for gas compressed in the compressor of the unit, a second cut-off valve in the outlet conduit,
a by-pass conduit extending between the supply and outlet conduits between the first cut-off valve and the turbine and between the second cut-off valve and the compressor, and a third cut-off valve in the by-pass conduit
which method, in the event of an operational disturbance in the gas turbine-compressor unit, includes the steps of closing the first and second cut-off valves to isolate the unit from the bed vessel,
opening the third cut-off valve in the by-pass conduit,
reducing the pressure in the bed vessel and in the pressure vessel, and
supplying an inert gas to the bed vessel to reduce the concentration of oxygen in the gas supplied to the combustible material in the bed.

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**4,744,213**

## PRESSURE-WAVE MACHINE

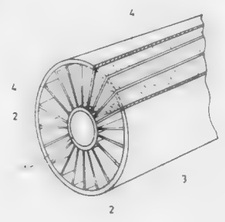
**Ibrahim El-Nashar, Kloten, Switzerland, assignor to BBC Brown, Boveri & Company, Limited, Baden, Switzerland**

**Continuation of Ser. No. 670,932, Nov. 13, 1984, abandoned. This application Sep. 2, 1986, Ser. No. 901,978**

**Claims priority, application Switzerland, Nov. 30, 1983, 6402/83**

**Int. Cl.[4] F02C** *3/02;* **F02G** *1/00, 3/00*

**U.S. Cl. 60—39.45** **4 Claims**



1. A gas dynamic pressure wave machine for the charging of internal combustion engines, said machine comprising a rotary cellular wheel which is rotatable about a longitudinal axis, said wheel defining a plurality of openended cells extending parallel to said longitudinal axis, each cell including generally radially extending surfaces and a generally circumferentially extending surface extending between outer edges of said generally radially extending surfaces, each cell being exposed during operation alternately to exhaust gas and ambient air, said generally radially extending surfaces and said generally circumferentially extending surfaces being coated with a catalytic material for the control of pollutants by oxidizing the exhaust gas.

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**4,744,214**

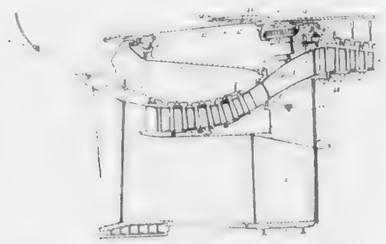
## ENGINE MODULARITY

**William G. Monsarrat, Willimantic, and Robert F. Brodell, Marlborough, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.**

**Filed Jun. 29, 1987, Ser. No. 67,339**

**Int. Cl.[4] F02K** *3/02*

**U.S. Cl. 60—226.1** **8 Claims**



1. In a turbine engine:

a low pressure compressor casing,

a low pressure rotor within the casing,

an intermediate stout attached to the downstream end of said casing and having a bearing support structure extending forwardly from the strut within the casing and rotor,

a bearing on said support for said low pressure rotor,

a high pressure compressor rotor downstream of the strut,

a bearing structure at the inner portion of the strut to support the high pressure rotor within this strut, said bearing having an axially slidable connection with the strut,

a low pressure shaft within the high pressure compressor rotor and extending forwardly therefrom,

a stub shaft having a splined connection with the low pressure shaft and with the low pressure rotor adjacent to its forward end to provide for axial assembly of the stub shaft within the engine,

means for removably securing said stub shaft to said low pressure shaft at the forward end of said low pressure shaft, said securing means being accessible within the stub shaft, and

securing bolts to hold said bearing structure axially within the strut, said bolts being accessible through the low pressure rotor when the stub shaft is removed from within the compressor.

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**4,744,215**

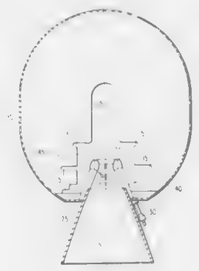
## ROCKET MOTORS HAVING DEEPLY SUBMERGED NOZZLES

**William H. Comerford, Manassas, Va., and Morris S. Roth, Gaithersburg, Md., assignors to Satellite Business Systems, McLean, Va.**

**Filed Aug. 26, 1982, Ser. No. 411,942**

**Int. Cl.[4] F02K** *9/32, 9/97*

**U.S. Cl. 60—253** **6 Claims**



1. An improved solid rocket motor of the type incorporating a submerged nozzle with a reduced tendency to nutate comprising:

a shell, with a longitudinal axis,

solid fuel contained within said shell,

a nozzle extending throught a hole in said shell, said nozzle including a submerged throat located so that said longitudinal axis coincides with an axis of symmetry of said nozzle, and

restraining means surrounding said throat of said nozzle retraining motion of products of combustion trapped within said shell to inhibit rotation of said products of combustion about said longitudinal axis,

wherein said restraining means comprises a series of baffles each extending inwardly from an inner surface of said shell and directed radially outward from said longitudianl axis to form pockets, each defined by a pair of baffles for restraining a tendency of said products of combustion to rotate about said longitudinal axis.

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**4,744,216**

## ELECTRICAL IGNITION DEVICE FOR REGENERATION OF A PARTICULATE TRAP

**V. Durga N. Rao, Bloomfield Township, and Michael G. Aimone, Westland, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.**

**Filed Oct. 20, 1986, Ser. No. 921,028**

**Int. Cl.[4] F01N** *3/02*

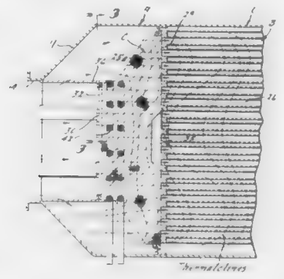
**U.S. Cl. 60—303** **14 Claims**

1. An ignition system for regenerating a particulate trap for the exhaust gas of an internal combustion engine, the particulate trap having an entrance face for receiving a gaseous flow therethrough, the system comprising:

(a) a flow guide means effective to direct exhaust gas to said entrance face during filtration by said trap and a gaseous flow during regeneration of said trap;

(b) an open cell ceramic foam body extending across said flow guide means and having (i) radially outer ring surface in contact with the radially outer portion of said entrance face and (ii) an entrance surface remote from said particulate trap, said foam body having a pocket located radially





inwardly of said ring surface to provide a separation, between said body and trap, thereby forcing said heat transfer to be through said ring surface, said open cell foam body being effective to trap an ignitable collection of particulates from the exhaust gas during filtration; and

(c) electrically energized resistance heating means stationed in a radially central portion of the open cell body adjacent said entrance surface effective to heat said body during regeneration to a temperature effective to ignite said ignitable particulate collection.

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**4,744,217**

## PARTICLE SEPARATOR ARRANGEMENT IN AN EXHAUST PIPE OF A DIESEL ENGINE

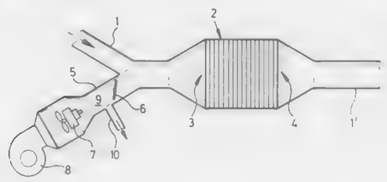
**Dieter Goerlich, Emmering; Wilfried Meiler, Weilheim, and Dieter Ráethel, Mittelstetten, all of Fed. Rep. of Germany, assignors to Webasto-Werk W. Baier GmbH & Co., Stockdorf, Fed. Rep. of Germany**

**Filed Mar. 4, 1987, Ser. No. 21,687**

**Claims priority, application Fed. Rep. of Germany, Mar. 12, 1986, 3608179**

**Int. Cl.[4] F01N** *3/02*

**U.S. Cl. 60—303** **14 Claims**



1. An exhaust gas particle separation arrangement comprising a separator in an exhaust pipe and with a burner unit for regenerating the separator by means of fuel gases fed from the burner unit via a fuel gas line in which a flap valve is placed between an intake side of the separator and the burner unit, said valve being opened for regeneration of the separator and closed for closing off the fuel gas line when said burner unit is inoperative, wherein venting means is provided in communication with the fuel gas line, at a location between the flap valve and the burner unit, for withdrawing exhaust gases leaking past the flap valve into the fuel gas line away from the burner unit when said fuel gas line is closed off by said flap valve.

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**4,744,218**

## POWER TRANSMISSION

**Thomas L. Edwards, 7831 Almont Rd., Almont, Mich. 48003; Yehia M. El-Ibiary, 5947 Diamond, Troy, Mich. 48098; Rajamouli Gunda, 679 Rutgers Rd., Rochester, Mich. 48063; Richard S. Leemhuis, 3494 Eagle, Troy, Mich. 48083; Fred H. Phillips, 6170 Niles, Troy, Mich. 48098, and Melvin A. Rode, 6861 N. Clunbury Rd., West Bloomfield, Mich. 48033**

**Filed Apr. 8, 1986, Ser. No. 849,542**

**Int. Cl.[4] F16D** *31/00*

**U.S. Cl. 60—368** **18 Claims**




1. An electrohydraulic system with distributed control comprising

a plurality of electrohydraulic devices responsive to electronic control signals for performing hydraulic operations and control means for providing said control signals, said control means including a plurality of individual device control means each associated with and dedicated to directly controlling operation at an associated hydraulic device, master control means and means coupling said master control means to all of said device control means for coordinating operation of said device control means and said hydraulic devices controlled thereby,

said coupling means comprising a bus common to all of said master and device control means, all of said device control means being constructed for connection to said common bus for individual communication with said master control means,

said bus comprising a serial data bus, and each of master and device control means including means for transmitting and receiving data on said bus,

said master control means including means for establishing a repetitive time sequence of communication windows and means for communicating with each of said device control means in turn during an associated said window, each said device control means including means for communicating with said master control means only during an associated said window, and means for performing control operation at the associated said device other than during said associated window,

each said master and device control means including memory means, means for receiving both address and data information, and means for storing said data information at locations in said memory means indicated by said address information.

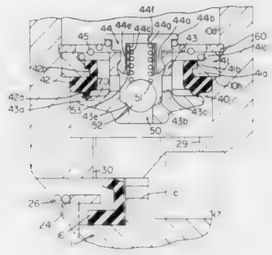
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**4,744,219**
## MASTER CYLINDER

**Kouji Yamamoto, and Hironki Takeuchi, both of Toyota, Japan, assignors to Aisin Seiki Kabushiki Kaisha, Aichi, Japan**

**Continuation of Ser. No. 639,217, Aug. 9, 1984, abandoned. This application Aug. 21, 1986, Ser. No. 898,802**
**Claims priority, application Japan, Aug. 31, 1983, 58-135134[U]**
**Int. Cl.[4] B60T** *11/08*
**U.S. Cl. 60—578** **1 Claim**



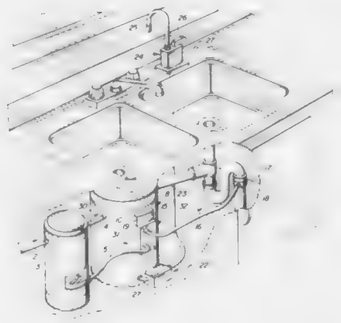
1. A master cylinder comprising:
(a) a cylinder body having a stepped bore including larger and smaller diameter sections;
(b) a stepped piston having larger and smaller diameter heads slidably fitted respectively in said larger and smaller diameter sections defining a first pressure chamber and a second pressure chamber, said second chamber having an outlet port, said cylinder body having a coupling hole defined in the vicinity of a junction between said larger and smaller diameter sections of said bore for connection to a reservoir, and communication and compensation ports defined in a bottom of said coupling hole and communicating with said first and second chambers, said smaller diameter head of said piston supporting thereround a cup seal for closing communication between said second pressure chamber and said compensation port when said piston is moved to a forward position;
(c) a first valve disposed in said coupling hole and openable for allowing a fluid to flow from the reservoir into said first pressure chamber in response to a negative pressure developed in said first chamber at the time said piston moves rearwardly from a forward position;
(d) a second valve disposed in said coupling hole and openable for allowing fluid to be released from said first pressure chamber into the reservoir in response to a pressure in said first pressure chamber exceeding a predetermined level at the time said piston is moved to a forward position; and
(e) said first valve including an annular plate fixedly mounted in said coupling hole of the cylinder body, an annular sealing member fixedly attached to said plate, said sealing member having a radially extending surface, an annular lip projecting from said surface, a valve body having an outwardly extending flange adjacent one end thereof, said valve body housing said second valve and disposed concentrically with respect to said plate and said sealing member, said flange having an opposing seating surface positioned to sealingly engage said annular lip at times when the first valve is in a closed position, said opposing seating surface of the flange having a groove forming a restricted passage therein positioned to be beneath said annular lip, said annular lip being urged normally into said groove increasing the restriction thereof while said first valve is closed during pressure level increase in said first pressure chamber, prior to reaching said predetermined pressure level and the opening of said second valve, in response to said piston movement, said groove extending along the seating surface beyond both sides of said annular lip to provide restrictive fluid communication between the reservoir and said first pressure chamber to release fluid into the reservoir in response to an increase in fluid pressure caused by ambient temperature increase at times when the first and second valves are in a closed position, and a spring disposed between an upper portion of said valve body on an upper portion of said plate to normally keep said first valve in a closed position.

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**4,744,220**
## THERMOELECTRIC HEATING AND/OR COOLING SYSTEM USING LIQUID FOR HEAT EXCHANGE

**James M. Kerner, 779 Hillgrove Court, Chico, Calif. 95926; Carl Palmer, 514 Greenview Drive, La Habra, Calif. 90631; Michael A. Reed, San Diego, and John J. Pagendarm, Chico, both of Calif., assignors to James M. Kerner, Chico; Carl Palmer, La Habra and Paul Toffel, Flintridge, all of, Calif., a limited partnership**

**Filed Jan. 29, 1987, Ser. No. 8,647**
**Int. Cl.[4] F25B** *21/02*
**U.S. Cl. 62—3** **13 Claims**



1. An apparatus for thermoelectrically cooling a first liquid to a first temperature, comprising means for providing a solution to the problems of excessive cost and excessive size of a heat exchanger yet efficiently removing heat pumped out of the first liquid without overheating a hot side of a thermoelectric device, including in combination:
(a) thermoelectric means having a first surface and a second surface for pumping heat;
(b) an insulated reservoir;
(c) means for supplying the first liquid to the reservoir;
(d) means for thermally coupling the first surface of the thermoelectric heat pumping means to the reservoir;
(e) heat exchanging means for thermally coupling the second surface of the thermoelectric heat pumping means to a second liquid having a second temperature, the first temperature being lower than the second temperature, the heat exchanging means including a passage having an inlet and an outlet, wherein the passage has a relatively thin, wide portion that shapes the second liquid into a thin sheet within the passage to increase the rate of exchange of heat between the second liquid and the heat exchanging means; and
(f) means for forcing the second liquid to flow into the inlet of the passage.



**4,744,221**
## ZEOLITE BASED ARSINE STORAGE AND DELIVERY SYSTEM

**Karl O. Knollmueller, Hamden, Conn., assignor to Olin Corporation, Cheshire, Conn.**

**Filed Jun. 29, 1987, Ser. No. 68,486**
**Int. Cl.[4] F17C** *11/00*
**U.S. Cl. 62—48** **9 Claims**

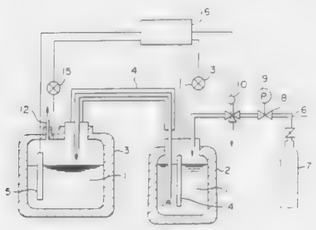
1. A method of storing and subsequently delivering arsine which comprises the steps of:
(a) contacting arsine at a temperature of between about −30° C. and about +30° C. with a zeolite having a pore size of between about 5 and about 15 angstroms to provide arsine-adsorbed zeolite suitable to be stored, and
(b) heating said arsine-adsorbed zeolite to an elevated temperature of no greater than about 175° C. for a time sufficient to release at least a portion of said adsorbed arsine to provide free arsine.

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**4,744,222**
## VERY LOW TEMPERATURE LIQUID TRANSFER SYSTEM

**Takashi Murai, Kobe, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Feb. 11, 1987, Ser. No. 13,553**
**Claims priority, application Japan, Feb. 27, 1986, 61-42981**
**Int. Cl.[4] F17C** *13/02*
**U.S. Cl. 62—49** **7 Claims**

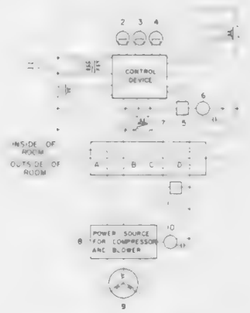


1. A very low temperature liquid transfer system, which comprises in combination:
(a) first and second containers, each storing therein very low temperature liquid;
(b) connecting means for communicatively connecting said first and second containers;
(c) a pressure control system for increasing and decreasing a pressure in said first container for pressurized transfer of the very low temperature liquid from said first container into said second container through said connecting means and for controlling the pressure in said second container;
(d) a pressure gauge for measuring the pressure in said first container;
(e) a liquid level sensor for measuring a quantity of said very low temperature liquid in said second container; and
(f) a control circuit which functions to logically determine input signals from said pressure gauge and said liquid level sensor, and to produce an output operating signal to said pressure control system based on the logical determination.

**4,744,223**
## AIR CONDITIONING APPARATUS

**Kenji Umeza, Shizuoka, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Nov. 25, 1986, Ser. No. 934,820**
**Claims priority, application Japan, Nov. 29, 1985, 60-267201**
**Int. Cl.[4] F25B** *1/00*
**U.S. Cl. 62—176.5** **6 Claims**



1. An air conditioning apparatus comprising:
a variable speed compressor provided outside of a room for compressing a refrigerant;
a heat-exchanger provided inside of the room for exchanging heat between the refrigerant and air;
a blower provided inside of the room for delivering air passing through the heat-exchanger;
a plurality of sensors for detecting room temperature, heat-exchanger temperature, and humidity in the room;
a switching means for selectively setting an operational mode; and
means for controlling the rotating speed of said compressor and the quantity of air delivered from said blower based on the setting of said switching means and the outputs of said sensors such that during at least part of the operation of the apparatus, the rotating speed of the compressor is increased when the quantity of air is decreased, and the rotating speed of the compressor is decreased when the quantity of air is increased, to vary the temperature of said heat exchanger in two or more predetermined ranges.

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**4,744,224**
## INTERMITTENT SOLAR AMMONIA ABSORPTION CYCLE REFRIGERATOR

**Donald C. Erickson, 1704 S. Harbor La., Annapolis, Md. 21401**

**Filed Jul. 27, 1987, Ser. No. 78,048**
**Int. Cl.[4] F25B** *27/00*
**U.S. Cl. 62—235.1** **7 Claims**



1. A solar-powered absorption refrigeration apparatus comprised of:
(a) a pressure vessel of approximately circular cross-section

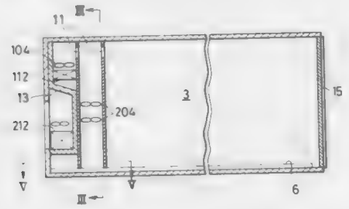
for containment of a liquid absorbent solution containing absorbed refrigerant;
(b) a solar-radiation reflector for concentrating solar radiation onto said pressure vessel;
(c) a condenser for condensing refrigerant vapor desorbed from said liquid absorbent solution, and a conduit connecting the upper portion of said pressure vessel to said condenser;
(d) a refrigeration evaporator which is supplied refrigerant which has been condensed in said condenser via a means for pressure reduction;
(e) a conduit for returning evaporated refrigerant from said refrigeration evaporator to said liquid absorbent solution in said pressure vessel; and
(f) a means for removal of heat from said liquid absorbent solution comprised of:
(i) a thermosyphon evaporator in heat exchange contact with said liquid absorbent solution;
(ii) Conduit for transporting refrigerant condensed in said condenser to said thermosyphon evaporator; and
(iii) conduit for transporting evaporated refrigerant from said thermosyphon evaporator to said condenser.

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**4,744,225**
## CONTAINERS FOR TRANSPORTING PERISHABLE FOODS

**Koichiro Shoji, Kamakura; Isamu Yuki, Tokyo; Saburo Ozeni, Kanagawa; Kinya Niizeki, Tokyo; Kenyo Matsushita, and Keiichi Akashi, both of Shizuoka, all of Japan, assignors to Nippon Yusen Kaisha and Nippon Light Metal Co., Ltd., both of Tokyo, Japan**

**Filed Oct. 21, 1986, Ser. No. 921,192**
**Int. Cl.[4] B60H** *3/04*
**U.S. Cl. 62—239** **9 Claims**

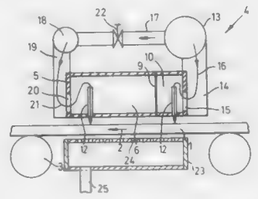



1. A container for use in the transportation of perishable foods comprising:
a storage chamber for containing perishable foods and having a door therein and a machine room divided from each other by partition walls;
main cold air flow channels opened at one end on the side of said door and auxiliary cold air flow channels closed at the end on the side of said door, both of which are respectively disposed on the surface of at least one of the bottom wall, top wall or one side wall of said storage chamber;
means for flowing cold air having ports perforated substantially over the entire region at the surface of said auxiliary cold air flow channels on the side of said storage chamber;
means disposed within said machine room for controlling the temperature of the circulated cold air from said storage chamber and then supplying the air by way of the main cold air flow channels to the inside of said storage chamber; and
means disposed within said machine room for pressurizing the circulated cold air from said storage chamber, to a pressure higher than that of said cold air circulated through said main cold air flow channels, and then supplying the air at higher pressure by way of the auxiliary cold air flow channels to the inside of said storage chamber.

**4,744,226**
## APPARATUS FOR COOLING A METAL PRODUCT IN MOTION

**Jean-Francois Noville, Liers Herstal, and Stéphan Wilmotte, Ninane-Chaudfontaine, both of Belgium, assignors to Centre de Recherches Metallurgiques-Centrum voor Research in de Metallurgie, Brussels, Belgium**

**Filed Feb. 4, 1987, Ser. No. 10,621**
**Claims priority, application Belgium, Feb. 5, 1986, 6/48188**
**Int. Cl.[4] F25D** *17/02*
**U.S. Cl. 62—374** **5 Claims**



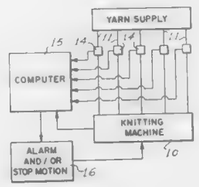

1. An apparatus for cooling a metal product in motion, comprising an upper chamber and a lower chamber, between which the product to be cooled is passed along a path, the upper and lower chambers being arranged transversely with respect to the path of the product, the upper and lower chambers having outlet apertures in respective bottom and top walls thereof for the passage of a cooling agent to the product, at least the upper chamber being provided with partitions dividing at least the upper chamber into at least three juxtaposed compartments including a central compartment corresponding to a central zone of the product, and two lateral compartments corresponding respectively to edge zones of the product, the partitions being substantially perpendicular to the bottom wall of the upper chamber and forming inside of the upper chamber a channel coverging in the direction of motion of the product along said path.

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**4,744,227**
## PATTERN MONITORING METHOD AND APPARATUS

**Charles G. Whitener, Jr., and Gary Hibbard, both of 1465C Howell Mill Rd., Atlanta, Ga. 30318**

**Filed Jun. 23, 1987, Ser. No. 65,517**
**Int. Cl.[4] D04B** *35/12*
**U.S. Cl. 66—163** **12 Claims**




1. In a textile machine wherein textile goods are produced, said textile goods having a predetermined pattern and a plurality of yarns are utilized by said textile machine for producing said pattern in said goods, the combination therewith of means for monitoring movement of each of said plurality of yarns as said yarns are moved for utilization in said textile machine for producing said goods, means for indicating the beginning of a cycle wherein said textile machine begins to produce said one piece of said textile goods, and means for producing a signal indicating the speed of said textile machine, information storage means for storing information as to the movements of each of said plurality of yarns as said yarns are used to produce one piece of said textile goods, said information as to the movements of each of said plurality of yarns constituting a standard pattern, and comparing means for comparing subsequent movements of each of said plurality of yarns during the production of subsequent textile goods, and error means for indicating a difference in a movement of yarn between said standard pattern and each of said subsequent patterns.



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**4,744,228**
## AGITATORLESS CLOTHES LAUNDERING

**Michael Goldberg, 118 Page Rd., Bedford, Mass. 01730**

**Filed Oct. 21, 1985, Ser. No. 789,635**
**Int. Cl.[4] D06F** *17/04*
**U.S. Cl. 68—20** **7 Claims**



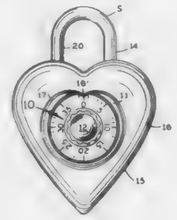
1. Laundering apparatus comprising,
tub means having an axis and a bottom for holding clothes in water,
eductor means along the axis of said tub means for ejecting a stream of water to create a toroidal flow of water in said tub means and receiving water entering the eductor means at the tub means bottom,
means for maintaining said tub means stationary and free of a mechanical member relatively displaced with respect to said tub means when said toroidal flow of water is produced,
and open basket means seated in said tub means for containing clothes to be washed in said tub means in said toroidal flow of water.

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**4,744,229**
## PADLOCK COVER

**Judith A. Stanich, Pompano Beach, Fla., assignor to Hot Locks, Inc., Pompano Beach, Fla.**

**Continuation of Ser. No. 618,685, Jun. 8, 1984, Pat. No. 4,555,920, which is a continuation-in-part of Ser. No. 554,903, Nov. 25, 1983, Pat. No. 4,534,190. This application Nov. 27, 1985, Ser. No. 802,767**
**The portion of the term of this patent subsequent to Dec. 3, 2002, has been disclaimed.**
**Int. Cl.[4] E05B** *67/38*
**U.S. Cl. 70—54** **11 Claims**



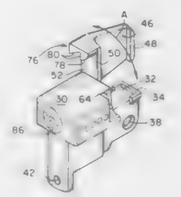

1. A cover for attachment to a padlock of the type having a body portion and an inverted, U-shaped shackle extending from said body portion, said cover having front and rear portions and including:
retaining means comprising a pre-formed inner wall portion which is generally complementary to the shape of the body portion of the padlock and is adapted to prevent movement of the body portion of said padlock within said cover in a first plane defined by the shackle, wherein said inner wall portion includes at least one aperture adapted to permit said shackle to pass therethrough; and
securing means adapted to prevent movement of the body portion of said padlock within said cover in a second plane perpendicular to the first plane, wherein said cover further includes at least one aperture adapted to permit said shackle to pass therethrough.

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**4,744,230**
## KEEPER LOCK FOR A SLIDE FASTENER

**Yip S. Shum, 194-196 Choi Hung Road, Kowloon, Hong Kong**

**Filed Apr. 8, 1987, Ser. No. 35,876**
**Int. Cl.[4] E05B** *67/38*
**U.S. Cl. 70—68** **3 Claims**




1. A lock for the zipper of a zippered pouch comprising a narrow housing having a defined longitudinal axis and a taper designed to fit into the pouch at that end thereof where the zipper closes, said housing having a forward section and a rearward section that are aligned along the longitudinal axis thereof, a lock assembly block attached to the rearward section of said housing, said block having a forward face and a rearward face respectively facing the forward and rearward sections of said housing, the width of said block being larger than the width of said housing such that in elevation, said block and housing have a T-shaped configuration, the forward end of said housing being formed with a flat upper surface, a raised lip on leading edge of the last-mentioned surface, a keeper plate formed with a forward depending flange and a rearward depending flange, the rearward flange of said plate carrying a pivot pin which is adapted pivotally to seat in the forward face of said block whereby said plate is adapted to pivot coaxially along the longitudinal axis of said housing from an open position pivoted essentially clear of said flat surface and a closed position spaced from and covering said flat surface with the space thus defined adapted to receive the upstanding bail of the slide fastener, means for releasably locking said plate in the closed position, the length of said plate being such as to place the forward flange thereof outboard and in front of said lip when the same is in the closed position thus to lock the upstanding bail of the slide fastener between said flat surface and plate.

**4,744,231**

## CLOSURE LOCK SYSTEM

**Kazumasa Takagi, Yokohama, and Haruo Mochida, Kanagawa, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Jan. 6, 1983, Ser. No. 456,252**
**Claims priority, application Japan, Jan. 14, 1982, 57-4604**
**Int. Cl.[4] E05B** *47/00, 65/36*
**U.S. Cl. 70—264** **15 Claims**



1. A closure lock system comprising:
a vehicle door;
a lock assembly including a key cylinder mounted to said vehicle door;
a lock actuator operatively connected with said lock assembly for locking or unlocking said lock assembly;
a lock circuit including a reed switch operatively connected with said lock actuator, said reed switch being mounted inside of said door near a predetermined external portion of said door;
a key including a portion insertable into said key cylinder for locking or unlocking said lock assembly; and
a magnet mechanically connected to a non-insertable key head portion of said key, said magnet being operative to actuate said reed switch when it approaches said predetermined external portion of said door from outside of said vehicle.

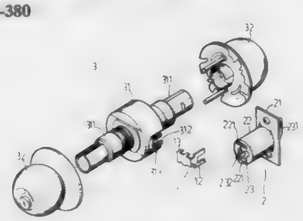
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**4,744,232**

## LATCHBOLT SLIDE EXTENSION

**Richard Shen, P.O. Box 180, Tainan, R.O.C., Taiwan**

**Filed Nov. 25, 1985, Ser. No. 802,185**
**Int. Cl.[4] E05B** *63/06*
**U.S. Cl. 70—380** **1 Claim**



1. In a slide extension for a cylindrical lockset having:
a spring-loaded latch comprising a latch front, a latch case passing through the latch front and being secured thereto, one end of the latch case being formed with hook plates, a sliding member being furnished at one end with a latch bolt and at the other end with a latch bar, the sliding member being slidably disposed in the latch case;
a cylindrical body comprising a cylindrical housing which is provided at both sides with a pair of rotatable spindles, the cylindrical housing being formed at the periphery with a U-shaped retractor, a pair of knobs being respectively secured to the spindles, a pivotal shaft provided with a retractor being disposed in the interior of the cylindrical housing such that the pivotal shaft can be driven to move the sliding member of the spring-loaded latch in a predetermined manner by means of rotating the knobs thereof; the improvement comprising
a slide extension comprising a latch front which is formed at one end with a U-shaped member perpendicular thereto and at the other end with a pair of parallel U-shaped members which extend along the same direction as the U-shaped member whereby the U-shaped member thereof is engaged with the latch bar of the sliding member of the spring-loaded latch and said two parallel U-shaped members thereof are engaged with the retractor of the pivotal shaft of the lock body.

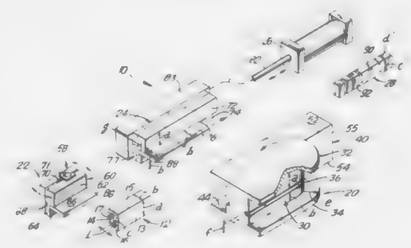
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**4,744,233**

## APPARATUS FOR BENDING RECTANGULAR TUBES

**Gerald R. Trudell, Pinconning, Mich., assignor to AP Industries, Inc., Toledo, Ohio**

**Filed Jul. 14, 1986, Ser. No. 884,974**
**Int. Cl.[4] B21D** *9/05*
**U.S. Cl. 72—150** **25 Claims**



1. An apparatus for bending a rectangular tube having first and second pairs of opposed parallel sides, said apparatus comprising:
a bending die having a bending surface defining an arc of a cylinder, said bending die being selectively rotatable about the axis of the cylinder;
a clamp die having a clamping surface for clamping the rectangular tube against the bending surface of the bending die, said clamp die being movable through a generally circular arc relative to the axis of the cylindrical bending surface of the bending die to bend the rectangular tube around said bending surface, said clamp die including opposed leading and trailing ends which respectively lead and trail the clamp die through its movement for bending the rectangular tube;
a pressure die disposed substantially adjacent the bending die and the trailing end of said clamp die, said pressure die having a pressure surface for engaging one said side of the rectangular tube, said pressure surface being aligned generally parallel to the rotational axis of the bending die, said pressure die comprising a tongue extending from the pressure surface toward the bending die, said pressure die being operative to move in a generally tangential direction relative to the bending die toward the clamp die as the clamp and bending dies move about said axis, at least selected portions of said tongue being movable relative to the remainder of the pressure die toward and away from the trailing end of the clamp die, whereby the movable portion of said tongue will move enabling the remainder of the pressure die to be urged toward the clamp die as the clamp die moves through the circular arc.

20. A mandrel for bending rectangular tubes, said mandrel comprising a rigid arm of rectangular cross section dimensioned to fit within the tube and a plurality of blocks pivotally mounted to said rigid arm for movement about a plurality of different axes, each said block being of generally rectangular cross section and being dimensioned to fit within the tube, said mandrel further comprising means for substantially symmetrically aligning the rectangular blocks of said mandrel to the rigid rectangular arm thereof to facilitate the insertion of said rectangular blocks into the rectangular tube, the aligning means comprising a plurality of spaced apart elongate flexible members extending between the rigid arm and the block adjacent thereto, and a plurality of spaced apart elongated flexible members extending between each pair of adjacent blocks of said mandrel, whereby the spaced apart elongate flexible members enable a substantially symmetrical alignment of the rectangular blocks with the rectangular arm to facilitate insertion of said mandrel into the rectangular tube.



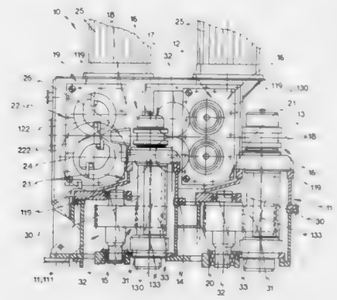
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**4,744,234**

## SUPERCOMPACT ROLLING GROUP WITH ROLLS SUPPORTED AT ONE END, AND A ROLLING LINE COMPRISING GROUPS THUS FORMED

**Alfredo Poloni, Ronchi dei Legionari, Italy, assignor to Danieli & C. Officine Meccaniche SpA, Buttrio, Italy**

**Continuation of Ser. No. 583,220, Feb. 24, 1984, abandoned.**
**This application Feb. 24, 1986, Ser. No. 834,106**
**Claims priority, application Italy, Feb. 25, 1983, 83336 A/83**
**Int. Cl.[4] B21B** *35/04, 1/00, 31/08*
**U.S. Cl. 72—235** **9 Claims**



1. A supercompact rolling group having rolls that are supported at one end only, comprising:
vertical and horizontal roll units, each roll of each said roll unit supported at one end only, each of said roll units having a substantially L-shaped casing, each of said casings in each pair of adjacent casings being arranged so that the longer leg of one of said casings fits within the space between the two legs of the other casing to form a compact arrangement;
a frame;
a number of independent motors equal in number to the number of said vertical and horizontal roll units, said motors solidly fixed to said frame;
a gear train coupled to each of said motors; and
a number of transmission groups, each transmission group contained within a corresponding casing, each of said transmission groups coupled between one of said gear trains and said corresponding roll unit, so that said transmission groups receive motion from said motor for actuation of its respective roll unit, wherein each transmission group, its respective motor and gear train, and the rolls of the respective roll unit have parallel, but offset, axes of rotation and lie on parallel planes.

8. A rolling line comprising:
a loop-forming means including a movable roll and a fixed idler roll immediately upstream from said movable roll; and
at least one supercompact rolling group having rolls that are supported at one end only, said rolling group comprising:
vertical and horizontal roll units, each roll of each said roll unit supported at one end only, each of said roll units having a substantially L-shaped casing, each of said casings in each pair of adjacent casings being arranged so that the longer leg of one of said casings fits within the space between the two legs of the other casing to form a compact arrangement;
a frame;
a number of independent motors equal in number to the number of said vertical and horizontal roll units, said motors solidly fixed to said frame;
a gear train coupled to each of said motors; and
a number of transmission groups, each transmission group contained within a corresponding casing, each of said transmission groups coupled between one of said gear trains and said corresponding roll unit, so that said transmission groups receive motion from said motor for actuation of its respective roll unit, wherein each transmission group, its respective motor and gear train, and the rolls of the respective roll unit have parallel, but offset, axes of rotation and lie on parallel planes.

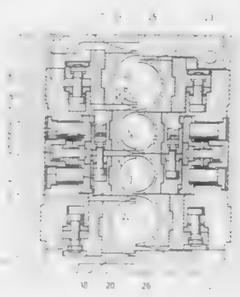
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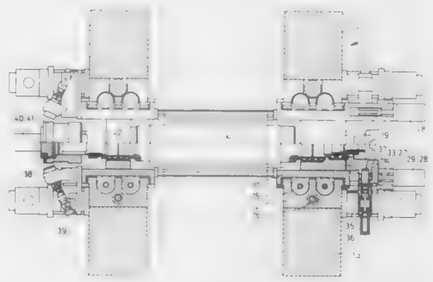
**4,744,235**

## ACTUATOR DEVICE FOR AXIALLY SHIFTING ROLLING MILL

**Günter Schiller, Kreuztal, Fed. Rep. of Germany, assignor to SMS Schloemann-Siemag Aktiengesellschaft, Dusseldorf, Fed. Rep. of Germany**

**Filed Aug. 14, 1986, Ser. No. 896,859**
**Claims priority, application Fed. Rep. of Germany, Aug. 16, 1985, 3529364**
**Int. Cl.[4] B21B** *31/18, 31/10, 31/32*
**U.S. Cl. 72—247** **4 Claims**





1. A rolling mill stand, comprising:
a pair of uprights each positioned on a respective side of the stand and provided with a respective window;
a plurality of rolls disposed one above another between said uprights and having stubs at respective ends journaled in said windows, said rolls including a pair of working rolls defining a nip between them through which stock to be rolled is passed, at least one of said rolls being shiftable in a direction parallel to an axis thereof relative to others of said rolls and said uprights;

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respective bearing blocks located in said windows and receiving stubs of said one of said rolls for journalling said one of said rolls on said stand;
respective guide bodies receiving each of said bearing blocks and formed with means defining a direction of displacement of said bearing blocks and said one of said rolls parallel to the axis thereof;
means in each of said windows acting upon the respective guide body for vertically shifting same and said one of said rolls relative to said uprights;
laterally projecting formations on one of said guide bodies at one end of said one of said rolls extending away from the respective upright;
a first pair of horizontally spaced hydraulic cylinder units and a second pair of horizontally spaced hydraulic cylinder units for displacing said one of said rolls, each of said units including:
a respective hydraulic cylinder fixed to a respective one of said formations, and
a respective piston shiftable in each of said cylinders and extending therefrom toward said one of said guide bodies and having a free end;
a first yoke pivotally connected to the free ends of said pistons of said first pair of hydraulic cylinder units, and a second yoke pivotally connected to the free ends of said pistons of said second pair of hydraulic cylinder units;
a projection formed on the bearing block received in said one of said guide bodies and extending out of the respective one of said windows, said yokes straddling said projection;
respective pins insertable through each yoke and into said projection from opposite sides thereof to articulatedly connect each of said yokes to said projection; and
hydraulically actuatable means connected to said plus for retracting same from said projection to decouple said yokes therefrom and permit withdrawal of said one of said rolls from said stand through said one of said windows.

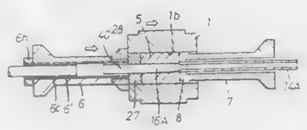
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**4,744,236**

## METHOD OF AND APPARATUS FOR INDIRECT EXTRUSION

**Akira Asari, Osaka; Masakazu Ueda, Kobe; Takahisa Tabuchi, Kobe; Munenori Soejima, Kobe; Toshio Kurosaki, Akashi, and Masaru Sugamoto, Kobe, all of Japan, assignors to Kabushiki Kaisha Kobeseikosho, Kobe, Japan**

**PCT No. PCT/JP85/00215, § 371 Date Dec. 10, 1985, § 102(e) Date Dec. 10, 1985, PCT Pub. No. WO85/04825, PCT Pub. Date Nov. 7, 1985**
**PCT Filed Apr. 18, 1985, Ser. No. 811,960**
**Claims priority, application Japan, Apr. 20, 1984, 59-58949; Apr. 25, 1984, 59-84814; Jun. 12, 1984, 59-87754**
**Int. Cl.[4] B21C** *23/00, 26/00, 35/04*
**U.S. Cl. 72—273.5** **4 Claims**



1. An indirect extrusion press of the double-stem type for forming a tubular product by extrusion, said indirect extrusion press comprising:
(a) a billet accommodating container;
(b) a press stem and a die stem arranged in opposed relation to each other on the center line of extrusion on opposite sides of said billet accommodating container so that, during use of said indirect extrusion press, a billet placed onto said billet accommodating container is upset by said press and die stems and thereafter extruded through a die on the forward end of said die stem by moving said billet accommodating container and said press stem together toward said die stem, said press stem having a longitudinally extending hole extending along its longitudinal axis, the surface of said longitudinally extending hole being parallel to the press direction, said press stem having at its container end a large-diameter portion larger than the opening in said billet accommodating container such that, during use of said indirect extrusion press, said large-diameter portion of said press stem abuts the adjacent end face of said billet accommodating container;
(c) a mandrel inserted in said longitudinally extending hole in said press stem and movable in the press direction, a gap being formed between the outer surface of said mandrel and the surface of said longitudinally extending hole;
(d) means for moving said mandrel axially into and out of said billet accommodating container so as to pierce a billet located in said billet accommodating container; and
(e) a blister preventing closure means which comprises said large-diameter portion of said press stem and a dummy block mountable on said large-diameter portion of said press stem, said dummy block having a center hole sized, shaped, and positioned to allow said mandrel to extend therethrough with little clearance, said blister preventing closure means comprising a distal cylindrical portion and a proximal cylindrical portion, said proximal and distal cylindrical portions being concentric to one another and being joined by a planar annular shoulder the entirety of which is flat and perpendicular to the center line of extrusion, said proximal cylindrical portion having an outer diameter that is not fittable in the openign in said billet accommodating container and said distal cylindrical portion having an outer diameter that is fittable in the opening in said billet accommodating container and having a working surface that comes into contact with the billet during use of said indirect extrusion press, the entirety of said working surface being perpendicular to the center line of extrusion.

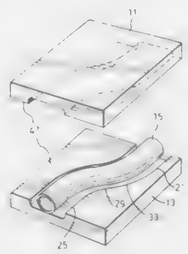
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**4,744,237**

## METHOD OF FORMING BOX-LIKE FRAME MEMBERS

**Ivano G. Cudini, Woodstock, Canada, assignor to TI Automotive Division of TI Canada Inc., London, Canada**

**Filed May 6, 1987, Ser. No. 46,567**
**Int. Cl.[4] B21D** *22/10*
**U.S. Cl. 72—367** **6 Claims**



1. Method of forming a box section frame member of which at least an elongate portion is of uniform smoothly continuous cross sectional profile having at least two generally opposed and planar side faces, comprising, providing a tubular blank between open die sections each having a channel section die cavity portion, a planar mating surface portion and the cavity portion having each channel side extending perpendicular to the mating surface portion, which die sections in the closed position have the mating surface of each section in mating engagement with the mating surface of each adjacent section and the cavity portions defining a die cavity up to about 5% larger in circumference than the circumference of the tubular blank and with a smoothly continuous box section cross section profile corresonding to the box section cross sectional profile of the desired final frame member; applying internal hydraulic pressure to the blank at least sufficient to overcome frictional forces exerted on the blank by the die sections on closing of the die sections and tending to expel the wall of the blank laterally outwardly between adjacent mating surfaces of the die sections and less than the yield limit of the wall of the blank; closing the die sections after pressurizing the bank to deform the blank inwardly in the areas corresponding to the generally opposed planar side faces and to force the blank evenly into the corners of the box section; expanding the blank circumferentially by increasing the internal hydraulic pressure within the blank above the yield imit of the wall until all exterior surfaces of the blank conform to the die cavity; separating the die sections; and removing the expanded blank from the die.



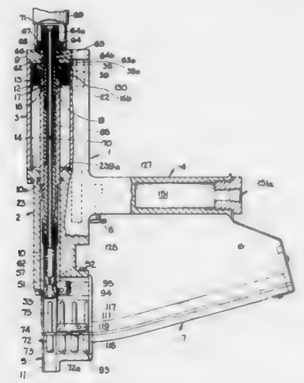
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**4,744,238**

## PNEUMATIC RIVET SETTING TOOL

**Eric H. Halbert, Cincinnati, Ohio, assignor to Senco Products, Inc., Cincinnati, Ohio**

**Filed Jul. 2, 1986, Ser. No. 881,340**
**Int. Cl.[4] B21J** *15/34*
**U.S. Cl. 72—391** **17 Claims**



1. A pneumatically actuated tool for setting blind rivets of the type having a head, a body and a breakaway mandrel, said tool comprising a body having a double-acting cylinder therein having an upper end and a lower end, a handle attached to said body, a guide body affixed to said body below said cylinder lower end, a pull track in said guide body for said rivets, and a bore in said body connecting said cylinder to said pull track, said cylinder, said bore and said pull track being coaxial, a rivet pickup and pull mechanism in said tool comprising a lower load piston and an upper pull piston mounted in said cylinder, a downwardly depending first tubular assembly being affixed to said lower load piston and being slidable within said body bore and said pull track, said first tubular assembly terminating in a nose piece having an axial bore, the mandrel of a rivet mounted in said nose piece bore and means in said bore for fricationally engaging said mandrel, said first tubular assembly having a pair of diametrically opposed check valves located just below said lower load piston and an internal annular stop surface, an O-ring mounted in said body bore and sealingly engaging said first tubular assembly, a second tubular assembly affixed to said upper pull piston and telescopically and shiftably located within said first tubular assembly, said second tubular assembly having an external annular groove near its upper end, an external annular flange and an external annular notch therebetween containing an O-ring in sealing engagement with the inside surface of said first tubular assembly, said second tubular assembly terminating in a chuck, a pair of mandrel engaging jaws mounted within said chuck at said lower end thereof, said jaws being shiftable between open and closed positions and yieldable means within said chuck biasing said jaws to their closed position, said lower load piston and its tubular assembly and said upper pull piston and its tubular assembly being shiftable from a lowermost position to a separated position, to an uppermost position, and back to said lowermost position, in said lowermost position, said lower load piston being at the bottom of said cylinder with said nose piece extending externally of said guide body below said pull track and said upper pull piston being adjacent said lower load piston with said jaws engaging said nose piece and maintained in said open position thereby against the urging of said yieldable means, in said separated position said upper pull piston and said lower load piston being spaced from each other by a distance determined by abutment of said second tubular assembly flange against said first tubular assembly stop surface in said separated position of said pistons, said jaws being spaced from said nose piece and free to close about said rivet mandrel and said upper pull piston and lower load piston defining a volume of said cylinder therebetween connected to that portion of said cylinder befirst tubular assembly check valves, in said uppermost position, said upper pull piston being at the top of said cylinder and said lower load piston being adjacent said upper pull piston, said nose piece being at the juncture of said pull track and said body bore and in engagement with said jaws maintaining said jaws in said open position, a source of air under pressure and cycle-through pneumatic sequencing control means within said body and said handle connected to said air source and said cylinder for shifting said lower load piston and its first tubular assembly and said upper pull piston and its second tubular assembly from said lowermost position wherein said rivet can be placed in perforations in workpieces to be joined, to said separated position wherein said rivet is set and its mandrel severed therefrom, to said uppermost position and back to said lowermost position with the mandrel of the next rivet engaged in said nose piece.

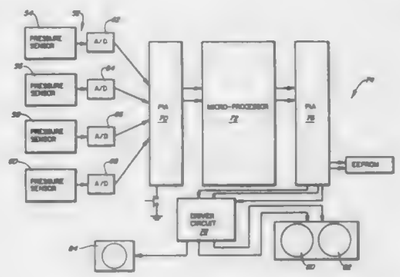
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**4,744,239**

## METHOD FOR MONITORING A WORK VEHICLE SUSPENSION

**Christos T. Kyrtsos, Peoria; Adam J. Gudat, Edelstein, and F. Paul Lutgen, Peoria, all of Ill., assignors to Caterpillar Inc., Peoria, Ill.**

**Filed Nov. 28, 1986, Ser. No. 935,870**
**Int. Cl.[4] G01M** *17/04*
**U.S. Cl. 73—11** **8 Claims**



1. A method for detecting a collapsed strut of a work vehicle having a plurality of left and right strut mounted wheels, comprising:
periodically sensing the internal pressure of each of the struts and delivering a plurality of first signals each having a magnitude correlative to the internal pressure of each respective strut;
calculating ratios of the first signals of selected pairs of the struts;
comparing the magnitude of each of the ratios to an upper and lower setpoint and delivering a second signal in re-

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sponse to at least one of the ratios being outside the upper and lower setpoints; and

delivering a third signal indicative of a collapsed strut in response to receiving the second signal.

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**4,744,240**

## METHOD FOR DETERMINING THE BUBBLE POINT OR THE LARGEST PORE OF MEMBRANES OR OF FILTER MATERIALS

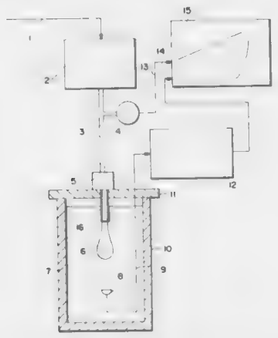
**Gert Reichelt, Oberaburg, Fed. Rep. of Germany, assignor to Akzo NV, Arnhem, Netherlands**

**Filed May 26, 1987, Ser. No. 53,485**

**Claims priority, application Fed. Rep. of Germany, May 27, 1986, 3617724**

**Int. Cl.⁴ G01N** *15/08*

**U.S. Cl. 73—38** **3 Claims**



1. A method for determining the bubble point or the largest pore of a membrane or filter material, comprising:

placing said membrane or filter material in a container in such a way as to divide the container into a first compartment and a second compartment;

filling the first compartment with a gas and filling the second compartment and pores of the membrane or filter material with a liquid which wets the membrane or filter material;

raising the gas pressure in the first compartment over time at least until a pressure in the first compartment is established at which the gas displaces the liquid from the largest pore of the membrane or filter material;

measuring sound intensity in the second compartment while raising said pressure; and

determining a pressure in said first compartment at which a sudden increase of the sound intensity can be detected.

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**4,744,241**

## METHOD AND DEVICE FOR DETECTING A WEAR LIMIT OR BREAK IN THE CUTTING EDGE OF A TOOL

**Kurt Mayer, Essen, Fed. Rep. of Germany, assignor to Fried. Krupp Gesellschaft mit beschränkter Haftung, Essen, Fed. Rep. of Germany**

**Filed Oct. 3, 1986, Ser. No. 915,126**

**Claims priority, application Fed. Rep. of Germany, Oct. 4, 1985, 3535474**

**Int. Cl.⁴ B23Q** *17/09*

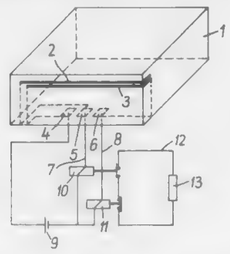
**U.S. Cl. 73—104** **18 Claims**

1. Method for detecting a wear limit or break in a cutting edge of a tool used in a machining process, the cutting edge being formed of material subject to wear, said method comprising:

embedding two insulated conductor paths in said cutting material;

connecting each insulated conductor path to a source of voltage so that one of the conductor paths forms part of a closed circuit and the other of the conductor paths forms part of an open circuit;

producing a signal for interrupting a machining process if either the conductor path in the closed circuit is interrupted or if the conductor path in the open circuit is closed.



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**4,744,242**

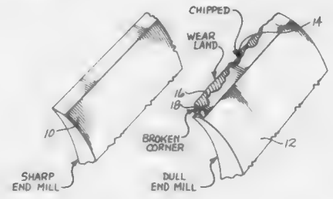
## METHOD FOR MONITORING CUTTING TOOL WEAR DURING A MACHINING OPERATION

**David A. Anderson, Sumner, and William A. Dias, Renton, both of Wash., assignors to The Boeing Company, Seattle, Wash.**

**Filed Sep. 16, 1986, Ser. No. 907,989**

**Int. Cl.⁴ G01B** *21/30*

**U.S. Cl. 73—104** **6 Claims**




1. A method for detecting wear of a cutting tool used for machining a workpiece, comprising:

sensing vibrational frequencies of said cutting tool during machining, wherein frequencies within a range from approximately 2.5 kilohertz (KHz) to at least 20.0 Khz are sensed;

monitoring the amplitude of individual sensed frequencies within said range, and wherein when the amplitude of any of such frequencies exceeds a certain threshold amplitude said cutting tool is known to be dull; and

identifying certain types of cutting tool wear by monitoring increases in amplitude of certain specific individual frequencies within said range of frequencies.

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**4,744,243**

## METHOD OF AND APPARATUS FOR DETECTING MAXIMUM CYLINDER PRESSURE ANGLE IN INTERNAL COMBUSTION ENGINE

**Akira Tanaka, Wako, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Jun. 19, 1987, Ser. No. 63,955**

**Claims priority, application Japan, Jun. 28, 1986, 61-150654**

**Int. Cl.⁴ G01M** *15/00*

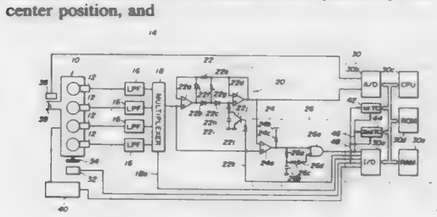
**U.S. Cl. 73—115** **13 Claims**

1. A method of detecting maximum cylinder pressure angle in an internal combustion engine, comprising the steps of:

a. detecting at least one reference crankshaft angular position with respect to an engine piston, said reference crankshaft angular position including the crankshaft angular position at piston top dead center

b. determining the actual piston top dead center position,

c. correcting the detected reference crankshaft angular position on the basis of the determined actual piston top dead center position, and



d. determining the maximum pressure angle by measuring the interval between the corrected reference crankshaft angular position and the angular position at which maximum cylinder pressure occurs.

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**4,744,244**

## CYLINDER PRESSURE SENSOR OUTPUT COMPENSATION METHOD FOR INTERNAL COMBUSTION ENGINE

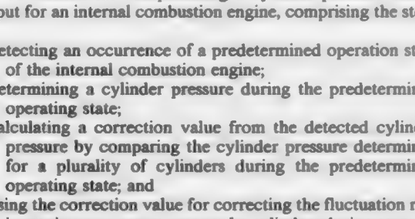
**Akira Tanaka, Wako, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Feb. 4, 1987, Ser. No. 10,670**

**Claims priority, application Japan, Feb. 19, 1986, 61-34331**

**Int. Cl.⁴ G01M** *15/00*

**U.S. Cl. 73—115** **12 Claims**



1. A method for compensating a cylinder pressure sensor output for an internal combustion engine, comprising the steps of:

detecting an occurrence of a predetermined operation state of the internal combustion engine;

determining a cylinder pressure during the predetermined operating state;

calculating a correction value from the detected cylinder pressure by comparing the cylinder pressure determined for a plurality of cylinders during the predetermined operating state; and

using the correction value for correcting the fluctuation rate in maximum-pressure among the cylinders during an operating state of the engine other than the predetermined state.

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**4,744,245**

## ACOUSTIC MEASUREMENTS IN ROCK FORMATIONS FOR DETERMINING FRACTURE ORIENTATION

**Gary L. White, Dallas, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.**

**Filed Aug. 12, 1986, Ser. No. 895,753**

**Int. Cl.⁴ E21B** *47/00*

**U.S. Cl. 73—151** **18 Claims**

15. A system for determining the orientation of at least the generally horizontal in situ stresses in a subterranean formation comprising:

a device adapted to be inserted into a wellbore extending within said formation, said device including means for transmitting radio frequency range radiation into said formation from said wellbore over a predetermined angular range with respect to the longitudinal central axis of said wellbore and acoustic transducer means for sensing acoustic emissions from said formation over a predetermined angular range with respect to said axis and generating signals related to said acoustic emissions; and



means for receiving said signals so that said signals can be recorded for determining the orientation of at least the generally horizontal in situ stresses in said formation with respect to said axis.

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**4,744,246**

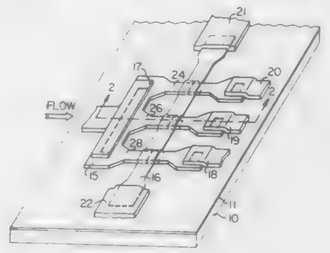
## FLOW SENSOR ON INSULATOR

**Heinz H. Busta, 223 N. Home, Park Ridge, Ill. 60068**

**Filed May 1, 1986, Ser. No. 857,986**

**Int. Cl.⁴ G01F** *1/68*

**U.S. Cl. 73—204** **23 Claims**




1. A flow sensor comprising:

a thermally insulating substrate;

a temperature sensing element disposed on said substrate; and

a thin film heating element disposed on said temperature sensing element and being in close thermal contact with and electrically isolated from said temperature sensing element;

wherein said temperature sensing element includes a pn junction having a p-doped region and a n-doped region positioned laterally on said substrate and a junction between the p-doped and the n-doped regions; and

wherein said heating element is positioned over said junction.

**4,744,247**

## DEVICE FOR ELECTRICAL MEASUREMENT OF THE LEVEL OF A LIQUID IN A FUEL TANK

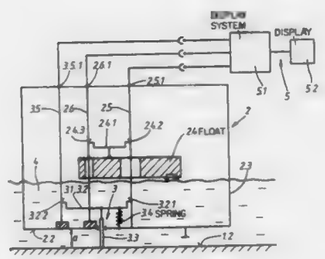
**Detlef Kaminski, Kornwesthein, Fed. Rep. of Germany, assignor to Daimler Benz Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Apr. 8, 1987, Ser. No. 35,855**

**Claims priority, application Fed. Rep. of Germany, Apr. 22, 1986, 3613521**

**Int. Cl.⁴ G01F** *23/68*

**U.S. Cl. 73—313** **2 Claims**




1. A device for electrical measurement of the level of a liquid contained in the fuel tank of a motor vehicle, with dip tube sensor means mountable on the tank and dippable into the liquid, comprising a dip tube with its end extending to the bottom of said tank and a float disposed therein and acting as a flotation body, said float having first contact bridge means with at least two wiper contacts, at least one said wiper contact on said float conductively connected with a resistance strip and another said wiper contact on said float conductively connected with a first contact strip, both of said strips extending along a length of said dip tube, said device having a level indicating device to which terminals of said resistance and said first contact strip are connected and in which a first measured value at said terminal of said first contact strip is used to generate a corresponding level indication, the improvement comprising:

travel sensor means arranged at one end of said dip tube, said travel sensor means having telescoping rod means extending from the bottom of said dip tube;

spring means for pretensioning said telescoping rod means out of said dip tube against said bottom of said tank;

said telescoping rod means having a telescope plate having second contact bridge means with at least two travel sensor wiper contacts;

a second contact strip extending along the length of said dip tube;

wherein at least one said travel sensor wiper contact is conductively connected with said resistance strip, and at least one other said travel sensor wiper contact in conductively connected with said second contact strip such that a second measured value at a terminal of said second contact strip is functionally related to a calibration value for said device.

**4,744,248**

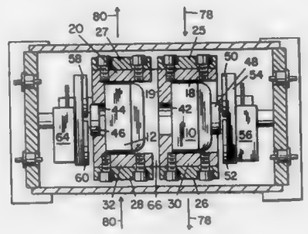
## VIBRATING ACCELEROMETER-MULTISENSOR

**Robert E. Stewart, Woodland Hills, Calif., assignor to Litton Systems, Inc., Beverly Hills, Calif.**

**Division of Ser. No. 884,115, Jul. 10, 1986, which is a continuation-in-part of Ser. No. 770,882, Aug. 29, 1985, abandoned, which is a continuation of Ser. No. 558,055, Dec. 5, 1983, abandoned, and a continuation-in-part of Ser. No. 573,017, Jan. 23, 1984, and a continuation-in-part of Ser. No. 758,692, Jul. 25, 1985, Pat. No. 4,679,434. This application Jun. 25, 1987, Ser. No. 66,834**

**Int. Cl.⁴ G01P** *9/04, 15/13*

**U.S. Cl. 73—505** **22 Claims**




1. A multisensor comprising, in combination:

a first accelerometer, having a sensing first axis, responsive to acceleration along said first sensing axis, to generate a first signal, with a first predetermined polarity, that is a measure of acceleration;

a second accelerometer, substantially identical to said first accelerometer, having a second sensing axis parallel and substantially collinear to said first axis, and responsive to acceleration along said second sensing axis to generate a second signal, with said first predetermined polarity, that is a measure of acceleration;

vibrating means for vibrating each of said accelerometers in phase opposition with one another along parallel third and fourth axes, respectively, said third and fourth axes being parallel to each other and orthogonal to said first and second axes;

a pair of beam suspensions, each having opposed beam support flexures, for mounting said first and second accelerometers with the polarities of their sensing axes in the same direction, said accelerometers facing in the same direction, and constraining said accelerometers to vibrate in purely translational motion along said third and fourth axes;

summing amplifier means connected to receive said first and second signals, to produce a sum signal; and

difference amplifier means, connected to receive said first and second signals, to produce a difference signal;

whereby the output of said summing amplifier means is a measure of acceleration along said first and second axes, and the output of said difference amplifier means is a measure of the Coriolis acceleration induced by angular velocity about a fifth axis perpendicular to said first, second, third and fourth axes.



**4,744,249**

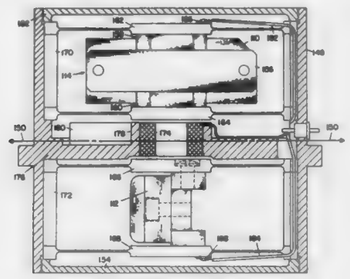
## VIBRATING ACCELEROMETER-MULTISENSOR

**Robert E. Stewart, Woodland Hills, Calif., assignor to Litton Systems, Inc., Beverly Hills, Calif.**

**Continuation-in-part of Ser. No. 770,882, Aug. 29, 1985, which is a continuation of Ser. No. 558,055, Dec. 5, 1983, abandoned, and a continuation-in-part of Ser. No. 573,017, Jan. 23, 1984, and a continuation-in-part of Ser. No. 758,692, Jul. 25, 1985, Pat. No. 4,679,434. This application Jul. 10, 1986, Ser. No. 884,115**

**Int. Cl.⁴ G01P** *15/08, 9/04*

**U.S. Cl. 73—505** **10 Claims**



1. A multisensor, responsive to the linear acceleration and rate of rotation of a body comprising, in combination:

(a) a first accelerometer responsive to linear acceleration along a first preselected sensing axis;

(b) a second accelerometer responsive to linear acceleration along a second preselected sensing axis;

(c) a pair of double diaphragm suspensions, including an electromagnet mounted between said double diaphragm suspensions, arranged and positioned to constrain said accelerometers so that said first preselected sensing axis is orthogonal to said second preselected sensing axis;

(d) means for vibrating said accelerometers out of phase; and

(e) means connected to receive the output signals of said accelerometers and to separate signals which are measures of the Coriolis accelerations exerted upon said accelerometers from signals caused by acceleration along the respective sensing axes of said accelerometers.

**4,744,250**

## METHOD FOR CLASSIFICATION OF POINT AND ELONGATED SINGLE DEFECTS IN WORKPIECES BY MEANS OF ULTRASONICS

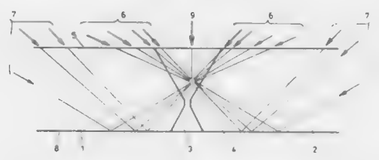
**Otto Ganglbauer; Josef Ausserwöger, and Felix Wallner, all of Linz, Austria, assignors to Voest-Alpine Aktiengesellschaft, Muldenstrasse, Austria**

**Filed Sep. 22, 1986, Ser. No. 909,888**

**Claims priority, application Austria, Oct. 3, 1985, 2866/85**

**Int. Cl.⁴ G01N** *29/04*

**U.S. Cl. 73—588** **4 Claims**




1. A method of classifying flaws in a workpiece, particularly on and in welds of planar or arcuate parts of said workpiece, said parts having a known thickness, comprising the steps of:

systematically testing said workpiece for flaws by generating first ultrasound echo images of said workpiece for separate cross-sectional planes of said workpiece, thereby obtaining a first cross-sectional representation of said workpiece;

changing at least one of a position of a transducer which generates said first ultrasound echo images of said workpiece and a transmitting direction of ultrasonic signals used in generating said first ultrasound echo images of said workpiece;

systematically testing said workpiece for flaws by generating second ultrasound echo images of said workpiece for said separate cross-sectional planes of said workpiece, thereby obtaining a second cross-sectional representation of said workpiece;

calculating delay times of reflection components of said first and second cross-sectional representations from reflection points of said workpiece so as to locate particular flaws in said workpiece;

generating a graphic representation of at least one area of said workpiece containing a predetermined number of said reflection points;

surrounding said graphic representation of said at least one area of said workpiece with a closed second order curve, said curve approximating the size and shape of said at least one area of said workpiece;

determining an orientation of a major axis of said curve with respect to a reference system of the workpiece, an axis ratio of the length and width of said curve, and a center location of said curve;

starting from said determined orientation, detecting a path difference between two reflection points located opposite from each other for one of said particular flaws; and

processing said axis ratio, said path difference, said determined orientation, said center location and a projected height of said one particular flaw with predetermined parameters and the position of said at least one area of said workpiece in the reference system of the workpiece so as to determine at least whether said one particular flaw is one of a volumetrictype defect, a planar defect, and a combination of a volumetrictype and a planar defect.

**4,744,251**

## APPARATUS FOR EXAMINING TUBULAR MEMBERS DISPOSED IN AXIALLY PARALLEL RELATIONSHIP

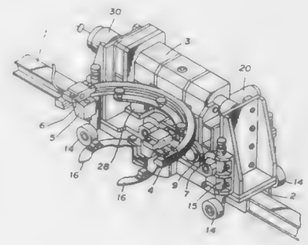
**Isao Shirasu, and Toshio Sanagawa, both of Kobe, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Sep. 30, 1986, Ser. No. 913,305**

**Claims priority, application Japan, Oct. 9, 1985, 60-153675[U]**

**Int. Cl.⁴ G01N** *29/00*

**U.S. Cl. 73—622** **6 Claims**




1. An apparatus for examining a circumferential surface of each of a plurality of tubular members disposed in axially parallel relationship with each other, comprisin:

a rail adapted to extend between adjacent tubular members;

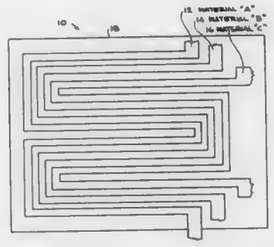
a truck movable on and along said rail;

a support frame having mounts at each end tiltably mounted said support frame on said truck for tilting around an axis extending along said rail;

a tilting mechanism connected to said support frame for tilting said support frame;
a semi-circular shaped beam mounted on said support frame for rotation around an axis through the center of the circle on which said semi-circular shaped beam lies and open laterally of said rail; and
a sensing element disposed at a predetermined position on said semi-circular shaped beam.

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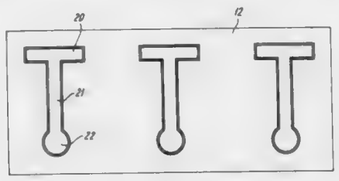
**4,744,252**
**TRIPLE-MATERIAL STRESS-STRAIN RESISTIVITY GAGE**
**Ray B. Stout, Livermore, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.**
**Filed May 19, 1987, Ser. No. 51,560**
**Int. Cl.[4] G01B *7/16***
**U.S. Cl. 73—768** **17 Claims**



1. A stress-strain gage comprising three thin foils of different stress-strain sensitive resistivity materials to provide three independent response measurements of resistance changes.

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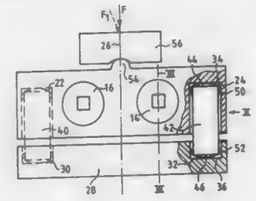
**4,744,253**
**SYSTEM FOR DETERMINING THE PRESSURE IN THE NIP BETWEEN TWO ROLLERS**
**Gerardus A. J. Hermkens, Ew Herten, Netherlands, assignor to Oce-Nederland B.V., Venlo, Netherlands**
**Filed Sep. 11, 1986, Ser. No. 905,970**
**Claims priority, application Netherlands, Sep. 11, 1985, 8502475**
**Int. Cl.[4] G01L *5/00*; H01L *27/20***
**U.S. Cl. 73—862.55** **10 Claims**



6. A laminated film sensor for determining pressure comprising in sequence: a first layer of electrically conducting material; a layer of polyvinylidene fluoride; a second layer of electrically conducting material having a plurality of detector regions which make no electrical contact with the part of the second layer situated around them; a layer of dielectric material; and a third layer of electrically conducting material, wherein a detector region further comprises: an elongated region which is in line at a predetermined mutual distance with an elongated region of another detector region; and a conductor region adjoining approximately perpendicular to the elongated region; and a connection region connected to the other end of the conductor and to a transmission/receiving device.

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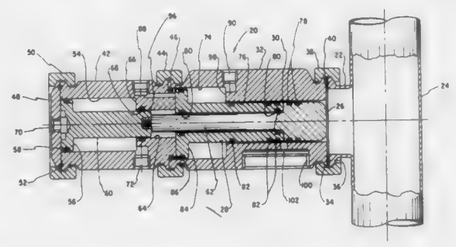
**4,744,254**
**FORCE MEASURING DEVICE**
**Hans Barten, Friedberg, Fed. Rep. of Germany, assignor to Pfister GmbH, Augsburg, Fed. Rep. of Germany**
**Filed Dec. 12, 1986, Ser. No. 941,213**
**Claims priority, application Fed. Rep. of Germany, Dec. 18, 1985, 3544885**
**Int. Cl.[4] G01L *1/26***
**U.S. Cl. 73—862.66** **12 Claims**



1. A force measuring device comprising:
a beam including a body provided with force sensitive means responsive to strain or shearing forces exerted onto said beam, an upper surface of said beam being formed for force introduction to said beam and a bottom surface of said beam having formed therein recesses at outward regions of said beam;
a base plate having a top surface in parallel to said bottom surface of said beam and being provided with recesses aligned to corresponding of said recesses provided at said bottom surface of said beam; and
support elements loosely fitting into said recesses in said bottom surface of said beam and said top surface of said base plate, having opposite curved surfaces for engaging bottom surfaces of said recesses and having a size adapted to maintain a relatively small gap between said bottom surface of said beam and said top surface of said base plate, the arrangement being such that a unitary force measuring device is formed with lateral force components being compensated by restoring forces caused by said support elements being rocked to slanted position by said lateral force components and an excess lateral movement of said beam relative to said base plate being limited by a restricted skewing of said support elements in said recesses.

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**4,744,255**
**SAMPLER AND METERING PUMP**
**Ben E. Jaeger, 50 Hunter La., Plano, Ill. 60545**
**Filed Mar. 23, 1987, Ser. No. 29,202**
**Int. Cl.[4] G01N *1/14***
**U.S. Cl. 73—863.84** **17 Claims**

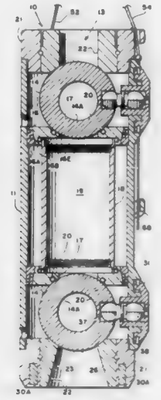


1. Apparatus adapted to be mounted on a vessel, said apparatus comprising a housing having a bore for communication at a forward end with the interior of the vessel; a front plunger reciprocable between positions within and sealed with said bore and forwardly completely out of said bore; a rear plunger reciprocable within and sealed with said bore immediately rearwardly of said front plunger, said front and rear plungers being reciprocable to a predetermined spaced apart relationship to establish a space therebetween and to abutting relationship to collapse said space; a port through said housing in communication with said bore; and drive means operatively connected to said plungers for independently reciprocating each of said plungers forwardly and rearwardly and for moving said plungers between positions whereat said rear plunger is moved forwardly in said bore, said front plunger is moved out of said forward end of said bore and said space is in communication with the interior of the vessel, and whereat said rear plunger is moved rearwardly in said bore, said front plunger is moved rearwardly into and in sealed relationship with said bore and said space is in said bore in communication with said port.



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**4,744,256**
**AIRBORNE WATER SAMPLER DEVICE**
**Shale J. Niskin, 3415 Chase Ave., Miami Beach, Fla. 33169**
**Filed Feb. 24, 1987, Ser. No. 17,826**
**Int. Cl.[4] G01N *1/12***
**U.S. Cl. 73—864.66** **16 Claims**

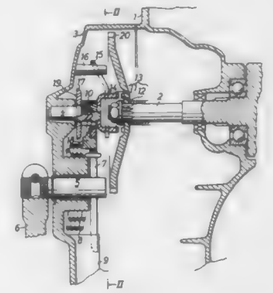


2. A method of collecting a water sample comprising:
providing a tubular member with a pair of open end tube portions, each of which contains a ball valve rotatably mounted between an inner valve seat and an outer valve seat;
setting said ball valves to an initially open position to receive said water sample;
attaching a first line between an airborne moving object and said tubular member and dropping said tubular member from said moving object into a body of water so that said tubular member submerges into said body of water and causes a yank on said first line; and
using said yank of said first line to provide the force necessary to rotate said ball valves to a closed position.

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**4,744,257**
**KICK TYPE STARTING DEVICE FOR ENGINE**
**Akio Yagasaki, and Kenji Yamane, both of Tokyo, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**
**Filed Mar. 17, 1987, Ser. No. 26,594**
**Claims priority, application Japan, Mar. 18, 1986, 61-60402; Mar. 20, 1986, 61-63367**
**Int. Cl.[4] F02N *3/04, 15/06***
**U.S. Cl. 74—6** **1 Claim**

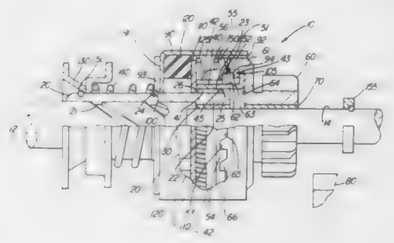
1. A kick type starting device for an engine, comprising:
a kick axle provided with a kick pedal; a driving clutch body operatively connected to said kick axle so as to receive engaging thrust and rotary torque when said kick pedal is kicked; a driven clutch body provided on a crank shaft of the engine and engagable with said driving clutch body when the driving clutch body is advanced by said engaging thrust; and a cam mechanism including a release plate connected to said driving clutch body, and a disc-shaped



release cam rotatably supported on said kick axle, said release cam coming into engagement with said release plate for disengaging said driving clutch body from said driven clutch body when said kick pedal returns to a resting position.

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**4,744,258**
**NON-INDEXING ENGINE STARTER GEARING**
**Nicholas A. Volino, Elmira, N.Y., assignor to Facet Enterprises, Inc., Tulsa, Okla.**
**Filed Dec. 11, 1986, Ser. No. 940,265**
**Int. Cl.[4] F02N *15/06***
**U.S. Cl. 74—7 R** **8 Claims**



1. A starter gearing comprising:
a housing;
a shaft rotatably mounted to said housing;
a driven clutch member mounted coaxially with said shaft, said driven clutch member having radially extending gear teeth on one end portion and axially extending dentil clutch teeth on the opposite end portion;
a driving clutch member mounted adjacent said driven clutch member, said driving clutch member having one end portion and an opposite end portion, said one end portion having axially extending dentil clutch teeth, said dentil clutch teeth being mutually engageable with said dentil clutch teeth of said driven clutch member for transmitting torque between said driving clutch member and said driven clutch member;
an annular sleeve member coaxially disposed with said driving clutch member, said annular sleeve member having one end portion and an opposite end portion, said annular sleeve member further comprising:
means for permitting axial movement of said annular sleeve member with respect to said shaft;
means for limiting axial movement of said annular sleeve member with respect to said shaft; and
means for permitting axial and rotatable movement of said

driving clutch member with respect to said annular sleeve member;

means for maintaining engagement between said dentil clutch teeth of said driving clutch member and said dentil clutch teeth of said driven clutch member for transmitting torque therebetween;

means for axially and rotatably translating said annular sleeve member, driving clutch member and driven clutch member along said shaft; and

restraining means secured to said driven clutch member for restraining thrust loads on said means for permitting axial and rotatable movement of said driving clutch member with respect to said annular sleeve member during rotational and axial movement of said driving clutch member with respect to said annular sleeve member and to thereby avoid the imposition of such thrust loads on said housing.

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**4,744,259**

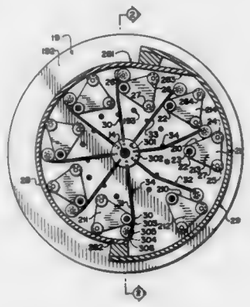
## APPARATUS FOR PRODUCING A DIRECTIONAL UNIT FORCE

**Oscar F. A. Peterson, 3125 Portage Avenue, Winnipeg, Manitoba, Canada R3K 0W4**

**Filed Jun. 5, 1987, Ser. No. 58,864**

**Int. Cl.[4] F03H** *5/00;* **F16H** *33/20*

**U.S. Cl. 74—84 S** **16 Claims**



1. Apparatus for producing a directional unit force comprising a body symmetrical about a central axis thereof, means mounting the body for rotation about said central axis, drive means for driving said rotation of said body, a plurality of pendulum masses, means mounting each mass on said body for pivotal movement about a respective pivot axis spaced radially of said central axis with said pivot axes spaced angularly around said central axis such that said body and said masses can rotate in a balanced condition around said central axis with said masses tending to move to an extended position in which a centre of gravity of each mass lies on a line joining said central axis and said respective pivot axis, a cam surface arranged to extend around said central axis, means on each of said masses for engaging on and running around said cam surface such that when engaged therewith each mass is pivoted out of said extended position to a retracted position in which said centre of gravity is moved regularly inwardly, said cam surface having an angular extent less than 360° so as to provide an angular part of the rotation of the body in which the masses are free to move toward the extended position, and spring means for engaging each of said masses as it moves to the extended position and arranged to provide a spring restraining bias force acting to return said mass to said retracted position.

**4,744,260**

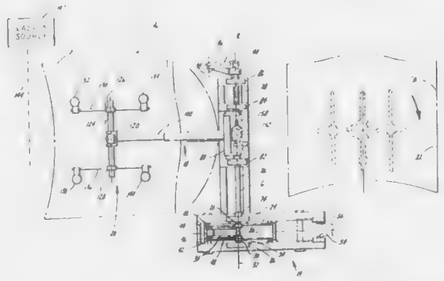
## APPARATUS FOR TURNING OVER A WORKPIECE

**Irvin D. Bond, 10270 Allen Rd., Clarkston, Mich. 48016**

**Continuation-in-part of Ser. No. 829,165, Feb. 14, 1986, Pat. No. 4,715,242. This application Jul. 18, 1986, Ser. No. 886,677**

**Int. Cl.[4] F16H** *21/46;* **B25J** *9/00*

**U.S. Cl. 74—98** **10 Claims**



1. Apparatus for turning a workpiece over, comprising:

a base;

a turnover shaft mounted on the base, and power means for rotating the turnover shaft about a first axis of rotation between a first rotated position and a second rotated position;

arm means mounted on the turnover shaft so as to be rotated therewith about said first axis of rotation;

workpiece support means;

first means mounting the workpiece support means on the arm means such that the workpiece support means is rotatable with respect to the arm means about a second axis of rotation that is non-parallel with respect to the first axis of rotation and spaced from said first axis by a fixed distance, as the arm means and the workpiece support means are rotated about the first axis of rotation;

gear box means including a gear box housing mounted on the turnover shaft, the gear box means including a first rotary member connected to the base, a second rotary member connected to the first rotary member so as to be rotatable with respect to the first rotary member, and means connecting the second rotary member to the workpiece support means such that the workpiece support means is rotated in a timed relationship about the second axis of rotation as the turnover shaft is being rotated about said first axis of rotation.

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**4,744,261**

## BALL COUPLED COMPOUND TRACTION DRIVE

**Peter E. Jacobson, Phoenix, Ariz., assignor to Honeywell Inc., Minneapolis, Minn.**

**Continuation of Ser. No. 802,565, Nov. 27, 1985, abandoned. This application Apr. 3, 1987, Ser. No. 36,148**

**Int. Cl.[4] F16H** *15/26*

**U.S. Cl. 74—198** **2 Claims**

1. Traction drive apparatus having a variable turns ratio comprising

a rotatable input member disposed for rotation about an input axis,

a plurality of drive balls disposed for rotation within said input member, each said drive ball having a center and rotating about a drive ball rotational axis through said center,

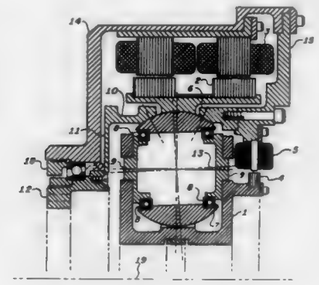
each said drive ball rotational axis being fixed with respect to each said drive ball, respectively, and disposed at a ball skew angle $\theta$ with respect to said input axis,

said ball skew angle $\theta$ between said drive ball rotational axes and said input axis controlling said variable turns ratio,

a first outer race ring fixedly attached to a housing and a second outer race ring forming a rotatable output member,



said drive balls being captured between said first and said second outer race rings such that torque is transmitted from said input member to said output member,



each said drive ball having a point of contact with said first outer race ring on a line through said center which forms a preselected angle with said input axis and said ball skew angle $\theta$ affecting said variable turns ratio (TR) in accordance with

$$TR = \frac{\sin(\alpha - \phi)}{\sin(\alpha - \phi) - \sin(\alpha + \phi)}$$

means for preloading said first and second outer race rings to control torque limits of said torque transmitted from said input member to said output member; and

means for varying said ball skew angle $\theta$ between said drive ball rotational axes with respect to said input axis to vary said variable turns ratio between said rotatable input member and said rotatable output member.

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**4,744,262**

## ARRANGEMENT FOR PROVIDING ENGAGEMENT WITHOUT BACKLASH BETWEEN A GEAR PINION AND A GEAR WHEEL COOPERATING THEREWITH

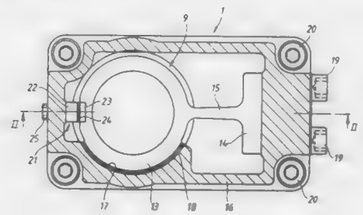
**Hakan Dahlquist, Västerås, Sweden, assignor to Asea Aktiebolag, Västerås, Sweden**

**Filed Jan. 20, 1987, Ser. No. 4,637**

**Claims priority, application Sweden, Jan. 21, 1986, 8600256**

**Int. Cl.[4] F16H** *55/18;* **F16C** *27/00, 27/06*

**U.S. Cl. 74—409** **6 Claims**



1. In a gear assembly which includes a gear housing, first and second bearing support means supported by said gear housing, first and second roller bearings respectively supported by said first and second bearing support means, a shaft extending between and rotatably journalled in said first and second roller bearings, a gear pinion mounted on said shaft between said first and second roller bearings, and a cylindrical gear wheel that is engageable with said gear pinion along an imaginary contact line that lies within an imaginary tangential contact plane, the improvement wherein said first bearing support means comprises

an elongated sleeve in which said first roller bearing is fixedly mounted,

an elongated fixing plate fixedly supported by said gear housing, and

an elongated rib portion extending between said elongated sleeve and said elongated fixing plate, said elongated rib portion being connected to said elongated sleeve and to said elongated fixing plate along substantially their entire lengths and extending in parallel with said imaginary tangential contact plane,

and wherein said gear assembly includes a stop means positioned near a portion of an outer surface of said elongated sleeve which faces away from said gear wheel,

said elongated rib portion being sufficiently flexible to enable said sleeve to move and contact said stop means upon engagement of said cylindrical gear wheel and said gear pinion, thus reducing backlash therebetween.

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**4,744,263**

## FACE GEAR TRANSMISSION

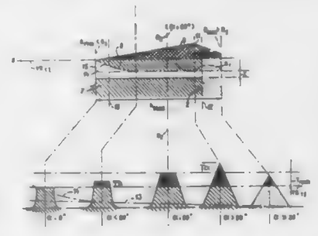
**Hendrik Kuiken, Emmeloord, Netherlands, assignor to Kuiken, N.V., Emmeloord, Netherlands**

**Filed Dec. 1, 1986, Ser. No. 936,241**

**Claims priority, application Netherlands, Dec. 5, 1985, 8503359**

**Int. Cl.[4] F16H** *55/06, 55/08, 55/10, 55/17*

**U.S. Cl. 74—462** **7 Claims**



1. Face gear transmission comprising:

a cylindrical gear wheel having a first axis, said cylindrical gear wheel engaging in substantially continuous line contact with a face gear having a second axis not parallel to said first axis;

said face gear having a teeth crown, said teeth crown having active tooth flanks over an active pressure angle $\alpha$ varying as a function of teeth crown radius, the range of variation of said pressure angle being a range within the range of $\alpha = 0°$ and approximately $\alpha = 40°$;

said face gear teeth having an axial height varying as a function of pressure angle $\alpha$ and extending at least into a plane disposed on a pitch cone located about said second axis, said axial height decreasing substantially linearly from a nominal tooth height as the pressure angle $\alpha$ decreases, and said axial height increasing as the pressure angle $\alpha$ increases, said axial height increasing to a sharp tip point and then decreasing outwardly therefrom.

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**4,744,264**

## HOLLOW NON-SINGULAR ROBOT WRIST

**Veljko Milenkovic, Birmingham, Mich., assignor to Ford Motor Company, Dearborn, Mich.**

**Continuation-in-part of Ser. No. 752,753, Jul. 8, 1985. This application Nov. 24, 1986, Ser. No. 934,526**

**Claims priority, application European Pat. Off., Jun. 30, 1986, 86305077.9**

**Int. Cl.[4] G05G** *11/00;* **B25J** *17/02*

**U.S. Cl. 74—479** **19 Claims**

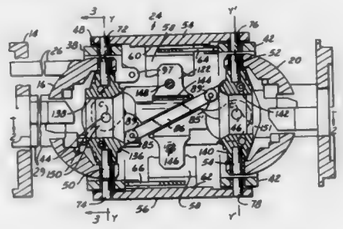
1. A hollow non-singular robot wrist comprising:

a first link;

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an end link spaced axially from the first link;
a ring connecting the first link and the end link, a first center and a second center spaced apart on the ring, having a hole extending between the first center and the second center;
a connecting tube;
first gimbal means for connecting the ring and the first link for rotation about a first pair of substantially perpendicular axes that intersect at the first center, having a hole aligned with the hole of the ring and extending through the first gimbal means;
second gimbal means concentric with the first center for connecting the tube and the first link for rotation about the first pair of axes;
third gimbal means for connecting the ring and the end link for rotation about a second pair of substantially perpendicular axes that intersect at the second center having a hole aligned with the hole of the ring and extending through the third gimbal means;
fourth gimbal means concentric with the second center for connecting the tube and the end link for rotation about the second pair of axes;
first means for substantially equalizing the amount of rotation of the first link about a first axis of the first pair of axes at the first link to the amount of rotation of the end link about a first axis of the second pair of axes at the second center; and
second means for substantially equalizing the amount of rotation of the first link about the second axis of the first pair of axis at the first center to the amount of rotation of the end link about the second axis of the second pair of axes at the second center.



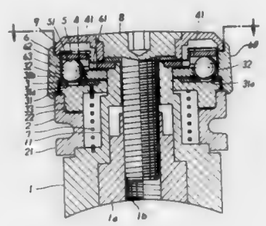
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**4,744,265**

## LEVER SHIFTING DEVICE FOR A BICYCLE

**Masashi Nagano, Izumi, Japan, assignor to Shimano Industrial Company Limited, Osaka, Japan**

**Filed Mar. 17, 1986, Ser. No. 839,970**
**Claims priority, application Japan, Mar. 20, 1985, 60-56682**
**Int. Cl.⁴ G05G *1/04, 5/06;* B60K *20/00***
**U.S. Cl. 74—523** **3 Claims**



1. A lever shifting device for a bicycle adapted to operate a derailleur having a return spring, said lever shifting device comprising:
a fixing member having a lever shaft,
an operating lever supported rotatably to said lever shaft,
a positioning mechanism provided with a positioning member having a plurality of engaging portions and an engaging member engageable with at least one of said engaging portions,
a friction mechanism having friction portions for applying to said operating lever a rotational resistance against said return spring of said derailleur, said engaging portions and friction portions being disposed in a plane perpendicular to an axis of rotation of said lever shifted from one another, and
a switching means which shifts one of said positioning member and said engaging member with respect to the other so that said engaging member disengages from said engaging portions and engages with said friction portions, wherein said positioning member lies in a plane perpendicular to the axis of rotation of said lever, said engaging portions and friction portions also lying in said plane.

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**4,744,266**

## MANIPULATOR MODULE

**Nedko S. Shivarov; Gencho S. Stainov, and Todor N. Todorov, all of Sofia, Bulgaria, assignors to Institute Po Technicheska Kibernetika, Sofia, Bulgaria**

**Filed Jan. 30, 1987, Ser. No. 8,694**
**Claims priority, application Bulgaria, Jan. 30, 1986, 73311**
**Int. Cl.⁴ B25J *9/08***
**U.S. Cl. 74—526** **6 Claims**



1. A manipulator module comprising,
an arm bearingly mounted on an axle;
left and right adjustable stops mounted on said axle, movement of said arm being confined by said adjustable stops, each of said stops being provided with a fixing surface;
a plurality of hard stops mounted on said arm, said hard stops being charged with spring means;
said spring means contacting one of said respective left and right adjustable stops when the arm approaches the respective adjustable stop;
a fix mover movably mounted to said arm and provided with a bearings block at one end, said bearings block being provided with a bearing;
means for actuating said fix mover;
such that when said arm has reached one of said respective left and right adjustable stops, said fix mover is moved and presses said bearing against the respective fixing surface of said respective adjustable stop and thereby pressing said adjustable stop causes said adjustable stop to deform said spring means.



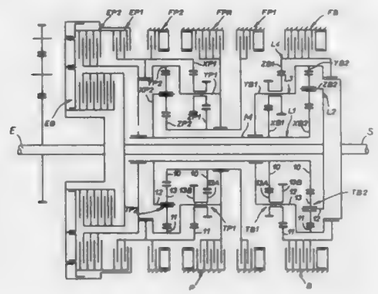
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**4,744,267**

## TRANSMISSION SYSTEM, ESPECIALLY FOR AUTOMOBILE VEHICLES, WITH WIDE TORQUE AND SPEED RANGE

**Pierre A. G. Lepelletier, Chatou, France, assignor to Valeo, Paris, France**

**PCT No. PCT/FR85/00179, § 371 Date Feb. 28, 1986, § 102(e) Date Feb. 28, 1986, PCT Pub. No. WO86/00676, PCT Pub. Date Jan. 30, 1986**
**PCT Filed Jul. 1, 1985, Ser. No. 852,638**
**Claims priority, application France, Jul. 2, 1984, 84 10455**
**Int. Cl.⁴ F16H *57/10***
**U.S. Cl. 74—759** **16 Claims**



1. Transmission system, especially for automobile vehicles, comprising an input shaft (E), an intermediate shaft (M), an output shaft (S), an input gearbox (P) between the input and intermediate shafts and a main gearbox (B) between the intermediate and output shafts, the input gearbox (P) having a free neutral setting in which the intermediate shaft (M) is decoupled from the input shaft (E) and freely rotatable and a sequence of forward gear ratios in which the intermediate shaft (M) is coupled to the input shaft (E) with a variable forward gear ratio, control means for the input gearbox by means of which the input gearbox (P) is selectively placed in its free neutral setting or in a forward gear with a ratio selected from said sequence of ratios, the main gearbox (B) comprising a clutch (EB), a brake (FB), a double planet gear (TB1, TB2) with four elements (L1, L2, L3, L4) of which a first element (L1) is coupled to the intermediate shaft (M), a second element (L2) is selectively coupled to the input shaft (E) or disengaged by the clutch (EB), a third element (L3) is coupled to the output shaft (S) and the fourth element (L4) is selectively immobilized or released by the brake (FB), said main gearbox (B) having three forward running ranges respectively called slow, intermediate and fast such that in its slow range the second element (L2) is released and the fourth elemenent (L4) is immobilized, in its intermediate range the second element (L2) is coupled to the input shaft (E) and the fourth element (L4) is immobilized in its fast range, the second element (L2) is coupled to the input shaft (E) and the fourth element (L4) is released in its fast range, the transmission system (P, B) having three forward running modes: a slow mode in which the input gearbox (P) is in a forward gear and the main gearbox (B) is in its slow range, an intermediate mode in which the input gearbox (P) is in its free neutral setting and the main gearbox (B) is in its intermediate range and a fast mode in which the input gearbox (P) is in a forward gear and the main gearbox (B) is in its fast range, a change of gear ratio within the sequence of forward gear ratios of the input gearbox (P) increasing the slow forward running ratio of the transmission system (P, B) and decreasing the fast forward running ratio of the transmission system (P, B) and vice versa, the transmission system characterized in that the input gearbox (P) has a reverse gear selected by the input gearbox control means (EP1, EP2, FP1, FP2, FPR), which gives the transmission system on the one hand, a reverse ratio (AR) when the main gearbox (B) is in its slow range and, on the other hand, a highest (11th) forward gear ratio of the transmission system when the main gearbox (B) is in its fast range.

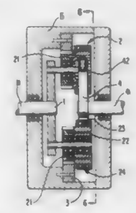
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**4,744,268**

## EPICYCLE POWER AMPLIFIER

**Eugene Kurywczak, 238 Murray St., Elizabeth, N.J. 07202**

**Filed Oct. 30, 1986, Ser. No. 925,098**
**Int. Cl.⁴ F16H *3/44***
**U.S. Cl. 74—781 R** **7 Claims**



1. An Epicycle Power Amplifier comprising a housing and means within the said housing to mount: a centrally positioned braked reaction gear, concentric to an axis of the said reaction gear, a rotatable input shaft with a rigidly affixed carrier lever, extending outside the said housing and providing means of connection with a rotating power means, opposite and concentric to the said input shaft, a rotatable output shaft with a rigidly affixed output lever, extending outside the said housing and providing means of connection with a load, on the said carrier providing means in a position at a distance from its axis, a rotatable iso-planet is mounted, comprising a planet gear meshing with the said reaction gear, a hub that is one piece construction with the said planet gear, a bearing fitted onto the said hub and having a free floating rim, isolated by a frictionless agent comprising a bearing that provides isolation of an angular rotation of the said planet gear around its axle from the said free floating rim, on the said output lever in a position separated by a distance from its axle, rollers, making contact connection on both sides with the said free floating rim of the said iso-planet and perpendicular to an orbital translation thereof.

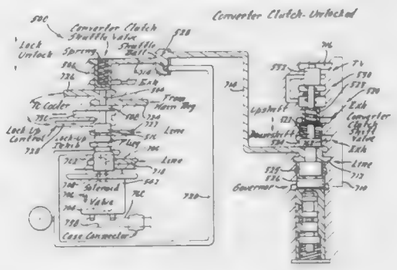
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**4,744,269**

## AUTOMATIC TRANSMISSION WITH LOCKUP CONVERTER CLUTCH CONTROLS

**Thomas L. Greene, Plymouth, and Bruce J. Palansky, Livonia, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.**

**Filed Nov. 6, 1986, Ser. No. 927,624**
**Int. Cl.⁴ B60K *41/22***
**U.S. Cl. 74—868** **4 Claims**



1. A control system for an automatic transmission in an engine powered vehicle comprising multiple ratio gearing:
a pressure source;

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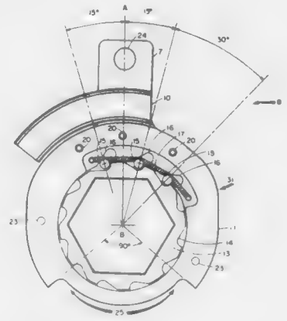
a clutch and brake means for effecting ratio changes including two top ratios and at least one lower, underdrive ratio;
a hydrokinetic torque converter having a turbine connected to torque input portion of said gearing and an impeller connected to said engine;
a pressure operated lockup clutch means in said converter for directly connecting said turbine and said impeller;
a control circuit including pressure operated means for sequentially actuating said clutch and brake means and shift valve means for controlling distribution of pressure from said source pressure to said pressure operated means
a converter clutch shift valve and a converter clutch shuttle valve in portions of said circuit connecting said pressure source to said lockup clutch means;
a source of a torque signal and a source of a speed signal connected to said converter clutch shift valve whereby the latter is shifted between a lockup clutch engaging position and a lockup clutch disengaging position depending upon the relative values of speed and torque;
said shuttle valve establishing and disestablishing communication between said lockup clutch and said pressure source as it is shifted between a lockup position and an unlock position in response to movement of said converter clutch shift valve, the latter being hydraulically linked to the former;
a solenoid valve means connected hydraulically to said converter clutch shuttle valve;
a microprocessor control unit for energizing and deenergizing said solenoid valve whereby the latter distributes actuating pressure selectively to said converter clutch shuttle valve, the influence of said converter clutch shift valve on said converter clutch shuttle valve thereby being overruled at speeds greater than a minimum calibrated valve; and
engine torque demand sensing means, engine speed sensing means and vehicle speed sensing means communicating with input signal conditioning portions of said microprocessor control unit.

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**4,744,270**
**METHOD FOR THERMALLY FITTING HARD TEETH IN ROCK BITS**
**Edward Vezirian, 110 Firwood, Irvine, Calif. 92714**
**Filed Jun. 19, 1987, Ser. No. 65,049**
**Int. Cl.[4] B21K** *5/02*
**U.S. Cl. 76—108 A** **5 Claims**

1. A method of installing individual hard, insert type, rock cutting teeth into appropriate undersized retention bores formed by and within a supporting structure of a rock bit, and securely retaining said teeth within said undersized retention bores formed by and within said rock bit comprising:
preparing said supporting structure of said rock bit by forming, machining, providing said undersized retention bores, and heat treating through all prescribed heat treat cycles exceeding about 1000 degrees F.,
providing said supporting structure at a stabilized first, relatively higher temperature, said first relatively higher temperature not to exceed prescribed temperature of remaining heat treat cycle,
providing said individual, hard, insert type, rock cutting teeth at a stabilized second, relatively lower temperature, said second, relatively lower temperature being a predetermined amount lower than said first, relatively higher temperature,
orienting and inserting each said individual rock cutting tooth into said appropriate undersized retention bore formed by and within said supporting structure of said rock bit, and
holding each said insert in place allowing its temperature to stabilize upward providing an interference fit thereto.

**4,744,271**
**RATCHETING BOX WRENCH**
**Bobby W. Collins, 800 Commerce Rd., Ste. 214, New Orleans, La. 70123**
**Continuation of Ser. No. 786,836, Oct. 11, 1985, Pat. No. 4,669,338. This application May 21, 1987, Ser. No. 52,485**
**The portion of the term of this patent subsequent to Jun. 2, 2004, has been disclaimed.**
**Int. Cl.[4] B25B** *13/46*
**U.S. Cl. 81—57.39** **12 Claims**

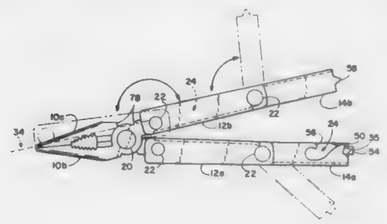


1. A torque wrench for flange nuts, comprising:
(a) a wrench body having an arcuate channel at one end;
(b) a lever arm intersecting said channel;
(c) a means, connected to said lever arm and matingly slidable within said channel, for guiding said lever arm;
(d) a retainer rim, having an edge connected to an end of said lever arm, said retainer rim further having a ratcheting portion, proximate to said lever arm, and confined within an angle of 270° on said retainer rim;
(e) a ratcheting gear, rotatably positioned within said retainer rim, having:
(i) a means for gripping said flange nut;
(ii) a plurality of circumferentially positioned teeth;
(f) a ratcheting means, within said ratcheting portion of said retainer rim, for engaging said teeth of said ratcheting gear when torque is applied in one direction and for allowing relative rotation between said retainer rim and said ratcheting gear when torque is applied in an opposite direction; and
(g) a reciprocating power means for pivoting said lever arm, having a first end pivotally connected to an opposite end of said lever arm, and a second end pivotally connected to an opposite end of said wrench body.

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**4,744,272**
**FOLDABLE TOOL**
**Timothy S. Leatherman, Portland, Oreg., assignor to Leatherman Tool Group, Inc., Portland, Oreg.**
**Filed Apr. 17, 1986, Ser. No. 853,349**
**Int. Cl.[4] B25B** *7/22;* **B25G** *1/00*
**U.S. Cl. 81—427.5** **27 Claims**

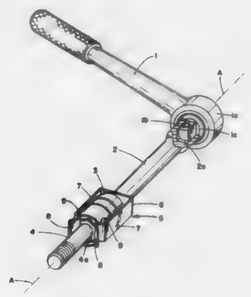
26. A foldable tool comprising:
(a) a tool head;
(b) a pair of elongate handles, each handle having an inner end pivotally connected to said tool head and an outer end opposite said inner end;
(c) a pair of elongate handle extensions, each of said handle extensions pivotably connected proximate one end thereof to a respective one of said outer ends of said handles;
(d) said handles and said handle extensions including respective open channel means for permitting said handle extensions to be selectively pivoted from a nested handle assembly, wherein said handles or alternatively said handle extensions are respectively received within said open channel means of the other, to extended positions with respect to each other, wherein neither of said handles or said handle extensions are received within the open channel means of the other, said respective open channel means also serving as means for permitting said nested handle assemblies to be selectively pivoted with respect to said tool head into a nested tool assembly with said tool



head received within said open channel means of, alternatively, said handles or said handle extensions; and
(e) said handle extensions arranged with respect to said respective handles so that said respective open channel means of said handles and said handle extensions face in opposite directions when said handle extensions are in extended relationship with said respective handles.

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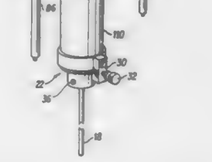
**4,744,273**
**FASTENER RETAINING ATTACHMENT FOR WRENCH SOCKETS**
**William P. Bartok, Jr., 6423 Meldon Dr., Mentor, Ohio 44060**
**Continuation-in-part of Ser. No. 894,939, Aug. 8, 1986, abandoned, which is a continuation-in-part of Ser. No. 752,820, Jul. 8, 1985, abandoned. This application Jun. 8, 1987, Ser. No. 59,564**
**Int. Cl.[4] B25B** *23/08*
**U.S. Cl. 81—453** **23 Claims**



20. An attachment for use with a socket wrench assembly comprising wrench handle means and means including shank means for releaseably mounting a wrench socket on said handle means, said shank means having an axis and being non-circular in cross-section, means providing abutment means adjacent said shank means in the direction toward said handle means and transverse to said axis, said means including shank means including circular rod means extending from said abutment means in the direction toward said handle means, said wrench socket having a mounting end receiving said shank means and facing said abutment means and an opposite end having a multi-faceted opening for receiving a threaded fastener component, said opening having a peripheral edge, said attachment being removably mountable on said shank means and comprising a bridging portion having an opening therethrough receiving said shank means, said bridging portion being axially adjacent said abutment means and said mounting end of said wrench socket, means on said bridging portion for releaseably securing said bridging portion to said circular rod means to support said attachment against axial displacement relative thereto and against tilting displacement relative to said axis, said bridging portion extending transverse to said axis and having opposite ends radially spaced from said axis, said attachment further comprising resilient finger means extending axially from said opposite ends of said bridging portion toward said opposite end of said wrench socket, and cam means on said finger means adjacent said opposite end of said wrench socket and projecting radially inwardly across said peripheral edge of said multi-faceted opening to releaseably retain a fastener component in said opening, said bridging portion in being axially captured between adjacent said abutment means and said mounting end of said wrench socket positioning said finger means and cam means against axial displacement relative to said shank means and said wrench socket whereby said cam means remains axially fixed relative to said shank means and wrench socket upon axial displacement of a fastener into and out of said opening and is engaged by the fastener component to displace said cam means and finger means radially outwardly against the resiliency of said finger means to enable said axial displacement of said fastener component into and out of said opening.

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**4,744,274**
**WAX RING PATTERN MACHINING TOOL**
**Eduardo C. Vasquez, 520 Palermo, Coral Gables, Fla. 33134**
**Filed Feb. 4, 1987, Ser. No. 10,729**
**Int. Cl.[4] B23B** *3/02, 5/00*
**U.S. Cl. 82—4 R** **7 Claims**



1. A tool for machining wax ring patterns from wax ring preform tubes while the ring pattern is a part of the tube comprising;
a tool holder having a body provided wtih a transverse slot therethrough adapted to receive cutting tool means, a pilot member on said body insertable into a first end of a wax preform tube bore, said pilot member having a periphery defining a sliding fit within the tube bore to precisely stabilize the tool holder during insertion of said pilot member into said tube first end,
an operating handle axially disposed at one end of said body,
indexing means having means manually operable to alternately secure said body adjacent said tube first end in selected fixed radial positions or allowing free rotation of said tool body relative the preform tube,
said indexing means including a base having an axial bore juxtaposed a second end of said preform tube, securing means radially affixing said base to said preform tube second end, a shaft joined to said pilot member and having a distal portion slidably disposed through said base bore, an indexing gear provided with an axial bore slidably mountable upon said shaft distal portion adjacent said base, fastener means securing said gear to said shaft,

said manually operable means on said indexing means including a lock member carried by said base and shiftable from a position engaging said indexing gear to a position free thereof, and

cutting tool means including an elongated tool cross-arm insertable within said body transverse slot for selectively operating upon a surface of the preform tube, an elongated tool support carried by said tool cross-arm, a tool element mountable upon said tool support, screw means attached to said handle and threadedly disposed within said body in communication with said transverse slot for securing said elongated tool cross-arm therein adjacent said preform tube first end, whereby

with said lock member not engaging said gear, said gear, shaft, pilot member and body are free to be rotated relative the preform tube so that said tool element may be utilized against the entire circumferential surface of the preform tube while, with said lock member in engagement with said gear, said gear, shaft, pilot member and body are radially locked relative the preform tube so that said tool element may be utilized to operate against but a selected radial portion of the preform tube.

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**4,744,275**

## METHOD OF AND APPARATUS FOR PROCESSING STRIP

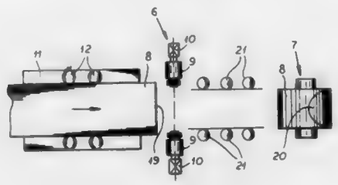
**Hermann Koppers, Duisburg; Herbert Lux, Mühlheim/Ruhr; Heinz-Wilhelm Berger, Neukirchen-Vluyn; Dieter Baukloh, Duisburg, and Dieter Hohl, Neukirchen-Vluyn, all of Fed. Rep. of Germany, assignors to BWG Bergwerk-und Walzwerk-Maschinenbaum GmbH, Duisburg, Fed. Rep. of Germany**

**Filed Sep. 23, 1986, Ser. No. 910,735**

**Claims priority, application Fed. Rep. of Germany, Sep. 28, 1985, 3534622**

**Int. Cl.⁴ B23D** *31/00*

**U.S. Cl. 83—44** **2 Claims**



1. A method of processing continuous strip—especially metal strip, in a strip-processing line, comprising the steps of:

advancing an oncoming continuous strip with segments of different width along said line;

upon approach of a transition region between segments of different widths to a predetermined location along said line transversely severing the strip to form a severed length of strip from one of said segments and a separation edge on a remaining length of continuous strip with a width different from that of the severed length; and

immediately after the transverse severing of the strip, trimming the lateral edges of said remaining length to a new trimmed width different from that of the severed length and while said remaining length is advanced along said line.

**4,744,276**

## METHOD AND APPARATUS FOR PRODUCING PUNCHED TUBE

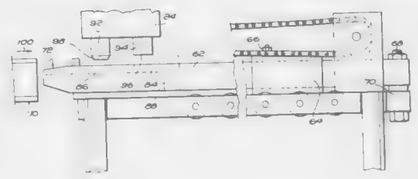
**Edward C. Duce, Liversedge, England, assignor to Stockrail Services Limited, West Yorkshire, England**

**Filed Jul. 15, 1986, Ser. No. 885,726**

**Claims priority, application United Kingdom, Jun. 18, 1986, 8614808**

**Int. Cl.⁴ B21D** *28/04, 28/28*

**U.S. Cl. 83—50** **9 Claims**



1. A method of punching apertures in tubes of square cross section comprising the steps of:

(a) placing the tube over a mandrel of corresponding section;

(b) moving a punch transversely of the tube and into a punch recess in the mandrel to punch a first aperture therein;

(c) moving the tube relative to the mandrel by a predetermined amount;

(d) moving the punch transversely of the tube to punch a second aperture therein spaced from the first aperture by said predetermined distance;

(e) repeating steps (c) and (d) to produce a line of evenly spaced apertures in one side of the tube; and after the first line of apertures has been provided in such one side of the tube:

(f) removing the tube from the mandrel;

(g) turning it about its axis by 90°;

(h) repositioning the tube on the mandrel; and

(i) carrying out and repeating steps (c) and (d) to provide a second line of apertures being staggered, lengthwise of the tube, relative to the first line of apertures.

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**4,744,277**

## METHOD AND DEVICE FOR CUTTING PIPE LENGTHS

**Ludwig Balint, Bregenzer Strasse 37, A-6911 Lochau, Austria**

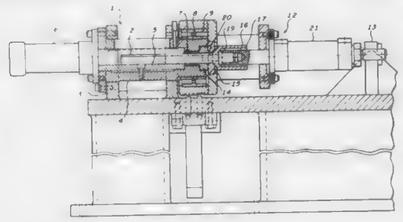
**PCT No. PCT/AT85/00054, § 371 Date Sep. 25, 1986, § 102(e) Date Sep. 25, 1986, PCT Pub. No. WO86/03440, PCT Pub. Date Jun. 19, 1986**

**PCT Filed Dec. 5, 1985, Ser. No. 900,099**

**Claims priority, application Austria, Dec. 7, 1984, 3899/84**

**Int. Cl.⁴ B26D** *3/00;* **B23D** *21/14*

**U.S. Cl. 83—54** **8 Claims**



1. A method of cutting a piece of pipe from a length of pipe in a cutting plane by gripping the length of pipe directly adjacent the cutting plane and displacing the piece of pipe with respect to the length of pipe in the cutting plane, which comprises the steps of

(a) applying a radially outwardly directed and a radially inwardly directed pressure against the length of pipe and the piece of pipe in the cutting plane and at both sides thereof,

(b) simultaneously applying an axial pressure, the pressures generating a stress amounting to at least 70% of the yield point of the material of the pipe, and

(c) maintaining the pressures during the entire cutting operation.

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**4,744,278**

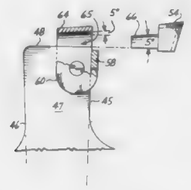
## ROTARY MACHINING TOOL AND METHOD OF ITS MANUFACTURE

**James L. Wright, Creswell, Oreg., assignor to Weyerhaeuser Company, Tacoma, Wash.**

**Continuation-in-part of Ser. No. 859,676, May 6, 1986, abandoned, which is a continuation-in-part of Ser. No. 823,152, Jan. 27, 1986, abandoned, which is a continuation-in-part of Ser. No. 725,958, Apr. 22, 1985, abandoned. This application Oct. 9, 1986, Ser. No. 918,582**

**Int. Cl.⁴ B27B** *33/08;* **B27G** *13/12;* **B23C** *5/22*

**U.S. Cl. 83—839** **54 Claims**



1. A rotary machining tool having a plurality of replaceable spaced apart peripheral cutter element assemblies which comprises:

a. a generally disk-shaped tool body having a plurality of pin receiving apertures placed therethrough at spaced apart locations around a circle concentrically located adjacent to and within the peripheral edge of the tool body;

b. a cutter element assembly pinned to the tool body at each aperture, each cutter element assembly further comprising an insertible cutter element means and a clevis means for holding the cutter element means in place on the tool body,

each clevis means generally being of inverted U-shape in transverse cross section and having an upper portion extending beyond the tool body periphery, two side portions spaced apart to fit snugly over the circumferential edge of the tool body and an associated rotation prevention buttress means acting against the tool body to prevent rearward rotation of the cutter element assembly while subject to use stresses,

the side portions of the clevis means being apertured along a common axis to accept a transverse pin means for attachment to the tool body,

said clevis means upper portion serving in conjunction with the circumferential edge of the tool body to define a tapered cutter element means retaining socket oriented generally tangent to said edge, and

the cutter element means comprising a head portion having at least one cutting edge, and an elongated tapered shank portion having a lower tool body periphery contacting surface and side and upper clevis means contacting surfaces, said tapered shank portion of the cutter element means being inserted into the cutter element means retaining socket and tightly wedged between the upper portion of the clevis means and the circumferential edge of the tool body whereby said clevis means is forced radially outward against the pin means and the assembly is securely locked in place on the tool.

**4,744,279**

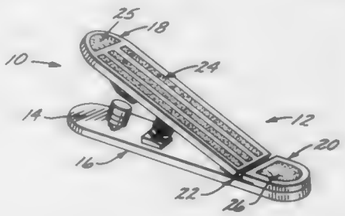
## ADJUSTABLE DRUM PEDAL DEVICE

**Duane P. Livingston, 1447 S. Saltair, Apt. 210, Los Angeles, Calif. 90025**

**Filed May 30, 1986, Ser. No. 869,106**

**Int. Cl.⁴ G10H** *3/14, 5/00*

**U.S. Cl. 84—1.01** **18 Claims**



1. A drum pedal device for triggering and controlling a synthesizer, comprising:

transducer means for supplying an electrical signal to said synthesizer;

actuation means for actuating said transducer means upon impact between said transducer means and said actuation means;

a movable pedal coupled to said actuation means to cause said impact between said actuation means and said transducer means upon movement of said pedal, said pedal being adapted for overtravel movement after said impact occurs; and

resisting means for resiliently resisting said overtravel movement after actuation of said transducer means, thereby simulating the action of an acoustic drum pedal.

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**4,744,280**

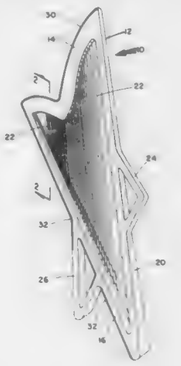
## ELECTRONIC HARP

**Ralph F. Garritano, P.O. Box 106, Patchogue, N.Y. 11772**

**Filed Oct. 16, 1986, Ser. No. 919,671**

**Int. Cl.⁴ G10D** *1/04;* **G10H** *3/18*

**U.S. Cl. 84—1.16** **8 Claims**



1. An electric harp, comprising:

(a) a first tensioning member having a plurality of holes disposed along its length;

(b) a second tensioning member secured to said first tensioning member at first ends of said first and second tensioning members, said second tensioning member having a plurality of holes disposed along its length;

(c) a string passing through one hole on said first tensioning member and its corresponding hole on said second tensioning member;

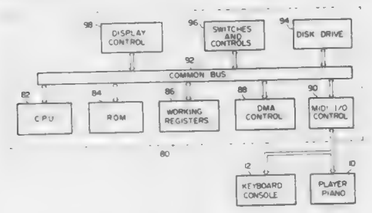
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(d) stop means for securing said string in said first tensioning member;
(e) adjustable securing means for adjustably securing said string to said second tensioning member;
(f) support means for maintaining said first tensioning member rigidly fixed with respect to said second tensioning member, said first and second tensioning members and said support means forming a frame;
(g) vibration damping means for damping vibrations in the frame;
(h) pick-up means for detecting vibration of said string; and
(i) frequency selection means responsive to said pick-up means to produce a signal having a frequency which is a function of the resonant frequency of said string.

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**4,744,281**
**AUTOMATIC SOUND PLAYER SYSTEM HAVING ACOUSTIC AND ELECTRONIC SOUND SOURCES**
**Yoshimasa Isozaki, Shizuoka, Japan, assignor to Yamaha Corporation, Shizuoka, Japan**
**Filed Mar. 25, 1987, Ser. No. 29,804**
**Claims priority, application Japan, Mar. 29, 1986, 61-71869; Mar. 29, 1986, 61-71868**
**Int. Cl.[4] G10H** *3/03*
**U.S. Cl. 84—1.28** **7 Claims**

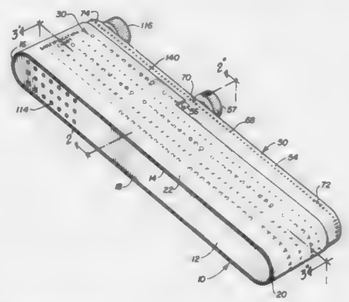



1. An automatic music player system having an ensemble playback mode of operation using a memory medium having recorded thereon a piece of music composed of at least two combined parts to be reproduced separately of each other, the parts being recorded in the form of at least two data subblocks, comprising
(a) first sound generator means to mechanically generate sounds when mechanically or electrically actuated,
(b) at least one second sound generator means to electronically generate sounds when electronically actuated and
(c) control means operatively connected to the first and second sound generator means, wherein said control means is operative so that
(1) one of the two or more data subblocks of the data read from the memory medium is discriminated from another, whereupon the discriminated one of the data subblocks is transmitted to the first sound generator means and another data subblock is transmitted to the second sound generator means, and
(2) the transmission of data to the second sound generator means is continuously delayed by a predetermined period of time from the transmission of data to the first sound generator so that the first and second sound generator means are enabled to produce sounds concurrently and in concert with each other.

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**4,744,282**
**MUSIC BOX WITH INSTRUCTIONAL DATA TABLES**
**Nadal DuJour, 570 NW. 190 St., Miami, Fla. 33169**
**Filed Sep. 14, 1987, Ser. No. 96,086**
**Int. Cl.[4] G10F** *1/06*
**U.S. Cl. 84—95.2** **8 Claims**

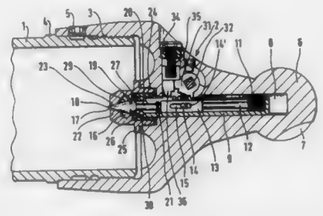
1. A musical box with instructional tables comprising:
a box-like support structure;
means for controllably producing music disposed in the interior of said support structure;
a flexible, continuous web sized to wrap around said support structure and having indicia representative of mathematical data tables, one column thereof indicating the mathematical resultant of data laterally displayed with respect



thereto, said mathematical resultants disposed proximate a side of said support structure; and,
a controllably movable strip means disposed proximate said side of said support structure including a continuous web having a window therein sized to reveal one of said mathematical resultants.

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**4,744,283**
**MORTAR**
**Inigo A. Ibarra, Vizcaya, Spain, assignor to Esperanza y Cia, S.A., Spain**
**Filed Apr. 9, 1986, Ser. No. 849,817**
**Claims priority, application Spain, Mar. 17, 1986, 292983; Mar. 17, 1986, 292986**
**Int. Cl.[4] F41F** *13/04*
**U.S. Cl. 89—27.12** **8 Claims**



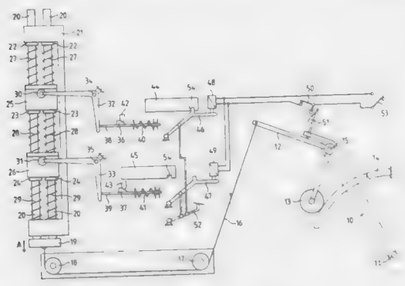
1. An improved mortar having a barrel and a cover, said cover having one end that attaches to said barrel and another end that attaches to a base plate, said cover having a blind hole therein coaxial with said barrel, said blind hole having an open end at said one end of said case, said mortar comprising:
(a) a hollow sheath slidably positioned in said blind hole, said hollow sheath movable between a rest position and a firing position, said hollow sheath having an outer surface and an inner surface, said outer surface having a toothed rack mounted thereon, said inner surface having a pin mounted therein;
(b) a spring mounted in said hollow sheath towards said other end of said blind hole;
(c) a hammer slidably positioned in said hollow sheath, said hammer operated on by said spring, said hammer having a groove therein, said pin of said hollow sheath positioned in said groove of said hammer;
(d) a first means for holding said hammer in a cocked position when said hollow sheath is in said rest position, said first means mounted in said cover;



(e) a drive pinion mounted in said cover, said pinion meshing with said toothed rack thereby effecting movement of said hollow sheath between said rest position and said firing position;
(f) a second means attached to said pinion to release said first means when said hollow sheath moves from said rest position to said firing position;
(g) a case attached to said cover and closing said open end of said blind hole, said case having a through hole, said through hole being coaxial with said barrel, said hole having a first truncated cone seating section;
(h) a sleeve housed inside said case, said sleeve having a second truncated cone seating section; and
(i) a firing pin member having a firing pin head, a central body and a rear body, said firing pin head having a tapered, rounded head and a truncated cone base, said firing pin member positioned in said through hole and in said sleeve, said firing pin member movable with said hollow sheath between said rest position and said firing position such that a first seal forms between said tapered, rounded head of said firing pin head and said first truncated cone seating section, and a second seal forms between said truncated cone base of said firing pin head and said second truncated cone seating section, said first seal and second seal being formed when said firing pin member is in said rest position and in said firing position.

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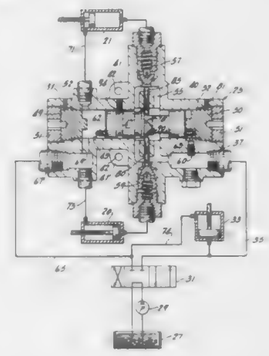
**4,744,284**
**DEVICE FOR LIMITING THE FIELD OF FIRE IN ELEVATION ON AN AUTOMATIC FIREARM**
**Carlos Schoch, Steinmaur, and Arto Airio, Nussbaumen, both of Switzerland, assignors to Werkzeugmaschinenfabrik Oerlikon-Bührle AG, Zürich, Switzerland**
**Filed Feb. 18, 1987, Ser. No. 16,013**
**Claims priority, application Switzerland, Mar. 4, 1986, 00879/86**
**Int. Cl.[4] F41D** *11/02*
**U.S. Cl. 89—134** **3 Claims**



1. An automatic firearm field of fire limiting device for a firearm having an electrical trigger, a mechanical trigger and a movable breechblock movable to perform an advance movement and a movement into a rearmost position, comprising:
switch means for disconnecting said electrical trigger when the switch means is actuated;
firing pin lock means for preventing advance movement of said breechblock and rendering ineffectual said mechanical trigger;
elevation angle detection means detecting when the firearm has exceeded a predetermined angle of elevation and operative to activate said switch means and said firing pin lock means to disconnect the electrical trigger and inactivate said mechanical trigger;
cam means for operating the switch means and the firing pin lock means;
a lifting flank adapted to be fixedly located at a firing position for the firearm, so that said cam means contacts said lifting flank and is raised by said lifting flank when the firearm is elevated;
linkage means linking said cam means to said firing pin lock means to activate said firing pin lock means when the firearm exceeds a predeterminate angle of elevation;
said linkage means comprising:
fixedly mounted bracket means;
spring-loaded control means mounted in said fixedly mounted bracket means;
cable means connecting said cam means and said spring-loaded control means such that movement of said cam means on said lifting flank during elevation of the firearm displaces said spring-loaded control means against the spring-loading of said spring-loaded control means;
follower means mounted for recoil with the firearm and contacting said spring-loaded control means and maintaining contact with said spring-loaded control means during recoil of the firearm; and
said follower means displacing said firing pin lock means upon displacement of said spring-loaded control means.

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**4,744,285**
**ALTERNATING VALVE**
**Glen T. Presley, Angola, Ind., assignor to Applied Power Inc., Butler, Wis.**
**Filed Mar. 10, 1987, Ser. No. 24,021**
**Int. Cl.[4] F15B** *11/00*
**U.S. Cl. 91—513** **21 Claims**



1. A valve for alternately extending and retracting first and second hydraulic cylinders, said valve comprising:
a body having a cylindrical bore therein;
a generally cylindrical spool axially slidable between a first position and a second position within said bore;
means for axially rotating said spool a preselected angular amount after said spool has moved from said first position to said second position and back to said first position;
a first cam element on said spool and in surrounding orientation intermediate the ends thereof, said first cam element comprising three segments, each of said segments including a cam surface and a hold point, said segments being equally spaced about said first cam element;
first and a second check valves radially spaced apart relative to said spool and perpendicular thereto, said first and second check valves being oriented so that in normal operation, fluid is allowed to flow away from said spool, wherein the outlet of said first check valve is connected to the base end of said first hydraulic cylinder and the outlet of said second check valve is connected to the base end of said second hydraulic cylinder;
means for locking said first and second check valves in an open position, such that bidirectional fluid flow is allowed therethrough, when said spool moves to said first position;

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a first port for supplying pressurized fluid to said check valves and to move said spool to said second position;

a second port for supplying fluid pressure to move said spool to said first position and to the outlet ends of said first and second hydraulic cylinders.

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**4,744,286**

## BRAKE MOTOR SUBASSEMBLY

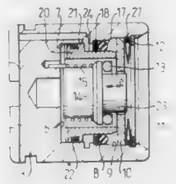
**Jean-Louis Gerard, Paris, France, assignor to Bendix France, Drancy, France**

**Filed Mar. 10, 1987, Ser. No. 24,276**

**Claims priority, application France, Mar. 19, 1986, 86 03937**

**Int. Cl.[4] F01B *31/14*; F15B *15/17*; F16D *55/02***

**U.S. Cl. 92—13.1** **3 Claims**



1. A brake motor subassembly comprising a control piston having an inner cavity delimited by a bottom wall and peripherally by a stepped bore and in which is arranged an automatic compensation nut biased toward the bottom wall via a washer by an elastic member bearing on the control piston axially opposite the bottom wall, and a stepped pilot piston having a first cylindrical peripheral surface of larger diameter interacting sealingly and slideably with one end of reduced diameter of the stepped bore and, in the vicinity of an opposite end axially opposite the first cylindrical peripheral surface, interacting with the washer, a second cylindrical peripheral surface of reduced diameter interacting sealingly and slideably with an annular gasket mounted in an intermediate portion of the stepped bore, characterized in that the subassembly has integrated means for limiting the stroke of the pilot piston in a direction opposite the bottom wall, the integrated limiting means comprising a mechanically acting stop which includes a stop member for engaging the washer to limit displacement of the washer by means of movement of the pilot piston, the elastic member bearing on a retaining ring mounted in an end of larger diameter of the stepped bore, the stop member comprising an intermediate ring disposed about the elastic member and arranged between the washer and retaining ring so that the stop member engages the retaining ring and displaced washer to provide said mechanically acting stop which protects said elastic member from excessive compression.

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**4,744,287**

## RODLESS CYLINDER

**Michikazu Miyamoto, Soka, Japan, assignor to SMC Corporation, Tokyo, Japan**

**Filed Jan. 2, 1987, Ser. No. 68**

**Claims priority, application Japan, Jan. 21, 1986, 61-6796[U]**

**Int. Cl.[4] F15B *15/24***

**U.S. Cl. 92—13.7** **9 Claims**

1. A rodless cylinder which comprises:

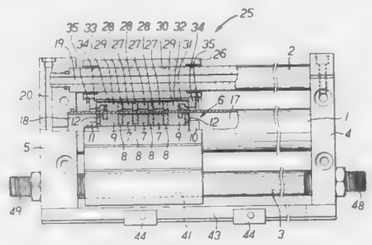
a cylinder tube whose both ends are fastened to end plates;

at least one guide rod disposed parallel to said cylinder tube, both ends of which being fastened to said end plates;

a piston carrying a series of driving magnets and slidably fitted in said cylinder tube;

a driven member sliding along said cylinder tube and carrying a series of driven magnets sliding along the peripheral surface of said cylinder tube, the series of driving and driven magnets attracting each other and the driven member having through-holes through which said guide rods are slidably passed;

one of said end plates having a pair of ports through which a hydraulic fluid is supplied to and discharged from pressure chambers on both sides of the piston in the cylinder tube, one of the ports communicating directly with one of the pressure chambers and the other port communicating with the other pressure chamber through one of the guide rods and passages provided in the other end plate.



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**4,744,288**

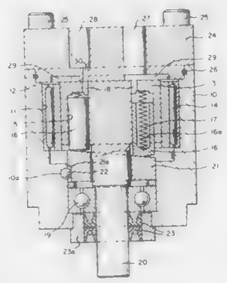
## AXIAL PISTON PUMPS AND MOTORS

**David L. Mauch, Westerville, Ohio, assignor to Commercial Shearing, Inc., Youngstown, Ohio**

**Filed Aug. 28, 1986, Ser. No. 901,288**

**Int. Cl.[4] F01B *13/04***

**U.S. Cl. 92—57** **9 Claims**



1. An axial piston pump comprising a housing, a cylindrical bore in said housing, a piston barrel rotatable in said bore and spaced from the bore walls, antifriction bearing means surrounding said barrel between said barrel and bore, a plurality of axial piston bores in said barrel open at one end and having fluid passages through the barrel at the other end, a piston in each such piston bore extending out of said open end, spring means between each piston and said other end of the piston bore, a fixed ramp swash plate in the housing bore beneath said extending pistons, antifriction thrust bearing means between the swash plate and pistons, an axial drive shaft on the barrel extending through an antifriction bearing in an opening in the housing opposite the bore for drivingly engaging an external drive means and removable port cap means on said housing over said bore having inlet and outlet ports communicating with the fluid passages in the barrel.



**4,744,289**

## CAB FOR OCCUPANCY BY INDIVIDUALS

**Heinz Hölter, Beisenstr. 39-41, D-4390 Gladbeck, Fed. Rep. of Germany; Heinrich Igelbüscher, Gladbeck, Fed. Rep. of Germany; Heinrich Gresch, Dortmund-Wickede, Fed. Rep. of Germany; Heribert Dewert, Gladbeck, Fed. Rep. of Germany, and Joachim Tischendorf, Aachen, Fed. Rep. of Germany, assignors to Heinz Hölter, Gladbeck, Fed. Rep. of Germany**

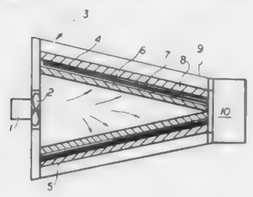
**PCT No. PCT/EP86/00050, § 371 Date Oct. 1, 1986, § 102(e) Date Oct. 1, 1986, PCT Pub. No. WO86/04553, PCT Pub. Date Aug. 14, 1986**

**PCT Filed Feb. 1, 1986, Ser. No. 929,853**

**Claims priority, application Fed. Rep. of Germany, Feb. 5, 1985, 3503780; Feb. 7, 1985, 3504155; Feb. 7, 1985, 3504156; Mar. 8, 1985, 3508213; Mar. 15, 1985, 3509369**

**Int. Cl.[4] B60S *1/54*; B60H *3/06***

**U.S. Cl. 98—2.01** **4 Claims**



1. In a ventilation system for a cab adapted to be occupied by a person and having a window, the improvement which comprises in combination:

a filter comprising:

a filter housing having an outlet,

two multilayer filter packages disposed in said housing and converging toward said outlet to define a V configuration of said packages having an open side opposite a vertex of the V, and

a blower in said housing adjacent said open side for drawing air into said housing from an inlet formed therein, and forcing said air outwardly through said filter packages from the interior of said V and then from said outlet, said filter packages each having:

a first filter layer containing soda lime or sodium carbonate,

a second filter layer containing expanded calcium-aluminum-silicate saturated with at least one $H_2S$-oxidizable substance, and

a third filter layer containing active carbon;

a condensate sensor on a surface of said window interiorly of the cab, said sensor comprising:

an electrically nonconducting carrier foil having one face applied to said surface, and

a pair of spaced apart wires received in said foil and having ends facing one another and angled to be inclined toward one another and terminating at an opposite face of said foil, whereby the formation of condensate on said opposite face reduces electrical resistance between said ends; and

circuit means connected to said sensor and said blower and responsive to a reduction of said electrical resistance to activate said blower and induce air flow through said filter into said cabin.

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**4,744,290**

## PIVOTED DAMPER BLADE AND PIN THEREFOR

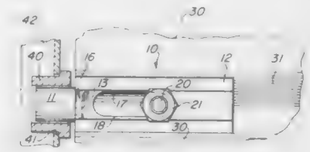
**Louis Josephson, Yonkers, N.Y., assignor to American Hardware & Paint Co., Inc., Irvington, N.J.**

**Filed Aug. 3, 1987, Ser. No. 80,800**

**Int. Cl.[4] F24F *13/14***

**U.S. Cl. 98—121.2** **5 Claims**

1. A pivoted blade having a centrally positioned V-shaped pin-receiving depression in combination with a longitudinally slidable mounting pin which is releasably secured within said depression, said pin comprises an elongated element which is circular in cross-section at one end thereof and having its other end flattened on one side and of V-shape on the other side, said other end of said pin having a centrally positioned hole extending therethrough with this hole being centrally disposed with respect to the flattened side and extending through the apex of the V-shaped side, said centrally positioned hole having a cross-section which is longer than it is wide with the longer cross-section extending longitudinally of the pin, said mounting pin being mounted at a side margin of a blade with the V-shaped portion of the pin fitting into the V-shaped depression in the blade and with the end of circular cross-section extending beyond the side margin of said blade, a bolt extending through a hole in the apex of the V-shaped depression in the blade and through the hole in the pin, and a nut associated with the free end of the bolt and locking the pin to the blade.



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**4,744,291**

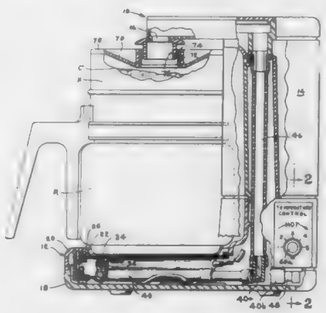
## ELECTRIC COFFEE MAKER

**Gus W. Wallin, Waterbury, Conn., assignor to Hamilton Beach Inc., Waterbury, Conn.**

**Filed Jan. 26, 1982, Ser. No. 342,924**

**Int. Cl.[4] A47J *31/16***

**U.S. Cl. 99—280** **3 Claims**



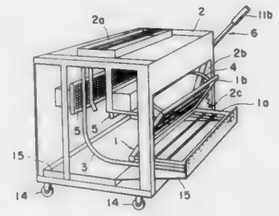
1. In an electric coffee maker comprising a reservoir for water, said reservoir having a lower end, a holder of coffee grinds superposing a coffee collection container, conduit means connecting the lower end of the reservoir to a spout at a level well above the lower end of reservoir, electric heating means adjacent the conduit means for heating the water, check valve means in the conduit means comprising a ball valve seat and a ball valve element for the purpose of utilizing pressure of steam generated in the water as it heats to move the water toward the spout, the ball being downstream from the ball valve seat, the improvement of control means for controlling the rate of flow through the conduit means, the control means comprising a manually turnable shaft downstream from the ball valve element, the shaft having an axis transverse to the flow of water and a cam lobe on the shaft whereby when the shaft is turned, the lobe engages against the ball valve element to limit the travel of the ball to a desired extent.

**4,744,292**

## DEVICE FOR ROASTING MEATS

**Toshio Nagata, Tokyo, Japan, assignor to Token Kogyo Co., Ltd., Tokyo, Japan**

**Filed Jul. 22, 1986, Ser. No. 888,016**
**Int. Cl.[4] A47J *37/04***
**U.S. Cl. 99—351** **3 Claims**



1. A device for roasting meats comprising:
a meat holding portion two grill frames, one end of said two grill frames being pivotably secured to each other and another end of said two grill frames being positioned to open and close;
a casing including a heating opening located at an upper surface and an operation opening located at a side surface for taking in and out of meat from said meat holding portion;
two guide rails secured to sides of said casing and being bent approximately in an "L" shape for guiding of said meat holding portion between said heating opening and said operation opening;
a spring body secured between said meat holding device and said casing to urge said meat holding portion positioned at said operation opening in an opening direction, and further to urge the meat holding portion in a closed direction by the movement of said meat holding device;
a roasting portion secured to the casing to heat said meat holding portion from front and rear adjacent to said heating opening; and
an operating lever secured to said casing and said meat holding portion, a portion of said lever being positioned outside of said casing, whereby said meat holding portion is moved to said roasting portion or withdrawn therefrom by the movement of said lever.

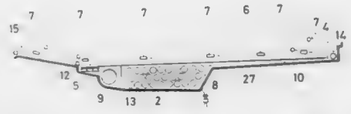
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**4,744,293**

## AUTOMATIC CONTINUOUS FOOD FRYING DEVICE

**Katsusuke Shimokawa, Moriguchi, Japan, assignor to Sun Plant Industry Co., Ltd., Osaka, Japan**

**Filed Dec. 30, 1986, Ser. No. 947,804**
**Int. Cl.[4] A47J *37/12***
**U.S. Cl. 99—404** **12 Claims**



1. An automatic continuous food frying device which comprises,
an oil container adapted to be filled with a frying oil, said oil container having an inlet end and an outlet end,
an impervious partition means disposed in said oil container for separating the oil container into an upper cooking zone and a lower heating zone,
heating means for heating said frying oil disposed in said heating zone,
pump means disposed in said heating zone for circulating the frying oil, and
conveying means disposed in said cooking zone for conveying the food to be fried from the inlet end to the outlet end of the oil container.

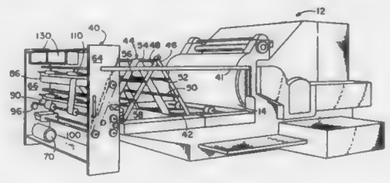
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**4,744,294**

## CYLINDER PRESS CONVERSION FOR HOT DIE APPLICATION OF FOIL

**Dirk Liepelt, deceased, late of Cornelius, and by Joan A. Liepelt, Personal Representative of the Estate, Rte. 1, Box 280, Cornelius, both of Oreg. 97113**

**Continuation of Ser. No. 743,375, Jun. 11, 1985, Pat. No. 4,627,343. This application Oct. 21, 1986, Ser. No. 921,639**
**The portion of the term of this patent subsequent to Dec. 9, 2003, has been disclaimed.**
**Int. Cl.[4] B41F *3/18***
**U.S. Cl. 101—27** **2 Claims**



1. Foil application apparatus useable in connection with a printing press equipped with a heated die and apparatus for carrying successive sheets of stock, for hot die stamping of foil onto a sheet of stock so carried on the press, the foil application apparatus comprising:
(a) supply means for holding ready a supply spool of foil-carrying material in the form of a coiled web;
(b) foil draw means fixedly located with respect to said press and separate from said foil application apparatus for carrying successive sheets of stock, for periodically pulling a portion of foil-carrying material from said supply spool through a predetermined position with respect to said apparatus for carrying successive sheets of stock;
(c) draw control means for adjustably controlling the distance through which said foil draw means pulls said foil-carrying material; and
(d) adjustable means included in said draw control means, for causing said foil draw means to pull said foil-carrying material a first distance a predetermined plurality of times, and to draw said foil-carrying material a different second distance each time said foil draw means has drawn said foil-carrying material said first distance said predetermined plurality of times.

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**4,744,295**

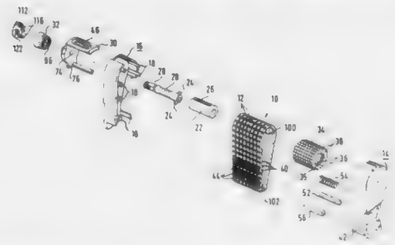
## SETTING MECHANISM FOR ENDLESS BAND PRINTING DEVICE

**Heinrich Volk, Beerfelden-Gammelsbach, Fed. Rep. of Germany, assignor to Esselte Meto International GmbH, Hirschhorn/N., Fed. Rep. of Germany**

**Filed Nov. 24, 1986, Ser. No. 934,034**
**Claims priority, application Fed. Rep. of Germany, Oct. 21, 1986, 3635732**
**Int. Cl.[4] B41J *1/20***
**U.S. Cl. 101—111** **18 Claims**

1. Printing mechanism comprising a plurality of type carriers which at their outer peripheral face carry in one region printing types and in another region indicator types, the printing types being adapted by turning the type carriers to be brought into a printing position, a setting means which includes an actuating knob and which by axial displacement can be brought into a drive connection with each of the type carriers for rotation thereof and stop means for limiting the turning travel of the type carriers, characterized by resilient detent elements (96; 114; 180) which with a detent moment which is governed by their spring hardness and which is greater than the torque necessary for turning the type carriers (12, 34) hold the actuating knob (32; 132; 170) against rotation relatively to





the type carrier in drive connection with the setting means (32, 132, 170; 20, 140, 172; 24, 174, 176), and a setting member (112; 152; 188) adapted to be brought into engagement with the detent elements (96; 114; 180) for influencing the spring hardness of the detent elements (96; 114; 180).

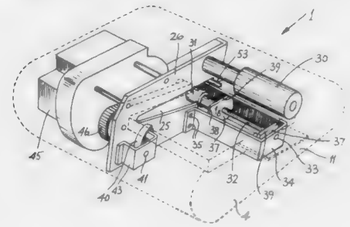
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**4,744,296**

## IMPRINTER APPARATUS WITH DOCUMENT ACTIVATED DOCUMENT AND CARD CARRIER

**David G. Edwards, Dublin; Gerard Finlay, Navan, and David J. Boyle, Leixlip, all of Ireland, assignors to Security Imprinter Corporation, Walkersville, Md.**

**Continuation-in-part of Ser. No. 834,634, Feb. 28, 1986, abandoned. This application Sep. 17, 1987, Ser. No. 99,407**
**Claims priority, application Ireland, Jun. 4, 1985, 1375/85**
**Int. Cl.[4] B41F *3/04*; B41J *11/54, 29/42***
**U.S. Cl. 101—269** **18 Claims**



1. Document actrvated imprinter apparatus for imprinting characters from a credit card or the like forming a thin character bearing imprint member onto a document, comprising a housing having entrance and exit openings for introduction and discharge of a document onto which characters are to be imprinted, imprint means in the housing including a printing station having an imprinter roller and a drive roller between which the document and imprint member are to be advanced, a carrier member movable within the housing along a feed path between a document receiving start position and a document discharge end position for advancing a document fed onto the carrier member through said entrance opening between said rollers, means on said carrier member for receiving and positioning the imprint member adjacent the document disposed on the carrier member to imprint characters on the document upon their passage between said rollers, means tor guiding and reciprocating said carrier member and the document and imprint member thereon along said feed path, powered drive means including a document sensor to sense the presence of a document at a support position on the carrier member to drive said drive roller through a carrier member imprint stroke along said feed path, means for guiding the document through said exit opening upon the carrier member reaching said end position, and means for returning the carrier member to said start position, said carrier member being a rigid platen having a flat upwardly facing surface with a recess in said surface for receiving said imprint member to be carried hereby at a position to form character imprints on the document, and said carrier member being shaped to admit said rollers into contact with the adjacent print member and document for imprinting characters on the document upon their passage between said rollers.

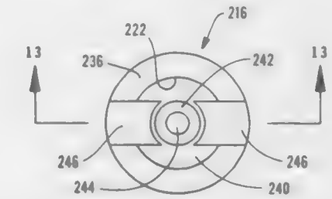
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**4,744,297**

## MOUNTING PRINTING PLATES

**Louis M. Sardella; John B. West, both of Cockeysville; John R. Harrison, Baltimore, all of Md.; Dennis J. Parr, York, Pa., and Edward H. Harrison, Jarrettsville, Md., assignors to The Ward Machinery Company, Cockeysville, Md.**

**Continuation-in-part of Ser. No. 776,775, Sep. 17, 1985, Pat. No. 4,683,822. This application May 1, 1986, Ser. No. 858,934**
**The portion of the term of this patent subsequent to Aug. 4, 2004, has been disclaimed.**
**Int. Cl.[4] B41F *27/06, 27/12***
**U.S. Cl. 101—382 MV** **11 Claims**



1. Apparatus for mounting a printing plate, comprising:
a rotatable cylinder having a surface on which the printing plate is to be mounted;
means for connecting an interior of said cylinder to a source of vacuum;
a plurality of passages between said interior and said surface for application of vacuum to said surface;
valve means, associated with said passages, for opening and closing said passages to control said application of vacuum to said surface;
said surface having grooves therien, and said passages communicating with said grooves via said valve means for distributing the vacuum beneath said printing plate;
said valve means having depressible actuating members which protrude above said surface when said valve means close said passages;
each of said actuating members being associated with a respective one of said grooves, said actuating members being individually depressed by said printing plate when mounted on said surface thereover to effect application of vacuum to those only of said grooves covered by said printing plate;
said grooves extending transversely to and being spaced apart along an axial direction of said cylinder;
said valve means comprising a plurality of valve assemblies disposed in said passages, each valve assembly comprising a spring-loaded valve member movable radially with respect to said cylinder inside a housing having a valve seat, said housing having a flange recessed into said surface, said flange having a slot therein communicating with a respective one of said grooves and placing that groove in communication with the valve member.

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**4,744,298**

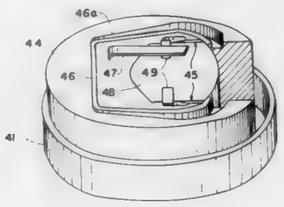
## SAFING AND ARMING DEVICE AND METHOD

**Dragolyoub Popovitch, 37 Myers Ave., Denville, N.J. 07834**

**Continuation-in-part of Ser. No. 861,273, May 9, 1986, Pat. No. 4,699,058. This application Apr. 16, 1987, Ser. No. 38,967**

**Int. Cl.[4] F42C** *15/26*

**U.S. Cl. 102—235** **13 Claims**




6. Safing and arming means for mounting inside the shell of small caliber ammunition for normally forming a barrier between a detonator and an explosive train contained in said shell, a set of two fingers normally holding said barrier against movement, said barrier being radially moveable as the result of high spin, and means for severing said two fingers as a consequence of high spin to enable arming after a safe delay.

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**4,744,299**

## IMPERMEABLE LINER-BARRIER FOR PROPELLANTS CONTAINING A HIGH CONTENT OF CARBORANE BURNING RATE ACCELERATOR

**David C. Sayles, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Apr. 1, 1983, Ser. No. 484,104**

**Int. Cl.[4] F42B** *1/00*

**U.S. Cl. 102—290** **3 Claims**

1. An impermeable liner-barrier composition when cured for propellants containing a high content of carborane burning rate catalyst, said liner-barrier composition when uncured containing from about 8.90 to about 10.21 weight percent solids and a solvent blend of isopropyl acetate and isopropyl alcohol from about 89.99 to about 91.10 percent by weight, said weight percent solids comprising:

(i) polyvinyl butyral resin having a vinyl acetate of about 1.0 percent by weight, a vinyl alcohol content from about 11.0 to about 19.0 percent by weight, a vinyl butyral content from about 80.0 to about 88.0 percent by weight, and having an approximate molecular weight average from about 500 to about 3500, said polyvinyl butyral resin being present in an amount from about 4.60 to about 4.78 percent by weight;

(ii) 4,5-epoxycyclohexylmethyl 4', 5-epoxycyclohexyl carboxylate in an amount from about 1.52 to about 1.56 percent by weight;

(iii) novolac resin from about 1.35 to about 2.33 percent by weight;

(iv) triphenylbismuthine from about 1.22 to about 1.25 percent by weight;

(v) toluene diisocyanate of about 0.23 percent by weight; and, said solvent blend comprising: (vi) isopropyl acetate from about 59.72 to about 60.21 percent by weight; and

(vii) isopropyl alcohol from about 29.58 to about 30.32 percent by weight.

**4,744,300**

## UTILIZATION OF METAL HYDRIDE AND ACIDIC REAGENT FOR THE ACCELERATING OF MASSES AND PROPULSION DEVICES FOR APPLYING SUCH MATERIALS

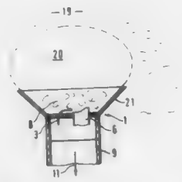
**Horst G. Bugiel, Bonn, Fed. Rep. of Germany, assignor to Diehl GmbH & Co., Nuremberg, Fed. Rep. of Germany**

**Filed Sep. 4, 1985, Ser. No. 772,319**

**Claims priority, application Fed. Rep. of Germany, Sep. 25, 1984, 3435076; Sep. 25, 1984, 3435075**

**Int. Cl.[4] C06D** *5/06;* **F02K** *9/08*

**U.S. Cl. 102—291** **26 Claims**




1. Utilization of saline, complex metal hydrides which is present in a lumpy consistency, and an acidic reagent which is sprayed onto the metal hydride, for the pulse-like generation of expanding reaction gas bubbles in a chamber having a dynamically yieldable dammed portion, said portion being immersed in an aqueous fluid for the accelerating of masses.

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**4,744,301**

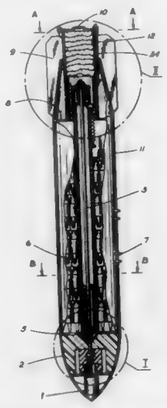
## SAFER AND SIMPLER CLUSTER BOMB

**Carlos Cardoen, Santiago, Chile, assignor to Industrias Cardoen Limitada (A Limited Liability Partnership), Santiago, Chile**

**Filed Sep. 30, 1986, Ser. No. 913,712**

**Int. Cl.[4] F42B** *13/50, 25/16*

**U.S. Cl. 102—393** **8 Claims**




1. An improved cluster bomb comprising

(a) cylindrical casing having fins at its rear end to impart aerodynamic stability and adapted to deploy over a target

(b) said cylindrical casing containing a cargo of ammunition in a central section, which is connected to a front end nose section and a rear tail end section

(c) said front nose section having frangible connections therein adapted to being split apart

(d) a spring loaded rod, held in a compressed loaded condition by a base cover and a holding means in the rod, said rod in a first surrounding tubular cylinder extending from the nose section rearwardly into the rear end section

(e) said rear end section containing at the rear thereof a latched cover plate on the section containing underneath inflatable stabilizer/retarder braking means attached to the cluster bomb

(f) said latched cover plate being held by a pin in a spring loaded latched condition and said pin being adapted to be pulled out by means attached to the spring loaded rod

(g) a programmable time fuze to effect a detonation in said nose section,

whereby functioning of the detonator destroys the nose section holding the rod in a spring loaded position, and fully opens the nose end while permitting rapid movement of the rod under the spring force to cause removal of the pin holding the latched cover plate covering the inflatable braking means permitting the inflatable braking means to be engaged by the surrounding air stream and to inflate whereupon a sudden braking of the entire assembly occurs causing the cargo of ammunition to move forward in the direction of flight of the cluster bomb as a result of inertia while the entire assembly is braked by the braking device.



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**4,744,302**

## MECHANISM FOR BENDING ABUTTING RAIL SECTION ENDS AT RAIL JOINTS IN THE OPERATION OF A TRACK WORKING MACHINE

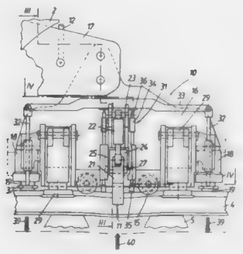
**Josef Theurer, Vienna, and Friedrich Peitl, Linz, both of Austria, assignors to Franz Plasser Bahnbaumaschinen-Industriegesellschaft, Vienna, Austria**

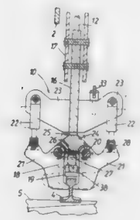
**Filed May 1, 1986, Ser. No. 858,108**

**Claims priority, application European Pat. Off., Jun. 28, 1985, 85890146.5**

**Int. Cl.[4] E01B** *31/08;* **B21D** *7/12*

**U.S. Cl. 104—7.2** **4 Claims**





1. In a mobile track working machine for a track consisting of two rails fastened to ties, each rail having a rail head defining a running face and a vertical plane of symmetry and consisting of track rail sections having abutting ends forming rail joints, the track working machine comprising a frame mounted for mobility on the track: a mechanism for bending the track rail section ends, the bending mechanism comprising

(a) a carrier frame vertically adjustably mounted on the machine frame above a respective one of the track rails, the carrier frame defining a recess and having respective end regions spaced from each other in the direction of the one track rail,

(b) a respective hydraulically operable and vertically adjustable thrust element mounted in a respective one of the end regions of the carrier frame for engagement with the running face of the one track rail,

(c) an intermediate carrier transversely movably mounted on the carrier frame in said recess, and

(d) a rail lifting hook device mounted centrally between the thrust elements on the carrier frame for engagement with the one track rail, the hook device being operable to bend the track rail section ends upon engagement of the thrust elements with the track rail running face and including

(1) two lifting hooks pivotally supported on the intermediate carrier and arranged symmetrically with respect to the vertical plane of symmetry of the one rail,

(2) a respective pivot having an axis extending in the direction of the one track rail and mounting a respective one of the lifting hooks for pivoting into a rail engaging position wherein the lifting hook subtends the rail head, and

(3) a respective independent drive linked to each lifting hook at another pivot for pivoting the hook linked thereto.

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**4,744,303**

## RAILWAY TRACK TAMPING MACHINE

**Sandro Pasquini, La Tour-de-Peilz, Switzerland, assignor to Kershaw Manufacturing Co., Inc., Montgomery, Ala.**

**Filed Jan. 23, 1987, Ser. No. 6,704**

**Claims priority, application Switzerland, Feb. 27, 1986, [illegible]**

**Int. Cl.[4] E01B** *27/16*

**U.S. Cl. 104—12** **11 Claims**



1. A railway track tamping machine with rolling chassis equipped, for each of two lines of rails, with at least one tamping unit having a frame connected to the rolling chassis, a tool holder which is vertically movable on the frame, at least one pair of tamping tools the two tools of which, in the form of levers each equipped with at least one pick with end tappet are artciulated, pivoting in opposition to each other, in a vertical plane parallel to the respective rail on two shafts rigidly attached to the tool holder, a forced oscillation generator installed on the tool holder with output shaft perpendicular to said plane and having two eccentrics of opposite eccentricity, two eccentric arms each articulated by a ring to one of the two eccentrics and each immobilized in rotation around said eccentric by connection to a pivot fastened to the tool holder, and two hydraulic cylinder-piston units each articulated to one of the two tools of the pair of tamping tools and each established in indirect connection with one of the two eccentrics so as to transmit to these tools the forced oscillations in phase opposition and control their pivoting, characterized by the fact that each of the two eccentric arms (**25**, **25'**) is formed by a lever comprising, in addition to the ring (**26**) for articulation to an eccentric (**24**, **24'**) at least one second articulation (**27**) remote from the respective eccentric and connected directly to a hydraulic cylinder-piston unit (**28**) which controls the pivoting of the respective tamping tool, and a third articulation (**29**) remote from the second articulation and from the associated eccentric and connected to the pivot (**31**) which is fastened to the tool holder.

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## RAILWAY TRACK TAMPING MACHINE

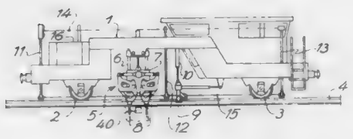
Sandro Pasquini, La Tour-de-Peilz, Switzerland, assignor to Kershaw Manufacturing Co., Inc., Montgomery, Ala.

Filed Jan. 22, 1987, Ser. No. 5,904

Claims priority, application Switzerland, Feb. 18, 1986, 00654/86

Int. Cl.[4] E01B 27/16

U.S. Cl. 104—12 4 Claims



1. A railway track tamping machine for tamping ballast adjacent each of two rail lines, said machine comprising a rolling chasis equipped for each of the two rail lines with at least one tamping unit comprising a frame connected to the rolling chassis, a tool holder (7) which is movable vertically on the frame, at least two junction levers which oscillate and pivot in opposition in a vertical plane parallel to the respective rail and are articulated on the tool holder, a forced oscillation generator installed on the tool holder, at least two tamping tools in the form of levers (39), each articulated on one of the two junction levers and each having at least one tamping tappet pick intended to plunge into the ballast on one side of a tie by lowering of the tool holder, these two tamping tools oscillating and pivoting in opposition to each other in a vertical plane parallel to the respective rail in working position and individually raisable into out-of-use position above the rails by pivoting in said same plane, and two hydraulic piston-cylinder units each articulated to one of the two junction levers in order to transmit the forced oscillations to the two tamping tools and control their pivoting into working position, wherein each junction lever (26) is connected by one of the two hydraulic piston-cylinder units (28) to the forced oscillation generator and has a first horizontal pivot (29) transverse to the track and remote from its articulation (27), on which pivot (29) there is articulated an intermediate lever (30), wherein the intermediate lever is connected to a drive device (31) which controls its pivoting and has two end-of-stroke positions (32, 33), which drive device is fastened to the junction lever, and comprises a second horizontal pivot (34) transverse to the track and remote from the first pivot; wherein the tamping tool (8) articulated to the junction lever comprises a third horizontal pivot (35) which is transverse to the track and remote from its articulation (25); wherein the tamping tool and the intermediate lever are connected by a connecting link which (36) is articulated at one end on the second pivot (34) and at the other end on the third pivot (35); and wherein in one end-of-stroke position of the drive device controlling the pivoting of the intermediate lever said three pivots (29, 34, 35) are aligned and the tamping tool is immobilized on the junction lever in the lowered working position while in the other end-of-stroke position of said drive device the tamping tool is immobilized on the junction lever in its raised, out-of-use position.

4,744,305

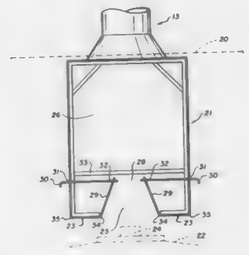
## EXHAUST REMOVAL SYSTEM

Edward Lim, Coquitlam; Gary Pattullo, Squamish; Wayne Maksylewich, North Vancouver; Robert Woolley, Prince George, and John Lusney, West Vancouver, all of Canada, assignors to B.C. Rail, Vancouver, Canada

Continuation-in-part of Ser. No. 854,165, Apr. 21, 1986, abandoned. This application Oct. 29, 1986, Ser. No. 924,350

Int. Cl.[4] B08B 15/02

U.S. Cl. 104—52 9 Claims



1. An exhaust system for use in locomotive service facilities, comprising:

a hood extending a substantial distance inside said service facilities over a track, said hood having an elongated opening adapted to be positioned over the exhaust port of a locomotive and having a number of hood sections, each separated from another by a baffle and each having at least one exhaust fan; and

a plurality of independently adjustable damping baffles hingedly mounted along the longitudinal edge of said hood opening, said baffles extending upwardly and inwardly to form a generally inverted V-shaped smoke entry slot of variable width.

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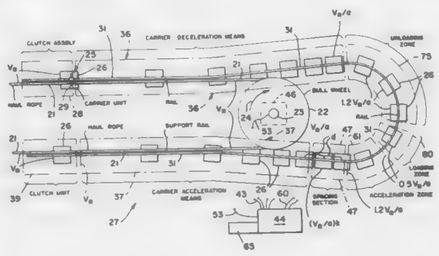
## CONVEYOR SYSTEM AND METHOD OF OPERATION FOR AN AERIAL TRAMWAY OR THE LIKE

Jan K. Kunczynski, 2400 Arrowhead Dr., Carson City, Nev. 89701

Filed Apr. 12, 1985, Ser. No. 722,697

Int. Cl.[4] B61B 13/00

U.S. Cl. 104—168 2 Claims



1. An aerial tramway system including a haul rope supported for movement, haul rope drive means coupled to drive said haul rope, a plurality of attachable and detachable passenger carrier units, attachment means formed to attach said units to said haul rope as it moves, detachment means formed to detach said units from said haul rope as it moves, and conveyor means receiving detached carrier units from said detachment means, decelerating said detached carrier units to a speed below said haul rope speed, advancing said detached carrier units to a spacing section, evenly spacing said detached carrier units in said spacing section for attachment to said haul rope, and accelerating said detached carrier units to said haul rope speed for attachment thereto by said attachment means, wherein the improvement in said aerial tramway system comprises:

said conveying means being provided by a plurality of side-by-side drive wheels positioned sufficiently close together so that at least one drive wheel engages said detached carrier unit over substantially the entire length of said conveyor means;

control means coupled to said conveyor means and to said haul rope drive means and slaving the speed of operation of substantially all of said drive wheels to the speed of movement of said haul rope with at least some of adjacent ones of said drive wheels being operated at different speeds to effect deceleration and acceleration of said detached carrier units on said conveyor means;

one of said drive wheels and said detached carrier units being further formed to accommodate differences in the speed of operation of adjacent drive wheels when said detached carrier unit is in driving engagement with two adjacent drive wheels operating at different speeds;

said control means controlling the speed of advancement of said detached carrier units immediately in advance of said spacing section to advance said detached carrier units at a speed above the speed of advancement in said spacing section until said detached carrier units are advanced into contact with each other in said spacing section;

said drive wheels immediately in advance of said spacing station advancing said detached carrier units into said spacing station with less driving power than the driving power of said drive wheels in said spacing station to enable said drive wheels in said spacing station to control the rate of discharge of said carrier units from said spacing station; and

said control means slaving said speed of advancement of said detached carrier units in said spacing section to the speed of movement of said haul rope times a spacing factor which is directly proportional to the number of said carrier units selected to be evenly spaced along said haul rope and is inversely proportional to the maximum number of said carrier units permitted to be evenly spaced along said haul rope, and said speed of advancement in said spacing section being further divided by a speed factor based upon the minimum spacing of said carrier units possible in said spacing section.



4,744,307

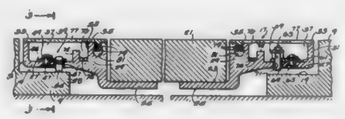
## SAFETY FLOOR

Robert J. Peterman, Hartland, and Dale Krasemann, Ft. Atkinson, both of Wis., assignors to Spacesaver Corporation, Ft. Atkinson, Wis.

Filed Mar. 16, 1987, Ser. No. 25,865

Int. Cl.[4] B60L 15/00

U.S. Cl. 104—295 11 Claims



1. A safety floor comprising:

a. a flat panel having opposed ends;

b. a pair of brackets, each bracket having a flange underlying and attached to a panel end, the bracket defining a longitudinally extending trough;

c. a plurality of leaf springs mounted in each bracket trough, each leaf spring having a lifting pin extending through the bracket to contact a support surface below the bracket to resiliently support the safety floor above the support surface;

d. safety switch means mounted in each bracket trough for sensing movement of the safety floor toward the support surface; and

e. cover means for covering the bracket troughs,

so that the safety floor deflects toward the support surface when a force is applied to the safety floor to thereby cause the support surface to actuate the safety switch means.

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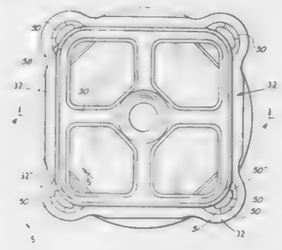
## COMBINED CENTER PLATE/CENTER FILLER FOR RAILWAY FREIGHT CARS

Jack R. Long, St. Charles, and Stephen W. Becker, Downers Grove, both of Ill., assignors to National Castings, Inc., Cicero, Ill.

Filed Feb. 24, 1987, Ser. No. 18,207

Int. Cl.[4] B61F 5/16

U.S. Cl. 105—199.4 10 Claims



1. In a body bolster center plate/center filler construction for the underframe of a railway car, in which said center plate and said center filler are integrally constructed as a single, unitary piece, and wherein said center filler is a substantially rectilinear-shaped cross-sectional piece, and said center plate comprises a lower circular cross-sectional portion for resting upon a mating piece of a truck, and an upper portion of substantially rectilinear-shaped cross section of greater expanse than said rectilinear-shaped cross section of said center filler, said upper portion of said center plate comprising a plurality of corner positioning projections for abutment against lower corner edge surfaces of a rectilinear-shaped pocket formed by a railway car underframe center sill and body bolster, wherein the improvement comprises:

said upper portion of said center plate comprising four uppermost, corner recessed areas, each of said uppermost, corner recessed areas having one of said plurality of positioning projections projecting therefrom at the outer portion thereof adjacent the outer perimeter thereof, a respective said positioning projection extending above a horizontal plane containing therein an upper surface of the respective said corner recessed area;

said upper portion of said center plate further comprising from separate, sloped circumferential surface lenghts, each of said four circumferential surface lengths extending between two respective adjacent said corner recessed areas;

said upper portion of said center plate further comprising four sloped, corner circumferential sections, each respective said corner sloped circumferential section joining adjacent ends of two said sloped circumferential lengths, which said two circumferential lengths extend at substantially right angles to each other;

each of said sloped circumferential sections sloping upwardly and inwardly toward said center filler section and terminating at said outer perimeter of a respective said corner recessed area and bounded by the outer circumferential surface portion of a respective said positioning projection, whereby said center plate/center filler construction may be welded to the undersurfaces of a railway car's underframe pocket by welding completely about the

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entire circumferential surfaces of said upper portion of said center plate.

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## TABLE FOR DENTAL TOOLS

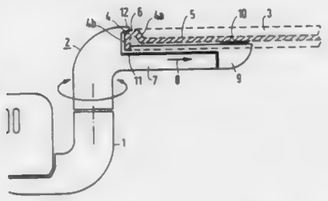
**Helmut Kiesel, Bensheim, and Tilmann Phleps, Lorsch, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Continuation of Ser. No. 721,532, Apr. 10, 1985, abandoned. This application Dec. 22, 1986, Ser. No. 945,175**

**Claims priority, application Fed. Rep. of Germany, Apr. 12, 1984, 3413871**

**Int. Cl.[4] A47B** *3/06*

**U.S. Cl. 108—157** **12 Claims**



1. A table assembly of the type for receiving dental tools, such as a set of instruments and the like, said table assembly comprising a holding arm, a mount attached to said holding arm and a receiving part which is releasably engaged with said mount, wherein:

said receiving part has a tool receiving bottom surface and a rim end portion having a predetermined height extending in a generally perpendicular direction relative to said bottom surface and encircling at least a portion of the perimeter of said bottom surface, said rim end portion having a lower rim edge extending downward relative to said bottom surface, and an upper rim edge;

said mount comprises a horizontally extending support part which in a longitudinal dimension of said support part is stationary with respect to said holding arm, a projection which is stationary with respect to said support part, and a carrying part mounted on said support part in a manner which allows movement in a longitudinal direction of said carrying part relative to said support part, said support part and said carrying part having guide elements coupled thereto for effecting said longitudinal movement of said carrying part relative to said support part;

said carrying part includes a depression therein dimensioned to engage with said downwardly extending lower rim edge of said receiving part; and

said projection of said mount is vertically spaced at a distance from said depression of said carrying part corresponding substantially to said height of said rim end portion of said receiving part, said projection and said depression being adapted to engage said upper and lower rim edges of said receiving part, repectively, when the lower rim edge of said receiving part is positioned in said depression and said carrying part and receiving part are moved longitudinally in a first direction relative to said support part until said projection of said mount engages said upper rim edge of said receiving part.

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**4,744,310**

## BALE TIE BLANKET

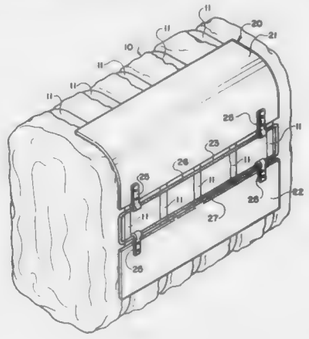
**Harry O. Moore, Charlotte, N.C., assignor to Hal F. Whisnant, Charlotte, N.C., a part interest**

**Filed Oct. 1, 1987, Ser. No. 103,199**

**Int. Cl.[4] E06B** *9/00*

**U.S. Cl. 109—49.5** **12 Claims**

1. A protective device for preventing injury from cut straps while opening a compressed bale of a substance held together by a plurality of straps extending circumferentially around the bale under pressure and spaced from each other along the length of the bale, said protective device comprising means covering the straps on at least one side of the bale and limiting



outward movement of the straps relative to the bale when the straps are cut, and said means having an opening therethrough providing access to the straps beneath said means, whereby the straps beneath said means may be cut.

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**4,744,311**

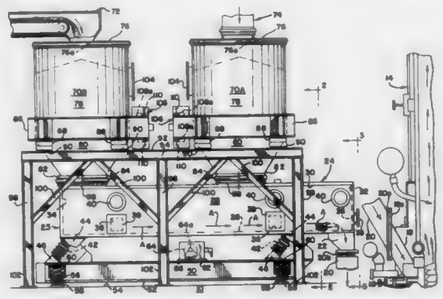
## SYSTEM FOR FEEDING SOLID PARTICULATE MATERIAL FOR COMBUSTION IN A REACTOR VESSEL

**Stanley J. Piekos, Holden, Mass., assignor to Riley Stoker Corporation, Worcester, Mass.**

**Filed May 27, 1987, Ser. No. 54,943**

**Int. Cl.[4] F23K** *3/10, 3/16*

**U.S. Cl. 110—108** **11 Claims**



1. A system for feeding solid particulate material for burning in a combustion reactor vessel, comprising:

a fuel injector chute having a lower end for directing a flow of said solid particulate material into said vessel and an upper end for receiving said material;

feeder means having a discharge end for delivering a metered flow of said material to said inlet of said injector chute, said feeder means including elongated trough means having a generally horizontal run and first vibratory means for vibrating said trough means for moving said solid particulate material toward a discharge end above said inlet of said injector chute;

a fixed support structure for said trough means and first resilient support means for mounting said trough means on said fixed support structure, said first vibratory means being mounted on said trough means for vibrating said trough means relative to said support structure to move said solid particulate material along said trough means for discharge into said upper end of said injector chute from said discharge end of said trough means;

a plurality of separate, spaced apart feed bins mounted above said feeder means, each bin adapted for holding a reservoir of said solid particulate material and selectively controllable to provide uninterrupted flow of said solid particulate material onto said feeder means, said feed bins having lower discharge outlets positioned in spaced apart relation above said run of said feeder means for independently controllable discharge of material onto said run for movement toward said discharge end of said feeder means; and

second resilient support means for mounting said feed bins on a support extending above said trough means and second vibratory means for vibrating each of said feed bins relative to said support,



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**4,744,312**

## METHOD OF PROMOTING SECONDARY COMBUSTION IN A FLUIDIZED BED INCINERATOR

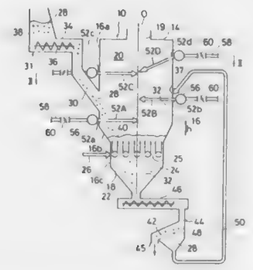
**Minoru Narisoko, Matsudo, and Satoshi Inoue, Asaka, both of Japan, assignors to Ishikawajima-Harima Heavy Industries Co., Ltd., Tokyo, Japan**

**Filed Jan. 20, 1987, Ser. No. 5,176**

**Claims priority, application Japan, Jan. 21, 1986, 61-8946**

**Int. Cl.[4] F23G** *5/00, 7/00*

**U.S. Cl. 110—245** **19 Claims**



1. A method of operating a fluidized bed incinerator which promotes secondary combustion of combustible gases generated in the fluidized bed, comprising the steps of:

(a) forming a fluidized bed in said incinerator by fluidizing refuse and a fluidizing medium with primary air, the primary air being blown into the fluidized by air diffuser tubes provided in the lower part of the incinerator, the air diffuser tubes extending generally parallel to each other;

(b) feeding the refuse and the fluidizing medium into said fluidized bed;

(c) burning and thermally decomposing the refuse inside the fluidized bed, the burning and decomposition of said refuse resulting in the generation of combustible gas inside said incinerator;

(d) forming a downward flow of the combination of the combustion residue of said refuse and the fluidizing medium inside the fluidized bed through the air diffuser tubes, and discharging said combination from the bottom of the incinerator;

(e) separating the fludizing medium from the combustion residue in a sieve, and then recirculating the separated fluidizing medium to the fluidized bed;

(f) supplying secondary air into a combustion chamber inside said incinerator for performing secondary combustion of said combustible gas, the supplying of said secondary air being performed by blowing said secondary air into said combustion chamber and horizontally across said combustion chamber through a plurality of groups of nozzles arranged in vertically staggered stages, the nozzles in each group being arranged in several horizontal rows, groups of the nozzles being alternately located in a pair of opposing side walls and forming parallel, staggered streams of air directed toward an opposite one of said side walls; and

(g) generating a vortex of a mixture of the combustible gas and the secondary air in each space between two horizontal streams of the secondary air in each space between two horizontal streams of the secondary air supplied through two groups of nozzles provided in said opposing side walls.

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**4,744,313**

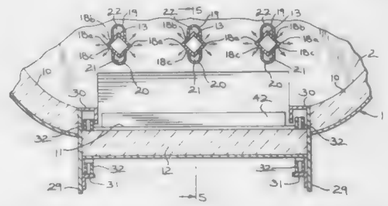
## AIR SUPPLY APPARATUS FOR AN INCINERATOR

**Gordon H. Hoskinson, 186 Mayfair Rd., Floral Park, N.Y. 11001**

**Division of Ser. No. 881,253, Jul. 2, 1986, Pat. No. 4,674,417. This application Apr. 22, 1987, Ser. No. 41,109**

**Int. Cl.[4] F23G** *5/00*

**U.S. Cl. 110—254** **7 Claims**



1. In an incinerator, means defining a combustion chamber, an air inlet tube disposed in the lower portion of a combustion chamber, means for supplying air to said air inlet tube, the sides of said air tube having a plurality of air outlet ports spaced along the length of said tube, a first elongated shroud secured to the upper portion of the air tube and defining with said air tube a first cooling medium passage, a second elongated shroud secured to the lower portion of the air tube and defining with said air tube a second cooling medium passage, means for supplying cooling medium to said first passage, means for discharging cooling medium from said second passage, and means for establishing communication between the downstream ends of said passages, said air tube being generally square in cross section and including a pair of opposed corners extending laterally outward in a horizontal plane, said first and second shrouds being generally U-shaped in cross section and each shroud including a pair of spaced legs and a connecting web, said legs being connected to said air tube adjacent said corners to expose opposed corner portions of said tube, said ports being located in said exposed corner portions.

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**4,744,314**

## ASH REMOVAL APPARATUS FOR AN INCINERATOR

**Gordon H. Hoskinson, 186 Mayfair Rd., Floral Park, N.Y. 11001**

**Division of Ser. No. 881,253, Jul. 2, 1986, abandoned. This application Apr. 22, 1987, Ser. No. 41,107**

**Int. Cl.[4] F23G** *5/00;* **F23J** *1/00*

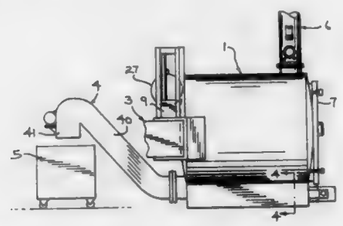
**U.S. Cl. 110—259** **11 Claims**

1. An incinerator, comprising a housing defining a combustion chamber, the lower end of the housing having a pair of spaced generally parallel walls that define a trough that extends a substantial portion of the length of the combustion chamber, each wall having a longitudinal recess communicating with said trough, an endless member mounted for movement in each recess, a plurality of conveying members interconnecting said endless members and disposed to extend across said trough, a section of each endless member having a length greater than the length of the trough being free of said conveying members, said sections being disposed in registry with said trough during the combustion operation, so that said conveying members will not be exoosed to the heat of the combustion

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operation, and means for driving said endless members in an endless path, driving of said endless members causing said



conveying members to move through said trough to convey ash from the combustion chamber to a discharge site.

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**4,744,315**

## PROCESS FOR BURNING PULVERIZED COAL

**Toshio Suwa, Kawasaki; Nobuaki Kobayashi, and Takashi Hirano, both of Tokyo, all of Japan, assignors to Nippon Sanso Kabushiki Kaisha, Tokyo, Japan**

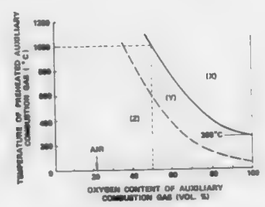
**PCT No. PCT/JP86/00581, § 371 Date Jul. 9, 1987, § 102(e) Date Jul. 9, 1987, PCT Pub. No. WO87/03066, PCT Pub. Date May 21, 1987**

**PCT Filed Nov. 14, 1986, Ser. No. 86,146**

**Claims priority, application Japan, Nov. 15, 1985, 60-256349; Nov. 15, 1985, 60-256350**

**Int. Cl.⁴ F23D** *1/00*

**U.S. Cl. 110—347** **6 Claims**




1. A process for burning pulverized coal, which comprises steps of preheating an auxiliary combustion gas, and burning pulverized coal with the preheated auxiliary combustion gas, the gas preheating step including the step of:

raising the temperature of the auxiliary combustion gas to the temperature T (°C.) defined by the following formula (i):

$$T \geq \exp\{14.14 - 1.84 \ln C - \exp(0.01127t - 3.444)\} \quad (i)$$

where C is the oxygen content (vol. %) of the auxiliary combustion gas, and t is the temperature (°C.) of the pulverized coal.

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**4,744,316**

## FURROW FORMING APPARATUS FOR A SEED PLANTER

**Darlo E. Lienemann, Darien; Nicholas H. Wunschl, La Grange, and Donald L. Ledermann, Darien, all of Ill., assignors to J. I. Case Company, Racine, Wis.**

**Filed Oct. 24, 1986, Ser. No. 923,109**

**Int. Cl.⁴ A01C** *5/06*

**U.S. Cl. 111—69** **1 Claim**

1. In a furrow forming apparatus for a seed planter having a frame adapted to be attached to a tool bar of a mobile power source and a furrow forming means rotatably mounted on said frame; an improved mounting means for securing said frame to said tool bar which permits selective adjustment of the downward or upward pressure applied to said furrow forming means; comprising:

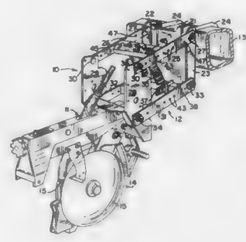
(a) a parallel linkage including a pair of transversely spaced longitudinally extending upper links pivotally secured at a first end to said tool bar and at a second end to said frame, and a pair of transversely spaced longitudinally extending lower links pivotally secured at a first end to said tool bar and at a second end to said frame, each of said upper links having a plurality of longitudinally spaced openings formed therein generally in transverse alignment with corresponding openings in the other of said upper links;

(b) an upper support member transversely extending between said upper links;

(c) a lower support member transversely extending between said lower links;

(d) down pressure spring means having an upper end received by said lower support member for spring loading said parallel linkage; and

(e) connecting pin members extending outward from the respective ends of said upper support member selectively movable between a first position extending into a selected one of said openings in said upper links, and a second retracted position withdrawn from said openings, wherein said upper support member is a channel-shaped member



defined by an upper wall, a pair of spaced side walls and a pair of spaced end walls, and includes a pair of transverse partition walls extending between said side walls parallel to each of said end walls and each respectively spaced therefrom, with a spring means received about each of said connecting pin members between the respective partition wall and the respective end wall for biasing the pin members toward their first position, said connecting pin members being positioned between said side walls and extending through a respective opening formed in said end wall,

said connecting pin members are formed with handle portions which extend upwardly through elongated slots formed in said upper wall to facilitate movement of said connecting pin members between their first and second positions, and

each of said spring means is held in captive relation between first and second washer members received about the respective connecting pin member and its respective partition wall, and said connecting pin member is provided with retaining means in contact with said respective first washer member for movement thereof towards said respective partition wall against the bias of the spring means about the connecting pin member as the pin member is moved from its first position toward its second position.



**4,744,317**

## MOCK-LINKING APPARATUS FOR JOINING TWO PIECES OF KNITTED FABRIC

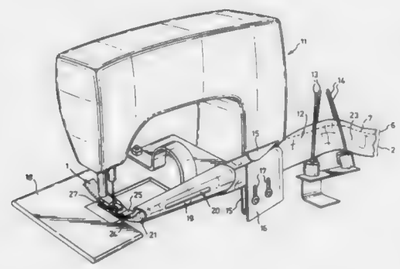
**John C. Cullen; Paul M. Cullen, both of Main Street, and Owen Cullen, "The Brackens" , all of Manasterevin, Co. Kildare, Ireland**

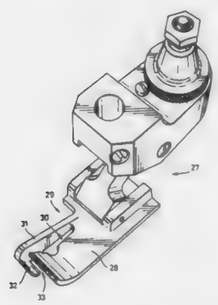
**Division of Ser. No. 770,265, Aug. 28, 1985, Pat. No. 4,691,537. This application Jul. 17, 1987, Ser. No. 74,924**

**Claims priority, application Ireland, Aug. 29, 1984, 2203/84**

**Int. Cl.⁴ D05B** *35/06, 35/10, 29/00*

**U.S. Cl. 112—138** **4 Claims**





1. Apparatus for linking a knitted edging trim with an unfinished edge of a knitted garment, wherein the trim is in the form of a ribbon of weft-knitted yarn, double-knit, having two parallel longitudinal side edges defining a selvedge and a ravel edge, including a course of transfer stitching spaced from a side edge thereof to define a fold line, such that when the trim is folded over upon itself along the fold line, the folded edge of the trim then presents an adjacent seam line traversing outwardly protruding loops defining spaces therebetween, which apparatus comprises:

a sewing machine with a reciprocable needle adapted to perform chain-stitching,

folding means defining a path through which the ribbon of trim may be advanced towards the machine, to firstly fold over a margin portion of the trim upon itself along said fold line, to secondly fold the thus folded trim in half so as to sandwich the said unfinished garment edge as the garment is fed adjacently past the folding means in the direction of the needle, such that the folded over margin portion of trim then lies above the garment edge and the seam line is aligned with the needle,

a foot, attached to the sewing machine arranged substantially perpendicular to the path of the folding means, defining an eye through which the needle may reciprocate, and guide means forward of the eye adapted to advance and impart a slight stretch to the folded over margin portion of the trim in order to open out said spaces defining said seam line just prior to advancement of the seam line to the needle.

**4,744,318**

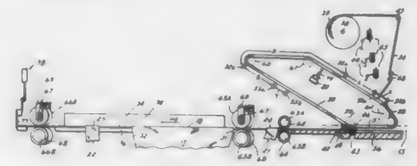
## ATHLETIC SUPPORTER

**Alvin C. Drury, Cincinnati, Ohio, assignor to Jung Corporation, Cincinnati, Ohio**

**Filed Mar. 4, 1986, Ser. No. 835,963**

**Int. Cl.⁴ D05C** *3/00*

**U.S. Cl. 112—262.1** **7 Claims**



1. A method for producing an athletic supporter, said method comprising the steps of

moving an endless length waistband strip through a stationary product fabrication area,

attaching first the free end of a first leg strap, then the top edge of a pouch piece, and the free end of a second leg strap, to said endless waistband strip in that sequence on a section of that endless length strip, said attaching step being carried out as said endless waistband strip is moving through said product fabrication area, and said attaching step providing a supporter assembly attached to said endless length strip,

providing guide fingers cooperable in timed sequence with said endless waistband strip as it passes through said fabrication area, said guide fingers being positioned relative one to the other so as to visually establish those locations on said endless waistband strip at which the free ends of said leg straps and the top edge of said pouch piece are to be attached, and

thereafter cutting said endless waistband strip to that discrete length which, when the ends thereof are attached together, will establish a closed loop waistband of desired waist size, said first and second leg straps and said pouch piece thereby being attached to that discrete length prior to cutting that discrete length from said endless strip.

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**4,744,319**

## WORKPIECE CONTROLLING DEVICE FOR A SEWING MACHINE

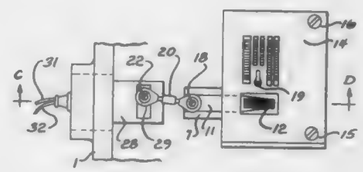
**Gunter Rohr, Hemmingen, Fed. Rep. of Germany, assignor to Union Special GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Jun. 16, 1987, Ser. No. 62,630**

**Claims priority, application Fed. Rep. of Germany, Jun. 25, 1986, 3621238**

**Int. Cl.⁴ D05B** *27/00*

**U.S. Cl. 112—306** **24 Claims**




1. A workpiece controlling device for a sewing machine having a workpiece feed mechanism which feeds material in a substantially straight line, in which an alignment means of an alignment member can be moved transversely relative to the direction of material feed in the sewing machine for automatic, controlled alignment of workpieces with the point of stitch formation, the alignment means of the alignment member is

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disposed immediately in advance of the point of stitch formation in the region of a needle plate and acts on the workpiece in synchronism with the stitch formation, and a control command device controls the transverse motion of the alignment means, in which the alignment means of the alignment member is a corrector which is driven in the same direction of feed as the feed mechanism.

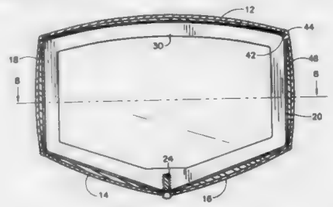
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**4,744,320**

## BOAT HULL AND METHOD OF FABRICATION

**Daniel D. Johnston, 1601 #62 Oro Vista Rd., San Diego, Calif. 92154**

**Filed Feb. 12, 1987, Ser. No. 14,244**
**Int. Cl.[4] B63B *3/00***
**U.S. Cl. 114—65 R** **13 Claims**




1. A method of fabricating a metal boat hull comprising the steps of:
selecting and forming an internal frame;
selecting a unitary plate having edges for each side and for the deck;
selecting at least one unitary plate having edges for the bottom;
forming the edges of the plates with an angle therebetween of about thirty-five to forty-five degrees;
securing the side plates to the deck plate and to the bottom plate along the edges thereof; and
securing the plates to the frame solely at the edges of the plates in a manner to curve away from said frame.

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**4,744,321**

## SHIP FOR THE LIQUID TRANSPORTATION OF HIGH MELTING AROMATIC HYDROCARBONS

**Michael Pfeuffer, Krefeld, and Arnold Alscher, Essen, both of Fed. Rep. of Germany, assignors to Verkaufsgesellschaft fuer Teererzeugnisse (VfT), Duisburg, Fed. Rep. of Germany**

**Filed Mar. 23, 1987, Ser. No. 28,933**
**Claims priority, application Fed. Rep. of Germany, Apr. 9, 1986, 3611920**
**Int. Cl.[4] B63B *25/08***
**U.S. Cl. 114—74 A** **12 Claims**

1. A double hull ship for the transportation of liquid, high melting aromatic hydrocarbons at temperatures of at least 100° K. above the melting point of said hydrocarbons comprising:
(a) at least one hydrocarbon holding tank (1) centrally located with respect to the side walls of said hull, said tank being provided with insulation, said tank being permanently fixed to the ship's hull, said tank being supported by a plurality of sliding bearings (3);
(b) at least one heat exchanger (4) introduced from above into said tank, heatable with thermal oil, having substantially vertical heat exchange surfaces, and controlled by a temperature sensor;
(c) at least one submersible pump (5), introduced from above into said tank, to which is connected a flushing line (6) and a product line (7) for filling and emptying the tank;
(d) a pendant flexible gas line (8) adapted for connection to the tank;
(e) an inert gas line (9) connected to said tank, and for injecting inert gas into said tank and being adapted for control by a pressure switch;
(f) at least one safety valve (10, 11) connected to said inert gas line and having an overpressure outlet and an underpressure outlet, with a flametrap (12) at the overpressure outlet and an inert gas supply connection at the underpressure outlet;
(g) a non-mechanical liquid meter (13) adapted for use in said holding tank and a safety system that triggers an alarm at a filling level of 96 to 98%;
(h) a companion heating system for all the product and gas lines, including control and shutoff devices connected therewith; and
(i) a heated, insulated manhole (14) on said holding tank.

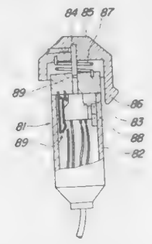
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**4,744,322**

## REMOTE STEERING SYSTEM FOR MARINE PROPULSION CRAFTS

**Ryoichi Nakase, Hamamatsu, Japan, assignor to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan**

**Filed Jun. 18, 1986, Ser. No. 875,633**
**Claims priority, application Japan, Jun. 19, 1985, 60-133772**
**Int. Cl.[4] B63H *25/00***
**U.S. Cl. 114—144 E** **6 Claims**




1. In a marine control apparatus having an outboard drive supported for steering movement upon an associated watercraft, an engine for powering said outboard drive, a first steering mechanism adapted to be affixed in the watercraft for effecting control of the steering movement of said outboard drive, the improvement comprising a hand held control unit for said engine and for steering said outboard drive comprising an element sized to be held in the hand of an operator, a steering control carried by said element and movable between a plurality of control positions, means for transmitting a control signal for steering said outboard drive in response to the position of said steering control, an engine control carried by said element and movable to a control position, and means for transmitting a control signal from said engine control to the engine for controlling the engine, said steering control and said engine control comprising a common control element that operates both said steering control and said engine control.

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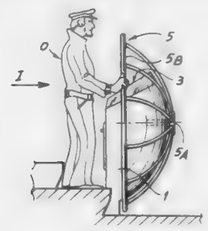
**4,744,323**

## HELM STEERING GEAR

**Fabio Perini, Via Fornace, S. Michele di Moriano, Lucca, Italy**

**Filed Jun. 16, 1987, Ser. No. 62,743**
**Claims priority, application Italy, Jun. 18, 1986, 9421 A/86**
**Int. Cl.[4] B63H *25/00***
**U.S. Cl. 114—144 R** **6 Claims**

1. A helm steering gear for a sea-going vessel, said steering gear having a support and a wheel, said wheel mounted on said support with the hub of said wheel on the forward side of the support, and with said wheel having a concave shape with arms thereof extending toward the stern of the vessel and toward the helmsman, and thus embracing the support and




presenting the peripheral rim of the wheel in a position closer to the helmsman.

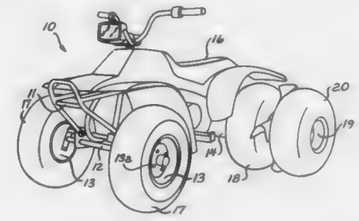
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**4,744,324**

## AMPHIBIOUS ALL TERRAIN VEHICLE (ATV) AND CONVERSION KIT

**Werner W. Martinmaas, P.O. Box 6321, Reno, Nev. 89503**

**Filed Aug. 15, 1986, Ser. No. 897,047**
**Int. Cl.[4] B63H *1/00***
**U.S. Cl. 114—270** **15 Claims**




1. In a self-propelled all terrain vehicle that has a frame provided with a front steering axle and front wheel means with front tire means thereon, a rear driving axle having opposite ends with wheel mounting studs at said opposite ends and single rear wheels mounted on said studs, said single rear wheels having single rear tires thereon, and means on said frame providing a seat for an operator, the improvement comprising, in combination;
a pair of axial hubs having inner ends by which they are detachably mounted on said mounting studs outwardly of said single rear wheels to provide extensions at both ends of the axle and said axial hubs having outer ends;
a pair of outer rear wheels mounted on the outer ends or said axial hubs, said outer rear wheels having outer rear tires thereon which are in outwardly spaced relationship to said single rear tires, said front tire means, said single rear tires and said outer rear tires being large enough that they provide flotation means capable of supporting the vehicle and a desired reasonable load in water without other buoyant means on the vehicle;
and paddle elements mounted on each of said axial hubs between the single rear wheels and the outer rear wheels to propel the vehicle over water, each of said paddle elements including a plurality of generally radially extending paddle members having outer ends that, during axial rotation of the paddle means, follow a circular path the nadir of which is slightly above a supporting surface when the vehicle is on land, whereby said vehicle is totally amphibious.

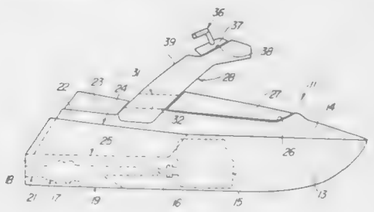


**4,744,325**

## ENGINE COMPARTMENT AND STEERING ARRANGEMENT LAYOUT FOR A SMALL WATERCRAFT

**Noboru Nobayashi, Kosai, Japan, assignor to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan**

**Filed Nov. 25, 1986, Ser. No. 934,728**
**Claims priority, application Japan, Nov. 26, 1985, 60-265890**
**Int. Cl.[4] B63B *35/86***
**U.S. Cl. 114—270** **8 Claims**




1. In a small watercraft, a hull defining a forwardly disposed enclosed engine compartment and a rearwardly disposed rider's area, a fixed mast carried by said hull in juxtaposition to said rider's area, an engine in said hull forwardly of said rider's area, an access opening in an upper surface of said hull for access to said engine forwardly of said mast, a removable cover closing said access opening, and a steering device journaled at the upper end of said mast and moveable relative to said mast for steering said watercraft, said mast extending upwardly and forwardly from said rider's area over the engine and removable cover in fixed condition to said hull.

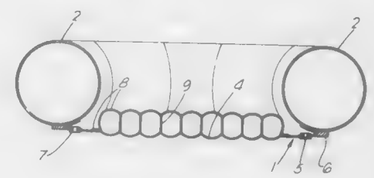
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**4,744,326**

## SELF-BAILING INFLATABLE BOAT

**Richard J. Harding, Trimsaran, Wales, assignor to Avon Inflatables Limited, Melksham, England**

**Filed Mar. 14, 1986, Ser. No. 839,568**
**Claims priority, application United Kingdom, Oct. 11, 1985, 8525103**
**Int. Cl.[4] B63B *7/00***
**U.S. Cl. 114—345** **9 Claims**

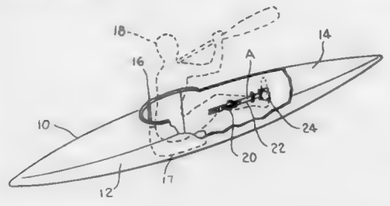



1. A self-bailing inflatable boat comprising:
a first buoyancy tube;
a second buoyancy tube;
a flexible floor extending continuously from said first buoyancy tube to said second buoyancy tube and lying below the normal waterline of the boat, and being permanently attached to said first and second buoyancy tubes;
seat means on said floor and raised above the normal waterline of the boat; and
one or more permanently open apertures defined in said flexible floor below said waterline to act as drainholes, thereby rendering the boat self-bailing and normally maintaining a user of said boat on said seat means out of water taken into the boat.

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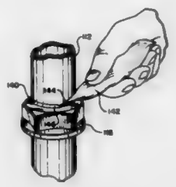
**4,744,327**
**KAYAK FOOT BRACE**
William E. Masters, P.O. Box 686, Liberty, S.C. 29657
Filed Sep. 29, 1986, Ser. No. 912,609
Int. Cl.[4] B63B *35/71*
U.S. Cl. 114—347 18 Claims



1. A foot brace for a kayak of the type having a hull with an upper deck, a cockpit having a cockpit opening formed in the deck and a cockpit seat carried within the hull accessible through the cockpit opening, said foot brace comprising:
an adjusting bracket carried by said hull adjacent said cockpit;
an elongated brace bar having a forward end and an aft end carried within said hull in a manner that relative movement in forward and aft directions is permitted between said brace bar and adjusting bracket within said hull;
a foot rest carried adjacent said forward end of said brace bar projecting laterally and outwardly towards a center of said hull so that a boater seated in said cockpit may rest and brace a foot on said foot rest;
adjusting means included within said adjusting bracket for adjusting the position of said brace bar in said forward and aft directions for affixing said foot rest in a desired position; and
said adjusting bracket including an attaching bracket which is attached to the hull of said kayak and a cam bracket integral with said attaching bracket which is flexible in a manner that the cam bracket may be flexed with respect to said attaching bracket for releasing and locking said brace bar in said desired position.

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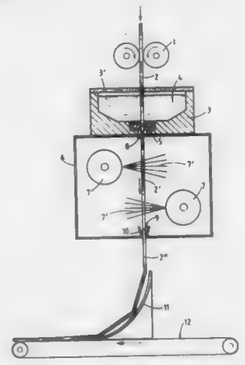
**4,744,328**
**SEALANT COMPOSITIONS AND METHODS FOR USE IN DETECTING EQUIPMENT TAMPERING**
D. Lynn Stevens, 55 Matterhorn, Summit Park; Terry K. Stevens, 3364 Cummings Rd., and Charles C. Cameron, 2135 Cresthill Dr., both of Salt Lake City, all of Utah
Filed Dec. 21, 1984, Ser. No. 684,526
Int. Cl.[4] G01D *13/00*; G09F *3/00*; F16L *35/00*
U.S. Cl. 116—200 34 Claims



10. A method of providing a security protection system for detecting tampering with utility meters comprising the steps of:
(a) obtaining a fluid paint composition which, when dry, forms a seal having putty-like consistency, and produces a visually detectable irreparable scar when two or more adjacent surfaces that have been painted with the paint composition are moved with respect to one another;
(b) matching the surface characteristics of the fluid paint composition when dry with the surface characteristics of the underlying surfaces;
(c) applying said paint composition to one or more joints on a utility meter; and
(d) checking the joints to determine whether any tears exist in the seal.

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**4,744,329**
**PROCESS FOR THE COATING OF PENCILS AND APPARATUS FOR THE PRACTICE OF THIS PROCESS**
Charles Jeanmonod, Thonex, Switzerland, assignor to Caran d'Ache S.A., Thonex, Switzerland
Filed May 28, 1986, Ser. No. 869,016
Claims priority, application Switzerland, Jun. 5, 1985, 02381/85
Int. Cl.[4] C23C *14/00*; B05D *3/06*
U.S. Cl. 118—50.1 4 Claims

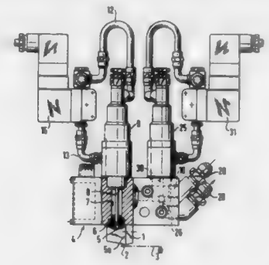


3. Apparatus for coating pencils, comprising means for pushing separate pencils individually downwardly through a bath of polymerizable resin and through the bottom of the bath further downwardly directly into a closed chamber containing an inert atmosphere, thereby to apply a coating of polymerizable resin to the pencils which then fall freely through the closed chamber, means in the chamber for subjecting the pencils to streams of accelerated electrons to polymerize the resin coating on the pencils, and means for directing the pencils through an outlet opening in the bottom of the chamber, said stream of electrons comprising vertically superposed streams arranged in opposite directions from each other.

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**4,744,330**
**DEVICE FOR INTERMITTENT APPLICATION OF LIQUIDS SUCH AS ADHESIVE**
Henning J. Claassen, Industriegebiet Hafen, 2120 Luneburg, Fed. Rep. of Germany
Filed Dec. 4, 1986, Ser. No. 937,859
Claims priority, application Fed. Rep. of Germany, Dec. 4, 1985, 3542903
Int. Cl.[4] B05C *5/02*
U.S. Cl. 118—410 6 Claims

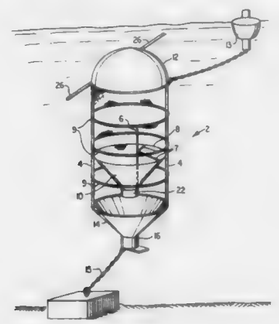
1. In a device for intermittent application of liquids such as hot-melt adhesive, to material moved relative to the device, including a reservoir for the liquid, an application nozzle, a supply line from the reservoir to the nozzle, a first needle valve provided upstream from the nozzle in the supply line for interrupting the flow from the reservoir to the nozzle at desired intervals, a return line to the reservoir connected to the supply line upstream from the first needle valve, and a second needle valve for shutting off the return line, the improvement comprising: said second needle valve being larger than the first needle valve and located as a preliminary valve in the supply line upstream from the first needle valve where the return line is connected to the supply line and wherein both valves are



controllable in adjustable time relationship with respect to each other.

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**4,744,331**
**APPARATUS FOR REARING FISH IN NATURAL WATERS**
David E. Whiffin, 4003 Edinburgh Street, Vancouver, B. C., Canada V5C 1R4
Filed Jun. 12, 1986, Ser. No. 873,410
Claims priority, application Canada, Jun. 14, 1985, 484029
Int. Cl.[4] A01K *63/00*
U.S. Cl. 119—3 21 Claims

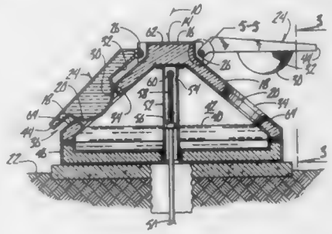


1. Apparatus for raising fish in an enclosed environment in natural waters comprising:
(a) means for submersibly enclosing and maintaining the fish in a confined location in naturally occurring waters at variable depths;
(b) means for feeding the fish within the enclosing means;
(c) camera and remotely located monitor means for viewing and monitoring the rate of growth of each fish retained in the enclosing means;
(d) means for maintaining an air pocket within the enclosing means; and
(e) means for non-disruptively culling the fish within the enclosing means and causing the fish to swim individually in an orderly manner so that they can be viewed and monitored by the camera and monitor means.





**4,744,332**
**LIVESTOCK WATERER**
Claude W. Ahrens, Grinnell, Iowa, assignor to Ahrens Agricultural Industries Co., Grinnell, Iowa
Filed Oct. 7, 1986, Ser. No. 916,294
Int. Cl.[4] A01K *7/00*
U.S. Cl. 119—73 12 Claims



1. A livestock waterer comprising,
an insulated tank for receiving water from a water source and having a top wall which includes an access opening into said tank, said access opening including a valve seat,
a lid pivoted to said top wall for closing said access opening, said lid including a substantially non-deformable downwardly extending closure member positioned to be received in and close said access opening,
the cross-sectional dimensions of said closure member being sufficiently larger than the dimensions of said access opening for spacing said lid from said top when in a lowered closed position for preventing any ice buildup between said lid and top wall interfering with sealing of said access opening by said closure member by raising said member out of said access opening, and
said valve seat and said closure member when said closure member is in said closed position interface in a plane extending at an angle to the perpendicular plane between said top wall and said lid whereby ice formed on said valve seat is struck and broken away be said closure member when said closure member is moved to the closed position, and when said closure member is in said closed position, only said closure member is in contact with said valve seat.

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**4,744,333**
**PROTECTIVE FOOTWEAR FOR ANIMALS**
Jackson H. Taylor, 467 Hill St., Green Lake, Wis. 54941
Continuation-in-part of Ser. No. 626,933, Jul. 2, 1984, Pat. No. 4,633,817. This application Aug. 11, 1986, Ser. No. 895,469
The portion of the term of this patent subsequent to Jan. 6, 2004, has been disclaimed.
Int. Cl.[4] A01K *13/00*
U.S. Cl. 119—96 9 Claims

1. Protective footwear for dogs, comprising:
(a) a plurality of booties, each being an independent garment, adapted to fit over a foot and leg of a dog, each bootee having a sole of soft flexible material, each bootee having an imperforate toe section, each bootee extending up the leg of the dog and terminating at a point above the knee, but below the legpit;
(b) a suspender system composed of an expandable material such as elastic adapted to drape over the dog's back and having a strap end corresponding to each bootee; and

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(c) fastening means for attaching each bootee to the corresponding strap end of the suspender system,



so that the protective footwear permits full functional freedom to an active dog.

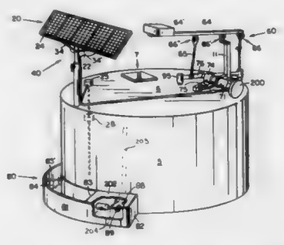
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**4,744,334**

## SELF-CONTAINED SOLAR POWERED FLUID PUMPING AND STORAGE UNIT

**Charles W. McAnally, P.O. Box 101, Alpine, Tex. 79831**

**Filed Dec. 29, 1986, Ser. No. 946,764**
**Int. Cl.[4] A01K** *7/00*
**U.S. Cl. 119—78** **7 Claims**



1. A self-contained solar powered fluid pumping and storage unit comprising:

a solar collector means for transforming solar energy into electrical energy;

a fluid pumping means operatively connected to said solar collector means and operatively connectable in flow communication with a fluid supply, whereby the electrical energy is utilized to pump fluid from the fluid supply;

a reservoir tank operatively connected in flow communication with said fluid pumping means for receiving and storing the fluid pumped by said fluid pumping means;

a common support structure integrally connected to said solar collector means, said fluid pumping means and said reservoir tank, thereby forming a composite unit;

means for sensing the liquid level in said reservoir tank; and

means operatively connected to said sensing means and said fluid pumping means for shutting off power to said pumping means when the liquid level in said reservoir tank reaches a specified point.

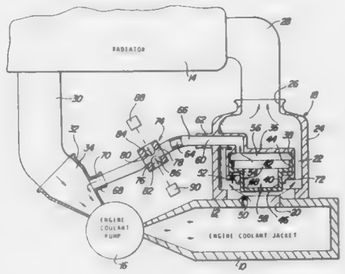
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**4,744,335**

## SERVO TYPE COOLING SYSTEM CONTROL

**Paul D. Miller, Huntsville, Ala., assignor to Chrysler Motors Corporation, Highland Park, Mich.**

**Filed Aug. 3, 1987, Ser. No. 80,840**
**Int. Cl.[4] F01P** *7/16*
**U.S. Cl. 123—41.1** **6 Claims**



1. A cooling system for an internal combustion engine using a liquid coolant within an engine coolant jacket where it receives heat from the engine to be subsequently transferred to the atmosphere, comprising: a radiator fluidly connected to the coolant jacket for receiving coolant therefrom, for transferring heat to air flowing therethrough and for returning cooled coolant back to the coolant jacket; pump means having a pressurized inlet and a higher pressurized outlet for passing coolant from the coolant jacket to the radiator and subsequently back into the coolant jacket; fluid valve means between the coolant jacket and the radiator for regulating the flow of coolant therebetween, the valve means including a housing enclosure defining a stepped cylinder bore and a step configured servo powered valve supported in the bore for reciprocal movement therein, both the servo powered valve and stepped cylinder bore having corresponding large and small dimensions to permit reciprocal movement of the stepped servo valve within the stepped cylinder bore; the valve means having an inlet opening in spaced relation to a portion of the servo powered valve, whereas relative movement of the portion of the servo powered valve regulate coolant flow through the valve means; the housing enclosure defining a servo valve control chamber formed about an end of the servo powered valve; a servo control passage extending between the servo control chamber and the lower pressure inlet of the pump means; an electrically activated valve for selectively regulating and even blocking coolant flow through the servo control passage; fluid connecting means extending between the engine coolant jacket and the control chamber so that the control chamber is always open to at least a small flow of relatively high pressure coolant from the coolant jacket; an electronic control unit generating an output for transmittal to the electrically activated valve in response to several engine operational parameters for controlling operation of this valve in regulating coolant flow through the servo control passage and resultantly in generating a coolant pressure control level in the control chamber whereby the servo powered valve is moved relative to the inlet in response to the control chamber pressure for permitting desired coolant flow therethrough from the engine coolant jacket to the radiator.

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**4,744,336**

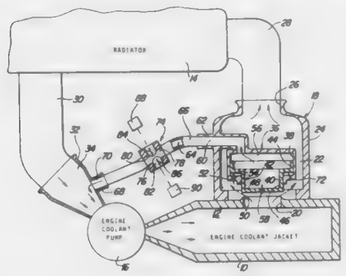
## SERVO TYPE COOLING SYSTEM VALVE

**Paul D. Miller, Huntsville, Ala., assignor to Chrysler Motors Corporation, Highland Park, Mich.**

**Filed Aug. 3, 1987, Ser. No. 80,841**
**Int. Cl.[4] F02P** *7/16*
**U.S. Cl. 123—41.1** **7 Claims**

1. In a liquid coolant type engine temperature control system particularly for use in an automobile having coolant filled engine passages, a control valve assembly responsive to a pressure force balance generated from a selectively regulated coolant pressure and the coolant pressure in the engine passages for regulating the discharge of heated coolant from the engine passages, comprising: first hollow enclosure means defining a first interior space and having an inlet adapted to receive coolant from the engine passages and an outlet; second hollow enclosure means within the first interior and defining a second interior space; the second interior having an outlet connected for fluid flow to the selectively regulated coolant pressure; the second enclosure means defining a cylinder therein opening to the first interior; a movable piston valve





member reciprocally supported in the cylinder with an end portion thereof covering the opening of the cylinder to the first interior, the end portion having a bleed orifice positioned to always connect the coolant filled engine passages and the second interior, whereas pressurized coolant from the engine passages tends to generate a first force on the movable piston valve in a first axial direction of the cylinder and the selectively regulated coolant tends to generate a second force on the movable piston valve in a second and opposite direction to the first direction thereby positioning the end portion of the movable member with respect to the inlet of the first enclosure means to control flow therethrough and from the engine.

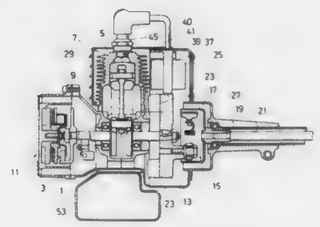
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**4,744,337**

## PORTABLE ENGINE

**Takanori Ebinuma; Hiroshi Kato, and Mituko Sakurai, all of Tokyo, Japan, assignors to Komatsu Zenoah Co., Japan**

**Filed Oct. 9, 1986, Ser. No. 917,033**
**Claims priority, application Japan, Oct. 9, 1985, 60-153635[U]; Dec. 5, 1985, 60-186619[U]; Feb. 27, 1986, 61-026543[U]; Mar. 17, 1986, 61-037470[U]**
**Int. Cl.[4] F01P** *7/04*
**U.S. Cl. 123—41.66** **6 Claims**



1. A portable engine comprising:

a crankcase;

an engine cylinder disposed within said crankcase;

a cylinder cover for said engine cylinder;

a fan connected with said engine cylinder;

a fan cover fixed to a front surface of said crankcase to cover said fan and direct a blown stream of air toward said engine cylinder, said fan cover being disposed adjacent said cylinder cover and forming a step therebetween;

a partition plate formed integrally with said crankcase to cover said step formed between said fan cover and said cylinder cover; and

an ignition coil for said engine cylinder fixed to said partition plate;

wherein said fan cover is provided with an opening located at a position corresponding to a position where said ignition coil is disposed, and a cover plate removably fitted to said fan cover to cover said opening.

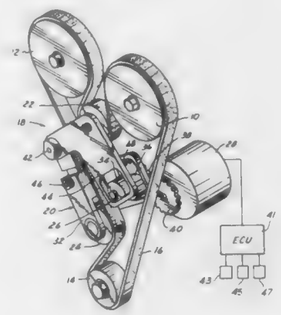
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**4,744,338**

## VARIABLE CAMSHAFT TIMING SYSTEM

**Samuel J. Sapienza, IV, Hampton, Va., assignor to Allied Corporation, Morris Township, N.J.**

**Filed Feb. 24, 1987, Ser. No. 17,670**
**Int. Cl.[4] F01L** *1/34*
**U.S. Cl. 123—90.15** **11 Claims**




1. A variable camshaft timing system in combination with an internal combustion engine having at least one cylinder, a rotatable member such as a crankshaft, and an intake and exhaust valve coupled to an intake camshaft and an exhaust camshaft respectively, the system comprising:

a pulley wheel fixedly attached at one end of each of the intake and exhaust camshafts and the crankshaft;

belt means interconnecting each of said pulley wheels for transferring rotational motion from the crankshaft to the intake and exhaust camshafts;

first and second idler arm means pivotally attached to the engine, each of said idler arm means having a pivoting arm, a cam follower arm and an idler wheel in operative contact with said belt means;

positioning cam means operatively coupled to each of said cam follower arms of said idler arm means;

a control means responsive to various engine operating parameters for generating motor control signals; and

electric motor means responsive to said motor control signals and operatively coupled to rotate said positioning cams means for positioning each of said idler arm means for changing the relative rotational position between the input camshaft and the exhaust camshaft.

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4,744,339

## CENTRIFUGAL SPARK-ADVANCE CONTROL DEVICE

Shigeru Nagai; Yasuhide Sakamoto; Hiromitsu Sato; Hideji Ohura; Masashi Kawamata, and Masayuki Kumada, all of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 5, 1987, Ser. No. 58,764
Claims priority, application Japan, Jun. 6, 1986, 61-130244; Nov. 28, 1986, 61-281991
Int. Cl.[4] F02P 5/04
U.S. Cl. 123—146 S A 15 Claims



1. A centrifugal spark-advance control device for an ignition system of an internal combustion engine, comprising:
- an input shaft which rotates at a speed corresponding to the rotational speed of the engine;
- a base plate fixedly attached to the input shaft;
- a timing member which is rotatably supported on the base plate;
- a biasing means for biasing the timing member in a certain direction;
- a centrifugal weight which is pivoted to the base plate at a point spaced from the center of gravity of the centrifugal weight and which is provided with a cam surface for rotatably driving the timing member in an opposite direction against the biasing force of the biasing means by cooperating with a corresponding cam follower surface provided in the timing member;
- a spark generating means coupled to the timing member for generating ignition sparks in synchronism with the rotational angle of the timing member;
- a mass member attached to the timing plate by way of an elastic member.

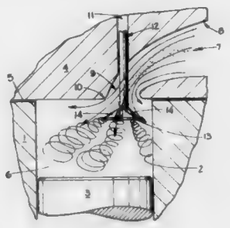
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4,744,340

## VORTEX GENERATOR INTAKE VALVE AND SYSTEM OF USING THE SAME

Ronald A. Kirby, 97 Miller La., Ft. Thomas, Ky. 41075

Continuation-in-part of Ser. No. 755,903, Jul. 17, 1985, abandoned. This application Jun. 23, 1986, Ser. No. 877,118
Int. Cl.[4] F01L 3/06
U.S. Cl. 123—188 VA 5 Claims



1. An intake valve for use with an internal combustion engine or the like of the type igniting a fuel/air mixture in a combustion chamber of the engine, said valve comprising:
- a. an elongated valve stem;
- b. a generally cylindrical flangeless valve head having spaced apart upper and lower faces, said stem being rigidly attached at one end to said lower valve face, the outer periphery of said head forming a seating surface; and
- c. a plurality of spaced impellers having an upper edge fixedly secured to said lower valve face and extending radially from said stem to the seating surface, each of said impellers comprising a thin arcuate vane-like member curving in a single direction from the stem to the seating surface and tapering decreasingly in height from said stem to the outermost tip of said impellers so as to merge into the lower face of the valve head adjacent said valve seat, the curvature, spacing and height of said impellers being configured so as to divert an incoming fuel/air mixture away from the valve by creating vortices in the combustion chamber of the engine.

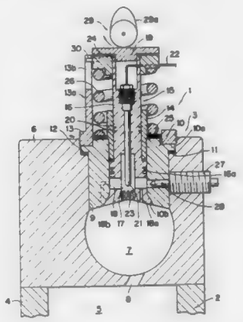
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4,744,341

## INTERNAL COMBUSTION ENGINE

Kisichiro Hareyama, and Shokichi Hareyama, both of Iwate, Japan, assignors to Yugen Kaisha Hareyama Jiko, Japan

Filed Jun. 24, 1986, Ser. No. 878,057
Claims priority, application Japan, Jun. 28, 1985, 60-141906
Int. Cl.[4] F02B 19/02
U.S. Cl. 123—256 8 Claims



1. A fuel valving apparatus for an internal combustion engine which has a cylinder defining a combustion chamber in which a piston is movable, comprising a cylinder head closing the combustion chamber, said head having a top opening with an injection port extending from the top opening into the combustion chamber and defining an intermediate chamber communicating with said injection port, a cylindrical hollow valve holding portion positioned in an opening above the intermediate chamber and having a valve seat, a valve body movable in said valve holding portion having a flange portion engageable and disengageable with said seat so as to position said valve body in respective closed and open positions, said valve body having an interior vaporizing chamber which communicates with said intermediate chamber when said valve body is opened, fuel injection means connected through said valve holding portion communicating with said intermediate chamber when said valve body is closed, and drive means engageable with said valve body to move said valve body between closed and opened positions.

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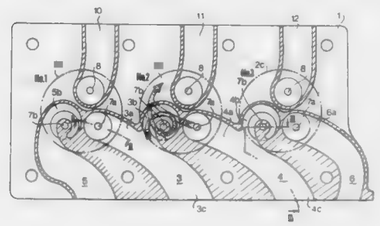
4,744,342

## INTAKE PORT STRUCTURE FOR AN INTERNAL COMBUSTION ENGINE

Katsumi Ochiai, Mitaka, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 2, 1987, Ser. No. 64
Claims priority, application Japan, Jan. 8, 1986, 61-1776
Int. Cl.[4] F02B 31/00
U.S. Cl. 123—308 4 Claims

1. An intake port structure for an internal combustion engine having a cylinder head, said cylinder head having a first end adjacent a first cylinder, a second cylinder, and the opposite end adjacent a last cylinder, each of said cylinders having a combustion chamber
- at least two intake valves provided for each cylinder;
- the cylinder head having two independent intake ports, and at least one siamese intake port comprising a common port, a second helical port and a first straight port;
- said second helical port being disposed in a tangential direction of said second cylinder and communicated with one of the intake valves of the second cylinder;



said first straight port being disposed in a tangential direction of said first cylinder and communicated with one of the intake valves of the first cylinder;
- one of the independent intake ports having a first helical port and communicated with the other intake valve of the first cylinder having the first straight port, and the other independent intake port having a second straight port and communicated with one of the intake valves of the last cylinder.



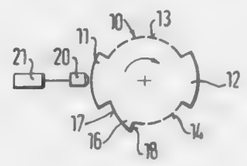
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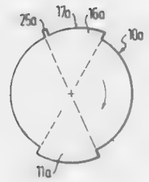
4,744,343

## DEVICE FOR CONTROLLING AN INTERNAL COMBUSTION ENGINE

Jean-Claude Bisenius, Darmstadt; Heinz Decker, Vaihingen/-Enz, and Richard Schleupen, Ingersheim, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed May 2, 1986, Ser. No. 859,623
Claims priority, application Fed. Rep. of Germany, Jun. 12, 1985, 3520998
Int. Cl.[4] F02D 41/30; F02P 7/067
U.S. Cl. 123—476 6 Claims





1. A device for controlling operation of an internal combustion engine of a motor vehicle having a rotary shaft and means for sensing angular position of the shaft, said sensing means including a sensor disc arranged for joint rotation with the shaft and having on its periphery a plurality of radially projecting segments whose number is proportional to the number of cylinders of the engine, and each having a steep leading and a steep trailing flank, a stationary detector cooperating with the flanks of respective segments to generate control pulses, said detector being connected to a circuit for controlling ignition and/or fuel injection of the engine, said sensor disc having a single sloping ramp which is arranged in a gap between two segments, said ramp having a steep flank facing a flank of one or said two segments; and said detector cooperating with said ramp to generate a marking signal applied to said controlling circuit to indicate position of said rotary shaft.

4. A device for controlling operation of an internal combustion engine of a motor vehicle having a rotary shaft and means for sensing angular position of the shaft, said sensing means including a sensor disc arranged for joint rotation with the shaft and having on its periphery a plurality of radially projecting segments whose number is proportional to the number of cylinders of the engine, said segments being spaced apart one from the other and each having a steep leading and a steep trailing flank, all segments being of uniform angular interval and at least one segment being of uniform diameter, a stationary detector cooperating with the flanks of said segments to generate control pulses, said detector being connected to a circuit for controlling ignition and/or fuel injection of the engine, comprising a sloping ramp formed in at least one remaining segment of the disc, said ramp defining a steep flank coinciding with a flank of said one remaining segment and a sloping surface terminating at a base of an inner flank of a narrow projection whose outer flank coincides with the other flank of said one remaining segment.

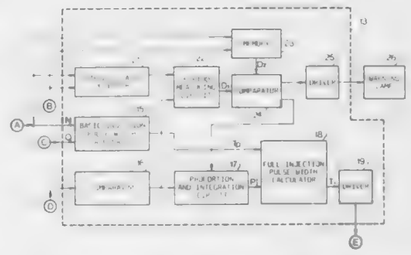
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4,744,344

## SYSTEM FOR COMPENSATING AN OXYGEN SENSOR IN AN EMISSION CONTROL SYSTEM

Takuro Morozumi, Mitaka, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 14, 1986, Ser. No. 829,664
Claims priority, application Japan, Feb. 20, 1985, 60-33093; Feb. 27, 1985, 60-38500
Int. Cl.[4] F02M 7/24; F01N 3/22
U.S. Cl. 123—479 14 Claims



1. A system for compensating an oxygen sensor in an emission control system for an automotive engine having a fuel supply device for supplying fuel to cylinders, the oxygen sensor, a control circuit responsive to the output of the oxygen sensor for controlling the air-fuel ratio of mixture to stoichiometry, comprising;
- proportion and integration circuit means included in the control circuit for producing a PI signal at a constant of proportionality and a constant of integration;
- first means for detecting the steady state of the operation of the engine;
- second means for detecting the period of the output of the oxygen sensor at the steady state detected by the first means;
- a comparator for comparing the period detected by the second means with a predetermined reference value and

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for producing a difference signal when the period is longer than the reference value;

third means for changing the constants of proportionality and integration responsive to said difference signal so as to correct the deviation of the air-fuel ratio from the stoichiometry.

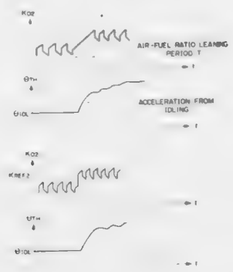
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**4,744,345**

## AIR-FUEL RATIO FEEDBACK CONTROL METHOD FOR INTERNAL COMBUSTION ENGINES

**Akihiro Yamato, Wako, Japan, assignor to Honda Giken Kogyo K.K., Tokyo, Japan**

**Filed Dec. 23, 1986, Ser. No. 945,878**
**Claims priority, application Japan, Dec. 28, 1985, 60-299055**
**Int. Cl.[4] F02D *41/10***
**U.S. Cl. 123—489** **6 Claims**




1. A method of controlling in a feedback manner the air-fuel ratio of an air-fuel mixture being supplied to an internal combustion engine having an exhaust passage and an exhaust gas ingredient concentration sensor arranged in said exhaust passage, wherein a basic value of a fuel quantity to be supplied to said engine is determined, a correction coefficient which varies in response to output from said exhaust gas ingredient concentration sensor is determined, and said basic value of said fuel quantity is corrected by means of said correction coefficient, when said engine is operating in an air-fuel ratio feedback control effecting region, the method comprising the steps of:

(1) determining whether or not said engine is operating in a predetermined idling region;

(2) calculating a first mean value of said correction coefficient determined during a period during which said engine is operating in said predetermined idling region, when said engine is determined to be operating in said predetermined idling region;

(3) determining whether or not said engine is operating in a predetermined condition accelerating from said predetermined idling region;

(4) calculating a second mean value of said correction coefficient and then storing and holding it when said engine is determined to be operating in said predetermined accelerating condition; and

(5) effecting said air-fuel ratio feedback control using said stored and held second mean value as an initial value of said correction coefficient, when said engine subsequently enters said predetermined accelerating condition from said predetermined idling region.

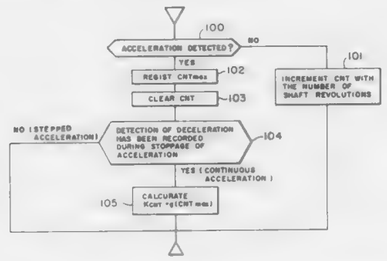
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**4,744,346**

## FUEL CONTROL APPARATUS IN INTERNAL COMBUSTION ENGINE

**Kiyomi Morita, Katsuta; Junji Miyake, Mito; Keiji Hatanaka, Chigasaki, and Kiyotoshi Sakuma, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo and Nissan Motor Co., Ltd., Yokohama, both of, Japan**

**Filed Aug. 24, 1987, Ser. No. 88,417**
**Claims priority, application Japan, Sep. 1, 1986, 61-203714**
**Int. Cl.[4] F02M *51/00***
**U.S. Cl. 123—492** **7 Claims**




1. A fuel control apparatus in an internal combustion engine arranged to increase a quantity of fuel supply uniquely determined on the basis of an engine speed and a quantity of suction air by a predetermined quantity upon detection of acceleration of said internal combustion engine; said apparatus comprising:

a detection means for detecting acceleration and deceleration of said internal combustion engine;

an engine speed operation means for calculating the number of engine revolutions, said engine speed operation means being arranged to perform the calculation from a point in time when acceleration is detected by said detection means to a point in time when deceleration is detected by said detection means;

a calculation means for calculating a continuous acceleration correcting factor representing a quantity to be subtracted from said predetermined quantity in accordance with the value of integration of the number of engine revolutions calculated by said engine speed operation means; and

a fuel supply means for supplying fuel to said internal combustion engine in accordance with an output of said calculation means.

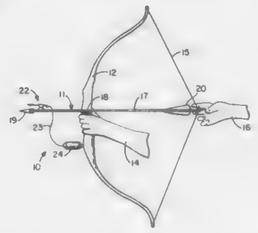
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**4,744,347**

## ARCHERY GAME TRACKING DEVICE

**Paul A. Dodge, Route 3, Menomonie, Wis. 54751**

**Filed Sep. 22, 1986, Ser. No. 910,132**
**Int. Cl.[4] F41B *5/00*; A63B *65/02***
**U.S. Cl. 124—86** **20 Claims**



6. An archery game tracking device for mounting on an arrow shaft comprising:

a dart having a dart tip and a dart shank;

a base connectable to an arrow shaft;



means for releasable connecting the dart to the base with the dart a short distance from and pointed generally in the intended path of travel of the arrow and positioned with respect to the arrow to point outwardly at a small acute angle relative to the longitudinal axis of the arrow, said means connecting the dart to the base with a force sufficient to hold the dart to the base during flight of the arrow and release the dart upon penetration of the dart in an animal hide;

a tracking line having a first end connected to the dart and a second end comprised as a supply of tracking line to be played out upon discharge of the arrow from a bow.

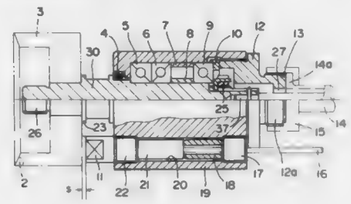
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**4,744,348**

## DRESSING APPARATUS FOR GRINDING WHEELS

**Hideaki Oda, and Akira Unozawa, both of Higashimatsuyama, Japan, assignors to Diesel Kiki Co., Ltd., Tokyo, Japan**

**Filed Nov. 12, 1986, Ser. No. 929,688**
**Int. Cl.[4] B24B *53/14***
**U.S. Cl. 125—11 CD** **6 Claims**



1. A grinding wheel dressing apparatus comprising:

a dresser shaft rotatably mounted and having one end adapted for connection to a drive shaft and an opposite end adapted to receive a dresser wheel;

an acoustic sensor adapted to detect acoustic signals produced by contact between the rotating dresser wheel and a grinding wheel being dressed thereby;

a housing means retaining said dresser shaft and said acoustic sensor and defining a fluid chamber adapted to couple said acoustic signals between said acoustic sensor and the contacting surfaces of the dresser and grinding wheels; and

supply means for supplying pressurized fluid to said fluid chamber.

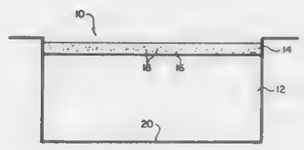
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**4,744,349**

## SUPPRESSION OF HEAT CONVECTION IN AQUEOUS INSULATING LAYER OF SOLAR POND

**Jens O. Sorensen, Box 2278 El Acebo, Rancho Santa Fe, Calif. 92067**

**Continuation-in-part of Ser. No. 889,960, Jul. 28, 1986. This application Aug. 11, 1987, Ser. No. 84,452**
**Int. Cl.[4] F24J *3/02***
**U.S. Cl. 126—452** **18 Claims**



1. A method of suppressing heat convection in an insulating layer of a solar pond containing a heat absorbing fluid, comprising forming the insulating layer by the steps of

(a) providing a body of water above the heat absorbing fluid; and

(b) suspending fibers in and dispersing the fibers throughout the body of water.

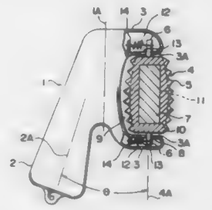
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**4,744,350**

## SCALP MASSAGER HAVING RESILIENTLY BIASED ROLLER WITH OPTIONAL INTERNAL MAGNET

**Atsuhiko Sato, 10-20, Matsubara 5-chome, Soka, Saitama, Japan**

**Filed Dec. 2, 1986, Ser. No. 936,759**
**Claims priority, application Japan, Dec. 9, 1985, 60-188473[U]**
**Int. Cl.[4] A61H *15/00***
**U.S. Cl. 128—57** **9 Claims**



1. A scalp massager comprising:

a main body having a base portion with a longitudinal axis and a grip portion rearwardly extending from said base portion with an axis inclined with respect to said longitudinal axis;

a pair of hollow supporting arms projecting forwardly and laterally from said base portion and spaced from each other in the longitudinal direction of said base portion, each arm having a slot;

a roller member rotatably mounted between said arms for rotation about an axis substantially parallel to said longitudinal axis of said base portion, said roller member being provided on the outer peripheral surface thereof with scalp stimulating projection means and said roller member being provided at each longitudinal end with a pin, said pins being slidable along and projecting through said slots, respectively, into said hollow arms; and

resilient means disposed within said hollow arms for resiliently biasing said roller member forwardly.

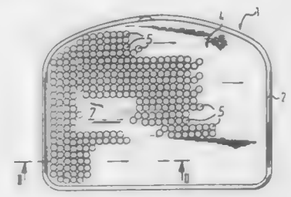
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**4,744,351**

## MEDICAL SUPPORT

**Hans Grundei, Lübeck, and Ulrich Moellers, Hamburg-Poppenbüttel, both of Fed. Rep. of Germany, assignors to S + G Implants GmbH, Lubeck, Fed. Rep. of Germany**

**Filed Jun. 17, 1986, Ser. No. 875,404**
**Claims priority, application Fed. Rep. of Germany, Jun. 25, 1985, 3522691**
**Int. Cl.[4] A61F *5/00*; A47C *27/00***
**U.S. Cl. 128—78** **1 Claim**



1. A medical support for parts of the body comprising a plate-like base part, said base part being provided with a plurality of frustoconical receivers, said receivers being independent of each other but closely spaced together, and a corresponding plurality of plug-in components selectively and replaceably

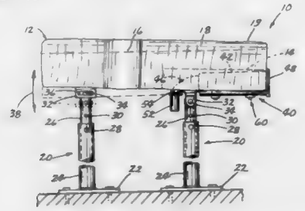
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supported in said receivers, said plug-in components not all being of the same length and each having cylindrical upper ends and being frusto conical throughout the entirety of their lower ends, said lower ends being removably positioned in said frustoconical receivers, the upper ends of said plug-in components having a yieldable configuration to define a substantially closed supporting surface, said upper ends of said plug-in components tangentially contacting adjacent plug-in components along a vertical line and having body bearing surfaces of partly spherical shapes to define in combination with said tangentially contacting components air pockets between any four adjoining plug-in components, whereby said plug-in components can be readily arranged to define a selected configuration on said base part to complementarily support a particular portion of the body.

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**4,744,352**
**ARTIFICIAL INSEMINATION SEMEN COLLECTION PHANTOM**
Joseph B. Emery, 15083 E. "C" Ave., Augusta, Mich. 49012
Filed Jan. 16, 1987, Ser. No. 4,550
Int. Cl.[4] A61F 5/00
U.S. Cl. 128—79 5 Claims

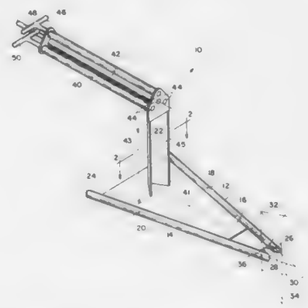


1. An artificial insemination semen collection phantom, comprising:
- a body section, said body section having an opening in one end, forming an artificial vagina and further including recessed gripping areas disposed intermediate its ends;
- a pair of vertically adjustable support leg means pivotally attached to said body section; wherein, one of the support means has a pivotal attachment which is laterally translatable with respect to said body section, and each of said support legs being vertically adjustable independent of the other support leg such that both vertical and angular adjustment of the body section relative to the ground is provided; and
- an artificial vagina releasably attached within said opening in one end of said body section.

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**4,744,353**
**METHOD FOR ATTACHING SOFT TISSUE TO BONE TISSUE**
Joseph R. McFarland, 507 Palo Alto Dr., Vancouver, Wash. 98661
Filed Apr. 18, 1986, Ser. No. 853,754
Int. Cl.[4] A61F 5/04
U.S. Cl. 128—92 VD 3 Claims

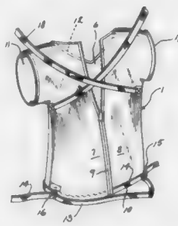
1. A method of performing the Bankart operation to surgically repair a shoulder joint, comprising:
- (a) providing a drilling guide defining a pair of convergent bores whose axes intersect to define an angle in the range of 20–50 degrees;
- (b) holding said drilling guide so that each of said two convergent bores opens toward a respective face of the anterior rim of the glenoid cavity of the scapula;
- (c) drilling a first hole into the glenoid rim coaxially through a first one of said bores of said drilling guide;
- (d) placing a locating pin through said first bore and into said first hole in the scapula while continuing to hold said drilling guide against the glenoid rim;
- (e) drilling a second hole coaxially through the second one of said pair of bores of the drilling guide and intersecting said first hole within said scapula in the vicinity of said rim;
- (f) pushing a suture into one of said first and second holes in said scapula;
- (g) inserting a hook into the other of said holes and engaging said suture within said scapula with said hook;



- (h) thereafter withdrawing a portion of said suture through said other of said holes; and
- (i) attaching a portion of the capsule of the shoulder joint to said scapula by use of said suture extending through said first and second holes in said scapula.

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**4,744,354**
**BODY RESTRAINT**
David Triunfol, 2001 N. 72nd Ct., Elmwood Park, Ill. 60635
Filed Jul. 11, 1986, Ser. No. 884,607
Int. Cl.[4] A61F 5/37, 13/00
U.S. Cl. 128—134 3 Claims

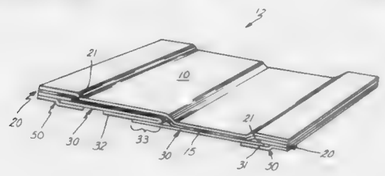


1. A body restraint for a patient, comprising a unitary vest body having a front panel and a pair of back panels and having a neck opening and a pair of arm openings, said front and back panels beng connected together along adjacent side edges with the connections between the front panel and the respective back panels extending the entire distance from the lower edge of said vest body to the respective arm openings, said back panels having adjacent back edges, fastening means for removably fastening said adjacent back edges together, a pair of first reinforcing straps, each first strap attached to the lower edge of a respective back panel and extending transversely across the opposite back panel, strap positioning means mounted on each back panel for positioning the respective first straps to the opposite panels, the free ends of said first straps extending outwardly and being adapted to be connected to an outside object, and a pair of second straps, one end of each second strap being fixedly connected to said vest body immediately beneath the respective arm opening, said second straps extending diagonally upwardly across said back panels in an X-configuration and extending across said fastening means, the opposite end of each second strap being adapted to be connected to an outside object.



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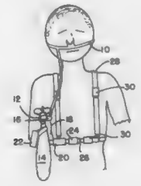
**4,744,355**
**HINGED END WOUND DRESSING**
Adrian L. Faasse, Jr., 10408 Braska Ave., Middleville, Mich. 49333
Filed May 23, 1986, Ser. No. 866,269
Int. Cl.[4] A61L 15/00
U.S. Cl. 128—156 17 Claims



1. A wound dressing or like applique having a surface covering layer adhesively coated on one side, said adhesive coating being covered with a release liner, wherein the improvement comprises:
- said release liner comprising a main body and an edge strip, said edge strip having an outside edge generally aligned with an edge of said covering layer and an inside edge spaced inwardly from said outside edge;
- said main body and said edge strip being hingedly joined by flexible hinge means, said flexible hinge means overlying said main body and said edge strip whereby as one peels said main body of said release liner away from said covering layer, said main body folds back with respect to said edge strip at said hinge means, thereby minimizing the peeling force exerted along said inside edge of said edge strip and enabling a user to control said covering layer by manipulating said main body of said release liner until said covering layer is applied to the desired surface, at which time force can be applied against said edge strip in the direction of said covering layer to thereby fold said edge strip over and increase its tendency to peel away from said covering layer as a continuing pulling force is applied to said main body of said release liner.

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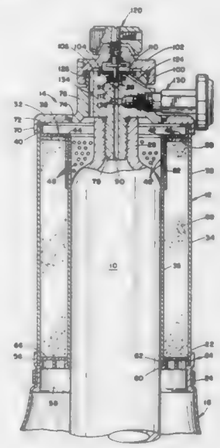
**4,744,356**
**DEMAND OXYGEN SUPPLY DEVICE**
Eugene C. Greenwood, 4825 Coleman Rd., Richmond, Va. 23230
Filed Mar. 3, 1986, Ser. No. 835,215
Int. Cl.[4] A61M 16/00
U.S. Cl. 128—204.26 5 Claims



1. In a gas flow regulator for attachment to a gas reservoir:
a solenoid valve capable of movement between an open position and a closed position where gas flow is stopped,
- a power supply electrically connected to said solenoid valve for moving said valve between the open and closed position,
- a motion sensitive detection sensor for detecting the direction of motion including an oscillator which generates an electrical signal corresponding to a particular motion direction detected,
- a controller in signal communication with said sensor and signal communication with said valve, said controller incorporating means for interpreting a change in the frequency of said sensor signal to read out the amount and direction of movement of the torso and means for generating a responsive signal thereto where said responsive signal causes said valve to move between the open and closed position.

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**4,744,357**
**PORTABLE EMERGENCY BREATHING APPARATUS**
Josef A. Bartos, Diamond Bar, Calif., assignor to Respirator Research Ltd., Willoughby, Ohio
Division of Ser. No. 762,253, Aug. 5, 1985, abandoned. This application Oct. 30, 1986, Ser. No. 924,979
Int. Cl.[4] A62B 7/00
U.S. Cl. 128—205.12 35 Claims



1. In portable emergency breathing apparatus of the character comprising breathing hose means, gas scrubber means and breathing bag means in a breathing circuit with said breathing hose means for inhaled and exhaled gas to respectively flow from and to said breathing bag means through said scrubber means, breathing gas container means, and valve means to control the flow of gas from said container means to said breathing circuit, the improvement comprising: said container means including means providing an opening thereinto, said valve means comprising a valve body interengaged with said means providing said opening, said body having passageway means therethrough including an inlet passageway communicating with the interior of said container means and an outlet passageway communicating with said breathing circuit, flow control valve means in said body to open and close said inlet passageway with respect to the flow of gas from said container means and to reduce the pressure of gas flowing from said container means when said inlet passageway is open, and pressure responsive valve means in said passageway means between said flow control valve means and said outlet passageway, said pressure responsive valve means being responsive to pressure in said breathing circuit to control the flow of gas from said container means to said outlet passageway.

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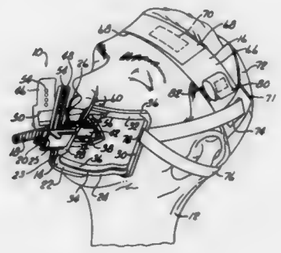


**4,744,358**

## ENDOTRACHEAL TUBE HOLDER

Gerald E. McGinnis, 131 Kelvington Dr., Monroeville, Allegheny County, Pa. 15146

Filed Jan. 18, 1984, Ser. No. 571,785
Int. Cl.[4] A61M *25/62*
U.S. Cl. 128—207.17 6 Claims



1. In an endotracheal tube holder apparatus for securing an endotracheal tube in the operative position thereof in the airway of a patient, the combination comprising:

a rigid face plate means adapted to be retained adjacent the mouth and jaw of such a patient;

said face plate means including a rigid support portion which projects outwardly thereof and is adapted to project outwardly with respect to the mouth of such a patient;

an elongated tube platform portion affixed to said face plate means centrally thereof and adapted for receiving one end of an endotracheal tube in the operative position thereof passing through the mouth and into the airway of such a patient;

said elongated platform portion having an inner end portion which projects inwardly of said face plate means and is adapted to reside within the oral cavity of a patient and thereby provide a bite block for such a patient, and a resiliently flexible outer end portion located outwardly of said inner end portion and projecting outwardly of said face plate means with said outer end portion being affixed with respect to and supported by said rigid support portion; said outer end portion including resiliently flexible tube restraining clamp means which are cooperable with said rigid face plate means for fixedly retaining such an endotracheal tube with respect to said rigid face plate means;

said face plate means including respective left and right frame portions which are rigidly affixed with respect to and extend laterally in opposite directions from said rigid support portion and are engageable with respective left and right portions of the face of such a patient;

a harness means cooperable with said frame portions for securing said endotracheal tube holder with respect to the head of such a patient;

said harness means comprising an elongated non-extensable head band adapted to generally horizontally encompass the head of such a patient and a non-extensible overhead strap affixed to said head band adapted to extend over the head of such a patient from side to side; and

a non-extensible retaining strap means cooperable with said frame portions and said harness means for fixedly retaining said endotracheal tube holder on the face of such a patient.

**4,744,359**

## CAUTERY HEMOSTATIC UNIT

Shinji Hatta; Akira Taniguchi, both of Hachioji; Koichi Matsui, Tokyo, and Takashi Tsukaya, Hachioji, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 774,618, Sep. 10, 1985, abandoned. This application Mar. 6, 1987, Ser. No. 22,473
Claims priority, application Japan, Sep. 13, 1984, 59-192279; Nov. 28, 1984, 59-251236; Jun. 15, 1985, 60-130467
Int. Cl.[4] A61B *17/38*
U.S. Cl. 128—303.1 9 Claims



1. A cautery hemostatic unit comprising:

a power box;

slender probe means which is deliverable through an insert channel of an endoscope, said probe means having a distal extremity end and a proximal extremity end;

connector means for connecting said proximal extremity end of said probe means to said power box;

a semi-conductor thermal element of small heat capacity contained in said distal extremity end of said probe means, said thermal element having a first and second end;

constant current circuit means for supplying a constant current to electrically heat said thermal element when said probe means is connected to said connector means to said power box;

setting button means on said power box for selecting and setting an amount of heat to be generated by said thermal element to heat tissue when said distal extremity end of said probe means is applied to said tissue;

heat dissipation detection means connected to said setting button means for detecting whether the amount of heat generated by said thermal element selected by said setting button means is achieved;

minute current circuit means for detecting deterioration of said thermal element, said minute current circuit means being connected to said thermal element for supplying a minute constant current to electrically test said thermal element, said minute current circuit means being connected to said thermal element when (a) said heat dissipation detection means detects said amount of heat set by said setting button means and generated by said thermal element has been achieved so that constant current is absent from said thermal element and (b) said thermal element is connected by said connector means to said power box;

changeover means for detecting an abnormality, said changeover means switching said thermal element from said minute current circuit means to said constant current circuit means in order to detect a characteristic deterioration of said thermal element;

a changeover control means to control the switching function of said changeover means from said minute constant current of said minute current circuit means to the constant current of said constant current circuit means, said changeover control means causing said minute constant current to be supplied to said thermal element only before said constant current is supplied to said thermal element;

recognition circuit means connected to said constant current circuit means and said minute current circuit means for providing an output which indicates whether a voltage between said first and second ends of said thermal element is within a predetermined range either when said constant current is applied to said thermal element or when said minute constant current is applied to said thermal element; and

an alarm circuit means connected to said output of said recognition circuit means, said alarm circuit means functions according to said output of said recognition circuit.

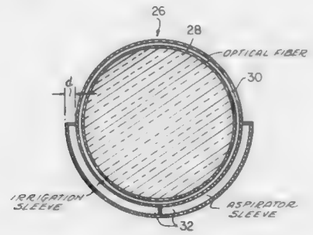


**4,744,360**

## APPARATUS FOR ABLATING AND REMOVING CATARACT LENSES

Patricia E. Bath, 4554 Circle View Blvd., Los Angeles, Calif. 90024

Filed Dec. 18, 1986, Ser. No. 943,098
Int. Cl.[4] A61B *17/36*
U.S. Cl. 128—303.1 7 Claims



1. An apparatus for removing cataracts from an eye comprising:

a flexible line including an optical fiber for conducting coherent radiation to the cataract and an aspiration sleeve extending at least partially about and along said fiber, the diameter of said line being 1 mm or less;

a laser means coupled to said fiber for supplying said coherent radiation thereto at a wavelength such that crystalline lens material will be disintegrated into particles less than 0.1 mm in diameter; and

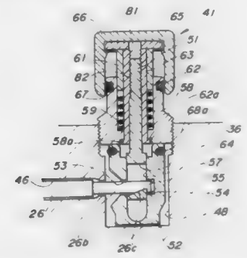
means for applying suction to said aspiration sleeve for removing ablated cataract material.

**4,744,361**

## RESECTOSCOPE

Hitoshi Karasawa, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed May 8, 1987, Ser. No. 47,381
Claims priority, application Japan, May 15, 1986, 61-073388[U]
Int. Cl.[4] A61B *17/36*
U.S. Cl. 128—303.15 12 Claims



1. A resectoscope comprising:

a hollow sheath;

an observing scope inserted in said sheath;

a resecting electrode means inserted through said sheath;

a handle part having a slider connected to said sheath, having said electrode means connected at the base end to it and moving said electrode means forward and rearward in the axial direction; and

an electrode fixing mechanism having:

an inserting hole which is provided in said slider and in which said electrode means is inserted at the base end;

an engaging part provided in the base end part of said electrode means inserted in said inserting hole;

an electrode fixing member having a locking part engaged with said engaging part provided in said electrode means to lock said electrode means and movable in the direction intersecting with the axis of said electrode means;

an energizing means energizing said electrode fixing member in the direction of fixing said electrode means;

an electrode fixing mechanism fixing means fixing said electrode fixing member and said energizing means to said slider; and

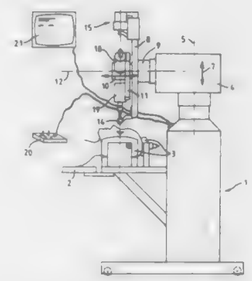
a position adjusting means making the position of said electrode fixing member with respect to said slider adjustable in the diretion intersecting with the axis of said electrode [illegible]

**4,744,362**

## DEVICE FOR TRANSPLANTING THE CORNEA OF THE HUMAN EYE

Patrik Gründler, Iddastrasse 7, CH-9098 St. Gallen, Switzerland

Filed Jun. 26, 1986, Ser. No. 878,894
Claims priority, application Fed. Rep. of Germany, Jun. 27, 1985, 3522998; Jun. 27, 1985, 3522999; Jun. 27, 1985, 3523015
Int. Cl.[4] A61B *17/32*
U.S. Cl. 128—305 28 Claims



1. In a device for transplanting the cornea of the human eye, which device includes a base frame (1) constructed as a patient carrier, a head rest with a fixing structure (3) and an eyeball holder ring (14) which can be fixed during the operation and which can be placed with its lower surface (70) , to which suction can be applied, upon the corneal-scleral transition zone of the eye, the improvement wherein said device further comprises:

a carrier (11) which is three-dimensionally adjustable by means of electonically controllable drives, said carrier being mounted on said base frame (1);

at least three instruments mounted on said carrier (11), including an optical axis adjustment instrument (17) for simultaneous monocular observation of the surface of the cornea and of the fundus of the eye of the patient, a trephine (18) for cutting out a circular disk-shaped central part of the cornea, and a transplanter (19) for transferring a cornea transplant (112) and fixing it in the eye of the patient; and

means for storing the positional data of the instruments, and

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an electronic control systen operably connected to said carrier for adjusting said carrier (11) and said instruments such that an instrument which is to be selected moves on command into the position previously taken up by another instrument.

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**4,744,363**

## INTRA-ABDOMINAL ORGAN STABILIZER, RETRACTOR AND TISSUE MANIPULATOR

**Harrith M. Hasson, 2043 N. Sedgwick, Chicago, Ill. 60614**

**Filed Jul. 7, 1986, Ser. No. 882,416**
**Int. Cl.[4] A61B** *17/28*
**U.S. Cl. 128—321** **20 Claims**



1. An intra-abdominal organ stabilizer, manipulator and retractor comprising:
- an elongated tube for insertion through an introducer sleeve into an abdominal area;
- a relatively stiff stabilizer tip at the distal end of the tube, the tip being convertible from a collapsed condition for insertion through the introducer sleeve to an expanded condition for retracting, manipulating, supporting and stabilizing organs, tissue or the like, the stabilizer tip being sized for withdrawal into the tube when in collapsed condition;
- a thin membrane bridging any open space between the expanded condition of the tip for supporting, manipulating, retracting and stabilizing organs, said membrane being withdrawn into the tube along with the stabilizer tip; and
- manipulative means on the proximal end of the tube and operatively associated through the tube with the stabilizer tip for converting the tip between its collapsed and expanded conditions.

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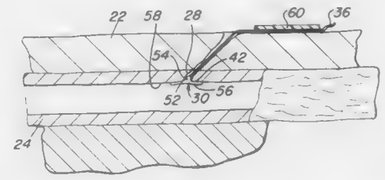
**4,744,364**

## DEVICE FOR SEALING PERCUTANEOUS PUNCTURE IN A VESSEL

**Kenneth Kensey, Hinsdale, Ill., assignor to Intravascular Surgical Instruments, Inc., Frazer, Pa.**

**Filed Feb. 17, 1987, Ser. No. 15,267**
**Int. Cl.[4] A61B** *17/04*
**U.S. Cl. 128—334 R** **32 Claims**

1. A device for sealing a percutaneous incision or puncture in the wall of a blood vessel of a living being, said device comprising first means having an outlet at the distal end thereof and adapted to be inserted through said incision or puncture so that said outlet is located within the interior of said vessel, expandable closure means disposed within said first means and being formed of a material which is held in a compact configuration within said first means, ejecting means for causing said closure means to pass out of said outlet into the interior of said vessel, said closure means being expandable to expand to form an engagement surface, said engagement surface conforming to the arcuate inner surface of said vessel contiguous with said incision or puncture, and retraction means for moving said closure to said opening after said first means has been removed therefrom, whereupon said engagement surface hemostatically engages said arcuate inner surface



of said vessel contiguous with said incision or puncture to seal said incision or puncture, said retraction means serving to hold said closure in place and without said closure appreciably blocking the flow of blood through said vessel.

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**4,744,365**

## TWO-PHASE COMPOSITIONS FOR ABSORBABLE SURGICAL DEVICES

**Donald S. Kaplan, Weston; Matthew E. Hermes, Norwalk; Ross R. Muth, Brookfield, and John J. Kennedy, Stratford, all of Conn., assignors to United States Surgical Corporation, Norwalk, Conn.**

**Continuation of Ser. No. 860,302, Jul. 17, 1986, abandoned, which is a continuation of Ser. No. 586,686, Mar. 6, 1984, abandoned. This application Sep. 22, 1987, Ser. No. 99,635**
**Int. Cl.[4] A61L** *15/04*
**U.S. Cl. 128—335.5** **28 Claims**

1. An absorbable, annealed surgical device of a multi-phase polymeric composition derived from lactide and glycolide, the first phase having about 0–about 25% m glycolide moieties and about 75–about 100% m lactide moieties and the other phase or phases having glycolide and lactide moieties in amounts such that the composition overall has up to 45% m glycolide moieties, wherein the first phase constitutes at least 50% by weight of the annealed surgical device.

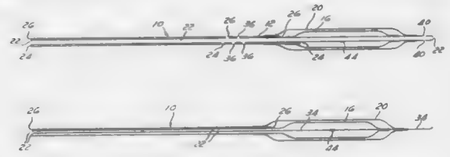
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**4,744,366**

## CONCENTRIC INDEPENDENTLY INFLATABLE/DEFLATABLE MULTIPLE DIAMETER BALLOON ANGIOPLASTY CATHETER SYSTEMS AND METHOD OF USE

**G. David Jang, 636 Golden West Dr., Redlands, Calif. 92373**

**Filed Sep. 10, 1986, Ser. No. 905,790**
**Int. Cl.[4] A61M** *29/02*
**U.S. Cl. 128—344** **52 Claims**



1. A catheter for performing balloon angioplasty, comprising:
- an elongate, flexible catheter shaft having at least two lumens therethrough;
- at least two relatively inelastic angioplasty balloons on said shaft, wherein said balloons are connected to separate lumens for independent inflation and deflation thereof, and each of said balloons has a predetermined maximum inflated diameter and is adapted to dilate a stenosis when inflated;

said balloons comprising:



- a first balloon;
- a second balloon on top of said first balloon, so that said first balloon is inside said second balloon, wherein the maximum inflated diameter of said first balloon is less than the maximum inflated diameter of said second balloon so that when said first balloon and said second balloon are fully both inflated, said first balloon is spaced radially inwardly from said second balloon;
- a central lumen extending longitudinally through said catheter shaft; and
- a steerable guidewire extending through said central lumen.

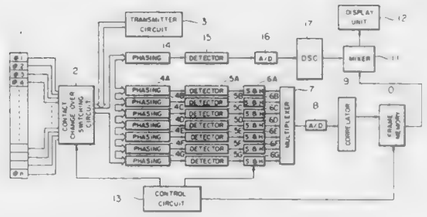
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**4,744,367**

## APPARATUS FOR MEASURING BLOOD FLOW SPEED USING AN ULTRASONIC BEAM

**Mashio Kodama, Tokyo, and Toshio Kondo, Kunitachi, both of Japan, assignors to Hitachi Medical Corp., Tokyo, Japan**

**Filed Dec. 23, 1985, Ser. No. 812,843**
**Claims priority, application Japan, Dec. 28, 1984, 59-279738**
**Int. Cl.[4] G01N** *29/02*
**U.S. Cl. 128—663** **16 Claims**



1. An ultrasonic diagnosis apparatus comprising:
- an ultrasonic probe for transmitting an ultrasonic beam toward a body having a blood vessel at a predetermined transmission interval;
- receiving means for receiving a reflected wave of each transmitted ultrasonic beam from said body;
- measuring means for measuring a reflected-wave intensity distribution, in a direction transverse to the transmitted ultrasonic beam, output from said receiving means at a predetermined interval of time corresponding to said predetermined transmission interval;
- shift detecting means for detecting a shift between two successive reflected-wave intensity distributions measured by said measuring means to determined a blood flow speed in the blood vessel of said body;
- said receiving means including a plurality of receiver circuits corresponding to a plurality of sampling points on said body in the direction transverse to the transmitted ultrasonic beam, said receiver circuits providing intensities of the reflected waves from said sampling points, respectively;
- wherein said receiver circuits have different directivities, and each of said receiver circuits includes a delay circuit having a plurality of delay elements connected to ultrasonic oscillator elements in said ultrasonic probe, respectively, and an adder for producing a sum of outputs of said delay elements, said delay elements in each delay circuit providing predetermined delays based on the directivity of that delay circuit.

10. A blood flow speed measuring apparatus comprising:
- a single ultrasonic probe including a plurality of ultrasonic oscillator elements for transmitting an ultrasonic beam toward a body having a blood vessel at a predetermined transmission interval and for receiving a reflected ultrasonic wave;
- receiving means including a plurality of receiver circuits which have different directivities for receiving reflected waves from said body for one ultrasonic beam transmitted from predetermined ones of said plurality of ultrasonic oscillator elements;
- reflected-wave intensity distribution measuring means for measuring, a distribution of reflected-wave intensities in a direction intersecting the direction of transmission of the ultrasonic beam from the ultrasonic oscillator elements, on the basis of outputs of said receiver circuits at a predetermined interval of time corresponding to said predetermined transmission interval; and
- blood flow speed measuring means for detecting a shift between two successive reflected-wave intensity distributions measured by said reflectd-wave intensity distribution measuring means to measure a blood flow speed in the blood vessel of said body;
- wherein the reflected waves of the ultrasonic beam transmitted from said predetermined ones of said plurality of ultrasonic oscillator elements are received by the same said predetermined ones of said plurality of ultrasonic oscillator elements.

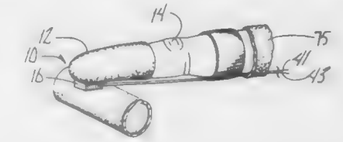
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**4,744,368**

## METHOD AND MEANS FOR DETECTING PREGNANCY IN DOMESTIC FARM ANIMAL

**Donald F. Young; Leroy R. Waite; Stephen P. Ford, and Alan J. Conley, all of Ames, Iowa, assignors to Iowa State University Research Foundation, Inc., Ames, Iowa**

**Filed May 13, 1986, Ser. No. 862,711**
**Int. Cl.[4] A61B** *10/00*
**U.S. Cl. 128—663** **4 Claims**



1. A method for detecting pregnancy in an animal having first and second uterine horns and first and second uterine arteries within said first and second uterine horns, respectively said method comprising:
- taking a first measurement indicating the velocity of blood flow within said first uterine artery
- taking a second measurement of the velocity of blood flow within said second uterine artery;
- comparing said first and second measurements whereby an elevation of one of said measurements substantially above the other of said measurements indicates pregnancy in the one of said uterine horns associated with said one elevated measurement.

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**4,744,369**

## MEDICAL CURRENT LIMITING CIRCUIT

**Mark W. Kroll, Minnetonka, Minn., assignor to Cherne Medical, Inc., Minneapolis, Minn.**

**Filed Oct. 6, 1986, Ser. No. 915,778**
**Int. Cl.[4] H02H** *9/04*
**U.S. Cl. 128—696** **6 Claims**

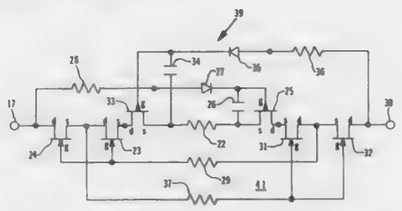
1. A two terminal, bi-directional medical current limiter device for series use with an electrode connected to the first external terminal and an electro-medical diagnostic or therapeutic apparatus connected to the second external terminal, comprising:
- a. first, second, third and fourth n-channel field effect transistors connected consecutively in series between the first and second external terminals, each said field effect transistor having a gate, a source and a drain terminal, said drain terminals of said first and said fourth field effect transistors being connected to the first external terminal,

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and the second external terminal respectively, said drain terminals of said second and said third field effect transistors being connected to said source terminals of said first and said fourth field effect transistor respectively, said gate terminals of said first and said second field effect transistors being connected to the second external terminal through said fourth field effect transistor and said gate terminals of said third and said fourth field effect transistors being connected to the first external terminal through said first field effect transistor;

b. first and second p-channel, field effect transistors connected in series between said second and said third n-channel, field effect transistors, each said p-channel, field effect transistor having a gate, a source and a drain terminal, said drain terminal of said first p-channel field effect transistor being connected to said source terminal of said third n-channel field effect transistor, said drain terminal of said second p-channel field effect transistor being connected to said source terminal of said second n-channel field effect



transistor, said gate terminal of said first p-channel field effect transistor being connected to the first external terminal and said gate terminal of said second p-channel field effect transistor being connected to the second external terminal;

c. a low resistance voltage dropping means connected between said first and said second p-channel field effect transistors;

d. a first node located between said second p-channel field effect transistor and said voltage dropping means;

e. a second node located between said first p-channel field effect transistor and said voltage dropping means;

f. a first means, connected between said second node and said gate terminal of said first p-channel field effect transistor, to maintain a charge on said gate terminal of said first p-channel field effect transistor; and

g. a second means, connected between said first node and said gate terminal of said second p-channel field effect transistor, to maintain a charge on said gate terminal of said second p-channel field effect transistor.

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**4,744,370**

## LEAD ASSEMBLY WITH SELECTABLE ELECTRODE CONNECTION

**Donald L. Harris, Key Largo, Fla., assignor to Cordis Leads, Inc., Miami, Fla.**

**Filed Apr. 27, 1987, Ser. No. 42,677**
**Int. Cl.[4] A61N *1/05*; H01R *17/18***
**U.S. Cl. 128—786** **13 Claims**

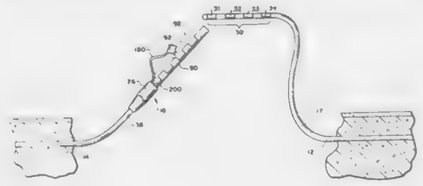
1. A multi-conductor lead assembly comprising:

a first lead including a lead body having a distal end portion with a plurality of electrodes thereon, a proximal end portion with a plurality of sleeve electrodes thereon and a plurality of insulated wire conductors within the lead body and electrically connecting said electrodes on said distal end portion with said sleeve electrodes on said proximal end portion;

a second lead including a lead body having a proximal end, a proximal end portion, a distal end and a distal end portion, and an insulated wire conductor therein having a proximal end and a distal end;

a terminal assembly including a terminal pin connected to said proximal end of said wire conductor in said second lead; and

a connector assembly including a body, said distal end portion of said second lead being received in said body, a flexible insulated wire conductor having a proximal end in said body and electrically connected to said distal end of



said wire conductor in said second lead and a distal end, a connector clip connected to said distal end of said flexible insulated wire conductor and adapted to make electrical contact with a selected one of said plurality of sleeve electrodes on said first lead, and means for insulating the connection between said connector clip and a selected one of said sleeve electrodes.

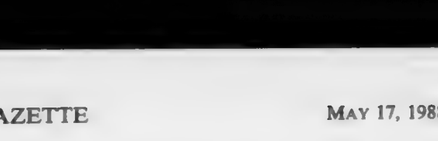
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**4,744,371**

## MULTI-CONDUCTOR LEAD ASSEMBLY FOR TEMPORARY USE

**Donald L. Harris, Key Largo, Fla., assignor to Cordis Leads, Inc., Miami, Fla.**

**Filed Apr. 27, 1987, Ser. No. 42,834**
**Int. Cl.[4] A61N *1/05*; H01R *17/18***
**U.S. Cl. 128—786** **14 Claims**



1. A multi-conductor lead assembly comprising:

a first lead including a lead body having a distal end portion with a plurality of electrodes thereon, a proximal end portion with a plurality of sleeve electrodes and a plurality of insulated wire conductors within the lead body and electrically connecting said electrodes on said distal end portion with said sleeve electrodes on said proximal end portion;

a second lead including a lead body having a proximal end, a proximal end portion, a distal end and a distal end portion, and a plurality of insulated wire conductors therein, each of said wire conductors having a proximal end and a proximal end portion extending out of the proximal end of said lead body, a sleeve connector mounted on each wire conductor proximal end portion;

a needle connected to said proximal ends of said wire conductors; and

a connector assembly including a body, said distal end portion of said second lead being received in said body, a plurality of connector clips in said body adapted to receive and to make electrical contact with respective ones of said plurality of sleeve electrodes on said first lead, means for electrically connecting each of said wire conductors in said second lead with one of said connector clips, and means for insulating the connection between said connector clips and said sleeve electrodes.

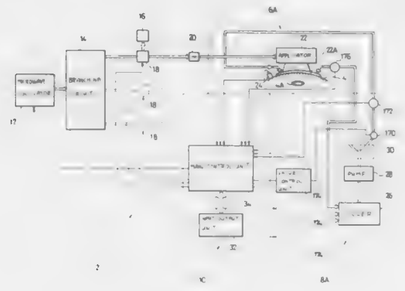


**4,744,372**

## HEATING APPARATUS AND METHOD FOR HYPERTHERMIA

**Makoto Kikuchi, 16-19, Inokashira 1-chome, Mitaka-shi, Tokyo; Shinsaku Mori, 31-6, Okusawa 1-chome, Setagaya-ku, Tokyo; Yoshio Nikawa, 26-14, Nerima 2-chome, Nerima-ku, Tokyo, and Takashige Terakawa, Tokyo, all of Japan, assignors to Tokyo Keiki Co., Ltd.; Makoto Kikuchi; Shinsaku Mori and Yoshio Nikawa, all of Tokyo, Japan**

**Filed Jul. 22, 1985, Ser. No. 757,850**
**Claims priority, application Japan, Jul. 31, 1984, 59-162464; Jul. 31, 1984, 59-162465; Jul. 31, 1984, 59-162466; Jul. 31, 1984, 59-162467**
**Int. Cl.[4] A61N *5/02***
**U.S. Cl. 128—804** **10 Claims**



1. Hyperthermia apparatus comprising:

(a) at least one treatment branch including:

(1) a microwave source for generating microwaves that are applied to the branch;

(2) an applicator for applying microwaves in the branch to a treatment region of a patient;

(3) a cooling mechanism for cooling the surface of said treatment region when coolant is supplied to said cooling mechanism;

(4) a coolant reservoir;

(5) adjustable means connecting said reservoir to said cooling mechanism for supplying coolant to said mechanism in step-wise variable amounts; and

(b) a main control unit comprising:

(1) means for periodically reducing the power level in said branch to zero;

(2) means made effective each time the power level in said branch is zero for measuring internal and surface temperatures of said treatment region; and

(3) means responsive to the internal and surface temperatures each time they are measured for adjusting said adjustable means such that coolant flow is controlled in accordance with the measured internal and surface temperatures.

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**4,744,373**

## LEAF PICKING APPARATUS FOR TOBACCO PLANTS

**Yasuhiko Miyake, Oyama, and Katsuyuki Manzawa, Tochigi, both of Japan, assignors to Japan Tobacco, Inc., Tokyo, Japan**

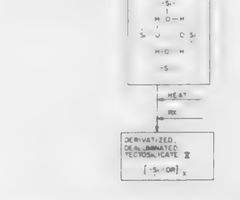
**Filed Mar. 5, 1986, Ser. No. 836,350**
**Claims priority, application Japan, Mar. 6, 1985, 60-42889**
**Int. Cl.[4] A10D *1/00***
**U.S. Cl. 130—30 R** **14 Claims**

1. A leaf picking apparatus for reaped and dried tobacco plants having a stalk and a number of tobacco leaves connected to the stalk by stems, comprising:

a leaf picking disk having an axis of rotation and supported for rotation, the disk having a peripheral edge portion, a center opening conentric with the axis and a plurality of flexible tongues spaced circumferentially and extending radially inward from the peripheral edge portion of the opening;

drive means for rotating the leak picking disk in one rotating direction around the axis of rotation;

forming means for deflecting inside end portions of said flexible tongues of the leaf picking disk to one side of the disk so that the inside end portions of the tongues spread radially outward, wherein said forming means comprises curved metallic plate pieces, each piece being attached to



one side of the tongue and extending along the longitudinal direction of the tongue;

a plurality of leaf picking elements projecting from the distal ends of the tongues and adapted to rotate, in contact with the outer peripheral surface of the stalks of the tobacco plants, as the leaf picking disk rotates when the plants are passed through the disk from the one side thereof with the base of the stalk of each plant forward; and

transport means for transporting the tobacco plants in one direction along the axis of rotation.

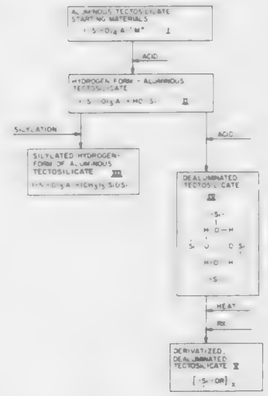
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**4,744,374**

## HYDROPHOBIC, CRYSTALLINE, MICROPOROUS SILACEOUS MATERIALS OF REGULAR GEOMETRY

**Kenneth S. Deffeyes, Princeton, N.J., and Aaron A. Rosenblatt, New York, N.Y., assignors to Scopas Technology Company, Inc., New York, N.Y.**

**Division of Ser. No. 565,460, Dec. 27, 1983, Pat. No. 4,688,318.**
**This application May 12, 1987, Ser. No. 49,588**
**Int. Cl.[4] A24B *15/00***
**U.S. Cl. 131—331** **6 Claims**



1. A diaper comprising an absorbent inner core having an effective amount of hydrophobic microporous crystalline tectosilicate of regular geometry having aluminum-free sites in a silaceous lattice that are characterized by the presence of about 1–4 associated moieties in said sites of the formula ≡SiOR, wherein R is a substituent that is a weaker point electric source than aluminum.

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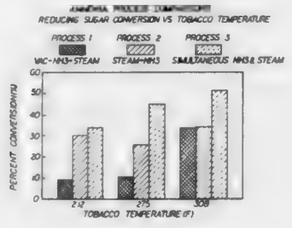


**4,744,375**

## PROCESS FOR FORMING FLAVOR COMPOUNDS IN TOBACCO

**Robert F. Denier, Elmer F. Litzinger, and Ezra D. Allford, all of Louisville, Ky., assignors to Brown & Williamson Tobacco Corporation, Louisville, Ky.**

**Filed Feb. 24, 1986, Ser. No. 832,551**
**Int. Cl.[4] A24B** *15/28, 3/12*
**U.S. Cl. 131—309** **29 Claims**




1. A method of of forming favorable flavor compounds in a moisturized tobacco comprising: introducing the moisturized tobacco to be treated into a tobacco containing zone; introducing an ammonia source into said tobacco containing zone; heating said tobacco containing zone by injecting steam into said containing zone when substantially closed to bring the temperature of the tobacco introduced into said zone to a temperature in the range of approximately 250° F. to 350° F. for a sufficient time period to cause reaction of the ammonia source and reducing sugars in the tobacco without substantially reducing moisture content of the tobacco to improve the tobacco flavor compounds; cooling the tobacco in the containing zone to a lower preselected temperature level; and removing the treated tobacco from the containing zone.

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**4,744,376**

## POCKET-CONTAINER FOR COSMETIC PRODUCTS

**Giovanni Verducci, Monza San Fruttuoso, Italy, assignor to Gianni Verducci S. r. l., Milan, Italy**

**PCT No. PCT/EP85/00717, § 371 Date Aug. 13, 1986, § 102(e) Date Aug. 13, 1986, PCT Pub. No. WO86/03659, PCT Pub. Date Jul. 3, 1986**
**PCT Filed Dec. 18, 1985, Ser. No. 902,452**
**Claims priority, application Italy, Dec. 20, 1984, 24200/84[U]**
**Int. Cl.[4] A45D** *33/00*
**U.S. Cl. 132—82 C** **15 Claims**



1. A pocket container for cosmetic products or the like comprising a generally box-shaped body of substantially parallel piped configuration; said body including a bottom wall, a pair of generally parallel upstanding side walls and an upstanding rear wall between said side walls; said rear wall being located at a first end of said bottom wall remote from an opposite second end of said bottom wall; a first cover pivotally connected by a first pivot adjacent said first end for pivoting said first cover between relatively open and closed positions in the latter of which a top wall of said first cover is in generally parallel overlying spaced relationship to said bottom wall; a second cover pivotally connected by a second pivot adjacent said second end for pivoting said second cover between relatively open and closed positions in the latter of which a top wall of said second cover is coincident with said first cover top wall, said first and second pivots being disposed in generally parallel relationship to each other, said first and second cover define respective first and second paths of travel of said first and second cover which are directed toward each other when said first and second covers move toward their closed positions, a drawer beneath said bottom wall, means mounting said drawer for sliding movement generally parallel to said first and second pivots, said drawer and second cover each having a bottom wall which are in a generally common plane when said second cover is in its closed position, and said first and second covers having respective first and second edge portions in abutting relationship to each other along a plane in oblique relationship to said bottom wall whereby one of said covers overlappingly retains another of said covers in its closed position.

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**4,744,377**

## MASCARA APPLICATOR

**Howard D. Dolan, Jr., Monroe, N.Y., assignor to Avon Products, Inc., New York, N.Y.**

**Continuation of Ser. No. 337,954, Jul. 7, 1982. This application Oct. 20, 1986, Ser. No. 921,809**
**Int. Cl.[4] A45D** *40/30*
**U.S. Cl. 132—88.5** **6 Claims**




1. A mascara applicator comprising:
(a) a shaft;
(b) handle means attached to one end of said shaft; and
(c) an applicator head attached to the other end of said shaft, said head being in the form of a tube having an open core and a plurality of transverse slits extending substantially completely therethrough, said applicator head being attached to said other end of said shaft at one end thereof wherein said applicator head extends from said shaft other end to exclude said shaft from occupying the space defined by said open core, and wherein said slits define a series of applicator elements spaced from each other and from said other end of said shaft in a direction extending away from said other end of said shaft, each of said elements being attached to its neighboring element or elements at a location substantially coinciding with the outside diameter of said tube such that said open core extends commonly through said elements to serve as a resevoir for mascara, and the applicator elements are adapted to apply mascara from said resevoir to substantially coat the entire circumference of an eyelash being wiped thereby as said eyelash is passed between adjacent elements transversely through said commonly extending open core.

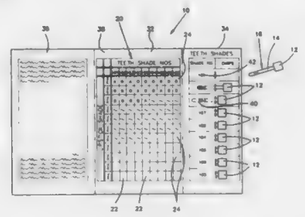


**4,744,378**

## METHOD AND APPARATUS FOR SELECTING LIPSTICK SHADES

**John S. Bostic, Strongsville, Ohio, assignor to 637073 Ontario Inc., Toronto, Canada**

**Continuation of Ser. No. 503,878, Jun. 13, 1983, abandoned. This application Dec. 18, 1986, Ser. No. 945,196**
**Int. Cl.[4] A45D** *40/30*
**U.S. Cl. 132—88.5** **8 Claims**



1. A tooth and lipstick shade analyzing guide, comprising:
a tooth color panel having a plurality of tooth color samples for comparison with an individual's tooth color, each sample having an indicia associated therewith;
an anlyzing chart having multiple rows, each row having indicia assoicated therewith corresponding to a selected indicia of the tooth color samples, each row of said analyzing chart further having indicia acceptance or non-acceptance; and
a lipstick shade display having multiple columns, each column containing at least one lipstick shade, the columns being juxtaposed to the acceptance or non-acceptance indicia in the analyzing chart.

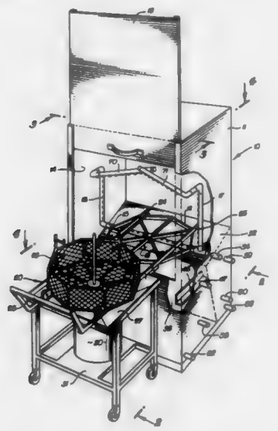
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**4,744,379**

## CONVEYOR SYSTEM FOR WASHING APPARATUS

**Andrew P. Goettel, 4818 47th Street, Camrose, Alberta, Canada T4V 1J6**

**Continuation-in-part of Ser. No. 832,473, Feb. 20, 1986. This application Mar. 26, 1986, Ser. No. 844,101**
**Int. Cl.[4] B08B** *3/02*
**U.S. Cl. 134—109** **7 Claims**



1. An article washing system which includes
(a) a washer comprising a cabinet, a washing chamber within the cabinet, means in one of the cabinet walls to provide access to the washing chamber from the exterior thereof, means to spray cleaning fluid onto articles supported within the washing chamber; and
(b) a conveying system for transporting articles to be cleaned from a distant location to the washer, for loading the articles to be cleaned into the washer, for unloading cleaned articles from the washer and transporting the cleaned articles to a distant location, comprising:
(i) a support table mounted within the washing chamber having guide means secured thereto;
(ii) a mobile carrier having guide means secured to the upper surface thereof which are adapted to be aligned with the guide means secured to the support table mounted in the washing chamber and having a catch pan secured under the guide means with a drain to direct material which falls into the pan to a container mounted on the mobile carrier beneath the drain; and
(iii) an article support tray adapted to be conveyed into and out of the washing chamber by means of the guide means on the mobile carrier and the support table to thereby load articles into and to unload articles out of the washer.

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**4,744,380**

## ANIMAL FECES DISPOSAL APPARATUS

**David G. Sheriff, 932 Rosedown La., Lafayette, La. 70503**

**Filed Feb. 24, 1987, Ser. No. 17,724**
**Int. Cl.[4] B08B** *3/02*
**U.S. Cl. 134—198** **5 Claims**



1. Apparatus for disposing of animal feces comprising:
(a) a rigid tube having a first end and a second end;
(b) connection means attached to said first end for enabling connection of said tube to a water source;
(c) a diffusing spray nozzle attached to said second end of said tube;
(d) an enlarged chamber connected to said second end of said tube and encompassing said nozzle, said chamber having a substantially flat open end opposite said nozzle; and
(e) a gridwork positioned over the open end of said chamber for separating a deposit of feces into small pieces for enhancing its dissolvability when said chamber is positioned about the deposit.

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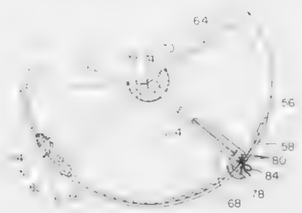


**4,744,381**

## CENTER POLE LODGE

**Wayne Pritchett, 1820 Sherwood St., Missoula, Mont. 59802**

**Filed Mar. 13, 1986, Ser. No. 839,158**
**Int. Cl.[4] E04H** *15/14, 15/26, 15/24*
**U.S. Cl. 135—93** **8 Claims**




1. A ventilating system for a tepee comprising:
an uppermost portion of a wall of a tepee;
a substantially horizontally disposed opening defined by a top of said uppermost portion;
a support means disposed above a center of said opening; and
a cone-shaped cap having a vertex, a base, a wall and a pivot point disposed on a top side of said wall a distance from said vertex, wherein said pivot point is rotatably supported by said support and wherein a bottommost portion of said base opposite from said pivot point rests on an outer annular surface of said uppermost portion such that said cap is rotatble about said support.

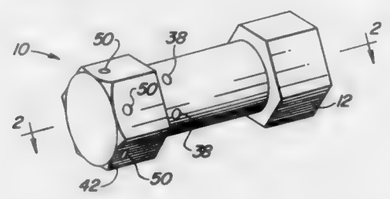
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**4,744,382**

## COMBINATION THERMAL OR PRESSURE ACTIVATED RELIEF VALVE

**James E. Visnic, and Kevin M. Johnston, both of West Lafayette, Ind., assignors to Aluminum Company of America, Pittsburgh, Pa.**

**Filed Apr. 29, 1987, Ser. No. 43,955**
**Int. Cl.[4] F16K** *17/14*
**U.S. Cl. 137—68.1** **13 Claims**




1. A combination thermal or pressure activated relief valve comprising:
(a) a body having an inlet adapted to be attached to a pressure source, an internally threaded bore fluidly communicating with said inlet and at least one outlet port formed through said body which connects said threaded bore to an area having a lower pressure value than said pressure source;
(b) an insert having a threaded stem with an enalarged head formed on an end thereof and having a first passage formed therethrough which fluidly communicates with said inlet, said stem being threadably secured to said bore with said enlarged head preventing said insert from completely entering said bore, said stem further having a groove formed in its outer periphery, the bottom of said groove extending below the root of said thread, said groove extending between said inlet and said outlet port to form a second passage through said valve when said insert is secured in said bore;
(c) material means for normally blocking fluid flow through said second passage and being fusible at a selected temperature to permit fluid flow from said pressure source to said lower pressure area;
(d) a cap secured to said insert having at least two ports formed therethrough which intersect said first passage to provide fluid communication between said pressure source and said lower pressure area; and
(e) means for normally blocking fluid flow through said first passage, said means being rupturable in response to a selected pressure arising at said pressure source to permit fluid flow through said first passage to said lower pressure area.

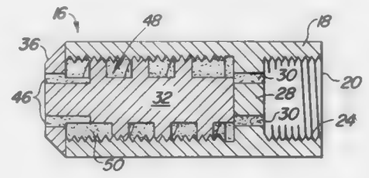
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**4,744,383**

## THERMALLY ACTIVATED VALVE

**James E. Visnic, and Kevin M. Johnston, both of West Lafayette, Ind., assignors to Aluminum Company of America, Pittsburgh, Pa.**

**Filed Apr. 29, 1987, Ser. No. 43,830**
**Int. Cl.[4] F16K** *17/14*
**U.S. Cl. 137—72** **9 Claims**




1. A thermally activated valve comprising:
(a) a body having an inlet and an internally threaded outlet in fluid communication with each other, said inlet adapted to be attached to a pressure source and said outlet communicating with an area having a lower pressure value than said pressure source;
(b) an insert having a threaded stem with an enlarged head formed on an end thereof, said head having at least one aperture formed therethrough, said stem being threadably secured to said outlet with said enlarged head preventing said insert from completely entering said body, said stem further having a groove formed in its outer periphery which extends from said aperture formed in said head to an opposite end of said insert, the bottom of said groove extending below the root of said thread, said groove cooperating with an internal surface of said body and with said aperture to form a passageway through said valve; and
(c) material means for normally blocking fluid flow through said passageway and being fusible at a selected temperature to permit fluid flow from said pressure source to said area having a lower pressure value.

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**4,744,384**

## AUTOMATIC GAS DISTRIBUTING DEVICE CONTROLLED BY A DIRECT APPLICATION OF HIGH GAS PRESSURE OF A SOURCE FOR SUPPLYING A PIPE WITH GAS FROM AN ALTERNATIVE GAS SOURCE

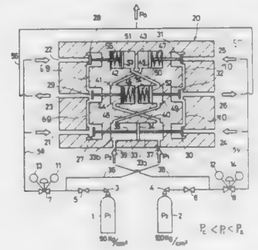
**Masaki Nakamura, Yokohama; Nobuo Fujie, and Hiroyuki Okamoto, both of Kawasaki, all of Japan, assignors to Fujitsu Limited, Kanagawa, Japan**

**Filed Jul. 17, 1987, Ser. No. 74,607**
**Claims priority, application Japan, Jul. 18, 1986, 61-170386**
**Int. Cl.[4] F17C** *13/04*
**U.S. Cl. 137—110** **12 Claims**

1. An automatic gas distributing device installed in a gas supply system for supplying a utilization pipe with gas at a low predetermined secondary pressure, the gas coming from either



of first and second high pressure vessels initially containing said gas under a high primary pressure which is regulated into said secondary pressure,
said automatic gas distributing device comprising:
two flow paths corresponding to said first and second high pressure vessels, each flow path containing a plurality of stop valves actuatable by said primary pressure of the gas contained in said first and second high pressure vessels, each flow path receiving said gas under said secondary pressure from the corresponding high pressure vessel, and each flow path issuing said gas under the secondary pressure into said utilization pipe; and
two actuating means corresponding to said first and second high pressure vessels, for selectively applying the primary




pressures of the gas contained in the corresponding high pressure vessels to said stop valves contained in said flow paths to actuate said stop valves;
said stop valves contained in each of said flow paths including
a first stop valve actuated by the primary pressure of the gas contained in the corresponding high pressure vessel,
a second stop valve being disposed in series with said first stop valve, and being actuated by the primary pressure of the gas contained in another high pressure vessel; and
a third valve disposed in a flow pass which by-passes said second stop valve, and being actuated by the difference between the pressures of the gas contained in both high pressure vessels.

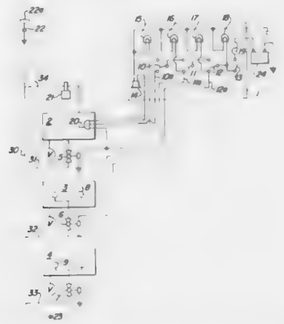
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**4,744,385**

## WATER SUPPLY AND WASTE REMOVAL SYSTEM FOR A VEHICLE

**William H. Houghton, 317 Moffat, Sp. #5, P.O. Box 630, Manteca, Calif. 95336**

**Filed Aug. 27, 1987, Ser. No. 90,182**
**Int. Cl.[4] E03C** *1/00*
**U.S. Cl. 137—255** **6 Claims**



1. A water supply and waste removal system for a vehicle having a fresh water tank, a grey tank and a waste tank, comprising:
a water supply line connectable to a water source external to the vehicle;
a fill water line communicating the supply line with the water tank and including a normally closed electric valve;
a grey water line connected to the supply line downstream of the fill water line and communicating with the grey tank and including a normally closed electric valve;
a waste water line connected to the supply line downstream of the grey water line and communicating with the waste tank and including a normally closed electric valve, electrical control means for operating the valves including a power on/off switch, a fill line switch wired to the fill line valve, a grey line switch wired to the grey line switch, and a waste line switch wired to the waste line valve, said switches being electrically arranged so that, with the power on/off switch in "on" mode, only one of the water line, grey line and waste line switches may be switched to "on" mode at any one time.

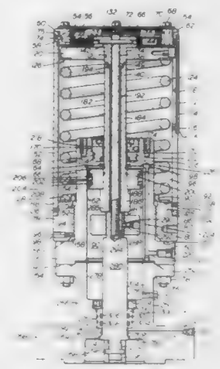
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**4,744,386**

## MODULAR HYDRAULIC ACTUATOR

**Neil F. Frazer, Stroud, United Kingdom, assignor to Cameron Iron Works USA, Inc., Houston, Tex.**

**Filed Aug. 11, 1987, Ser. No. 84,651**
**Int. Cl.[4] F16K** *43/00, 31/122, 37/00*
**U.S. Cl. 137—315** **23 Claims**



1. An actuator for a gate valve, the gate valve having a body with a flow passage therethrough and a cavity in the body, there being a gate disposed in the body cavity and reciprocable across the flow passage for alternately permitting and preventing the flow of fluids through the flow passage, comprising:
a bonnet having means disposed thereon for removably mountind the bonnet on the valve body, and lower stem means reciprocatingly disposed in the bonnet and having a lower portion adapted for extending into the valve body cavity and connecting to the gate and an upper portion extending out of the bonnet;
a hydraulic cylinder having a body and means disposed on said cylinder body for removably mounting said hydraulic cylinder on said bonnet, said hydraulic cylinder including upper stem means reciprocatingly disposed in said cylinder body and engaging said lower stem means, and means for supplying pressurized hydraulic fluid to said upper stem means for moving it downwardly in said cylinder, said lower stem means being moved downwardly along with said upper stem means; and
a spring module including a body having means disposed thereon for removably mounting said spring module

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around said hydraulic cylinder, spring means disposed in said spring module body, and removable means connected between said spring means and said lower stem means for compressing said spring means when said lower stem means is moved downwardly and for lifting said lower stem means upwardly when said pressurized hydraulic fluid is removed from said upper stem means and said spring means is allowed to expand said spring module body having upper and lower retaining means disposed at its upper and lower ends, respectively, for retaining said spring means in said spring module body and for enabling removal of said spring module body and said spring means as a unit from said hydraulic cylinder when said removable means connected between said spring means and said lower stem means has been removed, whether said gate valve is open or closed and leaving said hydraulic cylinder in tact on said bonnet.

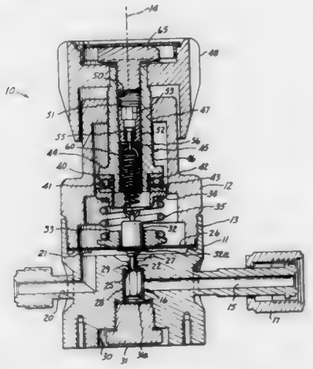
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**4,744,387**

## FLUID PRESSURE REGULATOR

John H. Otteman, 4005 Hecker Pass Hwy., Gilroy, Calif. 95020

Filed Jun. 25, 1987, Ser. No. 66,898
Int. Cl.[4] F16K *31/12*
U.S. Cl. 137—505.41 4 Claims



1. A fluid pressure regulator having an axis and comprising:
a body having an inlet cavity and a sensing cavity, an inlet port to the inlet cavity and an outlet port to the sensing cavity;
an axial poppet passage interconnecting said cavities;
a poppet seat surrounding said poppet passage in said inlet cavity;
an axial poppet stem passing through said poppet passage with a peripheral clearance;
a poppet head on said stem in said inlet cavity;
a poppet seat on said poppet head facing said seat and adapted to bear against it to close said poppet passage or to move away from it to open said poppet passage;
a flexible diaphragm partially closing said sensing chamber, extending generally normal to said axis, said poppet stem being attached thereto on said axis for axial movement when said diaphragm is flexed;
a range spring;
an axial range spring adjusting screw threadedly mounted in said body for movement toward and away from said diaphragm when said range spring adjusting screw is turned, said range spring being compressed between said diaphragm and said range spring adjusting screw, said range spring adjusting screw having a central passage with an internal thread;
a poppet spring; and
a poppet spring adjusting screw threaded into said central passage, said poppet spring being anchored in tension between said poppet spring adjusting screw and said diaphragm.

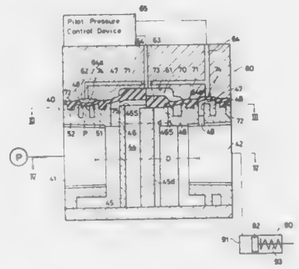
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**4,744,388**

## DIAPHRAGM TYPE OF PILOT OPERATED DIRECTIONAL CONTROL VALVE

Ryozo Ariizumi, Urawa; Masakuni Kainuma; Shoji Suda, both of Ohmiya; Toshikazu Aoki, Kawagoe; Takashi Ejiri; Masao Kojima, both of Tokyo, and Mitsunori Hoshi, Ohmiya, all of Japan, assignors to Fujikura Rubber Ltd., Japan

Filed May 15, 1987, Ser. No. 50,110
Claims priority, application Japan, May 19, 1986, 61-114360; May 28, 1986, 61-80863[U]; Sep. 30, 1986, 61-232933
Int. Cl.[4] F15B *13/042*
U.S. Cl. 137—596.14 16 Claims



1. A diaphragm type of pilot operated directional control valve, comprising a pair of passage block and control block, and a diaphragm which is held between the passage block and the control block, said passage block being provided therein with at least one feeding port which is connected to a pressurized fluid source, at least one loading port, and at least one discharge port, said feeding port, said loading port and said discharge port being connected to respective fluid passages which are formed in the passage block and which open into the end face of the passage block that is located adjacent to the control block, said control block being provided therein with pilot pressure passages which are connected to a pilot pressure control device and which exert a pilot pressure on the face of the diaphragm that is located adjacent to the control block, so that the fluid connection between the feeding port, the loading port, and the discharge port can be controlled by the control of the pilot pressure acting on the diaphragm, wherein said fluid passages connected to the feeding port, loading port and discharge port are located in a concentric arrangement, and wherein said diaphragm has a center valve portion and a circumferential annular valve portion around the center valve portion, said center valve portion and said circumferential annular valve portion being independently subjected to the pilot pressure to selectively establish the fluid connection between the two adjacent concentric fluid passages.

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**4,744,389**

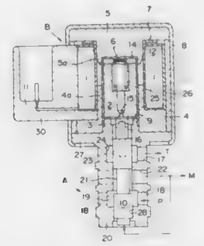
## PRESSURE CONTROL DEVICE

Kouji Ichihashi, Higashimatsuyama, Japan, assignor to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Oct. 14, 1986, Ser. No. 918,210
Claims priority, application Japan, Oct. 15, 1985, 60-227735
Int. Cl.[4] F15B *13/044*
U.S. Cl. 137—625.65 14 Claims

1. A hydraulic pressure controller comprising:
a valve body having a longitudinal bore and defining an inlet port for connection to a hydraulic pump, an outlet port for connection to a hydraulically operated device, a discharge port for connection to a hydraulic fluid reservoir and a cylindrical end portion surrounding a portion of said longitudinal bore and concentric therewith, said ports opening transversely into said longitudinal bore;
a valve spindle axially movable in said longitudinal bore between positions that provide flow passages between said inlet, outlet and discharge ports;
an electromagnet having a solenoid winding, a fixed magnetic core defining an alignment cylinder, and a cylindrical plunger movable within said winding and axially aligned and engageable end-to-end with said valve spindle; and
a cylindrical guide tube having a first open ended inner length portion fitted over said cylindrical end portion, another inner length portion slidably fitted over said plunger, and an outer length portion fitted within said alignment cylinder.





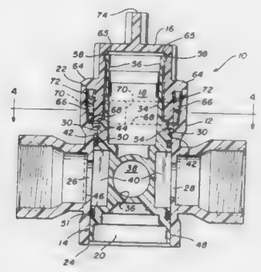
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**4,744,390**

## PLASTIC VALVE

Ralph E. Henry, Rixford, Pa., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Oct. 14, 1987, Ser. No. 108,824
Int. Cl.[4] F16K *13/06, 17/40, 5/00*
U.S. Cl. 137—797 14 Claims



14. A plastic service valve comprising:
a valve body of molded plastic, having an upper chamber and a lower chamber;
said upper chamber having a larger internal diameter than said lower chamber;
said valve body having an open top end and an open bottom end;
said lower chamber having an inlet opening and an outlet opening;
a thrust seat formed in said upper chamber between said open top end and said inlet and outlet openings in said lower chamber;
said thrust seat comprising a circumferential protrusion;
a valve member having an external perimeter and being inserted into said valve body through said open bottom end and positioned against said thrust seat;
means disposed on said valve member and adjacent said thrust seat for locking said valve member to said valve body;
said valve member being molded of plastic material to form a unitary body including a plug portion and an actuator portion;
said plug portion having a flow passage therethrough;
said plug portion being rotatable in said thrust seat between an open position where said flow passage is aligned with said inlet and outlet openings and a closed position where said flow passage is out of alignment with said inlet and outlet openings;
said plug portion having counterbores spaced oppositely of one another and 90 degrees from said flow passage;
a pair of spring loaded sealing inserts positioned in said pair of counterbores, respectively;
said sealing inserts engaging said lower chamber around said inlet and outlet openings to prevent leakage when said valve is in said closed position;
said plug portion including a skirt portion for mating with said valve body open bottom end for sealing said valve body bottom end;
said plug portion having a shoulder for engagement with said thrust seat;
said plug portion having a top end adjacent to said actuator portion and a lower end adjacent to said open bottom end of said valve body;
said plug portion having first and second annular grooves;
said first annular groove being disposed between said shoulder and said flow passage;
said second annular groove being disposed between said flow passage and said lower end of said plug portion;
a seal disposed in said first and second grooves to prevent fluid leakage;
said plug portion having an annular slot for receiving said locking means;
said slot being positioned so as to secure said circumferential protrusion of said thrust seat between said locking means and said shoulder of said plug portion;
said actuator portion extending upwardly from said plug portion through said upper chamber;
said actuator portion having a top end with an external perimeter and a pair of upwardly protruding latch fingers which extend beyond said open top end of said valve body;
said latch fingers having ears overlaying said external perimeter at said farthest extension;
said latch fingers being positioned opposite one another and being connected at said farthest extension by a ring having a circumference less than said external perimeter of said actuator portion;
said ring being spaced apart from said top end of said actuator portion;
said latch fingers being formed in said top end of said actuator portion with slots on both sides of each of said latch fingers;
an operating nut for engaging said actuator portion;
said operating nut having an internal perimeter designed to match said external perimeter of said actuator portion;
said operating nut having an external perimeter to provide for rotation of said valve member;
said operating nut having an external flange protruding from said external perimeter fitting over and covering said upper chamber of said valve body;
said operating nut having slots disposed in said internal perimeter for latching engagement with said latch fingers of said actuator portion;
said operating nut having two pair of oppositely facing lugs located between said external flange;
said upper chamber of said valve body having runs for said lugs including stops designed to allow said operating nut to be turned in one direction until one pair of said lugs contact said stops and in the opposite direction until the other pair of said lugs contact said stops;

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said lugs being breakable to indicate overtorquing of said operating nut; and

a seal disposed between said external flange and said lugs.

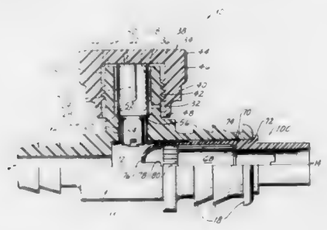
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**4,744,391**

## FLOW CONTROL VALVE

George E. Lardner, Seminole, Fla., assignor to Halkey-Roberts Corporation, St. Petersburg, Fla.

Filed May 23, 1986, Ser. No. 867,238
Int. Cl.[4] F16K *31/50*
U.S. Cl. 137—877 3 Claims



1. A flow control valve, comprising in combination:

(a) a one piece, integral body having an integral bleed fluid passageway and an integral axial fluid passageway, said fluid passageways each having an input and an output, said output of said bleed fluid passageway being connected in fluid communication with said output of said axial fluid passageway, said bleed fluid passageway including a large diameter portion and a small portion joined together at a bleed valve seat means, said bleed valve seat means comprising a forward converging frustro-conical valve seat;

(b) a one piece bleed cap threadably engaging about said input of said bleed fluid passageway;

(c) a one piece bleed valve element reciprocatingly positioned within said bleed fluid passageway, said bleed valve element comprising a large diameter portion formed with an internal hole with external ribs to thereby constitute a flexible sleeve and a small diameter portion and an element valve seat means positioned therebetween for sealing engagement with said bleed valve seat means of said bleed fluid passageway, said bleed valve element being dimensioned to protrude from said input of said bleed fluid passageway to be engaged by an inner surface of said bleed cap such that, upon further movement of said bleed cap about said bleed fluid passageway, said bleed valve element is flexed about its hole end, said element valve seat means of said valve element is forced into sealing engagement with said bleed valve seat means of said bleed fluid passageway, a bleed hole formed through said large diameter portion of said bleed fluid passageway allowing air to bleed therethrough into said axial fluid passageway upon unseating of said valve seat means of said valve element from said bleed valve seat means of said bleed fluid passageway; and

(d) a check valve positioned within said input of said axial fluid passageway and oriented to prevent fluid flow from said output of said axial fluid passageway to said input of said axial fluid passageway, said check valve comprising

(i) a valve housing and

(ii) a valve element reciprocatingly positioned within said valve housing, said valve element and said valve housing having mating forwardly converging frustro-conical seats which form a fluid tight seal therebetween when fluid back pressure is exerted on said valve element of said check valve, said valve housing being dimensioned to be sealingly inserted within said input of said axial fluid passageway allowing said check valve to be removed from said input of said axial fluid passageway.

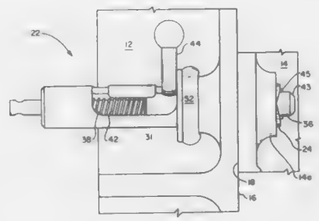
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**4,744,392**

## NOZZLE DAM SEGMENT BOLT AND KEEPER

Lee A. Tade, III, Hixson, Tenn.; Eric M. Weisel, Windsor Locks, Conn., and Richard L. Church, Port St. Lucie, Fla., assignors to Combustion Engineering, Inc., Windsor, Conn.

Filed Feb. 27, 1987, Ser. No. 19,725
Int. Cl.[4] F16L *55/10*
U.S. Cl. 138—89 8 Claims



1. In a nuclear steam generator isolation dam segment assembly, a bolt assembly and a keeper member combination for securing a plurality of assembled dam segments,

said bolt assembly including an elongated bolt body having an outer dam segment engaging surface portion, an axial bore in said bolt body, a first and large diameter bore portion at one end of said bore, a second and reduced diameter bore portion at the opposite end of said bolt body bore, an elongated bolt pin slidably mounted in said bore and including a first and large diameter pin portion in slidable engagement with said first and large diameter bore portion and a second and reduced diameter portion at the opposite end of said pin in slidable engagement with said second and reduced diameter bore portion first means for biasing said bolt pin and said first and large diameter pin portion axially toward a position of projection from the end of said first bolt body bore portion, and, means for rotating and securing said bolt pin and said first and large diameter pin portion in both a position of retraction within said first and large diameter bolt bore portion against said means biasing said pin and in a position of protection from said first bolt body bore portion;

said keeper member including an elongated keeper body having a dam segment engaging surface portion, an axial bore in said keeper body for receiving said bolt pin when said keeper member is mounted on one dam segment opposite said bolt assembly on an adjacent dam segment assembled thereto,

said bolt pin having a transverse projection adjacent the end of the large diameter pin portion remote from said small diameter pin portion,

said keeper body axial bore being in open communication with a slot parallel to said bore for receiving said transverse projection as said bolt pin is projected and received in said keeper body axial bore, said keeper body and said bolt pin being proportioned to permit said transverse projection to pass to the end of said slot and be rotated into engagement with the end of said keeper body opposite said bolt pin assembly, and,

second means for biasing acting to urge said rotated bolt pin transverse projection toward said end of said keeper body against the force of the means biasing the large diameter pin portion axially toward a position of projection from the end of said bolt body.



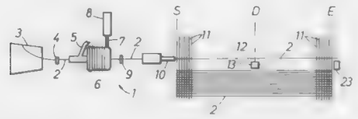
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**4,744,393**

## PICKING OPERATION CONTROL METHOD AND CONTROLLER FOR CARRYING OUT SAME

Yujiro Takegawa, Ishikawa, Japan, assignor to Tsudakoma Corp., Ishikawa, Japan

Filed Nov. 14, 1986, Ser. No. 931,367
Claims priority, application Japan, Nov. 15, 1985, 60-256033
Int. Cl.[4] D03D *49/50*
U.S. Cl. 139—116 7 Claims



1. A method for controlling the picking operation of a picking device which includes a measuring and storing drum around which a weft yarn is wound for temporary storage, a restraining pin movable between an advance position in which it prevent withdrawal of the weft yarn from the measuring and storing drum and a retracted position in which it permits withdrawal of the weft yarn from the measuring and storing drum, and a picking nozzle for picking the weft yarn withdrawn from the measuring and storing drum into a loom shed, comprising the steps of:

(a) detecting an actual crankshaft angle at which a predetermined part of the picked weft yarn passes a predetermined position which is spaced from a final arrival position;

(b) comparing the detected actual crankshaft angle with a reference crankshaft angle; and

(c) changing on the basis of the result of the comparison a point in time at which picking movement of the weft yarn starts by changing at least one of a crankshaft angle at which the restraining pin is moved to its retracted position and a crankshaft angle at which the picking nozzle is actuated.

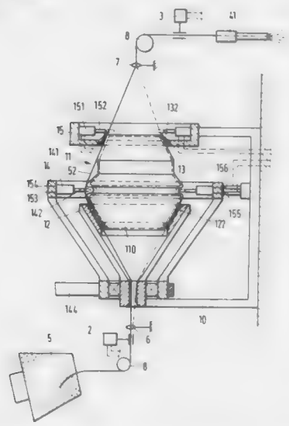
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**4,744,394**

## WEFT YARN STORE FOR LOOMS

Paul Lincke, Kollbrunn, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed May 5, 1987, Ser. No. 46,151
Claims priority, application Switzerland, May 23, 1986, 02103/86
Int. Cl.[4] B65H *47/01*
U.S. Cl. 139—452 15 Claims



1. A loom weft yarn store for receiving yarn from a weft package and making lengths of such yarn available intermittently for picking into the shed of a loom, comprising a stationary drum supported by way of its outer periphery and adapted to receive a yarn supply to be stored, winding means rotatable around the periphery of said drum, said winding means including at least one yarn entraining element movable between a first position in which it is spaced radially away from the periphery of said drum and a second position in which it is disposed close to the periphery of said drum to contact a weft yarn located on said periphery and move the contacted yarn portion about said periphery during rotation of said winding means, and means for selectively moving said yarn entraining element between said first and second positions in accordance with a program.

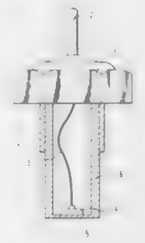
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**4,744,395**

## DEVICE FOR DETECTING THE FILLING LEVEL OF A LIQUID IN A CONTAINER

Klaus Ziegler, Furtwangen, Fed. Rep. of Germany, assignor to VDO Adolf Schindling AG, Frankfurt am Main, Fed. Rep. of Germany

Filed Dec. 10, 1986, Ser. No. 940,002
Claims priority, application Fed. Rep. of Germany, Dec. 10, 1985, 3543529
Int. Cl.[4] B65B *3/04*
U.S. Cl. 141—95 6 Claims



1. In a system for detecting a filling level for a liquid in a container, a device mountable on the container for detecting a level during filling, storage and evacuation of liquid of the container, the device having an electro-mechanical transducer mounted on a diaphragm, by which transducer the diaphragm is placed in oscillation, there being electrical means for initiating oscillations of the diaphragm, the device including a holder of the diaphragm and an intermediate cylindrical member, the diaphragm being secured to the holder by means of the intermediate member; the improvement wherein

the wall thickness of the cylindrical intermediate member is a multiple of the thickness of the diaphragm to prevent loss of vibrational energy from the diaphragm to the holder.

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**4,744,396**

## APPARATUS FOR COMMINUTING TREE STUMPS

Ralph W. Smith, 5101 S. Grand Circle Ter., Homosassa, Fla. 32646

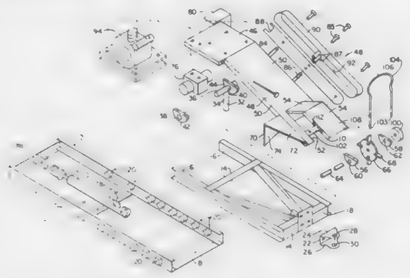
Filed Jun. 19, 1987, Ser. No. 64,235
Int. Cl.[4] A01G *23/06*
U.S. Cl. 144—2 N 10 Claims

1. An apparatus for comminuting tree stumps, the apparatus comprising a vehicle having a substantially flat bed portion, rails disposed on said bed portion, ball bearings mounted on said rails, frame means slidably disposed on said rails and in contact with said ball bearings, slide power means mounted on said apparatus and adapted to move said frame means on said rails, an arm mounted on said frame means and adapted for pivotal movement, a rotatable cutter wheel mounted on said arm, handle means mounted proximate a free end of said arm, cutter power switch means mounted on said apparatus and

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operative to activate cutter power means mounted on said frame to operate drive means connected to said cutter wheel to turn said cutter wheel, and slide power switch means mounted on said arm proximate said handle means and operative to activate said slide power means to move said frame means on



said rails, whereby an operator may from a position proximate said cutter wheel, energize said cutter power means, energize said slide power means to extend said cutter wheel toward said tree stump, and by manipulation of said slide power means and said pivotally mounted arm by way of said handle, selectively engage said cutter wheel with said stump.

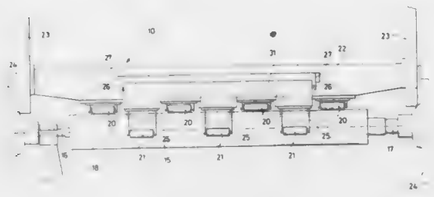
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**4,744,397**

## ROTARY VENEER CUTTING MACHINE FOR THE CONVERSION OF A BLOCK OF WOOD INTO VENEERS, WITH AN IMPROVED TYPE OF DEVICE FOR PREVENTING SAG OF THE BLOCK OF WOOD

**Cremona Lorenzo, Via Ramazzotti, 9, 20052 Monza (Milano), Italy**

**Filed May 1, 1987, Ser. No. 44,661**
**Claims priority, application Italy, May 22, 1986, 20538 A/86**
**Int. Cl.[4] B27L** *5/02*
**U.S. Cl. 144—213** **2 Claims**



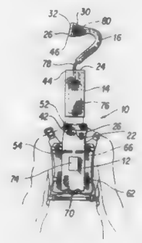
1. A rotary veneer cutting machine for converting a block of wood into veneers, said machine comprising a pair of opposed mandrels adapted to support in a rotatable manner a block of wood, a cutting blade, means for thrusting said block of wood against said cutting blade, and a sag prevention device comprising a first and a second set of pressure rollers adapted to act, respectively, on the upper and lower half of the block of wood, a beam translatable along the plane that contains it and having the first set of rollers mounted along said beam, articulated arms extending from said beam and carrying the said second set of rollers, and guide means and actuators associated with the said beam and articulated arms for keeping the said sets of rollers in contact with the block of wood as its diameter varies.

**4,744,398**

## PROTECTIVE COVER FOR RECEIVER-SPEAKER

**Larry E. Clark, 151 Cedar Pl., Huntington, W. Va. 25702**

**Filed May 27, 1986, Ser. No. 867,041**
**Int. Cl.[4] A45F** *4/00*
**U.S. Cl. 750—52 R** **10 Claims**



1. A protective carrier assembly comprising, a large outer container of generally rectangular configuration and having a substantially closed bottom and closed sides, the top of said outer container provided with an opening, a flap adapted to enclose said opening, attachment means on said outer container for removably mounting said outer container to a user's body, a smaller inner container of generally rectangular configuration and having a closed bottom and closed sides, the top of said inner container provided with an opening, an elongated cover closed along its sides and having an open lower end and an enlarged opposite free end portion adapted to be closed, a radio transceiver within said smaller inner container and having a flexible cable provided with a free end extending from said radio transceiver through said inner container opening, said radio transceiver containing inner container fully insertable within said outer container with said cable projecting from said outer container opening, said cable including a speaker microphone at its free end and insertable within said cover with said speaker-microphone disposed within said cover enlarged free end portion whereby, said transceiver disposed within said smaller inner container and in turn disposped within said large container is protected from the weather while said speaker-microphone is similarly protected and readily displaceable to alternate portions of the user's body for manipulation of said speaker-microphone from outside said cover free end portion.

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**4,744,399**

## CENTRAL TIRE INFLATION SYSTEM

**Rolland A. Magnuson, Seattle, and Robert G. Shires, Kent, both of Wash., assignors to PACCAR Inc., Bellevue, Wash.**

**Filed Jul. 31, 1986, Ser. No. 893,081**
**Int. Cl.[4] B60C** *23/00*
**U.S. Cl. 152—417** **19 Claims**

1. A central tire inflation system for a vehicle of the type having pressurized tires and utilizing one rotary air seal on an air passageway between each tire and a pressure source, comprising:

means for selecting one of a plurality of different control pressures, each less than the source pressure;

a pressure monitoring vessel having means for simulating the inflation and deflation characteristics of the tires;

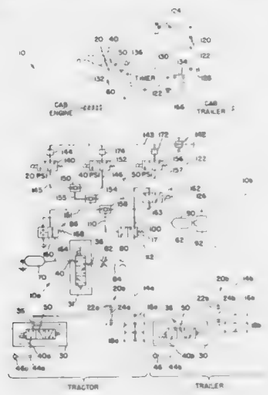
means for comparing pressure in the pressure monitoring vessel to the selected control pressure;

a valve, fluidly connected between each of the tires and the corresponding rotary seal, and the pressure monitoring vessel and the air passageway, respectively having deflation means responsive to the application of pressure less than the instantaneous tire pressure, for quickly depressurizing the tires and pressure monitoring vessel by using the full pressure differential between the instantaneous tire pressure and atmospheric pressure and having inflation means responsive to the application of pressure greater than the instantaneous tire pressure, for pressurizing the tires and pressure monitoring vessel;

means, responsive to the pressure comparison means, for applying the source pressure to the air passageway to activate the valve and quickly pressurize the tires and the pressure monitoring vessel approximately to the selected control pressure and for regulating the source pressure to the selected control pressure and applying the regulated source pressure to the air passageway to activate the valve and depressurize the tires and pressure monitoring vessel approximately to the selected control pressure; and

means responsive to the pressure comparison means, for venting the air passageway to atmospheric pressure after the pressure in the pressure monitoring vessel becomes approximately equal to the selected control pressure.

14. A central tire inflation system for use on a vehicle of the type having pressurized tires and utilizing one rotary air seal on an air passageway between each tire and a pressure source and a valve actuated by applying pressure to the air passageway, comprising:



means for selecting one of a plurality of different control pressures, each less than the source pressure;

a pressure monitoring vessel having means for simulating the inflation and deflation characteristics of the tires;

means for comparing pressure in the pressure monitoring vessel to the selected control pressure;

means responsive to the pressure comparison means for applying the source pressure to the air passageway to quickly pressurize the tires and the pressure monitoring vessel approximately to the selected control pressure and for regulating the source pressure to the selected control pressure and applying the regulated source pressure to the air passageway to depressurize the tires and pressure monitoring vessel approximately to the selected control pressure; and

means responsive to the pressure comparison means, for venting the air passageway to atmospheric pressure after the pressure in the pressure monitoring vessel becomes approximately equal to the selected control pressure.

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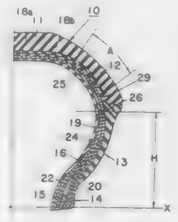
**4,744,400**

## PNEUMATIC RADIAL TIRE FOR MOTORCYCLE

**Masaharu Sekoguchi, Ninomiyamachi, Japan, assignor to Yokohama Rubber Co., Ltd, Tokyo, Japan**

**Continuation of Ser. No. 590,433, Mar. 16, 1984, abandoned. This application Aug. 8, 1986, Ser. No. 893,468**
**Claims priority, application Japan, Mar. 30, 1983, 58-54707**
**Int. Cl.[4] B60C** *9/28*
**U.S. Cl. 152—546** **5 Claims**

1. In a radial tire for a motorcycle having a tread portion that includes a crown and rounded right and left shoulder portions, right and left side walls and bead cores and a carcass layer that wraps around said bead cores and extends from one tire bead to the other tire bead and belt reinforcing layers disposed over said carcass layer and extending from one shoulder portion to the other in the tread of the tire, the improvement comprising right and left cord reinforcing layers disposed axially outside of the main carcass layer, a first end of each cord layer overlapping and being stacked between the carcass layer and the lateral ends of the belt reinforcing layers in the shoulder portion of the tread of the tire for a distance of at least 10 mm, the cord layer extending down the side wall from said first end around the bead core on that side of the tire between the main carcass layer and the bead core and back up said side wall of the tire so that said cord layer overlaps the outside of that portion of said cord layer extending down from the shoulder, said cord layer extending back up the side wall to a point where it overlaps and is stacked between said first end of the cord layer and the ends of the belt reinforcing layers in said shoulder portion.



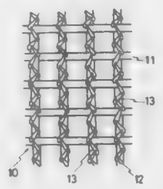
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**4,744,401**

## PNEUMATIC TIRE REINFORCED WITH FABRIC

**Nobuhiro Sowa, Kawachinagano, and Rituo Nakayasu, Kobe, both of Japan, assignors to Sumitomo Rubber Industries, Ltd., Hyogo, Japan**

**Continuation of Ser. No. 659,757, Oct. 11, 1984, abandoned. This application Sep. 22, 1986, Ser. No. 910,789**
**Claims priority, application Japan, Oct. 12, 1983, 58-190550; Oct. 24, 1983, 58-198779; Oct. 28, 1983, 58-203137**
**Int. Cl.[4] B60C** *9/06, 9/11*
**U.S. Cl. 152—559** **3 Claims**



1. A pneumatic tire having bias structure, which comprises a carcass formed by cutting a ply having a knitting fabric is a bias manner, and arranging the bias-cut ply so that warps in the knitting fabric orient to a direction at an angle of 20° to 70° with respect to the equatorial plane of the tire; said knitting fabric being prepared by arranging the warps parallel to each other, setting wefts on the warps to cross the warps at an angle of 60° to 90° without weaving, and wrapping fine knitting yarns from both sides of the fabric at each location where the warps and wefts are superimposed to bind the warps and wefts together.

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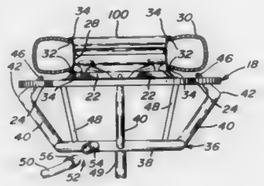


**4,744,402**

## TIRE INFLATING APPARATUS

**Germain St-Hilaire, 3578 Avenue Royale, St. Fereol des Neiges, Que, Canada**

**Filed Jul. 28, 1986, Ser. No. 889,851**
**Int. Cl.[4] B60C *25/00***
**U.S. Cl. 157—1.1** **12 Claims**



1. A tire changing machine comprising:
a supporting structure;
a rotatable table comprising a top surface for supporting a wheel and tire assembly thereon;
an axle means for rotatably supporting said table to said supporting structure;
means for rotating said table;
wheel clamping means mounted on said table and being movable between a wheel clamping position and a wheel release position by a mechanism mounted below said table;
a tire changing tool means mounted to said supporting structure; and
a device for seating tire beads of a tubeless tire onto the rims of a wheel, said device including a conduit structure mounted to said table for rotating therewith, said conduit structure extending along a peripheral portion of said table below the top surface thereof and defining a central space for accommodating said mechanism, said conduit structure including:
(a) an elongated header extending around said axle means and defining an opening through which extends said axle means, said elongated header being adapted to be connected to a source of compressed air; and
(b) a plurality of upwardly extending conduits having each an end connected to said header and an opposite end passing through a respective opening in said table and defining an air discharge nozzle for injecting air toward the interface between a bead of said tire and a corresponding rim portion of a wheel.

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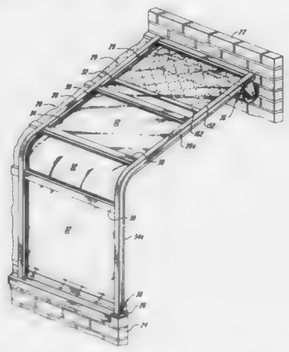
**4,744,403**

## RETROFITTABLE INSULATING SYSTEM FOR SOLAR ROOMS

**Scott Hausmann, Brattleboro; Allan McLane, Jr., Marlboro; Daniel B. Bump, Putney, and Andrew E. Smith, Brattleboro, all of Vt., assignors to Appropriate Technology Corporation, Brattleboro, Vt.**

**Continuation-in-part of Ser. No. 920,563, Oct. 17, 1986, abandoned, which is a continuation of Ser. No. 772,765, Sep. 5, 1985, abandoned. This application Jan. 16, 1987, Ser. No. 4,106**
**Int. Cl.[4] A47H *3/00***
**U.S. Cl. 160—272** **19 Claims**

1. A retrofittable insulation system for solar rooms having a window wall defined by a generally horizontally extending sill, one or more horizontally extending mullions and at least two vertically extending glazing bars which describe the sides of a window bay and separate adjacent bays comprising:
a pair of elongated tracks formed of a plastic material, each of said tracks being adapted to be secured to the inside of a glazing bar on each side of a window bay and extending substantially the full length thereof, each of said tracks having at least one channel open to the side of said track and a base to facilitate securing of said track to a bar;
a take-up roller bracket secured adjacent the top of each bar and carrying a take-up roller, said take-up roller carrying an insulating shade sheet having a lower edge;
a corded edge provided on each side edge of the shade sheet, each of said corded edges extending into a channel in one of said tracks;
a batten secured to said lower edge of said shade sheet;



a pair of cables connected to opposite ends of the batten, said cables each being disposed in one of said channels into which the corded edges extend;
a pair of spring motor mounted on the sill, one motor being adjacent the bottom of each track, each motor being connected to a second end of one of said cables, said motors being biased to retract said shade sheet over the bay; and
means for turning said take-up roller to roll up said shade sheet onto the roller agianst the action of said spring motors.

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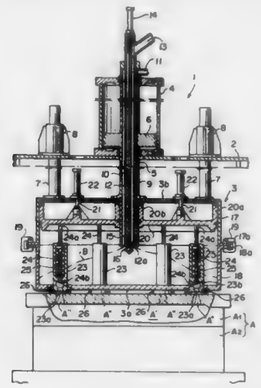
**4,744,404**

## FOUNDRY SAND BLOWING APPARATUS

**Yutaka Sakoda; Akira Tumoto; Shigetoshi Nakano, and Fujio Fujii, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan**

**Filed Jun. 25, 1987, Ser. No. 66,343**
**Claims priority, application Japan, Jun. 25, 1986, 61-150586; Jun. 25, 1986, 61-150587; Jun. 25, 1986, 61-150588; Jun. 25, 1986, 61-150589; Jun. 25, 1986, 61-150590; Jun. 25, 1986, 61-150591; Jun. 25, 1986, 61-97060[U]**
**Int. Cl.[4] B22C *15/24***
**U.S. Cl. 164—180** **15 Claims**

1. A foundry sand blowing apparatus for blowing foundry sand stored in a sand storage tank into a cavity of a mold through a sand discharge port formed in the sand storage tank wherein the improvement comprises an eject pin provided in the sand storage tank to be movable between a retracted position in which it is retracted in the sand storage tank and an ejecting position in which the lower end portion of the eject pin projects outside the sand storage tank through the sand discharge port, and an eject pin driving means for moving the



eject pin between the retracted position and the ejecting position.

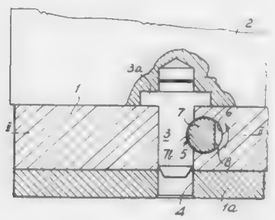
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**4,744,405**

## DEVICE FOR LOCKING CORE BOXES ON SUPPORTING PLATES OF MOLDING SAND CORE-FORMING MACHINES

**Guido Peterle, Via Novara 37, 28021 Borgomanero (Province of Novara), Italy**

**Filed Jun. 29, 1987, Ser. No. 68,489**
**Claims priority, application Italy, Jul. 9, 1986, 21080 A/86**
**Int. Cl.[4] B22C *7/06, 13/12***
**U.S. Cl. 164—228** **6 Claims**



1. In a molding sand core-forming machine, a device for locking core boxes on respective supporting plates comprising a pin rigidly connected to a base portion of the core box and freely insertable in a corresponding first hole extending in the supporting plate, said pin having longitudinal axis and at least one recess extending transversely to said longitudinal axis, said device further comprising a cam element rotatably mounted in a second hole formed in the supporting plate, said cam element having an engagement portion which, in a first angular portion of said cam element, engages with said recess so as to lock said pin to the supporting plate and, in a second angular portion of said cam element, accommodated in said second hole, to disengage said pin, said device further comprising cam operating means, external to the supporting plate.

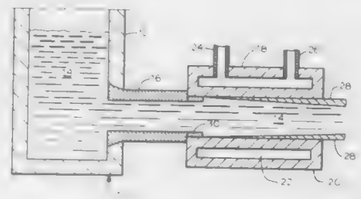


**4,744,406**

## HORIZONTAL CONTINUOUS CASTING APPARATUS WITH BREAK RING FORMED INTEGRAL WITH MOLD

**Libor F. Rostik, Duncanville, Tex., assignor to Chaparral Steel Company, Midlothian, Tex.**

**Filed Oct. 30, 1986, Ser. No. 924,638**
**Int. Cl.[4] B22D *11/04, 11/10***
**U.S. Cl. 164—440** **6 Claims**



1. In an apparatus for the horizontal continuous casting of molten material including a tundish for receiving a quantity of molten material, such as molten metals and alloys, to be cast, a refractory nozzle providing a molten material outlet from said tundish and a flow-through mold of heat-conducting material having an inlet end contacting said nozzle for receiving said molten material therefrom and an outlet end for discharging an embryo casting resulting from cooling of said molten material during passage through said mold, the improvement comprising a break ring formed integral with said mold at the inlet end thereof and without any intermediate bonding material between the break ring and the mold.

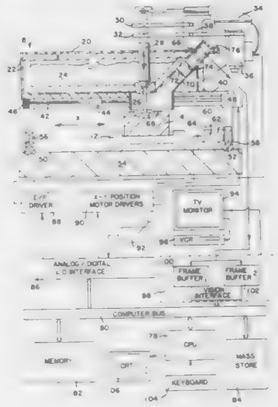
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**4,744,407**

## APPARATUS AND METHOD FOR CONTROLLING THE POUR OF MOLTEN METAL INTO MOLDS

**Oleg Fishman, Dresher, Pa.; William R. Pflug, Mt. Laurel, and Thomas E. Sheie, Willingboro, both of N.J., assignors to Inductotherm Corp., Rancocas, N.J.**

**Continuation-in-part of Ser. No. 920,401, Oct. 20, 1986, abandoned. This application Nov. 10, 1986, Ser. No. 928,769**
**Int. Cl.[4] B22D *46/00***
**U.S. Cl. 164—457** **22 Claims**




1. Apparatus for controlling the pour of molten metal into individual molds, comprising:
(a) at least one mold having a sprue to receive molten metal and having a mold gating system internal to the
(b) reservoir means for holding molten metal to be poured into the mold,
(c) flow control means operatively associated with the reser-

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voir means for controlling the flow of molten metal from the reservoir means into the mold,

(d) sensor means for continuously sensing the image of the surface of the molten metal in the sprue and generating image area information representative of the surface area of the metal relative to the surface of the mold,

(e) sampling means for repetitively sampling the image area information during predetermined sampling intervals for a pour and generating sampled image area information at a preselected sampling rate,

(f) means for repetitively comparing the sampled image area information to a preselected reference area value and generating a difference value representative of the difference between the image area information and the reference area value, and

(g) control means responsive to the difference value for generating a control signal to the flow control means for controlling the flow of molten metal into the sprue to equal the flow of metal into the mold through the mold gating system and to terminate the flow of metal to accommodate metal in transit from the reservoir means to the mold to precisely fill the mold, the control signal comprising a control value for each sampling interval, each control value being a function of the difference value for its associated sampling interval and control bias values for that sampling interval based on preselected pour parameters from at least one previous pour.

**18**. Method of adaptively controlling the pour of molten metal into individual molds, comprising the steps of:

(a) sensing a parameter representative of a pour characteristic and generating information representative of the sensed parameter,

(b) comparing the information to a preselected reference parameter value and generating a difference value representative of the difference between the information and the reference parameter value,

(c) generating pour control values responsive to the difference value,

(d) generating control bias values over the duration of a pour based on parameter information from previous pours, and

(e) adaptively altering the control values by the control bias values for successive pours.

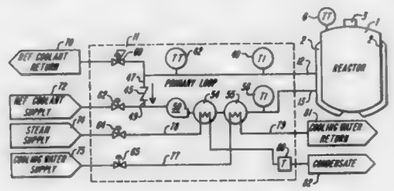
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**4,744,408**

## TEMPERATURE CONTROL METHOD AND APPARATUS

**Wayne K. Pearson, North Attleboro, and Charles E. Cordino, Jr., Plymouth, both of Mass., assignors to Herzog-Hart Corporation, Boston, Mass.**

**Filed Nov. 30, 1984, Ser. No. 676,667**
**Int. Cl.[4] F25B** *13/00*
**U.S. Cl. 165—2** **17 Claims**




1. Temperature control apparatus for controlling the temperature of a manufacturing vessel in a manufacturing plant having a source of refrigerant and a source of cooling water, said temperature control apparatus comprising

means for circulating a heat transfer medium around said vessel in a closed loop,

a heat exchanger connected in said loop,

means for circulating cooling water from said source through said heat exchanger, and

means for adding refrigerant from said source to said loop to circulate with said heat transfer medium in said loop when the heat load generated by said vessel exceeds the cooling capacity of said exchanger.

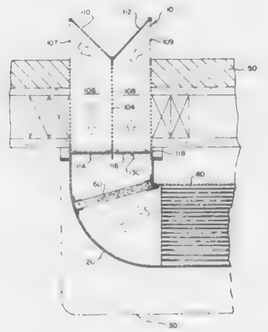
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**4,744,409**

## VALVE ASSEMBLY FOR AIR TREATMENT APPARATUS

**Erling Berner, Loretohohe 5, CH-6300 Zug, Switzerland**

**Continuation of Ser. No. 761,465, Aug. 1, 1985, abandoned. This application Feb. 24, 1987, Ser. No. 18,807**
**Int. Cl.[4] F28D** *17/00*
**U.S. Cl. 165—4** **2 Claims**



1. In an air treatment apparatus having a heat exchanging matrix disposed within a chamber for alternately giving heat up to and receiving heat from a reversing flow of air across said matrix, the improvement comprising:

ducting disposed between said matrix and a source of intake air, said ducting defining two separate flow channels to said source, a first one of said channels being an intake channel and a second one of said channels being an exhaust channel;

valve means disposed in each of said flow channels at the ends thereof proximate to said chamber and being biased to the closed position, the valve means in said intake channel being actuatable to the open position by air flow in said intake channel and the valve means in the exhaust channel being actuatable to the open position by air flow out of the exhaust channel.

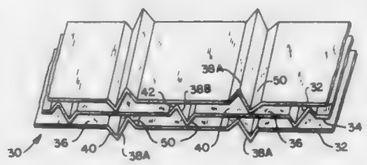
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**4,744,410**

## HEAT TRANSFER ELEMENT ASSEMBLY

**James A. Groves, Wellsville, N.Y., assignor to The Air Preheater Company, Inc., Wellsville, N.Y.**

**Filed Feb. 24, 1987, Ser. No. 17,954**
**Int. Cl.[4] F23D** *19/00*
**U.S. Cl. 165—10** **14 Claims**




1. An assembly of heat transfer element for a heat exchanger comprising a plurality of heat transfer plates stacked in spaced relationship thereby providing a plurality of passageways between adjacent plates for flowing a heat exchange fluid therebetween, each of said plates having spacers formed therein at spaced intervals so as to maintain a predetermined distance between adjacent plates, said spacers comprising bilobed folds having first and second lobes projecting outwardly from the plates, each lobe having an outermost surface for contacting an adjacent plate, and a sloping web portion extending between the outermost surface of the first and second lobes, a first portion of said folds in each of said plates having their first lobe projecting outwardly from said plate in a first direction and their second lobe projecting outwardly from said plate in a second direction opposite to the first direction, and a second portion of said folds in said plate having their first lobe projecting outwardly from said plate in the second direction and their second lobe projecting outwardly from said plate in the first direction, the web portions of said second portion of said folds thereby having a pitch opposite to the pitch of the web portions of said first portion of said folds, said bilobed folds being formed in each plate at equally spaced intervals along the length thereof, each fold disposed at a periodic interval equal to at least three-times the spaced interval comprising a fold from said second portion of said folds and each fold disposed between said spaced second folds comprising a fold from said first portion of said folds, said first portion of said folds, comprising at least one-half of the total number of folds in said plate and said second portion of said folds comprising no more than one-half of the total number of folds in said plate.



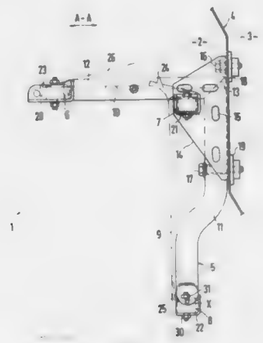
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**4,744,411**

## MOUNTING ARRANGEMENT OF AN INTERCOOLER

**Bernard Lohmann, Loeningen, Fed. Rep. of Germany, assignor to Dr. Ing. h.c.F. Porsche Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Sep. 9, 1986, Ser. No. 905,151**
**Claims priority, application Fed. Rep. of Germany, Sep. 7, 1985, 3531930**
**Int. Cl.[4] F24H** *9/06*
**U.S. Cl. 165—41** **20 Claims**




1. A support arrangement for the suspension of a cooler by means of elastic fastening elements, particularly of a charge air cooler in a motor vehicle driven by an internal combustion engine, particularly a passenger car, the internal combustion engine being surrounded by lateral wall means, said arrangement comprising:

only one pair of support parts arranged at a right angle to one another and extending along two adjacent cooler walls, and

fastening element means for threadably attaching one of the support parts to the lateral wall means surrounding the engine.

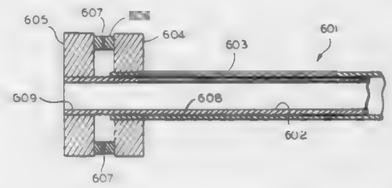
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**4,744,412**

## DOUBLE-WALL TUBE HEAT EXCHANGER

**Sung C. Kim, Des Plaines; Marvin P. Schwartz, Arlington Heights, and Howard Y. Yoon, Des Plaines, all of Ill., assignors to ITT Corporation, New York, N.Y.**

**Filed Oct. 1, 1986, Ser. No. 914,105**
**Int. Cl.[4] F28F** *9/16*
**U.S. Cl. 165—70** **4 Claims**




1. A heat exchanger comprising in combination:

at least one heat transfer tube, said heat transfer tube comprising an inner tube and an outer tube;

said inner tube having a knurled exterior surface, said knurled exterior surface being in contact with the interior surface of said external tube throughout the length of said outer tube and extending beyond said outer tube at each end, said knurled surface providing a plurality of interconnected leak paths, said outer tube having a relatively smooth external surface;

an outer tube sheet having an aperture receiving an end portion of said outer tube;

said outer tube being roller expanded into contact with said outer tube sheet;

an inner tube sheet spaced from said outer tube sheet;

said inner tube have first and second end portions with a smooth external surface beyond said extended knurled surface;

a spacer being positioned between said inner and outer tube sheets and around said extended knurled surface adjacent said first end portion, and said spacer having at least one vent hole; and

said first inner tube smooth external end portion extending into an aperture of said inner tube sheet and being roller expanded into attachment to said inner tube sheet.

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**4,744,413**

## APPARATUS FOR CARRYING OUT PHYSICAL AND/OR CHEMICAL PROCESSES, IN PARTICULAR A HEAT EXCHANGER

**Dick G. Klaren, and Zacharias L. Nunninga, both of Hillegom, Netherlands, assignors to Eskla B.V., Halfweg, Netherlands**

**Filed Sep. 28, 1987, Ser. No. 101,437**
**Claims priority, application Netherlands, Sep. 30, 1986, 8602463**
**Int. Cl.[4] F28C** *3/16;* **F28D** *19/02*
**U.S. Cl. 165—104.16** **5 Claims**

1. Apparatus for carrying out physical and/or chemical processes, comprising

(a) a lower chamber,

(b) an upper chamber,

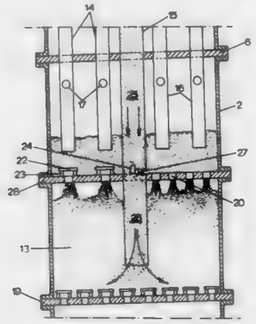
(c) a plurality of vertical riser tubes connecting the lower chamber to the upper chamber for the passage in use of a first fluid medium from the lower chamber to the upper chamber, said riser tubes having inlets in the lower chamber and outlets in the upper chamber,

(d) an intermediate chamber which is between the lower chamber and the upper chamber and through which the riser tubes extend so that in use a second fluid medium in the intermediate chamber can contact the riser tubes,

(e) a granular mass which in use is present in the lower chamber, the upper chamber and the riser tubes and is

fluidized in at least the riser tubes by the flow of the first medium,

(f) for return passage of the granular mass from the upper chamber to the lower chamber, at least one vertical gravity tube which connects the upper chamber to the lower chamber and has an outlet at a lower level in the lower chamber than the inlets of the riser tubes, and



(g) a distribution plate for the first medium having a plurality of openings for passage of the first medium and the granular mass mounted in the lower chamber at a level between the inlets of the riser tubes and the outlet of the gravity tube

and wherein the said gravity tube has, for passage of the granular mass, at least one opening connecting to the lower chamber above the distribution plate.

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**4,744,414**

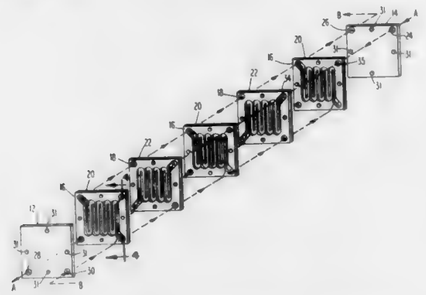
**PLASTIC FILM PLATE-TYPE HEAT EXCHANGER**

**Steven G. Schon, Philadelphia, Pa., assignor to Arco Chemical Company, Newtown Square, Pa.**

**Filed Sep. 2, 1986, Ser. No. 902,990**

**Int. Cl.[4] F28F** *3/08*

**U.S. Cl. 165—167** **15 Claims**



1. A plate-type heat exchanger pack, effective for heat exchange at absolute pressures of 200–300 psig maximum and small differential pressures between fluids to be heat exchanged, comprising, in successive, stacked arrangement, a first end plate, a plurality of first plastic separator plates, a plurality of plastic separator films each having a thickness of about 1 to 20 mils, a plurality of second plastic separator plates and a second end plate, and further including means for locking the plates and films in said pack;

the first separator plate having a slot in the plane thereof bounded on an open side to the film to define a continuous flowpath for a first fluid, the second separator plate having a slot in the plane thereof bounded on an open side to the film to define a continuous flowpath for a second fluid, said first and second separator plates being positioned in a mirror image relationship to each other, said slots being positioned for slot to slot heat transfer through said film;

said first and second plastic separator plates having a thickness of at least 10 mils but not greater than a thickness which will increase the cross-flow section in said slots to thereby decrease the film heat transfer coefficient by decreasing the fluid velocity in said slots, said first and second separator plates arranged alternately in said pack with a separator film disposed between each pair of separator plates;

the pack having a first channel extending transversely through the separator plates and film and communicating with the slot in the first separator plate for passage of the first fluid, and futher including a second channel extending transfersely through the separator plates and film and communicating with the slot in the second separator plate for passage of the second fluid.

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**4,744,415**

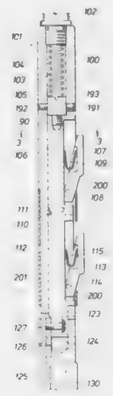
**KICKOVER TOOL FOR PLACING AND REMOVING WELL FLOW CONTROL DEVICES**

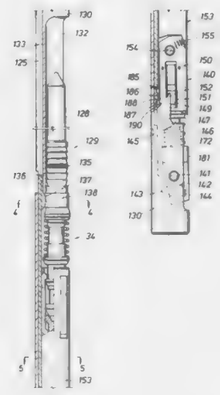
**Douglass W. Crawford; William B. Crawford, both of P.O. Box 51, Atwood Akers, Crowley, La. 70526, and Mark S. Crawford, 501 Kaiser Dr., LaFayette, La. 70508**

**Filed Apr. 24, 1987, Ser. No. 42,361**

**Int. Cl.[4] E21B** *23/03*

**U.S. Cl. 166—117.5** **17 Claims**





1. A kickover tool apparatus for use in placing and removing flow control devices in and from a side pocket mandrel, comprising: orienting means; tray means connected to the lower end of said orienting means and having inwardly biased kickover means pivotally mounted thereon; said kickover means including normally retracted, laterally shiftable guide means for causing outward pivotal movement of said kickover means when said guide means is shifted outward; said orienting means including upper and lower dog means and means for mounting said dog means in a predetermined angular relationship to one another; and control means coupled to said dog means and responsive to a change in said angular relationship for caming said kickover means outwardly to permit lateral shifting of said normally retracted guide means.



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**4,744,416**

**DIRECTIONAL ACOUSTIC LOGGER APPARATUS AND METHOD**

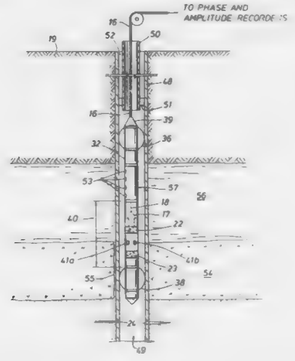
**Frank M. Bower, Edmond, Okla., assignor to Exxon Production Research Company, Houston, Tex.**

**Division of Ser. No. 677,776, Dec. 3, 1984, Pat. No. 4,703,459.**

**This application Jul. 31, 1987, Ser. No. 80,132**

**Int. Cl.[4] E21B** *33/13, 43/19, 47/10*

**U.S. Cl. 166—253** **4 Claims**




1. A method of stopping channeling of reservoir fluids from a hydrocarbon producing formation to a non-hydrocarbon producing formation behind casing of a well penetrating said formation comprising:

(a) lowering on an electric wire line to a desired depth into said well a logging assembly having:

a directional noise logging apparatus comprising two cylindrical piezoelectric crystal transducers, electrically processed so as to buck each other, supported on arms which may be moved outward by rotatable cams connected to a moveable rack attached to said logging assembly so that, before entering said well, said transducers may be positioned together so as to move easily through any production tubing that may be in the well, and at said desired depth, said transducers may be moved to a position such that they are about six and one-half centimeters apart, side by side, with their cylindrical axes substantially parallel to each other and to said well,

a perforating gun with zero phase shots connected to said logging apparatus such that said perforating gun is aligned with one of the transducers of the apparatus, and

a downhole rotator for rotating said logging apparatus and perforating gun;

(b) generating an output from said transducers;

(c) rotating said logging apparatus through 360 degrees at said desired depth;

(d) determining orientation of the transducers when their amplitude and phase difference signals are at their minimum;

(e) rotating the transducers 90° in the direction that the transducer aligned with the perforating gun produces a phase signal leading that produced by the other transducer and thereby orienting the perforation shots toward the noise source which is caused by the channeling of reservoir fluids behind well casing;

(f) perforating said casing at said noise source with said perforating gun; and

(g) injecting into said non-producing formation through said perforation a material or fluid to block said channeling of reservoir fluids from said hydrocarbon producing formation.

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**4,744,417**

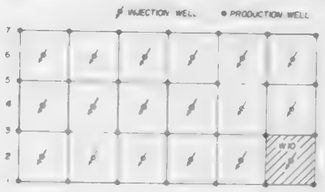
**METHOD FOR EFFECTIVELY HANDLING $CO_2$-HYDROCARBON GAS MIXTURE IN A MISCIBLE $CO_2$ FLOOD FOR OIL RECOVERY**

**Bassem R. Alameddine, Carrollton, Tex., assignor to Mobil Oil Corporation, New York, N.Y.**

**Filed May 21, 1987, Ser. No. 52,301**

**Int. Cl.[4] E21B** *43/30, 43/40, 47/00*

**U.S. Cl. 166—245** **6 Claims**




1. In a method for the recovery of viscous oil from a subterranean viscous, oil-containing formation penetrated by a plurality of injection wells and a plurality of spaced-apart production wells forming a well pattern comprising:

(a) injecting carbon dioxide into the formation via said plurality of injection wells at the miscible displacement pressure to miscibily displace oil through the formation to said plurality of production wells and recovering fluids including oil and gas containing hydrocarbons from the formation via said plurality of production wells;

(b) separating said gas containing hydrocarbons from said oil and analyzing said gas to determine the concentration of carbon dioxide;

(c) recovering said produced gas containing the maximum $CO_2$ content tolerable in a fuel gas;

(d) continuing steps (a), (b) and (c) until the produced gas contains from more than the maximum $CO_2$ content tolerable in a fuel gas up to about 70 volume percent $CO_2$ and reinjecting said gas into a small portion of the well pattern volume via a predetermined number of injection wells;

(e) continuing steps (a), (b), (c) and (d) until the produced gas contains more than 70 volume percent $CO_2$ and reinjecting said gas into a larger portion of the well pattern volume via a predetermined number of injection wells; and

(f) continuing steps (a), (b), (c), (d) and (e) until the amount of oil recovered from the formation is unfavorable.

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## DELAYED POLYACRYLAMIDE GELATION PROCESS FOR OIL RECOVERY APPLICATIONS

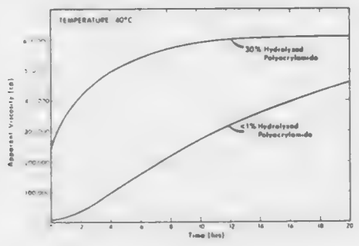
Robert D. Sydansk, Littleton, Colo., assignor to Marathon Oil Company, Findlay, Ohio

Continuation-in-part of Ser. No. 822,709, Jan. 27, 1986, Pat. No. 4,683,949, which is a continuation-in-part of Ser. No. 807,416, Dec. 10, 1985, abandoned. This application Dec. 9, 1986, Ser. No. 939,660

The portion of the term of this patent subsequent to Aug. 4, 2004, has been disclaimed.

Int. Cl.[4] E21B *33/138, 43/26*

U.S. Cl. 166—270 30 Claims




1. A process for delaying the gelation rate of a gelation solution to form a continuous crosslinked polymer gel utilized for a hydrocarbon recovery application in a treatment region of a hydrocarbon-bearing formation below an earthen surface penetrated by a wellbore in communication with said region, the process comprising the steps of:

(a) predetermining a delayed gelation rate required of said continuous crosslinked polymer gel to perform said hydrocarbon recovery application;

(b) preparing a chromic carboxylate complex in a solution consisting essentially of a solvent, at least one chromic species, and at least one acetate species, said complex capable of crosslinking a polyacrylamide;

(c) preselecting said polyacrylamide wherein the degree of hydrolysis of amide groups to carboxylate groups in said polyacrylamide is less than about 5.0% such that said preselected polyacrylamide gels at said predetermined delayed gelation rate when admixed with said complex in solution;

(d) preparing said gelation solution at said earthen surface by admixing said preselected polyacrylamide and said complex in solution;

(e) injecting said gelation solution into said treatment region via said wellbore; and

(f) forming said continuous crosslinked polymer gel in situ from said gelation solution at said predetermined delayed gelation rate required to perform said hydrocarbon recovery application.

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4,744,419

## CONFORMANCE IMPROVEMENT IN A SUBTERRANEAN HYDROCARBON-BEARING FORMATION USING A CROSSLINKED POLYMER

Robert D. Sydansk, Littleton, and Perry A. Argabright, Larkspur, both of Colo., assignors to Marathon Oil Company, Findlay, Ohio

Continuation-in-part of Ser. No. 822,709, Jan. 27, 1986, Pat. No. 4,683,949, which is a continuation-in-part of Ser. No. 807,416, Dec. 10, 1985, abandoned. This application Dec. 9, 1986, Ser. No. 939,666

The portion of the term of this patent subsequent to Aug. 4, 2004, has been disclaimed.

Int. Cl.[4] E21B *33/138*

U.S. Cl. 166—270 32 Claims

1. A process for substantially plugging at least one relatively high permeability region bounded by at least one relatively low permeability region in a hydrocarbon-bearing formation below an earthen surface, said formation penetrated by a wellbore in fluid communication with said at least one relatively high permeability region, the process consisting essentially of the steps of:

(a) preparing a gelation solution at the surface consisting essentially of a water-soluble carboxylate-containing polymer, a complex capable of crosslinking said polymer and formed of at least one electropositive chromium III species and at least one electronegative carboxylate species, and a solvent for said polymer and said complex;

(b) injecting said gelation solution into said wellbore;

(c) displacing said gelation solution into said at least one relatively high permeability region; and

(d) crosslinking said gelation solution substantially to completion in said at least one relatively high permeability region to form a crosslinked gel which substantially plugs said at least one relatively high permeability region.

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4,744,420

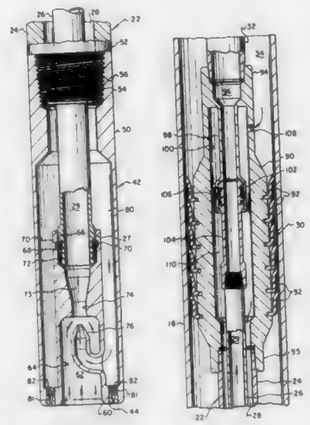
## WELLBORE CLEANOUT APPARATUS AND METHOD

John C. Patterson, Plano, and David D. Hearn, Richardson, both of Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Jul. 22, 1987, Ser. No. 76,565

Int. Cl.[4] E21B *37/00*

U.S. Cl. 166—312 17 Claims



1. Apparatus for evacuating solids such as sediment, sand and the like from a subterranean wellbore, said apparatus comprising:

an elongated tubing string extendable into said wellbore, said tubing string including a first tubing member forming a flow path for conducting solids evacuation fluid to said wellbore and a second tubing member for conducting solids laden evacuation fluid from said wellbore; and

pump means operably connected to said first and second tubing members to receive evacuation fluid from one of said tubing members and to conduct solids laden evacuation fluid to the other of said tubing members, said pump means including means for jetting a portion of said evacuation fluid into said wellbore to entrain solids in said evacuation fluid, said pump means being operated by a further portion of said evacuation fluid to discharge solids laden evacuation fluid into said other tubing member for removal of solids from said wellbore.

13. A method for removing accumulations of solids such as sediment, sand and proppant materials from a wellbore, said method comprising in the steps of:



providing jet pump means including means for connecting said pump means to a first conduit for receiving evacuation fluid in said pump means and a second conduit for discharging solids laden evacuation fluid from said pump means, said pump means including means for circulating evacuation fluid into said wellbore to accumulate solids for evacuation from said wellbore through said pump means;

providing a tubing string including a first elongated tubing member adapted to be connected at one end to said pump means;

extending said pump means into said wellbore connected to one end of said tubing string;

inserting a second tubing member within said first tubing member and connecting one end of said second tubing member to said pump means;

connecting said first and second tubing members to means for conducting evacuation fluid to and from said pump means through said tubing string; and

circulating said evacuation fluid into and out of a selected area of said wellbore through said first tubing member, said pump means and said second tubing member to remove accumulations of solids from said selected area of said wellbore.

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4,744,421

## INFLATABLE PACKER SYSTEMS

Edward T. Wood, Kingwood; William T. Bell, Huntsville, and Bob V. Barker, Houston, all of Tex., assignors to Completion Tool Company, Houston, Tex.

Filed Apr. 1, 1983, Ser. No. 481,581

Int. Cl.[4] E21B *33/127*

U.S. Cl. 166—387 12 Claims



1. A method of preparing an inflatable packer for insertion into a fluid filled well bore, said inflatable packer including a tubular mandrel, a pair of spaced apart collars connected to the mandrel, each of said collars having connected thereto an annular head, said heads being radially spaced apart from said mandrel to define respective chambers, one of said collars including a passageway for conducting inflating fluid from inside said one collar into one of said chambers, and an inflatable sleeve connected to and extending between said heads about said mandrel, which comprises the steps of:

exhausting substantially all of the fluid from each of said chamber and said passageway in said one collar to form substantial vacuums therein;

and filling said exhausted chambers and passageway with a substantially incompressible fluid.

11. The method as set forth in claim 9 wherein prior to the steps (a) and (b) the packer is inserted into a testing pipe and the packer element is inflated in the testing pipe by a testing gas to a pressure and for a time period sufficient ot determine whether there is any leakage of gas from the inflated packing element, and thereafter deflating the packer element by reducing the testing gas to atmospheric pressure.

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4,744,422

## HORSE HOOF SHOE WHICH IS MOUNTABLE WITH [illegible]

Helmuth Dallmer, Alte Landstrasse 3, 2125 Salzhausen-Putensen, Fed. Rep. of Germany

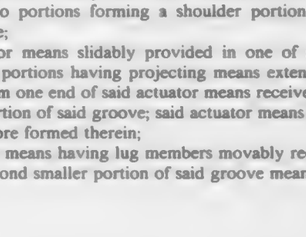
PCT No. PCT/EP85/00674, § 371 Date Aug. 27, 1986, § 102(e) Date Aug. 27, 1986, PCT Pub. No. WO86/03936, PCT Pub. Date Jul. 17, 1986

PCT Filed Dec. 5, 1985, Ser. No. 910,212

Claims priority, application Fed. Rep. of Germany, Dec. 29, 1984, 8438230[U]

Int. Cl.[4] A01L *3/00*

U.S. Cl. 168—18 10 Claims



1. A horse hoof shoe, comprising a front part having a horse shoe like bottom portion and a wall portion upwardly extending from said bottom portion; a rear part formed as a cap and having a rear portion and at least one strip portion extending forwardly from said rear portion and engaging said wall portion; two upper loops and two lower loops provided on said rear portion of said rear part; two belts extending through said upper loops and said lower loops in a crosswise manner and also partially extending over said front part and each having one end arrested on said wall portion of said front part and another end located above said one end; and a tensioning device arranged at a front side and at a center of said wall portion of said front part and connected with said other ends of said belts, said tensioning device being selflocking and having a rotary button formed so that by rotation of said rotary button said belts are pulled forwardly or pushed rearwardly in a stepless manner without use of an additional tool.

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4,744,423

## PIEZOELECTRIC HIGH VOLTAGE IMPACT MECHANISM

Yen Chia-Hsi, Taichung, Taiwan, assignor to Tri Square Industrial Co., Ltd., Taichung, Taiwan

Filed Mar. 26, 1986, Ser. No. 844,382

Int. Cl.[4] B25D *9/00*

U.S. Cl. 173—90 11 Claims

1. An improved piezoelectric high voltage impact mechanism comprising:

a housing means having an axial inner groove means with two portions a first portion and a smaller second portion; said two portions forming a shoulder portion at their juncture;

an actuator means slidably provided in one of said two groove portions having projecting means extending axially from one end of said actuator means received in said first portion of said groove; said actuator means having a blind bore formed therein;

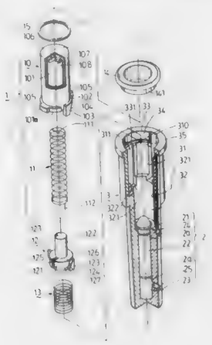
a hammer means having lug members movably received in said second smaller portion of said groove means;

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piezoelectric element means received in said housing, said piezoelectric element means responsive to mechanical actuation thereof to produce a spark;

an actuating spring means received within said blind bore and operably connected to said hammer means; wherein said actuating spring means is torsionally and axially received in said blind bore and connected with said hammer means to result in the engagement of said lug members of



said hammer means with said shoulder portion by the biasing action of the torsioned actuating spring means, and wherein said actuating spring means exerts force directly on said hammer means causing it to strike said piezoelectric element means in a straight-line direction when said lug members are pushed by said projecting means of said actuator means upon the inward movement of said actuator means in said housing means.

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**4,744,424**

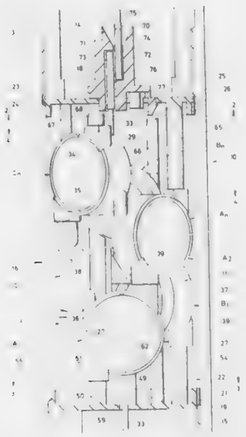
**SHAPED CHARGE PERFORATING APPARATUS**

**Gary M. Lendermon, Missouri City, and Jack F. Lands, Jr., West Columbia, both of Tex., assignors to Schlumberger Well Services, Houston, Tex.**

**Filed Aug. 21, 1986, Ser. No. 898,962**

**Int. Cl.[4] E21B *43/117***

**U.S. Cl. 175—4.51** **21 Claims**



1. Perforating apparatus comprising: at least one group of three substantially-identical charge cases with each of said charge cases respectively defining a forwardly-opening cavity around a central axis adapted to receive a shaped explosive charge that is cooperatively arranged to produce a perforating jet along said central axis;

upper and lower support members aligned with one another along an upright longitudinal axis and respectively positioned above and below said charges cases;

lower support means defining downwardly-facing abutment surfaces on opposite sides of each of said charge cases and in transverse planes lying below their respective central axes and upwardly-facing abutment surfaces at circumferentially-spaced locations on said lower support member cooperatively arranged for supporting each of said charge cases at successively higher positions above said lower support member;

upper support means defining upwardly-facing abutment surfaces on opposite sides of each of said charge cases and in transverse planes lying above their respective central axes and downwardly-facing abutment surfaces at circumferentially-spaced locations on said upper support member cooperatively arranged for supporting each of said charge cases in their successively higher positions above said upper support member; and

alignment means cooperatively arranged on said upper and lower support means for retaining each of said charge cases facing outwardly from said longitudinal axis with said central axes respectively directed in a different radial direction.

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**4,744,425**

**APPARATUS FOR EXCAVATING A SUBSTANTIALLY VERTICAL SLOT**

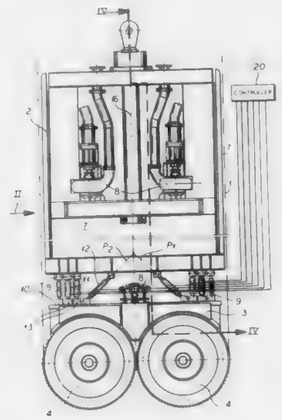
**Volker Hentschel, Dorsten, Fed. Rep. of Germany, assignor to Hochtief Aktiengesellschaft Vorm. Gebr. Helfmann, Essen, Fed. Rep. of Germany**

**Filed Jan. 27, 1987, Ser. No. 6,764**

**Claims priority, application Fed. Rep. of Germany, Jan. 28, 1986, 3602387**

**Int. Cl.[4] E21B *7/08***

**U.S. Cl. 175—73** **2 Claims**



1. An apparatus for excavating a slot, comprising:

an upper member of generally vertically elongated horizontally narrow rectangular parallelopipedal configuration adapted to be lowered into the ground;

a lower member of rectangular parallelopipedal configuration with a horizontal cross section corresponding to that of said upper member and spaced directly below said upper member;

a plurality of substantially inextensible links connecting said upper member with said lower member and being swivably joined at the ends of said links with said members to permit angular displacement of said lower member relative to said upper member about a vertical axis of said members, and two substantially horizontal mutually perpendicular axes corresponding to longitudinal and transverse axes of said cross section, said vertical axis and said longitudinal axis defining a longitudinal median plane through said members, said vertical axis and said transverse axis defining a transverse median plane through said members;

at least two hydraulic piston-and-cylinder units symmetrically inclined to said transverse median plane and connected to ball joints to said upper and lower members;

at least two pairs of hydraulic piston-and-cylinder units disposed symmetrically on opposite sides of said transverse median plane but symmetrically inclined to said longitudinal median plane and connected by ball joints to said upper and lower members;

means for controlling said piston-and-cylinder units to control displacement of said lower member about said axes;

at least one cutting wheel on said lower member drivable to cut said slot into the ground; and

wherein four of said inextensible links are provided at respective corners of the horizontal cross section through said apparatus.



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**4,744,426**

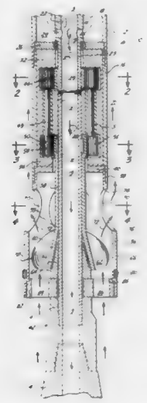
**APPARATUS FOR REDUCING HYDRO-STATIC PRESSURE AT THE DRILL BIT**

**John A. Reed, 204 H Long Plantation Rd., Lafayette, La. 70508**

**Filed Jun. 2, 1986, Ser. No. 869,314**

**Int. Cl.[4] E21B *4/02, 21/00***

**U.S. Cl. 175—102** **10 Claims**



1. An apparatus for reducing the hydro-static pressure at the drill bit, comprising:

a. an elongated member connectably situated in a drill string between a rotating mud motor and a drill bit;

b. a second tubular member positioned concentrically within the first member and rotating in conjunction with the rotation of the mud motor;

c. gearing means situated between the first and second members;

d. means on the second member for imparting rotation to the gear means; and

e. fan means incorporated within the first member and rotating in unison with the rotation of the gear means to draw drilling mud away from the drill bit for reducing the hydro-static pressure at the bit.

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**4,744,427**

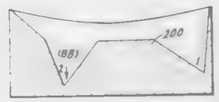
**BIT DESIGN FOR A ROTATING BIT INCORPORATING SYNTHETIC POLYCRYSTALLINE CUTTERS**

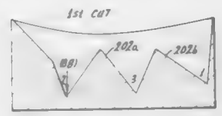
**Richard H. Grappendorf, Riverton, Utah, assignor to Eastman Christensen Company, Salt Lake City, Utah**

**Filed Oct. 16, 1986, Ser. No. 919,712**

**Int. Cl.[4] E21B *10/50***

**U.S. Cl. 175—329** **16 Claims**






1. An improvement in a rotating bit having a bit face defining a primary surface and an outer gage comprising:

a plurality of generally radial and hydraulically straight waterways defined in said bit face below said primary surface;

a corresponding plurality of tooth bearing pads disposed within said radial waterways, at least one pad disposed within each radial waterway, each said radial waterway extending azimuthally in front of and behind each pad, said pad disposed in said waterway characterized by an uppermost surface disposed below said primary surface of said bit face; and

a plurality of teeth disposed on said pads, said teeth extending from said pads above said primary surface of said bit face, so that fluid disposed in said radial waterways at the center of said bit is substantially confined to said radial waterways in a substantially uniform and hydraulically straight flow extending from the center of said bit to said outer gage without being required to substantially change direction of flow across said bit face.

16. A method for cutting a rock formation with a rotating bit characterized by a plurality of synthetic polycrystalline diamond cutting elements comprising the steps of:

cutting a first kerf;

cutting a second parallel concentric kerf spaced apart from the first kerf by a predetermined distance, an interlying land being defined by said first and second kerfs;

removing at least part of said interlying land by a first clearing cutter cutting a third kerf;

cutting a fourth kerf at a position offset by a predetermined fraction of said predetermined distance, said fourth kerf positioned between said first and third kerf;

cutting a fifth kerf positioned radially inside of said second kerf, said second and fifth kerfs defining a second interlying land of said predetermined radial distance therebetween;

removing at least part of said second interlying land with a second clearing tooth cutting a sixth kerf, said second

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clearing tooth positioned between said first clearing tooth and said second kerf; and

wherein each of said foregoing steps is performed at any given radial section within said rock formation during a single rotation of said rotating bit,

whereby a plurality of kerfing cuts are made, with each subsequent kerfing cut acting to kerf into the land made by the prior kerfing cuts.

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**4,744,428**

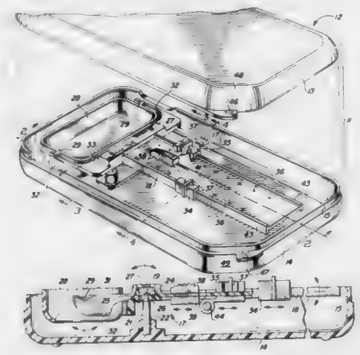
**SCALE**

**David G. Knotter, 3522 E. Pasadena Ave., Phoenix, Ariz. 85018; Donald R. Levin, 1196 Oxford Ct., Highland Park, Ill. 60035, and Jody L. Numbers, 7908 E. Oak, Scottsdale, Ariz. 85257**

**Filed Sep. 29, 1986, Ser. No. 912,912**

**Int. Cl.[4] G01G** *21/28, 1/36*

**U.S. Cl. 177—127** **5 Claims**



1. A lightweight portable scale comprising a base, a beam having a substance holder at one end thereof and a scale extending toward the opposite end thereof, a sliding weight movably carried by said beam for movement along said scale, a pair of metallic fulcrum posts projecting upwardly from said base, and a pair of metallic bearing inserts in said beam for cooperation with said fulcrum posts, one pair of the pair of posts or the pair of inserts having pointed projections thereon receivable in tapered recesses in the other pair for positioning and pivotally supporting said beam, said sliding weight being movable from a zero position to a position near the said opposite end of the beam and said sliding weight when in its zero position having a portion thereof disposed substantially in an imaginary plane containing the fulcrum of the beam, whereby to minimize the weight of the substance holder required to balance the beam when the sliding weight is in its zero position.

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**4,744,429**

**LOAD MEASUREMENT**

**Arthur Kellenbach, 46 Waipori Street, St. Ives, N.S.W., 2075, Australia**

**PCT No. PCT/AU85/00140, § 371 Date Feb. 11, 1986, § 102(e) Date Feb. 11, 1986, PCT Pub. No. WO86/00700, PCT Pub. Date Jan. 30, 1986**

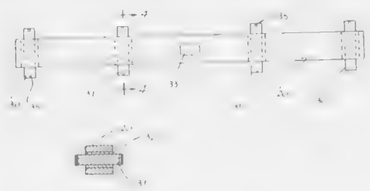
**PCT Filed Jun. 26, 1985, Ser. No. 835,851**

**Claims priority, application Australia, Jul. 4, 1984, PG5843; Sep. 21, 1984, PG7258; Feb. 15, 1985, PG9310; Apr. 24, 1985, PG0293**

**Int. Cl.[4] G01G** *3/14*

**U.S. Cl. 177—211** **35 Claims**

1. Load measuring apparatus in which a load force is applied to a beam in equilibrium with a pair of reaction forces and the strain in the beam is measured at a selected region thereof, said load force and said reaction forces being applied to respective force receiving means spaced from one another in the longitudinal direction of the beam, characterised in that the connection between the beam and at least one of said force receiving means comprises a resilient body at least a portion of which,



operative to transfer force to the beam from the associated force receiving means, lies substantially within the lateral side boundaries of the beam.

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**4,744,430**

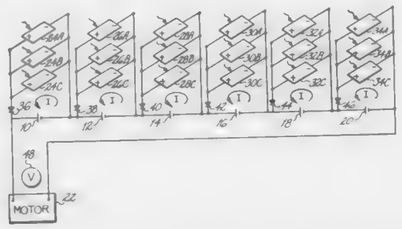
**SOLAR POWERED GOLF CART**

**Thomas R. McCoy, 4313 Timor Pl., Sarasota, Fla. 34241**

**Filed Aug. 14, 1987, Ser. No. 85,156**

**Int. Cl.[4] B60L** *9/00, 11/00;* **H01M** *10/44*

**U.S. Cl. 180—2.2** **14 Claims**




1. In a vehicle having a propulsion motor powered by electrical energy, a battery and solar cell assembly for providing electrical energy comprising:

a plurality of batteries;

a solar cell array having a plurality of solar cell panels;

said solar cell array connected to supply electricity to said batteries;

each of said panels having a flexible substrate facilitating the positioning of said panel is other than a planar configuration;

each of said substrates having a rectilinear configuration defined by edges and said substrates mechanically joined along abutting edges to form a rectilinear array having a peripheral margin;

a fabric covering extending beneath said rectilinear array and enclosing said peripheral margin of said array; and

a support structure beneath said fabric covering having a plurality of longitudinal supports connected by a plurality of lateral supports.

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**4,744,431**

**ENDLESS TREAD CHASSIS FOR FULL-TRACK VEHICLES**

**Wolfgang Stöllinger, Knittelfeld, Austria, assignor to Voest-Alpine Aktiengesellschaft, Linz, Austria**

**Filed May 6, 1986, Ser. No. 860,181**

**Claims priority, application Austria, May 6, 1985, 1347/85**

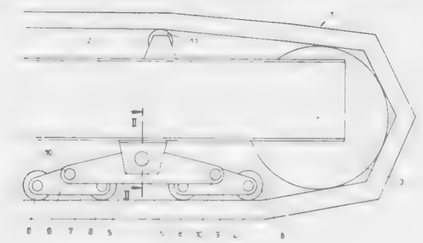
**Int. Cl.[4] B62D** *55/00*

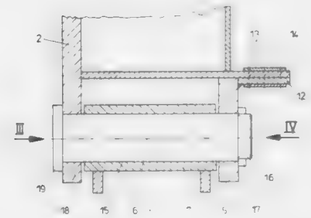
**U.S. Cl. 180—9.5** **2 Claims**

1. An endless-track chassis for a heavy duty vehicle comprising: an elongated carrier around which an endless track can be looped, at least one rocker arm pivotally connected to the carrier by means of an axle passing through a part of the carrier in a direction which is transverse to the long dimension of the



carrier so that the rocker arm may pivot about an axis extending in said transverse direction, said rocker arm supporting rollers which engage the endless track; a bearing bracket located at the outer side of carrier and supporting an end portion of said axle, said outer bearing bracket having a flange extending parallel to said pivot axis and having a body having an upwardly facing horizontal surface abutting a downwardly facing horizontal surface on the carrier such that vertical forces transmitted to the bracket by the axle are transmitted to





the carrier at said horizontal surfaces, and said flange engaging a complementary surface on a flange extending from the carrier; and removable fastening means detachably connecting said flanges together, whereby said outer bearing bracket can be detached from the carrier to permit the rocker arm to be removed from the carrier in a direction parallel to said axis, and whereby the flanges are not load bearing and, with the fastening means, need only prevent horizontal shifting of the bracket in the direction of said axis.

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**4,744,432**

**COOLING APPARATUS FOR VEHICLE ENGINE**

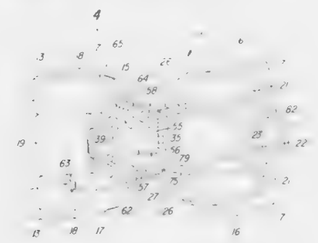
**Hirotaka Shibata, Hamamatsu, and Masahiro Nishioka, Iwata, both of Japan, assignors to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan**

**Filed Jan. 22, 1986, Ser. No. 821,401**

**Claims priority, application Japan, Jan. 28, 1985, 60-12359**

**Int. Cl.[4] B62K** *5/00*

**U.S. Cl. 180—68.1** **6 Claims**



1. In a vehicle having a generally open frame, a pair of wheels supported at one end of said frame, at least one wheel supported at the other end of said frame, a saddle type seat supported by said frame, and an engine supported by said frame beneath said seat and between said wheels, said engine being air cooled and having a crankshaft rotatable about an axis extending generally transversely relative to said frame and at least one cylinder extending from said crankshaft, a cylinder head, inlet and exhaust valves in said cylinder head, a cam shaft journaled in said cylinder head for operating said intake and exhaust valves, means for driving said cam shaft from one end of said crankshaft, the improvement comprising a cooling shroud carried by the engine and surrounding the engine and defining an air path, an air cooling fan in said cooling shroud rotating about an axis displaced from the axis of said crankshaft and juxtaposed to said cylinder and said cylinder head, and means for driving said fan from the other end of said crankshaft for forcing cool air through said cooling shroud air path.

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**4,744,433**

**RESERVE TANKS FOR RADIATORS IN WATER-COOLED, THREE- OR FOUR-WHEELED BUGGIES**

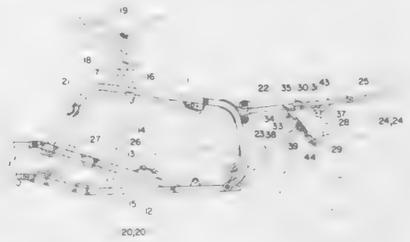
**Tsutomu Takeuchi; Masami Yanagishita, and Tadanori Horiuchi, all of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 29, 1986, Ser. No. 924,479**

**Claims priority, application Japan, Oct. 30, 1985, 60-167334[U]; Oct. 30, 1985, 60-167335[U]**

**Int. Cl.[4] F28D** *1/04*

**U.S. Cl. 180—68.4** **4 Claims**



1. A buggy comprising a main body frame, at least one wheel provided at the front of said main body frame, two wheels provided at the rear of said main body frame, an engine installed within said main body frame, a seat rail extending horizontally from an upper rear portion of said main body frame above said rear wheels and a reserve tank connected to said engine, said reserve tank having an inlet at front and upper portion thereof, wherein rear most portion of said seat rail extends to the rear, at least to the plane of the rear most portion of said rear wheels such that said buggy can stand upright by the support of said rear wheels and said rear most portion of said seat rail.

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**4,744,434**

**WHEEL SUSPENSION SYSTEM FOR MOTORCYCLES**

**Shinichi Miyakoshi, and Kazuhiko Tsunoda, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed May 26, 1982, Ser. No. 382,101**

**Claims priority, application Japan, May 26, 1981, 56-79775; Jul. 20, 1981, 56-114122; Aug. 14, 1981, 56-120854[U]; Aug. 14, 1981, 56-120855[U]; Aug. 20, 1981, 56-130807**

**Int. Cl.[4] B62K** *25/04, 25/12, 25/24, 25/26*

**U.S. Cl. 180—219** **3 Claims**

1. A wheel suspension system for a motorcycle including a

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relatively stable member and a swingable member swingably connected with said stable member, said swingable member supporting thereon a road wheel, comprising:

at least one torsion bar arranged on said stable member;

a linkage operably connected between said swingable member and said torsion bar so as to transmit forces therebetween;

a lever type damper including a casing having damping force generating means disposed therein, and a rotatable operation shaft operably connected with said damping force generating means so as to be rotatable in both opposite rotating directions to operate said damping force generating means;



said casing of said damping being fixedly mounted on said stable member in stationary relation thereto;

said operation shaft being engaged with said linkage;

said motorcycle including a vehicle frame;

said stable member comprising a bottom portion of said vehicle frame;

said bottom portion having mounted thereon an engine of said motorcycle;

said torsion bar being supported by said bottom portion so as to be disposed longitudinally beneath said bottom portion and said engine; and

said damper being disposed beneath said bottom portion and rearwardly of said torsion bar.

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**4,744,435**

**MOTOR VEHICLE HAVING ALL-WHEEL DRIVE**

**Otmar Schnurer, Gifhorn, Fed. Rep. of Germany, assignor to Volkswagen AG, Wolfsburg, Fed. Rep. of Germany**

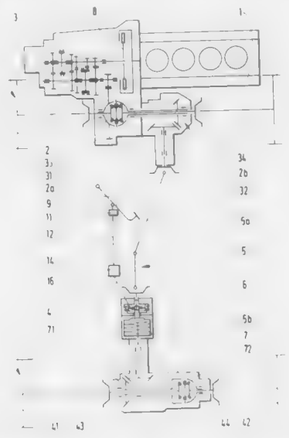
**Filed Mar. 12, 1987, Ser. No. 24,826**

**Claims priority, application Fed. Rep. of Germany, Mar. 25, 1986, 3609977**

**Int. Cl.⁴ B60K** *23/08*

**U.S. Cl. 180—233** **12 Claims**

1. A motor vehicle comprising a front engine and an all-wheel drive arrangement wherein wheels of a front axle are driven continuously, while a drive for wheels of a rear axle is capable of being made automatic by means of a viscous coupling arranged in a driveshaft line between the front axle and the rear axle so that the front and rear axles are essentially rigidly coupled together with regard to torque, and at least one free-wheeling means with a free-wheel lock is provided in a train of the driveshaft line transmitting the torque between the front and rear wheels so that, in an unlocked state, a first part of said free-wheeling means is coupled with a rear-axle drive and is capable, in a forward drive function of the vehicle, of overriding a second part of said free-wheeling means coupled with a front-axle drive, and lock control means for actuating



the free-wheel lock during drive operation and for releasing the free-wheel lock upon actuation of a service brake.

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**4,744,436**

**ADAPTER CASE ASSEMBLY IN FOUR-WHEEL DRIVE VEHICLE**

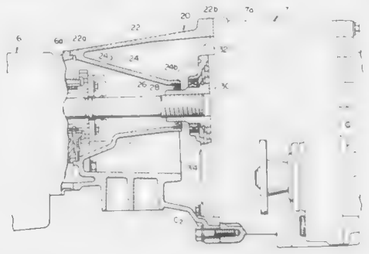
**Hirao Uchiyama, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Jul. 11, 1986, Ser. No. 884,523**

**Claims priority, application Japan, Jul. 12, 1985, 60-106638[U]**

**Int. Cl.⁴ F16H** *57/02*

**U.S. Cl. 180—233** **13 Claims**



1. An adapter case assembly for connecting a transmission and a transfer case in a four-wheel drive vehicle, comprising:

a rotatable power output shaft extending from the transmission and adapted to be rotated by the transmission, the shaft for drivingly connecting the transfer case with the transmission;

outer wall means securely and sealingly interposed between the housing of the transmission and the housing of the transfer case, said outer wall means defining thereinside a space;

partition wall means disposed inside said outer wall means and located around said power output shaft and extending along said output shaft, said partition wall means having a first end section securely and sealingly connected to said outer wall means, and a second end section sealingly surrounding said power output shaft, said partition wall means dividing said spaced into an inner chamber defined inside said partition wall means and an outer chamber



defined outside said partiton wall means, said inner chamber being in communication with the inside of the transmission housing.

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**4,744,437**

**POWER TRANSMITTING SYSTEM FOR A FOUR-WHEEL DRIVE VEHICLE**

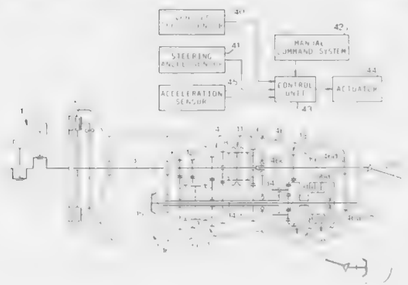
**Rempei Matsumoto, Oota, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Feb. 20, 1987, Ser. No. 16,759**

**Claims priority, application Japan, Feb. 27, 1986, 61-43095; May 26, 1986, 61-120404; Jul. 11, 1986, 61-163028; Jul. 11, 1986, 61-163029**

**Int. Cl.⁴ B60K** *17/34*

**U.S. Cl. 180—249** **12 Claims**




1. A power transmitting system for a four-wheel drive vehicle having an engine comprising

a planetary gear device for transmitting power of the engine to front and rear wheels of the vehicle;

a torque distribution device including clutch means, said clutch means for continuously changing clutch torque, said clutch means having opposite members operatively connected to two members of the planetary gear device; and

control means for producing a control signal for operating the clutch means so as to change the clutch torque to various plurality of values in accordance with various driving conditions of the vehicle, so as to change distribution of torque transmitted to the front and rear wheels to a plurality of continuously varying torque distributions at the various driving conditions of the vehicle.

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**4,744,438**

**SEISMIC PROBE MORE PARTICULARLY USABLE IN AN UNTUBED DRILLING SHAFT**

**Gérard Ruzie, Dourdan; Jean Batot, Arpajon, and Jean-Louis Marchand, St. Vrain, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France**

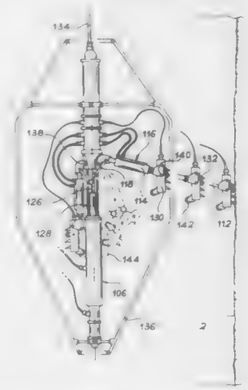
**Filed Dec. 15, 1986, Ser. No. 941,835**

**Claims priority, application France, Dec. 16, 1985, 85 18613**

**Int. Cl.⁴ G01V** *1/40*

**U.S. Cl. 181—102** **4 Claims**

1. A seismic probe comprising a central body, at least three arms which can be opened out in different directions about the central body, each arm having an end, each end being provided with anchoring means and a transducer, and means for opening the arms out and for engaging the ends of the arms against the wall of a drilling shaft, and wherein the means for opening out the arms and engaging the end thereof act independently for each arm, wherein each arm comprises a jack and a rod, the rods carrying the anchoring means and transducers, and wherein the anchoring means and transducers comprise a transducer holding box connected by an articulation to the end of the arm, and in which the jack pivots about an articulation fixed to the central body wherein the central body is provided with means ensuring that the transducer holding box occupies a position substantially parallel to the arm when the latter is in a rest position substantially parallel to the central



body and a position which is substantially perpendicular to the arm when the latter is in a working position substantially perpendicular to the central body.

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**4,744,439**

**TARGET PLATE FOR IMPULSE-TYPE ACOUSTIC SIGNAL GENERATOR**

**Marvin G. Bays, Ponca City, Okla., assignor to Atlantic Richfield Company, Los Angeles, Calif.**

**Continuation of Ser. No. 311,100, Oct. 13, 1981. This application Sep. 12, 1984, Ser. No. 650,317**

**Int. Cl.⁴ G01V** *1/04*

**U.S. Cl. 181—114** **3 Claims**



1. An acoustic signal generator comprising:

(a) an earth-contacting target plate having a relatively large bottom area in contact with the earth which area is sufficient to produce principally elastic deformation of the earth when said target plate receives an impact from a mass;

(b) an impact mass supported above said target plate;

(c) means for propelling said impact mass downwardly toward said target plate;

(d) an elastomeric disk of selected bulk modulus positioned upon an upwardly facing surface of said target plate;

(e) a striker plate supported upon said disc for receiving a blow from said impact mass and transmitting the energy thereof to said target plate through said disc; and

(f) means for confining said disc so that it experiences three-dimensional compression responsive to downward movement of said striker plate, thereby effecting a reduction in the rate of acceleration of said target plate responsive to said blow which is inversely proportional to the value of said bulk modulus.

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**4,744,440**
## EXHAUST GAS SILENCING DEVICE
**Roger D. Hanson, Jackson, Mich., assignor to Tenneco, Inc., Tenneco Automotive Bldg., Lincolnshire, Ill.**
**Filed Jun. 10, 1987, Ser. No. 60,317**
**Int. Cl.[4] F01N** *7/08*
**U.S. Cl. 181—227** **8 Claims**



1. A silencing device for automotive exhaust gas systems or the like comprising an inner gas flow tube and an elongated outer tube around the inner tube and substantially coextensive in length with it and providing an annular space between the tubes, said inner tube defining a primary gas flow path and being perforated along its length whereby gas flowing along the inside of the inner tube is in communication with said annular space, said outer tube having a plurality of radial sections reduced in diameter to subdivide said annular space into a longitudinal series of annular chambers around the inner tube, each said radial section comprising U-shaped fold portions and a plurality of arcuate portions concentric with the inner tube, certain of said radial sections having spaced apart fold portions to provide gas flow channels interconnecting adjacent annular chambers whereby a secondary gas flow path is provided for gas to flow from one annular chamber to the next on the outside of said inner tube and parallel to the primary flow path.

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**4,744,441**
## SCREW-TYPE LADDER LEVELER
**Bruce D. Sandstrom, 888 Burke Ave., Roseville, Minn. 55113**
**Filed Aug. 25, 1986, Ser. No. 900,002**
**Int. Cl.[4] E06C** *7/44*
**U.S. Cl. 182—111** **1 Claim**

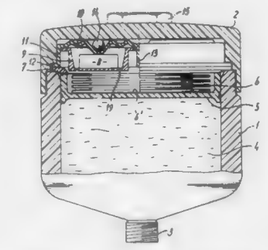


1. A device for leveling a ladder having side rails comprising:

a mounting bracket with a back attached to said rail a base attached to said back to provide support for the lower end portion of said side rail and a lateral member extending from said back formed with a threaded longitudinal bore at is distal end; and a threaded shaft sized to fit in said threaded bore and embodied with a convex semi-spherical head at its lower distal end and a handle at its upper distal end; and a pivotable foot further comprising a raised member, a bottom and a concave semi-spherical cavity within said raised member which provides a uniform point of contact for said semi-spherical head of said shaft while in engaged position; and a keeper plate attached to the top of said raised member of said foot with a hole formed at its center sized to both prevent said shaft from detaching from said foot and to allow pivotability of said foot with respect to said shaft, the size of said semi-spherical head is such than when in disengaged position provides a clearance between said convex head and said concave cavity; and horizontal openings near the distal end of said raised member will allow the free exit of foreign material from said concave semi-spherical cavity.

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**4,744,442**
## DEVICE FOR SUPPLYING A LUBRICANT
**Johan C. Bras, Tricht; Antonio Gabelli, Ijsselstein, and Emanuel M. de Blic, Le Chesnay, all of Netherlands, assignors to SKF Industrial Trading and Development Company B.V., Nieuwegein, Netherlands**
**Filed Jun. 20, 1986, Ser. No. 876,528**
**Claims priority, application Netherlands, Jun. 26, 1985, 8501839**
**Int. Cl.[4] F16N** *11/10*
**U.S. Cl. 184—39** **6 Claims**



1. Device for supplying a lubricant, comprising a receptacle to contain the lubricant with an opening arranged in the bottom thereof, a piston member sealingly displaceable along the walls inside the receptacle and located initially near the top of the receptacle, at least one expandable member supported by the receptacle at the circumference over the lubricant present in the receptacle with a bottom portion located near and above the piston member which piston member contains an electrolyte, at least one galvanic element supported over the electrolyte inside the receptacle, and operating means for bringing the galvanic element into contact with the electrolyte, characterized in that said expandable member with the electrolyte present therein, the operating means and the galvanic element form a separate assembly detachable from the receptacle, and the receptacle consists of a bottom part open at the top which may contain the lubricant and a cover capable of closing this portion from the top, so that after removal of the cover, said separate assembly remains within said receptacle.

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**4,744,443**
## HYDRODYNAMIC RETARDER
**Klaus Brosius, Kistelbergstr. 58, 7920 Heidenhemm, Fed. Rep. of Germany**
**Filed Sep. 24, 1986, Ser. No. 911,490**
**Claims priority, application Fed. Rep. of Germany, Oct. 4, 1985, 3535494**
**Int. Cl.[4] F16D** *57/02*
**U.S. Cl. 188—292** **19 Claims**

1. A hydrodynamic retarder comprising:

a primary blade wheel and a secondary blade wheel mounted for rotation relative to one another about a common axis, each of said primary and secondary blade wheels including an outer annular semi-toroidal blade ring and an inner annular semi-toroidal blade ring, the outer annular semi-toroidal blade rings facing one another and cooperating to define an outer toroidal working circuit capable of being filled with a working fluid, the inner annular semi-toroidal blade rings facing one another and cooperating to define an inner toroidal working circuit disposed within the outer toroidal working circuit and capable of being filled with a working fluid, the outer annular semi-toroidal blade rings including blades inclined in a first direction relative to an axial plane, the inner annular semi-toroidal blade rings including blades inclined in a second direction relative to an axial plane;

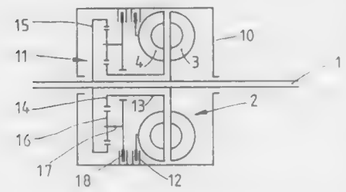
primary shaft means connected to said primary blade wheels for rotation therewith;

secondary shaft means connected to said secondary blade wheel for rotation therewith;

working fluid means for selectively filling and emptying said inner and outer toroidal working circuits with a working fluid suitable for coupling said primary blade wheel to said secondary blade wheel for the transfer of energy therebetween;

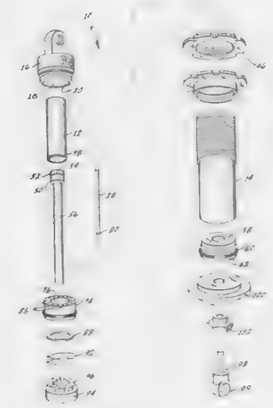
the facial surface area and the blade size and inclination of the outer annular semi-toroidal blade rings being selected with respect to the facial surface area and the blade size and inclination of the inner annular semi-toroidal blade rings such that the energy transfer of the outer toroidal working circuit is approximately equal to the energy transfer of the inner toroidal working circuit, and the energy transfer between said primary and secondary blade wheels is approximately equal in both directions of relative rotation.





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**4,744,444**
## SHOCK ABSORBER
**Craig L. Gillingham, 2689 Mataro St., Pasadena, Calif. 91107, assignor to Craig L. Gillingham, Pasadena, Calif.**
**Continuation of Ser. No. 895,609, Apr. 12, 1978, abandoned. This application Aug. 4, 1981, Ser. No. 289,890**
**Int. Cl.[4] F16F** *9/34, 9/44*
**U.S. Cl. 188—315** **1 Claim**



1. A vehicle shock absorber comprising a cylinder containing hydraulic fluid, a first cylinder end closure carrying vehicle coupling means, and a second cylinder end closure, said end closures being adapted to coaxial mounting of an oppositely reactive spring encircling said cylinder in energy storing and returning relation; a piston operating within said cylinder, a piston rod coupled to said piston and having a piston rod extension extending through said second cylinder end closure and carrying further means for coupling to a vehicle, said pistion dividing said cylinder into a compression chamber adjacent said first cylinder end closure and an extension chamber adjacent said second cylinder end closure; means transferring hydraulic fluid between said compression and extension chambers responsive to piston operation, said transfer means including a housing structure coaxially surrounding said cylinder supported by said end closures and partially defining a first passageway in the annulus between the housing structure and the cylinder for receiving compression displaced fluid for transfer to said extension chamber, a separately defined tube within said housing defining a second passageway extending paraxially through said annulus and receiving extension displaced fluid for transfer to said compression chamber; compression response determining valve means comprising a first valve chamber formed within said first cylinder end closure communicating said compression chamber and extension chamber through said annulus, said first valve chamber defining a first valve seat, an exteriorly accessible first bolt extending through said first valve chamber coaxially with said valve seat, a first valve body slidably journaled on said first bolt in adjustably fixed positionable relation responsive to bolt rotation, and a coaxial compression spring biasing said first valve body toward said valve seat unyieldingly under normal fluid pressure conditions; extension response determining valve means comprising a second valve chamber formed within said first cylinder end closure parallel to and coplanar with said first valve chamber communicating said second extension chamber and second passageway tube with said compression chamber, said second valve chamber defining a second valve seat, an exteriorly accessible externally threaded second bolt extending through said second valve chamber coaxially with said valve seat, an exteriorly accessible internally and externally threaded third bolt threadedly supporting said second bolt within the chamber, a plug-shaped second valve body having a radially enlarged annular sholder, an axial bore and a counterbore defining a recess within said shoulder, said second valve body being slidably journaled on said second bolt, a stop ring fixed to said second bolt in second valve body recess engagable relation, compression spring means engaged between said third bolt and said second valve body shoulder resiliently controlling movement of said second valve body relative to said valve seat responsive to relative adjustment of said second and third bolts and the relative positioning of said stop ring and said second valve body recess, and check valves blocking counteerflow of hydraulic fluid through said first and second passageways responsive to compression or extension operation fluid displacement in said shock absorber, in reactive spring energy storing and returning action damping relation.

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**4,744,445**
## CASE ASSEMBLY KIT
**Michael D. Anderson, 1004 Nard Rd., Encinitas, Calif. 92024, and Mark A. Baumgart, Santee, Calif., assignors to Michael D. Anderson, Encinitas, Calif.**
**Filed Apr. 29, 1986, Ser. No. 857,740**
**Int. Cl.[4] A45G** *3/02, 7/00*
**U.S. Cl. 190—107** **16 Claims**

1. A case assembled from a kit, the case comprising:

two box-like enclosures forming a base and lid of a case, the base and lid being hinged together along their rear edges and having a releasable latch mechanism for releasably securing the lid to the base at the front edge in a closed position;

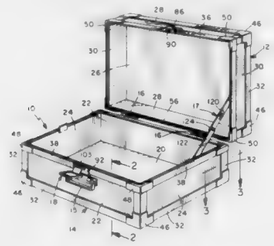
mateable closure strips bonded around at least part of the peripheral edges of the base and lid, the closure strips having cooperable mating formations for mating engagement when the lid is closed on the base; and

mateable two-way corner strips bonded to each corner on

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the peripheral upper and lower edges, respectively, of the base and lid, the corner strips having cooperable mating



formations equivalent to those of the closure strips for mating engagement when the lid is closed on the base.

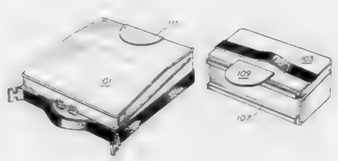
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**4,744,446**

## APPARATUS FOR TEMPORARILY ATTACHING ONE ITEM OF LUGGAGE TO ANOTHER

**Michel D. Arney, Lowell, Mass., assignor to Wang Laboratories, Inc., Lowell, Mass.**

**Continuation of Ser. No. 831,694, Feb. 21, 1986. This application Oct. 22, 1987, Ser. No. 112,204**
**Int. Cl.[4] A45C** *5/06, 13/00, 15/00*
**U.S. Cl. 190—108** **10 Claims**



10. Apparatus for temporarily attaching one item of luggage to another item of luggage comprising:

weight-bearing attachment means for attaching the one item to the other item and bearing substantially all of the weight of either item including

a channel with a substantially C-shaped profile attached to a first surface of the one item;

a form attached to a second surface of the other item and having a shape permitting slidable insertion into the interior of the C-shaped profile; and

means for preventing sliding of the form in the channel including a flap made of flexible material and having a first end attached to a third surface and a second end bearing a first surface of a hook and loop attachment system and

flap engaging means attached to a fourth surface and bearing a second surface of a hook and loop attachment system for engaging the first end, the third and fourth surfaces lying substantially in planes parallel to the direction of insertion and having edges adjacent to each other when the items are attached and the first end being attached to the third surface and the flap engaging means being attached to the fourth surface close to the adjacent edges.

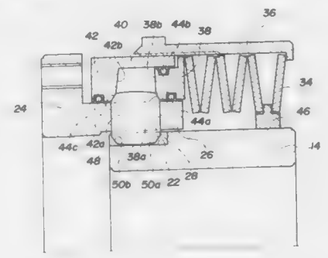
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**4,744,447**

## OVERLOAD RELEASE CLUTCH

**Heizaburou Kato, and Masaaki Yoshino, both of Shizuoka, Japan, assignors to Sankyo Mfg. Co., Ltd., Tokyo, Japan**

**Filed Aug. 7, 1986, Ser. No. 893,970**
**Claims priority, application Japan, May 9, 1986, 61-104987**
**Int. Cl.[4] F16D** *7/06, 3/23*
**U.S. Cl. 192—56 R** **8 Claims**



1. An overload release clutch comprising:

a rotary driving member and a rotary driven member, one of said members including at least one recess formed on an outer surface thereof, said recess being arcuate in the circumferential direction about an axis parallel to an axis of one member, the other being formed to include at lease one hole at a position corresponding to said at least one recess;

a transmission roller coaxial with said arcuate recess, said roller having a tapered surface on at least one end thereof and being fitted in said hole so as to be rotatable on its axis and movable along the radial direction of said other member;

pressure means acting on said tapered surface for normally urging said roller radially inward to thereby engage said roller with said recess and for permitting said roller to move radially outward to disengage from said recess upon application of an overload torque; and

a crowned peripheral surface on said roller to permit compensation for misalignment of the driving and driven members.

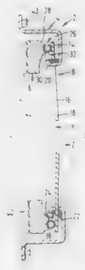
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**4,744,448**

## DIAPHRAGM SPRING CLUTCH COVER ASSEMBLY

**Ian C. Maycock; Peter A. Romer, both of Leamington Spa, and Steven Trotman, Snitterfield, all of England, assignors to Automotive Products plc, Warwickshire, England**

**Filed Sep. 30, 1986, Ser. No. 914,184**
**Claims priority, application United Kingdom, Oct. 29, 1985, 8526570; Nov. 9, 1985, 8527699**
**Int. Cl.[4] F16D** *13/71, 13/50*
**U.S. Cl. 192—70.27** **8 Claims**



1. A diaphragm spring friction clutch cover assembly comprising a pressure plate extending about an axis of the cover assembly, a cover, a diaphragm spring having a plurality of radially inwardly directed fingers, said diaphragm spring applying force to a first annular fulcrum arrangement on the pressure plate and to a second annular fulcrum arrangement on the cover, at least one of said fulcrum arrangements including cushioning means comprising at least one resilient tube extending longitudinally along At least part of substantially circular locus which is substantially co-axial with said cover assembly, said tube being hollow and having a cross-section which is resiliently deformable under force applied to the tube from the diaphragm spring during clutch re-engagements, said tube having a wall with a slot through said wall, said slot extending longitudinally along said tube, and said slot wholly facing substantially radially of said axis, wherein in a relatively low stressed state of said tube, by said diaphragm spring, said slot is open whereby opposite sides of the slot are spaced apart, and wherein deformation of said tube is for cushioning said clutch re-engagements in which at least an initial deformation of said tube brings said sides of the slot closer together.



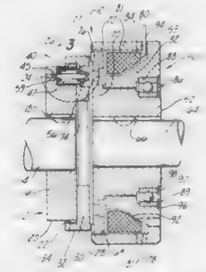
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**4,744,449**

## COMPACT ELECTROMAGNETIC TOOTH CLUTCH

**Thomas C. Sekella, Elmira, and Kenneth F. Seager, Sr., Horseheads, both of N.Y., assignors to Facet Enterprises, Inc., Tulsa, Okla.**

**Filed Aug. 29, 1986, Ser. No. 901,811**
**Int. Cl.[4] F16D** *27/10*
**U.S. Cl. 192—84 C** **16 Claims**



1. A compact electromagnetic clutch comprising:

a driven clutch member having an axis of rotation, said driven clutch member having a driven hub, an annular armature disposed coaxial with said driven hub and adjacent thereto, said annular armature having a first set of radial teeth disposed on the face opposite said driven hub, means for connecting said annular armature to said driven hub for rotation therewith, said means for connecting enabling axial translation of said annular armature relative to said driven hub, and means for biasing said annular armature towards said driven hub, said means for biasing comprising a plurality of cylindrical cup members symmetrically disposed about said axis of rotation, each of said cylindrical cup members having an open end supported from said annular armature and a bottom end received in a counterbore provided in said driven hub, said bottom end of each said cylindrical cup member being partially closed by an annular spring seat which circumscribes a central stop pin aperture, a stop pin member disposed in each of said cylindrical cup members, each of said stop pin members having a head provided at one end thereof and an opposite end which passes through said stop pin aperture and is fixedly attached to said driven hub, and a precompressed disengagement spring disposed in each of said cylindrical cup members between said annular spring seat and said head of said stop pin member;

a magnetically susceptible driving hub disposed coaxial with said driven clutch member, said driving hub having a radial flange displaced a predetermined distance from said annular armature, said radial flange having a plurality of kidney shaped apertures defining inner and outer magnetic pole regions thereof, and having a second set of radial teeth operative to engage said first set of radial teeth;

an electromagnet having an annular core member circumscribing said driving hub, said annular core member having a U-shaped cross-section defining an annular coil cavity, the open end of which is disposed adjacent to said radial flange, a field coil disposed in said annular coil cavity for generating a magnetic field having a field strength sufficient to displace said annular armature towards said radial flange of said driving hub and engage said first set of radial teeth with said second set of radial teeth; and

a ball bearing disposed between said annular core member and said driving hub for rotatably supporting said electromagnet adjacent to said radial flange.

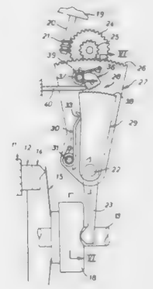
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**4,744,450**

## DEVICE FOR MAINTAINING A CLUTCH RELEASE BEARING IN CONTACT WITH A CLUTCH COVER ASSEMBLY AT ALL TIMES

**Patrice Bertin, Mery-Sur-Oise; Rabah Arhab, Pierrefitte, and Yvon Sevennec, Vernouillet, all of France, assignors to Valeo, Paris, France**

**Filed May 24, 1985, Ser. No. 737,427**
**Claims priority, application France, Mar. 28, 1984, 84 08324**
**The portion of the term of this patent subsequent to Jun. 9, 2004, has been disclaimed.**
**Int. Cl.[4] F16D** *12/75, 23/12*
**U.S. Cl. 192—111 A** **7 Claims**



1. A clutch actuating assembly operating a release device of a biased-engaged clutch cover assembly through a clutch release bearing, said biased-engaged clutch cover assembly includes resilient means acting to engage said clutch, said clutch actuating assembly comprising a motorized actuator, gear means driven by said actuator, a sector gear meshing with said gear means and freely rotatable about an operating shaft, a lever means fast with said operating shaft and cooperable with the clutch release bearing, thrust transmitting means operatively disposed between said sector gear and said lever means for coupling said lever means to said sector gear in a thrust transmitting mode for clutch disengagement and uncoupling said lever means and sector gear in the clutch engaged position, elastic means operatively connected between said sector gear and said lever means for biasing said thrust transmitting means to an uncoupled position when the associated clutch is engaged and for preloading said lever means to ensure constant contact between the clutch release bearing and the release device of the clutch cover assembly when the associated clutch cover assembly is engaged, said elastic means acting in a direction opposing an engaging force of said resilient means of the cover assembly.

**4,744,451**

## SUCCESSIVE COMPONENT DELIVERY CHUTE

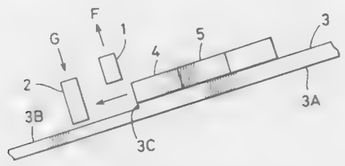
**Moriaki Sekiguchi, and Hidefumi Toda, both of Tokyo, Japan, assignors to Ando Electric Co., Ltd., Tokyo, Japan**

**Filed Jul. 29, 1986, Ser. No. 891,718**

**Claims priority, application Japan, Jul. 31, 1985, 60-117975[U]; Jul. 31, 1985, 60-117976[U]; Jul. 31, 1985, 60-117977[U]**

**Int. Cl.⁴ B65G *11/00***

**U.S. Cl. 193—40** **2 Claims**




1. A successive component delivery chute comprising a slide installed with an inclination which consists of a thin, or high-floor, section and a thin, or low-floor, section bordered by a step which provides a difference in level, or height, less than the thickness, or height, of the components to be handled, said low-floor section being on the downstream side, a first stopper located above the slide, slightly downstream, or toward the low-floor section, away from the step and which is vertically movable between a lower position, where the first stopper stops a sufficient distance above the low-floor section to allow each component thereon to slide down clear of the first stopper and where a component that has slid down on the high-floor section is brought to a stop by hitting against one side of the first stopper, and an upper position above the top of each component on the high-floor section, and a second stopper also held above the low-floor section of the slide but a distance equal to the length of the component downstream from the step and which is vertically movable between a lower position where the second stopper causes the component on the low-floor section to stop upon contact with the second stopper and an upper position above the top of each component on the low-floor section,

said first stopper having a sideward extension formed integrally with the lower position thereof and extended into contact with said second, downstream stopper.

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**4,744,452**

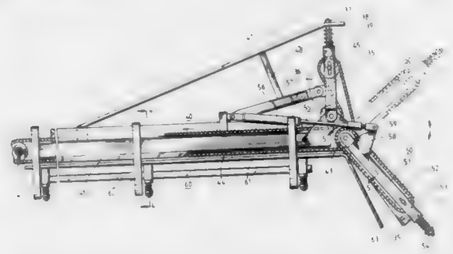
## AUTOMATED PILER ASSEMBLY

**V. Kenneth Broussard, P.O. Box 558, St. Martinsville, La. 70582**

**Continuation of Ser. No. 827,197, Feb. 7, 1986, abandoned, which is a continuation of Ser. No. 549,732, Nov. 8, 1983, abandoned. This application Nov. 5, 1986, Ser. No. 926,873**

**Int. Cl.⁴ B65G *21/10***

**U.S. Cl. 198—314** **17 Claims**



1. An improved automated piler assembly for use in combination with motorized stalk harvesting means, comprising:

(a) a pair of piler arm assemblies pivotally attached to said motorized stalk harvesting means, each of said piler arm assemblies being movable to a plurality of positions, each of said piler arm assemblies including means for frictionally engaging stalk material, said means for frictionally engaging conveying said stalk material from a cutting assembly to a discharge assembly.

(b) A pressure bar assembly aligned in a manner to functionally cooperate with said means for frictionally engaging said stalk material, said pressure bar assembly urging at least a portion of said stalk material into contact with said means for frictionally engaging; and

(c) a pressure rod assembly engaged by one end of said pressure bar assembly, said pressure rod being rigidly and angularly displaced from linear alignment with said pressure bar assembly;

(d) a discharge assembly fixedly attached to said piler arm assembly, said discharge assembly being movable to a plurality of discharge positions and wherein when said discharge assembly is in close proximity to said pressure rod said discharge assembly cooperates with said pressure rod along a portion of said pressure rod to direct the fall of said stalk material.

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**4,744,453**

## APPARATUS FOR TEMPORARY STORAGE OF CIGARETTES OR THE LIKE

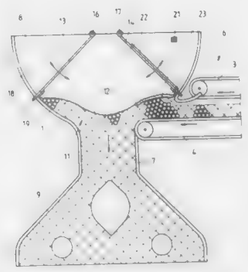
**Lothar Krause, and Günter Menge, both of Hamburg, Fed. Rep. of Germany, assignors to Körber AG, Hamburg, Fed. Rep. of Germany**

**Filed Aug. 22, 1986, Ser. No. 899,347**

**Claims priority, application Fed. Rep. of Germany, Aug. 22, 1985, 3530028**

**Int. Cl.⁴ B65G *47/44***

**U.S. Cl. 198—347** **14 Claims**



1. Apparatus for temporary storage of rod-shaped articles of the tobacco processing industry, comprising a collecting vessel arranged to store a supply of articles; means for conveying articles into said vessel; means for discharging articles from said vessel; and a cover for the supply of articles in said vessel, including two carriers movably mounted in said vessel and a flexible membrane connected to said carriers and arranged to overlie the supply of articles in the vessel, each of said carriers including a first portion movably secured to said vessel and a second portion remote from the first portion, said membrane having spaced-apart first and second portions connected to the second portions of said carriers.



**4,744,454**

## TIPPING CONVEYOR ELEMENT FOR A PACKAGE CONVEYOR

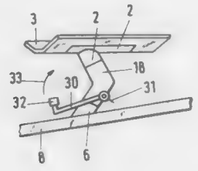
**Ludger Pölling, Wadersloh, Fed. Rep. of Germany, assignor to Bernhard Beumer Maschinenfabrik KG, Beckum, Fed. Rep. of Germany**

**Filed Jan. 29, 1987, Ser. No. 8,351**

**Claims priority, application Fed. Rep. of Germany, Jan. 31, 1986, 3602861**

**Int. Cl.⁴ B65G *47/46***

**U.S. Cl. 198—365** **17 Claims**




1. In a driven conveyor having a plurality of conveyor elements connected to one another and movable along guide means in a conveying direction, a conveyor element, a portion of which is selectively tippable, upon actuation by actuator means, from a conveying condition for supporting and conveying an article into a delivery condition for the delivery of the article from the conveyor element, said conveyor element comprising:

a support part having means for movably supporting said support part on guide means for movement in a conveying direction;

a tippable carrying element movable between said conveying condition and said delivery condition, said carrying element having a carrying surface for supporting an item, said carrying surface being substantially horizontal when in said conveying condition, said carrying element being substantially symmetric with respect to a plane of symmetry thereof;

a shaft depending from said carrying element, extending toward said support part, and laying in said plane of symmetry of said carrying element, a longitudinal axis of said shaft providing a first swivel axis disposed at an acute angle with respect to said carrying surface;

a stud projecting upwardly from said support part, a longitudinal axis of said stud providing a second swivel axis, a distal end of said shaft being pivotally connected to said stud;

a support device disposed between said support part and said carrying element, said support device supporting said carrying element and rotatingly mounting at least said shaft;

means for selectively preventing rotation of said support device about said second swivel axis; and

means responsive to the actuator means for rotating said shaft in a controlled manner about said second swivel axis to move said carrying element between said conveying condition and said delivery condition.

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**4,744,455**

## DISPENSER AND COMPONENT FEEDER

**Peter J. Dragotta, 4 Bodie Rd., Wayne, N.J. 07470, and Robert D. Mitchell, Oakland, N.J., assignors to Peter J. Dragotta, Wayne, N.J.**

**Filed Dec. 1, 1986, Ser. No. 936,449**

**Int. Cl.⁴ B65G *47/24***

**U.S. Cl. 198—389** **15 Claims**

1. A dispenser and component feeder for high speed placement of self-orienting components comprising

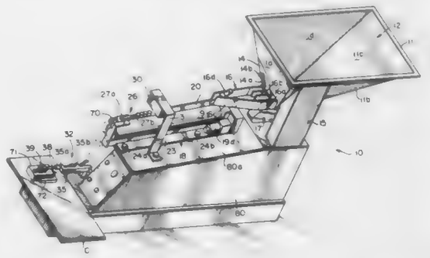
a. a storage hopper having inlet means for charging quantities of the self-orienting component into the storage hopper, and a controlled outlet means for discharging said self-orienting components,

b. an adjustable single roller feed assembly having means for adjusting the same to receive and convey self-orienting components of various sizes and shapes,

c. a linear vibratory chute disposed in communication with said controlled outlet means for vibratorily transferring self-orienting components to said single roller feed assembly at a predetermined rate,

d. said single roller feed assembly having an upper end disposed to communicate with said vibratory chute, a lower end remote from said upper end, and a roller to facilitate in conveying self-orienting components from said upper end to said lower end by gravity,

e. escapement means operatively connected to the lower end of the single roller feed assembly to segregate a single self-orienting component for release therefrom, and



f. a pick-up and placement assembly operatively associated with said escapement means at a pick-up position for moving said segregated self-orienting component including

i. an operating arm to pivotally move said segregated self-orienting component from the pick-up position to a placement position at a different angular position;

ii. a vacuum head disposed at the end of said operating arm for picking up said segregated self-orienting component and securing the same during movement of said operating arm;

iii. a gear arrangement operative to align said vacuum head with said segregated self-orienting component at the pick-up position and to position said component for placement simultaneous with the movement of said operating arm; and

iv. means for locking said vacuum head in the respective positions established by the gear arrangement.

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**4,744,456**

## APPARATUS FOR THE ORIENTATED SUPPLY OF HELICAL SPRINGS TO A WORKING STATION

**Siegmund Kumeth, Bayreuther Strasse 37, 8450 Amberg, Fed. Rep. of Germany**

**Filed Jun. 30, 1986, Ser. No. 879,896**

**Claims priority, application Fed. Rep. of Germany, Jul. 17, 1985, 3525463**

**Int. Cl.⁴ B65G *47/24***

**U.S. Cl. 198—389** **8 Claims**

1. An apparatus for the orientated supply of helical springs, which are provided on at least one end with an open loop, to a working station, said apparatus comprising: a first conveying device having a guide groove (10) for the springs (1), said guide groove (10) extending in conveying direction (A) of the first conveying device (7) and being open at one end of the first conveying device (7) and forming a resting surface for the springs (1), with said springs (1) being arranged in said guide groove (10) and on said resting surface such that said spring (1) extends longitudinally in the conveying direction (A) of the first conveying device (7) and said spring (1) being supplied to said one end of the first conveying device by said device,

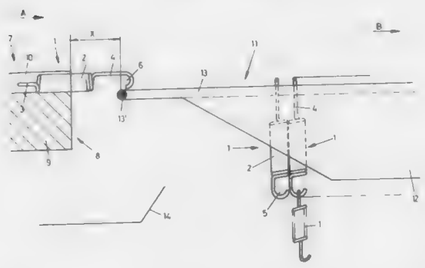
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a second conveying device (11) having a beginning adjoining said one end of the first conveying device,

said second conveying device (11) comprising a guide strip (13), on which the springs (1) are transferred from the first conveying device (7) to the second conveying device (11) such that said spring (1) is held hanging downward by loop (5, 6) of said spring (1),

said guide strip (13) having an area (13') forming said beginning of the second conveying device (11) and extending transversely to the conveying direction (A) which the first conveying device (7) has at its end,



said one end of the first conveying device (7) being arranged opposite to said area (13') of said guide strip (13) and in conveying direction (A) of the first conveying device (7) at a distance (x) from and before said area (13') of the guide strip,

with the guide strip (13) having in said area (13') an overhung upper edge, said area (13') situated in approximately the same plane as said resting surface of a first conveying device.

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**4,744,457**

## METHOD AND DEVICE FOR COLLECTING COMMODITIES

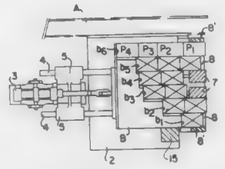
**Hiroaki Takimoto, Kyoto, Japan, assignor to Tetra Pak International Aktiebolga, Lund, Sweden**

**Continuation of Ser. No. 771,209, Aug. 30, 1985, abandoned. This application May 4, 1987, Ser. No. 48,970**

**Claims priority, application Japan, Sep. 3, 1984, 59-185265**

**Int. Cl.[4] B65G** *47/26*

**U.S. Cl. 198—426** **1 Claim**



1. A device for collecting commodities characterized by a tapered pusher on which a plurality of stages are formed, each stage having a longitudinal length shorter than the length of a box-like commodity, a first stage of said plurality of stages having a lateral length smaller than the width of the box-like commodity and the remaining of said plurality of stages having a lateral length substantially the same as the width of the box-like commodity, said pusher being disposed on an operation table provided at a side of a conveyor for conveying the box-like commodities and is slidable in a longitudinal direction parallel to the conveyer.

**4,744,458**

## CONVEYOR FOR ADVANCING WAFER-LIKE ARTICLES

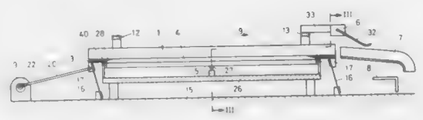
**René Fluck, Schleitheim, and Paul Graf, Neuhausen am Rheinfall, both of Switzerland, assignors to Sig Schweizerische-Industrie Gesellschaft, Neuhausen am Rheinfall, Switzerland**

**Filed Feb. 10, 1986, Ser. No. 827,741**

**Claims priority, application Switzerland, Feb. 11, 1985, 607/85; Feb. 11, 1985, 608/85**

**Int. Cl.[4] B65G** *47/26*

**U.S. Cl. 198—460** **16 Claims**



1. In a vibratory conveyor for advancing mutually contacting, stacked, wafer-like articles in an edgewise upstanding orientation, including a plurality of vibratory troughs arranged for supporting the articles; a common driving means connected to each vibratory trough for vibrating said vibratory troughs to effect an advance of the articles by vibratory effect in a conveying direction on the vibratory troughs along a length dimension thereof; each said vibratory trough having a width measured transversely to said conveying direction, the improvement wherein each said vibratory trough includes

(a) an article-supporting vibratory base portion forming part of said vibratory trough; said vibratory base portion being elongated and extending parallel to the length dimension of said vibratory trough; said vibratory base portion having an elongated opening extending parallel to the length dimension thereof;

(b) a non-vibratory, elongated rail-like member extending parallel to the length dimension of said vibratory trough and being situated in said elongated opening generally coextensively therewith; said non-vibratory rail-like member having a width measured parallel to the width of said vibratory trough; the width of said non-vibratory rail-like member being smaller than the width of said elongated opening; and

(c) means for causing the articles to be disengaged, in response to an operational parameter, from said article-supporting vibratory base portion of said vibratory trough and for simulaneously causing the articles to be supported solely by said non-vibratory rail-like member, whereby conveyance of the articles is interrupted.

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**4,744,459**

## METHOD AND APPARATUS FOR ACCUMULATING STOCKPILES OF FLOWABLE SOLID MATERIAL

**Patrick J. Ryan, 64, Ballinclea Heights, Killiney Co., Dublin, Ireland**

**Continuation of Ser. No. 328,863, Dec. 9, 1981, abandoned. This application Jun. 13, 1984, Ser. No. 619,688**

**Claims priority, application Fed. Rep. of Germany, Dec. 18, 1980, 3047756**

**Int. Cl.[4] B65G** *21/08, 65/28, 69/04*

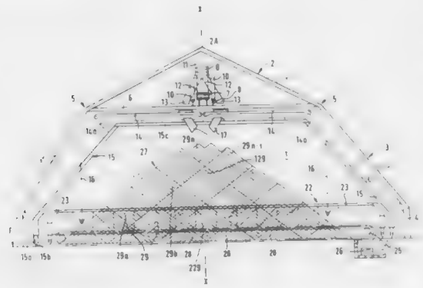
**U.S. Cl. 198—508** **6 Claims**

1. A method of accumulating a stockpile of flowable solid material comprising the steps of:

(a) subdividing a feed stream of said material into at least two additional streams each of which has a leader;

(b) forming a first layer of at least substantially parallel piles of said material, the step of forming said first layer including simultaneously discharging the leaders of said additional streams along substantially parallel first paths located at opposite sides of and substantially equally spaced from a vertical symmetry plane to thus deposit a pair of first elongated piles of said material, and the step of forming said first layer further including changing the distance between said leaders at most by the combined width of said first piles, and thereafter simultaneously discharging said leaders along second paths which are substantially equally spaced from said symmetry plane on opposite sides of the latter and are substantially parallel to said first paths, each of said second paths being disposed adjacent to one of said first paths so that a second elongated pile of said material is deposited next to each of said first piles, and said first and second piles being deposited consecutively; and





(c) completing said stockpile, the completing step including depositing at least one additional layer of substantially parallel piles of said material on said first layer, and the deposition of said at least one additional layer when the latter has at least four piles being performed using the forming step, the deposition of said at least one additional layer when the latter has two or three piles including simultaneously discharging said leaders along substantially parallel paths located at opposite sides of and substantially equally spaced from said symmetry plane, and the forming and completing steps being performed in such a manner that symmetry about said plane is substantially maintained at all times.

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**4,744,460**

## DEVICE FOR TRANSLATING PARTS UNDERGOING MACHINING ON ULTRAPRECISE HIGH SPEED MACHINES

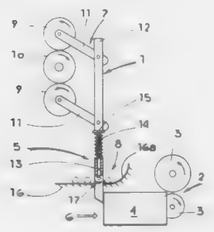
**Luigi Pazzaglia, Bologna, Italy, assignor to Cefin S.p.A., Bologna, Italy**

**Continuation-in-part of Ser. No. 597,229, Apr. 4, 1984, abandoned. This application Aug. 12, 1986, Ser. No. 894,752**

**Claims priority, application Italy, Apr. 12, 1983, 3394 A/83; Feb. 24, 1984, 3355 A/84**

**Int. Cl.[4] B65G** *25/02*

**U.S. Cl. 198—740** **7 Claims**



1. Device for translating parts undergoing machining on ultraprecise high speed machines utilizing a motorized regulatable speed working station, such a device comprising pusher means extending in a transversal direction with respect to the feeding direction of the parts undergoing machining and disposed upstream of said working station, an articulated parallelogram supporting said pusher means wherein said articulated parallelogram has a fixed side directed transversely to said feeding direction, and wherein said pusher means follows a closed path intersecting the path of said parts undergoing machining along said feeding direction, and control means being provided to cause said pusher means to follow a linear path parallel to said feeding direction during the operative running of said pusher means in such a way as to regulate, in combination with the rotational speed of a rotating arm of said articulated parallelogram, the speed of said pusher means with respect to the speed of parts undergoing machining in said working station, wherein the rotational speed of said articulated parallelogram is regulated to the speed of said working station.

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**4,744,461**

## CARRYING CASE FOR EYEGLASSES

**Ralph R. Lapham, New London, N.H., assignor to Uvex Winter Optical, Inc., North Smithfield, R.I.**

**Filed Feb. 20, 1987, Ser. No. 27,259**

**Int. Cl.[4] A45C** *11/04*

**U.S. Cl. 206—5** **12 Claims**



1. A carrying case for a pair of eyeglasses comprising a substantially rigid cylindrical capsule comprising releasably connected first and second capsule sections, said capsule being adapted and dimensioned for receiving said pair of eyeglasses therein when said pair of eyeglasses is in a collapsed disposition and for positioning said pair of eyeglasses so that the width of the lens frame portion thereof extends in a substantially axial direction in said capsule and the upper and lower extremities of said pair of eyeglasses are disposed adjacent substantially diametrically opposite portions of said capsule.

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**4,744,462**

## ESCUTCHEON DEVICE FOR VENDING MACHINE

**Thomas Houseknecht, Five Madison Ave., Batavia, N.Y. 14020**

**Filed Jun. 10, 1987, Ser. No. 61,155**

**Int. Cl.[4] B65D** *79/00*

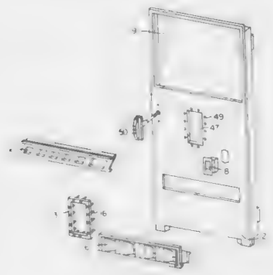
**U.S. Cl. 206—223** **5 Claims**

1. An escutcheon kit for use in adding a paper money validator to an existing vending machine lacking said validator which comprises a housing of dimensions sufficient to accommodate at least a portion of said validator, having securing means within said housing to secure the validator to said housing, and having a border forming a lip around one edge of said housing of dimensions sufficient to securely hold said housing to said vending machine, a template of dimensions similar to said border and having fastening means to secure said housing

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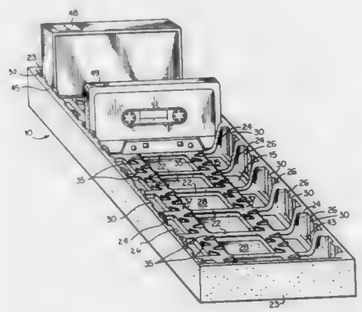
when said border and said template are opposed, wherein said template is opposed to said housing from the outside of the



vending machine, and an opening within said housing of dimensions sufficient to allow access to said validator.

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**4,744,463**
**STORAGE DISPLAY TRAY**
**Richard Merzon, 85 N. 3rd St., Brooklyn, N.Y. 11211**
**Filed Dec. 6, 1985, Ser. No. 805,874**
**Int. Cl.[4] B65D *85/672***
**U.S. Cl. 206—387** **23 Claims**



**1**. A storage display tray for selectively retaining either or both an unboxed and boxed cassette having length, width, and thickness, with said unboxed cassette having an opening along a longitudinal edge thereof, said tray comprising:

a plurality of elongate compartments, having longitudinal edges which are slightly spaced from each other;

longitudinally extending partition flanges, one of said flanges between each of said compartments, the spacing between proximate surfaces of each longitudinally extending partition flange being greater than the thickness of a boxed cassette to be retained;

laterally extending end walls one at each end of each compartment, said laterally extending end walls spaced apart a distance greater than the length of a boxed or unboxed cassette to be retained;

a bottom wall extending between said partition flanges and said laterally extending end walls in each compartment;

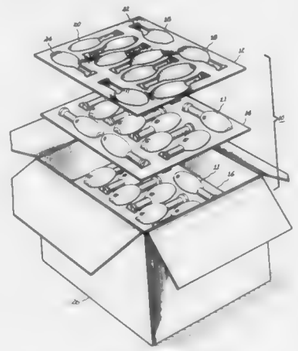
engaging elements extending up from said bottom wall, at least one element in each compartment dimensioned to extend into and frictionally engage in the opening in the unboxed cassette to be retained;

ribs, one rib on each compartment end wall for retaining a boxed cassette, said ribs having faces spaced apart so that proximate faces of opposing end wall ribs in each compartment frictionally engage the ends of a boxed cassette;

whereby either a boxed or unboxed cassette may be selectively retained in any compartment, with the boxed cassette engaged along its end walls when positioned in said compartment, or an unboxed cassette engaged within an opening in the unboxed cassette along its longitudinal edge.

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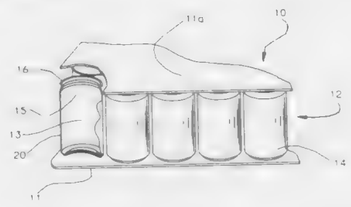
**4,744,464**
**RIBBON BLOWN GLASS ARTICLE TRANSPORT**
**Raymond J. Noe, Warren, Ohio, assignor to General Electric Company, Schenectady, N.Y.**
**Continuation of Ser. No. 793,423, Oct. 31, 1985, abandoned. This application Apr. 7, 1987, Ser. No. 10,869**
**Int. Cl.[4] B65D *85/42***
**U.S. Cl. 206—422** **23 Claims**



**1**. A transport tray member for supporting, in a horizontal position, a plurality of articles having a shape generally defined by a cylindrical neck portion terminating in a larger diameter cylindrical or bulb portion, said tray comprising a flat sheet having cavities formed therein for at least partially enclosing one side of each of said individual articles to be supported by said tray, and with the location of said cavities being defined by at least one central row containing a plurality of said cavities aligned alternately in opposite longitudinal directions together with end rows containing a plurality of said article supporting cavities being located at each side of said central row, wherein said cavities in said end rows are aligned in a longitudinal direction transverse to the longitudinal direction of the cavities in said central row and further aligned in opposite direction with respect to each other in the same end row and in the opposite end row.

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**4,744,465**
**MULTI-UNIT PACKAGE HAVING REDUCED TASTE/FLAVOR IMPARTING MATERIALS**
**Glenn E. Parker, Fort Branch, Ind., assignor to Ball Corporation, Muncie, Ind.**
**Filed Apr. 28, 1986, Ser. No. 856,883**
**Int. Cl.[4] B65D *57/00*; B65B *13/02***
**U.S. Cl. 206—597** **3 Claims**



**1**. A multi-unit package comprising at least two plastic dividers receiving and holding a plurality of unfilled open-ended



metal containers having their interior walls coated with an epoxy resin layer, said containers having their open ends in abutting relationship with a first surface of one of said at least two plastic dividers and their bases in abutting relationship with a second surface of the second of said at least two plastics dividers, the open ends of said containers being sealingly engaged with the first surface to form closed spaces wherein migration and/or diffusion of an organoleptic active agent capable of traveling from said first surface encompassed by said open ends to said resin layer is substantially suppressed, said plastic dividers comprising linear polymers selected from the group consisting of polyesters formed by cycloaliphatic diols and dibasic carboxylic acids and polyesters of polyalkyleneterephthalate formed by terephthalic acid and ethylene glycol wherein the alkylene of said polyalkyleneterephthalate is a member selected from the group consisting of methylene, ethylene, propylene, butylene and pentylene, said polyesters being unmodified and free of anti-blocking agent, said polyesters having an intrinsic viscosity of at least about 0.60, and a static coefficient of friction relative to the metal of said containers of about $0.28 \pm 0.02$ or $0.37 \pm 0.04$.

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**4,744,466**
**QUICK OPENING PINCH SEAL BAG**
**Donald E. Hall, Sibley, Iowa, assignor to Chase Bag Company, Greenwich, Conn.**
**Filed Dec. 8, 1981, Ser. No. 328,733**
**Int. Cl.[4] B65D *33/16***
**U.S. Cl. 206—620** **7 Claims**



**1**. A multi-wall, heavy-duty bag having an outer ply, at least one inner ply, gusseted side walls, and an adhesive closure for each end of the bag, characterized in that said bag has:

(a) a slot in the outer ply of one of said gusseted side walls adjacent a said closure, and

(b) transverse perforations in the inner ply of said one gusseted side wall adjacent said slot, whereby said bag may be quickly opened by tearing the outer ply adjacent said slot, and penetrating the inner ply through said transverse perforations.

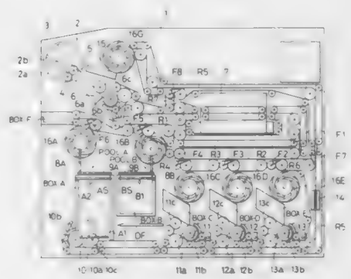
**4,744,467**
**LIQUID PACK WITH AREAS OF LOW ADHESION**
**Bengt Jönsson, Dural; Sten Persson, St Ives, and David Wiggins, Blaxland, all of Australia, assignors to Tetra Pak International AB, Lund, Sweden**
**Filed Dec. 19, 1985, Ser. No. 810,852**
**Claims priority, application Fed. Rep. of Germany, Dec. 19, 1984, 3446323; Sweden, Jul. 31, 1985, 8503653**
**Int. Cl.[4] B65D *5/54***
**U.S. Cl. 206—631.3** **12 Claims**



**1**. A container, which comprises a container body, a container bottom at a first end of said container body, means for closing said container at a second end of said container body, and means for sealing said closing means, said sealing means comprising regions of high adhesive force and low adhesive force, the regions of low adhesive force comprising two surfaces each having raised and lowered portions adjacent to and alternate with one another to form a pattern, said raised and lowered portions adhering to one another when the closing means is sealed.

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**4,744,468**
**CIRCULATION-TYPE BILL RECEIVING AND DISPENSING MACHINE**
**Kowichi Goi; Junichi Arikawa; Hiroshi Emori, and Hiroshi Kinoshita, all of Tokyo, Japan, assignors to Laurel Bank Machine Co., Ltd., Tokyo, Japan**
**Filed Oct. 30, 1984, Ser. No. 666,369**
**Claims priority, application Japan, Nov. 4, 1983, 58-207284; Nov. 4, 1983, 58-207285; Nov. 4, 1983, 58-207286**
**Int. Cl.[4] B07C *5/34***
**U.S. Cl. 209—534** **6 Claims**



**1**. A circulation-type bill receiving and dispensing machine comprising:

two dealing ports,

dealing port means including two dealing drums communicating with said two dealing ports, respectively,

a receiving port for selectively communicating with either one of said two dealing drums to receive bills therefrom,

a dispensing port for selectively communicating with either one of said two dealing drums to dispense bills thereto,

a received-bill handling route for receiving bills from said receiving port and for separating, transporting, and discriminating the bills, and then distributing the bills in accordance with the results of the discrimination,

a plurality of boxes for accommodating therein the bills distributed by said received-bill handling route and for feeding out bills, and

a dispensing-bill handling route for receiving the bills fed out

from said plurality of boxes to transfer the bills to said dispensing port, said received-bill handling route and said dispensing-bill handling route being arranged to avoid intersecting each other so that a receiving operation and a dispensing operation can be performed simultaneously.

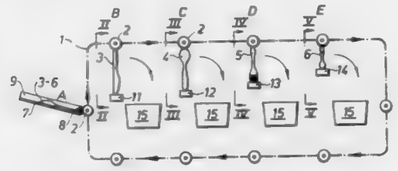
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**4,744,469**

## MAGNETIC CUTLERY SORTING MACHINE

**Sven A. Swallert, 11, rue Michel Chauvet, CH-1208 Geneva, Switzerland**

**Filed Aug. 29, 1986, Ser. No. 901,686**
**Claims priority, application Sweden, Aug. 30, 1985, 8504064**
**Int. Cl.[4] B07C 9/00**
**U.S. Cl. 209—636** **5 Claims**




1. A machine for sorting substantially rod-shaped articles (3–6) of magnetic material in accordance with respective lengths thereof, such as knives, forks and spoons of mutually different lengths, comprising:

(a) means (7; 20) for aligning the articles in a given direction at a collecting station (A);

(b) a conveyor arrangement (1) disposed closely proximate the collecting station and comprising a plurality of spaced magnetic collecting elements (2) for magnetically attracting one end of articles presented hereto at the collecting station and for transporting the articles along a transport path with said articles hanging vertically downwardly from undersides of said collecting elements; and

(c) a plurality of delivery stations (B, C, D, E) individually spaced along said transport path, the number of said delivery stations corresponding to the number of different lengths of said articles, and said delivery stations individually incorporating a plurality of magnetic removal elements (11, 12, 13, 14) disposed at progressively shorter distances below the transport path travelled by the undersides of the collecting elements, said distances being no greater than the lengths of the respective articles, and the magnetic force exerted by each removal element being sufficient to draw loose from an overhead collecting element an article coming into contact with a removal element.

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**4,744,470**

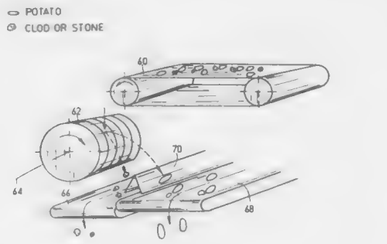
## APPARATUS FOR SEPARATING AGRICULTURAL PRODUCE FROM SPURIOUS MATTER

**Ron Feller, Ramat Efal; Shmuel Gan-Mor, Rehovot; Avi Zacharin, Moshav Magshimim, and Ehud Margolin, Tel Aviv, all of Israel, assignors to State of Israel Ministry of Agriculture Volcani Research Center, Bet Dagan, Israel**

**Filed Feb. 10, 1986, Ser. No. 828,038**
**Claims priority, application Israel, Apr. 11, 1985, 74885**
**Int. Cl.[4] B07C 5/00**
**U.S. Cl. 209—640** **14 Claims**

1. Apparatus for separating a mixture of agricultural products and stones comprising:

impact element means for providing separation of agricultural products and stones by bouncing them different distances, said impact element means including a plurality of independently resiliently mounted sections, each defining an impact surface, each being mounted independent of the other and being arranged so that when impacted by a single stone, significant energy absorption occurs during the characteristic dwell time of the stone in contact with the impact surface, and when impacted by an item of agricultural produce insignificant energy absorption occurs during the characteristic dwell time of the agricultural produce in contact with the impact surface, which is longer than the characteristic dwell time of the stone, such that said impact element means is operative to absorb appreciable kinetic energy from stones but to absorb a




significantly lower amount of kinetic energy from agricultural products sought to be separated therefrom;

means for causing the mixture of agricultural products and stones to impinge on said impact surfaces, whereby stones are caused to bounce within a first range of distances and agricultural produce is caused to bounce within a second range of distances, said second range of distances extending beyond said first range of distances.

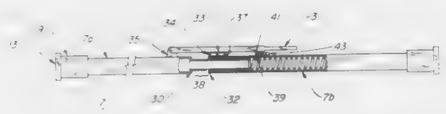
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**4,744,471**

## TELESCOPING ROD WITH LOCKING DEVICE

**Judith A. Leister, 4430 Clovermeadow Dr., Meridian, Id. 83642**

**Continuation of Ser. No. 843,156, Mar. 24, 1986, Pat. No. 4,667,352. This application Feb. 17, 1987, Ser. No. 15,048**
**Int. Cl.[4] A47H 1/08; E05B 73/00**
**U.S. Cl. 211—7** **1 Claim**




1. Apparatus for mounting between opposing surfaces comprising:

an elongated tubular member having two ends and a plurality of telescoping sections, said elongated tubular member being expandable and compressible in length;

spring means disposed within said elongated tubular member for urging the ends of said elongated tubular member into contact with said opposing surfaces;

handle means having two ends, one of said two ends rotatably attached to a first section of said plurality of telescoping sections, said handle means rotatable in the plane of said elongated tubular member, a linkage bar rotatably coupling said handle means to a second section of said plurality of telescoping sections, said second telescoping section adjacent to said first telescoping section, said linkage bar responsive to a rotation of said handle means towards and into contact with said second telescoping section oppositely expanding said first and second telescoping sections thereby urging the ends of said elongated tubular member against said opposing surfaces; and

pad lock means detachably coupling the other end of said handle means to said second telescoping section for retaining and securing said handle means in contact with said second telescoping section thereby preventing the removal of said elongated tubular member from between said opposing surfaces.



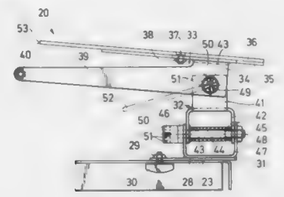
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**4,744,472**

## PILE TABLE FOR SMALL OFFSET PRINTING MACHINES

**Reiner Pfister, Nussloch, Fed. Rep. of Germany, assignor to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany**

**Continuation of Ser. No. 848,303, Apr. 4, 1986, abandoned. This application Aug. 19, 1987, Ser. No. 88,039**
**Claims priority, application Fed. Rep. of Germany, Apr. 4, 1985, 8510062[U]**
**Int. Cl.[4] A47F 7/00**
**U.S. Cl. 211—50** **5 Claims**




1. Pile table for a small offset printing machine and for receiving a pile of flat workpieces to be printed, the workpieces, respectively, being of nonuniform thickness over the area thereof, comprising a pile carrying plate, a double pivot bearing pivotally bearing said pile carrying plate, and including a lower and an upper part, said lower part being secured to a height adjustment device for the pile table and having a lower swivel axis extending in a direction in which flat workpieces are transported in the machine, said upper part being pivotally connected to said lower part at said lower swivel axis, means for producing adjustable friction forces between said lower and upper parts so as to hold said upper part in position, said upper part having an upper swivel axis extending in a direction transverse to said direction in which the flat workpieces are transported in the machine and an actuating lever pivotally connected to said upper part at said upper swivel axis, means for producing adjustable friction forces between said actuating lever and said upper part so as to hold said actuating lever in position, said actuating lever having a long arm and a short arm, said long arm carrying a handle and extending beyond said pile carrying plate in a substantially opposite direction to said direction in which the flat workpieces are transported in the machine, said short arm being secured to said pile carrying plate.

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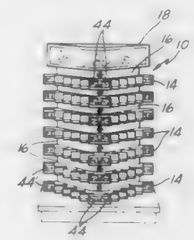
**4,744,473**

## KNOCK-DOWN END CAP MERCHANDISE DISPLAY UNIT COMPRISING VERTICALLY SPACED MERCHANDISE RECEIVING TRAYS PROVIDED WITH FORWARD AND REARWARD ADJUSTMENT THEREOF

**Stephen N. Hardy, Copley, Ohio, assignor to American Greetings Corporation, Cleveland, Ohio**

**Filed Feb. 24, 1986, Ser. No. 832,427**
**Int. Cl.[4] A47F 7/00**
**U.S. Cl. 211—55** **15 Claims**

1. A knock-down merchandise display rack comprising a plurality of generally vertically spaced substantially identical trays having upwardly opening pockets therein readily accessible from exteriorly of the respective tray for receiving and displaying merchandise, such as for instance greeting cards, and separate individual spacer members coacting with adjacent trays intermediate the latter and supporting the latter in said spaced relation, said spacer memebers each having means thereon coacting with means on said trays for providing for effecting a laterally offset or terraced relation of said trays with respect to one another in a vertical direction or for effecting an aligned relation of said trays with respect to one another in a vertical direction, said offset and said aligned relationships providing for selectively varying the orientational and visual effect provided by said display rack, each said tray including a top surface having therein a generally centralized recess receiving therein an associated one of said spacer members in supported relation for spacing adjacent trays vertically with respect to one another, said pockets in each tray being disposed




laterally of the associated spacer member, each said spacer member being open on its upper end, said recess being defined in a vertical direction by step portions so as to provide a generally horizontal support shelf therein and receiving the respective of said spacer members in supported relation on said support shelf, said recess and support shelf defining a projection portion on the underside of the respective tray received in said open upper end of the coating underlying spacer member.

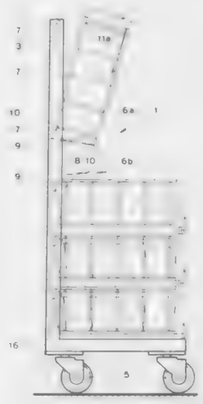
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**4,744,474**

## DISPLAY STAND

**Nils Tallving, Tallbackens Gård, S-605 90 Norrköping, Sweden**

**PCT No. PCT/SE86/00321, § 371 Date Feb. 13, 1987, § 102(e) Date Feb. 13, 1987, PCT Pub. No. WO87/00015, PCT Pub. Date Jan. 15, 1987**
**PCT Filed Jul. 2, 1986, Ser. No. 34,152**
**Claims priority, application Sweden, Jul. 5, 1985, 8503354-6**
**Int. Cl.[4] A47F 3/14**
**U.S. Cl. 211—133** **2 Claims**




1. A product or display stand with at least two wire baskets (6) which have upward- and outward-inclined sides and with a frame component comprising two vertically arranged uprights (3, 4) on which the wire baskets are in engagement in an articulated and detachable fashion at their respective rear corners one above the other and are foldable one after the other from the top downwards against the uprights (3, 4), the front side (11*a*) of each wire basket (6*a*) is foldable inwards and down-

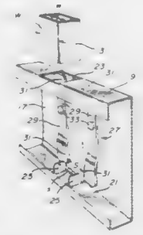
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wards against the bottom of the wire basket (**6***a*) to enable a lower basket to fit inside the superjacent basket when the baskets are folded upwardly against the uprights, in that each upright (**3, 4**) encloses the associated rear corners of the respective wire basket (**6**), and in that there are arranged preferably at identical mutual distances along the aforementioned uprights (**3, 4**) projections (**7**) facing towards one another and includes means permitting engagement with at least one part of a corresponding contact surface (**8**) on each wire basket (**6***a*), which contact surface (**8**) is bounded by a rear stop (**9**) and a front stop (**10**) acting against the aforementioned projections (**7**), in conjunction with which the rear stop (**9**) whereby the wire basket (**6**) can be removed only once it has been lifted so that the rear stop (**9**) can pass over the projection (**7**) and the front stop (**10**) is so arranged that, when a wire basket (**6***a*) is in a folded, vertical position inclined against the uprights (**3, 4**), the front stop (**10**) rests against the associated projection (**7**) with the wire basket (**6***a*) suspended, and in that the aforementioned front side (**11***a*) of the respective wire basket (**6***a*) comprises upward-extending locking means (**14**) arranged at its upper edge for engaging a lower edge (**15**) of the front side (**11***b*) of the superjacent wire basket (**6***a*) to prevent the front side (**11***a*) of the superjacent wire basket from being folded inwards and downwards before that wire basket (**6***a*) has been folded up toward the uprights.

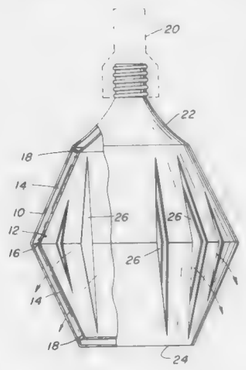
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**4,744,475**
**FREE-STANDING DISPLAY ASSEMBLY**
**René St. Pierre, Chatealguay, Canada, assignor to Roll-It, Inc., Lachine, Canada**
**Filed Feb. 17, 1987, Ser. No. 14,862**
**Int. Cl.[4] A47B** *57/58*
**U.S. Cl. 211—134** **6 Claims**



1. A free-standing display assembly comprising:
at least one post member, said post member having an outer surface width;
at least one base member having an outer wall, a top wall and a bottom wall;
an opening in said top wall for receiving said post therethrough; and
cam means on the inner surface of said outer wall in alignment with said opening for detachably connecting said post member to said base member when said post member extends through said opening to said bottom wall;
said cam means comprising an elongated member having a finger at each end thereof, said fingers being pointed, in operation, at said post member;
said cam means further including pivoting means at a point between the ends thereof;
wherein, when said post member extends through said opening to said bottom wall, said elongated member pivots to detachably connect said post member to said base member.

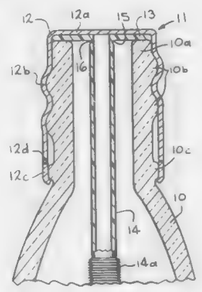
**4,744,476**
**COLLAPSIBLE INFANT FEEDING BOTTLE**
**Francis X. McKee, 323 Alberts Way, Langhorne, Pa. 19047**
**Filed Aug. 27, 1987, Ser. No. 89,596**
**Int. Cl.[4] A61J** *9/00*
**U.S. Cl. 215—11.1** **6 Claims**



1. A container, comprising;
a. a cylindrical main body portion including a tapered neck at the top and a circular base at the bottom,
b. a tearable outer membrane enclosing the entire periphery of said cylindrical main body portion,
c. a tearable inner membrane concentric with and located within said outer membrane,
d. a plurality of axially oriented rod-like members between said inner and said outer membranes affixed thereto, and
e. a plurality of hinge points located in the middle and at the ends of said rod-like members whereby under axial compression, said container will collapse tearing said inner and outer membranes and expelling any fluid contained therein.

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**4,744,477**
**COMBINED BOTTLE CAP AND STRAW STRUCTURE**
**Barry Wofford, 1102 Parkside, Toledo, Ohio 43607**
**Filed Sep. 16, 1987, Ser. No. 97,048**
**Int. Cl.[4] B65D** *51/24*
**U.S. Cl. 215—229** **7 Claims**

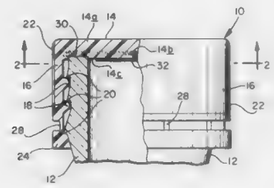


1. A combined bottle cap and straw structure adapted to be secured to an open end of a bottle comprising:
a cap portion including a central region adapted to close the open end of the bottle and a skirt portion adapted to be secured to the bottle; and
a liner attached to said central region of said cap portion, said liner including a straw portion removably secured thereto and adapted to extend into the bottle when said cap portion is secured thereto, said straw portion being formed integrally with said liner, a frangible region being provided at a junction of said straw portion with said liner.



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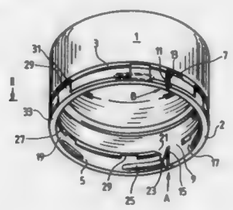
**4,744,478**
**PLASTIC CLOSURE WITH UNITARILY MOLDED, FOAMED SEALING LAYER**
**Granville J. Hahn, Big Spring, Tex., assignor to Permian Research Corporation, Big Spring, Tex.**
**Filed Oct. 23, 1986, Ser. No. 922,127**
**Int. Cl.[4] B65D** *53/00*
**U.S. Cl. 215—252** **12 Claims**



1. A container closure molded from a single polymeric composition, said closure comprising integrally molded polymeric end and side walls, said end wall further comprising a first layer having a density substantially the same as the density of said side wall and a second relatively less dense foamed layer that is formed in situ.

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**4,744,479**
**TAMPER INDICATING CLOSURE FOR BOTTLES AND THE LIKE**
**Theodor Schöttli, Diessenhofen, Switzerland, assignor to Interplastic AG, Newhausen a. Rhf., Switzerland**
**Filed Jun. 23, 1987, Ser. No. 65,836**
**Claims priority, application Switzerland, Jul. 11, 1986, 2794/86-0**
**Int. Cl.[4] B65D** *41/34*
**U.S. Cl. 215—252** **24 Claims**



1. A tamper indicating closure for application to containers, particularly an internally threaded cap for application to the externally threaded necks of bottles, comprising a tubular member having an open end; and a tamper indicating band adjacent said open end, said band being substantially concentric with said member and including a relatively long and a relatively short arcuate section, weakened portions constituting rupture sites intermediate said sections, and at least one bridge connecting at least one of said sections with said member.

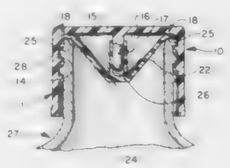
**4,744,480**
**TAMPER-EVIDENT CONTAINER-CLOSURE**
**Daniel Luch, Warwick, N.Y., and David E. Babcock, Springfield, N.J., assignors to The West Company, Phoenixville, Pa.**
**Filed Dec. 19, 1985, Ser. No. 810,923**
**Int. Cl.[4] B65D** *41/34*
**U.S. Cl. 215—252** **22 Claims**



1. A tamper-evident closure for a container having external thread means and a circumferentially extending radially outwardly projecting bead comprising a cap portion of cup-like form, a tamper-evident band connected to the lower terminal edge of the cap portion by a series of circumferentially spaced fracturable bridge connections, a radially inwardly directed retaining rib on the inner surface of the tamper-evident band cooperatively associated with the bead on the container to effect fracture of the bridges when the cap portion is actuated in a direction to remove it from the container and a series of angularly disposed tabs between the bridge connections operable to limit lateral displacement and telescoping of the tamper-evident band when initially applying the closure to the container and during engagement with the bead on the container, said tabs extending angularly inwardly and wherein the intermediate portion of the lower terminal edge of the cap portion between the bridges engages the truncated conical face of the tabs at approximately the mid-point thereof upon axial displacement of said tamper-evident band and skirt portion of the cap toward one another thereby preventing lateral displacement of the tamper-evident band and telescoping thereof upon application of the closure to the container.

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**4,744,481**
**CLOSURE FOR CONTAINERS**
**Robert L. Morgan, Jr., Cockeysville, Md., assignor to Poly-Seal Corporation, Baltimore, Md.**
**Filed Apr. 6, 1987, Ser. No. 46,394**
**Int. Cl.[4] B65D** *53/00*
**U.S. Cl. 215—329** **7 Claims**



1. A closure for a container having a mouth defined by a container wall portion encircling the mouth, the closure comprising, in combination:
a cap having an open ended cylindrical portion with means thereon for tightening the cap upon a container, an aperture free top portion provided with an interior circular surface having four quadrants and closing one end of the cap, respective pluralities of protuberances extending from the interior surface in each of the quadrants in vicinity of intersection between the interior surface and the cylindrical portion and an internal stud of substantially

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circular cross section extending from the interior surface and located centrally thereon; and

a sealing member of resilient material and having a circumference, said sealing member being fitted within said cylindrical portion of said cap with a peripherial portion thereof adjacent to said circumference of the sealing member positioned over said respective pluralities of protuberances extending from said interior surface of said cap to prevent turning of the cap relative to the sealing member during closing and opening of a container so that the sealing member may be sealingly fit over a mouth of a container with said peripherial portion of the sealing member over an end of a wall portion of a container encircling a mouth thereof; and

wherein said sealing member is of substantially frusto-conical shape flairs outwardly from a central portion thereof and has a central, substantially cylindrical, longitudinally extending sleeve, said stud being fitted within said sleeve;

whereby the closure can be placed on and removed from a container by application of high removal torques without the sealing member turning relative to the cap.

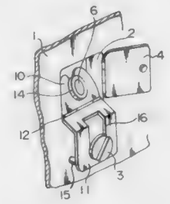
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**4,744,482**

## PROTECTION ASSEMBLY FOR FUELING INLET FOR MOTOR VEHICLE

**Hirobumi Ohsawa, Ayase, Japan, assignor to Ikeda Bussan Co., Ltd., Ayase, Japan**

**Filed Jul. 2, 1987, Ser. No. 69,140**
**Claims priority, application Japan, Jul. 4, 1986, 61-156278**
**Int. Cl.⁴ B65D** *69/00*
**U.S. Cl. 220—85 SP** **5 Claims**



1. A protection assembly for protecting a body panel as well as a fuel inlet port which is provided in the body panel of a motor vehicle and normally closed by a removable cap, comprising a base member destined to be placed internally in a recess formed in said body panel where said fuel inlet port is provided, said recess being usually covered by a cover member, a supporting member hinged to said base member so as to be unfoldably extended outwardly from said recess in the opened state thereof, said supporting member serving to support a tool used for fueling through said fuel inlet port, and a retaining portion formed in said supporting member and serving to hold said removable cap removed from said fuel inlet port during the refueling operation.

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**4,744,483**

## TAMPER EVIDENT COVER

**Daniel P. Hidding, Rte. 2, Ridgecroft La., Barrington Hills, Ill. 60010**

**Filed Feb. 24, 1987, Ser. No. 17,862**
**Int. Cl.⁴ B65D** *17/34*
**U.S. Cl. 220—270** **8 Claims**

1. A tamper evidencing covering for containers, comprising:

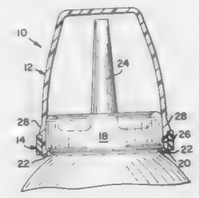
a. a removable first covering portion comprising a hollow container cover,

b. an orifice in said cover for accommodating a container,

c. a retention recess adjacent said orifice, said recess comprising a flat, cylindrical skirt in said cover at said orifice and an annular collar extending outwardly from said cover adjacent said skirt,

d. an annular internal locking bead adjacent said orifice for affixing said cover to a container, said bead extending into the interior of said cover,

e. a removable second covering portion comprising a frangible ring shaped to fit within said recess, said ring including



a weakened notch therein for facilitating breaking of said ring at said notch, and

f. a tab extending radially outwardly from said ring adjacent said notch.

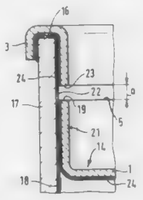
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**4,744,484**

## CAN, AND A DIAPHRAGM FOR THE CLOSING AND SEALING THEREOF

**Werner Grabher, Au, Switzerland, assignor to Grabher Indosa-Maschinenbau AG, Switzerland**

**Filed Jul. 8, 1986, Ser. No. 883,306**
**Claims priority, application Switzerland, Jul. 10, 1985, 2995/85**
**Int. Cl.⁴ B65D** *53/00*
**U.S. Cl. 220—276** **7 Claims**



1. A container having a cylindrical wall having an interior surface with said wall surrounding an opening at one end of said container and said opening being closed by a diaphragm, said diaphragm having a substantially planar wall portion and a peripheral wall surrounding said planar wall portion and extending upwardly relative thereof to define a dish shape, said peripheral wall terminating in a rim, said diaphragm having a substantially uniform thickness of no greater than approximately 60 microns, said peripheral wall being formed with a plurality of elongated slits arranged along a circumferential line lying in a plane parallel to spaced a selected distance from said planar wall portion, each of said slits being separated from each adjacent slit by a ligament lying on said circumferential line, said peripheral wall being adhesively secured to said interior surface of said wall of said container and with said ligaments being separated.

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**4,744,485**

Patent Not Issued For This Number

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**4,744,486**

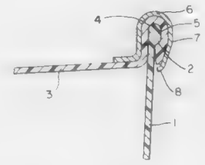
## SEALING SYSTEM FOR CONTAINERS

**Luis H. D. L. Godinho, Linda-a-Velha, Portugal, assignor to Seville Design Inc., Lincroft, N.J.**

**Filed Dec. 2, 1986, Ser. No. 936,813**
**Claims priority, application Portugal, Dec. 2, 1985, 81/592**
**Int. Cl.⁴ B65D** *45/32*
**U.S. Cl. 220—319** **3 Claims**

1. A sealable container comprising a plastic base member including an upstanding annular rim portion, a plastic lid member overlying said annular rim portion, said plastic lid member including an annular U-shaped outer periphery comprising inner and outer substantially parallel wall portions and a substantially planar cover portion connecting said inner wall portion so that upon application of said U-shaped outer periphery of said lid member to said annular rim portion of said base member, said pair of substantially parallel wall portions are disposed on opposite sides of said annular rim portion and said cover portion is disposed substantially below said annular rim portion of said lid member, and a substantially U-shaped annular metallic clamping strip having a configuration substantially





corresponding to said U-shaped outer periphery of said lid member and including inner and outer substantially parallel wall portions, said clamping strip being formed from a predetermined length of said metal so as to provide for overlap at the ends of said clamping strip, said outer wall portion of said clamping strip including a depending lower portion depending below said outer wall portion of said lid member, whereby upon application of said clamping strip to the outer surface of said lid member and crimping of said pair of substantially parallel wall portions of said clamping strip towards each other, said container is effectively sealed from the surrounding atmosphere thereby, while at the same time facilitating removal of said clamping strip.

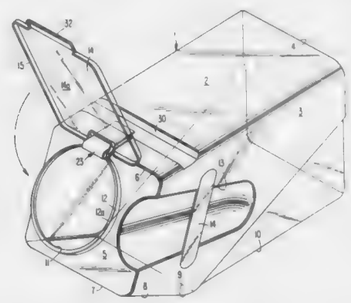
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**4,744,487**

## FOOD CONTAINER WITH A HINGED COVER

**Kenneth G. Welborn, Santa Cruz, Calif., assignor to Harmony Foods, Inc., Santa Cruz, Calif.**

**Filed Sep. 16, 1987, Ser. No. 98,223**
**Int. Cl.⁴ B65D** *43/14, 51/04*
**U.S. Cl. 220—342** **9 Claims**



1. In a food container having a first wall and a second wall disposed at an angle to said first wall and an access opening in said second wall through which said container is adapted to be filled and through which the contents thereof are adapted to be disbursed, said access opening having an edge thereof adjacent to said first wall, a cover for said opening, and means for hinging said cover to said container comprising an upwardly open groove formed in said container adjacent to and disposed with the axis thereof in a plane substantially normal to the axis of said opening, a hinge pin on said cover at the edge thereof and adapted to be seated in said groove for pivoting the cover on said container, said cover having a slot along the edge thereof inwardly of said hinge pin and a clip having an inner leg and an outer leg and an intermediate end portion, said outer leg being adapted to extend through said slot and to overlie the wall of said container adjacent to said access opening and the open side of said groove to retain said hinge pin therein, said intermediate end portion being adapted to extend about the wall of said container about said access opening and the bottom wall of said groove and said inner leg being opposed to said outer leg and adapted to underlie the wall of said container opposite from said outer leg, said clip being resilient and normally biased into a closed position in which said outer and inner legs are in engagement and adapted to be opened for inserting the outer portion of said clip through said slot in said cover and over said groove and the wall of said container while the inner portion thereof passes beneath said groove and the wall of said container.

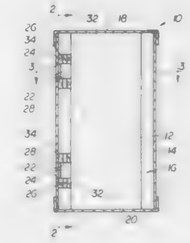
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**4,744,488**

## METHOD AND DEVICE FOR MANUFACTURING A FOAM INSULATED WATER HEATER, AND A FOAM INSULATED WATER HEATER CONSTRUCTION

**Thomas E. Nelson, 11102 Ridge Rd., Anchorage, Ky. 40223**

**Filed Sep. 8, 1986, Ser. No. 904,206**
**Int. Cl.⁴ B65D** *25/36, 90/06, 90/10*
**U.S. Cl. 220—444** **22 Claims**



1. An insulating device for use in insulating water heaters of the type having an inner tank and an outer shell spaced from the inner tank defining an annular space therebetween, and at least one control apparatus at the exterior wall surface of the inner tank extending into the space between the inner tank and outer shell, the outer shell having an aperture through the shell wall in alignment with the control apparatus to expose the control apparatus to the exterior of the water heater providing access to the control apparatus, the insulating device comprising:

a collar to be received in the space between the inner tank and outer shell having a back surface for fitting in abutment against the exterior wall surface of the inner tank and a front surface for fitting in abutment against the interior wall surface of the outer shell, the thickness of the collar measured between the back surface and front surface being greater than the width of the space between the tank wall and shell wall, a generally centrally located opening therethrough from the collar back surface to the collar front surface, the peripheral configuration of the collar opening matching the peripheral configuration of the control apparatus and sized to fit closely around the perimeter of the control apparatus, the outer perimeter of the collar being larger than the perimeter of the aperture through the outer shell, the collar being fabricated of at least three laminates of diverse thermal insulating materials, the intermediate layer having a greater coefficient of compression in the direction between the collar back surface and collar front surface than either one of the outer layers such that when the collar is installed about the control apparatus between the inner tank and outer

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shell of the water heater the outer layer of the laminated collar in contact with the exterior wall surface of the inner tank is compressed between the tank wall and intermediate collar layer and the outer layer of the laminated collar in contact with the interior wall surface of the outer shell is compressed between the shell wall and intermediate collar layer.

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**4,744,489**

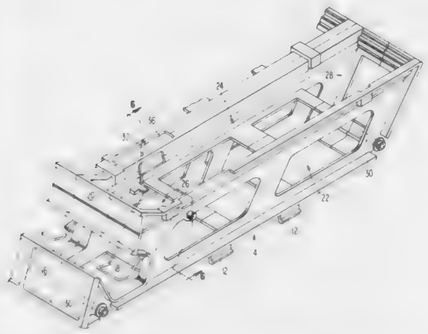
## STORE DISPLAY FIXTURE

**J. Morris Binder, West Des Moines, Iowa; Archie G. Drummond, Jr., Palatine, and Dale E. Fahnstrom, Riverside, both of Ill., assignors to Tone Brothers, Inc., Des Moines, Iowa**

**Filed Nov. 22, 1985, Ser. No. 801,191**

**Int. Cl.[4] A47F** *3/14, 3/06*

**U.S. Cl. 221—6** **12 Claims**



1. A tray for displaying and dispensing objects comprising first course means for holding a plurality of said objects and having a first end for dispensing said objects and a second end, second course means above said first course means for holding a plurality of said objects, said second course means having a first end for loading said objects and a second end, wherein said first end of said second course means is adjacent said first end of said first course means, means between said first end of said second course means and said first end of said first course means for allowing said objects in said second course means to pass to said first course means and said second end of said second course means is adjacent said second end of said first course means, means between said second end of said second course means and said second end of said first course means for allowing objects in said second course means to pass to said first course means, and further comprising gate means for blocking said mean between said first end of said second course means and said first end of said first course means for preventing passage of said objects from said first end of said second course means to said first end of said first course means until an initial supply of said objects has been removed from said first course means and, guide means for guiding objects between said second end of said second course means and said second end of said first course means.

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**4,744,490**

## TABLE OR LIKE VENDING MACHINE WITH CUSTOMER OPERATED ANTI-THEFT PRODUCT DELIVERY DRAWER

**Henry J. Albright, West Des Moines, and David R. Frerking, Des Moines, both of Iowa, assignors to Fawn Engineering Corp., Des Moines, Iowa**

**Filed Aug. 25, 1986, Ser. No. 900,181**

**Int. Cl.[4] G07F** *11/36, 11/28, 11/18*

**U.S. Cl. 221—75** **2 Claims**

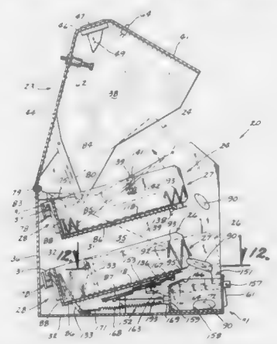
1. A vending machine for a table top or like comprising:

housing means including a hood element hingedly connected for arcuate movement between a closed position denying access to the interior of the machine and a raised position enabling access thereto, said hood element having a transparent portion;

shelf means mounted within said housing means and carrying a plurality of driven helical feeder coils thereon, each coil adapted to receive items of merchandise between the convolutions thereof for axial advance responsive to rotation of said coil for dispensing said items one-by-one at one end of said coil forwardly of said shelf means, said items being dispensed viewable through said hood portion by the customer;

product selection means mounted within said housing means on one side of said shelf means for selected actuation of one of said feeder coils; and

anti-theft drawer means mounted within said housing means



below said shelf means for receiving a dispensed item of merchandise advanced off said shelf means, said drawer means customer operated to deliver said dispensed item for retrieval by said customer;

and further wherein said drawer means comprises a drawer open at the top and biased inwardly of the machine to a position below said shelf means to receive product therefrom, said drawer movable outwardly of said machine to a position exposing the product therein;

a cover plate slidably mounted on said housing and movable between an inner stored position wherein said drawer is adapted to receive product to an outer position preventing product vended off said shelf means from falling into said drawer; and

means connected between the drawer and said cover plate for moving said cover plate in concert with said drawer.

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**4,744,491**

## DEVICE FOR THE DISTRIBUTION OF CARTRIDGES IN A CARTRIDGE CARRIER FOR A COFFEE MACHINE

**Heinz Bäni, Granges, and Roger Jaquier, Chexbres, both of Switzerland, assignors to Nestec S.A., Vevey, Switzerland**

**Filed May 19, 1986, Ser. No. 864,828**

**Claims priority, application Switzerland, Jun. 28, 1985, 2768/85**

**Int. Cl.[4] B65G** *59/06*

**U.S. Cl. 221—172** **6 Claims**

1. A device for the distribution of cartridges containing ingredients for the preparation of a beverage comprising:

(a) a housing;

(b) a cavity within the housing;

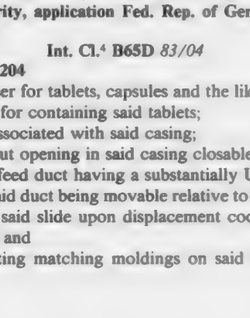
(c) a delivery tube within the housing positioned above the cavity;

(d) a distribution tube between and communicating with the delivery tube and the cavity and being widened in relation to the delivery tube;

(e) a horizontal yoke positioned within the distribution tube;

(f) a spring lever within the housing extending from above the distribution tube to the cavity, the lever being pivotally affixed about an axis which is at a position above the distribution tube, the lever being capable of pivoting from a first position to a second position, and the distribution tube having an opening capable of receiving a portion of the lever which is configured to move freely about the yoke within the distribution tube;

(g) a first retaining means affixed to the lever below the pivot axis at a position coinciding with the position where the delivery tube communicates with the distribution tube, a second retaining means affixed to the lever above the pivot axis, the delivery tube having openings to receive entry of each retaining means, and the first and second retaining means being configured such that they are spaced about a cartridge width apart;



the lever, first and second retaining means, cartridges and yoke being capable of cooperating such that when the lever is moved to the first position, the first retaining means is withdrawn from the tubes thereby releasing a cartridge into the delivery tube and such that a cartridge is retained by resting upon the second retaining means, and such that when the lever is urged to pivot to the second position, the second retaining means is withdrawn from the delivery tube and the first retaining means enters into the delivery tube such that the cartridge which rested upon the second retaining means is released to then rest upon the first retaining means, the horizontal yoke being positioned within the distribution tube such that a cartridge moving through the distribution tube contacts the yoke and is forced to rotate to an orientation suitable for insertion into the cavity.

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**4,744,492**

## DISPENSER FOR TABLETS, CAPSULES AND THE LIKE

**Ludger Hackmann, Lohne, and Peter Keller, Juchen, both of Fed. Rep. of Germany, assignors to Bramlage Gesellschaft mit beschrankter Haftung, Lohne/Oldenburg, Fed. Rep. of Germany**

**Filed Nov. 3, 1986, Ser. No. 926,915**

**Claims priority, application Fed. Rep. of Germany, Nov. 2, 1985, 3538923**

**Int. Cl.[4] B65D** *83/04*

**U.S. Cl. 221—204** **9 Claims**

1. A dispenser for tablets, capsules and the like, comprising:

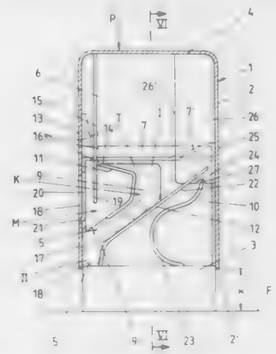
(a) a casing for containing said tablets;

(b) a slide associated with said casing;

(c) a drop out opening in said casing closable by said slide;

(d) a tablet feed duct having a substantially U-shaped cross section, said duct being movable relative to the casing and the slide, said slide upon displacement cooperating with said duct; and

(e) cooperating matching moldings on said slide and said tablet feed duct which deflect the tablet feed duct from the direction of movement of the slide so as to produce a



shaking or vibrating motion of the tablet feed duct as a result of the slide operation.

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**4,744,493**

## TONER REPLENISHING DEVICE

**Masumi Ikesue, Tokyo, and Takashi Ikeda, Sagamihara, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan**

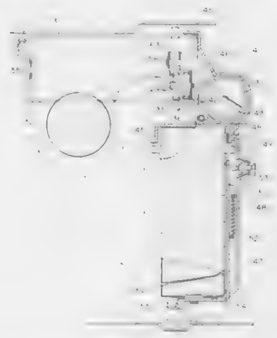
**Continuation of Ser. No. 598,022, Apr. 9, 1984, Pat. No. 4,611,730. This application May 23, 1986, Ser. No. 866,414**

**Claims priority, application Japan, Jan. 9, 1984, 59-1729**

**The portion of the term of this patent subsequent to Feb. 10, 2004, has been disclaimed.**

**Int. Cl.[4] B67D** *5/64, 3/00;* **B65D** *88/54;* **B67C** *3/26*

**U.S. Cl. 222—167** **13 Claims**



1. Apparatus for replenishing toner from a cartridge to a desired location, comprising:

a cartridge containing toner, said cartridge being open at an end thereof for the egrees of toner, there being a circumferentially-extending gear disposed on an outer surface thereof;

a toner replenishing device for releasably holding said cartridge, said toner replenishing device comprising stationary receiving means for receiving therein said open end of said cartridge so as to allow the toner to be transferred into the interior of said toner replenishing device as discharged from said open end of said cartridge and means for supporting said cartridge in a substantially vertical first position for mounting or dismounting of said cartridge, for re-positioning said cartridge to a non-vertical second position for toner replenishing operation, and for supporting said cartridge in said second position, said supporting means normally keeping said open end of said cartridge in

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rotatable and sealing contact with said receiving means, said toner replenishing device comprising rotation means rotatable about an axis of rotation of said toner replenishing device for accomplishing said re-positioning of said cartridge,

said toner replenishing device having a passage therein for allowing toner to pass from said cartridge to the interior of said toner replenishing device, said passage being disposed so as to communicate said open end of said cartridge with said interior of said toner replenishing device when said cartridge is in said second position;

driving means for rotating said cartridge about an axis of rotation of said cartridge, said driving means comprising gear means drivingly engaging said gear disposed on said cartridge when said cartridge is in said second position and being disengaged from said gear disposed on said cartridge when said cartridge is in said first position; and

transporting means for transporting toner from the interior of said toner replenishing device to said desired location.

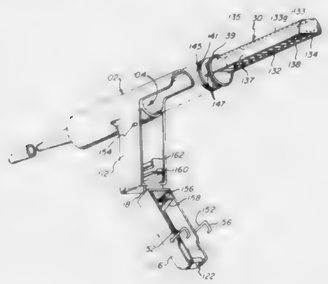
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**4,744,494**

## RAM GUN

**Richard H. Seager, Mystic, and Philip B. Hinkle, W. Hartford, both of Conn., assignors to Calumet Manufacturing Co., E. Orange, N.J.**

**Filed Dec. 1, 1986, Ser. No. 936,176**
**Int. Cl.[4] B67D** *5/42*
**U.S. Cl. 222—391** **13 Claims**



1. A ram gun for dispensing viscous fluid material comprising in combination:

a hollow housing adapted to receive fluid material to be dispensed;

nozzle means for dispensing material from said housing; ram means slidably mounted in said housing;

a ratchet rack disposed lengthwise on said ram means; a handle integral with said housing;

trigger means pivotally attached to the lower end of said handle;

means biasing said trigger means away from said handle in a direction away from said nozzle means;

pawl means disposed on said trigger means and adapted to engage said ratchet rack upon squeezing said trigger means against said handle; and

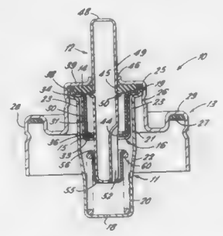
means limiting the distance through which the trigger means is biased away from said handle.

**4,744,495**

## VALVE FOR PRESSURIZED DISPENSING CONTAINERS

**Richard J. Warby, King's Lynn, England, assignor to Bespak PLC, King's Lynn, England**

**Filed Feb. 11, 1986, Ser. No. 828,379**
**Claims priority, application United Kingdom, Feb. 12, 1985, 8503553**
**Int. Cl.[4] B65D** *83/14*
**U.S. Cl. 222—402.16** **10 Claims**



1. A valve for dispensing metered doses from a pressurized dispensing container, said valve comprising:

a valve housing;

an outer nested component located within the housing,

an inner nested component nestably located within the outer nested component, and defining a metering chamber therein,

first and second valve seals having apertures, the valve seals closing off opposed ends of the metering chamber,

a valve stem in sliding engagement with the apertures in the seals and extending therethrough, the valve stem having an outlet orifice and an inlet orifice, the inlet orifice communicating with the metering chamber when the valve stem is in an operative position, and

a spring for urging the valve stem into an inoperative position, the spring located within the valve housing outside the metering chamber,

wherein one of the valve seals is trapped between said nested components and the inner component defines the volume of the metering chamber.

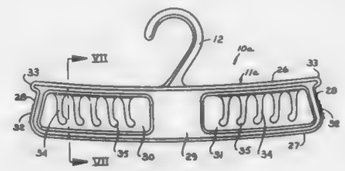
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**4,744,496**

## WRAPAROUND SKIRT AND SLACK HANGER WITH ANCHOR FINGERS

**Russell O. Blanchard, Zeeland, and John H. Batts, Grand Rapids, both of Mich., assignors to Batts, Inc., Zeeland, Mich.**

**Filed Mar. 26, 1987, Ser. No. 28,152**
**Int. Cl.[4] A47G** *25/30, 25/36*
**U.S. Cl. 223—95** **4 Claims**



1. A garment hanger having an elongated body, hook means for supporting said body midway between the ends thereof, said body having a depending end member at each end, said end members each having an outwardly facing garment engaging end surface shaped to resist downward sliding movement of a garment pulled around said members to press the garment against said end surfaces; a plurality of spaced fingers integral with and depending from said body intermediate said end members, said fingers being arranged in two groups, one on each side of the longitudinal center of said body, each of said fingers having a garment engaging and gripping surface directed and inclined toward the center of the hanger and away from the adjacent end of the hanger, whereby a selected pair of said fingers, one from each group, can grip and hold the stretched waistband of a garment which extends lengthwise along one face of said hanger and is wrapped firmly around both end members; the spacing between the fingers in one of the groups being different from that in the other of the groups and is such as to accommodate both full sizes and half sizes without waistband stretching which will result in permanent set of the plastic; and means spaced from the lower ends of the fingers joining said end members.



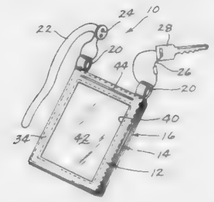
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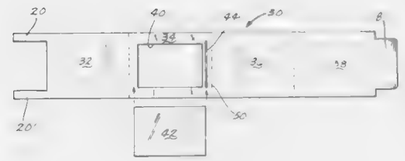
**4,744,497**

## SECURITY WALLET

**William T. O'Neal, 10449 Yorkford Dr., Dallas, Tex. 75238**

**Filed Dec. 10, 1986, Ser. No. 940,053**
**Int. Cl.[4] A45C** *1/06, 11/32*
**U.S. Cl. 224—202** **10 Claims**





1. A security wallet, comprising:

a body portion formed of a continuous linear strip of flexible material, said strip having a centerline, one end, and another end, said strip being divided into four rectangular panels of equal length, said strip being folded first along said centerline such that said one end is in registry with said another end, and being folded again such that both ends are in registry with the centerline, said body portion having an exterior and an interior, wherein two of said panels on one side of the centerline form exterior panels of said body portion and two of said panels on the other side of the centerline form interior panels of said body portion;

one of said panels on the exterior of said body portion adjacent the centerline having a window opening formed centrally therein and a slot opening formed adjacent the window opening, said slot being adapted to receive an identification card;

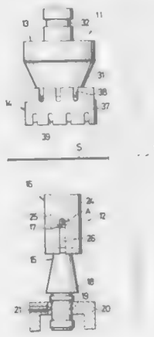
means for interconnecting the three sides of each panel remote from the centerline such that the exterior panel having the window opening and its adjacent interior panel forms an identification card compartment having said slot opening, the other exterior panel and its adjacent interior panel forms an open currency compartment, and the two interior panels form an open key compartment.

**4,744,498**

## BUTTON HOLDER/DIE ASSEMBLY IN A DEVICE FOR ATTACHING BUTTONS TO SHEET MEMBERS

**Takeshi Suzuki, Toyama, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan**

**Filed Aug. 13, 1986, Ser. No. 896,065**
**Claims priority, application Japan, Aug. 13, 1985, 60-124179[U]; Aug. 13, 1985, 60-124180[U]**
**Int. Cl.[4] B25C** *7/00*
**U.S. Cl. 227—140** **5 Claims**



5. A button holder/die assembly in a device for attaching a button to a sheet member, comprising:

a die having a button support, a frustroconical portion tapered toward said button support, and a neck disposed at the junction of said button support and said frustroconical portion; and

a tubular button holder of a resilient material movably fitted over said die for holding a button member, said tubular button holder having a cylindrical wall having means on one end thereof for supporting the button member and on the opposite end a plurality of radially inwardly extending lips normally engaging said neck,

said cylindrical wall having a plurality of circumferentially spaced slots extending axially to and opening at said one end of the cylindrical wall, said means comprising a plurality of retainers divided by said slots and extending radially inwardly beyond a circumferential edge of said button support for holding the button member on said button support;

said cylindrical wall having a plurality of circumferentially spaced second slots extending axially to and opening at said opposite end of the cylindrical wall, said lips being divided by said second slots, said first and second slots being staggered with respect to each other in the circumferential direction of said cylindrical wall.

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**4,744,499**

## SYSTEM FOR AUTOMATED MANUFACTURE OF PRESSURE VESSELS

**Daniel D. Johnson, and Robert L. Johnson, both of Tulsa, Okla., assignors to Lecco, Inc., Tulsa, Okla.**

**Filed Sep. 8, 1986, Ser. No. 904,549**
**Int. Cl.[4] B23K** *31/02*
**U.S. Cl. 228—4.1** **2 Claims**

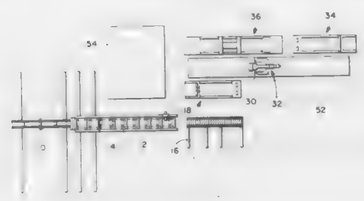
1. A system for the automated manufacture of a pressure vessel having a shell formed from an elongated length of cylindrical stock, comprising:

a cutting station having means for axially horizontally receiving a portion of an elongated length of cylindrical stock thereon;

means to cut said elongated length of cylindrical stock to a preselected length at said cutting station to form the vessel shell;

a first computer controlled shell indexing station having

means to rotate said shell about its horizontal cylindrical axis;
a computer controlled, multi-axes, arm robot, the robot having means to grasp and manipulate a cutting torch and a welding torch;
means to cut piping holes at preselected rotational and lonitudinal locations in said shell by the simultaneous positional controls of said robot and said first shell indexing station;
a second computer controlled shell indexing station having means to rotate said shell about its horizontal cylindrical axis;
means at said second indexing station to sequentially position



piping components in engagement with said shell at piping holes cut in said shell;
means to control said robot and said second shell indexing station to weld piping components to said shell;
a third computer controlled shell indexing station having means to rotate said shell about its horizontal cylindrical axis; and
means to control said robot and said third shell indexing station to weld heads onto said shell to close the ends thereof, said robot moving from said first, second and third indexing station in response to operator and computer controls, said shell being moved from said cutting station to said first, second and third indexing station in response to operator control.

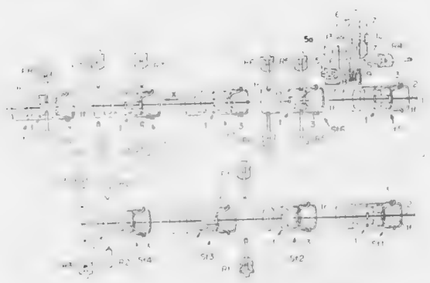
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**4,744,500**

## VEHICLE ASSEMBLY SYSTEM

**Mitunori Hatakeyama, and Mitsugi Taniguchi, both of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan**

**Filed Jan. 21, 1987, Ser. No. 5,643**
**Claims priority, application Japan, Jan. 22, 1986, 61-11654**
**Int. Cl.[4] B23K** *37/00*
**U.S. Cl. 228—4.1** **11 Claims**



1. A vehicle assembly system in which a plurality of vehicle bodies are successively conveyed in the same orientation with one of the front and rear of each vehicle body being opposed to the other one of the front and rear of the immediately rearward vehicle body, comprising
a single robot means for mounting (a) a first part on a leading one of the vehicles, and (b) a second part on the immediately rearward vehicle body; said single robot means being pivotable;
an overhead conveyor means;
an automatic traveling hanger means for independently controllable traveling along said overhead conveyor means;
a plurality of working stations, said automatic traveling conveyor traveling through each of said plurality of working station;
said single robot means being disposed in the vicinity of said overhead conveyor and in the vicinity of two predetermined ones of said plurality of working stations, said single robot means being capable of performing operations selectively at either one of said two predetermined working stations;
said two predetermined working stations being disposed within a swinging locus of an operating portion of said single robot means;
the space between said two predetermined working stations being smaller than a maximum space between other adjacent pairs of working stations.

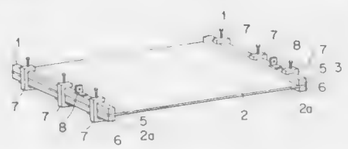
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**4,744,501**

## METHOD OF PREVENTING SAG OF PANEL AND APPARATUS THEREFOR

**Akira Sakaguchi, Kobe, and Tsuneo Kinoshita, Takasago, both of Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan**

**Filed Nov. 13, 1986, Ser. No. 930,184**
**Claims priority, application Japan, Dec. 6, 1985, 60-275298**
**Int. Cl.[4] B23K** *31/00*
**U.S. Cl. 228—102** **20 Claims**



1. A method for preventing the sag of a panel, comprising the steps of:
disposing a plate on a skeleton to which said plate is to be attached;
gripping the upper and lower surfaces of said plate at end parts of said plate with grasp electrodes of resistance heating means;
causing current to flow through said plate and said grasp electrodes so as to thereby preheat said plate to a predetermined temperature and thermally expand said plate;
welding said thermally expanded plate to said skeleton; and
developing a residual tensile stress in said plate owing to the thermal shrinkage deformation of said plate attendant upon cooling of said plate after said welding.

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**4,744,502**

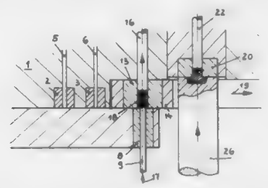
## PROCESS FOR THE PRODUCTION OF TRI-METALLIC CONTACT RIVETS

**Erwin Bollian, Rastatt, Fed. Rep. of Germany, assignor to Dr. Eugen Durrwachter Doduco Kg., Pforzheim, Fed. Rep. of Germany**

**Filed Mar. 26, 1982, Ser. No. 362,063**
**Claims priority, application Fed. Rep. of Germany, Mar. 28, 1981, 3112452**
**Int. Cl.[4] B23K** *21/00*
**U.S. Cl. 228—116** **4 Claims**

1. A process for the production of a tri-metallic contact rivet by cold pressure welding operation, comprising:
inserting three wire segments of congruous diameter but of different length and of different composition in a first guide bush which fits the same;
arranging the three wire segments, one behind another and impinging upon one another with their frontal surfaces, between an ejector pin which is displaceable lengthwise in the first guide bush, and an abutment with a cross-sectional area which is larger than the cross-sectional areas of the wire segments, which is arranged coaxially to the ejector pin outside the first guide bush and initially abutting the one end surface of the first guide bush;
pushing forward the ejector pin in the first guide bush and simultaneously withdrawing the abutment from the first guide bush coaxially with the forward movement of the ejector pin, so as to upset thereby the wire segments in accordance with decreasing distance between the adja-





cent surfaces of the ejector pin and of the abutment, and form a blank therefrom;
during the upsetting, leading the upset blank of the three wire segments into a second guide bush in which the abutment is displaceable;
the velocity of the abutment relative to the first guide bush being smaller than the velocity of the ejector pin relative to the first guide bush, and both velocities standing in constant ration to one another, and forming the rivet head by cold press working at one end of the blank formed from the upset three wire segments;
the cross-sectional area of the second guide bush being proportional to the cross-sectional area of the first guide bush, as the velocity of the ejector pin to the velocity of the abutment.

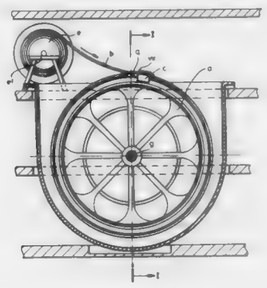
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**4,744,503**

## PROCESS AND APPARATUS FOR TENSIONING AN ENDLESS THIN METAL SHELL ON A WHEEL, ROLL OR DRUM

**Rupert Harreither, Baden, Austria, assignor to Austria Metall Aktiengesellschaft, Braunau am Inn, Austria**

**Filed Apr. 15, 1986, Ser. No. 852,253**
**Claims priority, application Austria, Apr. 15, 1985, 1116/85**
**Int. Cl.[4] B23K** *31/00*
**U.S. Cl. 228—125** **20 Claims**



1. A process for covering the periphery of a cylindrical metal drum with a thin metal shell which comprises:
unrolling a metal band onto said drum;
pressing said metal band continuously onto said drum until said b and surrounds said drum and ends of said metal band overlap;
clamping said metal band to said drum under tension by wrapping a clamping belt around said metal band;
with said band clamped under tension cutting said metal bands to length;
welding ends of said band together; and
finishing the resulting metal band.

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**4,744,504**

## METHOD OF MANUFACTURING A CLAD TUBULAR PRODUCT BY EXTRUSION

**William C. Turner, 85 Pinto La., Sedona, Ariz. 86336**

**Continuation-in-part of Ser. No. 694,347, Jan. 2, 1985, Pat. No. 4,620,660. This application Oct. 20, 1986, Ser. No. 920,598**
**The portion of the term of this patent subsequent to Nov. 4, 2003, has been disclaimed.**
**Int. Cl.[4] B23K** *1/00*
**U.S. Cl. 228—127** **18 Claims**



17. A method of manufacturing an internally clad tubular product employing a tubular host having a first and a second end, comprising:
(a) plating the internal surface of the tubular host with a low melting point bonded metal alloy;
(b) inserting a tubular cladding member into the plated tubular host the tubular cladding member having a first and second end, the tubular host and cladding member being of substantially the same length;
(c) circumferentially welding the first end of said cladding member to the first end of said tubular host;
(d) welding a circumferential bag between the second end of said tubular host and the second end of said tubular cladding member to form a sealed subassembly, the bag being in the substantial shape of one-half of a toroid cut in a plane perpendicular the circular axis providing an inner and outer circumferential surface, the inner circumferential surface being welded to the second end of said tubular cladding member and the outer circumferential surface being welded to the second end of said tubular host;
(e) evacuating the annular space between the exterior of said cladding member and the interior of said host and charging it with inert gas by attachment of apparatus to said bag in a manner to substantially remove all water and oxygen;
(f) heating the subassembly from about 1,650° F. to about 2,200° F.; and
(g) forming the heated subassembly in a mill to metallically bond the cladding member to the tubular host.

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**4,744,505**

## METHOD OF MAKING A HEAT EXCHANGER

**Gerald C. Calleson, Madison, Conn., assignor to The Allen Group, Inc., New Haven, Conn.**

**Continuation of Ser. No. 543,324, Oct. 19, 1983, abandoned. This application May 13, 1986, Ser. No. 867,402**
**Int. Cl.[4] B21D** *39/00, 53/00;* **B23K** *31/02;* **B21K** *29/00*
**U.S. Cl. 228—175** **8 Claims**

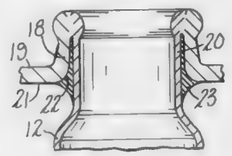
1. A method of affixing tubes of non-circular cross section to a wall of a header in a heat exchanger, wherein the wall has a

inner, liquid facing, side and an outer air facing side, comprising:

a. forming a plurality of collars in the header wall, each of said collars having an opening of substantially circular cross section, each of said collars projecting inwardly toward said liquid facing side;

b. shaping the ends of each of the tubes into a substantially circular cross section corresponding to a diameter which is slightly smaller than that of said collar opening;

c. inserting each of said tube ends into said collar openings so that the end portions of each tube extend through each collar opening;




d. thereafter expanding the outermost portion of said tube ends to create a tight fit between the end of the collar opening and the expanded portion of the tube end while leaving an annular opening between the body of the collar and the unexpanded remainder of the circular portion of said tube within said collar;

e. welding said expanded tube portions to the ends of said collars; and

f. bonding the tubes to the header by flowing a bonding material into said annular openings between the tube and the collar body.

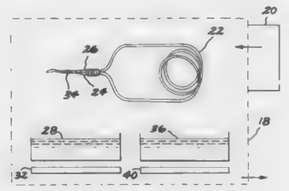
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**4,744,506**

**SUPERCONDUCTING JOINT FOR SUPERCONDUCTING WIRES AND COILS AND METHOD OF FORMING**

**Roy F. Thornton, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Division of Ser. No. 567,117, Dec. 30, 1983, Pat. No. 4,584,547.**
**This application Apr. 18, 1986, Ser. No. 853,794**
**Int. Cl.⁴ B23K** *1/20*
**U.S. Cl. 228—208** **19 Claims**




18. The method of forming a superconductor coil which comprises

forming a superconductor wire to have at least one strand of superconductor disposed in a carrier metal wire,

immersing the ends of the superconductor wire in first low melting liquid metal to dissolve the carrier metal from said at least one strand without oxidation of the exposed surface of said strand,

replacing said first liquid metal by a second low melting molten metal of a superconducting solder,

forming a strand to strand superconducting joint of the end sections of said wire by urging the exposed surfaces of said strands together while coated with said second molten metal, and

allowing said second low melting molten metal to solidify to hold the end sections of said strand together as a superconducting joint.

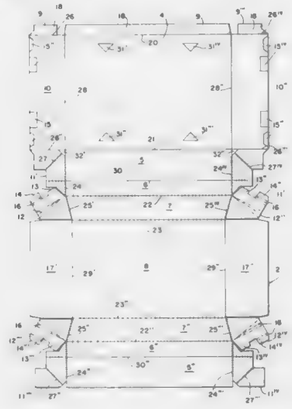
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**4,744,507**

**PACKAGING MATERIAL BLANK OF CARDBOARD OR THE LIKE FOR A MULTIPACK PACKAGE**

**Günter Morsbach, Neuendettelsauer Str. 34, 8500 Nürnberg 60, Fed. Rep. of Germany**

**Filed Feb. 20, 1986, Ser. No. 831,275**
**Claims priority, application Fed. Rep. of Germany, Feb. 20, 1985, 3505806**
**Int. Cl.⁴ B65D** *5/08*
**U.S. Cl. 229—40** **4 Claims**



1. A packaging material blank for a multipack package comprising

an upper part including

a cover part,

cover flaps connected by bending lines to opposite lateral sides of said cover part;

oblique panels connected by bending lines to opposite longitudinal sides of said cover part;

side panels connected by bending lines to each of said oblique panels on longitudinal sides opposite from the connection of said oblique panels to said cover part;

said side panels including upper and lower side panels connected to each other by bending lines;

a bottom part connected by a bending line to at least one of said side panels along a longitudinal side opposite from the connection of said side panel to said oblique panel;

side flaps connected on opposite lateral edges of said oblique panels and having perforated bending lines on said side flaps oriented to function for tolerance equalizing;

first bottom flaps connected by bending lines on opposite lateral edges of said bottom part;

second bottom flaps connected by bending lines on opposite lateral edges of said lower side panels;

said side flaps have side tabs extending therefrom;

said first bottom flaps have stamped indentations therein;

side tabs and indentations being oriented to allow said stamped indentations to receive said side tabs when said cover and bottom parts are in substantially parallel planes whereby a smooth surface is presented to said cover flaps when folded to overlie said first bottom flaps.

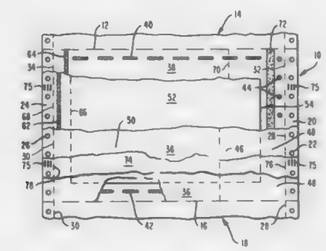


**4,744,508**

**CONTINUOUS FORM MAILER ASSEMBLY**

**Terry J. Fowler, Grapevine, Tex., and Jill H. Gehrhardt, Centerville, Ohio, assignors to NCR Corporation, Dayton, Ohio**

**Filed Jan. 20, 1987, Ser. No. 5,178**
**Int. Cl.⁴ B65D** *27/06*
**U.S. Cl. 229—73** **8 Claims**



1. A mailer assembly comprising a

front ply for receiving information thereon, said front ply including a body portion and a removable tab portion adjacent the body portion, said front ply having coated means for transferring information, a

back ply connected to said front ply along the side, top and bottom edges thereof to provide a pocket between the front and back plies, said back ply including a body portion for receiving information thereon and including a side portion having printed use instructions thereon and exhibited after removal of the tab portion from the front ply, and an

insert ply between the front and back plies and having coated means for transferring information onto said back ply, said front ply and said back ply each having a line of weakening at one side of the mailer assembly to define a marginal portion, and the front ply, the insert ply and the back ply each having a line of weakening at the other side of the mailer assembly to define a marginal portion, said insert ply being free of attachment to the front and back plies at one side thereof and extending to the edges of the front and back plies and being connected inwardly of the marginal portion at said other side of the mailer assembly with lines of adhesive positioned in offset manner to the front and back plies at the opposite side from said one side thereof, said insert ply having a line of weakening inwardly of the connection thereof with the back ply whereby the insert ply is removable with respect to the top and bottom plies, the side portion of said back ply being folded over the front ply for providing a return envelope assembly.

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**4,744,509**

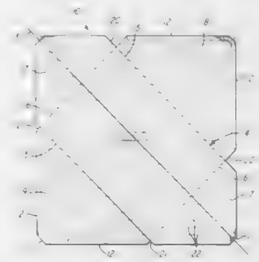
**FOLDABLE LETTER THAT CAN BE MAILED**

**Ingrid Büchler, Waldstrasse 86, D-6640 Merzig, Fed. Rep. of Germany**

**PCT No. PCT/DE85/00209, § 371 Date Feb. 19, 1986, § 102(e) Date Feb. 19, 1986, PCT Pub. No. WO86/00276, PCT Pub. Date Jan. 16, 1986**
**PCT Filed Jun. 20, 1985, Ser. No. 852,448**
**Claims priority, application Fed. Rep. of Germany, Jun. 20, 1984, 3422771; Mar. 7, 1985, 3508116**
**Int. Cl.⁴ B65D** *27/00*
**U.S. Cl. 229—92.1** **24 Claims**

1. A foldable letter that can be mailed, and including a sheet of paper having an essentially square basic shape within which, on both sides of said sheet of paper, there appears a rectangular field that is of such a size, and that is disposed non-symmetrically and at an angle relative to the square in such a way, that the corners of the rectangle inscribed in the square are spaced from the edges of the square; at those locations where the corners of the rectangle are near the edges of the square, triangular notches are provided in said square, with the most indented point of each of said notches coinciding with a corner of said rectangle; the four sides of said rectangle, namely two long sides and two short sides, each form both a folding line and a base of a triangular closure flap; after the closure flaps have been folded over to one side, the foldable letter can be sealed as a rectangular letter, with strips having an adhesive on one side being provided to secure said closure flaps; the improvement wherein:

the long sides of said rectangular field are parallel to an imaginary corner-to-corner diagonal of said square, but are disposed non-symmetrically relative to said diagonal in such a way that the four triangular closure flaps, after having been folded over to one and the same side, completely seal the foldable letter via overlapping ones of their edge portions, which are to be glued, whereby near these edge portions of some of said closure flaps, and on one side of the latter, strip-like sections are provided that have said adhesive provided thereon;



said notches of said square being of two different depths, with one pair of each being provided; one pair of notches of a first depth being disposed at opposite ends of one of said long sides of said rectangular field, and the other pair of notches of a second depth being disposed at opposite ends of the other of said long sides of said rectangular field, so that the two wider triangular closure flaps non-symmetrically overlap said rectangular field after being folded over.

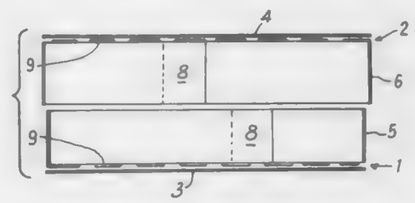
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**4,744,510**

**ASSEMBLY FOR PACKAGING OBJECTS**

**Jean Hochart, Soissons, France, assignor to Cartonneries de Saint-Germain, France**

**Filed Oct. 20, 1986, Ser. No. 921,959**
**Claims priority, application France, Feb. 24, 1986, 86 02480**
**Int. Cl.⁴ B65D** *3/28*
**U.S. Cl. 229—125.19** **10 Claims**




1. A box assembly for packaging objects, said box including a lower portion and an upper portion, one portion slidably fitting onto the other portion, comprising

a flat lower wall section;

a flat upper wall section, having a different surface area from said lower wall section; and

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a pair of elongated side wall sections, the side wall sections including a plurality of spaced apart tabs extending from one longitudinal edge of each section, said tabs being folded at substantially right angles to said elongated side wall section and said tabs of one side wall section being adherable to an inside perimeter surface of said lower wall section, and said tabs of the other side wall section being adherable to an inside surface of said upper wall section, such that when said elongated side wall sections are adhered to said lower and upper wall sections, respectively, said lower and upper portions of said box are formed said tabs being spaced apart in such a way that a substantial, empty area is defined between said each two adjacent tabs, said empty area having a substantially rectangular configuration and extending along said longitudinal edges of each section, said tabs on the lower and upper portions of said box extending substantially below and above a level of the longitudinal edges, respectively, so that a plurality of ventilation passages is defined between said tabs and said lower and upper wall sections.

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**4,744,511**

## AIR CONDITIONER FOR AUTOMOBILES

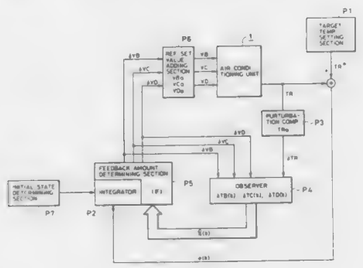
**Tohru Kakehi, Nagoya; Katsumasa Matsui, and Masahiro Ohba, both of Okazaki, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan**

**Filed Nov. 26, 1986, Ser. No. 935,683**

**Claims priority, application Japan, Nov. 27, 1985, 60-267022; Nov. 29, 1985, 60-270292**

**Int. Cl.⁴ F25D** *17/00;* **G05B** *13/04*

**U.S. Cl. 236—13** **15 Claims**



1. An air conditioner for a compartment of a vehicle, comprising:
(a) air duct means for supplying said vehicle compartment with air;
(b) supply heat quantity controlling means for controlling an amount of heat of the air supplied from said air duct means to said vehicle compartment;
(c) temperature setting means for setting a target temperature for air in said vehicle compartment;
(d) compartment temperature detecting means for detecting an actual temperature of air in said vehicle compartment as a detected compartment temperature;
(e) deviation computing means for computing a temperature deviation of said detected compartment temperature from said target temperature;
(f) temperature perturbation component computing means for computing perturbation components of said detected compartment temperature relative to a reference temperature of said vehicle compartment under a steady air-conditioning state according to a dynamic model used for controlling the heat quantity which is predetermined through system identification;
(g) internal state estimating means for estimating an estimated internal state of said dynamic model using said perturbation components computed by said temperature perturbation component computing means;
(h) initial state decision means for determining whether said supply heat quantity controlling means is in an initial state in which said supply heat quantity means is being started;
(i) adjusting amount perturbation component computing means for computing adjusting amount perturbation components of said supply heat quantity controlling means relative to a reference adjusting amount under said steady air-conditioning state in said dynamic model on the basis of said temperature deviation computed by said deviation computing means, said estimated interval state of said internal state estimating means, and the determination made by said initial state decision means; and
(j) control adjusting amount determining means for determining an adjusting control amount of said supply heat quantity controlling means on the basis of said adjusting amount perturbation components and said reference adjusting amount.

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**4,744,512**

## COMPOSITE SECTION, IN PARTICULAR COMPOSITE CONDUCTOR RAIL

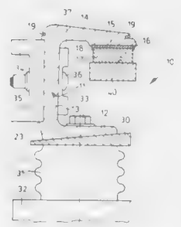
**Gerhard Mier, Singen, Fed. Rep. of Germany, assignor to Swiss Aluminium Ltd., Chippis, Switzerland**

**Filed Dec. 8, 1986, Ser. No. 938,823**

**Claims priority, application Fed. Rep. of Germany, Dec. 12, 1985, 3543831**

**Int. Cl.⁴ B61K** *7/02*

**U.S. Cl. 238—14.3** **10 Claims**



1. A composite conductor rail comprising a first part made of a light metal, said first part having a composite interface comprising a second substantially planar part made of a heavy metal having a first surface metallically bonded to a portion of said first part by extrusion and a second surface, and a wear resistant section bonded to said second surface of said second part by thermal means.

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**4,744,513**

## DEVICE AND PROCESS FOR THE ELECTROSTATIC COATING OF ARTICLES WITH FLUIDS

**Roland-Andreas Meisner, Senden, and Gerd-Rüdiger Kissau, Münster, both of Fed. Rep. of Germany, assignors to BASF Farben & Faser AG, Hamburg, Fed. Rep. of Germany**

**Continuation of Ser. No. 837,668, Mar. 4, 1986, abandoned, which is a continuation of Ser. No. 543,873, Oct. 20, 1983, abandoned. This application Jun. 15, 1987, Ser. No. 63,728**

**Claims priority, application Fed. Rep. of Germany, Oct. 21, 1982, 3238917; Nov. 10, 1982, 3241504**

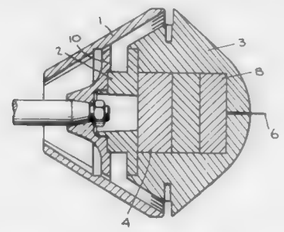
**Int. Cl.⁴ B05B** *5/04*

**U.S. Cl. 239—3** **24 Claims**

13. A process for electrostatically coating an article with liquids such as quick-evaporating paint, said process including feeding the liquid into a liquid atomizing bell having a cavity formed from a shell having an atomizing edge facing the article to be coated, rotating said bell about a fixed axis at high speed, maintaining said bell under high electrical potential of a single preselected polarity, and whirling the liquid in atomized form from the atomizing edge of the bell onto the article to be coated, the improvement comprising:



providing an electrical conducting displacing body connected to said bell in front of said bell cavity for aerodynamically deflecting said sprayed coating liquid flying back toward said displacing body and said body protruding along said axis outwardly from the bell cavity a substantial distance beyond the atomizing edge of said bell; and
generating from said body a magnetic field external to said body in front of said bell cavity.



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**4,744,514**

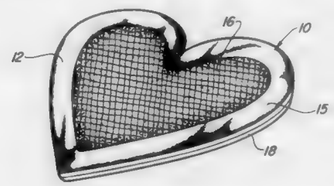
## SCENTED LAPEL ORNAMENT

**Susan M. Gadoua, 1911 Stellma La., Rochester, Mich. 48063**

**Filed Sep. 5, 1986, Ser. No. 903,601**

**Int. Cl.⁴ A61L** *9/04*

**U.S. Cl. 239—36** **4 Claims**



1. A rechargeable, scented ornament of essentially flat, flexible, laminated construction to be worn on a lapel or other location of person's clothing comprising:
a permeable, decorative top lamination a first portion of which consists of loose, open net-like fabric and a second portion of which consists of tightly woven, substantially closed fabric;
an absorbent center lamination, disposed immediately under, and held in place by, said top lamination, to receive and hold a charge of scented fluid; and
an adhesive backed, impermeable cloth lamination disposed immediately under said center lamination and substantially coextensive with said top lamination;
said laminations being joined to form a single essentially flat unit of decorative shape and cloth-like pliability.

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**4,744,515**

## AUTOMATIC WATER-SPRINKLING CONTROLLER

**Junichi Watanabe, Kusatsu, Japan, assignor to Konan Seiko Co., Ltd., Japan**

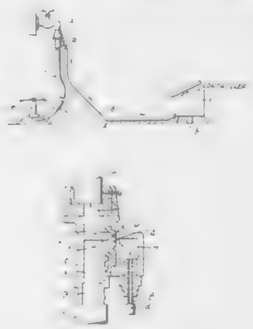
**Continuation of Ser. No. 658,381, Oct. 5, 1984, abandoned. This application Nov. 13, 1986, Ser. No. 930,983**

**Claims priority, application Japan, Nov. 2, 1983, 58-206631**

**Int. Cl.⁴ A01G** *27/00*

**U.S. Cl. 239—70** **3 Claims**

1. An automatic water sprinkling system for sprinkling an area of ground, which comprises:
a main valve adapted to be connected to a supply of water and hydraulically controllable to allow water to selectively flow therethrough to a sprinkler;
a microvalve hydraulically coupled to the main valve, the microvalve being operable in a first state for a selectable period of time to hydraulically control the main valve to allow water to flow through the main valve, the microvalve being responsive to a microvalve control signal;
means for sensing moisture, the moisture sensing means being in an activating condition when the sensed moisture is less than a predetermined value, the moisture sensing means comprising an elongated strip of moisture sensitive material disposed within a cover box having a first vented portion above the ground and a second porous portion in the ground, the second porous portion being filled with a water-absorptive material;
switch means operatively coupld to the moisture sensing means and responsive to the activating condition thereof,



the switch means providing a timing means actuating signal;
timing means for controlling the duration that the microvalve is in said first state, the timing means being responsive to the timing means actuating signal and providing a microvalve control signal; and
means for wetting the moisture sensitive strip of the sensing means, the wetting means being operatively coupled to the microvalve, wherein said moisture sensing means senses when the moisture is below the predetermined value and activates said switch means, said switch mans providing said actuating signal to the timing means to activate the timing means, whereupon said timing means provides said control signal to said microvalve to activate said microvalve for a predetermined period of time.

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**4,744,516**

## AIR ASPIRATED COOLING FOR SPRAY GUNS

**Gerald E. Peterson, St. Paul; Gary C. Polk, Eden Prairie; Richard W. Gunderson, Elk River; Warren J. Walsh, Waverly, all of Minn., and Ewald Kille, Friedrichshafen, Fed. Rep. of Germany, assignors to J. Wagner GmbH, Fed. Rep. of Germany**

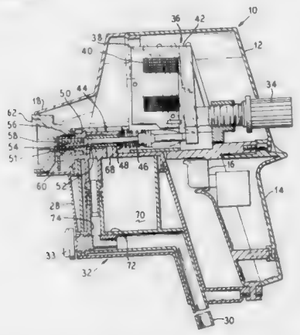
**Filed Aug. 22, 1985, Ser. No. 768,212**

**Int. Cl.⁴ B05B** *1/24*

**U.S. Cl. 239—128** **13 Claims**

1. A high pressure paint spray gun which includes:
a gun-like housing;
a spray tip at one end of the housing, said spray tip including a liquid atomizing spray nozzle having a spray pattern and a ribbed open-mesh spray structure about said nozzle and opening into said housing, said structure having a larger diameter downstream of the nozzle such that said structure lies substantially outside of the spray pattern from the nozzle;
housing associated wall means radially spaced from said nozzle substantially encircling said nozzle and extending downstream therefrom defining an area open to an interior of the housing, said wall means being substantially outside the spray pattern;

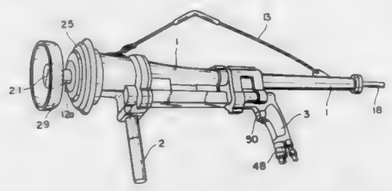
pump means in said housing for delivering a liquid under high pressure to said nozzle for spraying at a high velocity;
electric motor means in said housing for driving said pump means, said motor means generating heat during operation;
vent means formed in said housing adjacent said electric motor means;



whereby during spraying said liquid is sprayed at a high pressure and is atomized and creates a low pressure area forward of and adjacent said spray tip interior of said wall means, which cooperates in drawing air through said vents, over said electric motor means, through said housing and around said spray tip interior of said wall means, so as to aid in cooling said electric motor means.

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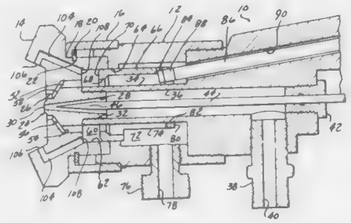
**4,744,517**
**ULTRA-HIGH-PRESSURE ROTARY WATER JET GUN**
**Toru Iwamoto; Eikichi Shinagawa, and Takayuki Adachi, all of Tokyo, Japan, assignors to Aiko Engineering Co., Ltd. and JSE Corporation, both of Tokyo, Japan**
**Filed Aug. 5, 1986, Ser. No. 893,280**
**Claims priority, application Japan, Aug. 9, 1985, 60-174025**
**Int. Cl.[4] B05B** *3/04, 1/34, 3/00*
**U.S. Cl. 239—263** **7 Claims**



1. An ultra-high-pressure rotary water jet gun comprising:
a housing having a grip at the rear-end thereof,
an eccentric rotor mounted in said housing,
a water supply tube rotatably mounted in an eccentric position with respect to the center of said eccentric rotor,
a nozzle cartridge carrying one or more nozzle tips connected on the front end of said water supply tube,
a hydraulic circuit for supplying ultra-high-pressure water to said water supply tube,
an actuator mounted in said housing to rotate said eccentric rotor, said actuator being an air turbine using pressurized air as its power source, said air turbine comprises a casing secured in said housing nearby said grip, said casing having an inlet port and an outlet port, a turbine rotor rotatably supported in said casing and having a spindle extending therefrom, a plurality of vanes radially fixed on said turbine rotor, a planetary gear mechanism connected to said spindle of said turbine rotor and, an output shaft provided to said gear mechanism to rotate said eccentric rotor,
an intake passage for feeding the pressurized air to said turbine rotor,
an exhaust passage for discharging waste air from said outlet port to the atmosphere,
an air control device mounted in said grip for opening and closing said intake passage, said air control device consists of a pilot valve mounted in said exhaust passage and in operative relation to the actuation of said operation member and a control valve mounted in said intake passage which is controlled by said pilot valve in a switching manner to open and close said intake passage,
an operation member mounted on a front portion of said grip to operate said air control device, and
a pneumatic circuit connected to a terminal portion of said intake passage so as to feed the pressurized air to said air turbine.

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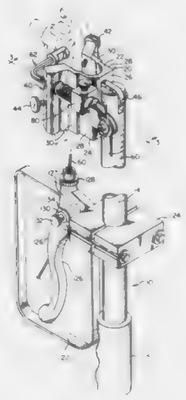
**4,744,518**
**FAN ADJUSTMENT FOR PAINT SPRAY GUN**
**Dennis W. Toth, Pontiac, Mich., assignor to Can-Am Engineered Products, Inc., Livonia, Mich.**
**Filed Nov. 12, 1986, Ser. No. 929,678**
**Int. Cl.[4] B05B** *1/28*
**U.S. Cl. 239—297** **4 Claims**



1. In a paint spray gun including a housing, an annular air cap mounted at the forward end of said housing, said air cap having a central air discharge opening extending coaxially therethrough, nozzle means mounted on said housing coaxially of said air discharge opening, said nozzle means having a paint discharge orifice at its forward end for discharging paint under pressure in a forwardly directed stream coaxially of said air discharge opening, first passage means in said housing for supplying paint under pressure to said discharge orifice, second passage means in said housing for supplying air under pressure to said air discharge opening to atomize paint discharged from said orifice into a spray, and third passage means in said air cap communicating with said second passage means for discharging air from diametrically opposed parts in said air cap to control fanning of said spray;
the improvement comprising valve means in said housing adjustably movable between a fully open and a fully closed position for adjusting the flow of air from said second passage means to said third passage means, the atomizing air and fanning air being discharged from a single chamber formed in the air cap forward of the valve means prior to discharge into said second and third passages, respectively, and manually operable means independent of said air cap for adjustably positioning said valve means.



**4,744,519**
**EXTENSION HOLDER DEVICE FOR PAINT SPRAYING APPARATUS**
**Brian W. Crowley, Box 3448, Midway, Wash. 98032**
**Filed Apr. 6, 1987, Ser. No. 34,928**
**Int. Cl.[4] B05B** *15/06*
**U.S. Cl. 239—532** **12 Claims**

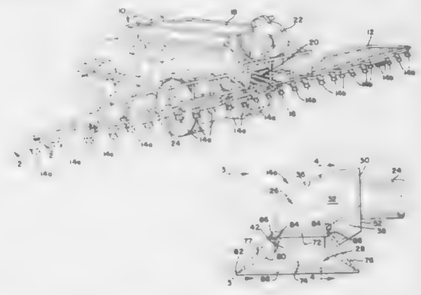


1. Spray gun holder and actuator mechanism for a painter's extension pole, comprising:
(a) a spray body member adapted to be secured to one end of said painter's pole and which is generally U-shaped and of a predetermined length to define a cavity area through its length to receive the handle portion of a spray gun, said body member having releasable holding means for securing said handle of said spray gun therein, said body member having an outside back section with pivotal means which is adapted to be removably attached to an extension pole,
(b) a spray gun trigger valve actuating means adapted to engage the trigger valve of a spray gun held in said cavity area, said actuating means including cable means operably attached to said actuating means, said cable means extending from said holder device along the length of said extension pole to a hand control means at the other end of said pole for exerting pull pressure on said cable means to cause movement of said actuating means and thereby to actuate said spray gun trigger valve,
(c) resilient return means mounted on said body member and operably connected to said cable means and to said actuator means such that positive release of said trigger valve from its actuated position to unactuated position is effected, said resilient return means also including quick adjustment means for adapting said actuating means and said cable means to changes in pole length and differences in spray gun configurations.

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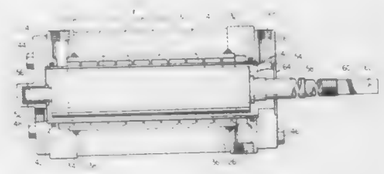
**4,744,520**
**PNEUMATIC SPREADER AND DISTRIBUTOR NOZZLES THEREFOR**
**Gerald L. Widmer, 1 Sunrise Ter., Bayles Lake, Loda, Ill. 60948**
**Filed Jun. 20, 1986, Ser. No. 876,691**
**Int. Cl.[4] A01C** *15/04*
**U.S. Cl. 239—654** **28 Claims**

1. A distributor nozzle for distributing materials suspended in a stream of fluid, said nozzle comprising:
a flow chamber;
an inlet opening into said chamber for introducing the materials suspended in the fluid to said chamber;
a discharge opening from said chamber for discharging the materials suspended in the fluid from said chamber, said discharge opening being spaced from said inlet opening and having a cross-sectional area greater than the cross-sectional area of said inlet opening; and
a discharge structure means adjacent to but downstream of said discharge opening, said discharge structure means comprising a deflector plate of increasing width and extending at an angle relative to and into the flow from said discharge opening, and a pair of spaced flared sidewalls on said deflector plate and which extend at an angle to each other and away from said discharge opening, the angle of said sidewalls being greater than the angle of spread of the materials issuing from said discharge opening.



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**4,744,521**
**FLUID FOOD PROCESSOR**
**Norman S. Singer; Shoji Yamamoto, and Joseph Latella, all of London, Canada, assignors to John Labatt Limited, London, Canada**
**Filed May 4, 1984, Ser. No. 606,978**
**Int. Cl.[4] B02C** *4/10*
**U.S. Cl. 241—66** **22 Claims**



1. A fluid substrate processor comprising:
a tube including an outer surface and an inner cylindrical surface having a central longitudinal axis;
means on said outer surface to carry a heat exchange medium;
an elongated cylindrical rotator rotatable about said central longitudinal axis of said tube, said rotator having a smooth surface and being located within said tube and oriented coaxially with said inner surface whereby there is provided a treatment zone consisting of a substantially unobstructed annular space of a uniform cross-sectional area, said annular space being not more than about 2 mm between said smooth surface of said rotator and said inner cylindrical surface of said tube;
means to rotate said rotator at high speed;
means external of said treatment zone, adapted to fill said treatment zone with a fluid substrate to be treated and thereafter to maintain said zone in a filled condition while providing for the through-put of said fluid substrate during the processing thereof through said treatment zone; and
a means to maintain said zone at sufficiently elevated pressure relative to ambient atmospheric pressure to prevent

the formation of a vapour phase within said zone which might otherwise result as a consequence of out-gassing of components contained in said fluid substrate at elevated treatment temperatures.

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**4,744,522**

## FOOD PROCESSOR WITH JUICE EXTRACTOR

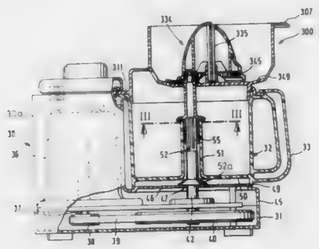
**Michael Borgmann; Egon Kunde, and Stefan Henn, all of Solingen, Fed. Rep. of Germany, assignors to Robert Krups Stiftung & Co. KG., Solingen, Fed. Rep. of Germany**

**Filed Dec. 18, 1986, Ser. No. 943,677**

**Claims priority, application Fed. Rep. of Germany, Dec. 20, 1985, 3545227; Dec. 20, 1985, 3545226**

**Int. Cl.⁴ A23N *1/00*; A02C *18/12***

**U.S. Cl. 241—92** **24 Claims**



1. A food processor comprising a housing; a prime mover installed in said housing and having an upright rotary output member; a bowl removably mounted on said housing and having an open top and a bottom portion with an opening for said output member; a receptacle removably mounted on and having an apertured bottom wall overlying the open top of said bowl; a rotary juice extractor in said receptacle; and means for transmitting torque from said output member to said juice extractor, said extractor being rotatable by said torque transmitting means about a first axis, and said output member defining a discrete second axis other than said first axis, said torque transmitting means including a torque transmitting member which is interposed between said output member and said extractor, and said torque transmitting member being rotatable about said second axis by said output member and being arranged to directly engage said extractor.

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**4,744,523**

## WHOLE EAR CORN CONVERSION METHOD EMPLOYING BREAKING OF WHOLE EARS BEFORE SHELLING KERNELS AND GRINDING COBS

**Samuel E. High, Jr., Lititz, and Aquila D. Mast, Lancaster, both of Pa., assignors to Feedmobile, Inc., Lititz, Pa.**

**Division of Ser. No. 599,129, Apr. 11, 1984. This application Jul. 14, 1986, Ser. No. 885,058**

**Int. Cl.⁴ B02C *19/12***

**U.S. Cl. 241—3** **4 Claims**




1. A method of converting a livestock feed material, such as whole ears of corn, from a first condition having lower nutritional value into a second condition having higher nutritional value, comprising the steps of:

(a) receiving whole ears of corn, being in said first condition, and breaking the same into smaller pieces by impacting the whole ears to cause a snapping action which breaks the ears but leaves substantially all of the kernels intact on the broken ear pieces, said kernels intact on the broken ear pieces along with any kernels separated therefrom being relatively unaffected by said snapping action so as to be left in a substantially unbroken condition precedent to a subsequent cracking thereof;

(b) stripping husks from said corn ears simultaneously with said breaking of said whole ears of corn into said smaller pieces;

(c) throwing and blowing said smaller, broken corn ear pieces together with any separated kernels and stripped husks upwardly along a predetermined transfer path;

(d) separating said smaller, broken corn ear pieces moved along said transfer path into kernels and pieces of cobs and husks;

(e) cracking said kernels separated by said snapping action and said kernels separated in said immediately preceding separating steps into smaller pieces;

(f) grinding said separated pieces of cobs and husks into fine cob and husk particles; and

(g) recombining said smaller, cracked pieces of kernels and fine particles of cobs and husks into a mixture of feed material being in said second condition.

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**4,744,524**

## EQUIPMENT FOR MAKING NO-BEANY FLAVOR SOYMILK

**Rajendra P. Gupta, and Rashmi R. Gupta, both of Ottawa, Canada, assignors to Prosoya Corporation, Maryland Heights, Mo.**

**Filed Apr. 1, 1987, Ser. No. 32,538**

**Int. Cl.⁴ B02C *19/12***

**U.S. Cl. 241—36** **8 Claims**




1. An equipment for making aqueous extracts of protein and oil containing seeds, said equipment comprising:

an enclosure to maintain an environment devoid of free-oxygen to prevent seed enzymes from producing off-flavors and bitter taste during the disintegration of said seeds at a temperature which is lower than the temperature required to inactivate the enzymes and concomitantly insolubilize the seed proteins;

means to remove completely free-oxygen or air from said enclosure;

means to disintegrate said seeds;

means to introduce into said enclosure said seeds and an aqueous medium in the desired proportions; and

means to extract the slurry of disintegrated seeds in said aqueous medium from said enclosure;

wherein

said aqueous medium comprises a liquid selected from a group consisting of ordinary water, deaerated water, dilute aqueous solution of an acid, dilute aqueous solution of an alkali, and dilute aqueous solution of a salt.



**4,744,525**

## DEVICE FOR REGULATING THE RETENTION TIME OF THE MATERIAL IN A GRINDING MILL

**Vincent Ortega De La Orden, Brussels, Belgium, assignor to Slegten Societe Anonyme, Belgium**

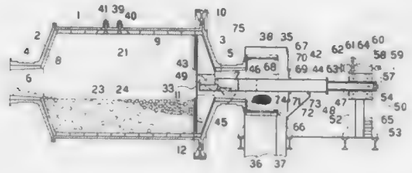
**PCT No. PCT/BE86/00003, § 371 Date Oct. 6, 1986, § 102(e) Date Oct. 6, 1986, PCT Pub. No. WO86/04526, PCT Pub. Date Aug. 14, 1986**

**PCT Filed Jan. 27, 1986, Ser. No. 921,043**

**Claims priority, application Luxembourg, Feb. 8, 1985, 85767**

**Int. Cl.⁴ B02C *17/00***

**U.S. Cl. 241—171** **11 Claims**



1. A device for regulating the retention time of material ground in a grinding mill, comprising:

a cylindrical casing having first and second opposed sides with said first side including an inlet opening and said second side including an outlet opening, said casing adapted for rotary motion about a longitudinal axis passing through said inlet and outlet openings:

a wall in said casing having a plurality of apertures therethrough, said wall being spaced from said second side and said outlet opening of said casing, a reservoir chamber being defined between said wall and said second side wherein sufficiently ground material passes through said apertures of said wall and insufficiently ground material does not pass through said apertures of said wall, said reservoir chamber including an outlet aperture communicating with said outlet opening of said casing;

lifting means in said reservoir chamber for lifting ground material upwardly when said casing undergoes rotary motion and for discharging the lifted material towards said outlet aperture;

discharge scoop means spaced from said cylindrical casing and extending into said reservoir chamber through said outlet opening and aperture, said scoop means being substantially coaxial with said longitudinal axis of said casing, said scoop means comprising a hollow longitudinal member having an upper surface and a lower surface, said scoop means including a first opening on said upper surface and a second opening on said lower surface, said first and second opening being spaced along said longitudinal axis from each other;

means for adjustably moving said discharge scoop means longitudinally along a plurality of positions between a first position within said reservoir chamber adjacent said wall thereof and a second position withdrawn from said reservoir chamber; and

said discharge scoop means cooperating with said lifting means to recirculate within said reservoir chamber a controllable amount of ground material discharged by said lifting means.

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**4,744,526**

## CONSTANT TENSION REEL WITH AUTOMATIC REEL BAR LOADER

**Djuro Kremar, N.D. Ile Perrot, Canada, assignor to Valmet-Dominion Inc., Lachine, Canada**

**Filed Jul. 30, 1987, Ser. No. 79,878**

**Int. Cl.⁴ B65H *19/30, 18/16*; B21C *47/24***

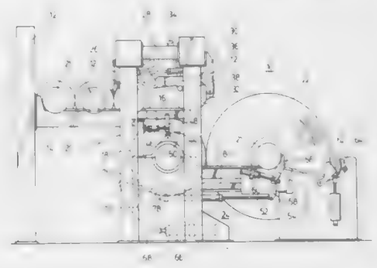
**U.S. Cl. 242—65** **11 Claims**

1. A reel bar loader for loading a reel into winding position in a paper making machine, comprising:

rail means sloping downwardly from one end towards the other end thereof for carrying at least one reel;

means for positively locating one reel at the other end of the rail means in a pre-winding position above a driving roll of the paper making machine;

means for collapsing the other end of the rail means to move the reel into a first winding position engaging the driving roll and to control initial nip pressure with the driving roll while the locating means continues to positively locate the one reel on the other end of the rail means; and,



transfer arm means pivotally movable between a first loaded position for accepting the reel from the locating means and a second loaded position positioning the reel in a second winding position remote from the rail means, said transfer arm means including means for controlling the nip pressure between the reel and the driving roll during pivotal movement from the first loaded position to the second loaded position and for controlling nip pressure between the driving roll and the reel in said second winding position as paper winds into a wound roll on said reel.

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**4,744,527**

## FILM CASSETTE

**Jack H. Coote, Rochford, and George F. A. M. Turner, Ingatestone, both of England, assignors to Ciba-Geigy AG, Basel, Switzerland**

**Filed Feb. 11, 1987, Ser. No. 13,891**

**Claims priority, application United Kingdom, Feb. 11, 1986, 8603253**

**Int. Cl.⁴ G03B *17/26***

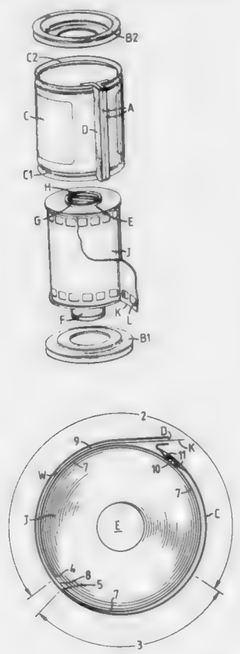
**U.S. Cl. 242—711** **6 Claims**

1. A cassette formed by a tubular wall and opposed end caps attached thereto, said cassette adapted to contain a length of photographic film wound on a spool and which has an exit-slot from which the film is pulled from the cassette, the cassette including a scroll control chamber therein which is formed from a continuous strip of light opaque resilient material having first and second portions of first and second widths, respectively, said first width being greater than said second width, and having first and second lengths, respectively, said first length being greater than said second length, said first portion being positioned by interlocking means in the cassette, said first portion being such that it is disabled by said end caps from touching an inside wall of the cassette, and said second portion having an end resiliently abutting the inside wall of the cassette and defining a slot with an opposed end of said first portion, the scroll control chamber being so located in the cassette that it is able to acommodate a length of photographic film wound

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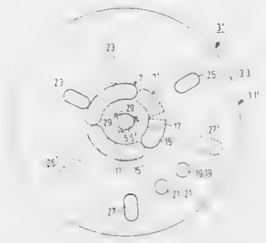
on a spool, a leading end of the film being led from the spool through said slot, then passing between the inside wall of the



cassette and an outer wall of the first portion of the strip to said exit-slot.

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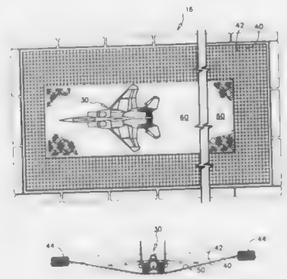
**4,744,528**
**COLLAPSIBLE REEL**
**Leo M. Winters, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**
**Filed Apr. 3, 1987, Ser. No. 33,712**
**Claims priority, application Netherlands, Dec. 22, 1986, 8603248**
**Int. Cl.[4] B65H *75/18***
**U.S. Cl. 242—71.8** **10 Claims**



1. A collapsible reel which is composed of two identical halves each half comprising a flat circular flange having a central opening and a number of expansion members arranged near the central opening, said expansion members being regularly distributed in the circumferential direction and being bounded by incisions, each expansion member having a folding rib and a hinge rib across it, each expansion member including a securing vane and a bridge part, each securing vane being joined to its associated bridge part by its associated folding rib, each said bridge part being joined to the flange by its associated hinge rib, each said hinge rib extending parallel to its associated folding rib, said two reel halves being joined by means of said securing vanes to form said reel, said bridge parts constituting the reel core, said incisions extending substantially in or tangentially to the circumferential direction of the central opening and said folding ribs and said hinge ribs being arranged so that the reel can be extended by a relative rotational movement of the two reel halves.

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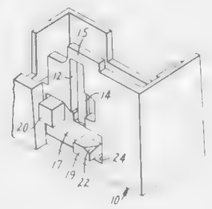
**4,744,529**
**SYSTEM AND METHOD FOR RECOVERY OF DISABLED AIRCRAFT**
**John G. Clarke, P.O. Box 4760, San Ysidro, Calif. 92073**
**Filed Oct. 14, 1986, Ser. No. 917,843**
**Int. Cl.[4] B64F *1/00***
**U.S. Cl. 244—114 R** **19 Claims**



1. An aircraft recovery system, comprising;
an enlarged net having a generally rectangular configuration; and
peripheral support means extending around and totally enclosing said net for supporting said net in a stationary position near the surface of a body of water for enabling an aircraft to land on water above said net and for receiving and supporting said aircraft in a partially submerged position at the surface of said body of water indefinitely, said peripheral support means comprises a plurality of floats secured around the perimeter of the net.

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**4,744,530**
**CARTRIDGE DOOR-LATCHING MECHANISM**
**Claude E. Cybulski, and Gregory H. Johnson, both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**
**Filed Sep. 12, 1986, Ser. No. 906,445**
**Int. Cl.[4] G11B *23/04***
**U.S. Cl. 242—198** **6 Claims**



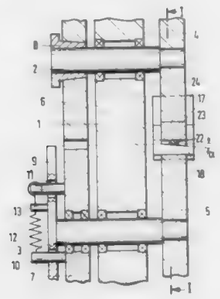
1. Door-latching mechanisms for a cartridge that comprises a molded plastic casing on which is pivotably mounted a door affording access to the interior of the cartridge, said casing having a wall formed with an opening, a plastic arm attached to and projecting from the wall to provide a cantilevered plastic spring, the free end of the arm being formed with a



door-locking pawl which extends through the opening to engage and lock the door when the spring is at rest, and unlock the door when the spring is flexed.

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**4,744,531**
**ARRANGEMENT FOR COMMINUTING SCRAP IN RIBBON OR STRIP FORM FROM, FOR EXAMPLE, STEEL PLATE**
**Friederich Hasenkamp, Nettetal, Fed. Rep. of Germany, assignor to Metallverarbeitung Breyell-Dinslaken GmbH, Nettetal, Fed. Rep. of Germany**
**PCT No. PCT/DE86/00480, § 371 Date Mar. 31, 1987, § 102(e) Date Mar. 31, 1987, PCT Pub. No. WO87/03231, PCT Pub. Date Jun. 4, 1987**
**PCT Filed Nov. 26, 1986, Ser. No. 34,177**
**Claims priority, application Fed. Rep. of Germany, Nov. 28, 1985, 3541984**
**Int. Cl.[4] B02C *18/24***
**U.S. Cl. 241—101.2** **12 Claims**



1. Apparatus for comminuting scrap in ribbon form comprising a support means, first and second shafts rotatably mounted on said support means, a first rotor fixed to said first shaft, a second rotor fixed to said second shaft, first knife means mounted on and extending to the periphery of said first rotor, second knife means mounted on and extending to the periphery of said second rotor such that upon rotation of said first and second rotors synchronously in opposite directions, said first and second knife means are moved to a juxtaposed and mutually cooperable position to effect cutting of said scrap, a first gear wheel disposed on said first shaft, first mounting means mounting said first gear wheel on said first shaft to preclude relative rotation between said first gear wheel and said first shaft, a second gear wheel disposed on said second shaft so as to be rotatable relative to said second shaft, and an elastic driving means between said second gear wheel and said second shaft which elastically connects said second gear wheel to said second shaft.

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**4,744,532**
**AIRCRAFT FLIGHT CONTROL SYSTEM**
**Bernard Ziegler, Leguevin; Michel Durandeau, and Thierry Collard, both of Toulouse, all of France, assignors to Societe Nationale Industrielle et Aerospatiale, Paris, France**
**Continuation of Ser. No. 925,509, Oct. 30, 1986, abandoned, which is a continuation of Ser. No. 689,174, Jan. 7, 1985, abandoned. This application Sep. 1, 1987, Ser. No. 93,100**
**Claims priority, application France, Jan. 9, 1984, 84 00206; Jan. 9, 1984, 84 00207**
**Int. Cl.[4] B64C *9/00***
**U.S. Cl. 244—75 R** **15 Claims**

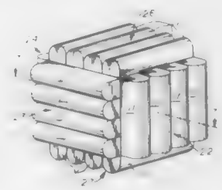
1. In an aircraft, an electrical-mechanical compound flight control system comprising:
piloting means (12);
computer means (21, 22) receiving piloting orders from said piloting means (12);
ailerons (6), upper surface spoilers (7) and upper surface air-brakes (8);
first, second and third actuator means (13, 14, 20) for respectively actuating said ailerons (6), said upper surface spoilers (7) and said upper surface air-brakes (8), said first, second and third actuator means being electrically controlled by said computer means (21, 22) and said ailerons (6) being exclusively actuated by said first actuator means (13);
a rudder (9) mechanically controlled by said piloting means (12);
elevators (10);



fourth actuator means (15) for actuating said elevators (10), said fourth actuator means (15) being electrically controlled by said computer means (21, 22) and said elevators (10) being exclusively actuated by said fourth actuator means (15);
horizontal stabilizers (5) with variable angle of incidence;
a hand-operated mechanical member (17);
a fifth actuator means (16) for actuating said horizontal stabilizers (5), said fifth actuator means (16) being electrically controllable by said computer means and mechanically controllable by said hand-operated member (17).

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**4,744,533**
**MODULAR SPACE STATION**
**Charles F. Mullen, 204 Yacht Club La., Seabrook, Tex. 77586**
**Filed Aug. 25, 1986, Ser. No. 900,094**
**Int. Cl.[4] B64G *1/12***
**U.S. Cl. 244—159** **29 Claims**

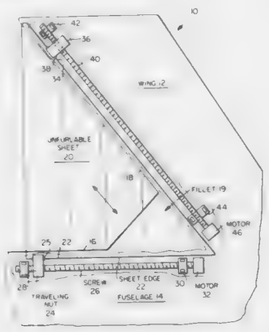


1. A space station structure assembled in orbit comprising;
a plurality of hollow modules transported into orbit by rocket and peripherally joined in a predetermined pattern to form a complete enclosure about a common interior volume, without an interior supporting framework.

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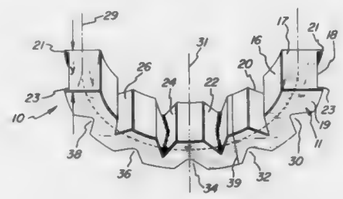


**4,744,534**
**UNFURLABLE MEMBER FOR INCREASING WING SURFACE AREA**
**Marshall J. Corbett, East Northport, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.**
**Filed Feb. 5, 1986, Ser. No. 826,514**
**Int. Cl.[4] B64C** *3/54*
**U.S. Cl. 244—218** **3 Claims**




1. An aircraft structure for selectively increasing the wing surface area of an aircraft, the structure comprising:
a hollowed fillet located at the corner formed between a fuselage and a confronting edge of the wing for enhancing the airfoil of the aircraft in the corner;
wherein the wings are fixed to the fuselage at a fixed sweep angle to define the corner;
an unfurlable sheet of flexible material normally stored within the fillet; and
means located substantially entirely within the aircraft for unfurling the sheet from the fillet to a deployed position substantially coplanar with the wing.

**4,744,535**
**PIPE SEAT**
**George A. Patenaude, P.O. Box 408, Mechanicville, N.Y. 12118**
**Filed Mar. 24, 1987, Ser. No. 29,542**
**Int. Cl.[4] F16L** *3/00*
**U.S. Cl. 248—74.1** **16 Claims**



1. A seat capable of being positioned between a portion of pipe and surrounding pipe support such that the seat cradles the pipe and isolates the pipe from the pipe support, said seat comprising:
a performed rigid body member manufactured of an engineered resin and having a substantially arc-shape, said body member having a top surface and a bottom surface, said top surface being formed to engagably cradle said pipe and said bottom surface being formed to engagably conform to the contour of a portion of said pipe support when said seat is positioned between said pipe and said support, said top surface having at least one channel therein sufficient to allow air flow about said pipe and thereby inhibit the collection and retention of corrosive material on said pipe in the vicinity of said support.

**4,744,536**
**COLLAPSABLE POLE AND STAND COMBINATION**
**Cecil G. Bancalari, Los Angeles County, Calif., assignor to ICU Medical, Inc., Mission Viejo, Calif.**
**Filed Jun. 25, 1986, Ser. No. 843,557**
**Int. Cl.[4] A47G** *29/00*
**U.S. Cl. 248—125** **11 Claims**



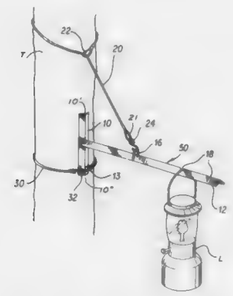
1. A collapsible pole/stand including:
a base having a central hub and a plurality of legs extending radially outwardly from the hub, each leg having one end pivotally connected to the hub and adapted to fold inwardly and upwardly about its pivot connection to the hub,
a vertically extending pole including a plurality of telescoping segments that allow the pole to collapse inwardly, with the smaller diameter segments being received in larger diameter segments, and means for locking the segments in the extended position and unlocking these segments to allow them to collapse inwardly, and,
a hanger member secured to the end of the pole and disposed generally at a right angle with respect to the pole, said hanger member having outwardly extending end sections which are pivotally mounted to fold inwardly, and movable means that in a first position retain the end sections in an outwardly extended position and in a second position allow the end sections to be folded inwardly.

**4,744,537**
**HANGER BRACKET**
**Robert R. Buckley, 12400 28th Pl. North, Plymouth, Minn. 55441**
**Filed Apr. 24, 1987, Ser. No. 42,040**
**Int. Cl.[4] E04G** *3/00*
**U.S. Cl. 248—219.1** **5 Claims**

1. A hanger apparatus for supporting various types of articles in a spaced manner from vertical structures of varying diameters comprising:
a vertical angle bracket having two longitudinally extending divergent legs terminating in a top end and a bottom end, fastener receiving means on said bracket adjacent said bottom end,
a substantially horizontally disposed support arm having one end affixed to said vertical angle bracket intermediate said top and bottom ends, a fastener receiving element on said support arm spaced from said vertical angle bracket,

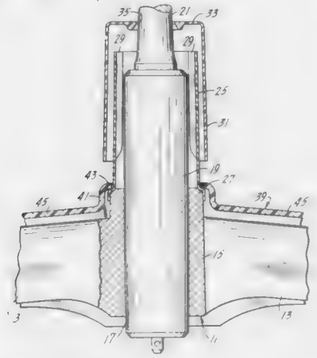


an elastic band having opposite ends each provided with a fastener element,
a flexible rope sling having means at one end engageable about a vertical support structure and fastener means at its opposite end, whereby



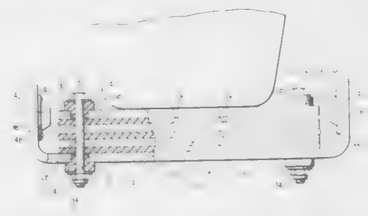
said hanger apparatus is attachable to a vertical support structure with said angle bracket flanges engageable therewith and rigidly secured thereto as said elastic band encircles said support structure with said fastener elements attached to said receiving means to hold said bottom end as said rope sling fastener means grasps said support arm receiving element.

**4,744,538**
**DECORATIVE CAP AND BASE COVER FOR AN OFFICE CHAIR CENTER POST AND BASE**
**William K. Hofman, Coopersville, Mich., assignor to The Shaw-Walker Company, Moskegon, Mich.**
**Filed May 8, 1987, Ser. No. 47,287**
**Int. Cl.[4] A47B** *95/00*
**U.S. Cl. 248—345.1** **2 Claims**



1. In an office chair having:
a metal base with a central tubular hub and a plurality of base arms extending radially from the central tubular hub,
a height adjustment mechanism cylinder positioned in the central tubular hub with a portion of the cylinder extending above the hub,
a rod extending upwardly from the height adjustment mechanism cylinder,
a tubular plastic sleeve surrounding the upper portion of the height adjustment mechanism cylinder which extends above the hub,
a plastic cylindrical cap telescoping over the tubular plastic sleeve, with the height adjustment mechanism rod extending through a central opening in the top wall of the cap to engage the cylindrical cap to raise and lower it relative to the tubular plastic sleeve as the height adjustment rod is raised and lowered,
a plastic cover for the metal base, said cover having a central hub portion which fits over the central tubular hub of the metal base and arms which fit over the arms of the metal base, and
means to fasten the plastic cover to the metal base,
the improvement comprising an outwardly flaring shoulder formed on said tubular plastic sleeve at its lower end, which shoulder engages and rests upon the central tubular hub of the metal base, and an inwardly projecting shoulder formed integrally with the central hub portion of the plastic cover, which inwardly projecting shoulder fits over and engages the outwardly flaring shoulder of the tubular plastic sleeve to prevent the tubular plastic sleeve from lifting off the hub as the height adjusting rod is raised.

**4,744,539**
**VEHICLE MOUNTING ARRANGEMENT**
**David F. Stimeling, Orefield, Pa., assignor to Mack Trucks, Inc., Allentown, Pa.**
**Filed Jan. 21, 1987, Ser. No. 5,766**
**Int. Cl.[4] F16M** *3/00*
**U.S. Cl. 248—638** **8 Claims**



1. An engine mounting arrangement for mounting an engine on a vehicle frame, said frame including a cross member, said mounting arrangement comprising:
(a) a support member secured to said cross member, said support member including a horizontal portion and an upwardly extending leg at each end of said horizontal portion;
(b) a laminated elastomeric member mounted on said horizontal portion of said support member for supporting the front end of the engine;
(c) said laminated elastomeric member comprising a plurality of first horizontally-extending sheets of elastomeric material and a plurality of second horizontally-extending metal sheets, said first and second plurality of sheets being disposed in alternating fashion to form said laminated member, adjacent metal sheets being prevented from contacting each other by the interposed sheets of elastomeric material;
(d) means for attaching said laminated member to said support member; and
(e) stop means mounted on each of said legs in alignment with the ends of said laminated member for limiting lateral movement.

**4,744,540**

## CASTING MOLD FOR MANUFACTURING GRID PLATES FOR LEAD BATTERIES

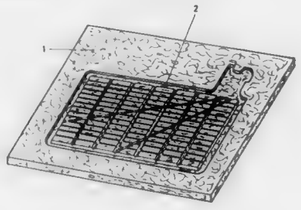
**Klaus Salamon, Kelkheim, and Bernhard Kallup, Aschaffenburg, both of Fed. Rep. of Germany, assignors to Varta Batterie Aktiengesellschaft, Hanover, Fed. Rep. of Germany**

**Filed Sep. 11, 1986, Ser. No. 906,739**

**Claims priority, application Fed. Rep. of Germany, Sep. 20, 1985, 3533581**

**Int. Cl.⁴ B22D** *25/04*

**U.S. Cl. 249—60** **8 Claims**



1. A casting mold for manufacturing grid plates for lead batteries including a mold insert and an external metallic mold insert holder receiving said insert, said mold insert being made of a highly porous, non-woven fiber material having a relief impression in a surface thereof for casting said grid plates, and said insert holder being capable of interchangeably receiving inserts having varying relief impressions therein.

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**4,744,541**

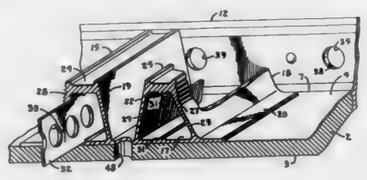
## MULTIPLE PURPOSE CONCRETE FORM

**Michael G. Carlson, Lenexa; Ronald A. Ward, Overland Park, both of Kans., and Terry H. Jolin, Lee Summit, Mo., assignors to Western Forms, Inc., Kansas City, Mo.**

**Filed May 12, 1986, Ser. No. 862,249**

**Int. Cl.⁴ E04G** *9/02*

**U.S. Cl. 249—192** **4 Claims**



4. A set of multipurpose concrete form panels each comprising:

(a) a face sheet having front and back surfaces, top and bottom end edges and spaced side edges;

(b) a frame of continuous rails having a depth dimension and with said face sheet being set into said frame so that said rails project rearwardly;

(c) a plurality of cross members mounted against said face sheet and extending between and secured to said rails for providing rigidity to said frame;

(d) of said cross members including a unitary pair of parallel, hollow ribs arranged in a hat section and including spaced legs joined together at a top strip, said ribs being spaced by a groove and with a web extending across a base of said legs, and extending between and enclosing said ribs, and positioned flat against aid face sheet; and

(e) bores extending through said rails for inserting connecting fasteners to join said panels together side by side, said bores being positioned through said rails at points between said ribs in each pair thereof and aligned with said groove, whereby said cross members are rigidly connected in a line to resist deflection under load.

**4,744,542**

## HYDRAULIC CONTROL APPARATUS

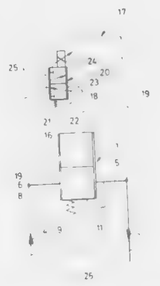
**Martin Heusser, Munich, Fed. Rep. of Germany, assignor to Heilmeier & Weinlein Fabrik fur Oel-Hydraulik GmbH & Co. KG, Munich, Fed. Rep. of Germany**

**Filed Apr. 10, 1987, Ser. No. 37,028**

**Claims priority, application Fed. Rep. of Germany, Apr. 15, 1986, 3612684**

**Int. Cl.⁴ F16K** *31/124*

**U.S. Cl. 251—30.01** **10 Claims**



1. A hydraulic control apparatus comprising a throttle valve (1) including a hydraulically adjustable orifice (14) disposed between an inlet passage (4) and an outlet passage (5), and a three-way pilot valve (20) having a valve element (23) connected to an external actuator (24), the inlet of said pilot valve being connected to an inlet control pressure passage (16), and its control outlet, to a chamber (10) of said throttle valve (1) in which a throttle element (7) is displaceable against the pressure in said outlet passage (5) and the force of a spring (9), characterized in that the second outlet of said three-way pilot valve (20) is connected to said outlet passage (5), that said valve element (23) of said three-way pilot valve (20) is subjected to the pressure at said control outlet in opposition to the force of said external actuator (24), and in the opposite direction, to the pressure at said second outlet of said three-way pilot valve (20), and that the pressure in said inlet passage (4) is greater than the pressure in said outlet passage (5) at least by the maximum value of the possible pressure difference between the pressure at said control outlet and the pressure at said second outlet.

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**4,744,543**

## ELECTRO-MAGNETICALLY ACTUATED VALVE ARRANGEMENT

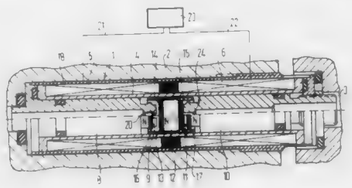
**Gunnar Renheim, Bromma, Sweden, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Aug. 15, 1986, Ser. No. 896,732**

**Claims priority, application Fed. Rep. of Germany, Aug. 26, 1985, 3530453**

**Int. Cl.⁴ F16K** *31/08*

**U.S. Cl. 251—65** **8 Claims**



1. An electromagnetically actuated valve arrangement for flowing media including a sleeve in which an intake and a discharge valve each having a valve seat are mounted, a permanent magnet arranged axially displaceable being provided between said intake and said discharge valve, and the flow of the medium from said intake to said discharge valve being controllable via said permanent magnet, comprising the improvement wherein said permanent magnet includes continuations at both ends, said continuations proceeding in the moving direction of said permanent magnet and extending beyond or over said valve seats, said continuations being in the form of a tube in which said permanent magnet is secured.



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**4,744,544**

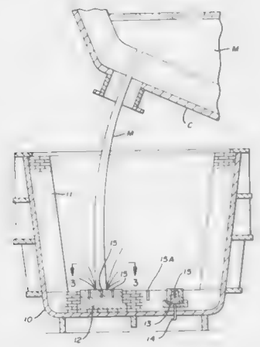
## REFRACTORY EROSION VISUAL INDICATOR

**Micheal D. LaBate, Ellwood City; Joseph Perri, Corsopolis, both of Pa., and Jeffrey Towns, New Waterford, Ohio, assignors to Insul Company, Inc., East Palestine, Ohio**

**Filed Jul. 6, 1987, Ser. No. 70,057**

**Int. Cl.⁴ C21C** *5/48*

**U.S. Cl. 266—100** **8 Claims**



1. A refractory erosion visual indicator for a metallurgical vessel having a refractory lining comprising a refractory body of a known thickness positioned in said lining and having a surface facing the interior of said vessel, indicia means in said refractory body facing the interior of said vessel, said indicia means comprising at least one metal rod extending inwardly of said surface of said refractory body a predetermined length less than the known thickness of said refractory body, said rod arranged so that an end or a section thereof defines a visual dot surrounded by refractory, the rod adapted to become red hot and the refractory there-around adapted to contrast in color when subjected to molten metal.

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**4,744,545**

## APPARATUS FOR DEGASSING MOLTEN METAL

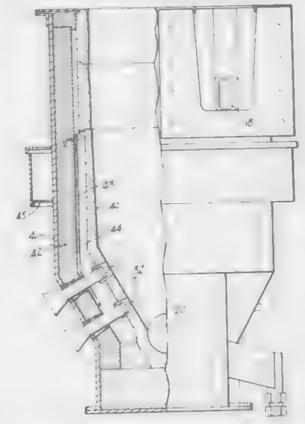
**Howard A. McDonald, Hendersonville, N.C., assignor to Swiss Aluminium Ltd., Chippis, Switzerland**

**Filed Feb. 3, 1987, Ser. No. 10,463**

**Int. Cl.⁴ C22B** *9/05*

**U.S. Cl. 266—227** **8 Claims**

1. An apparatus for use in degassing molten metal which comprises: a chamber having an inner elongated sidewall portion and an outer elongated sidewall portion spaced therefrom; molten metal inlet means positioned at a first height with respect to said chamber to introduce molten metal into said chamber such that said molten metal flows from said molten metal inlet downwardly through said chamber; molten metal outlet means positioned at a second height below said first height for removing molten metal from said chamber; at least one fluxing gas inlet means mounted on said first inner elongated sidewall portion below said first height for introducing fluxing gas into said chamber; and heating means in the space between said inner elongated sidewall portion and outer elongated sidewall portion spaced from both said inner and outer sidewall portions, insulating means between said heating means and outer sidewall portion, and an air space between said heating means and said inner elongated sidewall portions for



providing uniform heating of said inner elongated sidewall portion.

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**4,744,546**

## FLUSHING ARRANGEMENT FOR A METALLURGICAL VESSEL

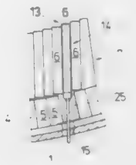
**Konrad Graf, Asten, Austria, assignor to Voest-Alpine Aktiengesellschaft, Linz, Austria**

**Filed Jan. 8, 1987, Ser. No. 1,385**

**Claims priority, application Austria, Feb. 3, 1986, 245/86**

**Int. Cl.⁴ C21C** *5/48*

**U.S. Cl. 266—266** **4 Claims**



1. A flushing arrangement for a metallurgical vessel including a metal outer shell, a bottom provided with a permanent lining, adjacently arranged refractory bricks applied onto said permanent lining so as to provide for a working lining, pipe means having flat cross sections and being inserted in recessed of said bricks at predetermined sites, and means to supply flush gas to flow through said pipes, the improvement comprising:

a rigid supply pipe for said flush gas extending through said metal outer shell into said permanent lining and having an end located in said permanent lining,

said pipe means being comprised of at least two and at most four, distributing pipes welded to, and diverging from, said end of said supply pipe located in said permanent lining,

each of said distributing pipes extending into a straight pipe section arranged in a recess of said bricks of said working lining,

the distributing pipes which are connected to one supply pipe being arranged to enclose one of said bricks,

the distance of said straight pipe sections from each other corresponds to approximately one of the width and length of said brick, and

only said straight pipe sections of said distributing pipes have said flat cross sections.

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**4,744,547**

## ELASTIC ENGINE MOUNT

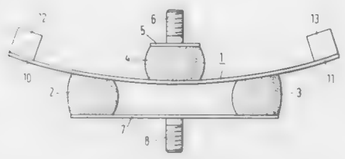
**Volker Härtel, Germering, Fed. Rep. of Germany, assignor to Metzeler Kautschuk GmbH, Munich, Fed. Rep. of Germany**

**Filed Nov. 26, 1985, Ser. No. 801,740**

**Claims priority, application Fed. Rep. of Germany, Nov. 26, 1984, 3443029**

**Int. Cl.⁴ F16F** *15/04;* **B60K** *5/12*

**U.S. Cl. 267—141** **8 Claims**



1. Elastic engine mount with a dynamic stiffness decreasing in dependence on frequency for damping sound transmitted through solids, comprising a leaf spring having a central region and ends, an elastomer support disposed on said central region of said leaf spring for transmitting force to said leaf spring in a given direction and loading said leaf spring by bending, and at least two support points supporting said leaf spring, said ends of said leaf spring extending freely beyond said support points forming auxiliary masses coupled to said elastomer support, said auxiliary masses each being extended beyond a respective one of said support points by a given moment arm with a given resonance frequency, said auxiliary masses vibrating with unlimited movement in a direction opposite to said given force transmission direction at all frequencies below said given resonance frequency of said moment arms.

**4,744,548**

## GAS STRUT RETENTION DEVICE WITH L-SHAPED STRUCTURE

**Richard C. Hathaway, Greenville, Ohio, assignor to C. R. and I. Inc., Greenville, Ohio**

**Filed Jun. 19, 1986, Ser. No. 876,269**

**Int. Cl.⁴ F16F** *5/00, 9/32*

**U.S. Cl. 267—64.12** **25 Claims**



1. Apparatus for application to a projected portion of the piston rod of a control cylinder to selectively limit its retraction into the housing of the cylinder of which the rod forms a part comprising a structure which has a substantially L-shaped configuration as applied to a control cylinder, said structure comprising means defining a short leg and a relatively longer linearly directed leg, said means defining said short leg including means for a secure connection thereof in a substantially radially projected relation to a portion of the length of a piston rod which is projected from the housing of a control cylinder of which it forms a part, thereby to couple said longer leg to the piston rod, said legs having a connection therebetween providing a relative disposition thereof which in the secured connection of said shorter leg to the piston rod to which it applies inherently adapts said longer leg to position lengthwise of, alongside and immediately adjacent to the rod and to have at least a portion thereof substantially in bearing contact with the facing surface of the rod when said rod is sufficiently extended, said generally L-shaped structure presenting longitudinally spaced surface portions thereof which in the application of said structure to the rod, when said rod is sufficiently extended, are positioned in line with the end surface of the housing from which the projects and by reason of the secured connection thereof to the rod limits the movement of its projected portion into the cylinder housing.

**4,744,549**

## COIL SPRING FOR THE WHEEL SUSPENSION OF A MOTOR VEHICLE WHEEL SUSPENSION SYSTEM

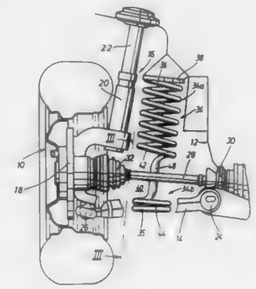
**Manfred von der Ohe; Achim Hespelt, both of Stuttgart, and Arthur Borlinghaus, Gummersbach, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany**

**Filed Jul. 30, 1986, Ser. No. 890,550**

**Claims priority, application Fed. Rep. of Germany, Jul. 30, 1985, 3527184**

**Int. Cl.⁴ B60G** *11/14;* **F16F** *1/06*

**U.S. Cl. 267—287** **23 Claims**



1. A coil spring for the wheel suspension of a motor vehicle wheel suspension system having two spring segments spaced at a distance from another in the direction of the spring axis and having a connecting piece developed in one piece as a continuous uninterrupted strand with the spring segments bridging the space between the adjacently opposite spring turns of the two spring segments, and wherein the connecting piece is developed to be reinforced by a change in its configuration enlarging its cross-section in at least one radial direction with respect to the adjacent spring turns.

**4,744,550**

## VACUUM WAFER EXPANDER APPARATUS

**Ivan W. Oglesbee, Phoenix, Ariz., assignor to ASM America, Inc., Phoenix, Ariz.**

**Filed Apr. 24, 1986, Ser. No. 855,841**

**Int. Cl.⁴ B23P** *17/00;* **B25B** *11/00*

**U.S. Cl. 269—21** **8 Claims**

1. A vacuum wafer expander apparatus for mounting onto a wafer inspection and processing apparatus, comprising:

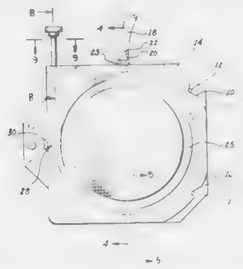
a planar substantially ring-shaped brace frame member having at least one indented portion around a circumference thereof for accommodating a pin therein and having an aperture substantially centered therethrough;

flexible member means for receiving electronic semiconductor wafers, said flexible member means being attached to



said planar substantially ring-shaped brace and subtending said aperture substantially centered therethrough;

substantially planar mounting bracket member means having an upper portion for mounting said brace frame member means thereon and downwardly protruding member integral thereto, said upper portion having groove means



therein for accommodating a portion of said flexible member means and having adjustment means operably coupled thereto for adjusting said upper portion relative to said mounting bracket member means; and

a vacuum-producing apparatus operably joined to said upper portion of said mounting bracket member means for creating a vacuum in said groove means.

**4,744,551**

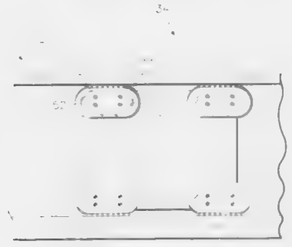
## SHORT-SLIDE POSITIONING TABLE WITH RECIRCULATING BEARING

**Anwar Chitayat, P.O. Box 107, Northport, N.Y. 11768**

**Filed Feb. 17, 1987, Ser. No. 15,742**

**Int. Cl.⁴ B23Q** *3/02*

**U.S. Cl. 269—55** **8 Claims**



1. A positioning table comprising:

a U-shaped frame having first and second substantially parallel arms;

a first groove in an inner surface of said first arm;

a slide disposed between said first and second arms;

a second groove in a first edge of said slide;

said second groove being disposed parallel to and facing said first groove;

a first plurality of bearings mutually engaging said first and second grooves;

a third groove in an inner surface of said second arm parallel to and facing said first groove;

a fourth groove in a second edge of said slide opposite said first edge, said second groove facing said third groove;

a second plurality of bearings mutually engaging said third and fourth grooves;

means for permitting said slide to move along an axis parallel to said first and second grooves;

means for returning said first plurality of bearings released from a downstream end of said first and second grooves to an upstream end thereof;

means for returning said second plurality of bearing released from a downstream end of said third and fourth grooves to an upstream end thereof; and

said first and second grooves, and said third and fourth grooves accepting preload forces from said first and second pluralities of bearings therebetween.

**4,744,552**

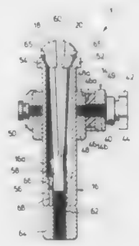
## CRAFTSMAN'S JEWELRY SUPPORT TOOL

**Donald A. Glaser, Emporia, Kans., assignor to Glendo Corporation, Emporia, Kans.**

**Filed May 20, 1986, Ser. No. 865,169**

**Int. Cl.⁴ B23Q** *1/04*

**U.S. Cl. 269—71** **10 Claims**



1. For use with a support such as a work bench, a craftsman's tool for supporting jewelry comprising:

frame means;

a coupling means for adjustably mounting the frame means on the support permitting selective pivoting of the frame means about a first axis of rotation;

jaw means including a first jaw and a second jaw movable toward and away from a jewelry clamping position adjacent said first jaw for releasably clamping an item of jewelry therebetween;

means for selectively moving said second jaw toward said jewelry clamping position thereof,

there being a housing extension on said jaw means for grasping by the craftsman in one hand to adjust the position of the item of jewelry as the craftsman performs required operations on the item of jewelry using his other hand;

connecting means for pivotally mounting the jaw means on the frame means allowing selective pivoting of the jaw means about a second axis of rotation at an angle with respect to said first axis of rotation,

said connecting means including components carrying the jaw means in disposition for pivoting of the jaw means about a third axis of rotation at an angle with respect to said first and second axes of rotation,

said coupling means and the connecting means including finger-actuated elements readily accessible to the fingers of one hand of the craftsman using the tool while the jaw means holding the jewelry is manipulated into desired disposition with the craftsman's other hand, said finger-actuated elements permitting selective minute adjustment of the degree of resistance to rotation of the frame means about said first axis and pivoting of the jaw means about the second axis offered by said coupling means and connecting means respectively whereby the craftsman has total selective control over the position of the item of jewelry during performance of exacting work operations thereon including shifting of the jewelry as the work proceeds,

said coupling means including a pair of smooth walls in mutual interengagement and smoothly slidable relative to each other in directions along an arc extending about said

first axis of rotation in transverse relation thereto during said pivoting of said frame member about said first axis,

said connecting means including a pair of smooth walls in mutual engagement and smoothly slidable relative thereto in directions along an arc extending about said second axis of rotation in transverse relation thereto during said pivoting of said jaw means about said second axis,

said finger actuated elements including means for yieldably biasing said pair of smooth walls of said coupling means toward each other and for yieldably biasing said pair of smooth walls of said connecting means toward each other to enhance said selective minute adjustment of the degree of resistance to rotation of the frame means about said first axis and pivoting of said jaw means about said second axis.

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**4,744,553**

**DOCUMENT CONVEYING SYSTEM**

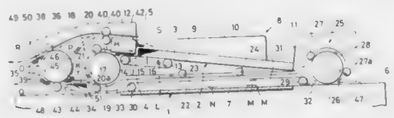
**Akira Hirose, Tokyo, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan**

**Continuation of Ser. No. 774,355, Sep. 10, 1985, abandoned. This application Jan. 22, 1987, Ser. No. 8,070**

**Claims priority, application Japan, Sep. 18, 1984, 59-193987; Sep. 27, 1984, 59-200597**

**Int. Cl.⁴ B65H** *5/22, 29/66;* **G03B** *27/32*

**U.S. Cl. 271—3.1** **8 Claims**



1. A document conveying system for use with a document illuminating section, comprising:

a document storage section which is located above, and at least partly overlaps, the document illuminating section, said document storage section being capable of supporting a plurality of documents therein and having a first document feeding port and a document return port, said ports being located at the same side of the document storage section;

means for feeding documents from the document storage section through said first document feeding port;

first direction altering means arranged between said document feeding port and said document illuminating section for altering the direction in which a document fed from said document storage section through said first document feeding port is conveyed so that it will be conveyed above said document illuminating section from one end thereof toward an opposite end thereof;

second direction altering means arranged between said first direction altering means and said document illuminating section for altering the direction in which the document is conveyed so that it will be conveyed again along the document illuminating section from the opposite end thereof toward the one end thereof;

third direction altering means for altering the direction in which the document is conveyed after being illuminated at the document illuminating section so that it will face said document return port located on the same side as the first document feeding port and be returned to the document storage section;

a third passageway extending from the third direction altering means to the document illuminating section, and a fourth passageway branching from said third passageway for returning the document from the third direction altering means to the document storage section, and a second switch claw located at the junction of the third and fourth passageways for switching the direction of movement of the document that has had the direction of its movement altered by the third direction altering means.

**4,744,554**

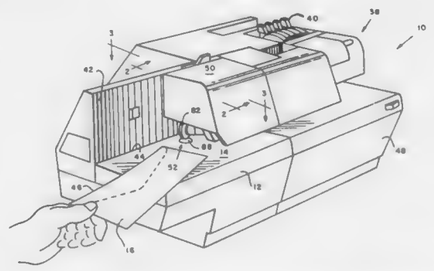
**DESKEWING DEVICE FOR MAILING MACHINE**

**Walter J. Kulpa, Trumbull, and Aaron M. Albert, Bridgeport, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.**

**Filed Oct. 10, 1986, Ser. No. 917,881**

**Int. Cl.⁴ B65H** *9/16*

**U.S. Cl. 271—251** **8 Claims**



1. In a mailing machine having a substantially horizontal mailpiece feed deck, an elongate registration guide extending along one side edge of said feed deck, a postage meter mounted on said feed deck in a downstream direction in position to print postage indicia in a predetermined location on mailpieces being fed along said feed deck wherein the improvement comprises:

deskewing means for causing a mailpiece longitudinally traversing said feed deck at a lengthwise angular relationship relative to said registration guide to be subjected to an alignment drive force and cooperatively acting alignment drag force which forces cause realignment of said mailpiece to be lengthwise parallel and side abutting to said registration guide.

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**4,744,555**

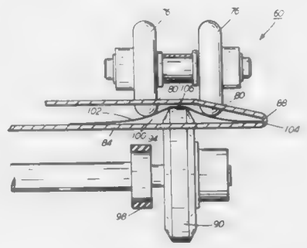
**SHEET TRANSPORT AND REGISTRATION APPARATUS**

**Raymond A. Naramore, Penfield, and Anthony Ilacqua, Rochester, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Dec. 22, 1986, Ser. No. 944,064**

**Int. Cl.⁴ B65H** *9/16*

**U.S. Cl. 271—251** **1 Claim**



1. An electrophotographic printing machine of the type having a document handling apparatus for advancing individual document sheets from a stack to an exposure station and for returning the document sheets to the stack in repeated cycles, a processor for forming copies of the documents, and a copy sheet attaching station with each copy sheet being aligned during the movement thereof to the sheet attaching station, wherein the improvement includes:

a registration edge;

a pair of idler rollers spaced from one another to define a gap therebetween;



a drive roller spaced from said pair of idler rollers and having a portion thereof interposed between said pair of idler rollers in the gap with the copy sheet passing through the gap having one surface thereof contacting said pair of idler rollers and the other surface thereof contacting said drive roller so to bend the copy sheet in the gap, said drive roller and said pair of idler rollers having their respective longitudinal axes substantially parallel to one another and extending in a direction transverse to said registration edge; and

means for resiliently urging said pair of idler rollers into contact with the copy sheet sheet, said drive roller and said pair of idler rollers moving the copy sheet along a path having a forward direction of movement and a lateral direction of movement substantially normal to the forward direction with the lateral movement of the copy sheet causing the side edge of the copy sheet to engage said registration edge so as to be aligned thereat, said drive roller and said pair of idler rollers applying a moving force having a magnitude proportional to the thickness of the copy sheet so that the moving force varies as a function of the thickness of the copy sheet being moved with the copy sheet slipping laterally when engaging said registration edge to prevent buckling thereof.

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**4,744,556**

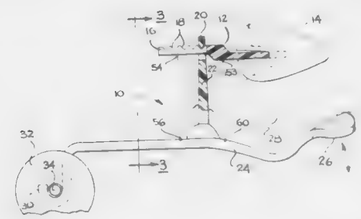
**ISOMETRIC MUSCLE EXERCISER**

**Eugene P. Shaffer, 243 La Follette Dr., Los Angeles, Calif. 90041**

**Filed Jun. 11, 1987, Ser. No. 61,918**

**Int. Cl.⁴ A63B** *23/00*

**U.S. Cl. 272—94** **5 Claims**



1. An isometric muscle exerciser, comprising:

a generally C-shaped structure having upper and lower horizontal members and a vertical member, where the free end of the upper horizontal member to be held by the mouth of a user using the clamping action of the jaw muscles, and where the free end of the lower horizontal member includes means for extending under the chin of the user and pressing against the lower jaw and neck muscles underneath the chin, wherein the vertical member pivotally connects the upper and lower horizontal members; and

means for adding a weight to the structure at a location, external to the user's mouth, such that the weight causes the free end of the lower horizontal member to pivot with respect to the upper member and press upward against the lower jaw and neck muscles underneath the chin.

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**4,744,557**

**DOWNHILL SKI EXERCISE DEVICE**

**Heinz J. Smirmaul, 1307 Brookstone La., Duncanville, Tex. 75137**

**Filed Jun. 16, 1987, Ser. No. 62,869**

**Int. Cl.⁴ A63B** *69/18*

**U.S. Cl. 272—97** **12 Claims**

1. A ski exercise device comprising:

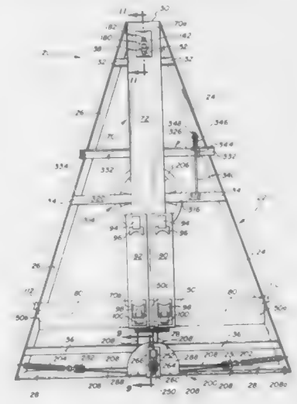
a frame;

a track having first and second ends, said ends of said track being connected to said frame;

a rail having first and second ends, said first end being pivotally mounted to said frame and said second end including means for engaging said track, such that said rail moves along said track between said first and second ends of said track;

a flywheel rotatably mounted to said frame;

a cable interconnecting said flywheel and said rail;



means for biasing said rail to said frame, said rail having a neutral position when located centrally between said track first and second ends and being movable along said track between said first and second ends thereof by the user of the device by overcoming the force exerted by said biasing means and said flywheel to thereby impart rotational motion to said flywheel; and

means mounted to said rail between said first and second ends for supporting the user of the device.

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**4,744,558**

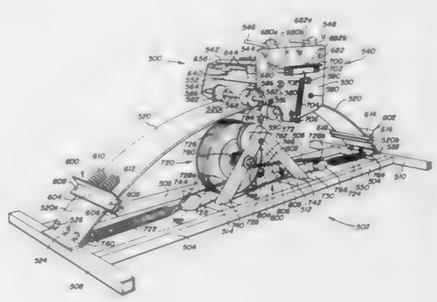
**DOWNHILL SKI EXERCISE DEVICE**

**Heinz J. Smirmaul, 1307 Brookstone La., Duncanville, Tex. 75137**

**Continuation-in-part of Ser. No. 62,869, Jun. 16, 1987. This application Sep. 4, 1987, Ser. No. 93,296**

**Int. Cl.⁴ A63B** *69/18*

**U.S. Cl. 272—97** **11 Claims**



1. A ski exercise device comprising:

a frame;

a track having first and second ends, said ends of said track being connected to said frame;

means slidably mounted to said track for supporting the user

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of the device, such that said support means moves along said track between said first and second ends of said track;
a flywheel rotatably mounted to said frame;
a cable interconnecting said flywheel and said support means;
means for biasing said support means to said frame, said support means having a neutral position when located centrally between said track first and second ends and being movable along said track between said first and second ends thereof by the user of the device by overcoming the force exerted by said biasing means and said flywheel to thereby impart rotational motion to said flywheel.

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**4,744,559**

## MULTI-STATION EXERCISE APPARATUS

**Parker E. Mahnke, Studio City, and Ron Sheltra, Alhambra, both of Calif., assignors to Marcy Gymnasium Equipment Co., Ontario, Calif.**

**Filed Jul. 28, 1986, Ser. No. 889,766**
**Int. Cl.[4] A63B *21/06***
**U.S. Cl. 272—118** **16 Claims**



1. An exercise apparatus, comprising:
(a) a reciprocating carriage;
(b) a first frame means, including carriage guide means for guiding reciprocative travel of said carriage;
(c) resistance means operably associated with said carriage for yieldably resisting reciprocative travel thereof in one direction;
(d) first and second reciprocative sheaves operably associated with said carriage said carriage being reciprocatively movable in response to movement of said first or second sheaves;
(e) a second frame means, disposed in close proximity with said first frame means and including sheave guide means for guiding reciprocative travel of said first and second sheaves; and
(f) body engaging means carried by said reciprocating carriage for moving said carriage independently of said first and second sheaves.

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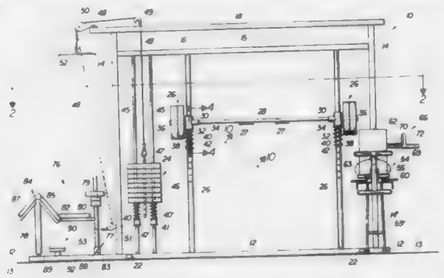
**4,744,560**

## EXERCISING AND BODY FITNESS ASSEMBLY

**John Azari, 611 E. 7th St., Hialeah, Fla. 33010**

**Filed Jul. 18, 1986, Ser. No. 886,911**
**Int. Cl.[4] A63B *21/06***
**U.S. Cl. 272—118** **19 Claims**

1. An exercising structure of the type primarily designed to exercise various muscle groups of the human body by utilizing independent exercising assembly, said exercising structure comprising:
(a) a support frame including an elongated base portion disposed on a supporting surface and a header portion disposed in spaced relation to said base and in substantially overhanging relation hereto,
(b) a plurality of spaced apart stanchions secured to said base portion and extending upwardly therefrom into said supporting engagement with said header structure,
(c) said base portion, header structure and plurality of stanchions each comprising an elongated, substantially linear configuration and disposed in substantially coplanar relation to one another,
(d) said base portion further including a plurality of spaced apart lateral supports extending outwardly from opposite sides of said base portion, whereby lateral stability is provided to said support frame;
(e) a plurality of exercising assemblies each having a primary



support secured to and disposed in coplanar relation to said support frame,
(f) each of said plurality of exercising assemblies disposed in spaced relation to one another and each structured to exercise at least one different muscle group than the other of said plurality of exercising assemblies,
(g) a plurality of collections of weights interconnected to said support frame and movably secured to at least one of said plurality of assemblies for disposition along a restricted path of travel, and
(h) said plurality of exercising assemblies comprising a primary support secured to said base portion in coplanar relation thereto and including a seat structure and a weight support disposed in cooperative relation to one another, said weight support movable mounted immediately above and in engageable relation to a user's legs above the knee portion thereof and a foot support for each foot of the user disposed adjacent to and at least partially beneath said weight support.

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**4,744,561**

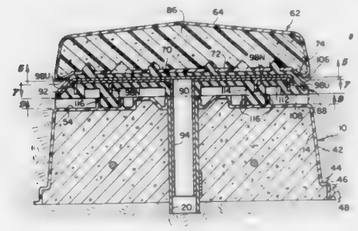
## SAFETY BASE WITH ANCHOR

**Roger E. Hall, 100 Lakeview Dr., Elizabethtown, Pa. 17022**

**Continuation-in-part of Ser. No. 472,241, Mar. 4, 1983, which is a continuation-in-part of Ser. No. 395,279, Jul. 6, 1982, Pat. No. 4,398,715, which is a continuation of Ser. No. 234,618, Feb. 17, 1981, abandoned, which is a division of Ser. No. 18,844, Mar. 8, 1979, Pat. No. 4,266,768, which is a continuation-in-part of Ser. No. 758,638, Jan. 12, 1977, abandoned. This application Sep. 5, 1984, Ser. No. 647,534**
**Int. Cl.[4] A63B *71/00***
**U.S. Cl. 273—25** **12 Claims**

1. An athletic contact device comprising: a base having a resilient exterior and a foam interior, said exterior including a lower mounting surface having a generally horizontal portion, said generally horizontal portion including a plurality of recesses, each recess having an engagement portion disposed at its entrance and defining a hole which is narrower than at least part of the recess; and
a lower ground support comprising: a support plate having an encasing portion and a plurality of upwardly extending resilient fasteners fixed thereto and engageable to said engagement portions, a support tube fixed to extend downwardly from said support plate; a ground anchor housing having a receiving tube disposed therein; said receiving tube receiving said support tube to removably hold said support plate relative to said ground anchor housing;
wherein said recesses and engagement portions are operable to severably fasten said base to said lower ground support, said plurality of upwardly extending resilient fasteners





fixed to said lower ground support extending into said recesses such that one or more of said engagement portions is severable from a corresponding fastener or fasteners upon a sufficiently high lateral force; and
wherein said encasing portion has a plurality of locator means on its bottom and operable to mate with a plurality of complementary locator means on the top of said ground anchor housing, said locator means and complementary locator means together minimizing any pivoting of said rigid support member relative to said ground anchor housing.

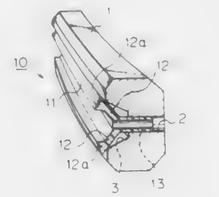
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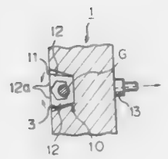
**4,744,562**

## STRING PROTECTOR FOR A RACKET

**Tetsuyuki Awano, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Japan**

**Filed May 19, 1986, Ser. No. 865,252**
**Claims priority, application Japan, May 28, 1985, 60-079820[U]**
**Int. Cl.[4] A63B *49/14***
**U.S. Cl. 273—73 D** **4 Claims**





1. A stringed racket comprising a frame head having a peripheral notch for receiving a string under tension, at least one string exposed in said notch, and a connecting section received into said notch, said connecting section including first and second resilient tongues attached to and extending along said connecting section, each of said first and second resilient tongues having an elongated projection thereon forming a string receiving space between said tongues, said elongated projections opposing each other, said connecting section being drawn into said notch by the tension of said string such that said tongues move toward each other causing said elongated projections to be brought into close proximity with each other thereby substantially covering said string within said string receiving space.

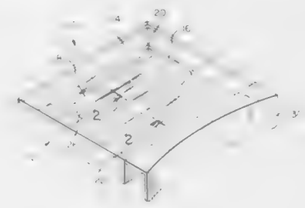
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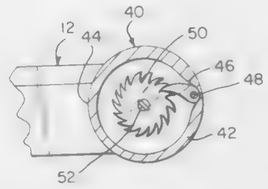
**4,744,563**

## WAIST-MOUNTED ROLLING BALL GAME

**Angelo Anastasia, 222 Edinburgh Ave., Monterey, Calif. 93940, and George Spector, 233 Broadway, RM 3815, New York, N.Y. 10007**

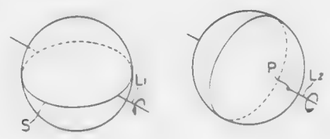
**Filed Jul. 31, 1986, Ser. No. 891,284**
**Int. Cl.[4] A63B *67/14***
**U.S. Cl. 273—116** **2 Claims**

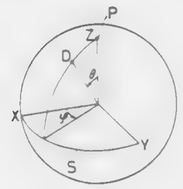




1. A rock and roll game comprising:
(a) a hollow container having a transparent top and a floor;
(b) a track formed within said floor;
(c) a ball disposed within said container for rolling in said track;
(d) a holder extending rearwardly from said container adapted for hooking onto a belt of said person so that said person can manipulate said container by body movement;
(e) an adjustment device between said container and said holder to change the angle of said container with respect to said holder wherein said adjustment device comprises:
(f) a cylindrical housing mounted to rear side of said container;
(g) a pawl pivotly mounted and spring biased inwardly to said housing;
(h) a ratchet having a shaft rotatably mounted through said housing, said ratchet coacting with said pawl;
(i) a pair of extension arms each downwardly angular extend from one external end of said shaft to said holder; and
(j) a release lever operatively connected to said pawl whereby said housing and said pawl can travel around said ratchet in one direction and be locked into position by said pawl until said release lever releases said pawl from said ratchet to reset the angle of the container.

**4,744,564**
**GOLF BALL**
Kaname Yamada, Kakogawa, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan
Filed Jun. 6, 1986, Ser. No. 871,220
Claims priority, application Japan, Jun. 7, 1985, 60-124644
Int. Cl.[4] A63B *37/14*
U.S. Cl. 273—232 11 Claims



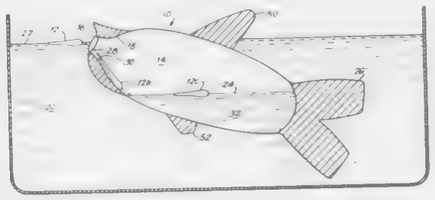



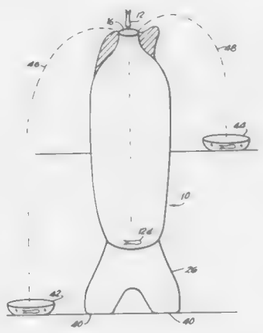

1. A golf ball comprising,
a spherical surface,
a plurality of dimples distributed over the spherical surface of the ball,
a first axis (L2) passing through the center of the ball and defining two poles (P, P) at its intersection with the spherical surface,
the dimples being symmetrically arranged in relation to a parting line (S) of the ball which is formed by the intersection of a plane passing through the center of the ball, said plane being perpendicular to the first axis and equidistant between the two poles,
the dimples (D2) near a pole being smaller in volume than the dimples (D1) near the parting line,
a total effectiveness of dimple volume in relation to the first axis (L2) being substantially equal to a total effectiveness of dimple volume in relation to a second axis (L1) passing through the center of the ball and being perpendicular to the first axis, wherein the effectiveness of dimple volume is defined as the product obtained by multiplying the volume of a dimple by the sine value of an angle made by a radius from the center of that dimple and the first or second axis of the ball.

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**4,744,565**
**FISH SWALLOWING GAME**
Judah Newberger, 134 Kingsley Ave., Staten Island, N.Y. 10314
Filed Jan. 30, 1986, Ser. No. 824,151
Int. Cl.[4] A63F *9/00*
U.S. Cl. 273—342 20 Claims

10. A method of playing a fish swallowing game comprising the steps of:
placing a first hollow fish shaped receptacle in water, said first receptacle having a mouth opening from the exterior thereof into the interior thereof, with said mouth opening being placed partly depresed in said water so as to be below the level of said water and at an angle with respect thereto for collecting water therethrough, said mouth opening being partly depressed for ensuring that the water level of any collected water flowing into said first fish shaped receptacle will be below the water level of said water in which said first shaped receptacle has been placed for creating a waterfall effect flow of collected water from said water level of said water in which said first fish shaped receptacle has been placed to the water level of any collected water in the interior of said first fish shaped receptacle; placing a buoyant fish shaped object in said water adjacent the exterior of said first fish shaped receptacle, said object having a dimension smaller than said mouth opening for enabling passage of said object through said mouth opening; moving said first fish shaped receptacle partly depressed mouth opening adjacent said buoyant fish shaped object; and drawing said adjacent fish shaped object into said first receptacle hollow interior through said partly depressed mouth opening along with said collected water due to said waterfall flow effect of said collected water due to the difference of said two water levels between said first receptacle exterior at said mouth opening and said collected water in said first receptacle interior; said fish shaped object placing step comprising the step of placing a plurality of said buoyant fish shaped objects in said water; said receptacle moving step comprising the step of successively moving said fish shaped receptacle partly depressed mouth opening adjacent each of said buoyant fish shaped objects; and said drawing step comprising the step of successively drawing each of said adjacent fish shaped objects into said receptacle hollow interior through said partly depressed mouth opening along with said collected water due to said waterfall effect of said collected water; said fish shaped receptacle comprising a squeezable material, said drawing step further comprising the step of externally squeezing said adjacently placed receptacle for creating a partial vacuum within said receptacle interior for further aiding in drawing said adjacent fish shaped object into said receptacle interior along with said collected water.



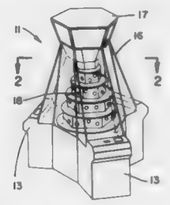


12. A method of playing fish swallowing game comprising the steps of:
placing a first hollow fish shaped receptacle in water, said first receptacle having a mouth opening from the exterior thereof into the interior thereof, with said mouth opening being placed partly depressed in said water so as to be below the level of said water and at an angle with respect thereto for collecting water therethrough, said mouth opening being partly depressed for ensuring that the water level of any collected water flowing into said first fish shaped receptacle will be below the water level of said water in which said first fish shaped receptacle has been placed to the water level of any collected water in the interior of said first fish shaped receptacle; placing a buoyant fish shaped object in said water adjacent the exterior of said first fish shaped receptacle, said object having a dimension smaller than said mouth opening for enabling passage of said object through said mouth opening; moving said first fish shaped receptacle partly depressed mouth opening adjacent said buoyant fish shaped object; and drawing said adjacent fish shaped object into said first receptacle hollow interior through said partly depressed mouth opening along with said collected water due to said waterfall flow effect of said collected water due to the difference of said two water levels between said first receptacle exterior at said mouth opening and said collected water in said first receptacle interior; said method further comprising the steps of removing said receptacle from said water, standing said receptacle upright on a dry land surface with said mouth opening being substantially at the top thereof, and dropping said fish shaped object into said receptacle through said mouth opening due to gravity; whereby said game may be played both in water and on dry land.



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**4,744,566**
**COIN PROJECTING, MOVING TARGET GAME APPARATUS**
Gregory A. Malavazos, and Alex J. Malavazos, both of Rte. 1, 1125 Amarillo Dr., Gardnerville, Nev. 89410
Filed Nov. 3, 1986, Ser. No. 926,325
Int. Cl.[4] A63F *9/02*
U.S. Cl. 273—357 18 Claims




12. A coin projecting game apparatus, including; a transparent display housing, a central target carousel disposed within said display housing, a plurality of player consoles spaced about the display housing, a plurality of coin projecting means, each disposed at one of said player consoles, for projecting a coin provided by the player toward said target carousel, said target carousel including a plurality of upwardly extending target panels, means for rotating said target panels continuously past said player consoles, a plurality of winner openings disposed in said target panels and dimensioned to receive a coin projected from said coin projecting means, means for issuing an award at each player console in response to a coin projected therefrom being received in one of said winner openings, and means for separating said transparent display housing into a plurality of discrete game areas, each associated with one of said player consoles and a portion of said target carousel, said means for separating also preventing any coins emitted by the coin projecting means of the respective player console from being projected outside the respective discrete game area.

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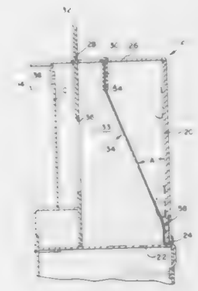
**4,744,567**
**DUCK ON THE ROCK**
Voldemore F. Kochmanski, 876 S. Brookside Dr., Muskegon, Mich. 49441, and George Spector, 233 Broadway, Rm. 3815, New York, N.Y. 10007
Filed Oct. 14, 1986, Ser. No. 918,786
Int. Cl.[4] A63B *71/04*
U.S. Cl. 273—393 2 Claims



2. A duck on the rock game comprising the following equipment:
(a) a plurality of playing pieces each with a flat top surface of given area;
(b) a base for stacking playing pieces successively thereupon;
(c) adjustable means for increasing the difficulty of stacking playing pieces on top of each other, wherein said means comprise a disc with a flat top of lesser area adjustably mounted on each said piece whereby said disc flat top is adjustable to a raised position above said flat top surface of the playing piece thus reducing the area of support for a superimposed playieng piece.

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**4,744,568**
**TARGET SYSTEM FOR LOW VELOCITY PROJECTILES**
Jeffery H Bernahl, Mt. Prospect, Ill., and Drake D. Mertes, executor, First National Bank Bldg., 701 Lee St., Suite 790, Des Plaines, Ill. 60016
Filed Apr. 14, 1986, Ser. No. 851,927
Int. Cl.[4] F41J *1/14*
U.S. Cl. 273—404 4 Claims



1. A target system for trapping low velocity projectiles of up to 350 feet per second comprising:
means for forming a box-like housing including means providing an open front on said housing, first and second means providing the sides of said housing, means providing a back of said housing, means for providing a top for said housing, means located behind said means providing said open front providing a partition within said housing and extending across the open front, said partition providing means including means forming a target; and
means for absorbing kinetic energy extending diagonally and downwardly generally from said means for providing a

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top to said means providing a back of said housing whereby the major plane of said means for absorbing kinetic energy and the major plane of said means providing a back form an angle of generally 20, plus or minus 7 degrees.

3. A target system for trapping low velocity projectiles of up to 350 feet per second comprising:

a box-like housing including: an open front, solid first and second sides, a solid back and a solid bottom which share a common juncture, a top having at least one horizontally extending opening therein, a partition having a hole therein located behind said open front and extending thereacross; and

a sheet-like means for absorbing kinetic energy having a base portion and tip portion including first and second edges, said base portion being movably carried in said horizontally extending opening means and said tip portion being secured to said back adjacent to said common joint whereby said means for absorbing kinetic energy extends diagonally and downwardly from said horizontally extending opening to said back and has a degree of fullness.

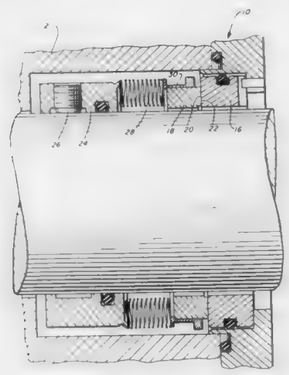
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**4,744,569**

## BELLOWS MECHANICAL SEAL WITH INACTIVE DIAPHRAGMS

**Robert S. Wentworth, Jr., deceased, late of Murrieta, Calif., and by Benning Wentworth, executor, St. Charles, Ill., assignors to BW/IP International, Inc., Long Beach, Calif.**

**Filed Oct. 13, 1987, Ser. No. 107,334**
**Int. Cl.⁴ F16J** *15/36*
**U.S. Cl. 277—88** **5 Claims**



1. In a bellows type mechanical seal assembly adapted to surround a rotatable shaft and having a non-rotatable seal ring and a rotatable seal ring, means connecting said rotatable seal ring to said shaft, the seal rings having lapped seal faces opposing one another so as to be relatively rotating when the shaft rotates, and resilient means comprising a metal bellows for urging at least one of said seal rings axially toward the other seal ring, said bellows being constructed of a plurality of annular diaphragms in stacked relationship with the next adjacent ones connected at their outer and inner extremities forming a series of outer and inner joints and with an extremity of the outermost diaphragms free of a joint, the improvement comprising:

said bellows having a connection at one end to said connecting means and at the other end to said rotatable seal ring, the connection of one end of said bellows being at a joint so as to provide at least one inactive diaphragm adjacent an end thereof.

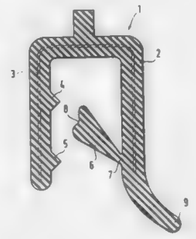
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**4,744,570**

## SEALING PROFILE WITH U-SHAPED CROSS-SECTION AND INSIDE SEALING LIPS

**Jürgen Kranz, Lindau/Bodolz, Fed. Rep. of Germany, assignor to Metzeler Kautschuk GmbH, Munich, Fed. Rep. of Germany**

**Filed Aug. 4, 1987, Ser. No. 81,186**
**Claims priority, application Fed. Rep. of Germany, Aug. 5, 1986, 3626457**
**Int. Cl.⁴ F16J** *15/12;* **E06B** *7/23*
**U.S. Cl. 277—184** **5 Claims**



1. Sealing profile, comprising a basic body being formed of elastomeric material and having a U-shaped cross section defining an inner surface thereof with sides, a metallic reinforcement inlay disposed in said basic body, sealing lips integrally formed on said inner surface of said basic body, at least one of said sealing lips on one of said sides of said inner surface of said basic body being formed of the same material as said basic body, said at least one sealing lip having a substantially triangular cross section defining corners and an enlarged head surface, one of said corners pivotally connecting said at least one sealing lip to said basic body, and said enlarged head surface of said sealing lip having a concavely curved recess formed therein.

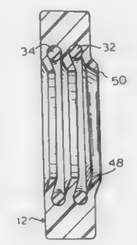
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**4,744,571**

## SELF-COMPENSATING SEAL WITH BIASED SEALING WIPERS

**John D. Geberth, Jr., 10 Goose Cove La., Ramsey, N.J. 07446**

**Filed Jul. 8, 1986, Ser. No. 883,404**
**Int. Cl.⁴ F16J** *15/24*
**U.S. Cl. 277—208** **12 Claims**



1. A self-compensating seal installed to effect a fluid tight seal between a recirpocating or rotating shaft and a guide therefor by sealing against a surface to be sealed, said seal comprising:

(a) a toroidally shaped seal body;

(b) at least two substantially parallel annular wipers extending radially from said toroidally shaped seal body, said annular wipers being spatially separated from one another in the axial direction so as to define grooves between pairs of said annular wipers, said parallel annular wipers being partially collapsed to extend in the axial direction of higher fluid pressure when said seal is in the installed condition, the annular wiper adjacent the high fluid pressure being beveled so that in the partial collapsed state of said wipers when said seal is in the installed condition, the pressure exerted on said beveled annular wiper by the high fluid pressure is radially directed to force said annular wiper against the surface to be sealed and said wiper forms a knife-like scraper edge with said surface to be sealed; and

(c) biasing means disposed in each groove defined between said pairs of annular wipers biasing said partially collapsed annular wipers against said surface to be sealed.



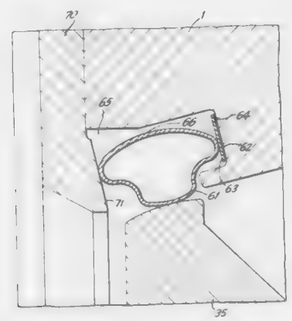
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**4,744,572**

## ALL-METAL, VALVE SEALING MECHANISM

**Bahman Sahba, Warwick; Harry C. Champlin, Jr., Hopkinton, both of R.I., and John M. Cory, Old Lyme, Conn., assignors to Posi-Seal International, Inc., North Stonington, Conn.**

**Continuation of Ser. No. 706,114, Feb. 27, 1985, abandoned, which is a continuation-in-part of Ser. No. 611,741, May 18, 1984, abandoned, which is a continuation-in-part of Ser. No. 513,353, Jul. 13, 1983, abandoned. This application Jul. 14, 1987, Ser. No. 73,401**
**Int. Cl.⁴ F16J** *15/08;* **F16K** *1/226*
**U.S. Cl. 277—236** **27 Claims**



1. A sealing mechanism capable of use in a valve subject to extend temperatures and pressures, comprising a metal seal ring adapted to fit within an undercut groove, circumferential to the passageway of said valve, said groove having means defining an opening between opposed sides, said sides spaced apart by a distance greater than the width of said opening;

said metal seal ring comprising a convex seating portion adapted to extend through said opening for engagement with a complementary sealing surface of a closure member, said convex seating portion integrally joined at the sides thereof to one end of each of a pair of lateral shoulder portions, said shoulder portions adapted for contact with the sides of said groove, and wherein said metal ring is resiliently compressed in width while being held in said groove, so that a side-sealing force is imparted to said contact with the sides of said groove, and wherein a bearing force is exerted between said seating portion of said seal ring and said sealing surface of said closure member when the latter is in the closed position so that essentially no leakage occurs;

wherein the other end of each of said pair of shoulder portions is integrally joined to a back portion, wherein said metal seal ring defines a toroidal cavity, and whereby when the closure member is in the closed position, said back portion is pressed against the base of said circumferential groove, such that said seal ring is compressed in the radial direction and in a spring-like manner exerts a force in counteraction to the radial force exerted by said closure member against said seating portion of said seal ring; and

wherein when said closure member is in the closed position, said seal ring is radially compressed in proportion to said bearing forces whereby said side-sealing force is correspondingly increased.

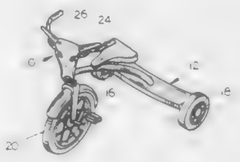
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**4,744,573**

## STEER HEAD ATTACHMENT FOR A TRICYCLE

**Gordon Most, Box 49, Seneca, Nebr. 69161**

**Filed Oct. 7, 1986, Ser. No. 916,381**
**Int. Cl.⁴ A63G** *19/00;* **B62J** *39/00*
**U.S. Cl. 280—1.13** **2 Claims**



1. In combination:

a velocipede having a forward and at least one rearward wheel,

said forward wheel being mounted in a fork member and rotatable therein,

said fork member mounted for steerable movement on the forward end of said velocipede,

a center post extending upwardly from the upper end of said fork member for holding a handlebar structure,

a handlebar structure mounted on said center post for steering said velocipede,

said handlebar structure including right and left generally horizontal handlebars attached to said center post,

an ornamental steer head having means for removably attaching said head to said handlebar structure, said removable attaching means including right and left spring clips affixed to the rearward side of said head and removably connected to said right and left handlebar, respectively,

said steer head having right and left horn positions extending outwardly from said head parallel and adjacent to said right and left handlebar, respectively, and

said steer head having a nose portion located lower-most on said head, said nose portion being in contact with the upper end of said fork member at the junction of said center post with said fork member.

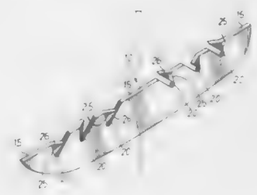
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**4,744,574**

## BLADE FOR HOCKEY SKATES

**Mike Soo, No. 403, Chung Shan Road, Jen Teh Hsiang, Tainan Hsien, Taiwan**

**Continuation-in-part of Ser. No. 873,531, Jun. 12, 1986, abandoned. This application Jul. 1, 1987, Ser. No. 70,166**
**Int. Cl.⁴ A63C** *1/30*
**U.S. Cl. 280—11.18** **3 Claims**



1. In a blade for ice hockey skates comprising: a plurality of

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slanted slots which are symmetrically provided on a top edge of said blade, each opening of said slots facing upward and toward a center line of said blade; and a plurality of remaining materials between two adjacent said slanted slots:

the improvements in that: a tip portion of each of said remaining materials, which faces towards said center line of said blade, is bent alternatively leftward and rightward about a non-horizontal axis on said remaining material.

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**4,744,575**

## COASTER WAGON WITH ANTI-TIPPING FEATURES

**Roger Tonelli, Elmwood Park, Ill., assignor to Radio Steel & Mfg. Co., Chicago, Ill.**

**Filed Jun. 30, 1986, Ser. No. 880,188**
**Int. Cl.[4] B62B** *9/02*
**U.S. Cl. 280—87.01** **4 Claims**



1. A coaster wagon with an anti-tipping feature which blocks the free rotation of the sterring mechanism to reduce the likelihood of tipping by preventing sharp turns, comprising:

a turntable rigidly affixed to the bottom of the coaster wagon for securing a steering assembly thereto, said turntable defining a surface which is parallel to the bottom of said wagon, said surface having an upwardly grooved circular portion and an opening in the center of said surface for pivotal connection to a steering assembly;

a steering assembly having laterally spaced-apart depending flanged portions, said flanged portions having cross-wise aligned openings through which a front axle extends for mounting wheels; a forward end portion having a pair of latterally spaced-apart tabs, said tabs extending forwardly and being provided with cross-wise aligned openings for pivotal attachment to a handle; a downwardly grooved circular portion located generally midway between said lateral flanged portions, and including an opening in the center of said grooved portion for pivotal connection to the turntable;

means pivotally securing the steering assembly to the turntable for steering the coaster wagon;

stop means formed at diametrically opposed locations on each of said turntable and said steering assembly, said turntable stop means comprising downwardly grooved portions formed within said upwardly grooved circular portion of said turntable, said turntable and said steering assembly stop means comprising upwardly grooved portions formed within said downwardly grooved circular portion of said steering assembly and steering assembly stop means blocking pivotal movement of the steering assembly beyond a predetermined degree whereby the coaster wagon cannot be turned sharply to either side thereby reducing the chance of tipping the wagon.

**4,744,576**

## ROLLER BOARD APPARATUS WITH INDEPENDENT LATERALLY COMPLIANT SURFACE AND BRAKING RESISTANCE

**Hugh J. Scollan, Jr., 18671 Crabtree Avenue, Cupertino, Calif. 95014**

**Filed Jun. 11, 1987, Ser. No. 60,681**
**Int. Cl.[4] A63C** *17/26*
**U.S. Cl. 280—87.04 A** **6 Claims**



1. A movable roller board apparatus comprising:

a first structure;

a second structure having a front end and a rear end;

means for movably mounting said first structure on said second structure so that said first structure is free to be moved in a horizontal direction to the left or right relative to said second structure so as to facilitate off-center loading of said second structure by a person standing on said first structure facing frontward;

means for resiliently biasing said first structure to a central position relative to said second structure; and

a set of wheels located at each end of said second structure for movably supporting said second structure, each of said sets of wheels being attached to said second structure by steering means such that each of said sets of wheels rotates about an axis in response to an off-center loading of said second structure such that said apparatus turns to the right when said off-center loading is to the left and said apparatus turns to the left when said off-center loading is to the right.

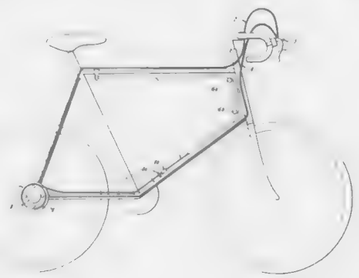
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**4,744,577**

## REGENERATIVE BRAKING SYSTEM FOR BICYCLES

**Mark R. Brent, 285 Chiquita Ave., #3, Mountainview, Calif. 94041, and Jim M. Papadopoulos, 241 Washington St., Apt. 2, Cambridge, Mass. 02139**

**Filed Apr. 21, 1986, Ser. No. 854,173**
**Int. Cl.[4] B62M** *1/10*
**U.S. Cl. 280—215** **17 Claims**



1. A regenerative braking system for a human-powered vehicle having a ground-engaging wheel including a hub rotatably mounted to an axle, for selectively storing braking energy and applying same to propel the vehicle, comprising:

energy storing elastic material having first and second ends, the first end being affixed to the vehicle,



a cable having first and second cable ends, the first cable end being affixed to the second end of said elastic material,

reverse wrapping means, rotatably mounted to the hub of said wheel, coaxially with said hub, said reverse wrapping means including a wrapping surface to which said second cable end is affixed, for wrapping said cable about said wrapping surface in a direction opposite that of rotation of the hub, whereby said elastic material is elongated and energy is stored;

braking means for selectively causing rotation of the wheel hub to be transmitted to the reverse wrapping means upon braking, whereby the reverse wrapping means rotates and elongates the elastic material; and

transmission means for transmitting energy stored in the elastic material to the hub so as to propel the vehicle.

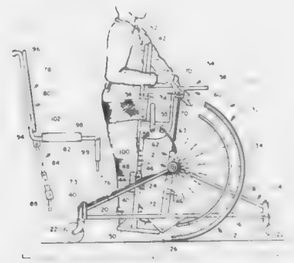
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**4,744,578**

## USER INCLINABLE PRONE STANDER TYPE WHEELCHAIR

**Cynde Stearns, Bakersfield, Calif., assignor to Luconex, Inc., Foster City, Calif.**

**Filed Feb. 9, 1987, Ser. No. 12,507**
**Int. Cl.[4] A61H** *3/04;* **B62M** *1/14*
**U.S. Cl. 280—242 WC** **15 Claims**



1. A wheelchair with an inclinable prone user support platform comprising:

a pair of juxtaposed longitudinal support frames with a front and back end with a caster wheel on each of the ends thereof, said caster wheels adapted to rest upon a planar supporting surface with the adjacent caster wheels having a longitudinal opening therebetween;

first and second spaced apart transverse support members extending between and fixedly attached to each of said pair of support frames remote from said ends;

said inclinable prone user support platform comprising a body support member for the support of the forward portion of the prone body of the user and a floor platform for supporting the feet of the user, said body platform is pivotally attached to said first support member for relative rotation between said support frames;

a length adjustable actuator means fixedly connected to said user platform at one end and pivotally attached to said second support member at its other end; and

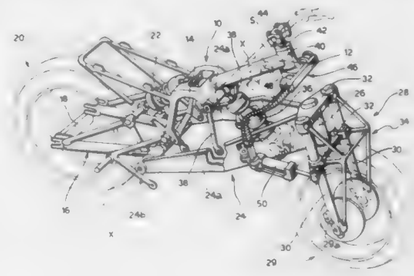
user adjustment means for adjusting the length of said length adjustable actuator means for tilting said user platform between a support member position substantially vertical to said planar supporting surface and a user platform position substantially horizontal and adjacent to said planar supporting surface whereby said user can craw onto said body support member through the longitudinal opening between adjacent casters when said user platform is in said substantially horizontal position and then elevate himself by operating said user adjustment means for positioning said user platform to a substantially vertical position.

**4,744,579**

## MOTORCYCLE WITH SINGLE-SHOCK-ABSORBER, FRONT SUSPENSION

**Renato Roatta, Frazione Prale 35, 12078 Ormea (Cuneo), Italy**

**Filed Jun. 5, 1987, Ser. No. 58,723**
**Int. Cl.[4] B62K** *19/00, 21/00, 25/00*
**U.S. Cl. 280—275** **6 Claims**



1. A motor cycle of the type having a frame; a fork pivotally attached to said frame and extending rearwardly to support the rear-wheel axle; a member pivotally attached to said frame and extending forwardly to support the front-wheel axle; and shock-absorber means interposed between said fork and said frame and between said member and said frame, said fork and said member are pivoted about a common axis.

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**4,744,580**

## TOW HITCH FOR A TRACTOR

**Charles C. Ryan, Rte. 2, Box 96, Elizabethtown, Ill. 62931**

**Filed Mar. 20, 1987, Ser. No. 28,461**
**Int. Cl.[4] B60D** *1/14*
**U.S. Cl. 280—411 A** **12 Claims**



1. A hitch for use with a riding lawn tractor and two or more wheeled lawn implements, the tractor having a longitudinal center line and tow means at the rear thereof, and each of the lawn implements having a housing on wheels, said hitch comprising:

(a) a tow bar which is elongated,

(b) attachment means secured to said tow bar at substantially the center thereof,

(c) a removable connector for rigidly securing said attachment means to the tow means on the tractor with the tow bar extending transversely of said longitudinal center line of the tractor,

(d) said attachment means and said connector preventing pivotal movement of said tow bar relative to said center line,

(e) a vertically extending pin adapted to be secured to the housing of each implement, each of said pins having an enlarged upper portion, and

(f) a flexible connector attaching said tow bar to each of said pins, each of said flexible connectors including a loop

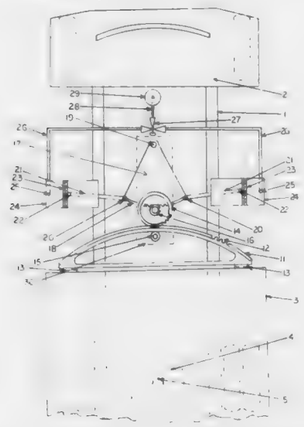
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which fits around said pin and under said enlarged portion, whereby each connector is readily attachable and releasable so that the implements may be attached to or detached from the tow bar.

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**4,744,581**
**ANTIJACKKNIFING MEANS**
**Gilbert Cables, 87 Kimberly Ave., Hamden, Conn. 06518**
**Filed Aug. 21, 1986, Ser. No. 898,631**
**Int. Cl.[4] B62D** *53/00, 53/06*
**U.S. Cl. 280—432** **2 Claims**



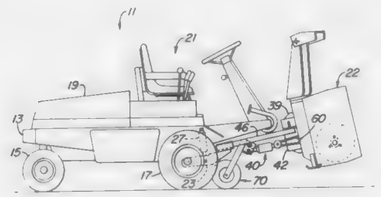
**1.** An anti-jackknifing device for tractor-trailer assembly comprising a curved geared tracking bar attached to the forward end of a trailer, means for sensing the motion of said tracking bar, such sensing means comprising pilot wheel and take-off gear, the latter being connected with control gear meshing with gear plate, wherein said take-off gear, control gear, pilot wheel and gear plate are held in their respective relationship by a gear box; and means for translating circular motion into linear motion of piston plus cylinder arrangement and means for restricting the flow of fluid caused by the motion of the piston in the cylinder; wherein the angle of said tracking bar measured at the pivotal point is 70–95 degrees, the radius of said tracking bar is 50–62 inches, the ratio of the radius of said tracking bar to the radius of said take-off gear is 6–12, the radius of said gear plate to the radius of said control gear is 7.5–21, said gear plate having an angular width 20–76 degrees, and wherein said tracking bar is disengageable from said sensing means.

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**4,744,582**
**IMPLEMENT HITCH LINKAGE FOR FRONT MOUNT MOWERS**
**Lloyd A. Wykhuis; Michael J. O'Neill, both of Mayville, and Ronald K. Leonard, Horicon, all of Wis., assignors to Deere & Company, Moline, Ill.**
**Continuation of Ser. No. 767,947, Sep. 16, 1985, abandoned. This application Nov. 10, 1986, Ser. No. 930,948**
**Int. Cl.[4] B60D** *3/00*
**U.S. Cl. 280—460 A** **11 Claims**

**1.** A hitch linkage for hitching a ground engaging implement to a vehicle having front drive wheels and rear steering wheels, said vehicle having a plurality of lift arms each pivotally mounted at one end to said vehicle and means for raising and lowering said lift arms, the hitch linkage comprising:
- a plurality of hitch arms each operatively connected at one end to said implement and at the other end to a respective one of said lift arms;
- a cross-link rotatably mounted between said hitch arms at a position forward of said vehicle between the vehicle and implement;
- a pair of support struts operatively connected to said cross-link and having a single support wheel for transferring weight from said front drive wheels to said rear steering wheels rotatably mounted therebetween;
- a cylinder pivotally connected at one end to said cross-link at a point remote from the axis of rotation of said cross-link;

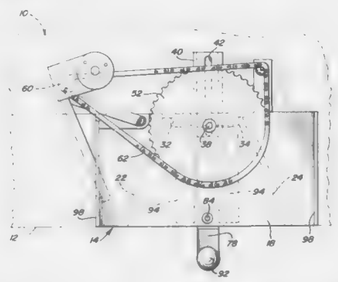
and



means for pivotally mounting the other end of said cylinder in fixed location relative to said hitch arms whereby said cylinder selectively pivots said cross-link to a first position raising said support wheel or to a second implement carrying position lowering said support wheel to a ground engaging position at a point slightly forward of and in close proximity to said drive wheels point of ground engagement for stabilizing said mower about the axis of said drive wheels.

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**4,744,583**
**MOTORIZED WIDE RANGE TOW HITCH**
**Lloyd Blackwood, 5612 Crystal Springs Dr., Bakersfield, Calif. 93313**
**Filed May 27, 1987, Ser. No. 54,805**
**Int. Cl.[4] B60D** *1/16*
**U.S. Cl. 280—478 B** **11 Claims**



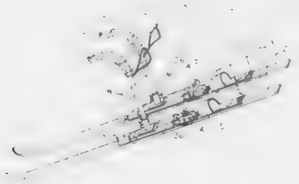
**1.** A motorized wide range tow hitch including a mount for support from a support portion carried by the rear of a vehicle, said mount including vertically spaced top and bottom plates having front and rear margins, a pair of laterally spaced apart upstanding and forwardly convergent opposite side plates interconnecting and extending between said top and bottom plates and defining a rearwardly flared and opening recess therebetween bisected by a center vertical plane disposed centrally intermediate said side plates, a pair of upstanding generally transversely aligned front plates spaced on opposite sides of said plane and interconnecting and extending between said top and bottom plates defining a front-to-rear extending passage therebetween in which said plane is generally centered, a vertical drive shaft extending between and journalled from said top and bottom plates for rotation about an axis generally centered in said plane, an elongated front-to-rear



extending support tube slidingly received between said top and bottom plates for front-to-rear shifting in said passage and including upper and lower longitudinal slots formed therein through which said drive shaft is slidingly and rotatably received, a drive gear mounted on said drive shaft within said tube and drivingly meshed with a rack gear mounted on one inner side of said tube, said tube and mount including coacting abutment means limiting front-to-rear longitudinal shifting of said tube through said passage, the front end of said tube, when the latter is disposed in the rear limit position thereof, projecting forwardly of said front plates, said tube, when displaced rearwardly of the front limit position thereof, being swingable about said axis within said recess, support means carried by the rear end of said tube for removably supporting a tow hitch therefrom, said tube and mount including coacting means operative to cam said tube to a substantially centered position thereof in said recess and bisected by said plane responsive to movement of said tube to said front limit position, said tube and mount including coacting releasable lock means operative to releaseably lock said tube against swinging about said axis and shifting rearwardly from said front limit position when said tube is in said front limit position.

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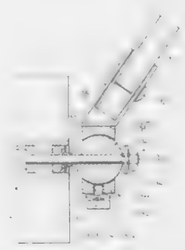
**4,744,584**
**HANDLEBARS FOR TUCKED-IN SKIING**
**F. Javier Monreal, 718 State Tower Bldg., Syracuse, N.Y. 13202**
**Continuation-in-part of Ser. No. 923,612, Oct. 27, 1986, abandoned. This application Jul. 6, 1987, Ser. No. 70,227**
**Int. Cl.[4] A63C** *5/06*
**U.S. Cl. 280—606** **3 Claims**



**1.** A sporting, paired, ski-steering device for use with a pair of skis having standard toe and heel ski bindings mounted thereon, said device being capable of providing a snow skier with hand steering controls of the skis and includes foot holders for securing the skier's boots to the skis, each member of the pair being identical to one another and each one comprising:
- an upright handlebar made of a lightweight rounded metal tubing having a straight vertical portion with a height approximately that of the user's knee, a free bottom end, and a curved portion extending from the top of said straight vertical portion and curving smoothly with an approximate six inch radius into a horizontal portion of approximately four inches in length, said horizontal portion having a free top end and being horizontally flattened along its length; a perforation extending through said straight vertical portion at a location adjacent said free bottom end, said straight vertical portion having at its upper end adjacent said curved portion a string-like strap secured thereto forming a loop capable of extending around the user's wrist; a continuous non-slip rubberized sleeve enclosing said curved and horizontal portions of said handlebar;
- an attachment metal bracket consisting of a welded or cast metal block having a rectangular horizontal plate and an upright stem extending vertically from the center of said horizontal plate, said horizontal plate having a hole at each of its four corners for accommodating a fastener, said upright stem having a perforation extending therethrough and said upright stem being recivable within the free bottom end of said vertical portion of said handlebar; a fastening bolt provided with a hand-fastenable wing nut, said bolt extending through said perforations within said upright stem and said vertical portion of said handlebar;
- a sole plate comprising a rectangular structure having rounded corners with a thin front end and a thicker rear end, said front and rear ends being of the same shape and thickness as a that of a standard ski boot sole; said horizontal plate of said attachment metal bracket being secured to the upper surface of said sole plate by screw fasteners; said pole plate being adapted to be releasably secured between said tow and heel bindings of said ski; said upright handlebars being adapted to be mounted on said vertical upright stem with said flattened horizontal portion extending in either a forward direction or a rearward direction; and
- a foot holder made of lightweight molded plastic having a rectangular, flat portion capable of receiving the weight of the skier standing thereon, said flat portion being firmly screwed to the upper surface of said ski immediately behind said standard rear heel binding, an upwardly extending front portion having a rearwardly facing open cavity for receiving the front portion of the skier's boot, and an elastic loop secured to the rear end of said flat portion for engaging the rear portion of the skier's boot while secured by said foot holder.

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**4,744,585**
**COLLAPSIBLE BARROW WITH ADJUSTABLE WHEELS**
**James C. Huang, No. 105, Sec. 4, San-Ho Rd., Sanchung City, Taipei Hsien, Taiwan**
**Filed Oct. 6, 1987, Ser. No. 104,969**
**Int. Cl.[4] B62B** *1/12*
**U.S. Cl. 280—646** **4 Claims**



**1.** A collapsible golf club barrow comprising:
- a longitudinal bar having a front end and a rear end;
- a rear carriage connected to said rear end;
- a handle connected pivotally to said front end;
- two wheel holding bars having first ends which are interconnected pivotally and second ends opposite to said first ends,
- two links each of which has one end connected pivotally and slideably to said longitudinal bar near said front end of said longitudinal bar and an opposite other end connected to each of said wheel holding bars near said second end of each of said wheel holding bar;
- two wheels each of which has a shaft with a portion extending out of said wheel to be connected to said second end of each of said wheel holding bars,
- a substantially spherical member secured to said extending portion of each of said shafts and having an axial hole through which each said shaft is inserted;
- a socket member connected to said second end of each of said wheel holding bars and sleeved around and secured adjustably to each of said spherical members; and
- locking members adjustably fixing said socket members to respective ones of said spherical members.

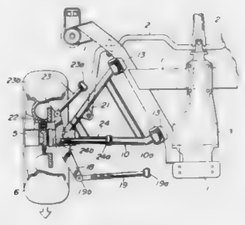
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**4,744,586**
## WISHBONE SUSPENSION FOR AUTOMOTIVE VEHICLE

**Yasuji Shibahata, Yokohama; Hiroshi Tonomura, and Yasumasa Tsubota, both of Yokosuka, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Dec. 22, 1986, Ser. No. 944,169**
**Claims priority, application Japan, Dec. 24, 1985, 60-289327**
**Int. Cl.[4] B60G** *3/20*
**U.S. Cl. 280—661** **6 Claims**



1. In a suspension for a wheeled vehicle having a chassis and a road wheel, said road wheel having an axis of rotation and a center of rotation which lies on said axis;
- a sructural member which rotatably supports said road wheel;
- a first suspension arm, said first suspension arm being resiliently connected to the chassis at its inboard end and operatively connected at its outboard end of said structural member via a first joint, said joint being located on the inboard side of a plane which is normal to said axis of rotation and which includes said center of rotation;
- second and third suspension arms, said second and third suspension arms being resiliently connected at their respective inboard ends to said chassis and connected at their respective outboard ends to said structural member via second and third joints, said second and third suspension arms having axes which converge and intersect at a point which is located outboard of said plane;
- a king pin axis, said king pin axis passing through said first joint and the point at which the extrapolation of said second and third suspension arms intersect, said king pin axis intersecting said plane at a point which is substantially coincident with said center of rotation; and
- a lateral rod, said lateral rod being resiliently connected at its inboard end to said chassis and at its outboard end to said structural member through a fourth joint.

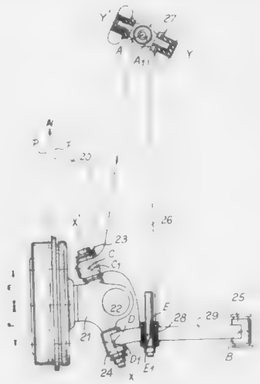
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**4,744,587**
## REAR AXLE ASSEMBLY FOR SUSPENSION OF MOTOR VEHICLES HAVING INDEPENDENT WHEELS

**Jean Veneau, Rueil Malmaison, France, assignor to Regie Nationale des Usines Renault, Boulogne Billancourt, France**

**Filed Apr. 22, 1987, Ser. No. 41,282**
**Claims priority, application France, May 13, 1986, 86 06825**
**Int. Cl.[4] B60G** *3/00*
**U.S. Cl. 280—690** **5 Claims**

1. A rear axle assembly for the suspension of a vehicle having independent wheels, comprising:
- a steering knuckle defining a rear axle;
- a cross arm connected to a body of the vehicle via a first joint having a horizontal pivot axis extending parallel with a longitudinal axis of said vehicle, said cross arm being connected to said steering knuckle via a second joint positioned behind said rear axle relative to said vehicle axis and having a horizontal pivot axis forwardly inclined away from the vehicle; and
- a triangular arm having one vertex connected to said steering knuckle at a third joint positioned adhead of said rear axle relative to said vehicle axis and having a pivot axis aligned with said pivot axis of said second joint, said triangular arm having another vertex connected to said cross arm at a fourth joint having a pivot axis parallel with the pivot axis of said first joint, said triangular arm having a third vertex connected to the vehicle body by a double joint having a vertical pivot axis and a horizontal pivot axis,



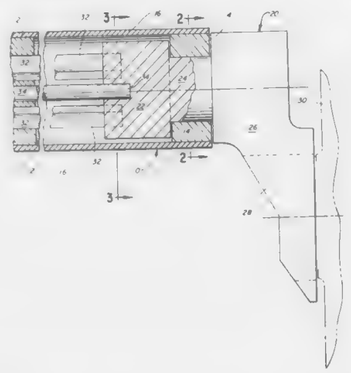
wherein said double joint includes bushing means permitting said third vertex to move along said horizontal pivot axis of said double joint and wherein said horizontal pivot axis is forwardly inclined away from the vehicle, whereby a braking force produces movement of said third vertex along said horizontal pivot axis of said double joint and toe-in of a wheel mounted on said rear axle.

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**4,744,588**
## SUSPENSION SYSTEM

**Charles E. Wharton, Lake Bluff, Ill., assignor to TLW, Inc., Lake Bluff, Ill.**

**Continuation-in-part of Ser. No. 836,056, Mar. 4, 1986. This application Jan. 16, 1987, Ser. No. 4,031**
**Int. Cl.[4] B60G** *11/20*
**U.S. Cl. 280—700** **9 Claims**



1. In a suspension system which comprises a first hub, bearing means spaced from said hub, a second hub carried within said bearing means and rotatable relative to it, and a plurality of separate torsion bars positioned eccentrically relative to said first and second hubs, at least a portion of said second hub and said bearing means being positioned within a stationary, hollow tube of noncircular cross section, said second hub defining



rotary motion limiter means that moves into contact with said hollow tube at a desired limit of rotary motion of the second hub, to prevent further rotary motion beyond said limit, said rotary motion limiter means comprising a portion of said second hub having a generally polygonal periphery and positioned within said hollow tube, whereby said polygonal periphery is spaced from the interior of said hollow tube in permitted angles of rotary motion, and a plurality of spaced sides of said polygonal periphery enter into engagement with the inner surface of said hollow tube at a plurality of contact areas spaced about the axis of said second hub at said desired limit of rotary motion and in which said second hub also carries a transversely extending arm, said second hub, including said limiter means and said arm, being made of a single, integral piece, said bearing means comprising a pair of generally semicircular bearing halves which are secured together about a portion of said second hub.

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**4,744,589**
## SUSPENSION CONTROL SYSTEM

**Shuuichi Buma, Toyota; Toshio Onuma, Susono; Kaoru Ohashi, Okazaki, and Masami Itou, Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan**

**Filed Sep. 30, 1986, Ser. No. 913,262**
**Claims priority, application Japan, Oct. 1, 1985, 60-219686; Oct. 2, 1985, 60-221659**
**Int. Cl.[4] B60G** *17/00*
**U.S. Cl. 280—707** **19 Claims**



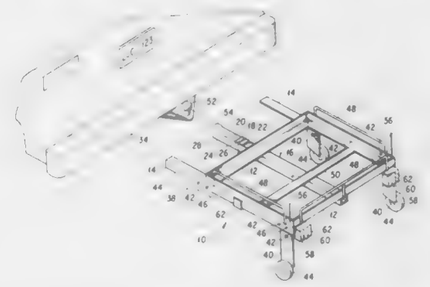

1. A suspension control system comprising;
- vehicle height detection means for providing a vehicle height signal representative of a vehicle height;
- suspension characteristic alternation determination means for providing a vehicle height data signal responsive to said vehicle height signal and for providing a first determination signal representative of a suspension characteristic alteration if a difference between a maximum and and minimum value of said vehicle height data signal within a first time interval exceeds a first value thereof;
- suspension characteristic alteration means responsive to said alteration determination means for altering said suspension characteristic;
- suspension characteristic restoring determination means for providing a second determination signal representative of suspension characteristic restoration if a difference between a maximum and minimum value of said vehicle height data signal within a second time interval is less than a second reference value thereof for a predetermined number of consecutive times; and
- suspension characteristic restoring means responsive to said suspension characteristic restoring determination means for restoring said suspension characteristic, and wherein said first time interval is greater than said second time interval.

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**4,744,590**
## REMOVABLY ATTACHABLE SUSPENDED TRAILER APPARATUS AND METHOD

**Larry J. Chesney, 2005 Sager, Rockdale, Tex. 76567**

**Filed Feb. 13, 1987, Ser. No. 14,685**
**Int. Cl.[4] B60R** *9/00*
**U.S. Cl. 280—769** **2 Claims**



1. A removably attachable suspended trailer comprising:
- (a) a frame:
- (b) a plurality of parallel strength members mounted on said frame;
- (c) a frame receiving means adapted to be mounted on a towing vehicle;
- (d) means interconnecting said frame and said frame receiving means for removably suspending said frame from said frame receiving means;
- (e) a plurality of legs rotatably attached to the underside of said frame for supporting said suspended trailer at each corner upon the removal of said interconnecting means from said receiving means;
- (f) means for locking said legs in a retracted position when said frame is attached to a towing vehicle and for locking said legs in an extended position when said frame is standing alone;
- (g) wheel means attached to said legs so that when said legs are locked in said extended position and said frame is standing alone, said frame may be rolled from one place to another;
- (h) tie down rail means for use in securing transported materials to said frame;
- (i) hinge means in said interconnecting means for enabling the raising of said frame from a horizontal to a vertical position; and
- (j) support and anti-rotational strength member means attached to said frame and adapted to contact towing vehicle at spaced intervals and support said frame and inhibit side to side rotation of said frame.

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**4,744,591**
## LABELS AND MANUFACTURE THEREOF

**David J. Instance, Past Heap Farm, Pembury, Tunbridge Wells, Kent, England**

**Filed Oct. 29, 1985, Ser. No. 792,735**
**Claims priority, application United Kingdom, Oct. 29, 1984, 8427291; Feb. 18, 1985, 8504113**
**The portion of the term of this patent subsequent to Jun. 3, 2003, has been disclaimed.**
**Int. Cl.[4] B42D** *19/00, 15/00;* **A61F** *13/00*
**U.S. Cl. 281—5** **10 Claims**

1. A label for affixing to a container comprising a longitudinal strip divided into a series of panels by a plurality of transverse fold lines, the first two panels forming a front cover and a back cover respectively for enveloping the remaining panel or panels of the strip when folded, the transverse fold lines being spaced along the strip so that upon folding of the strip

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the said remaing panel or panels is or are folded to lie over the back cover and is or are in turn covered by folding of the front cover about the fold line between the front and back covers; a support web to which the said back cover is adhered, the support web being dimensioned so that at least one region thereof extends laterally at least beyond the edge of the back cover which occurs at the fold line between the back cover and the remaining panel or panels; and a layer of pressure-sensitive self-adhesive material which is adhered by the self-adhesive surface thereof over the label, the self-adhesive material extending beyond the free outer edge of the front cover panel, which free outer edge is opposite the fold line between the




front and back cover panels, and the self-adhesive material having at least one portion thereof which is releasably adhered by the self-adhesive surface thereof to the at least one region, thereby to secure the front cover panel in a closed condition and can be pulled away from the support web thereby to open the front cover panel and give access to the interior of the folded strip and the self-adhesive material extends beyond the said at least one region so that the self-adhesive material is also adhered to a part of the support web which is adjacent to said at least one region and an elongate cut or weakened tear line through the self-adhesive material separates the said at least one portion from the remainder of the self-adhesive material which is adhered to the said part of the support web.

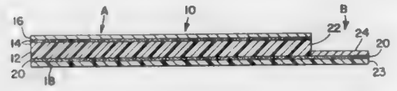
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**4,744,592**

## LAMINATE AND METHOD FOR PROTECTING BOOKS

**Charles J. Barnette, Akron, and Gregory P. Brumbaugh, Stow, both of Ohio, assignors to Kent Adhesive Products Co., Kent, Ohio**

**Filed Sep. 25, 1986, Ser. No. 911,469**
**Int. Cl.⁴ B42D** *3/02, 3/00, 3/12;* **B32B** *3/04*
**U.S. Cl. 281—15 R** **11 Claims**




1. A laminate for protecting the outside surfaces of a book having a spine, said laminate comprising:

(a) a stiff rectangular sheet having a width and height at least as great as the width and height, respectively, of the covers of the book to be protected;

(b) a first pressure sensitive adhesive coating on one surface of said stiff sheet;

(c) a first release liner covering said first adhesive;

(d) a thin flexible transparent rectangular sheet bonded to the other surface of said stiff sheet, said flexible sheet being of the same height as but greater width than said stiff sheet, said flexible sheet being bonded to said stiff sheet with the top and bottom edges of stiff and flexible sheets aligned, whereby said flexible sheet has a main portion that is adhered to said stiff sheet, and at least one flexible extension which is not so adhered, said extension being adapted to cover the spine of said book;

(e) a second pressure sensitive adhesive coating on at least the exposed portion of the surface of said flexible sheet which is adhered to said stiff sheet;

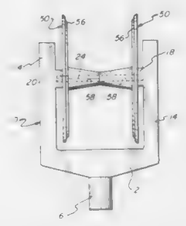
(f) a second release liner covering the exposed portion of said second adhesive.

**4,744,593**

## GOLF BALL RETRIEVER

**Rodney J. Spielman, 113 Main St., Vernon, Conn. 06066, and Donald J. Allison, 38 Strant St., Manchester, Conn. 06040**

**Continuation-in-part of Ser. No. 896,875, Aug. 15, 1986, Pat. No. 4,669,770. This application May 27, 1987, Ser. No. 54,798**
**Int. Cl.⁴ A63B** *47/02*
**U.S. Cl. 294—19.2** **11 Claims**




1. In a device for retrieving golf balls and the like, a head assembly comprised of a forked body which is integrally formed, as a single piece, from a synthetic resinous material, said body including at least two laterally spaced, generally parallel prong portions each having an inwardly extending boss element thereon with a socket formed thereinto and providing a bearing surface thereabout, said sockets being in lateral alignment with one another; a shaft supported between said prong portions and having opposite end portions seated within said sockets; at least two disc members, each having a disc portion and a hub portion extending coaxially from one side thereof, said disc members being rotatably mounted upon said shaft with said hub portions extending toward one another to cooperatively space said disc portions laterally and thereby define a generally cylindrical space therebetween of a width which is slightly less than the diameter of the balls that are to be retrieved with said device, said disc portions being sufficiently resiliently deflectable to receive such balls within said space and to wedge them therebetween, said prong portions having sufficient resilience to permit spreading from normal positions, for insertion of said shaft end portions into said sockets, and to thereafter return toward said normal positions to cause said bearing surfaces of said prong boss elements to bear upon said disc portions and to maintain said shaft and disc members in assembly with said body, without need for supplemental securing means.

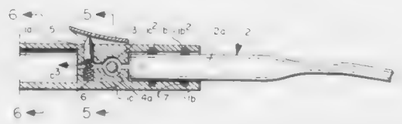
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**4,744,594**

## VACUUM HANDLING ESPECIALLY FOR THE USE IN HANDLING SILICON WAFERS

**Bernard Poli, Roche La Moliere, and Gérard Chincholle, Saint Etienne, both of France, assignors to RECIF (Societe Anonyme), France**

**Filed Dec. 10, 1986, Ser. No. 940,535**
**Claims priority, application France, Dec. 10, 1985, 85 18635; Nov. 12, 1986, 86 16186**
**Int. Cl.⁴ B25J** *15/06*
**U.S. Cl. 294—64.1** **4 Claims**




1. An elongated tubular holder for silicon wafers and the like comprising an elongated hollow tube, said tube being opened at one end and defining a socket portion and a hollow portion at the other end, a solid means separating said socket portion



and said hollow portion, said hollow portion having means whereby to connect it to a vacuum source to produce diminished gas pressure in said hollow portion, said solid means having an axial bore therethrough thereby connecting said socket portion and said hollow portion, a first transverse bore completely through said solid means intersects said axial bore, a reciprocable elongated means positioned in said first transverse bore having a plug portion to selectively completely interrupt said axial bore, said reciprocable elongated means having at each end axle means extending beyond said first transverse bore, a second transverse bore in said solid means axially displaced from said first transverse bore which intersects said axial bore, a movable plug positioned in said second transverse bore to selectively completely interrupt said axial bore, spring means operatively connected to said plug to urge said plug in a radial direction externally of said second transverse bore, a lever means, said lever means manually operatively articulated to impinge on said plug extending from said second transverse bore, said lever means being pivotally mounted on said axle means, said lever means when manually depressed in the direction of the solid means thrusts said plug in a manner to interrupt said axial bore.

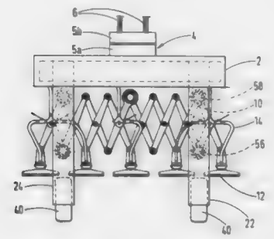
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**4,744,595**

## HOISTING APPARATUS FOR GROUPWISE TRANSFER OF CARGO UNITS, SUCH AS PAPER ROLLS

**Erling Tonning, and Jacob S. Halvorson, both of Oslo, Norway, assignors to Leif Hoegh & Co. A/S, Oslo, Norway**

**PCT No. PCT/N085/00070, § 371 Date Sep. 8, 1986, § 102(e) Date Sep. 8, 1986, PCT Pub. No. WO86/02915, PCT Pub. Date May 22, 1986**
**PCT Filed Oct. 31, 1985, Ser. No. 885,580**
**Claims priority, application Norway, Nov. 9, 1984, 844480**
**Int. Cl.⁴ B66G** *1/02*
**U.S. Cl. 294—65** **11 Claims**



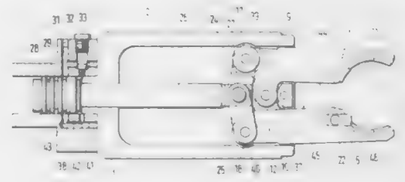

1. In a hoisting apparatus for group-wise transfer of cargo units, such as paper rolls, drums or the like, a hoisting bank of the kind having a plurality of horizontally spaced mutually adjustable gripper means such as vacuum cups for gripping and holding a group of side by side positioned cargo units, said hoisting bank provided with one or more guiding arms for effecting lateral adjustment of said gripping means relative to the cargo units prior to positioning of said grippers onto said cargo units, wherein at least one of said guiding arms (**24**) is provided with at least two sensors (**40,32,32**) operable upon contact with said cargo to effect said adjustment of the gripper means relative to the cargo units, one of said sensor means effective to reduce a distance between said grippers, the other sensor effective to extend said distance, said sensors being formed and positioned such that a first one of said sensors initially contacts said cargo in dependence of the contour of said cargo and effecting the required gripper adjustment.

**4,744,596**

## GRIPPING DEVICE

**Norbert Hiller, Wendlingen, and Walter Horny, Nuertingen, both of Fed. Rep. of Germany, assignors to Heller Maschinenfabrik GmbH, Nuertingen, Fed. Rep. of Germany**

**Filed Jul. 10, 1987, Ser. No. 71,962**
**Claims priority, application Fed. Rep. of Germany, Jul. 12, 1986, 3623586**
**Int. Cl.⁴ B25J** *15/08*
**U.S. Cl. 294—88** **9 Claims**




1. A gripping device for gripping tools, workpieces or the like, comprising:

(a) a housing,

(b) a pair of gripping arms, mounted in said housing, said arms being pivotally mounted to each other adjacent their inner ends about a pivot axis,

(c) piston-cylinder means movable longitudinally in said housing,

(d) lever means pivotally connected both to said piston-cylinder means and to said gripping arms in such a manner that said piston-cylinder means is longitudinally displaceable relative to said pivot axis, and

(e) stop means on said housing in alignment with said pivot axis and forwardly thereof, whereby

forward movement of said piston-cylinder means causes said gripping arms to move correspondingly forward until said gripping arms in the region of said pivot axis engage said stop means, with continued movement of said piston-cylinder means causing said lever means to rotate and move said gripping arms into a gripping position.

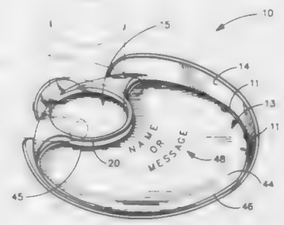
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**4,744,597**

## FOOD AND BEVERAGE TRAY

**Charles E. Bauman, and Barbara M. Bauman, both of 11850 W. 22nd Pl., Lakewood, both of Colo. 80215**

**Filed Mar. 5, 1987, Ser. No. 21,989**
**Int. Cl.⁴ A47G** *23/06*
**U.S. Cl. 294—172** **21 Claims**




1. A food and beverage tray for holding food items and supporting a beverage container and adapted to be held by the hand of a person comprising:

a bottom having an upper surface for supporting food items and a lower surface opposite said upper surface and having a surrounding peripheral edge;

a container recess formed in said bottom and having a container support surface for supporting the beverage container;

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a sidewall extending upwardly from a first edge portion of the peripheral edge, said sidewall having a C-shaped configuration with first and second end edges spaced apart from one another on opposite sides of said container recess to define a second edge portion of said peripheral edge, said second edge portion being arcuate in shape and located adjacent the container recess whereby the beverage container may be received in said recess and supported by said container support surface such that a person may simultaneously grip the beverage container between the thumb and index finger of the one hand and support the tray with the remaining fingers positioned along the lower surface of the bottom and with the second edge portion received in the palm of the hand.

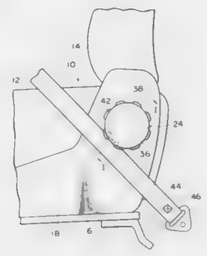
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**4,744,598**

## SEAT STRUCTURE FOR VEHICLE

**Masato Ohchi, Toyota, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan**

**Filed Oct. 7, 1986, Ser. No. 916,164**
**Claims priority, application Japan, Nov. 1, 1985, 60-168951**
**Int. Cl.[4] A47C *31/00***
**U.S. Cl. 297—183** **14 Claims**



1. A seat structure for a vehicle, comprising:
a seat for an occupant of the vehicle;
a dial-type handle having a grip portion formed along an entire circumference of a peripheral edge thereof in such a manner that said grip portion extends toward a cover member, and projecting from a position on said seat which is in the vicinity of an occupant restraining webbing, said handle being turned to actuate a seat adjusting mechanism, concealed by said cover member and incorporated in said seat, so as to effect adjustment of said seat;
a recess formed inside of said handle in opposition to said cover member, said recess extending in the circumferential direction of said handle;
said cover member having a through-hole through which a shaft linked to said seat adjusting mechanism extends so as to be rigidly secured to said handle; and
a projecting wall integral with said cover member having a height higher than the gap between said cover member and the peripheral edge portion of said handle, and extending into said recess in said handle,
whereby the webbing is prevented from entering said gap more than a predetermined amount.

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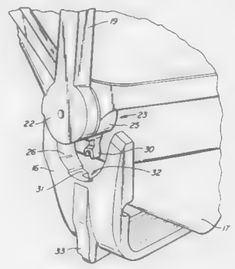
**4,744,599**

## TWO-POSITION PLAYSEAT COUPLING

**Mark D. Jankowski, Akron, and Robert L. Quinlan, Jr., Stow, both of Ohio, assignors to Gerber Products Company, Fremont, Mich.**

**Filed Nov. 7, 1986, Ser. No. 928,446**
**Int. Cl.[4] A47D *1/10***
**U.S. Cl. 297—250** **10 Claims**

1. A two-position latch for joining a seat to a frame, comprising
a hub on the side of said seat with a hook projecting therefrom;
a U-shaped collar on said frame to receive said hub:
a flange along said U-shaped collar having a gap therein to



receive said hook, said gap dividing said flange into first and second flange segments to engage said hook; and
a retractable stop in said frame engageable with said collar to prevent travel of said hook between said first and second flange segments.

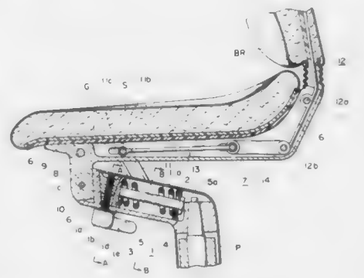
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**4,744,600**

## CUSHIONING MECHANISM FOR USE WITH SEAT OF CHAIR AND INTERLOCKING CUSHIONING MECHANISM FOR SEAT AND BACKREST

**Noboru Inoue, Tokyo, Japan, assignor to Itoki Co., Ltd., Ohsaka, Japan**

**Filed Apr. 28, 1987, Ser. No. 43,316**
**Claims priority, application Japan, May 6, 1986, 61-101915; May 6, 1986, 61-66908[U]**
**Int. Cl.[4] A47C *1/02***
**U.S. Cl. 297—326** **5 Claims**



1. A cushioning mechanism adapted for use with a seat portion of a chair, comprising:
a support frame of a pillar-like shape to which the seat portion of a chair is mounted and having an upper end portion which is tilted toward the front edge of the seat portion;
a cushioning member such as a coil spring incorporated in said support frame and having a stopper member at its front end;
a seat frame bearing thereon the seat portion of a chair, said seat frame having a front end portion connected pivotally via a horizontal shaft to the upper end portion of said support frame in which said cushioning member is incorporated, said horizontal shaft extending substantially parallel to the front and rear edges of the seat portion and allowing for vertically swinging motion of the seat portion in an approximately horizontal plane;
a lever block integral with said seat frame, said lever block projecting downwardly from the portion of said seat frame to which the upper end portion of said support frame is pivotably connected and serving to cause motion of said cushioning member;
a tie rod disposed in a lower portion of said lever block for pivotal motion at its front end, said tie rod being inserted at its rear end portion into said support frame incorporating said cushioning member so as to support the rear end of said cushioning member at the rear end of said tie rod;
a receiver member disposed in the front end portion of the support frame for supporting the cushioning member, the receiver member being capable of being moved forwardly and rearwardly of the seat portion; and
a wedge member disposed adjacent to said receiver member for vertical movement in the front end portion of said support frame so as to allow for vertical motion of said receiver member, thereby enabling adjustment of the cushioning effect provided by the cushioning member.



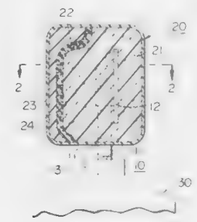
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**4,744,601**

## HEADREST APPARATUS

**Motoyasu Nakanishi, Fujishi, Japan, assignor to Kabushiki Kaisha Cubic Engineering, Shimizushi, Japan**

**Filed Apr. 29, 1987, Ser. No. 44,901**
**Int. Cl.[4] A47C *7/38***
**U.S. Cl. 297—391** **22 Claims**



1. A headrest apparatus comprising
a. a support mechanism provided with at least one support member which is uprightly fixed to a seat and a pillow member securing means, and
b. a pillow member provided with a high cushioning elastic base part which is mounted on said support member, a low cushioning elastic support wall having a higher resistance to deformation than said elastic base part and which is provided in front of this elastic base part, an empty space formed in front of this elastic support wall, a head resting part formed on the front surface of this empty space, and a gel material layer which is formed by filling said empty room with gel material, wherein a load to be applied to said head resting part is applied to said gel material layer.

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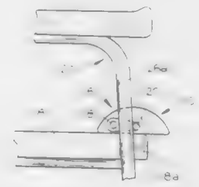
**4,744,602**

## APPARATUS FOR POSITIONING A CHILD IN A HIGH-CHAIR

**Thomas L. Campbell, and Phyllis A. Campbell, both of 106 S. 51st Ave., Omaha, Nebr. 68132**

**Continuation-in-part of Ser. No. 915,682, Oct. 6, 1986, abandoned. This application Mar. 25, 1987, Ser. No. 29,779**
**Int. Cl.[4] A47C *31/00, 7/50***
**U.S. Cl. 297—423** **13 Claims**

1. An adjustable device for positioning a child in a high-chair, comprising:
an elongated cushion for placement under the legs of a child on the seat of a high-chair;
a rotatable rod means extending longitudinally through said cushion and projecting out of each end thereof; and



means on said rod means for adjustably restraining said cushion from moving towards the forward edge of the seat of a high-chair.

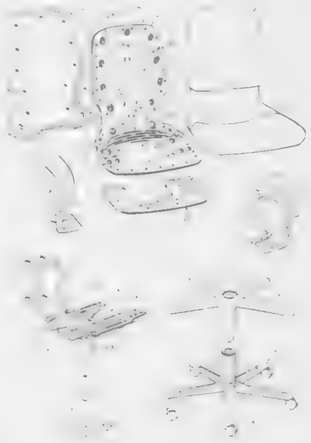
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**4,744,603**

## CHAIR SHELL WITH SELECTIVE BACK STIFFENING

**Glenn A. Knoblock, Kentwood, Mich., assignor to Steelcase Inc., Grand Rapids, Mich.**

**Filed Apr. 10, 1986, Ser. No. 850,505**
**Int. Cl.[4] A47C *7/02***
**U.S. Cl. 297—457** **24 Claims**



1. A chair comprising:
a base;
a seat supported on said base;
a back pivotally supported on said base;
a control operatively connecting said base and said back, and selectively controlling rearward tilting of said back;
a cushion assembly shaped to support a user thereon;
an inner shell construction connecting said cushion assembly with said seat and said back, said inner shell construction comprising:
a semi-rigid, resiliently flexible sheet, having forward and rearward surfaces, and a generally L-shaped side elevational configuration, including a bottom shaped to support a buttock area of an adult user thereon, and a back shaped to selectively support a back area of an adult user thereon; said back having a substantially flat planar shape, with a central area disposed directly behind a lumbar area of a seated adult user to selectively support the same, and an upper area disposed above said central area, and generally behind an upper back area of a seated user to selectively support the same;
a plurality of ribs formed integrally with said sheet on the

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rearward side thereof, and extending generally vertically along the central area of said back to stiffen the central area of said back in a vertical plane for firm support of at least the lumbar area of the seated user, yet permit at least the upper portion of said back to flex in a horizontal plane for improved freedom of movement of the upper back area of the seated user.

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**4,744,604**

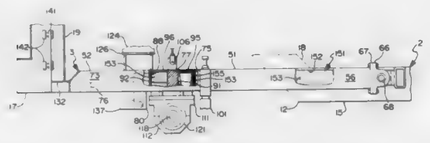
## VIBRATION DAMPING DEVICE AND A METHOD FOR A ROAD PLANER AND THE LIKE

**Roger L. Lewis, Leawood; Richard S. Norland, Stillwell, both of Kans., and Leon D. Jones, Elba, N.Y., assignors to Federal-Mogul Corporation, Southfield, Mich.**

**Continuation of Ser. No. 720,586, Apr. 8, 1985, abandoned. This application Dec. 30, 1986, Ser. No. 948,450**

**Int. Cl.[4] E21C** *41/00;* **E01C** *23/09*

**U.S. Cl. 299—10** **20 Claims**



13. A method of damping vibration in a machine including a main frame and a sub-frame, a prime mover mounted of said sub-frame for driving a driven device supported on a shaft mounted on said sub-frame, wherein said method comprises the steps of:

pivotally connecting said mainframe and said subframe;

providing a slightly constrained mass within said sub-frame;

transmitting vibrational energy from said prime mover and said driven device to said slightly constrained mass;

converting said vibrational energy in said slightly constrained mass to thermal energy;

transferring said thermal energy from said slightly constrained mass to said frame; and

dissipating said thermal energy from said frame, thereby increasing effectiveness of the driven device.

15. A vibration damping assembly for a machine, comprising:

frame means having a void spaced formed therein;

vibration means mounted on said frame means, said vibration means comprising a combustion engine for driving a tool; and

a slightly constrained mass provided in said void space and comprising a plurality of particles adapted to move with respect to each other and with respect to said frame means, said mass comprising a lead ingot and lead shot particles having rounded configurations.

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**4,744,605**

## BIT AND BIT HOLDER FOR MINING MACHINES

**Michael Komotzki, Lichtendorfer Strasse 127, D-5840 Schwerte, Fed. Rep. of Germany**

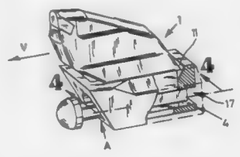
**Filed Aug. 4, 1986, Ser. No. 893,100**

**Claims priority, application Fed. Rep. of Germany, Aug. 2, 1985, 3527707**

**Int. Cl.[4] E21B** *10/62*

**U.S. Cl. 299—91** **10 Claims**

1. In a material removing machine, particularly in a mining machine, the combination of a holder movable in a predetermined direction and defining a chamber extending in said direction and having an open side, said chamber having a substantially square or rectangular cross-sectional outline and said holder further having a front opening and a rear opening, said openings communicating with said chamber; a bit having a shank extending through the open side of and into said chamber, said shank having a surface provided with a groove extending in said direction and tapering from said front opening toward said rear opening; and means for releasably locking



said shank to said holder including a key having a tapering stem filling said groove and being in frictional engagement with said shank and said holder.

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**4,744,606**

## WHEEL COVER FOR VEHICLE

**Takao Yoshida, Kawaguchi, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Jun. 10, 1986, Ser. No. 872,555**

**Claims priority, application Japan, Jun. 14, 1985, 60-128008; Jul. 26, 1985, 60-114964[U]; Dec. 19, 1985, 60-286479**

**Int. Cl.[4] B60B** *3/00*

**U.S. Cl. 301—6 CS** **3 Claims**

1. In a small vehicle equipped with a wheel, an associated disk brake system and wheel supporting means;

wherein said wheel includes

a wheel rim,

wheel cover supporting wall means, on said wheel rim and a wheel spoke section,

the improvement residing in wheel cover apparatus comprising:

a wheel cover for a wheel of said small vehicle including

a first pair of left and right annular first covers, said first pair having a plurality of air exhaust ports arranged in a peripheral direction, and

being fixed to said wall means on said wheel rim to which said wheel spoke section is connected, and

extending generally transversely of the axis of the axle of said wheel; and

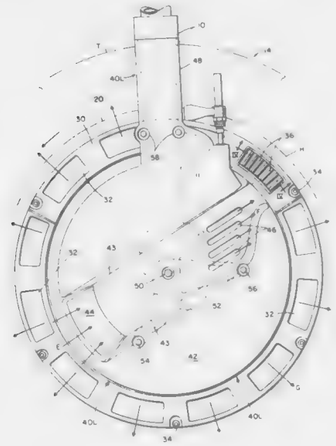
a second pair of left and right second covers, said second pair

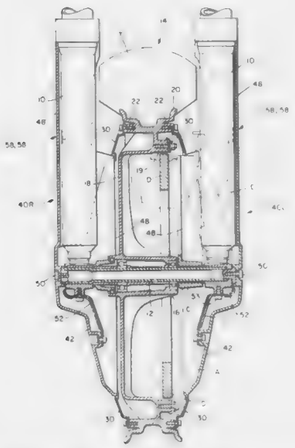
having air intake port means capable of receiving air while said wheel is rotating,

being connected with said wheel supporting means, and



said first and second covers being generally contiguous and cooperating to define





inner chamber means housing portions of of said wheel and covering sides of said wheel, including said brake caliper means.

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**4,744,607**

## BRAKE CONTROL SYSTEM FOR COMBINING ELECTRIC AND FLUID PRESSURE BRAKES

**Kazutaka Nagata, Tarumi, Japan, assignor to Nippon Air Brake Co., Ltd., Kobe, Japan**

**Filed Oct. 16, 1986, Ser. No. 919,405**

**Claims priority, application Japan, Dec. 18, 1985, 60-286173**

**Int. Cl.[4] B60T** *13/66*

**U.S. Cl. 303—16** **11 Claims**

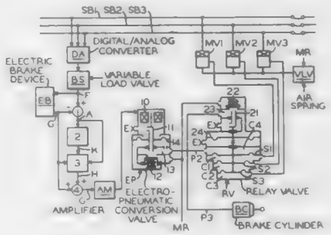
1. A brake control system for a railway vehicle having an electrical brake system and a fluid pressure brake system, said brake control system comprising:

(a) means for providing a brake power control signal according to the desired total braking power of said vehicle;

(b) said electric brake system being operative in response to said brake power control signal to provide vehicle braking power;

(c) means for providing an equivalent signal according to the effective vehicle braking power provided by said electric brake system;

(d) detector means for determining only when the difference between said brake power control signal and said equivalent signal changes in a decreasing sense to thereby provide a modified equivalent signal; and




(e) said fluid pressure brake system being operative to provide additional vehicle braking power in accordance with the difference between said brake power control signal and said modified equivalent signal to supplement said braking power provided by said electric brake system.

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**4,744,608**

## BRAKING CORRECTOR

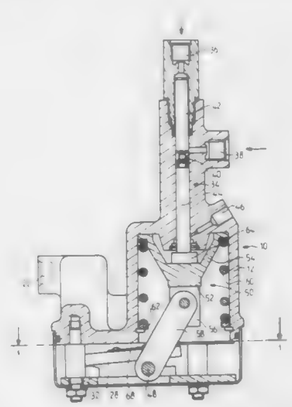
**Pierre Pressaco, La Courneuve, France, assignor to Bendix France, Paris, France**

**Filed Dec. 9, 1986, Ser. No. 939,646**

**Claims priority, application France, Dec. 11, 1985, 85 18345**

**Int. Cl.[4] B60T** *8/18*

**U.S. Cl. 303—22.5** **7 Claims**



1. A variable ratio braking corrector for a vehicle, comprising a housing provided with at least two parallel bores, two pistons each mounted slideably in a respective bore, the two pistons projecting from the housing and cooperating with ends of a rocker mounted in an articulated manner relative to the housing, a hinge pin of the rocker displaceable by means of a mechanism connected to a vehicle suspension to vary the operational ratio of the corrector as a function of vehicle load, characterized in that the mechanism comprises a reversible escape device which includes at least two elements coupled pivotably to one another, one element coupled pivotably to the hinge pin and the other element biased toward a rest position by spring means, the mechanism comprising at least a third piston displaceable as a function of the vehicle load, and an end of the third piston engaging the other element, the other ele-

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ment displaceable by said third piston and, in said rest position, biased by the spring means toward a substantially axially aligned position with the third piston, the two pistons able to displace the rocker against the hinge pin so as to immobilize the hinge pin and prevent displacement thereof, the spring means and pivotable couplings of the two elements and hinge pin permitting the other element to be displaced by the third piston into nonalignment relative to the third piston and thereby prevent displacement of the hinge pin by the one element when the hinge pin is immobilized by said rocker, said spring means effecting a subsequent return of the other element to said substantially aligned position.

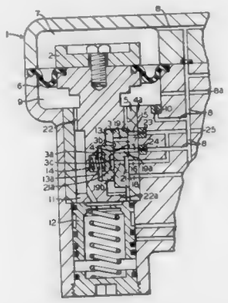
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**4,744,609**

## FREIGHT BRAKE CONTROL VALVE HAVING AN EMERGENCY PISTON SLIDE VALVE AND GRADUATING VALVE ARRANGED TO PROVIDE AN ACCELERATED BRAKE APPLICATION FUNCTION

**Charles L. Weber, Jr., North Huntingdon, Pa., assignor to American Standard Inc., Wilmerding, Pa.**

**Filed Nov. 14, 1986, Ser. No. 930,480**
**Int. Cl.[4] B60T** *15/30, 11/34*
**U.S. Cl. 303—37** **9 Claims**



**1**. For use on each car of a railway train having a brake pipe charged with fluid under pressure interconnected to the brake pipe of an adjoining car, a control valve device operable in response to selective service and emergency rates of reduction of the pressure carried in said brake pipe for effecting either a service or an emergency brake application, said control valve device comprising:

(a) a housing having a cavity therein;

(b) an emergency piston in said cavity forming therewith first and second pressure chambers;

(c) passage means interposed between said brake pipe and said first and second chambers via which said first and second chambers are charged with the fluid pressure carried in said brake pipe;

(d) first choke means for restricting the flow of fluid pressure between said brake pipe and said second chamber;

(e) slide valve means carried in said piston for effecting a further reduction of said brake pipe fluid pressure in addition to said selective reduction of said brake pipe fluid pressure upon initial movement of said piston in one direction when a pressure differential is established between said first and second chambers in response to said selective reduction of said brake pipe fluid pressure and thereafter effecting a reduction of the fluid pressure effective in said second chamber in bypass of said first choke means to such extent as to counterbalance the reduction of fluid pressure in said first chamber when said selective reduction of said brake pipe fluid pressure is at said service rate, thereby preventing further movement of said piston in said one direction, and for terminating said further reduction of fluid pressure only upon movement of said piston in a direction opposite said one direction subsequent to termination of said selective reduction of the fluid pressure carried in said brake pipe;

(f) a recess in said piston; and

(g) said slide valve means including:

(i) a first slide valve carried within said recess, said first slide valve having an axial dimension less than the axial dimension of said recess so that during initial movement of said piston in said one and said opposite directions, lost motion occurs between said piston and said first slide valve and thereafter said first slide valve is moved with said piston; and

(ii) a second slide valve carried fast in said recess for continuous movement therewith whereby relative movement occurs between said first and second slide valves during said initial movement of said piston, said first and second slide valves being cooperatively arranged to provide a first fluid flow path therebetween via which said further reduction of said brake pipe fluid pressure is established during said initial movement of said piston in said one direction and via which said further reduction of said brake pipe fluid pressure is interrupted during said initial movement of said piston in said opposite direction.

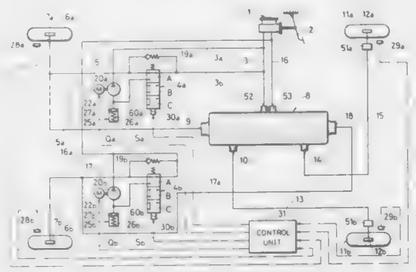
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**4,744,610**

## ANTI-SKID CONTROL APPARATUS FOR A VEHICLE BRAKING SYSTEM

**Tetsuro Arikawa, Kanagawa, Japan, assignor to Nippon A B S, Ltd., Tokyo, Japan**

**Filed Sep. 15, 1986, Ser. No. 907,596**
**Claims priority, application Japan, Sep. 13, 1986, 60-203982**
**Int. Cl.[4] B60T** *17/18*
**U.S. Cl. 303—92** **11 Claims**




**1**. In an anti-skid control apparatus for a vehicle braking system including:

(A) a pair of front wheels and a pair of rear wheels;

(B) a first fluid pressure control valve device arranged in a first conduit system device for controlling the brake fluid pressure of the wheel cylinder of one of said front wheels, arranged between a first fluid pressure generating chamber of a tandem master cylinder and said wheel cylinder of said one front wheel;

(C) a second fluid pressure control valve device arranged in a second conduit system for controlling the brake fluid pressure of the wheel cylinder of the other of said front wheels, arranged between a second fluid pressure generating chamber of said tandem master cylinder and said wheel of the other front wheel;

(D) a control unit for measuring or judging the skid conditions of said front and rear wheels and for generating instructions for controlling said first and second fluid pressure control valve devices; and

(E) a valve apparatus for generating a fluid pressure in accordance with the lower one of the brake fluid pressures of said front wheels controlled with said first and second fluid pressure control valve devices, being arranged between said wheel cylinders of the front wheels and the wheel cylinders of the rear wheels; wherein said valve apparatus comprises a pair of valve parts each for opening and closing a conduit between the wheel cylinders of the ones of said front and rear wheels in the corresponding one of the two conduit systems, said valve parts being arranged so as to open and close in opposite directions with respect to one another, and a piston or piston group consisting of plural piston members, including a pair of fluid pressure receiving portions or piston members which receive the fluid pressure of the corresponding one of said first and second fluid generating chambers of the tandem master cylinder, and the fluid pressure of the corresponding one of the wheel cylinders of said front wheels in opposite directions, respectively, said piston or piston group is located normally at a neutral position for opening said valve parts and is movable in the directions to selectively close any one of said valve parts by the difference between the fluid pressures of the wheel cylinders of said front wheels during the skid operation and when one of the two conduit systems fails, said piston or piston group is moved in the corresponding one of the opposite directions by the fluid pressure difference between the first and second fluid pressure generating chambers of the tandem master cylinder so as to forcibly maintain the one valve part at the opened state, said one valve part being for opening and closing the conduit of the other normal conduit system, or said piston or said piston group is maintained at the neutral position so as to maintain said pair of valve parts at the opened state.



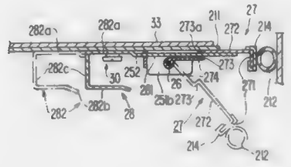
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**4,744,611**

## DISPLAY CABINET

**Fumiyasu Tamura; Kenichi Nara, and Ryoichi Takahashi, all of Maebashi, Japan, assignors to Sanden Corporation, Gunma, Japan**

**Filed Apr. 3, 1986, Ser. No. 847,522**
**Claims priority, application Japan, Apr. 4, 1985, 60-49245**[U]; Mar. 3, 1986, 61-30218[U]
**Int. Cl.[4] A47F** *3/04*
**U.S. Cl. 312—116** **9 Claims**



**1**. In a display case including a mechanical chamber having a refrigeration unit disposed therein and provided with a compartment for display and storage of merchandise, said display compartment being defined by a front window, right and left windows, a top plate portion and hinged door, and said front, right and left windows being attached together by frame elements, at least one impervious partition plate disposed within said display compartment to divide said compartment into two chambers, a gap defined between at least one of said windows and an edge portion of said partition plate for said chambers to communicate with one another through said gap to vary the temperature condition of each of said chambers by opening and closing said gap, and a sealing mechanism to control opening and closing said gap, the improvement comprising said sealing mechanism including a sealing element movably engaged with said partition plate to engage with at least one of said windows so as not to allow air to pass through said gap when such window is engaged and a retaining element to hold the selected position of said sealing element.

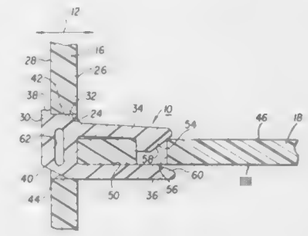
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**4,744,612**

## FASTENER

**Russell K. Winter, Crownsville; Thomas D. Harvey, Rockville; Nedim Savas, Bethesda, and Richard S. Kain, Woodbine, all of Md., assignors to Russell William, Ltd., Odenton, Md.**

**Continuation-in-part of Ser. No. 629,515, Jul. 10, 1984, Pat. No. 4,650,261. This application Feb. 27, 1987, Ser. No. 20,092**
**The portion of the term of this patent subsequent to Mar. 17, 2004, has been disclaimed.**
**Int. Cl.[4] A47F** *3/12*
**U.S. Cl. 312—140** **19 Claims**



**1**. An improved fastener for releasably coupling a side panel member having opposing internal and external surfaces to a display panel member, said side panel member having a side panel member through opening of predetermined contour formed therethrough, said improved fastener comprising:

a base portion defining a lug member upper section extending beyond said side panel through opening contour when said fastener operatively engages said side panel and display panel members, said lug member upper section contiguously interfacing with said external surface of said side panel member, said base portion having a chamfered lower section for insert of said fastener through said side panel member through opening in a reversible longitudinal direction, a central portion of said fastener secured to said base portion, at least a portion of said fastener central portion having a predetermined contour for matingly engaging a portion of an inner wall of said panel member through opening, and a pair of longitudinally extending arm members fixedly mounted to said fastener central portion and adapted to clampingly engage said display panel member on opposing surfaces thereof, one of said longitudinally extending arm members extending substantially normal a plane defining said side panel member, the other of said longitudinally extending arm members being inclined with respect to said plane of said side panel member defining an inclined display panel member insert passageway having a longitudinally directed planar lower surface for slidable insert of said display panel member in a substantially horizontal plane, said arm members being longitudinally reversibly insertable through said through opening of said side panel for slidable insert on said display panel member.

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**4,744,613**

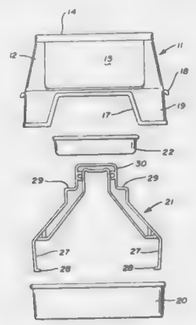
## COMBINATION TOOL BOX AND STOOL

**Mark Brantingham, Lisbon, and Robert Coffee, Salem, both of Ohio, assignors to Brantingham Design Inc., Lisbon, Ohio**

**Filed Apr. 24, 1987, Ser. No. 41,976**
**Int. Cl.[4] A47B** *83/00*
**U.S. Cl. 312—235 R** **3 Claims**

**1**. A combination tool box and stool comprises in combination a storage portion having a storage base, compound recessed areas on said outer surface of said storage base, a reinforced handle support bracket extending from said compound recessed areas, a tool tray removably positioned on said reinforced handle support bracket in spaced relation to said storage base, a rib divider in said storage base defining horizontal and vertical stabilization for said storage base, a pair of oppositely

disposed spaced shoulders on said handle support bracket for registerably securing said tool tray thereon, a stool portion removably secured on said handle support bracket, enclosing



said tool tray and said storage base, said stool portion having reinforcing means registerable on said storage base, a hand grip on said handle support bracket registerably engaged through said tool tray and said stool portion.

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**4,744,614**

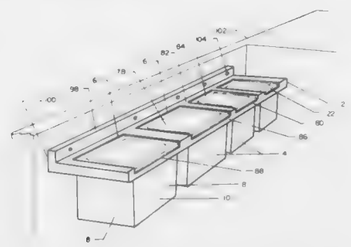
**BAIT BOX AND RACK ASSEMBLY**

**Kenneth D. Gombosi, 1100 Richmond Street, Joliet, Ill. 60435**

**Filed Apr. 10, 1986, Ser. No. 850,182**

**Int. Cl.[4] B65D** *85/50;* **A47B** *81/00*

**U.S. Cl. 312—242** **13 Claims**



**1**. A bait box and rack assembly comprising a container having a chamber to receive bait, openable closure means movable between an open position and a closed position to close said chamber against entrance and escape of water and air when in said closed position, releasable locking means to releasably lock said closure means in said closed position until intended force is applied to intentionally move to said open position, a rack frame member receivable in a boat and removable from a boat, aperture means in said rack frame member to receive and hold said container, said aperture means having a peripheral configuration and dimension corresponding to that of said container, releasable securing means to secure said container in said aperture means to releasably secure said container therein until intended force is applied to intentionally move said container out of said aperture means.

**4,744,615**

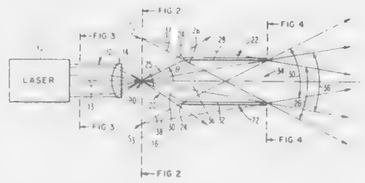
**LASER BEAM HOMOGENIZER**

**Bunsen Fan, Peekskill; Raymond E. Tibbetts, Mahopac; Janusz S. Wilczynski, and David F. Witman, both of Ossining, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Jan. 29, 1986, Ser. No. 823,554**

**Int. Cl.[4] G02B** *6/00;* **H01S** *3/10;* **F21V** *7/04*

**U.S. Cl. 350—96.10** **8 Claims**




**1**. Apparatus for uniformly illuminating a substantially flat plane with light from a coherent laser source, comprising

means forming a diverging laser light beam which diverges from a central optical axis, the light in said beam having a coherence length $L_c$ an having possibly a non-uniform spatial intensity distribution;

a light tunnel receiving said diverging laser beam, said light tunnel having flat internally reflective sides parallel to said optical axis and to each other to provide a light tunnel with a uniform size cross section for forming an array of apparent laser light sources, the light from each apparent source in said array being superposed by said light tunnel at the exit of said light tunnel, each individual light ray from each apparent source following a distinct light path to an illumination plane, each of said distinct light paths having an individual path length; and

means providing a minimum difference between the individual path lengths of any two rays coincident at said illumination plane and arising from adjacent apparent sources in said array, said minimum path length difference being equal to or greater than the coherence length $L_c$ of said laser beam.

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**4,744,616**

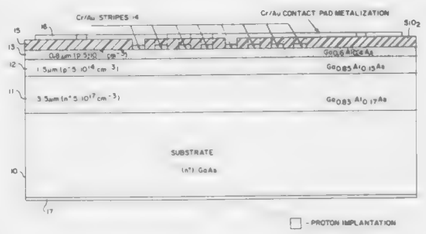
**MONOLITHIC ELECTRO-OPTIC MODULATOR ARRAY**

**Deborah L. Robinson, La Canada; William K. Marshall, and Joseph Katz, both of Pasadena, all of Calif., assignors to California Institute of Technology, Pasadena, Calif.**

**Filed Feb. 25, 1985, Ser. No. 704,922**

**Int. Cl.[4] G02B** *6/10*

**U.S. Cl. 350—96.14** **10 Claims**




**1**. A monolithic electro-optic modulator array for modulating the intensity of light of predetermined wavelength transmitted through said array comprised of a semiconductor structure having at least three semiconductor layers on a heavily doped substrate, said three semiconductor layers consisting of a first p-type layer, a second n-type, and a third virtually intrinsic layer between the first and second layers, the composition and doping of said third layer being selected to have a greater index of refraction than the first and second layers to provide a slab waveguide capable of providing at least one propagating optical mode of light having a wavelength that approaches within approximately 500 Å the bandgap of the semiconductor material in said third layer; a plurality of parallel conductor stripes on one of said first and second layers defining in the direction of said stripes modulating waveguide channels in said third layer for said array, the thickness of said third layer and width of said stripes being selected to support only a single mode waveguide operation; a contact on the side of said substrate opposite said three layers for completing circuits to each of said channels for a reverse-bias voltage applied to said conductor stripes; and means for electrically isolating said channels, whereby light guided by each of said channels under said conductor stripes will be intensity modulated separately in each channel in proportion to the voltage applied to the stripe over the channel.



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**4,744,617**

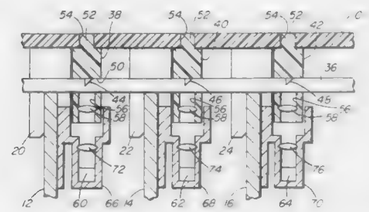
**MOUNTING OPTICAL BUSBARS ON BACKPLANES**

**Jaroslav M. Hvezda, Nepean; Jack F. Dalgleish, Ottawa, and David A. Kahn, Nepean, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada**

**Filed Mar. 17, 1986, Ser. No. 840,244**

**Int. Cl.[4] G02B** *6/26*

**U.S. Cl. 350—96.15** **30 Claims**



**1**. A mounting arrangement for mounting, upon a backplane, an optical conductor in the form of a rod of optically transmissive material having a plurality of reflector means spaced apart along its length for reflecting light to emerge laterally therefrom, said mounting arrangement comprising an elongate member having a longitudinal channel to receive and locate said rod, securing means for securing said elongate member to said backplane, and light-coupling means disposed adjacent said channel for conveying light between said plurality of reflectors, and a corresponding plurality of optical elements spaced laterally from said rod.

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**4,744,618**

**OPTICAL DEVICE FOR USE AS A MULTIPLEXER OR DEMULTIPLEXER IN ACCORDANCE WITH THE DIFFRACTION GRATING PRINCIPLE**

**Hans F. Mahlein, Unterhaching, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

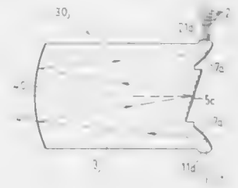
**Filed Apr. 1, 1983, Ser. No. 481,357**

**Claims priority, application Fed. Rep. of Germany, May 3, 1982, 3216516**

**Int. Cl.[4] G02B** *6/34;* **H04B** *9/00*

**U.S. Cl. 350—96.19** **36 Claims**

**1**. An optical device selectively operated according to the diffraction grating principles as either a wavelength demultiplexer to separate light of different wavelengths into separate bands or as a wavelength multiplexer to multiplex light of different wavelengths into a single band, said device comprising a compact transparent member having a plurality of surfaces including at least a first surface, a second surface opposite the first surface, a third and fourth surface adjacent the second surface and separated thereby, a fifth surface adjacent the third surface and being separated from the second surface by the third surface and a sixth surface adjacent the fourth surface and being separated from the second surface by the fourth surface; optical means for forming imaging optics having an object space and an image space, said optical means including at least one concavely curved imaging mirror with an optical axis and being disposed on the first surface of the member; a diffraction grating being provided on the second surface of the said member opposite said imaging mirror and on said optical axis; first coupling means being provided on the fifth surface for coupling light between the member and a first optical waveguide; second coupling means being provided on the sixth surface for coupling a group of second waveguides to the member; and an additional mirror being disposed on each of the third and fourth surfaces for folding the light path in said transparent member immediately adjacent each of the first and second coupling means, said additional mirrors being totally reflecting



mirrors applied directly on the third and fourth surfaces, said fifth surface being at the object space and the sixth surface being at the image space so that light entering either of the first and second coupling means is reflected by the additional mirror onto the optical means which reflects the light onto the diffraction grating which directs the light back at the optical means to be reflected at the other additional mirror, which reflects it to the other of the first and second coupling means to exit the device, and so that the diffraction grating when receiving a beam of more than one wavelength creates a reflection maxima for each of the wavelengths, which maximas are outside of the zero order of diffraction of the grating and are located at the individual second waveguides of the group of second waveguides and when receiving beams of different wavelengths combines the beams into a single beam of a plurality of wavelengths and directs the single beam to the single first waveguide.

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**4,744,619**

**CONNECTING AND ALIGNING OPTICAL FIBRES AND WAVEGUIDES**

**Keith H. Cameron, Woodbridge, England, assignor to British Telecommunications public limited company, Great Britain**

**PCT No. PCT/GB85/00312, § 371 Date Mar. 12, 1986, § 102(e) Date Mar. 12, 1986, PCT Pub. No. WO86/00717, PCT Pub. Date Jan. 30, 1986**

**PCT Filed Jul. 11, 1985, Ser. No. 849,505**

**Claims priority, application United Kingdom, Jul. 13, 1984, 8417911**

**Int. Cl.[4] G02B** *6/30*

**U.S. Cl. 350—96.17** **16 Claims**

**1**. A method of affixing a single-mode optical fibre to a waveguide substrate in optical alignment with a waveguide thereon comprising the steps of:

(a) preparing an end of the fibre such as to have a planar end-face substantially normal with respect to the fibre axis,

(b) mounting on the surface of the substrate in which the waveguide is embedded a support block which straddles the waveguide and which has an end-face substantially co-planar with the termination of the waveguide;

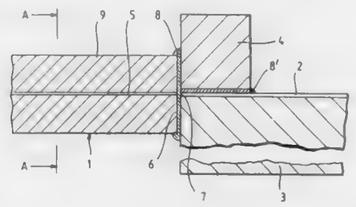
(c) optically aligning the fibre core and the waveguide, and

(d) affixing the end-face of the optical fibre with transparent

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adhesive to the waveguide substrate and block such that the optical fibre is butt-jointed to the substrate and block




by the transparent adhesive to maintain axial alignment of the optical fibre and the waveguide.

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**4,744,620**

## OPTICAL COUPLER

**Hiroshi Ueno; Hisami Nishi, both of Nishinomiya, and Minoru Toyama, Takarazuka, all of Japan, assignors to Nippon Sheet Glass Co., Ltd., Hyogo, Japan**

**Filed Oct. 21, 1985, Ser. No. 789,780**
**Claims priority, application Japan, Oct. 30, 1984, 59-228818**
**Int. Cl.⁴ G02B** *6/32*
**U.S. Cl. 350—96.18** **3 Claims**




1. An optical coupler including a lens coupling a light source and an optical fiber wherein the lens comprises a transparent column in which a refractive index n(r) at a radius r from an optical axis in a plane normal to the optical axis is expressed by $n^2(r)=n_0^2\{1-(gr)^2+h_4(gr)^4+[h_6(gr)^6+h_8(gr)^8+]\ldots\}$, and satisfies the following conditions when Sf=g/0.3:

$0<C_1/Sf<0.67$

$C_2=0$

$0\leqq l_1\cdot Sf\leqq 1.5$

$0.5\leqq h_4\leqq 2.0$

wherein $C_1$ and $C_2$ are curvatures of input and output end faces where a sign is positive when a center of the radius of curvature is positioned at the side of the optical fiber with respect to the end face, $l_1$ is a back focus at the side of the light source, $n_0$ is a refractive index on the optical axis, and g and $h_4$ are distribution constants.

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**4,744,621**

## CONNECTOR HOUSING FOR AN OPTICAL FIBER CABLE

**Takashi Tanabe, and Koya Komatsu, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan**

**Filed Apr. 29, 1987, Ser. No. 44,052**
**Claims priority, application Japan, May 2, 1986, 61-101193**
**Int. Cl.⁴ G02B** *6/36*
**U.S. Cl. 350—96.20** **3 Claims**

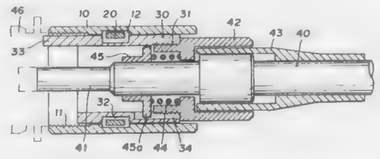
1. A connector housing for an optical fiber cable comprising,

an outer housing member which is provided at one end on the inner surface thereof with a screw thread for receiving one end of an adapter and at an approximately center position on the inner surface thereof with a predetermined width and depth of a groove,

an inner housing member which is coaxially positioned in said outer housing member and which is provided at one end on the inner surface thereof opposite to said one end of said outer housing member with a screw thread for receiving one end of a housing sleeve to be placed over an optical fiber cable and at a position on the outer surface thereof corresponding to said approximately center position of said outer housing member with a predetermined width and depth of a groove, and

a snap ring which is made of a resilient metal strip to be formed with at least one convex portion along the longitudinal direction thereof,

wherein said predetermined width of said groove of said outer housing member is equal to or more than a dimension in the addition of the width of said snap ring to the height of said convex portion, while said predetermined




depth of said groove of said outer housing member is less than the thickness of said snap ring, and said predetermined width of said groove of said inner housing member is equal to or more than said dimension in said addition, while said predetermined depth of said groove of said inner housing member is equal to or more than the thickness of said snap ring, said snap ring being shaped circular to have a predetermined gap at facing ends opposite to each other and positioned in said grooves of said outer and inner housing members whereby said inner housing member to which said housing sleeve is coupled through said screw thread at said opposite end on the inner surface thereof is pushed in the direction towards said opposite end by said adaptor which is coupled through said screw thread provided at said one end on the inner surface of said outer housing member with said outer housing member so that said snap ring in said grooves of said outer and inner housing members is resiliently compressed.

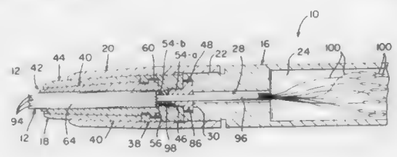
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**4,744,622**

## OPTICAL FIBER SPLICE CASE

**Hitesh Cherry, Harrisburg, and Walter M. Werner, Downingtown, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.**

**Filed Sep. 12, 1986, Ser. No. 907,289**
**Int. Cl.⁴ G02B** *6/36*
**U.S. Cl. 350—96.20** **6 Claims**




1. An optical fiber splice case for composite cable of the type having a plurality of optical fibers within a tube and wire strands surrounding the tube, said case comprising:

elongated body means having a chamber intermediate the ends and passages extending from the ends to said chamber through which the tubes may extend;



cable gripping assemblies for being positioned against said ends of said body means and for gripping the wire strands of the composite cable, said assemblies each including;

support means having a passage therethrough with first and second openings at respective ends of said passage and with said second opening having jaw retaining means;

resilient bushing means and bushing retaining means, for being positioned in said first opening to said passage in said support means, said bushing means adapted to be compressed in said first opening and around the tube of the composite cable which may extend through said passage in said support means by said bushing retaining means;

a plurality of discrete elongated jaw means having one surface beveled relative to an opposite surface, said plurality of jaw means forming in cooperation with each other a reusable cylindrical member having a passage therethrough and a tapered outer surface, said jaw means further having retaining means at one end for cooperative engagement with said jaw retaining means in said second opening in said support means to thereby position and retain said cylindrical member in an outwardly projecting manner from said support means;

compression means having a tapered passage therethrough and adapted to be slidingly driven onto and compress said cylindrical member into a tight grip on the wire strands of the composite cable surrounding the tube; and

securing means having a tapered passage in one end to be conformably and lockingly received over said cable gripping assemblies and cooperative attaching means in another end for attaching said securing means to said ends of said body means to thereby secure said cable gripping assemblies to said body means.

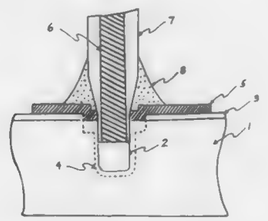
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**4,744,623**

## INTEGRATED FIBER OPTIC COUPLER FOR VHSIC/VLSI INTERCONNECTS

**Paul R. Prucnal, Bardonia; Eric R. Fossum, Peekskill, and Richard M. Osgood, Jr., Chappaqua, all of N.Y., assignors to The Trustees of Columbia University in the City of New York, New York, N.Y.**

**Continuation-in-part of Ser. No. 787,910, Oct. 16, 1985, abandoned. This application Jun. 30, 1986, Ser. No. 879,981**
**Int. Cl.⁴ G02B** *6/36*
**U.S. Cl. 350—96.20** **21 Claims**




1. An integrated fiber optic coupler useful for optically transmitting data from a light source to a detector located on a semiconductor chip capable of having circuitry etched therein, which comprises:

a. a semiconductor wafer having a cavity etched into a surface;

b. means within the cavity for converting light into an electrical signal;

c. an electroconductive metal deposited on the surface of the semiconductor wafer around the opening of the cavity forming an electrical connection between the means for converting light into an electrical signal and circuitry etched into the semiconductor wafer; and

d. a single-mode optical fiber inserted into the cavity and affixed to the semiconductor wafer.

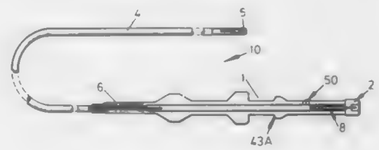
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**4,744,624**

## OPTICAL FIBRE ASSEMBLY FOR TRANSMITTING HIGH ENERGY LASER RADIATION

**Ronald J. Burston, Barassie, Scotland, assignor to Pilkington, Medical Systems, Ltd., Clydebank, Scotland**

**Filed Dec. 9, 1985, Ser. No. 806,788**
**Claims priority, application United Kingdom, Jul. 4, 1985, 8516999**
**Int. Cl.⁴ G02B** *6/36*
**U.S. Cl. 350—96.20** **6 Claims**




1. An optical fibre assembly for transmitting high energy laser radiation, said assembly comprising a tubular moulded plastics handle to which is fitted at one end a tubular metallic termination and at the other end a length of plastics tubing adapted to fit within an endoscope, the distal end of the tubing incorporating an end formation within the bore of the tubing, a single plastics-coated glass-cored optical fibre extending through the interior of the termination, the handle, the tubing and the end formation and being secured to the termination, the plastics tubing being a sliding fit within the bore of the handle to enable location of the end formation on the fibre and being secured to the handle by a heat shrunk plastics sleeve, the fibre being cleaved at each end and accurately located with respect to the termination by a crimp secural of the termination to the plastics coating of the fibre, the fibre diameter being smaller than the bore of the tubing to thereby establish a channel between the fibre and the tubing and the end formation being provided with a thru passageway communicating with said channel whereby, in use, gas can be transmitted along said channel and thru said passageway to free the cleaved fibre end face of contaminants.

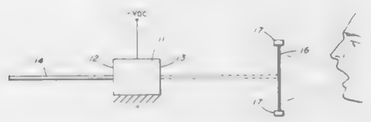
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**4,744,625**

## METHODS OF AND APPARATUS FOR PROVIDING FREQUENCY MODULATED LIGHT

**Vincent A. Lanzisera, Northboro, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.**

**Filed Sep. 30, 1982, Ser. No. 430,585**
**Int. Cl.⁴ G02B** *6/00, 6/36, 6/02;* **H04R** *17/00*
**U.S. Cl. 350—96.20** **9 Claims**




1. A method of providing frequency modulated light to an optical fiber comprising the steps of

exciting a lasing medium so that stimulated emitted radiation at a fixed wavelength λ emanates from opposite surfaces thereof;

coupling one end of said optical fiber to one of said surfaces;

providing a reflecting medium a distance nλ/4 away from the other of said surfaces to reflect emanated radiation from said other surface back to said other surface; and

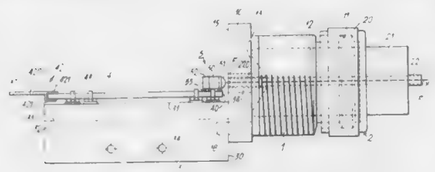
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oscillating said reflecting medium in accordance with a signal to be modulated;
wherein n is a positive integer.

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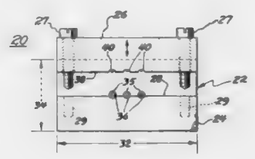
**4,744,626**
**CONNECTOR FOR OPTICAL FIBER AND RECEIVING OR EMITTING PHOTOELEMENT AND METHOD OF POSITIONING AN OPTICAL FIBER ENDFACE RELATIVE TO PHOTOEMITTER**
**Jean-Paul Mery, Paris, France, assignor to Societe Anonyme de Telecommunications, Paris, France**
**Filed Mar. 29, 1985, Ser. No. 717,681**
**Claims priority, application France, Mar. 29, 1984, 84 04915**
**Int. Cl.[4] G02B *6/36***
**U.S. Cl. 350—96.20** **24 Claims**



1. A connector for an optical fiber and a photoelement, said connector comprising a planar holder, said photoelement being secured to said holder along a reference axis coaxial with an end of said optical fiber, a base member having a major surface on which said holder is secured, a female member positioned coaxially with the reference axis so it is in front of said photoelement and integral with said base member, and a male member in which said end of said optical fiber is slightly bonded, said fiber having an endface squared off in line with a reference face of said male member facing said photoelement, said end fiber endface being spaced by a predetermined distance from an endface of said photoelement, said male member being removably, mechanically coupled to said female member such that said endface of said fiber end is opposite said endface of said photoelement along said reference axis, said photoelement comprising a hollow tubular body having a face sealed by an air-tight and transparent window opposite said endface of said optical fiber, and another face carrying a small photomember.

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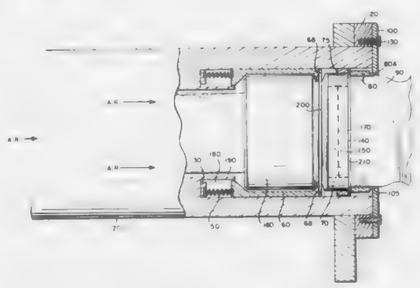
**4,744,627**
**OPTICAL FIBER HOLDER**
**Tushar S. Chande, Schenectady; Gregory Georgalas, Bronx; Angel L. Ortiz, Jr., Ballston Lake; Marshall G. Jones, Scotia, and John L. August, Jr., Schenectady, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.**
**Filed Nov. 3, 1986, Ser. No. 926,281**
**Int. Cl.[4] G02B *6/42***
**U.S. Cl. 350—96.20** **31 Claims**



1. An optical fiber holder for holding at least one optical fiber, comprising:
a base including a generally flat base surface and defining at least one substantially straight groove transversing said base surface;
a cap including a generally flat cap surface adjacent to said base surface;
said cap defining at least one substantially straight groove traversing said cap surface in opposing relationship to said groove in said base surface so as to form a passage shaped to accommodate said optical fiber in a snug fit;
means for affixing said cap to said base so as to secure said optical fiber against motion in said passage; and
said base and said cap each comprising a material which is substantially transparent to a laser beam at a predetermined wavelength, so that a stray laser beam impinging on said cap or said base passes harmlessly therethrough.

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**4,744,628**
**COUPLING DEVICE FOR LIGHT TRANSMISSIVE MEDIA**
**Richard G. Winter, c/o XRE Corp., 300 Foster St., Littleton, Mass. 01460**
**Filed Sep. 12, 1985, Ser. No. 775,418**
**Int. Cl.[4] G02B *6/36***
**U.S. Cl. 350—96.20** **11 Claims**



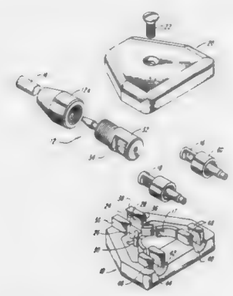
1. A joint for coupling light transmissive media mounted in separate housings, at complementary mating surfaces comprising:
a pusher including variably compressible spring means attached to an array of spaced pusher arms engagable with a pusher surface connected to one of the light transmissive media, wherein the pusher and the one light transmissive medium are successively mounted within one of the separate housings through which a flow of air is routed through the pusher and over the one light transmissive medium;
a barrier for engaging the rear of the pusher wherein the distance between the rear of the pusher and the point of engagement of the arms with the pusher surface is selected to exert a predetermined amount of compression force in the springs upon mating of the complementary mating surfaces and coupling of the housings; and,
means for aligning the mating surfaces, comprising a pilot strap surrounding one of the light transmissive media, the pilot strap including spaced fingers for receiving and aligning the mating surface of the other of the light transmissive media with the mating surface of the one medium, the fingers protruding laterally from and parallel to the axis of the strap.

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**4,744,629**
**MULTIFIBER OPTICAL CABLE CONNECTOR**
**Guido Bertoglio, Viganello, and Carmelo Foglia, Pazzalo, both of Switzerland, assignors to Augat Inc., Mansfield, Mass.**
**Filed Aug. 16, 1985, Ser. No. 766,902**
**Int. Cl.[4] G02B *6/36***
**U.S. Cl. 350—96.20** **10 Claims**

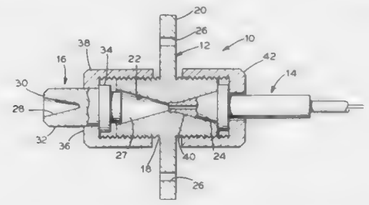
1. A multifiber optical cable connector for receiving a multifiber optical cable secured in a fitting and arranging individual optical fibers thereof, each secured in a ferrule, for subsequent interconnection, comprising:
a housing having a first unitary section and a second unitary section of dissimilar shape;
said first unitary section of said housing integrally including a first receptacle portion including integral means for engaging external surfaces of the fitting secured to the optical cable to rigidly retain the optical cable in said housing;
at least two second receptacle portions and wherein each second receptacle portion includes integral means for independently engaging confronting surfaces of the ferrule securing the respective optical fiber of the optical cable to loosely retain the ferrule therein to permit independent alignment thereof by axial and transverse movement of the ferrule with respect to said external surfaces engaging means;
said second unitary section of said housing having first and second means cooperative with said integral external surfaces engaging means and said integral confronting surfaces engaging means of said first and second receptacle portions, respectively, for rigidly retaining the fitting and loosely retaining each ferrule within said housing with said first and second unitary sections secured together; and
means for securing said first and second unitary sections of said housing together.





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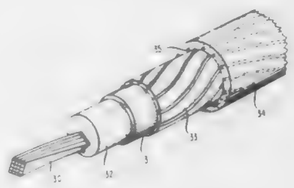
**4,744,630**
**PANEL INDICATOR**
**James H. Hipple, and Don W. Smith, both of Lancaster, Ohio, assignors to The Babcock & Wilcox Company, New Orleans, La.**
**Filed Oct. 15, 1982, Ser. No. 434,682**
**Int. Cl.[4] G02B *6/36, 7/26***
**U.S. Cl. 350—96.20** **10 Claims**



1. A panel indicator comprising a housing, a first light transmitting member received within said housing and having an exposed end portion protruding therefrom for emitting light received at the opposite end of said first member along said exposed end portion, said first light transmitting member having a concial depression formed in said protruding end portion for dispersing light received by said first member from the end portion for lateral viewing of the exposed illuminated end portion.

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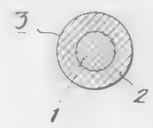
**4,744,631**
**SINGLE MODE OPTICAL FIBER RIBBON CABLE**
**Bernard R. Eichenbaum, Basking Ridge, N.J.; Charles H. Gartside, III, Lilburn, and Manuel R. Santana, Doraville, both of Ga., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.**
**Continuation of Ser. No. 697,055, Jan. 31, 1985, abandoned. This application Aug. 31, 1987, Ser. No. 91,327**
**Int. Cl.[4] G02B *6/44***
**U.S. Cl. 350—96.23** **7 Claims**



1. An optical fiber cable comprising at least one optical fiber ribbon contained within a sheath, the ribbon comprising a multiplicity of optical fibers maintained substantially parallel with each other within a flexible sheathing, the optical fibers adapted for operation at least at one predetermined operating wavelength, CHARACTERIZED IN THAT the optical fibers have a first and a second operating wavelength of about 1.3 $\mu$m and about 1.55 $\mu$m, respectively, with the optical fibers being single mode optical fibers at both the first and the second operating wavelength, the optical fiber cable having an average cabling loss of at most about 0.1 dB/km at both the first and the second operating wavelength.

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**4,744,632**
**PLASTIC OPTICAL FIBERS**
**Shozi Yamamoto, Ichihara, and Hirokazu Kobayashi, Kameyama, both of Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan**
**Continuation of Ser. No. 701,406, Feb. 14, 1985, abandoned. This application May 4, 1987, Ser. No. 52,123**
**Claims priority, application Japan, Feb. 17, 1984, 59-26980**
**Int. Cl.[4] G02B *6/16***
**U.S. Cl. 350—96.34** **7 Claims**



7. A plastic optical fiber comprising a plastic core;
a plastic clad covering said plastic core;
the refractive index of said plastic core being higher than that of said clad;
a single cover of polyvinyl chloride covering said clad; and
said cover containing trimellitate plasticizer in a minimum amount of 10 PHR for flexibility and a maximum amount of 40 PHR to inhibit increase in transmission loss of the plastic optical fiber due to higher temperature ambient conditions of up to 100° C.

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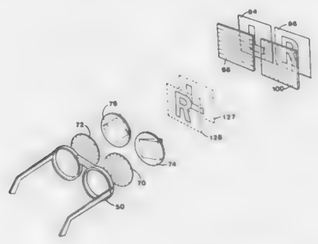


**4,744,633**

## STEREOSCOPIC VIEWING SYSTEM AND GLASSES

David M. Sheiman, 1401 Alvarado Terr., Los Angeles, Calif. 90006

Filed Feb. 18, 1986, Ser. No. 830,459
Int. Cl.[4] G02B *27/26, 7/18;* G02C *7/12, 7/16*
U.S. Cl. 350—132 22 Claims



1. A stereoscopic viewing system comprising:

a. a pair of right and left stereoscopic images of a subject positioned in a side-by-side array;

b. a pair of light polarizing filters, one each positioned in front of each of said images;

c. an eyepiece having left and right eyeglass frames worn by an observer and including:

(1) left and right ocular light polarizing filters mounted on said left and right eyeglass frames so as to be positioned in front of the observer's eyes, each corresponding in polarizing direction to the polarizing filter in front of its respective image;

(2) at least one thin face prism having an apex edge and one flat planar face and having a faceted face, opposite said flat planar face, which has a plurality of straight, parallel V-grooves to form therebetween a plurality of straight, parallel, triangular prisms and respective prism mounting means on one of said left and right eyeglass frames to position said prism in front of an eye of the observer, and having a diopter angle to diverge the line of sight from said eye sufficiently to merge its respective image on its fovea centralis; and

(3) adjustment means associated with said prism mounting means permitting the rotatable adjustment of said prism about an axis normal to said flat planar face, whereby said observer can adjust the angular position of said prism to accommodate for varied distances to said images.

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**4,744,634**

## METHOD AND APPARATUS FOR REDUCING THE EFFECTS OF VIBRATIONAL DISTURBANCES ON THE FREQUENCY STABILITY OF A LASER

David Fink, Los Angeles, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Apr. 28, 1986, Ser. No. 856,559
Int. Cl.[4] H01S *3/02;* G02B *9/02*
U.S. Cl. 350—163 13 Claims



1. In an interferometer structure including a resonant cavity structure and cavity reflectors whose relative positions determine the resonant cavity frequency of said resonant cavity, a mounting for said interferometer structure comprising:

at least one pair of support means connected to said structure, said strucure including a resonant cavity disposed between cavity end reflectors;

individual ones of said pair of support means each being connected to said structure at a distinct location relative to one of said cavity end reflectors, each individual one of said pair of support means being connected to said structure at a distinct location which is independant of the location of the other individual one of said pair of support means; and wherein

each of said locations is selected from a plurality of possible support locations to reduce variations in said resonant cavity frequency when said structure is subjected to accelerating forces.

10. A method of determining an optimum position for individual ones of at least one pair of support members for a laser transmitter structure, the structure including a resonant cavity and a pair of cavity end reflectors, the optimum position being a position that minimizes a tilt between the end reflectors due to acceleration forces, comprising the steps of:

mechanically coupling the transmitter structure to a movable platform;

moving the platform such that the transmitter structure is accelerated for an interval of time (t) thereby inducing a frequency change Δf(t) in an output of the transmitter structure;

comparing the frequency output of the transmitter structure with a reference frequency to determine a difference therebetween; and

positioning each of the support members at a position which minimizes the difference between the reference frequency and the frequency output.

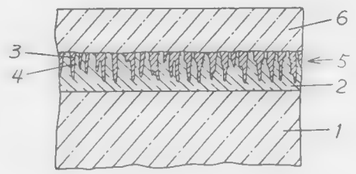
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**4,744,635**

## COLOR FILTER WITH A POROUS ACTIVATED FILM LAYER HAVING DYE FIXED IN THE MINUTE PORES TO FORM COLOR OR PATTERN

Minoru Takaochi, Kyoto; Kozo Matsumura, Otokuni; Takao Sumi, and Kenichi Masaki, both of Kyoto, all of Japan, assignors to Nissha Printing Co., Ltd., Japan

Continuation of Ser. No. 817,622, filed as PCT JP85/00263 on May 10, 1985, published as WO85/05462, Dec. 5, 1985, abandoned. This application Sep. 1, 1987, Ser. No. 93,131
Claims priority, application Japan, May 14, 1984, 59-97210
Int. Cl.[4] G02B *5/22*
U.S. Cl. 350—311 11 Claims



8. A method for forming a color filter which comprises: applying a layer of colloidal alumina or silica or a mixture thereof on transparent substrate; thereafter drying then sintering the layer to form thereby a transparent activated film layer on said substrate with a number of minute pores therein; thereafter applying a dye to said activated film layer uniformly or in a pattern; and, subsequently applying a transparent sealing coating over the dyed activated film layer.

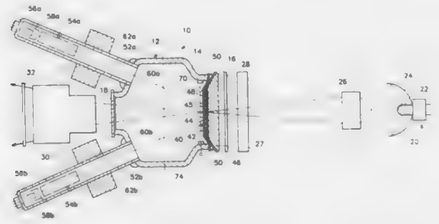


**4,744,636**

## ELECTRON BEAM-ADDRESSED LIQUID CRYSTAL CELL HAVING COATING LAYER FOR SECONDARY ELECTRON EMISSION

Duane A. Haven, Milwaukie; Thomas S. Buzak, Beaverton, and Rolf S. Vatne, Portland, all of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed May 5, 1987, Ser. No. 46,807
Int. Cl.[4] G02F *1/13*
U.S. Cl. 350—331 R 5 Claims



1. An electron beam-addressed liquid crystal cell for a light valve, comprising:

(a) a first transparent substrate;

(b) a second transparent substrate positioned adjacent to the first substrate and having a base layer with an outer surface, the base layer being formed of material that emits secondary electrons at a first rate of emission when struck by an electron beam propagating with a predetermined energy;

(c) a coating applied to the outer surface of the base layer of the second substrate, the coating being formed of material that emits secondary electrons at a second rate of emission when struck by the electron beam propagating with the predetermined energy, the second rate of emission being greater than the first rate of emission; and

(d) liquid crystal means sandwiched between the first and second substrates for modulating incident light electrooptically as the liquid crystal cell is struck by the electron beam.

5. A target substrate for a liquid crystal cell that is addressed by an eletron beam having a predetermined energy, comprising:

(a) a base layer formed of material that emits secondary electrons at a first rate of emission when addressed by the beam; and

(b) a coating applied to the base, the coating being formed of material that emits secondary electrons at a second rate of emission when addressed by the beam, the second rate of emission being greater than the first rate of emission.

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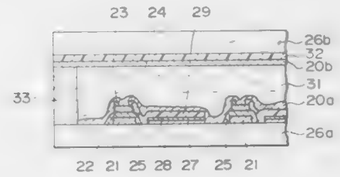
**4,744,637**

## LIQUID CRYSTAL DEVICE WITH A PROTECTIVE LAYER OF A PARTICULAR COEFFICIENT OF EXPANSION

Nobuyuki Sekimura, Kawasaki; Masaru Kamio, Atsugi; Eiji Sakamoto, Hiratsuka, and Taiko Motoi, Sagamihara, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 3, 1985, Ser. No. 783,429
Claims priority, application Japan, Oct. 5, 1984, 59-207990; Sep. 14, 1985, 60-203994
Int. Cl.[4] G02F *1/133*
U.S. Cl. 350—339 R 18 Claims

1. A liquid crystal device comprising a pair of substrates and a liquid crystal disposed therebetween, at least one of the substrates having a resinous color filter layer, a resinous protective layer and a transparent electrode disposed successively in the order named thereon, said protective layer having a coefficient of linear expansion 0.01 to 6 times that of the transparent electrode said protective layer being in contact with said electrode.



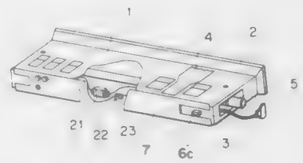
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**4,744,638**

## LIQUID CRYSTAL DISPLAY APPARATUS HAVING STABILIZER WITHIN LIGHT SOURCE AND LCD-CONTAINING CASE

Makoto Ota, Yokohama; Akira Naito, Machida, and Hiroshi Sawamura, Sagamihara, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 9, 1985, Ser. No. 806,900
Claims priority, application Japan, Dec. 24, 1984, 59-195664[U]
Int. Cl.[4] G02F *1/13*
U.S. Cl. 350—345 3 Claims



1. A display apparatus comprising: a plurality of display units forming a display section, each display unit including a fluorescent lamp, a display element capable of transmitting light emitted by said fluorescent lamp, means varying the transmissivity of said display element in response to an input signal provided thereto, a stabilizer for stabilizing said fluorescent lamp, a case accommodating said fluorescent lamp, said stabilizer and said display element and a box supporting said plurality of display units.

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**4,744,639**

## FERROELECTRIC LIQUID CRYSTAL DEVICE HAVING A FLATTENING LAYER

Akira Tsuboyama, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 17, 1985, Ser. No. 809,722
Claims priority, application Japan, Dec. 20, 1984, 59-269886
Int. Cl.[4] G02F *1/13*
U.S. Cl. 350—350 S 37 Claims

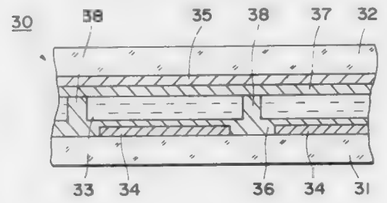
1. A liquid crystal device, comprising: a pair of parallel base plates and a ferroelectric liquid crystal disposed therebetween; at least one of said pair of parallel base plates having thereon an electrode, and a flattening layer coating the base plate and the electrode, said ferroelectric liquid crystal being disposed in contact with the flattening layer and said electrode comprising a transparent conductor film having a thickness of from 1000 Å to 3000 Å.

25. A ferroelectric liquid crystal device, comprising: a pair of base plates each comprising an electrode, and a ferroelectric liquid crystal disposed between the base plates; at least one of

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the base plates having thereon a flattening layer, at least one of the base plates including the flattening layer being provided




with an orientation axis, said ferroelectric liquid crystal assuming a non-helical structure in the absence of an electric field.

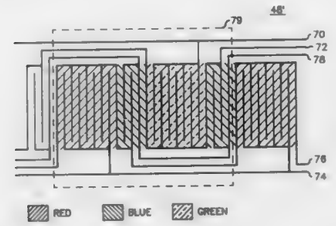
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**4,744,640**

## PLZT MULTI-SHUTTER COLOR ELECTRODE PATTERN

**James R. Phillips, Albuquerque, N. Mex., assignor to Motorola Inc., Schaumburg, Ill.**

**Filed Aug. 29, 1985, Ser. No. 770,560**
**Int. Cl.[4] G02F** *1/03, 1/25*
**U.S. Cl. 350—388** **12 Claims**




1. An improved, electronic shutter arrangement having an electrode pattern for controlling a plurality of light paths passing through an electro-optic substrate and forming a plurality of sequentially positioned unit cells, comprising in combination:

electro-optic substrate means responsive to an electric field established between a set of electrodes mounted thereon;

a first set of electrodes having a first active and a first common lead for establishing a first electric field;

a second set of electrodes having a second active and a second common lead for establishing a second electric field, with said second set interleaved with said first set; and

a third set of electrodes having two parts formed by a third active lead interposed in serpentine fashion between said first and second sets of electrodes for establishing a third electric field and interdigitated with said first and second common leads thereof,

said first, second, and third sets of electrodes cooperating to form unit cells in positional sequence and wherein each unit cell provides selectively controlled individual light paths having sets of electrodes positionally related to one another without surface-mounted crossovers.

**4,744,641**

## TELEPHOTO LENS ASSEMBLY FOR OVERHEAD PROJECTOR

**Dennis Vanderwerf, Cottage Grove, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Jun. 1, 1987, Ser. No. 56,443**
**Int. Cl.[4] G02B** *17/08, 9/34*
**U.S. Cl. 350—445** **6 Claims**



1. A lens assembly for use in an overhead projector for projecting an image from a transparency stage to a projection screen, said lens assemlby affording an extended projection distance from said lens assembly to said projection screen while retaining substantially the same back focus as a two-element projection lens for overhead projectors, comprising in order from said stage to said screen a first negative meniscus lens airspaced from a first positive double convex lens which is airspaced from a second negative meniscus lens in contact with a second positive double convex lens.

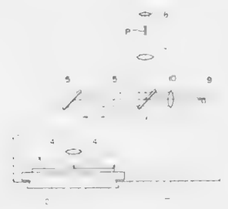
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**4,744,642**

## MICROSCOPE

**Makoto Yoshinaga; Yoichi Iba; Noriyuki Miyahara; Masami Kawasaki; Terumasa Morita, and Takashi Nagano, all of Hachiouji, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 748,564, Jun. 25, 1985, abandoned. This application Nov. 7, 1986, Ser. No. 928,682**
**Claims priority, application Japan, Jun. 25, 1984, 59-129204; Dec. 29, 1984, 59-279663; Dec. 29, 1984, 59-279664; Feb. 4, 1985, 60-18771**
**Int. Cl.[4] G02B** *7/02, 21/00, 21/06*
**U.S. Cl. 350—518** **15 Claims**



1. A microscope, comprising:

a microscope body;

a stage mounted on said microscope body;

an objective optical system mounted movably in parallel with the surface of said stage on said microscope body and an eyepiece optical system which is fixedly mounted on said microscope body and through which the image of the light having passed said objective optical system and coming out of a sample placed on said stage can be observed, a light path length between said objective optical system and eyepiece optical system being variable by moving said objective optical system;



an afocal 1× relay lens system consisting of a plurality of lens components arranged between said objective optical system and eyepiece optical system to relay an image of the sample formed by said objective optical system to the position of the entrance pupil of said eyepiece optical system and a reflecting member arranged between said stage surface and relay lens system and for arranging at least the light path of said relay lens system parallelly with the surface of said sample, said objective optical system and reflecting member being integrally movable in parallel with the surface of said sample and, in response to the movement of said objective optical system and reflecting member, the distances between the respective lens components of said relay lens system being varied so that said relay lens system may be kept afocal 1×.

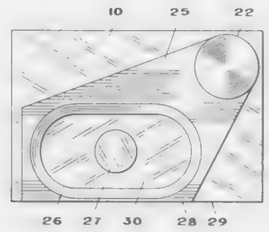
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**4,744,643**

## APPARATUS FOR RESTRICTING MOTION OF LIVING MICROSCOPIC ORGANISMS DURING OBSERVATION UNDER A MICROSCOPE

**Howard L. Taylor, 2221 NE. 123 St., North Miami, Fla. 33181**

**Filed Jan. 20, 1987, Ser. No. 5,126**
**Int. Cl.[4] G02B** *21/34*
**U.S. Cl. 350—536** **1 Claim**




1. A device for restricting movement of a microscopic, living organism during microscopic examination comprising;

adjustable means for varying the separation between two flat, parallel surfaces of a first glass element mounted on a base and a second glass element mounted on a movable arm extending from a hub assembled slidably and rotatably on a column mounted perpendicularly on said base;

a compression spring assembled concentrically on said column and supporting said hub;

an isolation element assembled slidably on and in non-rotatable engagement with said column;

an adjusting knob with threaded portion assembled onto or into said column and bearing on said isolation element, said knob providing adjusting means for raising and lowering said hub against the pressure of said spring, said isolation element preventing the transfer of rotational force in either direction between said knob and said hub;

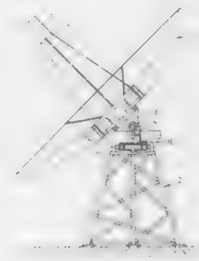
wherein said first glass element is shaped and located with reference to the center line of said column and a clear area of said second glass element is shaped and located with reference to the first glass element so that the centers of said two glass elements can be brought into juxtaposition, in which setting the entire area of said first glass element can be scanned and, while viewing any point within the area of said first glass element, parfocal microscope objectives mounted on a revolving nosepiece can be interchanged without mechanical interference between said microscope objectives and said arm and said adjusting means.

**4,744,644**

## MEMBRANE CONCENTRATOR MIRROR

**Jürgen Kleinwächter, and Hans Kleinwächter, both of Lörrach, Fed. Rep. of Germany, assignors to Jurgen Kleinwachter, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 677,223, Dec. 3, 1984, abandoned. This application Nov. 13, 1986, Ser. No. 930,795**
**Claims priority, application Fed. Rep. of Germany, Dec. 29, 1983, 3344195**
**Int. Cl.[4] G02B** *5/10, 7/18*
**U.S. Cl. 350—608** **7 Claims**



1. Membrane concentrator mirror comprising a rigid basic frame body with an air-tight closed bottom wall, said basic body comprising a device for connection with a conduit leading to device for generating sub-pressure, a membrane being hermetically stretched over said basic frame body said membrane being deformable under the influence of a sub-pressure, and consisting of a plurality of membrane segments and having an outer rim with a circular segment shape, said membrane segments being connected with one another along radially extending rims, characterized in that the membrane segments are connected with one another by rigid clamping profiles extending radially across said frame body, each of said clamping profiles being provided with clamping devices which secure the radially extending outer rims of adjacent membrane segments and which have a parabolic or approximately parabolic curvature.

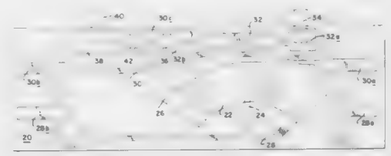
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**4,744,645**

## LIGHTED MIRROR ASSEMBLY FOR MOTOR VEHICLE VISOR

**Larry L. Sharp, Rolling Meadows, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.**

**Filed Jun. 8, 1987, Ser. No. 59,417**
**Int. Cl.[4] B60Q** *1/04, 1/12;* **B60J** *3/00;* **G02B** *7/18*
**U.S. Cl. 350—631** **8 Claims**



1. A mirror assembly comprising a glass mirror having a back face, a polymeric film substrate mounted adhesively to the back face of the mirror, and electrical circuit components printed on the substrate, said components including a heat-dissipative component printed on the substrate, the mirror providing a heat sink for the components printed on the substrate, shards of the mirror tending to be adhesively retained by the substrate if the mirror happens to shatter.

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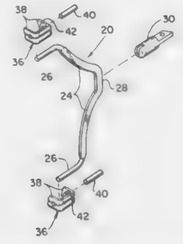


**4,744,646**

## PLASTIC EYEGLASS FRAMES

**Saleta Stewart, 130 Cuttermill Rd., Great Neck, N.Y. 11022**

**Filed Apr. 9, 1986, Ser. No. 849,855**
**Int. Cl.[4] G02C** *5/14, 5/22*
**U.S. Cl. 351—153** **1 Claim**



1. An improved plastic eyeglass frame of the type having a pair of earpieces hingedly connected at opposite sides thereof, said improvement comprising a temple piece disposed at the higned end of each earpiece and being in the form of a V-shaped metallic bracket with the earpiece being hingedly connected to the apex thereof, said temple piece having a pair of vertically spaced upper and lower U-shaped clip bodies that are each integrally attached to a respective free end of said V-shaped bracket and aligned in substantial vertical registration, said clip bodies defined by a pair of cooperating tabs in facing relation to each other, at least one pin integrally connected in spanning relation between each of said pair of tabs to form a channel bounded by said hinge body, tabs and pin, said channel, in top view, being of a substantially elongate rectangular configuration, and a plastic frame having material thereof molded through said channel and forming fillets adjacent the exterior edges of each of said clip bodies thereby integrally to interconnect said temple piece to said plastic frame.

**4,744,647**

## SEMI-OPAQUE CORNEAL CONTACT LENS OR INTRAOCCULAR LENS AND METHOD OF FORMATION

**Leroy G. Meshel, San Francisco County; Robert J. Pressley, Santa Clara County; Robert Butcher, Santa Clara County, and Theodore Fahlen, Santa Clara County, all of Calif., assignors to Lens Plus Co., Daly City, Calif.**

**Filed Dec. 4, 1984, Ser. No. 677,727**
**Int. Cl.[4] G02C** *7/04;* **A61F** *2/16;* **B23K** *26/00*
**U.S. Cl. 351—177** **25 Claims**

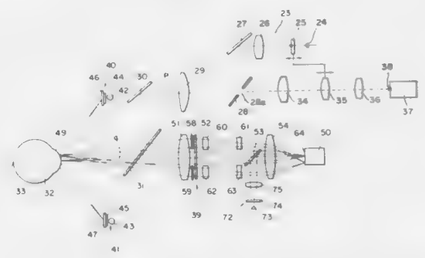
1. A method of treating a limited predetermined area of an eye lens selected from the group consisting of a corneal contact lens or an intraoccular lens in finished or unfinished state to render only that area semi-opaque, comprising directing a focused laser beam into the interior of the eye lens under conditions to form a pattern of disruptions in a predeterined area of the eye lens material which substantially disrupts the undistorted optical transmissibility of visible images through the eye lens, at least a portion of said pattern of disruptions being formed in the interior of the eye lens.

**4,744,648**

## EYE REFRACTIVE POWER MEASURING APPARATUS

**Yasuo Kato; Yasufumi Fukuma; Kiwami Horiguchi, and Kiichi Kamiyama, all of Tokyo, Japan, assignors to Tokyo Kogaku Kikai Kabushiki Kaisha, Itabashi, Japan**

**Filed May 23, 1986, Ser. No. 866,247**
**Claims priority, application Japan, May 24, 1985, 60-111538**
**Int. Cl.[4] A61B** *3/10*
**U.S. Cl. 351—211** **4 Claims**



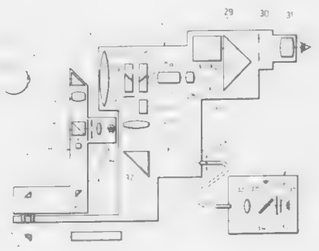
1. In an eye refractive power measuring apparatus including a measurement system for projecting a measurement target image to the retina of an eye to be tested and measuring the refractivity of the eye to be tested by detecting the focussing state of the measurement target image, the improvement comprising:
an eye position detection means for detecting a shifted amount from a reference position of the eye to be tested in the axial direction of the measuring system; and
correction means for correcting a measurement result of said refractivity based on said detected shifted amount.

**4,744,649**

## OPHTHALMOLOGICAL MEASURING APPARATUS

**Masao Niino, Okazaki; Nobuyuki Yasuda, Gamagori; Koichiro Kakizawa, Okazaki; Tadashi Ichihashi, and Masunori Kawamura, both of Hino, all of Japan, assignors to Kowa Kabushiki Kaisha, Nagoya, Japan**

**Filed May 14, 1986, Ser. No. 863,046**
**Claims priority, application Japan, May 15, 1985, 60-103177**
**Int. Cl.[4] A61B** *3/10, 3/14*
**U.S. Cl. 351—221** **5 Claims**



1. An ophthalmological measuring apparatus comprising:
a laser-slit projector means for projecting a laser beam on a point in a human eyeball;
a microscope means adapted for receiving and observing the light said reflected from the point in the human eyeball, and said microscope means including:
objective optics (**15**);
imaging optics (**28**);
a scattered light pickup prism (**171**) disposed between said objective optics (**15**) and said imaging optics (**28**) and having a reflecting surface (**17***a*) for diverting and directing a part of the reflected light;
beam splitter means (**18**) for superposing another optical axis parallel to the optical axis diverged by said prism on the optical axis of said imaging optics (**28**);
converging optics (**25**) for receiving the diverged optical axis and the other optical axis parallel thereto; and
an optical fiber (**26**) having a first and a second end with the first end disposed adjacent to the focal plane of said converging optical system and said optical fiber (**26**) being movable up and down and right and left; and
detector means (c) adapted for displaying and observing the point in the eyeball projected by the laser beam and said detector means including
a photoelectric device (**37**) in the optical path of the second end of said optical fiber;
a wavelength separating mirror (**34**) disposed between the second end of said optical fiber and said photoelectric device; and
a light emitting diode (**38**) disposed on the reflecting side of said mirror (**34**) and adapted for emitting light having a wavelength different from that of the laser beam; and
right-to-left inverting optics (**20**) disposed between said beam plitter (**18**) and said converging optics (**25**).

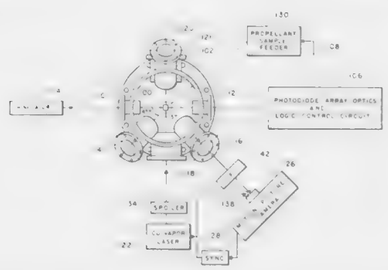


**4,744,650**

## HIGH RESOLUTION CINEPHOTOGRAPHICS SYSTEM

**Roger J. Becker, Kettering, and James M. Aulds, Oxford, both of Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Jun. 27, 1986, Ser. No. 879,726**
**Int. Cl.[4] G03B** *41/00*
**U.S. Cl. 352—84** **19 Claims**



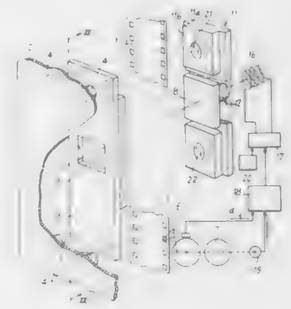
1. Motion picture photography apparatus for recording burn face phenomena of a rocket propellant sample comprising:
a pressure vessel having a plurality of optical apertures, a pressure sealable fuel sample aperture and gaseous purge apertures disposed therein;
a rocket propellant sample partially received via said fuel sample aperture within said pressure vessel;
a high-speed motion picutre camera having a film transport and an optical system receptive of burn face optical images via said pressure vessel optical apertures;
pulsed laser monochromatic light source means for illuminating said propellant sample burn face via said optical apertures and in the presence of incandescent propellant combustion gases, optical energy pulses from said laser being of short, motion freezing duration with respect to film motion in said camera film transport and particle motion at said burn face;
closed-loop sample feeding means connected with a portion of said propellant sample external of said pressure vessel for maintaining said burn face within depth of field focus of said camera optical system during sample burning consumption; and
synchronizing means responsive to film movement velocity in said film transport for triggering generating of said laser optical output pulses in frame synchronization with said film movement;
means surrounding said propellant sample in said pressure vessel for limiting propellant burn product action on said apparatus.

**4,744,651**

## DEVICE FOR GUIDING A FILM IN A CINE CAMERA

**Jean-Pierre Beauviala, Grenoble, France, assignor to Aaton RG, Grenoble, France**

**Filed Feb. 20, 1987, Ser. No. 17,270**
**Claims priority, application France, Feb. 24, 1986, 86 02492**
**Int. Cl.[4] G03B** *1/48*
**U.S. Cl. 352—225** **19 Claims**

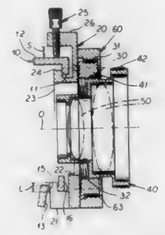


1. A device for guiding a film in a cine camera, comprising:
a channelled plate pierced with a window for filming, the film being displaced along the rear face of said channelled plate;
driving means for intermittently displacing the film and for maintaining it immobile during each image-taking;
a presser member made of ferromagnetic material disposed behind the film opposite the filming window in said channelled plate;
means for applying said presser member under pressure against the film and said channelled plate, when the film is stopped during filming, and for eliminating this pressure during descending movement of the film, said applying means being synchronized with said driving means;
said driving means controlling the pressure exerted by said presser member onto the film and comprising a periodic magnetic field generator producing a magnetic field acting on said presser member during the descending movement of the film to eliminate the pressure of said presser member onto the film during the descent thereof;
said periodic magnetic field generator comprising a solenoid extending in the immediate vicinity of said presser member substantially along the axis thereof, and said solenoid being energized by a periodic electric current having the appropriate wave form for periodically eliminating the pressure exerted by said presser member onto the film;
a digital/analog converter for supplying the current energizing said solenoid;
a counter having an output connected to the input of said digital/analog converter;
a tachometer coupled to an electric motor controlling the intermittent movement of the film and supplying pulses to said counter; and
a driving mechanism for supplying a synchronization pulse to said counter at a rate of one synchronization pulse per image, so that the digital/analog converter delivers at its output a periodic analog current varying in time.

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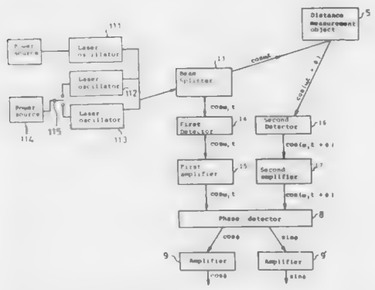


**4,744,652**
**FOCUSING SYSTEM FOR A TRANSPARENCY PROJECTOR**
**Dwight W. Lindsey, Oysterbay, N.Y., assignor to Schneider Corporation of America, Woodbury, N.Y.**
**Filed Dec. 22, 1986, Ser. No. 945,339**
**Int. Cl.[4] G03B *21/14***
**U.S. Cl. 353—101** **8 Claims**



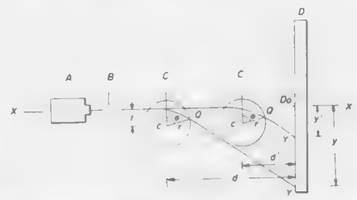
1. A focusing system for a projector having a projector housing formed with a projection lens aperture, said focusing system comprising:
an adapter formed with a plate adapted to rest against said housing over said aperture and provided with a lower formation engaging in said housing below said aperture and a ledge overhanging said housing above said aperture;
clamping means on said ledge for bracing said ledge against said housing to releasably retain said plate rigidly thereon, said plate being formed with an opening registering with said aperture;
an axially stepped cylindrical mount carried by said plate;
a replaceable ring carried by said plate and interposed between said plate and said mount for positioning said mount on said plate; and
a projection lens received in said mount and having a focus adjustable therein relative to said projector.

**4,744,653**
**DISTANCE MEASUREMENT BY LASER LIGHT**
**Reiji Sano; Minoru Kimura, and Hidemi Takahashi, all of Kawasaki, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan**
**Filed Apr. 10, 1985, Ser. No. 721,665**
**Claims priority, application Japan, Apr. 12, 1984, 59-73357; Dec. 10, 1984, 59-260254**
**Int. Cl.[4] G01C *3/08***
**U.S. Cl. 356—5** **20 Claims**




1. A method of measuring a distance to an object, comprising the steps of:
directing first and second laser beams having frequencies $\omega_{11}$ and $\omega_{12}$ toward said object;
providing a first reference signal having a beat frequency $\omega_1=\omega_{11}-\omega_{12}$;
detecting a first reflected light beam reflected from said object, said first reflected light beam having said beat frequency $\omega_1$ and a first phase difference with respect to said first reference signal;
extracting said first phase difference from said first reference signal and said detected first reflected light beam;
calculating a first plurality of distance nodes from said first phase difference;
changing a frequency of said second laser beam to $\omega_{13}$;
providing a second reference signal having a beat frequency $\omega_2=\omega_{11}-\omega_{13}$;
detecting a second reflected light beam reflected from said object, said second reflected light beam having said beat frequency $\omega_2$ and a second phase difference with respect to said second reference signal;
extracting said second phase difference from said second reference signal and said detected second reflected light beam;
calculating a second plurality of distance nodes from said second phase difference; and
selecting a minimum distance node coincident between said first and second pluralities of nodes.

**4,744,654**
**METHOD OF MEASURING REFRACTIVE INDEX PROFILE OF CYLINDER**
**Hiroshi Jinno, Kyoto, and Takeshi Yao, Hirakata, both of Japan, assignors to Kyoto University, Kyoto, Japan**
**Continuation-in-part of Ser. No. 715,298, Mar. 25, 1985, abandoned. This application Jun. 17, 1987, Ser. No. 63,810**
**Claims priority, application Japan, Sep. 14, 1984, 59-191645**
**Int. Cl.[4] G01N *21/41***
**U.S. Cl. 356—73.1** **5 Claims**



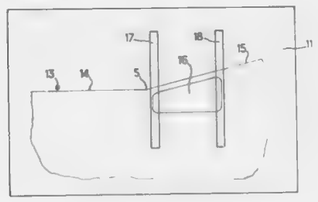
1. A method of measuring refractive index profile of a cylinder, comprising steps of:
applying k distinct parallel rays of light to the cylinder so that the rays enter the cylinder at incident positions $P_1$, $P_2$, . . . , $P_k$ and leave the cylinder at true exit positions $Q_1$, $Q_2$, . . . , $Q_k$, said rays being on one plane perpendicular to longitudinal axis of said cylinder;
measuring said true exit positions;
assuming a mathematical function representing a phantom refractive index profile of the cylinder on said plane;
calculating phantom exit positions $Q_1'$, $Q_2'$, . . . , $Q_k'$ for the parallel rays from said incident positions based on said assumed mathematical functions;
modifying said mathematical function so as to minimize a sum of the squared distances between the true and phantom exit positions for the rays from said incident positons, wherein said mathematical function is in the form of

$$F(r, a_1, a_2, \ldots, a_m),$$

r being distance from an arbitrary point to the longitudinal axis f of the cylinder, $a_1$ through $a_m$ being parameters representing pattern of the refractive index profile of the cylinder, the number m of the parameters being not greater the number k of the rays ($k \geqq m$), whereby the thus modified function represents the refractive index profile of the cylinder.

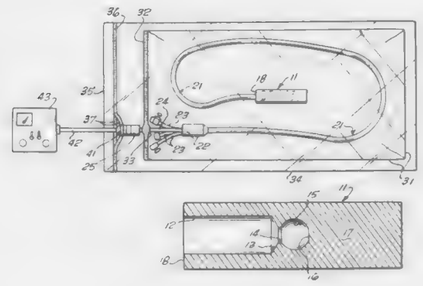


**4,744,655**
**METHOD AND DEVICE PERMITTING FACILITATION OF THE LATERAL ANGULAR ADJUSTMENT OF A VEHICLE HEADLIGHT**
**Claude Sdika, Saint Martin le Vinoux, France, assignor to Societe d'Automatisme et de Reglage Optique, France**
**Filed Apr. 14, 1986, Ser. No. 851,606**
**Claims priority, application France, Apr. 15, 1985, 85 05639**
**Int. Cl.[4] G01J *1/00***
**U.S. Cl. 356—121** **14 Claims**



3. Apparatus for use in the angular adjustment, in the lateral direction, of a vehicle headlight, in the low beam condition thereof, comprising:
a lens adapted to be disposed in front of a vehicle headlight;
first and second vertically extending elongate photoelectric devices;
means positioning said photoelectric devices laterally adjacent each other and in the focal plane of said lens for focusing on the photosensitive surfaces thereof of the light beam from the headlight after passage of such light beam through said lens, for illumination of the lower portion of each device, while leaving the upper portion of each device unilluminated, to cause said photoelectric devices to provide two electrical output signals of a specified ratio when the headlight has the desired lateral adjustment;
means for comparing the electrical output signals from said photoelectric devices to provide a comparison signal indicative of the lateral angular position of the headlight.

**4,744,656**
**DISPOSABLE CALIBRATION BOOT FOR OPTICAL-TYPE CARDIOVASCULAR CATHETER**
**Byron L. Moran, Santa Barbara; Allan F. Willis, Newbury Park, both of Calif., and Mendelson, Yitzhak, Worcester, Mass., assignors to Spectramed, Inc., Oxnard, Calif.**
**Filed Dec. 8, 1986, Ser. No. 939,009**
**Int. Cl.[4] G01J *1/02***
**U.S. Cl. 356—243** **13 Claims**



1. A disposable calibration medium and shipping sleeve for an optical catheter that has a tip and a constriction near the tip, such catheter being adapted for projection of light from the interior of such catheter through such tip to the environment of such tip and for reception of light from such environment through such tip into the interior of such catheter; said disposable medium and sleeve comprising:
a body;
a cavity, defined in the body, to receive such optical-catheter tip; said cavity fitting sufficiently closely around the catheter, when such tip is received within the cavity, to effectively prevent ambient light from reaching such tip;
detent means, defined within the cavity, for snapping into the constriction when such tip is fully received within the cavity, to gently retain such tip fully received within the cavity; and
means within the cavity and generally facing such tip and in a mechanically and optically standardized calibration relationship with such tip at all times, when such tip is fully received within the cavity, for reflecting such light projected from the interior of such catheter back for reception into the interior of such catheter;
said reflection means comprising a substance of standardized character and quality to provide a reflection standard for calibration.

**4,744,657**
**METHOD AND RECORD FOR CALIBRATION OF A SPECTROPHOTOMETER**
**Frank M. Aralis, Irvine, and Barry S. Master, Tustin, both of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.**
**Filed Jul. 11, 1985, Ser. No. 754,369**
**Int. Cl.[4] G01J *3/02***
**U.S. Cl. 356—319** **3 Claims**

1. A method for obtaining calibration of a scientific instrument performing analysis through measurement of light transmission or absorbance at certain wavelengths of generated monochromatic light, said instrument being controlled by a computer or microprocessor having memory means for storing and accessing information, and electronic signal processing means including amplifiers responsive to calibration signals for generating an output responsive to said light measurement, comprising:
generating a plurality of records of calibration signal values by said computer for entry into said next computer memory, said computer memory storing the most recent record and retaining the next most recent n records used by said scientific instrument, and erasing all records ealier than n records upon introduction of a new record into computer memory for each wavelength of light measured, each record comprising a plurality of signals for reception by said electronic signal processing means which provide information of the following parameters:
(a) wavelength of light;
(b) amplifier offset value for a specified light wavelength;
(c) amplifier gain value for a specified light wavelength;
(d) a first processing means output for a first light transmission characteristic;
(e) a second processing means output for a second light transmission characteristic.

**4,744,658**
**WAVEFRONT SENSOR**
**Sandor Holly, Woodland Hills, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.**
**Filed Jan. 16, 1987, Ser. No. 4,391**
**Int. Cl.[4] G01B *9/02***
**U.S. Cl. 356—351** **26 Claims**

1. An apparatus for sensing and measuring the quality of the wavefront of a substantially collimated incoming optical beam, comprising:
(a) a polarizing beam splitter for separating said wavefront into an S-polarized beam and a P-polarized beam;
(b) beam directing means for directing said P-polarized and

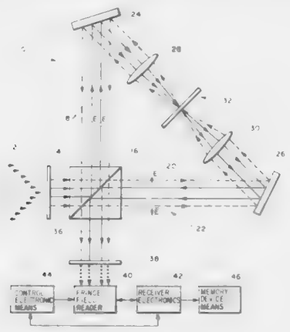
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S-polarized beams along a common closed path but in opposite directions;

(c) focusing means for focusing the P-polarized and S-polarized beams at a common focal region on said path and recollimating each beam after it passes through said focal region;

(d) a polarizer with an optical aperture, said polarizer located in said focal region and being positioned such that said aperture is centered on the centroid of the focused beams, said polarizer being angularly oriented about an optical axis of the closed path so that it transmits substan-



tially all of the beam traveling in one direction and is an effective optical spatial filter for the beam traveling in the opposite direction;

(e) means for directing said beams along a second common path after each is passed through said polarizer and recollimated;

(f) means for orienting the polarizations of said beams traveling along said second common path into a common plane of polarization thereby causing them to interfere; and

(g) means for reading the resulting optical interference fringe pattern and thereby determining the quality of the incoming optical beam.

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**4,744,659**

## METHOD OF AND APPARATUS FOR MEASURING THE SHAPE OF A WAVEFRONT

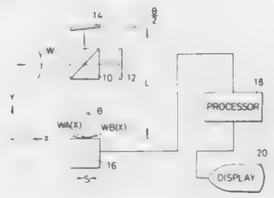
**Junichi Kitabayashi, Tokyo, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan**

**Filed Mar. 17, 1986, Ser. No. 840,442**

**Claims priority, application Japan, Mar. 20, 1985, 60-056215; Mar. 20, 1985, 60-056216; Apr. 3, 1985, 60-070637; Apr. 22, 1985, 60-059937[U]**

**Int. Cl.[4] G01B** *9/02*

**U.S. Cl. 356—353** **9 Claims**




1. A method of measuring the shape of a wavefront of light, comprising the steps of:

separating the light into two light beams to travel along optical paths lying within a plane and inclined at a small angle to each other;

applying said light beams to an area sensor while the light beams are in said plane and laterally shifted a small distance from each other;

effecting a Fourier transform on interference fringes measured by said area sensor, removing an inclination-related component from the result of the Fourier transform, and then effecting an inverse Fourier transform on the result of the Fourier transform to derive a phase difference between said beams; and

effecting a computation process including an integration process in the direction in which the light beams are laterally shifted, on said phase difference, to thereby determine the shape of the wavefront of the light.

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**4,744,660**

## APPARATUS FOR MEASURING DIFFERENCE IN SHALLOW LEVEL

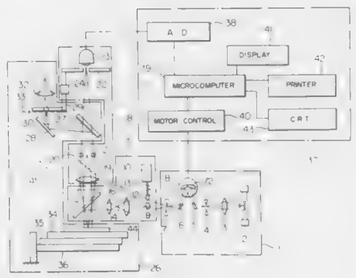
**Minori Noguchi, Yokohama; Toru Otsubo, Fujisawa, and Susumu Aiuchi, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Apr. 11, 1986, Ser. No. 850,683**

**Claims priority, application Japan, Apr. 12, 1985, 60-76391**

**Int. Cl.[4] G01B** *9/02*

**U.S. Cl. 356—355** **17 Claims**




1. A level difference measuring apparatus comprising:

light source means for projecting coherent light onto a rugged portion of a sample, said light source means including wavelength varying means for varying a light wavelength λ of the projected light and for providing a signal indicative of the light wavelength λ;

a spatial filter, arranged at a position in an imaging relation with said light source, for shielding 0-order diffraction light of the light reflected from the rugged portion of the sample or diffraction light from the rugged portion of the sample other than the 0-order diffraction light;

an imaging optical system for imaging the light image reflected from the rugged portion of the sample;

detection means, having an opening for passing only the light image reflected from the rugged portion at a position where the imaging by said imaging optical system is effected, for detecting the intensity of the light passing said spatial filter and said opening and for providing a detection signal (I) indicative thereof; and

arithmetic means for calculating the depth of the rugged portion of the sample from the detection signal (I) from the detection means and the signal indicative of the light wavelength λ as varied by said wavelength varying means.



**4,744,661**

## DEVICE FOR MEASURING SMALL DISTANCES

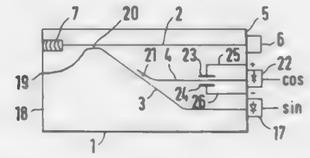
**Gerd Ulbers, Weilersbach, and Karl Hutter, Muhlhausen, both of Fed. Rep. of Germany, assignors to Hommelwerke GmbH, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 883,553, Jul. 9, 1986. This application Dec. 10, 1986, Ser. No. 940,011**

**Claims priority, application Fed. Rep. of Germany, Mar. 26, 1986, 3610154; Sep. 11, 1986, 3630887**

**Int. Cl.[4] G01B** *9/02*

**U.S. Cl. 356—358** **10 Claims**




1. A device for measuring small distances, said device including a sensing tip mounted to be movable in the direction of the distance to be measured, a transducer for converting the movements of said sensing tip into corresponding electric signals, and indicating means for indicating said electrical signals, characterized in that said transducer comprises:

a laser for emitting light;

an optical interferometer, said interferometer including first and second ends and a measuring waveguide, said first end interconnected to said laser;

optical means, interconnected to said second end of said measuring waveguide, for focusing said light; and

a measuring mirror, disposed at a distance from said optical means, for receiving said focused light and reflecting said light back to said optical means, said mirror being interconnected to said sensing tip;

said interferometer further including a reference waveguide coupled to said measuring waveguide, at one end having disposed a mirror and at its other end having disposed a photoelectric transducer connected to said indicating means for indicating the electric output signal of the photoelectric transducer, wherein said indicating means consists of a counter; said device further comprising

an optical electronic range finder, said range finder producing an electrical signal dependent on the distance of scanning points from the interferometer; and

reset means, interconnected to said range finder, for responding to a present value of the electrical signal and setting the counter at zero.

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**4,744,662**

## APPARATUS FOR MEASURING DIMENSIONS OF MICROPATTERN

**Takeshi Suto, Funabashi; Masato Kumazawa, Kawasaki, and Tatsumi Ishizeki, Ohmiya, all of Japan, assignors to Nippon Kogaku K. K., Tokyo, Japan**

**Filed Jul. 2, 1986, Ser. No. 881,391**

**Claims priority, application Japan, Jul. 9, 1985, 60-150927**

**Int. Cl.[4] G01B** *11/02*

**U.S. Cl. 356—372** **7 Claims**

1. An apparatus for measuring size of a microelement constituting a pattern comprising:

means for irradiating energy to said pattern to form an energy intensity distribution corresponding to said pattern;

means for generating a photoelectric signal corresponding to said energy intensity distribution in such a direction as to cross at least two edges of said microelement;

means for comparing the level of said photoelectric signal with a predetermined slice level to determine a distance between said two edges; and




means for changing said predetermined slice level when said distance is smaller than a predetermined value.

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**4,744,663**

## PATTERN POSITION DETECTION APPARATUS USING LASER BEAM

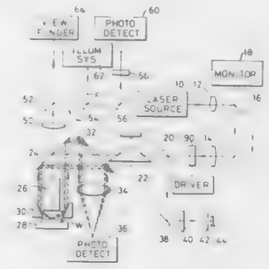
**Muneki Hamashima, and Kinya Kato, both of Tokyo, Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan**

**Filed Dec. 13, 1985, Ser. No. 808,932**

**Claims priority, application Japan, Dec. 14, 1984, 59-264037; Jun. 28, 1985, 60-140430**

**Int. Cl.[4] G01B** *11/00*

**U.S. Cl. 356—375** **7 Claims**




1. An apparatus for detecting a position of a photoresist pattern formed on a surface of a substrate, said apparatus comprising:

means for radiating an energy beam and forming a tiny spot of said energy beam on the surface of said substrate;

means for displacing said substrate and said energy beam relative to each other and scanning the surface of said substrate with said tiny spot along a scanning line;

first detecting means for receiving at least one of a reflection and scattering of said energy beam from said surface of said substrate and generating a first output representing the position of edges of said pattern intersecting said scanning line;

second detecting means for receiving a luminescence emitted by said surface of said substrate in response to said energy beam and generating a second output representing the position of said photoresist pattern on said scanning line; and

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means for determining the position of edges of said pattern in accordance with the comparison between said first output and said second output.

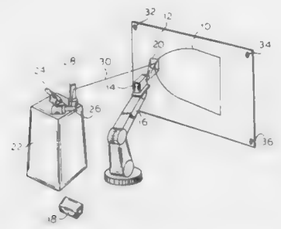
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**4,744,664**

## METHOD AND APPARATUS FOR DETERMINING THE POSITION OF A FEATURE OF AN OBJECT

**Alan M. Offt, Clifton Park; Robert L. Jackson, Jr., Schenectady; Russell P. Kraft, Averill Park, and John F. Wagner, Guilderland, all of N.Y., assignors to Mechanical Technology Incorporated, Latham, N.Y.**

**Filed Jun. 3, 1986, Ser. No. 870,233**
**Int. Cl.[4] G01B *11/00***
**U.S. Cl. 356—375** **10 Claims**



1. A method of determining the position of a feature on an object disposed in a frame comprising the steps of:

directing an imaging device with a field of vision towards the feature;

projecting a relative reference light pattern into the field of vision, said reference light pattern being disposed at a known location with respect to a fixed reference; and

measuring the distance between said relative reference light pattern and said feature as indicated by said imaging device.

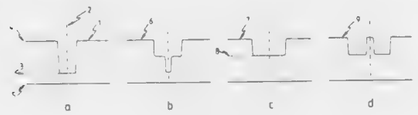
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**4,744,665**

## AUTOMATED OPTICAL LINEWIDTH MEASUREMENT

**Christopher P. Kirk, Haxby, United Kingdom, assignor to Vickers PLC, London, England**

**Filed Mar. 17, 1986, Ser. No. 840,605**
**Claims priority, application United Kingdom, Mar. 26, 1985, 8507843**
**Int. Cl.[4] G01B *11/02***
**U.S. Cl. 356—384** **7 Claims**




1. Apparatus for automatically measuring the width of a line in an optical image, said apparatus comprising:

shearing means for splitting an optical image into two superimposed images, and shearing the two images;

imaging means for generating an electronic signal which represents the intensity profile of the sheared image in a direction perpendicular to the line image and parallel to the direction of shear;

means for sampling and digitising the intensity profile of the sheared image;

means for correlating the digital signal with a digital filter;

means for automatically adjusting the shearing to a position given by an electronic signal; and

means for recording two positions of the shearing means, calculating the difference between the two positions, and multiplying said difference by a calibration constant.

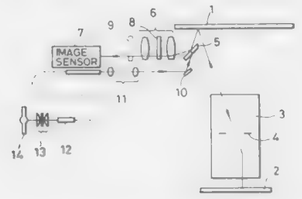
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**4,744,666**

## ALIGNMENT DETECTION OPTICAL SYSTEM OF PROJECTION TYPE ALIGNER

**Yoshitada Oshida, Fujisawa; Naoto Nakashima, and Toshihiko Nakata, both of Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jul. 16, 1986, Ser. No. 886,044**
**Claims priority, application Japan, Jul. 19, 1985, 60-158122**
**Int. Cl.[4] G01B *11/27***
**U.S. Cl. 356—401** **5 Claims**




1. An alignment detection optical system which is designed to observe an alignment pattern of a mask and an image of an alignment pattern of a wafer formed on the alignment pattern of the mask by a projection lens in order to make the alignment between the mask and the wafer in a projection type aligner, said detection optical system is provided with a spatial filter disposed at a position which is out of the conjugate relation to said alignment pattern of the wafer and between the image, of said alignment pattern of the wafer and an image sensor for detecting said image and said spatial filter has a transmittivity variable in the lateral direction of said alignment pattern but not variable in the longitudinal direction.

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**4,744,667**

## MICROSPECTROFLUORIMETER

**Fredric S. Fay, Worcester; John F. Hatch, Framingham; Kevin E. Fogarty, Worcester, and Cyril Rodgers, Paxton, all of Mass., assignors to University of Massachusetts, Worcester, Mass.**

**Continuation-in-part of Ser. No. 828,766, Feb. 11, 1986, abandoned. This application Aug. 26, 1986, Ser. No. 900,407**
**Int. Cl.[4] G01N *21/64***
**U.S. Cl. 356—417** **48 Claims**



1. A microscope comprising:

means for locating a sample;

a source of radiation for illuminating the sample;

a detector for detecting radiation from a microscopic portion of the sample;

a filter assembly in an optical path between the source and the detector, the filter assembly comprising a plurality of bandpass filters having different pass bands circumferentially spaced about a filter axis offset from said optical path and opaque segments between the filters, the width of each opaque segment being such that the opaque segment just blocks a beam of the radiation as the opaque segment is centered on that beam of radiation, and drive means for continuously rotating the filters about the filter axis to sequentially move the plurality of filter elements into said optical path to change the wavelengths of radiation passed through the filter assembly; and

means for synchronizing the radiation detection with the position of the rotating filters.



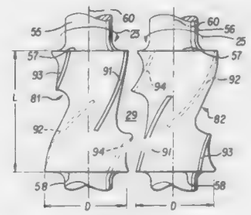
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**4,744,668**

## INTERNAL BATCH MIXING MACHINES WITH NON-INTERMESHING ROTORS OF INCREASED PERFORMANCE

**Narku O. Nortey, Trumbull, Conn., assignor to Farrel Corporation, Ansonia, Conn.**

**Filed Oct. 14, 1986, Ser. No. 918,155**
**Int. Cl.[4] B01F *7/02***
**U.S. Cl. 366—76** **30 Claims**



1. In an internal mixing machine of the batch type including housing means defining a mixing chamber shaped to accommodate two counter-rotating non-intermeshing winged rotors on parallel horizontal axes in said mixing chamber with a central region of the mixing chamber located generally between said rotors, said housing means having an inlet with associated means for introducing materials into said mixing chamber to be mixed into a homogeneous mass and having a closable outlet for discharging the mixed materials from said mixing chamber and including drive means for rotating said rotors in opposite directions around their respective axes, a pair of non-intermeshing rotors comprising:

first and second rotors each having a driven end and a coolant end and at least three wings with wing tips of generally helical configuration including first and second long wings and at least one short wing,

said first long wing on each rotor originating at a first end of the rotor at a zero angular position with respect to the rotor axis and having its wing tip oriented to the rotor axis at a first helix angle $A_1$ in the range from 25° to 45°,

said second long wing originating at the second end of the rotor at an angular position with respect to the rotor axis in the range from 176° to 184° and having its wing tip oriented to the rotor axis at a second helix angle $A_2$ greater than $A_1$,

said short wing originating at the same end of the rotor as the long wing having the lesser helix angle $A_1$, namely, at said first end of the rotor being the same end where said first wing originates,

said short wing originating at said first end of the rotor at an angular position with respect to the rotor axis in the range from 131° to 139° and having the wing tip oriented to the rotor axis at a third helix angle $A_3$ in the range from 20° to 50°, and

said first end of said first rotor being the driven end and said second end of said second rotor being the driven end.

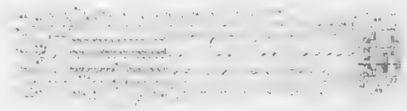
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**4,744,669**

## MIXING AND EXTRUDING APPARATUS AND METHODS

**James E. Kowalczyk, and Bernard A. Loomans, both of Saginaw, Mich., assignors to Baker Perkins, Inc., Saginaw, Mich.**

**Filed Oct. 23, 1986, Ser. No. 922,202**
**Int. Cl.[4] B28C *7/16***
**U.S. Cl. 366—77** **8 Claims**



1. Material mixing apparatus comprising:

a. an elongate, axially extending barrel with an interior wall defining a mixing chamber adapted to receive, mix, and discharge material, and having an inlet in an inlet end and an outlet in an outlet end;

b. mechanism including at least a pair of parallel mixing shafts extending within said barrel chamber from the inlet end to the outlet end, and drive elements for driving said shafts in the same direction of rotation and at the same speed of rotation;

c. mixing elements on each of said shafts which are in radial interwiping relation within said barrel and configured to wipe one another and the chamber wall;

d. said barrel having at least a pair of radially separated, reduced cross-section, discharge chambers through which said shafts extend axially from the outlet end of said mixing chamber and axially aligned therewith to receive said shafts, one of said discharge chambers having a radial discharge port interjacent its ends;

e. said barrel having a cross-sectionally enlarged end pass chamber through which said shafts extend at the ends of said discharge chambers remote from said mixing chamber, said chamber being of such cross-sectional volume relative to the conveying capacity of the other discharge chamber as to operate in a partially starved mode at substantially atmospheric pressure;

f. radially aligned paddle portions on each of said shafts in said end pass chamber, shaped to wipe one another and said end pass chamber wall;

g. the shaft passing through said other discharge chamber having flights thereon pitched to advance material from said mixing chamber through said other of said discharge chambers to said end pass chamber;

h. the shaft extending in said one discharge chamber having helical flights thereon pitched to advance material in said one discharge chamber from said mixing chamber to said radial discharge port, and also having helical flights thereon of opposing hand pitched to advance material from said paddle portions in said end pass chamber to said radial discharge port;

i. a helical flight, of an enlarged diameter relative to said flights on said one shaft and of opposite hand thereto, configured to wipe the wall of said end pass chamber and force material in a direction opposite to the flights on said one shaft;

j. a helical flight, in interwiping relationship with said helical flight of enlarged diameter, and of the same hand as said helical flights of opposing hand on said other shaft, also of enlarged diameter and configured to wipe the wall of said end pass chamber and force material in a direction toward said helical flights of opposing hand on said other shaft;

k. seal and bearing means for sealing and journaling the upstream ends of said shafts; and

l. seal and bearing means outboard of said helical flights of enlarged diameter for sealing and journaling the downstream ends of said shafts.

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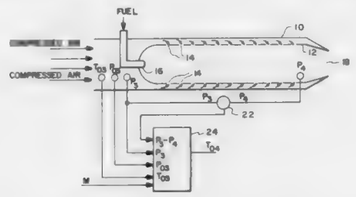


**4,744,670**

## METHOD AND APPARATUS FOR MONITORING THE TEMPERATURE OF THE PROPULSION GAS AT THE INLET TO A HIGH-PERFORMANCE TURBINE WHEEL

**John E. Janssen, Minnetonka, Minn., assignor to Honeywell, Inc., Minneapolis, Minn.**

**Filed May 5, 1986, Ser. No. 859,666**
**Int. Cl.⁴ G01K** *13/00*
**U.S. Cl. 374—144** **5 Claims**




1. Apparatus for monitoring the temperature of the propulsion gas at the inlet to a turbine wheel in a turbine in which a compressor feeds air into a chamber where it is heated and the products exiting the chamber form the propulsion gas, comprising in combination;

first means responsive to the static pressure of air fed into said chamber;

second means responsive to the total temperature of the air fed into said chamber;

third means responsive to the total pressure of the air fed to said chamber;

fourth means responsive to the static pressure of the chamber products, and

fifth means responsive to said first through fourth means for indicating the temperature of the gas exiting said chamber as a function of a static pressure drop across said chamber.

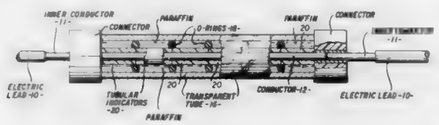
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**4,744,671**

## INSTRUMENT FOR MEASURING ELECTRIC CURRENT

**John G. Bowen, Valley View Cottage, Newgrounds, Godshill, Fordingbridge, Hampshire, England**

**Filed Mar. 13, 1987, Ser. No. 25,668**
**Int. Cl.⁴ G01K** *11/06*
**U.S. Cl. 374—160** **5 Claims**



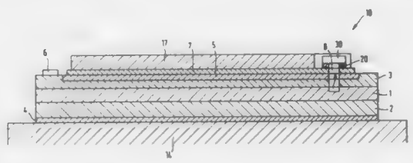

1. An instrument for displaying indications of an electric current flowing through a conductor, including: a transparent tubular member surrounding the conductor in coaxial relationship therewith and spaced radially from said conductor; a plurality of annular separators mounted between the conductor and the transparent tubular member and axially spaced along the conductor to form individual compartments, with said transparent tubular member forming the outer wall of said compartments; a plurality of tubular indicators surrounding said conductor in coaxial relationship therewith and positioned between successive pairs of said annular separators, and forming inner walls for said compartments; and an opaque solid material contained in each of said compartments and having a melting point different from the melting point of the material in the other compartments, to melt and become transparent at a particular temperature so as to reveal the corresponding tubular indicator through said transparent tubular member.

**4,744,672**

## SEMICONDUCTOR ARRANGEMENT

**Werner Tursky; Reinhard Grube, both of Nuremberg, and Hans-Jürgen Fuchs, Stein, all of Fed. Rep. of Germany, assignors to Semikron Gesellschaft für Gleichrichterbau und Elektronik mbH, Nuremberg, Fed. Rep. of Germany**

**Filed Mar. 10, 1981, Ser. No. 242,251**
**Claims priority, application Fed. Rep. of Germany, Mar. 11, 1980, 3009192**
**Int. Cl.⁴ G01K** *7/00;* **H02H** *7/125*
**U.S. Cl. 374—178** **3 Claims**



1. In a power semiconductor arrangement including at least one power semiconductor element with high current carrying capability composed of a semiconductor material which generates recombination radiation when current flows through the semiconductor element, a control element disposed for monitoring the operation of said semiconductor element, with said control element comprising a device having an internal photoelectric effect and disposed for receiving the recombination radiation generated in said semiconductor material for producing an output parameter representative of the intensity of such radiation, and monitoring means connected to said control element for regulating the current flowing through said semiconductor element as a function of the output parameter; the improvement wherein: said monitoring means is operative for monitoring the current through, and the temperature of, said semiconductor element; said control element is a semiconductor-based device having at least one pn-junction; and said monitoring means cooperate with said control element for monitoring the temperature of said semiconductor element, on the basis of the forward current behavior of said control element, during the reverse bias phases of said semiconductor element.

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**4,744,673**

## PACKAGING BAG

**Toshio Nakamura, Osaka, Japan, assignor to Nakamura Seitai Co., Ltd., Osaka, Japan**

**PCT No. PCT/JP86/00117, § 371 Date Nov. 7, 1986, § 102(e) Date Nov. 7, 1986, PCT Pub. No. WO86/05162, PCT Pub. Date Sep. 12, 1986**
**PCT Filed Mar. 7, 1986, Ser. No. 921,283**
**Claims priority, application Japan, Mar. 18, 1985, 60-55444; Mar. 8, 1986, 60-47065**
**Int. Cl.⁴ G06K** *9/68*
**U.S. Cl. 383—38** **4 Claims**




1. A packaging bag comprising a central bag body formed of at least one plastic sheet, and a twofold cover sheet member of the same width as said central bag body and formed of a plastic sheet, wherein said cover sheet member is integrally formed of a first portion and a second portion, said first and second portions sandwiching said central bag body therebetween, the central bag body and the first and second portions of said cover sheet member being fused together along opposite widthwise lateral edges, said first portion of said cover sheet member and said bag body forming a front pocket having an upper open end and said second portion of said cover sheet member and said bag body forming a back pocket having an upper open end.



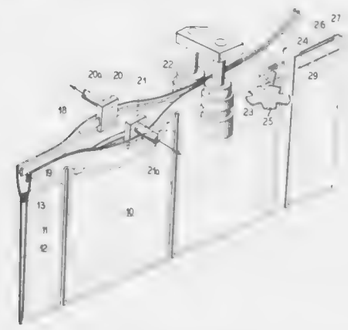
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**4,744,674**

## NON-RECLOSABLE MECHANICALLY FILLABLE AND CLOSABLE LINK BAG STRUCTURE AND METHOD

**Robert Nocek, Stamford, Conn., assignor to Minigrip, Inc., Orangeburg, N.Y.**

**Filed Jan. 7, 1987, Ser. No. 1,045**
**Int. Cl.⁴ B65D** *33/16*
**U.S. Cl. 383—63** **27 Claims**




1. A container structure comprising in combination:

a bag body formed of a flexible plastic film having a top through which contents may be filled or emptied from the bag interior;

a mechanically interlockable rib and groove continuous fastener along said top located at the edge of the film with an absence of projections of any substantial grippable length extending above said fastener so that a lateral separating force connot be applied externally of the bag for opening;

and means below said fastener for normally cooperating with said fastener for maintaining the bag closed;

said means being forcibly separable to permit opening of the bag.

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**4,744,675**

## MOVING MECHANISM

**Shigeo Sakino; Mahito Negishi, both of Yokohama; Koichi Matsushita, Chiba; Michio Horikoshi, Ushikumachi, and Makoto Higomura, Yokohami, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Jan. 16, 1987, Ser. No. 3,769**
**Claims priority, application Japan, Jan. 21, 1986, 61-008925**
**Int. Cl.⁴ F16C** *32/06, 29/02*
**U.S. Cl. 384—12** **3 Claims**

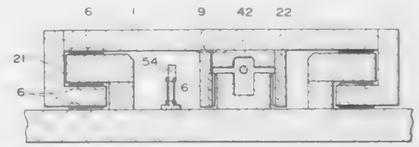
1. A movement guiding device, comprising:

a guiding member having first and second surfaces which are in a back-to-back relation;

a supporting member extending so as to substantially embrace said guiding member, said supporting member having (i) a third surface opposed to the first surface of said guiding member, (ii) a fourth surface opposed to the second surface of said guiding member and (iii) a fifth surface which is in a back-to-back relation with the fourth surface of said supporting member;

a stationary member on which said guiding member is fixedly provided, said stationary member having a sixth surface opposed to the fifth surface of said supporting member;

a first fluid bearing element provided on the third surface of said supporting member opposed to the first surface of said guiding member;




a second fluid bearing element provided on the fourth surface of said supporting member opposed to the second surface of said guiding member; and

a third fluid bearing element provided on the fifth surface of said supporting member opposed to the sixth surface of said stationary member, said third fluid bearing element being effective to prevent deformation of at least a portion of said supporting member in the neighborhood of the fourth and fifth surfaces thereof due to the effect of said second fluid bearing element.

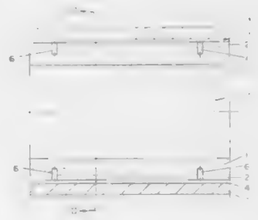
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**4,744,676**

## GAS BEARING AND METHOD OF MAKING IT

**Björn Lind, Billdal, Sweden, assignor to SKF Nova AB, Goteborg, Sweden**

**Filed Dec. 29, 1986, Ser. No. 946,829**
**Claims priority, application Sweden, Mar. 18, 1986, 8601258**
**Int. Cl.⁴ F16C** *32/06*
**U.S. Cl. 384—115** **3 Claims**




1. A gas bearing with a bearing surface arranged on a sintered gas permeable element (1) to which a pressure medium can be supplied from an external source and flow through the element to the bearing surface, the element being made of a gas permeable porous material and having a bearing surface on a less permeable surface layer of said gas porous material (2) through which a number of holes (6) are made, characterized in that the holes extend into the porous material a distance corresponding to at least half the diameter of the holes, so that those portions of the holes which are situated inside surface layer (2) are limited by a porous material; and wherein the holes (6) have a diameter of between 0.01 and 1 mm.

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4,744,677

## BUSH ASSEMBLAGE

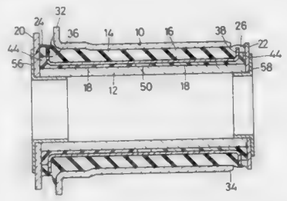
Toru Tanaka, Nagoya; Koji Sawada, Toyota; Takafumi Tachibana, and Koji Shinohara, both of Kasugai, all of Japan, assignors to Tokai Rubber Industries, Ltd. and Toyota Jidosha Kabushiki Kaisha, both of Aichi, Japan

Filed Nov. 25, 1985, Ser. No. 802,051

Claims priority, application Japan, Nov. 27, 1984, 59-249942; Nov. 27, 1984, 59-249943; Nov. 27, 1984, 59-249944

Int. Cl.[4] F16C *27/06;* B60G *11/22;* F16F *1/14*

U.S. Cl. 384—222 24 Claims



1. A bush assemblage having an inner sleeve, an outer sleeve disposed around the inner sleeve in coaxial and radially-spaced relation therewith, a rigid sleeve member disposed between the inner and outer sleeves, and a cylindrical resilient member interposed between the outer sleeve and the rigid sleeve member, comprising:

a retainer member located at at least one of axial ends of said inner sleeve to extend radially outwardly;

means for sealing at least between said retainer member and said rigid sleeve member, said sealing means including a rubber member which is disposed on one of the retainer member and an axial end of the rigid sleeve member corresponding to said at least one axial end of said inner sleeve and which abuts against the other; and

a cylindrical sliding member interposed between said inner sleeve and said rigid sleeve member and including a pair of separate cylindrical parts with an annular space of a predetermined size defined laterally by said pair of cylindrical parts, radially inwardly by the inner sleeve and radially outwardly by the rigid sleeve member, at least one of the separate cylindrical parts which is situated on the side of said retainer member having an outer flange which extends radially outwardly from one of axial ends thereof situated on the side of said retainer member.

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4,744,678

## ARRANGEMENT WITH ROLLER ELEMENTS

Kurt G. Fickelscher, Frankenthal, Fed. Rep. of Germany, assignor to Delta-Drive, Technik nach dem Gleitkeilprinzip GmbH, Frankenthal, Fed. Rep. of Germany

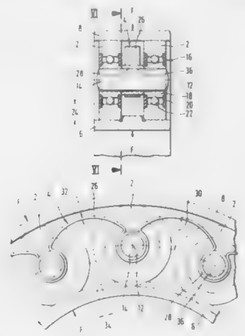
Filed Dec. 3, 1986, Ser. No. 937,503

Claims priority, application Fed. Rep. of Germany, Dec. 4, 1985, 3542776; Jun. 11, 1986, 3619561

Int. Cl.[4] F16C *19/49*

U.S. Cl. 384—461 20 Claims

1. An arrangement with roller elements which are guided by means of a guide ring and are arranged between two support rings, wherein said roller elements are each rotatably mounted on an associated shaft, said guide ring is resiliently formed in such a way and the shafts are each connected with the guide ring in such a manner that the roller elements can make movements relative to each other, and said roller elements are each



annular in form and are each rotatably mounted on the associated shaft by means of an inner rolling body bearing.

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4,744,679

## PLASTIC CAGE FOR A ROLLING BEARING

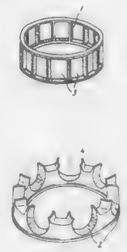
Martin B. Verburg, Amersfoort, and Graham E. Hollox, Voorschoten, both of Netherlands, assignors to SKF Industrial Trading and Development Co. B.V., Nieuwegein, Netherlands

Filed Sep. 15, 1986, Ser. No. 907,396

Claims priority, application Netherlands, Sep. 27, 1985, 8502636

Int. Cl.[4] F16C *33/38, 33/44, 33/46*

U.S. Cl. 384—523 4 Claims



1. In a lubricated rolling bearing assembly comprising rolling elements and a cage for retaining the rolling elements within the assembly, said cage comprising an annular member of relatively soft plastic having openings spaced around the member for receiving and holding the rolling elements, the surfaces of said openings contacting the rolling elements having thereon a deposited layer of a non-plastic material which is much harder than the soft plastic and is capable of resisting the embedment therein of loose particles which may cause damage to the rolling elements during use.

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4,744,680

## WIDE-TYPE THERMAL-TRANSFER PRINTER

Yukihiro Hirosaki; Takahiko Ohata, both of Mishima; Motonobu Hamada, Fuji, and Seiji Koike, Shizuoka, all of Japan, assignors to Tokyo Electric Co., Ltd., Tokyo, Japan

Filed May 15, 1986, Ser. No. 863,697

Claims priority, application Japan, May 21, 1985, 60-108531

Int. Cl.[4] B41J *3/20, 33/08*

U.S. Cl. 400—120 23 Claims

1. A wide-type thermal-transfer printer which includes a fixed thermal head and prints a record medium being transported relatively to the thermal head by the use of an ink ribbon being transported relatively to the thermal head in substantially the same direction as that of the transportation of the record medium, comprsing:

a fixed mechanism section including

a fixed frame,

a record medium holder mounted on the fixed frame adapted to rotatably hold a record medium rolled in the longitudinal direction thereof, and

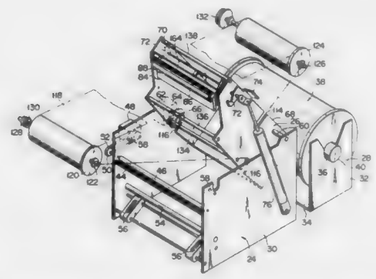
a platen mounted on the fixed frame adapted to carry thereon the record medium drawn out from the record medium holder; and

a printer unit including

a moving frame coupled to the fixed frame so as to have at least a portion thereof movable between a first position adjacent to the fixed frame and a second position remote from the fixed frame,

a thermal head mounted on the moving frame, the record medium being held between the platen and the thermal head when the moving frame is located in the first position, and the record medium being released from between the platen and the thermal head when the moving frame is moved from the first position to the second position,





an ink ribbon supply shaft detachably mounted on said moving frame and wound with the ink ribbon, and an ink ribbon take-up shaft mounted on said moving frame for taking up the ribbon drawn out from the supply shaft, the ink ribbon being held between the platen and the thermal head such that the longitudinal direction of the ink ribbon is substantially in line with the transporting direction of the record medium when the moving frame is located in the first position, and

said record medium holder and said platen of the fixed mechanism section are located above a lower surface of the printer unit, and said record medium extending between the record medium holder and said platen and located along the lower surface of said printer unit when the moving frame is in its first position, and

wherein said take-up shaft can be attached to and detached from the moving frame when the moving frame is located in the second position, and said thermal head starts printing with the record medium and the ink ribbon being moved in substantially the same direction as that of the transportation of the record medium when the moving frame is located in the first position.

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4,744,681

## FORM PRINTER

Dunstan P. Sheldon, 1752 E. Altadena, Altadena, Calif. 91001

Filed Apr. 1, 1987, Ser. No. 32,535

Int. Cl.[4] B41J *3/12*

U.S. Cl. 400—121 11 Claims

1. In a form printer, the combination comprising

(a) a feed plate adjacent which a form is fed in a longitudinal feed direction,

(b) a print head for printing the form,

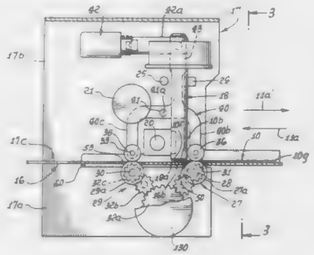
(c) first drive roller means at one longitudinal side of the print head and second drive roller means at the opposite longitudinal side of the print head, said drive rollers adapted to move the form longitudinally,

(d) drive means to drive said roller means in one mode to feed the form longitudinally forwardly and then in a second mode to feed the form longitudinally reversely to enable the print head to print on spaced zones on the form,

(e) first pinch roller means located to urge the form against the first drive roller means, and second pinch roller means located to urge the form against the second drive roller means, and actuator means movable cyclically to selectively and alternately urge the first and second pinch roller means relatively toward the first and second drive roller means, respectively,

(f) a first sensor positioned to sense the edge of a form that has passed longitudinally forwardly between the first drive roller means and first pinch roller means, and operatively connected with the actuator means to cause the actuator means to urge the first pinch roller means, toward the first drive roller means to pinch the form therebetween, whereby the first drive roller means then drives the form longitudinally forwardly,

(g) the first roller means comprising laterally spaced apart rollers, and the second drive roller means also comprising laterally spaced apart rollers,



(h) the drive means for the drive roller means comprising a stepper motor operable to alternately travel the form forwardly or reversely during travel intervals and to arrest form advancement during arrest intervals, to enable printing on the form by the print head during the arrest intervals, the stepper motor connected to both first and second drive roller means,

(i) there being a second sensor positioned to sensor said edge of the sensor that has passed beyond the second drive roller means and second pinch roller means, and operatively connected with said actuator means to cause the actuator means to urge the second pinch roller means toward the second drive roller means to pinch the form therebetween whereby the second drive roller means then drives the form further longitudinally forwardly, thereby to bring a rear section of the form into registration with the print head,

(j) and a third sensor positioned to sense said edge of the form that has passed further beyond the second drive roller means and second pinch roller means, and to a point corresponding to said registration of the rear section of the form with the print head, and operatively connected with said drive means for causing the drive means to drive the roller means in said second mode.

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4,744,682

## NEEDLE PRINTING HEAD

Per E. Ericsson, Bromma, Sweden, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 16, 1987, Ser. No. 62,922

Claims priority, application Sweden, Jun. 18, 1986, 8602718

Int. Cl.[4] B41J *3/12*

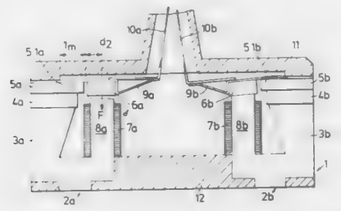
U.S. Cl. 400—124 2 Claims

1. A needle printing head comprising a number of printing

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elements each consisting of a printing needle and an armature fixed to a flat spring, a permanent magnet, and an electromagnet consisting of an exciting coil provided with a core, the armature together with the core of the exciting coil and the permanent magnet being included in a magnetic field path, the flat spring in one of its ends being fixed between a first contact surface situated on the side of the spring facing the electromagnet and a second contact surface situated on the opposite side of the spring, the other end of the spring supporting the printing needle being freely movable between a printing position and a rest position, the armature fixed to the flat spring in the



rest position resting upon the core of the electromagnet, a supporting means being disposed on the side of the spring facing the electromagnet in a position between the first contact surface and an end of the core of the exciting coil which cooperates with the armature, characterized in that the spring during all of its movement between the rest position and the printing position is pretensioned in one single direction and that the spring all the time is in direct contact with the supporting means and slidingly rests upon the supporting means during its movement between said two positions so that the spring shows a curve shaped section between the contact surfaces and the supporting means.

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**4,744,683**

## REVOLVING ENDLESS BANDS COMPRISING MEANS FOR COMPENSATING FOR A DISPLACEMENT PERPENDICULAR TO THEIR DIRECTION OF MOVEMENT

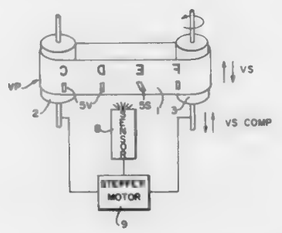
**Ludwig Fischer, Herrenberg; Gottfried Goldrian, Boblingen, and Volker Zimmermann, Sindelfingen, all of Fed. Rep. of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Feb. 26, 1987, Ser. No. 19,466**

**Claims priority, application European Pat. Off., Mar. 25, 1986, 86 104 057.4**

**Int. Cl.⁴ B41J** *1/20*

**U.S. Cl. 400—146** **6 Claims**



1. A rotatable endless band, including means to detect both timing and positioning of said band, said means comprising:

at least three sensor marks wherein a first sensor mark is obliquely positioned relative to its adjoining sensor marks, the center of said first sensor mark being equidistantly spaced from the centers of said adjoining sensor marks,

said adjoining sensor marks positioned parallel to each other and perpendicular to said band's direction of rotation,

said sensor marks capable of being sensed to assure proper timing,

said sensor marks also capable of being sensed to assure proper positioning of said band perpendicular to its direction of rotation.

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**4,744,684**

## IMPACT-TYPE RECORDING APPARATUS

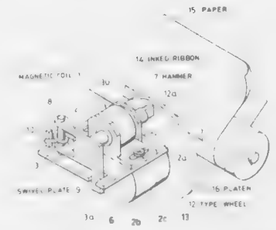
**Tomohiro Maekawa, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 23, 1986, Ser. No. 922,307**

**Claims priority, application Japan, Nov. 5, 1985, 60-246148**

**Int. Cl.⁴ B41J** *9/38, 9/42*

**U.S. Cl. 400—167** **8 Claims**



1. An impact-type recording apparatus comprising:

a platen for supporting a recording medium;

hammer means guided for reciprocal movement between a strike position where said hammer means strikes a character element against an inked ribbon and a recording medium supported on said platen and a stand-by position where said hammer means is kept away from said platen;

energizing means for generating a force acting to move said hammer means from said stand-by position to said strike position;

control means for actuating said energizing means while said hammer means is being moved from said stand-by position to said strike position for striking purposes and while said hammer means is being moved from said strike position to said stand-by position for returning purposes; and stopper means for stopping said hammer means at said stand-by position, said stopper means including a swivel plate which is capable of swivelling about a fulcrum thereof in such a direction as to reduce impact caused by said hammer means when said hammer means is returned from said strike position to said stand-by position, said stopper means further including spring means for resiliently stopping said swivel plate at said stand-by position.

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**4,744,685**

## THERMAL TRANSFER RIBBON AND METHOD OF MAKING SAME

**Norbert Mecke; Rüdiger Weiss, both of Hanover, and Otto Jung, Laatzen, all of Fed. Rep. of Germany, assignors to Pelikan Aktiengesellschaft, Hanover, Fed. Rep. of Germany**

**Filed Jun. 26, 1986, Ser. No. 878,747**

**Claims priority, application Fed. Rep. of Germany, Jun. 26, 1985, 3522801**

**Int. Cl.⁴ B41J** *3/20, 31/06;* **B41M** *5/00*

**U.S. Cl. 400—241.4** **19 Claims**

1. A thermal transfer ribbon comprising:

a substrate constituted of a synthetic-resin foil band;

a fusible synthetic-resin-bonded color-transfer layer on a surface of said foil and responsive to heat for transfer of an image upon heating; and

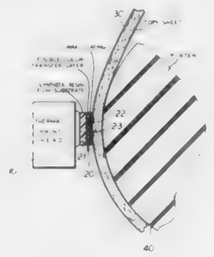
a further layer on a surface of said fusible synthetic-resin-bonded color-transfer layer facing away from said substrate consisting of wax.

10. A method of making a thermal transfer ribbon comprising:

a substrate constituted of a synthetic-resin foil band:

a fusible synthetic-resin-bonded color-transfer layer on a surface of said foil and responsive to heat for transfer of an image upon heating; and

a further layer on a surface of said fusible synthetic-resin-bonded color-transfer layer facing away from said sub-



strate consisting of wax, said method comprising the steps of:

coating said fusible synthetic-resin-bonded color-transfer layer onto said band in the form of an aqueous suspension and evaporating water from said suspension to form said synthetic-resin-bonded color-transfer layer thereon; and

coating said further layer of wax onto said fusible synthetic-resin-bonded color-transfer layer in the form of an aqueous suspension and evaporating water from the latter aqueous suspension.

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**4,744,686**

## DEVICE FOR CARRYING PRINTING HEAD

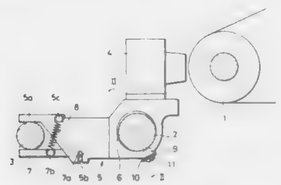
**Hirotada Wakabayashi, 1-1, Taihei 4-chome, Sumida-ku, Tokyo, Japan**

**Filed Nov. 24, 1986, Ser. No. 934,156**

**Claims priority, application Japan, Nov. 26, 1985, 60-265297**

**Int. Cl.⁴ B41J** *25/28*

**U.S. Cl. 400—352** **15 Claims**



6. A device for carrying a printing head, comprising: a pair of longitudinal guide means disposed in parallel to each other, at least one of the longitudinal guide means being composed of magnetic materials and having a peripheral surface; carriage means mounted to undergo sliding movement along the pair of longitudinal guide means for carrying thereon a printing head to move the same in the longitudinal direction of the guide means; and means for preventing the carriage means from floating relative to said one of said longitudinal guide means composed of magnetic material including a permanent magnet member fixed to the carriage means in closely opposed relation to the peripheral surface of said one longitudinal guide means and positioned so as to be magnetically attracted to the peripheral surface with a force sufficient to prevent the carriage means from floating relative to said one longitudinal guide means during the sliding movement of the carriage means along the longitudinal guide means.



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**4,744,687**

## PAPER FEED ROLLER DRIVE SYSTEM FOR A PRINTER

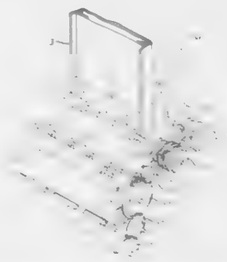
**Yasuyuki Nukaya, Tokyo; Tomio Wakabayashi, Hatano; Iwao Mitsuki, Atsugi, and Takeshi Motohashi, Yokohama, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan**

**Filed Sep. 27, 1985, Ser. No. 781,394**

**Claims priority, application Japan, Sep. 29, 1984, 59-205248; Dec. 18, 1984, 59-265173; Dec. 25, 1984, 59-272050; Dec. 25, 1984, 59-272051; Dec. 31, 1984, 59-188131[U]**

**Int. Cl.⁴ B41J** *11/58*

**U.S. Cl. 400—624** **2 Claims**



1. A printing apparatus comprising a printing unit including a printing head for printing on a paper on a platen, a carriage disposed in facing relation to said platen and having a paper guide for guiding the paper and a driving means for driving said carriage longitudinally of said platen, a paper supply unit including a paper feeding portion for feeding the paper to a printing portion of said printing unit, a discharge paper guide member for guiding the paper passed through said printing portion and a control means for controlling said driving means such that, in feeding the paper, said carriage occupies a position other than its home position at least at a time when a front end of the paper starts to enter into said discharge paper guide member, said paper supply unit including an opening for feeding the paper to said printing portion manually and at least a paper supply portion for feeding the paper to said printing portion one by one, with a paper path from said opening and a paper path from said paper supply portion being joined at a joining point on said paths, and said control means including a paper sensor for detecting the front end of the paper passing through said joining point and for producing an output detection signal in response thereto, said driving means responsive to the output detection signal from said paper sensor for driving said carriage to said position other than said home position, wherein said platen has a drive shaft, and said paper supply unit includes paper feed rollers on a print feed roller shaft and a clutch for transmitting driving power to said paper feed rollers, said clutch being engaged by rotating said platen by a predetermined amount in a paper feeding direction and subsequently rotating a predetermined amount in an opposite direction to actuate said drive shaft of said platen to drive said feed rollers in synchronism with rotation of said platen in said paper feeding direction, said clutch being disengaged by rotating said platen in said opposite direction after the front end of the paper is slightly taken onto said platen, said clutch comprising a drive disk and a clutch disk supported rotatably by said paper feed roller shaft, said drive disk being provided with a drive gear, a latch pawl and a positioning pin, said clutch disk being provided with a stopper engageable with said positioning pin when said drive disk is rotated reversely, a one-way clutch disposed rotatably between a driven shaft and said clutch disc, a pawl switching portion for said latch pawl and a recess for selectively trapping said latch pawl, said latch pawl being biased toward said recess of said clutch disk and swingable to

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a direction of escaping from said recess and to a direction to a path including said recess when an end portion of said pawl passes through said pawl switching portion in a reverse direction, the distance between a switching point of said pawl switching portion and said recess being set larger than a pawl moving amount corresponding to a predetermined permissible reverse rotation amount of said platen during printing, and said apparatus further comprising a guide means for guiding said latch pawl from said switching point to said recess.

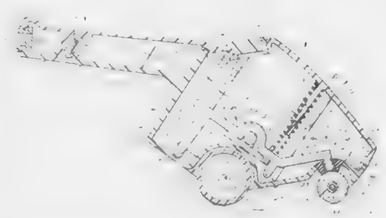
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**4,744,688**

## HAND TOOL FOR APPLYING HOT MELT ADHESIVE

**David Silber, 1320 53rd St., Brooklyn, N.Y. 11219**

**Filed May 30, 1986, Ser. No. 868,933**
**Int. Cl.[4] B42C** *9/00*
**U.S. Cl. 401—1** **5 Claims**



1. A hand tool for applying a hot melt adhesive to a material to be adhered to a work surface, comprising:
a housing containing a chamber adapted for retaining a selected amount of hot melt adhesive, said housing having a rest position and a use position;
heater means in said housing for maintaining the hot melt adhesive in a liquefied state;
a brayer roller rotatably secured to said housing;
an applicator roller rotatably secured to said housing, said heater means including a portion in sliding engagement with said applicator roller;
a first opening in said housing adjacent said applicator roller in communication with said chamber;
whereby said housing in its rest position is adapted to rest on a horizontal support surface with the applicator roller being vertically displaced therefrom and said first opening communicating with said chamber at a point substantially above the chamber bottom, and in its use position the housing is tilted for the liquefied hot melt adhesive to flow toward said point and enter the first opening and so that at least one of the brayer and applicator rollers contacts said material.

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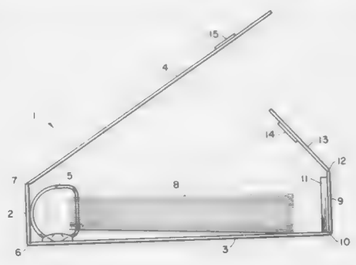
**4,744,689**

## BINDER WITH CLOSURE

**Adam Sternberg, 380 Fulton St., Apt. D-1, Farmingdale, Long Island, N.Y. 11735**

**Continuation-in-part of Ser. No. 762,102, Aug. 2, 1985, abandoned. This application Sep. 18, 1985, Ser. No. 777,369**
**Int. Cl.[4] B42F** *13/16;* **B42D** *3/00, 3/10*
**U.S. Cl. 402—73** **38 Claims**

1. A binder comprising a first cover, having an inner face and an outer face, connected to a spine by a first hinge at a first edge of said spine, a second cover, having an inner face and an outer face, connected to said spine by a second hinge at a second edge of said spine remote from and parallel to said first edge, a releasable retaining means located between the inner face of said first cover and the inner face of said second cover when said binder is in closed position and adapted to receive and retain sheets of material thereon, a closure connected to said first cover by a third hinge at an outside edge thereof, a ledge carried by said closure and having an upper surface, said upper surface located at a first distance from said third hinge substantially equal to the width of said spine, said width being greater than the total thickness of said sheets, whereby a portion of the inner face of said second cover abuts said surface



and said first and second covers are substantially parallel to each other when said first cover, said second cover, and said closure are in the closed position.

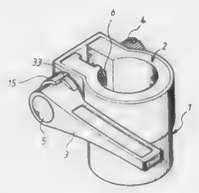
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**4,744,690**

## STABILIZER FOR TELESCOPIC STANDS

**Wu H. Hsieh, No. 178, Chung-shan Second Road, Lu Chou Hsiang, Taipei Hsien, Taiwan**

**Filed Sep. 18, 1987, Ser. No. 98,488**
**Int. Cl.[4] F16B** *7/10*
**U.S. Cl. 403—104** **1 Claim**



1. A stabilizer for a telescopic stand comprising:
(a) a male ring having an opening formed by an outwardly extending circumference of said male ring; two extended walls of said opening, each extended wall having a respective square hole thereon; a block being set on the outside circumference of said male ring so as to be engageable with a slot on the inside of a circumference of a female ring;
(b) said female ring being larger than said male ring and said male ring being installed into said female ring; a hole being set on each correspondent wall on said female ring with said male ring, wherein an outside of one of said holes has a toothed block set proximate thereto; said toothed block being formed of a plurality of toothed elements, each toothed element being composed of an inclined surface and a top surface; an arch-like plate being installed above said toothed block which appears when a handle is enveloped said toothed block;
(c) said handle also having a toothed block which is engageable with said toothed block of said female ring which is installed on a passing hole set on top of said handle; a protuberance being installed on a top of said passing hole which contacts with said arch-like plate when said handle envelops said toothed block of said female ring so as to limit said handle's angle of rotation to no more than 90 degrees;
(d) a squared bolt passing through said passing hole of said handle, said holes of said female ring and said square holes of said male ring being fixed on an outside circumference of said female ring by threading into a nut;
(e) a spring being installed on said opening of said male ring and encompassing said squared bolt; and
(f) a pad with a hole being set between said hole of said male ring and of said female ring; said stabilizer is adapted to be provided on a connection position of a female tube and a male tube of the telescopic stand with said female ring being set on said female tube and said male ring being set on said male tube.



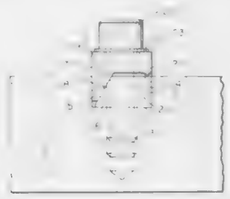
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**4,744,692**

## SPLIT-TAPERED JOINT CLAMPING DEVICE

**Max J. Olsen, North Huntingdon, and John F. Schwartz, Jr., Pittsburgh, both of Pa., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Sep. 22, 1987, Ser. No. 99,802**
**Int. Cl.[4] B25G** *3/20;* **F16B** *2/14*
**U.S. Cl. 403—374** **8 Claims**



6. A clamping device for removably attaching a tool element to a bracket element, said device comprising:
said tool element has a slot therein wherein said bracket element is received;
a clamp body means having a wedge portion in said slot;
a holding means to hold said wedge portion in said slot in wedging engagement with said bracket element and said tool element;
said holding means including a clamping screw extending through openings in said clamp body means and said bracket element;
and, said clamp body means having a pivot means so that said clamp body means pivots thereabout on said bracket element as said clamping screw is tightened to force said wedge portion into engagement with said bracket element in said slot.

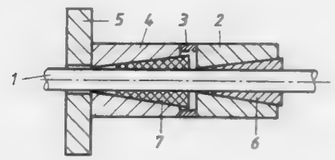
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**4,744,691**

## ANCHORING MEANS FOR TENSION MEMBERS

**Hermann Thal, Mondsee, Austria, assignor to Vorspann-Technik Gesellschaft m.b.H., Salzburg, Austria**

**Filed Mar. 5, 1986, Ser. No. 836,385**
**Claims priority, application Austria, Mar. 5, 1985, 646/85**
**Int. Cl.[4] B25G** *3/20;* **F16B** *2/14*
**U.S. Cl. 403—374** **9 Claims**




1. An anchor comprising:
an anchoring support having a passage,
a first anchoring member having a passage extending therethrough and being movable towards said anchoring support,
a second anchoring member having a passage extending therethrough, said second anchoring member being positioned closer to said anchoring support than said first anchoring member so as to be against said anchoring support,
a tension member extending successively through said passage of said anchoring support, said passage of said second anchoring member and said passage of said first anchoring member,
a first clamping component having a passage extending therethrough, said first clamping component being located in said passage of said first anchoring member and said tension member passing through said passage of said first clamping component,
a second clamping component having a passage extending therethrough, said second clamping component being located in said passage of said second anchoring member and said tension member passing through said passage of said second clamping component, and
means to ensure that upon tensioning of said tension member to draw said first clamping component and said second clamping component toward said anchoring support, said first clamping component engages said first anchoring member and both said first anchoring member and said first clamping component move so as to press said first anchoring member against said second clamping component to engage said second clamping component with said second anchoring member.

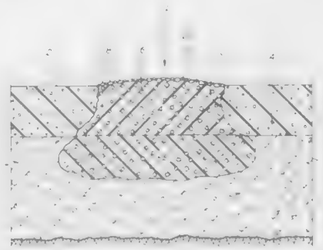
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**4,744,693**

## POT HOLE FILLER MATERIAL AND METHOD OF FILLING SAME

**William C. Smith, Stafford, Tex., assignor to CRS Sirrine, Inc., Houston, Tex., a part interest**

**Continuation-in-part of Ser. No. 688,615, Jan. 3, 1985, abandoned. This application Sep. 17, 1986, Ser. No. 908,613**
**Int. Cl.[4] E01C** *21/00*
**U.S. Cl. 404—77** **13 Claims**



1. A method for filling a pot hole comprising:
placing an ethylene-unsaturated carboxylic acid copolymer wherein the carboxylic acid is selected from the group consisting of acrylic acid, methacrylic acid, ethacrylic acid, crotonic acid, vinyl acetic acid, maleic acid and fumaric acid and wherein the carboxylic acid comprises 12 to 35 weight percent of the copolymer into the pot hole at ambient temperature;
placing aggregate in the pot hole;

heating the mixture of copolymer and aggregate with an infrared heat source until the copolymer is melted; and removing the heat source.

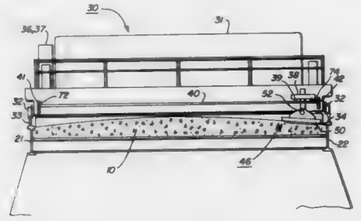
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**4,744,694**

## METHOD AND APPARATUS FOR TEXTURING BRIDGE DECKS AND THE LIKE

**John Leone, 635 Hopkins Rd., Amherst, N.Y. 14221**

**Filed Feb. 2, 1987, Ser. No. 9,730**
**Int. Cl.[4] E01C** *23/02*
**U.S. Cl. 404—89** **1 Claim**



1. An apparatus for forming grooves in plastic concrete deposited upon a bridge deck or the like comprising:
a support structure arranged for movement upon the deck or the like along the longitudinal axis thereof,
a carriage arranged for reciprocal movement upon said support tranversely of the deck or the like and from one side thereof to the other,
a cutter member associated with said carriage for movement with said carriage, said member having a plurality of blades in parallel orientation, and arranged for penetrating the surface of the plastic concrete whereby said movement of said carriage produces parallel grooves in the plastic concrete normal to the longitudinal axis of the deck or the like, and means connected to said carriage and said cutter member for permitting pivotal movement of said member about an axis transverse to the movement of said member whereby said cutter blades are adapted to assume the contour of the surface of the concrete.

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**4,744,695**

## UNDERGROUND CABLE DUCT COMPONENTS AND METHOD OF INSTALLING MULTIPLE CABLES THERETHROUGH

**Keith E. Lindsey, La Canada, and Frank Gasztonyi, Downey, both of Calif., assignors to Lindsey Manufacturing Company, Los Angeles, Calif.**

**Filed Sep. 20, 1985, Ser. No. 778,546**
**Int. Cl.[4] F16L** *1/02;* **H02G** *9/00*
**U.S. Cl. 405—154** **22 Claims**




1. An article of manufacture comprising:
a tubular elbow component of nonconductive high-strength material which is sized and shaped to minimize damage to and the tensile force required to tow a plurality of electrical cables simultaneously into ducting formed of at least one of said elbow components;
said elbow component including a relatively long first portion of D-shape in cross section one end of which converges gradually into a junction with a relatively short second portion of circular cross-section; and
the wider interior dimension of said first portion being at least as great as the combined diameters of the plurality of cables to be installed therein and located on the side thereof nearest the center of curvature of said elbow component.

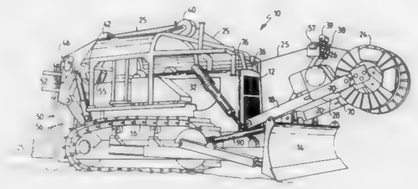
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**4,744,696**

## CABLE LAYING APPARATUS

**Ross A. Vidler, Queensland, Australia, assignor to Australian Telecommunications Commission, Melbourne, Australia**

**Continuation-in-part of Ser. No. 778,453, Sep. 20, 1985. This application Sep. 11, 1986, Ser. No. 905,998**
**Claims priority, application Australia, Sep. 21, 1984, PG7266/84**
**Int. Cl.[4] E02F** *5/10;* **F16L** *1/02*
**U.S. Cl. 405—180** **7 Claims**



1. Cable laying apparatus comprising:
a mobile carrier movable over a ground surface and operable to pay out cable carried by the apparatus so that the cable extends in a run from a supply location for laying as the apparatus moves;
drive means for effecting said paying out;
control means for controlling said drive means, said control means including sensing means for sensing the amount of cable present in a slack loop formed in the cable run, and the control means being effective to vary the rate of said paying out of said cable, as effected by said drive means, whereby to increase said rate of paying out on detection of a decreased amount of cable in said slack loop and to decrease the rate of paying out on detection of a n increase in the amount of cable in said slack loop; and
first and second tension rollers with respective adjacent first and second pinch rollers, the tension rollers being spaced apart along said cable run and arranged whereby the cable passes lengthwise between and is engaged by each tension roller and its adjacent pinch roller, the slack loop being formed between the tension rollers and said drive means being effective to drive said tension rollers to drivingly engage the said cable to substantially remove tension in the cable.

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**4,744,697**

## INSTALLATION AND REMOVAL VESSEL

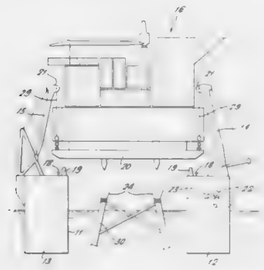
**Anton Coppens, Oegstgeest, Netherlands, assignor to Heerema Engineering Service BV, Leiden, Netherlands**

**Filed Apr. 28, 1986, Ser. No. 856,745**
**Claims priority, application United Kingdom, Apr. 29, 1985, 8510822; Jun. 5, 1985, 8514180**
**Int. Cl.[4] E02B** *17/00;* **B63B** *35/00*
**U.S. Cl. 405—204** **20 Claims**

1. A vessel for use in installing or removing a module on or from a support structure extending upwardly in a body of water to a level near to or above the surface of the water, which vessel comprises:



suspending means for carrying a module, which suspending means includes spaced-apart downwardly hanging cables and means for connecting the lower ends of the cables to opposite sides of the module to support the module in position vertically with respect to the vessel while allowing the module freedom to move horizontally relative to the vessel,
means to raise and lower the module between the level at which the module rests on the support structure and a raised position above said level,



and horizontal force-applying means operatively interposed between the module and the vessel for applying horizontal force to the module to thereby enable the horizontal position of the module relative to the vessel to be altered while the module is being carried by said cables, so as to thereby align the module relative to the support structure while the module is installed upon or removed from the support structure.

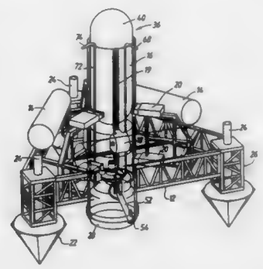
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**4,744,698**

## METHOD AND APPARATUS FOR INSTALLING MARINE SILOS

**Davis S. Dallimer, 20 Brunswick Court, Regency Street, London, JK SWIP 4AE, England, and Giles M. B. Nixon, Suite 901, 135, George Street South, Toronto, Ontario, Canada M5A 4E8**

**Filed Dec. 31, 1986, Ser. No. 948,057**
**Int. Cl.[4] E02D** *7/28, 27/52*
**U.S. Cl. 405—226** **19 Claims**



1. Apparatus for installing marine silos to a desired depth into the seabed such that the interior of the silos is void of seabed material to a desired depth, said apparatus comprising:
(a) a submergible silo positioning template operatively supporting said silo during surface transportation of the silo to its intended site; and being capable while floating and submerged of raising and lowering said silo relative thereto, said silo positioning template including means for maintaining vertical alignment of said silo during installation thereof.
(b) a submergible excavation module capable of establishing mated assembly with the silo with at least a portion thereof entering the silo; and
(c) excavation means being operatively supported by said excavation module and being controllably movable relative to said excavation module and the silo, said excavation means being capable of loosening the soil of the seabed and removing the loosened soil from the silo.

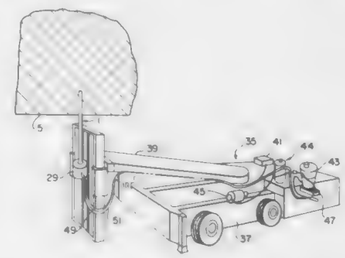
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**4,744,699**

## SINGLE-PASS ROOF BOLT AND APPARATUS AND METHOD FOR INSTALLATION

**William S. Price, Irving, Tex., and Timothy W. Saunders, Belmont, Calif., assignors to Baker International Corporation, Houston, Tex.**

**Filed May 19, 1986, Ser. No. 864,929**
**Int. Cl.[4] E21D** *20/02*
**U.S. Cl. 405—260** **15 Claims**



1. A roof bolting system adapted both to drill a bore in the roof of a mine and to secure a roof bolt in the bore so formed for supporting the mine roof in a single-pass operation, said system comprising:
a roof bolting machine comprising means for releasably holding a roof bolt, and operatively associated with said means for releasably holding the roof bolt, means for rotating the roof bolt for drilling the bore hole, means for providing drilling air to the roof bolt during drilling operations to remove bore hole cuttings, means for applying axial force to the roof bolt, a supply of a flowable grouting material adapted to harden in a relatively short time period in a bore in a mine roof, and means for selectively delivering a charge of grouting material under pressure to the roof bolt, all of said means operatively associated with said releasable holding means being adapted and intended to perform their respective functions while the roof bolt is held in said releasable holding means, and with said supply of grouting material and said means for selectively delivering a charge thereof to the roof bolt being wholly external of the roof bolt and thus free of engagement with hardened grout in the roof bolt for rapid disengagement of the releasable holding means from the roof bolt upon it being secured in the bore of the mine roof, and
a roof bolt comprising:
a tubular body open at one end thereof, constituting the inner end of the bolt;
a cutting structure at the opposite end of the tubular body, constituting the outer end of the bolt, adapted to drill a bore in the mine roof upon rotation of the bolt and the application of an axial force for advancing the bolt into the mine roof, the cutting structure being wider than the tubular body for forming an annular space between the tubular body and the wall of the bore; and
a head at the inner end of the bolt adapted to be held by said releasable holding means of the bolting machine for being rotated and advanced axially during drilling and for being pressed against the mine roof in pressurized relationship upon completion of drilling while the grouting material is hardening;
said tubular body further having a transfer port at its outer

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end, whereby during drilling air is flowable through the tubular body for removing cuttings from the bore, and upon completion of drilling a charge of grouting material from the bolting machine may be injected via the tubular body and the transfer port into the annular bore space around the tubular body for securing the bolt in the bore upon hardening of at least a portion of the grouting material in the annular bore space.

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**4,744,700**

## METHOD FOR FILLING ABANDONED MINES

**Albert Andy, Washington, Pa., and John H. Beale, Medfield, Mass., assignors to Washington Penn Plastic Co., Washington, Pa.**

**Filed Feb. 24, 1987, Ser. No. 17,999**
**Int. Cl.[4] E02D** *3/12*; **E04B** *1/16*
**U.S. Cl. 405—264** **6 Claims**

1. A method of completely filling mines and underground cavities, without applying external heat, to reinforce the strata and ground thereabove in order to prevent collapse or subsidence; comprising introducing, into said mines, a foamable plastic material, reacting therewith, polymeric isocynates with polyols and, additionally, with co-catalytic amounts of epoxides by general base and metal salt catalysis in the presence of blowing agents and surfactants, to promote unusually high exothermic urethane/isocyanurate polymer formation, whereby said foamable plastic material is expanded many-fold into a low combustible strongly reinforcing foam filler.

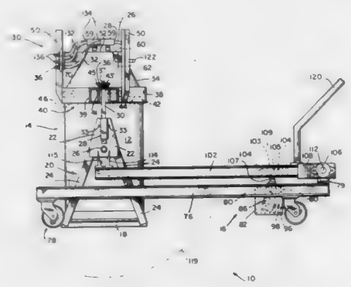
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**4,744,701**

## DRUM UNLOADER

**Thomas A. Chasteen, Indianapolis, Ind., assignor to Ransburg Corporation, Indianapolis, Ind.**

**Filed Nov. 7, 1986, Ser. No. 928,318**
**Int. Cl.[4] B65G** *53/34*
**U.S. Cl. 406—39** **14 Claims**



1. A drum- or barrel-unloader comprising a stand for supporting the drum or barrel in right side up and inverted orientations, the stand including a hopper for receiving the drum or barrel contents when the drum or barrel is inverted with its lid open and means for mounting the hopper for adjustment between first and second positions, the first position away from the top of the drum or barrel to permit placement of the drum or barrel in, and removal of the drum or barrel from, the stand and the second position in engagement with the top of the drum or barrel to receive the contents of the drum or barrel when the drum or barrel is placed in the stand and inverted, the unloader further comprising an elevator for engaging and raising the stand, one of the stand and elevator comprising at least one trunnion and the other of the stand and elevator comprising at least one block for engaging the at least one trunnion, operation of the elevator causing the engagement of the at least one trunnion and at least one block to suspend the stand pivotally from the elevator so that the stand and the drum or barrel supported by the stand can be inverted, subsequent disengagement of the elevator leaving the stand and the drum or barrel supported therein in inverted orientation, the elevator comprising a first frame portion and a second frame portion, means for pivotally mounting the second frame portion relative to the first frame portion, the pivotal mounting means comprising means defining a generally horizontally extending pivot axis about which the second frame portion pivots relative to the first frame portion, means for mounting the one of the trunnion and the block for engaging the trunnion which is mounted on the elevator from the second frame portion, a jack, and means for mounting the jack between the first and second frame portions, actuation of the jack in a first direction pivoting the second frame portion relative to the first to elevate the one of the trunnion and the block for engaging the trunnion mounted on the second frame portion and actuation of the jack in a second direction pivoting the second frame portion relative to the first to lower the one of the trunnion and the block for engaging the trunnion mounted on the second frame portion.

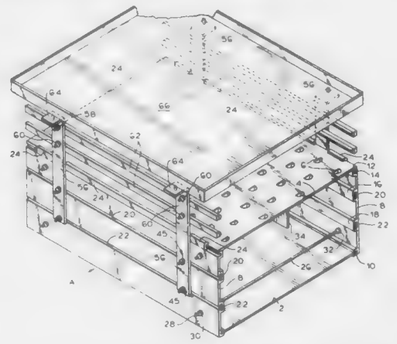
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**4,744,702**

## MODULAR AIR CONVEYOR CONSTRUCTION

**John A. Wiseman, Lynchburg, and Gregory S. Burns, Forest, both of Va., assignors to Simplimatic Engineering Co., Lynchburg, Va.**

**Filed Jan. 12, 1987, Ser. No. 2,623**
**Int. Cl.[4] B65G** *53/04*
**U.S. Cl. 406—88** **17 Claims**



1. A modular air conveyor assembly section comprising separate wall members comprising bottom wall, top wall apertured to produce a conveying air flow at the upper surface thereof, and a pair of side walls, all of essentially the same length, said side walls having parts for releasably receiving and capturing side portions of said bottom and top walls, and releasable means extending between and engaging said side walls for holding said side walls together and thereby retaining said top and bottom walls in received and captured position relative thereto, the space between said walls defining the plenum of said conveyor and adapted to be placed into communication with a source of conveying air.

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**4,744,703**

## ROTARY CUTTER FOR SLOTTING OR CUT-OFF

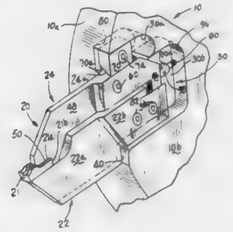
**Burton L. Cochran, Wooster, Ohio, assignor to Manchester Tool Company, Akron, Ohio**

**Filed Feb. 10, 1987, Ser. No. 12,827**
**Int. Cl.[4] B26D** *1/12*
**U.S. Cl. 407—45** **8 Claims**

2. A rotary cutting tool, comprising:
(a) a cutter body rotatable about a central axis;
(b) a plurality of insert support assemblies mounted at spaced locations along the periphery of said cutter body and including portions that extend radially beyond said periphery;



(c) each insert support assembly including:
(i) an insert support arm having a mounting portion by which said support arm is fixed to said cutter body and an insert support blade extending radially from said periphery of said cutter wheel;
(ii) said insert support blade defining an insert engaging structure;
(iii) a clamp member movable towards and away from said insert engaging structure;



(iv) clamp force generating means engageable with said clamp member and operative to cause said clamp member to apply a clamping force to a cutter insert held between said support blade and said clamp member, said generating means acting between said cutter body and said clamp member;
(v) securing means for securing said clamp member to said cutter body while allowing slight movement in said clamp member for adjustment;
(vi) radial adjustment means for adjusting and maintaining a radial position of said clamp member.

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**4,744,704**

## DRILL

**Nils L. Galvefors, deceased, late of Sandviken, Sweden (by Margareta Signe Gavlefors, legal representative), assignor to Santrade Limited, Lucerne, Switzerland**

**Continuation of Ser. No. 753,055, Jul. 9, 1985, abandoned. This application Jan. 22, 1987, Ser. No. 8,156**
**Claims priority, application Sweden, Jul. 12, 1984, 8403685**
**Int. Cl.[4] B23B** *51/02*; **B23C** *5/18*
**U.S. Cl. 408—144** **7 Claims**



1. A drill comprising a drill body and a drill tip detachably secured thereto,
said drill body comprising a diametrically extending slot formed in a forward end of said body,
said slot having a first bottom wall, and
a pair of front-to-rear extending planar first contact surfaces inclined at a first acute angle relative to a longitudinal axis of said drill body,
said first contact surfaces intersecting at a location longitudinally rearwardly of a longitudinally forwardmost end of said drill body as said drill body is viewed in a radial direction,
said drill body including curved chip gullets extending to said slot,
said drill tip being detachably secured in said slot and including forwardly facing end surfaces carrying cutting edge means, and
curved chip surfaces arranged longitudinally rearwardly of said cutting edge means and in alignment with the curved chip gullets of said drill body, said curved chip surfaces defining an extension of the chip gullets,
said drill tip further including a pair of planar second contact surfaces inclined relative to said longitudinal axis at a second acute angle substantially equal to said first angle and situated to engage said first contact surfaces and be wedgingly secured thereto when a second bottom wall of said drill tip abuts said first bottom wall of said slot, and
side surfaces connected to said curved chip surfaces by outwardly projecting shoulders containing said second contact surfaces,
said second contact surfaces terminating longitudinally rearwardly of said front end surfaces,
one of said first and second bottom walls carrying a cylindrical tap and the other of said first and second bottom walls carrying a cylindrical hole receiving said tap.

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**4,744,705**

## TWIST DRILL BIT

**Koujirou Imanaga, Gifu, Japan, assignor to Mitsubishi Kinzoku Kabushiki Kaisha, Tokyo, Japan**

**Filed Aug. 11, 1986, Ser. No. 895,177**
**Claims priority, application Japan, Jun. 23, 1986, 61-95820[U]**
**Int. Cl.[4] B23B** *51/02*
**U.S. Cl. 408—230** **4 Claims**



1. A twist drill bit comprising a cylindrical body having a forward end which contacts a workpiece and having a pair of spiral grooves formed in an outer peripheral surface of said body and extending spirally along a length thereof to said forward end, each of said grooves having a forward portion defined by a first surface which is concavely arcuate when viewed from said forward end and extends from the outer periphery of said body generally radially inwardly thereof and a second surface which is convexly arcuate when viewed from said forward end and extends from an inner end of said first surface to the outer periphery of said body, each of said first surfaces serves as a rake surface which terminates at said forward end in a cutting edge which is concavely curved when viewed from said forward end, each of said cutting edges being coated with a hard coating, said coating being harder than said edges upon which said hard coating is applied, said body having a web thickness of 0.25 D to 0.5 D wherein D is a diameter of said body, and said first surface having a radius of curvature of 0.20 D to 0.30 D while said second surface has a radius of curvature of 0.25 D to 0.40 D, and wherein said bit body has at said forward end a land disposed between said pair of spiral grooves, the ration of a width of said rpiral groove to a width of said land in a circumferential direction of said bit body is 0.8 to 1.3.

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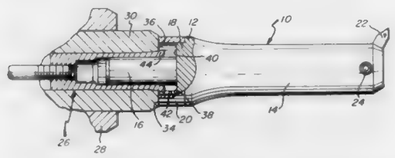


**4,744,706**

## DEVICE FOR COLLET MOUNTING

**Ernest H. Marshall, 30 Saulters Rd., Manchester, Conn. 06040**

**Filed Feb. 17, 1987, Ser. No. 15,685**
**Int. Cl.[4] B23B** *29/12*
**U.S. Cl. 408—239 A** **6 Claims**



1. A device for mounting in a machine having a spindle including an axial bore and an end surface perpendicular to the axial bore at one end thereof and a collet including a main portion within the bore and a forward portion projecting outwardly of the bore a predetermined distance beyond the end surface of the spindle, said device having a cylindrical shank portion including a base end and a free end for entry into said collet, an annular surface projecting radially outwardly from said base end of said shank portion, an internal surface surrounding and confronting said shank portion and projecting longitudinally from the outer periphery of said annular surface, and a bearing surface perpendicular to the axis of said shank portion and projecting radially outwardly from the end of said internal surface remote from said annular surface for bearing engagement with the end surface of the spindle at a location radially outwardly of the forward end of the collet, with said shank portion, said annular surface and said internal surface providing a groove for free reception therein of the forward portion of the collet with said bearing surface engaging the end surface of the spindle.

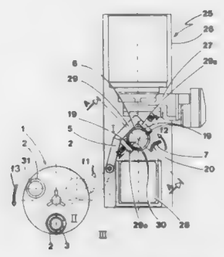
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**4,744,707**

## METHOD FOR AUTOMATIC CHANGEOVER OF THE WORKHOLDING DEVICE IN HOBBING MACHINES, AND MEANS FOR THE IMPLEMENTATION OF SUCH A METHOD

**Roberto Negri, San Lazzaro di Savena, and Mario Serra, Bologna, both of Italy, assignors to C.I.M.A. Costruzioni Italiane Macchine Attrezzi S.p.A., Castenaso, Italy**

**Filed Jun. 3, 1986, Ser. No. 870,171**
**Claims priority, application Italy, Jul. 10, 1985, 3494 A/85**
**Int. Cl.[4] B23F** *23/04*
**U.S. Cl. 409—7** **15 Claims**



1. Apparatus for automatic changeover of a detachable workholding device in a hobbing machine having a rotatable work rest, comprising a vertical axis equipment magazine having at least two stations to hold workholding devices, a change arm pivotably secured to said hobbing machine for transferring a workholding device to said work rest, said arm being rotatable through a horizontal plane from a first limit position in which the workholding device is substantially positioned on the work rest, via an intermediate position in which the workholding device occupies one of the stations of the magazine, to a second limit position in which the change arm lies outside the area occupied by the magazine, said work rest being provided with a horizontal surface that affords support and a means of location to the flat horizontal underside of the workholding device, and a vertical cylindrical surface projecting upward from the horizontal surface, which affords a stop against which at least one reference component offered by the workholding device may locate to the end of ensuring coaxial alignment, a scraper pivotally supported on said hobbing machine for cleaning the horizontal end vertical surfaces of the work rest, a sensor mounted on said machine and means for moving said sensor to bring it into contact with a beveled surface on the workholding device to detect any positioning error between the workholding device and the work rest, means for releasing said positioned workpiece, and means for clamping said workholding device on said work rest.

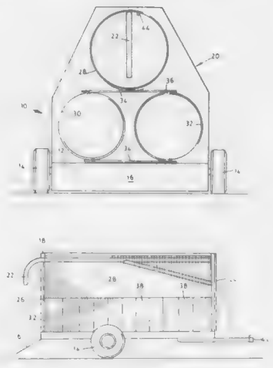
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**4,744,708**

## COIL MEMBER RESTRAINING BARRIER AND CARRYING VEHICLE

**Richard B. Cochrane, Transvaal, South Africa, assignor to Cochrane Steel Products (Proprietary) Limited, Johannesburg, South Africa**

**Filed Mar. 21, 1986, Ser. No. 842,233**
**Claims priority, application South Africa, Mar. 25, 1985, 85/2212**
**Int. Cl.[4] E04H** *17/26, 17/04*
**U.S. Cl. 410—47** **9 Claims**



1. A barrier which includes at least two adjacent compressed coils of suitable material which are axially extensible so that the axial directions of the coils extend in a spaced parallel direction to one another, and a plurality of support devices which provide connection between the coils at a plurality of locations along their respective lengths and space the coils outside of one another thereby to prevent entanglement between coils, each coil comprising a plurality of short coils which are interconnected in axial alignment in head-to-tail relation with adjacent short coils having oppositely directed senses of rotation so that any net rotational forces produced by each short coil are counterbalanced.

7. The combination of a barrier and a vehicle,

said barrier including at least two adjacent compressed coils of suitable material which are axially extensible so that the axial directions of the coils extend in a spaced parallel direction to one another, and a plurality of support devices which provide connection between the coils at a plurality of locations along their respective lengths and space the coils outside of one another thereby to prevent entanglement between coils, each coil comprising a plurality of short coils which are interconnected in axial alignment in head-to-tail relation with adjacent short coils having oppositely directed senses of rotation so that any net rotational forces produced by each short coil are counterbalanced, one of said coils being an uppermost coil,

said vehicle including elongate means supporting said uppermost coil of said barrier.



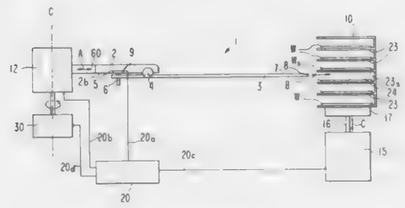
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**4,744,709**

## LOW DEFLECTION FORCE SENSITIVE PICK

**Richard J. Hertel, Bradford, and Leo V. Klos, Newburyport, both of Mass., assignors to Varian Associates, Inc., Palo Alto, Calif.**

**Filed Mar. 30, 1987, Ser. No. 32,204**
**Int. Cl.[4] B65G** *65/00*
**U.S. Cl. 414—21** **10 Claims**



1. A wafer handling device comprising:

a first arm member;

a second elongated arm member partially extending beneath said first arm member and attached thereto by a pivot, said second arm member having a first portion on one side of said pivot and a second portion adapted for receiving a wafer on the other side of said pivot;

means for sensing a wafer transferred to said second arm member, said means for sensing being located on said one side of said pivot and comprising a load cell including a first strain gauge attached to a flexible member attached to one of said first arm member and said first portion and a member for actuating said strain gauge extending toward said flexible member from the other of said first arm member and said first portion, so that the weight of a wafer transferred to said second arm member causes said second arm member to rotate about said pivot so that said member for actuating stretches said flexible member; and

means, responsive to said means for sensing, for providing a signal having a first value when a wafer having a weight in a selected range is received by said second portion and a second value different from said first value when a wafer is not received by said second portion.

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**4,744,710**

## DRILLING DERRICK WITH EXTERNAL PIPE STORAGE

**Lowell M. Reed, Moore, Okla., assignor to Parco Mast and Substructures, Del City, Okla.**

**Filed Nov. 24, 1986, Ser. No. 934,419**
**Int. Cl.[4] E21B** *19/14*
**U.S. Cl. 414—22** **5 Claims**

1. A drilling rig for drilling a hole in the earth which comprise:

a mast having a center which defines the location at which the hole will be drilled and having a first, a second, a third and a fourth quadrant spaced radially about said center, with said second quadrant being spaced 90° degrees from said first quadrant and said fourth quadrant being 180° from said second quadrant, said mast having an interior working area:

a drawworks for said mast at one side of said center and in said first quadrant;

a V-door formed at the lower end of said mast and located in said second quadrant;



a racking means supported by said mast and is only in said fourth quadrant outside of the working area and outside said mast.

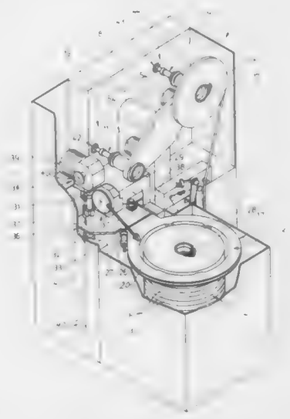
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**4,744,711**

## BOBBIN CHANGING APPARATUS FOR USE IN TOBACCO PROCESSING MACHINES

**Bob Heitmann, Hamburg; Wolfgang Steiniger, Börnsen, and Peter Schumacher, Hamburg, all of Fed. Rep. of Germany, assignors to Körber AG, Hamburg, Fed. Rep. of Germany**

**Filed Nov. 8, 1985, Ser. No. 796,563**
**Claims priority, application Fed. Rep. of Germany, Nov. 16, 1984, 3441872; Sep. 30, 1985, 3534771**
**Int. Cl.[4] B65H** *19/00*
**U.S. Cl. 414—120** **22 Claims**



21. Apparatus for manipulating bobbins having cores for convoluted webs, such as webs of cigarette paper, comprising a magazine arranged to store a supply of bobbins and comprising means for maintaining the axes of the supply of bobbins therein in positions of coincidence with or at least close to a substantially vertical first axis; a support; means for transferring discrete bobbins from said magazine to said support, comprising a gripping device having means for engaging the peripheries of discrete bobbins and means for moving said gripping device between said magazine and said support, said support including means for receiving and retaining the core of

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the bobbin which is delivered by said gripping device and said gripping device comprising tongs constituting an at least substantially complete annulus defining a central opening for the bobbin which is being transferred to said support, said receiving means defining a second axis and said moving means including means for locating said tongs and said magazine in a position of at least substantial concentricity with the bobbin awaiting transfer to said support, said moving means further comprising means for changing the orientation of said gripping device during transfer of bobbins to said support so that the axis of the bobbin which reaches said receiving means coincides with or is at least close to said second axis; and elevator means for reciprocating said gripping device along a path extending in substantial parallelism with said first axis.

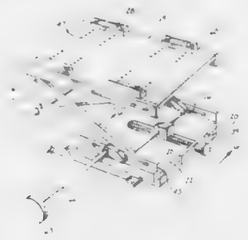
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**4,744,712**

**APPARATUS AND METHOD FOR AN IMPROVED WAFER HANDLING SYSTEM FOR CANTILEVER TYPE DIFFUSION TUBES**

**Ron Mitchell, 3111 S. Park Dr., Tempe, Ariz. 85282**

**Filed May 6, 1986, Ser. No. 860,331**
**Int. Cl.[4] B65G** *53/00;* **F16M** *13/00*
**U.S. Cl. 414—217** **2 Claims**



1. A wafer boat trolley apparatus for transporting wafers into a wafer processing tube, comprising:

an upper portion means for mounting at least one wafer means thereon;

an intermediate portion means generally positioned on a first horizontal plane for adjustably mounting said upper portion means thereon, said intermediate portion means having a vertical adjustment means for adjustably locating a vertical position of said upper portion means relative to a position of said wafer processing tube; and

a bottom portion means generally positioned on a second horizontal plane for accommodating thereon said vertical adjustment means, said bottom portion means having a plurality of wheel means for transporting said wafer boat apparatus thereabove a loading track into said wafer processing tube, said second horizontal plane being positioned at a fixed distance from said first horizontal plane.

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**4,744,713**

**MISALIGNMENT SENSOR FOR A WAFER FEEDER ASSEMBLY**

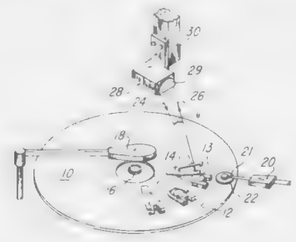
**Julius G. Hrovath, Houston, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Filed May 21, 1986, Ser. No. 865,484**
**Int. Cl.[4] A61K** *27/02*
**U.S. Cl. 414—222** **6 Claims**

1. In an ion implantation device having a wafer holder assembly with a plurality of wafer holders each having a retractable wafer clamp and wafer feeder for loading wafers onto respective wafer holders, and a misalignment sensor, comprising:

a light source for directing a collimated beam of light onto each wafer once a wafer has been loaded onto a corresponding wafer holder but before being clamped;

a light sensor positioned relative to said light source for detecting light reflected from a loaded wafer at a predetermined angle from the direction of the incident beam of light; and



means for indicating a misaligned wafer in response to the absence of reflected light being detected by said sensor within a predetermined time following loading.

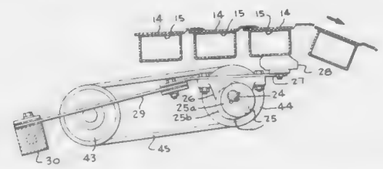
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**4,744,714**

**BIN VIBRATING DISCHARGE DEVICE FOR SURGE OR BLENDING BINS OR THE LIKE**

**Wiley E. Cross, Jr., Glen Allen; Thomas E. Fahed, and David E. Wilsoxson, both of Richmond, all of Va., assignors to The Cardwell Machine Company, Richmond, Va.**

**Filed Feb. 26, 1987, Ser. No. 19,602**
**Int. Cl.[4] B65G** *65/42*
**U.S. Cl. 414—304** **21 Claims**



1. A vibrating discharge apparatus for discharging particulate stored material from a surge or blending bin or the like, comprising a bin forming a receptacle for retaining the material having means defining a storage zone and a discharge end defining a discharge station at one end thereof, a discharge apron defining an upwardly facing apron surface lying in a substantially horizontal plane over most of its length extending along a conveyance path through said storage zone to said discharge end, means at said discharge station directing said discharge apron along a convexly curving discharge end path sloping downwardly from said horizontal plane to discharge the stored material at said discharge end of said apron surface for gravitational discharge of the material downwardly to a material receiving station, said discharge apron comprising a plurality of rigid elongated slat members transversely spanning the apron disposed in parallel cross-wise relation across the apron surface and each having substantially rigid slat body portion and a thin flange-like lip portion projecting therefrom in overlapping abutting relation to the next adjacent slat member when occupying said horizontal plane to define a substantially planiform apron surface, driven chain means at opposite lateral edge portions of the apron trained about sprockets and coupled to the respective slat members for moving the slat members along said horizontal plane, and driven eccentric rotatable impact means having an abutment formation to engage a downwardly facing abutment surface portion of successive slat members as they reach the convexly curving apron path and transfer vibratory movement thereto to assist gravitational discharge of the material therefrom, and support arms for said abutment formation movable to accommodate vibratory movement imparted to the abutment surface portions of said slat members by eccentric means of said impact means, said abutment formation and support arms therefore being formed of an elongated impact bar similar in length and width to said slat body portions arranged parallel to the latter carried on the ends of spring strap arms which are deformable by rotary eccentrics forming the eccentric portion of said impact means to abut and impart vibration to the slat body portions as the latter reach said discharge station.



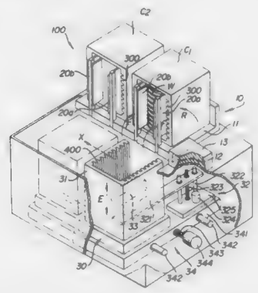
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**4,744,715**

**WAFER TRANSFER APPARATUS**

**Taturo Kawabata, Kawasaki, Japan, assignor to Fujitsu Limited, Kanagawa, Japan**

**Filed Jun. 24, 1987, Ser. No. 65,749**
**Claims priority, application Japan, Jun. 26, 1986, 61-150323**
**Int. Cl.[4] B65G** *65/23*
**U.S. Cl. 414—331** **5 Claims**



1. A wafer transfer apparatus for transferring wafers in a first wafer carrier having a first opening to a second wafer carrier having a second opening, said apparatus comprising:

a carrier turning means for turning the first and the second wafer carriers so that the first and the second openings are directed downward,

a wafer holding means for holding the wafers which are being transferred from the first wafer carrier to the second wafer carrier, said wafer holding means comprising a third opening directed upward for facing the first opening when directed downward for transferring wafers to the wafer holding means and for facing the second opening when directed downward for transferring wafers to the second wafer carriers, wherein said wafer holding means moves to position the third opening to face the first opening when directed downward and the second opening when directed downward, and

a wafer supporting means for supporting the wafers which are being transferred from the first wafer carrier to the wafer holding means when the wafers are being transferred to the wafer holding means, and for supporting the wafers which are being transferred from the wafer holding means to the second wafer carrier means when the wafers are being transferred to the second wafer carrier.

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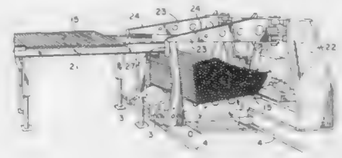
**4,744,716**

**METHOD AND APPARATUS FOR TRANSFERRING ELONGATED OBJECTS**

**James J. Pasko, Naperville, and Ireneusz W. Baran, Chicago, both of Ill., assignors to Maneely-Illinois, Inc., Chicago, Ill.**

**Filed Mar. 11, 1986, Ser. No. 838,457**
**Int. Cl.[4] B65G** *59/02*
**U.S. Cl. 414—376** **19 Claims**

1. A material transfer system for elongated objects comprising a transfer cart having a mobile base and a selectively vertically movable table top on the mobile base, said transfer cart being selectively reciprocally transferred between a loading station and an unloading station, cradle means on the transfer cart cooperating with the table top to hold the elongated objects on the table top from the loading station to the unloading station, with the elongated objects overhanging each end of the table top and pivotal support arms at the unloading station movable between two positions, the pivotal support arms in their first retracted position being out of the way of vertical table top movement to allow the table top and elongated objects thereon to be raised to a level above the level of



the pivotal support arms, the pivotal support arms in their second extended position respectively being under the overhung ends of the elongated objects to allow the table top to be lowered with the elongated objects being unloaded onto the pivotal support arms to allow the transfer car with the lowered table top to return empty to the loading position.

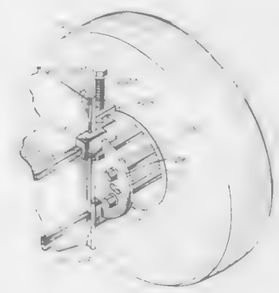
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**4,744,717**

**VEHICLE LIFTING DEVICE**

**Kenneth F. Dyer, 182 Harborn Trail, Mississauga, Ontario, Canada L5B 1A8**

**Filed Jan. 21, 1986, Ser. No. 820,236**
**Claims priority, application Canada, Jul. 8, 1985, 486468**
**Int. Cl.[4] B66F** *7/22*
**U.S. Cl. 414—678** **11 Claims**



1. A cradle for a vehicle lifting device for rolling a vehicle over on its side and supporting said vehicle on its side in a raised position, comprising:

at least one bearer element, curved for at least a portion of its length, the convex surface of said curved portion being designed for rolling contact with a supporting surface; and

mounting means on the concave side of said bearer element for engaging a fully assembled vehicle wheel assembly and for securing said cradle to said vehicle without removing said wheel assembly from said vehicle;

said mounting means comprising a support bracket secured to and extending inwardly from said concave side of said bearer element, a vehicle wheel attachment plate located inwardly of said support bracket, means on said support bracket movably securing said wheel attachment plate thereto whereby said wheel attachment plate is free for orientation relative to means securing the vehicle wheel assembly to said vehicle, means engaged with said support bracket for locking said attachment plate in position, and a plurality of elongated connecting members each being secured at one end to said wheel attachment plate and, at

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the other end, engaging said vehicle wheel securing means of said wheel assembly.

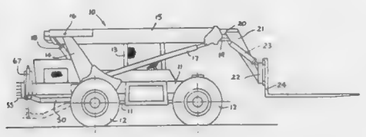
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**4,744,718**

## AIRCRAFT SERVICE VEHICLE

**Christopher T. Logan; Albert Barton; William Cottrell, and William Mitchell, all of Victoria, Australia, assignors to Gleason Cranes (Vic.) Pty. Ltd., Victoria, Australia**

**Filed Mar. 5, 1985, Ser. No. 708,179**
**Claims priority, application Australia, Mar. 6, 1984, PG3926**
**Int. Cl.[4] B66C** *23/00*
**U.S. Cl. 414—724** **5 Claims**



1. A support vehicle including a chassis having forward and rear ends supported on ground engaging wheels, an extendable boom pivoted at said rear end of said chassis to an upwardly extending support means connected to the vehicle chassis, the pivot connection of said extendable boom to the support means being located such that in a first lowered position the boom extends forwardly closely adjacent to an operator's control station supported on said chassis and in a second raised position the boom extends upwardly from the pivot connection, said extendable boom carrying connection means enabling a plurality of separate service implements to be selectively connected thereto, said vehicle including towing means located rearwardly of said vehicle, said towing means including a draw bar pivotally connected to said chassis intermediate its forward and rear ends whereby the draw bar is pivotable by actuating means between lower and upper positions adjacent the rear end of the vehicle chassis, said draw bar carrying hitch means located rearward of but adjacent to the rear end of the vehicle chassis, said hitch means defining a connection axis for connecting a towed vehicle to said support vehicle, said connection axis being substantially vertical when said support vehicle is on level ground, said hitch means including a mechanism comprising a fixed frame member connected to or forming part of said chassis, said frame member defining a pair of curved guide tracks, said hitch means being disposed between said guide tracks such that one lower end of said hitch means is pivotally connected to the rear end of said draw bar, and said hitch means carries guide members receivable in said guide tracks, whereby upon operation of said actuating means, said guide members slide along said guide tracks to ensure that said connection axis remains substantially vertical upon said draw bar moving between said lower and said upper positions.

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**4,744,719**

## CONTROL SYSTEM OF MULTI-JOINT ARM ROBOT APPARATUS

**Kuniji Asano, Machida; Yoshiaki Arimura, Yokohama; Masao Obama, Yokosuka; Yutaka Hitomi, and Mitsunori Kondoh, both of Yokohama, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan**

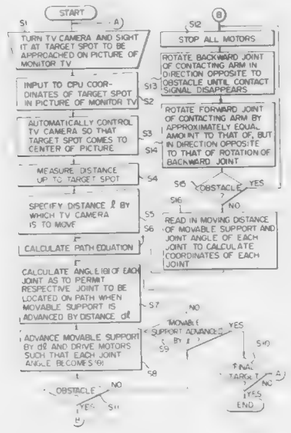
**Continuation of Ser. No. 545,275, Oct. 25, 1983, abandoned.**
**This application Apr. 30, 1987, Ser. No. 45,192**
**Claims priority, application Japan, Oct. 29, 1982, 57-189071; Oct. 29, 1982, 57-189072; Oct. 29, 1982, 57-189077; Oct. 29, 1982, 57-189083**
**Int. Cl.[4] B25J** *9/16, 19/06*
**U.S. Cl. 414—730** **3 Claims**

1. In a control system for a multi-joint arm robot apparatus including a multi-joint arm having a plurality of unit arms coupled in tandem with each other through joints, said multi-joint arm having first actuating means for controlling a joint angle of each of said joints, first detecting means for detecting the joint angle of each of said joints; a movable support for supporting a base arm of said multi-joint arm; and contact sensor means for detecting which unit arm is in contact with an obstacle to generate a contact signal, said movable support having second actuating means for moving said movable support so as to move said multi-joint arm, and second detecting means for detecting the distance by which said movable support moves;

said control system comprising:

means coupled to a foremost unit arm of said multi-joint arm for measuring the direction and distance in and by which said multi-joint arm is to be moved;

data processing means responsive to said measuring means, said first detecting means and said second detecting means for computing joint angles of said joints such that said joints are put into a path represented by measured distance




and direction data obtained by said measuring means when said movable support is moved by a unit distance by said second actuating means; and

driving means responsive to said data processing means for actuating said second actuating means to move said movable support by the unit distance and actuating said first actuating means of said multi-joint arm in such a way that said joints are set to joint angles computed by said data processing means,

said data processing means being responsive to the contact signal generated by said contact sensor means to cause said driving means to rotate the rearward joint of a unit arm of said multi-joint arm, which is in contact with the obstacle, until the contact signal disappears, and then rotate the forward joint of said contacting unit arm in a direction opposite to the rotating direction of said rearward joint through substantially the same amount.

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**4,744,720**

## REEL BAR LOADING DEVICE

**Djuro Kremar, Dorval, Canada, assignor to Valmet-Dominion Inc., Lachine, Canada**

**Filed Jun. 13, 1986, Ser. No. 874,160**
**Int. Cl.[4] B65H** *17/06, 19/06*
**U.S. Cl. 414—748** **6 Claims**

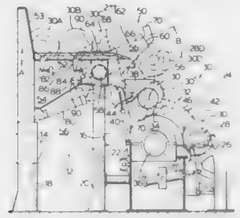
1. A reel bar loader for loading a reel bar into a winding posiiton in a paper making machine, comprising:

rack means adapted to carry a plurality of reel bars and sloping downwardly from one end towards the other end thereof,

transfer arm means for depositing one of the reel bars into said winding position, said transfer arm means being moveable between a first receiving position located directly beneath said other end of said rack means for receiving said one reel bar and a first transfer position adapted to transfer said one reel bar into said winding position, and,

reel bar lowering means for lowering said one reel bar from the rack means directly onto said transfer arm means in said first receiving position, said reel bar lowering means comprising a pair of interconnected horizontally spaced lowering arms pivotally mounted below said rack means on a pivotal axis positioned between said one and said other end and adjacent said other end for pivotal movement from a second upper receiving position to a second lower transfer position, when in said second upper receiving position each of said lowering arms having an upper support surface having at least one portion thereof sloping upwardly relative to the horizontal adjacent the said other





end of said rack means to engage and support a hub of said one reel bar whereby movment of said one reel bar in a direction down said rack means is arrested by said upward sloping portion of said surface, said lowering arms further including abutment means at the end of said upper support surface remote from the pivoted axis of said lowering arms, said abutment means arresting movement of said one reel bar over said supporting surface as the lowering arms are pivoted to said second lower transfer position and preventing said one reel bar from moving off said lowering arms, when in said second lower transfer position support of said one reel bar being transferred from said lowering arms directly to said transfer arm means, said reel bar lowering means being returnable to said upper receiving position to support another one of said reel bars once said arm transfer means has moved into said first transfer position to deposit said one reel bar in said winding position.

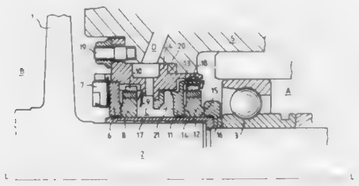
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**4,744,721**

## TURBOPUMP SEALING DEVICE

**Michel Villeneuve, Saint Marcel, France, assignor to EG & G Sealol, Coignieres, France**

**Filed Oct. 28, 1986, Ser. No. 924,563**
**Claims priority, application France, Nov. 8, 1985, 85 16595**
**Int. Cl.[4] F01D** *25/16*
**U.S. Cl. 415—113** **15 Claims**



1. A turbopump sealing device for a fluid such as a liquid propergol having at least one floating ring, mounted in a case concentric with a rotary shaft connecting a turbine and a pump together, said device including:

a cavity defined by said case for a pressurizing gas, said cavity being defined on the turbine side by a bearing ring which is integral therewith, in contact with a first sealing ring secured against rotation, said cavity being defined on said pump side by an added shell one fact of which is in contact with a contact face of a second sealing ring secured against rotation, said second sealing ring having a contact surface on its side opposite said contact face, said contact surface bearing on a friction ring integral with said shaft, said bearing and friction rings being mounted on a socket concentric with said shaft, said shell being further connected to said cavity by a bellows, said cavity having an outer diameter $\phi_1$, said contact face having an outer diameter $\phi_2$ and an inner diameter $\phi_3$, and said contact surface having an outer diameter $\phi_5$ and an inner diameter $\phi_4$, and wherein $b_1$ is greater than $\phi_2$ which is greater than $\phi_5$, whereby means are provided for effecting tight sealings between said turbine and said pump during a cold period and for providing controlled leakage towards said turbine during an operation stage.

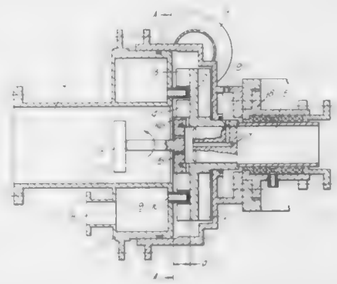
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**4,744,722**

## METHOD AND APPARATUS FOR THE MIXING OF LIQUID OR GAS INTO PULP STOCK

**Jukka Sämpi, Pori, and Timo Aaltonen, Luvia, both of Finland, assignors to Rauma-Repola Oy, Pori, Finland**

**Filed Oct. 21, 1986, Ser. No. 921,106**
**Claims priority, application Finland, Oct. 21, 1985, 854105**
**Int. Cl.[4] F01D** *15/00*
**U.S. Cl. 415—121 B** **10 Claims**



1. Method for the mixing of one of a liquid and a gas into a pulp stock including the steps of:

feeding the pulp stock into a centrifugal pump and out of the pump; and at the same time,

feeding one of the liquid or gas to be mixed from a stationary pin extending between rotating blade portions into a zone formed by the pin between a center shaft and an outer circumference of a rotor wheel of the centrifugal pump.

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**4,744,723**

## METHOD FOR STARTING THERMAL POWER PLANT

**Tsuguo Hashimoto, and Taiji Inui, both of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

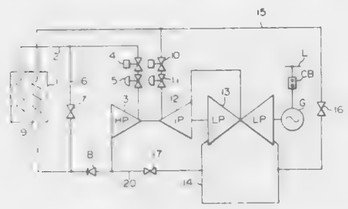
**Filed Mar. 2, 1987, Ser. No. 20,888**
**Claims priority, application Japan, Mar. 7, 1986, 61-49972**
**Int. Cl.[4] F04D** *15/00*
**U.S. Cl. 415—145** **4 Claims**

1. In a method for starting a thermal power plant for delivering steam, generated in a boiler, through a steam regulating valve, a high pressure turbine, a reheater and a intercept valve, into an intermediate pressure turbine and a low pressure turbine, said thermal power plant having a high pressure bypass system for bypassing said steam regulating valve and said high

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pressure turbine, and an intermediate and low pressure bypass system for bypassing said intercept valve and said intermediate and said low pressure turbines, wherein upon starting said thermal power plant, said steam generated in said boiler passes through said high pressure bypass system, said reheater and said intercept valve into said intermediate and said low pressure turbines to accelerate the turbines, and after a synchronous steam supply, said steam passes into a high pressure turbine through said steam regulating valve to increase a load imposed on said power plant instead of passing into said high pressure bypass system, comprising a step of performing an opening control of said steam regulating valve under a condition that a reheated steam pressure becomes equal to or lower than a predetermined pressure level as a result of opening operation of said intercept valve.



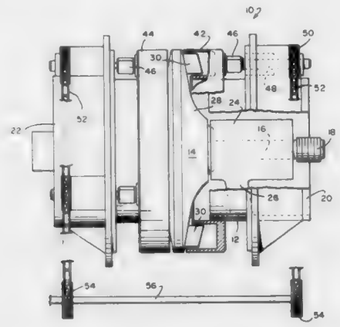

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**4,744,724**

## ABSORPTION DYNAMOMETER

**Walter L. Brassert, Belmont; Pat A. Capone, Lynnfield; Anthony F. Carter, Newton; Arnold M. Heitmann, Woburn; Willem Jansen, Woburn; Robert M. Sexton, Woburn, and Salaiyur N. Thirumalaisamy, Newton, all of Mass., assignors to Northern Research and Engineering Corp., Woburn, Mass.**

**Continuation of Ser. No. 356,932, Mar. 10, 1982, abandoned.**
**This application Jul. 13, 1987, Ser. No. 72,934**
**Int. Cl.[4] G01L *3/20*; F01D *17/14***
**U.S. Cl. 415—158** **13 Claims**



1. An absorption dynamometer, for fluid, comprising:
a housing structure; and
a rotor rotatably journaled in said structure; wherein
said rotor has a rotary axis; further including
means for admitting fluid into said structure for communication thereof with said rotor from either of opposite axial directions; and wherein
said rotor has a body and a plurality of blades projecting from said body substantially parallel with said axis;
said blades of said plurality are substantially radially disposed on said rotor, each blade having a radially innermost edge and a radially outermost edge, and said edges of each blade lie substantially on a given, discrete, radial line drawn from said axis; and
each of said blades is spaced apart from blades immediately adjacent thereto, a given circumferential distance, thereby to define, on opposite sides of each said blade, open, unobstructed, radial flow paths for fluid; and further including
means, coupled to said structure, selectively operative for occluding said blades, of said plurality thereof, from fluid admitted into said structure.

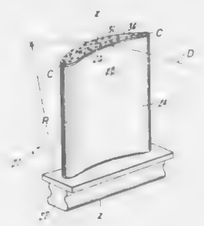
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**4,744,725**

## ABRASIVE SURFACED ARTICLE FOR HIGH TEMPERATURE SERVICE

**Alfred P. Matarese, North Haven; Harry E. Eaton, Woodstock; Richard C. Novak, Glastonbury, and James M. Goodman, Ellington, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.**

**Filed Jun. 25, 1984, Ser. No. 624,421**
**Int. Cl.[4] F01D *5/20*; F04D *29/08***
**U.S. Cl. 415—172 A** **16 Claims**



1. An article comprised of a substrate to the surface of which is adhered an abrasive material comprised of metal matrix and a single layer of ceramic particulates contacting the substrate, the particulates surrounded by a thin metal cladding diffused with the matrix said metal cladding being of a differnt composition than said metal matrix, the preponderane of the ceramic particulates extending through the matrix from the substrate surface to a machined surface of the abrasive material.

16. A gas turbine engine blade having a tip surface to which is adhered a layer of an abrasive material comprised of a plasma sprayed high temperature nickel base superalloy metal matrix which surrounds a single layer of abrasive silicon carbide particulates; wherein the particulates are sized between about No. 20 and No. 40 U.S. Sieve Series, and are coated with a thin layer of nickel, wherein each particulate contacts the tip surface and a portion of the nickel layer is diffused with the matrix and bonded to the tip surface, there being at least about 42 particulates per square centimeter of tip surface, regularly spaced apart thereon, less than about 15 percent of the particulates contacting one another; and wherein the surface of the metal matrix is machined and about 10–50 percent of each particulate extends through the surface of the matrix.

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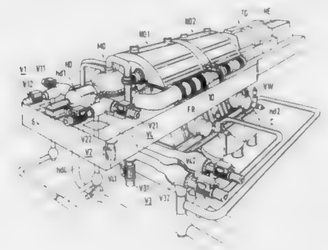
**4,744,726**

## TURBOSET WITH AT LEAST ONE LOW-PRESSURE TURBINE STAGE HAVING AN OUTER HOUSING AND AN INNER HOUSING COAXIAL THERETO, AND WITH HIGH-PRESSURE AND/OR MEDIUM-PRESSURE TURBINE STAGE

**Axel Remberg, Mülheim, Fed. Rep. of Germany, assignor to Kraftwerk Union Aktiengesellschaft, Mülheim, Fed. Rep. of Germany**

**Filed Jun. 26, 1986, Ser. No. 879,008**
**Claims priority, application Fed. Rep. of Germany, Jun. 27, 1985, 3522916**
**Int. Cl.[4] F01D *25/24***
**U.S. Cl. 415—219 R** **18 Claims**

1. Turboset having at least one low-pressure turbine stage with an outer housing and an inner housing coaxial therewith, and having at least one other turbine stage disposed coaxially with and upstream of the low-pressure turbine stage, the turbine stages having shafts rigidly coupled to one another to form a line of shafts, turbine stages having respective housings which with the shaft line are mounted in turbine mounts formed of housing mounts and shaft bearings, the turbine mounts located between the turbine stages having housing mounts mounted on foundation locks of a turbine foundation in axial interspaces between the turbine stages and at ends of the turbine stages, and other turbine mount with a thrust bearing for the shaft line preceding the low-pressure turbine stage upstream therefrom, the thrust bearing of said other turbine mount defining an axially normal first reference plane $(y\text{-}z)_0$ from which axial shaft expansion and shift begin, the low-pressure turbine stage having an outer housing, and an inner housing mounted so as to be radially-centrically, heat-movable and axially shiftable independently of and relative to the outer housing and being also connected to an axially movable mounted end of an axially adjacent turbine stage housing or turbine mount housing by means of thrust transmitting coupling rods leading heat-movably and vacuumtightly through an end wall of the outer housing by means of sealing elements also permitting limited transverse motion, and one of the turbine mounts preceding the low-pressure turbine stage defining an axially normal second reference plane $(y\text{-}z)_1$ from which axial expansion and shift of the turbine stage housing mounted on the one turbine mount and of the turbine stage housings coupled thereto, including the inner housing or housings of the low-pressure turbine stage or stages, take their start so that the shaft and housing shift takes place over practically the same axial expansion length and in the same direction while achieving minimum axial plays between mutually adjacent rotor blade and vane rings of the respective low-pressure turbine stage, comprising a horizontal, heat-movable lug mounting of the inner housing of the respective low-pressure turbine stage on lug arms structurally combined with the vacuumtight leadthrough of the coupling rods via which the thrust transmission is disposable in vicinity of the thrust transmitting turbine mounts; said lug arms of the inner housing of the respective low-pressure turbine state extending in a direction parallel to the shaft center line, and sliding support and guide surfaces of said lug arms being mounted and guided on fixed bearing surfaces of the associated mount housing; the coupling rods being positively coupled to said lug arms in said vicinity of the thrust transmitting turbine mounts, and the leadthrough through the outer housing of the respective low-pressure turbine stage for the positive-coupled coupling rod to the respective lug arm being disposed on said support and guide surfaces of said fixed bearing surfaces, respectively, in a common vacuum chamber communicating with an exhaust steam chamber of the low-pressure turbine stage and, respectively, sealed from the outside by means of a diaphragm seal, said fixed bearing surfaces being formed by stationary consoles of the mount housings anchored in the foundation locks, support arms of said consoles extending out in line with said lug arms towards said lug arms through the respective outer housing end wall, said support and guide surfaces being disposed on the top and bottom sides of supporting extensions of said support arms and being engaged on top and bottom thereof by projections formed by mouthshaped recesses.





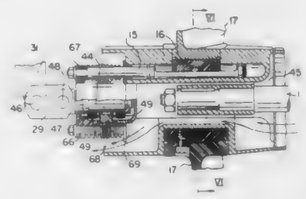
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**4,744,727**

## CONTROLLABLE PITCH PROPELLER AND WATERCRAFT DRIVE

**Peter Muller, Widmerstrasse 27, Zurich, Switzerland**

**Continuation-in-part of Ser. No. 649,373, Sep. 11, 1984, Pat. No. 4,599,043. This application Jul. 8, 1986, Ser. No. 883,101**
**Claims priority, application Switzerland, Sep. 22, 1983, 5159/83**
**Int. Cl.[4] B63H *3/08***
**U.S. Cl. 416—93 A** **14 Claims**



1. A controllable variable pitch propeller assembly for driving a watercraft comprising a main drive shaft, outer housing means attached to the shaft for rotation therewith, a plurality of propeller blades, each blade having a propeller hub pivotally attached to said outer housing means so that the pivoting of each said hub adjusts the pitch of its associated blade, an inner housing connected to said outer housing means and extending longitudinally within said outer housing means around the axis of rotation of said drive shaft, said outer housing means and inner housing defining open spaces therebetween which extend through the length of said housings, an adjusting means spaced from said outer housing means, and means comprising a thrust bearing rotatable around said drive shaft axis for coupling the adjusting means to said propeller hubs without obstructing the flow of gas through said open spaces.

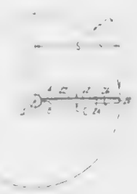
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**4,744,728**

## HELICOPTER BLADE AIRFOIL

**David A. Lednicer, South Bend, Ind., and Stephen J. Owen, Cheshire, Conn., assignors to United Technologies Corporation, Hartford, Conn.**

**Filed Sep. 3, 1986, Ser. No. 903,169**
**Int. Cl.[4] B64C *27/46***
**U.S. Cl. 416—223 R** **5 Claims**



1. A blade for a rotorcraft having a first root end mounted to a central hub, a second tip end, and a span extending between the root and tip ends, the blade further including a high lift, low drag airfoil cross section having a leading edge and a trailing edge, an upper airfoil surface and a lower airfoil surface, each surface extending between the leading and trailing edges and characterized by the tabulation:

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| X/C | $Y_{u/c}$ | $Y_{l/c}$ |
|---|---|---|
| 0.0 | 0.0 | 0.0 |
| 0.004179 | 0.012216 | −0.007622 |
| 0.006589 | 0.015843 | −0.008855 |
| 0.011469 | 0.021681 | −0.010655 |
| 0.023818 | 0.032107 | −0.013265 |
| 0.048677 | 0.044925 | −0.016700 |
| 0.073637 | 0.052653 | −0.019156 |
| 0.098647 | 0.057671 | −0.021112 |
| 0.148716 | 0.063313 | −0.024060 |
| 0.198856 | 0.065816 | −0.026699 |
| 0.249026 | 0.066705 | −0.029199 |
| 0.299206 | 0.066734 | −0.031285 |
| 0.337529 | 0.066424 | −0.032514 |
| 0.377406 | 0.065877 | −0.033372 |
| 0.417281 | 0.065058 | −0.033801 |
| 0.437217 | 0.064511 | −0.033848 |
| 0.457152 | 0.063848 | −0.033784 |
| 0.477085 | 0.063055 | −0.033605 |
| 0.497018 | 0.062135 | −0.033304 |
| 0.536880 | 0.059927 | −0.032343 |
| 0.556810 | 0.058641 | −0.031680 |
| 0.576739 | 0.057228 | −0.030903 |
| 0.596668 | 0.055676 | −0.030019 |
| 0.636519 | 0.052112 | −0.027955 |
| 0.656445 | 0.050076 | −0.026770 |
| 0.676366 | 0.047861 | −0.025512 |
| 0.696288 | 0.045461 | −0.024157 |
| 0.736125 | 0.040116 | −0.021213 |
| 0.756042 | 0.037186 | −0.011641 |
| 0.775956 | 0.034105 | −0.018017 |
| 0.795871 | 0.030894 | −0.016351 |
| 0.835698 | 0.024166 | −0.012929 |
| 0.855611 | 0.020691 | −0.011180 |
| 0.875522 | 0.017178 | −0.009404 |
| 0.895435 | 0.013670 | −0.007600 |
| 0.935263 | 0.007073 | −0.004043 |
| 0.955180 | 0.004381 | −0.002462 |
| 0.975106 | 0.002582 | −0.001260 |
| 0.985074 | 0.002218 | −0.000912 |
| 0.995045 | 0.002365 | −0.000821 |
| 1.000000 | 0.002676 | −0.000899 |

wherein

X is the linear displacement along a chord line extending between the airfoil leading edge and the airfoil trailing edge;

C is the chordal length of the airfoil cross section measured between the leading and the trailing edges;

$Y_u$ is the transverse displacement of the airfoil upper surface from the chord line; and

$Y_l$ is the transverse displacement of the airfoil lower surface from the chord line.

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**4,744,729**

## PRESSURE ACTIVATED PUMP-OFF CONTROL

**Jerry D. Hasten, Crystal City, and James R. Clark, Carrizo Springs, both of Tex., assignors to Conoco Inc., Ponca City, Okla.**

**Filed Sep. 11, 1986, Ser. No. 906,122**
**Int. Cl.[4] F04B** *49/02*
**U.S. Cl. 417—12** **12 Claims**

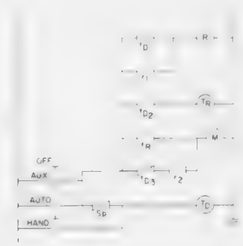
1. A method for intermittently operating a pump of a well which produces less than 50 barrels of oil per day, said method comprising:

disabling the pump for a first period of time during which well fluids may accumulate in the well, said first time period being determined by a first timer;

upon expiration of said first time period, closing a first circuit path thereby turning on said pump for a second period of time, said second time period being determined by a second timer;

sensing the pressure of the fluids built up in the well, opening a second circuit path responsive to sensing a desired minimum pressure in said well;

shutting off said pump either after the elapsing of said second time period if said minimum pressure is not sensed, or after a




third time period determined by a third timer if said minimum pressure is sensed.

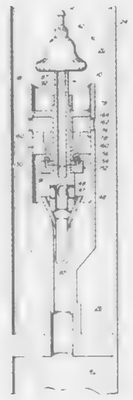
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**4,744,730**

## DOWNHOLE JET PUMP WITH MULTIPLE NOZZLES AXIALLY ALIGNED WITH VENTURI FOR PRODUCING FLUID FROM BOREHOLES

**George K. Roeder, P.O. Box 4335, Odessa, Tex. 79760**

**Filed Mar. 27, 1986, Ser. No. 844,554**
**Int. Cl.[4] F04F** *5/00*
**U.S. Cl. 417—172** **3 Claims**



1. A downhole jet pump for producing fluid from a wellbore; said pump has a pump body, an upper and lower end, and a longitudinal axis; said pump body includes means forming a packer nose assembly at the upper end thereof by which said pump can be circulated into and out of the wellbore; a longitudinally extending axial bore formed within said main body, said axial bore is separated into an upper power fluid passageway and a lower formation fluid passageway to receive power fluid from a source located above the surface of the ground and to receive formation fluid from the lower end of the borehole;

means mounting a nozzle assembly at the lower end of said pump body, said nozzle assembly includes a plurality of radially spaced nozzles which are circumferentially arranged about the longitudinal axis of said pump body; said nozzles each have a jet end spaced from an inlet end, passage means connecting each nozzle to the upper power fluid passageway of the axial bore; a venturi assembly axially aligned respective to said nozzle assembly, said venturi assembly includes a plurality of venturi each having an inlet and outlet;

a tubing string extending into the wellbore into communication with a production zone, means forming a pump cavity located downhole in the borehole at the end of the tubing string for removably receiving said pump in sealed relationship therewithin; an annulus is formed between said tubing string and the borehole through which produced fluid admixed with spent power fluid is conducted uphole to the surface of the ground;

seal means positioned about said pump body by which said pump body and said cavity jointly form a suction annulus and a produced fluid annulus spaced from one another by said venturi assembly, said suction annulus is concentrically arranged about the jet end of said nozzle assembly and the inlet end of the venturi assembly, and thereby provides formation fluid flow into the inlet end of the venturi assembly whereupon the formation fluid is forced to flow through the venturi assembly and into said produced fluid annulus located within said pump cavity; means by which said inlet end of each said nozzles of the assembly is directly connected to said power fluid in the axial passageway such that power fluid can flow into said inlet end, through the interior of said nozzle assembly, and out of said jet end thereof;

a formation fluid inlet means connected at the lower end of said axial bore, means forming a flow passageway extending from said formation fluid inlet means, through said lower formation fluid passageway of said axial bore, and into said suction annulus;

said venturi assembly is of annular construction and sealingly engages the interior of the cavity wall and is spaced from said nozzle assembly; said inlet end of each said venturi is placed adjacent to said jet end of each said nozzle; said suction annulus is separated from the produced fluid annulus by said venturi assembly; an annuluar member spaced above said venturi asembly; said produced fluid annulus commences in proximity of the venturi outlet and extends to said annular member; and an outlet port formed in said cavity and connected to said produced fluid annulus for conducting mixed fluid flow away from the jet pump, into the annulus between the tubing and the wellbore, and towards the surface of the ground.



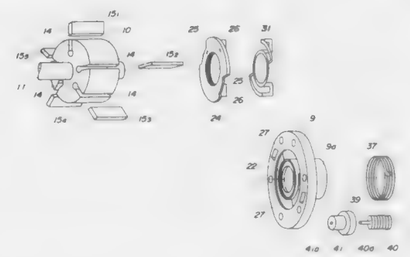
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**4,744,731**

## VARIABLE CAPACITY VANE COMPRESSOR

**Nobuyuki Nakajima; Kenichi Inomata; Shigeru Okada, and Kazuo Eitai, all of Konan, Japan, assignors to Diesel Kiki Co., Ltd., Japan, Japan**

**Filed Jul. 1, 1987, Ser. No. 68,554**
**Claims priority, application Japan, Jul. 7, 1986, 61-159310; Sep. 17, 1986, 61-142362[U]; Oct. 16, 1986, 61-246027; Dec. 19, 1986, 61-195583[U]**
**Int. Cl.[4] F04B** *49/02;* **F04C** *29/08*
**U.S. Cl. 417—295** **11 Claims**



1. A variable capacity vane compressor comprising:

a cylinder formed by a cam ring and a pair of front and rear side blocks respectively closing opposite axial ends of said cam ring, one of said front and rear side blocks having at least one first inlet port, said at least one inlet port having a first portion and a second portion;

a rotor rotatably received within said cylinder, said one side block having an axial end face facing toward said rotor and an annular recess formed in said axial end face in substantially concentric relation to an axis of said one side block;

a plurality of vanes radially slidably fitted in slits formed in said rotor;

a low and a high pressure chamber;

said cylinder, said rotor and the adjacent vanes cooperating with each other to defince a plurality of compression chambers which change in their respective volumes, as said rotor rotates, so that a compression medium is successively drawn into said compression chambers from said low pressure chamber through said first inlet port, and the drawn medium is compressed within said compression chambers and is discharged therefrom:

said second portion of said at least one inlet port communicating with said low pressure chamber and with at least one of said compression chambers which is on a suction stroke;

at least one space provided in said one side block and communicating with said low and high pressure chambers;

a control element for controlling an opening degree of said second porion of said at least one inlet port, said control element including at least one pressure-receiving protuberance slidably fitted in said space to divide same into a first pressure chamber communicating with said low pressure chamber and a second pressure chamber communicating with said high pressure chamber and capable of communicating with said low pressure chamber, said pressure-receiving protuberance having formed therein a groove extending along an outer peripheral edge of said pressure-receiving protuberance, said control element having a central bore, an annular groove formed in a peripheral wall surface of said central bore, at least one generally radially extending groove formed in an axial end face of said control element, and at least one peripherally extending, arcuate groove formed in an outer peripheral surface of said control element;

said control element angularly moving in response to a differential pressure between said first and second pressure chambrs acting upon said pressure-receiving protuberance, for controlling the opening degree of said second portion of said at least one inlet port, thereby controlling a compression commencing timing of the compressor to control a delivery quantity thereof;

a communication passageway communicating said second pressure chamber and said low pressure chamber with each other;

valve means provided in said communication passageway for opening and closing same, said valve means being operable to close said communication passageway when the pressure within said low pressure chamber is above a predetermined value, and to open said communication passageway when the pressure within said low pressure chamber is below said predetermined value; and

sealing means mounted on said control element for sealing between said first and second pressure chambers and between said low pressure chamber and a zone of a back pressure acting upon said vanes, said sealing means comprising a first annular sealing portion fitted in said annular groove formed in the peripheral wall surface of said central bore in said control element for sealing between the peripheral wall surface of said central bore and an inner peripheral side wall surface of said annular recess in said one side block, a second sealing portion cencentric with said first sealing portion and fitted in said arcuate groove formed in the outer peripheral surface of said control element for sealing between the outer peripheral surface of said control element and an outer peripheral side wall surface of said annular recess in said one side block, a third sealing portion provided in a manner integral with one end of said second sealing portion and said first sealing portion to connect them with each other, said third sealing portion being fitted in said groove extending along the

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outer peripheral edge of said pressure-receiving protuberance for sealing between the outer peripheral edge of said pressure-receiving protuberance and the inner and outer peripheral wall surfaces and a bottom wall surface of said annular recess in said one side block and an inner wall surface of said space, and a fourth sealing portion provided in a manner integral with said first sealing portion and the other end of said second sealing portion to connect them with each other, said fourth sealing portion being fitted in said groove formed in the axial end face of said control element for sealing between the axial end face of said control element and the bottom wall surface of said annular recess in said one side block.

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**4,744,732**

## VARIABLE CAPACITY VANE COMPRESSOR

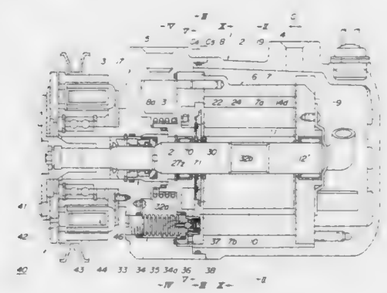
**Nobuyuki Nakajima; Kenichi Inomata, and Shigeru Okada, all of Konan, Japan, assignors to Diesel Kiki Co., Ltd., Tokyo, Japan**

**Filed Dec. 23, 1986, Ser. No. 946,425**

**Claims priority, application Japan, Dec. 28, 1985, 60-299054; Jan. 31, 1986, 61-019936; Jan. 31, 1986, 61-019937; Feb. 19, 1986, 61-035880; Mar. 22, 1986, 61-064460; May 12, 1986, 61-107881**

**Int. Cl.⁴ F04B** *49/02, 49/08*

**U.S. Cl. 417—295** **22 Claims**



1. A variable capacity vane compressor comprising:

a cylinder comprising a cam ring and a pair of front and rear side blocks closing opposite ends of said cam ring, said cylinder having at least one first inlet port formed therein;

a rotor rotatably received within said cylinder, one of said front and rear side blocks having an end face facing said rotor and a recess formed therein;

a plurality of vanes radially slidably fitted in respective slits formed in said rotor;

a housing accommodating said cylinder and defining a suction chamber and a discharge pressure chamber therein;

a driving shaft on which said rotor is secured, said driving shaft extending through said front side block;

power transmitting means mounted on said driving shaft at a side of said front side block remote from said rotor;

compression chambers being defined between said cylinder, said rotor and adjacent ones of said vanes and which vary in volume with rotation of said rotor for effecting suction of a compression medium from said suction chamber into said compression chambers through said at least one first inlet port, and compression and discharge of said compression medium;

at least one second inlet port being formed in said one of said front and rear side blocks and adjacent a corresponding one of said at least one first inlet port, said at least one second inlet port communicating said suction chamber with at least one of said compression chambers which is on a suction stroke;

a control element arranged in said recess formed in said end face of said one of said front and rear side blocks facing said rotor for rotation about an axis common with an axis of rotation of said rotor, said control element being so disposed that a circumferential position thereof determines the opening angle of said at least one second inlet port to thereby determine the timing of commencement of the compression of the compression medium;

said control element including a pressure-receiving portion defining a first pressure chamber supplied with a high pressure from said discharge pressure chamber and a second pressure chamber supplied with a low pressure from said suction chamber, said first and second presure chambers being arranged in said one of said front and rear side blocks, said control element being circumferentially displaceable in response to at least a pressure difference between said high pressure in said first pressure chamber and

spacer means interposed between said control element and at least one of said one of said front and rear side blocks and said rotor, for maintaining a predetermined minimum clearance therebetween.

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**4,744,733**

## SCROLL TYPE COMPRESSOR WITH VARIABLE DISPLACEMENT MECHANISM

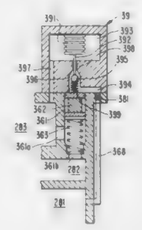
**Kiyoshi Terauchi, and Atsushi Mabe, both of Isesaki, Japan, assignors to Sanden Corporation, Japan**

**Filed Jun. 18, 1986, Ser. No. 875,561**

**Claims priority, application Japan, Jun. 18, 1985, 60-132487**

**Int. Cl.⁴ F04B** *49/02, 49/08*

**U.S. Cl. 417—310** **2 Claims**



1. In a scroll type compressor including a housing having an inlet port and an outlet port, a fixed scroll fixedly disposed within said housing and having a circular end plate from which a first spiral element extends into the interior of said housing, an orbiting scroll having a circular end plate from which a second spiral element extends, said first and second spiral elements interfitting at an angular and radial offset to make a plurality of line contacts and define at least one pair of fluid pockets within the interior of said housing, a driving mechanism operatively connected to said orbiting scroll to effect the orbital motion of said orbiting scroll, a rotation preventing mechanism for preventing the rotation of said orbiting scroll during the orbital motion, said circular end plate of said fixed scroll dividing the interior of said housing into a front chamber and a rear chamber, said front chamber communicating with said inlet port, and said rear chamber being divided into a discharge chamber which communicates between said outlet port and a central fluid pocket formed by both said scrolls and an intermediate pressure chamber, the improvement comprising:

at least one pair of holes formed through said circular end plate of said fixed scroll forming a fluid channel between the fluid pockets and said intermediate pressure chamber, a communication channel formed through said circular end plate of said fixed scroll to form a fluid channel between said intermediate pressure chamber and said front chamber, control means disposed on a portion of said intermediate pressure chamber for controlling fluid communication between said intermediate pressure chamber and said front chamber, said control means comprising a valve element operated by the compressed fluid in said discharge chamber, and a cylinder, a piston slidably disposed within said cylinder, and a control valve element, a top portion of said cylinder being connected to said discharge chamber, said control valve element controlling the communication between said discharge chamber and said front chamber.



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**4,744,734**

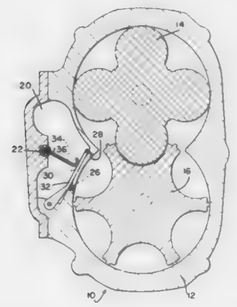
## MEANS FOR CONTROLLING AIR DISCHARGE, IN AN AIR COMPRESSOR

**Brian D. Sowards, Mocksville, N.C., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.**

**Filed Jul. 20, 1987, Ser. No. 75,386**

**Int. Cl.⁴ F04B** *49/00, 31/44*

**U.S. Cl. 417—440** **8 Claims**



1. In an air compressor having a housing, and coacting rotors therewithin, said housing having a discharge port opening onto said rotors, means for controlling air discharge through said port, comprising:

throttle means in said port, and movable therewithin between a first disposition thereof in which said throttle means occludes said port, and a second disposition thereof in which said throttle means opens said port;

an air bypass channel formed in said housing and opening directly onto said rotors;

closure means in one end of said channel, and movable therewithin between a given disposition thereof in which said closure means closes off said channel from fluid communication with said rotors, and in another disposition thereof in which said closure means opens said channel to fluid communication with said rotors; and

means engaging both said throttle means and said closure means for causing said closure means to move between said given and another dispositions in response to movement of said throttle means between said first and second dispositions.

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**4,744,735**

## PARALLEL-CYLINDER, ANGLED-VALVE FLUID PUMP

**Geoffrey S. Niemand, Plot 18, Eikenhof, Transvaal, South Africa**

**Filed Oct. 20, 1986, Ser. No. 921,605**

**Claims priority, application South Africa, Oct. 21, 1985, 85/8078**

**Int. Cl.⁴ F04B** *21/02*

**U.S. Cl. 417—533** **21 Claims**

1. A fluid pump comprising a pair of pistons which are reciprocable in parallel cylinders opening into a common inlet and outlet housing through cylinder outlets surrounded by outlet valve seats, the housing including inlet apertures surrounded by inlet valve seats and which open into the housing, the cylinders being closable by outlet valves closing against the outlet valve seats and the inlet apertures being closable by inlet valves closing against the inlet valve seats, the outlet valve seats being angled with respect to the principal cylinder axes



and the inlet valve seats being angled with respect to the cylinder plane, which is the plane extending between the cylinder centre lines.

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**4,744,736**

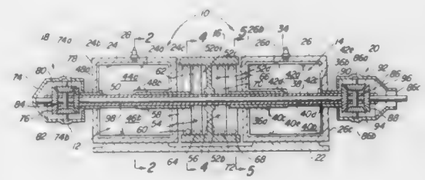
## COMPOUND ROTARY INTERNAL COMBUSTION ENGINE

**John E. Stauffer, 6 Pecksland Rd., Greenwich, Conn. 06830**

**Continuation-in-part of Ser. No. 773,636, Sep. 9, 1985. This application Dec. 19, 1986, Ser. No. 943,634**

**Int. Cl.⁴ F02B** *53/00*

**U.S. Cl. 418—35** **8 Claims**



1. A drive assembly comprising:

(A) means defining first and second chambers arranged on a common fixed axis and axially spaced;

(B) a first pair of vanes mounted in said first chamber for independent rotation about said axis;

(C) a second pair of vanes mounted in said second chamber for independent rotation about said axis;

(D) a first pair of concentric drive shafts positioned on said axis and respectively drivingly secured to said first pair of vanes;

(E) a second pair of concentric drive shafts positioned on said axis and respectively drivingly secured to said second pair of vanes;

(F) a housing positioned between said axially spaced chambers and mounted for rotation about said axis;

(G) first control means drivingly interconnecting said first pair of drive shafts to said housing and operative to allow clockwise movement of said first pair of drive shafts relative to said housing while precluding relative counterclockwise movement, so that said first pair of vanes may rotate freely in said first chamber in a clockwise direction and may simultaneously undergo relative rotation;

(H) second control means drivingly interconnecting said second pair of drive shafts to said housing and operative to allow counterclockwise movement of said second pair of drive shafts relative to said housing while precluding relative clockwise movement, so that said second pair of vanes may rotate freely in said second chamber in a counterclockwise direction and may simultaneously undergo relative rotation;

(I) first converter means, including a first output shaft, drivingly connected to said first pair of vanes and operative to convert the clockwise rotation of said first pair of vanes

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and the relative rotation of said first pair of vanes into unidirectional rotation of said first output shaft; and

(J) second converter means, including a second output shaft, drivingly connected to said second pair of vanes and operative to convert the counterclockwise rotation of said second pair of vanes and the relative rotation of said second pair of vanes into unidirectional rotation of said second output shaft.

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**4,744,737**

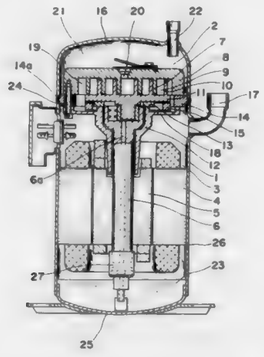
## ELECTRICALLY DRIVEN COMPRESSOR WITH A PERIPHERAL HOUSING WELD

**Michio Yamamura; Kiyoshi Sawai, both of Kusatsu; Katuharu Fujio, Shiga; Shuuichi Yamamoto, Kyoto, and Hiroshi Morokoshi, Shiga, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed May 29, 1987, Ser. No. 56,410**

**Int. Cl.⁴ F01C *1/04;* F04B *39/12***

**U.S. Cl. 418—55** **4 Claims**




1. An electrically driven compressor comprising:

a lower vessel in which a suction space of the compressor is defined;

an electric motor disposed in the lower vessel;

a compression mechanism for compressing gas introduced into the suction space of the compressor,

said compression mechanism comprising a stationary impeller component having a stationary impeller, a rotary impeller component having a rotary impeller for rotating relative to the stationary impeller, a plurality of spaces defined between said stationary impeller and said rotary impeller and communicating with said suction space, the gas entering into said plurality of spaces from said suction space so as to be compressed therein between the rotary impeller and the stationary impeller, a crank shaft operatively connected to said rotary impeller component and said electric motor for being driven by the electric motor to rotate said rotary impeller, a bearing component for rotatably supporting said crank shaft in the compressor, a self-rotation restricting means operatively connected to the rotary impeller component for preventing the rotary impeller from self-rotating when the gas enters said plurality of spaces and for only allowing a forced rotation thereof by said crank shaft, a thrust bearing operatively connected in a bearing relation with said rotary impeller component for supporting a thrust load exerted by said rotary impeller, a partition frame component interposed between said stationary impeller component and said bearing component;

an upper vessel encircling said stationary impeller component, and an upper space defined in said upper vessel, said upper space communicating with said plurality of spaces and in which the gas after being compressed in said plurality of spaces passes,

said partition frame component extending between said suction space and said upper space and between respective free ends said upper vessel and said lower vessel for separating said suction space from said upper space except via said plurality of spaces; and

a weld extending entirely along the outer periphery of said partition frame component for coupling the upper vessel to the lower vessel and the partition frame component to said vessels and for effecting a seal between said suction space and said upper space at the portion of the compressor at which said partition frame component extends between the upper vessel and the lower vessel.

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**4,744,738**

## GEAR PUMP OR MOTOR WITH HARD LAYER IN INTERIOR CASING SURFACE

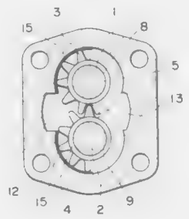
**Masayuki Miki, Otsu, and Kyoji Sera, Joyo, both of Japan, assignors to Shimadzu Corporation, Kyoto, Japan**

**Continuation of Ser. No. 784,643, Oct. 4, 1985, abandoned. This application Jun. 23, 1987, Ser. No. 65,110**

**Claims priority, application Japan, Oct. 8, 1984, 59-212139; Feb. 28, 1985, 60-40713**

**Int. Cl.⁴ F04C *2/18, 2/10, 15/00***

**U.S. Cl. 418—126** **11 Claims**




1. A high pressure gear pump or motor comprising:

a casing having an internal cavity therein,

a pair of intermeshing gears located in said cavity,

a hard layer formed only on portions of said internal cavity,

each of said gears having teeth with tips, a center portion and two ends,

shaft means secured to each of said gears at said two ends thereof for supporting each of said gears in said cavity,

said hard layer being made of a material harder than said gear teeth tips, each of said gears being shaped to have the diameter thereof become gradually smaller towards the central portion from both said ends by said hard layer grinding said tips of said gears when rotating, so as to make an appropriate clearance between said casing and said gears in operation to seal leakage of a fluid.

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**4,744,739**

## TIRE CURING PRESS

**Anand P. Singh, Youngstown, Ohio, assignor to NRM Corporation, Columbiana, Ohio**

**Filed Feb. 2, 1987, Ser. No. 10,012**

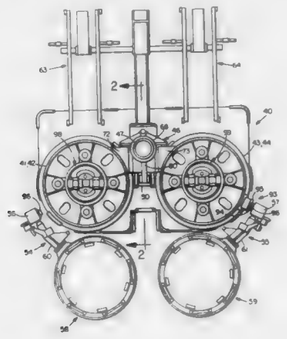
**Int. Cl.⁴ B29C *33/00***

**U.S. Cl. 425—34.1** **35 Claims**

1. A tire loader for a tire press comprising a vertically extending guide rail, an elevator mounted on said rail for vertical movement, an arm including a vertical shaft pivotally mounted



on said elevator for horizontal swinging, a loader chuck on the end of said arm, a rotary actuator on said vertical shaft for




swinging said arm, and torque shock absorbing spring means between said actuator and said elevator.

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**4,744,740**

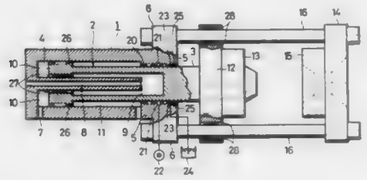
## STRAIGHT-HYDRAULIC MOLD CLAMPING SYSTEM IN MOLDING MACHINE

**Hisashi Kojima, Tokyo, Japan, assignor to Technoplas, Inc., Tokyo, Japan**

**Continuation of Ser. No. 526,693, Aug. 25, 1983, abandoned. This application Nov. 22, 1985, Ser. No. 800,371**

**Int. Cl.⁴ B30B *15/28***

**U.S. Cl. 425—107** **1 Claim**



1. A straight-hydraulic mold clamping system in an injection molding machine, which comprises:

a mold clamp cylinder having an inner chamber;

a reciprocating piston slidably mounted within said inner chamber for dividing said inner chamber into two chamber parts;

a rod having a rear end connected to said piston and a leading end extending out of said mold clamp cylinder, said mold clamp cylinder having a bearing portion slidably supporting said rod and having an inner circumference having at least one sealing member in sealing engagement with said rod;

a movable platen attached to said leading end of said rod and having thereon one mold half of a pair of mold halves constituting an injection mold;

a stationary platen disposed opposite to said movable platen and having the other mold half of said injection mold mounted thereon; and

tie bars extending between said mold clamp cylinder and said stationary platen and slidably supporting said movable platen,

said bearing portion of said mold clamp cylinder having an inner circumferential surface having therein a plurality of narrow annular outwardly divergent V-shaped oil grooves, said inner circumferential surface and said rod having a clearance therebetween through which said narrow annular oil grooves communicate with one of said chamber parts of said inner chamber in said mold clamp cylinder, and said piston having an outer circumferential surface having therein a plurality of further narrow annular outwardly divergent V-shaped grooves, said outer circumferential surface of said piston and the inner circumferential surface of said mold clamp cylinder having a clearance therebetween through which said further narrow annular grooves communicate with said chamber parts of said inner chamber in said mold clamp cylinder.

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**4,744,741**

## APPARATUS FOR THE MANUFACTURE OF COMPOSITE ARTICLES USING ROTATING MOLDS

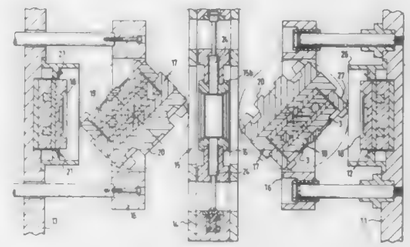
**John B. Glover, Huddersfield; Ronald A. Ireland, Lichfield, and Colin Adie, Handsacre, Nr. Rugeley, all of Great Britain, assignors to The Hepworth Iron Company Limited, Stockbridge, England**

**Filed Jul. 7, 1986, Ser. No. 882,237**

**Claims priority, application United Kingdom, Jul. 5, 1985, 8517073**

**Int. Cl.⁴ B29C *45/16***

**U.S. Cl. 425—123** **16 Claims**



1. Apparatus for producing a pipe fitting having a first component in the form of an annular body of thermoplastic material and a second component in the form of a seal ring of elastomer material bonded to the annular body at an end thereof, the apparatus comprising:

a first outer mold member;

a second outer mold member;

means for moving said mold members towards and away from one another along a mold axis thereof;

an intermediate support member disposed between said mold members;

a first face on said intermediate support member;

a first inner mold profile on said first face complementary to said first outer mold member for forming therewith a first mold cavity for molding said annular body;

a second face on said intermediate support member on a side thereof opposite from said first face;

a second inner mold profile on said second face complementary to said second outer mold member for forming therewith a second mold cavity for molding said seal ring;

said support member being rotatable about an axis of rotation perpendicular to said mold axis selectively to a first rotary position in which said first inner mold profile faces said first outer mold and said second inner mold profile faces said second outer mold. and to a second rotary position in which said first inner mold profile faces said second outer mold and said second inner mold profile faces said first outer mold;

means for rotating said support member;

means for separately injecting thermoplastic material into said first mold cavity and for injecting elastomer material into said second mold cavity;

said mold cavities being designed so that on axial separation of said mold members from said support after said injecting, one of said components will remain in position on the respective associated one of said mold members and the

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other of said components will remain in position on the respective associated one of said mold profiles;

means for heating said second mold cavity;

control means for effecting an operating cycle comprising

(a) disposing said mold members in contact with said support member with the support member in said first rotary position,

(b) injecting said thermoplastic material into said first mold cavity and substantially simultaneously injecting said elastomer material into said second mold cavity while heating said second mold cavity,

(c) separating said mold members from said support member,

(d) rotating said support member with said other of said components thereon through 180° about said axis of rotation,

(e) moving together said one of said mold members with said one component thereon, and said support member with said other component thereon for thereby bonding together said components by means of molding heat retained in said components to form said pipe fitting, and

(f) separating said mold member and support member for removing said pipe fitting; and

means provided on at least one of said outer mold members and said support member adjacent said one of said mold profiles for maintaining a thermal barrier between said support member and said one mold member during said bonding.

8. Molding apparatus for producing a pipe coupling including a first component in the form of a tubular plastics sleeve and two second components each comprising a respective elastomer seal ring bonded to said sleeve at a respective end of the sleeve, said apparatus comprising:

means defining a mold axis;

a double-sided central mold member on said axis;

first and second outer mold members respectively on said mold axis at each side of said central mold member;

a respective support member on said mold axis between each said outer mold member and said central mold member;

means for moving said mold members and support members towards and away from one another along said axis between a mold closed condition and a mold open condition;

each said support member being rotatable about an axis of rotation perpendicular to said mold axis selectively to a molding position and a bonding position 180° apart;

means for rotating said support members;

an internal mold profile on said central mold member for molding the outer surface of said sleeve and having two opposite open ends facing said support members respectively;

a first face on each said support member;

a core on each first face complementary to said internal mold profile and adapted to define therewith, when said support member is rotated into its molding position and in said mold closed condition, a sleeve mold cavity between said internal mold profile and both said cores;

means for injecting thermoplastic material into said sleeve mold cavity to form said plastics sleeve;

a second face on each said support member on the side opposite said first face;

a first seal mold profile on said second face;

a face on each said outer mold member facing the adjacent support member;

a second seal mold profile on said outer mold member face complementary to said first seal mold profile and adapted to define therewith, when said support member is rotated into it molding position and in said mold closed condition, a respective seal mold cavity between said first and second seal mold profiles;

means for injecting elastomeric material into said seal mold cavities substantially simultaneously with said injection of thermoplastic material into said sleeve cavity;

said mold cavities being designed so that on axial separation of said members to the mold open condition said molded sleeve will remain in said central mold member with the ends of said sleeve exposed, and said molded seal rings will remain in place on said second faces of said support members respectively;

means for heating said seal mold cavities; and

control means for rotating said support members with said seal rings thereon 180° to said bonding position so that each said seal ring faces and is aligned with a respective exposed end of said sleeve in said central mold member, and for moving said mold members and support members axially towards one another to bring said seal rings into contact with said exposed sleeve ends for bonding said seal rings to said sleeve ends by means of molding heat retained therein to form said pipe coupling.

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**4,744,742**

## MOLDER FOR MOLDING DOUBLE-LAYERED PREFORMS IN AN INJECTION, STRETCHING AND BLOW MOLDING MACHINE

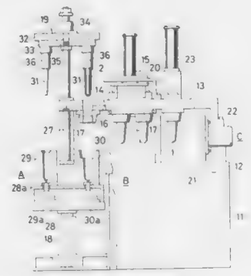
**Katashi Aoki, 6037 Ohazaminamijo, Sakaki-machi, Hanishina-gun, Nagano-ken, Japan**

**Continuation of Ser. No. 563,830, Dec. 21, 1983, abandoned. This application Aug. 29, 1986, Ser. No. 901,607**

**Claims priority, application Japan, Dec. 28, 1982, 57-228275**

**Int. Cl.⁴ B29C *45/16***

**U.S. Cl. 425—126.1** **3 Claims**



1. A molding machine comprising:

an inner molding station;

a rotating platen with a center situated adjacent the inner molding station;

a plurality of neck molds mounted for rotational movement on said rotating platen relative to said inner molding station so that each of said neck molds is rotated sequentially to a stopping position directly above said inner molding station;

an outer molding station disposed adjacent to said inner molding station and beyond the periphery of said rotating platen such that the inner molding station is disposed between the outer molding station and the center of the rotating platen;

a pair of injection cores disposed for rotational movement above said inner and outer molding stations; one of said injection cores disposed above that portion of said rotating platen which is in line with said stopping position of said neck molds so that said one of said injection cores can pass through one of said neck molds before it is inserted into said inner molding station;

means for simultaneously moving said injection cores into and out of said inner and outer molding stations, so that one of said injection cores having an inner layer preform previously molded thereon at said outer molding station is passed through one of said neck molds disposed at said inner molding station and into said inner molding station to simultaneously mold an outer layer preform and an integral neck onto said inner layer preform, while the other of said injection cores is simultaneously being inserted into the outer molding station to mold another inner layer preform thereon, which will then be withdrawn from said outer molding station, and rotated to a position above said inner molding station, for insertion through a next one of said neck molds and into said inner molding station.

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**4,744,743**

## MEANS FOR PRESSURE AND QUANTITY CONTROL OF THE HYDRAULIC DRIVES OF AN INJECTION MOULDING MACHINE

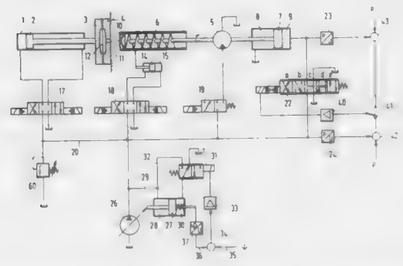
**Reiner Püschel, Lohr-Steinbach, Fed. Rep. of Germany, and Karl Krieger, Gallneukirchen, Austria, assignors to Mannesmann Rexroth GmbH, Fed. Rep. of Germany**

**Filed Oct. 17, 1986, Ser. No. 920,583**

**Claims priority, application Fed. Rep. of Germany, Oct. 21, 1985, 3537423**

**Int. Cl.⁴ B29C *45/77, 45/80***

**U.S. Cl. 425—145** **10 Claims**



1. Means for pressure and quantity control of hydraulic drives in an injection moulding machine, said machine consisting of an injection cylinder, a clamping cylinder, and a plasticizing motor, said control means comprising respective directional valves controlling a communication of said cylinder and said motor with the output line of a variable displacement pump and a tank, a quantity control for setting the displacement of said variable displacement pump in response to a command variable and a pressure control for setting the pressure in said output line in response to a command quantity defining the pressure, characterized in that said variable displacement pump has only a quantity control, pressure control being effected by operating a one directional valve in said output line to the tank via a regulatable throttle governing the pressure.

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**4,744,744**

## EXTRUSION NOZZLE FOR COAGULATION OF POLYMER LATICES

**Teruhiko Sugimori; Noriyuki Tajiri; Akio Hironaka, and Hideaki Habara, all of Ohtake, Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan**

**Filed Mar. 22, 1984, Ser. No. 592,365**

**Claims priority, application Japan, Mar. 22, 1983, 58-47523; Mar. 23, 1983, 58-48447**

**Int. Cl.⁴ B29C *47/30***

**U.S. Cl. 425—464** **14 Claims**

1. An extrusion nozzle assembly for coagulating a polymer latex, said assembly comprising:

(a) a base plate;

(b) fine tubes which satisfy simultaneously the following conditions (i)–(iii):

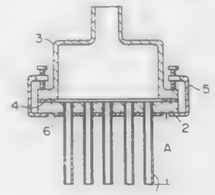
(i) said fine tubes have a circular section inner diameter D which is constant over the entirety of a length L of the fine tubes and not less than 0.5 mm,

(ii) a ratio L/D of the fine tubes is 5–200, and

(iii) said fine tubes have a circular section outer diameter which is constant over the entirety of said length L; and

(c) a holder,

wherein said base plate, said fine tubes and said holder are constructed so that said fine tubes are fixed to the base plate in such a manner that said fine tubes are mutually spaced by at least 3 mm and no more than 10 mm, the fine



tubes protrude from the base plate in a direction opposite said holder by at least 10 mm, and the base plate and the holder define a chamber portion for distribution of the polymer latex to the fine tubes at a uniform pressure.

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**4,744,745**

## VARIABLE CONTOUR RUBBER EXTRUDER

**Jumei Harada; Takashi Yokoi, both of Tokyo, and Keiji Yamamoto, Kuroiso, all of Japan, assignors to Bridgestone Corporation, Tokyo, Japan**

**Filed May 14, 1986, Ser. No. 862,948**

**Claims priority, application Japan, May 14, 1985, 60-100395**

**The portion of the term of this patent subsequent to Mar. 18, 2003, has been disclaimed.**

**Int. Cl.⁴ B29C *47/32***

**U.S. Cl. 425—466** **5 Claims**



1. A variable contour rubber extruder comprising a rotary driving roller, a main body forming therein an eccentric arc chamber with said rotary driving roller, a movable mouth piece forming with a barrel surface of said rotary driving roller an opening of variable sectional area for extruding rubber material, said eccentric arc chamber of said main body constructed such that with said rubber material being supplied with the same rubber material commensurate with amounts of the material extruded from said mouth piece, pressure gradients at the mouth piece in extruding the rubber material having thicknesses of 1–5 mm are within a qualrilateral area having four corners, said corners corresponding to pressure gradients 65 and 150 (kg/cm$^3$) at the mouth piece for extruding 1 mm thickness rubber and pressure gradients 11 and 23 (kg/cm$^3$) at the mouth piece for extruding 5 mm thickness rubber in a graph having an ordinate in logarithm showing the pressure gradients and an abscissa in logarithm showing thicknesses (mm) of extruded rubber.

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**4,744,746**

## INJECTION MOLDING APPARATUS

**Bryce C. Granger, Ravenna, Ohio, assignor to McNeil-Akron, Inc., Akron, Ohio**

**Filed Sep. 30, 1986, Ser. No. 913,718**

**Int. Cl.⁴ B29B *11/06***

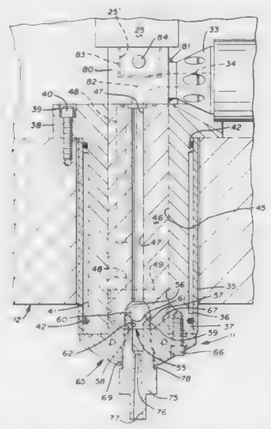
**U.S. Cl. 425—563** **18 Claims**

1. Injection molding apparatus for processing and transferring molding material from a feed mechanism to a nozzle for

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discharging into a mold comprising, bolster means, injection head means extending through said bolster means, injection barrel means in said injection head means for containing a predetermined sized shot of the molding material, plunger means movable in said injection barrel means for discharging the shot of molding material into the mold, bore means extending longitudinally within said plunger means for loading molding material into said barrel means, feed means communicating



with and supplying molding material to said bore means at the end of said plunger means opposite the nozzle, said feed means being an elongate body disposed substantially perpendicular to the direction of movement of said plunger means, and valve means closing said bore means upon movement of said plunger means in one direction for discharging the shot of molding material and opening said bore means upon movement of said plunger means in the other direction for charging said barrel means with a predetermined shot of molding material.

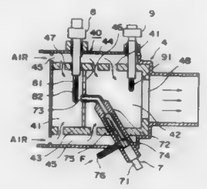
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**4,744,747**

**HEATER CONTROLLER**

**Hideo Kawamura, Kanagawa; Keiichi Yamashita, and Yukio Yoshida, both of Yokohama, all of Japan, assignors to Isuzu Motors Limited, Tokyo, Japan**

**Filed Dec. 23, 1986, Ser. No. 945,865**
**Claims priority, application Japan, Dec. 23, 1985, 60-290123**
**Int. Cl.[4] F23N** *1/00*
**U.S. Cl. 431—36** **5 Claims**



1. A controller for controlling a heater including a burner having an atomizing glow plug for heating and atomizing fuel and an igniting glow plug for igniting the fuel which has been heated and atomized by the atomizing glow plug, said controller comprising:

a first switch for supplying electric power to said atomizing glow plug and said igniting glow plug which are connected in parallel with each other;

a second switch connected in parallel with said first switch and in series with a resistor for producing a voltage drop there across;

a combustion sensor for sensing temperature inside said burner; and

means for closing said first switch and, upon elapse of a predetermined period of time, opening said first switch and closing said second switch, and for cutting off supply of electric power to said atomizing glow plug and said igniting glow plug when the temperature inside said burner sensed by said combustion sensor has reached a predetermined value.

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**4,744,748**

**MULTIPLE BURNER TORCH TIP**

**Clifford D. Raines, San Antonio, Tex., and Claudio P. Negro, Lynn, Mass., assignors to Wingaersheek Division of Victor Equipment Company, Danvers, Mass.**

**Filed Oct. 2, 1986, Ser. No. 914,636**
**Int. Cl.[4] F23D** *15/02*
**U.S. Cl. 431—353** **20 Claims**



1. A multiple burner torch tip comprising:

a mixing chamber including means for introducing thereto a fuel and an oxidizer so as to produce a combustible gas mixture, said mixing chamber including a downstream mixing chamber outlet,

a plurality of combustion chambers, each of said combustion chambers including a combustion chamber inlet and a combustion chamber outlet,

each of said combustion chambers located substantially adjacent at least two other combustion chambers so as to enhance mixing of fluid flowing therethrough,

a plurality of flameholders, each of said flameholders being positioned between said mixing chamber and respective combustion chamber inlet,

each of said flameholders having means thereon for imparting a swirling motion to a combustible gas mixture passing through said mixing chamber and said flameholders and

further including means thereon for producing eddying of said mixture so as to enhance flameholding and ensure more complete combustion.

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**4,744,749**

**PIPES HAVING ORIENTABLE NIPPLES FOR FURNACES FOR FIRING CARBONACEOUS BLOCKS**

**Christian Dreyer, St. Jean de Maurienne, and Bernard Boffa, Lannemezan, both of France, assignors to Aluminium Pechiney, Paris, France**

**Filed Jun. 10, 1987, Ser. No. 60,258**
**Claims priority, application France, Jun. 17, 1986, 86 08988**
**Int. Cl.[4] F27B** *9/00*
**U.S. Cl. 432—121** **12 Claims**

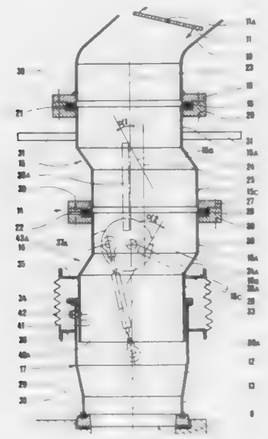
1. In a suction or blowing pipe for a furnace having partitioned chambers intended for the firing of carbonaceous blocks, said pipe comprising a main body (3) provided with a plurality of nozzles (10) to which tubular nipples (2) are connected in a number equal to the number of partitions (5) forming the chambers of the furnace, each said nipple being connected to a transverse furnace wall (9) or partition (5) by a taphole (8) disposed in the upper part of the wall or partition, the improvement comprising forming each nipple by at least two tubular elements disposed in series,

a first element (15) provided in its upper part (15A) with a first flat flange (18), adapted to cooperate in jointed relationship and in respect of rotation with a flat flange (19) located in the lower part of a nozzle (10), and in its lower



part (15C) with a second flat flange (27) which is parallel to the first flat flange (18), and

a second element (16) provided in its upper part (16A) with a third flat flange (26), which cooperates in jointed relationship and in respect of rotation with said second flat flange (27),



said first and second elements having over at least a part of their height an axis inclined by an angle $\alpha$ with respect to the axis (23) which is perpendicular to the plane of the flanges,

whereby a sealed joint is produced between each nipple and its corresponding taphole by alignment along the long and short axes of the furnace despite deformation of the chambers.

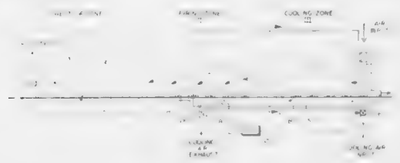
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**4,744,750**

**TUNNEL KILN SYSTEM FOR COOLING THE UNDERSIDE OF A TRAIN OF KILN CARS**

**Hans Lingl, Jr., An der Schiessmauer 46, D-7910 Neu-Ulm, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 930,924, Nov. 17, 1986, Pat. No. 4,722,682. This application Feb. 6, 1987, Ser. No. 11,948**
**Claims priority, application Fed. Rep. of Germany, Feb. 13, 1986, 3604501**
**The portion of the term of this patent subsequent to Feb. 2, 2005, has been disclaimed.**
**Int. Cl.[4] F27B** *9/26*
**U.S. Cl. 432—137** **16 Claims**



1. A system for cooling the underside of kiln cars located in a tunnel kiln, said system comprising:

a plurality of kiln cars;

a tunnel kiln including a heat-up zone, a firing zone and a cooling zone and having elongated bottom, side and top structures defining an elongated tunnel through which said kiln cars may be passed in train formation;

said kiln cars including a deck portion on which uncured articles may be stacked for kiln curing and which deck portion passes in close proximity to said side structures so as to define an upper kiln firing tunnel channel thereabove and a lower tunnel chamber therebelow;

said lower tunnel chanber in at least said heat-up zone being divided transversely into plural sub-chambers by transversely situated dividers; wherein

a portion of said tunnel kiln, subjacent to said lower tunnel chambers in at least said cooling zone also defines a depressed undercar channel; and wherein said system further comprises,

cooling means disposed to transfer heat from said depressed undercar channel.

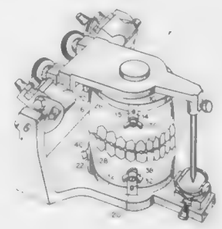
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**4,744,751**

**REMOVEABLE FIXTURE FOR DENTAL ARTICULATORS**

**Arthur M. Finkelstein, and Reuben W. Finkelstein, both of 2170 Brigham St., Brooklyn, N.Y. 11229**

**Filed Jan. 31, 1986, Ser. No. 825,016**
**Int. Cl.[4] A61C** *11/00*
**U.S. Cl. 433—60** **14 Claims**



1. An apparatus for reproducibly mounting and adjusting the position of a pair of dental casts upon a dental articulator which comprises removable upper and lower fixtures, each fixture comprising:

a support plate;

means for attaching said support plate to a dental articulator;

a plurality of bracket means attached to and spaced along the periphery of said support plate, said bracket means each including a plurality of apertures for engaging cast retaining means;

a plurality of cast retaining means each adjustable to engage and penetrate a portion of said dental casts, said cast retaining means including adjustable means for contacting said dental casts to provide a limited predetermined depth of penetration thereof, whereby said dental casts may be reproducibly positioned upon said support plate by adjusting and advancing said cast retaining means to penetrate said dental casts to said predetermined depth; and

registration means for orienting said support plate within said articulator, said registration means located on the bottom of said support plate;

said lower fixture further comprising means for adjusting the vertical position of its support plate with respect to the articulator.

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**4,744,752**

**DENTAL HANDPIECE CONTROL DEVICE**

**Shozo Nakayama; Hiroo Watanabe; Toshiki Tawa, all of Kyoto; Shusuke Hashimoto, Osaka; Katsumi Suzuki, and Teruji Nakai, both of Kyoto, all of Japan, assignors to Kabushiki Kaisha Morita Seisakusho, Kyoto, Japan**

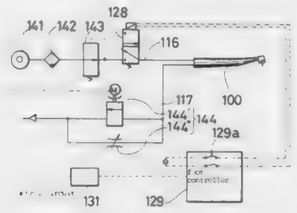
**Filed Jul. 26, 1985, Ser. No. 759,606**
**Claims priority, application Japan, Jul. 30, 1984, 59-160742; Jul. 30, 1984, 59-160743; Sep. 18, 1984, 59-141303[U]; Sep. 18, 1984, 59-141304[U]**
**Int. Cl.[4] A61C** *1/02*
**U.S. Cl. 433—100** **17 Claims**

1. A control device for use in a handpiece comprising an air

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turbine which is integrated with a spindle supporting a cutting tool and is rotatably supported in a head housing via pneumatic bearings, an air supply passage which supplies compressed air to said air turbine, and a non-bleeding exhaust passage which discharges air spent to drive said air turbine, said control device being characterized in that said control device comprises a flowrate regulating device disposed in said exhaust passage to change the back pressure of said air turbine, said air supply passage comprises a three-port, two position selection valve to




open and close said air supply passage for releasing residual compressed air by controlling said air supply passage and a timer circuit for controlling said three-port, two position selection valve and said exhaust passage comprises a valve for opening and closing said exhaust passage, and a control circuit which opens said air supply passage during a specified time between completion of turbine stop operation and actual stopping of said turbine, closes said three-port, two position selection valve after said specified time has passed, and close said exhaust passage when stop operation begins.

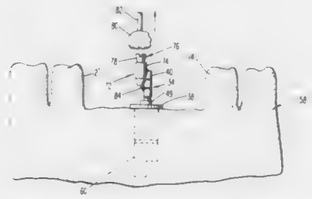
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**4,744,753**

**METHODS FOR FORMING DENTAL PROSTHESIS**

**Stanley E. Ross, Boca Raton, Fla., assignor to Ross Systems Corporation, Palm Beach, Fla.**

**Filed Oct. 20, 1986, Ser. No. 920,781**
**Int. Cl.[4] A61C** *8/00*
**U.S. Cl. 433—173** **21 Claims**



1. A method of forming a dental prosthesis comprising the steps of:

attaching an internally threaded sleeve to a post,

applying a dimensionally stable, heat-meltable material to said post and around said sleeve without covering an open end of said sleeve with said heat-meltable material, and

melting said heat-meltable material and replacing same with a permanent material such that said open end of said sleeve remains uncovered by said permanent material.

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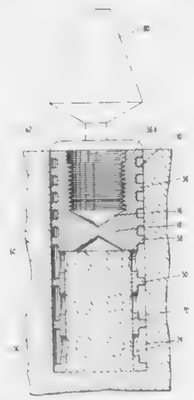
**4,744,754**

**DENTAL IMPLANT AND METHOD FOR INSTALLING SAME INTO BONE TISSUE**

**Stanley E. Ross, Boca Raton, Fla., assignor to Ross Systems Corporation, Palm Beach, Fla.**

**Filed Aug. 13, 1986, Ser. No. 896,101**
**Int. Cl.[4] A61C** *8/00*
**U.S. Cl. 433—173** **4 Claims**

1. A dental implant adapted to be installed in a predrilled bore formed in jaw bone tissue for retaining a dental prosthesis, said implant comprising a generally cylindrical body defining a longitudinal axis, said body being open at a front end thereof and including a cylindrical front cavity communicating with said open front end for receiving a cylindrical bone core, said front cavity being surrounded by a front portion of said body, said front portion including a plurality of circumferentially and radially spaced through-holes extending radially completely therethrough to accommodate the growth of bone tissue therethrough, said body being open at a rear end thereof and including an internally threaded cylindrical rear cavity which communicates with said open rear end and adapts said rear cavity to receive externally threaded prosthesis-attachment means,



said rear cavity being surrounded by a rear portion of said body, said rear portion being non-apertured, said front and rear portions of said body including front and rear outer peripheries, respectively, each of said front and rear outer peripheries including a plurality of longitudinally spaced, circumferentially extending ribs, each rib lying in a plane extending transversely to said longitudinal axis, at least some of said ribs on said front outer periphery being disposed longitudinally between longitudinally spaced ones of said through-holes, said ribs on said front and rear outer peripheries including outer surfaces which are of the same diameter and define a maximum outer diameter of said implant.

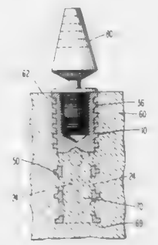
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**4,744,755**

**DENTAL IMPLANT AND METHOD FOR INSTALLING SAME**

**Stanley E. Ross, Boca Raton, Fla., assignor to Ross Systems Corporation, Palm Beach, Fla.**

**Filed Aug. 13, 1986, Ser. No. 896,524**
**Int. Cl.[4] A61C** *8/00*
**U.S. Cl. 433—173** **13 Claims**



1. A dental implant adapted to be installed in a predrilled bore formed in jaw bone tissue for retaining a dental prosthesis,



said implant comprising a generally cylindrical body defining a longitudinal axis, said body being open at a front end thereof and including a cylindrical front cavity communicating with said open front end for receiving a cylindrical bone core, said front cavity being surrounded by a front portion of said body, said front portion including a plurality of circumferentially and radially spaced through-holes extending radially completely therethrough to accommodate the growth of bone tissue therethrough, said body being open at a rear end thereof and including an internally threaded cylindrical rear cavity which communicates with said open rear end and adapts said rear cavity to receive externally threaded prosthesis-attachment means, said rear cavity being surrounded by a rear portion of said body, said rear portion being non-apertured, said front and rear portions of said body including front and rear outer peripheries, respectively, each of which including a plurality of outwardly projecting longitudinally spaced, circumferentially extending ribs, each rib lying in a plane extending transversely to said longitudinal axis, at least some of said ribs on said rear outer periphery surrounding said rear cavity, said ribs on said front and rear outer peripheries including outer surfaces of the same diameter to define a maximum outer diameter of said implant, at least some of said ribs including a front surface facing toward said front end and a rear surface facing toward said rear end, at least one of said front and rear surfaces being offset longitudinally relative to said outer periphery of said rib in a direction away from the respective implant end toward which said one surface faces in order to define an annular reservoir adapted to store blood adjacent to surrounding bone tissue.

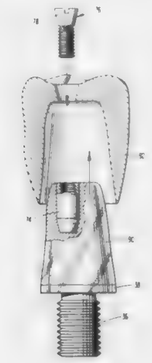
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**4,744,756**

**APPARATUS FOR FORMING DENTAL PROSTHESIS**

**Stanley E. Ross, Boca Raton, Fla., assignor to Ross Systems Corporation, Palm Beach, Fla.**

**Filed Oct. 20, 1986, Ser. No. 920,796**
**Int. Cl.[4] A61C** *8/00*
**U.S. Cl. 433—173** **17 Claims**



1. A combination of a dental anchor securable within a patient's jaw and a dental prosthesis mountable within said anchor,

said anchor formed of a biocompatible material and configured as a circular cylindrical sleeve for installation in a circular cylindrical hole in a patient's jaw bone, an internally threaded opening formed at a circular end of said anchor and arranged to open into the patient's mouth,

said dental prosthesis comprising a pin and a dental body disposed on said pin, said pin being of one piece construction comprising:

a circular flange having first and second sides, and a straight cylindrical outer periphery, the diameter of said periphery being equal to that of said circular end of said anchor,

an externally threaded stem projecting integrally from said first side of said flange and threadedly receivable in said threaded hole of said anchor, said stem being of smaller width than said flange, and

a post projecting integrally from said second side of said flange and including a portion of non-circular cross-section and longitudinally irregular profile, said post being of less width than said flange, such that a portion of said second side of said flange disposed between an outer periphery of said flange forms a shelf,

said dental body being case in situ on said post and said shelf.

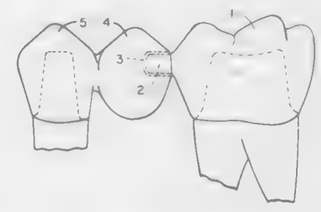
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**4,744,757**

**FIXED PARTIAL DENTURES AND METHOD OF MAKING**

**Peter J. Adair, Boston, Mass.; Vincent T. Cammarato, Milford, Del., and David G. Grossman, Corning, N.Y., assignors to Corning Glass Works, Corning, N.Y.**

**Filed Mar. 20, 1985, Ser. No. 713,837**
**Int. Cl.[4] A61C** *13/12*
**U.S. Cl. 433—180** **20 Claims**



1. Fixed partial dentures consisting of abutment crowns and pontics connected through male/female attachments fixedly-joined into unitary structures, said female portions of said attachments having a location within the pontics of said dentures, and said male portions being integral with said crowns and having a length extending up to the entire mesial-distal length of the pontics of said dentures, said crowns and pontics being fixedly joined together by means of a joining medium selected from the group consisting of a time-setting material, a material curable through exposure to ultraviolet radiation, a material curable through exposure to visible light radiation, and a combination thereof.

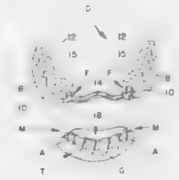
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**4,744,758**

**PARTIAL DENTURE ATTACHMENT APPLIANCE**

**John W. Harrison, R.D. #2 Stoltz Rd., Saegertown, Pa. 16433, and John H. Tucker, 809 W. 26th St., Erie, Pa. 16508**

**Continuation-in-part of Ser. No. 710,478, Mar. 11, 1985, Pat. No. 4,661,068. This application Apr. 24, 1987, Ser. No. 41,933**
**Int. Cl.[4] A61C** *13/22*
**U.S. Cl. 433—181** **20 Claims**



1. A method for constructing and applying at least one non-clasp retained, removable partial denture without crowns comprising the steps of:

(a) modifying the enamel about the posterior surface of a retaining abutment tooth to create a flat broad surface adjacent the occlusal surface thereof for placement of a

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spherical metal male retainer having a flat base surface thereagainst;
(b) preparing a cast from a full arch impression of the jaw receiving said denture after modifying said abutment tooth;
(c) providing a guideplane pattern having a flat, vertically-extending abutment plate portion and a connector sphere spaced slightly from one end of said abutment plate portion and extending outwardly therefrom;
(d) surveying and positioning said guideplane pattern with said sphere centered over the crest of the jawbone ridge, said abutment plate portion extending generally normal to said ridge, said sphere spaced away from the occlusal surface of said abutment tooth and closely adjacent the tissue of said jawbone;
(e) forming said male retainer out of metal from said guideplane pattern by the use of the lost wax process and the like;
(f) etching said male retainer;
(g) bonding said vertically-extending base surface of said male retainer to the enamel of said posterior surface of said abutment tooth in an area adjacent the occlusal surface of said abutment tooth by means of an adhesive resin;
(h) providing a metal female retainer member having a blind vertically-extending opening from the bottom thereof, a resiliant insert having a cylindrical opening extending therethrough, said insert within said blind opening, said insert and said female retainer having a vertically-extending groove communicating with said openings;
(i) forming a removable denture;
(j) securing said female retainer within the anterior pontic of said denture;
(k) seating said denture by positioning said connector sphere within said groove of said plastic insert.

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**4,744,759**
## INSERTS FOR COMPOSITE DENTAL RESTORATIONS
**Rafael L. Bowen, Gaithersburg, Md., assignor to American Dental Association Health Foundation, Washington, D.C.**
**Filed May 13, 1986, Ser. No. 862,706**
**Int. Cl.[4] A61C *5/04*; A61K *6/02***
**U.S. Cl. 433—228.1** **29 Claims**

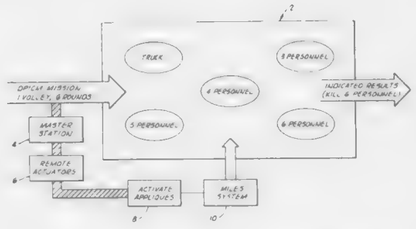
1. A method of making an object suitable for use as an insert in a composite dental restoration comprising
(a) preparing a mix consisting of silicon dioxide and at least one other oxide selected from the group consisting of aluminum oxide, boron oxide, strontium oxide, calcium oxide, zinc oxide, tin oxide, titanium oxide, niobium oxide, magnesium oxide, zirconium oxide, tantalum oxide and tungsten oxide, so as to provide for an x-ray opacity and visual opacity substantially within the range of human dentin an enamel upon treatment as specified hereinafter;
(b) heating the mix to form a liquid or slurry;
(c) mixing the liquid or slurry to homogenize it;
(d) quenching the liquid or slurry to form cooled objects in assorted sizes and shapes, each of said objects being sized and shaped to fill a typical dental cavity as nearly as possible with a single object;
(e) heat treating the quenched objects to obtain objects having a visual opacity substantially within the range of human dentin and enamel, and separate internal phases;
(f) etching the objects by treating them with one or more solutions comprising a base or NaF, KF, $NH_4HF_2$ or $NH_4F$ to remove the surface layer and provide an object of rough-textured surface with increased area; and
(g) applying an adhesion-promoting compound to the objects to form an insert.

**4,744,760**
## COLLOIDAL SIZED METAL-POLYSACCHARIDE PARTICLES
**Robert S. Molday, Vancouver, Canada, assignor to University of British Columbia, Vancouver, Canada**
**Filed Jan. 14, 1985, Ser. No. 691,508**
**Claims priority, application Canada, Apr. 24, 1984, 452605**
**Int. Cl.[4] G01N *1/00, 25/00, 31/00***
**U.S. Cl. 424—3** **22 Claims**

1. Colloidal sized particles each comprising a metal particle selected from the group consisting of gold, platinum and silver, coated with a derivative of a water-soluble compound which is polyethylene glycol or a water soluble polysaccharide having a molecular weight of between about 5,000 to 70,000, which derivative when not coating the metal particle has a plurality of pendant functional groups each containing a nitrogen atom which is positively charged in aqueous solution.

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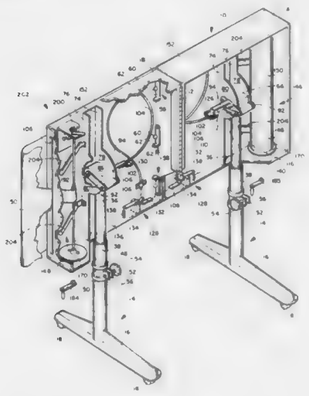
**4,744,761**
## REMOTE ACTUATION SYSTEM
**Stephen Doerfel, Meers; Anthony G. Pokorny, and Howard H. Rubin, both of Lawton, all of Okla., assignors to L B & M Associates, Inc., Lawton, Okla.**
**Division of Ser. No. 753,668, Jul. 9, 1985, Pat. No. 4,682,953.**
**This application May 6, 1987, Ser. No. 47,293**
**Int. Cl.[4] F41G *1/00***
**U.S. Cl. 434—16** **8 Claims**




1. A portable indicator apparatus for detecting when an object at a target area has been hit by replicated indirect ammunition fire, comprising:
radio frequency receiver means, attachable to the object, for receiving a plurality of radio frequency actuating signals;
decoder means for determining whether the object has been hit when the radio frequency actuating signals are received by said radio frequency receiver means, said decoder means including:
logic circuit means, connected to said radio frequency receiver means, for programming said apparatus with a plurality of probabilities for a predetermined type of object being hit, wherein each of the probabilities is assigned to a respective type of replicated indirect ammunition fire, so that in response to radio frequency actuating signals received by said receiver means and encoded to designate at least one type of replicated indirect ammunition fire said logic circuit means determines whether the object has been hit by the encoded type of replicated indirect ammunition fire; and
means, responsive to said decoder means, for signifying when the object has been hit by the replicated indirect ammunition fire.



**4,744,762**
## COLLAPSIBLE WRITING BOARD DEVICE
**Nicholas P. Konsuvo, 6330 Genesse, San Diego, Calif. 92112**
**Filed Mar. 27, 1987, Ser. No. 31,036**
**Int. Cl.[4] B43L *1/00***
**U.S. Cl. 434—412** **15 Claims**

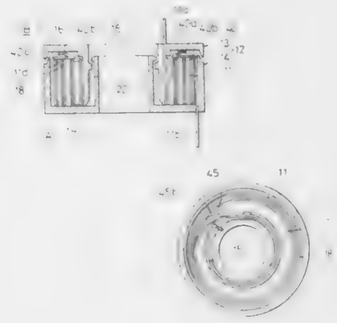


1. A combined black board and easel device comprising:
first and second writing surfaces;
a hinge means interconnecting said writing surfaces along one edge thereof, said hinge means allows said writing surfaces to pivot between a stowed back to back position and an end to end use position;
writing surface locking means for locking said writing surfaces in said use position;
a pair of writing surface support means, one of which is pivotaly attached to each of said writing surfaces, said writing surface support means are length adjustable;
length locking means on each of said pair of writing surface support means for locking said writing surface support means at a selected length;
pivot means for pivoting said writing surfaces relative to said writing said surface support means; and
pivotal locking means for locking said pivot means at a selected angle between said writing surface and support means.

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**4,744,763**
## CONNECTOR DEVICE FOR A TRANSMISSION LINE CONNECTING TWO RELATIVELY ROTATING MEMBERS
**Hironori Suzuki, Tokyo; Jiro Kakimoto, Yokohama, and Masahiro Shibata, Hiratsuka, all of Japan, assignors to Furukawa Electric Co., Ltd., Japan**
**Filed Apr. 7, 1987, Ser. No. 35,499**
**Claims priority, application Japan, Apr. 15, 1986, 61-55466[U]; Apr. 16, 1986, 61-56102[U]**
**Int. Cl.[4] H01R *39/00***
**U.S. Cl. 439—15** **15 Claims**

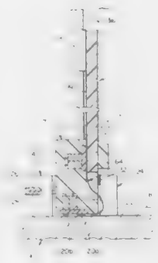
1. A connector device, comprising:
a belt-shaped transmission line coiled in the shape of a convolution, said coiled transmission line having side edges;
housing means containing said coiled transmission line, said housing means including a stationary housing portion attached to a fixed member and a movable housing portion attached to a movable member, said stationary housing portion being fixedly coupled to one end portion of said transmission line and having a first flange portion facing one side edge of said coiled transmission line, and said movable housing portion being fixedly coupled to another end portion of said transmission line and having a second flange portion facing the other side edge of said coiled transmission line, so that said movable housing portion can make a plurality of revolutions relative to said stationary housing portion;
a space being defined between at least one of said side edges of said coiled transmission line and its respective facing flange portion; and



vibration restraining means disposed in at least one of said spaces and including at least one resilient member for applying a resilient restraining force between at least one of said first and second flange portions and its associated side edge of said coiled transmission line.

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**4,744,764**
## CONNECTOR ARRANGEMENT
**Leon Rubenstein, Natick, Mass., assignor to Rogers Corporation, Rogers, Conn.**
**Filed May 27, 1986, Ser. No. 867,473**
**Int. Cl.[4] H01R *9/09***
**U.S. Cl. 439—62** **20 Claims**



1. A connector system for electrically connecting flexible circuit contacts carried by a daughter printed circuit board with fixed contacts carried by a mother printed circuit board, said flexible circuit contacts being connected to flexible circuit structure that serves as a connector to circuits on the daughter board, and said flexible circuit contacts being arranged adjacent an edge of said daughter board,
said system including guides on said mother board for enabling said daughter board to slide in guided, edge-wise direction toward the face of said mother board, with said flexible circuit contacts in registry with said fixed contacts on said mother board, and driven cam/locking means carried by said mother board and engaging mating structure on said daughter board to press said edge of said

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daughter board tightly toward said face of said mother board in locking motion while camming said daughter board bodily laterally over the surface of said mother board whereby said contacts wipe upon one another as they move into locked position.

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**4,744,765**
**HIGH VOLTAGE GROUND STUD**
**John DeLeo, 107 Sun Valley Dr., Southington, Conn. 06489, assignor to John DeLeo, Southington, Conn.**
**Filed Jun. 19, 1987, Ser. No. 63,974**
**Int. Cl.[4] H01R** *4/66, 4/70*
**U.S. Cl. 439—92** **2 Claims**



1. A ground stud assembly for high voltage apparatus comprising in combination:

a ground stud consisting of an elongated metal cylinder, threaded at both ends and including a raised hex skirt for accommodating an attachment tool;

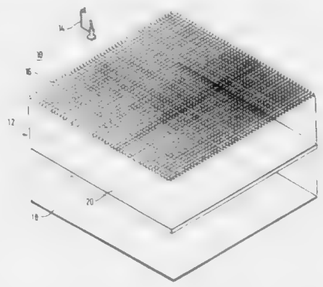
an insulative plastic case consisting of a cylindrical case member having a first internal slot receiving said cylinder, a second internal slot receiving said hex skirt and internal threads receiving one of said threaded ends; and

an insulative plastic cap consisting of a cylindrical cap member having an internal slot receiving a hex nut joining said ground stud to a high voltage terminal bus and internal threads receiving another of said threaded ends, and an eyelet formed within an exterior surface of said cylindrical case member for accommodating a hotstick, said case and cap comprising thermoplastic resin, said cap member internal threads extending a longer distance along said elongated cylinder than said case member internal threads.

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**4,744,766**
**LOW VOLTAGE ELECTRICAL DISTRIBUTION SYSTEM**
**Stephen Hall; David S. B. Clarke, both of London, and Michael D. Thompson, Little Hellingbury, all of England, assignors to Light Source Electrical Equipment Limited, Great Britain**
**Filed Jan. 29, 1987, Ser. No. 8,697**
**Claims priority, application United Kingdom, Jan. 29, 1986, 8602201**
**Int. Cl.[4] H01R** *13/60*
**U.S. Cl. 439—110** **25 Claims**

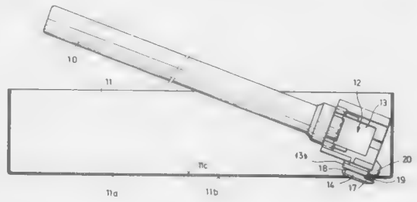
1. A low voltage electrical distribution system comprising a distribution bus and a jack plug, the jack plug having an electrical contact assembly, the distribution bus comprising two electrodes supplied or adapted to be supplied with low voltage electricity therebetween, at least one of the electrodes being in the form of a sheet having a substantial number of pre-perforated hole means for receiving the contact assembly of the jack plug, said hole means enabling the contact assembly of the jack plug to be plugged into the distribution bus at selected alternate positions to make electrical contact with both electrodes, and means on the jack plug and coacting with hole means other than the hole means which receive said contact



assembly for the purpose of securing said jack plug to said distribution bus.

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**4,744,767**
**SWINGABLE SOCKET FOR LAMPS**
**Dieter Henrici, and Alfred Bothe, both of Arnsberg, Fed. Rep. of Germany, assignors to Brokelmann, Jaeger & Busse GmbH & Co., Arnsberg, Fed. Rep. of Germany**
**Continuation of Ser. No. 814,111, Dec. 27, 1985, abandoned. This application May 18, 1987, Ser. No. 52,134**
**Claims priority, application Fed. Rep. of Germany, Jan. 9, 1985, 3500453**
**Int. Cl.[4] H01R** *33/08*
**U.S. Cl. 439—226** **2 Claims**



1. A light fixture for a tube lamp having an axis and a connecting base at one axial end of said lamp, said fixture comprising:

an elongated holder open at one side and having a wall on an opposite side, said wall being provided with a throughgoing rectangular opening at one end of said holder;

a socket adapted to receive said base mounted in said holder at said one end thereof;

a pivot hook formed on said socket adapted to reach through said opening from the interior of said holder to a rear side of said wall thereby said socket and said lamp are swingable about an axis perpendicular to said lamp axis relative to said holder between a position wherein said lamp axis lies substantially parallel to said wall and a position wherein said tube axis is inclined away from said wall toward said open side of said holder, said hook having a body receivable in said opening, a projection extending from said body away from said lamp, and at a free end of said projection a pin extending perpendicular to said projection and adapted to reach from behind through a respective hole formed in said wall and spaced from said opening when said socket and said lamp are displaced into said position wherein said lamp axis lies substantially parallel to said wall;

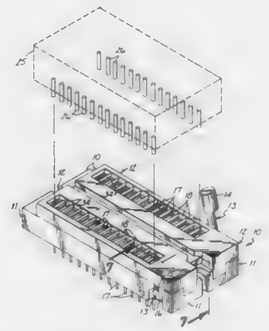
a resilient catch on said body on a side thereof opposite that at which said projection extends for releasable engagement with said wall in said position of said socket wherein said lamp axis lies substantially parallel to said wall; and

an abutment on said socket directly juxtaposed with said pin for engagement with said wall in said position of said socket wherein said lamp axis is inclined away from said wall toward said open side of said holder to yieldably retain said socket in said inclined position for replacement of said tube lamp, said pin defining a gap with said abutment which is at most substantially equal to the thickness of said wall.



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**4,744,768**
**COUPLING CONNECTOR**
**Juan P. Rios, Phoenix, Ariz., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**
**Filed Feb. 10, 1987, Ser. No. 12,849**
**Int. Cl.[4] H01R** *13/629*
**U.S. Cl. 439—262** **30 Claims**



1. A coupling connector for electrically interconnecting electrical devices, having device electrical terminals extending therefrom, to other means containing electrical circuit portions, said coupling connector being capable of accepting said device electrical terminals being inserted in terminal reception openings thereof, and of selectively permitting application of a retaining force against said device electrical terminals thereby tending to retain same against removal and to improve conductive contact therewith, said coupling connector also being capable of selectively permitting termination of said retaining force and release of said device electrical terminals to permit same to be removed, said connector comprising:

base means having a plurality of base contact recesses opening to a base means first surface for receiving a plurality of contact means;

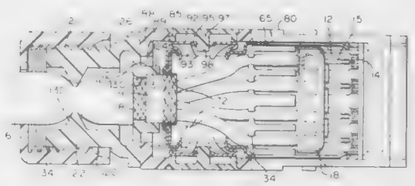
a plurality of contact means each having a pair of opposing contact side members which are normally biased to be adjacent to one another and which can be selectively positioned both relatively apart from one another for receiving a terminal therebetween and adjacent to one another for engaging a said terminal, each of said contact means being located in a corresponding base contact recess but extending past said base means first surface;

contact operation means adjacent said base means first surface such that said contact operation means may move with respect to said base means first surface in a plurality of directions for selectively positioning said contact means side members, said contact operation means being engaged with each of said plurality of contact means such that motion of said contact operation means in a first direction causes said opposing contact side members of each said contact means to move apart, and such that sufficient motion of said contact operation means in a second direction forces these opposing contact side members toward one another; and

actuator means engaged with both said base means and said contact operation means and being capable of selectively causing said contact operation means to move in said first and second directions with respect to said base means first surface.

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**4,744,769**
**CLOSED LOOP CONNECTOR**
**Dimitry G. Grabbe, Middletown, Pa.; Charles W. Herb, Winston-Salem, N.C., and Iosif Korsunsky, Harrisburg, Pa., assignors to AMP Incorporated, Harrisburg, Pa.**
**Continuation of Ser. No. 684,233, Dec. 20, 1984, Pat. No. 4,602,833. This application Jul. 28, 1986, Ser. No. 891,441**
**Int. Cl.[4] H01R** *13/28*
**U.S. Cl. 439—284** **15 Claims**



1. A shielded electrical connector having means interconnectable with individual conductors of a shielded multiconductor electrical cable, the connector comprising a shield means having an opening for receiving the shielded cable therethrough, and a conductive ferrule profiled to be received in said opening, the ferrule being stamped from a flat spring metal blank, and rolled to join opposed plate portions, with opposed side edges adjacent to one another forming an axial seam thereof, the side edges along said seam being beveled relative to a circumferential tangent to which they intersect, the ferrule being profiled for receipt on an outer diameter of a shielded cable braid, the ferrule being resiliently deformable to store energy therein producing an outward radial force against the opening during compression; whereby when the ferrule is placed over the braid and the braid is dressed over the ferrule, the conductors may be inserted through the opening to an internal portion of the housing and the cable may be inserted in the opening with edges of the opening intermediate ends of the ferrule, the stored energy within the ferrule producing a spring loaded electrical connection between the cable braid and the opening.

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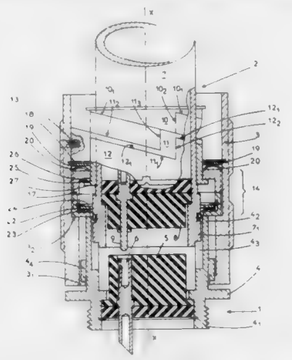
**4,744,770**
**MULTI-PIN ELECTRICAL CONNECTOR**
**Pierre L. M. Drogo, Le Verdier, Dampierre en Burly Ouzouer sur Loire (Loiret), France**
**Filed Sep. 4, 1986, Ser. No. 903,475**
**Claims priority, application France, Sep. 6, 1985, 85 13252**
**Int. Cl.[4] H01R** *13/625*
**U.S. Cl. 439—318** **8 Claims**

1. Multi-pin electrical connector, comprising a socket having a socket body containing a block of electrically insulative material and a plug having a plug body containing a block of electrically insulative material, one of said socket and plug being provided with female pins and the other thereof being provided with male pins, a ring rotatably mounted on said plug body for ensuring relative axial displacement between the ring and plug body when when the ring rotates on the plug body, said ring and said socket body each including ribs arranged for interfitting with one another while permitting rotation of the ring on the socket body, locking means for angularly positioning said ring relative to said plug, in the position where the ring is farthest forward the end of the plug, said locking means being disposed between said ring and said plug body for unlocking by an axial movement relative to the socket body, said socket body being located outside of the plug body and be-

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tween said ring and said plug body, said socket body having a length such that, when the socket and plug are assembled the



socket body acts on the locking means to effect unlocking thereof.

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4,744,771

## FIXING STRUCTURE OF CONTACT TAILS OF ELECTRICAL CONNECTOR

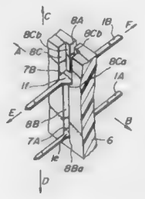
Kanzaburo Uchida, Mooka, Japan, assignor to Daiichi, Denshi, Kogyo, Kabushika, Kaisha, Tokyo, Japan

Filed Apr. 27, 1987, Ser. No. 43,027

Claims priority, application Japan, Apr. 30, 1986, 61-65887[U]

Int. Cl.[4] H01R *13/64, 13/42*

U.S. Cl. 439—374 3 Claims



1. A fixing structure for contact tails of an electrical connector, said contact tails being aligned in rows and provided with holding projections to be press-fitted in a plurality of fixing slits formed in a locator plate of said electrical connector, said slits being in parallel with each other and having an interval equal to the spacing of said contact tails in one of said rows, said slits extending at right angles to said rows, said fixing structure comprising:

a first holding projection for a first said contact tail of one of said rows to be located at a bottom of one of said fixing slits and in the form of a first trapezoid extending perpendicularly to and on both sides of said contact tail;

a second holding projection of a second said contact tail in a second of said rows located closer to an entrance of said one fixing slit than said first holding projection is provided with a second trapezoid wider than said first trapezoid, said second holding projection extending perpendicularly to and on both sides of said second contact tail;

said one firing slit is formed in a T-shaped configuration in cross-section including a common locating slit portion for receiving parts of said first and second contact tails having no holding projections and a press-fixing slit portion for press-fitting said holding projections of said first and second contact tails therein, said press-fixing slit portion including a plurality of slit portion sections formed progressively larger in stepwise manner as they are closer to an entrance of said one slit, said slit portion sections having widths able to receive said holding projections of said contact tails by press-fitting and said holding projections being pushed and fixed to bottoms of said slit portion sections.

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4,744,772

## CONNECTOR FOR FLAT CABLE TERMINATION

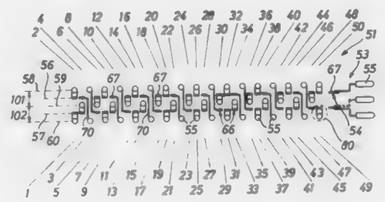
Manfred Reichardt, Weinsberg, and Eberhard Raab, Untereisesheim, both of Fed. Rep. of Germany, assignors to Amphenol Corporation, Wallingford, Conn.

Filed Mar. 6, 1987, Ser. No. 22,900

Claims priority, application Fed. Rep. of Germany, Mar. 6, 1986, 3607409

Int. Cl.[4] H01R *11/20*

U.S. Cl. 439—405 20 Claims



1. A connector having a plug-in or connecting side and a termination side substantially oppositely facing to the plug-in side, said termination side being adapted for flat cable termination, said connector comprising a plurality of contact elements, each of said contact elements comprising a plug-in element on the plug-in side of the connector, insulation displacement means comprising a plurality of insulation displacement contacts on the termination side of the connector and connecting means arranged between and electrically joining said plug-in elements and said insulation displacement contacts, characterized in that said plug-in elements are arranged in the form of three parallel rows on the plug-in side, and said insulation displacement contacts are arranged in two parallel rows on the termination side, the plug-in elements in all said three rows being electrically joined by said connecting means to said insulation displacement contacts in said two rows and said three rows also extending in parallel relationship to said two rows.

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4,744,773

## MULTI-LAYER FLAT CABLE ELECTRICAL CONNECTOR AND ITS TERMINATION METHOD

Mitsuo Nakamura, and Keiji Souma, both of Tokyo, Japan, assignors to Hirose Electric Co., Ltd., Tokyo, Japan

Filed Jul. 20, 1987, Ser. No. 75,740

Claims priority, application Japan, Aug. 8, 1986, 61-186240

Int. Cl.[4] H01R *4/24*

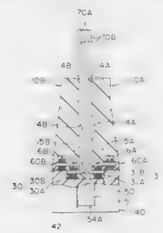
U.S. Cl. 439—418 7 Claims

1. A multi-layer flat cable electrical connector for terminating flat cables in a plurality of layers, which comprises:

a plurality of contacts having a contacting portion for contact with a contact of the mating connector and a press-fit portion for connection with a conductor of said flat cable;

an insulating housing for supporting said contacts so that said press-fit portions may project upward from its top surface in at least a pair of rows;

a cable retainer with a retention channel for holding the end portions of said flat cables laminated one upon another, a plurality of termination grooves for receiving each conductor of said flat cable on either side, and a pluraliry of recesses for receiving said press-fit protions projecting from said housing, said cable retainer adapted to join to



said insulating housing to complete said multi-layer flat cable electrical connector.

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4,744,774

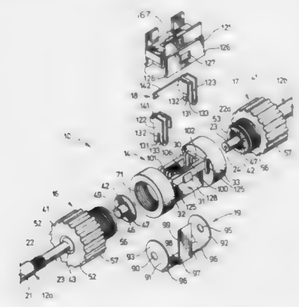
## ELECTRICAL CONNECTOR HAVING CONDUCTIVE SHEATH-CLAMPING MEANS

William V. Pauza, Palmyra, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Jan. 20, 1987, Ser. No. 4,512

Int. Cl.[4] H01R *13/02*

U.S. Cl. 439—225 19 Claims



1. An electrical connector for a cable having a conductive outer sheath surrounding one or more center conductors comprising;

a first clamping member having a first axial passageway, said first clamping member comprising an insulative fitting and a first electrically conductive member mounted on said fitting and having a first substantially radially extending sheath-engaging surface;

a second clamping member having a second axial passageway, said second clamping member comprising an insulative connector housing having center conductor connection means and a second electrically conductive member mounted on said housing and having a second substantially radially extending sheath-engaging surface;

wherein said first and second sheath-engaging surfaces comprises substantially disk-shaped surfaces, and wherein an exposed portion of said conductive sheath is fanned-out substantially radially relative to the axis of said cable for being clamped between said first and second sheath-engaging surfaces;

and wherein at least one of said sheath-engaging surfaces is bowed outwardly toward the other sheath-engaging surface, said bowed surface flattening out upon clamping of said first and second sheath-engaging surfaces, but being capable of recovering through spring action to maintain the conductive sheath firmly clamped notwithstanding slight movement apart of the first and second sheath-engaging surfaces; and

means for attaching said first clamping member to said second clamping member with said first and second passageways substantially aligned with one another for clamping said first and second sheath-engaging surfaces together;

whereby a cable having a conductive outer sheath and one or more center conductors is extended through said first passageway, said conductive outer sheath is clamped between said first and second sheath-engaging surfaces, and said one or more center conductors is extended through said second passageway into said connector housing for connection to said center conductor connection means.

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4,744,775

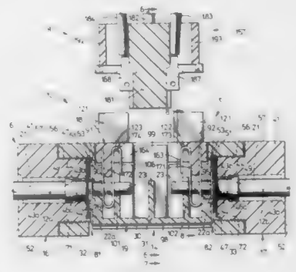
## ELECTRICAL TAP CONNECTOR ASSEMBLY

William V. Pauza, Palmyra, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Feb. 12, 1987, Ser. No. 13,748

Int. Cl.[4] H01R *17/04*

U.S. Cl. 439—607 13 Claims



1. A tap connector for connecting first and second electrical cables, comprising:

a connector housing;

first and second signal-carrying contacts carried by said connector housing and adapted to be connected to signal-carrying conductors of said first and second cables, respectively;

a third grounding contact carried by said housing and adapted to be connected to conductive sheaths of said first and second cables; and

receiving means on said housing for receiving a mating connector, whereby said first, second, and third contacts are engaged by said mating connector when said mating connector is received by said receiving means to provide electrical connection of said first and second signal-carrying contacts and said third grounding contact with said mating connector.

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4,744,776

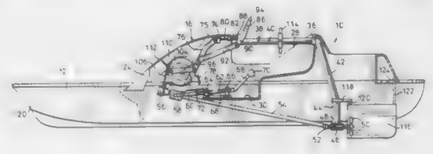
## PEDAL CRAFT

Ronald D. Morrison, 7786 Jasper Avenue, Edmonton, Alberta T5H 3R8, Canada

Filed May 30, 1986, Ser. No. 869,017

Int. Cl.[4] B63H *16/20*

U.S. Cl. 440—29 14 Claims



1. A water craft comprising:

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two parallel, spaced-apart pontoon hulls,
a superstructure bridging between said pontoon hulls,
a propeller,
first means for rotating the propeller to drive the craft,
second means for supporting the propeller between the pontoon hulls, said second means allowing the propeller to shift laterally across the spacing between the pontoon hulls,
rudder means aft of the propeller,
and steering means adapted simultaneously (a) to control the angulation of the rudder means in order to promote turning of the craft in a desired direction, and (b) to shift the lateral position of the propeller toward the pontoon hull which would describe the outside arc for the turning maneuver in said desired direction.

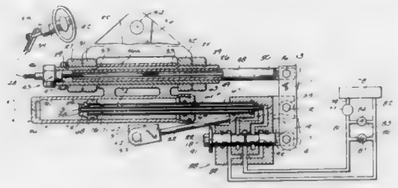
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**4,744,777**

## POWER STEERING SYSTEM FOR MARINE PROPULSION DEVICE

**Arthur R. Ferguson, Northbrook, Ill., assignor to Outboard Marine Corporation, Waukegan, Ill.**

**Filed Mar. 23, 1987, Ser. No. 28,958**
**Int. Cl.[4] B63H** *25/02*
**U.S. Cl. 440—61** **21 Claims**



1. A marine propulsion device comprising a propulsion unit including a propeller adapted to be driven by a power source, mounting means adapted to be mounted on a boat for supporting said propulsion unit for pivotal steering movement around a generally vertical steering axis and including a tilt tube for affording tilting movement of said propulsion unit around a tilt axis substantially transverse to said steering axis, a steering ram within said tilt tube for bi-directional movement relative to said tilt tube and having a projecting end, a power steering cylinder fixed relative to said tilt tube, a piston reciprocable within said power steering cylinder, a piston rod having an inner end connected to said piston and having an outer end extending from said steering cylinder, a spool valve assembly including a first member mounted to said outer end of said piston rod, and a second member reciprocably moveable relative to said first member, an elongate bell crank having a first end pivotally connected to said projecting end of said steering ram, having a second end pivotally connected to said second member and being pivotally connected between said first and second ends to said first member for movement relative to said first member, and linkage means coupled between said outer end of said piston rod and said propulsion unit for pivoting said propulsion unit around said steering axis in response to movement of said piston rod relative to said cylinder.

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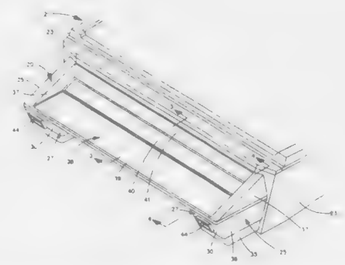
**4,744,778**

## MARINE ENGINE EXHAUST MUFFLER WITH SWIM PLATFORM

**Victor B. Porter, Decatur, Ind., assignor to Thunderbird Products Corporation, Decatur, Ind.**

**Filed Jul. 21, 1986, Ser. No. 887,343**
**Int. Cl.[4] B63H** *21/32*
**U.S. Cl. 440—89** **10 Claims**

1. An outboard exhaust muffler for a motor boat having an exhaust pipe through which exhaust is emitted through the transom above the water line at the stern, which comprises:
an enclosed housing located at the stern of the boat over the exhaust pipe into which the exhaust is emitted, the housing being attached to the transom and extending aft of the transom and aft of the boat, the space within the enclosed housing defining muffler means for reducing the noise of the exhaust, the housing comprising:
a pair of sidewalls each adjacent to one of the sides of the boat extending aft of the transom;



a top extending between the two sidewalls above the exhaust pipe, the top being above and near the water line and forming a swim platform;
a bottom extending between the two sidewalls below the exhaust pipe;
a rear wall extending from the top to the bottom between the two sidewalls, the rear wall having an exhaust port through which the exhaust leaves the enclosed housing.

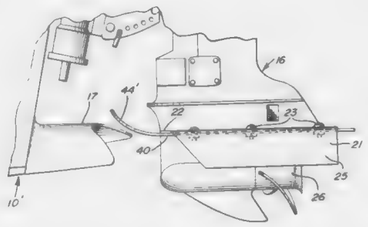
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**4,744,779**

## OUTBOARD MOTOR CAVITATION PLATE EXTENSION

**Kenneth E. Koehler, Harlingen, Tex., assignor to Ferrero & Wepfer, Harlingen, Tex., a part interest**

**Filed Dec. 4, 1986, Ser. No. 938,077**
**Int. Cl.[4] B63H** *1/18*
**U.S. Cl. 440—900** **10 Claims**



1. In combination with a transom equipped boat hull to be used in shoal waters and including a propeller equipped outdrive of sufficient horse power to drive said hull at planing speeds and above and wherein the outdrive is disposed rearwardly of the transom of said hull and equipped with a depending lower unit and further wherein the outdrive is supported from the hull in an upwardly adjusted position relative to the conventional height adjusted position of an outdrive thereon, so as to reduce the draft of the hull as determined by the propeller equipped outdrive, said hull including a downwardly facing longitudinally extending planing surface portion terminating rearwardly a spaced distance forward of said lower unit and defining a longitudinal downwardly and rearwardly opening narrow tunnel defining an upper extremity and longitudinally aligned with said lower unit, said lower unit including opposite side outwardly projecting cavitation plate portions spaced closely above said propeller and disposed at an elevation no lower than the upper extremity of said tunnel, a water confining lower unit attachment including a generally horizontal panel having front and rear margins as well as opposite side margins and further having a longitudinal slot formed therein centrally intermediate said opposite side margins, said slot opening rearwardly through said rear margin and terminating forwardly rearwardly of said front margin, said panel being positioned in lapped relation with said cavitation plate portions and with said lower unit snugly received in and at least substantially forwardly seated in said slot, means mounting said horizontal panel from said plate portions, said horizontal panel including a maximum width front margin portion which is at least slightly forwardly and upwardly curved, said hull including a transversely arched and downwardly opening rearward extension of said tunnel projecting rearwardly of said transom and terminating rearwardly a spaced distance forward of said lower unit.



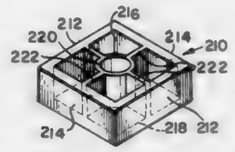
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**4,744,780**

## ADAPTER BLOCK

**Leo S. Volpe, Collingswood, N.J., assignor to Tyco Industries, Inc., Moorestown, N.J.**

**Filed Feb. 6, 1986, Ser. No. 826,826**
**Int. Cl.[4] A63H** *33/08, 33/06*
**U.S. Cl. 446—128** **2 Claims**



1. An adapter for interconnecting hollow toy building blocks, each block including a first end having an end wall with an inner surface and an outer surface which includes at least one generally cylindrical primary projection extending outwardly therefrom and sidewalls extending generally outwardly from and encompassing the inner surface to define a second generally open end, some of the blocks including at least one generally cylindrical secondary projection extending outwardly from the inner surface of the first end wall, generally parallel to the sidewalls, the blocks being normally interconnected with the first end of one block engaging the second end of another block, the primary projection of the one block extending into the open second end of the other block and engaging at least one of the sidewalls, the secondary projection, or both, on the other block to provide a gripping force for holding the blocks together, the adapter comprising a housing generally square in cross section and including at least two interconnected pairs of generally parallel sidewalls defining first and second generally open ends, the sidewalls having a height not less than twice the height of the primary projections on the blocks, the adapter further including at least one generally cylindrical tubular member extending along an axis generally parallel to said sidewalls, said tubular members being of substantially the same height as the housing sidewalls and being positioned substantially within the center of the housing, the cylindrical tubular member being supported by at least two flange members extending inwardly from two of the sidewalls and each of said flanges extending generally parallel to one of the sidewalls, whereby the first housing end is adapted for engaging the first end wall of one block with the primary projection on the one block extending into the housing and engaging with an interference fit two of the housing sidewalls and the cylindrical tubular member to provide three points of contact between the primary projection on the one block and the adapter, and the second housing end is adapted for engaging the first end wall of another block with the primary projection on the other block extending into the housing and engaging with an interference fit two of the housing sidewalls and the cylindrical tubular member to provide three points of contact between the primary projection on the other block and the adapter to interconnect the blocks with their respective first end walls facing each other, the cylindrical tubular member being formed so that the cylindrical tubular member rather than the housing sidewalls may deflect radially inwardly when engaged by one or more of the primary projections.

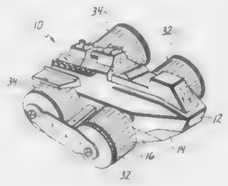
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**4,744,781**

## AMPHIBIOUS TOY VEHICLE

**Eric C. Ostendorff; Peter C. Crosson, both of Torrance; Samuel M. Goldstein, Los Angeles, and Daniel H. Meggs, Yorba Linda, all of Calif., assignors to Mattel, Inc., Hawthorne, Calif.**

**Filed Jan. 2, 1987, Ser. No. 273**
**Int. Cl.[4] A63H** *23/04*
**U.S. Cl. 446—164** **6 Claims**



1. An amphibious toy vehicle comprising:
a vehicle body;
a flotation chamber attached to said body;
two axles rotatably mounted on said body;
wheels attached to said axles;
paddles slidably engaged to said axles, said paddles capable of retracting inside said wheels, extending outside said wheels and rotating with said wheels;
means for rotating said axles; and
means for extending said paddles outside said wheels and retracting said paddles inside said wheels.

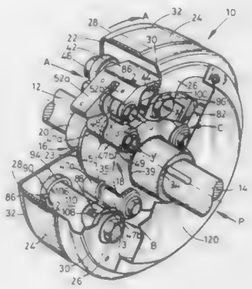
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**4,744,782**

## CENTRIFUGAL COUPLINGS

**Neil M. Wallace, Stockport, and John P. Harrington, Whitefield, both of United Kingdom, assignors to Flexibox Ltd., Manchester, England**

**PCT No. PCT/GB86/00057, § 371 Date Oct. 6, 1986, § 102(e) Date Oct. 6, 1986, PCT Pub. No. WO86/04653, PCT Pub. Date Aug. 14, 1986**
**PCT Filed Jan. 31, 1986, Ser. No. 925,092**
**Claims priority, application United Kingdom, Feb. 5, 1985, 8502838**
**Int. Cl.[4] F16D** *3/60*
**U.S. Cl. 464—69** **39 Claims**



1. A centrifugal coupling comprising:
an input member connectible to a driving shaft;

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an output member connectible to a driven shaft;

one of sid input and output members comprising two substantially L-shaped section sheet metal elements connected together to define a substantially U-shaped section, the substantially U-shaped section comprising a disc adapted to surround and to be connected to one shaft and extending radially of the latter, a ring axially spaced from the disc and also extending radially of said one shaft, and a cylindrical section connecting the disc and the ring radially outwardly of said one shaft; and,

coupling means including a coupling for interconnecting said input and output members for rotational movement and for being flexible in the plane of rotation of the coupling such that said input and output members are relatively rotatable, said coupling means including a plurality of coupling elements pivotally mounted to said one member;

said coupling means further including a pin on which a respective coupling element is pivoted, the pin having two ends, said coupling means also including support means comprising supports for supporting the pin at its ends between the disc and ring such that radial loads imposed by the pins are shared substantially between the disc and the ring and with each pin being axially free in its end supports in said one member to a predetermined degree.

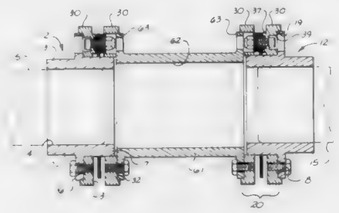
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**4,744,783**

## FLEXIBLE SHAFT COUPLING

**Holmes A. Downey, Simpsonville, and Steven C. Marsh, Greenville, both of S.C., assignors to Reliance Electric Company, Greenville, S.C.**

**Filed Nov. 6, 1986, Ser. No. 928,261**
**Int. Cl.[4] F16D** *3/78*
**U.S. Cl. 464—99** **25 Claims**



**1**. A flexible coupling for connecting a driving shaft and a driven shaft together in an end-to-end relationship for transmitting power from the driving shaft to the driven shaft, the flexible coupling comprising:

a first coupling hub having an annular flange projecting radially outwardly therefrom;

a second coupling hub having an annular flange projecting radially outwardly therefrom;

a first adaptor ring having a central bore therethrough; a substantially radially extending guide face defined on one side of said first adaptor ring and a substantially radially extending, generally planar face defined on an opposite side thereof, said guide face receiving said annular flange of said first coupling hub in mating relationship therewith;

a second adaptor ring having a central bore therethrough; a substantially radially extending guide face defined on one side of said second adaptor ring and a substantially radially extending, generally planar face defined on an opposite side thereof, said guide face receiving said annular flange of said second coupling hub in mating relationship therewith;

flexible element means disposed between said first and second adaptor rings for transmitting rotational forces from the driving shaft to the drive shaft, said flexible element means defining a plurality of bores therethrough and being adjacent both said generally planar face of said first adaptor ring and said generally planar face of said second adaptor ring;

first fastening means for fastening said first coupling hub to said first adaptor ring and said second coupling hub to said second adaptor ring and second fastening means for securing said flexible element means between said first and second adaptor rings; and

a plurality of countersunk bosses provided in said first and second adaptor rings, each of said countersunk bosses defining a recess for receipt of said second fastening means, said countersunk bosses extending outwardly from said generally planar face of each of said first and second adaptor rings towards said flexible element means.

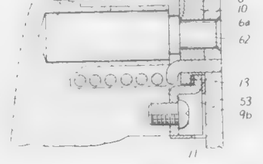
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**4,744,784**

## REAR DERAILLEUR FOR A BICYCLE

**Masashi Nagano, Izumi, Japan, assignor to Shimano Industrial Company Limited, Osaka, Japan**

**Filed Apr. 7, 1987, Ser. No. 35,383**
**Claims priority, application Japan, Apr. 12, 1986, 61-55127[U]**
**Int. Cl.[4] F16H** *9/00*
**U.S. Cl. 474—80** **7 Claims**



**1**. A rear derailleur for a bicycle for shifting a driving chain from one sprocket to another of a multistage sprocket assembly having a plurality of axially spaced substantially parallel sprockets, said derailleur comprising:

a base member,

a movable member supported relative to said base member to be movable along a predetermined direction adapted to correspond to an axial direction of said sprocket assembly when said derailleur is mounted on said bicycle,

a chain guide,

a support mechanism supporting said chain guide on said movable member,

said chain guide including a roller plate rotatably supported to said movable member, a guide roller and a tension roller both rotatably supported on said roller plate,

said support mechanism comprising a support shaft which is fixed to said roller plate and which includes a locking face at an intermediate portion thereof, said locking face extending radially of said support shaft,

said movable member including a blind shaft bore closed on one end and open at its other end which is disposed opposite to said roller plate, said support shaft being rotatably disposed within said blind shaft bore,

a locking member having a thrust bearing surface extending radially of said support shaft and facing said locking face, and

means for fixing said locking member to said movable member.

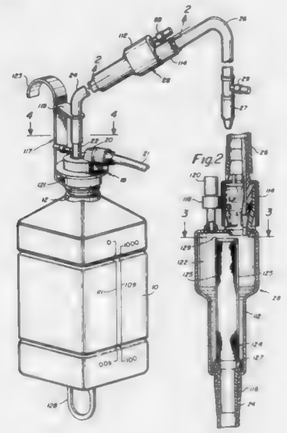


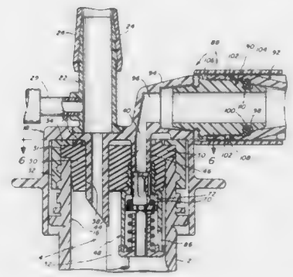
**4,744,785**

## AUTOTRANSFUSION SYSTEM

**Arthur L. Rosenthal, Hopkinton, Mass.; John Uhoch, Warwick, and Augustus Felix, Cranston, both of R.I., assignors to C. R. Bard, Inc., Murray Hill, N.J.**

**Filed Oct. 2, 1984, Ser. No. 656,955**
**Int. Cl.[4] A61M** *1/02*
**U.S. Cl. 604—4** **17 Claims**



**1**. An autotransfusion system for the collection and reinfusion of blood comprising:

a collection container;

flow port means to enable blood to flow into and from the container;

suction port means in communication with the container to enable the container to be connected to a source of suction;

valve means associated with the suction port for normally closing the suction port means, said valve means being openable in response to connection of a source of suction with the suction port; and

vent means associated with the container to permit venting of the container while collected liquid is permitted to flow out of the container through said flow port means.

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**4,744,786**

## INFUSION PUMP

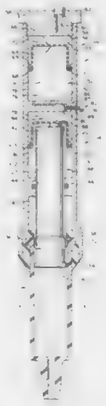
**Michael D. Hooven, Miami, Fla., assignor to Cordis Corporation, Miami, Fla.**

**Filed Jun. 17, 1986, Ser. No. 875,106**
**Int. Cl.[4] A61M** *5/00*
**U.S. Cl. 604—143** **20 Claims**

**1**. An infusion pump for delivering liquid to a body at an adjustably controlled rate of delivery, said pump comprising a syringe section including a syringe barrel having a nozzle at one end and an inner end of a syringe piston in said syringe barrel with an outer end of said syringe piston extending out of the other end of said barrel,

a drive mechanism comprising a generally cylindrical housing having one end mounted to the other end of said syringe barrel, said outer end of said piston extending into said one end of said housing,

a gas spring at the other end of said housing,



dampening/timing means positioned between said gas spring and said outer end of said syringe piston, said dampening/timing means including a viscous fluid which is movable through a passageway in said housing from a space adjacent said gas spring to a space above said piston, and

adjustment means for adjusting the flow rate of the viscous fluid through said passageway and between said spaces.

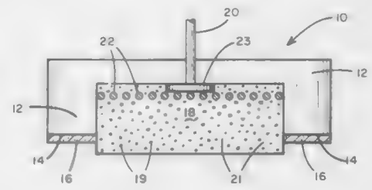
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**4,744,787**

## IONTOPHORESIS APPARATUS AND METHODS OF PRODUCING SAME

**Joseph B. Phipps, Plymouth, and Darrel F. Untereker, Cedar, both of Minn., assignors to Medtronic, Inc., Minneapolis, Minn.**

**Filed Oct. 29, 1984, Ser. No. 665,698**
**Int. Cl.[4] A61N** *1/00, 1/30*
**U.S. Cl. 604—20** **8 Claims**




**1**. An improved electrode for an iontophoresis device, the electrode comprising:

a source of drug to be iontophoretically delivered;

support means for said drug source;

at least one electrochemically active component in electrical connection to said drug source which, during iontophoretic drug delivery, hydrolyzes water to a minimal extent;

wherein said electrically active component is a current distribution member; and

wherein the current distribution member comprises an intercalation compound and the balancing ion of the drug in the drug source is an alkali metal ion.

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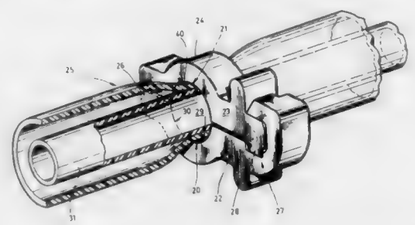


4,744,788

## METHOD OF USING A SURGICAL CLIP FOR CHOLANGIOGRAPHY

Leo C. Mercer, Jr., Department of Surgery, Texas Tech Regional Academic Medical Center, 4800 Alberta, El Paso, Tex. 79905

Division of Ser. No. 818,651, Jan. 13, 1986. This application Dec. 29, 1986, Ser. No. 947,286
Int. Cl.[4] A61B *17/00*
U.S. Cl. 604—49 6 Claims



1. A method for anchoring a tubular surgical instrument, previously inserted into a hollow linear organ structure, to the position it has been placed within said hollow linear organ structure comprising;

compressing the inner wall of said hollow linear organ structure against said tubular surgical instrument with a surgical clip of one-piece integral construction comprising:

two arms axially displaced from each other at one end and rotatably connected to each other at the other end;

said arms having substantially flat planar surfaces except for a single generally semi-circular recessed groove located on each said arm, the generally semi-circular recessed groove of one arm facing the generally semi-circular recessed groove of the other arm in a coplanar relationship, enabling the connecting of said axially displaced ends to produce a surgical clip having a generally circular passageway extending through said surgical clip substantially normal to the plane of the clip's rotation;

one of said axially displaced ends possesses a single lug and a single slotted groove; and

the other said axially displaced end possesses a single recessed groove and a single inward facing flange;

said lug and slotted groove being insertable into a gap between said recessed groove and said flange, enabling said lug and slotted groove to be locked into position between said recessed groove and said flange, enabling the connection of one axially displaced end of one arm of the axially displaced end of the other arm;

said surgical clip enabling the application of an axially distributed compressive force against said hollow linear organ structure, thereby inhibiting slippage of said tubular surgical instrument from the position it has been placed within said hollow linear organ structure, and wherein said surgical clip is composed of a biocompatible material and is absorbable.

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4,744,789

## SYRINGE DEVICE FOR BODY FAT INJECTION

Gerald W. Johnson, 17070 Red Oak, Suite 301, Houston, Tex. 77090

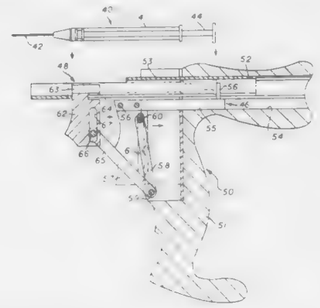
Division of Ser. No. 925,443, Oct. 31, 1986, Pat. No. 4,710,162. This application Sep. 18, 1987, Ser. No. 82,798
Int. Cl.[4] A61M *5/315*
U.S. Cl. 604—218 4 Claims

1. A body fat infection device for operating an injection syringe comprising a barrel with an open end and a closed end with an opening therefrom and a needle supported on said opening, and a plunger movable in said barrel for injecting material into a body in a controlled distribution comprising

supporting means for said injection syringe plunger,

operating means for supporting and moving said injection syringe barrel, and

means for moving said operating means relative to said



supporting means to withdraw said needle and injection syringe barrel relative to said injection syringe plunger to inject material from said barrel in a controlled distribution.

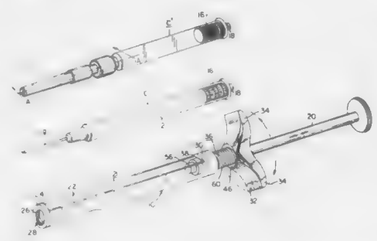
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4,744,790

## FAST ACTION CARTRIDGE SYRINGE HOLDER

George Jankowski, Media; Michael G. Maietta, Cogan Station, and William E. Waters, Malvern, all of Pa., assignors to The West Company, Phoenixville, Pa.

Filed Aug. 19, 1986, Ser. No. 898,048
Int. Cl.[4] A61M *5/245*
U.S. Cl. 604—232 14 Claims



1. A holder for cartridges or containers for medicaments in injectable form comprising an elongated housing having a pocket for the cartridge, a head assembly including an elongated plunger rod adapted to be attached to the cartridge plunger for actuating the same to effect discharge of medicament from the cartridge, means operatively connecting the head assembly to one end of the housing for actuating a shank portion of the head assembly axially in the housing, said head assembly and housing having complementary threads having confronting thread surfaces and each surface having a different coefficient of friction to facilitate relative rotation of the head assembly and housing and resist slippage when the shank exerts an axial force on the cartridge to seat it in the housing.

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4,744,791

## SYRINGE WITH AUTOMATIC PISTON RETRACTION

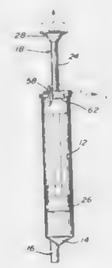
Georges Egolf, 1933 Prospect Street, Sherbrooke, Canada J1J 4C9

Filed Dec. 18, 1986, Ser. No. 946,498
Int. Cl.[4] A61M *5/315*
U.S. Cl. 604—229 9 Claims

1. An aspirating hypodermic syringe comprising a barrel having at one end a spout for mounting a needle and at the



opposite end a fully-open mouth; a partition fixed within said barrel nearer said mouth than said spout and defining a longer chamber between said partition and said spout, and a shorter chamber between said partition and said mouth, said partition having a bore therethrough; an outwardly-projecting flange at said opposite end defining finger grips; a plunger including a piston located in said longer chamber, a piston rod fixed to said piston and extending through said bore of said partition, through said shorter chamber and beyond said opposite end of said barrel and terminated by a thumb piece fixed thereto; a sleeve frictionally surrounding said piston rod and slidable thereon in either direction, said sleeve located between said partition and said thumb piece; a biasing member freely surrounding said piston rod between said sleeve and said partition; the assembly of said sleeve and biasing member having a first position completely located in said shorter chamber with said



biasing member abutting said partition and in biased condition, and having a second position partially projecting beyond said shorter chamber past said mouth when said biasing member is in unbiased condition, the friction force exerted by said sleeve on said piston rod and the retraction force exerted by said biasing member on said sleeve being sufficient to partially retract said plunger from said barrel away from said spout, a pushing force exerted by a user on said thumb piece to advance the piston towards said spout capable of overcoming the resistance of said sleeve and of biasing said biasing member; and further including a manually-operated abutment member mounted on said flange and movable between a closed position closing said mouth and trapping said assembly in said first position, and an open position releasing said assembly, so that said biasing member is allowed to cause said partial retraction of said plunger.

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4,744,792

## MIDDLE EAR VENTILATING TUBE

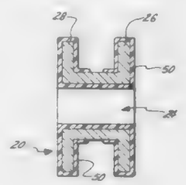
Thomas W. Sander, Southaven, Miss., and Karen Krygier, Memphis, Tenn., assignors to Richards Medical Company, Memphis, Tenn.

Filed Jan. 22, 1985, Ser. No. 693,155
Int. Cl.[4] A61F *2/18*
U.S. Cl. 623—10 13 Claims

1. A composite ventilation tube adapted to be inserted in and engage the tympanic membrane portion of an ear, between the middle ear and outer ear canal, comprising:

(a) a main tubular body with an outer surface and an inner surface forming a bore with openings at both ends for venting fluids from the middle ear the outer ear canal;

(b) at least the central portion of the outer surface that engages the tympanic membrane during use being formed of an extrusion resistant material so that the adjacent tissue growth about the outer surface of the main tubular body is



permitted without substantial tissue ingrowth to resist but not prevent extrusion from the tympanic membrane;

(c) at least the portion of said inner surface adjacent the middle ear during use having a tissue adhesion resistant lining to prevent the tube from clogging; and

(d) means for holding the tubular body in a position upon the tympanic membrane projecting from the tubular body.

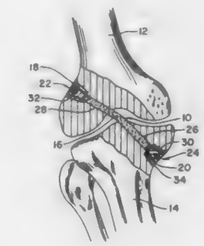
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4,744,793

## PROSTHETIC LIGAMENT CONNECTION ASSEMBLY

Jack E. Parr, North Webster, and Robert L. Fuson, Warsaw, both of Ind., assignors to Zimmer, Inc., Warsaw, Ind.

Filed Sep. 6, 1985, Ser. No. 773,286
Int. Cl.[4] A61F *2/58*
U.S. Cl. 623—13 5 Claims



1. A prosthetic connection assembly for attachment of a prosthetic ligament to a bone, the bone defining an opening for receiving the prosthetic ligament wherein said opening defines a frusto conical wall; and said connection assembling comprising a prosthetic ligament having a central portion and at least one substantially hollow tubular end portion;

first and second members, said first member defining a frusto conical outer surface engagable with said opening and a frusto conical inner surface forming an aperture to receive said second member such that the hollow tubular end portion of said prosthetic ligament is positioned between said first and second member establishing a uniform interface between said members and said ligament thereby interlocking and securing said ligament therebetween.

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4,744,794

## LEATHER FATLIQUORING AGENTS COMBINABLE WITH TANNING AND RETANNING COMPOSITIONS

Hans-Herbert Friese, Monheim; Uwe Ploog, Haan, and Friedrich Pieper, Langenfeld, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Continuation of Ser. No. 736,745, May 22, 1985, abandoned.
This application Apr. 10, 1987, Ser. No. 38,411
Claims priority, application Fed. Rep. of Germany, May 24, 1984, 3419405
Int. Cl.[4] C14C *5/00, 11/00, 9/00*
U.S. Cl. 8—94.23 19 Claims

1. In a continuous leather manufacturing process for treating hides by non-sequentially tanning, pretanning and/or retanning with chromimum or aluminum electrolyte-containing liquors, fatliquoring, and other known chemical processing steps, the improvement comprising using a fatliquoring agent which is stable in the presence of said electrolyte-containing tanning liquors, and wherein said tanning liquors and said fatliquor are at least partially associated with one another by adding said fatliquoring agent to the tanning or retanning liquor before, during, or after the addition of the chromium or aluminum electrolytes, so that said agent and said electrolytes are simultaneously present, said fatliquoring agent comprising

(A) about 40 to 90% by weight of at least one sulfosuccinic acid ester or its salt, whose esterification component is a $C_{12-24}$ fatty residue which is alkoxylated or non-alkoxylated; in combination with

(B) the balance to 100% by weight of at least one nonionic or anionic emulsifier which is (a) an alkoxylated $C_{8-20}$ compound selected from fatty alcohol, alkyl phenol, fatty acid, fatty acid alkanolamide, or (b) a sulfuric acid eater of the foregoing or said eaters' alkali, ammonium, or amine salt.

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4,744,795

## TERPOLYMERS OF ETHYL ACRYLATE/METHACRYLIC ACID/UNSATURATED ACID ESTER OF ALCOHOLS AND ACIDS AS ANTI-SETTLING AGENTS IN COAL WATER SLURRIES

Arpad Savoly, Martinsville; José L. Villa, Bridgewater; Reuben H. Grinstein, Denville, all of N.J., and Solomon J. Nachfolger, Monsey, N.Y., assignors to Diamond Shamrock Chemicals Company, Dallas, Tex.

Filed Aug. 21, 1986, Ser. No. 898,613
Int. Cl.[4] C10L *1/32*
U.S. Cl. 44—51 58 Claims

1. A pumpable stabilized coal water slurry, having a coal content of at least about 50% by weight wherein at least 80% of the coal particles are about 200 mesh or finer, containing from about 0.01% to about 1% by weight of said slurry of a water soluble terpolymer of ethylacrylate (A), methacrylic acid (B) and a third monomer (C) selected from the group consisting of an unsaturated carboxylic acid ester of an alcohol and an ethoxylated carboxylic acid; wherein the unsaturated carboxylic acid is a mono- or di- basic unsaturated carboxylic acid of 3 to 10 carbon atoms selected from the group consisting acrylic acid, methacrylic acid, itaconic acid, fumaric acid, and maleic acid; the alcohol is $-(OCH_2CH_2)_nOR$ wherein n is an integer of 0 to 100; the ethoxylated carboxylic acid is

$$-(OCH_2CH_2)_aOCR,$$

wherein a is an integer of about 1 to 100 and R is hydrogen, a linear or branched alkyl group with 8 to 30 carbon atoms, an unsubstituted aryl with from 6 to 10 carbon atoms, an aryl substituted with one or more of a linear or branched alkyl group with from 5 to 24 carbon atoms, an aryl with from 6 to 10 carbon atoms or an aralkyl group with from 7 to 12 carbon atoms; and wherein the mole % ratio of A:B:C is 20%–80% A:20%–80% B:1%–20% C and A+B+C is 100%.

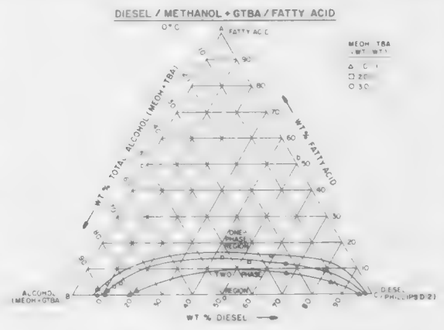
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4,744,796

## MICROEMULSION FUEL SYSTEM

Edward A. Hazbun, Media; Steven G. Schon, Philadelphia, and Roger A. Grey, West Chester, all of Pa., assignors to ARCO Chemical Company, Newtown Square, Pa.

Filed Feb. 4, 1986, Ser. No. 825,841
Int. Cl.[4] C10L *1/32*
U.S. Cl. 44—51 12 Claims




1. A microemulsion fuel composition comprising:

(a) a jet fuel, fuel oil or diesel hydrocarbon fuel;

(b) about 3.0 to about 40% by weight water and/or methanol; and

(c) a surface active amount of a combination of surface active agents consisting of: (1) tertiary butyl alcohol; and (2) at least one amphoteric; anionic, cationic or nonionic surfactant.

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4,744,797

## MIXED FUEL OF COAL POWDER OR THE LIKE AND HEAVY OIL

Yoshinari Shimada, 6-40, Asashigaoka 4-chome, Asaka-shi, Saitama 351, and Tasuku Sugita, 22-3, Honkomagome 2 Bunkyo-ku, Tokyo 112, both of Japan

Continuation of Ser. No. 821,732, filed as PCT JP85/00221, Apr. 21, 1984, published as WO85/04895 on Nov. 7, 1985, abandoned.
This application Sep. 30, 1987, Ser. No. 104,548
Claims priority, application Japan, Apr. 21, 1984, 59-79361
Int. Cl.[4] C10L *1/32*
U.S. Cl. 44—51 2 Claims

1. A mixed fuel consisting essentially of a carbonaceous solid fuel powder and a heavy oil, wherein the mixed fuel is obtained by dispersing a carbonaceous sold fuel powder and a dilute aqueous solution of at least one compound selected from the group consisting of gelatin and glue in a heavy oil, and wherein

(a) the proportions of said heavy fuel and said carbonaceous solid fuel powder are 70 to 30% by weight of heavy oil and 30 and 70% by weight of carbonaceous sold fuel powder,

(b) the proportions of said heavy oil and said dilute aqueous solution of a compound selected from the group consisting of a gelatin and glue are 75 to 99% by volume of heavy oil and 35 to 1% by volume of the aqueous solution,

(c) the dilute aqueous solution of a compound selected from the group consisting of gelatin and glue is an aqueous solution of 1 to 0.0001% by weight of a compound selected from the group consisting of gelatin and glue, and

(d) the particle size of the water component in the aqueous solution is about 5 to 30 um.

4,744,798

## BENZOPHENONE DERIVATIVES AS FUEL ADDITIVES

Harry J. Andress, Wenonah, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Sep. 30, 1982, Ser. No. 430,196
Int. Cl.[4] C10L *1/18*
U.S. Cl. 44—70 10 Claims

1. A composition comprising a major amount of a liquid hydrocarbon fuel having an initial boiling point of at least about 75° F. and an end boiling point of about 750° F., and a minor amount sufficient to improve the fuel detergency thereof of the reaction product of an ester of a benzophenone tetracarboxylic dianhydride or mixtures of such esters and an amine wherein said benzophenone tetracarboxylic dianhydride ester or mixtures of such esters are reacted with the amine in a mole ratio of from about 3:1 to about 1:3 at a temperature of from about 100°–300° C. at atmospheric pressure from about three to about 10 hours.

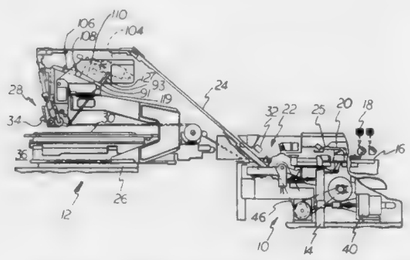
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4,744,799

## COMBINED SEQUENCER AND INSERTION MACHINE

Daniel W. Woodman, Jr., Beverly, and Henry L. Wright, Ipswich, both of Mass., assignors to USM Corporation, Farmington, Conn.

Filed Jun. 6, 1986, Ser. No. 871,722
Int. Cl.[4] H05K *3/30*
U.S. Cl. 29—566.3 8 Claims




1. A combination axial leaded electrical component sequencing and inserting machine for placing the components on a printed circuit board comprising:

a. a sequencer conveyor for receiving components from a source;

b. a verifier adjacent said sequencer conveyor for checking the acceptability of the component;

c. means for removing unacceptable components from said sequencer conveyor;

d. a component transfer station adjacent said sequencer conveyor for receiving the components and including a transport conveyor to convey the components;

e. a component insertion means for receiving the components from said transport conveyor and positioning the components on the board;

f. means for driving said sequencer conveyor,

g. means for interconnecting said sequencer and transport conveyors and operating said driving means for conjointly displacing said sequencer and transport conveyors;

h. means for driving said transport conveyor, and

i. means for disconnecting said sequencer and transport conveyors and operating said transport conveyor driving means so that said transport conveyor is driven while said sequencer conveyor is idle.

4,744,800

## GASOLINE COMPOSITIONS FOR AUTOMOTIVE VEHICLES

Eiichi Yoshida, Yokohama; Hirotsugu Nomura, Chigasaki, and Shoichi Satoh, Yokohama, all of Japan, assignors to Nippon Oil Co., Ltd., Tokyo, Japan

Filed Jan. 13, 1986, Ser. No. 818,353
Claims priority, application Japan, Jan. 18, 1985, 60-7130; Jan. 29, 1985, 60-14795; Jan. 29, 1985, 60-14796
Int. Cl.[4] C10L *1/18*
U.S. Cl. 44—70 7 Claims

1. A gasoline composition for use as automotive fuel which consists essentially of a gasoline fraction having an aromatics content of 35–60 volume percent and a 50 percent distillation temperature of 85°–125° C., and an alkaline earth metal salicylate in an amount of 0.01–1.0 weight percent based on said gasoline fraction.

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4,744,801

## FUEL OIL COMPOSITIONS

Malcolm G. Taylor, Marlow Bottom; Henry E. Blackshaw; David J. Claydon, both of Wantage, all of United Kingdom, and Stephan Ilnyckyj, Mississauga, Canada, assignors to Exxon Chemical Patents Inc., Linden, N.J.

Filed Apr. 23, 1986, Ser. No. 855,180
Claims priority, application United Kingdom, Apr. 26, 1985, 8510721; Dec. 16, 1985, 8530907
Int. Cl.[4] C10L *1/18, 1/22*
U.S. Cl. 44—71 12 Claims

1. A fuel oil composition comprising a fuel oil and a minor amount by weight of a mixture of (i) 20 to 40 wt% of polyphenol, sulphurized polyphenol, or mixture thereof, and (ii) 80 to 60 wt% of a cyclic amide derived from (a) dicarboxylic acid or anhydride having a hydrogen-and-carbon containing substituent of at least 40 carbon atoms, and (b) polyalkylene polyamine containing at least 2 nitrogen atoms and at least 3 carbon atoms wherein 2 of said nitrogen atoms are present as terminal amino groups and at least 3 of said carbon atoms are present in a bridging moiety comprising a chain containing at least 3 carbon atoms joining said two terminal amino groups.

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4,744,802

## PROCESS FOR DURABLE SOL-GEL PRODUCED ALUMINA-BASED CERAMICS, ABRASIVE GRAIN AND ABRASIVE PRODUCTS

Mark G. Schwabel, Cottage Grove, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 728,852, Apr. 30, 1985, abandoned. This application Jan. 7, 1987, Ser. No. 1,329
Int. Cl.[4] C09C *1/68*
U.S. Cl. 51—309 42 Claims

1. In the sol-gel process for forming alumina-based ceramic, the process comprising:

a. preparing a dispersion of alpha alumina monohydrate particles;

b. gelling the dispersion;

c. drying the gel dispersion to form a solid;

d. calcining the solid; and

e. sintering the calcined solid, the improvement comprising introducing nucleating agents into the dispersion before the drying step by adding to the dispersion a nucleating agent selected from the group consisting of a precursor of alpha ferric oxide and alpha ferric oxide.

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4,744,803

## COMPLEMENTARY PRESSURE SWING ADSORPTION

Kent S. Knaebel, Dublin, Ohio, assignor to The Ohio State University Research Foundation, Columbus, Ohio

Filed Aug. 19, 1985, Ser. No. 767,138
Int. Cl.[4] B01D *53/04*
U.S. Cl. 55—25 9 Claims

1. A method for purifying and quantitatively recovering a plurality of components from a multicomponent gaseous mixture using complementary pressure swing adsorption technology, wherein two adsorption columns are used, each column being selectively adsorptive for a different one of the components to be recovered, each column further having a top end with an influent valve and an effluent valve and a bottom end with an influent valve and an effluent valve, which comprises the sequential steps of:

(a) opening the influent valve at the bottom end of one said column, while the other valves remain closed,

(b) pressurizing said one column by injecting gaseous influent through the open valve,

(c) closing the previously open valve and opening the influent valve at the top end of said one column and the effluent valve at the bottom end of said one column,

(d) high-pressure feeding said one column, through the open influent valve, with blowdown and purge effluent from the other said column, while withdrawing effluent from said one column through said open effluent valve in the bottom,

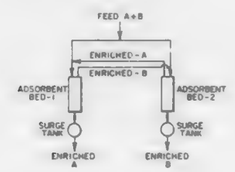
(e) closing the previously open valves in said one column and opening the effluent valve at the top end of said one column,

(f) blowing down said one column by allowing effluent to escape through the open valve,

(g) opening the influent valve at the top end of said other column and delivering said effluent from the one column to the other column through the open influent valve,

(h) opening the effluent valve in the bottom of the other column and withdrawing effluent,






(i) closing the open influent and effluent valves of the other column and opening the effluent valve at the top of the other column,

(j) blowing down said other column by allowing effluent to escape through the open valve and delivering the effluent to the influent valve at the top of the one column and

(k) opening the influent valve at the top of the one column and opening the effluent valve at the bottom of the one column to withdraw effluent.

6. An apparatus for purifying and quantitatively recovering a plurality of components from a multicomponent gaseous mixture using complementary pressure swing adsorption technology, comprising:

(a) a plurality of adsorption columns, each column having a top end and a bottom end, and each column containing an adsorbent which is selective for one of the components to be recovered,

(b) means for connecting the top end of each column to the top end of another column, which another column contains a different adsorbent from the column to which its top is connected, so that blowdown and purge effluent from each column can be supplied as high-pressure feed influent to said another column, and

(c) means for connecting the bottom end of each column with the bottom end of another column, which another column contains the same adsorbent as the column to which its bottom is connected, so that high pressure feed effluent from each column can be supplied as the pressurizing and purging influent to said other column.

4,744,804

## DUST PRE-REMOVAL METHOD IN A DRY MOVING BED TYPE ADSORPTION TOWER

Kuninori Furuyama, Tochigi, and Yoshiro Ito, Chuo, both of Japan, assignors to Mitsui Mining Company, Limited and Mitsui Miike Engineering Corp., both of Tokyo, Japan

Continuation of Ser. No. 896,587, Aug. 18, 1986, abandoned, which is a continuation of Ser. No. 699,397, Feb. 7, 1985, abandoned. This application Jan. 9, 1987, Ser. No. 6,247
Claims priority, application Japan, Feb. 16, 1984, 59-26154
Int. Cl.[4] B01D *53/08*
U.S. Cl. 55—60 6 Claims



1. In a dust pre-removal method in an adsorption apparatus of the dry moving bed type for purifying a gas, which apparatus comprises an adsorption tower having an upper and lower part and a hopper for feeding a dry granular adsorbent comprising carbonaceous grains downwardly to the upper part of said tower, in which adsorption tower a granular adsorbent is moved downwardly to form vertical flow and a waste gas is passed transversely through the vertical flow of the granular adsorbent, the improvement which comprises providing a pipe between said hopper and upper part of said tower, said pipe having an inlet for receiving said granular adsorbent from said hopper, an outlet for discharging said granular adsorbent to the upper part of said tower and a further outlet for removal of dust from said granular adsorbent and wherein a portion of said gas purified in said adsorption tower rinses said granular adsorbent in said pipe and wherein said granular adsorbent dust is removed through said further outlet, the flow rate of said purified gas through said pipe being such as to not fluidize the downwardly flowing granular adsorbent in said pipe.

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4,744,805

## SELECTIVE ADSORPTION PROCESS USING AN OXIDIZED ION-EXCHANGED DEHYDRATED CHABIZITE ADSORBENT

Peter J. Maroulis, Allentown; Charles G. Coe, Macungie; Steven M. Kuznicki, Easton; Patrick J. Clark, Palmerton, and David A. Roberts, Allentown, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

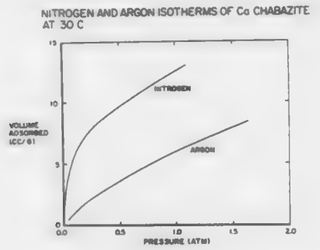
Division of Ser. No. 866,531, May 22, 1986, Pat. No. 4,713,362. This application Jul. 1, 1987, Ser. No. 69,331
Int. Cl.[4] B01D *53/04*
U.S. Cl. 55—66 12 Claims

1. In a process for the selective adsorption and separation of one or more constituents from a gas stream, wherein the gas stream is contacted with a zeolite adsorbent contained within a column maintained within a gas chromatograph while having an inert carrier gas continually flowing through the column, the improvement for the selective adsorption and separation of the constituents comprises utilizing a dehydrated chabazite adsorbent having a residual water content of less than 1.5 wt% as the zeolite adsorbent, wherein the dehydrated chabazite has

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at least 50% of any exchangeable ion capacity exchanged with a polyvalent metal cation and wherein the dehydrated chabazite has been reacted with an oxidizing atmosphere either during or following dehydration.



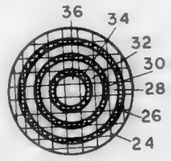

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**4,744,806**

## VARIEGATED DENSITY MESH PAD FOR MIST REMOVAL AND METHOD OF PREPARING SAME

**Karlis P. Ozolins, Verona, N.J.; Ole V. Hansen, Wichita, Kans.; Jamie P. Monat, Stow, Mass., and Kenneth J. McNulty, Atkinson, N.H., assignors to Koch Engineering Company, Inc., Wichita, Kans.**

**Filed Jan. 30, 1987, Ser. No. 9,359**
**Int. Cl.[4] B01D** *39/10*
**U.S. Cl. 55—97** **24 Claims**




1. A mist-eliminator variegated density mesh pad suitable for use in gas-liquid contact devices for the removal of mists from mist-containing gas streams, which pad comprises open areas to permit the flow of a gas stream therethrough and characterized within the pad by defined, adjacent regions of high and low densities, said high and low density regions comprising a plurality of layers of corrugated, woven or knitted fibrous mesh material characterized by peaks and valleys, the high density region having said layers disposed in a nesting relationship, and the low density region having said layers disposed in a non-nesting relationship, with the direction of high and low density variegation generally perpendicular to the direction of the gas flow to provide for enhanced drainage of liquid from the high density region.

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**4,744,807**

## METHOD OF MANUFACTURING A CELLULOSE ACETATE MEMBRANE AND THE MEMBRANE SO PRODUCED

**Bhupender S. Minhas, Ottawa; Takeshi Matsuura, Gloucester, and Srinivasa Sourirajan, Ottawa, all of Canada, assignors to Canadian Patents and Development Ltd., Ottawa, Canada**

**Filed Jul. 21, 1986, Ser. No. 887,728**
**Int. Cl.[4] B01D** *53/22;* **C08J** *9/28, 9/36*
**U.S. Cl. 55—158** **7 Claims**

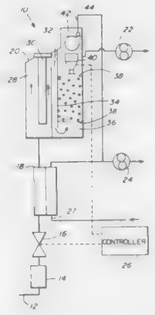
1. A cellulose acetate membrane having a pore radius in the range 1.5 Å to 5.0 Å and a standard deviation in the range 0.5 Å to 5.5 Å according to the definition of Gaussian normal distribution.

**4,744,808**

## LIQUID LEVEL SENSING AND CONTROL

**Dennis M. Treu, Morrison, Colo., assignor to Cobe Laboratories, Inc., Lakewood, Colo.**

**Filed Oct. 30, 1986, Ser. No. 925,736**
**Int. Cl.[4] B01D** *19/00*
**U.S. Cl. 55—165** **13 Claims**




1. A fluid flow chamber and a controller for flow therethrough comprising
a housing defining a chamber, a chamber inlet and a chamber outlet for flow of liquid therethrough,
a float in said chamber,
a magnet,
a magnetic position sensor that provides an output signal with a magnitude related to the strength of a magnetic field to which it is subjected,
one of said magnet and magnetic position sensor being carried by said float for movement with the change in liquid level in said chamber,
the other of said magnet and magnetic position sensor being fixedly mounted with respect to said housing,
said magnet being oriented with respect to said sensor so as to subject said sensor to a magnetic field that continuously varies in strength as a function of level of liquid in said chamber,
thereby causing an output signal at said sensor that continuously varies in magnitude as a function of level,
an actuator hydraulically connected to said chamber so as to affect flow through said chamber, and
an electronic controller connected to receive said output signal of said sensor and to provide a control signal to said actuator based upon the magnitude of said output signal.

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**4,744,809**

## METHOD AND APPARATUS FOR HOMOGENIZING FLAT GLASS

**George A. Pecoraro, Lower Burrell, and Joseph A. Gulotta, New Kensington, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.**

**Filed Jan. 2, 1987, Ser. No. 26**
**Int. Cl.[4] C03B** *5/187*
**U.S. Cl. 65—135** **41 Claims**

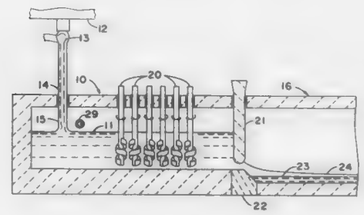
1. A method of making glass comprising:
feeding a stream of molten glass onto a molten metal support;
stirring the molten glass while supported on the molten metal so as to substantially homogenize the glass; and
passing the homogenized glass to a forming operation.

10. A method of making flat glass comprising:
feeding a stream of melted and refined molten glass from a melting and refining stage to a separate stirring chamber;
stirring the glass at a temperature greater than 2200° F. so as to substantially homogenize the glass while preventing return flow to the melting and refining stage; and



initiating forming of the homogenized glass into a flat ribbon while the glass temperature is at least 2100° F.

25. Apparatus for processing glass comprising:
a vessel adapted to hold a pool of molten metal;



means for feeding molten glass onto the pool of molten metal; and
means for stirring the molten glass in the vessel on the molten metal pool.

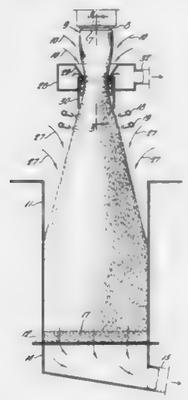
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**4,744,810**

## PROCESS FOR FORMING FIBER MATS

**Jean A. Battigelli, and Francois Bouquet, both of Rantigny, France, assignors to Isover Saint-Gobain, Paris La Défense, France**

**Continuation of Ser. No. 603,665, Apr. 26, 1984, abandoned, which is a continuation-in-part of Ser. No. 404,327, Aug. 2, 1982, abandoned. This application Mar. 31, 1986, Ser. No. 846,475**
**Claims priority, application France, Aug. 6, 1981, 81 15283**
**Int. Cl.[4] C03B** *37/022*
**U.S. Cl. 65—3.43** **4 Claims**



1. A method for forming glass fiber mats from attenuable molten glass comprising forming streams of the molten glass, stretching or attenuating said streams of molten glass by projecting the streams radially outwardly into a surrounding high-speed downwardly directed unconfined annular attenuating gas blast and thereby producing solidified attenuated glass fibers carried in said blast, the fiber-laden blast being exposed to the surrounding atmosphere and inducing gas from the surrounding atmosphere throughout the periphery of the blast and thereby providing an unconfined downwardly directed fiber-laden gas current with the induced gas in the peripheral region thereof, spraying a thermosetting binder material on the attenuated fibers carried in said gas current in a zone of said current downstream of the attenuation and solidification of the fibers, said current being directed toward a perforated fiber-collecting conveyor, thereby depositing the fibers in the form of a mat on the surface of the conveyor while gas of said current passes through the conveyor, aspirating said current after it passes through the perforated conveyor, and, in a zone downstream of the exposure of the fiber-laden blast to the surrounding atmosphere but upstream of the spraying of the thermosetting binder, removing an annular portion of said current from the peripheral region thereof.

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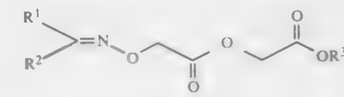
**4,744,811**

## SUBSTITUTED OXIME-ETHERS AND THEIR USE AS BIOREGULATORS TO LOWER THE ENDOGENOUS ETHYLENE LEVEL IN PLANTS

**Guenter Schulz, Ludwigshafen; Wolfgang Will, Kirchheim; Johann Jung, and Hansjoerg Fritsch, both of Limburgerhof, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

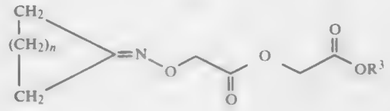
**Filed Apr. 8, 1987, Ser. No. 35,730**
**Claims priority, application Fed. Rep. of Germany, Apr. 23, 1986, 3613649**
**Int. Cl.[4] A01N** *3/02, 37/00;* **C07C** *69/74, 101/02*
**U.S. Cl. 71—68** **3 Claims**

1. A substituted oxime-ether of the formula



(Ia)

or



(Ib)

where $R^1$ and $R^2$ independently of one another are $C_1$–$C_6$-alkyl, n is 2 or 3 and $R^3$ is hydrogen or $C_1$–$C_6$-alkyl.

2. A composition for lowering the endogenous ethylene level in plants, which contains an effective amount of one or more compounds of the formula Ia or Ib as claimed in claim 1 with a solid or liquid carrier, with or without one or more surfactants.

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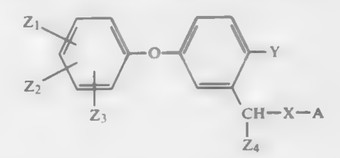
**4,744,812**

## SUBSTITUTED DIPHENYL ETHERS, HERBICIDES CONTAINING THESE COMPOUNDS AND THEIR USE AS HERBICIDES

**Adolf Parg, Bad Durkheim; Bruno Wuerzer, Otterstadt, and Gerhard Hamprecht, Weinheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Continuation of Ser. No. 337,287, Jan. 5, 1982, abandoned. This application Mar. 4, 1985, Ser. No. 707,190**
**Claims priority, application Fed. Rep. of Germany, Jan. 9, 1981, 3100387**
**Int. Cl.[4] A01N** *43/08;* **C07C** *143/68, 147/06, 147/14*
**U.S. Cl. 71—88** **6 Claims**

1. A substituted diphenyl ether of the formula



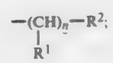
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where $Z_1$ is 2-chloro, $Z_2$ is 4-trifluoromethyl, $Z_3$ is hydrogen, $Z_4$ is hydrogen, cyano, $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy, acetoxy or $C_1$–$C_4$-alkylmercapto, Y is chlorine, bromine, cyano or nitro,

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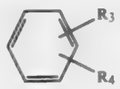


X is oxygen, sulfur, sulfinyl or sulfonyl, and A is $C_1$–$C_6$-alkyl, $C_1$–$C_4$ alkyl substituted by tetrahydrofuryl;

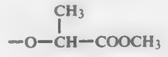




where $R_8$, $R_9$ and $R_{10}$ are identical or different and are methyl, ethyl, n-propyl or n-butyl;



where $R^3$ is hydrogen and $R^4$ is;



or benzyl substituted by chlorine; where $R^1$ is hydrogen, methyl, ethyl or n-propyl, $R^2$ is cyano, methoxy, ethoxy,



where B is OH, ONa, $OCH_3$, $OC_2H_5$, O—i—$C_3$–$H_7$ or O—($C_4$–$C_{20}$)-alkyl, O-phenyl, fluoro-substituted phenoxy, —$NH_2$, —NH($C_1$–$C_4$)-alkyl or —N(($C_1$–$C_4$)-alkyl)$_2$ and n is 1, 2, or 3.

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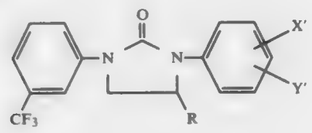
**4,744,813**

## HERBICIDAL IMIDAZOLIDINE-2-ONES AND METHODS OF USE

**Eugene G. Teach, El Cerrito, Calif., assignor to Stauffer Chemical Co., Westport, Conn.**

**Filed Nov. 24, 1986, Ser. No. 933,834**
**Int. Cl.[4] A01N *43/50*; C07D *233/70***
**U.S. Cl. 71—92** **21 Claims**

**15.** A method for controlling undesirable weed pests which comprises applying to the locus where control is desired a herbicidally effective amount of an imidazolidine-2-one having the formula



in which

X′ and Y′ are the same or different and are selected from the group consisting of trifluoromethyl, chloro, bromo, fluoro, hydrogen, cyano, alkyl, thioalkyl, halothioalkyl, alkoxy and sulfonylalkyl, wherein the alkyl groups have from one to four carbon atoms; and

R is selected from the group consisting of hydrogen and alkyl wherein the alkyl groups have from one to four carbon atoms.

**4,744,814**

## N-[(4,6-DIMETHOXYPYRIMIDIN-2-YL)AMINOCARBONYL]-3-TRIFLUOROMETHYLPYRIDINE-2-SULFONAMIDE OR SALTS THEREOF, HERBICIDAL COMPOSITION CONTAINING THE SAME

**Fumio Kimura; Takahiro Haga; Nobuyuki Sakashita, all of Shiga; Chimoto Honda, Osaka; Kouji Hayashi, Shiga; Toshio Seki, Shiga, and Kouji Minamida, Shiga, all of Japan, assignors to Ishihara Sangyo Kaisha, Osaka, Japan**

**Filed Nov. 27, 1985, Ser. No. 802,279**
**Claims priority, application Japan, Dec. 6, 1984, 59-258186**
**Int. Cl.[4] C07D *401/12*; A01N *43/54***
**U.S. Cl. 71—92** **12 Claims**

**1.** A herbicidal composition comprising, as an active ingredient, N-[(4,6-Dimethoxyprimidin-2-yl)amino-carbonyl]-3-trifluoromethylpyridine-2-sulfonamide or a salt thereof in a herbicidally effective amount sufficient for control of at least one noxious weed of the group consisting of Cyperaceae, Leguminosae, Oxalidaceae, Polygonaceae, Gramineae, Amaranthaceae, Chenopodiaceae, Caryophyllaceae, Compositae, Convolvulaceae and Portulacaceae, and an agriculturally acceptable adjuvant.

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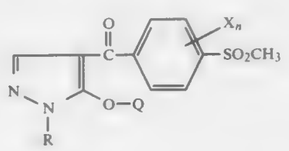
**4,744,815**

## 4-BENZOYL-1-ALKYL (ALKENYL) - PYRAZOLES, COMPOSITION CONTAINING THEM, HERBICIDAL METHOD OF USING THEM, AND INTERMEDIATE IN THEIR PREPARATION

**Masatoshi Baba; Norio Tanaka, both of Funabashi; Takasi Ikai, and Tsutomu Nawamaki, both of Saitama, all of Japan, assignors to Nissan Chemical Industries, Ltd., Tokyo, Japan**

**Filed May 6, 1986, Ser. No. 860,199**
**Claims priority, application Japan, May 11, 1985, 60-98905; Sep. 3, 1985, 60-194476**
**The portion of the term of this patent subsequent to Feb. 17, 2004, has been disclaimed.**
**Int. Cl.[4] A01N *43/56*; C07D *231/28***
**U.S. Cl. 71—92** **12 Claims**

**1.** A pyrazole derivative of the formula I:



(I)

wherein

R represents an alkyl group having 2 to 4 carbon atoms or an alkenyl group having 2 to 4 carbon atoms which may be substituted by halogen atom,

X represents a halogen atom, a lower alkyl group, nitro group, cyano group, a lower alkylsulfonyl group or trifluoromethyl group,

n represents an integer of 1 to 3,

Q represents hydrogen atom; a carbocyclic aryl lower alkyl group which may be substituted by halogen atom, nitro group, cyano group or a lower alkyl group; benzenesulfonyl group which may be substituted by a lower alkyl group or halogen atom; benzoyl group which may be substituted by a lower alkyl group or halogen atom; phenacyl group which may be substituted by a lower alkyl group or halogen atom; a lower alkyl group which may be substituted by halogen atom; a lower alkenyl group which may be substituted by halogen atom; or a lower alkynyl group.

**11.** A method for damaging and controlling weeds which comprises applying to the weeds or to the locus thereof a herbicidally effective amount of a compound of the formula I claimed in claim **1**.



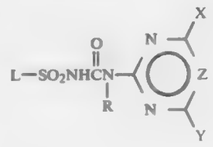
**4,744,816**

## HERBICIDAL SULFONAMIDES

**Martha M. Bolinski, Northeast, Md., and Donald J. Dumas, Wilmington, Del., assignors to E. I. DuPont de Nemours and Company, Wilmington, Del.**

**Continuation of Ser. No. 731,261, May 8, 1985, abandoned, which is a continuation-in-part of Ser. No. 618,412, Jun. 7, 1984, abandoned. This application Jun. 11, 1987, Ser. No. 60,567**
**Int. Cl.[4] A01N *43/70*; C07D *401/12, 409/12, 251/52***
**U.S. Cl. 71—93** **21 Claims**

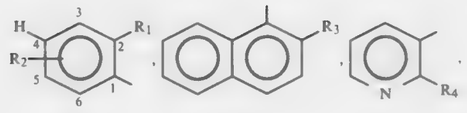
**1.** A compound of the formula:



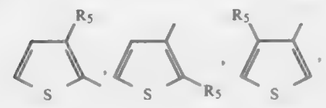
wherein

R is H or $CH_3$;

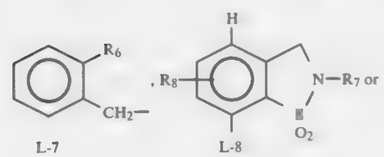
L is



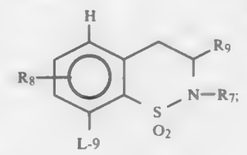
L-1 L-2 L-3



L-4 L-5 L-6



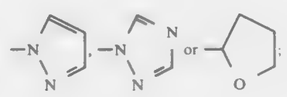
L-7 L-8



L-9

$R_1$ is F, Cl, Br, $NO_2$, $CO_2R_{10}$, $SO_2NR_{11}R_{12}$, $SO_2N(OCH_3)CH_3$, $CH_2OCH_3$, $CH_2OC_2H_5$ or Q;

Q is



Q-1 Q-2 Q-3

$R_2$ is H, F, Cl, Br, $CF_3$, $CH_3$, $C_2H_5$, $OCH_3$, $OC_2H_5$, $SCH_3$ or $SC_2H_5$;

$R_3$ is H, $CH_3$, $OCH_3$, F, Cl, Br, $SO_2N(CH_3)_2$, $OSO_2CH_3$ or $S(O)_nCH_3$;

$R_4$ is $CH_3$, $C_2H_5$, $OCH_3$, $OC_2H_5$, F, Cl, Br, $SO_2NR_{11}R_{12}$, $SO_2N(OCH_3)CH_3$ or $S(O)_nR_{13}$;

$R_5$ is $C_1$–$C_3$ alkyl, F, Cl, Br, $NO_2$, $CO_2R_{10}$, $SO_2NR_{11}R_{12}$, $SO_2N(OCH_3)CH_3$ or $S(O)_nR_{13}$;

$R_6$ is $CO_2CH_3$, $CO_2C_2H_5$, $SO_2N(CH_3)_2$, $OSO_2CH_3$, $SO_2CH_3$ or $SO_2CH_2CH_3$;

$R_7$ is H, $C_1$–$C_5$ alkyl, $CH_2CH_2F$, $CH_2CH_2CH_2F$, $C_3$–$C_4$ alkenyl, $C_3$–$C_4$ alkynyl, $CH_3OCH_2CH_2$ or $C_2H_5OCH_2CH_2$;

$R_8$ is H, Cl, $CH_3$ or $OCH_3$;

$R_9$ is H or $CH_3$;

$R_{10}$ is $C_1$–$C_4$ alkyl, $CH_2CH_2OCH_3$, $CH_2CH_2Cl$, $CH_2CH{=}CH_2$ or $CH_2C{\equiv}CH$;

$R_{11}$ is H or $C_1$–$C_2$ alkyl;

$R_{12}$ is $C_1$–$C_2$ alkyl;

$R_{13}$ is $C_1$–$C_3$ alkyl;

n is 0, 1 or 2;

X is $NR_{14}R_{15}$;

$R_{14}$ is H or $C_1$–$C_2$ alkyl;

$R_{15}$ is $C_1$–$C_2$ alkyl, $OCH_3$, $OC_2H_5$ or $CH_2CN$;

Y is $OCH_2CH_2F$, $OCH_2CHF_2$ or $OCH_2CF_3$; and

Z is N;

and their agriculturally suitable salts.

**15.** A method for controlling the growth of undesired vegetation which comprises applying to the locus to be protected an effective amount of a compound of claim **1**.

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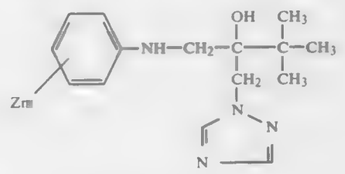
**4,744,817**

## TRIAZOLE DERIVATIVES

**Graham Holmwood, Wuppertal; Karl H. Büchel, Burscheid; Paul Reinecke, Leverkusen; Wilhelm Brandes, Leichlingen, and Gerd Hänssler, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Mar. 3, 1986, Ser. No. 835,824**
**Claims priority, application Fed. Rep. of Germany, Mar. 22, 1985, 3510411**
**Int. Cl.[4] C07D *249/08*; A01N *43/653*; A61K *31/41***
**U.S. Cl. 71—92** **9 Claims**

**1.** A triazole derivative of the formula



in which

$X^1$ represents hydrogen or halogen,

$X^2$ represents halogen,

Z represents fluorine, chlorine, bromine, alkyl, having 1 to 4 carbon atoms, halogenoalkyl having 1 or 2 carbon atoms and 1 to 5 identical or different halogen atoms, halogenoalkoxy having 1 or 2 carbon atoms and 1 to 5 identical or different halogen atoms, halogenoalkylthio having 1 or 2 carbon atoms and 1 to 5 identical or different halogen atoms, or phenyl and

m represents the number 0, 1, 2 or 3, or an addition product thereof with an acid or metal salt.

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**4,744,818**

## HERBICIDAL N-HALO-5(SUBSTITUTED-PHENOXY OR -PYRIDYLOXY)-2-SUBSTITUTED BENZOIC ACID SULFONAMIDES AND SULFAMATES

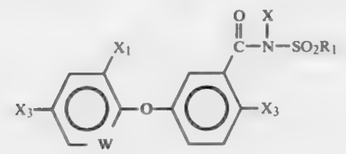
**El-Ahmadi I. Heiba, Princeton, N.J., assignor to Rhone-Poulenc Agrochimie, Lyone, France**

**Filed Jul. 27, 1981, Ser. No. 286,935**

**Int. Cl.[4] A01N** *43/40, 41/10;* **C07D** *239/72;* **C07C** *147/107*

**U.S. Cl. 71—94** **16 Claims**

1. A compound having herbicidal activity of the formula:



(i) W is CH, C-$X_4$ or N;

(ii) $R_1$ is $C_2$ to $C_6$ alkenyl; $C_2$ to $C_6$ alkynyl; $C_1$–$C_4$ alkyl substituted with up to 4 substituents selected from the group consisting of phenyl, Cl, Br, OH, O alkyl of 1 to 4 carbon atoms, SH, S alkyl of 1 to 4 carbon atoms, and CN; or phenyl substituted with up to 4 substituents selected from the group consisting of Cl, Br, $C_1$ to $C_4$ alkyl, CN, COOH, COO alkyl of 2 to 5 carbon atoms, $NO_2$, OH, O alkyl of 1 to 4 carbon atoms, SH and S alkyl of 1 to 4 carbon atoms;

(iii) X is halogen;

(iv) $X_1$, $X_2$, $X_3$ and $X_4$ are selected from the group consisting of halogen, polyhaloalkyl, $NO_2$, CN, alkyl, alkoxy, $SO_2$ alkyl, $SO_2NH_2$, NO, and COO alkyl, wherein said alkyl and alkoxy groups have 1 to 4 carbon atoms.

15. A herbicidal composition comprising a herbicidally effective amount of a compound according to claim 1 and an agronomically acceptable carrier.

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**4,744,819**

## 4-OXO PYRIDINECARBOXAMIDE DERIVATIVES AS PLANT GROWTH REGULATORS

**Yoichiro Ueda, Himeji; Yoshiyuki Hirako, Otake; Kazuhisa Masamoto; Yukihisa Goto, both of Himeji; Hiroshi Yagihara, Himeji; Yasuo Morishima, Kobe, and Hirokazu Osabe, Himeji, all of Japan, assignors to Daicel Chemical Industries Ltd., Osaka, Japan**

**Filed Oct. 21, 1985, Ser. No. 789,412**

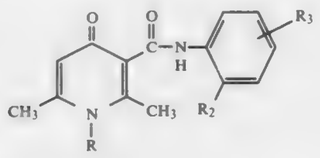
**Claims priority, application Japan, Oct. 23, 1984, 59-223688; Jan. 10, 1985, 60-2719**

**The portion of the term of this patent subsequent to Feb. 16, 2005, has been disclaimed.**

**Int. Cl.[4] A01N** *43/40;* **C07D** *213/82, 401/06, 405/06*

**U.S. Cl. 71—94** **10 Claims**

1. A method for inhibiting plant growth comprising treating the plant or its seed with a plant growth inhibitory-effective amount of a compound of the formula (I)



(I)

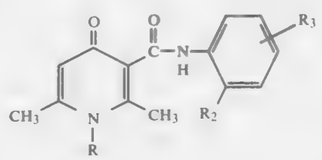
or a salt thereof wherein

R is (a) a hydrogen atom, (b) an alkoxy group, (c) an aralkyloxy group selected from the group consisting of phenylmethoxy, phenethyloxy, phenylpropoxy, or phenylbutoxy which may be substituted by an alkyl or a halogen atom on the aryl ring, or (d) a group of $-(CH_2)_n-R_1$ wherein n is an integer from 1 to 3 and $R_1$ is a hydrogen atom, hydroxy group, lower alkoxy group, mercapto group, lower alkylthio group, amino group, di-lower alkylamino group, $C_{3-11}$ alkyl group, lower alkenyl group, lower alkynyl group, cycloalkyl group, a furyl or pyridyl group which may be substituted by halogen, lower alkyl, or phenyl, or a phenyl or naphthyl group which may be substituted by one or two substituents of halogen, lower alkyl, or lower alkoxy;

$R_2$ is a halogen atom, lower alkyl group, hydroxy group, lower alkoxy group, aryloxy group, carboxy group, or lower alkoxy-carbonyl group; and

$R_3$ is a hydrogen atom, halogen atom, or lower alkyl group.

6. A compound of the formula (I)



(I)

or a salt thereof wherein

R is a $C_{4-6}$ alkyl group, a $C_{2-3}$ alkyl group substituted by phenyl or phenyl having either one of halogen or methyl, a $C_{1-3}$ alkyl group substituted by cycloalkyl, or a lower alkoxy group which may be substituted by phenyl;

$R_2$ is a halogen atom, or methyl or ethyl group; and

$R_3$ is a hydrogen atom, a halogen atom, or a methyl or ethyl group.

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**4,744,820**

## CYCLOHEXENONE DERIVATIVES, THEIR MANUFACTURE, AND THEIR USE AS AGENTS FOR REGULATING PLANT GROWTH

**Michael Keil, Freinsheim; Ulrich Schirmer, Heidelberg; Dieter Kolassa, Ludwigshafen; Wilhelm Rademacher, and Johann Jung, both of Limburgerhof, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

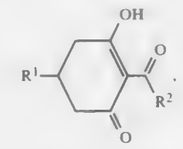
**Filed Feb. 13, 1987, Ser. No. 14,542**

**Claims priority, application Fed. Rep. of Germany, Feb. 15, 1986, 3604871**

**Int. Cl.[4] A01N** *31/06*

**U.S. Cl. 71—123** **7 Claims**

1. Cyclohexenone derivatives of the formula



I

where $R^1$ is —CHO or $—CH(OR^3)_2$, $R^2$ is alkyl or alkoxyalkyl, each of 1 to 4 carbon atoms, or cyclopropyl, and $R^3$ is alkyl of 1 to 8 carbon atoms, and salts thereof.



**4,744,821**

## PROCESS FOR PRODUCING SPHEROIDAL METAL PARTICLES

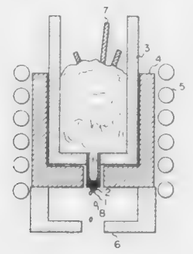
**Ritsue Yabuki, Iwatsuki, and Junya Ohe, Ohmiya, both of Japan, assignors to Mitsubishi Kinzoku Kabushiki Kaisha, Tokyo, Japan**

**PCT No. PCT/JP84/00613, § 371 Date Jul. 29, 1986, § 102(e) Date Jul. 29, 1986, PCT Pub. No. WO86/03700, PCT Pub. Date Jul. 3, 1986**

**PCT Filed Dec. 24, 1984, Ser. No. 909,117**

**Int. Cl.[4] B22D** *23/08*

**U.S. Cl. 75—0.5 C** **12 Claims**



1. A process for producing spheroidal metal granules for use in pad hardening having substantially uniform size and shape from a melt of a molten metal from the group consisting of nickel, cobalt or copper or a molten alloy from the group consisting of nickel-base, cobalt-base and copper-base alloys, said melt being held in a refractory vessel having a small-diameter nozzle provided at the bottom thereof by dropping small globules of said melt into a coolant through said nozzle, said nozzle having one or more vertical holes of an inside diameter of 0.3 to 3.0 mm, the globules of the melt emerging from said nozzle being dropped into a two-layered cooling medium composed of an overlying oil layer having a viscosity grade of 10–680 according to the ISO VG (International Standards Organization for Viscosity Grading) and an underlying water layer, said globules being solidified and cooled as they pass through said cooling medium.

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**4,744,822**

## PROCESS FOR CONTINUOUS PURIFICATION OF HOT METAL

**Maurizio Palchetti; Santi Palella, and Adolfo Crisafulli, all of Rome, Italy, assignors to Centro Sviluppo Materiali S.p.A., Rome, Italy**

**Filed Dec. 3, 1986, Ser. No. 937,363**

**Claims priority, application Italy, Dec. 3, 1985, 48864 A/85**

**Int. Cl.[4] C21C** *7/02*

**U.S. Cl. 75—57** **6 Claims**



1. Continuous process for purification of hot metal containing silicon, sulphur and phosphorus tapped from a blast furnace through an iron notch into a trough and thence into a receptacle, comprising the following steps:

measuring at least the silicon content of the hot metal as it is tapped from the blast furnace;

adding sulfur reduction agent to the hot metal flowing in the trough close to the iron notch;

deslagging the hot metal;

adding silicon reduction agent to the hot metal when the silicon exceeds 0.25%; and

adding phosphorus reduction agent to the hot metal entering the receptacle.

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**4,744,823**

## PROCESS FOR THE PURIFICATION OF METALS BY FRACTIONAL CRYSTALLISATION

**André Raymond-Seraille, Vicdessos, France, assignor to Aluminum Pechiney, France**

**Filed Dec. 30, 1986, Ser. No. 947,600**

**Claims priority, application France, Jan. 6, 1986, 86 00399**

**Int. Cl.[4] C22B** *21/00*

**U.S. Cl. 75—68 R** **5 Claims**

1. In a process for the purification of metals by fractional crystallization comprising the steps of:

(a) immersing an internally cooled body into an externally heated container containing a volume of liquid metal to progressively solidify said liquid metal to form purified metal crystals and a supernatant liquid metal containing concentrated impurities;

(b) collecting said crystals in the bottom of said container;

(c) compacting said crystals to form a purified mass of metal crystals;

(d) separating said purified mass from said supernatant liquid metal by tilting the container to drain off said supernatant liquid metal;

the improvement which comprises, after said supernatant liquid metal has drained, maintaining the container in its tilted position for a period of from 5 minutes to 1 hour to drain interstitial liquid from said purified mass to thereby improve the purity of said mass.

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**4,744,824**

## METHOD OF PRODUCING METALLIC MATERIALS FOR THE COMPONENTS OF NUCLEAR REACTORS

**Shunichi Yuhara, Higashi-Ibaraki; Yutaka Oka, Chiba; Terufumi Sasaki, Chiba; Osamu Masuko, Chiba; Kiyohiko Nohara, Chiba, and Tomoo Tanaka, Chiba, all of Japan, assignors to Doryokuro Kakunenryo Kaihatsu Jigyodan, Tokyo and Kawasaki Steel Corporation, Kobe, both of, Japan**

**Filed May 29, 1986, Ser. No. 868,789**

**Claims priority, application Japan, Jun. 6, 1985, 60-123106; Jun. 20, 1985, 60-135070**

**Int. Cl.[4] C22B** *23/00*

**U.S. Cl. 75—82** **3 Claims**

1. A method of producing metallic materials for the components of nuclear reactors, which components are under neutron irradiation environment, which comprises adding a boron-containing material having a ratio of $^{11}B$ content to $(^{10}B+^{11}B)$ content larger than the ratio of $^{11}B$ content to $(^{10}B+^{11}B)$ content of about 0.8 in naturally produced boron to molten metal for the production of a given metallic material, and then subjecting to a refining process for decreasing the total boron content in molten metal.

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**4,744,825**

## REMOVAL AND RECOVERY OF SILVER FROM WASTE STREAM

**Abraham S. C. Chen, Monroeville, and Hubert L. Fleming, Mars, both of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.**

**Filed Dec. 4, 1986, Ser. No. 937,682**

**Int. Cl.[4] C22B** *11/04*

**U.S. Cl. 75—118 R** **20 Claims**

1. An improved process for the efficient removal and recov-

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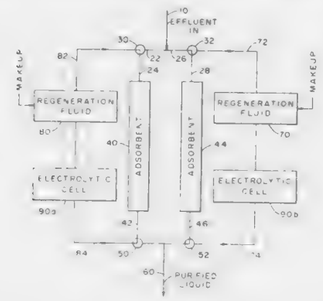


ery of silver from a solution containing complexed silver ions which comprises:

(a) contacting the silver-containing solution with an activated alumina adsorbent to selectively adsorb the complexed silver ions from said solution and to lower the subsequent effluent discharge to less than 1 ppm silver;

(b) treating said activated alumina adsorbent with a regeneration fluid to recover said silver from said adsorbent; and

(c) reducing said recovered silver to metallic silver.




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**4,744,826**

**INK COMPOSITION**

**Zenshiro Iijima, Abiko, Japan, assignor to Adger Kogyo Co., Ltd., Japan**

**Filed Jul. 29, 1986, Ser. No. 890,283**

**Claims priority, application Japan, Aug. 6, 1985, 60-172636**

**Int. Cl.⁴ C09D** *11/00*

**U.S. Cl. 106—20** **5 Claims**

1. A colorless, transparent ink composition consisting essentially of an alkaline aqueous medium and an amine complex salt of zinc dissolved in said aqueous medium, said complex salt being the reaction product of ammonia and zinc hydroxide, said ink composition turning white upon use.

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**4,744,827**

**(METH)-ACRYLIC ACID DERIVATIVES OF TRICYCLODECANES AND THEIR USE**

**Jens Winkel, Cologne; Bruno Bömer, Bergisch-Gladbach; Robert Schmitz-Josten, Cologne; Gerhard Klein, Monheim; Carlhans Süling, Odenthal, and Dieter Arlt, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

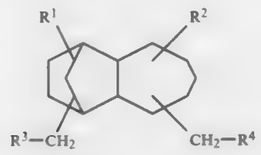
**Filed Jun. 4, 1986, Ser. No. 870,609**

**Claims priority, application Fed. Rep. of Germany, Jun. 20, 1985, 3522006**

**Int. Cl.⁴ A61K** *6/02;* **C07C** *69/52, 125/06*

**U.S. Cl. 106—35** **8 Claims**

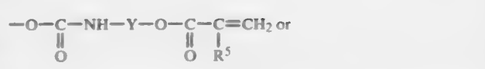
1. A (Meth)-acrylic acid derivative of a tricyclodecane of the formula



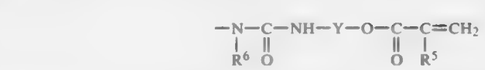
in which

$R^1$ and $R^2$ each independently denote hydrogen, lower alkyl, lower alkyoxy, halogen or trifluormethyl and

$R^3$ and $R^4$ each independently represent the group

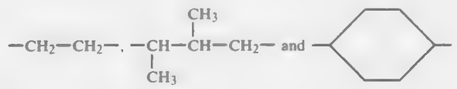


or



wherein

Y denotes a divalent bridge member selected from the group consisting of



and wherein

$R^5$ represents hydrogen or methyl and

$R^6$ represents, lower alkyl or phenyl.

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**4,744,828**

**(METH)-ACRYLIC ACID ESTERS AND THE USE THEREOF**

**Jens Winkel, Cologne; Bruno Bömer, Bergisch-Gladbach; Carlhans Süling, Odenthal; Jürgen Reiners, Leverkusen, and Wolfgang Podszun, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

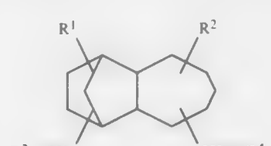
**Filed Jun. 4, 1986, Ser. No. 870,610**

**Claims priority, application Fed. Rep. of Germany, Jun. 20, 1985, 3522005**

**Int. Cl.⁴ A61K** *6/02;* **C07C** *69/52, 125/06*

**U.S. Cl. 106—35** **9 Claims**

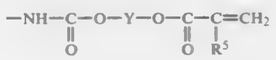
1. A (meth)-acrylic acid derivative of a tricyclodecane of the formula



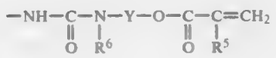
in which

$R^1$ and $R^2$ are identical or different and denote hydrogen, lower alkyl, lower alkoxy, halogen or trifluoromethyl and

$R^3$ and $R^4$ are identical or different and represent the groups



or



in which

Y is selected from the group consisting of a linear or branched hydrocarbon chain which has 2 to 10 carbon atoms, a linear or branched hydrocarbon chain which has 2 to 10 carbon atoms and contains at least one oxygen bridge, a linear or branched hydrocarbon chain which has 2 to 10 carbon atoms and is substituted by 1 to 4 acrylate or methacrylate radicals, and a linear or branched hydrocarbon chain which has 2 to 10 carbon atoms and contains at least one oxygen and is substituted by 1 to 4 acrylate or methacrylate radicals and

$R^5$ represents hydrogen or methyl and

$R^6$ represents hydrogen, lower alkyl or phenyl.



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**4,744,829**

**PROCESS FOR PRODUCING AGGLOMERATES WHICH ARE RESISTANT TO LEACHING OUT**

**Hubert Eirich, Sandweg 16; Paul Eirich, Bahnhofstr. 11, and Walter Eirich, Spessartweg 16, all of 6969 Hardheim, Fed. Rep. of Germany**

**Filed Jul. 11, 1986, Ser. No. 884,555**

**Claims priority, application Fed. Rep. of Germany, Jul. 13, 1985, 3525111**

**Int. Cl.⁴ C04B** *7/02;* **C02F** *1/68*

**U.S. Cl. 106—97** **21 Claims**

1. A process for producing agglomerates from finely divided waste materials, which are resistant to leaching out, characterised in that a hydraulic binding agent is dissolved in water under a condition of forced mixing until it substantially no longer sediments; the resulting aqueous colloidal solution is combined with the finely divided waste materials and in so doing the water content of the mixture is adjusted to an agglomeratable consistency; the mixture is agglomerated through mixing, and then hardened.

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**4,744,830**

**FIBROUS BINDER AND A METHOD FOR THE PREPARATION THEREOF**

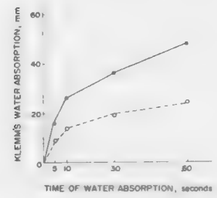
**Yoshinari Kobayashi, and Ryukichi Matsuo, both of Takamatsu, Japan, assignors to Agency of Industrial Science & Technology, Tokyo, Japan**

**Filed Nov. 26, 1986, Ser. No. 935,203**

**Claims priority, application Japan, Dec. 7, 1985, 60-275678**

**Int. Cl.⁴ C08L** *5/00*

**U.S. Cl. 106—205** **6 Claims**




1. A fibrous binder formed of a water-insoluble gel comprising a water-insoluble metal salt of alginic acid and an alkyleneglycol ester of alginic acid.

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**4,744,831**

**HOLLOW INORGANIC SPHERES AND METHODS FOR MAKING SUCH SPHERES**

**Warren R. Beck, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Jul. 30, 1984, Ser. No. 635,658**

**Int. Cl.⁴ C04B** *14/00*

**U.S. Cl. 106—288 B** **8 Claims**

1. A free-flowing mass of hollow spheres which individually comprise a solidified seamless spherical exterior wall that defines and encloses a central interior space, the exterior wall of the individual spheres being at least about ½ millimeter thick and comprising inorganic particulate material selected from metals, metalloids, metal oxides and metal salts sintered together to provide a rigid shape-retaining structure.

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**4,744,832**

**IRON OXIDE COATED PERLESCENT PIGMENTS**

**Klaus D. Franz, Kelkheim, and Klaus Ambrosius, Frankfurt am Main, both of Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Fed. Rep. of Germany**

**Filed Aug. 7, 1986, Ser. No. 894,138**

**Claims priority, application Fed. Rep. of Germany, Aug. 7, 1985, 3528256**

**Int. Cl.⁴ C09C** *1/24, 1/36*

**U.S. Cl. 106—309** **16 Claims**

1. In a pearlescent pigment comprising a plateletlike substrate coated with metal oxides, the metal oxide layer containing titanium dioxide and iron oxide, the improvement wherein the pigment comprises a multi-layer structure in which superimposed on the substrate is a first layer of $TiO_2$ in the rutile form, formed from a precipitated layer of titanium dioxide or titanium dioxide hydrate, having a thickness of at least 40 nm, the latter being superimposed by a layer of pseudobrookite and the latter being superimposed by an iron oxide layer, formed by the precipitation of an iron oxide or hydroxide layer, having a thickness of at least 15 nm, wherein the $TiO_2$ concentration, relative to the total pigment, is about 20 to about 50% by weight, and the iron side concentration relative to the total pigment, is about 10 to about 50% by weight.

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**4,744,833**

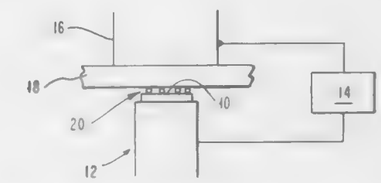
**ELECTROSTATIC REMOVAL OF CONTAMINANTS**

**Douglas W. Cooper, Millwood; Henry L. Wolfe, Pleasant Valley, and James T. C. Yeh, Katonah, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Jun. 11, 1987, Ser. No. 61,753**

**Int. Cl.⁴ B08B** *3/12*

**U.S. Cl. 134—1** **16 Claims**




1. A method for removing micron and/or sub-micron sized contaminant particles from a surface comprising the steps of:

(a) establishing a first electrically conductive base means, said first base means being connected to one terminal of a high voltage, direct current power supply,

(b) locating the surface from which the particles are to be removed on said first base means,

(c) establishing a second electrically conductive base means in a predetermined and geometrical position at least one particle diameter apart from said first base means and said surface, said second base means being connected to the other terminal of said high voltage, direct current power supply,

(d) placing an insulator between said second base means and said surface from which particles are to be removed, and

(e) applying an electric field of approximately 0.1 MV/cm or larger between said first and second base means to electrostatically remove said particles from said surface.

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**4,744,834**

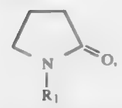
## PHOTORESIST STRIPPER COMPRISING A PYRROLIDINONE, A DIETHYLENE GLYCOL ETHER, A POLYGLYCOL AND A QUATERNARY AMMONIUM HYDROXIDE

**Noor Haq, 20291 Saratoga-Los Gatos Road, Saratoga, Calif. 95070**

**Filed Apr. 30, 1986, Ser. No. 857,841**
**Int. Cl.[4] C09D** *9/00;* **C11D** *7/52;* **C23D** *17/00;* **G03C** *11/12*
**U.S. Cl. 134—38** **10 Claims**

1. A composition of matter useful for removing a photoresist material from a substrate, comprising:

50 to 80% by weight of a 2-pyrrolidinone compound of the formula



15 to 30% by weight of a diethylene glycol monoalkyl ether of the formula

$$HOCH_2CH_2OCH_2CH_2OR_2$$

1 to 10% by weight of a polyglycol having a molecular weight from about 200 to about 600; and

0.5 to 4% by weight of a quaternary ammonium hydroxide of the formula

$$N^+R_3R_4R_5R_6\,OH^-$$

wherein $R_1$ is hydrogen, alkyl 1 to 3 carbon atoms or hydroxyalkyl of 1 to 3 carbon atoms, $R_2$ is alkyl of 1 to 4 carbon atoms, $R_3$ and $R_4$ are the same or different alkyl groups of 1 to 4 carbon atoms, $R_5$ is an alkyl group of 1 to 18 carbon atoms, and $R_6$ is an alkyl group of 1 to 18 carbon atoms, phenyl, alkyl phenyl wherein the alkyl is of 1 to 18 carbon atoms, benzyl, or alkylbenzyl where the alkyl is of 1 to 18 carbon atoms.

10. A method of removing a photoresist material from a substrate comprising contacting said substrate with the composition of claim 1.

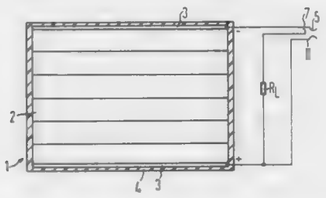
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**4,744,835**

## ARRANGEMENT FOR AVOIDING UNWANTED DEGRADATION IN NO-LOAD OPERATION OF SOLAR CELL MODULES COMPOSED OF AMORPHOUS SILICON

**Guenter Winstel, and Rolf Plaettner, both of Ottobrunn, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Jan. 2, 1987, Ser. No. 160**
**Claims priority, application Fed. Rep. of Germany, Mar. 25, 1986, 3610083**
**Int. Cl.[4] H02N** *6/00;* **H01L** *25/04*
**U.S. Cl. 136—244** **5 Claims**



1. An arrangement for avoiding unwanted degradation in no-load operation of amorphous silicon solar cells which are interconnected to form a module which has a pair of output contacts which extend to load terminals, comprising:

an internal load resistor integrated within the module; and

switching means operable upon disconnection of the load terminals from a load to connect said internal load resistor across said output contacts.

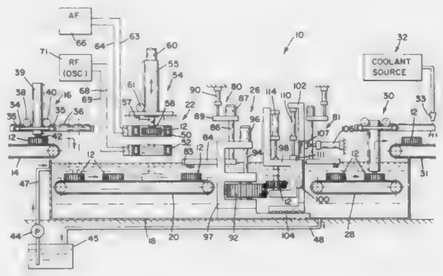
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**4,744,836**

## METHOD FOR SELECTIVELY HEATING A WORKPIECE SUBJECTED TO LOW TEMPERATURE THERMOMECHANICAL PROCESSING

**George D. Pfaffmann, Farmington, Mich., assignor to Tocco, Inc., Boaz, Ala.**

**Continuation-in-part of Ser. No. 899,323, Aug. 22, 1986, Pat. No. 4,715,907, which is a division of Ser. No. 752,550, Jul. 8, 1985, Pat. No. 4,637,844. This application Jan. 23, 1987, Ser. No. 6,142**
**The portion of the term of this patent subsequent to Jan. 20, 2004, has been disclaimed.**
**Int. Cl.[4] C21D** *8/00*
**U.S. Cl. 148—12 R** **17 Claims**




1. A method for finish forming and heat treating a preselected portion of a ferrous workpiece comprising the steps of:

(a) preheating a preselected first portion of said workpiece to a temperature at least equal to the approximate $M_s$ temperature, but less than the austenitic temperature of said workpiece;

(b) heating a second portion of said workpiece to a temperature at least equal to the austenitic temperature for said workpiece, said second portion smaller than and contained within said first portion;

(c) forming the desired shape of said workpiece by means of a shaping tool mechanically deforming said second portion before said second portion drops in temperature below said $M_s$ temperature; and,

(d) cooling said workpiece below said $M_s$ temperature.

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**4,744,837**

## BRIGHT ANNEALING OF STAINLESS STEELS

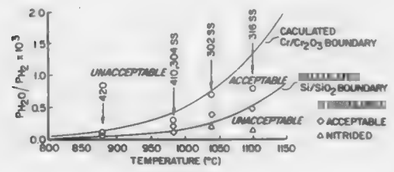
**James W. Brockington, Allentown; Alejandro L. Cabrera, Fogelsville; Charles G. Coe, Macungie, and John F. Kirner, Allentown, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.**

**Filed Jan. 13, 1987, Ser. No. 2,841**
**Int. Cl.[4] C21D** *1/74*
**U.S. Cl. 148—16** **10 Claims**

1. In a process for bright annealing of chromium containing ferrous alloys in an atmosphere of nitrogen and hydrogen containing controlled additions of an inhibitor elected from the group consisting of water vapor, oxygen, oxides of nitrogen, oxides of carbon and mixtures thereof while controlling the dewpoint of the furnace atmosphere and/or the ratio of the partial pressure of the inhibitor to the oartial pressure of hydrogen in said atmosphere, the improvement which conprises providing at least one element which oxidizes more readily than Cr at the surface of the article to be annealed in an amount



such that it is oxidized in preference to the Cr in said article and controlling the ratio of the partial pressure of the inhibitor to the partial pressure of the hydrogen in the furnace atmosphere as a function of the temperature and the content of said element, whereby nitrogen uptake is inhibited and dulling the metal surface by formation of a film containing chromium oxide on said surface is avoided.



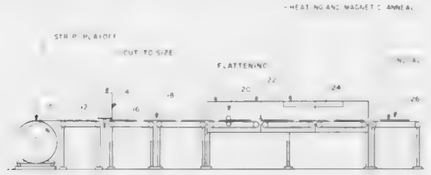

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**4,744,838**

## METHOD OF CONTINUOUSLY PROCESSING AMORPHOUS METAL PUNCHINGS

**Kou C. Lin, Mercer County, Pa.; Charles E. Burkhardt, Georgetown County, S.C., and Paul W. Martincic, Mercer County, Pa., assignors to Electric Power Research Institute, Inc., Palo Alto, Calif.**

**Filed Jul. 10, 1986, Ser. No. 884,215**
**Int. Cl.[4] H01F** *1/00;* **C21D** *1/26*
**U.S. Cl. 148—120** **8 Claims**




1. A method of magnetic field annealing of amorphous metal strip for use in a transformer core, comprising the steps of

cutting amorphous metal strip into a plurality of separate blanks as needed for a transformer core,

feeding each of said metal blanks through a heat source to heat said blanks, and flattening each of said blanks,

thermally and magnetically annealing each of said blanks at a temperature greater than about 360° C., and

cooling said blanks whereby they are prepared for stacking into a transformer core.

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**4,744,839**

## PROCESS FOR A RAPID AND HOMOGENEOUS CARBURIZATION OF A CHARGE IN A FURNACE

**Philippe Queille, Viroflay, France, assignor to L'Air Liquide, Paris, France**

**Filed Jul. 15, 1986, Ser. No. 885,852**
**Claims priority, application France, Aug. 14, 1985, 85 12379**
**Int. Cl.[4] C21D** *1/74*
**U.S. Cl. 148—16.5** **9 Claims**

1. In a carburization-diffusion process in a batch furnace having a door, the process comprising preheating said furnace to a carburizing temperature; opening the door of said furnace; introducing a workpiece into said furnace; closing the door of said furnace; injecting a carburization atmosphere at a flow rate of $D_1$ comprised of a mixture of between 10% to 85% nitrogen and the balance methanol; subjecting the workpiece to a first carburization phase, in the course of which the rate of transfer of the carbon from the atmosphere of the furnace to the surface of the workpiece is preponderant relative to the rate of diffusion of the carbon from the surface of the workpiece to the interior of the workpiece; injecting a diffusion atmosphere at a flow rate $D_2$ comprised of a mixture of between 10% and 85% nitrogen and the balance methanol different from the mixture comprising the carburization atmosphere; subjecting the workpiece to a second diffusion phase, in the course of which said rate of diffusion becomes preponderant relative to said rate of transfer; maintaining a temperature of between 850° C. and 1050° C. during said carburization and diffusion phases; and the flow rates $D_1$ and $D_2$ being in a relationship such that:

$$1.5D_2 \leqq D_1 \leqq 2D_2$$

where said flow rate $D_2$ is at least equal to the minimum safety flow rate of said furnace.

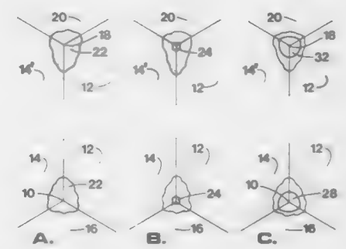
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**4,744,840**

## METHOD FOR SEALING CONTROLLED-ATMOSPHERE STORAGE ROOM

**Michael J. Addleman, Cashmere, Wash., assignor to Bethlehem Construction Co., Inc., Cashmere, Wash.**

**Filed Nov. 17, 1986, Ser. No. 931,347**
**Int. Cl.[4] E04B** *1/66, 2/04*
**U.S. Cl. 156—71** **12 Claims**




1. A method of sealing a room having a floor, a ceiling, and at least two adjacent walls lying between said floor and said ceiling comprising the steps of:

(a) adhesively securing a square of gas-impermeable sheet material into each three-way corner of said room;

(b) adhesively scuring a patch of said gas-impermeable sheet material larger than said square of material onto the adjacent surfaces making up ach of said three-way corners, overlying said square of material;

(c) adhesively securing sheets of said gas-impermeable material to ach of sid walls and said ceiling of said room, substantially completely covering saidwalls and ceiling; and

(d) adhesively securing continuous strips of said gas-impermeable sheetmaterial onto said walls and ceiling of said room at the intersection of adjacnet walls and the intersection of the walls and floor and the intersection of the walls and ceiling of the room, ach of said strips overlapping at least a portion of the sheets of material covering each of said adjacent walls or floor or ceiling associated with wach such strip.

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**4,744,841**

## APPARATUS AND METHOD FOR REPAIRING GLASS BODIES

**Thomas L. Thomas, 190 W. 1700 North, Centerville, Utah 84014**

**Filed Apr. 21, 1986, Ser. No. 854,002**
**Int. Cl.[4] B32B** *31/16, 35/00*
**U.S. Cl. 156—73.6** **7 Claims**

1. A method of repairing glass comprising the steps of

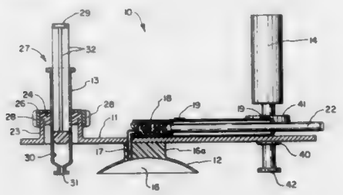
picking loose glass particles from a glass break in the surface of glass body such as a windshield or the like;

positioning a pressure applier over the break and fixing said pressure applier to the surface of the glass;

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injecting resin through the pressure applier into the glas break while simultaneously vibrating and heating the glass body surface; and



discontinuing heating and vibrating of the glass and removing the pressure applier from the glass body.

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**4,744,842**

## METHOD OF MAKING A COATED PIPELINE

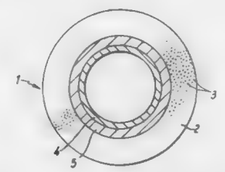
**George A. Webster, Aberdeen, and Steven A. Burton, Montrose, both of Scotland, assignors to Webco Limited, Scotland**

**Continuation of Ser. No. 819,912, Jan. 16, 1986, abandoned. This application Jul. 6, 1987, Ser. No. 70,646**

**Claims priority, application United Kingdom, Jan. 17, 1985, #501196**

**Int. Cl.[4] B32B *31/24***

**U.S. Cl. 156—78** **9 Claims**



1. A method for producing a conduit having a thermally insulating, resilient, water impermeable coating comprising the steps of:

providing a mould around a conduit;

supplying to said mould a mixture of chemicals which are capable of reacting chemically together to form a thermally insulating, resilient, water impermeable material, said mixture having dispersed therein a plurality of discrete units of which at least a portion is hollow;

providing conditions in said mould to cause chemical reaction between said chemicals throughout said mould thereby to form said thermally insulating, resilient, water impermeable material containing said discrete units dispersed therein;

removing said thermally insulating, resilient, water impermeable covered conduit from said mould.

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**4,744,843**

## RELEASE TREATMENT USING A NON-REINFORCING, NON-WOVEN FABRIC FOR CONVEYOR BELT CURING

**Richard K. Lewis, Wadsworth, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Continuation of Ser. No. 548,392, Nov. 3, 1983, abandoned. This application Sep. 26, 1986, Ser. No. 913,170**

**Int. Cl.[4] B32B *31/20***

**U.S. Cl. 156—87** **4 Claims**

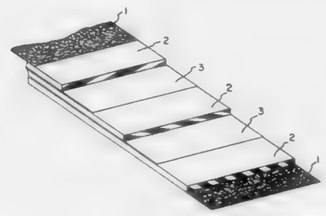
1. A method of manufacturing a reinforced rubber belt using a belt curing press having a lower platen and an upper platen, said upper and lower platens being moveable relative to each other, said method comprising:

(a) superposing an outer layer of uncured rubber over a plurality of alternating layers of reinforcing members and uncured rubber to form an uncured belt precursor;

(b) positioning a mold release layer on said outer layer of rubber of said belt precursor, said mold release layer being a non-reinforcing, non-woven fabric of entangled continuous filaments having a melt temperature above 200° C., said filaments being bonded at each crossover point and selected from the group consisting of polyesters and polyamides;

(c) placing said belt precursor in said belt curing press between said upper platen and lower platen such that said mold release layer of said non-reinforcing, non-woven fabric is adjacent to one of said platens;

(d) moving said upper platen and lower platen together to place said belt precursor overlaid by said mold release



layer of non-reinforcing, non-woven fabric under sufficient pressure to make said non-woven fabric an integral part of said belt precursor;

(e) heating said upper platen and lower platen to about 90° C. to about 165° C. for a time sufficient to fully cure said rubber layers of said belt precursor to form the reinforced rubber belt;

(f) eliminating air trapped between said belt precursor and said upper and lower platens of said belt press by migration of said trapped air along said continuous filaments of said non-woven fabric mold release layer;

(g) separating said upper platen and said lower platen to release the pressure on said reinforced rubber belt; and

(h) removing said reinforced rubber belt from said belt curing press.

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**4,744,844**

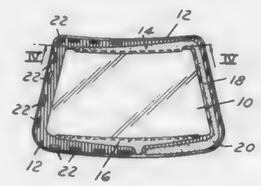
## METHOD OF MAKING A LAMINATED WINDSHIELD

**Garfield W. Hurst, Niagara on the Lake, Canada, assignor to Ford Motor Company, Dearborn, Mich.**

**Filed Jan. 12, 1987, Ser. No. 2,485**

**Int. Cl.[4] B32B *17/00***

**U.S. Cl. 156—101** **4 Claims**



1. A method of making a windshield having two sheets of glass laminated together by a laminating interlayer which comprises the steps of:

cutting a first glass template from a sheet of glass;

placing on a selected surface of said first glass template opaque material which is bondable to said selected surface to form opaque areas on said selected surface which do not transmit light in the visible wave length area;

bonding said opaque material to said selected surface of said first glass template to form said opaque areas;

placing on portions of both said opaque areas and said selected surface of said first glass template conductive material which is bondable to portions of both said opaque areas and said selected surface to form electrically conductive terminal areas for an electrically conductive coating to be applied between terminal areas of opposite polarity;

placing on portions of said opaque areas not having electrically conductive terminal areas thereon a slippage inducing material which is bondable to portions of said opaque areas to permit slippage of a glass template thereover;

bonding said conductive material to said portions of said opaque areas and said selected surface area;

bonding said slippage inducing material to portions of said opaque areas;

cutting a second glass template from a sheet of glass;

placing said second glass template and said first glass template in a glass bending device in such a manner that said selected surface of said first glass template is in facing relationship with a surface of said second glass template;

bending said first and said second glass templates, said electrically conductive terminal areas and slippage inducing material permitting relative movement between said first and said second glass templates during said bending thereof without the production of glass chips;

separating said first and said second glass templates;

applying an electrically conductive coating between said terminal areas of opposite polarity on said first glass template;

reuniting said first and said second glass templates with an interposed laminating interlayer; and

laminating said first and said second glass templates together to form a laminated glass windshield.



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**4,744,845**

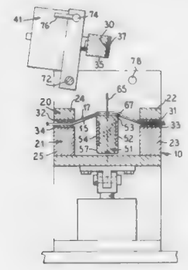
## APPARATUS FOR SPLICING FILM TOGETHER

**John Posey, McHenry, Ill., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.**

**Filed Sep. 12, 1986, Ser. No. 906,726**

**Int. Cl.[4] B65H *69/06, 69/08***

**U.S. Cl. 156—159** **25 Claims**



1. An apparatus for splicing film comprising:

a first jaw having a first bar and a second bar;

a second jaw having a first bar and a second bar;

the first and second jaws cooperating to clamp two film ends between the first and second bars of said first and second jaws;

sealing means located in the first jaw for sealing the two ends of the film together; and

film moving means including a rotatable member having at least one side that includes a slot and at least one side that includes a backup member located within the second jaw for moving film secured between the first and second bars of the first and second jaws from a first position to a second position wherein when the film ends are in the second position the film ends are in a horizontal plane substantially the same as a horizontal plane defined between the first and second bars of the first and second jaws, and when the film ends are in the first position the portion of the film ends between the first and second bars of the first and second jaws extends outwardly from that plane a side of the rotatable member having the slot contacting the film ends when the film ends are in the first position and a side of the rotatable member having the back up member contacting the two ends of the film when the film ends are in the second position.

21. A method of splicing film comprising the steps of:

passing a first film end between a splicer having a first jaw and a second jaw, the first jaw being coupled to sealing means for sealing two film ends together and the second jaw being coupled to film moving means including a rotatable block for moving the film ends to a first cutting position and to a second sealing position each jaw including a first bar and a second bar, the first and second bars of each jaw defining when they are clamped together a horizontal plane;

passing a second film end between the first and second jaws;

rotating the rotatable block to a cutting position;

moving the jaws together and clamping the two film ends together between the first and second bars of the first and second jaws;

the rotatable block causing at least a portion of the film ends to extend outwardly from the horizontal plane;

severing the two film ends as the two film ends are in the first cutting position;

rotating the rotatable block to cause the two film ends to move to the second sealing position;

peeling back a scrap layer from the first film end and a scrap layer from the second film end; and

sealing the two remaining layers of the two film ends together with the sealing means.

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**4,744,846**

## METHOD OF SHAPING RESIN LAMINATE SHEET

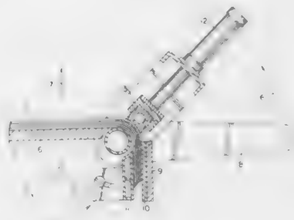
**Guenther Pflug, Vienna, and Georg Petershofer, Wiener Neudorf, both of Austria, assignors to Isovolta, Vienna, Austria**

**Continuation of Ser. No. 441,429, Nov. 15, 1982, abandoned, which is a division of Ser. No. 915,577, Jun. 15, 1978, abandoned. This application Mar. 6, 1985, Ser. No. 708,373**

**Claims priority, application Austria, Jun. 20, 1977, 4317/77**

**Int. Cl.[4] B31D *3/00;* C09J *3/02;* B29C *45/14***

**U.S. Cl. 156—212** **7 Claims**



1. A process for the heat shaping at an elevated deformation temperature of a heat shapable resin laminate sheet for producing a bent laminate having an edge zone of the sheet bent at an angle which retains its bent shape without being fixed on a support, the laminate being composed of several heat-bonded support webs impregnated with thermosetting binders and molded at an elevated temperature, the deformation temperature being higher than the temperature utilized in molding the laminate sheet, the laminate sheet having a thickness of greater than 1.2 mm and a decorative surface on at least one side and

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comprising a plurality of individual laminations, each of which is formed separately of one or more support webs impregnated with post-forming, thermosetting binders, and of thermoplastic binder layers arranged between the individual laminations and forming joints between them, the softening temperatures or the melting temperatures of the thermoplastic binders being lower than the deformation temperature comprising (a) heating the heat shapable resin laminate sheet, the heat being applied at least over a deformation area of the sheet to a temperature higher than the softening temperature or higher than the melting temperature of the thermoplastic binder, which deformation area is formed of a bending area and the edge zone to be bent at an angle, (b) thereupon bending the sheet within the bending area in a bending device around a cylindrical surface the radius of which is less than 8 times the thickness of the sheet whereby the laminations of the sheet shift relative to each other in the deformation area in the direction of the sheet surface to produce a stepped edge at one border of the bent edge zone, (c) cooling the sheet after termination of the bending process, provided that during and/or after shaping and at least until the binder solidifies again during cooling separation of the joints formed by the binder is prevented and (d) removing the stepped edge by trimming.

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**4,744,847**

## FILM TRIMMING OF LAMINATED PHOTOSENSITIVE LAYER

**Tit-Keung Lau, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Jan. 29, 1986, Ser. No. 823,529**

**Int. Cl.**[4] **B32B** *31/00;* **B44C** *1/00;* **G03C** *1/90*

**U.S. Cl. 156—238** **6 Claims**

1. A process for laminating a layer of a photosensitive composition which is supported by a stippable polymeric film to at least two substrate elements and separating the photosensitive layer and the polymeric film along an edge of each substrate element comprising the steps of:

(a) advancing two substrate elements to a laminating position;

(b) laminating a layer of a photosensitive composition supported by a strippable polymeric film onto a first substrate element and continuing the lamination onto a second substrate element whereby the sbustrate elements abut or substantially abut on another;

(c) heating a localized area of the strippable film in a line pattern adjacent an edge of each of the substrate elements which abut or substantially abut one another whereby the heating serves to weaken the strippable polymeric film along the line pattern without substantially adversely affecting the photosensitive composition and whereby the localized heating results in a higher temperature in the area being heated then in adjacent portions of the film;

(d) pulling on the first substrate element along its longitudinal axis in a direction of advancement of the substrate element to exceed the breaking strength of the laminated photosensitive layer and the weakened polymeric film to separate the first and second substrate elements.

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**4,744,848**

## METHOD OF FORMING A CONTOURED SHAPE

**Joseph B. Andrews, West Bloomfield; Chris G. Hewett, Birmingham, and Thomas M. Smith, Westland, all of Mich., assignors to RHJ Products, Inc., Franklin, Mich.**

**Filed Feb. 2, 1987, Ser. No. 10,068**

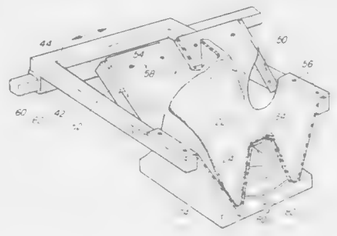
**Int. Cl.**[4] **B31F** *1/00;* **B27N** *3/10;* **B28B** *11/08;* **B29C** *55/00*

**U.S. Cl. 156—224** **15 Claims**

6. A method of forming a permanently deep drawn contour in a laminate having a woven finish sheet permanently bonded on a thermoplastic sheet, said method comprising the following steps:

(a) forming a laminate by bonding a woven finish sheet having outer sides along at least two opposed sides on a larger thermoplastic sheet having outer sides along at least two opposed sides, said woven finish sheet having a width which is less than the width of said thermoplastic sheet, whereby said outer sides of said woven finish sheet are spaced apart from said outer sides of said thermoplastic sheet to separate said woven finish sheet from said thermoplastic sheet by side margins of said thermoplastic sheet on opposed sides of said woven finish sheet;

(b) releasably clamping said thermoplastic sheet in a frame assembly, said frame assembly having opposed spaced side members, clamping means releasably clamping said side margins of said thermoplastic sheet to said side members and said frame assembly including a hinged portion hingedly attached to said side members independently supporting a portion of said laminate, said frame assembly hinged portion located adjacent the area where the deepest draw is to be formed in said laminate;



(c) heating said laminate in said frame assembly to soften said thermoplastic sheet to the forming temperature;

(d) placing said frame assembly and heated laminate in a die press having at least one contoured die member, said die member receivable between said frame assembly side members and said die member having an area of greatest contour adjacent said frame assembly hinged portion;

(e) relatively moving said die member into forming engagement with said heated laminate between said frame assembly side members, said woven finish sheet floating on said thermoplastic sheet as said thermoplastic sheet is formed by said die member and said frame assembly hinged portion moving relative to said side members to approximately midway between the areas of greatest contour of said die member; and

(f) cooling to harden said laminate in the contoured shape of said die member.

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**4,744,849**

## METHOD FOR MANUFACTURING A MOLD FOR PRODUCING MOLDED PARTS OF LARGE SIZE AND OF A COMPOSITE MATERIAL

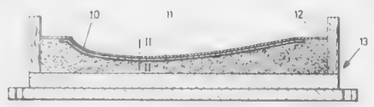
**Jean A. Michaud-Soret, Paris, France, assignor to Societe Nationale Industrielle Aerospatiale, France**

**Division of Ser. No. 651,609, Sep. 17, 1984, Pat. No. 4,659,056. This application Apr. 7, 1986, Ser. No. 848,486**

**Claims priority, application France, Sep. 19, 1983, 83 14838**

**Int. Cl.**[4] **B29C** *39/26*

**U.S. Cl. 156—245** **12 Claims**



5. A process for producing a mold intended for forming molded parts with large dimensions, especially parts of great length, made of a composite material and particularly of reinforced resin, polymerized by the application of heat and pressure, comprising:

making an impression molding plate of thick and rigid sheet metal with high thermal conductivity, with an internal molding surface substantially in the shape of a part to be molded and an external surface;

applying a number of heating elements in the form of blankets including electrical resistors to the external surface of this impression molding plate and in direct thermal contact with this plate;

covering the external surface of the impression molding plate equipped with the aforesaid heating elements, with an insulating coating of non-rigid synthetic resin foam, of low density and low thermal conductivity; and

enclosing the molding plate with its heating elements and its insulating coating in a structure which is rigid relative to a uniform transmission of pressure to the structure.

6. A process according to claim 5, in which the aforesaid heating elements applied to the external surface of the impression molding plate are adhesive tapes of ductile metal, particularly lead, arranged to form an electrical resistor whose ends are supplied with suitable regulated voltage, with the aforesaid tapes being enclosed between two thin plastic, electrically non-conductive films.



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**4,744,850**

## METHOD FOR BONDING AN LSI CHIP ON A WIRING BASE

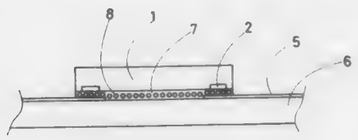
**Yoshitugu Imano; Kazuhito Ozawa, both of Nara; Yoshitomo Kitanishi, Kashihara; Katsuhide Shino, Nara; Yukihiro Inoue, Kashihara; Yoshinori Oogita, Nara; Kazuhiro Nakao, Nara, and Shigeki Komaki, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Continuation of Ser. No. 593,651, Mar. 26, 1984, abandoned. This application Dec. 9, 1985, Ser. No. 805,420**

**Claims priority, application Japan, Apr. 21, 1983, 58-71020**

**Int. Cl.**[4] **B29C** *65/02, 65/30, 65/48, 65/54*

**U.S. Cl. 156—265** **4 Claims**



1. A method for preparing and optically bonding an LSI chip having terminals thereon to corresponding electrodes on the surface of a wiring base comprising the steps of:

uniformly coating a translucent electrically insulative adhesive on the surface of a wafer comprising a plurality of LSI chips each having conductive terminals thereon;

dispersing electrically conductive particles of substantially uniform diameter in said insulative adhesive such that said particles are not in contact with each other, said insulative adhesive having a thickness substantially equal to said diameter of said particles;

heating said insulative adhesive inclusive of said electrically conductive particles;

scribing said wafer such that it is divided into singular LSI chips;

providing a wiring base having electrodes thereon, and

optically positioning said terminals of each of said LSI chips on corresponding electrodes of said wiring base by manually placing said LSI chip on said wiring base in a facing relationship such that each of said terminals of said respective LSI chip is positioned opposite corresponding electrodes of said wiring base, said positioning being achieved optically or visually as a result of said translucent heat sensitive adhesive; and

bonding said LSI chip to said wiring base by applying heat to said LSI chip under pressure.

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**4,744,851**

## METHOD OF PRODUCING RUBBER SHEETS HAVING CLEAN AREAS

**Harold K. Lorenz, Marion, Mass., assignor to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Continuation of Ser. No. 694,374, Jan. 24, 1985, abandoned. This application Mar. 10, 1987, Ser. No. 24,120**

**Int. Cl.**[4] **B32B** *31/04, 31/14*

**U.S. Cl. 156—289** **3 Claims**

1. A method of producing rubber sheeting having a top surface and a bottom surface wherein an area of at least one of said surfaces is protected against surface contamination comprising the steps of:

(a) providing an uncured rubber sheeting,

(b) applying to an area of said uncured rubber sheeting a releasable strip of material prior to the uncured rubber sheeting being exposed to surface contamination and

(c) curing said uncured rubber sheeting with the releasable strip attached, wherein the releasable strip of material is an internally delustered polymerically plasticized solution cast polyvinyl chloride film.

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**4,744,852**

## BONDING METHOD EMPLOYING THERMO REVERSIBLE CROSSLINKING ADHESIVES

**Daniel Augustin, Bernay, France; Christian Leriche, Tokyo, Japan, and Pierre Poisson, Bernay, France, assignors to Atochem, Puteaux, France**

**Division of Ser. No. 694,223, Jan. 24, 1985, Pat. No. 4,617,354. This application Dec. 19, 1986, Ser. No. 910,954**

**Claims priority, application France, Jan. 31, 1984, 84 01436**

**Int. Cl.**[4] **C09J** *5/00*

**U.S. Cl. 156—327** **2 Claims**

1. A process for bonding two substrates to one another which comprises applying a coating of a thermoreversible adhesive to at least one surface of one substrate and contacting the coated surface with the other substrate, the adhesive composition being prepared by the reaction of the vinyl ether functions of a divinyl ether having the formula $CH_2{=}CH{-}O{-}R{-}O{-}CH{=}CH_2$, wherein R is aliphatic, aromatic or cyloaliphatic, with the carboxyl functions of a polymer produced by the polymerization of an olefin with an ethylenically unsaturated monocarboxylic acid, the quantity of the divinyl ether being from 0.1 to 5 percent by weight and the quantity of polymer being from 99.9 to 95 percent by weight.

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**4,744,853**

## CORE OR SHELL BUNDLING MACHINE

**Werner Landua, and Jürgen Müller, both of Mannheim, Fed. Rep. of Germany, assignors to Adolf Hottinger Maschinenbau GmbH, Mannheim-Rheinau, Fed. Rep. of Germany**

**Filed Jul. 21, 1986, Ser. No. 887,321**

**Claims priority, application Fed. Rep. of Germany, Jul. 23, 1985, 3526265**

**Int. Cl.**[4] **B32B** *31/00*

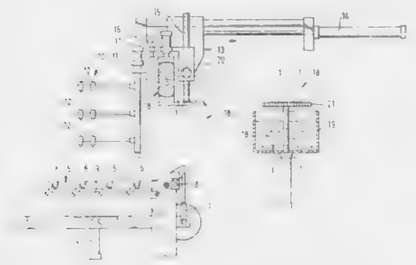
**U.S. Cl. 156—390** **6 Claims**

1. A core or shell bundling machine for the fully automatic assembly of bundles of cores or shells in foundry work, comprising a removal apparatus for removing spaced-apart cores or shells from a core and shell shooting machine, a pivot apparatus for lifting the cores or shells from the removal apparatus, the pivot apparatus capable of pivoting the cores or shells from a first position horizontally next to each other to a second position vertically one below the other, an adhesive application system for applying adhesive to the cores or shells when in the second position, a bundling apparatus for combining the cores or shells when in the second position into bundles, and an

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immersion device, the bundling apparatus including means for moving the bundles to the immersion device, wherein each



bundle is being immersed in the immersion device for applying a coating.

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**4,744,854**

**APPARATUS FOR CONTINUOUS MANUFACTURE OF AN ENDLESS STRIP OF CHIPBOARD**

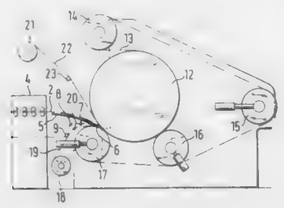
**Manfred Schenz, Gittelde, Fed. Rep. of Germany, assignor to Wilhelm Mende GmbH, Fed. Rep. of Germany**

**Filed Mar. 20, 1986, Ser. No. 841,880**

**Claims priority, application Fed. Rep. of Germany, Mar. 22, 1985, 3510460; Nov. 22, 1985, 3541286**

**Int. Cl.**[4] **B27N** *3/26;* **B30B** *3/04*

**U.S. Cl. 156—498** **20 Claims**



1. In an apparatus for the continuous manufacture of an endless strip of thin chipboard having

a horizontally-disposed pretensioned conveyor belt;

means for depositing wood chips mixed with a bonding agent onto a horizontal section of said conveyor belt;

a heated compression drum adjacent the discharge end of said conveyor belt;

an endless steel belt encircling a portion of the drum surface to provide a compression gap between the steel belt and the drum surface; and

a counter-roller providing pressure against said steel belt and said drum surface,

the improvement comprising:

a first deflector roller mounted adjacent the point where said chips enter said gap;

a second deflector roller beneath said depositing means; and said conveyor belt being endless, made from textile material and trained around said first and second deflector rollers to convey said deposited chips to said gap, wherein said conveyor belt and the portion of said counter-roller located between the discharge end of said conveyor belt and the compression gap define a support path for said chips, said conveyor belt and said portion of said counter-roller being in close proximity to each other such that said support path forms a substantially continuous arcuately curved surface that supports said chips at substantially all times as said chips are conveyed from said conveyor belt to said gap.

**4,744,855**

**WELDING MACHINE FOR FOIL WEBS**

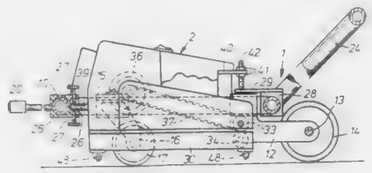
**Bernd Ellenberger, Gonbach; Karlheinz Schäfer, Neustadt, and Paul Reinheimer, Kindsbach, all of Fed. Rep. of Germany, assignors to Pfaff Industriemaschinen GmbH, Fed. Rep. of Germany**

**Filed Jun. 26, 1986, Ser. No. 879,200**

**Claims priority, application Fed. Rep. of Germany, Oct. 12, 1985, 8529090[U]**

**Int. Cl.**[4] **B44C** *7/00*

**U.S. Cl. 156—499** **23 Claims**



1. A welding machine for foil webs which are arranged in overlapping relationship, comprising an undercarriage including a supporting frame and a self contained welding device detachably mounted on said supporting frame, means defined between said welding device and said mounting frame permitting the adjustment of height of said welding device, said mounting frame including a rectangular frame having four wheels, and drive means driving at least one of said wheels.

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**4,744,856**

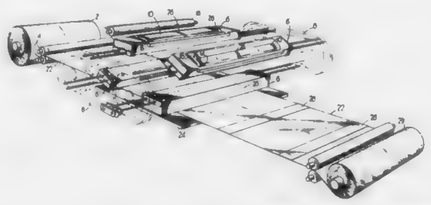
**DEVICE FOR PRODUCING PAPER FROM WHICH A BAG HAVING A WATERPROOF, LEAKPROOF BOTTOM MAY BE FABRICATED, AND METHOD FOR PRODUCING SAID BAG**

**Joseph I. Williams, III, 701 Pitt St., Mt. Pleasant, S.C. 29464**

**Filed Oct. 16, 1986, Ser. No. 919,754**

**Int. Cl.**[4] **B32B** *31/00;* **B31B** *39/02*

**U.S. Cl. 156—519** **4 Claims**



1. A device for producing paper having strips of plastic affixed transversely thereto at uniform intervals, comprising means for feeding a web of paper along a path, a continuous conveyor means overlying the path having a multiplicity of applicator means conveyed by said conveyor means, and wherein each of said multiplicity of applicator means contacts said paper at a uniform interval, or as to apply a strip of plastic fed from each of said multiplicity of applicator means transversely to said paper at a uniform interval, wherein each of said multiplicity of applicator means comprises:

(a) a roll of plastic material contained within each of said multiplicity of applicators;

(b) a drive means contained within each of said multiplicity of applicator means for intermittently and cyclically feeding a portion of plastic material from said roll of plastic material contained within each of said multiplicity of applicator means; and

(c) one or more means for applying glue to a surface of said portion of plastic material as said portion of plastic material is fed from said roll of plastic material.



**4,744,857**

**METHOD FOR MODIFYING FLUOROPOLYMER FIBERS**

**Kevin G. Nelson, Pittston, Pa., assignor to Acton Associates, Inc., Pittston, Pa.**

**Filed Oct. 23, 1986, Ser. No. 922,159**

**Int. Cl.**[4] **B44C** *1/22;* **B29C** *37/00*

**U.S. Cl. 156—637** **8 Claims**

1. A method of etching fluoropolymer fibers comprising:

(a) immersing said fibers in an alkali metal/polyaryl hydrocarbon etching solution and;

(b) subjecting said fibers in said etching solution to high shear agitation which maintains said fibers at a temperature in the range of from about 50° C. to 110° C. until at least 98% of said fibers are sufficiently hydrophilic to sink when placed in water.

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**4,744,858**

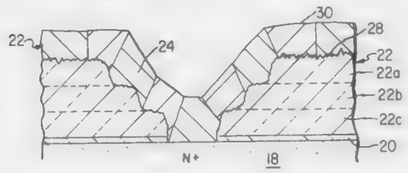
**INTEGRATED CIRCUIT METALLIZATION WITH REDUCED ELECTROMIGRATION**

**James M. McDavid, Dallas, and Dirk N. Anderson, Plano, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Mar. 11, 1985, Ser. No. 710,346**

**Int. Cl.**[4] **B44C** *1/22;* **C03C** *15/00, 25/06*

**U.S. Cl. 156—643** **17 Claims**



1. A method of making a semiconductor device comprising:

forming circuit elements on a semiconductor surface,

applying an insulating layer over said circuit elements,

opening apertures in said insulating layer to selected portions of said circuit elements,

nonuniformly roughening the surface of said insulating layer, and

applying a layer of metal on a portion of said insulating layer extending into said apertures, said layer of metal having a granular interior and a roughened surface to provide enhanced electromigration properties.

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**4,744,859**

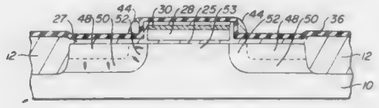
**PROCESS FOR FABRICATING LIGHTLY DOPED DRAIN MOS DEVICES**

**Yaw W. Hu, Cupertino, and Charles C. C. Kau, San Jose, both of Calif., assignors to Vitelic Corporation, San Jose, Calif.**

**Filed Oct. 23, 1986, Ser. No. 922,509**

**Int. Cl.**[4] **H01L** *21/306;* **B44C** *1/22;* **C03C** *15/00, 25/06*

**U.S. Cl. 156—643** **16 Claims**



1. A method for fabricating a field effect transistor comprising:

forming a first layer of insulating material on a first conductivity type semiconductor substrate;

defining a gate electrode on the first layer, the gate electrode having an upper surface bounded by edges protruding above the first layer;

depositing an etch resistant layer over the gate electrode and over the first layer, the etch resistant layer having edges conforming to the edges of the gate electrode;

depositing an etchable layer of material over the etch resistant layer;

removing the etchable layer from the etch resistant layer except for spacer regions disposed adjacent the edges of the etch resistant layer; and

using the gate electrode and the spacer regions of the etchable layer as a mask, introducing first impurity of second conductivity type into the substrate to define spaced apart source and drain regions.

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**4,744,860**

**PROCESS FOR MAKING A NON-POLAR POLYMERIC MATERIAL DYEABLE WITH AN ACID DYE**

**Leopold Cop, Burlington, Canada; Jan Jordaan, De Rijp, Netherlands; Henry P. Schreiber, and Michael R. Wertheimer, both of Montreal, Canada, assignors to Shell Oil Company, Houston, Tex.**

**Filed Apr. 14, 1987, Ser. No. 38,174**

**Claims priority, application United Kingdom, Apr. 14, 1986, 8609071**

**Int. Cl.**[4] **B44C** *1/22;* **B29C** *37/00*

**U.S. Cl. 156—643** **20 Claims**

1. A process for treating at least one surface of a non-polar polymeric material to improve the receptivity of that surface to coloration with an acid dye, which comprises treating said surface of the material with a low temperature microwave plasma from a chemical compound which is capable of creating receptor sites for acid dye on said surface.

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**4,744,861**

**METHOD OF PRODUCING SEMICONDUCTOR DEVICE USING REACTIVE ION ETCHING**

**Daisuke Matsunaga, Yokohama, and Yoshikazu Kato, Mizusawa, both of Japan, assignors to Fujitsu Limited, Kanagawa, Japan**

**Filed Oct. 30, 1986, Ser. No. 924,666**

**Claims priority, application Japan, Nov. 8, 1985, 60-250263**

**Int. Cl.**[4] **H01L** *21/306;* **B44C** *1/22;* **C03C** *15/00;* **C23F** *1/02*

**U.S. Cl. 156—643** **12 Claims**



1. A method of producing a semiconductor device comprising the steps of:

forming a contact hole in an insulator layer which is formed on a semiconductor substrate, said semiconductor substrate having an impurity region immediately under said contact hole;

filling said contact hole by a material selected from a group consisting of tungsten, tungstem silicide, molybdenum, molybdenum silicide, tantalum, and tantalum silicide;

forming a polycide layer over said insulator layer and said

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contact hole, said polycide layer being made up of a first layer made of titanium silicide and a second layer made of polysilicon;

forming a photoresist pattern on said polycide layer;

carrying out a dry etchign of said polycide layer in a reactive gas consisting essentially of bromine gas by use of said photoresist pattern as a mask to thereby form a wiring pattern on said semiconductor substrate, so that said material filling said contact hole substantially acts as a protective mask for said impurity reigon during said dry etching.

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**4,744,862**

**MANUFACTURING METHODS FOR NONLINEAR SEMICONDUCTOR ELEMENT AND LIQUID CRYSTAL DISPLAY PANEL USING THE SAME**

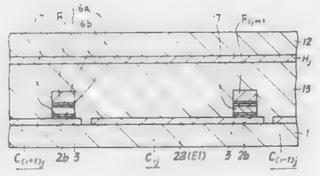
**Shunpei Yamazaki; Akira Mase; Toshimitsu Konuma; Minoru Miyazaki; Mitsunori Sakama, and Takashi Inushima, all of Tokyo, Japan, assignors to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan**

**Division of Ser. No. 782,628, Oct. 1, 1985. This application Jan. 2, 1987, Ser. No. 155**

**Claims priority, application Japan, Oct. 1, 1984, 59/206080; Oct. 1, 1984, 59/206081; Jan. 7, 1985, 60/000547**

**Int. Cl.⁴ H01L** *2/306;* **B44C** *1/22;* **C03C** *15/00;* **C23F** *1/02*

**U.S. Cl. 156—652** **8 Claims**



1. A method of manufacturing a nonlinear semiconductor element comprising the steps of:

(a) forming a first conductive layer, which will ultimately serve as a first electrode, on a substrate having an insulating surface;

(b) forming a first non-single crystal semiconductor layer laminate member on the substrate so that it continuously extends on the first conductive layer, where the forming of the first non-single-crystal semiconductor layer laminate member includes the substeps of:

(1) forming at least a first non-single-crystal semiconductor of a predetermined conductivity type on the substrate and extending on the first conductive layer,

(2) forming an i-type second non-single-crystal semiconductor layer on the first non-single-crystal semiconductor layer, said i-type layer containing an additive selected from the group consisting of carbon, nitrogen, oxygen, boron, and mixtures thereof, and

(3) forming a third non-single-crystal semiconductor layer of said predetermined conductivity type on the i-type second non-single-crystal semiconductor layer;

(c) forming a second conductive layer, which will ultimately serve as a second electrode, in a predetermined pattern on the first non-single-crystal semiconductor layer laminate member in opposing relation to the first conductive layer; and

(d) selectively etching away the first non-single-crystal semiconductor layer laminate member through the patterned second conductive layer to obtain a second non-single-crystal semiconductor laminate member.

**4,744,863**

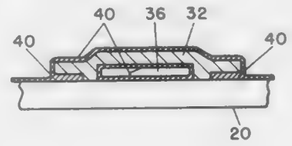
**SEALED CAVITY SEMICONDUCTOR PRESSURE TRANSDUCERS AND METHOD OF PRODUCING THE SAME**

**Henry Guckel, and David W. Burns, both of Madison, Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.**

**Continuation-in-part of Ser. No. 727,909, Apr. 26, 1985, abandoned. This application Apr. 24, 1986, Ser. No. 855,806**

**Int. Cl.⁴ H01L** *21/306, 41/08, 29/84;* **B05D** *7/22*

**U.S. Cl. 156—653** **26 Claims**




1. A method of producing a deformable membrane of a transducer on a substrate, comprising the steps of:

(a) masking a suface of the substrate to expose a selected area where a cavity of the transducer is to be located;

(b) forming an etchable substance in the exposed area of the substrate to define an etchable post;

(c) removing the mask from the substrate to leave the etchable post isolated on the substrate;

(d) masking the substrate in areas of the surface of the substrate adjacent to the post in a pattern in which at least one continuous exposed area extends from the post to a position on the substrate remote from the post;

(e) forming an etchable substance in the exposed areas of the substrate to define at least one ridge on the substrate;

(f) removing the mask from the substrate to leave the post and the ridge isolated thereon;

(g) depositing a solid material from a gas phase in a layer over the post and ridge and adjacent areas of the substrate;

(h) removing peripheral portions of the deposited layer to expose an outer edge of the ridge at a position remote from the post;

(i) applying an etchant to the substrate and the deposited layer thereon which etches the material of the post and ridge but does not substantially etch the material of the substrate or the deposited layer, such that the etchant etches out the ridge to form a channel in the deposited layer and then etches out the post to leave a cavity which is spanned by the covering deposited layer defining said deformable membrane and with the cavity communicating to ambient atmosphere through the channel.

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**4,744,864**

**CATIONIC GRAFTED STARCH COPOLYMERS AS HIGH-STRENGTH PAPER ADDITIVES**

**Gary L. Deets, St. Peters, and William G. Tamalis, Maryland Heights, both of Mo., assignors to Akzo N.V., Arnhem, Netherlands**

**Division of Ser. No. 710,191, Mar. 11, 1985, Pat. No. 4,684,708. This application Jun. 2, 1987, Ser. No. 57,411**

**Int. Cl.⁴ D21D** *3/02, 3/40*

**U.S. Cl. 162—164.6** **13 Claims**

1. Paper containing a cationic grafted starch copolymer comprising starch, nonionic vinyl monomer, and cationic vinyl monomer wherein:

(a) said starch is present in amounts from about 10% to about 90% of the copolymer, and at least about 5% of the starch is cationic starch;

(b) said nonionic vinyl monomer is present in amounts from about 90% to about 10% of the copolymer; and

(c) said cationic vinyl monomer is present in amounts from about 5% to about 80% of the copolymer.



**4,744,865**

**PROCESS FOR CONTROLLING PITCH DEPOSITION FROM PULP IN PAPERMAKING SYSTEMS**

**David D. Dreisbach, and Gilbert S. Gomes, both of Jacksonville, Fla., assignors to Betz Laboratories, Inc., Trevose, Pa.**

**Filed Jun. 3, 1986, Ser. No. 870,212**

**Int. Cl.⁴ D21D** *3/00;* **D21H** *3/40;* **D21C** *3/20*

**U.S. Cl. 162—168.1** **4 Claims**

1. A process for controlling pitch deposition from pulp in papermaking systems which comprises adding to the pulp an effecive amount of a water soluble polymer derived by substituting methyl ether groups onto a preformed reactive polymer wherein said preformjed reactive polymer is a vinyl alcohol polymer and said water soluble polymer has from about 20% to about 100% of available reactive groups of the preformed reactive polymer substituted with methyl ether groups.

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**4,744,866**

**WEB-FORMING METHOD IN A PAPER MACHINE**

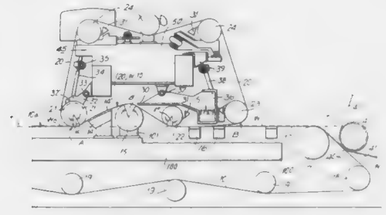
**Martti Koponen; Martti Pullinen; Erkki Koski, and Jouni Koskimies, all of Jyväskylä, Finland, assignors to Valmet Oy, Finland**

**Division of Ser. No. 575,543, Jan. 31, 1984, Pat. No. 4,614,566, which is a continuation-in-part of Ser. No. 430,231, Sep. 29, 1982, abandoned. This application Mar. 17, 1986, Ser. No. 840,534**

**Claims priority, application Finland, Mar. 2, 1982, 820742**

**Int. Cl.⁴ D21F** *1/00, 1/40*

**U.S. Cl. 162—203** **11 Claims**



1. A method in a web forming section of a paper machine, the forming section including a lower wire loop having an initial, substantially horizontal lower wire run constituting an initial, substantially horizontal single-wire dewatering zone of the web forming section, and an upper wire loop situated over the lower wire loop having a run which forms a joint run with a run of said lower wire loop subsequent to said initial single-wire dewatering zone, said joint run constituting a two-wire dewatering zone of the web-forming section,

the method comprising the steps of:

depositing web-forming stock from a headbox onto the single-wire dewatering zone;

predraining the web-forming stock downwardly through the lower wire as it travels in the single-wire dewatering zone supported on the lower wire, for initially forming a fiber network such that retention of fillers and fines is promoted as the web is subsequently dewatered, whereupon the web is passed into the two-wire dewatering zone wherein it is situated between the lower and upper wires of the joint run thereof;

after the predraining step, initially dewatering the web bidirectionally in the two-wire dewatering zone by guiding the joint wire run and web situated therebetween over a sector of a first dewatering forming roll having an open face situated inside the upper wire loop to curve the joint run of the two-wire dewatering zone upwardly, the bidirectional dewatering being both upwardly through the upper wire and downwardly through the lower wire with the upward dewatering being greater than the downward dewatering wherein the web is substantially dewatered;

after the initial bidirectional dewatering step, passing the joint wire run and web situated therebetween over a short, free unsupported run and then further dewatering the substantially dewatered web at least upwardly through the upper wire by guiding the joint wire run and web situated therebetween over a curved deck of a forming shoe to curve the joint run of the two-wire dewatering zone downwardly;

after the further dewatering step, passing the joint wire run and web situated therebetween over a short free unsupported run and then still further dewatering the web upwardly through the upper wire by guiding the joint wire run and web situated therebetween over a sector of a second forming roll to curve the joint wire run of the two-wire dewatering zone downwardly, wherein dewatering takes place within the two-wire dewatering zone asymmetrically; and

situating said run of said upper wire loop forming said joint run entirely in and above a plane of said initial, substantially horizontal and planar lower wire run.

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**4,744,867**

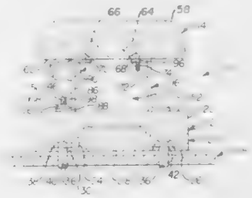
**DOOR LINER AND DOOR ASSEMBLY FOR A COKE OVEN**

**Paul V. Suey, 1043 Black Forest Dr., Pittsburgh, Pa. 15235**

**Filed Nov. 20, 1986, Ser. No. 932,884**

**Int. Cl.⁴ C10B** *25/06*

**U.S. Cl. 202—248** **6 Claims**



1. A coke oven door liner and door assembly adapted to seal an opening in a coke oven having a lower portion in which coal is coked, a top portion from which gases created by the coking coal are removed from the coke oven and at least one opening thereto which is sealed by said door, said door having an inner surface facing within the coke oven, said coke oven door liner comprising:

a first refractory layer having an outer surface adapted to abut said inner surface of said door, said first refractory layer having width and height dimensions substantially coextensive with those of a coke oven opening which is to be sealed by said door;

a second refractory layer spaced apart from and generally parallel to said first refractory layer, thus creating an elongated chamber between said first and second refractory layers, said second refractory layer having width and height dimensions substantially coextensive with those of said first refractory layer;

said first and second refractory layers formed of a plurality of abutting, vertically aligned sections;

the outer surface of each of said sections of said first refractory layer having a recess therein which is filled with an insulating material; and

connecting means for connecting said second refractory layer to said first refractory layer;

whereby gases created by the coking coal enter said elongated chamber between said first and second spaced apart parallel refractory layers and rise to the top portion of said chamber to be removed therefrom.

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**4,744,868**

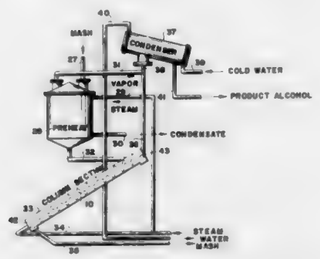
## DISTILLATION COLUMN AND METHOD

**Ferdinand le Grand, Gainesville, and Carlos E. Odio, Clearwater, both of Fla., assignors to University of Florida, Gainesville, Fla.**

**Continuation-in-part of Ser. No. 760,119, Jul. 29, 1985, Pat. No. 4,657,638. This application Sep. 10, 1986, Ser. No. 905,537**

**Int. Cl.[4] B01D** *3/24, 3/38*

**U.S. Cl. 203—19** **11 Claims**




**1**. In a distillation stripping process for separating volatile components from a multicomponent liquid mass, the improvement which comprises passing said liquid mass downward through a vapor-liquid contact zone and passing vapor upward through said zone in counter-current flow with said liquid mass; said vapor being a mixture of steam introduced into the lower end of said zone and the vaporous product resulting from heating said liquid mass by means of said steam, said liquid mass cascading over a series of falls into a series of pools, consecutively, from one pool to the next lower pool, and said vapor passing upwardly consecutively through a series of vapor spaces above said pools and falls, each said vapor space being totally enclosed above said pool and falls by vapor impervious walls and separated from each adjacent vapor space solely by said downwardly flowing liquid mass, with the only passage for said upwardly moving vapor being through said downwardly flowing liquid mass in said pool and falls.

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**4,744,869**

## PROCESS FOR PURIFYING METHANOL

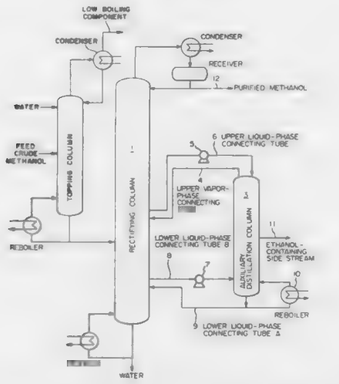
**Yoshihiko Saito, and Osamu Hashimoto, both of Niigata, Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan**

**Filed Aug. 18, 1986, Ser. No. 897,371**

**Claims priority, application Japan, Aug. 16, 1985, 60-180168**

**Int. Cl.[4] B01D** *3/34*

**U.S. Cl. 203—82** **9 Claims**




**1**. A process for purifying methanol which comprises;

(a) introducing crude synthetic methanol obtained by catalytic reaction of carbon oxide and hydrogen into a rectifying column,

(b) forcibly conducting liquid components at a liquid-phase portion on a plate located between the bottom plate and the material feed plate of the rectifying column to a liquid-phase portion on a plate near the bottom of an auxiliary distillation column which is provided side-by-side with the rectifying column through a lower liquid-phase connecting tube B,

(c) conducting liquid components at a liquid-phase portion on a plate at the bottom of the auxiliary distillation column to the liquid-phase portion on the plate located between the bottom plate and the material feed plate of the rectifying column through a lower liquid-phase connecting tube A,

(d) evaporating the bottom components in the auxiliary distillation column by heating a reboiler provided at the bottom portion of the auxiliary distillation column,

(e) forcibly conducting liquid components at a liquid-phase portion on a plate slightly above the material feed plate of the rectifying column to a liquid-phase portion on a plate at the top of the auxiliary distillation column through an upper liquid-phase connecting tube,

(f) conducting vapor components at a vapor-phase portion on a plate at the top of the auxiliary distillation column to the vapor-phase portion on a plate slightly above a material feed plate on the rectifying column through an upper vapor-phase connecting tube,

(g) thereby carrying out the distillation while circulating the vapor components and the liquid components between the rectifying column and the auxiliary distillation column

(h) withdrawing product methanol from the top of the rectifying column and the remaining water from the bottom of the column, and

(i) withdrawing a side stream rich in ethanol from the liquid-phase portion of a plate located in the middle part of the auxiliary distillation column.

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**4,744,870**

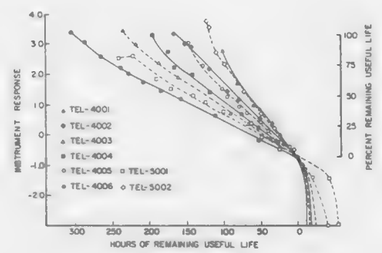
## METHOD FOR EVALUATING THE REMAINING USEFUL LIFE OF A LUBRICANT

**Robert E. Kauffman, Kettering, Ohio, assignor to University of Dayton, Dayton, Ohio**

**Filed Dec. 23, 1986, Ser. No. 945,755**

**Int. Cl.[4] G01N** *27/48*

**U.S. Cl. 204—1 T** **27 Claims**




**1**. A method for measuring the remaining useful life of a lubricant containing at least one antioxidant species, comprising the steps of:

mixing a lubricant sample with a solvent, organic base, and an electrolyte to produce an analysis sample;

placing said analysis sample into an electrolytic cell;

applying an electric potential of a first value to said analysis sample to produce an electric current therethrough;

varying said potential from said first value to a second value to produce an oxidation reaction of said antioxidant species within said cell;



varying said potential from said second value to said first value to produce a reduction reaction of an oxidized product of said antioxidant species within said cell; and

measuring and recording said current during at least said reduction reaction.

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**4,744,871**

## ELECTROLYTE SOLUTION AND PROCESS FOR GOLD ELECTROPLATING

**Jean A. Lochet, Metuchen, N.J., assignor to Vanguard Research Associates, Inc., South Plainfield, N.J.**

**Continuation-in-part of Ser. No. 912,171, Sep. 25, 1986, Pat. No. 4,670,107, which is a continuation of Ser. No. 836,240, Mar. 5, 1986, abandoned. This application Jun. 1, 1987, Ser. No. 56,546**

**Int. Cl.[4] C25D** *3/48, 3/62*

**U.S. Cl. 204—44.3** **24 Claims**

**1**. A citrate-free bath for the electrodeposition of gold comprising an aqueous solution containing at least one soluble gold cyanide compound, a dicarboxylic acid having the formula $HOOC—(CH_2)_n—COOH$ in which n is an integer from 1 to 4 and mixtures thereof, an acid selected from the class consisting of malic acid, gluconic acid and formic acid and mixtures thereof, a hardener selected from the group consisting of nickel and cobalt compounds and sufficient alkali to bring the pH to within the range of about 3.5 to about 4.8.

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**4,744,872**

## ANODIZING SOLUTION FOR ANODIC OXIDATION OF MAGNESIUM OR ITS ALLOYS

**Waichi Kobayashi; Kinji Uehori, and Masashi Furuta, all of Ube, Japan, assignors to Ube Industries, Ltd., Yamaguchi, Japan**

**Filed Mar. 26, 1987, Ser. No. 30,941**

**Claims priority, application Japan, May 30, 1986, 61-123223; Nov. 14, 1986, 61-269562**

**Int. Cl.[4] C25D** *11/30*

**U.S. Cl. 204—58.4** **12 Claims**

**1**. An aqueous anodizing solution for anodic oxidation of an article of magnesium or magnesium alloy, which contains dissolved therein, per one liter of said solution, from 30 to 150 grams of a silicate, from 10 to 120 grams of a carboxylate and from 30 to 150 g of an alkali hydroxide.

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**4,744,873**

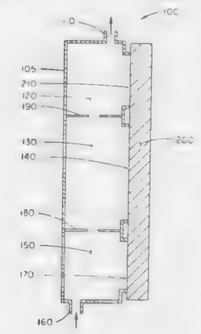
## MULTIPLE COMPARTMENT ELECTROLYTIC CELL

**Marius W. Sorenson, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.**

**Filed Nov. 25, 1986, Ser. No. 934,769**

**Int. Cl.[4] C25B** *1/16, 1/34, 11/03, 15/08*

**U.S. Cl. 204—98** **10 Claims**




**7**. An electrolysis method employing a cell having an anode and a cathode separated by an ion exchange membrane wherein the cathode is an electrode/gas chamber combination having:

a gas-permeable, vertically disposed electrode having oppositely disposed first and second vertical surfaces;

a gas supply chamber contacting and supporting the electrode;

wherein said gas supply chamber has a plurality of compartments at least including a gas inlet comparatment, an intermediate compartment, and a gas outlet compartment;

each of said compartments being connected to its adjoining compartments through a foraminous structure and

at least a portion of said compartments opening onto portions of the first surface of the electrode to provide a pathway for gas to reach the surface of the electrode;

wherein at least a portion of the walls of the gas supply chamber are electrically conductive and provide a pathway for electrical current to flow from a power supply to the electrode;

said method comprising:

flowing an aqueous alkali metal halide solution into a compartment containing the anode;

flowing an oxygen gas into the gas supply chamber of said cathode; and

electrolyzing said aqueous alkali metal halide solution to form a halide gas at said anode and an alkali metal hydroxide at said cathode.

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**4,744,874**

## TREATMENT OF MEDIUM USED IN PHOTOGRAPHIC PROCESSORS

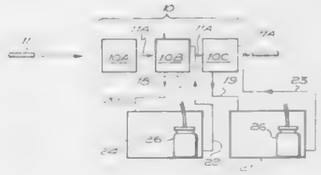
**Brian Toulson, Leeds, England, assignor to Fixersave Limited, Leeds, England**

**Filed Mar. 3, 1987, Ser. No. 21,261**

**Claims priority, application United Kingdom, Mar. 4, 1986, 8605278**

**Int. Cl.[4] C25C** *1/20*

**U.S. Cl. 204—109** **5 Claims**




**1**. A method of treating photographic fixer medium used for the development of black and white photographic films, X-ray plates and the like, to extend the useful life of the fixer medium comprising the steps of:

(a) recirculating the fixer medium between a fixer tank in which photographic negatives are subject to fixation and a conditioning treatment tank;

(b) inserting a portable treatment unit in the conditioning tank, said unit comprising:

(i) a container having apertures therein so that fixer medium can flow into and out of the container, electrodes in the container for the electro-deposition of silver from the fixer medium, air delivery means and means enabling air to be bubbled from the air delivery means into the container for the treatment of the fixer medium,

(ii) a control box including an air pump and power supply, and

(iii) an air pipe and coupling cables connecting the control box and said air delivery means and the said electrodes, and the treatment unit being portable for easy removal, servicing and replacement of the container,

(c) supplying air to said air delivery means to cause agitation of the first medium in said container in the treatment tank; and

(d) applying an electric potential to said electrodes to cause an electrolysing current of no more than 300 mA to flow between the electrodes so as to deposit on the cathode only small amounts of silver and so as not to impair the fixing quality of the fixer medium.

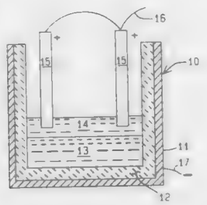
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**4,744,875**

## STEEL REFINING WITH AN ELECTROCHEMICAL CELL

**Milton Blander, Palos Park, and Glenn M. Cook, Naperville, both of Ill., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Division of Ser. No. 736,575, May 21, 1985, Pat. No. 4,687,564. This application Mar. 23, 1987, Ser. No. 28,989**
**Int. Cl.[4] C25F *1/00***
**U.S. Cl. 204—140** **15 Claims**




1. A process for refining an iron product containing not more than about 10% by weight oxygen and not more than about 10% by weight sulfur, comprising providing an electrolyte of a slag containing one or more of calcium oxide, magnesium oxide, silica or alimina, providing a cathode of molten iron product in contact with the electrolyte, maintaining said cathode of molten iron at cathodic potential through contact with an electrically conductive refractory, providing an anode in contact with the electrolyte electrically separated from the cathode, and operating an electrochemical cell formed by the anode, the cathode and the electrolyte to separate oxygen or sulfur present in the iron product therefrom.

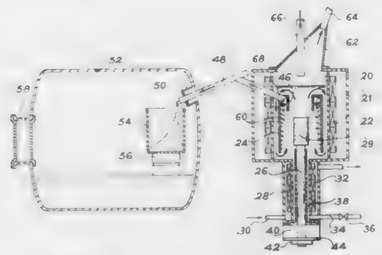
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**4,744,876**

## ELECTROLYZER FOR EXTRACTING A SUBSTANCE FROM AN ELECTROLYTIC BATH

**Robert Bernard, Grenoble; Georges Lonchampt, Meylan, and Robert Tinti, Echirolles, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France**

**Filed Oct. 16, 1986, Ser. No. 919,705**
**Claims priority, application France, Oct. 25, 1985, 85 15885**
**Int. Cl.[4] C25C *3/02***
**U.S. Cl. 204—245** **16 Claims**




1. An electrolyzer for the extraction from an electrolytic bath of a substance which is less dense than said bath, said electrolyzer comprising an anode and a cathode which are immersed in the bath, the cathode, on which is formed the substance, extending vertically and surrounding the anode, the electrolyzer also having means for confining the substance in the vicinity of the cathode and for guiding said substance along and towards the upper end of the cathode, together with means for collecting the substance at said end, wherein the confinement and guidance means have at least one layer of a grid formed from an electrically conductive material resistant to the bath and the electrolysis products, and wherein each layer is disposed in the vicinity of the cathode, between the latter and the anode, extends along the cathode and forms an internal doubling of said cathode.

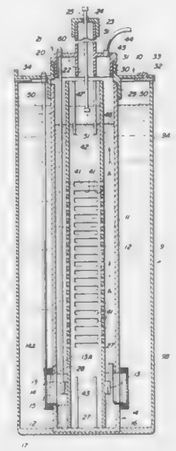
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**4,744,877**

## APPARATUS FOR GENERATING CHLORINE GAS

**Robert E. Maddock, 2252 Grand Ave., Phoenix, Ariz. 85009**

**Filed May 14, 1987, Ser. No. 49,575**
**Int. Cl.[4] C25B *9/00, 1/26, 13/02***
**U.S. Cl. 204—266** **1 Claim**



1. The Apparatus for electorlytically generating chlorine gas from a salt solution, comprising:

(a) hollow housing means for holding a volume of water and including;

(i) an outer wall having an upper portion and a lower portion,

(ii) a base connected to said lower portion, and

(iii) cover means mounted on said upper portion of said housing means;

(b) an elongate hollow salt cell spaced apart from said outer wall and having a window formed therein;

(c) a first aqueous solution of sodium ions intermediate said salt cell and said outer wall;

(d) a second aqueous salt solution inside said hollow salt cell and having an upper surface;

(e) an elongate hollow salt spacer carried in said housing means inside and spaced apart from said salt cell, and including a plurality of spaced apart perforations formed therein, said second solution being both intermediate said spacer and salt cell and being inside said spacer;

(f) a volume of salt inside said salt spacer and having an upper surface;

(g) anode means mounted in said housing means adjacent said window and intermediate said salt cell and said salt spacer, said salt spacer extending upwardly from said anode means to a point above said upper surface of said second solution and said upper surface of said salt, said perforations in said spacer being intermediate said anode and said upper surface of said salt;

(h) cathode means mounted in said housing means adjacent and spaced apart from said anode and intermediate said anode and said housing; and,



(i) membrane means intermediate said anode and cathode means and covering said window to generally separate said second solution in said salt cell from said first solution, said membrane permitting sodium ions to migrate outwardly from said second solution through said membrane means into said first solution intermediate said salt cell and outer wall;

salt ions from with said salt spacer moving outwardly through said perforations and downwardly intermediate said salt spacer and salt cell through said second solution to contact said anode means to produce chlorine gas rising upwardly intermediate said salt cell and salt spacer through said second aqueous solution and traveling near said perforations and through said salt ions moving outwardly from said perforations to said upper surface of said second aqueous solution, and

said perforations permitting chlorine gas collecting inside said salt spacer when said upper surface of said salt is solid to outwardly escape through at least one of said perforations into said second aqueous solution intermediate said spacer and salt cell and rise to said upper surface of said second aqueous solution.

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**4,744,878**

## ANODE MATERIAL FOR ELECTROLYTIC MANGANESE DIOXIDE CELL

**Olen L. Riggs, Jr., Oklahoma City, Okla., assignor to Kerr-McGee Chemical Corporation, Oklahoma City, Okla.**

**Filed Nov. 18, 1986, Ser. No. 931,993**
**Int. Cl.[4] C25B *11/04;* C25C *1/00***
**U.S. Cl. 204—293** **10 Claims**

1. A titanium base alloy composition characterized by a positive open circuit corrosion potential and a substantially reduced rate of corrosion when contacted with a mineral acid environment, said alloy consisting essentially of from about 0.25 to about 1.5 weight percent of iron and from about 0.1 to about 1.5 weight percent of copper, said percentages based on the weight of the alloy composition, the balance of said alloy composition being substantially all titanium apart from incidental impurities.

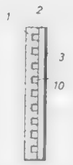
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**4,744,879**

## OXYGEN-CATHODE FOR USE IN ELECTROLYSIS OF ALKALI CHLORIDE AND PROCESS FOR PREPARING THE SAME

**Tetsuo Kaminaga, Abiko; Masatomo Shigeta, and Hiroyuki Fukuda, both of Iwaki, all of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Continuation-in-part of Ser. No. 751,525, Jul. 3, 1985, Pat. No. 4,675,094. This application Jan. 10, 1986, Ser. No. 817,541**
**Claims priority, application Japan, Jul. 12, 1984, 59-143301**
**The portion of the term of this patent subsequent to Jun. 23, 2004, has been disclaimed.**
**Int. Cl.[4] C25B *11/12***
**U.S. Cl. 204—294** **12 Claims**




1. An oxygen-cathode for use in electrolysis of an alkali chloride, comprising a current collector made of a compact carbonaceous material, and at least one electrode substrate made of a porous carbonaceous material having a catalyst carried thereon, wherein said current collector and said electrode substrate are integrated into one body consisting essentially of carbon and said catalyst, wherein said current collector has a permeability to air of not more than $10^{-3}$ ml/cm·hour·mm$H_2O$, a bending strength of not less than 500 kg/cm$^2$, an electric resistance of not more than 10 m$\Omega$·cm and a thermal conductivity of not less than 3 kcal/m·hour·°C., and said electrode substrate has a thickness of 0.2 to 2 mm, a pore diameter of 5 to 100 $\mu$m, a permeability to air of not less than 5 ml/cm·hour·mm$H_2O$, a bending strength of not less than 30 kg/cm$^2$, an electric resistance of not more than 50 m$\Omega$·cm and a thermal conductivity of not less than 0.5 kcal/m·hour·°C.

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**4,744,880**

## ANODE FOR MAGNETIC SPUTTERING OF GRADIENT FILMS

**F. Howard Gillery, Allison Park, and Russell C. Criss, Pittsburgh, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.**

**Continuation-in-part of Ser. No. 571,406, Jan. 17, 1984, Pat. No. 4,478,702. This application Oct. 17, 1984, Ser. No. 661,748**
**Int. Cl.[4] C23C *14/34***
**U.S. Cl. 204—298** **6 Claims**



1. In an apparatus for coating a substrate comprising a cathode having a substantially planar surface consisting of a material to be sputtered, magnet means for producing a magnetic field having lines of flux which extend in a curve from said sputtering surface and return thereto to form a magnetic tunnel over a closed loop erosion region on said sputtering surface, an anode positioned to produce an electric field adjacent said sputtering surface for producing a glow discharge confined by said magnetic field to the region adjacent said sputtering surface and within said magnetic tunnel, and means for connecting said cathode and said anode to a source of electrical potential, the improvement which comprises said anode being asymmetrically designed and positioned in relation to said cathode, and spaced from the major dimension of said magnetic tunnel outside the zone of glow discharge confinement, in order to provide a sputtered coating of gradient thickness.

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**4,744,881**

## ANTIOXIDANT MATERIAL AND ITS USE

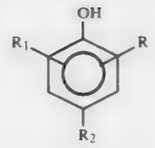
**Dwight K. Reid, Houston, Tex., assignor to Betz Laboratories, Inc., Trevose, Pa.**

**Continuation-in-part of Ser. No. 678,448, Dec. 5, 1984, abandoned. This application Oct. 7, 1986, Ser. No. 916,263**
**Int. Cl.[4] C10G *29/16***
**U.S. Cl. 208—48 AA** **27 Claims**

1. A method of controlling fouling during the processing of a hydrocarbon having a bromine number greater than 10 and containing substituents which are induced by oxygen to react to form fouling materials, which comprises adding to the petroleum or petrochemical being processed a sufficient amount for the purpose of an antioxidant composition comprising (a) an unhindered or partially hindered phenol which possesses the following formula:

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wherein R and $R_1$ are selected from the group consisting of hydrogen and carbon groupings, with the proviso that not more than one of R and $R_1$ be a secondary or tertiary carbon grouping and $R_2$ is alkyl, alkoxy or an amine group; and (b) at least one oil soluble strongly basic amine compound selected from the group consisting of aminoethylpiperazine and cyclohexylamine.

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**4,744,882**

## POLYCONDENSATES OF SULFONATED COAL TAR FRACTIONS

**Samuel Cukier, Toronto, and Marvin D. Camp, Jr., Mississauga, both of Canada, assignors to Domtar Inc, Montreal, Canada**

**Filed Jan. 2, 1987, Ser. No. 88**
**Int. Cl.[4] C10C** *3/06*
**U.S. Cl. 208—44** **10 Claims**

1. A process for the polycondensation of sulfonated coal tar fraction having a distillation range of about 200° to 240° C. at normal pressure, in the presence of about molar ratio of formaldehyde, comprising:

(a) sulfonating a coal tar fraction having a distillation range of about 200°–240° C. at normal pressure, having about 85% to 95% naphthalene the remaining portion comprising other aromatic hydrocarbons, with about 20%–30% excess mole of sulfuric acid, for about 4–8 hours at a temperature of about 160° C.±10° C. under reflux condition to produce a sulfonated coal tar fraction;

(b) cooling and diluting the reaction product obtained from step (a) with water to render the sulfonated coal tar fraction fluid at a temperature of about 80° C.;

(c) adding substantially a molar ratio of formaldehyde, per mole of the sulfonated coal tar fraction at a temperature of about 85° C.±5° C.;

(d) gradually raising the temperature of the sulfonated coal tar fraction containing the formaldehyde of step (c) for a period of about 1 to 4 hours at a temperature from 100° C. to 106° C., then further raising said temperature from 106° C.–120° C. for a period of 2 to 4 hours to produce a water soluble polycondensation of the sulfonated coal fraction;

(e) cooling the reaction product of step (d) and neutralizing, said steps c, d and (e) being completed within 16 hours.

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**4,744,883**

## PRODUCTION OF SYNTHESIS GAS AND RELATED PRODUCTS VIA THE CRACKING OF HEAVY OIL FEEDS

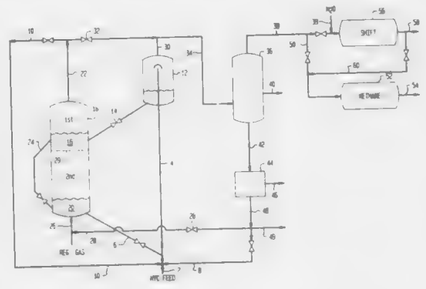
**William P. Hettinger, Jr., Russell, Ky., assignor to Ashland Oil, Inc., Ashland, Ky.**

**Continuation of Ser. No. 656,832, Oct. 2, 1985, Pat. No. 4,606,811, which is a continuation of Ser. No. 403,241, Jul. 29, 1982, abandoned. This application Jun. 16, 1986, Ser. No. 852,070**
**The portion of the term of this patent subsequent to Aug. 19, 2003, has been disclaimed.**
**Int. Cl.[4] C10G** *11/18*
**U.S. Cl. 208—108** **8 Claims**

1. In a process for cracking a heavy oil feed having a Conradson carbon number above 2 wt. % and being a member selected from the group consisting of topped crudes, reduced crudes, vacuum bottoms, heavy asphaltic crudes, coal crude oils, shale oils, and tar sands oil products, which process comprises contacting in a riser cracking zone said heavy oil feed with a fluid hydrocarbon cracking catalyst to form products comprising gasoline and coke on catalyst, said coke containing hydrogen, and thereafter regenerating said catalyst in a regeneration zone by removing at least a portion of said coke to provide as regenerated catalyst, and passing said regenerated catalyst to said cracking zone, the improvement which comprises:

A. cracking said heavy oil feed in a progressive flow riser cracking zone at an outlet temperature of about 950° F. to 1150° F. in the substantial absence of added molecular hydrogen and for a period of time within the range of 0.5 second to 4 seconds and in the presence of said catalyst, a first water condensation product, and a first CO-rich flue gas to produce a coked catalyst and a gasiform effluent comprising hydrocarbon products, a second water condensation product, and a hydrogen-rich gaseous product comprising gaseous hydrocarbons, hydrogen, ammonia, and acidic components;

B. separating said coked catalyst from said gasiform effluent and regenerating said coked catalyst in a regeneration zone consisting of a first regeneration stage and a second regeneration stage, wherein said coked catalyst enters said first regeneration stage and is contacted with steam and second-stage flue gas from said second regeneration stage, said second-stage flue gas containing less than stoichiometric amounts of oxygen to provide a partially regenerated catalyst and a second CO-rich flue gas comprising sulfur oxides, the temperature in said first regeneration



stage being sufficient to support endothermic removal of coke, and said partially regenerated catalyst subsequently enters said second regeneration stage and in said second regeneration stage is contacted with a high purity oxygen-rich gas to produce catalyst further reduced in residual coke for recycle to said riser cracking zone and to produce said second-stage flue gas;

C. separating said gasiform effluent into said hydrocarbon products, said hydrogen-rich gaseous product, and said second water condensation product;

D. treating said hydrogen-rich gaseous product to remove said ammonia and said acidic components therefrom and to provide a purified hydrogen-rich gaseous product;

E. dividing said second CO-rich flue gas into a first portion of CO-rich flue gas and a second portion of CO-rich flue gas, removing sulfur oxides from said first portion of CO-rich flue gas to form a purified CO-rich flue gas, and sending said second portion of CO-rich flue gas to said riser cracking zone as said first CO-rich flue gas;

F. recycling said second water condensation product to a lower portion of said riser cracking zone, said second water condensation product becoming said first water condensation product in said riser cracking zone; and

G. combining said purified hydrogen-rich gaseous product and at least a portion of said purified CO-rich flue gas to produce a synthesis gas comprising hydrogen and carbon monoxide.

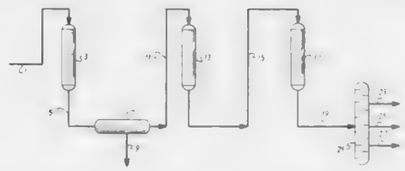


**4,744,884**

## PROCESS FOR PRODUCING LUBRICATION OIL OF HIGH VISCOSITY INDEX

**Eric L. Moorehead, Diamond Bar, Calif., and Sidney Y. Shen, Cypress, Tex., assignors to Union Oil Company of California, Los Angeles, Calif.**

**Continuation-in-part of Ser. No. 779,939, Sep. 25, 1985, abandoned. This application May 28, 1986, Ser. No. 867,768**
**Int. Cl.[4] C10G** *45/00, 47/02*
**U.S. Cl. 208—111** **105 Claims**



1. A hydrocarbon upgrading process comprising contacting a hydrocarbon feedstock containing components boiling above 650° F., including polynaphthenic compounds in a concentration greater than 18.8 percent by weight of the components boiling above 650° F., with a catalyst in the presence of hydrogen under conditions of elevated temperature above 700° F. and elevated pressure so as to hydrocrack at least some of said polynaphthenic compounds and increase the viscosity index of the components boiling above 650° F., said catalyst comprising:

(1) a heterogeneous carrier composite of about 10 to 50 weight percent of a silica-alumina cogel or copolymer having a $SiO_2/Al_2O_3$ weight ratio of about 50/50 to 85/15 dispersed in a large pore alumina gel matrix, the composite carrier having a surface area between about 200 and 700 $m^2/g$, and a pore volume of about 0.8 to 2.0 ml/g, with about 0.3 to 1 ml/g of said pore volume being in pores of diameter greater than 500 angstroms; and

(2) a minor proportion of a platinum group metal selectively dispersed by cation exchange on said silica-alumina cogel or copolymer from an aqueous solution of a platinum group metal compound wherein the platinum group metal appears in the cation.

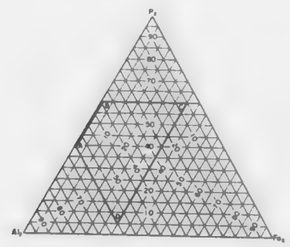
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**4,744,885**

## HYDRO-CARBON CONVERSION USING FERROALUMINOPHOSPHATES

**Celeste A. Messina, Ossining; Brent M. Lok, New City, and Edith M. Flanigen, White Plains, all of N.Y., assignors to Union Carbide Corporation, Danbury, Conn.**

**Division of Ser. No. 514,335, Jul. 15, 1983, Pat. No. 4,554,143. This application Aug. 19, 1985, Ser. No. 766,961**
**Int. Cl.[4] C01G** *11/02, 25/00, 35/06, 45/04*
**U.S. Cl. 208—114** **11 Claims**



1. Process for catalytically converting a hydrocarbon which comprises contacting said hydrocarbon under hydrocarbon converting conditions with a crystalline ferroaluminophosphate having a three-dimensional microporous framework structure of $FeO_2$, $AlO_2$ and $PO_2$ tetrahedral units and having an empirical chemical composition on an anhydrous basis expressed by the formula

$$mR:(Fe_xAl_yP_z)O_2$$

wherein "R" represents at least one organic templating agent present in the intracrystalline pore system; "m" represents the moles of "R" present per mole of $(Fe_xAl_yP_z)O_2$ and has a value of from zero to 0.3, "x", "y" and "z" represent the mole fraction of the iron, aluminum and phosphorus respectively present as tetrahedral oxides, said mole fractions being such that they are within the tetragonal compositional area defined by points A, B, C and D of the ternary diagram which is FIG. 1 of the drawings, or by the points a, b, c and d of the ternary diagram which is FIG. 2 of the drawings.

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**4,744,886**

## CATALYTIC CRACKING CATALYSTS FOR HIGH OCTANE GASOLINE PRODUCTS

**Robert L. Chiang, Oakland, N.J., and Mark T. Staniulis, Peekskill, N.Y., assignors to Union Carbide Corporation, Danbury, Conn.**

**Division of Ser. No. 657,482, Oct. 3, 1984, Pat. No. 4,678,765. This application Feb. 5, 1986, Ser. No. 826,501**
**Int. Cl.[4] C10G** *11/05*
**U.S. Cl. 208—120** **20 Claims**

1. The process for cracking a hydrocarbon feedstock to produce lower boiling hydrocarbons to provide products having increased gasoline octane number wherein said process comprises contacting said hydrocarbon feedstock with a cracking catalyst comprising: (a) an aluminosilicate which has a mole ratio of oxides in the dehydrated state of

$$(0.85\text{–}1.1)M_{2/n}O:Al_2O_3:xSiO_2$$

wherein M is a cation having a valence of "n", the $SiO_2$ to $Al_2O_3$ ratio "x" has a value greater than 6 to about 11, has a X-ray powder diffraction pattern having at least the d-spacings of Table A, has extraneous silicon atoms in the crystal lattice in the form of framework $SiO_4$ tetrahedra; (b) an inorganic oxide matrix; (c) having from greater than zero to less than 5 weight percent of at least one rare earth, expressed as the oxide, based on the weight of the aluminosilicate employed in such catalyst; and (d) having less than 1.2 weight percent $Na_2O$ based on the weight of said aluminosilicate employed in such catalyst.

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**4,744,887**

## SOLID ADDITION AND WITHDRAWAL

**Roger P. Van Driesen, Titusville; William R. Adams, Upper Montclair; Mario Baldasarri, Paramus; John Caspers, Basking Ridge, all of N.J., and Harold Trimble, Grove, Tex., assignors to Lummus Crest Inc., Bloomfield, N.J.**

**Filed Dec. 20, 1985, Ser. No. 811,491**
**Int. Cl.[4] C10G** *13/00*
**U.S. Cl. 208—152** **6 Claims**

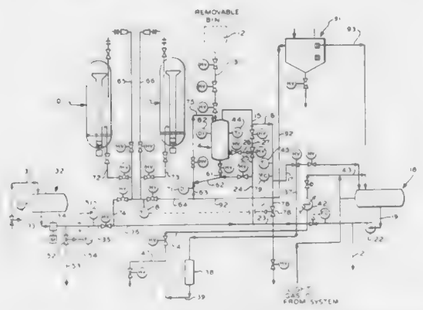
1. A process for withdrawing solids containing a reaction liquid by use of a catalyst withdrawal system, comprising:

withdrawing a first stream comprising solids and a reaction liquid from a reactor; combining the first stream with a second stream comprising a transport liquid to provide a combined stream for transporting solids to a catalyst withdrawal vessel; maintaining a set flow rate for the second stream; withdrawing a mixture of reactor liquid and transport liquid from the vessel; and maintaining a rate of

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withdrawal of the first stream by controlling the flow rate of the mixture to maintain one of a set flow rate for the



mixture or a set temperature of the combined stream or a set temperature of the mixture.

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**4,744,888**

## PROCESS FOR THE REMOVAL OF SODIUM FROM A HYDROCARBON FEEDSTOCK EMPLOYING A CATALYST SYSTEM

**Chi-Wen Hung, San Rafael, and Bruce E. Reynolds, Martinez, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.**

**Filed Oct. 6, 1986, Ser. No. 915,457**
**Int. Cl.[4] C10G *45/04, 29/04***
**U.S. Cl. 208—251 H** **5 Claims**

1. A process for removing oil-soluble sodium from a hydrocarbon feedstock having at least 1 ppm oil-soluble sodium, using a catalyst system, comprising:

passing said feedstock, in the presence of hydrogen through said catalyst system at hydrodemetalating conditions, wherein said catalyst system comprises a fixed bed catalyst layer characterized by catalyst particles having

(a) less than 30 volume percent of their pore volume in the form of macropores above 1000 Å in diameter;

(b) an average mesopore diameter ranging from about 80 Å to about 400 Å;

(c) a surface area ranging from about 80 $m^2/g$ to about 300 $m^2/g$;

(d) at least 0.7 wt% of a Group VIII metal; and

(e) at least 3.0 wt% of a Group VIB metal.

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**4,744,889**

## SEPARATION OF VISCOUS HYDROCARBONS AND MINERALS PARTICLES FROM AQUEOUS MIXTURES BY MIXTURES BY OLEOPHILIC ADHESION

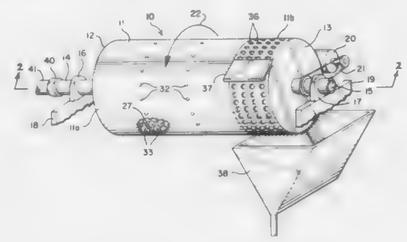
**Jan Kruyer, 9707 67A Street, Edmonton, Canada**

**Continuation-in-part of Ser. No 722,318, Apr. 12, 1985, abandoned. This application Apr. 8, 1986, Ser. No. 849,546**
**Int. Cl.[4] B03B *1/00*; C10G *1/00*; B01D *15/00***
**U.S. Cl. 209—9** **80 Claims**

1. A method for the continuous separation and removal of oil phase from an aqueous phase and oil phase mixture which comprises,

(a) providing a continuous separation and recovery system comprising a generally horizontal rotatable drum, the interior of which is defined by a rear endwall, a front endwall and a cylindrical sidewall interconnecting said front and rear endwalls, said drum being divided into two or more successive compartments by means of one or more oleophilic apertured baffle plates positioned within said drum, each of said compartments containing oleophilic surfaced free bodies having an external size which is larger than the apertures in said baffle plates, said free bodies having a bulk density greater than the density of water, the first of said compartments in the direction of mixture flow being the feed compartment containing means for introducing the mixture to be processed therein, the last of said compartments in the direction of mixture flow being the discharge compartment in which a wall thereof has a plurality of apertures spaced therein, said apertures in the wall of such discharge compartment being smaller in size that the free bodies contained therein, said apertured wall of such discharge compartment further having interior oleophilic surfaces, said system further having means to rotate said drum;

(b) continuously introducing said aqueous and oil phase mixture into said feed compartment while said drum is rotating and continuously tumbling said mixture in the presence of said oleophilic free bodies causing, in each compartment, said oil phase to adhere to and coat the oleophilic surfaces contained therein such that the velocity of travel of oil phase through each of said compartments is slowed relative to the velocity of travel of aqueous phase resulting in an in situ buildup of oil phase in each compartment by oil phase adhering to the oleophilic surfaces in each compartment and accumulating between the voids of said free bodies,



(c) continuously withdrawing said aqueous phase from said discharge compartment through the apertures contained in the apertured wall thereof in a lower area of drum rotation where the concentration of free bodies is minimal and causing said oil phase to rotate away from the area of aqueous phase removal in the direction of drum rotation and migrate toward and adhere to the interior oleophilic surface of said wall in the area of drum rotation where the concentration of free bodies is greatest and be extruded through said apertures in said discharge compartment by the force of the tumbling free bodies and the flow of said aqueous phase, and

(d) removing said oil phase from the outer surface of said apertured wall.

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**4,744,890**

## FLOTATION APPARATUS AND METHOD

**Jan D. Miller, and David J. Kinneberg, both of Salt Lake City, Utah, assignors to University of Utah, Salt Lake City, Utah**

**Continuation of Ser. No. 680,613, Dec. 11, 1984, abandoned, which is a continuation of Ser. No. 465,748, Feb. 11, 1983, abandoned, which is a continuation-in-part of Ser. No. 323,336, Nov. 20, 1981, Pat. No. 4,397,741, which is a continuation-in-part of Ser. No. 182,524, Aug. 29, 1980, Pat. No. 4,399,027, which is a continuation-in-part of Ser. No. 94,521, Nov. 15, 1979, Pat. No. 4,279,743. This application Mar. 21, 1986, Ser. No. 842,697**
**Int. Cl.[4] B03D *1/02*; B04C *5/103, 5/16***
**U.S. Cl. 209—164** **8 Claims**

1. A flotation method for separating particles from a particulate suspension, comprising the steps of:

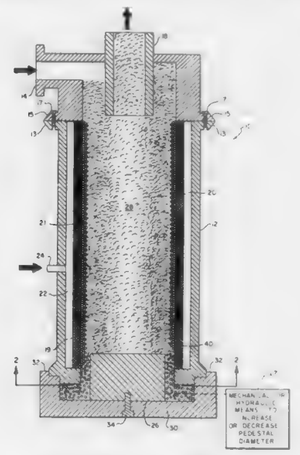
obtaining a vessel having a generally circular cross-section and a generally vertical orientation;

introducing a particulate suspension into an upper end of the vessel in a generally tangential fashion;

introducing gas into the particulate suspension inside the vessel adjacent a wall of the vessel, the gas forming small bubbles which separate particles from the particulate suspension by flotation, thereby leaving a fluid discharge, the separated particles and bubbles forming a froth within the vessel;

positioning a pedestal having a generally circular cross-section within a lower end of the vessel so as to direct the fluid discharge out of the lower end of the vessel in a





generally annular fashion such that the fluid discharge does not substantially disturb the fluid flow within the vessel, the pedestal serving to minimize mixing between the froth and the fluid discharge;

removing the froth from the vessel; and

controlling the amount of material leaving the vessel in the froth and the amount of material leaving the vessel in the fluid discharge by adjusting the diameter of the pedestal.

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**4,744,891**

## FLOTATION OF APATITE FROM MAGNATITE

**Radhakrishnan Selvarajan, Oak Park, and Richard D. Christie, Downers Grove, both of Ill., assignors to NALCO Chemical Company, Naperville, Ill.**

**Filed May 12, 1986, Ser. No. 862,296**
**Int. Cl.[4] B03D *1/02***
**U.S. Cl. 209—166** **5 Claims**

1. A method of beneficiating magnetite iron ore concentrates to remove apatite by flotation which comprises the steps of:

(a) Adding to said concentrates from about 0.1 pounds/ton to about 0.7 pounds/ton of a collector consisting essentially of the half ester of a short-chain dicarboxylic acid or source thereof containing at least four carbon atoms with a saturated aliphatic monohydric alcohol containing from eight to thirteen carbon atoms,

(b) Subjecting the thus treated concentrate to a flotation process whereby the apatite is floated from the iron ore contained in the magnetite, and then,

(c) Recovering the iron ore.

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**4,744,892**

## PROCESS FOR DRESSING KAOLINITE BY FLOTATION

**Wolfgang von Rybinski; Holger Tesmann, both of Duesseldorf, and Bohuslav Dobias, Regensburg, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany**

**Division of Ser. No. 834,072, Feb. 26, 1986, Pat. No. 4,714,544. This application Sep. 14, 1987, Ser. No. 96,706**
**Claims priority, application Fed. Rep. of Germany, Feb. 27, 1985, 3506808**
**Int. Cl.[4] B03D *1/02***
**U.S. Cl. 209—167** **15 Claims**

1. A process for the selective separation for kaolinite from feldspar by flotation in aqueous pulp comprising:

(a) suspending an ultra-fine particle size mineral mixture comprising feldspar and kaolinite in water to form an aqueous pulp at a pH of from about 5 to 8;

(b) treating the aqueous pulp with a water-soluble salt of $Al^{3+}$ or $Fe^{3+}$ and a collector a cationic surfactant; said collector and water-soluble salt being present in sufficient concentration(s) to provide a kaolin float and a feldspar sink in step (c);

(c) subjecting the treated pulp to a flotation treatment to float kaolinite; and

(d) recovering kaolinite from the resulting float and feldspar from the resulting flotation residue.

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**4,744,893**

## POLYMERIC SULFIDE MINERAL DEPRESSANTS

**Alan S. Rothenberg, Norwalk; David W. Lipp, Stamford; Samuel S. Wang, Cheshire, and Donald P. Spitzer, Riverside, all of Conn., assignors to American Cyanamid Company, Stamford, Conn.**

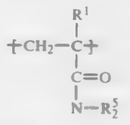
**Filed Aug. 28, 1985, Ser. No. 770,125**
**Int. Cl.[4] B03D *1/02***
**U.S. Cl. 209—167** **6 Claims**

1. A method which comprises beneficiating value sulfide minerals from sulfide ores with selective rejection of gangue iron sulfide minerals by:

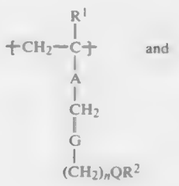
(a) providing an aqueous pulp slurry of finely-divided, liberation-sized ore particles which contain said value sulfide minerals and said gangue iron sulfide minerals;

(b) conditioning said pulp slurry with an effective amount of a gangue iron sulfide depressant, a value sulfide mineral collector and a frothing agent, respectively, said depressant comprising a polymer comprising;

(i) x units of the formula:



(ii) y units of the formula:

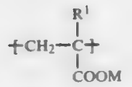


and

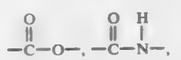
(iii) z units of the formula:

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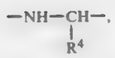
wherein each $R^1$, individually, is hydrogen or $C_1$–$C_4$ lower alkyl; $R^2$ is hydrogen, $C_1$–$C_4$ lower alkyl or $C_1$–$C_4$ substituted lower alkyl; A is a bridging group selected from



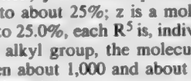
$C_6H_4$ and $C_2$–$C_{10}$ alkylene; G is a valence bond or a group selected from



and



wherein $R^3$ is hydrogen, hydroxyl or mercaptan and $R^4$ is hydrogen or COOM; n is 0 or 1; Q is selected from —O—, —S—, —N—$R^2$—, or —$NR^2$—$NR^2$; M is hydrogen, an alkali metal cation or an ammonium ion; x represents the residual mole percent fraction; y is a mole percent fraction ranging from about 0.5% to about 25%; z is a mole percent fraction ranging from 0% to 25.0%, each $R^5$ is, individually, hydrogen or a $C_1$–$C_4$ lower alkyl group, the molecular weight of said polymer is between about 1,000 and about 500,000, and with the proviso that when A is



n is 1, and,

(c) collecting the value sulfide mineral having a significantly reduced content of gangue iron sulfide by froth flotation.

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**4,744,894**

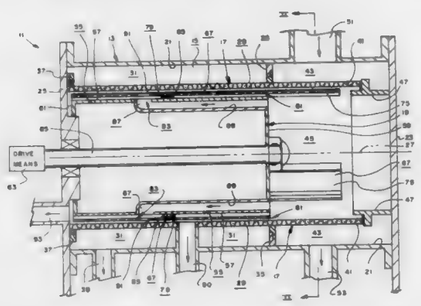
**FIBROUS STOCK SCREENING APPARATUS**

**W. Thomas Gauld, 4313 Winding Way, Mobile, Ala. 36609**

**Filed Jun. 30, 1986, Ser. No. 880,552**

**Int. Cl.[4] B07B** *9/00, 1/20*

**U.S. Cl. 209—234** **7 Claims**



1. A fibrous stock screening apparatus comprising:

(a) a housing member having a substantially hollow interior;

(b) screen means located within said interior for dividing said interior into a screened zone and a screening zone and for allowing acceptable stock to pass therethrough from said screening zone to said screened zone, said screen means including a cylindrical screen member;

(c) rotor means located at least partially within said screening zone for causing acceptable fibrous stock within said screening zone to pass through said screen means into said screened zone, said rotor means including a cylindrical body member having a first end and a second end;

(d) dam means located within said screening zone for dividing said screening zone into a first screening zone and a second screening zone, said dam means including a transverse ring member positioned between said screen member and said body member intermediate said first and second ends of said body member;

(e) first stock inlet means communicating with said first screening zone for allowing fibrous stock to be screened to be introduced into said first screening zone;

(f) first rejects outlet means communicating with said first screening zone for allowing debris to exit said interior;

(g) second stock inlet means communicating with said second screening zone for allowing fibrous stock to be screened to be introduced into said second screening zone;

(h) second rejects outlet means communicating with said second screening zone for allowing debris to exit said interior; and

(i) accepts outlet means communicating with said screened zone for allowing acceptable stock to exit said interior.

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**4,744,895**

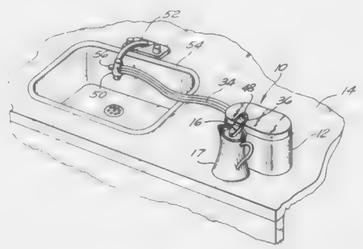
**REVERSE OSMOSIS WATER PURIFIER**

**Michael A. Gales, New York, N.Y.; Stanley I. Magidson, Morristown, N.J.; John Wistrand, New Canaan, Conn., and Donald B. Guy, Park Ridge, N.J., assignors to Aquasciences International, Inc., Lincoln Park, N.J.**

**Filed Nov. 8, 1985, Ser. No. 796,296**

**Int. Cl.[4] B01D** *13/00*

**U.S. Cl. 210—96.2** **20 Claims**



1. A reverse osmosis water purifier comprising, in combination, a housing having a base adapted to rest upon a countertop, a reverse osmosis water purifier element mounted in said housing, a purified water reservoir mounted in said housing and connected to receive purified water from said purifier element, conduit means for conducting pressurized unpurified water to said purifier element, coupling means for coupling said conduit means to a water faucet outlet as a source of pressurized unpurified water, dispensing outlet means for said reservoir, said outlet means being located a substantial distance above the bottom wall of said reservoir, and pump means operable to pump purified water from said reservoir and out through said outlet.



**4,744,896**

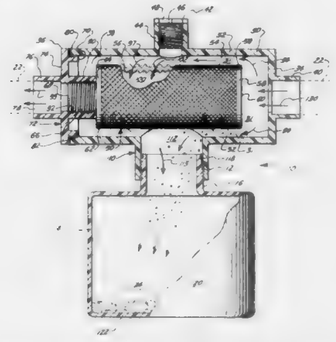
**FILTER APPARATUS FOR WATER WELLS**

**Andrew James, and Jessie James, both of P.O. Box 433, Gonzales, La. 70707**

**Filed Jan. 28, 1987, Ser. No. 7,676**

**Int. Cl.[4] B01D** *35/02*

**U.S. Cl. 210—170** **10 Claims**



1. A filtration apparatus in a fluid flow line, comprising:

a. filter housing having a fluid intake port and a fluid outflow port;

b. a filter element positioned within the filter housing and connectably engaged to the outflow port, said filter element further comprising:

i. an annular screen portion extending substantially the length of the filter element for supporting the filter element within the filter housing; and

ii. a primary filter layer positioned interior to the filter screen defining an interior filtrate collection zone, for filtering particles out of the fluid flow flowing into the filtrate collection zone from the filter chamber;

c. means on that portion of the filter housing adjacent the fluid intake port, for contacting the fluid flowing into the filter housing and to direct the fluid flow from external of the filter element into the filtration collection zone of the filter element, so that the particles contained within the fluid flow are restricted from flowing to the filtration collection zone of the filter element and is maintained on the exterior of the filter element; and

d. means for collecting any particles maintained on the exterior of the filter element, said means located exterior to the filter housing.

7. A filter positioned along a water well line intermediate the water well and the well pump, the filter comprising:

a. a primary filter housing positioned along the water flow line, the housing having a water intake for allowing water to flow into the housing on the first end and a water outflow portion on its second end, and defining a filtration zone there within;

b. a filtration element housed within the filter housing, the element fixedly engaged onto the output portion of the filter housing and supported substantially within the length and internal of the filter housing, the diameter of the filter element being less than the internal diameter of the filter housing for defining a fluid flow space there between;

c. a primary filtration layer on the filter element, for maintaining any debris within the fluid flow on the exterior of the filter element, and allowing filtered water flowing out of the outflow portion;

d. a screen layer exterior to the filtration layer for supporting the filter housing along its length as it is attached to the outflow port;

e. a plate member on the end portion of the filter housing adjacent the intake portion, for receiving fluid flowing into the filter housing and contacting the plate member so that fluid flows around the end plate and into the fluid flow space along the housing, along the length of the filter and is directed through the filter material for flowing out of the outflow portion; and

f. collection means engaged to the lowermost portion of the housing for providing a collection zone for the debris collected on the filter housing to flow out of the filter housing and into the collection zone so that the debris is collected exterior to the filter housing.

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**4,744,897**

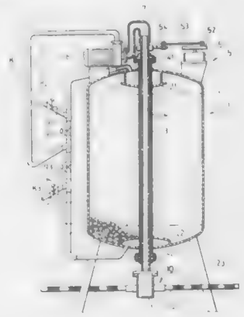
**SWEEPER TYPE APPARATUS FOR CLEARING THE DEPOSITION FORMED ON THE BOTTOM OF A POND**

**Johnson Yes, No. 9, She Tze Street, Shin Lin District, Taipei, Taiwan**

**Filed Nov. 26, 1986, Ser. No. 935,435**

**Int. Cl.[4] B01D** *35/02*

**U.S. Cl. 210—170** **7 Claims**



1. An apparatus for clearing the bottom of a culturing pond comprising:

a filter device having a cylinder body with a through bore provided at a central portion thereof;

a suction water tube passing through said through bore and arranged so as to be able to swivel within said through bore;

a plurality of suction means respectively connected to said suction water tube for taking in water from the pond;

a driving device provided on said cylinder body of said filter device for actuating said suction water tube to swivel; and

a plurality of pipes connecting said suction water tube to said filter device with control valves provided thereon to regulate the direction of water flow therethrough;

whereby the pond water is filtered by said filter device to remove deposits therefrom.

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**4,744,898**

**INFLATABLE SCREEN CLAMP**

**Marshall G. Bailey, Banchory, Scotland, assignor to Thule United Limited, Aberdeen, Scotland**

**Filed Jun. 9, 1986, Ser. No. 871,756**

**Claims priority, application United Kingdom, Jun. 13, 1985, 8514982**

**Int. Cl.[4] B07B** *1/28*

**U.S. Cl. 210—236** **5 Claims**

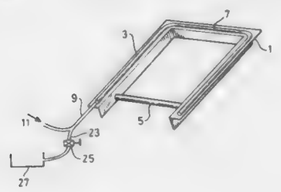
1. In a vibratory screening apparatus which includes a vibratory basket having two spaced lateral projections on the inside of its periphery and a screen member having a screen supported by a peripheral frame, the improvement of a separate and removable clamping device releasably clamping the screen member in the basket, the clamping device comprising:

a frame member and inflatable means carried by and located on said frame member, the peripheral frame of the screen member and the frame member of the clamping device both being located between the lateral projections of the

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vibratory basket with the inflatable means disposed against the peripheral frame of the screen member and the frame member pressed against one of the lateral projections; and




means for inflating and deflating the inflatable means for releasably clamping the screen member in the vibratory basket,

wherein said frame member is not unitarily fixed to either of said screen member or said basket.

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**4,744,899**

## STERILIZATION OF ADSORBENT AND COLUMN HAVING IMPROVED STORABILITY INCLUDING STERILIZED ADSORBENT FOR USE IN EXTRACORPOREAL CIRCULATION TREATMENT

**Nobutaka Tani, Minoo; Tsutomu Okuyama, and Shigeo Furuyoshi, both of Kobe, all of Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan**

**Filed Oct. 21, 1985, Ser. No. 789,540**

**Claims priority, application Japan, Oct. 22, 1984, 59-221861; Oct. 22, 1984, 59-221862**

**Int. Cl.[4] B01D** *15/00*

**U.S. Cl. 210—263** **3 Claims**

1. A sterilized adsorption column for use in extracorporeal circulation treatment comprising a columnar container, an adsorbent comprising a water-insoluble support and a sulfated polysaccharide immobilized on said support through covalent coupling, and an aqueous solution of pH 5 to 9 containing 0.001 to 10% by weight of a buffer, said adsorption column being sterilized by packing said adsorbent and said aqueous solution in said container and heating the container with steam under a high pressure.

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**4,744,900**

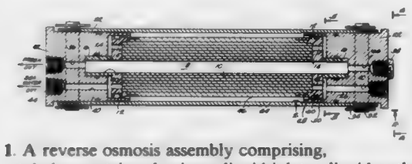
## REVERSE OSMOSIS MEMBRANE CONTAINER

**Russell I. Bratt, 2431 Laguna Dr., Ft. Lauderdale, Fla. 33316**

**Filed Apr. 20, 1987, Ser. No. 40,309**

**Int. Cl.[4] B01D** *13/00*

**U.S. Cl. 210—321.78** **1 Claim**



1. A reverse osmosis assembly comprising,

a tubular container having a liquid inlet, a liquid outlet and a clear product outlet,

an end cap mounted in each end of said container,

means sealing each end cap with respect to the inside wall of said container,

each end cap having a central opening,

a reverse osmosis membrane having a central tubular passage with a tubular projection at each end of the membrane, each said projection being received in said central opening of the associated end cap and sealed with respect thereto,

the central passage through one of said end caps being sealed so the central passage through the other end cap serves as a clear product outlet,

a sea water inlet in said one of said end caps communicating with the membrane in said tubular container,

said one end cap including an annular skirt lying between said membrane and said tubular container,

first seal means between said membrane and said skirt preventing flow of liquid from said sea water inlet into the space between said membrane and said tubular container,

a sea water outlet in the other of said end caps and communicating with said membrane to receive and discharge sea water which has passed through the membrane,

there being no seal between said sea water outlet and said tubular container whereby the pressure in the space between the membrane and the tubular container is generally comparable to that within the membrane,

and a bleed hole in said skirt on the inlet side of said first seal means and leading between said sea water inlet and the space between said skirt and said tubular container to allow liquid flow from said inlet through the bleed hole to the space between said skirt and said tubular container and then axially of said container in the space between the membrane and the container.

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**4,744,901**

## MULTIPLE DISC TYPE FILTER AND DISC CONSTRUCTION USEFUL THEREIN

**Mordeki Drori, 89 Zahal Street, Kiron, Israel**

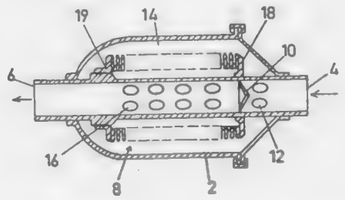
**Filed Apr. 10, 1986, Ser. No. 850,146**

**Claims priority, application Israel, Apr. 10, 1985, 74873**

**The portion of the term of this patent subsequent to Jul. 28, 2004, has been disclaimed.**

**Int. Cl.[4] B01D** *25/02*

**U.S. Cl. 210—323.1** **14 Claims**




1. A filter comprising:

a housing having an inlet connectable to an upstream pipe, and an outlet connectable to a downstream pipe; and a stack of discs disposed within said housing for separating solid particles from a fluid flowing between said discs from the upstream said of said stack to the downstream side thereof; including means for improving the filtering capacity, further including,

a plurality of co-operating filter elements defining a plurality of paired co-operating filter surfaces, each filter element including a first surface defining a large surface area formed with circumferentially directed grooves and a second surface shaped in sinuous configuration on the opposite side thereof, said second surface contacting only a portion of said large surface area of said first surface on another one of said plurality of co-operating filter elements and leaving a portion of the large surface area on the upstream side of the stack not contacted thereby, so as to form:

(a) compartments on the upstream side of the stack for accumulation of solid particles; and

(b) edge-filtering passageways extending along the circumferentially directed grooves in contact with said second surface, which passageways define the minimum size of particles separated by the filter and extend from said compartments to the downstream side of the stack for permitting liquid flow therethrough even when said compartments become clogged, and wherein said second surface is formed with serrated edge surfaces defining said compartments on the upstream side of the stack for increasing the peripheral edge length along which said edge-filtering passageways are defined and improving the filtering capacity.



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**4,744,902**

## ANNULAR WAVE FILTER DEVICE

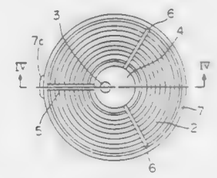
**Yoshihiro Taki, Nagoya; Toshiaki Fukuta; Hajime Akado, both of Anjo; Susumu Miyakawa, Kariya, and Yoshitaka Nishio, Nagoya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan**

**Division of Ser. No. 743,878, Jun. 12, 1985, Pat. No. 4,569,813, which is a continuation of Ser. No. 519,666, Aug. 23, 1983, abandoned. This application Jan. 31, 1986, Ser. No. 824,949**

**Claims priority, application Japan, Aug. 4, 1982, 57-136591; Jul. 2, 1983, 58-120762**

**Int. Cl.[4] B01D** *27/06*

**U.S. Cl. 210—493.1** **16 Claims**




1. A filter device comprising:

an annular filter element made of filter sheet material and having a plurality of annular wave portions extending outwardly;

a central portion made of synthetic resin and arranged at an inner periphery of said filter element, an innermost peripheral end of said filter element being held by said central portion;

a support frame made of synthetic resin and arranged at an outer periphery of said filter element, an outermost peripheral end of said filter element being held by said support frame; and

a connecting portion made of synthetic resin and positioned where both sides of said filter element are abutting on opposite sides of said connecting portion, said connecting portion being provided along a whole length from a bottom end of said annular wave portions to a top end thereof, said connecting portion being inserted between adjacent side surfaces of said annular wave portions for rigidly fixing said adjacent side surfaces of said annular wave portions, both of said sides of said filter sheet material being held by said connecting portion, wherein said central portion, said support frame and said connecting portion are made as an integral structure.

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**4,744,903**

## WASTE WATER TREATMENT

**Terry L. McAninch, Westminster; David H. Hughes, Weldona, and Robert D. McDonough, Westminster, all of Colo., assignors to Birko Corporation, Westminster, Colo.**

**Continuation-in-part of Ser. No. 850,580, Apr. 11, 1986. This application Apr. 2, 1987, Ser. No. 34,067**

**Int. Cl.[4] C02F** *1/54*

**U.S. Cl. 210—632** **7 Claims**

1. A process for facilitating the separation of fat from a waste stream composition comprising water, fat, fatty acids, and solids produced in food processing plants and animal rendering plants, said process comprising in sequence:

(a) adding a flocculant composition to the waste stream compostion, said flocculant composition comprising an aluminum salt in a quantity sufficient to subsequently react with salts of fatty acids subsequently produced to yield aluminum salts thereof, and further comprising an acid component sufficient to impart a pH value of from about 3.5 to about 6.8 to the waste stream composition;

(b) injecting air into the resulting waste stream composition of (a);

(c) adding an alkaline pH control composition to the resulting waste stream composition of (b), said pH control composition comprising a pH control component having an equivalent alkalinity of from about 20% to about 50% by weight of sodium hydroxide to produce a pH of from about 6.0 to about 6.5 in the resulting waste stream composition to yield salts of the fatty acids in the original




waste stream composition, said salts reacting with the aluminum salt of (a) to produce said aluminum salts, and further comprising a surfactant in an amount of from about 0.1% to about 5% by weight of the pH control composition; and

(d) holding the resulting waste stream composition of (c) in a clarifier for a period of time sufficient to effect separation of said composition into three iayers, the bottom layer thereof comprising essentially solids, the middle layer thereof comprising essentially water, and the top layer thereof comprising essentially fat which can be recovered by skimming for further processing.

3. The process of claims 1 or 2 and wherein the flocculant composition contains a protease.

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**4,744,904**

## WASTE WATER TREATMENT

**Terry L. McAninch, Westminster, and Rodney D. Cooke, Loveland, both of Colo., assignors to Birko Corporation, Westminster, Colo.**

**Filed Apr. 11, 1986, Ser. No. 850,580**

**Int. Cl.[4] C02F** *1/54*

**U.S. Cl. 210—632** **12 Claims**

1. A process for facilitating the separation of fat from a waste stream composition comprising water, fat, fatty aids, and solids produced in food processed plants and rendering plants, said process comprising the steps of:

(a) adding an aqueous flocculant composition comprsing an aluminum salt the waste stream composition in an amount to maintain from about 5 ppm to about 100 ppm of the aluminum salt in the waste stream composition prior to subsequent addition of an aqueous alkaline pH control composition to said waste stream;

(b) subsequently adding the aqueous alkaline pH control composition to the resulting waste stream composition of (a), said pH control composition comprising an alkali metal hydroxide in a sufficient amount to produce an equivalent alkalinity thereto of from about 20% to about 50% by weight of sodium hydroxide to produce a pH of from about 6.0 to about 6.5 in the resulting waste stream composition, and further comprising a surfactant in an

amount of from about 0.1% to about 5.0% by weight of the pH control composition; and

(c) subsequently holding the resulting waste stream composition of (b) in a clarifier for a period of time sufficient for formation of an aluminum hydroxide fatty acid complex which floats to thereby effect separation of the waste stream composition into three layers, the bottom layer thereof comprising essentially solids, the middle layer thereof comprising essentially water, and the top layer thereof comprising essentially fat which can be recovered by skimming for further processing.

6. The process of claim 1 and wherein the flocculant composition contains a protease in an amount of from about 0.05% to about 1.0% by weight of the flocculant composition.

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**4,744,905**

## METHOD FOR REPLACING PCB CONTAINING COOLANTS IN ELECTRICAL INDUCTION APPARATUS WITH SUBSTANTIALLY PCB-FREE DIELECTRIC COOLANTS

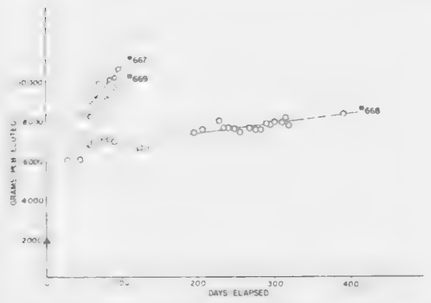
**Gilbert Atwood, Briarcliff Manor, N.Y., assignor to Union Carbide Corporation, Danbury, Conn.**

**Continuation-in-part of Ser. No. 675,278, Nov. 27, 1984, abandoned, which is a continuation-in-part of Ser. No. 566,306, Dec. 28, 1983, abandoned. This application Jun. 3, 1985, Ser. No. 739,775**

**The portion of the term of this patent subsequent to Apr. 19, 2005, has been disclaimed.**

**Int. Cl.**[4] **B08B** *5/00*

**U.S. Cl. 210—634** **16 Claims**




1. A method for replacing a coolant containing PCB in an electrical induction apparatus having a tank containing said coolant, an electrical winding and porous solid cellulosic electrical insulation immersed in said PCB-containing coolant with a substantially PCB-free high boiling dielectric permanent coolant to convert said electrical apparatus into one in which the rate of elution of PCB into said coolant is below the maximum allowable rate of elution into the coolant of an electrical apparatus rated as non-PCB, said solid porous electrical insulation being impregnated with said PCB-containing coolant, said method comprising the steps of:

(a) draining said PCB-containing coolant from said tank to remove a major portion of said PCB-containing coolant contained by it;

(b) filling said tank with an interim dielectric cooling liquid that is miscible with said PCB, is sufficiently low in viscosity to circulate within said tank and penetrate the interstices of said porous solid electrical insulation, and is capable of being readily separated from said PCB;

(c) electrically operating said electrical induction apparatus and continuing said electrical operation for a period sufficient to elute PCB contained in said PCB-containing coolant impregnated in said porous solid insulation therefrom into said interim dielectric cooling liquid;

(d) thereafter draining said interim dielectric cooling liquid containing said eluted PCB from said tank;

(e) repeating the cycle of steps (b), (c) and (d) when the rate of elution of PCB into said interim dielectric cooling liquid exceeds 0.55 ppm of PCB per day based on the weight of said permanent dielectric coolant; and

(f) filling said tank with a substantially PCB-free permanent coolant selected from the group consisting of high boiling, high viscosity, silicone oils, synthetic ester fluids, poly-alpha-olefin oils and hydrocarbon oils so as to reclasify said electrical apparatus to non-PCB status.

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**4,744,906**

## POROUS FIBERS AND MEMBRANES AND METHODS FOR THEIR PREPARATION AND USE

**Klaus Gerlach, Aschaffenburg-Bernau, and Erich Kessler, Hoechst, both of Fed. Rep. of Germany, assignors to Akzo NV, Arnhem, Netherlands**

**Continuation of Ser. No. 456,758, Jan. 10, 1986, Pat. No. 4,564,488, which is a continuation-in-part of Ser. No. 360,631, Mar. 22, 1982, abandoned, and a continuation-in-part of Ser. No. 360,632, Mar. 22, 1982, abandoned, and a continuation of Ser. No. 61,989, Jun. 30, 1979, abandoned, and a continuation of Ser. No. 61,990, Jun. 30, 1979, abandoned. This application Oct. 4, 1985, Ser. No. 785,324**

**Claims priority, application Fed. Rep. of Germany, Jul. 31, 1978, 2833568; Jul. 31, 1978, 2833493; Jul. 31, 1978, 2833623**

**The portion of the term of this patent subsequent to Jan. 14, 2003, has been disclaimed.**

**Int. Cl.**[4] **B01D** *13/00*

**U.S. Cl. 210—651** **7 Claims**

1. Porous fibers or membranes in the form of tube foils or hollow fibers, prepared from synthetic polymers with 10 to 90 volume-% pores in commincation with one another and a smooth, open porous surface in which the proportion of openings in said surface is between about 10 to 90% and with a permeability coefficient of at least $10 \cdot 10^{-12}$ cm$^2$, said porous fibers or membranes being produced by a process comprising forming a homogeneous mixture of at least two components, wherein one component is a meltable polymer and a second component is a liquid inert to said polymer which forms a binary mixture with said polymer in its liquid state, said binary mixture in liquid aggregate form exhibiting a temperature range of complete miscibility and a range with a miscibility gap; and extruding said mixture at a temperature above the temperature at which said components separate directly into a bath containing at least some of said inert liquid, said bath having a temperature below said separation temperature, whereby the fiber structure of said porous fiber or membrane is fixed.

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**4,744,907**

## BLOOD CELL SEPARATION

**Robert J. Klimchak, Flemington, N.J., assignor to Interferon Sciences, Inc., New Brunswick, N.J.**

**Filed Jan. 16, 1987, Ser. No. 3,838**

**Int. Cl.**[4] **B01D** *21/00*

**U.S. Cl. 210—730** **12 Claims**

1. A method of separating leukocyte and erythrocyte-containing blood or blood fraction into a first fraction enriched for leukocytes in which over 80% of the original leukocytes are recovered and a second fraction enriched for erythrocytes, which method comprises mixing the blood or blood fraction with a sedimenting agent consisting essentially of a hydroxyalkyl cellulose, permitting the mixture to settle and separating the mixture into said first and second fractions.



**4,744,908**

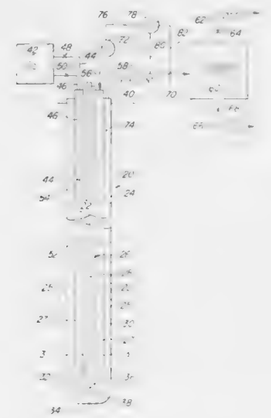
## PROCESS FOR EFFECTING CHEMICAL REACTIONS

**Hermann W. Peterscheck, Longmont, and Leonard A. Kaufmann, Aurora, both of Colo., assignors to VerTech Treatment Systems, Inc., Denver, Colo.**

**Filed Feb. 24, 1987, Ser. No. 17,659**

**Int. Cl.**[4] **C02F** *1/74, 11/08*

**U.S. Cl. 210—747** **22 Claims**



1. In a process for effecting chemical reactions between at least two reactants, said process comprising the following steps:

(a) flowing an influent liquid including said reactants downwardly through a downflowing passage extending below ground in a subterranean opening forming a hydrostatic column of liquid defining a predetermined pressure with said reactants at a temperature sufficient to initiate and maintain said chemical reaction and forming reaction products;

(b) flowing said liquid and reaction products as an effluent liquid upwardly through an upflowing passage to ground level; and

(c) controlling the temperature and pressure of said effluent liquid to initiate boiling of said liquid in said upflowing passage, vaporizing at least a portion of said effluent liquid, generating vapor bubbles in said upflowing passage and thereby reducing the hydrostatic pressure in said upflowing passage and increasing the mass flow rate through said passages.

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**4,744,909**

## METHOD OF EFFECTING ACCELERATED OXIDATION REACTION

**Francis M. Ferraro, Westminster, Colo., and Ronald H. Hall, Oakville, Canada, assignors to VerTech Treatment Systems, Inc., Denver, Colo.**

**Filed Feb. 2, 1987, Ser. No. 10,060**

**Int. Cl.**[4] **C02F** *1/74*

**U.S. Cl. 210—747** **24 Claims**

1. A method for introducing gaseous oxygen into a fluid waste stream in conjunction with the accelerated oxidation of organic matter inside a reaction apparatus, comprising the steps of:

preparing a multiple-phase composition which contains gaseous oxygen which is substantially fully saturated with water vapor, said multiple-phase composition also containing liquid water;

injecting said multiple-phase composition into said fluid waste stream in said reaction apparatus at at least one injection site; and,

raising the temperature and pressure of said fluid waste stream containing said multiple-phase composition to produce said accelerated oxidation reaction of organic matter,

whereby unwanted dry spots which could otherwise form in said reaction apparatus are substantially eliminated.

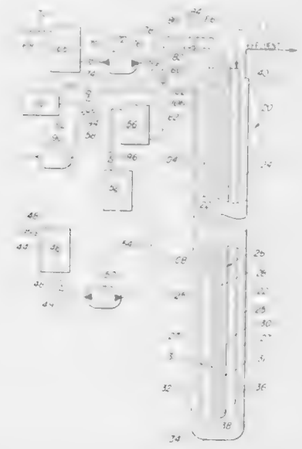
16. In a method of producing an accelerated wet oxidation reaction in an aqueous stream containing combustible waste in a reaction apparatus wherein gaseous oxygen or an oxygen-enriched gas is introduced into said aqueous stream containing combustible waste through at least one injection line and wherein said accelerated wet oxidation reaction occurs at a selected elevated temperature and pressure in said reaction apparatus to form an effluent waste stream mixture containing an end-product and a liquid portion, and wherein said end-product is removed from said liquid portion, the improvement comprising the steps of:

(A) flowing said aqueous stream containing combustible waste into said reactor;

(B) causing said aqueous stream containing combustible waste to attain said selected elevated temperature and pressure;

(C) flowing continuously a first stream of inert gas into said aqueous stream containing combustible waste in said reaction apparatus through said injection line;

(D) flowing continuously a first stream of liquid water through said injection line along with said first stream of inert gas;



(E) stopping the flow of said first liquid water stream;

(F) flowing continuously a dilute aqueous detergent solution through said injection line along with said first stream of inert gas into said reaction apparatus to clean said injection line;

(G) stopping the flow of said dilute aqueous detergent solution;

(H) flowing continuously a second stream of liquid water through said injection line along with said first stream of inert gas into said reaction apparatus to rinse said injection line;

(I) flowing through said injection line and into said reaction apparatus a stream of gas containing said gaseous oxygen along with said second stream of liquid water and said first stream of inert gas;

(J) stopping the flow of said first stream of said inert gas;

(K) adjusting the flow of said gas containing said oxygen and the flow of said second stream of liquid water to provide a multiplephase composition, wherein said multiple-phase composition includes both said gas containing said oxygen which is saturated with water vapor, and liquid water to prevent the formation of dry spots in said reaction appara-

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tus which would otherwise occur and to control said accelerated wet oxidation reaction.

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**4,744,910**

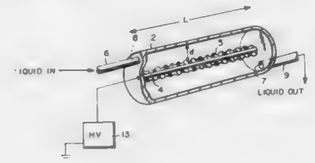
## ELECTROSTATIC FILTER

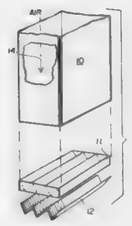
**Peter R. Bossard, Langhorne, Pa., assignor to Voyager Technologies, Inc., Langhorne, Pa.**

**Continuation-in-part of Ser. No. 855,071, Apr. 22, 1986. This application Jan. 14, 1987, Ser. No. 3,324**

**Int. Cl.**[4] **B03C** *5/02, 3/41, 3/45;* **B01D** *50/00*

**U.S. Cl. 210—748** **16 Claims**




**13**. An electrostatic filter system for removing particles from a fluid passing therethrough comprising:

an m×n array of interconnected filter elements, wherein m and n are non-zero integers;

each of said filter elements including: an elongated housing having an input port for receiving fluid to be filtered, and an output port for supplying filtered fluid; a conductor disposed within the housing extending at least substantially the length of the housing;

high voltage supply means coupled to each of said conductors in said array; and

a mechanical air filter disposed upstream of said input port such that said fluid is initially filtered by said mechanical filter to eliminate large fluid particles and said initially filtered fluid is further filtered by said array of filter elements to remove relatively fine fluid particles, said mechanical filter being a HEPA filter.

**16**. An electrostatic filter comprising means for defining a flow path of fluid to be filtered; and a conductor disposed within said defining means generally along said flow path, said conductor surrounded by a ridged insulator, the ridges being formed and spaced so as to facilitate the trapping of particles.

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**4,744,911**

## DISPERSIBLE FABRIC SOFTENERS

**Andre Baeck, Bonheiden, and Alfred Busch, Grimbergen, both of Belgium, assignors to The Procter & Gamble Company, Cincinnati, Ohio**

**Filed Jul. 30, 1986, Ser. No. 891,819**

**Claims priority, application United Kingdom, Aug. 1, 1985, 8519363**

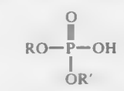
**Int. Cl.**[4] **D06M** *13/36*

**U.S. Cl. 252—8.8** **12 Claims**

**1**. A water-dispersible fabric softening composition comprising:

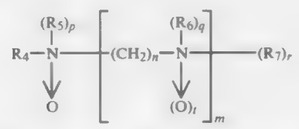
(a) an amine of the formula $R_1$, $R_2$, $R_3N$ wherein $R_1$, is $C_6$ to $C_{20}$ alkyl, $R_2$ is $C_1$ to $C_{20}$ alkyl or hydrogen, and $R_3$ is $C_1$ to $C_{10}$ alkyl or hydrogen;

(b) a phosphate ester of the formula



wherein R′ is $C_1$–$C_{20}$ alkyl, or alkoxylated alkyl of the formula alkyl —$(OCH_2CH_2)_Y$, wherein the alkyl substituent is $C_1$–$C_{20}$, and Y is an integer from 1 to 15, and R is R′ or hydrogen, and

(c) an amine oxide of the formula



wherein $R_4$ is $C_{10}$–$C_{22}$ alkyl or alkenyl, $R_5$, $R_6$ and $R_7$ are selected from $C_1$–$C_4$ alkyl, ethylene oxide and propylene oxide, n is an integer from 1 to 6, m is an integer from 0 to 6, t is 0 or 1, p, q and r are each 1 for alkyl substituents, and integers in the range from 1 to 10 for ethylene oxide or propylene oxide substituents such that the sum of (p+q+r) is not greater than 25, wherein the weight ratio of amine:phosphate ester is from 5:1 to 20:1 and the weight ratio amine:amine oxide is from 1:1 to 20:1.

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**4,744,912**

## SULFURIZED ANTIWEAR ADDITIVES AND COMPOSITIONS CONTAINING SAME

**Angeline B. Cardis, Florence, N.J., assignor to Mobil Oil Corporation, New York, N.Y.**

**Filed Apr. 14, 1987, Ser. No. 38,084**

**Int. Cl.**[4] **C10M** *141/10, 141/08, 141/06*

**U.S. Cl. 252—46.7** **13 Claims**

**1**. A product of a one-step reaction prepared by reacting a sulfurized olefin with a dialkyl hydrogen phosphite and an alkyl primary amine wherein a $C_2$ to about a $C_8$ sulfurized olefin is reacted with a $C_2$ to about a $C_8$ dialkyl hydrogen phosphite and a $C_2$ to about a $C_{20}$ primary amine in a weight ratio of sulfurized olefin to phosphite to amine of from about 3.0:0.5:1.0 to about 7.0:1.0:1.3 at a temperature of from about 90° C. to about 130° C.

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**4,744,913**

## DE-ICING AND ANTI-ICING AGENT FOR AIRCRAFT

**René Salvador, Neuötting; Josef Kapfinger, and Erich Leidl, both of Burgkirchen, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Feb. 4, 1987, Ser. No. 11,266**

**Claims priority, application Fed. Rep. of Germany, Feb. 6, 1986, 3603583; Oct. 21, 1986, 3635721**

**Int. Cl.**[4] **C09K** *3/18*

**U.S. Cl. 252—70** **8 Claims**

**1**. De-icing and anti-icing agent for aircraft, based on glycols and water and containing crosslinked acrylic polymers as the thickener, consisting essentially of:

(a) 40 to 70% by weight of a glycol having an alkylene chain of 2 to 3 carbon atoms or a oxalkylene glycol having 4 to 6 carbon atoms,

(b) 0.1 to 1% by weight of crosslinked acrylic polymers consisting essentially of 1 part by weight of a crosslinked copolymer formed from acrylic acid or an alkali metal acrylate and acrylamide and containing 10 to 90% by weight of copolymerized units of acrylic acid or alkali metal acrylate and 10 to 90% by weight of copolymerized units of acrylamide and 1 to 10 parts by weight of a crosslinked homopolymer of acrylic acid or an alkali metal acrylate, subject to the proviso that the homopolymer and the copolymer each have a viscosity of 5000 to 70,000 mPa s and a laminar flow behavior at a shear rate of 0 to 20,000 seconds$^{-1}$, the viscosity and the laminar flow behavior each being determined using a 0.5% strength by weight aqueous solution at 20° C. and a pH of 7 by means of a Brookfield viscometer at 20 r.p.m. and a rotational viscometer for shear rates of up to 20,000 seconds$^{-1}$, respectively,

(c) 0.05 to 1% by weight of a surfactant consisting essentially of an alkali metal alkylarylsulfonate,

(d) 0.01 to 1% by weight of at least one corrosion inhibitor,

(e) the three following basic compounds ($e_1$) to ($e_3$) in the amounts indicated, in order to adjust the pH of the agent to a value of 7.5 to 11,

($e_1$) 0.03 to 1% by weight of ammonia, monoethanolamine, diethanolamine or triethanolamine or a mixture thereof,

($e_2$) 0.10 to 0.7% by weight of potassium hydroxide and

($e_3$) 0.02 to 0.5% by weight of a further alkali metal hydroxide, and

(f) water as the remaining percentage by weight, the percentages by weight relating in each case to the weight of the agent.



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**4,744,914**

## ELECTRIC FIELD DEPENDENT FLUIDS

**Frank E. Filisko, and William E. Armstrong, both of Ann Arbor, Mich., assignors to Board of Regents of the University of Michigan, Ann Arbor, Mich.**

**Filed Oct. 22, 1986, Ser. No. 922,003**

**Int. Cl.**[4] **H01B** *3/20*

**U.S. Cl. 252—74** **8 Claims**

**1**. An electric field dependent fluid comprising:

(a) a nonconductive liquid phase; and

(b) a dispersed particulate crystalline zeolite phase, substantially free of adsorbed water.

**2**. An electric field dependent fluid of claim **1** wherein said crystalline zeolite is characterized by the formula: $M_{(x/n)}[(AlO_2)_x(SiO_2)_y]\cdot wH_2O$ where M is a metal cation or mixture of metal cations of average valence charge n, x and y are integers and the ratio of y to x is from about 1 to about 5, and w is a variable.

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**4,744,915**

## 2-METHYLCYCLOHEXOXY END BLOCKED ABA TYPE SILICONE FLUIDS AND THEIR USE AS BRAKE FLUIDS

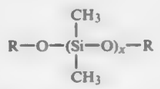
**Richard A. Budnik, Mt. Kisco, N.Y., assignor to Union Carbide Corporation, Danbury, Conn.**

**Filed Aug. 24, 1987, Ser. No. 88,289**

**Int. Cl.**[4] **C10M** *105/76;* **C07F** *7/08*

**U.S. Cl. 252—78.3** **8 Claims**

**5**. A process for transmitting force through a hydraulic brake system having a hydraulic activating means, hydraulic activated means and hydraulic lines inter connecting said hydraulic activating means with said hydraulic activated means comprising substantially filling said hydraulic activating means, said hydraulic activated means and said hydraulic lines with a hydraulic fluid comprising a liquid alkoxysiloxane of the formula:



wherein R is 2-methylcyclohexyl and x is an integer having a value of from about 4 to about 60, and

applying a force to said hydraulic activating means to activate said hydraulic activated means.

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**4,744,916**

## NON-GELLING NON-AQUEOUS LIQUID DETERGENT COMPOSITION CONTAINING HIGHER FATTY DICARBOXYLIC ACID AND METHOD OF USE

**Richard Adams, and Michael C. Crossin, both of Kendall Park, N.J., assignors to Colgate-Palmolive Company, New York, N.Y.**

**Filed Jul. 18, 1985, Ser. No. 756,334**

**Int. Cl.**[4] **C11D** *10/02, 3/075, 3/39*

**U.S. Cl. 252—99** **15 Claims**

**1**. A non-aqueous heavy duty, built liquid laundry detergent composition which is pourable at high and low temperatures and does not gel when mixed with cold water, said composition consisting essentially of

at least one liquid nonionic surfactant in an amount of from about 20 to about 70% by weight;

at least one detergent builder suspended in the nonionic surfactant in an amount of from about 10 to about 60% by weight;

an aliphatic linear alkyl or alkenyl dicarboxylic acid having at least 6 carbon atoms in the aliphatic moiety wherein one of the carboxylic acid groups is bonded to the terminal carbon atom of the alkyl or alkenyl group and the other carboxylic acid group is bonded to the β-,γ-, or Δ- carbon atom of said alkyl or alkenyl group or an aliphatic $C_5$–$C_6$ monocyclic dicarboxylic acid having a total of at least 14 carbon atoms in the molecule as a gel inhibiting compound in an amount effective to lower the gelling temperature of said nonionic surfactant by at least 2° C. and effective to lower the temperature at which the composition will form a gel to no more than about 5° C.;

a peroxygen compound bleaching agent in an amount of from about 2 to about 20% by weight;

a compound of the formula $R^4O(CH_2CH_2O)_nH$ where $R^4$ is a $C_2$ to $C_8$ alkyl group and n is a number having an average value in the range of from about 1 to 6;

as a supplemental gel-inhibiting additive in an amount up to about 5% by weight;

aluminum salt of a $C_8$ to $C_{22}$ higher aliphatic carboxylic acid in an amount up to about 3% by weight; and

optionally, one or more detergent adjuvants selected from the following: enzymes, corrosion inhibitors, anti-foam agents, suds suppressors, soil suspending or anti-redeposition agents, anti-yellowing agents, anti-static agents, colorants, perfumes, optical brighteners, bluing agents, pH modifiers, pH buffers, bleach stablizers, bleach activators, enzyme inhibitors and sequestering agents.

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**4,744,917**

## TOXIC CHEMICAL AGENT DECONTAMINATION EMULSIONS, THEIR PREPARATION AND APPLICATION

**Michael Scardera, Hamden; Jimmie Floyd, Monroe, and Frank S. Natoli, Hamden, all of Conn., assignors to Olin Corporation, Cheshire, Conn.**

**Filed Jul. 31, 1985, Ser. No. 760,848**

**Int. Cl.**[4] **C01B** *11/06;* **C11D** *7/54;* **B08B** *7/00*

**U.S. Cl. 252—187.28** **13 Claims**

**1**. A calcium hypochlorite-containing emulsion having an emulsifying agent which comprises an oil soluble ethylene oxide adduct of an alkylphenol having from about 4 to about 7 moles of ethylene oxide wherein the alkyl group has from about 8 to about 12 carbon atoms, and an oil soluble alkyl aryl sulfonate in a chlorinated organic solvent.

**9**. A decontaminating agent for toxic chemicals comprised of an emulsion of an aqueous solution of a calcium hypochlorite compound and an emulsifying amount of a solution of a mixture of an oil soluble ethylene oxide adduct of an alkylphenol having from about 4 to about 7 moles of ethylene oxide and an oil soluble calcium alkyl aryl sulfonate in a chlorinated organic solvent.

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**4,744,918**

## LIQUID CRYSTAL PHASE

**Gerd Heppke, and Feodor Oestreicher, both of Berlin, Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft Mit Beschrankter Haftung, Darmstadt, Fed. Rep. of Germany**

**Filed Jul. 11, 1985, Ser. No. 754,053**

**Claims priority, application Fed. Rep. of Germany, Jul. 11, 1984, 3425503**

**Int. Cl.⁴ G02F** *1/13;* **C09K** *19/06, 19/34, 19/30*

**U.S. Cl. 252—299.61** **5 Claims**

1. In a liquid crystal phase comprising at least two liquid crystalline compounds, the improvement wherein at least one compound in said phase is an optically active compound of the formula

$$R^1—X^1—CHR^0(CH_2)_pX^2—R^2$$

wherein

each of $X^1$ and $X^2$ independently is —CO—O— or —O—CO—,

each of $R^1$ and $R^2$ independently is $—(A^1—Z)_m—(A^2)_n—Y$,

each of $A^1$ and $A^2$ independently is a 1,4-phenylene (Phe), pyrimidine-2,5-diyl (Pyr), 1,4-cyclohexylene (Cy), 1,3-dioxane-2,5-diyl (Dio), 1,3-dithiane-2,5-diyl, pyrazine-2,5-diyl, pyridine-2,5-diyl, or 1,4-bicyclo(2,2,2)-octylene (Bi) or one of said $A^1$ and $A^2$ groups monosubstituted or polysubstituted by F, Cl, Br, CN, alkyl of 1–12 C Atoms, $C_{1-12}$ alkyl wherein 1 or 2 non-adjacent $CH_2$ groups are replaced by O atoms, or a combination thereof,

Z is —CO—O—, —O—CO—, $—CH_2CH_2—$, $—OCH_2—$, $—CH_2O—$, —CH=N—, —N=CH—, N=N, —N(O)=N— or a single bond,

each of m and n independently is 0, 1 or 2,

each Y independently is alkyl of 1–12 C atoms or $C_{1-12}$-alkyl wherein 1 or 2 non-adjacent $CH_2$ groups are replaced by O atoms, or when n is 1 or 2, Y can also be F, Cl, Br or CN,

p is 1, and

$R^0$ is alkyl of up to 5 C atoms, phenyl or cyclohexyl,

with the proviso that (m+n) in at least one of $R^1$ and $R^2$ is 2, 3 or 4.

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**4,744,919**

## METHOD OF DISPERSING PARTICULATE AEROSOL TRACER

**Thomas P. O'Holleran, Belleville, Mich., assignor to KMS Fusion, Inc., Ann Arbor, Mich.**

**Filed Sep. 12, 1986, Ser. No. 907,112**

**Int. Cl.⁴ C09K** *3/30;* **C01N** *31/00, 33/00;* **G01W** *1/00*

**U.S. Cl. 252—305** **6 Claims**

1. A method of dispersing a particulate aerosol tracer comprising the steps of:

(a) dissolving in water a soluble salt to form an aqueous salt solution containing cations selected from the group consisting of rare earth elements, transition elements and mixtures thereof,

(b) dispersing a carrier of sheet silicate composition in said aqueous solution such that said carrier deflocculates to form a dispersion of particles, a major portion of which are less than one micron in size,

(c) atomizing said solution to form droplets, and

(d) superheating said droplets to separate the water and chemically fusing the cation into the carrier particles in homogeneously dispersed solid solution throughout the particles.

**4,744,920**

## BORATED OVERBASED MATERIAL

**Joseph P. Fischer, Willowick; Kirk E. Davis, Euclid; Jack L. Karn, Richmond Heights, and John M. Cahoon, Mentor, all of Ohio, assignors to The Lubrizol Corporation, Wickliffe, Ohio**

**Filed Dec. 22, 1986, Ser. No. 945,754**

**Int. Cl.⁴ C10M** *135/10*

**U.S. Cl. 252—33.4** **32 Claims**

1. A process for obtaining a high carbonate content borated product comprising:

(a) mixing a carbonate overbased sulfonate,

(b) borating the mixture (a) with a borating agent at a temperature less than that at which substantial foaming occurs thereby substantially retaining the carbonate in the mixture,

(c) raising the temperature of the mixture (b) to that temperture in excess of the boiling point of water within the mixture (b),

(d) separating substantially all of the water from the reaction mixture (c) while retaining substantially all of the carbonate in the mixture (c) and,

(e) recovering the product (d) as a high carbonate content borated product.

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**4,744,921**

## METHODS FOR PREPARING, GROUP II METAL OVERBASED SULFURIZED ALKYLPHENOLS

**Thomas V. Liston, San Rafael, Calif., assignor to Chevron Research Company, San Francisco, Calif.**

**Filed Oct. 21, 1986, Ser. No. 921,299**

**Int. Cl.⁴ C10M** *129/00*

**U.S. Cl. 252—427** **11 Claims**

1. A method for preparing Group II metal overbased sulfurized alkylphenols which comprises the steps:

(a) combining into an inert hydrocarbon diluent an alkylphenol wherein the alkyl group contains a sufficient number of carbon atoms to render oil-soluble the resulting Group II metal overbased sulfurized alkylphenol, an oil-soluble Group II metal overbased natural or synthetic hydrocarbyl sulfonate, a sulfurization catalyst, and an alkanol of at least 8 carbon atoms; wherein the oil-soluble Group II metal overbased natural or synthetic hydrocarbyl sulfonate is employed at from about 1 to 20 weight percent to the alkylphenol; the sulfurization catalyst is employed at from about 0.5 to 10 weight percent to the alkylphenol, and the alkanol of at least 8 carbon atoms is employed at a molar ratio to the alkylphenol of from about 0.5 to about 5;

(b) heating the system to a temperature of from about 90° C. to about 155° C.;

(c) combining into the reaction system a Group II metal oxide, hydroxide or $C_1$–$C_6$ alkoxide and sulfur at a temperature sufficient to effect sulfurization of the alkylphenol followed by addition at from about 145° C. to about 165° C. of a $C_2$–$C_4$ alkylene glycol wherein the Group II metal oxide, hydroxide or $C_1$–$C_6$ alkoxide is employed at a molar ratio to the alkylphenol of from about 1 to about 4, sulfur is employed at a molar ratio to the alkylphenol of from about 1.5 to about 4, the $C_2$–$C_4$ alkylene glycol is employed at a molar ratio to the alkylphenol of from about 1 to about 4;

(d) heating at a temperature sufficient to effect removal of a portion of the water in the system;

(e) heating the system to a temperature of from about 160° C. to about 190° C.;

(f) combining into the reaction system carbon dioxide wherein carbon dioxide is employed at a molar charge to the alkylphenol of from about 1 to 3; and

(g) heating the system under reduced pressure at a temperature and pressure sufficient to remove a portion of the water, $C_2$–$C_4$ alkylene glycol and the unreacted carbon dioxide.



**4,744,922**

## NEUTRON-ABSORBING MATERIAL AND METHOD OF MAKING SAME

**Keith A. Blakely, Buffalo, and Peter T. B. Shaffer, Grand Island, both of N.Y., assignors to Advanced Refractory Technologies, Inc., Buffalo, N.Y.**

**Filed Jul. 10, 1986, Ser. No. 884,046**

**Int. Cl.⁴ C04B** *35/68;* **G21F** *1/06;* **G21C** *11/06*

**U.S. Cl. 252—478** **27 Claims**

1. A neutron-absorbing material formed by a process which includes the steps of:

creating a mixture consisting of an absorptive material having a high thermal neutron capture cross-section and having an element selected from the group consisting of boron, gadolinium, europium, indium, samarium, dysprosium, iridium, thorium and uranium, (b) a neutron-moderating material consisting of either carbon or graphite, and (c) a phenol formaldehyde resin binder;

shaping such mixture;

curing such shaped mixture; and

siliconizing such shaped and cured mixture by causing silicon to react with substantially all of the free carbon in such mixture to form silicon carbide.

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**4,744,923**

## USE OF ALKYLAMINOPOLYGLYCOL ETHERS AS FOAM-DEPRESSING ADDITIVES IN LOW-FOAM DETERGENT PREPARATIONS

**Robert Piorr, Ratingen-Hösel, and Gilbert Schenker, Erkrath, both of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany**

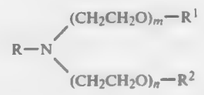
**Filed Apr. 30, 1987, Ser. No. 44,927**

**Claims priority, application Fed. Rep. of Germany, May 2, 1986, 3614825**

**Int. Cl.⁴ C11D** *7/22, 7/06*

**U.S. Cl. 252—544** **14 Claims**

1. The process of suppressing foam in an aqueous detergent solution comprising contacting said solution with from about 10 to about 2500 ppm of a terminal-group-blocked alkylaminopolyethylene glycol ether corresponding to the following formula



wherein R represents a $C_6$–$C_{20}$ alkyl or alkenyl radical, $R^1$ and $R^2$ independently of one another represent a $C_1$–$C_8$ alkyl radical, m and n independently of one another is a number of from about 3 to about 20, with the proviso that the sum of m and n is from about 5 to about 25.

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**4,744,924**

## COSMETIC DETERGENT BASE

**Hermann Hensen, Hilden; Dagmar Stuhrmann, Duesseldorf; Renate Lindner, Hilden, and Renate Kruse, Duesseldorf, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany**

**Filed Jul. 2, 1987, Ser. No. 69,789**

**Claims priority, application Fed. Rep. of Germany, Jul. 4, 1986, 3622438**

**Int. Cl.⁴ C11D** *1/29*

**U.S. Cl. 252—551** **2 Claims**

1. A cosmetic detergent base in the form of an aqueous concentrate pumpable at 20° C., comprising

from about 0.4 to about 0.6 mole/kg of an alkyl ether sulfate mixture of sulfated ethoxylates consisting of from about 35 to about 45% by weight of an adduct of 8 to 12 moles ethylene oxide with one mole of a substantially linear $C_{12}$–$C_{18}$ fatty alcohol cut,

from about 40 to about 60% by weight of an adduct of 1 to 3 moles ethylene oxide with one mole of a substantially linear $C_{12}$–$C_{14}$ fatty alcohol cut,

from 0 to about 20% by weight of an adduct of 1 to 3 moles ethylene oxide with one mole of an oleyl/cetyl alcohol mixture, of which about 0.2 to about 0.3 mole is present as magnesium salt and the rest as as sodium salt,

from about 0.03 to about 0.08 mole/kg oleic acid diethanolamide and/or linoleic acid diethanolamide and

from about 1.4 to about 1.6 moles/kg sodium ions in the form of sodium chloride and/or sodium sulfate.

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**4,744,925**

## METHOD FOR PRODUCING MODIFIED ROSIN & ESTER

**Ciro S. Lampo, and William T. Turner, both of De Ridder, La., assignors to Westvaco Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 732,438, May 9, 1985, Pat. No. 4,650,607. This application Dec. 17, 1986, Ser. No. 942,725**

**The portion of the term of this patent subsequent to Mar. 17, 2004, has been disclaimed.**

**Int. Cl.⁴ C09F** *7/00*

**U.S. Cl. 260—104** **15 Claims**

1. A process for producing a modified rosin ester which comprises heating rosin and polyhydric alcohol in the presence of a catalytic amount of phosphinic acid and a phenol sulfide compound in an inert environment wherein the rosin is reacted with an effective modifying amount of a compound selected from the group consisting of a phenol, an aldehyde, a dicarboxylic acid, and a combination thereof.

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**4,744,926**

## MASS TRANSFER EXTRACTION OF LIQUIDS FROM SOLIDS

**Wayne K. Rice, Wanatah, Ind., assignor to Vitamins, Inc., Chicago, Ill.**

**Continuation of Ser. No. 774,332, Sep. 10, 1985, abandoned. This application Feb. 25, 1987, Ser. No. 18,404**

**Int. Cl.⁴ C11B** *1/06, 1/10*

**U.S. Cl. 260—412.2** **9 Claims**

1. A method of extracting soluble materials from seed vegetables which comprises:

contacting a seed vegetable to be extracted with a selected quantity of $CO_2$ at a selected elevated pressure within a defined space;

forming a fluid mixture of $CO_2$ and dissolved soluble seed vegetables in said defined space;

discharging said fluid mixture as a mass from said defined space;

mechanically maintaining said pressure in said defined space as said fluid mixture is discharged by simultaneously reducing the volume of said defined space at a rate sufficient to maintain the pressure as fluid mixture is removed from said defined space; and

compacting said seed vegetable as the volume of said defined space is reduced.

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**4,744,927**

## SYNTHESIS OF DIBASIC ORGANO-LEAD COMPOUNDS IN MELT PHASE

**Kurt Worschech; Peter Wedl, both of Loxstedt; Erwin Fleischer, Bremerhaven-Spaden, and Frido Loeffelholz, Bremerhaven-Surheide, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany**

**Filed Dec. 5, 1985, Ser. No. 805,487**

**Claims priority, application Fed. Rep. of Germany, Dec. 5, 1984, 3444259**

**Int. Cl.⁴ C11C** *1/00*

**U.S. Cl. 260—414** **23 Claims**

1. A method for the synthesis of dibasic lead-fatty acid salts in a melt reaction comprising:

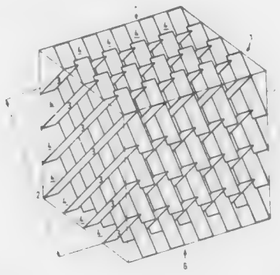
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melting at least one fatty acid capable of forming a monobasic or dibasic lead-fatty acid salt;
charging thereto plumbous oxide in an amount effective to form a given amount of said dibasic lead-fatty acid salt;
admixing a catalyst/initiator consisting essentially of at least one organic compound having a free hydroxyl moiety, that is high-boiling, and is capable of remaining in said melt during said synthesis; said charging and admixing being in any order and repeatable.

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**4,744,928**
**REGULAR PACKING FOR COUNTERCURRENT MASS AND DIRECT HEAT TRANSFER COLUMNS**
**Werner Meier, Elgg, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland**
**Filed Jul. 13. 1982, Ser. No. 397,776**
**Claims priority, application Switzerland, Jul. 30, 1981, 4922/81**
**Int. Cl.⁴ B01F** *3/04*
**U.S. Cl. 261—95** **8 Claims**

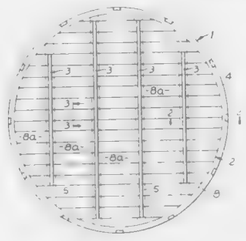


1. In combination with a countercurrent column for mass and direct heat exchange having a longitudinal vertical axis;
a regular packing of open construction in said column having a plurality of vertically disposed side-by-side layers of parallel deflecting elements in continuous contact, said deflecting elements of each layer being inclined relative to said axis and being inclined relative to said elements of an adjacent layer in criss-crossing relation, said deflecting elements of each layer defining parallel flow channels for a descending first fluid and an ascending second fluid, said flow channels of each layer being open laterally to said flow channels of each adjacent layer to permit a lateral distribution of the descending first fluid and ascending second fluid.

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**4,744,929**
**SUPPORT DEVICE FOR A PACKED COLUMN**
**Kenneth Robinson, Gnosall, England, and Frank Rukovena, Jr., Tallmadge, Ohio, assignors to Norton Company, Worcester, Mass.**
**Filed Mar. 9, 1987, Ser. No. 23,413**
**Claims priority, application European Pat. Off., Aug. 22, 1986, 8630550.4**
**Int. Cl.⁴ B01F** *3/04*
**U.S. Cl. 261—97** **12 Claims**

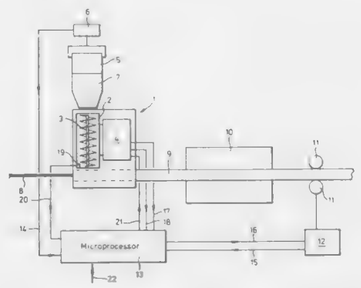
1. A support device for supporting a packing material and collecting a portion of liquid flow in a packed column of a counterflowing gas and liquid contact apparatus comprising:
support means including a circumferential sump extending about and at least one other sump extending across the support device supported within and by the column;
a plate having a plurality of juxtaposed elongate members and upwardly extending formations thereon extending between the sumps and each formation comprising at least one spaced pair of side walls extending upwardly from the elongate members of the plate and adapted to permit the flow of said gas into and through the formations; and



liquid collecting means provided on top of at least one of the formations and situated adjacent the said side walls for collecting and directing a portion of the liquid to an edge of the plate and into one of said sumps adjacent the edge.

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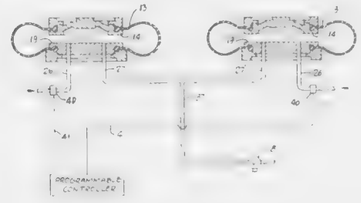
**4,744,930**
**EXTRUSION CONTROL**
**Reginald J. Twist, Cuddington, and James H. Hughes, Upton, both of England, assignors to BICC Public Limited Company, London, England**
**Filed Feb. 5, 1986, Ser. No. 826,314**
**Claims priority, application United Kingdom, Feb. 28, 1985, 8505199**
**Int. Cl.⁴ B29C** *47/02, 47/92, 67, 20*
**U.S. Cl. 264—40.2** **8 Claims**




1. A method of controlling an extrusion process comprising the steps of feeding the material to be extruded from a supply station to an extruder;
repeatedly weighing the supply station to calculate the throughput of the extruder, the frequency of the weighing being independent of line speed;
calculating an initial line speed necessary to produce a predetermined weight/meter of extrudate;
adjusting the line speed directly to said initial line speed;
subsequently increasing the throughput of the extruder and the line speed simultaneously, such that the weight/meter of the extrudate is maintained substantially constant, until any one of a plurality of measured parameters reaches a predetermined maximum value; and
thereafter adjusting the line speed or extruder throughput in response to the calculated throughput of the extruder such as to maintain the weight/meter of the extrudate substantially constant at said predetermined weight/meter.



**4,744,931**
**PRESSURE-DETERMINED SHAPING SYSTEM FOR EACH OF MULTIPLE, COMMONLY MANIFOLDED CURING PRESSES**
**Dennis L. Trapp, Akron, Ohio, assignor to The Uniroyal Goodrich Tire Company, Akron, Ohio**
**Filed Aug. 21, 1986, Ser. No. 898,965**
**Int. Cl.⁴ B29C** *35/04, 37/00*
**U.S. Cl. 264—40.5** **6 Claims**

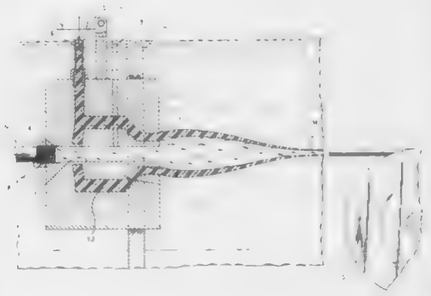



1. In a curing room containing plural curing presses for tires, each of which presses is provided with an elastomeric curing bladder to be deployed within a green tire to be cured between separable upper and lower mold halves, and a shaping steam supply conduit through which shaping steam is flowed into said bladder to pressurize it so as to shape the green tire to allow it to be cured without trapping air between the bladder and the tire, the improvement comprising, pressure transducer means distally located relative to said halves but in pressure sensing communication with the interior of said bladder so as to generate a first signal correlatable with an instantaneous pressure within said bladder; programmable controller means including (i) means for storing and executing a sequence of instructions determinative of plural desired shaping pressures within said bladder, at each of which shaping pressures, each of successive shaping stages is completed; (ii) means for presetting a target pressure which is computed as a function of (a) the press down time and (b) the number of heats on the bladder; and, means for generating a second signal corresponding to said preset target pressure; and, (iii) means for comparing said first signal with said second signal corresponding, in turn, to each of said desired shaping pressures within the range from about 2 psig to about 25 psig; and, (iv) means to maintain each said desired pressure for a predetermined period of time when said first and second signals are matched, and thereafter to actuate the initation of a subsquent shaping stage; and, mechanical pressure safety switch means in pressure sensing relationship with the interior of said bladder preset for a preselected pressure at which the press may be safely opened; whereby the pressure in the inflated bladder is variable depending upon the period of time a press remains open before it is loaded, and the number of heats on said bladder.

4. In a process for shaping a green tire with an elastomeric curing bladder into which shaping steam is flowed to pressurize it so at to shape the green tire and allow it to be cured between upper and lower mold halves without trapping air between the bladder and the tire, the improvement comprising, electronically sensing the instantaneous pressure within the bladder at a location distally located relative to said mold halves so as to generate a first signal correlatable with said instantaneous pressure; executing a sequence of instructions to determine a sequence of desired shaping pressures within said bladder each succeeding pressure being different from the preceding one, at each of which shaping pressures, each of successive shaping stages is completed; presetting a target pressures which is computed as a function of (a) the press down time, and (b) the number of heats on the bladder; and generating a second signal corresponding to said preset target pressure and; comparing said first signal with said second signal corresponding, in turn, to each of said desired shaping pressures within the range from about 2 psig to about 25 psig; and, maintaining each said desired pressure for a predetermined period of time when said first and second signals are matched, and thereafter, actuating the initiation of a subsequent shaping stage.

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**4,744,932**
**PROCESS FOR FORMING A SKINLESS HOLLOW FIBER OF A CELLULOSE ESTER**
**Colin L. Browne, Clover, S.C., assignor to Celanese Corporation, New York, N.Y.**
**Filed May 31, 1985, Ser. No. 739,946**
**Int. Cl.⁴ D01F** *2/28;* **D01D** *5/06*
**U.S. Cl. 264—41** **13 Claims**



1. A process of forming a skinless hollow uncollapsed fiber of a cellulose ester material, said process comprising the steps of:
(a) providing a coagulation bath containing an aqueous liquid having a tube-in-ring jet immersed therein;
(b) establishing fluid communication between said aqueous liquid contained in said coagulation bath and the tube of said tub-in-ring jet by providing an opening in said tube below the surface of said aqueous liquid;
(c) extruding a spinning solution comprising at least one cellulose ester material and a solvent therefore directly into said aqueous liquid contained in said coagulation bath through an annulus surrounding the tube of said tube-in ring jet to form an extruded fiber consisting essentially of said at least one cellulose ester material while simultaneously allowing a portion of said aqueous liquid contained in said coagulation bath to be autogenously aspirated through said opening and into said tube thereby forming a lumen in the extruded fiber; and then
(d) drying said extruded fiber to yield a hollow fiber formed of said cellulose ester material.

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**4,744,933**
**PROCESS FOR ENCAPSULATION AND ENCAPSULATED ACTIVE MATERIAL SYSTEM**
**ChoKyun Rha, Boston, and Dolores Rodriguez-Sanchez, Cambridge, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.**
**Continuation of Ser. No. 580,394, Feb. 15, 1984, abandoned.**
**This application Aug. 16, 1985, Ser. No. 766,214**
**Int. Cl.⁴ A61K** *9/62, 9/64, 37/00;* **B01J** *13/02*
**U.S. Cl. 264—4.3** **14 Claims**

1. A process for producing a capsule having an aqueous liquid core from ionic polymers while avoiding gelation of the core comprising the steps of:
forming an aqueous non-gel liquid droplet from an aqueous solution of a first ionic polymer selected from the group consisting of at least one anionic polymer and at least one cationic polymer, said liquid droplet containing an active material suspended in said droplet; and
contacting said aqueous non-gel droplet with an aqueous solution of at least one second ionic polymer, said second ionic polymer having an ionic charge opposite from said

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first ionic polymer whereby said first and second polymers interact with each other and wherein said first ionic polymer and said second ionic polymer are free to react with each other along the entire chain lengths of said polymers where said polymers come into reactive contact with each other to form a membrane encapsulating said non gel droplets and said active material or aqueous liquid core containing said active material, and said encapsulated non gel droplets being suspended in said aqueous solution of said second ionic polymer.

10. The process for producing a product for a living cell which comprises encapsulating said cell by the process of claim 1 and controlling the permeability of said membrane to prevent said product from permeating said membrane, collecting said encapsulated cell, rupturing said membrane and recovering said product.

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**4,744,934**

## PROCESS FOR DEVOLATILIZING MOLTEN OXYMETHYLENE POLYMER

**Ronald S. Christy, Kingsville, Tex., assignor to Hoechst Celanese Corporation, Chatham, N.J.**

**Continuation-in-part of Ser. No. 797,054, Nov. 12, 1985, Pat. No. 4,692,290. This application Feb. 28, 1986, Ser. No. 834,981**
**The portion of the term of this patent subsequent to Sep. 8, 2004, has been disclaimed.**
**Int. Cl.[4] B29B** *7/84*
**U.S. Cl. 264—101** **7 Claims**

1. A process for reducing black speck formation which occurs during melt processing of oxymethylene polymer compositions containing polyamide stabilizers having a melting or softening point below the melting point of the oxymethylene polymer and for simultaneously removing volatile materials from a molten oxymethylene polymer, comprising adding to the oxymethylene polymer from 0.05 to about 5.0 weight percent, based on the weight of the oxymethylene polymer of said polyamide stabilizer and from about 0.05 to about 10.0 weight percent, based on the weight of the oxymethylene polymer, of a hindered phenol antioxidant while passing said molten oxymethylene polymer through a rotating disk polymer processor having at least three stages, the three stages comprising in sequence a first devolatilization stage, then a stabilization stage and then a second devolatilization stage, the molten polymer in the first devolatilization stage being maintained at a temperature above its melting point in the temperature range of from about 160° C. to about 220° C. and at a vapor space pressure of from about 0.1 to about 500 Torr, the polymer in the stabilization stage being maintained in the molten state at a temperature of from 160° to about 220° C., the polymer in the last devolatilization stage being maintained in the molten state at a temperature of from about 160° C. to 220° C. and at a vapor space pressure of from about 0.1 to about 200 Torr.

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**4,744,935**

## PROCESS AND APPARATUS FOR MANUFACTURING A CABLE WITH HELICAL FILAMENTS EMBEDDED IN PLASTIC

**Paolo G. Priaroggia, and Feliciano Cecchi, both of Milan, Italy, assignors to Società Cavi Pirelli S.p.A., Milan, Italy**

**Filed Sep. 22, 1986, Ser. No. 911,914**
**Claims priority, application Italy, Sep. 27, 1985, 22302 A/85**
**The portion of the term of this patent subsequent to Jun. 16, 2004, has been disclaimed.**
**Int. Cl.[4] B29C** *47/02*
**U.S. Cl. 264—103** **9 Claims**

1. A process for manufacturing cables in which at least one filiform element having an open-helix configuration is embedded in a polymeric material with the filiform element radially spaced from the longitudinal axis of the cable, said process comprising:

feeding at least one non-helical, filiform element through an extruder;

while said filiform element is passing through said extruder, extruding a polymeric material in a plastic state on and around said filiform element so as to surround and contact said filiform element by said polymeric material;

while said filiform element surrounded and contacted by said polymeric material is advanced in the direction of feed of said filiform element, causing alternating rotary movement of said polymeric material, while it is still in the plastic state and with said filiform element therein, around an axis extending in the direction of feed of said filiform element and radially spaced from the axis of said filiform element to cause said filiform element to be forced by said polymeric material to follow the rotary movement of said plastic material to thereby cause alternating movement of said filiform element around said axis spaced from said axis of said filiform element; and

causing said polymeric material to set downstream of said extruder and thereby fix said filiform element in open-helix configuration;

whereby with a single extrusion step a cable with a filiform element of open helix configuration surrounded by set polymeric material and spaced radially from the cable axis is obtained by reason of the alternating rotary movement of the polymeric material in a plastic state which engages the surface of the filiform element.

5. Apparatus for producing a cable having at least one filiform element with an open-helix configuration embedded in a



polymeric material and spaced from the axis of said cable, said apparatus comprising:

an extruder with a conduit for receiving said polymeric material in a plastic state and an outlet for the passage of said filiform element with said polymeric material surrounding and contacting the surface of said filiform element, said outlet having an entrance side at said conduit and an exit side spaced from said entrance side in the direction away from said conduit and having a size greater than the diameter of said filiform element;

said extruder having a channel extending from externally of said extruder to the side of said conduit opposite from said entrance side of said outlet and said channel having an opening at said conduit which is of a cross-sectional size smaller than said size of said opening and the axis of which is displaced to one side of the axis of said outlet for directing the passage of said filiform element into said conduit and for confining the passage of said filiform element through said conduit and said outlet to a path radially spaced from said axis of said outlet; and

rotatable means in advance of said exit side of said outlet for alternately rotating said polymeric material in the plastic state in opposite directions around said axis of said outlet;

whereby the filiform element passes through said outlet in a position spaced from the axis of said outlet, the plastic polymeric material passes through said outlet and surrounds and contacts the filiform element and the rotatable means by reason of the alternate rotation of the plastic polymeric material causes the filiform element to asssume an open helix configuration.

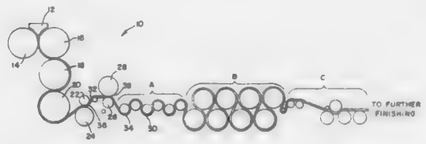


**4,744,936**

## PROCESS FOR EMBOSSING THERMOPLASTIC MATERIAL

**John J. Bittner, Jr., Burr Ridge, Ill., assignor to Plastic Film Corporation of America, Lemont, Ill.**

**Filed Jan. 30, 1986, Ser. No. 824,218**
**Int. Cl.[4] B29C** *59/04*
**U.S. Cl. 264—175** **18 Claims**




1. A process for embossing both mutually opposing first and second sides of a sheet of thermoplastic material comprising:

(a) forming an embossable sheet of thermoplastic material at a temperature such that both mutally opposing first and second sides of said embossable sheet of thermoplastic material are capable of being embossed;

(b) passing said embossable sheet of thermoplastic material between a first pair of embossing-counter rollers maintained at a first temperature with a first pressure between said first embossing roller and said first counter roller thereby embossing the said first side of said embossable sheet of thermoplastic material; and thereafter;

(c) passing said embossable sheet of thermoplastic material between a second pair of embossing-counter rollers maintained at a second temperature with a second pressure between said second embossing roller and said second counter roller thereby embossing said second side of said embossable sheet of thermoplastic material, provided that said first temperature is greater that said second temperature and said first pressure is less than said second pressure.

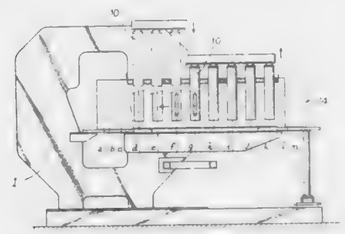
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**4,744,937**

## METHOD FOR PRODUCING CONTAINERS FROM EXTRUDED AND BLOW-MOLDED PLASTIC MATERIAL

**Antoine D. Settembrini, Le Lubrier, 84480 Bonnieux, France 84480**

**Continuation of Ser. No. 390,764, Jun. 21, 1982, abandoned.**
**This application Apr. 2, 1985, Ser. No. 718,204**
**Claims priority, application France, Jun. 26, 1981, 81 12634**
**Int. Cl.[4] B29C** *49/18, 49/68;* **H05B** *3/40*
**U.S. Cl. 264—521** **2 Claims**



1. Method for stepwise producing containers of extruded and blow-molded plastic material, comprising:

a first step of producing preforms having outer cylindrical surfaces by blow-molding hot parisons in a cooled mold so that the average mass temperature of said preforms is at a first temperature;

a second step of cooling down, by contact with the ambient atmosphere, the outer surface of each of said preforms to around a second temperature;

a third step of tempering said preforms by subjecting the entire outer cylindrical surface of each of said preforms to a plurality of successive controlled supplies of radiated heat, said supplies comprising substantially cylindrical bell-shaped heating elements each mounted for reciprocal vertical movement, each of the elements being successively lowered over each of said preforms for a suitable interval of time, the amount of said heat supplied being defined in relation to an estimated temperature gradient in the thickness of a cylindrical wall of said preform, for any horizontal section thereof, in order to obtain as even a temperature as possible about said second temperature throughout the thickness of said preform wall; and

a fourth step immediately following said third step of blow-molding each of said preforms into a container.

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**4,744,938**

## METHOD AND APPARATUS FOR PRODUCING ULTRALOWMASS FISSIONABLE DEPOSITS FOR REACTOR NEUTRON DOSIMETRY BY RECOIL ION-IMPLANTATION

**Francis H. Ruddy, Monroeville, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Aug. 18, 1986, Ser. No. 897,466**
**Int. Cl.[4] G21C** *17/00*
**U.S. Cl. 376—153** **21 Claims**



1. A method for producing a fissionable deposit of selectively ultralow mass for neutron dosimetry, comprising the steps of:

(a) spacing in opposing relation a substrate and an alpha-emitting parent source which decays to implant into the substrate a fissionable daughter ejected from the parent source as a result of the decay; and

(b) holding the opposing relation for a period of time until the parent source decays to form a corresponding mass of isotopically pure fissionable daughter uniformly on the substrate.

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**4,744,939**

## METHOD FOR CORRECTING FOR ISOTOPE BURN-IN EFFECTS IN FISSION NEUTRON DOSIMETERS

**Raymond Gold, and William N. McElroy, both of Richland, Wash., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Aug. 18, 1986, Ser. No. 897,555**
**Int. Cl.[4] G21G** *1/08;* **G01T** *5/00*
**U.S. Cl. 376—159** **7 Claims**

1. A method for correcting for burn-in in a fissionable neutron dosimeter employing a fissionable isotope (Z, A), comprising the steps of:

(a) forming two solid state track recorders with fission deposits of the same fissionable material as the fissionable neutron disometer;

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(b) exposing a first of the two solid state track recorders and the fissionable neutron dosimeter to a first neutron fluence, at least effectively with the same neutron flux-time history with respect to the location of one of them in the first neutron fluence, whereafter the fissionable neutron dosimeter indicates a total number of fissions $F_T$ which is to be corrected for the burn-in;

(c) irradiating the two solid state track recorders with a second neutron fluence;

(d) determining the amount of burn-in $P_{Z', A'}$ of a higher order isotope (Z', A'), wherein A'>A, in the fission deposit of the first solid state track recorder from the difference between the absolute numbers of fissions per unit volume of the fission deposits in the two solid state track recorders;

(e) determining the number of fissions $F_{Z', A'}$ of the higher order isotope (Z', A') in the fissionable deposit of the first solid state track recorder during the exposure to the first neutron fluence; and

(f) using $P_{Z', A'}$ and $F_{Z', A'}$ to correct the total number of fissions $F_T$ indicated by the fissionable neutron dosimeter, to provide a value corresponding to the fission rate of the fissionable isotope that is corrected for the fissions due to the burn-in.

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**4,744,940**

## APPARATUS FOR COMPACTING NUCLEAR REACTOR FUEL RODS

**William J. Wachter, Glenshaw, Pa., assignor to U.S. Tool & Die, Inc., Allison Park, Pa.**

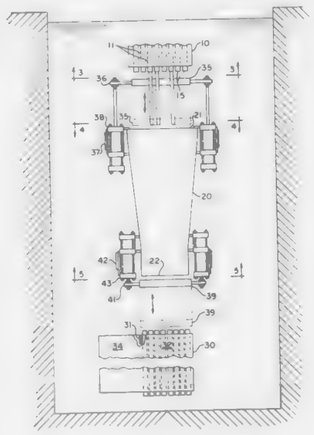
**Continuation-in-part of Ser. No. 814,481, Dec. 30, 1985, which is a continuation-in-part of Ser. No. 291,230, Aug. 10, 1981. This application Jan. 20, 1987, Ser. No. 4,609**

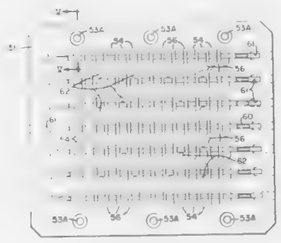
**Int. Cl.[4] G21C** *19/32*

**U.S. Cl. 376—261** **5 Claims**

1. A gripper apparatus to move elongated nuclear fuel rods in the direction of the length thereof, said gripper apparatus including the combination of gripper plate means having web sections extending between and separating fuel rod passageways for an array of fuel rods,

means supported by said gripper plate means for pressing said fuel rods in each passageway against end portions of the fuel rod passageway, said web sections strengthening said passageways against the gripping forces imposed on the fuel rods in each passageway, and reciprocative means to move said gripper plate means between spaced-apart gripping and release positions for





advancing said fuel rods and increment of their length in one axial direction.

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**4,744,941**

## ANTISEISMIC PROTECTION DEVICE FOR SOLID BLOCKS

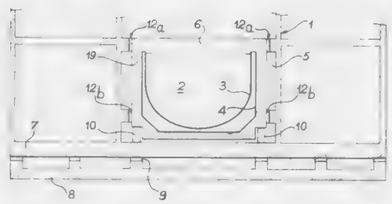
**Pierre Bacher, Les Loges en Josas, and Roger Gueraud, Maisons Alfort, both of France, assignors to Service National Electricite de France, Paris, France**

**Continuation of Ser. No. 520,730, Aug. 5, 1983, abandoned. This application Jun. 9, 1986, Ser. No. 873,148**

**Claims priority, application France, Aug. 13, 1982, 82 14086**

**Int. Cl.[4] G21C** *9/00, 13/00*

**U.S. Cl. 376—285** **4 Claims**



1. An antiseismic support structure for a pile block in a building well having a top and a bottom, said pile block containing a reactor vessel of a nuclear reactor and having a top and a bottom, said support structure comprising: a first floor supporting said building well; a second floor below said first floor; elastic support means separating said first and second floor for permitting a horizontal oscillatory displacement of one floor relative to the other to filter horizontal components of an earthquake with respect to the pile block; a series of elastic, absorbing supports between the bottom of said pile block and said first floor, for filtering vertical components of seismic waves; and a plurality of vertical guiding means between said building well and said pile block and arranged between the top and bottom of the building well, said vertical guiding means being horizontally rigid for preventing horizontal displacement and rocking of said pile block relative to said building well under the action of horizontal components of seismic waves, said vertical guiding means being vertically flexible for permitting and guiding a relative vertical movement between the pile block and the building well during a seismic occurrence.



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**4,744,942**

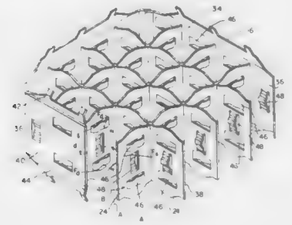
## NUCLEAR REACTOR SPACER GRID LOADING

**Harry M. Ferrari, Edgewood Boro; Elwyn Roberts, Pittsburgh, and Edmund E. DeMario, Penn Hills Township, Allegheny County, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Jun. 11, 1986, Ser. No. 872,988**

**Int. Cl.[4] G21C** *3/34*

**U.S. Cl. 376—442** **11 Claims**





1. A nuclear fuel assembly containing a plurality of generally cylindrical fuel rods, comprising:

a top nozzle;

a bottom nozzle;

a control rod guide thimble extending between said top and bottom nozzles;

a plurality of fuel rod spacer grid assemblies axially disposed along said control rod guide thimble for maintaining the said fuel rods in a spaced lateral array, each of said spacer grid assemblies comprising a plurality of grid straps interlocked into an egg-crate configuration to form cells through which said fuel rods pass, each of said cells having a grid spring and at least one opposing dimple, each said grid spring and opposing dimple having a first selected spring force for a lowermost grid, a second selected spring force for an intermediate grid, and a third selected spring force for an uppermost grid less than said first and second spring forces, said first, second and third spring forces allowing the fuel rods to expand in their respective cells.

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**4,744,943**

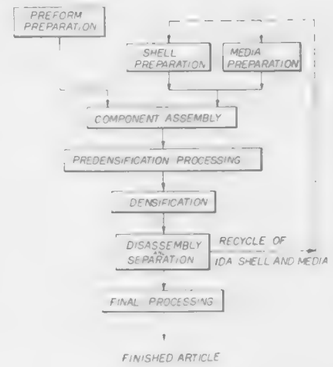
## PROCESS FOR THE DENSIFICATION OF MATERIAL PREFORMS

**Edward E. Timm, Traverse City, Mich., assignor to The Dow Chemical Company, Midland, Mich.**

**Filed Dec. 8, 1986, Ser. No. 939,340**

**Int. Cl.[4] B22F** *1/00*

**U.S. Cl. 419—10** **20 Claims**




1. A process for preparing dense, consolidated bodies of predetermined density, the process comprising compressing in a forging press an isostatic die assembly, the assembly comprising a preform surrounded by a fluid pressure-transmitting medium, the medium and the preform being contained in a ceramic-containing shell having an open top; under sufficient conditions of temperature, time and pressure that a dense, consolidated body of desired shape is formed, and then recovering the body by separating the body from the fluid pressure-transmitting medium.

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**4,744,944**

## PROCESS FOR PRODUCING TUNGSTEN HEAVY ALLOY BILLETS

**James R. Spencer, Sayre, and De Wayne R. Grover, Towanda, both of Pa., assignors to GTE Products Corporation, Stamford, Conn.**

**Filed Aug. 5, 1987, Ser. No. 81,779**

**Int. Cl.[4] C21D** *1/00*

**U.S. Cl. 419—23** **8 Claims**

1. A process for producing tungsten heavy alloy billets, said process comprising:

(a) forming a uniform blend of elemental powders to form tungsten alloys having a tungsten content of equal to or less than about 91% by weight and wherein the particle size of said tungsten is no less than about 2 micrometers in diameter;

(b) uniformly packing said powder blend into a container, said container being made of material having thermal expansion similar to said powder blend;

(c) sintering said powder blend in a hydrogen atmosphere at a temperature sufficient to impart strength to said powder and to reduce oxides and remove volatile impurities from the powder without significant densification in the powder; and

(d) solid state sintering the resulting strengthened powder in a reducing atmopshere at a sufficient temperature to densify said powder to at least about 90% of the theorectical density but at a temperature below the liquid phase sintering temperature of said powder blend to form the billet.

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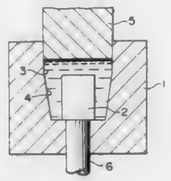


**4,744,945**

## PROCESS FOR MANUFACTURING ALLOY INCLUDING FINE OXIDE PARTICLES

**Kaneo Hamajima; Tadashi Dohnomoto; Atsuo Tanaka, and Masahiro Kubo, all of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan**

**Continuation of Ser. No. 723,918, Apr. 16, 1985, abandoned. This application Jul. 28, 1986, Ser. No. 888,650**
**Claims priority, application Japan, Dec. 4, 1984, 59-256336**
**Int. Cl.[4] C22C *1/00***
**U.S. Cl. 420—129** **21 Claims**




1. A method for making an alloy of a first metal and a second metal having a fine distribution of an oxide of said second metal in a matrix of said alloy, said second metal having a stronger tendency to form an oxide than said first metal, comprising:

(a) preparing a powder comprising an oxide of said first metal;

(b) forming a porous preform having interstices from said powder;

(c) placing said porous preform in a bath of molten metal comprising said second metal;

(d) pressurizing said bath of molten metal so as to infiltrate said molten metal into the interstices of said porous preform;

(e) reducing said oxide of said first metal by said second metal while forming thereby an oxide of said second metal; and

wherein the second metal in a mass of said molten metal infiltrated into the interstices of said porous preform has a greater tendency to form an oxide than the first metal of said first metal oxide in said porous preform so that said porous preform and said mass of molten metal infiltrated into the interstices of said porous preform form said alloy, with said first metal thus reduced being alloyed with a first part of said second metal in said mass of molten metal while a second part of the second metal in said mass molten metal forms said oxide thereof, which oxide is finely distributed in the matrix of said alloy thus formed.

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**4,744,946**

## MATERIALS FOR STORAGE OF HYDROGEN

**Takashi Sasai, Gunma; Hisao Konno, Chofu; Noboru Hayami; Kenichi Kobayashi, both of Gunma; Susumu Uoya, Gunma, and Koichi Oku, Matsudo, all of Japan, assignors to Japan Metals and Chemicals Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 731,344, May 6, 1985, abandoned, which is a continuation of Ser. No. 577,892, Feb. 7, 1984, abandoned. This application Nov. 7, 1986, Ser. No. 928,692**
**Claims priority, application Japan, Feb. 9, 1982, 58-20192; Sep. 27, 1983, 58-179032**
**Int. Cl.[4] C22C *19/03***
**U.S. Cl. 420—443** **6 Claims**

1. A material for storage of hydrogen, consisting essentially of an alloy represented by the formula:

$$LmNi_{a-x}A_x$$

wherein Lm represents rare earth metals which contain 40 to 70% by weight of lanthanum, 0.1 to 20% by weight of cerium and 10 to 59.9% by weight of a combination of neodymium, praseodymium and samarium;

A represents a metal selected from the group consisting of aluminum, manganese, iron and chromium;



a represents a range of $4.8 < a < 5.5$; and

x is from 0.01 to 2.0.

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**4,744,947**

## METHOD OF DISPERSION-HARDENING OF COPPER, SILVER OR GOLD AND OF THEIR ALLOYS

**Fehmi Nilmen, Kriftel, and Heinrich Winter, Eschborn, both of Fed. Rep. of Germany, assignors to Battelle-Institut e.V., Frankfurt am Main, Fed. Rep. of Germany**

**PCT No. PCT/EP86/00231, § 371 Date Jan. 28, 1987, § 102(e) Date Jan. 28, 1987, PCT Pub. No. WO86/07613, PCT Pub. Date Dec. 31, 1986**
**PCT Filed Apr. 18, 1986, Ser. No. 6,711**
**Int. Cl.[4] C22C *9/00***
**U.S. Cl. 420—590** **15 Claims**

1. Method for the dispersion hardening of copper, silver or gold as well as the alloys thereof as the matrix metal with at least one metal boride as the dispersoid, comprising: preparing a single melt of the matrix metal, adding stoichiometric amounts of boron and at least one boride forming metal to said melt, superheating the resultant melt by about 300°to 750° C. above the melting temperature of the matrix metal and subsequently subjecting said melt to extremely rapid solidification at a rate of at least 103° C. to 104° C. per second.

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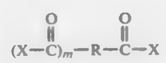
**4,744,948**

## THIOL ESTER CORROSION INHIBITION SYSTEM

**Michael J. Incorvia, Houston, Tex., assignor to Texaco Inc., White Plains, N.Y.**

**Filed Jun. 4, 1987, Ser. No. 62,025**
**Int. Cl.[4] C23F *11/00, 11/04;* C09K *3/00***
**U.S. Cl. 422—7** **11 Claims**

10. A method of protecting metals from corrosive agents in hydrocarbon and aqueous fluids which comprises contacting the metal with an effective amount of a thiol ester represented by the formula



wherein R is an alkyl group having about 8 to about 22 carbon atoms, or an alkyl or alkylaryl group that is the nucleus of a dimerized fatty acid having about 28 to about 36 carbon atoms, X is a dithiol having about 1 to about 5 carbon atoms, m=0 where R has about 8 to about 22 carbon atoms, and m=0 or 1 where R has about 28 to about 36 carbon atoms.



**4,744,949**

## METHOD FOR PREVENTING CORROSION IN AQUEOUS SYSTEMS

**John E. Hoots, Naperville; Guy A. Crucil, Bloomingdale, and Ellen L. Johnson, Naperville, all of Ill., assignors to Nalco Chemical Company, Oak Brook, Ill.**

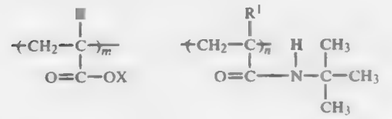
**Continuation of Ser. No. 844,056, Mar. 26, 1986, abandoned. This application Jul. 6, 1987, Ser. No. 73,369**
**Int. Cl.[4] C23F *11/167***
**U.S. Cl. 422—15** **2 Claims**

1. A method for inhibiting corrosion of steel in aqueous cooling systems having hardness and a pH of at least 6.5 by dosing said system with:

From 10–50 ppm of a composition comprising:

I. a water-soluble mixture of inorganic orthophosphate and condensed phosphate capable of inhibiting corrosion in an aqueous alkaline environment, and

II. a water-soluble noncross-linked random polymer of 50 to 90 weight parts of an acrylic acid and 10- to 50 weight parts of a substituted acrylamide, on the basis of a total of 100 weight arts of polymerized monomers, said polymer having weight average molecular weight in the range of about 9,000 to 30,000 and the polymerized units of an acrylic acid and a substituted acrylamide are defined by the following formula:



where m is in the range of about 10–700 and n is in the range of about 0.1 to 350, subject to the molecular weight limitations,

R and $R^1$ are individually selected from hydrogen and methyl;

X is selected from hydrogen, sodium, potassium, calcium, ammonium and magnesium moieties; with the weight ratio of polymer to phosphate being within the range of 0.1:1 to 5:1.

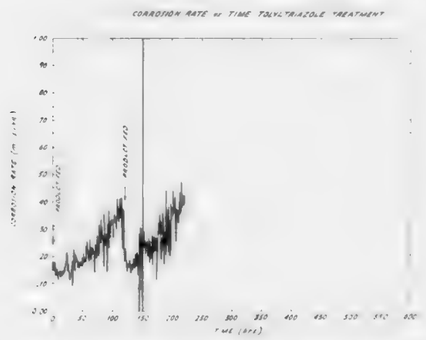
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**4,744,950**

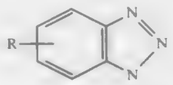
## METHOD OF INHIBITING THE CORROSION OF COPPER IN AQUEOUS MEDIUMS

**Orin Hollander, Langhorne, Pa., assignor to Betz Laboratories, Inc., Trevose, Pa.**

**Continuation-in-part of Ser. No. 624,653, Jun. 26, 1984, abandoned. This application Aug. 22, 1986, Ser. No. 899,117**
**Int. Cl.[4] C23F *11/14***
**U.S. Cl. 422—16** **15 Claims**




1. A method of providing a durable, long lasting chemically resistant, pH tolerant, corrosion inhibiting film on the surface of copper or copper containing metal in contact with an aggressive dynamic aqueous system substantially free of glycols having a pH substantially neutral to alkaline which comprises adding in a non-continuous manner a sufficient amount for the purpose of an alkyl benzotriazole having the formula



where R is a $C_3$ to $C_6$ linear hydrocarbon, and permitting contact of said triazole for a time sufficient to provide said film and thereafter discontinuing the feed of said triazole and permitting any residual triazole to deplete.

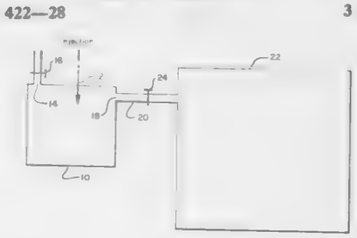
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**4,744,951**

## VAPORIZATION METHOD TO ENHANCE STERILANT PENETRATION

**Arthur L. Cummings, Erie; Jack H. Young, Cambridge Springs, and Ralph W. Makinen, Erie, all of Pa., assignors to American Sterilizer Company, Erie, Pa.**

**Continuation-in-part of Ser. No. 548,956, Nov. 7, 1983, abandoned. This application May 10, 1985, Ser. No. 733,014**
**Int. Cl.[4] A61L *2/20***
**U.S. Cl. 422—28** **3 Claims**




1. A process for furnishing concentrated hydrogen peroxide vapor to interior surfaces of articles having a tortuous or a narrow path, said articles being so disposed within an evacuated sterilization chamber so that said interior surfaces can be contacted by vapor only after it traverses said tortuous or narrow path, comprising the steps of:

heating a liquid solution of relatively dilute hydrogen peroxide and water within an evacuated first chamber to preferentially vaporize said water;

withdrawing a portion of said water vapor from said first chamber to concentrate said hydrogen peroxide remaining in said first chamber;

terminating said withdrawal of water vapor from said first chamber when said remaining hydrogen peroxide is sufficiently concentrated so as to produce, upon complete vaporization, vapors concentrated in hydrogen peroxide to greater than about 40% by weight;

continuing heating said liquid solution to completely vaporize said solution; and

introducing into said sterilization chamber said vapors concentrated in hydrogen peroxide and maintaining said hydrogen peroxide vapors in contact with said articles until sterilization is achieved.

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**4,744,952**

## TEST PAPER FOR DETERMINING THE CONCENTRATION OF HALOGEN IONS BY FILTER PAPER CHROMATOGRAPHY, AND MANUFACTURING PROCESS FOR AND USE OF THE SAME

**Zen-ichi Ogita, No. 2556-4-1-102, Suehiro-Cho, Gofuku, Toyama-Shi, Toyama-Ken, Japan**

**Filed Feb. 14, 1986, Ser. No. 829,110**
**Claims priority, application Japan, Feb. 22, 1985, 60-34998**
**Int. Cl.[4] G01N** *30/90, 31/22*
**U.S. Cl. 422—56** **5 Claims**



1. A test paper for determining the concentration of halogen ions in a solution by filter paper chromatography, said test paper comprising a filter paper having a portion coated with a mixed berberine sulfate/Patent Blue V solution, said mixed berberine sulfate/Patent Blue V solution being produced by dissolving berberine sulfate and Patent Blue V in water or an organic solvent.

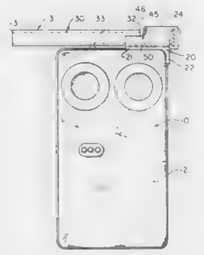
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**4,744,953**

## BREATH FLOW INDICATOR

**Karl P. Wolf, Webster Groves, and Macquorn R. Forrester, St. Louis, both of Mo., assignors to Intoximeters, Inc., St. Louis, Mo.**

**Filed Jan. 28, 1987, Ser. No. 7,508**
**Int. Cl.[4] G01N** *1/22*
**U.S. Cl. 422—84** **4 Claims**



1. In a portable breath alcohol detector wherein a tubular mouthpiece is mounted on one end of a housing, said mouthpiece having a breath inlet and a breath discharge end when mounted on said housing, the improvement comprising a breath direction and continuity sensor comprising a whistle mounted on said housing at a predetermined distance from said discharge end of said mouthpiece to leave a gap opened to the ambient atmosphere between said discharge end and said whistle, said gap being of a size and said whistle being sufficiently sensitive to be activated by breath blown toward said whistle across said gap with a force sufficient to provide an adequate breath sample when maintained for a predetermined period but not appreciably to restrict the flow of breath and said gap being sufficiently wide to permit air being inhaled to pass freely through it and into the said mouthpiece, whereby residual alcohol in said whistle will not be drawn back into said mouthpiece when a subject inhales.

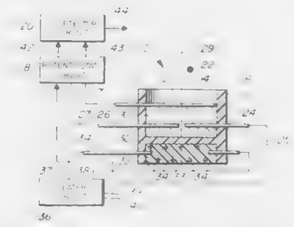
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**4,744,954**

## AMPEROMETRIC GAS SENSOR CONTAINING A SOLID ELECTROLYTE

**Donald N. Campbell, Timonium; Robert C. Davis, Jr., Westminster, and John C. Schmidt, Baltimore, all of Md., assignors to Allied-Signal Inc., Morristown, N.J.**

**Filed Jul. 11, 1986, Ser. No. 884,582**
**Int. Cl.[4] G01N** *27/12*
**U.S. Cl. 422—98** **8 Claims**



1. Apparatus for sensing selected gas constituents of an ambient gas comprising:

a sensing electrode having a surface positioned and arranged to be exposed to said ambient gas,

a reference electrode spaced apart from said sensing electrode,

a counter electrode spaced apart from said sensing electrode and said reference electrode,

an alkali salt in the solid state in physical and electrical contact with said sensing electrode, said reference electrode and said counter electrode,

circuit means including means for providing a current from said counter electrode through said alkali salt to said sensing electrode to maintain a predetermined voltage on said sensing electrode with respect to said reference electrode through said alkali salt to said counter electrode.

means for heating said alkali salt to at least a predetermined temperature at which said alkali salt conducts electricity, and means responsive to electric current from said sensing electrode to provide an indication of the concentration of a gas constituent in said ambient gas.

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**4,744,955**

## ADJUSTABLE VOLUME PIPETTE SAMPLER

**Justin J. Shapiro, c/o Labindustries, Inc., 620 Hearst Ave., Berkeley, Calif. 94710-1992**

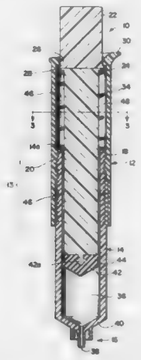
**Filed Aug. 8, 1986, Ser. No. 894,809**
**Int. Cl.[4] B01L** *3/02;* **G01N** *1/14*
**U.S. Cl. 422—100** **16 Claims**

1. An adjustable volume sampler or syringe, useful for the introduction and the dispension of liquid samples therefrom comprising:

an upper hollow tubular member having a central longitudinal axis and a first inner diameter along a majority of the length thereof, and upper and lower ends, said upper member including an inwardly projecting internally threaded region of short length near its said lower end, said internally threaded region having a second inner diameter smaller than said first inner diameter;

a lower hollow tubular member coaxial with said upper tubular member, and having upper and lower ends, said lower member including a partially externally threaded region near its said upper end, said lower member being partially received within and threadedly fastened coaxially within said upper member to define an adjustable volumetric capacity barrel, said lower end of said tubular member having an introduction and discharge opening;

plunger means, coaxial with said upper and lower tubular members, for the introduction or dispension of liquid samples from within said barrel, said plunger means extending from outside of said upper tubular member along and within said upper tubular member and into the interior of said lower tubular member, and having a slidable sealing means at the bottom thereof for sliding contact with an interior of said lower tubular member;



spring biasing means for urging said plunger means in an upward axial direction and comprising a coil spring residing within said upper tubular member above said internally threaded region and encircling a portion of said plunger means, an upper end of said coil spring abutting against an upper portion of said plunger means, and a lower end of said coil spring abutting against said lower tubular member; and

stop means at the upper end of said upper tubular member for limiting the upward axial travel of said plunger means.

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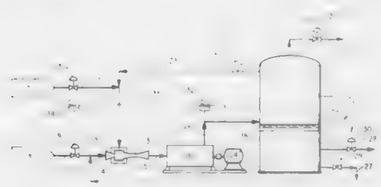


**4,744,956**

## CONTINUOUS REACTION OF GASES WITH LIQUIDS

**Robert E. Yant, Medina, and Philip A. Larson, Bay Village, both of Ohio, assignors to Quantum Technologies, Inc., Twinsburg, Ohio**

**Filed Feb. 12, 1986, Ser. No. 828,537**
**Int. Cl.[4] B01F** *5/18;* **B01J** *10/00;* **B05B** *7/02*
**U.S. Cl. 422—106** **17 Claims**



1. A compact assembly of apparatus for continuously effecting chemical reaction between cocurrently flowing gas and liquid reactants to form a desired fluid product comprising the following items of equipment connected closely in series in the order specified:

(a) a pressurized, fluid energized, in-line cocurrent flow mixing device having separate inlets for gas and for liquid near an inlet end thereof plus means for continuously supplying gas and liquid respectively to said inlets and an outlet thereof for discharging the resulting gas/liquid mixture:

(b) an enclosed, regenerative turbine pumping means having at least one mechanically drive multivaned impeller associated with close fitting stator elements, said pumping means being adapted to propel a gas/liquid mixture steadily through said pumping means to an outlet thereof while simultaneously increasing the pressure of the gas/liquid mixture by at least one atmosphere;

(c) a fluid carrying conduit between the outlet of said flow mixing device and an inlet of said enclosed, regenerative turbine pumping means; and

(d) an enclosed, super-atmospheric, pressure tight, product-receiving tank equipped with pressure control means and liquid level control means to maintain a desired super-atmospheric pressure and a substantial gas head space therein, an inlet opening located in a side wall of said tank and a fluid carrying conduit connecting said inlet opening with said outlet from the regenerative pumping means of (b), said tank also being equipped with fluid recycle conduits connecting a gas head space and a lower liquid holding space therein with the gas and liquid supply means for said cocurrent flow mixing device of (a).

12. A continuous process for effecting chemical reaction between gaseous and liquid reactants comprising:

(a) continuously feeding said reactants into the upstream end of a fluid pressure energized, in-line, cocurrent flow mixing zone with at least one of said reactants being supplied at a pressure substantially above atmospheric pressure, thereby forming an intimate gas-liquid reaction mixture;

(b) discharging said gas-liquid reaction mixture from the downstream end of said mixing zone at a pressure which is lower than the pressure at which at least one of said reactants is supplied in (a) but not substantially below atmospheric pressure;

(c) transferring the reaction mixture discharged in (b) directly to the upstream end of a mechanically operated, regenerative, fluid propulsion and repressurizing pumping zone in which at least one multivaned rotary impeller is driven at high speed adjacent to a side channel stator to effect intensive gas/liquid interaction and highly turbulent flow of said reaction mixture through said pumping zone while simultaneously raising the pressure in said mixture by at least one atmosphere and discharging said mixture therefrom at an absolute pressure which is at least about two atmospheres;

(d) passing the thus pressurized mixture discharged in (c) into a superatmospheric, pressure tight, product receiving and gas/liquid separation zone maintained at a controlled pressure of at least about 1 atmosphere above atmospheric and equipped with liquid level control means adapted to reserve a sizeable gas head space therein while also maintaining a large liquid holding space in the lower region thereof;

(e) collecting the desired liquid product in a lower region of said gas-liquid separation zone while unreacted gases accumulate in said gas head space; and

(f) recycling some of either or both of the gas collecting in said head space and the liquid accumulating in said lower region of said separation zone of (d) back to the upstream end of said cocurrent flow mixing zone of (a).

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**4,744,957**

## APPARATUS FOR REMOVING VOLATILE MATTERS CONTAINED IN POLYMERS

**Shigehiro Imai, Chiba; Hirokuni Mihara, Tokyo; Junichi Yoshida, Sakura; Masao Omori, and Hiroshi Kurokawa, both of Ichihara, all of Japan, assignors to Mitsui Engineering & Shipbuilding Co., Ltd. and Idemitsu Petrochemical Co., Ltd., both of Tokyo, Japan**

**Filed Feb. 17, 1987, Ser. No. 15,396**
**Int. Cl.[4] B01D** *1/22, 1/28*
**U.S. Cl. 422—138** **10 Claims**

1. Apparatus for producing a continuous polymer product and removing volatile matters contained therein comprising:

a polymer chamber;

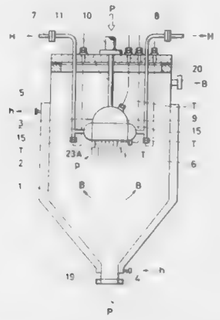
a decompression vessel;

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a heating medium source means; and

a polymer discharge device having a main body with an inlet end face connected to said polymer chamber and a discharge end face open to an interior of said decompression vessel, said main body being formed by a plurality of adjacent plates spaced apart by elongate fins extending between each pair of adjacent plates providing a plurality of passageways therebetween, wherein the fins spacing alternate pairs of said adjacent plates extend in one direction and the fins spacing intermediate pairs of said adja-



cent plates between said alternate pairs extend in a second direction oriented at an angle relative to said one direction;

whereby said plurality of passageways defined between each alternate pair of adjacent plates provide polymer passageways between said inlet end face and said discharge end face of said main body and said plurality of passageways defined between each intermediate pair of adjacent plates provide angularly disposed passageways for a heating medium between said polymer passageways supplied thereto by said heating medium source means.

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**4,744,958**

**HETEROGENEOUS REACTOR**

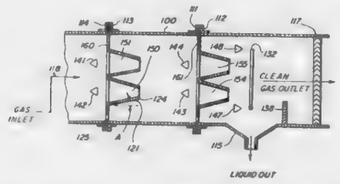
**Ladislav J. Pircon, 305 Canterberry La., Oak Brook, Ill. 60521**

**Continuation of Ser. No. 388,921, Jun. 16, 1982, abandoned, which is a continuation-in-part of Ser. No. 846,033, Oct. 27, 1977, Pat. No. 4,358,433, which is a continuation-in-part of Ser. No. 677,750, Apr. 16, 1976, Pat. No. 4,209,502, which is a continuation-in-part of Ser. No. 467,083, May 6, 1974, Pat. No. 3,957,465. This application Mar. 28, 1986, Ser. No. 845,614**

**The portion of the term of this patent subsequent to May 18, 1993, has been disclaimed.**

**Int. Cl.[4] B01D** *47/00*

**U.S. Cl. 422—193** **23 Claims**



1. A low pressure drop apparatus, having pressure drop of less than that characteristic of high turbulence reactors, for promoting heterogeneous chemical and physical reactions in a gas stream by cocurrent movement of said gas stream and reactant liquids or solids comprising:

a casing which is substantially liquid and gas tight having a gas inlet in one end and a gas outlet in the other end and means capable of introducing said gas stream through said inlet at a velocity of about 380 to about 2100 feet per minute;

two to six straight sided continually converging nozzle means having a common axis and each said nozzle symmetrical with respect to its axis within said casing having an entry at one end in communication with said gas inlet and an outlet at the other end, said entry being unrestricted allowing entry of all said reactant liquids or solids and being in substantially closed relation to said casing to avoid substantial bypass of said nozzle and having an effective cross-sectional area of about 2 to about 64 times the effective cross-sectional area of said outlet and the mean angle of convergence of said nozzle being about 6° to 20°, said outlet being formed by the end of straight continually converging sides of said nozzle means and being unrestricted allowing passage of all said reactant liquids or solids, said nozzle means having unrestricted flow of said gas stream and said reactant liquids or solids therethrough creating substantially only along the axis of said nozzle means differential velocities and differential accelerations and decelerations between said variable sized non-compressible liquids or solids and the compressible gas passing through said nozzle maintaining plug flow of said gas stream and creating pressure drops less than about 11.2 inches of water promoting said reactions;

reactant introduction means in said one end of said casing prior to said entry to said converging nozzle means for introduction of said reactant liquids or solids as variable sized non-compressible liquids or solids;

means for removing liquid and particulate matter from said casing following desired reaction; and

means for removing the gas separately from the liquid and particulate matter from said other end of said casing, said gas being removed without passage through any liquid pool.

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**4,744,959**

**APPARATUS FOR PRODUCING A SUSPENSION OF CYANURIC CHLORIDE IN WATER, OR FOR REACTING CYANURIC CHLORIDE WITH AMMONIA OR WITH AMINES**

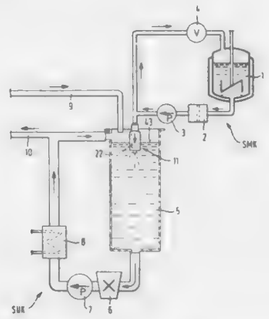
**Marianne Punzar, Bottmingen; Franz Marti, Dornach; Robert Mercier, Basel; Paul Tobler, and Rudolf Büttiker, both of Riehen, all of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland**

**Division of Ser. No. 710,621, Oct. 30, 1984, Pat. No. 4,678,852, which is a division of Ser. No. 493,920, May 12, 1983, Pat. No. 4,552,959. This application Nov. 21, 1986, Ser. No. 933,622**

**Claims priority, application Switzerland, May 18, 1982, 3082/82; May 24, 1982, 3184/82**

**Int. Cl.[4] C07D** *251/28;* **B01F** *5/04*

**U.S. Cl. 422—231** **10 Claims**



1. An apparatus for performing a process for producing a suspension of cyanuric chloride in water, or for reacting cya-



nuric chloride with ammonia or with amines, by bringing melted cyanuric chloride into contact with a liquid phase which is water or an aqueous ammonia or amine solution or suspension, which apparatus comprises a melting vessel provided with heating means, a tank for containing the liquid phase and a melt pipe line having an end which is connected with the melting vessel and an end which is positioned in the tank, the end of the pipe line in the tank being provided with a spray device which comprises an immersion cone and a spray nozzle positioned inside said immersion cone, said cone being connected to a first gas line for supplying a pressurized gas and having a first valve, and to a second gas line for removal of the pressurized gas and having a second valve, the pressurized gas supply and pressurized gas removal being controlled by the first valve and by the second valve so that with the opening of the first valve and the closing of the second valve the level of a liquid phase inside the immersion cone will be controlled so as to sink below the spray nozzle.

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**4,744,960**

**PROCESS FOR THE SEPARATION OF RARE EARTHS AND URANIUM OF A $UF_4$ CONCENTRATE AND FOR PUTTING THEM INTO USEFUL FORM**

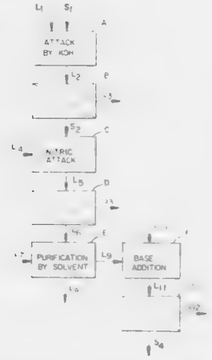
**Antoine Floreancig, Saint Genis Laval, and Bernard Martinez, Narbonne, both of France, assignors to Uranium Pechiney, Courbevoie, France**

**Filed Jun. 25, 1986, Ser. No. 878,212**

**Claims priority, application France, Jun. 27, 1985, 85 10374**

**Int. Cl.[4] C01G** *43/00*

**U.S. Cl. 423—10** **6 Claims**




1. A process for separation of rare earth and uranium compounds from a $UF_4$ concentrate produced generally by acid attack on a uranium-containing phosphate ore, followed by solvent extraction of uranium and rare earth compounds, and treatment of the solvent-containing uranium and rare earth compounds with hydrofluoric acid, and for placing the compounds into usable form, comprising the steps of:

(a) attacking the $UF_4$ concentrate with potassium hydroxide and separating the resultant solid hydroxides of uranium and rare earths from the resulting suspension;

(b) dissolving said solid hydroxides in aqueous nitric acid to form an aqueous solution of nitrates and separating the resultant insoluble matter formed by thorium and a part of the rare earths which are thus put into usable form;

(c) extracting uranyl nitrate from the solution of nitrates with an organic solvent, with rare earth nitrates remaining in the aqueous phase; and

(d) adding a base to the aqueous phase to precipitate the balance of the rare earths in the form of usable hydroxides.

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**4,744,961**

**SUBMERGED COMBUSTION CALCINATION**

**Larbi Bounini, Libertyville, Ill., assignor to United States Gypsum Company, Chicago, Ill.**

**Division of Ser. No. 727,078, Apr. 25, 1985, Pat. No. 4,626,199. This application Nov. 4, 1986, Ser. No. 926,684**

**Int. Cl.[4] C04B** *11/036*

**U.S. Cl. 423—171** **2 Claims**

1. A method for calcining gypsum which comprises charging uncalcined gypsum into a kettle, introducing gypsum from the kettle into a toroid formed by a heating tube mounted within a draft tube which extends beneath the surface of the mass of gypsum in the kettle, drawing the gypsum through the toroid and heating it by forcing a hot gas axially out of the heating tube into the portion of the draft tube which is immersed in the mass of gypsum, discharging the heated gypsum from the draft tube, and removing calcined gypsum from the kettle.

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**4,744,962**

**PROCESS FOR THE REDUCTION OF AMMONIA IN REGENERATION ZONE OFF GAS BY SELECT ADDITION OF $NO_x$ TO THE REGENERATION ZONE OR TO THE REGENERATION ZONE OFF GAS**

**Gregory L. Johnson; Norman C. Samish, and Diana M. Altrichter, all of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.**

**Filed Jul. 22, 1987, Ser. No. 76,530**

**Int. Cl.[4] C01B** *21/20*

**U.S. Cl. 423—235** **21 Claims**



1. A process to reduce $NO_x$ content in a CO combustion zone effluent stream of a fluid catalytic cracking process having a regeneration zone operated in a partial mode of combustion wherein said regeneration zone contains from 1 to 6 volume percent CO which comprises combining a regeneration zone off gas stream containing CO, $CO_2$, HCN and $NH_3$ with an additive gas stream comprising a substantially stoichiometric quantity of $NO_x$ compared to the quantity of $NH_3$ in said off gas stream, to form a combined gas stream, passing said combined gas stream to said CO combustion zone in which an oxygen-containing gas is added for the combustion of CO to $CO_2$ and to form said combustion zone effluent stream, wherein the content of $NO_x$ in said combustion zone effluent stream is reduced as a result of the reaction of said $NH_3$ with said added $NO_x$ prior to entry of said combined gas stream to said combustion zone.

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## HIGHLY EFFICIENT CALCINATION OF GYPSUM TO HEMIHYDRATE

**Otto L. Dozsa, Palos Heights; Donald R. Janninck, Bloomingdale; Richard F. Stone, Buffalo Grove, and Larbi Bounini, Libertyville, all of Ill., assignors to United States Gypsum Company, Chicago, Ill.**

**Filed Aug. 14, 1986, Ser. No. 896,373**
**Int. Cl.[4] C04B** *11/02*
**U.S. Cl. 423—171** **2 Claims**

1. A method for calcining gypsum which comprises charging the gypsum into a calcining kettle, heating the kettle and causing the gypsum to become a boiling, calcining mass of solids and gases by conduction of heat from the kettle, and intensifying the boiling action of the mass by contacting the calcining mass with a heating element immersed therein which is constantly emitting at least about 1 British Thermal Unit per minute from each square inch of the element's surface, thereby enhancing the conduction of heat from the kettle by the calcining mass.

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**4,744,964**

## METHOD OF PURIFYING PYROLYSIS GASES

**Eberhard Kühl, Mainz, Fed. Rep. of Germany, assignor to Environment Protection Engineers, Incorporated, Southfield, Mich.**

**Filed Aug. 2, 1985, Ser. No. 761,776**
**Int. Cl.[4] C01B** *17/16, 31/20, 7/00;* **B01J** *8/00*
**U.S. Cl. 423—230** **13 Claims**

1. A continuous method of purifying acidic pyrolysis gases containing at least one of hydrogen halides, hydrogen sulfide and sulfur oxides with simultaneous neutralization and dust separation, in which the gas is mixed with a particulate basic neutralizing agent containing at least one of lime hydrate, limestone, dolomite, calcium oxide, magnesium oxide, magnesium carbonate, magnesium hydroxide, basic sodium compounds and basic potassium compounds, the mixture of gas and neutralizing agent is led continuously downwardly through a bulk bed of granular mineral material resting on a gas and dust-permeable bottom, the bulk bed is intermittently set in shocklike movement during said continuous method, and said mixture is continuously subjected to dust removal after passing through said gas and dust-permeable bottom.

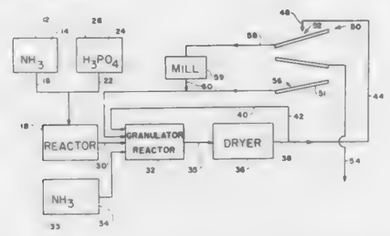
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**4,744,965**

## PROCESS FOR PRODUCING GRANULAR DIAMMONIUM PHOSPHATE

**William D. Fairchild, Valrico, Fla., assignor to Conserv, Inc., Nichols, Fla.**

**Filed Aug. 28, 1986, Ser. No. 901,267**
**Int. Cl.[4] C01B** *25/28*
**U.S. Cl. 423—310** **11 Claims**




1. A process for the production of solid granular diammonium phosphate comprising:
reacting anhydrous ammonia with phosphoric acid in a reactor to form a partially reacted slurry of monoammonium phosphate and diammonium phosphate;
pumping the slurry to a granulator-reactor and further reacting the slurry with anhydrous ammonia to form a solid granular diammonium phosphate mixture having a particle range size consisting of undersize, oversize and product;
drying the solid granular diammonium phosphate mixture in a dryer;
dividing the dried solid granular diammonium phosphate mixture being discharged from the dryer into a first portion and a second portion;
diverting and feeding the first portion of the dried granular diammonium phosphate mixture back to the granulator-reactor;
feeding the second portion of dried granular diammonium phosphate mixture to a classifying means consisting of a set of screens including an oversize screen and an product screen set to a narrow size separation to separate the mixture of the solid granular diammonium phosphate into undersize, oversize and product solid granular diammonium phosphate;
milling the oversize granular diammonium phosphate;
recycling to the granulator-reactor the milled oversized granular diammonium phosphate and the undersized granular particles obtained during the classifying of the solid granular diammonium phosphate mixture; and
collecting the desired product granular particle thereby enhancing the production of a narrow range of granular diammonium phosphate particle size distribution within a broad range of particle size distribution.

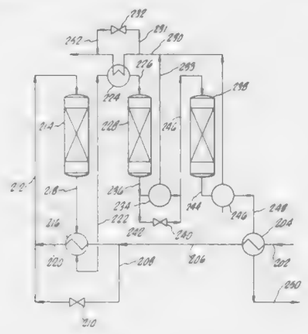
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**4,744,966**

## PROCESS FOR SYNTHESIZING AMMONIA

**Bernard J. Grotz, Pasadena, Calif., assignor to Santa Fe Braun Inc., Alhambra, Calif.**

**Filed Nov. 20, 1986, Ser. No. 932,614**
**Int. Cl.[4] C01C** *1/04*
**U.S. Cl. 423—360** **10 Claims**



1. In a continuous ammonia synthesis process in which a synthesis gas mixture containing nitrogen and hydrogen is passed sequentially over two or more catalyst beds containing ammonia synthesis catalyst to produce a gaseous effluent from each of said catalyst beds containing ammonia and unreacted nitrogen and hydrogen, the improvement which comprises cooling the gaseous effluent from the first of said catalyst beds, before said effluent enters the second catalyst bed, by heat exchange in a steam superheater to control the temperature of the effluent entering the second catalyst bed to a desired level.



**4,744,967**

## PROCESS FOR THE PURIFICATION OF EXHAUST GASES CONTAINING OXIDES OF NITROGEN AND SULFUR

**Reinhold Brand, Moembris; Bernd Engler, Hanau; Peter Kleine-Moellhoff; Edgar Koberstein, both of Alzenau, and Herbert Voelker, Hanau, all of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany**

**Filed Jan. 20, 1987, Ser. No. 4,407**
**Claims priority, application Fed. Rep. of Germany, Jan. 18, 1986, 3601378**
**Int. Cl.[4] B01J** *8/00;* **C01B** *21/00, 17/00*
**U.S. Cl. 423—239** **23 Claims**

1. A process for the purification of exhaust gas containing oxides of nitrogen and sulfur obtained from combustion installations and industrial production processes comprising
selectively catalytically reducing the oxides of nitrogen with a sufficient amount of ammonia for the reduction of oxides of nitrogen in the exhaust gas in the presence of a reduction catalyst at a temperature in the range of 250°–550° C., and subsequently oxidizing sulfur dioxide with oxygen in the presence of a catalyst therefor at a temperature in the range of 250°–550° C. to obtain sulfur trioxide, cooling the sulfur trioxide to a temperature of from 20°–160° C., and converting the sulfur trioxide obtained into sulfuric acid, wherein the reduction and oxidation are carried out in a single reaction zone, the first section of which contains said reduction catalyst and the second section of which contains said oxidation catalyst.

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**4,744,968**

## STABILIZED AQUEOUS HYDROGEN PEROXIDE SOLUTION

**Michael J. Malin, Park Ridge, and Louis D. Sclafani, Carmel, both of N.J., assignors to Technicon Instruments Corporation, Tarrytown, N.Y.**

**Filed Sep. 3, 1985, Ser. No. 772,114**
**Int. Cl.[4] C01B** *15/037*
**U.S. Cl. 423—272** **11 Claims**

1. A stabilized aqueous hydrogen peroxide solution having a pH below 7 and an amount of Ferric ion up to about 2 ppm comprising hydrogen peroxide, acetanilide having a concentration which ranges between 0.74 mMol/L and 2.22 mMol/L, and o-benzene disulfonic acid or salt thereof at a concentration between about 0.86 mMol/L to about 1.62 mMol/L.

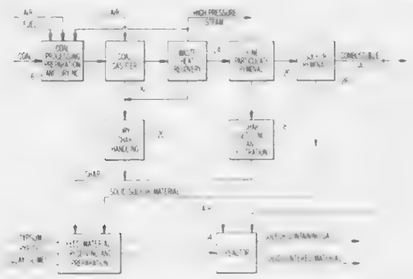
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**4,744,969**

## PROCESS FOR THE CONVERSION OF COAL AND GYPSUM TO VALUABLE PRODUCTS

**Jerome H. Marten, and Timothy J. Kendron, both of Lakeland, Fla., assignors to Florida Institute of Phosphate Research, Bartow, Fla.**

**Filed Dec. 10, 1986, Ser. No. 939,964**
**Int. Cl.[4] C01B** *17/50*
**U.S. Cl. 423—541 R** **26 Claims**



1. A process for the coproduction of a combustible first gas stream usable as an energy source and a sulfur-containing second gas stream useable as a feedstock for the production of sulfuric acid, said process comprising the steps of:
(a) heating coal in the presence of an oxygen-lean atmosphere under partial coal-gasifying conditions to produce a solid carbonaceous char and a crude gas stream containing gaseous sulfur-containing compounds;
(b) separating the gaseous sulfur-containing compounds from the crude gas stream to produce a combustible first gas stream and converting the separated sulfur-containing compounds to a solid sulfur-containing material;
(c) forming a feed mixture by combining the solid carbonaceous char from step (a) and the solid sulfur-containing material from step (b) with gypsum in proportions such that the non-gypsum portion of the feed mixture contains sufficient reducing potential to reduce sulfur in the gypsum to gaseous compounds of sulfur in +4 or lower oxidation state;
(d) heating the feed mixture from step (c) under reducing conditions to produce a sulfur-containing second gas stream.

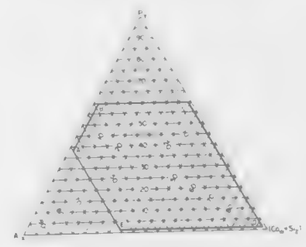
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**4,744,970**

## COBALT-ALUMINUM-PHOSPHORUS-SILICON-OXIDE MOLECULAR SIEVES

**Brent M. Lok, New York; Bonita K. Marcus, Rye, and Edith M. Flanigen, White Plains, all of N.Y., assignors to Union Carbide Corporation, Danbury, Conn.**

**Filed Apr. 13, 1984, Ser. No. 600,174**
**Int. Cl.[4] C01B** *25/00, 33/26;* **B01J** *29/02*
**U.S. Cl. 423—306** **44 Claims**



1. Crystalline molecular sieves having three-dimensional microporous framework structures of $CoO_2$, $AlO_2$, $PO_2$ and $SiO_2$ tetrahedral units having an empirical chemical composition on an anhydrous basis expressed by the formula:

$$mR:(Co_wAl_xP_ySi_z)O_2$$

wherein "R" represents at least one organic templating agent present in the intracrystalline pore system; "m" represents the molar amount of "R" present per mole of $(Co_wAl_xP_ySi_z)O_2$ and has a value between zero (0) and about 0.3; and "w", "x", "y" and "z" represent the mole fractions of cobalt, aluminum, phosphorus and silicon, respectively, present as tetrahedral oxides, said mole fractions being such that they are within the pentagonal compositional area defined by points A, B, C, D, and E of FIG. 1 and each has a value of at least 0.01, said crystalline molecular sieves having a characteristic X-ray powder diffraction pattern which contains at least the d-spacings set forth in one of the following Tables A to H and J to M

TABLE A

| | (CoAPSO-5) | |
|---|---|---|
| 2Θ | d (A) | Relative Intensity |
| 7.3–7.5 | 12.11–11.79 | m–vs |
| 14.7–14.9 | 6.03–5.95 | w–m |
| 19.6–19.8 | 4.53–4.48 | w–m |
| 20.9–21.2 | 4.25–4.19 | w–vs |
| 22.3–22.4 | 3.99–3.97 | m–vs |

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TABLE A-continued

| 2Θ | (CoAPSO-5) d (Å) | Relative Intensity |
|---|---|---|
| 25.8–26.0 | 3.453–3.427 | vw–m |

TABLE B

| 2Θ | (CoAPSO-11) d (Å) | Relative Intensity |
|---|---|---|
| 7.9–8.1 | 11.19–10.92 | ■ |
| 9.3–9.5 | 9.51–9.31 | m–s |
| 21.0–21.3 | 4.23–4.17 | vs |
| 22.1–22.3 | 4.02–3.99 | m |
| 22.7–23.1 | 3.92–3.85 | m |
| 23.2–23.4 | 3.83–3.80 | m |

TABLE C

| 2Θ | (CoAPSO-16) d (Å) | Relative Intensity |
|---|---|---|
| 11.4–11.6 | 7.76–7.63 | w–s |
| 17.2–17.4 | 5.16–5.10 | m |
| 18.7–18.9 | 4.75–4.70 | vw–m |
| 21.9–22.1 | 4.06–4.02 | vs |
| 23.1–23.3 | 3.85–3.82 | m |
| 26.8–27.0 | 3.326–3.302 | ■ |
| 29.8–29.9 | 2.998–2.988 | w–m |

TABLE D

| 2Θ | (CoAPSO-20) d (Å) | Relative Intensity |
|---|---|---|
| 13.9–14.0 | 6.37–6.33 | m |
| 19.7–19.8 | 4.51–4.48 | m |
| 24.2–24.3 | 3.68–3.66 | vs |
| 28.0–28.1 | 3.187–3.175 | w |
| 31.4–31.5 | 2.849–2.840 | w |
| 34.5–34.6 | 2.600–2.592 | w |

TABLE E

| 2Θ | (CoAPSO-31) d (Å) | Relative Intensity |
|---|---|---|
| 8.5–8.6 | 10.40–10.28 | ■ |
| 20.2–20.3 | 4.40–4.37 | ■ |
| 22.0–22.1 | 4.04–4.02 | ■ |
| 22.6–22.7 | 3.93–3.92 | vs |
| 28.0–28.1 | 3.187–3.175 | w |
| 31.7–31.8 | 2.823–2.814 | m |

TABLE F

| 2Θ | (CoAPSO-34) d (Å) | Relative Intensity |
|---|---|---|
| 9.4–9.8 | 9.41–9.03 | s–vs |
| 12.86–13.06 | 6.86–6.76 | w |
| 14.08–14.30 | 6.28–6.19 | w–m |
| 15.90–16.20 | 5.57–5.47 | vw–m |
| 20.60–20.83 | 4.31–4.26 | w–vs |
| 30.50–30.80 | 2.931–2.903 | w–m |

TABLE G

| 2Θ | (CoAPSO-35) d (Å) | Relative Intensity |
|---|---|---|
| 10.9–11.0 | 8.12–8.04 | m–vs |
| 13.4–13.7 | 6.61–6.46 | m–vs |
| 17.3–17.4 | 5.13–5.10 | m–s |
| 20.9–21.2 | 4.25–4.19 | ■ |
| 21.9–22.3 | 4.06–3.99 | m–vs |

TABLE G-continued

| 2Θ | (CoAPSO-35) d (Å) | Relative Intensity |
|---|---|---|
| 28.3–28.6 | 3.153–3.121 | m |

TABLE H

| 2Θ | (CoAPSO-36) d (Å) | Relative Intensity |
|---|---|---|
| 7.8–8.0 | 11.33–11.05 | vs |
| 8.2–8.3 | 10.78–10.65 | ■ |
| 16.4–16.6 | 5.40–5.34 | m |
| 19.0–19.3 | 4.67–4.60 | m |
| 20.7–21.0 | 4.29–4.23 | m |
| 22.3–22.6 | 3.99–3.93 | w–m |

TABLE J

| 2Θ | (CoAPSO-39) d (Å) | Relative Intensity |
|---|---|---|
| 9.4–9.5 | 9.41–9.31 | m |
| 13.3–13.4 | 6.66–6.61 | m |
| 18.1–18.2 | 4.90–4.87 | w–m |
| 21.0–21.2 | 4.23–4.19 | vs |
| 22.4–22.5 | 3.97–3.95 | m–s |
| 26.4–26.5 | 3.376–3.363 | ■ |

TABLE K

| 2Θ | (CoAPSO-44) d (Å) | Relative Intensity |
|---|---|---|
| 9.3–9.5 | 9.51–9.31 | vs |
| 16.0–16.3 | 5.54–5.44 | w–m |
| 20.5–20.8 | 4.33–4.27 | m |
| 24.3–25.1 | 3.66–3.548 | w–m |
| 25.8–26.2 | 3.453–3.401 | w–m |
| 30.7–31.1 | 2.912–2.876 | vw–m |

TABLE M

| 2Θ | (CoAPSO-47) d (Å) | Relative Intensity |
|---|---|---|
| 9.4–9.6 | 9.41–9.21 | vs |
| 12.8–13.1 | 6.92–6.76 | w–m |
| 16.0–16.3 | 5.54–5.44 | w–m |
| 20.6–21.0 | 4.31–4.23 | m–vs |
| 25.5–25.9 | 3.943–3.440 | w–m |
| 30.6–31.1 | 2.921–2.876 | w–m |

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**4,744,971**

## PROCESS FOR TREATMENT OF PHOSSY WATER FOR RECYCLING

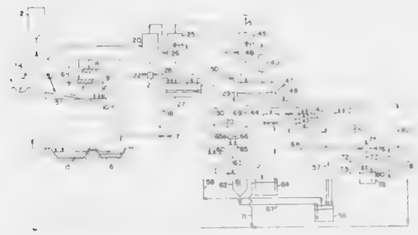
**Gordon H. Scherbel; David A. Crea; Jerry A. Keely; Ronald L. Andersen, all of Pocatello, Id., and Byron L. Nichols, Federal Way, Wash., assignors to FMC Corporation, Philadelphia, Pa.**

**Continuation of Ser. No. 746,916, Jun. 20, 1985, abandoned, which is a continuation of Ser. No. 527,061, Aug. 29, 1983, abandoned. This application Nov. 14, 1986, Ser. No. 931,375**

**Int. Cl.[4] C01B** *25/01*

**U.S. Cl. 423—323** **13 Claims**

1. In the electric furnace production of elemental phosphorus the steps comprising segregating cold phossy water used for cooling and washing purposes from hot phossy water used in condensing and handling liquid phosphorus, clarifying the segregated cold phossy water, recycling the clarified cold water for cooling and washing purposes, passing hot furnace gases containing phosphorus vapors and entrained particulate solids through a gas-solids separator to remove the major proportion of the solids, passing the hot furnace gases from the separator through a hot water spray in a first condenser to reduce the gas temperature below the dew point of the phosphorus but above the freezing point of the phosphorus to condense phosphorus vapors into liquid phosphorus globules, allowing the hot water, liquid phosphorus globules and entrained particulate solids to pass into a first sump and form a suspension of liquid phosphorus globules and particulate solids in hot phossy water, allowing the suspension to stratify into a hot phossy water layer, a liquid phosphorus layer and an intermediate sludge layer in the first sump, recycling the hot phossy water to the spray in the first condenser, passing the gas containing residual phosphorus vapors, residual entrained particulate solids and water vapors from the first condenser through a cold water spray in a second condenser to cool the gas to a temperature below the freezing point of phosphorus to freeze the residual phosphorus vapors and condense the water vapors, allowing the frozen phosphorus particles, particulate solids and water to pass into a second sump and form a suspension of phosphorus particles and particulate solids in water, allowing the suspension to stratify into a phossy water layer



and a layer of phosphorus particles, particulate solids and water, cooling a portion of the phossy water layer in the second sump and passing the cooled water to the spray in the second condenser, passing the remainder of the water layer in the second sump to the first sump to at least partially replace water vaporized in the first condenser, melting the phosphorus particles in the second sump, passing the melted phosphorus, associated water and particulate solids in the second sump and the liquid phosphorus and sludge in the first sump into a separation tank, allowing the mixture in the separation tank to stratify into a liquid phosphorus layer, a hot phossy water layer and a sludge layer, transferring the phosphorus to a railroad car to displace the water therein, passing excess hot phossy water from the first sump and displaced hot phossy water from the separation tank and the railroad car into a lamellar settler wherein phosphorus and suspended solids separate from the hot phossy water as a sludge underflow to form clarified hot water, recycling the clarified hot water for condensing and handling liquid phosphorus and recovering phosphorus from the lamellar settler sludge underflow.

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**4,744,972**

## METHOD FOR PRODUCTION OF HIGHLY DIELECTRIC POWDER

**Yasuyuki Ogata, and Hidetsugu Ono, both of Saitama, Japan, assignors to Mitsubishi Mining and Cement Co. Ltd., Tokyo, Japan**

**Filed Aug. 26, 1986, Ser. No. 900,556**

**Claims priority, application Japan, Nov. 25, 1985, 60-264420**

**Int. Cl.[4] C04B** *35/46;* **C01G** *23/053*

**U.S. Cl. 423—598** **16 Claims**

9. A method for the production of a highly dielectric powder having the chemical composition represented by the general formula:

$$(Sr_xPb_{1-x}TiO_3)_y(PbMg_{0.5}W_{0.5}O_3)_{1-y}$$

(wherein $0<x<1$ and $0<y<1$), comprising adding a mixture consisting of strontium alkoxide, lead alkoxide, titanium alkoxide, and magnesium alkoxide to an aqueous solution of ammonium para-tungstate thereby effecting hydrolysis of alkoxides and coprecipitation of tungsten component and subsequently heating the resulting precipitate to dry.

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**4,744,973**

## INORGANIC POLYMERIC CATIONIC ION EXCHANGE MATRIX

**Thomas S. Snyder, Oakmont, and Edward J. Lahoda, Edgewood Boro, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Nov. 29, 1985, Ser. No. 803,023**

**Int. Cl.[4] C01B** *25/01, 17/96;* **C01D** *31/24;* **C01G** *25/02*

**U.S. Cl. 423—305** **7 Claims**

1. A method of making an inorganic polymeric cationic ion exchange matrix comprising

(A) adding a quantity of water to an alkyl compound having the general formula $M(R)_n$, where M is an element having a valence of at least 3 selected from the group consisting of B, Si, Zr, Al, Ti, Hf, and mixtures thereof, and R is alkyl from $C_1$ to $C_4$;

(B) adding to said water and said alkyl compound a dopant that forms a group on said matrix selected from the group consisting of sulfate, phosphate, chromate, carbonate, and mixtures thereof, where the amount of said water plus said dopant is about 30 to about 50% of the amount stoichiometrically required to replace all of the alkyl groups that are present on said alkyl compound, and the amount of said water is about 50 to about 80 mole % of the amount of said water plus said dopant; and

(C) drying at about 300° to about 600° C.

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**4,744,974**

## PROCESS FOR PRODUCTION OF ALUMINA

**Duane J. Lewis, Ponca City, Okla., and William H. McNeese, Houston, Tex., assignors to Vista Chemical Company, Houston, Tex.**

**Filed Sep. 23, 1986, Ser. No. 910,619**

**Int. Cl.[4] C01F** *7/02*

**U.S. Cl. 423—625** **7 Claims**

1. A process for the production of alumina, comprising:

reacting an aluminum trialkyl with a substantially water immiscible alcohol to produce aluminum alkoxide and alkane;

hydrolyzing said aluminum alkoxide to produce said alcohol and alumina, said reaction between said aluminum trialkyl and said alcohol being conducted in an organic phase, said hydrolysis of said aluminum alkoxide being conducted in an aqueous phase, said organic phase and said aqueous phase being contiguous, said reacting of said aluminum trialkyl with said alcohol and said hydrolyzing being conducted in a single, common reaction zone; and

recovering said alumina.

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**4,744,975**

## 6-IODOETHYLATED STARCH AND PROCESS FOR PREPARING THE SAME

**Tetsuo Suami, Musashino, and Masao Sako, Kobe, both of Japan, assignors to Nippon Universal Pharmaceutical Co., Ltd., Tokyo, Japan**

**Filed May 20, 1986, Ser. No. 865,347**

**Claims priority, application Japan, May 28, 1985, 60-113300**

**Int. Cl.[4] A61K** *49/04*

**U.S. Cl. 424—5** **8 Claims**

1. A 6-iodoethylated starch containing one iodine attached per 5 glucose units characterized by the following physicochemical properties:

Melting point: 165° C. (decomposed);

Specific optic rotation: $[\alpha]_D^{22}+136°$ (C=1.45, $H_2O$);

IR: $\gamma_{max}^{KBr}$ $cm^{-1}$;3400, 2920, 1655, 1360, 1210, 1150, 1020, 685;

Solubility in water: 0.5 g/ml;

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1090
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Elementary analysis: Calc'd % (for one iodine attached per 5 glucose units): C 41.07; H 5.50; I 12.05: Found %: C 37.31; H 5.42; I 12.47.

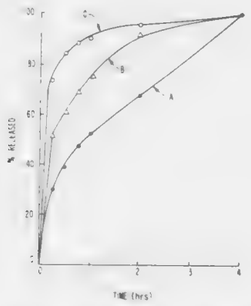
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**4,744,976**

## ERODIBLE MATRIX FOR SUSTAINED RELEASE BIOACTIVE COMPOSITION

**Wallace C. Snipes, Pine Grove Mills, and Stephen J. Wagner, Pennsylvania Furnace, both of Pa., assignors to Zetachron, Inc., State College, Pa.**

**Continuation-in-part of Ser. No. 633,604, Jul. 23, 1984, Pat. No. 4,629,621. This application Oct. 14, 1986, Ser. No. 918,294**
**The portion of the term of this patent subsequent to Dec. 16, 2003, has been disclaimed.**
**Int. Cl.[4] A61J** *3/10*
**U.S. Cl. 424—408** **85 Claims**




1. A composition erodible by an aqueous liquid comprising 5 to 99.5% by weight of a polyethylene glycol having a molecular weight of from about 1000 to about 20,000, and 95 to 0.5% by weight of an erosion rate modifier component comprising a combination of stearyl alcohol and stearic acid.

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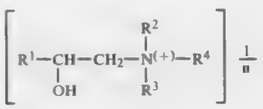
**4,744,977**

## QUATERNARY AMMONIUM COMPOUND HAIR CONDITIONERS

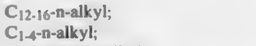
**Hermann Hensen, Hilden; Horst Rutzen, Langenfeld; Peter Busch, Erkrath-Unterbach; Dagmar Stuhrmann, Duesseldorf, and Klaus Thiele, Langenfeld, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany**

**Filed Nov. 14, 1985, Ser. No. 798,201**
**Claims priority, application Fed. Rep. of Germany, Nov. 17, 1984, 3442175**
**Int. Cl.[4] A61K** *7/06, 7/08, 7/11*
**U.S. Cl. 424—70** **16 Claims**

1. An aqueous shampoo consisting essentially of;
0.5 to 8% of a hair conditioning compound of the formula



wherein:
$R^1$ is a $C_{12-16}$-n-alkyl;
$R^2$ is a $C_{1-4}$-n-alkyl;
$R^3$ is a $C_{1-4}$-hydroxyalkyl;
$R^4$ is a $C_{1-4}$-n-alkyl or a $C_{2-4}$-hydroxyalkyl;
A is an inorganic or organic acid anion; and
n is the valence of said anion; and
5 to 20% of at least one anionic surfactant of the formula:



wherein:
$R^5$ is a linear $C_{10-18}$-alkyl;
m is 0 or an integer from 1 to 12; and
M is lithium, sodium, potassium, magnesium, ammonium, monoethanolammonium, diethanolammonium, or triethanolammonium;
all weights being based on the weight of the shampoo.

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**4,744,978**

## HAIR TREATING COMPOSITION CONTAINING CATIONIC ORGANIC POLYMER AND CARBOXYFUNCTIONAL SILICONE

**Gary R. Homan, Midland, and Susan M. Cornwall, Owosso, both of Mich., assignors to Dow Corning Corporation, Midland, Mich.**

**Filed Oct. 24, 1985, Ser. No. 791,047**
**Int. Cl.[4] A61K** *7/06, 7/00;* **A45D** *7/00*
**U.S. Cl. 424—70** **14 Claims**

1. A method of setting hair comprising the steps of: rolling the hair around a shaping device, moistening the hair with water, applying to the hair without subsequent water rinsing an effective amount of a composition comprising
(A) a carboxyfunctional polysiloxane of the formula



wherein Me denotes the methyl radical, R denotes a carboxyfunctional radical selected from the group consisting of carboxyalkyl radicals, carboxyalkylthio radicals, alkoxycarbonylalkyl radicals, and alkoxycarbonylalkylthio radicals, Q denotes a methyl radical or R, x has an average value from 30 to 400, and y has an average value from 1 to 30, and
(B) a cationic, organic polymer containing amine or ammonium groups in the polymer chain or joined to the polymer chain,
in a suitable aqueous or organic solvent carrier, wherein the weight ratio of (A) to (B) in the composition is within the range of 0.1 to 5, and drying the hair while the hair is rolled.

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**4,744,979**

## SELF-LATHER GENERATING SHAVING COMPOSITION

**Lloyd I. Osipow, 2 Fifth Ave, New York, N.Y. 10011; George Spitzer, 44 Coconut Row, Palm Beach, Calif. 33480, and Dorothea C. Marra, 107 Fernwood Rd., Summit, N.J. 07901**

**Continuation of Ser. No. 679,222, Dec. 7, 1984, abandoned. This application Sep. 4, 1986, Ser. No. 903,903**
**Int. Cl.[4] A61K** *7/15*
**U.S. Cl. 424—73** **24 Claims**

1. A shaving preparation having a sub-atmospheric vapor pressure at ambient temperatures and which generates lather in a practical period of time when applied to the skin consisting essentially of (1) an aqueous soap solution; (2) a surface active agent; and, (3) a volatile water-insoluble organic liquid having a vapor pressure substantially below atmospheric pressure, and capable of having its volatilization promoted by the aqueous soap solution and surface active agent, said aqueous soap solution and surface active agents being of such nature and in such amounts that when said compositions is applied to the skin the volatilization of the volatile organic liquid is promoted to the extent that a lather is generated in a practical period of time while reducing the tendency of the volatile organic liquid to cause smarting of the skin, said aqueous solution containing the surface active agent in an amount of about 1 to 10% by weight of the total composition and a water-insoluble volatile organic liquid in an amount of 1 to 10% by weight of the total composition, said aqueous solution containing soap in an amount from about 5 to 25% by weight; the water of the aqeuous solution being present in an amount to give 100% by weight for the composition.



**4,744,980**

## OPHTHALMIC SOLUTION FOR TREATMENT OF DRY EYE SYNDROME

**Frank J. Holly, 301 York Avenue, Lubbock, Tex. 79416**

**Filed Apr. 28, 1986, Ser. No. 856,531**
**Int. Cl.[4] A61K** *31/74*
**U.S. Cl. 424—78** **16 Claims**

1. An aqueous solution exhibiting a surface tension between 40 and 45 mN/m similar to that of aqueous tears while forming a completely water-wettable adsorbed layer over a hydrophobic surface such as glossy polyethylene, which comprises a partially hydrolyzed polyvinyl acetate having at least 73% but no more than 90% of its acetate groups hydrolyzed to alcohol in combination with a fully hydrolyzed polyvinyl alcohol having more than 99% of its acetate groups hydrolyzed to alcohol; and
wherein the weight ratio of partially hydrolyzed polyvinyl acetate to fully hydrolyzed polyvinyl alcohol is within the range from 1:2 to 1:5.

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**4,744,981**

## TRICHOTHECENE ANTIBODY CONJUGATES

**Gowsala Pavanasasivam, Edmonds, Wash., assignor to NeoRx Corporation, Seattle, Wash.**

**Filed Oct. 17, 1985, Ser. No. 788,325**
**Int. Cl.[4] A61K** *39/395*
**U.S. Cl. 424—85** **21 Claims**

1. A conjugate of a trichothecene and an antibody or antibody fragment, said antibody or antibody fragment being capable of specifically binding to a defined population of cells.
21. A method for inhibiting antigen positive cells, comprising:
exposing the antigen positive cells to a conjugate of a trichothecene and an antibody or antibody fragment specific for said antigen positive cells.

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**4,744,982**

## HUMAN MONOCLONAL ANTIBODY REACTIVE WITH POLYRIBOSYLRIBITOL PHOSPHATE

**Kenneth W. Hunter, 4401 Dresden St., Kensington, Md. 20895, and Gerald W. Fischer, 10748 Wayridge Dr., Gaithersburg, Md. 20879**

**Filed Aug. 24, 1982, Ser. No. 411,115**
**Int. Cl.[4] A61K** *39/40;* **C12N** *15/00;* **G01N** *33/53*
**U.S. Cl. 424—87** **7 Claims**

1. A human monoclonal antibody reactive with antigenic polyribosylribitol phosphate capsular polysaccharide, said antibody produced by a self-reproducing carrier cell containing genes that produce a human monoclonal antibody reactive with polyribosylribitol phosphate capsular polysaccharide.

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**4,744,983**

## IMMUNOGENIC PROTEIN OR PEPTIDE COMPLEX, METHOD OF PRODUCING SAID COMPLEX AND THE USE THEREOF AS AN IMMUNE STIMULANT AND AS A VACCINE

**Bror Morein, Krokusvägen 14, S-175 74 Järfälla, Sweden**

**Division of Ser. No. 543,032, Oct. 18, 1983, Pat. No. 4,578,269. This application Jan. 31, 1986, Ser. No. 825,778**
**Claims priority, application Sweden, Oct. 18, 1982, 8205892**
**The portion of the term of this patent subsequent to Mar. 25, 2003, has been disclaimed.**
**Int. Cl.[4] A61K** *39/00;* **C07K** *1/02, 3/12, 17/10*
**U.S. Cl. 424—88** **8 Claims**

1. Immunogenic complex containing antigenic proteins and peptides with hydrophobic regions and at least one polar triterpensaponin having hydrophobic regions, said complex being formed by attraction between said hydrophobic regions of said at least one polar triterpensaponin and said hydrophobic regions of said proteins and peptides, said complex being obtained by mixing proteins, peptides, viruses, mycoplasmas, bacteria, parasites or animal cells with hydrophobic regions with one or more solubilizing agents, whereby complexes are formed between charged monomeric antigenic proteins or peptides and solubilizing agent, whereafter the charged monomeric antigenic proteins or peptides are separated from solubilizing agent in the presence of, or are separated from the solubilizing agent and directly transferred to a triterpensaponin solution, containing one or more triterpensaponins with hydrophobic and hydrophilic regions in a concentration of at least the critical micellular concentration.

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**4,744,984**

## ANTIVIRAL IMMUNOTHERAPEUTIC AGENT AND PREPARATION THEREOF

**William L. Ragland, Athens, Ga., assignor to Vetrepharm Research, Inc., Athens, Ga.**

**Filed Oct. 8, 1985, Ser. No. 785,070**
**Int. Cl.[4] A61K** *39/02, 35/78*
**U.S. Cl. 424—92** **3 Claims**

1. A method of treating a viral infection in animals and humans comprising the step of injecting an animal or human with an effective amount of a deproteinized bacterial cell wall suspension in an oil and water emulsion, wherein the bacterial cell wall suspension is derived from bacteria being selected from the group consisting of Mycobacterium species, Corynebacterium species and Nocardia species.

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**4,744,985**

## NOVEL SUBSTANCES HAVING CARCINOSTATIC AND IMMUNOSTIMULATING ACTIVITY, PROCESS FOR PREPARING THE SAME AND CARCINOSTATIC AGENT CONTAINING THE SAME

**Kenzo Tamai, Kanazawa; Isamu Saikawa, Toyama; Takashi Yasuda, Toyama; Shohachi Murakami, Toyama; Toyoo Maeda, Kanazawa; Hisatsugu Tsuda, Toyama; Hiroshi Sakai, Takaoka; Masatoshi Sugita, Toyama; Yoshiko Yamamoto, Namerikawa; Hisashi Minami, and Takako Hori, both of Toyama, all of Japan, assignors to Toyama Chemical Co., Ltd., Tokyo, Japan**

**Filed Aug. 21, 1980, Ser. No. 180,040**
**Claims priority, application Japan, Aug. 24, 1979, 54-107814; Aug. 24, 1979, 54-107817; Aug. 24, 1979, 54-107818; Aug. 24, 1979, 54-107819; Aug. 6, 1980, 55-108123; Aug. 6, 1980, 55-108121; Aug. 6, 1980, 55-108122; Aug. 6, 1980, 55-108120**
**Int. Cl.[4] A61K** *35/74;* **C12P** *1/04*
**U.S. Cl. 424—116** **45 Claims**

1. A substance TF-100 having the following properties:
(a) Grayish white—light brown powder,
(b) It inhibits the proliferation of mouse Ehrlich ascites tumor and Ehrlich solid tumor, and has an immunostimulating activity,
(c) It is soluble in water and it is insoluble in methanol, ethanol, acetone, benzene, chloroform, ethyl acetate and diethyl ether,
(d) It has no clear melting point, begins to decompose at about 110° C., and decomposes remarkably above 200° C.,
(e) Its infrared absorption spectrum obtained by a KBr tablet method has absorption bands in the vicinity of 3600–3200, 2960–2930, 1670–1640, 1550, 1440–1380, 1240, 1140–1000 and 820 $cm^{-1}$,
(f) The ultraviolet absorption spectrum of its aqueous solution shows a strong absorption at the absorption edge, and shows an absorption peak in the vicinity of 256–260 nm,
(g) When it is fractionated by gel filtration (column: 50 mm$\phi$×600 mm, eluent: distilled water) by using Sephadex G-50 (registered trademark of Pharmacia Co., Ltd.), it has absorption bands at the elution volumes in the vicinity of the void volume—400, 430–530, 700–800, and 840–870 ml in the ultraviolet absorbance measurement at 260 nm; and at the elution volumes in the vicinity of the void volume—390, and 410–430 ml in the absorbance measurement at 620 nm by an anthrone-sulfuric acid method,
(h) Its high performance liquid chromatogram (eluent: a 0.1M phosphate buffer having a pH of 7, flow rate: 0.8

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ml/min., at room temperature) obtained by using TSK-GEL G3000 SW (trade name of Toyo Soda Co., Ltd., column: 7.9 mmϕ×600 mm×2) has peaks in the vicinity of the solvent front, 38–60, and 65 min. in the ultraviolet absorbance measurement at 220 nm and 260 nm.

(i) It is positive in Molisch reaction,, phenol-sulfuric acid reaction, anthrone-sulfuric acid reaction, indole-hydrochloric acid reaction, Lowry-Folin's reaction, and ninhydrin reaction,

(j) Elementary analysis values C: 30.6–35.7%, H: 4.2–5.2%, N: 4.2–5.2%

(k) Its saccharide content measured by a phenol-sulfuric acid method is about 40.0—about 46.0% by weight in terms of glucose, and its protein content measured by Lowry-Folin's method is about 20.0—about 23.0% by weight in terms of calf serum albumin.

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**4,744,986**

## PROCESS FOR THE PREPARATION OF A VISCOSITY-STABLE ANTACID COMPOSITION

**Joseph R. Luber, Lafayette Hills; Kenneth M. Feld, Chalfont; Richard J. Harwood, Bensalem, and Wayne M. Grim, Doylestown, all of Pa., assignors to Rorer Pharmaceutical Corporation, Fort Washington, Pa.**

**Filed Mar. 7, 1986, Ser. No. 837,527**

**Int. Cl.⁴ A61K** *31/10, 33/12, 33/08*

**U.S. Cl. 424—156** **15 Claims**

1. A method for the preparation of a viscosity-stable aqueous antacid composition containing an alginic acid salt comprising:

(A) forming an aqueous mixture of an alginic acid salt and an aluminum-containing antacid material having a tendency to form reaction products which effect the viscosity of said composition:

(B) forming a stabilized reaction product under conditions which include heating said aqueous mixture to an elevated temperature; and

(C) recovering the stabilized reaction product in a form which is capable of being used in the preparation of a viscosity-stable aqueous antacid composition.

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**4,744,987**

## COPROCESSED MICROCRYSTALLINE CELLULOSE AND CALCIUM CARBONATE COMPOSITION AND ITS PREPARATION

**Dev K. Mehra, Furlong; Kenneth P. West, Devon, both of Pa., and J. Donald Wiggins, Princeton Junction, N.J., assignors to FMC Corporation, Philadelphia, Pa.**

**Continuation of Ser. No. 709,748, Mar. 8, 1985, abandoned. This application Aug. 3, 1987, Ser. No. 81,584**

**Int. Cl.⁴ A61K** *9/14, 33/10;* **C08L** *1/00;* **C09J** *3/04*

**U.S. Cl. 424—156** **24 Claims**

1. A composition of matter useful as a pharmaceutical excipient comprising dried particulate agglomerates of coprocessed microcrystalline cellulose and calcium carbonate, the two components being present in a weight ratio of from about 75:25 to 35:65 microcrystalline cellulose:calcium carbonate and intimately associated with each other.

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**4,744,988**

## SOFT GELATIN CAPSULES AND METHODS FOR THEIR PRODUCTION

**Werner Brox, Beerfelden, Fed. Rep. of Germany, assignor to R. P. Scherer Corporation, Troy, Mich.**

**Continuation of Ser. No. 667,006, Oct. 31, 1984. This application Dec. 17, 1986, Ser. No. 943,386**

**Claims priority, application Fed. Rep. of Germany, Mar. 2, 1983, 3307353**

**Int. Cl.⁴ A61K** *9/48*

**U.S. Cl. 424—456** **5 Claims**

1. A soft gelatin capsule comprising a shell of gelatin and a softener, and a filling consisting of a polyethylene glycol and a low polyhydric alcohol and at least one active substance, characterized in that

(a) the dried shell of the capsule contains 4 to 40% by weight of a mixture of sorbitol and at least one sorbitane,

(b) at least 50% by weight of the polyethylene glycol used in the filling for dissolving or suspending the active substance is a polyethylene glycol having a mean molecular weight of 600, and

(c) the capsule filling comprises up to 20% by weight of glycerol and/or 1,2-propylene glycol.

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**4,744,989**

## METHOD OF PREPARING LIPOSOMES AND PRODUCTS PRODUCED THEREBY

**Nicholas I. Payne; Peter Timmins, both of Merseyside, and Cheryl V. Ambrose, London, all of United Kingdom, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.**

**Continuation-in-part of Ser. No. 578,156, Feb. 8, 1984, abandoned, which is a continuation-in-part of Ser. No. 578,159, Feb. 8, 1984, abandoned. This application Mar. 21, 1986, Ser. No. 842,569**

**Int. Cl.⁴ A61K** *9/16, 37/22, 9/50*

**U.S. Cl. 424—490** **28 Claims**

1. A method for preparing a stable liposome precursor in the form of a thin film of liposomal components of predetermined amount coated on a water-soluble particulate carrier material which is suitable for intravenous use, which liposome precursor may be hydrated to form a liposome product of controlled and acceptable mean size, which comprises forming a solution, in an organic solvent, of at least one liposome-forming lipid selected from the group consisting of a phospholipid, a natural lecithin and a synthetic lecithin in an amount of from about 1 to about 25% by weight of the organic solution, optionally, at least one biologically active compound which is medicament, protein, enzyme, hormone or diagnostic agent, and, optionally, at least one adjuvant which imparts advantageous properties to the final liposome preparation, and coating a particulate water-soluble carrier material which is suitable for intravenous use and is substantially insoluble in said organic solvent, with the so-formed organic solution to form a thin film of liposomal components of predetermined desired amount on said carrier material which thin film contains a ratio of lipid:optional biologically active compound (where present) of within the range of from about 0.5:1 to about 1000:1, which so-coated particulate water-soluble carrier material may be exposed to a hydration medium to form a final hydrated liposome product of controlled and desired mean size.

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**4,744,990**

## HYDANTOINS AS ANIMAL FOOD SUPPLEMENTS

**Robert W. Bragdon, Nashua, and Roger R. Gaudette, Hudson, both of N.H., assignors to W. R. Grace & Co., Lexington, Mass.**

**Filed Sep. 25, 1986, Ser. No. 911,688**

**Int. Cl.⁴ A01K** *00/00*

**U.S. Cl. 426—2** **4 Claims**

1. In the method of feeding protein-containing food materials to warm-blooded animals, the improvement which comprises orally administering to said animals an admixture of protein-containing food materials with 0.01 to 6.0 weight percent of one or more of the 5-substituted hydantoin analogues of valine, isoleucine or leucine.



**4,744,991**

## SPECKLED SUGARLESS CHEWING-GUM AND PROCESS FOR ITS MANUFACTURE

**Michél Serpelloni, Béthune, France, assignor to Roquette Freres, Lestrem, France**

**Filed Dec. 20, 1985, Ser. No. 811,762**

**Claims priority, application France, Dec. 21, 1984, 84 19740**

**Int. Cl.⁴ A23G** *3/30*

**U.S. Cl. 426—5** **13 Claims**

1. In a sugarless speckled chewing-gum comprising a gum base, a sweetener in liquid phase, a sweetener in solid phase and a plurality of sweetening particles comprising a coloring or dye, the improvement comprising confining the coloring or dye inside the sweetening particles by incorporating at least one confining agent selected from the group consisting of the edible stearates, edible fatty acid esters and hydrogenated starch hydrolysates whose glucidic spectrum is as follows, percentages being given with respect to the dry matter:

maltitol: 25 to 95%,

sorbitol: 0.1 to 19%,

the complement to 100 being constituted by polyols of degree of polymerization (DP) ≧3,

wherein the stearates are incorporated, in the sweetening particles in a proportion of about 0.5 to 4% by weight with respect to the weight of the particles,

wherein the fatty acid esters are incorporated, in the sweetening particles in a proportion of about 0.5 to 5% by weight with respect to the weight of the particles, and/or

wherein the hydrogenated starch hydrolysates are incorporated, in the sweetener in liquid phase in a proportion of about 5 to 30% by weight with respect to the total mass of the chewing-gum.

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**4,744,992**

## NUTRITIONAL RICE MILK PRODUCTION

**Cheryl R. Mitchell; Pat R. Mitchell, both of 446 N. Powers, Manteca, Calif. 95336, and Robert Nissenbaum, 750 Homer Ave., Palo Alto, Calif. 94301**

**Filed Apr. 24, 1986, Ser. No. 856,300**

**Int. Cl.⁴ A23L** *1/10, 2/38*

**U.S. Cl. 426—29** **19 Claims**

1. A method for producing a nutritional rice milk product, comprising the steps of

selecting as a starting material a whole grain rice and dividing it into particles of reduced size,

liquifying the whole grain rice particles with an alpha-amylase enzyme in an aqueous medium substantially free from protease, in an amount and for a period of time which is sufficient to form a liquid slurry, and

treating the liquid slurry with a glucosidase enzyme in a saccharification step, in an amount and for a period of time less than about three hours which is sufficient to yield a rice milk product retaining nutritional components from the whole grain rice and having a glucose content of about 5 to 70% solids.

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**4,744,993**

## PREPARATION OF A CASEIN-BASED PUFFED PRODUCT

**Jean-Pierre Bisson, Saint Jean des Baisants; Michel Bussière, Beauvais; Gaston Fournet, Thonon-les-Bains, and Pierre Jacquenod, Berneuil-en-Bray, all of France, assignors to Nestec S.A., Vevey, Switzerland**

**Filed May 12, 1986, Ser. No. 862,134**

**Claims priority, application France, May 21, 1985, 85 07605**

**Int. Cl.⁴ A23C** *9/13;* **A23J** *1/20*

**U.S. Cl. 426—38** **12 Claims**

1. A process for the preparation of a casein-based puffed product comprising drying a rennet casein curd having a pH of from 5.1 to 5.7 at a product temperature not exceeding approximately 70° C. to a dry matter content of at least from 81% to 85% by weight, extruding the dried curd at a dry matter content of from 81% to 85% by weight at a product temperature of from 30° C. to 100° C. under a pressure sufficient to render it plastic, puffing the extruded curd by subjecting it to sub-atmospheric pressure and then discharging the puffed curd product from the sub-atmospheric pressure to atmospheric pressure.

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**4,744,994**

## PROCESS FOR PREPARING READILY RECONSTITUTED FROZEN COMESTIBLES AND FROZEN COMESTIBLES PRODUCED THEREBY

**Donald B. Bernacchi, and Robert J. Loewe, both of Chicago, Ill., assignors to Griffith Laboratories U.S.A., Inc., Alsip, Ill.**

**Filed Sep. 24, 1985, Ser. No. 779,657**

**Int. Cl.⁴ A23P** *1/08*

**U.S. Cl. 426—293** **26 Claims**

1. A method for preparing coated, frozen comestibles which, when reconstituted by microwave cooking or by baking, have a texture and appearance organoleptically equivalent or superior to that of fat fried coated comestibles, comprising the steps of:

enrobing a comestible with a first coating of a batter comprising wheat flour and shortening blended with sufficient water to yield a batter of a consistency suitable for enrobing the comestible and frying said comestible to set up the first coating without undercooking or overcooking the coating;

applying to said comestible a second coating chosen from the group consisting of chemically leavened batter and a combination of a batter and a supplemental breading capable of yielding a crisp, porous coating upon reconstitution and frying a second time for at least about 20 seconds; and

freezing the twice coated, twice fried product.

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**4,744,995**

## PROCESS OF PREPARING MIXED GROUND COMPRESSED FRUIT AND NUT PRODUCTS

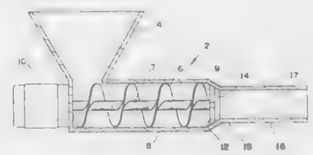
**Eldon L. Robinson, Site 18, Compartment C-40, R.R. #6, Vernon, B. C., Canada V1T 6Y5**

**Filed Jan. 20, 1987, Ser. No. 5,678**

**Claims priority, application Canada, Jan. 24, 1986, 500307**

**Int. Cl.⁴ A23L** *1/36*

**U.S. Cl. 426—454** **9 Claims**




1. A process of preparing an edible mixed ground compressed fruit and nut product comprising:

(a) mixing dried fruit and nuts in a receptacle means at ambient temperature;

(b) transporting the fruit and nut mixture from the receptacle means into a primary mixing and grinding means at ambient temperature, the mixing and grinding means comprising a rotatable auger mounted inside a chamber;

(c) adjusting the rotational speed of the auger to produce an extrudable ground mixture which will maintain its shape after extrusion and have a soft, uniform texture;

(d) transporting the ground mixture after it has passed through the mixing and grinding means into an extrusion and compression means; and

(e) adjusting the pressure generated by the extrusion and compression means to form a compressed fruit and nut product having a uniform shape and soft texture with sufficient moisture to maintain its shape after extrusion, said mixture being maintained at ambient temperature during extrusion.

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**4,744,996**

## METHOD FOR PRODUCING MICROALGAE BASED FOODSTUFF

**Allen L. Rakow, 620 Monte Vista, and Rudolph Roubicek, 1304 Delano Dr., both of Las Cruces, N. Mex. 88001**

**Continuation-in-part of Ser. No. 707,461, Mar. 1, 1985, abandoned. This application Jun. 26, 1986, Ser. No. 878,645**

**Int. Cl.[4] A23L** *1/04*

**U.S. Cl. 426—575** **1 Claim**

1. A method for producing a microalgae based foodstuff comprising:

preparing a mixture containing by weight 50%–98% water, 0.8%–20% Spirulina cells, and 1.2%–30% of a matrix comprising by weight 50%–100% agar and 0%–50% cornstarch;

heating the mixture to a temperature 100° Centrigrade, or more;

cooling the heated mixture to a temperature of 40° Centrigrade or less;

placing the cooled mixture into shaping means;

drying the cooled mixture in said shaping means to a predetermined moisture content;

and removing the resulting dried, shaped mixture from said shaping means.

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**4,744,997**

## METHOD FOR PRODUCING GUM CANDY

**Peter Hoffmann, Heidelberg, and Klaus Bräumer, Eberbach, both of Fed. Rep. of Germany, assignors to Deutsche Gelatine-Fabriken Stoess & Co. GmbH, Fed. Rep. of Germany**

**Filed Jul. 22, 1986, Ser. No. 887,951**

**Claims priority, application Fed. Rep. of Germany, Jul. 24, 1985, 3526376**

**Int. Cl.[4] A23G** *3/12, 3/00*

**U.S. Cl. 426—576** **13 Claims**

1. A method of producing gum candy having a desired final water content from a basic sugar-gelatin mass comprising the steps of:

(a) preparing a basic sugar-gelatin mass in an extruder from a raw mass containing gelatin in the form of a granulate pre-swollen in water, said raw mass having a water content substantially corresponding to that of the desired final water content of said gum candy,

(b) supplying said basic sugar-gelatin mass from the extruder to an injection mold, and

(c) molding said gum candy.

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**4,744,998**

## PROCESS FOR THE MANUFACTURING OF CHEESE AND CHEESELIKE PRODUCTS

**Adrianus H. M. van Gennip, Boxtel; Carolus G. M. van der Sommen, Gemert, and Johannes van Pijkeren, Veghel, all of Netherlands, assignors to DMV-Campina B.V., Veghel, Netherlands**

**Filed Apr. 4, 1984, Ser. No. 596,613**

**Int. Cl.[4] A23C** *20/02*

**U.S. Cl. 426—582** **16 Claims**

1. A process for the manufacture of imitation cheese products in the absence of emulsification salts from an admixture comprising water, fat and a soluble protein derived from milk and selected from the group consisting of paracaseinate and a paracaseinate-containing protein and one or more of acidulents, colorants and flavoring agents,

the amount of ingredients in said admixture being sufficient that it is in a pourable condition at pasteurization temperatures therefor and in a solidifiable form at a lower temperature, which comprises,

preparing a well mixed emulsion from the admixed materials,

pasteurizing said emulsion,

cooling and solidifying said pasteurized emulsion into shaped pieces, and

treating said shaped pieces with calcium ions to transform the solidified mass into a product having a cheeselike appearance and texture by said treating.

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**4,744,999**

## HIGH THROUGHPUT, HIGH UNIFORMITY FIELD EMISSION DEVICES

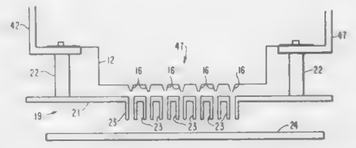
**Shangar S. Nandra, Chessington, and Frank G. Wilson, Merrow, both of United Kingdom, assignors to Engelhard Corporation, Menlo Park, N.J.**

**Filed Aug. 22, 1983, Ser. No. 524,942**

**Claims priority, application United Kingdom, Sep. 9, 1982, 8225767; Sep. 9, 1982, 8225768**

**Int. Cl.[4] B05D** *1/04*

**U.S. Cl. 427—13** **21 Claims**



1. A high-throughput device for field emission spraying of metal or alloys in the liquid state, comprising: a feed electrode nozzle array including a face plate of electrically conductive material insoluble in but wettable by the metal to be sprayed having formed thereupon an array of two or more substantially conical nozzles each having an orifice formed at the tip thereof, reservoir means adjacent said face plate for retaining metal to be sprayed and means for heating said face plate to a temperature in excess of the melting-point of the metal to be sprayed by passing an electric current therethrough.

15. A method of field emissions spraying of metals comprising the steps of:

providing a face plate of electrically conductive material insoluble in but wettable by the metal to be sprayed having formed thereupon an array of two or more substantially conical nozzles each having an orifice formed at the tip thereof:

providing an electrically conductive extractor electrode adjacent to said face plate;

engaging a supply of metal to be sprayed with the side of said face plate opposite said extractor electrode;

heating said face plate to a temperature which is in excess of the melting point of the metal to be sprayed by passing an electric current through said face plate; and

urging said metal spray out of said orifices by imposing a potential difference between said face plate and said adjacent electrically conductive extractor electrode.

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**4,745,000**

## METHOD OF FABRICATING ELECTROSTATIC DRUMS USING MICROWAVE ENERGY

**Stanford R. Ovshinsky, Bloomfield Hills; David D. Allred, Troy; Lee Walter, Bloomfield Hills, and Stephen J. Hudgens, Southfield, all of Mich., assignors to Energy Conversion Devices, Inc., Troy, Mich.**

**Continuation of Ser. No. 854,247, Apr. 21, 1986, Pat. No. 4,664,937, which is a continuation of Ser. No. 725,616, Apr. 22, 1985, Pat. No. 4,615,905, which is a continuation of Ser. No. 423,424, Sep. 24, 1982, Pat. No. 4,517,223. This application Jan. 29, 1987, Ser. No. 8,442**

**The portion of the term of this patent subsequent to May 14, 2002, has been disclaimed.**

**Int. Cl.[4] C23C** *11/02*

**U.S. Cl. 427—39** **8 Claims**

1. A process method of fabricating electrostatic, image-producing device by depositing thin, non-single crystal films onto a substrate, comprising:

providing a source of microwave energy;

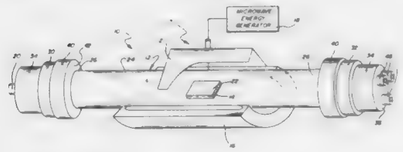


providing an enclosed reaction vessel;

providing a substrate in the reaction vessel;

coupling said microwave energy into said substantially enclosed reaction vessel containing said substrate;

introducing into said vessel at least one reaction gas including a semiconductor-containing compound to form a glow



discharge plasma within said vessel and to form reaction gas species from said reaction gas;

evacuating said reaction vessel to a deposition pressure of 0.1 torr or less; depositing at least one thin film of semiconductor material from said reaction gas species onto said substrate at high deposition rates with high reaction gas conversion efficiencies.

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**4,745,001**

## PROCESS FOR THE PREPARATION OF MAGNETIC RECORDING MEDIUM

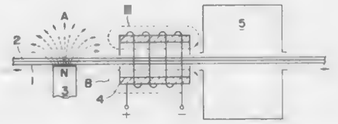
**Takahito Miyoshi, and Masaaki Fujiyama, both of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Jan. 27, 1987, Ser. No. 7,166**

**Claims priority, application Japan, Jan. 24, 1986, 61-13182**

**Int. Cl.[4] H01F** *10/02*

**U.S. Cl. 427—48** **5 Claims**



1. In a process for the preparation of a magnetic recording tape which comprises the steps of applying a magnetic paint onto a surface of a running nonmagnetic support to form a coated paint layer, said magnetic paint comprising magnetic recording layer-forming components including a ferromagnetic powder, an abrasive and a resin component dispersed in an organic solvent, and then subjecting the coated layer on a running non-magnetic support to magnetic orientation for orienting the magnetic powder in the coated paint layer along the running direction, the improvement wherein a step of drawing said ferromagnetic powder in the coated magnetic paint layer toward the surface of the support by means of a magnet having a magnetic flux density of not less than 1,500 gauss is performed prior to subjecting the coated paint layer to the magnetic orientation along the running direction.

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**4,745,002**

## ELECTRICAL CONDUCTORS FOR CABLE

**Gavriel L. Vexler, Montreal West, and B. Paul S. Cheema, Dollard-Des-Ormeaux, both of Canada, assignors to Northern Telecom Limited, Montreal, Canada**

**Filed Nov. 27, 1985, Ser. No. 802,412**

**Int. Cl.[4] B05D** *3/06, 1/24*

**U.S. Cl. 427—52** **10 Claims**

1. A method of making a copper clad conductor construction comprising causing copper particles to impinge upon the surface of a steel wire while causing an electrical current to flow at said surface to preferentially heat said surface to a temperature above the melting point of copper and thereby effect adhesion of the particles to the wire, building up the particles to produce a coating of copper by coalescence of the particles, and then drawing the copper coated steel wire to the required diameter.

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**4,745,003**

## METHOD FOR IMPROVING DURABILITY OF MIRRORS UTILIZING RADIATION CURABLE COATINGS

**Robert J. Sirkoch, Pittsburgh; Ken W. Niederst, Allison Park; Alan B. Weissberg, Pittsburgh; Paul P. Greigger, Allison Park, and Calvin C. Henning, Upper St. Clair, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.**

**Filed Dec. 22, 1986, Ser. No. 944,777**

**Int. Cl.[4] B05D** *3/06*

**U.S. Cl. 427—54.1** **20 Claims**

1. A method of coating a mirror comprising: applying to a reflective layer of metal adhered to a transparent glass sheet a protective layer of a coating composition comprising a film-forming material and pigment particles which hardens to an opaque coating, and thereafter applying to said opaque coating, one or more protective layers wherein the outermost protective layer is a cured coating formed by exposing to ultraviolet light a liquid coating composition comprising an organic resin which is curable by ultraviolet light and which exhibits a film shrinkage for the cured coating of less than 10 percent upon curing as calculated from the following formula:

$$(D_1 - D_2)/D_1 \times 100 = \text{Percent Shrinkage},$$

wherein

$D_1$ is the density of said liquid coating composition, and

$D_2$ is the density of the cured coating.

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**4,745,004**

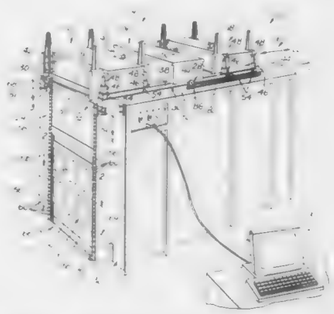
## METHOD AND APPARATUS FOR TRANSPORTING CIRCUIT OR OTHER WORK UNITS BEING PROCESSED

**Thomas E. Schwerin, 2131 No. 1st St., Flagstaff, Ariz. 86001**

**Filed Jan. 8, 1987, Ser. No. 1,574**

**Int. Cl.[4] B05D** *5/12*

**U.S. Cl. 427—96** **26 Claims**



1. In a processing apparatus for electrical circuit boards, the combination comprising:

a row of successive circuit board processing stations,

a circuit board infeed station at one end of said row and a circuit board outfeed station at the other end of said row,

transport means for picking up circuit boards to be processed from said infeed station, transporting the circuit boards through said processing stations in succession for processing of the circuit boards at each station, and depositing the processed circuit boards at said outfeed station, and wherein:

said transport means transports circuit boards from said infeed station to said outfeed station along a path extending along and laterally spaced from said station row to

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successive positions along said path opposite the successive processing stations, respectively, and at each said position moves the circuit boards laterally of said path into the respective station for processing therein and thereafter from the respective station for movement to the next processing station.

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**4,745,005**

## MAGNETIC RECORDING MEDIUM AND METHOD FOR MAKING THE SAME

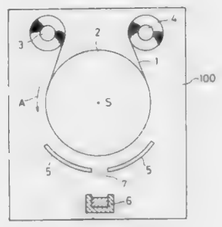
**Ryuji Sugita, Hirakata, and Toshiaki Kunieda, Minoo, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan**

**Division of Ser. No. 497,583, May 24, 1983, abandoned. This application May 1, 1985, Ser. No. 728,449**

**The portion of the term of this patent subsequent to Oct. 16, 2001, has been disclaimed.**

**Int. Cl.[4] B05D** *5/12;* **C23C** *16/00*

**U.S. Cl. 427—128** **3 Claims**




1. A method of making a magnetic recording medium comprising the steps of:

(1) vacuum-depositing Ti on a surface of a high polymer sheet, to form a Ti-undercoating having a thickness no greater than 800 Angstroms, and

(2) vacuum-depositing a magnetization material consisting essentially of Co-Cr in the form of a layer on the surface of said Ti-undercoating, to form a magnetization film.

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**4,745,006**

## METHOD FOR COATING NYLON-6 FOR IMPROVED THERMAL STABILITY

**Yousef Mohajer, Midlothian, Va., assignor to Allied Corporation, Morris Township, Morris County, N.J.**

**Continuation-in-part of Ser. No. 946,724, Dec. 29, 1986, abandoned. This application Sep. 29, 1987, Ser. No. 102,190**

**Int. Cl.[4] B05D** *7/00*

**U.S. Cl. 427—222** **20 Claims**

1. A process for production of heat stabilized nylon-6 polymer comprising:

polymerizing caprolactam to form a polymer-monomer mixture containing low molecular weight fractions;

pelletizing said polymer-monomer mixture to form pellets;

leaching said monomer and low molecular weight fractions from said pellets with hot water, thereby elevating the temperature of said pellets and resulting in pellets formed substantially of nylon-6 polymer;

and coating said leached nylon-6 polymer pellets, while still warm from said leaching step, with measured quantities of copper salt and halide salt in solution, said measured quantities of copper salt and halide salt comprising an amount of copper sufficient to provide to the polymer 10–500 parts per million copper based on the weight of the polymer and 0.01 to 0.5 weight percent halide, based on the weight of the polymer, sufficient time being provided to permit substantial absorption of the copper and halide into the nylon-6 polymer pellet.

**4,745,007**

## METHOD OF FORMING SILICON CARBIDE FILMS ON TANTALUM CONTAINING SUBSTRATES

**Arrigo Addamiano, Alexandria, Va., and Philipp H. Klein, Washington, D.C., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Aug. 29, 1985, Ser. No. 770,891**

**Int. Cl.[4] C23C** *16/32;* **B05D** *1/35*

**U.S. Cl. 427—249** **5 Claims**

1. A method for forming smooth and adherent SiC films on tantalum or tantalum alloy substrates comprising the steps of:

coating a tantalum or tantalum alloy substrate with a layer of tantalum carbide; and

coating the said layer of tantalum carbide with a layer of silicon carbide.

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**4,745,008**

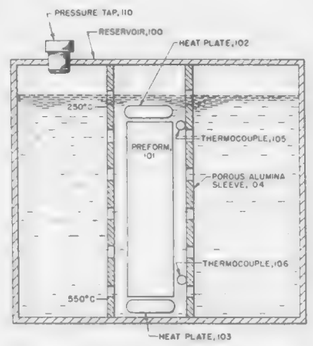
## PROCESS FOR CARBON-CARBON COMPOSITE FABRICATION

**Irene G. Plotzker, Wilmington, Del.; Joan H. Cranmer, Cerritos, Calif.; Donald R. Uhlmann, Newton, Mass., and Leighton H. Peebles, Jr., Annandale, Va., assignors to United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Apr. 16, 1986, Ser. No. 852,597**

**Int. Cl.[4] B05D** *3/02;* **C01B** *31/02*

**U.S. Cl. 427—228** **8 Claims**




1. A process of fabricating a carbonized billet using a preform and reservoir of pitch, said process comprising the steps of:

immersing said preform in said reservoir of pitch;

establishing a temperature gradient across said preform, said temperature gradient having a cooler temperature at one extreme and a hot temperature at the other extreme, said cooler temperature being selected from a range of temperature in which said pitch remains fluid, said hot temperatures in which said pitch hardens by pyrolysis, wherein said temperature gradient comprises a vertical placement of a range of temperatures within said resevoir of pitch, said range of temperatures having said hot temperature at one extreme and said cooler temperature at the other extreme, and wherein said vertical placement of said range of temperatures includes having said cooler temperature at the upper end of said reservoir and said hot temperature at the lower end of said reservoir, said vertical placement of said range of temperature allowing fluid pitch to move by gravity to fill pores left in said preform by said hardening pitch;

applying moderate pressures within said reservoir of pitch;

gradually increasing the temperatures in said temperature gradient until all temperatures are within the range of temperatures in which said pitch hardens by pyrolysis, said gradually increasing the temperatures step having a delay which allows fluid pitch to fill pores in said preform left by hardening pitch; and

removing said carbonized billet from said reservoir of pitch, said carbonized billet being formed as said pitch hardens on said preform.



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**4,745,009**

## METHOD FOR PROTECTING STONE MATERIALS FROM ATMOSPHERIC AGENTS BY MEANS OF PERFLUOROPOLYETHER DERIVATIVES

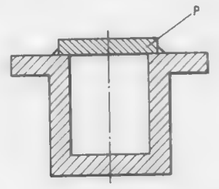
**Franco Piacenti, Firenze; Adolfo Pasetti, Milan; Ugo Matteoli, Firenze, and Ezio Strepparola, Bergamo, all of Italy, assignors to Ausimont S.p.A., Milan, Italy**

**Filed Feb. 21, 1986, Ser. No. 831,615**

**Claims priority, application Italy, Feb. 22, 1985, 19628 A/85**

**Int. Cl.[4] B05D** *3/02*

**U.S. Cl. 427—393.5** **8 Claims**




1. A process for protecting marble, stones, tiles, cement, and other similar materials utilized in particular in building works, from the degradation caused by atmospheric agents and pollutants, which process comprises applying to the surfaces of said materials a protective agent selected from perfluoropolyethers having functionalized end groups and belonging to one of the following two groups:

(a) products of general formula:

$$Rf—O—(C_3F_6O)_m(CFXO)_n—A \quad (I)$$

wherein

Rf is a perfluoroalkyl group having 1 to 3 carbon atoms; $(C_3F_6O)$ and (CFXO) are oxyperfluoroalkylene units statistically distributed along the chain, and X is F or $CF_3$;

m and n are integers or n is 0, m being always different from 0, and m/n varies from 5 to 40 when n is different from 0;

A is group —CFX—COY wherein X is F or $CF_3$ and Y is OH, OR′, NR″R‴, wherein R′ may be an alkyl group with 1 to 8 carbon atoms, an aromatic or alkylaromatic group, or an aromatic group substituted by polyethoxy groups;

R″ may be H or an alkyl group containing from 1 to 8 carbon atoms, or a substituted phenyl group; R‴ may be H or an alkyl group with 1 to 8 carbon atoms or a substituted phenyl group;

the average molecular weight of said product of formula I being from 500 to 10,000;

(b) products of general formula:

$$A'—(C_2F_4O)_p(CF_2O)_q—A'$$

wherein

units $(C_2F_4O)$ and $(CF_2O)$ are statistically distributed along the chain;

p and q are such integers that p/q varies from 2 to 0.5;

A′ is $—CF_2—COY$;

Y is as defined hereinabove;

the average molecular weight of the product of formula II being from 1,000 to 20,000.



**4,745,010**

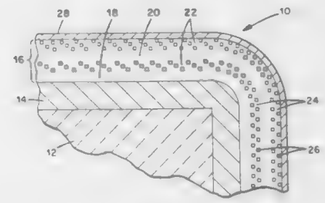
## PROCESS FOR DEPOSITING A COMPOSITE CERAMIC COATING ON A CEMENTED CARBIDE SUBSTRATE

**Vinod K. Sarin, Lexington, Mass.; Hans E. Hintermann, Ins, and Gilbert Gindraux, Neuchatel, both of Switzerland, assignors to GTE Laboratories Incorporated, Waltham, Mass.**

**Filed Jan. 20, 1987, Ser. No. 5,001**

**Int. Cl.[4] C23C** *16/30, 16/40*

**U.S. Cl. 427—255** **22 Claims**




1. In a process for depositing a wear resistant ceramic coating on a cemented carbide substrate comprising the step of:

passing over the cemented carbide substrate a first gaseous mixture of a first halide vapor selected from the group consisting of halides of aluminum, yttrium, and zirconium, with one or more volatile oxidizing gases, and optionally a carrier gas, at a temperature of about 900°–1250° C., at a pressure between about 1 torr and about ambient pressure, and at partial pressure ratios, at a flow rate, and for a time sufficient to deposit a continuous, fully dense, adherent, wear resistant layer of a material selected from the group consisting of oxides of aluminum, zirconium, and yttrium about 0.1–20 microns thick on the cemented carbide substrate;

the improvement which comprises the steps of:

mixing with the first gaseous mixture at least one additional vapor selected from the halides of aluminum, zirconium, and yttrium;

wherein the additional vapor is different from the first halide vapor, and is mixed at a partial pressure selected to form at least one discontinuous additional phase, dispersed as discrete particles within the continuous oxide layer, of at least one material selected from the group consisting of oxides of aluminum, zirconium, and ytrrium, to form a wear resistant composite ceramic layer on the cemented carbide substrate.

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**4,745,011**

## TWO-COMPONENT MIXING TYPE COATING METHOD

**Kenji Fukuta; Matsuo Komiyama; Kazuo Katsuyama, and Minoru Tanno, all of Aichi, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota and Trinity Industrial Corp., Tokyo, both of, Japan**

**Filed May 19, 1986, Ser. No. 864,478**

**Claims priority, application Japan, May 17, 1985, 60-105703**

**Int. Cl.[4] B05D** *1/08, 1/10*

**U.S. Cl. 427—426** **18 Claims**

1. A two-component mixing type coating apparatus, comprising:

a first source of a pressurized fluid main coating component;

a second source of a pressurized fluid coating hardener;

spray coating dispensing means;

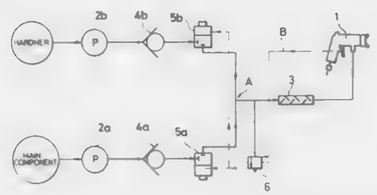
conduit means connecting said dispensing means with said first and second sources, said conduit means including a main component flow portion connected to said first source, a hardener flow portion connected to said second source, a junction of said main component and hardener flow portions and a combined main component and hardener flow portion extending between said junction and said dispensing means;

mixing means in said combined flow portion;

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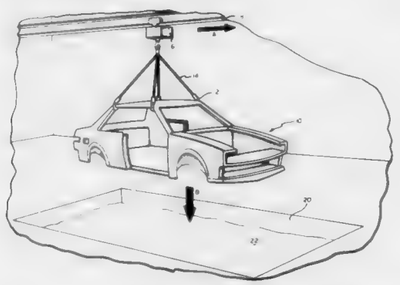
a check valve positioned in each of said main component and hardener flow portions for permitting fluid flow therethrough only towards said junction;
first and second stop valves respectively positioned in said main component and hardener flow portions at points between a respective one of said check valves and said junction;
means for selectively operating said stop valves for stopping fluid flow through said main component and hardener flow portions;




means seaprate from said spray coating dispensing means for selectively venting said combined flow portion comprising:
an escape valve;
a second conduit means connecting said escape valve with said combined main component and hardener flow portion between said junction and said mixing means; and
means responsive to the actuation of said dispensing means for selectively operating said escape valve.

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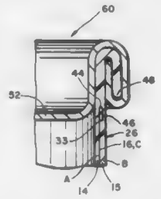
**4,745,012**
**PROCESS FOR WORKPIECE COATING WITH A CONDUCTIVE PRIMER**
**Salvador R. Lo, Blue Island, Ill., assignor to William C. Richards Co., Blue Island, Ill.**
**Continuation-in-part of Ser. No. 829,112, Feb. 28, 1986, abandoned. This application Oct. 23, 1986, Ser. No. 922,318**
**Int. Cl.⁴ B05D** *1/18*
**U.S. Cl. 427—435** **11 Claims**



1. An improved method of simultaneously electrocoating a multi-material workpiece having a conductive, metallic component and at least one non-conductive component, said method comprising the steps of:
pre-coating the non-conductive component with a primer which is conductive when cured into a film to render the surface of the non-conductive component sufficiently conductive for electrocoating;
curing the primer which has been pre-coated on the non-conductive component;
assembling the primed component with the conductive, metallic component to form the multi-material workpiece; and
submerging the formed multi-material workpiece in an electro-coat bath for simultaneously electrocoating both the primed component and the conductive, metallic component of the formed multi-material workpiece.

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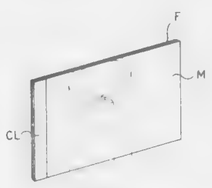
**4,745,013**
**MULTI-LAYER MOLDED ARTICLES**
**Frederick G. Kudert, Niles; Maurice G. Latreille, Batavia; Robert J. McHenry, St. Charles; George F. Nahill, Crystal Lake, all of Ill.; Henry Pfutzenreuter, III, Alta Loma, Calif.; William A. Tennant, Schaumburg, Ill.; Thomas T. Tung, Hoffman Estates, Ill., and John Vella, Jr., Aurora, Ill., assignors to American National Can Company, Greenwich, Conn.**
**Division of Ser. No. 484,707, Apr. 13, 1983, Pat. No. 4,712,990. This application Sep. 19, 1986, Ser. No. 909,404**
**Int. Cl.⁴ B27N** *5/02;* **B65D** *23/00;* **B29C** *45/00*
**U.S. Cl. 428—35** **68 Claims**




1. An at-least five-layer plastic injection molded or injection blow-molded article having a side and bottom walls comprised of
an outside surface layer,
an inside surface layer,
an internal layer,
a first intermediate layer between the outside surface layer and the internal layer,
and a second intermediate layer between the inside surface layer and the internal layer, wherein the internal layer has a terminal end encapsulated by intermediate layer material.

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**4,745,014**
**PACKAGING MATERIAL AND SEALING CAP**
**Toru Hanaya, Ikoma, and Masaei Ibi, Isesaki, both of Japan, assignors to Nippon Film Industrial Co., Ltd., Japan**
**Filed Jan. 24, 1986, Ser. No. 822,162**
**Claims priority, application Japan, Jan. 25, 1985, 60-13211; Dec. 27, 1985, 60-298579**
**Int. Cl.⁴ B32B** *15/08;* **B65B** *53/02*
**U.S. Cl. 428—36** **28 Claims**

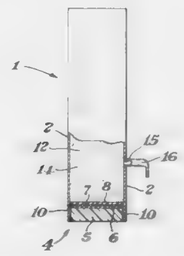



1. A packaging material comprising:
a metallic foil; and
at least one heat-shrinkable film of synthetic resin disposed on at least one surface of the metallic foil;
wherein the film superposed on the metalic foil comprises superposed portions bonded to the metallic foil with an adhesive, and which undergoes substantially no shrinkage on the application of heat by virtue of the shape retention of the metallic foil, and superposed portions not bonded to the metallic foil and to be heat-shrunk and the portion of the film to be heat-shrunk being shrunk by application of heat.

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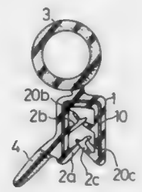
**4,745,015**
**THERMAL INSULATING PANEL**
**Chin H. Cheng, Midland, and Wilhelm E. Walles, Freeland, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.**
**Continuation-in-part of Ser. No. 307,349, Sep. 30, 1981, abandoned. This application Apr. 18, 1983, Ser. No. 485,699**
**Int. Cl.⁴ B32B** *1/06, 3/02*
**U.S. Cl. 428—35** **13 Claims**




1. A thermal insulating panel having double wall construction exhibiting a permeance to oxygen of about no more than 0.1 cc per day per $m^2$ of surface area per atmosphere, said panel comprising:
(a) two walls of a structurally stable material containing at least one metal layer of at least 0.125 mm in thickness;
(b) edges of a normally solid plastic material which have been rendered substantially impermeable to gases, said edges being affixed by means of an adhesive layer to the walls such that an evacuated space is enclosed between the walls of the panel, and
(c) a gas-absorbing material residing in the evacuated space.

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**4,745,016**
**WEATHER STRIP FOR AUTOMOBILE**
**Hideyuki Hashimoto, Nishikasugai, and Masakazu Fujiyoshi, Gifu, both of Japan, assignors to Toyoda Gosei Co., Ltd., Nishikasugai, Japan**
**Filed Aug. 20, 1986, Ser. No. 898,384**
**Claims priority, application Japan, Aug. 26, 1985, 60-129808[U]**
**Int. Cl.⁴ E06B** *7/16*
**U.S. Cl. 428—122** **7 Claims**




1. A weather strip to be installed on a flange formed along an opening of a body of an automobile comprising:
a trim portion having a U-shaped section;
a plurality of flange-retaining lips, at least two flange-retaining lips of said plurality of flange-retaining lips projecting obliquely upward from each of inner surfaces of opposed side walls of said trim portion;
a seal portion formed in an outer surface of said trim portion to be come in contact with a closing member for closing the opening of the body of the automobile;
a body seal lip projecting from an outer surface of one of said opposed side walls of said trim portion, which is to be positioned on the outer side of the opening when the weather strip is installed on the flange until a tip end of said body seal lip comes in contact with a surface of the body; and
each of one of said plurality of flange-retaining lips, formed in the upper inner surface of one of said opposed side walls, from which said body seal lip projects, and another one of said plurality of flange retaining lips, which is formed in the lower inner surface of the other one of said opposed side walls, having a respective sub-lip extending toward the inner surface of a respective one of said opposed side walls and being disposed to be urged into contact with the respective said inner surface of the respective said side wall when said weather strip is installed on said flange.

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**4,745,017**
**MAGNETIC RECORDING MEDIUM**
**Takahito Miyoshi; Masahiro Utumi; Kenichi Masuyama; Toshimitu Okutu, and Masaaki Fujiyama, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**
**Filed Jun. 4, 1984, Ser. No. 616,761**
**Claims priority, application Japan, Jun. 3, 1983, 58-99043**
**The portion of the term of this patent subsequent to Jul. 1, 2003, has been disclaimed.**
**Int. Cl.⁴ G11B** *5/70*
**U.S. Cl. 428—141** **6 Claims**

1. A magnetic recording medium comprising a non-magnetic support base; a magnetic recording layer on the surface side thereof; and a backing layer on the opposite side of the support containing carbon black and a binder, the backing layer having a thickness of 2 μm or less, the carbon black being composed of fine-grained carbon black having a mean grain size of 10 to 30 mμ and coarse-grained carbon black having a mean grain size of 100 to 150 mμ, the backing layer having a ratio of the content of the carbon black to that of the binder ranging from 1:0.5 to 1:3.5 by weight, wherein the ratio of the fine-grained carbon black to the coarse-grained carbon black is in the range og 99.5:0.5 to 50:50, and wherein the backing layer has a center line average roughness Ra of 0.024 μm or less under a cut-off condition of 0.08 mm.

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**4,745,018**
**TREATMENT OF FRP SURFACES FOR BONDING**
**Kohji Y. Chihara, Hudson, and Earl G. Melby, Uniontown, both of Ohio, assignors to GenCorp Inc., Akron, Ohio**
**Filed Sep. 8, 1987, Ser. No. 93,674**
**Int. Cl.⁴ B32B** *3/00;* **B29C** *37/00;* **B44C** *1/22*
**U.S. Cl. 428—141** **12 Claims**

1. The method which comprises irradiating the surface of FRP parts with a pulsed eximer laser operating at from about 180 to 260 nm to etch or to photo ablative decompose the surfaces of the FRP parts without causing change in the FRP matrix, coating the treated surface of at least one part with an adhesive selected from the group consisting of epoxy based adhesives and polyurethane based adhesives, joining the adhesive coated and treated part and a treated part together so that the adhesive is sandwiched between the treated surfaces of the parts and curing and heat treating the same for from about 90 to 120 minutes at a temperature of from about 100 to 150° C. to form a strong adhesive bond between the parts.

7. The product produced by the method of claim 1.

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**4,745,019**

## GRAPHIC FILM HAVING A COPOLYESTER PRIMED POLYESTER FILM AS ITS SUBSTRATE

**Robert G. Posey, Taylors, and Edwin C. Culbertson, Greer, both of S.C., assignors to American Hoechst Corporation, Somerville, N.J.**

**Division of Ser. No. 605,434, Apr. 30, 1984, Pat. No. 4,585,687, which is a division of Ser. No. 495,192, May 16, 1983, Pat. No. 4,476,189. This application Jan. 23, 1986, Ser. No. 804,558**

**Int. Cl.[4] B41N** *1/24*

**U.S. Cl. 428—143** **12 Claims**

1. A graphic film comprising an oriented self-supporting polyester film having a continuous copolyester primer coating on one or both sides thereof, said polyester film prepared by melt extruding a substantially amorphous polyester film and thereafter orienting the film by stretching in one or two directions and heat setting the film, said copolyester primer coating being applied to said film as an aqueous dispersion prior to stretching in one direction or subsequent to stretching in one direction but prior to stretching in a mutually perpendicular direction, said copolyester primer coating consisting essentially of the polyester condensation product of the following monomers or their polyester forming equivalents:

(A) about 60 to 75 mole percent of terephthalic acid;

(B) about 15 to 25 mole percent of at least one aliphatic dicarboxylic acid of the formula $HOOC(CH_2)_nCOOH$, wherein n ranges from about 1–11;

(C) greater than from about 6 up to about 15 mole percent of at least one sulfomonomer containing an alkali metal sulfonate group attached to a dicarboxylic aromatic nucleus; and

(D) stoichiometric quantities of about 100 mole percent of at least one copolymerizable aliphatic or cycloaliphatic alkylene glycol having about from 2 to 11 carbon atoms and further having a matte layer comprising a resinous binder contained in a finely divided particulate material applied directly to said primer coating, with the proviso that said resinous binder and said particulate material are both present in respective amounts which render the film suitable for use as a drafting material.

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**4,745,020**

## ENGRAVED PLASTIC ARTICLE

**Gregory D. Jackson, Sturgis, Mich., assignor to Electro-Voice, Incorporated, Buchanan, Mich.**

**Filed Jul. 8, 1986, Ser. No. 883,125**

**Int. Cl.[4] B32B** *3/00*

**U.S. Cl. 428—195** **9 Claims**

1. An article bearing engraved indicia thereon comprising:

a polyether sulfone resin substrate;

a coating of an epoxy resin paint material which has been deposited on a surface of the substrate and then cured at an elevated temperature to form a bond between the paint material and the substrate layer;

said cured and coated substrate having indicia engraved through the paint material and into a surface of the substrate.

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**4,745,021**

## NONPILLING FIBROUS SUBSTRATE FOR POUCHED LAUNDRY PRODUCTS

**Vernon S. Ping, III, Cincinnati, and Eric E. Beard, West Chester, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio**

**Filed Dec. 19, 1986, Ser. No. 944,147**

**Int. Cl.[4] B32B** *3/00;* **B65D** *85/84;* **C11D** *17/00*

**U.S. Cl. 428—195** **8 Claims**

1. A through-the-wash laundry product comprising:

(a) a water-permeable, water-insoluble fibrous substrate in the form of a pouch;

(b) a laundering composition enclosed within said substrate pouch, said substrate pouch having an outside surface; and

(c) said substrate pouch having on its outside surface a water-insoluble, spaced-apart glue pattern adapted to reduce pilling of said fibrous substrate on the outside of said pouch when said product is used in the laundering of fabrics; and




wherein the spaced-apart glue pattern covers from about 1% to about 70% of said outside surface and is present at a level of from about 3 grams to about 150 grams per square meter of said substrate.

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**4,745,022**

## COMPOSITE SINTERED SILICON NITRIDE MATERIAL AND CUTTING TOOL MADE THEREFROM

**Masaya Miyake, and Akira Yamakawa, both of Hyogo, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan**

**Filed Oct. 23, 1985, Ser. No. 790,496**

**Claims priority, application Japan, Oct. 23, 1984, 59-222818**

**Int. Cl.[4] B32B** *7/02, 9/00;* **C04B** *35/58;* **B24D** *3/02*

**U.S. Cl. 428—216** **27 Claims**

1. Composite sintered $Si_3N_4$ material consisting of:

a sintered $Si_3N_4$ substrate containing 0.1 to 10 weight % of $Y_2O_3$, 0.1 to 10 weight % of $ZrO_2$ and 1 to 15 weight % of at least one member selected from the group consisting of carbide, nitride and carbonitride and solid solution thereof of elements of IVa (except Zr), Va and VIa of the Periodic Table and the balance being of $Si_3N_4$;

a first layer of Ti compound coated on the sintered $Si_3N_4$ substrate;

a second layer of $Al_2O_3$ coated on the first layer; and the total thickness of the first and second layers being in the range of 1 to 20 microns.

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**4,745,023**

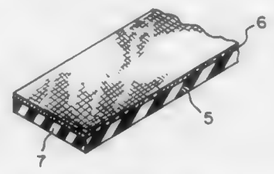
## ENDLESS FLEXIBLE BELT OR BAND

**Gregory A. Chapman; Melvin W. King; David J. Maguire, and Eugene R. Zitek, all of Lincoln, Nebr., assignors to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Filed Jul. 22, 1986, Ser. No. 889,058**

**Int. Cl.[4] B65G** *15/34;* **B65H** *3/04;* **F16G** *1/10*

**U.S. Cl. 428—230** **5 Claims**




1. A high speed flexible endless belt or band of the type used as a paper or sheet handling band, said band having improved flex life under high stress comprising an elastomeric member or members having an elastic stretch fabric member adhered on the surface or just beneath the surface of said elastic band to reduce the tendency of the elastomer to fail by flex cracking.



**4,745,024**

## NON-WOVEN TEXTILES

**Karl Jellinek, Iserlohn-Letmathe; Arno Gardziella, Witten-Rüdinghausen; Karl-Heinz Schwieger, Iserlohn; Peter Adolphs, Menden-Halingen, and Josef Suren, Wünnenberg Haaren, all of Fed. Rep. of Germany, assignors to Rutgerswerke Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Jul. 20, 1987, Ser. No. 75,111**

**Int. Cl.[4] D04H** *1/58*

**U.S. Cl. 428—288** **14 Claims**

1. A non-woven textile comprising a web of organic fibers bonded together by a binder applied to the fibers as a powdered mixture of a non-heat reactive phenolic resin and at least one thermoreactive condensation resin selected from the group consisting of phenolic resins, epoxy resins and amino resins and then fused.

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**4,745,025**

## NONWOVEN PRODUCTS BONDED WITH BINDER EMULSIONS OF VINYL ACETATE/ETHYLENE COPOLYMERS HAVING IMPROVED SOLVENT RESISTANCE

**Chung-Ling Mao, Emmaus, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.**

**Division of Ser. No. 831,015, Feb. 19, 1986, Pat. No. 4,698,384. This application Aug. 6, 1987, Ser. No. 82,892**

**Int. Cl.[4] D04H** *1/58*

**U.S. Cl. 428—288** **20 Claims**

1. A nonwoven product comprising a nonwoven web of fibers bonded together with a vinyl acetate/ethylene copolymer binder deposited from an aqueous medium having colloidally dispersed therein a copolymer consisting essentially of vinyl acetate, 5–35 wt% ethylene and 2–10 wt% of an amide functional crosslinking comonomer which is N-methylolacrylamide or a comonomer of the formula

$$R\text{-}NH\text{-}(CH_2)_n\text{-}CH(OR')_2$$

where R is acryloyl or methacryloyl, R′ is a $C_{1-C4}$ alkyl group, and n is 3 or 4, the copolymer prepared by emulsion polymerization in the presence of 0.1 to 1 wt% polyvinyl pyrrolidone, based on vinyl acetate in the copolymer, at a binder add-on sufficient to bond the fibers together to form a self-sustaining web.

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**4,745,026**

## THERMAL DELAYED TACK SHEETS

**Hirokazu Tsukahara, Kanamachi; Nobuhiro Kagota, Tokyo, and Masashi Yoda, Zushi, all of Japan, assignors to Mitsubishi Paper Mills, Ltd., Tokyo, Japan**

**Filed Mar. 3, 1987, Ser. No. 21,393**

**Claims priority, application Japan, Mar. 3, 1986, 61-46822; Mar. 13, 1986, 61-56157; Apr. 10, 1986, 61-83326; Apr. 11, 1986, 61-83873; Apr. 24, 1986, 61-95977**

**Int. Cl.[4] B32B** *5/16, 27/06;* **C09J** *7/02*

**U.S. Cl. 428—323** **15 Claims**

1. A thermal delayed tack sheet comprising a base sheet coated with a thermal delayed tack composition, said composition comprising (A) an adhesive polymer and (B) a solid plasticizer,

wherein said solid plasticizer comprises fine particles of at least one compound having the following general formula (I):

$$R_1\text{-}O\text{-}\Phi\text{-}R_2 \qquad (I)$$

wherein Φ is a benzene ring or a naphthalene ring which may have a substituent;

wherein $R_1$ is selected from the group consisting of hydrogen, acryl, alkylsulphonyl, and benzene sulphonyl which may have a substituent on the benzene ring thereof;

$R_2$ is selecited from the group consisting of —O—CO—$R_3$ or CO—O—$R_3$;

wherein $R_3$ is selected from the group consisting of alkyl, alkenyl, aralkyl, aralkenyl and aryl, with the proviso that when $R_1$is hydrogen, positions 1 and 2, 1 and 3, or 1 and 4 on said Φ may be substituted by —O—$R_1$, and $R_2$, and where $R_1$ is acryl, alkylsulfonyl or benzenesulfonyl, the positions 1 and 2 on the ring are substituted.

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**4,745,027**

## FIBER HAVING HIGH DENSITY AND ROUGHENED SURFACE

**Katsura Maeda; Takao Akagi, both of Kurashiki; Masanori Sato, Toyono, and Shinji Yamaguchi, Kurashiki, all of Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan**

**Filed Aug. 25, 1986, Ser. No. 899,979**

**Claims priority, application Japan, Sep. 4, 1985, 60-197042**

**Int. Cl.[4] D02G** *3/00;* **C08K** *3/32*

**U.S. Cl. 428—372** **2 Claims**

1. An improved polyester fiber exhibiting a specific gravity of 1.430 to 1.600, said improvement comprising:

(a) said fiber containing from 5–20 wt %, based on said polyester, of barium sulfate particles, said particles exhibiting an average diameter of less than 1 μm; and

(b) said fiber exhibiting a roughened surface containing recesses therein, said recesses ranging from about 2 μm to 10 μm in length, the breadth of said recesses being greater than about 0.3 μm but less than about 2 μm, and the density of said recesses ranging from about 5 to about 100 per 100 square microns, thereby providing improved drape and silhouette to woven or knitted fabrics made therefrom.

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**4,745,028**

## SIZED GLASS FIBERS AND REINFORCED POLYMERS CONTAINING SAME

**Balbhadra Das, Pittsburgh; Chester S. Temple, McKees Rocks, and Carl A. Melle, Allison Park, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.**

**Division of Ser. No. 717,758, Mar. 29, 1985, Pat. No. 4,637,956. This application Jun. 17, 1986, Ser. No. 875,045**

**The portion of the term of this patent subsequent to Oct. 7, 2003, has been disclaimed.**

**Int. Cl.[4] B32B** *9/00;* **D02G** *3/00*

**U.S. Cl. 428—391** **18 Claims**

1. Glass fibers treated with an aqueous chemical treating composition for reinforcing polymeric matrices, comprising:

a. an aqueous dispersion of an epoxy polyurethane copolymer essentially free of any quaternary ammonium salts and having epoxy groups and having crosslinkable groups selected from isocyanate, polyisocyanate, and polyurethane moieties present as the sole compatibilizing polymeric material,

b. one or more organo silane coupling agents,

c. water in an effective amount to provide for treatment of the glass fibers to yield about 0.1 to about 5 weight percent solids of the treating composition on the glass fibers.

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**4,745,029**

## TRANSPARENT BLENDS OF POLYMETHYL METHACRYLATE AND BPA POLYCARBONATE

**Roger P. Kambour, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Filed Oct. 6, 1986, Ser. No. 915,472**

**Int. Cl.[4] B32B** *27/36*

**U.S. Cl. 428—412** **4 Claims**

1. A method for making a transparent blend of BPA polycarbonate, and polymethyl methacrylate having a lower critical solution temperature of at least 140° C. which comprises

(A) solution blending 25 to 95 parts of a BPA polycarbonate having an intrinsic viscosity in chloroform of from 0.35 to 1.8 dl./g. at 25° C. and 75 to 5 parts of a polymethyl

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methacrylate having a weight average molecular weight as determined by membrane osmometry and gel permeation chromatography of from $10\times10^3$ to $500\times10^3$ in an organic solvent,

(B) applying the resulting solution onto a substrate to a thickness of up to one mil per pass, and

(C) allowing the organic solvent to evaporate to produce a transparent polycarbonate/polymethyl methacrylate blend.

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**4,745,030**

## ELECTROSTATIC RECORDING DEVICE

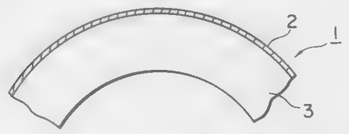
**Kozo Arahara; Tatsuo Takeuchi, both of Tokyo, and Yoshio Takasu, Tama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 9, 1985, Ser. No. 785,616**

**Claims priority, application Japan, Oct. 15, 1984, 59-215677; Dec. 19, 1984, 59-266415; Dec. 19, 1984, 59-266418; Dec. 19, 1984, 59-266419**

**Int. Cl.⁴ B32B** *27/30, 15/08*

**U.S. Cl. 428—421** **21 Claims**




1. An electrostatic recording device for a transfer system provided with a recording medium having a dielectric layer and an electroconductive substrate, said recording medium having a dielectric layer containing a resin for film formation and a fluorine-containing block copolymer comprising a polymer having a fluorine-containing monomer component block copolymerized at one end of a non-fluorine-containing polymer.

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**4,745,031**

## MAGNETIC RECORDING MEDIUM

**Masatoshi Nakayama; Haruyuki Morita; Yuichi Kubota, and Keiko Tsuchiya, all of Tokyo, Japan, assignors to TDK Corporation, Tokyo, Japan**

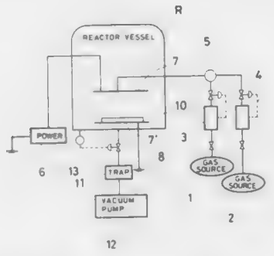
**Filed Dec. 26, 1985, Ser. No. 813,639**

**Claims priority, application Japan, Dec. 30, 1984, 59-281046**

**The portion of the term of this patent subsequent to Mar. 11, 2003, has been disclaimed.**

**Int. Cl.⁴ G11B** *5/704*

**U.S. Cl. 428—433** **8 Claims**




1. A magnetic recording medium, comprising:

a rigid substrate of a material selected from the group consisting of metal, hard glass and ceramics which has been plasma treated at a frequency of 10 kHz to 200 kHz in an atmosphere consisting essentially of an inorganic gas; and

a magnetic layer formed on said substrate, wherein saids inorganic gas is a member selected from the group consisting of $N_2$, $H_2$, $NH_3$, $O_2$, $O_3$, $H_2O$, $NO_x$ and mixtures thereof.

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**4,745,032**

## ROOFING AND SIMILAR MATERIALS

**Bernard J. Morrison, Reading, Pa., assignor to AcrySyl International Corporation, Reading, Pa.**

**Continuation of Ser. No. 498,715, May 27, 1983, abandoned. This application Nov. 19, 1986, Ser. No. 931,942**

**Int. Cl.⁴ B32B** *15/08, 5/06*

**U.S. Cl. 428—215** **6 Claims**

1. An article of construction comprising a substrate coated with a multi-ply coating, one of said coatings being an underlying coating adhered to the surface of said substrate and underlying and adhered to an overlying coating, said underlying coating being weather-resistant and fire-resistant and being formed from an aqueous adhesive composition which includes an elastomeric roof acrylic resin, said overlying coating being formed from an aqueous adhesive composition which includes an acrylic resin which is different from the acrylic resin of said underlying coating, the adhesive bond between said overlying and underlying coatings being stronger than if the bond were between two coatings formed from the acrylic resin of said underlying coating, and wherein said overlying coating has adhered thereto a top coating which consists essentially of an elastomeric roof acrylic resin.

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**4,745,033**

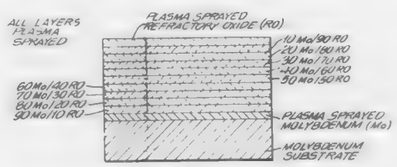
## OXIDATION RESISTANT COATINGS FOR MOLYBDENUM

**George A. Timmons, Ann Arbor, Mich., assignor to AMAX Inc., Greenwich, Conn.**

**Filed Mar. 24, 1987, Ser. No. 29,691**

**Int. Cl.⁴ B22F** *5/04, 7/02*

**U.S. Cl. 428—552** **7 Claims**




1. As an article of manufacture, a molybdenum element comprising a molybdenum substrate in which said substrate has adherently bonded thereto a thermally self-healing plasma-sprayed coating consisting essentially of a composite of molybdenum and a refractory oxide material capable of reacting with molybdenum oxide under oxidizing conditions to form a substantially thermally stable refractory compound of molybdenum,

said plasma-sprayed coating being formed of a plurality of interbonded plasma-sprayed layers of a composite of molybdenum/refractory oxide material produced from a particulate mixture thereof,

said plurality of bonded layers ranging from a first layer adjacent to said substrate to an Nth or last layer which include:

(a) a first layer of molybdenum plasma-sprayed bonded to the said molybdenum substrate of said molybdenum element,

(b) a second layer of plasma-sprayed mixture of particulate molybdenum/refractory oxide consisting essentially of predominantly molydbenum bonded to said first layer,

(c) with succeeding layers of said molybdenum/refractory oxide mixture providing from layer to layer a descending concentration gradient of molydbenum and a corresponding ascending concentration gradient of refractory oxide material,

said concentration gradient continuing to an N-1 layer in which the refractory oxide concentration of the mixture predominates and terminates at the Nth layer,

(d) said Nth layer consisting essentially of said refractory oxide material plasma-sprayed bonded to said N-1 layer.



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**4,745,034**

## REEL AND METHOD

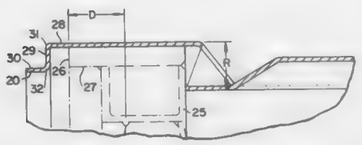
**Arthur Joly, 17 avenue du 8 mai 1945, 59165 Auberchicourt, France**

**Filed Sep. 22, 1986, Ser. No. 909,703**

**Claims priority, application France, Sep. 10, 1985, 85 15222**

**Int. Cl.⁴ B65D** *85/04;* **B65B** *13/02*

**U.S. Cl. 428—582** **5 Claims**




1. A metal strip for wrapping about the periphery of a reel wherein the reel has side flanges and a pair of cylindrical tires, a first zone of said strip having a center section having a width less than the spacing between the reel side flanges, a pair of second zones comprising end edges, each end having a width greater than the reel tires, and a pair of third zones connecting the pair of second zones to the first zone, each said third zone having inverted folds defining there between inclined sides, and a plurality of spaced deformations in the third zones adapted to engage the side flanges of the reel and prevent said metal strip from shifting laterally of the reel, said pair of second zones, when the metal strip is applied to a reel, being bent under the outer edges of the pair of tires.

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**4,745,035**

## ARTICLE HAVING A WEAR RESISTING PRECIOUS METAL COATING

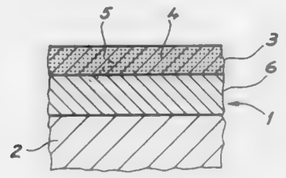
**Eric Saurer, Bevaix; Yves Ruedin, St-Blaise; Jean-Paul Randin, Cortaillod, and Michel Sallin, Neuchâtel, all of Switzerland, assignors to Asulab S.A., Bienne, Switzerland**

**Filed Nov. 3, 1986, Ser. No. 926,065**

**Claims priority, application France, Nov. 4, 1985, 85 16425**

**Int. Cl.⁴ B32B** *15/04*

**U.S. Cl. 428—614** **4 Claims**




1. An article topped by a wear resistant coating comprising a precious metal from the group including gold, silver, rhodium, palladium, platinum, iridium, osmium and ruthenium or any alloy of the foregoing, said coating being made up of a first layer of said precious metal or alloy thereof, and a second layer of said precious metal or alloy thereof, said second layer being electrodeposited on said article, said first layer comprising discrete inclusions of a metallic compound formed by an oxide, a nitride, a carbide, a boride, a phosphide, a silicide or a fluoride, said inclusions being distributed in a substantially homogeneous manner thorugh the entire thickness of the first layer, said first layer being applied over said second layer by vapour deposition (CVD) or PVD), its thickness being equal to or greater than 0.4 um, the total thickness of the coating and its precious metal content being such that said article is entitled to bear hallmarking.

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**4,745,036**

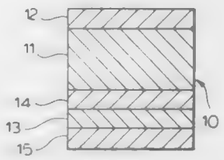
## JUMPER CHIP FOR SEMICONDUCTOR DEVICES

**Robert L. Trevison, Spokane, Wash.; William E. McKee, Coeur D'Alene, Id., and Larry B. Hunnel, Otis Orchards, Wash., assignors to Cominco Ltd., Canada**

**Filed Oct. 17, 1986, Ser. No. 920,081**

**Int. Cl.⁴ B32B** *15/10*

**U.S. Cl. 428—652** **2 Claims**




1. A jumper chip for semiconductor devices consisting of a substrate made of a material chosen from the group consisting of iron-nickel binary alloys and iron-nickel-cobalt ternary alloys; a surface layer made of a material chosen from the group consisting of aluminum and aluminum-silicon alloys on one side of said substrate, a gold-alloy layer having a gold layer on opposite sides thereof, one of said gold layers having a distinct thickness and being intermediate the other side of said substrate and said gold-alloy layer; said gold-alloy layer being made of alloys chosen from the group consisting of gold-germanium binary alloys, gold-silicon binary alloys and gold-germanium-silicon ternary alloys, said gold-silicon binary alloys and said gold-germanium-silicon ternary alloys containing silicon in an amount in the range of about 0.3 to 4% by weight and said gold-germanium binary alloys and said gold-germanium-silicon ternary alloys containing germanium in an amount of less than about 12% by weight; said surface layer, said substrate, said gold layers and said gold-alloy layer being integral and contiguous.

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**4,745,037**

## HOMOGENEOUS, DUCTILE BRAZING FOILS

**Nicholas DeCristofaro, Chatham, N.J., and Peter Sexton, Weston, Conn., assignors to Allied Corporation, Morris Township, N.J.**

**Continuation of Ser. No. 709,850, Mar. 11, 1985, abandoned, which is a continuation of Ser. No. 488,486, Apr. 25, 1983, abandoned, which is a continuation-in-part of Ser. No. 426,050, Sep. 28, 1982, abandoned, which is a continuation-in-part of Ser. No. 068,266, Aug. 20, 1979, Pat. No. 4,302,515, which is a continuation-in-part of Ser. No. 008,370, Feb. 1, 1979, abandoned, which is a continuation-in-part of Ser. No. 912,667, Jun. 5, 1978, Pat. No. 4,148,973, which is a continuation of Ser. No. 751,000, Dec. 15, 1976, abandoned. This application Nov. 17, 1986, Ser. No. 933,276**

**Int. Cl.⁴ B32B** *15/00*

**U.S. Cl. 428—678** **7 Claims**

1. An article comprising a brazed joint, said article having orginally a gap to be brazed to form said joint less than 0.064 mm, said brazed joint having been formed with a filler metal in the form of a homogeneous, ductile brazing foil composed of metastable material having at least 50 percent amorphous structure and a composition consisting of 0 to about 6 atom percent iron, 0 to about 21 atom percent chromium, 0 to about 5 atom percent tungsten, 0 to about 20 atom percent cobalt, 0

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to about 19 atom percent boron, 4 to about 12 atom percent silicon, 0 to about 22 atom percent phosphorus, 0 to about 3 atom percent carbon and the balance essentially nickel and incidental impurities, wherein the composition is such that the total of iron, chromium, tungsten, cobalt and nickel ranges from about 70 to 84 atom percent, the total of boron, silicon, phosphorous and carbon ranges from about 16 to 30 atom percent and at least one of the elements tungsten, and cobalt is present.

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**4,745,038**

## INTEGRATED GASIFICATION IRON-AIR ELECTRICAL SYSTEM

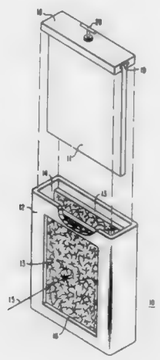
**Jack T. Brown, Churchill, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Nov. 10, 1983, Ser. No. 550,657**

**The portion of the term of this patent subsequent to Oct. 2, 2001, has been disclaimed.**

**Int. Cl.[4] H01M** *4/00, 8/04*

**U.S. Cl. 429—27** **9 Claims**



1. An integrated, gasification, iron-air electrical system, capable of generating electrical energy from a carbonaceous material, comprising:

(A) a gasification means for carbonaceous material comprising at least one gasification reactor, where a carbonaceous material is contacted and reacted with a gaseous medium containing steam and air, at a temperature and for a time effective to gasify the carbonaceous material and produce a hot gaseous reaction product comprising CO and $H_2$;

(B) an iron-air cell containing at least one discharged iron electrode

(C) means to remove the discharged iron electrode from the cell of (B), and contact it with the gaseous reaction product produced in (A);

(D) the discharged iron electrode removed from the cell of (B), containing material consisting essentially of Fe and $Fe(OH)_2$, which electrode is contacted with the hot gaseous reaction product produced in the gasification reactor of (A), directly, at a temperature of from about 450° C. to about 700° C., for a time effective to convert, by reduction, discharged iron compounds consisting essentially of Fe and $Fe(OH)_2$ to charge iron compounds in the electrode and provide a recharged iron electrode;

(E) an iron-air cell into which the recharged iron electrode provided in (D) is placed;

(F) means to transport the recharged iron electrode provided in (D) to the iron-air cell of (E); and

(G) electrical connection means attached to the iron-air cell of (E), providing the cell with capability of generating electrical energy.

**4,745,039**

## SEALED LEAD STORAGE BATTERY

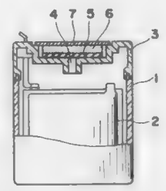
**Minoru Yoshinaka, Fujisawa, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Nov. 17, 1986, Ser. No. 931,062**

**Claims priority, application Japan, Dec. 23, 1985, 60-289902**

**Int. Cl.[4] H01M** *2/12*

**U.S. Cl. 429—54** **5 Claims**




1. A sealed lead storage battery including at least one negative electrode plate capable of absorbing oxygen gas generated from a positive electrode plate during recharging thereof, which battery comprises a battery casing having a breathing hole defined therein in communication with the interior of the battery casing, and a safety valve including a flat rubber plate of synthetic material overlaying the breathing hole in contact with the battery casing and an elastic pad made of open-celled elastic material placed over the flat rubber plate so as to urge the flat rubber plate against the battery casing.

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**4,745,040**

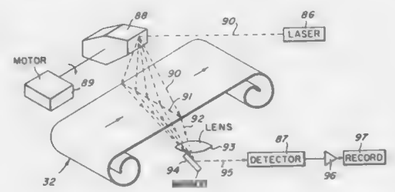
## METHOD FOR DESTRUCTIVE ELECTRONIC DEVELOPMENT OF PHOTO FILM

**Alfred B. Levine, 2924 Terrace Dr., Chevy Chase, Md. 20815**

**Division of Ser. No. 834,923, Feb. 28, 1986, which is a continuation-in-part of Ser. No. 617,344, Jun. 4, 1984, Pat. No. 4,588,282. This application Feb. 17, 1987, Ser. No. 15,142**

**Int. Cl.[4] G03C** *11/00*

**U.S. Cl. 430—21** **16 Claims**




1. A method for destructively developing a visible optical image from a stored latent image in an exposed but undeveloped conventional photographic film, including a dispersion of a light sensitive chemical compound that is variably absorptive of light energy to change its chemical composition, comprising the steps of:

subjecting each incremental portion of the film having the latent image to an interrogating light beam of constant, low level intensity and of low time-intensity energy integral, thereby to bring about saturation of the chemical compound in the film at that position,

detecting the quanta of energy of the interrogating beam that is absorbed by the chemical compound at each incremental position,

and determining from the absorbed energy quanta at each position in the film, the previous degree of light exposure creating the latent image, said light sensitive chemical compound comprising silver halide crystals.



**4,745,041**

## CVD PROCESS FOR FORMING SEMICONDUCTING FILM HAVING HYDROGENATED GERMANIUM MATRIX

**Toshiyuki Komatsu, Kawasaki; Yutaka Hirai; Katsumi Nakagawa, both of Tokyo, and Tadaji Fukuda, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Division of Ser. No. 914,523, Oct. 3, 1986, which is a continuation of Ser. No. 561,161, Dec. 14, 1983, abandoned, which is a continuation of Ser. No. 418,293, Sep. 15, 1982, Pat. No. 4,565,731, which is a continuation of Ser. No. 36,226, May 4, 1979, Pat. No. 4,471,042. This application Nov. 18, 1986, Ser. No. 932,160**

**Claims priority, application Japan, May 4, 1978, 53-53605; May 4, 1978, 53-53606**

**Int. Cl.[4] G03G** *5/082*

**U.S. Cl. 430—128** **17 Claims**

1. A method of chemical vapor deposition wherein a semiconducting film comprising germanium and hydrogen and at least one element selected from the group consisting of carbon, nitrogen and oxygen in the germanium-hydrogen matrix is uniformly deposited on a substrate resulting in a deposited film having a smooth surface comprising the steps of:

(a) supplying a germane deposition gas including a germanium hydride gas and at least one other reacting gas, wherein said at least one other reacting gas includes an element selected from the group consisting of oxygen, nitrogen and carbon to a volume adjacent a deposition surface of said substrate;

(b) applying an excitation energy for reacting the germane deposition gas and said at least one other reaction gas and for depositing a layer of said semiconducting film on said deposition surface; and

(c) maintaining said deposition gas at a reduced pressure during the deposition process.

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**4,745,042**

## WATER-SOLUBLE PHOTOPOLYMER AND METHOD OF FORMING PATTERN BY USE OF THE SAME

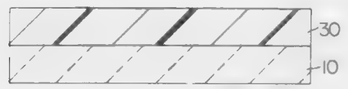
**Masaru Sasago, Hirakata; Masayuki Endo, Izumi; Kenichi Takeyama, Osaka, and Noboru Nomura, Toyonaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Apr. 17, 1985, Ser. No. 724,304**

**Claims priority, application Japan, Apr. 19, 1984, 59-78868; Oct. 4, 1984, 59-208501; Oct. 4, 1984, 59-208502**

**Int. Cl.[4] G03C** *1/495, 1/52, 1/71, 5/16*

**U.S. Cl. 430—156** **12 Claims**




1. A pattern forming organic film of a multi-layer structure consisting essentially of:

a radiation sensitive resin layer capable of being developed with a developing agent, and

a separate water-soluble polymeric layer containing pullulan as the main polymer which is produced and refined by bacterial culture and which is removable by a developing agent used for the development of said radiation-sensitive resin, said water-soluble polymeric layer containing a light absorbing agent capable of absorbing light in the ultraviolet region of 500 nm or less.

11. A pattern forming organic film of a multi-layer structure consisting essentially of:

a radiation sensitive resin capable of being developed by a developing agent, and

a separate water-soluble polymeric layer containing pullulan as the main polymer, which pullulan is produced and refined by bacterial culture, and which water-soluble layer can be removed by a developing agent to be used for the development of said radiation sensitive resin, said water-soluble polymeric layer containing a light absorbing agent capable of absorbing light in the ultraviolet region of 500 nm or less, said light absorbing agent being a compound which contains at least one member selected from the group consisting of a diazo group, and azide group, a cinnamoyl group, an acryloyl group, a cinnamiliden group, a double bond, an epoxy group, a triple bond, a chloromethyl group, an iodomethyl group, a silicon-silicon double bond, a carbon-carbon single bond, and a carbon-sulfur single bond.

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**4,745,043**

## HEAT DEVELOPMENT METHOD FOR FORMING AN IMAGE USING INTENSIFYING AGENTS

**Hiroyuki Hirai, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Jul. 25, 1986, Ser. No. 889,059**

**Claims priority, application Japan, Jul. 25, 1985, 60-164645**

**Int. Cl.[4] G03C** *5/54, 7/00*

**U.S. Cl. 430—203** **22 Claims**

1. A method for forming an image, which comprises heating to at least 50° C. a light-sensitive material comprising a support having thereon at least a light-sensitive silver halide, a binder, and a dye providing substance simultaneously with or after imagewise exposure thereof in the presence of water, a reducing agent, and at least one intensifying agent, wherein the intensifying agent is a peroxide, a cobalt (III) complex, a salt of halogenous acid or a polyvalent iodine compound and wherein the amount of water is in a range from 0.1 time the total weight of the whole coated layer(s) to the weight of water corresponding to the maximum swelling volume of the whole coated layer(s).

7. A method for forming an image as in claim 1, wherein the intensifying agent is incorporated into a dye fixing material.

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**4,745,044**

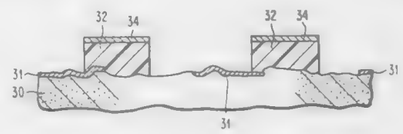
## MULTILAYER RESISTS WITH IMPROVED SENSITIVITY AND REDUCED PROXIMITY EFFECT

**Lawrence V. Gregor, Hopewell Junction, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Division of Ser. No. 727,469, Apr. 26, 1985, Pat. No. 4,612,275. This application May 29, 1986, Ser. No. 866,822**

**Int. Cl.[4] G03C** *5/00, 1/495, 1/46, 1/94*

**U.S. Cl. 430—312** **5 Claims**




1. A method of producing a multi-layer resist structure for use in fabrication of electronic devices, comprising the steps of:

(a) Applying a thin layer of a metal or an alloy of said metal to the surface of a substrate, wherein the atomic number of said metallic layer ranges between about 60 and about 84 and the density of said metallic layer ranges between about 12 $g/cm^2$ and about 23 $g/cm^2$, and wherein the thickness of said metallic layer ranges between about 400 Å and about 4,000 Å;

(b) applying a layer of radiation-sensitive polymeric material over the surface of said metallic layer; and

(c) exposing the surface of said radiation-sensitive polymeric material to patterned radiation to create a latent image within said radiation-sensitive polymeric material.

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**4,745,045**

## METHOD FOR IMPROVING RESOLUTION IN MICROELECTRONIC CIRCUITS USING PHOTORESIST OVERLAYER BY USING THERMALLY PROCESSED POLYIMIDE UNDERLAYER FORMED FROM POSITIVE PHOTORESIST AND POLYAMIC ACID

**Edward C. Fredericks, Manasssas, and Giorgio G. Via, McLean, both of Va., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Continuation-in-part of Ser. No. 710,746, Mar. 11, 1985, abandoned. This application Nov. 10, 1986, Ser. No. 928,746**

**Int. Cl.⁴ G03F** *7/20;* **H01L** *21/283*

**U.S. Cl. 430—315** **1 Claim**

1. In a process for manufacturing integrated circuits, said circuits having a first layer of conductors supported on a substrate, a process for reducing scattered light from a polyimide/photoresist interface during the exposure of a photoresist layer with light in a process for defining a second layer of conductors comprising:

depositing a layer of polyamic acid on said first layer of conductors, said polyamic acid layer including a quantity of a positive photoresist;

said positive photoresist including a diazo-oxo napthalene photoactive compound selected from the group consisting of 2-diazo-1 oxo napthalene, 1-diazo-2 oxo-napthalene and acids or an ester thereof, the quantity of the photoresist selected to provide the polyimide layer with an index of refraction approaching that of the photoresist layer;

converting the polyamic acid to polyimide by successively heating to a first cure temperature in the range 90–110 degrees C., a second cure temperature in the range 150–250 degrees C., and a third cure temperature in the range 270–350 degrees C.;

applying a layer of photoresist containing a dizao-oxo napthalene photoactive compound selected from the group consisting of 2-diazo-1 oxo napthalene, 1-diazo-2 oxo napthalene and acids or an ester thereof, on said polyimide layer;

lithographically defining a pattern in said photoresist layer by exposure to light and subsequent development; and

depositing the second layer of conductors through the pattern in the photoresist layer on said polyimide layer;

whereby the polyimide layer with photoresist will reduce the undesired scattered and reflected light due to its light absorptive properties and index of refraction approaching that of the photoresist layer.

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**4,745,046**

## THERMAL IMAGING METHOD

**Alan L. Borror, Andover, and Ernest W. Ellis, Carlisle, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.**

**Continuation-in-part of Ser. No. 740,888, Jun. 3, 1985, abandoned. This application May 14, 1986, Ser. No. 861,376**

**Int. Cl.⁴ G03C** *1/72, 7/00*

**U.S. Cl. 430—332** **16 Claims**

1. A heat-sensitive element comprising a support carrying as color-forming co-reactants in the same or different layers (a) a substantially colorless di- or triarylmethane compound possessing on the meso carbon atom within its di- or triarylmethane structure an aryl group substituted in the ortho position with a nucleophilic moiety which is ring-closed on the meso carbon atom and (b) an electrophilic reagent which upon heating and contacting said di- or triarylmethane compound undergoes a bimolecular nucleophilic substitution reaction with said nucleophilic moiety to form a colored, ring-opened di- or triarylmethane compound.

**4,745,047**

## COLOR IMAGE-FORMING PROCESS

**Masahiro Asami, and Kazunori Hasebe, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Jan. 27, 1987, Ser. No. 7,227**

**Claims priority, application Japan, Jan. 24, 1986, 61-14545**

**Int. Cl.⁴ G03C** *7/30*

**U.S. Cl. 430—376** **27 Claims**

1. A color image-forming process which comprises imagewise exposing a silver halide photographic material comprising a reflective support having provided thereon at least one light-sensitive silver halide emulsion layer constituted by at least two kinds of monodispersed silver halide grains which are free of silver iodide and substantially differ from each other in mean grain size, and developing the exposed photographic material for a developing time of within 2 minutes and 30 seconds using a color developer containing substantially no benzyl alcohol, wherein the two kinds of monodispersed silver halide grains which are respectively the most and the second most by weight, among said at least two kinds of monodispersed silver halide grains, satisfy the conditions of

$$1.2 \leqq (\bar{\gamma}_1/\bar{\gamma}_2)^2 \leqq 4.0,$$

wherein $\bar{\gamma}_1$ represents the mean grain size of the larger kind of grains, and $\bar{\gamma}_2$ represents the mean grain size of the smaller kinds of grains, and wherein the monodispersed silver halide grains form a latent image predominantly on the surface thereof upon exposure to light.

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**4,745,048**

## SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL AND METHOD OF PROCESSING THE SAME USING AN IMPROVED DESILVERING ACCELERATOR

**Shinzo Kishimoto; Kei Sakanoue, and Noboru Sasaki, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Jun. 5, 1986, Ser. No. 870,909**

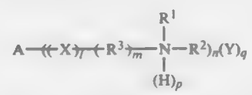
**Claims priority, application Japan, Jun. 7, 1985, 60-123945; Dec. 9, 1985, 60-276622**

**Int. Cl.⁴ G03C** *5/44, 5/38, 1/46, 7/32*

**U.S. Cl. 430—376** **18 Claims**

1. A method of processing silver halide color photographic light-sensitive material used for taking photographs, wherein the silver halide color photographic light-sensitive material used for taking photographs has at least one red-sensitive silver halide emulsion layer, at least one green-sensitive silver halide emulsion layer and at least one blue-sensitive silver halide emulsion layer on a substrate in which the total amount of coated silver is 5.2 g/m² or less, the average iodide content based on the total amount of light-sensitive silver halide grains is 5.5 mol% or less, and a 2-equivalent magenta polymer coupler is included as a magenta coupler, said method comprising subjecting the material to one of bleach-fixing treatment, bleaching treatment at a pH of 5.5 or less, or desilvering treatment in the presence of a desilvering accelerator represented by general formula XI or XII:

[XI]



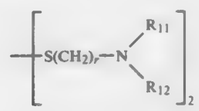
wherein A represents a n-valent aliphatic, aromatic or heterocyclic linking group provided that, if n equals 1, A is merely an aliphatic, aromatic or heterocyclic group or a hydrogen atom, X represents —O—, —S— or





wherein $R^4$ represents a lower alkyl group, $R^1$ and $R^2$ represent a substituted or unsubstituted lower alkyl group, $R^3$ represents a lower alkylene group having 1 to 5 carbon atoms, Y represents an anion, l is zero or 1; m, zero or 1; n, 1, 2 or 3; p, zero or 1; and l, zero, 1, 2, or 3,

[XII]



wherein $R_{11}$ and $R_{12}$ may be the same or different and represent a hydrogen atom, a substituted or unsubstituted lower alkyl group, and r is an integer of 1 to 3 provided that $R_{11}$ and $R_{12}$ is not a hydrogen atom at the same time.

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**4,745,049**

## SILVER HALIDE PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL

**Keiji Ohbayashi; Akiyoshi Tai, and Noboru Mizukura, all of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan**

**Filed Apr. 7, 1987, Ser. No. 35,653**

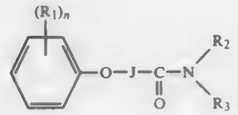
**Claims priority, application Japan, Apr. 11, 1986, 61-83855; Apr. 12, 1986, 61-84819**

**Int. Cl.⁴ G03C** *7/36, 1/04, 1/06*

**U.S. Cl. 430—546** **10 Claims**

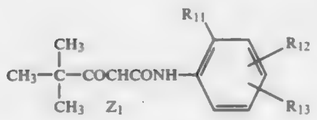
1. A silver halide photographic light-sensitive material comprising a support and, provided thereon, at least one silver halide emulsion layer, wherein said emulsion layer contains at least one of the compounds represented by General Formula [I] and at least one of the yellow couplers represented by General Formula [II]:

General Formula [I]



wherein $R_1$ is an alkyl group or an alkoxy group; J is an alkylene group having a straight or branched chain; $R_2$ and $R_3$ are each an alkyl group; and n is an integer of from 1 to 3, in which, when n is 2 or 3, the groups represented by $R_1$ may be the same with or different from each other.

General Formula [II]



wherein $R_{11}$ is a halogen atom or an alkoxy group; $R_{12}$ is a hydrogen atom, a halogen atom or an alkoxy group; $R_{13}$ is an acylamino group, an alkoxycarbonyl group, an alkylsulfamoyl group, an arylsulfamoyl group, an arylsulfonamido group, an alkylureido group, an arylureido group, a succinimido group, an alkoxy group or an aryloxy group; and $Z_1$ is a hydrogen atom or a group capable of splitting off from a coupler residue upon reaction of the coupler residue with the oxidized products of a color developing agent.

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**4,745,050**

## SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL AND DISCOLORATION INHIBITOR THEREFOR

**Nobuo Seto; Masakazu Morigaki, and Nobuo Sakai, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Jan. 28, 1986, Ser. No. 823,365**

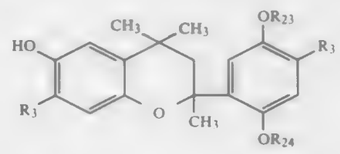
**Claims priority, application Japan, Jan. 29, 1985, 60-15197; Feb. 2, 1985, 60-19093; Feb. 2, 1985, 60-19094**

**Int. Cl.⁴ G03C** *7/26, 7/38*

**U.S. Cl. 430—551** **25 Claims**

1. A silver halide color photographic material comprising at least one silver halide emulsion layer having associated therewith at least one compound represented by formula (X) and at least one pyrazolone type magenta coupler having at the coupling position thereof a coupling off group represented by formula (II)

(X)



—S—R (II)

wherein R represents an alkyl group or an aryl group; each pair of $R_3$ and $R_3$ has the same meaning and represents a hydrogen atom, alkyl group, aryl group, alkoxy group, aryloxy group, alkylthio group, arylthio group, acylamino group, diacylamino group, sulfonamido group, alkylamino group, acyl group, alkoxycarbonyl group, acyloxy group, or halogen atom; $R_{23}$ and $R_{24}$ each represents a hydrogen atom or alkyl group, provided that both of them are not hydrogen atoms or alkyl groups at the same time and when R and $R_3$ are alkyl groups or aryl groups or those groups containing partially alkyl groups or aryl groups, such alkyl groups or aryl groups may be further substituted by other substituent groups.

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**4,745,051**

## METHOD FOR PRODUCING A RECOMBINANT BACULOVIRUS EXPRESSION VECTOR

**Gale E. Smith, and Max D. Summers, both of Bryan, Tex., assignors to The Texas A&M University System, College Station, Tex.**

**Filed May 27, 1983, Ser. No. 498,858**

**Int. Cl.⁴ C12P** *21/00, 19/34;* **C12N** *15/00, 1/00, 7/00;* **C07H** *21/04*

**U.S. Cl. 435—68** **29 Claims**

1. A method for producing a recombinant baculovirus expression vector, capable of expressing a selected heterologous gene in a host insect cell, comprising:

(a) cleaving baculovirus DNA to produce a DNA fragment comprising a polyhedrin promoter and sufficient flanking DNA sequences to facilitate homologous recombination;

(b) preparing a recombinant shuttle vector by inserting said DNA fragment into a cloning vehicle and thereafter inserting at least one selected heterologous gene into the thus modified cloning vehicle such that said selected heterologous gene is under the transcriptional control of the baculovirus promoter;

(c) contacting said recombinant shuttle vector with baculovirus DNA so as to effect recombination, thereby producing a mixture of recombinant and nonrecombinant baculoviruses; and

(d) isolating a recombinant baculovirus expression vector from said mixture.

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4,745,052

## COLOR PHOTOGRAPHIC RECORDING MATERIAL CONTAINING 2-EQUIVALENT MAGENTA COUPLERS

Günter Renner, Bergisch Gladbach, Fed. Rep. of Germany, assignor to Agfa Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

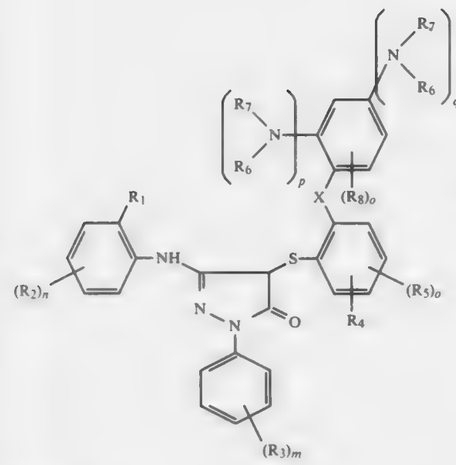
Filed Jun. 19, 1987, Ser. No. 63,688

Claims priority, application Fed. Rep. of Germany, Jul. 1, 1986, 3622007

Int. Cl.[4] G03C *1/40, 7/36*

U.S. Cl. 430—555 3 Claims

1. Colour photographic recording material containing at least one silver halide emulsion layer and at least one layer containing a 2-equivalent magenta coupler corresponding to the formula



wherein

X denotes O, S or $NR_9$,

$R_1$ denotes hydrogen, halogen or alkoxy,

$R_2$ denotes halogen, alkoxy, acylamino, alkoxycarbonyl, aminocarbonyl which may be substituted on the nitrogen or aminosulphonyl which may be substituted on the nitrogen,

$R_3$ denotes hydrogen, halogen, cyano, alkoxy, alkyl, acylamino, alkoxycarbonyl or alkylsulphonyl,

$R_4$ denotes hydrogen or alkyl,

$R_5$ denotes a substituent having electron donor properties,

$R_6$ and $R_7$ denote alkyl, acyl or alkylsulphonyl,

$R_8$ denotes a substituent having electron acceptor properties,

$R_9$ denotes hydrogen or alkyl,

m represents a number from 1 to 5,

n and o have the value 0, 1 or 2 and

p and q have the value 0 or 1 and when m, n and/or o has a value >1, the respective substituents $R_2$, $R_3$, $R_5$ and $R_8$ may be identical or different, and the sum of p and q is 1 or 2.

4,745,053

## PROCESS FOR PRODUCING HUMAN INTERFERON AND METHOD FOR ASSAYING THE INTERFERON PRODUCTIVITY OF BLOOD

Masakazu Mitsuhashi, Okayama, Japan, assignor to Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyojo, Okayama, Japan

Filed Jun. 26, 1984, Ser. No. 624,752

Claims priority, application Japan, Jul. 8, 1983, 58-125152; Jul. 8, 1983, 58-125153

Int. Cl.[4] C12Q *1/70, 1/02;* G01N *33/53*

U.S. Cl. 435—5 20 Claims

1. A clinical assay for detecting human cancer, comprising:

collecting whole blood from a subject;

incubating in vitro a predetermined amount of the whole blood in the presence of an anticoagulating effective amount of an anticoagulant and an interferon inducing effective amount of a virus under conditions appropriate for the production of interferon; and

determining the interferon level in the resultant culture,

whereby the determination of an interferon level below a predetermined amount is indicative of the possible presence of human cancer.

4,745,054

## ENZYMIC METHOD OF DETECTING ANALYTES AND NOVEL SUBSTRATES THEREFOR

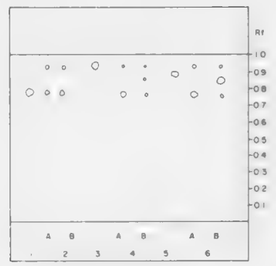
Brian R. Rabin, Potters Bar; Michael R. Hollaway, East Molesey, and Christopher J. Taylorson, Chiswick, all of England, assignors to London Biotechnology Limited, London, England

Filed Mar. 22, 1985, Ser. No. 715,236

Claims priority, application United Kingdom, Mar. 26, 1984, 8407736

Int. Cl.[4] G01N *33/535;* G12Q *1/68*

U.S. Cl. 435—6 9 Claims



1. A method of detecting an analyte in a sample medium, involving the use of an assay component comprising an enzymically inactive first fraction of a primary enzyme, and the addition of a complementary enzymically inactive protein fraction of the primary enzyme so as to combine with said first fraction and produce an active primary enzyme, and the performance of a reaction catalysed by said enzyme, leading to a detectable result; wherein said assay component comprises a specific recognition probe which binds to the analyte, and said primary enzyme catalyses a reaction which converts a substrate into a primary product which itself, or as a subsequent product produced by a further reaction or series of reactions initiated by said primary product, is an essential component of a second enzyme, which essential component combines with an inactive second component of the second enzyme, which is thereby completed and catalyses a reaction leading to a detectable result.



4,745,055

## FUSED PROTEIN FOR ENZYME IMMUNOASSAY SYSTEM

Dale B. Schenk, Campbell, and Sharon K. Spratt, Sunnyvale, both of Calif., assignors to California Biotechnology Inc., Mountain View, Calif.

Continuation-in-part of Ser. No. 731,853, May 7, 1985, abandoned. This application May 28, 1986, Ser. No. 868,393

Int. Cl.[4] G01N *33/535;* C12N *15/00*

U.S. Cl. 435—7 10 Claims

5. A method of producing a fused protein for use in a homogeneous enzyme immunoassay system designed for determination of a protein or peptide analyte, comprising:

(a) selecting a peptide which is immunologically reactive with an antibody which is cross-reactive with an antigenic region of the analyte;

(b) providing a nucleotide sequence coding for such peptide;

(c) constructing a plasmid having a β-galactosidase gene which (1) encodes for enzymatically active β-galactosidase in a suitable host, and (2) terminates at its 3'-end at a selected restriction endonuclease site;

(d) inserting the peptide-coding sequence into the plasmid at such restriction site; and

(e) selecting a plasmid transfected host which produces a fused protein which (1) has β-galactosidase activity, (2) is immunologically reactive with an antibody specific against such peptide, and (3) shows increasing inhibition of β-galactosidase activity in response to increasing levels of said antibody added to the fused protein.

8. A homogenous enzyme immunoassay system for determination of a peptide or protein analyte, comprising:

(a) an anti-analyte antibody effective to bind immunospecifically to said analyte;

(b) a fused protein composed of an enzymatically active β-galactosidase enzyme fused, at its C terminus, to an immunologically active peptide which is effective to bind said antibody, in proportion to the amount of analyte present in an assay mixture containing the fused protein, antibody, and analyte, to reduce the specific β-galactosidase activity of the fused protein.

4,745,056

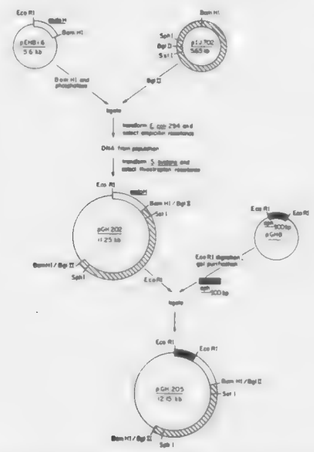
## STREPTOMYCES SECRETION VECTOR

Sonia Guterman, Belmont; Janice Pero, Lexington, and Phillips Robbins, Arlington, all of Mass., assignors to Biotechnica International, Inc., Cambridge, Mass.

Filed Oct. 23, 1984, Ser. No. 663,842

Int. Cl.[4] C12P *21/00;* C12N *15/00, 1/20, 7/00*

U.S. Cl. 435—68 26 Claims



1. A DNA vector for producing a desired protein in a Streptomyces host, said vector comprising the following components:

(a) a DNA sequence coding for a signal sequence, wherein said sequence is identical to the DNA signal sequence of a Streptomyces endoH gene, or an engineered or chemically synthesized variant thereof;

(b) a structural gene that codes for the desired protein, wherein said gene comprises DNA that is not naturally transcribed and translated with said DNA coding for a signal sequence wherein said gene is operably linked to said DNA signal sequence; and

(c) regulatory DNA that includes a promoter sequence effective to start transcription in said host Streptomyces, said promoter being positioned and oriented in said vector to initiate transcription toward the signal sequence-encoding DNA and the structural gene.

2. A DNA vector for producing a desired protein in a Streptomyces host, said vector comprising the following components:

(a) a DNA sequence coding for a signal sequence, wherein said sequence is identical to the DNA signal sequence of a Streptomyces endoH gene, or an engineered or chemically synthesized variant thereof;

(b) an engineered restriction site positioned to receive DNA that codes for a protein to be secreted and that is not naturally translated and transcribed with said DNA coding for a signal sequence wherein said restriction site is operably linked to said DNA signal sequence; and

(c) regulator DNA that includes a promoter sequence effective to start tanscription in said host Streptomyces, wherein said promoter is positioned and oriented in said vector to initiate transcription toward the signal sequence-encoding DNA and the structural gene.

4,745,057

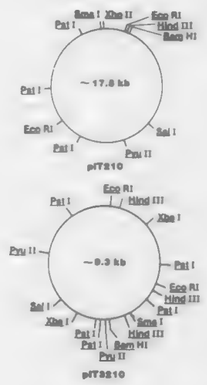
## METHOD, VECTORS AND TRANSFORMANTS FOR HIGH EXPRESSION OF HETEROLOGOUS POLYPEPTIDES IN YEAST

Cheryl A. Beckage, and Thomas D. Ingolia, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Continuation-in-part of Ser. No. 611,782, May 18, 1984. This application Aug. 13, 1984, Ser. No. 640,422

Int. Cl.[4] C12P *21/00, 19/34;* C12N *15/00, 5/00*

U.S. Cl. 435—68 41 Claims



1. A method for inducing a high level expression in yeast of a nucleotide sequence that is under the transcriptional and translational control of the yeast YH100 gene, said method comprising

(1) transforming a yeast cell with selectable plasmid that is capable of autonomous replication or genomic integration, said plasmid comprising, in translational reading frame,

(a) the transcriptional and translational activating sequence of the yeast YG100 gene, and

(b) a nucleotide sequence that codes for a functional heterologous polypeptide,

(2) culturing said transformed cell under conditions suitable for aerobic growth,

(3) culturing said aerobically-grown cells under conditions suitable for anaerobic growth, and

(4) culturing said anaerobically-grown cells under conditions suitable for aerobic growth and gene expression,

subject to the limitation that said conditions for anaerobic growth are maintained for a time sufficient to cause induction of the transciptional and translational activating sequence of the yeast YG100 gene when said conditions for aerobic growth are restored.

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**4,745,058**

## METHOD FOR PRODUCING CELLULOSIC FIBERS AND MICROCRYSTALLINE CELLULOSE

**Philip M. Townsley, 4569 W. 13th Avenue, Vancouver, B. C., Canada V64 2V5**

**Filed May 10, 1984, Ser. No. 608,892**

**Int. Cl.[4] C12P** *19/04;* **C12R** *1/02*

**U.S. Cl. 435—101** **10 Claims**

1. A method for producing cellulose strands comprising the steps of:

placing cellulose fibril producing bacteria of the genus Acetobacter in a growing medium,

flowing said growing medium over a surface adapted to direct said growing medium in a straight-line flow path and to allow cellulose fibrils produced by the bacteria to string out along the flow path and intertwine to form a cellulose strand, and

thereafter removing said cellulose strand from said surface.

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**4,745,059**

## PROCESS FOR THE PREPARATION OF L-PHENYLALANINE

**Hartmut Voelskow, Hattersheim am Main; Reinhold Keller, Bad Soden am Taunus; Merten Schlingmann, Königstein; Martin Platen, Frankfurt am Main; Johann Then, Bonn, and Gerhard Wöhner, Flörsheim am Main, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Jun. 27, 1985, Ser. No. 749,465**

**Claims priority, application Fed. Rep. of Germany, Jun. 29, 1984, 3423936**

**Int. Cl.[4] C12P** *13/22;* **C12N** *11/04, 1/36*

**U.S. Cl. 435—108** **6 Claims**

1. A process for increasing the yield from the microbial preparation of L-phenylalanine comprising the step of adapting a microorganism from the group consisting of *E. coli, Paracoccus denitrificans,* Torula, Rhodotorula, and Streptomyces to tolerate increasing concentrations of a precursor selected from the group consisting of phenylpyruric acid and the salts thereof by repeated exposure to a constant or increasing amount of said precursor wherein said precursor is aminated in the presence of a nitrogen source in a nutrient solution by biotransformation so as to produce L-phenylalanine with said adapted microorganism.

**4,745,060**

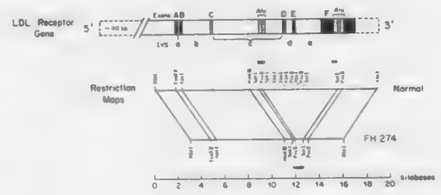
## METHODS AND COMPOSITIONS FOR THE DETECTION OF FAMILIAL HYPERCHOLESTEROLEMIA

**Michael S. Brown; Joseph L. Goldstein, and David W. Russell, all of Dallas, Tex., assignors to Board of Regents, The University of Texas System, Austin, Tex.**

**Filed Dec. 28, 1984, Ser. No. 687,087**

**Int. Cl.[4] C12N** *15/00, 1/20;* **C12Q** *1/68;* **C07H** *21/00*

**U.S. Cl. 435—172.3** **21 Claims**




1. A DNA molecule comprising a recombinant DNA vector having a DNA sequence which encodes human LDL receptor protein as defined by the amino acid sequence of FIGS. 3A, 3B, 3C and 3D.

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**4,745,061**

## NOVEL D-AMINOACID TRANSAMINASE AND ITS USE

**Werner Aretz, Kelkheim, and Klaus Sauber, Schwalbach, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Dec. 20, 1985, Ser. No. 811,466**

**Claims priority, application Fed. Rep. of Germany, Dec. 22, 1984, 3447023**

**Int. Cl.[4] C12N** *9/10, 9/06;* **C12Q** *1/52;* **C12P** *35/00, 13/04, 7/50;* **C07B** *19/02;* **C12R** *1/10*

**U.S. Cl. 435—193** **3 Claims**

1. A D-aminoacid transaminase from *Bacillus licheniformis* ATCC 9945, which converts Cephalosporin C with an α-keto acid into α-ketoadipinyl-7-amino-cephalosporinic acid and the corresponding D-α-amino acid.

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**4,745,062**

## PLASMID VECTORS FOR CLONING AND EXPRESSION OF A PROTEIN IN A MICROORGANISM, COMPRISING AT LEAST ONE PROMOTER FOR EXPRESSION OF β-GLUCOSIDASE IN YEASTS; MICROORGANISMS CONTAINING THESE PLASMIDS; A FERMENTATION PROCESS AND THE ENZYMES OBTAINED

**Michel M. Guerineau, Paris, and Alain Raynal, Gomez Lechatel, both of France, assignors to Centre National de la Recherche Scientifique, Paris, France**

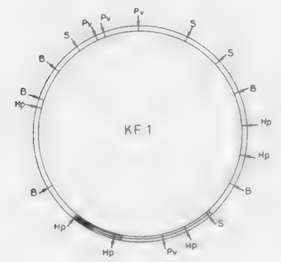
**Filed Dec. 5, 1984, Ser. No. 678,492**

**Claims priority, application France, Dec. 6, 1983, 83 19494**

**Int. Cl.[4] C12N** *9/42, 15/00, 5/00*

**U.S. Cl. 435—209** **4 Claims**

1. A strain of Saccharomyces transformed by a plasmid vector for the expression of beta-glucosidase, said plasmid vector comprising the structural gene for beta-glucosidase and expression promoter for that gene, said structural gene and said




expression promoter both being obtained from *Kluyveromytes fragilis.*

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**4,745,063**

## METHOD FOR SEPARATING RENNET COMPONENTS

**Peter Birschbach, Waukesha, Wis., assignor to Sanofi Bio Ingredients, Inc.**

**Continuation-in-part of Ser. No. 913,965, Oct. 1, 1986, abandoned. This application Aug. 17, 1987, Ser. No. 86,499**

**Int. Cl.[4] C12N** *9/64;* **A23C** *9/12, 19/02*

**U.S. Cl. 435—226** **16 Claims**

1. A method for separating chymosin from a liquid containing the milk-clotting enzymes chyomsin and pepsin comprising the steps of:

adjusting the enzyme-containing liquid to a pH of about 3.8 to about 5.2 and to a conductivity of about $2\times10^3$ to about $19\times10^3$ μumhos;

equilibrating an anionic exchange medium bed to a pH of about 3.8 to about 5.2 and to a conductivity of about $2\times10^3$ to about $19\times10^3$ μumhos;

contacting the equilibrated exchange medium with the adjusted enzyme-containing liquid to bind pepsin onto the exchange medium;

recovering chymosin in the liquid resulting after contact with the exchange medium bed; and

periodically contacting the exchange medium with a solution for removing the bound pepsin therefrom.

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**4,745,064**

## PROCESS FOR THE DEGRADATION OF S-TRIAZINE DERIVATIVES IN AQUEOUS SOLUTIONS

**Alasdair M. Cook, Wädenswil, and Ralf Hütter, Gockhausen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Filed Oct. 26, 1984, Ser. No. 665,408**

**Claims priority, application Switzerland, Nov. 4, 1983, 5968/83**

**Int. Cl.[4] C12N** *1/20;* **C12P** *39/00, 5/02, 17/00*

**U.S. Cl. 435—253** **12 Claims**

1. A biologically pure culture of a microorganism of the genus *Rhodococcus corallinus* NRRL B-15444.

**4,745,065**

## GENES CONFERRING ON YEASTS A RESISTANCE TO HERBICIDES

**Jean M. A. G. Delcour, Wahlin; Anne-Marie J. C. G. Colson-Corbisier, Thion-Valmon; Annie F. J. De Baetselier-van Broekhoven, Berchem, and Charles Colson, Thion-Valmon, all of Belgium, assignors to Labofina, S.A., Brussels, Belgium**

**Filed May 8, 1984, Ser. No. 608,162**

**Claims priority, application Luxembourg, May 9, 1983, 84795**

**Int. Cl.[4] C12N** *15/00, 5/00, 7/00*

**U.S. Cl. 435—256** **30 Claims**

1. A recombinant yeast cloning vector comprising (i) plasmid capable of transforming a yeast cell and (ii) DNA comprising a gene coding for resistance to at least the organic herbicide 3-(3,4-dichlorophenyl)-1,1-dimethylurea, wherein said gene is a nuclear determinant in yeast.

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**4,745,066**

## METHOD FOR PRODUCING OPTICALLY ACTIVE GLYCOL DERIVATIVES

**Shigeki Hamaguchi; Takehisa Ohashi, both of Kobe, and Kiyoshi Watanabe, Akashi, all of Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan**

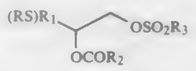
**Filed Apr. 1, 1986, Ser. No. 846,766**

**Claims priority, application Japan, Apr. 1, 1985, 60-69770**

**Int. Cl.[4] C07P** *41/00*

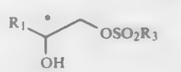
**U.S. Cl. 435—280** **10 Claims**

1. A method for producing optically active glycol derivatives by biochemical resolution which comprises contacting a racemic ester of the general formula 1



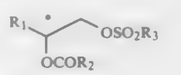

1

(wherein $R_1$ is an aliphatic hydrocarbon group of 1 to 16 carbon atoms, $R_2$ is an aliphatic hydrocarbon group of 1 to 8 carbon atoms, and $R_3$ is a phenyl, tolyl or naphtyl group) with a microorganism- or animal organ-derived enzyme having stereoselective, hydrolytic activity to asymmetrically hydrolyze said racemic ester of general formula 1 to produce an optically active alcohol of general formula 2*




2*

(wherein $R_1$ and $R_3$ have the same meanings as defined above) and an unreacted ester of the general formula 1*




1*

(wherein $R_1$, $R_2$ and $R_3$ have the same meanings as defined hereinbefore) and, then, isolating the respective optically active compounds.

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**4,745,067**

## L-AMINOACYLASES

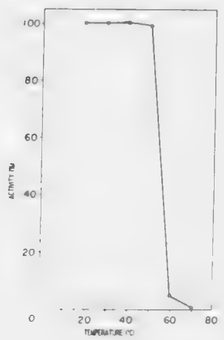
**Hamao Umezawa; Tomio Takeuchi, both of Tokyo; Toshiharu Nagatsu, Yokohama; Masa Hamada; Shuichi Iwadare, both of Tokyo; Ikuo Matsumoto, and Hajime Morishima, both of Tokyo, all of Japan, assignors to Microbial Chemistry Research Foundation and Banyu Pharmaceutical Co., Ltd., both of Tokyo, Japan**

**Filed Apr. 29, 1986, Ser. No. 857,941**

**Claims priority, application Japan, May 2, 1985, 60-93769; Mar. 18, 1986, 61-58192**

**Int. Cl.[4] C12N** *9/80;* **C12P** *13/00;* **C07B** *19/02;* **C12R** *1/04, 1/465, 1/52, 1/625*

**U.S. Cl. 435—228** **3 Claims**




1. L-aminoacylase $S_1$ derived from an actinomycete and having the following physicochemical characteristics:

(1) Action and substrate profile:

It is a L-aminoacylase which acts on a N-acyl-L-amino acid to give a L-amino acid, its substrate profile is wide, and it acts not only on a N-acyl derivative of a natural L-amino acid, but also on a N-acyl derivative of a synthetic L-amino acid, while it does not act on a N-acyl-D-amino acid, a DL-N-acetyl-α-methylbenzylamine and a N-acetyl-D-glucosamine,

(2) Stability

Temperature: it maintains its activity almost fully at 50° C., and a slight activity remains even at 60° C. (when left for one hour at pH 7.0),

pH: it is most stable at pH 7.0–9.0, and relatively stable even at about pH 10.0, but it loses its activity at pH 4.0 or lower (when left for 24 hours at 5° C.),

(3) Temperature- and pH-dependence

Temperature: its activity increases linearly up to 50° C., and it loses its reactivity rapidly at a temperature of 60° C. or higher,

pH: its reactivity is high at pH 6.5–9.5 and the optimum pH for the reaction is about pH 7.5–8.5,

(4) Molecular weight: 50,000–60,000 (gel-filtration method)

(5) Isoelectric point: pI=7.00–7.70,

(6) Disc gel electrophoresis: $R_m$BPB=0.125–0.167

(7) Influence of metal ions

It is strongly inhibited by $Fe^{++}$, $Ni^{++}$, $Ag^{+}$, $Hg^{++}$ and $Cu^{++}$, and it is activated by $Co^{++}$,

(8) Inhibitor

It is inhibited by p-chloromercuribenzoate, it is not inhibited by monoiodoacetic acid, and it is moderately inhibited by ethylenediaminetetraacetate.

**4,745,068**

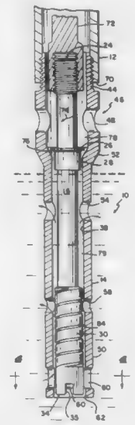
## DISPERSION TOOL

**Otis W. Godfrey, Greenwood; Walter A. Raas, Brownsburg, and James R. Ayres, Indianapolis, all of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.**

**Filed Apr. 30, 1987, Ser. No. 44,150**

**Int. Cl.[4] C12M** *1/02*

**U.S. Cl. 435—316** **13 Claims**



1. A dispersion apparatus for dispersing a material in a liquid comprising;

an elongated outer shroud having a first end and a second end and formed to include an inner bore, the shroud formed to include an axial inlet opening on the first end, a plurality of shear ports adjacent the first end, and at least one output intermediate the first end and the second end,

elongated suspension means for finely dividing a material, said suspension means disposed within the inner bore and configured to rotate within the shroud,

shearing means disposed on the suspension means and and located adjacent the shear ports and configured to cooperate with the shear ports to shear a portion of the material, and

spiral means disposed on the suspension means axially above the shearing means and configured to cooperate with the inner bore to move a portion of the material and liquid axially upwardly through the inner bore and out of the inner bore through the at least one output opening.

**4,745,069**

## CLONING VECTORS FOR EXPRESSION OF EXOGENOUS PROTEIN

**Nancy G. Mayne; J. Paul Burnett; Ramamoorthy Belegaje, and Hansen M. Hsiung, all of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.**

**Continuation-in-part of Ser. No. 381,992, May 25, 1982, abandoned. This application Mar. 6, 1984, Ser. No. 586,581**

**Int. Cl.[4] C12N** *15/00, 1/20;* **C12P** *21/00, 19/34;* **C07H** *21/02*

**U.S. Cl. 435—320** **26 Claims**

1. A recombinant DNA cloning vector useful for expressing exogenous protein, which comprises

(a) a DNA segment containing a functional origin of replication;

(b) one or more DNA segments, each of which conveys to a transformable host cell a property useful for selection when said vector is transformed into said host cell; and

(c) a DNA segment comprising a sequence that defines in tandem,

(1) the promoter of a lipoprotein gene

(2) the 5′ untranslated region of a lipoprotein gene and

(3) a translation start codon followed, without interposition of a portion or all of a nucleotide sequence coding for endogenous protein, by a nucleotide sequence coding for an enterokinase cleavage site said site being a sequence of amino acid residues comprising Asp-Asp-Asp-Asp-Lys, to which is joined, without interruption, a nucleotide sequence coding for an exogenous protein.



**4,745,070**

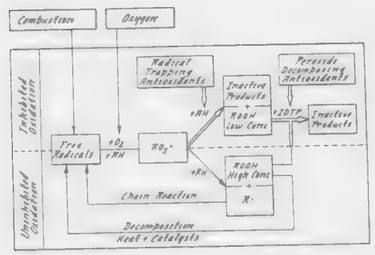
## METHOD FOR ASSESSMENT OF HIGH TEMPERATURE ANTIOXIDANT CAPABILITIES OF ENGINE OILS, BASE OILS & ENGINE OIL ADDITIVES

**Stefan Korcek, Birminghan, and Milton D. Johnson, Livonia, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.**

**Continuation of Ser. No. 725,609, Apr. 22, 1985, abandoned. This application Mar. 19, 1987, Ser. No. 28,057**

**Int. Cl.[4] G01N** *33/28*

**U.S. Cl. 436—60** **19 Claims**




1. A method for assessing the high temperature antioxidant capabilities of materials for both radical trapping and peroxide decomposing antioxidant species, which materials are selected from engine oils, base oils, and engine oil additives, under conditions simulating those encountered in an operating internal combusion engine, which method comprises:

(a) oxidizing said materials in a reactor by means of an oxidizing gas comprising oxygen and at a temperature between about 100° C. and about 200° C., while concurrently and continuously introducing free radicals or materials capable of breaking down into free radicals into the reaction mixture,

(b) monitoring the extent of the oxidation of said reaction mixture, and

(c) determining the delay in the oxidative breakdown of said reaction mixture attributable to said antioxidant species present in said reaction mixture.

**4,745,071**

## METHOD FOR THE VOLUMETRIC DIFFERENTIATION OF BLOOD CELLS TYPES

**James D. Lapicola, Pleasant Hill, and Sherburne M. Edmondson, Jr., Cupertino, both of Calif., assignors to Sequoia-Turner Corporation, Mountain View, Calif. and Hematology Marketing Associates, Inc., Plano, Tex.**

**Division of Ser. No. 772,666, Sep. 5, 1985, abandoned. This application Oct. 2, 1986, Ser. No. 914,637**

**Int. Cl.[4] G01N** *33/50*

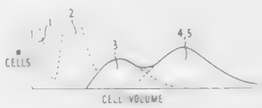
**U.S. Cl. 436—63** **8 Claims**

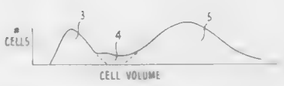
1. In a method for volumetrically differentiating leukocytes in a whole blood sample into three subpopulations, identified as lymphocyte, neutrophilic granulocyte and infrequent and rare leukocyte subpopulations, using an atomatic particle analyzing system, said method comprising the steps of:

(a) supplying a whole blood sample, a volume of diluent suitably balanced for maintaining cell size in the whole blood sample, and a volume of a lysing reagent to an automatic particle analyzing system;

(b) mixing the whole blood sample with the diluent and the lysing reagent in the automatic particle analyzing system in such a manner as to enable enumeration of the lymphocyte and neutrophilic granulocyte subpopulations in the whole blood sample and to enable quantitative evaluation of the infrequent and rare leukocyte subpopulation in the whole blood sample; and

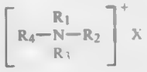
(c) using the automatic particle analyzing system to enumer-




ate the lymphocyte and neutrophilic granulocyte subpopulations in the whole blood sample and to quantitatively evaluate the infrequent and rare leukocyte subpopulation in the whole blood sample; wherein the improvements comprise:

using a diluent containing cell-stabilizing 1,3-dimethylurea and using a lysing agent consisting of 55–150 ml of a 50% (w/v) solution of a single, intrinsically gentle, quaternary ammonium salt, up to 4 g of potassium cyanide, and sufficient water to make one liter, wherein the quaternary ammonium salt is selected from the group consisting of salts having the general formula:



wherein $R_1$, $R_2$ and $R_3$ are short-chain alkyl groups having one to four carbons, $R_4$ is a twelve-carbon alkyl group, and X is a cation selected from the group consisting of halides, sulfates, nitrates, and phosphates.

**4,745,072**

## IMMUNOASSAY AND IMMUNOMETRIC ASSAY OF FREE LIGAND CONCENTRATIONS IN BIOLOGICAL FLUIDS

**Roger P. Ekins, and Thomas M. Jackson, both of Department of Molecular Endocrinology, The Middlesex Hospital School of Medicine, Mortimer Street, London, England W1N 8AA**

**PCT No. PCT/GB84/00220, § 371 Date Feb. 20, 1985, § 102(e) Date Feb. 20, 1985, PCT Pub. No. WO85/00226, PCT Pub. Date Jan. 17, 1985**

**PCT Filed Jun. 22, 1984, Ser. No. 705,421**

**Claims priority, application United Kingdom, Jun. 23, 1983, 8317124**

**Int. Cl.[4] G01N** *33/53, 33/534, 33/546, 33/78*

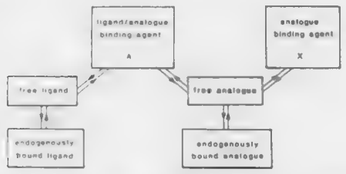
**U.S. Cl. 436—500** **13 Claims**

1. A method of measuring the concentration of free ligand in a biological fluid containing the ligand both as a free ligand and as ligand reversibly bound to an endogenous binding agent, comprising

(a) mixing a sample of the biological fluid with (1) an analogue of the ligand, (2) a specific binder with which the

free ligand and the ligand analogue reversibly bind, and (3) an exogenous binding agent which reversibly binds the ligand analogue but not the ligand, either the ligand analogue or the specific binder being labelled,

(b) incubating the resulting mixture so that the ligand and ligand analogue compete for the specific binder,




(c) determining either (1) the amount of the labelled analogue bound to the specific binder or the exogenous binding agent; or (2) the amount of labelled specific binder bound, or not bound, to the ligand analogue, and

(d) correlating the determined amount to the amount of free ligand present in the biological fluid.

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**4,745,073**

## MANUAL IMMUNOASSAYS AND APPARATUS THEREFOR

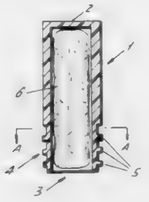
**Gordon Forrest, Ingatestone, and John F. Stivala, South Harrow, both of England, assignors to Serono Diagnostics Ltd., England**

**Filed Jun. 7, 1983, Ser. No. 501,773**

**Claims priority, application United Kingdom, Jun. 8, 1982, 8216595**

**Int. Cl.⁴ G01N** *33/53, 33/538, 33/553*

**U.S. Cl. 436—518** **10 Claims**




1. A closure for a small generally tubular container used in immunoassays for containing a liquid under assay consisting essentially of a cap receivable in liquid-tight fashion on said container to close the same and prevent material in said container from exiting said container at any time when closed by said cap, said cap including a liquid-absorbing material accessible to liquid in said container so that, when a closed container with liquid therein is inverted, the liquid absorbing material in the cap absorbs the liquid and retains it therein when the closed container is returned in an upright position thereby separating the absorbed liquid from any solid material in the container.

9. A method of immunoassay in which a reaction mixture is formed comprising a liquid phase and a solid phase, and wherein the solid phase is separated from the liquid phase, characterized in that there is used a combination of a small generally tubular container for use in immunoassays for containing a liquid under assay and a closure therefore, which closure is receivable on the open end of the container in liquid-tight fashion, the closure consisting essentially of a cap receivable in liquid-tight fashion on said container to close the same and prevent material in said container from exiting said container at any time when closed by said cap, said cap including a liquid-absorbing material accessible to liquid in said container so that, when a closed container with liquid therein is inverted, the liquid absorbing material in the cap absorbs the liquid and retains it therein when the closed container is returned in an upright position thereby separating the absorbed liquid from any solid material in the container, and wherein the said separation is effected by inverting the closed container whereby the liquid is absorbed by the liquid-absorbing material in the cap, the solid phase being retained in the container.

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**4,745,074**

## BLOOD-FLUID COMPOSITION FOR CELL LYSIS SYSTEM

**Hans Schreier; Francis J. Martin, both of San Francisco; Viola T. Kung, Menlo Park, and Francis C. Szoka, San Francisco, all of Calif., assignors to Cooper-Lipotech Partnership, Menlo Park, Calif.**

**Filed Feb. 23, 1984, Ser. No. 583,095**

**Int. Cl.⁴ G01N** *33/536, 33/543, 33/555*

**U.S. Cl. 436—518** **11 Claims**

1. A homogeneous liposome immunoassay system comprising

liposomes having surface-bonded ligand molecules and encapsulated reporter molecules which are detactable upon cell lysis,

serum complement,

anti-ligand molecules capable of reacting specifically and with high affinity with said ligand molecules in the presence of said complement, to induce ligand-specific cell lysis and release of the encapsulated reporter molecules, and

lipid vesicles effective to increase the ratio of ligand-specific lysis to nonspecific lysis produced in the absence of said anti-ligand, where said vesicles are present in an amount which increases said specific to nonspecific ratio more than 2-fold over that achievable in the system in the absence of said vesicles,

where both the liposomes and lipid vesicles contain phosphatidylcholine as a major component.

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**4,745,075**

## DIAGNOSTIC TEST METHODS

**Susan G. Hadfield, and Franklin E. A. Norrington, both of Beckenham, England, assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.**

**Filed Aug. 26, 1985, Ser. No. 769,597**

**Claims priority, application United Kingdom, Sep. 6, 1984, 8422512; Jul. 10, 1985, 8517477**

**Int. Cl.⁴ G01N** *33/53, 33/545, 33/577*

**U.S. Cl. 436—523** **20 Claims**

1. A method of testing for the presence of a ligand in an aqueous liquid medium comprising the steps of:

A. mixing a sample of the said medium with a reagent comprising particles of a first colour having attached thereto polyclonal antibody bindable tothe said ligand, in admixture with particles of a second colour having attached thereto immunoglobulin from a non-inoculated animal of the same species as that in which the said polyclonal antibody was rasied, whreby non-specific interaction between the said sample and the said reagent is indicated by agglutination of both the said particles of the first colour and the said particles of the second colour and the presence of the said ligand in the said sample, free from said non-specific interaction, is indicated by agglutination of the said particles ofthe first colour alone;

B. after an appropriate period of time, inspecting the mixture resulting from step A.; and

C. determining the test result from the appearance of said mixture.



**4,745,076**

## RUTHENIUM COMPLEXES USEFUL AS CARRIERS FOR IMMUNOLOGICALLY ACTIVE MATERIALS

**Francis Müller, and Dieter Schmidt, both of Basle, Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

**Filed Sep. 9, 1985, Ser. No. 773,956**

**Claims priority, application Switzerland, Sep. 17, 1984, 4433/84; Jul. 10, 1985, 2984/85**

**Int. Cl.⁴ G01N** *33/533, 33/536;* **C07F** *7/00*

**U.S. Cl. 436—537** **8 Claims**

1. Ruthenium complexes to which are coupled an immunologically active material, whereby the ruthenium complexes have the general formula

$$R^{2+}L_1L_2L_3 \qquad I$$

wherein $L_1$ and $L_2$ are the same or different and are bathophenanthroline or benzobathphenanthroline groups substituted with sulphonic acid groups as groups conferring water-solubility, and wherein $L_3$ is a member of the group consisting of a bathophenanthroline group and a benzobathophenanthroline group, both of which are substituted with an alkylene group having a maximum of eight carbon atoms which is terminally substituted with a —COOH, $—NH_2$ —NCS, —I or $—SO_2$ Hal group.

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**4,745,077**

## METHOD OF PERFORMING ASSAY FOR ANALYTE IN LIQUID MEDIUM

**John Holian, Chalfont St. Giles; John C. Edwards, Great Missenden; John K. Martin, Wendover, and Stephen A. Charles, Great Missenden, all of England, assignors to Amersham International plc., Buckinghamshire, England**

**Filed Jan. 17, 1985, Ser. No. 692,162**

**Claims priority, application United Kingdom, Jan. 19, 1984, 8401368**

**Int. Cl.⁴ G01N** *33/553, 33/533*

**U.S. Cl. 436—526** **7 Claims**

1. A method of performing an assay for an analyte in a liquid medium which comprises the steps:

(a) incubating, in an assay vessel, a sample containing said analyte, together with a first, labelled, reagent which is soluble in said liquid medium and wherein the label of said labelled reagent is a component of a fluorescent or luminescent system, and with a second reagent which is bound to magnetically attractable particles that are insoluble in, but suspendable in, said liquid medium; one of said first and said second reagents being a specific binder for said analyte and the other of said first and said second reagents being able to bind either to said analyte or to said specific binder; whereby said labelled reagent becomes partitioned between said liquid medium and said magnetically attractable particles in a proportion which depends on the concentration of said analyte in said sample;

(b) separating said magnetically attractable particles from said liquid medium and removing said liquid medium from said vessel; and

(c) resuspending said magnetically attractable particles in another liquid medium containing any further reagents required to react with the labelled reagent to generate a signal, and observing a signal generated by said labelled reagent bound to said magnetically attractable particles, whereby the concentration of said analyte in said sample may be determined.

**4,745,078**

## METHOD FOR INTEGRATED SERIES CONNECTION OF THIN FILM SOLAR CELLS

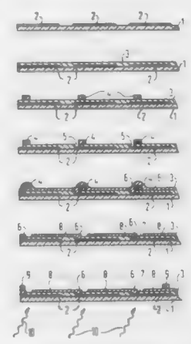
**Walter Stetter, Tiefenbach, and Winfried Peters, Neubiberg, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Dec. 29, 1986, Ser. No. 946,919**

**Claims priority, application Fed. Rep. of Germany, Jan. 30, 1986, 3602798**

**Int. Cl.⁴ H01L** *31/18*

**U.S. Cl. 437—4** **14 Claims**



1. A method for providing integrated series connections of a plurality of thin film solar cells including thin photovoltaic films formed on a common insulative transparent substrate having spaced apart transparent front electrodes formed therealong with metal filled separating grooves being formed in said films as electrically conductive connectors between the individual solar cells, comprising:

depositing a strip pattern of a material which is readily removable from said thin photovoltaic film onto said photovoltaic film at intervals dependent on the size of said solar cells, the strips of said pattern being offset laterally relative to the front electrodes lying under said thin films and extending over the regions of said thin film which are not to be covered by subsequently applied back electrodes;

mechanically generating separating grooves in said films alongside said strips;

depositing an electrically conductive metal over the entire surface thus produced; and

removing said strip pattern by lifting said pattern off said film, leaving gaps in the metallized layer forming the separated back electrodes of said solar cells.

3. A method according to claim 1 wherein said thin photovoltaic films are composed of deposited amorphous silicon.

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**4,745,079**

## METHOD FOR FABRICATING MOS TRANSISTORS HAVING GATES WITH DIFFERENT WORK FUNCTIONS

**James R. Pfiester, Austin, Tex., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Mar. 30, 1987, Ser. No. 31,299**

**Int. Cl.⁴ H01L** *21/265*

**U.S. Cl. 437—029** **21 Claims**

1. A method for fabricating an insulated gate field effect transistor (IGFET) comprising the steps of:

providing a semiconductor substrate;

forming a layer of gate dielectric material on the semiconductor substrate;

forming a layer of semiconductor material on the gate dielectric material layer;

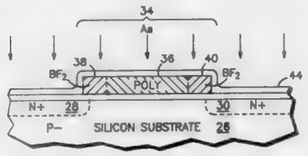
providing a pattern of masking material on the layer of semiconductor material, through which selected areas of the layer of semiconductor material are exposed;

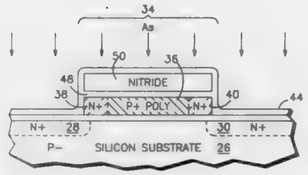
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introducing an impurity of a first conductivity type into the selected areas of the semiconductor material layer;

diffusing the impurity of the first conductivity type a selected distance into the semiconductor material layer laterally under the masking material pattern, wherein the selected distance is less than that required to completely




dope the semiconductor material under the masking material pattern, leaving a central portion of the conductive material pattern undoped with the impurity of the first conductivity type; and

providing an impurity of a second conductivity type into the central portion.

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**4,745,080**

## METHOD OF MAKING A SELF-ALIGNED BIPOLAR TRANSISTOR WITH COMPOSITE MASKING

**Peter D. Scovell, Chelmsford; Peter F. Blomley, Bishops Stortford; Roger L. Baker, Chelmsford, and Gary J. Tomkins, Maidstone, all of Great Britain, assignors to STC, plc, England**

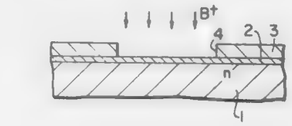
**Filed Feb. 20, 1986, Ser. No. 831,257**

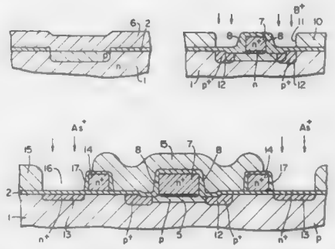
**Claims priority, application United Kingdom, Mar. 23, 1985, 8507607**

**Int. Cl.[4] B01J** *17/00;* **H01L** *21/26, 21/225*

**U.S. Cl. 437—31** **7 Claims**

7. A method of manufacturing a bipolar transistor including the steps of providing a semiconductor substrate having an oxide layer on a surface thereof, a region of which semiconductor substrate comprises the collector of the bipolar transistor; providing a base region within the collector region, the oxide layer being removed at the base region and the base region having a surface which is substantially unoxidized; depositing a layer of polycrystalline silicon to cover said oxide layer and the base region; defining a polycrystalline silicon emitter mesa from said polycrystalline silicon layer on the substantially unoxidized surface of the base region, the entire surface of the emitter mesa facing the base region being in contact therewith, and simultaneously defining a polycrystalline silicon collector contact alignment mesa from said polycrystalline layer on the oxide layer, the sole useful purpose of the alignment mesa in the transistor being for spacing definition; oxidizing the side walls of the emitter and alignment mesas and the exposed surface of the base region; providing a first photoresist layer over the emitter mesa including the oxidized side walls thereof, over the oxidized surface of the base region, the alignment mesa including the oxidized side walls thereof and over adjoining surface regions of the semiconductor substrate on which the oxide layer is disposed; patterning the first photoresist layer to define one part of a two-part base contact implantation mask, the other part of the base contact implantation mask being comprised by at least one oxidized side wall of the emitter mesa, and to remove the first photoresist layer from the at least one oxidized side wall of the emitter mesa between which mask part is defined a first window for base contact region implantation; subsequently implanting, in a first implantation step, a base contract region in contact with the base region through the first window, the base contact region being self-aligned with the emitter mesa as a result of using said at least one oxidized side wall of the emitter mesa directly as part of the respective mask, removing the patterned first photoresist layer; providing a second photoresist layer over the emitter mesa including the oxidized walls thereof, over the oxidized surface of the base region, over the alignment mesa including the oxidized side walls thereof and over adjoining surface regions of the semi conductor substrate on which the oxide layer is disposed; patterning the second







photoresist layer to define one part of a two-part collector contact region implantation mask, the other part of the collector contact region implantation mask being comprised by at least one oxidized side wall of the alignment mesa, and to remove the further photoresist layer from the at least one oxidized side wall of the alignment mesa, between which collector contact region implantation mask parts is defined a second window for collector contact region implantation; subsequently implanting, in a second implantation step, a collector contact region through the second window, the spacing between the emitter mesa and the collector contact region being defined by the spacing between the emitter mesa and the alignment mesa, the patterned second photoresist layer serving also to prevent implantation of collector contact material into areas other than the collector contact region; and removing the patterned second photoresist layer.

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**4,745,081**

## METHOD OF TRENCH FILLING

**Klaus D. Beyer, Poughkeepsie, and Victor J. Silvestri, Hopewell Junction, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Oct. 31, 1985, Ser. No. 793,518**

**Int. Cl.[4] H01L** *21/36, 21/425*

**U.S. Cl. 437—38** **28 Claims**

9. A method of forming an integrated circuit structure having an isolation pattern and a contact pattern comprising the steps of:

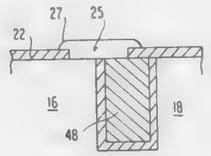
providing a semiconductor substrate having a pattern of substantially vertical-walled trenches extending downward from a major surface of said substrate;

forming an insulator layer on the walls of said trenches;



providing a channel stop at the bottom of each of said trenches;

filling said trenches with a photoresist and then selectively etching said photoresist from trenches where electrical contact with said substrate is to be made and also removing from those trenches the insulator layer at the trench bottom;




removing the remaining photoresist and growing epitaxial p-doped silicon in those trenches to be substrate contacts to fill and cover those trenches; and

filling the remaining trenches with undoped polysilicon; and

planarizing the major surface of said substrate to simultaneously form a pattern of substrate contact trenches and a pattern of isolation trenches.

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**4,745,082**

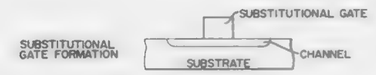
## METHOD OF MAKING A SELF-ALIGNED MESFET USING A SUBSTITUTIONAL GATE WITH SIDE WALLS

**Siang P. Kwok, Colorado Springs, Colo., assignor to Ford Microelectronics, Inc., Colorado Springs, Colo.**

**Filed Jun. 12, 1986, Ser. No. 873,515**

**Int. Cl.[4] H01L** *21/306, 21/265, 21/24*

**U.S. Cl. 437—39** **22 Claims**




1. A process for producing a semiconductor device, comprising:

a. depositing a layer of insulator material onto a supporting substrate of the type having a surface and which includes a channel region below the surface containing a carrier concentration of a desired conductivity type;

b. removing selected portions of the insulator material to form a substitutional gate on the substrate surface;

c. forming sidewalls of a dielectric material selected from the group consisting of silicon dioxide, silicon nitride, polymers and photoresist bounding the substitutional gate to define an effective masking area in cooperation with the substitutional gate;

d. reducing the thickness of the sidewalls to a desired thickness;

e. ion implanting a dopant into the unmasked region of the substrate;

f. removing the sidewalls;

g. annealing the resultant device;

h. applying a planarizing polymeric material over the substrate surface and the substitutional gate and thereafter etching back to expose the top of the substitutional gate;

i. removing the substitutional gate;

j. depositing gate metal and first and second ohmic contacts in correct positional relation to one another on the substrate; and

k. depositing metallic interconnects in electrical communication with the ohmic contacts to produce a semiconductor device.

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**4,745,083**

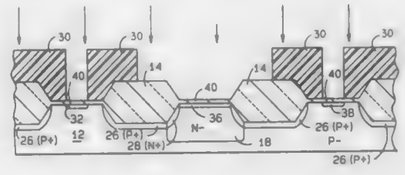
## METHOD OF MAKING A FAST IGFET

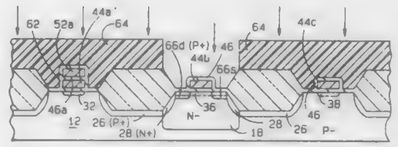
**Wing K. Huie, North Wales, Pa., assignor to Sprague Electric Company, North Adams, Mass.**

**Filed Nov. 19, 1986, Ser. No. 932,250**

**Int. Cl.[4] H01L** *21/265*

**U.S. Cl. 437—45** **9 Claims**




1. A method for making integrated CMOS transistors comprising:

(a) growing a layer of silicon dioxide on the surface of a silicon substrate of one conductivity type;

(b) forming a first photoresist mask over said silicon dioxide layer, said mask having an aperture registered with the site at which the gate of one FET device is to be formed in said substrate;

(c) selectively implanting through said mask aperture and through said silicon dioxide impurity ions of said one conductivity type to adjust the threshold of said one FET device;

(d) removing said first mask by a standard dissolution step, and by a standard chemcial vapor deposition step depositing a blanket layer of polycrystalline silicon over said oxide layer;

(e) forming a second mask that is patternwise complementary to said first mask to the extent that at the device region of said FET said second mask has a portion selectively covering said one-device gate site and exposing the adjacent source and drain sites;

(f) etching away the portions of said polysilicon layer that are exposed through said second mask to form said gate from a portion of said polysilicon layer;

(g) doping with impurities of said opposite conductivity type at said source and drain sites to form said source and drain using said gate as a self-aligning mask; and

(h) diffusing impurities of said opposite conductivity type in another FET device region prior to growing said silicon dioxide layer to form a well of opposite conductivity type, said first mask having an aperture over the entire of said another FET region so that said selectively implanting to adjust the threshold of one said FET device also effects a blanket implanting of opposite type impurities into said another device region to adjust the threshold of and increase the speed of said another device, said second mask additionally selectively covering the gate site of said another FET device and being open over the adjacent source and drain sites whereby said etching also removes portions of said polysilicon layer adjacent to said another-device-gate site to form said another-gate site to form said another-device gate and doping with impurities of said one conductivity type at said source and drain sites of said another device using said another-device gate as a self-aligning mask.

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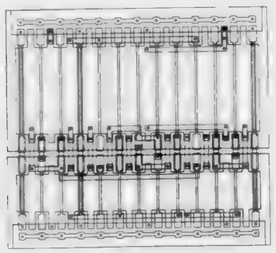


**4,745,084**

## METHOD OF MAKING A CUSTOMIZED SEMICONDUCTOR INTEGRATED DEVICE

**James A. Rowson, Fremont, and Stephen M. Trimberger, San Jose, both of Calif., assignors to VLSI Technology, Inc., San Jose, Calif.**

**Filed Nov. 12, 1986, Ser. No. 930,305**
**Int. Cl.[4] H01L *21/70***
**U.S. Cl. 437—51** **8 Claims**



1. A method of fabricating an electronic circuit, represented in netlist form and having a plurality of netlist transistors, in a customizable integrated semiconductor device in a substrate, comprising the steps of:

forming a plurality of chains of continuously electrically connected transistors (hereinafter: "physical transistors"), each chain having physical transistors all of the same conductivity type, in said substrate, each physical transistor has a gate, a source, and a drain;

electrically connecting the physical transistors to an adjacent physical transistor to form a continuous chain;

grouping the netlist transistors by diffusion line tracing, forming a plurality of groups;

assigning each group of netlist transistors to a group of physical transistors;

calculating the cost function associated with each group of physical transistors;

optimizing the total cost function by changing the assignment of one or more groups of said netlist transistors to said physical transistors and recalculating the cost function thereafter; and

routing the electrical interconnection from one group of physical transistors to another group of physical transistors to form the physical layout of said circuit.

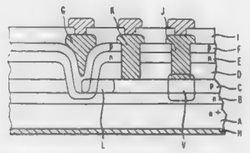
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**4,745,085**

## METHOD OF MAKING $I^2L$ HETEROSTRUCTURE BIPOLAR TRANSISTORS

**Chan-Long Shieh, Plainsboro, N.J., assignor to Siemens Corporate Research & Support, Inc., Iselin, N.J.**

**Division of Ser. No. 721,257, Apr. 8, 1985, Pat. No. 4,644,381. This application Dec. 1, 1986, Ser. No. 936,676**
**Int. Cl.[4] H01L *21/20***
**U.S. Cl. 437—55** **5 Claims**



1. A method of fabricating transistors for integrated injection logic, said method comprising the steps of:

(a) growing, on one side of a substrate of III-V compound semiconductor material having a first conductivity type, an epitaxial first layer of the same, first conductivity type;

(b) growing an epitaxial second layer on said first layer, said second layer having a second conductivity type opposite to that of said first conductivity type;

(c) depositing an insulating third layer on said second layer;

(d) etching a first opening in said second and third layers to the depth of said first layer;

(e) growing an epitaxial fourth layer of semi-insulating polycrystalline material of said second conductivity type on said fourth layer in said first opening;

(f) growing an epitaxial fifth layer of semi-insulating polycrystalline material of said second conductivity type on said fourth layer in said first opening;

(g) etching a second opening in said third, fourth and fifth layers to the depth of said second layer;

(h) depositing an ohmic first contact on said fifth layer over said first opening, thereby contacting the emitter of a lateral transistor and depositing an ohmic second contact on said second layer through said second opening, thereby contacting the collector of the lateral transistor; and

(i) depositing an ohmic third contact on the opposite side of said substrate, thereby contacting the base of said lateral transistor;

whereby the base region of said lateral transistor is formed by said fourth layer.

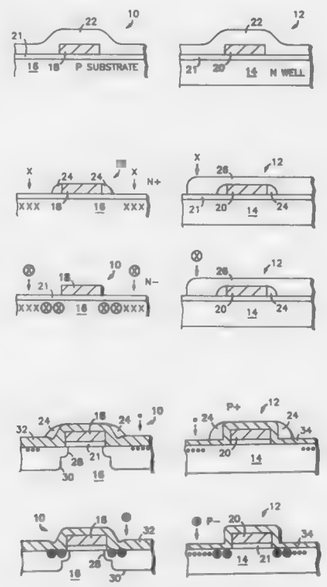
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**4,745,086**

## REMOVABLE SIDEWALL SPACER FOR LIGHTLY DOPED DRAIN FORMATION USING ONE MASK LEVEL AND DIFFERENTIAL OXIDATION

**Louis C. Parrillo; Stephen J. Cosentino, and Richard W. Mauntel, all of Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.**

**Continuation of Ser. No. 780,535, Sep. 26, 1985, abandoned. This application May 11, 1987, Ser. No. 47,589**
**Int. Cl.[4] H01L *21/26, 21/265, 21/22***
**U.S. Cl. 437—57** **10 Claims**




1. A process for forming lightly doped drains (LDDs) on both NMOS and PMOS devices together on a CMOS integrated circuit using only one mask level, comprising the following steps in the following sequence:

forming gates for NMOS and PMOS devices on an integrated circuit substrate;

forming disposable, cleanly removable sidewall spacers along the gate edges;

protecting gates of a first conductivity type by covering them with a disposable barrier material;

implanting heavily doped source/drain regions along sidewall spacer edges of gates of a second conductivity type, while gates of the first conductivity type are protected by the disposable barrier material;

removing the disposable sidewall spacer from along the edges of the gates of the second conductivity type;

implanting LDDs along the gate edges of the second conductivity while the gates of the first conductivity type are protected by a disposable barrier material;

removing the disposable barrier material;

driving in the source/drain regions and LDDs along the gate edges of the second conductivity type in a first thermal drive-in cycle in an oxidizing ambient to grow silicon dioxide over the surface of the substrate wherein the oxide over the source/drain regions and LDDs by the gates of the second conductivity type is thicker than the oxide over future source/drain regions by the gates of the first conductivity type;

reforming disposable, cleanly removable sidewall spacers along the gate edges;

implanting heavily doped source/drain regions along the edges of the sidewall spacers of gates of the first conductivity type;

removing all disposable sidewall spacers from along the gate edges;

implanting LDDs along the gate edges of the first conductivity type; and

driving in the source/drain regions and LDDs along the gate edges of the first conductivity type in a second thermal drive-in cycle.



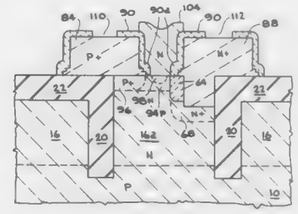
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**4,745,087**

## METHOD OF MAKING FULLY SELF-ALIGNED BIPOLAR TRANSISTOR INVOLVING A POLYSILICON COLLECTOR CONTACT FORMED IN A SLOT WITH AN OXIDE SIDEWALL

**Ali Iranmanesh, San Antonio, Tex., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.**

**Filed Jan. 13, 1987, Ser. No. 2,850**
**Int. Cl.[4] H01L *21/44***
**U.S. Cl. 437—69** **21 Claims**



1. An improved method of making a fully self-aligned bipolar transistor comprising:

(a) forming one or more mask layers over a silicon substrate;

(b) etching at least one of said one or more masking layers to define a base contact area and a spaced apart collector contact area with an unetched emitter contact area defined in between;

(c) masking said base contact area;

(d) forming a collector slot in a substrate of an integrated circuit structure through said collector contact area defined in said one or more mask layers;

(e) oxidizing the sidewall of said collector slot;

(f) forming a deeper portion of said collector slot after oxidizing said collector slot sidewall;

(g) forming a collector region in said substrate through the wall of said collector slot below said oxidized collector slot sidewall;

(h) filling said collector slot and said base and collector contact regions with polysilicon;

(i) forming an emitter contact region between said collector and base contact regions; and

(j) forming a base region in said substrate spaced from said collector slot by said oxide formed on the sidewall of said slot.

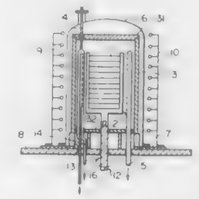
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**4,745,088**

## VAPOR PHASE GROWTH ON SEMICONDUCTOR WAFERS

**Yosuke Inoue, Ibaraki; Takaya Suzuki, Katsuta; Masahiro Okamura, Tokyo; Noboru Akiyama, Hitachi; Masato Fujita, Yamanashi; Hiroo Tochikubo, Tokyo, and Shinya Iida, Tama, all of Japan, assignors to Hitachi, Ltd. and Kokusai Elect. Co. Ltd., both of Tokyo, Japan**

**Filed Feb. 19, 1986, Ser. No. 830,713**
**Claims priority, application Japan, Feb. 20, 1985, 60-30459**
**Int. Cl.[4] C23C *13/08, 16/00***
**U.S. Cl. 437—102** **9 Claims**



1. A method of growing a thin layer on a semiconductor wafer from vapor phase, comprising the steps of:

holding a multiplicity of semiconductor wafers within a cylindrical heater in a state that said semiconductor wafers are arranged in a vertical direction at substantially regular intervals while making the principal surfaces of each semiconductor wafer substantially parallel to a horizontal plane and are rotated about an axis passing through the substantial center of the principal surface of each semiconductor wafer, said heater being able to substantially surround all the semiconductor wafers;

placing said heater in a reaction vessel to isolate said heater from the external atmosphere;

heating said heater by a heating source, said heating source being provided outside of said reaction vessel; and

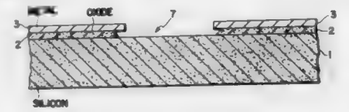
supplying a raw material gas from one side of said semiconductor wafers to each semiconductor wafer, at a position in the vicinity of each said semiconductor wafer, so that the flow of said raw material gas is substantially parallel to the principal surface of each semiconductor wafer, the raw material gas being supplied by a gas supply nozzle, the gas supply nozzle being placed outside of the heater, and discharging exhausted raw material gas on the other side opposite to the gas supply side, at a position in the vicinity of each said semiconductor wafer, to grow thin layers on said semiconductor wafers from said raw material.

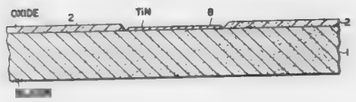
**4,745,089**

## SELF-ALIGNED BARRIER METAL AND OXIDATION MASK METHOD

**Richard A. Orban, Raleigh, N.C., assignor to General Electric Company, N.Y.**

**Filed Jun. 11, 1987, Ser. No. 60,490**
**Int. Cl.⁴ H01L** *21/283*
**U.S. Cl. 437—190** **18 Claims**




9. A method for forming a self-aligned barrier layer and oxidation mask for use in the manufacture of at least one electronic device on a semiconductor substrate, comprising at least the steps of:

a. forming an insulating layer on the substrate;
b. forming a metallic layer on the insulating layer;
c. forming an etch-resistant layer on the metallic layer;
d. selectively removing part of the etch-resistant layer, thereby exposing part of the underlying metallic layer;
e. removing the exposed part of the metallic layer, thereby exposing part of the underlying insulating layer;
f. removing the remainder of the etch-resistant layer, and the exposed part of the insulating layer, thereby exposing part of the underlying substrate;
g. depositing barrier material on the exposed substrate;
h. removing the remainder of the metallic layer;
i. flowing the exposed insulating layer to prevent stress point sites; and
j. depositing a metallic contact layer over the insulating layer and in contact with the barrier material.

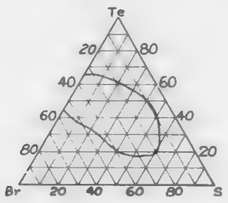
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**4,745,090**

## GLASSES BASED ON TELLURIUM HALIDES, THEIR PREPARATION AND THEIR USE PRINCIPALLY IN THE OPTOELECTRONIC AND INFRA-RED TRANSMISSION FIELD

**Jacques Lucas, Betton, and Xiang H. Zhang, Rennes, both of France, assignors to Centre National de la Recherche Scientifique (CNRS), Paris, France**

**Filed Feb. 9, 1987, Ser. No. 12,393**
**Claims priority, application France, Feb. 7, 1986, 86 01683**
**Int. Cl.⁴ C03C** *3/32, 13/00*
**U.S. Cl. 501—40** **9 Claims**




1. A solid vitreous composition having the formula

$$Te_{100-x-z}X_xZ_z \quad (I)$$

wherein

X represents a halogen selected from the group consisting of chlorine, bromine and iodine,
Z represents sulfur and/or selenium,
x is a number representing the molar percentage of the element X and ranging from 5 to 67,
z is a number representing the molar percentage of the element Z and ranging from 0 to 60,
it being understood that the sum (x+z) ranges from 33 to 85.

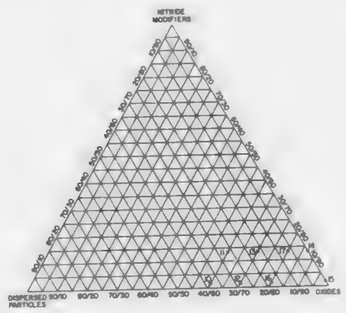
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**4,745,091**

## NOVEL COMPOSITIONS FOR OXIDE CERAMICS

**Richard L. Landingham, Livermore, Calif., assignor to Landalloy, Inc., Livermore, Calif.**

**Continuation-in-part of Ser. No. 820,515, Jan. 17, 1986, abandoned, which is a continuation of Ser. No. 550,869, Nov. 9, 1983, abandoned. This application Aug. 11, 1986, Ser. No. 895,335**
**Int. Cl.⁴ C04B** *35/10, 35/56, 35/58*
**U.S. Cl. 501—87** **6 Claims**




1. A ceramic composition for use in cutting tools, seal rings and wear resistant applications consisting essentially of:

a predominantly aluminum oxide matrix;
a second phase in said matrix comprising a uniform distribution of from 0.1 to 15.0 weight percent nitride modifiers selected from the group consisting of silicon nitride, aluminum nitride and mixtures thereof; and, 0.10 to 40.0 weight percent dispersion particles selected from the group consisting of TiC, TiN, ZrC, ZrN, HfC, HfN, $B_4C$, SiC, $Ti_xN_y$, $ZrC_xN_y$ and $HfC_xN_y$, where x plus y is in the range of 0.5 to 1.0, and mixtures thereof.

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**4,745,092**

## STRENGTHENED CORDIERITE HAVING MINOR AMOUNTS OF CALCIA

**Arthur R. Prunier, Jr., Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.**

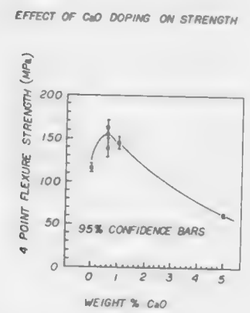
**Filed Apr. 27, 1987, Ser. No. 42,996**
**Int. Cl.⁴ C04B** *35/04*
**U.S. Cl. 501—119** **20 Claims**

1. A sintered, isotropic refractory body consisting essentially of doped cordierite having from about 47.5 to about 56 weight percent $SiO_2$, from about 31 to about 40 weight percent $Al_2O_3$, from about 12 to about 19 weight percent MgO, from about 0.15 to about 1 weight percent CaO, from zero to about 0.3 weight percent total alkaline earth metal oxides other than MgO and CaO, from zero to about 250 ppm $NaO_2O$, from zero to about 150 ppm $K_2O$, and less than about 500 ppm transition metals, on the oxide basis, the cordierite body being prepared using synthetic raw materials, the body having mean flexural strength of at least about 20,000 psi.



16. A process for the preparation of a refractory body, the process comprising:

(a) preparing a synthetic cordierite precursor powder from synthetic raw materials;
(b) preparing an aqueous slurry of a calcia source and the powder of step (a);
(c) treating the slurry to obtain a dry, calcia-containing powder;




(d) preparing a green body from the powder of step (c), optionally including in the green body one or more forming additives; and
(e) firing the green body to form a refractory doped cordierite body having from about 47.5 to about 56 weight percent $SiO_2$; from about 31 to about 40 weight percent $Al_2O_3$; from about 12 to about 19 weight percent MgO; from about 0.15 to about 1 weight percent CaO; and a mean flexural strength of at least about 20,000 psi as measured using the 4 point bending strength method.

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**4,745,093**

## DIELECTRIC CERAMIC COMPOSITION

**Takashi Okawa, Kokubu, and Nobuo Yokoe, Hayato, both of Japan, assignors to Kyocera Corporation, Kyoto, Japan**

**Filed Nov. 26, 1985, Ser. No. 802,037**
**Claims priority, application Japan, Nov. 27, 1984, 59-251322**
**Int. Cl.⁴ C04B** *35/46, 35/00*
**U.S. Cl. 501—138** **1 Claim**

1. A dielectric ceramic material consisting essentially of a solid solution of strontium nickelniobate and barium titanate represented by the following formula:

$$(1-x)Sr(Ni_{1/3}Nb_{2/3})O_3.x\ BaTiO_3,$$

wherein x is a positive number of from 0.06 to 0.20 and said dielectric ceramic material has a perovskite structure.

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**4,745,094**

## MONO- OR MULTI-METAL MICROAGGREGATES, A METHOD FOR THEIR PREPARATION AND THEIR APPLICATION IN THE CATALYSIS OF THE PHOTOREDUCTION OF WATER

**Jacqueline Belloni Cofler, Palaiseau; Jean-Louis Marignier, Meudon; Marie-Odile Delcourt Euverte, Magny-les-Hameaux, and Michele Mirana Lourseau, Rambouillet, all of France, assignors to Centre National de la Recherche Scientifique, Paris, France**

**Continuation-in-part of Ser. No. 744,445, Jun. 13, 1985, Pat. No. 4,629,709. This application Sep. 18, 1986, Ser. No. 909,055**
**Claims priority, application France, Jun. 13, 1984, 84 09196**
**Int. Cl.⁴ B01J** *37/34*
**U.S. Cl. 502—5** **19 Claims**

1. A mono- or multi-metal microaggregate composition comprising a monodisperse phase of mono- or multi-metal microaggregates in a liquid or solid medium, wherein the metal of said mono-metal microaggregates is selected from the group consisting of a non-noble metal and a noble metal selected from the group consisting of mercury, palladium, rhodium, ruthenium, osmium and copper, wherein the metal of said multi-metal microaggregate is selected from the group consisting of alloys of non-noble metals,alloys of noble metals and alloys of non-noble metals with noble metals, and wherein said microaggregates have a size which is uniformly less than 5 nm.

3. The mono- or multi-metal microaggregate composition of claim 1, wherein the non-noble metal is selected from the group consisting of nickel, cobalt, lead, zinc, iron, antimony, tin and bismuth.

7. A method for the preparation of a mono- or multi-metal microaggregate composition in homogenous dispersed phases by irradiation of a metal salt, or a mixture of salts, by means of an ionizing radiation source, comprising dissolving a metal salt or a mixture of metal salts, in a suitable solvent, in the presence of an oxidizing radical scavenger, and a surfactant, a support or both a surfactant and a support, and then carrying out irradiation.

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**4,745,095**

## PROCESS FOR PREPARATION OF HYDROGEN-ION-EXCHANGED DEALUMINATED MORDENITE

**Hiroyuki Saito; Takahiko Inoue, both of Tokuyama, and Kazushige Igawa, Shinnanyo, all of Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Shinnanyo, Japan**

**Filed Dec. 2, 1986, Ser. No. 937,111**
**Claims priority, application Japan, Dec. 4, 1985, 60-271597**
**Int. Cl.⁴ B01J** *29/18, 29/08*
**U.S. Cl. 502—78** **9 Claims**

1. A process for the preparation of hydrogen ion-exchanged dealuminized mordenite wherein synthetic sodium mordenite is treated with an acid to form hydrogen ion-exchanged mordenite having a reduced alumina content, which comprises:

filtering an aqueous mordenite slurry containing synthetic sodium mordenite which is obtained without drying an as-synthesized sodium mordenite, through a filter to form a wet cake layer of the sodium mordenite;
passing through the cake layer an aqueous solution of a mineral acid having a concentration of 0.1N to 5N; and then,
washing the cake layer.

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**4,745,096**

## BAGASSE RESIDUE FILTER MATERIALS AND ACTIVATED CARBON PRODUCTS AND METHODS OF MANUFACTURING THE SAME

**Boyd T. Keogh, Sydney, Australia, assignor to Anjan DVI Limited, British Virgin Isls.**

**Continuation of Ser. No. 194,051, Oct. 6, 1980, abandoned, which is a continuation-in-part of Ser. No. 951,082, Oct. 13, 1978, Pat. No. 4,249,954. This application Jun. 24, 1985, Ser. No. 748,049**
**Claims priority, application Australia, Aug. 26, 1980, PE5239**
**Int. Cl.⁴ B01J** *20/20, 20/16, 20/28;* **B01D** *39/02*
**U.S. Cl. 502—413** **11 Claims**

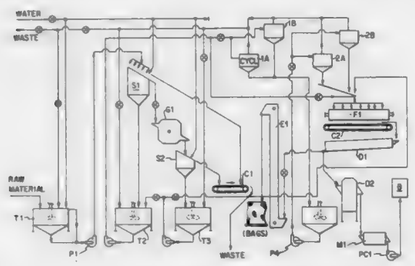
1. A filtration product consisting essentially of inorganic bagasse ash particles derived from the combustion of bagasse fibre, said bagasse ash particles having been classified by size so that no greater than 25% by weight of said ash particles are of a particle size below about 12 to 15 microns and at least 90% by weight of said particles are smaller than about 375 microns and having an activated carbon content of below about 30% by weight based on the loss of ignition.

6. An adsorbent product derived from bagasse ash resulting from the combustion of bagasse fibre in a sugar mill boiler, said product consisting essentially of inorganic ash particles of high activated carbon content constituting partially burnt or

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charred portions of said bagasse fibre, said ash particles having been classified by size so as to exhibit a loss on ignition of at least about 40% by weight and having a particle size below about 1700 microns.




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**4,745,097**

## MICROCAPSULE-COATED PAPERS FOR PRESSURE-SENSITIVE COPYING PAPER

**Masakazu Maekawa, and Yasuhiro Ogata, both of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Mar. 11, 1986, Ser. No. 838,498**
**Claims priority, application Japan, Mar. 12, 1985, 60-48937**
**Int. Cl.[4] B41M** *5/16, 5/22*
**U.S. Cl. 503—209** **7 Claims**

1. A microcapsule-coated paper for a pressure-sensitive copying paper comprising a base paper having coated thereon consecutively (a) a subbing layer and (b) a coated layer including microcapsules wherein (1) said subbing layer contains a flocculant for aggregating said microcapsules and (2) said microcapsules are anionic microcapsules and the flocculant is selected from the group consisting of water-soluble cationic polymers, cationic emulsions, cationic fine particles, water-soluble cationic low-molecular weight organic compounds, and water-soluble polyvalent metal salts.

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**4,745,098**

## COMPOSITIONS AND METHOD FOR IMPROVING WOUND HEALING

**Dov Michaeli, San Francisco, Calif., assignor to The Regents of the University of California, Berkeley, Calif.**

**Filed Feb. 24, 1984, Ser. No. 583,159**
**Int. Cl.[4] A61K** *37/00, 31/725, 31/715*
**U.S. Cl. 514—2** **46 Claims**

1. A method for promoting the healing of a surface wound, which method comprises:

applying to the wound surface, a liquid aqueous suspension of collagen fibrils in admixture with a minor amount of a glycosaminoglycan wherein said glycosaminoglycan is chemotactic for fibroblasts or endothelial cells and the collagen is not covalently crosslinked to the glycosaminoglycan, wherein said liquid aqueous suspension is applied repeatedly to the wound surface during the healing to effectively promote the healing process.

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**4,745,099**

## PHARMACEUTICAL COMPOSITION FOR THE TREATMENT OF THE ANEMIA OF MALIGNANT TUMORS

**Ken-ichi Akamatsu, Tokyo, and Masayoshi Ono, Saitama, both of Japan, assignors to Chugai Seiyaku Kabushiki Kaisha, Tokyo, Japan**

**Filed Feb. 3, 1986, Ser. No. 825,223**
**Claims priority, application Japan, Feb. 6, 1985, 60-21163**
**Int. Cl.[4] A61K** *37/10*
**U.S. Cl. 514—8** **1 Claim**

1. A method for treating the anemia of malignant tumors in a patient who is suffering from anemia of malignant tumors which comprises administering to said patient a therapeutically effective amount of human erythropoietin for treating anemia of malignant tumors in a pharmaceutically acceptable carrier.

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**4,745,100**

## STIMULATION OF TEAR SECRETION

**Jeffrey P. Gilbard, Boston, and Darlene A. Dartt, Newton, both of Mass., assignors to Eye Research Institute of Retina Foundation, Boston, Mass.**

**Continuation-in-part of Ser. No. 733,967, May 14, 1985, abandoned. This application Feb. 19, 1986, Ser. No. 830,996**
**Int. Cl.[4] A61K** *37/24, 37/28;* **G02C** *7/04*
**U.S. Cl. 514—12** **6 Claims**

1. A method of stimulating in vivo fluid secretion from human accessory lacrimal glands comprising the step of topical administration to the ocular surface of an effective amount of a preparation which includes a compound that activates the vasoactive intestinal peptide receptors of said accessory lacrimal glands, said compound selected from a group consisting a glucagon, vasoactive intestinal peptide, and their active precursors, derivatives, analogs, and fragments.

4. A method of stimulating in vivo fluid secretion from human accessory lacrimal glands comprising the step of topical administration to the ocular surface of an effective amount of a preparation which includes a compound that activates the vasoactive intestinal peptide receptors of said accessory lacrimal glands, said compound selected from a group consisting of secretin, and its active precursors, derivatives, analogs, and fragments.

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**4,745,101**

## NOVEL PEPTIDE HAVING DENTINAL FLUID TRANSPORT-STIMULATING ACTIVITY

**Shigeru Aonuma, Gotenba, Japan, assignor to Teikoku Hormone Mfg. Co., Ltd., Tokyo, Japan**

**Filed Apr. 25, 1986, Ser. No. 856,021**
**Claims priority, application Japan, Apr. 26, 1985, 60-88862**
**Int. Cl.[4] A61K** *37/02;* **C07K** *7/08*
**U.S. Cl. 514—13** **3 Claims**

1. A peptide having the amino acid sequence represented by the following formula

1 10
Gly—Val—Ile—Ala—Trp—Glu—Leu—Gln—His—Asn—Glu—

20
—Pro—Gly—Arg—Lys—Asp—Ser—Thr—Ala—Gly.

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**4,745,102**

## NOVEL TREATMENT METHOD

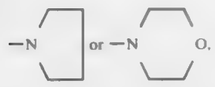
**Fernand Labrie, Quebec, Canada, and Jean-Pierre Raynaud, Paris, France, assignors to Roussel Uclaf, Paris, France**

**Division of Ser. No. 621,421, Jun. 28, 1984, which is a division of Ser. No. 468,932, Feb. 23, 1983, Pat. No. 4,472,382, which is a division of Ser. No. 189,168, Sep. 22, 1980, abandoned. This application Oct. 22, 1986, Ser. No. 921,737**
**Claims priority, application France, Sep. 21, 1979, 79 23545**
**Int. Cl.[4] A61K** *37/02*
**U.S. Cl. 514—15** **6 Claims**

1. A method of treating hormono-dependent mammary tumors in female mammals consisting essentially of administering to female mammals an amount of a peptide of the formula

p Glu-His-Trp-Ser-Tyr-X-Y-Arg-Pro-Z (I)

wherein (a) Z is Gly-$NH_2$, Y is Leu and X is Gly, (b) Z is Gly-$NH_2$, Y is Leu, X is DN Leu, DN Val, D Abu (α-aminobutyric acid), D Phe, D Ser, D Thr, D Met, D Pgl, D Lys, Leu, Ile, Nle, Val, N Val, Met, Phe, D Leu, D Arg, D Ser (tbu), D Thr (tbu), D Cys (tbu), D Asp (0 tbu), D Glu (0 tbu), D Orn (boc), D Lys (boc), D Trp, Trp, 2-methyl Ala, D Tyr, ε-lauryl-D Lys, α-dextran-D Lys, (c) Z is NH-cyclopropyl- or NH-Alk wherein Alk is alkyl of 1 to 3 carbon atoms, Y is Leu and X is D Ser (tbu), D Thr (tbu), D Asp (Otbu), D Glu (Otbu), D Orn (boc), D Lys (boc), (d) Z is —NH—$CH_3$, —NH—$CH_2$—$CH_3$, NH—$CH_2$—$CH_2$—$CH_3$, —NH—$CH_2$—$CH_2$—OH,




Y is Leu and X is Gly, (e) Z is —NH—$CH_2$—$CH_3$, Y is Leu and X is D Trp, D Leu, D Ala, D Ser (tbu), D Tyr, D Lys, Ala, (f) Z is Gly-$NH_2$ or —NH—$CH_2$—$CH_3$, Y is NαMe Leu and X is Gly, (g) Z is —NH-cyclopropyl, Y is Leu and X is D Leu or (h) Z is Gly-$NH_2$, —NH-cyclopropyl or -NHAlk′ wherein Alk′ is alkyl of 1 to 3 carbon atoms, Y is Ser (but), Cys (but), Asp (Obut), Glu (Obut), Orn (boc), Lys (boc) and X is Gly and an antiandrogen sufficient to treat hormono-dependent mammary tumors.

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**4,745,103**

## HAIR COSMETIC COMPOSITION

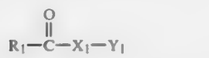
**Tooru Oono, and Yuichi Nishida, both of Tokyo, Japan, assignors to Lion Corporation, Japan**

**Filed Jun. 3, 1985, Ser. No. 740,809**
**Claims priority, application Japan, Jun. 29, 1984, 59-134792**
**Int. Cl.[4] A61K** *7/06*
**U.S. Cl. 514—23** **22 Claims**

1. A composition of matter in the form of a solution, comprising:

(a) a solvent including ethanol;

(b) a hair-growing component which is at least one compound selected from the group consisting of:


(1)

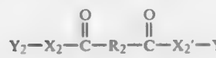
wherein

$R_1$ is a straight chain aliphatic group having 8 or more even numbered carbon atoms,

$X_1$ is —O— or



where $R_4$ represents hydrogen or an organic group, and $Y_1$ is hydrogen, an organic group or an inorganic group;


(2)

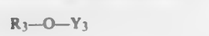
wherein

$R_2$ is a straight chain aliphatic group having 7 or more, odd numbered carbon atoms,

$X_2$ and $X_2'$ are independently —O— or



where $R_5$ represents hydrogen or an organic group and $Y_2$ and $Y_2'$ are independently hydrogen, an organic group or an inorganic group; and


(3)

wherein

$R_3$—O—$Y_3$ is a straight chain aliphatic group having 9 or more odd numbered carbon atoms,

$Y_3$ is hydrogen, an organic group or an inorganic group; and

(c) a nonionic surfactant having an HLB value of not greater than 10.

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**4,745,104**

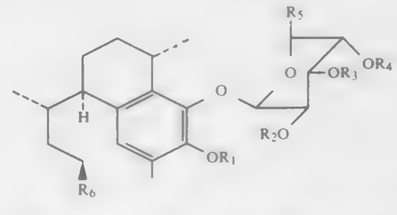
## PSEUDOPTEROSIN AND SYNTHETIC DERIVATIVES THEREOF

**Robert S. Jacobs, Santa Barbara, and William H. Fenical, Del Mar, both of Calif., assignors to The Regents of the University of California, Berkeley, Calif.**

**Filed Apr. 15, 1985, Ser. No. 723,214**
**Int. Cl.[4] A61K** *31/70;* **C07H** *15/24*
**U.S. Cl. 514—33** **22 Claims**

21. A method for treating mammals suffering from pain to reduce pain which comprises:

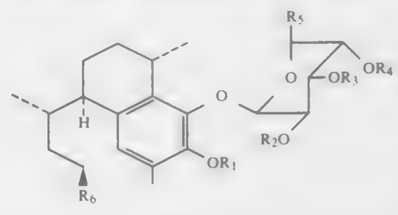
administering to said mammal a pain reducing effective amount of a composition consisting essentially of seco analogs of compounds having the structure:



wherein $R_1$, $R_2$, $R_3$ and $R_4$ are hydrogen or an acyl residue having from 1 to 6 carbon atoms, $R_5$ is hydrogen or $CH_2OH$ and $R_6$ is a hydrocarbon having from 1 to 10 carbon atoms; and a pharmaceutically acceptable carrier compound therefor.

22. A method for treating mammals having inflamed tissue to reduce inflammation which comprises:

administering to said mammal an inflammation reducing effective amount of a composition consisting essentially of seco analogs of compounds having the structure:



wherein $R_1$, $R_2$, $R_3$ and $R_4$ are hydrogen or an acyl residue having from 1 to 6 carbon atoms, $R_5$ is hydrogen or $CH_2OH$ and $R_6$ is a hydrocarbon having from 1 to 10 carbon atoms; and a pharmaceutically acceptable carrier compound therefor.

**4,745,105**

## LOW MOLECULAR WEIGHT HEPARIN DERIVATIVES WITH IMPROVED PERMEABILITY

**Charles C. Griffin, 710 Melissa Dr., Oxford, Ohio 45056; Kevin M. Foley, 5757 Lynn St., Franklin, Ohio 45005, and Eduardo Amaya, 811 Sands Ave., Monroe, Ohio 45050**

**Filed Aug. 20, 1986, Ser. No. 898,130**

**Int. Cl.[4] A61K** *31/715;* **C08B** *37/10*

**U.S. Cl. 514—56** **34 Claims**

1. An ester of low molecular weight heparin characterized by

a butanol water (3:2) partition coefficient greater than $1\times10^{-4}$.

**34**. A pharmaceutically active composition comprising a pharmaceutically acceptable carrier or diluent and, as the pharmaceutically active component, a product as claimed in any one of claims **1–33**.

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**4,745,106**

## HEPARIN DERIVATIVES HAVING IMPROVED ANTI-XA SPECIFICITY

**Charles C. Griffin, 710 Melissa Dr., Oxford, Ohio 45056; Kevin M. Foley, 5757 Lynn St., Franklin, Ohio 45005, and Eduardo Amaya, 811 Sands Ave., Monroe, Ohio 45050**

**Filed Aug. 20, 1986, Ser. No. 898,436**

**The portion of the term of this patent subsequent to May 17, 2005, has been disclaimed.**

**Int. Cl.[4] A61K** *31/725;* **C08B** *37/10*

**U.S. Cl. 514—56** **17 Claims**

1. An ester of heparin characterized by an anti-Xa/APTT ratio greater than 1.5.

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**4,745,107**

## HEPARIN DERIVATIVES WITH IMPROVED PERMEABILITY

**Kevin M. Foley, 5757 Lynn St., Franklin, Ohio 45005; Charles C. Griffin, 710 Melissa Dr., Oxford, Ohio 45056, and Eduardo Amaya, 811 Sands Ave., Monroe, Ohio 45050**

**Filed Aug. 20, 1986, Ser. No. 898,124**

**The portion of the term of this patent subsequent to May 17, 2005, has been disclaimed.**

**Int. Cl.[4] A61K** *31/725;* **C08B** *37/10*

**U.S. Cl. 514—56** **31 Claims**

1. An aliphatic ester of heparin containing more than 0.1 ester groups per tetrasaccharide unit.

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**4,745,108**

## HEPARIN DERIVATIVES HAVING DECREASED ANTI-XA SPECIFICITY

**Kevin M. Foley, 5757 Lynn St., Franklin, Ohio 45005; Charles C. Griffin, 710 Melissa Dr., Oxford, Ohio 45056, and Eduardo Amaya, 811 Sands Ave., Monroe, Ohio 45050**

**Filed Aug. 20, 1986, Ser. No. 898,127**

**The portion of the term of this patent subsequent to May 17, 2005, has been disclaimed.**

**Int. Cl.[4] A61K** *31/725;* **C08B** *37/10*

**U.S. Cl. 514—56** **17 Claims**

1. An ester of heparin characterized by an anti-Xa/APTT ratio less than 1.0.

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**4,745,109**

## SUICIDE INHIBITORS OF AROMATASE

**Patrick J. Bednarski; David J. Porubek, and Sidney D. Nelson, all of Seattle, Wash., assignors to Washington Research Foundation, Seattle, Wash.**

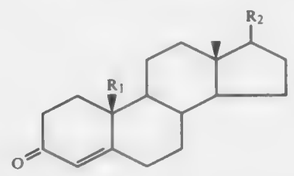
**Filed Aug. 20, 1984, Ser. No. 642,620**

**Int. Cl.[4] A61K** *31/56;* **C07J** *1/00*

**U.S. Cl. 514—170** **18 Claims**

8. A method for treating estrogen-dependent breast tumors by inhibiting the formation of estrogen from $C_{19}$ androgens having a $\Delta^4$,3-ketone group, such an androstenedione, comprising the step of:

administering an effective amount of a pharmaceutically active, synthetic hormone to the patient, the hormone selected from the group consisting of:



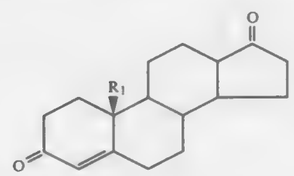
and mixtures thereof, wherein

$R_1$=—SH, and

$R_2$= ▌OH or =O.

12. A suicide inhibitor for human aromatase in the presence of NADPH to inhibit the activity of aromatase for converting $C_{19}$ androgens having a $\Delta^4$,3-ketone group to $C_{18}$ estrogens, the inhibitor comprising:

a pharmaceutically active, synthetic hormone having a testosterone ring system backbone, a B-thiol substituent at the 10 carbon of the backbone, and a=0 at the 17 carbon of the backbone, so that the hormone has the generalized structure:



wherein $R_1$=the thiol substituent.

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**4,745,110**

## BICYCLIC BENZENOID AMINOALKYLENE ETHERS AND THIOETHERS, PHARMACEUTICAL COMPOSITIONS AND USE

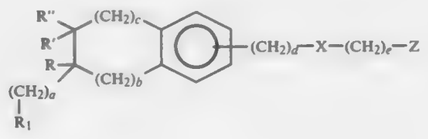
**Donald E. Kuhla, Doylestown; Henry F. Campbell, Lansdale, and William L. Studt, Harleysville, all of Pa., assignors to Rorer Pharmaceutical Corporation, Fort Washington, Pa.**

**Division of Ser. No. 929,592, Nov. 12, 1986, Pat. No. 4,692,445, which is a division of Ser. No. 867,467, May 23, 1986, Pat. No. 4,647,559, which is a continuation-in-part of Ser. No. 604,813, Apr. 27, 1984, Pat. No. 4,638,001, which is a continuation-in-part of Ser. No. 798,697, Nov. 1, 1985, Pat. No. 4,639,442, which is a continuation-in-part of Ser. No. 489,702, Apr. 29, 1983, Pat. No. 4,529,723. This application Jul. 27, 1987, Ser. No. 62,951**

**Int. Cl.[4] A61K** *31/55, 31/535;* **C07D** *401/14, 413/14*

**U.S. Cl. 514—212** **18 Claims**

1. A compound of the formula:



wherein:

a is 0, 1 or 2;

b is 0 or 1;

c is b, 1-b, 2-b, or 3-b;

d is 0 or 1



e is 2, 3 or 4;

X is oxygen, sulfur,



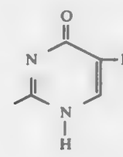
Z is $NHR_4$;

R, R′ and R″ are each independently H, alkyl, or unsubstituted or substituted phenylalkyl;

$R_1$ is $—NR_2R_3$;

$R_2$ and $R_3$ are each independently H or alkyl, or both together with the nitrogen to which they are attached form a 5, 6 or 7-membered ring which may include one to three additional hetero atoms of N, O or S;

$R_4$ is selected for the group consisting of



$R_{15}$ is arylalkyl; or a pharmaceutically acceptable salt thereof.

17. A method for the treatment of gastrointestinal hyperacidity and ulceration in a mammal comprising administering thereto an effective amount of a compound according to claim **1**.

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**4,745,111**

## ANTI-ANXIETY, ANTI-AGITATION, AND ANTI-SLEEPLESS STATES 4-SUBSTITUTED 10-CYANOMETHYLENETHIENO-[4,3-E]BENZOAZEPINE DERIVATIVES, COMPOSITIONS, AND METHODS OF USE THEREFOR

**Gerd Steiner, Kirchheim; Hans-Juergen Teschendorf, Dudenhofen, and Liliane Unger, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

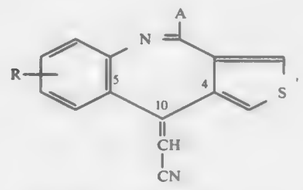
**Filed Jul. 9, 1986, Ser. No. 883,628**

**Claims priority, application Fed. Rep. of Germany, Jul. 11, 1985, 3524744**

**Int. Cl.[4] A61K** *31/55;* **C07D** *223/14, 223/16*

**U.S. Cl. 514—215** **14 Claims**

1. A 4-substituted 10-cyanomethylenethieno[4,3-]-benzoazepine of the formula I



I

where R is hydrogen, halogen, alkyl of 1 to 3 carbon atoms, trifluoromethyl or alkoxy of 1 to 3 carbon atoms and A is an amino radical $—NR^1R^2$, in which $R^1$ and $R^2$, together with the nitrogen atom to which they are bonded, form a saturated 5-membered, 6-membered or 7-membered ring which may contain nitrogen or oxygen as a further heteroatom, and any additional nitrogen atom present is unsubstituted or substituted by alkyl of 1 to 3 carbon atoms, hydroxyalkyl of 2 or 3 carbon atoms, alkoxyalkyl where the alkyl and alkoxy radicals are each of 1 to 3 carbon atoms, cycloalkyl or cycloalkylmethyl, each of which has 3 to 7 carbon atoms in the cycloalkyl ring, or alkynyl of 2 to 5 carbon atoms, and may additionally be substituted by oxygen in the form of an N-oxide, or A is, piperidinyl, piperazinyl or homopiperazinyl, wherein any ring nitrogen atom may be substituted by hydrogen, methyl, ethyl, β-hydroxyethyl, cyclopropyl or propynyl and/or may be present in the form of the n-oxide, and its physiologically tolerated additional salts with acids.

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**4,745,112**

## OXADIAZOLYLIMIDAZOBENZODIAZEPINE, COMPOSITIONS, AND METHOD III

**Frank Wätjen, Bagsvaerd; Mogens Engelstoft, Vaerlose; John B. Hansen, Lyngby, and Leif H. Jensen, Hellerup, all of Denmark, assignors to A/S Ferrosan, Soborg, Denmark**

**Filed Apr. 28, 1986, Ser. No. 856,945**

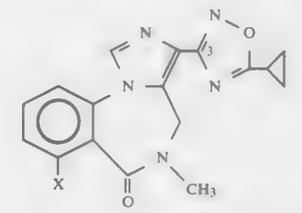
**Claims priority, application Denmark, May 17, 1985, 2204/85; Aug. 12, 1985, 3659/85; Oct. 17, 1985, 4769/85; Dec. 20, 1985, 5994/85**

**The portion of the term of this patent subsequent to Nov. 11, 2003, has been disclaimed.**

**Int. Cl.[4] A61K** *31/55;* **C07D** *487/04*

**U.S. Cl. 514—220** **6 Claims**

1. 3-(5-cyclopropyl-1,2,4-oxadiazol-3-yl)-5,6-dihydro-5-methyl-6-oxo-7-X-4H-imidazo[1,5-a][1,4]benzodiazepines having the formula



wherein X is selected from the group consisting of F and $CF_3$.

4. A pharmaceutical composition suitable for use in the treatment of a central nervous system ailment comprising an amount of a compound of claim **1**, **2** or **3**, which is effective for the alleviation of such disorder together with a pharmaceutically-acceptable carrier or diluent.

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**4,745,113**

## PESTICIDAL BENZOYLUREA COMPOUNDS, COMPOSITIONS AND USE

**Martin Anderson, and Anthony G. Brinnand, both of Kent, England, assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

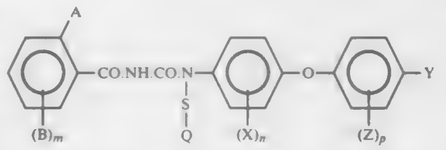
**Filed Sep. 10, 1986, Ser. No. 906,361**

**Claims priority, application United Kingdom, Sep. 25, 1985, 8523606**

**Int. Cl.[4] A01N** *43/84, 43/60;* **C07D** *265/32, 279/12*

**U.S. Cl. 514—226.8** **9 Claims**

1. A compound of the general formula



(I)

in which each of A and B independently represents a halogen atom or an alkyl group; m is 0 or 1; Q represents a group of general formula

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in which R represents an optionally substituted alkylene group in which a $—CH_2—$ group is replaced by an oxygen or sulphur atom or by a sulphone or sulphoxide group, or by a group $N—R^1$ in which $R^1$ represents an optionally substituted alkyl, alkylcarbonyl, alkoxycarbonyl, dialkylaminocarbonyl, alkylsulphonyl or arylsulfonyl group, and in which a $—CH_2—$ group is replaced by a carbonyl or thiocarbonyl group; the optional substituents for an alkyl moiety or alkylene group being selected from halogen atoms and cyano, alkoxy, haloalkoxy, alkylcarbonyl, haloalkylcarbonyl, alkoxycarbonyl and haloalkoxycarbonyl groups and the optional substituents for an aryl group being selected from these substituents and also from alkyl, haloalkyl and nitro groups; X represents a halogen atom or a cyano, nitro, alkyl or haloalkyl group; each of Y and Z independently represents a halogen atom or a cyano, nitro or haloalkyl group; n is 0, 1, 2, 3 or 4; and p is 0, 1 or 2.

2. An acaricidal or insecticidal composition comprising an acaricidally or insecticidally effective amount of a compound according to claim 1 together with a carrier.

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**4,745,114**

## BENZOPYRAN FUNGICIDAL COMPOSITIONS AND USE

**Alison Elliott, Nr Reading, and Vivienne Anthony, Maidenhead, both of United Kingdom, assignors to Imperial Chemical Industries PLC, London, England**

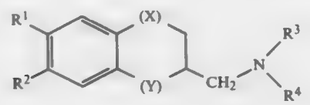
**Filed Jun. 2, 1986, Ser. No. 869,568**

**Claims priority, application United Kingdom, Jun. 18, 1985, 8515389**

Int. Cl.[4] **A01N** *43/84*

U.S. Cl. **514—233.5** **5 Claims**

1. A fungicidal composition comprising an adjuvant and/or carrier and as an active ingredient a compound having the general formula:



(I)

or a stereoisomer thereof, wherein X is a methylene group and Y is an oxygen atom, or X is an oxygen atom and Y is a methylene $R^1$ and $R^2$, which may be the same or different, are hydrogen or halogen atoms, or alkyl, alkenyl, alkynyl, alkoxy, haloalkyl, or haloalkoxy groups; $—NR^3R^4$ is a morpholine ring optionally substituted by alkyl, aryl, aralkyl, hydroxy, alkoxy or aryloxy groups; or an acid addition salt of such a compound.

5. A method of combating fungi which comprises applying to a plant, to seed of a plant, or to the locus of a plant or seed, a fungicidal composition as claimed in any one of claims 1 to 3.

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**4,745,115**

## ISOQUINOLINES OR BENZISOQUINOLINER HAVING ANTIINFLAMMATORY ACTIVITY

**Roger E. Markwell, Great Dunmow; Stephen A. Smith, and David J. Hunter, both of Bishop's Stortford, all of England, assignors to Beecham Group p.l.c., Brentford, England**

**Filed Oct. 18, 1985, Ser. No. 789,105**

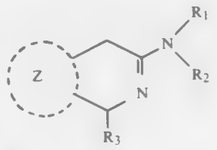
**Claims priority, application United Kingdom, Oct. 19, 1984, 8426584**

**The portion of the term of this patent subsequent to Mar. 25, 2003, has been disclaimed.**

Int. Cl.[4] **A61K** *31/47*; **C07D** *217/22, 221/08, 221/10*

U.S. Cl. **514—226.8** **10 Claims**

1. A compound of formula (I) or a salt or solvate thereof:



(I)

in which:

$R_1$ and $R_2$ are independently hydrogen or $C_{1-6}$ alkyl;

$R_3$ is phenyl, naphthyl, furyl, thienyl, pyrryl, pyridyl, benzofuranyl, benzothienyl or indolyl optionally substituted by one or more of fluoro, chloro, bromo, $CF_3$, nitro, methyl, ethyl, n- or iso-propyl, n-, sec- or tert-butyl, methoxy, ethoxy, n- or iso-propoxy, or, when $R_3$ is phenyl or naphthyl, optionally substituted by one or more of methylthio, ethylthio, n- or iso-propylthio, acetyl, propionyl, carboxyl, methoxycarbonyl, ethoxycarbonyl, cyano, $CONH_2$, $NR_9^1R_{10}^1$, in which $R_9^1$ and $R_{10}^1$ are independently selected from hydrogen, methyl, or methylsulphonyl or together are a group $X^1$ which is $C_4$ or $C_5$ polymethylene or $—(CH_2)_2—O—(CH_2)_2—$, $SO_2NR_{11}^1R_{12}^1$, in which $R_{11}^1$ and $R_{12}^1$ are independently selected from hydrogen or methyl, methylsulphonyl, ethylsulphonyl, methylsulphinyl or ethylsulphinyl;

Z is naphthyl, or, (when $R_3$ is other than phenyl or substituted phenyl), phenyl and Z is optionally C-substituted by one or two substituents $R_4^1$ and $R_5^1$ which are independently selected from methyl, ethyl, n- or iso-propyl, cyano, amino, aminocarbonyl or amino-carbamoyl optionally substituted by one or two methyl groups, fluoro, chloro, bromo, nitro, methoxy, hydroxy, acetoxy, n-butyryloxy or 2,2-dimethylpropionyloxy, or together on adjacent carbon atoms are methylenedioxy.

9. A pharmaceutical composition for the treatment of inflammatory conditions in mammals comprising a therapeutically effective amount of a compound as claimed in claim 1, or a pharmaceutically acceptable salt or solvate thereof, together with a pharmaceutically acceptable carrier.

10. A method of treating an inflammatory condition in mammals, which comprises administering an effective amount of a compound as claimed in claim 1, or a pharmaceutically acceptable salt or solvate thereof, to the mammal.

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**4,745,116**

## 2-OXY-4H-3,1-BENZOXAZIN-4-ONES AND RELATED COMPOUNDS AND PHARMACEUTICAL USE

**Alexander Krantz, Toronto; Robin Spencer, Mississauga; Tim Tam, Mississauga, and Teng J. Liak, Mississauga, all of Canada, assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.**

**Continuation-in-part of Ser. No. 748,631, Jun. 25, 1985, Pat. No. 4,665,070. This application Dec. 23, 1986, Ser. No. 945,751**

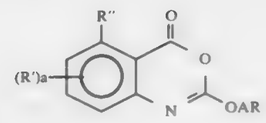
**The portion of the term of this patent subsequent to May 12, 2004, has been disclaimed.**

Int. Cl.[4] **A61K** *31/535*; **C07D** *265/36*

U.S. Cl. **514—230.5** **38 Claims**

1. A compound of the formula:





wherein:

a is an integer of 0 to 3;

A is a bond, or alkylene having one to eight carbon atoms;

R is hydrogen, imidazolyl, phenyl, or cycloalkyl having three to six carbon atoms, wherein the phenyl, imidazolyl or cycloalkyl ring is optionally substituted with 1 to 3 substituents independently selected from the group consisting of lower alkyl having one to four carbon atoms, lower alkoxy having one to four carbon atoms, $—N(R^1)_2$, $—NO_2$, halo, and lower alkylthio having one to four carbon atoms; and

each R′ and R″ are independently selected from the group consisting of hydroxy, benzyloxy, lower alkyl having one to six carbon atoms, lower alkenyl having two to six carbon atoms, halo, lower alkoxy having one to six carbon atoms, halo-lower alkyl having one to six carbon atoms, lower alkylthio having one to six carbon atoms, $—NO_2$, $—N(R^1)_2$, $—NR^1CO_2R^2$, $—NR^1C(O)R^2$, and $—NR^1C(O)N(R^1)_2$,

in which

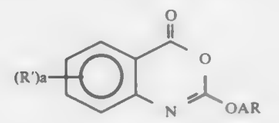
each $R^1$ is independently hydrogen or lower alkyl having one to six carbon atoms, or together form a piperidine or piperazine ring optionally substituted at the ring nitrogen with lower alkyl having one to four carbon atoms, or $—CH_2CH_2OH$;

each $R^2$ is independently lower alkyl having one to four carbon atoms, and

A is alkylene if R is hydrogen,

or a pharmaceutically acceptable acid addition salt thereof.

33. A method of inhibiting serine proteases in humans and animals which method comprises administering to a human or animal in need of such treatment a compound of the formula:



(I)

wherein:

a is an integer of 1 to 4;

A is a bond, or alkylene having one to eight carbon atoms;

R is hydrogen, phenyl, imidazolyl or cycloalkyl having three to six carbon atoms, wherein the phenyl, imidazolyl or cycloalkyl ring is optionally substituted with 1 to 3 substituents independently selected from the group consisting of lower alkyl having one to four carbon atoms, lower alkoxy having one to four carbon atoms, $—N(R^1)_2$, $—NO_2$, halo or lower alkylthio having one to four carbon atoms, and,

at least one R′ represents a substituent at one of the 5- and 7-positions, and each R′ is independently selected from the group consisting of hydroxy, benzyloxy, lower alkyl having one to six carbon atoms, lower alkenyl having two to six carbon atoms, lower alkoxy having one to six carbon atoms, lower alkylthio or halo-lower alkyl having one to six carbon atoms, halo, $—NO_2$, $—N(R^1)_2$, $—NR^1CO_2R^2$, $—NR^1COR^2$, and $—NR^1C(O)N(R^1)_2$, in which each $R^1$ is independently hydrogen or lower alkyl having one to four carbon atoms, or together form a piperidine or a piperazine ring optionally substituted at the ring nitrogen by lower alkyl having one to four carbon atoms or $—CH_2CH_2OH$;

each $R^2$ is independently lower alkyl having one to four carbon atoms,

A is an alkylene group if R is hydrogen,

or a pharmaceutically acceptable acid addition salt thereof.

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**4,745,117**

## IMIDE DERIVATIVES AND COMPOSITIONS FOR USE AS ANTIPSYCHOTIC AGENTS

**Kikuo Ishizumi, Toyonaka; Fujio Antoku, Takarazuka; Isamu Maruyama, Kawanishi, and Atuyuki Kojima, Takarazuka, all of Japan, assignors to Sumitomo Pharmaceuticals Company, Limited, Osaka, Japan**

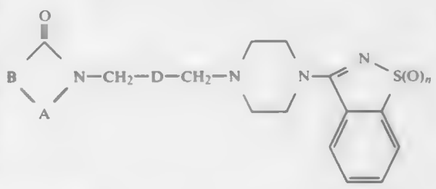
**Filed Mar. 27, 1986, Ser. No. 844,528**

**Claims priority, application Japan, Mar. 27, 1985, 60-62796; Mar. 27, 1985, 60-62797; Mar. 27, 1985, 60-62798; Jun. 25, 1985, 60-139813; Jul. 23, 1985, 60-163485; Aug. 13, 1985, 60-177980**

Int. Cl.[4] **A61K** *31/495*; **C07D** *417/14*

U.S. Cl. **514—254** **16 Claims**

1. A compound of the formula:

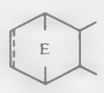


(I)

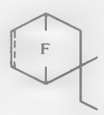
wherein

A is a carbonyl group or a sulfonyl group;

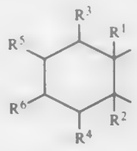
B is either one of the formulas:



(in which E is a methylene group, an ethylene group or an oxygen atom and a full line accompanying a broken line (⋯⋯) indicates a single bond or a double bond),



(in which F is a methylene group or an ethylene group and a full line accompanying a broken line (⋯⋯) is as defined above) and



(in which $R^1$, $R^2$, $R^3$, $R^4$, $R^5$ and $R^6$ are each a hydrogen atom or a methyl group) when A represents a carbonyl group, or B is a 1,2-phenylene group when A represents a sulfonyl group;

D is an ethylene group, an ethenylene group or an ethynylene group, of which one or more may be optionally substituted with hydroxyl; and

n is an integer of 0, 1 or 2, or its acid addition salts.

7. A method for the treatment of a condition requiring neuroleptic activity which comprises administering to a person a pharmaceutically effective amount of at least one compound and its pharmaceutically acceptable acid addition salt as claimed in claim 1.

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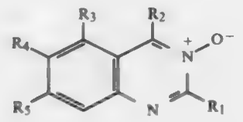
**4,745,118**

## SUBSTITUTED QUINAZOLINE-3-OXIDES PROVIDING PHARMACOLOGICAL ACTIVITY

**Donald W. Combs, Piscataway, and Robert Falotico, Belle Mead, both of N.J., assignors to Ortho Pharmaceutical Corporation, Raritan, N.J.**

**Filed Jun. 5, 1986, Ser. No. 871,031**
**Int. Cl.[4] A61K** *31/00;* **C07D** *413/00*
**U.S. Cl. 514—259** **17 Claims**

**1.** A substituted quinazoline-3-oxide having a structure conforming to the formula:



wherein:

$R_1$ is a radical selected from the group consisting of straight or branched lower alkyl and cycloalkyl having 3 to about 6 carbon atoms in the ring;

$R_2$ is selected from the group of radicals consisting of hydrogen, straight or branched lower alkyl and cycloalkyl having 3 to about 6 carbon atoms in the ring;

$R_3$, $R_4$ and $R_5$ are the same or different and are selected from the group of radicals consisting of hydrogen, halogen, hydroxy, lower alkyl, lower alkoxy, methylthio, lower acylamino, $NR_6R_7$ where $R_6$ and $R_7$ are the same or different lower alkyl or $NR_6R_7$ taken together form a heterocyclic ring having 5 or 6 atoms selected from N-morpholinyl, N-pyrrolidenyl, N-piperidyl and 4-methyl-N-piperazinyl, and where $R_4$ and $R_5$ together are methylenedioxy provided that $R_3$, $R_4$ and $R_5$ are not simultaneously hydrogen.

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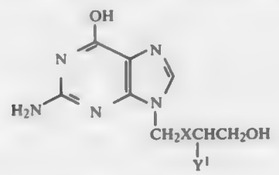
**4,745,119**

## METHOD FOR USING PURINE DERIVATIVES

**Thomas A. Krenitsky, Chapel Hill, N.C., assignor to Burroughs Wellcome Co., Research Triangle Park, N.C.**

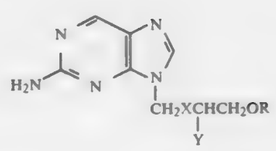
**Continuation of Ser. No. 434,395, Oct. 14, 1982, Pat. No. 4,609,662. This application Aug. 27, 1986, Ser. No. 900,822**
**The portion of the term of this patent subsequent to Sep. 2, 2003, has been disclaimed.**
**Int. Cl.[4] C07D** *473/18;* **A61K** *31/52*
**U.S. Cl. 514—262** **8 Claims**

**1.** A method of generating a compound of formula (IA)



(IA)

wherein X is oxygen or sulphur and $Y^1$ is $CH_2OH$ within the body of a human by internally administering to said human a compound of formula (I)



(I)

wherein X is oxygen or sulphur, Y is $CH_2OR$ and the R groups may be the same or different and each is hydrogen or



wherein $R^o$ is hydrogen, alkyl of 1 to 6 carbons provided that at least one R is



or a physiologically acceptable acid addition salt thereof.

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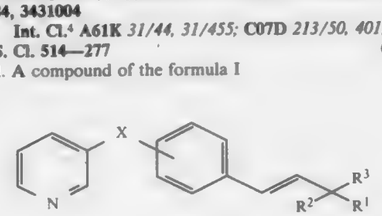
**4,745,120**

## 3-PYRIDYL COMPOUNDS AND USE AS THROMBOXANE SYNTHETASE INHIBITORS

**Günther Wess, Erlensee; Wilhelm Bartmann, Bad Soden am Taunus; Gerhard Beck, Frankfurt am Main, and Hans-Hermann Lau, Bad Soden am Taunus, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany**

**Filed Aug. 21, 1985, Ser. No. 767,965**
**Claims priority, application Fed. Rep. of Germany, Aug. 23, 1984, 3431004**
**Int. Cl.[4] A61K** *31/44, 31/455;* **C07D** *213/50, 401/12*
**U.S. Cl. 514—277** **6 Claims**

**1.** A compound of the formula I



I

o, m, p

in which:

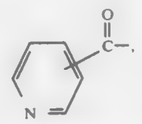
X denotes a vinylene group or ethylene group,

$R^1$ and $R^2$ together with the carbon atom to which they are attached denote the carbonyl group, or $R^1$ denotes hydrogen and $R^2$ denotes the radical —$OR^4$, in which $R^4$ represents hydrogen or

(a) a branched or unbranched aliphatic acyl radical having up to 10 carbon atoms,

(b) the benzylcarbonyl or benzoyl radical, the phenyl radical being unsubstituted or substituted once to 3 times by halogen or $C_1$–$C_4$-alkyl,

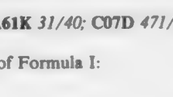
(c) the radical



(d) branched or unbranched alkyl having 1–10 carbon atoms,

(e) the benzyl radical, the phenyl nucleus being unsubstituted or substituted once to 3 times by halogen or $C_1$–$C_4$-alkyl, or

(f) the radical



$R^3$ denotes a phenyl radical which may be unsubstituted or substituted in the nucleus once to 3 times by one or more of halogen, trifluoromethyl, alkyl, alkoxy or said alkyl or alkoxy having 1–6 carbon atoms, or denotes an unsubstituted cycloaliphatic radical having 3–8 carbon atoms, or an unsubstituted straight-chain or branched unsaturated aliphatic hydrocarbon radical having 3–8 carbon atoms, or denotes a cycloaliphatic radical having 3–8 carbon atoms, a straight-chain or branched alkyl radical having up to 8 carbon atoms, or a straight-chain or branched unsaturated aliphatic hydrocarbon radical having 3–8 carbon atoms wherein the said cycloaliphatic, alkyl and unsaturated aliphatic radicals are substituted by

(a) a straight-chain or branched alkoxy radical having up to 10 carbon atoms, or a straight-chain or branched alkenyloxy or alkynyloxy radical having 3 to 6 carbon atoms,

(b) halogen, cycloalkyl having 3–7 carbon atoms, an unsubstituted phenyl, $\alpha$- or $\beta$-thienyl or $\alpha$- or $\beta$-furyl radical, or said phenyl, thienyl or furyl radical which is substituted in the nucleus once to 3 times by one or more of halogen, trifluoromethyl, alkyl or alkoxy, said alkyl or alkoxy having 1–6 carbon atoms,

(c) an unsubstituted phenoxy, $\alpha$- or $\beta$-thienyloxy or cycloalkoxy radical having 3–7 carbon atoms, or one of said radicals which is substituted in the nucleus once to 3 times by one or more of halogen, trifluoromethyl, alkyl or alkoxy, said alkyl or alkoxy each having 1–6 carbon atoms, or

(d) a 1-imidazolyl radical.

**4.** A pharmaceutical composition which contains a pharmaceutically effective amount of a compound of formula I as claimed in claim **1** together with a pharmaceutically acceptable vehicle.

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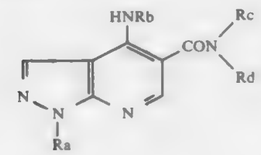
**4,745,121**

## PYRAZOLO[3,4-B]PYRIDINE-5-CARBOXAMIDES AND THEIR USE AS ANXIOLYTIC AGENTS

**Thomas M. Bare, West Chester, Pa., assignor to ICI Americas Inc., Wilmington, Del.**

**Filed Sep. 11, 1985, Ser. No. 774,905**
**Claims priority, application United Kingdom, Oct. 4, 1984, 84/25104**
**Int. Cl.[4] A61K** *31/40;* **C07D** *471/04, 223/04*
**U.S. Cl. 514—303** **5 Claims**

**2.** A compound of Formula I:



(I)

wherein

Ra is pent-3-ynyl or pent-4-ynyl;

Rb is hydrogen or propionyl;

Rc and Rd are each selected from a group consisting of hydrogen, (1–10C)alkyl, (3–6C)cycloalkyl, (3–6C)cycloalkyl(1–6C)alkyl, (3–10C)alkenyl and (3–10C)alkynyl, provided that Rc and Rd do not have any unsaturated carbon-carbon bonds at the "1" position, and wherein at least one of Rc and Rd is hydrogen;

or a 7-N-oxide thereof;

or a pharmaceutically-acceptable acid addition salt of said compound or its 7-N-oxide.

**4.** An anxiolytic pharmaceutical composition comprising a compound of claim **2** in an amount sufficient to affect anxiolytic activity in a mammal in association with a non-toxic pharmaceutically-acceptable diluent or carrier.

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**4,745,122**

## METHOD FOR TREATING OBESITY

**Joergen B. Lassen, Glostrup, Denmark, assignor to A/S Ferrosan, Soberg, Denmark**

**Filed Dec. 4, 1985, Ser. No. 804,810**
**Claims priority, application United Kingdom, Dec. 4, 1984, 8430581**
**Int. Cl.[4] A61K** *31/435*
**U.S. Cl. 514—321** **15 Claims**

**1.** A method for treating obesity in human or non-human animals, which method comprises administering an anti-obesity effective, non-toxic amount of paroxetine or a pharmaceutically acceptable salt thereof, to obese humans or non-human animals.

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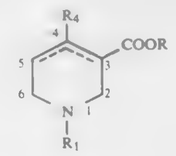
**4,745,123**

## SUBSTITUTED TETRAHYDRO-3-PYRIDINE-CARBOXYLIC ACID, ESTER, AND AMIDE CHOLINERGIC AGENTS

**Donald E. Butler, Holland, Mich.; John H. Dodd, Lebanon, N.J.; Walter H. Moos, and Haile Tecle, both of Ann Arbor, Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.**

**Filed Feb. 18, 1986, Ser. No. 830,035**
**Int. Cl.[4] A61K** *31/44, 31/445;* **C07D** *211/42, 207/12*
**U.S. Cl. 514—356** **21 Claims**

**1.** A compound having the structural formula



wherein the dashed lines indicate the presence of only one carbon-carbon double bond between either carbon atoms 3 and 4 or carbon atoms 4 and 5;

$R_1$ is

hydrogen;

alkyl of from one to six carbon atoms;

alkenyl of from from two to six carbon atoms;

cycloalkyl of from four to eight carbon atoms;

R is

hydrogen;

alkyl of from one to six carbon atoms;

alkenyl of from two to six carbon atoms;

cycloakly of from three to eight carbon atoms;

phenyl;

phenyl substituted with halogen, hydroxy, nitro, amino, alkyl of from one to four carbon atoms, alkyloxy of from one to four carbon atoms, or alkanoylamino of from two to six carbon atoms;

$R_4$ is

phenyl;

phenyl substituted with halogen, hydroxy, nitro, amino, alkyl of from one to four carbon atoms, alkyloxy of from one to four carbon atoms, or alkanoylamino of from two to six carbon atoms;

phenylalkyl wherein the alkyl portion contains from one

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to four carbon atoms, and the phenyl ring is unsubstituted or is substituted with halogen, hydroxy, alkyl of from one to four carbon atoms, or alkyloxy of from one to four carbon atoms; or a pharmaceutically acceptable salt thereof.

20. A pharmaceutical composition useful for alleviating the symtoms of senile cognitive decline comprising a cholinergically effective amount of a compound as defined in claim 1 together with a pharmaceutically acceptable carrier.

21. A method of alleviating the symptoms of senile cognitive decline comprising administering to a patient in need of such treatment a pharmaceutical composition as defined in claim 20.

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**4,745,124**

## ORALLY EFFECTIVE ANTI-HYPERTENSIVE AGENTS

**James W. Ryan, and Alfred Chung, both of Miami, Fla., assignors to University of Miami, Coral Gables, Fla.**

**Continuation-in-part of Ser. No. 295,589, Aug. 24, 1981, Ser. No. 156,749, Jun. 5, 1980, Ser. No. 145,772, May 2, 1980, Ser. No. 145,773, May 2, 1980, Ser. No. 146,107, May 2, 1980, Ser. No. 127,472, Mar. 5, 1980, Ser. No. 121,188, Mar. 3, 1980, Ser. No. 116,950, Jan. 30, 1980, Pat. No. 4,695,582, Ser. No. 64,897, Aug. 14, 1979, Ser. No. 64,898, Aug. 14, 1979, Ser. No. 64,899, Aug. 14, 1979, Ser. No. 64,900, Aug. 14, 1979, Ser. No. 64,901, Aug. 14, 1979, Ser. No. 64,902, Aug. 14, 1979, and Ser. No. 64,903, Aug. 14, 1979, said Ser. No. 295,589, is a continuation of Ser. No. 116,951, Jan. 30, 1980, abandoned, which is a continuation of Ser. No. 958,180, Nov. 6, 1978, abandoned, said Ser. No. 156,749, and Ser. No. 121,188, each is a continuation-in-part of Ser. No. 116,950, Ser. No. 116,951, Ser. No. 64,897, Ser. No. 64,898, Ser. No. 64,899, Ser. No. 64,900, Ser. No. 64,901, Ser. No. 64,902, Ser. No. 64,903, Ser. No. 958,180, and Ser. No. 941,289, Sep. 11, 1978, abandoned, said Ser. No. 156,749, is a continuation-in-part of Ser. No. 121,188, , said Ser. No. 116,950, is a continuation of Ser. No. 941,289 . This application Jul. 20, 1983, Ser. No. 515,474**

**Int. Cl.[4] A61K** *31/40, 31/41;* **C07D** *207/00, 211/12*

**U.S. Cl. 514—362** **2 Claims**

1. A compound having the formula

$$R_1\text{-}A_1\text{-}S\text{-}B\text{-}A_2$$

wherein,

$R_1$ is hydrogen or an acyl group consisting of hydrogen or a hydrocarbyl moiety linked to a carbonyl group;

$A_1$ is a residue of a carboxylic acid having at least one alpha-amino or alpha-imino group, is linked to $R_1$ through such an alpha-amino or alpha-imino group to form an amide linkage therewith and is linked to the sulfur atom through a carboxyl group to form a thiolester bond;

B represents a substituted or unsubstituted 2 to 4 carbon backbone chain which is in mercapto linkage with the sulfur atom and which includes a carbonyl group through which B is linked to a nitrogen atom of $A_2$ in amido relationship therewith; and

$A_2$ is a carboxylic acid or lower alkyl ester or physiologically acceptable salt thereof which contains at least one amino- or imino-nitrogen atoms.

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**4,745,125**

## ANTIULCER BENZIMIDAZOLES

**Jacques N. Astoin; Bernard Hublot, both of Paris, and Francis Lepage, Creteil, all of France, assignors to Novapharme, Paris, France**

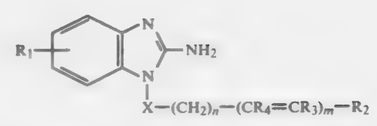
**Filed Jan. 20, 1987, Ser. No. 4,607**

**Claims priority, application France, Jan. 20, 1986, 86 00691**

**Int. Cl.[4] A61K** *31/415;* **C07D** *405/06, 235/30*

**U.S. Cl. 514—388** **10 Claims**

4. A pharmaceutical composition for the treatment of ulcers which comprises a therapeutically effective amount of a compound of the formula:



wherein

X represents a carbonyl or sulfonyl radical;

$R_1$ represents a hydrogen atom, a halogen atom, or a methoxy radical;

$R_2$ represents a hydrogen atom, a methyl or ethyl radical, or a phenyl, pyridyl or furanyl radical, possibly substituted;

$R_3$ and $R_4$ represent, each independent of the other, a hydrogen atom or an alkyl radical;

n is less than or equal to 10; and

m is equal to 1 to 2

or a physiologically acceptable acid salt thereof, and a pharmaceutically acceptable carrier.

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**4,745,126**

## METHOD OF TREATING ANXIETY WITH TETRAHYDROBENZ[C,D]INDOLE-6-CARBOXAMIDES

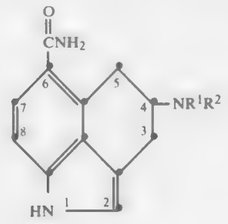
**J. David Leander, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.**

**Filed Mar. 12, 1987, Ser. No. 25,291**

**Int. Cl.[4] A61K** *31/40*

**U.S. Cl. 514—411** **7 Claims**

1. A method of treating anxiety in humans comprising administering to a human susceptible to or suffering from anxiety an antianxiety dose of a compound of the formula



wherein:

$R^1$ is hydrogen, methyl, ethyl, n-propyl or allyl

$R^2$ is hydrogen, methyl, ethyl, n-propyl or allyl; and

the pharmaceutically acceptable acid addition salts thereof.

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**4,745,127**

## BENZYL ESTERS OF BENZOFURAN-2-CARBOXYLIC ACIDS USEFUL AS INHIBITORS OF LEUKOTRIENE BIOSYNTHESIS

**Joseph G. Atkinson, Montreal; Yvan Guindon, Ile Bizard, and Cheuk K. Lau, Pierrefonds, all of Canada, assignors to Merck Frosst Canada, Inc., Canada**

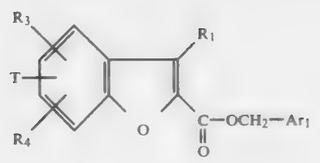
**Division of Ser. No. 725,265, Apr. 19, 1985, Pat. No. 4,663,347, which is a continuation-in-part of Ser. No. 661,645, Oct. 17, 1984, abandoned, which is a continuation-in-part of Ser. No. 547,508, Oct. 31, 1983, abandoned. This application Jan. 7, 1987, Ser. No. 1,262**

**Int. Cl.[4] A61K** *31/34;* **C07D** *307/85*

**U.S. Cl. 514—469** **20 Claims**

1. A compound of the Formula Id:





wherein

$R_1$ is hydrogen, $C_1$ to $C_6$ alkyl, $Ar_1$–$C_1$ to $C_3$ alkyl, $Ar_1$ or $CH_2OH$;

$R_3$, $R_4$ and T are each independently selected from:

(1) hydrogen;

(2) alkyl having 1 to 4 carbon atoms;

(3) alkenyl having 2 to 4 carbon atoms;

(4) $-(CH_2)_nM$

wherein n is 0 or 1, and

M is

(a) $-OR_5$;

(b) halogen;

(c) $-CF_3$;

(d) $-SR_5$;

(e) $Ar_1$;

(f) $-COOR_6$;

(g)

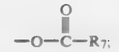


wherein $R_{12}$ is H, $C_1$ to $C_6$ alkyl, or $Ar_1$;

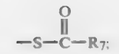
(h)



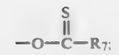
(i)



(j)



(k)



(l) $NR_8R_9$;

(m) $-NHSO_2R_{10}$ wherein $R_{10}$ is $C_1$ to $C_6$ alkyl, phenyl, p-tolyl or $CF_3$;

(n) $-SOR_5$;

(o) $-CONR_8R_9$;

(p) $-SO_2NR_8R_9$;

(q) $-SO_2R_5$;

(r) $-NO_2$; or

(s) $-CN$;

or any two of $R_3$, $R_4$ and T may be joined to form a saturated ring having 5 or 6 ring atoms, said ring atoms comprising 0, 1 or 2 oxygen atoms, the remaining ring atoms being carbon;

each $R_5$ is independently H, $C_1$ to $C_6$ alkyl, benzyl, $Ar_1$, perfluoro-$C_1$–$C_4$ alkyl, $CH_2$–$R_{11}$ wherein $R_{11}$ is $C_1$ to $C_5$ alkyldimethylamino, hydroxy $C_2$ to $C_5$ alkyl, $CH_2COOR_6$, or $CH_2CO-R_7$;

each $R_6$ is independently H or $C_1$ to $C_6$ alkyl;

each $R_7$ is indenpendently $C_1$ to $C_6$ alkyl, benzyl, $Ar_1$, $NR_8R_9$, $NHAr_1$, or O—$C_1$ to $C_4$ alkyl;

each $R_8$ and each $R_9$ is independently H or $C_1$ to $C_4$ alkyl, or $R_8$ and $R_9$ may be joined through the N to which they are attached to form a heterocycloalkyl ring having 5 to 8 ring atoms; and

each $Ar_1$ is independently 1- or 2-naphthyl, phenyl or mono- or disubstituted phenyl, wherein the substituents on the phenyl are independently selected from $C_1$ to $C_3$ alkyl, I, Br, Cl, F, $COOR_6$, $(CH_2)_n-NR_8R_9$ wherein n is 0 to 2, methylenedioxy, $C_1$ to $C_3$ alkoxy, OH, CN, $NO_2$, $CF_3$, $C_1$ to $C_4$ acyl, $NR_8R_9$, S—$C_1$ to $C_6$ alkyl, SO—$C_1$ to $C_6$ alkyl, and $SO_2$—$C_1$ to $C_6$ alkyl; with the proviso that at least one of $R_3$, $R_4$ or T is either $OR_5$ or $-OCOR_7$;

or a pharmaceutically acceptable salt thereof.

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**4,745,128**

## NOVEL CARBAMIC ACID ESTER DERIVATIVES, PESTICIDAL COMPOSITIONS CONTAINING THEM AND A PROCESS FOR THEIR PREPARATION

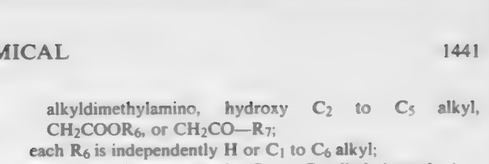
**István Ujvári; György Matolcsy; Iván Bélai; László Varjas, and Béla Darvas, all of Budapest, Hungary, assignors to Inofinance Altalanos Innovacios Penzintezet, Budapest, Hungary**

**Filed Jan. 9, 1987, Ser. No. 1,835**

**Int. Cl.[4] C07C** *145/04;* **A01N** *47/12*

**U.S. Cl. 514—483** **6 Claims**

1. An insecticidal and arachicidal composition comprising carbamic acid ester derivatives as active ingredients of the formula (I)



wherein

$R^1$ is alkyl of from one to four carbon atoms;

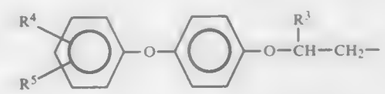
$R^2$ represents alkyl of from one to four carbon atoms or (when X is alkyl of from one to twelve carbon atoms) alkyl of from one to twelve carbon atoms;

$R^3$ is H, methyl or ethyl;

$R^4$ and $R^5$ are, independently from each other, H or halogen, preferably Cl, Br or F atoms;

n=0, 1 or 2;

X represents alkyl of from one to twelve carbon atoms or a 4-aryloxyphenoxyalkyl group of formula (II)



where $R^3$, $R^4$ and $R^5$ are as defined above—together with inert carrier(s).

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4,745,129

## CHEMICALLY-ACTIVE AQUEOUS SOLUTION AND SOLID SUBSTANCE CONTAINING DIVALENT IRON IONS

**Yoshikatsu Ikari; Shoichiro Yokoyama, both of Ibaraki; Chiaki Ohama, and Ryosuke Fukui, both of Tokyo, all of Japan, assignors to Technology and Minato Sangyo Co. Ltd., Tokyo, Japan**

**PCT No. PCT/JP83/00199, § 371 Date Feb. 14, 1985, § 102(e) Date Feb. 14, 1985, PCT Pub. No. WO85/00033, PCT Pub. Date Jan. 3, 1985**

**PCT Filed Jun. 18, 1983, Ser. No. 708,076**

**Int. Cl.[4] A01N** *55/02, 59/16;* **A01B** *79/00;* **A21D** *4/00*

**U.S. Cl. 514—502** **9 Claims**

1. An oxidation-resistant chemical composition effective as a deodorizing agent, a bactericidal agent, a food preserving agent, or a pollutant coagulating agent, which comprises divalent iron ions and L-ascorbic acid, said L-ascorbic acid being present in an amount of 2 to 10 parts by weight per 100 parts by weight of the divalent iron ions, expressed in terms of metallic iron.

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4,745,130

## COMPOSITION FOR INCREASING BLOOD PRESSURE

**Richard J. Wurtman, Boston, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.**

**Continuation of Ser. No. 366,887, Apr. 8, 1982, abandoned, which is a division of Ser. No. 145,909, May 2, 1980, Pat. No. 4,327,112, which is a continuation-in-part of Ser. No. 88,226, Oct. 25, 1979, abandoned, which is a continuation of Ser. No. 898,740, Apr. 27, 1978, abandoned. This application Oct. 29, 1984, Ser. No. 665,679**

**Int. Cl.[4] A61K** *31/195*

**U.S. Cl. 514—567** **1 Claim**

1. A composition for increasing blood pressure comprising a mixture of tyrosine and a blood pressure increasing agent selected from the group consisting of neosynephrine, calcium chloride, ephedrine, dopamine and norepinephrine in an amount effective to increase blood pressure wherein the dosage of tyrosine is between about 5 and 200 mg/kg body weight in an inert carrier.

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4,745,131

## AMIDINOUREAS FOR TREATING IRRITABLE BOWEL SYNDROME

**John Yelnosky, Warrington, and Ghulam N. Mir, Buckingham, both of Pa., assignors to Rorer Pharmaceutical Corporation, Fort Washington, Pa.**

**Continuation of Ser. No. 570,362, Jan. 13, 1984, Pat. No. 4,611,011. This application Jun. 12, 1986, Ser. No. 873,677**

**The portion of the term of this patent subsequent to Sep. 9, 2003, has been disclaimed.**

**Int. Cl.[4] A61K** *31/17*

**U.S. Cl. 514—596** **1 Claim**

1. A method for the treatment of irritable bowel syndrome in a constipated patient comprising administering to said patient, one to eight times daily, an anticonstipating effective oral or parenteral dose of about 0.05 to about 10 mg of 1-(2,6-dimethylphenyl)-3-N-methyl-amidinourea or a pharmaceutically acceptable acid addition salt thereof.

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4,745,132

## BIOCIDAL COMPOSITIONS AND USE THEREOF EMPLOYING A SYNERGISTIC MIXTURE OF N-ALKYLDIMETHYL BENZYL AMMONIUM HALIDE AND N-DODECYLGUANIDINE

**Paul Swered, Philadelphia, Pa., and Deborah K. Donofrio, The Woodlands, Tex., assignors to Betz Laboratories, Inc., Trevose, Pa.**

**Filed Jul. 31, 1986, Ser. No. 892,222**

**Int. Cl.[4] A01N** *33/12, 37/52*

**U.S. Cl. 514—634** **5 Claims**

1. A bacterial composition comprising a synergistic mixture of n-alkyl dimethyl benzyl ammonium choride having an alkyl distribution of about 50% $C_{14}$, 40% $C_{12}$, 10% $C_{16}$ and n-dodecylguanidine or water-soluble salt thereof, the weight ratio of said n-dodecylguanidine or water-soluble salt thereof to said n-alkyl dimethyl benzyl ammonium chloride being from about 1:2 to about 1:8.

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4,745,133

## FLAME RETARDANT POLYURETHANE FOAMS

**Egils Grinbergs, Farmington Hills; William W. Levis, Jr., Wyandotte, and Steven D. Gagnon, Detroit, all of Mich., assignors to BASF Corporation, Wyandotte, Mich.**

**Continuation-in-part of Ser. No. 750,391, Jun. 28, 1985, abandoned. This application Mar. 19, 1987, Ser. No. 27,800**

**Int. Cl.[4] C08G** *18/14*

**U.S. Cl. 521—128** **6 Claims**

1. The preparation of a flame-retardant flexible polyurethane foam consisting of reacting a polyoxyalkylene polyether polyol having an average equivalent weight of from about 500 to about 3000, an organic polyisocyanate, a blowing agent, and a silicone surfactant wherein dispersed in the polyether polyol is melamine in the amount ranging from about 10 weight percent to about 55 weight percent of the total composition as the sole flame-retardant compound in the absence of a melamine dispersion stabilizer and wherein the melamine polyol dispersion is not crushed.

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4,745,134

## INERT SEPARATOR BEADS FOR REGENERATION OF MIXED BED-ION EXCHANGE RESINS

**Peter Osei-Gyimah, North Wales, Pa., assignor to Rohm and Haas Co., Philadelphia, Pa.**

**Filed Jun. 27, 1984, Ser. No. 624,986**

**Int. Cl.[4] C08D** *5/20*

**U.S. Cl. 521—28** **15 Claims**

1. Improved, inert separator beads for separating anion exchange resin beads from cation exchange resin beads during regeneration of mixed-bed ion exchange resins, which inert separator beads comprise a copolymer of from about 60 to about 90 weight percent methyl methacrylate, from about 5 to about 15 weight percent styrene, from about 2 to about 10 weight percent hydrophilic monomer containing an amide functional group, and from about 1 to about 6 weight percent polyvinyl crosslinking monomer, the percentages based upon the total weight of the copolymer.

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4,745,135

## POLYURETHANES PREPARED FROM LIQUID CRYSTAL-CONTAINING POLYOLS

**Oomman P. Thomas, and Robert B. Turner, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.**

**Continuation-in-part of Ser. No. 878,460, Jun. 25, 1986, abandoned. This application Jul. 14, 1987, Ser. No. 73,038**

**Int. Cl.[4] C08G** *18/14*

**U.S. Cl. 521—114** **50 Claims**

1. A solution or colloidal dispersion of a liquid crystalline polymer in an active hydrogen-containing compound having an average of at least two active hydrogen-containing moieties.



4,745,136

## POLYURETHANES PREPARED FROM DISPERSIONS OR SOLUTIONS OF CHOLESTEROL OR CHOLESTANOL-CONTAINING POLYMERS IN A POLYOL

**Oomman P. Thomas, and Robert B. Turner, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.**

**Continuation-in-part of Ser. No. 878,460, Jun. 25, 1986, abandoned. This application Jul. 14, 1987, Ser. No. 73,037**

**Int. Cl.[4] C08G** *18/14*

**U.S. Cl. 521—114** **24 Claims**

1. A solution or colloidal dispersion of a polymer of an ethylenically unsaturated steroid derivative in an active hydrogen-containing compound having an average of at least two isocyanate-reactive groups per molecule.

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4,745,137

## POLYURETHANES PREPARED FROM SOLUTIONS OR DISPERSIONS OF POLYMERS OF RIGID POLYAROMATIC MONOMERS IN POLYOLS

**Oomman P. Thomas, and Robert B. Turner, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.**

**Continuation-in-part of Ser. No. 878,460, Jun. 25, 1986, abandoned. This application Jul. 14, 1987, Ser. No. 73,040**

**Int. Cl.[4] C08G** *18/14*

**U.S. Cl. 521—137** **37 Claims**

1. A solution or colloidal dispersion of a polymer of an ethylenically unsaturated polyaromatic compound, said compound containing a rigid moiety comprising at least two aromatic nuclei which are connected by a covalent bond or a rigid connecting group, said polymer being dissolved or dispersed in an active hydrogen-containing compound having an average of at least two isocyanate-reactive groups per molecule.

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4,745,138

## RADIATION CURABLE PARTIAL ESTERS OF ANHYDRIDE-CONTAINING COPOLYMERS

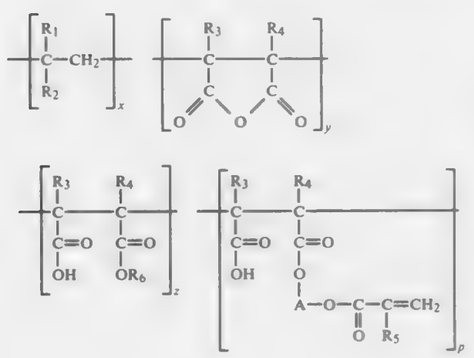
**Chandrakant B. Thanawalla, Exton, and Gary W. Ceska, Paoli, both of Pa., assignors to Pony Industries, Inc., New York, N.Y.**

**Filed Aug. 5, 1985, Ser. No. 762,607**

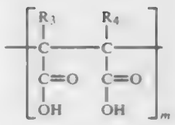
**Int. Cl.[4] C08F** *8/14*

**U.S. Cl. 522—120** **15 Claims**

1. A radiation-curable partial ester of a free anhydride-containing copolymer corresponding to the structural formula:



-continued



wherein: $R_1$ and $R_2$ are each independently selected from the group consisting of hydrogen, alkyl containing of from 1 to 20 carbon atoms, aryl containing of from 6 to 10 carbon atoms, alkaryl containing of from 7 to 14 carbon atoms, cycloalkyl containing of from 4 to 12 carbon atoms, and a halo radical; $R_3$, $R_4$ and $R_5$ are each independently selected from the group consisting of hydrogen, and an alkyl radical containing of from 1 to 5 carbon atoms; the radical $R_6$ is a member selected from the group consisting of an alkyl, arylalkyl, alkyl-substituted arylalkyl and oxyalkylated derivatives of each of such radicals containing of from 2 to 4 carbon atoms in each oxyalkylene group, which group may be of 1 to 20 repeating units; the radical A is a linear or branched divalent alkylene of from 1 to 20 carbon atoms, or an oxyalkylated derivative thereof containing of from 2 to 4 carbon atoms in each oxyalkylene group, which group may be of 1 to 20 repeating units, and subscripts x, y, z, m and p are each whole numbers such that the sum of x, y, z, m and p may range from 4 to about 20, with x, p, m and y each being equal to or greater than 1, and z may be 0, said partial ester being characterized a exhibiting a number average molecular weight of between about 1,000 and 20,000, an acid number of at least about 40, and an acrylate equivalent per gram value of at least about 0.1.

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4,745,139

## ELASTOMERIC COATINGS CONTAINING GLASS BUBBLES

**Robert J. Haasl, Roseville; Thomas M. Miller, Lakeland, and Scott R. Haasl, Roseville, all of Minn., assignors to PDI, Inc., St. Paul, Minn.**

**Filed Feb. 9, 1987, Ser. No. 12,339**

**Int. Cl.[4] C08J** *5/14, 9/32;* **C08L** *53/00*

**U.S. Cl. 523—149** **3 Claims**

1. Surface coating formulation for application to surfaces in contact with water for providing surface roughness and for increasing frictional and anti-slip characteristics of such surfaces while wet, said formulation comprising:

(a) a styrene/ethylene/butylene/styrene block copolymer and contained in said formulation in an amount ranging from between about 30 and 60 parts by weight;

(b) finely divided silicon dioxide filler selected from the group consisting of particulate colloidal and powdered silicon dioxide and contained in said formulation in an amount ranging from between about 3 and 10 parts by weight;

(c) solvent solution of methylmethacrylate copolymer solids and contained in said formulation in an amount ranging from between about 15 parts and 25 parts by weight;

(d) rubber tackifier solids and contained in said formulation in an amount ranging from between about 5 parts and 15 parts by weight; and

(e) glass microspheres substantially uniformly distributed in said formulation and having an average size of up to about 70 microns, and contained in said formulation in an amount ranging from between about 5 parts and 15 parts by weight.

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**4,745,140**

## AQUEOUS ADHESIVE COMPOSITION CONTAINING N-VINYL LACTAM RESIN, TACKIFIER, AND ETHYLENE/VINYL ACETATE EMULSION STABILIZER

**Jagadish C. Goswami, New City, N.Y., assignor to Chesebrough-Pond's Inc., Greenwich, Conn.**

**Filed Mar. 13, 1987, Ser. No. 25,425**
**Int. Cl.[4] C08L** *39/00, 39/06*
**U.S. Cl. 523—334** **7 Claims**

1. An aqueous adhesive composition having good adhesion to a non-polar polymeric surface and to cellulosic materials which comprises an aqueous dispersion of:
(a) a N-vinyl lactam polymeric resin adhesive;
(b) a tackifier for (such) said adhesive; and
(c) an (effective) emulsion stabilizing amount of an ethylene/vinyl acetate copolymer emulsion stabilizer for the adhesive (a) and tackifier (b).

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**4,745,141**

## UNSATURATED POLYESTER RESIN COATING COMPOSITION

**Mamoru Akiyama, Ibaraki; Sadao Shigematsu, Amagasaki, and Akira Matsumura, Suita, all of Japan, assignors to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan**

**Continuation-in-part of Ser. No. 759,959, Jul. 29, 1985, abandoned. This application Jan. 12, 1987, Ser. No. 2,284**
**Claims priority, application Japan, Aug. 3, 1984, 59-164024**
**Int. Cl.[4] C08L** *67/06*
**U.S. Cl. 523—500** **4 Claims**

1. An unsaturated polyester resin coating composition comprising (A) 10 to 45 parts by weight of an air dryable unsaturated polyester resin comprising a condensation product of a polybasic acid, a polyhydric alcohol, at least one member selected from the group consisting of cyclopentadiene and dicyclopentadiene and an acyclic ether having allyl group and hydroxyl group, (B) 50 to 70 parts by weight of a filler and (C) 5 to 50 parts by weight of a vinyl monomer, the total amount of said components (A), (B) and (C) being 100 parts by weight; said unsaturated polyester resin (A) having (1) 10 to 50% of units of the at least one member selected from the group consisting of cyclopentadiene and dicyclopentadiene and (2) 2 to 40% of units of the acyclic ether having allyl group and hydroxyl group, said % being % by mole based on said polybasic acid.

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**4,745,142**

## STAINPROOF POLYESTER FIBER

**Shinji Ohwaki, Minoo; Togi Suzuki, Matsuyama, and Shigenobu Kobayashi, Toyonaka, all of Japan, assignors to Teijin Limited, Osaka, Japan**

**Filed Oct. 10, 1986, Ser. No. 918,008**
**Claims priority, application Japan, Oct. 14, 1985, 60-226977; Jul. 29, 1986, 61-176566**
**Int. Cl.[4] C08K** *5/54, 5/42, 5/34;* **C08L** *67/02*
**U.S. Cl. 524—87** **15 Claims**

1. A stainproof polyester fiber comprising at least one fiber-forming polyester copolymer comprising:
a backbone polyester chain; and at least one type of terminal substituents which block at least some of terminals of the molecules of the backbone polyester and which substituents consist of a polyoxyalkyleneglycol monoether groups of the Formula (I):

$$R^1-O-(R^2-O)_n \quad (I)$$

wherein $R^1$ represents a monovalent organic radical free from active hydrogen atom, $R^2$ represents an alkylene radical, and n represents a positive integer of 2 or more, said polyester fiber being composed of crystalline segments in which the backbone polyester chains of the copolymer are concentrated and amorphous segments in which the polyoxyalkyleneglycol monoether groups of the copolymer are concentrated to form a two block segment-containing micelle stainproof structure, and having a crystal size at a (100) plane of 50 to 100 angstroms, a crystal size at a (010) plane of 65 to 170 angstroms, and a birefringence of 0.15 or more.

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**4,745,143**

## SALT RESISTANT POLYAMIDE COMPOSITION

**Charles D. Mason, Chatham; Paul G. Galanty, West Orange, and Elmer D. Jones, Madison, all of N.J., assignors to Allied-Signal Inc., Morris Township, Morris Co., N.J.**

**Filed Jul. 12, 1985, Ser. No. 754,505**
**Int. Cl.[4] C08K** *5/43, 5/41*
**U.S. Cl. 524—98** **6 Claims**

1. A method comprising the step of contacting a composition comprising a calcium chloride salt with a composition: consisting essentially of
a polyamide comprising from 50 to 100% by weight of caprolactam groups; and
from 2 to 30 percent based on the weight of the polyamide of a water insoluble plasticizer.

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**4,745,144**

## SILICONE RUBBER COMPOSITION RESISTANT AGAINST DYNAMIC FATIGUE

**Kunio Itoh; Kiyoshi Imai; Takeshi Fukuda, all of Annaka, Japan, and Nobuyuki Uesugi, Pasadena, Calif., assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan**

**Filed Aug. 14, 1986, Ser. No. 899,044**
**Claims priority, application Japan, Aug. 16, 1985, 60-180347**
**Int. Cl.[4] C08K** *5/53*
**U.S. Cl. 524—123** **7 Claims**

1. A silicone rubber composition which comprises:
(a) 100 parts by weight of a substantially linear diorganopolysiloxane represented by the average unit formula

$$R_aSIO_{(4-a)/2}$$

in which R is an alkyl, substituted alkyl, alkenyl, substituted alkenyl, aryl, substituted aryl, cycloalkyl or substituted cycloalkyl group and a is a positive number in the range from 1.90 to 2.05;
(b) from 10 to 100 parts by weight of a reinforcing silica filler having a specific surface area of at least 50 $m^2/g$; and
(c) from 0.05 to 5 parts by weight of a phosphorus-containing organic compound selected from the group consisting of phosphate, phosphonate, and phosphinate compounds.

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**4,745,145**

## RUBBER COMPOSITIONS AND ARTICLES THEREOF HAVING IMPROVED METAL ADHESION AND METAL ADHESION RETENTION

**Steven E. Schonfeld, Akron; Frederick J. Ravagnani, Uniontown, and Adel F. Halasa, Bath, all of Ohio, assignors to The Firestone Tire & Rubber Company, Akron, Ohio**

**Filed Sep. 14, 1983, Ser. No. 532,078**
**Int. Cl.[4] C08J** *3/18;* **C08K** *3/30*
**U.S. Cl. 524—169** **8 Claims**

1. A vulcanizable rubber composition having improved metal adhesion and metal adhesion retention properties with brass and brass-plated metallic reinforcing elements, the improvement wherein:
from about 0.2 to about 6.0 parts by weight of a compound selected from the group consisting of 3-amino-2-carboxy-4-chlorobenzophenone, 3-hydroxy-2-methyldiphenylamine and 5-amino-2-methyl-N-phenylbenzenesulfonamide and mixtures thereof per 100 parts of the rubber component in said rubber composition is incorporated into said rubber composition prior to curing.



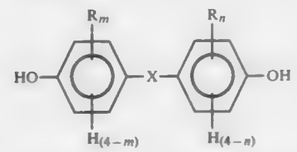
**4,745,146**

## REINFORCED POLYAMIDES HAVING IMPROVED FLOW BEHAVIOR

**Rolf-Volker Meyer; Rolf Dhein; Dietrich Michael, all of Krefeld, and Heinz-Josef Füllmann, Leichlingen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Nov. 24, 1986, Ser. No. 934,486**
**Claims priority, application Fed. Rep. of Germany, Dec. 6, 1985, 3543116; Mar. 29, 1986, 3610595**
**Int. Cl.[4] C08K** *5/41, 5/13*
**U.S. Cl. 524—171** **15 Claims**

1. A thermoplastically processable polyamide moulding composition equipped with inorganic reinforcing material, in which moulding composition contains 3 to 40% by weight, relative to the amount of polyamide, of bisphenol(s) of the general formula




(I)

in which
R stands for a methyl, methoxy or ethyl group,
m and n are independently 0, 1, 2, 3 or 4, and
X denotes a chemical bond, a $C_1$–$C_7$-alkylene or $C_5$–$C_6$-cycloalkylene radical, O, S, SO, $SO_2$, CO or O-$(CH_2)_p$-O- with p=2 to 10
and with the proviso tnat the sum of the aliphatic carbon atoms of all the radicals bonded to the phenol rings is <6.

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**4,745,147**

## VULCANIZABLE CHLORINATED POLYETHYLENE COMPOSITIONS

**Wolfgang Honsberg, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Oct. 24, 1986, Ser. No. 923,166**
**Int. Cl.[4] C08K** *5/05;* **C08L** *23/06;* **C08F** *8/34*
**U.S. Cl. 524—386** **10 Claims**

1. A composition comprising an elastomeric chlorinated polyethylene containing 20 to 50 percent by weight chlorine, form 0.25 to 10 parts by weight per 100 parts by weight chlorinated polyethylene of a polyhydric alcohol having at least two hydroxyl groups in steric proximity to each other and a molecular weight of less than 600, from 0.3 to 5 parts by weight per 100 parts chlorinated polyethylene of an initiator which is an amine, quaternary ammonium compound, or quaternary phoaphonium compound, and from 0.75 to 3.0 parts by weight of a mercapto compound containing 2 to 4 mercapto groups and having a molecular weight of less than 500 is present per 100 parts by weight chlorinated polyethylene.

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**4,745,148**

## THERMOPLASTIC POLYESTER MOLDING COMPOSITION HAVING AN IMPROVED IMPACT PERFORMANCE

**James Y. J. Chung, New Martinsville, W. Va.; Peter H. Markusch, McMurray, Pa., and Mark W. Witman, Krefeld, Fed. Rep. of Germany, assignors to Mobay Corporation, Pittsburgh, Pa.**

**Continuation of Ser. No. 600,047, Apr. 13, 1984, abandoned. This application Apr. 21, 1986, Ser. No. 854,207**
**The portion of the term of this patent subsequent to Jun. 11, 2002, has been disclaimed.**
**Int. Cl.[4] C08L** *67/02*
**U.S. Cl. 524—504** **10 Claims**

1. A thermoplastic molding composition comprising the extruded blend of
(i) about 70–95 percent of a polyethylene terephthalate resin having an intrinsic viscosity of at least about 0.4 dl/gm measured as a 1% solution in a 60:40 mixture of phenol and tetrachloroethane at 30° C., and
(ii) about 5–30 percent of an elastomeric impact modifier characterized in its compatibility with said resin and in that the glass transition temperature of its elastomeric phase is below 20° C. said percent being relative to the weight of said blend, and about 0.5 to about 8 phr of a blocked polyisocyanate prepolymer wherein prepolymer is a reaction product of a polyisocyanate and an organic compound which contains at least two isocyanate-reactive groups having weight average molecular weight of 61 to 10,000 selected from the group consisting of hydroxy polyethers, hydroxy polythioethers, hydroxy polyacetals, hydroxy polyolefins, hydroxy polybutadiene, hydroxy polycarbonates and hydroxy polyester amides, said phr being relative to the weight of said blend, said prepolymer being further characterized in that its backbone is substantially immiscible in said resin.

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**4,745,149**

## THERMOPLASTIC ELASTOMERS

**Ulrich Eisele, Leverkusen; Dieter Jache, Overath; Ludwig Mott, Leverkusen, and Karl-Heinz Schabel, Burscheid, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen-Bayerwerk, Fed. Rep. of Germany**

**Filed Sep. 2, 1986, Ser. No. 902,701**
**Claims priority, application Fed. Rep. of Germany, Sep. 11, 1985, 3532357**
**Int. Cl.[4] C08L** *53/02, 23/12, 23/16*
**U.S. Cl. 524—505** **5 Claims**

1. Thermoplastic elastomer containing a polymer mixture consisting essentially of
(i) 48–88% by weight of ethylene-propylene-diene-rubber, 10–50% by weight of polypropylene and
2–20% by weight of a block-copolymer made of at least two blocks A and B, whereby block A is polystyrene and block B is polybutadiene or polyisoprene, and the polymer of block B is at least partially hydrogenated, and
(ii) 5–60% by weight of a plasticizing oil with the percentages of component (ii) being
based on the total of the components of (i).

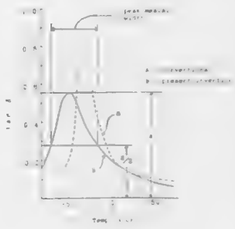
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**4,745,150**

## RUBBER COMPOSITION FOR TIRE TREADS

**Eiji Ida, Takatsuki, and Riichiro Ohara, Suita, both of Japan, assignors to Toyo Tire & Rubber Company Limited, Osaka, Japan**

**Filed Dec. 15, 1986, Ser. No. 941,325**
**Claims priority, application Japan, Dec. 17, 1985, 60-284960**
**Int. Cl.[4] C08K** *3/04;* **C08L** *51/02*
**U.S. Cl. 524—505** **3 Claims**



1. A tire tread rubber composition exhibiting outstanding dynamic behavior, said rubber composition comprising:
a rubber component; and
60–150 parts of carbon black per 100 parts of said rubber component;

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wherein said rubber component comprises:

30 to 100 wt % of an elastic styrene-butadiene copolymer prepared by solution polymerization with use of a lithium-base catlyst, the copolymer being higher than −60° C. in glass transition temperature (Tg) and at least 40° C. in the peak mesial width of tan δ determined from the temperature range between the two points of intersection of the curve of tan δ with the line of tan δ=½a wherein a is the peak value of tan δ determined from a temperature−tan δ dispersion curve and tan δ is the loss factor measured at a rate of rise of temperature of 2° C./min and a frequency of 100 Hz, and

0 to 70 wt % of at least one rubber selected from the group of natural rubber and synthetic rubber.

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**4,745,151**

## PROCESS FOR THE PRODUCTION OF AQUEOUS DISPERSIONS OF POLYURETHANE POLYUREAS, THE DISPERSIONS OBTAINABLE BY THIS PROCESS AND THEIR USE AS COATING COMPOSITIONS

**Klaus Noll, Cologne; Jürgen Mosbach, Leverkusen; Josef Pedain, Cologne; Klaus Nachtkamp, Duesseldorf, and Jürgen Schwindt, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Apr. 14, 1987, Ser. No. 38,256**

**Claims priority, application Fed. Rep. of Germany, Apr. 22, 1986, 3613492**

**Int. Cl.⁴ C08L** *75/04*

**U.S. Cl. 524—591** **4 Claims**

1. A process for the preparation of an aqueous polyurethane polyurea dispersion which comprises reacting

(a) an NCO-prepolymer having an average NCO-functionality of 2 to 2.3, an average molecular weight of about 700 to 5000 and prepared from (i) organic polyhydroxyl compounds and, optionally, organic monohydroxyl compounds and (ii) an excess quantity of organic polyisocyanates and, optionally monoisocyanates with

(b) organic polyamines having an (average) amine functionality of 2,05 to about 3, an (average) molecular weight of 60 to about 2000 and containing primary or secondary amino groups or mixtures thereof at an equivalent ratio of isocyanate groups of component (a) to the amino groups of component (b) of 1.05:1 to about 7:1, in the presence of a water-miscible weakly polar solvent inert to isocyanate groups and having a boiling point at normal pressure below 100° C., either component (a) or component (b) or both containing carboxylate groups and/or nonionic hydrophilic groups in a quantity sufficient to guarantee the dispersibility of said polyurethane polyurea in water, subsequently converting the resulting solution of the reaction product in solvent into an aqueous dispersion by adding water and optionally removing the solvent by distillation, characterized in that the reactants and the quantitative ratios used are selected such that the resulting reaction products have an NCO-functionality of 2.2 to about 3 and an NCO-content of about 0.01 to 5% by weight.

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**4,745,152**

## TRANSPARENT COATING OF FLEXIBLE, ELASTIC POLYURETHANE FOR TRANSPARENT GLASS OR SYNTHETIC RESIN SUBSTRATES

**Juergen Fock, Duesseldorf; Günter Hahn, Mulheim/Ruhr; Gerhard Holzer, and Helmer Rädisch, both of Aachen, all of Fed. Rep. of Germany, assignors to Saint-Gobain Vitrage, Courbevoie, France**

**Filed Feb. 20, 1987, Ser. No. 16,946**

**Claims priority, application Fed. Rep. of Germany, Feb. 22, 1986, 3605765**

**Int. Cl.⁴ C08G** *18/38*

**U.S. Cl. 524—718** **15 Claims**

1. Transparent coating for windows or other substrates made of glass or synthetic resin, comprising a flexible elastic polyurethane that is prepared from a reaction mixture consisting essentially of an isocyanate component which consists essentially of trifunctional aliphatic polyisocyanates of biuret or isocyanurate structure based on 1,6-hexamethylenediisocyanate, containing 15 to 25% by weight of NCO groups and with an average molecular weight of approximately 450 to approximately 1000 g per mole, and a polyol component which contains at least one polyfunctional polyol, and which may contain a reaction catalyst and other auxiliary substances, wherein said polyol component of the reaction mixture comprises a difunctional sulfonated polyether polyol containing 1 to 10% by weight of OH groups and a trifunctional polyol containing approximately 8 to 12% by weight of OH groups and having an average molecular weight of approximately 400 to approximately 1000 g per mole.

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**4,745,153**

## LOW VISCOSITY, HIGH SOLIDS POLYMER POLYOLS PREPARED USING A PREFORMED DISPERSANT

**Dwight K. Hoffman, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.**

**Filed Dec. 17, 1986, Ser. No. 942,657**

**Int. Cl.⁴ C08G** *18/14*

**U.S. Cl. 524—762** **18 Claims**

1. A process for preparing a polymer dispersion in a continuous polyol phase comprising the steps of

(a) forming in a first step a dispersant by homopolymerizing a vinyl-terminated adduct, or copolymerizing said adduct with at least one ethylenically unsaturated monomer, in the presence of an active hydrogen-containing compound as a solvent under conditions such that the resulting dispersant is soluble in a base polyol and has a Brookfield viscosity of less than about 25,000 centipoises at 25° C. as a 20–35 wt.-% solution in an active hydrogen-containing compound, and then in a second step

(b) polymerizing an ethylenically unsaturated monomer or mixture thereof in the presence of said dispersant and a base polyol under conditions such that the polymerized monomer forms a plurality of particles which are stabilized against agglomeration by the disperant.

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**4,745,154**

## WATER SOLUBLE POLYMERS, THEIR PREPARATION AND THEIR USES

**Charles G. Ruffner, Chattanooga, Tenn., assignor to Alco Chemical Corporation, Chattanooga, Tenn.**

**Filed Apr. 14, 1986, Ser. No. 851,512**

**Int. Cl.⁴ C08F** *2/32, 18/00*

**U.S. Cl. 524—801** **24 Claims**

1. A water-in-oil emulsion comprising:

(a) an oleophilic continuous phase; and

(b) an aqueous dispersed phase; said dispersed phase containing a water soluble copolymer obtained by polymerizing in said water-in-oil emulsion a monomer system comprising:

(1) an addition copolymerizable surfactant monomer which has adequate water solubility to remain in solution during solution polymerization yet which is polar enough that said surfactant monomer is essentially not extracted into said oleophilic phase of said water-in-oil emulsion;

and

(2) at least one neutral or neutralized water soluble vinyl monomer.



**4,745,155**

## EMULSIFIED CRACK OR JOINT FILLER

**Anthony V. Grossi, Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio**

**Filed Sep. 25, 1986, Ser. No. 911,596**

**Int. Cl.⁴ C08L** *95/00*

**U.S. Cl. 525—54.5** **15 Claims**

1. An emulsified composition useful as a cold-pour crack and joint filler, said composition comprising an aqueous emulsion of the reaction product of an asphalt having a penetration of about 210 to about 325, an extender oil, which is a hydrocarbon oil, a mixture of elastomers, said mixture including a liquid rubber and at least one block copolymer, said liquid rubber being a hydroxy terminated homopolymer or copolymer of a conjugated diene and said block copolymer being a copolymer of one or more conjugated dienes and one or more ethylenic monomers, a vinyl aromatic monomer and an acrylamide, and the reactant materials being selected and employed in amounts so that the solid emulsion residue meets the requirements of ASTM Specification D-1190.

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**4,745,156**

## THERMOPLASTIC RESIN COMPOSITIONS

**Masayuki Yoshihara, Osaka; Nobuo Naka, and Masanori Kobayashi, both of Hyogo, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan**

**Continuation of Ser. No. 698,661, Feb. 6, 1985, abandoned. This application Aug. 11, 1986, Ser. No. 899,741**

**Claims priority, application Japan, Feb. 7, 1984, 59-21190**

**Int. Cl.⁴ C08L** *27/06, 27/24, 25/12, 25/16*

**U.S. Cl. 525—80** **6 Claims**

1. A polyvinyl chloride resin composition comprising:

(A) from 55 to 75% by weight of a polyvinyl chloride resin having an average degree of polymerization in the range of 700 to 1,500;

(B) from 10 to 30% by weight of an α-methylstyrene/acrylonitrile copolymer consisting of from 90 to 60% by weight of a α-methylstyrene and from 10 to 40% by weight of acrylonitrile; and

(C) from 15 to 20% by weight of at least one impact modifier selected from the group consisting of a methyl methacrylate/acrylic acid ester copolymer elastomer, chlorinated polyethylene, an ethylene/vinyl acetate copolymer elastomer grafted with vinyl chloride, and an ethylene/propylene/non-conjugated diene copolymer elastomer.

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**4,745,157**

## IMPACT MODIFICATION OF POLYPHENYLENE ETHER-POLYAMIDE COMPOSITIONS

**John B. Yates, III, Glenmont, and Timothy J. Ullman, Clifton Park, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Filed Dec. 18, 1986, Ser. No. 943,222**

**Int. Cl.⁴ C08L** *71/04*

**U.S. Cl. 525—92** **24 Claims**

1. A method for preparing a resinous composition which comprises:

(I) intimately blending, at a temperature in the range of about 270°–350° C. (A) at least one polyphenylene ether, or a mixture thereof with at least one polystyrene; (B) at least about 0.5 parts by weight, per 100 parts of component A, of a functionalizing compound containing at least one carbon-carbon double or triple bond and at least one carboxylic acid group or functional derivative thereof; and (C) at least one unfunctionalized elastomeric olefin copolymer comprising a major proportion of structural units derived from ethylene and at least one $C_{3-8}$ l-olefin; and

(II) blending, at a temperature in the range of about 270°–350° C., the product of step I with (D) at least one polyamide.

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**4,745,158**

## HIGHLY WATER-ABSORPTIVE OPTICAL MATERIAL

**Tatsutoshi Nakashima; Nobuyuki Toyoshima, and Yasuomi Sasai, all of Nagoya, Japan, assignors to Toyo Contact Lens Co., Ltd., Nagoya, Japan**

**Filed Apr. 21, 1987, Ser. No. 40,585**

**Int. Cl.⁴ C08F** *259/08, 265/06*

**U.S. Cl. 525—276** **12 Claims**

1. A highly water-absorptive optical material obtained by saponification for hydrophilic treatment of a copolymer composed essentially of:

(A) from 2 to 30 parts by weight of a (meth)acrylate polymer having at least one polymerizable group per molecule on an average obtained by copolymerizing (a) an alkyl (meth)acrylate monomer and (b) a monomer having at least two polymerizable groups per molecule, as the main components, and

(B) from 70 to 98% by weight of a fatty acid vinyl ester.

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**4,745,159**

## METHACRYLATE RESIN COMPOSITION AND PROCESS FOR ITS PREPARATION

**Hisao Anzai; Hideaki Makino, both of Ohtake; Isao Sasaki, Hiroshima; Kozi Nishida, and Masaru Morimoto, both of Ohtake, all of Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan**

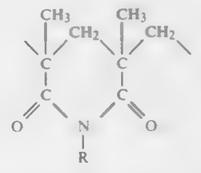
**Filed Jan. 20, 1987, Ser. No. 5,423**

**Claims priority, application Japan, Jan. 23, 1986, 61-10994; Oct. 30, 1986, 61-256958**

**Int. Cl.⁴ C08F** *8/30*

**U.S. Cl. 525—329.9** **15 Claims**

1. A methacrylate resin composition comprising a methacrylate resin containing methacrylimide units of the following formula:



(I)

wherein R is a hydrogen atom or an aliphatic, alicyclic or aromatic hydrocarbon group having from 1 to 20 carbon atoms, said composition having a yellowness index (YIs) of at most 3 as measured in the form of a solution of the heated resin composition and a total light transmittance of from 89 to 95%.

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**4,745,160**

## BIODEGRADABLE AMPHIPATHIC COPOLYMERS

**Jeffrey R. Churchill, Northwich, and Francis G. Hutchinson, Lymm, both of United Kingdom, assignors to Imperial Chemical Industries PLC, London, England**

**Filed Jun. 21, 1985, Ser. No. 747,173**

**Claims priority, application United Kingdom, Jun. 26, 1984, 8416234**

**Int. Cl.⁴ C08L** *5/02, 53/00, 71/02, 89/00*

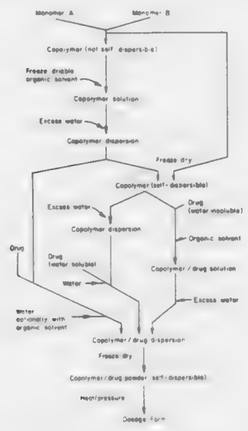
**U.S. Cl. 525—415** **5 Claims**

1. A pharmaceutically or veterinarily acceptable amphipathic block copolymer, which is self-dispersable in water to form a stable dispersion in water without the addition of any surfactant or other additive and has a minimum weight average molecular weight of 1000, selected from the group consisting of

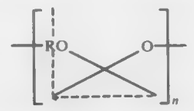
(a) non-cross-linked linear copolymers of the formula $A_m(BA)_n$ or $B_m(AB)_n$; and

(b) non-cross-linked branched or graft block copolymers of the formula $AB_n$ or $BA_n$ wherein respectively A or B is a backbone polymer with n units of a monomer or polymer B or A

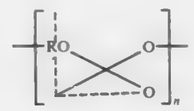
respectively grafted onto it;
wherein m is 0 or 1; n is an integer;
wherein A is a pharmaceutically or veterinarily acceptable hydrophobic polymer which is biodegradable or hydrolytically unstable under normal physiological conditions



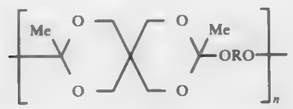

and is selected from the group consisting of poly(D-, L- and DL-lactic acids); poly(D-, L-, and DL-lactides); polyglycolic acid; polyglycolide; poly-caprolactone; poly(3-hydroxybutyric acid); non-therapeutic hydrophobic polypeptides; polyacetals of the formula:



wherein R is a hydrocarbon radical, and n is as previously defined; polycarbonates and polyorthoesters of the formula:



wherein R and n are as previously defined; copolymers of the formula:



wherein R and n are as previously defined; and copolymers derived from at least two monomers from which the above polymers are derived; and
wherein B is a pharmaceutically or veterinarily acceptable hydrophilic polymer selected from the group consisting of polyvinylalcohol, polyvinylpyrrolidone, polyethylene glycol, polyacrylamide, polymethacrylamide, dextran, alginic acid, sodium alginate, gelatine, copolymers thereof, and polyoxyethylene/polyoxypropylene block copolymers.

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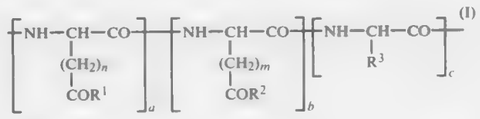
**4,745,161**

## SOLUBLE AND BIODEGRADABLE POLYAMINO ACID ACTIVATED FOR BONDING OF BIOLOGICALLY ACTIVE COMPOUND

**Vladimír Saudek; Frantisek Rypacek, and Jaroslav Drobnik, all of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Czechoslovakia**

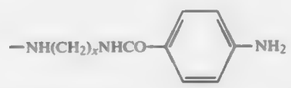
**Filed Apr. 1, 1986, Ser. No. 846,707**
**Claims priority, application Czechoslovakia, Apr. 10, 1985, 2634/85**
**Int. Cl.[4] C08G *69/48***
**U.S. Cl. 525—420** **2 Claims**

1. A biodegradable copolymer activated for bonding of biologically active compounds, wherein the main chain of the copolymer is formed from the units of aspartic acid or glutamic acid, or from both these units, or also from units of other amino acids, according to the general formula I



(I)

where n is 1 or 2, m is 1 or 2, a+b+c is 100, a is 0.5 to 100, b is 0 to 99.5, c is 0 to 80, substituent $R^1$ is —NH—$NH_2$, —N≡N or



where x is 2 to 6; $R^2$ is —$NH(CH_2)_xOH$ where x is 2 to 6; and $R^3$ is methyl, 2-propyl, 2-methylpropyl, butyl, 2-butyl, benzyl or 4-hydroxybenzyl.

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**4,745,162**

## POLY(ALKYLENE CARBONATE) POLYAHLS HAVING ON THE AVERAGE UP TO ONE ACID-TERMINAL MOIETY AND SALTS THEREOF

**Robert F. Harris, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.**

**Filed Sep. 22, 1986, Ser. No. 909,992**
**Int. Cl.[4] C08F *283/02;* B01F *17/00***
**U.S. Cl. 525—461** **13 Claims**

1. A surfactant composition, comprising:
between about 5 weight percent and 95 weight percent of an acid-functional polymer having a poly(alkylene carbonate) backbone and on the average at least about 0.05 and up to and including about 1 terminal acid group per molecule or a salt thereof, and
between about 95 weight percent and 5 weight percent of a non-ionic polymer, wherein said non-ionic polymer is selected from the group consisting of non-ionic poly(alkylene carbonate) polyahls, polyether polyahls, polyester polyahls, alcohol alkoxylates, alkylphenol alkoxylates, carboxylic acid alkoxylates and amine alkoxylates.



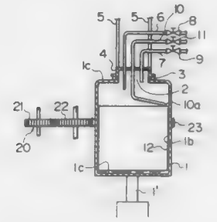
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**4,745,163**

## CATALYTIC FILM POLYMERIZATION OF ACETYLENE

**Ichiro Hide, and Junichi Umetsu, both of Sapporo, Japan, assignors to Hoxan Corporation, Sapporo, Japan**

**Division of Ser. No. 649,506, Sep. 11, 1984, Pat. No. 4,663,123. This application Oct. 31, 1986, Ser. No. 925,218**
**Claims priority, application Japan, Mar. 15, 1984, 59-37092; Mar. 16, 1984, 59-37529**
**Int. Cl.[4] C08F *2/02, 38/02***
**U.S. Cl. 526—62** **5 Claims**



1. A process for the catalytic film polymerization of acetylene, comprising the steps of:
(a) providing an apparatus which includes
(1) a polymerization vessel having an interior surface defining a sidewall portion and a bottom portion;
(2) means for feeding a catalyst exclusively along said sidewall portion;
(3) means for containing said catalyst to form a layer thereof along said interior surface, said coating means preventing a flow of catalyst from said sidewall portion to said bottom portion in excess of that necessary to produce a polymerized film of uniform thickness along said interior surface; and
(4) means for maintaining a single continuous monomer gas stream at said interior surface sufficient for uniform polymerization at all locations along said interior surface;
(b) producing an inert atmosphere in the polymerization vessel and feeding a catalyst exclusively along said sidewall portion of said polymerization vessel;
(c) coating said catalyst along said interior surface of said polymerization vessel and allowing said catalyst to flow from said sidewall portion to said bottom portion;
(d) regulating said catalyst flow to maintain a level of flow no greater than that necessary to produce a polymerized film of uniform thickness in step (f);
(e) feeding an acetylene monomer gas to said vessel;
(f) maintaining a homogeneous acetylene monomer gas concentration along said interior surface of said polymerization vessel; and
(g) polymerizing said acetylene monomer gas to form a polymer film of uniform thickness along said interior surface.

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**4,745,164**

## PREPARATION OF HOMOPOLYMERS AND COPOLYMERS OF PROPYLENE BY MEANS OF A ZIEGLER-NATTA CATALYST SYSTEM

**Guenther Schweier, Friedelsheim; James F. R. Jaggard, Gruenstadt; Rainer A. Werner, Bad Durkheim, and Wolfgang Gruber, Frankenthal, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Filed Nov. 14, 1986, Ser. No. 930,528**
**Claims priority, application Fed. Rep. of Germany, Nov. 16, 1985, 3540701**
**Int. Cl.[4] C08F *4/02, 10/06***
**U.S. Cl. 526—125** **1 Claim**

1. A process for preparing homopolymers of propylene and copolymers of propylene with minor amounts of other $C_2$–$C_6$-alpha-monoolefins by dry phase polymerizing the monomer or monomers at 50°–90° C. and 10–50 bar by means of a Ziegler-Natta catalyst system comprising
(1) a titanium component which contains titanium, magnesium, chlorine and a benzenecarboxylic acid derivative,
(2) an aluminum component of the formula

$$X\ Al\ R_2^1$$

where
X is $R^1$ or chlorine and
$R^1$ is alkyl of not more than 4 carbon atoms,
(3) a silane component of the formula

$$R_n^2\ Si(OR^3)_{4-n}$$

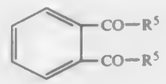
where
$R^2$ is aryl or alkyl of not more than 10 carbon atoms,
$R^3$ is alkyl of not more than 7 carbon atoms and
n is 0, 1 or 2 with the proviso that the atomic ratio of titanium in titanium component (1): aluminum is aluminum component (2) is from 1:20 to 1:200 and of aluminum in aluminum component (2):silicon in silane component (3) is from 1:0.03 to 1:0.3,
which comprises using a titanium component (1) obtained by first of all reacting
(1.1) in a first stage
(1.1.1) in a liquid alkane hydrocarbon,
(1.1.2) a finely divided magnesium compound having a particle diameter within the range from 0.05 to 0.3 mm and the formula

$$MgX_2$$

where
X is chlorine,
(1.1.3) an alcohol of the formula

$$R^4OH$$

where
$R^4$ is $C_2$-alkyl,
(1.1.4) a phthalic acid derivative of the formula



where
$R^5$ is $C_2$–$C_8$-alkoxy and
(1.1.5) titanium tetrachloride with one another by
(1.1.A) first bringing together the magnesium compound and the alcohol with constant mixing at from +10° to +30° C. using per 100 mole parts of the hydrocarbon from 13 to 18 mole parts of magnesium compound and per 100 mole parts of magnesium compound from 200 to 350 mole parts of the alcohol, the mixing being continued for from 0.5 to 4 hours and the temperature being maintained at from +50° to +130° C.,
(1.1.B) subsequently adding the titanium tetrachloride with constant mixing at from +10° to +30° C. using per 100 mole parts of alcohol from 90 to 250 mole parts of titanium tetrachloride, and with constant mixing maintaining the resulting mixture at 60°–120° C. for from 0.2 to 2.5 hours with the proviso that the phthalic acid derivative is added during process steps (1.1.A) and/or (1.1.B), in an amount, per 100 mole parts of magnesium compound, of from 10 to 25 mole parts, and isolating the resulting solid intermediate by separating off the remaining liquid phase, then
(1.2) in a second stage extracting the solid intermediate obtained from stage (1.1), which is A weight percent magne-

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sium, at 115°–135° C., continuously, with a liquid alkylbenzene which has 1 or 2 alkyls as substituents which in turn each have 1 or 2 carbon atoms and has not more than 10 carbon atoms until the remaining solid substance has become richer in magnesium by a factor of from 1.4 to 2.0, i.e., comprises from 1.4×A to 2.0×A weight percent magnesium, and finally washing in a third stage the extractant

(1.3) moist solid substance remaining in stage (1.2) with a liquid $C_5$–$C_8$-alkane 3, 4, or 5 times, using per 100 parts by weight of solid substance from 300 to 400 parts by volume of alkane per wash step, and in this way recovering with the solid substance produced in stage (1.3) said titanium component (1).

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**4,745,165**

## PROCESS FOR THE PREPARATION OF CURABLE FLUOROELASTOMERS AND PRODUCTS SO OBTAINED

**Vincenzo Arcella, Novara; Giulio Brinati, Milan; Piergiorgio Bonardelli, Brescia, and Giulio Tommasi, Milan, all of Italy, assignors to Ausimont S.p.A., Milan, Italy**

**Filed Jul. 7, 1986, Ser. No. 882,724**

**Claims priority, application Italy, Jul. 8, 1985, 21472 A/85**

**Int. Cl.[4] C08F *16/24, 2/00***

**U.S. Cl. 526—247** **9 Claims**

1. Process for the preparation of curable fluoroelastomers comprising reacting from 35 to 80 mol % of vinylidene fluoride, from 15 to 35 mol % of hexafluoropropene, from 0 to 30 mol % of another comonomer selected from fluoroolefins and/or perfluorovinyl ethers and from 0.01 to 1 mol % of a brominated fluorovinyl ether having general formula:

$$CF_2Br—(R_f)_n—O—CF=CF_2$$

wherein $R_f$ is a fluorinated alkylene radical containing from 1 to 9 carbon atoms and n can be either 0 or 1, in the presence of a known polymerization initiator for fluoroelastomers, and of a chain-transfer agent having general formula:

$$R—(CF_2Br)_m$$

wherein m is either 1 or 2; when m is 1, R can be either bromine or a perfluoroalkyl radical of 2 to 4 carbon atoms containing a bromine atom bonded to a secondary carbon atom; and when m is 2, R is an alkylene radical of up to 4 carbon atoms containing a bromine atom bonded to a secondary carbon atom.

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**4,745,166**

## HEAT-CURABLE MIXTURE CONTAINING SUBSTITUTED BICYCLO (2.2.1) HEPT-5-ENE-2,3-DICARBOXIMIDE AND POLYMALEIMIDE, AND ETHYLENICALLY UNSATURATED PHENOLIC COMPOUND

**Alfred Renner, Muntelier, and Sameer H. Eldin, Fribourg, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Division of Ser. No. 773,724, Sep. 9, 1985, Pat. No. 4,666,997. This application Mar. 16, 1987, Ser. No. 26,083**

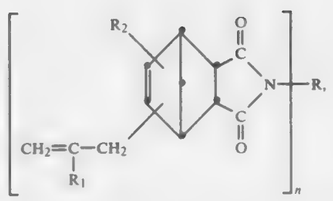
**Claims priority, application Switzerland, Sep. 14, 1984, 4389/84**

**Int. Cl.[4] C08F *222/40***

**U.S. Cl. 526—259** **11 Claims**

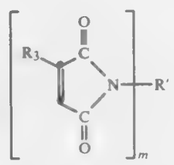
1. A heat-curable mixture comprising

(a) 10–90% by weight of at least one compound of formula I



(I)

(b) 90–10% by weight of at least one compound of formula II

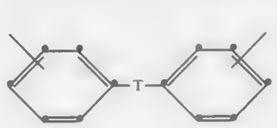


(II)

wherein

n is 1 or 2 and m is 2 or 3,

R when n is 1, is a hydrogen atom, $C_1$–$C_{12}$alkyl, $C_3$–$C_6$alkenyl, $C_5$–$C_8$cycloalkyl, $C_6$–$C_{10}$aryl or benzyl, or when n is 2, is —$C_pH_{2p}$—, wherein p is 2 to 20, or is $C_6$–$C_{10}$arylene or a group of the formula III



(III)

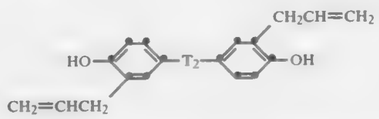
wherein

T is methylene, isopropylidene, —CO—, —S— or —$SO_2$,

R′ is an organic radical of valency m which contains 2 to 30 carbon atoms, and

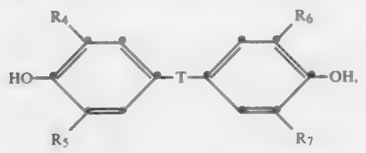
$R_1$, $R_2$ and $R_3$ are each independently a hydrogen atom or a methyl group; and

(c) a maximum of 30%, based on the total weight of (a) and (b), of at least one compound which is able to react with component (b), said component (c) corresponding to the formulae



(X)

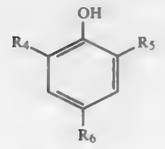
wherein $T_2$ is a direct bond, or $T_2$ is methylene, isopropylidene, —O—, —S—, —SO— or —$SO_2$—,



(XII)

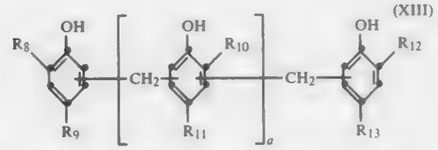
wherein $R_4$, $R_5$, $R_6$ and $R_7$ are each independently a hydrogen atom, an allyl or propenyl group, with the proviso that at least one of $R_4$ to $R_7$ is a propenyl group, and T is as previously defined,





(XI)

wherein $R_4$, $R_5$ and $R_6$ are as previously defined and at least one of $R_4$ to $R_6$ is a propenyl group, and



(XIII)

wherein $R_8$, $R_9$, $R_{10}$, $R_{11}$, $R_{12}$ and $R_{13}$ are each independently a hydrogen atom, $C_1$–$C_4$alkyl, allyl or propenyl, with the proviso that at least one of $R_8$ to $R_{13}$ is a propenyl group, and a is a value from 0 to 10.

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**4,745,167**

## POLYARYLENE SULFIDE PREPARATION IN TITANIUM REACTION VESSEL WITH TWO DISTINCT TEMPERATURE RANGES

**Yo Iizuka; Takao Iwasaki; Takayuki Katto, and Zenya Shiiki, all of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 12, 1986, Ser. No. 941,209**

**Claims priority, application Japan, Dec. 18, 1985, 60-285243**

**Int. Cl.[4] C08G *75/16***

**U.S. Cl. 526—262** **12 Claims**

1. A process for the production of a high-molecular-weight polyarylene sulfide, wherein a reaction liquid comprising an alkali metal sulfide and a dihalo aromatic compound in an organic amide solvent is subjected to dehalogenation sulfidation reaction in a reaction vessel in the following two steps:

(1) the step of carrying out the reaction at a temperature of 180° to 235° C. in the presence of water in an amount higher than 2.4 and up to 10 moles per mole of the alkali metal sulfide so that the conversion of the dihalo aromatic compound is at least 50% and the melt viscosity of the polyarylene sulfide formed does not exceed 500 poises, and

(2) the step of elevating the temperature to 245° to 290° C. in the presence of water in an amount of 2.5 to 10 moles per mole of the alkali metal sulfide with or without the addition of water to the reaction system and

wherein at least the portion of the reaction vessel which the reaction liquid contacts is made of titanium in at least step (1).

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**4,745,168**

## PLASTIC LENS AND METHOD OF MANUFACTURING THEREOF

**Hideo Nakamoto, and Hiroshi Fukushima, both of Nagoya, Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan**

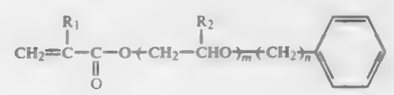
**Continuation of Ser. No. 693,042, Jan. 22, 1985, abandoned. This application Aug. 18, 1986, Ser. No. 896,571**

**Claims priority, application Japan, Jan. 27, 1984, 59-14136; Sep. 28, 1984, 59-20397**

**Int. Cl.[4] C08F *18/02, 18/18***

**U.S. Cl. 526—320** **10 Claims**

1. A plastic lens comprising a polymer (B) containing a dimethallyl phthalate (A) as a major component and having a refractive index of not less than 1.55, wherein the polymer (B) is a colorless copolymer comprising 70 to 99% by weight of a dimethallyl phthalate and 30 to 1% by weight of one or more monomers ($C_1$) represented by the general formula



wherein $R_1$ and $R_2$ each represent a hydrogen atom or methyl group and m and n each represent an integer from 0 to 3.

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**4,745,169**

## ALKALI-SOLUBLE SILOXANE POLYMER, SILMETHYLENE POLYMER, AND POLYORGANOSILSESQUIOXANE POLYMER

**Hisashi Sugiyama, Yokohama; Kazuo Nate, Machida; Takashi Inoue, and Akiko Mizushima, both of Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

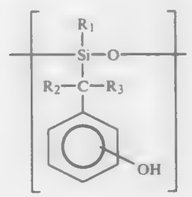
**Filed May 5, 1986, Ser. No. 859,370**

**Claims priority, application Japan, May 10, 1985, 60-98032; Aug. 22, 1985, 60-182950; Oct. 24, 1985, 60-236344**

**Int. Cl.[4] C08G *77/00***

**U.S. Cl. 528—43** **7 Claims**

1. An alkali-soluble siloxane polymer in which more than 40% of the siloxane units is composed of the unit represented by the formula (1):



(1)

where $R_1$ is a hydrogen or a monovalent organic group other than aromatic groups; $R_2$ and $R_3$ are each a hydrogen, a chlorine, or a monovalent organic group.

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**4,745,170**

## POLYURETHANE ELASTOMERS FROM EO/BO POLYETHER POLYOLS

**Kimbley A. Bushman, Clute, and Michael K. Laughner, Lake Jackson, both of Tex., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Jul. 25, 1985, Ser. No. 758,897**

**Int. Cl.[4] C08G *18/10, 18/32***

**U.S. Cl. 528—61** **16 Claims**

1. A polyurethane and/or polyurea elastomer prepared in the reaction of:

(a) an organic polyisocyanate;

(b) a chain extender and

(c) an isocyanate reactive polyether having a molecular weight from about 500 to about 10,000, which polyether is a block copolymer of ethylene oxide and butylene oxide comprising an internal poly(EO) block bonded on each side to a poly(BO) block, wherein said poly(BO) blocks comprise from about 10 to about 90 percent of the total weight of the polyether.

**4,745,171**

## POLY-ε-CAPROLACTONE RESIN AND METHOD FOR RETARDING HYDROLYSIS RATE THEREOF

**Takashi Sato, and Kisaku Otani, both of Ohtake, Japan, assignors to Daicel Chemical Industries, Ltd., Osaka, Japan**

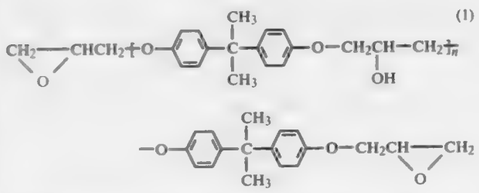
**Filed Apr. 6, 1987, Ser. No. 34,717**

**Claims priority, application Japan, Apr. 15, 1986, 61-85024**

**Int. Cl.⁴ C08G** *63/08*

**U.S. Cl. 528—116** **11 Claims**

1. A poly-ε-caprolactone resin obtained by ring-opening polymerization of a monomer composition comprising ε-caprolactone and 0.01 to 5.0% by weight, based on the ε-caprolactone, of an epichlorohydrin-bisphenol A type epoxy compound represented by the following general formula (1):



(1)

wherein n is an average degree of polymerization and a number of 0 to 5.

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**4,745,172**

## PHENOLIC RESINS USING POLYAMINES AND POLYETHERS IN THEIR PRODUCTION

**Thomas Scholl; Reinhard Preuss, both of Krefeld; Manfred Abele, Cologne; Hermann Fries, Bergisch Gladbach, and Theo Kempermann, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen-Bayerwerk, Fed. Rep. of Germany**

**Filed Aug. 13, 1986, Ser. No. 896,061**

**Claims priority, application Fed. Rep. of Germany, Aug. 22, 1985, 3529985**

**Int. Cl.⁴ C08G** *14/06*

**U.S. Cl. 528—162** **5 Claims**

1. A phenolic resin obtained by condensing

(a) an o- or p-$C_1$–$C_{15}$-alkyl or —$C_3$–$C_{15}$-cycloalkylphenol,

(b) an aliphatic $C_1$–$C_6$-aldehyde,

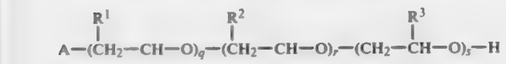
(c) a polyamine corresponding to the formula $H_2N$—[$(CH_2)_n$—NH]$_m$—$(CH_2)_n$—$NH_2$

in which

n=2 or 3 and

m=3 to 150, and

(d) a polyether corresponding to the formula



in which

$R^1$, $R^2$ and $R^3$ represent hydrogen or $C_1$–$C_{12}$ -alkyl,

q, r and s are integers of from 0 to 300,

A represents hydrogen, —OH, —$Or^4$, —$OCOR^4$ NHCOR⁴ and

$R^4$ represents alkyl, aryl or aralkyl

and the sum of q, r and s is at least 2, in a molar ratio a:b:c:d of 1:(0.7 to 1.3):(0.005 to 0.2) : (0.001 to 0.3) at 95° to 180° C. and under a pressure of 1 to 7 bar.

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**4,745,173**

## CONDENSATION COPOLYMERS CONTAINING 2,5-DIARYLAMINOTEREPHTHALIC ACID TYPE COLORANTS AND PRODUCTS THEREFROM

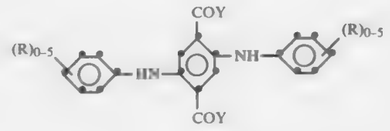
**Max A. Weaver; Wayne P. Pruett, both of Kingsport, and Samuel D. Hilbert, Jonesborough, all of Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Feb. 24, 1987, Ser. No. 17,959**

**Int. Cl.⁴ C08G** *63/44, 69/44, 63/52*

**U.S. Cl. 528—288** **15 Claims**

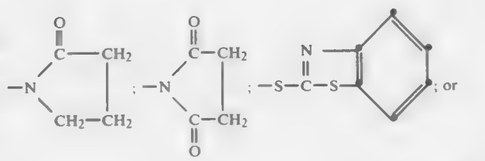
1. A composition comprising molding or fiber grade condensation polymer having copolymerized therein a total of from 1.0 to about 20,000 ppm, of the reactant residue moieties of one or a mixture of colorants of the formula



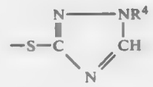
wherein:

each Y is selected from hydroxyl, alkoxy, allyloxy, aryloxy, cycloalkyloxy, or halogen;

each R when present as a substituent, is selected from alkyl; aryl; cyclohexyl; cyclohexyloxy; alkoxy; alkoxycarbonyl; halogen; alkylthio; aryloxy; arylthio; cyclohexylthio; alkanoyl; aroyl; cyano; hydroxyalkyl; hydroxyalkoxy; hydroxyalkylthio; trifluoromethyl; —$NR^2R^3$ wherein $R^2$ and $R^3$ are independently selected from hydrogen, alkanoyl, alkoxycarbonyl, alkylsulfonyl, aroyl, alkylcarbamoyl, dialkylcarbamoyl, alkyl, aryl, cycloalkyl, arylsulfonyl or cyclohexylcarbonyl; —$CONR^4R^5$ or —$SO_2NR^4R^5$ wherein $R^4$ and $R^5$ are independently selected from hydrogen, alkyl, aryl or cycloalkyl;



; or



wherein $R^4$ is as defined above;

wherein each alkyl, aryl, or cycloalkyl moiety or portion of a group or radical may be substituted where appropriate with 1–3 of hydroxyl, hydroxyalkoxy, hydroxyalkyl, alkanoylamino, acylamino, acyloxy, cyano, alkoxycarbonyl, halogen, alkoxy, alkoxyalkoxy, aryl, aryloxy, or cycloalkyl; and

wherein in the above definitions the alkyl moieties or portions of the various groups contain from 1–8 carbons, straight or branched chain, the aryl nuclei contain from 4–10 carbons, and the cycloalkyl nuclei contain from 4–6 carbons.



**4,745,174**

## POLYESTERS HAVING IMPROVED WHITENESS

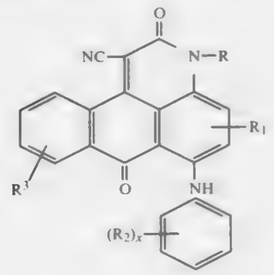
**Wayne P. Pruett, Kingsport; Samuel D. Hilbert, Jonesborough; John G. Thompson, and Max A. Weaver, both of Kingsport, all of Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Apr. 23, 1987, Ser. No. 41,512**

**Int. Cl.⁴ C08G** *69/44, 73/16*

**U.S. Cl. 528—289** **11 Claims**

1. A composition comprising a molding or fiber grade polyester having added or reacted therein, in an amount sufficient to improve the apparent whiteness of the polyester, one or more compounds having the structure:



wherein

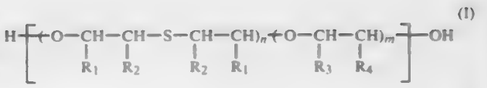
R is hydrogen, cycloalkyl, allyl, alkyl, aralkyl, alkoxyalkyl or cycloalkylalkylene;

$R_1$ is hydrogen, halogen, alkyl, alkoxy, aryloxy, alkylthio or arylthio;

$R_2$ is hydrogen, halogen, alkyl, aryl, alkoxy, aryloxy, alkylthio, arylthio, carbalkoxy, carbaryloxy, carbaralkoxy, carboxy, sulfamoyl, alkylsulfamoyl, dialkylsulfamoyl, alkylarylsulfamoyl, cycloalkylsulfamoyl, arylsulfamoyl, carbamoyl, alkylcarbamoyl, dialkylcarbamoyl, alkylarylcarbamoyl, cycloalkylcarbamoyl, arylcarbamoyl, 2-pyrrolidono, acylamido, or N-alkylacylamido;

$R_3$ is one or more residues selected from the group consisting of hydrogen, halogen, alkyl and alkoxy; and

x is an integer of 1 to 5; wherein one or more of the alkyl, alkoxy, alkoxy, aryl, aryloxy, alkylthio, arylthio or aralkyl residues may contain one or more reactive groups selected from the group consisting of carboxy, carbalkoxy, carbaryloxy, N-alkyl-carbamoyloxy, carbamoyloxy, acyloxy, chlorocarbonyl, hydroxyl, cycloalkylcarbonyloxy, N-arylcarbamoyloxy and N,N-dialkylcarbamoyloxy and wherein said alkyl and aryl groups may contain substituents selected from the group consisting of alkoxy, acyloxy, cyano, hydroxy, halogen and acylamido.

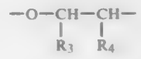


(I)

in which

$R_1$ and $R_2$, independently of each other represent hydrogen and/or a straight-chain or branched $C_1$ to $C_{20}$ alkyl group,

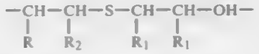
$R_3$ and $R_4$, independently of each other and independently of adjacent



groups, in each case represent hydrogen, a straight-chain or branched $C_1$ to $C_{20}$ alkyl group and/or —A—O—B, where

A denotes a straight-chain or branched $C_1$ to $C_{20}$ alkylene group and

B denotes a straight-chain or branched $C_1$ to $C_{20}$ alkylene-OH group or a



group with $R_1$ and $R_2$ as defined above,

n represents an integer from 1 to 100 and

m represents an integer from 10 to 2500, said polyether having a mean molecular weight of 10,000 to 100,000, to a water-in-oil emulsion.

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**4,745,175**

## CONDENSATION PRODUCTS OF THIOALKYLENE OXIDES OF POLYTHIO-ALKYLENE OXIDES WITH POLYALKYLENE OXIDES, THEIR PREPARATION AND THEIR USE AS BREAKERS FOR WATER-IN-OIL EMULSIONS

**Thomas Scholl, Krefeld; Wolfgang Oberkirch, Leverkusen, and Hermann Perrey, Krefeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Jan. 22, 1986, Ser. No. 821,568**

**Claims priority, application Fed. Rep. of Germany, Feb. 12, 1985, 3504645**

**Int. Cl.⁴ C10M** *105/08*

**U.S. Cl. 528—380** **7 Claims**

1. A method for breaking water-in-oil emulsions comprising adding a sulphur-containing polyether of the formula

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**4,745,176**

## CATALYTIC PROCESS FOR PREPARING POLYCUMYLENE FROM α-CUMYL HALIDE

**Robert Becker, Leverkusen; Ludwig Bottenbruch, Krefeld; Johann Grolig, and Helmut Waldmann, both of Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Dec. 4, 1984, Ser. No. 678,167**

**Claims priority, application Fed. Rep. of Germany, Dec. 15, 1983, 3345446**

**Int. Cl.⁴ C08G** *61/02*

**U.S. Cl. 528—397** **6 Claims**

1. A process for preparing polycumylene from α-cumyl halide by Friedel-Crafts alkylation which comprises reacting cumyl halide and, relative to 100 parts by weight of cumyl halide, 1 to 50 parts by weight of a catalyst mixture comprising

(a) aluminum trichloride and

(b) at least one halide selected from the group consisting of copper (II) halides, zinc halides, chromium (III) halides, iron (II) halides, iron (III) halides, cobalt halides, and nickel halides,

wherein the molar ration of component (a) to component (b) is from 1:10 to 4:1, and the reaction is at a temperature of from −50° C. to 10° C., in from 100 to 5,000 parts by weight of inert organic solvent.

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**4,745,177**

## DESULFATOHIRUDINS, THE PREPARATION THEREOF AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

**Hans Fritz, Hoenbrunn; Johannes Dodt; Ursula Seemüller, both of Munich, and Ernst Fink, Westerstede-Giesselhorst, all of Fed. Rep. of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y. and Plantorgan Werk Heinrich G.E. Christensen KG, Bad Zwischenahn, Fed. Rep. of Germany**

**Division of Ser. No. 673,952, Nov. 21, 1984, Pat. No. 4,654,302. This application Nov. 13, 1986, Ser. No. 929,710**

**Claims priority, application Fed. Rep. of Germany, Nov. 22, 1983, 3342139**

**Int. Cl.**[4] **C07K** *7/10;* **A61K** *37/43, 37/02*

**U.S. Cl. 530—324** **4 Claims**

1. A desulfatohirudin of the formula I

(I)

H—Val—Val—Tyr—Thr—Asp—Cys—Thr—Glu—Ser—Gly—
—Gln—Asn—Leu—Cys—Leu—Cys—Glu—Gly—Ser—Asn—
—Val—Cys—Gly—Gln—Gly—Asn—Lys—Cys—Ile—Leu—
—Gly—Ser—Asp—Gly—Glu—Lys—Asn—Gln—Cys—Val—
—Thr—Gly—Glu—Gly—Thr—Pro—Lys—Pro—Gln—Ser—
—His—Asn—Asp—Gly—Asp—Phe—Glu—Glu—Ile—Pro—
—Glu—Glu—Tyr—Leu—Gln—OH

or of the formula II

(II)

H—Val—Val—Tyr—Thr—Asp—Cys—Thr—Glu—Ser—Gly—
—Gln—Asn—Leu—Cys—Leu—Cys—Glu—Gly—Ser—Asn—
—Val—Cys—Gly—Gln—Gly—Asn—Lys—Cys—Ile—Leu—
—Gly—Ser—Asp—Gly—Glu—Lys—Asn—Gln—Cys—Val—
—Thr—Gly—Glu—Gly—Thr—Pro—Lys—Pro—Gln—Ser—
—His—Asn—Asp—Gly—Asp—Phe—Glu—Glu—Ile—Pro—
—Glu—Glu—Tyr—OH

wherein the —Cys— residues are linked in pairs by disulfide bridges in the same manner as in hirudin, or a salt thereof.

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**4,745,178**

## PROCESS FOR SELECTIVE PEPTIDE BOND CLEAVAGE USING SULFOXIDES AND $CF_3COOH$

**Richard D. DiMarchi, and Harlan B. Long, both of Carmel, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.**

**Filed Apr. 22, 1987, Ser. No. 41,162**

**Int. Cl.**[4] **C07K** *17/00*

**U.S. Cl. 530—345** **11 Claims**

1. A process for selectively cleaving a peptide or protein at one or more tryptophan residues, which comprises treating in trifluoroacetic acid said peptide or protein at a concentration of from about 0.05 mM to about 50 mM with an organic sulfoxide at a concentration of from about 0.01M to about 1M, chloride ion at a concentration of from about 0.01M to about 2M, and water at a concentration not in excess of about 10M.

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**4,745,179**

## $^{59}$VALINE INSULIN-LIKE GROWTH FACTOR I AND PROCESS FOR PRODUCTION THEREOF

**Ikuo Ueda, Toyonaka; Mineo Niwa, Mukoo; Yoshimasa Saito, Osaka; Susumu Sato; Hiroki Ono, both of Osaka, and Tadashi Kitaguchi, Amagasaki, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan**

**Filed Mar. 20, 1985, Ser. No. 713,828**

**Claims priority, application United Kingdom, Apr. 2, 1984, 8408473; Jun. 1, 1984, 8413989; Sep. 25, 1984, 8424157**

**Int. Cl.**[4] **C07K** *13/00, 7/10*

**U.S. Cl. 530—350** **3 Claims**

1. A $^{59}$valine insulin-like growth factor I (hereinafter referred to as $^{59}$Val-IGF-I) fused to a protein peptide LH, wherein said $^{59}$Val-IGF-I has the following amino acid sequence:

Gly-Pro-Glu-Thr-Leu-Cys-Gly-Ala-Glu-Leu-Val-Asp-Ala-Leu-Gln-Phe-Val-Cys-Gly-Asp-Arg-Gly-Phe-Tyr-Phe-Asn-Lys-Pro-Thr-Gly-Tyr-Gly-Ser-Ser-Ser-Arg-Arg-Ala-Pro-Gln-Thr-Gly-Ile-Val-Asp-Glu-Cys-Cys-Phe-Arg-Ser-Cys-Asp-Leu-Arg-Arg-Leu-Glu-Val-Tyr-Cys-Ala-Pro-Leu-Lys-Pro-Ala-Lys-Ser-Ala.

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**4,745,180**

## SOLUBILIZATION OF PROTEINS FOR PHARMACEUTICAL COMPOSITIONS USING HEPARIN FRAGMENTS

**Margaret Moreland, and Danute E. Nitecki, both of Berkeley, Calif., assignors to Cetus Corporation, Emeryville, Calif.**

**Filed Jun. 27, 1986, Ser. No. 879,456**

**Int. Cl.**[4] **C07K** *15/00;* **A61K** *45/02, 37/02, 39/00*

**U.S. Cl. 530—351** **16 Claims**

1. A pharmaceutical composition comprising a non-toxic, inert, pharmaceutically acceptable aqueous carrier medium in which is dissolved a biologically active, selectively conjugated, recombinant protein selected from the group consisting of β-interferon, interleukin-2, and an immunotoxin, wherein the protein is covalently conjugated via at least one of its lysine residues to at least one heparin fragment having a terminal 2,5-anhydro-D-mannose residue through the aldehyde group of such residue, wherein said protein in its unconjugated form is normally hydrophobic and poorly soluble in said aqueous carrier medium at pH 6–8 in the absence of a solubilizing agent.

10. A process for preparing a pharmaceutical composition comprising:

(a) preparing a heparin fragment having a terminal 2,5-anhydro-D-mannose residue with an aldehyde not involved in intramolecular hemiacetal formation;

(b) reacting a biologically active, normally hydrophobic, poorly water-soluble recombinant protein selected from the group consisting of β-interferon, interleukin-2, and an immunotoxin with said aldehyde of said heparin fragment so as to provide a more water-soluble, biologically active, selectively conjugated recombinant protein; and

(c) formulating said protein in a non-toxic, inert, pharmaceutically acceptable aqueous carrier medium.



**4,745,181**

## POLYSUBSTITUTED ARYL ACRIDINIUM ESTERS

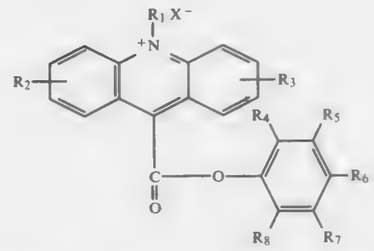
**Say-Jong Law, Westwood; Steve C. S. Chang, Franklin; Stephen A. Palmacci, Walpole, and Roger S. Cubicciotti, Needham, all of Mass., assignors to Ciba Corning Diagnostics Corp., Medfield, Mass.**

**Filed Oct. 6, 1986, Ser. No. 915,527**

**Int. Cl.**[4] **C07K** *15/14;* **C07H** *5/04, 19/06, 15/12;* **C07D** *219/00, 219/08*

**U.S. Cl. 530—387** **7 Claims**

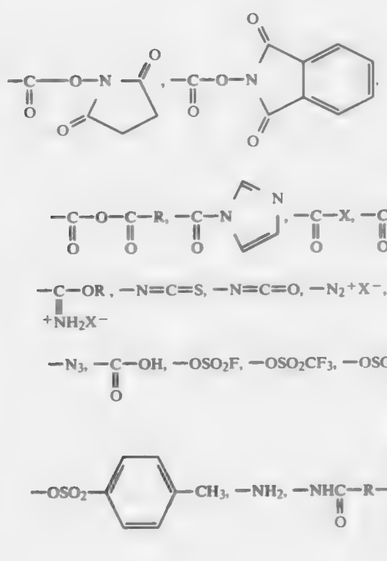
1. A luminescent conjugate for use in luminescent assays comprising a polysubstituted aryl acridinum ester of the formula:



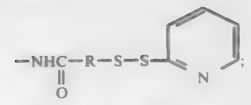
where $R_1$ is an alkyl, alkenyl, alkynyl, or aryl group; $R_2$, $R_3$, $R_5$, or $R_7$ are a hydrogen, amino, carboxyl, hydroxyl, alkoxyl, nitro, or halide group; $R_4$ or $R_8$ are an alkyl, alkenyl, alkynyl, aryl, alkoxyl, amino, amido, sulfonamido, or sulfide group; $R_6$ represents the following substituent:

$R_6$=-$R_9$-$R_{10}$

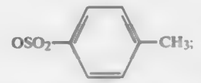
where $R_9$ is not required but optionally can be an alkyl, aryl, or aralkyl group, and $R_{10}$ is selected from the following:



-continued



X is $CH_3SO4^-$, $OSO_2F^-$, a halide, $OSO_2CF_3^-$, $OSO_2C_4F_9^-$,



R is alkyl, aryl, aralkyl; and finally $R_5$, $R_6$, and $R_7$ substituent positions on the phenoxy ring are interchangeable, wherein the $R_6$ substituent of the polysubstituted aryl acridinium ester is covalently coupled to a molecule with biological activity which molecule is capable of being covalently coupled to the $R_6$ substituent.

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**4,745,182**

## HERPES VIRUS SPECIFIC IMMUNOLOGICAL MATERIALS AND METHODS

**Gary H. Cohen, Havertown, Pa., and Roselyn J. Eisenberg, Haddonfield, N.J., assignors to University Patents, Inc., Westport, Conn.**

**Continuation-in-part of Ser. No. 644,205, Aug. 24, 1984, abandoned. This application Jan. 31, 1985, Ser. No. 696,582**

**Int. Cl.**[4] **C07K** *15/00;* **C12P** *21/00;* **C12N** *15/00;* **G01N** *33/571*

**U.S. Cl. 530—387** **14 Claims**

1. A monoclonal antibody capable of specifically binding with glycoprotein D of Herpes Simplex Virus types 1 and 2 and with a proteinaceous material comprising an amino acid sequence duplicating part or all of the following sequence:

PELA(or V)PEDPEDSALLEDPV(or A)GTVA(or S).

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**4,745,183**

## USE OF HYDROXYLAPATITE FOR THE ANALYSIS AND PREPARATION OF PURIFIED MONOCLONAL ANTIBODIES

**Sheldon C. Engelhorn, San Pablo; Hector Juarez-Salinas, Larkspur, and Gary S. Ott, Livermore, all of Calif., assignors to Bio-Rad Laboratories, Inc., Richmond, Calif.**

**Continuation-in-part of Ser. No. 582,089, Feb. 21, 1984, abandoned. This application Dec. 3, 1984, Ser. No. 677,145**

**Int. Cl.**[4] **A61K** *39/395;* **C07K** *3/00;* **G01N** *33/577*

**U.S. Cl. 530—387** **8 Claims**

1. A method for the separation of an antibody of selected light chain composition from a mixture containing antibodies of the same isotype but different light chain composition, said method comprising:

(a) impregnating a hydroxylapatite chromatography column with said mixture;

(b) passing through said column an elution buffer of increasing concentration to cause said mixture to elute therefrom in substantially separate peaks according to light chain composition; and

(c) recovering from the eluate of step (b) a fraction containing the peak corresponding to said antibody of selected light chain composition.

**4,745,184**

## METHOD FOR THE PREPARATION OF BORATE-CONTAINING, DISPERSIBLE, WATER-SOLUBLE POLYGALACTOMANNANS AND POLYGALACTOMANNAN DERIVATIVES

**Friedrich Bayerlein; Peter-Paul Habereder, both of Krailling; Nikolaos Keramaris, Eichenau; Nikolaus Kottmair, Gauting, and Manfred Kuhn, Munich, all of Fed. Rep. of Germany, assignors to Diamalt AG, Munich, Fed. Rep. of Germany**

**Continuation of Ser. No. 420,684, Sep. 21, 1982, Pat. No. 4,645,833. This application Feb. 17, 1987, Ser. No. 15,649**

**Claims priority, application Fed. Rep. of Germany, Sep. 22, 1981, 3137357**

**The portion of the term of this patent subsequent to Feb. 24, 2004, has been disclaimed.**

**Int. Cl.**[4] **C08B** *37/00;* **C07H** *1/00*

**U.S. Cl. 536—17.1** **12 Claims**

1. A process for the preparation of borate-containing, dispersible, water-soluble polygalactomannan material selected from the group of water-soluble derivative of polygalactomannan, depolymerizate of said derivative, derivative of polygalactomannan, or mixtures thereof which comprises:

obtaining polygalactomannan substance from endosperm of legumes;

soaking said polygalactomannan substance in an aqueous alkaline solution containing 0.001 to 0.09 weight percent of borate ions, expressed as borax ($Na_2B_4O_7.10H_2O$), based upon the polygalactomannan, and 0.2 to 10 percent weight of hydroxyl ions, expressed as sodium hydroxide, based upon the polygalactomannan

to thereby obtain a soaked material; and then subjecting said soaked material to mechanical treatment resulting in destruction of the cell structure of said polygalactomannan substance, and then treating said polygalactomannan substance to obtain dispersible, water-soluble polygalactomannan material.

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**4,745,185**

## D-ARABINOSE-1,5-DIPHOSPHATE SALTS AND METHODS FOR THE TREATMENT OF DIABETES

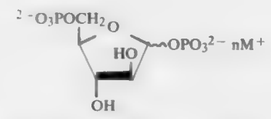
**Bruce E. Maryanoff, New Hope, and Allen B. Reitz, North Wales, both of Pa., assignors to McNeilab, Inc., Fort Washington, Pa.**

**Continuation of Ser. No. 614,914, May 29, 1984, abandoned. This application Dec. 12, 1985, Ser. No. 808,132**

**Int. Cl.**[4] **A61K** *31/665;* **C07H** *11/04, 13/00*

**U.S. Cl. 536—117** **19 Claims**

1. A D-arabinose-1,5-diphosphate salt of the follow formula (I):



(I)

wherein n is about 3 to 4 and $M^+$ is a cation.

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**4,745,186**

## 2,3,4-TRIACYLHEXOSES AND MIXTURES THEREOF

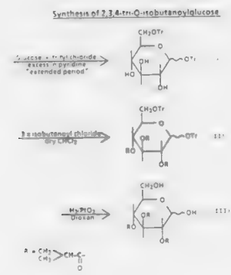
**John B. Mudd, Danville; Basil A. Burke, Palo Alto, both of Calif.; Jon F. Fobes, Edina, Minn., and Muraleedharan G. Nair, Dublin, Calif., assignors to Plant Cell Research Institute, Inc., Dublin, Calif.**

**Continuation-in-part of Ser. No. 709,550, Mar. 8, 1985, abandoned. This application Feb. 10, 1986, Ser. No. 828,108**

**Int. Cl.**[4] **C07H** *13/02, 11/00*

**U.S. Cl. 536—119** **35 Claims**

1. 2,3,4-tri-0-acyl D- and/or L-hexoses having the structure:




wherein

the hexose is a hexose selected from the group consisting of glucose, mannose, galactose, allose, altrose, gulose, idose, and talose,

the anomeric (C-1) substituent is either alpha or beta, and $R^1$, $R^2$, and $R^3$ are fatty acids independently selected from the group consisting of normal-, iso-, and anteiso- alkanoic and alkenoic acids containing 3 to 30 carbons.

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**4,745,187**

## PROCESS FOR THE PREPARATION OF WATER-SOLUBLE PHTHALOCYANINE DYESTUFFS

**Hartmut Springer, Königstein/Taunus, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Jan. 29, 1987, Ser. No. 8,300**

**Claims priority, application Fed. Rep. of Germany, Feb. 1, 1986, 3603124**

**Int. Cl.**[4] **C09B** *47/08, 47/20*

**U.S. Cl. 540—123** **12 Claims**

1. A process for the preparation of water-soluble phthalocyanine dyestuffs which contain one or more substituted ethylsulfonyl groups or one or more vinylsulfonyl groups, by reaction of a phthalocyaninesulfonyl chloride which may contain sulfo groups, or a mixture thereof with a primary or secondary amine which contains one or more $\beta$-substituted ethylsulfonyl groups or one or more vinylsulfonyl groups, and with, or in the absence of, a second primary or secondary amine of the aliphatic, heterocyclic or aromatic series, which consists essentially of carrying out the reaction in the presence of a pyridinesulfonamide or a pyridinecarboxamide or a mixture of such compounds.



**4,745,188**

## PROCESS FOR PREPARING 3-SUBSTITUTED-6-SUBSTITUTED-7-OXO-1-AZABICYCLO[3.2.0]HEPT-2-ENE-2-CARBOXYLIC ACID

**Burton G. Christensen, Scotch Plains, and Ronald W. Ratcliffe, Matawan, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.**

**Continuation of Ser. No. 209,237, Nov. 21, 1980, which is a continuation-in-part of Ser. No. 141,020, Apr. 17, 1980, abandoned, which is a continuation of Ser. No. 061,738, Jul. 30, 1979, abandoned, which is a continuation of Ser. No. 843,478, Oct. 19, 1977, abandoned. This application Jul. 29, 1985, Ser. No. 759,721**

**The portion of the term of this patent subsequent to Apr. 19, 2005, has been disclaimed.**

**Int. Cl.**[4] **C07D** *487/04;* **A61K** *31/40*

**U.S. Cl. 540—350** **3 Claims**

1. A process for preparing a compound having the structure:



and the pharmaceutically acceptable salts thereof wherein R is H; pharmaceutically acceptable salt cation; or a pharmaceutically acceptable ester moiety; and $R^6$, $R^7$ and $R^8$ are independently selected from the group consisting of hydrogen, substituted and unsubstituted: alkyl, alkenyl, and alkynyl, having from 1–10 carbon atoms; cycloalkyl, cycloalkylalkyl, and alkylcycloalkyl, having 3–6 carbon atoms in the cycloalkyl ring and 1–6 carbon atoms in the alkyl moieties; phenyl; aralkyl, aralkenyl, and aralkynyl wherein the aryl moiety is phenyl and the linear chain has 1–6 carbon atoms; heteroaryl, heteroaralkyl, heterocyclyl and heterocyclylalkyl wherein the substituent or substituents relative to the above-named radicals are selected from the group consisting of: amino, mono-, di- and trialkylamino, hydroxyl, alkoxy, mercapto, alkylthio, phenylthio, sulfamoyl, amidino, guanidino, nitro, chloro, bromo, fluoro, cyano and carboxy; and wherein the hetero atom or atoms in the above-named heterocyclic moieties are selected from the group consisting of 1–4 oxygen, nitrogen or sulphur atoms; and wherein the alkyl moieties of the above-recited substituents have 1–6 carbon atoms; comprising treating:



with $HSR^8$ reagent calculated to provide the substituent $—SR^8$; wherein X is a leaving group; when $R^6/R^7$ is hydrogen $R^7/R^6$ is not 1-hydroxyethyl.

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**4,745,189**

## METHOD OF PREPARING N-HALOGENATED ORGANIC HETEROCYCLIC COMPOUNDS

**John Y. Lee, and Mark A. Templeton, both of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.**

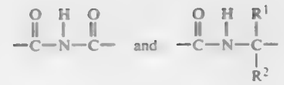
**Filed Jun. 23, 1986, Ser. No. 877,154**

**Int. Cl.**[4] **C07D** *251/00, 239/02*

**U.S. Cl. 544—221** **19 Claims**

1. In a method of preparing a N-halogenated organic heterocyclic compound comprising reacting in an aqeuous mixture under alkaline conditions:

(a) a N-hydrogen organic heterocyclic compound containing at least one divalent organic moiety selected from the group consisting of



and



wherein $R^1$ and $R^2$ are independently selected from the group consisting of hydrogen and an alkyl having 1 to about 6 carbon atoms, aryl, arylaklyl, alkylaryl, and a cycloalkyl having about 3 to about 7 carbon atoms and provided further that $R^1$ and $R^2$ together can form a cycloalkyl having about 3 to about 7 carbon atoms; and,

(b) a halogen-producing chemical;

the improvement comprising conducting said reaction in the the presence of a halogenated organic compound selected from the group consisting of halogenated aliphatic compounds having from 1 to about 6 carbon atoms, halogenated aromatic compounds and halogenated alicyclic compounds having about 6 carbon atoms wherein said halogenated organic compound is present in said aqeuous mixture in an amount in the range of from about 5 to about 95 weight percent of the combined weight of the water and said halogenated organic compound to increase the particle size of said N-halogenated organic heterocyclic compound.

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**4,745,190**

## SELECTIVE SYNTHESIS OF SUBSTITUTED AMINES

**John A. Marsella, Allentown, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.**

**Continuation-in-part of Ser. No. 634,503, Jul. 25, 1984, abandoned. This application Mar. 31, 1986, Ser. No. 846,375**

**The portion of the term of this patent subsequent to Jul. 14, 2004, has been disclaimed.**

**Int. Cl.**[4] **C07D** *265/30, 207/00;* **C07C** *85/06*

**U.S. Cl. 544—170** **19 Claims**

1. In the catalytic amination of ethylene glycol or 1,3 propanediol with a secondary amine, the method for selectively favoring the formation of mono-aminated products which comprises:

effecting said amination at a temperature in the range of 100° to 125° C. in the presence of a catalyst consisting of a compound or complex of ruthenium in chemical combination or in admixture with an organic phosphine modifier selected from the group consisting of $PPh_3$, $P(p\text{-}C_6H_4F)_3$, $P(Ph)Me_2$, $P(p\text{-tol})_3$ and mixtures thereof, in an amount to provide at least one mole of organic phosphine per gram atom of ruthenium.

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**4,745,191**

## 1-((A-SUBSTITUTED PHENYL-ω-SUBSTITUTED PIPERAZINYL)ALKENYL) CYCLOHEXANOL

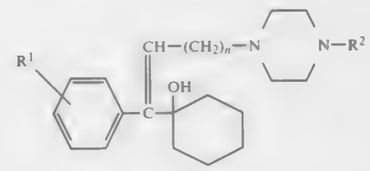
**G. E. Morris Husbands, Berwyn, Pa., assignor to American Home Products Corporation, New York, N.Y.**

**Filed Sep. 30, 1987, Ser. No. 103,223**

**Int. Cl.**[4] **C07D** *403/04, 295/08;* **A61K** *31/505, 31/495*

**U.S. Cl. 544—295** **11 Claims**

1. A compound of the formula:



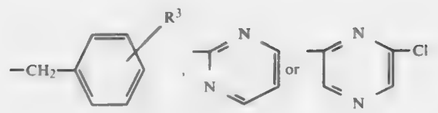
in which

$R^1$ is 3-hydroxy, 4-hydroxy, 3-methoxy, 4-methoxy or 3,4-methylenedioxy;

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1090
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3
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17
1988
UMI



n is 1 or 2; and
$R^2$ is



where $R^3$ is hydrogen, alkoxy of 1 to 6 carbon atoms, halo or trifluoromethyl;
or a pharmaceutically acceptable salt thereof.

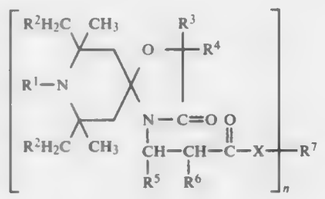
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**4,745,192**
**1-OXA-3-OXO-4,8-DIAZA-SPIRO(4,5)DECANE COMPOUNDS**

**Josef Ertl, Wertingen, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

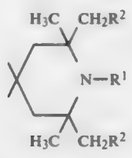
**Filed Jul. 8, 1986, Ser. No. 883,353**
**Claims priority, application Fed. Rep. of Germany, Jul. 10, 1985, 3524542**
**Int. Cl.[4] C07D** *498/10;* **C08K** *5/35*
**U.S. Cl. 546—19** **2 Claims**

**1**. A 1-oxa-3-oxo-4,8-diaza-sprio[4,5]decane compound of the formula I



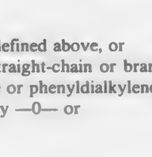
(I)

wherein
n is an integer from 1 to 4,
$R^1$ is hydrogen, $C_1$–$C_4$-alkyl, benzyl, allyl, $C_2$–$C_{30}$-alkanoyl $C_3$–$C_{20}$-alkenoyl, $C_7$–$C_{11}$-aroyl, $C_8$–$C_{14}$-arylalkanoyl or $C_8$–$C_{20}$-alkylaryl,
$R^2$ is hydrogen or $C_1$–$C_4$-alkyl,
$R^3$ is hydrogen, $C_1$–$C_{18}$-alkyl, $C_5$–$C_{12}$-cycloalkyl, a phenyl or naphthyl group which can be substituted by chlorine or $C_1$–$C_4$-alkyl, or a $C_7$–$C_{12}$-phenylalkylene group which may be unsubstituted or substituted by $C_1$–$C_4$-alkyl,
$R^4$ is hydrogen, $C_1$–$C_4$-alkyl, $C_5$–$C_{12}$-cycloalkyl, $C_1$–$C_3$-alkenyl which is substitute by —COOH, carbo-$C_1$–$C_4$-alkoxy or carbamoyl, a phenyl, naphthyl or pyridyl group which can be substituted by $C_1$–$C_4$-alkoxy or $C_1$–$C_4$-alkyl, or a $C_7$–$C_{12}$-phenylalkyl group which can be substituted by $C_1$–$C_4$-alkyl, or
$R^3$ and $R^4$, together with the carbon atom linking them, form a $C_5$–$C_{12}$-cyloalkyl group, which can be monosubstituted to tetrasubstituted by $C_1$–$C_4$-alkyl groups, or a radical of the formula II



(II)

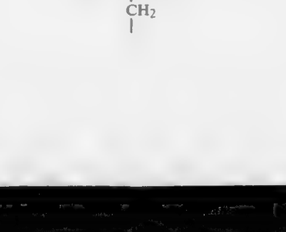
wherein $R^1$ and $R^2$ are as defined above,
$R^5$ is hydrogen, methyl, phenyl or carbo-$C_1$–$C_{21}$-alkoxy,
$R^6$ is hydrogen or methyl,
$R^7$ is, if n=1, hydrogen, $C_1$–$C_{21}$-alkyl, $C_2$–$C_{22}$-alkenyl, $C_7$–$C_{18}$-phenylalkyl, $C_5$–$C_{12}$-cycloalkyl, phenyl, naphyl, $C_7$–$C_{18}$-alkylphenyl, a radical of the formula



in which $R^1$ and $R^2$ are as defined above, or $C_2$–$C_{20}$-alkyl which can be interrupted by —0— or

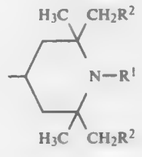


and/or substituted by a radical of the formula III



(III)

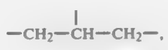
or by $C_1$–$C_{21}$-alkylcarboxyl, $R_1$, $R^2$, $R^3$, $R^4$, $R^5$, $R^6$ and X being as defined above and $R^8$ being hydrogne, $C_1$–$C_{10}$-alkyl or a radical



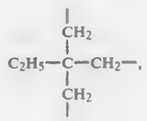
in which
$R^1$ and $R^2$ are as defined above, or
$R^7$ is, if n=2, a straight-chain or branch $C_1$–$C_{30}$-alkylene, $C_2$–$C_{30}$-alkylene or phenyldialkylene, which radicals can be interrupted by —0— or



$R^8$ being as defined above, or
$R^7$ is, if n=3 or 4, a radical of the formulae IV, V, VI or VII



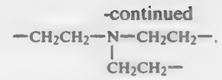
(IV)

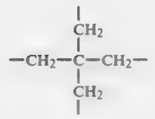


(V)



-continued





and
X is —0— or



being as defined above.

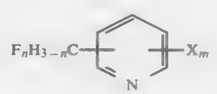
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**4,745,193**
**PROCESS FOR THE PREPARATION OF FLUOROMETHYLPYRIDINES**

**Michael S. Howarth; Edward G. Scovell, and David J. Watson, all of Lancashire, England, assignors to Imperial Chemical Industries PLC, London, England**

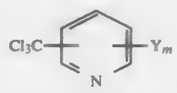
**Continuation of Ser. No. 564,200, Dec. 22, 1983, abandoned, which is a continuation of Ser. No. 366,350, Apr. 7, 1982, abandoned. This application May 9, 1986, Ser. No. 861,667**
**Claims priority, application United Kingdom, Apr. 27, 1981, 8112932**
**Int. Cl.[4] C07D** *213/61*
**U.S. Cl. 546—345** **11 Claims**

**1**. A process for the preparation of fluoromethyl pyridines of the formula (I):



(I)

wherein the group $F_nH_{3-n}C$— may be ortho, meta or para to the ring nitrogen atom, n is 1, 2, or 3, m is 1, 2 or 3, X is Cl or F and, when m is 2 or 3, the substituents represented by X may be the same or different, at least on X being ortho or para to the $F_nH_{3-n}C$— group, which comprises reacting a mixture consisting essentially of a compound of formula (II):



(II)

wherein Y is Cl or F and m is 1, 2 or 3 and potassium fluoride, alone or in the presence of a minor amount of cesium fluoride and, in either case, optionally in the presence of a phase transfer catalyst in a polar aprotic solvent under substantially anhydrous conditions.

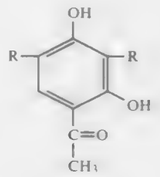
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**4,745,194**
**ULTRAVIOLET LIGHT ABSORBERS HAVING TWO DIFFERENT CHROMOPHORS IN THE SAME MOLECULE**

**Otto Vogl, and Shanjun Li, both of Brooklyn, N.Y., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Oct. 6, 1983, Ser. No. 539,366**
**Int. Cl.[4] C07D** *249/20*
**U.S. Cl. 548—261** **2 Claims**

**2**. An ultraviolet light absorbing compound having the structural formula



wherein R is a benzotriazole group.

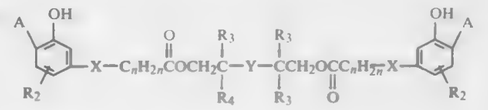
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**4,745,195**
**ULTRAVIOLET RAY ABSORBING AGENT**

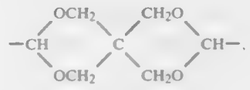
**Tatsuo Kaneoya, Toyonaka, and Haruki Okamura, Osaka, both of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan**

**Filed Apr. 28, 1986, Ser. No. 856,334**
**Claims priority, application Japan, May 2, 1985, 60-95105**
**Int. Cl.[4] C07D** *249/20*
**U.S. Cl. 548—261** **5 Claims**

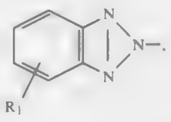
**1**. An ultraviolet ray absorbing compound of the formula,



wherein, Y is



A is



$R_1$ is hydrogen, halogen, lower alkyl of 1 to 4 carbon atoms, lower alkoxyl of 1 to 4 carbon atoms, carboxyl, or sulfo, $R_2$ is hydrogen or alkyl of 1 to 12 carbon atoms, $R_3$ and $R_4$ are alkyls of 1 to 12 carbon atoms, X is methylene, oxygen, imino, sulfur, sulfinyl, or sulfonyl, and n is an integer of 0 to 12.

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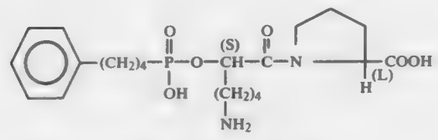
**4,745,196**

## ORALLY ACTIVE PHOSPHONYL HYDROXYACYL PROLINES

**Donald S. Karanewsky, East Windsor, and Edward W. Petrillo, Jr., Pennington, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.**

**Filed Jan. 6, 1986, Ser. No. 816,476**
**Int. Cl.[4] C07F *9/65*; A61K *31/675***
**U.S. Cl. 548—413** **3 Claims**

1. A compound of the formula



or a pharmaceutically acceptable salt thereof.

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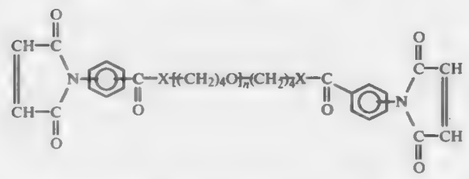
**4,745,197**

## FLEXIBLE BISMALEIMIDES

**Philipp Eisenbarth, Bad Durkheim; Anton Hesse, Weinheim; Jan Holoch, Heidelberg, and Roland Peter, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Filed Jun. 30, 1987, Ser. No. 68,070**
**Int. Cl.[4] C07D *403/12***
**U.S. Cl. 548—521** **5 Claims**

1. Bismaleimides having the general formula



in which n is a whole number between 5 and 70 and each —X— may independently be —O— or —NH—.

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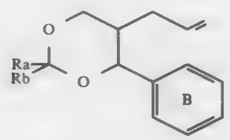
**4,745,198**

## 1,3-DIOXAN-5-YLALKENOIC ACIDS

**Andrew G. Brewster, and Peter W. R. Caulkett, both of Macclesfield, United Kingdom, assignors to Imperial Chemical Industries PLC, London, England**

**Division of Ser. No. 492,247, May 6, 1983, Pat. No. 4,567,197. This application Nov. 12, 1985, Ser. No. 797,204**
**Claims priority, application United Kingdom, May 12, 1982, 82-13702**
**Int. Cl.[4] C07D *319/06***
**U.S. Cl. 549—369** **6 Claims**

1. A 5-allyl-4-phenyl-1,3-dioxane derivative of the formula VII:



VII

wherein Ra and Rb are independently hydrogen, (2–6C)alkenyl, (1–8C) alkyl optionally bearing up to three halogeno substitutents, pentafluorophenyl, carbocyclic aryl or carbocyclic aryl(1–4C)alkyl, the latter two of which may optionally bear up to three substituents selected from halogeno, (1–6C)alkyl, (1–6C)alkoxy, (1–4C)alkylenedioxy, trifluoromethyl, cyano, nitro, hydroxy, (2–6C)alkanoyloxy, (1–6C) alkylthio, (1–6C)alkanesulphonyl, (1–6C)alkanoylamino, and oxapolymethylene of 2 to 4 carbon atoms, provided that when both Ra and Rb are alkyl or alkenyl, the total number of carbon atoms in Ra and Rb taken together is 8 or less; or Ra and Rb together form polymethylene of 2 to 7 carbon atoms, optionally bearing one or two (1–4C)alkyl substituents; benzene ring B optionally bears one or two substituents selected from halogeno, (1–6C)alkyl, (1–6C)alkoxy, hydroxy, (1–6C)alkanoyloxy, (1–6C)alkanoylamino, trifluoromethyl and nitro; and the substituents at positions 4 and 5 of the dioxane ring have cis-relative stereochemistry.

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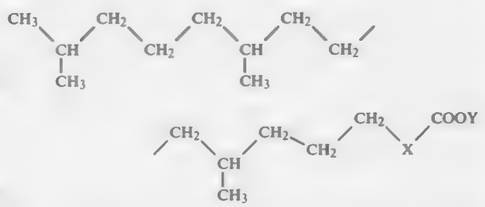
**4,745,199**

## SURFACTANTS

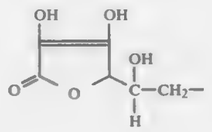
**Thommy Carlson, Helsingborg, Sweden, assignor to Nestec S.A., Vevey, Switzerland**

**Filed Nov. 4, 1985, Ser. No. 794,519**
**Claims priority, application European Pat. Off., Nov. 29, 1984, 84114490.0**
**Int. Cl.[4] C07D *307/62***
**U.S. Cl. 549—315** **4 Claims**

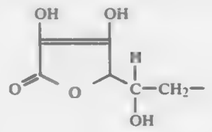
1. A compound having the general formula:



or a salt thereof wherein X is selected from the group consisting of a methylene radical and an isopropylene radical and Y is a residue selected from the group consisting of a residue of L-ascorbic acid having the formula:



and a residue of D-isoascorbic acid having the formula:





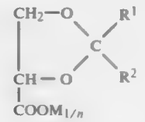
**4,745,200**

## METHOD OF PRODUCING SALTS OF 1,3-DIOXOLANE-4-CARBOXYLIC ACIDS AND METHOD OF USING SAME

**Hinrich Moeller, Monheim, Fed. Rep. of Germany, assignor to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany**

**Filed Dec. 13, 1985, Ser. No. 808,594**
**Claims priority, application Fed. Rep. of Germany, Dec. 29, 1984, 3447783**
**Int. Cl.[4] C07D *317/00***
**U.S. Cl. 549—450** **8 Claims**

1. A process for producing a 1,3-dioxolane-4-carboxylic acid salt having the general formula (I):



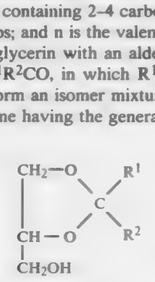
(I)

in which:

$R^1$ is hydrogen and $R^2$ is hydrogen or an alkyl group having 1–4 carbon atoms;

M is selected from the group consisting of alkali metal ions, alkaline earth metal ions, ammonium ion, monoalkanolammonium ions containing 2–4 carbon atoms in the alkanol group, dialkanolammonium ions containing 2–4 carbon atoms in each of the alkanol groups, and trialkanolammonium ions containing 2–4 carbon atoms in each of the alkanol groups; and n is the valency of M comprising:

(a) reacting glycerin with an aldehyde having a general formula $R^1R^2CO$, in which $R^1$ and $R^2$ are as defined above to form an isomer mixture of 4-hydroxymethyl-1,3-dioxolane having the general formula



(I)

wherein $R^1$ and $R^2$ are as defined above, and a 5-hydroxy1,3-dioxane;

(b) selectively oxidizing with air or oxygen the 4-hydroxymethyl-1,3-dioxolane in the isomer mixture in the presence of a catalyst seslected from the platinum metals group and a base in an aqueous reaction medium at a pH in the range or about 7 to 14; and

(c) isolating the 1,3-dioxolane-4-carboxylic acid salt from the reaction medium.

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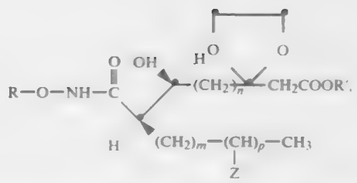
**4,745,201**

## PROCESS FOR INTERMEDIATES TO 1-CARBAPENEMS AND 1-CARBACEPHEMS

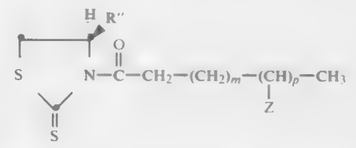
**Chi-nung W. Hsiao, and Marvin J. Miller, both of South Bend, Ind., assignors to University of Notre Dame du Lac, Notre Dame, Ind.**

**Filed Sep. 25, 1985, Ser. No. 780,101**
**Int. Cl.[4] C07D *317/26***
**U.S. Cl. 549—452** **9 Claims**

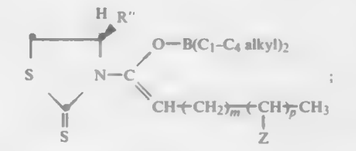
1. A process for preparing a compound of the formula



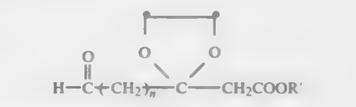
wherein R is $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkanoyl, benzyl, or substituted benzyl; R′ is a carboxy-protecting group; Z is protected hydroxy; p is 0 or 1; m is 0, 1 or 2; and n is 1 or 2; which comprises (1) mixing in an inert solvent in the presence of a tertiary amine at a temperature between about −20° C. and about 15° C. an N-acylthiazolidine-2-thione of the formula



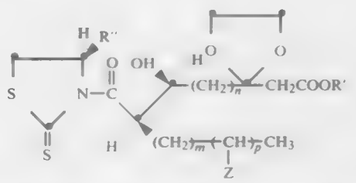
wherein R″ is $C_1$–$C_4$ alkoxycarbonyl, benzyl, or substituted benzyl; and m, Z, and p are as defined above; with a di-($C_1$–$C_4$ alkyl)boryl trifluoromethanesulfonate to form the boron enolate of the formula



(2) mixing with the boron enolate at a temperature between about −90° C. and about −40° C. a protected β-keto ester aldehyde of the formula



wherein n and R′ are an defined above, to form the condensation product of the formula



and (3) reacting said condensation product in an inert solvent at a temperature between about 20° C. and about 35° C. with an O-alkyl, O-acyl or O-aralkyl hydroxamate of the formula $RONH_2$.

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**4,745,202**

## AEROCYANIDIN-ANTIBIOTIC

**Wen-Chih Liu, Princeton Junction; William L. Parker, Pennington; Pushpa Singh, Piscataway, and Richard B. Sykes, Belle Mead, all of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.**

**Division of Ser. No. 885,983, Jul. 14, 1986, Pat. No. 4,686,299, which is a continuation-in-part of Ser. No. 827,857, Feb. 10, 1986, abandoned. This application Feb. 20, 1987, Ser. No. 17,287**

**Int. Cl.[4] C07D** *303/48*

**U.S. Cl. 549—550** **1 Claim**

1. The compound [2α(R*),3α]-κ-hydroxy-3-isocyano-3-methyloxiraneundecanoic acid having an optical rotation of about $[\alpha]_D^{23} = -20°$ (c=0.5, methanol), or a pharmaceutically acceptable salt thereof.

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**4,745,203**

## PROCESS FOR THE PREPARATION OF MIXTURES OF METAL SALTS OF RING-SUBSTITUTED SALICYLIC ACID COMPOUNDS

**Hermann Nachbur, Reinach, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.**

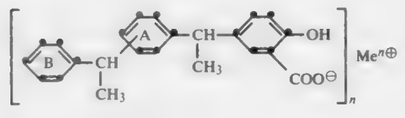
**Filed Sep. 26, 1986, Ser. No. 912,896**

**Claims priority, application Switzerland, Oct. 3, 1985, 4287/85**

**Int. Cl.[4] C07F** *9/00, 3/06, 5/06, 7/22*

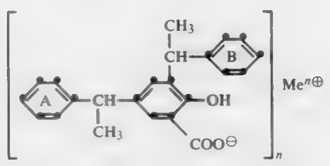
**U.S. Cl. 556—44** **9 Claims**

1. A process for the preparation of a mixture of a metal salt of formula



(1)

and a metal salt of formula



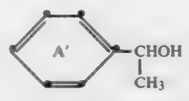
(2)

in which formulae (1) and (2)

Me is a metal ion of valency n, selected from the group consisting of aluminium, zirconium, vanadium, tin and zinc,

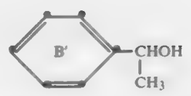
n is 2, 3 or 4, and

each of the rings A and B independently of the other is unsubstituted or substituted by halogen, lower alkyl, lower alkoxy or an alpha-methylbenzyl radical, which process comprises treating 2 moles of salicylic acid with at least 2 moles of a 1-phenylethanol of formula

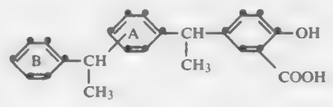


(3)

and at least 2 moles of a 1-phenylethanol of formula

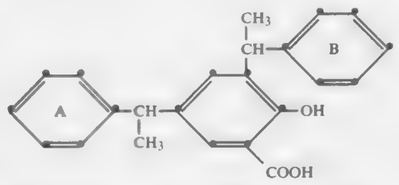


in which formulae (3) and (4) the benzene rings A′ and B′ are unsubstituted or substituted by halogen, lower alkyl or lower alkoxy, at a temperature in the range of 80° to 170° C., in the presence of a halide of a polyvalent metal having an atomic weight from 26 to 66, and, in a further step, reacting 2n moles of the resultant mixture of the salicylic acid compound of formula



(5)

and the salicylic acid compound of formula



(6)

in which formulae (5) and (6) A and B are as defined for formulae (1) and (2), with 2 moles of the salt of an n-valent metal of an inorganic acid or of a lower aliphatic carboxylic acid, where n has the given meaning.

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**4,745,204**

## PROCESS FOR PRODUCING ALUMINUM ALKOXIDE OR ALUMINUM ARYLOXIDE

**Jerome J. Cuomo, Lake Lincolndale; Pamela A. Leary, Newburgh, and Jerry M. Woodall, Bedford Hills, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Jun. 5, 1986, Ser. No. 871,046**

**Int. Cl.[4] C07F** *5/06*

**U.S. Cl. 556—182** **18 Claims**

1. A process for producing aluminum alkoxide or aluminum aryloxide which comprises dissolving aluminum in an agent in liquid form selected from the group of gallium, gallium-based alloy, or mixtures thereof; and then reacting said aluminum with an organic compound in the liquid phase having at least one reactive hydroxyl group; and thereby obtaining said aluminum alkoxide or aluminum aryloxide.

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**4,745,205**

## NOVEL PRECERAMIC POLYMERS DERIVED FROM CYCLIC SILAZANES AND HALOGENATED DISILANES AND A METHOD FOR THEIR PREPARATION

**Loren A. Haluska, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.**

**Filed Nov. 3, 1986, Ser. No. 926,145**

**Int. Cl.[4] C07F** *7/08*

**U.S. Cl. 556—412** **10 Claims**

1. A method of preparing a preceramic polymer comprising contacting and reacting in an inert, essentially anhydrous atmosphere, a chlorine-containing disilane or a mixture of chlorine-containing disilanes, of the general formula $(Cl_dR'_eSi)_2$ with a cyclic silazane, or a mixture of cyclic silazanes selected from the group consisting of cyclic silazanes having the general formula (i) $(CH_3R''SiNH)_x$ and (ii) $(C_6H_5R''SiNH)_x$ at a temperature in the range of 22° C. to 280° C. while distilling by produced volatile products, wherein R′ and R″ are each independently selected from the group consisting of hydrogen, vinyl, phenyl and alkyl radicals containing 1 to 3 carbon atoms; d has a value of 0.5 to 3; e has a value of 0 to 2.4 and the sum of (d+e) is equal to three and x is an integer of 3 to 6.



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**4,745,206**

## AMINOPHENOXYPHOSPHAZENES AND A PROCESS FOR PRODUCING SAME

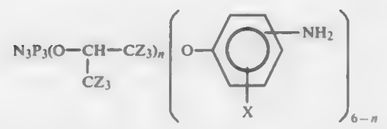
**Massimo D. Bezoari, Baton Rouge, La., assignor to The Dow Chemical Company, Midland, Mich.**

**Filed May 30, 1986, Ser. No. 868,972**

**Int. Cl.[4] C07F** *9/24*

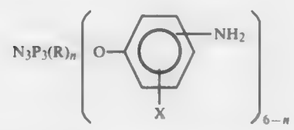
**U.S. Cl. 558—080** **23 Claims**

1. Compounds of the formula,

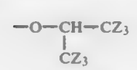


wherein n is either 3 or 4, each Z constituent is selected from F and H, and wherein X is selected from Cl, Br, F and H.

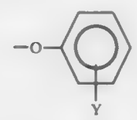
3. A process for the production of a cyclotriphosphazene of the formula,



wherein R is an isopropoxy radical having the formula



or an aryloxy radical having the formula



wherein each Z constituent is independently selected from F and H, wherein X and Y are each independently selected from Cl, Br, F and H, and wherein n is a whole integer which is ≧1 and ≦5, said process comprising, reacting an R-chlorocyclotriphosphazene having n R constituents and 6-n chloride constituents and an inorganic salt of aminophenoxide for a time period sufficient to yield said cyclotriphosphazene, said reaction occurring in an inert organic solvent medium, at a temperature within the range of from about 20° C. to about 150° C., and with a molar ratio of said R-chlorocyclotriphosphazene to said inorganic salt of aminophenoxide which is 1:a, wherein a is greater, than 5-n.

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**4,745,207**

## PREPARATION OF THE REACTION PRODUCTS OF HYDROGEN CYANIDE

**Fritz Brunnmueller, Limburgerhof; Karlheinz Stecher, Ludwigshafen; Michael Kroener, and Rolf Schneider, both of Mannheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Filed Nov. 25, 1985, Ser. No. 802,058**

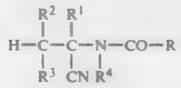
**Claims priority, application Fed. Rep. of Germany, Nov. 29, 1984, 3443462**

**Int. Cl.[4] C01C** *3/04*

**U.S. Cl. 558—351** **6 Claims**

1. A process for the preparation of a compound which is the reaction product of a carbonyl-containing compound and hydrogen cyanide, which comprises:

(a) forming HCN by the pyrolysis of formamide or a compound of the formula:



wherein R, $R^1$, $R^2$ and $R^3$ are each H or $C_1$–$C_6$ alkyl, or $R^1$ and $R^2$ or $R^2$ and $R^3$ together form a carbocyclic ring of 5 or 6 carbon atoms, and $R^4$ is H or $C_1$–$C_6$ alkyl, at from 250°–650° C. over a solid catalyst and under a pressure of 5–200 mbar;

(b) cooling said formed HCN and other products formed by pyrolysis, still under a pressure of 5–200 mbar to a temperature in the range of from 200° to −10° C., thereby separating uncondensed HCN from said other products;

(c) feeding the cooled uncondensed HCN under a pressure of 5–200 mbar to a chemisorption reaction with a carbonyl-containing compound; and

(d) removing said reaction product from the reaction mixture.

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**4,745,208**

## 2,2,2-TRINITROETHYL 2-NITROXYETHYL ETHER AND A METHOD OF PREPARATION

**Horst G. Adolph, Silver Spring, and Kyung E. Kim, Potomac, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Apr. 27, 1987, Ser. No. 43,267**

**Int. Cl.[4] C07C** *77/02*

**U.S. Cl. 558—483** **3 Claims**

1. 2,2,2-trinitroethyl 2-nitroxyethyl ether, $C(NO_2)_3CH_2OCH_2CH_2ONO_2$.

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**4,745,209**

## METHOD OF PREPARING α-ARYLALKANOIC ESTERS

**Yasumitsu Tamura, Takarazuka, and Junichi Haruta, Osaka, both of Japan, assignors to Yasumitsu Tamura, Japan**

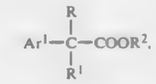
**Filed Mar. 13, 1986, Ser. No. 839,213**

**Claims priority, application Japan, Mar. 15, 1985, 60-52966**

**Int. Cl.[4] C07C** *67/475*

**U.S. Cl. 560—9** **8 Claims**

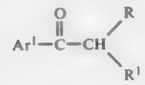
1. A method for preparing an α-arylalkanoic ester represented by the general formula



wherein $Ar^1$ is an aromtic hydrocarbon, R is an alkyl group or a hydrogen atom, $R^1$ is an alkyl group or a hydrogen atom, and $R^2$ is an alkyl group, which comprises reacting, under α-arylalkanoic ester-producing conditions, a trivalent iodine compound represented by the general formula

$$Ar—I=O$$

wherein Ar is an aromatic hydrocarbon, with a carbonyl compound represented by the general formula



wherein $Ar^1$, R and $R^1$ are as defined above, in the presence of an orthocarboxylic ester represented by the general formula

$$ZC(OR^2)_3$$

wherein Z is an alkyl group or a hydrogen atom and $R^2$ is as defined above.

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**4,745,210**

## PREPARATION PROCESS OF N-FORMYL-α-ASPARTYL PHENYLALANINE

**Ryuichi Mita; Toshio Katoh, both of Kawasaki; Chojiro Higuchi, Kamakura; Takeshi Oura, Zushi, and Akihiro Yamaguchi, Kamakura, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan**

**Filed Dec. 4, 1985, Ser. No. 804,479**

**Claims priority, application Japan, Dec. 17, 1984, 59-264618**

**Int. Cl.⁴ C07C** *103/52, 102/00*

**U.S. Cl. 560—41** **3 Claims**

1. Process for preparing N-formyl-α-aspartyl phenylalanine by condensating N-formyl aspartic acid anhydride and phenylalanine, comprising adding the N-formyl aspartic acid anhydride to the phenylalanine dissolved in an aqueous solution, the pH of the aqueous solution being maintained in the range of 7 to 12 by adding an aqueous alkaline solution, and the reaction temperature being maintained at 50° C. or below.

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**4,745,211**

## PROCESS FOR THE PREPARATION OF PURIFIED BIS(2-HYDROXYETHYL) ESTER OF 2,6-NAPHTHALENEDICARBOXYLIC ACID

**Winston J. Jackson, Jr., and Thomas H. Wicker, Jr., both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Sep. 15, 1987, Ser. No. 96,436**

**Int. Cl.⁴ C07C** *67/00*

**U.S. Cl. 560—80** **8 Claims**

1. A process for preparation of purified, crystalline bis(2-hydroxyethyl) ester of 2,6-naphthalenedicarboxylic acid comprising

(a) preparing the bis(2-hydroxyethyl) ester of 2,6-naphthalenedicarboxylic acid by reacting impure 2,6-naphthalenedicarboxylic acid with at least two moles of ethylene glycol per mole of 2,6-naphthalenedicarboxylic acid in the presence of a catalytic amount of a tertiary amine and a titanium-containing compound,

(b) crystallizing the bis(2-hydroxyethyl) ester of 2,6-naphthalenedicarboxylic acid, and

(c) recovering the purified, crystalized bis(2-hydroxyethyl) ester of 2,6-naphthalenedicarboxylic acid.

**4,745,212**

## PROCESS FOR THE PRODUCTION OF ISOCYANATES

**Werner Mormann, Kreuztal, and Edith Hissmann, Holte-Stukenbrock, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Oct. 8, 1987, Ser. No. 105,833**

**Claims priority, application Fed. Rep. of Germany, Oct. 8, 1986, 3634248**

**Int. Cl.⁴ C07C** *69/00, 71/00*

**U.S. Cl. 560—130** **8 Claims**

1. A process for the production of an isocyanate containing ester and/or amide groups in which

(a) an isocyanatocarboxylic acid chloride is reacted with

(b) an organic compound containing at least one silylated alcoholic group, silylated phenolic hydroxyl group and/or silylated amino group which compound contains no other group which is reactive with isocyanate and chlorocarbonyl groups under the reaction conditions at a temperature of from −20° to 150° C.

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**4,745,213**

## METHOD OF PREPARING ESTERS OF ACRYLIC ACID AND METHACRYLIC ACID BY TRANSESTERIFICATION

**Fritz Schlosser, Darmstadt; Peter J. Arndt, Seeheim-Jugenheim; Manfred Mueller, Rossdorf, and Lothar Janssen, Breuberg, all of Fed. Rep. of Germany, assignors to Röhm GmbH Chemische Fabrik, Darmstadt, Fed. Rep. of Germany**

**Filed Jun. 17, 1985, Ser. No. 745,486**

**Claims priority, application Fed. Rep. of Germany, Jun. 26, 1984, 3423441**

**Int. Cl.⁴ C07C** *67/02*

**U.S. Cl. 560—217** **17 Claims**

1. A method for preparing an ester of (meth)acrylic acid by trans-esterification with an alcohol, comprising reacting a (meth)acrylic acid ($C_{1-4}$) ester with a trans-esterifying monohydric alcohol haivng a higher molecular weight of higher boiling point than the ($C_{1-4}$) alcohol portion of the said (meth) acrylic acid ($C_{1-4}$) ester, in the presence of a catalyst, where the catalyst is LiCl/CaO or LiBr/CaO or LiI/CaO or mixture thereof, said transesterifying monohydric alcohol being a member selected from the group consisting of all monohydric alcohols other than glycidol.

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**4,745,214**

## PROCESS FOR THE PREPARATION OF AN AQUEOUS SOLUTION OF UNSATURATED QUATERNARY AMMONIUM SALTS

**Raymond Hess, Forbach, and Christian Lacroix, Forkling, both of France, assignors to Norsolor, Paris, France**

**Filed Jun. 20, 1986, Ser. No. 876,602**

**Int. Cl.⁴ C07C** *69/52*

**U.S. Cl. 560—222** **40 Claims**

1. A process for the preparation of an aqueous solution of unsaturated quaternary ammonium salts corresponding to the following formula (I):

$$H_2C=C(R_3)—C(O)—A—R_4—N(R_1)(R_2)(R).X$$

in which:

A is an oxygen atom or an NH group,

$R_3$ is a hydrogen atom or a methyl radical,

$R_4$ is a linear or branched alkyl radical containing from 2 to 4 carbon atoms,

$R_1$ and $R_2$, which are different or identical, are an alkyl radical or an aryl radical,

R is an alkyl or aryl radical, and

X is chosen from Cl, Br, I, $CH_3—CO_3$ or $CH_3—SO_4$, from at least one (meth)acrylic monomer (II) of the formula:

$$H_2C=C(R_3)—C(O)—A—R_4—N(R_1)(R_2)$$

and at least one quaternizing agent III of the formula RX, in



the presence of at least one polymerization inhibitor, the process comprising:

(a) reacting the (meth)acrylic monomer (II) in a closed reactor with 5 to 20% of the weight quantity of quaternizing agent (III) required for the reaction, wherein the latter agent is introduced into the reactor continuously,

(b) next, adding water and the remainder of the quaternizing agent (III) continuously until the required concentration of quaternary ammonium salt (I) in water is obtained,

(c) during the stages (a) and (b), maintaining the temperature at a value of between 30° and 60° C., and

(d) during the stages (a) and (b) and as the end of the reaction approaches, maintaining a stream of gas containing oxygen in the reaction mixture, such that the volume ratio of gas at the reactor outlet to the oxygen introduced at the inlet of this same reactor is less than 100/1.

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**4,745,215**

## FLUORINE CONTAINING DICYANATE RESINS

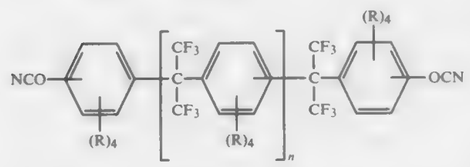
**Robert J. Cox, Watsonville, Calif.; William J. Summa, Endwell, and David W. Wang, Vestal, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Apr. 3, 1987, Ser. No. 33,557**

**Int. Cl.⁴ C07C** *71/00;* **C08G** *73/00;* **B32B** *27/00*

**U.S. Cl. 560—301** **5 Claims**

1. A compound of the formula



wherein each R group is independently selected from hydrogen, alkyl with 1 to about 8 carbon atoms, alkenyl with 2 to about 8 carbon atoms, aryl or alkaryl with 6 to about 12 carbon atoms, and halogen, and n is an integer from 0 to about 4.

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**4,745,216**

## PROCESS FOR THE PRODUCTION OF POLYISOCYANATES

**Berthold Keggenhoff; Günther Ellendt; Marcel Petinaux, all of Krefeld; Alfred Mitschker, Odenthal, and Peter M. Lange, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Mar. 25, 1985, Ser. No. 715,716**

**Claims priority, application Fed. Rep. of Germany, Apr. 7, 1984, 3413174**

**Int. Cl.⁴ C07C** *71/00*

**U.S. Cl. 560—347** **18 Claims**

1. A process for the production of a polyisocyanate comprising

(a) phosgenating a polyamine to form a polyisocyanate by reacting

(1) a polyamine on which the polyisocyanate is based in solution in an inert solvent with

(2) phosgene in solution in an inert solvent,

(b) separating the solvent from the polyisocyanate,

(c) treating the separated solvent to be reused in polyamine solution (1) with a cross-linked polymer which is insoluble in the solvent and which cross-linked polymer contains at least one functional group selected from the group consisting of primary alcoholic hydroxyl, secondary alcoholic hydroxyl, primary amino and secondary amino groups and

(d) mechanically separating any excess cross-linked polymer and/or reaction product formed during treatment (c) from the treated solvent.

**4,745,217**

## PROCESS FOR PRODUCING METHACRYLIC ACID

**Mutsumi Matsumoto; Hideki Sugi, both of Takasaki, and Atsushi Sudo, Annaka, all of Japan, assignors to Nippon Kayaku Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 239,409, Mar. 2, 1982, abandoned, which is a division of Ser. No. 948,761, Oct. 5, 1978, Pat. No. 4,273,676. This application May 26, 1983, Ser. No. 484,610**

**Claims priority, application Japan, Oct. 31, 1977, 52-129685**

**Int. Cl.⁴ C07C** *51/25, 57/055*

**U.S. Cl. 562—534** **5 Claims**

1. A process for producing methacrylic acid by oxidizing methacrolein with molecular oxygen or molecular oxygen-containing gas in the vapor phase characterized by the use of a catalyst having a heteropoly-acid structure and the general formula:

$$Mo_aV_bP_cCu_dX_eO_f$$

wherein Mo, V, P, Cu and O represent respectively molybdenum, vanadium, phosphorus, copper and oxygen, X represents one or more elements selected from the group consisting of tin, thorium, germanium, nickel, iron, cobalt, magnesium, zinc, titanium, lead, rhenium, zirconium, and chromium and a, b, c, d, e and f represent the atomic ratio of the elements where,

a is 10

b is a number of 3 or less than 3 excluding 0,

c is a number of 0.5 to 3,

d is a number of 3 or less than 3 excluding 0,

e is a number of 3 or less than 3 excluding 0,

f is a number determined depending on the valency and atomic ratio of the other elements in the formula.

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**4,745,218**

## PROCESS FOR THE ENANTIOSELECTIVE PRODUCTION OF α-VINYL-α-AMINOCARBOXYLIC ACIDS

**Dieter Seebach, Zürich, and Theodor Weber, Vouvry, both of Switzerland, assignors to Degussa AG, Frankfurt am Main, Fed. Rep. of Germany**

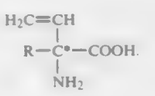
**Filed Oct. 8, 1986, Ser. No. 917,071**

**Claims priority, application Fed. Rep. of Germany, Oct. 10, 1985, 3536146**

**Int. Cl.⁴ C07C** *101/04*

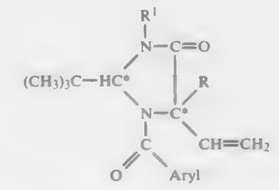
**U.S. Cl. 562—574** **2 Claims**

1. A process for the enantioselective production of an α-vinyl-α-amino-carboxylic acid of the formula:



(I)

in which * is a center of asymmetry and R is hydrogen, deuterium, a methyl, ethyl, n-propyl, isopropyl, n-butyl, isobutyl, sec. butyl, allyl or benzyl group or a benzyl group substituted 1 to 3 times on the ring by an alkyl or alkoxy group or by fluorine or chlorine comprising producing an imidazolidin-4-one of the formula



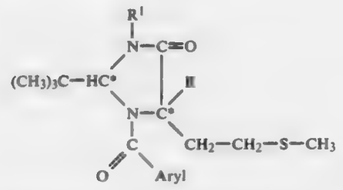
(II)

in which * and R are as defined above, $R^1$ is a methyl or ethyl

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group and aryl is a phenyl or substituted phenyl group by oxidation and subsequent fragmentation of an imidazolidin-4-one of the formula:



(V)

and then acid hydrolyzing the imidazolidin-4-one.

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**4,745,219**

## CHEMICAL INTERMEDIATES AND A PROCESS FOR THEIR PREPARATION

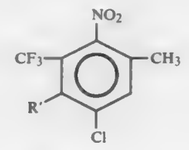
**Thomas E. Nickson, St. Charles; John P. Chupp, Kirkwood, and Thomas E. Neumann, Creve Coeur, all of Mo., assignors to Monsanto Company, St. Louis, Mo.**

**Continuation of Ser. No. 552,886, Nov. 17, 1983, abandoned. This application Aug. 8, 1986, Ser. No. 894,540**

**Int. Cl.[4] C07C** *102/00, 103/34, 79/10*

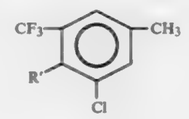
**U.S. Cl. 564—146** **5 Claims**

1. A process for preparing the compound having the formula:



I

which comprises nitrating the compound having the formula:



II

wherein the above formula R′ is chloro or $C_{1-4}$ alkylamido radical.

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**4,745,220**

## SUBSTITUTED ALPHA-(2-TRICYCLO(3.3.1.13,7)-DECYLIDENE)BENZENEACETAMIDE DERIVATIVES

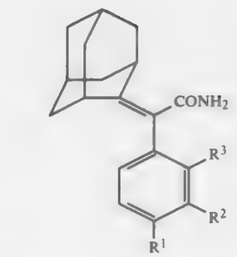
**Vasil S. Georgiev, Rochester, and George B. Mullen, Avon, both of N.Y., assignors to Pennwalt Corporation, Philadelphia, Pa.**

**Filed May 27, 1986, Ser. No. 866,840**

**Int. Cl.[4] C07C** *103/26, 103/22;* **A61K** *31/165*

**U.S. Cl. 564—172** **10 Claims**

1. A compound of the formula:



where the $R^1$, $R^2$ and $R^3$ substituents are independently selected from hydrogen, lower alkyl, lower alkoxy, halogen, and trifluoromethyl provided that at least one of such substituents is hydrogen.

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**4,745,221**

## CATALYTIC PROCESS FOR PREPARING CYCLOHEXANONE-OXIME

**Paolo Roffia, Saronno; Mario Padovan, Milan; Enrico Moretti, Arese, and Giordano De Alberti, Besnate, all of Italy, assignors to Montedipe S.p.A., Milan, Italy**

**Filed Jul. 7, 1986, Ser. No. 882,718**

**Claims priority, application Italy, Jul. 10, 1985, 21511 A/85**

**Int. Cl.[4] C07C** *131/04*

**U.S. Cl. 564—267** **6 Claims**

1. A process for the manufacture of cyclohexanoneoxime, which comprises reacting cyclohexanone with ammonia and hydrogen peroxide in the liquid phase at a temperature ranging from 25° to 100° C. at a pressure equal to or higher than atmospheric pressure in the presence of a catalyst comprising titanium-silicalite.

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**4,745,222**

## NOVEL ARYLOXYCYCLOALKANOLAMINOALKYLENE ARYL KETONES

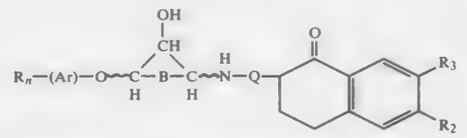
**Michael E. LeTourneau, Lebanon; James R. McCarthy, Zionesville, and Donald L. Trepanier, Indianapolis, all of Ind., assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio**

**Continuation-in-part of Ser. No. 497,775, May 25, 1983, abandoned. This application Apr. 17, 1984, Ser. No. 599,891**

**Int. Cl.[4] C07C** *49/637, 49/553*

**U.S. Cl. 564—305** **17 Claims**

1. A compound of the structural formula



and the pharmaceutically acceptable salts thereof, wherein Ar represents phenyl, naphthyl, indolyl, thienyl or pyridyl; the R represents hydrogen, lower alkyl, halogeno, nitro, trifluoromethyl, trifluoromethoxy, methylenedioxy, lower alkanoyl, carboxy, hydroxy, lower alkoxy, cyano, $—SO_2NH_2$, lower alkylthio, $CH_3SO_2NH—$, amino, carboxamido, amidino or imidazol-2-yl; n represents 1, 2 or 3, B or Q each represent an alkylene bridge having 1 to 3 carbon atoms; with $R_2$ and $R_3$ each being hydrogen, lower alkyl, lower alkyl or phenyl.



**4,745,223**

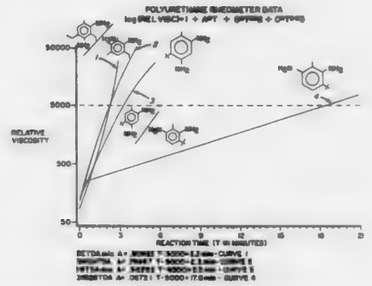
## MONO-TERTIARY-ALKYLATED TOLUENEDIAMINE AND DERIVATIVES

**William F. Burgoyne, Jr., Allentown; Jeremiah P. Casey, Emmaus; Dale D. Dixon, Kutztown, and Barton Milligan, Coplay, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.**

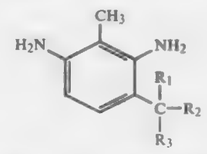
**Continuation-in-part of Ser. No. 659,597, Oct. 11, 1984. This application Aug. 23, 1985, Ser. No. 768,885**

**Int. Cl.[4] C07C** *87/58*

**U.S. Cl. 564—305** **10 Claims**



1. A toluenediamine composition having an alkyl substituent having a tertiary carbon atom represented by the formula:



wherein $R_1$, $R_2$ and $R_3$ are $C_{1-3}$ alkyl groups or $R_2$ and $R_3$ are combined to form a $C_{5-6}$ membered ring.

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**4,745,224**

## METHODS FOR MAKING TERTIARY PHOSPHINE OXIDES

**Joachim Knebel, and Werner Ude, both of Darmstadt, Fed. Rep. of Germany, assignors to Röhm GmbH, Darmstadt, Fed. Rep. of Germany**

**Filed Dec. 2, 1986, Ser. No. 937,200**

**Claims priority, application Fed. Rep. of Germany, Dec. 13, 1985, 3544065**

**Int. Cl.[4] C07F** *9/02*

**U.S. Cl. 568—14** **12 Claims**

1. A method for making a tertiary phosphine oxide of the formula



wherein $R_1$, $R_2$, and $R_3$ are alkyl having from 1 to 10 carbon atoms, cycloalkyl having from 5 to 10 carbon atoms, aryl having from 6 to 10 carbon atoms, or aralkyl having from 7 to 10 carbon atoms, which method comprises reacting the corresponding tertiary phosphine sulfide at a temperature from 70° C. to 250° C. with at least one sulfur-oxygen exchange reagent selected from the group consisting of sulfuric acid of at least 70 percent concentration and sulfonic acids of the formula $R—SO_3H$ wherein R is alkyl having 1 to 6 carbon atoms or aryl.

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**4,745,225**

## PHOSPHORUS-CONTAINING POLYARYLENE ETHERS

**Werner Ude, and Joachim Knebel, both of Darmstadt, Fed. Rep. of Germany, assignors to Röhm GmbH, Darmstadt, Fed. Rep. of Germany**

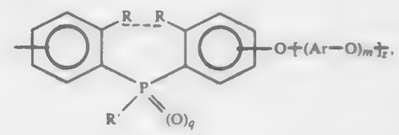
**Filed Jun. 4, 1986, Ser. No. 870,369**

**Claims priority, application Fed. Rep. of Germany, Jun. 13, 1985, 3521123**

**Int. Cl.[4] C07F** *9/02*

**U.S. Cl. 568—15** **16 Claims**

1. A phosphorus-containing polyarylene ether having repeating units of the structure

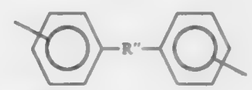


wherein

R taken alone is hydrogen or R . . . R taken together are one of the groups R″;

R′ is alkyl, chloroformethyl, or aryl;

Ar is phenylene, naphthylene, or



wherein

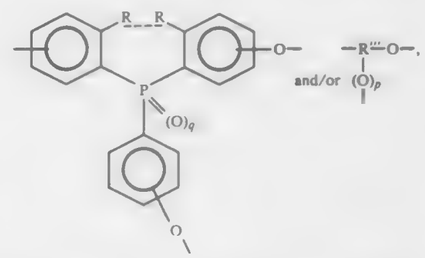
R″ is a covalent sngle bond, oxygen, sulfur, a sulfonyl, carbonyl, methylene, or isopropylidene bridge, or an organic groups having from 5 to 15 carbon atoms whose free valences emanate from quaternary carbon atoms;

q is 0 or 1;

m has an average value from 1 to 10; and

z is 0 or 1,

said ether further being branched and containing as branching points units of the structures



which statistically alternate with said repeating units, R‴ being an at least trivalent aliphatic or aromatic group, q being 0 or 1, and p being an integer from 1 to 4.

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**4,745,226**

## REACTION OF SULFUR WITH POLYCHLORINATED POLYPHENYLS

**Kyung S. Shim, Irvington, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.**

**Filed Sep. 22, 1986, Ser. No. 909,812**

**Int. Cl.[4] C07C** *149/00*

**U.S. Cl. 568—25** **9 Claims**

1. In a process of reacting sulfur with a polychlorinated

polyphenyl material to convert the polyphenyl material to a more innocuous substance, the improvement which comprises the additional use of an effective amount of a sulfur chloride to promote the reaction and yield a lowered amount of unreacted chlorinated polyphenyl residue in the product formed.

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**4,745,227**

## REVERSIBLE PHOTOCHROMATIC SOLID

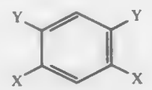
**Fred Wudl, and Sherman D. Cox, both of Santa Barbara, Calif., assignors to The Regents of the University of California, Berkeley, Calif.**

**Filed Mar. 29, 1985, Ser. No. 717,387**

**Int. Cl.⁴ C07C *149/34, 149/32***

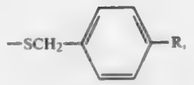
**U.S. Cl. 568—49** **7 Claims**

1. A compound having the generic formula:

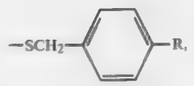


wherein:

X=halogen and Y=

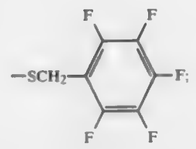


X=Y=



or

X=Y=



and

R=hydrogen, halogen, lower alkoxy, or lower alkyl.

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**4,745,228**

## PREPARATION OF CYCLIC KETONES

**Martin Decker, Ludwigshafen; Rolf Fischer, Heidelberg; Wolfgang Franzischka; Rudolf Kummer, both of Frankenthal; Heinz-Walter Schneider, Ludwigshafen, and Uwe Vagt, Speyer, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

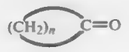
**Filed Jun. 24, 1987, Ser. No. 65,959**

**Claims priority, application Fed. Rep. of Germany, Jul. 1, 1986, 3622012**

**Int. Cl.⁴ C07C *45/00, 45/51***

**U.S. Cl. 568—443** **8 Claims**

1. A process for the preparation of a cyclic ketone of the formula



I

where n is an integer from 4 to 6, wherein an aliphatic dicarboxylate of the formula

$$R^1OOC-(CH_2)_n-COOR^2 \qquad II$$

where n has the above meaning and $R^1$ and $R^2$ are each alkyl of 1 to 12 carbon atoms, cycloalkyl of 5 or 6 carbon atoms, aralkyl or aryl and $R^2$ may furthermore be hydrogen, is converted at from 150° to 450° C. over a solid oxide catalyst.

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**4,745,229**

## PROCESS FOR PREPARING α, β-UNSATURATED ALDEHYDES

**Junzo Otera, Okayama; Shigeaki Suzuki; Takashi Onishi, both of Kitakanbara, and Yoshiji Fujita, Kurashiki, all of Japan, assignors to Kuraray Company Ltd., Kurashiki, Japan**

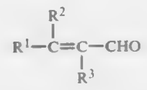
**Filed Feb. 13, 1987, Ser. No. 15,095**

**Claims priority, application Japan, Feb. 28, 1986, 61-45104; Jun. 20, 1986, 61-145069**

**Int. Cl.⁴ C07C *45/56, 45/27***

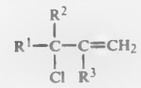
**U.S. Cl. 568—490** **18 Claims**

1. A process for preparing an α,β-unsaturated aldehyde of the formula:



in which $R^1$, $R^2$ and $R^3$ are, independently, a hydrogen atom, or an alkyl or alkenyl group with or without being substituted with a lower acyloxy group, comprising the steps of:

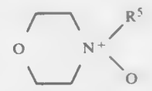
(i) reacting (a) an allylic chloride of the formula



in which $R^1$, $R^2$ and $R^3$ have, respectively, the same meanings as defined above, and (b) about 1–5 moles per mole of said allylic chloride of an amine oxide selected from the group consisting of tri(lower alkyl)amine N-oxides of the formula

$$R_3^4N^+O^-,$$

in which $R^4$ is a $C_{2\text{-}4}$ alkyl group, and N-lower alkylmorpholine N-oxides of the formula



in which $R^5$ is a $C_{1\text{-}4}$ alkyl group; at a temperature from 20°–80° C. in the presence of about 1–3 moles per mole of said allylic chloride of an alkali metal iodide of from about 0.001–2.0 moles per mole of said allylic chloride of a copper halide.



**4,745,230**

## LOW ODOR SURFACTANT

**Jay G. Otten, Flat Rock, and Edward J. Parker, Riverview, both of Mich., assignors to BASF Corporation, Parsippany, N.J.**

**Division of Ser. No. 812,335, Dec. 23, 1985. This application Sep. 8, 1987, Ser. No. 94,474**

**Int. Cl.⁴ C07C *43/11***

**U.S. Cl. 568—621** **10 Claims**

1. A process for deodorizing a polyoxypropylene group terminated polyoxyalkylene polyether polyol composition by removing allyloxypropan-2-ol in sufficient amount to reduce the content to less than 200 ppm, said allyloxypropan-2-ol, along with other imperities, are removed by evacuation to 1.0 to 10 mm of mercury and adjusting the pressure to 2.0 to 70 mm of mercury by injecting nitrogen below the surface of the liquid polyol.

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**4,745,231**

## ALKYLENE OXIDE BLOCK POLYMERS USABLE AS DEFOAMERS

**Fritz Lange, Essen; Rainer Hoefer, Duesseldorf; Karl-Heinz Schmid, Mettmann; Adolf Asbeck, Duesseldorf, and Klaus Herrmann, Monheim, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany**

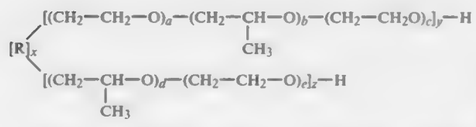
**Filed Aug. 6, 1986, Ser. No. 893,756**

**Claims priority, application Fed. Rep. of Germany, Aug. 31, 1985, 3531212**

**Int. Cl.⁴ C07C *43/11***

**U.S. Cl. 568—624** **14 Claims**

1. A block polymer corresponding to the following formula



in which R represents a glycerol or polyglycerol function having a degree of polymerization x of from 1 to 6 and the indices y is equal to (x−z+2), z is equal to (x−y+2), a is equal to 1 to 15, b is equal to 50 to 250, c is equal to 1 to 15, d is equal to 50 to 250 and e is equal to 1 to 15, with the proviso that the sums (a+c+e) is equal to 2 to 20, (b+d) is equal to 50 to 250 and (c+e) is equal to 1 to 15, and y has a value of at least 1, said polymer having been prepared by reacting said glycerol or polyglycerol with from 1 to 15 moles of ethylene oxide, reacting the reaction product thereof with from 50 to 250 moles of propylene oxide, and then reacting the reaction product thereof with from 1 to 15 moles of ethylene oxide wherein the total quantity of ethylene oxide used in the process amounts to between about 2 and about 20 moles of ethylene oxide, and wherein said polymer is prepared under pressure and at a temperature of between about 80° C. and about 200° C.

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**4,745,232**

## PROCESS FOR PREPARING 4,6-DINITRORESORCINOL

**Robert J. Schmitt, Mountain View; David S. Ross, and James F. Wolfe, both of Palo Alto, all of Calif., assignors to SRI International, Menlo Park, Calif.**

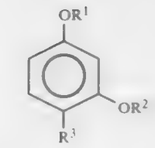
**Filed Jan. 7, 1987, Ser. No. 1,243**

**Int. Cl.⁴ C07C *79/28***

**U.S. Cl. 568—712** **18 Claims**

1. A process for preparing 4,6-dinitroresorcinol which minimizes side reactions catalyzed by the nitrosonium ion, comprising the steps of:

providing a resorcinol-based starting material having the structure



wherein $R^1$ and $R^2$ are independently selected from the group consisting of hydrogen and —C—R, R is hydrogen or lower alkyl, and $R^3$ is selected from the group consisting of hydrogen, nitro and nitroso, with the proviso that $R^1$, $R^2$ and $R^3$ are not all hydrogen;

purging a reaction medium containing nitric acid with an inert gas so as to remove substantially all $NO_2$ and nitrous acid therefrom;

adding to the reaction medium an amount of a nitrosonium ion control agent effective to minimize nitrosonium ion-catalyzed side reactions;

cooling the reaction medium to a temperature of between about −20° C. and about 25° C.;

adding the resorcinol-based starting material to the cooled reaction medium; and

allowing the starting material to react with the nitric acid while maintaining the temperature between about −20° C. and about 25° C. for a period of time selected so as to minimize styphnic acid production while sufficient to produce substantially complete precipitation of 4,6-dinitroresorcinol.

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**4,745,233**

## DERIVATIVES OF 1,1,2,2-TETRAMETHYL-1,2-BIS-(2-FLUORO-4-HYDROXYPHENYL)-ETHANE

**Helmut Schonenberger, Pentling; Rolf W. Hartmann, Abbach; Martin Schneider, Regensburg; Walter Schwarz, Pentling, and Jurgen Engel, Alzenau, all of Fed. Rep. of Germany, assignors to Asta-Werke Aktiengesellschaft, Bielefeld, Fed. Rep. of Germany**

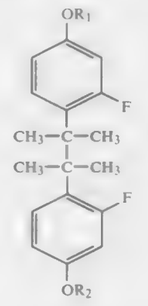
**Filed Jun. 9, 1986, Ser. No. 871,892**

**Claims priority, application Fed. Rep. of Germany, Jun. 8, 1985, 3520622**

**Int. Cl.⁴ C07C *39/14, 125/04, 125/06***

**U.S. Cl. 568—729** **10 Claims**

1. A compound corresponding to the following formula:



I

in which the substituents $R_1$ and $R_2$ are hydrogen, an aminocarbonyl group, a $C_1$–$C_6$ alkylaminocarbonyl group, a di-$C_1$–$C_6$-alkylaminocarbonyl group, the group $PO(OH)_2$, a $C_2$–$C_8$ alkanoyl group, a $C_2$–$C_8$ halogen alkanoyl group or a $C_3$–$C_8$ alkenoyl group.

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**4,745,234**

## PROCESS FOR THE PREPARATION OF α-β UNSATURATED ALCOHOLS

**Cornelis G. M. van de Moesdijk, Spaubeek, and Marcel A. R. Bosma, Geleen, both of Netherlands, assignors to Stamicarbon B.V., Geleen, Netherlands**

**Continuation of Ser. No. 911,064, Sep. 24, 1986, abandoned. This application Aug. 19, 1987, Ser. No. 86,788**

**Claims priority, application Netherlands, Oct. 11, 1985, 8502778**

**Int. Cl.[4] C07C *29/14***

**U.S. Cl. 568—830** **15 Claims**

1. A process for preparing an α-β unsaturated alcohol having the formula

$$R_1-C\equiv C-CH_2OH$$
$$\quad\;\;|\quad\;\;|$$
$$\quad R_2\;\;R_3$$

where $R_1$, $R_2$ and $R_3$, independent of one another, represent phenyl, substituted phenyl having one or more alkyl and/or alkoxy groups wherein the total number of carbon atoms of the substituents is at most 5, or hydrogen or a 1–10 carbon atom alkyl group, wherein at least one of $R_1$, $R_2$, and $R_3$ represents substituted phenyl, comprising:

hydrogenating, in the liquid phase, the aldehyde corresponding with the desired alcohol in the presence of a platinum-on-graphite catalyst and a promoter at a partial hydrogen pressure of at least 500 kPa at a temperature from about −5° C. to about 60° C.

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**4,745,235**

## ORGANIC FLUORIDES FROM FLUOROFORMIC ESTERS

**David P. Ashton, Warrington; Thomas A. Ryan, Kelsall, and Brett A. Wolfindale, Liverpool, all of United Kingdom, assignors to Imperial Chemical Industries PLC, London, England**

**Continuation of Ser. No. 778,300, Sep. 23, 1985, abandoned, which is a continuation of Ser. No. 582,232, Feb. 21, 1984, abandoned. This application Sep. 14, 1987, Ser. No. 96,785**

**Claims priority, application United Kingdom, Mar. 1, 1983, 8305593; May 26, 1983, 8314561**

**Int. Cl.[4] C07C *17/00, 17/33, 25/02***

**U.S. Cl. 570—142** **6 Claims**

1. A method for the preparation of an organic fluoride of the formula RF where R is phenyl, 4-chlorophenyl or 2,4,6-trimethylphenyl which comprises contacting a fluoroformic acid ester of the formula ROCOF with alumina at a temperature in the range 200°–600° C.

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**4,745,236**

## SYNTHESIS OF CHLOROPENTAFLUOROETHANE

**Robert Azerad, Corbas; Bernard Cheminal, Brignais, and Henri Mathais, Saint Didier An Mont d'Or, all of France, assignors to Atochem, Courbevoie, France**

**Filed Nov. 14, 1986, Ser. No. 931,365**

**Claims priority, application France, Nov. 15, 1985, 85 16951**

**Int. Cl.[4] C07C *17/20, 19/08***

**U.S. Cl. 570—166** **17 Claims**

1. A process for the manufacture of chloropentafluoroethane which comprises subjecting dichlorotetrafluoroethane to the action of hydrofluoric acid in gaseous phase in the presence of a fluorinated alumina catalyst, said catalyst being prepared by reacting in gaseous phase an activated alumina in which the sodium oxide content is below 300 ppm and the volume of the pores having a radius of 40 angstroms or above is greater than 0.7 $cm^3/g$, with hydrofluoric acid or with a mixture of hydrofluoric acid and of air, nitrogen or a fluorinated compound.

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**4,745,237**

## PREPARATION OF 1-CHLORO-1,2,2,2-TETRAFLUOROETHANE

**Denis G. H. Ballard, Littleton; Jeffrey Farrar, Kelsall, and Dale A. Laidler, Dee Banks, all of England, assignors to Imperial Chemical Industries PLC, London, England**

**Continuation of Ser. No. 741,743, Jun. 6, 1985, abandoned. This application Aug. 27, 1987, Ser. No. 90,385**

**Claims priority, application United Kingdom, Jun. 14, 1984, 8415201**

**Int. Cl.[4] C07C *17/00, 17/38, 19/02***

**U.S. Cl. 570—176** **6 Claims**

1. A method for the selective preparation of 1-chloro-1,2,2,2-tetrafuoroethane which comprises treating a mixture of 1,1-dichloro-1,2,2,2-tetrafluoroethane and 1,2-dichloro-1,1,2,2-tetrafluoroethane at a temperature in the range form −35° to 30° C. with an alkali metal amalgam in an active hydrogen containing liquid medium which includes a solvent for the dichlorotetrafluoroethanes and separating the 1-chloro-1,2,2,2-tetrafluoroethane from unchanged 1,2-dichloro-1,1,2,2-tetrafluoroethane.



**4,745,238**

## FLOATABLE FLEXIBLE ELECTRIC AND/OR OPTICAL LINE

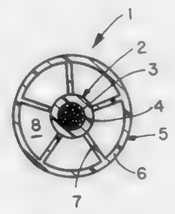
**Alfred Kotthaus, Kuckeswagen, and Lothar Nohring, Kaarst, both of Fed. Rep. of Germany, assignors to Kabelwerke Reinshagen GmbH, Fed. Rep. of Germany**

**Filed Dec. 23, 1985, Ser. No. 812,259**

**Claims priority, application Fed. Rep. of Germany, Dec. 22, 1984, 3447225**

**Int. Cl.[4] H01B *7/12***

**U.S. Cl. 174—101.5** **4 Claims**




1. A floatable flexible line comprising a plurality of conductors and a flexible one-piece casing having an extrudable cross-section shape and comprising an inner cylindrical wall and an outer cylindrical wall with a plurality of radial walls extending therebetween, said walls being impermeable to air and liquid, said inner cylindrical wall surrounding said conductors, said walls defining a plurality of air chambers extending longitudinally of said line for providing buoyancy thereto, said casing being constructed of an extrudable thermoplastic rubber having a density of less than 1 $kg/dm^3$ for supplementing the buoyancy of said line.

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**4,745,239**

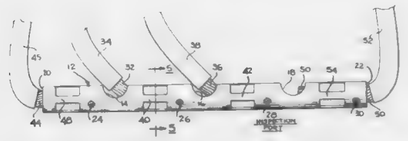
## MULTIPLE WIRE JOINING DEVICE AND METHOD

**Richard A. Conrad, Vista, Calif., assignor to Teledyne Industries, Inc., Los Angeles, Calif.**

**Filed Sep. 9, 1986, Ser. No. 905,741**

**Int. Cl.[4] H02G *15/08;* H01R *43/04***

**U.S. Cl. 174—72 R** **6 Claims**



1. A device for joining multiple wires, comprising:

a generally tubular, deformable, electrically conductive housing having multiple apertures formed in the wall thereof and axially spaced apart along the length of the housing, each said aperture adapted to admit one end of one of the multiple wires through the aperture and axiallly along a length of the housing, where the spacings between the apertures are sufficient to permit the admittance of the one end of the one wire into the housing through any one of the apertures a sufficient distance to enable the housing adjacent each said aperture to be crimped to retain the respective wire therein and where the one end of each of the multiple wires terminates in the housing.

3. A method of joining multiple wires, comprising the steps of:

providing a generally tubular, deformable, electrically conductive housing having multiple apertures formed in the wall thereof and axially spaced apart along the length of the housing, each aperture adapted to admit one end of one of the multiple wires through the aperture and axially along a length of the housing where the spacings between the apertures are sufficient to permit the admittance of the one end of the one wire into the housing through any one of the apertures a sufficient distance to enable the crimping of the housing adjacent each aperture to retain the respective wire therein;

positioning each of the wires into the housing through a respective said aperture the sufficient distance to enable their retention by crimping the housing; and

crimping the housing adjacent each of the apertures to retain the wires in the housing where the one end of each of the multiple wires terminates in the housing.

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**4,745,240**

## SEE-THROUGH COORDINATE GRAPHIC INPUT TABLET

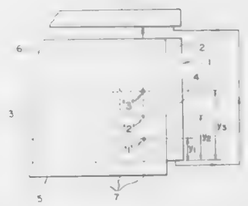
**Mikio Furukawa, Tokyo; Yutaka Omori, and Klyomichi Ihara, both of Saitama, all of Japan, assignors to Shin-Etsu Polymer Co., Ltd., Tokyo, Japan**

**Filed Jul. 23, 1986, Ser. No. 889,088**

**Claims priority, application Japan, Jul. 23, 1985, 60-162281**

**Int. Cl.[4] G08C *21/00***

**U.S. Cl. 178—18** **5 Claims**




1. A see-through coordinate graphic input tablet which comprises:

(a) a first or lower tablet element, which is in the form of a rectangular sheet made of an electrically insulating transparent material and provided on one surface with a plurality of electroconductive lines formed from wires of a low-resistivity metal, each wire extending from a side to the opposite side of the rectangular sheet running in parallel with each other;

(b) a second or upper tablet element, which is in the form of a rectangular sheet made of an electrically insulating transparent material and provided on one surface with a plurality of electroconductive lines formed from wires of a low-resistivity metal, each wire extending from a side to the opposite side of the rectangular sheet running in parallel with each other, disposed above the first element in parallel without contacting therewith in such a direction that the surfaces of the first and the second elements provided with the electroconductive lines face each other and the running directions of the electroconductive lines on the first and the second elements are perpendicular to each other; and

(c) at least one detecting resistor placed along a side of the first or second element having the ends of the electroconductive lines on said element in electrical contact with the resistor.



210–371 O.G.–88–13

**4,745,241**

## TOUCH-OPERATED SEE-THROUGH COORDINATE INPUT UNIT

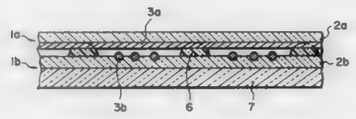
**Mikio Furukawa, Tokyo; Kazutoki Tahara, and Yosuke Kunishi, both of Saitama, all of Japan, assignors to Shin-Etsu Polymer Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 869,099, May 30, 1986. This application Aug. 7, 1987, Ser. No. 83,686**

**Claims priority, application Japan, Jun. 11, 1985, 60-126901; Jun. 11, 1985, 60-126902**

**Int. Cl.⁴ G08C** *21/00*

**U.S. Cl. 178—18** **7 Claims**




1. A touch-operated see-through coordinate input unit which comprises:

(a) a first electrically insulating transparent substrate sheet having flexibility provided on one surface with an array of electroconductive lines each in parallel to the others and bonded to the surface;

(b) a second electrically insulating transparent substrate sheet provided on one surface with an array of electroconductive lines each in parallel to the others and bonded to the surface,

the first and second sheets being disposed in parallel to each other in such a manner that the arrays of the electroconductive lines on the first and second sheets face one to the other, the running direction of the electroconductive lines on the first sheet being perpendicular to the running direction of the electroconductive lines on the second sheet; and

(c) a plurality of electrically insulating spacers disposed between the first and the second sheets to keep the arrays of electroconductive lines thereon apart each from the other when the first substrate sheet is not in a depressed condition by pushing with a pushing body but not to disturb contacting of the electroconductive line on the first and the second sheets each with the other when the first substrate sheet is depressed by pushing with a pushing body, each of the spacers being integrally bonded to either of the first and the second substrate sheets,

the pitch of arrangement of the electroconductive lines on at least either one of the first and the second sheets being such that at least two contacting points are formed between the electroconductive lines on the first sheet and the electroconductive lines on the second sheet when the first substrate sheet is depressed by pushing with a pushing body.

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**4,745,242**

## COORDINATE INPUT SHEET WITH CORRECTION ELECTRODES

**Haruyuki Koizumi, Kyoto; Shinichi Hashizume, Kasatsu; Koichi Omae, Kyoto, and Sanji Nakabayashi, Mishima, all of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan**

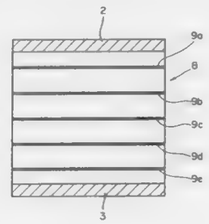
**Filed Feb. 9, 1987, Ser. No. 12,154**

**Claims priority, application Japan, Feb. 10, 1986, 61-27087; Feb. 10, 1986, 61-27088**

**Int. Cl.⁴ G08C** *21/00*

**U.S. Cl. 178—18** **7 Claims**

1. A coordinate input sheet used for coordinate digitizing and comprising main electrodes disposed at a predetermined spacing in parallel on an insulating sheet, a surface resistance on the sheet between said main electrodes, at least one stripe-like auxiliary electrode disposed between and in parallel with said main electrodes on said surface resistance portion of said sheet, and means for applying a voltage to each of said auxiliary electrodes, said voltage being set in accordance with the positions of said auxiliary electrodes on said sheet and a designed voltage to be detected at said positions during coordinate digitizing use of said coordinate input sheet, said applying means comprising a resistance provided between each said auxiliary electrode and said main electrodes, which has a value adjusted to provide said designed voltage.




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**4,745,243**

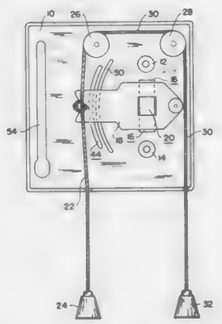
## DECORATIVE LIGHT SWITCH COVER

**Paul S. Wang, 16033 Villa Flores Dr., Hacienda Heights, Calif. 91745**

**Filed Dec. 15, 1986, Ser. No. 941,681**

**Int. Cl.⁴ H01H** *3/20, 17/00*

**U.S. Cl. 200—331** **3 Claims**




1. A decorative switch actuator assembly for a wall switch to replace the standard cover plate of the switch, the wall switch including an actuating arm, and the actuator assembly comprising: a decorative cover plate adapted to be mounted over the wall switch, said decorative cover plate having an opening therein for receiving the actuating arm of the wall switch; a lever arm pivotally mounted on the rear side of said decorative cover plate having an opening therein for receiving the actuating arm of the wall switch and for moving said actuating arm from one operating position to another to turn the wall switch on and off when said lever arm is angularly turned about its pivot point between first and second angular positions; a first cord secured at one end of said lever arm to move said lever arm to said first angular position as said first cord is pulled; a pair of pulleys mounted on the rear side of said decorative cover plate and said first cord extending around said pulleys; a second cord secured at said one end of said lever arm to move said lever arm to said second angular position when said second cord is pulled; said first and second cords extending through the lower edge of said decorative cover plate; a moveable design element positioned on the front side of said decorative cover plate and coupled to said lever arm to cause said design element to move from one position to another as said lever arm is operated by said cords; and a pin-like member attached to said movable design element and extending at right angles to the plane of movement of said design element through a slot in said decorative cover plate and attached to said lever arm for coupling said design element to said lever arm.



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**4,745,244**

## HF-SWITCH

**Georg Spinner, Am Eichberg 12, 8152 Feldkirchen, Fed. Rep. of Germany**

**Filed Apr. 22, 1987, Ser. No. 41,816**

**Claims priority, application Fed. Rep. of Germany, Apr. 22, 1986, 3613608**

**Int. Cl.⁴ H01H** *1/46*

**U.S. Cl. 200—258** **6 Claims**





1. A switch, comprising:

a contact piece including at least two contact springs supported at one end and provided with opposing contact rivets at their other end; and

a contact blade movable in a direction between said contact rivets within a predetermined tolerance range, said contact rivets extending perpendicular to the direction of movement of said contact blade and being of circular cone shape with a height of at least half the tolerance range of said contact blade and with a base angle which is equal to or smaller than 45°, wherein said contact springs are prestressed toward each other in a direction perpendicular to the direction of movement of said contact blade by a spring deflection which substantially corresponds to half the tolerance range of said contact blade.

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**4,745,245**

## METHOD AND APPARATUS FOR THE MANUFACTURE OF A CLAD TUBE THROUGH USE OF INDUCTION HEATING

**Hiromu Kitaide, and Michio Kawasaki, both of Suzuka Mie, Japan, assignors to Fuji Electric Co., Ltd., Kawasaki, Japan**

**Continuation-in-part of Ser. No. 925,304, Oct. 31, 1986, abandoned. This application Feb. 3, 1987, Ser. No. 10,497**

**Int. Cl.⁴ H05B** *6/10*

**U.S. Cl. 219—8.5** **12 Claims**

1. A method for manufacturing a clad tube comprising:

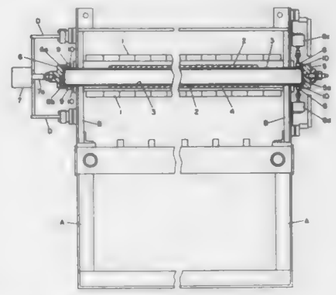
(a) coaxially positioning a metallic tube within a cylindrically formed induction coil;

(b) coaxially positioning a tube of a thermally deformable coating material within the metallic tube;

(c) positioning a magnetic tube within the tube of coating material;

(d) applying a current to the induction coil such that the induction coil serves as a heater and heats the metallic tube and the magnetic tube which in turn radiantly heat the tube of coating material to a temperature sufficient to make the coating material deformable; and

(e) applying pressure on the interior of the tube of coating material such that the tube of coating material deforms to contact and fuse with the interior surface of the metallic tube to form a clad tube.



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**4,745,246**

## HIGH FREQUENCY HEATING APPARATUS WITH ELECTRIC HEATING DEVICE

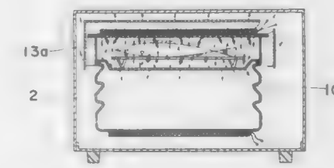
**Ichiroh Hori, Yamatokoriyama; Kazumi Hirai, Nabari; Mitsuo Akiyoshi, Nara, and Yoshio Mitsumoto, Kashihara, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan**

**Continuation of Ser. No. 852,245, Apr. 15, 1986, abandoned. This application Sep. 4, 1987, Ser. No. 94,017**

**Claims priority, application Japan, Apr. 15, 1985, 60-79614; Apr. 17, 1985, 60-81667; Jul. 9, 1985, 60-150768**

**Int. Cl.⁴ H05B** *6/64*

**U.S. Cl. 219—10.55 B** **9 Claims**




1. A heating apparatus for heating with radiant heat and microwaves, comprising:

a heating chamber for accommodating a food material to be heated, and having at least an upper wall of metal exposed to the interior of said chamber and having an oven plate holding means on the sidewalls of said heating chamber spaced downwardly from the upper wall;

a frequency oscillation device for generating microwaves and directing them toward said heating chamber;

a flat radiant heat supplying heating element against the outside of the metal upper wall of said heating chamber for supplying heat to the metal of said upper wall for raising the temperature of the entire area of the upper wall for causing radiant heat to be emitted from the metal upper wall at temperatures up to food grilling temperatures; and

one chamber sidewall having a microwave supply opening therein between said holding means and said upper wall to which said frequency oscillation device supplies the microwaves into said heating chamber.

VOL 1090 ISS 3 MY 17 1988 UMI

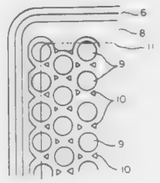


**4,745,247**

## MICROWAVE OVEN DOOR STRUCTURE

**Shigeaki Fukumoto, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Feb. 12, 1987, Ser. No. 13,973**
**Claims priority, application Japan, Feb. 19, 1986, 61-23675[U]**
**Int. Cl.[4] H05B** *6/76*
**U.S. Cl. 219—10.55 D** **16 Claims**



1. A microwave oven door structure comprising

a panel having first and second surfaces opposite to each other and sides defining peripheral regions therealong, said panel being formed with a large number of holes all over said surfaces therethrough,

a first transparent film entirely covering said first surface and said holes air-tightly with a first adhesive layer sandwiched between said first transparent film and said first surface with said holes, and

a second transparent film nearly entirely covering said second surface and said holes with a second adhesive layer sandwiched between said second transparent film and said second surface with said holes, said second transparent film only partially covering those of said holes in one or more of said peripheral regions, said second adhesive layer surrounding said holes discontinuously so as to form air passages connecting said holes between said second surface and said second transparent film and to allow air in said holes to flow out.

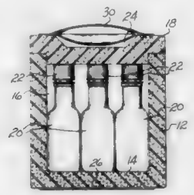
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**4,745,248**

## METHOD OF HEATING AND STORING LIQUIDS

**Charles S. Hayes, 1634 E. Jefferson Blvd., South Bend, Ind. 46617**

**Filed Aug. 18, 1986, Ser. No. 897,583**
**Int. Cl.[4] H05B** *6/64*
**U.S. Cl. 219—10.55 M** **3 Claims**



1. A method of maintaining the temperature of heated liquids comprising the steps of:

(a) providing an insulated lightweight container capable of permitting ready hand toting which includes a removable nesting top to provide a closable internal storage compartment, all of lightweight insulative material and a sealing and carrying member associated therewith;

(b) placing at least one receptable carrying a consumable liquid to be heated in said storage compartment and closing the compartment with said nesting top to snugly retain said receptacle in position within said storage compartment;

(c) externally heating from a heat source positioned externally of said container said liquid in said receptacle within said closed insulative storage compartment with the liquid in the receptacle reaching a desired temperature above consumption temperature; and

(d) allowing said insulated container to set at ambient temperature for a time within said closed storage compartment wherein the liquid in said receptacles cools slowly to allow ready hand toting of said container by said sealing and carrying member and consumption of said liquid in said receptable in a heated condition.

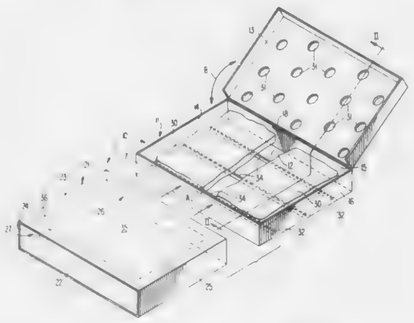
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**4,745,249**

## PACKAGE AND METHOD FOR MICROWAVE HEATING OF A FOOD PRODUCT

**James A. Daniels, Plymouth Meeting, Pa., assignor to Mrs. Paul's Kitchens Inc., Philadelphia, Pa.**

**Filed Feb. 19, 1987, Ser. No. 16,531**
**Int. Cl.[4] H05B** *6/80*
**U.S. Cl. 219—10.55 E** **19 Claims**



2. A package assembly for a microwave-heatable food product comprising:

a container including at least one support member for supporting said food product in said container and minimizing contact between said food product and said support member and having at least one outlet air opening in one wall of said container, at least one inlet air opening in another wall of said container to form an external air flow path therethrough and being composed of a microwave interactive material;

a support base upon which said container can be placed to elevate said container off a support surface of a microwave cooking oven, said support base allowing air outside the container to flow along the external flow path, by entering the container through said inlet opening, become heated by the microwave interactive material and flow over said food product and out of said container through said outlet air opening to convectively heat said food product and aid in the removal of moisture from said food product during microwave heating.

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**4,745,250**

## INTERLOCK SWITCH BASEPLATE ASSEMBLY

**Stephen K. Mayo, Memphis, Tenn., assignor to Litton Systems, Inc., Beverly Hills, Calif.**

**Filed Apr. 27, 1987, Ser. No. 43,216**
**Int. Cl.[4] H01H** *9/00;* **H05B** *6/64*
**U.S. Cl. 219—10.55 C** **10 Claims**

9. An interlock switch baseplate assembly in combination with a microwave oven comprising:

(a) a unitary baseplate having:

(i) a generally planar first surface with mounting means therein for adjustably mounting said baseplate to an adjacent surface;

(ii) a generally planar surface projecting substantially perpendicularly from said first surface and containing first and second operator apertures therein;

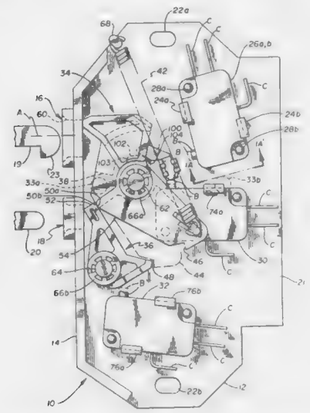
(iii) a plurality of sets of switch location and retention means integrally formed as a part of said baseplate and projecting substantially perpendicularly from said first surface for positively locating and retaining first, second and third switches on said baseplate; and

(iv) first and second shaft means integrally formed as a part of said baseplate and projecting substantially perpendicularly from said first surface;

(b) a first actuator positioned on said first shaft means and adapted to receive translational motion of a first operator received through said first operator aperture such that the translational motion of said first operator is converted into rotary motion for sequentially actuating and deactuated said first switch;

(c) a second actuator positioned on said second shaft means and adapted to receive translational motion of a second





operator received through said second operator aperture actuator such that the translational motion of said second operator is converted into rotary motion for actuating and deactuating said second switch; wherein said first and second actuators have interengaging surfaces which prevent actuation of said first and second switches upon receiving the translational motion of one of the first and second operators without receipt of motion of the other;

(d) a third actuator retained in sliding relationship with said baseplate and adapted to receive translational motion of said first operator such that the translational motion of said first operator drives said third actuator for sequentially actuating said third switch such that said third switch is actuated after actuation of both said first and second switches; and

(e) said microwave oven having a pivoting microwave oven door having first and second operators projecting therefrom.

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**4,745,251**

## VALVE SEAT INDUCTOR

**Robert V. Vickers, Chagrin Falls, Ohio, assignor to Tocco, Inc., Boaz, Ala.**

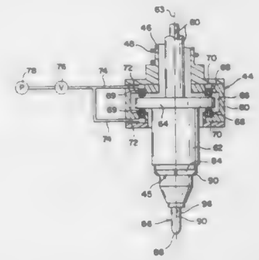
**Division of Ser. No. 921,906, Oct. 27, 1986, Pat. No. 4,673,784, which is a continuation of Ser. No. 712,744, Mar. 18, 1985, abandoned. This application Jun. 11, 1987, Ser. No. 60,617**
**The portion of the term of this patent subsequent to Jun. 16, 2004, has been disclaimed.**
**Int. Cl.[4] H05B** *6/10*
**U.S. Cl. 219—10.57** **1 Claim**

1. An apparatus for inductively heating the frustoconical valve seat surface of a valve port or an engine component having a valve stem bore coaxially disposed with respect to the valve seat surface, said apparatus comprising:

an inductor coil having a conical surface complementary to the valve seat surface;

frame means for advancing said coil toward the valve seat with the axis of the coil surface being substantially parallel to the axis of the valve seat;

bearing means operative between the inductor coil and the frame means accommodating radial and angular movement of said inductor coil to an orientation wherein the axes of the conical surfaces are coincident;



an elongated nose member having a cylindrical surface coaxial with the conical surface of the valve seat, said cylindrical surface having a close telescopic sliding fit with and entering the bore of said port upon advancing of said frame means and when received therewithin establishing coincidence of the axes as accommodated by said bearing means; and

electrically non-conductive insulating spacer means attached to said conical surface of said coil having outer reference surfaces thereon lying on a conical surface spaced from the inductor coil a predetermined distance thereby prescribing concentricity and axial spacing between the conical surfaces of the seat and said coil.

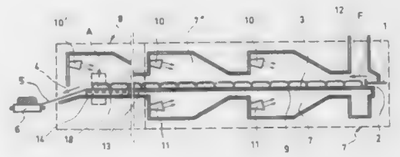
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**4,745,252**

## DEVICE FOR THE HOMOGENIZATION OF THE TEMPERATURE OF PASSING METALLIC PRODUCTS

**Jean-Luc Roth, and Hervé Sierpinski, both of Metz, France, assignors to IRSID, Maizieres-les-Metz, France**

**Continuation of Ser. No. 758,999, Jul. 25, 1985, abandoned. This application Oct. 3, 1986, Ser. No. 914,530**
**Claims priority, application France, Jul. 27, 1984, 84 12228**
**Int. Cl.[4] H05B** *6/40*
**U.S. Cl. 219—10.71** **6 Claims**



1. In a reheating furnace comprising a heating zone provided with burners, metallic products to be rolled moving in said reheating furnace and, downstream of said heating zone with respect to the direction of movement of products, a thermal equalization zone, said furnace having, in said heating zone, support means comprising elongated support elements on which said products are moving, said support elements being constituted by slides or bars arranged parallel to the direction of the movement of the products, the improvement comprising

an apparatus for homogenizing the temperature of said metallic products, said apparatus comprising elongated static polyphase inductors located, in said thermal equalization zone, in the prolongation of said support elements extending into said thermal equalization zone, and hence directly beneath skid marks in the lower portions of said metallic products resulting from contact between said metallic products and said support elements preventing their direct exposure to heat in said heating zone, an active face of said inductors facing said metallic products and having a width in the range of one to four times the width of said support elements, whereby heating of said metallic products is concentrated in the region of said skid marks.

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**4,745,253**

## DEVICE AND PROCESS DESIGNED TO AUTOMATICALLY HOLD UP AND FIX IN POSITION THE PARTS CUT OUT OF A WORKPIECE DURING ELECTROEROSION MACHINING TO ROUGH DIMENSIONS AND APPLICATION INVOLVING THE AUTOMATIC REMOVAL OF THE CUTOUT PARTS

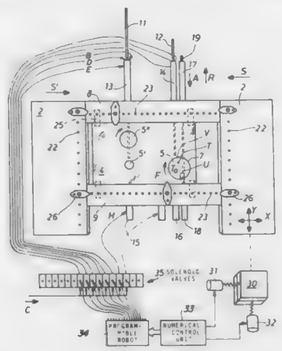
**Roger Girardin, Vernier, Switzerland, assignor to Charmilles Technologies S.A., Geneva, Switzerland**

**Filed Dec. 11, 1986, Ser. No. 940,595**

**Claims priority, application Switzerland, Dec. 12, 1985, 5320/85**

**Int. Cl.⁴ B23H** *7/02;* **B23Q** *3/06*

**U.S. Cl. 219—69 R** **15 Claims**



1. A process designed to automatically hold up and fix in position a part cut out of a workpiece machined to rough dimensions when a closed path is cut in said workpiece by electroerosion, said part having a flat base, wherein at least two bars, each offering a flat surface, are positioned in such a manner that said flat surfaces a..e in the same plane as the lower surface of said part and wherein at least one mobile gib is moved, after partial completion of said cutting, so that said gib crosses under both coplanar surfaces of said two bars and under the lower surface of the part and is then pressed against said lower surfaces of both bars before completion of said cutting.

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**4,745,254**

## METHOD OF HARD-FACING A METAL SURFACE

**Charles F. Funk, P.O. Box 6513, Gulfport, Miss. 39501**

**Continuation of Ser. No. 557,760, Dec. 5, 1983, abandoned, which is a continuation-in-part of Ser. No. 455,923, Jan. 6, 1983, abandoned. This application Oct. 17, 1985, Ser. No. 788,405**

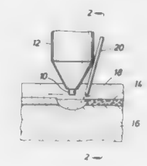
**Int. Cl.⁴ B23K** *9/04*

**U.S. Cl. 219—76.15** **14 Claims**

1. A method of hard-facing a metal base member with a tough, wear resistant metal matrix from 3/16" to 1" or more thick having substantially uniformly distributed, throughout the matrix, hard, wear resistant particles of a diameter substantially less than the thickness of the matrix, comprising the steps of:

(a) positioning a member of cast matrix metal on the surface to be hard-faced, said metal having a composition that is suitable for the formation of a swirling molten metal pool when melted and a tough, wear resistant matrix having a hardness of about 48 Rockwell C when resolidified;

(b) moving a non-consumable, welding electrode supplied with electricity over said matrix metal member to melt





that portion of said matrix metal member that is in close proximity to said electrode and a portion of the metal base member therebelow to form a moving, swirling, molten metal pool; and

(c) simultaneously introducing a stream of hard, wear resistant particles of a diameter substantially less than the thickness of said matrix metal member into said pool such that said particles are substantially uniformly distributed and suspended in said pool for entrapment as the rear edge of said pool solidifies behind said electrode as it moves.

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**4,745,255**

## METHOD AND APPARATUS FOR WELDING CURRENT REGULATION FOR A RESISTANCE WELDING MACHINE

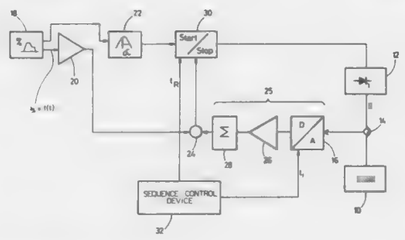
**Paul Mettler, Bremgarten, Switzerland, assignor to Elpatronic AG, Switzerland**

**Filed Sep. 8, 1986, Ser. No. 904,890**

**Claims priority, application Switzerland, Sep. 10, 1985, 3892/85**

**Int. Cl.⁴ B23K** *11/24*

**U.S. Cl. 219—110** **8 Claims**




1. A method of regulating a cyclic welding operation in a resistance welding machine which receives alternating input current, and senses welding current and controls the welding time, each welding operation cycle comprising the iterative steps of:

a. presetting a value of desired welding current $i_r$ and of desired welding time $t_r$;



b. determining a value for the desired welding energy, from said values of desired welding current using an integral $\int i^2_r dt$ over said desired welding time $t_r$;

c. applying welding current;

d. measuring during a time interval (ti) a value of the actual welding current $i_f$, said time interval comprising more than one-half-cycle of the input current;

e. integrating said measured welding current value with previously measured values of welding current according to an integral $\int i^2_f dt$ to determine an actual welding energy value;

f. comparing the actual welding energy value with the desired welding energy value; and

g. switching off the welding current when said actual welding energy value approximately equals said desired welding energy value.

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**4,745,256**

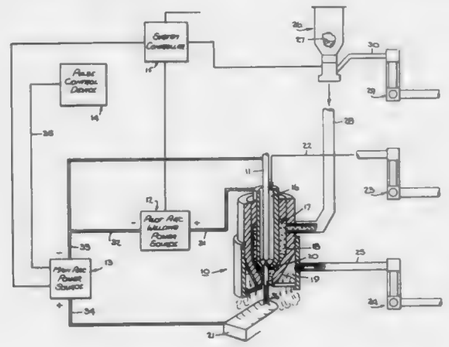
## NARROW SUBSTRATE HAVING WELD BEAD OF POWDERED METAL

**Gary C. Shubert, Tinton Falls, N.J., assignor to Metallurgical Industries, Inc., Tinton Falls, N.J.**

**Continuation of Ser. No. 700,972, Feb. 12, 1985, abandoned. This application Mar. 6, 1986, Ser. No. 836,953**

**Int. Cl.⁴ B23K** *9/00*

**U.S. Cl. 219—121 PL** **15 Claims**



1. A metallic substrate having a narrow longitudinally disposed surface and at least one layer of a single weld bead deposit made from powdered metal on said surface characterized in that said bead is formed of a longitudinally aligned series of overlapping weld deposits and has a width of from 0.020 inch to 0.125 inch and wherein the ratio of the width of said substrate width to the width of said bead deposit is from 0.5:1 to 1:1.

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**4,745,257**

## LASER WELDING METHOD

**Naotake Rito; Masao Ohta; Tsugio Yamada; Junichi Gotoh, and Tsutomu Kitagawa, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 666,417, Oct. 30, 1984, abandoned. This application Apr. 14, 1987, Ser. No. 38,445**

**Claims priority, application Japan, Apr. 2, 1984, 59-66905**

**Int. Cl.⁴ B23K** *26/00*

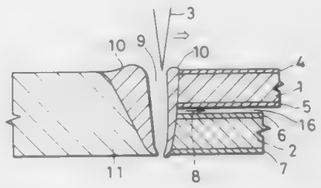
**U.S. Cl. 219—121 LD** **4 Claims**

1. A laser welding method comprising the following steps:

covering materials to be welded with coating material having a lower melting point than the base metal thereof;

stacking said materials to be welded one on top of another while positioning a spacer therebetween to provide a continuous predetermined air gap in the joints therebetween; and

applying a laser beam to said materials to be welded to lap weld the latter, said continuous predetermined air gap



forming a path for discharge of gas formed by heating said coating material during application of said laser beam.

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**4,745,258**

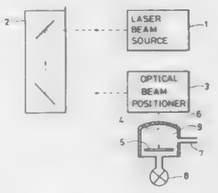
## APPARATUS FOR LASER-CUTTING METAL INTERCONNECTIONS IN A SEMICONDUCTOR DEVICE

**Junichi Arima, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Division of Ser. No. 769,768, Aug. 27, 1985. This application Jan. 12, 1987, Ser. No. 2,264**

**Int. Cl.⁴ B23K** *26/00*

**U.S. Cl. 219—121 LG** **5 Claims**




1. Apparatus for cutting metal interconnections having a high melting point, in a semiconductor device, comprising:

containment means for containing a low-pressure gaseous atmosphere comprising oxygen and for containing said semiconductor device within said atmosphere;

means for maintaining said low pressure inside said containment means in a pressure range 1 to 10 mTorr.;

a laser beam source means for providing a laser beam;

optical beam-positioning means for positioning said laser beam to irradiate selected portions of said interconnections of said semiconductor device located in said low-pressure atmosphere within said containment means, whereby said interconnections are sublimated and cut, and

a source of oxygen connected to said containment means to deliver oxygen gas thereto at a pressure in the range 1 to 1.5 mTorr.

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**4,745,259**

## AUTOMATIC CORNER WELDING ADAPTER

**Wray H. Russ, 1419 Hickory St., Roseville, Calif. 95678, and Ronald E. Roberts, 2533 Amaryl CT., San Jose, Calif. 95132**

**Filed Jul. 21, 1986, Ser. No. 887,227**

**Int. Cl.⁴ B23K** *9/12*

**U.S. Cl. 219—125.1** **5 Claims**

1. An adapter for supporting a torch to fuse weld a corner line formed by a first edge of a first plate in contact with a second edge of a second plate wherein said first plate is inclined to said second plate so as to form an angle having an inside and an outside and wherein said adapter comprises:

a plate support means for supporting said second plate in proximity to said first plate so that said first and second edges meet to form said angle with said corner line;

a moveable torch support means for supporting said torch so

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that an electrode on one end of said torch is in proximity to said corner line on said outside of said angle and which further comprises a threaded nut;

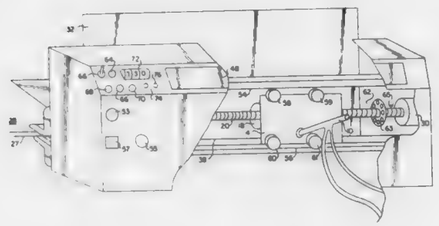
a lead screw having two ends which are rotatably attached to said plate support means aligned parallel to said corner line and threaded into said nut;

a reversible motor coupled to said lead screw so that when power is applied to said motor, said lead screw rotates thereby causing said moveable torch support means to move so that said electrode moves parallel to said corner line;

arc switch means for initiating and interrupting said arc;

a motor logic circuit means connected to said motor and said arc switch means;

means for turning said motor off and on connected to said motor logic circuit means;



a manually operated reversing switch means connected to said motor logic circuit means so that when said manually operated reversing switch is activated and said motor is turning, said motor will turn in a direction opposite to that when said manually operated reversing switch is deactivated;

a manually operated slew switch means connected to said motor logic circuit means;

a manually operated start switch means connected to said motor logic circuit means;

so that an operator may operate said reversing switch and said slew switch means and said manually operated start switch means to move said torch to an arbitrary position preparatory to starting the welding operation and when said operator depresses said start switch means, said motor turns thereby moving said torch and said arc turns on.

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**4,745,260**

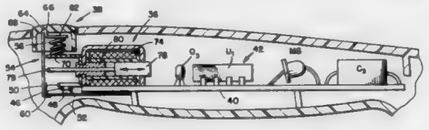
**AUTOMATIC SWITCHING APPARATUS FOR AN ELECTRIC APPLIANCE**

**Harry Albinger, Jr., Monroe; Thomas M. O'Loughlin, Milford, both of Conn.; Charles A. Baichunas, Apple Valley, Calif., and William D. Ryckman, Jr., Orange, Conn., assignors to Black & Decker Inc., Townson, Md.**

**Continuation of Ser. No. 821,274, Jan. 22, 1986, abandoned. This application Aug. 27, 1987, Ser. No. 90,389**

**Int. Cl.[4] H05B** *1/02;* **D06F** *75/26;* **H01H** *51/10*

**U.S. Cl. 219—250** **23 Claims**



1. Automatic switching apparatus for a hand held electrically operated appliance comprising:

switch means convertible between a power mode for electrically connecting the appliance to a source of electrical power and a dormant mode for electrically disconnecting the appliance from the source of electrical power;

electromechanical means which is normally deenergized but operable when energized for converting said switch means to the dormant mode;

a motion sensor responsive to movement of the appliance for generating a signal;

timer means timing a preset period time responsive to the signal from said motion sensor for re-setting the preset period of time and energizing said electromechanical means upon lapse of said preset period of time; and

manually operable mechanical reset means to selectively convert said switch means to the source of electrical power independent of movement of the appliance.

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**4,745,261**

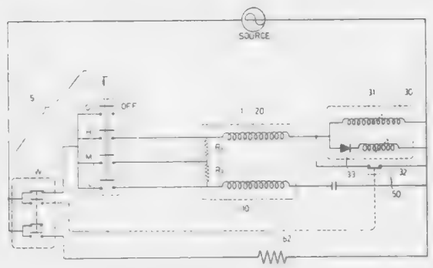
**WARMING FAN**

**Chih-Hua Yu, Taipei, Taiwan, assignor to Taiwan Electric Heating Equipment Co., Ltd., Taipei, Taiwan**

**Filed Jul. 23, 1987, Ser. No. 76,844**

**Int. Cl.[4] F24H** *3/00;* **H05B** *1/00*

**U.S. Cl. 219—364** **4 Claims**



1. A warming fan comprising:

a fan set;

a power set for driving the fan set, having a starting inductor and a running inductor;

a heating device installed on one side of the fan set; an electrical control device for connecting and controlling the power set and the heating device and the power source; and

a speed reducing device connected in series with the running inductor of the power set between the running inductor and the power source;

wherein the speed reducing device comprises a choke coil, a diode paralleled to the choke coil and a choke coil connected in serise with the diode in the downstream of the diode and paralleled to the above-mentioned chode coil.

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**4,745,262**

**ENERGY CONTROL SYSTEM**

**Laurie E. Larsen, Sydney, Australia, assignor to Appliance Control Systems (Holdings) Pty. Ltd., Revesby, Australia**

**Filed Jun. 5, 1986, Ser. No. 870,861**

**Claims priority, application Australia, Jun. 7, 1985, PH0962**

**Int. Cl.[4] H05B** *1/02*

**U.S. Cl. 219—492** **22 Claims**

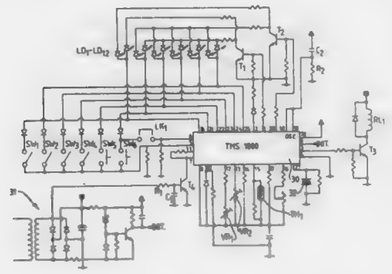
1. A frypan control system for controlling a supply of electrical power to a heating element associated with said frypan, said control system being adapted to control said supply of power in a first mode for simmering and in a second mode for cooking, comprising:

sensing means arranged in a heat conducting relationship with said heating element for sensing the temperature of said heating element;

setting means for setting the required operating temperature for said frypan;

microprocessor means receiving output from said sensing means and said setting means for providing in said first mode a control signal comprising control periods each having a first duration and a duty cycle which is related to the difference between the temperature of said setting means and the temperature of said sensing means, and in said second mode a control signal comprising control periods each having a second duration, said second duration being greater than said first duration; and





switching means responsive to said control signals for switching said supply of electrical power to said heating element for control periods having said first duration and duty cycle in said first mode and for control periods having said second duration in said second mode.

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**4,745,263**

**CURRENT REGULATOR FOR CARPET SEAMING APPARATUS**

**Ronald H. Brooks, 293 Nepean Highway, Edithvale, Vic. 3196, Australia**

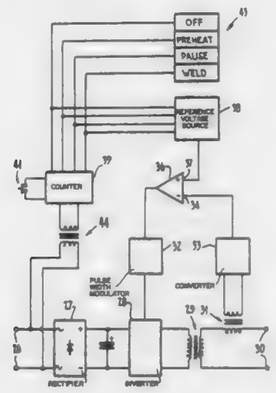
**PCT No. PCT/AU84/00171, § 371 Date May 8, 1985, § 102(e) Date May 8, 1985, PCT Pub. No. WO85/01367, PCT Pub. Date Mar. 28, 1985**

**PCT Filed Sep. 7, 1984, Ser. No. 731,787**

**Claims priority, application Australia, Sep. 9, 1983, PG1337**

**Int. Cl.[4] H05B** *1/02*

**U.S. Cl. 219—497** **6 Claims**



1. Apparatus for use in joining abutting edges of carpet or other material using a resistive heating element in conjunction with a joining tape, the joining tape having a heat softenable adhesive thereon, said apparatus comprising power input means to be connected to an A.C. mains power source, an oscillator means having an output frequency in the range of 100 to 50,000 Hertz, power output means driven by the oscillator to produce an A.C. or pulsed D.C. output voltage having a frequency which is a function of the oscillator means frequency, said power output means including an amplifier means receiving a control signal from a pulse width modulator to vary the pulse width of the oscillator means output which varies both the pulse width of the output voltage and the Rms value of output current which is applied to the heating element, current sensing means to sense the Rms value of output current, control means to adjust the pulse width modulator means in accordance with sensed output current to mainstain a predetermined selected output current, and switch means operable to select the desired output current, the switch means having a first operational mode in which the output voltage applied to the heating element has a frequency and a pulse width to cause the Rms value of the output current to be at a first predetermined value at which heating of the heating element occurs and a second operational mode in which the pulse width is reduced to reduce the Rms value of the output current to a value which maintains the heating element at a desired temperature.

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**4,745,264**

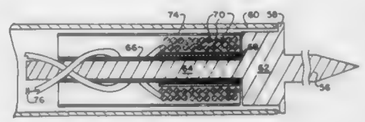
**HIGH EFFICIENCY AUTOREGULATING HEATER**

**Philip S. Carter, Palo Alto, Calif., assignor to Metcal, Inc., Menlo Park, Calif.**

**Continuation-in-part of Ser. No. 586,715, Mar. 6, 1985. This application Oct. 30, 1984, Ser. No. 666,346**

**Int. Cl.[4] H05B** *3/10*

**U.S. Cl. 219—553** **39 Claims**



1. A temperature autoregulation heater comprising

a layer of magnetic material,

an electrical conductor means for inducing in said magnetic material layer an induced current constrained to follow a circuitous path through said magnetic layer to increase the resistive component of the input impedance of said electrical conductor below Curie temperature of said layer of magnetic material,

said electrical conductor means including means for connecting said electrical conductor means to a source of high frequency, substantially constant conductor current,

said induced current being substantially confined to said layer,

said electrical conductor means and said layer of magnetic material being configured to produce a coupling approaching unity to cause said magnetic material when said conductor is connected to a high frequency, substantially, constant current source to be heated to a temperature at least approaching the Curie temperature thereby to reduce substantially its permeability and cause said resistive component of the input impedance to reduce substantially.

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**4,745,265**

**AUTOMATIC CHECK CARD ISSUING APPARATUS**

**Shugo Douno; Fumio Miyanaga; Hiroshi Tomiyama, and Haruo Odagiri, all of Himeji, Japan, assignors to Glory Kogyo Kabushiki Kaisha, Hyogo, Japan**

**Filed Jul. 26, 1985, Ser. No. 759,607**

**Claims priority, application Japan, Feb. 6, 1984, 59-19803**

**Int. Cl.[4] G06F** *15/30*

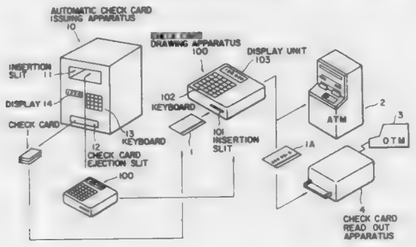
**U.S. Cl. 235—379** **14 Claims**

1. An automatic check card issuing apparatus which comprises a check card storage member for storing unissued check cards, a card extracting mechanism for taking out and transferring said unissued check cards one by one from the check card storage member, a check card conveying means for conveying and ejecting said unissued check cards transferred from said

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card extracting mechanism to an ejection slit, a means for recording the date on a prescribed position of said unissued check card which has been conveyed, an interface means for transmitting the data to and receiving the data from a check card drawing apparatus of a customer, and a control means for controlling said card extracting mechanism, said check card




conveying means, said data recording means and interface means so as to read out the customer's data from said check card drawing apparatus via said interface means, to record the data on a prescribed position of said unissued check card via the data recording means and to issue the check cards from said ejection slit.

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**4,745,266**

**BILL BUNDLE DRAWING OUT APPARATUS**

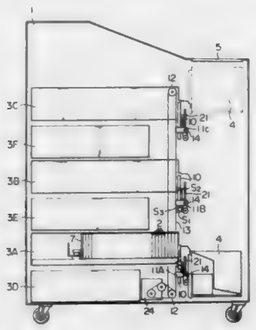
**Yoshifumi Miura, Urawa, Japan, assignor to Laurel Bank Machines Co., Ltd., Tokyo, Japan**

**Filed Sep. 15, 1986, Ser. No. 906,910**

**Claims priority, application Japan, Sep. 25, 1985, 60-146500[U]; Jul. 8, 1986, 61-104519[U]**

**Int. Cl.⁴ G06F *15/30*; B65G *59/00***

**U.S. Cl. 235—379** **2 Claims**




1. A bill bundle drawing out apparatus comprising: a plurality of storage boxes provided to a machine body of a bundle-and-bar money paying machine, the storage boxes being arranged above and below one another and adapted for storing bill bundles stacked in a horizontal direction; an elevator vertically movably provided in front of the storage boxes; slide guide shafts vertically provided between the elevator and the storage boxes; pivot shafts horizontally provided to slide blocks which are supported by the slide guide shafts and movable along the slide guide shafts; discharge blocks pivotally provided around the pivot shafts, the discharge blocks being adapted for pushing out upward the bill bundle from the storage boxes while moving upward together with the slide blocks, each of the discharge blocks being formed with a bill pushing surface adapted for being brought into contact with a bottom surface of the bill bundle and an inclined surface adapted for sliding on a block return roller when the discharge block is lowered together with the slide blocks so as to allow the bill pushing surface to be directed upward, each of the discharge blocks being biased in a direction allowing the inclined surface to be pressed against the block return roller; and discharge block rollers provided to confining arms rotatable integrally with the pivot shafts, each of the discharge block roller being adapted for being brought into contact with a part of the elevator when the elevator is in a certain position so as to confine a pivotal movement of the discharge block.

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**4,745,267**

**FRAUDULENT CARD INTERCEPT SYSTEM**

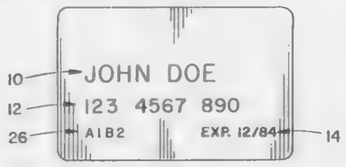
**William H. Davis, Fairview Park, Ohio; John J. Goba, Elizabeth, N.J.; Dean D. Riggs, Avon Lake, Ohio; Abraham Zeewy, Cleveland, and Howard M. Flint, Chagrin Falls, both of Ohio, assignors to Fairview Partners, Westlake, Ohio**

**PCT No. PCT/US84/02129, § 371 Date Aug. 23, 1986, § 102(e) Date Aug. 23, 1985, PCT Pub. No. WO85/02927, PCT Pub. Date Jul. 4, 1985**

**Continuation-in-part of Ser. No. 566,180, Dec. 28, 1983, Pat. No. 4,626,669. This PCT application Dec. 26, 1984, Ser. No. 772,335**

**Int. Cl.⁴ G06F *15/30***

**U.S. Cl. 235—379** **12 Claims**




1. A method of securing credit card transactions against tampering and counterfeiting, the method comprising:

encoding card blanks with at least account information and a verification code generated with an encoding algorithm to produce credit cards;

verifying authenticity of one of the credit cards by electronically operating on at least a portion of one of the verification code and the account information with a verification algorithm to generate an answer for comparison with at least a portion of the account information and the verification code, the verification algorithm being different from the encoding algorithm such that the authenticity verification is less than completely accurate to protect the encoding algorithm from being reverse engineered from the verification algorithm.

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**4,745,268**

**PERSONAL INFORMATION CARD SYSTEM**

**Jerome Drexler, Los Altos Hills, Calif., assignor to Drexler Technology Corporation, Mountain View, Calif.**

**Continuation-in-part of Ser. No. 693,856, Jan. 22, 1985, Pat. No. 4,692,394, which is a continuation-in-part of Ser. No. 443,596, Nov. 22, 1982, Pat. No. 4,503,135, which is a continuation-in-part of Ser. No. 238,832, Feb. 27, 1981, Pat. No. 4,360,728, and a continuation-in-part of Ser. No. 238,833, Feb. 27, 1981, and a continuation-in-part of Ser. No. 721,384, Apr. 9, 1985. This application Jan. 24, 1986, Ser. No. 822,067**

**Int. Cl.⁴ G06K *19/00***

**U.S. Cl. 235—487** **15 Claims**

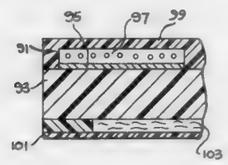
1. A data card transaction system comprising,

a wallet-size card having opposed, planar, major surfaces,

an in situ, laser recordable strip disposed on one of said



surfaces and a visually readable image disposed on an image medium on the opposite surface, and




optical means for reading both sides of said card while said card remains operatively associated with said optical means.

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**4,745,269**

**METHOD OF IDENTIFYING OBJECTS PROVIDED WITH A CODE FIELD CONTAINING A DOT CODE, A DEVICE FOR IDENTIFYING SUCH A DOT CODE, AND A PRODUCT PROVIDED WITH SUCH A DOT CODE**

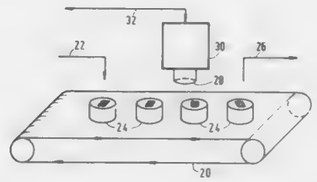
**Willibrordus J. Van Gils, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed May 12, 1986, Ser. No. 862,068**

**Claims priority, application Netherlands, May 22, 1985, 8501460**

**Int. Cl.⁴ G06K *19/00***

**U.S. Cl. 235—487** **7 Claims**




1. A method for identifying an object provided with an identifying code comprising an array of dots shaped as a code field having a predetermined multiplicity of rotational symmetry, which multiplicity lies between two and six, said method comprising the steps of:

providing an identifying information having n bits together with m additional bits for indicating an actual orientation among said multiplicity;

encoding said identifying information and additional bits (n+m bits) into a code word that comprises of a plurality of code dot groups arranged within said array, the dot positions in a dot group having the same multiplicity of rotational symmetry as said array, such that mapping of said code word by rotating among said multiplicity will always produce an acceptable code word, said code furthermore possessing error correction capability for at least two bits;

applying the dots of said code word to an object according to said array;

picking up said dots from said object and reconstructing said code word without taking into account an actual mapping while invoking said error correction capability; and

by means of said additional m bits correcting for said mapping if present and delivering said identifying code to a user.

**4,745,270**

**PHOTOELECTRIC MICROSCOPE USING POSITION SENSITIVE DEVICE**

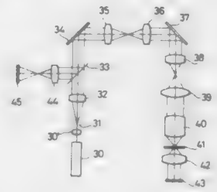
**Yoshiaki Horikawa, and Masao Kuga, both of Hachiouji, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed Apr. 25, 1986, Ser. No. 856,155**

**Claims priority, application Japan, Apr. 26, 1985, SHO 60-88972**

**Int. Cl.⁴ H01J *3/14***

**U.S. Cl. 250—216** **9 Claims**




1. A photoelectric microscope using a position sensitive device, comprising:

a light source;

an objective lens for collecting a light emitted from said light source onto an object to be observed; and

a position sensitive device having a single surface receiving said light and at least a pair of output electrodes, in which there is a difference between an output signal derived from one of said pair of output electrodes which is taken as a first electrode and an output signal derived from the other of said pair of output electrodes which is taken as a second electrode in accordance with a position of incidence of the light impinging onto said single surface receiving the light, wherein a light which is collected by said objective lens and has passed through or has reflected on the object is received by said position sensitive device, a signal being so formed by the difference in the output signals derived from said first and second electrodes that a differential image of the object may be obtained, and a signal being so formed by the sum of the output signals derived from said first and second electrodes that an ordinary image of the object also may be obtained.

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**4,745,271**

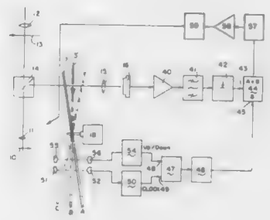
**APPARATUSES FOR AUTOMATIC FOCUSING OF LENS SYSTEMS, IN PARTICULAR MICROSCOPES AND INSTRUMENTS FOR THE ELECTRONIC ACQUISITION OF MICROSCOPE IMAGES**

**Pier A. Benedetti, Livorno, and Valtere Evangelista, Cascina, both of Italy, assignors to Consiglio Nazionale Delle Ricerche, Rome, Italy**

**Filed Apr. 8, 1986, Ser. No. 850,320**

**Int. Cl.⁴ G01T *1/20***

**U.S. Cl. 250—201** **12 Claims**



1. An apparatus for automatic focusing of lens systems, in particular microscopes and instruments for the electronic acquisition of microscope images, comprising:

means for analyzing space frequency components along any direction in an image of said lens system close to an ideal focus plane thereof, comprising a rotating disc with radial slits evenly distributed therein for passing respective parts of each said image;

means for detecting a plane comprising the image having the maximum of said space frequencies close to said ideal focus plane;

means for detecting the position of said image plane having said maximum of high space frequency components and providing a corresponding adjustment signal applied to a servocontrol capable of adjusting the focus of said lens system, in such a way that said image plane having said maximum of high frequency components is brought into coincidence with said ideal focus plane.

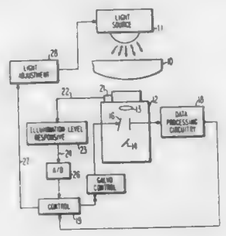
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**4,745,272**

## APPARATUS FOR IDENTIFYING ARTICLES FROM RECEIVED ILLUMINATION WITH LIGHT ADJUSTMENT MEANS

**Evo Andreatti, Jr., Rheems, Pa., assignor to RCA Licensing Corporation, Princeton, N.J.**

**Filed Sep. 15, 1986, Ser. No. 907,219**
**Int. Cl.[4] G01J** *1/32;* **G01N** *9/04;* **G06M** *7/00*
**U.S. Cl. 250—205** **4 Claims**




1. In a system for identifying an article by the intensity of illumination received from said article, said system including an illumination source for illuminating said article, a camera for receiving illumination from said article and for providing illumination data representative of said illumination, and control means for controlling said system in response to said illumination, an improvement comprising:

light detector means, arranged in the proximity of said camera to receive substantially the same illumination as said camera, said light detector means providing an illumination level signal in response to said illumination;

circuit means responsive to said illumination level signal, said circuit means providing an output signal having a level indicative of the intensity of the illumination from said article;

means for providing the output of said circuit means to said control means whereby said control means provides an identification signal for identifying said article; and

light adjustment means responsive to said control means for adjusting said illumination source in accordance with said identification signal.

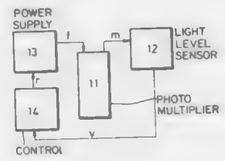
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**4,745,273**

## METHOD AND APPARATUS FOR MEASURING LUMINOSITY WITH CONTROLLED SENSITIVITY

**Bela Szabo; Jeno Vágvölgyi, and István Fehér, all of Budapest, Hungary, assignors to MTA Kozponti Fizikai Kutato Intezete, Budapest, Hungary**

**PCT No. PCT/HU84/00047, § 371 Date May 22, 1985, § 102(e) Date May 22, 1985, PCT Pub. No. WO85/01801, PCT Pub. Date Apr. 25, 1985**
**Continuation of Ser. No. 760,749, May 22, 1985, abandoned.**
**This PCT application Oct. 5, 1984, Ser. No. 86,229**
**Claims priority, application Hungary, Oct. 7, 1983, 3470/83**
**Int. Cl.[4] G01T** *1/11*
**U.S. Cl. 250—207** **2 Claims**




1. In a method of thermoluminescent dosimetry comprising the steps of:

heating a thermoluminescent material to generate a luminous flux;

using a photomultiplier supplied with an input voltage to detect luminosity corresponding to said generated luminous flux and to generate a current proportional to said detected luminosity; and

measuring said generated current over a time interval corresponding to said generated luminous flux;

wherein said photomultiplier has a saturation threshold above which said luminosity corresponding to said generated luminous flux is not detected; the improvement comprising:

decreasing the sensitivity of said photomultiplier by decreasing its said input voltage each time said generated current attains a predetermined value corresponding to a said luminosity at or below said saturation threshold, each said decrease in input voltage being irreversible during said time interval.

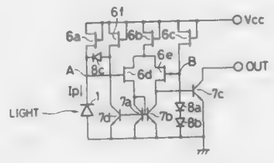
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**4,745,274**

## SEMICONDUCTOR LIGHT DETECTING INTEGRATED CIRCUIT

**Hideo Muro, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Kanagawa, Japan**

**Filed Oct. 14, 1986, Ser. No. 918,124**
**Claims priority, application Japan, Oct. 17, 1985, 60-229933**
**Int. Cl.[4] H01J** *39/12*
**U.S. Cl. 250—214 R** **3 Claims**




1. A semiconductor light detecting integrated circuit comprising:

a. a light detecting element;

b. a first constant current source including a first FET connected in series to a power source and to the light detecting element at a connecting point;

c. a second constant current source including a second FET connected in parallel to said first FET, the second constant current source being connected to the power source and to the connecting point;

d. circuit means, including a third FET the gate of which is connected to the connecting point, for providing a two-valued output signal based on the gate voltage at the connecting point, wherein the gate voltage varies in accordance with changes in the output current of the light detecting element and the two-valued output signal is indicative of whether the output current of the light detecting element reaches a predetermined level.



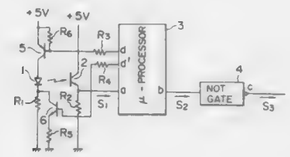
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**4,745,275**

## SENSOR CIRCUIT

**Koji Osafune, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Apr. 26, 1985, Ser. No. 727,435**
**Claims priority, application Japan, Apr. 29, 1984, 59-87593**
**Int. Cl.[4] G01V** *9/04*
**U.S. Cl. 250—221** **4 Claims**




1. An apparatus for sensing conditions associated with the operation of a system comprising:

a power supply;

sensor means, comprising:

a light emission diode having an anode and a cathode;

a photoelectric element; and

a transistor for receiving a receive power signal, operatively connected to the power supply for supplying a power supply current to the light emission diode in response to receipt of the receive power signal, the transistor being interposed between the anode of the light emission diode and the power supply, the photoelectric element generating a sensor means output based on at least a condition of the system when the light emission diode is supplied with the power supply current; and

control means, comprising a microprocessor, for supplying the receive power signal to the transistor of the sensor means, at times selected by the control means, the control means being operative to receive the sensor means output at the selected times.

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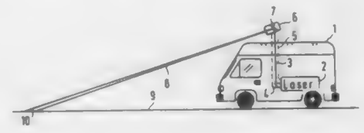
**4,745,276**

## DEVICE FOR THE DETECTION OF FLUORESCENT SUBSTANCES ON THE SURFACE OF THE EARTH

**Heribert Broicher; Erich Kirsch; Friedhart Knolle, all of Goslar; Helmut Winnacker, Ehlershausen, and Arthur Zydek, Wolfenbüttel, all of Fed. Rep. of Germany, assignors to Preussag Aktiengesellschaft Metall, Fed. Rep. of Germany**

**Filed Feb. 25, 1986, Ser. No. 833,099**
**Int. Cl.[4] G01N** *21/64*
**U.S. Cl. 250—253** **7 Claims**

1. A device for detecting fluorescent substances on a surface area of the earth, comprising a vehicle, a pulsating laser for illuminating the surface area by generating a beam, the laser being installed in the vehicle, means for irradiating an essentially linear surface on a strip in front of and transverse to the vehicle, the means for irradiating having a cylindrical lens for diffusing the beam of the laser into a fan-shaped beam in a plane at a shallow angle to the horizontal to illuminate a linear strip transverse to the direction of movement of the vehicle and a directing device for directing the fan-shaped beam of the laser in front of the vehicle at the surface area of the earth, and




means for detecting fluorescence emitted by the entire linear surface area strip illuminated by the beam, said means for detecting being positioned in the vicinity of the directing device so as to be sensitive to fluorescence emitted at said shallow angle to the horizontal.

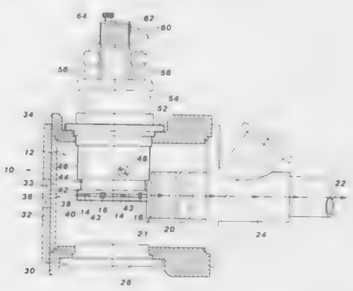
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**4,745,277**

## ROTARY TURRET AND REUSABLE SPECIMEN HOLDER FOR MASS SPECTROMETER

**Joseph C. Banar, Los Alamos; Richard E. Perrin, Jemez Springs, and Raymond A. Ostrenga, Los Alamos, all of N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Oct. 6, 1986, Ser. No. 915,840**
**Int. Cl.[4] H01J** *49/04*
**U.S. Cl. 250—288** **14 Claims**



1. A turret assembly for rotatably supplying a plurality of material samples for mass spectrographic analysis comprising:

holder means for mounting said plurality of material samples with each of said material samples exposable for said spectrographic analysis;

rotatable electrical radial contact means for heating a first of said samples for analysis and heating a second of said samples for pretreatment where said second sample is angularly separated from said first sample for effective contamination control;

substantially solid body means for supporting and relatively rotating said electrical radial contact means and said holder means while aligning said holder means for said spectrographic analysis; and

housing means about said holder means and said rotatable electrical contact means for establishing and maintaining a vacuum.

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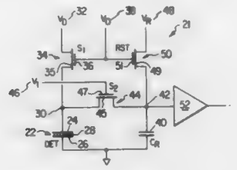


**4,745,278**

## CAPACITIVE BOLOMETER WITH IMPROVED RESPONSIVITY

**Charles M. Hanson, Richardson, Tex., assignor to Varo, Inc., Garland, Tex.**

**Filed Oct. 23, 1986, Ser. No. 922,311**
**Int. Cl.[4] H01L** *37/02*
**U.S. Cl. 250—338.2** **29 Claims**



1. A capacitive bolometer comprising:

a detection capacitor having two electrodes, a ferroelectric material between said electrodes exhibiting a first order phase transition between ferroelectric and paraelectric phases when the electric displacement between said electrodes is substantially zero, said capacitor responding during a detection step to a change in temperature; and,

means for applying a preselected electric field between said electrodes during said detection step to maximize the sensitivity of said ferroelectric material to a change in temperature during said detection step, said preselected electric field being selected to cause said ferroelectric material to simulate a second order transition between ferroelectric and paraelectric phases.

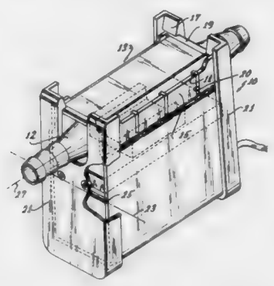
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**4,745,279**

## HEMATOCRIT MEASURING APPARATUS

**Maurice N. Karkar; Warren M. Long, both of Costa Mesa, and Stan O. Heinemann, Irvine, all of Calif., assignors to American Hospital Supply Corporation, Deerfield, Ill.**

**Filed Jan. 2, 1986, Ser. No. 815,576**
**Int. Cl.[4] G01J** *1/00;* **G01N** *33/48*
**U.S. Cl. 250—343** **19 Claims**



1. Apparatus for measuring the hematocrit of a flowing bloodstream in real time, comprising:

(a) transparent cuvette means for containing said flowing bloodstream;

(b) infrared light source means adjacent said cuvette means for illuminating said bloodstream;

(c) detector means adjacent said cuvette means for detecting said infrared light after diffusion thereof by said bloodstream; and

(d) signal-producing means for producing a hematocrit signal which is a predetermined function of said detected diffused light;

(e) second detector means for compensating said first-named detector means; and

(f) second light source means for directly illuminating the said second detector means, said second light source and said first-named light source being connected in series;

(g) said signal-producing means being arranged to produce a hematocrit signal which is a function of the ratio of the light values senses by said first-named and second detector means, respectively.

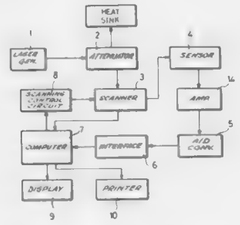
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**4,745,280**

## APPARATUS FOR MEASURING THE PROFILE OF A LASER BEAM

**Kwon Y. Gi; Lee Y. In, and Lee Y. Gi, all of Seoul, Rep. of Korea, assignors to Daewoo Heavy Industries, Ltd., Incheon, Rep. of Korea**

**Filed Sep. 13, 1985, Ser. No. 775,746**
**Claims priority, application Rep. of Korea, Nov. 20, 1984, 84-7248**
**Int. Cl.[4] G01J** *5/08*
**U.S. Cl. 250—347** **4 Claims**




1. Apparatus for measuring the intensity profile of a laser beam produced by a laser generator, comprising:

means for attenuating the laser beam;

scanning means which receives the attenuated laser beam and comprises optical reflecting means positioned by horizontal and vertical stepping motors which cause such optical reflecting means to successively scan across each of successive parallel scanning lines of a profile of said beam;

a sensor which receives from said scanning means the successive scanning lines of the profile of said beam and produces an electrical signal which is an analog of the intensity of said beam along each of said successive scanning lines;

analog-to-digital converting means for converting said analog electrical signal to a digital signal corresponding thereto;

and computing means for receiving said digital signal and producing therefrom signals representing a visual image of the intensity profile of said beam.

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**4,745,281**

## ION BEAM FAST PARALLEL SCANNING HAVING DIPOLE MAGNETIC LENS WITH NONUNIFORM FIELD

**Harald A. Enge, Winchester, Mass., assignor to Eclipse Ion Technology, Inc., Gloucester, Mass.**

**Filed Aug. 25, 1986, Ser. No. 899,966**
**Int. Cl.[4] H01J** *3/14, 3/20*
**U.S. Cl. 250—356 R** **11 Claims**

1. Apparatus for providing a parallel scanned ion beam, said apparatus comprising

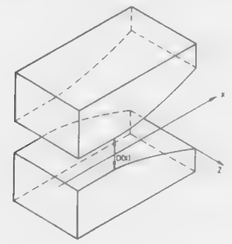
A. a source of an ion beam,

B. deflecting means for deflecting said ion beam to provide a deflected ion beam, and

C. dipole magnetic lens means for establishing a nonuniform magnetic field for deflecting said deflected ion beam to provide a scanned ion beam characterized by a contiguous



array of parallel trajectories after emerging from said dipole magnetic lens means, said dipole magnetic lens means comprising a pair of magnetic poles, each of rectan-



gular cross section in planes parallel to a beam plane including the scanned ion beam, and defining between said poles a gap of variable width in a plane perpendicular to the beam plane.

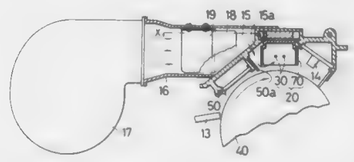
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**4,745,282**

## VENTILATED CORONA CHARGING

**Kazuaki Tagawa; Izumi Tagoku, both of Tokyo, and Itaru Matsuda, Yokohama, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan**

**Continuation of Ser. No. 486,379, Apr. 19, 1983, abandoned. This application Apr. 30, 1986, Ser. No. 858,547**
**Claims priority, application Japan, Apr. 20, 1982, 57-65761**
**Int. Cl.[4] G03G** *15/02;* **H01T** *19/00*
**U.S. Cl. 250—326** **18 Claims**




1. A ventilated corona charging device for charging a receptor positioned opposite to said device, comprising:

a first electrode of a small cross-sectional size extending in parallel above a surface portion of the charge receptor for forming a concentration of electric field therethrough enough to cause corona discharge when a high voltage above the corona onset level is applied thereto;

a second electrode partly enclosing said first electrode and including at least one ventilation opening, said second electrode being comprised of an electrically conductive material and connected to a predetermined potential; and

means for supplying a flow of gas directed in a direction generally normal to a set of hypothetical straight lines extending between points on said first electrode and said charge receptor which are closest to one another thereby maintaining the corona discharge characteristically uniform substantially along the entire length of said first electrode and causing part of said flow of gas to pass through said ventilation opening to ventilate a region between said first and second electrodes, said means for supplying including a source for supplying said gas and an air chamber juxtaposed to said first electrode and extending generally in parallel with and over approximately the same length as said first electrode, said air chamber being provided with an inlet port at its center to receive said gas supplied from said source and also with a plurality of outlet ports arranged in a line in parallel with said first electrode thereby spreading the flow of gas the entire length of said first electrode, and said means for supplying further including deflecting means disposed at said inlet port of said air chamber for deflecting a part of said gas supplied from said source toward the opposite ends of said air chamber, thereby obtaining a substantially uniform charging characteristic against said receptor along the entire length of said first electrode.

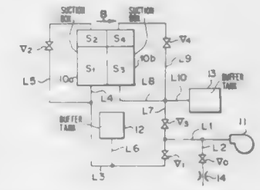
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**4,745,283**

## STIMULABLE PHOSPHOR SHEET TRANSFER APPARATUS WHICH INCLUDES FIRST AND SECOND SUCTION BOXES SEPARATELY CONNECTED TO A SECTION BLOWER AND A PAIR OF BUFFER TANKS

**Satoshi Katsuda, and Yasuhiro Kawai, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Japan**

**Filed Oct. 8, 1985, Ser. No. 785,506**
**Claims priority, application Japan, Oct. 16, 1984, 59-216906; Oct. 16, 1984, 59-216907**
**Int. Cl.[4] G01T** *1/105*
**U.S. Cl. 250—327.2** **6 Claims**




1. A stimulable phosphor sheet transfer apparatus for transferring a stimulable phosphor sheet storing therein a radiation image information in a sub-scanning direction when the stimulable phosphor sheet is scanned with a stimulating ray along a main scanning line substantially perpendicular to the sub-scanning direction to emit light in the pattern of the stored radiation energy, the light emitted from the stimulable phosphor sheet being detected to obtain an image information signal, comprising a transfer belt for transferring the stimulable phosphor sheet in a sub-scanning direction, and first and second suction boxes disposed below the transfer belt and adapted to provide a suction force for attracting the stimulable phosphor sheet against the transfer belt, the first and second suction boxes being respectively upstream and downstream of the main scanning line with respect to the sub-scanning direction,

characterized in that said first and second suction boxes are separately connected to a section blower respectively by way of switching valves, and a pair of buffer tanks are provided respectively between the first suction box and the switching valve corresponding thereto and between the second suction box and the switching valve corresponding thereto, so that the suction applied to the first suction box gradually decreases and the suction applied to the second box gradually increases as the stimulable phosphor sheet is transferred across said main scanning line due to said first and second buffer tanks.

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**4,745,284**

## INFRARED RAY DETECTOR

**Noboru Masuda, Kawaguchi; Kenji Tomaki, Kawasaki; Tetsuo Oosawa, Tokyo, and Michihiro Murata, Kyoto, all of Japan, assignors to Murata Manufacturing Co., Ltd., Kyoto, Japan**

**Filed May 27, 1986, Ser. No. 866,641**
**Claims priority, application Japan, May 27, 1985, 60-115116; Feb. 12, 1986, 61-29827; Mar. 11, 1986, 61-54398**
**Int. Cl.[4] G01J** *5/08*
**U.S. Cl. 250—338.3** **19 Claims**

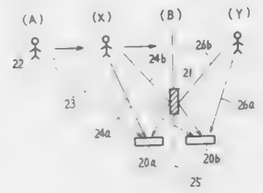
1. An infrared ray detector of dual structure having two electrically connected pyroelectric infrared ray detecting elements, said infrared ray detector comprising:

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a pair of pyroelectric infrared ray detecting elements having substantially identically directed light receiving surfaces, said pair of detecting elements having opposite polarities and being electrically connected with each other to generate an output signal representing the difference therebetween; and

a mirror means being spaced a predetermined distance in




front of said light receiving surfaces, said mirror means having a predetermined width, said predetermined distance and predetermined width restricting an incident infrared light ray on one of said pair of detecting elements while another of said pair of detecting elements receives said incident infrared light ray directly on the light receiving surface and also receives a reflected infrared light ray from said mirror means.

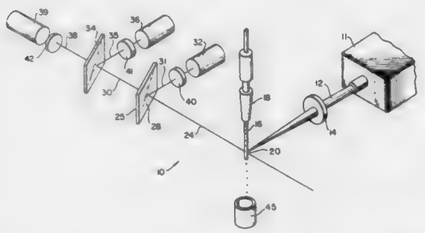
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**4,745,285**

## MULTI-COLOR FLUORESCENCE ANALYSIS WITH SINGLE WAVELENGTH EXCITATION

**Diether J. Recktenwald, Cupertino, and Chia H. Chen, San Jose, both of Calif., assignors to Becton Dickinson and Company, Franklin Lakes, N.J.**

**Filed Aug. 21, 1986, Ser. No. 898,685**
**Int. Cl.[4] G01N *21/64***
**U.S. Cl. 250—458.1** **19 Claims**




1. A method for determining one or more characteristics of cells or the like using multiple fluorescence analysis comprising:

moving cells, substantially one at a time, in a liquid flow stream, said cells including at least three fluorescent markers each having different emission spectra wherein the markers, when excited, produce emission maxima sufficiently spectrally separated to permit detection thereof without substantial spectral overlap;

directing an incident light beam of a single wavelength at the cells in said flow stream to excite all of the fluorescent markers with the single wavelength of light such that different wavelengths of fluorescence are emitted from said cells;

spectrally separating with optical elements the different wavelengths of emitted fluorescence to simultaneously refine the emitted fluorescence to enable the separate detection of the different wavelengths;

simultaneously detecting the three or more different fluorescence emissions associated with the cells moving in the flow stream; and

using said detected fluorescence to determine one or more characteristics of said cells.

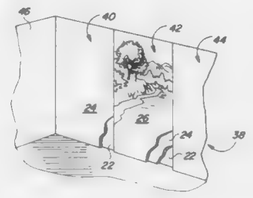
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**4,745,286**

## LUMINOUS SHEET AND INDICIA

**Billy R. Jones, 731 W. Wadley, Bldg. O, Suite 100, Midland, Tex. 79705**

**Filed Jun. 9, 1986, Ser. No. 871,689**
**Int. Cl.[4] F21K *2/00***
**U.S. Cl. 250—459.1** **6 Claims**




1. A method of providing a glow-in-the-dark image on wallpaper comprising the steps of:

providing a sheet of phosphorescent material suitable for subsequent use as wallpaper that glows in the dark when illuminated and thereafter viewed in the dark;

applying a coating of photosensitive emulsion over one surface of said sheet of phosphorescent material;

providing a glow-in-the-dark image on said one surface of said sheet of phosphorescent material by selecting said image and thereafter imagewise exposing and processing said photosensitive emulsion to produce said image;

wherein said sheet of material can be exposed to light and thereafter said image can be viewed in the dark.

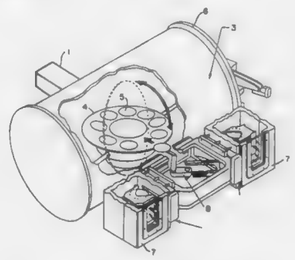
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**4,745,287**

## ION IMPLANTATION WITH VARIABLE IMPLANT ANGLE

**Norman L. Turner, Gloucester, Mass., assignor to Ionex/HEI, Newburyport, Mass.**

**Filed Oct. 23, 1986, Ser. No. 922,319**
**Int. Cl.[4] H01V *37/20***
**U.S. Cl. 250—492.2** **2 Claims**




1. Ion implantation apparatus in which the implant angle may be varied during implantation comprising, in combination,

means for producing an ion beam, a wafer support comprising a spinning disk and adapted to support one or more wafers in the path of said ion beam in such a manner that the implant angle in one dimension is fixed during the implantation process, and

means for imparting a scanning movement to said spinning disk along a scan axis transverse to the axis of spin of said spinning disk, and



means for rotating said spinning disk about said scan axis so as to control and vary said implant angle in a dimension transverse to said one dimension.

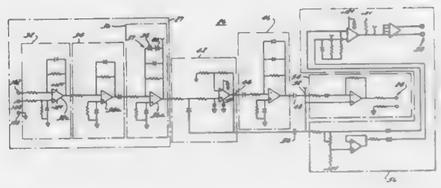
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**4,745,288**

## PHOTO RESPONSIVE SELF ADJUSTING REGISTRATION CONTROLLER ACCOUNTING FOR CHANGES IN THE REFLECTIVENESS OF A WEB

**John Hurley, River Hills; Paul W. Bergland, Brookfield; James D. Parker, New Berlin, and Mark G. Blonigen, Mukwonago, all of Wis., assignors to Zerand Corporation, New Berlin, Wis.**

**Filed Aug. 18, 1986, Ser. No. 897,257**
**Int. Cl.[4] G01N *21/86;* G01V *9/04***
**U.S. Cl. 250—548** **7 Claims**



1. In a registration controller for web processing apparatus wherein a moving reflective web has registration marks thereon:

means for scanning said registration marks comprising means for transmitting a first beam of light onto said web and onto said registration marks and for transmitting in return a reflected beam of light, the intensity of said reflected beam being determined by the reflectiveness of said web;

photo responsive means for responding to said reflected beam of light and for providing a web analog electric signal representative of the intensity of said reflected beam when said transmitted beam is directed at a non-mark portion of the web and a mark analog electric signal representative of the intensity of said reflected beam when said transmitted beam is directed at a mark;

electronic means for amplifying said analog electric signals into a high gain analog signals,

means for limiting said high gain signals so that the difference between them does not exceed a predetermined maximum,

means for filtering said limited signals to remove background noise therefrom,

and means for converting said filtered signals into digital output signals

such that said digital output signals are usable to control operation of said web processing apparatus regardless of any change in the reflectiveness of said web.

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**4,745,289**

## MULTIWAVELENGTH OPTICAL APPARATUS FOR LASER PROCESSING ALIGNMENT AND OBSERVATION

**Kiyoto Mashima, Kawasaki, Japan, assignor to Nippon Kogaku K. K., Tokyo, Japan**

**Filed Apr. 8, 1986, Ser. No. 849,294**
**Claims priority, application Japan, Apr. 17, 1985, 60-81954**
**Int. Cl.[4] G01N *21/86;* G01V *9/04***
**U.S. Cl. 250—548** **14 Claims**

1. An apparatus for processing an object including:

(a) first generating means for generating a first light beam to process the object;

(b) second generating means for generating a second light beam of a wavelength different from that of said first light beam;

(c) aperture means having an aperture irradiated with the first and second light beams;

(d) stage means for disposing said object thereon;

(e) dichroic mirror means for substantially entirely reflecting or transmitting said first light beam and for partially reflecting and partially transmitting said second light beam;

(f) a projection optical system having an objective lens, said dichroic mirror means being disposed between said aperture means and said objective lens, said dichroic mirror means and said projection optical system causing an object disposed on said stage means and said aperture means to be conjugate with each other and forming a first image



of said aperture conforming to said first light beam and a second image of said aperture conforming to said second light beam on the object disposed on said stage means;

(g) means for providing relative displacement between said projection optical system and said stage means along two dimensional coordinates substantially perpendicular to an optical axis of said objective lens; and

(h) determining means for detecting a position of said second image with respect to said two dimensional coordinates, whereby a position of said first image with respect to said two dimensional coordinates may be determined from said detected position of said second image.

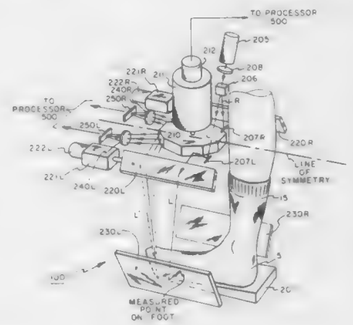
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**4,745,290**

## METHOD AND APPARATUS FOR USE IN MAKING CUSTOM SHOES

**David Frankel, 1942 S. Pelham, No. 9, Los Angeles, Calif. 90025, and Leo Beiser, 151-77 28th Ave., Flushing, N.Y. 11354**

**Filed Mar. 19, 1987, Ser. No. 27,798**
**Int. Cl.[4] G01B *11/24;* A43D *00/00***
**U.S. Cl. 250—560** **22 Claims**




1. A method for making a custom shoe last, based on a particular subject's foot, comprising the steps of:

placing a foot at an inspection position;

directing a light beam at the foot;

scanning the light beam in a predetermined pattern over the surface of the foot;
detecting, at a position detector, the light beam reflected from the foot;
determining surface coordinates of the foot as a function of the detector output;
storing the determined surface coordinates; and
forming a shoe last having a shape which depends on the stored coordinates.

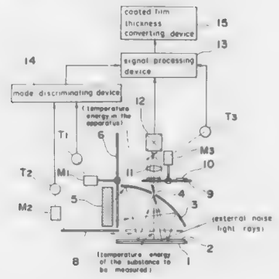
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**4,745,291**

## APPARATUS FOR MEASURING THICKNESS OF LAYER ON SUBSTANCE

**Masanori Niiya, Osaka, Japan, assignor to Chugai Ro Co., Ltd., Osaka, Japan**

**Filed Mar. 31, 1987, Ser. No. 33,109**
**Claims priority, application Japan, Apr. 1, 1986, 61-76022**
**Int. Cl.[4] G01N** *21/86*
**U.S. Cl. 250—560** **3 Claims**




1. A surface layer thickness measuring apparatus comprising a reference light ray source for radiating light rays, a mirror for reflecting the light rays coming from the reference light ray source against the surface of a layer applied to the surface of a substance, an opening or closing means located between said mirror and said reference light ray source to perform the screening operation and the opening operation between them, a plane total reflection mirror located between said mirror and the measured surface layer to be measured to perform the screening operation and the opening operation between them, a light ray sensor for detecting the light ray amount from said total reflection mirror or the light ray amount reflected on said substance without being totally absorbed by said surface layer to be measured, a mode discriminating device for discriminating the combination of said opening or closing means and said plane total reflection mirror, a signal processing device for calculating the signals so that the signals showing only the light ray amount either absorbed by said surface layer to be measured or reflected by a substance without being absorbed by said surface layer may be drawn out from the light ray sensor output, and a surface layer thickness converting device for converting the signals from said signal processing device into the surface layer thickness.

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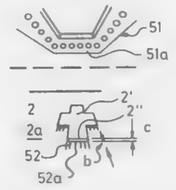
**4,745,292**

## ARRANGEMENT FOR ESTABLISHING THE THICKNESS OF PRINT APPLIED TO A PRINT CARRIER

**Sylve J. D. Ericsson, Tumba, Sweden, assignor to Svecia Silkscreen Maskiner AB, Norsborg, Sweden**

**Filed Mar. 19, 1987, Ser. No. 27,658**
**Claims priority, application Sweden, Mar. 19, 1986, 8601288**
**Int. Cl.[4] G01N** *21/86*
**U.S. Cl. 250—560** **20 Claims**

1. An arrangement for determining the thickness of a print applied to a print carrier, characterized in that the applied print whose thickness is to be determined is orientated in a manner which enables the print to be irradiated with light, e.g. light beams, emitted from a light source; in that the light is projected onto the print at an angle not greater than 90° in relation to a line orientated at right angles to the horizontal plane of the print; in that the respective magnitudes of a shadow image of the print thickness, produced by said light beams, and the




extension of said shadow image along the carrier are evaluated together with information relating to the prevailing angle of the light beams; and in that the height or thickness of the print above the surface of the carrier is established on the basis of the thus evaluated magnitudes.

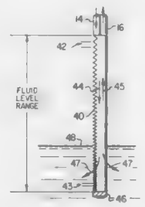
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**4,745,293**

## METHOD AND APPARATUS FOR OPTICALLY MEASURING FLUID LEVELS

**Douglas A. Christensen, Salt Lake City, Utah, assignor to CV Technology, Inc., Dallas, Tex.**

**Filed Mar. 23, 1987, Ser. No. 29,443**
**Int. Cl.[4] G01F** *23/00*
**U.S. Cl. 250—577** **26 Claims**




1. A fluid level measuring apparatus, comprising:
a broadband radiant energy source;
an elongate sensor having a length immersible in the fluid;
a means for transmitting radiant energy from said source to said sensor;
said sensor including means for converting said broadband radiant energy to a radiant energy wavelength spectrum functionally related to the length of said sensor immersed in the fluid;
means for receiving said radiant energy wavelength spectrum; and
means for converting said radiant energy wavelength spectrum into an indication of the fluid level.

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**4,745,294**

## PHOTOCOUPLER WITH LIGHT EMITTING AND RECEIVING ELEMENTS COUPLED THROUGH A SOFT RESIN

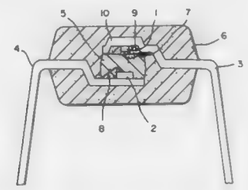
**Ikuo Kohashi, Tenri; Hajime Kashida, Nara, and Shin Satoh, Kashihara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Mar. 14, 1986, Ser. No. 839,875**
**Claims priority, application Japan, Apr. 1, 1985, 60-69371**
**Int. Cl.[4] H01L** *31/12*
**U.S. Cl. 250—551** **3 Claims**

1. A photocoupler comprising an assembly including a light-emitting element, a hard light-transmissive protective resin covering said light-emitting element, a light-receiving element



and a soft light-transmissive resin, said light-emitting element and said light-receiving element being optically coupled




through said soft light-transmissive resin, and a light-blocking resin which is formed by transfer molding and encapsulates said assembly therein.

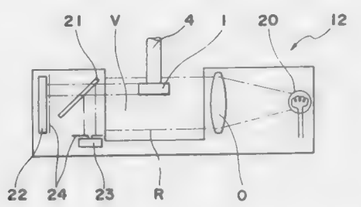
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**4,745,295**

## ATTITUDE DETECTING ARRANGEMENT FOR DETECTING THE LENGTH AND THICKNESS OF A PART USING HORIZONTALLY AND VERTICALLY DISPOSED LINE SENSORS

**Makito Seno, Hirakata; Yoshihiko Misawa, Katano; Makoto Kawai, Neyagawa, and Kenichi Sato, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Jun. 17, 1986, Ser. No. 875,210**
**Claims priority, application Japan, Jun. 18, 1985, 60-132207**
**Int. Cl.[4] G01B** *11/06*
**U.S. Cl. 250—560** **3 Claims**




1. An attitude detecting apparatus for detecting the attitude of objects, said apparatus comprising:
a light emitting portion for emitting light;
a lens means through which the light emitted by the light emitting portion passes, said lens means for focussing the light into parallel light rays;
holding means for holding an object in the path of the light so that the object intercepts at least a portion of the light;
a light receiving portion comprising a first and a second line sensor which extend in respective directions that are perpendicular to one another, and a half mirror facing said lens so as to receive a remaining portion of the light after the light has been focused by the lens means and intercepted by the object,
said half mirror located at a position with respect to said line sensors at which said remaining portion of the light passing therethrough is incident on said first line sensor and said remaining portion of the light reflected thereby is directed onto said second line sensor so that a shadow cast by the object corresponding to the length of the object is effected on one of said line sensors and a shadow corresponding to the thickness of the object is effected on the other of the line sensors; and
an operation processing means for receiving data corresponding to the length and the thickness of the object held by the holding means from said line sensors to determine the attitude of the object.

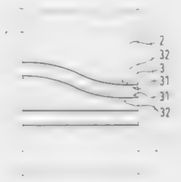
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**4,745,296**

## PROCESS FOR OPTICALLY TESTING CIRCUIT BOARDS TO DETECT INCORRECT CIRCUIT PATTERNS

**Hubert Driller, and Paul Mang, both of Schmitten, Fed. Rep. of Germany, assignors to Mania Elektronik Automatisation Entwicklung und Gerätebau GmbH, Schmitten, Fed. Rep. of Germany**

**Filed Nov. 12, 1986, Ser. No. 930,362**
**Claims priority, application Fed. Rep. of Germany, Nov. 12, 1985, 3540100**
**Int. Cl.[4] G01N** *21/88;* **G06K** *9/00*
**U.S. Cl. 250—563** **6 Claims**




1. In a process for optically testing a circuit board or the like having conductor tracks for functional faults, such as shorts, conductor track interruptions and conductor track misplacement, by means of a computer controlled testing apparatus including at least one camera, said process comprising scanning the surface of said circuit board in a point-by-point manner by means of said camera and thereby establishing for each point scanned an image representation indicative of a conductor track area or a non-conductor track area, and utilizing said representations to ascertain whether widths of said conductor tracks and spacings therebetween have required minimum values, the improvement comprising:
dividing said surface of said circuit board into a predetermined plurality of windows of predetermined size;
associating said image representations with respective said windows;
counting for each said window only said points of said window corresponding to a conductor track area or said points of said window corresponding to a non-conductor track area, whereby the sum of such counting establishes an identification value descriptive of said window; and
comparing said identification values of said windows with predetermined values of corresponding respective windows of a reference master.

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**4,745,297**

## SPECIMEN HOLDER FOR HOLDING SPECIMEN STUBS TO BE COATED IN AN ION-BEAM SPUTTER COATING UNIT

**William H. Sullivan, Gillette, and Marjorie Jamieson, Berkeley Heights, both of N.J., assignors to Hoechst Celanese Corporation, Somerville, N.J.**

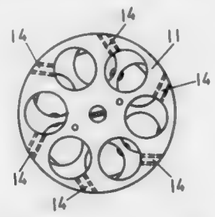
**Filed Feb. 17, 1987, Ser. No. 15,463**
**Int. Cl.[4] G01F** *21/00*
**U.S. Cl. 250—440.1** **14 Claims**

1. A specimen holder for holding specimen stubs for use in a scanning electron microscope comprising:
(a) an upper planar member containing a plurality of openings, each opening larger in diameter than the diameter of the specimen stub;
(b) a lower planar member axially connected to the upper planar member containing a plurality of openings of equal number to those in the upper planar member, each said opening larger in diameter than the diameter of the specimen stub;

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(c) a means to limit the axial rotation of the lower planar member in relation to the upper planar member; and




(d) a means to secure the specimen stubs within the openings of the upper planar member.

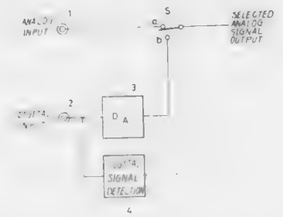
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**4,745,298**

## SIGNAL SELECTION CIRCUIT

**Masayuki Iwamatsu, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan**

**Filed Sep. 28, 1987, Ser. No. 101,571**
**Claims priority, application Japan, Sep. 30, 1986, 61-230139**
**Int. Cl.[4] H02J** *3/00;* **H01H** *67/00*
**U.S. Cl. 307—38** **5 Claims**




1. A signal selection circuit for selecting an input signal and supplying the selected signal to a post stage circuit comprising:
an analog input terminal for an input source;
a digital input terminal for the same input source;
switch means for connecting either said analog input terminal or said digital input terminal to said post stage circuit; and
preferential selection means for causing said switch means to connect said analog input terminal to said post stage circuit when an analog input signal only has been applied to said analog input terminal and causing said switch means to connect said digital input terminal to said post stage circuit when a digital input signal only has been applied to said digital input terminal or when an analog input signal and a digital input signal have been applied simultaneously to said respective input terminals.

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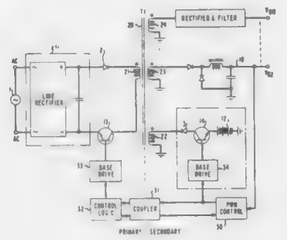
**4,745,299**

## OFF-LINE SWITCHER WITH BATTERY RESERVE

**Wing K. Eng, Stanhope, and Robert E. Schroeder, Flanders, both of N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Apr. 17, 1986, Ser. No. 853,173**
**Int. Cl.[4] H02J** *9/00*
**U.S. Cl. 307—66** **4 Claims**

1. A switching type power supply comprising:
a power transformer including a primary winding a secondary winding and an auxiliary winding, and having a first transformation ratio between the primary winding and secondary winding and a second transformation ratio between the auxiliary winding and the secondary winding,
a first input means for accepting a primary source of energy,
a second input means for accepting a secondary source of energy,
an output means for coupling energy from the secondary winding to a load,
the first input means being continuously coupled to supply energy to the primary winding through a first power switch continuously periodically connecting the first input means to the primary winding,
the second input means being continuously coupled to supply energy to the auxiliary winding through a second power switch continuously periodically connecting the second input means to the auxiliary winding,




a regulation control responsive to a magnitude of a signal generated at the output means by the power supply and operative in responsive to the magnitude of a signal for continuously and concurrently driving the first and second power switch at a common duty cycle, and
the first and second transformation ratios selected such that the first and second power switches transmit power signals to the output means within first and second input voltage ranges, respectively; whereby:
the first input voltage range is operative to derive output energy from the primary source of energy when it is fully operative and the second input voltage range is operative to derive output energy from the secondary source of energy when the primary source of energy is below its desired operating limits.

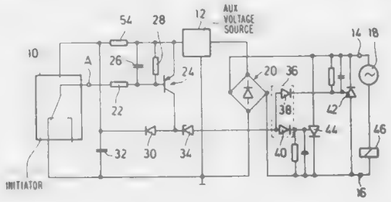
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**4,745,300**

## TWO-WIRE SWITCH

**Heinz Kammerer, Ostfildern, and Peter Dolderer, Esslingen, both of Fed. Rep. of Germany, assignors to Gebhard Balluff Fabrik Feinmechanischer Erzeugnisse GmbH & Co., Fed. Rep. of Germany**

**Filed Apr. 27, 1987, Ser. No. 43,151**
**Claims priority, application Fed. Rep. of Germany, May 3, 1986, 3615052**
**Int. Cl.[4] H03K** *17/00*
**U.S. Cl. 307—112** **11 Claims**




1. A two-wire switch for connecting a load to an AC voltage source comprising:
a bridge rectifier circuit having an input coupled to said AC voltage source;



an initiator;
a semiconductor circuit connected on the output side of said bridge circuit, having an input coupled to said initiator, and having a switchable semiconductor path which can be brought into the conducting state by operation of said initiator;
controllable switch means, having a control electrode located in a control current circuit including said switchable semiconductor path, for delivering power from said AC voltage source to said load;
a capacitor coupled to said initiator to supply power thereto; and
auxiliary voltage source means, having an output coupled to said capacitor and said initiator and having an input coupled to an output of said bridge circuit to receive power therefrom, for generating a pulsating DC voltage as auxiliary voltage to power said initiator and charge said capacitor, whereby said capacitor acts as a charge storage device and powers said initiator when the pulsating DC voltage of said auxiliary voltage source is inadequate to power said initiator.

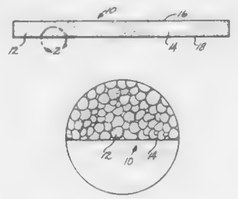
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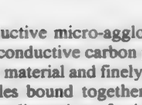
**4,745,301**

## PRESSURE SENSITIVE ELECTRO-CONDUCTIVE MATERIALS

**Michael Michalchik, Los Altos, Calif., assignor to Advanced Micro-Matrix, Inc., Altadena, Calif.**

**Filed Dec. 13, 1985, Ser. No. 809,075**
**Int. Cl.[4] G01H** *35/00;* **H01C** *10/10;* **H01B** *1/06*
**U.S. Cl. 307—115** **9 Claims**




1. Electrically conductive micro-agglomerates of unbound finely divided electro-conductive carbon particles enclosed by a matrix of elastomeric material and finely divided electro-conductive carbon particles bound together by the elastomeric material, the maximum dimension of said microagglomerates being between about 0.1 and about 10 microns.

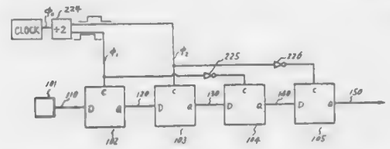
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**4,745,302**

## ASYNCHRONOUS SIGNAL SYNCHRONIZING CIRCUIT

**Makoto Hanawa; Kouki Noguchi, both of Kokubunji, and Osamu Shinbo, Musashino, all of Japan, assignors to Hitachi, Ltd. and Hitachi Micro Computer Engineering, Ltd., both of Tokyo, Japan**

**Filed Dec. 23, 1985, Ser. No. 812,349**
**Int. Cl.[4] H03K** *13/03, 5/00*
**U.S. Cl. 307—269** **7 Claims**




1. An asynchronous signal synchronizing circuit comprising:
means for generating first and second clock signals of equal frequency but shifted in phase as well as third and fourth clock signals of equal frequency but shifted in phase such that said third clock signal has a frequency substantially equal to that of said first clock signal as well as a phase substantially opposite to that of said first clock signal, said fourth clock signal has a frequency substantially equal to that of said second clock signal as well as a phase substantially opposite to that of said second clock signal:
a first latch circuit having as an input an asynchronous signal to be synchronized, means for transmitting said asynchronous signal from said input to an output of said first latch circuit in response to either a high level or a low level of said first clock signal, and means for latching said output of said first latch circuit in response to either of said high level or said low level of said first clock signal;
a second latch circuit having said output signal of said first latch circuit as an input, means for transmitting said output signal of said first latch circuit from said input to an output of said second latch circuit in response to either a high level or a low level of said second clock signal, and means for latching said output of said second latch circuit in response to either of said high level or said low level of said second clock signal;
a third latch circuit having said output signal of said second latch circuit as an input, means for transmitting said output signal of said second latch circuit from said input to an output of said third latch circuit in response to either a high level or a low level of said third clock signal, and means for latching said output of said third latch circuit in response to either of said high level or said low level of said third clock signal; and
a fourth latch circuit having said output signal of said third latch circuit as an input, means for transmitting said output signal of said third latch circuit from said input to an output of said fourth latch circuit in response to either a high level or a low level of said fourth clock signal, and means for latching said output of said fourth latch circuit in response to either of said high level or said low level of said fourth clock signal.

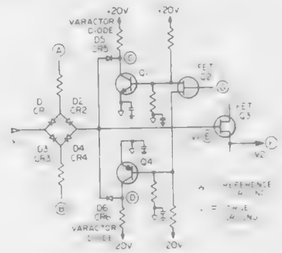
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**4,745,303**

## DC-DC IMPEDANCE TRANSFORMER CHARGE PUMP

**John C. Hubbs, Santa Clara County, Calif., assignor to Wavetek Corporation, San Diego, Calif.**

**Continuation-in-part of Ser. No. 762,254, Aug. 5, 1985, abandoned. This application Feb. 17, 1987, Ser. No. 15,477**
**Int. Cl.[4] G11C** *27/02*
**U.S. Cl. 307—353** **14 Claims**




1. A circuit for sampling a voltage of an input waveform signal including an input for receiving the signal, sampling means connected to said input for periodically sampling the signal,
storage capacitor means for storing a voltage corresponding to the sampled portion of the signal, said storage capacitor means comprising at least a first voltage variable capacitor having first and second capacitance values,
control means for setting said first capacitor to a first upper value during a sampling period of said sampling means for storing said voltage, and for setting the capacitance of said

capacitor to a second lower value during a read period of said sample circuit, and

output means coupled to said capacitor for providing an amplified version of said input signal.

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**4,745,304**

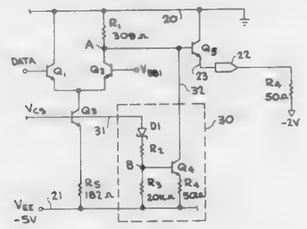
## TEMPERATURE COMPENSATION FOR ECL CIRCUITS

**Stanley Wilson, Sunnyvale, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.**

**Filed May 3, 1985, Ser. No. 730,709**

**Int. Cl.[4] H03K** *19/086, 3/01, 3/26*

**U.S. Cl. 307—455** **5 Claims**




**1**. A temperature compensating bias means for an ECL circuit comprising:

a first transistor having a base;

a bias resistor coupled to the base of said first transistor;

a bias transistor having a collector coupled to said base of said first transistor and said bias resistor, said bias transistor having a base and an emitter; and

means including a Schottky diode having a negative temperature coefficient coupled between a source of potential $V_{CS}$ and said base of said bias transistor for providing a bias potential $V_x$ on said base of said bias transistor which is a function of

$$V_S+V_{BE}-V_{SD}$$

where $V_S$ is a constant potential, $V_{BE}$ is the base-to-emitter potential on said bias transistor and $V_{SD}$ is the voltage drop across said Schottky diode, said bias potential $V_x$ providing an emitter potential $V_E$ on the emitter of said bias transistor which is a function of

$$V_x-V_{BE}=V_S-V_{SD}$$

for controlling current flow through said bias resistor such that a change in the potential on said base of said first transistor due to a change in the operating temperature of said ECL circuit is solely a function of the temperature coefficient of said Schottky diode.

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**4,745,305**

## COMMON CELL I/O INTERFACE CIRCUIT

**Harold S. Crafts, Fort Collins, Colo., assignor to NCR Corporation, Dayton, Ohio**

**Filed Sep. 23, 1985, Ser. No. 779,379**

**Int. Cl.[4] H03K** *19/092, 17/16;* **G06F** *7/38*

**U.S. Cl. 307—475** **10 Claims**

**1**. A common cell for use as an input/output circuit in an integrated circuit comprising:

an I/O pad;

a P-channel transistor structure having a plurality of individual P-channel transistors;

an N-channel transistor structure having a plurality of individual N-channel transistors;

a Vdd terminal connected to the sources of the individual P-channel transistors of the P-channel transistor structure;

a P-channel drain terminal connected to the drains of the individual P-channel transistors of the P-channel transistor structure;

a plurality of P-channel gate terminals, each connected to one of the gates of the individual P-channel transistors of the P-channel transistor structure;

a Vss terminal connected to the sources of the individual N-channel transistors of the N-channel transistor structure;

an N-channel drain terminal connected to the drains of the individual N-channel transistors of the N-channel transistor structure and to said P-channel drain terminal; and

a plurality of N-channel gate terminals, each connected to one of the gates of the individual N-channel transistors of the N-channel transistor structure;

said I/O pad, P-channel drain terminal, P-channel gate terminals, N-channel drain terminal, and N-channel gate terminals being selectively connected, as desired, to form selected input/output circuit configurations having electrostatic discharge protection.

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**4,745,306**

## HALF ADDER HAVING A PAIR OF PRECHARGED STAGES

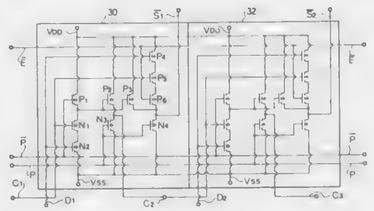
**Jiroh Shimada, Tokyo, Japan, assignor to NEC Corporation, Japan**

**Filed Oct. 31, 1986, Ser. No. 925,307**

**Claims priority, application Japan, Oct. 31, 1985, 60-245396**

**Int. Cl.[4] G06F** *7/42;* **H03K** *19/096*

**U.S. Cl. 307—472** **10 Claims**




**1**. A half adder which includes at least one data input, one carry input, one addition data output and one carry output, said adder comprising:

a first drive stage having an input and being connected at its output to the carry output;

a second drive stage having an input and being connected at its output to the addition data output;

a circuit coupled to the inputs and the outputs of the first and second drive stages and also coupled to receive a first timing signal for precharging the inputs and the outputs of the first and second drive stages for a first timing period defined by the first timing signal so that the inputs and the outputs of the first and second drive stages are respectively forced into predetermined logic voltage levels which are defined as a result of the precharge, the precharging circuit being disabled during a second timing period succeeding the first timing period, said precharging circuit acting as a load for the first and second drive stages;

a first logic stage having inputs connected to the data input and the carry input, respectively, and also having an output connected to inputs of the first and second drive stages so as to apply a first logical signal to the inputs of the first and second drive stages if the data input and the carry input assume a first logic level during the second timing period, whereby the inputs and the outputs of the drive stages assume the respective logic levels which are opposite to the predetermined logic levels which result from the precharge; and

a second logic stage connected to the output of the second drive stage and having inputs connected to the data input and the carry input, respectively, the second logic stage being coupled to receive a second timing signal to forcibly change the logic level of the second drive stage output when the data input and the carry input assume a second logic level which is opposite to the first logic level, at a timing which is included in the second timing period and is defined by the second timing signal.



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**4,745,307**

## SEMICONDUCTOR INTEGRATED CIRCUIT WITH A PROGRAMMABLE LOGIC ARRAY

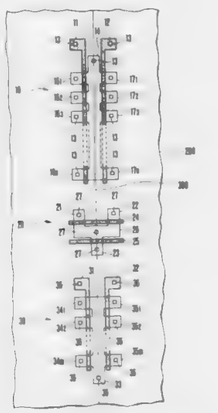
**Yoshishige Kitamura; Katsuya Furuki, and Nobuyuki Sugiyama, all of Tokyo, Japan, assignors to NEC Corporation, Japan**

**Filed Sep. 2, 1986, Ser. No. 902,874**

**Claims priority, application Japan, Sep. 6, 1985, 60-197908; Oct. 25, 1985, 60-239709**

**Int. Cl.[4] H03K** *19/094*

**U.S. Cl. 307—468** **8 Claims**



**1**. A programmable logic array comprising a plurality of logic matrices in which a plurality of MOSFET columns, each of which consists of a plurality of MOSFETs aligned along linear input lines, are aligned parallel to each other in accordance with a predetermined number of said input lines,

each of said logic matrices comprising:

linear gate electrodes commonly used by said MOSFETS of said MOSFET column as said input line;

a first wiring layer;

a predetermined number of first output lines formed in said first wiring layer and perpendicular to said linear gate electrodes;

a second wiring layer;

a predetermined number of second output lines formed in said second wiring layer and arranged to correspond to and to be perpendicular to said first output lines;

load means connected to said second output lines; and

a plurality of holes through which said opposing first and second output lines are respectively connected to each other,

a source electrode of each of said MOSFETs being connected to a common potential through a contact hole, a drain electrode thereof being connected to said first output line through a contact hole, and said output lines of one logic matrix being connected to said common linear gate electrodes serving as input lines of another logic matrix.

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**4,745,308**

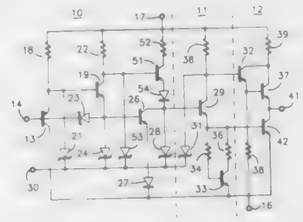
## NON-INVERTING THREE STATE TTL LOGIC WITH IMPROVED SWITCHING FROM A HIGH IMPEDANCE STATE TO AN ACTIVE HIGH STATE

**Eric D. Neely, Phoenix, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Feb. 18, 1983, Ser. No. 467,681**

**Int. Cl.[4] H03K** *19/003, 19/084, 19/088, 17/16*

**U.S. Cl. 307—473** **6 Claims**



**1**. A non-inverting three state gate having at least one input terminal, an output terminal, a first voltage terminal, a second voltage terminal, an input stage coupled between said first and second voltage terminals and to said at least one input terminals, a phase splitting stage coupled between said first and second voltage terminals, and an output stage coupled between said first and second voltage terminals and to said phase splitting stage, said output stage providing a first state output, a second state output, or a high impedance state output at said output terminal, said input stage having biasing means coupled to said phase splitting stage to inhibit said output stage from momentarily providing said second state output when said output stage is switching from said high impedance state output to said first state output.

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**4,745,309**

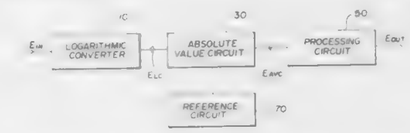
## ADJUSTABLE RMS CIRCUIT

**James K. Waller, Jr., 9901 Allen Rd., Clarkston, Mich. 48016**

**Filed Sep. 29, 1986, Ser. No. 912,526**

**Int. Cl.[4] G02G** *7/12;* **H03K** *5/00;* **G01R** *15/10*

**U.S. Cl. 307—490** **6 Claims**




**1**. An adjustable RMS circuit for an input signal comprising:

means for compressing said input signal proportionately in relation to its logarithm to provide a compressed signal;

means for deriving from said compressed signal an inverted half wave rectified signal proportional to said compressed signal to provide a first rectified signal;

means for deriving from said compressed signal a signal half the magnitude of said inverted half wave rectified signal to provide a second rectified signal;

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means for generating a reference signal of variably selectable level; and

means for combining said first rectified signal with said second recified signal and with said reference signal to provide a signal proportionate to the absolute value of said compressed signal offset by the preselected level of said reference signal.

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**4,745,310**

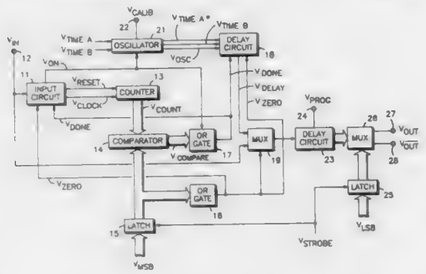
## PROGRAMMABLE DELAY CIRCUIT

**Mavin C. Swapp, Mesa, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.**

**Continuation of Ser. No. 892,513, Aug. 4, 1986, abandoned. This application Nov. 23, 1987, Ser. No. 125,755**

**Int. Cl.[4] H03K** *5/13, 5/159*

**U.S. Cl. 307—603** **18 Claims**




1. A monolithically integrated delay circuit comprising:

a first input terminal for receiving a digital input signal;

a second input terminal for receiving an analog input signal;

an output terminal for providing an output signal;

first means coupled to said first input terminal for providing a modified digital signal in response to said digital input signal, said modified digital signal comprising a pulse having a leading edge and a trailing edge, said leading edge and said trailing edge having a different transition time, said first means comprising:

a first voltage terminal;

a second voltage terminal;

an NPN transistor having a base coupled to said first input terminal, a collector coupled to said first voltage terminal, and an emitter;

a current source coupled between said emitter and said second voltage terminal; and

second means coupled between said output terminal and both said emitter of said NPN transistor and said second input terminal for comparing said modified digital signal and said analog signal and providing an output signal at said output terminal that is delayed in time from said digital input signal.

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**4,745,311**

## SOLID-STATE RELAY

**Yuzo Iwasaki, Arita, Japan, assignor to Omron Tateisi Electronics Co., Kyoto, Japan**

**Filed May 1, 1987, Ser. No. 44,482**

**Claims priority, application Japan, May 7, 1986, 61-104397**

**Int. Cl.[4] H03K** *17/72, 17/687*

**U.S. Cl. 307—632** **7 Claims**

1. A solid-state relay, comprising:

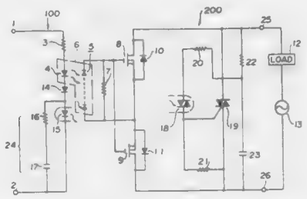
a first and a second light emitting element which are adapted to be lighted up by an input signal;

a first light receiving element which is optically coupled to the first light emitting element and is adapted to selectively supply AC electric power from a power source to a load depending on whether the light from the first light emitting element is being received or not;

a second light receiving element which is optically coupled to the second light emitting element and is adapted to supply the AC electric power from the power source to the load depending on whether the light from the second light emitting element is being received or not; and

a time delay means which maintains the second light emitting element lighted up for a certain time interval after the input signal is terminated;

the second light receiving element comprises a means for terminating the supply of the AC electric power to the load when the voltage of the power source is below a certain level.




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**4,745,312**

## STEPPING MOTOR

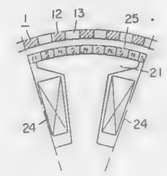
**Nagahiko Nagasaka, Iruma, Japan, assignor to Kabushiki Kaisha Yaskawa Denki Seisakusho, Japan**

**Filed Dec. 16, 1986, Ser. No. 942,461**

**Claims priority, application Japan, Jan. 9, 1986, 61-2738; Sep. 30, 1986, 61-233028**

**Int. Cl.[4] H02K** *37/00*

**U.S. Cl. 310—49 R** **8 Claims**



1. A stepping motor comprising:

a stator including a laminated circular ferromagnetic core member having a plurality of slots therein; a plurality of concentrically wound coils positioned in said slots to form multiphase electromagnetic poles; and a plurality of thin planar shaped permanent magnets adhered to said circular core member adjacent the circumference thereof to provide a plurality of magnetic poles arranged in oppositely magnetically oriented pairs of equal width; and

a rotor including a substantially flat, circular bottom portion and a circumferential rim portion extending from the circumferential edge of said circular bottom portion and adjacent said permanent magnets with an air gap therebetween, the outer edge of said rim portion having a plurality of teeth formed therein.

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**4,745,313**

## STATOR HAVING THREE-PHASE SUPERCONDUCTING WINDINGS

**Yves Brunet, Gieres, and Pascal Tixador, Grenoble, both of France, assignors to Alsthom, Paris, France**

**Filed Jan. 7, 1987, Ser. No. 1,079**

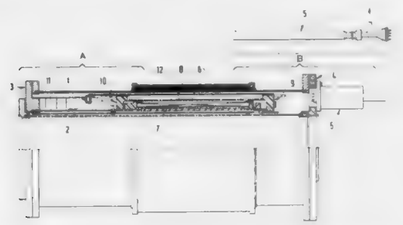
**Claims priority, application France, Jan. 8, 1986, 86 00181**

**Int. Cl.[4] H02K** *9/00*

**U.S. Cl. 310—52** **12 Claims**

1. In an electric machine stator including superconducting three-phase windings, said stator comprising tubular elements and end plates forming a cryogenic enclosure containing a bath of liquid helium at very low temperature, said windings being disposed in said bath, an additional tubular element supporting said enclosure at one of its ends and fixed, at its other end, in a sealed manner to an additional end plate, annular screens for reflecting radial thermal radiation, and current least to the windings, the improvement wherein the tubular element and





the end plates forming the enclosure, and the annular screens for reflecting radial thermal radiation are formed of a material which does not conduct electricity, and wherein the annular screens for reflecting radial thermal radiation are covered with layers of metal wires of high thermal conductivity, each of which layers having at least one point thereof forming a heat conducting connection with a heat exchanger having a chamber and means for passing a flow of gaseous helium evacuated from the enclosure through said heat exchanger chamber.

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**4,745,314**

## LIQUID-COOLED MOTOR

**Jiro Nakano, Hino, Japan, assignor to Fanuc Ltd., Yamanashi, Japan**

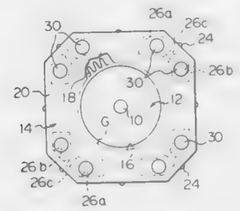
**PCT No. PCT/JP85/00634, § 371 Date Jul. 8, 1986, § 102(e) Date Jul. 8, 1986, PCT Pub. No. WO86/03069, PCT Pub. Date May 22, 1986**

**PCT Filed Nov. 13, 1985, Ser. No. 887,163**

**Claims priority, application Japan, Nov. 14, 1984, 59-238589**

**Int. Cl.[4] H02K** *9/08*

**U.S. Cl. 310—57** **4 Claims**



1. A liquid-cooled motor comprising:

a rotor having a rotor shaft in a central portion thereof;

a stator comprising a laminated core impregnated with a resin, said laminated core being provided with a plurality of pairs of cooling liquid passages each pair having two axially extending cooling liquid passages bored from one end face to another end face of said laminated core;

end plates applied to axially opposite end faces of the laminated core of said stator, respectively, said two axially extending cooling liquid passages of each pair being connected together at both end faces of said laminated core by a connecting passage;

a plurality of clamping means for inserting through the end plates and the cooling liquid passages of the laminated core, said clamping means for applying a compressive force to the laminated core by pressing the end plates against said axially opposite end faces of said laminated core, respectively, wherein said resin of said laminated core coats the cooling liquid passages of the laminated core with the resin to construct a leakproof construction after the laminated core is clamped with said clamping means.

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**4,745,315**

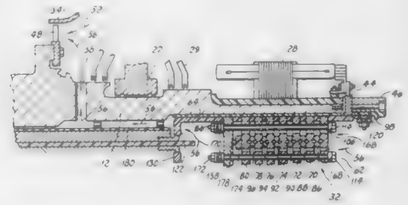
## BRUSHLESS EXCITER WITH ZERO-GRAVITY RECTIFIER ASSEMBLY

**Vincent G. Terry, Jr., Beverly, and Robert G. Hamilton, Georgetown, both of Mass., assignors to General Electric Company, Schenectady, N.Y.**

**Filed Dec. 15, 1983, Ser. No. 561,689**

**Int. Cl.[4] H02K** *9/00*

**U.S. Cl. 310—68 D** **10 Claims**



1. A rectifier assembly for use in a brushless exciter of a dynamoelectric machine, said dynamoelectric machine including a cylindrical cavity in a shaft thereof and an exciter on said shaft effective for generating AC power, comprising:

a plurality of conductive heat-sink discs having their axes aligned to form a stack;

a hockey-puck diode disposed in said stack between each adjacent pair of said heat-sink discs, an axis of each of said hockey-puck diodes being aligned with said axes of said heat-sink discs;

each of said hockey-puck diodes including first and second contacts on said axis at each of first and second sides thereof respectively;

means for applying an inward axial force on axially outward ones of said heat-sink discs whereby a predetermined axial contact force is provided between each of said first and second contacts and their adjacent pair of said heat-sink discs;

said stack being fittable within said cylindrical cavity;

means for connecting AC power to a first subset of said heat-sink discs; each of said heat-sink discs of said first subset including means for connecting said AC power to a selected one of said first and second contacts of a second subset of said hockey-puck diodes;

means for connecting rectified DC power from a third subset of said heat-sink discs, said third subset including means for receiving said DC power from selected other ones of said first and second contacts of the second subset of said hockey-puck diodes; and wherein all electrical connection to said hockey-puck diodes is effected through said heat sink discs; and,

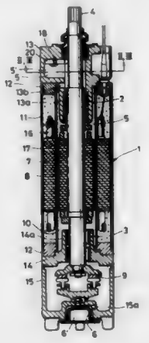
a plurality of slots about the perimeter of each of the heat sink discs, at least some of the slots on all of the heat-sink discs in said stack being aligned, and said means for connecting AC power to the first subset of said heat-sink discs and said means for connecting rectified DC power from the third subset of said heat-sink discs include conductive bars axially disposed in different ones of said slots and making electrical contact with only one of said heat-sink discs.

**4,745,316**

## SUBMERSIBLE MOTOR

**Ryoichi Nakashima, Funabashi; Yasuro Suzuki, Narashino, and Masato Kobayashi, Chiba, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Apr. 21, 1986, Ser. No. 854,030**
**Claims priority, application Japan, Apr. 19, 1985, 60-82685**
**Int. Cl.⁴ H02K** *5/10*
**U.S. Cl. 310—87** **3 Claims**



1. A submersible motor comprising:

a stator fixed to an inner peripheral portion of a frame; a rotor disposed inside said stator and fixed to a shaft; an upper sleeve bearing means and a lower sleeve bearing means for rotatably supporting said shaft on said frame; a liquid hermetically contained in a sealed manner within a rotor chamber surrounding said rotor; a diaphragm having a prdetermined volume enclosed thereby and disposed beneath said frame; means for communicating said rotor chamber with said diaphragm; and chamber means communicating with said rotor chamber disposed above said upper sleeve bearing means; and being filled with air and reserve sealing fluid, wherein said chamber means comprises a plurality of rectangular chambers in communication with one another around said shaft, and the volume of said chamber means is larger than said predetermined volume of said diaphragm.

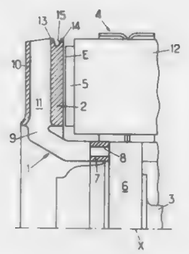
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**4,745,317**

## ARMATURE ROTORS FOR ELECTROMAGNETIC RETARDERS

**Michel Estaque, Taverny, France, assignor to Labavia-S.G.E., France**

**Filed Apr. 24, 1987, Ser. No. 42,118**
**Claims priority, application France, Apr. 30, 1986, 86 06280**
**Int. Cl.⁴ H02K** *49/00;* **F16D** *65/27*
**U.S. Cl. 310—105** **9 Claims**



1. An armature rotor for an electromagnetic retarder, including at least one disk made from a ferromagnetic material connected to an inner fixing ring by an annulus of arms forming ventilation fins, the largest diameter portions of these arms projecting axially from the face of the disk opposite the air gap, and the crests of these portions being joined together by an annular web, the assembly formed by the disk, the ring, the arms and the web being formed of a single molded block, characterized in that the maximum outer diameter of the ventilation structure formed by the arms and the web is greater than the outer diameter of the disk, considered at the level of the mean plane of this disk.

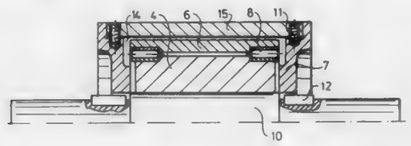
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**4,745,318**

## INDUCTION MOTOR WITH SECONDARY ROTOR

**László Ivanics, Budapest, Hungary, assignor to Ipari Muszergyar Ikiad, Hungary**

**Filed Apr. 21, 1987, Ser. No. 40,949**
**Claims priority, application Hungary, Apr. 22, 1986, 1670/86**
**Int. Cl.⁴ H02K** *21/08, 17/02*
**U.S. Cl. 310—114** **9 Claims**



1. An induction motor comprising a stator having a stator winding and a rotor coupled with a motor shaft and separated from the stator winding by an air gap, wherein the rotor comprises a current conducting element and a magnetically excitable member, characterized in that in the air gap (13) between the stator (2) and the magnetically excitable member (4) a rotary element (6) is arranged which is supported in a free-running fashion with respect to the rotor and is made from a permanent magnetic material, wherein the rotary element (6) is constructed with segments (21) made from ferromagnetic material, which are premagnetized in a direction normal to the rotor and have the same number of poles as the stator winding (3).

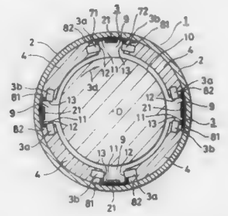
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**4,745,319**

## MAGNETO D.C. MOTOR HAVING ELASTIC MAGNET MOUNTING RETAINERS

**Tosio Tomite; Shotaro Naito, both of Katsuta; Nobuhiko Ogasawara, Mito; Tatsuhiro Tani, and Hidemitsu Kobayashi, both of Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Mar. 1, 1985, Ser. No. 707,032**
**Claims priority, application Japan, Mar. 7, 1984, 59-41970; Mar. 28, 1984, 59-58311**
**Int. Cl.⁴ H02K** *21/26*
**U.S. Cl. 310—154** **3 Claims**



1. A magneto D.C. motor with a magnet mounting retainer comprising: a stator having a plurality of arcuate permanent magnets disposed annularly on the inner periphery of a cylindrical yoke with gaps between two adjacent magnets; a rotor



which rotates around the central axis of said stator by excitation; retainers, each of which comprises a surface contacting the inner periphery of said yoke in said gap, said surface having bores therethrough, said cylindrical yokebeing plastically deformed at prescribed locations thereof so as to have protrusions extending from the inner periphery thereof, said protrusions being inserted into the bores of said retainer so as to secure said retainers to the inner periphery of said cylindrical yoke, the surface of each retainer being connected with two radially extending surfaces thereof, and being made of an elastic material, and extending in a direction of the central axis of said D.C. motor along facing surface of said magnets opposite to each other across said gap, and two end portions which are connected to said two radially extending surfaces, respectively, made of an elastic member, and extending along outer surfaces of said magnets adjacent to said facing surfaces; said two radial extending surfaces and said two end portions securing said permanent magnets to said yoke by pressing and clamping said magnets while contactng said magnets from three directions, namely, from said facing surfaces and said outer surfaces, and wherein said retainer has, on the surface contacting said yoke, reinforcing ribs which are formed along the peripheral direction of said yoke.

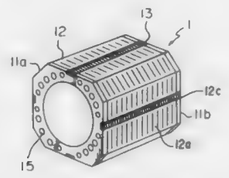
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**4,745,320**

## INDUCTION MOTOR

**Shigeaki Oyama, Hachioji; Kosei Nakamura; Yoshiyuki Hayashi, both of Hino, and Shigeru Koyoshida, Omuta, all of Japan, assignors to Fujitsu Fanuc Limited, Tokyo, Japan**

**PCT No. PCT/JP81/00309, § 371 Date Jun. 24, 1982, § 102(e) Date Jun. 24, 1982, PCT Pub. No. WO82/01793, PCT Pub. Date May 27, 1982**
**PCT Filed Oct. 28, 1981, Ser. No. 395,012**
**Claims priority, application Japan, Oct. 28, 1980, 55-150060**
**Int. Cl.⁴ H02K** *1/06*
**U.S. Cl. 310—217** **3 Claims**



1. A stator core for an induction motor, said stator core comprising:

(a) a plurality of stacked steel plates positioned adjacent to one another;

(b) first and second end plate means, each end plate means being positioned on one end of said stacked steel plates;

(c) at least one support bar, consisting of a nonmagnetic metal, positioned in contact with each of said steel plates and welded thereto.

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**4,745,321**

## REFLECTIVE ARRAY SURFACE ACOUSTIC WAVE DEVICE

**Curt R. Raschke, Dallas, Tex., assignor to Texas Instruments Incorporated, Tex.**

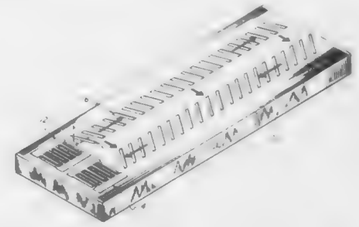
**Continuation of Ser. No. 790,771, Oct. 24, 1985, abandoned, which is a continuation-in-part of Ser. No. 633,771, Jul. 23, 1984, abandoned. This application Feb. 18, 1987, Ser. No. 16,526**
**Int. Cl.⁴ H01L** *41/08*
**U.S. Cl. 310—313 D** **4 Claims**

1. A reflective array surface acoustic wave device comprising:

(a) a substrate of material having preselected surface wave propagation characteristics;

(b) transducer means operatively combined with said substrate for converting electrical impulses into acoustic waves in the surface of the substrate and for converting reflected acoustic waves received from the surface of the substrate into electrical impulses; and

(c) the substrate having a plurality of space grooves utilized as a reflection grating means for responding to surface acoustic waves having a preselected band of frequencies with a center frequency, the plurality of grooves having



predefined lengths, widths and depths, with single grooves being responsive to preselected frequencies of surface acoustic waves based upon the widths of each single groove being selected such that the sin of $\pi$ times the ratio of the groove width divided by the wavelength of the center frequency is less than 1, the substrate being in operative association with the transducer means for receiving and reflecting impinging acoustic surface waves to the transducer means.

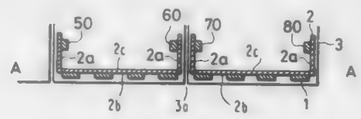
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**4,745,322**

## DISPLAY UNIT HAVING EQUALLY SPACED DISPLAY ELEMENTS

**Nobuo Terazaki, Nagasaki, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 28, 1986, Ser. No. 845,312**
**Claims priority, application Japan, Mar. 29, 1985, 60-66032**
**Int. Cl.⁴ H01J** *1/92, 19/38, 19/46, 33/26*
**U.S. Cl. 313—1** **6 Claims**



1. A display unit comprising:

a display element board (2) having front and rear surfaces and a plurality of end portions (2*a*) disposed about the periphery of said board;

a plurality of display elements (1) mounted on said front surface of said display board inwardly of said end portions; and

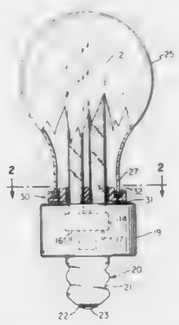
signal connectors disposed on at least two of said end portions, wherein said two of said end portions are disposed adjacent each other and bent back rearwardly relative to said display board.

**4,745,323**

## COMPACT FLUORESCENT LAMP WITH OUTER ENVELOPE

**Donald P. Northrop, Glen Rock, and Arpad L. Pirovic, Montvale, both of N.J., assignors to Duro-Test Corporation, North Bergen, N.J.**

**Filed Feb. 26, 1986, Ser. No. 833,857**
**Int. Cl.[4] H01J** *61/34, 61/36*
**U.S. Cl. 313—25** **8 Claims**



1. The combination comprising:
a self-contained fluorescent lamp unit having terminals thereon for electrical connection to a ballast means,
a housing having a wall with an opening therein;
electrical circuit ballast means within said housing;
means for detachably electrically connecting said lamp unit terminals to said ballast means with the terminals of said lamp unit extending through the opening of said housing wall,
an envelope having an open neck portion through which said lamp unit passes into the envelope interior.
and adapter means having a lower part for placement over said opening of said housing wall and a portion through which said lamp unit extends into said envelope, said envelope neck portion mechanically coupled to an upper part of said adapter means whereby said envelope and adapter are detachable as an assembly from said housing and said lamp unit is accessible for detachment from said housing.

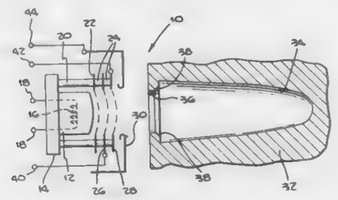
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**4,745,324**

## HIGH POWER SWITCH TUBE WITH FARADAY CAGE CAVITY ANODE

**Richard B. True, Santa Clara, Calif., assignor to Litton Systems, Inc., Woodland Hills, Calif.**

**Filed May 12, 1986, Ser. No. 862,122**
**Int. Cl.[4] H01J** *29/48, 1/46, 29/46*
**U.S. Cl. 313—296** **18 Claims**



1. A high-power switch, comprising: a plurality of individual gunlets, each gunlet comprised of:
a cathode;
a shadow grid mounted adjacent said cathode;
a control grid mounted beyond said shadow grid; and
a screen grid mounted beyond said control grid;
a plurality of anode cavities mounted in closely spaced proximity to said screen grids of said plurality of gunlets, said plurality of anode cavities facing said screen grids of said cathode gunlets having openings therein that are smaller in dimension than a corresponding initial internal dimension that defines said cavities to form a plurality of Faraday cage collectors having an increased surface area for increasing the electrical power switched by said high-power switch and creating a fail soft switch should one or more of said cathode gunlets fail.

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**4,745,325**

## HEATER FOR INDIRECT-HEATED CATHODE

**Sachio Koizumi, Mobara, Japan, assignor to Hitachi, Ltd., Tokyo, Japan**

**Filed Dec. 19, 1985, Ser. No. 810,716**
**Claims priority, application Japan, Dec. 26, 1984, 59-272801**
**Int. Cl.[4] H01J** *1/14, 17/06*
**U.S. Cl. 313—345** **6 Claims**



1. A heater for an indirect-heated cathode having a heating element composed of a first wire with a high specific resistance around which a second wire with a low specific resistance is wound, at least part of said heating element being covered with a heat-resisting insulating material.

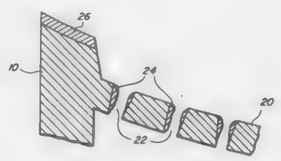
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**4,745,326**

## METHOD OF MANUFACTURING INTEGRAL SHADOW GRIDDED CONTROLLED POROSITY, DISPENSER CATHODES

**Richard F. Greene, Bethesda, and Richard E. Thomas, Riverdale, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Dec. 10, 1986, Ser. No. 940,121**
**Int. Cl.[4] H01J** *1/14, 9/04*
**U.S. Cl. 313—346 DC** **36 Claims**



1. A controlled porosity dispenser cathode apparatus comprising:
an integral support structure bounding emissive fields of said cathode apparatus, said support structure comprising emissive material; and
a shadow grid comprising a pattern of emissive limitation means bonded to said support structure for increased laminarity of a cathode beam;
wherein said emissive fields have multiple closely spaced holes between said emission limitation means for improving beam optics.

10. A method for manufacturing a controlled porosity dispenser thermionic cathode which comprises the steps of:
manufacturing a pattern of triangular slots into a mandrel face;
coating said mandrel face with a support material to form a support structure;
machining said support material flush with said mandrel face to leave said support structure embedded in said mandrel face;
depositing an emissive material uniformly over said mandrel face;
depositing an emission suppressing material uniformly over said mandrel face;
machining said deposited materials leaving a shadow grid of emission suppressing surfaces and a linking support structure;
etching out said mandrel face;
drilling an array of holes in the emissive material fields between said emission suppressing surfaces; and
narrowing said holes' diameter.



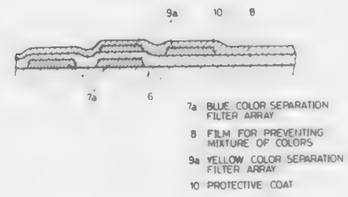
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**4,745,327**

## COLOR SEPARATION FILTER INCLUDING MONOMOLECULAR FILM LAYERS OF COUPLED DYESTUFF

**Hideo Saeki, and Shigeyuki Uematsu, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Feb. 18, 1986, Ser. No. 830,131**
**Claims priority, application Japan, May 21, 1985, 60-109806**
**Int. Cl.[4] H01J** *29/10, 31/26*
**U.S. Cl. 313—371** **6 Claims**




1. A color separation filter for color image pickup having a plurality of prescribed color separation filter parts for transmitting prescribed color light components, each of said prescribed color separation filter parts comprising a pattern of monomolecular film layers of dyestuff coupled with at least one hydrocarbon chain having functional groups crosslinked by ioinizing radiation.

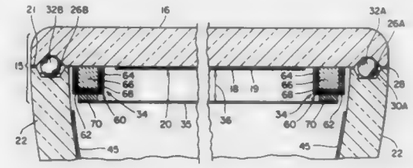
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**4,745,328**

## CRT TENSION MASK SUPPORT STRUCTURE

**Paul Strauss, Chicago, Ill., assignor to Zenith Electronics Corporation, Glenview, Ill.**

**Filed Dec. 16, 1986, Ser. No. 942,336**
**Int. Cl.[4] H01J** *29/81*
**U.S. Cl. 313—402** **35 Claims**



1. A front assembly for a color cathode ray tube including a faceplate having on its inner surface a centrally disposed phosphor screen surrounded by a peripheral area adapted to mate with a funnel, said assembly including a shadow mask support structure for securing a shadow mask in tension upon said faceplate inner surface and for spacing the shadow mask from the screen, said support structure comprising a support assembly including an inverted channel member having a cross portion and depending leg portions, said cross portion defining a surface to facilitate securing the shadow mask to said support structure, and a stiffening core secured within said channel member between said leg portions of said channel member.

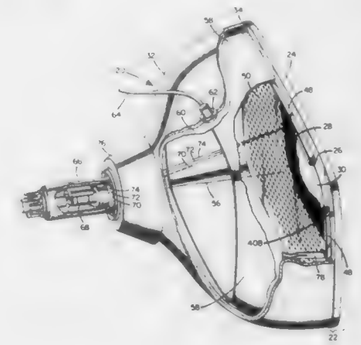
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**4,745,329**

## FRONT ASSEMBLY FOR AN ULTRA-HIGH RESOLUTION COLOR CATHODE RAY TUBE HAVING AN IMPROVED SHADOW MASK COMPENSATED FOR DIFFRACTION AND PROCESS THEREFOR

**Leonard Dietch, Skokie, Ill., assignor to Zenith Electronics Corporation, Glenview, Ill.**

**Filed Jun. 17, 1986, Ser. No. 875,123**
**Int. Cl.[4] H01J** *29/07, 29/32, 9/227*
**U.S. Cl. 313—402** **12 Claims**



1. For use in a high-resolution color cathode ray tube of the general type having a shadow mask whose apertures are of such diminutive nominal size as to normally elongate the phosphor deposits in peripheral screen areas during phosphor photoscreening as a result of UV-diffraction distortion effects, an improved shadow mask having apertures which are substantially round at the mask center and increasingly elongated radially outwardly as a function of distance from the mask center, such that radial elongation of phosphor deposits in peripheral areas of the screen areas due to UV-diffraction distortion effects during photoscreening is reduced.

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**4,745,330**

## FACEPLATE FRONT ASSEMBLY WITH IMPROVED CERAMIC TENSION MASK SUPPORT STRUCTURE

**Raymond G. Capek, Elmhurst, and Jennifer M. Knowlton, Wilmette, both of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.**

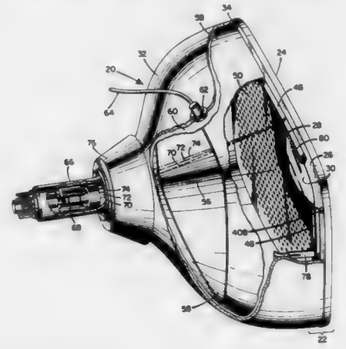
**Filed Jan. 23, 1987, Ser. No. 6,391**
**Int. Cl.[4] H01J** *29/07, 29/82*
**U.S. Cl. 313—407** **10 Claims**

1. A faceplate assembly for a color cathode ray tube including a glass faceplate having on its inner surface a centrally disposed phosphor screen, and a foil shadow mask mounted in

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tension on a mask support structure located on opposed sides of the screen and secured to said inner surface, said mask



support structure comprising at least two adhered layers of ceramic having different coefficients of thermal expansion.

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**4,745,331**

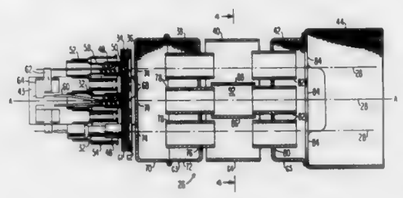
**COLOR PICTURE TUBE HAVING AN INLINE ELECTRON GUN WITH AN EINZEL LENS**

**Roger C. Alig, West Windsor Township, Mercer County, N.J., assignor to RCA Licensing Corporation, Princeton, N.J.**

**Filed Jul. 20, 1987, Ser. No. 75,783**

**Int. Cl.[4] H01J** *26/62*

**U.S. Cl. 313—414** **3 Claims**



1. In a color picture tube including a neck, a funnel and a faceplate and having an inline electron gun in said neck for generating and directing three inline electron beams, a center beam and two side beams, along initially coplanar paths toward a screen of said tube, said gun including a plurality of spaced electrodes which form a main focus lens for focusing said electron beams, the improvement comprising

said plurality of spaced electrodes which form a main focus lens including three electrodes that form an einzel lens in the path of each electron beam, a first of the einzel lens electrodes including three inline cylinders through which the electron beams pass, a second of the einzel lens electrodes including a large oval cylinder that overlaps portions of all three cylinders of the first of the einzel lens electrodes, a third of the einzel lens electrodes including three inline cylinders which are partially overlapped by said oval cylinder, and said first and third einzel lens electrodes being electrically connected, and

means connected to the oval cylinder for shaping the main focus lens to focus the three electron beams stigmatically near ground potential and to converge the outer beams at the center of the screen.

**4,745,332**

**CONTROL PLATE FOR PICTURE-REPRODUCING DEVICES**

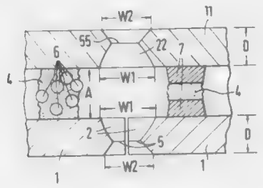
**Kurt-Manfred Tischer, Wendlinger, Fed. Rep. of Germany, assignor to Standard Elektrik Lorenz A. G., Stuttgart, Fed. Rep. of Germany**

**Filed Mar. 12, 1987, Ser. No. 25,225**

**Claims priority, application Fed. Rep. of Germany, Mar. 25, 1986, 3609967**

**Int. Cl.[4] H01J** *29/50*

**U.S. Cl. 313—422** **11 Claims**



1. A control plate for a flat picture-reproducing device, comprising:

a plurality of conductor layers, each layer being formed of spaced metal conductors having first and second surfaces coplanar with surfaces of the layer;

openings arranged in a regular pattern in said conductor layers, said openings having a width that narrows with depth from the surfaces of the conductors, said conductor layers being arranged so that the metal conductors of adjacent layers are orthogonal to each other and the openings are superimposed; and

glass frit disposed between said layers for bonding said layers to each other and providing a predetermined spacing between said layers.

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**4,745,333**

**AUXILIARY ELECTRODES IN FLUORESCENT LAMPS FOR PREVENTING IRREGULAR LIGHT FLICKERING**

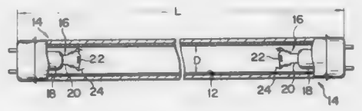
**Masami Takagi; Toshiharu Yagi, both of Yokosuka, and Masao Kawaziri, Kanuma, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Nov. 25, 1986, Ser. No. 934,853**

**Claims priority, application Japan, Nov. 29, 1985, 60-267335**

**Int. Cl.[4] H01J** *61/067, 61/10*

**U.S. Cl. 313—492** **8 Claims**



1. A fluorescent lamp comprising:

a bulb with two ends and defining a discharge path which extends between the ends; and

a pair of discharge electrodes provided at both ends of said bulb, for discharging electrons to and from each other, at least one of said discharge electrodes including a pair of leads protruding in the discharge path substantially along an axial direction of the bulb, a filament mounted between the leads, and rod-like auxiliary electrodes protruding from the leads, respectively, each of said auxiliary electrodes protruding beyond the filament substantially along the axial direction of the bulb, and said auxiliary electrodes being constructed so as to satisfy the following equation



$$Q/I_L \geq 1.0 \times 10^{-2}$$

where

Q: heat capacity of the auxiliary electrode (cal/°C.)

$I_L$: lamp current (A).

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**4,745,334**

**ELECTROLUMINESCENT ELEMENT AND METHOD FOR CONNECTING ITS TERMINALS**

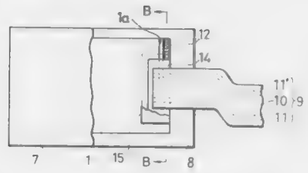
**Kazuhiko Kawachi, Furukawa, Japan, assignor to Alps Electric Co., Ltd., Japan**

**Filed Oct. 27, 1986, Ser. No. 923,302**

**Claims priority, application Japan, Oct. 25, 1985, 60-237199; Oct. 25, 1985, 60-162853[U]**

**Int. Cl.[4] H05B** *33/06, 33/26*

**U.S. Cl. 313—512** **2 Claims**



1. An electroluminescent element comprising:

a transparent upper electrode (2);

an electroluminescent (EL) layer (3) in contact with the transparent electrode;

a lower electrode (1) in contact with the EL layer so that the EL layer emits light when a voltage is applied between the transparent upper electrode and the lower electrode,

said lower electrode and EL layer each having a cut-out portion (1*a*) in registration with each other so as to expose the transparent upper electrode therethrough;

a lead electrode (12) having dimensions smaller than the cut-out portion and disposed within the area of the cut-out portion in contact with the transparent upper electrode but not in contact electrically with the lower electrode around the cut-out portion, wherein a lower surface of the lead electrode and an adjacent lower surface of the lower electrode in the vicinity of the cut-out portion are substantially coplanar;

an anisotropic sheet (14) placed in bridging contact across both the lower surface of the lead electrode and the adjacent lower surface of the lower electrode in the vicinity of the cut-out portion, said anisotropic sheet having the characteristic of being normally non-conductive except that it is made conductive and adhesive in local portions thereof to which heat and pressure are applied;

a flexible printed board (9) having a pair of spaced apart lead patterns (11,11') printed on one surface which are placed in contact with the anisotropic sheet such that one lead pattern is disposed in registration with the lower surface of the lead electrode, and the other lead pattern is disposed in registration with the adjacent lower surface of the lower electrode, said printed board being locally compressed toward the anisotropic sheet and heated such that an electrically conductive portion is established between the one lead pattern and the adjacent lower surface of the lower electrode, and another electrically conductive portion is established between the other lead pattern and the lower surface of the lead electrode.

**4,745,335**

**MAGNESIUM VAPOR DISCHARGE LAMP**

**Masachika Ohyama, Himeji; Mitsuo Narita, Takasago, and Kunihiro Noguchi, Himeji, all of Japan, assignors to Ushio Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Sep. 22, 1986, Ser. No. 909,915**

**Claims priority, application Japan, Oct. 4, 1985, 60-220326; Dec. 23, 1985, 60-287991**

**Int. Cl.[4] H01J** *61/12*

**U.S. Cl. 313—639** **7 Claims**



1. In a magnesium vapor discharge lamp including a light-emitting tubing in which magnesium and a halogen are sealed as light-emitting substances together with mercury and a rare gas in amounts sufficient to retain a discharge, the improvement comprising: iron additionally sealed within the light-emitting tubing in order to intensify the emission spectrum of magnesium.

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**4,745,336**

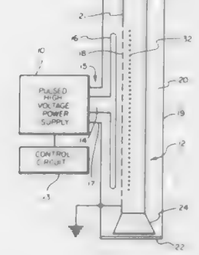
**MICROWAVE GENERATION BY VIRTUAL CATHODE WITH PHASE VELOCITY MATCHING**

**Tihiro Ohkawa, La Jolla, Calif., assignor to GA Technologies Inc., San Diego, Calif.**

**Filed May 27, 1986, Ser. No. 867,074**

**Int. Cl.[4] H03B** *9/01*

**U.S. Cl. 315—4** **7 Claims**



1. A microwave source for generating pulses of microwaves having a dominant frequency comprising:

a direct current high voltage source;

an elongated cathode having an emitting surface with a longer dimension and a shorter dimension, said longer dimension being at least three times the wavelength corresponding to the dominant frequency of said microwave pulses;

an elongated anode aligned parallel to said elongated cathode and laterally spaced therefrom and electron previous over at least an area corresponding to said emitting surface so as to produce an oscillating elongated virtual cathode with a surface wave having a velocity near the velocity of light when the high voltage of said direct current high voltage source is applied between said elongated cathode and said elongated anode; and

a waveguide enclosing said virtual cathode and disposed to propagate in the direction of the elongation of said elongated cathode, microwave radiation having a phase veloc-

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ity, said waveguide being constructed such that the phase velocity of said microwave radiation approximately matches the velocity of said virtual cathode surface wave.

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**4,745,337**

## METHOD AND DEVICE FOR EXCITING A PLASMA USING MICROWAVES AT THE ELECTRONIC CYCLOTRONIC RESONANCE

**Michel Pichot, Grenoble; Jacques Pelletier, Saint Martin D'Heres, and Yves Arnal, Poizat, all of France, assignors to Centre National d'Etudes des Telecommunications and Centre National De La Recherche Scientifique, both of Paris, France**

**Filed Jun. 5, 1986, Ser. No. 871,107**

**Claims priority, application France, Jun. 7, 1985, 8508836**

**Int. Cl.[4] H01J *27/00*; B23K *9/00***

**U.S. Cl. 315—111.41** **14 Claims**



1. A device exciting a plasma by using microwaves at the electronic cyclotronic resonance to create a central volume of plasma which is devoid of magnetic field, wherein said device comprises a vessel defining a central volume, at least one permanent magnet positioned remote from the central volume creating a surface of constant magnetic field and of intensity corresponding to the electronic cyclotronic resonance remote from the central volume, and at least one antenna joined to a co-axial structure for applying energy in the microwave range, and positioned on said surface of constant magnetic field and of intensity corresponding to the electronic cyclotronic resonance for exciting a plasma locally to the at least one permanent magnet and remote from the central volume so that the plasma is devoid of magnetic field in the central volume.

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**4,745,338**

## ELECTROMAGNETICALLY SUSTAINED PLASMA REACTOR

**Daniel L. Hollis, Jr., Cottondale, and Jerry T. McLendon, Berry, both of Ala., assignors to University of Alabama, Tuscaloosa, Ala.**

**Filed Apr. 22, 1986, Ser. No. 854,632**

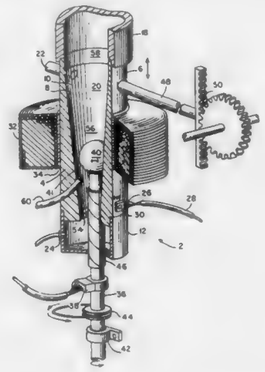
**Int. Cl.[4] H01J *23/34*; H05B *31/26, 7/005***

**U.S. Cl. 315—111.71** **13 Claims**

1. A plasma arc reactor for refining raw materials comprising:

spaced electrode means including at least one anode electrode defining a reaction chamber and at least one cathode electrode mounted within said reaction chamber and variably spaced from said anode electrode;

electrical circuit means connected to said anode and cathode electrodes for creating a plasma arc within said reaction chamber;



and an induction coil means externally mounted circumferentially about said reaction chamber for producing a magnetic field therein.

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**4,745,339**

## LAMP FAILURE DETECTING DEVICE FOR AUTOMOBILE

**Minoru Izawa, Toyota; Ryohei Doi; Ritsuo Suzuki, and Kenichi Kinoshita, all of Aichi, Japan, assignors to Kabushiki Kaisha Tokai Rika Denki Seisakusho, Japan**

**Filed Apr. 8, 1986, Ser. No. 849,415**

**Claims priority, application Japan, Apr. 12, 1985, 60-055207[U]**

**Int. Cl.[4] H01J *1/60***

**U.S. Cl. 315—130** **3 Claims**



1. A lamp failure detecting device for automobiles comprising:

(a) a lamp circuit comprising a plurality of lamps connected in parallel and a power-supply source;

(b) an electric current detecting resistance connected in series to the power-supply source and said lamp circuit, said electric current detecting resistance having two terminals;

(c) a first voltage divider circuit comprising a plurality of first resistances connected in series between one of the terminals of said electric current detecting resistance and a ground potential point;

(d) a second voltage divider circuit comprising a plurality of second resistances connected in series between the other terminal of said electric current detecting resistance and the ground potential point;

(e) a first diode connected in series to the first resistances of said first voltage divider circuit in the forward direction;

(f) a second diode connected in series to the second resistances of said second voltage divider circuit in the forward direction; and

(g) a comparator circuit having its inputs connected respectively to the junction of resistors in the first voltage divider circuit and in the second voltage divider circuit for comparing the divided voltages gained in said first and second voltage divider circuits, thereby producing a lamp failure detection signal in the case where a failure occurs in at least one of the lamps.



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**4,745,340**

## ELECTRIC GENERATOR SYSTEM FOR PORTABLE FLOODLIGHTING EQUIPMENT

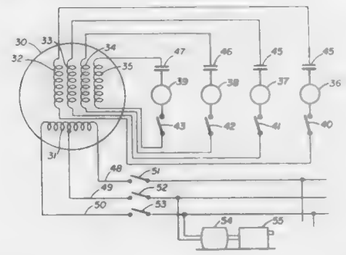
**Michael J. Wanasz, Littleton, Colo., assignor to Herbert F. Koether, Denver, Colo.**

**Continuation-in-part of Ser. No. 513,295, Jul. 14, 1983, Pat. No. 4,591,763. This application May 27, 1986, Ser. No. 868,115**

**The portion of the term of this patent subsequent to May 27, 2003, has been disclaimed.**

**Int. Cl.[4] H05B *41/16***

**U.S. Cl. 315—144** **2 Claims**



1. A power generating system for portable floodlighting equipment and the like including a plurality of high intensity gaseous electric discharge lamps and an auxiliary electric motor-driven apparatus, an engine-driven generator for supplying alternating current to said lamps and to said auxiliary apparatus, said generator having a plurality of separate windings including a respective winding connected in a series circuit with each respective one of said lamps for supplying current at voltages sufficiently high for starting said lamps, a switch for each respective lamp circuit, and an additional separate winding connected to said motordriven apparatus for supplying current at a lower voltage for energizing said auxiliary apparatus, said generator including a magnetic core having a multiplicity of slots for retaining the windings and wherein each of said separate windings is located in a different set of said slots, each of said respective windings generating alternating current at least approximately ninety degrees out of phase with respect to that of the other and with respect to the alternating current generated by said additional winding, a respective capacitor connected in series curcuit with each of said respective windings and said respective lamps for limiting the current flowing through each said circuit when the respective lamp is conducting, the phase difference between the current flowing in said respective winding and the current flowing in said additional winding decreasing the likelihook of interference with the operation of the load on any one of said windings upon the occurrence of a change of load on another.

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**4,745,341**

## RAPID RESTRIKE STARTER FOR HIGH INTENSITY DISCHARGE LAMPS

**Donald C. Herres, Syracuse, N.Y., assignor to Cooper Industries, Houston, Tex.**

**Continuation-in-part of Ser. No. 843,548, Mar. 25, 1986, abandoned. This application May 26, 1987, Ser. No. 54,060**

**Int. Cl.[4] H05B *37/00***

**U.S. Cl. 315—176** **5 Claims**

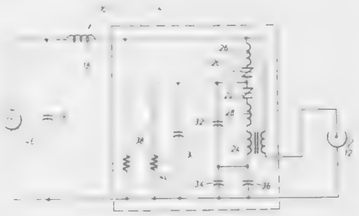
1. A rapid restrike starter for starting a high intensity discharge lamp by high voltage pulses comprising:

a pulse transformer, the secondary of which is connected in series with the lamp and a ballast;

a first voltage triggered switch connected in series with the primary of said pulse transformer;

a second voltage triggered switch connected in series with said first voltage triggered switch and the primary of said pulse transformer;

a first inductor connected in series with said first and said second voltage triggered switch and the primary of said pulse transformer;



a second inductor connected in series with said first and said second voltage triggered switch, said first inductor means and the primary of said pulse transformer;

a first capacitor connected in series with said first and second voltage triggered switch, said first and second inductor means and the primary of said pulse transformer;

a second capacitor connected and parallel with said second voltage triggered switch, said second inductor, said first capacitor and the primary of said pulse transformer; and

a third capacitor connected in parallel with said second voltage triggered switch and said second inductor and the primary of said pulse transformer.

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**4,745,342**

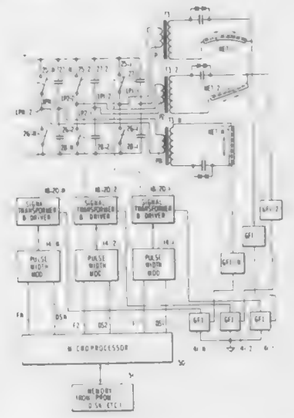
## METHOD AND APPARATUS FOR DRIVING NEON TUBE TO FORM LUMINOUS BUBBLES AND CONTROLLING THE MOVEMENT THEREOF

**Jack S. Andresen, and Mark S. Andreasen, both of 2663 Fair Oaks Ave., Redwood, Calif. 94063**

**Filed Oct. 30, 1986, Ser. No. 924,946**

**Int. Cl.[4] H05B *37/00***

**U.S. Cl. 315—200 R** **5 Claims**



1. A system for driving a neon tube to form luminous bubbles or beads and controlling the motion thereof in said neon tube comprising:

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a high voltage transformer having primary and secondary windings, said secondary winding being electrically connected to said neon tube,
a high voltage DC supply having a pair of terminals,
a pair of electronic switches connected in tandem across said pair of terminals, there being a first common point between said tandem connected electronic switches,
a pair of capacitors connected in tandem across said pair of terminals, there being a second common point between said tandem capacitors,
means connecting one end of said primary windings to said first common point and the other end of said primary winding to said second common point,
means connecting the ends of said secondary winding to said neon tube,
a control signal generator having means for adjusting at least one of the duty cycle and frequency thereof,
a signal transformer having primary and secondary windings,
an impedance matching circuit coupling said control signal generator to said primary winding, and
conductor means connecting said secondary windings to said electronic switches to alternately control the on/off conditions of said electronic switches and thereby the formation and movement of said luminous bubbles or beads.

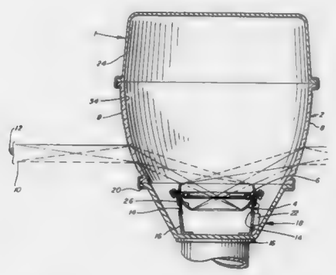
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**4,745,343**

## PANORAMIC OPTICAL SYSTEM WITH VERY SHARP BEAM CONTROL

**William C. Beggs, 4110 Shawnee La., NE., Atlanta, Ga. 30319**

**Division of Ser. No. 651,742, Nov. 7, 1984, Pat. No. 4,593,345, which is a division of Ser. No. 405,723, Aug. 6, 1982, Pat. No. 4,486,691, and Ser. No. 165,131, Jul. 2, 1980, abandoned. This application Dec. 23, 1985, Ser. No. 812,054**
**Int. Cl.[4] H05B** *41/32*
**U.S. Cl. 315—246** **1 Claim**



1. In a flash lamp incorporating a flash tube and a reflector, the improvement comprising
a flash tube adapted to be triggered by the application of an external high voltage pulse,
high current discharge electrodes associated with said tube and having an electrical potential limited to the voltage insulation capability of the main discharge circuit of the tube,
a trigger conductor on the external surface of the tube for applying said external high voltage pulse,
a source of high voltage connected to the trigger conductor arranged to provide said high voltage electrical pulse,
a reflector having an open top and an open bottom and continuous sides positioned adjacent to and spaced apart from the trigger conductor at a distance less than the voltage insulation capability of the dielectric between the reflector and the trigger conductor,
the distance between the reflector and the surface of the tube providing a passageway for a moving layer of cooling fluid between the reflector and the surface of the tube through the open bottom and open top of the reflector, and
means for supplying an electrical potential to the reflector equal to the electrical potential on the trigger conductor.

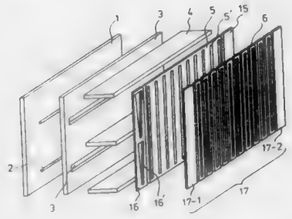
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**4,745,344**

## FLAT PLATE-SHAPED CATHODE RAY TUBE

**Kaoru Tomii, Isehara; Hiroshi Miyama, Yokohama; Yoshikazu Kawauchi, Kawasaki, and Jun Nishida, Tokyo, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan**

**Filed Nov. 6, 1985, Ser. No. 795,490**
**Claims priority, application Japan, Nov. 6, 1984, 59-233636; Nov. 6, 1984, 59-233649; Nov. 6, 1984, 59-233650**
**Int. Cl.[1] H01J** *29/70*
**U.S. Cl. 315—366** **34 Claims**



1. A flat plate-shaped cathode ray tube comprising:
filament-cathode means for emitting an electron beam;
a back electrode disposed at one side of said filament-cathode means;
beam extracting electrode means for extracting said electron beam, disposed at an other side of said filament-cathode means;
vertical focussing and deflecting electrode means for focussing and deflecting said electrode beam, disposed at said other side of said beam extracting electrode means;
a plurality of electrodes disposed at said other side of said vertical focussing and deflection electrode means;
a screen disposed in front of said plurality of electrodes; and
electron beam current detecting electrode means for detecting a magnitude of said electron beam, said electron beam current detecting electrode means disposed outside, in a horizontal direction, of an effective picture area, which is an area through which an electron beam controlled by a video signal passes, of at least one of said plurality of electrodes.

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**4,745,345**

## D.C. MOTOR WITH AXIALLY DISPOSED WORKING FLUX GAP

**Christian C. Petersen, Pocasset, Mass., assignor to Camatec Corporation, Fremont, Calif.**

**Filed Dec. 2, 1986, Ser. No. 936,815**
**Int. Cl.[4] H02K** *29/08*
**U.S. Cl. 318—254** **26 Claims**



1. Motion generating apparatus, comprising:
a magnetically permeable base;
a stator having a predetermined number of magnetically permeable core components supported in upstanding fashion from said base, in magnetic flux transfer communication therewith and extending along their lengthwise extents to end locations arranged to define a locus of selectively spaced pole positions;
insulative means mounted over each said core component for providing insulation over the said lengthwise extent thereof;
field winding means supported upon said insulative means and selectively excitable during an excitation state; and
rotor means including a magnetically permeable support, a select number of thin permanent magnet segments formed of a magnetic material substantially resistant to demagnetization in the presence of flux directed thereinto, supported by said support, movable along said locus to provide flat outwardly disposed surfaces extending over said pole positions and substantially perpendicular to said lengthwise extents thereof, the surface of said magnet segments being spaced a predetermined gap width from said end locations and being configured having a dimension along said locus selected to effect a substantial minimization of static state attraction and repulsion characteristics between said rotor means and said pole positions when said rotor means is driven during said excitation state by select excitation of said field winding means.



16. Motion generating apparatus, comprising:
a magnetically permeable base;
a predetermined number of magnetically permeable stator core components having a given thickness and principal lengthwise extent supported in upstanding fashion from said base, in magnetic flux transfer communication therewith and extending along their lengthwise extents to end locations arranged to define a circular locus of selectively spaced pole positions having a central axis;
insulative means mounted over each said core component for providing insulation over said lengthwise extent thereof;
field winding means supported upon said insulative means and selectively excitable during an excitation state;
driver means including a select number of permanent magnet segments mounted for driver movement along said locus, said magnet segments being spaced a predetermined gap width from said end locations and being configured having a dimension along said locus selected to effect a substantial minimization of static state attraction and repulsion characteristics between said driver means and said pole positions when said driver means is driven during said excitation state by select excitation of said field winding means and
said stator core components being mounted wherein the principal widthwise dimension is skewed with respect to a radius through said axis an amount selected to minimize said static state attraction and repulision characteristics.

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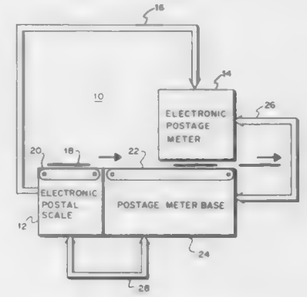
**4,745,346**

## ELECTRONIC POSTAGE METER PRINT WHEEL SETTING OPTIMIZATION SYSTEM

**Arno Muller, Westport, Conn., assignor to Pitney Bowes Inc., Stamford, Conn.**

**Continuation of Ser. No. 657,707, Oct. 4, 1984, abandoned. This application Mar. 16, 1987, Ser. No. 27,144**
**Int. Cl.[4] G05B** *13/00*
**U.S. Cl. 318—685** **9 Claims**

1. In a postage meter system of the type having postage value input selection means for specifying a desired postage value, a postage printing means with a settable printing element and a drive means in communication with said input selection means and coupled to said postage printing means for setting said postage printing element of said postage printing means, a print element setting system, comprising:
said drive means operable to drive said printing element of said postage printing means at different operating speeds to set said postage printing element to selected postage value;
position detecting means for detecting the actual position setting of said printing element; and
control means coupled to said input selection means and said drive means for controllably causing said drive means to change the position of said postage printing element from an initial position to a selected position corresponding to the desired postage value specified by said input selection means at a given setting speed and incrementally increasing said setting speed for each successive position change




of said postage printing element up to a maximum setting speed;
said control means further coupled to said position detection means for comparing the actual position of said postage printing element to the selected position by said input selection means such that should said selected position and said actual position of said postage printing elements not correspond said control means shall position correct said postage printing element to said selected position and decrement said setting speed and set said maximum setting thereto.

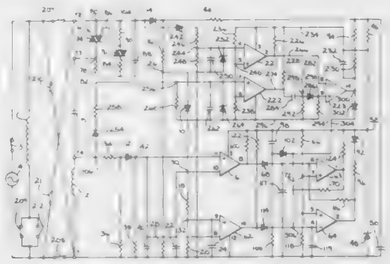
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**4,745,347**

## LOW COST INSTANT REVERSING CIRCUIT

**Richard A. Wrege; Victor A. Murn, both of Muskego, and Dennis K. Lorenz, Brookfield, all of Wis., assignors to PT Components, Inc., Brookfield, Wis.**

**Filed Sep. 24, 1986, Ser. No. 911,009**
**Int. Cl.[4] H02P** *3/20*
**U.S. Cl. 318—744** **4 Claims**



1. In a single phase AC induction motor having a main winding and an auxiliary winding both connectable to an AC power source, and having start switch means for automatically connecting and disconnecting said auxiliary winding to and from said AC source in starting and running modes, respectively, and having a user operated reversing switch for reversing the voltage polarity applied from said AC source to one of said windings relative to the other of said windings, the improvement comprising means electrically sensing said polarity

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reversal during said running mode and automatically reconnecting said auxiliary winding to said AC source,

said sensing means comprising:

first voltage sensor means sensing main winding voltage;

second voltage sensor means sensing auxiliary winding voltage;

third voltage sensor means comprising voltage comparator means having a reference input from one of said first and second voltage sensor means and having a comparing input from the other of said first and second voltage sensor means and having an output actuating said start switch means to reconnect said auxiliary winding to said AC source upon said polarity reversal;

differentiator means between one of said first and second voltage sensor means and said voltage comparator means of said third voltage sensor means and differentiating the respective one of said reference and comparing inputs to said voltage comparator means,

wherein:

said first voltage sensor means outputs pulses responsive to a give polarity and magnitude of said main winding voltage;

said second voltage sensor means outputs pulses responsive to a give polarity and magnitude of induced auxiliary winding voltage during said running mode, said induced auxiliary winding voltage being phase shifted by 0°–90° from said main winding voltage during said running mode;

said differentiator means differentiates said output pulses from one of said first and second voltage sensor means to a reduced pulse width narrower than said output pulses from the other of said first and second voltage sensor means, said differentiated output pulses from said one voltage sensor means being compared against said output pulses from said other voltage sensor means by said voltage comparator means, such tht upon said polarity reversal the auxiliary winding voltage shifts 180° relative to the main winding voltage and said differentiated pulse shifts from a running mode position to a polarity reversal position relative to said output pulse from said other voltage sensor means, said differentiated pulse being coincident with said output pulse from said other voltage sensor means in one of said running mode and polarity reversal positions, said differentiated pulse being non-concident with said output pulse from said other voltage sensor means in the other of said running mode and polarity reversal positions.

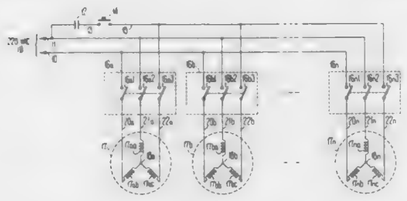
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**4,745,348**

## APPARATUS FOR STARTING AND RUNNING A PLURALITY OF THREE-PHASE MOTORS FROM A SINGLE-PHASE POWER SOURCE

**William T. Young, Rte. 1, Box 1496, Dawsonville, Ga. 30534**

**Filed Sep. 22, 1986, Ser. No. 910,133**
**Int. Cl.[4] H02P *1/44***
**U.S. Cl. 318—749** **5 Claims**



1. Apparatus for starting and running a plurality of three-phase motors from a single-phase power source, each said motor having at least three terminals, said single-phase power source providing a predetermined voltage between a first conductor and a second conductor, comprising:

phase shifting means connected to said first conductor for providing a phase-shifted voltage;

first switching means connected to said phase shifting means for selectively applying said phase-shifted voltage to a third conductor; and

a plurality of second switching means, each said second switching means being connected between said first, second, and third conductors, and a particular one of said motors for selectively connecting said first, second, and third conductors to said first, second, and third terminals, respectively, of said particular one of said motors;

wherein said first switching means applies said phase-shifted voltage to said third conductor during starting of each of said three-phase motors.

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**4,745,349**

## APPARATUS AND METHOD FOR CHARGING AND TESTING BATTERIES

**Thirumalai G. Palanisamy, Morris Township, Morris County; Stuart E. Mendelson, Kendall Park; Divna Cipris, Morristown, and Ronald R. Chance, Annandale, all of N.J., assignors to Allied Corporation, Morris Township, Morris County, N.J.**

**Filed Oct. 16, 1986, Ser. No. 919,417**
**Int. Cl.[4] H02J *7/00***
**U.S. Cl. 320—22** **10 Claims**

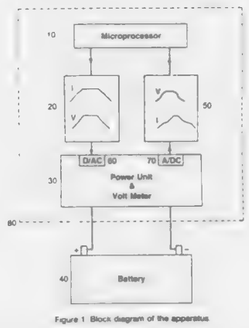



Figure 1. Block diagram of the apparatus

1. A method for charging a rechargeable battery which comprises the steps of:

(a) measuring the open circuit voltage of said battery and estimating the number of cells possible for the measured open circuit voltage;

(b) supplying a controllably varying charging current or voltage to the battery for a predetermined period of time and testing said battery for the evolution of gas;

(c) charging said battery automatically at any charge voltage until the battery charge voltage equals the estimated number of cells of the battery multiplied by a predetermined voltage which is characteristic of the battery;

(d) repeating steps (a), (b) and (c) until step (b) indicates the evolution of gas;

(e) determining the current and voltage at which the said battery evolves gas in the increasing current direction ("Igas-up") or in the increasing voltage direction ("Vgas-up"), and the current and voltage at which the battery stops evolving gas in the decreasing current direction ("Igas-down") and in the decreasing voltage direction ("Vgas-down");

(f) determing the true number of cells in the said battery from Vgas-up and/or Vgas-down;

(g) charging the said battery automatically at any charge rate until the battery voltage equals the true number of cells multiplied by a predetermined voltage which is characteristic of the battery;

(h) charging the said battery at a constant voltage equal to voltage in step (g) until the charge current decreases to a predetermined low value;

(i) charging the said battery with a predetermined constant current at any voltage for a predetermined period of time; and

(j) repeating steps (b), (e), and (i) until step (b) indicates the evolution of gas and step (e) indicates that Igas-down reaches a predetermined lower limit which is characteristic of the desired state of charge of the battery.



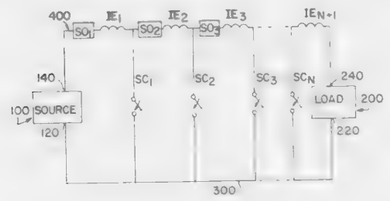
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**4,745,350**

## DEVICE FOR AND METHOD OF MODULATING AN ELECTRIC CURRENT PULSE

**James R. Long, La Jolla, and Kenneth G. Lindner, San Diego, both of Calif., assignors to Energy Compression Research Corporation, Del Mar, Calif.**

**Filed Jun. 22, 1987, Ser. No. 64,555**
**Int. Cl.[4] G05F *1/70***
**U.S. Cl. 323—209** **18 Claims**




4. A device for delivering a current pulse having a predetermined current profile to a load having a first load terminal and a second load terminal, said device comprising:

a source of electrical energy having a first source terminal and a second source terminal, said first source terminal being electrically connected to said first load terminal by a direct connection;

a linear inductor array interposed between said second source terminal and said second load terminal, said array comprising N mutually magnetically coupled inductor elements, N being a positive integer; N closing switch elements, each of said closing switch elements being arranged to connect an associated inductor element to said direct connection; and N constant voltage opening switch elements, each of said opening switch elements being interposed in series between an associated closing switch element and said direct connection for disconnecting an inductor element associated with said associated closing switch element from said direct connection.

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**4,745,351**

## MULTIPLE LOCATION DIMMING SYSTEM

**Michael J. Rowen, Emmaus; John E. Longenderfer, Orefield, and Stephen J. Yuhasz, Zionsville, all of Pa., assignors to Lutron Electronics Co., Inc., Coopersburg, Pa.**

**Continuation-in-part of Ser. No. 857,739, Apr. 29, 1986, Pat. No. 4,689,547. This application Apr. 22, 1987, Ser. No. 41,149**
**The portion of the term of this patent subsequent to Aug. 25, 2004, has been disclaimed.**
**Int. Cl.[4] G05F *1/455***
**U.S. Cl. 323—239** **15 Claims**

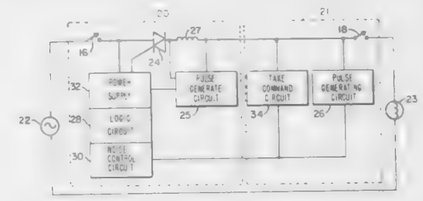
1. A system for controlling electrical power to a load comprising, in combination:

(a) a dimming system to control power to said load in accordance with a signal provided by a control means, which includes an actuator positionable for determining the value of said control signal,

(b) override means to permit power to said load when said actuator is positioned for power to said load to be off, and

(c) a first switch means, which

(i) if power to said load is on, turns said power off; and



(ii) if power to said load is off, turns said power on to a value determined either by said actuator position or by said override means.

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**4,745,352**

## SWITCHING AC VOLTAGE REGULATOR

**Thomas B. McGuire, San Diego, Calif., assignor to Topaz, Inc., San Diego, Calif.**

**Filed Jun. 8, 1987, Ser. No. 59,089**
**Int. Cl.[4] G05F *1/26***
**U.S. Cl. 323—263** **20 Claims**




1. An automatic AC voltage regulator for receiving an AC input voltage and maintaining an AC output voltage at a predetermined level, said regulator comprising:

a first input terminal and a second input terminal between which the input voltage is applied;

a first output terminal and a second output terminal between which the output voltage is maintained;

an auto-transformer having a first winding and a second winding;

switching means connected to said auto-transformer, said input terminals, and said output terminals, said switching means having a first position and a second position, in the first position said switching means allowing transformer action to take place between said input terminals and said output terminals, in the second position said switching means shorting out the windings of said auto-transformer such that no transformer action takes place between said input terminals and said output terminals;

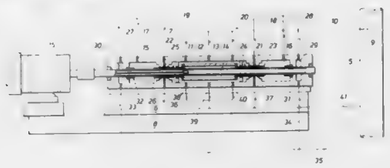
sensing means for comparing the output voltage to the predetermined voltage level, said sensing means sending a signal to indicate the relationship between the output voltage and said predetermined voltage level; and

control means for receiving said signal and alternately operating said switching means in response to said signal to maintain said output voltage at said predetermined level.

## 4,745,353
### IN SITU BS&W MEASUREMENT

**Thomas L. Stewart, Houston, and Florian C. Demny, Pasendana, both of Tex., assignors to Shell Oil Company, Houston, Tex.**

**Filed Sep. 25, 1985, Ser. No. 780,521**
**Int. Cl.[4] G01N *23/04***
**U.S. Cl. 324—58.5 A** **4 Claims**



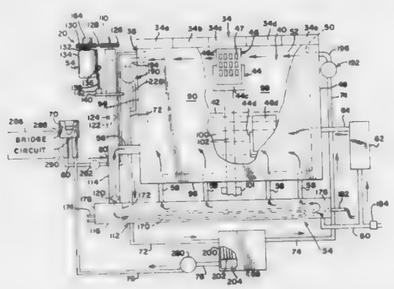
1. A process for measuring the water and sediment content of a wet stream which is predominantly non-aqueous, comprising:
- removing a sample of the wet stream;
- admitting the wet stream sample to an outer chamber containing an inner chamber having a wall formed of a filter;
- rotating the inner chamber while pressuring the wet stream sample from the outer chamber into the inner chamber, whereby any sediment present is filtered from the wet stream sample passing into the inner chamber and centrifugal force in the inner chamber forces water in the wet stream sample to remain in the outer chamber and thereby form a dry stream sample;
- producing short wave radio waves of a fixed frequency and constant energy;
- emitting the radio waves by an antenna into the dry stream sample substantially immediately as the dry stream sample is formed and into a portion of the wet stream;
- determining the attenuation of the radio waves by the effect upon output voltage from means producing the radio waves; and
- measuring the difference between the attenuation of the radio waves emitted into the dry stream sample and the wet stream portion to facilitate determining the true water and sediment content of the wet stream.

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## 4,745,354
### APPARATUS AND METHODS FOR EFFECTING A BURN-IN PROCEDURE ON SEMICONDUCTOR DEVICES

**Douglas S. Fraser, Bloomington, N.Y., assignor to FTS Systems, Inc., Stone Ridge, N.Y.**

**Continuation-in-part of Ser. No. 736,421, May 20, 1985, abandoned. This application Aug. 26, 1986, Ser. No. 900,530**
**Int. Cl.[4] G01R *31/26***
**U.S. Cl. 324—73 R** **59 Claims**



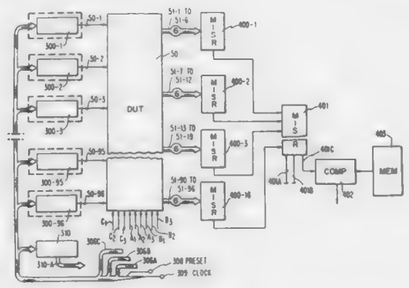
1. An apparatus for thermally stressing for an extended period a plurality of semiconductor devices at an elevated temperature in a bath of an inert, substantially electrically insulating, liquid heat exchange medium, the medium having a specific heat greater than air and a boiling point greater than said elevated temperature, and said semiconductor devices being electrically operated to produce excess heat while being thermally stressed for said extended period, said apparatus comprising:
- a tank having a sealable burn-in chamber adapted to receive therein said semiconductor devices, the tank further being adapted to receive therein a quantity of said liquid medium sufficient to cover said semiconductor devices while they are being electrically operated and the medium having said elevated temperature, said tank having sufficient size for said chamber to include an upper free space containing ambient gases, in which water vapor can be present, above said medium sufficient for said semiconductor deices to be positioned in said free space and be clear of said medium;
- cooling means in liquid communication with said chamber and adapted to remove said excess heat from said liquid medium to maintain said liquid medium substantially at said elevated temperature, said cooling means being exterior of said chamber;
- pump means adapted to move said liquid medium from said tank to said cooling means back to said tank with said liquid medium entering said chamber at plural locations to produce agitation of the liquid medium therein, so that said apparatus maintains a substantially uniform temperature throughout the medium in said tank chamber; and
- vapor recovery means for removing vapors of at least said medium from said upper free space in a closed loop from and to said upper free space, said vapors being condensed to liquid medium and liquid water and said condensed liquid medium being returned to said liquid medium in said chamber substantially free of any liquid water vapor simultaneously condensed.

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## 4,745,355
### WEIGHTED RANDOM PATTERN TESTING APPARATUS AND METHOD

**Edward B. Eichelberger, Hyde Park, N.Y.; Roger N. Langmaid, New Fairfield, Conn.; Eric Lindbloom, Poughkeepsie, N.Y.; Franco Motika, Hopewell Junction, N.Y.; John L. Sinchak, Wappingers Falls, N.Y., and John A. Waicukauski, Hopewell Junction, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Division of Ser. No. 748,288, Jun. 24, 1985, Pat. No. 4,687,988. This application May 11, 1987, Ser. No. 48,178**
**Int. Cl.[4] G01R *31/28***
**U.S. Cl. 324—73 R** **6 Claims**




1. Apparatus for testing a complex integrated circuit device having a very substantially greater number of internally interconnected logic elements than the number of input and output terminals of said device, thus rendering the internal elements inaccessible for discrete testing theoeof, comprising;
- (a) a plurality of pseudo-random pattern generators, one for each input terminal, each of said generators being operative to produce a uniquely different sequence of pseudo-random bit patterns,
- (b) means for applying the succession of bits from each of said generators to a different one of said input terminals in parallel as test input stimuli thereto.
- (c) signature register means operative responsive to all of the signals produced on said output terminals responsive to a succession of input stimuli to derive a signature which is a predetermined function of all of said output responses, and
- (d) and comparing means for comparing the thus-derived test signature with a signature of a known good device subjected to the same test stimuli.

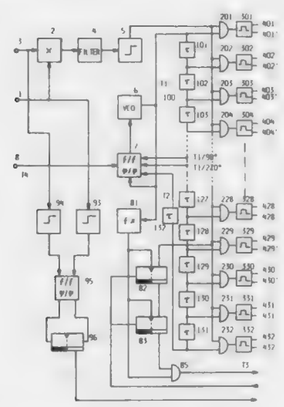


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## 4,745,356
### METHOD AND APPARATUS FOR QUICKLY AND PRECISELY MEASURING THE FREQUENCY OF A SIGNAL

**Werner Henze, Hohnhorst, Fed. Rep. of Germany, assignor to Blaupunkt-Werke GmbH, Hildesheim, Fed. Rep. of Germany**

**Filed Apr. 17, 1987, Ser. No. 39,677**
**Claims priority, application Fed. Rep. of Germany, Apr. 26, 1986, 3614272**
**Int. Cl.[4] G01R *23/02***
**U.S. Cl. 324—78 D** **15 Claims**



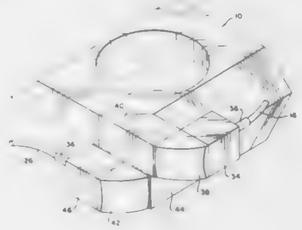
1. Method of continuously measuring with high precision the frequency of a radio-frequency signal (3) by counting pulses and outputting the resulting count (90) as a digital signal, comprising the steps of
- deriving (2,4,5) count pulses from clock pulses (T1), said count pulses having a frequency which is a multiple of the frequency of said clock pulses,
- feeding said count pulses to a chain (100) of delay elements (101–131),
- tapping output pulses at respective taps or terminals of said delay elements,
- counting said output pulses in a plurality of counters (61–68); and
- adding together the contents of said counters (61–68) after a time interval corresponding to a cycle or portion of a cycle of said signal (3).

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## 4,745,357
### OPTICAL INTERFACE FOR A MAGNETO-OPTICAL CURRENT TRANSDUCER

**Robert C. Miller, Salem Twp., Westmoreland County, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Mar. 23, 1987, Ser. No. 30,004**
**Int. Cl.[4] G02B *6/42*; G02F *1/09***
**U.S. Cl. 324—96** **6 Claims**



1. A magneto-optical current measuring device for measuring the current in an energy transmission line, comrising:
- a calibrated light source,
- a magneto-optical current sensing means disposed in surrounding proximity to said energy transmission line for imparting a change in planar orientation of a polarized beam of light as a function of a magnitude of current in said energy transmission line;
- a collimating lens element having a spacer lens portion and a collimator segment which has a surface formed in the shape of a paraboloid of revolution, said collimating lens element being receptive of the output of said calibrated light source and further being effective such that said calibrated light source output, which enters said collimating lens element as a divergent beam of light, is focussed by a parabolic surface associated with said paraboloid of revolution into a parallel beam of light; a polarizing element connected between said collimating lens element and said magneto-optical current sensing means and effective such that said parallel beam of light is polarized thereby; logic means connected to said magneto-optical current sensing means for evaluating said change in polar orientation of said polarized beam of light and determining therefrom said magnitude of current.

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## 4,745,358
### AUXILIARY DISPLAYING DEVICE OF A DIGITAL METER DISPLAY

**Takaaki Yada; Tadao Nakamura, and Ichiro Asano, all of Minami, Japan, assignors to Horiba, Ltd., Kyoto, Japan**

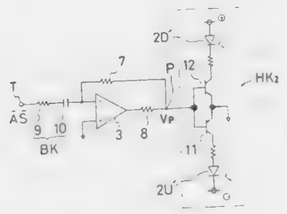
**Filed Jan. 2, 1986, Ser. No. 815,997**
**Claims priority, application Japan, Feb. 7, 1985, 60-23179**
**Int. Cl.[4] G01R *17/06*; G06F *3/14***
**U.S. Cl. 324—99 D** **4 Claims**

1. An auxiliary display device for use in conjunction with a digital meter display comprising:
- a means for receiving an analog input signal;
- a slope detection means operatively connected to said receiving means for determining whether said analog input signal is increasing in value or decreasing in value with respect to time;
- first and second display means which are disposed physically adjacent to the digital meter display and which are operatively electrically connected to said slope detection means for respectively indicating whether said analog input signal is increasing or decreasing in value with respect to

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time, whereby the direction of change of the value of said analog signal with respect to time which is being digitally




displayed on said digital display may be immediately determined at a glance.

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**4,745,359**

## METHOD AND APPARATUS FOR DETERMINING POLARITY OF A CAPACITOR

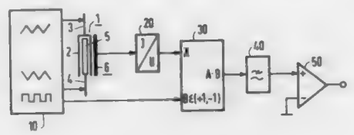
**Eberhardt Leitz, Herzogenaurach, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Dec. 5, 1985, Ser. No. 805,508**

**Claims priority, application Fed. Rep. of Germany, Dec. 17, 1984, 3445993**

**Int. Cl.[4] G01R** *19/14, 11/52, 27/26*

**U.S. Cl. 324—133** **21 Claims**




12. Apparatus for determining the polarity of a capacitor whose polarity is not determinable from the structural form of its exterior portion, said capacitor having an inner and an outer electrode arranged concentrically, two axial electrical terminals, and an outwardly electrically insulating coating, wherein one of said electrical terminals is connected to the outer electrode and the other one of said electrical terminals is connected to the inner electrode, comprising:

a circuit for the generation of mutually phase-shifted a-c voltages;

means for applying said mutually phase-shifted voltages to respective electrical terminals of said capacitor;

a probe, adapted for contacting a portion of said outwardly electrically insulating coating of said capacitor, for producing a measurement signal; and

means for evaluating said measurement signal in response to the mutually phase-shifted signals and for generating a polarity representative signal; wherein

the shape of the probe develops a sufficiently large capacitance over a large area of the exterior portion of the capacitor.

**4,745,360**

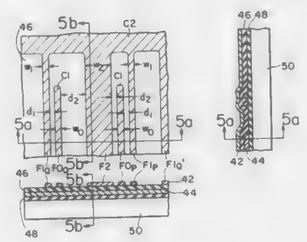
## ELECTRON-BEAM PROBE SYSTEM UTILIZING TEST DEVICE HAVING INTERDIGITATED CONDUCTIVE PATTERN AND ASSOCIATED METHOD OF USING THE TEST DEVICE

**Jan D. Reimer, Palo Alto, and Victor R. Akylas, San Jose, both of Calif., assignors to North American Phillips Corporation, Signetics Division, Sunnyvale, Calif.**

**Filed May 1, 1986, Ser. No. 858,613**

**Int. Cl.[4] G01R** *19/00, 35/00*

**U.S. Cl. 324—158 R** **20 Claims**




1. A system comprising: a test device in which a patterned electrically conductive layer lies on an electrically insulating layer; means for directing a beam of primary electrons towards the conductive layer to cause the device to emit secondary electrons; and means for collecting secondary electrons emitted from the device; characterized in that the conductive layer comprises at least one region, each region comprises first and second conductors separated from each other, each conductor has a group of fingers extending from a main portion, the fingers run substantially parallel to one another and are at least partially interdigitated, the width of each finger is largely constant along its length, each region is composed of a plurality of subregions, each subregion has a specified one of the fingers of the first conductor lying between a first of the fingers of the second conductor and a second of the fingers of one of the conductors, and $w_0$for each subregion differs from $w_0$ for each other subregion in the same region where $w_0$ is the width of the specified finger in each subregion.

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**4,745,361**

## ELECTRO-OPTIC MEASUREMENT (NETWORK ANALYSIS) SYSTEM

**John A. Nees; Gerard A. Mourou, and Todd A. Jackson, all of Rochester, N.Y., assignors to University of Rochester, Rochester, N.Y.**

**Filed Mar. 3, 1987, Ser. No. 21,089**

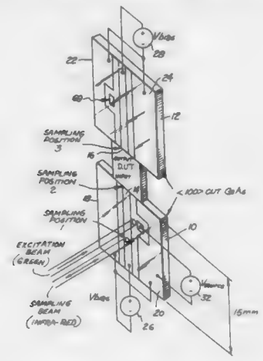
**Int. Cl.[4] G01R** *27/00*

**U.S. Cl. 324—158 R** **20 Claims**

19. A system for characterizing the properties of a device which comprises means for generating a pulse signal at a first location spaced from said device and propagating said signal towards said device where it is incident thereon and also away from said device, means for detecting said signal at second and third locations respectively towards and away from said device which are equidistant from said first location, and means



responsive to the signal detected at said third location and the difference of the signals detected at said second and third




locations for providing an output characterizing the properties of said device.

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**4,745,362**

## METHOD AND APPARATUS FOR DETECTING AND IMAGING A VOLTAGE SIGNAL OF AT LEAST ONE SPECIFIC FREQUENCY AT A MEASURING LOCATION

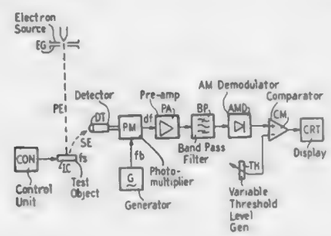
**Hans-Detlef Brust, Dudweiler, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Mar. 28, 1985, Ser. No. 717,115**

**Claims priority, application Fed. Rep. of Germany, May 30, 1984, 3420272**

**Int. Cl.[4] G01N** *23/00*

**U.S. Cl. 324—158 R** **29 Claims**




25. An apparatus for detecting and imaging a voltage signal present at at least one measuring location of a specimen carrying a signal of a first frequency fs comprising:

means for generating a primary particle beam;

means for directing said primary particle beam at said measuring location, said primary particle beam generating a secondary particle beam emanating from said measuring location;

means for pulsing said primary particle beam at a second frequency fb, where fb≠fs;

means for detecting particles in said secondary particle beam;

means for generating an electronic secondary particle signal from the detected secondary particles beam, said secondary particle signal having a signal component having a differential frequency $df=fb-fs$ due to the pulsing of said primary particle beam;

means for demodulating said signal component of said secondary particle signal having said frequency df; and

means for recording the demodulated signal component.

**4,745,363**

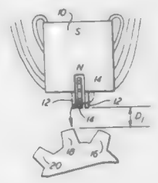
## NON-ORIENTED DIRECT COUPLED GEAR TOOTH SENSOR USING A HALL CELL

**Ronald E. Carr, Plantation; Matthew L. Schneider, Margate, and Paul E. Payne, Ft. Lauderdale, all of Fla., assignors to North American Philips Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 886,592, Jul. 16, 1986. This application Nov. 25, 1986, Ser. No. 934,873**

**Int. Cl.[4] G01B** *7/30;* **G01P** *3/4;* **G01R** *33/06*

**U.S. Cl. 324—208** **11 Claims**




1. A direct coupled gear tooth sensor to sense the presence or absence of gear teeth or similar ferrous objects as they rotate past a sensor, independent of the angular orientation of said sensor to said gear teeth, comprising:

a single permanent magnet;

a substantially planar Hall cell integrated circuit package having opposed first and second planar surfaces, said package being positioned adjacent to one polar end of said magnet such that the flux lines from said magnet have essentially no component perpendicular to the plane of said Hall cell in the absence of said teeth;

means to steer and concentrate the flux lines of said magnet perpendicular to the plane of said Hall cell when said flux lines are modulated by the presence of a ferrous gear tooth or similar ferrous object, said means comprising first and second soft iron flux concentrators appended to said one planar end of said magnet, said concentrators being arranged adjacent respective opposed planar surfaces of said package and off center from each other.

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**4,745,364**

## METHOD AND APPARATUS FOR RAPID NMR IMAGING

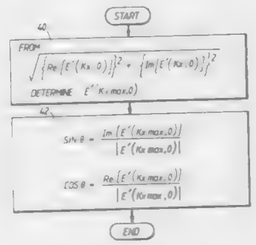
**Masahiko Hatanaka, Otawara, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Jun. 24, 1986, Ser. No. 877,762**

**Claims priority, application Japan, Jul. 4, 1985, 60-147770**

**Int. Cl.[4] G01R** *33/20*

**U.S. Cl. 324—309** **5 Claims**




1. A method of determining a spatial nuclear magnetization distribution in an object, said method comprising the steps of:

(a) applying a static magnetic field along an axis of the object to be sampled;

(b) exciting, with a frequency selective RF pulse, selected nuclear spins in a selected plane of said object in the pres-

ence of a plane selection gradient of the static magnetic field, so as to produce an NMR signal;

(c) applying simultaneously, first and second mutually orthogonal magnetic field gradients at least one of said mutually orthogonal gradients having one of a predetermined number of selectable different magnitudes to phase encode into said NMR signal, information of the spatial distribution of said excited nuclear spins within a volume containing said selected plane;

(d) irradiating said object with a 180° RF pulse so as to invert said excited nuclear spins to obtain NMR spin echo signals, said nuclear spin echo signals producing a composite NMR signal for Fourier transformation to yield information of said spatial distribution throughout said selected plane of said object;

(e) determining an inherent phase shift of said spatial distribution information Fourier-transformed on said composite NMR signal with respect to a spatial Fourier-transformed information of a measured NMR signal at a point where one of said first and second mutually orthogonal gradients does not contribute substantially to said excited nuclear spins, and

(f) utilizing said determined phase shift for calculating said nuclear magnetization distribution.

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**4,745,365**

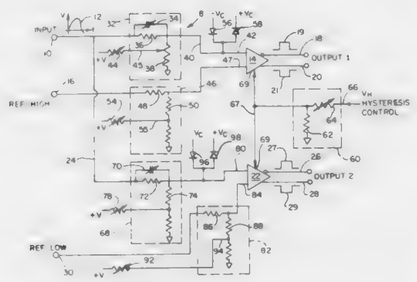
**DIGITAL RECEIVER WITH DUAL REFERENCES**

**Michael Ugenti, Melville, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.**

**Filed Dec. 31, 1986, Ser. No. 948,260**

**Int. Cl.⁴ H03K** *5/153, 5/24*

**U.S. Cl. 328—147** **9 Claims**




1. In a digital receiver capable of multi-mode operation and having at least first and second comparators with each having a first input connected to an input signal, the improvement comprising:

at least two signal attenuators each respectively connected between the signal input and a respective comparator first input for permitting the receiver to handle input signals of relatively high amplitude;

a first reference signal terminal connected to a second input of the first comparator for supplying a first reference signal thereto for switching the comparator at first preselected points of the input signal and generating pulse outputs thereat having a first pulse width;

a second reference signal terminal connected to a second input of the second comparator for supplying a second reference signal thereto for switching the comparator at second preselected points of the input signal which may be different than the first points, such switching causing the generation of pulse outputs thereat having a second pulse width;

means connected to each of the comparators for clamping the voltage of the signals input into the comparator; and

hysteresis control means connected to each comparator for adjusting the switching points of the comparators thereby avoiding erroneous switching due to noise.

**4,745,366**

**SIGNAL PROCESSING ARRANGEMENT**

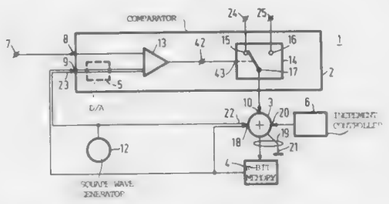
**Marinus C. W. Van Buul, Breda, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Oct. 8, 1986, Ser. No. 916,356**

**Claims priority, application Netherlands, Oct. 14, 1985, 8502800**

**Int. Cl.⁴ H03K** *5/22;* **H03M** *1/06*

**U.S. Cl. 328—159** **8 Claims**




1. A signal processing arrangement, comprising:

a. a comparator circuit having a first signal input for receiving an input signal, a second signal input, and an output, the second signal input having a least significant bit input;

b. a summing arrangement having a first signal input connected to the output of the comparator circuit and a second signal input;

c. a memory having an output connected to the second signal input of the summing arrangement and to the second signal input of the comparator circuit; and

d. a square-wave generator having an output coupled to the summing arrangement and to the least significant bit input of the second signal input of the comparator circuit, the square wave generator generating a bit sequence which represents the least significant bits of signals applied to the comparator circuit.

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**4,745,367**

**SUPERCONDUCTING MAGNET SYSTEM FOR PARTICLE ACCELERATORS OF A SYNCHROTRON RADIATION SOURCE**

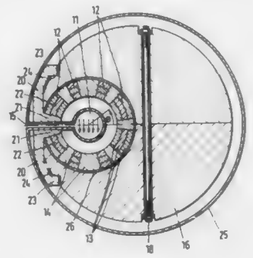
**Cord-Henrich Dustmann; Hubert Keiber, both of Weinheim, and Berthold Krevet, Dettenheim, all of Fed. Rep. of Germany, assignors to Kernforschungszentrum Karlsruhe GmbH, Karlsruhe and Brown, Boveri & Cie AG, Mannheim, both of, Fed. Rep. of Germany**

**Filed Mar. 28, 1986, Ser. No. 845,889**

**Claims priority, application Fed. Rep. of Germany, Mar. 28, 1985, 3511282**

**Int. Cl.⁴ H05H** *7/04, 13/04*

**U.S. Cl. 328—235** **15 Claims**



1. Superconducting magnet system for particle accelerators of a synchrotron radiation source having a particle orbit in a given plane, comprising a superconducting winding surrounding the particle orbit and having a slot formed therein in and symmetrical to said given plane of the particle orbit for egress of a synchrotron radiation, said superconducting winding being in the form of a circular cylinder having a circular cross section, each point along said circular cross section being described by polar coordinates of radius r and azimuth angle $\theta$ having a current distribution $I(\theta)=I_0 \cos n\theta$, where n=1,2,3 . . . , and a mechanical support for said superconductiing winding including at least one clamping element pre-tensioning said superconducting winding, and tightening elements in the vicinity of said slot pre-tensioning said superconducting winding in cooperation with said at lest one clamping element.



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**4,745,368**

**SWITCHING AMPLIFIER**

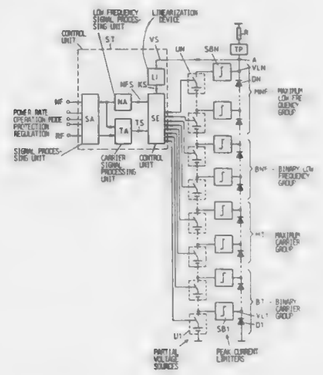
**Manfred Lodahl, Berlin, Fed. Rep. of Germany, assignor to Licentia Patent-Verwaltungs-GmbH, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Sep. 26, 1986, Ser. No. 911,918**

**Claims priority, application Fed. Rep. of Germany, Sep. 28, 1985, 3534679**

**Int. Cl.⁴ H03F** *3/38*

**U.S. Cl. 330—10** **21 Claims**




1. A switching amplifier for amplifying an input signal to produce a high voltage output signal to be fed to a high frequency output stage of a transmitter having a distortion level below a selected value, said amplifier comprising:

a plurality of electronically switchable partial voltage sources each switchable between an on state for supplying an output voltage and an off state, said sources being connected together in series;

a plurality of rectifier diodes corresponding in number to said plurality of partial voltage sources and connected together in series aiding to form a series connection having output terminals for connection of a load;

means connecting each said diode across a respective partial voltage source; and

control means connected to receive the input signal and to switch the partial voltage sources between their on and off states as a function of the input signal to generate the output signal between the output terminals, the improvement wherein:

said connecting means comprise at least one peak current limiter connected in series between one said partial voltage source and one said diode;

the number of said partial voltage sources and the magnitude of the voltage produced by each said partial voltage source are selected for maintaining the distortion level of the output signal below the selected value;

said control means comprise linearization means connected for compensating for non-linearities in the transmission characteristic of said amplifier; and

said control means are operative for switching said partial voltage sources as a function of the polarity and amplitude of the input signal.

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**4,745,369**

**CIRCUIT ARRANGEMENT FOR PROTECTION AGAINST THERMAL OVERLOAD OF TRAVELING WAVE TUBE AMPLIFIERS HAVING MULTICOLLECTOR TRAVELING WAVE TUBES**

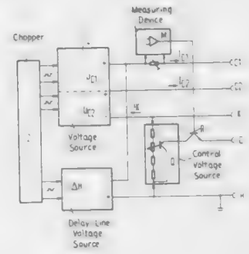
**Ludwig Wanninger, Neubiberg, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Nov. 17, 1986, Ser. No. 931,629**

**Claims priority, application Fed. Rep. of Germany, Mar. 27, 1986, 3610524**

**Int. Cl.⁴ H03F** *3/58*

**U.S. Cl. 330—43** **3 Claims**




1. A circuit arrangement for protecting against thermal overload in a traveling wave tube amplifier which includes power supply connected to a multicollector traveling wave tube which comprises a delay line, at least first and second collectors, a cathode and a control electrode, a first collector terminal, a second collector terminal, a cathode terminal and a delay line terminal, comprising: a measuring device connected to at least one of the

collector terminals for measuring alternating and direct collector current; and

regulating means connected to the control electrode and to the cathode terminal and connected to and controlled by said measuring device to decrease the cathode current in response to measuring a predetermined collector current.

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**4,745,370**

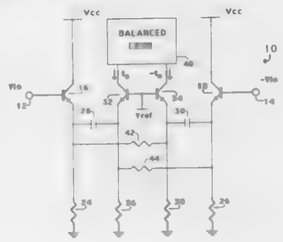
**ADJUSTABLE PHASE SHIFT CIRCUIT**

**Michael McGinn, Scottsdale, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Aug. 30, 1987, Ser. No. 81,085**

**Int. Cl.⁴ H03F** *3/45*

**U.S. Cl. 330—252** **2 Claims**




1. A phase shift circuit, comprising:

a first differential amplifier including first and second transis-

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tors, the base of said second transistor being biased at a reference potential;
a second differential amplifier including third and fourth transistors, the base of said fourth transistor being biased at said reference potential;
means for coupling the bases of said first and third transistors to a pair of inputs of the phase shift circuit to which a differential input voltage is supplied;
first capacitive means coupled between the emitters of said first and second transistors;
second capacitive means coupled between the emitters of said third and fourth transistors;
first resistive means coupled between said emitters of said second and third transistors;
second resistive means coupled between said emitters of said first and fourth transistors; and
means for coupling the collectors of said second and fourth transistors to utilization means.

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**4,745,371**

## PHASE-LOCKED DIGITAL SYNTHESIZER

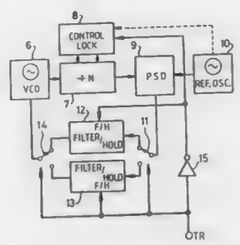
**John L. Haine, Cambridge, England, assignor to Libera Developments Limited, London, England**

**Filed Jul. 23, 1986, Ser. No. 888,798**

**Claims priority, application United Kingdom, Aug. 2, 1985, 8519521; Jun. 7, 1986, 8613920**

**Int. Cl.⁴ H03B** *7/00*

**U.S. Cl. 331—1 A** **8 Claims**




1. A phase-locked digital synthesizer comprising a voltage-controlled oscillator, a frequency divider supplied by the oscillator, a phase-sensitive detector to which is fed the output of the divider, the detector also receiving an input from a reference oscillator, the output of the detector being fed back by a feedback loop to the voltage-controlled oscillator to achieve phase-locking, wherein the divider receives an input from a logic circuit to control the division ratio of the divider, the logic circuit being prompted by a control signal which is also used to select one of a plurality of loop filters connected for selectable use in the feedback loop from the detector to the voltage controlled oscillator, the selected loop filter being appropriate to the prompted division ratio, wherein compensating means are provided to correct a loop phase error arising from a change in the division ratio, the compensating means comprising comparator means for comparing the phase of the output of the frequency divider with the phase of the reference signal at a sampling time after a predetermined number of reference cycles from the change in the division ratio, means for generating an incremental or decremental correction signal in dependence upon the phase comparison, and means for applying the correction signal to the frequency divider in order to adjust the division ratio, to tend to bring the output of the frequency divider into phase with the reference signal at the sampling time.

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**4,745,372**

## PHASE-LOCKED-LOOP CIRCUIT HAVING A CHARGE PUMP

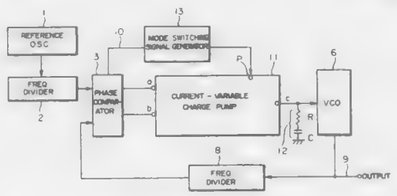
**Makoto Miwa, Tokyo, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Oct. 16, 1986, Ser. No. 919,474**

**Claims priority, application Japan, Oct. 17, 1985, 60-231512; Oct. 3, 1986, 61-236464; Oct. 3, 1986, 61-236465; Oct. 3, 1986, 61-236466**

**Int. Cl.⁴ H03L** *7/10, 7/18*

**U.S. Cl. 331—8** **16 Claims**




1. A phase-locked loop (PLL) circuit comprising:
a first frequency divider,
a second frequency divider,
a digital phase comparator having a reference input terminal to which an output of said first frequency divider is applied and another input terminal to which an output of said second frequency divider is applied and producing two phase difference outputs and a phase lock output,
a charge pump responsive to the phase difference outputs of said digital phase comparator and producing a drive current which is variable depending on the phase lock output of said phase comparator, and
a voltage-controlled oscillator driven by the output of said charge pump,
said charge pump including (i) a pair of switching circuits each having a control terminal receiving one of the phase difference outputs of said phase comparator and a common output terminal providing the drive current to said voltage-controlled oscillator and (ii) drive current control means responsive to the phase lock output of said phase comparator and connected to each of said switching circuits.

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**4,745,373**

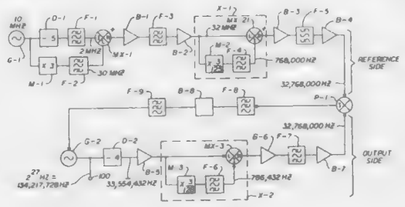
## METHOD AND STRUCTURE FOR SYNTHESIZING $2^C$ HZ FROM A $2^A.5^B$ HZ OSCILLATOR

**Stuart L. Carp, Menlo Park, and William P. Cornelius, Sunnyvale, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Jun. 26, 1987, Ser. No. 67,655**

**Int. Cl.⁴ H03L** *7/18*

**U.S. Cl. 331—16** **22 Claims**




1. A signal generator comprising: a reference signal means for providing a reference signal having a reference frequency equal to $2^A.5^B$ Hz, where A and B are integers greater than or equal to zero;
an output signal means for providing an output signal for said signal generator having an output frequency equal to $2^C$ Hz, where C is an integer greater than or equal to zero, the phase of said output signal being controlled by an error signal applied to said output signal means;
a phase comparator for comparing the phase of a first signal derived from said reference signal with the phase of a second signal derived from said output signal, and for providing said error signal to said output signal oscillator;
a first multiplication means for multiplying the frequency of said reference signal by a factor of $2^D/5^E$, where D and E are integers, and for providing said first signal having a frequency of $2^{A+D}.5^{B-E}$ Hz; and
a second multiplication means for multiplying the frequency of said output signal by a factor of $5^F/2^G$, where F and G are integers, and for providing said second signal having a frequency of $2^{C-G}/5^F$ Hz.



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**4,745,374**

## EXTREMELY-HIGH FREQUENCY SEMICONDUCTOR OSCILLATOR USING TRANSIT TIME NEGATIVE RESISTANCE DIODE

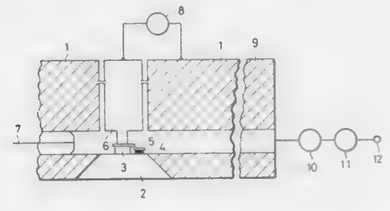
**Jun-ichi Nishizawa, and Kaoru Motoya, both of Sendai, Japan, assignors to Zaidan Hojin Handotai Kenkyu Shinkokai, Sendai, Japan**

**Filed Jun. 17, 1986, Ser. No. 875,095**

**Claims priority, application Japan, Jun. 18, 1985, 60-132723**

**Int. Cl.⁴ H03B** *7/14*

**U.S. Cl. 331—96** **6 Claims**




1. An extremely-high frequency semiconductor oscillator comprising:
a wavelength means forming a cavity resonator therein for producing an output wave;
a semiconductor transit time device having a frequency-dependent negative resistance mounted in said cavity resonator;
a power supply connected via a biasing post to said semiconductor device for applying a biasing voltage to said device and to said wave guide means; and
a reflector connected to one end of said cavity resonator for orienting the output wave of said device in one direction, the improvement wherein:
said semiconductor device has a $p^+n^+n^-n^+$ structure in which an impurity concentration distribution N(x) in the n+ type layer between the p+ and n− layers is expressed by

$$N(x)=N_i \exp(X/L)+N_d$$

where $N_i$ represents a maximum donor concentration at the $p^+n^+$ junction, and L represents the degree of the impurity gradient, and $N_d$ represents the impurity concentration of the n− type layer, and said device being comprised of a diode designed so that carrier injection is effected by combining an avalanche and a tunnel phenomena and the current-reverse-voltage characteristic has a temperature dependency which is constant with increase in device temperature or is varied to augment and subsequently to inhibit current flow with increase in device temperature whereby the output power of said oscillator has a temperature dependency which increases as the temperature rises.

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**4,745,375**

## VARIABLE FREQUENCY OSCILLATOR WITH CURRENT CONTROLLED REACTANCE CIRCUIT

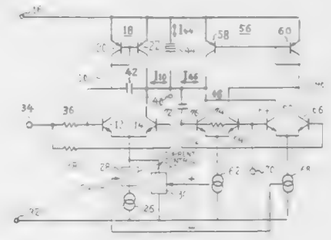
**Tsuneo Suzuki, Kamakura, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Dec. 19, 1986, Ser. No. 943,801**

**Claims priority, application Japan, Dec. 20, 1985, 60-286926**

**Int. Cl.⁴ H03B** *5/36*

**U.S. Cl. 331—116 R** **15 Claims**



1. A variable frequency circuit for generating a frequency output variable in response to a control signal comprising:
a solid resonator means;
an exciting amplifier for exciting an oscillation in the solid resonator means;
a first current supplying means for supplying a driving current to the exciting amplifier;
a variable reactance circuit connected in parallel to the solid resonator means, the variable reactance circuit operating as an equivalent reactance;
a second circuit supplying means responsive to the control signal for supplying a variable driving current to the variable reactance circuit; and
means for coupling the first current supplying means and the second current supplying means for controlling the driving current of the first current supplying means in response to the variable driving current of the second current supplying means.

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**4,745,376**

## FAULT TOLERANT OSCILLATOR CIRCUIT HAVING REDUNDANT RESONANT ELEMENTS

**Robert J. Aleksa; Carl L. Shore, both of Glendale, and Richard Hobby, Peoria, all of Ariz., assignors to Honeywell Inc., Minneapolis, Minn.**

**Filed Feb. 6, 1987, Ser. No. 11,802**

**Int. Cl.⁴ H03B** *5/32*

**U.S. Cl. 331—162** **3 Claims**



1. An oscillating apparatus comprising:
an amplifier having an input port and an output port; and
at least two resonant structures, each comprising a series circuit including a crystal coupled between first and second series capacitors, said resonant structures coupled to

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form a parallel circuit, said parallel circuit having a first terminal coupled to said input port and a second terminal coupled to said output port, whereby a signal at said output port oscillates in accordance with resonant characteristics of said parallel circuit.

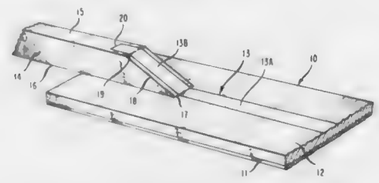
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**4,745,377**

## MICROSTRIP TO DIELECTRIC WAVEGUIDE TRANSITION

**Richard A. Stern, Allenwood, and Richard W. Babbitt, Fairhaven, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Jun. 8, 1987, Ser. No. 59,347**
**Int. Cl.[4] H01P** *5/10*
**U.S. Cl. 333—26** **6 Claims**



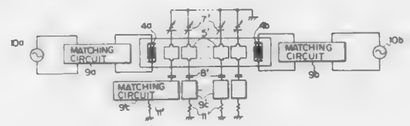
1. A microstrip to dielectric waveguide transition comprising
a length of microstrip transmission line dielectric substrate having top and bottom parallel surfaces;
first electrically conductive microstrip conductor means mounted on the top surface of said substrate and extending over only a portion of the total length of the substrate so that the remaining portion of said substrate total length is not occupied by said conductor means;
an electrically conductive ground plane mounted on the bottom surface of said substrate;
a length of dielectric waveguide having a rectangular cross-sectional area and top and bottom surfaces mounted on said substrate with the bottom surface of the waveguide abutting the top surface of the substrate, said length of waveguide being aligned with said first microstrip conductor means and being disposed in said remaining portion of said substrate total length so that one end of said waveguide length abuts an end of said first microstrip conductor means, the top surface of said waveguide length being tapered such that the height of the waveguide top surface above the waveguide bottom surface decreases linearly from full height at a first point on said waveguide top surface which is spaced a distance away from said one end of said waveguide length to zero height at said one end of said waveguide length; and
second electrically conductive microstrip conductor means electrically connected to said first microstrip conductor means and mounted on the top surface of said waveguide length, said second microstrip conductor means extending between said one end of said waveguide length and a second point of full waveguide height on said waveguide top surface which is a short distance beyond said first point of full waveguide height.

**4,745,378**

## SURFACE ACOUSTIC WAVE DEVICE

**Teruo Niitsuma; Takeshi Okamoto, and Shoichi Minagawa, all of Tokyo, Japan, assignors to Clarion Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 774,423, Sep. 10, 1985. This application Sep. 18, 1987, Ser. No. 99,688**
**Claims priority, application Japan, Sep. 21, 1984, 59-198985; Sep. 21, 1984, 59-198986; Sep. 21, 1984, 59-198987**
**Int. Cl.[4] H03H** *9/00*
**U.S. Cl. 333—196** **9 Claims**




1. A surface acoustic wave device comprising:
a semiconductor substrate;
a piezoelectric film provided on one surface of said substrate;
two signal input transducers which are provided at spaced locations on said piezoelectric film and can each enter a signal thereinto;
a plurality of electrically separate output gate electrodes provided on said piezoelectric film between said input transducers, said substrate having a plurality of interaction regions which are each associated with a respective said gate electrode;
bias voltage applying means connected directly to each said output gate electrode for applying to each of said output gate electrodes a respective bias voltage independently selected to optimize a capacity-to-voltage characteristic in the associated interaction region of said substrate, said bias voltage applying means including a plurality of independently variable bias voltage sources which are each connected to a respective said output gate electrode; and
output signal extracting means for extracting a respective output signal from each of said output gate electrodes, said output signal extracting means including a plurality of DC blocking capacitors which each have one end connected to a respective one of said output gate electrodes, each said output signal being extracted through a respective said blocking capacitor.

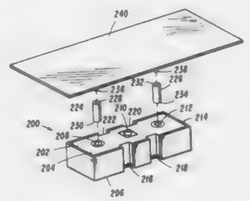
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**4,745,379**

## LAUNCHER-LESS AND LUMPED CAPACITOR-LESS CERAMIC COMB-LINE FILTERS

**James B. West, Cedar Rapids, and James C. Cozzie, Ely, both of Iowa, assignors to Rockwell International Corp., El Segundo, Calif.**

**Filed Feb. 25, 1987, Ser. No. 19,398**
**Int. Cl.[4] H01P** *1/205, 7/04*
**U.S. Cl. 333—206** **1 Claim**



1. A monolithic ceramic dielectric RF filter comprising:
a. a single dielectric block having a top surface, a bottom surface, a first end, a second end, a front side, and a back side;
b. said dielectric block further having a plurality of resonator holes, for forming TEM resonators, spatially disposed at a predetermined distance from another extending from said top surface to said bottom surface;
c. said dielectric block further having a conductive material coating upon all surfaces including the sides of said plurality of resonator holes and excepting only portions of said top surface;
d. a first capacitor probe positioned within one of said plurality of resonator h holes and being capable of attachment to a circuit board;
e. a second capacitor probe positioned within another of said plurality of resonator holes and being capable of attachment to a circuit board;
f. a first cylindrical insulator sleeve interposed between said first capacitor probe and said one of said resonator holes;
g. a second cylindrical insulator sleeve interposed between said second capacitor probe and said another of said resonator holes; and
h. a conductor pad formed on said top surface and surrounding all of said plurality of resonator holes excepting said one of said plurality of resonator holes and said another of said plurality of resonator holes, and further being in electrical contact with said conductive material coating, for creating an elongated current path.



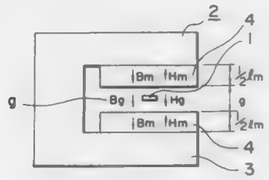
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**4,745,380**

## YIG THIN FILM MICROWAVE APPARATUS

**Yoshikazu Murakami, Kanagawa; Hideo Tanaka, Miyagi; Masami Miyake; Seigo Ito, both of Tokyo; Hitoshi Tamada, and Toshiro Yamada, both of Kanagawa, all of Japan, assignors to Sony Corporation, Tokyo, Japan**

**Filed Jul. 9, 1986, Ser. No. 883,605**
**Claims priority, application Japan, Jul. 9, 1985, 60-150431; Apr. 30, 1986, 61-100037**
**Int. Cl.[4] H01P** *7/00*
**U.S. Cl. 333—234** **1 Claim**




1. YIG thin film microwave apparatus comprising a YIG thin film device utilizing ferrimagnetic resonance effect, a magnetic circuit having a gap of length lg in which said YIG thin film device is located and means for applying a bias magnetic field perpendicular to a film surface of said YIG thin film device, said magnetic circuit including a permanent magnet having a thickness lm, said YIG thin film being formed of a substituted YIG thin film where part of $Fe^{3+}$ ion is substituted by a nonmagnetic metal with an atomic proportion of $\delta$, said permanent magnet satisfying the characteristics

$$Br > (fo/\gamma) + Nz^{Y} 4\pi Mso^{Y}(0)$$

$$\alpha_1{}^{B} > \frac{Nz^{Y}\, 4\pi Mso^{Y}(0)}{(fo/\gamma) + Nz^{Y}\, 4\pi Mso^{Y}(0)} \cdot \alpha_1{}^{Y}(0)$$

wherein fo is resonance frequency of said YIG thin film device
$\gamma$ is gyromagnetic ratio of said YIG thin film
$Nz^{Y}$ is demagnetization factor of said YIG thin film
$4\pi Mso^{Y}(0)$ is saturation magnetization of said YIG thin film when said amount $\delta$ equals to zero at room temperature
Br is remanence of said permanent magnet at room temperature
$\alpha_1{}^{B}$ is first order temperature coefficient of the remanent magnet near room temperature
$\alpha_1{}^{Y}(0)$ is first order temperature coefficient of the saturation magnetization of said YIG thin film when said amount $\delta$ equals to zero near room temperature
and, said thickness lm and said amount $\delta$ being selected to reduce temperature dependency of the resonance frequency.

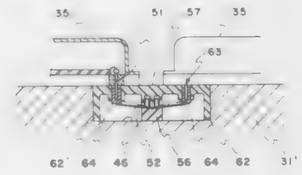
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**4,745,381**

## MICROWAVE CONNECTOR ASSEMBLY CAPABLE OF BEING READILY CONNECTED TO MICROWAVE CIRCUIT COMPONENTS

**Yuhei Kosugi; Hirohisa Ozawa; Hideki Kusamitsu, and Yoshio Minowa, all of Tokyo, Japan, assignors to NEC Corporation, Japan**

**Filed Oct. 10, 1986, Ser. No. 918,547**
**Claims priority, application Japan, Oct. 14, 1985, 60-228375; May 2, 1986, 61-102621; Jun. 30, 1986, 61-151715**
**Int. Cl.[4] H01P** *5/00*
**U.S. Cl. 333—245** **14 Claims**




1. A microwave connector assembly for use in electrical connection between terminals of microwave circuit components, wherein the improvement comprises:
an internal conductor which is operable as a leaf spring and which has a conductor axis extended along a predetermined direction, a center area transversely of said conductor axis, and a pair of end areas on both sides of said center area along said conductor axis;
an insulator support member for supporting said internal conductor at said center area;
a pair of contacts to be urged towards said terminals by said internal conductor with said contacts brought into contact with said end areas of said internal conductor, respectively; and
an external conductor member having bottom and wall surfaces which define a cavity for accommodating said internal conductor, said insulator support member, and said contact pair with said insulator support member attached to said bottom surface.

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**4,745,382**

## ELECTROMAGNETIC RELAY FOR AUTOMATIC ASSEMBLY

**Michael Dittmann, Berlin, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

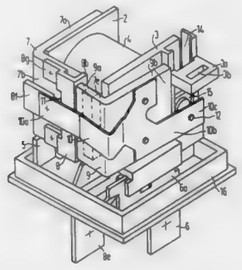
**Filed May 11, 1987, Ser. No. 48,434**
**Claims priority, application Fed. Rep. of Germany, May 22, 1986, 3617188**
**Int. Cl.[4] H01H** *67/02*
**U.S. Cl. 335—128** **40 Claims**

1. An electromagnetic relay including a coil containing a spool having an axis which runs parallel to a connecting surface of the relay, at least one stationary contact element attached to a first flange of two flanges on the spool and the spool supports a winding between the two flanges, the relay comprising:
a core having two ends inserted into the spool and oriented in the direction of the axis;
a generally L-shaped yoke whose first leg is fastened to one

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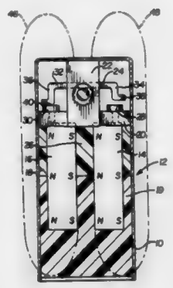
of the two ends of the core and whose second leg extends parallel to the axis of the coil and has a free end adjacent to the winding;
an armature located in front of the free end of the second yoke leg to form an air gap with the other one end of the core;
a leaf spring mounted on the armature providing support for the armature opposite the yoke by means of a reset leg and at least one leg extending adjacent to the contact element; and



the leaf spring being electrically conductive and having a terminal element connected thereto and at least one contact for contacting the stationary contact element;
two coil terminal elements for the winding each anchored in a respective spool flange for supporting the coil while electrically connecting to the winding; and
a connecting piece joined to the free end of the second yoke leg having a fastening tab for the leaf spring and providing a support for the armature, and being said terminal element for the leaf spring.

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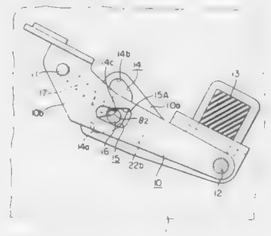
**4,745,383**
**MAGNETIC PROXIMITY SWITCH**
**Peter J. Zovath, 12914 N. Hunters Cir., San Antonio, Tex. 78230, and John T. Schutzmaier, 2258 Shadowdale, Houston, Tex. 77043**
**Filed May 11, 1987, Ser. No. 48,663**
**Int. Cl.[4] H01H** *9/00*
**U.S. Cl. 335—181** **9 Claims**



1. A magnetic proximity switch, comprising:
a pivotally mounted magnetically permeable armature means with a pivotal axis, and
permanent magnet means having a different pole face adjacent to the end areas of said armature means,
said armature means being pivotally movable from a first position to a second position when magnetic flux is diverted from said armature means upon the approach of a magnetically permeable operator,
said armature means comprising a main body and a pair of magnetically permeable members depending from said main body and extending in the same direction, toward said magnet means for concentrating said flux of said magnet means along said pair of permeable members,
said pair of permeable members having a similar configuration and dissimilar lengths and masses such that in said first position of said armature means the permeable member with the longer length and greater mass has a lesser air gap and a stronger magnetic field strength with respect to its respective magnet means and the permeable member with the shorter length and lesser mass has a greater air gap and weaker magnetic field strength relative to its said magnet means such as to change said magnetic field strengths to cause said pivotal movement of said armature means from its said first position to said second position upon said approach of said permeable operator.

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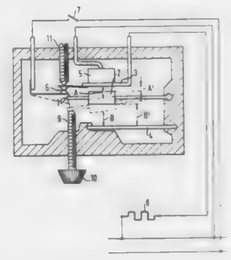
**4,745,384**
**CIRCUIT INTERRUPTER**
**Haruhisa Toda, and Toshiyuki Tanibe, both of Fukuyama, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan**
**Filed Jul. 20, 1987, Ser. No. 75,685**
**Claims priority, application Japan, Jul. 24, 1986, 61-114681[U]**
**Int. Cl.[4] H01H** *3/00*
**U.S. Cl. 335—195** **1 Claim**



1. A circuit interrupter arranged to open by an electromagnetic repulsive force upon the ocurrence of a large overcurrent by separating a movable contact from a stationary contact irrespective of an automatic trip operation of an operating mechanism, comprising;
a contact arm assembly for supporting the movable contact composed of a first contact arm and a second contact arm pivotally supported by a common pin, said first contact arm having an elongated guide hole extending in the direction of movement of said movable contact, said second contact arm having an elongated hole extending substantially in the direction of extension of said second contact arm,
a spring biased second pin extending through said elongated hole and said guide hole,
said elongated hole having a pin sliding surface on which said second pin slides and which forms an angle of 90° or more with respect to a pin sliding surface of said elongated pin guide hole when said first contact arm is being reset after said second contact arm is separated by an electromagnetic repulsive force.



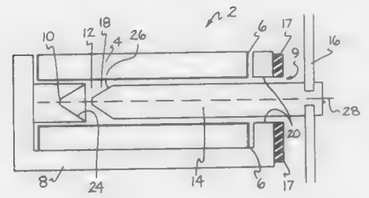
**4,745,385**
**SWITCHING RELAYS**
**Guglielmo Rossi, Linkenheim-Hochstätten, Fed. Rep. of Germany, assignor to Ranco Incorporated, Dublin, Ohio**
**Continuation of Ser. No. 804,269, Dec. 3, 1985, abandoned. This application Aug. 11, 1987, Ser. No. 85,325**
**Claims priority, application Fed. Rep. of Germany, Dec. 4, 1984, 3444223**
**Int. Cl.[4] H01H** *9/00*
**U.S. Cl. 335—208** **19 Claims**



1. Temperature compensated switching relay with thermally effected switching delay, comprising:
a switching member movable between two end positions and bearing a permanent magnet, said switching member actuating at least one switching contact,
a first and a second paramagnetic member provided on opposite sides of said permanent magnet in the direction of movement thereof,
a PTC resistor feedable by a source of current, mounted on said first paramagnetic member,
the distance of said permanent magnet from said first paramagnetic member in an end position of said switching member at said second paramagnetic member being less than its distance from said paramagnetic member.

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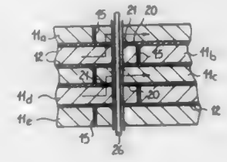
**4,745,386**
**SOLENOID DEVICE**
**Stephen M. Pawlak, Homer, N.Y., assignor to Smith Corona Corporation, Cortland, N.Y.**
**Filed Jun. 27, 1986, Ser. No. 879,736**
**Int. Cl.[4] H01F** *7/08*
**U.S. Cl. 335—258** **1 Claim**



1. A plunger-type solenoid device for reducing an amount of increased plunger force that would otherwise occur during a plunger stroke comprising:
a. a stationary casing consisting of material of high magnetic permeability and having an opening from which a central recess extends;
b. a plunger consisting of material of high magnetic permeability disposed in the central recess for movement therein;
c. an excitation coil wound around the plunger which generates a magnetic field within the central recess for moving the plunger in the central recess;
d. a primary air gap formed between the plunger and an inner wall of the stationary casing;
e. a secondary air gap formed between the plunger and the opening in the casing; and
f. the plunger having an annular groove, the annular groove being located outside of the primary air gap and the secondary air gap before movement of the plunger in the central recess to maintain a high plunger force at the beginning of the plunger stroke, and the annular groove moves within the secondary air gap for reducing the amount of increased plunger force during the plunger stroke.

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**4,745,387**
**COIL CONNECTION FOR AN IRONLESS SOLENOIDAL MAGNET**
**Guy Aubert, Grenoble, France, assignor to Centre National de la Recherche Scientifique, Paris, France**
**PCT No. PCT/FR86/00137, § 371 Date Jan. 6, 1987, § 102(e) Date Jan. 6, 1987, PCT Pub. No. WO86/06870, PCT Pub. Date Nov. 20, 1986**
**PCT Filed Apr. 22, 1986, Ser. No. 13,980**
**Claims priority, application France, May 10, 1985, 85 07152**
**Int. Cl.[4] H01F** *5/00*
**U.S. Cl. 335—299** **7 Claims**



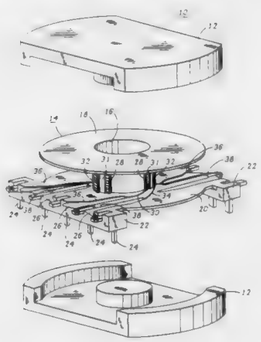
1. A solenoidal magnetic of the type including:
at least one coil formed of a stack, with interpositioning of insulators, of annular conducting disks;
each disk having a cut out transforming it into a turn and said turns being connected end to end; wherein
said disks extend in respective parallel planes perpendicular to the longitudinal axis of said coil;
said cut out of each said disk is a slit;
the arrangement and the form of the slits define several zones of overlapping of turns between and two juxtaposed slits;
said zones are divided into two groups; and
the electric contact between any two adjacent disks is formed by a juction at a group of said overlapping zones, the electric contacts from disk to disk being provided by juctions at one of said groups of said overlapping zones and then at the other of said groups, in an alternating manner.

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**4,745,388**
**TRANSFORMER WITH WIRE LEAD ISOLATION SLOTS**
**Robert L. Billings, Andover, Mass., and Robert C. Cooper, Newton, N.H., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.**
**Filed Feb. 2, 1987, Ser. No. 9,772**
**Int. Cl.[4] A01F** *15/10*
**U.S. Cl. 336—192** **2 Claims**

1. In combination, an electrically insulating bobbin and at least one winding supported on the bobbin comprising:
a hub about which turns of the winding are wound;
a pair of spaced opposed flanges between which the hub extends, the flanges having facing surfaces and one of the flanges having a pair of slots in its facing surface for respectively accommodating lead wires of the winding, the slots extending from the vicinity of the hub to an outer

edge of the one flange, and the one flange having a ledge projecting over each slot for insulating the lead wires positioned within the slots from turns wound about the hub, and the one flange further having a plurality of ribs protruding from the facing surface of the one flange into



the space between the opposed flanges otherwise occupied by turns wound about the hub, the ribs being respectively positioned adjacent to the pair of slots and serving to prevent turns wound about the hub from moving into the slots.

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**4,745,389**

## PROTECTION SWITCH WITH THERMAL EXCESS-CURRENT RELEASE

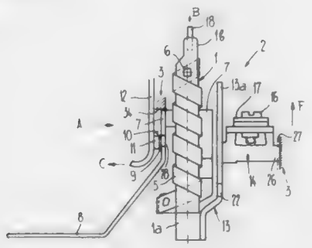
Willy Feller, Rombach, and Peter Hilfiker, Buchs, both of Switzerland, assignors to Sprecher + Schuh AG, Switzerland

Filed Apr. 1, 1987, Ser. No. 32,601

Claims priority, application Switzerland, Apr. 7, 1986, 01352/86

Int. Cl.[4] H01H *71/16*

U.S. Cl. 337—45 15 Claims



1. A protection switch having a thermal excess-current release, comprising:

at least one bimetallic element;

a carrier secured to said bimetallic element to form a unit;

a housing including first and second housing parts, said unit being insertable into said first housing part;

centering means for holding said unit in a defined position in said housing, said centering means coming to bear on said carrier upon insertion of said carrier into said first housing part; said centering means including:

guides in said housing extending in an insertion direction of said carrier and said bimetallic element, said carrier being guided by said guides, said guides defining a position of said carrier together with said bimetallic element in a deflection direction of said bimetallic element.

**4,745,390**

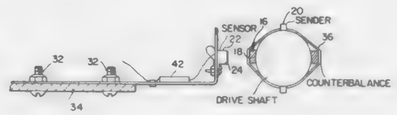
## FOUR-WHEEL DRIVE ENGAGEMENT DETECTOR

Michael A. Oden, 31,145 All View Dr., Running Springs, Calif. 92382, and Darrell B. Oden, 1184 E. 27th St., San Bernardino, Calif. 92404

Filed Jan. 28, 1987, Ser. No. 7,782

Int. Cl.[4] B60Q *1/00*

U.S. Cl. 340—52 R 9 Claims




1. In a four-wheel-drive vehicle having a transfer case, a first drive shaft normally operable for driving a first pair of wheels, and a second drive shaft selectively engageable through the transfer case for driving a second pair of wheels;

a retrofittable detection and alarm apparatus for indicating to the vehicle driver, without his leaving the driver's compartment, that the second shaft is inadvertently operating; said detection and alarm apparatus comprising, in combination:

(a) a permanent magnet positioned on said second shaft at a location remote from the transfer case;

(b) a counterbalance weight disposed adjacent to said permanent magnet but on the opposite side of said second shaft;

(c) strap means removably securing both said magnet and said counterbalance weight to said shaft;

(d) a rack disposed adjacent said second shaft at said location and removably attached by nuts and bolts to the frame of the vehicle;

(e) a magnetically activated reed switch relay supported from said rack adjacent to said permanent magnet;

(f) an illumination means mounted in the driver's compartment; and

(g) electric circuit means connected to the vehicle battery and connecting said relay and said illumination means in a series loop circuit so that rotation of said second drive shaft is visibly indicated by a periodic flashing of said illumination means on and off;

the operation being such that at relatively low vehicle speeds the flashing of said illumination means is clearly visible, and if the driver succeeds in disengaging said second drive shaft while the vehicle is in motion, said illumination means then assumes a fixed condition of operation and thereby indicates that success.

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**4,745,391**

## METHOD OF, AND APPARATUS FOR, INFORMATION COMMUNICATION VIA A POWER LINE CONDUCTOR

Jagdish T. Gajjar, Clifton Park, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Feb. 26, 1987, Ser. No. 19,390

Int. Cl.[4] H04M *11/04*

U.S. Cl. 340—310 A 20 Claims

1. A method for transmission of information over at least one conductor of a power distribution system, comprising the steps of:

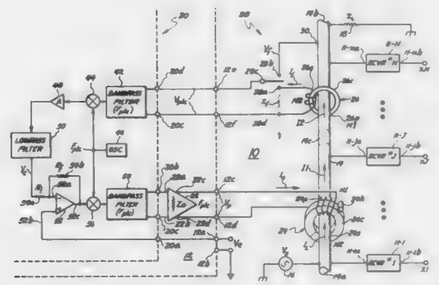
(a) receiving, at a transmitter, a local data signal containing the information to be transmitted;

(b) receiving, at the transmitter, at least one PLC signal, each at a power-line-carrier (PLC) communications frequency and each from an associated first conductor portion of the system;

(c) processing the local data signal and the at least one PLC signal to generate in the transmitter an output PLC signal, also at the PLC frequency;

(d) coupling at least a portion of the output PLC signal through the non-saturating core of a transmitter-coupling current transformer to inject a PLC current into a second conductor portion of the system; and





(e) recovering the transmitted information with a receiver connected to a system conductor at a location different from the location of the transmitter.

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**4,745,392**

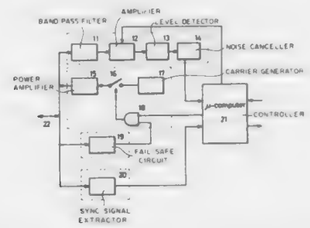
## NOISE REDUCTION IN SIGNAL TRANSMISSION SYSTEM OVER BUILDING POWER DISTRIBUTION WIRING

Masahiko Ise, Kashihara; Katsuyuki Machino, Nara; Hidehiko Tanaka, Tenri, and Takaaki Okamoto, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Oct. 27, 1982, Ser. No. 436,931

Int. Cl.[4] H04M *11/04*

U.S. Cl. 340—310 R 5 Claims




1. A signal transmission system for transmission of signals over building or house wiring, said signals being superimposed over a commercial A.C. supply and representing a signal one as the presence of an A.C. burst signal having a frequency substantially higher than that of said A.C. supply, comprising:

means for sampling said signals in a given sampling interval;

means for level detecting said signal to develop pulses representative of signal ones and of noise above a threshold, each said A.C. burst signal being developed as a series of consecutively appearing pulses;

means for counting the number of consecutively appearing pulses in said signals during the sampling interval; and

means for ignoring said pulses in said given interval as noise if the number of pulses counted during said sampling interval by said means for counting is less than a predetermined reference count and for treating the pulses as an authentic signal one if the number of pulses counted is more than said reference count.

**4,745,393**

## ANALOG-TO-DIGITAL CONVERTER

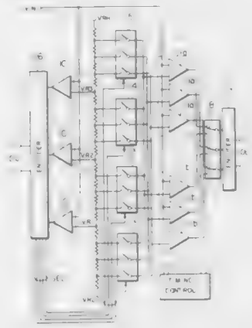
Toshiro Tsukada, Hachioji; Seiichi Ueda, Takasaki; Tatsuji Matsuura, Tokyo; Yuichi Nakatani, Mitaka, and Eiki Imaizumi, Fuchu, all of Japan, assignors to Hitachi, Ltd and Hitachi VLSI Engineering Corp., both of Tokyo, Japan

Filed Sep. 24, 1986, Ser. No. 911,154

Claims priority, application Japan, Sep. 25, 1985, 60-210012; Sep. 25, 1985, 60-210013

Int. Cl.[4] H03M *1/36*

U.S. Cl. 340—347 AD 12 Claims



1. An analog-to-digital (A/D) converter comprising:

means for supplying coarse division voltages coarsely dividing a voltage range to be subjected to an A/D conversion;

a coarse compare circuit for comparing analog input voltages with said coarse division voltages and for outputting coarse compare results corresponding to higher order bits and indicating to which one of partitions of the voltage region each said analog input voltage belongs;

means for supplying fine division voltages finely dividing a partition of the voltage range depending on said coarse compare results from said coarse compare circuit;

a fine compare circuit for comparing said analog input voltages with said fine division voltages and for outputting fine compare results corresponding to lower order bits and indicating to which one of finely divided portion of the voltage range each said analog input voltage belongs, said fine compare circuit including plural groups of fine comparators, each of which groups being capable of functioning as an independent comparison circuit for the lower order bits and of being alternately operated;

means for sequentially selecting fine compare results from alternate ones of said plural groups of fine comparators;

means for controlling said fine compare circuit to sequentially supply said analog imput voltage to one of said plural groups of fine comparators; and

means for generating a digital output signal corresponding to said analog input voltages based on said coarse compare results and said fine compare results.

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**4,745,394**

## PIPELINED A/D CONVERTER

Frank N. Cornett, Queen Creek, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Apr. 3, 1987, Ser. No. 33,717

Int. Cl.[4] H03M *1/44*

U.S. Cl. 340—347 AD 19 Claims

19. An analog-to-digital converter comprising:

a first amplifier configured to have a gain of approximately 2 and having an input adapted to receive an analog input signal and an output for providing a first amplifier output signal;

a first comparator having an input coupled to the input of

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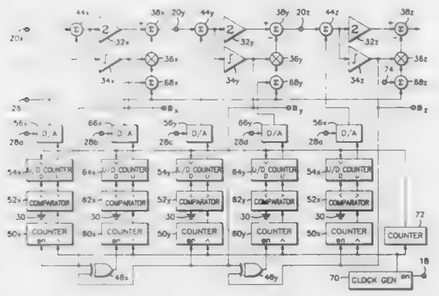


said first amplifier and an output for providing a first digital output bit;

first means, coupled to said first amplifier output, said first comparator output, and a terminal adapted to receive a maximum voltage reference signal, for combining the maximum voltage reference signal with the first amplifier output signal under control of the first digital output bit, said combining means having an output for providing a first stage output signal;

a second amplifier configured to have a gain of approximately 2 and having an input coupled to said first combining means output and an output for providing a second amplifier output signal;

a second comparator having an input coupled to the input of said second amplifier and an output for providing a second digital output bit;



second means, coupled to said second amplifier output, said second comparator output, and the terminal adapted to receive the maximum voltage reference signal, for combining the maximum voltage reference signal with the second amplifier output signal under control of the second digital output bit, said combining means providing a second stage output signal;

means, coupled to said first comparator output, said second comparator output, and said first combining means for adjusting the maximum voltage reference signal to compensate for gain errors of said first amplifier; and

means, coupled to said first comparator output, the input of said first comparator, and the input of said first amplifier, for adjusting the analog input signal to compensate for offset errors of said first comparator.

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**4,745,395**

## PRECISION CURRENT RECTIFIER FOR RECTIFYING INPUT CURRENT

**Jeffrey I. Robinson, New Fairfield, Conn., assignor to General Datacomm, Inc., Middlebury, Conn.**

**Division of Ser. No. 822,396, Jan. 27, 1986. This application Jan. 28, 1987, Ser. No. 7,714**

**Int. Cl.⁴ H03M *1/44***

**U.S. Cl. 340—347 AD** **4 Claims**

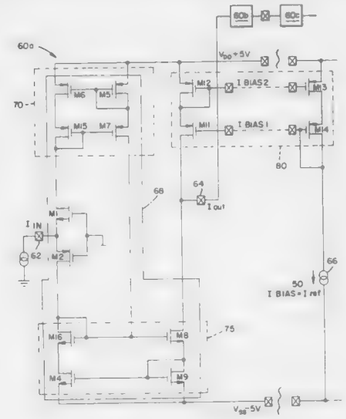
1. An apparatus for rectifying an input current, comprising:

(a) a p-channel transistor and an n-channel transistor having common gates connected to ground and common sources connected to an input current $I_{in}$;

(b) a first current mirror with its input connected to the drain of said n-channel transistor, and its output connected to the drain of said p-channel transistor;

(c) a second current mirror with the drain of said p-channel transistor as an input and a rectified output current $I_{out}$ as an output; and

(d) a third current mirror having a bias current $I_{ref}$ as an input and the output of said second current mirror as an



output, wherein the rectified output current is thereby offset and equals $I_{out}-I_{ref}$.

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**4,745,396**

## DECODER CIRCUIT FOR GENERATING LOGICAL SIGNALS IN RESPONSE TO THE ACTUATION OF A KEYBOARD PROVIDED WITH SYMBOLS ASSOCIATED WITH RESPECTIVE LOGICAL SIGNALS

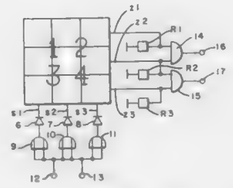
**Karl Reber, Kloster Indersdorf, Fed. Rep. of Germany, assignor to Firma Hans Widmaier, Fabrik fur Apparate der Fernmelde—und Feinwerktechnik, Fed. Rep. of Germany**

**Filed Mar. 14, 1986, Ser. No. 840,119**

**Claims priority, application Fed. Rep. of Germany, Mar. 18, 1985, 3509742**

**Int. Cl.⁴ G06F *3/023***

**U.S. Cl. 340—365 R** **15 Claims**



1. A decoder circuit for generating logical signals in response to the actuation of a keyboard provided with symbols associated with respective logical signals, being provided with a plurality of symbol fields, which are adapted to be provided with respective ones of said symbols and are separated by gaps between adjacent keys and defined by a plurality of adjacent keys which are adapted to be jointly depressed by a finger of an operator wherein:

the plurality of adjacent keys are associated with each of said symbol fields whereby each key of said keyboard, with the exception of keys disposed at the edges of the keyboard, is associated with four adjacent symbol fields and only alternate keys of each row of keys of the keyboard and only alternate keys of each column of keys of the keyboard are connected to electric switches for generating the logical signals;

each of said switches comprising a contact connected to one of a plurality of row conductors associated with respective rows of keys, and another contact connected to one of



a plurality of column conductors associated with respective columns of keys;

each column conductor being coupled to an output terminal of an associated OR gate;

two input terminals of each OR gate being associated with a column of keys at the edge of the keyboard and being interconnected, one input terminal of a given OR gate and one input terminal of an adjacent OR gate being connected by leads;

row conductors associated with adjacent rows of keys being connected to respective input terminals of an associated AND gate;

means for delivering successive input signals to said leads between adjacent OR gates; and

means for detecting successive logical signals corresponding to an actuated group of keys at the output terminals of said AND gates.

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**4,745,397**

## REMOTE CONTROL DEVICES

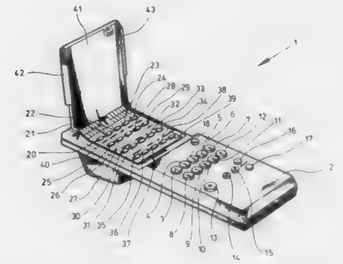
**Norbert Lagerbauer, Frankfurt; Dietmar Adler, and Peter Hartwein, both of Konigstein, all of Fed. Rep. of Germany, assignors to Analog and Digital Systems, Inc., Wilmington, Mass.**

**Filed Dec. 19, 1985, Ser. No. 810,699**

**Claims priority, application Fed. Rep. of Germany, Dec. 21, 1984, 3446806**

**Int. Cl.⁴ G06F *3/02***

**U.S. Cl. 340—365 VL** **11 Claims**



1. A remote control device for the joint or successive remote control of radio receivers, record players, tape recorders, television receivers and the like, the remote control device comprising a body having means for setting thereon controls for a particular item of particular equipment to be remotely controlled and said remote control device having a number of control members on said body enabling several functions to be set on the particular item of equipment to be remotely controlled, wherein said means for setting said controls of the remote control device comprise a plurality of drop sheets, each drop sheet being associated with a respective item of equipment to be remotely controlled and carrying indications of the functions of the control members on said remote control device for the remote control of said associated item of equipment, and each drop sheet having cutouts through which said control members can be passed, and in which a flap is pivotally mounted on said body of the remote control device, a slider being movably mounted on said flap and being capable of adopting a plurality of different positions in each of which the slider is arranged to connect different electrical contacts and to carry up a predetermined number of drop sheets when said slider is pivoted with the flap through a given angle with respect to said body of the remote control device, said slider being movable on the flap only when said flap is pivoted to a position in which it overlies the body of said remote control device, and in which a displaceable part is provided which makes it possible to form a fixed coupling between the slider and the flap, said displaceable part being displaceably arranged on a part fixed to the slider, said part having a web which engages in a cutout of the flap in a first position.

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**4,745,398**

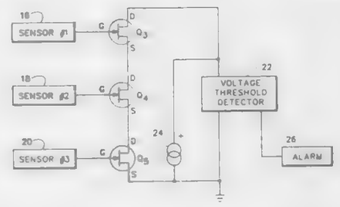
## SELF-POWERED SENSOR FOR USE IN CLOSED-LOOP SECURITY SYSTEM

**William E. Abel, Portland, Oreg., and Douglas H. Marman, Ridgefield, Wash., assignors to Sentrol, Inc., Portland, Oreg.**

**Filed Feb. 9, 1987, Ser. No. 12,623**

**Int. Cl.⁴ G08B *23/00***

**U.S. Cl. 340—500** **9 Claims**



1. A self-powered sensor for a closed-loop security system, comprising:

(a) self-powered sensor network means for providing a switch actuating signal upon the detection of a physical condition wherein said self-powered sensor network means comprises transducer means, said transducer means having a pair of plates separated by a piezoelectric element and having a transient alternating current output, and voltage doubling circuit means responsive to the output of said transducer means, said pair of plates forming a charge storage element of said voltage doubling circuit means, for approximately doubling the peak voltage output of said transducer means to provide said switch actuating signal for a predetermined period of time; and

(b) electronic switch means, said electronic switch means having a semiconductor junction forming a diode included in said voltage doubling circuit means, said electronic switch means being in a normally closed position thereby allowing current in said closed-loop security system to flow therethrough, for opening said closed-loop security system in response to said switch actuating signal.

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**4,745,399**

## DEVICE FOR GENERATING AN ALARM SIGNAL IN THE EVENT OF AN ENVIRONMENTAL ABNORMALITY

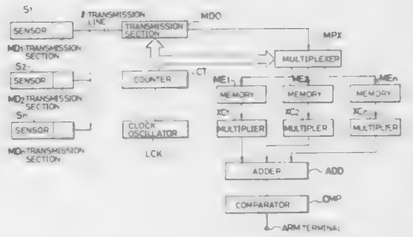
**Tetsuo Kimura, Tokyo, Japan, assignor to Nittan Company, Ltd., Tokyo, Japan**

**Filed Nov. 21, 1986, Ser. No. 933,121**

**Claims priority, application Japan, Nov. 25, 1985, 60-262555**

**Int. Cl.⁴ G08B *19/00***

**U.S. Cl. 340—521** **7 Claims**



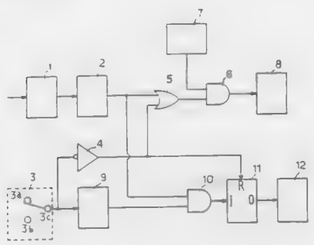
1. A device for generating an alarm signal in the event of an environmental abnormality comprising:

a plurality of sensors disposed in respective sensing volumes

for detecting a level of one or more environment conditions in each volume and coverting the level into an electrical analog signal;
means for setting a coefficient for each sensor corresponding to the sensing volume in which a sensor is disposed;
multiplying means for multiplying said coefficients with the analog signals from said sensors and providing the respective products of the multiplying at outputs;
adding means for adding the outputs of said multiplying means; and
comparing means for generating said alarm signal at an output when the output of said adding means exceeds a predetermined value.

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**4,745,400**
**ALARM SYSTEM**
**Hirokazu Miura, 4, Kitahiyoshi-cho, Imakumano, Higashiyama-ku, Kyoto, Japan**
**Filed Aug. 12, 1986, Ser. No. 896,209**
**Claims priority, application Japan, Aug. 13, 1985, 60-178940**
**Int. Cl.[4] G01B** *13/00*
**U.S. Cl. 340—541** **1 Claim**

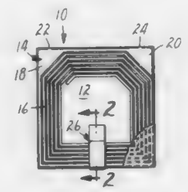


1. An alarm system comprising:
a sensor positioned to detect the existence of a human body in a fixed detection area and outputs signals,
a delay timer circuit which outputs signals after passing a fixed delay time by turning on an alarm switch,
a two input AND circuit in which the signals outputted from said delay timer circuit and said sensor are entered,
a latch circuit with a delay timer which outputs signals after passing the fixed delay time from a point of time when output signals of said two input AND circuit are entered, and keeps the signals until entry of reset signals,
an alarm unit by which alarms are given by being operated by the output signals of said latch circuit, and
wherein a retriggerable one-shot timer circuit, which outputs signals during a setup time from a point of time when the signals detected by the sensor are entered, is interposed between the sensor and the two input AND circuit so that the output signals of the sensor are entered in the two input AND circuit by way of the retriggerable one-shot timer circuit.

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**4,745,401**
**RF REACTIVATABLE MARKER FOR ELECTRONIC ARTICLE SURVEILLANCE SYSTEM**
**Samuel Montean, Blaine, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**
**Filed Sep. 9, 1985, Ser. No. 773,593**
**Int. Cl.[4] G08B** *13/18*
**U.S. Cl. 340—572** **16 Claims**

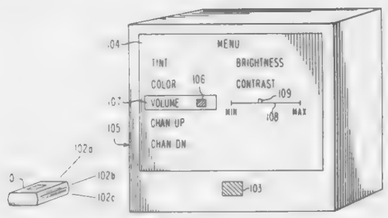
13. An electronic article surveillance system comprising
(a) means for generating within an interrogation zone a radio frequency electromagnetic field
(b) marker means having therein a tuned, inductive-capacitive circuit resonant at a predetermined frequency and having a Q-factor associated therewith in excess of a predetermined value such that when said marker means is in said zone, said circuit responds to said field by absorbing and radiating energy at said frequency and
(c) receiver means for receiving energy radiated from said marker means when the effective Q-factor therein is in excess of said predetermined value and for activating an output in response thereto;
wherein said marker means further comprises therein, (i) the resonant circuit having a Q-factor in a sensitized state greater than said predetermined value and a Q-factor in a desensitized



state less than said predetermined value, (ii) at least one piece of magnetic material substantially enclosing at least a portion of one or more turns of said inductive component and (iii) means for controlling a magnetic circuit formed by said material to alternately establish a low efficiency and a high efficiency condition in said magnetic circuit, said high efficiency condition being such as to cause sufficient hysteresis losses therein to reduce said Q-factor below said predetermined value such that said marker is then in a desensitized state.

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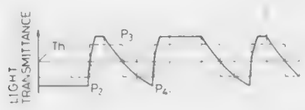
**4,745,402**
**INPUT DEVICE FOR A DISPLAY SYSTEM USING PHASE-ENCODED SIGNALS**
**Victor Auerbach, Trenton, N.J., assignor to RCA Licensing Corporation, Princeton, N.J.**
**Filed Feb. 19, 1987, Ser. No. 16,804**
**Int. Cl.[4] G09G** *1/00*
**U.S. Cl. 340—709** **8 Claims**




8. A remote control system, comprising;
remote transmitting means including transducing means disposed for radiating a plurality of predetermined angularly spaced information beams when energized said transmitting means intended to be operated by a user at a distance substantially displaced from a receiving means along a line of sight between said remote transmitting means and said receiving means; and
means for energizing said transducing means with energizing signals having predetermined phase shifts corresponding to associated ones of said plurality of beams;
said receiving means, being mounted in a fixed position relative to said transmitting means, receiving said plurality of beams and being responsive to relative phase shift relationships between signals derived from said plurality of beams for producing a control signals indicative of the angular displacement of said beams relative to said receiving means.



**4,745,403**
**CONTROLLER FOR A LIQUID CRYSTAL DISPLAY**
**Kouichi Tamura, Ohtsu, Japan, assignor to Nippondenso Co., Ltd., Kariya, Japan**
**Continuation of Ser. No. 511,006, Jul. 5, 1983, abandoned. This application Jun. 23, 1986, Ser. No. 877,715**
**Claims priority, application Japan, Jul. 8, 1982, 57-118764**
**Int. Cl.[4] G09G** *3/36*
**U.S. Cl. 340—713** **9 Claims**

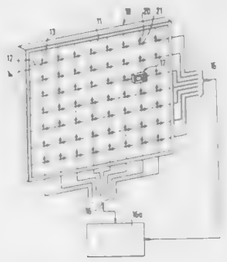



1. A controller for a liquid crystal display having picture elements which comprises:
temperature detecting means for detecing a temperature of the liquid crystal display and producing a temperature signal indicative thereof;
driving voltage generating means for producing a driving voltage and selectively applying said driving voltage to the picture elements of the liquid crystal display so that, during actuation intervals, each picture element is in either a voltage-applied condition when said driving voltage is applied thereto, and is in a no-voltage-applied condition when no driving voltage is applied thereto;
signal processing means, connected to said temperature detecting means to receive said temperature signal, for producing a control signal output to control a timing of said driving voltage producing of said driving voltage generating means, thereby controlling a timing of initiation of said voltage-applied condition of selected picture elements;
said signal processing means including delay calculating means, receiving said temperature signal, for calculating a fall time of said driving voltage on a picture element and a temperature-dependant delay relative to said fall time, said signal processing means for delaying the initiation of said voltage-applied condition of selected picture elements based on said temperature-dependent delay, to those of said picture elements which were in said no-voltage-applied condition during the preceding actuation interval such that a rise curve of a voltage response characteristic for light transmittance of said those picture elements switched to said voltage-applied condition, and a fall curve of picture elements switched to said no-voltage-applied condition respectively pass through a predetermined level of light transmittance at the same time and actuation intervals are maintained constant over a wide temperature range;
said delay being relative to the time of elimination of driving voltage to picture elements which have driving voltage applied thereto.

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**4,745,404**
**DISPLAY DEVICE FOR PLANNING PURPOSES**
**Rüdiger Kallenberg, Ahrensburg, Fed. Rep. of Germany, assignor to Edding AG, Ahrensburg, Fed. Rep. of Germany**
**Filed Nov. 19, 1986, Ser. No. 932,785**
**Claims priority, application Fed. Rep. of Germany, Nov. 23, 1985, 3541519**
**Int. Cl.[4] H04Q** *9/00*
**U.S. Cl. 340—752** **3 Claims**

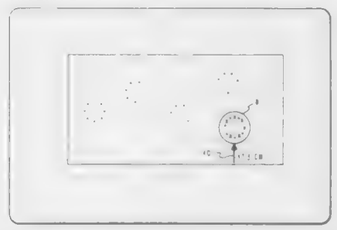
1. A display device, particularly for planning purposes comprising board means having an approximately plane display surface, a plurality of electrical conductors being arranged on or embedded in the said board, said conductors defining a pattern of perpendicularly crossing coordinates, said conductors being isolated from each other, said board having at least one hole at each crossing of said conductors, leading to both conductors adjacent said crossing, and comprising further a plurality of display elements, said display elements having a housing including a pattern of LCD elements for displaying purposes to be observed on a front side of said housing, and a micro processor including a programmable memory, said micro processor being adapted to control the LCD elements, said housing including further at least one pin extending from a rear side of said housing, said pin being adapted to be inserted in one of said holes to releasably retain said display elements on said display surface of said display board, said pin including at



least one conducting portion contacting said conductors adjacent their respective crossing, said conducting portions being connected to said micro processor, and computer means coupled to the plurality of conductors, said computer being adapted to be connected to the individual conductors on or in said display board and to communicate with the display elements on said display surface if the pin is contacting said conductors at the respective crossing in order to interrogate the position of the display element and the contents of said memory thereof and/or to program said memory.

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**4,745,405**
**OBJECT MOVEMENT FEEDBACK**
**Carol S. Himelstein, and John S. Wang, both of Austin, Tex., assignors to International Business Machines Corporation, Armonk, N.Y.**
**Filed Aug. 31, 1984, Ser. No. 646,382**
**Int. Cl.[4] G09G** *1/16*
**U.S. Cl. 340—709** **8 Claims**



1. A method of facilitating precise rotational and translational positioning of an object representation on a display screen, said method comprising:
selecting said object representation displayed on said display screen;
displaying a single numerical readout of the relative movement of said object representation adjacent said object representation during movement of said object representation whereby said numerical readout dynamically changes in response to said movement; and
moving said object representation from a first position on said display screen to a second position on said screen whereby said step of displaying causes said numerical

readout to move along with said displayed object representation.

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**4,745,406**

## LIQUID CRYSTAL DISPLAY APPARATUS

**Yuji Hayashi, and Mitsuo Soneda, both of Shinagawa, Japan, assignors to Sony Corporation, Tokyo, Japan**

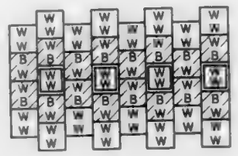
**PCT No. PCT/JP85/00463, § 371 Date Apr. 22, 1986, § 102(e) Date Apr. 22, 1986, PCT Pub. No. WO86/01624, PCT Pub. Date Mar. 13, 1986**

**PCT Filed Aug. 22, 1985, Ser. No. 859,626**

**Claims priority, application Japan, Aug. 23, 1984, 59-175703; Aug. 30, 1984, 59-180935**

**Int. Cl.⁴ G02F** *1/133, 1/23*

**U.S. Cl. 340—784** **1 Claim**



1. In a liquid crystal display apparatus in which a plurality of first signal lines are provided parallel to one another and extend in the vertical direction, a plurality of second signal lines are provided parallel to one another and extend in the horizontal direction, picture element electrodes of display liquid crystal cells are respectively provided with a plurality of switching transistors at intersections where said first and second plurality of signal lines intersect with one another, a plurality of gate lines to which a control signal for controlling said switching transistors is supplied, said plurality of gate lines extending parallel to one another in the horizontal direction, said liquid crystal display apparatus being characterized in that said picture element electrodes are formed at every other one in the horizontal direction with a displacement of ½ picture element pitch distance in said vertical direction, wherein during one interlaced field, arbitrary picture element electrodes are aligned at every other one in the horizontal direction and picture element electrodes are located upwardly from the former with a displacement of ½ picture element pitch distance which constitute a horizontal line, while during the other interlaced field, said arbitrary picture element electrodes and picture element electrodes are located downwardly from the former with a displacement of ½ picture element pitch distance which constitutes a horizontal line to thereby carry out the display, and said gate lines are straight and extend in the horizontal direction.

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**4,745,407**

## MEMORY ORGANIZATION APPARATUS AND METHOD

**Peter W. Costello, Los Altos, Calif., assignor to Sun Microsystems, Inc., Mountain View, Calif.**

**Filed Oct. 30, 1985, Ser. No. 792,795**

**Int. Cl.⁴ G09G** *1/16*

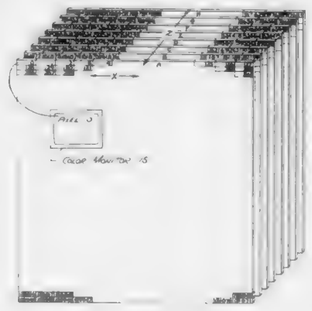
**U.S. Cl. 340—799** **19 Claims**

1. An improved memory organization for use in a computer display system including a display having a plurality of display pixels for defining images, comprising:

a frame buffer memory having a plurality of selectively addressable memeory cells organized into a three-dimensional matrix, wherein each of said memory cells is adapted for storing a data bit defining selected characteristics of a corresponding display pixel and wherein said memory cells are relatable by a first bit organization oriented in a first plane of said matirx and a second bit organization orientied in a second plane of said matrix; said first and second bit organizations defining, respectively, first and second characteristics among said selected characteristics;

reading means coupled to said frame buffer memory for selectively reading, in one memory cycle operation, a plurality of bits from memory cells related by one of said bit organizations and defining one of said first or said second characteristics;

writing means coupled to said frame buffer memory for selectively writing, in one memory cycle operation, a



plurality of bits into memory cells related by one of said bit organizations and defining one of said first or second characteristics;

control logic means coupled to said reading means and said writing means for generating control signals for controllably selecting one of said first and second bit organizations;

whereby image data may be conveniently organized in a single memory array for selective storage and retrieval in one of said first and second bit organizations so as to provide said selected characteristics of said pixels.

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**4,745,408**

## RADIO PAGING SYSTEM AND RECEIVER THEREFOR

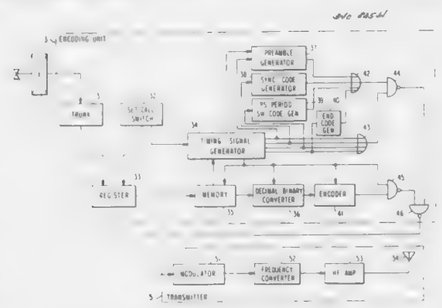
**Koichi Nagata; Takashi Oyagi, and Toshihiro Mori, all of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan**

**Filed Apr. 6, 1984, Ser. No. 597,788**

**Claims priority, application Japan, Apr. 9, 1983, 58-61522; Apr. 9, 1983, 58-61523**

**Int. Cl.⁴ G08B** *5/22;* **H04Q** *3/02*

**U.S. Cl. 340—825.44** **10 Claims**



1. A radio paging system having a paging receiver, said receiver comprising:

means for receiving a remotely-generated carrier wave which is modulated with either a first or a second plurality of preamble codes, in accordance with a volume of call traffic, and with one of an address and a control code, said first plurality of preamble codes being shorter than said second plurality of preamble codes;

means for demodulating said carrier wave;

means for processing the output of said demodulating means into said first and second pluralities of preamble codes, said address code, and said control code;

means for generating first and second control signals having first and second repetition periods, respectively, said first repetition period being shorter than said first plurality of preamble codes and shorter than said second repetition period, said second repetition period being shorter than said second plurality of preamble codes

means for intermittently supplying power to a prescribed part of said receiver at either said first repetition period or said second repetition period in response to a corresponding one of said first and second control signals; and

means for supplying said second control signal from said generating means to said power supply means in response to said control code, and for supplying said first control signal from said generating means to said power supply means in response to said second plurality of preamble codes,

wherein said power supply means supplies power to said receiver at either said first repetition period or said second repetition period in accordance with a volume of call traffic.



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**4,745,409**

## BROADBAND SIGNAL SPACE SWITCHING DEVICE

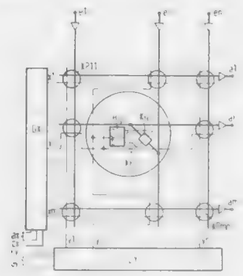
**Rüdiger Hofmann, Gilching, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Oct. 16, 1986, Ser. No. 919,700**

**Claims priority, application Fed. Rep. of Germany, Oct. 28, 1985, 3538319**

**Int. Cl.⁴ H04Q** *9/00, 3/52*

**U.S. Cl. 340—825.870** **1 Claim**



1. In a broadband signal space switching device in which a plurality of crosspoints are arranged in a matrix of columns and rows formed by input lines and output lines, in which the crosspoints each include a decoder-controlled bistable memory cell having complementary outputs, in which each crosspoint comprises a complementary metal-oxide-semiconductor inverter including an input connected to a respective input line, an output connected to a respective output line, a first MOS transistor connected to a first feed potential, a second MOS transistor connected between said first MOS transistor and a second feed potential, and in which each of said first and second MOS transistors comprises a gate connected to a respective input line, and in which the junction of the first and second transistors is connected to the respective output line, and in which the first transistor is a p-channel transistor of the enhancement type and said second transistor is an n-channel transistor of the enhancement type, the improvement comprising:

a p-channel third transistor of the enhancement type connected between said first transistor and the respective feed potential; and

an n-channel fourth transistor of the enhancement type connected between said n-channel second transistor and the appertaining feed voltage,

each of said third and fourth transistors comprising a gate connected to a respective complementary output of the respective memory cell.

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**4,745,410**

## TOWING VEHICLE MONITORING DEVICE

**Reinhard Schuller, Munich, and Wolfgang Heiser, Dachau, both of Fed. Rep. of Germany, assignors to Krauss-Maffei A.G., Fed. Rep. of Germany**

**Filed Sep. 24, 1986, Ser. No. 911,145**

**Claims priority, application Fed. Rep. of Germany, Sep. 24, 1985, 3534044**

**Int. Cl.⁴ G08B** *21/00*

**U.S. Cl. 340—958** **14 Claims**



1. An aircraft tow vehicle comprising:

a fork shaped frame exhibiting a first support member and a second support member opposing said first support member;

means for gripping and lifting a wheel assembly between said first and second support members disposed on said fork shaped frame

first measuring means for contactless measurement of a width of said wheel assembly disposed on said fork shaped frame; and

second measuring means for contactless measurement of distances between two points on said tow vehicle and an aircraft, disposed on said fork shaped frame;

first processor means for generating an aircraft type identification signal responsive to said first measuring means;

second processor means for generating an output indicative of an instantaneous turn-out angle between said vehicle and said aircraft responsive to said second measuring means; and

means for generating an indication signal when said turn-out angle exceeds a predetermined value corresponding to said aircraft type identification signal, responsive to said second processor means output and said aircraft type identification signal.

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**4,745,411**

## DIGITAL GAIN ADJUSTMENT

**Warren A. Barnhart, San Jose, and Term Kovattana, Menlo Park, both of Calif., assignors to Kaiser Electronics, San Jose, Calif.**

**Filed Oct. 29, 1986, Ser. No. 924,534**

**Int. Cl.⁴ H01J** *29/70*

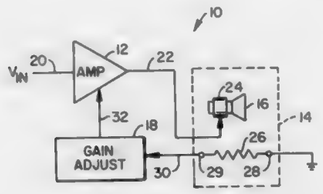
**U.S. Cl. 342—403** **17 Claims**

1. A circuit for deflecting an electrom beam in a cathode ray tube, in response to an input signal from an input signal source, said circuit comprising:

amplifier means for supplying current in response to the input signal, said amplifier means having an input coupled to the input signal source for receiving the input signal,

said amplifier means having an output for transmitting the supplied current, and further having a gain adjust input and an adjustable gain, said gain being adjustable in response to a gain adjust signal received at said gain adjust input, said gain defining the value of current supplied at said output in response to the value of the input signal;

deflection means, coupled to the output of said amplifier means, for deflecting an electron beam in response to the current supplied by said amplifier means, said deflection means having a predetermined characteristic deflection sensitivity descriptive of the amount of beam deflection produced in response to the value of the supplied current;




indicating means attached to said deflection means and having a measurable predetermined fixed value for indicating the deflection sensitivity of said deflection means; and

gain adjust means coupled to said indicating means for measuring the deflection sensitivity of said deflection means by measuring the value of said indicating means, said gain adjust means being coupled to the gain adjust input of said amplifier means for generating and transmitting to said amplifier means a gain adjust signal for adjusting, in response to said measured deflection sensitivity, the gain of said amplifier.

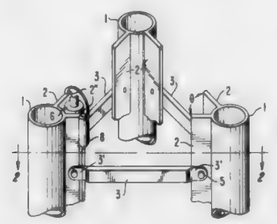
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**4,745,412**

**LIGHTWEIGHT TOWER ASSEMBLIES FOR ANTENNAS AND THE LIKE**

**Charles W. Creaser, Jr., Hollis, N.H., assignor to Chu Associates, Inc., Littleton, Mass.**

**Filed May 10, 1985, Ser. No. 732,844**
**Int. Cl.[4] H01Q *1/12***
**U.S. Cl. 343—890** **4 Claims**



**1. A lightweight antenna tower structure having, in combination, three substantially identical tubular legs, each leg comprising a hollow, extruded, elongated tube having an integral pair of radially extending fins subtending an angle therebetween in planes perpendicular to the length of the tube and extending longitudinally external to and along the outer surface of the tube parallel to and substantially coextensive with the length thereof, the tubes being mounted at the vertices of an equilateral triangle configuration, at least one of said pairs of fins being provided with means for mounting a clip therebetween and subtending the angle thereof to confine a cable for the antenna; a plurality of substantially identical extruded struts each integrally flattened at its ends; and means for securing the flattened ends of each strut to respective fins of adjacent tubes between which the strut extends, the struts being disposed along corresponding sides of said triangle configuration and at periodic longitudinal intervals of the tower structure to provide a periodic connecting structure.**

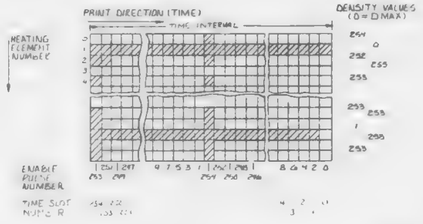
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**4,745,413**

**ENERGIZING HEATING ELEMENTS OF A THERMAL PRINTER**

**Scott A. Brownstein, and Holden Caine, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Jun. 3, 1987, Ser. No. 56,935**
**Int. Cl.[4] G01D *15/10***
**U.S. Cl. 346—76 PH** **2 Claims**




**1. In a continuous tone, thermnal printer apparatus including a print head having a plurality of heating elements, each such heating element being selectively energized for a particular portion of a time interval during which image pixels of a line are printed, the improvement comprising:**

**a. means for storing values representing the desired density of each image pixel of a line, and**

**b. means responsive to such stored numbers for selectively energizing each said heating element during both the first and second halves of such time interval to cause the heat produced by such heating elements to be uniformly distributed throughout the time interval such that line gaps are reduced.**

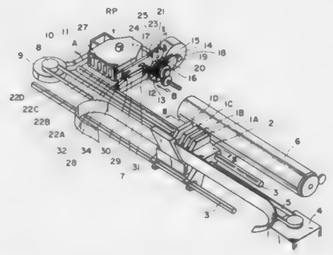
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**4,745,414**

**RECOVERY DEVICE FOR AN INK JET RECORDER AND A RECOVERY METHOD THEREOF**

**Shigeru Okamura, Kawasaki; Shigeyasu Nagoshi, Tokyo, and Toshiyuki Ohnishi, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 6, 1987, Ser. No. 34,930**
**Claims priority, application Japan, Apr. 9, 1986, 61-81637; Apr. 9, 1986, 61-81638; Apr. 9, 1986, 61-81639**
**Int. Cl.[4] G01D *15/16***
**U.S. Cl. 346—140 R** **8 Claims**



**1. An ink jet recorder provided with a recovery device for preventing unsatisfactory ink discharge of a recording head, said recovery device being provided with ink suction means having a cap covering an ink discharge port, a vent valve for opening and closing the interior of said cap with respect to the atmosphere and a suction pump for producing a negative pressure in said cap, and wiping means having a cleaning blade adapted to be advanced and retracted relative to the ink discharge port, said cleaning blade being protruded when a motor effecting the sequence operation of said ink suction means revolves in one direction, said cleaning blade being stopped at its retracted position when said motor revolves in the opposite direction.**



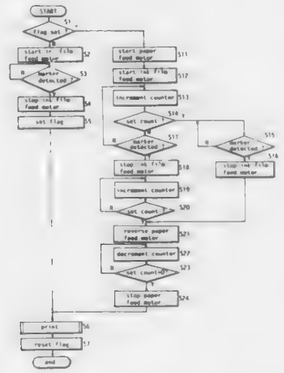
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**4,745,415**

**THERMAL PRINTER HAVING THERMAL HEAD FOR TRANSFERRING INK OF INK FILM ONTO TRANSFER PAPER**

**Shoji Konda; Iwao Fujii, and Yasuhiro Kyoden, all of Sagamihara, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed Feb. 27, 1987, Ser. No. 20,035**
**Claims priority, application Japan, Mar. 7, 1986, 61-51020; Mar. 31, 1986, 61-75226**
**Int. Cl.[4] G01D *15/00***
**U.S. Cl. 346—105** **9 Claims**



**1. A printer comprising:**

**transfer means for pressing an ink film into tight contact with a recording paper and transferring ink from the ink film to the recording paper by means of a thermal head;**

**separating means for separating the recording paper from the ink film after the ink is transferred;**

**means for moving the ink film through transfer means and separating means;**

**means for moving the recording paper through transfer means and separating means;**

**power supply means for supplying power for printing;**

**first control means for controlling the ink film moving means to move the ink film to a first predetermined position when a power interruption occurs during a printing operation and power is then restored; and**

**second control means for controlling the recording paper moving means to move the recording paper to a second predetermined position when a power interruption occurs during a printing operation and power is then restored.**

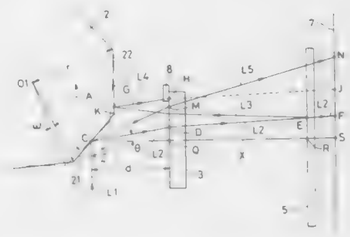
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**4,745,416**

**LASER BEAM PRINTER WITH OPTICAL SYSTEM FOR PREVENTING GHOST IMAGES**

**Katsushi Horihata, Osaka, Japan, assignor to Mita Industrial Co., Ltd., Osaka, Japan**

**Filed Feb. 26, 1987, Ser. No. 19,354**
**Claims priority, application Japan, Feb. 28, 1986, 61-44999**
**Int. Cl.[4] G01D *9/42, 15/14;* H04N *1/21***
**U.S. Cl. 346—108** **7 Claims**



**1. A laser beam printer comprising a beam source for emitting a beam corresponding to an image signal, a photosensitive member for forming an electrostatic latent image thereon with the beam, a polygon mirror for reflecting the beam emitted by the beam source to scan the photosensitive member with the beam, an image forming lens provided between the polygon mirror and the photosensitive member in the optical path of the mirror for focusing the reflected beam from the polygon mirror on the surface of the photosensitive member, a box accommodating the beam source, the polygon mirror, and the image forming lens therein and having a window for passing therethrough the beam from the image forming lens toward the photosensitive member, an optical filter provided over the opening of the window, and light blocking means disposed in an optical path along which a portion of the beam reflected from a first mirror face of the polygon mirror travels toward the image forming lens again after the beam portion reversely travels through the image forming lens upon reflection at the surface of the filter and is reflected from a second mirror face adjacent to said first mirror face, the light blocking means thereby preventing the beam portion, after it is reflected from the second mirror face, from striking the photosensitive member.**

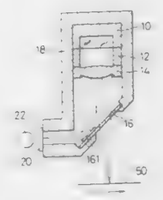
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**4,745,417**

**SELF SCANNED RECORDING ELEMENT**

**Toshiyuki Inokuchi, Yokohama, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan**

**Filed Jul. 8, 1986, Ser. No. 883,499**
**Int. Cl.[4] G01D *9/42***
**U.S. Cl. 346—108** **5 Claims**



**1. A device for writing optical information, comprising:**

**a housing having a roof mirror array, a lens array, an optical-path separator, a pair of slits extending in the same direc-**

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tion as a longitudinal direction of a lens array, and a mirror member being retained in said housing;

said roof mirror array composed of an array of roof mirrors arranged at a constant pitch;

said lens array extending in said longitudinal direction composed of an array of lenses at the same pitch as said constant pitch, each of said lenses being optically associated with one of said roof mirrors; and

each optical axis of said lenses is perpendicular to a recording medium surface;

said optical-path separator disposed between said roof mirror array and said lens array for separating optical paths between said roof mirrors and said lenses associated therewith;

said mirror member comprising an elongated transparent plate with a mirror surface formed by vapor deposition on one longitudinal side of the plate which is disposed opposite to and remotely from said roof mirror array with said lens array interposed therebetween, said mirror member extending in the same direction as said longitudinal direction of said lens array, and disposed in covering relation to an exit from said housing;

a self-scanned recording element fixedly mounted on said housing and having a light-signal producing surface being held in registration with an object surface on which a unit magnification object image would be formed on said recording medium by said lens array and said roof mirror array.

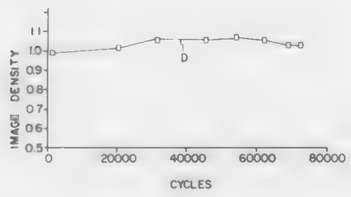
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**4,745,418**

## REUSABLE DEVELOPING POWDER COMPOSITION

**Thomas J. Brennan, and Nancy N. Quan, both of Saint Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.**

**Filed Apr. 30, 1986, Ser. No. 858,368**
**Int. Cl.⁴ G01D** *15/00*
**U.S. Cl. 346—74.5** **18 Claims**




1. A magnetically responsive developing powder of particles comprising an organic resin having a high fusion point and a glass transition temperature of at least 55° C., a magnetically responsive component admixed with said organic resin, and a layer of an electrically conductive, non-magnetizable powder secured to the surface of said particles, said electrically conductive powder having a particle size substantially smaller than that of said developing powder, wherein said developing powder is non-fusible at temperatures below 120° C. and has a maximum 23 hour secant number of 0.5 megohm.

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**4,745,419**

## HOT MELT INK ACOUSTIC PRINTING

**Calvin F. Quate, Stanford, and Scott A. Elrod, Menlo Park, both of Calif., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Jun. 2, 1987, Ser. No. 57,184**
**Int. Cl.⁴ G01D** *15/16*
**U.S. Cl. 346—140 R** **10 Claims**

1. In an acoustic ink printer having a printhead including at least one ejector means for supplying an acoustic beam which converges to a focus approximately in a predetermined focal plane, the improvement compising

a carrier means, which is coated with a generally uniformly thick layer of hot melt ink, for transporting said ink in a longitudinal direction across said printhead; said ejector means being acoustically coupled to said ink via said carrier means for ejecting individual droplets of ink therefrom on command; and

heating means proximate said printhead; said heating means being thermally coupled to said ink ahead of said printhead for liquefying said ink as it approaches said printhead, whereby said ink presents a free liquid surface to said printhead;

the thickness of said hot melt ink layer and the rate at which it is transported across said printhead being selected so that said free surface remains essentially coplanar with said focal plane during operation.

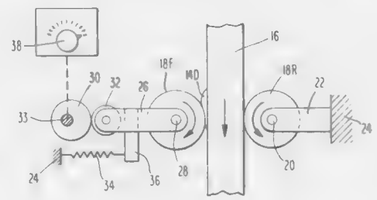
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**4,745,420**

## METHOD AND APPARATUS FOR CONTROLLING THE SIZE OF DOTS PRODUCED BY JETTING PHASE CHANGE INK

**Amy Gerstenmaier, Danbury, Conn., assignor to Dataproducts Corporation, Woodland Hills, Calif.**

**Filed Jul. 21, 1986, Ser. No. 887,283**
**Int. Cl.⁴ G01D** *15/16*
**U.S. Cl. 346—140** **18 Claims**




1. In a method of operating a system for jetting ink capable of undergoing a thermally reversible liquid to solid phase transition, including the steps of elevating the temperature of the ink so as to effect a solid-to-liquid phase transition, ejecting a small volume of liquid ink toward a target, striking the target with the volume and lowering the temperature of the ink so as to effect a liquid-to-solid transition, the improvement comprising the step of applying pressure to the volume of ink on the target after said lowering of temperature to spread the volume across the surface of the target.

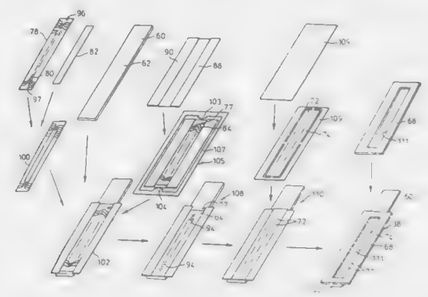


**4,745,421**

## IONIC PRINT CARTRIDGE AND PRINTER

**Robert S. McCallum, Terra Cotta; Paul E. Plasschaert, Limehouse; Dolf Landheer, Ottawa, and Hemant M. Gandhi, Toronto, all of Canada, assignors to Delphax Systems, Mississauga, Canada**

**Division of Ser. No. 675,664, Jul. 7, 1987, Pat. No. 4,679,060.**
**This application Apr. 17, 1987, Ser. No. 14,408**
**Claims priority, application Canada, Dec. 9, 1983, 442946**
**Int. Cl.⁴ G01D** *15/00*
**U.S. Cl. 346—159** **3 Claims**



1. A method of making an ionographic cartridge for use with a dielectric coated drum to lay electrostatic images on the drum for subsequent toning, the method comprising the steps:

making a printed circuit board carrying on one of its faces a plurality of driver electrodes;

attaching to said face of the board a dielectric layer sufficient to cover the driver electrodes;

providing finger electrodes supported individually between parallel strips of dielectric tape; and

adhering the finger electrodes to the dielectric layer with the finger electrodes straddling the driver electrodes and the tape spaced to either side of the printed circuit boards.

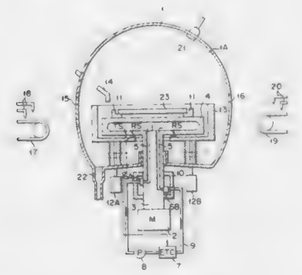
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**4,745,422**

## AUTOMATIC DEVELOPING APPARATUS

**Yasuo Matsuoka, Kawasaki; Kinya Usuda, Yokohama, and Michiro Takano, Kawasaki, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Nov. 17, 1986, Ser. No. 930,925**
**Claims priority, application Japan, Nov. 18, 1985, 60-257953; Nov. 18, 1985, 60-257954**
**Int. Cl.⁴ G03D** *3/02*
**U.S. Cl. 354—299** **21 Claims**



1. An automatic developing apparatus comprising:

a stage on which a substrate is to be set;

a processing case which is moved relative to said stage to receive said stage, and which has a bottom wall and an outlet formed in the bottom wall, said stage being brought into contact with the bottom wall to hermetically close the outlet, thereby constituting a developing tank; and

means for supplying a developing solution to said developing tank.

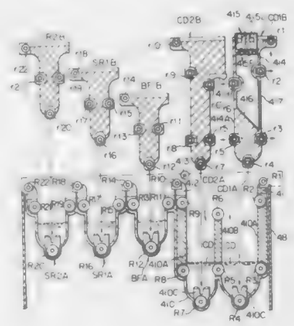
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**4,745,423**

## PHOTOSENSITIVE MATERIAL PROCESSING APPARATUS

**Shunji Uchida, Hachioji, Japan, assignor to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan**

**Filed Oct. 31, 1986, Ser. No. 925,230**
**Claims priority, application Japan, Nov. 5, 1985, 60-248595**
**Int. Cl.⁴ G03D** *3/08*
**U.S. Cl. 354—320** **5 Claims**



1. A photosensitive material processing apparatus comprising

an outside unit disposed in a vessel, said outside unit having an opening at the top side thereof, and being capable of accommodating therein an inside unit,

an inside unit adapted to be inserted into, and pulled out from said outside unit through the opening therein,

wherein the inner periphery of said outside unit and the outer periphery of said inside unit form a communication passage therebetween for conveying the photosensitive material through the vessel when said inner unit is positioned within said outer unit,

a plurality of roller pairs disposed along said communication passage, each of said roller pairs consisting of a driving roller and a driven roller, said driving roller being rotatably fixed onto the inner periphery of said outside unit and being capable of coupling with a driving source, said driven roller being fixed to the outer periphery of said inside unit by displacing means having a bias member, and being positioned in pressure contact with said driving roller when said inside unit is positioned within said outside unit,

wherein said displacing means is capable of releasing the pressure contact between said driving rollers and said driven rollers so that said inner unit can be removed from said vessel without removing said outer unit.

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**4,745,424**

## METHOD FOR PRODUCING AN EVOLUTIVE PHOTOGRAPHIC COMPOSITION AND COMPOSITION THUS OBTAINED

**Jean-Claude Cardaire, 2 rue du General Leclerc, F-80400 Ham, France**

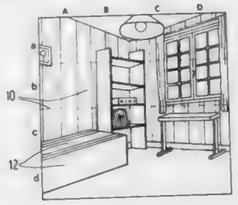
**PCT No. PCT/FR86/00210, § 371 Date Apr. 3, 1987, § 102(e) Date Apr. 3, 1987, PCT Pub. No. WO87/00302, PCT Pub. Date Jan. 15, 1987**

**PCT Filed Jun. 19, 1986, Ser. No. 32,453**

**Claims priority, application France, Jun. 25, 1985, 85 09663**

**Int. Cl.[4] G03B** *15/00*

**U.S. Cl. 354—354** **17 Claims**



1. A method for producing an evolutive photographic composition, which method consists in photographing with a camera the scenery alone, that is to say elements of landscape which are intended to remain unchanged in the photographic composition, causing a predetermined grid of registration lines to appear on the basic photograph obtained in this manner, in order to facilitate handling, and then, without moving the camera, or by replacing it at the same location very accurately, in photographing as many times as is desired, the evolutive subject by placing it, or by replacing it on each occasion, at a different location, or in a different orientation, with respect to the same landscape, in such a manner as to obtain a plurality of prints, each marked with the same grid of registration lines as the basic photograph, and which are distinguished from one another only by the position of the subject, in cutting the said prints along registration lines of the grid, or the natural lines existing in the photograph, for the utilization of the method, without causing the appearance of the grid of registration lines, which is solely intended to facilitate the use of the method, in such a manner as to isolate the element or elements including the variable subject, and then in producing evolutive images by applying at least one of the said elements of at least one of the prints to its corresponding location on the basic photograph.

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**4,745,425**

## AUTOMATIC FOCUS CONTROL APPARATUS

**Yosuke Kusaka, Yokohama, Japan, assignor to Nippon Kogaku K. K., Tokyo, Japan**

**Filed Oct. 3, 1986, Ser. No. 915,011**

**Claims priority, application Japan, Oct. 8, 1985, 60-224164**

**Int. Cl.[4] G03B** *3/00*

**U.S. Cl. 354—400** **15 Claims**

1. An apparatus for controlling a position of an image of an object to be photographed through a photographing optical system of a camera, including:

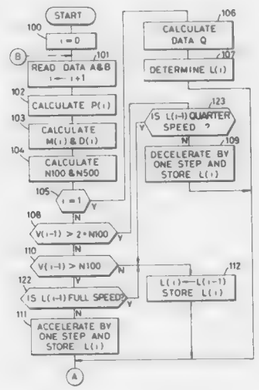
(a) focus detecting means for repeatedly generating defocus signals each of which conforms to a positional relationship between a predetermined plane and the position of the image;

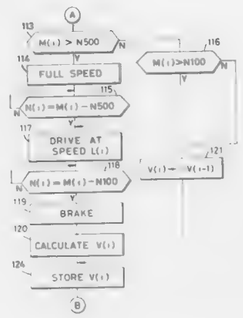
(b) driving means for driving at least part of said photographing optical system;

(c) driving control means for generating a stop signal on the basis of said defocus signals, said stop signal causing said driving means to stop said at least part of said photographing optical sytem;

(d) memory means; and

(e) driven amount detecting means responsive to said stop signal for detecting an amount conforming to a driven amount of said at least part of said photographing optical system from a timing of generation of said stop signal, and producing data conforming to said detected amount and stored in said memory means;




said driving control means controlling speed of the driving of said driving means on the basis of said data stored in said memory means.

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**4,745,426**

## LIGHT MEASURING DEVICE FOR A CAMERA

**Yasuo Suda, and Akira Ishizaki, both of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Sep. 30, 1986, Ser. No. 913,259**

**Claims priority, application Japan, Oct. 4, 1985, 60-220250; Oct. 4, 1985, 60-220251**

**Int. Cl.[4] G03B** *3/00, 7/099*

**U.S. Cl. 354—407** **6 Claims**

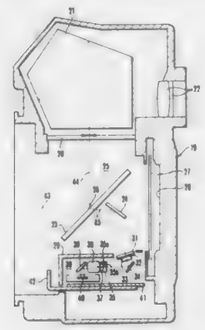
5. A single lens reflex camera, comprising:

(a) a taking lens;

(b) a focus detecting means comprising two electrical sensors for producing electrical signals in response to receiving an image of an object formed by light from said object passing through said taking lens, wherein said focus detecting means controls the focus condition of the taking lens in accordance with the correlation value associated with the object image and the output from said two electrical sensors; and



(c) light sensitive means positioned in the vicinity of an imaging plane of said taking lens, for converting a portion of a light beam passing through said taking lens into an electrical signal, for controlling an exposure value of said camera, and for permitting the remainder of the light beam to pass therethrough, wherein said light sensitive means is positioned relative to said focus detecting means such that the remainder of the light beam illuminates said two electrical sensors to control the focus state of said



taking lens, wherein said light sensitive means comprises a plurality of light sensitive elements, wherein a portion of said plurality of elements block the light beam passing through said taking leans which would otherwise pass through said light sensitive means and illuminate said two electrical sensors, and wherein the direction in which said two electrical sensors are oriented substantially coincides with the direction in which said plurality of light sensitive elements are oriented so as to uniformly distribute the remainder of the light beam on the light sensitive means.

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**4,745,427**

## MULTI-POINT PHOTOMETRIC APPARATUS

**Shuji Izumi, Sakai; Masaaki Nakai, Kawachinagano; Akihiko Fujino, Sakai; Toshio Yamaki, Osaka; Hiromu Mukai, Kawachinagano, and Nobuyuki Taniguchi, Nishinomiya, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Continuation of Ser. No. 899,099, Aug. 22, 1986, abandoned. This application Jun. 30, 1987, Ser. No. 68,722**

**Claims priority, application Japan, Sep. 13, 1985, 60-201651; Sep. 13, 1985, 60-201652; Sep. 13, 1985, 60-201653; Sep. 13, 1985, 60-201654**

**Int. Cl.[4] G03B** *7/091*

**U.S. Cl. 354—432** **11 Claims**

1. A multi-point photometric apparatus for measuring the luminance of an objective field comprising:

means for measuring the luminance of a plurality of areas of an objective field to generate and store a plurality of signals representative of the luminance of the measured areas;

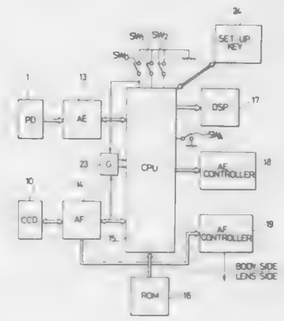
means for selecting a reference luminance signal among the signals from said measuring means;

means for identifying an effective maximum luminance signal and an effective minimum luminance signal among the signals from said measuring means, a luminance distribution including the reference luminance being defined between the maximum and minimum luminances;

means for providing information relating to the width of the film latitude;

means for producing exposure information in accordance with the reference luminance signal;

means for shifting the exposure information so as to increase a degree of overlap between the film latitude and the luminance distribution with the reference luminance remained within the film latitude; and




means for determining whether or not to enable said shifting means in response to said identifying means and said providing means.

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**4,745,428**

## METHOD OF AND APPARATUS FOR ESTABLISHING A PROGRAMMABLE EXPOSURE RESPONSE OF CAMERA

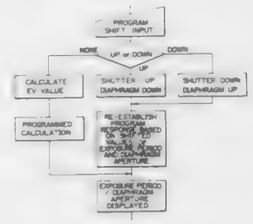
**Tetsuo Miyasaka, Hachioji, Japan, assignor to Olympus Optical Company, Ltd., Tokyo, Japan**

**Filed Mar. 6, 1987, Ser. No. 23,111**

**Claims priority, application Japan, Mar. 14, 1986, 61-057650**

**Int. Cl.[4] G03B** *7/097*

**U.S. Cl. 354—443** **17 Claims**




1. A method of establishing a program exposure response of a camera having a shift operating member for shifting from a point along a preset program response contained in a memory to another point along another program response, the shift value also being stored in memory, comprising the steps of:

determining a point, representing at least one exposure controlling value, on a first preset program response comprising a combination of an exposure period and a diaphragm aperture which is determined by an EV value as a function of the brightness of an object being photographed and a film speed and being represented in terms of a constant which depends on the relationship between the exposure period and the diaphragm aperture;

shifting the combination of the exposure period and the diaphragm aperture through a given number of steps in a direction to maintain an equivalent EV value as the exposure control value at said point responsive to the operation of the shift operation member through a like member of steps;

setting a second program response including the exposure control value comprising a combination of the exposure period and the diaphragm aperture which are obtained subsequent to the shift operation and separated from the first program response;

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and determining a combination of subsequent exposure period and diaphragm aperture values along the second program response in accordance with an EV value.

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**4,745,429**

## DEVELOPING APPARATUS FOR AN ELECTROSTATIC PHOTOCOPIER

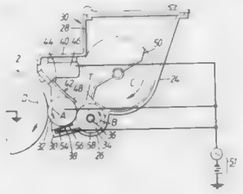
**Hideo Mukai, Yokohama; Sachiko Yasuda, Tokyo; Minoru Yoshida, Machida, and Tomoyuji Asada, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Jun. 25, 1987, Ser. No. 66,110**

**Claims priority, application Japan, Sep. 30, 1986, 61-231784; Nov. 12, 1986, 61-172695**

**Int. Cl.[4] G03G** *15/06*

**U.S. Cl. 355—3 DD** **6 Claims**



1. A developing apparatus for an electrostatic photocopier having an image carrier with an electrostatic latent image on a photosensitive surface thereof, comprising:

a housing for containing an electrically chargeable developer;

means for electrically charging said developer;

means for carrying the charged developer to a developing position exterior to said housing, whereby a portion of said charged developer may develop a latent image; and

means for recovering a residual charged developer on said developer carrying means while maintaining a uniform charge on said residual developer, said recovering means comprising means having a conductive portion urged against said developer carrying means.

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**4,745,430**

## MALFUNCTION DETECTING DEVICE IN USE FOR THE FIXING DEVICE OF AN IMAGE-FORMING APPARATUS

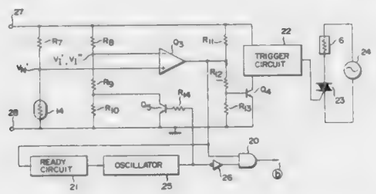
**Shizuo Tsuchiya, Tokyo, Japan, assignor to Casio Computer Co. Ltd. and Casio Electronics Manufacturing Co., Ltd., both of Tokyo, Japan**

**Filed Oct. 24, 1986, Ser. No. 923,029**

**Claims priority, application Japan, Nov. 1, 1985, 60-245635; Jan. 22, 1986, 61-11330**

**Int. Cl.[4] H05B** *1/02;* **G03G** *15/00*

**U.S. Cl. 355—3 FU** **11 Claims**




1. A temperature control device for use in the fixing device of an image-forming apparatus, comprising:

a heated member heated by a heat source included in a closed-loop circuit of a commercial power supply;

detecting means for detecting the temperature of said heated member, which is connected to one of the arms of a bridge circuit coupled for reception, using a low-power voltage;

means for controlling the current-feed to said heated member, on the basis of the result of comparison of the output signal from said detecting means and a reference potential appearing at the output terminal of said bridge circuit, which is for setting the temperature of said heated member to a predetermined level;

means for changing said reference potential according to the output signal from said controlling means; and

means for producing a signal indicative of a heat source abnormality, in response to the output signals of said current-feed control means and said reference potential-changing means.

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**4,745,431**

## FIXING DEVICE FOR IMAGE FORMING APPARATUS

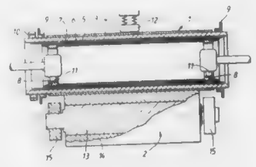
**Mitutosi Kogure, Yokohama; Yuka Nakamura, Kamakura, and Makoto Tamura, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Mar. 16, 1987, Ser. No. 26,299**

**Claims priority, application Japan, Mar. 18, 1986, 61-58324**

**Int. Cl.[4] G03G** *15/20*

**U.S. Cl. 355—3 FU** **5 Claims**



1. A device for fixing a toner image on an image forming medium in an image forming apparatus, said device comprising:

(a) a cylindrical roller body;

(b) a parting layer of fluororesin formed on the outer peripheral surface of said cylindrical roller body in surface abutting contact therewith;

(c) a first electrically insulating layer formed on the inner peripheral surface of said cylindrical roller body in surface abutting contact therewith;

(d) an electrically resistive heating layer formed on the inner peripheral surface of said first electrically insulating layer in surface abutting contact therewith;

(e) a second electrically insulating layer formed on the inner peripheral surface of said electrically resistive heating layer in surface abutting contact therewith, said second electrically insulating layer extending axially beyond said electrically resistive heating layer and, with said first electrically insulating layer, substantially encasing said electrically resistive heating layer;

(f) first and second ring-shaped electrodes in electrical contact with axially opposite ends of said electrically resistive heating layer and projecting radially inwardly through said second electrically insulating layer and beyond the inner peripheral surface of said second electrically insulating layer;

(g) first and second power supply terminals in sliding electrical contact with said first and second ring-shaped electrodes, respectively;

(h) first and second heat insulating bearings journalling the outer peripheral surface of said cylindrical roller body at axially opposite ends thereof;

(i) a heat insulating gear mounted on said cylindrical roller body for driving said cylindrical roller body in rotation;

(j) a supporting roller; and

(k) means for urging said supporting roller toward said parting layer to define a nip therebetween.



**4,745,432**

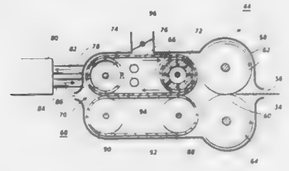
## LIQUID INK FUSING SYSTEM

**Michael J. Langdon, Pittsford, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Jan. 30, 1987, Ser. No. 8,987**

**Int. Cl.[4] G03G** *15/20*

**U.S. Cl. 355—3 FU** **12 Claims**



1. A reproducing machine of the type having a latent image recorded on a member, wherein the improvement includes:

means for developing the latent image recorded on the member with a liquid developer material comprising at least a liquid carrier having pigmented particles dispersed therein;

means for transferring the developed imaged from the member to a sheet of support material;

a housing having sheet inlet and sheet outlet passageways therein;

a pressure roll;

a heated roll cooperating with said pressure roll to form a nip for advancing the sheet of support material therethrough from the inlet of said housing so as to vaporize liquid carrier from the sheet of support material and to heat the pigmented particles to fuse the pigmented particles to the sheet of support material in image configuration;

an air pervious conveyor, disposed interiorly of said housing, arranged to advance the sheet of support material having the fused image from the nip defined by said heated roll and said pressure roll to the outlet of said housing said conveyor includes a first pair of spaced rollers with one of said first pair of rollers being positioned in the region of said heated roll and being air pervious, and an upper belt having a multiplicity of apertures therein entrained about said pair of rollers;

means for removing a substantial portion of the heated air and vaporized liquid carrier from said housing; and

means, in communication with the interior of said housing, for cooling the heated air and vaporized liquid carrier removed from said housing to condense the vaporized liquid carrier wherein the cooled air from said cooling means is returned to the interior of said housing to aid in cooling the sheet of support material without substantial cooling of said heated roll.

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**4,745,433**

## IMAGE FORMING APPARATUS WITH A LIGHT SHUTTER OF THE G-H TYPE LIQUID CRYSTAL

**Koh Fujimura, and Hisashi Aoki, both of Tokyo, Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan**

**Filed Jul. 16, 1984, Ser. No. 630,957**

**Claims priority, application Japan, Jul. 22, 1983, 58-132915**

**Int. Cl.[4] G03G** *15/00*

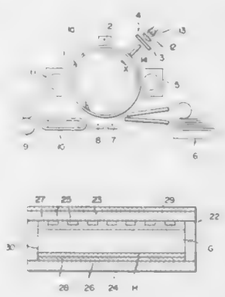
**U.S. Cl. 355—3 R** **9 Claims**

1. An image forming apparatus comprising:

a light source;

photosensitive means operated such that a portion of a charged surface thereof which is exposed with light from said light source is discharged;

exposing means, arranged between said light source and said photosensitive means, for forming a desired image upon exposure by light from said light source and for forming a latent image corresponding to the desired image on said photosensitive means, said exposing means comprising a guest-host effect liquid crystal shutter, said guest-host effect liquid crystal shutter including a pair of opposing substrates, electrodes formed on inner surfaces of said pair of opposing substrates, respectively, to provide a plurality of electrically controllable shutter portions, aligning films formed on exposed portions of the inner surfaces of said pair of opposing substrates and said electrodes, respectively, and a frequency driven liquid crystal which contains a dichroic dye and is sealed between said aligning films, to form a liquid crystal layer, the molecules of said



liquid crystal and said dichoric dye being homogeneously aligned, and a polarizing plate being arranged which has a polarization axis extending parallel to the longer axes of the molecules of said liquid crystal, said shutter shielding the light from said light source when a voltage is not applied across said electrodes, and said shutter passing the light from said light source when a voltage is applied across said electrodes;

developing means for developing the latent image formed on said photosensitive means to a visible image; and

recording means for transcribing the visible image from said photosensitive means to a recording medium.

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**4,745,434**

## COPYING APPARATUS HAVING PROGRESSIVE CONTROL MEANS

**Yoshinobu Shimomura, and Yoshiaki Takayanagi, both of Yokohama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Feb. 27, 1985, Ser. No. 706,453**

**Claims priority, application Japan, Mar. 5, 1984, 59-42600; Dec. 28, 1984, 59-276473; Dec. 28, 1984, 59-276987**

**Int. Cl.[4] G03G** *15/00*

**U.S. Cl. 355—14 R** **26 Claims**

1. A copying apparatus comprising:

means for scanning an original;

means for progressively forming an image of the original on a photosensitive member in accordance with a variable image forming condition;

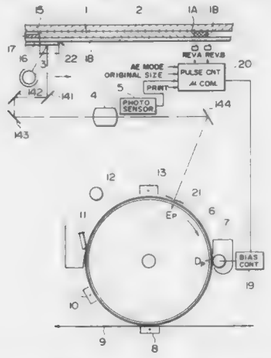
means for progressively detecting density of the original; and

means for progressively controlling the image forming condition corresponding to an area of the original in a first manner using the density of the area of the original detected by said detecting means, except for an end area

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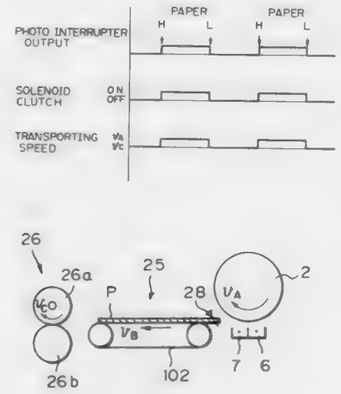


adjacent to an end of the original, and for controlling the end area in a second manner which is different from said first manner, and which does not use the detected density at said end area.




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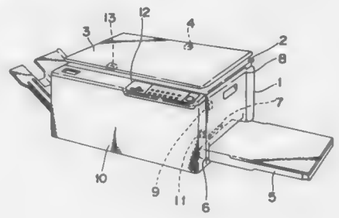
**4,745,435**
**SHEET TRANSPORTING APPARATUS IN A PRINTING SYSTEM**
**Toshio Sakata, and Tateomi Kono, both of Toyokawa, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**
**Filed Jul. 18, 1986, Ser. No. 886,686**
**Claims priority, application Japan, Jul. 29, 1985, 60-167969**
**Int. Cl.⁴ G03G *15/00***
**U.S. Cl. 355—14 SH** **10 Claims**

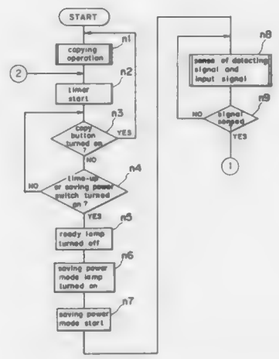



**1**. A transfer type printing system for transferring powder images formed on a photo-sensitive member to a printing sheet at a transferring station, comprising:
means for feeding the printing sheet to the transferring station at a predetermined speed;
means for fixing the transferred powder images onto the sheet, while the transferred sheet is moved at a speed different from the above-mentioned predetermined speed;
means for transporting the transferred sheet from the transferring station to the fixing means;
means for detecting a position of the sheet in a sheet transporting passage from the transferring station to the fixing means; and,
means for controlling the drive speed of the sheet transporting means in accordance with data detected by the detecting means.

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**4,745,436**
**COPYING MACHINE**
**Hirokazu Matsuura, Yamatokoriyama, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan**
**Filed Jul. 9, 1985, Ser. No. 753,064**
**Claims priority, application Japan, Jul. 10, 1984, 59-144012**
**Int. Cl.⁴ G03G *15/00, 21/00***
**U.S. Cl. 355—14 R** **10 Claims**



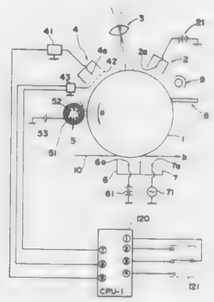



**1**. A copying machine comprising:
body means, a platen means mounted on said body means for receipt of a manuscript, platen cover means mounted over said platen means for opening to expose said platen means and for closing to cover said platen means and said manuscript thereon, operating means for signaling the start of a copying operation, power saving means for enabling a power saving mode by which power consumption of said copying machine is decreased in a period during which said copying operation of said copying machine is not performed, operating sensor means for detecting the start of said copying operation from said operating means wherein said operating sensor means emits a canceling signal in response to said start of said copying operation, platen cover sensor means for emitting a canceling signal when said platen cover means is opened or closed to start said copying operation, and canceling means for canceling said power saving mode automatically in response to said canceling signal.



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**4,745,437**
**COPIER MACHINES**
**Tateki Oka, Toyokawa; Naoki Toyoshi, Toyohashi, and Tomoaki Yokoyama, Toyokawa, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**
**Filed Jul. 8, 1987, Ser. No. 71,263**
**Claims priority, application Japan, Jul. 15, 1986, 61-167342; Jul. 15, 1986, 61-167343**
**Int. Cl.⁴ G03G *15/00***
**U.S. Cl. 355—14 CH** **15 Claims**




**1**. A copying apparatus comprising:
first charging means for charging an electrostatic latent image bearing member to a predetermined potential;
exposing means for exposing an original document to the charged electrostatic latent image bearing member to form an electrostatic latent image;
second charging means for recharging the electrostatic latent image formed on the electrostatic latent image bearing member, said second charging means having a grid;
developing means for developing the electrostatic latent image formed on the electrostatic latent image bearing member with an insulative toner having a polarity opposite to the polarity of the first charging means;
mode designating means for designating a first mode wherein a toner is deposited onto the latent image exclusive of the outline portion to visualize;
control means for operating the second charging means when the first mode is designated by the mode designating means.




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**4,745,438**
**AUTOMATIC COPIER SHOW-AROUND ERASE SYSTEM**
**Thomas Acquaviva, Penfield, and Donald W. Schaeffer, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.**
**Filed Sep. 16, 1986, Ser. No. 908,052**
**Int. Cl.⁴ G03G *21/00***
**U.S. Cl. 355—14 SH** **5 Claims**

**1**. In a copier or copier/printer with a photosensitive imaging surface and a variable magnification optical imaging system with magnification setting means and a copying platen on which various sizes of document sheets may be variably sequentially imaged by the magnification setting of said optical imaging system onto the photosensitive imaging surface as latent images to be developed and transferred to copy sheets, wherein the copier has a fade-out system for preventing the development of areas of the photosensitive imaging surface adjacent the latent images thereon of the document sheets, the improvement comprising:
a document sheet transport for transporting the document sheets in a document path onto and over the copying platen of the copier;
an array of plural document sensing means integral said document sheet transport and positioned in the document path of said document sheet transport for measuring both the length and width of the document sheets being transported onto the copying platen of the copier;
means for indicating the size of the copy sheets on which copies are being made;
and fade-out means connecting with and controlled by both said array of plural document sensing means and said magnification setting means of said variable magnification optical imaging system for preventing development of variable areas of said photosensitive imaging surface in response to said length and width measuring of the document sheet being copied and said magnification setting, and wherein said fade-out means is further responsive to said means for indicating the size of the copy sheets on which copies are being made, for automatically preventing development of all areas of said photosensitive imaging surface outside of the smaller of the two of the document latent image areas on the photosensitive imaging surface or said actual copy sheet size indication, by fading out any portions of the document latent image area which will not be engaged for image transfer by the copy sheet, and fading out otherwise developable but nondocument latent image areas of the photosensitive imaging surface even if they are within areas of the photosensitive imaging surface which will be engaged by the copy sheets, so as to provide complete fade-out for a wide range of magnifications, document sizes, and copy sizes, even if the document latent image area is smaller than the copy sheet or the copy sheet is smaller than the document latent image area, to prevent either "show-around" copy defects or undesirable development of portions of the document latent image area which cannot be transferred to the copy sheet, and wherein said fade-out means is operated and controlled in accordance with all of the following parameters:
1. If document width X magnification < copy width, then fade out to the former;
2. If document width X magnification > copy width, then fade out to the latter;
3. If document length X magnification < copy length, then fade out to the former;
4. If document length X magnification > copy length, then fade out to the latter.

**4,745,439**

## COPYING APPARATUS

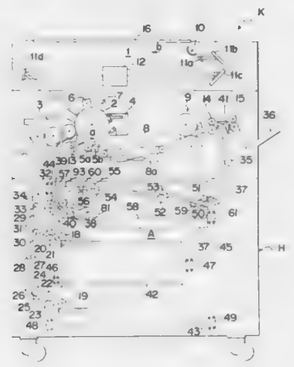
**Yoshihiro Hanada; Yasuo Nakamura, both of Toyokawa, and Kazuyuki Fukui, Toyohashi, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

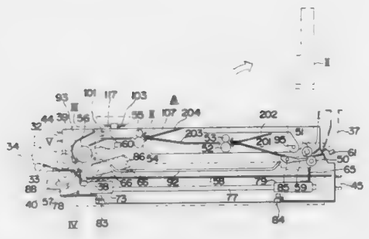
**Filed Jun. 18, 1986, Ser. No. 875,612**

**Claims priority, application Japan, Jul. 2, 1985, 60-146150; Jul. 5, 1985, 60-148918; Jul. 5, 1985, 60-148919; Jul. 8, 1985, 60-151057**

**Int. Cl.[4] G03G** *21/00;* **B65H** *5/22*

**U.S. Cl. 355—14 SH** **8 Claims**





1. A copying apparatus capable of effecting duplex copying and composite copying and comprising:

means for housing said apparatus;

a unitary intermediate tray means for storing a plurality of copy paper sheets transported thereto and refeeding plurality of copy paper sheets transported thereto and refeeding the stored copy paper sheets therefrom, one sheet at a time, with the copy paper sheets each having one copied face;

said intermediate tray means comprising a storage portion for storing and stacking thereon the copy paper sheets transported sequentially thereto, a first transport portion, a second transport portion and a paper feeding means for feeding, one sheet at a time, the copy paper sheets stored in sheet storage portion;

said first transport portion being pivotally provided at least partially so as to be pivoted relative to said storage portion and transporting the copy paper sheets to said storage portion through turnover of the copy paper sheets at the time of duplex copying such that each of the copy paper sheets on said storage portion has the one copied face directed upwardly;

said second transport portion transporting the copy paper sheets to said storage portion at the time of composite copying such that each of the copy paper sheets on said storage portion has the one copied face directed downwardly; and

a mounting means for detachably mounting said intermediate tray means to be drawn out of said means for housing said copying apparatus in a direction perpendicular to a transport direction of the copy paper sheets.

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**4,745,440**

## IMAGE FORMING APPARATUS

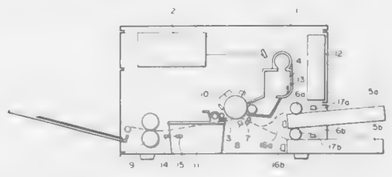
**Kimio Kono; Haruo Shimizu, both of Yokohama, and Koichi Miyamoto, Tama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 822,962, Jan. 28, 1986, abandoned, which is a continuation of Ser. No. 465,575, Feb. 10, 1983, abandoned. This application Jul. 16, 1987, Ser. No. 73,887**

**Claims priority, application Japan, Feb. 17, 1982, 57-25108**

**Int. Cl.[4] G03G** *15/00*

**U.S. Cl. 355—14 SH** **12 Claims**



1. Image forming apparatus, comprising:

first detection means for detecting quantity of an image forming medium usable to form a visible image on a recording material;

second detection means for detecting whether a storage member for accommodating therein a plurality of sheets of recording material is mounted on the apparatus, said storage member being removably mountable to the apparatus;

process means for performing an image forming operation on recording material fed by feeding means from said storage member to said processing means, said processing means being adapted to form images on the recording material by using said image forming medium; and

control means for controlling the image forming operation by said processing means, wherein after a predetermined time elapses from a time when power is applied to the apparatus, said control means is operable to prohibit the image forming operation when said first detection means detects a shortage of said image forming medium and said second detecting means detects that said storage member is removed from the apparatus, and wherein before the predetermined time elapses from a time when power is applied to the apparatus, said control means is operable to prohibit the image forming operation when said first detection means detects a shortage of said image forming medium without regard to the detection output of said second detecting means.

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**4,745,441**

## COPYING MACHINE CAPABLE OF FORMING FILING MARGINS ON BOTH SIDES OF COPY PAPER

**Syuzi Maruta, Toyokawa; Masazumi Ito, Toyohashi, and Tadashi Ohira, Toyokawa, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed Jun. 26, 1987, Ser. No. 67,466**

**Claims priority, application Japan, Jul. 1, 1986, 61-154612**

**Int. Cl.[4] G03G** *15/00*

**U.S. Cl. 355—14 R** **4 Claims**

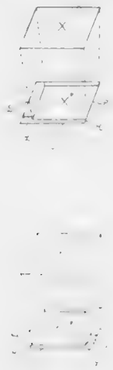
1. A copying machine comprising:

image forming means capable of operating in a single-side copying mode in which an image of a document is formed on one side of a copying paper, and in a double-side copying mode in which images of documents are formed on both sides of a copying paper, respectively,

copying mode selecting means for selecting either the single-side copying mode or the double-side copying mode;

filing margin forming means for forming an image of a document on a copying paper on a reduced scale to form a filing margin in a direction of conveyance of the copying paper;

filing margin forming mode selecting means for actuating said filing margin forming means to form a filing margin; and



control means for making the leading edge of a copying paper coincide with the leading edge of an image of a document in copying the image of the document on the first side of the copying paper and for making the leading edge of the copying paper coincide with the trailing edge of an image of a document in copying the image of the document on the second side of the copying paper, when both the double-side copying mode and the filing margin forming mode have been chosen.

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**4,745,442**

## INSTANT PHOTOGRAPHIC METHOD AND APPARATUS

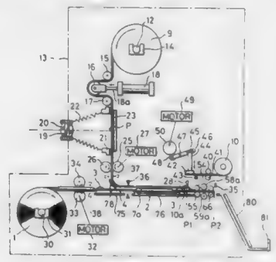
**Yuji Oshikoshi, Tokyo; Masashi Katoh, and Hisashi Kikuchi, both of Kanagawa, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Division of Ser. No. 808,277, Dec. 12, 1985, Pat. No. 4,677,046. This application Dec. 31, 1986, Ser. No. 572**

**Claims priority, application Japan, Dec. 12, 1984, 59-262226; Dec. 12, 1984, 59-262227; Dec. 12, 1984, 59-262228; Jan. 28, 1985, 60-12674; Jan. 28, 1985, 60-12675**

**Int. Cl.[4] G03B** *29/00, 27/30*

**U.S. Cl. 355—28** **19 Claims**



1. An instant photographic apparatus, comprising:

means for supporting an elongated photosensitive member in the form of a roll;

exposure means for creating a latent image on an end of said photosensitive member disposed in an exposure position;

means for advancing said photosensitive member by a predetermined increment of length after exposure;

means for supporting an image-receiving member on which a positive image is adapted to be formed corresponding to said latent image on said photosensitive member during processing by means of diffusion transfer;

means for advancing said image-receiving member a predetermined distance after the exposure of said photosensitive member;

means for superposing the exposed portion of said photosensitive member and said image-receiving member;

means for releasably adhesively connecting said members together;

means for thereafter spreading a processing liquid between said members; and

means for cutting off at least said exposed photosensitive member to provide a single frame comprised by a pair of superposed sheets comprising said photosensitive and image-receiving members, prior to the spreading of said processing liquid.

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**4,745,443**

## COPYING APPARATUS

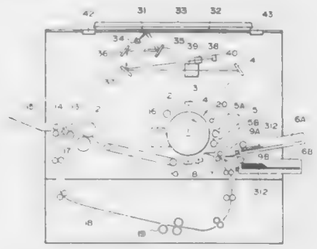
**Hideki Adachi; Masahiro Tomosada, both of Kawasaki; Tadashi Suzuki, Yokohama, and Naoyuki Ohki, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 732,840, May 10, 1985, abandoned. This application Dec. 22, 1986, Ser. No. 943,854**

**Claims priority, application Japan, May 15, 1984, 59-95484; May 15, 1984, 59-95485; May 15, 1984, 59-95486; May 15, 1984, 59-95487; May 15, 1984, 59-95491**

**Int. Cl.[4] G03B** *27/52*

**U.S. Cl. 355—40** **98 Claims**



1. A copying apparatus comprising:

optical means for projecting an image of an original onto a copy material;

image forming means for forming the original image projected by said optical means on the copy material;

image area designating means for designating an arbitrary area on the original;

copy area designating means for designating an arbitrary area on the copy material; and

control means for copying an image in said image area into said copy area,

wherein said control means includes means for erasing the image formed on the copy material in response to the area designation by said image area designating means.

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**4,745,444**

## DEVICE FOR LOADING PAPER MASK ON PHOTOGRAPHIC PRINTER

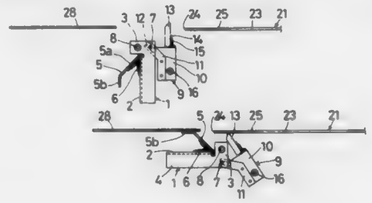
**Hiroshi Miyawaki, Wakayama, Japan, assignor to Noritsu Kenkyu Center Co., Ltd., Wakayama, Japan**

**Filed Apr. 23, 1987, Ser. No. 42,098**

**Claims priority, application Japan, Apr. 25, 1986, 61-63802[U]; Aug. 11, 1986, 61-123579[U]**

**Int. Cl.[4] G03B** *27/58*

**U.S. Cl. 355—74** **3 Claims**



**1.** A device for loading a paper mask on a photograpic printer having a printing unit, comprising a working unit pivotally mounted to be movable toward and away from one longitudinal edge of a web of photographic printing paper loaded in the printing unit, a push plate elastically mounted on said woking unit for pushing up said printing paper along the edge from which said paper mask is inserted, and a controller actuated by an edge portion of said paper mask to move said working unit to its operative position and adapted to permit said working unit to get back to its inoperative position when a cutout portion of said paper mask is passing over said controller.

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**4,745,445**

## INTERDIGITATED SCHOTTKY DIODE

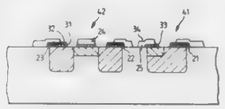
**Joseph Mun; Graeme K. Barker, both of Essex, and Mohamed H. Badawi, Stansted, all of England, assignors to ITT Gallium Arsenide Technology Center, a Division of ITT Corporation, Roanoke, Va.**

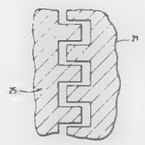
**Continuation of Ser. No. 587,350, Mar. 8, 1984, abandoned. This application Dec. 22, 1986, Ser. No. 945,244**

**Claims priority, application United Kingdom, Mar. 15, 1983, 8307145; May 19, 1983, 8313853**

**Int. Cl.[4] H01L** *29/48*

**U.S. Cl. 357—15** **5 Claims**





**1.** A millimeter wave frequency integrated circuit comprising a Schottky field effect transistor (MESFET) and a Schottky diode structure including a plurality of diodes formed in a compound semiconductor substrate, the MESFET of said circuit including first and second deep layers of $n^+$ type material separated by a first surface layer of lightly doped n-type material, a Schottky gate contact disposed on said first surface layer, and first and second ohmic contacts connected directly to said first and second deep layers respectively to form the source and the drain contacts of the MESFET, and each said diode including a third deep layer of $n^+$-type material overload by a second surface layer of lightly doped n-type material, a Schottky diode contact disposed on said second surface layer, and a third ohmic contact connected directly to said third deep layer, said Schottky diode contacts and said third ohmic contacts being arranged in an interdigited finger structure for connecting said diodes in parallel.

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**4,745,446**

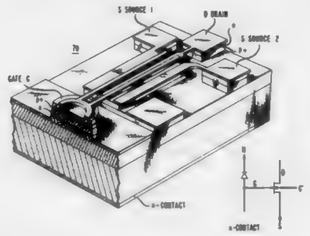
## PHOTODETECTOR AND AMPLIFIER INTEGRATION

**Julian Cheng, and Stephen R. Forrest, both of Chatham, N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.**

**Continuation of Ser. No. 700,391, Feb. 11, 1985, abandoned. This application Jun. 10, 1987, Ser. No. 61,006**

**Int. Cl.[4] H01L** *29/80*

**U.S. Cl. 357—22** **25 Claims**



**1.** A semiconductor device comprising at least one PINFET structure, said PINFET structure comprising:

a. first region comprising n-type III-V semiconductor compound;

b. second epitaxial region comprising intrinsic III-V semiconductor compound, said second epitaxial layer contacting at least a portion of the first region;

c. third epitaxial region comprising III-V semiconductor compound, said third epitaxial region contacting at least a portion of the second epitaxial region;

d. a JFET portion of the PINFET structure comprising fourth epitaxial region comprising III-V semiconductor compound with n-type conductivity, said fourth epitaxial region contacting at least a portion of the third epitaxial region;

e. fifth epitaxial region comprising III-V semiconductor compound with p-type conductivity and contacting at least a portion of the fourth epitaxial region, said fifth epitaxial region having a length;

f. source and drain electrodes, said source and drain electrodes contacting said fourth epitaxial region;

g. gate electrode contacting said fifth epitaxial region and having a length, the length and position of the gate electrode relative to the fifth epitaxial region being such that it overhangs the fifth epitaxial region;

h. a PIN portion of the PINFET structure comprising a sixth epitaxial region comprising III-V semiconductor compound with n-type conductivity, said sixth epitaxial region contacting at least a portion of the third epitaxial region but not contacting the fourth or fifth epitaxial regions;

i. seventh epitaxial region comprising III-V semiconductor compound with p-type conductivity contacting at least a portion of the sixth epitaxial region but not contacting the fourth or fifth epitaxial regions;

j. a p-contact comprising conductive material contacting at least a portion of a highly doped p-type region that extends from under the p-contact through the seventh epitaxial region, through the sixth epitaxial region and partially into the portion of the third epitaxial region under the p-contact;

k. means for electrically connecting the p-contact to the gate electrode

characterized in that the third epitaxial region comprises p-type III-V semiconductor compounds; and a back gate electrode is contacted to the third epitaxial layer.



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**4,745,447**

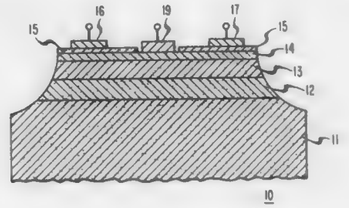
## GALLIUM ARSENIDE ON GALLIUM INDIUM ARSENIDE SCHOTTKY BARRIER DEVICE

**Chung Y. Chen, New Providence; Alfred Y. Cho, Summit, and Sung-Nee G. Chu, New Providence, all of N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Jun. 14, 1985, Ser. No. 745,294**

**Int. Cl.[4] H01L** *29/201, 29/56, 29/80*

**U.S. Cl. 357—22** **10 Claims**



**1.** A semiconductor device comprising at least one semiconductor element, said element comprising

a. first epitaxial region comprising InP or III–V semiconductor compound approximately lattice-matched to InP,

b. gate electrode,

c. a second epitaxial region contacting both first epitaxial region and gate electrode, said second epitaxial region consisting essentially of gallium arsenide with thickness greater than 700 Å, and

d. substrate comprising semi-insulating indium phosphide said substrate contacting said first epitaxial layer.

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**4,745,448**

## SEMICONDUCTOR DEVICES HAVING COMPENSATED BUFFER LAYERS

**H. Barteld Van Rees, Newton Upper Falls, and Barry J. Liles, Westboro, both of Mass., assignors to Raytheon Company, Lexington, Mass.**

**Filed Dec. 24, 1985, Ser. No. 813,306**

**Int. Cl.[4] H01L** *29/80, 29/167, 29/207, 29/227*

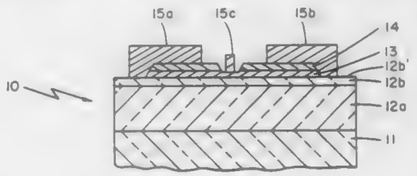
**U.S. Cl. 357—22** **7 Claims**

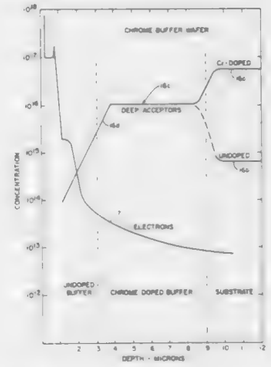
**5.** A field effect transistor comprising:

a substrate of gallium arsenide having a resistivity of at least about $10^7$ ohm-cm;

a first layer of gallium arsenide disposed over said substrate comprising a deep level acceptor dopant incorporated into said layer to compensate for donor dopants incorporated into said layer, a first portion of said layer having the concentration of said deep level acceptors being substantially constant at about $10^{16}$ acceptors/cc adjacent said substrate and having a first predetermined resistivity characteristic of about $10^7$ ohm-cm, and a second portion of said layer having a concentration of deep level acceptors monotonically declining to a value less than about $10^{14}$ acceptors/cc and having a second predetermined resistivity characteristic of at least about $10^5$ ohm-cm; and

means for providing the field effect transistor comprising a layer of gallium arsenide disposed over at least a portion





of said second portion of said first layer of gallium arsenide.

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**4,745,449**

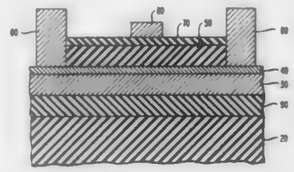
## INTEGRATED ELECTRONICS SUITABLE FOR OPTICAL COMMUNICATIONS

**Tao-Yuaan Chang, Lincroft, and Richard E. Howard, Holmdel, both of N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.**

**Continuation of Ser. No. 695,806, Jan. 28, 1985, abandoned. This application Aug. 7, 1987, Ser. No. 83,873**

**Int. Cl.[4] H01L** *29/78, 27/02, 29/34*

**U.S. Cl. 357—23.1** **19 Claims**



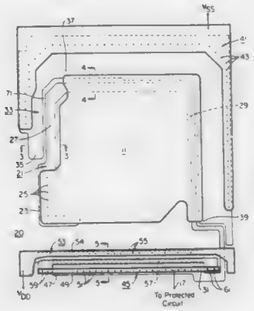
**1.** A body comprising an active device and a substrate providing physical integrity to said device, wherein said active device comprises (1) an active channel providing electrical continuity between a source and drain, and (2) a gate structure which, upon application of a potential, is capable of substantially decreasing electrical current in said channel characterized in that said gate structure comprises (1) a first dielectric region comprising a low conductivity semiconductor material overlying and having a bandgap greater than said active channel, and (2) a second dielectric region comprising an aluminum oxide material overlying said first dielectric region.

**4,745,450**

## INTEGRATED CIRCUIT HIGH VOLTAGE PROTECTION

Marc D. Hartranft, Scotts Valley, and Keith A. Garrett, San Jose, both of Calif., assignors to Zilog, Inc., Campbell, Calif.

Division of Ser. No. 585,407, Mar. 2, 1984, Pat. No. 4,605,980.
This application Apr. 1, 1986, Ser. No. 846,732
Int. Cl.[4] H01L *29/78*; H02H *3/20*
U.S. Cl. 357—23.13 3 Claims



1. A transistor formed on a substrate of a first conductivity type of an integrated circuit for protecting the circuit from high static discharge voltages that can be introduced through an electrically conductive wire bonding pad formed thereon with a defined perimeter, said transistor comprising:

a first elongated diffusion in said substrate having a second conductivity type doping opposite to that of said substrate and having its width entirely under said pad for a first portion of its length, an outside edge of said first diffusion length portion being adjacent to and substantially parallel with a defined segment of the pad perimeter, said first diffusion being electrically connected to said pad and additionally having a second portion of its length extending outside of said pad perimeter to the integrated circuit to be protected against high static discharge voltages,

a second elongated diffusion in said substrate having said second conductivity type and having only a portion of its width under said pad along its said defined perimeter segment and electrically insulated therefrom, an inside edge thereof under said pad being substantially parallel with and spaced apart from the outside edge of the first diffusion in order to form a channel in the substrate therebetween along said defined pad perimeter segment, said second diffusion having its width extending from under the pad along its said defined perimeter segment, and

an electrically conductive bus layer formed over the portion of the second diffusion width that extends outside of said pad perimeter, said layer being electrically isolated from said pad and having an edge that is parallel with and extends along substantially the entire length of said defined pad perimeter, said conductive layer being electrically connected with said second diffusion and to a common voltage circuit point,

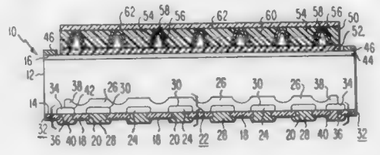
whereby a drain and a source of a protective transistor are formed by the first and second diffusions, and a gate is formed by the defined perimeter segment of the pad positioned over the channel between the first and second diffusions.

**4,745,451**

## PHOTODETECTOR ARRAY AND A METHOD OF MAKING SAME

Paul P. Webb, Beaconsfield, and Robert J. McIntyre, Pointe-Claire, both of Canada, assignors to RCA Corporation, Del.

Filed Jul. 1, 1983, Ser. No. 510,172
Int. Cl.[4] H01L *27/14*, *31/00*
U.S. Cl. 357—30 11 Claims



1. In a photodetector array comprising a body of light-sensitive semiconductor material having a light entry surface and a plurality of spaced-apart elements therein, each of which includes a semiconductor junction, thereby forming a plurality of high response regions about said elements with low response regions therebetween;

the improvement comprising wedge-shaped regions with a light-reflective coating overlying the surfaces thereof and positioned over the low response regions for reflecting light incident thereon into a high response region of the body.

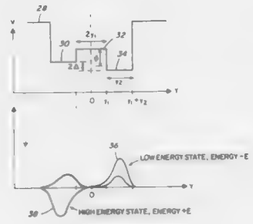
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**4,745,452**

## TUNNELING TRANSFER DEVICES

T. C. L. Gerhard Sollner, Winchester, Mass., assignor to Massachusetts Institute Of Technology, Cambridge, Mass.

Continuation of Ser. No. 653,455, Sep. 24, 1984, abandoned. This application Apr. 6, 1987, Ser. No. 35,222
Int. Cl.[4] H01L *27/14*
U.S. Cl. 357—30 18 Claims



1. A detector of electromagnetic radiation comprising:

a pair of closely spaced, coupled semiconductor structures each structure having a thin inner layer disposed between outer layers, the ground state carrier energy levels at zero bias in said inner layers being less than that in the outer layers and different from one another, two adjacent ones of said outer layers comprising a higher-carrier-energy layer, the higher-carrier-energy layer between the two lower-carrier-energy layers being very thin to provide splitting of the conduction-band energy subbands in the coupled layers, wherein carrier mobility is higher in one of said inner layers than in the other; and

source and drain electrodes, but no gate electrode, in electrical contact with said coupled structures;

whereby electromagnetic waves propagating in the plane of the layers alters conductance between the source and drain for detection of the electromagnetic waves.

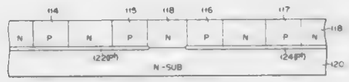


**4,745,453**

## SEMICONDUCTOR DEVICE

Yoshihisa Mizutani, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 626,388, Jun. 29, 1984, abandoned.
This application Aug. 26, 1986, Ser. No. 899,783
Claims priority, application Japan, Jun. 30, 1983, 58-119348
Int. Cl.[4] H01L *27/02*
U.S. Cl. 357—42 9 Claims



1. A semiconductor device comprising:

a semiconductor body of one conductivity type;

a plurality of wells of an opposite conductivity type formed in the surface area of said semiconductor body;

a plurality of groups of MIS transistors, each of said transistors having source and drain regions formed in the surface area of one of said wells;

a plurality of embedded layers of the opposite conductivity type each being associated with the wells of one of said groups and each formed in contact with those ones of said wells which contain the associated group of said MIS transistors, each of said embedded layers having a higher impurity concentration than the associated wells, said embedded layers being separated from the surface of said semiconductor body by a predetermined distance, and each of said wells being in contact with the upper surface of the associated embedded layer;

a plurality of electrode means for causing one group of said MIS transistors to have different characteristics from another group of said MIS transistors, each of said electrode means being respectively connected to a different one of said embedded layers, said electrode means being selectively set at different potentials from each other; and

a plurality of second MIS transistors each of which has source and drain regions formed in the surface area of said semiconductor body and which have a complementary relationship with the first MIS transistors, at least one of said second MIS transistors being positioned above one of said embedded layers between two of said wells containing first MIS transistors of one of said groups.

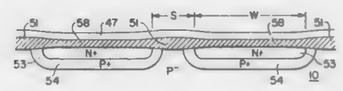
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**4,745,454**

## HIGH CAPACITY SEMICONDUCTOR CAPACITANCE DEVICE STRUCTURE

Darrell M. Erb, Los Altos, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Continuation of Ser. No. 689,199, Jan. 7, 1985, abandoned. This application Nov. 3, 1986, Ser. No. 926,600
Int. Cl.[4] H01L *29/92*, *29/78*, *27/02*
U.S. Cl. 357—51 11 Claims



1. A semiconductor device structure for providing a plurality of capacitance devices comprising:

(a) a semiconductor substrate having an upper surface;

(b) a plurality of first regions of a first conductivity type provided within said substrate, said first regions being disposed at the upper surface of said substrate;

(c) a plurality of second regions of a second conductivity type provided within said substrate, said second regions being disposed at the upper surface of said substrate such that a portion of each of said second regions is interposed between a respective one of said first regions and the remainder of said substrate;

(d) an insulating layer overlying the upper surface of said substrate including said first and second regions, the thickness of said insulating layer overlying the portions of said substrate between said second regions at the upper surface of said substrate being less than about 1,000 Angstroms, wherein the thickness of said insulating layer over said first regions at the upper surface of said substrate is in the range of about 300 to 500 Angstroms and the thickness of said insulating layer overlying the portions of said substrate between said second regions at the upper surface of said substrate is in the range of about 450 to 650 Angstroms; and

(e) a conducting layer overlying said insulating layer, whereby the application of a ground reference voltage potential to said conducting layer provides for the electrical isolation of said respective first regions.

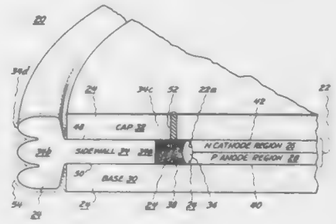
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**4,745,455**

## SILICON PACKAGES FOR POWER SEMICONDUCTOR DEVICES

Homer H. Glascock, II; Harold F. Webster, both of Scotia; Constantine A. Neugebauer, Schenectady, all of N.Y.; Fadel A. Selim, Swarthmore, Pa.; David L. Mueller, Media, Pa., and Dante E. Piccone, Glenmoore, Pa., assignors to General Electric Company, Schenectady, N.Y.

Filed May 16, 1986, Ser. No. 863,761
Int. Cl.[4] H01L *23/06*
U.S. Cl. 357—74 45 Claims



1. A hermetically sealed package having a silicon semiconductor wafer power device sealed therein; said semiconductor wafer comprising a layer of silicon material having first and second device regions on respective sides thereof; said package comprising:

an electrically conductive silicon base bonded to said wafer in ohmic electrical contact with said first device region;

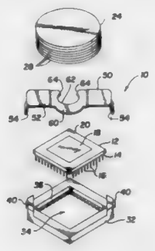
an electrically conductive silicon cap bonded to said wafer in ohmic electrical contact with said second device region;

an electrically insulative sidewall of silicon material surrounding said semiconductor wafer spaced from an edge thereof, said sidewall bonded to said silicon base and said silicon cap, said sidewall, base and cap together forming the hermetically sealed enclosure of said package;

an electrical passivant disposed on said edge of said semiconductor wafer and adjoining said first and second device regions; and

an arc suppressant disposed within said package and conforming to and substantially completely filling said space between said electrical passivant and said sidewall.

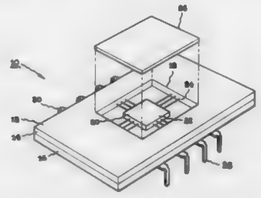
**4,745,456**
**HEAT SINK CLIP ASSEMBLY**
**Donald L. Clemens, The Colony, Tex., assignor to Thermalloy Incorporated, Dallas, Tex.**
**Filed Sep. 11, 1986, Ser. No. 905,657**
**Int. Cl.[4] H01L** *23/42*
**U.S. Cl. 357—79** **14 Claims**



1. Apparatus for mounting a heat sink having a plurality of spaced fins extending radially from a central post on an enclosed and sealed electronic device package having a plurality of leads extending substantially parallel from one surface thereof comprising:
(a) electrically insulating frame means having an open cavity adapted to receive and support an electronic device package about the periphery thereof with the leads extending from the device package through said open cavity and a pair of spaced latching means extending from opposite sides of said frame means; and
(b) elongated clip means adapted to releasably grip a heat sink and urge it into thermal contact with the face of said device package opposite said leads, each end of said elongated clip means adapted to mate with one of said pair of latching means.

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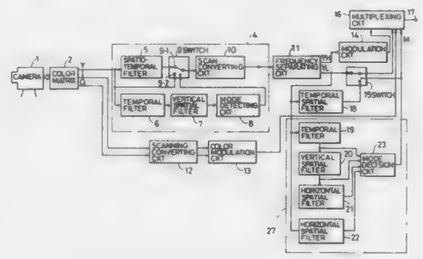
**4,745,457**
**ELECTRONIC SUBSTRATE ARTICLE AND METHOD OF PREPARATION**
**Charles G. Morgan, Laurens, S.C., assignor to General Electric Company, New York, N.Y.**
**Filed Jul. 30, 1984, Ser. No. 635,996**
**Int. Cl.[4] H01L** *39/02*
**U.S. Cl. 357—80** **2 Claims**



1. An improved integrated circuit package comprising an alumina based sintered ceramic member having a central cavity opening in which is disposed an integrated circuit device attached to said ceramic member, said integrated circuit device also being electrically connected to circuit elements of said ceramic member, and cover means for the central cavity opening in said ceramic member, wherein the improvement comprises forming said ceramic member with a sintered body of polycrystalline alumina ceramic having an approximate weight percent based on the starting batch formulation at least 95.7% $Al_2O_3$, about 1–4% aggregate content of $SiO_2$, MgO and $ZrO_2$ glass forming oxides in combination along with about 0.4–2.0% refractory metal oxide selected from molybdenum oxide and tungsten oxide to produce a dense color in the ceramic member which substantially reduces visible transmission in said ceramic member without degrading electrical and physical characteristics, said ceramic having grains of alumina sintered together with a secondary phase containing said $SiO_2$, MgO and $ZrO_2$ constituents disposed at the boundaries of said alumina grains and with said refractory metal oxide also being dissolved in said secondary phase.

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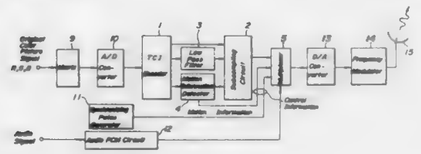
**4,745,458**
**TELEVISION SIGNAL PROCESSING SYSTEM**
**Yasuhiro Hirano, Hachioji; Hiroshi Yoshigi, Nishitama; Takahiko Fukinuki, and Hidehiko Jusa, both of Kokubunji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**
**Filed Nov. 19, 1985, Ser. No. 799,510**
**Claims priority, application Japan, Nov. 21, 1984, 59-244433; Dec. 7, 1984, 59-257523; Dec. 14, 1984, 59-262763**
**Int. Cl.[4] H04N** *9/42*
**U.S. Cl. 358—11** **5 Claims**

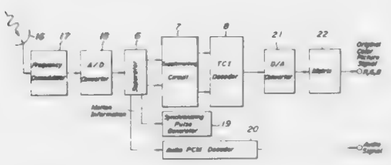



1. A color television signal processing system comprising:
first means for providing a linear-sequentially scanned luminance signal and a linear-sequentially scanned chrominance signal;
motion detecting means for detecting motion of a picture from said linear-sequentially scanned luminance signal;
a spatio-temporal filter for receiving as an input signal said linear-sequentially scanned luminance signal and for eliminating an aliasing component of said linear-sequentially scanned luminance signal so as to provide an output signal of said linear-sequentially scanned luminance signal without the aliasing component;
switch means for selecting one of the input signal and the output signal of said spatio-temporal filter in response to an output of said motion detecting means;
first scan converting circuit means for converting an output of said switch means into an interlaced scanned luminance signal and for providing an output signal thereof;
second scan converting circuit means for converting said linear-sequentially scanned chrominance signal into an interlaced scanned chrominance signal and for providing an output signal thereof;
modulating circuit means for modulating a color subcarrier by said interlaced scanned chrominance signal and for providing an output signal thereof; and
second means for multiplexing output signals of said first scan converting circuit means and said modulating circuit means to provide a complex color television signal for transmission.



**4,745,459**
**DIVISIONALLY TIME-COMPRESSED SUBSAMPLE TRANSMISSION AND MOTION-COMPENSATED REPRODUCTION SYSTEM FOR A HIGH DEFINITION COLOR TELEVISION PICTURE SIGNAL**
**Yuichi Ninomiya; Yoshimichi Ohtsuka, and Yoshinori Izumi, all of Tokyo, Japan, assignors to Nippon Hoso Kyokai, Japan**
**Continuation of Ser. No. 659,404, Oct. 10, 1984, abandoned. This application Apr. 2, 1987, Ser. No. 33,878**
**Claims priority, application Japan, Oct. 19, 1983, 58-194115; Oct. 19, 1983, 58-160530; Jan. 24, 1984, 59-9397; Feb. 6, 1984, 59-16418**
**Int. Cl.[4] H04N** *7/12, 11/02*
**U.S. Cl. 358—12** **9 Claims**

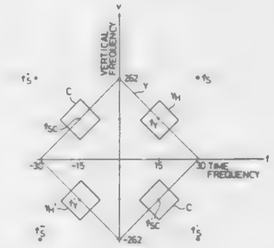


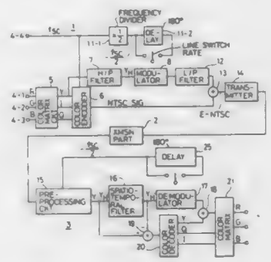


1. A divisionally time-compressed subsample transmission and motion compensated reproduction system for a high definition color television signal, comprising:
a sending end including:
means for individually compressing time axes of luminance and chrominance signal components of a high definition color television picture signal by sampling said high definition color television picture signal at a clock rate phase-locked on a line synchronizing signal of said high definition color television picture signal whereby said time axes are compressed,
means for time-divisionally multiplexing the compressed time axes of said luminance and chrominance signal components, so as to obtain a time-divisionally compressed and multiplexed picture signal, means for subsampling said time-divisionally compressed and multiplexed picture signal during predetermined plural fields, so as to obtain a picture signal conditioned for narrow band transmission, and
means for forming a control signal including a line synchronizing control signal having a polarity the same as a picture information signal of said high definition color television picture signal, so as to allow reproduction of a reproduced line synchronizing signal phase-locked on the subsampled picture signal,
means for transmitting said picture signal conditioned for narrow band transmission and said control signal to a receiving end;
motion information detector means, provided at at least one of the sending end and receiving end, for generating a picture motion information signal detected from said time-divisionally compressed multiplexed picture signal;
said receiving end comprising:
means for receiving said picture signal condition for narrow-band transmission,
means for separating said control signal from said picture signal conditioned for narrow-band transmission, means for supplementing said picture signal conditioned for narrow-band transmission by inserting samples of luminance and chrominance signal components which were skipped by said means for subsampling at the sending end, so as to restore said picture signal condition for narrow band transmissioned into said time-divisionally compressed and multiplexed picture signal under control of said control signal separated from said picture signal conditioned for narrow-band transmission and under control of said picture motion information signal, and
means for respectively expanding the time axes of said luminance and said chrominance signal components separated from the restored time-divisionally compressed and multiplexed picture signal, so as to reconstruct said luminance and chrominance signal components of said high definition color television picture signal.

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**4,745,460**
**METHOD FOR TRANSMITTING A TELEVISION SIGNAL BY FIELD TO FIELD PROCESSING**
**Takahiko Fukinuki, Kokubunji, Japan, assignor to Hitachi, Ltd., Tokyo, Japan**
**Division of Ser. No. 578,528, Feb. 9, 1984, Pat. No. 4,660,072. This application Mar. 16, 1987, Ser. No. 26,281**
**Claims priority, application Japan, Mar. 18, 1983, 58-44238**
**The portion of the term of this patent subsequent to Apr. 21, 2004, has been disclaimed.**
**Int. Cl.[4] H04N** *11/14*
**U.S. Cl. 358—12** **4 Claims**




1. A method for transmitting a television signal, comprising:
(a) a first step of generating a color television signal including;
providing a luminance signal and a color signal of a video signal,
modulating a first subcarrier by the color signal in order to obtain a modulated color signal,
modulating a second subcarrier by one part of the luminance signal to obtain a modulated luminance signal, and
multiplexing another part of the luminance signal, the

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modulated color signal and the modulated luminance signal;

(b) a second step of transmitting the color television signal; and

(c) a third step of receiving the transmitted color television signal and reproducing the luminance signal and the color signal from the received color television signal;

wherein the phase of at least said first subcarrier changes by substantially 180° every scanning line of the television signal, the phase of the first subcarrier on a current scanning line being substantially equal to that of the first subcarrier on a scanning line located just over the current scanning line and delayed by about one field period from the current scanning line, the phase of the second subcarrier on the current scanning line being substantially 180° out of phase to that of the second subcarrier on a scanning line just over the current scanning line and delayed by about one field period.

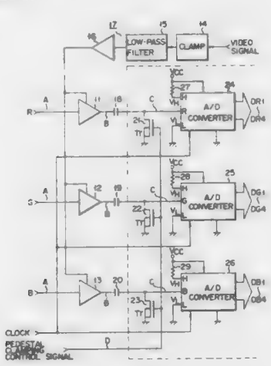
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**4,745,461**

**R,G,B LEVEL CONTROL IN A LIQUID CRYSTAL TV USING AVERAGE OF COMPOSITE VIDEO SIGNAL**

**Fujio Shirai, and Takahiro Fuse, both of Tokyo, Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan**

**Filed Mar. 9, 1987, Ser. No. 23,484**
**Claims priority, application Japan, Apr. 11, 1986, 61-83821**
**Int. Cl.⁴ H04N** *9/68*
**U.S. Cl. 358—21 R** **4 Claims**




1. A circuit for controlling the level of a color video signal on a liquid crystal television receiver, comprising:

a color demodulation circuit for decoding a composite color video signal into primary color signals R (Red), G (Green) and B (Blue);

amplifying means for amplifying the respective primary color signals demodulated by the color demodulation circuit;

an automatic gain control means for receiving the composite color video signal and for controlling an amplification factor of the amplifying means in accordance with the level of the composite color video signal;

clamping means for clamping the primary color signals amplified by the amplifying means so that their aligned pedestal level is obtained; and

A/D converting means for converting the primary color signals having the pedestal levels which are aligned by said clamping means to digital signals for liquid crystal drive.

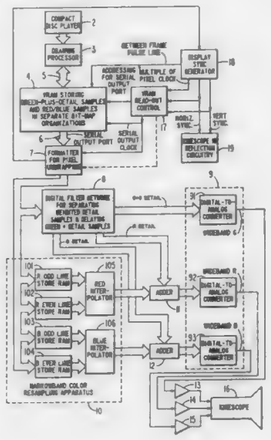
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**4,745,462**

**IMAGE STORAGE USING SEPARATELY SCANNED COLOR COMPONENT VARIABLES**

**Robert A. Dischert, Burlington; David L. Sprague, Hopewell; Lawrence D. Ryan, Princeton Junction, and Nicola J. Fedele, Kingston, all of N.J., assignors to RCA Corporation, Princeton, N.J.**

**Filed Mar. 2, 1987, Ser. No. 20,639**
**Int. Cl.⁴ H04N** *9/64*
**U.S. Cl. 358—21 R** **10 Claims**




1. A system for storing and retrieving electric signals descriptive of color images, said system comprising:

a video random-access memory having a multiplicity of storage locations, an input port and a serial-access output port;

means for writing electric signals descriptive of color images into said video random-access memory via its input port for storage in storage locations thereof in accordance with separate bit-map organizations for combined detail and narrowband first primary color information, for narrowband second primary color information, and for narrowband third primary color information;

means for selecting successive rows of storage locations storing combined detail and narrowband first primary color information for reading out from said video random-access memory via its serial-access output port, one line of combined detail and narrowband first primary color information during each display line trace interval;

means for selecting successive rows of storage locations storing narrowband second primary color information and narrowband third primary color information for read out from said video random-access memory via its serial-access output port, during selected display line retrace intervals;

means for resampling said narrowband second primary color information to the same sampling density as said combined detail and narrowband first primary color information;

means for temporally aligning corresponding samples of combined detail and first primary color information, of second primary color information of the same sampling density and of third primary color information of the same sampling density; and

means for generating wideband component color signals in response to said temporally aligned corresponding samples of combined detail and narrowband first primary color information, of said second primary color information, including

means for separating detail information from said combined detail and narrowband firt primary color information,

means for combining said separated detail information with said resampled narrowband second primary color information in proportions to generate a wideband second primary color signal, and

means for combining said separated detail information with said resampled narrowband third primary color information in proportions to generate a wideband third primary color signal.



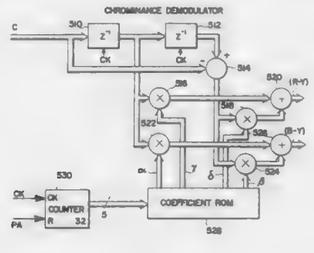
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**4,745,463**

**GENERALIZED CHROMINANCE SIGNAL DEMODULATOR FOR A SAMPLED DATA TELEVISION SIGNAL PROCESSING SYSTEM**

**Chung H. Lu, Plainsboro, N.J., assignor to RCA Licensing Corporation, Princeton, N.J.**

**Filed Sep. 25, 1986, Ser. No. 911,424**
**Int. Cl.⁴ H04N** *9/50*
**U.S. Cl. 358—23** **10 Claims**




1. In a system for processing video signals which include a horizontal line synchronizing signal component and a chrominance signal component including a baseband color information signal that modulates a carrier signal, apparatus comprising:

means, coupled to receive said video signals, for generating a sampled data signal representing said chrominance signal component and having a sampling frequency substantially equal to N/D times the frequency of said carrier signal where N and D are positive integers; and

means coupled to said sampled data chrominance signal generating means for demodulating said sampled data chrominance signal to provide said baseband color information signal, including:

delay means, coupled to said sampled data chrominance signal generation means, for delaying the samples provided thereby by first and second amounts of time substantially equal to one and two periods of said sampling frequency respectively, to provide respective first and second delayed samples;

means for combining successive samples provided by said sampled data chrominance signal generation means with successive ones of said second delayed samples to generate successive compound samples;

means for multiplying successive ones of said first delayed samples by respective proportioning factors to generate respective successive proportional samples;

means for combining said successive proportional samples with said successive compound samples to generate successive samples representing said baseband color information signal; and

means for changing the proportioning factors in a predetermined sequence having N steps corresponding respectively to N successive samples provided by said sampled data chrominance signal generation means.

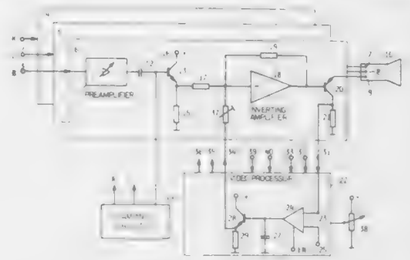
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**4,745,464**

**BLACK-CURRENT-SETTING CIRCUIT FOR COLOR CRT**

**Gerald Gronau, Hildesheim, and Lukas Hinkel, Nordstemmen, both of Fed. Rep. of Germany, assignors to Blaupunkt-Werke GmbH, Hildesheim, Fed. Rep. of Germany**

**Filed Jan. 29, 1987, Ser. No. 8,307**
**Claims priority, application Fed. Rep. of Germany, Jan. 29, 1986, 3602529**
**Int. Cl.⁴ H04N** *9/72*
**U.S. Cl. 358—34** **6 Claims**




1. In a color video output circuit having a video processor (22) and, for each of a respective red, green, and blue chromaticity signal, a respective output amplifier (18, 20), and a respective sticking-voltage control circuit (23–29) in said video processor (22),

a circuit arrangement to control the respective working points of said output amplifiers (18, 20) to, in turn, control cathode beam currents (7, 8, 9) of a cathode ray tube (10) having color video signals (1, 2, 3; R, G, B) applied thereto,

comprising

means (21) for couping a voltage (31, 32, 33) corresponding to the respective cathode beam current to the video processor (22) to form an input voltage thereto; and

connection means (34, 35, 36) for superimposing an output signal from the video processor (22) on the video signal being applied to the respective output amplifier (18, 20), said connection means including a controllable resistor (37) connected between the video processor (22) and the respective output amplifier (18,20).

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**4,745,465**

**DIGITAL COLOR IMAGE PROCESSING METHOD EMPLOYING HISTOGRAM NORMALIZATION FOR TONE AND COLOR REPRODUCTION**

**Heemin Kwon, Pittsford, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Mar. 24, 1986, Ser. No. 843,409**
**Int. Cl.⁴ G03F** *3/08;* **H04N** *1/46;* **G03B** *27/80*
**U.S. Cl. 358—80** **6 Claims**

1. A digital color image processing method comprising the steps of:

a. operating on a luminance component Y of a digital color image with an image detail detection operator to detect regions of the image representing luminance detail;

b. operating on color components of the digital image in the luminance detail regions with a contrast detection filter to detect the contrast of the color components of the image in the luminance detail regions;

c. separating color values of the color components in the luminance detail regions into contrast intervals and forming a histogram of the color values of each of the color components in the contrast intervals;

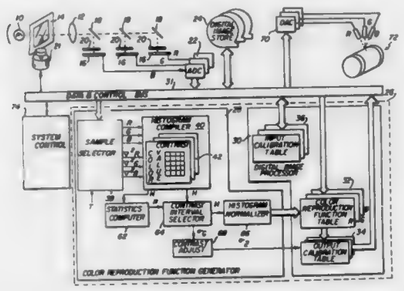
d. selecting one of the contrast intervals based upon the similarity in shape of the color value histograms in the selected contrast interval;

e. forming color reproduction functions by normalizing the

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color value histograms in the selected contrast interval; and



f. applying the color reproduction functions to the color values of the color components of the digital color image.

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**4,745,466**

## DIGITAL COLOR IMAGE PROCESSING APPARATUS WITH COLOR MASKING PROCESSING UNIT ADDRESSED BY A PLURALITY OF MULTI-BIT COLOR COMPONENT SIGNALS USING VARIOUS COMBINATIONS OF THE BITS OF THE SIGNALS

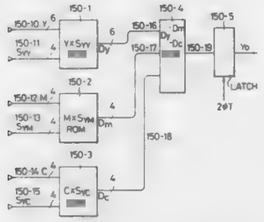
**Tadashi Yoshida, Ichikawa; Kimiyoshi Hayashi, Tokyo; Shunichi Abe; Nobuo Matsuoka, both of Kawasaki; Yoshinori Ikeda, Tokyo; Mitsuo Akiyama, Murayama, and Yoshinobu Mita, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 2, 1984, Ser. No. 585,602**

**Claims priority, application Japan, Mar. 6, 1983, 58-36510; Mar. 6, 1983, 58-36511; Mar. 6, 1983, 58-36512**

**Int. Cl.⁴ G03F *3/08*; H04H *1/46***

**U.S. Cl. 358—80** **3 Claims**



1. An image processing apparatus comprising data output means for providing a plurality of color data, and masking processing means for modifying said plurality of color data by processing each of the plurality of color data provided by said data output means according to other color data respectively associated with each of the plurality of color data, wherein said masking processing means includes first memory means for providing first data in accordance with each of the plurality of color data and said respective other color data, and second memory means for providing second data in accordance with the first data provided by said first memory means, wherein each of the plurality of color data and said respective other color data are used as addresses of said first memory means, and the number of bits of each of the plurality of color data is larger than the number of bits of each of said respective other color data.

2. Color image processing apparatus comprising:

data output means for generating a plurality of multi-bit color component signals; and

masking processing means for producing recording color data in response to the plurality of color component signals;

said masking processing means including memory means for storing recording color data corresponding to each of the color component signals;

wherein said memory means is addressed by the plurality of color component signals, the recording color data in said memory means being addressed by the corresponding one of the color component signals and at least one other of the plurality of color component signals using a larger number of bits of the corresponding one of the color component signals than of said at least one other color component signal.

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**4,745,467**

## COLOR IMAGE-PROCESSING APPARATUS

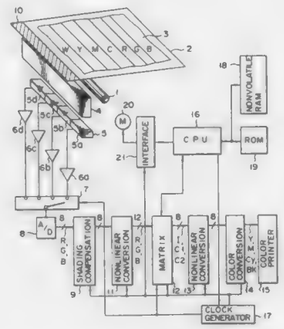
**Hidekazu Sekizawa, Yokohama; Naofumi Yamamoto, Tokyo; Tutomu Saito, Yokohama, and Haruko Kawakami, Funabashi, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Oct. 24, 1986, Ser. No. 923,045**

**Claims priority, application Japan, Oct. 28, 1985, 60-240974; Oct. 17, 1986, 61-246988**

**Int. Cl.⁴ H04N *1/46***

**U.S. Cl. 358—80** **10 Claims**



1. A color copier comprising:

a color line image sensor for optically scanning, line by line, a color document to provide fundamental color signals for each line of the document;

matrix circuit means connected to receive the fundamental color signals for converting the fundamental color signals into a brightness signal and two color difference signals, said matrix circuit means having a set of matrix coefficients for obtaining the brightness signal and the two color difference signals;

a color printer for reproducing the color document by use of a plurality of color inks;

color conversion circuit means, coupled between said matrix circuit means and said color printer, including a read only memory table for storing ink amount control signals in a digitalized manner, which are adapted for controlling the amounts of the color inks used in said color printer, said read only memory table being accessed by the brightness signal and the color difference signals for outputting corresponding ink amount control signals; and

nonlinear conversion circuit means connected between said image sensor and said matrix circuit means for converting the fundamental color signals from said image sensor in a nonlinear fashion such that a change in level of an input signal in a low-level range is increased to an extent greater that that in a high-level range, whereby the degrees of data quantization of the ink amount control signals are made substantially uniform in said read only memory table of said color conversion circuit means.



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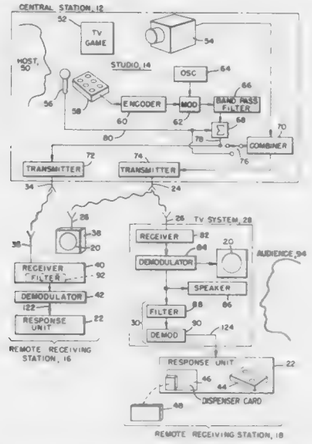
## SYSTEM FOR EVALUATION AND RECORDING OF RESPONSES TO BROADCAST TRANSMISSIONS

**Henry Von Kohorn, 215 Rocky Rapids Rd., Stamford, Conn. 06903**

**Filed Mar. 10, 1986, Ser. No. 837,827**

**Int. Cl.⁴ H04H *9/00***

**U.S. Cl. 358—84** **20 Claims**



1. A system for broadcasting task-setting program signals from a central site to a plurality of receiving stations at remote sites, and for responding to said program signals at said receiving stations, said system comprising:

means at said central site for transmitting a program signal;

means at each of said receiving stations for presenting a program transmitted by said program signal to an audience, said program being a television program;

means at said central site for transmitting an instructional signal incorporating predetermined response criteria;

means at said central site for encoding said instructional signal, said encoding means being suitable for operation by a conductor of said television program, said instructional-signal transmitting means including means for modulating encoded instructional signals upon a voice channel of said television program;

means at each of said receiving stations responsive to said instructional signal for storing said predetermined response criteria;

means at each of said receiving stations for entering a response by members of said audience to a situation presented in said program;

means at each of said receiving stations for comparing said audience response to said predetermined response criteria;

means coupled to said comparing means for scoring said audience response; and

demodulation means at said receiving station coupled to said predetermined response criteria storing means for extracting said instructional signal from said voice channel of said transmitted program signal; and wherein

said scoring means includes means for timing the response of said audience;

said entering means includes buffer storing means for storing said audience response, said buffer storing means outputting the audience response to said comparison means;

said scoring means includes means for designating a mode of scoring individual ones of said audience responses in response to said instructional signal; and wherein

said instructional signal can be generated to activate said designating means of said scoring means independently of a transmission of the program signal.

**4,745,469**

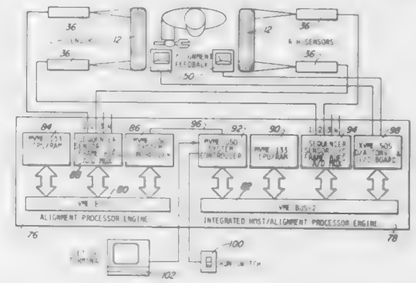
## VEHICLE WHEEL ALIGNMENT APPARATUS AND METHOD

**Thomas J. Waldecker, Ypsilanti; Robert Dewar, Troy; David R. Wybo, Novi, and Richard Woroniec, West Bloomfield Township, Oakland County, all of Mich., assignors to Perceptron, Inc., Farmington Hills, Mich.**

**Filed Feb. 18, 1987, Ser. No. 15,943**

**Int. Cl.⁴ H04N *7/18***

**U.S. Cl. 358—93** **67 Claims**



1. A noncontact wheel alignment system for measuring a predetermined alignment characteristic of the wheel of a vehicle, comprising:

light source means for projecting along an axis a structured light pattern onto the wheel of the vehicle;

optical sensor means positioned at a perspective angle relative to said axis of said projected light for receiving the reflected image of said structured light pattern off the wheel of the vehicle and converting said reflected image to corresponding electrical signals; and

processor means for processing said electrical signals and calculating therefrom said predetermined alignment characteristic of said wheel.

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**4,745,470**

## ENDOSCOPE USING A CHIP CARRIER TYPE SOLID STATE IMAGING DEVICE

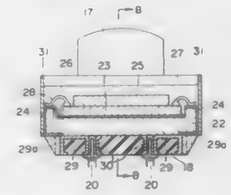
**Hisao Yabe, and Teruo Eino, both of Hachioji, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed Apr. 3, 1987, Ser. No. 33,954**

**Claims priority, application Japan, Apr. 4, 1986, 61-77825**

**Int. Cl.⁴ H04N *7/18***

**U.S. Cl. 358—98** **22 Claims**



1. An endoscope having:

an image forming objective system contained in the tip part of an insertion part formed to be elongate so as to be insertable into a body cavity or the like;

a solid state imaging device having a photoelectric converting function and arranged so as to have its imaging surface located in the focal plane of said objective system; and

a substrate having said solid state imaging device fixed thereon and having conductive parts electrically con-

nected with the electrodes of said solid state imaging device,

characterized in that said conductive parts are formed on at least one side surface of said substrate and said solid state imaging device is fitted onto said substrate while, for electrodes located on at least one end surface side in said solid state imaging device placed on said substrate so as to be adjacent to said conductive parts, one side surface of said conductive parts retreats to be below the same level as of said electrode position.

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**4,745,471**

## SOLID-STATE IMAGING APPARATUS AND ENDOSCOPE

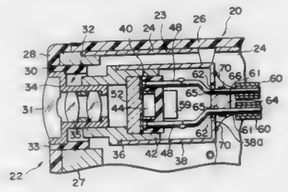
**Koji Takamura, and Haruhiko Kaiya, both of Tokyo, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed May 12, 1987, Ser. No. 49,720**

**Claims priority, application Japan, May 13, 1986, 61-109081; May 14, 1986, 61-109753; May 15, 1986, 61-111133**

**Int. Cl.[4] H04N** *7/18;* **A61B** *1/06, 1/04*

**U.S. Cl. 358—98** **11 Claims**



1. A solid-state imaging apparatus comprising:

a base;

a solid-state imaging element chip mounted on the base and having a light-receiving section and a plurality of electrodes;

a plurality of leads provided at the base; and

a transparent cover fixed to the base to face the light-receiving section of the chip, the cover having a surface facing the light-receiving section and a lead pattern which is formed on the surface and electrically connects the leads and the electrodes.

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**4,745,472**

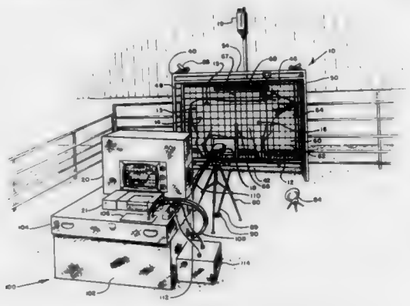
## ANIMAL MEASURING SYSTEM

**Norman J. Hayes, Cody, Wyo., assignor to Applied Genetics International, Inc., Cody, Wyo.**

**Filed Mar. 30, 1981, Ser. No. 248,824**

**Int. Cl.[4] H04N** *7/18*

**U.S. Cl. 356—107** **13 Claims**



1. A system for measuring preselected physical dimensions of an animal comprising:

a chute means for confining the animal in a vertical upright standing position;

a first side wall means associated with said chute means for enabling viewing of a side profile of the animal and measurement of dimensional characteristics of the animal;

a top wall means associated with said chute means for enabling viewing of a top profile of the animal and measurement of dimensional characteristics of the animal;

a first image receiving means located opposite to and in predeterminal spaced relationship to said side wall means for recording a side profile image of the animal and said side wall means;

a second image receiving means located opposite to and in predetermined spaced relationship to said top wall means for imaging a top profile of the animal;

an image reproducing means communicating with said image receiving means for reproducing the said profile image and top profile image of the animal; and

linear measurement means associated with said image reproducing means for measuring predetermined linear physical characteristics of the animal.

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**4,745,473**

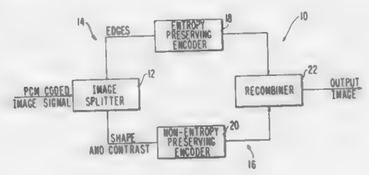
## HYBRID IMAGE COMPRESSION SYSTEM

**Charles F. Hall, Satellite Beach, Fla., assignor to Harris Corporation, Melbourne, Fla.**

**Filed Mar. 24, 1986, Ser. No. 843,005**

**Int. Cl.[4] H04N** *11/06, 7/12*

**U.S. Cl. 358—133** **19 Claims**




1. A system for encoding images with reduced bandwidth comprising:

(a) an image input signal source of a PCM encoded image comprised of a plurality of samples each having a plurality of bits, the plurality of bits encoding each sample having an upper bit plane containing information defining edges of the image and one or more lower bit planes containing information of shape and contrast of the image;

(b) means for separating each encoded sample into first and second encoding channels with the first channel encoding the upper bit plane and the second channel encoding the one or more lower bit planes;

(c) said first channel containing encoding means for encoding the upper bit plane of each sample by an entropy encoding process which reduces the bandwidth necessary to transmit the upper bit plane of successive samples;

(d) said second channel containing encoding means for encoding the one or more lower bit planes of each sample by a nonentropy encoding process which reduces the bandwidth necessary to transmit the one or more lower bit planes of successive samples; and

(e) combining means coupled to the encoding means of the first and second channels to recombine the encoded upper bit plane and the encoded one or more lower bit planes of each sample to produce a composite signal.



**4,745,474**

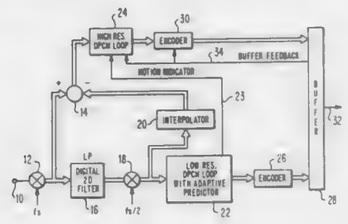
## TWO RESOLUTION LEVEL DPCM SYSTEM

**Leonard N. Schiff, Lawrenceville, N.J., assignor to General Electric Company, Schenectady, N.Y.**

**Filed Apr. 17, 1987, Ser. No. 40,470**

**Int. Cl.[4] H04N** *7/13*

**U.S. Cl. 358—133** **22 Claims**




1. Apparatus for transmitting a digital television picture signal comprising:

a buffer having a first output means for providing said digital television picture signal;

means for providing first data to said buffer representing a low resolution low pass filtered version of said picture; and

means for providing second data to said buffer, only when said buffer can accept said second data without overflowing, said second data representing a high pass filtered high resolution version of said picture.

19. Apparatus for receiving a digital television picture signal, said apparatus comprising:

a first inverse digital pulse code modulation loop for receiving first data representing a low resolution low pass filtered version of said picture;

a second inverse digital pulse code modulation loop for receiving second data representing a high resolution high pass filtered version of said picture; and

an adder coupled to said loops.

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**4,745,475**

## DISPLAYS FOR INFORMATION OBTAINED BY VECTOR SCANNING

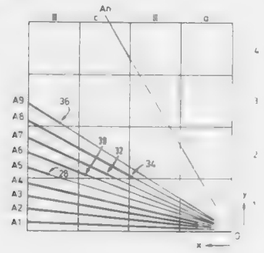
**John Bicknell, Rudgwick, England, assignor to Mars Incorporated, McLean, Va.**

**Filed Dec. 10, 1985, Ser. No. 807,349**

**Claims priority, application United Kingdom, Dec. 11, 1984, 8431208**

**Int. Cl.[4] H04N** *7/01*

**U.S. Cl. 358—140** **29 Claims**



1. A method for converting A-scan signal information in r, $\theta$ coordinates into display data for x, y co-ordinate display locations, comprising the steps of contributing the signal information in each A-scan signal to the display data only when the r co-ordinates of said A-scan signal is greater than a predetermined value, and establishing different predetermined values of r for different A-scans.

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**4,745,476**

## TELEVISION SOUND SIGNAL PROCESSING APPARATUS

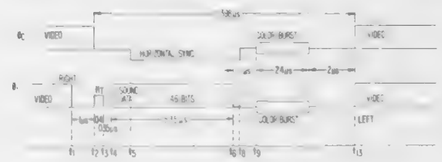
**Masayoshi Hirashima, Ibaraki, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Feb. 12, 1985, Ser. No. 701,284**

**Claims priority, application Japan, Feb. 15, 1984, 59-26334; Feb. 15, 1984, 59-26337**

**Int. Cl.[4] H04N** *7/087, 7/093*

**U.S. Cl. 358—145** **5 Claims**



1. A television sound signal processing apparatus comprising a means to receive a digitized delta-encoded sound signal being superposed in a horizontal blanking period and a digital signal indicating a standard value of said sound signal, said digital signal is superposed in a vertical blanking period of each field, a means to store said received digital signal until a digital signal of a next field is received, a means to compare the digital signal of a current field with that of a previous field, a means to delta-decode the delta-encoded sound signal for reproducing the sound by using the digital signal, and a means to employ a delta-encoded sound signal being received just before said digital signal as the standard value for delta decoding in said means to delta-decode the delta-encoded sound signal when the difference of both of said digital signals being received in said current field and in said previous field is greater than specified.

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**4,745,477**

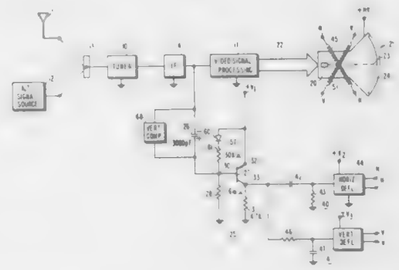
## ANTIJITTER ARRANGEMENT FOR SYNCHRONIZING PULSE SEPARATOR

**Isaac M. Bell, and Thomas D. Gurley, both of Indianapolis, Ind., assignors to RCA Corporation, Princeton, N.J.**

**Filed Jul. 7, 1986, Ser. No. 882,560**

**Int. Cl.[4] H04N** *5/08*

**U.S. Cl. 358—153** **5 Claims**



1. A synchronizing pulse separator for a video display apparatus comprising:

a source of video information signals incorporating line and field rate synchronizing information;

a capacitor coupled to said source of video information signals;

a transistor having a first terminal coupled to a source of

VOL 1090 ISS 3 MY 17 1988 UMI



potential, a second terminal coupled to said capacitor, and a third terminal, said transistor being rendered conductive by said video information signals for producing an output signal at said third terminal representative of said line field rate synchronizing information, said capacitor being charged during conduction of said transistor and discharged when said transistor is nonconducting for establishing a bias on said transistor; and

means coupled between said source of potential and said second terminal for establishing a current conduction path solely from said source of potential to said second terminal for maintaining said bias on said transistor.

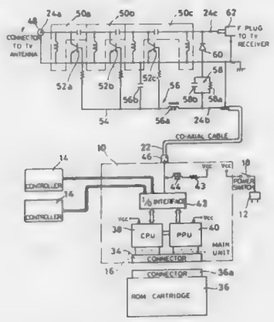
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**4,745,478**

## RF SWITCH

**Katsuya Nakagawa, Kusatsu, and Yoshiaki Nakanishi, Kyoto, both of Japan, assignors to Nintendo Co., Ltd., Kyoto, Japan**

**Filed Aug. 1, 1985, Ser. No. 761,744**
**Int. Cl.[4] H04N *5/268***
**U.S. Cl. 356—181** **14 Claims**




1. An RF switch adapted to selectively connect one of two video source signals to a television monitor, comprising:

a first input for receiving a first television signal;

a second input for receiving a second television signal from an auxiliary source in which the auxiliary source is adapted to produce a DC control signal superimposed on the second television signal;

an output adapted to be connected to said television monitor;

a plurality of inductive-capacitive filters connected in cascade between said first input and said output, each said inductive-capacitive filter having an associated transistor switch including a control input and connected to provide an impedance path switchable to a low impedance state so as to ground each said filter in response to a control voltage applied to said control input;

an RF choke connecting said control input of said associated transistor switch of each said inductive-capacitive filters to said second input for causing said associated transistor switch to switch to said low impedance state in response to said DC control signal superimposed on said second television signal so as to inactivate said inductive-capacitive filters and thereby isolate said first television signal from said output; and

a voltage controlled signal transmitting circuit connected between said second input and said output, said transmitting circuit comprising a diode connected in series with a parallel resistive-capacitive network, said diode having a high impedance reverse bias state in the absence of said DC control signal at said second input so as to isolate said output from said second input, and said diode being responsive to a bias voltage developed across said resistive-capacitive network in response to said DC control signal to assume a low impedance forward biased condition that transmits the second television signal through said resistive-capacitive network and through said diode to said output for application to the television monitor.

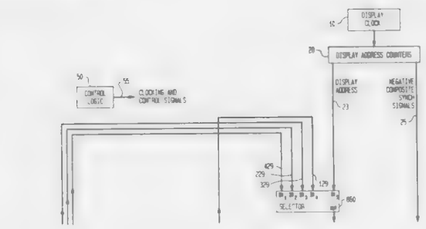
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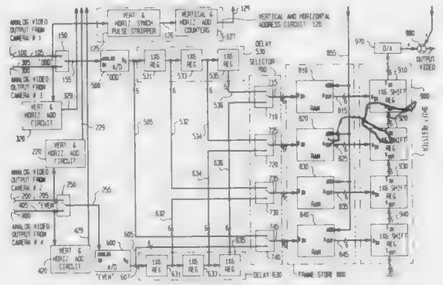
**4,745,479**

## MULTIPLE IMAGE VIDEO DISPLAY SYSTEM

**Glenn C. Waehner, New Canaan, Conn., assignor to American Dynamics Corporation, Orangeburg, N.Y.**

**Filed Oct. 4, 1985, Ser. No. 784,334**
**Int. Cl.[4] H04N *5/262***
**U.S. Cl. 358—183** **27 Claims**




1. In a multiple image video display system, having a plurality of video images displayed and a single composite image, wherein each video image originates from a separate corresponding incoming video signal and is substantially simultaneously displayed in a separate non-overlapping section of said single composite image, the improvement comprising:

means for repetitively selecting a successive one of a plurality of incoming video signals and writing at least one pixel value from said selected incoming video signal into a frame store memory during one of a plurality of succesive memory write operations involving said frame store memory;

means for repetitively selecting at least one successive pixel value stored in said frame store memory and reading said selected successive pixel value from said frame store memory during read operation interleaved between two successive ones of said memory write operations; and

the frame store memory, responsive to said repetitive selecting and writing means, and to said repetitive selecting and reading means, for storing values of pixels comprising said composite image and for repetitively performing a memory read operation interleaved between two successive ones of said memory write operations whereby said frame store memory operates at a sufficiently high data transfer rate to permit each of said video images to be substantially simultaneously displayed in a corresponding non-overlapping portion of the composite image.

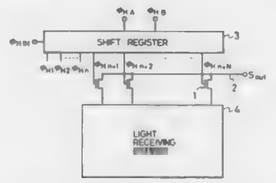


**4,745,480**

## SOLID-STATE IMAGE PICK-UP DEVICE HAVING AN ARRANGEMENT TO AVOID ADVERSE EFFECTS ON THE WAVEFORM OF PICTURE ELEMENTS SIGNAL BY THE READ-OUT START PULSE

**Toshiro Kinugasa; Takuya Imaide, and Iwao Aizawa, all of Yokohama, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jul. 16, 1986, Ser. No. 886,225**
**Claims priority, application Japan, Jul. 19, 1985, 60-159784**
**Int. Cl.[4] H04N *3/14***
**U.S. Cl. 358—213.18** **9 Claims**




1. A solid-state image pick-up device, comprising:

a group of photoelectric converting elements arranged in a two dimensional array;

means for sequentially reading out picture element signals from said photoelectric converting elements;

means for generating horizontal scan pulses in response to a start pulse of a read out; and

means for controlling a phase difference between said start pulse and the first one of said horizontal scan pulses which are provided to said reading out means so as to provide said horizontal scan pulses to said read out means after a lapse of a predetermined period, said predetermined period being set so that said start pulse will not adversely influence a waveform of said picture element signals.

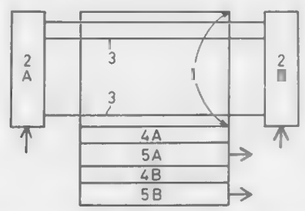
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**4,745,481**

## SOLIDSTATE IMAGING DEVICE

**Shoichi Tanaka, 305, CI Hongou, 2-37, Kamiyashro, Meitouku, Nagoyashi, Aichken, 465, Japan**

**PCT No. PCT/JP85/00038, § 371 Date Nov. 12, 1985, § 102(e) Date Nov. 12, 1985, PCT Pub. No. WO85/03398, PCT Pub. Date Aug. 1, 1985**
**PCT Filed Jan. 30, 1985, Ser. No. 787,798**
**Claims priority, application Japan, Jan. 30, 1984, 59-15950; Mar. 14, 1984, 59-49685; May 8, 1984, 59-91417; May 12, 1984, 59-95314; Sep. 10, 1984, 59-189970; Oct. 9, 1984, 59-211797**
**Int. Cl.[4] H04N *3/14***
**U.S. Cl. 358—213.29** **5 Claims**




1. In a solidstate imaging device, which comprises picture cells, at least one horizontal CCD and vertical CCDs,

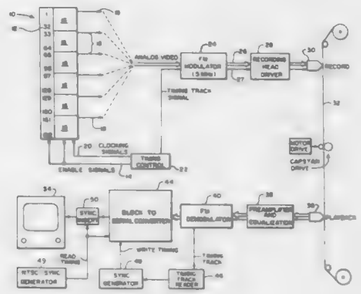
the solidstate imaging device comprising a vertical CCD which independently transfers charge packets accumulated in clocked potential wells created by clocked directional transfer electrodes and charge packets accumulated in middle constant potential wells placed between adjacent two clocked potential wells.

**4,745,482**

## ELECTRONIC RECORDER

**Hans P. Baumeister, Churchville, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Continuation of Ser. No. 827,856, Feb. 10, 1986, abandoned. This application Oct. 9, 1987, Ser. No. 110,074**
**Int. Cl.[4] H04N *3/14***
**U.S. Cl. 358—213.29** **4 Claims**




1. An electronic recorder system comprising:

a sensor for imaging a one-dimensional scene, said sensor having a single column of n×m photosites linearly arranged in n blocks of m photosites;

means for simultaneously reading out each of said n blocks of photosites into respective n parallel-in and serial-out shift registers;

means for serially reading out each of said n shift registers in parallel to produce n parallel video signals, each having m serial image samples;

means for repeatedly reading out said sensor over T sequential time periods to produce a set of T time sequential, one-dimensional video images of said scene; and

electronic display means for simultaneously displaying said set of T time sequential one-dimensional video images in an array of T columns of n×m image samples in each column.

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**4,745,483**

## ELECTRONIC MULTI-IMAGER

**Dan Inbar, Haifa, Israel, assignor to Elscint Inc., Boston, Mass.**

**Continuation of Ser. No. 218,705, Dec. 22, 1980, abandoned. This application Oct. 19, 1983, Ser. No. 543,403**
**Int. Cl.[4] H04N *5/84***
**U.S. Cl. 358—244** **1 Claim**

1. An electronic imaging system comprising:

(a) a memory having n syllables of m words for storing a p level representation of a video image;

(b) an N-lines per frame raster generator for producing N horizontal synchronization pulses per vertical frame synchronization pulse, wherein N is greater than either n or m;

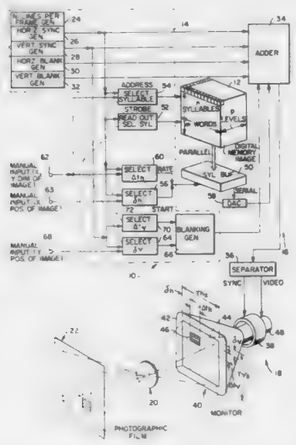
(c) data processing circuitry responsive to said synchronization pulses for converting said n syllables, within the time for vertical synchronization pulses to define a frame and in timed relationship to the horizontal synchronization pulses, into a plurality of video signals, each of which contains m signals and represents a line of m picture elements of the image;

(d) a TV monitor having a screen on which an electron beam is incident for producing a display;

(e) a deflection circuit responsive to said synchronization pulses for causing said beam to scan said screen and produce an N-line raster;

(f) a modulation circuit responsive to said video signals for modulating the intensity of said beam during its scan;

(g) an optical lens system for focusing said screen on a film plane, and



(h) means for making p passes into the p level memory and for producing a video signal of unit amplitude on the ith pass for each word having a level greater than i−1.

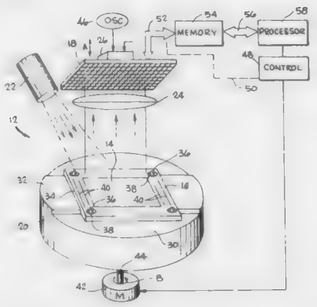
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**4,745,484**

## METHOD AND APPARATUS FOR STEPPED IMAGING IN READING DATA

**Jerome Drexler, and Joseph B. Arnold, both of Los Altos, Calif., assignors to Drexler Technology Corporation, Mountain View, Calif.**

**Filed Jul. 30, 1986, Ser. No. 892,221**
**Int. Cl.⁴ H04N** *5/232, 3/14*
**U.S. Cl. 358—227** **11 Claims**



1. A method of optically reading data in a data field on a data surface using a CCD area array comprising,

disposing a data medium with a data field on a data surface thereof in a position spaced apart from and generally parallel to a CCD area array, said CCD area array having a focal plane and a depthwise region of focus around said focal plane,

imaging regions of said data surface within said depthwise region of focus onto said CCD area array to form a partial image of the data surface,

vibrating one of said CCD area array and said data surface in a direction normal to a reference plane of said data surface to change the relative depthwise distance between said CCD area array and said reference plane in order to bring second depthwise regions of the data surface into said region of focus, said vibrations having a characteristic vibration period, said CCD area array being characterized by a response time which is substantially longer than said vibration period,

imaging said second regions onto said CCD area array to form a second partial image of the data surface,

repeating the two previous steps for other regions of said data surface until partial images have been obtained for all of said data surface, and

forming a composite image from all of said partial images to read the data field.

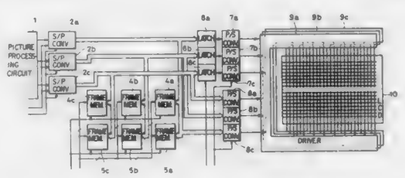
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**4,745,485**

## PICTURE DISPLAY DEVICE

**Shoji Iwasaki, Tottori, Japan, assignor to Sanyo Electric Co., Ltd, Japan**

**Filed Jan. 21, 1986, Ser. No. 821,160**
**Claims priority, application Japan, Jan. 28, 1985, 60-14038; Mar. 19, 1985, 60-55357; Mar. 28, 1985, 60-64191; Sep. 13, 1985, 60-204089**
**Int. Cl.⁴ H04N** *5/74*
**U.S. Cl. 358—236** **12 Claims**



1. A picture display device comprising:

a liquid crystal display for displaying images in dot matrix form, said display being divided into an upper display area and a lower display area,

frame memories for storing picture element data for one frame corresponding to the dots of the divided two display areas of said liquid crystal display,

writing means for storing in said frame memories, the picture element data in the order of picture elements based on video signals successively applied,

reading means for reading said picture element data stored in said frame memories,

timing control means for controlling said reading means and said writing means so that said reading means and said writing means are syncronized and operate alternately and for controlling said reading means so that the picture element data corresponding to the dot matrix of the upper display area of said liquid crystal display and the picture element data corresponding to the dot matrix of the lower display area thereof are read out alternately from said frame memories,

said timing control means including:

clock signal generating means for generating a clock signal,

display timing signal generating means for generating a display timing signal indicating an effective display area for said picture element data successively applied, and

delay timing signal generating means for generating a timing signal for delaying by several clocks the display timing signal generated from said display timing signal generating means, based on the clock signal generated from said clock signal generating means;

said writing means comprises means for storing said picture element data in said frame memories in response to the generation of said delay timing signal from said delay timing signal generating means; and

drive means for driving said liquid crystal means based on the picture element data read out by said reading means.

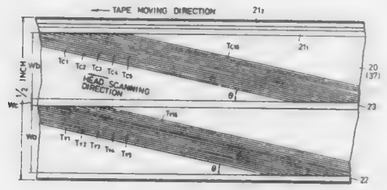


**4,745,486**

## HELICAL SCAN TYPE MAGNETIC RECORDING APPARATUS

**Tsunehisa Ohira, and Haruki Ogata, both of Sagamihara, Japan, assignors to Victor Company of Japan, Ltd., Tokyo, Japan**

**Filed Apr. 1, 1986, Ser. No. 846,917**
**Claims priority, application Japan, Apr. 2, 1985, 60-69287**
**Int. Cl.⁴ H04N** *9/79*
**U.S. Cl. 358—310** **5 Claims**



1. A helical scan type magnetic recording apparatus which forms tracks which are mutually separated in a width direction of a magnetic tape, said helical scan type magnetic recording apparatus comprising:

a rotary body wrapped with the magnetic tape on an outer peripheral surface thereof over a predetermined angular range, said rotary body having a tape guide for guiding a part of the magnetic tape;

n pairs of rotary heads mounted on said rotary body, where n is equal to two or three, each pair out of said n pairs of rotary heads being constituted by two rotary heads which are mounted at mutually opposite positions on a rotational plane of said rotary body at the same height position, said n pairs of rotary heads being mounted at different positions in an axial direction of said rotary body but at approximately the same positions on the rotational plane of said rotary body;

recording means for recording three kinds of signals which constitute a color video signal on the magnetic tape by simultaneously and independently forming n oblique tracks which are mutually separated in the width direction of the magnetic tape in units of one field of the color video signal by use of said n pairs of rotary heads;

first stationary head means for recording audio signals by forming one or two audio tracks in a longitudinal direction of the magnetic tape in an arbitrary recording region out of three or four recording regions in which the oblique tracks are not formed, said three or four recording regions including an upper end portion of the magnetic tape, a lower end portion of the magnetic tape and a guard band portion between two oblique tracks which are mutually separated in the width direction of the magnetic tape out of the n oblique tracks;

second stationary head means for recording a control pulse signal by forming a control track in the longitudinal direction of the magnetic tape in an arbitrary recording region other than the recording region in which the one or two audio tracks are formed out of said three or four recording regions; and

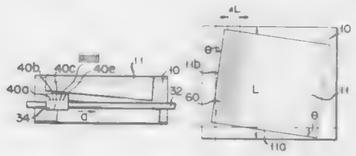
third stationary head means for recording a specific information signal for forming a specific information signal recording track in the longitudinal direction of the magnetic tape in a remaining recording region out of one or two recording regions in which the audio track nor the control track is formed out of said three or four recording regions.

**4,745,487**

## HELICAL SCANNING APPARATUS WITH ONE OR MORE ROWS OF SCANNING ELEMENTS AND AN OBJECT OF SCANNING DISPOSED AT AN ANGLE TO THE AXIS OF A ROTATING DRUM TO ELIMINATE SKEW OF SCANNING LINES

**Masaji Nishikawa, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed Jun. 6, 1985, Ser. No. 742,090**
**Claims priority, application Japan, Jun. 15, 1984, 59-122099; Jul. 11, 1984, 59-142160**
**Int. Cl.⁴ H04N** *1/06, 1/04*
**U.S. Cl. 358—289** **15 Claims**



1. A helical scanning apparatus with a plurality of scanning elements comprising:

a rotating drum disposed for rotation;

storing means for storing rectangular objects of scanning;

feed means for feeding one of the rectangular objects of scanning to the rotating drum from said storing means and for winding the object around the drum so that one side of the object is inclined at a predetermined angle $\theta$ to the axis of the rotating drum, said feed means feeding the rectangular object of scanning to the rotating drum along a feeding direction which is inclined at said predetermined angle $\theta$ to a line perpendicular to the axis of the rotating drum;

a scanning head movable in a predetermined direction along the outer peripheral surface of the rotating drum on which the object is wound, said scanning head including a plurality of scanning elements for forming on said object scanning lines extending at right angles to the one side of the object as the drum rotates and the scanning head moves; and

drive means for rotating the rotating drums and for driving the scanning head in synchronism with the rotation of the drum;

wherein said predetermined angle $\theta$ is given by $\theta=\tan^{-1}\Delta L/L$, where L is the circumference of the rotating rum and $\Delta L$ is the distance covered by the scanning head while he drum makes one revolution.

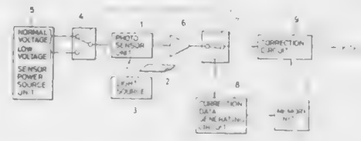
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**4,745,488**

## IMAGE READER

**Noriyuki Kaifu, Hiratsuka; Shinichi Seito; Hiromi Kodama, both of Atsugi, and Katsuhiko Yamada, Hiratsuka, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Jan. 22, 1987, Ser. No. 5,787**
**Claims priority, application Japan, Jan. 27, 1986, 61-13787**
**Int. Cl.⁴ H04N** *1/40*
**U.S. Cl. 358—294** **3 Claims**



1. An image reader, comprising:

a plurality of photosensors which photoelectrically convert incident light from an object to be read;
memory means for storing, as correction reference data, data corresponding to photoelectric conversion outputs from said photosensors when the object to be read presents a uniform halftone image; and
correction means for obtaining uniform photoelectric conversion output levels among said photosensors using the correction reference data.

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**4,745,489**

## IMAGE RECORDING APPARATUS FOR RECORDING ONLY THE IMAGE AREA OF A FILM

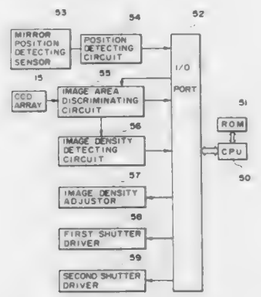
**Kazuo Kashiwagi; Masaaki Yanagi, both of Tokyo; Yoshihiro Saito, Hachioji; Yoshihiko Yoshihara, Kawasaki; Tatsuya Yamamoto, Hino, and Yasuhiro Yamamoto, Kiyose, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Aug. 12, 1986, Ser. No. 895,699**

**Claims priority, application Japan, Aug. 15, 1985, 60-179983; Aug. 15, 1985, 60-179984; Aug. 15, 1985, 60-179985; Aug. 20, 1985, 60-181968; Aug. 20, 1985, 60-181969; Aug. 30, 1985, 60-191143**

**Int. Cl.⁴ H04N** *1/32*

**U.S. Cl. 358—296** **16 Claims**




14. A microfilm reader printer comprising:
illuminating means for illuminating a microfilm having a frame on which an image is recorded and having information for retrieval recorded outside said frame;
means for selectively directing the light from the microfilm illuminated by the illuminating means to either of a screen or a photosensitive member;
detecting means receiving the light from the microfilm illuminated by the illuminating means for detecting densities of an inside portion of the frame and an outside portion of the frame, wherein said outside portion provides said information for retrieval per image element, by dividing the image surface of the image bearing member;
developing means for developing an electrostatic latent image formed on said photosensitive member by projecting the light from the microfilm;
discriminating means for discriminating a border of the frame on the basis of the densities of said inside and outside portions of each frame detected by said detecting means; and
means for preventing the developer from adhering to an area of the photosensitive member corresponding to said outside portion of said border discriminated by said discriminating means.

**4,745,490**

## IMAGE RECORDING APPARATUS WITH MULTIPLE IMAGE RECORDING MEANS

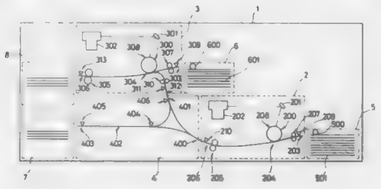
**Katsuichi Shimizu, Kunitachi, and Koichi Miyamoto, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 876,295, Jun. 18, 1986, abandoned, which is a continuation of Ser. No. 643,173, Aug. 22, 1984, abandoned. This application Nov. 26, 1986, Ser. No. 935,132**

**Claims priority, application Japan, Aug. 26, 1983, 58-155008; Aug. 29, 1983, 58-156413**

**Int. Cl.⁴ G03G** *15/00*

**U.S. Cl. 358—300** **24 Claims**



1. An image recording apparatus responsive to external inputs thereto, said apparatus comprising:
first and second image recording units for respectively recording images on a recording medium, each of said first and second recording units including means for generating a horizontal synchronization signal;
a transport unit for transporting said recording medium between said first and second image recording units;
first and second control units for controlling said first and second image recording units;
a third control unit for controlling said transport unit; and
a master control unit for controlling said first, second and third control units according to the external inputs to said apparatus, said master control unit including means for selecting one of said horizontal synchronization signals generated by one of said generating means included in said first and second recording units in response to an external input for selection of said recording units.

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**4,745,491**

## IMAGE FORMATION APPARATUS CAPABLE OF DESIGNATING A RECORDING AREA

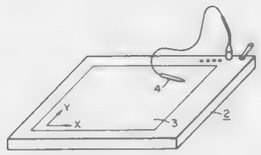
**Hirotoshi Kishi, Tokyo; Tadashi Sato, Kokubunji, and Haruo Tsunoi, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 559,832, Dec. 8, 1983, abandoned, which is a continuation of Ser. No. 291,633, Aug. 10, 1981, abandoned. This application Jul. 18, 1985, Ser. No. 756,338**

**Claims priority, application Japan, Aug. 20, 1980, 55-114208**

**Int. Cl.⁴ H04N** *1/23;* **G03G** *15/00;* **G08C** *21/00*

**U.S. Cl. 358—300** **24 Claims**



1. An image formation apparatus for recording information in a designated area comprising:
means for bearing an original thereon with one side of the original in contact with said bearing means and including position output means for generating a signal associated with a position on the original where direct designation is made on the opposite side of said original;
means disposed to face the opposite side of the original for reading information by scanning the opposite side of the original and for forming an information signal;
means for selecting one of first and second operating modes, wherein in the first mode the image information in the designated area is recorded and the image information outside the designated area is not recorded and in the second mode the image information in the designated area is not recorded and the image information outside the designated area is recorded;
means responsive to the position signal from said position output means, the selected mode and the information signal from said information signal forming means for producing a recording signal; and
recording means for recording information on a recording medium, said recording means being responsive to the recording signal from said recording signal producing means to thereby record the information on the recording medium either within the designated area of the original or outside the designated area.



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**4,745,492**

## VIDEO SIGNAL DIGITAL PROCESSING SYSTEM USING LOWER SAMPLING FREQUENCY FOR CHROMA SIGNAL DATA DECIMATION

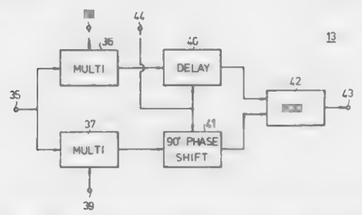
**Kaoru Kobayashi, Yokohama, and Hidetoshi Ozaki, Chofu, both of Japan, assignors to Victor Company of Japan, Ltd., Tokyo, Japan**

**Filed Sep. 30, 1985, Ser. No. 781,939**

**Claims priority, application Japan, Sep. 29, 1984, 59-205111; Sep. 29, 1984, 59-205112; Sep. 29, 1984, 59-205113; Oct. 4, 1984, 59-208782; Nov. 30, 1984, 59-253599**

**Int. Cl.⁴ H04N** *5/782*

**U.S. Cl. 358—310** **14 Claims**




1. A video signal digital processing system comprising:
an analog-to-digital converting means for converting an input analog video signal employing the NTSC or PAL system into a digital video signal by sampling the input analog video signal with a sampling frequency $f_s$ which is a predetermined integer times a horizontal synchronizing signal frequency $f_H$ of the input analog video signal;
first frequency converting means for frequency-converting the output digital video signal of said analog-to-digital converting means, said first frequency converting means frequency-converting a chrominance subcarrier frequency of the digital video signal into a frequency $f_s/4$;
decimation means for performing a ¼ decimation process with respect to the output signal of said first frequency converting means by extracting one out of every three consecutive samples in the output signal of said first frequency converting means and decimating the remaining two out of said every three consecutive samples;
interpolation means for compensating the decimated remaining two samples by an interpolation process with respect to an output signal of said decimation means, said interpolation process being a process complementary to said decimation process performed by said decimation means;
second frequency converting means for frequency-converting an output signal of said interpolation means, said second frequency converting means performing a frequency conversion complementary to the frequency conversion performed in said first frequency converting means; and
digital-to-analog converting means for generating an analog video signal by subjecting an output signal of said second frequency converting means to a digital-to-analog conversion.

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**4,745,493**

## CIRCUIT ARRANGEMENT FOR A COLOR IMAGE RECORDING AND REPRODUCTION INSTRUMENT OR A COLOR TELEVISION RECEIVER

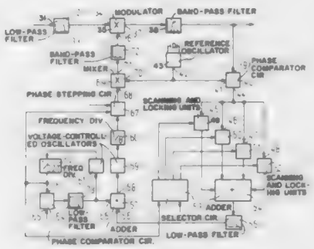
**Karl Gedl, St. Pölten, Austria, and Jörg Wölber, Pinneberg, Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Jul. 17, 1986, Ser. No. 887,152**

**Claims priority, application Fed. Rep. of Germany, Jul. 17, 1985, 3525492**

**Int. Cl.⁴ H04N** *9/80, 9/66*

**U.S. Cl. 358—324** **4 Claims**




1. A demodulation circuit arrangement for a color image recording and reproduction instrument (video recorder) or a color television receiver having a phase regulation circuit, wherein interference occurring in the phase regulation circuit at a frequency a fraction of the line frequency is eliminated during rapid phase regulation, said phase regulation circuit comprising: a phase comparator circuit; a voltage-controlled oscillator wherein the phase comparator circuit comprises a first input to receive a color synchronization signal and a second input for receiving a signal derived from the oscillator, and an output, the output of the phase comparator circuit being coupled to a control input of the oscillator and the oscillator output being coupled to the second input of the phase comparator circuit; at least two scanning and locking units coupled at their inputs to the output of the phase comparator circuit; and an adder having first and second inputs coupled to the outputs of the scanning and locking units, the output of the adder being coupled to the control input of the oscillator, and the scanning and locking units are arranged to scan the phase comparator circuit output signal successively by alternate lines during the color synchronization blanking periods, such that at any given moment only one scanning and locking unit scans the comparator circuit while the other scanning and locking circuits store previous values output from the comparator circuit.

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**4,745,494**

## SYSTEM FOR CORRECTING TIME BASE ERROR OF INFORMATION REPRODUCING APPARATUS

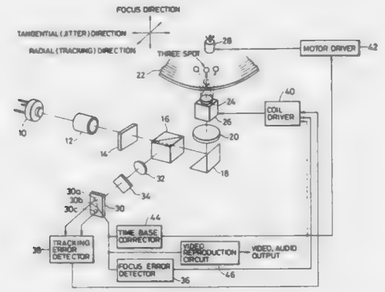
**Atsushi Kaneko, Kamakura; Junichi Ikoma, and Akio Nakashima, both of Yokohama, all of Japan, assignors to Hitachi Video Eng. Inc. and Hitachi, Ltd., both of Tokyo, Japan**

**Filed Jun. 11, 1986, Ser. No. 872,904**

**Claims priority, application Japan, Jun. 12, 1985, 60-126082; Jun. 17, 1985, 60-129762**

**Int. Cl.[4] H04N** *5/95*

**U.S. Cl. 358—338** **23 Claims**




1. A system for correcting a time base error of an information reproducing apparatus, comprising:

means for reproducing an information signal from an information recording medium;

means for separating a periodical signal from said information signal reproduced by said reproducing means;

means for generating a ramp signal;

means for sampling said ramp signal generated by said generating means with said periodical signal separated by said separating means; and

time base error correcting means for correcting a time base error which is caused by fluctuation of said information signal reproduced by said reproducing means based on said sampled signal by said sampling means, said time base error correcting means including zero crossing means for detecting zero crossing points of said ramp signal generated by said generating means, and ramp signal controlling means for controlling a start of a rise portion of said ramp signal in response to said zero crossing points detected by said zero crossing means.

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**4,745,495**

## EASILY OPERABLE RECORDING/REPRODUCING APPARATUS OF DOUBLE CASSETTE TYPE

**Kazuo Hashimoto, Tokyo, Japan, assignor to Hashimoto Corporation, Tokyo, Japan**

**Continuation of Ser. No. 857,766, Apr. 29, 1986, abandoned. This application Apr. 29, 1987, Ser. No. 48,498**

**Claims priority, application Japan, Apr. 30, 1985, 60-93204**

**Int. Cl.[4] G11B** *15/10*

**U.S. Cl. 360—13** **3 Claims**

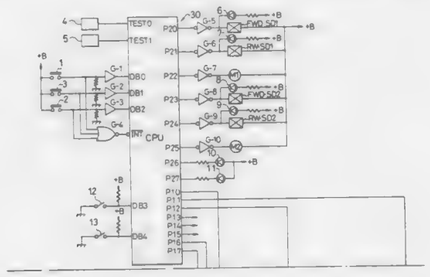
1. An easily operable recording/reproducing apparatus of a double cassette type, comprising:

a first operation button consisting of a single button which is adapted to be repetitively depressed for selecting one of reproducing, rewinding, and fast-forwarding manual operations of a master tape;

a second operation button consisting of a single button which is adapted to be repetitively depressed for selecting one of reproducing, rewinding, and fast-forwarding manual operations of a slave tape;

a third operation button for a dubbing operation from said master tape to said slave tape,

means for controlling said dubbing operation in response to a single depression of said third operation button; and




means for performing recording on said slave tape in response to a simultaneous depression of said second and third operation buttons.

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**4,745,496**

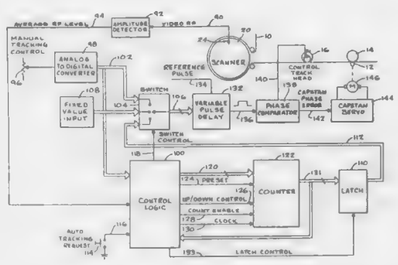
## APPARATUS AND METHOD FOR ADJUSTING THE TRACKING POSITION OF A MAGNETIC HEAD ALONG A MAGNETIC TRACK

**David C. O'Gwynn, San Mateo, Calif., assignor to Ampex Corporation, Redwood City, Calif.**

**Division of Ser. No. 418,491, Sep. 15, 1982, Pat. No. 4,689,706. This application Jan. 22, 1987, Ser. No. 6,046**

**Int. Cl.[4] G11B** *5/584*

**U.S. Cl. 360—77** **6 Claims**




4. A method for adjustment of magnetic head tracking position responsive to control track and reference video pulses in a video recorder/reproducer apparatus, comprising the steps of:

determining the level of the video signal;

changing the phase between the control track and reference video pulses in a first direction;

determining a first point when said level of said video signal has begun to decrease in response to changing said phase in said first direction;

storing a first value corresponding to the phase at said first point;

changing the phase between the control track and reference video pulses in a second direction;

determining a second point when said level of said video signal has begun to decrease in response to changing said phase in said second direction;

storing a second value corresponding to the phase at said second point;

obtaining a mathematical average of said first and second values to produce a first output indicative of a desired value of said phase; and

adjusting the phase betwen the control track and reference video pulses to said desired value in response to said first output.



**4,745,497**

## DIGITAL HEAD POSITION CONTROLLER WITH TRIANGLE WAVE COMPARISON

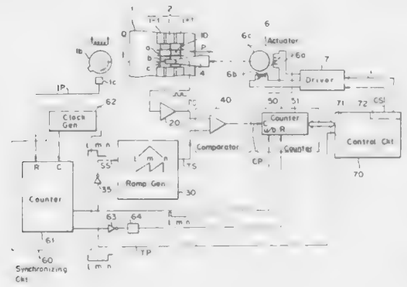
**Hiromi Ozawa, Kawasaki, Japan, assignor to Fuji Electric Company Ltd., Kawasaki, Japan**

**Filed Aug. 8, 1986, Ser. No. 895,032**

**Claims priority, application Japan, Aug. 12, 1985, 60-177313; Sep. 6, 1985, 60-197410**

**Int. Cl.[4] G11B** *21/10, 5/596*

**U.S. Cl. 360—77** **4 Claims**




1. A system for controlling the position of a head in a disc memory unit, comprising:

a rotatable disc having a surface with a plurality of concentric tracks thereon, each of said tracks including a center line, said rotatable disc having recorded on said surface on each side of the center line of each of said tracks first and second patterns bearing first reference information and second reference information respectively, said first reference information being displaced in the circumferential direction of said tracks with respect to said second reference information;

a spindle motor for rotatably driving said disc;

index pulse generating means coupled to said spindle motor, said index pulse generating means generating an index pulse when said disc is at a predetermined angular position, said first reference information and said second reference information being recorded on the surface of said disc in synchronism with said index pulse;

an adjustable head for writing information in and reading information out of the surface of said disc, said head generating a reference signal including said first and second reference information;

synchronizing means responsive to said index pulse for generating a synchronizing signal;

threshold signal generating means for generating a threshold signal having a first portion which increases in magnitude substantially linearly after a first point in time to a peak value and having a second portion which decreases in magnitude substantially linearly to about its initial value at a second point in time, the start of the first portion of said threshold signal occurring at said first point in time in response to said synchronzing signal just after said reference signal generates the beginning of said first reference information and the end of the second portion of said threshold signal occurring at said second point in time in response to said synchronizing signal just prior to said reference signal generating the termination of said second reference information;

comparator means for comparing the magnitude of said reference signal with the magnitude of said threshold signal, the output of said comparator means comprising a first pulse train having a number of pulses therein corresponding to the number of times the magnitude of the first reference information in said reference signal exceeds the magnitude of the first portion of said threshold signal and a second pulse train having a number of pulses therein corresponding to the number of times the magnitude of the second reference information in said reference signal exceeds the magnitude of the second portion of said threshold signal;

counter means coupled to said synchronizing means and to said comparator means, said counter means counting the difference in the number of pulses in said first and second pulse trains; and

head position correcting means for correcting the position of said head in accordance with said difference obtained from said counter means.

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**4,745,498**

## CASSETTE TYPE VIDEO TAPE RECORDER HAVING A SELECTIVELY POSITIONED TAPE LOADER

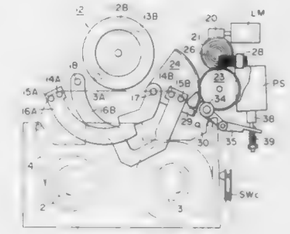
**Masaya Maeda, and Hiroyuki Takimoto, both of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 467,378, Feb. 17, 1983, abandoned, which is a continuation of Ser. No. 204,872, Nov. 7, 1980, abandoned. This application Mar. 24, 1986, Ser. No. 844,226**

**Claims priority, application Japan, Nov. 16, 1979, 54-148665**

**Int. Cl.[4] G11B** *5/027*

**U.S. Cl. 360—85** **15 Claims**




1. An information signal recording and/or reproducing apparatus comprising:

(a) means for receiving a container which houses therein a wound tape;

(b) recording and/or reproducing means including a guide drum having at least one rotary head for recording an information signal onto the tape and reproducing an information signal recorded on the tape;

(c) tape loading means for drawing the tape from the container so as to load the tape on the guide drum, said tape loading means including a movable member;

(d) first tape guide means provided on said movable member for two-dimensionally guiding the tape running direction;

(e) second tape guide means provided on said movable member for three-dimensionally guiding the tape running direction;

(f) detection means for detecting a plurality of positions of said tape loading means to produce an output signal, said plurality of positions including a first position in which said first and second tape guide means are both out of contact with the tape, a second position in which said first and second tape guide means are both in contact with the tape, and a third position in which said first guide means is in contact with the tape while said second guide means is out of contact with the tape;

(g) motor means for driving said loading means between said first position and said second position; and

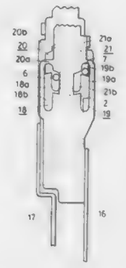
(h) control means for controlling said motor means in response to the output signal of said detection means, said control means being operable for selectively stopping said tape loading means at said first position, said second position and said third position.

**4,745,499**

## FAST FORWARD AND REVERSE DRIVE MECHANISM RESPONSIVE TO SELECTED TAPE PLAYBACK DIRECTION IN AN AUTO-REVERSE TAPE PLAYER

**Kikuo Yoshikawa, Tokyo, Japan, assignor to Clarion Co., Ltd., Tokyo, Japan**

**Filed Dec. 28, 1984, Ser. No. 687,236**
**Claims priority, application Japan, Dec. 28, 1983, 58-247182**
**Int. Cl.[4] G11B** *5/008, 15/00, 17/00*
**U.S. Cl. 360—93** **7 Claims**



1. In an auto-reverse type tape player having a change member movable between a forward mode position and a reverse mode position, having means cooperable with a tape cassette removably inserted in the tape player for selectively effecting lengthwise tape movement at a first speed in a first direction and in a second direction opposite said first direction when said change member is respectively in said forward mode position and said reverse mode position, and having fast forward and reverse drive means for selectively effecting movement in said first and second directions at a second speed faster than said first speed of a tape in a tape cassette removably inserted in said tape player, the improvement comprising a lever mechanism which controls said fast forward and reverse drive means and which includes:

a fast drive link supported rotatably by a stationary pivot shaft and movable to first and second positions and to a third position between said first and second positions;

a fast drive pin disposed on said first drive link at a location spaced radially from said pivot shaft, said fast forward and reverse drive means being responsive to said fast drive pin for effecting tape movement at said second speed in said first and second directions when said fast drive link is respectively in said first and second positions;

a mode plate supported for movement between forward drive and reverse drive positions and being operatively coupled to said change member for movement synchronously therewith, said mode plate being in said forward and reverse drive positions when said change member is respectively in said forward and reverse mode positions;

a fast forward drive lever and a reverse drive lever disposed adjacent each other and each supported for movement in a direction approximately transverse to the directions of movement of said mode plate;

first and second fast drive arms supported rotatably on said first drive link for movement about respective pivot axes and each having thereon a fast drive shaft at a location spaced from said pivot axis thereof;

a first guide hole and a second guide hole provided in said mode plate; and

a third guide hole and a fourth guide hole provided in each of said fast forward drive lever and said reverse drive lever, a first of said fast drive shafts being slidably received in said first guide hole and each of said third guide holes, and a second of said fast drive shafts being slidably received in said second guide hole and each of said fourth guide holes, wherein as said mode plate moves between said forward and reverse drive positions it moves said fast drive shafts in directions approximately transverse to the directions of movement of said fast forward and reverse drive levers, said third and fourth guide holes having means engageable with said first and second fast drive shafts for effecting pivotal movement of said fast drive link from said third position to said first position in response to movement of said fast forward drive lever when said mode plate is in said forward drive position and in response to movement of said reverse drive lever when said mode plate is in said reverse drive position, and for effecting pivotal movement of said fast drive link from said third position to said second position in response to movement of said fast forward drive lever when said mode plate is in said reverse drive position and in response to movement of said reverse drive lever when said mode plate is in said forward drive position.

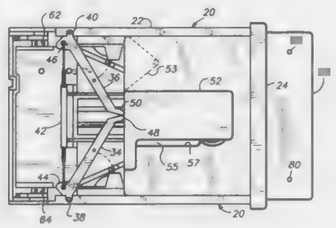
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**4,745,500**

## DISK DRIVE FOR CARTRIDGE DISKS

**Marvin B. Davis, Colorado Springs, Colo., assignor to Laser Magnetic Storage International Company, Colorado Springs, Colo.**

**Filed Sep. 19, 1985, Ser. No. 777,814**
**Int. Cl.[4] G11B** *5/012, 23/04*
**U.S. Cl. 360—97** **2 Claims**



1. In a disk drive having a disk housing, receiving means in said disk housing for receiving a disk cartridge, drive means in said disk housing for engaging a disk enclosed in a cartridge housing of a disk cartridge received in said receiving means, said disk cartridge having a door on said cartridge housing moveable between an open position wherein a surface of said disk is exposed to a sensor in said disk housing to enable recording and/or reading of data recorded on said disk and a closed position wherein said disk surface is enclosed in said cartridge housing and not exposed to said sensor, and bias means carried by said cartridge housing biasing said door to its closed position, the improvement comprising: a recess on said door, said recess being laterally offset from the horizontal center of the cartridge housing so as to be oriented in the upper or lower portion of the door depending on the orientation of the cartridge housing; first and second arms pivotally mounted in said disk housing; a first actuator mounted to said first arm to engage said recess on said door of said disk cartridge when the disk cartridge is in a first orientation in the receivng means of the disk housing such that the recess is above the horizontal center of the cartridge housing; and a second actuator mounted to said second arm to engage said recess on said door of said disk cartridge when the disk cartridge is in a second orientation opposite said first orientation in the receiving means of the disk housing such that the recess is below the horizontal center of the cartridge housing; whereby upon insertion of a disk cartridge into said receiving means, one or the other of said first and second actuators engages said recess so that continued insertion movement of the cartridge housing forces pivotal movement of the arm whose actuator engages said recess causing said door to move from its closed to its open position against the bias of said bias means.

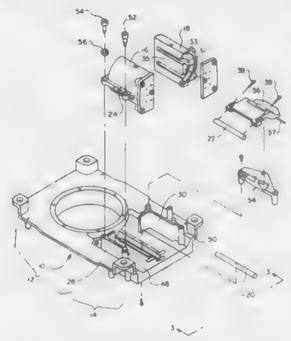


**4,745,501**

## THERMAL ISOLATION OF THE VOICE COIL MOTOR FROM BASE PLATE AND CARRIAGE GUIDE RAILS OF A DISC DRIVE

**Ronald F. Fasano, Santa Clara County, and Michael K. Andrews, Santa Cruz County, both of Calif., assignors to Seagate Technology, Scotts Valley, Calif.**

**Filed Nov. 20, 1985, Ser. No. 800,058**
**Int. Cl.[4] G11B** *5/55, 21/20*
**U.S. Cl. 360—97** **10 Claims**



1. In a disc drive including at least one disc and an actuator means for moving a transducer relative to the disc comprising a housing including a base plate, said base plate comprising a first region for rotatably mounting discs and a second region for mounting a voice coil motor for moving a carriage supporting read/write transducers along a pair of carriage guide rods radially relative to the disc, said voice coil motor comprising first and second sections divided along a plane radial to the disc, said base plate including a pair of raised mounting surfaces for supporting said voice coil motor sections, means for coupling said voice coil motor sections to said raised mounting surfaces of the base in a way to allow relative thermal expansion and contraction of said voice coil motor sections and said base along an axis parallel to said radial plane and parallel to the surfaces of said discs, and along two other axes, one being perpendicular to said discs and the other being parallel to a tangent to said discs and perpendicular to the other two said axes without causing distortion of said base or relative displacement of said carriage guide rods, said means providing only one fixed attachment in each of said axes.

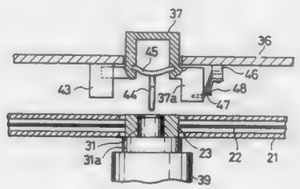
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**4,745,502**

## ROTARY MAGNETIC SHEET APPARATUS

**Naoki Takatori, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Japan**

**Filed Jun. 11, 1986, Ser. No. 872,964**
**Claims priority, application Japan, Jun. 17, 1985, 60-129975; May 19, 1986, 61-112674**
**Int. Cl.[4] G11B** *25/04*
**U.S. Cl. 360—99** **5 Claims**



1. In a drive mechanism employed for recording and reproducing a magnetic disc:

an actuator member supported for movement between a first, a second and a third position and return to said first position;

a presser member carried by said actuator member and which is movable to engage and accurately position a magnetic disc inserted into said device when said actuator member is in a first position of said actuator member, and which is moved away from said disc to a disengaged position of said presser member when said actuator member is moved to said second position, and is retained disengaged as said actuator member is moved from said second position to said third position;

a switch interposed in an electrical supply line of a drive motor of said device and which is operated to a closed position upon movement of said actuator member from said second position to said third position, and, which is disengaged upon subsequent movement of said actuator member from said third position to said first position;

whereby, said presser member is engaged with said magnetic disc prior to energization of the drive motor of said device.

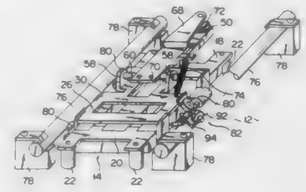
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**4,745,503**

## LINEAR ACTUATOR FOR MOVING A RECORDING/READING HEAD IN AN ACCESS DIRECTION RELATIVE TO A RECORDING DISC

**Takao Muraoka, Yokohama, and Toshihiro Sugaya, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Feb. 24, 1986, Ser. No. 832,233**
**Claims priority, application Japan, Feb. 25, 1985, 60-35931; Feb. 25, 1985, 60-35932**
**Int. Cl.[4] G11B** *5/55, 21/08*
**U.S. Cl. 360—106** **9 Claims**



1. A linear actuator for moving a recording/reading head in an access direction of the recording/reading head relative to a recording disk, comprising:

a box-like carriage which is flat and hollow, and to which the head is attached, the carriage including a body having a base wall extending parallel to a plane including the disc and a pair of side walls extending transverse to the plane including the disc and parallel to each other in the access direction, said carriage further including a cover supported by said side walls and extending parallel to said base wall;

guiding means for guiding said carriage along the access direction, said guiding means including a pair of stationary rods which are respectively arranged close to longitudinal central axes of the side walls of said carriage and which extend parallel to each other in the access direction, and bearing means arranged on the side walls of said carriage, for movably supporting said carriage along the stationary rods;

a motor coil fixed inside said carriage; and

a magnetic field applying assembly for applying a magnetic field to said motor coil, said magnetic field applying assembly including a yoke member extending through said carriage, the yoke member being provided with a central portion in said motor coil and extending along the access direction, a pair of outer portions which are arranged to be spaced apart by a predetermined gap from two sides of said central portion on said plane parallel to the disk and

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which extend parallel to said central portion, and a pair of connecting portions for magnetically connecting end portions of said central portion and said pair of outer portions, and generating means, fixed to the yoke member, for generating magnetic fields between the central portion and the pair of outer portions such that the polarities thereof are opposite to each other,

wherein said base wall and said cover are located on opposite sides of said coil and said yoke.

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**4,745,504**

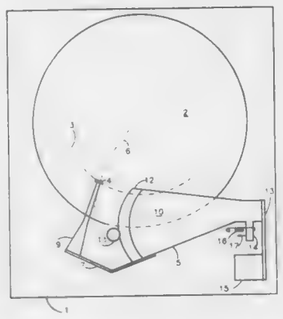
## DISC MEMORY HEAD POSITIONER

**Wayne E. Foote, Boise, Id., assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Continuation-in-part of Ser. No. 590,814, Mar. 19, 1984, abandoned. This application Mar. 19, 1987, Ser. No. 28,036**

**Int. Cl.⁴ G11B** *5/55, 21/08*

**U.S. Cl. 360—106** **2 Claims**



1. Apparatus for positioning read/write heads in a disc memory system comprising:

a chassis;

support means mounted on said chassis;

a positioner arm, having a supported end and a driven end, for supporting at least one read/write head and for positioning said read/write head over a desired track on a memory disc;

flexural support means for pivotally coupling said supported end of said positioner arm to said support means;

drive means coupled to said driven end of said positioner arm for rotatably driving and providing vertical support for said positioner arm, said read/write head mounted at said driven end of said positioner arm; and

spring means for urging said driven end of said positioner arm into engagement with said drive means.

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**4,745,505**

## MAGNETIC HEAD WITH A MODIFIED GAP FILLER

**Winfried L. Peeters, and Johannes J. Ponjee, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

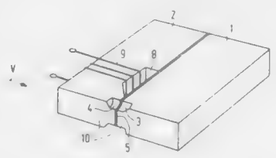
**Filed Jun. 28, 1984, Ser. No. 625,420**

**Claims priority, application Netherlands, Jul. 4, 1983, 8302364**

**Int. Cl.⁴ G11B** *5/235*

**U.S. Cl. 360—120** **3 Claims**

1. A magnetic head comprising first and second ferrite moldings having respective gap limiting pole tip surfaces, said surfaces being opposed to limit a gap of less than 0.5 microns therebetween, a modifier being applied to at least one of said gap limiting pole tip surfaces, said gap being filled with a synthetic resin selected from the group consisting of epoxy resins, acrylic ester resins, and polyester resins, said modifier



being chemically bonded to the pole tip and the synthetic resin, said synthetic resin adhering to said pole tips.

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**4,745,506**

## MAGNETIC HEAD FOR PERPENDICULAR MAGNETIC RECORDING AND REPRODUCTION

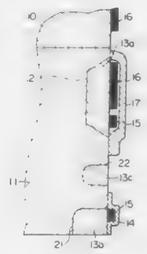
**Kazuo Nakamura, Toyonaka; Seishi Sasaki, Nishinomiya; Ken Takahashi, Suita; Hiroshi Yohda, Hirakata, and Nobuyuki Kaminaka, Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Continuation of Ser. No. 758,547, Jul. 24, 1985, abandoned. This application Aug. 26, 1987, Ser. No. 89,945**

**Claims priority, application Japan, Aug. 1, 1984, 59-161814; Sep. 27, 1984, 59-202503; Dec. 26, 1984, 59-277929**

**Int. Cl.⁴ G11B** *5/147, 5/187, 5/23*

**U.S. Cl. 360—123** **23 Claims**



1. A perpendicular magnetic recording head for use with a double-layered perpendicular magnetic recording medium having a high-permeability backing layer, said magnetic recording head comprising:

a magnetic thin film pole which is disposed substantially perpendicular to an operative surface of the head, said operative surface being a surface which in operation faces said recording medium, said magnetic thin film pole including one edge exposed to said operative surface;

a high permeability flux return yoke means having at least two end portions, one end portion thereof being magnetically coupled to an end portion of said magnetic thin film pole which is most remote from said operative surface, and another end portion thereof being exposed to said operative surface, said return yoke means and said magnetic thin film pole forming a first magnetic path which is substantially magnetically open;

a non-magnetic separating means located between a portion of said magnetic thin film pole and a portion of said return yoke means, with a portion of said separating means being exposed to said operative surface, said separating means being provided so as to retain said first magnetic path to be magnetically open;

a transformer core means comprising a first high-permeability transformer core means and a second high-permeability transformer core means which are magnetically coupled at least at two portions so as to form a second magnetic path which is substantially a closed magnetic circuit;

a first thin film coil which is disposed substantially parallel to said magnetic thin film pole, and which itself constitutes a closed electric circuit, a portion of said first coil encompassing said end portion of the magnetic thin film pole to which said return yoke means is coupled so as to form an electromagnetic coupling with said first magnetic path, another portion of said first coil encompassing one of said portions of the transformer core means which are magnetically coupled so as to form an electromagnetic coupling with said second magnetic path; and

a second coil which is electromagnetically coupled with said second magnetic path, said second coil having a number of turns which is larger than a number of turns of said first thin film coil in relation to said second magnetic path, said second coil being adapted to provide an output from said head.



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**4,745,507**

## COMPOSITE TYPE MAGNETIC HEAD WITH NON-MAGNETIC MEMBER IN COIL MOUNTING PORTION

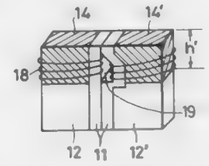
**Shigekazu Otomo, Sayama; Noriyuki Kumasaka, Ome; Takeo Yamashita, Tachikawa; Juichi Morikawa, Katsuta; Hideo Fujiwara; Osamu Inagoya, both of Ibaraki; Takeshi Tottori, Toride, and Masashi Hayashi, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Feb. 5, 1986, Ser. No. 826,340**

**Claims priority, application Japan, Feb. 13, 1985, 60-24305**

**Int. Cl.⁴ G11B** *5/127*

**U.S. Cl. 360—125** **18 Claims**



1. A magnetic head comprising a forward portion including a head front surface facing a magnetic recording medium, said forward portion including a pair of members of a magnetic metal substance coupled to a substrate of a nonmagnetic substance, said pair of magnetic metal substance members opposing each other through a functional gap, and a coil mounting portion provided at a rearward part of said forward portion, said coil mounting portion including a coil window provided between said pair of magnetic metal substance members and a coil for encircling both said nonmagnetic substance substrate and at least one of said magnetic metal substance members coupled to said substrate, and at least a rear core portion provided rearwardly of said coil mounting portion and magnetically coupled with said magnetic metal substance members, said rear core portion including at least a part made of a high permeability ferrite.

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**4,745,508**

## PLASTIC SUPPLY TAPE GUIDE FOR VIDEOCASSETTE

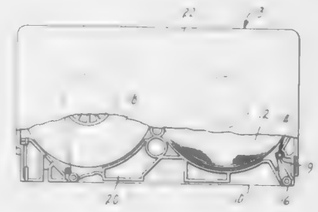
**Dale T. Tollefson, Woodbury, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Nov. 13, 1985, Ser. No. 797,433**

**Int. Cl.⁴ G11B** *23/08*

**U.S. Cl. 360—130.21** **8 Claims**

1. A magnetic recording tape videocassette having at least one plastic supply tape guide which comprises a supply pin which is fully inserted into a boss which is formed with an



opening for receiving said supply pin, said supply pin having a tunnel gate which is fully inserted into said boss.

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**4,745,509**

## MAGNETIC HEAD WITH IMPROVED SUPPORTER FOR PERPENDICULAR MAGNETIZATION RECORDING

**Yoshio Watanabe, Yokohama; Yasuhiko Nakayama; Nobuaki Furuya, both of Kawasaki, and Hiroshi Miyama, Yokohama, all of Japan, assignors to Matsushita Electric Industrial Company, Limited, Japan**

**Filed Aug. 20, 1982, Ser. No. 409,895**

**Claims priority, application Japan, Aug. 21, 1981, 56-131958; Aug. 21, 1981, 56-131952; Aug. 21, 1981, 56-131955; Aug. 21, 1981, 56-131957; Feb. 12, 1982, 57-21411; Jul. 23, 1982, 57-129336**

**Int. Cl.⁴ G11B** *5/127, 5/187*

**U.S. Cl. 360—125** **11 Claims**



1. In an magnetic head of perpendicular magnetization type for use with a magnetic recording medium having a layer made of Co-Cr, the improvement comprising:

(a) a main magnetic pole having a thin layer made of a high permeability magnetic material, and a nonmagnetic supporter for holding said thin layer, said thin layer and said supporter providing a contact surface arranged to be in contact with the recording medium, at least the contact surface of said supporter being made of a polycrystalline sintered body substantially composed of titanium carbide (TiC) and alumina ($Al_2O_3$);

(b) a sub magnetic pole having a core arranged to face said main magnetic pole to constitute a magnetic circuit therewith so that said recording medium travels between said main and sub magnetic poles;

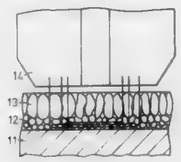
(c) at least one coil arranged to excite one of said main and sub magnetic poles, and

(d) a second thin layer made of a high permeability magnetic material, said second thin layer being normal to the first mentioned thin layer and attached to one end of said first

mentioned thin layer so as to form a T-shaped magnetic contact surface.

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**4,745,510**
**PERPENDICULAR MAGNETIC RECORDING AND REPRODUCING SYSTEM**
**Noboru Watanabe; Yasuo Ishizaka; Kazuo Kimura, all of Yokohama, and Eiichiro Imaoka, Sagamihara, all of Japan, assignors to Victor Company of Japan, Ltd., Japan**
**Filed Feb. 28, 1986, Ser. No. 835,045**
**Claims priority, application Japan, Mar. 7, 1985, 60-45327**
**Int. Cl.[4] G11B *5/74***
**U.S. Cl. 360—131** **4 Claims**

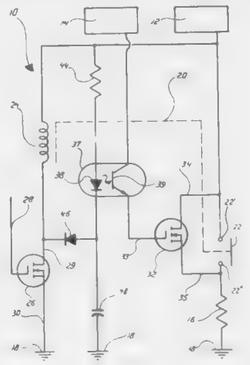


1. A perpendicular magnetic recording and reproducing system for recording and reproducing a signal on and from a perpendicular magnetic recording medium by use of a ring core head, said perpendicular magnetic recording medium comprising a medium base, a magnetic layer formed on said medium base, said magnetic layer being made of a single magnetic material and formed by a single continuous sputtering process, said single magnetic material being constituted by cobalt, chromium and at least one of tantalum and niobium, said magnetic layer comprising an upper layer portion having a coercivity larger than approximately 900 Oe in a direction perpendicular to a surface of said magnetic layer, and a lower layer portion having coercivities less than approximately 180 Oe in both of an in-plane direction of said magnetic layer and said direction perpendicular to said surface of said magnetic layer, wherein said upper and lower layer portions of said single magnetic layer are formed as a consequence of said single continuous sputtering of said single magnetic material upon said medium base.

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**4,745,511**
**MEANS FOR ARC SUPPRESSION IN RELAY CONTACTS**
**Michael M. Kugelman, and James M. Roman, both of Akron, Ohio, assignors to The BF Goodrich Company, Akron, Ohio**
**Filed Oct. 1, 1986, Ser. No. 913,894**
**Int. Cl.[4] H02H *7/00***
**U.S. Cl. 361—8** **7 Claims**

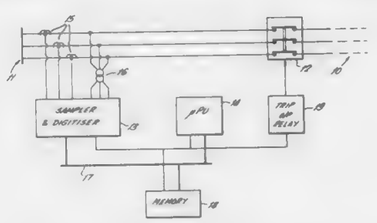
1. In an electrical circuit having an electro-mechanical relay activated by a flow of electrical current through an activating coil to close the electro-mechanical relay for the transmission from time to time of electrical current thereacross, and wherein electrical current carrying contacts within the electro-mechanical relay are subject to damage by dint of arcing of electrical current between the contacts upon opening or closing of the contacts during operation of the electro-mechanical relay, a means for suppressing the arcing comprising:
- a solid state switching means configured to bridge the relay to carry electrical current around the relay within the circuit, the solid state current conducting means being activatible by an application of a desired electrical signal to a sensing electrode thereof:
- means for detecting a condition within the circuit enabling a flow of electrical current through the activating coil together with means for applying to the sensing electrode of the solid state means the desired electrical signal throughout the duration of said condition;
- means for continuing application of the desired electrical signal to the sensing electrode for a desired period of time



following a discontinuance of the flow of electrical current through the activating coil.

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**4,745,512**
**REMOTE PROTECTION OF THREE PHASE DISTRIBUTION TRANSFORMERS**
**John T. Hampson, Chester, United Kingdom, assignor to The Electricity Council, London, United Kingdom**
**Filed Sep. 17, 1987, Ser. No. 98,007**
**Claims priority, application United Kingdom, Sep. 30, 1986, 8623467**
**Int. Cl.[4] H02H *7/045***
**U.S. Cl. 361—36** **26 Claims**

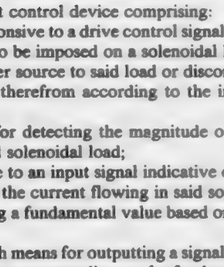



1. A method of remotely protecting three phase electricity supply distribution transformers, including the steps of monitoring parameters of the supply on a distributor cable to the transformers to detect both increases in negative sequence current and increases in positive sequence current, comparing detected simultaneous increases in negative and positive sequence currents and initiating the triggering of a circuit breaker to isolate the supply cable in response to a detected increase in negative sequence current only if the negative sequence current increase exceeds a predetermined proportion of any simultaneous positive sequence current increase.

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**4,745,513**
**PROTECTION OF GTO CONVERTERS BY EMITTER SWITCHING**
**William McMurray, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.**
**Filed Sep. 15, 1986, Ser. No. 907,418**
**Int. Cl.[4] H02H *3/08***
**U.S. Cl. 361—56** **8 Claims**

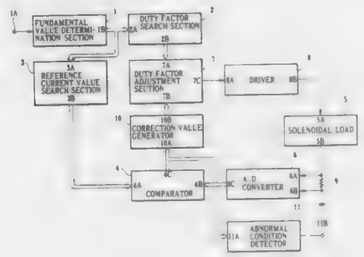
1. A fault current protected power converter circuit comprising:
- circuit means adapted to be connected between relatively positive and negative voltage buses, said circuit means including at least one gate turn-off thyristor;
- a gate driver circuit for providing control signals to a gate terminal of said thyristor, said driver circuit connected to provide a bias voltage between said gate terminal and a cathode terminal of said thyristor;
- circuit interruption apparatus serially connected with said cathode terminal of said thyristor; and




- means responsive to an overcurrent condition for causing said interruption apparatus to open-circuit said cathode terminal for forcing current in said thyristor to be diverted to said gate terminal for effecting rapid turn-off of said thyristor, said means responsive to an overcurrent condition comprising a solenoid having a coil connected in series circuit with said thyristor.

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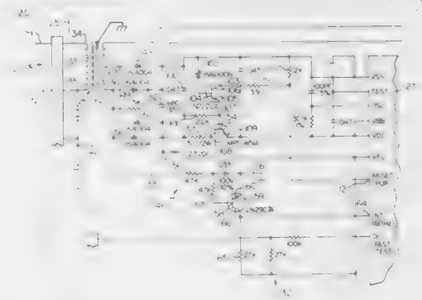
**4,745,514**
**LOAD CURRENT CONTROL DEVICE**
**Sadao Takeshima, and Hideo Yabe, both of Higashimatsuyama, Japan, assignors to Jidosha Kiki Co., Ltd., Tokyo, Japan**
**Filed Jul. 2, 1986, Ser. No. 880,989**
**Claims priority, application Japan, Jul. 18, 1985, 60-108858[U]**
**Int. Cl.[4] H01H *47/00*; G05B *11/28*; B62D *5/06***
**U.S. Cl. 361—154** **5 Claims**




1. A load current control device comprising:
- drive means responsive to a drive control signal indicative of a duty factor to be imposed on a solenoidal load for connecting a power source to said load or disconnecting said power source therefrom according to the imposed duty factor;
- detector means for detecting the magnitude of the current flowing in said solenoidal load;
- means responsive to an input signal indicative of an instruction related to the current flowing in said solenoidal load for determining a fundamental value based on the instruction;
- duty factor search means for outputting a signal indicative of the duty factor corresponding to the fundamental value;
- means for outputting a signal indicative of a reference current value corresponding to the fundamental value;
- comparator means for comparing an actual load current value outputted from said detector means with the reference current value to output a signal indicative of a difference therebetween;
- means for correcting the duty factor outputted from said duty factor search means by the difference signal outputted from said comparator means to supply the drive control signal indicative of the corrected duty factor to said drive means; and
- means responsive to an output signal of said comparator means for producing a signal indicative of an abnormal condition when the difference is out of a predetermined range.

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**4,745,515**
**ELECTRICALLY OPERATED CONTROL DEVICE AND SYSTEM FOR AN APPLIANCE AND METHOD OF OPERATING THE SAME**
**Daniel L. Fowler, Kentwood, Mich., assignor to Robertshaw Controls Company, Richmond, Va.**
**Filed May 30, 1986, Ser. No. 869,137**
**Int. Cl.[4] H02H *7/00*; H01H *47/28*; G05F *1/10***
**U.S. Cl. 361—185** **4 Claims**



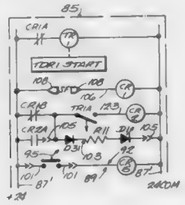
1. In a control device for a control system for an appliance wherein said system comprises a power source of alternating electrical current that has a repeating voltage wave cycle and a repeating current wave cycle and load means for using said electrical current to provide an output of said load means for said appliance, said control device comprising relay means having normally open contact means and coil means for closing said contact means only when said coil means is energized, and electrical circuit means for interconnecting said power source to said load means only through said contact means to provide said output and only when said contact means are closed by said coil means, the improvement comprising control means for causing said coil means to close said contact means substantially at a certain point on said voltage wave cycle each time said relay coil means closes said contact means from said open condition thereof whereby the current flow through said contact means at each closing thereof is at substantially a desired level thereof.

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**4,745,516**
**SAFETY FLOOR AND SWEEP WITH LINE POWER**
**James W. Griffin, Lake Mills, Wis., assignor to Spacesaver Corporation, Fort Atkinson, Wis.**
**Filed Jan. 27, 1986, Ser. No. 822,846**
**Int. Cl.[4] H01H *9/00*, *47/00*; A47B *53/00***
**U.S. Cl. 361—189** **18 Claims**

1. An electric circuit for controlling at least one solenoid between energized and deenergized conditions and comprising:
- a. a first circuit portion connected to a source of electric power and having at least one branch that includes the solenoid to be controlled; and
- b. a second circuit portion electrically connected to the first circuit portion comprising:

i. a first branch containing at least one safety switch for being actuated to an open condition and deactuated to a closed condition;
ii. relay and contact means in the first and second circuit portions for responding to actuation of the safety swtich to energize the solenoid and to deenergize the solenoid after the safety switch is deactuated;
iii. timer relay and contact means in the first and second

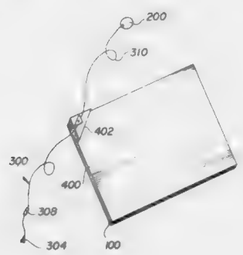


circuit portions for retaining the solenoid in the energized condition for a predetermined time after deactuation of the safety switch; and
iv. indicator means controlled by the relay and contact means for visually indicating the energization of the solenoid,

so that the solenoids remain energized after deactuation of the safety switch until the predetermined time on the timer means has elapsed.

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**4,745,517**
**MULTI-VECTOR DISCHARGE OF STATIC ELECTRICITY**
**Warren R. Pitts, Needham, Mass., assignor to Dennison Manufacturing Company, Framingham, Mass.**
**Filed Jul. 15, 1985, Ser. No. 755,129**
**Int. Cl.[4] H05F *3/02***
**U.S. Cl. 361—212** **17 Claims**

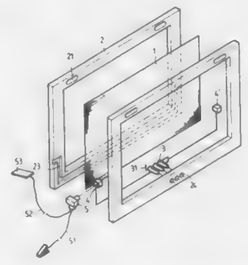


1. Apparatus for the discharge of static electricity, comprising:
a plurality of semi-conductive sheets overlapped and fastened together, perforated along a common line;
a grounding wire electrically connecting said sheets to ground;
a resistor serially connected to said grounding wire;
whereby sheets are removed along the perforation, wherein remaining sheets are electrically connected to ground.

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**4,745,518**
**MONITOR FILTER WITH STATIC ELIMINATING MEANS**
**Kuo C. Fang, No. 28, Lane 58, Kwang Fu S. Rd., Taipei, Taiwan**
**Filed Apr. 1, 1987, Ser. No. 32,537**
**Int. Cl.[4] H05F *1/00***
**U.S. Cl. 361—220** **1 Claim**

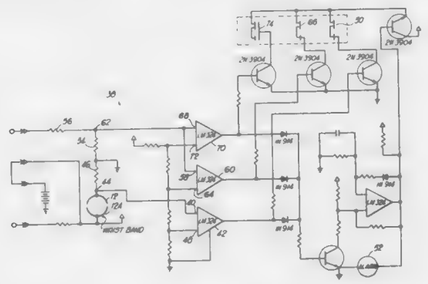
1. A monitor filter with a static eliminating means comprising:
a conducting net weaved by a plurality of nylon threads covered with black material;
a plastic frame having two portions between which the circumference of the conducting net is fixedly attached, each portion of the plastic frame being provided with two slots;
a static eliminating means mounted into the the plastic frames, said means comprising a set of light emitting diodes connected in series, one end of said series connected



light emitting diodes is connected with a terminal disposed at one side of the plastic frame, the other end of said series connected light emitting diodes being connected to the conducting net via a wire;
a grounded plug having two wires respectively connected with ground and a contact plate, said grounded plug being engageable with the terminal mounted at one side of the plastic frame so that induced static in the conducting net and an operator would be respectively transferred to the ground via the grounded plug and the contact plate.

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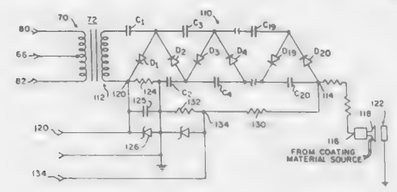
**4,745,519**
**GROUNDING STRAP WHICH CAN BE MONITORED**
**Albert C. Breidegam, Sharpsburg, Ga., assignor to Semtronics Corporation, Atlanta, Ga.**
**Continuation-in-part of Ser. No. 804,052, Dec. 2, 1985, Pat. No. 4,639,825, which is a continuation-in-part of Ser. No. 654,636, Sep. 25, 1984, Pat. No. 4,577,256. This application Jan. 12, 1987, Ser. No. 2,172**
**Int. Cl.[4] H05F *3/00***
**U.S. Cl. 361—220** **22 Claims**



1. A device for connecting a person's body to electrical ground, comprising:
a. a strap which may be connected to the person's body, comprising at least two electrically conductive sections;
b. at least two electrically connective means, each for connecting a conductive section of the strap to ground; and
c. circuit means connected to the electrically connective means for actuating a first warning means when any of the conductive sections is not connected to ground and a second warning means when any of the conductive sections is not connected to the person's body.



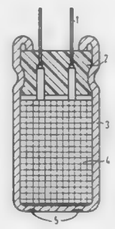
**4,745,520**
**POWER SUPPLY**
**Daniel C. Hughey, Indianapolis, Ind., assignor to Ransburg Corporation, Indianapolis, Ind.**
**Filed Oct. 10, 1986, Ser. No. 917,702**
**Int. Cl.[4] H02H *3/08*; B05B *5/00***
**U.S. Cl. 361—228** **36 Claims**



1. In combintion, a high magnitude electrostatic potential supply, an electrostatic potential utilization device, and means for coupling the electrostatic potential supply to the utilization device, the coupling means consisting essentially of a conductor having substantially no distributed capacitance and substantially no distributed resistance, the electrostatic potential supply comprises an operating potential source, a transformer having a primary winding and a secondary winding, a high potential rectifier and multiplier, means for coupling the operating potential source to the primary winding and means for coupling the secondary winding to the high voltage rectifier and multiplier, and the means for coupling the electrostatic potential supply to the utilization device consists essentially of the conductor for coupling the high potential rectifier and multiplier to the utilization device, the means for coupling the operating potential source to the primary winding comprises a regulator for providing regulated operating voltage and means for switching the regulated operating voltage across the primary winding, a resistive voltage divider, means for coupling the resistive voltage divider across the high potential rectifier and multiplier, and means for coupling a portion of the resistive voltage divider to the regulator, current sensing means and means for coupling the current sensing means in series with the regulator.

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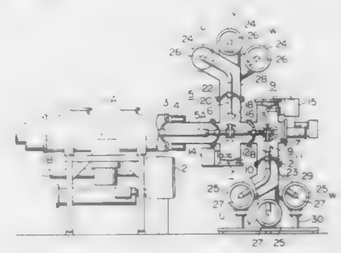
**4,745,521**
**EXPLOSION PROOF SAFETY VALVE FOR A CONDENSER**
**Manoel S. De Lima Filho, Porto Alegre, Brazil, assignor to Icotron S.A. Industria de Componentes Electronicos, Brazil**
**Filed Oct. 29, 1986, Ser. No. 924,458**
**Claims priority, application Brazil, Oct. 31, 1985, 8505573**
**Int. Cl.[4] H01G *9/00, 9/16***
**U.S. Cl. 361—272** **4 Claims**



1. A safety valve for a capacitor having a can-shaped capacitor element in a can-shaped envelope closed by a lid, comprising:
a bottom of said envelope having a thin part formed by six radial concave grooves, said concave grooves meeting one another at the center of said bottom, said concave groove providing a control for excessive pressures inside the envelope to prevent explosions, said radial concave grooves forming a pattern of three uniformly spaced "V"s, each of said "V"s defining an angle which is substantially less than an angle defined between said "V"s.

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**4,745,522**
**GAS-INSULATED SWITCHGEAR APPARATUS**
**Toshihide Mitomo, Hitachi; Satoshi Miwada, Ibaraki, and Shigetaka Takeuchi, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**
**Filed Dec. 17, 1986, Ser. No. 942,636**
**Claims priority, application Japan, Dec. 17, 1985, 60-282034**
**Int. Cl.[4] H02B *1/04***
**U.S. Cl. 361—341** **8 Claims**



1. A gas-insulated switchgear apparatus comprising:
gas-insulated circuit breakers for three phases disposed with an axis in a horizontal plane and having one axial end in a horizontal direction connected with a coupling bus;
first phase-separated main buses disposed in a first set of horizontal planes at different levels spaced from said horizontal plane, and second phase-separated main buses disposed in a second set of horizontal planes at different levels spaced from said horizontal plane; and
first switch means for each phase for connecting or disconnecting each gas-insulated circuit breaker and each first phase-separated main bus for the same phase, and a second switch means for each phase for connecting or disconnecting each gas-insulated circuit breaker and each second phase-separated main bus for the same phase;
said coupling buses for respective phases having the same length, said first switch means for respective phases laying in a common vertical plane and said second switch means for respective phases laying in a second common vertical plane, said first phase-separated main buses for three phases being positioned at the side of said gas-insulated circuit breakers and respectively arranged on the first set of horizontal planes at different levels above said first switch means, and said second phase-separated main buses being separated from said gas-insulated circuit breakers and respectively arranged on the second set of horizontal planes at different levels below said second switch means.

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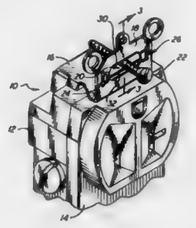
**4,745,523**
**AUTOMATIC GROUNDING CLIP**
**Bernard Moreau, Aixe sur Vienne, and Roger Pariatore, Soliginac, both of France, assignors to Pass & Seymour, Inc., Syracuse, N.Y.**
**Filed Feb. 24, 1987, Ser. No. 17,607**
**Int. Cl.[4] H01R *3/06***
**U.S. Cl. 361—356** **9 Claims**

1. In an electrical wiring device with automatic grounding means, the combination comprising:
(a) a metal yoke having at least one elongated, through slot extending along an axis between first and second ends and containing a metal screw which mounts said wiring device

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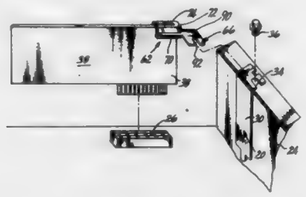
in a metal flush box, said slot having a width greater than the diameter of said screw;
(b) first and second openings through said yoke adjacent said first and second ends of said slot, respectively;
(c) a metal wire clip formed from a continuous length of wire bent to an essentially U-shaped configuration with a pair of parallel legs spaced by a distance less than the diameter of said screw, said legs extending between laterally adjacent, terminal ends at a first end portion of said clip, and being joined by an intermediate portion at the opposite, second end portion of said clip;



(d) said first and second end portions of said clip extending through said first and second openings, respectively, from a first to a second side of said yoke; and
(e) said first and second end portions of said clip being bent-over on said second side of said yoke to secure said clip in firm engagement with said yoke with said legs extending across said slot in closely superposed relation therewith, between said first and second ends thereof, and parallel to said axis, whereby said screw in passing through said slot passes between and in contact with said legs.

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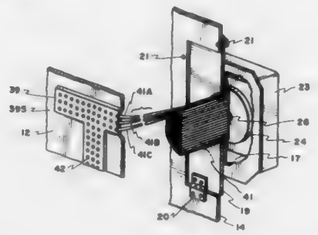
**4,745,524**
**MOUNTING OF PRINTED CIRCUIT BOARDS IN COMPUTERS**
**Charles R. Patton, III, Long Beach, Calif., assignor to Western Digital Corporation, Irvine, Calif.**
**Filed Apr. 24, 1987, Ser. No. 42,267**
**Int. Cl.[4] H05K *07/12***
**U.S. Cl. 361—399** **20 Claims**



1. Apparatus for mounting an expansion card inside a computer chassis having an expansion slot in a rear panel with an expansion card socket adjacent the expansion slot for receiving a connector on the card for securing the base of the card to the chassis and for making electrical connections between circuitry on the card and electrical contacts in the expansion socket, the computer chassis also having a removable cover plate separate from the expansion card for shielding the expansion slot and a fastener for releasably securing the cover plate in a fixed position in its shielding position over the expansion slot, the mounting apparatus comprising a mounting bracket having a combination board mounting clip and chassis mounting tab formed as an integral unit in which the clip fastens to a portion of the expansion card by fastening means on the clip for engaging the board in a continuous means of attachment without use of separate external fasteners that rigidly fasten the mounting bracket to the expansion card, the chassis mounting tab being arranged on the bracket with respect to the board mounting clip so that when the expansion card is plugged into the expansion socket inside the expansion slot, a portion of the chassis mounting tab extends away from the clip and automatically registers with the fastener for the cover plate so that the fastener is usable to rigidly fasten the chassis mounting tab to the computer chassis in a fixed position adjacent the cover plate, with the cover plate providing a separate means of shielding the expansion slot adjacent the mounted expansion card independently of the mounting bracket on the card.

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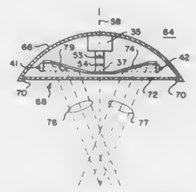
**4,745,525**
**LIGHTED TAILGATE FOR PICKUP TRUCK**
**Paul M. Sheehy, 8334 S. Fields Cir., Sacramento, Calif. 95828**
**Filed Mar. 2, 1987, Ser. No. 20,432**
**Int. Cl.[4] F21V *7/04***
**U.S. Cl. 362—32** **7 Claims**



1. In combination with a truck's brake lights, and the truck's tailgate, a supplementary lighting system comprising
(a) a truck tailgate having a front and rear panel spaced from each other by spaced side panels;
(b) indicia on the rear panel configured as a series of bores through the rear panel of said tailgate;
(c) a light means electrically connected to the brake lights and mounted on said tailgate;
(d) a series of fiber optic cables each of which is mounted on one end in one of said bores, and on a distal end, mounted for light receiving in front of said light means, whereby on actuation of the brakes, the light means will be lit, and light will travel down the series of fiber optic cables to spell out the indicia in light.

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**4,745,526**
**SPINNING LIGHT**
**Joseph T. Sestak, Erie, Pa., assignor to American Sterilizer Company, Erie, Pa.**
**Filed Jan. 12, 1987, Ser. No. 2,586**
**Int. Cl.[4] F21V *21/30***
**U.S. Cl. 362—35** **7 Claims**

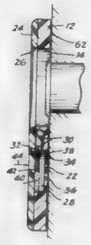


1. A light for providing a large diameter lighting pattern, comprising:
a rotatable arm having a reflective surface;
means for rotating said arm at a frequency greater than the retention time of the human eye; and
first and second sources of light each providing a small lighting pattern, said sources being carried on opposite ends of said rotatable arm such that upon rotation thereof a large diameter lighting pattern is created, said sources being carried by said arm at an angle that permits light from said light sources to be reflected from said reflective surface of said arm.

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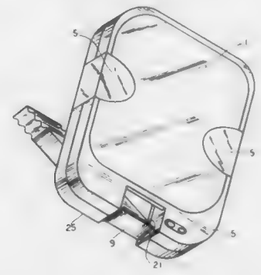
**4,745,527**
**ILLUMINATED DOOR LOCK SCRATCH GUARD**
**Joseph L. Belverio, Jr., Verona; David Dennison, Morristown, and Gregory Ball, Brookside, all of N.J., assignors to Allison Corporation, Livingston, N.J.**
**Filed Jan. 9, 1987, Ser. No. 1,904**
**Int. Cl.[4] E05B *17/10***
**U.S. Cl. 362—100** **8 Claims**



1. An illuminated door lock scratch guard, comprising a base plate means having an aperture therein, said plate means mounting onto a door with the aperture in registration with the door lock; illumination means associated with the plate means for casting illumination onto the door lock, a cavity formed in said plate means for accommodating said illumination means, said cavity including a channel approaching said aperture, wherein said illumination means further includes a pressure type switch within said plate means and a battery in said plate means, whereby pressing onto the plate means turns on said illumination means, and said scratch guard being formed as an assembly being mounted onto the door as a separate unit.

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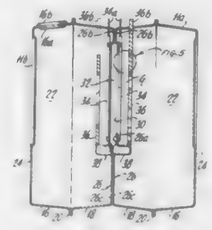
**4,745,528**
**LIGHTED TRAVEL MIRROR WITH RETRACTABLE COMBINED BASE SUPPORT AND HANDLE**
**Wayne D. Dieterle, South Plainfield, N.J., assignor to Conair Corporation, Edison, N.J.**
**Filed Apr. 3, 1987, Ser. No. 33,673**
**Int. Cl.[4] F21V *33/00***
**U.S. Cl. 362—135** **4 Claims**



1. A lighted travel mirror adapted to alternatively stand alone or be hand held, said mirror including
a housing, a reflective surface on one side of said housing, said housing carrying at least one light,
said housing including a side having a lower edge running substantially the width of said housing, an elongate recess opening to said side of said housing, said recess including slots upon opposing sides thereof, a base support slidingly and frictionally mounted for movement into and out of said recess, said support including pivot arms at the inner end thereof, said pivot arms being operatively engaged with said slots, and
the lower end of said base support being flush with said lower edge when said base support is positioned within said housing,
whereby said base support may be alternatively stored within said recess or withdrawn from said recess and pivoted so as to form with said lower edge a T-shaped base for said mirror.

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**4,745,529**
**BATTERY POWERED LIGHT SOURCE**
**Robert P. Hamlen, Bernardsville; Thomas J. Zoltner, Denville; William Kobasz, Edison, all of N.J., and Michael V. Rose, Pittsburgh, Pa., assignors to Alupower, Inc., Bernardsville, N.J.**
**Filed Oct. 6, 1986, Ser. No. 915,815**
**Int. Cl.[4] H01M *6/34***
**U.S. Cl. 362—157** **15 Claims**



1. A battery powered light source comprising:
(a) an electric light bulb;
(b) a plurality of air cathodes;
(c) a plurality of metal anodes, one for each cathode;
(d) a plurality of electrically nonconductive housings disposed adjacent to each other;
(e) wherein each housing encloses a respective chamber for holding liquid electrolyte, said chamber containing one cathode and one anode which are spaced from each other and form an anode-cathode pair, for electrolytic reaction with said electrolyte producing an insoluble reaction product, the chamber in each said housing further defining a cavity below the anode-cathode pair and in fluid flow communication with the chamber for collecting said reaction product, and the housings being connected to form at least one air passage connected exteriorly with the atmosphere and extending from one side of said housing to the opposite side, and an opening in a side of each housing through which a surface of the cathode contained in the housing is exposed to air in said passage.

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**4,745,530**
**LIGHT ASSEMBLY AND MOUNTING APPARATUS**
**Mason G. Farrell, Jr., Renton; Craig A. Anderson, Seattle, and Douglas K. Garoutte, Federal Way, all of Wash., assignors to Target Tech, Inc., Kent, Wash.**
**Filed Jun. 6, 1986, Ser. No. 871,447**
**Int. Cl.[4] H01R *33/06***
**U.S. Cl. 362—226** **14 Claims**

1. A light assembly for a vehicle having an inner surface, an outer surface and a conductive lead having a connecting portion for conducting an electrical output from a power supply of the vehicle, said light assembly comprising:
a. a housing having a light transparent portion, and including a base which is adapted to be fixedly mounted to the

vehicle, and a cover which is attached to said base, said base being formed by a wall having an inner surface, an outer surface and at least one through-hole which has an inner surface and which extends between said inner surface and said outer surface of said wall;

b. indicating means located inside said housing, said indicating means including:

(1) an indicating member which is mounted to said base and which provides a visual output through said light transparent portion,

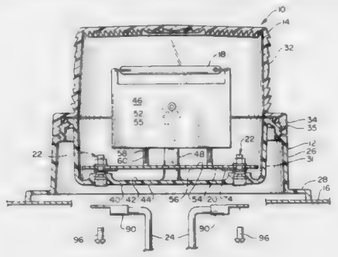
(2) circuit board means having (i) a conductive portion and (ii) electronic components which are fixedly mounted to said conductive portion and which are in electrical communication with said indicating member and which cause said indicating member to generate said visual output in response to the electrical output from the power supply;

c. means for fastening said circuit board means and said conductive lead to said base in a manner to conduct said electrical output between said vehicle power supply and said circuit board means, said fastening means including an electrically conductive elongated member having:

(1) a middle portion fixedly mounted in said base wall through-hole,

(2) a head portion which faces outwardly from the outer surface of said base wall and which is adapted to be connected to said connecting portion of said conductive lead,

(3) a shaft portion which faces inwardly from said inner



surface of said base wall and which engages said circuit board means in a manner that said shaft portion is in electrical communication with the conductive portion of said circuit board means, and

(4) an end connector which is attached to said shaft portion to engage said circuit board means to said shaft portion in a manner that disengagement of said end connector permits said circuit board means to be removed from said shaft portion.

10. In a light unit including a base with an inner surface and an outer surface, a light transparent cover, light emitting means, a circuit board, and an electrically conductive fastener member having a head portion, a middle portion and a shaft portion, a method of assembling and attaching the light unit to the outside of a vehicle having a conductive lead with a connecting portion located outside the vehicle for conducting an electrical output from a power supply of the vehicle, the method comprising the steps of:

a. joining the middle portion of the electrically conductive fastener to the base so that (i) the head portion faces outwardly from the outer surface of the base and (ii) the shaft portion extends upwardly from the inner surface of the base;

b. placing the circuit board in a substantially horizontal manner onto the shaft portion so that a hole in the circuit board is placed over the shaft portion so that the shaft portion extends upwardly through the hole, with the circuit board being supported on the shaft portion by a substantially horizontal shoulder portion of the shaft portion, so that the shaft portion is in electrical communication with an electrically conductive portion of the circuit board;

c. releasably attaching the circuit board to the shaft portion;

d. releasably attaching the indicating member to the light unit above the circuit board and in electrical communication with the conductive portion of the circuit board;

e. removably attaching the transparent cover to the base;

f. mounting the base to the vehicle; and

g. releasably attaching the connecting portion of the conductive lead to the head portion of the fastener so that the vehicle power supply is in electrical communication with the indicating member.

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**4,745,531**

**LIGHTING DEVICE WITH ALL PARAMETERS ADJUSTABLE SIMULTANEOUSLY, IN PARTICULAR FOR USE AS A STAGE LIGHT**

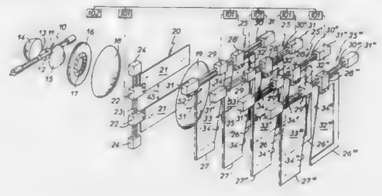
**Didier Leclercq, Paris, France, assignor to Cameleon, La Garenne Colombes, France**

**Filed May 29, 1986, Ser. No. 868,077**

**Claims priority, application France, May 31, 1985, 85 08252**

**Int. Cl.[4] F21V *13/12***

**U.S. Cl. 362—281** **17 Claims**



1. A lighting device comprising a wide light source adapted to produce a light beam, said light source having electrodes with an effective length greater than 6 mm, a reflective mirror disposed behind said light source, and in front of said light source, along the path of the light beam and spaced in succession from said light source toward an outlet end of the lighting device, an adjustable iris diaphragm, at least two optical lenses mounted for displacement along the path of the light beam relative to each other and arranged such that the image of the light source is focused on a forwardmost one of said two optical lenses, and a plurality of colored filters disposed in spaced relationship, each of said plurality of colored filters comprising a pair of films of colored transparent material mounted for movement into and out of the path of the light beam whereby the light beam exiting the lighting device defines a spot of homogeneous color and intensity which is gradually changeable in color by displacement of selective pairs of films of transparent material into and out of the path of the light beam.

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**4,745,532**

**LAMPSHADE**

**Yhu-Kee Mo, No. 53-2, Chung Tai E. St., Pei Chu, Taichung City, Taiwan**

**Filed Jul. 31, 1987, Ser. No. 80,341**

**Int. Cl.[4] F21V *1/06***

**U.S. Cl. 362—352** **5 Claims**

1. A lampshade comprising:

a corrugated hollow outer cover of truncated cone shape having an upper hooking rim member curved inwardly and a lower hooking rim member curved inwardly;

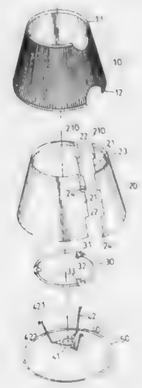
a plurality of curved plates each shaped to a segment of a truncated hollow cone so as to be connected to another to form an inner lining of said outer cover, each of said curved plates having an inwardly curved upper hooking edge which can be received in said upper hooking rim member, an inwardly curved lower hooking edge which can be received in said lower hooking rim member, and



two opposite lateral sides to be jointed with the other adjacent said curved plate;

an upper ring to be hooked up by said upper hooking edges, having attachment members at intervals;

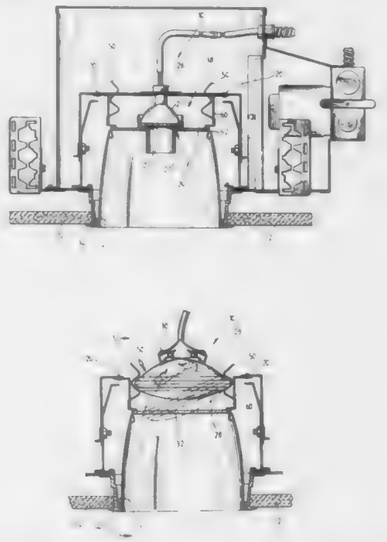
a rib assembly having a rib holding circular ring with a cross-section of U-shape in a plane perpendicular to the plane of said rib holding ring and with an outer periphery which has spaced apart tubular members extending radially outward therefrom, and a plurality of bent ribs ex-



tending upward from said rib holding ring, each of said bent ribs having a lower angled end inserted into said rib holding ring through each of said tubular members and an upper angled end to be connected releaseably to said upper ring, each of said bent ribs extending radially and outwardly from said rib holding ring and then bent upward towards said upper ring; and

a lower ring to be hooked up by said lower hooking edges of said curved plates.

a central mounting portion constructed and arranged for attachment to said respective mounting support; and



an upper resilient portion constructed and arranged to hold a second style of lamp.

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**4,745,534**

**MINIATURE LAMP HOLDER**

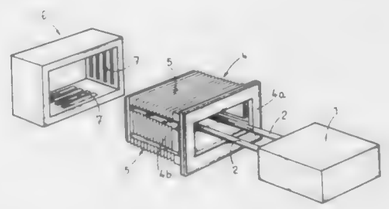
**Jean Brunner, La Chaux-De-Fonds, Switzerland, assignor to Universo S.A., Neuchatel, Switzerland**

**Filed Apr. 20, 1987, Ser. No. 40,340**

**Claims priority, application Switzerland, Apr. 24, 1986, 1.660/86-6**

**Int. Cl.[4] F21V *19/00, 21/00***

**U.S. Cl. 362—365** **5 Claims**



1. A miniature lamp holder comprising a first inner sleeve having an opening, the cross-sectional shape of which corresponds to that of a lamp to be held, in which sleeve the lamp is engaged, and a second outer sleeve surrounding said first sleeve, in which said first sleeve has a wall and is provided with at least one resiliently deformable small tongue provided in said wall, said tongue being connected to said wall in the neighbourhood of an end of said first sleeve opposite to that end through which the lamp is engaged, the thickness of said tongue increasing from an end thereof connected to said wall towards a free end of the tongue, the arrangement being such that, when said second sleeve is engaged on said first sleeve, it acts on said tongue to press it inwardly against the lamp so as to maintain the lamp in place in the first sleeve.

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**4,745,533**

**MULTI-LAMPHOLDER AND ACCESSORY RETAINMENT SYSTEM**

**Frank G. Smerz, Addison, Ill., assignor to Cooper Industries, Houston, Tex.**

**Filed Jan. 27, 1987, Ser. No. 6,835**

**Int. Cl.[4] F21V *17/00***

**U.S. Cl. 362—364** **20 Claims**

1. A multi-lampholder and accessory retainment system for use in a recessed lighting fixture, said system comprising:

mounting supports contained within said recessed lighting fixture; and

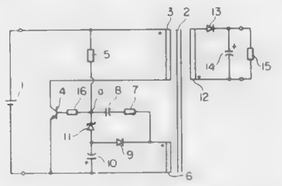
a retainment spring affixed to a respective one of each of said mounting supports, said retainment spring having:

a lower resilient portion constructed and arranged to hold a first style of lamp;

## 4,745,535
## RINGING CHOKE TYPE DC/DC CONVERTER

Eiichi Sugishima, and Osamu Miyazaki, both of Nagoya, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Mar. 12, 1987, Ser. No. 25,093
Claims priority, application Japan, Mar. 14, 1986, 61-37719[U]; Mar. 14, 1986, 61-37720[U]; Mar. 14, 1986, 61-37721[U]; Mar. 14, 1986, 61-37722[U]
Int. Cl.[4] H02M 3/335
U.S. Cl. 363—19 5 Claims

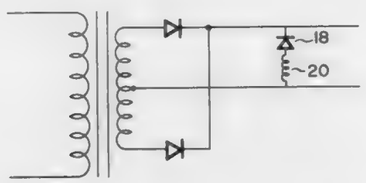


1. A ringing choke-type DC/DC converter comprising:
a transformer having a primary winding, a feedback winding, and a secondary winding;
a transistor having a base and an emitter and connected between said primary winding and said feedback winding;
an input DC power source connected to said primary winding through said transistor;
a DC power output connected to said secondary winding;
a base circuit having a first capacitor and connected between the base of said transistor and said feedback winding;
a branch circuit branching from said base circuit and having a Zener diode connected in series with a second capacitor, and
stabilizing means including an impedance element connected in series between said transistor and said branch circuit for preventing said transistor intermittently operating, thereby stabilizing said DC power output.

## 4,745,536
## REACTOR FOR CIRCUIT CONTAINING SEMICONDUCTOR DEVICE

Yorio Hirose, and Yasunobu Sakamizu, both of Tokyo, Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Continuation of Ser. No. 744,660, Jun. 14, 1985, abandoned, and a continuation of Ser. No. 563,982, Dec. 21, 1983, abandoned. This application Dec. 1, 1986, Ser. No. 936,934
Claims priority, application Japan, Dec. 23, 1982, 57-230398
Int. Cl.[4] H02M 3/335
U.S. Cl. 363—21 19 Claims



1. A method of restraining current spikes, ringing, and electromagnetic noise in an electric circuit that includes a semiconductor device, the current spikes, ringing and electromagnetic noise being of a type that occurs when a voltage applied to the semiconductor device is inverted, said method comprising the step of:
providing a reactor in series with said semiconductor device, wherein the reactor includes (a) a core formed with a through hole and which is made of an amorphous magnetic alloy having a magnetic flux density of not less than 6 kilogauss at an external magnetic field of 1 oersted, a coercive force of not more than 0.5 oersted, and a squareness ratio of not less than 0.8 when a frequency of said circuit is set to approximately 100 kilohertz, and (b) a conductor wound around the core through the through hole, the conductor being insulated from the core, wherein said amorphous magnetic alloy has a general formula:

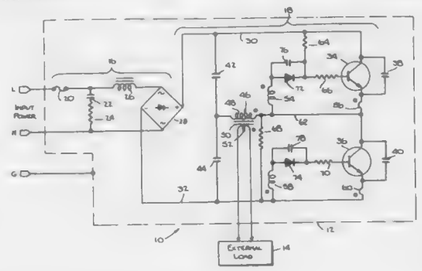
$$Co_aM_bM'_cY_d$$

wherein M is at least one metal element selected from the group consisting of iron and manganese; M' is a transition metal element (excluding iron and manganese); Y is at least one element selected from the group consisting of silicon, boron, phosphorus, carbon, germanium, zinc and aluminum; and a, b, c and d indicate atomic percentages of the respective atoms in the alloy, and $a+b+c+d=100$, $50 \leqq a \leqq 80$, $0 < b \leqq 10$, $0 \leqq c \leqq 10$, and $d=100-(a+b+c)$.

## 4,745,537
## LOW DISSIPATION POWER CONVERTER

P. S. Cheung, 18, Newgale St., Nepean, Canada K2H 5R3

Filed Jan. 23, 1987, Ser. No. 6,568
Int. Cl.[4] H02M 5/458, 7/5387
U.S. Cl. 363—37 7 Claims



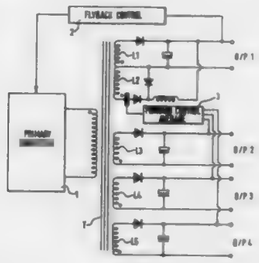
1. An electric power converter comprising:
a first transistor and a second transistor serially connected between positive and negative terminals of a DC source, each of said transistors comprising an emitter terminal and a base terminal and a collector terminal, the emitter terminal of said first transistor being connected via a first junction point to the collector terminal of said second transistor;
a power transformer having a primary winding, a secondary winding and a saturable core inductively coupled to said primary and secondary windings;
a bypass circuit coupled between said positive and said negative terminals of said DC source, said bypass circuit comprising first and second capacitors serially connected at a second junction point, said primary winding being connected between said first junction point and said second junction point;
means magnetically coupled to said transformer for applying base current alternately to said first and said second transistors to induce states of conduction of current alternately in each of said transistors, the current in each of said transistors passing through said primary winding and inducing a voltage drop across said primary winding during a nonsaturated condition of said transformer core for minimizing power dissipation in each of said transistors, saturation of said transformer core reversing polarity of said current applying means to alternate activation of said two transistors, alternate flow of current in said transistors via said primary winding resulting in an oscillatory current in said primary winding, the oscillatory current inducing a voltage at said secondary winding suitable for operation of a load external to said converter;
a first transformer winding magnetically coupled to said base-current-applying means and connected between an emitter terminal of said first transistor and a collector terminal of said second transistor; and
a second transformer winding magnetically coupled to said base-current-applying means and connected between an emitter terminal of said second transistor and a junction of said bypass circuit with said DC source, said first and second tranformer windings acting to decrease voltage across said first and said second transistors respectively during states of conduction in said transistors.



## 4,745,538
## ELECTRICAL POWER SUPPLIES

Bryan N. Cross, and Andrew D. B. Wheele, both of N. Devon, England, assignors to Coutant Electronics Limited, Devon, England

Filed Mar. 28, 1986, Ser. No. 846,558
Claims priority, application United Kingdom, Mar. 28, 1985, 8508064
Int. Cl.[4] H02M 3/335
U.S. Cl. 363—21 17 Claims



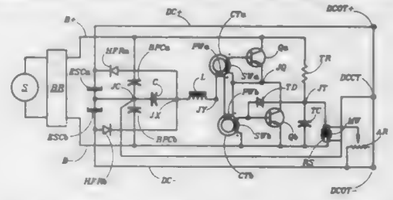
1. A switched-mode power supply having main load terminals and one or more auxiliary load terminals, wherein loads at the main and auxiliary load terminals are regulated both by controlling the stored energy of flyback conversion, and by controlling the direct energy of forward conversion, the power supply comprising a transformer having a primary winding, at least two main output windings and one or more other output windings, a primary converter associated with the primary winding, a forward conversion circuit associated with one of the main output windings for supplying the main load terminals, a flyback conversion circuit associated with the other of the main output windings for also supplying the main load terminals, one or more further flyback conversion circuits associated with the other output winding or windings for supplying the other load terminals, a forward control circuit connected to the forward conversion circuit for controlling the main load terminals in response to a signal derived from the flyback conversion circuit supplying the main load terminals, and a flyback control circuit connected to the primary converter and arranged to control the other load terminals in response to a signal derived from the main load terminals.

## 4,745,539
## CONTROLLABLE FREQUENCY CONVERTER

Ole K. Nilssen, Caesar Dr., Barrington Hills, Ill. 60010

Filed Feb. 2, 1987, Ser. No. 9,822
Int. Cl.[4] H02M 5/45
U.S. Cl. 363—37 38 Claims

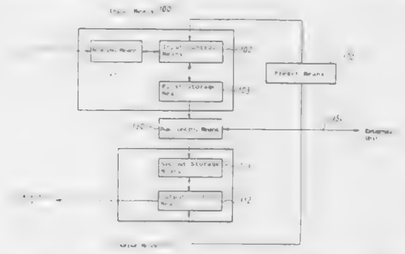
1. An arrangement comprising:
rectifier means connected with an ordinary electric utility power line and operative to provide a DC voltage at a set of DC terminals; and
inverter means connected with the DC terminals and operative to provide an AC voltage at a set of AC terminals;
the inverter means having: (i) semiconductor switch means switched ON and OFF in accordance with controllable ON and OFF periods, and (ii) control means operative to permit adjustment of the frequency and the magnitude of the AC voltage by way of controlling the ON and OFF periods, the ON and OFF periods each being substantially shorter than the fundamental period of the AC voltage, thereby to cause this fundamental period to span at least two ON periods and two OFF periods.



## 4,745,540
## PROCESS INPUT/OUTPUT SYSTEM

Akihide Hamada, Kawasaki, and Keiichi Tomizawa, Hino, both of Japan, assignors to Fuji Electric Company Ltd., Kawasaki and Fuji Facom Corporation, Tokyo, both of, Japan

Filed Nov. 13, 1985, Ser. No. 797,650
Claims priority, application Japan, Nov. 15, 1984, 59-239339
Int. Cl.[4] G06F 15/46, 9/00
U.S. Cl. 364—140 6 Claims



1. A process input/output unit for a sequence controller comprising:
an input means having input terminals and means for reading an external input signal received via said input terminals from an external unit;
an output means having a first storage means for storing output data inputted from a bus of said sequence controller, which is to be outputted to said external unit or another external unit, output terminals, and means for outputting said stored data to said external unit or said another external unit via said output terminals;
presetting means connected to said input means and said output means and responsive to select signals for presetting selection of either one of said input means and said output means which is to be in use, the number of said input terminals and the number of said output terminals and input response time corresponding to said input signals;
said input means further having judging means for performing input filtering with respect to said external input signals according to the setting that was preset by the presetting means and for determining an input condition of an external input signal that has been read by the means for reading, and a second storage means for storing said input condition determined by said judging means; and
means for controlling said bus to perform exchanges of data from said second storage means to said bus and from said bus to said first storage means, said input means, said output means, said presetting means, and said means for controlling being integrally arranged as one unit.

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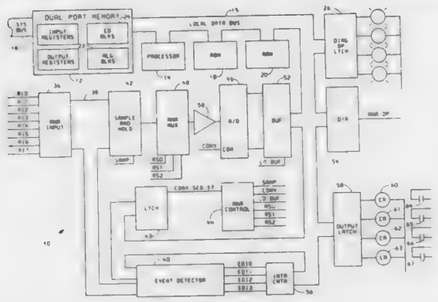


**4,745,541**

## METHOD AND APPARATUS FOR PROCESS CONTROL

**Christopher L. Vaniglia, West Chester; Perry J. Anderson, and Dennis G. O'Keefe, both of Cincinnati, all of Ohio, assignors to Cincinnati Milacron Inc., Cincinnati, Ohio**

**Filed Jun. 16, 1986, Ser. No. 874,729**
**Int. Cl.[4] G05B *19/02***
**U.S. Cl. 364—141** **10 Claims**



1. In a method for controlling a process wherein an element affecting the process is responsive to a control signal representing a value of a controlled process parameter and the control signal is produced by periodically executing a selected algorithm associated with an activity in a sequence of activities describing the process, and wherein the algorithm to be executed is periodically selected, the improvement comprising the steps of:

(a) storing event detector data blocks defining predetermined changes of value of process parameters marking the onset of process activities;

(b) recalling a stored event detector data block associated with the selected algorithm;

(c) continuously comparing an input signal representing a process parameter to a predetermined trigger value to detect the predetermined change of value defined by the recalled event detector data block; and

(d) producing an interrupt signal in response to detecting the predetermined change, the interrupt signal interrupting the execution of algorithms and initiating the execution of a predetermined procedure using data stored with the recalled event detector data block.

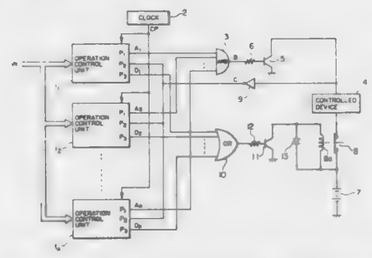
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**4,745,542**

## FAIL-SAFE CONTROL CIRCUIT

**Satoshi Baba; Tadashi Nose, both of Osaka; Tetsuji Muto, and Yuji Fujimura, both of Saitama, all of Japan, assignors to Nec Home Electronics, Osaka, Japan**

**Filed Nov. 12, 1985, Ser. No. 796,701**
**Claims priority, application Japan, Sep. 29, 1984, 59-205095**
**Int. Cl.[4] G06F *11/16*; G05B *9/02***
**U.S. Cl. 364—184** **7 Claims**



1. A fail-safe control circuit connected to operation control units producing control signals and to a controlled device, said fail-safe control circuit comprising:

detection means for detecting coincidence between the control signals, activating the controlled device only when coincidence occurs and producing a feedback signal, each said operation control unit producing a disagreement signal when the respective control signal disagrees with the feedback signal, said detection means comprising:

a single AND gate connected to said operation control units and the controlled device; and

an inverter connected to said AND gate and the operation control units, and producing the feedback signal; and

fail-safe means for placing the controlled device in a fail-safe state when at least one disagreement signal is produced.

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**4,745,543**

## FRONT PANEL FOR A PROCESS CONTROLLER

**Robert Michener, Warrington, and Thomas Frederiksen, Jr., Hatboro, both of Pa., assignors to Fischer & Porter Co., Warminster, Pa.**

**Continuation of Ser. No. 294,528, Aug. 20, 1981, abandoned. This application May 28, 1987, Ser. No. 56,363**
**Int. Cl.[4] G06F *3/14***
**U.S. Cl. 364—188** **4 Claims**



1. In an industrial process electronic controller operable in a manual or automatic mode to compare a signal representing a process variable with a set point signal to produce an output signal that reflects the deviation of the variable from the set point, the output signal being applied to a final control element for governing the process variable, a front display panel free of discrete indicators or switches comprising:

A. a first gas discharge bar graph analog indicator responsive to the process variable signal;

B. a second gas discharge bar graph analog indicator responsive to the set point signal;

C. a third gas discharge bar graph analog indicator responsive to the output signal; and

D. a gas discharge digital indicator responsive to the signal applied to either the first or second indicator, said analog and digital indicators being integrated in a display panel constituted by a non-deflectable front plate spaced a fixed distance from a parallel second plate and peripherally sealed thereto to define a sealed envelope filled with an ionizable gas, said plates having electrodes formed on the internal surfaces thereof appropriate to said first and second analog and said digital indicators whereby all of the analog and digital indications appear and are readable on said common panel, said first and second indicators being vertically disposed on said panel in parallel relation adjacent a graduated scale, said third indicator being horizontal and disposed below said first and second indicators, said display panel further including electrodes formed on the internal surfaces of said plates to define a plurality of touch-sensitive capacitive switches in which said gas functions as a dielectric, said switches each being actuated when the front plate in the region of the electrodes forming the switch is merely touched by an operator, one of said switches, when actuated, causing said controller to operate either in the manual or automatic mode, whereby all of said indicators and said switches are integrated into said sealed, gas-filled envelope which acts as the display panel which is free of discrete indicators or switches.

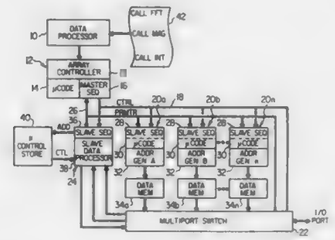


**4,745,544**

## MASTER/SLAVE SEQUENCING PROCESSOR WITH FORCED I/O

**Karl Renner, Dallas, Tex., and John P. Shanklin, Colorado Springs, Colo., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Dec. 12, 1985, Ser. No. 809,095**
**Int. Cl.[4] G06F *15/16***
**U.S. Cl. 364—200** **16 Claims**



1. A processor for processing data, comprising:

a master processor for generating sequence commands to control instruction flow in the processor;

first and second slave processors, connected to said master processor, having internal instructions stored therein, for receiving common ones of said sequence commands from said master processor and executing internal instructions in response thereto, wherein addresses and control signals are generated, said first and second processors operating in either a data processing mode or an I/O mode, sequence commands from said master processor determining which mode said first and second slave processors are in such that one of said slave processors operates in the I/O mode and one of the slave processors operates in the data processing mode;

first and second data memories having data ports and connected to said first and second slave processors, repsectively, for storing data and operating in response to addresses and control signals generated by the first and second slave processors to either receive and store data from, or retrieve and output data to, the data ports;

a data processor, having an input and an output port, for receiving data on the input port and processing received data in accordance with a predetermined data processing function and outputting results on the output port;

a reconfigurable switch for interconnecting the data ports of said data memories with both the input and output ports of the data processor and an I/O port, the I/O port interfaced with an external I/O device for generating data for input to the I/O port and for receiving data output by the I/O port, said switch being configured in accordance with one of a plurality of predetermined connectivity patterns stored internal thereto and selected in repsonse to receiving a sequencing command from said master processor;

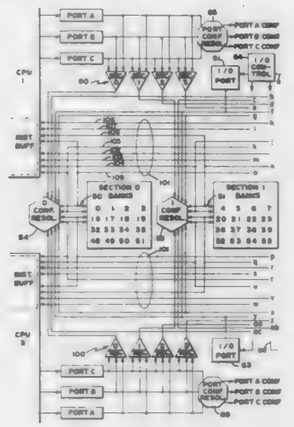
status register means connected to said first and second memories for containing status information as to the status thereof to determine if the memory connected to a slave processor operating in the I/O mode has completed the I/O mode, said master processor means operating in response to completion of an I/O mode in one of said data memories to force the slave processor connected to the other data memory into an I/O mode to continue receiving or transmitting data to the I/O port through said switch, wherein said switch reconfigures to connect such that other data memory to the I/O port.

**4,745,545**

## MEMORY REFERENCE CONTROL IN A MULTIPROCESSOR

**Alan J. Schiffleger, Chippewa Falls, Wis., assignor to Cray Research, Inc., Minneapolis, Minn.**

**Filed Jun. 28, 1985, Ser. No. 750,099**
**Int. Cl.[4] G06F *13/14***
**U.S. Cl. 364—200** **13 Claims**





1. In a multiprocessor computer system including a main memory organized into a plurality of sections each consisting of a plurality of individually addressable memory banks, and wherein each processor includes a plurality of reference generating ports which may generate memory references to any one of said sections and banks, a memory reference interface between said processors and said sections comprising:

section level bank conflict resolution means, one for each of said sections of memory, each for receiving reference requests and resolving conflicts between said reference requests;

port level gating means, one associated with each of said processors, each for receiving reference requests from each of the ports associated with its respective processor and gating said reference requests to the associated one of said section level bank conflict resolution means in accordance with the bank to which the request is directed, said port level gating means permitting only one reference per memory section to be gated at a time;

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port level section conflict resolution means, one associated with each of said processors, each for monitoring reference requests generated by the ports of its respective processor and detecting whether conflicts between reference requests to the same section of memory exist, and if conflicts are detected, determining which one reference request may proceed to each section of memory through said port level gating means and causing the other conflicting reference requests to be held by the port that generated them;

each of said section level bank conflict resolution means comprising:

a plurality of input gating means, one associated with each processor, each for selectively gating either a reference request gated through said port level gating means or a resubmitted reference request previously gated therethrough but which could not proceed to the memory due to a conflict;

bank busy means for monitoring each bank in the associated memory section and generating a set of busy signals each one indicative of the activity status of a particular bank in said associated memory section;

a plurality of bank conflict checking means each receiving the reference requests gated through a respective one of said input gating means and said set of busy signals for determining the availability of the bank required for a received reference request and generating a bank busy conflict signal indicative of whether or not the checked reference request may proceed;

simultaneous bank conflict checking means receiving all reference requests gated through said input gating means simultaneously for determining if any of said simultaneous reference requests are directed to the same bank and for generating a set of simultaneous request conflict indicating signals each one corresponding to a respective one of said received simultaneous references; and

means receiving said bank busy and simultaneous request conflict indicating signals for resolving conflicts between reference requests submitted to said section level bank conflict resolution means, determining which reference requests may proceed to the memory, causing permissible reference requests to be issued to the memory, causing conflicting impermissible reference requests to be resubmitted to their associated input gating means, and causing the port level section conflict resolution means and associated processor to hold the procession of subsequent reference requests when a reference request associated therewith cannot proceed.

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**4,745,546**

**COLUMN SHORTED AND FULL ARRAY SHORTED FUNCTIONAL PLANE FOR USE IN A MODULAR ARRAY PROCESSOR AND METHOD FOR USING SAME**

**Jan Grinberg, Los Angeles; Donald H. Close, Santa Monica, and Robert D. Etchells, Topanga, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Jun. 25, 1982, Ser. No. 392,207**
**Int. Cl.[4] G06F** *15/16*
**U.S. Cl. 364—200** **36 Claims**

1. An array processor system comprising:

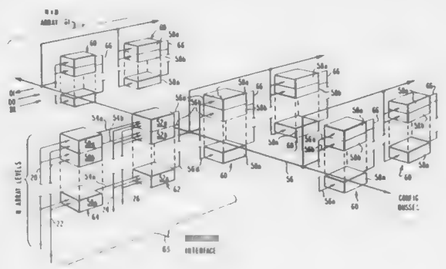
(a) a control processor;

(b) an array processor having a plurality of elemental processors configured in an M×N array of M elements by N elements, with the operation of said array processor being directed by said control processor; and

(c) a replicated data transfer plane operatively associated with said control processor and said array processor for respectively exchanging data thereinbetween or between said elemental processors within said array processor, said replicated data transfer plane including:

(i) a plurality of pseudo-modules corresponding to the M×N array of elemental processors, said pseudo-modules having means for transferring data to and from said elemental processors; and

(ii) pseudo-module control logic having means for transferring data to and from said control processor, means



for transferring data to and from all of said pseudo-modules, and means for allowing said control processor to select and direct all transfers of data through said replicated data transfer plane.

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**4,745,547**

**VECTOR PROCESSING**

**Werner Buchholz; Ronald M. Smith, both of Wappingers Falls, N.Y., and David S. Wehrly, Montrose, Pa., assignors to International Business Machines Corp., Armonk, N.Y.**

**Filed Jun. 17, 1985, Ser. No. 745,040**
**Int. Cl.[4] G06F** *7/38*
**U.S. Cl. 364—200** **4 Claims**



1. In a data processing system including storage, registers including at least one general register and at least one vector register subdivided into vector element locations, vector elements of at least one vector in said storage, means for loading and storing said vector elements in said storage and in said vector register, and at least one central processing unit that executes instructions at least one of which is a vector instructions which operates on said vector elements and references a general register, the method for operating on said elements of said vector which is larger than said vector register comprising the steps of:

a. loading a first register with a number representing the total number of said vector elements to be operated on by said vector instruction during more than one iterative execution of said vector instruction, said total number of said vector elements being more than the number of said vector element locations in said vector register,

b. executing a machine language instruction which:



i. loads a seocnd register with a number representing at most the number of said vector element locations in said vector register, said number in said second register indicating the number of elements of said vector to be processed during a single iterative execution of said vector instruction,

ii. loads said second register with the content of said first regiser when the content of said first register is not greater than the number of vector element locations in said vector, and sets a condition code indicative of the content of said first register, and

iii. subtracts the content of said second register from the content of said first register and stores the result in said first register, said first register now containing the number of vector elements remaining to be processed during subsequent interative executions of said vector instruction,

c. executing said vector instruction which references saidi general register that is automatically updated to identify the first element of a group of said vector elements in said vector in storage to be loaded into said vector register, which is also referenced in said vector instruction, said vector elements subsequently loaded in said vector register being processed during a single iterative execution of said vector instruction, the number of elements in said group of elements loaded in said vector register being determined by the content of said second register.

d. setting and updating one pointer register for continuously identifying each of said vector elements in said vector register to be operated on by said vector instruction,

e. stopping the operation before any subsequent one of said vector element is processed, if said vector instruction is interrupted, without discarding the results obtained from the operation on each previous one of said vector elements prior to the interruption of said vector instruction,

f. reissuing said vector instruction after said vector instruction is interrupted and resuming operation on remaining onews of said vector elements identified by said pointer register, thereby starting said reissued vector instruction at the precise point of the interruption, and returning to step e if said vector instruction is interrupted again, and

g. returning to step b(ii) after completing said single iterative execution of said vector instruction and repeating the steps until said condition code is set to a predetermined value indicating that all of said vector elements have been processed by said vector instruction based on the content of said first register.

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**4,745,548**

**DECENTRALIZED BUS ARBITRATION USING DISTRIBUTED ARBITERS HAVING CIRCUITRY FOR LATCHING LOCKOUT SIGNALS GATED FROM HIGHER PRIORITY ARBITERS**

**Donald E. Blahut, Holmdel, N.J., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.**

**Continuation-in-part of Ser. No. 581,258, Feb. 17, 1984, abandoned. This application Jan. 23, 1987, Ser. No. 9,634**
**Int. Cl.[4] G06F** *13/00, 13/18, 13/26, 13/36*
**U.S. Cl. 364—200** **19 Claims**

1. Apparatus comprising:

a plurality of component circuits, each of said circuits being coupled to a signal conduit path and selectively needing to transmit information onto the signal conduit path, and each of said component circuits being integrated in a separate semiconductor chip;

a plurality of arbitration conduit paths;

a carrier, each of the chips being coupled thereto or being a part thereof, a body portion of the carrier and a body portion of at least some of the chips being essentially of the same semiconductor material;

each of the component circuits assigned a priority with respect to transmission of information onto the signal conduit path;

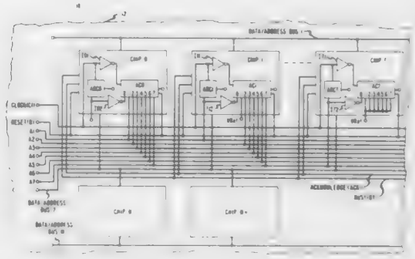
each of the component circuits, except for possible the component circuit having the lowest priority, including a separate one of a plurality of arbitration request circuits;

each arbitration request circuit coupled to a separate one of a plurality of arbitration conduit paths for selectively enabling a signal from its component circuit to reach the signal conduit path coupled thereto;

each of the component circuits, except for possibly the component circuit having a highest priority, including a separate one of a plurality of arbitration resolution circuits;

each arbitration resolution circuit coupled to at least one of the arbitration conduit paths to detect whether any of the other component circuits having a higher priority is requesting access to the signal conduit path and to enable its component circuit to gain access to the signal conduit path if its component circuit is requesting access to the signal conduit path and if its component circuit has a higher priority than any other component circuit which is requesting such access;

a clock conduit path which is coupled to each of the component circuits;



each arbitration request circuit comprising a first transmission gate element having a control terminal which is coupled to the clock conduit path and having first and second output terminals which are separately coupled respectively to a portion of the component circuit which determines if the component circuit desires access to the signal conduit path and, except for possibly the one such transmission gate element in the component circuit of lowest priority, to a separate one of the arbitration conduit paths;

each arbitration resolution circuit including a separate binary logic gate, or the equivalent thereof, which has a number of input terminals equal to at least the number of component circuits of higher priority;

each of the input terminals of the logic gate coupled to a separate one of the arbitration conduit paths or to a node which is connected to a potential level; and

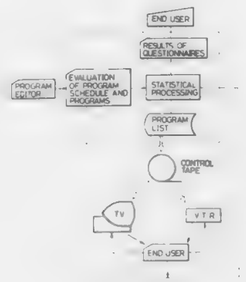
each arbitration resolution circuit further including a latch circuit element and a second transmission gate element having a control terminal which is coupled through an inverter to the clock conduit path and having first and second output terminals which are separately coupled respectively to an output terminal of the logic gate and to an input terminal of the latch circuit element.

**4,745,549**

## METHOD OF AND APPARATUS FOR OPTIMAL SCHEDULING OF TELEVISION PROGRAMMING TO MAXIMIZE CUSTOMER SATISFACTION

**Kazuo Hashimoto, Tokyo, Japan, assignor to Hashimoto Corporation, Tokyo, Japan**

**Filed Jun. 6, 1986, Ser. No. 871,549**
**Claims priority, application Japan, Jun. 11, 1985, 60-126432**
**Int. Cl.[4] G06F** *15/46;* **H04N** *7/02, 7/10*
**U.S. Cl. 364—402** **3 Claims**




1. An apparatus for providing an individual television program table wherein television channels and corresponding time intervals are listed for each individual, comprising;

record reading means for reading subscriber taste data obtained from a questionnaire and in response developing subscriber taste data signals;

means for evaluating television programs in accordance with predetermined criteria to obtain program evaluation data;

linear programming means responsive to said subscriber taste data signals and said program evaluation data for generating optimal program list data;

printer means for printing from said optimal program list data a program list on a recording medium;

feedback means for inputting complaints on the program list from a subscriber and, in response, modifying said program evaluation data to improve prediction reliability of a subsequent program list to be printed by said printer; and

setting means for setting a television or video cassette recorder in accordance with the program list.

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**4,745,550**

## PROCESSING OF ORIENTED PATTERNS

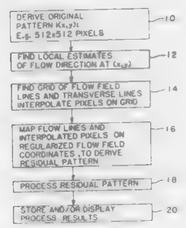
**Andrew P. Witkin, Half Moon Bay, and Michael H. Kass, San Francisco, both of Calif., assignors to Schlumberger Technology Corporation, Palo Alto, Calif.**

**Filed Aug. 16, 1985, Ser. No. 766,639**
**Int. Cl.[4] G01V** *1/00;* **G06K** *9/46*
**U.S. Cl. 364—422** **38 Claims**

1. A method of processing an oriented pattern comprising the steps of:

finding local estimates of flow direction in the pattern;

deriving a flow field based on said local estimates of flow direction; and







extracting useful features of the pattern by utilizing said flow field.

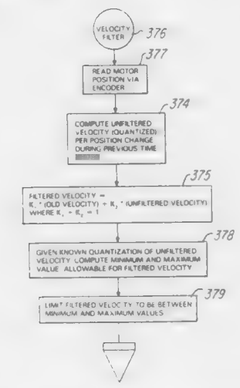
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**4,745,551**

## SOFTWARE SERVO VELOCITY FILTER WITH BOUNDED OUTPUT

**Martin A. Wand, Garland, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Aug. 30, 1985, Ser. No. 771,443**
**Int. Cl.[4] G06F** *15/50*
**U.S. Cl. 364—424** **10 Claims**




1. A controllable mobile apparatus for traveling to a commanded destination comprising:

guidance means for providing velocity and direction commands to the controllable mobile apparatus for guiding the controllable mobile apparatus to the commanded destination;

servo means for moving the controllable mobile apparatus to the commanded destination in response to velocity and direction commands from the guidance means;

position means for determining a dead reckoning position of the controllable mobile apparatus and to provide the dead reckoning position to the guidance means from which the guidance means derives the velocity and direction commands;

filter means for filtering the velocity and direction commands prior to application to the servo means, to prevent too rapid a change in the commanded velocity and direction;

speed means for measuring the rate of change of the position data and of the direction data to obtain an unfiltered velocity thereby;

measuring means for measuring rate of change of the absolute position to obtain an old velocity thereby; and

wherein the filter means comprises summation means for obtaining the sum of the product of a first constant times the old velocity, plus the product of a second constant times the unfiltered velocity, wherein the first constant is predetermined and the sum of the first constant plus the second constant is equal to one.



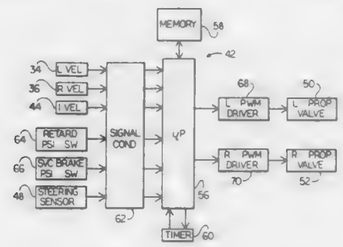
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**4,745,552**

## ANTI-SPIN CONTROL APPARATUS AND METHOD

**Weldon L. Phelps, Dunlap; Alan L. Stahl, Peoria, and Giles K. Sorrells, Dunlap, all of Ill., assignors to Caterpillar Inc., Peoria, Ill.**

**Filed Mar. 31, 1986, Ser. No. 846,314**
**Int. Cl.[4] B60T** *8/34*
**U.S. Cl. 364—426** **9 Claims**




4. An anti-spin apparatus for controlling the power delivered through a differential mechanism to at least two wheels of a vehicle, comprising:

circuit means for producing a slip signal having a value responsive to the difference in rotational velocity between said wheels caused by a particular working condition, defining first and second pluralities of slip signal value bands, each of said slip signal value bands being associated with a respective predetermined range of slip signal values, repeatedly comparing said produced slip signal value to each of said first and second pluralities of slip signal value bands, and producing first and second incrementally variable brake control signals in response to the respective slip signal value bands that correspond to the produced slip signal;

first and second brake mechanisms, each associated with a respective one of said wheels and each having an engageable friction portion movable between a brake released position, a brake pre-engaged position, and a range of brake engaged positions;

first proportionally controllable valve means for receiving said first brake control signal and responsively controllably moving said respective brake engageable friction portion from said brake released position to said brake pre-engaged position; and

second proportionally controllable valve means for receiving said second brake control signal and responsively controllably moving said respective brake engageable friction portion from said brake released position to said brake engaged position.

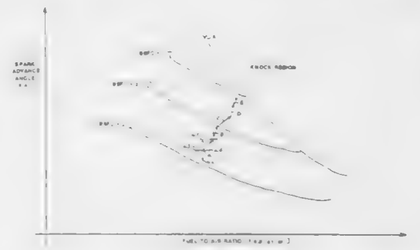
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**4,745,553**

## METHOD AND APPARATUS FOR OPTIMIZING THE OPERATION CHARACTERISTICS OF AN ENGINE

**Elizabeth A. Raven; Henry P. Tyler, both of South Bend, Ind., and Francis G. Sollman, Jacksonville, Fla., assignors to Allied Corporation, Morristown, N.J.**

**Filed Dec. 24, 1984, Ser. No. 685,626**
**Int. Cl.[4] F02D** *37/00*
**U.S. Cl. 364—431.05** **15 Claims**



1. A method of minimizing at least one of a plurality of engine variables derived from engine sensors operatively connected with the engine by selectively controlling at least two engine effectors, said method comprising the steps of:

(a) detecting the engine variables and controlling the engine effecters so as to place the engine in an initial operating condition such that the engine variables are within predetermined initial ranges;

(b) (1) controlling the engine effecters so as to place the engine in an optimum operating condition such that one of the plurality of engine variables is minimized and all of the engine variables are within predetermined operating limits, (2) determining the sensitivity of each engine variable to a movement of each effector by calculating the amount of change of each engine variable as a function of a change of each effector, (3) determining the magnitude and direction that each effector can be moved as a function of the sensitivity of each variable so as to minimize the fuel consumption variable, and moving each effector in accordance with said determination, (4) repeating steps (2) and (3) until no further minimization of the fuel consumption variable can be obtained;

(c) reading the engine variables and checking if any of the engine variables have moved greater than a predetermined amount after the engine has been placed in its optimum operating condition; and

(d) controlling the engine effecters so as to place the engine in a new optimum operating condition if step (c) is affirmative.

14. An electronic control system for optimizing the operating characteristics of an engine, comprising:

(a) engine variable detecting means for detecting a plurality of engine variables;

(b) engine effector control means for selectively controlling a plurality of engine effectors in response to effector control signals;

(c) computer means operably connected with said engine variable detecting means and said engine effector control means for storing predetermined operating limits of the engine variables, for determining the sensitivity of each engine variable to a change in each engine effector, for determining the magnitude and direction that the engine effectors can be moved, without violating any predetermined operating limits of the engine variables, so as to optimize at least one of said engine variables, and for

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providing effector control signals to said engine effector control means for moving said engine effectors.

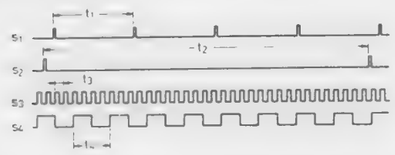
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**4,745,554**

## METHOD OF DETECTING THE NUMBER OF REVOLUTIONS OF INTERNAL COMBUSTION ENGINE

**Kikuo Tomozawa; Hayato Yasui, both of Tokyo; Akihiro Yamato, and Yutaka Otobe, both of Shiki, all of Japan, assignors to Oki Electric Industry Co., Ltd. and Honda Giken Kogyo Kabushiki Kaisha, both of Tokyo, Japan**

**Continuation of Ser. No. 541,204, Oct. 12, 1983, abandoned.**
**This application Mar. 21, 1986, Ser. No. 842,760**
**Claims priority, application Japan, Oct. 12, 1982, 57-179360**
**Int. Cl.[4] G05B** *15/00*
**U.S. Cl. 364—431.07** **2 Claims**



1. A method of detecting the number of revolutions of an internal combustion engine by using a first signal which is produced when each piston reaches the top dead center and a second signal which is produced when a predetermined cylinder reaches a predetermined time point of its cylinder cycle, and a first clock signal having a period sufficiently smaller than the shortest period of said first signal, said method comprising producing a second clock signal when said first signal is not detected, and the number of revolutions of the internal combustion engine is detected by using said second signal and said second clock signal, said second clock signal having a period such that the ratio of the period of said second clock signal to the period of said first clock signal is the same as the ratio of the period of said second signal to the period of said first signal in rotation of the internal combustion engine, said number of revolutions being obtained by an arithmetic operation which is performed on the basis of said first signal and said first clock signal, and if said first signal is not detected, on the basis of said second signal and said second clock signal, by means of a processing circuit including a central processing unit (CPU), said second clock signal being an output from a terminal which outputs said first clock signal.

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**4,745,555**

## METHOD AND APPARATUS FOR INVENTORY CONTROL TO OPTIMIZE USAGE OF COLORED FABRIC

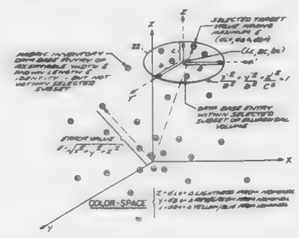
**Roland L. Connelly; Robert F. Willis; Jeremy D. Phelan, all of Greensboro, and Kathleen A. Nealen, Kernersville, all of N.C., assignors to Burlington Industries, Inc., Greensboro, N.C.**

**Continuation of Ser. No. 773,216, Sep. 6, 1985, Pat. No. 4,688,178. This application May 26, 1987, Ser. No. 54,205**
**Int. Cl.[4] G01N** *21/25;* **G01J** *3/50*
**U.S. Cl. 364—470** **8 Claims**

1. A method for selecting, from an inventory, a subset of colored fabric pieces which may be used together, each potentially acceptable fabric piece in inventory having plural color parameters associated therewith which deviate to varying degrees from predetermined nominal values, said method comprising the steps of:

defining a sub-volume of predetermined shape and size corresponding to acceptable deviations for such parameters within a defined color space in which all values of said color parameters reside;

moving said sub-volume to different locations of said sub-volume within said color space to encompass color parameter values associated with corresponding subsets of said fabric pieces, which encompassed values substantially deviate from the corresponding nominal values located at the center of said color space but which encompassed values are nevertheless sufficiently close to each other as to be commonly usable; and



recording the identity of the fabric pieces having said encompassed color parameter values for the one location of said sub-volume as a selected subset.

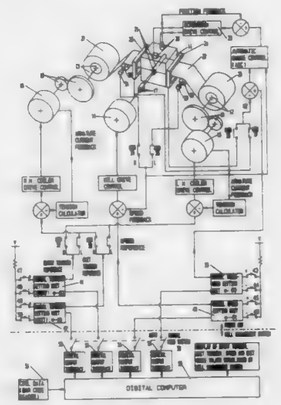
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**4,745,556**

## ROLLING MILL MANAGEMENT SYSTEM

**John W. Turley, Oxford, Conn., assignor to T. Sendzimir, Inc., Waterbury, Conn.**

**Filed Jul. 1, 1986, Ser. No. 880,801**
**Int. Cl.[4] G06F** *15/46;* **B21B** *37/00*
**U.S. Cl. 364—472** **8 Claims**



1. A method of optimizing the operation of a rolling mill having a mill structure, a pair of work rolls rotatably supported in the mill structure for reducing the dimensions of a workpiece being rolled, means for varying the separation force between the work rolls, drive means for rotating the work rolls, and control means for controlling the operation of the rolling mill, said method comprising the steps of:

(a) storing, in the control means, values representative of the separation force capacity of the mill structure for the work rolls, and values representative of the drive torque capacity of the drive means;

(b) storing, in the control means, values representative of properties of the material from which the workpiece to be rolled is to be formed;

(c) storing, in the control means, values representative of the dimensions of the workpiece to be rolled and the desired dimensions to be produced by the rolling mill;

(d) storing, in the control means, values representative of the maximum permissible pass reduction for first pass, intermediate passes and final pass of the workpiece through the work rolls;



(e) using the values stored in the control means to calculate a pass reduction schedule to reduce the workpiece to the desired dimensions by multiple passes through the work rolls, and for each pass making an iterative calculation to determine the minimum workpiece dimension the mill can achieve as limited by the separating force capacity of the mill structure, the drive torque capacity of the drive means, the skidding of the rolls relative to the workpiece material, the maximum permissible pass reduction, and the desired workpiece dimension; and

(f) using the calculated pass schedule to operate the control means to optimize operation of the rolling mill by controlling the separating force between the working rolls and the speed of the drive means.

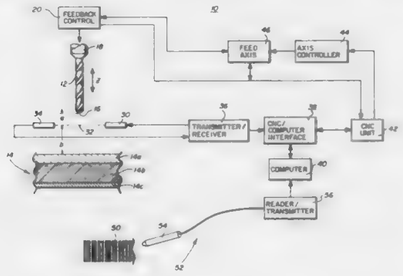
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**4,745,557**

## MACHINE TOOL CONTROL SYSTEM

**Gary W. Pekar; Billy R. Sewell, both of Grand Prairie, and Michael Blanc, Forth Worth, all of Tex., assignors to LTV Aerospace & Defense Company, Dallas, Tex.**

**Filed Feb. 13, 1986, Ser. No. 828,919**
**Int. Cl.[4] G06F** *15/46*
**U.S. Cl. 364—474** **9 Claims**



1. An adaptive control system for a drill for drilling through a multi-ply work piece wherein each ply has a variable thickness and hardness comprising:

means for storing drilling information including the thickness and hardness for each of the materials in the work piece;

means for generating control signals based upon said stored drilling information; and

means for receiving said control signals and for continuously controlling a translational velocity and rotational velocity of the drill as the drill passes through the work piece in response to said control signals, such that the translational velocity and rotational velocity are selectively adjusted based upon the type of material within each ply of the multi-ply work piece as the drill passes through the work piece.

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**4,745,558**

## ISLAND CUTTING METHOD

**Hajimu Kishi; Masaki Seki, and Takashi Takegahara, all of Tokyo, Japan, assignors to Fanuc Ltd., Minamitsuru, Japan**

**PCT No. PCT/JP84/00593, § 371 Date Aug. 13, 1985, § 102(e) Date Aug. 13, 1985, PCT Pub. No. WO85/02573, PCT Pub. Date Jun. 20, 1985**
**PCT Filed Dec. 14, 1984, Ser. No. 767,265**
**Claims priority, application Japan, Dec. 14, 1983, 58-235462**
**Int. Cl.[4] G05B** *9/00*
**U.S. Cl. 364—474** **8 Claims**

1. An area cutting method for cutting an area delimited by a curve of an external shape and at least two closed curves which lie within said curve of the external shape, comprising the steps of:

moving a tool relative to a workpiece along a first cutting path to perform cutting;

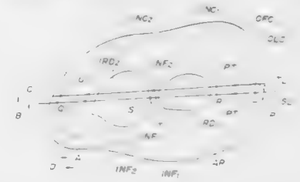
moving the tool to a machining starting point on a second cutting path, which is shifted from said first cutting path by a predetermined amoount, after the completion of cutting along said first cutting path;

moving the tool relative to the workpiece along the second cutting path to peform cutting;

calculating first and second offset curves obtained by outwardly offsetting respective closed curves by an amount dependent upon tool diameter;

moving the tool, while the tool performs cutting, along the second cutting path to a first point of intersection $R_i$ of two points of intersection between said second cutting path and the first offset curve;

checking, after cutting said first cutting path, before moving the tool, without the tool performing cutting, to that point



of intersection $U_i$ of two points of intersection $T_i$ and $U_i$ between the second offset curve and the second cutting path which does not lie inside the first offset curve, whether a second point of intersection $S_i$ lies between the two points of intersection $T_i$ and $U_i$ between the second cutting path and the second offset curve to determine whether said second point of intersection lies inside the second offset curve;

moving the tool, without the tool performing cutting, to that point of intersection $U_i$ of two points of intersection $T_i$ and $U_i$ between the second offset curve and the second cutting path which does not lie inside the first offset curve when said second point of intersection $S_i$ between said first offset curve and the second cutting path lies inside the second offset curve; and

moving the tool, while the tool performs cutting, along the second cutting path from said point of intersection $U_i$ to a machining end point on the cutting path.

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**4,745,559**

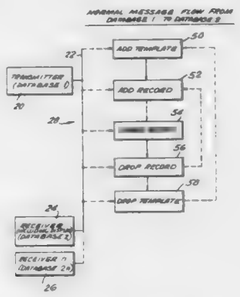
## METHOD AND SYSTEM FOR DYNAMICALLY CONTROLLING THE CONTENT OF A LOCAL RECEIVER DATA BASE FROM A TRANSMITTED DATA BASE IN AN INFORMATION RETRIEVAL COMMUNICATION NETWORK

**Richard A. Willis, West Clandon; Alan Markham, Radlett, both of United Kingdom, and Robert S. Genshaft, Plainview, N.Y., assignors to Reuters Limited, London, England**

**Filed Dec. 27, 1985, Ser. No. 813,703**
**Int. Cl.[4] G06K** *15/00;* **G06F** *15/20*
**U.S. Cl. 364—514** **60 Claims**

15. In an information retrieval communication system comprising a message transmitter means for dynamically providing data base messages, message receiver means for receiving said dynamically provided data base messages, and a message distribution network operatively connected between said message transmitter means and said message receiver means for distributing said data base messages from said message transmitter means to said message receiver means, said message transmitter means comprising data base storage means for remotely dynamically storing said data base messages in a transmitter data base, and said message receiver means comprising local data base storage means for storing a local receiver data base, the improvement comprising means for transmitting a plurality of

said data base messages as self contained integral records, said self contained integral records comprising an information content, said message transmitter means comprising said self contained integral record transmitting means; and means for local retrievably integrally storing each of said transmitted integral records in said local data base storage means for providing said local receiver data base, said message receiver means comprising said integral record storage means, said integral record storage means comprising a plurality of different storage template means defining a different unique logical data structure for said records in said local receiver data base storage means, at least one of said storage template means being corresponding to a plurality of said stored records in said




local receiver data base storage means, each of said stored records in said local receiver data base storage means having a corresponding storage template means, each of said transmitted self contained integral records comprising a storage template means identifier corresponding to a given one of said storage template means, said message receiver means further comprising means for retrieving said storage template means corresponding to said transmitted storage template means identifier, each of said storage template means comprising means for uniquely deciphering a transmitted self contained integral record for enabling complete processing thereof by said message receiver means based on said retrieved storage template means; whereby a communication network dynamic local data base management system is provided.

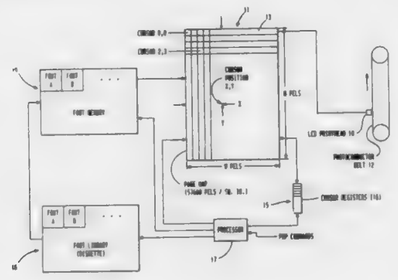
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**4,745,560**

**METHOD OF CONTROLLING A BIT-IMAGE PRINTER**

**John W. Decker, Lyons, Colo.; James C. King, San Jose, Calif.; Ray A. Larner, and Jeffrey B. Lotspiech, both of Boulder, Colo., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Oct. 15, 1985, Ser. No. 787,297**
**Int. Cl.[4] G06F** *15/66*
**U.S. Cl. 364—519** **14 Claims**



1. A method of printing on a sheet having top, bottom, left and right edges, and having a right edge to left edge width dimension (W), and a top edge to bottom edge height dimension (H), the sheet containing W-times-H individually printable areas (PELS) which may be either printed in a color or left uncolored, using an all-pels-addressable (APA) printer, and the printer feeding the sheet through a print station with the sheet's top edge as the leading edge, comprising:

providing a page memory having at least W-times-H PEL memory locations, and a cursor which is movable within said page memory, the cursor's position being identified by W and H dimensions within said page memory, and the cursor's position identifying an individual PEL area on said sheet and a corresponding PEL memory location is said page memory, the binary number content of said page memory location determining whether the corresponding sheet PEL area will be colored or left uncolored;

providing a source of print fonts, each font having a unique font identifying number, and each font comprising a plurality of characters, each character being defined by h parallel raster scan lines, each raster scan line being w PELs long, and each individual PEL containing a binary bit, the multiplicity of binary bits in the multiplicity of raster lines defining the character, the character also having

(a) a unique character identifying number,

(b) a rectangular character box of h-times-w PEL areas, said character box having h raster scan lines, each of w-PEL length, and containing within said character box the binary content of the raster scan lines defining the character's image,

(c) an L/T number defining the number of PELS which exist between the left edge of its character box and the location of the starting cursor position for the character,

(d) and R/B number defining the number of PELS which exist between the right edge of its character box and the location of the ending cursor position for the character, and

(e) a cursor line (CL) offset number defining the number of PELS which exist between the top edge of its character box and the location of a cursor line which connects the character's staring cursor position and its ending cursor position,

composing a page to be printed by defining a font whose characters may be loaded into page memory to compose a page image,

loading selected characters from said font into said page memory in accordance with the character's L/T, R/B and CL numbers, whereupon each ending cursor position for a character becomes the starting cursor position for the next character, and the cursor lines of all characters are aligned to define scan lines within said page memory; and

scanning the memory locations of said page memory, while applying the resulting binary content of each of said memory locations to said print station, as said printer prints corresponding PEL areas of said sheet.

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**4,745,561**

**CHARACTER FONT PATTERN EDITING SYSTEM FOR MODIFICATION OF FONT PATTERNS**

**Toshio Hirosawa, Machida; Tetsuzou Uehara, Hinode; Tutomu Itoh, Hachiouji; Junichi Kurihara, Hachiouji, and Motohide Kokunishi, Hachiouji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Dec. 27, 1984, Ser. No. 686,659**
**Claims priority, application Japan, Dec. 28, 1983, 58-246276**
**Int. Cl.[4] B41B** *19/00*
**U.S. Cl. 364—523** **10 Claims**

1. The interactive character font pattern creation, editing and composition control device comprising:

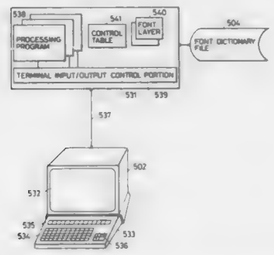
a file device for storing a font pattern;

a main storage;

a display screen;

operator-operable means for inputting a transfer command for effecting transfer of a font pattern between the file device and the main storage and a command for applying predetermined processings to the font pattern transferred to the main storage;

processor means for controlling the file device and the main storage to effect transfer of the font pattern from the file device to the main storage according to the transfer command and to effect said predetermined processings on the font pattern in response to the command for applying predetermined processings as inputted from the operator-operable means, and including means for controlling the displaying of one processed result of the processings on the display screen so as to enable an operator to indicate




and execute a next predetermined processing by observing the result of a previous processing displayed on the display screen, including dot deletion and dot addition operations to effect modification of the dot pattern by operator interactive control, wherein a first font pattern storage and a second font pattern storage are provided in the main storage, said processor means comprising means for storing the font patterns read out of the file device alternately in the first font pattern storage and the second font pattern storage, thereby enabling a terminal operator to restore and display a processed result of one precedent command on the dispaly screen.

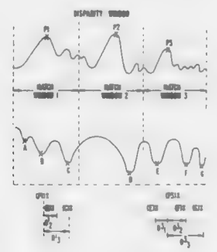
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**4,745,562**

**SIGNAL PROCESSING DISPARITY RESOLUTION**

**Kvetoslav F. Prazdny, Palo Alto, Calif., assignor to Schlumberger, Limited, New York, N.Y.**

**Filed Aug. 16, 1985, Ser. No. 766,747**
**Int. Cl.[4] G01B** *11/04;* **B25J** *19/02*
**U.S. Cl. 364—551** **20 Claims**




1. A process for matching two related but transformed signal waveforms representative of sensor outputs in a particular application domain, said process comprising the steps of:

selecting criteria, associated with the particular application domain, for use in the determination of significant points of interest, type sets of allowable types of point matches, type match valuation, match windows, disparity windows, and disparity similarity valuation;

identifying significant points of interest in each data set;

determining positional offset information and type information for significant points of interest in each data set responsive to said criteria;

determining a match window for each significant point of interest responsive to said criteria;

locating and determining match values for all allowable matches between significant points in the two data sets, within respective match windows;

determining disparity windows for all significant points in the two data sets;

determining composite similarity values for each allowable match to a particular significant point in the first data set, responsive to the positional offset information for each allowable match to said particular point and to the positional offset information for correspondingly offset allowable matches for other significant points in the first data set, for such points within the disparity window with said particular point, responsive to the match values;

determining a best match for each said particular point within the first data set corresponding to the allowable match point in the second data set having the maximum composite similarity value for the respective particular point, responsive to the match values and the composite similarity values; and

matching the two signal waveforms responsive to the criteria and the determined best matches.

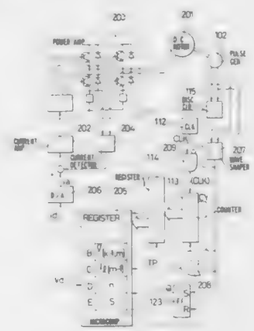
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**4,745,563**

**METHOD OF DETECTING THE SPEED OF A MOTOR**

**Yasuhiko Kaku, Kitakyushu, and Nobuhiro Kyura, Munakata, both of Japan, assignors to Yaskawa Electric Mfg. Co., Ltd., Japan**

**Filed Feb. 15, 1985, Ser. No. 702,181**
**Claims priority, application Japan, Feb. 17, 1984, 59-27237**
**Int. Cl.[4] G06F** *15/46;* **G05B** *11/14*
**U.S. Cl. 364—565** **3 Claims**




1. A method of detecting the speed of a motor, the output shaft of which is connected to a pulse generator for generating pulse signals depending on the angular displacement of the motor, the method comprising the steps of

(a) setting an initial value which is used to estimate the speed and an estimated value of the variable representing the torque disturbance both at zero,

(b) estimating the speed at the time when a sampling pulse is generated, by integrating the sum of the variable representing the motor torque and the estimated value of the variable representing the torque disturbance with the prior initial value as an initial value, each time the sampling pulse is generated, until the pulse generator generates a pulse signal,

(c) calculating the variable representing the torque disturbance when the pulse signal is generated, by using the time period between the time step (a) is executed and the time the pulse signal is generated and the estimated values of the speed calculated at step (b) between this time period,

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(d) calculating the real speed at the time when the pulse signal is generated, by compensating the speed estimated just before this time, using the amount of compensation for the torque disturbance which is the difference between the variable representing the torque disturbance and the estimated value of the variable representing the torque disturbance,

(e) replacing the initial value which is used to estimate the speed by the real speed calculated at step (d), and replacing the estimated value of the variable representing the torque disturbance by the prior variable representing the torque disturbance calculated at step (c),

(f) estimating the speed at the time when the sampling pulse is generated, by integrating the sum of the variable representing the motor torque and the estimated value of the variable representing the torque disturbance with the initial value replaced at step (e) as an initial value, each time the sampling pulse is generated, until the pulse generator generates a pulse signal,

(g) calculating the variable representing the torque disturbance when the pulse signal is generated, by using the time period between the time the preceding pulse signal is generated and the time the present pulse signal is generated and the estimated values of the speed calculated at step (f) between this time period,

(h) calculating the real speed at the time when the pulse signal is generated, by compensating the speed estimated just before this time, using the amount of compensation for the torque disturbance which is the difference between the variable representing the torque disturbance and the estimated value of the variable representing the torque disturbance,

(i) replacing the initial value which is used to estimate the speed by the real speed calculated at step (h), and replacing the estimated value of the variable representing torque disturbance by the prior variable representing the torque disturbance calculated at step (g),

(j) estimating the speed at the time when the sampling pulse is generated, by integrating the sum of the variable representing the torque disturbance with the initial value replaced at step (i) as an initial value, each time the sampling pulse is generated, until the pulse generator generates a pulse signal, and (k) repeating steps (g)–(j).

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**4,745,564**

## IMPACT DETECTION APPARATUS

**Bernard R. Tennes, Charlotte; Galen K. Brown, Okemos; Joseph R. Clemens; Henry A. Affeldt, both of East Lansing, all of Mich.; Siamak Siyami, Tehran, Iran; Brian A. Klug, Buchanan, and Hans R. Zapp, Okemos, both of Mich., assignors to Board of Trustees Operating Michigan State University**

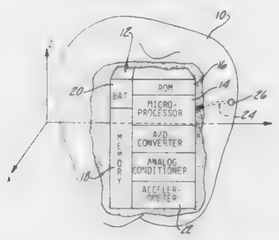
**Filed Feb. 7, 1986, Ser. No. 827,142**

**Int. Cl.[4] G01P** *15/04;* **G01D** *1/14;* **G06F** *15/74*

**U.S. Cl. 364—566** **27 Claims**

**MICROFICHE APPENDIX INCLUDED**

**(1 Microfiche, 45 Pages)**




1. The method of sensing physical variables affecting an item while it is subjected to handling operations such as packaging and shipping, and recording a portion of the time history of those sensed physical variables which meet predetermined criteria, comprising the steps of:

(A) attaching to the item a housing containing transducer means for sensing the physical variables, clock means, memory means, communication means, microprocessor means, and power supply means, operable to sense and quantify the values of the physical variables and to record the quantified sensed physical variables and their times of occurrence in the memory means under the control of a program comprising instructions to the microprocessor means, the housing being attached in a manner so that the values of the physical variables sensed by the transducer means are substantially similar to the values of the physical variables affecting the item;

(B) causing the item to be sujected to the handling operations so that the housing is subjected to the same physical variables as the item;

(C) sensing the physical variables experienced by the housing;

(D) storing intervals of the time history of the values of those sensed physical variables which meet predetermined criteria in the memory means, the intervals being of predetermined duration and beginning with the values of those sensed physical variables which first meet the predetermined criterion in each interval; and

(E) reading the stored values of the physical variables from the memory means to a device external to the housing, whereby the magnitude of, and the time and frequency content of the occurrence of the sensed physical variables, experienced while the item is being handled, can be determined after the handling operations are performed on the item.

2. An acceleration event detector/recorder that can be contained within a housing, comprising:

transducer means for sensing accelerations along at least one axis, and for producing digital signals quantifying the sensed physical quantities;

clock means for producing a digital timer signal;

memory means for storing program instructions and for storing data representing digital signals;

communication means for communicating digital information with a separate device; and

microprocessor means connected to the transducer means, the clock means, the memory means, and the communication means, and being adapted to read and execute the program instructions from the memory means, for causing the data representing both the digital signals produced by the transducer means during an interval of time of predetermined duration and the digital timer signal produced by the clock means at the beginning of the interval of time to be stored in the memory means, the interval of time beginning when at least one of the accelerations satisfies a predetermined criterion and for controlling the communication means to communicate digital information with the separate device.

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**4,745,565**

## CALIBRATION OF A FORCE SENSING TYPE OF DATA INPUT DEVICE

**Richard L. Garwin, Scarsdale, and James L. Levine, Yorktown Heights, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

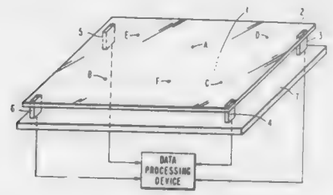
**Filed Jan. 21, 1986, Ser. No. 821,177**

**Int. Cl.[4] G08C** *21/00*

**U.S. Cl. 364—571** **3 Claims**

1. An apparatus for introducing data into a data processing device said data being indicative of the position of a localized force applied to an area member supported with respect to a reference by at least three separate force sensors, the improvement comprising:

the data processing device provides at least one correction for the force sensed by each said force sensor in service, said correction being based on the minimization of the differences between coordinates of each of a plurality of known location test forces calculated with respect to the




effect of said test forces on the equilibrium of said area member and actual coordinates of said test forces wherein said minimization is achieved mathematically through a procedure known as least squares.

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**4,745,566**

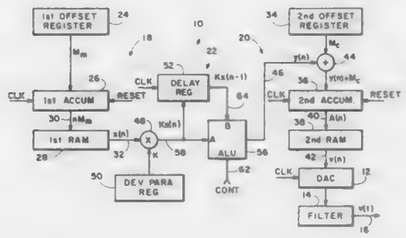
## ANGLE MODULATED WAVEFORM SYNTHESIZER

**John J. Ciardi, Aloha, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.**

**Filed Mar. 7, 1985, Ser. No. 709,154**

**Int. Cl.[4] G06F** *1/02;* **H03C** *3/00;* **H03K** *7/00*

**U.S. Cl. 364—718** **18 Claims**




1. An apparatus responsive to a modulation parameter and a carrier parameter for synthesizing an angle modulated waveform, said apparatus comprising:

first means responsive to the modulation parameter for generating a first number sequence oscillating at a frequency controlled by the modulation,

second means responsive to said first number sequence and said carrier parameter for generating a second number sequence, each number of said second number sequence being an arithmetical combination of numbers of said first number sequence and the carrier parameter, and

third means responsive to the second number sequence for generating a third number sequence, each number of said third number sequence being an accumulation of numbers of said second number sequence.

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**4,745,567**

## MOMENT GENERATOR

**Zigmantas L. Budrikis, Dalkeith, Australia, and Mehdi Hatamian, Old Bridge, N.J., assignors to American Telephone and Telegraph Company AT&T Bell Laboratories, Murray Hill, N.J.**

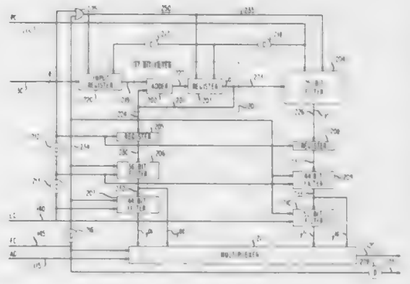
**Filed Feb. 1, 1985, Ser. No. 697,244**

**Int. Cl.[4] G06F** *7/38*

**U.S. Cl. 364—724** **20 Claims**

1. A moment generator for generating at least one moment of a sequence of inputted signals, said generator comprising:

means for generating a plurality of filtered signals from said inputted signals, each of said filtered signals being a predetermined function of individual moments of said sequence, and



means for dematrixing said filtered signals to generate said at least one moment.

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**4,745,568**

## COMPUTATIONAL METHOD AND APPARATUS FOR FINITE FIELD MULTIPLICATION

**Ivan M. Onyszchuk, 62 Dorset St. #5; Ronald C. Mullin, 533 Twin Oaks Cres., and Scott A. Vanstone, 333 Auburn Drive, all of Waterloo, Ontario, Canada**

**Filed May 30, 1985, Ser. No. 739,220**

**Int. Cl.[4] G06F** *7/52, 7/38*

**U.S. Cl. 364—754** **27 Claims**




1. A method of determining the product D of two elements B and C of the finite field $GF(2^m)$, where m is an integer greater than 1, the field having elements

$A^{2i}$ $(0 \leq i < m)$ that constitute a normal basis, comprising the steps of:

(a) representing the element B as a vector of binary digits $b_i$, where $b_i$ is the coefficient of $A^{2i}$ in the normal basis representation of B,

(b) representing the element C as a vector of binary digits $c_i$, where $c_i$ is the coefficient of $A^{2i}$ in the normal basis representation of C,

(c) representing the product D of elements B and C as a vector of binary digits $d_i$, where $d_i$ is the coefficient of $A^{2i}$ in the normal basis representation of D, each of said binary digits $d_i$ being expressed in the form of a sum of products of the binary digits $b_j$ and $c_k$, $(0 \leq j,k < m)$,

(d) storing in m successive cells of a first recirculating shift register the binary digits, $b_i$,

(e) storing in m successive cells of a second recirculating shift register the binary digits, $c_i$,

(f) selecting at least some of said products of the binary digits $b_j$ and $c_k$ $(0 \leq j,k < m)$ expressing a binary digit $d_i$ and grouping like ones of one of the binary digits $b_j$ or $c_k$ to provide grouped terms of the form

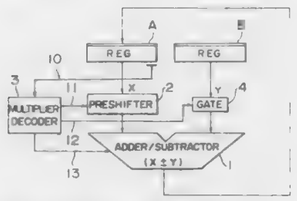
$$b_j\left(\sum_{k=0}^{m-1}\sigma_{jk}c_k\right) \text{ or } c_k\left(\sum_{j=0}^{m-1}\sigma_{jk}b_j\right),\ \sigma_{jk}\epsilon\{0,1\},$$

mod 2 mod 2

(g) associating each of said grouped terms with a different one of m accumulating cells of an accumulating recirculating shift register,
(h) establishing connections between the cells of said first and second recirculating shift registers and a first of said accumulating cells to provide a first of said grouped terms in said accumulating cell,
(i) establishing connections between the cells of said first and second recirculating shift registers and a second of said accumulating cells adjacent to said first of said accumulating cells to provide an expression equivalent to another of said grouped terms with the suffixes of the binary digits of said second grouped term increased by 1 (Modulo m),
(j) repeating step i for successive ones of the grouped terms with the increase in the suffix of each binary digit of said grouped terms accumulating by 1 (Modulo m) for each repetition whereby there is provided in each accumulating cell a grouped term of each of the m binary digits $d_i$,
(k) generating a respective grouped term in at least (m−1) of said accumulating cells,
(l) accumulating modulo 2 each generated grouped term with the previously generated grouped terms accumulated in an adjacent one of said accumulating cells wherein grouped terms of the same binary digit are accumulated in the same cell,
(m) transferring the contents of each cell of the first and second recirculating shift registers to its next cell, and
(n) repeating steps k, l and m, (m−1) times whereby after (m−1) repetitions each of said accumulating cells contains the modulo 2 sum of said selected ones of the grouped terms of a different one of the binary digits $d_i$.

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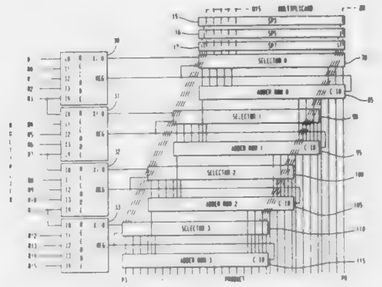
**4,745,569**
**DECIMAL MULTIPLIER DEVICE AND METHOD THEREFOR**
**Akira Yamaoka, Hadano; Kenichi Wada, Sagamihara, and Kazunori Kuriyama, Hadano, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**
**Filed Dec. 27, 1984, Ser. No. 686,692**
**Claims priority, application Japan, Dec. 28, 1983, 58-246929**
**Int. Cl.⁴ G06F** *7/52*
**U.S. Cl. 364—755** **12 Claims**




1. A decimal multiplier device comprising:
a register A for storing a multiplier;
a register B for storing a multiplicand;
a shifter for outputting the output of said register A as it is or after having shifted it, based on a first signal;
a gate for outputting the output of said register B or "0", based on a second signal;
an adder/subtractor for adding the output of said shifter and that of said gate and storing a result thus obtained in said register A; and
means for receiving a selected digit of the content of said register A having a value and controlling said gate and said shifter by generating said first signal and said second signal, based on said received value, so that the multiplicand is added n times, n corresponding to said received value, to the content of said register A or subtracted (10−n) times therefrom.

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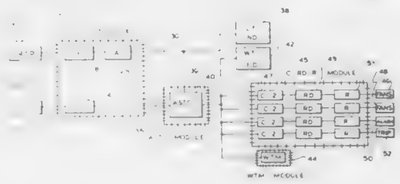
**4,745,570**
**BINARY MULTIBIT MULTIPLIER**
**Richard A. Diedrich, and Jay A. Lawrence, both of Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.**
**Filed May 27, 1986, Ser. No. 867,167**
**Int. Cl.⁴ G06F** *7/52*
**U.S. Cl. 364—760** **10 Claims**



1. A digital multiplier circuit for generating a product from multi bit inputs representing a multi bit multiplicand and a multi bit multiplier comprising:
a plurality of special product generators having inputs for receiving predetermined bits of the multiplicand to generate therefrom outputs which are multiples of said multiplicand together with sign bits for said multiples of said multiplicand,
a plurality of recoders for recoding at least more than two bits of said multiplier to generate selection signals for selecting different multiples of the multiplicand including the multiplicand itself,
a plurality of selectors each connected to receive multiples of the multiplicand including the multiplicand itself and connected to receive said selection signals from said recoders; and,
a plurality of adders connected to said selectors and the outputs of said adders being interconnected to generate the product.

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**4,745,571**
**MODULAR ELECTRONIC TEMPERATURE CONTROLLER**
**Joseph F. Foster, Fairport, N.Y., assignor to Qualitrol Corporation, Fairport, N.Y.**
**Filed Aug. 30, 1985, Ser. No. 772,133**
**Int. Cl.⁴ G01K** *17/20, 1/12;* **G06F** *15/56*
**U.S. Cl. 364—557** **11 Claims**

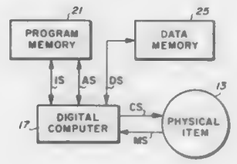


1. The method of generating a parameter representative of the temperature of a power transformer winding immersed in a fluid, comprising the steps of;
measuring the temperature of the fluid,
generating a parameter proportional to the fluid temperature measurement,
measuring the amount of current passing through the transformer winding,
generating a parameter proportional to the change of winding temperature expected to result from the measured current passing through the transformer winding by calibrating a circuit to electronically provide the proportional parameter,
providing a time constant response to the change of winding temperature parameter, and
adding the parameters representative of fluid temperature and expected change of temperature resulting from the current passing through the transformer winding, to obtain a parameter representative of the winding temperature of the power transformer.



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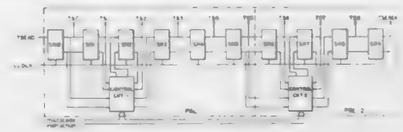
**4,745,572**
**SOFTWARE EDITING INSTRUMENT**
**Darrell L. Wilburn, Saratoga, Calif., assignor to Step Engineering, Sunnyvale, Calif.**
**Filed Nov. 4, 1985, Ser. No. 794,632**
**Int. Cl.⁴ G06F** *1/00*
**U.S. Cl. 364—900** **10 Claims**




1. An instrument for assisting an editor in editing a program in an electronic memory which includes an algorithm for controlling a physical item having momentum while the physical item is interactively operating with a microprocessor acting to control the physical item comprising:
a. a first program memory, connected to the microprocessor, containing a first set of algorithms to interactively operate the microprocessor which, in turn, controls operation of said physical item in response to monitored signals from said physical item;
b. a second program memory, connected to the microprocessor, containing a second set of algorithms to interactively operate with the microprocesor;
c. a first switch connected between the first program memory and the second program memory and the microprocessor to allow one of either the first program memory or the second program memory to interactively operate the microprocessor at a given time; and
d. detector means, connected to the first switch, which recognizes a preassigned address which is generated during execution of an algorithm in either the first program memory or the second program memory, the detector means functioning to actuate the first switch upon recognition of the preassigned address so that if the first program memory is interactively operating said microprocessor, it will be replaced with the second program memory without interrupting operative control of the microprocessor and the physical item, and if the second program memory is interactively operating said microprocessor, it will be replaced with the first program memory without interrupting operative control of the microprocessor and the physical item.

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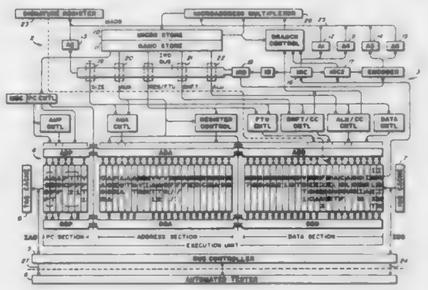
**4,745,573**
**PROGRAMMABLE CLOCK GENERATOR**
**Ronald J. Lebel, Los Angeles, Calif., assignor to Symbolics Inc., Cambridge, Mass.**
**Filed Apr. 11, 1986, Ser. No. 851,006**
**Int. Cl.⁴ G06F** *1/04*
**U.S. Cl. 364—900** **1 Claim**



1. A programmable clock generator comprising programmable logic array means including: a shift register having a plurality of register elements, each shift register element having an input for receiving a timing signal and an output for producing a timing signal during shifting and control means connected to selected ones of said inputs and outputs of the shift register elements and responsive to a code applied thereto for effecting the skipping of preselected shift register elements during shifting; and at least one JK flip-flop receptive of timing signals from the outputs of non-skipped shift register elements at the J and K inputs thereof to produce a clock signal at the output thereof having desired characteristics represented by said code.

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**4,745,574**
**MICROCODE TESTING OF PLA'S IN A DATA PROCESSOR**
**Robert W. Aaron; John Kuban; Douglas B. MacGregor, and Robert R. Thompson, all of Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.**
**Continuation of Ser. No. 660,590, Oct. 15, 1984, abandoned.**
**This application Sep. 17, 1987, Ser. No. 97,276**
**Int. Cl.⁴ G06F** *9/00*
**U.S. Cl. 364—900** **1 Claim**



1. In a microcoded data processor having:
an address port for providing addresses;
an operand port for receiving instructions and data;
an instruction register for temporarily storing each of said instructions; and
at least one PLA for decoding the instruction in the instruction register and providing a plurality of outputs in response thereto;
a method for recursively testing the PLA comprising the steps of:
accepting as an instruction operand a selected test value via the operand port;
loading said selected test value into said instruction register;
allowing said PLA to decode said selected test value as if it were one of said instructions and to provide said plurality of outputs in response thereto;

extracting a selected portion of said plurality of outputs provided by said PLA in response to the decoding of said selected test value; and

providing as if it were an instruction address said extracted portion of said plurality of outputs of said PLA via said address port;

whereby the PLA may be tested by:

(1) providing a predetermined sequence of said selected test values to said data processor via said operand port; and

(2) comparing each of said instruction addresses provided by said data processor via said address port to a selected one of a plurality of expected values; so that the PLA can be tested by using only said address and said operand ports.

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**4,745,575**

## AREA FILLING HARDWARE FOR A COLOR GRAPHICS FRAME BUFFER

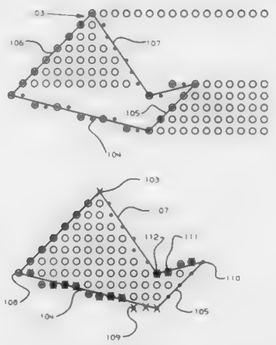
**Adrian J. Hawes, Eastleigh, United Kingdom, assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Nov. 26, 1984, Ser. No. 675,038**

**Claims priority, application European Pat. Off., Dec. 22, 1983, 83307844.7**

**Int. Cl.⁴ G09G *1/00***

**U.S. Cl. 364—900** **3 Claims**



1. A graphics display apparatus comprising a raster-scanned cathode ray tube display, a graphics processor for providing bit patterns corresponding to a desired graphics image to be displayed on said cathode ray tube, a bit-per-pel refresh buffer containing bit patterns provided by said graphics processor to refresh said cathode ray tube, an auxiliary memory for containing a bit pattern representing the outline of an area to be displayed on said cathode ray tube, and control logic responsive to said graphics processor to load a bit pattern representing the outline of the area to be displayed into said auxiliary memory and thereafter read data from said auxiliary memory to said refresh buffer while adding bits to fill said outline of said area with a desired color pattern,

said control logic including means for EXCLUSIVELY-ORing successive bits of said bit pattern read byte-by-byte from said auxiliary memory to thereby provide data representing said filled area.

**4,745,576**

## ADDRESS ASSIGNMENT SYSTEM FOR IMAGE MEMORY

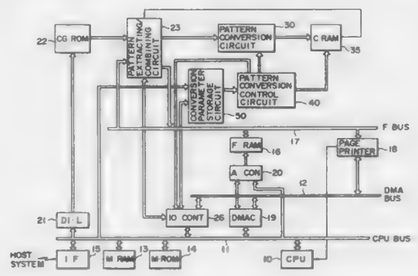
**Hirokazu Hasegawa; Hideki Kudoh, and Takashi Aoki, all of Tokyo, Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan**

**Filed Sep. 5, 1985, Ser. No. 772,951**

**Claims priority, application Japan, Sep. 17, 1984, 59-194395**

**Int. Cl.⁴ G06F *7/00***

**U.S. Cl. 364—900** **8 Claims**




1. An image memory address assignment system having a printer and operated such that a block address is accessed by upper bits of an address signal and an intrablock address is accessed by lower bits thereof, comprising:

page data memory means having a plurality of block areas for storing at least one-page data;

means for supplying a read address to said page data storage means and readout data to said printer;

means for detecting whether or not data read access of each block in said page data storage means is completed and supplying the data and a write address to completely read block areas so as to write the data therein; and

block address converting means for receiving as a block address the upper bits of the read and write addresses, converting block addresses to different block addresses, respectively, and supplying said different block addresses to said page data storage means;

read address conversion designating means, coupled to said block address converting means, for designating the conversion of the read address signals during a period in which the read out data is supplied to said printer; and

write address conversion designating means, coupled to said block address converting means, for designating the conversion of the write address signals during a period different from a period in which the read out data is supplied to said printer.

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**4,745,577**

## SEMICONDUCTOR MEMORY DEVICE WITH SHIFT REGISTERS FOR HIGH SPEED READING AND WRITING

**Junji Ogawa, and Yoshihiro Takemae, both of Tokyo, Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

**Filed Nov. 15, 1985, Ser. No. 798,284**

**Claims priority, application Japan, Nov. 20, 1984, 59-245802; Dec. 25, 1984, 59-275553**

**Int. Cl.⁴ G11C *19/00, 7/00***

**U.S. Cl. 365—78** **6 Claims**

1. A semiconductor memory device comprising:

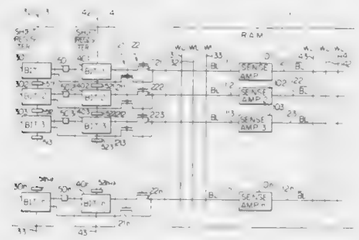
a random-access memory having a memory cell array, a plurality of bit lines, and a plurality of word lines intersecting said plurality of bit lines;

first and second shift registers, respectively, operatively connected to said plurality of bit lines;

first and second transfer gate means operatively connected between said plurality of bit lines and said first and second shift registers, respectively; and



parallel data transfer means, operatively connected between said first and second shift registers, for carrying out a



parallel data transfer between said first and second shift registers independently of said first and second transfer gate means.

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**4,745,578**

## MAGNETIC BUBBLE MEMORY DEVICE

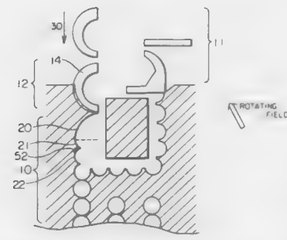
**Teruaki Takeuchi, Kokubunji; Naoki Kodama, Tachikawa; Masatoshi Takeshita, Hachioji; Takashi Toyooka, Sayama, and Ryo Suzuki, Hachioji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Aug. 21, 1986, Ser. No. 898,517**

**Claims priority, application Japan, Sep. 20, 1985, 60-206445**

**Int. Cl.⁴ G11C *19/08***

**U.S. Cl. 365—36** **6 Claims**




1. A magnetic bubble memory device comprising:

minor loop means for storing information therein and including ion-implanted magnetic bubble propagation track means formed by implanting selectively ions in a magnetic layer which can hold magnetic bubbles therein, said track means including a first bubble propagation pattern having a small period and a second bubble propagation pattern having a great period, said first and second bubble propagation patterns being connected in a straight propagation track of said track means so that a tip of the pattern unit of said first bubble propagation pattern is contiguous to a tip of the pattern unit of said second bubble propagation pattern;

major line means or major loop means for reading and writing information; and

connecting means between said minor loop means and said major line means or said major loop means.

**4,745,579**

## ELECTRICALLY ERASABLE PROGRAMMABLE LOGIC ARRAY (EEPLA)

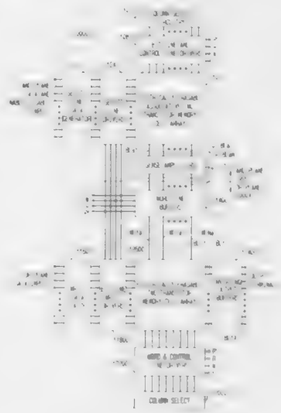
**Carver Mead, Pasadena, and Cecilia Shen, Palo Alto, both of Calif., assignors to Silicon Communications Corporation, Menlo Park, Calif.**

**PCT No. PCT/US86/00286, § 371 Date Feb. 7, 1986, § 102(e) Date Feb. 7, 1986, PCT Pub. No. WO87/04879, PCT Pub. Date Aug. 13, 1987**

**PCT Filed Feb. 7, 1986, Ser. No. 837,388**

**Int. Cl.⁴ G11C *17/00*; H03K *19/177***

**U.S. Cl. 365—104** **23 Claims**



23. An array of rows and columns of devices characterized in that:

each device comprises upper and lower memory cells which are programmable and electrically erasable and have a control terminal and an input/output terminal and are adapted to store electrical charge;

a plurality of pairs of select lines, a first and a second select line of a separate pair of the select lines being coupled to the control terminals of all of the upper and lower memory cells, respectively, of a separate row of devices;

a plurality of bit lines with a separate one of the bit lines being coupled to the output terminals of the memory cells of the devices of a separate one of the columns of devices; and

select line means coupled to the select lines for selectively causing one of the select lines of a pair of select lines to be selectively coupled to a first potential which facilitates the read out of information stored in memory cells and selectively causes the other select line of the pair of select lines to be coupled to a second potential level which acts to inhibit the read out of information from the memory cells, the select line means being adapted to selectively allow one select line of one or more pairs of select lines to be set to the first potential level during a common time period, and the select line means being further adapted to selectively allow both select lines of one or more pairs of select lines to be coupled to the second potential during a common time period.

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**4,745,580**

## VARIABLE CLAMPED MEMORY CELL

**Samir M. Laymoun, 655 Princeton Dr., Sunnyvale, Calif. 94087, and Roger V. Rufford, 1415 Roosevelt Ave., Redwood City, Calif. 95061**

**Filed Jun. 9, 1986, Ser. No. 872,292**

**Int. Cl.⁴ G11C *11/34***

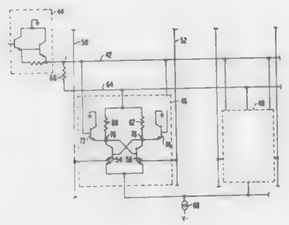
**U.S. Cl. 365—179** **13 Claims**

1. In a memory circuit having a plurality of memory cells,

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each memory cell having a pair of transistors, a collector of a first transistor being coupled to a base of a second transistor and a collector of said second transistor being coupled to a base of said first transistor, each of said first and second transistors having an emitter coupled to a different bit line, a first load resistor coupling said collector of said first transistor to a word line and a second load resistor coupling said collector of said second transistor to said word line, said word line being part of a word line circuit including a word line driver, the improvement comprising:



first means for limiting a voltage between a first node in said word line circuit and said collector of a substantially conducting one of said first and second transistors to a first level; and

second means for limiting a voltage between said first node and said collector of a substantially nonconducting one of said frist and second transistors to a second level lower than said first level.

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**4,745,581**

**LSI SYSTEM OF A STRUCTURE REQUIRING NO ADDITIONAL ADDRESS SIGNALS TO INCORPORATE ADDITIONAL STATUS REGISTERS INTO THE SYSTEM**

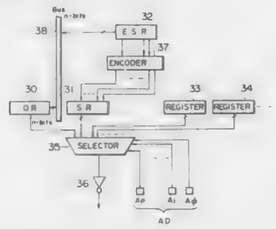
**Tomoru Sato, Kodaira; Kenji Kaneko, Sagamihara; Hirotada Ueda, Kokubunji; Yoshimune Hagiwara, Hachioji; Hitoshi Matsushima, Tachikawa; Tetsuya Nakagawa, Kokubunji, and Atsushi Kiuchi, Kunitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Apr. 25, 1986, Ser. No. 855,928**

**Claims priority, application Japan, Apr. 26, 1985, 60-88535**

**Int. Cl.[4] G11C** *13/00, 11/40*

**U.S. Cl. 365—189** **3 Claims**




1. An LSI system comprising:

first register means for storing first internal status information of said LSI system;

second register means for storing second internal status information of said LSI system as a predetermined number of bits;

output register means coupled to said second register means through a bus means, for storing said second internal status information;

selector means for transmitting the internal status information stored in one of said first register means and said output register means to an output buffer in response to an address signal; and

encoder means for compressing the predetermined number of bits of said second internal status information stored in said second register means and for transmitting the compressed bit information to said first register means.

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**4,745,582**

**BIPOLAR-TRANSISTOR TYPE RANDOM ACCESS MEMORY DEVICE HAVING REDUNDANCY CONFIGURATION**

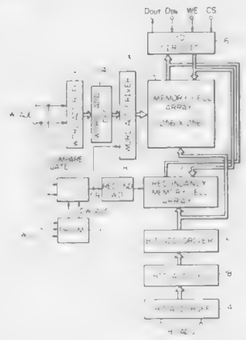
**Isao Fukushi, Tokyo, and Tomoharu Awaya, Yokohama, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

**Filed Oct. 17, 1985, Ser. No. 788,458**

**Claims priority, application Japan, Oct. 19, 1984, 59-218707; Nov. 14, 1984, 59-238580**

**Int. Cl.[4] G11C** *13/00*

**U.S. Cl. 365—200** **3 Claims**




1. An emitter-coupled-logic type random access memory device comprising:

a memory cell array including a plurality of memory cells and a plurality of address lines, each of said memory cells formed by an emitter-coupled-logic (ECL) flip-flop;

a redundancy memory cell array including a plurality of memory cells and a plurality of redundancy address lines, each of said memory cells formed by an ECL flip-flop;

address signal input terminals for receiving address signals;

means, connected to said address signal input terminals, for receiving said address signals and including first ECL gate circuits outputting signals, each having:

a first transistor having a base for receiving a bit of said address signals and having an emitter;

a second transistor having an emitter coupled to said emitter of said first transistor; and

first amplifying transistors for receiving the output signals from said first ECL gate circuits and amplifying the output signals;

means, operatively connected to said address signal receiving means, and including second ECL gate circuits, each having:

a plurality of third transistors connected to receive the output signals from said first amplifying transistors and having an emitter;

a fourth transistor having an emitter coupled to said emitters of said third transistors; and

drive transistors, connected to said address lines for driving said address lines in response to output signals from said second ECL gate circuits, for selecting a memory cell in said memory cell array in response to said address signals from said address signal receiving means;

means for storing one or more defective memory address signals of one or more defective memory cells in said memory cell array;

means, operatively connected to said defective memory address storing means and including third ECL gate circuits, each having:

a fifth transistor having a base connected to receive said address signals;

a sixth transistor for receiving said defective memory address signals and comparing said address signals and said defective memory address signals; and

second amplifying transistor circuits connected to said fifth and sixth transistors, respectively, each having two amplifying transistors having emitters connected at a common node and having bases for receiving output signals from said fifth and sixth transistors, respectively, and amplifying the same, for receiving said address signals independently of said address signal receiving means and for receiving one or more defective memory address signals from said defective address storing means and comparing said address signals with said defective memory address signals; and

means, operatively connected to said address signal receiving and comparing means and including fourth ECL gate circuits, each having:

a second transistor having a base connected to said node of said two amplifying transistors in said second amplifying transistor circuits for receiving a signal therefrom and having an emitter;

an eighth transistor having an emitter coupled to said emitter of said seventh transistor; and

redundancy drive transistors, connected to said redundancy address lines, for driving respective redundancy address lines in response to output signals from said fourth ECL gate circuits, for selecting one of said memory cells in said redundancy memory cell array corresponding to one of said defective memory cells in said memory cell array,

said memory cell selecting means, operatively connected to said node of said two amplifying transistors, being energized when said address signal does not coincide with said defective memory address signal, said redundancy memory cell selecting means not being energized when said address signal coincides with said defective memory address signal.



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**4,745,584**

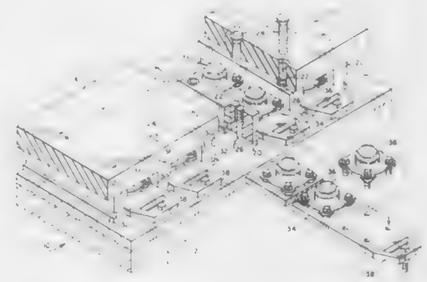
**SONAR TRANSDUCER ARRAY**

**James K. Andersen, Arnold, Md., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Sep. 29, 1986, Ser. No. 912,856**

**Int. Cl.[4] H04R** *00/00*

**U.S. Cl. 367—153** **18 Claims**



1. A transducer array comprising:

(A) backing means;

(B) a plurality of elongated adjacent rail members disposed on said backing means, each including a top and sidewall portions;

(C) a plurality of stave members each carrying a plurality of transducer elements;

(D) said sidewall portions of adjacent rail members including means for holding a said stave member in sliding engagement for easy removal of said stave member and its associated transducer elements.

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**4,745,585**

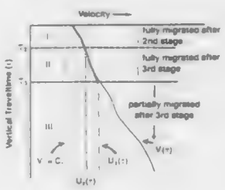
**METHOD OF MIGRATING SEISMIC DATA**

**Kenneth L. Larner, Houston, Tex., assignor to Western Atlas International, Inc., Houston, Tex.**

**Filed Apr. 3, 1986, Ser. No. 847,950**

**Int. Cl.[4] G01V** *1/36*

**U.S. Cl. 367—50** **5 Claims**




1. A method for migrating seismic data, comprising the steps of:

generating a depth-variable velocity function from seismic data samples of a body of seismic data arranged in an array of seismic-wave travel times as a function of spatial distribution, said depth-variable velocity function being limited by a maximum velocity observed at a greatest travel time of interest;

calculating a minor velocity fraction from said maximum velocity, said minor velocity fraction being a function of the maximum velocity and a number of migration stages contemplated;

partially migrating, by use of automatic data processing means, the data samples of said body of seismic data during each one of a succession of a plurality of migration stages, during each stage, applying said minor velocity fraction as a constant;

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**4,745,583**

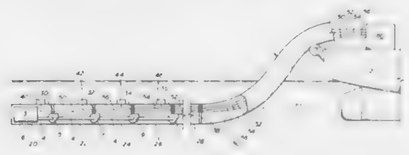
**MARINE CABLE SYSTEM WITH AUTOMATIC BUOYANCY CONTROL**

**Gary W. Motal, Houston, Tex., assignor to Exxon Production Research Company, Houston, Tex.**

**Filed Dec. 18, 1986, Ser. No. 943,091**

**Int. Cl.[4] G01V** *1/38*

**U.S. Cl. 367—18** **5 Claims**



1. A marine cable system, including:

(a) a cable having an outer skin impervious to fluid flow and enclosing at least two elongated cable sections that are connected end-to-end, each section including an elongated bladder whose volume varies in response to variations in the amount of fluid within the bladder in such a manner that the density of each section may be controlled by varying the amount of fluid in the bladder; and

(b) a pump disposed between each two adjacent sections, each said pump being capable of transferring fluid between the bladders in the adjacent sections in response to control signals.

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defining a jth-order effective migration velocity from a succession of j-migration stages;
applying said depth-variable velocity function as a migration velocity for all data samples that were not fully migrated during a (j−1)th migration stage, wherein the jth-order effective migration velocity is greater than the depth-variable velocity function; and
displaying the fully migrated data samples.

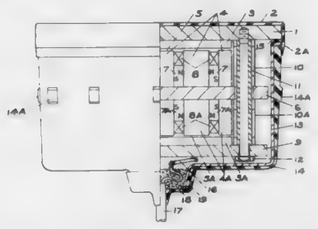
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**4,745,586**

## ELECTROMAGNETIC TRANSDUCERS FOR UNDERWATER LOW-FREQUENCY HIGH-POWER USE

**Frank Massa, Cohasset, Mass., assignor to Fred M. Dellorfano, Jr. and Donald P. Massa, both of Cohasset, Mass.**

**Filed Jun. 8, 1987, Ser. No. 59,411**
**Int. Cl.⁴ H04R** *9/00, 11/00*
**U.S. Cl. 367—175** **18 Claims**



1. In combination in an electromagnetic transducer assembly designed for efficient underwater generation of high power acoustic energy densities in excess of approximately 25 peak Watts per square inch of radiating surface when operating at a mid-audible frequency located within the approximate range 500 Hz to 2500 Hz under conditions of 100% rho-c loading, a vibratile plate having an outer surface adapted for transmitting oscillatory mechanical vibrations into the water when the transducer is immersed therein, said vibratile plate also having a flat inner plane surface, a first magnetic flux conducting structure having a specified thickness defined by two parallel plane surfaces, means for rigidly attaching the first one of said two parallel plane surfaces of said first magnetic flux conducting structure to the said flat inner plane surface of said vibratile plate, a first plate member characterized in that it has two parallel plane surfaces, a second magnetic flux conducting structure having a specified thickness defined by two parallel plane surfaces, means for rigidly attaching the first one of said two parallel surfaces of said second magnetic flux conducting structure to the first one of said two parallel surfaces of said first plate member, said second parallel surface of said second magnetic flux conducting structure characterized in that one or more pairs of slots are provided into the said second parallel plane surface of said second magnetic flux conducting structure, a plurality of coils wound with insulated electrical conductors and dimensioned to fit with adequate clearance within said plurality of pairs of slots provided into the said second parallel plane surface of said second magnetic flux conducting structure, rigid potting means filling said clearance space between said coils and said slots, a plurality of spring members characterized in that their overall length dimensions are precisely machined to a uniform specified height, first fastening means for attaching one end of said spring members to the inner plane surface of said vibratile plate, second fastening means for attaching the opposite end of said spring members to the said first parallel surface of said first plate member, the uniform specified height of said plurality of spring members and the precise location of the springs on the facing flat surfaces of said vibratile plate and said first plate member establish a specified uniform air-gap dimension between said first and said second magnetic flux conducting structure, a second plate member characterized in that it has at least one flat plane surface, and also characterized in that the area of said second plate member is comparable to the area of said first plate member, a third magnetic flux conducting structure which is a functional duplicate of said first magnetic flux conducting structure, means for rigidly attaching the first one of said two parallel surfaces of said third flux conducting structure to the flat plane surface of said second plate member, a fourth magnetic flux conducting structure which is a functional duplicate of said second magnetic flux conducting structure, means for rigidly attaching said first one of said two parallel surfaces of said fourth magnetic flux conducting structure to the second one of said two parallel plane surfaces of said first plate member, a second functional duplicate set of coils wound with insulated electrical conductors fitted and potted into the corresponding slots provided in said fourth magnetic flux conducting structure, a second plurality of functionally identical spring members rigidly attached between the facing flat surfaces of said first and said second plate members, the uniform specified height of said second plurality of said spring members and their precise location on the facing peripheral flat surfaces of said first and said second plate members establish the same specified uniform air gap as established by the same springs mounted between said first and said second magnetic flux conducting structures, a plurality of rigid post-like spacing members of uniform precise specified length dimension and having parallel flat end surfaces, rigid fastening means for mounting said plurality of post-like spacing members between the facing flat surfaces of said vibratile piston and said second plate member whereby the instantaneous alternating magnetic forces generated in each of the dual air gaps are added in phase when alternating electrical current is supplied to all of the coils, means for providing dc magnetic polarizing flux in each of the dual air gaps, a waterproof housing structure for enclosing said electromagnetic transducer assembly, sealed insulated terminal means associated with said housing structure for establishing external electrical connection through the transducer housing to said enclosed electromagnetic transducer assembly, electrical connection means from said plurality of coils to said terminal means, and means for generating controlled equal electromagnetic forces in each of the dual magnetic air gaps by supplying controlled electrical power to said electrical terminal means.

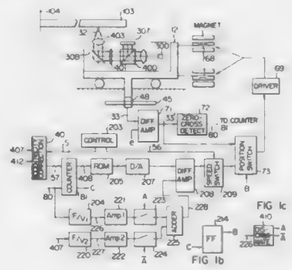
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**4,745,587**

## ECCENTRICITY CORRECTION DURING OPTICAL HEAD ACCESSING OF A DESIRED TRACK

**Takeshi Maeda, Kokubunji; Masuo Kasai, and Koji Muraoka, both of Hachioji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Mar. 14, 1986, Ser. No. 639,541**
**Claims priority, application Japan, Mar. 22, 1985, 60-55831; May 31, 1985, 60-116416**
**Int. Cl.⁴ G11B** *21/08, 7/095*
**U.S. Cl. 369—32** **10 Claims**



1. A method of accessing a rotating recording medium in which a light emitting head for irradiating said rotating recording medium with a light spot is controlled to move said light spot to a target track on said rotating recording medium, comprising the steps of:
generating a scale pitch pulse for each pitch of an external scale as said head is moved;
generating signals each time said light spot emitted from said light emitting head passes through a track on said rotating recording medium, said signals being generated based on light reflected from said rotating recording medium by irradiation thereof with said light spot;
counting said signals and converting said signals into data which is representative of a condition of eccentricity of said rotating recording medium, said data corresponding to the pitch of said scale and being stored in an eccentricity memory means; and
counting said scale pitch pulses to detect the number of pitches of said scale corresponding to a distance difference between a track on said rotating recording medium at which said light spot emitted from said light emitting head is presently positioned and said target track; and
controlling the speed of movement of said light emitting head in accordance with the detected number of pitches to move said light spot to said target track, said controlling step including the steps of reading at least part of said data from said eccentricity memory means to correct said number of pitches and correcting the amount of movement of said light emitting head in accordance with the corrected number of pitches.

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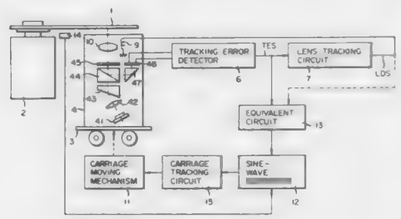


**4,745,588**

## TRACKING CONTROL APPARATUS

**Shozi Yoshikawa, and Masanori Doi, both of Tokyo, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed Apr. 7, 1986, Ser. No. 849,053**
**Claims priority, application Japan, Apr. 16, 1985, 60-81149; May 13, 1985, 60-100986**
**Int. Cl.⁴ G11B** *17/00, 7/00, 21/10*
**U.S. Cl. 369—32** **10 Claims**




1. A tracking control appartaus, comprising:
pickup means arranged for movement in a radial direction relative to a recording medium having concentric tracks or a spiral track, for recording or reproducing data in said tracks while the recording medium spins;
first signal generating means for generating a periodic signal corresponding to rotation of the recording medium;
second signal generating means associated with said pickup means for generating a signal representing an eccentricity of a track of the recording medium relative to the center of rotation of the medium when spinning;
control means for controlling a phase of the periodic signal output from the first signal generating means in accordance with the output signal of the second signal generating means, and for generating a corresponding periodic drive signal; and
tracking means for controlling tracking of the recording medium, including means for moving said pickup means in said radial direction in accordance with the periodic drive signal having a phase controlled by the control means.

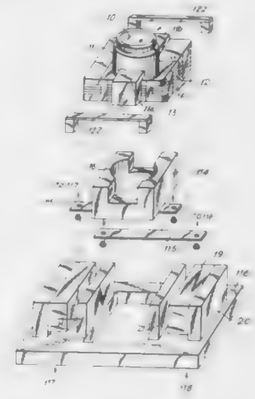
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**4,745,589**

## OBJECTIVE LENS ACTUATOR HAVING MOVEMENTS RESTRICTING CONTROL MEANS FOR AN OPTICAL HEAD

**Hiroaki Nomura, Nagano, Japan, assignor to Seiko Epson Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 4, 1985, Ser. No. 784,916**
**Claims priority, application Japan, Oct. 4, 1984, 59-208914; Nov. 22, 1984, 59-247721**
**Int. Cl.⁴ G11B** *7/095, 7/12*
**U.S. Cl. 369—45** **49 Claims**



1. An objective lens actuator for an optical head, the objective lens having an optical axis, said actuator comprising;
a first movable portion adapted to move the objective lens in the focusing direction along the optical axis, the first movable portion including an objective lens holder with a piston projecting from said objective lens in the direction of the optical axis, said objective lens holder securing the objective lens on the optical axis and supporting a rectangular focusing coil and a four component tracking coil;
a second movable portion adapted to guide the objective lens in a tracking direction essentially perpendicular to the focusing direction, including a guide hole shaped to slidably receive the first movable portion therein and to restrict movement of the first movable portion relative to the second movable portion to motion substantially along the focusing direction; and
magnetic circuit means for driving said objective lens in the focusing and tracking directions, said magnetic circuit means including two essentially parallel gaps, portions of said focusing and tracking coils being located in the gaps, respective currents in the focusing and tracking coils causing said first and second movable portions to be urged in the focusing and tracking directions.

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**4,745,590**

## ANNIVERSARY CLOCK WITH GLASS CASE

**Günter Neininger, Villingen-Schwenningen, Fed. Rep. of Germany, assignor to Kieninger & Obergfell GmbH & Co., St. Georgen, Fed. Rep. of Germany**

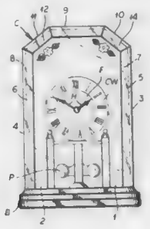
**Filed Jun. 3, 1986, Ser. No. 870,169**
**Claims priority, application Fed. Rep. of Germany, Apr. 16, 1986, 8610394**[U]
**Int. Cl.⁴ G04B** *17/02*
**U.S. Cl. 368—180** **5 Claims**

1. A clock comprising:
a base;
a clockwork on said base having a clock face; and
a fully transparent upright clock case mounted on said base and enclosing said clockwork, said case being prismatic and defined by a front wall juxtaposed with said clock

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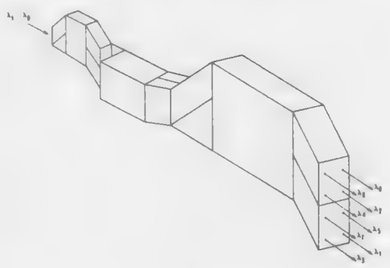
face, a rear wall parallel to said front wall, a pair of mutually parallel side walls interconnecting said front and rear walls, and an upwardly convex top formed from a plurality of angularly adjoining walls connected to said front, rear and side walls, all of said walls being planar and transparent, an outer face of each of said walls forming a planar facet including an obtuse angle with each adjoining one of said facets and, said top comprising a horizontal upper wall and a pair of inclined walls adjoining said upper wall and respectively extending downwardly there-



from to each of said side wall, said upper wall and said inclined walls forming angularly adjoining facets including obtuse angles between them, edges between said front wall and said side walls, edges between said rear wall and said side walls, edges between said front, rear and side walls and said top and inclined walls all being respectively beveled with planar bevels providing additional ones of said facets, said front and rear walls being vertically elongated and have greater areas than any other of said walls, the bevels at said edges being formed by trapezoidal flat wall elements.

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**4,745,591**
**MULTIPLE CHANNEL WAVELENGTH DIVISION MULTIPLEXER/DEMULTIPLEXER**
**Barbara M. Foley, Watertown, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.**
**Filed Feb. 24, 1987, Ser. No. 18,232**
**Int. Cl.[4] H04B** *9/00;* **G02B** *5/30*
**U.S. Cl. 370—3** **6 Claims**



4. Multiple channel birefringent demultiplexing apparatus comprising

log2n stages serially coupled together, wherein n represents the number of optical wavelengths capable of being multiplexed and log2n is an integer greater than one, each of said stages comprising

an input polarizing beam splitting means for receiving at least one input beam of collimated light whose polarization state is immaterial into twice as many orthogonally polarized output beams, said input and output beams being parallel to each other,

a length of birefringent material having an input face and an output face, said faces being parallel, for receiving said output beams normally applied to said input face, said material having a length and transfer function such that certain wavelengths pass therethrough with their polarization unchanged and that remaining wavelengths have their polarization rotated by 90° and

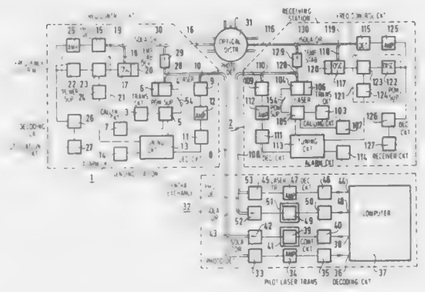
an output polarizing beam splitting means coupled to said output face for receiving $2^X$ beams of polarized light therefrom and for converting same to $2^X$ collimated multiplexed beams of light whose polarization is immaterial,

and wherein said input polarizing beam splitting means of a subsequent one of said stages is coupled to said output polarizing beam splitter of the immediately preceding one of said stages, and

wherein X is a positive integer.

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**4,745,592**
**COHERENT PHOTONIC TELECOMMUNICATIONS SYSTEM**
**Jean-Michel Gabriagues, Bailly, France, assignor to Compagnie Generale d'Electricite, Paris Cedex, France**
**Filed Jan. 28, 1987, Ser. No. 7,544**
**Claims priority, application France, Jan. 28, 1986, 86 01161**
**Int. Cl.[4] H04B** *9/00;* **G02B** *6/28*
**U.S. Cl. 370—3** **8 Claims**



1. A coherent photonic telecommunications system comprising

N subscriber stations, each comprising

a transmitter circuit operable to deliver electric transmit signals,

a calling circuit operable to deliver signals for calling other stations,

a semiconductor laser generator, operable to deliver an optical transmit wave,

an electrical power supply circuit connected to the input of the laser generator, the calling circuit and the transmit circuit being connected to the power supply circuit to modulate the optical transmit wave by the calling signals and electrical transmit signals respectively,

a photoelectric receiver,

and a utilization circuit connected to an electrical output of the receiver,

a passive optical distributor consisting of a material transparent to the optical transmit waves,

and N pairs of optical fibers respectively connected to the N subscriber stations, each pair connected to a station comprising an optical fiber having one end thereof connected to the output of the laser generator and another optical fiber having one end thereof connected to an optical input of the photoelectric receiver and the other end thereof connected to the passive optical distributor.

wherein, the optical fiber connected to the laser generator being a control line and the other optical fiber being a communications line, each subscriber station comprises

means for maintaining the temperature of the laser source at a predetermined, fixed value,



a photoelectric detector the optical input whereof is connected to the control line optical fiber,

and a tuning circuit the input whereof is connected to the electrical output of the photoelectric detector and one output whereof is connected to the laser generator's power supply circuit, said tuning circuit being operable, when no signals are received at its input, to adjust the supply current to the laser generator to set the optical transmit wave to an optical frequency $f_A$, the calling circuit enabling modulation of the optical transmit wave of frequency $f_A$ by the calling signals from another station,

wherein a switch or exchange is provided, comprising

N photoelectric detectors connected respectively to the N subscriber stations by the other ends of the N optical fiber control lines, to receive the optical transmit waves modulated by the calling signals,

a computer connected to the electrical output of the N photoelectric detectors to receive the calling signals coming from the various stations, said computer being operable to assign, for each call booked between a calling station and a called station, an optical frequency $f_c$ available at the time of the call, selected from a predetermined list of frequencies separated from one another by a constant frequency interval,

and N single-mode laser transmitters whose outputs are optically connected to the N optical fiber control lines coming from the N stations, each laser transmitter being equipped with two coupled cavities and disposed in a constant-temperature enclosure, the electrical input of each laser transmitter being connected to the computer via a control circuit, said control circuit being operable, when the station connected to the same laser transmitter is not callingly engaged with another station, to tune the optical frequency of the laser transmitter to the value $f_A$, which value is reserved for communications between the exchange and the N stations, the control circuits being operable, when a call is booked or initiated, to modulate the frequency $f_A$ of the laser transmitters connected to the calling and called stations by signals representative of the frequency $f_c$ assigned by the computer for same call, the specific $f_c$ frequency data being transmitted along the control fiber lines to the photoelectric detectors and the tuning circuits of the calling and called stations, said tuning circuits being operable to adjust the supply currents of the laser generators of said stations such that the frequency of their optical transmit waves will be equal to $f_c$, the control circuits connected to the calling and called stations then being operable to adjust the frequency of the laser transmitters connected to same to the value $f_c$, such that the radiant energy at frequency $f_c$ emitted by said laser transmitters and transmitted through the control optical fiber lines are injected into the cavity of the laser generators of the calling and called stations to lock their transmit frequency at the frequency $f_c$,

and wherein each subscriber station further comprises

means for optically connecting the output of the laser generator to the communications optical fiber, so that said fiber can transmit to the passive optical distributor the optical transmit wave of frequency $f_c$ modulated by the electric transmit signals,

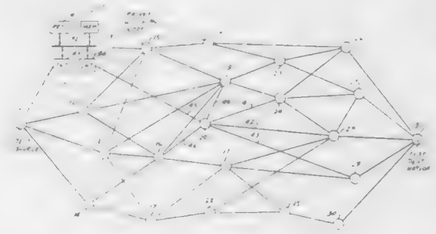
a servocontrol circuit connected to the tuning circuit and to an electrical input of a local oscillator, so that it tunes the output frequency of the local oscillator to a value $f_D$ close to $f_c$ when the tuning circuit receives the computer-assigned frequency $f_c$ information for a call between the concerned station

and any other station, the difference $f_D$-$f_c$ being small compared to the interval between two successive frequencies in the list of predetermined frequencies

and means for optically connecting the output of the local oscillator with the input to the photoelectric receiver, such as to form a hetereodyned detection system capable of picking up the optical transmit waves received by the passive optical distributor and transmitted along the optical fiber communications line, the electrical output of said heterodyned detection system being connected to the utilization circuit.

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**4,745,593**
**ARRANGEMENT FOR TESTING PACKET SWITCHING NETWORKS**
**Gilbert M. Stewart, Bolingbrook, Ill., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.**
**Filed Nov. 17, 1986, Ser. No. 931,685**
**Int. Cl.[4] H04L** *11/12*
**U.S. Cl. 370—15** **25 Claims**



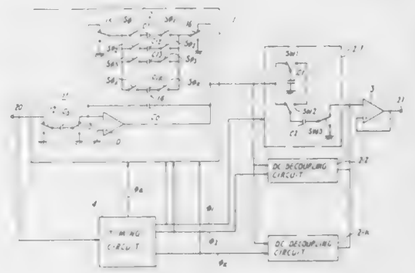
1. In a test arrangement for testing communication from a test source to a test destination via a packet switching network comprising a plurality of packet switching nodes and a plurality of bidirectional links each interconnecting a distinct pair of said nodes, a test method comprising

in response to a receipt of a test packet from said test source, one of said nodes transmitting said test packet to another of said nodes via the one of said links interconnecting said one node and said another node and

in response to a failure to receive acknowledgment via said one link from said another node within a predetermined time interval of said one node transmitting said test packet, said one node transmitting information to said test source defining said failure as concerning packet transmission between said one node and said another node via said one link.

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**4,745,594**
**OFFSET-COMPENSATED SWITCHED-CAPACITOR FILTER FOR TDM MULTICHANNEL ANALOG SIGNALS**
**Yutaka Takahashi, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**
**Filed Feb. 3, 1987, Ser. No. 10,432**
**Claims priority, application Japan, Feb. 3, 1986, 61-22281**
**Int. Cl.[4] H04J** *3/20*
**U.S. Cl. 370—51** **4 Claims**



1. An offset-compensated filter circuit for a time division multiplexed (TDM) signal having multichannel analog signal components assigned on different time slots, comprising:

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a timing circuit for generating a plurality of channel-switching signals respectively synchronized with said time slots;
a switched-capacitor filter having an input terminal to which said TDM signal is applied and an output terminal, said switched-capacitor filter including an operational amplifier and a switched-capacitor circuit for establishing a transfer function between said input and output terminals.
a summing amplifier; and
a plurality of switched-capacitor DC decoupling circuits respectively associated with said channel-switching signals for coupling the output of said switched-capacitor filter to an input terminal of said summing amplifier, each of said DC decoupling circuits comprising a first and a second capacitor and switch means responsive to the presence of the associated channel-switching signal for charging said first capacitor with a voltage developed at the output terminal of said switched-capacitor filter and charging said second capacitor with a voltage developed between the output of said switched-capacitor filter and the input terminal of said summing amplifier and discharging said first and second capacitors in response to the absence of said associated channel-switching signal.

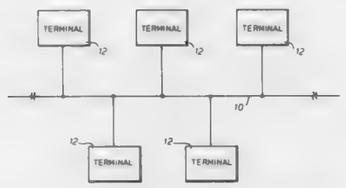
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**4,745,595**

## DISTRIBUTED ELECTRONIC MAILBOX SYSTEM

**Leslie Muir, Glasgow; John Smith, Falkirk, and Andrew McKechnie, Glasgow, all of Scotland, assignors to Unisys Corporation, Blue Bell, Pa.**

**Filed Jun. 24, 1986, Ser. No. 877,774**
**Claims priority, application United Kingdom, Sep. 20, 1985, #523246**
**Int. Cl.[4] H04J** *3/02, 3/16*
**U.S. Cl. 370—85** **18 Claims**



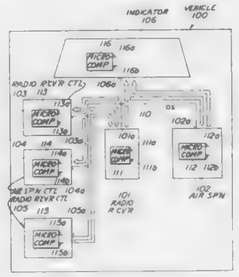

1. In a data communications network including a plurality of like terminals coupled to a common communication channel, each of said terminals being adapted to transmit messages to any other terminal within the network and receive messages destined to it from any other terminal within the network, a method comprising:
a—at any given time selecting as a first terminal any one of said plurality of like terminals; and
b—said first terminal monitoring whether any terminal other than said first terminal is operating in a network control terminal mode as indicated by an interrogation message on said channel; and
c—said first terminal responding to said monitoring indicating that no other terminal is operating in said network control terminal mode by entering the network control terminal mode.

**4,745,596**

## MULTIPLEX COMMUNICATION SYSTEM

**Morio Sato, Yokohama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Japan**

**Filed Jul. 11, 1986, Ser. No. 884,539**
**Claims priority, application Japan, Jul. 16, 1985, 60-157807; Mar. 8, 1986, 61-50773; Mar. 8, 1986, 61-50775**
**Int. Cl.[4] H04J** *3/02*
**U.S. Cl. 370—85** **9 Claims**




1. A multiplex communication system comprising:
a single signal line; and
a plurality of nodes connected to said signal line, each node being assigned a specific node address and having transmitting means connected to said signal line for outputting data in the form of a serial binary signal thereto and receiving means connected to said signal line for receiving data in the form of a serial binary signal therefrom, the data outputted from each transmitting means including source address data representative of the specific node address of a respective one of said nodes and destination address data representative of the specific node address of one of said nodes to which said data is to be transmitted, each of said nodes storing the data received from said signal line by a respective one of said receiving means when the destination address data included in the received data coincides with the node address thereof, said transmitting means of said nodes cooperating with said signal line to form a preferential circuit which provides on said signal line one of two binary signal levels defined to have a priority over the other binary signal level when at least one of said transmitting means outputs data onto said signal line at said one level, said preferential circuit isolating from said signal line those transmitting means simultaneously having output data at said other level, each of said nodes having collision detecting means for comparing bit by bit the data outputted from the transmitting means thereof with the data received by the receiving means thereof to detect a collision of data on which signal line when said two data differ from each other, each of said nodes causing the transmitting means thereof to stop outputting data when the collision of data is detected by the collision detecting means thereof.

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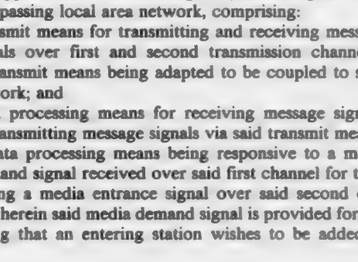
**4,745,597**

## RECONFIGURABLE LOCAL AREA NETWORK

**Doug Morgan, and Phil Landmeier, both of P.O. Box 18888, Irvine, Calif. 92713**

**Filed May 14, 1986, Ser. No. 863,086**
**Int. Cl.[4] H04J** *3/08*
**U.S. Cl. 370—87** **33 Claims**

1. A local area network comprising
a loop controller having a loop controller input and a loop controller output;
a plurality of nodes each having a first node input and a first node output, and a second node input and a second node output;
the first node having its first node input coupled to said loop controller output and its second node output coupled to said loop controller input, each successive node having its first node input coupled to the first node output of the preceeding node and its second node output coupled to the second node input of the preceeding node, whereby said nodes are coupled in the network in an ascending order on a first unidirectional communication link and in a descending order on a second unidirectional communication link,
each of said nodes having control means having a control means input and a control means output, said control means input being coupled to the respective said first node input, said control means having temporary storage means associated therewith,
each of said nodes also having switching means for
(a) connecting said first node input thereof to said first node output thereof




(b) connecting said second node input thereof to said second node output thereof
(c) connecting said control means output to at least one of said first and second node outputs thereof
(d) connecting said first node input thereof to said second node output thereof
whereby all nodes may be controllably connected to the loop controller on the first communication link in a multidrop configuration to all receive a message from the loop controller substantially simultaneously, with responding nodes switching to a daisy chain configuration to receive and temporarily retain incoming messages on the first communication link while outputting its own message or any previously received and temporarily retained message on the first communication link, the last node in the series of nodes being switched to loop messages received on the first communication link back on the second communication link for direct communication to the loop controller.

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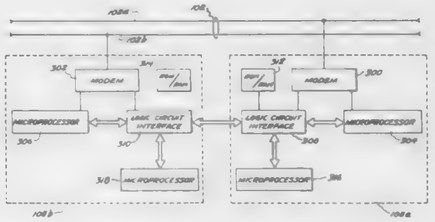
**4,745,598**

## METHOD AND APPARATUS FOR MAINTAINING A DYNAMIC LOGICAL RING IN A TOKEN PASSING LAN

**Mehmet E. Ulug, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Filed Nov. 27, 1985, Ser. No. 802,287**
**Int. Cl.[4] H04J** *3/26*
**U.S. Cl. 370—89** **33 Claims**

1. Apparatus for maintaining a dynamic logical ring in a token passing local area network, comprising:
transmit means for transmitting and receiving message signals over first and second transmission channels, said transmit means being adapted to be coupled to said network; and
data processing means for receiving message signals and transmitting message signals via said transmit means, said data processing means being responsive to a media demand signal received over said first channel for transmitting a media entrance signal over said second channel, wherein said media demand signal is provided for indicating that an entering station wishes to be added to the logical ring and said media entrance signal is provided for adding said entering station to the logical ring, the logical




ring being a list prescribing an order in which the token is passed from station to station in said network.

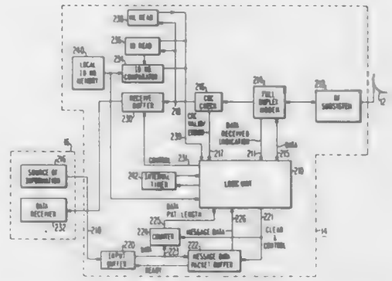
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**4,745,599**

## RANDOM ACCESS COMMUNICATION SYSTEM WITH CONTENTION SCHEDULING OF SUBPACKETIZED DATA TRANSMISSIONS AND SCHEDULED RETRANSMISSION OF UNSUCCESSFUL SUBPACKETS

**Dipankar Raychaudhuri, S. Brunswick Township, Middlesex County, N.J., assignor to General Electric Company, Schenectady, N.Y.**

**Filed Jan. 5, 1987, Ser. No. 424**
**Int. Cl.[4] H04J** *3/24*
**U.S. Cl. 370—93** **11 Claims**



1. A method for burst communication among a plurality of similar associated transmitter-receivers by way of a transmission path having a time delay between any transmitter and any receiver which is longer than the duration of an information packet, the method comprising the steps at each transmitter-receiver of:
accepting at a source transmitter-receiver offered information to form accepted information which is to be transmitted to at least one destination transmitter-receiver;
forming said accepted information into a plurality of sequential information subpackets, each of predetermined duration;
determining the number of said information subpackets in said plurality of sequential information subpackets to produce a length-representative word;
associating with each of said information subpackets of said plurality of sequential information subpackets control information comprising said length-representative word, and words representing the identities of said source and destination transmitter-receivers, to produce combined subpackets;
selecting a random time during times in which said source transmitter-receiver is enabled for initiation of nonscheduled transmissions;
transmitting at least one of said combined subpackets of said sequence of said combined subpackets into the sending

end of said transmission path beginning at said random time to produce transmitted combined subpackets;

receiving transmitted combined subpackets from the receiving end of said transmission path in the form of own combined subpackets originating from the same transmitter-receiver by which they are received, and other combined subpackets originating from transmitter-receivers other than the receiving transmitter-receiver;

counting successfully received combined subpackets up to a predetermined number, and ending a nonscheduled operating interval of an operating cycle including a nonscheduled operating mode interval and a scheduled operating mode interval upon reaching said predetermined number of successfully received combined subpackets;

enabling initiation of nonscheduled transmissions during each said nonscheduled operating mode interval;

storing the identities of the source and destination transmitter-receivers, and the associated length-representative word of successfully received combined subpackets;

for those successfully received combined subpackets from each particular source in which said length-representative word is greater than the number of combined subpackets successfully received from said particular source, calculating the number of said combined subpackets from said particular source which are not received to form a nonreceived number, and forming a continuous sum representative of the sum of all such nonreceived numbers;

at each transmitter-receiver whose transmitted combined subpackets resulted in a combination of own combined subpackets which were successfully received and own combined subpackets which were not successfully received, retransmitting at least the data contained in those of its own combined subpackets which were not successfully received as a result of said transmitted combined subpackets, said retransmission beginning at a time following the beginning of said scheduled operating mode interval by a delay which is the sum of an integer multiple of said predetermined duration plus the product of said continuous sum multiplied by said predetermined duration.

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**4,745,600**

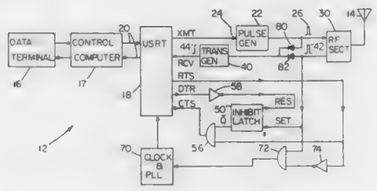
## NETWORK COLLISION DETECTION AND AVOIDANCE APPARATUS

**Alexander Herman, Sharon, and Robert L. Smith, Jr., North Easton, both of Mass., assignors to Codex Corporation, Mansfield, Mass.**

**Continuation-in-part of Ser. No. 753,183, Jul. 9, 1985, abandoned. This application Apr. 14, 1986, Ser. No. 851,253**

**Int. Cl.⁴ H04J** *3/16, 3/12*

**U.S. Cl. 370—95** **21 Claims**




1. In a synchronous digital data communications network having a multiplicity of nodes each having a transmitter and a receiver for connection to a medium, means for regulating the transmission of messages initiated simultaneously by a plurality of nodes, said means for regulating comprising

clock means for determining clock intervals for said network,

coding means connected to be responsive to said clock means for including in each message a sequence of digital values and for transmitting to said medium each said sequence at a rate of one digital value per clock interval as determined by said clock means,

timing means for causing each said sequence included in each one of a plurality of said messages initiated simultaneously by a plurality of said nodes to be transmitted in the same clock intervals,

monitoring means connected to be responsive to said medium for detecting the presence on said medium of a selected digital value during any said clock interval in which a node is transmitting a different digital value within said sequence included in a said message, and

collision control means connected to be responsive to said monitoring means for interrupting transmission of said message by said node upon such detection by said monitoring means.

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**4,745,601**

## DIGITAL SERVICE UNIT WITH SECONDARY CHANNEL DIAGNOSTICS

**Jose R. Diaz, Sunrise, and Norman J. Donaghue, Jr., Plantation, both of Fla., assignors to Racal Data Communications Inc., Sunrise, Fla.**

**Filed Oct. 23, 1985, Ser. No. 790,687**

**Int. Cl.⁴ H04J** *3/12*

**U.S. Cl. 370—110.1** **18 Claims**




1. A circuit arrangement for receiving primary and secondary communication over either a DDS-I or a DDS-II network, said circuit arrangement comprising:

input means for receiving AMI data signals from one of said networks, said AMI signals including a primary channel signal multiplexed with a secondary channel signal, a multiplexed control signal and, if said network is a DDS-I network, said AMI signals also possibly including bipolar violations;

determining means for determining which of said networks is coupled to said input means and for providing an output signal indicative of whether the input means is connected to a DDS-I or a DDS-II network;

violation decoding means, coupled to and receiving AMI data signals from said input means and receiving said output signal from said determining means, for decoding bipolar violations in said data signal into a first network control signal if required as indicated by said output signal;

demultiplexing means, coupled to said determining means and receiving said output signal, said demultiplexing means operating at a frequency determined by said output signal from said determining means, said demultiplexing means for demultiplexing said data signal received from said input means into a primary channel signal, a secondary channel signal and a second network control signal;

controller means for receiving said first and second network control signals;

primary output means for supplying said primary channel signal as an output; and

secondary output means for supplying said secondary channel signal as an output.



**4,745,602**

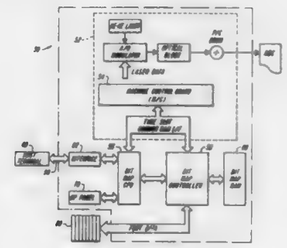
## PRINTER ERROR AND CONTROL SYSTEM

**Brian R. Morrell, Randolph, Mass., assignor to Minolta Camera Company, Ltd., Osaka, Japan**

**Continuation-in-part of Ser. No. 778,378, Sep. 20, 1985, abandoned. This application Oct. 23, 1985, Ser. No. 790,319**

**Int. Cl.⁴ G06F** *11/00*

**U.S. Cl. 371—20** **3 Claims**



1. For use with a host system having a bidirectional communication port, a data output device, comprising:

printer means for providing an image according to a sequence of signals;

a printer process controller for receiving signals from said host system and for providing signals to said printer means in response to said signals from said host system, and further providing error signals to said host upon occurrence of an error condition as detected by said printer process controller, said error signals indicating first kind of error and second kind of error which is more severe than the first kind of error and fatal to the operation of said printer means; and

means for resetting said printer means and said printer process controller upon receipt of a reset command from said host system only in response to the first kind of error condition.

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**4,745,603**

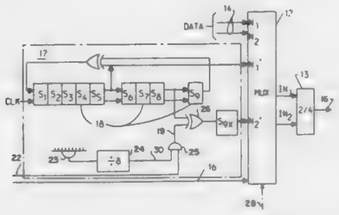
## CODE SEQUENCE GENERATOR FOR A DIGITAL TRANSMISSION LINE FAULT LOCATION SYSTEM

**Dennis A. Shedd, Lexington, Mass., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed May 27, 1986, Ser. No. 866,903**

**Int. Cl.⁴ H04M** *3/26*

**U.S. Cl. 371—27** **4 Claims**




1. A digital transmission line fault location signal generator including means for generating a first sequence of binary signals, the signal generator being characterized by

means for delaying the first sequence of binary signals by n time slots into a second sequence of binary signals; and

means for synchronously merging the first and second sequences of binary signals into a combined sequence of signals on the transmission line, each different combination of input signals producing in the combined sequence an output signal that is distinct from the output signals of the other combinations of input signals.

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**4,745,604**

## METHOD AND APPARATUS FOR TRANSFERRING DATA BETWEEN A HOST PROCESSOR AND A DATA STORAGE DEVICE

**Arvind M. Patel; David T. Wang, and Wellington C. Yu, all of San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Oct. 20, 1986, Ser. No. 921,022**

**Int. Cl.⁴ G06F** *11/10*

**U.S. Cl. 371—38** **11 Claims**

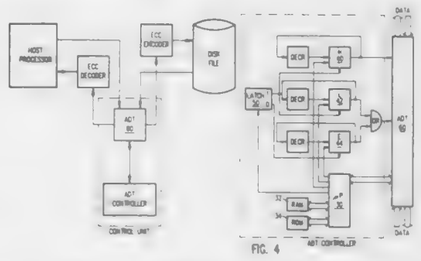



FIG. 4

1. A method for transferring data having variable length fields which are separated by fixed time gaps between a host processor and a data storage device wherein error correction bytes are encoded into or decoded from the data during transfer, the method comprising the steps of:

determining the actual length of the field to be transferred;

computing the number of error correction bytes for the field being transferred;

initiating transfer of the field at the termination of the fixed time gap and before said computation has been completed if the determined actual field length is greater than a predetermined value; and

completing transfer of the field when said computation has been completed.

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**4,745,605**

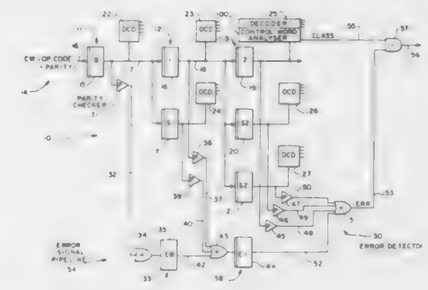
## CONTROL WORD ERROR DETECTION AND CLASSIFICATION

**Gary S. Goldman, San Jose, and Mark W. Semmelmeyer, Sunnyvale, both of Calif., assignors to Amadahl Corporation, Sunnyvale, Calif.**

**Filed Aug. 19, 1986, Ser. No. 897,922**

**Int. Cl.⁴ G06F** *11/10*

**U.S. Cl. 371—49** **18 Claims**




1. In a data processing machine that generates a control word and that includes a plurality of registers connected to receive respective copies of the control word for execution in

sections of the data processing machine, an apparatus for detecting an error condition in the execution of the control word, comprising:

first means, coupled to the plurality of registers and responsive to the respective copies of the control word, for detecting an error in any of the respective copies;

second means, coupled to one of the plurality of registers and responsive to the one copy of the control word in the one register, for analyzing the one copy to identify a class of possible errors; and

means, coupled to the first means and the second means and responsive to the detection of an error in any of the respective copies and to the class of possible errors, for generating a signal indicating the error condition.

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**4,745,606**

## DUAL-WAVELENGTH LASER APPARATUS

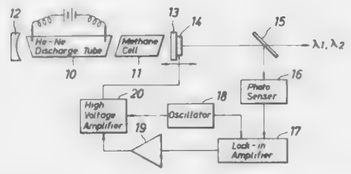
**Kiyoji Uehara, Fukagawa; Hiroaki Tanaka, Koganei; Takashi Ueki, Ohta, and Hideo Tai, Higashi-Ikebukuro, all of Japan, assignors to Tokyo Gas Co., Ltd., Tokyo, Japan**

**Filed Mar. 20, 1986, Ser. No. 841,913**

**Claims priority, application Japan, Mar. 28, 1985, 60-61876**

**Int. Cl.[4] H01S *3/10, 3/13***

**U.S. Cl. 372—23** **13 Claims**




1. A dual-wavelength laser apparatus characterized by comprising: a laser for emitting a laser beam consisting of two wavelength components; gain control means for controlling and substantially equalizing gains of the two wavelength components; cavity length modulating means for periodically modulating a cavity length of said laser; and modulation center controlling means for controlling a modulation center of said cavity length modulating means, such that a sum of output intensity of the two modulated wavelength components from said laser is held constant.

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**4,745,607**

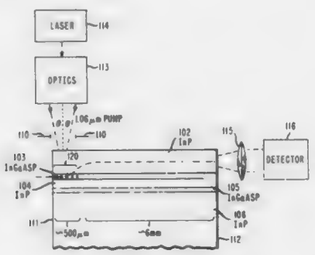
## INTERLAYER DIRECTIONAL COUPLING IN ANTIRESONANT REFLECTING OPTICAL WAVEGUIDES

**Thomas L. Koch, Middletown, N.J., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Oct. 8, 1986, Ser. No. 916,498**

**Int. Cl.[4] H01S *3/19***

**U.S. Cl. 372—45** **9 Claims**




1. An optical device comprising a first optical waveguiding layer including a first optical material having boundaries to guide light of a selected wavelength in a predetermined direction, means abutting at least one of the boundaries of said first optical waveguiding layer for establishing an antiresonant reflection for a component of light propagating in a direction perpendicular to said predetermined direction, said means for establishing an antiresonant reflection including at least a first reflector layer including a second optical material having an index of refraction greater than that of said first optical material, the optical device characterized in that said first reflector layer also acts as a second optical waveguiding layer by conventional total internal reflection, said optical device includes means effective over a portion of said first and second optical waveguiding layers along said predetermined direction for coupling energy at said selected wavelength from said first optical waveguiding layer into said second optical waveguiding layer, and said second optical waveguiding layer is substantially parallel to said first optical waveguiding layer.

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**4,745,608**

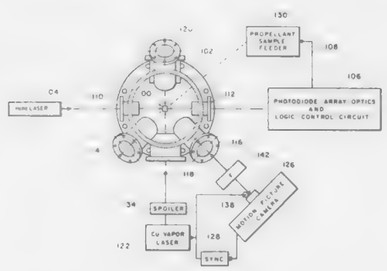
## LASER PHOTOGRAPHY PULSE SYNCHRONIZATION CIRCUIT

**James M. Aulds, Oxford, and Roger J. Becker, Kettering, both of Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Jun. 27, 1986, Ser. No. 879,717**

**Int. Cl.[4] H01S *3/00***

**U.S. Cl. 372—38** **19 Claims**




1. Laser keep alive and triggering control apparatus for initiating the generation of laser output pulses, maintaining laser operation temperatures, and slaving the occurrence of laser output pulses to a variable speed mechanical apparatus comprising:

a pulse triggered laser;

first pulse sourcing means including a free-running electronic oscillator circuit received therein, said sourcing means generating first electrical pulses capable of triggering operating temperature maintaining keep alive bursts of optical energy from said laser;

second pulse sourcing means including a signal pickup transducer responsive to predetermined movement events of said variable speed mechanical apparatus for generating second electrical pulses also capable of triggering bursts of optical energy from said laser;

electronic switching means responsive to a predetermined rate of said second pulse sourcing means for selecting one or the other of said first sourcing means and second sourcing means electrical pulses of said laser; and

means for inhibiting premature first and second pulses and resultant short cycle triggering of said laser, following first pulse to second pulse and second pulse to first pulse triggering changes in said switching means.



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**4,745,609**

## STABILIZED LASER DEVICE

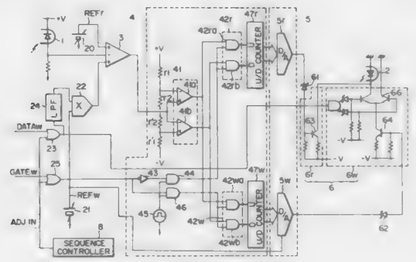
**Shozi Yoshikawa, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed Dec. 30, 1985, Ser. No. 814,613**

**Claims priority, application Japan, Jan. 17, 1985, 60-6123**

**Int. Cl.[4] H01S *3/13***

**U.S. Cl. 372—29** **7 Claims**




1. A stabilized laser device, comprising:

laser means for generating laser light;

optical detection means for photoelectrically converting the laser light from the laser means into a corresponding detection signal;

means for presetting a reference signal corresponding to a desired output light from the laser means;

means for outputting a differential signal representing a difference between said detection signal and the preset reference signal;

arithmetic operating means for generating a control signal corresponding to a product of said differential signal and the preset reference signal; and

drive means for driving the laser means in accordance with the control signal.

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**4,745,610**

## SEMICONDUCTOR LASER DRIVE DEVICE WITH AN ABNORMAL VOLTAGE PROTECTION CIRCUIT

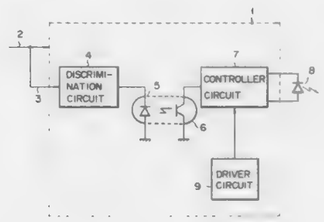
**Shozi Yoshikawa, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed May 13, 1986, Ser. No. 862,770**

**Claims priority, application Japan, May 20, 1985, 60-108044**

**Int. Cl.[4] H01S *3/00***

**U.S. Cl. 372—38** **7 Claims**




1. A semiconductor laser device, comprising:

semiconductor laser driver means for causing a semiconductor laser to emit a laser beam;

discriminating means for detecting whether at least one power source voltage of different power source voltages supplied to said semiconductor laser driver means is within a predetermined voltage range;

means for emitting coherent or non-coherent light when said discriminating means detects that said at least one power source voltage is in said predetermined voltage range;

light converting means for photo-electrically converting a light level emitted from said means for emitting light, and for producing an output representing the level of said at least one power source voltage; and

control means coupled to said light converting means for inhibiting the laser beam emitting operation of said semiconductor laser driver means when the output of said light converting means represents a level outside said predetermined voltage range.

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**4,745,611**

## BURIED TWIN RIDGE SUBSTRATE LASER

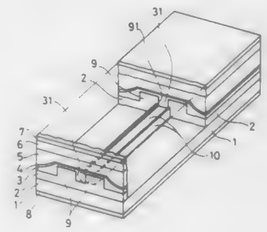
**Ken Hamada, Toyonaka; Kunio Itoh, Uji; Masahiro Kume; Takao Shibutani, both of Takatsuki, and Hirokazu Shimizu, Suita, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan**

**Filed Oct. 24, 1986, Ser. No. 922,654**

**Claims priority, application Japan, Oct. 25, 1985, 60-239857; Dec. 17, 1985, 60-283411**

**Int. Cl.[4] H01S *3/19***

**U.S. Cl. 372—45** **7 Claims**



1. In a semiconductor laser device comprising:

a semiconductor substrate of a first conductivity type having, on a principal face thereof, a protrusion of stripe shape, said protrusion having end faces inside of cavity facts;

a semiconductor layer of a second conductivity type formed on said principal face, having two ridge parts which have a groove therebetween, whose bottom reaches the upper face of said protrusion at a part on said protrusion but does not reach said principal face of said semiconductor substrate and said groove remains in said first semiconductor layer except on said part on said protrusion, said groove being parallel to and over said protrusion;

a plurality of layers disposed one on another formed on said ridges and on said groove, said plurality of layers including at least one active layer, a first cladding layer of said first conductivity type formed below said active layer, and a second cladding layer of said second conductivity type, formed above said active layer;

a first electrode formed on an uppermost layer of said plural layers; and

a second electrode formed on the other face of said semiconductor substrate.

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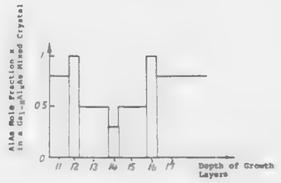


**4,745,612**

## SEPARATE CONFINEMENT HETEROSTRUCTURE SEMICONDUCTOR LASER DEVICE

**Toshiro Hayakawa, Nara; Takahiro Suyama, Tenri; Kohsei Takahashi; Masafumi Kondo, both of Tenri, and Saburo Yamamoto, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Jul. 11, 1986, Ser. No. 884,554**
**Claims priority, application Japan, Jul. 16, 1985, 60-159148**
**Int. Cl.[4] H01S *3/19***
**U.S. Cl. 372—45** **7 Claims**




1. In a semiconductor laser device the combination comprising:
a substrate;
a first electrode formed under said substrate;
a multilayer construction formed on said substrate; and
a second electrode formed on said multilayer construction,
said multilayer construction comprising at least the following in sequence:
a first $Al_zGa_{1-z}As$ ($z>y$) cladding layer;
a first $Al_wGa_{1-w}As$ ($w>z$) barrier layer;
a first $Al_yGa_{1-y}As$ ($y>x$) carrier supplying layer;
an $Al_xGa_{1-x}As$ ($x\geqq 0.3$) quantum well active region having a thickness of 200 angstroms or less;
a second carrier supplying layer having the same crystal composition as said first carrier supplying layer;
a second barrier layer having the same crystal composition as said first barrier layer; and
a second cladding layer having the same crystal composition as said first cladding layer.

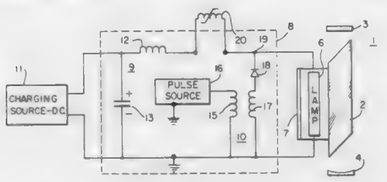
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**4,745,613**

## LASER FLASH LAMP TRIGGERING CIRCUIT

**Gene E. Tye, Endicott, and Joseph Montner, Binghamton, both of N.Y., assignors to General Electric Co., Schenectady, N.Y.**

**Filed Jan. 9, 1987, Ser. No. 1,944**
**Int. Cl.[4] H01S *3/097***
**U.S. Cl. 372—81** **5 Claims**




1. In a laser system including:
(a) a solid state lasing material mounted in an optical cavity;
(b) a flash lamp including a pair of electrodes positioned adjacent to said solid state lasing material for optically pumping said solid state lasing material;
(c) a D.C. power supply including energy storage means coupled in series with the flash lamp electrodes to establish a D.C. current flow path between said storage means and said lamp electrodes;
(d) a triggering circuit path connected in parallel with said flash lamp electrodes and connected to said D.C. current path for periodically supplying high voltage triggering pulses to the flash lamp electrodes to initiate ionization of the gas in said lamp and to initiate optical pumping of said lasing material;
(e) saturable reactor means connected in said D.C. current flow path between said point of connection of said triggering circuit to said current flow path and said energy storage means of said power supply, said saturable reactor means having a high impedance to the high voltage triggering pulse to limit current flow from the triggering circuit to the energy storage means in the power supply and having a low impedance to D.C. current flow from the energy storage means to said lamp electrodes once said lamp becomes conductive.

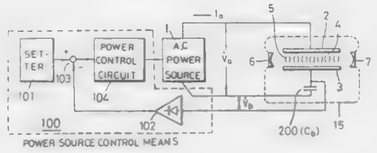
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**4,745,614**

## SILENT DISCHARGE TYPE LASER DEVICE

**Akira Egawa; Hakaru Mizoguchi; Kiyonori Matsuno, all of Hiratsuka; Tatsuya Ariga, Ninomiya, and Ryoichi Nodomi, Hiratsuka, all of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan**

**Filed Aug. 20, 1986, Ser. No. 898,224**
**Int. Cl.[4] H01S *3/13***
**U.S. Cl. 372—85** **4 Claims**




1. A silent discharge type laser device including a pair of discharging electrodes at least one of which is coated with dielectric material, a laser gas medium between said electrodes, a power source for applying an AC voltage between said discharge electrodes to cause silent discharging therebetween, and an optical resonator having a totally-reflective mirror and a semi-transparent mirror which mirrors delimit a discharging space in a relation opposed to each other, wherein said silent discharging is used to promote laser oscillation; said laser device being characterized by:
means for setting a target value of electric charge passed between said discharging electrodes; means for detecting the amount of electric charge passed between said discharging electrodes; and
means for controlling output of said power source in response to the detected value of said electric charge-amount detecting means to equalize the target value and the detected electric charge-amount thereby establishing a constant laser output.

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**4,745,615**

## SEMICONDUCTOR LASER DEVICE WITH A DIFFRACTION GRATING

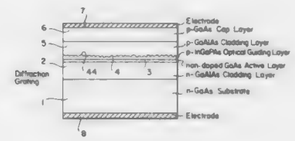
**Shinji Kaneiwa, Nara; Haruhisa Takiguchi, Osaka; Toshihiko Yoshida, and Sadayoshi Matsui, both of Tenri, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

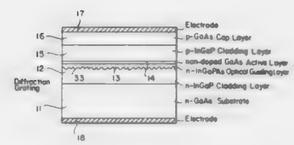
**Filed Oct. 21, 1985, Ser. No. 789,787**
**Claims priority, application Japan, Oct. 22, 1984, 59-223576**
**Int. Cl.[4] H01S *3/19***
**U.S. Cl. 372—96** **20 Claims**

1. A semiconductor laser device, the improvment comprising:
a multi-layer structure which includes,
a first cladding layer,
an active layer formed on said first cladding layer comprising $Ga_{1-x}Al_xAs$ wherein x satisfies the relation $0\leqq x\leqq 0.4$,
an optical guiding layer formed on said active layer comprising $In_{1-y}Ga_yP_{1-z}As_z$ wherein y and z satisfy the relations $0.51\leqq y\leqq 1$, $0\leqq z\leqq 1$, and $z=2.04y-1.04$ and wherein said optical guiding layer has a diffraction grating formed thereon, and
a second cladding layer formed on said optical guiding layer,
wherein said semiconductor laser device employing said multi-layer structure attains laser oscillation at a wavelength in the range of from 660 nm to 890 nm.



11. A semiconductor laser device, the improvement comprising:
a multi-layer structure which includes,




a first cladding layer comprising $In_{1-y}Ga_yP_{1-z}As_z$ wherein y and z satisfy the relations $0.51\leqq y\leqq 1$, $0\leqq z\leqq 1$, and $z=2.04y-1.04$ and wherein said first cladding layer has a diffraction grating formed thereon,
an optical guiding layer formed on said first cladding layer,
an active layer comprising $Ga_{1-x}Al_xAs$ wherein x satisfies the relation $0\leqq x\leqq 0.4$, and
a second cladding layer formed on said active layer,
wherein said semiconductor laser device employing said multi-layer structure attains laser oscillation at a wavelength in the range of from 660 nm to 890 nm.

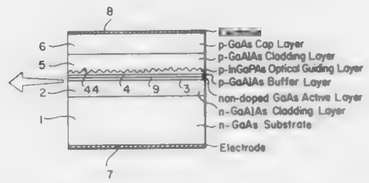
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**4,745,616**

## SEMICONDUCTOR LASER DEVICE WITH A DIFFRACTION GRATING

**Shinji Kaneiwa; Haruhisa Takiguchi, both of Nara; Toshihiko Yoshida, and Sadayoshi Matsui, both of Tenri, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Feb. 19, 1986, Ser. No. 830,864**
**Claims priority, application Japan, Feb. 19, 1985, 60-33603**
**Int. Cl.[4] H01S *3/19***
**U.S. Cl. 372—96** **16 Claims**




1. A semiconductor laser device having an optical structure comprising:
a GaAlAs first cladding layer,
an $Ga_{1-x}Al_xAs$ ($0\leqq x\leqq 0.4$) active layer for laser oscillation formed on said first cladding layer,
a GaAlAs buffer layer formed on said active layer,
an $In_{1-y}Ga_yP_{1-z}As_z$ ($z=2.04y-1.04$, and $0\leqq z\leqq 1$) optical guiding layer having a diffraction grating thereon formed on said buffer layer, and
a GaAlAs second cladding layer formed on said optical guiding layer,
wherein the width of the forbidden band of said buffer layer is greater than that of said active layer and smaller than that of said optical guiding layer.

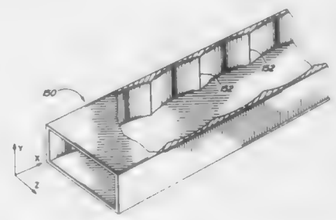
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**4,745,617**

## IDEAL DISTRIBUTED BRAGG REFLECTORS AND RESONATORS

**Robin J. Harvey, Thousand Oaks, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Mar. 27, 1987, Ser. No. 31,327**
**Int. Cl.[4] H01S *3/08***
**U.S. Cl. 372—96** **30 Claims**




1. The method of designing an ideal distributed-Bragg reflector for a microwave waveguide comprising the steps of:
selecting a signal waveform for propagation as a symmetric travelling wave within the reflector; and
determining those surfaces which do not interfere with the symmetric travelling wave having a transverse magnetic polarization by solving the equation

$$\sin(k_yY)=\sin(ky\Delta)\sin P\,(k_xx)$$

for horizontally aligned surfaces and the equation

$$\sin(k_xx)=\sin(k_x\Delta)\sin^r(k_yY)$$

for vertically aligned surfaces;
where
$k_y$ is the transverse wave number,
$k_x$ is the axial wave number,
$p=ky/kx$,
$r=kx,ky$, and
$\Delta$ is set equal to the amplitude of the corrugation, being the transverse spacing at a surface boundary between adjacent horizontally aligned surfaces.

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**4,745,618**

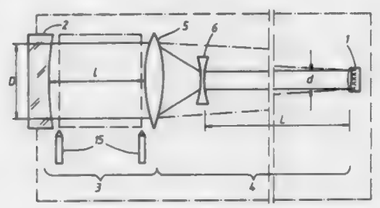
## OPTICALLY STABLE RESONATOR FOR PRODUCING A LASER BEAM

**Dieter Burger, Vaihingen, Fed. Rep. of Germany, assignor to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany**

**Filed Feb. 11, 1987, Ser. No. 13,260**
**Claims priority, application Fed. Rep. of Germany, Feb. 11, 1986, 3604231**
**Int. Cl.[4] H01S *3/08***
**U.S. Cl. 372—101** **18 Claims**

1. An optically table resonator for producing a laser beam, comprising an end mirror means substantially fully reflecting the light and arranged at one end of said resonator, decoupling window means constructed as partially reflecting mirror and arranged at the other end of said resonator, an amplifier part having laser-active medium adapted to be fed with amplifying energy and being substantially coaxially traversed by light several times in opposite direction, at least one separate optical

element arranged within said resonator which is operable to converge the light beam proceeding the direction toward said end mirror means in such a manner that the beam impinging on said end mirror means is considerably smaller in diameter than the diameter of the light beam exiting out of said decoupling



window means, and at least one further optical means in said resonator which is operable to diverge the light beam proceeding in the direction toward said decoupling window means substantially corresponding to the extent of the convergence of the oppositely directed light beam.

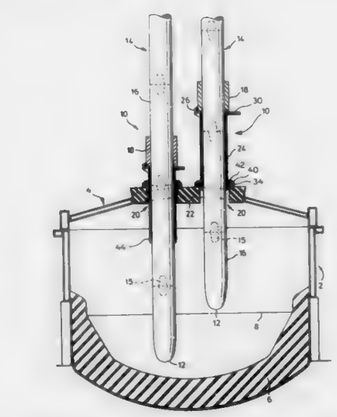
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**4,745,619**

## ELECTRODE ASSEMBLY FOR ELECTRIC ARC FURNACES

**Kurt A. Strobele, 68 Barringham Drive, Oakville, Ontario, L6J 4P2, Canada L6J 4P2**

**Continuation of Ser. No. 547,474, Oct. 31, 1983, abandoned.**
**This application Aug. 13, 1986, Ser. No. 896,294**
**Int. Cl.[4] H05B** *7/12*
**U.S. Cl. 373—96** **10 Claims**



**1**. An electric arc furnace having a roof, a plurality of vertically movable electrode assemblies each comprising a consumable electrode consisting of a plurality of consumable electrode elements coupled end to end in vertical alignment, an electrode clamp in electrical current transfer and frictional engagement with said electrode at a level on the electrode which will be above said furnace roof throughout the range of movement of said electrode, said assemblies having a normal range of movement during operation of the furnace, and an additional range of movement upward clear of the furnace roof, a fluid cooled sleeve fixedly attached to the electrode clamp of each assembly in an orientation in which it extends downwardly from the electrode clamp to form a shroud disposed concentrically around the electrode and depending into the furnace, the electrode being a spaced fit in the sleeve and the sleeve being free of internal structure engaging the electrode, whereby longitudinal movement of the electrode through the electrode clamp is free of resistance by structure depending from said clamp, and free of structure preventing its withdrawal from the furnace, the vertical extent of the sleeve below the clamp being such that its lower end depends beneath the furnace of roof over at least part of the range of vertical movement of the assembly occurring during normal operation of the furnace, and such that the sleeve ends short of arcing proximity to the highest anticipated level at which conductive material will occur within the furnace, the furnace further comprising means for defining a passageway with clearance for the sleeve of each electrode through the furnace roof, the vertical extent of the sleeve being such that it will extend into said passageway throughout its normal range of movement during operation of the furnace, and beneath said passageway during at least part of said range of movement, an annular seal spanning said clearance being provided sliding on the external surface of each sleeve and normally supported by the associated passageway defining means, and means being provided retaining each seal on the external surface of its associated sleeve when the latter is withdrawn from its associated passageway defining means.

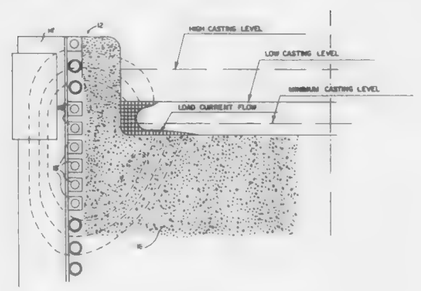
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**4,745,620**

## APPARATUS AND METHOD FOR MAINTAINING CONSTANT MOLTEN METAL LEVEL IN METAL CASTING

**John H. Mortimer, Medford, N.J., assignor to Inductotherm Corporation, Rancocas, N.J.**

**Division of Ser. No. 848,675, Apr. 4, 1986, Pat. No. 4,673,025.**
**This application Nov. 18, 1986, Ser. No. 932,063**
**Int. Cl.[4] H05B** *6/22;* **B22D** *27/02*
**U.S. Cl. 373—152** **3 Claims**




**1**. A coreless induction furnace comprising
a shell,
a non-conductive crucible within the shell, the crucible having an interior cavity whose depth is substantially smaller than the lateral dimensions of the crucible, and
an induction coil within the shell and surrounding the crucible, said coil being in fixed relationship with the crucible and surrounding at least a lower portion of the interior cavity , the length of said coil being at least two times greater than the depth of the crucible and less than the diameter of the coil.

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**4,745,621**

## METHOD OF AND APPARATUS FOR DETECTING MINIMUM BIT NUMBER OF RECEIVED DATA

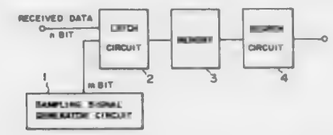
**Hajime Sawaya; Yoshinobu Fukuda, and Hiroyuki Sato, all of Tokyo, Japan, assignors to Ando Electric Co., Ltd., Tokyo, Japan**

**Filed Oct. 2, 1986, Ser. No. 914,685**
**Claims priority, application Japan, Oct. 4, 1985, 60-220297**
**Int. Cl.[4] H03K** *9/06*
**U.S. Cl. 375—10** **6 Claims**

**1**. A method of detecting a minimum bit number from a received digital signal generated by serially transmitting a plurality of bits at a bit transmission rate, comprising the steps



of: sampling said digital signal at a predetermined sampling rate which is substantially greater than said bit transmission rate to thereby obtain a plurality of successive digital data




samples, and searching said data samples so as to determine a value which is the minimum number of successive identical data samples, said value being said minimum bit number.

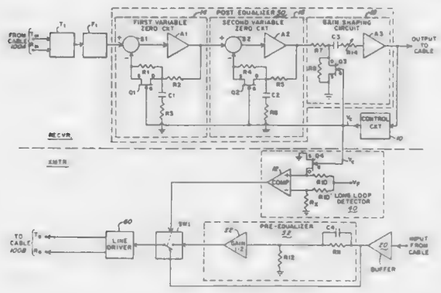
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**4,745,622**

## EQUALIZER FOR DIGITAL TRANSMISSION SYSTEMS

**Dev V. Gupta, Flemington, N.J., assignor to Integrated Network Corporation, Bridgewater, N.J.**

**Filed Jul. 29, 1986, Ser. No. 891,462**
**Int. Cl.[4] H04B** *1/58;* **H03F** *3/04*
**U.S. Cl. 375—14** **21 Claims**



**16**. A method for equalizing the pulse and frequency response of a transmission medium comprising the steps of:
(a) providing a transfer frequency and gain response to electrical analog or pulse signals received from said medium characterized by a variable gain and at least two variable zero frequency locations; and
(b) simultaneously adjusting said zero frequency locations and gain response, in accordance with the signal loss of said medium.

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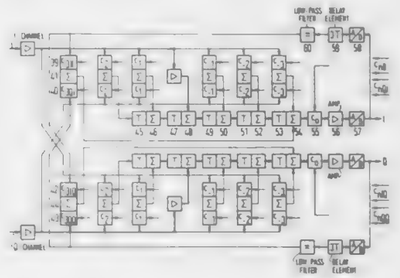
**4,745,623**

## ADAPTIVE TRANSVERSE EQUALIZER

**Georg Sebald, Munich; Berthold Lankl, Landsberg, and Josef A. Nossek, Iffeldorf, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Sep. 25, 1986, Ser. No. 911,675**
**Claims priority, application Fed. Rep. of Germany, Oct. 3, 1985, 3535390**
**Int. Cl.[4] H03H** *7/30;* **H03K** *5/159*
**U.S. Cl. 375—14** **7 Claims**

**1**. An adaptive transverse equalizer, comprising:
a plurality of iteratively connected delay element means each having a delay time T in accordance with a spacing between two successively sent characters;
a plurality of control element means each connected to respective inputs of a summer and having manipulated variables representing coefficients derived from output signals of a decision stage means;
said decision stage means providing (n−1) positive and m negative coefficients set in accordance with a zero-forcing algorithm;
linear transverse filter means forming a decision controlled recursion path for providing at least one additional, positive, decision-fedback coefficient as a correction pulse following upon an access region of said linear transverse filter means and whose loop transit time corresponds to n times or n+i times a symbol period, wherein m is a whole



number≧0, i is a whole number≧1, and n is a whole number≧2; and
wherein the equalizer is a complex transverse equalizer having identically designed equalizers in an I-channel and a Q-channel, feedback paths being provided from the decision stage means output of each channel to a corresponding control element of the same channel and of the other channel.

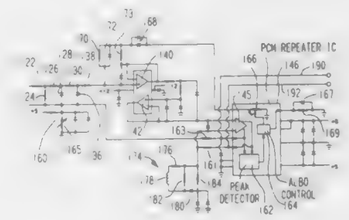
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**4,745,624**

## AUTOMATIC LINE BUILDOUT

**John C. Mantovani, Lilburn, and Larry D. Bishop, Norcross, both of Ga., assignors to Conklin Instrument Corporation, Pleasant Valley, N.Y.**

**Filed Nov. 29, 1985, Ser. No. 802,966**
**Int. Cl.[4] H04L** *25/34*
**U.S. Cl. 375—17** **7 Claims**




**1**. A receiver circuit for restoring a bipolar customer data signal at a bipolar customer data bit rate equal to or less than 250 kb/s, the circuit comprising
customer data input means for receiving serial bipolar input signals from a data transmission line having a length which is between a maximum length producing a maximum permissible signal loss characteristic and a minimum length producing a minimum signal loss characteristic at the customer data frequency;
a PCM integrated circuit repeater designed for use in a circuit restoring 1.544 Mb/s communication signals in transmission lines; said repeater including a repeater amplifier, a peak detector for detecting output signals above a selected magnitude from the repeater amplifier, and voltage responsive resistance means for producing a variable resistance inversely proportional to an output voltage from the peak detector;

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equalizer circuit means connected with the repeater amplifier such that the repeater amplifier produces restored bipolar output signals by fixed amplification and frequency spectrum restoration sufficient to restore original signal magnitude and characteristics to input signals having the maximum signal loss characteristics;

buffer amplifier means having its output connected with the input of the repeater amplifier;

means including series resistance means connecting the customer data input means to the input of the buffer amplifier means; and

a parallel connected resistance and capacitance being connected in series by a coupling capacitance with the repeater voltage responsive resistance means across the input of the buffer amplifier so that the maximum signal loss characteristics are produced in the output signal of the buffer amplifier means.

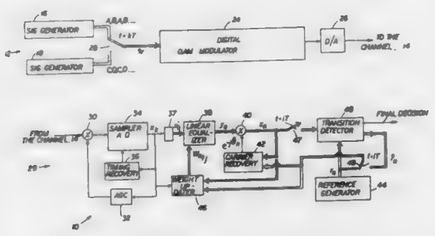
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**4,745,625**

## TRANSITION DETECTOR

**Vedat M. Eyuboglu, Boston, Mass., assignor to Codex Corporation, Mansfield, Mass.**

**Filed Mar. 12, 1986, Ser. No. 839,706**
**Int. Cl.[4] H04L** *27/06*
**U.S. Cl. 375—75** **20 Claims**



1. A receiver comprising

means for deriving from a received signal a sequence of signal points, each said signal point comprising a symbol and a distortion sample, said sequence comprising a first periodic subsequence of said symbols ending at an unknown time instant, and a second periodic subsequence of said symbols beginning at said unknown time instant, one period of each said first and second subsequences being known to said receiver, and

means for determining said unknown time instant from said derived sequence by comparing measures, with respect to said sequence of signal points derived by said receiver, of sequences corresponding to all possible combinations of said first and second subsequences, said combinations corresponding to different possible positions of said unknown time instant.

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**4,745,626**

## DECODER

**Brian D. Wells, Stockport, Great Britain, assignor to International Computers Limited, London, England**

**Filed Mar. 4, 1987, Ser. No. 21,914**
**Claims priority, application United Kingdom, Mar. 12, 1986, 8606028**
**Int. Cl.[4] H04L** *27/22*
**U.S. Cl. 375—87** **9 Claims**

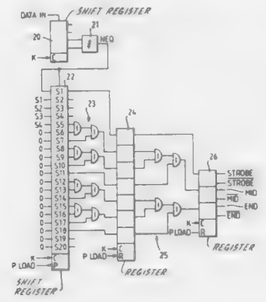
1. A decoder for decoding an encoded data in a self-clocking code, comprising:

(a) a shift register,

(b) means for clocking the shift register at a frequency equal to a multiple of the bit rate of the encoded data,

(c) means for injecting a bit into the shift register to represent each transition in the encoded data, and

(d) a logic network for detecting in the shift register a plurality of bits representing the transitions in a bit cell of the encoded data, the logic network including at least one OR-logic circuit for detecting one of these bits in any one



of a plurality of adjacent stages of the shift register, so as to allow for variations in the timing or the transitions as a result of jitter.

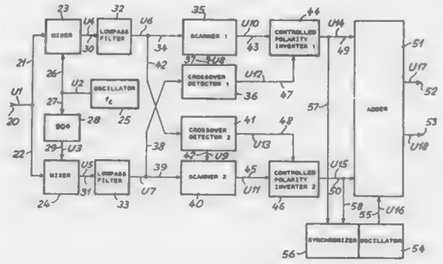
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**4,745,627**

## PROCEDURE AND CIRCUIT FOR DETECTION OF THE INFORMATION OF A RECEIVED SIGNAL

**Andrea Gubser, Dietlikon, Switzerland, assignor to Gesellschaft zur Forderung der Industrieorientierten Forschung an den Schweizerischen Hochschulen und Weiteren Institutionen, Bern, Switzerland**

**PCT No. PCT/CH85/00171, § 371 Date Aug. 7, 1986, § 102(e) Date Aug. 7, 1986, PCT Pub. No. WO86/03643, PCT Pub. Date Jun. 19, 1986**
**PCT Filed Dec. 4, 1985, Ser. No. 905,388**
**Claims priority, application Switzerland, Dec. 7, 1984, 5815/84**
**Int. Cl.[4] H04L** *27/22*
**U.S. Cl. 375—88** **14 Claims**



1. Method for detecting binary information in a received signal, comprising initially demodulating said received signal into a first quadrature signal and a second quadrature signal which is phase shifted by 90 degrees, converting each of said first and second quadrature signals into a sequence of samples corresponding to the amplitude and polarity of the associated quadrature signal at instant of the sampling, whereby the instant of the sampling is controlled dependent on the crossover of the other quadrature signal in each case; inverting or non-inverting the polarity of the samples obtained, dependent upon the directions of the crossovers of the other quadrature signal in each case; whereby the inversion of samples of the first quadrature signal and the inversion of the samples of the second quadrature signal occurs, in each case, at opposite directions of the crossovers of the second quadrature signal and the first quadrature signal, to generate samples with adapted polarities within each individual information bit interval of the received signal from both quadrature signals; summing all samples with adapted polarities within each individual information bit interval of the received signal, and evaluating the preceding sign of the resulting sum as an estimate of the received binary information symbol.



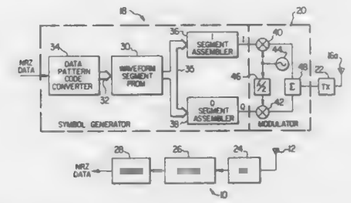
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**4,745,628**

## SYMBOL GENERATOR FOR PHASE MODULATED SYSTEM

**William T. McDavid, Allen, and William W. Bryce, Dallas, both of Tex., assignors to Terra Marine Engineering, Inc., Dallas, Tex.**

**Filed Apr. 15, 1986, Ser. No. 852,200**
**Int. Cl.[4] H04L** *5/12*
**U.S. Cl. 375—39** **21 Claims**



1. A filter for filtering digital data, comprising:

means for receiving a digital data stream containing the digital data;

memory means for storing digital representations of analog waveform segments in predetermined addressable locations, said waveform segments corresponding to the cross-correlation of a predetermined filter function with a predetermined sequence and number of adjacent data bits, there being a plurality of different sequences of adjacent data bits with each predetermined sequence of adjacent data bits corresponding to a unique one of said waveform segments;

address means for examining a frame of adjacent data bits in said data stream, said frame equal in length to said predetermined sequence and number of adjacent data bits, said address means generating an address for addressing one of said waveform segments corresponding to said predetermined number of adjacent data bits in said frame; and

means for assembling said addressed waveform segments into an analog filtered waveform, each of said waveform segments having a duration equal to the duration of each of the data bits in said digital data stream, each increment by one data bit of said data stream providing a new frame for examining by said address means.

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**4,745,629**

## DUTY CYCLE TIMER

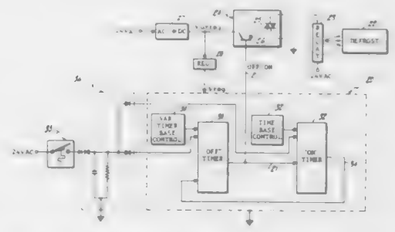
**Thomas W. Essig, and Rajendra K. Shah, both of Fort Wayne, Ind., assignors to United Technologies Corporation, Hartford, Conn.**

**Continuation of Ser. No. 932,769, Sep. 26, 1986, abandoned, which is a continuation of Ser. No. 586,935, Mar. 7, 1984, abandoned. This application Jun. 19, 1987, Ser. No. 61,600**
**Int. Cl.[4] H03K** *17/296, 17/28, 21/38;* **F25D** *21/06*
**U.S. Cl. 377—20** **14 Claims**

1. An improved duty cycle timer for providing a duty cycle control signal, said duty cycle control signal having alternate "on" and "off" intervals of different logic states, said timer comprising:

integrated circuit means including first clock signal generating means for generating a first frequency clock, second clock signal generating means for generating a second frequency clock independent of said first clock, first electronic counting means responsive to said first clock for measuring a predetermined one of said "on" and "off" time intervals and providing a signal representative of the completion thereof, and second electronic counting means responsive to said second clock for measuring the other one of said "on" and "off" time intervals and providing a signal representative of the completion thereof, said first and said second clock signal generating means each being responsive to a two-state "enable or hold" signal to respectively enable or inhibit operation of the respective said clock signal generating means, any count in said first and said second counting means remaining static during application of said "hold" signal thereto;

means for connecting a two-state "enable or hold" signal to said first and second clock signal generating means and having an input terminal adapted to have an AC voltage connected thereto and disconnected therefrom and including rectifying means operatively connected to a "hold" potential and to said first and said second clock



signal generating means for applying an "enabling" DC potential to said clock signal generating means when said AC voltage is connected to said input terminal and for applying said "hold" potential to said clock signal generating means when said AC voltage is disconnected from said input terminal;

circuit means, including resetting circuitry, cross-connecting said first and said second electronic counting means in complementary relation for initiating said measurement of said "on" and said "off" time intervals respectively from a reset condition of the respective one of said first and said second electronic counting means in response to said signals representative of the completion of the preceding said "off" and "on" time intervals respectively; and

wherein said duty cycle control signal is provided by at least one of said first and said second electronic counting means.

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**4,745,630**

## MULTI-MODE COUNTER NETWORK

**George D. Underwood, Inglewood, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Jun. 18, 1986, Ser. No. 875,895**
**Int. Cl.[4] G06F** *11/00;* **H03K** *21/40*
**U.S. Cl. 377—29** **22 Claims**

1. A multi-mode counter network (11) comprising:

a plurality of registers (13, 15, 17, 19 and 21), each of said plurality of registers having an input port and an output port;

a plurality of multiplexers (23, 25, 27, 29 and 31), each of said multiplexers having a plurality of input ports and output ports, each of said multiplexers having an output port connected to an input port of an associated one of said plurality of registers, said multiplexer input ports including a counting input port and a testing input port;

counter enable circuitry (33, 35, 37 and 39) connected to the counting input port (I0) of at least one of said multiplexers;

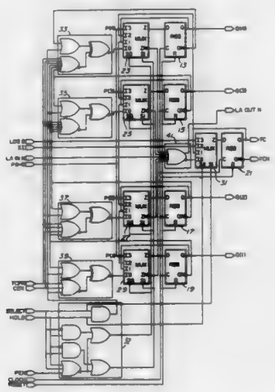
a test pattern data stream input port (SI) connected to the testing input port (I2) of at least one of said multiplexers; and

multiplexer control logic circuitry (32) selectively control-

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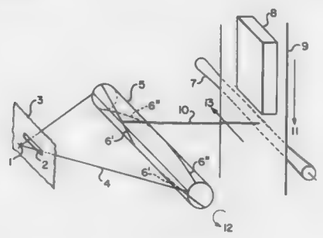
ling said multiplexers so that selected input ports of each multiplexer are connected to that multiplexer's output port and thereby to the input port of said associated one of the plurality of registers so that said multiplexers operate in one of a plurality of operational modes, said operational modes including a counting mode wherein multiplexers are controlled to connect the counter enable circuitry to



the plurality of registers for the purpose of generating a counter output signal at a predetermined counter cyce rate, and also including a testing mode wherein the plurality of multiplexers are controlled to connect the test pattern data stream input port to the plurality of registers for the purpose of serially shifting a test pattern through said plurality of registers.

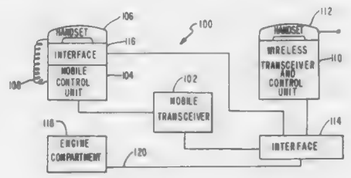
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**4,745,631**
**FLYING SPOT GENERATOR**
Francis R. Paolini, Stamford, Conn., assignor to North American Philips Corp., New York, N.Y.
Filed Dec. 27, 1982, Ser. No. 453,420
Int. Cl.[4] G21K *1/02, 5/10;* H04N *3/04, 5/32*
U.S. Cl. 378—146 12 Claims



1. A flying spot generator comprising
first means for forming a beam of radiation,
second means for generating a flying spot of said radiation from said beam, said second means including a rotating cylinder having an even number of helical slots through which said beam passes to form said flying spot, said first means being located outside of the region occupied by said second means,
third means for placing objects to be inspected in said flying spot, and
fourth means for detecting said flying spot after traversing through said objects.

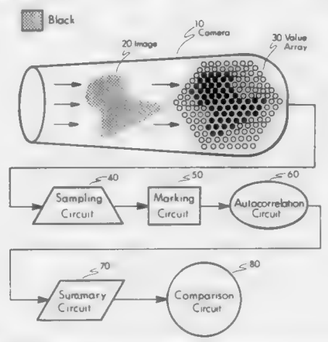
**4,745,632**
**WIRELESS MOBILE TELEPHONE COMMUNICATION SYSTEM**
Anthony G. Duffy, 9036 Wall St., North Bergen, N.J. 07047
Filed Dec. 27, 1985, Ser. No. 814,215
Int. Cl.[4] H04B *1/40*
U.S. Cl. 379—58 16 Claims




1. Apparatus for interconnecting a wireless telephone unit and a mobile telephone unit, said mobile telephone unit having a handset and mobile control unit with said mobile control unit having an off-hook detector therein, said apparatus enabling communications initiated at said wireless telephone unit to be transmitted through said mobile control unit and to enable external communications directed to said mobile telephone unit to be received at said wireless telephone unit via said mobile control unit, said apparatus comprising:
first means for coupling signals to and receiving signals from a mobile telephone unit; and
second means for interconnecting a wireless telephone unit to said first means,
said first means including means for applying signals generated at said wireless telephone unit to said mobile telephone unit and for applying external signals received by said mobile telephone unit to said second means, said first and second means cooperating to enable communications initiated at said wireless telephone unit to be further transmitted through said mobile telephone unit and to enable external communications directed to said mobile telephone unit to be received at said wireless telephone unit.

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**4,745,633**
**OPTICAL IMAGE ENCODING AND COMPARING USING SCAN AUTOCORRELATION**
Peter Waksman, 54 Minot Rd., Concord, Mass. 01742, and Ernest Greene, P.O. Box 413, Sun Valley, Calif. 91352
Filed Aug. 18, 1986, Ser. No. 897,780
Int. Cl.[4] G06K *9/36, 9/64*
U.S. Cl. 382—56 20 Claims

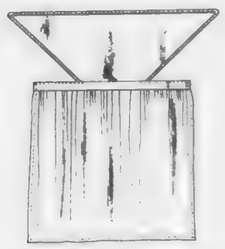



1. A system for encoding information from the optical image of a camera, comprising,
(a) means for representing a predetermined characteristic of said image by an array of values,
(b) means for sampling an ordered sequence of the values of said array, and for marking transitions in said ordered sequence by a sequence of marker values, and
(c) means for autocorrelating said sequence of marker values to provide an autocorrelation function for said sequence of marker values, and thus for said ordered sequence.

# DESIGNS

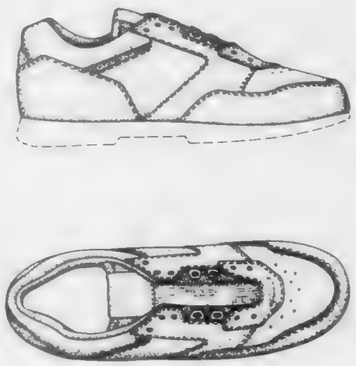
MAY 17, 1988

**295,685**
**DRESS OR SIMILAR ARTICLE**
Carole Dost, 118 Madison Ave., #12, New York, N.Y. 10016
Filed Nov. 18, 1985, Ser. No. 805,466
Term of patent 14 years
U.S. Cl. D2—72



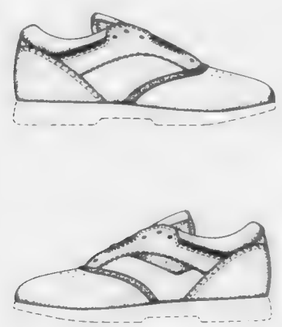
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**295,687**
**SHOE UPPER**
Lawrence Selbiger, Portland, and David Cousin, Tualatin, both of Oreg., assignors to AVIA Group International, Inc., Portland, Oreg.
Filed Aug. 21, 1987, Ser. No. 87,750
Term of patent 14 years
U.S. Cl. D2—314



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**295,686**
**SHOE UPPER**
Lawrence Selbiger, Portland, and David Cousin, Tualatin, both of Oreg., assignors to AVIA Group International, Inc., Portland, Oreg.
Filed Aug. 21, 1987, Ser. No. 87,749
Term of patent 14 years
U.S. Cl. D2—314



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**295,688**
**ELEMENT OF A SHOE UPPER**
Paul D. Brown, Hingham, and Tuan Le, Cohasset, both of Mass., assignors to Reebok International Ltd., Canton, Mass.
Filed Sep. 4, 1987, Ser. No. 93,521
Term of patent 14 years
U.S. Cl. D2—314



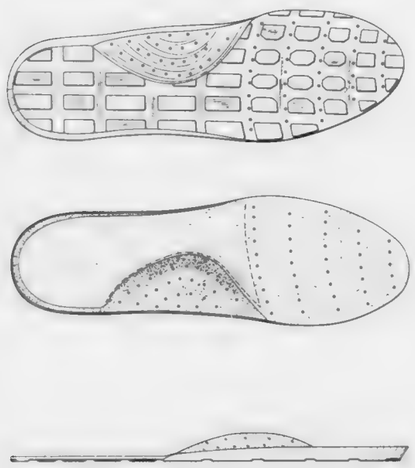
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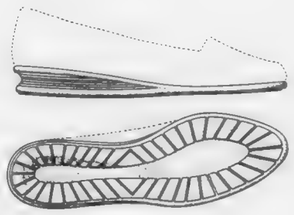
295,689
SHOE UPPER
Juan A. Diaz, Weymouth, and Paul D. Brown, Hingham, both of Mass., assignors to Reebok International Ltd., Canton, Mass.
Filed Jul. 16, 1987, Ser. No. 74,162
Term of patent 14 years
U.S. Cl. D2—314



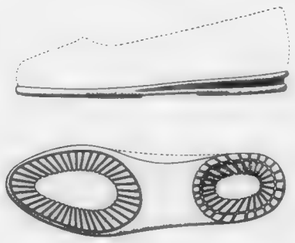
295,690
INNERSOLE
Norman H. Finn, Newton, Mass., assignor to The United States Shoe Corporation, Cincinnati, Ohio
Filed Mar. 18, 1986, Ser. No. 845,056
Term of patent 14 years
U.S. Cl. D2—318



295,691
SHOE SOLE
Gary Zuidema, Rohnert Park; John Schelling, Orinda, and Steve Dodds, Novato, all of Calif., assignors to The Donner Mountain Corporation, San Rafael, Calif.
Filed Jun. 15, 1987, Ser. No. 61,384
Term of patent 14 years
U.S. Cl. D2—320



295,692
SHOE SOLE
Gary Zuidema, Rohnert Park; John Schelling, Orinda, and Steve Dodds, Novato, all of Calif., assignors to The Donner Mountain Corporation, San Rafael, Calif.
Filed Jun. 15, 1987, Ser. No. 61,385
Term of patent 14 years
U.S. Cl. D2—320





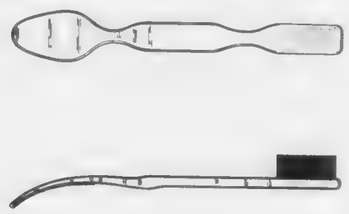
295,693
UMBRELLA HANDLE
Ann S. Cain, Cincinnati, Ohio, assignor to 'totes', Incorporated, Loveland, Ohio
Filed Oct. 28, 1987, Ser. No. 114,151
Term of patent 14 years
U.S. Cl. D3—12



295,694
CANE HANDLE
Ronald L. Mace, Raleigh, N.C., assignor to Jung Corporation, Cincinnati, Ohio
Filed Jul. 26, 1985, Ser. No. 759,277
Term of patent 14 years
U.S. Cl. D3—16



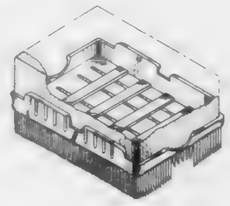
295,695
COMBINATION TOOTH BRUSH AND TONGUE SCRAPER
Iraj Golzari, 924 Bird Bay Way, Venice, Fla. 33595
Filed Sep. 11, 1986, Ser. No. 906,160
Term of patent 14 years
U.S. Cl. D4—105



295,696
HAND SHOWER AND MASSAGE BRUSH
Thomas Larsen, Kindhestegade 11, 3. tv., 4700 Naestved, Denmark
Filed May 20, 1986, Ser. No. 865,247
Claims priority, application Denmark, Nov. 25, 1985, 1013/85
Term of patent 14 years
U.S. Cl. D4—115



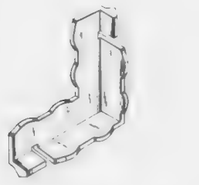
295,697
COMBINED BRUSH AND SPONGE
Jack W. Kaufman, 357 Frankel Blvd., Merrick, N.Y. 11566
Filed Mar. 24, 1986, Ser. No. 845,773
Term of patent 14 years
U.S. Cl. D4—120

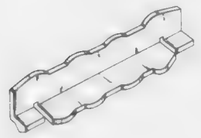


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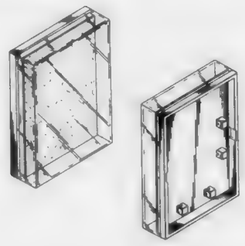


295,698
**CONNECTOR FOR PICTURE FRAME**
Takeo Komamura, Matsudo, Japan, assignor to Japan Art Kikaku Co., Ltd., Saitama, Japan
Filed Jul. 16, 1984, Ser. No. 630,972
Claims priority, application Japan, Jul. 18, 1983, 58-111122[U]; Jul. 18, 1983, 58-111123[U]; Jul. 18, 1983, 58-111124[U]; Jul. 18, 1983, 58-111125[U]; Jul. 18, 1983, 58-111126[U]
Term of patent 14 years
U.S. Cl. D6—300





295,699
**PICTURE FRAME**
Edgar A. Purdy, Easton, Pa., assignor to MCS Industries, Inc., Easton, Pa.
Filed Jul. 5, 1985, Ser. No. 752,270
Term of patent 14 years
U.S. Cl. D6—310



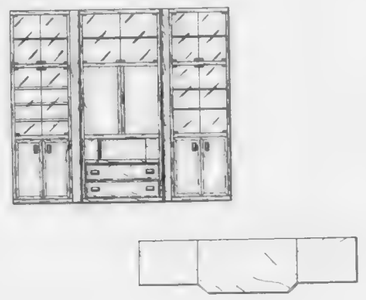
295,700
**CLOTHES HANGER BODY**
Jeff Jaffe, 4525 White Cedar La., Delray Beach, Fla. 33445
Filed Apr. 22, 1986, Ser. No. 857,441
Term of patent 14 years
U.S. Cl. D6—319



295,701
**CHAIR**
Peter de Boer, Pr.Margrietplantsoen 45, 1403 SV Bussum, Netherlands
Filed Dec. 19, 1984, Ser. No. 683,682
Claims priority, application Benelux, Jun. 22, 1984, 59102 02
The portion of the term of this patent subsequent to Sep. 1, 2001, has been disclaimed.
Term of patent 14 years
U.S. Cl. D6—366

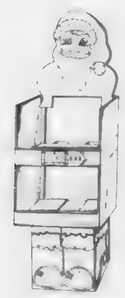


295,702
**ENTERTAINMENT CABINET UNIT**
Gary A. Huffstetler, Lenoir, N.C., assignor to Broyhill Furniture Industries, Inc., Lenoir, N.C.
Filed Feb. 24, 1987, Ser. No. 18,132
Term of patent 14 years
U.S. Cl. D6—436

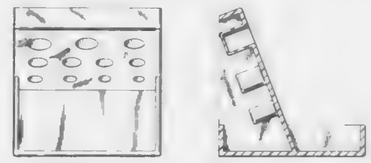




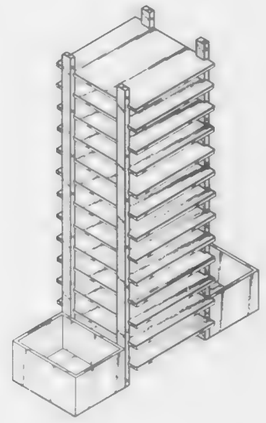
295,703
**DISPLAY STAND**
Niels Astrup, Glostrup/Copenhagen, Denmark, assignor to Petzold & Aulhorn (GmbH & Co. KG)
Filed Dec. 12, 1985, Ser. No. 808,337
Claims priority, application Fed. Rep. of Germany, Jun. 12, 1985, 66 MR 12 268
Term of patent 14 years
U.S. Cl. D6—453



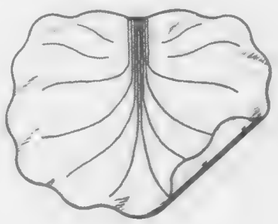
295,704
**STORAGE AND DISPLAY STAND FOR HOLE CUTTING SAWS**
Roger J. Despres, 9630 El Rey Ave., No. 13, Fountain Valley, Calif. 92708
Filed Nov. 15, 1985, Ser. No. 805,217
Term of patent 14 years
U.S. Cl. D6—469



295,705
**COMBINED SHELF AND STORAGE UNIT**
Morris E. Cornelius, Box 91, Yale, Iowa 50277
Filed Jul. 25, 1985, Ser. No. 759,106
Term of patent 14 years
U.S. Cl. D6—479



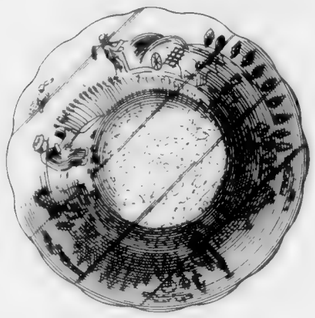
295,706
**COMFORTER OR SIMILAR ARTICLE**
Patricia M. Judiscak, 5714 E. Sandy La., Scottsdale, Ariz. 85254-4262
Filed Aug. 22, 1985, Ser. No. 768,061
Term of patent 14 years
U.S. Cl. D6—600

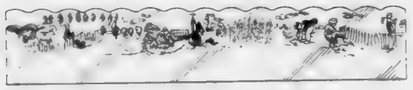


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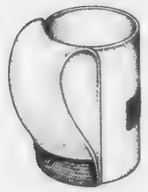


295,707
**BOWL OR SIMILAR ARTICLE**
Jean-Jacques Durand, LaBute 62510, Arques, France
Filed Aug. 29, 1985, Ser. No. 770,516
Term of patent 14 years
U.S. Cl. D7—24

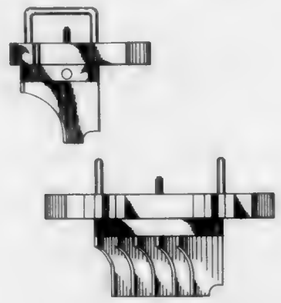




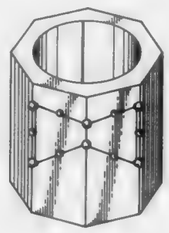
295,709
**CAN HOLDER**
John C. Evans, and John E. Blair, both of North Webster, Ind., assignors to Kover-Up, Inc., North Webster, Ind.
Filed Oct. 7, 1985, Ser. No. 785,262
Term of patent 14 years
U.S. Cl. D7—70



295,708
**DOUGH SLICER AND GROOVER**
Roger Castonguay, P.O. Box 7266, Lewiston, Me. 04240
Filed Nov. 14, 1985, Ser. No. 805,146
Term of patent 14 years
U.S. Cl. D7—43

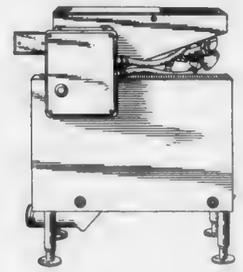


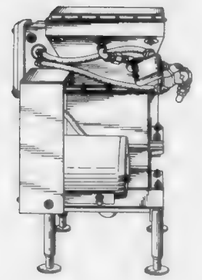
295,710
**LIGHTED BEVERAGE COOLER**
Larry T. Hero, R.R.-3, Box 707, Monticello, Ind. 47960
Filed Jul. 25, 1985, Ser. No. 758,869
Term of patent 14 years
U.S. Cl. D7—77



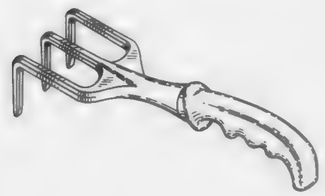


295,711
**ELECTRIC GARBAGE DISPOSAL**
James M. Carbone, Snyder, N.Y., assignor to 240 Michigan Street, Inc., Lockport, N.Y.
Filed Jul. 3, 1985, Ser. No. 751,807
Term of patent 14 years
U.S. Cl. D7—375

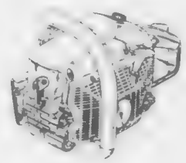




295,712
**HAND CULTIVATOR**
Gary M. Scott, Milwaukie, Oreg., assignor to Wallace Mfg. Co., Enfield, Conn.
Filed Aug. 5, 1987, Ser. No. 81,904
Term of patent 14 years
U.S. Cl. D8—13

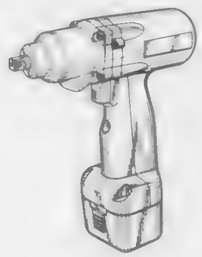


295,713
**POWER CHAINSAW MOTOR HOUSING**
Akira Nagashima, Kawasaki; Hiroshi Takahashi, Ichikawa, and Toshio Taomo, Tokyo, all of Japan, assignors to Kioritz Corporation, Tokyo, Japan
Filed Jun. 19, 1984, Ser. No. 622,184
Term of patent 14 years
U.S. Cl. D8—65





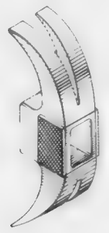
295,714
**CORDLESS IMPACT WRENCH**
Yuichiro Sasaki, and Takao Tanabe, both of Ibaragi, Japan, assignors to Hitachi Koki Co., Ltd., Tokyo, Japan
Filed Sep. 5, 1986, Ser. No. 904,306
Term of patent 14 years
U.S. Cl. D8—68



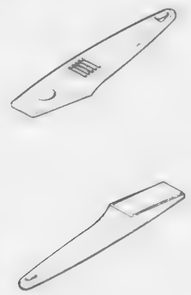
VOL
1090
ISS
3
MY
17
1988
UMI



295,715
**DOUBLE NAIL PULLER WITH NAILER**
Lamills A. Garrett, 2033 Atlas Rd., Columbia, S.C. 29209
Filed Mar. 31, 1986, Ser. No. 847,590
Term of patent 14 years
U.S. Cl. D8—79



295,716
**WHETSTONE**
Takeshi Shohoji, and Yutaka Kanamaru, both of Tokyo, Japan, assignors to Ryobi Limited, Hiroshima, Japan
Filed Mar. 5, 1985, Ser. No. 708,282
Claims priority, application Japan, Sep. 11, 1984, 59-37810
Term of patent 14 years
U.S. Cl. D8—91



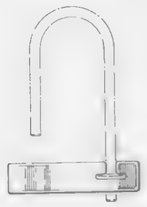
295,717
**EXTENSION LEVER ATTACHMENT FOR A MOTOR VEHICLE DOOR HANDLE**
William J. Driscoll, 15225 Meredith State Rd., Sunbury, Ohio 43074
Filed Sep. 13, 1985, Ser. No. 775,786
Term of patent 14 years
U.S. Cl. D8—300



295,718
**CLOSER FOR SLIDING DOORS**
Ronald B. Peterson, 5312 Arbutus St., Arvada, Colo. 80002
Filed Aug. 8, 1986, Ser. No. 894,639
Term of patent 14 years
U.S. Cl. D8—330

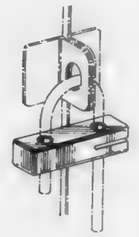


295,719
**SEAL LOCK BODY**
Carlo B. DeLuca, and John J. Klosin, both of Ormond Beach, Fla., assignors to Homac Mfg. Company, Ormond Beach, Fla.
Filed Sep. 18, 1986, Ser. No. 909,076
Term of patent 14 years
U.S. Cl. D8—331





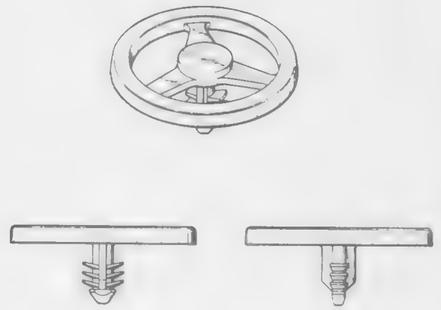
295,720
**SEAL LOCK BODY**
Carlo B. DeLuca, and John J. Klosin, both of Ormond Beach, Fla., assignors to Homac Mfg. Company, Ormond Beach, Fla.
Filed Sep. 18, 1986, Ser. No. 909,458
Term of patent 14 years
U.S. Cl. D8—331



295,721
**SECURITY CABLE**
Steven G. Marshall, 70 Chestnut Ct., Belle Mead, N.J. 08502
Filed Mar. 19, 1986, Ser. No. 845,360
Term of patent 14 years
U.S. Cl. D8—333



295,722
**PANEL FASTENER OR THE LIKE**
Hiroshi Osada, Yokohama, Japan, assignor to Nifco Inc., Yokohama, Japan
Filed Nov. 19, 1985, Ser. No. 805,759
Claims priority, application Japan, May 24, 1985, 60-21320
The portion of the term of this patent subsequent to May 24, 2002, has been disclaimed.
Term of patent 14 years
U.S. Cl. D8—382



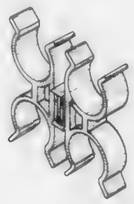
295,723
**RETAINER CLAMP FOR ELONGATED BODIES OR THE LIKE**
Mitsugu Shioda, Yokohama, Japan, assignor to Nifco Inc., Yokohama, Japan
Filed Jun. 4, 1986, Ser. No. 870,682
Claims priority, application Japan, Dec. 6, 1985, 60-50876
Term of patent 14 years
U.S. Cl. D8—396



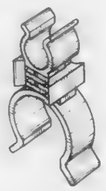
VOL
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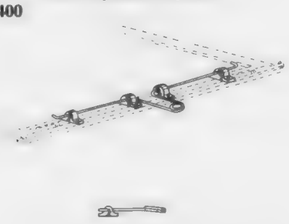
295,724
**RETAINER CLAMP FOR ELONGATED BODIES OR THE LIKE**
Mitsugu Shioda, Yokohama, Japan, assignor to Nifco Inc., Yokohama, Japan
Filed Jun. 4, 1986, Ser. No. 870,681
Claims priority, application Japan, Dec. 6, 1985, 60-50874
Term of patent 14 years
U.S. Cl. D8—396



295,725
**RETAINER CLAMP FOR ELONGATED BODIES OR THE LIKE**
Mitsugu Shioda, Yokohama, Japan, assignor to Nifco Inc., Yokohama, Japan
Filed Jun. 4, 1986, Ser. No. 870,680
Claims priority, application Japan, Dec. 6, 1985, 60-50877
Term of patent 14 years
U.S. Cl. D8—396



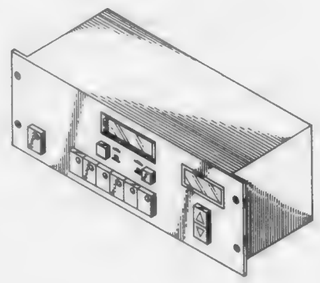
295,726
**WINDOW OPENER**
Martin L. Todd, R.R. #1, Box 125f, Cairo, Nebr. 68824, and Denzel R. Busick, P.O. Box 790, Grand Island, Nebr. 68802
Filed Feb. 14, 1985, Ser. No. 701,757
Term of patent 14 years
U.S. Cl. D8—400



295,727
**BAG HOLDER**
Francis A. Clarke, 198 Main Road, Lower Plenty, Victoria 3093, Australia
Filed Aug. 12, 1985, Ser. No. 764,565
Claims priority, application Australia, May 17, 1985, 1267/85
Term of patent 14 years
U.S. Cl. D9—434



295,728
**ELECTRONIC VISUAL METRONOME**
Loren E. Berry, 902 E. Acton, Woodriver, Ill. 62095
Filed Jun. 17, 1985, Ser. No. 745,189
Term of patent 14 years
U.S. Cl. D10—43

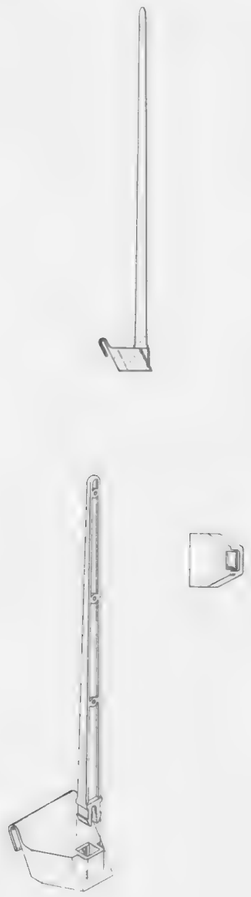


295,729
**WRIST WATCH**
Yoshiko Suzuki, Ohme, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan
Filed Oct. 23, 1985, Ser. No. 790,414
Claims priority, application Japan, May 14, 1985, 60-19819
Term of patent 14 years
U.S. Cl. D10—39

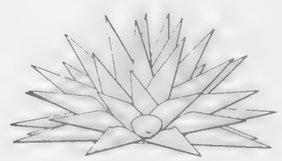


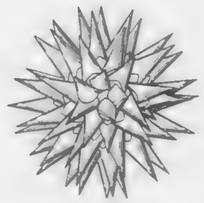


295,730
**COMBINED FLAGSTAFF AND SUPPORT BASE BRACKET**
Richard J. Blackburn, 2607 W. 68th St., Tulsa, Okla. 74132
Filed Aug. 30, 1985, Ser. No. 771,038
Term of patent 14 years
U.S. Cl. D11—182

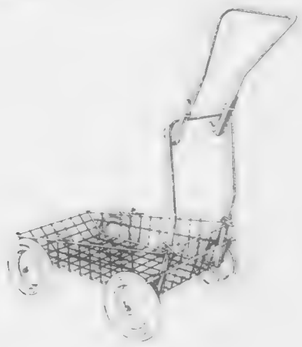


295,731
**GIFTWRAP DECORATION**
James D. Mancel, Brampton, Canada, assignor to Rainbow Star Licensing S.A., Fribourg, Switzerland
Filed Mar. 1, 1985, Ser. No. 707,151
Claims priority, application Canada, Oct. 19, 1984, 19-10-84-2
Term of patent 14 years
U.S. Cl. D11—184





295,732
**SULKY**
Sune Nilsson, Falkenberg, Sweden, assignor to Bröderna Holmbergs Fabriks AB, Anderstorp, Sweden
Filed Jul. 19, 1985, Ser. No. 756,595
Claims priority, application Sweden, Feb. 8, 1985, 85-0309
Term of patent 14 years
U.S. Cl. D12—19



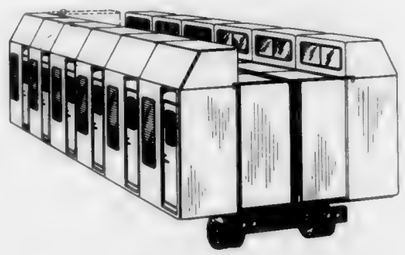
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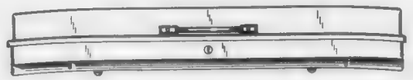
295,733
**TIRE**
Georges Adam, Bissen, and René Goergen, Colmar-Berg, both of, Luxembourg, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio
Filed Oct. 25, 1985, Ser. No. 803,769
Claims priority, application Int'l Pat. Institute, Aug. 2, 1985, 30495
Term of patent 14 years
U.S. Cl. D12—143

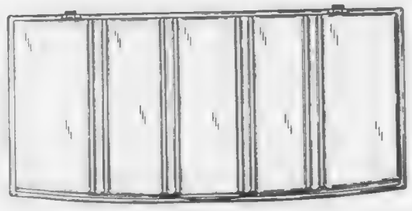


295,734
**MOBILE LIVING QUARTERS UNIT**
Gerald L. Barber, 10 Whittington Ct., and Wayne P. Comstock, 23 Selwyn Dr., both of Greenville, S.C. 29615
Filed Apr. 30, 1984, Ser. No. 605,381
Term of patent 14 years
U.S. Cl. D12—104

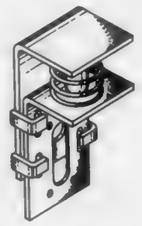


295,735
**VEHICLE LUGGAGE CARRIER**
Charles S. Fox, 8516 Dogwood, Germantown, Tenn. 38138
Filed Dec. 30, 1985, Ser. No. 814,377
Term of patent 14 years
U.S. Cl. D12—157





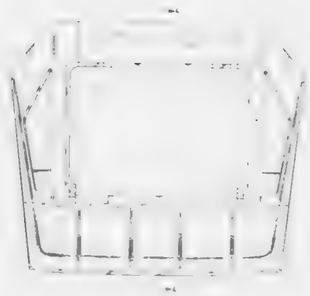
295,736
**COMBINED VEHICLE SUSPENSION AND SHOCK ABSORBER**
James C. Dickey, 45199 Rector Dr., Canton, Mich. 48188
Filed Nov. 27, 1985, Ser. No. 806,928
Term of patent 14 years
U.S. Cl. D12—159





295,737
**AUTOMOTIVE REAR DECK BEZEL**
George B. Kobel, 3039 Single Peak, San Antonio, Tex. 78261
Filed Dec. 3, 1985, Ser. No. 804,171
Term of patent 14 years
U.S. Cl. D12—196



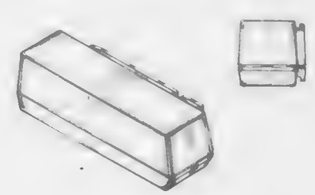


295,738
**WIND SPUN PROPELLER DRIVEN AUTOMOBILE HOOD ORNAMENT**
Vincent Federico, R.D. 6 Box 403-B Rte. 571, Jackson, N.J. 08527
Filed Jul. 1, 1985, Ser. No. 753,043
Term of patent 14 years
U.S. Cl. D12—197

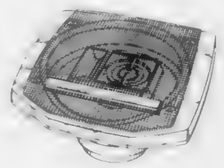




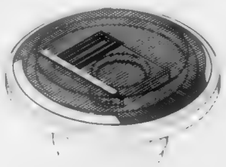
295,739
**BATTERY PACK FOR A PORTABLE DEFIBRILLATOR**
Dennis M. Lanci, Redmond, and Mike M. Paull, Seattle, both of Wash., assignors to Physio-Control Corporation, Redmond, Wash.
Filed Apr. 18, 1985, Ser. No. 724,597
Term of patent 14 years
U.S. Cl. D13—5



295,740
**SPEAKER**
Shu Takahara, Tokyo, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan
Filed Jun. 17, 1985, Ser. No. 744,877
Claims priority, application Japan, Jan. 19, 1985, 60-1527
Term of patent 14 years
U.S. Cl. D14—30



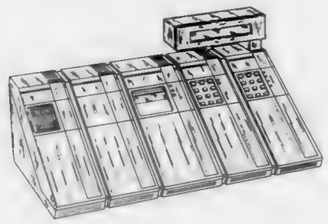
295,741
**SPEAKER**
Noboru Keitoku, Tokyo, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan
Filed Jul. 8, 1985, Ser. No. 752,684
Claims priority, application Japan, Mar. 18, 1985, 60-10695
Term of patent 14 years
U.S. Cl. D14—30



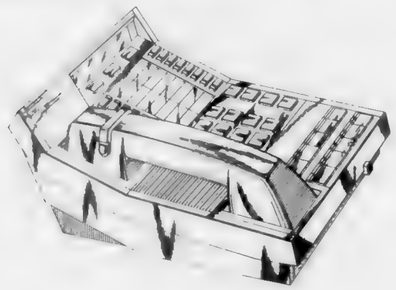
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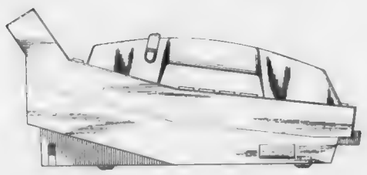


295,742
MODULAR TELEPHONE ANSWERING SET
Konrad Ellermeier, Gaaden, Austria, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Aug. 18, 1986, Ser. No. 897,699
Claims priority, application Benelux, Feb. 26, 1986, 60894-01
Term of patent 14 years
U.S. Cl. D14—52



295,743
MODULAR TELEPHONE UNIT
Sandor F. Weisz, Stamford, Conn., and Andrew J. Blance, Mamaroneck, N.Y., assignors to Dictaphone Corporation, Rye, N.Y.
Filed Aug. 8, 1986, Ser. No. 894,585
Term of patent 14 years
U.S. Cl. D14—58



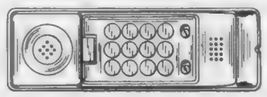


295,744
TELEPHONE BASE
Kenneth L. Reichenstein, 269-32P Grand Central Pkwy., Floral Park, N.Y. 11005
Filed Jun. 20, 1986, Ser. No. 876,909
Term of patent 14 years
U.S. Cl. D14—62





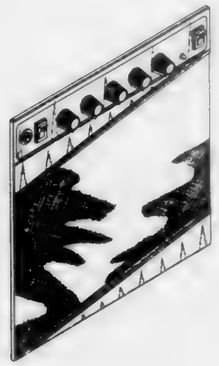
295,745
TELEPHONE HANDSET
Kenneth L. Reichenstein, 269-32P Grand Central Pkwy., Floral Park, N.Y. 11005
Filed Jun. 20, 1986, Ser. No. 876,907
Term of patent 14 years
U.S. Cl. D14—64



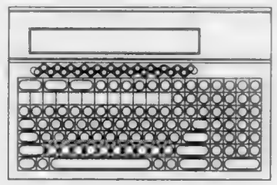




295,746
FRONT PANEL FOR AN AMPLIFIER OR THE LIKE
Stephen T. Ridinger, San Juan Capistrano, Calif., assignor to Evets Corporation, Irvine, Calif.
Filed Jun. 21, 1985, Ser. No. 747,320
Term of patent 14 years
U.S. Cl. D14—96

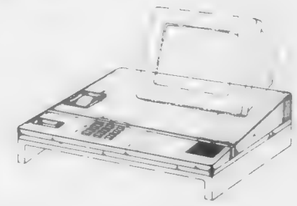


295,747
KEYBOARD
Kenneth H. Grange, and Johan C. Santer, both of London, England, assignors to Reuters Limited, London, England
Filed Jan. 9, 1985, Ser. No. 689,999
Claims priority, application United Kingdom, Jul. 27, 1984, 1021162
Term of patent 14 years
U.S. Cl. D14—100

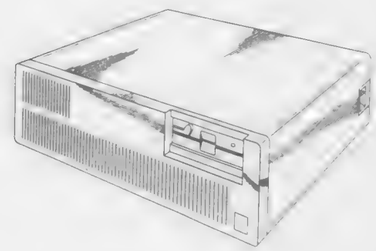




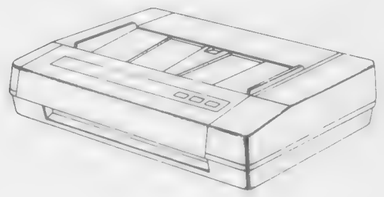
295,748
BASE FOR COMPUTER, COMPUTER TERMINAL OR SIMILAR ARTICLE
Alvin D. Day, San Jose, Calif.; Stephen G. Miggels, Wyckoff, N.J.; Michael J. Nuttall, Palo Alto, Calif., and Gordon E. Sylvester, Jamaica, N.Y., assignors to American Telephone & Telegraph Company, New York, N.Y.; AT&T Information Systems Inc., Morristown, N.J. and Convergent Technologies, Inc., Santa Clara, Calif.
Division of Ser. No. 715,191, Mar. 22, 1985, Pat. No. Des. 290,703. This application Jul. 1, 1987, Ser. No. 69,558
Term of patent 14 years
U.S. Cl. D14—100



295,749
DATA PROCESSOR
Ted F. Kelley, Jr., Boca Raton, Fla., and Richard W. Marklin, Jr., Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed May 30, 1985, Ser. No. 739,342
Term of patent 14 years
U.S. Cl. D14—100



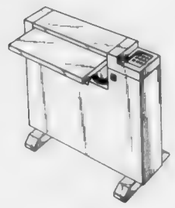
295,750
IMAGE SCANNER
Akira Imai, Kanagawa, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan
Filed Apr. 24, 1985, Ser. No. 726,625
Claims priority, application Japan, Oct. 24, 1984, 59-044012
Term of patent 14 years
U.S. Cl. D14—107



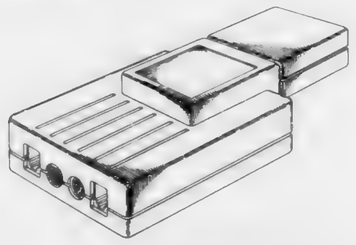
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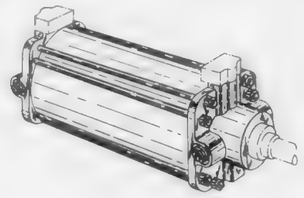
295,751
**READER FOR IMAGE INFORMATION STORING/RETRIEVING MACHINE**
Shigeru Sutoh, Saitama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Oct. 31, 1985, Ser. No. 793,222
Claims priority, application Japan, May 20, 1985, 60-20498
Term of patent 14 years
U.S. Cl. D14—107

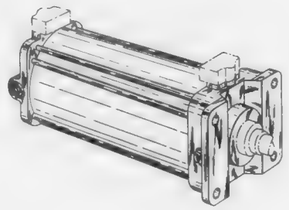


295,752
**MODEM**
William MacKenzie, San Jose, and Stephen Peart, Los Gatos, both of Calif., assignors to Apple Computer, Inc., Cupertino, Calif.
Filed Jul. 17, 1985, Ser. No. 755,815
Term of patent 14 years
U.S. Cl. D14—107



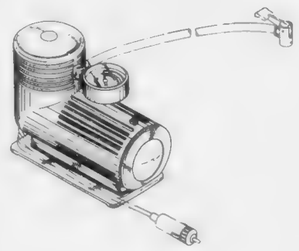
295,753
**AIR CYLINDER**
Richard L. LaBair, Pontiac, Mich., assignor to Peninsular, Inc., Roseville, Mich.
Filed Apr. 28, 1986, Ser. No. 857,780
Term of patent 14 years
U.S. Cl. D15—7





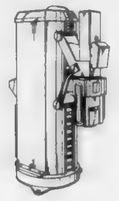


295,754
**AIR COMPRESSOR FOR TIRE INFLATION**
Ta-Chin Wang, No. 269, An Ho Rd., Sec. 2, Tainan City, Taiwan
Filed Jun. 11, 1985, Ser. No. 743,522
Claims priority, application Taiwan, Jan. 12, 1985, 7430016
Term of patent 14 years
U.S. Cl. D15—9

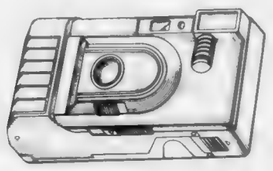




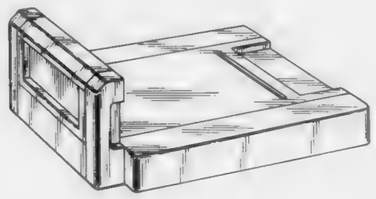
295,755
**INDUSTRIAL ROBOT**
Akifumi Inoue, and Koshiro Takeda, both of Hamamatsu, Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Japan
Filed Jun. 6, 1985, Ser. No. 741,820
Claims priority, application Japan, Dec. 25, 1984, 59-53365
Term of patent 14 years
U.S. Cl. D15—199



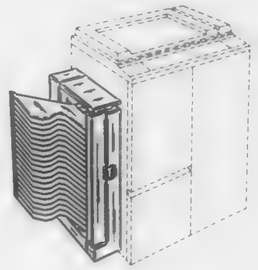
295,756
**CAMERA**
Toshiya Ando, Murayama, and Tomihiro Kaneko, Tokyo, both of Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan
Filed Oct. 10, 1985, Ser. No. 786,281
Claims priority, application Japan, Apr. 30, 1985, 60-18060
Term of patent 14 years
U.S. Cl. D16—6



295,757
**SHEET TRANSFER MACHINE FOR DOUBLE-SIDED COPYING**
Tooru Okuyama, Isehara, and Kunio Hara, Chiba, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Oct. 30, 1985, Ser. No. 792,853
Term of patent 14 years
U.S. Cl. D16—32



295,758
**SORTER**
Mikio Kosako, Osaka, Japan, assignor to Sharp Corporation, Osaka, Japan
Filed Oct. 11, 1985, Ser. No. 786,864
Claims priority, application Japan, Apr. 16, 1985, 60-15975
Term of patent 14 years
U.S. Cl. D16—32



295,759
**COMBINED MUSICAL INSTRUMENT AND MICROPHONE**
Robert A. Kolich, East Aurora, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.
Filed Oct. 10, 1985, Ser. No. 786,195
Term of patent 14 years
U.S. Cl. D17—99



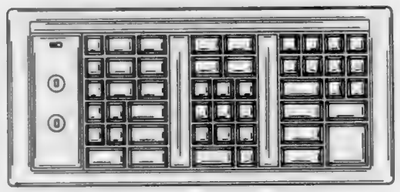
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295,760
**ELECTRONIC MUSIC GENERATOR**
Yasuhito Kudo, Nagano, Japan, assignor to Kabushiki Kaisha Sankyo Seiki Seisakusho, Japan
Filed Jul. 8, 1985, Ser. No. 752,689
Term of patent 14 years
U.S. Cl. D17—99



295,761
**KEYBOARD FOR CASH REGISTER**
Hiroshi Nishibori, and Akira Tsukada, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Sep. 6, 1985, Ser. No. 773,453
Claims priority, application Japan, Mar. 7, 1985, 60-9413
Term of patent 14 years
U.S. Cl. D18—4





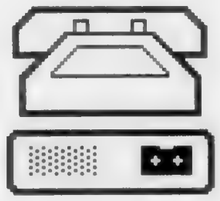
295,762
**ICON FOR PHYSICAL FLOPPY DRIVE OR THE LIKE**
Doris E. Wells-Papanek; William L. Verplank, both of Menlo Park, and Norman L. Cox, Mountain View, all of Calif., assignors to Xerox Corporation, Stamford, Conn.
Filed Dec. 9, 1985, Ser. No. 806,723
Term of patent 14 years
U.S. Cl. D18—27



295,763
**ICON FONT OR THE LIKE**
Doris E. Wells-Papanek; William L. Verplank, both of Menlo Park, and Norman L. Cox, Mountain View, all of Calif., assignors to Xerox Corporation, Stamford, Conn.
Filed Dec. 9, 1985, Ser. No. 807,003
Term of patent 14 years
U.S. Cl. D18—27



295,764
**ICON FOR TELEPHONE OR THE LIKE**
Doris E. Wells-Papanek; William L. Verplank, both of Menlo Park, and Norman L. Cox, Mountain View, all of Calif., assignors to Xerox Corporation, Stamford, Conn.
Filed Dec. 9, 1985, Ser. No. 806,721
Term of patent 14 years
U.S. Cl. D18—27

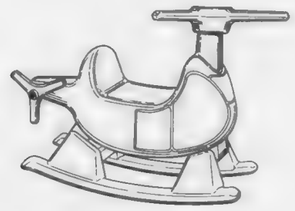




295,765
**ICON FOR EMULATED FIXED DISK OR THE LIKE**
Doris E. Wells-Papanek; William L. Verplank, both of Menlo Park, and Norman L. Cox, Mountain View, all of Calif., assignors to Xerox Corporation, Stamford, Conn.
Filed Dec. 9, 1985, Ser. No. 806,724
Term of patent 14 years
U.S. Cl. D18—27



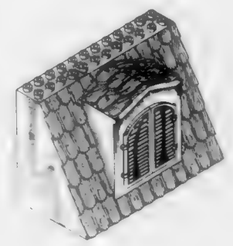
295,766
**TOY ROCKING HELICOPTER**
Daniel G. Hahn, 1040 E. North Ave., Olney, Ill. 62450
Filed Jun. 23, 1986, Ser. No. 877,690
Term of patent 14 years
U.S. Cl. D21—68



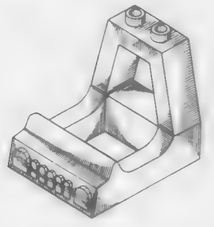
295,767
**TOY ROCKING HELICOPTER**
Daniel G. Hahn, 1040 E. North Ave., Olney, Ill. 62450
Filed Jun. 23, 1986, Ser. No. 877,521
Term of patent 14 years
U.S. Cl. D21—68



295,768
**SIMULATIVE TOY CONSTRUCTION PIECE**
Philip M. Kushner, Greve Strand, Denmark, assignor to Interlego A.G., Baar, Switzerland
Filed Nov. 26, 1986, Ser. No. 935,695
Term of patent 14 years
U.S. Cl. D21—108



295,769
**TOY VEHICULAR CONSTRUCTION PIECE**
Flemming H. Olsen, Espergaerde, Denmark, assignor to Interlego A.G., Baar, Switzerland
Filed Nov. 26, 1986, Ser. No. 935,692
Term of patent 14 years
U.S. Cl. D21—108



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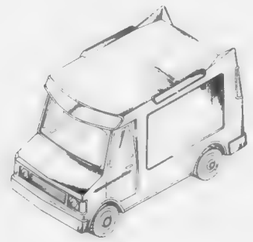
295,770
**TOY VACUUM CLEANER**
M. Allyson Hilton, Orchard Park, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.
Continuation-in-part of Ser. No. 794,057, Nov. 1, 1985. This application Oct. 27, 1986, Ser. No. 923,709
Term of patent 14 years
U.S. Cl. D21—122



295,771
**MULTIPLE DOLL UNIT**
Nickos H. Kotsinadelis, 5009 Amarillo Blvd. East, Amarillo, Tex. 79107
Filed Jun. 10, 1985, Ser. No. 743,012
Term of patent 14 years
U.S. Cl. D21—149



295,772
**TOY TRUCK**
Luk C. Kwan, Los Angeles, Calif., assignor to Tai Tung International, Inc., Los Angeles, Calif.
Filed Jun. 20, 1985, Ser. No. 746,749
Term of patent 14 years
U.S. Cl. D21—140



295,773
**ANIMATED STUFFED KOALA BEAR**
Kathy Henn, 9388 Oakhurst Rd., Seminole, Fla. 33542, and Babs Ray, 1424 Rowewood Dr., Chattanooga, Tenn. 37421
Filed Oct. 21, 1985, Ser. No. 789,642
Term of patent 14 years
U.S. Cl. D21—159

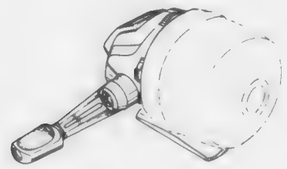


295,774
**TOY CHICK**
Christine M. Zinter-Chahin, Orchard Park, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.
Filed Oct. 2, 1985, Ser. No. 782,878
Term of patent 14 years
U.S. Cl. D21—160





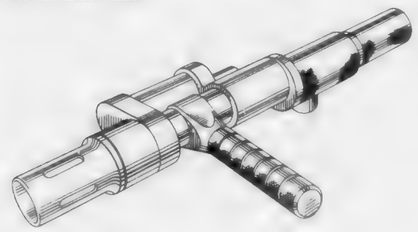
295,775
**FISHING REEL BODY**
Yasuhisa Kameda, Tokyo, Japan, assignor to Daiwa Seiko, Inc., Tokyo, Japan
Filed Jun. 14, 1985, Ser. No. 744,717
Term of patent 14 years
U.S. Cl. D22—141



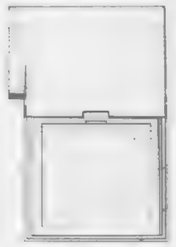
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**MULTIPLE POSITION FISHING POLE HOLDER**
Kay R. Johansen, 2025 N. 53 West, Centerville, Ohio 84104
Filed Jun. 5, 1985, Ser. No. 741,518
Term of patent 14 years
U.S. Cl. D22—147



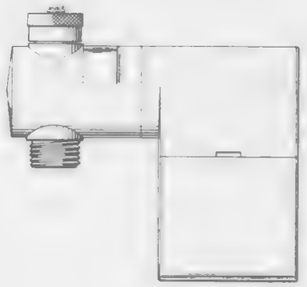
295,777
**ROTARY HIGH PRESSURE WATER JET CLEANING TOOL**
Curtis C. Steele, 5329 Camp Rd., Trenton, Ohio 45067
Filed Apr. 3, 1985, Ser. No. 719,548
Term of patent 14 years
U.S. Cl. D23—223



295,778
**TIMER FOR A LAWN SPRINKLER CONTROLLER**
Kenneth J. Bruninga, Mapleton; Douglas C. Fletcher, Peoria, both of Ill., and Ronald G. Hayes, Batavia, Ohio, assignors to L. R. Nelson Corporation, Peoria, Ill.
Filed Jul. 17, 1985, Ser. No. 755,818
Term of patent 14 years
U.S. Cl. D23—245



295,779
**LAWN SPRINKLER CONTROLLER-TIMER WITH COVER**
Kenneth J. Bruninga, Mapleton; Douglas C. Fletcher, Peoria, both of Ill., and Ronald G. Hayes, Batavia, Ohio, assignors to L. R. Nelson Corporation, Peoria, Ill.
Filed Jul. 17, 1985, Ser. No. 755,819
Term of patent 14 years
U.S. Cl. D23—245



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295,780
**TRAP FOR PLUMBING INSTALLATIONS**
Richard E. Thomas, 1008 Amberwood Rd., Sacramento, Calif. 95825
Filed Sep. 17, 1984, Ser. No. 651,109
Term of patent 14 years
U.S. Cl. D23—268



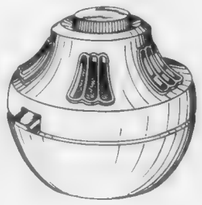
295,781
**BATH TUB**
Vello Hubel, Toronto, Canada, assignor to Mirolin Industries Inc., Toronto, Canada
Filed May 9, 1985, Ser. No. 732,190
Claims priority, application Canada, Nov. 28, 1984, 28-11-84-3
Term of patent 14 years
U.S. Cl. D23—281



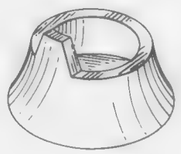
295,782
**LAVATORY PEDESTAL**
Herbert V. Kohler, Jr., Kohler, Wis., assignor to Kohler Co., Kohler, Wis.
Filed Jan. 16, 1986, Ser. No. 820,199
Term of patent 14 years
U.S. Cl. D23—308



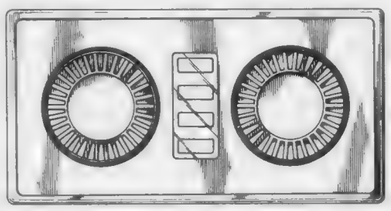
295,783
**AIR FRESHENER**
Ronald R. Gutkowski, Racine County, Wis., assignor to S. C. Johnson & Son, Inc., Racine, Wis.
Filed Feb. 10, 1986, Ser. No. 827,701
Term of patent 14 years
U.S. Cl. D23—366



295,784
**ELECTRODE PAD FOR AN ELECTROCARDIOGRAPH**
Hirokatsu Inoue, Chiba, and Chuji Shimizu, Funabashi, both of Japan, assignors to Fukuda Denshi Co., Ltd., Tokyo, Japan
Filed Sep. 20, 1985, Ser. No. 778,053
Term of patent 14 years
U.S. Cl. D24—17



295,785
**SPA CONTROL PANEL**
Len Gordon, 640 Glenoaks Blvd., San Fernando, Calif. 91340
Filed Jul. 2, 1984, Ser. No. 627,334
Term of patent 14 years
U.S. Cl. D24—38

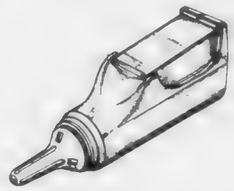




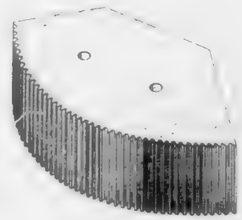
295,786
**HEATING COVER FOR INFUSION EQUIPMENT**
Einar Melvaer, Oslo, Norway, assignor to Forsvarets Forsknings-sinstitutt, Kjeller, Norway
Filed Nov. 14, 1984, Ser. No. 671,446
Claims priority, application Norway, May 18, 1984, 65 208
Term of patent 14 years
U.S. Cl. D24—29



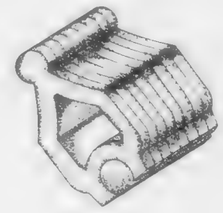
295,787
**NASAL SPRAY DISPENSER**
Manfred K. Hegemann, 10 Ferris La., South Nyack, N.Y. 10960, and Edward J. Drozd, Jr., 10 Maureen Ct., Lake Hiawatha, N.J. 07034
Filed May 13, 1985, Ser. No. 733,019
Term of patent 14 years
U.S. Cl. D24—62



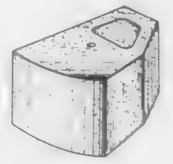
295,788
**WALL BLOCK**
Paul J. Forsberg, Richfield, Minn., assignor to Keystone Retaining Wall Systems, Inc., Edina, Minn.
Filed Feb. 11, 1987, Ser. No. 13,383
Term of patent 14 years
U.S. Cl. D25—113



295,789
**CONCRETE BLOCK**
E. Doyle Smith, 116 74th St., Virginia Beach, Va. 23451
Filed Jul. 10, 1985, Ser. No. 753,381
Term of patent 14 years
U.S. Cl. D25—116



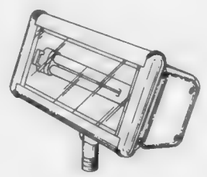
295,790
**STARTER WALL BLOCK**
Paul J. Forsberg, Richfield, Minn., assignor to Keystone Retaining Wall Systems, Inc., Edina, Minn.
Filed Oct. 1, 1986, Ser. No. 914,615
Term of patent 14 years
U.S. Cl. D25—116



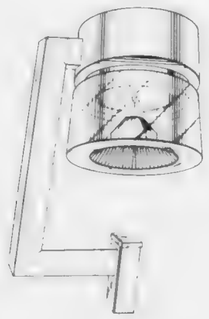
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295,791
FLOODLIGHT OR SIMILAR ARTICLE
Stanley L. Strandberg, 11580 Hesby St., North Hollywood, Calif. 91601
Filed Feb. 11, 1986, Ser. No. 828,466
Term of patent 14 years
U.S. Cl. D26—63



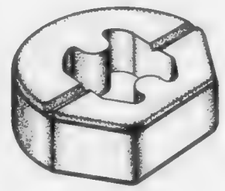
295,792
AREA LIGHT
Robert L. Ewing; John W. Harvey; Richard G. Armstrong, and Herbert A. Fouke, all of Newark, Ohio, assignors to Manville Corporation, Denver, Colo.
Filed Jan. 27, 1986, Ser. No. 822,710
Term of patent 14 years
U.S. Cl. D26—71



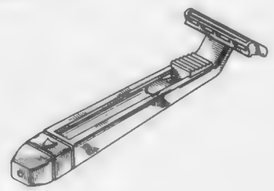
295,793
SIMULATED ASH TRAY
Jimmy D. Pettijohn, 515 N. Santa Fe, Tulsa, Okla. 74127
Filed Jul. 11, 1985, Ser. No. 736,675
Term of patent 14 years
U.S. Cl. D27—22




295,794
TABLET
John R. Kirk, McKeesport, Pa., assignor to McNeilab, Inc., Fort Washington, Pa.
Filed Aug. 12, 1985, Ser. No. 764,808
Term of patent 14 years
U.S. Cl. D28—2

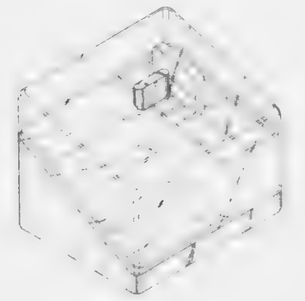


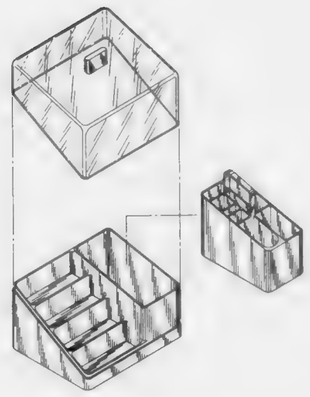
295,795
DISPOSABLE RAZOR
Robert Demars, 7932 Maestro, Canoga Park, Calif. 91304
Filed Jun. 7, 1985, Ser. No. 742,479
Term of patent 14 years
U.S. Cl. D28—46



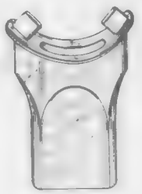


295,796
COSMETIC HOLDER HAVING REMOVABLE COVER AND ACCESSORY TRAY
Ronald Wadsworth, Diamond Bar; Carl A. Meisterlin, Long Beach; Richard K. O'Neill, Pomona; Richard P. Grogan, Downey, and Brian R. Lindley, Costa Mesa, all of Calif., assignors to La Shea Corporation, Costa Mesa, Calif.
Filed Oct. 3, 1985, Ser. No. 783,880
Term of patent 14 years
U.S. Cl. D28—77

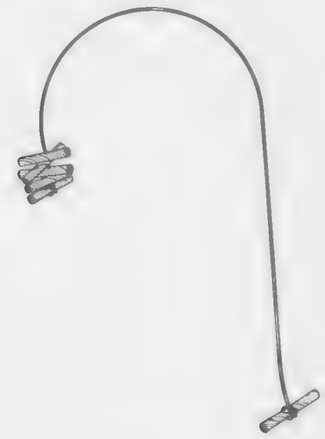




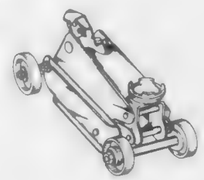
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RESPIRATOR MOUTHPIECE
Michael Bono, Collegeville, and Frank J. Rossi, Pottstown, both of Pa., assignors to Amici, Inc., Royersford, Pa.
Filed Nov. 14, 1985, Ser. No. 805,144
Term of patent 14 years
U.S. Cl. D29—7



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CAT TOY OR SIMILAR ARTICLE
James C. Boelke, P.O. Box 404, Oshkosh, Wis. 54902
Filed Apr. 4, 1985, Ser. No. 719,867
Term of patent 14 years
U.S. Cl. D30—160



295,799
JACK
Michael Hung, Taipei, Taiwan, assignor to Shinn Fu Corporation, Taipei, Taiwan
Filed Mar. 11, 1986, Ser. No. 838,600
Term of patent 14 years
U.S. Cl. D34—31



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# LIST OF PATENTEES

TO WHOM

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Miyoshi, Takahito; and Fujiyama, Masaaki, to Fuji Photo Film Co., Ltd. Process for the preparation of magnetic recording medium. 4,745,001, Cl. 427-48.000.
Miyoshi, Takahito; Utumi, Masahiro; Masuyama, Kenichi; Okutu, Toshimitu; and Fujiyama, Masaaki, to Fuji Photo Film Co., Ltd. Magnetic recording medium. 4,745,017, Cl. 428-141.000.
Mizoguchi, Hakaru: *See—*
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Mizukura, Noboru: *See—*
Ohbayashi, Keiji; Tai, Akiyoshi; and Mizukura, Noboru, 4,745,049, Cl. 430-546.000.
Mizushima, Akiko: *See—*
Sugiyama, Hisashi; Nate, Kazuo; Inoue, Takashi; and Mizushima, Akiko, 4,745,169, Cl. 528-43.000.
Mizutani, Yoshihisa, to Kabushiki Kaisha Toshiba. Semiconductor device. 4,745,453, Cl. 357-42.000.
Mo, Yhu-Kee. Lampshade. 4,745,532, Cl. 362-352.000.
Mobay Corporation: *See—*
Chung, James Y. J.; Markusch, Peter H.; and Witman, Mark W., 4,745,148, Cl. 524-504.000.
Mobil Oil Corporation: *See—*
Alameddine, Bassem R., 4,744,417, Cl. 166-245.000.
Andress, Harry J., 4,744,798, Cl. 44-70.000.
Benoit, Gordon L., Jr.; and Smith, R. Stuart, Jr., 4,744,200, Cl. 53-447.000.
Cardis, Angeline B., 4,744,912, Cl. 252-46.700.
Mochida, Haruo: *See—*
Takagi, Kazumasa; and Mochida, Haruo, 4,744,231, Cl. 70-264.000.
Mockli, Peter, to Reishauer AG. Process for controlling tool infeed at machining start of a gear cutting machine. 4,744,179, Cl. 51-287.000.
Modin, Jimmie D. Scissors with integrated finger loops and stop. 4,744,147, Cl. 30-254.000.
Moeller, Hinrich, to Henkel Kommanditgesellschaft auf Aktien. Method of producing salts of 1,3-dioxolane-4-carboxylic acids and method of using same. 4,745,200, Cl. 549-450.000.
Moellers, Ulrich: *See—*
Grundei, Hans; and Moellers, Ulrich, 4,744,351, Cl. 128-78.000.
Mohajer, Yousef, to Allied Corporation. Method for coating nylon-6 for improved thermal stability. 4,745,006, Cl. 427-222.000.
Molday, Robert S., to University of British Columbia. Colloidal sized metal-polysaccharide particles. 4,744,760, Cl. 424-3.000.
Monat, Jamie P.: *See—*
Ozolins, Karlis P.; Hansen, Ole V.; Monat, Jamie P.; and McNulty, Kenneth J., 4,744,806, Cl. 55-97.000.
Monreal, F. Javier. Handlebars for tucked-in skiing. 4,744,584, Cl. 280-606.000.
Monsanto Company: *See—*
Nickson, Thomas E.; Chupp, John P.; and Neumann, Thomas E., 4,745,219, Cl. 564-146.000.
Monsarrat, William G.; and Brodell, Robert F., to United Technologies Corporation. Engine modularity. 4,744,214, Cl. 60-226.100.
Montean, Samuel, to Minnesota Mining and Manufacturing Company. RF reactivatable marker for electronic article surveillance system. 4,745,401, Cl. 340-572.000.
Montedipe S.p.A.: *See—*
Roffia, Paolo; Padovan, Mario; Moretti, Enrico; and De Alberti, Giordano, 4,745,221, Cl. 564-267.000.
Montner, Joseph: *See—*
Tye, Gene E.; and Montner, Joseph, 4,745,613, Cl. 372-81.000.
Moore, David E.; and Crane, Newell D. Particle-blast cleaning apparatus and method. 4,744,181, Cl. 51-436.000.
Moore, Harry O., to Whisnant, Hal F., a part interest. Bale tie blanket. 4,744,310, Cl. 109-49.500.
Moorehead, Eric L.; and Shen, Sidney Y., to Union Oil Company of California. Process for producing lubrication oil of high viscosity index. 4,744,884, Cl. 208-111.000.
Moos, Walter H.: *See—*
Butler, Donald E.; Dodd, John H.; Moos, Walter H.; and Tecle, Haile, 4,745,123, Cl. 514-356.000.
Moran, Byron L.; Willis, Allan F.; and Mendelson, Yitzhak, to Spectramed, Inc. Disposable calibration boot for optical-type cardiovascular catheter. 4,744,656, Cl. 356-243.000.
Moreau, Bernard; and Parlatore, Roger, to Pass & Seymour, Inc. Automatic grounding clip. 4,745,523, Cl. 361-356.000.
Morein, Bror. Immunogenic protein or peptide complex, method of producing said complex and the use thereof as an immune stimulant and as a vaccine. 4,744,983, Cl. 424-88.000.
Moreland, Margaret; and Nitecki, Danute E., to Cetus Corporation. Solubilization of proteins for pharmaceutical compositions using heparin fragments. 4,745,180, Cl. 530-351.000.
Moretti, Enrico: *See—*
Roffia, Paolo; Padovan, Mario; Moretti, Enrico; and De Alberti, Giordano, 4,745,221, Cl. 564-267.000.
Morgan, Charles G., to General Electric Company. Electronic substrate article and method of preparation. 4,745,457, Cl. 357-80.000.
Morgan, Doug; and Landmeier, Phil. Reconfigurable local area network. 4,745,597, Cl. 370-87.000.
Morgan, Robert L., Jr., to Poly-Seal Corporation. Closure for containers. 4,744,481, Cl. 215-329.000.
Mori, Shinsaku: *See—*
Kikuchi, Makoto; Mori, Shinsaku; Nikawa, Yoshio; and Terakawa, Takashige, 4,744,372, Cl. 128-804.000.
Mori, Toshihiro: *See—*
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Morikawa, Juichi: *See—*
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Morimoto, Masaru: *See—*
Anzai, Hisao; Makino, Hideaki; Sasaki, Isao; Nishida, Kozi; and Morimoto, Masaru, 4,745,159, Cl. 525-329.900.
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Umezawa, Hamao; Takeuchi, Tomio; Nagatsu, Toshiharu; Hamada, Masa; Iwadare, Shuichi; Matsumoto, Ikuo; and Morishima, Hajime, 4,745,067, Cl. 435-228.000.
Morishima, Yasuo: *See—*
Ueda, Yoichiro; Hirako, Yoshiyuki; Masamoto, Kazuhisa; Goto, Yukihisa; Yagihara, Hiroshi; Morishima, Yasuo; and Osabe, Hirokazu, 4,744,819, Cl. 71-94.000.

Morita, Haruyuki: *See*—
Nakayama, Masatoshi; Morita, Haruyuki; Kubota, Yuichi; and Tsuchiya, Keiko, 4,745,031, Cl. 428-433.000.

Morita, Kiyomi; Miyake, Junji; Hatanaka, Keiji; and Sakuma, Kiyotoshi, to Hitachi, Ltd.; and Nissan Motor Co., Ltd. Fuel control apparatus in internal combustion engine. 4,744,346, Cl. 123-492.000.

Morita, Terumasa: *See*—
Yoshinaga, Makoto; Iba, Yoichi; Miyahara, Noriyuki; Kawasaki, Masami; Morita, Terumasa; and Nagano, Takashi, 4,744,642, Cl. 350-518.000.

Mormann, Werner; and Hissmann, Edith, to Bayer Aktiengesellschaft. Process for the production of isocyanates. 4,745,212, Cl. 560-130.000.

Morokoshi, Hiroshi: *See*—
Yamamura, Michio; Sawai, Kiyoshi; Fujio, Katuharu; Yamamoto, Shuuichi; and Morokoshi, Hiroshi, 4,744,737, Cl. 418-55.000.

Morozumi, Takuro, to Fuji Jukogyo Kabushiki Kaisha. System for compensating an oxygen sensor in an emission control system. 4,744,344, Cl. 123-479.000.

Morrell, Brian R., to Minolta Camera Company, Ltd. Printer error and control system. 4,745,602, Cl. 371-20.000.

Morrison, Bernard J., to AcrySyl International Corporation. Roofing and similar materials. 4,745,032, Cl. 428-215.000.

Morrison, Ronald D. Pedal craft. 4,744,776, Cl. 440-29.000.

Morsbach, Gunter. Packaging material blank of cardboard or the like for a multipack package. 4,744,507, Cl. 229-40.000.

Mortimer, John H., to Inductotherm Corporation. Apparatus and method for maintaining constant molten metal level in metal casting. 4,745,620, Cl. 373-152.000.

Mosbach, Jurgen: *See*—
Noll, Klaus; Mosbach, Jurgen; Pedain, Josef; Nachtkamp, Klaus; and Schwindt, Jurgen, 4,745,151, Cl. 524-591.000.

Most, Gordon. Steer head attachment for a tricycle. 4,744,573, Cl. 280-1.130.

Motal, Gary W., to Exxon Production Research Company. Marine cable system with automatic buoyancy control. 4,745,583, Cl. 367-18.000.

Motika, Franco: *See*—
Eichelberger, Edward B.; Langmaid, Roger N.; Lindbloom, Eric; Motika, Franco; Sinchak, John L.; and Waicukauski, John A., 4,745,355, Cl. 324-73.00R.

Motohashi, Takeshi: *See*—
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Motoi, Taiko: *See*—
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Motorola, Inc.: *See*—
Aaron, Robert W.; Kuban, John; MacGregor, Douglas B.; and Thompson, Robert R., 4,745,574, Cl. 364-900.000.
Cornett, Frank N., 4,745,394, Cl. 340-347.0AD.
McGinn, Michael, 4,745,370, Cl. 330-252.000.
Neely, Eric D., 4,745,308, Cl. 307-473.000.
Parrillo, Louis C.; Cosentino, Stephen J.; and Mauntel, Richard W., 4,745,086, Cl. 437-57.000.
Pfiester, James R., 4,745,079, Cl. 437-029.000.
Phillips, James R., 4,744,640, Cl. 350-388.000.
Swapp, Mavin C., 4,745,310, Cl. 307-603.000.

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Nees, John A.; Mourou, Gerard A.; and Jackson, Todd A., 4,745,361, Cl. 324-158.00R.

Mrs. Paul's Kitchens Inc.: *See*—
Daniels, James A., 4,745,249, Cl. 219-10.55E.

MTA Kozponti Fizikai Kutato Intezete: *See*—
Szabo, Bela; Vagvolgyi, Jeno; and Feher, Istvan, 4,745,273, Cl. 250-207.000.

Mudd, John B.; Burke, Basil A.; Fobes, Jon F.; and Nair, Muraleedharan G., to Plant Cell Research Institute, Inc. 2,3,4-triacylhexoses and mixtures thereof. 4,745,186, Cl. 536-119.000.

Mueller, David L.: *See*—
Glascock, Homer H., II; Webster, Harold F.; Neugebauer, Constantine A.; Selim, Fadel A.; Mueller, David L.; and Piccone, Dante E., 4,745,455, Cl. 357-74.000.

Mueller, Manfred: *See*—
Schlosser, Fritz; Arndt, Peter J.; Mueller, Manfred; and Janssen, Lothar, 4,745,213, Cl. 560-217.000.

Muir, Leslie; Smith, John; and McKechnie, Andrew, to Unisys Corporation. Distributed electronic mailbox system. 4,745,595, Cl. 370-85.000.

Mukai, Hideo; Yasuda, Sachiko; Yoshida, Minoru; and Asada, Tomoyuji, to Kabushiki Kaisha Toshiba. Developing apparatus for an electrostatic photocopier. 4,745,429, Cl. 355-3.0DD.

Mukai, Hiromu: *See*—
Izumi, Shuji; Nakai, Masaaki; Fujino, Akihiko; Yamaki, Toshio; Mukai, Hiromu; and Taniguchi, Nobuyuki, 4,745,427, Cl. 354-432.000.

Mullen, Charles F. Modular space station. 4,744,533, Cl. 244-159.000.

Mullen, George B.: *See*—
Georgiev, Vassil S.; and Mullen, George B., 4,745,220, Cl. 564-172.000.

Muller, Arno, to Pitney Bowes Inc. Electronic postage meter print wheel setting optimization system. 4,745,346, Cl. 318-685.000.

Muller, Francis; and Schmidt, Dieter, to Hoffmann-La Roche Inc. Ruthenium complexes useful as carriers for immunologically active materials. 4,745,076, Cl. 436-537.000.

Muller, Jurgen: *See*—
Landua, Werner; and Muller, Jurgen, 4,744,853, Cl. 156-390.000.

Muller, Peter. Controllable pitch propeller and watercraft drive. 4,744,727, Cl. 416-93.00A.

Mullin, Ronald C.: *See*—
Onyszchuk, Ivan M.; Mullin, Ronald C.; and Vanstone, Scott A., 4,745,568, Cl. 364-754.000.

Mun, Joseph; Barker, Graeme K.; and Badawi, Mohamed H., to ITT Gallium Arsenide Technology Center, a Division of ITT Corporation. Interdigitated Schottky diode. 4,745,445, Cl. 357-15.000.

Murai, Takashi, to Mitsubishi Denki Kabushiki Kaisha. Very low temperature liquid transfer system. 4,744,222, Cl. 62-49.000.

Murakami, Shohachi: *See*—
Tamai, Kenzo; Saikawa, Isamu; Yasuda, Takashi; Murakami, Shohachi; Maeda, Toyoo; Tsuda, Hisatsugu; Sakai, Hiroshi; Sugita, Masatoshi; Yamamoto, Yoshiko; Minami, Hisashi; and Hori, Takako, 4,744,985, Cl. 424-116.000.

Murakami, Yoshikazu; Tanaka, Hideo; Miyake, Masami; Ito, Seigo; Tamada, Hitoshi; and Yamada, Toshiro, to Sony Corporation. YIG thin film microwave apparatus. 4,745,380, Cl. 333-234.000.

Muraoka, Koji: *See*—
Maeda, Takeshi; Kasai, Masuo; and Muraoka, Koji, 4,745,587, Cl. 369-32.000.

Muraoka, Takao; and Sugaya, Toshihiro, to Kabushiki Kaisha Toshiba. Linear actuator for moving a recording/reading head in an access direction relative to a recording disc. 4,745,503, Cl. 360-106.000.

Murata Manufacturing Co., Ltd.: *See*—
Masuda, Noboru; Tomaki, Kenji; Oosawa, Tetsuo; and Murata, Michihiro, 4,745,284, Cl. 250-338.300.

Murata, Michihiro: *See*—
Masuda, Noboru; Tomaki, Kenji; Oosawa, Tetsuo; and Murata, Michihiro, 4,745,284, Cl. 250-338.300.

Murn, Victor A.: *See*—
Wrege, Richard A.; Murn, Victor A.; and Lorenz, Dennis K., 4,745,347, Cl. 318-744.000.

Muro, Hideo, to Nissan Motor Co., Ltd. Semiconductor light detecting integrated circuit. 4,745,274, Cl. 250-214.00R.

Musiani, Mario, to Arcotronics Italia S.p.A. Apparatus for automatically inserting leads on electrical and/or electronic components into corresponding holes in a substrate. 4,744,141, Cl. 29-741.000.

Muth, Ross R.: *See*—
Kaplan, Donald S.; Hermes, Matthew E.; Muth, Ross R.; and Kennedy, John J., 4,744,365, Cl. 128-335.500.

Muto, Tetsuji: *See*—
Baba, Satoshi; Nose, Tadashi; Muto, Tetsuji; and Fujimura, Yuji, 4,745,542, Cl. 364-184.000.

MWB Messwandler-Bau Aktiengesellschaft: *See*—
Preissinger, Norbert; and Bogdan, Teofil, 4,744,138, Cl. 29-606.000.

Nachbur, Hermann, to Ciba-Geigy Corporation. Process for the preparation of mixtures of metal salts of ring-substituted salicylic acid compounds. 4,745,203, Cl. 556-44.000.

Nachfolger, Solomon J.: *See*—
Savoly, Arpad; Villa, Jose L.; Grinstein, Reuben H.; and Nachfolger, Solomon J., 4,744,795, Cl. 44-51.000.

Nachtkamp, Klaus: *See*—
Noll, Klaus; Mosbach, Jurgen; Pedain, Josef; Nachtkamp, Klaus; and Schwindt, Jurgen, 4,745,151, Cl. 524-591.000.

Nagai, Shigeru; Sakamoto, Yasuhide; Sato, Hiromitsu; Ohura, Hideji; Kawamata, Masashi; and Kumada, Masayuki, to Honda Giken Kogyo Kabushiki Kaisha. Centrifugal spark-advance control device. 4,744,339, Cl. 123-146.0SA.

Nagano, Masashi, to Shimano Industrial Company Limited. Lever shifting device for a bicycle. 4,744,265, Cl. 74-523.000.

Nagano, Masashi, to Shimano Industrial Company Limited. Rear derailleur for a bicycle. 4,744,784, Cl. 474-80.000.

Nagano, Takashi: *See*—
Yoshinaga, Makoto; Iba, Yoichi; Miyahara, Noriyuki; Kawasaki, Masami; Morita, Terumasa; and Nagano, Takashi, 4,744,642, Cl. 350-518.000.

Nagasaka, Nagahiko, to Kabushiki Kaisha Yaskawa Denki Seisakusho. Stepping motor. 4,745,312, Cl. 310-49.00R.

Nagata, Kazutaka, to Nippon Air Brake Co., Ltd. Brake control system for combining electric and fluid pressure brakes. 4,744,607, Cl. 303-16.000.

Nagata, Koichi; Oyagi, Takashi; and Mori, Toshihiro, to NEC Corporation. Radio paging system and receiver therefor. 4,745,408, Cl. 340-825.440.

Nagata, Toshio, to Token Kogyo Co., Ltd. Device for roasting meats. 4,744,292, Cl. 99-351.000.

Nagatsu, Toshiharu: *See*—
Umezawa, Hamao; Takeuchi, Tomio; Nagatsu, Toshiharu; Hamada, Masa; Iwadare, Shuichi; Matsumoto, Ikuo; and Morishima, Hajime, 4,745,067, Cl. 435-228.000.

Nagoshi, Shigeyasu: *See*—
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Nahill, George F.: *See*—
Kudert, Frederick G.; Latreille, Maurice G.; McHenry, Robert J.; Nahill, George F.; Pfutzenreuter, Henry, III; Tennant, William A.; Tung, Thomas T.; and Vella, John, Jr., 4,745,013, Cl. 428-35.000.





Nair, Muraleedharan G.: *See*—
Mudd, John B.; Burke, Basil A.; Fobes, Jon F.; and Nair, Muraleedharan G., 4,745,186, Cl. 536-119.000.

Naito, Akira: *See*—
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Naito, Shotaro: *See*—
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Nakabayashi, Sanji: *See*—
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Nakagawa, Katsumi: *See*—
Komatsu, Toshiyuki; Hirai, Yutaka; Nakagawa, Katsumi; and Fukuda, Tadaji, 4,745,041, Cl. 430-128.000.

Nakagawa, Katsuya; and Nakanishi, Yoshiaki, to Nintendo Co., Ltd. RF switch. 4,745,478, Cl. 356-181.000.

Nakagawa, Tetsuya: *See*—
Sato, Tomoru; Kaneko, Kenji; Ueda, Hirotada; Hagiwara, Yoshimune; Matsushima, Hitoshi; Nakagawa, Tetsuya; and Kiuchi, Atsushi, 4,745,581, Cl. 365-189.000.

Nakai, Masaaki: *See*—
Izumi, Shuji; Nakai, Masaaki; Fujino, Akihiko; Yamaki, Toshio; Mukai, Hiromu; and Taniguchi, Nobuyuki, 4,745,427, Cl. 354-432.000.

Nakai, Teruji: *See*—
Nakayama, Shozo; Watanabe, Hiroo; Tawa, Toshiki; Hashimoto, Shusuke; Suzuki, Katsumi; and Nakai, Teruji, 4,744,752, Cl. 433-100.000.

Nakajima, Nobuyuki; Inomata, Kenichi; Okada, Shigeru; and Eitai, Kazuo, to Diesel Kiki Co., Ltd. Variable capacity vane compressor. 4,744,731, Cl. 417-295.000.

Nakajima, Nobuyuki; Inomata, Kenichi; and Okada, Shigeru, to Diesel Kiki Co., Ltd. Variable capacity vane compressor. 4,744,732, Cl. 417-295.000.

Nakamoto, Hideo; and Fukushima, Hiroshi, to Mitsubishi Rayon Co., Ltd. Plastic lens and method of manufacturing thereof. 4,745,168, Cl. 526-320.000.

Nakamura, Kazuo; Sasaki, Seishi; Takahashi, Ken; Yohda, Hiroshi; and Kaminaka, Nobuyuki, to Matsushita Electric Industrial Co., Ltd. Magnetic head for perpendicular magnetic recording and reproduction. 4,745,506, Cl. 360-123.000.

Nakamura, Kosei: *See*—
Oyama, Shigeaki; Nakamura, Kosei; Hayashi, Yoshiyuki; and Koyoshida, Shigeru, 4,745,320, Cl. 310-217.000.

Nakamura, Masaki; Fujie, Nobuo; and Okamoto, Hiroyuki, to Fujitsu Limited. Automatic gas distributing device controlled by a direct application of high gas pressure of a source for supplying a pipe with gas from an alternative gas source. 4,744,384, Cl. 137-110.000.

Nakamura, Mitsuo; and Souma, Keiji, to Hirose Electric Co., Ltd. Multi-layer flat cable electrical connector and its termination method. 4,744,773, Cl. 439-418.000.

Nakamura Seitai Co., Ltd.: *See*—
Nakamura, Toshio, 4,744,673, Cl. 383-38.000.

Nakamura, Tadao: *See*—
Yada, Takaaki; Nakamura, Tadao; and Asano, Ichiro, 4,745,358, Cl. 324-99.00D.

Nakamura, Toshio, to Nakamura Seitai Co., Ltd. Packaging bag. 4,744,673, Cl. 383-38.000.

Nakamura, Yasuo: *See*—
Hanada, Yoshihiro; Nakamura, Yasuo; and Fukui, Kazuyuki, 4,745,439, Cl. 355-14.0SH.

Nakamura, Yuka: *See*—
Kogure, Mitutosi; Nakamura, Yuka; and Tamura, Makoto, 4,745,431, Cl. 355-3.0FU.

Nakanishi, Motoyasu, to Kabushiki Kaisha Cubic Engineering. Headrest apparatus. 4,744,601, Cl. 297-391.000.

Nakanishi, Yoshiaki: *See*—
Nakagawa, Katsuya; and Nakanishi, Yoshiaki, 4,745,478, Cl. 356-181.000.

Nakano, Jiro, to Fanuc Ltd. Liquid-cooled motor. 4,745,314, Cl. 310-57.000.

Nakano, Shigetoshi: *See*—
Sakoda, Yutaka; Tumoto, Akira; Nakano, Shigetoshi; and Fujii, Fujio, 4,744,404, Cl. 164-180.000.

Nakao, Kazuhiro: *See*—
Imano, Yoshitugu; Ozawa, Kazuhito; Kitanishi, Yoshitomo; Shino, Katsuhide; Inoue, Yukihiro; Oogita, Yoshinori; Nakao, Kazuhiro; and Komaki, Shigeki, 4,744,850, Cl. 156-265.000.

Nakase, Ryoichi, to Sanshin Kogyo Kabushiki Kaisha. Remote steering system for marine propulsion crafts. 4,744,322, Cl. 114-144.00E.

Nakashima, Akio: *See*—
Kaneko, Atsushi; Ikoma, Junichi; and Nakashima, Akio, 4,745,494, Cl. 358-338.000.

Nakashima, Naoto: *See*—
Oshida, Yoshitada; Nakashima, Naoto; and Nakata, Toshihiko, 4,744,666, Cl. 356-401.000.

Nakashima, Ryoichi; Suzuki, Yasuro; and Kobayashi, Masato, to Hitachi, Ltd. Submersible motor. 4,745,316, Cl. 310-87.000.

Nakashima, Tatsutoshi; Toyoshima, Nobuyuki; and Sasai, Yasuomi, to Toyo Contact Lens Co., Ltd. Highly water-absorptive optical material. 4,745,158, Cl. 525-276.000.

Nakata, Toshihiko: *See*—
Oshida, Yoshitada; Nakashima, Naoto; and Nakata, Toshihiko, 4,744,666, Cl. 356-401.000.

Nakatani, Yuichi: *See*—
Tsukada, Toshiro; Ueda, Seiichi; Matsuura, Tatsuji; Nakatani, Yuichi; and Imaizumi, Eiki, 4,745,393, Cl. 340-347.0AD.

Nakayama, Masatoshi; Morita, Haruyuki; Kubota, Yuichi; and Tsuchiya, Keiko, to TDK Corporation. Magnetic recording medium. 4,745,031, Cl. 428-433.000.

Nakayama, Shozo; Watanabe, Hiroo; Tawa, Toshiki; Hashimoto, Shusuke; Suzuki, Katsumi; and Nakai, Teruji, to Kabushiki Kaisha Morita Seisakusho. Dental handpiece control device. 4,744,752, Cl. 433-100.000.

Nakayama, Yasuhiko: *See*—
Watanabe, Yoshio; Nakayama, Yasuhiko; Furuya, Nobuaki; and Miyama, Hiroshi, 4,745,509, Cl. 360-125.000.

Nakayasu, Rituo: *See*—
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Nalco Chemical Company: *See*—
Hoots, John E.; Crucil, Guy A.; and Johnson, Ellen L., 4,744,949, Cl. 422-15.000.
Selvarajan, Radhakrishnan; and Christie, Richard D., 4,744,891, Cl. 209-166.000.

Nandra, Shangar S.; and Wilson, Frank G., to Engelhard Corporation. High throughput, high uniformity field emission devices. 4,744,999, Cl. 427-13.000.

Nara, Kenichi: *See*—
Tamura, Fumiyasu; Nara, Kenichi; and Takahashi, Ryoichi, 4,744,611, Cl. 312-116.000.

Naramore, Raymond A.; and Ilacqua, Anthony, to Xerox Corporation. Sheet transport and registration apparatus. 4,744,555, Cl. 271-251.000.

Narisoko, Minoru; and Inoue, Satoshi, to Ishikawajima-Harima Heavy Industries Co., Ltd. Method of promoting secondary combustion in a fluidized bed incinerator. 4,744,312, Cl. 110-245.000.

Narita, Mitsuo: *See*—
Ohyama, Masachika; Narita, Mitsuo; and Noguchi, Kunihiro, 4,745,335, Cl. 313-639.000.

Nate, Kazuo: *See*—
Sugiyama, Hisashi; Nate, Kazuo; Inoue, Takashi; and Mizushima, Akiko, 4,745,169, Cl. 528-43.000.

National Castings, Inc.: *See*—
Long, Jack R.; and Becker, Stephen W., 4,744,308, Cl. 105-199.400.

Natoli, Frank S.: *See*—
Scardera, Michael; Floyd, Jimmie; and Natoli, Frank S., 4,744,917, Cl. 252-187.280.

Nawamaki, Tsutomu: *See*—
Baba, Masatoshi; Tanaka, Norio; Ikai, Takasi; and Nawamaki, Tsutomu, 4,744,815, Cl. 71-92.000.

NCR Corporation: *See*—
Crafts, Harold S., 4,745,305, Cl. 307-475.000.
Fowler, Terry J.; and Gehrhardt, Jill H., 4,744,508, Cl. 229-73.000.

Nealen, Kathleen A.: *See*—
Connelly, Roland L.; Willis, Robert F.; Phelan, Jeremy D.; and Nealen, Kathleen A., 4,745,555, Cl. 364-470.000.

NEC Corporation: *See*—
Kitamura, Yoshishige; Furuki, Katsuya; and Sugiyama, Nobuyuki, 4,745,307, Cl. 307-468.000.
Kosugi, Yuhei; Ozawa, Hirohisa; Kusamitsu, Hideki; and Minowa, Yoshio, 4,745,381, Cl. 333-245.000.
Nagata, Koichi; Oyagi, Takashi; and Mori, Toshihiro, 4,745,408, Cl. 340-825.440.
Shimada, Jiroh, 4,745,306, Cl. 307-472.000.
Takahashi, Yutaka, 4,745,594, Cl. 370-51.000.
Tanabe, Takashi; and Komatsu, Koya, 4,744,621, Cl. 350-96.200.

Neely, Eric D., to Motorola, Inc. Non-inverting three state TTL logic with improved switching from a high impedance state to an active high state. 4,745,308, Cl. 307-473.000.

Nees, John A.; Mourou, Gerard A.; and Jackson, Todd A., to University of Rochester. Electro-optic measurement (network analysis) system. 4,745,361, Cl. 324-158.00R.

Negishi, Mahito: *See*—
Sakino, Shigeo; Negishi, Mahito; Matsushita, Koichi; Horikoshi, Michio; and Higomura, Makoto, 4,744,675, Cl. 384-12.000.

Negri, Roberto; and Serra, Mario, to C.I.M.A. Costruzioni Italiane Macchine Attrezzi S.p.A. Method for automatic changeover of the workholding device in hobbing machines, and means for the implementation of such a method. 4,744,707, Cl. 409-7.000.

Negro, Claudio P.: *See*—
Raines, Clifford D.; and Negro, Claudio P., 4,744,748, Cl. 431-353.000.

Nei Canada Limited: *See*—
Browne, John; and Wales, Thomas, 4,744,163, Cl. 40-449.000.

Neininger, Gunter, to Kieninger & Obergfell GmbH & Co. Anniversary clock with glass case. 4,745,590, Cl. 368-180.000.

Nelson, Kevin G., to Acton Associates, Inc. Method for modifying fluoropolymer fibers. 4,744,857, Cl. 156-637.000.

Nelson, Sidney D.: *See*—
Bednarski, Patrick J.; Porubek, David J.; and Nelson, Sidney D., 4,745,109, Cl. 514-170.000.

Nelson, Thomas E. Method and device for manufacturing a foam insulated water heater, and a foam insulated water heater construction. 4,744,488, Cl. 220-444.000.

NeoRx Corporation: *See*—
Pavanasasivam, Gowsala, 4,744,981, Cl. 424-85.000.

Nestec S.A.: *See*—
Bani, Heinz; and Jaquier, Roger, 4,744,491, Cl. 221-172.000.

Bisson, Jean-Pierre; Bussiere, Michel; Fournet, Gaston; and Jacquenod, Pierre, 4,744,993, Cl. 426-38.000.
Carlson, Thommy, 4,745,199, Cl. 549-315.000.

Neugebauer, Constantine A.: *See*—
Glascock, Homer H., II; Webster, Harold F.; Neugebauer, Constantine A.; Selim, Fadel A.; Mueller, David L.; and Piccone, Dante E., 4,745,455, Cl. 357-74.000.

Neumann, Thomas E.: *See*—
Nickson, Thomas E.; Chupp, John P.; and Neumann, Thomas E., 4,745,219, Cl. 564-146.000.

Newberger, Judah. Fish swallowing game. 4,744,565, Cl. 273-342.000.

Nichols, Byron L.: *See*—
Scherbel, Gordon H.; Crea, David A.; Keely, Jerry A.; Andersen, Ronald L.; and Nichols, Byron L., 4,744,971, Cl. 423-323.000.

Nickson, Thomas E.; Chupp, John P.; and Neumann, Thomas E., to Monsanto Company. Chemical intermediates and a process for their preparation. 4,745,219, Cl. 564-146.000.

Niederst, Ken W.: *See*—
Sirkoch, Robert J.; Niederst, Ken W.; Weissberg, Alan B.; Greiger, Paul P.; and Henning, Calvin C., 4,745,003, Cl. 427-54.100.

Niemand, Geoffrey S. Parallel-cylinder, angled-valve fluid pump. 4,744,735, Cl. 417-533.000.

Niems, Lee H., to Kennedy Van Saun Corporation. Apparatus for removing dust from pyroprocessed particulate material. 4,744,155, Cl. 34-57.00R.

Niino, Masao; Yasuda, Nobuyuki; Kakizawa, Koichiro; Ichihashi, Tadashi; and Kawamura, Masunori, to Kowa Kabushiki Kaisha. Ophthalmological measuring apparatus. 4,744,649, Cl. 351-221.000.

Niitsuma, Teruo; Okamoto, Takeshi; and Minagawa, Shoichi, to Clarion Co., Ltd. Surface acoustic wave device. 4,745,378, Cl. 333-196.000.

Niiya, Masanori, to Chugai Ro Co., Ltd. Apparatus for measuring thickness of layer on substance. 4,745,291, Cl. 250-560.000.

Niizeki, Kinya: *See*—
Shoji, Koichiro; Yuki, Isamu; Ozeni, Saburo; Niizeki, Kinya; Matsushita, Kenyo; and Akashi, Keiichi, 4,744,225, Cl. 62-239.000.

Nikawa, Yoshio: *See*—
Kikuchi, Makoto; Mori, Shinsaku; Nikawa, Yoshio; and Terakawa, Takashige, 4,744,372, Cl. 128-804.000.

Nilmen, Fehmi; and Winter, Heinrich, to Battelle-Institut e.V. Method of dispersion-hardening of copper, silver or gold and of their alloys. 4,744,947, Cl. 420-590.000.

Nilssen, Ole K. Controllable frequency converter. 4,745,539, Cl. 363-37.000.

Ninomiya, Yuichi; Ohtsuka, Yoshimichi; and Izumi, Yoshinori, to Nippon Hoso Kyokai. Divisionally time-compressed subsample transmission and motion-compensated reproduction system for a high definition color television picture signal. 4,745,459, Cl. 358-12.000.

Nintendo Co., Ltd.: *See*—
Nakagawa, Katsuya; and Nakanishi, Yoshiaki, 4,745,478, Cl. 356-181.000.

Nippon A B S, Ltd.: *See*—
Arikawa, Tetsuro, 4,744,610, Cl. 303-92.000.

Nippon Air Brake Co., Ltd.: *See*—
Nagata, Kazutaka, 4,744,607, Cl. 303-16.000.

Nippon Film Industrial Co., Ltd.: *See*—
Hanaya, Toru; and Ibi, Masaei, 4,745,014, Cl. 428-36.000.

Nippon Gakki Seizo Kabushiki Kaisha: *See*—
Awano, Tetsuyuki, 4,744,562, Cl. 273-73.00D.
Iwamatsu, Masayuki, 4,745,298, Cl. 307-38.000.

Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha: *See*—
Akiyama, Mamoru; Shigematsu, Sadao; and Matsumura, Akira, 4,745,141, Cl. 523-500.000.

Nippon Hoso Kyokai: *See*—
Ninomiya, Yuichi; Ohtsuka, Yoshimichi; and Izumi, Yoshinori, 4,745,459, Cl. 358-12.000.

Nippon Kayaku Kabushiki Kaisha: *See*—
Matsumoto, Mutsumi; Sugi, Hideki; and Sudo, Atsushi, 4,745,217, Cl. 562-534.000.

Nippon Kogaku K. K.: *See*—
Kusaka, Yosuke, 4,745,425, Cl. 354-400.000.
Mashima, Kiyoto, 4,745,289, Cl. 250-548.000.
Suto, Takeshi; Kumazawa, Masato; and Ishizeki, Tatsumi, 4,744,662, Cl. 356-372.000.

Nippon Kogaku K.K.: *See*—
Hamashima, Muneki; and Kato, Kinya, 4,744,663, Cl. 356-375.000.

Nippon Light Metal Co., Ltd.: *See*—
Shoji, Koichiro; Yuki, Isamu; Ozeni, Saburo; Niizeki, Kinya; Matsushita, Kenyo; and Akashi, Keiichi, 4,744,225, Cl. 62-239.000.

Nippon Oil Co., Ltd.: *See*—
Yoshida, Eiichi; Nomura, Hirotsugu; and Satoh, Shoichi, 4,744,800, Cl. 44-70.000.

Nippon Sanso Kabushiki Kaisha: *See*—
Suwa, Toshio; Kobayashi, Nobuaki; and Hirano, Takashi, 4,744,315, Cl. 110-347.000.

Nippon Sheet Glass Co., Ltd.: *See*—
Ueno, Hiroshi; Nishi, Hisami; and Toyama, Minoru, 4,744,620, Cl. 350-96.180.

Nippon Universal Pharmaceutical Co., Ltd.: *See*—
Suami, Tetsuo; and Sako, Masao, 4,744,975, Cl. 424-5.000.

Nippon Yusen Kaisha: *See*—
Shoji, Koichiro; Yuki, Isamu; Ozeni, Saburo; Niizeki, Kinya; Matsushita, Kenyo; and Akashi, Keiichi, 4,744,225, Cl. 62-239.000.

Nippondenso Co., Ltd.: *See*—
Kakehi, Tohru; Matsui, Katsumasa; and Ohba, Masahiro, 4,744,511, Cl. 236-13.000.

Taki, Yoshihiro; Fukuta, Toshiaki; Akado, Hajime; Miyakawa, Susumu; and Nishio, Yoshitaka, 4,744,902, Cl. 210-493.100.
Tamura, Kouichi, 4,745,403, Cl. 340-713.000.

Nishi, Hisami: *See*—
Ueno, Hiroshi; Nishi, Hisami; and Toyama, Minoru, 4,744,620, Cl. 350-96.180.

Nishida, Jun: *See*—
Tomii, Kaoru; Miyama, Hiroshi; Kawauchi, Yoshikazu; and Nishida, Jun, 4,745,344, Cl. 315-366.000.

Nishida, Kozi: *See*—
Anzai, Hisao; Makino, Hideaki; Sasaki, Isao; Nishida, Kozi; and Morimoto, Masaru, 4,745,159, Cl. 525-329.900.

Nishida, Yuichi: *See*—
Oono, Tooru; and Nishida, Yuichi, 4,745,103, Cl. 514-23.000.

Nishikawa, Masaji, to Olympus Optical Co., Ltd. Helical scanning apparatus with one or more rows of scanning elements and an object of scanning disposed at an angle to the axis of a rotating drum to eliminate skew of scanning lines. 4,745,487, Cl. 358-289.000.

Nishio, Yoshitaka: *See*—
Taki, Yoshihiro; Fukuta, Toshiaki; Akado, Hajime; Miyakawa, Susumu; and Nishio, Yoshitaka, 4,744,902, Cl. 210-493.100.

Nishioka, Masahiro: *See*—
Shibata, Hirotaka; and Nishioka, Masahiro, 4,744,432, Cl. 180-68.100.

Nishizawa, Jun-ichi; and Motoya, Kaoru, to Zaidan Hojin Handotai Kenkyu Shinkokai. Extremely-high frequency semiconductor oscillator using transit time negative resistance diode. 4,745,374, Cl. 331-96.000.

Niskin, Shale J. Airborne water sampler device. 4,744,256, Cl. 73-864.660.

Nissan Chemical Industries, Ltd.: *See*—
Baba, Masatoshi; Tanaka, Norio; Ikai, Takasi; and Nawamaki, Tsutomu, 4,744,815, Cl. 71-92.000.

Nissan Motor Co., Ltd.: *See*—
Morita, Kiyomi; Miyake, Junji; Hatanaka, Keiji; and Sakuma, Kiyotoshi, 4,744,346, Cl. 123-492.000.
Muro, Hideo, 4,745,274, Cl. 250-214.00R.
Shibahata, Yasuji; Tonomura, Hiroshi; and Tsubota, Yasumasa, 4,744,586, Cl. 280-661.000.
Takagi, Kazumasa; and Mochida, Haruo, 4,744,231, Cl. 70-264.000.
Uchiyama, Hirao, 4,744,436, Cl. 180-233.000.

Nissenbaum, Robert: *See*—
Mitchell, Cheryl R.; Mitchell, Pat R.; and Nissenbaum, Robert, 4,744,992, Cl. 426-29.000.

Nissha Printing Co., Ltd.: *See*—
Takaochi, Minoru; Matsumura, Kozo; Sumi, Takao; and Masaki, Kenichi, 4,744,635, Cl. 350-311.000.

Nissninboseki Kabushiki Kaisha: *See*—
Hatsuzaki, Toshio; Ogawa, Yoshihiko; Hiramatsu, Toshio; Senga, Hideo; and Tokoro, Takehiko, 4,744,193, Cl. 52-744.000.

Nitecki, Danute E.: *See*—
Moreland, Margaret; and Nitecki, Danute E., 4,745,180, Cl. 530-351.000.

Nittan Company, Ltd.: *See*—
Kimura, Tetsuo, 4,745,399, Cl. 340-521.000.

Niwa, Mineo: *See*—
Ueda, Ikuo; Niwa, Mineo; Saito, Yoshimasa; Sato, Susumu; Ono, Hiroki; and Kitaguchi, Tadashi, 4,745,179, Cl. 530-350.000.

Nixon, Giles M. B.: *See*—
Dallimer, Davis S.; and Nixon, Giles M. B., 4,744,698, Cl. 405-226.000.

Nobayashi, Noboru, to Yamaha Hatsudoki Kabushiki Kaisha. Engine compartment and steering arrangement layout for a small watercraft. 4,744,325, Cl. 114-270.000.

Nocek, Robert, to Minigrip, Inc. Non-reclosable mechanically fillable and closable link bag structure and method. 4,744,674, Cl. 383-63.000.

Nochta, George A. Fishing lure. 4,744,169, Cl. 43-42.310.

Nodomi, Ryoichi: *See*—
Egawa, Akira; Mizoguchi, Hakaru; Matsuno, Kiyonori; Ariga, Tatsuya; and Nodomi, Ryoichi, 4,745,614, Cl. 372-85.000.

Noe, Raymond J., to General Electric Company. Ribbon blown glass article transport. 4,744,464, Cl. 206-422.000.

Noguchi, Kouki: *See*—
Hanawa, Makoto; Noguchi, Kouki; and Shinbo, Osamu, 4,745,302, Cl. 307-269.000.

Noguchi, Kunihiro: *See*—
Ohyama, Masachika; Narita, Mitsuo; and Noguchi, Kunihiro, 4,745,335, Cl. 313-639.000.

Noguchi, Minori; Otsubo, Toru; and Aiuchi, Susumu, to Hitachi, Ltd. Apparatus for measuring difference in shallow level. 4,744,660, Cl. 356-355.000.

Nohara, Kiyohiko: *See*—
Yuhara, Shunichi; Oka, Yutaka; Sasaki, Terufumi; Masuko, Osamu; Nohara, Kiyohiko; and Tanaka, Tomoo, 4,744,824, Cl. 75-82.000.

Nohring, Lothar: *See*—
Kotthaus, Alfred; and Nohring, Lothar, 4,745,238, Cl. 174-101.500.

Noll, Klaus; Mosbach, Jurgen; Pedain, Josef; Nachtkamp, Klaus; and Schwindt, Jurgen, to Bayer Aktiengesellschaft. Process for the production of aqueous dispersions of polyurethane polyureas, the dispersions obtainable by this process and their use as coating compositions. 4,745,151, Cl. 524-591.000.

Nomura, Hiroaki, to Seiko Epson Kabushiki Kaisha. Objective lens actuator having movements restricting control means for an optical head. 4,745,589, Cl. 369-45.000.





Nomura, Hirotsugu: *See*—
Yoshida, Eiichi; Nomura, Hirotsugu; and Satoh, Shoichi, 4,744,800, Cl. 44-70.000.

Nomura, Noboru: *See*—
Sasago, Masaru; Endo, Masayuki; Takeyama, Kenichi; and Nomura, Noboru, 4,745,042, Cl. 430-156.000.

Nordischer Maschinenbau Rud. Baader GmbH+C KG: *See*—
Hartmann, Franz; and Matern, Klaus, 4,744,131, Cl. 17-55.000.

Noritsu Kenkyu Center Co., Ltd.: *See*—
Miyawaki, Hiroshi, 4,745,444, Cl. 355-74.000.

Norkoski, Joseph: *See*—
Hood, Stephen K.; Norkoski, Joseph; and Arnold, Halan P., 4,744,198, Cl. 53-415.000.

Norland, Richard S.: *See*—
Lewis, Roger L.; Norland, Richard S.; and Jones, Leon D., 4,744,604, Cl. 299-10.000.

Norrington, Franklin E. A.: *See*—
Hadfield, Susan G.; and Norrington, Franklin E. A., 4,745,075, Cl. 436-523.000.

Norsolor: *See*—
Hess, Raymond; and Lacroix, Christian, 4,745,214, Cl. 560-222.000.

Nortey, Narku O., to Farrel Corporation. Internal batch mixing machines with non-intermeshing rotors of increased performance. 4,744,668, Cl. 366-76.000.

North American Philips Corporation: *See*—
Carr, Ronald E.; Schneider, Matthew L.; and Payne, Paul E., 4,745,363, Cl. 324-208.000.
Paolini, Francis R., 4,745,631, Cl. 378-146.000.

North American Phillips Corporation, Signetics Division: *See*—
Reimer, Jan D.; and Akylas, Victor R., 4,745,360, Cl. 324-158.00R.

Northern Research and Engineering Corp.: *See*—
Brassert, Walter L.; Capone, Pat A.; Carter, Anthony F.; Heitmann, Arnold M.; Jansen, Willem; Sexton, Robert M.; and Thirumalaisamy, Salaiyur N., 4,744,724, Cl. 415-158.000.

Northern Telecom Limited: *See*—
Hvezda, Jaroslav M.; Dalgleish, Jack F.; and Kahn, David A., 4,744,617, Cl. 350-96.150.
Vexler, Gavriel L.; and Cheema, B. Paul S., 4,745,002, Cl. 427-52.000.

Northrop, Donald P.; and Pirovic, Arpad L., to Duro-Test Corporation. Compact fluorescent lamp with outer envelope. 4,745,323, Cl. 313-25.000.

Norton Company: *See*—
Robinson, Kenneth; and Rukovena, Frank, Jr., 4,744,929, Cl. 261-97.000.

Nose, Tadashi: *See*—
Baba, Satoshi; Nose, Tadashi; Muto, Tetsuji; and Fujimura, Yuji, 4,745,542, Cl. 364-184.000.

Nossek, Josef A.: *See*—
Sebald, Georg; Lankl, Berthold; and Nossek, Josef A., 4,745,623, Cl. 375-14.000.

Novak, Richard C.: *See*—
Matarese, Alfred P.; Eaton, Harry E.; Novak, Richard C.; and Goodman, James M., 4,744,725, Cl. 415-172.00A.

Novapharme: *See*—
Astoin, Jacques N.; Hublot, Bernard; and Lepage, Francis, 4,745,125, Cl. 514-388.000.

Noville, Jean-Francois; and Wilmotte, Stephan, to Centre de Recherches Metallurgiques-Centrum voor Research in de Metallurgie. Apparatus for cooling a metal product in motion. 4,744,226, Cl. 62-374.000.

NRM Corporation: *See*—
Singh, Anand P., 4,744,739, Cl. 425-34.100.

Nukaya, Yasuyuki; Wakabayashi, Tomio; Mitsuki, Iwao; and Motohashi, Takeshi, to Ricoh Company, Ltd. Paper feed roller drive system for a printer. 4,744,687, Cl. 400-624.000.

Numbers, Jody L.: *See*—
Knotter, David G.; Levin, Donald R.; and Numbers, Jody L., 4,744,428, Cl. 177-127.000.

Nunninga, Zacharias L.: *See*—
Klaren, Dick G.; and Nunninga, Zacharias L., 4,744,413, Cl. 165-104.160.

Obama, Masao: *See*—
Asano, Kuniji; Arimura, Yoshiaki; Obama, Masao; Hitomi, Yutaka; and Kondoh, Mitsunori, 4,744,719, Cl. 414-730.000.

Oberkirch, Wolfgang: *See*—
Scholl, Thomas; Oberkirch, Wolfgang; and Perrey, Hermann, 4,745,175, Cl. 528-380.000.

Oce-Nederland B.V.: *See*—
Hermkens, Gerardus A. J., 4,744,253, Cl. 73-862.550.

Ochiai, Katsumi, to Fuji Jukogyo Kabushiki Kaisha. Intake port structure for an internal combustion engine. 4,744,342, Cl. 123-308.000.

Oda, Hideaki; and Unozawa, Akira, to Diesel Kiki Co., Ltd. Dressing apparatus for grinding wheels. 4,744,348, Cl. 125-11.0CD.

Odagiri, Haruo: *See*—
Douno, Shugo; Miyanaga, Fumio; Tomiyama, Hiroshi; and Odagiri, Haruo, 4,745,265, Cl. 235-379.000.

Oden, Darrell B.: *See*—
Oden, Michael A.; and Oden, Darrell B., 4,745,390, Cl. 340-52.00R.

Oden, Michael A.; and Oden, Darrell B. Four-wheel drive engagement detector. 4,745,390, Cl. 340-52.00R.

Odio, Carlos E.: *See*—
le Grand, Ferdinand; and Odio, Carlos E., 4,744,868, Cl. 203-19.000.

Oestreicher, Feodor: *See*—
Heppke, Gerd; and Oestreicher, Feodor, 4,744,918, Cl. 252-299.610.

Offt, Alan M.; Jackson, Robert L., Jr.; Kraft, Russell P.; and Wagner, John F., to Mechanical Technology Incorporated. Method and apparatus for determining the position of a feature of an object. 4,744,664, Cl. 356-375.000.

Ogasawara, Nobuhiko: *See*—
Tomite, Tosio; Naito, Shotaro; Ogasawara, Nobuhiko; Tani, Tatsuhiro; and Kobayashi, Hidemitsu, 4,745,319, Cl. 310-154.000.

Ogata, Haruki: *See*—
Ohira, Tsunehisa; and Ogata, Haruki, 4,745,486, Cl. 358-310.000.

Ogata, Yasuhiro: *See*—
Maekawa, Masakazu; and Ogata, Yasuhiro, 4,745,097, Cl. 503-209.000.

Ogata, Yasuyuki; and Ono, Hidetsugu, to Mitsubishi Mining and Cement Co. Ltd. Method for production of highly dielectric powder. 4,744,972, Cl. 423-598.000.

Ogawa, Junji; and Takemae, Yoshihiro, to Fujitsu Limited. Semiconductor memory device with shift registers for high speed reading and writing. 4,745,577, Cl. 365-78.000.

Ogawa, Yoshihiko: *See*—
Hatsuzaki, Toshio; Ogawa, Yoshihiko; Hiramatsu, Toshio; Senga, Hideo; and Tokoro, Takehiko, 4,744,193, Cl. 52-744.000.

Ogita, Zen-ichi. Test paper for determining the concentration of halogen ions by filter paper chromatography, and manufacturing process for and use of the same. 4,744,952, Cl. 422-56.000.

Oglesbee, Ivan W., to ASM America, Inc. Vacuum wafer expander apparatus. 4,744,550, Cl. 269-21.000.

O'Gwynn, David C., to Ampex Corporation. Apparatus and method for adjusting the tracking position of a magnetic head along a magnetic track. 4,745,496, Cl. 360-77.000.

Ohama, Chiaki: *See*—
Ikari, Yoshikatsu; Yokoyama, Shoichiro; Ohama, Chiaki; and Fukui, Ryosuke, 4,745,129, Cl. 514-502.000.

Ohara, Riichiro: *See*—
Ida, Eiji; and Ohara, Riichiro, 4,745,150, Cl. 524-505.000.

Ohashi, Kaoru: *See*—
Buma, Shuuichi; Onuma, Toshio; Ohashi, Kaoru; and Itou, Masami, 4,744,589, Cl. 280-707.000.

Ohashi, Takehisa: *See*—
Hamaguchi, Shigeki; Ohashi, Takehisa; and Watanabe, Kiyoshi, 4,745,066, Cl. 435-280.000.

Ohata, Takahiko: *See*—
Hirosaki, Yukihiro; Ohata, Takahiko; Hamada, Motonobu; and Koike, Seiji, 4,744,680, Cl. 400-120.000.

Ohba, Masahiro: *See*—
Kakehi, Tohru; Matsui, Katsumasa; and Ohba, Masahiro, 4,744,511, Cl. 236-13.000.

Ohbayashi, Keiji; Tai, Akiyoshi; and Mizukura, Noboru, to Konishiroku Photo Industry Co., Ltd. Silver halide photographic light-sensitive material. 4,745,049, Cl. 430-546.000.

Ohchi, Masato, to Toyota Jidosha Kabushiki Kaisha. Seat structure for vehicle. 4,744,598, Cl. 297-183.000.

Ohe, Junya: *See*—
Yabuki, Ritsue; and Ohe, Junya, 4,744,821, Cl. 75-0.50C.

Ohio State University Research Foundation, The: *See*—
Knaebel, Kent S., 4,744,803, Cl. 55-25.000.

Ohira, Tadashi: *See*—
Maruta, Syuzi; Ito, Masazumi; and Ohira, Tadashi, 4,745,441, Cl. 355-14.00R.

Ohira, Tsunehisa; and Ogata, Haruki, to Victor Company of Japan, Ltd. Helical scan type magnetic recording apparatus. 4,745,486, Cl. 358-310.000.

Ohkawa, Tihiro, to GA Technologies Inc. Microwave generation by virtual cathode with phase velocity matching. 4,745,336, Cl. 315-4.000.

Ohki, Naoyuki: *See*—
Adachi, Hideki; Tomosada, Masahiro; Suzuki, Tadashi; and Ohki, Naoyuki, 4,745,443, Cl. 355-40.000.

Ohnishi, Toshiyuki: *See*—
Okamura, Shigeru; Nagoshi, Shigeyasu; and Ohnishi, Toshiyuki, 4,745,414, Cl. 346-140.00R.

O'Holleran, Thomas P., to KMS Fusion, Inc. Method of dispersing particulate aerosol tracer. 4,744,919, Cl. 252-305.000.

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Yu, Chih-Hua, to Taiwan Electric Heating Equipment Co., Ltd. Warming fan. 4,745,261, Cl. 219-364.000.
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Yuhara, Shunichi; Oka, Yutaka; Sasaki, Terufumi; Masuko, Osamu; Nohara, Kiyohiko; and Tanaka, Tomoo, to Doryokuro Kakunenryo Kaihatsu Jigyodan; and Kawasaki Steel Corporation. Method of producing metallic materials for the components of nuclear reactors. 4,744,824, Cl. 75-82.000.
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Zetachron, Inc.: *See—*
Snipes, Wallace C.; and Wagner, Stephen J., 4,744,976, Cl. 424-408.000.
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Lucas, Jacques; and Zhang, Xiang H., 4,745,090, Cl. 501-40.000.
Ziegler, Bernard; Durandeau, Michel; and Collard, Thierry, to Societe Nationale Industrielle et Aerospatiale. Aircraft flight control system. 4,744,532, Cl. 244-75.00R.
Ziegler, Klaus, to VDO Adolf Schindling AG. Device for detecting the filling level of a liquid in a container. 4,744,395, Cl. 141-95.000.
Zilog, Inc.: *See—*
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TO WHOM

PATENTS WERE ISSUED ON THE 17TH DAY OF MAY, 1988

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Angle, Lonnie L. Energy amplifier apparatus. Re. 32,669, Cl. 417-150.000.
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Staerzl, Richard E., Re. 32,667, Cl. 123-435.000.
Ketels, Gerardus H. J., to Protecon B.V. Device for deboning meat. Re. 32,666, Cl. 17-1.00G.
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Ketels, Gerardus H. J., Re. 32,666, Cl. 17-1.00G.
Santo, Philip J. Floatation sleep system. Re. 32,665, Cl. 5-452.000.
Smith, Irving. Foldable display stand. Re. 32,668, Cl. 211-149.000.
Staerzl, Richard E., to Brunswick Corporation. Gated knock detector for internal-combustion engines. Re. 32,667, Cl. 123-435.000.

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Adam, Georges; and Goergen, Rene, to Goodyear Tire & Rubber Company, The. Tire. 295,733, 5-17-88, Cl. D12-143.000.
American Telephone & Telegraph Company: *See—*
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Amici, Inc.: *See—*
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Ando, Toshiya; and Kaneko, Tomihiro, to Casio Computer Co., Ltd. Camera. 295,756, 5-17-88, Cl. D16-6.000.
Apple Computer, Inc.: *See—*
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Armstrong, Richard G.: *See—*
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AT&T Information Systems Inc.: *See—*
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AVIA Group International, Inc.: *See—*
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Barber, Gerald L.; and Comstock, Wayne P. Mobile living quarters unit. 295,734, 5-17-88, Cl. D12-104.000.
Berry, Loren E. Electronic visual metronome. 295,728, 5-17-88, Cl. D10-43.000.
Blackburn, Richard J. Combined flagstaff and support base bracket. 295,730, 5-17-88, Cl. D11-182.000.
Blair, John E.: *See—*
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Blance, Andrew J.: *See—*
Weisz, Sandor F.; and Blance, Andrew J., 295,743, Cl. D14-58.000.
Boelke, James C. Cat toy or similar article. 295,798, 5-17-88, Cl. D30-160.000.
Bono, Michael; and Rossi, Frank J., to Amici, Inc. Respirator mouthpiece. 295,797, 5-17-88, Cl. D29-7.000.
Broderna Holmbergs Fabriks AB: *See—*
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Brown, Paul D.: *See—*
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Broyhill Furniture Industries, Inc.: *See—*
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Bruninga, Kenneth J.; Fletcher, Douglas C.; and Hayes, Ronald G., to L. R. Nelson Corporation. Timer for a lawn sprinkler controller. 295,778, 5-17-88, Cl. D23-245.000.
Bruninga, Kenneth J.; Fletcher, Douglas C.; and Hayes, Ronald G., to L. R. Nelson Corporation. Lawn sprinkler controller-timer with cover. 295,779, 5-17-88, Cl. D23-245.000.
Busick, Denzel R.: *See—*
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Cain, Ann S., to 'totes', Incorporated. Umbrella handle. 295,693, 5-17-88, Cl. D3-12.000.
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Castonguay, Roger. Dough slicer and groover. 295,708, 5-17-88, Cl. D7-43.000.
Clarke, Francis A. Bag holder. 295,727, 5-17-88, Cl. D9-434.000.
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Cornelius, Morris E. Combined shelf and storage unit. 295,705, 5-17-88, Cl. D6-479.000.
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DeLuca, Carlo B.; and Klosin, John J., to Homac Mfg. Company. Seal lock body. 295,719, 5-17-88, Cl. D8-331.000.
DeLuca, Carlo B.; and Klosin, John J., to Homac Mfg. Company. Seal lock body. 295,720, 5-17-88, Cl. D8-331.000.
Demars, Robert. Disposable razor. 295,795, 5-17-88, Cl. D28-46.000.
Despres, Roger J. Storage and display stand for hole cutting saws. 295,704, 5-17-88, Cl. D6-469.000.
Diaz, Juan A.; and Brown, Paul D., to Reebok International Ltd. Shoe upper. 295,689, 5-17-88, Cl. D2-314.000.
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Dost, Carole. Dress or similar article. 295,685, 5-17-88, Cl. D2-72.000.
Driscoll, William J. Extension lever attachment for a motor vehicle door handle. 295,717, 5-17-88, Cl. D8-300.000.
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227 4,744,440

**CLASS 182**

111 4,744,441

**CLASS 184**

19 4,744,442

**CLASS 188**

292 4,744,443
315 4,744,444

**CLASS 190**

107 4,744,445
4,744,446

**CLASS 192**

56 R 4,744,447
70.27 4,744,448
84 C 4,744,449
111 A 4,744,450

**CLASS 193**

40 4,744,451

**CLASS 198**

314 4,744,452
347 4,744,453
4,744,454
4,744,455
4,744,456
4,744,457
4,744,458
4,744,459
740 4,744,460

**CLASS 200**

258 4,745,244
331 4,745,243

**CLASS 202**

248 4,744,867

**CLASS 203**

19 4,744,868
82 4,744,869

**CLASS 204**

1 T 4,744,870
44.3 4,744,871
4,744,872
98 4,744,873
4,744,874
4,744,875
245 4,744,876
4,744,877
293 4,744,878
4,744,879
4,744,880

**CLASS 206**

3 4,744,461
223 4,744,462
387 4,744,463
422 4,744,464
4,744,465
620 4,744,466
631.3 4,744,467

**CLASS 208**

4,744,882
48 AA 4,744,881
4,744,883
111 4,744,884
4,744,885
120 4,744,886
152 4,744,887
251 H 4,744,888

**CLASS 209**

9 4,744,889
4,744,890
4,744,891
167 4,744,892
4,744,893
4,744,894
4,744,468
4,744,469
4,744,470

**CLASS 210**

96.2 4,744,895
170 4,744,896
4,744,897
4,744,898
263 4,744,899
321.78 4,744,900
323.1 4,744,901
493.1 4,744,902
632 4,744,903
4,744,904
634 4,744,905
651 4,744,906
730 4,744,907
747 4,744,908
4,744,909
748 4,744,910

**CLASS 211**

7 4,744,471
4,744,472
55 4,744,473
133 4,744,474
134 4,744,475
149 Re.32,668

**CLASS 215**

11.1 4,744,476
229 4,744,477
252 4,744,478
4,744,479
4,744,480
329 4,744,481

**CLASS 219**

8.5 4,745,245
10.55 B 4,745,246
10.55 C 4,745,250
10.55 D 4,745,247
10.55 E 4,745,249
10.55 M 4,745,248
10.57 4,745,251
10.71 4,745,252
69 R 4,745,253
76.15 4,745,254
110 4,745,255
121 LD 4,745,257
121 LG 4,745,258
121 PL 4,745,256
125.1 4,745,259
4,745,260
4,745,261
4,745,262
4,745,263
4,745,264

**CLASS 220**

85 SP 4,744,482
4,744,483
4,744,484
4,744,486
4,744,487
4,744,488

**CLASS 221**

6 4,744,489
75 4,744,490
172 4,744,491
204 4,744,492

**CLASS 222**

167 4,744,493
391 4,744,494
402.16 4,744,495

**CLASS 223**

95 4,744,496

**CLASS 224**

202 4,744,497

**CLASS 227**

140 4,744,498

**CLASS 228**

4.1 4,744,499
4,744,500
102 4,744,501
116 4,744,502
125 4,744,503
127 4,744,504
175 4,744,505
208 4,744,506

**CLASS 229**

40 4,744,507
73 4,744,508
92.1 4,744,509
125.19 4,744,510

**CLASS 235**

379 4,745,265
4,745,266
4,745,267
487 4,745,268
4,745,269

**CLASS 236**

13 4,744,511

**CLASS 238**

14.3 4,744,512

**CLASS 239**

3 4,744,513
4,744,514
4,744,515
4,744,516
263 4,744,517
297 4,744,518
532 4,744,519
654 4,744,520

**CLASS 241**

3 4,744,523
36 4,744,524
66 4,744,521
92 4,744,522
101.2 4,744,531
171 4,744,525

**CLASS 242**

65 4,744,526
71.8 4,744,528
198 4,744,530
711 4,744,527

**CLASS 244**

75 R 4,744,532
114 R 4,744,529
159 4,744,533
218 4,744,534

**CLASS 248**

74.1 4,744,535
125 4,744,536
219.1 4,744,537
345.1 4,744,538
638 4,744,539

**CLASS 249**

60 4,744,540
192 4,744,541

**CLASS 250**

4,745,271
205 4,745,272
4,745,273
214 R 4,745,274
216 4,745,270
4,745,275
253 4,745,276
4,745,277
326 4,745,282
327.2 4,745,283
338.2 4,745,278
338.3 4,745,284
4,745,279
4,745,280
356 R 4,745,281
440.1 4,745,297
458.1 4,745,285
459.1 4,745,286
492.2 4,745,287
548 4,745,288
4,745,289
4,745,294
560 4,745,290
4,745,291
4,745,292
4,745,295
563 4,745,296
577 4,745,293

**CLASS 251**

30.01 4,744,542
65 4,744,543

**CLASS 252**

8.8 4,744,911
33.4 4,744,920
46.7 4,744,912
70 4,744,913
74 4,744,914
78.3 4,744,915
99 4,744,916
187.21 4,744,917
299.61 4,744,918
305 4,744,919
427 4,744,921
478 4,744,922
544 4,744,923
551 4,744,924

**CLASS 260**

104 4,744,925
412.2 4,744,926
414 4,744,927

**CLASS 261**

95 4,744,928
97 4,744,929

**CLASS 264**

4.3 4,744,933
40.2 4,744,930
40.5 4,744,931
41 4,744,932
101 4,744,934
103 4,744,935
175 4,744,936
521 4,744,937

**CLASS 266**

100 4,744,544
227 4,744,545
266 4,744,546

**CLASS 267**

64.12 4,744,548
141 4,744,547
287 4,744,549

**CLASS 269**

21 4,744,550
55 4,744,551
71 4,744,552

**CLASS 271**

3.1 4,744,553
251 4,744,554
4,744,555

**CLASS 272**

94 4,744,556
97 4,744,557
4,744,558
118 4,744,559
4,744,560

**CLASS 273**

25 4,744,561
73 D 4,744,562
116 4,744,563
232 4,744,564
342 4,744,565
357 4,744,566
393 4,744,567
404 4,744,568

**CLASS 277**

88 4,744,569
184 4,744,570
208 4,744,571
236 4,744,572

**CLASS 280**

1.13 4,744,573
11.18 4,744,574
87.01 4,744,575
87.04 A 4,744,576
215 4,744,577
242 WC 4,744,578
275 4,744,579
411 A 4,744,580
432 4,744,581
460 A 4,744,582
478 B 4,744,583
606 4,744,584
845 4,744,585
861 4,744,586
890 4,744,587
700 4,744,588
707 4,744,589
769 4,744,590

**CLASS 281**

5 4,744,591
15 R 4,744,592

**CLASS 294**

19.2 4,744,593
64.1 4,744,594
65 4,744,595
88 4,744,596
172 4,744,597

**CLASS 297**

4,744,598
4,744,599
326 4,744,600
391 4,744,601
423 4,744,602
457 4,744,603

**CLASS 299**

10 4,744,604
91 4,744,605

**CLASS 301**

6 CS 4,744,606

**CLASS 303**

16 4,744,607
22.5 4,744,608
37 4,744,609
92 4,744,610

**CLASS 307**

4,745,298
66 4,745,299
112 4,745,300
119 4,745,301
269 4,745,302
353 4,745,303
455 4,745,304
468 4,745,307
472 4,745,306
473 4,745,308
475 4,745,305
490 4,745,309
603 4,745,310
632 4,745,311

**CLASS 310**

49 R 4,745,312
52 4,745,313
57 4,745,314
68 D 4,745,315
87 4,745,316
105 4,745,317
114 4,745,318
154 4,745,319
217 4,745,320
313 D 4,745,321

**CLASS 312**

116 4,744,611
140 4,744,612
235 R 4,744,613
242 4,744,614

**CLASS 313**

1 4,745,322
25 4,745,323
296 4,745,324
345 4,745,325
346 DC 4,745,326
371 4,745,327
372 4,745,328
4,745,329
407 4,745,330
414 4,745,331
422 4,745,332
492 4,745,333
512 4,745,334
639 4,745,335

**CLASS 315**

4 4,745,336
111.41 4,745,337
111.71 4,745,338
130 4,745,339
144 4,745,340
176 4,745,341
200 R 4,745,342
246 4,745,343
366 4,745,344

**CLASS 318**

254 4,745,345
685 4,745,346
744 4,745,347
749 4,745,348

**CLASS 320**

22 4,745,349

**CLASS 323**

209 4,745,350
239 4,745,351
263 4,745,352

**CLASS 324**

58.5 A 4,745,353
73 R 4,745,354
4,745,355
78 D 4,745,356
96 4,745,357
99 D 4,745,358
133 4,745,359
158 R 4,745,360
4,745,361
4,745,362
208 4,745,363
309 4,745,364

**CLASS 325**

147 4,745,365
159 4,745,366
235 4,745,367

**CLASS 330**

10 4,745,368
43 4,745,369
252 4,745,370

**CLASS 331**

1 A 4,745,371
8 4,745,372
16 4,745,373
96 4,745,374
116 R 4,745,375
162 4,745,376

**CLASS 333**

26 4,745,377
196 4,745,378
206 4,745,379
234 4,745,380
243 4,745,381

**CLASS 335**

128 4,745,382
181 4,745,383
195 4,745,384
208 4,745,385
258 4,745,386
299 4,745,387

**CLASS 336**

192 4,745,388

**CLASS 337**

45 4,745,389

**CLASS 340**

52 R 4,745,390
310 A 4,745,391
310 R 4,745,392
347 AD 4,745,393
4,745,394
4,745,395
365 R 4,745,396
365 VL 4,745,397
500 4,745,398
521 4,745,399
541 4,745,400
572 4,745,401
709 4,745,402
4,745,405
713 4,745,403
752 4,745,404
784 4,745,406
799 4,745,407
825.44 4,745,408
825.870 4,745,409
938 4,745,410

**CLASS 342**

403 4,745,411

**CLASS 343**

890 4,745,412

**CLASS 346**

74.5 4,745,418
76 PH 4,745,413
105 4,745,415
108 4,745,416
4,745,417
140 4,745,420
140 R 4,745,414
4,745,419
159 4,745,421

**CLASS 210**

96.10 4,744,615
96.14 4,744,616
96.15 4,744,617
96.17 4,744,619
96.18 4,744,620
96.19 4,744,618
96.20 4,744,621
4,744,622
4,744,623
4,744,624
4,744,625
4,744,626
4,744,627
4,744,628
4,744,629
4,744,630
96.23 4,744,631
96.34 4,744,632
132 4,744,633
163 4,744,634
311 4,744,635
331 R 4,744,636
339 R 4,744,637
345 4,744,638



350 S 4,744,639
388 4,744,640
445 4,744,641
518 4,744,642
536 4,744,643
608 4,744,644
631 4,744,645

**CLASS 351**

153 4,744,646
177 4,744,647
211 4,744,648
221 4,744,649

**CLASS 352**

84 4,744,650
225 4,744,651

**CLASS 353**

101 4,744,652

**CLASS 354**

299 4,745,422
320 4,745,423
354 4,745,424
4,745,425
407 4,745,426
432 4,745,427
443 4,745,428

**CLASS 355**

3 DD 4,745,429
3 FU 4,745,430
4,745,431
4,745,432
3 R 4,745,433
14 CH 4,745,437
14 R 4,745,434
4,745,436
4,745,441
14 SH 4,745,435
4,745,438
4,745,439
4,745,440
28 4,745,442
40 4,745,443
74 4,745,444

**CLASS 356**

5 4,744,653
73.1 4,744,654
107 4,745,472
121 4,744,655
181 4,745,478
243 4,744,656
319 4,744,657
351 4,744,658
353 4,744,659
355 4,744,660
358 4,744,661
372 4,744,662
375 4,744,663
4,744,664
384 4,744,665
401 4,744,666
417 4,744,667

**CLASS 357**

15 4,745,445
22 4,745,446
4,745,447
4,745,448
23.1 4,745,449
23.13 4,745,450
30 4,745,451
4,745,452
42 4,745,453
51 4,745,454
74 4,745,455
79 4,745,456
90 4,745,457

**CLASS 358**

11 4,745,458
12 4,745,459
4,745,460
21 R 4,745,461
4,745,462
23 4,745,463
34 4,745,464
80 4,745,465
4,745,466
4,745,467
84 4,745,468
93 4,745,469
98 4,745,470
4,745,471
133 4,745,473
4,745,474
140 4,745,475
145 4,745,476
153 4,745,477
183 4,745,479
213.18 4,745,480
213.29 4,745,481
4,745,482
227 4,745,484
236 4,745,485
244 4,745,483
289 4,745,487
294 4,745,488
296 4,745,489
300 4,745,490
4,745,491
310 4,745,486
4,745,492
324 4,745,493
338 4,745,494

**CLASS 360**

13 4,745,495
77 4,745,496
4,745,497
4,745,498
93 4,745,499
97 4,745,500
4,745,501
99 4,745,502
106 4,745,503
4,745,504
120 4,745,505
123 4,745,506
125 4,745,507
4,745,509
130.21 4,745,508
131 4,745,510

**CLASS 361**

8 4,745,511
36 4,745,512
56 4,745,513
154 4,745,514
185 4,745,515
189 4,745,516
212 4,745,517
220 4,745,518
4,745,519
228 4,745,520
272 4,745,521
341 4,745,522
356 4,745,523
399 4,745,524

**CLASS 362**

32 4,745,525
35 4,745,526
188 4,745,527
135 4,745,528
157 4,745,529
226 4,745,530
281 4,745,531
352 4,745,532
364 4,745,533
365 4,745,534

**CLASS 363**

19 4,745,535
21 4,745,536
4,745,538
37 4,745,537
4,745,539

**CLASS 364**

140 4,745,540
141 4,745,541
184 4,745,542
188 4,745,543
200 4,745,544
4,745,545
4,745,546
4,745,547
4,745,548
402 4,745,549
422 4,745,550
424 4,745,551
426 4,745,552
431.05 4,745,553
431.07 4,745,554
470 4,745,555
472 4,745,556
474 4,745,557
4,745,558
4,745,559
514 4,745,560
519 4,745,561
523 4,745,562
551 4,745,571
557 4,745,563
565 4,745,564
576 4,745,565
571 4,745,566
718 4,745,567
724 4,745,568
754 4,745,569
755 4,745,570
760 4,745,572
900 4,745,573
4,745,574
4,745,575
4,745,576

**CLASS 365**

36 4,745,578
78 4,745,577
104 4,745,579
179 4,745,580
189 4,745,581
200 4,745,582

**CLASS 366**

76 4,744,668
77 4,744,669

**CLASS 367**

18 4,745,583
50 4,745,585
153 4,745,584
175 4,745,586

**CLASS 368**

180 4,745,590

**CLASS 369**

32 4,745,587
4,745,588
45 4,745,589

**CLASS 370**

3 4,745,591
4,745,592
15 4,745,593
51 4,745,594
85 4,745,595
4,745,596
87 4,745,597
89 4,745,598
93 4,745,599
96 4,745,600
110.1 4,745,601

**CLASS 371**

20 4,745,602
27 4,745,603
38 4,745,604
49 4,745,605

**CLASS 372**

23 4,745,606
29 4,745,609
38 4,745,608
4,745,610
45 4,745,607
4,745,611
4,745,612
81 4,745,613
85 4,745,614
90 4,745,615
4,745,616
4,745,617
101 4,745,618

**CLASS 373**

4,745,619
152 4,745,620

**CLASS 374**

144 4,744,670
160 4,744,671
178 4,744,672

**CLASS 375**

10 4,745,621
14 4,745,622
4,745,623
17 4,745,624
39 4,745,628
75 4,745,625
87 4,745,626
88 4,745,627

**CLASS 376**

153 4,744,938
159 4,744,939
261 4,744,940
4,744,941
442 4,744,942

**CLASS 377**

20 4,745,629
29 4,745,630

**CLASS 378**

146 4,745,631

**CLASS 379**

58 4,745,632

**CLASS 382**

56 4,745,633

**CLASS 383**

38 4,744,673
63 4,744,674

**CLASS 384**

12 4,744,675
115 4,744,676
222 4,744,677
461 4,744,678
523 4,744,679

**CLASS 400**

120 4,744,680
121 4,744,681
124 4,744,682
146 4,744,683
167 4,744,684
241.4 4,744,685
352 4,744,686
624 4,744,687

**CLASS 401**

1 4,744,688

**CLASS 402**

73 4,744,689

**CLASS 403**

104 4,744,690
374 4,744,691
4,744,692

**CLASS 404**

77 4,744,693
89 4,744,694

**CLASS 406**

3 4,744,695
180 4,744,696
204 4,744,697
226 4,744,698
240 4,744,699
264 4,744,700

**CLASS 408**

39 4,744,701
88 4,744,702

**CLASS 407**

45 4,744,703

**CLASS 408**

144 4,744,704
230 4,744,705
239 A 4,744,706

**CLASS 409**

7 4,744,707

**CLASS 410**

47 4,744,708

**CLASS 414**

21 4,744,709
22 4,744,710
120 4,744,711
217 4,744,712
222 4,744,713
404 4,744,714
331 4,744,715
376 4,744,716
678 4,744,717
724 4,744,718
730 4,744,719
748 4,744,720

**CLASS 415**

113 4,744,721
121 B 4,744,722
145 4,744,723
158 4,744,724
172 A 4,744,725
219 R 4,744,726

**CLASS 416**

93 A 4,744,727
223 R 4,744,728

**CLASS 417**

12 4,744,729
150 Re.32,669
172 4,744,730
295 4,744,731
4,744,732
310 4,744,733
440 4,744,734
533 4,744,735

**CLASS 418**

35 4,744,736
55 4,744,737
126 4,744,738

**CLASS 419**

10 4,744,943
23 4,744,944

**CLASS 420**

129 4,744,945
443 4,744,946
590 4,744,947

**CLASS 422**

7 4,744,948
15 4,744,949
16 4,744,950
211 4,744,951
4,744,952
84 4,744,953
94 4,744,954
100 4,744,955
106 4,744,956
138 4,744,957
193 4,744,958
231 4,744,959

**CLASS 423**

10 4,744,960
171 4,744,961
4,744,963
230 4,744,964
235 4,744,962
239 4,744,967
272 4,744,968
304 4,744,973
306 4,744,970
310 4,744,965
323 4,744,971
360 4,744,966
541 R 4,744,969
4,744,972
625 4,744,974

**CLASS 424**

3 4,744,760
4,744,975
70 4,744,977
4,744,978
73 4,744,979
78 4,744,980
4,744,981
4,744,982
88 4,744,983
92 4,744,984
116 4,744,985
156 4,744,986
4,744,987
4,744,976
456 4,744,988
490 4,744,989

**CLASS 425**

34.1 4,744,739
107 4,744,740
123 4,744,741
126.1 4,744,742
145 4,744,743
164 4,744,744
446 4,744,745
563 4,744,746

**CLASS 426**

4,744,990
5 4,744,991
29 4,744,992
38 4,744,993
293 4,744,994
454 4,744,995
575 4,744,996
576 4,744,997
582 4,744,998

**CLASS 427**

13 4,744,999
39 4,745,000
4,745,001
52 4,745,002
54.1 4,745,003
4,745,004
128 4,745,005
222 4,745,006
228 4,745,008
249 4,745,007
255 4,745,010
393.5 4,745,009
426 4,745,011
435 4,745,012

**CLASS 428**

35 4,745,013
4,745,015
36 4,745,014
122 4,745,016
141 4,745,017
4,745,018
143 4,745,019
195 4,745,020
4,745,021
215 4,745,032
216 4,745,022
230 4,745,023
288 4,745,024
4,745,025
323 4,745,026
372 4,745,027
391 4,745,028
412 4,745,029
421 4,745,030
433 4,745,031
552 4,745,033
4,745,034
614 4,745,035
652 4,745,036
678 4,745,037

**CLASS 429**

27 4,745,038
54 4,745,039

**CLASS 430**

21 4,745,040
4,745,041
156 4,745,042
163 4,745,043
312 4,745,044
315 4,745,045
332 4,745,046
376 4,745,047
4,745,048
546 4,745,049
551 4,745,050
555 4,745,052

**CLASS 431**

36 4,744,747
353 4,744,748

**CLASS 432**

121 4,744,749
137 4,744,750

**CLASS 433**

343 4,744,751
100 4,744,752
173 4,744,753
4,744,754
4,744,755
4,744,756
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| 87 | 4,745,091 | 277 | 4,745,120 | 505 | 4,745,149 | 345 | 4,745,178 | 550 | 4,745,202 | 49 | 4,745,227 | | |
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| | CLASS 502 | 356 | 4,745,123 | 718 | 4,745,152 | 387 | 4,745,181 | 182 | 4,745,204 | 621 | 4,745,230 | | |
| 5 | 4,745,094 | 362 | 4,745,124 | 762 | 4,745,153 | | 4,745,182 | 412 | 4,745,205 | 624 | 4,745,231 | | |
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| 413 | 4,745,096 | 411 | 4,745,126 | | CLASS 525 | | CLASS 536 | 000 | 4,745,206 | 729 | 4,745,233 | | |
| | CLASS 503 | 469 | 4,745,127 | 54.5 | 4,745,155 | 17.1 | 4,745,184 | 351 | 4,745,207 | 830 | 4,745,234 | | |
| 209 | 4,745,097 | 483 | 4,745,128 | 80 | 4,745,156 | 117 | 4,745,185 | 483 | 4,745,208 | | CLASS 570 | | |
| | CLASS 514 | 502 | 4,745,129 | 92 | 4,745,157 | 119 | 4,745,186 | | CLASS 560 | 142 | 4,745,235 | | |
| 2 | 4,745,098 | 507 | 4,745,130 | 276 | 4,745,158 | | CLASS 540 | 9 | 4,745,209 | 166 | 4,745,236 | | |
| 8 | 4,745,099 | 567 | 4,745,131 | 329.9 | 4,745,159 | 123 | 4,745,187 | 41 | 4,745,210 | 176 | 4,745,237 | | |
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| 15 | 4,745,102 | | CLASS 521 | 481 | 4,745,162 | 170 | 4,745,190 | 217 | 4,745,213 | 20 | 4,744,787 | | |
| 23 | 4,745,103 | 28 | 4,745,134 | | CLASS 526 | 221 | 4,745,189 | 222 | 4,745,214 | 188 | 4,744,788 | | |
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| 36 | 4,745,105 | | 4,745,136 | 125 | 4,745,164 | | CLASS 546 | 347 | 4,745,216 | 218 | 4,744,789 | | |
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| | 4,745,108 | | CLASS 522 | 262 | 4,745,167 | | CLASS 548 | 574 | 4,745,218 | | CLASS 623 | | |
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| 212 | 4,745,110 | | CLASS 523 | | CLASS 528 | | 4,745,195 | 146 | 4,745,219 | 13 | 4,744,793 | | |
| 215 | 4,745,111 | 149 | 4,745,139 | 43 | 4,745,169 | 413 | 4,745,196 | 172 | 4,745,220 | | CLASS 700 | | |
| 220 | 4,745,112 | 334 | 4,745,140 | 61 | 4,745,170 | 521 | 4,745,197 | 267 | 4,745,221 | 52 R | 4,744,398 | | |
| 226.8 | 4,745,113 | 500 | 4,745,141 | 116 | 4,745,171 | | | 305 | 4,745,222 | | | | |
| | 4,745,115 | | CLASS 524 | 162 | 4,745,172 | | | | | | | | |
| | | 117 | 4,745,142 | 288 | 4,745,173 | | | | | | | | |
| | | 98 | 4,745,143 | | | | | | | | | | |

## CLASSIFICATION OF DESIGNS

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D2— | 72 | 295,685 | | 479 | 295,705 | | | 295,724 | | 58 | 295,743 | | 27 | 295,762 | | 281 | 295,781 |
| | 314 | 295,686 | | 600 | 295,706 | | | 295,725 | | 62 | 295,744 | | | 295,763 | | 308 | 295,782 |
| | | 295,687 | D7— | 24 | 295,707 | | 400 | 295,726 | | 64 | 295,745 | | | 295,764 | | 366 | 295,783 |
| | | 295,688 | | 43 | 295,708 | D9— | 434 | 295,727 | | 98 | 295,746 | | | 295,765 | D24— | 17 | 295,784 |
| | | 295,689 | | 70 | 295,709 | D10— | 39 | 295,729 | | 100 | 295,747 | D21— | 68 | 295,766 | | 29 | 295,786 |
| | 318 | 295,690 | | 77 | 295,710 | | 43 | 295,728 | | | 295,748 | | | 295,767 | | 38 | 295,785 |
| | 320 | 295,691 | | 375 | 295,711 | D11— | 182 | 295,730 | | | 295,749 | | 108 | 295,768 | | 82 | 295,787 |
| | | 295,692 | D8— | 13 | 295,712 | | 184 | 295,731 | | 107 | 295,750 | | | 295,769 | D25— | 113 | 295,788 |
| D3— | 12 | 295,693 | | 65 | 295,713 | D12— | 19 | 295,732 | | | 295,751 | | 122 | 295,770 | | 116 | 295,789 |
| | 16 | 295,694 | | 68 | 295,714 | | 104 | 295,734 | | | 295,752 | | 140 | 295,772 | | | 295,790 |
| D4— | 105 | 295,695 | | 79 | 295,715 | | 143 | 295,733 | D15— | 7 | 295,753 | | 149 | 295,771 | D26— | 63 | 295,791 |
| | 115 | 295,696 | | 91 | 295,716 | | 157 | 295,735 | | 8 | 295,754 | | 159 | 295,773 | | 71 | 295,792 |
| | 120 | 295,697 | | 300 | 295,717 | | 159 | 295,736 | | 199 | 295,755 | | 160 | 295,774 | D27— | 22 | 295,793 |
| D6— | 300 | 295,698 | | 330 | 295,718 | | 196 | 295,737 | D16— | 6 | 295,756 | D22— | 141 | 295,775 | D28— | 2 | 295,794 |
| | 310 | 295,699 | | 331 | 295,719 | | 197 | 295,738 | | 32 | 295,757 | | 147 | 295,776 | | 66 | 295,795 |
| | 319 | 295,700 | | | 295,720 | D13— | 8 | 295,739 | | | 295,758 | D23— | 223 | 295,777 | | 77 | 295,796 |
| | 366 | 295,701 | | 333 | 295,721 | D14— | 30 | 295,740 | D17— | 99 | 295,759 | | 245 | 295,778 | D29— | 7 | 295,797 |
| | 436 | 295,702 | | 382 | 295,722 | | | 295,741 | | | 295,760 | | | 295,779 | D30— | 160 | 295,798 |
| | 453 | 295,703 | | 396 | 295,723 | | 52 | 295,742 | D18— | 4 | 295,761 | | 268 | 295,780 | D34— | 31 | 295,799 |
| | 469 | 295,704 | | | | | | | | | | | | | | | |

## CLASSIFICATION OF PLANTS

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| P.— | 8 | 6,177 | 51 | 6,178 | 68 | 6,179 | 6,180 | 6,181 | 6,182 | | |

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| | 4,744,336 | 4,744,616 | 4,745,411 | 4,745,395 | 4,744,316 | 4,745,477 |
| | 4,744,894 | 4,744,633 | 4,745,419 | 4,745,420 | 4,744,354 | 4,745,520 |
| | 4,745,338 | 4,744,634 | 4,745,450 | 4,745,468 | 4,744,363 | 4,745,553 |
| D4 : | Re.32,669 | 4,744,647 | 4,745,454 | 4,745,479 | 4,744,364 | 4,745,629 |
| | 4,744,151 | 4,744,656 | 4,745,484 | 4,745,556 | 4,744,412 | 19 : 4,744,175 |
| | 4,744,261 | 4,744,657 | 4,745,496 | 4,745,631 | 4,744,483 | 4,744,332 |
| | 4,744,428 | 4,744,658 | 4,745,501 | 10 : 4,744,847 | 4,744,520 | 4,744,368 |
| | 4,744,504 | 4,744,681 | 4,745,524 | 4,745,008 | 4,744,568 | 4,744,466 |
| | 4,744,550 | 4,744,695 | 4,745,525 | 4,745,147 | 4,744,575 | 4,744,489 |
| | 4,744,712 | 4,744,762 | 4,745,546 | 12 : 4,744,137 | 4,744,580 | 4,744,490 |
| | 4,744,768 | 4,744,781 | 4,745,550 | 4,744,229 | 4,744,588 | 4,745,379 |
| | 4,744,877 | 4,744,813 | 4,745,562 | 4,744,256 | 4,744,614 | 20 : 4,744,147 |
| | 4,745,004 | 4,744,834 | 4,745,572 | 4,744,274 | 4,744,645 | 4,744,541 |
| | 4,745,308 | 4,744,859 | 4,745,573 | 4,744,282 | 4,744,716 | 4,744,552 |
| | 4,745,310 | 4,744,884 | 4,745,579 | 4,744,370 | 4,744,777 | 4,744,604 |
| | 4,745,370 | 4,744,888 | 4,745,580 | 4,744,371 | 4,744,845 | 21 : 4,744,181 |
| | 4,745,376 | 4,744,921 | 4,745,597 | 4,744,391 | 4,744,875 | 4,744,340 |
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| | 4,744,143 | 4,744,992 | 4,745,617 | 4,744,560 | 4,744,949 | 4,744,883 |
| | 4,744,145 | 4,745,055 | 4,745,630 | 4,744,643 | 4,744,958 | 22 : 4,744,144 |
| | 4,744,146 | 4,745,071 | 08 : 4,744,418 | 4,744,753 | 4,744,961 | 4,744,197 |
| | 4,744,169 | 4,745,074 | 4,744,419 | 4,744,754 | 4,744,963 | 4,744,271 |
| | 4,744,170 | 4,745,084 | 4,744,597 | 4,744,755 | 4,744,994 | 4,744,380 |
| | 4,744,180 | 4,745,091 | 4,744,808 | 4,744,756 | 4,745,012 | 4,744,415 |
| | 4,744,192 | 4,745,098 | 4,744,903 | 4,744,786 | 4,745,013 | 4,744,426 |
| | 4,744,195 | 4,745,104 | 4,744,904 | 4,744,865 | 4,745,328 | 4,744,452 |
| | 4,744,220 | 4,745,180 | 4,744,908 | 4,744,868 | 4,745,329 | 4,744,896 |
| | 4,744,248 | 4,745,183 | 4,744,909 | 4,744,900 | 4,745,330 | 4,744,925 |
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| | 4,744,444 | 4,745,290 | 4,744,554 | 4,745,519 | 4,744,701 | 4,745,040 |
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| | 4,744,487 | 4,745,303 | 4,744,593 | 16 : 4,744,471 | 4,744,778 | 4,745,326 |
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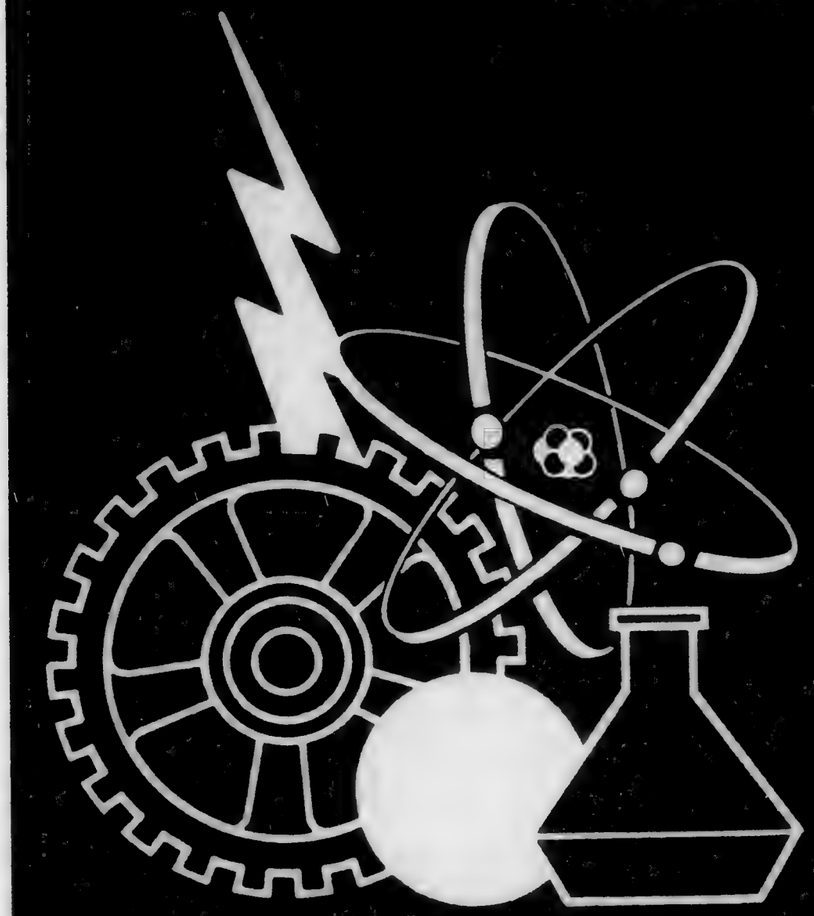
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# PATENT AND TRADEMARK OFFICE NOTICES

### Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1076 O.G. 3 on Mar. 3, 1987.

For use of the European Patent Office as a Searching Authority for PCT applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as a Preliminary Examining Authority for PCT applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987.

Certain domestic PCT fees for international applications have been changed effective Oct. 5, 1985 in the rule change notice titled "Revision of Patent Fees" published at 1057 O.G. 24 on Aug. 20, 1985.

The Search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar with regard to the German Mark as of Mar. 15, 1988, and was announced in the *Official Gazette* at 1087 O.G. 24 on Feb. 16, 1988.

Domestic PCT Fees for Chapter II, effective July 1, 1987, were announced in the *Official Gazette* at 1079 O.G. 32 on June 16, 1987.

International PCT fees were changed on July 1, 1987 due to a difference in the exchange rate of the U.S. dollar with regard to the Swiss Franc and were announced in the *Official Gazette* at 1079 O.G. 50 on June 23, 1987.

International PCT Chapter II fees which were effective July 1, 1987, were announced in the *Official Gazette* at 1079 O.G. 50 on June 23, 1987. The elimination of multiple handling fees and the supplement to the handling fee under PCT Rule 57 was announced at 1085 O.G. 34 on Dec. 22, 1987.

The withdrawal of the Japanese declaration under PCT Article 64(2)(a), concerning the requirement for a Japanese translation of the international application within 20 months from the priority date when Japan is elected under PCT Chapter II, as from Dec. 8, 1987, was announced at 1085 O.G. 34 on Dec. 22, 1987.

National stage fees effective July 1, 1987, for entering the U.S. Patent and Trademark Office as a designated or elected Office were changed effective July 1, 1987, and were announced in the *Official Gazette* at 1079 O.G. 32 on June 16, 1987.

The current schedule of PCT fees is as follows:

| | |
|---|---|
| Transmittal fee: | 170.00 |
| Search Fee | |
| U.S. Patent and Trademark Office as Searching Authority (ISA) | |
| —No corresponding prior U.S. national application filed: | 520.00 |
| —Corresponding prior U.S. national application filed: | 350.00 |
| —Supplemental search fee, per additional invention | 140.00 |
| European Patent Office as Searching Authority | 1300.00 |
| Preliminary examination fee | |
| U.S. Patent and Trademark Office as Preliminary Examining Authority (IPEA) | |
| —Search fee paid to USPTO as Searching Authority | 370.00 |
| —Additional examination fee, per additional invention | 125.00 |
| —Searching Authority not the USPTO | 570.00 |
| —Additional examination fee, per additional invention | 190.00 |
| International fees | |
| Basic fee: | 485.00 |
| Basic Supplemental fee (for each page over 30): | 10.00 |
| Designation fee per country or region for the first 10 national or regional offices: | 120.00 |
| Designation fee for 11th and subsequent designations: | No Charge |
| Handling fee: | 150.00 |

U.S. National Stage fees

| | Small Entity | Non-small Entity |
|---|---|---|
| U.S. Patent and Trademark Office was Preliminary Examining Authority (IPEA) | 150.00 | 300.00 |
| USPTO was ISA but not IPEA | 170.00 | 340.00 |
| USPTO was neither ISA nor IPEA | 225.00 | 450.00 |
| USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(1) to (4) | 25.00 | 50.00 |
| —For each independent claim in excess of 3 | 17.00 | 34.00 |
| —For each claim in excess of 20 | 6.00 | 12.00 |
| —For each application containing a multiple dependent claim | 55.00 | 110.00 |
| —Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39.1 | 55.00 | 110.00 |
| —Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39.1 | 26.00 | 26.00 |

DONALD J. QUIGG,
Mar. 21, 1988. *Assistant Secretary and Commissioner of Patents and Trademarks.*

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### Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on applications filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Oct. 5, 1985. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the grant.

Attention is drawn to the patents which were issued on May 21, 1985, for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,517,685 through 4,519,096
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months are set forth in 37 CFR 1.20(e) and (h), as amended effective Oct. 5, 1985, which are reproduced below:

37 CFR §1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant . . . $ 225.00"

"(h) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)) . . . . . $ 225.00
By other than a small entity . . . . . $ 450.00"

The amounts of the surcharges as amended effective Oct. 5, 1985, are set forth in 37 CFR 1.20 (k) and (l) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982 . . . . . $ 110.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity (§1.9(f)) . . . . . $ 55.00
By other than a small entity . . . . . $ 110.00"

Section 1.20 paragraph (m) as amended as a result of enactment of Public Law 98–622 effective Nov. 8, 1984, is reproduced below:

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay in payment is shown to the satisfaction of the Commissioner to have been unavoidable . . . . . $ 500.00"

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### Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first mai ntenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

*PATENTS WHICH EXPIRED MARCH 6, 1988, DUE TO FAILURE TO PAY MAINTENANCE FEES*

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| 4,435,250 | 06/375,445 | 3/6/84 | | | |
| 4,435,259 | 06/413,645 | 3/6/84 | | | |
| 4,435,266 | 06/428,525 | 3/6/84 | | | |
| 4,435,306 | 06/317,545 | 3/6/84 | | | |
| 4,435,316 | 06/396,288 | 3/6/84 | | | |
| 4,435,324 | 06/361,692 | 3/6/84 | | | |
| 4,435,331 | 06/474,158 | 3/6/84 | | | |
| 4,435,342 | 06/318,261 | 3/6/84 | | | |
| 4,435,347 | 06/274,267 | 3/6/84 | | | |
| 4,435,356 | 06/261,696 | 3/6/84 | | | |

**Recission of Notice of Patent Expiration**

The Notice of Expiration due to failure to pay maintenance fees for the following patent was published in error and is hereby recinded:

| Patent Number | Serial Number | Issue Date |
|---|---|---|
| 4,428,862 | 06/267,247 | 1/31/84 |

**Notification of Acceptance of Delayed Payment of Maintenance Fee (35 U.S.C. 41(c); 37 CFR 1.378)**

The patent listed below is considered as not having expired but is subject to the conditions set forth in 35 U.S.C. 41(c)(2), in view of the Petition to Accept Late Payment of the maintenance fees which has been GRANTED BY THE COMMISSIONER OF PATENTS AND TRADEMARKS, as provided for under 35 U.S.C. 41(c)(1) and 37 CFR 1.378.

| Patent No. | Serial No. | Patent Date | Application Filing Date | Delayed Payment Acceptance Date |
|---|---|---|---|---|
| 4,378,486 | 06/220,688 | 3/29/83 | 12/29/80 | 4/20/88 |



**REISSUE APPLICATIONS FILED**

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.19(a)).

**4,452,462,** Re. S.N. 110,094, Filed Oct. 13, 1987, Cl. 277/105, TEMPERATURE RESISTANT JOINT PACKING WITH E-SHAPED SPRING SEAL, Michael A. Karr, Jr., Owner of Record: *Vetco Gray, Inc.,* Attorney or Agent: James E. Bradley, Ex. Gp.: 246

**4,538,461,** Re. S.N. 147,621, Filed Jan. 22, 1988, Cl. 73/505, VIBRATORY ANGULAR RATE SENSING SYSTEM, William F. Juptner, et al., Owner of Record: *Inventor,* Attorney or Agent: Harold C. Hohbach, Ex. Gp.: 265

**4,538,944,** Re. S.N. 101,360, Filed Sept. 2, 1987, Cl. 408/206, ANNULAR CUTTER, Everett D. Hougen, Owner of Record: *Inventor,* Attorney or Agent: Raymond E. Scott, et al., Ex. Gp.: 322

**4,541,042,** Re. S.N. 094,771, Filed Sept. 10, 1987, Cl. 346/76PH, TRANSFER RECORDING METHOD AND APPARATUS THEREFOR, Tadao Kohashi, Owner of Record: *Matsushita Electric Industrial Co. Ltd., Osaka, Japan,* Attorney or Agent: Paul N. Kokulis, et al., Ex. Gp.: 216

**4,550,354,** Re. S.N. 114,222, Filed Oct. 29, 1987, Cl. 360/133, DISC CASSETTE (DISC CARTRIDGE), Manabu Wakabayashi, et al., Owner of Record: *Hitachi, Ltd., Tokyo, Japan,* Attorney or Agent: Donald R. Antonelli, et al., Ex. Gp.: 233

**4,551,082,** Re. S.N. 113,914, Filed Oct. 29, 1987, Cl. 418/55, BEARING DEVICE OF SEALED TYPE SCROLL COMPRESSOR, Eiichi Hazaki, et al., Owner of Record: *Hitachi, Ltd., Tokyo, Japan,* Attorney or Agent: Donald R. Antonelli, et al., Ex. Gp.: 343

**4,562,788,** Re. S.N. 141,193, Filed Jan. 6, 1988, Cl. 114/311, SEA ANCHOR OR CHANGEABLE DRAG, William J. Abernathy, Owner of Record: *Inventor,* Attorney or Agent: Arthur Schwartz, et al., Ex. Gp.: 315

**4,572,283,** Re. S.N. 158,879, Filed Feb. 22, 1988, Cl. 165/61, ENVIRONMENTAL TEST CHAMBER, Donald V. Schaaf, Owner of Record: *Venturedyne, Ltd., Milwaukee, Wis.,* Attorney or Agent: Bayard H. Michael, et al., Ex. Gp.: 345

**4,590,001,** Re. S.N. 140,659, Filed Jan. 4, 1988, Cl. 530/394, PLATINUM BOUND TO TRANSFERRIN FOR USE IN THE TREATMENT OF BREAST TUMORS, Rune L. Stjerholm, Owner of Record: *Inventor,* Attorney or Agent: Kenneth S. Klarquist, et al., Ex. Gp.: 153

**4,610,339,** Re. S.N. 104,004, Filed Oct. 2, 1987, Cl. 192/48.920, ADJUSTABLE TORQUE LIMITING ASSEMBLY, Donald A. Ciolli, Owner of Record: *Snap-On-Tool Corp., Kenosha, Wis.,* Attorney or Agent: Vincent L. Barker, Jr., et al., Ex. Gp.: 352

**4,660,698,** Re. S.N. 162,658, Filed Feb. 29, 1988, Cl. 192/45, ONE WAY CLUTCH, Osamu Miura, Owner of Record: *Tok Bearing Co. Ltd., Tokyo, Japan,* Attorney or Agent: Howard C. Miskin, Ex. Gp.: 352

**4,668,160,** Re. S.N. 090,044, Filed Aug. 26, 1987, Cl. 415/90, VACUUM PUMP, Masahiro Mase, et al., Owner of Record: *Hitachi, Ltd., Tokyo, Japan,* Attorney or Agent: Donald R. Antonelli, et al., Ex. Gp.: 341

**4,678,459,** Re. S.N. 126,905, Filed Nov. 30, 1987, Cl. 604/22, IRRIGATING CUTTING AND ASPIRATING SYSTEM FOR PERCUTANEOUS SURGERY, Gary Onik, et al., Owner of Record: *Medical Instruments Development Laboratories, San Leandro, Calif.,* Attorney or Agent: Lloyd McHulay, et al., Ex. Gp.: 336

**REQUESTS FOR REEXAMINATION FILED**

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

**Re. 31,368,** Reexam. No. 90/001,496, Requested: Apr. 11, 1988, Cl. 52/303, FLOUR SYSTEM FOR GRAIN BIN, Mark A. Trumper, Owner of Record: *Grain Systems Inc., Assumption, Ill.,* Attorney or Agent: Polster, Polster, et al., Ex. Gp.: 150, Requester: Hawkeye Steel Product Inc., Houghton, Iowa

**4,489,779,** Reexam. No. 90/001,494, Requested: Apr. 18, 1988, Cl. 166/64, FLUID SAMPLING APPARATUS, William D. Dickerson, et al., Owner of Record: *Q.E.D. Environmental Systems, Inc., Ann Arbor, Mich.,* Attorney or Agent: Harness, Dickey, et al., Ex. Gp.: 350, Requester: American Sigma, Inc., Middleport, N.Y.

**4,585,060,** Reexam. No. 90/001,493, Requested: Apr. 18, 1988, Cl. 166/64, FLUID SAMPLING APPARATUS, Frederick E. Bernardin, et al., Owner of Record: *Q.E.D. Environmental Systems, Inc., Ann Arbor, Mich.,* Attorney or Agent: Harness, Dickey, et al., Ex. Gp.: 350, Requester: American Sigma, Inc., Middleport, N.Y.

**4,636,207,** Reexam. No. 90/001,495, Requested: Apr. 21, 1988, Cl. 604/370, DISPOSABLE GARMENT WITH BREATHABLE LEG CUFFS, Kenneth B. Buell, Owner of Record: *The Procter & Gamble Co., Cincinnati, Ohio,* Attorney or Agent: Monte D. Witte, Ex. Gp.: 330, Requester: Stephen Geimer, Chicago, Ill.

**4,648,904,** Reexam. No. 90/001,492, Requested: Apr. 5, 1988, Cl. 106/2, AQUEOUS SYSTEM CONTAINING SILANES FOR RENDERING MASONRY SURFACES WATER REPELLANT, Ralph DePasquale, et al., Owner of Record: *PCR Inc., Gainesville, Fla.,* Attorney or Agent: Unknown, Ex. Gp.: 150, Requester: Toren, McGeady, et al.

**Service by Publication**

A petition to cancel each of the registrations identified below having been filed, and the notice of such proceedings sent by registered mail to each registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrants listed herein, their assigns or legal representatives, shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

American Health Products Co. Inc., Orangeburg, N.Y., Reg. No. 1,220,430, for the mark "NEWTRITION", Canc. No. 16,004.

Jane & Jane Ltd., New York, N.Y., Reg. No. 850,255, for the mark "JANE & JANE", Canc. No. 16,448.

H. Mantell, Inc., New York, N.Y., Reg. No. 514,415, for the mark "MANNINGS", Canc. No. 16,631.

Status International, Inc., Jersey City, N.J., Reg. No. 1,231,174, for the mark "STATUS (Block form)", Canc. No. 16,192.

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Instacopy, Inc., Federal Way, Wash., Reg. No. 1,149,133, for the mark "INSTACOPY", Canc. No. 16,267.

Timberline Industries, Inc., Anchorage, Ak., Reg. No. 1,261,158, for the mark "TIMBERLINE INDUSTRIES, INC. and Design", Canc. No. 16,294.

Edward Wright & Co., dba Insurance R Us, Poway, Calif., Reg. No. 1,213,451, for the mark "INSURANCE R US", Canc. No. 16,307.

American Home Cooking Corp., Beverly Hills, Calif., Reg. No. 1,437,576, for the mark "AMERICAN HOME COOKING", Canc. No. 16,525.

Life Laboratories, Inc., Sun Valley, Calif., Reg. No. 978,018, for the mark "LIFE", Canc. No. 16,555.

ERMA S. BROWN,
*Administrator*
*of the Trademark Trial*
*and Appeal Board.*

For JEFFREY M. SAMUELS,
*Assistant Commissioner*
*for Trademarks.*

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**U.S. Department of Commerce**
**Office of the Secretary**
**Public Advisory Committee for Trademark Affairs**

*Agency*: Patent and Trademark Office, Commerce
*Action*: Notice of Renewal
*Summary*: In accordance with the provisions of the Federal Advisory Committee Act, 5 U.S.C. App. (1976), and after consultation with GSA it has been determined that the renewal of the charter of the Public Advisory Committee for Trademark Affairs is in the public interest in connection with the performance of duties imposed on the Department by law.
*Supplementary Information*: The Committee was first established in Sept. 1970, and is now being renewed. The Committee's purpose is to advise the Patent and Trademark Office concerning steps which can be taken to increase the efficiency and effectiveness of administration of the Trademark Act and to provide a continuing flow of knowledge from the private sector to the government in the field of trademarks.

As it was initially established, the Committee will continue to comprise the members of the Advisory Committee for Trademark Affairs of the United States Trademark Association. The membership is balanced and is selected by the President of said association, subject to the approval of the Assistant Secretary and Commissioner of Patents and Trademarks. The Committee will function solely as an advisory body, and in compliance with the provisions of the Federal Advisory Committee Act.
*For Further Information Contact*: Carlisle E. Walters, Committee Control Officer, Office of the Assistant Commissioner for Trademarks, U.S. Patent and Trademark Office, Washington, D.C. 20231, telephone: (703) 557-7464, or Suzette Kern, Committee Management Analyst, U.S. Department of Commerce, Washington, D.C. 20230, telephone: (202) 377-4217.

Apr. 29, 1988.

DONALD J. QUIGG,
*Assistant Secretary and*
*Commissioner of Patents*
*and Trademarks.*

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**Department of Commerce**
**Patent and Trademark Office**

**Extension of Previously-Granted Interim Orders Under the Semiconductor Chip Protection Act of 1984**

*Agency*: Patent and Trademark Office, Department of Commerce
*Action*: Extension of interim orders
*Summary*: On Nov. 18, 1987, a Notice of Initiation of Proceedings was published at 52 FR 44200, whereby the Commissioner requested comments on the extension of existing interim orders under the Semiconductor Chip Protection Act of 1984. A hearing was held on Mar. 16, 1988. To promote the development of international comity in the protection of mask works, the Commissioner extended the existing interim orders until May 31, 1988.

By Amendment 2 to Department Organization Order 10-14, the Secretary of Commerce delegated to the Assistant Secretary and Commissioner of Patents and Trademarks (hereinafter the Commissioner) the authority, under section 914 of the Semiconductor Chip Protection Act of 1984 (SCPA), 17 U.S.C. 914, to make findings and issue orders for interim protection of semiconductor mask works produced in foreign countries. Pursuant to the Semiconductor Chip Protection Act Extension of 1987, P.L. 100-159, the Commissioner's authority to grant interim protection orders was extended until July 1, 1991.

Interim orders have been issued, and extended, in favor of mask works produced in eighteen (18) countries —Japan, Australia, Sweden, Switzerland, Finland, Canada, and the twelve Member States of the European Communities (EC). This proceeding was initiated to review the further progress that has been made toward establishing legal protection of semiconductor mask works in the eighteen (18) subject countries, and to permit the Commissioner to determine, on a case-by-case basis, whether to extend the orders or to recommend that permanent protection be granted through the issuance of a Presidential proclamation pursuant to section 902(a)(2) of the SCPA, 17 U.S.C. 902(a)(2).

Comments were received from or on behalf of all countries that have been granted interim protection under the SCPA. At the hearing on Mar. 16, 1988, testimony was received from the Government of Switzerland, the Commission of the European Communities, the Electronic Industry Association of Japan, and the U.S Semiconductor Industry Association.

Based on the record, the Commissioner has decided to extend all eighteen (18) interim protection orders until May 31, 1989.
*Dates*: The effective date of this order shall be June 1, 1988. The termination date of this order shall be May 31, 1989.
*For Further Information Contact*: Michael K. Kirk, Assistant Commissioner for External Affairs, by telephone at (703) 557-3065, or by mail marked to his attention and addressed to Commissioner of Patents and Trademarks, Box 4, Washington, D.C. 20231.
*Supplementary Information*: The SCPA established a new form of intellectual property protection for mask works that are fixed in semiconductor chips. Mask works are defined as a "series of related images, however fixed or encoded," that represent the three-dimensional pattern in the layers of a semiconductor chip. Thus, the subject matter of protection under the SCPA are the layout designs of semiconductor chips, known in some countries as "integrated circuit layout designs" or as "semiconductor topographies." The SCPA provides a ten-year term of protection for original mask works measured from their date of registration or first commercial exploitation anywhere in the world. To maintain protection, mask works must be registered in the United States Copyright Office within two years of first commercial exploitation.

Protection for foreign mask works may be extended under both section 902 and section 914 of the SCPA. Protection of foreign mask works under section 902 continues until revoked. Section 902 sets out three different ways that foreign mask works may become eligible for protection in the United States. First, on the date the work is registered or is first commercially exploited anywhere in the world, the mask work is protectible if its owner is a national, domiciliary or sovereign authority of a foreign nation that is a party to a treaty that provides protection of mask works and to which the United States is also a party, or a stateless person wherever domiciled. Second, foreign mask works may be protected when they are first commercially exploited in the United States. The third way, set forth in section



902(a)(2), is when the foreign mask work comes within the scope of a Presidential proclamation. The President may issue a proclamation upon finding that a foreign nation extends protection to mask works of U.S. nationals or domiciliaries (1) on substantially the same basis as it protects mask works of its own nationals and domiciliaries, or (2) on substantially the same basis as the SCPA.

Section 914 was included in the SCPA as a transitional provision, intended by Congress to encourage other countries to pass laws extending protection to this new form of intellectual property. Once laws were in place, it was reasoned, permanent protection for foreign mask works could be conferred under section 902 or through a multilateral treaty that extended coverage to mask works. Section 914 gives the Secretary of Commerce authority to issue orders extending interim protection to foreign mask work owners upon the satisfaction of certain conditions. First, the Secretary must find that the foreign nation is making good-faith efforts and reasonable progress toward entering into a treaty with the United States, or that the foreign government is in the process of enacting legislation that will protect U.S. mask works on the same basis as domestic mask works, or at a level similar to that provided under the SCPA. Second, the Secretary must determine that nationals, domiciliaries and sovereign authorities of the foreign nation are not engaged in the misappropriation, unauthorized distribution, or commercial exploitation of mask works. Finally, the Secretary must determine that issuance of an interim order would promote the purposes of the SCPA and international comity with respect to the protection of mask works.

Under the original terms of the SCPA, the Secretary's authority under Section 914 expired on Nov. 7, 1987. Congress included the three-year transition period to encourage other countries time to enact legislation providing mask work protection. It was also thought that progress would be made under the auspices of the World Intellectual Property Organization (WIPO) toward the development of a multilateral treaty extending protection to integrated circuit layout designs. While commendable progress has taken place on both fronts, the Congress recently extended the Secretary's authority under Section 914 until July 1, 1991. *See* P.L. 100-159, Nov. 8, 1987. The purpose of the extension was to enable the United States to "provide a continued incentive for foreign nations to move expeditiously to enact chip protection legislation," and to "lay a sound basis for the development of a new multilateral treaty under the auspices of the WIPO, or another appropriate forum." H.R. Rep. No. 100-388, 100th Cong., 1st Sess. 3-4 (1987).

The Secretary of Commerce has delegated to the Commissioner of Patents and Trademarks the authority under section 914 to make pertinent findings and to issue orders for the interim protection of foreign mask works. The Patent and Trademark Office established procedures for submission of requests for interim orders. The Commissioner has issued orders granting interim protection under section 914 for mask works produced in Australia, Belgium, Canada, Denmark, Finland, France, the Federal Republic of Germany, Greece, Ireland, Italy, Japan, Luxembourg, the Netherlands, Portugal, Spain, Sweden, Switzerland, and the United Kingdom. With the exception of orders in favor of mask works produced in Switzerland and Finland, all of the interim orders have been extended. *See Interim Protection for Mask Works of Foreign Nationals*, 51 FR 30690 (Aug. 28, 1986). Orders for all eighteen (18) countries are in effect until May 31, 1988.

On Nov. 18, 1987, a Notice of Initiation of Proceedings was published at 52 FR 44200, whereby the Commissioner requested comments and scheduled a hearing concerning the status of the interim protection orders previously issued under section 914. The Commissioner announced that he would determine, on a case-by-case basis, whether to extend the interim protection available under section 914 or to recommend that the President confer permanent protection through a proclamation under section 902(a)(2) of the SCPA. On Feb. 25, 1988, a Notice of Proposed Rulemaking was published at 53 FR 5588-90, setting forth proposed regulations that specify the content and procedures for submission of requests to the Secretary of Commerce for the issuance of such proclamations.

*Submissions of the Parties*

Comments were submitted by the Governments of Japan, Switzerland, Sweden, Finland, Canada, and Australia; the Commission of the European Communities submitted comments on behalf of the EC Member States. Comments were also received from the Electronic Industries Association of Japan (EIAJ) and the U.S. Semiconductor Industry Association (SIA). At the hearing on Mar. 16, 1988, testimony was received from the Government of Switzerland, the Commission of the European Communities, the EIAJ and the SIA.

*European Communities*

The views of the Commission of the European Communities were delivered at the hearing by Mme. Margarita Langer, Director General for Internal Markets and Industrial Affairs. Mme. Langer began her testimony by observing that considerable progress has taken place in the EC relative to the legal protection of semiconductor chip layout designs. On Dec. 16, 1986, the Council of the EC issued *its Directive on the Legal Protection of Topographies of Semiconductor Products* (Directive), 87/54/EEC, OJ No. L24, 27.1.87, p. 36. The Directive sets forth principles to be applied in all EC Member States, obligating them to enact laws and administrative provisions necessary to provide protection for topographies according to the principles.

Mme. Langer stated that the standards of protection required under the Directive are substantially similar to those in the SCPA. Member States must grant exclusive rights to authorize or prohibit the reproduction and commercial exploitation of a protected topography, however it is fixed or encoded. Reverse engineering is permitted, and no liability attaches to an innocent infringer prior to notice that the work is protected. Protection is granted for ten years from the date of first commercial exploitation anywhere in the world, or from the date of the filing of an application for registration in those Member States that require registration. Registration and deposit of identifying material are optional; if the law of a Member State requires a deposit, trade secret material must remain confidential. The Member States have discretion under the Directive to protect foreign mask works through membership in a multilateral treaty or through bilateral measures.

The Directive required that all Member States enact legislation protecting semiconductor topographies by Nov. 7, 1987. Mme. Langer stated that, while legislation was not completed in all twelve Member States by that date, laws are in place in five Member States—Denmark, the Federal Republic of Germany, France, the Netherlands, and the United Kingdom. Protection for foreign mask works under all of these laws is based on the existence of reciprocal protection in the particular foreign country.

Mme. Langer reported that progress towards implementation of the Directive in the other seven states has been substantial. In Belgium, a draft law has been prepared and is awaiting presentation to the Parliament, following endorsement by a newly formed government. A presidential decision to implement the Directive has been prepared in Greece, and implementing legislation is pending before the Greek Parliament. Adoption of a draft law in Spain is expected by May 1988. In Ireland, issuance of a national instrument is expected shortly. Draft laws are before the Parliaments of Italy and Luxembourg. A decree-law has been prepared in Portugal, and at the time of the hearing was awaiting action by the Portuguese Council of Ministers.

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To assure that U.S. mask works are protected in the EC while national laws protecting semiconductor topographies are finalized, the Council of the European Communities adopted a decision on Oct. 26, 1987, obligating the Member States to extend protection under the Directive to U.S. nationals and domiciliaries until Nov. 7, 1990. *Council Decision of 26 October 1987,* 87/532/EEC, OJ No. L313, 4.11.87, p. 22. This protection is based on continued U.S. protection of mask works produced in the EC. Mme. Langer testified that no misappropriation of mask works is taking place in the Member States. Since legislation is not in place throughout the EC, Mme. Langer requested an extension of the interim orders granting protection under section 914 of the SCPA to mask works produced in the twelve Member States. She stated that the Commission will request a Presidential proclamation conferring permanent protection under section 902(a)(2) as soon as all laws are final.

*Government of Switzerland/Swiss Federation of Commerce and Industry (SFCI)*

The views of the Government of Switzerland, supported by the SFCI, were conveyed at the hearing by Dr. Roland Grossenbacher, Assistant Director-General of the Swiss Federal Intellectual Property Office. Dr. Grossenbacher indicated that a degree of protection for mask works in Switzerland is currently available through a recently-enacted unfair competition statute. On the international level, he noted that the Government of Switzerland has strongly supported the movement within WIPO to conclude a treaty on the protection of integrated circuits.

Dr. Grossenbacher stated that permanent protection of mask works will be established in the context of a total revision of the Swiss Copyright Act. Dr. Grossenbacher noted that a Federal commission concluded the preparation of a draft law in Dec., 1987, and that the draft includes a chapter concerning the protection of mask works. He stated that the chapter is framed along the lines of the SCPA and the EC Directive. Dr. Grossenbacher indicated that final legislation should be in place by late 1989 or early 1990.

Protection of mask works under the proposed chapter is of a *sui generis* nature, according to Dr. Grossenbacher, even though it will likely be included in the Copyright Act. The subject matter of protection is to be topographies and parts of topographies manufactured by any process, "provided that their structure is not evident." Dr. Grossenbacher stated that the term "parts of topographies" indicates that protection will extend to discrete semiconductor devices that meet the requisite standard of originality.

Like the SCPA, the Swiss draft contains exceptions to the rights of mask work owners for reverse engineering and innocent infringement. The draft goes beyond the SCPA, however, by providing that innocent infringers must pay royalties to mask work owners for all uses of a protected work, not merely for those occurring after the innocent infringer had notice that the work was protected. The draft provides for a ten-year term of protection extending from the date of the application for registration or the date of first commercial exploitation of the mask work, whichever comes first. Registration must be made within two years after first commercial exploitation to maintain protection for the ten-year period. While permitting any party to inspect the register of mask works, the draft chapter safeguards against disclosure of trade secrets by precluding public access to the application files.

Protection for foreign mask works under the draft will be provided on the basis of reciprocity, according to Dr. Grossenbacher. Stating that no misappropriation of mask works has been or is taking place in Switzerland, Dr. Grossenbacher requested that the order granting interim protection under the SCPA to mask works produced in Switzerland be extended for two years, until May 31, 1990.

*Government of Sweden/Federation of Swedish Industries (FSI)*

In comments presented on behalf of the Government of Sweden and supported by the FSI, the Swedish Ministry of Justice stated that an *Act for the Protection of the Layout-Design of the Circuitry in Semiconductor Products* (Swedish Act) has been in force since Apr. 1, 1987. The Government has issued a Special Decree extending protection under the Act to mask works of U.S. nationals and domiciliaries, and to mask works first commercialized in the United States, until May 8, 1988. The basis for the protection of U.S. works under the Special Decree is reciprocity.

The Ministry stated that protection afforded to U.S. mask works under the Swedish Act and the Special Decree is substantially the same as that provided under the SCPA. The Government and the FSI requested an extension of the section 914 interim order in favor of Swedish mask works for an "appropriate" period; the Government of Sweden will extend reciprocal protection to U.S. works under the Special Decree for an identical period. The Swedish Government is prepared to begin negotiations on the question of permanent protection for Swedish mask works under section 902 at any time, according to the Ministry.

*Government of Finland*

On behalf of the Government of Finland, the Finnish Ministry of Education presented a Progress Report on the preparation of integrated circuits legislation. The Ministry states that the State Copyright Committee published a report, *Information Technology and Copyright* , in Apr. 1987. In the report, the Committee proposed a draft *sui generis* law for the protection of integrated circuit layout designs. Fifty-seven written comments on the proposal were received, and reaction to the Committee draft was supportive.

The Ministry reported that the proposed legislation is being modified to incorporate suggestions made in the written comments. The points of clarification are: more precise definitions; provision for an exclusive right of importation; deletion of a provision concerning private use; provisions covering reverse engineering and innocent infringement; simplification of the duration provision; and more precise formulation of penalties for infringement.

The Ministry stated that a final version of the draft will be presented to the Finnish Parliament in mid-1988.

*Government of Canada/Information Technology Association of Canada (ITAC)*

The Canadian Government, supported by ITAC, presented comments requesting a one-year extension of the order protecting Canadian mask works under the SCPA. The Government noted that the Ministry of Consumer and Corporate Affairs issued a discussion paper in Apr. 1987, containing recommendations for legislation protecting semiconductor layout designs. The Ministry has stated its intention to introduce such legislation in the first half of 1988. The Government also cited its strong support for multilateral efforts to conclude an international convention for the protection of integrated circuit designs

*Government of Australia*

In written comments presented on behalf of the Government of Australia, the Australian Attorney-General's Department reported that the design and manufacture of integrated circuits is a small but growing sector of Australian industry. The Department referred to its discussion paper published in Mar. 1987, *Copyright Protection for Artistic Works Industrially Applied,* in which the need for legal protection for integrated circuits was recognized. Based on comments on the discussion paper, the Attorney-General has concluded tentatively that a *sui generis* regime of protection for integrated circuits should be developed in Australia.

While formal proposals for legislation have not yet been considered, the Department maintained that protection for U.S. mask works is currently available in Australia under the Copyright Act of 1968. Should a court find that the Act does not protect mask works, the Department stated that it will seek immediate introduction of appropriate legislation. The Department requests an appropriate extension of the order granting interim protection in the United States to mask works produced in Australia.



*Electronic Industries Association of Japan (EIAJ)/ Government of Japan*

The views of the EIAJ, with the concurrence of the Government of Japan, were delivered at the hearing by Mr. Robert Schwartz, Esquire, Washington counsel to EIAJ. Mr. Schwartz testified that a Presidential proclamation should be granted to Japan as soon as the Patent and Trademark Office has issued final rules implementing section 902(a)(2) of the SCPA. He noted that the Japanese *Act Concerning the Circuit Layout of a Semiconductor Integrated Circuit* has been in force since Jan. 1, 1986. The standards of protection under the Japanese Act are virtually identical to those under the SCPA, Mr. Schwartz claimed, and protection is available for mask works produced anywhere in the world, including the United States.

Mr. Schwartz recalled the 1986 proceeding in which the Patent and Trademark Office considered extensions of previously-issued interim protection orders. He referred to two arguments made at a July 9, 1986, hearing against the issuance of a Presidential proclamation in favor of Japanese mask works; he stated that the concerns on which those arguments were based have been superseded by events. The first argument was that Presidential proclamations in general should not be issued unless it is clear that they can also be revoked in light of changed circumstances. Mr. Schwartz stated that the recently-enacted SCPA Extension clarifies the President's authority to revoke proclamations issued under section 902(a)(2).

The other argument against the issuance of a Presidential proclamation was that as of July 1986 there had been only six months' experience under the Japanese Act. Mr. Schwartz maintained that this concern is now obsolete. Japan now has two full years' experience under the Act, nearly 1500 mask works have been registered in Japan as of Mar. 1988, and roughly 18 percent of the applications processed in 1987 were from U.S. entities.

Mr. Schwartz urged that interim protection for mask works produced in Japan continue in force until final rules are issued and the appropriate actions toward the issuance of a Presidential proclamation can be taken.

*U.S. Semiconductor Industry Association (SIA)*

Mr. William Cray, Operations Law Group Manager, Digital Equipment Corporation, presented the views of SIA at the Mar. 16 hearing. SIA favors a blanket one-year extension of all 18 interim protection orders under section 914 of the SCPA, and opposes the issuance of a Presidential proclamation under section 902(a)(2) to any country at this time. Mr. Cray stated that section 914 is the best mechanism for review and evaluation of mask work legislation in the United States and foreign countries, that the extent of such review under the Presidential proclamation provisions is not yet clear, and that section 914 provides full, if not permanent, protection to foreign mask work owners. He stated that the issuance of a Presidential proclamation could jeopardize the negotiation of the multilateral integrated-circuits treaty in WIPO (1) by relegating international dialogue concerning mask work legislation solely to the treaty negotiations, and (2) because the grant of bilateral protection through a Presidential proclamation will compromise the negotiation of a multilateral treaty.

Mr. Cray noted SIA's longstanding concern that adequate protection for the discrete class of semiconductor products be provided under both the SCPA and mask work protection laws of other countries.

Concerning the degree of legal protection for mask works in each of the countries under consideration, Mr. Cray urged that the Commission of the European Communities continue its aggressive efforts to ensure that legislation compatible with the Directive soon be in place in all EC Member States. Concerning the draft law in Switzerland, Mr. Cray made several recommendations—that the definition of "topography" be made more precise, that the limitation on the right of reproduction for purposes of analysis be clarified, and that a provision for reverse engineering be included.

Mr. Cray congratulated the Government of Sweden on the enactment of its mask work protection law in Apr. 1987, stating that SIA prefers to see the law in operation for a substantial period of time prior to the issuance of a Presidential proclamation. He also requested that the Swedish Government explain the purpose of a provision in the law permitting reproduction of single copies of mask works for private use. Mr. Cray expressed SIA's pleasure with the progress made in Finland toward the development of mask work legislation during the short period since interim U.S. protection was granted to Finnish works.

Praising the Canadian Government's plans to introduce legislation protecting integrated circuits by July 1988, Mr. Cray voiced SIA's concern that the current draft does not adequately protect the discrete class of semiconductor products. He suggested statutory language to ensure coverage of "discretes." Noting that draft legislation has yet to be prepared in Australia, Mr. Cray nonetheless cited the Australian Government's active participation in the WIPO negotiations for a multilateral treaty as evidence of its good faith intent to provide adequate legal protection for mask works. He restated an SIA concern that Australia's current copyright law does not adequately protect mask works, since it does not provide for reverse engineering, innocent infringement, or registration and notice of mask works. Mr. Cray urged the Australian Government to proceed expeditiously with the preparation of specific legislation to protect mask works.

As to Japan, Mr. Cray noted the record of success under the Japanese law protecting integrated circuits since it became effective in Jan. 1986, but voiced SIA's opposition to the issuance of a Presidential proclamation in favor of Japanese mask works at this time. Restating SIA's objections to Presidential proclamations in general, he cited two concerns specific to the Japanese law. First, SIA claimed that the quasi-governmental agency responsible for registering claims to mask work protection, the Industrial Property Cooperation Center (IPCC), has strong ties to the Japanese semiconductor industry. Second, the Japanese law requires the inclusion of trade secret material in applications for mask work registration; because the IPCC is sponsored by Japanese companies, SIA feared that the confidentiality of proprietary information contained in the IPCC registry may not be maintained.

*Supplemental Comments*

To allow the parties to address issues raised in written comments or in testimony at the Mar. 16 hearing, the record in this proceeding remained open until Apr. 4, 1988. Supplemental comments were received from the Swedish Ministry of Justice on behalf of the Government of Sweden, from the EIAJ, and from SIA.

The Swedish Ministry of Justice addressed SIA's concern regarding a private-use exemption in the new Swedish law, explaining that the exemption was included for two reasons. First, since protection under the law extends to both two- and three-dimensional expressions of layout designs, a private-use exemption was included to permit private copying of two-dimensional represen-

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tations of mask works, such as magazine photographs. The provision does not permit manufacture of semiconductor products for private use. Second, a private-use exemption is included in the Swedish Copyright Act, under which mask works were arguably protected before the new integrated-circuits law took effect. It seemed reasonable, according to the Ministry, to include in the new law a similar exemption for private copying of two-dimensional expressions of semiconductor layout designs.

The EIAJ addressed SIA's concerns regarding the quasi-governmental nature of IPCC and the confidentiality of trade secret information in the registration process. Concerning the nature of IPCC, EIAJ stated that IPCC exists only by statute and regulation, and that it may be dissolved in the event of any violation of law. Moreover, as the Government of Japan confirmed at the most recent session of the WIPO committee of experts on integrated circuits, IPCC enjoys the legal status of a "national public authority." EIAJ also pointed out that no specific allegation of impropriety has ever been made with respect to the composition of IPCC.

Concerning the confidentiality of trade secret material, EIAJ stated that the registration officers at IPCC are former Japanese Patent Office employees appointed by the Minister of Trade and Industry, and that they have no links to the semiconductor industry. EIAJ cited Article 38 of the Japanese law, which makes it a crime for any IPCC officer or staff member to leak trade secret information. EIAJ also provided evidence that practice in Japan allows the obliteration of proprietary material from photographs or drawings of mask works deposited with registration applications.

SIA's additional comments reaffirmed its position concerning the importance of continued interim protection for foreign mask works under section 914 of the SCPA, its view that issuance of Presidential proclamations will compromise the multilateral treaty negotiations within WIPO, and its objection to the issuance of a Presidential proclamation in favor of Japanese mask works at this time. SIA expressed particular concern that an opportunity for review be provided as part of the Presidential proclamation process to ensure that U.S. mask works continue to receive reciprocal protection in particular foreign countries.

*Findings of the Commissioner*

Based on the record in this proceeding, consisting of the written submissions of the parties and the oral testimony received at the hearing on Mar. 16, 1988, the Commissioner of Patents and Trademarks has decided to extend all of the interim orders previously issued under section 914 of the SCPA until May 31, 1989, one year from the date on which they are now scheduled to expire. No recommendations concerning the issuance of a Presidential proclamation under section 902(a)(2) of the SCPA will be made in this proceeding.

The Commissioner finds that substantial progress toward the enactment of legislation protecting mask works has been made in all eighteen (18) countries subject to interim protection orders. Indeed, legislation is now in place in seven countries – Denmark, the Federal Republic of Germany, France, Japan, the Netherlands, Sweden and the United Kingdom. Mask works of U.S. nationals and domiciliaries, and mask works first commercialized in the United States, are entitled to protection under all of these laws on the same basis as the laws protect domestic works, and on substantially the same basis as mask works are protected under the SCPA.

Moreover, the other eleven (11) countries are making good faith efforts toward the enactment of legislation that will protect U.S. mask works on the same basis as domestic works, or at a level similar to that provided under the SCPA. It is also noteworthy that these countries are actively supporting the work of WIPO in developing a new multilateral agreement that would establish a regime of international protection for mask works.

The record reveals no evidence that nationals, domiciliaries or sovereign authorities of any country subject to an interim protection order are engaged in the misappropriation, unauthorized distribution, or unauthorized commercial exploitation of mask works. The Commissioner also finds that a one-year extension of the previously-issued interim protection orders will promote the purposes of the SCPA and international comity with respect to the protection of mask works. While some of the parties requested extensions for a longer period, a one-year extension will permit further review of progress toward enactment of legislation in all countries now subject to interim orders, if such review is appropriate at the time.

Concerning the issuance of Presidential proclamations under section 902(a)(2) of the SCPA to those countries that provide permanent, reciprocal protection to U.S. mask works, it is commendable that legislation providing such protection is in place in seven (7) foreign countries and in varying degrees of preparation in eleven (11) others. However, no party in this proceeding requested the issuance of a Presidential proclamation at this time. The Commission of the European Communities noted that legislation protecting U.S. mask works is in effect in five Member States, but stated that it would request a Presidential proclamation conferring permanent protection under the SCPA only when laws have been enacted in all twelve (12) Member States. Similarly, the Government of Sweden stated its readiness to begin negotiations on the question of permanent U.S. protection for Swedish mask works, but did not formally request a Presidential proclamation. The EIAJ, while avowing that the first proclamation issued under section 902(a)(2) should be in favor of Japanese mask works, stated that no request would be made until the Patent and Trademark Office has promulgated final rules for the submission of such requests.

In a Notice of Proposed Rulemaking published at 53 FR 5588-90 on Feb. 25, 1988, the Patent and Trademark Office proposed regulations under section 902(a)(2) that specify the content and procedures for submission of requests for Presidential proclamations to the Secretary of Commerce. The proposed rules provide that an evaluation concerning the issuance of a Presidential proclamation will be initiated by the Commissioner upon request of a foreign government, or upon the Commissioner's own motion. The proposed rules also provide that the record in proceedings under section 914 will form the basis for determining whether a recommendation should be made that the President issue a proclamation.

The Commissioner does not agree with SIA that issuance of Presidential proclamations will jeopardize the ongoing work within WIPO to negotiate a multilateral agreement for the protection of semiconductor layout designs. The evidence adduced in this proceeding demonstrates that the semiconductor industry is increasingly international in scope. While the United States is a large market for semiconductor products, other markets are strong and growing. It is axiomatic that protection for foreign mask works in the United States under a Presidential proclamation is no substitute for protection in other countries under a widely-ratified multilateral agreement. It strains reason to suggest, as SIA does, that protection of foreign mask works in the United States under a Presidential proclamation may compromise successful completion of the draft integrated-circuits treaty, which is clearly in the best interests of all countries where semiconductor products are manufactured. The Commissioner sees no valid reason, in the meantime, to withhold permanent U.S. protection for mask works produced in those countries that clearly meet the statutory criteria of eligibility in section 902(a)(2)(A) and (B) of the SCPA.

Issuance of final rules implementing the Presidential proclamation provisions of section 902 is forthcoming. Once issued, the Commissioner will take appropriate steps to assure that U.S. protection is made available to eligible foreign mask works. Interim protection under section 914 will continue in force for one additional year, that is, until May 31, 1989.



*Order Extending the Expiration Date for Interim Protection Orders Issued Under Chapter 9 of Title 17, United States Code*

In accordance with the authority vested in me by Amendment 2 to Department Organization Order 10-14 regarding 17 U.S.C. 914, and based upon the record of this proceeding commenced on Nov. 18, 1987, I find that Australia, Belgium, Canada, Denmark, Finland, France, the Federal Republic of Germany, Greece, Ireland, Italy, Japan, Luxembourg, the Netherlands, Portugal, Spain, Sweden, Switzerland, and the United Kingdom are making good faith efforts toward providing protection for U.S. mask works in conformity with 17 U.S.C. 902(a)(2). I find further that nationals, domiciliaries and sovereign authorities of those countries, and persons controlled by them, are not engaged in the misappropriation, unauthorized distribution or unauthorized commercial exploitation of mask works. I find further that the extension of the expiration date for interim orders for those countries will promote the purposes of the Semiconductor Chip Protection Act of 1984 and international comity with respect to the protection of mask works.

Accordingly, the existing interim orders for Australia, Belgium, Canada, Denmark, Finland, France, the Federal Republic of Germany, Greece, Ireland, Italy, Japan, Luxembourg, the Netherlands, Portugal, Spain, Sweden, Switzerland and the United Kingdom are hereby extended and shall terminate on May 31, 1989.

Apr. 29, 1988. DONALD J. QUIGG,
*Assistant Secretary and Commissioner of Patents and Trademarks.*

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**Department of Commerce**

**Patent and Trademark Office**
**37 CFR Part 1**
**[Docket Number 80108-8008]**

## Miscellaneous Changes in Patent Practice

*Agency*: Patent and Trademark Office, Commerce
*Action*: Notice of proposed rulemaking
*Summary*: The Patent and Trademark Office proposes to amend its regulations to (1) correct certain rules to conform to previous changes in other rules, (2) require all correspondence directed to the Patent and Trademark Office concerning a patent application to include the serial number after the Office has assigned and informed the applicant of the serial number of the application, (3) provide for the indication of copyright and mask work protection in patent applications, (4) require that any necessary corrections to drawings be made only by submission of new or replacement drawings, (5) provide in limited situations for the use of color drawings in utility patent applications, (6) prohibit the use of broken lines in design patent application drawings to show hidden planes and surfaces, and (7) provide for a refund of a portion of the preliminary examination fee where the Demand is withdrawn. The change pertaining to the drawings would remove any need for patent applicants or their representatives to borrow drawings filed in patent applications from the Office after the effective date of the rule change for purposes of making corrections.
*Dates*: Comments must be submitted on or before July 21, 1988; a public hearing will be held on July 21, 1988 at 9 a.m. Requests to present oral testimony should be received on or before July 14, 1988.
*Addresses*: Address written comments and requests to present oral testimony to the Commissioner of Patents and Trademarks, Washington, D.C. 20231, Attention: Louis O. Maassel. The hearing will be held in Room 912, on the 9th floor of Crystal Park Bldg. 2, located at 2121 Crystal Dr., Arlington, Va. Written comments and a transcript of the public hearing will be available for public inspection in Room 11A13 of Crystal Plaza Bldg. 3, located at 2021 Jefferson Davis Highway, Arlington, Va.
*For Further Information Contact*: Louis O. Maassel by telephone at (703) 557-3070 or by mail marked to his attention and addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231.

### Supplemental Information

*Discussion of specific rules*

Section 1.4, if amended as proposed, would correct the listing of rules in paragraph (a)(2).

Section 1.5, if amended as proposed, would provide that all correspondence related to a U.S. national patent application already filed with the Patent and Trademark Office must include the identification of the serial number assigned to the application by the Patent and Trademark Office. Any correspondence not containing such identification will be returned to the sender where a return address is available. Given there are over 30,000 documents to be routed each day, this requirement will greatly facilitate the matching of correspondence received with the relevant patent application file. Without serial number identification, documents are either significantly delayed or never matched with the relevant application file. The proposed amendments to paragraph (b) draw attention to the different requirements for identification in correspondence relating to the payment of maintenance fees.

Section 1.53(c) and (d), if amended as proposed, would require that a copy of the "Notice of Incomplete Application" or "Notice to File Missing Part" form sent to the applicant by the Office should accompany any response submitted to the Office in order for the response to be accepted. This will prevent the inadvertent assignment of a new serial number to correspondence sent in response to such notices or the misrouting of the correspondence.

Section 1.56(e), if amended as proposed, would correct the reference to the "Board of Appeals" to read "Board of Patent Appeals and Interferences".

Section 1.71, if amended as proposed, would contain new paragraphs (d) and (e) relating to the inclusion of copyright and mask work notices in patent applications. The provisions proposed are similar to those set forth in the Official Gazette notice dated Mar. 20, 1987 titled "Inclusion of Copyright or Mask Work Notice in Patents" appearing on Apr. 21, 1987 at 1077 O.G. 22. Under current intellectual property laws, it is possible to obtain copyright protection or mask work protection as well as patent protection for certain designs and technologies. On occasion, an author or inventor considers it desirable to include a notice of copyright or mask work in a design or utility patent which discloses material on which copyright or mask work protection has previously been established.

The inclusion of a copyright or mask work notice in a patent that discloses material on which copyright or mask work protection has previously been established, would serve to publicize and thereby protect the various intellectual property rights of the author or inventor. Further, this publication would tend to protect the public by militating against an unintentional encroachment into the rights. The presence of an unrestricted copyright or mask work notice in a patent could have an inhibiting effect on public dissemination of the patent disclosure to the extent it discourages the facsimile reproduction of the patent. The possible effect would be contrary to the mission of the Patent and Trademark Office to disseminate knowledge and information publicly by way of patent issuance, publication, and distribution. To avoid this effect, it is considered necessary to include an appropriate authorization by the author or inventor for copying of the patent itself with any copyright or

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mask work notice appearing in the patent. Inclusion of a copyright or mask work notice after a Notice of Allowance has been mailed will be permitted only if the criteria of 37 CFR 1.312 have been fulfilled. If the authorization required by proposed §1.71(e) is not included, the notice will be objected to as improper by the examiner. If the examiner maintains the objection upon reconsideration, further review must be by way of a petition filed in accordance with 37 CFR 1.181.

Section 1.81, if amended as proposed, would clarify that high quality copies of drawings should be submitted in patent applications. Since corrections are the responsibility of the applicant, the original drawing(s) should be retained by the applicant for future correction, if necessary.

Section 1.84(a), if amended as proposed, would be reworded to recommend that two-ply or three-ply bristol board be used by applicants to prepare drawings so that erasure and correction by India ink is possible. Proposed amended paragraph (a) would also indicate that photolithographs are not acceptable as drawings and add a reference to paragraph 1.84(p) relating to color drawings in utility patent applications.

High quality copies of drawings should be supplied to the Patent and Trademark Office when filing a patent application. Whether or not bristol board is used for drawings is applicant's choice. However, the drawings that are submitted to the Office must be on strong, white, smooth, and non-shiny paper and meet the standards according to §1.84. If corrections to the drawings are necessary, they should be made to the original drawings and high-quality copies of the corrected original drawings then submitted to the Office.

Only one copy is required or desired. The Office had attempted to encourage the submission of three copies, but compliance was very low. It was determined that it is more efficient for the Office to rely on consistency and only one copy.

The Patent and Trademark Office will no longer release to applicants, bonded drafting companies or others drawings from patent applications filed after the effective date of these proposed rule changes. See proposed §1.85(b). If corrections to the drawings are necessary, new corrected drawings must be prepared and filed in the Patent and Trademark Office. Therefore, the applicant, attorney or agent should retain the original drawing.

The Office will continue to allow applicants to borrow for correction drawings which have been filed prior to the effective date of these rule changes.

Section 1.84(b), if amended as proposed, would provide for applicants using drawing sheets which are 8½ by 13 inches in size.

Section 1.84(i), if amended as proposed, would make grammatical corrections in the text of the rules and clarify Office drawing requirements as to exploded views, enlarged views and views which require several sheets.

Section 1.84(j), if amended as proposed, would clarify how views should be arranged when they are placed sideways on the drawing sheet.

Section 1.84(l), if amended as proposed, would indicate that drawings may be identified by lightly writing identifying information on the drawings in the top margin. For identification by serial number,the Office prefers that the information be placed on the front of the drawing. When the applicant forwards drawings separate from the original application papers, a cover letter identifying the application by serial number must accompany the drawings. The application serial number must also be placed on drawings filed after the serial number has been indicated in correspondence to the applicant, in accordance with §1.84(l).

Section 1.84(n), if added as proposed, would permit numbering of the drawing sheets. However, such numbering would not appear on the drawings of the printed patent.

Section 1.84(o), if added as proposed, would provide for the indication of copyright or mask work protection notice on patent application drawings. This procedure is the same as that established by the Official Gazette notice dated Mar. 20, 1987 published on Apr. 21, 1987 at 1077 O.G. 22.

Section 1.84(p), if added as proposed, would provide in the rules for the filing of color drawings in a very limited number of utility patent applications. An Official Gazette notice relating to this topic dated Aug. 6, 1986, titled "Use of Color Drawings in Utility Patents" was published on Sept. 9, 1986 at 1070 O.G. 10. In light of the substantial administrative and economic burden associated with printing a utility patent with color drawings, the letters patent and the patent copies which are printed at the issuance of the patent will be only in black and white. However, copies of the patent with the color drawings may be purchased separately from the Patent and Trademark Office upon special request and payment of the fee.

It is anticipated that color drawings will only be permitted when color drawings are the only practical method in a utility patent application in which to disclose the subject matter sought to be patented. In order to avoid issues of lack of description or enablement under 35 U.S.C. 112 or new matter under 35 U.S.C. 132, applicants are advised to file the desired color drawings as part of the original application papers. The petition should be directed to the attention of the Deputy Assistant Commissioner for Patents.

Section 1.85, if amended as proposed, would indicate that drawings not complying with §1.84 will be accepted in some instances for purposes of examination and that drawings which do comply with all rules relating to drawings be required later, and that no corrections are permitted to drawings filed in the Patent and Trademark Office after the effective date of the rule change.

When corrected drawings are required to be submitted at the time of allowance, the applicant is required to submit *acceptable* drawings within three months from the mailing of the "Notice of Allowance". Within that three-month period, two weeks should be allowed for review of the drawings by the Drafting Branch. If the Office finds that correction is necessary, the applicant must submit a new corrected drawing to the Office within the original three-month period to avoid the necessity of obtaining an extension of time and paying the extension fee. Therefore, the applicant should file corrected drawings as soon as possible following the receipt of the Notice of Allowance.

Section 1.152, if amended as proposed, would permit broken lines on drawings to show visible environmental structure but not hidden planes and surfaces in design patent application drawings.

Section 1.378, if amended as proposed, would amend the rules to conform with section 404 of Public Law 98-622 which states:

> "(a) Notwithstanding section 41(c) of title 35, United States Code, as in effect before the enactment of Public Law 97-247 (96 Stat. 317), the Commissioner of Patents and Trademarks may accept after the six-month grace period referred to in such section 41(c), the payment of any maintenance fee due on any patent based on an application filed in the Patent and Trademark Office on or after Dec. 12, 1980, and before Aug. 27, 1982, to the same extent as in the case of patents based on applications filed in the Patent and Trademark Office on or after Aug. 27, 1982."

The proposed rule wording would include reference to maintenance fees due on patents based on applications filed in the Patent and Trademark Office on or after Dec. 12, 1980 and before Aug. 27, 1982.

Section 1.421(f), if amended as proposed would delete reference to a canceled PCT Rule and add reference to the current PCT Rule provision.

Section 1.480(d), if amended as proposed, would provide for a refund of a portion of the international preliminary examination fee where the applicant withdraws the demand before the examiner has begun the international preliminary examination. An amount equal to the transmittal fee would be retained by the Patent and Trademark Office to cover the cost of the clerical work involved.



*Environmental, Energy, and Other Considerations*

The proposed rule change will not have a significant impact on the quality of the human environment or conservation of energy resources.

The proposed rule change is in conformity with the requirements of the Regulatory Flexibility Act (Pub. L. 96-354), Executive Order 12291, and the Paperwork Reduction Act of 1980, 44 U.S.C. 3501 et seq.

The General Counsel of the Department of Commerce certified to the Small Business Administration that the proposed rule change will not have a significant adverse economic impact on a substantial number of small entities (Regulatory Flexibility Act, Pub. L. 96-354) because the proposed rule change corrects some rules so that they correspond to earlier changes, relate to identification of applications on correspondence, allow greater flexibility in patent drawing content and handling, and provide for a refund where a proper demand for international preliminary examination has been filed but withdrawn later.

The Patent and Trademark Office has determined that this proposed rule change is not a major rule under Executive Order 12291. The annual effect on the economy will be less than $100 million. There will be no major increase in costs or prices for consumers, individual industries, federal, state or local government agencies, or geographic regions. There will be no significant adverse effects on competition, employment, investment, productivity, innovation, or on the ability of United States-based enterprises to compete with foreign-based enterprises in domestic or export markets.

The Patent and Trademark Office has also determined that this notice has no federalism implications affecting the relationship between the national government and the States as outlined in Executive Order 12612.

The rule change involves correction of information requirements subject to the Paperwork Reduction Act of 1980, 44 U.S.C. 3501 *et seq.*, and are cleared under OMB Control No. 0651-0011.

List of Subjects in 37 CFR Part 1.

Administrative practice and procedure, Authority delegations (government agencies), Courts, Inventions and patents, Lawyers.

Notice is hereby given that pursuant to the authority granted to the Commissioner of Patents and Trademarks by 35 U.S.C. 6 and 41, the Patent and Trademark Office is proposing to amend Title 37 of the Code of Federal Regulations as set forth below.

It is proposed to amend 37 CFR, Part 1, as follows, with deletions of portions of the rules indicated by brackets([ ]) and additions by arrows (>\<).

**Part 1—Rules of Practice in Patent Cases**

1. The authority citation for 37 CFR Part 1 would continue to read as follows:

**Authority: 35 U.S.C. 6 unless otherwise noted.**

2. Section 1.4 is proposed to be amended by revising paragraph (a)(2) to read as follows:

§1.4 *Nature of Correspondence*

(a) * * *

(2) Correspondence in and relating to a particular application or other proceeding in the Office. See particularly the rules relating to the filing, processing, or other proceedings of national applications in Subpart B. §§1.31 to [1.352]>1.378<; of international applications in Subpart C, §§1.401 to [1.482]<1.499>; of reexamination of patents in Subpart D, §§1.501 to 1.570; of interferences in Subpart E; §§1.601 to [1.688]>1.690; of extension of patent term in Subpart F, §§1.710 to 1.785<; and of trademark applications §§2.11 to 2.189.

* * * * *

3. Section 1.5 is proposed to be amended by revising paragraphs (a) and (b) to read as follows:

§1.5 *Identification of application, patent or registration.*

(a) When a letter >directed to the Patent and Trademark Office< concerns [an]>a previously filed< application for patent, it >must identify on the top page in a conspicuous location, the serial number, including the series code, which was assigned to that application and indicated in correspondence to the applicant by the Patent and Trademark Office or the international application number of the application. Any correspondence not containing such identification will be returned to the sender where a return address is available. In addition, all letters directed to the Patent and Trademark Office concerning applications for patent <should> also < state> "PATENT APPLICATION", <the name of the applicant, the title of the invention, [the serial number or international application number of the application,] the date of filing the same, and if known, the group art unit or other unit within the Patent and Trademark Office responsible for considering the letter and the name of the examiner or other person to which it has been assigned.

(b) When the letter concerns a patent >other than for purposes of paying a maintenance fee<, it should state the number and date of issue of the patent, the name of the patentee, and the title of the invention. >For letters concerning payment of a maintenance fee in a patent, see the requirements of §1.366(c).<

* * * * *

4. Section 1.53 is proposed to be amended by revising paragraphs (c) and (d) to read as follows:

§1.53 *Serial number, filing date, and completion of application.*

* * * * *

(c) If any application is filed without the specification or drawing required by paragraph (b) of this section, applicant will be so notified and given a time period within which to submit the omitted specification or drawing in order to obtain a filing date as of the date of filing of such submission. >A copy of the "Notice of Incomplete Application" form notifying the applicant should accompany any response thereto submitted to the Office.< If the ommission is not corrected within the time period set, the application will be returned or otherwise disposed of; the fee, if submitted, will be refunded less a $15.00 handling fee.

(d) If an application which has been accorded a filing date pursuant to paragraph (b) of this section does not include the appropriate filing fee or an oath or declaration by the applicant, applicant will be so notified, if a correspondence address has been provided and given a period of time within which to file the fee, oath, or declaration and to pay the surcharge as set forth in §1.16(e) in order to prevent abandonment of the application. >A copy of the "Notice to File Missing Parts" form mailed to applicant should accompany any response thereto submitted to the Office.< If the required filing fee is not timely paid, or if the processing and retention fee set forth in §1.21(l) is not paid within one year of the date of mailing of the notification required by this paragraph, the application will be disposed of. No copies will be provided or certified by the Office of an application which has been disposed of or in which neither the required basic filing fee nor the processing and retention fee has been paid. The notification pursuant to

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this paragraph may be made simultaneously with any notification pursuant tothis section. If no correspondence address is included in the application, applicant has two months from the filing date to file the >basic filing< fee, oath or declaration and to pay the surcharge as set forth in §1.16(e) in order to prevent abandonment of the application or >, if no basic filing fee has been paid,< one year from the filing date to pay the processing and retention fee set forth in §1.21(l) to prevent disposal of the application.

5. Section 1.56 is proposed to be amended by revising paragraph (e) to read as follows:

§1.56 *Duty of disclosure; fraud; striking or rejection of applications.*

* * * * *

(e) The examination of an application for compliance with paragraph (d) of this section will normally be delayed until such time as (1) all other matters are resolved, or (2) appellant's reply brief pursuant to §1.193(b) has been received and the application is otherwise prepared for consideration by the Board of >Patent< Appeals >and Interferences<, at which time the appeal will be suspended for examination pursuant to paragraph (d) of this section. The prosecution of the application will be reopened to the extent necessary to conduct the examination pursuant to paragraph (d) of this section including any appeal pursuant to §1.191. If an appeal has already been filed based on a rejection on other grounds, any further rejection under this section shall be treated in accordance with §1.193(c).

* * * * *

6. Section 1.71 is proposed to be amended by adding new paragraphs (d) and (e) to read as follows:

§1.71 *Detailed description and specification of the invention.*

* * * * *

>(d) A copyright or mask work notice may be placed in a design or utility patent application adjacent to copyright and mask work material contained therein. The notice may appear at any appropriate portion of the patent application disclosure. For notices in drawings, see §1.84(o). The content of the notice must be limited to only those elements required by law. For example, "©1983 John Doe" (17 U.S.C. 401) and "*M* John Doe" (17 U.S.C. 909) would be properly limited and, under current statutes, legally sufficient notices of copyright and mask work, respectively. Inclusion of a copyright or mask work notice will be permitted only if the authorization language set forth in paragraph (e) of this section is included at the beginning (preferably as the first paragraph) of the specification.

(e) The authorization shall read as follows:

A portion of the disclosure of this patent document contains material which is subject to {copyright or mask work} protection. The {copyright or mask work} owner has no objection to the facsimile reproduction by anyone of the patent document or the patent disclosure, as it appears in the Patent and Trademark Office patent file or records, but otherwise reserves all {copyright or mask work} rights whatsoever.<

7. Section 1.81 is proposed to be amended by revising the title and paragraph (a) to read as follows:

§1.81 *Drawings required >in patent application<.*

(a) The applicant for a patent is required to furnish a drawing of his >or her< invention where necessary for the understanding of the subject matter sought to be patented; this drawing >, or a high quality copy thereof,< must be filed with the application. >Since corrections are the responsibility of the applicant, the original drawing(s) should be retained by the applicant for any necessary future corrections.<

* * * * *

8. Section 1.84 is proposed to be amended by revising paragraphs (a), (b), (i), (j) and (l) and by adding new paragraphs (n), (o), and (p), to read as follows:

§1.84 *Standards for drawings.*

(a) *Paper and ink.* Drawings >or high quality copies thereof which are submitted to the Office< must be made upon paper which is flexible, strong, white, smooth, nonshiny and durable [Two-ply or three-ply bristol board is preferred. The surface of the paper should be calendered and of a quality which will permit erasure and correction with India ink.] >It is recommended that two-ply or three-ply bristol board or paper of sufficient quality to permit erasure and correction with India ink be used for original drawings to facilitate any future corrections by the applicant.< India ink, or it equivalent in quality, is preferred for pen drawings to secure perfectly black solid lines. The use of white pigment to cover lines is not normally acceptable. >Photolithographs are not acceptable. See paragraph (p) of this section for use of color drawings in utility patent applications.<

(b) *Size of sheet and margins.* The size of the sheets on which drawings are made may [either] be exactly 8½ by 14 inches (21.6 by 35.6 cm.) >, exactly 8½ by 13 inches (21.6 by 33.1 cm.)<, or exactly 21.0 by 29.7 cm. (DIN size A4). All drawing sheets in a particular application must be the same size. One of the shorter sides of the sheets is regarded as its top.

* * *

>(2) On 8½ by 13 inch drawing sheets, the drawing must include a top margin of 1 inch (2.5 cm.) and bottom and side margins of ¼ inch (6.4 mm.) from the edges, thereby leaving a "sight" precisely 8 by 11½ inches (20.3 by 29.8 cm.). Margin border lines are not permitted. All work must be included within the "sight". The sheets may be provided with two ¼ inch (6.4 mm.) diameter holes having their centerlines spaced 11/16 inch (17.5 mm.) below the top edge and 2¾ inches (7.0 cm.) apart, said holes being equally spaced from the respective side edges.<

[(2)]>(3)< On 21.0 by 29.7 cm. drawing sheets, the drawing must include a top margin of at least 2.5 cm., a left side margin of 2.5 cm., a right side margin of 1.5 cm., and a bottom margin of 1.0 cm. Margin border lines are not permitted. All work must be contained within a sight size not to exceed 17 by 26.2 cm.

* * * * *

(i) *Views.* The drawing must contain as many figures as may be necessary to show the invention; the figures should be consecutively numbered if possible in the order in which they appear. The figures may be >plan< [plain], elevation, section, or >perspective< [prespective] views, and detail views of portions or elements on a larger scale if necessary, may also be used. Exploded views, with the separated parts of the same figure embraced by a bracket, to show the relationship or order of assembly of various parts are permissible. >When an exploded view is shown in a figure which is on the same sheet as another figure, the exploded view should be placed in brackets.< When necessary, a view of a large machine or device in its entirety may be broken and extended over several sheets if there is no loss in facility of understanding the view. Where figures on two or more sheets form in effect a single complete figure, the figures on the several sheets should be so arranged that the complete figure can be understood by laying the drawing sheets adjacent to one another.



>The figures, even though on separate sheets, should be labeled as separate figures, for example as Fig. 1a, Fig. 1b, etc., so that it would be apparent that the views actually comprise one figure.< The arrangement should be such that no part of any of the figures appearing on the various sheets [are] >is < concealed and that the complete figure can be understood even though spaces will occur in the complete figure because of the margins on the drawing sheets. The plane upon which a sectional view is taken should be indicated on the general view by a broken line, the ends of which should be designated by numerals corresponding to the figure number of the sectional view and have arrows applied to indicate the direction in which the view is taken. A moved position may be shown by a broken line superimposed upon a suitable figure if this can be done without crowding, otherwise a separate figure must be used for this purpose. Modified forms of construction can only be shown in separate figures. Views should not be connected by projection lines nor should centerlines be used. >When a portion of a figure is enlarged for magnification purposes, the figure and the enlarged figure must be labeled as a separate figure.<

(j) *Arrangement of views.* All views on the same sheet should stand in the same direction and, if possible, stand so that they can be read with the sheet held in an upright position. If views longer than the width of the sheet are necessary for the clearest illustration of the invention, the sheet may be turned on its side so that the top of the sheet with the appropriate top margin >to be used as the heading space< is on the right-hand side. One figure must not be placed upon another or within the outline of another.

* * * * *

(l) [*Extraneous matter.*] >*Identification of drawings.*< Identifying indicia (such as the >serial number, group art unit, title of the invention,< attorney's docket number, inventor's name, number of sheets, etc.) not to exceed 2½ inches (7.0 cm.) in width may be placed in a centered location between the side edges within three-fourths inch (19.1 mm.) of the top edge. >Either this marking technique on the front of the drawing or the placement, although not preferred, of this information and the title of the invention on the back of the drawings is acceptable.< Authorized security markings may be placed on the drawings provided they [be] >are< outside the illustrations and are removed when the material is declassified. Other extraneous matter will not be permitted upon the face of a drawing.

* * * * *

>(n) *Numbering of drawing sheets.* The drawing sheets may be numbered in consecutive arabic numbers at the top of the sheets, in the middle, but not in the margin. Such numbering will be deleted for printing purposes since page numbers are added at the time of printing the patent by the Office.<

>(o) *Copyright or Mask Work Notice.* A copyright or mask work notice may appear in the drawing but must be placed within the "sight" of the drawing immediately below the figure representing the copyright or mask work material and be limited to letters having a print size of ⅛ to ¼ inches high. The content of the notice must be limited to only those elements required by law. For example, "©1983 John Doe" (17 U.S.C. 401) and "*M* John Doe" (17 U.S.C. 909) would be properly limited and, under current statutes, legally sufficient notices of copyright and mask work, respectively. Inclusion of a copyright or mask work notice will be permitted only if the authorization language set forth in §1.71(e) is included at the beginning (preferably as the first paragraph) of the specification.<

>(p) *Limited use of color drawings in utility patent applications.* Paragraph (a) of this section requires that drawings in utility patent applications must be in black on white paper. However, on rare occasion, color drawings may be necessary as the only practical medium by which to disclose the subject matter sought to be patented in a utility patent application. The Patent and Trademark Office will accept color drawings in utility patent applications only after granting of a petition by the applicant under §1.183 of this part which requests waiver of the requirements of paragraph (a) of this section. Any such petition should be directed to the Office of the Deputy Assistant Commissioner for Patents and must include the following:

(1) The appropriate fee set forth in §1.17(h).
(2) Five (5) sets of color drawings on DIN size A4 (21.0 by 29.7 cm.) sheets.
(3) A proposed amendment to insert in the specification the following language as the first paragraph in the portion of the specification relating to the brief description of the drawing:

"The file of this patent contains at least one drawing executed in color. Copies of this patent with color drawing(s) will be provided by the Patent and Trademark Office upon request and payment of the necessary fee."<

9. Section 1.85 is proposed to be revised to read as follows:

§1.85 [*Informal*] >*Corrections to*< *drawings.*

>(a)< The requirements of §1.84 relating to drawings will be strictly enforced. A drawing not executed in conformity thereto, if suitable for reproduction, may be admitted >for examination< but in such case [the drawing must be corrected or] a new [one] >drawing must be< furnished [, as required].

>(b) The Patent and Trademark Office will not release drawings for purposes of correction. If corrections are necessary, new corrected drawings must be submitted within the time set by the Office.<

>(c) When corrected drawings are required to be submitted at the time of allowance, the applicant is required to submit *acceptable* drawings within three months from the mailing of the "Notice of Allowance". Within that three-month period, two weeks should be allowed for review of the drawings by the Drafting Branch. If the Office finds that correction is necessary, the applicant must submit a new corrected drawing to the Office within the original three-month period to avoid the necessity of obtaining an extension of time and paying the extension fee. Therefore, the applicant should file corrected drawings as soon as possible following the receipt of the Notice of Allowance.<

10. Section 1.152 is proposed to be revised to read as follows:

§1.152 *Drawing.*

The design must be represented by a drawing made in conformity with the rules laid down for drawings of mechanical inventions and must contain a sufficient number of views to constitute a complete disclosure of the appearance of the article. Appropriate surface shading must be used to show the character or contour of the surfaces represented. >Broken lines may be used to show visible environmental structure, but may not be used to show hidden planes and surfaces which cannot be seen through opaque materials.<

11. Section 1.378 is proposed to be amended by revising paragraphs (b)(1) and (c)(1) to read as follows:

§1.378 *Acceptance of delayed payment of maintenance fee in expired patent to reinstate patent.*

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(b) * * *

(1) The required maintenance fee set forth in §1.20[(h)] >(e)< - (j),

* * *

(c) * * *

(1) The required maintenance fee set forth in §1.20[(h)] >(e)< - (j),

* * *

12. Section 1.421 is proposed to be amended by revising paragraph (f) and adding a new paragraph (g) to read as follows:

§1.421 *Applicant for international application.*

* * * * *

(f) Changes in the person, name, or address of the applicant of an international application shall be made in accordance with PCT Rule [18.5] >92bis<.

(g) The wording of PCT Rule 92bis is as follows:

PCT Rule 92bis – Recording of Changes in Certain Indications in the Request or the Demand

*92bis Recording of Changes by the International Bureau*

(a) The International Bureau shall, on the request of the applicant or the receiving Office, record changes in the following indications appearing in the request or demand:

(i) person name, residence, nationality or address of the applicant,
(ii) person, name or address of the agent, the common representative or the inventor.

(b) The International Bureau shall not record the requested change if the request for recording is received by it after the expiration:

(i) of the time limit referred to in Article 22(1), where Article 39(1) is not applicable with respect to any Contracting State;
(ii) of the time limit referred to in Article 39(1)(a), where Article 39(1) is applicable with respect to at least one Contracting State.<

13. Section 1.480 is proposed to be amended by revising paragraph (d) to read as follows:

§1.480 *Demand for international preliminary examination.*

* * * * *

(d) Withdrawal of a proper Demand >prior to the start of the international preliminary examination< will [not] entitle applicant to a refund of the preliminary examination fee [or handling fee] >minus the amount of the transmittal fee set forth in §1.445(a)(1)<.

Mar. 9, 1988.

DONALD J. QUIGG,
*Assistant Secretary and Commissioner of Patents and Trademarks.*

# PATENT NOTICES

## Certificates of Correction for the Week of May 24, 1988

| | | | |
|---|---|---|---|
| PP. 6,055 | 4,675,213 | 4,699,565 | 4,710,339 |
| D. 292,087 | 4,675,757 | 4,699,916 | 4,710,713 |
| D. 293,142 | 4,676,936 | 4,700,181 | 4,710,821 |
| D. 293,693 | 4,679,386 | 4,700,737 | 4,710,862 |
| 4,479,758 | 4,679,931 | 4,700,772 | 4,710,901 |
| 4,527,269 | 4,679,965 | 4,700,957 | 4,710,945 |
| 4,530,698 | 4,680,769 | 4,701,438 | 4,711,016 |
| 4,564,354 | 4,683,134 | 4,702,052 | 4,711,077 |
| 4,565,685 | 4,683,867 | 4,703,097 | 4,711,655 |
| 4,581,552 | 4,685,745 | 4,703,196 | 4,711,972 |
| 4,594,692 | 4,685,958 | 4,703,648 | 4,712,022 |
| 4,612,640 | 4,685,964 | 4,703,864 | 4,712,072 |
| 4,613,635 | 4,686,162 | 4,704,290 | 4,712,686 |
| 4,613,658 | 4,686,668 | 4,704,788 | 4,712,877 |
| 4,621,598 | 4,686,991 | 4,704,889 | 4,713,526 |
| 4,622,240 | 4,687,379 | 4,704,930 | 4,713,753 |
| 4,627,887 | 4,688,162 | 4,705,127 | 4,714,035 |
| 4,628,634 | 4,688,663 | 4,705,450 | 4,714,069 |
| 4,631,865 | 4,688,930 | 4,705,512 | 4,714,318 |
| 4,632,566 | 4,689,638 | 4,705,602 | 4,714,375 |
| 4,635,981 | 4,689,900 | 4,705,805 | 4,714,381 |
| 4,636,245 | 4,691,049 | 4,705,932 | 4,714,463 |
| 4,638,004 | 4,691,629 | 4,706,003 | 4,714,531 |
| 4,639,737 | 4,692,406 | 4,706,061 | 4,714,682 |
| 4,641,548 | 4,692,595 | 4,706,687 | 4,715,143 |
| 4,642,569 | 4,692,859 | 4,706,977 | 4,715,386 |
| 4,646,498 | 4,693,463 | 4,707,027 | 4,716,032 |
| 4,650,257 | 4,695,528 | 4,707,793 | 4,716,033 |
| 4,657,231 | 4,695,780 | 4,707,941 | 4,716,254 |
| 4,658,997 | 4,695,871 | 4,708,287 | 4,716,906 |
| 4,659,747 | 4,696,006 | 4,708,523 | 4,717,403 |
| 4,660,847 | 4,696,106 | 4,708,954 | 4,717,696 |
| 4,663,309 | 4,696,157 | 4,708,974 | 4,718,178 |
| 4,665,267 | 4,696,332 | 4,708,999 | 4,719,316 |
| 4,665,858 | 4,696,446 | 4,709,145 | 4,719,431 |
| 4,668,280 | 4,698,011 | 4,709,465 | 4,719,697 |
| 4,668,915 | 4,698,020 | 4,709,574 | 4,720,371 |
| 4,671,370 | 4,698,248 | 4,709,760 | 4,720,559 |
| 4,671,805 | 4,698,333 | 4,709,983 | 4,721,369 |
| 4,672,326 | 4,698,376 | 4,710,075 | 4,721,704 |
| 4,673,341 | 4,698,668 | 4,710,191 | 4,721,874 |
| 4,674,063 | 4,699,434 | 4,710,273 | 4,724,382 |

### Disclaimers

D. 290,744.—*Warwick M. Whitley II,* Panama City, Fla. VENTURI LOUVERED VENT. Patent dated July 7, 1987. Disclaimer filed Mar. 16, 1988, by the assignee, *Attwood Corp.*

Hereby enters this disclaimer to the said claim of said patent.

4,581,592.—*Ralph C. Bennett,* Carrollton, Tex. SAW STABILIZED OSCILLATOR WITH CONTROLLED PULL-RANGE. Patent dated Apr. 8, 1986. Disclaimer filed Mar. 18, 1988, by the assignee, *R. F. Monolithics, Inc.*

Hereby enters this disclaimer to claims 1–13 of said patent.

4,593,837.—*Raymond F. Jakubowicz,* Rush and *Stuart G. MacDonald,* Webster, N.Y. VARIABLE VOLUME PIPETTE. Patent dated June 10, 1986. Disclaimer filed Mar. 21, 1988, by the assignee, *Eastman Kodak Co.*

Hereby enters this disclaimer to all claims of said patent.

4,640,938.—*Manfred Romer,* Stuhr, *Peter Woletz* and *Klaus Kruger,* Bremen, Germany. RADIATION-CURABLE COMPOSITION, A PROCESS FOR PREPARING SAME, AND THE USE THEREOF. Patent dated Feb. 3, 1987. Disclaimer filed Nov. 16, 1987, by the assignee, *Morton Thiokol GmbH.*

The term of this patent subsequent to Feb. 3, 1987, has been disclaimed.

### Dedication

4,653,576.—*Herman O. Lagally,* Hempfield Twp., Westmoreland County, Pa. EXPANDABLE ANTIVIBRATION BAR FOR A STEAM GENERATOR. Patent dated Mar. 31, 1987. Dedication filed Mar. 21, 1988, by the assignee, *Westinghouse Electric Corp.*

Hereby dedicates to the Public the entire term of said patent.

### Disclaimers and Dedications

4,354,040.—*Shigeru Inoue,* Kamakura; *Hiroshi Ono,* Fujisawa and *Hidetsugu Fujii,* Mobara, Japan. PROCESS FOR SYNTHESIZING UREA. Patent dated Oct. 12, 1982. Disclaimer and Dedication filed Feb. 3, 1988, by the assignee, *Toyo Engineering Corp.*

Hereby disclaims and dedicates to the Public the entire term of said patent.

4,484,138.—*Paul A. Bottomley,* Clifton Park, and *William A. Edelstein,* Schenectady, N.Y. METHOD OF ELIMINATING EFFECTS OF SPURIOUS FREE INDUCTION DECAY NMR SIGNAL CAUSED BY IMPERFECT 180 DEGREE RF PULSES. Patent dated Nov. 20, 1984. Disclaimer and Dedication filed Mar. 21, 1988, by the assignee, *General Electric Co.*

Hereby disclaims and dedicates to the Public claims 1 and 2 inclusive of said patent.

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| Box SN | Petitions under 37 CFR 1.182 and associated fees prior to receipt of "Filing Receipt", "Notice to File Missing Parts" or " Notice of Incomplete Information Application". |

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| | San Diego Public Library | (619) 236-5813 |
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| Virginia | Richmond: Virginia Commonwealth University Library | (804) 367-1104 |
| Washington | Seattle: Engineering Library, University of Washington | (206) 543-0740 |
| Wisconsin | Madison: Kurt F. Wendt Library, University of Wisconsin -Madison | (608) 262-6845 |
| | Milwaukee Public Library | (414) 278-3247 |

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## PATENT EXAMINING CORPS

**RENE D. TEGTMEYER, Assistant Commissioner**
**JAMES E. DENNY, Deputy Assistant Commissioner**

**CONDITION OF PATENT APPLICATIONS AS OF April 9, 1988**

| PATENT EXAMINING GROUPS | Actual Filing Date of Oldest New Case Awaiting Action |
|---|---|
| **CHEMICAL EXAMINING GROUPS** | |
| GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director | 1-12-87 |
| ORGANIC CHEMISTRY GROUP 120—S. N. ZAHARNA, Director | 9-3-85 |
| SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. F. WHITE, Director | 4-15-87 |
| HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director | 12-9-86 |
| BIOTECHNOLOGY, GROUP 180—S. N. ZAHARNA, Acting Director | 10-24-85 |
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| DESIGN, GROUP 290—K. L. CAGE, Director | 4-17-85 |
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| HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director | 3-13-87 |
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| SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—D. J. STOCKING, Director | 2-20-87 |
| GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director | 7-1-87 |

**Expiration of patents:** The patents within the range of numbers indicated below expire during April 1988, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,573,336 to 3,576,935, inclusive
Plant Patents ..... Numbers 3,037 to 3,053 inclusive



# REEXAMINATIONS

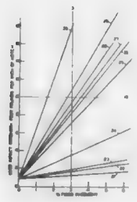
MAY 24, 1988

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

**B1 3,645,961 (857th)**

## IMPACT RESISTANT CONCRETE ADMIXTURE

**Solomon Goldfein, 1317 Jefferson Ave., Falls Church, Va. 22042**
**Reexamination Request No. 90/001,325, Sep. 8, 1987.**
**Reexamination Certificate for Patent No. 3,645,961, issued Feb. 29, 1972, Ser. No. 688,261, Dec. 5, 1967.**
**Continuation of Ser. No. 425,367, Jan. 13, 1965, abandoned.**
**Int. Cl.[4] C04B *16/06***
**U.S. Cl. 106—99**



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

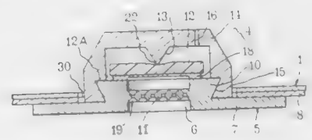
The patentability of claims **1–3** is confirmed.

**1**. A blast resistant concrete product comprising an admixture of inorganic hydraulic cement and selected aggregate, together with a plurality of finite fibers substantially uniformly distributed throughout said admixture, said fibers being substantially ¼ inch to three inches in length and of a material selected from the group consisting of nylon, polypropylene, polyethylene, and polyvinylidene chloride.

**B1 3,799,427 (858th)**

## DEGASSING VALVE FOR HERMETICALLY SEALED FLEXIBLE CONTAINERS AND A CONTAINER PROVIDED WITH THE VALVE

**Luigi Goglio, Via Solari 10, Milan, Italy**
**Reexamination Request Nos. 90/001,175, Feb. 24, 1987 and 90/001,232, May 1, 1987.**
**Reexamination Certificate for Patent No. 3,799,427, issued Mar. 26, 1974, Ser. No. 337,870, Mar. 5, 1973.**
**Claims priority, application Italy, Dec. 4, 1972, 32439/72**
**Int. Cl.[4] B65D *33/01***
**U.S. Cl. 383—103**




AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1**, **6**, **8** and **13** are determined to be patentable as amended.

Claims **2–5**, **7**, **9–12** and **14**, dependent on an amended claim, are determined to be patentable.

New claims **15** and **16** are added and determined to be patentable.

**1**. A unidirectional degassing valve for products in thermoweldable flexible containers, characterized by comprising:

a. a thermoplastic material molded base member provided with at least one conduit;

b. a resilient valve member normally closing said conduit and bearing on the base member through a *thin* viscous [layer] *coating*; and

c. a cap connected with said base member, therewith defining a chamber wherein said resilient valve member is located, and provided with at least one exhaust aperture, through which said chamber communicates with the external atmosphere.

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Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 32,670

## MOBILE CLEANING DEVICE FOR OPEN END FRICTION SPINNING MACHINES

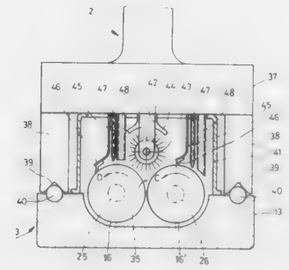
**Fritz Stahlecker, Neidhart-Strasse 18, 7347 Bad Ueberkingen, Fed. Rep. of Germany, assignor to Hans Stahlecker and Fritz Stahlecker, both of, Fed. Rep. of Germany**

**Original No. 4,514,973, dated May 7, 1985, Ser. No. 583,392, Feb. 24, 1984. Application for reissue Apr. 25, 1986, Ser. No. 856,028**

**Claims priority, application Fed. Rep. of Germany, Mar. 9, 1983, 3308248**

Int. Cl.[4] D01H *7/885*

U.S. Cl. 57—301 53 Claims



1. Apparatus for open end friction spinning comprising:

a plurality of adjacently arranged spinning units exhibiting [respetive] *respective* friction roller pairs defining a yarn forming wedge slot therebetween, fiber supply means for supplying fiber to said wedge slot, and roller driving means for drivingly rotating the rollers in the same rotational direction,

mobile servicing unit means including cleaning means for cleaning friction rollers of the spinning units and drive means for selectively moving said mobile servicing unit means to respective servicing positions adjacent spinning units to be cleaned, *and adjustable driving means for driving the rollers of a spinning unit to be cleaned.*

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Re. 32,671

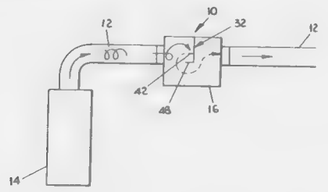
## FLUE CONTROL DEVICE

**John W. Seppamaki, 3768 Socorro, Grandville, Mich. 49418**

**Original No. 4,499,891, dated Feb. 19, 1985, Ser. No. 527,329, Aug. 29, 1983. Application for reissue Feb. 19, 1987, Ser. No. 16,553**

Int. Cl.[4] F23L *3/00*

U.S. Cl. 126—292 13 Claims



*12. A flue control device for slowing the rate at which furnace exhaust gases are conveyed through an exhaust stack comprising:*

*a housing having an inlet and outlet, the interior of the housing forming a closed baffle chamber, the inlet and outlet being formed such that the flue control device can be inserted in a section of the furnace exhaust flue; and*

*baffle means mounted in the baffle chamber for diverting the exhaust gases into a non-linear path around the baffle means in the housing while at the same time disrupting any circular, swirling movement of the gases and rendering such gas flow turbulent, the baffle means comprising a first plate positioned transversely between the inlet and outlet, at least one prominent flange extending from the first plate in an upstream direction relative to the gas flow direction through the flue control device, the baffle means further comprising second plate means extending further into the baffle chamber from an inner edge of the first plate, the second plate means having a prominent flange thereon spaced apart from and extending in the same general direction as the flange on the first plate, the flanges interrupting the swirling, circular flow of gases as they pass through the baffle chamber and causing the gas flow pattern to become disrupted, thus serving to slow the outward flow of exhaust gases through the exhaust stack.*

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Re. 32,672

## METHOD FOR SIMULTANEOUSLY CLEANING AND DISINFECTING CONTACT LENSES USING A MIXTURE OF PEROXIDE AND PROTEOLYTIC ENZYME

**Stanley W. Huth, Mission Viejo; Sam W. Lam, and Richard M. Kiral, both of Irvine, all of Calif., assignors to Allergan, Inc., Irvine, Calif.**

**Original No. 4,670,178, dated Jun. 2, 1987, Ser. No. 774,193, Sep. 9, 1985. Application for reissue Aug. 4, 1987, Ser. No. 81,860**

Int. Cl.[4] C11D *7/42, 7/54*

U.S. Cl. 252—95 15 Claims

1. A method for the simultaneous cleaning and disinfecting of contact lenses which method comprises contacting the lenses with a solution comprised of a disinfecting amount of peroxide and an effective amount of peroxide-active proteolytic enzyme for a time sufficient to remove substantially all protein accretions and to disinfect the lenses.

*10. The method of claim 1 wherein said contact lenses have a hydrophilic surface.*

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Re. 32,673

## PROCESS FOR THE PRODUCTION OF CALCIUM SILICATE-CONTAINING STONE BLANKS USEFUL IN CONSTRUCTING BUILDING WALLS

**Peter Schubert; Hermann Pfeifer, both of Aachen; Reimund Keller, Hattingen; Volker Hermann, Bad Schwalbach, and Eckhard Schulz, Wallenhorst, all of Fed. Rep. of Germany, assignors to SICOWA Verfahrenstechnik fur Baustoffe GmbH, Fed. Rep. of Germany**

**Original No. 4,376,086, dated Mar. 8, 1983, Ser. No. 256,614, Apr. 22, 1981. Continuation of Ser. No. 709,311, Mar. 7, 1985, abandoned. Application for reissue Aug. 19, 1986, Ser. No. 908,796**

**Claims priority, application Fed. Rep. of Germany, Apr. 22, 1980, 3015432**

Int. Cl.[4] B29C *35/00*

U.S. Cl. 264—26 25 Claims

1. A method for producing stones on calcium silicate-basis, which are useful in constructing building walls, the method comprising the following steps:

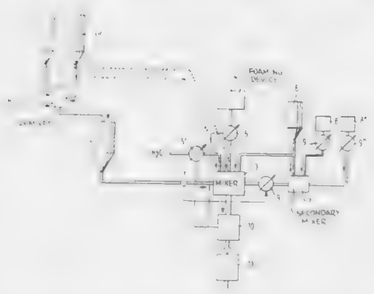
a. forming a crude mixture [of granulated] *comprising a* silicate-containing material, [lime, water, cement and a foaming agent, using such an amount of water that the crude mixture is pourable] *selected from the group consist-*

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*ing of quartz sand, pumice, alumina, quartz powder, boiler slag, and fly ash; a calcium containing material selected from the group consisting of calcium oxide, partially hydrated lime and calcium hydroxide and in addition to the silicate containing material and calcium containing material a cement, said cement acting as a binder, a foaming agent and water, said water added in an amount sufficient to render the crude mixture pourable* and by using a cement composition starting with strength-forming reactions substantially at elevated temperatures,

b. pouring the crude mixture of step (a) into molds,



c. heating the crude mixture in the molds to a temperature of between 45° C. and 90° C.—substantially without compacting the crude mixture to start the strength-forming reactions of the cement,

d. subjecting the crude mixture in the molds to the elevated temperature for 10 seconds to 5 minutes until the stone blanks formed in the molds from the crude mixture by heating to the elevated temperature achieves the desired blank strength necessary for removing the blanks from the molds,

e. removing the blanks from the molds and transporting the blanks to an autoclave, and

f. steam hardening the stone blanks in the autoclave.

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**Re. 32,674**

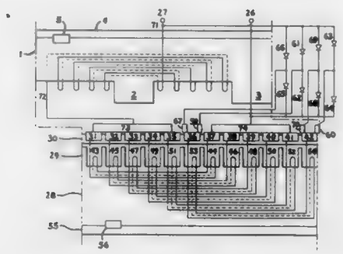
**MULTIPLE WINDINGS ELECTRICAL MACHINES**

**John T. R. Wilson, 736 Lynnhaven La., La Canada Flintridge, Calif. 91011**

**Original No. 4,305,027, dated Dec. 8, 1981, Ser. No. 20,341, Mar. 14, 1979. Continuation of Ser. No. 558,689, Dec. 6, 1983. Application for reissue Jun. 11, 1986, Ser. No. 873,127**

**Int. Cl.[4] H02K** *13/00*

**U.S. Cl. 318—439** **25 Claims**



*12. A multiple windings electrical machine having at least one repeatable section, comprising:*

*a stator and an armature facing each other across an air gap and mounted for relative movement in at least one preselected direction;*

*the stator having, for each repeatable section, two stator magnetic poles of opposite polarity facing an air gap and arranged side-by-side in the direction of relative movement;*

*the armature having an armature magnetic structure and, for each repeatable section, multiple open circuit windings disposed from each other in the direction of relative movement and arranged to inductively link said structure;*

*means for simultaneously establishing electrical connections to a plurality of said armature windings on an individual basis, such that each of the armature windings can be energized independently of the other armature windings as said relative movement occurs;*

*means for causing current to flow in the electrical connection means and said plurality of windings to establish armature electromagnetic poles having the same pitch as the stator poles;*

*the stator and armature poles having a relative orientation at which a preselected change of magnetic energy per unit relative movement occurs;*

*the electrical connection means being constructed to substantially maintain said orientation by progressively establishing connection to unenergized windings of the armature and interrupting connection to other previously energized windings of the armature, thereby shifting the armature poles incrementally relative to the armature as said relative movement occurs so that the machine continuously converts between electrical and mechanical energy; and*

*energy disposal means coupled to the interrupted armature windings to recover energy from said windings as an induced voltage.*

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**Re. 32,675**

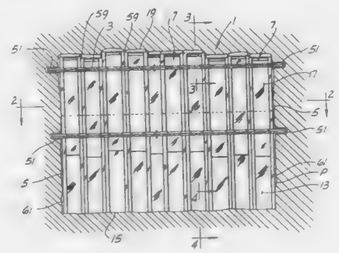
**MINE STOPPING AND METHOD OF AND JACK FOR INSTALLING SAME**

**John M. Kennedy, 918 Mesa Verde Ct., and William R. Kennedy, P.O. Box 304, both of Taylorville, Ill. 62568**

**Original No. 4,483,642, dated Nov. 20, 1984, Ser. No. 376,957, May 11, 1982. Continuation-in-part of Ser. No. 252,578, Apr. 9, 1981, abandoned. Application for reissue Oct. 27, 1986, Ser. No. 923,819**

**Int. Cl.[4] E21F** *1/14*

**U.S. Cl. 405—132** **20 Claims**



**16**. The method of installing in a mine a plurality of elongate extensible panels adapted to extend vertically in side-by-side relation from the floor to the roof of a passageway in a mine, each panel comprising a first elongate member constituting a lower member of the panel adapted for engagement of its lower end with the floor of the passageway, and a second elongate member constituting an upper member of the panel adapted for engagement of its upper end with the roof of the passageway, each of said panel members being a sheet metal member of channel shape in cross section having a web and flanges at opposite sides of the web, each flange having an inturned portion at its outer edge extending generally parallel to the [web and a lip at the inner edge of the inturned portion extending inwardly toward the ] web, one of said members having a telescoping sliding fit in the other with the webs of the members in engagement, the one member constituting the inner member and the other constituting the outer member of the panel, a plurality of the panels being adapted to be installed in a passageway with the side flanges of the outer members generally in engagement, the upper member of each panel having a head at its upper end, the lower member of each panel having a foot at its lower end, said method comprising:

engaging the base of a jack with the foot of a lower panel member and the end of an extensible member of the jack with the head of the respective upper panel member, and extending the extensible member of the jack to force the lower panel member down and the upper panel member up for sealing engagement of said upper panel member at its upper end with the roof.

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**Re. 32,676**

**7-AMINOZOLO[1,5-A]PYRIMIDINES AND FUNGICIDES CONTAINING THESE**

**Karl Eicken, Wachenheim; Hermann Graf, Mutterstadt; Walter Gramlich, Edingen-Neckarhausen; Hubert Sauter, Mannheim; Costin Rentzea, Heidelberg; Ernst-Heinrich Pommer, Limburgerhof, and Eberhard Ammermann, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

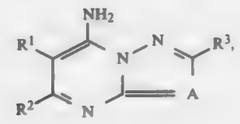
**Original No. 4,617,303, dated Oct. 14, 1986, Ser. No. 662,592, Oct. 19, 1984. Application for reissue Jun. 3, 1987, Ser. No. 59,254**

**Claims priority, application Fed. Rep. of Germany, Oct. 21, 1983, 3338292**

**Int. Cl.[4] C07D** *487/04;* **A01N** *43/90*

**U.S. Cl. 514—258** **7 Claims**

1.



where

$R^1$ is a [$C_6$–$C_{18}$-alkyl] $C_7$–$C_{18}$-*alkyl* which is unsubstituted or a $C_3$–$C_{18}$ alkyl which is mono substituted by a $C_1$–$C_{18}$-alkoxy or halogen and

$R^2$ and $R^3$ are each hydrogen or a $C_1$–$C_4$-alkyl, and

A is nitrogen or $CR^4$, where

$R^4$ is hydrogen, a $C_1$–$C_4$ alkyl or halogen.

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**Re. 32,677**

**POLYAMINES, A PROCESS FOR THE PRODUCTION OF POLYAMINES AND THEIR USE IN THE PRODUCTION OF POLYURETHANES**

**Werner Rasshofer, Cologne; Gerhard Grögler, Leverkusen; Klaus König, Leverkusen, and Dieter Dieterich, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Original No. 4,540,720, dated Sep. 10, 1985, Ser. No. 401,472, Jul. 26, 1982. Application for reissue Apr. 7, 1986, Ser. No. 848,607**

**Claims priority, application Fed. Rep. of Germany, Aug. 7, 1981, 3131252**

**The portion of the term of this patent subsequent to Jul. 30, 2002, has been disclaimed.**

**Int. Cl.[4] C07C** *127/15, 127/24*

**U.S. Cl. 521—159** **24 Claims**

1. A process for the production of aromatic and/or aliphatic, primary polyamines by the hydrolysis of compounds containing isocyanate groups, comprising

(I) converting aromatic and/or aliphatic compounds containing from 0.5 to 40% by weight of isocyanate groups *other than distillation residues containing isocyanate groups obtained in the commercial production of TDI* into compounds containing carbamate groups by mixing said aromatic and/or aliphatic compounds with a strong aqueous base and at least a stoichiometric quantity of water and

(II) recovering polyamines directly from the compounds containing carbamate groups by thermal decomposition or by solvent extraction.

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# PLANT PATENTS

## GRANTED MAY 24, 1988

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

6,183

### ROSE PLANT NAMED BUCAROO

**Griffith J. Buck, Ames, Iowa, assignor to Iowa State University Research Foundation, Inc., Ames, Iowa**

**Filed Mar. 21, 1986, Ser. No. 843,660**
**Int. Cl.[4] A01H** *5/00*
**U.S. Cl. Plt.—1** **1 Claim**

1. A new and distinct variety of rose plant substantially as herein shown and described, characterized by its profuse production of large flowers of light red-purple coloration, its vigorous growth habit, its ability to survive without protection under adverse winter conditions, and its resistance to foliar diseases.

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6,184

### COLUMNAR APPLE TREE—MAYPOLE VARIETY

**Kenneth R. Tobutt, Kent, England, assignor to The Kent Incorporated Society for Promoting Experiments in Horticulture, Kent and National Seed Development Organisation Limited, Cambridge, both of, England**

**Filed Apr. 15, 1986, Ser. No. 852,341**
**Int. Cl.[4] A01H** *5/03*
**U.S. Cl. Plt.—34** **1 Claim**

1. A new and distinct variety of ornamental apple tree, substantially as illustrated and described, having (a) an erect, dense and compact growth habit which is substantially free of side branches, and (b) the ability to form attractive small symmetrical crimson fruit.

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6,185

### BEGONIA PLANT NAMED 'MONA'

**Soeren Hvid, Aarup, Denmark, assignor to L. Daehnfeldt A/S, Odense, Denmark**

**Filed Jun. 6, 1986, Ser. No. 871,633**
**Int. Cl.[4] A01H** *5/00*
**U.S. Cl. Plt.—68** **1 Claim**

1. A new and distinct cultivar of Begonia Cultivar named Mona, as shown and described, and particularly characterized by its vigorous, compact growth habit; bright "light delicate rose" tepals that maintain color even under high light conditions; floriferous habit; and by its excellent keeping qualities.

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6,186

### BEGONIA PLANT NAMED 'LISA'

**Soeren Hvid, Aarup, Denmark, assignor to L. Daehnfeldt A/S, Odense, Denmark**

**Filed Jun. 5, 1986, Ser. No. 871,218**
**Int. Cl.[4] A01H** *5/00*
**U.S. Cl. Plt.—68** **1 Claim**

1. A new and distinct cultivar of Begonia plant named Lisa, as shown and described, comprising a flower color mutation of the cultivar Pia Elise, and particularly characterized by its large double light red flowers, which do not significantly fade under abnormal conditions, with the flower color pleasantly contrasting with the dark green foliage, vigorous growth habit and by its ease of manipulation for year around flower production, especially for larger containers and hanging baskets for interior decorating.

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6,187

### CARNATION PLANT NAMED JUN

**Jun J. Uchida, Salinas, and Barbara J. Grotta, Fremont, both of Calif., assignors to California Florida Plant Company, Fremont, Calif.**

**Filed Mar. 12, 1986, Ser. No. 838,927**
**Int. Cl.[4] A01H** *5/00*
**U.S. Cl. Plt.—71** **1 Claim**

1. A new and distinctive cultivar of carnation plant, named Jun Sakura, substantially as herein shown and described characterized particularly as to novelty by it distinctive and attractive pink flower color which retains its color without fading; slightly serrated flowers which open fully without bursting the calyx and causing splits; vigorous strong, straight stems; and good light and heat tolerance.

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# PATENTS

## GRANTED MAY 24, 1988

### ERRATA

| For CLASS | See PATENT NO. |
|---|---|
| 101-421 | 4,745,863 |
| 277-237 | 4,746,023 |
| 229-102 | 4,746,052 |
| 229-120 | 4,746,053 |
| 314-001 | 4,746,175 |
| 043-017 | 4,746,253 |
| 104-240 | 4,746,414 |
| 436-518 | 4,746,631 |
| 536-053 | 4,746,742 |
| 219-010 | 4,746,968 |

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# PATENTS

GRANTED MAY 24, 1988

## GENERAL AND MECHANICAL

**4,745,634**

### SINGLE GARMENT, DESTINED PÁRTICULARLY FOR CHILDREN HAVING MEANS TO ENABLE THE USE OF SUCH WITHOUT HAVING TO SLIP INTO SAID GARMENT

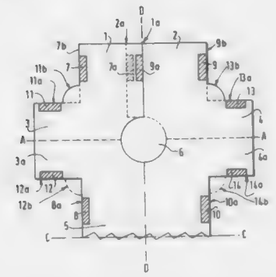
**Francoise Douez, 1 rue du Surmelin, 75020 Paris, France**

**Continuation-in-part of Ser. No. 786,084, Oct. 10, 1985. This application Jun. 17, 1986, Ser. No. 875,183**

**Claims priority, application France, Jun. 26, 1985, 85 09738; Nov. 18, 1985, 85 17021**

**Int. Cl.[4] A41B *13/06;* A41D *11/00***

**U.S. Cl. 2—69** **29 Claims**



1. A garment that can be put on a baby without having to slip the baby's head through a neck opening in said garment or slip the baby's arms through sleeves in said garment; said garment comprising:

a single piece of material which, when laid out flat, is in the shape of a cross; said cross having a longitudinal axis and a first transverse axis which intersect at a center of said cross; said cross comprising four quadrilateral forms; two of said forms projecting transversely and two of said forms extending longitudinally from said center of said cross; each of said forms having three sides free and a fourth side adjoining the remainder of said piece of material;

a first opening being provided about said center of said cross; and first opening serving as said neck opening when the baby is within said garment;

a slit being provided in one of said longitudinally projecting forms; said slit extenidng longitudinally from a transversely extending free side of said one longitudinally projecting form to said first opening; said slit dividing said one longitudinally projecting form into two adjacent form portions;

said piece of material being foldable about said first transverse axis and about the baby to form each of said two transversely projecting forms into front and back portions of a sleeve and to form said longitudinally projecting forms into front and back portions of said garment;

releasable fastener means being provided along two transversley extending free sides of each of said transversely projecting forms, on longitudinally opposite sides thereof, for fastening said front and back portions of said sleeves to one another along said transversely extending free sides to close said sleeves about the arms of the baby when the baby is within said garment;

said garment further comprising: releasable fastener means for fastening said front and back portions of said garment to one another to close said garment at its sides about the baby within said garment; and releasable fastener means for fastening said two adjacent form portions of said one longitudinally projecting form to each other along said slit to close said slit with the baby within said garment,

and at least one of said front and back portions including a diaper means.

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**4,745,635**

### DISPOSABLE GLOVE OR MITT FOR SELF-SERVICE GASOLINE

**Duane W. Kinnear, R.D. #1, 11770 Ridge Rd., East Springfield, Pa. 16411**

**Filed Dec. 4, 1986, Ser. No. 937,886**

**Int. Cl.[4] A41D *19/00***

**U.S. Cl. 2—161 R** **5 Claims**



1. A glove or mitt to be worn for self-service gasoline having a palm side of blister pack of flexible plastic film, the blisters being on the inner surface of the glove and of diameter much less than finger width and containing trapped air which provides a cushioned gripping surface and shock and thermal insulation.

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**4,745,636**

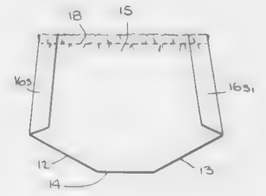
### DISPOSABLE, NON-WOVEN APPAREL SHORTS

**Audrey T. Lunt, 6371 Vermont Hill Rd., South Wales, N.Y. 14139**

**Filed Feb. 18, 1987, Ser. No. 16,110**

**Int. Cl.[4] A41B *9/08***

**U.S. Cl. 2—402** **3 Claims**



1. Apparel shorts formed of a single rectangular blank of textile material formed of non-woven polyester fibers having a pair of opposing isosceles triangular indentations therein whose vertices lie at the opposite ends of a transverse center line, the blank being folded in half on the center line to create identical front and rear sections in superposed relation, the folded-over triangular identations then defining leg openings, the side margins of the front section being folded in behind this section, and the corresponding side margins of the rear section being folded over the folded-in margins of the front section to define side vents in the leg openings to provide additional space in the shorts should it be required by the wearer, and a

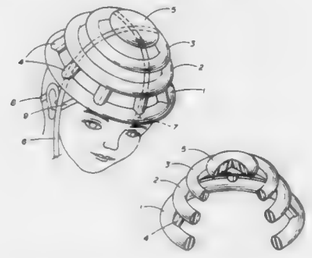
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continuous band of elastomeric material bonded in its stretched state to the inner surface of the upper margins of the front and rear sections and the upper ends of the side vents to form a circular waist, whereby when the band is released, it creates a shirred, expandable, multi-size waist.

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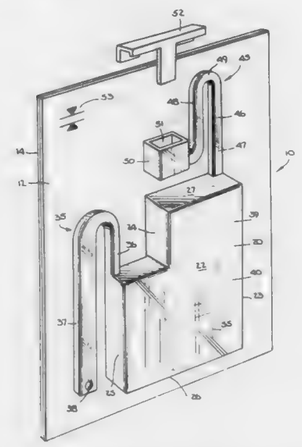
**4,745,637**
**HEAD PROTECTOR**
**Richard J. Steele, and Maribel Steele, both of 2202 Harwell, Houston, Tex. 77023**
**Filed Mar. 23, 1987, Ser. No. 29,052**
**Int. Cl.[4] A42B** *3/02*
**U.S. Cl. 2—411** **2 Claims**



1. A head protector including in combination
a plurality of concentric rings including an upper ring, a lower ring, and an intermediate ring between said upper ring and said lower ring, said rings being formed of tubular casing packed with yieldable material,
a top member positioned above said upper ring,
a plurality of fabric straps connected to said top member and to said plurality of concentric rings, and
a plurality of cushion members connected between said lower ring and said intermediate ring.

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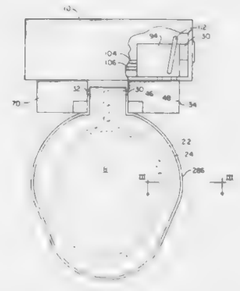
**4,745,638**
**PASSIVE DISPENSER HAVING DELAYED DISCHARGE**
**Randall G. Richards, Madison, Conn., assignor to The Drackett Company, Cincinnati, Ohio**
**Filed Jul. 30, 1985, Ser. No. 760,720**
**Int. Cl.[4] E03D** *9/02*
**U.S. Cl. 4—228** **13 Claims**



1. In a dispenser adapted for placement in a body of liquid and wherein a quantity of solution is contained in a vented product chamber of said dispenser, a predetermined volume of said solution being discharged therefrom in response to a lowering of the level of said body of liquid from a first elevation to a second elevation, the solution being discharged through discharge means providing fluid communication between said product chamber and said body of liquid, the improvement comprising product chamber vent means including an inverted U-shaped vent conduit extending above the top of said product chamber and including hydraulic means adapted to delay the onset of discharge of solution from the product chamber to the body of liquid through the discharge means, said hydraulic means being reservoir means in fluid communication with the outlet end of the vent conduit.

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**4,745,639**
**TOILET APPARATUS WITH AUTOMATIC SELF-CLEANING MEANS**
**Ben C. Wileman, III, Oklahoma City, Okla., assignor to Wileman Industries, Inc., Oklahoma City, Okla.**
**Filed Jun. 16, 1986, Ser. No. 874,667**
**Int. Cl.[4] A47K** *13/00*
**U.S. Cl. 4—233** **7 Claims**



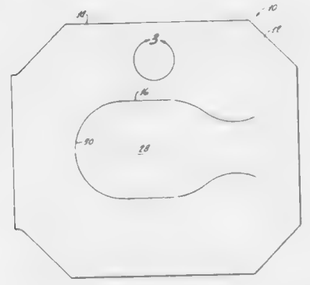
1. In a toilet apparatus comprising a bowl, a seat member adapted to overlie rim portions of said bowl, and a cover member adapted to overlie said seat member, the improvement comprising a channel disposed in said cover member, a plurality of holes extending from said channel to undersurface portions of said cover member overlying said seat member, first fluid conveying means interconnecting fluid source means with said cover member channel, a channel disposed in said seat member, a plurality of holes extending from said seat member channel to undersurface portions of said seat member overlying said bowl rim portions, second fluid conveying means interconnecting said fluid source means with said seat member channel, said fluid source means comprising a tank adapted to retain liquid therein and said first and second fluid conveying means comprising pipe means for said liquid, said fluid source means further comprising a gas source said first and second fluid conveying means further comprising said pipe means for said gas, and a control unit for initiating flow of said liquid through said liquid conveying pipe means, terminating said flow of said liquid, initiating operation of a valve means for said gas, and operation of said valve means to terminate said flow of said gas, whereby to cause liquid to flow through said cover member channel and said seat member channel and said cover member holes and said seat member holes and be directed onto said upper surfaces of said seat member and said bowl rim portions, and thereafter to cause gas to flow through said cover member channel and said seat member channel and said cover member holes and said seat member holes and be directed onto said upper surfaces of said seat member and said bowl rim portions, said flow of liquid being operable to wash said upper surfaces of said seat member and said bowl rim portions, and said flow of gas being operable to purge said cover member channel, said seat member channel, said cover



member holes, and said seat member holes of said liquid and further operable to dry said upper surface of said seat member and aid bowl rim portions.

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**4,745,640**
**TOILET SEAT COVER**
**Eric L. Nelson, Newport Beach, Calif., assignor to Nelson Research & Development Co., Irvine, Calif.**
**Filed Apr. 27, 1987, Ser. No. 42,712**
**Int. Cl.[4] A47K** *13/14*
**U.S. Cl. 4—243** **13 Claims**



1. A toilet seat cover comprising:
a sheet including means defining a toilet seat shape having sufficient area to prevent contact between a human buttocks and a toilet seat when the sheet is disposed on and aligned with said toilet seat;
a water-soluble oxidizing agent disposed in said sheet in the form of separate particles;
a water-soluble ene-diol compound disposed in said sheet in the form of separate particles;
said water-soluble oxidizing agent and said water-soluble ene-diol compound being present in said sheet in an amount sufficient to provide a microbiocidal shield between the toilet seat and said buttocks when perspiration from the buttocks contacts both the water-soluble oxidizing agent and the water-soluble ene-diol compound, said microbiocidal shield comprising a microbiocidal solution of said water-soluble oxidizing agent and said water-soluble ene-diol compound suspended in said sheet.

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**4,745,641**
**TOILET BOWL PLUNGER**
**George Tash, 18658 Chase St., Northridge, Calif. 91324**
**Continuation of Ser. No. 657,611, Oct. 4, 1984, abandoned. This application May 27, 1986, Ser. No. 867,790**
**Int. Cl.[4] E03D** *11/00*
**U.S. Cl. 4—255** **20 Claims**

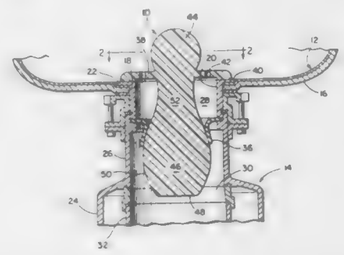
1. An improved drain clearing plunger, said plunger comprising, in combination:
(a) an elongated plunger handle having a bottom end;
(b) an annular flexible, resilient base sealing member having
(1) a central aperture extending vertically therethrough;
(2) a planar bottom portion having an inner and an outer periphery lying in a substantially horizontal plane and extending at said inner periphery radially from said central aperture,
(3) an annular peripheral sealing rim connected to and extending only upwardly and outwardly from said outer periphery of said bottom portion; the arcuate curvature of said sealing rim extending in the vertical directional terminating at a thin walled collapsible top,
(4) said bottom portion and peripheral sealing rim defining a nesting are,
(c) a flexible, resilient, collapsible, multi-pleated bellows having its upper end connected to said bottom end of said handle, the pleats of said bellows being generally transverse to the vertical;
(d) said thin walled collapsible top lying in a substantially horizontal plane and having an inner and an outer periphery and being connected at said outer periphery to a top portion of said peripheral sealing rim;



(e) said bellows having a lower end, said bellows being connected at its lower end to said inner periphery of said collapsible top,
(f) whereby compression of said bellows results in the nesting of the lower end of said bellows into said nesting area along with movement of said peripheral sealing rim radially outwards.

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**4,745,642**
**DISPOSER SAFEGUARD**
**Hazel B. Shands, 465 Calle Retama, Brownsville, Tex. 78520**
**Filed Jul. 14, 1987, Ser. No. 73,196**
**Int. Cl.[4] A47K** *17/00*
**U.S. Cl. 4—661** **7 Claims**



1. In combination with a sink having a drain opening and a flanged sleeve depending from the sink through the drain opening, a waste disposer suspended from said sleeve, including a grinding head and a casing enclosing a comminuting chamber within which the grinding head is exposed, said casing having an upper inlet portion attached to the sleeve to form therewith a drain passage of varying diameter between the drain opening and the comminuting chamber and having a throat section above the comminuting chamber at which the diameter is minimum, a device for controlling insertion of waste material into the comminuting chamber through the drain passage, comprising a protective cover seated on the flanged sleeve within the sink and covering the drain opening,

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an axially elongated body of variable diameter depending from the cover through the drain passage into the comminuting chamber, said body having: (a) a lower impaction end surface axially spaced by a clearance distance from the grinding head during support of the body within the comminuting chamber by the cover, (b) a cross-sectionally enlarged portion of maximum diameter terminated by said impaction end surface and (c) a neck portion of reduced diameter connecting the enlarged portion to the cover, said enlarged portion of the body having a dimensional passage clearance relationship to the throat section of the drain passage.

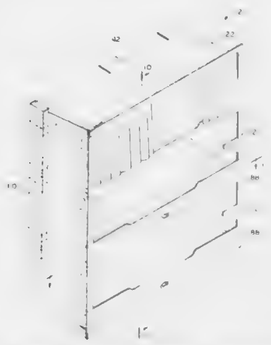
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**4,745,643**

## MODULAR SLEEPING UNIT FOR SHIP CREW OR THE LIKE

**Richard E. Clarke, King County, Wash., assignor to Amtech Corporation, Yelm, Wash.**

**Filed Jul. 18, 1985, Ser. No. 757,275**
**Int. Cl.[4] A47C *19/20*; B63B *29/10***
**U.S. Cl. 5—9 R** **6 Claims**



1. A berth system adapted for easy installation in a ship, comprising a plurality of modular sleeping units, each comprising a unitary berth having integral top, bottom pan, back wall and two end portions defining an interior with an entry-egress opening, wherein the bottom pan is sized to accept a mattress wherein the bottom pan forms a bottom frame portion having a hinged bottom panel contained therein and including a locker section connected to the bottom frame portion and disposed beneath the hinged bottom panel wherein the hinged bottom panel can be opened to reveal the locker section, the locker section having a drawer and a bottom panel prop bar to hold the hinged bottom panel in an open position, wherein the drawer is smaller in area than the locker section and wherein the locker section includes dividers which provide support for the hinged bottom panel and which define right, left, and rear storage area and a drawer receptacle separate therefrom, whereby access to the storage areas is only available through the hinged bottom panel, said units mounted on top of each other, the lowermost one including adjuster means to level the berth system relative to a supporting surface.

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**4,745,644**

## LOCKING SLAT BED FRAME

**Paul E. Pottschmidt, Lexington, N.C., assignor to Leggett & Platt, Incorporated, Carthage, Mo.**

**Filed Apr. 1, 1987, Ser. No. 33,993**
**Int. Cl.[4] A47C *19/00***
**U.S. Cl. 5—200 C** **14 Claims**

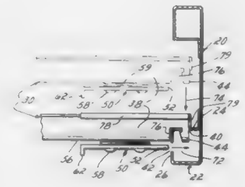
1. A bed frame having a headboard, a footboard, and a pair of wide longitudinal side rails extending therebetween parallel to each other and connecting said boards together to define a rectangular bed frame, said bed frame comprising:

an inwardly facing flange formed on at least one of said side rails, said flange having an inner vertical edge and having an upwardly facing surface adapted to support the end of a slat,

a transverse slat having an end supported upon the upwardly facing surface of said flange,

the upwardly facing surface of said flange having a vertical hole therein, and the inner vertical edge of said flange having a transverse hole therein,

a downwardly facing tab formed at said end of said slat and configured to fit into said vertical hole when said slat is



supported by said rail, said tab being inserted vertically into said vertical hole when said slat is assembled onto said rail, and

a lock mounted on said slat near said end and being transversely movable between a retracted and an extended position, said lock having a tip configured to fit, when said lock is in said extended position, into said transverse hole to prevent the upward movement of said slat from said rail, said lock being inserted horizontally into said transverse hole to lock said slat onto said rail.

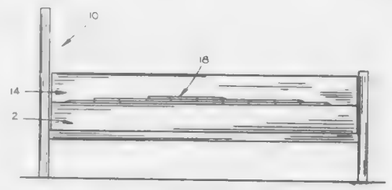
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**4,745,645**

## INFLATABLE INSERT FOR WORN MATTRESSES

**Douglas J. McWilliams, 1974 34th Ave., Columbus, Nebr. 68601**

**Filed Aug. 27, 1987, Ser. No. 90,208**
**Int. Cl.[4] A47C *21/00***
**U.S. Cl. 5—446** **2 Claims**



1. A device for insertion between a box spring and a mattress, comprising,

a first generally rectangular pad means including a horizontally disposed bottom pad member, a horizontally disposed top pad member sealed at its periphery to said bottom pad member to define a first air compartment therebetween, said top and bottom pad members having opposite ends and opposite side edges,

first valve means for selectively supplying air to said first air compartment,

a second pad means generally centrally positioned on top of, and secured to, said top pad member of said first pad means and having a length shorter than said first pad means so that the opposite ends of said first pad means are not covered by said second pad means, said second pad means including a horizontally disposed bottom pad member, a horizontally disposed top pad member sealed at its periphery to said bottom paid member to define a second air compartment therebetween, said top and bottom pad members of said second pad means having opposite ends and opposite side edges,

second valve means for selectively supplying air to said second air compartment,

said first and second air compartments having a plurality of transversely extending air pockets provided therein, each of said air pockets extending between the opposite edges of said pad members,

said mattress insert adapted to be positioned between the box spring and the mattress and at least partially inflated so as to raise a worn portion of the mattress and eliminate sagging.

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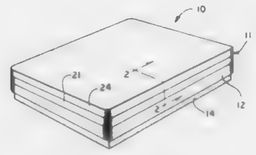


**4,745,646**

## RAIL CONSTRUCTION FOR HYBRID BED

**Mark J. Strobel, 3131 Industrial Pkwy., Jeffersonville, Ind. 47130**

**Filed Apr. 20, 1987, Ser. No. 40,344**
**Int. Cl.[4] A47C *27/08***
**U.S. Cl. 5—451** **7 Claims**



1. In a hybrid bed comprising a mattress disposed on a supporting surface, and a mattress cover covering said mattress, said mattress including a rail at the perimeter thereof and a flexible bag filled with water within said rail and supported by said rail, said rail including a flexible foam portion for providing a top surface which forms a part of the upper surface, and a rigid portion outwardly of said foam portion for preventing bowing of said rail, the improvement wherein said foam portion comprises an integral member defining an outwardly facing, generally "U" shaped groove, and said rail further includes an inwardly directed flange carried by said rigid portion and disposed within said groove, said groove and said flange being of substantially the same size and shape so that said flange is complementary to said groove, the arrangement being such that said mattress cover passes around said flange and is held thereon by said groove, said bag filled with water serving to increase the holding force between said groove and said flange.

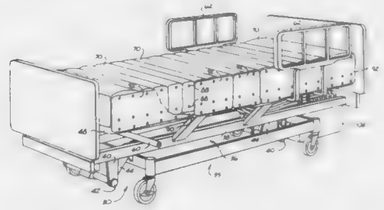
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**4,745,647**

## PATIENT SUPPORT STRUCTURE

**Vernon L. Goodwin, Charlotte, N.C., assignor to SSI Medical Services, Inc., Charleston, S.C.**

**Filed Dec. 30, 1985, Ser. No. 814,610**
**Int. Cl.[4] A47C *27/10*; A61G *7/00***
**U.S. Cl. 5—453** **31 Claims**



1. An improved patient support structure, comprising:

(a) a frame;

(b) a plurality of elongated inflatable sacks atop said frame;

(c) gas supply means in communication with each of said sacks for supplying gas to same;

(d) control means associated with said gas supply means and said sacks, for controlling supply of gas to each of said sacks according to a predetermined pressure profile across said plurality of sacks and according to a plurality of predetermined combinations of said sacks, each said combination of sacks defining a separate support zone; and

(e) gas flow switching means associated with certain of said sacks for switching said certain sacks between adjacent zones for accommodation of patients of differing heights and weights; and

(f) said gas flow switching means including:

(i) at least two manifolds, each said manifold having one inlet and at least two outlets,

(ii) at least four valve means, one said valve means being in communication with each one of said outlets of said manifolds, each said valve means having an inlet port and an outlet port,

(iii) at least four gas pipes, one said gas pipe extending from each outlet port of each of said valve means, and

(iv) wherein one of said gas pipes extending from one of said valve means of one of said manifolds communicates with the second of said gas pipes of the second of said valve means from said other manifold, and the third of said gas pipes extending from the third of said valve means of one of said manifolds communicates with the fourth of said gas pipes connected to the fourth of said valve means from said other manifold.

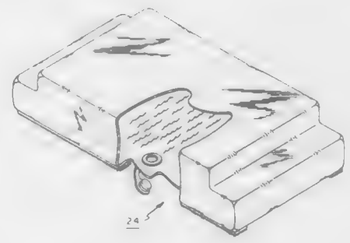
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**4,745,648**

## BODY SUPPORTING STRUCTURE

**Eric Viesturs, Southbury, Conn., assignor to Connecticut Artcraft Corp., Naugatuck, Conn.**

**Filed Aug. 24, 1987, Ser. No. 88,552**
**Int. Cl.[4] A47C *27/10*; A61G *7/04***
**U.S. Cl. 5—455** **2 Claims**



1. A body supporting structure comprising:

a hollow flexible body having the general shape of a rectangular parallelepiped which is horizontally elongated and is vertically shallow, said body having a closed bottom and closed sides and a top with a rectangular shaped opening therein, the area of the opening being somewhat smaller than the area of the top so that the periphery of the opening is spaced from the outer periphery of the top by a border, said body being adapted to rest upon a mattress; and

a plurality of water filled cushions detachably secured to the body and disposed adjacent each other, each cushion having a main portion disposed in the opening end two opposite side edge portions disposed underneath the border, the main portions together essentially filling the opening, some but not all of the cushions being vacuum formed, the vacuum formed cushions having main portions which are raised relative to both side edge portions in the unloaded condition.

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**4,745,649**

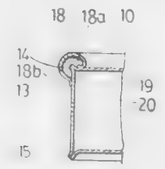
## INFLATABLE ARTICLE WITH EDGE CONCEALING MEANS

Cheng C. Wang, 7th Floor, No. 37, An-Ho Road, Taipei, Taiwan

Continuation-in-part of Ser. No. 738,067, May 24, 1985, Pat. No. 4,651,360, which is a continuation-in-part of Ser. No. 467,546, Feb. 17, 1983, Pat. No. 4,547,919. This application Sep. 16, 1985, Ser. No. 776,437

Int. Cl.[4] A47C *27/08*

U.S. Cl. 5—455 2 Claims




1. A inflatable article comprising:

first and second gas impervious sheets joined together into an inflatable envelope having at least one seam formed by heat sealing the edges of said first and second flexible sheets, and

a third gas impervious sheet overlying at least a portion of said first and second flexible sheets and said seam in one piece to form an additional air compartment superimposed on said envelope, wherein said third sheet has at least one marginal edge heat sealed to said first sheet along one side of said seam and is looped over said seam and heat sealed to said second sheet on the other side of said seam, whereby said additional air compartment conceals said seam upon inflation of said air compartment, said first and second sheets defining sharp, butt sealed, peripheral edges, said third sheet being heat sealed to said second sheet by placing a part of its inner surface adjacent to said second sheet and heat sealing it thereto.

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**4,745,650**

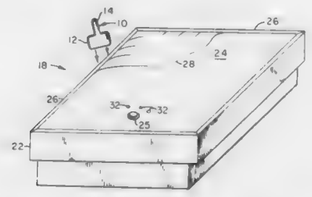
## METHOD OF BURPING A WATERMATTRESS AND TUCKING A SHEET BETWEEN SAID WATERMATTRESS AND A SURROUNDING FRAME

Francine A. Elliott, 1047 Waverly Ave., Holtsville, N.Y. 11742

Filed Jul. 27, 1987, Ser. No. 78,208

Int. Cl.[4] A47C *27/08*

U.S. Cl. 5—508 1 Claim




1. The method of preparing a waterbed for use said waterbed comprising a water filled mattress surrounded by a frame comprised of sidewalls, said method comprising steps of using a tool to remove trapped air from within said mattress, said tool consisting of a flat, rectangular member made of a self-lubricating plastic with rounded edges to prevent damage to said mattress and having a flat handle flush with the sides of said member and sufficiently thin to permit grasping around said handle, the thickness of said tool being about ¼ inch, the width being at least eight inches but no more than about ten inches, and the depth being no more than about five and one-half inches, the method comprising grasping said handle and placing a long side of said tool against the top surface of said mattress thus creating a temporary depression, and moving said tool to urge trapped air bubbles toward a valve in said mattress for removal, and then tucking the edge of a sheet between said mattress and said sidewalls of said frame with said tool at an angle of about thirty degrees with said mattress, and sliding said tool at said thirty degree angle along the perimeter of said mattress thereby tucking in the edge of said sheet between said mattress and said sidewall.

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**4,745,651**

## MULTI-PURPOSE UTILITY TOOL

Bernard G. Schellenger, P.O. Box 5622, Eugene, Oreg. 97405

Filed Sep. 18, 1987, Ser. No. 98,276

Int. Cl.[4] B25F *1/00*

U.S. Cl. 7—158 7 Claims



1. A multi-purpose utility tool, comprising:

a. a handle;

b. a curved plate, having a top surface and a bottom surface, a front edge, two side edges and a back edge, wherein

the front edge is straight and sharpened so as to form a cutting edge along the front edge;

the curvature of the curved plate occurs between the front edge and the back edge, and is concave with regard to the top surface; and

the two side edges are mutually parallel and intersect the front edge at a right angle;

c. an end of said handle is attached to the top surface of said curved plate, with the longitudinal axis of said handle forming an obtuse exterior angle with said curved plate at the point of attachment; and

d. a curved web is formed, between the back edge of the curved plate and the handle, which extends tangentially from the bottom surface at the back edge of the curved plate so as to curve toward said handle until intersection therewith, the curved web thereby forming a continuing fulcrum-contacting surface upon which the tool can pivot while prying or lifting, as well as providing additional strength to the attachment between the curved plate and the handle.

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**4,745,652**

## NEW TETRA-AMINOPYRIMIDINE DERIVATIVES AND THEIR USE IN HAIR-DYEING PREPARATIONS

David Rose, Hilden; Edgar Lieske, Duesseldorf, and Norbert Mauk, Neuss, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Jul. 29, 1987, Ser. No. 79,196

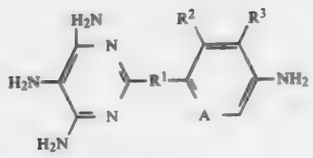
Claims priority, application Fed. Rep. of Germany, Aug. 18, 1986, 3627922

Int. Cl.[4] A61K *7/13*

U.S. Cl. 8—409 15 Claims

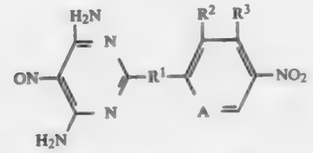
1. A pyrimidine compound selected from the group consisting of a 2,4,5,6-tetra-aminopyrimidine having the formula





(A)

and a pyrimidine having the formula



(B)

in which $R^1$ is selected from the group consisting of —NH—$(CH_2)_n$—NH— where n is an integer of 2–4, —NH—$CH_2$—CH(OH)—$CH_2$—NH— and



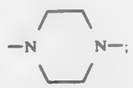
$R^2$ and $R^3$ which may be the same or different, independently of one another are hydrogen, chlorine or —$OR^4$, where $R^4$ is a $C_1$–$C_4$ alkyl group, and A is CH or a nitrogen atom.

7. A process of the production of a 2,4,5,6-tetra-amino-pyrimidine having the general formula

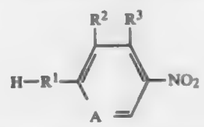


(I)

in which $R^1$ is selected from the group of —NH—$(CH_2)_n$—NH— where n is an integer of 2–4, —NH—$CH_2$—CH(OH)—$CH_2$—NH— or

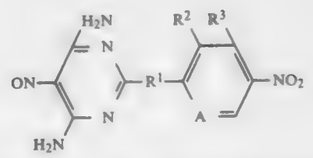


$R^2$ and $R^3$, which may be the same or different, independently of one another are hydrogen, chlorine or —$OR^4$, where $R^4$ is a $C_1$–$C_4$ alkyl group, and A is a CH group or a nitrogen atom, comprising reacting with a 2-alkylmercapto-4,6-diamino-5-nitrosopyrimidine in which the alkyl group contains from 1–4 carbon atoms, a compound of the formula



(II)

thereby providing a pyrimidine compound of the formula



(III)

wherein $R^1$, $R^2$, $R^3$ and A are as defined above and catalyticaly hydrogenating said compound III providing said 2,4,5,6-tetra-aminopyrimidine.

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**4,745,653**

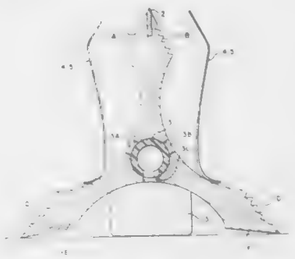
## WIPER/SCRAPER/WASHER BLADE FOR WINDOWS ON TRANSPORTATION MEANS

Bedrich V. Blizniak, 362 Rindge Ave., Apt. 3B, Cambridge, Mass. 02140

Filed Jul. 28, 1986, Ser. No. 890,733

Int. Cl.[4] B60S *01/38*

U.S. Cl. 15—250.04 14 Claims



1. A combination including a wiper/scraper blade and holding arm mechanism for windows on transportation devices having a dual function for both wiping and scraping a window, wherein the windshield wiper/scraper blade and holding arm mechanism comprise:

an elongated blade element comprising along the length of the blade element a central support and at least two spaced sharp elongated edges positioned with each elongated edge directed away from the other laterally on opposing sides of the central support, so that as the blade moves laterally in a back and forth sweeping motion over a window surface, the two elongated edges alternate forward positions, so that as the blade sweeps in a first direction, a first elongated edge pointing forwardly in the direction of motion, acts as a scraper, in advance of a second trailing elongated edge pointing rearwardly away from the direction of motion of the blade, which second elongated edge acts as a wiper, and as the blade sweeps back in an opposite second direction, the second elongated edge leads in a forwardly pointing direction acting as a scraper and the first elongated edge trails in a rearwardly pointing direction acting as a wiper;

a tensioning means for holding the wiper/scraper blade against a window;

and a reversing motion means of controlling the motion of the blade across the window;

and wherein the wiper/scraper blade comprises three elongated edges spaced equiangularly around the central support, thereby forming a series of three paired sets of elongated edges and the wiper/scraper blade may be rotated to position any of the three paired sets against the window;

and wherein the central support comprises a tubular liquid conducting opening through the central support with a single opening at one end of the central support facing

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toward the window and the blade further comprises an end opening between each adjacent pair of elongated edges, wherein each opening between elongated edges aligns with the central support opening when the pair of elongated edges having the end opening is positioned toward the window, thereby admitting liquid onto the window.

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**4,745,654**

## HAND-HELD VACUUM CLEANER

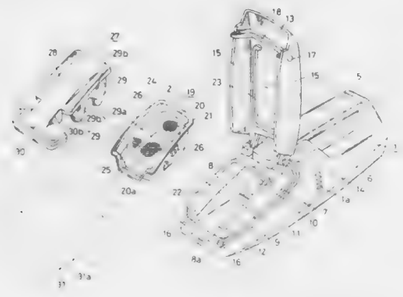
**Kyoichi Yamamoto, and Syouiti Tohya, both of Sumoto, Japan, assignors to Sanyo Electric Co., Ltd., Japan**

**Filed Jul. 16, 1986, Ser. No. 886,183**

**Claims priority, application Japan, Aug. 8, 1985, 60-174674; Oct. 9, 1985, 60-154474**

**Int. Cl.⁴ A47L** *5/24*

**U.S. Cl. 15—344** **10 Claims**



1. A hand-held vacuum cleaner, comprising

a main body having a dust collecting recess in a front portion thereof, an air outlet communicating with the recess, said dust collecting recess having an upward opening, a handle,

a dust case having an upward opening and an air-permeable filter wall formed as at least a portion of its structural wall, the dust case being removably fitted within the dust collecting recess,

a partitioning member having a suction opening and removably fitted over the opening of the dust case to cover the opening,

a closure pivoted to the main body for opening and closing the opening of the dust collecting recess except the suction opening of the partitioning member,

a fan motor positioned in the main body for drawing in outside air through the suction opening and discharging the air from the air outlet at least through the filter wall,

means for supplying electric power to the fan motor,

said partitioning member comprising a base plate removably fitted over the upward opening of the dust case for covering the opening and for holding a thin filter between the base plate and the dust case, and the base plate having the suction opening and ribs extending longitudinally of the vacuum cleaner and downwardly from its reverse side to substantially an inside surface of the dust case for contacting and pushing the thin filter into the dust case.

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**4,745,655**

## AIR-POWERED VACUUM-PRODUCING APPARATUS

**Emil R. Johnson, 375 Sumpter Rd., Belleville, Mich. 48111**

**Filed Mar. 18, 1987, Ser. No. 27,577**

**Int. Cl.⁴ A47L** *5/18*

**U.S. Cl. 15—409** **1 Claim**

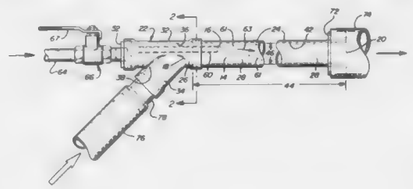
1. An improved vacuum-producing apparatus of the type powered by a stream of pressurized gaseous fluid and including a body having a chamber, a first inlet for allowing said stream of pressurized fluid to flow into said chamber, a discharge outlet for allowing said fluid to flow out of said chamber, and a second inlet in fluid communication with said chamber and arranged with respect to said first inlet and said outlet to enable a vacuum to be produced at said second inlet when said stream of pressurized fluid is flowing in said chamber, the improvement comprising in combination:

said second inlet being located relative to said first inlet and said outlet such that when said stream of pressurized fluid flows into said chamber, said stream is flowing generally away from said second inlet,

said body having first and second connected body portions respectively having first and second interconnected substantially cylindrical chamber portions arranged along a common longitudinal axis which form said chamber, said first body portion including said second inlet, said second body portion including said outlet, and said first inlet opening into said second chamber portion,

the average size of the chamber in cross-section transverse to the direction of the flow of pressurized fluid, the size of said outlet and the size of said second inlet each being at least three times larger in area than the size of said first inlet, and said second chamber portion having an average length which is at least about ten times its average width,

said first body portion including first and second openings at opposite ends of the first chamber portion, and a hollow



segment provided with a substantially cylindrical bore that is arranged at an angle to and intersects the first substantially cylindrical chamber portion, said second opening being in direct fluid communication with said second chamber portion, and said bore having a first end which is spaced from the intersection of the bore and the first chamber and which constitutes said second inlet, and

the apparatus further including a bushing sealingly engaged in the first opening of said first body portion, and conduit means disposed at least partially within said chamber for providing said pressurized fluid through said bushing to said first inlet,

said conduit means including an elongated hollow member having first and second ends and an average inner diameter which is at least five times smaller in area than said average size of said chamber, said hollow member being supported at the first end thereof by said bushing and extending through said first chamber portion and into said second chamber portion such that the second end thereof forms said first inlet, with the hollow member being offset from the common longitudinal axis of the first and second chamber portions in a direction which provides greater clearance for matter entering said first chamber portion through said bore.

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**4,745,656**

## REFRIGERATOR CABINET DOOR HANDLE

**Johnny R. Revlett, Henderson, Ky., assignor to Whirlpool Corporation, Benton Harbor, Mich.**

**Filed Dec. 10, 1986, Ser. No. 940,117**

**Int. Cl.⁴ E05B** *1/00;* **A47B** *95/02;* **B65D** *25/28*

**U.S. Cl. 16—110 R** **15 Claims**

1. A refrigeration apparatus door handle comprising:

an elongated contoured base member of cast construction defining a front face and having a longitudinal channel opening through said front face;



first securing means for securing said member to a door of a refrigerator apparatus;

an elongated insert for covering said channel;

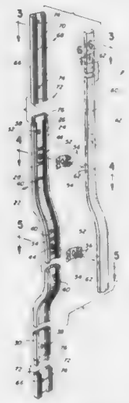
clip means;

second securing means for securing said clip means within said longitudinal channel; and

third securing means for flexibly securing said insert to said clip means in a snap-fit manner as the sole securing means to retain said insert in association with said elongated member.

14. A refrigeration apparatus door handle comprising:

an elongated base member defining a front face and having a longitudinal channel opening through said front face, said channel including opposed sidewalls;



first securing means for securing said member to a door of a refrigerator apparatus;

an elongated insert for covering said channel, said insert including a plurality of enlarged edge portions;

a plurality of clips, each clip having opposed lateral edges; and

second means for securing said clips within said longitudinal channel and defining a spacing between said lateral edges and said channel side walls less than the size of said enlarged edge portions of said inserts,

wherein the lateral edges of said clips interlock with the enlarged edge portions of said insert and said channel side walls to positively retain said insert within said channel.

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**4,745,657**

## HINGED SUPPORT BRACKET ASSEMBLY FOR A DRAIN TROUGH

**Lloyd H. Faye, 8821 Elm Rd., Richmond, Va. 23235**

**Filed Oct. 14, 1986, Ser. No. 917,890**

**Int. Cl.⁴ E05D** *5/06;* **E04D** *13/00, 13/06*

**U.S. Cl. 16—226** **2 Claims**

1. A hinged support bracket assembly for a drain trough comprising:

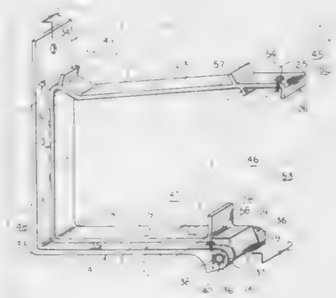
(a) a monolithic harness member comprised of a flat rear panel having uppermost and lowermost extremities, a bottom panel which emerges perpendicularly from the lowermost extremity of said rear panel and terminates in a front extremity, having a cylindrical channel, and an overhead panel emergent from the uppermost extremity of said rear panel and disposed directly above said bottom panel, said rear, overhead, and bottom panels being of substantially identical width,

(b) a monolithic bracket member comprised of a flat vertical panel and a horizontal panel which emerges perpendicularly from the lowermost extremity of said vertical panel and terminates in a bifurcated forward extremity having two axially aligned circular cylindrical channels which embrace the front extremity of the bottom panel in axial alignment with the cylindrical channel thereof, said vertical and horizontal panels being of substantially identical width.

(c) said harness member being narrower than said bracket member and adapted to reside in nested relationship above said bracket member,

(d) hinge means which join the front extremity of said bottom panel with the forward extremity of said horizontal panel in a manner to enable said harness member to rotate in at least 180 degrees of circular arc, said hinge means being comprised of the circular cylindrical channels associated with the joined extremities, and a cylindrical shaft which insertively engages said channels, and

(e) stopping means which limit the extent of rotative movement of said harness member.



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**4,745,658**

## POULTRY HOLDING MECHANISM WITH IMPROVED WING HOOKS

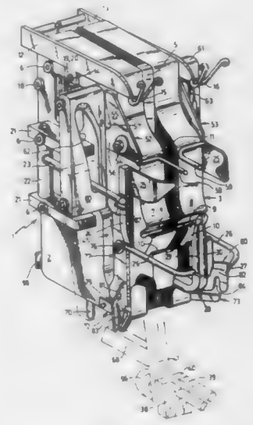
**Hershey Lerner, Aurora, Ohio, assignor to Automated Packaging Systems, Inc., Twinsburg, Ohio**

**Continuation of Ser. No. 572,455, Jan. 20, 1984, Pat. No. 4,575,901. This application Jan. 31, 1986, Ser. No. 817,421**

**The portion of the term of this patent subsequent to Mar. 18, 2003, has been disclaimed.**

**Int. Cl.⁴ A22C** *21/00*

**U.S. Cl. 17—11** **2 Claims**



1. A mechanism for holding slaughtered birds in a poultry cutting machine, comprising:

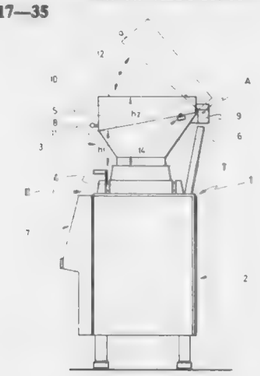
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a support member having a support face which engages and supports a bird while the bird is being cut into pieces;
means for holding the bird at a position where it lies against said support member;
wing holding means comprising a pair of movable wing hooks and a pair of lock members, said wing hooks and lock members being supported for relative movement from an open position at which said wing hooks and locking members are spaced apart to a closed position at which a wing of a bird is held between one of said wing hooks and an associated locking member; and
means for moving the wing hooks and the locking members between their open and closed positions.

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**4,745,659**
**MACHINE FOR FILLING RECEPTACLES OR SAUSAGE SKINS WITH SAUSAGE MEAT**
**Franz Abt, Schemmerhofen; Manfred Kern, Ummendorf; Robert Klingele, Ringschnait, and Georg Staudenrausch, Rissegg, all of Fed. Rep. of Germany, assignors to Albert Handtmann Maschinenfabrick GmbH & Co. KG., Biberach a.d. Rib, Fed. Rep. of Germany**
**Filed Nov. 26, 1986, Ser. No. 935,349**
**Claims priority, application Fed. Rep. of Germany, Jan. 17, 1986, 3601313**
**Int. Cl.[4] A22C** *25/00*
**U.S. Cl. 17—35** **10 Claims**

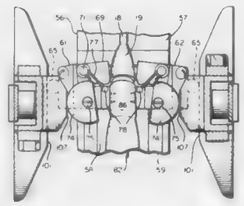


1. In a machine for stuffing casings with meat comprising a housing having means for discharging meat into the casings, a storage receptacle having side walls and mounted on said housing for holding a supply of the meat, and transport means for receiving the meat from the storage receptacle and transporting it to said discharge means, the improvement wherein the lower portions of the side walls of the storage receptacle are fixed with respect to the housing with at least a part of the upper portions of side walls being pivotally mounted with respect to the lower portions so that said part can be swung away to provide access to the interior of the storage receptacle at a level lower than the top of the side walls of said receptacle.

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**4,745,660**
**UNIVERSAL SHRIMP PEELING MACHINE**
**Edmund D. Betts, Libertyville; Jon T. Keith, Wheeling, and James E. Pershinske, Carpentersville, all of Ill., assignors to Gregor Jonsson Associates, Inc., Highland Park, Ill.**
**Filed Jul. 20, 1987, Ser. No. 75,087**
**Int. Cl.[4] A22C** *29/02*
**U.S. Cl. 17—73** **7 Claims**

1. A machine for peeling shrimp and having a loading station, a cutting station, a deveining station, a meat removal station and a shell removal station, comprising moving means, a plurality of clamp assemblies mounted on and carried by said moving means, each of said clamp assemblies including a body clamp, a tail clamp and a disjointing clamp, said body and tail clamps being operable respectively to clamp the body and the tail of a shrimp when engaged and said disjointing clamp being operable when engaged to break a joint between two shell parts of a shrimp, first cam means mounted adjacent said moving means for engaging said disjointing clamp, said first cam means being movably mounted and movable between an active position where it engages said disjointing clamp and an inactive position where it disengages said disjointing clamp, a second cam means mounted adjacent said moving means adjacent said meat removal station, said second cam means having an active position where it engages said tail clamp and an inactive position where it disengages said tail clamp, and movable connecting means between said first and second cam means for simultaneously moving said first and second cam means between said active and said inactive positions.



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**4,745,661**
**CORD ATTACHMENT FOR LOCATION OF CIGARETTE LIGHTER**
**Victor E. Wainscott, St. Petersburg, Fla., assignor to Creative Marketing, Inc., St. Petersburg, Fla.**
**Filed Apr. 6, 1987, Ser. No. 34,738**
**Int. Cl.[4] A45F** *5/02*
**U.S. Cl. 24—3 M** **6 Claims**



1. A device for locating and retrieving a cigarette lighter comprising a cord or chain having at one end of said cord or chain a first fastening means for fastening said cord or chain to the bottom of said cigarette lighter and having at the other end of said cord or chain a second fastening means for fastening said cord or chain to a portion of a lady's purse or to an article of a man's clothing, in which said cord or chain is an elastic cord, and in which said second fastening means is a clip which comprises (a) two partial rings swivelly held together at a top portion of the two partial rings said partial rings overlapping each other so as to form a complete ring when in a closed position, said partial rings each having a lever arm which serve to push the bottom portions of the two rings apart from each other when pressure is exerted to push the lever arms toward each other so that a looped object when inserted therebetween will be caught in the reassembled ring when the said pressure is released and the partial rings returned to a closed position, (b) a spring means positioned at the swivelly held portions of said two partial rings whereby pressure is exerted to press said partial rings against each other; and (c) two lever arms, one of which is attached to one of said partial rings and the other attached to the other of said partial rings whereby pressure exerted to press said lever arms toward each other will cause the bottom portion of said partial rings to separate from each other.



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**4,745,662**
**EASILY ASSEMBLED CLIP**
**Shih-Ho Chang, No. 2-12, Chang-Lu Rd., Changhua, Taiwan**
**Filed Jun. 5, 1987, Ser. No. 58,465**
**Int. Cl.[4] B42F** *1/00*
**U.S. Cl. 24—67.7** **3 Claims**



1. An improved clip of the type having a first clamping member and a second clamping member each of which has a clamping portion and two lugs each having a hole, a pivot pin disposed through each of said holes of said lugs of said first and second clamping members for interconnecting pivotally said lugs of said first and second clamping members, and means for biasing said clamping portions of said first and second clamping members to abut against each other for clamping papers therebetween, wherein one of said lugs of said first clamping member is positioned adjacent to one of said lugs of said second clamping member, and the other of said lugs of said first clamping member is positioned adjacent to the other of said lugs of said second clamping member, so that two pairs of adjacent lugs are formed; characterized by an end of said pivot pin including a pair of annular flanges spaced axially from each other at a distance slightly greater than the total thickness of one pair of said adjacent lugs, the diameter of one said flange remoted from said end of said pivot pin being smaller than the diameter of each of said holes of said lugs of said first and second clamping members for the insertion of said pivot pin through said holes of said lugs, whereby, when said pivot pin is forced through each of said holes of said lugs while permitting said one pair of said adjacent lugs to be positioned closely between said flanges, said one pair of said adjacent lugs are biased by said biasing means to move in opposite directions and in turn to clamp tightly said pivot pin between said flanges, thereby preventing said pivot pin from movement off the clip, said pivot pin including a plurality of equally spaced annular flanges projecting therefrom between said two pairs of said adjacent lugs for positioning said biasing means on said pivot pin.

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**4,745,663**
**FASTENING DEVICE FOR A ROPE**
**Harold J. Crowson, 7660 Manorwood Dr., Boise, Id. 83704**
**Filed Aug. 3, 1987, Ser. No. 80,609**
**Int. Cl.[4] F16G** *11/00*
**U.S. Cl. 24—131 R** **4 Claims**

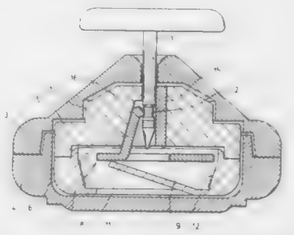
1. Fastening device for a rope comprising a body having a shank;
a curved portion defining a hook at one immediate end of said shank;
a curved portion defining an open loop at the opposing immediate end of said shank for receiving a rope therein, the openings of said hook and loop facing one another;
the terminal end of said loop bent to define a double leg



including a first leg and a second leg with a slot therebetween for receiving a rope, said legs being parallel to one another and spaced laterally from and perpendicular to said shank; and
terminal end of said second leg bent to define a single third leg, said third leg also perpendicular to and spaced laterally from said shank.

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**4,745,664**
**LOCK FOR SECURING A MARK ESPECIALLY ONTO A TEXTILE ARTICLE**
**Leif Damvig, Tåstrup, Denmark, assignor to Antonson Security Denmark A/S, Roskilde, Denmark**
**Filed Oct. 17, 1986, Ser. No. 920,236**
**Int. Cl.[4] A44B** *9/10*
**U.S. Cl. 24—155 R** **7 Claims**

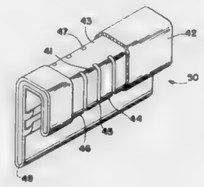


1. A lock preferably for an alarm for marking articles for sale, said lock comprising first and second members automatically interengaging when one member is inserted in a cavity in the other member, whereby said first member comprises a rod-shaped body, the inserting end of which is completely or partially pointed, a third member loosely inserted in the cavity in the second member, said third member comprising one or more inner surfaces capable of being tangent to and cooperating with corresponding inner surfaces on the second member, these surfaces further being inclined upwards and inwards when seen in a vertical sectional view through the lock with the inlet of the cavity facing upwards, whereby the cavity is pointed upwards towards the inlet of the cavity and whereby a spring with an upward elastic force is situated in the cavity below the loosely positioned third member, said second member being of a non-magnetizable material and said third member being of a magnetizable material to be attracted by a magnet and defining at least one projection for engaging the rod-shaped body, said projection being formed as a one piece, integral part of the third member, the second member comprising an upper non-magnetic portion and a lower non-magnetic portion, the lower portion being cast with an upwardly inclined flap forming the spring below the loosely positioned third member.

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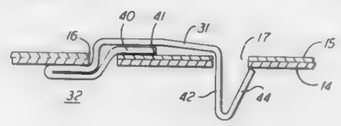
4,745,665
**ELONGATED CLIPS HAVING A METAL CORE AND METAL CORE FOR SUCH CLIPS**
Henry K. Hilsenbeck, 17813 Suncliff Pl., Strongsville, Ohio 44136
Filed Mar. 30, 1987, Ser. No. 32,758
Int. Cl.[4] E04F *19/02;* E06B *7/16*
U.S. Cl. 24—295 12 Claims



1. A core for making an elongate, flexible clip having a plastic covering comprising:
a length of a flexible metal ribbon having two opposed, outside lengthwise edges, said ribbon containing a plurality of slots lying transverse to said length, each of said slots not extending into, a longitudinally continuous portion of said ribbon, the slots along one of said edges being longitudinally offset from the slots along the other of said edges, wherein said slots are formed by cutting slits in said ribbon and elongating said ribbon along said continuous portion to widen said slits into said slots.

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4,745,666
**SPRING CLIP FOR SHEET METAL CONSTRUCTION**
Wesley T. Murphy, Auburn, N.Y., assignor to Etco Building Systems, Inc., Auburn, N.Y.
Filed Jul. 17, 1987, Ser. No. 76,472
Int. Cl.[4] F16B *5/06*
U.S. Cl. 24—453 5 Claims



1. An improved metal clip for joining together a pair of flat members which have respective pairs of slots that are aligned in registry with one another defining two sets of registered slots, the clip having a generally omega-shaped configuration and comprising a main elongated straight portion, an insertion arm at its one end to be inserted through one set of the slots and a Vee spring arm at the other end to be inserted through the other set of the slots; the Vee spring arm having a leg extending perpendicular to said main portion and an anchor leg extending back from an end of said leg at an acute angle, and said insertion arm being in the form of a flattened bight including an offset extending perpendicular from said one end of the main portion, an insertion bight portion that extends from said offset and parallel to said main portion to a bend and thence back to said offset, a diagonal portion extending from said insertion bight portion to said main portion, and a stub extending from said diagonal portion alongside said main portion and having a free end disposed approximately midway from the one end to the other end of the main portion.

4,745,667
**CLOSURE DEVICE AND BUCKLE**
Robert R. Conte, Cranston, R.I., assignor to Victoria Creations, Inc., Warwick, R.I.
Filed Jul. 20, 1987, Ser. No. 76,545
Int. Cl.[4] A44B *17/00*
U.S. Cl. 24—615 10 Claims



1. A closure device comprising: a female member having front and rear ends and comprising spaced top and bottom walls and a pair of spaced sidewalls extending therebetween, said female member being open at the front end thereof and including a substantially rectangular aperture having a front edge in said top wall; and a male member having front and rear ends and comprising a bottom plate portion dimensioned to be slidably received on said bottom wall, a nose portion which extends upwardly from said bottom plate portion to define the front end of said male member and then rearwardly in upwardly spaced relation to said bottom plate portion and a resiliently depressible button portion comprising a front wall portion which extends upwardly from said nose portion, a top plate portion which extends rearwardly from said front wall portion in further upwardly spaced relation to said bottom plate portion, said top plate portion being substantially disposed in a plane which is spaced upwardly from the rearwardly extending portion of said nose portion, and a rear wall portion which extends downwardly towards said bottom plate portion from said top plate portion, said male member being receivable in said female member by inserting the front end of said male member through the open front end of said female member and being releasably securable in a locked position therein wherein said bottom plate portion is received on said bottom wall and said button portion is received in said aperture with the top plate portion above the level of the adjacent portion of said top wall and with the rear wall portion of said button portion engaging the front edge of said aperture to prevent the inadvertent removal of said male member from said female member, said female member further comprising a pair of spaced alignment tabs in the open end thereof, said tabs extending inwardly and together a distance along said top wall portion from opposite sides of said female member and being positioned for receiving said button portion therebetween for guiding said button portion into said aperture when said male member is inserted into said female member.

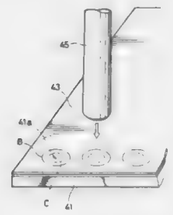
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4,745,668
**METHOD OF MANUFACTURING AN ELECTRIC DOUBLE LAYER CAPACITOR**
Masanori Endo; Yoshinori Mori, and Michinobu Maesaka, all of Nagaokakyo, Japan, assignors to Murata Manufacturing Co., Ltd., Japan
Filed Oct. 15, 1986, Ser. No. 919,048
Claims priority, application Japan, Oct. 18, 1985, 60-234326
Int. Cl.[4] H01G *13/00*
U.S. Cl. 29—25.42 3 Claims

1. A method of manufacturing an electric double layer capacitor comprising a pair of insulating gaskets having through-holes, said gaskets being superposed and separated by a separator, and polarizable electrodes received in said through-holes of said gaskets, said method comprising the steps of:
preparing an insulating gasket having a through-hole;



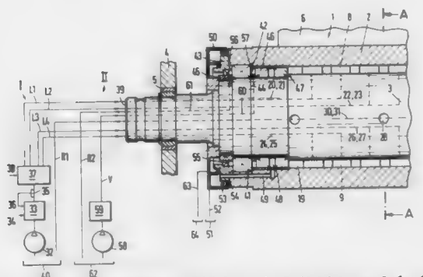
applying adhesive to a surface region of said gasket enclosing said through-hole;
adhering a separator sheet, to said surface region of said gasket having said adhesive applied thereto, said adhering being through use of said adhesive;
cutting said separator sheet, along a portion outside the inner peripheral edge of said region applied with said adhesive



and enclosing said through-hole, thereby to form a separator adhered to the surface of said gasket;
peeling said separator sheet from said gasket and thereby leaving said separator adhered to said gasket; and
attaching a second insulating gasket having a through-hole, to said first-mentioned insulating gasket and to said separator, said two through-holes being located at corresponding positions on opposite sides of said separator.

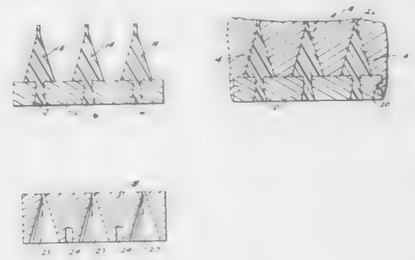
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4,745,669
**ROLL FOR USE IN CALENDERS AND THE LIKE**
Josef Pav; Richard Rauf, and Reinhard Wenzel, all of Krefeld, Fed. Rep. of Germany, assignors to Kleinewefers GmbH, Krefeld, Fed. Rep. of Germany
Filed Jul. 18, 1986, Ser. No. 888,115
Claims priority, application Fed. Rep. of Germany, Jul. 23, 1985, 3526283
Int. Cl.[4] B21B *13/02, 31/32*
U.S. Cl. 29—116 R 20 Claims



1. A pressure applying roll for use in calenders and the like, comprising a carrier; a flexible rotary cylindrical shell spacedly surrounding said carrier; hydraulic displacing means interposed between said carrier and said shell and operable to displace selected portions of said shell relative to said, carrier; a first fluid containing source of heated hydraulic fluid; first supplying means for supplying fluid from said source to said displacing means; an antifriction bearing interposed in said shell between said carrier and said displacing means; a second fluid containing source of lubricant; second supplying means for supplying second from said lubricant source to said bearing; and sealing means interposed between said carrier and said shell intermediate said bearing and said displacing means to prevent or to reduce interaction between the lubricant and the fluid.

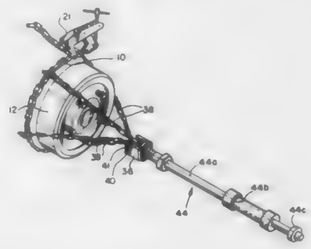
4,745,670
**METHOD FOR MAKING CHEMICAL LASER NOZZLE ARRAYS**
Donald H. Morris, Agoura, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.
Filed Oct. 28, 1980, Ser. No. 201,656
Int. Cl.[4] B23P *15/16;* C25D *1/08*
U.S. Cl. 29—157 C 1 Claim



1. A method of forming supersonic nozzle arrays for lasers or chemical lasers, comprising the steps of: molding a plurality of mandrels in the shape of a nozzle opening, mounting the mandrels on a base plate with the ends of the mandrels corresponding to the throat end of the nozzles extending away from the plate, and electrodepositing metal on the plate to a structural depth greater than the length of the supersonic nozzles being formed, removing excess deposited material beyond said length, and removing said mandrels to provide the nozzle openings.

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4,745,671
**BRAKE DRUM REMOVAL DEVICE**
Arthur W. Shannon, 3700 Darby Rd., Bryn Mawr, Pa. 19010
Filed Mar. 9, 1987, Ser. No. 23,645
Int. Cl.[4] B25B *19/00*
U.S. Cl. 29—254 14 Claims



1. Article removal apparatus comprising:
a flexible belt adapted to extend around a peripheral surface of an article and having a plurality of bearing members adapted to engage a surface of said article transverse to said peripheral surface;
means for tightening said belt on an article;
a fastening block;
a plurality of flexible members connected between said fastening block and plurality of spaced points on said belt;
and a slide hammer having its slide rod attached to said fastening block.

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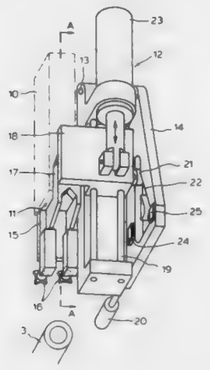


4,745,672

## METHOD OF MANUFACTURING CONTACT LENSES

Michael J. Sealey, "Windover", Providence Hill, Bursledon, and Albert H. Morland, 274 Swanwick Ln. Lower Swanwick, both of Southampton, Hants, United Kingdom

PCT No. PCT/GB83/00137, § 371 Date Jan. 11, 1984, § 102(e) Date Jan. 11, 1984, PCT Pub. No. WO83/03993, PCT Pub. Date Nov. 24, 1983
Continuation of Ser. No. 589,061, Jan. 11, 1984. This PCT application May 13, 1983, Ser. No. 24,927
Claims priority, application United Kingdom, May 14, 1982, 8214045
Int. Cl.[4] B23P *13/04*
U.S. Cl. 29—558 21 Claims



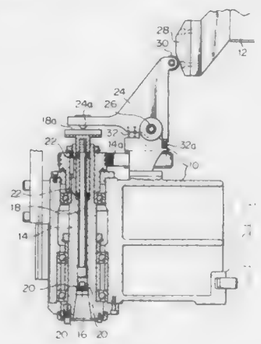
1. A method of manufacturing contact lenses comprising:
enclosing a first lens blank which is mounted on a first support and a second lens blank which is mounted on a second support in a first tubular protective magazine,
unloading at a first station said first mounted lens blank from said first tubular protective magazine,
positioning said unloaded first mounted lens blank at a predetermined location with respect to a collet of a first machine tool, said positioning including contacting a surface of said first support with a sensing means which senses the position of said first support relative to said collet, thereby sensing the position of said first support relative to said collet,
feeding said first support with said first blank lens mounted thereon from said predetermined location into said collet,
machining said first lens blank with said first machine tool, thereby forming a partly-worked first lens blank,
removing said partly-worked first lens blank from said collet,
enclosing said removed partly-worked first lens blank in a second tubular protective magazine,
after said unloading step, unloading said second mounted lens blank from said first tubular protective magazine, and machining said second mounted lens blank with said first machine tool, thereby forming a partly-worked second lens blank,
after said enclosing said removed partly-worked first lens blank step, enclosing said partly-worked second lens blank in said second tubular protective magazine, and
thereafter, transferring said second tubular protective magazine to a second machine tool and unloading said first and second partly-worked lens blanks from said second tubular protective magazine into a collet of said second machine tool and performing with said second machine tool a machining operation on said first and second lens blanks, and unloading said first and second lens blanks from said collet of said second machine tool after being machined by said second machine tool.

4,745,673

## SPINDLE HEAD UNIT OF A MACHINING CENTER

Hiroshi Araki; Toshiyuki Aso, and Yoshihisa Akiyama, all of Hino, Japan, assignors to Fanuc Ltd., Yamanashi, Japan

Continuation of Ser. No. 709,949, Feb. 27, 1985. This application Aug. 12, 1987, Ser. No. 85,258
Claims priority, application Japan, Jun. 29, 1983, 58-116046
Int. Cl.[4] B23C *5/26;* B23Q *3/157*
U.S. Cl. 29—56.8 3 Claims



1. In a spindle head unit of a machining center of the type having a tool magazine for storing tools therein; a spindle head supported for vertical movement along a column of the machining center, a spindle rotatably mounted in the spindle head and having a tool-receiving end for receiving therein individual tools stored in the tool magazine, a draw-bar disposed for axial movement within the spindle between a tool-engaging position and a tool-disengaging position, the draw-bar having one end engagable with a tool received in the tool-receiving end of the spindle when the draw-bar is at its tool-engaging position, the draw-bar having another end extending axially beyond the spindle, elastic pressure means continously urging the draw-bar towards its tool-engaging position, a draw-bar actuating cam member fixed to the column and having an actuating surface, and a bell-crank lever mounted at a corner thereof for pivotal movement about a pivot mounted on the spindle head, the bell-crank having a cam member-engaging arm and a draw-bar-depressing arm, an end of the cam-member-engaging arm of the bell-crank lever being disposed for engagement with the cam member actuating surface upon upward movement of the spindle head so as to actuate the bell-crank lever to move about its pivot so that the draw-bar-depressing arm of the bell-crank lever depresses the draw-bar toward the tool-disengaging position thereof, the improvement comprising:
an upper end surface member provided upon the other end of the drawbar;
the drawbar-depressing-arm of the bell-crank lever being disposed above the upper end surface member of the draw-bar;
a spherical depressing member directly attached at an under surface of the draw-bar-depressing arm of the bell-crank lever, for point contact with the upper surface member of the draw-bar so as to depress the draw-bar in response to arc movement of the draw-bar-depressing arm of the bell-crank lever by the cam member actuating surface;
a spring member arranged between the spindle head and the bell-crank lever adjacent the pivot thereof for urging the bell-crank lever in a direction about the pivot thereof to separate the spherical depressing member form the axially extended draw-bar end so as to hold apart the draw-bar-depressing arm of the bell-crank lever from draw-bar while the bell-crank cam member-engaging end is disengaged from the cam member actuating surface; and
an adjustable limiting member disposed between the spindle head and the bell-crank lever ajdacent the pivot thereof, for limiting excessive pivoting of the bell-crank lever under urging of the spring member when the bell-crank cam-engaging end is disengaged from the cama member actuating surface.

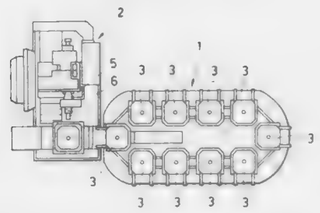


4,745,674

## TOOL HOLDER IN MACHINING CENTER

Hitoshi Abe, and Akira Kobayashi, both of Utsunomiya, Japan, assignors to Kyoritsu Seiki Corporation, Tochigi, Japan

Filed Jul. 23, 1985, Ser. No. 757,978
Claims priority, application Japan, Jul. 28, 1984, 59-158336
Int. Cl.[4] B23C *5/26;* B23Q *3/155*
U.S. Cl. 29—568 5 Claims



1. A tool holder for use in machining center, said tool holder having a cylindrical outer surface, a conical receiving base at its nose end and a base end portion at its opposite end, a tool having a conical shaft for engagement in said conical receiving base, a plurality of spaced guide holes in the circumferential wall of said conical receiving base, each of said holes having a locking ball therein for movement therethrough, the length of said holes being shorter then the diameter of said locking balls so that said locking balls project from said holes inwardly into said conical receiving base or outwardly from the opposite end of said holes and the outer cylindrical wall of said tool holder, a piston on said cylindrical wall and slidable thereon, means for urging said piston toward the end of said base end portion of said tool holder for locking said tool in said base, a pressure chamber between the base end of said tool holder and said piston, a high-pressure air source connected to said chamber and to the inner end of said conical receiving base and a directional control valve in said air source connection to said chamber, said piston having a plurality of locking ball receiving openings for receiving said locking balls in said holes in said conical receiving base when said piston is advanced by air pressure in said pressure chamber toward said nose end of said tool holder for unlocking and removing said tool from said base, said conical shaft of said tool having a recess for receiving said locking balls to lock said tool in said tool holder when said conical shaft of said tool is in said conical receiving base, said recess is aligned with said holes and said piston is urged by said urging means toward said end of said base end portion of said tool holder, said tool being unlocked for removal when said high pressure air from said air source is connected by said directional control valve to said air pressure chamber between said base end of said tool and said piston, said high pressure air connected to said inner end of said conical receiving base by said direction control valve removing any chips and dust deposited in said inner end of said base.

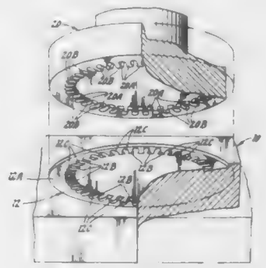
4,745,675

## METHOD OF MANUFACTURING LAMINATIONS FOR ELECTRICAL APPARATUS

Stephen W. Marks, Washington, Mich., and Theodore G. Seeger, Middletown, Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Mar. 25, 1983, Ser. No. 478,658
Int. Cl.[4] H02K *15/02*
U.S. Cl. 29—596 3 Claims

1. A method of manufacturing a lamination for electrical apparatus having a plurality of radially extending alternate slots and teeth and an annular yoke portion, the steps comprising, placing wire of magnetic material into a die cavity that has a plurality of radially extending grooves communicating with an annular groove such that loops of wire are positioned in the radially extending grooves and at least one circular turn of



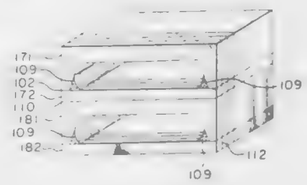
wire is placed in the annular groove, the radially extending grooves having a shape corresponding to the teeth of a lamination and the annular groove corresponding to the yoke portion of a lamination, and then deforming the wire to the shape of the die cavity.

4,745,676

## METHOD FOR MANUFACTURING A MAGNET HEAD

Tadashi Hasegawa, Koriyama, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 7, 1986, Ser. No. 827,266
Claims priority, application Japan, Feb. 27, 1985, 60-36274
Int. Cl.[4] G11B *5/42*
U.S. Cl. 29—603 1 Claim



1. A method for manufacturing a magnetic head of a construction, wherein first and second magnetic cores each having a magnetic gap are joined with first and second non-magnetic structures, the arrangement of said cores in said head being such that the first magnetic core is in contact with the second non-magnetic structure, and that the second magnetic core is in contact with the first non-magnetic structure, said method for manufacture comprising the first step of producing a core body by forming a closed magnetic member and forming a closed non-magnetic member and joining the two closed members together; the second step of placing said core body in an opening formed in a carrier plate without the use of adhesive material, followed by polishing both sides of said core body at the same time while said core body is held in said carrier plate; and a third step of cutting the core body to form two constituent elements each having a U-shaped magnetic member joined to a U-shaped non-magnetic member.

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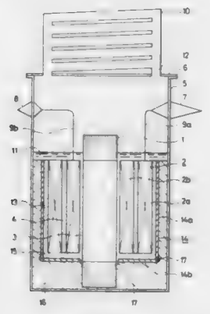


**4,745,677**

## METHOD OF MAKING AN ELECTROMAGNETIC INDUCTION APPARATUS

**Masaru Shichi, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 659,137, Oct. 9, 1984, abandoned, which is a division of Ser. No. 475,653, Mar. 15, 1983, abandoned. This application Jun. 6, 1986, Ser. No. 873,142**
**Claims priority, application Japan, Mar. 16, 1982, 57-43583**
**Int. Cl.⁴ H01F** *41/02, 27/10*
**U.S. Cl. 29—606** **3 Claims**



1. A method of constructing an electromagnetic induction apparatus of the type having an iron core and primary and secondary windings wound around the iron core and contained in a tank and immersed in a condensable cooling liquid, comprising;

assembling an iron core and primary and secondary windings in a manner so as to form open fluid ducts of passageways (a) between said iron core and the secondary windings, and (b) between said secondary winding and the primary winding;

constructing an insulating container surrounding the outer periphery of said primary winding and a lower portion of both said windings, so as to define the outer walls of a duct or passageway about said primary winding, and so as to form a further duct or passageway communicating with the aforementioned ducts and extending beneath said windings; said container having side walls extending in the longitudinal direction of said windings and terminating at substantially the same vertical level as said windings; placing the assembly in a tank;

injecting a resin into the spaces formed between said container and said tank, to the exterior of said windings and said container, said resin being filled to the same height as the top of said windings and top edges of said container, to define a fluid reservoir having a substantially flat bottom surface defined by said top edges of said container, said tops of said windings, and the top of said resin layer;

solidifying said resin; and

filling said tank with a condensable cooling liquid to a level above said windings and the upper ends of said ducts, said condensable cooling liquid being in direct contact with said core in the passageway or duct between said core and said secondary winding.

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**4,745,678**

## APPARATUS FOR BELLING AND EXPANDING COILS

**Kenneth P. Gray, Syracuse, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.**

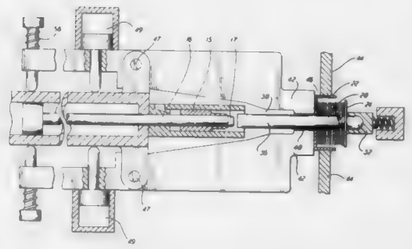
**Filed Dec. 22, 1986, Ser. No. 944,489**
**Int. Cl.⁴ B23P** *15/26*
**U.S. Cl. 29—727** **3 Claims**

1. An apparatus for belling tubes and then expanding the tubes in tension of a plate fin heat exchanger having a plurality of apertured plate fins parallelly spaced between two apertured tube sheets and a plurality of hairpin tubes extending through the apertures comprising:

a gripper means for gripping an open end of the hairpin tube;

a beller means for belling said open end of the hairpin tube; said beller means slidable along a support rod and said support rod movably positioned within said gripper means;

an expander means attached to an end of said support rod for expanding the tube: and



a clamp means for clamping a tube sheet proximate the open end of the tube whereby the gripper means grip the tube to prevent the tube from moving during a belling operation and whereby said clamp means clamps said tube sheet proximate the open end of the tube to allow the belled end of the tube to move axially against said tube sheet and to restrain the tube from moving during expansion of the tube in tension expansion.

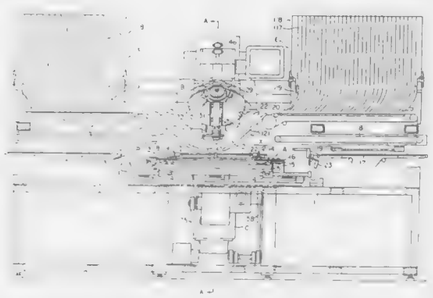
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**4,745,679**

## AUTOMATIC INSERTION MACHINE FOR ELECTRONIC COMPONENTS

**Keizo Shinano, Kodaira; Shinichi Ishizuka, Shinjuku, and Yoshinobu Inoue, Hachioji, all of Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan**

**PCT No. PCT/JP85/00504, § 371 Date Apr. 24, 1986, § 102(e) Date Apr. 24, 1986, PCT Pub. No. WO86/01971, PCT Pub. Date Mar. 27, 1986**
**PCT Filed Sep. 9, 1985, Ser. No. 858,443**
**Claims priority, application Japan, Sep. 12, 1984, 59-189744; Sep. 12, 1984, 59-137206[U]; Sep. 13, 1984, 59-139012[U]**
**Int. Cl.⁴ B23P** *19/04*
**U.S. Cl. 29—741** **11 Claims**



3. An automatic insertion machine for electronic components comprising:

a printed-circuit board traverse device for supporting a printed-circuit board and traversing it so that an inserting hole in a printed-circuit board for inserting a lead of an electronic component is placed in the single fixed position;

a turret-like insertion spindle column located above the traverse device for holding a plurality of insertion spindles each having a different insertion chuck and indexing rotatively a desired insertion spindle to the single fixed position in accordance with a selected electronic component; and

a taped component holding and feeding device including a plurality of taped electronic component feeders located below and behind the insertion spindle column and arranged on a mounting plate movable left and right, each of the taped electronic component feeders capable of holding many taped electronic components, being optionally selected, indexed to a fixed position corresponding to the single fixed position, and supplying the electronic components to the indexed insertion spindle.



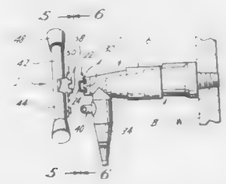
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**4,745,680**

## INSTALLATION TOOL FOR ATTACHING ELECTRICAL ELBOW CONNECTORS

**Danny R. Williams, and Carl J. Wentzel, both of Houston, Tex., assignors to Houston Industries Incorporated, Houston, Tex.**

**Filed Nov. 21, 1986, Ser. No. 933,571**
**Int. Cl.⁴ B25B** *27/02;* **H01R** *43/00*
**U.S. Cl. 29—747** **14 Claims**



1. An installation tool for attaching an elbow electrical connector, which includes an installation bracket, to a conductive bushing on a piece of electrical equipment, comprising:

(a) grip means having first and second gripping surfaces;

(b) mounting means for releasably attaching said grip means to the electrical elbow connector, said mounting means comprising:

(1) means for receiving the installation bracket of the elbow electrical connector, said means for receiving comprising:

(i) a knob member extending outwardly from said gripping surfaces of said grip means; and

(ii) said knob member having a key slot formed therein for receiving the installation bracket of the elbow electrical connector;

(2) means movable through said means for receiving to selectively engage the installation bracket of the elbow electrical connector; and

(c) said mounting means being located between said gripping surfaces of said grip means.

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**4,745,681**

## CONTROLLED PIN INSERTION USING AIRFLOW SENSING AND ACTIVE FEEDBACK

**Ralph L. Hollis, Jr., Yorktown Heights, and Michael A. O'Connor, New York, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Apr. 22, 1987, Ser. No. 41,374**
**Int. Cl.⁴ H05K** *3/30;* **B23P** *19/00*
**U.S. Cl. 29—837** **15 Claims**

1. An automatic assembly system for inserting a pin in a hole in a plate, characterized by:

(a) control means (4) for positioning pin (1) laterally in the vicinity of a selected hole (2) in the plate (3), in position within the detection region (9) of the hole (2);

(b) fluid flow means (11) associated with the plate (3), to form a pressure differential creating fluid flow (7)through at least one hole in the plate (3), including said selected hole (2);

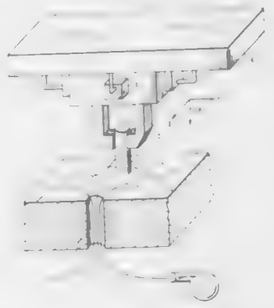
(c) fluid flow sensing means (6), associated with said control means (4) for positioning the pin (1) to sense the fluid flow (7) at the selected hole (2) and to supply force vector signals indicative of such forces;

(d) servo means, responsive to feedback from said fluid flow sensing means (6) to said control means (4), to supply information for positioning the pin (1) within the detection region of the selected hole at the insertion point (10) which is within the capture region of the selected hole (2) as defined by the composite of mechanical and virtual chamfers determined by a change of the force vector signals related to the null where lateral forces (7) of fluid flow through the selected hole (2) balance over the selected hole (2);

whereby the system provides power steering of the pin (1) to the insertion point (10) for the selected hole (2).

13. A method for pin-in-hole insertion by a robot comprising the steps of:

(a) applying airflow through at least the selected hole (2) for



insertion of a pin (1), creating a pattern of detectable airflow forces (7) within a detection region about the hole (2);

(b) moving the pin (1) by open-loop positioning to place within the detection region;

(c) sensing the airflow by airflow sensing means (6,16) closely associated with the pin (1);

(d) following the airflow-forces sensed by the airflow-sensing means (6,16) by closed-loop positioning through at least one sensing and airflow-following servo move in the (x,y) direction of changing lateral airflow force, thus moving the pin (1) toward the hole (2);

(e) repeating said sensing the airflow step (c) and said following the airflow-forces step (d) until an airflow null is sensed defining the insertion point 10 at the capture region of the hole (2); and

(f) commanding an entry move (z direction) of the pin (1) into the selected hole (2) at the insertion point (10) which is within the composite mechanical/virtual chamfer capture region of the hole (2).

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**4,745,682**

## METHOD OF CONNECTING COIL

**Tsuyoshi Hayakawa; Isato Watanabe; Satoru Yamauchi; Isao Kondo, and Junichi Aizawa, all of Tokyo, Japan, assignors to Seikosha Co,, Ltd., Tokyo, Japan**

**Filed Apr. 13, 1987, Ser. No. 37,465**
**Claims priority, application Japan, May 8, 1986, 61-105493**
**Int. Cl.⁴ H05K** *3/39*
**U.S. Cl. 29—840** **7 Claims**

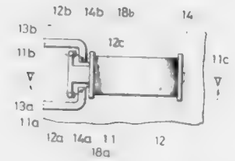
1. A method of connecting a coil consisting of windings of a lead wire said windings forming terminal portions of the coil, said method comprising the steps of:

drawing the terminal portions of the coil in such a way that they traverse a conductor to which the coil is to be con-

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nected; attaching the terminal portions to anchoring portions placed near the conductor; and




then connecting the lead wire to the conductor near the positions at which the terminal portions traverse the conductor.

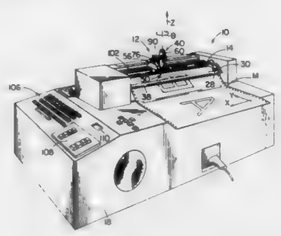
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**4,745,683**

**APPARATUS FOR PRODUCING A POUNCE PATTERN**

**Kenneth O. Wood, Ellington, Conn., assignor to Gerber Scientific Products, Inc., Manchester, Conn.**

**Filed Jun. 8, 1987, Ser. No. 59,000**
**Int. Cl.[4] B43L *13/00*; G01D *15/16***
**U.S. Cl. 33—18.1** **2 Claims**



1. An apparatus for perforating sheet material to produce a pouncing pattern for use, for example, in painting signs, said apparatus comprising:

means providing a surface for supporting sheet material;

a pouncing wheel having an axis of rotation and a plurality of angularly spaced radially extending pointed teeth, and

means for moving said pouncing wheel and the sheet material supported by said surface relative to one another so that said pouncing wheel moves along a desired path on said sheet material and rotates about said axis of rotation due to rolling engagement of its teeth with said material, said means operating to maintain said axis of wheel rotation at an acute angle to the tangent line of said path at the point on said path at which said wheel is momentarily positioned.

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**4,745,684**

**SOLDER THICKNESS MEASUREMENT METHOD AND APPARATUS**

**Kerry L. Brown, Sunland, and Robert A. Harger, Manhattan Beach, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Dec. 17, 1986, Ser. No. 944,051**
**Int. Cl.[4] G01B *5/00***
**U.S. Cl. 33—169 F** **16 Claims**

1. A solder thickness measurement apparatus comprising:

mounting means for carrying thereon an article having a solder layer thereon the thickness of which is to be measured;

a height measurement probe for bringing into contact with the top of the solder layer when it is cold;

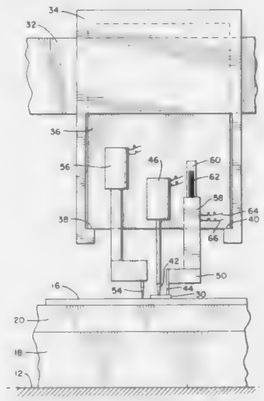
means for measuring the first position of said probe when it is in contact with the top of the cold solder layer;

means for recording the height of the top of the cold solder layer;

heating means for heating the solder sufficiently to melt the solder layer so that said probe moves substantially to a second position at the bottom of the solder layer;

means for measuring the second position of said probe substantially at the bottom of the solder layer;

means for substracting the positions of said probe one from



the other in order to determine substantially the thickness of the solder layer; and

a reference sensor probe positioned so that said reference sensor probe can contact the uncoated top surface of the article adjacent the solder on the article, said reference sensor probe being connected to correct the indicated thickness of solder as a consequence of movement of the article between the first and second measurements made by said heat measurement probe.

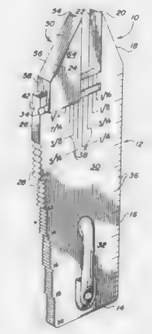
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**4,745,685**

**MOVABLE JAW MEASURING APPARATUS**

**David D. Castillo, 3808 S. 12th St., Phoenix, Ariz. 85040**

**Filed Aug. 10, 1987, Ser. No. 83,278**
**Int. Cl.[4] G01B *5/16, 3/20***
**U.S. Cl. 33—199 R** **12 Claims**



1. Movable jaw measuring apparatus for measuring nuts and bolts, comprising, in combination:

plate means, including

a relatively flat portion,

a straight edge on the relatively flat portion,

first measuring indicia along the straight edge,

a thread edge, and



thread measuring means along the thread edge for measuring the pitch of threads;

fixed jaw means secured to the plate means, including

a first inside jaw face,

a first bottom jaw edge, and

second measuring indicia adjacent to the first bottom jaw edge; and

movable jaw means movably secured to the plate means, including a second inside jaw face disposed substantially parallel to the first inside jaw face and movable along the second measuring indicia to measure elements placed between the first and second inside jaw faces.

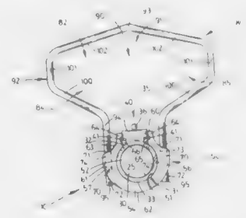
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**4,745,686**

**APPARATUS FOR IMPARTING ENHANCED DIRECTIONAL FLIGHT TO A PROJECTILE AND THE LIKE**

**John L. Willis, 1032 S. Berkeley, Turlock, Calif. 95380**

**Filed Jan. 28, 1987, Ser. No. 7,595**
**Int. Cl.[4] F41G *1/16***
**U.S. Cl. 33—254** **3 Claims**



1. Apparatus for imparting improved directional flight to a projectile and wherein the projectile is aimed and propelled at a moving target by a firearm having a barrel which mounts a vent rib, the apparatus comprising a discontinuous sleeve having an inside and outside surface, a first and second end, and an apical, basal and a thickened mid-portion, said discontinuous sleeve having formed in the apical portion a pair of horizontally disposed channels, each channel defining a substantially vertical wall, each wall being positioned in spaced substantially parallel relationship with respect to each other, said walls each having an inside surface which defines a passageway which is conformably dimensioned slidably to receive and hold the vent rib of the firearm, said inside surface of the discontinuous sleeve further defining an annular bore of uniform dimensions which is conformably adapted slidably to receive and hold the barrel of the firearm, said thickened mid-portion further having formed therein in an attitude closely adjacent to the second end a pair of parallel substantially vertically disposed conduits; and a hexagonal shaped rigid sight alignment loop having a pair of dependent legs is slidably mounted into receiving relationship with the vertically disposed conduits, the sight alignment loop defining a sight picture that permits enhanced firearm performance.

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**4,745,687**

**LEVEL INDICATION DEVICE AND METHOD FOR PROVIDING A LEVEL INDICATION OF UP TO THREE DEGREES ACCURACY**

**Whitney Wilhelmy, 1442 Leisure World, Mesa, Ariz. 85206**

**Filed May 22, 1987, Ser. No. 53,274**
**Int. Cl.[4] G01C *9/36***
**U.S. Cl. 33—348.2** **5 Claims**

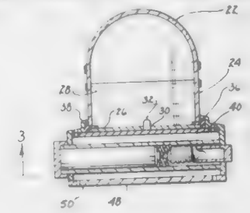
1. A level indicating device comprising:

an elongated semi-spherical shaped enclosure having a transparent portion, said transparent portion fixedly mounted upon a base portion;

light means for illuminating the interior of said enclosure; and

level means for indicating when said base portion has a known selected orientation with respect to a horizontal plane, said level means comprises:

a liquid constituting approximately one-half the volume of said enclosure located with said enclosure, said liquid comprising a means for retarding freezing; and



a pair of spaced apart circumferential parallel lines carried on said transparent portion, said parallel lines being separated by a width, such that when the surface of said liquid is located between said pair of parallel lines then the bottom surface of said base portion is within three degrees from level with respect to the horizontal plane.

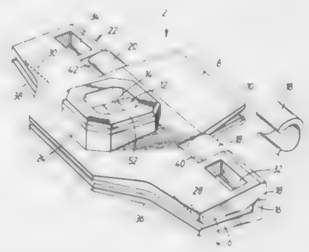
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**4,745,688**

**TRUEING DEVICE**

**David Jewers, 12 Woolmer Drive, Willesborough, Ashford, Kent, TN24 OUD, England**

**Filed Apr. 21, 1987, Ser. No. 40,808**
**Claims priority, application United Kingdom, May 8, 1986, #611268**
**Int. Cl.[4] G01C *9/28***
**U.S. Cl. 33—372** **11 Claims**

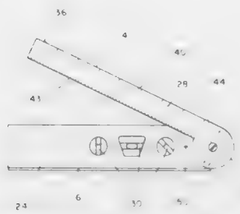


1. A trueing device for use in the hanging of wallpaper, which trueing device comprises relatively movable first and second jaws having means biasing said jaws to a closed position for gripping a longitudinal edge of the wallpaper, first and second hand grips respectively positioned one on each of the first and the second jaws, a single spirit level vial for enabling the trueing device to give a true vertical line, and abuting means against which the longitudinal edge of the wallpaper abuts in order to ensure that the trueing device is correctly positioned along the longitudinal edge of the wallpaper, the trueing device being such that it is operable with one hand for ease of insertion and removal of the trueing device on the wallpaper during hanging of the wallpaper, and the spirit level vial being a straight spirit level vial positioned to enable the spirit level vial to be read when the trueing device is gripping either longitudinal edge of the wallpaper.

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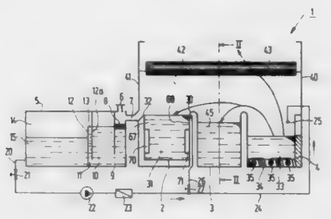
**4,745,689**
## MULTIFUNCTIONAL MEASURING AND LAYOUT TOOL
**Paul J. Hiltz, 61 Barnstable St., Hull, Mass. 02045**
**Filed Jan. 12, 1987, Ser. No. 2,210**
**Int. Cl.[4] B43L** *7/06*
**U.S. Cl. 33—451** **3 Claims**



1. A multifunctional tool comprising a body portion and an angle arm, the body portion having an arced terminal end and having a front surface and a rear surface, the angle arm having a shank portion and a circular portion, the shank portion having an end, the circular portion integral with and extending from the shank portion end lying on the same horizontal plane as that on which the shank portion lies, the circular portion having a front face and a rear face, the circular portion of the angle arm rotatably engaged to the arced terminal end of the body portion, the rear face of the circular portion faces the front surface of the arced terminal end and the front face of the circular portion includes first indicia means having a first starting point positioned on the circumference thereof, the first indicia means in degrees positioned on the circumference of the circular portion beginning at the first starting point with 0 degrees and proceeding in a clockwise direction to 90 degrees then to 0 degrees then to 90 degrees then to the beginning, the rear face of the circular portion includes second indicia means in degrees positioned on the circumference of the circular portion beginning at a second starting point, opposite to the first starting point, with 90 degrees and proceeding in a clockwise direction to 0 degrees then to 90 degrees then to 0 degrees then to the beginning, the arced terminal end of the body portion having a through aperture formed therein whereby at least a single indicia on the rear face of the circular portion may be observed through the aperture.

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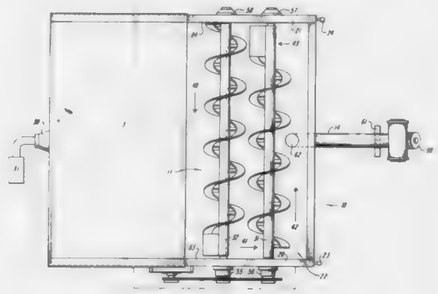
**4,745,690**
## METHOD OF REPLENISHING AND/OR PREPARING TREATING LIQUIDS
**Hermann Koop, Ronnenberg, and Friedrich-Wilhelm A. Thein, Wunstorf, both of Fed. Rep. of Germany, assignors to Polygram International Holding B.V., Baarn, Netherlands**
**Filed Jan. 12, 1987, Ser. No. 2,079**
**Claims priority, application Fed. Rep. of Germany, Jan. 14, 1986, 3600778**
**Int. Cl.[4] F26B** *5/16*
**U.S. Cl. 34—9** **12 Claims**



1. A method of replenishing and/or providing water-displacing treating liquids or mixtures of said treating liquids and of water-absorbing liquids in treating compartments, which liquids are used to remove water from the surfaces of objects to be immersed in the treating liquids, said objects being made of glass, ceramic, nickel, copper, stainless steel or synthetic resin such as, for example, disc-shaped information carriers, characterized in that the surfaces of the treating liquids in the compartments are kept at such a temperature that a similar, vaporized treating liquid which is provided over said surfaces condenses on said surfaces.

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**4,745,691**
## MEANS AND METHODS FOR DRYING SLUDGE
**Christopher G. Bradbury, Cumberland, R.I., assignor to Systems Engineering and Manufacturing Corp., Stoughton, Mass.**
**Filed Mar. 20, 1987, Ser. No. 28,245**
**Int. Cl.[4] F26B** *3/22*
**U.S. Cl. 34—11** **17 Claims**



1. A sludge drier useful for removing water from sludge obtained from wastewater treatment, said sludge drier comprising,
a plurality of augers having axes parallel to each other and functionally interconnected to provide a continous closed loop path of movement to said sludge through an area for drying to provide for recirculation of said sludge about said loop during said drying,
a heated surface positioned near said augers and lying in said path of movement of said sludge to provide heat to said sludge to remove water therefrom as said sludge moves over said path,
means for removing moisture from said area,
and means for removing sludge from said sludge drier after drying is carried out.

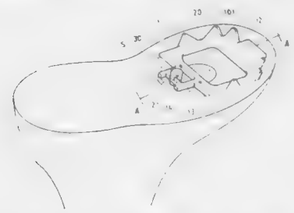
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**4,745,692**
## FOLDABLE ANTI-SLIP MEANS
**Kuo-Chen Liao, No. 18, Yunglo Rd., Pa Shian Ts'un, Chung Liao Hsiang, Nantou Hsien, Taiwan**
**Filed Mar. 12, 1987, Ser. No. 25,034**
**Int. Cl.[4] A43C** *15/00*
**U.S. Cl. 36—62** **3 Claims**

1. An anti-slip device for connection to a sole of a shoe, comprising, in combination:
a base plate having an approximate three-pronged form;
a plurality of rivets;
a fixing plate having an approximate three-pronged form, said base plate and said fixing plate being riveted together at a plurality of substantially equally-spaced points, the sole of the shoe being disposed between said base plate and said fixing plate;
a pin having a groove at a top end thereof, said pin being adapted to first pass through a pin hole in said base plate, then the sole of the shoe, and last through a pin hole in said fixing plate, the top end of said pin being externally exposed;



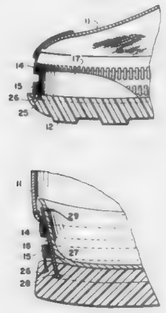
a slip-proof member having protruding tooth-like elements disposed along edges thereof, said slip-proof member being pivotably engaged within said groove by means of a transverse member positioned at an end of said slip-proof member opposite to a tongue member which is used for ready turnover operation of said slip-proof member for



allowing said slip-proof member to be turned over and rotated freely; and
a plurality of protrusions disposed at symmetric ends of said fixing plate for engaging with apertures provided on said slip-proof member for preventing said slip-proof member from randomly moving the right or left away from its normal position.

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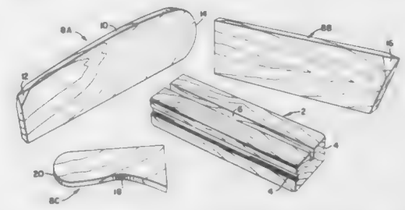
**4,745,693**
## SHOE WITH DETACHABLE SOLE AND HEEL
**Randy N. Brown, 8300 Old Kings Rd. S., Apt. #47, Jacksonville, Fla. 32217**
**Filed Feb. 9, 1987, Ser. No. 12,370**
**Int. Cl.[4] A43B** *3/24, 13/36*
**U.S. Cl. 36—101** **8 Claims**



1. In a shoe assembly including an upper shoe portion having an elongated lower edge portion and covering an upper portion of a foot of a wearer and a lower shoe portion having an elongated upper edge portion and covering a lower portion of a foot of a wearer wherein said shoe assembly includes curved toe and heel portions the improvement comprising a releasable connecting means selectively attaching said lower edge portion to said upper edge portion, said releasable connecting means including a first means attached to and along said lower edge portion and a second means attached to and along said upper edge portion, said releasable connecting means providing positive attachment between said lower and upper edge portions which resists detachment from forces generally perpendicular to said lower and upper edge portions, said lower shoe portion includes an arcuate semi-stiff heel support, means for permanently attaching said heel support to said lower shoe portion with said heel support being upstanding therefrom, said heel support shielding a heel of a wearer from contact with said releasable connecting means, and said lower shoe portion including an arcuate semi-stiff toe support means for permanently attaching said toe support to said lower shoe portion with said toe support being upstanding therefrom, said toe support shielding toes of a wearer from contact with said releasable connecting means, said heel and toe supports providing ready closure and inward support of said releasable connecting means about said toe and heel portions and providing retention of shape of said shoe assembly during repeated uses thereof.

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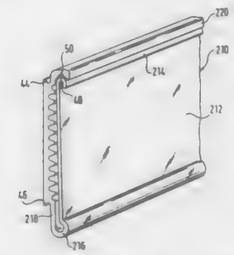
**4,745,694**
## SEAM BOARD PACK
**Elizabeth C. Skopek, 7837 Cahill Rd., Manlius, N.Y. 13104**
**Filed Oct. 7, 1986, Ser. No. 916,323**
**Int. Cl.[4] D06F** *81/08*
**U.S. Cl. 38—103** **5 Claims**



1. A seam board assembly comprising a generally oblong block having opposite side surfaces and flat top and bottom surfaces, finger grooves formed in said side surfaces running lengthwise of said block and spaced from said top and bottom surfaces, a slot in said top surface of said block formed centrally thereof and extending along at least a substantial portion of the length of said block, and a plurality of seam boards each adapted to be removably received in said slot and each said seam board having flat opposite side portions engaging the side surfaces of said slot and a straight edge portion supported on the base of said slot, and each said seam board having at least one additional edge portion conforming to the shape of the seam to be ironed.

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**4,745,695**
## INFORMATION CARRIER HOLDING RAIL
**Norbert Hetzer, Lobbach, Fed. Rep. of Germany, assignor to Esselte Meto International GmbH, Fed. Rep. of Germany**
**Filed Apr. 8, 1986, Ser. No. 849,280**
**Claims priority, application European Pat. Off., Apr. 10, 1985, 85104336.4**
**Int. Cl.[4] G09F** *3/18, 7/02*
**U.S. Cl. 40—10 D** **4 Claims**



1. Information carrier holding rail comprising a rear wall and a transparent front wall connected to the rear wall to from a upwardly open pocket, the front wall having an upper edge, the rear wall and the front wall being resiliently biased toward each other, a grip element being disposed at the upper edge of the front wall remote from a connection point between the front wall and the rear wall projecting from said front wall; the rear wall having a projectin which projects over the grip

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element of the front wall; the grip member having an uppermost portion having a web thereon; the rear wall projection having an inner surface, said inner surface having a groove therein adapted to receive the web of the uppermost portion of the grip element in engagement therewith.

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**4,745,696**

## VISUAL MARKER FOR USE IN INDICATING OR IDENTIFYING ROLLED DRAWINGS OR THE LIKE

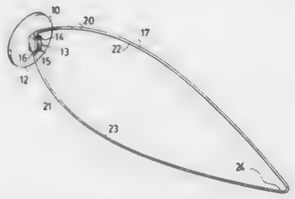
**Raymond E. Scouten, 145 Montrose Street, Winnipeg, Manitoba, Canada R3M 3L8**

**Filed Oct. 22, 1986, Ser. No. 921,482**

**Claims priority, application Canada, Oct. 25, 1985, 493861; Nov. 7, 1985, 494857**

**Int. Cl.⁴ G09F** *3/00*

**U.S. Cl. 40—309** **6 Claims**




1. A visual marker for comprising a visual marker member molded from a synthetic plastics material defining a marker face on one surface of the member for receiving indicia, a flexible spring member formed from spring wire, and coupling means integrally molded on said marker member and extending outwardly therefrom from a face thereof opposite to said marker face, said coupling means engaging the spring member so that an end of the spring member remote from the marker member can extend in a longitudinal direction thereof generally rearwardly from the marker face, said spring member having first and second open ends attached to said coupling means and comprising a single planar closed loop extending from an end adjacent to said marker member defined by said first and second open ends to said remote end and having sides intermediate said adjacent and remote ends having a tranverse spacing greater than the transverse width of the adjacent and remote ends, said coupling means defining a pair of surfaces generally at right angles to said marker member and at right angles to said planar loop, each of said surfaces having an opening therein with said openings lying on a common axis for receiving as a press fit a respective one of said first and econd open ends, said first and second open ends being turned to lie on a common axis lying in a direction at right angles to said longitudinal direction whereby the spring member can pivot relative to said marker member about said common axis defined by said first and second ends and by said openings from a first position in which the marker face lies substantially in the plane of the spring member to a second position in which the marker face is substantially at right angles to the plane of the spring member.

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**4,745,697**

## DEVICE FOR THE CYCLIC REARRANGEMENT OF A PILE OF SHEETS

**Peter Ackeret, Kusnacht, Switzerland, assignor to Licinvest AG, Chur, Switzerland**

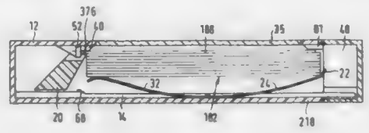
**PCT No. PCT/EP85/00610, § 371 Date Jul. 11, 1986, § 102(e) Date Jul. 11, 1986, PCT Pub. No. WO86/03024, PCT Pub. Date May 22, 1986**

**PCT Filed Nov. 12, 1985, Ser. No. 901,530**

**Claims priority, application Fed. Rep. of Germany, Nov. 13, 1984, 3441464**

**Int. Cl.⁴ G09F** *11/30*

**U.S. Cl. 40—513** **10 Claims**




1. Device for the cyclic rearrangement of a pile (182) of sheets having a housing (12) with a viewing window (35) and a slider member (14) that can be pulled out of the housing (12) and pushed back into the housing again parallel to the latter, and having a sheet-changing mechanism by means of which one sheet in the pile (182) can be retained in the housing (12) while the slider member (14) transports the remainder of the pile out of the housing (12), means being provided for removing the sheet remaining in the housing (12) from the housing (12) through the opening in the housing provided for the slider member (14).

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**4,745,698**

## WEAPON SIGHTS

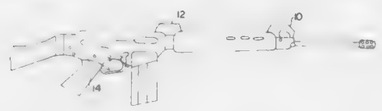
**Michael H. Schwulst, Pinetown, South Africa, assignor to Bienheim Gun Sights (Proprietary) Limited, Pinetown, South Africa**

**Filed Jun. 8, 1984, Ser. No. 618,837**

**Claims priority, application South Africa, Jun. 10, 1983, 83/4270**

**Int. Cl.⁴ F41G** *1/32*

**U.S. Cl. 42—100** **3 Claims**




1. An aiming apparatus for a weapon including a front sight and a rear sight which are not connected to each other and each having a sight passage through which a target may be viewed, the front sight being located towards the open end of the barrel of the weapon and spaced apart from the rear sight, the front sight only having a peripheral light colored, light-reflecting or light-emitting zone surrounding the sight passage of the front sight, said zone having a surface facing toward the rear sight and profiled to direct light only in the direction of the rear sight so that light directed in the direction of the rear sight is visible only to an eye looking directly through the rear sight toward the front sight and is not visible to the other eye, said light colored, light reflecting or light emitting zone surrounding the sight passage of the front sight being at least partially eclipsed by the rear sight when the front sight, rear sight and target are in line.



**4,745,699**

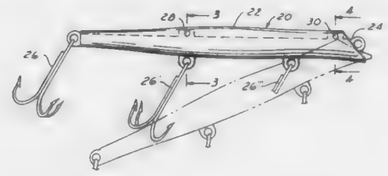
## FISHING LURE

**Steven M. Gage, 26450 Crocker, No. 719, Mount Clemens, Mich. 48043**

**Filed Mar. 12, 1987, Ser. No. 25,004**

**Int. Cl.⁴ A01K** *85/00*

**U.S. Cl. 43—42.09** **13 Claims**




1. A fish lure comprising:
an elongated body having a first and second end and an axially extending ventral slot formed therein;
an elongated hook carrier having a planar member sized for insertion within the slot in said body and having means for line attachment formed in one end projecting outwardly of the first end of the body and means for attaching at least one hook to a portion of the hook carrier planar member projecting outwardly of the ventral slot;
at least one hook attached to said hook carrier; and
wherein said body and hook carrier being further provided with a lug formed in the body and projecting into the ventral slot and a corresponding receptacle formed in the hook carrier planar member, at least one of which being formed of a resilient material to form a secure temporary attachment by shifting the lug into and out of cooperation as a result of relative movement therebetween along a fastener axis which is generally perpendicular to the axis of the body and falling within the plane of the ventral slot, to allow said body to be freely installed upon and removed from said hook carrier without removing the line attached thereto.

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**4,745,700**

## FISHING LURE

**Jack Davis, Star Rte. 2, Box 475, Crescent City, Fla. 32012**

**Filed Apr. 16, 1986, Ser. No. 852,813**

**Int. Cl.⁴ A01K** *85/00*

**U.S. Cl. 43—42.13** **4 Claims**



1. A fishing lure comprises:
a lure body;
means at one end of said lure body to attach a fishing line;
a fishing hook extending from said lure body;
an arm associated with said lure body and extending outwardly with respect to a side of the lure body;
a buoyant member attached to said arm in spaced apart relation to said lure body, whereby the buoyant member maintains the lure in a predetermined upright attitude as the lure sinks in a body of water;
said fishing hook having a pointed end disposed to lie above said lure body when said buoyant member maintains the lure in said predetermined upright attitude, thereby reducing the likelihood that the pointed end becomes snagged as the lure is at the bottom of the body of water;
means swivelably interconnecting said buoyant member to said arm;
said buoyant member having a closed hollow interior containing a quantity of shot loosely disposed for movement within the hollow interior;
said hollow interior having a longitudinal dimension and being relatively narrow at the end nearest said swivelable interconnection; and
the hollow interior widening as the longitudinal distance increases from said swivelable interconnection,
so that the loose shot collects at the relatively narrow end of the hollow interior as the buoyant member maintains a substantially vertical attitude in the water with no forward movement in the water, thereby enhancing the upright stability of the buoyant member,

and

so that the loose shot is permitted to move away from the relatively narrow end of the hollow interior to the wider part of the hollow interior as the buoyant member leaves the vertical attitude and undergoes gyrating movement in the water in response to forward movement of the fishing lure, thereby changing the center of gravity of the buoyant member to destabilize and enhance the gyrating movement.

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**4,745,701**

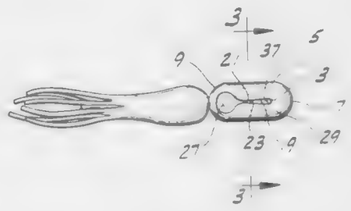
## FISHING DEVICE

**Jewell C. Fry, Rte. 2, Box A-18, Osage Beach, Mo. 65065**

**Filed Feb. 17, 1987, Ser. No. 15,730**

**Int. Cl.⁴ A01K** *91/04*

**U.S. Cl. 43—42.49** **13 Claims**

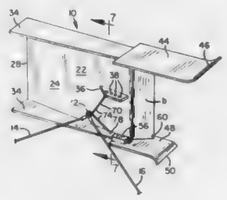



1. A fishing device comprising a body and a hook attached to the body, said body having an elongate hollow recess therein for holding a knot on a fishing line, a slot in the outer surface of the body extending generally parallel to said recess and communicating therewith, said slot having closely spaced side walls, and an entrance to said recess at one end of said slot through which said knot may be inserted into the recess, said recess being sized readily to receive said knot via said entrance with the knot being movable in the recess to a position spaced from said entrance whereby the line extends from said recess outwardly through the slot with said side walls gripping said line thereby retaining said knot in said recess.

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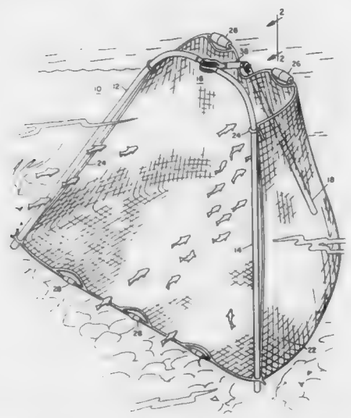
**4,745,702**
**WATER-WEIGHTED DIVER, SIDE PLANER, OR SIDE DIVER**
**Alexander W. Koch, P.O. Box 847, Winchester, Oreg. 97495**
**Filed Dec. 4, 1986, Ser. No. 923,620**
**Int. Cl.[4] A01K** *91/00*
**U.S. Cl. 43—43.13** **15 Claims**



1. A fishing device capable of use as any one of a depth control device, a side planer, and side diver, comprising
a basic unit capable of use as said depth control device.
said basic unit including a plate-like body member having forward and rearward ends,
a first surface tapered to a thinned rearward end at a second surface,
the front of said body member being tapered rearwardly from said second surface to said first surface,
a line connecting tab on the first surface of said body member adjacent the front of the latter,
said tapered front end and said first surface cooperating in combination with said line connecting tab for forming reaction areas when engaged by water pressure/weight to cause said body member to travel angularly relative to the direction of water pressure/weight,
means removably attachable to said body member when converting said basic unit to a side planer,
and means removably attachable to said body member when converting said basic unit to a side diver.

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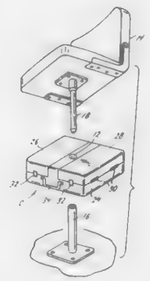
**4,745,703**
**SEINE NET DEVICE**
**Ronald P. Walter, 133 Hillside Dr., Reedsville, Pa. 17084**
**Filed Mar. 9, 1987, Ser. No. 23,151**
**Int. Cl.[4] A01K** *43/12*
**U.S. Cl. 43—14** **10 Claims**



1. A portable submersible bait fish netting device, comprising in combination:
two front legs;
a connecting means attached to said two front legs, said connecting means comprising in combination:
a bifurcated outer frame attached to one of said front legs;
a bifurcated inner frame rotatably positioned within said bifurcated outer frame and attached to the other of said front legs;
a pivot pin extending through said outer frame and said inner frame;
rear leg means attached to said connecting means;
a spreadable net attached to said two front legs and extending therebetween;
water buoyant floats attached to the upper portion of said net;
water sinkers attached to the bottom portion of said net.

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**4,745,704**
**PORTABLE STORAGE RECEPTACLE**
**Lawrence J. Schaefer, 41 Black Oak La., Fenton, Mo. 63026**
**Filed Apr. 8, 1987, Ser. No. 35,877**
**Int. Cl.[4] A01K** *97/04*
**U.S. Cl. 43—54.1** **10 Claims**



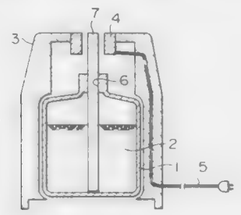
1. A portable storage receptacle having a bottom side and a top side, means defining a passageway through the receptacle and providing communication between the bottom side and the top side for freely rotatable engagement with a seat support member to minimize lateral movement of the receptacle within a transportation vehicle and to facilitate rotation of the receptacle around the seat support member independent of the rotation of the seat support member and a flange which extends outwardly from the bottom of the passageway and receptacle which rotates with the receptacle and facilitates rotation of the receptacle around the seat support member.

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**4,745,705**
**METHOD FOR KILLING INSECTS BY HEATING FUMIGATION**
**Shinobu Yamamoto; Kunihiro Okada; Satoshi Ohi, all of Hiroshima; Shiro Oyama, Urawa, and Yasuharu Takei, Hiroshima, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan**
**Filed Jul. 15, 1987, Ser. No. 73,459**
**Claims priority, application Japan, Jul. 18, 1986, 61-168120**
**Int. Cl.[4] A01M** *13/00*
**U.S. Cl. 43—125** **8 Claims**

1. In a method for knock down of injurious insects or for freeing a particular environment therefrom by heating fumigation comprising dipping a part of a porous absorptive wick in an insecticidal solution to allow it to absorb the solution and indirectly heating said wick around the top to fumigate the absorbed insecticidal solution, a method for knock down of injurious insects or for freeing a particular environment therefrom, which comprises exposing the insects to the vapor, characterized in that a $C_{12}$–$C_{18}$ aliphatic saturated hydrocarbon solution containing as an active ingredient 2-methyl-4-oxo-3-(2-propynyl)cyclopent-2-enyl chrysanthemate is used as said insecticidal solution, a porous absorptive wick prepared by caking a powdery inorganic substance with a binding agent is used as said porous absorptive wick, and besides that said

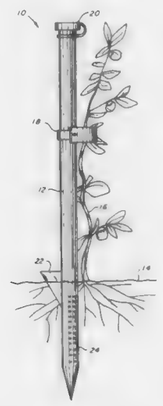




absorptive wick is indirectly heated around the top to a temperature in a range of from 105° to 130° C.

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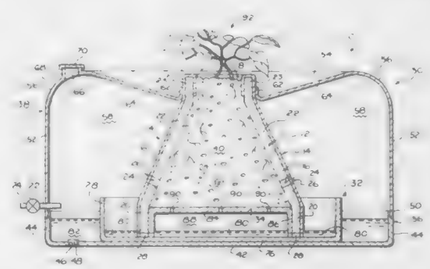
**4,745,706**
**PLANT WATERING AND FEEDING STAKE**
**Robert Muza, and Merry Muza, both of 1621 Cambridge, Kansas City, Mo. 64126**
**Filed Oct. 14, 1986, Ser. No. 918,330**
**Int. Cl.[4] A01G** *17/06, 17/14*
**U.S. Cl. 47—47** **1 Claim**



1. A plant watering and feeding device, comprising:
a. a stake positionable proximate a plant, said stake having a substantially cylindrical shape, said stake having an upper portion and a lower portion, said lower portion terminating in a point in order to facilitate introducing said stake into soil proximate said plant, said stake having a hollow construction for receiving a liquid therein, said stake having a plurality of through extending apertures formed in said lower portion, said apertures providing a means for slowly dispensing said liquid into said soil, said stake having a transparent construction to permit a visual inspection of said stake to determine an amount of said liquid still present in said stake, said stake having at least one groove along an axial length thereof;
b. a foot depressor integrally attached to said stake, said foot depressor providing a structure to which a user of said plant watering and feeding device may apply force in order to aid in introducing said device into said soil;
c. a plant support means attachable between said stake and said plant to effect an attachment of said plant to said stake, said plant support means comprising an adjustable length strap flexibly positionable around said plant, said plant support means further comprising a ring means slidably movable along said stake, said grasp being attachable to said ring means, said ring means being provided with at least one inwardly extending detent positionable within said groove, said ring means being further provided with at least one outwardly extending detent, said strap being selectively attachable to said outwardly extending detent; and
d. a cap means, said cap means comprising a flexible ring positionable around said upper portion of said stake, said cap means further comprising a cap positionable over a top end of said stake, said cap being attached to said flexible ring by an integral strap, said strap preventing a loss of said cap when removed from said stake.

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**4,745,707**
**PLANT POT ASSEMBLY**
**John Newby, 41289 Malcolmson St., Fremont, Calif. 94538**
**Filed Jun. 4, 1986, Ser. No. 870,341**
**Int. Cl.[4] A01G** *25/00*
**U.S. Cl. 47—79** **12 Claims**



1. A plant pot assembly comprising:
a growth medium container having substantially contiguous upwardly tapering sidewalls and an upwardly opening mouth to define a truncated conical contour, said container made of a porous material, said sidewalls terminating in a lip portion at said mouth,
covering means made from a material which is substantially impermeable to liquids, said covering means having an inner surface following the contour of at least the majority of the outer surface of said sidewalls, where said covering means is operationally separated from said outer sidewall surfaces to form a capillary space therebetween, said covering means extending over said lip portion of the container and entering said mouth, whereby liquids can be drawn upwardly within said capillary space and released into said mouth of said container, and
a collection tray below said container and in fluid communication with said capillary space, said container having at least one aperture providing fluid communication between the inside surfaces of the container sidewalls and the collection tray.

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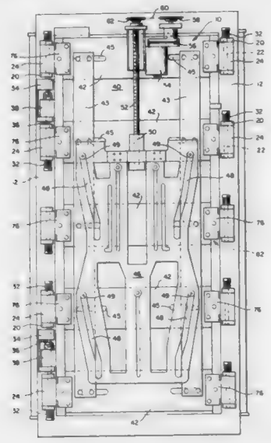
**4,745,708**
**APPARATUS FOR SECURING A CLOSURE**
**John N. Roche, Greenville, Pa., assignor to American Sterilizer Company, Erie, Pa.**
**Filed Nov. 25, 1986, Ser. No. 934,592**
**Int. Cl.[4] E05C** *9/00*
**U.S. Cl. 49—395** **20 Claims**

1. Apparatus for securing a door to a door frame comprising:
(a) a swing hook rotatably mounted on said door frame, said swing hook having a first cam surface in proximity to said door frame and a hook having a hook surface remote from said door frame, said swing hook being rotatable between an open position in which said first cam surface is not in facing relation to said door frame and a latched position;
(b) a latch hook mounted on said door adjacent the edge thereof, said latch hook having a latch surface which is engaged by said hook surface when said swing hook is in

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said latched position so as to secure said door to said door frame; and



(c) means mounted on said door for rotating said swing hook from its open position to its latched position.

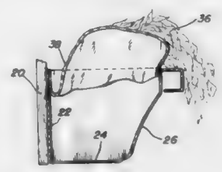
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**4,745,709**

**GUTTER WITH CLEANING APPARATUS**

Douglass M. Johnson, 7148 E. Brainerd Rd., Chattanooga, Tenn. 37421

Filed Jul. 10, 1987, Ser. No. 71,814
Int. Cl.[4] E04D *13/00*
U.S. Cl. 52—2 19 Claims



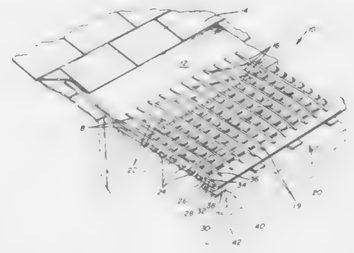
1. A building drain gutter having apparatus for permitting periodic cleaning of debris accumulated therein, said gutter comprising an elongated trough including transversely spaced apart substantially upstanding wall surfaces separated by and integral with a bottom surface, each of said wall surfaces having upper extremities, a liner comprising a sheet of flexible material loosely disposed within the tough, said liner having transversely spaced apart edges, means for securing each of said edges of the liner to a respective one of said wall surfaces proximate said upper extremities for enclosing the trough so that debris accumulates on the liner rather than in the trough, an aperture formed in said trough, a conduit communicating with said aperture, and means for supplying a fluid to said conduit under pressure through said aperture into the trough for pressurizing said trough and forceably urging said liner upwardly between said edges out of the trough with the accumulated debris.

**4,745,710**

**GUTTER SCREEN HAVING SPACED RIBS**

Robert H. Davis, 294 Smyrna Powder Springs Rd., Mariatta, Ga. 30060

Filed Sep. 15, 1986, Ser. No. 907,653
Int. Cl.[4] E04D *13/00*
U.S. Cl. 52—12 15 Claims



1. In a gutter cover for positioning on a roof to cover a gutter opening of a gutter having a front and a rear:

a plurality of spaced ribs, supported together in an array of ribs corresponding to the length of gutter,

a roof member attached to said ribs for positioning on the roof,

each of said ribs comprising an inner end and an outer end and said ribs being positioned substantially vertically over said gutter opening,

means for connecting said ribs together in succession in spaced relationship from the roof member to the front edge of the gutter, forming openings to the gutter between said ribs, said means for connecting said ribs comprising a plurality of elongated members extending in spaced relationship between said ribs so as to provide openings between said ribs through which water will pass into said gutter while stopping at least some of the debris.

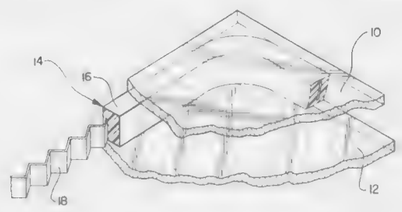
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**4,745,711**

**SELECTIVELY PERMEABLE ZEOLITE ADSORBENTS AND SEALANTS MADE THEREFROM**

James A. Box, Broadview Heights, Ohio, assignor to Tremco Incorporated, Cleveland, Ohio

Filed Oct. 16, 1986, Ser. No. 919,503
Int. Cl.[4] E06B *3/24*
U.S. Cl. 52—172 3 Claims



1. A multiple glazed window having two parallel panes of glass spaced apart to leave an air space between the panes with peripheries of the two panes being sealed with a sealant strip to close the air space, said sealant including an adsorbent therein, said adsorbent comprising a zeolite, having pores with apertures large enough to permit entry of oxygen and nitrogen molecules through said pore apertures, which is treated with a paraffinic, naphthenic or aromatic oil and outgassed under heat or under heat and vacuum to render the zeolite permeable to water vapor and essentially impermeable to nitrogen and oxygen molecules.

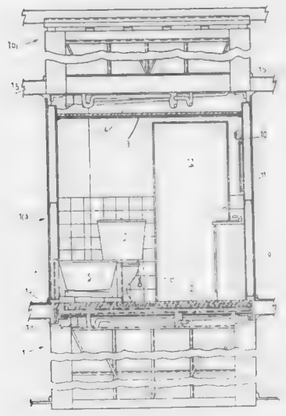


**4,745,712**

**BUILDING SYSTEM FOR MULTI-STOREY BUILDINGS**

Lawrence D. O'Leary, Croydon Park, Australia, assignor to Australian Stratacore Holdings Ltd., New South Wales, Australia

Filed Nov. 10, 1986, Ser. No. 928,457
Claims priority, application Australia, Nov. 15, 1985, PH03419
Int. Cl.[4] E04B *1/348*
U.S. Cl. 52—34 8 Claims



1. A multi-story building comprising at least two self-contained, load-bearing building modules, means for superimposing said modules upon each other, said means comprising attachment means at each upper corner of each of the modules engaging in corresponding attachment means at each corner of the lower module, said upper attachment means forming lifting points for transporting and placing each module, each module including a floor and a wet area with plumbing and electrical supply fittings therefor extending beneath the floor, characterized in that each module has a false ceiling spaced below the upper portion of the respective module so as to form a space, into which space the plumbing and electrical supply fittings of the adjacent upper module protrude to provide access for connection to plumbing and electrical supply services on site.

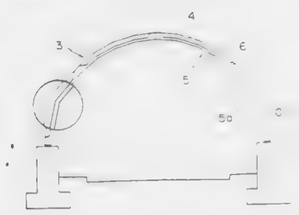
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**4,745,713**

**PREFABRICATED PC SHELTER STRUCTURE**

Yoshiharu Gotoh, at Nihon Samicon Company Ltd., 1-8-23 Bentenbashidori, Niigata, Japan

Filed Feb. 13, 1987, Ser. No. 14,296
Int. Cl.[4] E04B *1/32*
U.S. Cl. 52—88 24 Claims



1. A generally arched, prefabricated PC shelter structure comprising: a plurality of pairs of unit half plates prefabricated of highly strong concrete, any paired two of said unit half plates being peripherally curved to form a generally arched unit together when they are assembled to have their tops abutting against each other; peripheral fastening means for peripherally fastening the abutting tops of said paired two unit half plates together to form said generally arched unit; transverse fastening means including at least one unbonded PC steel bar buried in a plurality of generally arched units, which are arranged side by side, for transversely fastening the same together to construct a generally arched PC shelter structure; anchor means for anchoring the legs of said paired two unit half plates to foundations, said anchor means including one of:

a support mounted on one of said foundations, a plurality of anchor bolts and a hinge for hinging one of the legs of said each unit half plate to said one foundation through said anchor bolts;

and a concrete hinge preformed in one of the legs of said each unit half plate so that it may be buried in one of said foundations;

and peripheral reinforcing means buried in each of said unit half plates and including at least one unbonded PC steel bar for peripherally tensioning and reinforcing said each unit half plate.

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**4,745,714**

**ARTICULAR POLE ASSEMBLY CAPABLE OF WINDING**

Keinosuke Matsutani, 14-7, Katori 2-Chome, Ichikawa-shi, Chiba, 272-01, Japan

Filed Mar. 3, 1987, Ser. No. 21,069
Claims priority, application Japan, Apr. 3, 1986, 61-75412
Int. Cl.[4] E04H *12/18*
U.S. Cl. 52—108 8 Claims



1. An articular pole assembly comprising an articular pole composed of a single continuous series of unit block members pivotally connected to one another by pins and a take-up reel for extending the articular pole and for retracting and storing the articular pole in a wound state thereon, wherein each unit block member of said articular pole assembly comprises:

a main body formed of a single piece of hard plate material shaped in such a manner that the main body has a channel-like cross section;

the main body consisting of a bottom portion and a pair of side walls at opposing sides thereof perpendicular thereto forming a channel shape, said side walls having connecting projections at distal portions extending perpendicular therefrom;

a connecting plate pivotably supported by said connecting projections at an open terminal portion of said main body, said connecting plate having front projections formed thereon which are releasably engageable with notches provided in the side walls of the block member and an adjacent unit block member;

said main body being formed with stepped areas in said side walls such that an end of one block member may fit within the channel-like cross section of an adjacent block member main body, the stepped areas having a semi-circular projection part releasably engageable with semi-circular recess end parts of the adjacent block member side walls when the pole is extended; and

at least one end wall stepped area of said main body being

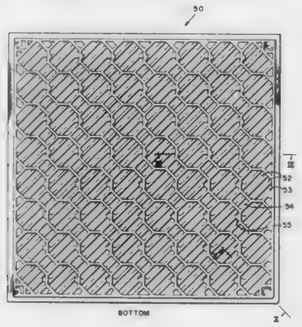
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provided with a projection portion extending to contact a rear end portion of an adjacent block member connecting plate when said articular pole is in an extended state so as to suppress undesired swing motion of said pole.

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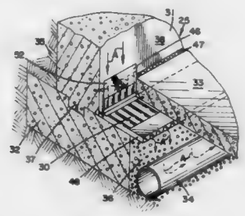
**4,745,715**
**ELEVATED FLOOR PLATE**
**Carl S. Hardwicke, Grosse Pointe, Mich.; Howard R. Leffel, Jr., Maumee, and George S. Spatoulas, Sylvania, both of Ohio, assignors to Farley Metals, Inc., Chicago, Ill.**
**Filed Mar. 23, 1987, Ser. No. 29,188**
**Int. Cl.[4] E04B** *5/58*
**U.S. Cl. 52—126.6** **15 Claims**



1. A rectangular elevated floor plate comprising:
(A) a top panel,
(B) a polygonal tessellation pattern of concentric rows of ribs attached and orthogonally projecting from said panel,
(C) a base rib attached and orthogonally projecting from along the edges of said panel,
(D) a plurality of ejector pin bosses integrally attached to one of the sides of at least some of the polygons in said tessellation pattern;
all of said ribs and bosses being of the same depth projecting orthogonally the same distance from the same side of said panel, and the thickness of said ribs in each said row inwardly from said base ribs to the center of said plate being thicker with the thickest ribs being at the center of said plate.

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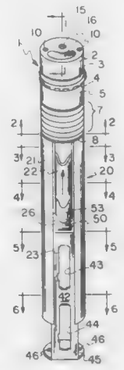
**4,745,716**
**STRUCTURAL WATER CONTROL**
**Fred A. Kuypers, 17148 Odell, Tinley Park, Ill. 60477**
**Filed Aug. 15, 1986, Ser. No. 897,057**
**Int. Cl.[4] E04B** *1/70;* **E04F** *17/00*
**U.S. Cl. 52—169.5** **24 Claims**



1. A product useful for preventing water seepage onto a floor in a structure having a foundation, a footing, a floor and a drain below the floor, including:
a barrier having a cross-sectional shape which forms conduit portions and contact portions;
said barrier being suitable for placement against said foundation and said footing prior to installation of said floor;
said barrier having an upper diverter suitable for placement against said foundation;
said barrier having a lower diverter suitable for placement against said footing;
said upper diverter being connected to said lower diverter at approximately right angles to one another;
said lower diverter extending a distance away from said foundation farther than said footing extends from said foundation;
said cross-sectional shape providing conduit portions which allow water to travel through said upper diverter conduit portions to and through said lower diverter conduit portions, said lower diverter conduit portions having both horizontal and longitudinal conduits which allow water to travel either horizontally or longitudinally to a point under said floor and away from said footing to said drain under said floor; and
said cross-sectional shape providing contact portions which allow substantial structural contact between said floor and said foundation, and said floor and said footing.

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**4,745,717**
**ADAPTOR FOR POKE-THRUS**
**Charles N. Domigan, Coolville, Ohio, assignor to Butler Manufacturing Company, Kansas City, Mo.**
**Filed Dec. 19, 1986, Ser. No. 943,711**
**Int. Cl.[4] E04B** *5/48*
**U.S. Cl. 52—221** **2 Claims**



1. An adaptor to interface a poke-thru with power cable sets of a flexible wiring system;
an elongated, hollow housing having an opening extending throughout the length of the housing;
A support member mounted inside of said hollow housing, the support member having a center section extending across said opening and partially along the length thereof and also having a head which extends across the interior of the housing in close association with the wall of same, the head including a passageway for said power conductors;
wire connector means including power conductors mounted on the center section of said support member and accessible through said opening;
a hollow barrier inside of said housing and engaging said head, the interior of the barrier being in communication with said power conductor passageway in said head and the barrier also serving as a passageway for power conductors; and
the portion of said opening not closed off by said center section serving as an entrance to the adaptor for communication cables and said barrier and said head isolating the communication cables from said power conductors.



**4,745,718**
**PRESTRESSED STRUCTURAL SUPPORT AND METHOD FOR MAKING SAME**
**Kevin B. O'Sullivan, and Arthur L. Troutner, both of Boise, Id., assignors to Trus Joist Corporation, Boise, Id.**
**Filed May 30, 1986, Ser. No. 868,952**
**Int. Cl.[4] E04B** *5/12;* **E04C** *3/14*
**U.S. Cl. 52—223 R** **21 Claims**

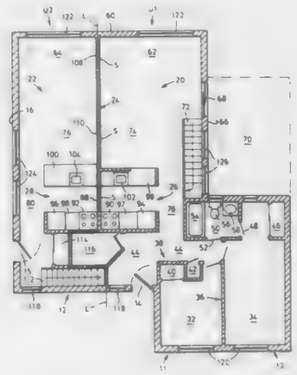


1. A prestressed and cambered structural support member in unloaded condition comprising:
a first elongate beam member having a top surface and a bottom surface and having two opposite end portions separated by an intermediate portion, the intermediate portion being curved and the two end portions being substantially straight;
a second elongate beam member underlying the first elongate beam member, the second beam member having a top surface and a bottom surface and having two opposite end portions separated by an intermediate portion, the intermediate portion being curved and the two end portions being substantially straight;
the intermediate portion of the bottom surfaces of the first and second beam members being stressed in compression to an extent greater than any compression in the top surfaces thereof; and
adhesive bond means for adhesively bonding the curved intermediate portions and end portions of the first and second beam members together by an adhesive joint extending between the beam members without the use of metal fasteners, the adhesive joint retaining a residual stress at the bottom surface of the second beam member resulting from its intermediate portion being curved, the retained residual stress being maximum at a mid location of curvature in the intermediate portion and a minimum in the substantially straight outer end portions, whereby the structural support member is prestressed and cambered.

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**4,745,719**
**HOUSING STRUCTURE**
**Murray E. Blankstein, 145 Sheldrake Boulevard, Toronto, Ontario, Canada (M4P 2B1), and Hershel B. Okun, 195 Strathgowan Avenue, Toronto, Ontario, Canada (M4N 1C4)**
**Filed Mar. 30, 1982, Ser. No. 363,675**
**Int. Cl.[4] E04H** *1/04*
**U.S. Cl. 52—234** **6 Claims**

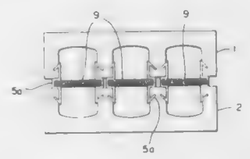
1. A housing structure convertible between a single family home and a two family home, the structure defining two living units, each of which has a separate entrance and is capable of accommodating a family living separately from a family in the other unit, said living units including respective living areas which are disposed side by side and separated by a demising wall, said living areas including respective kitchens disposed in contiguous relationship on opposite sides of said wall and the wall including at least one section between the kitchens which is closed when the structure is to serve as a two family home but which can be opened to permit access between the two kitchens when the structure is to serve as a single family home, the kitchens and wall section being designed to permit the kitchens to combine into a single enlarged kitchen and provide access between the two living units when the section is open; wherein the structure has at least two levels and is vertically divided by said demising wall so that said living units are both disposed on two levels, stairs being provided for permitting access between different levels of the same unit; and wherein the housing structure has the external appearance of a conventional house having a front door providing an entrance to one



of said living units and a side door providing access to the other of said units.

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**4,745,720**
**INSULATED CINDERBLOCK**
**Lawrence H. Taylor, P.O. Box 210.577, Dutch Fork PO Branch, Columbia, S.C. 29221**
**Filed Mar. 24, 1987, Ser. No. 29,547**
**Int. Cl.[4] E04C** *1/16*
**U.S. Cl. 52—405** **4 Claims**



1. A cinderblock having parallel interior and exterior faces with a cavity space between the faces so structured as to retain its conventional shape and basic structural strength, but simultaneously to provide a much higher level of insulative effectiveness through its physical construction, said cinderblock including disparate front and back half portions of a block vertically split on a longitudinal plane parallel to the block exterior face of the block held both rigidly apart, and together in a fixed relationship by a multiplicity of vertical metal channels between the opposing halves of the assembled block, a vertical full height panel of non-porous semi-rigid insulating material placed within the cavity space dividing the cavity space, into two separate dead air spaces to abut the front and back block sections respectively, with said vertical metal channel connecting elements being provided with a multiplicity of vertical lines of slits of not more than 15,000 ths of an inch to, provide a discontinuity for purpose of restructuring heat flow through the center portion of the vertical structural channel.

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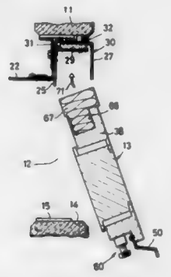


**4,745,721**

## METHOD OF ATTACHING WINDOW UNITS

**Karl Gartner, Gundelfingen, Fed. Rep. of Germany, assignor to Yoshida Kogyo K. K., Tokyo, Japan**

**Division of Ser. No. 516,316, Jul. 22, 1983, abandoned. This application Dec. 12, 1985, Ser. No. 808,266**
**Claims priority, application Japan, Jul. 27, 1982, 57-113502; Jul. 27, 1982, 57-113503; Jul. 27, 1982, 57-130850**
**Int. Cl.⁴ E06B *1/04***
**U.S. Cl. 52—741** **4 Claims**



1. A method of mounting a window unit in a building opening having an upper edge and a lower edge, said method comprising the steps of:
(a) providing a window unit having a top rail and a bottom rail;
(b) providing a channel-shaped upper frame having a generally C-shaped cross section and attaching the upper frame to said upper edge of the opening with the C-shaped cross-section opening downwardly;
(c) fixedly securing at least one adjustable anchor to said bottom rail of the window unit;
(d) attaching at least one attachment base plate to said lower edge;
(e) placing thermal insulation of resilient material on said top rail;
(f) subsequent to said placing of the thermal insulation of resilient material, inserting said top rail of the window unit into said upper frame so as to compress the thermal insulation;
(g) placing the adjustable anchor at a required position on the attachment base plate so as to allow the compressed thermal insulation to recover until a channel of the upper frame is filled with the thermal insulation;
(h) subsequent to said placing of the adjustable anchor, adjusting the adjustable anchor to an adjusted position for vertically adjusting the position of said window unit between the upper and lower edges of the building opening; and
(i) finally, fixedly securing the adjustable anchor at said adjusted position by securing a portion of the anchor to the base plate.

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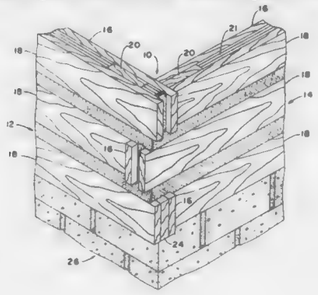
**4,745,722**

## DOUBLE WALL AND CORNER BUILDING STRUCTURE

**Dan E. Ross, 308 Almaville Rd., Smyrna, Tenn. 37167-4254**

**Filed Feb. 6, 1987, Ser. No. 12,805**
**Int. Cl.⁴ E04B *1/10***
**U.S. Cl. 52—233** **4 Claims**

1. A building structure having a foundation comprising:
vertically disposed and laterally spaced apart load bearing board members of standard width and thickness located away from double wall interlocking corners of intersecting horizontal boards of the building structure,
horizontally extending inner and outer boards secured to opposed, wide sides of the vertically disposed board members at vertically spaced apart locations on the vertical members such that adjacent horizontal boards have horizontally extending spaces between them, and a space between the inner and outer boards that is equal to the standard thickness of the vertical board members, the horizontal inner boards having surfaces facing inwardly of the enclosure, while the horizontal outer boards have surfaces facing outwardly of the enclosure, the horizontal boards, in addition, having ends located adjacent the double wall interlocking corners,
staggered, interlocking double wall corners in which each end of a first set of inner and outer horizontal boards abut against the inwardly facing surface of the inner horizontal board of a second set of inner and outer horizontal boards at right angles thereto and in the same plate, with the ends



of the second set being exposed and extending at least to the outwardly facing surface of the outer board of first set, with vertically adjacent ones of the first and second sets alternating at said double wall corners in a manner that staggers and interlocks the horizontal sets of boards over or under each other at the corners of the building structure, and
mortar material located in the horizontal spaces between adjacent horizontal boards, with the mortar being continuous at the interlocking double wall corners such that an expansion joint is provided by the mortar at the corners as well as throughout the spaces between the horizontal boards.

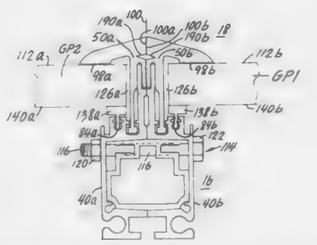
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**4,745,723**

## GLAZING GASKET AND RELATED SUPPORTING STRUCTURE AND METHOD

**Joseph Esposito, Holbrook, N.Y., assignor to Four Seasons Solar Products Corporation, Holbrook, N.Y.**

**Filed Mar. 13, 1987, Ser. No. 25,405**
**Int. Cl.⁴ E04D *1/36***
**U.S. Cl. 52—464** **26 Claims**



1. A glazing structure comprising first and second glazing support means adapted for being brought together to constitute a glazing support, first and second glazing entrapment means mounted respectively on said first and second support means and defining therewith first and second glazing receptacles, first and second glazing members adapted for edgewise engagement in said first and second receptacles, and fastening means to hold the first and second support means together, said first and second entrapment means including respective displaceable glazing contact portions and mutually engageable portions which contact each other as the first and second support means are brought together, the glazing contact portions being forced against respective of the glazing members in response to mutual engagement of the mutually engageable portions to lock the glazing members in the receptacles.



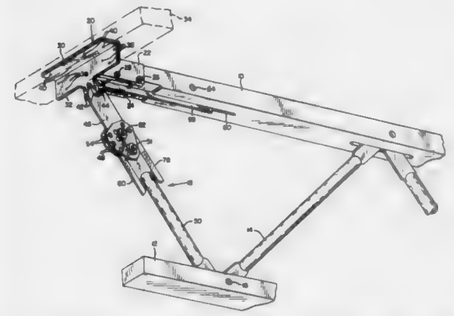
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**4,745,724**

## OPEN WEB STRUCTURAL SUPPORT MEMBER OF ADJUSTABLE LENGTH WITH INCREMENTAL ADJUSTMENT OF END WEB MEMBER

**William R. Reetz, Boise, Id., assignor to Trus Joist Corporation, Boise, Id.**

**Continuation-in-part of Ser. No. 852,732, Apr. 16, 1986, Pat. No. 4,682,460. This application Jun. 26, 1987, Ser. No. 67,606**
**Int. Cl.⁴ E04H *12/18*; E04C *3/292***
**U.S. Cl. 52—632** **20 Claims**



1. A structural support apparatus of the open web type, comprising:
an upper chord member;
a lower chord member;
a plurality of spaced web members interconnecting said chord members;
mounting bracket means attached to the end of said upper chord member and adapted to be secured to an end support;
adjustable connector means for connecting said bracket means to the end of said upper chord member and for adjusting the position of said connector means longitudinally of said upper chord member between a plurality of different predetermined length settings spaced along the length of said upper chord member to provide the structure support apparatus with an adjustable length; and
adjustable length end web means for connecting the lower chord member to said mounting bracket means, said end web means including incremental adjustment means for adjusting the length of said end web means in known increments between a plurality of different predetermined length settings corresponding to the settings of said connector means.

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**4,745,725**

## DEPLOYABLE TRUSS STRUCTURE

**Junjiroh Onoda, Tokyo, Japan, assignor to Japan Aircraft Mfg. Co., Ltd., Yokohama, Japan, a part interest**

**Filed May 3, 1985, Ser. No. 730,351**
**Claims priority, application Japan, May 7, 1984, 59-90442**
**Int. Cl.⁴ E04H *12/14***
**U.S. Cl. 52—646** **4 Claims**

1. A deployable truss structure which expands to a structure having two main, opposed flat or curved surfaces when deployed, said truss structure comprising a plurality of module units, each said modules comprising:
members arranged along the edges of an imaginary rectangular parallelepiped;
two flexible chords stretched in each of two opposed faces of the imaginary rectangular parallelpiped which form parts of the main, opposed flat or curved surfaces of the truss structure, along the diagnosis of these faces; and



a diagonal member provided along one diagonal in each of the other four faces of the imaginary rectangular parallelepiped, crossing the diagonal member provided in the opposite parallel face, said diagonal member being telescoping, being in an expanded state until the truss structure is deployed, and being contracted when the truss structure is deployed,
each module unit being joined to adjacent module units and sharing some of the members with adjacent module units.

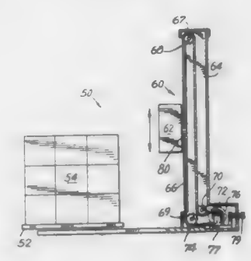
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**4,745,726**

## CARRIAGE SAFETY AND CHAIN TENSIONING DEVICE FOR STRETCH WRAP MACHINES

**Henry Rosenthal, and Howard J. Hein, both of Boca Raton, Fla., assignors to Mima, Inc., Pompano Beach, Fla.**

**Filed Oct. 2, 1986, Ser. No. 914,391**
**Int. Cl.⁴ B65B *11/04***
**U.S. Cl. 53—77** **4 Claims**



1. A wrapping machine, of a type wherein wrapping material is dispensed from different heights, comprising:
frame means including a vertically extending plate;
a carriage mounted to the frame structure for upward and downward movement along said plate and adapted to carry wrapping material to be so dispensed;
a safety member mounted to the lower end of said carriage for pivotal movement within a limited range relative to the carriage, the safety member being adapted to prevent movement of the carriage downwardly along the vertically extending plate whenever the safety member engages said plate;
biasing means for biasing the safety member for upward pivotal movement tending to propel the safety member

into engagement with said plate, opposite pivotal movement of the safety member loading the biasing means;

connection means having a first end portion attached to the upper end of said carriage and a second end portion attached to the safety member so that the safety member is pulled by the connection means, in a pivotal sense, so as to load the biasing means, which thus imparts tension to the connection means, and so that the carriage, the safety member, the biasing means, and the end portions of the connection means move together along the vertically extending plate; and

means for driving the connection means for movement of the carriage, the safety member, the biasing means, and the end portions of the connection means along said plate;

whereby the biasing means propels the safety member into engagement with said plate to arrest movement of the carriage downwardly along said plate whenever the connection means becomes loosened sufficiently or broken.

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**4,745,727**

## DEVICE SERVING TO FASHION CARRYING HANDLES FOR ATTACHMENT TO SHEET WRAPPING MATERIAL, AND A HANDLE OBTAINED WITH SUCH A DEVICE

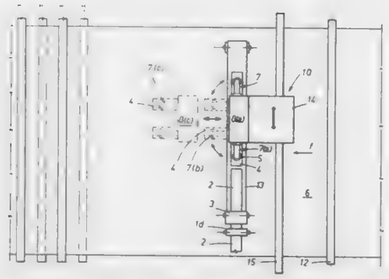
**Andrea Cinotti, Bologna, Italy, assignor to Wrapmatic, S.p.A., Bologna, Italy**

**Filed Apr. 27, 1987, Ser. No. 42,935**

**Claims priority, application Italy, May 2, 1986, 3407 A/86**

**Int. Cl.[4] B65B** *61/14*

**U.S. Cl. 53—134** **13 Claims**



**1. A device serving to fashion carrying handles for attachment to sheet wrapping material, comprising:**

**infeed means supplying narrow bulk strip from which single handles are formed;**

**cutting means with which to sever the bulk strip into discrete strips of given length;**

**support and feed means, located downstream of the infeed and cutting means, that convey the discrete strip through a rectilinear path above the level of the wrapping film;**

**means for retention of the two opposite ends of a discrete strip conveyed by the support and feed means, that are capable of vertical movement between a raised limit position in which the discrete strip is picked up from the support and feed means and a lowered limit position in which the discrete strip is offered to the film, and carried by first ends of a pair of identical arms mounted to a slide by their remaining ends and capable of horizontal movement between a first limit position, in which they are in alignment and parallel with the support and feed means, and a second limit position in which they lie substantially at right angles to the support and feed means with the strip retention means occupying points on the wrapping film that are calculated to coincide with the median axes of two opposite sides of the finished wrapping.**

**4,745,728**

## MACHINE FOR CLOSING THE TOP AND SIDES OF CASES IN WHICH THE RELEVANT PRODUCTS HAVE ALREADY BEEN PACKED

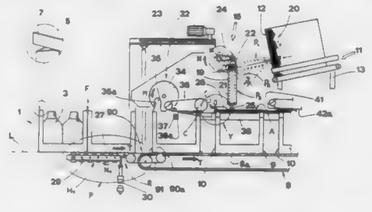
**Dante Valenti, Imola, Italy, assignor to In-Pak S.p.A., Italy**

**Filed Oct. 26, 1987, Ser. No. 113,622**

**Claims priority, application Italy, Oct. 30, 1986, 3555 A/86**

**Int. Cl.[4] B65B** *7/28, 7/20*

**U.S. Cl. 53—289** **16 Claims**



**1. A machine for closing the top and sides of cases in which relevant products have already been packed, each of said cases being open at the top and featuring related longitudinal side pieces each one with two wings to obtain a "U" shape, the base part of said "U" being lower than the height of said case, which features an equal number of vertical end flaps, whose length is equal to the transverse dimensions of the case, and which fold in a position corresponding to transverse edges of related transverse side pieces; each of said cases being destined to be closed by a related lid obtained from a flat lid blank featuring two preformed fold lines, orientated in relation to the shortest dimension, that are parallel to one another, delineating a central portion with an area equal to the horizontal section of said case, as well as two side portions whose width is greater than the distance between said wings of said "U", and whose height does not exceed that of said wings; said machine comprising: a magazine containing a stack of flat lid blanks; a conveyor situated below the aforesaid magazine, a top run of which is orientated longitudinally, and fitted with first pushing means which are equidistant from one another; a reception station located upstream of said top run, in relation to its direction of movement, followed by an infeed line, designed to intermittently feed said cases onto the aforesaid top run in synchrony with the movement of said first pushing means at the beginning of the above-mentioned top run; first folding means, located at the beginning of said conveyor, and above the latter, operating in synchrony with said reception station, designed to fold the above-mentioned end flaps towards the inside of said case until they are in a horizontal position; elastic opposing means located immediately after said first folding means, in relation to the direction of movement of said top run of the aforementioned conveyor, that extend longitudinally from an infeed station for said lid blanks, and which exert a downwards pressure on said end flaps, which have already been folded horizontally; first means for applying glue to areas of the surface of the said end flaps which are not in contact with the above-mentioned elastic opposing means; means for withdrawing a lid blank from the bottom of said stack, for transferring said lid blank to said infeed station, and, finally, for depositing said lid blank on the aforesaid elastic opposing means, in synchrony with the movement below of a case, with said central portion of the above-mentioned lid blank being at least longitudinally centred in relation to said case below it; further means for pushing said lid blank in synchrony with said case, keeping said lid blank longitudinally centred in relation to said case; second folding means that work in conjunction with said elastic opposing means and in synchrony with the withdrawal of the latter from said lid blank and case, designed to carry out a downwards pre-folding operation on said side portions of said lid blank, as result centering the latter transversly in relation to the related case; first pressing means, located downstream of said second folding means, and acting on said central portion of said lid blank to fix said central portion to said end flaps below it, by gluing them to one another; second means for applying glue to areas of outer surfaces of said longitudinal side pieces of said case; third folding means, located downstream of said second folding means, and which act on the above-mentioned side portions, bringing them into contact with said longitudinal side pieces of said case, said side pieces facing to one another; second pressing means, located downstream of said third folding means, and which act on said side portions in order to fix the latter to said related side pieces by gluing them to one another.**



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**4,745,729**

## SCREW HEAD ON CONTAINER-CLOSING MACHINE

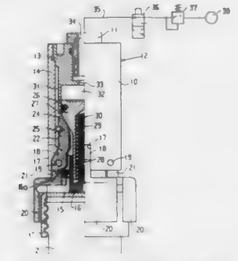
**Gerhard Bethge, Cologne, and Albert Schmitz, Kurten-Eichhof, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Oct. 9, 1987, Ser. No. 106,219**

**Claims priority, application Fed. Rep. of Germany, Nov. 26, 1986, 3640417**

**Int. Cl.[4] B65B** *7/28;* **B67B** *3/20*

**U.S. Cl. 53—331.5** **8 Claims**



**1. A screw head on a container-closing machine which comprises a holder (12) secured on a rotatable and reciprocating spindle (11), a pressure chamber (32) formed in said spindle (11), a piston (27) operative in said cylinder, said pressure chamber in said spindle bounded on one side by said piston, said piston having a conical section (24) and a cylindrical section forming a piston rod (28), a plurality of equally spaced levers (18) pivotally disposed within said holder, each of said levers include a jaw (20) integral therewith, means for moving one end (22) of each of said levers radially toward one another so that they rest upon said conical section of said piston which in a first position of rest, said jaws are spread apart for receiving a screw cap closure (1), means for applying a fluid pressure to said pressure chamber to axially move said piston and said conical section against said upper end of said lever to force said jaws to a second position which tightly holds said cap for screwing onto a container (2), whereby during a downward rotational movement of said spindle, said screw cap is threaded onto said container.**

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**4,745,730**

## METHOD AND APPARATUS FOR EVACUATING AIR FROM FOOD CONTAINERS

**David C. Bartle, Sr., 421 S. Walnut St., Muncie, Ind. 47306**

**Filed Oct. 22, 1986, Ser. No. 921,479**

**Int. Cl.[4] B65B** *31/04*

**U.S. Cl. 53—405** **4 Claims**

**1. A method for sealing a food bag comprising,**

**filling the food bag with food leaving room at a top thereof for sealing,**

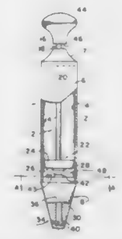
**slipping an O-ring over the unfilled top of the bag,**

**inserting the pump nozzle into the top of the bag and through the O-ring without having the nozzle contact the food,**

**pushing the O-ring up over the nozzle and fitting the O-ring in a circumferential groove provided around the nozzle at a point spaced from nozzle inlet ports, thereby sealing the bag opening around the nozzle,**

**evacuating air from the interior of the bag by reciprocal movement of the piston,**

**pinching the bag at the end of the nozzle and turning the bag until the bag slips off the nozzle,**



**continuing turning the bag while pinching, thereby trapping the air out,**

**tying a tie around the bag to seal the evacuated interior, and placing the sealed bag in a freezer.**

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**4,745,731**

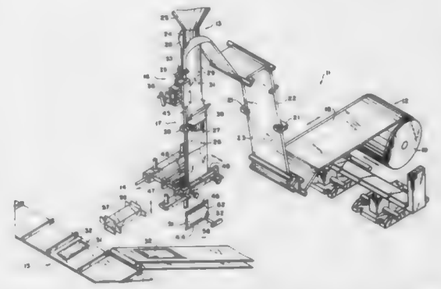
## APPARATUS AND METHOD FOR FORMING RECLOSABLE STORAGE CONTAINERS

**Ronnie D. Talbott, Battle Creek, Mich.; Thomas Tedeschi, Jr., Monmouth Junction, N.J., and Michael P. Hughes, Marshall, Mich., assignors to General Foods Corporation, White Plains, N.Y.**

**Filed Feb. 24, 1987, Ser. No. 17,512**

**Int. Cl.[4] B65B** *61/00*

**U.S. Cl. 53—451** **25 Claims**



**1. A form, fill and seal apparatus of the type that forms film material into flexible pouches, the form, fill and seal apparatus including means for storing and supplying the film material, a generally vertical fill tube assembly downstream thereof and around which the sheet material is generally wrapped, and sealing and severing means downstream of the fill tube assembly for sealing and severing the sheet material into flexible pouches that enclose the filled product therewithin, wherein the apparatus comprises:**

**means associated with said film material storing and supplying means for providing a continuous web of film material having mating flexible closure strips longitudinally positioned at generally opposing locations along said continuous web of film material, said mating flexible closure strips having generally complementary interlocking means for selectively engaging and disengaging said strips from each other;**

**flexible closure strip engagement means associated with said generally vertical fill tube assembly, said engagement**

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means engaging said mating flexible strips together to form a flow of continuous joined web of film material having mated flexible closures strips;

web spreading means located generally vertically downstream of said engagement means, said web spreading means receiving said continuous joined web of film material to modify its cross-section, configuration by increasing a longitudinal dimension of its cross-section, said web spreading means including means for guiding said mated flexible closure strips during passage of the joined web through said spreading means;

a pair of pinch rollers positioned a substantial distance down stream from a forming collar so that the film material can accomodate movement of the mating flexible closure strips into alignment with each other until their respective interlocking profiles interlock; and

said sealing and severing means seals and severs said joined web downstream of said spreading means for completing formation of pouches from said joined web.

19. A form, fill and seal method for forming film material into flexible pouches, filling the pouches with product and sealing the pouches, wherein the method comprises:

providing a continuous web of film material having mating flexible closure strips longitudinally positioned at generally opposing locations along said continuous web of film material, said mating flexible closure strips having generally complementary interlocking means for selectively engaging and disengaging said strips from each other;

guiding the mating flexible strips together by means of a pair of pinch rollers positioned a substantial distance down stream from a forming collar so that the film material can accomodate movement of the mating flexible closure strips into alignment with each other until their respective interlocking profiles interlock.

engaging said mating flexible strips together to form a flow of continuous joined web of film material having mated flexible closure strips;

thereafter spreading said flow of continuous joined web of film material to modify its cross-sectional configuration by increasing a longitudinal dimension of its cross-section, said web spreading step including guiding said mated flexible closure strips; and

sealing and severing said joined web at a location downstream of the location of said spreading step in order to complete formation of pouches from said joined web.

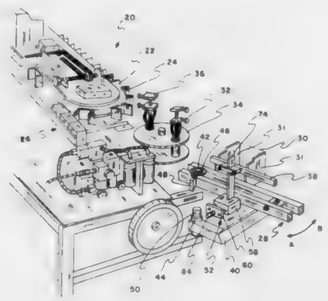
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**4,745,732**

## PACKAGING MACHINES HAVING CHART SETTING CAPABILITIES

**Steven Tisma, Chicago, Ill., assignor to Tisma Machine Corporation, Chicago, Ill.**

**Filed Sep. 15, 1986, Ser. No. 907,497**
**Int. Cl.[4] B65B** *43/14, 43/26*
**U.S. Cl. 53—564** **16 Claims**



1. In an automatic packaging machine an assembly comprising a table having a radially movable arm attached thereto at a pivot point about which the arm swings, a circular scale mounted at said pivot point, a pointer associated with said scale for indicating an azimuth at which said arm extends away from said table, means for linearly moving a part relative to said machine, linear scale means extending from said machine past said linearly moving part, and pointer means associated with said linearly moving part for identifying on the linear scale the position of said linearly moving part.

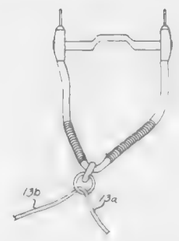
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**4,745,733**

## HORSE TACK BIT

**Gerald R. Bork, 36631 Hathaway, New Baltimore, Mich. 48047**

**Filed Feb. 5, 1987, Ser. No. 12,727**
**Int. Cl.[4] B68B** *1/06*
**U.S. Cl. 54—7** **12 Claims**



1. A bit for use in riding an animal said bit comprising:

a mouthpiece having two ends;

two opposed tubular cheekpieces, each of said cheekpieces including an angled shank portion attached to an end of the mouthpiece and extending rearwardly, downwardly and inwardly therefrom and a flexible portion;

a bridle ring disposed at an end of each cheekpiece proximate the angled portion thereof;

a connector disposed at an end of each cheekpiece proximate the flexible portion thereof and having opposed arms and a central leg angularly disposed with respect to the arms;

a flexible connecting means extending through the cheekpieces for connecting the bridle rings to the arms of the connector; and wherein

when a set of reins is attached to the connector, tensioning the reins in one direction indicating a turn in a direction opposite from the direction of tension will cause the connector to exert a cantilever action on the cheekpiece and associated bridle ring opposite from the direction of tension with respect to the other cheekpiece causing pressure to be applied to the animal's head opposite from the direction of tension, thereby turning the animal's head in the opposite direction of the tension.

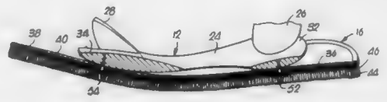
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**4,745,734**

## RIDING SADDLE WITH FLEXIBLE SKIRTS

**Roy L. Brown, Rte. 2, Box 132, Nevada, Mo. 64772**

**Filed Jun. 23, 1986, Ser. No. 877,115**
**Int. Cl.[4] B68C** *1/02*
**U.S. Cl. 54—44** **8 Claims**



1. A riding saddle for placement on a horse for supporting a rider thereon, said saddle comprising:

a tree frame including a pair of laterally spaced-apart forward sections each presenting a first effective surface area and a forward contact zone smaller than the first effective surface area on the underside thereof;

first and second flexible, resilient, laterally spaced-apart skirts each formed of material giving the skirt an initial shape which can be flexed during use of the saddle, with the skirt returning to its initial unflexed shaped when flexing forces are relieved,

each of said skirts further including an enlarged forward portion presenting a second effective surface area and being configured to overlie a respective withers section of a horse on which the saddle is placed,

said tree frame being located in superposed relationship to said skirts with said forward contact zones of said forward sections of said tree frame in engagement with a corresponding enlarged forward portion of a skirt therebeneath,

the second effective surface area of each of said skirts being larger than and extending outwardly and forwardly of the adjacent first effective surface area presented by said tree frame forward section thereabove; and

means for effecting a substantially rigid connection between said forward contact zone of each tree frame forward section and the corresponding skirt forward portion,

there being substantial clearance between the underside of each tree frame forward section surrounding said contact zone and the adjacent portion of the corresponding skirt therebeneath, for permitting substantial flexing of each skirt relative to said tree frame during use of the saddle.



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**4,745,736**

## IMPLEMENT TINES

**Viryle L. Copley, Zumbrota, Minn., assignor to Carol W. Brekken, Zumbrota, Minn., a part interest**

**Filed Aug. 31, 1987, Ser. No. 91,033**
**Int. Cl.[4] A01D** *80/02*
**U.S. Cl. 56—400** **7 Claims**



1. An implement tine for attachment to an implement crossbar comprising:

a bracket for mounting to an implement crossbar, said bracket having a web therein for engaging a hook on an implement tooth;

said implement tooth having said hook located on one end of said tooth, said hook extending around said web in said bracket to provide a mechanical connection between said bracket and said tooth, said mechanical connection permitting lateral pivotal motion of said tooth; and

a resilient mount encompassing the mechanical connection of said tooth with said bracket, said resilient mount providing lateral resiliency if said implement tooth is laterally deflected by an obstruction to provide a resilient implement tine for attachment to said implement crossbar that is resiliently deflected and returned to its original position regardless of the direction of lateral deflection of said implement tooth.

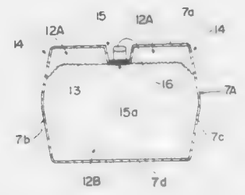
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**4,745,735**

## GRASS COLLECTING CONTAINER FOR GRASS MOWER

**Takao Katayama, Sennan, Japan, assignor to Kubota, Ltd., Osaka, Japan**

**Filed Dec. 29, 1986, Ser. No. 947,239**
**Claims priority, application Japan, Jan. 7, 1986, 61-789[U]; Sep. 4, 1986, 61-135882[U]**
**Int. Cl.[4] A01D** *34/70*
**U.S. Cl. 56—202** **6 Claims**



1. A grass collecting container for a lawn mower comprising a container body arranged to be attached to a vehicle body of said lawn mower, said container body including a grass collecting front opening, a rear wall, top and bottom walls and laterally spaced side walls, said side walls further having oppositely disposed ventilating openings positioned in proximity to said top wall, a depressed area extending medially of said top wall, a handle in said depressed area, said handle including an upper face which lies in substantially the same plane as an upper face of said top wall, and a mesh member engaging said depressed area in said top wall and further including terminal side portions arranged to engage each of said side walls beneath said ventilating openings, said mesh member and said top wall defining a ventilating space therebetween which is in communication with said ventilating openings.

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**4,745,737**

## PROCESS FOR THE STOPPING AND RESTARTING OF AN ARRANGEMENT FOR OPEN-END FRICTION SPINNING AND A DEVICE FOR THIS PURPOSE

**Wolfgang Feuchter, Deggingen Reichenbach, Fed. Rep. of Germany, assignor to Fritz Stahlecker, Bad Überkingen and Hans Stahlecker, Süssen, both of, Fed. Rep. of Germany**

**Filed Apr. 14, 1987, Ser. No. 38,148**
**Claims priority, application Fed. Rep. of Germany, Apr. 25, 1986, 3614032**
**Int. Cl.[4] D01H** *15/02, 1/135*
**U.S. Cl. 57—263** **35 Claims**

1. Process for operating an open-end friction spinning unit of the type including:

movable friction surface means defining a yarn forming region;

fiber feeding means for feeding fibers to said yarn forming region; and

suction means for creating a suction effect on said yarn forming region;

said process comprising:

feeding fibers to said yarn forming region while creating a suction effect at a first level;

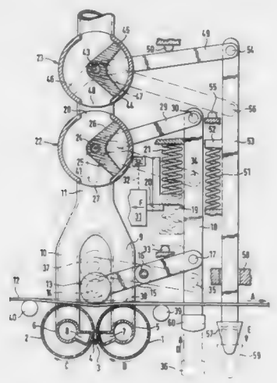
stopping said fiber feeding in response to yarn breakage;

reducing the suction effect from said first level to an inter-

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mediate level greater than an interrupted suction effect when said fiber feeding is interrupted; and



interrupting said suction means no later than a point when a yarn end is returned to the yarn forming region.

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**4,745,738**

**CLEANING ARRANGEMENT FOR OPEN-END FRICTION SPINNING MACHINE**

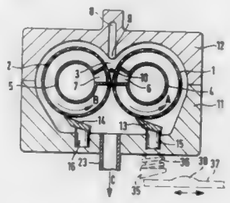
**Fritz Stahlecker, Josef-Neidhart-Strasse 18, 7347 Bad Überkingen, Fed. Rep. of Germany**

**Continuation of Ser. No. 838,431, Mar. 10, 1986, abandoned, which is a continuation of Ser. No. 677,465, Dec. 3, 1984, abandoned. This application Jan. 20, 1987, Ser. No. 6,280**

**Claims priority, application Fed. Rep. of Germany, Dec. 1, 1983, 3343483**

**Int. Cl.[4] D01H** *7/885*

**U.S. Cl. 57—301** **22 Claims**



1. Open-end friction spinning apparatus comprising:

at least one pair of friction roller surfaces on which yarn is formed defining a substantially linear yarn forming region therebetween;

means for withdrawing said formed yarn along said substantially linear yarn forming region; and

cleaning means for cleaning at least one of the pair of friction roller surfaces, said cleaning means mechanically contacting at least a portion of the surface of at least one of the pair of friction roller surfaces during normal yarn formation on and withdrawal from said friction roller surfaces during a cleaning operation.

**4,745,739**

**FUEL METERING DEVICE FOR A TURBOJET ENGINE**

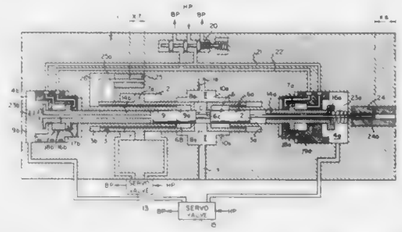
**Jean-Yves L. N. Bezard, Vaux le Penil, and Jean-Marie Brocard, Rubelles, both of France, assignors to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation "S.N.E.C.-M.A.", Paris, France**

**Filed Jan. 17, 1986, Ser. No. 819,625**

**Claims priority, application France, Jan. 24, 1985, 85 00951**

**Int. Cl.[4] F02C** *9/26*

**U.S. Cl. 60—39.281** **23 Claims**



1. A fuel metering device for a turbojet engine comprising:

(a) a housing having a fuel inlet, a fuel outlet and defining chamber means interconnecting the fuel inlet and the fuel outlet;

(b) a first valve means slidably supported by the housing so as to extend through the chamber means, the first valve means being movable along a first axis, the first valve means also defining a passage therethrough to allow fuel to flow from the fuel inlet to the fuel outlet;

(c) a second valve means slidably supported by the housing so as to move along a second axis, the second valve means oriented so as to interact with the first valve means so as to meter the flow of fuel through the housing;

(d) first actuating means to move the first valve means relative to the housing;

(e) second actuating means to move the second valve means relative to the housing;

(f) adjustable stop means acting on one of the first and second valve means to limit its axial movement during normal operating conditions; and,

(g) third actuating means connected to the adjustable stop means so as to reposition the stop means to retracted positions should one of the valve means become immovable such that the remaining movable valve means may continue to meter the flow of fuel at the desired value.

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**4,745,740**

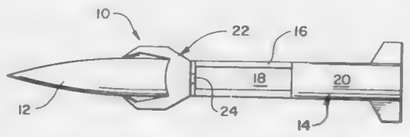
**VELOCITY CONTROLLER FOR RAMJET MISSILE AND METHOD THEREFOR**

**Braxton M. Dunn, Kent, and Lawrence E. Fink, Renton, both of Wash., assignors to The Boeing Company, Seattle, Wash.**

**Continuation of Ser. No. 428,766, Sep. 30, 1982, abandoned. This application Feb. 24, 1986, Ser. No. 833,132**

**Int. Cl.[4] F02K** *7/18*

**U.S. Cl. 60—234** **4 Claims**



1. A control system for a ramjet missile where said missile has a front end and a rear end, and where said missile comprises:

(a) a combustion section defining a through combustion



passageway and containing a solid fuel positioned adjacent to said passageway;

(b) an inlet section defining an air inlet having an air inlet area into which ambinet air flows;

(c) an air passageway which leads from said inlet to said combustion passageway and which is arranged so that substantially all of the air entering the inlet flows through said air passageway and into said combustion passageway

said control system comprising:

(a) inlet area cover means positioned at said inlet and being movable from at least a maximum area position where there is maximum air flow into said inlet, to intermediate positions at which there is a lesser air flow into said inlet;

(b) actuating and control means to move said inlet area cover means between said maximum area position and said intermediate positions so as to control air flow into said inlet as a means of controlling burn rate of said fuel to in turn control velocity of the missile;

(c) said control system being characterized in that said actuating and control means is substantially solely responsible for controlling burn rate of the fuel by regulating movement of the inlet closure means to control the amount of air entering said inlet;

(d) said inlet section comprising an edge lip portion having an inside surface portion at least partly defining said inlet and an outside surface portion, said inlet cover means comprising a cover member mounted to be movable toward and away from said edge lip portion so as to cause greater or lesser amounts of air to be diverted from said inlet and spilled over said outside surface portion;

(e) said cover member having a forward end and a rear end, said cover member being pivotally mounted at the forward end with the rear end of the cover member being movable angularly toward and away from said edge lip portion.

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**4,745,741**

**DOUBLE AIR-FUEL RATIO SENSOR SYSTEM HAVING IMPROVED RESPONSE CHARACTERISTICS**

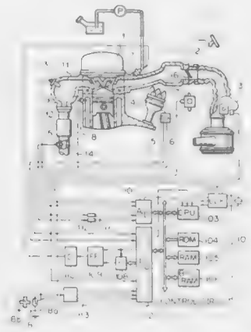
**Takatoshi Masui, Mishima; Toshinari Nagai; Toshiyasu Katsuno, both of Susono; Yoshiki Chujo, Mishima; Nobuaki Kayanuma, Gotenba; Hironori Bessho, Susono; Yasushi Sato, Mishima, and Toshio Tanahashi, Susono, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan**

**Filed Apr. 2, 1986, Ser. No. 847,304**

**Claims priority, application Japan, Apr. 4, 1985, 60-69930; Apr. 5, 1985, 60-71175; Apr. 13, 1985, 60-77553; May 22, 1985, 60-108330**

**Int. Cl.[4] F02D** *41/14*

**U.S. Cl. 60—274** **144 Claims**



1. A method for controlling the air-fuel ratio of an internal combustion engine having a catalyst converter for removing pollutants in the exhaust gas thereof, and upstream-side and downstream-side air-fuel ratio sensors disposed upstream and downstream, respectively, of said catalyst converter for detecting a concentration of a specific component in an exhaust gas, comprising the steps of:

calculating a first air-fuel ratio correction amount in accordance with the output of said upstream-side air-fuel ratio sensor:

calculating a second air-fuel ratio correction amount in accordance with the output of asid downstream-side air-fuel ratio sensor;

adjusting the actual air-fuel ratio in accordance with said first and second air-fuel ratio correcton amounts;

determining whether or not said engine is in a predetermined state; and

prohibiting the calculation of said second air-fuel ratio correction amount while carrying out the calculation of said first air-fuel ratio correction amount when said engine is in said predetermined state.

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**4,745,742**

**DUAL PATH EXHAUST PIPE FOR MOUNTING AN OXYGEN SENSOR**

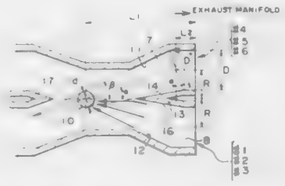
**Mitsuhiro Nada, Susono, and Hiroshi Sawada, Gotenba, both of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan**

**Filed Aug. 17, 1987, Ser. No. 85,965**

**Claims priority, application Japan, Aug. 20, 1986, 61-125788[U]**

**Int. Cl.[4] F01N** *3/10*

**U.S. Cl. 60—276** **15 Claims**




1. An exhaust pipe segment for mounting an oxygen sensor said segment comprising:

an upstream end adapted to be connected to a dual exhaust manifold of an internal combustion engine and being formed with two separated tubular paths, each path having a longitudinal axis and said segment having an axis positioned between the two paths;

a downstream end;

a communicating portion, axially spaced from said upstream end, wherein said two paths are open to each other so as to communicate with each other, said communicating portion including an oxygen sensor mounting position; and

tapered wall surfaces of said two paths located upstream of said oxygen sensor mounting position which face said axis of the exhaust pipe segment and are located farther from said axis than the longitudinal axes of said two paths, the tapers of said tapered wall surfaces being determined such that longitudinal extensions of said tapered wall surfaces tangentially contact an outside surface of an oxygen sensor when said oxygen sensor is installed at said mounting position.

**4,745,743**

## HYDRAULIC FLUID SUPPLY ASSEMBLY

**Francois Boulanger, Creil, France, assignor to Massey-Ferguson Services N.V, Curacao, Netherlands Antilles**

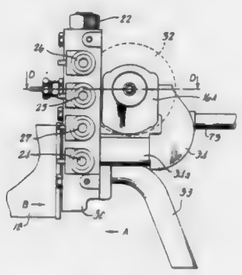
**PCT No. PCT/EP85/00495, § 371 Date May 22, 1986, § 102(e) Date May 22, 1986, PCT Pub. No. WO86/02413, PCT Pub. Date Apr. 24, 1986**

**PCT Filed Sep. 24, 1985, Ser. No. 888,652**

**Claims priority, application United Kingdom, Oct. 10, 1984, 8425655**

**Int. Cl.⁴ F16D** *31/00*

**U.S. Cl. 60—325** **7 Claims**



1. An hydraulic fluid supply assembly for an agricultural or industrial tractor or similar vehicle, the assembly comprising:

a mounting plate for closing an aperture in a casing of the vehicle which acts as a reservoir for hydraulic fluid,

an hydraulic pump carried on one side of the plate,

a pump feed means carried by the plate and connected with the pump,

a filter mount carried on the other side of the plate and hydraulically connected with the pump and the pump feed means,

a filter carried by the mount, the filter being removable from the mount with the plate secured in position closing the aperture,

one or more hydraulic valves or other hydraulic consumers carried by the plate, and

supply passages formed internally in the mounting plate to connect one or more the consumers with the pump,

the assembly being demountable from the casing as a unit.

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**4,745,744**

## POWER TRANSMISSION

**Jeffrey P. Cherry, Rochester; Melvin A. Rode, Bloomfield, and Gene Y. Wen, Troy, all of Mich., assignors to Vickers, Incorporated, Troy, Mich.**

**Continuation-in-part of Ser. No. 849,542, Apr. 8, 1986. This application Oct. 27, 1986, Ser. No. 923,185**

**Int. Cl.⁴ F16D** *31/00*

**U.S. Cl. 60—368** **4 Claims**

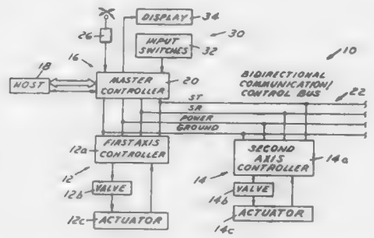
**MICROFICHE APPENDIX INCLUDED**

**(1 Microfiche, 41 Pages)**

1. An electrohydraulic system with distributed control comprising

a plurality of electrohydraulic devices responsive to electronic control signals for performing hydraulic operations and control means for providing said control signals, said control means each associated with and dedicated to di- control means each associated with the dedicated to directly controlling operation at an associated electrohydraulic device, central control means, and means coupling said central control means to all of said device control means for coordinating operation of said electrohydraulic devices controlled thereby,

characterized in that said central control means comprises host control means for generating control signals for said device control means to coordinate operation thereof and having a low speed I/O port for communicating said control signals, and master control means including a low speed I/O port for coupling to said host control means to receive said control signals, means for storing said control signals, and a high speed serial I/O port for communicating said control signals, and




in that said coupling means comprises a high speed serial I/O bus coupled to said high speed serial I/O port and common to all of said device control means, said device control means being constructed for connection to said common bus for individual communication with said master control means.

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**4,745,745**

## ENERGY STORAGE DEVICE

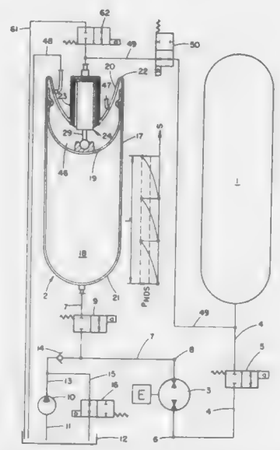
**Faust Hagin, Munich, Fed. Rep. of Germany, assignor to MAN Nutzfahrzeuge GmbH, Munich, Fed. Rep. of Germany**

**Filed Jul. 1, 1987, Ser. No. 69,003**

**Claims priority, application Fed. Rep. of Germany, Jul. 2, 1986, 3622120; Feb. 12, 1987, 3705642**

**Int. Cl.⁴ F16H** *39/46*

**U.S. Cl. 60—414** **14 Claims**



1. An energy storage device for use in connection with a system supplying surplus energy and requiring additional energy from time to time, said device comprising:

high pressure and low pressure liquid accumulators,

at least one pump and motor unit constituting a device able to be used as a pump and a motor, which is connected to said system and is adapted during charging of the high pressure liquid accumulator from the low pressure accumulator to function as a pump and on discharge thereof to function as a motor,

and pressure lines,

at least one of the pressure lines connecting the high pressure accumulator and the pump and motor unit having a shut off valve therein, said low pressure liquid accumulator having a piston delimiting a storage space therein, said piston being connected with a telescopic pressure cylinder bearing on an end plate of said storage space, said telescopic pressure cylinder being adapted to be connected via an operating pressure line with the high pressure liquid accumulator for pressurisation.



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**4,745,746**

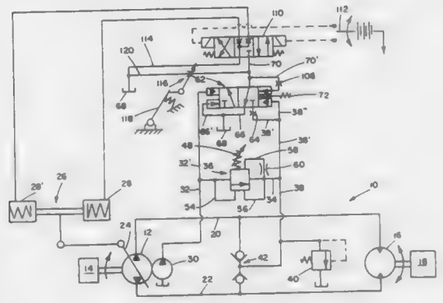
## POWER CONTROL FOR A HYDROSTATIC TRANSMISSION

**Kerry G. Geringer, Gilbert, Iowa, assignor to Sundstrand Corporation, Rockford, Ill.**

**Continuation of Ser. No. 899,562, Aug. 22, 1986, abandoned. This application Oct. 6, 1987, Ser. No. 106,919**

**Int. Cl.⁴ F16D** *31/02*

**U.S. Cl. 60—447** **13 Claims**



1. A power control for a hydrostatic transmission having a pair of hydraulic units at least one of which being of variable displacement, said variable displacement hydraulic unit having hydraulic servo means for varying the displacement thereof, said hydrostatic transmission furthermore having a fixed displacement speed signal pump driven at a speed proportional to the input speed of the transmission and providing a hydraulic input speed signal, said power control comprising first and second valves in series flow relationship between said speed signal pump and said servo means, said first valve being a variable orifice valve spring biased toward a cloeed position and biased by the input speed signal toward an open position to establish a pressure drop having a generally linear relationship to the input speed signal, said second valve being spring biased toward a closed position relative to communicating the output of said first valve to said servo means and having first and second opposed pilots connected across said first valve so that the input speed signal induced pressure drop biases said second valve toward an open position, said second valve also having an output feedback proportional to pressure in said servo means and connected to a third pilot biasing said second valve toward the closed position.

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**4,745,747**

## HYDRAULIC SYSTEM FOR THE SUPPLYING OF HYDROSTATIC STEERING SYSTEM

**Wolfgang Krausse, Lohr-Wombach, and Norbert Mucheyer, Rechtenbach, both of Fed. Rep. of Germany, assignors to Mannesmann Rexroth GmbH, Fed. Rep. of Germany**

**Filed Apr. 15, 1986, Ser. No. 852,203**

**Claims priority, application Fed. Rep. of Germany, Apr. 15, 1985, 3513452**

**Int. Cl.⁴ F16D** *31/02*

**U.S. Cl. 60—452** **12 Claims**

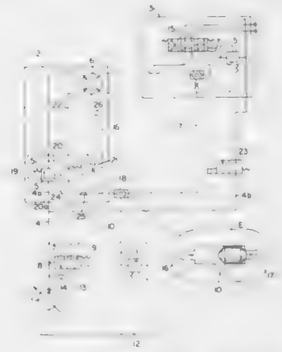
1. A hydraulic system for supplying a hydrostatic steering system, the hydraulic system comprising:

a central variable capacity pump for pumping hydraulic fluid; the steering system being operable with hydraulic fluid; a first fluid supply line from the pump to the steering system;

a secondary consuming device operable with hydraulic fluid; a second fluid supply line from the pump to the secondary consuming device; the secondary consuming device having an operating condition at which it consumes hydraulic fluid, a standby condition at which it does not consume the same pressure level of fluid it consumes in its operating condition, and a disconnected condition at which it is disconnected from the second fluid supply line;

a steering system first consuming device hydraulic pressure report line carrying the pressure of the steering system; a second consuming device hydraulic pressure report line for the secondary consuming device and carrying the pressure of the secondary consuming device;

a changeover valve connected on one side to the first report line and on another side to the second report line, and the changeover valve being movable by whichever of the first and the second report lines is reporting the higher pressure for blocking the other of the first and second report lines;



a control device connected with the changeover valve for maintaining the changeover valve in the position which closes the second report line when the secondary consuming device is at a standby or at a disconnect condition;

a volume governor for the pump for controlling the quantity of hydraulic fluid delivered to the first and second fluid supply lines by the pump, which is dependent upon the pressure at the volume governor; the changeover valve being connected with the volume governor for communicating the higher pressure reported by the unblocked report line to the volume governor for operating the volume governor for, in turn, controlling the quantity of hydraulic fluid in order to maintain a volume level set by the volume governor.

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**4,745,748**

## CLUTCH VALVE SYSTEM FOR STATIC HYDRAULIC CONTINUOUSLY VARIABLE TRANSMISSION

**Tsutomu Hayashi, Tokyo; Kazuhito Ito, Saitama; Yoshihiro Yoshida, and Mitsuru Saito, both of Tokyo, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 879,335, Jun. 27, 1986, abandoned. This application Jun. 30, 1987, Ser. No. 68,734**

**Claims priority, application Japan, Jun. 28, 1985, 60-142253; Jul. 17, 1985, 60-157791**

**Int. Cl.⁴ F16D** *39/00*

**U.S. Cl. 60—489** **4 Claims**

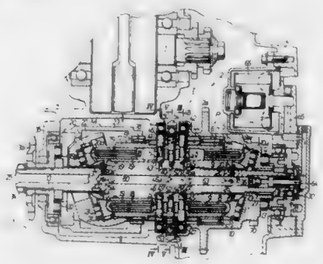
1. A clutch valve system for use in a static hydraulic continuously variable transmission in which a hydraulic closed circuit

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is formed between a swashplate type hydraulic pump and a swashplate type hydraulic motor, wherein

a first annular oil chamber and a second annular oil chamber are concentrically defined in the pump cylinder adjacent to annularly arranged cylinder bores of a pump cylinder to the hydraulic pump, the first oil chamber being adapted to be connected to the cylinder bores which are in a discharge stroke and the second oil chamber being adapted to be connected to the cylinder bores which are in a suction stroke;



a plurality of clutch valves are radially arranged in the pump cylinder for providing the communication or discommunication between both the oil chambers by the radial movement thereof; and

a clutch control ring engaged with the clutch valves for relative rotation therebetween so as to surround these clutch valves is pivoted on a fixing structure for pivotal movement between a clutch ON position in which it brings all the clutch valves into a closed state in the diametrical direction of the pump cylinder and a clutch OFF position in which it brings some of the clutch valves into an opened state.

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**4,745,749**

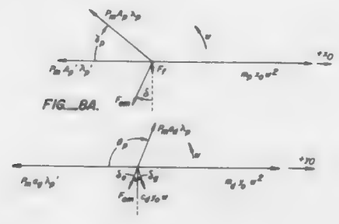
**SOLAR POWERED FREE-PISTON STIRLING ENGINE**

**Glendon M. Benson, Danville, Calif., assignor to New Process Industries, Inc., Minneapolis, Minn.**

**Division of Ser. No. 518,607, Jul. 29, 1983, Pat. No. 4,642,988, which is a continuation-in-part of Ser. No. 292,771, Aug. 14, 1981, abandoned. This application Oct. 7, 1986, Ser. No. 916,130**

**Int. Cl.[4] F02G** *1/06*

**U.S. Cl. 60—518** **38 Claims**




1. A method for controlling the operation of a free piston Stirling engine including a displacer piston having an integral electrical linear driver, an alternator piston driven by the displacer piston and including means for generating an electric current, and variable volume gas springs in the cylinders for the displacer and alternator piston, said method comprising the steps of:

sensing the output voltage of the generated electric current;

controlling the movement of the displacer piston by varying the volume of the gas spring in the displacer cylinder and the status of the linear driver responsively to the sensed output voltage;

sensing the frequency of the alternator piston; and

controlling the frequency of the alternator piston by varying the volume of the gas spring of the alternator cylinder responsive to the sensed frequency.

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**4,745,750**

**AUXILIARY-ENERGY-SUPPLIED BRAKE SLIP CONTROL SYSTEM OF A VEHICULAR HYDRAULIC BRAKE SYSTEM**

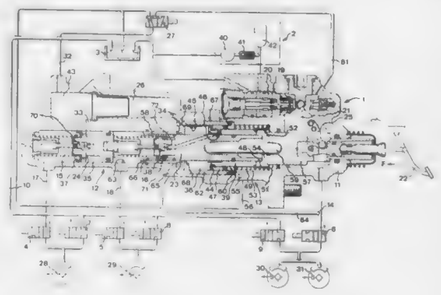
**Juan Belart, Walldorf; Wolfram Seibert, Pfungstadt; Norbert Ocvirk, Offenbach; Juergen Schonlau, Niedernhausen, and Guenter Trach, Offenbach, all of Fed. Rep. of Germany, assignors to Alfred Teves GmbH, Frankfurt Am Main, Fed. Rep. of Germany**

**Filed Sep. 18, 1986, Ser. No. 908,789**

**Claims priority, application Fed. Rep. of Germany, Sep. 18, 1985, 3533256**

**Int. Cl.[4] B60T** *13/00*

**U.S. Cl. 60—547.1** **4 Claims**



1. A slip control brake system for use with vehicles, said system comprising a master cylinder having a working chamber and a master cylinder piston slideably arranged therein, a brake pedal operable brake booster connected with the master cylinder piston for assisting the operation of same, said brake booster having a booster chamber connected to an auxiliary energy source by a brake valve for controlling the flow of auxiliary energy into said booster chamber, a prechamber between said booster chamber and said working chamber, said prechamber communicating with said working chamber and with a main valve, said main valve having a first position for connecting said prechamber to a fluid reservoir and a second position for connecting said prechamber to said booster chamber, said main valve being in said first position during a normal brake application and in said second position during a slip control brake application whereby static pressure is utilized during a normal brake application and dynamic pressure is utilized during a slip control brake application, a sleeve slideably arranged on said master cylinder piston and also relative to said working chamber, one end face of said sleeve being closer to said booster chamber than the other end face thereof and being pressurized by fluid in said booster chamber, the other end face of said sleeve being adjacent said working chamber for exposure to fluid in said working chamber, said master cylinder piston having a radial projection adjacent said other end face of said sleeve for moving said sleeve when said master cylinder piston moves toward said brake booster on release of the brake.



**4,745,751**

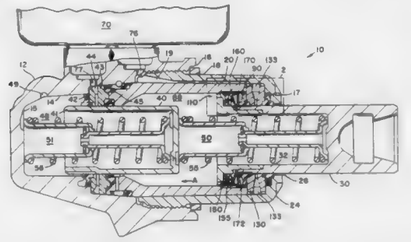
**MASTER CYLINDER WITH FAST FILL VALVING MECHANISM**

**Robert F. Gaiser, Stevensville, Mich., assignor to Allied Corporation, Morristown, N.J.**

**Filed Feb. 3, 1987, Ser. No. 10,361**

**Int. Cl.[4] B60T** *11/08*

**U.S. Cl. 60—578** **19 Claims**



1. A master cylinder, comprising a master cylinder housing with a bore extending axially therein, a reservoir providing fluid for said bore, an end of said housing having a bearing member attached thereto and retaining a sleeve member within said bore, a pair of pistons associated with said master cylinder housing and one of said pistons extending through an opening in said bearing member, an end of said one piston having a piston support guide, fast fill seal, seal retainer, and spring means disposed thereat between the end of the one piston and sleeve member and comprising an overcenter spring, the fast fill seal mounted upon the seal retainer which engages said spring means, the fast fill seal engaging sealably the sleeve member and the piston support guide, application movement of said one piston effecting increased pressure within an associated pressure chamber of said master cylinder and the increased pressure transmitted to a brake circuit, the increased pressure causing said seal retainer and fast fill seal to be displaced axially against biasing of said overcenter spring so that the fast fill seal disengages the piston support guide and permits fluid pressure within said chamber to be communicated past said fast fill seal and seal retainer.

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**4,745,752**

**EXHAUST GAS TURBINE TYPE SUPERCHARGER**

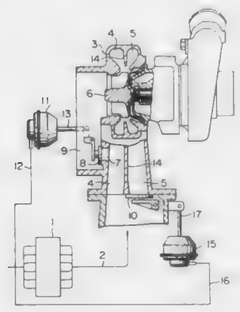
**Satoshi Suzuki, Katsuta, Japan, assignor to Hitachi, Ltd., Tokyo, Japan**

**Filed Nov. 1, 1985, Ser. No. 793,765**

**Claims priority, application Japan, Nov. 2, 1984, 59-230199; Dec. 29, 1984, 59-279706**

**Int. Cl.[4] F02D** *23/00*

**U.S. Cl. 60—602** **3 Claims**



1. An exhaust gas turbine type supercharger for an engine, the supercharger having a turbine and a compressor, a casing means for receiving said turbine, partition wall means for dividing the casing means into two scroll chambers, and means for supplying an exhaust gas to said two scroll chambers to rotate said turbine and to feed the engine with supercharged air through said compressor, said supercharger comprising a bypass passage means for connecting one of said scroll chambers to a portion downstream of said turbine, a first flow rate control valve means for controlling a flow rate of the exhaust gas passing through said bypass passage means, and a second flow rate control valve means for controlling a flow rate of the exhaust gas being fed to the other of said scroll chambers, and means for controlling said first and second flow rate control valve means in accordance with an electric signal representing an engine RPM corresponding to a supercharged pressure.

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**4,745,753**

**ENGINE TURBO-SUPERCHARGER CONTROL**

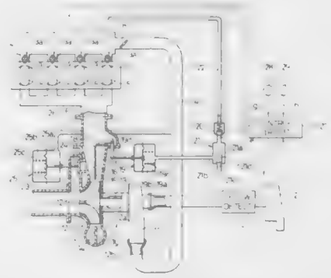
**Tomoo Tadokoro; Ikuo Matsuda, and Masami Nakao, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan**

**Filed May 28, 1986, Ser. No. 867,540**

**Claims priority, application Japan, May 29, 1985, 60-117338; May 29, 1985, 60-117339; May 29, 1985, 60-117341**

**Int. Cl.[4] F02B** *37/12*

**U.S. Cl. 60—602** **17 Claims**



1. An engine turbo-supercharger including exhaust gas turbine means provided in exhaust gas passage means of an engine, compressor means provided in intake passage means of said engine and adapted to be driven by said turbine means, variable nozzle means provided in said exhaust gas passage means upstream the turbine means for changing an effective area of the exhaust gas passage means leading to said turbine means, said variable nozzle means having a first position wherein a smaller effective passage area is provided and a second position wherein a larger effective passage area is provided, bypass passage means provided in said exhaust gas passage means and bypassing said turbine means, bypass valve means for opening said bypass passage means when the intake pressure of said engine increases beyond a predetermined value so that the intake pressure is maintained below the predetermined value, characterized by control means for detecting an engine operating condition wherein the engine intake pressure becomes said predetermined value when said variable nozzle means is in the first position and moving said variable nozzle means to said second position when said engine operating condition is detected.

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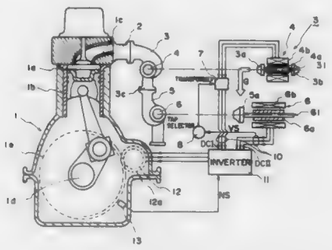


**4,745,754**

## TURBO COMPOUND ENGINE

**Hideo Kawamura, Kanagawa, Japan, assignor to Isuzu Motors Limited, Tokyo, Japan**

**Filed Oct. 16, 1986, Ser. No. 919,757**
**Claims priority, application Japan, Oct. 19, 1985, 60-233935**
**Int. Cl.⁴ F02B** *37/04, 41/10*
**U.S. Cl. 60—608** **4 Claims**



1. A turbo compound engine having a first exhaust turbine coupled to an exhaust pipe of an internal combustion engine and a second exhaust turbine coupled to an exhaust port of the first exhaust turbine; comprising:

a first generator drivable by said first exhaust turbine;

a second generator drivable by said second exhaust turbine;

a motor operatively coupled to an output shaft of said internal combustion engine;

speed detecting means for detecting the speed of rotation of said internal combustion engine; and

control means for controlling the frequency of electric power, which is the sum of electric power outputs from said first and second generators and supplied to said motor, based on a signal from said speed detecting means, in order to control operation of said motor.

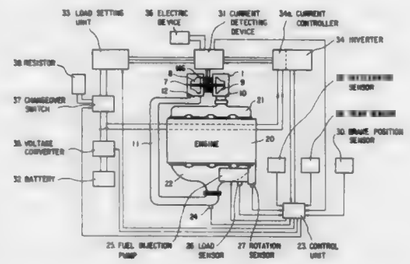
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**4,745,755**

## CONTROL SYSTEM FOR SUPERCHARGED INTERNAL COMBUSTION ENGINE

**Hideo Kawamura, Samukawa, Japan, assignor to Isuzu Motors Limited, Tokyo, Japan**

**Filed Jul. 23, 1986, Ser. No. 888,406**
**Claims priority, application Japan, Jul. 26, 1985, 60-165340; Jul. 26, 1985, 60-165341**
**Int. Cl.⁴ F02B** *37/14*
**U.S. Cl. 60—608** **7 Claims**




1. A control system for controlling an internal combustion engine having a supercharger including a rotatable shaft and an exhaust turbine driven by exhaust gas, said control system comprising:

a rotary electric machine mounted on the rotatable shaft of the supercharger for imposing a load on the exhaust turbine of the supercharger;

setting means for setting an engine brake mode of the internal combustion engine; and

operating means for operating said rotary electric machine when the engine brake mode is set by said setting means.

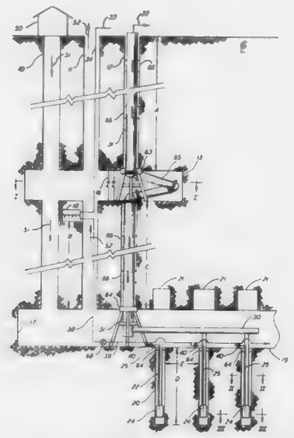
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**4,745,756**

## HDR CLOSED LOOP STEAM GENERATION

**Robert Sederquist, R.F.D. 4 Box 303, Laconia, N.H. 03246**

**Filed Oct. 6, 1987, Ser. No. 105,717**
**Int. Cl.⁴ F03G** *7/00*
**U.S. Cl. 60—641.2** **6 Claims**



1. A well system for extracting geothermal steam energy from hot dry rock comprising in combination:

(1) Three vertical bores into the earth spaced apart by a distance of at least 150 feet in a triangular pattern and being at least eight feet in diameter each, said bores being driven to at least 2,000 feet and terminating in a solid rock formation at a point where the rock temperature exceeds 100° F, said wells being designated respectively supply, utility and steam;

(2) At at least one level greater than 2,000 feet, an enlarged horizontal chamber about said steam bore and two horizontal bores each at least 8 feet in diameter, one connecting said supply bore to said utility bore and the other connecting said utility bore to said steam bore;

(3) A common bottom chamber into said which said bores terminate;

(4) A series of horizontal tunnels, each at least 8 feet in diameter, radiating out from said bottom chamber a distance of at least 1,500 feet each; and

(5) Each of said horizontal tunnels having at least three small bores less than two feet in diameter, descending therefrom to a depth of at least 1 mile there below and to a point where the rock temperature exceeds 500° F.

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**4,745,757**

## COMBINED HEAT RECOVERY AND MAKE-UP WATER HEATING SYSTEM

**Soo Y. Kim, West Hartford, Conn., assignor to Energy Services Inc., Farmington, Conn.**

**Filed Feb. 24, 1987, Ser. No. 17,938**
**Int. Cl.⁴ F22D** *1/50*
**U.S. Cl. 60—667** **20 Claims**

1. A cogeneration plant comprising in combination:

a first stage source of hot gas;

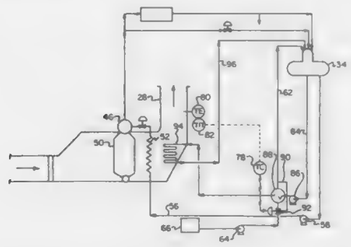
a duct having an inlet for receiving the hot gas and an outlet stack open to the atmosphere;

a second stage recovery heat steam generator including an evaporator situated in the duct, an economizer in the duct downstream of the evaporator, and steam drum fluidly connected to the evaporator and the economizer;

feedwater supply means including a deaerator heater and feedwater pump for supplying deaerated feedwater to the steam drum through said economizer;

makeup water supply means including a makeup pump for delivering makeup water to the deaerator heater;





means fluidly connected to the steam drum for supplying auxiliary steam to the deaerator heater; and

heat exchanger means located between the deaerator and the economizer, for transferring heat from the feedwater to the makeup water, thereby increasing the temperature of the makeup water delivered to the deaerator and decreasing the temperature of the feedwater delivered to the economizer, without fluid exchange.

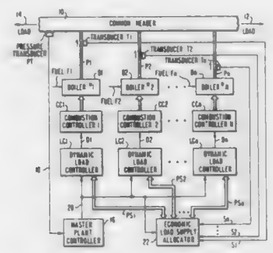
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**4,745,758**

## SYSTEM FOR ECONOMIC UNIT LOAD DISTRIBUTION DURING PROCESS LOAD TRANSITION

**Richard E. Putman, Penn Hills Twp., Allegheny County, Pa., and Katherine A. Gundersen, Chicago, Ill., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Continuation of Ser. No. 860,932, May 8, 1986, abandoned. This application Dec. 15, 1986, Ser. No. 942,947**
**Int. Cl.⁴ F01K** *13/02*
**U.S. Cl. 60—676** **15 Claims**



1. In a plant including a multiplicity of energy conversion units, each having an energy input and all coupled to a common junction for supplying load upon demand to a process; first control means for generating a first signal to govern said energy conversion units to collectively supply load to the process in accordance with the process load demand; and second control means, corresponding to each energy conversion unit, governed by a corresponding second signal to control the energy input of its corresponding energy conversion unit to achieve a desired unit load supply therefrom which contributes to the process load demand, a system for allocating load dynamically and economically among the multiplicity of energy conversion units to meet the process load demand during a transition from one steady-state loading condition to another, said system comprising:

load allocating means including:

means for calculating a cost of operating each energy conversion unit across its corresponding load supply spectrum based on corresponding efficiency characteristics of each unit determined from data measurements collected over the load supply spectrum of its corresponding unit;

means for determining an instantaneous process load demand;

means for deriving a set of unit load supply signals corresponding to each energy conversion unit to meet said instantaneous process load demand and virtual perturbations therefrom based on an optimal economic unit load supply distribution algorithm using said cost of operating calculations for said instantaneous and virtually perturbed values of process load demand;

first means for generating at least one gain control signal for each energy conversion unit based on a function of said corresponding set of unit load supply signals;

second means for generating a bias signal for each energy conversion unit based on a function of at least one signal from said corresponding set of unit load supply signals; and

third means for generating a demand signal for each energy conversion unit based on a function of said first signal; and

load control means for each energy conversion unit, each load control means governed by said first signal to generate said second signal which controls the corresponding energy conversion unit to render a desired unit load supply to meet the change in process load demand during said transition, each load control means including:

fourth means for generating a third signal based on a function of said first signal and corresponding demand signal;

means governed by said corresponding at least one gain signal to gain adjust said third signal and render a fourth signal representative of said gain adjusted third signal; and

fifth means for generating said corresponding second signal based on a function of said fourth and bias signals.

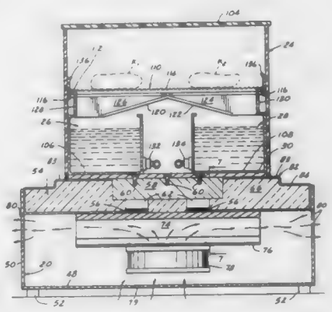
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**4,745,759**

## KIDNEY PRESERVATION MACHINE

**Dan O. Bauer, 277 Kenwood Rd., and Neal W. Bauer, 275 Merriweather, both of Grosse Pointe Farms, Mich. 48236**

**Filed Dec. 23, 1986, Ser. No. 945,641**
**Int. Cl.⁴ F25B** *21/02*
**U.S. Cl. 62—3** **14 Claims**



1. Apparatus for maintaining extracorporeal organs in a viable state during transportation and storage comprising, in combination:

a readily manually transportable insulated enclosure including separable cover and base portions;

means for releasably securing the base and cover portions together;

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a perfusate reservoir in the enclosure;
thermoelectric means in the base portion for cooling the reservoir and interior of the enclosure;
means in the enclosure for supporting an organ for perfusing;
means in the enclosure for directing perfusate expelled from the organ to the perfusate reservoir;
a perfusate pump on the base portion for fluid connection between the reservoir and an organ supported within the enclosure;
control means including means for sensing the temperature and pressure of perfusate being pumped, said control means being connected to said pump and to said thermoelectric means for varying the operation of the pump and thermoelectric means to maintain the temperature and flow or pressure of the perfusate being pumped within predetermined limits; and
wherein said thermoelectric means includes a cooling plate supported in an upwardly facing position on the baes portion, and means supporting the perfusate reservoir in direct heat transfer juxtaposition atop the cooling plate.

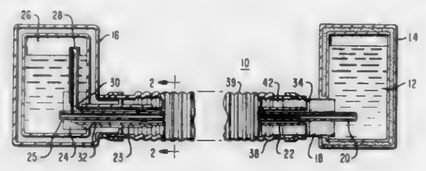
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**4,745,760**

## CRYOGENIC FLUID TRANSFER CONDUIT

**Warren W. Porter, Escondido, Calif., assignor to NCR Corporation, Dayton, Ohio**

**Filed Jul. 21, 1987, Ser. No. 76,414**
**Int. Cl.[4] F17C *7/02***
**U.S. Cl. 62—55** **19 Claims**



1. A cryogenic fluid transfer apparatus used for transferring a cryogenic fluid from a cryogenic reservoir to an enclosure for cooling an integrated circuit comprising:
coupling means, having a venting passage therein, connected to the cryogenic reservoir;
a first conduit means connected to said coupling means at one end and to said enclosure at the other end for transferring the cryogenic fluid from said cryogenic reservoir in a first direction to said enclosure at a first temperature;
a second conduit means connected to said enclosure and said coupling means, and circumferentially located around said first conduit means for transferring the cryogenic fluid from said enclosure at a higher temperature in a direction opposite to said first direction;
said second conduit means communicating with said venting passage for venting said fluid at said higher temperature; and
insulating means connected to said coupling means and said enclosure around said second conduit means for preventing the condensation of moisture from the operating environment.

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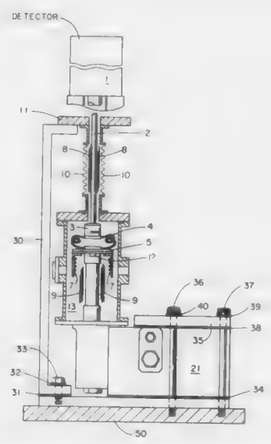
**4,745,761**

## VIBRATION DAMPED CRYOGENIC APPARATUS

**Dipak K. Bazaj, Tucson, Ariz., and David L. Swartz, Westerville, Ohio, assignors to Research & Manufacturing Co., Inc., Tucson, Ariz.**

**Filed Oct. 30, 1985, Ser. No. 792,905**
**Int. Cl.[4] B01D *8/00***
**U.S. Cl. 62—55.5** **2 Claims**

1. A method of inhibiting the transmission of vibration from a cryogenic refrigerator to an adjacent cryogenic detector apparatus to which the refrigerator is operatively interconnected, comprising:
mounting one side of the cryogenic refrigerator to a base plate and mounting said cryogenic detector apparatus to the same base plate through a beam support extending from the base plate to the detector;
providing in the mounting of the refrigerator a first layer of an elastomeric interface between the refrigerator and the base plate; and providing in the mounting of the cryogenic detector, a second layer of an elastomeric interface between the beam support for the detector apparatus and the mounting of the beam support extending from the base plate;




providing a damping mass adjacent a side of the refrigerator opposite the one side mounted to the base plate and providing in the mounting of said damping mass to the opposite side of the refrigerator a further layer of an elastomeric interface between the opposite side of the refrigerator and the damping mass;
whereby the refrigerator and the detector are mounted as masses in a mass/elastomeric/mass elastomeric/mass series springed system to produce an essentially apparently motionless relationship between the refrigerator and the detector.

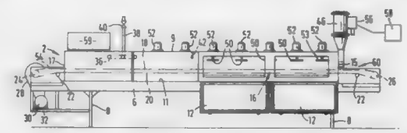
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**4,745,762**

## METHOD AND APPARATUS FOR COOLING OR FREEZING

**Robert I. Taylor, Epsom, England, assignor to The BOC Group, PLC, Windlesham, England**

**Filed Jul. 3, 1985, Ser. No. 752,348**
**Claims priority, application United Kingdom, Jul. 5, 1984, 8417120**
**Int. Cl.[4] F25D *13/06***
**U.S. Cl. 62—63** **17 Claims**



1. A method of cooling or freezing articles in an apparatus capable of being fed continuously with articles to be cooled or frozen, including the steps of loading articles onto an endless belt, conveying the articles through the apparatus, introducing liquefied gas into the apparatus such that it or its cold vapour, or both, comes into contact with the articles, and creating a flow of cold vapour, evolved by sad liquefied gas, in contact with the articles, the improvement comprising the steps of monitoring a chosen part of the surface area along which the laden belt travels, detecting what proportion of the belt in such surface, or a portion thereof, is covered or not covered by articles, generating signals representative of said proportion, comparing said signals with a desired amount, and, in the event that said proportion diverges from that desired, adjusting the belt speed in response to said signals so as to reduce or eliminate the divergence.



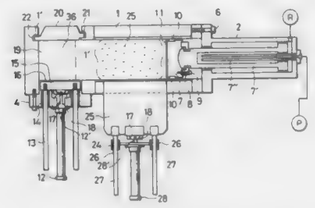
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**4,745,763**

## METHOD FOR PRODUCTION OF COMPRESSION-SOLIDIFIED SNOW

**Hisashi Tsukada; Takahiro Abe; Sugio Ishihara; Junichi Taira, and Hiroo Akabane, all of Hokkaido, Japan, assignors to The Japan Steel Works, Ltd., Tokyo, Japan**

**Division of Ser. No. 26,360, Mar. 16, 1987. This application Oct. 8, 1987, Ser. No. 105,755**
**Claims priority, application Japan, Mar. 14, 1986, 61-55127; Apr. 30, 1986, 61-100070**
**Int. Cl.[4] F25C *1/00***
**U.S. Cl. 62—66** **1 Claim**



1. A method of compressing and solidifying snow, comprising the steps of:
supplying snow having a temperature ranging from 0° to −30° C. into a pressure chamber;
compressing the snow into solidified ice lump having a density of 0.6 g/cm$^3$ or more by a pressure head reciprocally movable within said pressure chamber under conditions of a pressure ranging from 10 to 200 kg/cm$^2$, a head displacement velocity ranging from 0.1 to 150 mm/sec and a pressure holding time ranging from 0 to 300 seconds; and
discharging the solidified snow lump from said pressure chamber.

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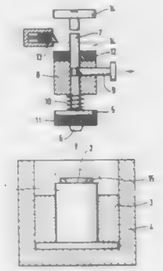
**4,745,764**

## METHOD AND DEVICE FOR METAL-MIRROR CRYOFIXATION OF BIOMEDICAL OR SIMILAR TECHNICAL SPECIMENS

**Hellmuth Sitte, Seefeld, Austria; Helmut Hassig, Homburg-Saar, and Klaus Neumann, Bexbach-Sarr, all of Fed. Rep. of Germany, assignors to Reichert-Jung Optische Werke A.G., Fed. Rep. of Germany**

**Filed Jul. 27, 1987, Ser. No. 78,304**
**Claims priority, application Fed. Rep. of Germany, Jul. 30, 1986, 3625695**
**Int. Cl.[4] F24F *3/16***
**U.S. Cl. 62—78** **18 Claims**

1. Method for metal-mirror cryofixation of bio-medical or similar technical specimens wherein a specimen mounted on a specimen holder is moved at a specified speed relative to a cooled, highly polished, solid surface (metal mirror) until contact takes place between the specimen and metal mirror, whereby the movement is braked until it is zero, and the specimen and the metal mirror are pressed against one another with a force corresponding to the braking, and wherein the specimen and metal mirror are kept in mutual contact, whereby at least the marginal zone of the specimen in contact with the metal mirror is suddenly cooled to the temperature of the metal mirror, characterized by the fact, that the specimen and the metal mirror, immediately after initial contact, are pressed



against one another by an additional force independent of the velocity or the braking, until the specimen is completely frozen.

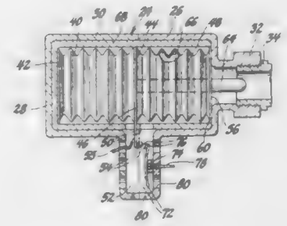
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**4,745,765**

## LOW REFRIGERANT CHARGE DETECTING DEVICE

**Edward D. Pettitt, Newfane, N.Y., assignor to General Motors Corporation, Detroit, Mich.**

**Filed May 11, 1987, Ser. No. 48,371**
**Int. Cl.[4] G01K *13/00***
**U.S. Cl. 62—129** **1 Claim**



1. In an air conditioning system charged with a refrigerant whose amount may diminish in time, said system including a evaporator, an improved low refrigerant charge detecting device comprising a sealed bellows containing refrigerant having a stationary end and an extendible end, said extendible end supporting an electrical contact and formed with a protruding temperature probe portion exposed to the refrigerant leaving the evaporator, an open bellows having a stationary end open to the refrigerant leaving the evaporator and an extendible end fixed to the extendible end of said sealed bellows about said probe portion, and a bimetal element exposed to ambient air supporting an electrical contact located opposite said first mentioned contact.

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**4,745,766**

## DEHUMIDIFIER CONTROL SYSTEM

**Chester A. Bahr, Rhine, Wis., assignor to Kohler Co., Kohler, Wis.**

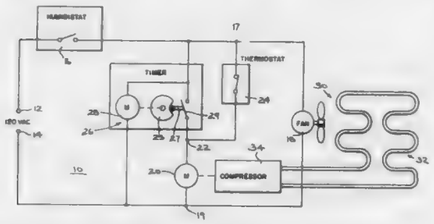
**Filed Mar. 27, 1987, Ser. No. 31,034**
**Int. Cl.[4] F25B *49/00***
**U.S. Cl. 62—176.6** **7 Claims**

1. A dehumidifier comprising:
an evaporator coil;
a condensor coil;
a compressor for circulating a refrigerant through the evaporator and condensor coils;
a fan for circulating air over the evaporator coil;

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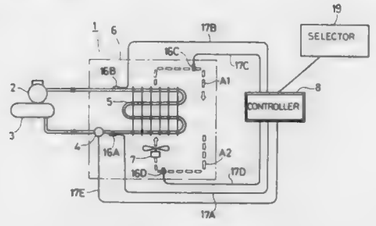
humidistatically controlled means for applying power to the compressor and the fan; and




means for periodically disconnecting the application of power to said compressor when the ambient temperature falls below a given value.

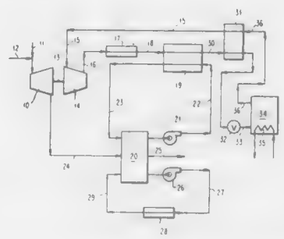
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**4,745,767**
**SYSTEM FOR CONTROLLING FLOW RATE OF REFRIGERANT**
**Satoshi Ohya, Ohizumi, and Katsuhiko Hoshi, Ohta, both of Japan, assignors to Sanyo Electric Co., Ltd., Japan**
**Division of Ser. No. 757,793, Jul. 22, 1985, Pat. No. 4,674,292. This application Mar. 10, 1987, Ser. No. 24,365**
**Claims priority, application Japan, Jul. 26, 1984, 59-156330**
**Int. Cl.[4] F25B *41/04***
**U.S. Cl. 62—211** **1 Claim**




1. A system for controlling the flow rate of a refrigerant for use in refrigeration cycles comprising an electronic expansion valve provided at the inlet of an evaporator, and a controller for controlling the opening-closing movement of the valve, the controller comprising (i) a valve drive unit for opening or closing the valve, (ii) a unit for measuring the degree of superheat of the evaporator, (iii) a unit for measuring the temperature of the space to be cooled by the evaporator, (iv) calculating means for feeding a valve opening adjusting signal to the valve drive unit in accordance with a value obtained by comparing the measured degree of superheat, (v) a valve full-closing signal generator for feeding to the valve drive unit a valve full-closing signal in preference to the valve opening adjusting signal, whenever the temperature measured by the temperature measuring unit is lower than or equal to a preset temperature against which the measured temperature is compared, (vi) a first comparator for comparing the measured degree of superheat with the preset degree of superheat to produce a signal representing the deviation of the measurement from the preset degree of superheat, and (vii) an internal algorithmic unit for (1) correcting the deviation represented by the signal in order to exclude the influence of disturbances, (2) storing the resulting correction signal as a control data, and (3) feeding the control data associated with the last valve opening value stored at the time of initiation of said valve full-closing signal, to the valve drive unit as a reference value, for upon reopening said valve, causing the valve to initially open to a position substantially the same as at the initiation of said valve full-closing signal, for rapidly reinitiating control of the valve opening, whenever the valve is reopened.

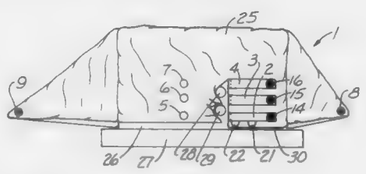
**4,745,768**
**COMBUSTION-POWERED REFRIGERATION WITH DECREASED FUEL CONSUMPTION**
**Hans P. Schorr, Douglaston, and Daniel J. Dessanti, Brooklyn, both of N.Y., assignors to The Brooklyn Union Gas Company, Brooklyn, N.Y.**
**Filed Aug. 27, 1987, Ser. No. 90,127**
**Int. Cl.[4] F25B *27/00***
**U.S. Cl. 62—238.6** **16 Claims**



1. An improved refrigeration system comprising a refrigerant vapor compressor driven by a prime mover powered by the combustion of a fluid fuel, a cooler connected to said compressor to remove heat from the hot compressed refrigerant vapor, a condenser connected to said cooler to condense the cooled compressed refrigerant vapor, a pressure reducing valve connected for the expansion of the condensed refrigerant and for the discharge of the expanded refrigerant into an evaporator equipped with heat transfer surface for the recovery of refrigeration from said evaporator by a fluid passed in contact with said heat transfer surface, said evaporator connected to pass refrigerant vapor therefrom back to said compressor, and an absorption refrigeration unit with an aqueous solution comprising lithium halide as absorbent connected to utilize waste heat of the hot exhaust gases from said prime mover and further connected to circulate a coolant chilled by said absorption unit through said condenser and back to said absorption unit.

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**4,745,769**
**CENTRAL AIR CONDITIONER COVER APPARATUS**
**Odell Wooden, Jr., 1439 Pruitt St., Indianapolis, Ind. 46208**
**Filed Aug. 31, 1987, Ser. No. 91,061**
**Int. Cl.[4] F25D *23/12***
**U.S. Cl. 62—259.1** **1 Claim**



1. Apparatus comprising:
a central air conditioner housing attached to the ground outside of a building to be air conditioned;
a first fluid conduit extending from said housing;
a second fluid conduit from said housing at a position spaced from and below said first conduit;
an adjustable cover disposed over said housing, said adjustable housing comprising:
a rectangular one piece sheet of flexible material habing a top side, a bottom side, first, second, third and fourth corners and a straight slit extending from a first edge between the first and second corners towards a second edge disposed between the third and fourth corners, thereby forming a triangular flap, said triangular flap

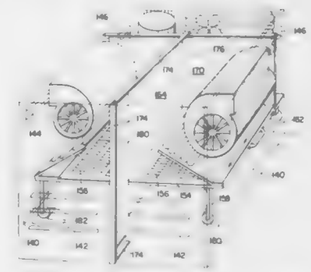


extending from said first edge to the end of said slit spaced away from said first edge;
a first fastener attached to said first corner of said sheet;
a second fastener attached to said second corner of said sheet;
first fastener means attached to said sheet at a point adjacent to and equidistant from said slit and said first edge for selective connection to said first fastener;
second fastener means attached to said sheet at a point adjacent to said first edge and disposed between said first fastener and said first fastener means for selective connection to said second fastener;
a first elastic member attached at one end thereof to said sheet at a point between said first fastener means and the end of the slit spaced away from said first edge;
a second elastic member attached at one end thereof to said sheet at a point between said first elastic member and said first fastener means, said elastic member extending between said first and second fluid conduits;
a third elastic member attached at one end thereof to said sheet at a point between said second fastener means and said second elastic member;
a third fastener attached to the other end of said first elastic member;
a fourth fastener attached to the other end of said second elastic member;
a fifth fastener attached to the other end of said third elastic member;
a third fastener means attached to said sheet at a point generally between the second corner and the fourth corner of the sheet and closer to the second corner than to the fourth corner for selective connection to said third fastener;
a fourth fastener means attached to said sheet at a point between the third fastener means and the first edge of the sheet for selective connection to said fourth fastener;
a fifth fastener means attached to said sheet at a point between the fourth fastener means and the first edge of the sheet for selective connection to said fifth fastener;
a sixth fastener attached to said third corner of said sheet;
a seventh fastener attached to said sheet between the sixth fastener and the second fastener and in juxtaposition to said sixth fastener;
an eighth fastener attached to said sheet between the seventh fastener and the second fastener and in juxtaposition to said seventh fastener;
a ninth fastener attached to said fourth corner of said sheet;
a sixth fastener means attached to said sheet at a point generally halfway between said sixth fastener and said ninth fastener for selective connection to said ninth fastener; and
a seventh fastener means attached to said sheet at a point generally between said sixth fastener means and said ninth fastener and closer to the ninth fastener than to the sixth fastener means for selective connection to any one of the sixth, seventh or eighth fasteners.

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**4,745,770**
**HEATER/COOLER UNIT**
**Alvin Mintz, Pepper Pike, Ohio, assignor to Shaker Tinning & Heating Co., Cleveland, Ohio**
**Continuation-in-part of Ser. No. 931,137, Nov. 17, 1986, Pat. No. 4,720,983. This application Apr. 17, 1987, Ser. No. 39,971**
**Int. Cl.[4] F25D *23/12***
**U.S. Cl. 62—263** **5 Claims**

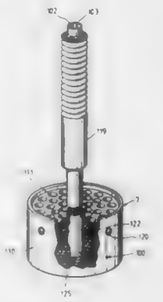
1. Apparatus for connecting an air conditioner to an exterior wall of a structure such as a hotel, motel, hospital, or the like, the wall having an opening that extends into two adjacent rooms, the two adjacent rooms being divided by an interior wall having a cutout section disposed adjacent the opening in the exterior wall, the apparatus comprising:
a housing connected to the exterior wall and disposed about the opening, the housing being fitted into the cutout section of the interior wall;
a cart atop which the air conditioner is disposed, the cart having wheels and being of a size and shape to enable the air conditioner and the cart to be wheeled into the housing such that the air conditioner can be moved into an installed position within the housing;
first barrier means disposed generally parallel to the exterior wall for creating a first compartment within the housing, the first compartment being exposed to the atmosphere through the opening in the exterior wall; and
second barrier means disposed generally parallel to the interior wall and connected to the first barrier means, the



second barrier means creating second and third compartments within the housing, the second compartment being disposed in one room on one side of the interior wall, and the third compartment being disposed in the adjacent room on the other side of the interior wall; and
the air conditioner includes a condenser and two evaporators, the condenser being disposed within the first compartment, one of the evaporators being disposed within the second compartment, and the other evaporator being disposed within the third compartment.

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**4,745,771**
**APPARATUS AND METHOD FOR CRYOPREPARING BIOLOGICAL TISSUE FOR ULTRASTRUCTURAL ANALYSIS**
**John G. Linner, and Stephen A. Livesey, both of The Woodlands, Tex., assignors to Board of Regents, The University of Texas System, Austin, Tex.**
**Continuation-in-part of Ser. No. 942,172, Dec. 16, 1986, Pat. No. 4,742,690, which is a continuation-in-part of Ser. No. 777,083, Sep. 17, 1985, abandoned, which is a continuation of Ser. No. 676,855, Nov. 30, 1984, Pat. No. 4,567,847, which is a continuation-in-part of Ser. No. 525,626, Aug. 23, 1983, Pat. No. 4,510,169. This application Apr. 13, 1987, Ser. No. 38,840**
**Int. Cl.[4] F25D *23/00***
**U.S. Cl. 62—264** **3 Claims**



1. Apparatus for retaining biological tissue during cryopreparation comprising:

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(a) a thermally conductive sample holder including a plurality of sample reservoirs, said sample holder including a central aperture adapted to receive radiant energy means, said sample holder including a vertical lip adapted to contain infiltration fluids, said vertical lip protruding vertically from the circumferential surface of said sample holder and extending below the plane defined by reservoir covers;

(b) a separate removable reservoir cover for each said sample reservoir, said reservoir covers defining a plane, each said reservoir adapted to retain one or more biological tissue samples, each said reservoir cover including a plurality of apertures to permit the flow of moisture from said biological tissue, at least a portion of the interior surface of each of said reservoir cover including a coating of a spectral material; and

(c) a cartridge heater insertable within said aperture to supply radiant heat to biological samples contained within said sample reservoirs.

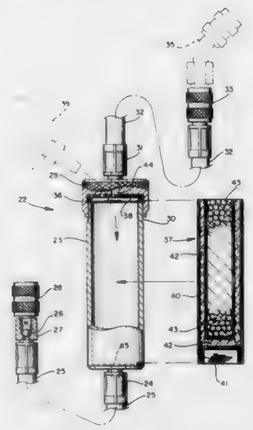
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**4,745,772**

## AIR CONDITIONER AUXILIARY FILTER/DRIER REFRIGERANT AND CHEMICAL ADDITIVE TRANSFER DEVICE

**James E. Ferris, 15 High Mesa Pl., Richardson, Tex. 75080**

**Filed Apr. 20, 1987, Ser. No. 40,073**
**Int. Cl.[4] F25B** *43/00*
**U.S. Cl. 62—292** **17 Claims**



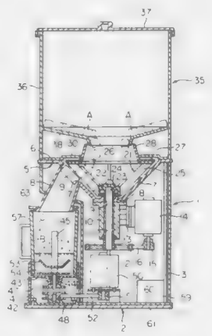
1. An air conditioner refrigerant auxiliary filter/drier unit comprising: a screw top cylindrical container that may be opened and closed with a screw top that seals the container against leakage when threaded down; a fluid inlet transfer line connected to said screw top for the feeding of fluid through opening means in said screw top and extended to a screw on fitting connectable to a high pressure fitting of an air conditioning system; an opening connection at the bottom of said screw top cylindrical container; a fluid outlet transfer line connected to said opening connection and extended to a screw on fitting connectable to a low pressure fitting of an air conditioning system; and desiccant containing filter screen member placeable in said screw top cylindrical container; wherein said desiccant containing filter screen member is a cup shaped member that when placed in said screw top cylindrical container occupies substantially the internal length of said screw top cylindrical container; an "O" ring seal is positioned between the top rim of said screw top cylindrical container and the inside top surface of said screw top; and wherein a disc of screening material is positioned inside said screw top and above said "O" ring.

**4,745,773**

## APPARATUS OF MAKING SOFT ICE-DRINK

**Toshio Ando, Kuwana, Japan, assignor to Chubu Industries, Inc., Kuwana, Japan**

**Filed Aug. 6, 1987, Ser. No. 82,411**
**Claims priority, application Japan, Mar. 11, 1987, 61-57511; Mar. 11, 1987, 61-36116[U]**
**Int. Cl.[4] F25C** *5/12*
**U.S. Cl. 62—320** **1 Claim**



1. In an apparatus of making a soft ice-drink comprising:

an ice shaving mechanism, disposed on an apparatus bed, including a shaver casing having a slit to which a shaving blade is exposed and a shaved ice discharge chute, rotatable blades, provided within said shaver casing, for cooperating with said shaving blade to shave ice blocks charged into said shaver casing, and a first drive motor for rotating said rotating blades; and

a mixing mechanism, disposed on said apparatus bed and under said ice shaving mechanism, including rotary blades, rotatably supported within a container disposed beneath said shaved ice discharge chute, for mixing together a liquid material such as syrup present within said container and shaved ice pieces discharged into said container and smashing the shaved ice pieces into granules of ice, and a second drive motor for rotating said rotary blades at high speeds;

the improvement which comprises a control circuit for controlling operations of said first and second drive motors such that after said first drive motor has been started to operate and after said first drive motor has been stopped, said second drive motor is stopped,

said control circuit comprises switch input means respectively provided corresponding to drinks for different helpings and producing signals representative of the different helpings, a counter connected to the outputs of said switch input means, a controller connected to the output of said counter, first and third timers each having one end connected in common to the output of said controller, a second timer connected to the output of said first timer and a flip-flop connected to the output of said third timer, said first and second drive motors being respectively connected to said first timer and flip-flop and driven by high level signals delivered out of said first timer and flip-flop, whereby said counter is set with "count" signals by said switch input means to deliver a high level signal to said controller, said controller receiving the high level signal delivers a high level signal to said first and third timers which in turn produce high level signals during intervals of time respectively present for said first and third timers, and said second timer produces, at the expiration of the interval of time preset for said first timer, a high level signal during an interval of time preset for said second timer and resets said counter and triggers said controller at the expiration of the interval of time preset for said second timer so that said counter produces a low level signal and said controller responds to the low level signal to deliver to said flip-flop a low level signal which resets said flip-flop and causes it to deliver a low level signal.



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**4,745,774**
**Patent Not Issued For This Number**

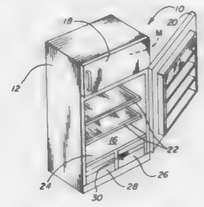
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**4,745,775**

## REFRIGERATOR PAN ASSEMBLY

**Marc R. Bussan, Knight Township, Vanderburgh County, and Charles G. Fellwock, Scott Township, Vanderburgh County, both of Ind., assignors to Whirlpool Corporation, Benton Harbor, Mich.**

**Filed Dec. 29, 1986, Ser. No. 946,899**
**Int. Cl.[4] F25D** *25/02*
**U.S. Cl. 62—382** **18 Claims**



1. In a refrigeration apparatus having a cabinet defining a refrigerated space, and a shelf in said space, a storage pan assembly comprising:

a storage pan defining an upwardly open top portion and a front portion having an outwardly extending flange;

means for supporting said pan in said cabinet refrigerated space; and

a front panel including a handle, a front wall and rearwardly extending sidewalls, each said sidewall including an inwardly opening channel portion slidably mounted to said pan flange with said front wall extending across said front portion of the storage pan, the slidable mounting of said channel portion to said pan flange comprising the sole means for mounting said front panel to said storage pan.

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**4,745,776**

## SINGLE CAN COOLER

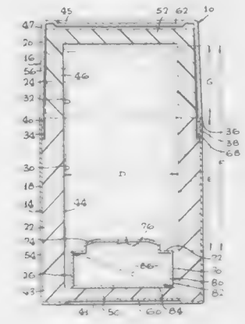
**Wilbert P. Clark, 720 W. Imperial, #101, El Segundo, Calif. 90245**

**Filed Feb. 18, 1987, Ser. No. 16,070**
**Int. Cl.[4] F25D** *3/08*
**U.S. Cl. 62—457** **4 Claims**

1. A beverae cooler which can keep a beverage-filled can of predetermined diameter cool for an extended period of time while facilitating the drinking of a beverage from the still-cold can comprising:

a hollow heat insulated container bottom assembly which includes a bottom end and side walls, and having a hollow inside with a can-supporting wall for supporting the bottom of said can;

a hollow heat insulated container top assembly which includes a top end, and which includes side walls which closely mate with the side walls of said bottom assembly to form a can-holding container which avoids the passage of air between the outside and inside of the container to thereby avoid convective heating;



said bottom assembly formed to closely surround said can along most of the height of the can to avoid can rattling when the bottom assembly is tilted, and the height of the hollow inside of said bottom assembly above said can-supporting wall being greater than the hollow inside of said top assembly and of a height more than 60% of the height of said can but no more than 75% of the height of said can to leave at least 25% of the top of the can free, whereby to facilitate drinking directly from the can while it lies in the bottom assembly;

said top assembly forming a recess that receives at least the upper 25% of the height of said can.

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**4,745,777**

## REFRIGERATING CYCLE APPARATUS

**Etsuo Morishita, Amagasaki; Keiju Sakaino, Shizuoka, and Masayuki Kakuda, Amagasaki, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 31, 1987, Ser. No. 32,281**
**Claims priority, application Japan, Mar. 31, 1986, 61-76146**
**Int. Cl.[4] F25B** *34/09*
**U.S. Cl. 62—509** **2 Claims**

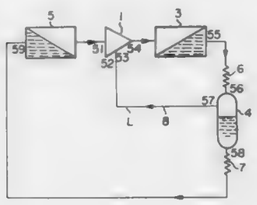
1. A refrigerating cycle apparatus which comprises in combination: a refrigerant circuit constructed with an evaporator, a compressor, a condenser, a first throttle, an economizer for separating said refrigerant into a gas phase and a liquid phase,

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and a second throttle, all being interconnected in the sequence as mentioned; and a piping for said economizer, which connects the gas phase portion of said economizer and an intermediate pressure region of said compressor, wherein the length L of said economizer piping is set to satisfy the following relationship:

$$L=\tfrac{1}{4}\cdot a_1\cdot\tau_1\cdot(2N-1)\pm 0.2\ (m)$$



where: $a_1$ (m/s) denotes a sonic velocity of the refrigerant in the gas phase within the economizer piping or in its vicinity; $\tau_1$ (sec.) is a cyclic period per one revolution of the compressor; and N is an integer of 1, 2, 3, . . . ,

whereby the coefficient of performance of the refrigerating cycle apparatus is increased due to the super-charging phenomenon.

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**4,745,778**

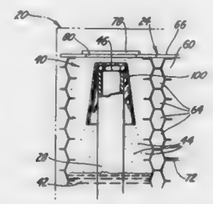
**INTEGRAL EVAPORATOR AND ACCUMULATOR FOR AIR CONDITIONING SYSTEM**

**Thomas J. Carella, Niagara Falls, and John N. Bannan, Lockport, both of N.Y., assignors to General Motors Corporation, Detroit, Mich.**

**Continuation-in-part of Ser. No. 031,022, Mar. 27, 1987. This application Jul. 9, 1987, Ser. No. 71,740**

**Int. Cl.[4] F25B *43/00***

**U.S. Cl. 62—512** **1 Claim**



1. An integral evaporator and accumulator assembly comprising: a housing including a fluid inlet and a fluid outlet; a heat exchange core in direct fluid communication with said fluid inlet for interchanging heat between refrigerant and a fluid passing over said core; and accumulator chamber within said housing in direct fluid communication with said fluid outlet and said heat exchange core for collecting vaporized and unvaporized refrigerant directly from said heat exchange core and for providing an environment of vaporized refrigerant about said fluid outlet, said housing including a stack of plates having a first opening at one end and second and third openings at a second end and corrugations extending traverse to and being in contact with the corrugations in an adjacent plate and its periphery joined to the periphery of said adjacent plate to form one series of said stacked flow chambers, said first openings being aligned to form a first header, said second openings being aligned to form a second header and said third openings being aligned to form said accumulator chamber, one of said plates having a first opening closed to define a first closing in said first header, one of said plates having said second opening closed to define a second closing in said second header, and several of said top plates including embossments extending between said second and third openings and between said first and second openings and said corrugations to define said passageways to and from said headers and flow chambers and said accumulator chamber, said lower plates including embosses extending from said first and second openings to said corrugations defining passageways for fluid flow in said lower stacked plates only between said headers and said flow chambers, said fluid outlet in the form of an upstanding outlet tube projecting upwardly from said bottom wall in said accumulator chamber, said outlet tube having an outlet opening at its upper end located adjacent a top wall of said housing in said accumulator chamber, baffle means mounted on said upper end of said outlet tube over said outlet opening for deflecting liquid refrigerant away from said outlet opening while permitting access thereto of vaporous refrigerant.

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**4,745,779**

**RINGS**

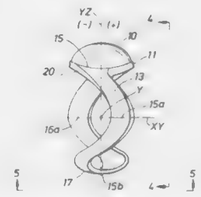
**Merle L. Wideman, 30 Wilson Rd., Pinehurst, N.C. 28374**

**Continuation-in-part of Ser. No. 188,322, Sep. 18, 1980, abandoned. This application Feb. 4, 1982, Ser. No. 345,562**

**The portion of the term of this patent subsequent to Mar. 4, 2003, has been disclaimed.**

**Int. Cl.[4] A44C *9/00***

**U.S. Cl. 63—15** **6 Claims**



6. A ring for use on a thumb member comprising:

a base member;

an ornamental gem mounted on said base member, said base member and said gem being bisected by a vertically extending longitudinal plane so that when the base member and gem are disposed on a thumb member there is a general longitudinal coincidence with a longitudinal vertical plane which extends through and bisects the thumb member;

ring shank means attached to said base member on opposite sides of said vertical longitudinal plane and on opposite sides of a transverse vertical plane which bisects said base member, said ring shank means having a generally flat interior surface for contact with the surface of a thumb member;

said ring shank means having a curvature which, when viewed from one side of the ring has a generally curved configuration and, when viewed from the other side of the ring, has a generally curved configuration which is reversed with respect to the said one side configuration and, when viewed from the bottom of the ring has a generally curved configuration joining the side curved configurations thereby defining a ring shank means with undulations; and

said ring shank means having mid-height ring shank portions with inclinations of said flat interior surfaces with respect to said vertical longitudinal plane, said mid-height ring shank portions intersecting a horizontal transverse plane disposed midway of said opening defined by said ring shank means, said inclinations of said mid-height portions serving the purpose of bringing the flat interior surface of said shank means into contact with the surface of a thumb member.



**4,745,780**

**ELECTROMAGNETICALLY OPERATED JACQUARD ARRANGEMENT**

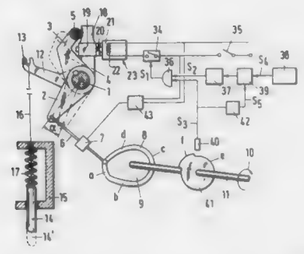
**Hans-Juergen Hoehne, Hainburg, Fed. Rep. of Germany, assignor to Karl Meyer Textilmaschinenfabrik GmbH, Fed. Rep. of Germany**

**Filed May 28, 1987, Ser. No. 55,419**

**Claims priority, application Fed. Rep. of Germany, Jun. 6, 1986, 3619121**

**Int. Cl.[4] D04B *23/04***

**U.S. Cl. 66—205** **20 Claims**



1. In an electromagnetically activated jacquard steering arrangement for positioning a plurality of steerable elements, a magnetic system comprising:

a magnetic core;

an anchor, said magnetic core and said anchor being relatively reciprocatable with respect to each other;

a permanent magnet attached to the anchor;

a repulsion winding on the magnetic core; and

a setting means coupled to one of said steerable elements, said setting means being operable after the magnetic core and the anchor are caused to approach each other, to position said steerable element into one of two working positions, in response to activation or deactivation of the repulsion winding, respectively.

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**4,745,781**

**ASSEMBLY OF TIGHTLY ADJACENT EYE NEEDLES**

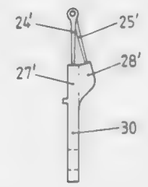
**Fritz Schuelein, Treuchtlingen; Johann Berger, Obere Schloss-Strasse 114, D-7071 Alfdorf, and Josef Berger, Hainstrasse 11, D-7070 Schwaebisch-Gmeund-Grossdeinbach, all of Fed. Rep. of Germany, assignors to Johann Berger, Alfdorf and Josef Berger, Schwaebisch-Gmuend-Grossdeinbach, both of, Fed. Rep. of Germany**

**Filed Jun. 26, 1987, Ser. No. 66,713**

**Claims priority, application Fed. Rep. of Germany, Nov. 3, 1986, 3637328**

**Int. Cl.[4] D04B *27/02***

**U.S. Cl. 66—214** **11 Claims**



1. Assembly holding mutually tightly adjacent eye needles of a knitting machine, wherein:

(a) a set of eye needles is anchored in such a manner in a support and in mutually equidistant positions in a casting such that the needles are mutually parallel in their main planes; and

(b) a plurality of supports, at least three in number (27,28,29) each with one set of eye needles (sets of needles 24,25,26) forming one segment of eye needles; and

(c) heads of the eye needles from the second to the last set of needles (25,26) enter between every two heads of the first set of needles (24) and the heads of all sets of needles mutually alternate in the direction of the common row of heads while being essentially mutually equidistant; and

(d) all sets of needles are mounted in fixed manner within the segment and obliquely in such a way that

(e) a conceptual plane 5 of one of the sets of needles extending along the eye needles and through the heads of this set of needles intersects in the region of the heads with the planes 5', 5'' of the other sets of needles.

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**4,745,782**

**APPARATUS REMOVING FAT AND FLESH FROM THE FLESH SIDE OF A FUR**

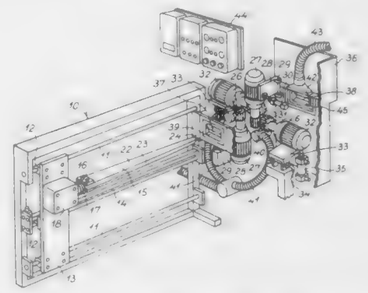
**Bent J. Larsen, Outrup, Denmark, assignor to Granly Trykluft ApS, Esbjerg, Denmark**

**Filed Oct. 16, 1986, Ser. No. 920,149**

**Claims priority, application Denmark, Feb. 20, 1986, 782/86**

**Int. Cl.[4] C14B *1/04***

**U.S. Cl. 69—39** **28 Claims**



1. An apparatus for removing fat and flesh from the flesh side of a fur, said apparatus comprising,

an elongated mandrel for supporting a fur therearound with its flesh side turned out,

a scraping device including scraping edges which define a contour substantially complementary to the cross-sectional contour of the mandrel,

means for biasing scraping edges of the scraping device into engagement with the flesh side of the fur arranged around the mandrel, and

moving means for moving the mandrel and the scraping device reciprocatingly in relation to each other through advance and return strokes, the biasing means being adapted to bias the scraping device into engagement with the flesh side of the fur only during the advance strokes of the relative movement.

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**4,745,783**

**TAMPER PROOF PADLOCK HASP APPARATUS**

**Lloyd R. Poe, 7341 S. Marina Pacifica Dr., Long Beach, Calif. 90803**

**Filed Jun. 29, 1987, Ser. No. 67,538**

**Int. Cl.[4] E05B *67/38*; E05C *19/08***

**U.S. Cl. 70—2** **15 Claims**

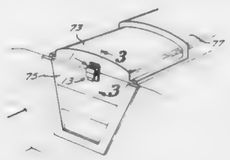
1. Padlook hasp apparatus for receiving a padlock for locking first and second parts together and including a padlock body formed with a top surface and mounting an inverted U-shaped padlock shackle of a predetermined cross sectional diameter and formed on its closed end with a loop of a selected

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inside radius and having oppositely disposed, generally straight, pivot and capture legs, the longitudinal dimension between a bearing point on the inside surface of such capture leg as it turns into such loop being located, when said shackle is in its locked position, a predetermined distance from such top surface of the padlock body, said apparatus comprising:

first and second hasps for mounting on the respective first and second parts and formed with respective first and second mounting flanges and first and second hasp plates arranged to, when mounted on such parts, project coextensive to one another, said first hasp plate being formed with a first capture leg-receiving bore larger than such predetermined diameter and said second hasp plate being formed with a second capture leg-receiving bore aligned therewith, said first and second hasp plates being formed with respective first pivot leg-receiving slots for receiving such pivot leg when said capture leg is received in said capture leg-receiving bores such that said mounting plates



of said first and second hasps may be mounted on said respective first and second parts with the opposed surfaces of said plates spaced a specified distance apart, which distance is less than said predetermined distance; and

guard plate means mounted on said first or first and second hasp plates and extending perpendicular in one direction from said first hasp plate a first guard distance sufficient to, when combined with said specified distance, at least equal the distance said shackle, when locked, projects from such top surface of the padlock body, and projecting in the direction opposite said one direction a second guard distance beyond said second plate, said second guard distance being at least equal to, when combined with said specified distance, said predetermined distance whereby said first and second hasps may be mounted on said parts with said opposed surfaces spaced apart said specified distance and said closure leg of said shackle inserted in said closure bores with said pivot leg received in said slots such that said plate means blocks access to said shackle.

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**4,745,784**

**ELECTRONIC DIAL COMBINATION LOCK**

**Klaus Gartner, Palos Verdes Estates, Calif., assignor to Alan Uyeda, Rosemead, Calif., a part interest**

**Filed Apr. 21, 1986, Ser. No. 854,330**

**Int. Cl.[4] E05B *47/00***

**U.S. Cl. 70—277** **20 Claims**

6. An electronic dial combination lock, comprising:

a lock housing;

a bolt slidably-retained within said housing for movement between locked and unlocked positions;

a fence lever having one end pivotally-attached to said bolt, a second end having a nose part, and a transversely-extending fence member intermediate of said ends;

a spindle having a long axis generally normal to the front of said housing, one end external of said housing, a second end contained internally of said housing, and being journaled in said housing for both rotational and axial displacement;

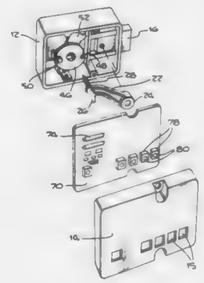
means for biasing said spindle to a axially-outward position from said housing;

means for manually-indexing said spindle rotationally at a plurality of discrete, evenly-spaced, identified angular positions relative to said housing and for pushing said spindle axially into said housing for a given distance against said spindle biasing means;

a cam wheel attached to said internal end of said shaft for coaxial rotation and translation therewith, said cam wheel having a circumferential gate therein disposed to engage said fence lever nose part at a given angular orientation of said cam wheel upon rotation of said spindle in one direction, and to disengage said nose part upon rotation of said spindle in the other direction, said cam wheel having a rearwardly-extending push pin located thereon at an angular position corresponding to one of said discrete spindle positions and at a given radial position relative to said spindle axis;

means for biasing said fence lever towards said cam wheel;

a solenoid having a reciprocating armature normally biased into a frst position of engagement with said fence to prevent engagement of said nose part with said cam wheel, operatively responsive to an electrical stimulus for withdrawing said armature into a second position of disengagement from said fence, to permit said nose part to engage said cam wheel;



a component mounting board mounted in said housing behind said cam wheel in a plane generally normal to said spindle axis and spaced apart from said cam wheel push pin by said given distance;

a plurality of distinct, switches mounted on said mounting board and opposing said cam wheel push pin in an evenly-spaced, circular pattern centered on said spindle axis at a radial position coincident with that of said push pin and at angular positions corresponding to those of said push pin when said spindle is indexed at said identified angular positions, each said switch making a distinct electrical connection when contacted by said push pin;

circuit means contained in said housing and connected to said switches for sensing the making of said distinct electrical connections and for detecting when a given subset of said connections has been made in a predetermined, sequential order corresponding to the combination of said lock, further including means for generating said solenoid electrical stimulus for a predetermined period of time upon detection of said subset; and

power supply means for bringing external electrical power to said lock.

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**4,745,785**

**MANUALLY OR ELECTRICALLY DRIVEN LOCK**

**Othmar Uebersax, Wetzikon, Switzerland, assignor to Bauer Kaba AG, Wetzikon, Switzerland**

**Filed Jun. 9, 1986, Ser. No. 872,004**

**Claims priority, application Switzerland, Jun. 12, 1985, 2477/85**

**Int. Cl.[4] E05B *17/04, 47/00***

**U.S. Cl. 70—279** **3 Claims**

1. A safety lock comprising

a frame including means defining first and second coaxial cylindrical cavities and an interconnecting web therebetween;

first and second cylindrical rotors rotatably mounted, respectively, in said first and second cavities and having a common axis with said cavities;

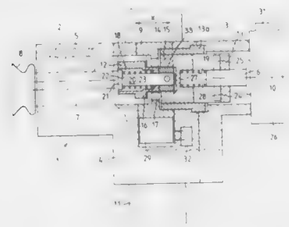
a key slot in at least said first rotor for receiving a key, said rotor including spring-urged tumbler pins for cooperating with said key to control the rotatability of said first rotor;

a remotely operable drive motor coupled to said second rotor;

a bolt;

a driver pivotably mounted in said frame, said driver having a cam in operative connection with said bolt so that pivoting said driver moves said bolt;

first means attached to said first rotor for rotation therewith, said first means being releasably coupleable to said driver;



first spring means urging said first means into coupling engagement with said driver, said first means being moved into coupling engagement with said driver by insertion of a key in said slot so that said lock can be operated manually;

second means attached to said second rotor for rotation therewith, said second means being releasably coupled to said driver;

second spring means urging said second means into coupling engagement with said driver;

and actuator means between said first and second releasably coupled means for decoupling said second rotor from said driver when a key is fully inserted into said key slot to prevent said lock from being operated by said motor when it is being manually operated.

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**4,745,786**

**HOT ROLLING METHOD AND APPARATUS FOR HOT ROLLING**

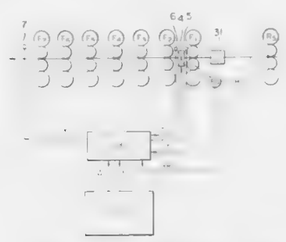
**Atsuhiro Wakako, Tokyo; Takeshi Ono, Tokai; Kunio Kawamura, Tokai, and Kenichi Matsui, Tokai, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan**

**Filed Mar. 6, 1986, Ser. No. 836,928**

**Claims priority, application Japan, Oct. 14, 1985, 60-228274**

**Int. Cl.[4] B21B *37/06***

**U.S. Cl. 72—13** **21 Claims**



1. In a hot rolling method comprising rough-hot-rolling a steel material, descaling the rough-hot-rolled steel material to remove scale by use of pressurized water so that a temperature of at least a portion of said steel material decreases below $Ar_3$ transformation temperature of the steel material, and finish-hot-rolling the descaled steel material,

the improvement comprising the steps of: subjecting said steel material to an intermediate heating of at least a portion of said steel material, the temperature of which portion decreases below the $Ar_3$ transformation temperature of the steel material, to a temperature not lower than the $Ac_3$ transformation temperature of the steel material so that the metallurgical structure of the whole of said steel material becomes austenite,

said intermediate heating being effected during said finish-hot-rolling;

subjecting said steel material having a single phase of austenite structure to at least one pass of finish hot-rolling after the intermediate heating; and

completing the final finish hot-rolling while the temperature of the steel material is at a temperature not less than the $Ar_3$ transformation temperature.

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**4,745,787**

**PLUG DRAWING**

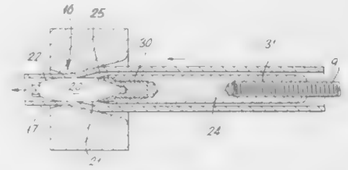
**Dennis H. Sansome, West Midlands, England, and Thiam B. Lim, Singapore, Singapore, assignors to National Research Development Corporation, London, England**

**Continuation of Ser. No. 729,851, May 2, 1985, abandoned. This application Feb. 17, 1987, Ser. No. 16,485**

**Claims priority, application United Kingdom, May 2, 1984, 8411289**

**Int. Cl.[4] B21C *9/00, 1/24***

**U.S. Cl. 72—41** **12 Claims**



1. In combination a plug assembly and a die for use in the process of plug-drawing elongated tubular workpieces, said plug assembly comprising:

a first and most forward portion having a smoothly and convexly curved forward surface and a rearward end portion;

said first portion merging smoothly at said rearward end portion into a parallel-sided second portion;

a third and more rearward portion, the most forward end of the third portion having a cross-section substantially equal to the cross-section of said second portion, the cross-section of the third portion gradually increasing from said forwardmost end to a maximum outer cross-section at the rearwardmost end thereof;

a fourth and yet more rearward portion having a length that is at least five times greater than the inner diameter of the workpiece to be drawn and having a maximum outer cross-section which is substantially greater than the outer cross-section of said second portion; and

plug bar means coupled to a rearward most end of said plug assembly for holding said plug assembly fixed relative to said die and radially spaced therefrom, said plug being positioned relative to said die by said plug bar so that during the plug-drawing process, said workpiece makes cross-section defining contact with said second portion of said plug assembly, said cross-section defining contact being the rearwardmost contact that said plug assembly makes with said workpiece during said plug-drawing process, and contact of said workpiece with said third portion and said fourth portion is avoided.

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**4,745,788**

## ROLL REARRANGING APPARATUS

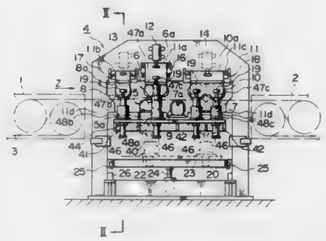
**Toshihiro Takemasa; Nobuyuki Taniguchi, both of Hiroshima; Hiroyasu Yuasa, and Namio Suganuma, both of Kurashiki, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha and Kawasaki Steel Corporation, both of, Japan**

**Filed Oct. 2, 1986, Ser. No. 914,621**

**Claims priority, application Japan, Oct. 7, 1985, 60-221925**

**Int. Cl.⁴ B21D** *1/02;* **B21B** *31/10*

**U.S. Cl. 72—160** **8 Claims**



1. A tension leveler comprising: a tension leveler housing; a first upper roll unit including at least one first upper roll unit roll adapted to rotate about a central axis, a roll support for supporting said at least one roll, at least one rail supported by said housing and wheels connected to said roll support engaging said at least one rail to allow said first upper roll unit to be movable relative to said housing in an axial direction with respect to said at least one first upper roll unit roll; at least one second upper roll unit including at least one second upper roll unit roll adapted to rotate about a central axis, a roll support for supporting said at least one second upper roll unit roll, at least one second upper roll unit rail supported by said housing and second upper roll unit wheels connected to said second upper roll unit roll support engaging said at least one second upper roll unit rail to allow said second upper roll unit to be movable relative to said housing in an axial direction with respect to said at least one second upper roll unit roll; a lower roll unit supported in a lower frame, said frame including a plurality of lower wheels, at least one lower rail adapted to receive said rails said lower frame being disposed in said housing, at least one lower roll adapted to rotate about an axis, said lower frame being movable in an axial direction with respect to said at least one lower roll; and engaging means, connected to said lower roll unit, for engaging the roll support of said first upper roll unit and said second upper roll unit so as to selectively provide for removing the lower roll unit and one of said first upper roll unit and said at least one second upper roll unit and both the first upper roll unit and said at least one second upper roll unit, said engaging means includes a hole portion provided in each of said first upper roll unit roll support and said at least one second upper roll unit roll support, and a plurality of up and down moving mechanisms movable relative to said lower frame to engage a corresponding hole in the first upper roll unit roll support and at the least one second upper roll unit roll support.

**4,745,789**

## APPARATUS FOR SEPARATING PRESSURE PLATES FROM EXTRUSION RESIDUES OF METAL EXTRUDED WITH A SHELL

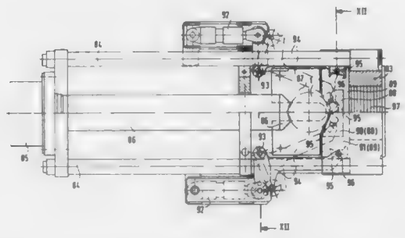
**Urban Richardt, and Josef Ahrweiler, both of Mettmann, Fed. Rep. of Germany, assignors to SMS Hasenclever Maschinenfabrik GmbH, Dusseldorf, Fed. Rep. of Germany**

**Filed Nov. 24, 1986, Ser. No. 933,911**

**Claims priority, application Fed. Rep. of Germany, Nov. 29, 1985, 3542237**

**Int. Cl.⁴ B21C** *35/04*

**U.S. Cl. 72—255** **17 Claims**



2. Apparatus for separating a pressure plate having an end face from an extrusion residue in the form of at least a compacted shell enclosing the pressure plate following direct or indirect extrusion of metal with a shell, comprising:

a frame having an opening whose width equals the diameter of the pressure plate plus the shell and whose height equals the thickness of the pressure plate;

a neck member on the pressure plate;

a slideway running peripendicularly up to said frame opening and locating the end face of the pressure plate at the level of said bottom edge of said frame opening;

a pusher movable over said slideway for pushing and advancing the pressure plate through said frame opening;

stripping means comprising stripping cutters on said frame at least at the sides of said frame opening which touch on diametrical generatrices the pressure plates pushed through said frame;

cutter carriers supporting said stripping cutters, said cutter carriers and stripping cutters being movable in opposite directions perpendicular to the direction of advance of the pusher; and

resiliently acting settng devices directed towards the pusher center for adjusting said cutter carriers and respective stripping cutters relative to one another, so that said stripping cutters, moving along with the advance of the pressure plate produced by the pusher advance, travel over a peripheral portion of the pressure plate.

**4,745,790**

## ROLLING METHOD AND ROLLING APPARATUS FOR METAL STRIPS

**Toko Teshiba; Fumiya Yanagishima; Akira Kishida; Hidenori Miyake, and Yoshio Nakazato, all of Chiba, Japan, assignors to Kawasaki Steel Corporation, Kobe, Japan**

**Continuation of Ser. No. 661,698, Oct. 17, 1984, abandoned.**

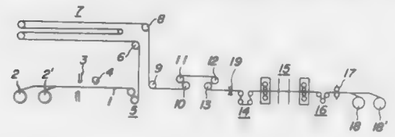
**This application Jan. 20, 1987, Ser. No. 9,602**

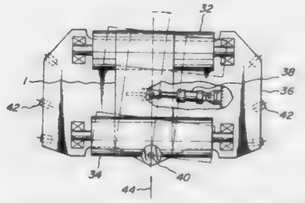
**Int. Cl.⁴ B21B** *1/24, 39/16, 41/10*

**U.S. Cl. 72—252** **2 Claims**

1. A method of rolling strips of metal in a tandem rolling mill with minimum irregular wear of work rolls and minimum work order width scheduling, said method comprising the steps of:

periodically swinging the metal strip, as it is moving along the rolling plane, in its width directions with a constant amplitude in accordance with output signals from a function generator, and at a location upstream of the tandem rolling mill, and subjecting the metal strip to rolling operation by said tandem rolling mill, where the rolling mill is a completely continuous tandem cold rolling mill having a





looper upstream thereof, and wherein said step of swinging the metal strip occurs between the looper and the rolling mill.



**4,745,791**

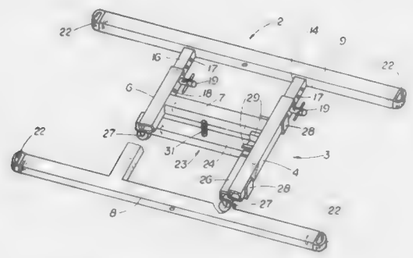
## PORTABLE KIT ASSEMBLY FOR STRAIGHTENING AUTOMOBILES

**James A. Fish, Creve Coeur, Mo., assignor to Maker Manufacturing Company, Inc., Creve Coeur, Mo.**

**Filed Sep. 22, 1986, Ser. No. 909,866**

**Int. Cl.⁴ B21D** *1/12*

**U.S. Cl. 72—305** **28 Claims**



1. Apparatus for repairing and straightening a vehicle frame of an automobile body comprising:

a rigid base frame sized to be positioned within a vehicle frame wheel base and vehicle tread, said base frame being expansible-collapsible in a direction parallel to the longitudinal axis of a vehicle frame to permit adjustment of said base frame relative such longitudinal axis of the vehicle frame between the vehicle frame wheel base;

beam means connected to and extending in cantilever fashion from said expansible-collapsible base frame, said beam means being sized to extend beyond the vehicle frame tread to permit ready accessibility thereto and being relatively moveable in one direction or another as said base frame is respectively expanded and collapsed; and,

clamp means slidably mounted on said beam means to permit adjustment thereon for clamp gripping connection to the vehicle frame of an automobile body.

**4,745,792**

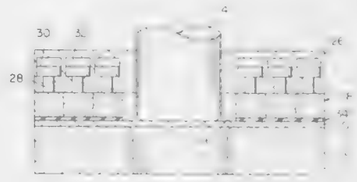
## BLANKHOLDER FOR A DRAW PRESS

**James M. Story; Andrew B. Trageser, both of Plum Boro, and George L. Smith, Jr., New Kensington, all of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.**

**Filed Oct. 14, 1986, Ser. No. 918,112**

**Int. Cl.⁴ B21D** *22/21*

**U.S. Cl. 72—351** **8 Claims**



5. A blankholder for applying pressure to a flange on a blank extending outwardly from an opening in a die in a draw press, comprising:

a base, a cylindrical block connected the base and having a blankholding surface and a punch opening in coaxial alignment with the die and adapted for axial movement so as to contact the blank flange with the blankholding surface, and with the block divided into separate segments defined by inner and outer cylindrical surfaces of the block, at least one circular division coaxial with the block axis and spaced between the inner and outer cylindrical surface, and radial divisions extending from the opening to the periphery of the block, each of said segments being movable independently of each other and of said base. and

power means to apply a force parallel to the block axis to each of the separate segments so that each segment may be forcefully applied against the blank flange independent of all other segments.

**4,745,793**

## HYDRAULICALLY DRIVEN FORGING MACHINE

**Hans J. Pahnke, Düsseldorf, Fed. Rep. of Germany, assignor to Pahnke Engineering GmbH & Co. KG, Dusseldorf, Fed. Rep. of Germany**

**Filed Feb. 25, 1987, Ser. No. 18,407**

**Claims priority, application Fed. Rep. of Germany, Mar. 8, 1986, 3607737**

**Int. Cl.⁴ B21J** *7/14*

**U.S. Cl. 72—402** **2 Claims**



1. In a hydraulically driven forging machine having four circumferentially spaced working piston-and-cylinder units having central axes on radii lying in a common vertical plane for multidirectional lateral forging of a workpiece disposed in the forging postion therebetween, the forging machine having a horizontal center plane, four synchronously driven fluid pressure-transmitting piston pumps, and separate pipe conduits connecting each piston pump to a respective working cylinder

for operating the working piston-and-cylinder units, the improvement comprising:

said piston pumps being individual pumps in upright position arranged about the forging machine; and

pump-end pipe connections for respective pipe conduits on said piston pumps all located on the horizontal center plane of the forging machine;

so that said pipe conduits are equal in length and have minimal length for minimizing stroke volume losses in the working piston-and-cylinder units due to compressibility of the fluid pressure medium.

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**4,745,794**

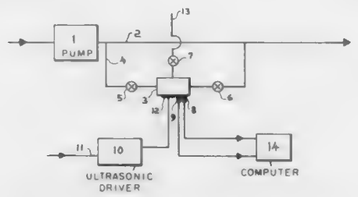
## ANALYZER FOR CARBON DIOXIDE IN BEVERAGES

**John C. Steichen, Landenberg, Pa., and James R. Small, Hockessin, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Dec. 22, 1986, Ser. No. 944,351**

**Int. Cl.[4] G01N** *33/14, 7/14*

**U.S. Cl. 73—19** **13 Claims**




1. An analyzer that determines the concentration of dissolved gas in a liquid stream which comprises:

a. a sealed cell having an entry for liquids and an exit for liquids and means for measuring the pressure of the gas phase and means for measuring the temperature of the contents of the cell;

b. a first valving means for diverting a portion of the liquid stream to the entry of the cell and a second valving means sealing the exit of the cell to prevent the liquid from escaping;

c. a third valving means for venting pressure from the cell;

d. an ultrasonic exciter attached to the cell capable of agitating the liquid in the cell and thereby in a short time bringing the liquid and the dissolved gas into equilibrium conditions;

e. means for sequencing the operation of the analyzer by opening the first valving means to allow liquid to enter the cell and opening the second valving means to allow liquid to leave the cell and then closing the first and second valving means to retain liquid in the cell and then opening and closing the third valving means to reduce pressure in the cell and then engaging the ultrasonic exciter for a sufficient period of time to bring the dissolved gas into equilibrium with the liquid and then measuring the pressure of the gas and the temperature of the liquid;

f. a computer which receives a signal from the means for measuring pressure and means for measuring temperature and converts these signals to provide dissolved gas content in the liquid.

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**4,745,795**

## APPARATUS FOR MEASURING GASES DISSOLVED IN WATER

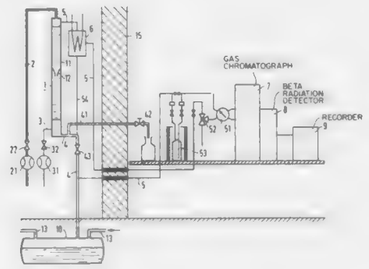
**Hermann Emmert, Burgbernheim, Fed. Rep. of Germany, assignor to Kraftwerk Union Aktiengesellschaft, Mülheim, Fed. Rep. of Germany**

**Filed Feb. 25, 1987, Ser. No. 18,704**

**Claims priority, application Fed. Rep. of Germany, Feb. 27, 1986, 3606457**

**Int. Cl.[4] G01N** *31/00*

**U.S. Cl. 73—19** **12 Claims**




1. An apparatus for measuring gases dissolved in water, comprising, a gas exchanger wherein water to be tested is stripped of gases dissolved in the water, a water feed line connected to the gas exchanger for supplying water to be tested, a gas feed line connected to the gas exchanger for supplying a carrier gas, a water drainage line connected to the gas exchanger for discharge of degassed water from the gas exchanger, a gas drainage line connected to the gas exchanger for the release of washed-out gas from the gas exchanger, a gas dryer connected to gas drainage line for drying the gas from the gas exchanger, said gas exchanger being a packed column disposed in an upright position, to which the water feed line and the gas drainage line are connected at the top and the gas feed line and the water drainage are connected at the bottom, a collecting container connected with the water drainage line for drainage into the collecting container, a dried gas drainage line connected to the gas cooler for discharge of dried gas therefrom, analysis and measuring instruments connected to the dried gas drainage line to analyze and measure the dried gas, a second branch gas drainage line connected to the analysis and measuring instruments for passage of gas no longer required for analysis and measurement to the collecting container, and a sample line having an outlet tap branching off from the water drainage line for drawing off samples of water from which the dissolved gases have been removed.

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**4,745,796**

## MEMBRANE-SELECTIVE VAPOR SENSING

**Mona Abdelrahman, Minnetonka; David W. Deetz, Apple Valley, and J. David Zook, Burnsville, all of Minn., assignors to Honeywell Inc., Minneapolis, Minn.**

**Filed Mar. 16, 1987, Ser. No. 26,096**

**Int. Cl.[4] G01N** *27/00*

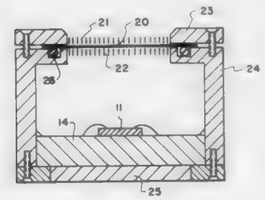
**U.S. Cl. 73—26** **10 Claims**

1. A system for detecting at least one species of interest in vapor form comprising:

enclosure means describing a hollow chamber and having an opening therein providing direct communication between the chamber and the external environment;

sensor means disposed within the chamber and having an output signal responsive to the presence of one or more of said species of interest;

stabilized immobilized liquid membrane matrix disposed across and covering said opening having pores therein forming a porous structure disposed across and covering said opening, said liquid membrane further comprising a permselective transport liquid in and wetting said pores, said liquid characterized by permselective transport properties which favor said one or more species of interest;




output means for generating a signal indicative of the species of interest based on the output signal of said non-selective sensor; and

conductor means connecting said sensor means with said output means.

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**4,745,797**

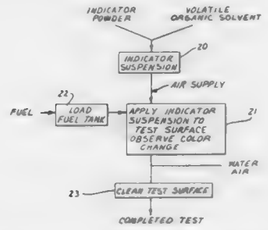
## METHOD AND APPARATUS FOR DETECTING HYDROCARBON FUEL LEAKS

**Jeffrey G. Wegrzyn, Dunwoody, Ga., assignor to Lockheed Corporation, Calabasas, Calif.**

**Division of Ser. No. 607,450, May 7, 1984. This application Sep. 8, 1986, Ser. No. 905,008**

**Int. Cl.[4] G01M** *3/20*

**U.S. Cl. 73—40.7** **9 Claims**




1. In a method for detecting leaks in a fuel tank which comprises introducing fuel into said fuel tank, allowing the fuel to soak said fuel tank for a period of time, applying an indicator to the surface being tested, observing color changes in said indicator and removing said indicator from the surface being tested; the improvement comprising:

a. applying a substance suitable for detecting hydrocarbon fluid leaks by color change consisting essentially of a major portion of a dry inert mineral carrier and from about 0.1 to about 5.0 percent by weight of a direct dye soluble in water and low chain alcohols which is essentially non-staining on painted surfaces and which does not migratte into or penetrate painted surfaces, said painted surfaces containing a polyurethane or epoxy resin base;

b. observing any changes in the color of the detecting substance; and

c. removing the detecting substance from the surface being tested.

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**4,745,798**

## METHOD AND DEVICE FOR MEASURING PARAMETERS IN A SUSPENSION

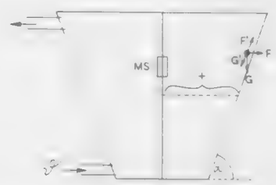
**Hans-Joachim Scherer, Mainbernheim, and Andreas Gazinski, Veitschochheim, both of Fed. Rep. of Germany, assignors to KRC Umwelttechnik GmbH, Wurzburg, Fed. Rep. of Germany**

**Filed Mar. 26, 1987, Ser. No. 30,234**

**Claims priority, application Fed. Rep. of Germany, Mar. 29, 1986, 3610739**

**Int. Cl.[4] G01N** *15/00*

**U.S. Cl. 73—61 R** **8 Claims**




1. Method for measuring parameters in suspensions containing particles having a specific gravity greater than the liquid comprising:

tangentially introducing a stream of the suspension to be measured into a quiescent-flow vessel at one end thereof;

tangentially withdrawing said stream at the other end of the vessel so that a smooth rotational flow of the suspension is created within said vessel; and

sensing a parameter of the suspension by means of at least one measuring probe located in the interior of the quiescent-flow vessel.

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**4,745,799**

## CONTROL DEVICE FOR CHASSIS DYNAMOMETER SYSTEM

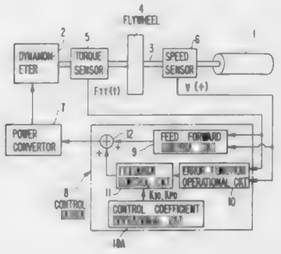
**Shigeyuki Kawarabayashi, and Hiromi Kaneko, both of Minami, Japan, assignors to Horiba, Ltd., Kyoto, Japan**

**Filed Sep. 16, 1986, Ser. No. 907,998**

**Claims priority, application Japan, Nov. 9, 1985, 60-251525**

**Int. Cl.[4] G01M** *15/00*

**U.S. Cl. 73—117** **5 Claims**




1. A control device for a chassis dynamometer system including a torque sensing means and a rotational speed sensing means which outputs a control signal for controlling a dynamometer on the basis of a control equation having parameters including a sensed torque and a sensed rotational speed of said dynamometer and an inertia of a vehicle to be tested and a mechanical inertia of said dynamometer system and including control coefficients, said control signal controlling said dynamometer so as to control a mechanical force to be absorbed therein when said dynamometer is connected to a rotating roller on which a driving wheel of said vehicle to be tested is place via a shaft which is provided with a flywheel, said con-

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trol device comprising a means for automatically adjusting said control coefficients of said control equation utilized in said control device in accordance with changes in said mechanical inertia of said dynamometer system.

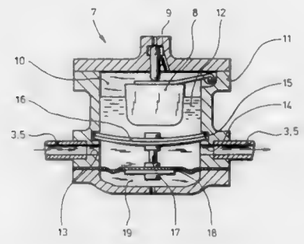
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**4,745,800**

## PROCESS AND DEVICE FOR FLOW MEASUREMENT

**Hans J. Henning, Neuss, Fed. Rep. of Germany, assignor to Pierburg Luftfahrtgeräte Union G.m.b.H., Fed. Rep. of Germany**

**Filed Jul. 10, 1987, Ser. No. 71,890**
**Claims priority, application Fed. Rep. of Germany, Jul. 18, 1986, 3624264**
**Int. Cl.⁴ G01F *9/00***
**U.S. Cl. 73—119 A** **11 Claims**




2. A device for measuring the flow of fluid supplied to a consuming device and subject to temperature variations, comprising a flow meter in the fluid supply line and means arranged in the system between the flow meter and the consuming device for changing the volumetric capacity of the system in response to changes in the temperature of the fluid in the system to compensate for changes in the volume of the said fluid due to said changes in temperature.

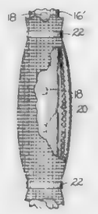
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**4,745,801**

## GROUNDWATER SAMPLING SYSTEM

**James E. Luzier, 2 Gershwin Ct., Lake Oswego, Oreg. 97034**

**Filed Jun. 3, 1986, Ser. No. 870,071**
**Int. Cl.⁴ E21B *49/08***
**U.S. Cl. 73—155** **16 Claims**



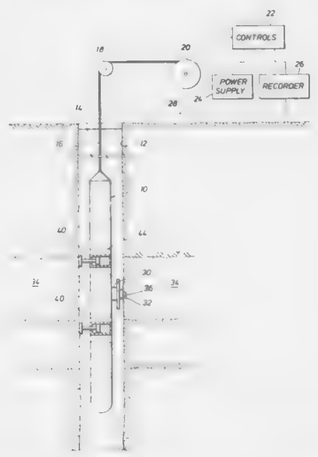

1. A groundwater sampling system, comprising:
(a) a plurality of elongated small diameter flexible sampling tubes each having inner and outer ends and with the inner ends of the tubes arranged to extend into a test site and terminate at said inner ends at different locations,
(b) a section of the inner end of each sampling tube being perforated, and
(c) fine mesh flexible cloth screen material secured to and loosely encircling said perforated section to allow flexing of the screen material toward and away from the sampling tube, to minimize collection of solid materials on the screen material, the outer end of each sampling tube being exposed outwardly of the test site for collection of groundwater samples therefrom.

**4,745,802**

## FORMATION TESTING TOOL AND METHOD OF OBTAINING POST-TEST DRAWDOWN AND PRESSURE READINGS

**Ernest H. Purfurst, Houston, Tex., assignor to Halliburton Company, Duncan, Okla.**

**Filed Sep. 18, 1986, Ser. No. 908,756**
**Int. Cl.⁴ E21B *49/08***
**U.S. Cl. 73—155** **18 Claims**




1. A method for performing measurements useful in determining the permeability of earth formations traversing a well borehole, comprising:
(a) establishing, through the wall of the well borehole and isolated from fluids within the well bore, a direct fluid flow path for communication with an adjacent formation to be tested;
(b) drawing a fluid sample from the formation sufficient to substantially remove any well borehole invasion pressure from the immediate area and to enable measurement of connate formation fluid pressure free of borehole invasion;
(c) subsequently making at least one flow test along the fluid flow path from the formation to determine formation flow properties based on the actual connate formation fluids; and
(d) making a post test pressure drawdown test after the flow test to measure formation pressure.

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**4,745,803**

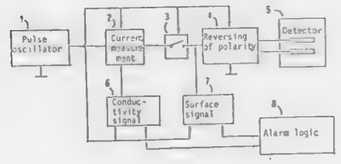
## METHOD AND APPARATUS FOR DETERMINING THE COVERING ON A ROAD SURFACE

**Taisto Haavasoja, Helsinki, Finland, assignor to Vaisala Oy, Helsinki, Finland**

**Filed Sep. 8, 1986, Ser. No. 904,710**
**Claims priority, application Finland, Sep. 9, 1985, 853444**
**Int. Cl.⁴ G01W *1/00;* G08B *19/02***
**U.S. Cl. 73—170 R** **10 Claims**

1. A method for determining road surface conditions, comprising the steps of:
inputting a measurement signal to a pair of spaced-apart electrodes inlaid in a road surface, said measurement signal being a low-voltage, low frequency alternating voltage biased at ground potential;
determining the ratio of current flowing between said pair of electrodes to voltage appearing across said pair of electrodes to thereby determine the conductivity of a covering on the road surface; and






measuring the polarization between said pair of electrodes to determine the thickness of said covering.

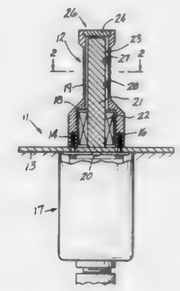
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**4,745,804**

## ACCRETION TYPE ICE DETECTOR

**Joshua I. Goldberg, Woodbridge, and Kenneth M. Harley, Fairfield, both of Conn., assignors to Dataproducts New England, Inc., Wallingford, Conn.**

**Filed Dec. 8, 1986, Ser. No. 938,834**
**Int. Cl.⁴ G01W *1/00;* G08B *19/02***
**U.S. Cl. 73—170 R** **30 Claims**




1. A device for detecting the accretion of ice upon a surface exposed to an atmosphere calculated to produce ice upon said surface comprising:
a protrusion having a surface exposed to the atmosphere,
power means for stressing the protrusion under a predetermined compressive load sufficient to deform the protrusion in ice free and in ice accreted conditions, and
measuring means for measuring the extent of deformation in each of said conditions whereby a comparison of said deformation measurements is useful as a measure of the occurrence and of the extent of ice accretion.

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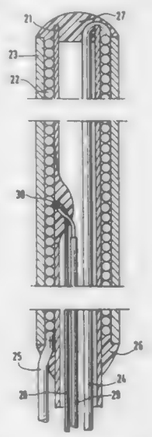
**4,745,805**

## PROCESS AND DEVICE FOR THE MEASUREMENT OF THE FLOW OF RAW SAP IN THE STEM OF A PLANT SUCH AS A TREE

**André F. Granier, Saint-Max, France, assignor to Institut National de la Recherche Agronomizue, France**

**Filed May 30, 1986, Ser. No. 868,596**
**Claims priority, application France, May 30, 1985, 85 08156**
**Int. Cl.⁴ G01F *1/68***
**U.S. Cl. 73—204** **5 Claims**

1. A device for measuring variations in raw sap flow in a sap-wood-containing plant stem which comprises:
a heating temperature probe having a stable heating circuit and a thermocouple measuring device with hot and cold junctions,
a non-heating temperature probe having a thermocouple measuring device with hot and cold junctions,
a temperature-monitoring instrument having terminals, and means for recording voltage at the terminals;
the heating temperature probe comprising a rigid tubular core surrounded by windings of a heating wire, the windings being surrounded by a heat distributing tube, the composition of which has high thermal conductivity;




the length of the windings and that of the distributing tube being approximately equal to the thickness of the sap wood of the plant stem, and
the tubular core containing a supply wire for said windings.

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**4,745,806**

## LEVEL GAUGE FOR LIQUID HELIUM

**Tsuyoshi Masumoto, Sendai; Uichiro Mizutani, Nagoya; Masami Ishii, Toyota; Hiroshi Motoyama, Toyota; Ryohei Yabuno, Toyota, and Tetsuo Oka, Toyoake, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan**

**Filed Jan. 24, 1986, Ser. No. 822,110**
**The portion of the term of this patent subsequent to Apr. 7, 2004, has been disclaimed.**
**Int. Cl.⁴ G01F *23/24;* C22C *16/00;* H01B *1/02, 12/00***
**U.S. Cl. 73—295** **2 Claims**




1. A level gauge for liquid helium comprising:
a sensing element comprising a wire of a superconductive alloy which has a superconducting transition temperature, Tc, of 4.5° to 5.2° K.;
a support member for linearly supporting and dielectrically insulating said sensing element;
means for energizing said sensing element; and
means for detecting a current passed through the sensing element,
said superconductive alloy consisting essentially of zirconium, ruthenium and rhodium and represented by the formula, $Zr_{100-x}(Ru_{1-y}Rh_y)_x$ in which x represents a

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content of at least one of said ruthenium and said rhodium in atomic % and in a numerical value of $17.0 \leqq x \leqq 22.5$ and y represents a numerical value of $0 \leqq y \leqq 1$, said superconductive alloy having an amorphous phase which is obtained by rapid quenching of a molten alloy material.

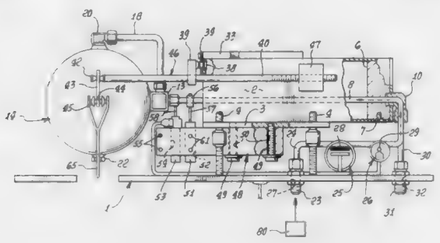
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**4,745,807**

## DENSITY METER FOR CONTINUOUS FLUID FLOW

**Timothy P. O'Neill, 417 Poppy Pl., Mountain View, Calif. 94043**

**Filed Nov. 6, 1986, Ser. No. 927,497**
**Int. Cl.[4] G01N** *9/06*
**U.S. Cl. 73—434** **7 Claims**



1. In a density device, the combination comprises:
(a) a plurality of hollow flexures,
(b) a relatively fixed support for one end of each of said flexures,
(c) and a closed container supported by, and interiorly communicating with the opposite ends of said flexures; one or more of said flexures serving to conduct a flowing fluid into the container and the other of said flexures serving to conduct a flowing fluid out of the container; changes in fluid density producing flexure deflection and said container when filled with fluid being supported in every position by said deflecting flexures;
(d) a first means to convert said deflection into an electrical displacement signal,
(e) a second means connected to said first means to convert said electrical displacement signal to an electrical weight signal,
(f) a third means to produce an electrical volume signal,
(g) a fourth means connected to said second means and to said third means to combine said weight signal with said volume signal to produce a density signal,
(h) and including a pressure sensing device to convert the pressure of the flowing fluid into an electrical pressure signal, and a temperature sensing device to convert the temperature of the fluid into an electrical temperature signal, and wherein said second means is connected to said first means and to said temperature sensing device for converting said displacement signal and said temperature signal into a temperature compensated weight signal; and wherein said fourth means is connected to said second means, third means, pressure sensing device and temperature device and combines said temperature compensated weight signal, said volume signal, said temperature signal and said pressure signal to produce a temperature and pressure compensated density signal.

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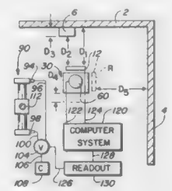
**4,745,808**

## MEASUREMENT APPARATUS UTILIZING SONAR WAVES

**John H. Hagen, 15415 N. 30th Ave., Phoenix, Ariz. 85023**

**Filed Dec. 15, 1986, Ser. No. 941,682**
**Int. Cl.[4] G01B** *17/02*
**U.S. Cl. 73—597** **15 Claims**

1. Sonar measurement apparatus for measuring the thickness of a work, comprising, in combination:
sonar transmitting and receiving means;
reference base means, including a first reference base and a second reference base;
means for moving the sonar transmitting and receiving means linearly with respect to the reference base means to obtain a first predetermined distance measurement before the work to be measured is placed against the reference base means, and then for moving the sonar transmitting means linearly with respect to the work to be measured to obtain a second predetermined measurement distance which is equal to the first predetermined distance mea-




surement, and including means for rotating the sonar means relative to the first reference base and the second reference base to obtain the first predetermined distance from the first reference base and the second predetermined distance from the work disposed against the second reference base; and
means for measuring the distance the sonar transmitting and receiving means moves between the first and second predetermined measurements, which distance represents the thickness of the work.

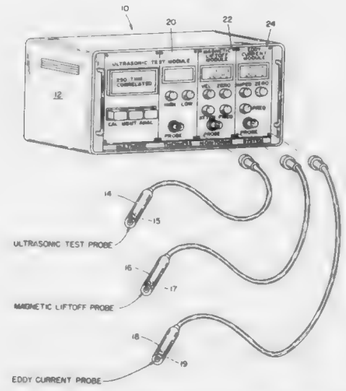
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**4,745,809**

## COMPOSITE ANALYZER TESTER

**Richard M. Collins, East Setauket, and Richard F. Chance, Bayport, both of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.**

**Filed Aug. 12, 1986, Ser. No. 895,789**
**Int. Cl.[4] G01N** *29/04*
**U.S. Cl. 73—661** **9 Claims**




1. A composite analyzer tester for nondestructively testing and analyzing the physical properties and gaging the thickness of a test material, comprising:
a. a magnetic induction circuit for measuring the thickness of the material, which includes a magnetic induction probe having a magnetic induction coil which is placed adjacent to the outer surface of the material and is energized at a relatively low frequency below one megahertz, and wherein the resultant impedance of the in the magnetic induction circuit is a measurement of the thickness of the test material;



b. an ultrasonic pulse-echo circuit for measuring the ultrasonic velocity of the test material in which said measurement of the thickness of the test material is utilized, and for also measuring the relative change in amplitude of an ultrasonic pulse transversing the test material from an outer surface thereof to an inner surface, whereat it is echoed back to the outer surface for detection, including an acoustic probe which is placed adjacent to the outer surface of the test material, for generating an ultrasonic pulse introduced into the test material and for detecting the echoed ultrasonic pulse to measure the transversal time of the echoed ultrasonic pulse, which after determining said measurement of thickness, allows the measurement of the ultrasonic velocity of the test material to be deterimed; and
c. an eddy current circuit for measuring the relative electrical conductivity of the test material, including an eddy current probe with an eddy current coil which is placed adjacent to the outer surface of the test material and is energized at a relatively high frequency above one megahertz to generate an alternating magnetic field which induces an alternating electric field in the test material having eddy currents and an alternating magnetic field associated therewith, with the associated magnetic field affecting the alternating magnetic field of the eddy current coil, such that the resultant impedence of the eddy current coil in the eddy current circuit provides a measurement of the electrical conductivity of the test material.

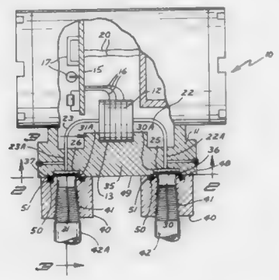
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**4,745,810**

## FLANGELESS TRANSMITTER COUPLING TO A FLANGE ADAPTER UNION

**Dean S. Pierce, St. Paul; Roger L. Frick, Chanhassen, and Gerald R. Cucci, Minneapolis, all of Minn., assignors to Rosemount Inc., Eden Prairie, Minn.**

**Filed Sep. 15, 1986, Ser. No. 907,481**
**Int. Cl.[4] G01L** *7/08, 9/00, 19/00*
**U.S. Cl. 73—706** **17 Claims**



9. An improved transmitter for providing an output indicative of a pressure of a process fluid supplied by a union, comprising:
an inlet for receiving the process fluid having a coupling surface facing the union and coupled thereto;
a seal disposed on the coupling surface for sealingly coupling the process fluid from the union to the inlet;
a pair of bolts disposed through bolt holes in the coupling surface, fastening the union to the transmitter and compressing the seal;
an isolator diaphragm having an isolator surface for coupling pressure from the process fluid to the transmitter;
sensor means disposed in the transmitter for receiving a pressure and for providing the output; and
coupling means coupled from the isolator means to the sensor means for coupling pressure therebetween comprising a substantially incompressible fluid; and
wherein the improvement comprises that the isolator diaphragm is disposed between the bolts in the inlet means and the isolator surface is disposed to face the union such that the transmitter has no flange and wherein the transmitter is a differential pressure transmitter having two inlets side by side and spaced apart to allow interfacing to standard orifice plate flange adapter unions.

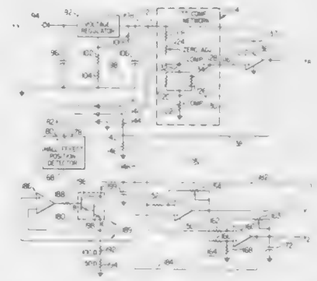
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**4,745,811**

## PRESSURE MONITORING APPARATUS HAVING A HALL-EFFECT DETECTOR

**Tommy L. Gray, Dallas, Tex., assignor to Span Instruments, Inc., Plano, Tex.**

**Filed Oct. 28, 1985, Ser. No. 792,150**
**Int. Cl.[4] G01L** *7/04, 9/14, 19/04*
**U.S. Cl. 73—708** **16 Claims**



1. A condition responsive apparatus, comprising:
a control member movable in response to variations in a physical condition;
magnetic means supported by said control member for movement therewith in response to said variations in the physical condition;
a Hall-effect detector mounted in proximity to said magnetic means for generating a signal proportional to movement of said magnetic means with respect to said detector; and
signal processing means including means for generating a temperature-compensating reference voltage, said processing means receiving the signal from said Hall-effect detector and the generated temperature compensated reference voltage and in response thereto generating at least one of the outputs, a floating voltage output, a ground referenced voltage output or a current output, each output proportional to variations in the external pressure.

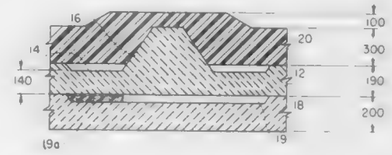
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**4,745,812**

## TRIAXIAL TACTILE SENSOR

**Charles A. Amazeen, Arlington, and Steven S. Bishop, Stafford, both of Va., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Mar. 25, 1987, Ser. No. 29,912**
**Int. Cl.[4] G01L** *1/22, 5/16*
**U.S. Cl. 73—862.04** **14 Claims**



1. A very sensitive, high resolution, transducer array-type tactile sensor adaptable for use with various electro-mechani-

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cal and fluidic or pneumatic mechanisms and manipulators including robot end-effectors, for determining lateral or shear forces in conjunction with normal force measurement to aid in the determining of sensor-applied mechanical to electrical transduction forces which in turn help determine any object slip and/or object rotation in the grasp of a robot end-effector; said sensor comprising in combination:

(a) a micro-thinned silicon wafer main body member **12** having top and bottom surfaces and a predetermined plurality of closely spaced microminature, tactile sensor boss elements **16** forming an array, each boss element **16** disposed centrally of and projecting upwardly above the top surface from a reduced body thickness portion constituting an annular more flexible diaphragm portion **14**, said bossed tactile sensor elements **16** and their respective diaphragm portions **14** being susceptible to mechanical perturbative movement from various applied forces including triaxial forces as applied to the various tactile boss elements surfaces;

(b) lower support layer means **18** upon which said main body member **12** via its bottom surface is engagingly supported, said layer means **18** being constituted by a layer of material which is thermally compatible to reduce any thermal stress gradient between said body member and support layer, said support layer having a corresponding plurality of recessed areas **19** corresponding generally in size and alignment location to that of the said diaphragms and tactile sensor boss elements **16**; and

(c) circuit means **C1**, **C2** in association with said tactile sensor elements **16** to help constitute the transducer array including circuit portions **C1** fabricated directly in conjunction with said main body **12** and support layer means **18**, to generate electrical signals responsive to mechanical perturbation across said tactile sensor elements **16**, with said electrical signals being adaptable for interpretive processing to effectively determine any object slip and/or object rotation of an object in the grasp of a robot end-effector.

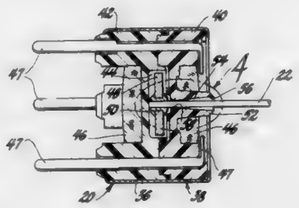
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**4,745,813**

**EXTENDED SPINDLE ELECTRIC GAGE MECHANISM**

**Daniel C. MacManus, Flint, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Mar. 16, 1987, Ser. No. 26,044**
**Int. Cl.⁴ G01D** *11/02*
**U.S. Cl. 73—866.1** **2 Claims**



1. An electric gage mechanism comprising;

a gage movement having a bobbin and an armature within the bobbin, a pointer located remotely from the armature,

an extended spindle for driving the pointer and having sufficient length to extend from the armature to the pointer,

first and second bearings between the pointer and the armature,

an outrigger adjacent the pointer,

the first bearing being placed in the outrigger for rotatably supporting the spindle, the first bearing being subject to misalignment with the bobbin, and

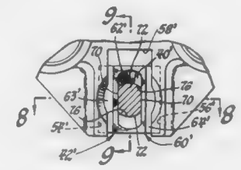
the second bearing being placed in the bobbin for supporting the spindle for rotary movement, the second bearing being shaped to accommodate misalignment of the first bearing.

**4,745,814**

**VARIABLE DISPLACEMENT WOBBLE PLATE COMPRESSOR SLIDE AND GUIDE JOINT**

**Gary T. Miller, E. Amherst, and John F. Benoit, Lockport, both of N.Y., assignors to General Motors Corporation, Detroit, Mich.**

**Continuation-in-part of Ser. No. 888,713, Jul. 24, 1986, abandoned. This application Jan. 27, 1987, Ser. No. 6,754**
**Int. Cl.⁴ F04B** *1/28;* **F16H** *23/04*
**U.S. Cl. 74—60** **2 Claims**



2. In a variable displacement wobble plate compressor having a guide rod that operates through a multiple axis joint to prevent rotation while permitting angulation of a wobble plate, the improvement comprising a bearing body slidably received on radially extending guides on the wobble plate, said bearing body having a slot therethrough converging inwardly from an oval shape on opposite sides of the bearing body so as to slidably receive the guide rod thereabout and permit angulation of the bearing body relative to the guide rod while maintaining contact about the guide rod with the bearing body in the slot, said guide rod and slot having parallel flat sides that contact over a substantial surface area to prevent rotation of the wobble plate.

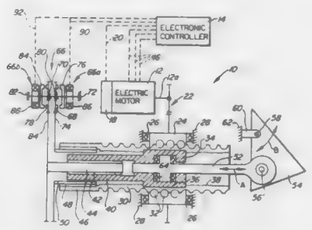
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**4,745,815**

**NON-JAMMING SCREW ACTUATOR SYSTEM**

**Brent A. Klopfenstein, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.**

**Filed Dec. 8, 1986, Ser. No. 939,407**
**Int. Cl.⁴ F16H** *25/20, 57/10*
**U.S. Cl. 74—424.8 R** **11 Claims**




1. A non-jamming ballscrew actuator system, comprising:

an inner screw;

an intermediate ballscrew internally threaded on the inner screw;

an outer ballscrew nut rotatably mounted about the ballscrew;

actuator means operatively associated with a load to be actuated and connected to the inner screw for axial movement therewith;

drive means for rotating the ballscrew nut to axially move the ballscrew; and

brake means for preventing relative rotation between the inner screw and the ballscrew to effect movement of the actuator means in response to movement of the ballscrew, the brake means being selectively releasable in the event of jamming of the ballscrew and ballscrew nut to allow the ballscrew to threadingly drive the inner screw and, thereby, move the actuator means.



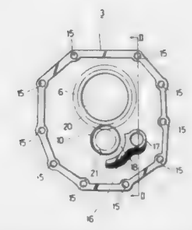
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**4,745,816**

**LUBRICATION MECHANISM OF GEAR TRANSMISSION**

**Yusuke Horiuchi; Masaki Inui, and Shinji Ogawa, all of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan**

**Continuation of Ser. No. 844,543, Mar. 27, 1986, abandoned. This application Sep. 22, 1987, Ser. No. 99,625**
**Claims priority, application Japan, Apr. 1, 1985, 60-48273[U]**
**Int. Cl.⁴ F16H** *57/04*
**U.S. Cl. 74—467** **4 Claims**



1. A dual-shaft type gear transmission comprising:

an intermediate plate arranged between a transmission case and an extension housing;

an output shaft;

a counter shaft arranged in said transmission case in parallel relation to and below said output shaft, said counter shaft including at least two counter gears of varying diameters, the smallest diameter counter gear being arranged in the vicinity of said intermediate plate; and

an oil guiding rib formed on said intermediate plate along an outer circumference of and spaced a predetermined distance from said smallest diameter counter gear.

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**4,745,817**

**PISTON/CRANK CONNECTION MECHANISM FOR AN INTERNAL COMBUSTION ENGINE**

**Takao Tomita, and Takahumi Asakura, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Continuation-in-part of Ser. No. 408,287, Aug. 16, 1982, abandoned. This application Jun. 14, 1985, Ser. No. 734,875**
**Claims priority, application Japan, Aug. 18, 1981, 56-121982**
**Int. Cl.⁴ G05G** *1/00;* **F02B** *75/32*
**U.S. Cl. 74—579 E** **3 Claims**

1. A piston/crank connection mechanism for a two cycle reciprocating internal combustion engine having a piston and a crank, comprising:

first and second pin members mounted on said piston and said crank, respectively;

said first pin member being disposed in parallel with an axis of a crankshaft of said engine;

a connecting rod member formed at opposite ends thereof first and second fitting holes in which said first and second pin members are fitted, respectively; and

at least one self-lubricating, heat-resisting, wear-resisting and relatively hard film layer having a slippery surface thereon and directly coated on an outer peripheral portion of said first pin member wherein said film layer is fabricated of a compound of nickel phosphor alloy and fluorine resin:

3. A piston/crank connection mechanism for a two cycle reciprocating internal combustion engine having a piston and a crank, comprising:

first and second pin members mounted on said piston and said crank, respectively;

said first pin member being disposed in parallel with an axis of a crankshaft of said engine;

a connecting rod member having formed at opposite ends thereof first and second fitting holes in which said first and second pin members are fitted, respectively; and



at least two self-lubricating, heat-resisting, wear-resisting and relatively hard film layers each having a slippery surface thereon, one of said film layers being directly coated on an inner peripheral portion of said first pin member and one of said film layers being directly coated on an inner peripheral portion of said first fitting hole in said connecting rod wherein said film layer is fabricated of a compound of nickel phosphor alloy and fluorine resin.

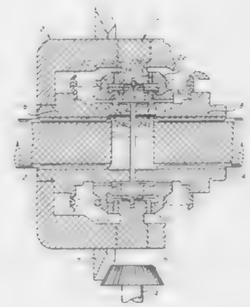
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**4,745,818**

**DIFFERENTIAL WITH ANGULARLY OFFSET HOLDOUT RINGS**

**Timothy R. Edwards, Warren, and John J. Schoeberle, Troy, both of Mich., assignors to Dyneer Corporation, Scottsdale, Ariz.**

**Filed Jan. 30, 1987, Ser. No. 8,966**
**Int. Cl.⁴ F16H** *35/04*
**U.S. Cl. 74—650** **5 Claims**



1. A differential apparatus for driving from the drive shaft of a vehicle a pair of output shafts arranged colinearly end-to-end, comprising:

(a) a rotatably driven annular center drive member arranged concentrically about the adjacent ends of the output shafts;

(b) a pair of side gears adapted for non-rotatable mounting

concentrically on the output shafts on opposite sides of said drive member, respectively;

(c) a pair of clutch members mounted for axial displacement on said side gears between clutch-engaged and clutch-disengaged positions relative to said drive member, respectively, each of said clutch members normally being resiliently biased toward the clutch-engaged position relative to said drive member;

(d) center cam means mounted concentrically within said drive member for coaxial angular adjustment relative thereto, said center cam means being operable to displace a given clutch member toward the clutch-disengaged position when the output shaft associated therewith overruns the other output shaft by a given amount; and

(e) holdout ring means for maintaining said given clutch member in the disengaged condition as long as the associated output shaft continues to overrun the other output shaft, said holdout ring means including:

(1) a pair of holdout rings mounted coaxially between said center cam member and said clutch members, respectively;

(2) said holdout rings being rotatably connected at their remote ends with, and extending into corresponding grooves contained in the adjacent faces of, the associated clutch members, respectively;

(3) said holdout rings being resiliently biased radially into frictional engagement with the associated clutch members, respectively;

(4) said holdout rings including at their adjacent ends a plurality of equally-circumferentially-spaced axially-projecting lug portions that normally extend, when said holdout rings are in inoperative first positions, within corresponding recesses contained in said center cam member when said clutch members are in the clutch-engaged positions, respectively, each of said holdout rings being angularly adjustable, when the associated clutch member is in a clutch-disengaged condition, toward an operative holdout position in which the extremities of said lug portions abut corresponding holdout surfaces on said center cam member, respectively;

(5) the lug portions of one of said holdout rings being angularly offset relative to the lug portions of the other holdout ring, whereby when said holdout rings are in their normal operative positions, the overrunning clutch member is maintained in a disengaged condition in the event of torque reversal between the center driving member and the engaged clutch member.

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**4,745,819**

**COMPACT POWER TRANSMISSION DEVICE FOR A FOUR-WHEEL DRIVE VEHICLE**

**Takenori Kano, Anjo; Mutsumi Kawamoto, Tokyo, and Tatsuya Iwatsuki, Okazaki, all of Japan, assignors to Aisin-Warner Kabushiki Kaisha, Aichi, Japan**

**Filed Dec. 31, 1986, Ser. No. 948,217**

**Int. Cl.[4] F16H** *37/10*

**U.S. Cl. 74—701** **4 Claims**

1. A power transmission device for a four-wheel drive vehicle having a compact transfer unit including front wheel differential gear means, differential motion limiting mechanism means and center differential gear means, comprising;

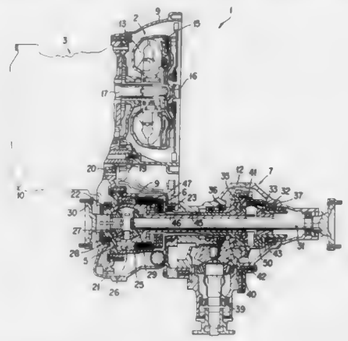
a first gear mount casing having a gear adapted to mesh with an output of an automatic transmission;

a front wheel differential gear arranged in said first gear mount casing, and including a diff-carrier having a pinion adapted to mesh with right and left side gears coupled to right and left front axles;

a differential motion limiting mechanism arranged coaxially with said front wheel differential gear in said first gear mount casing, said differential motion limiting mechanism including a cluth for connecting or disconnecting said first gear mount casing and said diff-carrier;

a second gear mount casing disposed coaxially with respect to said first gear mount casing; and

a center differential gear arranged in said second gear mount casing, and including a diff-carrier coupled with said first gear mount casing, a first side gear coupled with the diff-carrier of said front wheel differential gear, and a second side gear coupled with said second gear mount



casing adapted for transmitting power to rear wheels of the four-wheel drive vehicle;

wherein the diff-carrier of said center differential gear is supported between said first side gear and said second gear mount casing and has an extremity having an open end not supported by said second side gear, and said second side gear is connected directly to said second gear mount casing.

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**4,745,820**

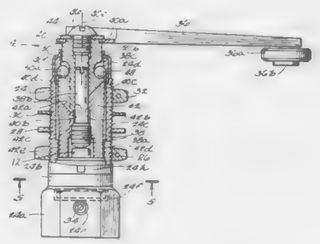
**AUXILIARY ROTARY ACTUATOR FOR A STANDARD PLUNGER OPERATED DEVICE**

**Richard G. Benshoff, and Ernest R. Remillard, both of Sarasota, Fla., assignors to Eaton Corporation, Cleveland, Ohio**

**Filed Jan. 5, 1987, Ser. No. 346**

**Int. Cl.[4] F16H** *25/18, 53/00*

**U.S. Cl. 74—107** **11 Claims**



1. In combination, a plunger operated device having a mounting portion through which its plunger extends and an auxiliary rotary actuator for such device, said auxiliary rotary actuator comprising:

a housing comprising means at one portion thereof for rigidly securing the same to said mounting portion of said device so that said plunger thereof extends into said housing;

means in said housing for converting rotary motion to reciprocating linear motion comprising:

a rotary cam having an axis of rotation;

means mounting said rotary cam in said housing for rotary motion on said axis of rotation with one end portion of said rotary cam being accessible from the exterior of another portion of said housing for external actuation thereof;

a convex cam surface on the other end portion of said rotary cam in the form of a modified right circular cone having its cone axis offset from said axis of rotation;

a reciprocative cam follower having a first end portion engaging said convex cam surface and a second end portion extending toward said device;

a concave cam surface on said first end portion of said reciprocative cam follower in the form of a modified right circular conesubstantially complementary to said convex cam surface of said rotary cam and having its cone axis correspondingly offset from said axis of rotation, said axis of rotation penetrating said modified right circular cone cam surfaces, rotation of said cam effecting rolling engagement of said convex cam surface along said concave cam surface to move said cam follower linearly;

means guiding said cam follower for reciprocating linear motion with respect to rotary cam with in said housing;

and means on said cam follower located and arranged to engage said plunger for actuating the same.

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**4,745,821**

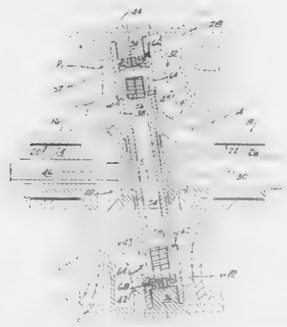
**SPEED RATIO ADJUSTING SYSTEM FOR NUTATIONAL TRACTION DRIVE TRANSMISSIONS**

**Yves J. Kemper, Bloomfield Hills, Mich., assignor to Bloomfield Research Limited Partnership, Troy, Mich.**

**Filed Nov. 21, 1986, Ser. No. 933,508**

**Int. Cl.[4] F16H** *15/16*

**U.S. Cl. 74—190** **2 Claims**



1. In a traction drive transmission comprising a support body defining a first axis, a shaft assembly supported by said support body for rotation on a second axis intersecting said first axis, and a pair of spaced traction discs having traction surfaces extending radially from said first axis, said support body, said shaft assembly and said traction discs being rotatable relative to one another, said shaft assembly comprising a central tubular shaft concentric with said second axis, and pair of oppositely divergent cone members rotatable with and movable axially on said shaft, said cone members being in rolling friction engagement with the traction surfaces on said traction discs at two points of contact spaced oppositely from the point of intersection of said first and second axes, the improvement comprising:

a thread shaft positioned within said tubular shaft and having a pair of oppositely pitched external thread sections spaced longitudinally thereon:

a carrier nut member threaded one each of said thread sections, said carrier nut members extending radially through said tubular shaft and being fixed to said cone members, respectively; and

means for coupling said thread shaft to said support body to effect relative rotation of said thread shaft, thereby to control axial movement of said cone members along said second axis.

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**4,745,822**

**TWO SPEED AXLE**

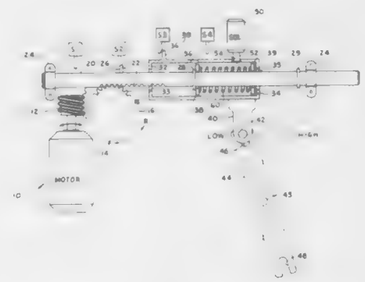
**Edward G. Trachman, Birmingham, and Daniel W. Roper, Rochester, both of Mich., assignors to Rockwell International Corporation, Pittsburgh, Pa.**

**Filed Apr. 19, 1985, Ser. No. 725,452**

**The portion of the term of this patent subsequent to Oct. 28, 2003, has been disclaimed.**

**Int. Cl.[4] B60K** *20/10, 20/00*

**U.S. Cl. 74—335** **2 Claims**



1. In combination with a two speed axle, a two speed axle shift apparatus comprising a reversible motor, a worm connected to the motor for turning by the motor, a gear connected to the worm for turning by the worm, a pinion connected to the gear for turning with the gear and a rack connected to the pinion for reciprocation by the pinion and a sliding shaft connected to the rack for sliding by the rack, bearings supporting the shaft for sliding, retainers mounted on the shaft, abutments mounted on the shaft between the retainers and a compression spring mounted between the abutments, a cage surrounding a portion of the shaft having first and second ends with openings therein permitting passage of the shaft and retainers and prevention of passage of the abutments, the cage being slidable along the shaft, spaced detent means on the cage and solenoid means adjacent the cage selectively engageable with the spaced detent means for holding the cage in selected positions and shifting means connected to the cage for movement with the cage to shift between high and low speeds, whereby the motor, worm, pinion, gear and rack move the shaft causing the retainer to move the abutment, compressing the spring between the abutments and one end of the cage until the solenoid releases the cage for movement along the shaft.

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**4,745,823**

**GEAR ASSEMBLY ADAPTED FOR MATING WITH A THIRD GEAR WITHOUT BACKLASH**

**Shuji Morita, and Katsujiro Satou, both of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan**

**Filed Jun. 3, 1986, Ser. No. 870,073**

**Claims priority, application Japan, Jun. 12, 1985, 60-87629[U]**

**Int. Cl.[4] F16H** *55/18*

**U.S. Cl. 74—409** **5 Claims**

1. A gear assembly adapted for mating with a third gear in a non-backlash manner, said assembly comprising:

a first gear and a second gear superimposed so as to be coaxially and relatively rotatable for mating together with a third gear, said first and second gears having axially spaced side surfaces facing each other;

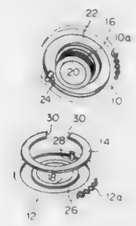
a first pin and a second pin standing on said respective side surfaces of said gears at substantially equidistant positions from a common axis of the assembly; and

a spring formed from a flat strip in a generally circular arcuate shape having an axis perpendicular to the plane of

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the strip and arranged between said first and second gears around the common axis, said spring having concave end surfaces to be received by said first and second pins, respectively, when said first and second gears are relatively



rotated so that said pins move apart, each of said concave end surfaces being defined by a part of a circle having a center which lies on a line of action of force exerted by said pins against said concave end surfaces.

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**4,745,824**

**MANUAL TRANSMISSION WITH MECHANISM FOR PREVENTING REVERSE GEAR SHIFT NOISE**

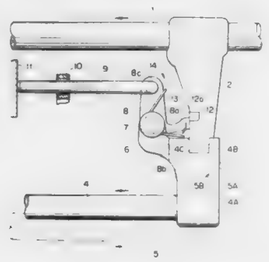
**Kazuyoshi Hiraiwa, Atsugi, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Dec. 23, 1985, Ser. No. 812,406**

**Claims priority, application Japan, Jan. 25, 1985, 60-13012; Jan. 25, 1985, 60-13011; Feb. 1, 1985, 60-13464[U]**

**Int. Cl.[4] F16H *3/38*; B60K *41/26***

**U.S. Cl. 74—475** **18 Claims**



1. A mechanism for a transmission having at least one synchronizer, comprising:

a first fork rod for effecting a first gear shift of the transmission by moving in a first direction from a first neutral position to a first shift position, said first fork rod having a first bracket,

a second fork rod connected with the synchronizer for effecting a second gear shift of the transmission through the synchronizer by moving in a second direction from a second neutral position to a second shift position said second fork rod having a second bracket,

a select member capable of moving said first fork rod when said select member is in a first select posture in which said select member is engaged with said first bracket, and moving said second fork rod when said select member is in a second select posture in which said select member is engaged with said second bracket, and

engaging means comprising first means mounted on said select member and second means mounted on said second fork rod, said first and second means being placed in an engaged relation with each other when said select member is put in said first select posture, said first and second means being disengaged from each other when said first fork rod is moved through a predetermined distance from said first neutral position in said first direction by said select member in said first select posture,

wherein said first and second fork rods are placed substantially in parallel to each other so that said first and second directions are axial directions toward a side of said transmission, and wherein one of said first and second means is translational means and the other of said first and second means is rotational means, said translational and rotational means being arranged so that said translational means travels a rectilinear path in said second direction and simultaneously said rotational means rotates about a rotation axis perpendicular to a plane substantially parallel to said rectilinear path according as said select member in said first select posture moves said first fork rod in said first direction from said first neutral position and simultaneously moves said second fork rod in said second direction from said second neutral position with said first and second means.

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**4,745,825**

**TRANSFER SYSTEM TO SELECTIVELY PERFORM THE TWO-WHEELED AND FOUR-WHEELED DRIVING OPERATIONS FOR USE IN AUTOMOBILES**

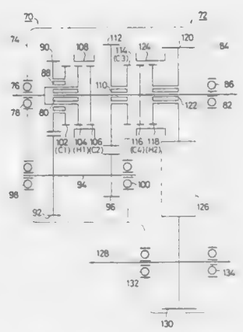
**Tamotsu Yamamoto, Toyohashi, Japan, assignor to Fuji Tekko Co., Ltd., Kosai, Japan**

**Filed Apr. 28, 1987, Ser. No. 43,455**

**Claims priority, application Japan, Nov. 20, 1986, 61-277505**

**Int. Cl.[4] F16H *37/06***

**U.S. Cl. 74—665 GA** **8 Claims**



1. A transfer system for use in automobiles in which a rotational motive power from a main speed change gear is received and the rotational speed is changed to at least two high and low speeds and also the driving mode is switched between the two-wheeled driving and four-wheeled driving modes, comprising:

a main drive shaft to which the rotational motive power is input from said main speed change gear;

a main shaft which is coaxially and relatively rotatably arranged with said main drive shaft and transfers the rotational motive power to rear wheels;

a main drive gear rotatably supported on said main drive shaft;

a speed change gear rotatably supported on said main shaft;

a counter gear mechanism for reducing the rotational speed of the rotational motive power of the main drive gear and transferring to said speed change gear;

first switching means for coupling the main drive shaft with the main shaft in the two-wheeled driving or four-wheel driving mode at the high-speed position, and for coupling the main drive shaft with the main drive gear in the two-wheeled driving or four- wheel driving mode at the low-speed position;

a front drive gear which is rotatably supported to the main shaft and transfers the rotational motive power to front wheels; and

second switching means for disconnecting the speed change gear and the front drive gear from the main shaft in the two-wheeled driving mode at the high-speed position, for coupling the main shaft with the front drive gear in the four-wheeled driving mode at the high-speed position, for coupling all of the speed change gear, the main shaft, and the front drive gear in the four-wheeled driving mode at the low-speed position, and for coupling the speed change gear with the main shaft in the two-wheeled driving mode at the low-speed position.



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**4,745,826**

**SHIFT CONDITION DETECTOR FOR AN AUTOMATIC VEHICLE TRANSMISSION**

**Seiichi Nishikawa, Toyokawa; Yoshiharu Harada; Kagenori Fukumura, both of Toyota; Yoichi Hayakawa, Toyoake, and Masao Kawai, Chirya, all of Japan, assignors to Aisin-Warner Limited, Anjo and Toyota Jidosha Kabushiki Kaisha, Toyota, both of, Japan**

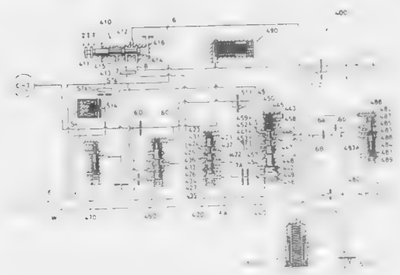
**Filed Jan. 17, 1986, Ser. No. 819,838**

**Claims priority, application Japan, Jan. 19, 1985, 60-7772**

**The portion of the term of this patent subsequent to Jul. 29, 2003, has been disclaimed.**

**Int. Cl.[4] B60K *41/18, 41/16***

**U.S. Cl. 74—866** **6 Claims**



1. A control system for a vehicle transmission, comprising

a main transmission;

a transfer gear having at least two speed modes being operative in respective shifting conditions of said transfer gear;

means forming part of said transfer gear for changing from a two-wheel drive mode to a four-wheel drive mode and conversely;

a manual shifting valve operatively connected with said transfer gear for changing said speed modes and drive modes;

an electric detecting means for detecting the shifting condition of said transfer gear for a respective said speed mold; and

an electric control means for controlling said main transmission according to said detected speed mode of said transfer gear.

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**4,745,827**

**FILE GUIDE FOR SAW CHAIN CUTTER TEETH**

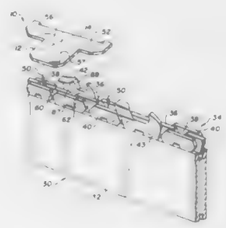
**Daniel Kuwica, 1756 Shannon Court, Coquitlam, British Columia, Canada V3J 6C6**

**Filed Aug. 4, 1987, Ser. No. 81,329**

**Int. Cl.[4] B23D *63/10***

**U.S. Cl. 76—36** **34 Claims**

1. A filing guide for a saw chain having inner links with spaces therebetween, outer links and cutter teeth, the filing guide comprising a rigid body with a front edge shaped to abut against the inner links, and a pair of spaced-apart elongated members extending from the body adjacent the front edge, the members being shaped to fit within the spaces between the inner links, the body being shaped to glidably receive a round file, whereby a cutter tooth can be filed by the round file when



the filing guide is positioned for use with the members inserted in the space between the inner links.

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**4,745,828**

**ROTARY WIRE STRIPPER**

**Jiri Stepan, St. Gallerstrasse 76, CH-7320 Sargans, Switzerland**

**Filed Feb. 21, 1986, Ser. No. 832,463**

**Claims priority, application Switzerland, Feb. 22, 1985, 815/85**

**Int. Cl.[4] H02G *1/12***

**U.S. Cl. 81—9.51** **21 Claims**



1. Device for removing a layer from electrical or optical cable, or the like, the device comprising:

frame means;

a stripping blade mounted on the frame means for being movable radially with respect to the cable for movement into contact with the layer of the cable to be removed, and means for rotating the blade around the axis of the cable, whereby the blade may sever the layer of the cable around the cable;

clamping jaws mounted on the frame means for being moved into clamping engagement with the cable, for fixing the cable in an axial position with a free end of the cable at a predetermined terminal position relative to the frame means;

centering jaws mounted on the frame means and disposed axially of the cable in a location near the blade, and means for moving the centering jaws radially of the cable into engagement with the cable, for radially holding and positioning the cable with respect to the centering jaws and the blade;

wherein the centering jaws are placed so that when the centering jaws clamp the cable, the centering jaws are directly next to the blade;

the centering jaws being movable radially of the cable independently of the radial movement of the blade with respect to the cable;

the means for moving the centering jaws radially into engagement against the cable comprising:

a first bevel surface in engagement with the centering jaws at an axial position that is separated from the position where the centering jaws contact the cable, such that motion of the bevel surface axially of the cable moves the engaged centering jaws into controlled symmetrical clamping engagement with the cable; and

bevel surface moving means in engagement with the first bevel surface, for shifting the first bevel surface to move the centering jaws into engagement with the cable; and

means for moving the blade radially toward the cable, comprising a second bevel surface spaced axially of the cable from the blade, the blade having means attached to it that are in engagement with the second bevel surface, the second bevel surface being so oriented that upon movement of the second bevel surface in a direction axially of the cable, the blade is moved radially to contact the layer of the cable to be removed.

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**4,745,829**

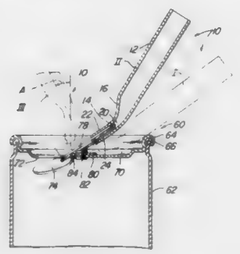
**CAN OPENER FOR USE WITH FULCRUM-TYPE OPENER TABS**

**Arthur C. VanHoutte, 24743 Murray Dr., and Earl L. Caber, 24744 Murray Dr., both of Mt. Clemens, Mich. 48045**

**Continuation of Ser. No. 155,204, Jun. 2, 1980, Pat. No. 4,373,246. This application Nov. 12, 1982, Ser. No. 440,925**

**Int. Cl.⁴ B67B *7/40***

**U.S. Cl. 81—3.55** **9 Claims**



1. A hand held opener to provide leverage in the opening of a beverage containing can employing a fulcrum-type opener characterized by a peripherally weakened closure member integrally formed in the top of said can and a key portion which effects ruputure opening of a contents dispensing aperture within said top about the periphery of said closure member and remains permanently affixed thereto after said opening, said key portion initially being disposed substantially parallel to and spaced slightly above a substantially horizontal planar portion of said top, said can being characterized by an upwardly depending edge portion circumferentially encompassing said fulcrum-type opener and extending substantially above said key portion, said hand held opener comprising:

an elongated handle adapted to be grasped in the hand of an operator so that one end of said handle projects outwardly therefrom in the general direction of a beverage containing can to be opened; and

tab embracing means depending from said handle and defining a key portion receiving recess therein having an axis of symmetry offset by a substantial angle from the axis of elongation of said handle, said tab embracing means comprising bifurcated upper and lower tab guides spaced from one another to receive said key portion therebetween with said upper tab guide being at least axially coextensive with said lower tab guide, said tab embracing means being operable, in combination with said handle, to effect mechanical linkage between said hand held opener and said key portion while avoiding interference with said upwardly depending edge portion, and subsequently to effect opening through a sequential reciprocal displacement of said key portion from a first, stowed position to a second, load bearing position and back to said first position.

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**4,745,830**

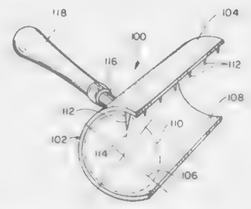
**CARPET INSTALLATION TOOL**

**Roy A. Gulino, 505 E. County Line Rd., Lakewood, N.J. 08701**

**Filed Mar. 10, 1986, Ser. No. 838,241**

**Int. Cl.⁴ B25G *3/00***

**U.S. Cl. 81—488** **8 Claims**



1. A tool for installing carpet around the nose of a stair tread projecting outwardly from an underlying riser, said tool comprising a body having an elongated opening adapted to receive that portion of the carpet to be installed around the nose of a stair tread, said body including a hollow member having an upper portion and a lower portion arranged spaced-apart along the longitudinal axis of said body providing said opening therebetween, said upper portion having an upper edge and said lower portion having a lower edge, a plurality of teeth secured to said upper portion of said body adjacent said upper edge and projecting into said opening towards said lower portion for releasably securing said carpet at a first location to said tool, said lower edge extending to a location at least opposite the corresponding location of said teeth for engaging said carpet at a second location spaced from said first location, and a handle attached to said body for manipulating said teeth and said lower edge of said body simultaneously into releasable engagement respectively with said first location and said second location of said carpet while stretching said carpet around and under said nose of said stair tread, said teeth when engaging said carpet at said first location acting as a pivot point while said handle is manipulated for engaging said carpet at said second location with said lower edge for wedging said carpet at said second location into the intersection of said stair tread and said underlying riser.

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**4,745,831**

**SETTING TOOL FOR SCREWING-IN THREADED RODS**

**Hubert Nutt, Mauren, and Norbert Hilty, Schaan, both of Liechtenstein, assignors to Hilti Aktiengesellschaft, Liechtenstein**

**Filed Sep. 19, 1986, Ser. No. 909,767**

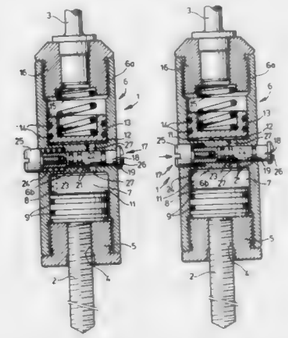
**Claims priority, application Fed. Rep. of Germany, Sep. 19, 1985, 3533396**

**Int. Cl.⁴ B25B *13/50, 21/00***

**U.S. Cl. 81—53.2** **4 Claims**

1. A setting tool for screwing a threaded rod into a receiving material, comprising a work driver, said work driver comprises an axially elongated sleeve-like member having a first end and a second end spaced apart in the axial direction, a partition wall located within said sleeve-like member extending transversely of the axis thereof and located intermediate the first and second ends thereof and dividing the interior of the sleeve-like member into a first axially extending space located between said partition wall and the first end of said sleeve-like member and a second axially extending space located between said partition wall and the second end of said sleeve-like member, a retainer part secured in the first end of said sleeve-like member and having a threaded bore therein extending through said retainer part in the axial direction of said sleeve-like member, means for transmitting rotational motion to said sleeve-like member, said retainer part comprising means for transmitting rotational movement from said work driver to a threaded rod secured in said threaded bore, stop means located within said first space between said retainer part and said partition wall for limiting the depth a threaded rod is screwed through said threaded bore in said retainer part, said stop means comprises a piston located within said first space and being displaceable therein in the axial direction of said sleeve-like member, a hydraulic medium located within said first space between said piston and said partition wall for biasing said piston against said retainer part, means located with said second space for supplying the hydraulic medium to said first space, and means in communication with hydraulic medium within said first space for selectively blocking or affording flow of the hydraulic medium between said first space and said second space, said means in communication





with said hydraulic medium comprises a valve located in a passageway interconnecting said first and second spaces, said partition wall has a bore extending therethrough extending transversely of the axial direction of said sleeve-like member, said valve comprises a tappet extending through said bore in said partition wall and having a head at one end thereof arranged to bear against the outside surface of said sleeve-like member in the closed position of the above said valve and a knob on the opposite end of said tappet projecting outwardly from the outside surface of said sleeve-like member in the closed position of said valve, said tappet being displaceable in said bore between the closed position and the open position where said head is spaced outwardly from the outside surface of said sleeve-like member, spring means in contact with said tappet for biasing it into the closed position, and means in said tappet for providing flow communication between said first and second spaces in the open position of said valve.

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**4,745,832**

**HYDRAULIC SPEED CONTROL SYSTEM**

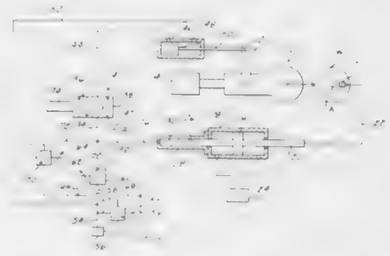
**Philip A. Kubik, 1527 Lochridge, Bloomfield Hills, Mich. 48013**

**Filed Nov. 28, 1986, Ser. No. 935,817**

**Int. Cl.⁴ B23B *3/00***

**U.S. Cl. 82—2 A** **4 Claims**

1. A control system for coordinating the rate of rotation of a workpiece about a fixed axis of rotation to the rate of movement of a cutting tool radially of said axis in cutting relationship to said workpiece to maintain a constant cutting speed, said system comprising reciprocable means for driving said tool in radial movement toward and away from said axis, variable speed drive means for driving said workpiece in rotation about said axis, and including speed control means movable in a first direction to increase the speed of said drive means and movable in the opposite direction to decrease the speed of said drive means, a master cylinder having a master piston reciprocable therein, a slave cylinder having a slave piston reciprocable therein, fluid filled conduit means operable to establish a fluid connection between said master cylinder and said slave cylinder to hydraulically transmit movement of said master piston to said slave piston, first means coupling said master piston to said reciprocable means to reciprocate said master piston in said master cylinder in coordination with



reciprocating movement of said tool by said reciprocable means, and second means coupling said slave piston to said control means to move said control means in said first direction in coordination with movement of said tool radially toward said axis.

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**4,745,833**

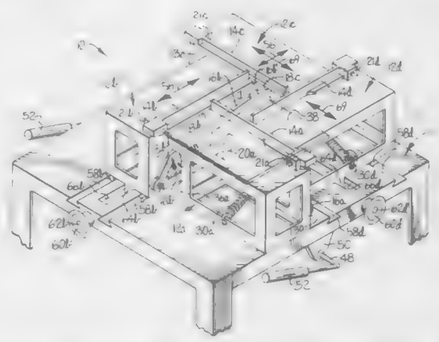
**APPARATUS FOR CUTTING RECTANGULAR CUTOUTS OF VARYING SIZE FROM A SHEET**

**James A. Davidson, 4300 Laurel Hill Rd., Raleigh, N.C. 27612**

**Filed Apr. 20, 1987, Ser. No. 40,850**

**Int. Cl.⁴ B26D *5/42***

**U.S. Cl. 83—385** **19 Claims**



1. Apparatus for cutting polygonal cutouts of different size from sheet material such as paper, comprising:

a plurality of cutting assemblies adapted during operation of said apparatus to make cuts along respective ones of the borders of a cutout to be cut from said sheet material;

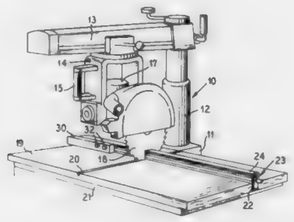
frame means mounting at least some of said cutting assemblies for adjustive movement relative to one another in directions facilitating alignment of said assemblies with said cutout borders;

and means responsive to said adjustive movement of said assemblies for automatically correlating the lengths of the cuts made by said assemblies with the lengths of the therewith aligned ones of said cutout borders.

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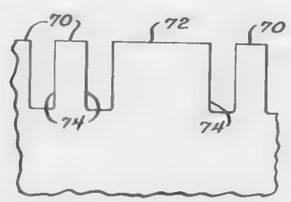


**4,745,834**
**CROSS CUTTING GUIDE FENCE AND GAUGE MEANS FOR RADIAL ARM SAWS**
**Arthur M. Neumann, 28 Dukes La., Lincolnshire, Ill. 60015**
**Filed Oct. 8, 1986, Ser. No. 917,096**
**Int. Cl.[4] B27B** *5/20*
**U.S. Cl. 83—468** **3 Claims**



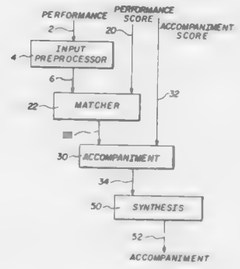
1. A radial arm cross cutting guide fence and gauging assembly, comprising:
a guide fence bar made of an aluminum extrusion having a front face side, an upper portion and a lower portion, each with a back side;
means for mounting said guide fence on a radial arm saw table top including a slot cut into said table top for receiving said guide fence lower portion;
an upwardly opening saw blade clearance kerf extending transversely through said guide fence;
a gauge extending along said guide fence bar including a rectangular panel and a tubular carrier pole attached to said panel;
a channel for receiving said gauge extending along said guide fence bar front face including a tubular channel for receiving said tubular pole and a recess in said front face for receiving said panel, said recess communicating with said tubular channel; and
means for adjustably securing said gauge within said guide fence bar including anchor wings securable at ends of said gauge by a micrometer adjustment screw for moving said gauge longitudinally relative to said guide fence and means located on said anchor wings for engaging walls of a channel located in said lower portion of said guide fence bar to prevent longitudinal displacement of said screw while permitting rotary adjustment of said screw.

**4,745,835**
**FINE TOOTH PERFORATION FOR WEBS**
**David H. Schnitzer, Palatine, Ill., assignor to Uarco Incorporated, Barrington, Ill.**
**Filed Sep. 15, 1981, Ser. No. 302,571**
**Int. Cl.[4] B26F** *1/20*
**U.S. Cl. 83—678** **7 Claims**



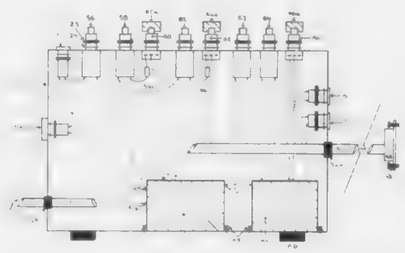

1. A perforating blade for creating extremely fine perforations in multiple ply business forms including a blade having a perforating edge made up of alternating perforating elements and notches separating the elements, said notches having a length along said edge no greater than about 0.010 inches and a depth of at least about 0.005 inches greater than the thickness of the multiple plies to be perforated, the length along said edge of a substantial majority of said elements being no more than 0.020 inches, at least certain of the remainder of said elements, located at relatively widely spaced intervals along said edges, having a length along said edge substantially in excess of said length of said substantial majority.

**4,745,836**
**METHOD AND APPARATUS FOR PROVIDING COORDINATED ACCOMPANIMENT FOR A PERFORMANCE**
**Roger B. Dannenberg, 6529 Aylesboro Ave., Pittsburgh, Pa. 15217**
**Filed Oct. 18, 1985, Ser. No. 789,064**
**Int. Cl.[4] G10H** *1/36*
**U.S. Cl. 84—1.03** **35 Claims**




1. A computerized method of providing accompaniment for a performance during performance input comprising
converting at least a portion of said performance into a sequence of performance sound related signals,
effecting comparison between said sequence of performance sound related signals and a desired sequence of the performance score,
if a predetermined match exists between said performance sound related signal and said performance score providing accompaniment for said performance, and
in effecting said comparison permitting a performance sound related signal departure from said performance score while concluding that said comparison results in a match.

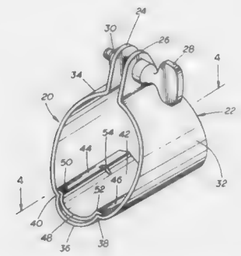
**4,745,837**
**INTERNALLY ILLUMINATED ELECTRIC GUITAR**
**Daniel P. Rimsa, 140 Danube Ave. #2, Tampa, Fla. 33606-3524**
**Filed Jan. 16, 1987, Ser. No. 4,159**
**Int. Cl.[4] G10D** *3/00*
**U.S. Cl. 84—291** **2 Claims**



1. An internally illuminated electric guitar, comprising:
(a) an electric guitar with body cast of solid transparent plastic resin consisting of:
(1) multiple layers of optically clear plastic resin,
(2) multiple layers of optically clear plastic resin tinted with colored dyes,
(3) alternately tinted layers of transparent plastic resin;
(b) a multiplicity of internal illumination sources encased in the transparent body such that:
(1) said illumination sources are an integral part of the guitar body,
(2) said illumination sources are encased at various depths throughout the guitar body,
(3) light emitted from said sources is distributed throughout the entire volume of the guitar body;
(c) electronic circuitry and interconnections necessary to activate said internal illumination sources.



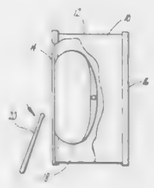
**4,745,838**
**REED HOLDING DEVICE FOR MUSICAL INSTRUMENTS**
**Conrad O. Johnson, 2414 Rosewood, Houston, Tex. 77004**
**Filed Mar. 23, 1987, Ser. No. 29,136**
**Int. Cl.[4] G10D** *9/02*
**U.S. Cl. 84—383 R** **5 Claims**



1. A reed holding device for holding a reed on a mouthpiece of a musical instrument comprising:
a single strip of material extending around the outer portions of said reed and said mouthpiece having a first end portion and a second end portion and a first concave side portion, a second concave side portion, and a concave bottom portion wherein said first concave side portion communicates with said concave bottom portion in such a way as to form a first shoulder and said second concave side portion communicates with said concave bottom portion in such a way as to form a second shoulder;
a bottom plate having a left side member, a right side member and a concave bottom member wherein said left side member communicates with said concave bottom member in such a way as to form a third shoulder and said right side member communicates with said concave bottom member in such a way as to form a fourth shoulder, said bottom plate being positioned within said strip such that said first shoulder fits on said fourth shoulder and said second shoulder fits on said third shoulder and said reed is held against said mouthpiece by said third and fourth shoulders at the edges of said reed;
fastening means for securely fastening said strip in engagement with said reed and said mouthpiece to secure said reed to said mouthpiece.

**4,745,839**
**DRUM MUTE**
**Victor Peraino, 28525 Selkirk, Southfield, Mich. 48076**
**Filed Jan. 15, 1987, Ser. No. 3,628**
**Int. Cl.[4] G10D** *13/02*
**U.S. Cl. 84—411 M** **11 Claims**

1. A combination comprising:
a percussion musical instrument having a hollow body with an opening, and a flat skin stretched over said opening;
mute means for altering the tones of the instrument when the skin is struck by a striking member, including:
an inflatable cushion member disposed in the drum;
the inflatable cushion member having a pair of opposed sides including a first side disposed in contact with the drum skin and a second side; and



a mounting rod having a midsection and a pair of opposite ends, the midsection being connected to the inflatable cushion member and said opposite ends being releasably mounted against opposite sides of the hollow body so as to support the inflatable cushion member in contact with the drum skin.

**4,745,840**
**MODIFIED MISSILE LAUNCHER**
**Kenneth R. Long, Plano, Tex., assignor to Varo, Inc., Garland, Tex.**
**Filed Feb. 24, 1987, Ser. No. 18,352**
**Int. Cl.[4] F41F** *3/04, 7/00*
**U.S. Cl. 89—1.814** **17 Claims**

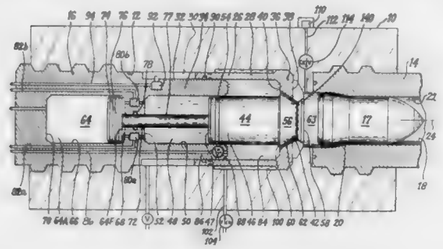


15. A method for providing electrical access to a missile launcher of the type having an elongate launcher body and a rail for slideable attachment thereto of a missile, electrical apparatus fixed within said launcher, and a sway brace for stabilizing said launcher with respect to an aircraft, comprising the steps of:
fixing a connector in said sway brace; and
connecting an electrical cable from said connector to said electrical apparatus.

**4,745,841**
**LIQUID PROPELLANT GUN**
**Inder K. Magoon, Pittsfield, and Robert E. Mayer, Williamstown, both of Mass., assignors to General Electric Company, Pittsfield, Mass.**
**Division of Ser. No. 879,723, Jun. 27, 1986, Pat. No. 4,693,165.**
**This application Mar. 30, 1987, Ser. No. 31,960**
**Int. Cl.[4] F41F** *1/04*
**U.S. Cl. 89—7** **14 Claims**

1. Gun means for firing liquid propellant comprising:
combustion chamber means for burning liquid propellant;
pumping chamber means for storing liquid propellant;
first displaceable piston means having a first annular surface;
second displaceable piston means having a second annular surface which is coaxial with said first annular surface;
annular injection orifice means having an effective cross-sectional area which is defined by said first and second annular surfaces and is coupled to and between said pumping chamber means and said combustion chamber means and providing a mass rate of flow of liquid propellant from said pumping chamber means into said combustion chamber means as a function of said cross-sectional area;

said cross-sectional area being a function of the differential displacement of said first and second piston means; and



the displacement of each of said first and second piston means being a function of the gas pressure in said combustion chamber.

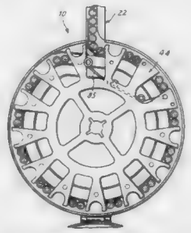
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**4,745,842**

## SPIRAL DRUM MAGAZINE WITH ELONGATED MAGAZINE CLIP AND MULTIPLE LINK LAST ROUND FOLLOWER

**Zhong Shou-Fu, Shandong, China, assignor to Poly Technologies, Inc., Beijing, China**

**Filed Oct. 16, 1986, Ser. No. 920,046**
**Int. Cl.⁴ F41D** *10/42*
**U.S. Cl. 89—33.02** **19 Claims**



1. A spiral drum magazine comprising a drum with an exterior approximately cylindrical wall, a front wall and a rear wall, said cylindrical wall defining a radial opening sized and shaped to pass a round of ammunition,

an elongated open ended clip magazine mounted to said drum and extending radially thereform at said radial opening of said cylindrical wall for passing rounds of ammunition therethrough,

an approximately spiral-shaped divider rigidly positioned in said drum and extending from a central portion of said drum progressively outwardly to said opening for guiding rounds of ammunition in series long a spiral path to said radial opening,

a rotor positioned in said drum adjacent said spiral divider and rotatable amount the longitudinal axis of said cylindrical wall, said rotor comprising a pair of rotor plates and means for maintaining said plates in spaced, parallel relationship, said rotor plates defining a plurality of circumferentially spaced radially outwardly facing slots for moving rounds of ammunition in series along the spiral path formed by said spiral shaped divider,

spring means for rotating said rotor, and

a last round follower for pushing the last round of ammunition from the spiral path of said spiral divider, said last round follower being positioned between said rotor plates and having a width less than the space between the rotor plates so as to be movable between said plates, and being pivotably connected at one end to said rotor with the other end including a protrusion having a width greater than the space between the rotor plates and extending beyond the plates and into said spiral path whereby the protrusion of said last round follower moves along the spiral path as the rotor rotates, through the radial opening and through the clip magazine.

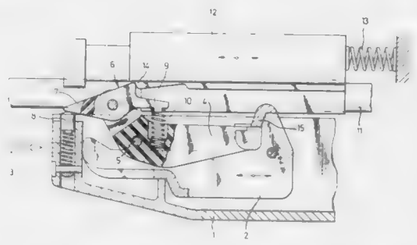
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**4,745,843**

## TRIGGER DEVICE FOR AUTOMATIC HANDGUNS

**Ulrich Zedrosser, and Walter Rossak, both of Steyr, Austria, assignors to Steyr-Daimler-Puch AG, Vienna, Austria**

**Filed Jun. 4, 1986, Ser. No. 870,719**
**Claims priority, application Austria, Jun. 7, 1985, 1713/85**
**Int. Cl.⁴ F41D** *11/02*
**U.S. Cl. 89—132** **3 Claims**



1. A trigger mechanism for automatic hand firearms, comprising

a lock including a nose, said lock being movable between a forward released position and a rearward arrested position,

a lock spring biasing said lock towards said forward position,

an actuable catching lever for arresting and releasing said lock, said catching lever being movable between an arrested and a released position,

a catching pawl cooperating with said catching lever, said catching pawl being mounted for swiveling motion at a forward end of said catching lever to engage and disengage said nose, said catching pawl comprising a double-arm rocking lever having a forward lever arm and a rear lever arm,

first spring means acting on said forward lever arm to urge said catching pawl into engagement with said nose and thereby to arrest said lock, and

second spring means acting on said rear lever arm and said catching lever to urge said catching lever into its arrested position.

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**4,745,844**

## CONTROL BLOCK COMPRISING A PLURALITY OF VALVE UNITS FOR A PLURALITY OF HYDRAULIC DRIVES, IN PARTICULAR FORK LIFT TRUCKS

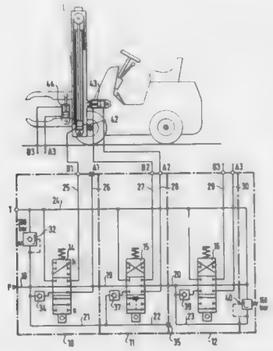
**Sönke Larsen, Marktheidenfeld, Fed. Rep. of Germany, assignor to Mannesmann Rexroth GmbH, Lohr/Main, Fed. Rep. of Germany**

**Filed Feb. 11, 1987, Ser. No. 13,377**
**Claims priority, application Fed. Rep. of Germany, Feb. 18, 1986, 3605140**
**Int. Cl.⁴ F01B** *25/02*
**U.S. Cl. 91—6** **7 Claims**

1. Control block comprising a plurality of valve units for a plurality of hydraulic drives, each drive being controlled by one of said valve units, each of said valve units having valve means movable between a first position for applying fluid pressure to the associated drive, a second position for relieving fluid pressure from the associated drive and a third position for the pressureless circulation of the fluid via a circulation passage extending through the valve units, a parallel passage formed in the valve unit and connected to the circulation passage of that valve unit, the circulation passages of said valve units being connected to each other and to a fluid source, upstream of the first valve unit, a first pressure-limiting valve



adjustable to a first pressure is connected to the circulation passage and to a pressure source and a second pressure-limiting valve adjustable to a second lower pressure connected to the parallel passage of one of the valve units for supplying at least one of the drives fluid the higher pressure set by said first pressure-limiting valve and to at least one of remaining drives fluid at a lower pressure set by said second pressure-limiting



valves, characterized in that the second pressure-limiting valve is connected to the parallel passage of the last valve unit of the control block and all valve units lying upstream of the connection of the parallel passages leading to the second pressure-limiting valve are subjected to the first pressure and all valve units lying downstream of that connection are subjected to the second pressure.

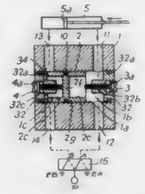
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**4,745,845**

## COMPRESSED AIR FLOW REGULATING DEVICES

**André Legris, Rennes, and Yvés Levenez, Vaux Le Penil, both of France, assignors to Societe Anonyme Styled LEGRIS, France**

**PCT No. PCT/FR84/00277, § 371 Date Jun. 27, 1985, § 102(e) Date Jun. 27, 1985, PCT Pub. No. WO85/02446, PCT Pub. Date Jun. 6, 1985**
**PCT Filed Nov. 26, 1984, Ser. No. 752,198**
**Claims priority, application France, Nov. 29, 1983, 83 19059**
**Int. Cl.⁴ F15B** *11/08, 13/04*
**U.S. Cl. 91—443** **20 Claims**



1. Improvement in compressed air flow regulating devices mounted between a conventional distributor of compressed air and a pneumatic jack, in order to regulate the speed of a piston of a jack in each direction, characterized in that it comprises a body (1) having a cylindrical housing (1*a*) limited by two bottoms (32) and in which is mounted for axial sliding an axi-symmetrical movable member (2), of which the stroke is defined at each end of the housing by an adjustable stop means, said body (1) being traversed perpendicularly to said cylindrical housing (1*a*) by two passageways (11, 12 and 13, 14) supplying the jack (5) said passageways (11, 12 and 13, 14) each one issuing into a chamber (1*b*, 1*c*) both of which are defined by the bottom, the cylindrical housing (1*a*) and the movable member (2), said movable member (2) comprising a central seal (10) isolating the two chambers (1*b*, 1*c*) defined at both ends of the cylindrical housing (1*a*), said movable member (2), being bistable and ensuring the opening of the passageways (11, 12 and 13, 14) as a function of the position of the stop members (3, 4) situated at both ends of said housing, so that as a result, a regulation of the supply and draining air flows is achieved in the two volumes of air of the double acting jack (5), and this in every direction of displacement of the jack piston.

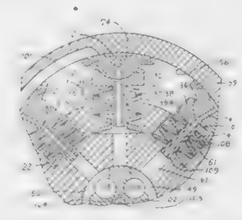
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**4,745,846**

## DEVICES WHICH TAKE IN AND EXPEL FLUID BY A CHAMBER WHICH MAY BORDER A CONED RING

**Karl Eickmann, 2420 Isshiki, Hayama-machi, Kanagawa-ken, Japan**

**Continuation-in-part of Ser. No. 806,574, Dec. 9, 1985, Pat. No. 4,690,623, which is a division of Ser. No. 282,990, Jul. 14, 1981, Pat. No. 4,557,347, which is a continuation-in-part of Ser. No. 910,809, May 30, 1978, abandoned, and a continuation-in-part of Ser. No. 911,246, May 31, 1978, abandoned, and a continuation-in-part of Ser. No. 224,769, Jan. 31, 1981, abandoned. This application Dec. 16, 1985, Ser. No. 809,105**
**Int. Cl.⁴ F01B** *1/00, 3/00, 13/04*
**U.S. Cl. 91—488** **9 Claims**



1. A fluid machine for the intake and explusion of a fluid, comprising, in combination, a first body (98), a second body (99), a control body (102), passages, working chambers which periodically increase and decrease their volumes, and an improvement, wherein said improvement includes:

(a) passages (161) through said first body to port into holding recesses (22) which are provided in said first body,

(b) a piston shoe guide face (156) provided on said second body,

(c) pistons 36, piston shoes 21 and coned rings 1,2 provided between said first and second bodies with partial extension of said pistons into said holding recesses, with said

(d) piston shoes provided between said pistons and said second body, and with said coned rings comprising

(e) at least one hollow coned ring, which has a medial bore, between a portion of a respective piston and a respective holding recess of said holding recesses,

(f) passages through said piston and through said piston shoes to port into pockets of hydrostatic bearings between said piston shoes and said guide face,

wherein one of said bodies moves respective to the other of said bodies to provide a periodic compression and expansion of said coned rings whereby said coned rings provide said working chamber and take in and expell fluid from and to respective ports in said control body, wherein said piston forms a head portion and a therefrom axially extending pipe portion with said head portion extending radially outwards beyond said pipe portion, and, wherein said pipe portion is inserted into the medial bore of said hollow coned ring.

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**4,745,847**

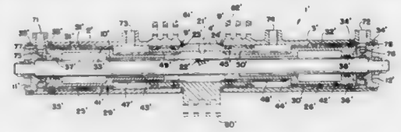
## HELICAL SPLINED ROTARY ACTUATOR

**Julian D. Voss, Bristol, Ind., assignor to Pneumo Abex Corporation, Boston, Mass.**

**Filed Sep. 3, 1987, Ser. No. 92,616**
**Int. Cl.⁴ F01B** *3/00*
**U.S. Cl. 92—33** **25 Claims**

1. An actuator comprising a cylinder housing, a piston axi-

ally movable in said housing, means for causing relative rotation between said piston and housing during axial movement of said piston relative to said housing, a barrier sleeve extending coaxially into one end of said housing between said housing and said piston, said housing having internal seal means in



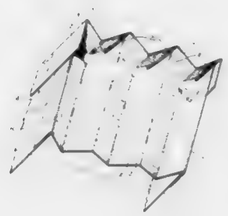
sliding sealed engagement with the exterior of said barrier sleeve, and said piston having external seal means in sliding sealed engagement with the interior of said barrier sleeve, and means permitting relative axial movement between said piston and barrier sleeve but not relative rotational movement.

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**4,745,848**
**BELLOWS**

**Kurt Hennig, Munich, Fed. Rep. of Germany, assignor to Gebr. Hennig GmbH, Ismaning, Fed. Rep. of Germany**

**Filed Jul. 2, 1985, Ser. No. 751,317**
**Claims priority, application Fed. Rep. of Germany, Jul. 11, 1984, 3425548**
**Int. Cl.[4] F01B** *19/00*
**U.S. Cl. 92—34** **11 Claims**



1. A bellows comprising a pleated cover (13) and two pleated arms (14) connected laterally to the cover, in which the cover and the arms are of multi-layer construction and include at least one continuous outer layer (12) and one inner layer (4) which is connected to the outer layer and is formed by a sheet which is perforated along the pleat edges, said continuous outer layer (12) of said cover (13) and arms (14) being made from fabric, and triangular stampings (9) are provided in the inner layer (4) and have the shapes of isosceles triangles in which the apex (9a) of each triangle coincides with the upper end of the inner edges of the pleats of the arms, and the lengths of the sides (9b, 9c) of the triangles are smaller than the distance (a) between the upper ends of the inner and outer edges of the pleats of the arms whereby the pleated cover (13) projects like a roof over the two pleated arms (14) and the apexes (20) of the inner layer (4) of the arms (14) are supported on the inner layer (4) of the cover (13).

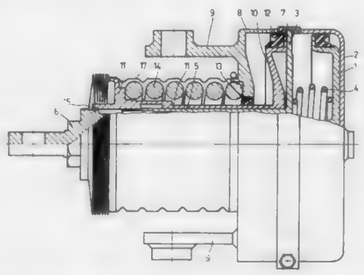
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**4,745,849**
**SPRING BRAKE ACTUATOR FOR A RAIL VEHICLE BRAKE UNIT**

**Fred S. Emilsson, Villa Solhem, and Krister E. Ljung, Leifs väg, both of Sweden, assignors to SAB Nife AB, Landskrona, Sweden**

**Filed Nov. 24, 1986, Ser. No. 933,899**
**Claims priority, application Sweden, Dec. 12, 1985, 8505704**
**Int. Cl.[4] F01B** *7/00, 31/00*
**U.S. Cl. 92—63** **10 Claims**

1. Brake Apparatus for a rail vehicle, comprising: service brake means including first actuating means for operating a service brake, the service brake means including a cylinder and a tubular member carried by the cylinder, and on outwardly extending force-transmitting part; second actuating means for operating the service brake means, the second actuating means including a cylinder-shaped housing, piston means slidably carried in the cylinder-shaped housing and including piston rod means, spring means positioned between the housing and



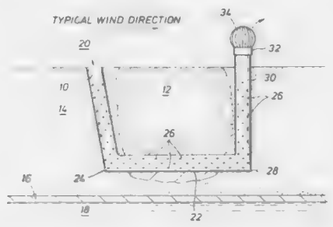
the piston rod means for biasing the piston rod means in a brake applying direction, the second actuating means being an integrated and self-contained unit surrounding the tubular member of the service brake means, and the piston rod means of the second actuating means being tubular and slidably carried on said tubular member to act on the outwardly extending force-transmitting part of the brake unit in response to the bias of the spring means.

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**4,745,850**
**DIFFUSIVE VENTING OF SOIL CONTAMINATED WITH VOLATILE COMPOUNDS**

**Bruce N. Bastian; Marion W. Kemblowski, and Edward H. Hsu, all of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.**

**Filed Dec. 10, 1986, Ser. No. 940,144**
**Int. Cl.[4] E02D** *3/00*
**U.S. Cl. 98—56** **5 Claims**




1. A system for reducing the concentration of volatile organic compounds in underground soil contaminated with volatile organic compounds which comprises:
- a first vertically positioned borehole within or adjacent the contaminated area and traversing the soil to a depth above the capillary fringe of the water table, said first borehole communicating at its upper end with ambient air,
- a horizontally positioned conduit traversing said contaminated soil at an elevation above said capillary fringe and having an inlet end in fluid communication with said first borehole, and having a plurality of apertures disposed along its length for admitting vapors of said volatile organic compounds to the interior of said horizontally positioned conduit,
- a second vertically positioned borehole within or adjacent the contaminated area and spaced apart from said first borehole, said second borehole being in fluid communication with said horizontally positioned conduit, and having an upper end in fluid communication with air above the surface of the soil, and
- a wind turbine operatively connected to said upper end of said second vertically positioned borehole to draw ambient air through said first borehole, thence through said horizontally positioned conduit and said second borehole to sweep vapors of said volatile organic compounds that have entered the system from the soil into the atmosphere to be dispersed by the wind.



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**4,745,851**
**PROCESS FOR THE CONSTRUCTION OF A GAS-TIGHT, THERMALLY INSULATED LINING FOR A FREE-STANDING STACK**

**Jan Dück, Frankfurt am Main, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Aug. 8, 1986, Ser. No. 894,892**
**Claims priority, application Fed. Rep. of Germany, Aug. 9, 1985, 3528653**
**Int. Cl.[4] F23J** *13/02*
**U.S. Cl. 98—58** **5 Claims**

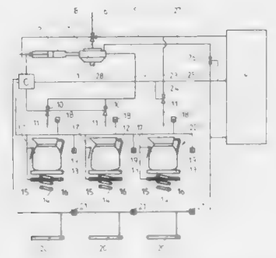
1. A process for rendering gas-pressure-tight and thermally-insulating a masonry or concrete lining of a free-standing stack, which lining is resistant to aggressive media, the process comprising covering the lining sequentially with a laminate of glass fiber and multicomponent reactive resin and with a layer of thermal insulation.

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**4,745,852**
**APPARATUS FOR MAKING A PREDETERMINED QUANTITY OF A BREWED BEVERAGE, IN PARTICULAR COFFEE**

**Peter Sager, Boppelsen, Fed. Rep. of Germany, assignor to HGZ Maschinenbau AG, Zurich, Switzerland**

**Filed Jun. 14, 1985, Ser. No. 745,300**
**Claims priority, application Fed. Rep. of Germany, Jun. 15, 1984, 3422290**
**Int. Cl.[4] A47J** *31/00*
**U.S. Cl. 99—280** **1 Claim**



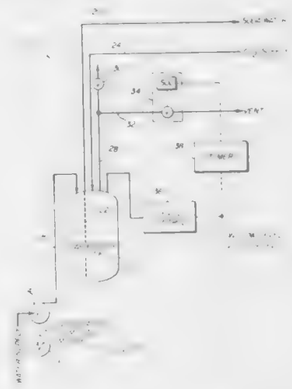
1. An automatic coffee brewing machine for brewing predetermined quantities of coffee and the like including a heater for heating water, a brewing chamber in communication with said heater for receiving hot water from said heater, water valve means controlling the flow of hot water from said heater to said brewing chamber, a coffee powder feed means arranged to dispense powdered coffee to said brewing chamber, at least two carafe supports for receiving carafes each of a capacity corresponding to the capacity of said brewing chamber, delivery conduit means for dispensing brewed coffee from said brewing chamber directly to one of said carafes without intermediate storage when placed on said carafe supports, brewed coffee valve means for controlling the flow of brewed coffee through said delivery conduit means to said carafes at each carafe support, switch means for operating said brewed coffee valve means at each carafe support responsive to the presence or absence of a carafe at the carafe support and responsive to the quantity of brewed coffee delivered to the carafe, whereby when a carafe is placed on a carafe support coffee powder and hot water are fed to the brewing chamber and the coffee is brewed in the brewing chamber and dispensed to the carafe.

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**4,745,853**
**SYSTEM FOR IMPROVING CARBONATION IN POST-MIX DISPENSER CARBONATORS**

**George H. Hoover, Marietta, Ga., assignor to The Coca-Cola Company, Atlanta, Ga.**

**Filed Jun. 2, 1987, Ser. No. 57,574**
**Int. Cl.[4] A23L** *2/26*
**U.S. Cl. 99—323.1** **4 Claims**



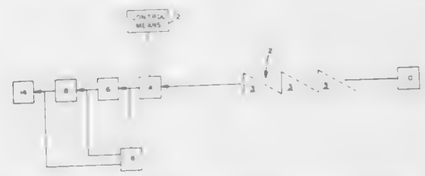
1. Apparatus for improving carbonation in a post-mix beverage; dispenser carbonator comprising:
- (a) a carbonator tank enclosing a headspace;
- (b) a pressure relief line from said tank;
- (c) a pressure relief valve in said pressure relief line;
- (d) an automatic vent line connected to said pressure relief line upstream of said pressure relief valve;
- (e) a solenoid-controlled valve in said automatic vent line for venting said headspace to atmosphere; and
- (f) timer means for opening said solenoid-controlled valve at predetermined times and for a predetermined length of time.

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**4,745,854**
**APPARATUS FOR IMPROVED PREPARATION OF FRIED FOODS**

**John T. Buckley, 266 Bedford Rd., Pleasantville, N.Y. 10570**

**Filed Sep. 24, 1986, Ser. No. 911,113**
**Int. Cl.[4] A23L** *3/00;* **A47J** *27/00*
**U.S. Cl. 99—360** **7 Claims**



1. A system for cooking food having low fat content comprising:
- at least one cooking station,
- a conveyor for transporting said food through said at least one cooking station,
- spray means at said one cooking station for spraying heated oil on said food in sufficient quantity to penetrate

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the outer surface of, but not saturate, said food on said conveyor, and

means for controlling the quantity of sprayed heated oil including means for monitoring the weight of said food carried by said conveyor and spraying said heated oil in a predetermined quantity in proportion to said monitored weight.

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**4,745,855**

## ELECTRIC TOASTER ELEMENT

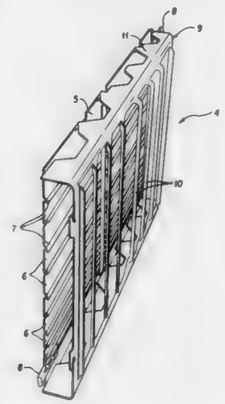
**William H. Younger, Victoria, Australia, assignor to Sunbeam Corporation, Downers Grove, Ill.**

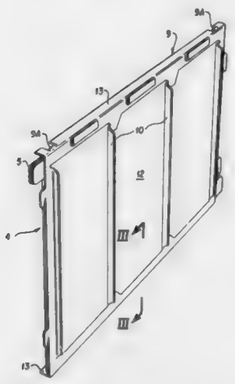
**Filed Feb. 13, 1987, Ser. No. 14,320**

**Claims priority, application Australia, Feb. 13, 1986, PH4593; Jul. 7, 1986, PH6805**

**Int. Cl.[4] A47J** *37/08;* **H05B** *3/06*

**U.S. Cl. 99—391** **8 Claims**





1. An electrical heater element card assembly for an electric toaster comprising a flat electrically insulating former, an electrically resistive heating wire wound on the former to expose the heater winding on at least a first face thereof, a heat conducting electrically insulating sheet overlying said first face to form a laminate, and a metal bread guide secured to the laminate and including a protective grating positioned in juxtaposition to said insulating sheet.

**4,745,856**

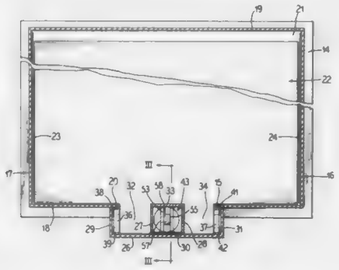
## HYDRAULIC REFUSE COMPACTOR WITH CHANNEL GUIDED COMPACTOR BLADE

**David P. Bakker, 8101 W. 79th St., Justice, Ill. 60458; David W. Van Sickle, 2925 W. 102nd St., and John Bakker, 3248 W. 97th St., both of Evergreen Park, Ill. 60642**

**Filed Jan. 29, 1987, Ser. No. 7,999**

**Int. Cl.[4] D05B** *15/04, 15/06*

**U.S. Cl. 100—249** **8 Claims**



1. A refuse body comprising a front wall, a pair of side walls and a bottom wall, a compactor blade formed with a downwardly extending extension substantially centrally located on a bottom edge thereof, a hollow nose portion mounted on said extension, said bottom wall formed with a depression and said compactor blade extension receivable in said depression, a multiple section telescoping hydraulic cylinder with one end connected to said front wall and the other end extending into said nose of said extension and connected to said nose, first and second friction reducing members connected to the sides of said extention of said compactor blade and engageable with opposite side walls of said depression, and hydraulic control means for extending and retracting said telescoping hydraulic cylinder.

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**4,745,857**

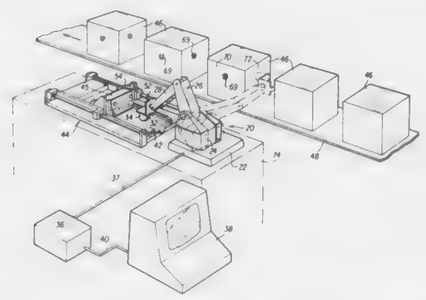
## PROGRAMMABLE PAD PRINTING APPARATUS AND METHOD

**Thomas P. Putnam, Keene; Roy A. Sunter, Fitzwilliam; David A. Kearney, Keene, and Richard J. Lothrop, Munsonville, all of N.H., assignors to Markem Corporation, Keene, N.H.**

**Filed Feb. 28, 1986, Ser. No. 834,413**

**Int. Cl.[4] B41F** *17/00*

**U.S. Cl. 101—44** **14 Claims**



1. A multicolor printing method comprising:

providing first and second engraved printing plates carrying print legends corresponding to first and second color components, respectively, of a multicolor image;

inking said first and second printing plates with inks having first and second colors, respectively, and scraping said printing plates to leave ink only in the engraved areas which define the print legends;

bringing a deformable transfer pad into contact with the first printing plate in order to pick up a first ink image therefrom corresponding to the first color component of the multicolor image;

bringing the transfer pad into contact with a location on the print receiving surface in order to deposit the first ink image thereon;

bringing the same transfer pad into contact with the second printing plate in order to pick up a second ink image therefrom corresponding to the second color component of the multicolor image; and

bringing the transfer pad into contact with the same location on the print receiving surface in order to deposit the second ink image thereon.



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**4,745,858**

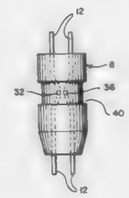
## ELECTRIC DETONATOR WITH STATIC ELECTRICITY SUPPRESSION

**William C. Harder, Kingston, N.Y., assignor to Ireco Incorporated, Salt Lake City, Utah**

**Filed Sep. 26, 1986, Ser. No. 911,781**

**Int. Cl.[4] F42B** *3/18*

**U.S. Cl. 102—202.2** **17 Claims**



1. An electric detonator comprising

an electrically conductive shell,

an explosive initiating device, at least a portion of which is disposed in the shell, for producing an explosion in response to electrical current,

a pair of conductors which extend into the shell and are coupled to the explosive initiating device for carrying electrical current thereto, and

means for securing the conductors in place as they enter the shell and for maintaining a section of each conductor in closer proximity both to the shell and to a corresponding section of another conductor at a one location in the shell, than at other locations.

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**4,745,859**

## APPARATUS FOR REPELLING BIRDS OR BEASTS

**Kim M. Kyoung, 7-101 Jangmi Apt. 530-3, Seryu-dong; Suwon City, and Chung K. Hong, 6-23 Youkchon-dong Eonpyoung-gu, Seoul, both of Rep. of Korea**

**Filed Jan. 5, 1987, Ser. No. 370**

**Claims priority, application Rep. of Korea, Jan. 6, 1986, 86-7[U]**

**Int. Cl.[4] F41F** *27/00;* **G08B** *3/14*

**U.S. Cl. 102—293** **3 Claims**

1. An apparatus for repelling birds or beasts by exploding gunpowder deposits on a gunpowder band automatically and repeatedly to make explosive sounds, said apparatus comprising:

a housing;

a body plate attached within said housing;

a bottom plate attached along the bottom side of said body plate, said bottom plate for receiving the gunpowder band thereof;

a cover plate for said housing;

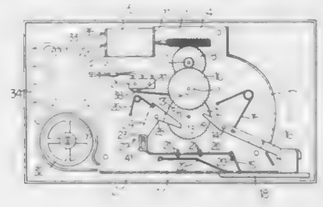
an electric motor secured to said body plate;

an intermediate reduction gear driven by said motor;

a disk-like gear driven by said intermediate reduction gear to rotate, said disk-like gear having pin-type bosses disposed on opposite sides of the periphery thereof;

a gun powder striking hammer having a shank and a head for striking the gunpowder deposits on the gunpowder band, said hammer secured to said body plate at a pivot point such that the free end of the shank engages with one of said bosses on said disk-like gear when said disk-like gear rotates to raise the head of said hammer, the shank and said pin-type boss disengaging as said disk-like gear continues to rotate, said hammer head being urged downward by a spring attached between said hammer and said body plate to strike a gunpowder deposit on said bottom plate;

a gunpowder supply plate for advancing the gunpowder band along said bottom plate, the rear end of said gunpowder supply plate being formed with a vertically elongated hole, and the front end of said gunpowder supply plate having a push plate connected by a hinge, said push plate extending forward and downward from said gunpowder



supply plate toward said bottom plate, the forward edge of said push plate contacting said gunpowder band on said bottom plate such that when said gunpowder supply plate is driven forward, said gunpowder band is advanced;

a driving link for driving said gunpowder supply plate, said driving link secured to said body plate at a pivot point such that one end of said driving link engages with one of said pin-type bosses on said disk-like gear when said disk-like gear rotates, said driving link having formed at its other end a pin-type boss for engaging the elongated hole of said gunpowder supply plate, and said driving link being urged by a spring attached between said driving link and said body plate;

an electrical power source;

a timer for controlling the time between explosions, said timer electrically connected to said electrical power source and said motor;

a switch having an actuating switch lever for engaging with one of said pin-type bosses on said disk-like gear to actuate said switch, said switch electrically connected to said timer.

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**4,745,860**

## SMALL SCALE SEMI-SUBMERSIBLE BOAT FOR NAVAL COMBAT

**Jacques A. Reymann, and Daniel Thoumyre, both of Brussels, Belgium, assignors to Swimart S.A., Brussels, Belgium**

**Filed Mar. 30, 1987, Ser. No. 31,625**

**Claims priority, application Luxembourg, Apr. 24, 1986, [illegible]6408**

**Int. Cl.[4] F42B** *4/00*

**U.S. Cl. 102—354** **9 Claims**

1. A small scale semi-submersible boat for a toy for naval combat between at least two similar boats, said small scale boat comprising :

a hull having a first watertight compartment which is insubmersible and which contains a mechanism for controlling the movement of the boat and a second compartment which is at least partly submersible ;

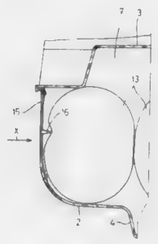
at least one balloon or caisson serving as a float, which is housed in the second compartment of the hull, which is

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inflated by means of a gas and which has a perforable wall ;

at least one window serving as a target provided in the hull opposite the perforable wall of a balloon or caisson housed in said second compartment, and



a spur carried by the hull and directed outwardly thereof, said spur being able to pierce directly the perforable wall of a balloon or caisson of an opponent's boat through said window, so as to impair the buyoancy of the opponent's boat.

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**4,745,861**

## MISSILES

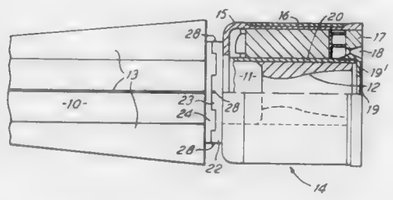
George H. A. Fenton, and Alfred E. Dransfield, both of Stevenage, United Kingdom, assignors to British Aerospace PLC, London, England

Filed Oct. 31, 1986, Ser. No. 925,235

Claims priority, application United Kingdom, Oct. 31, 1985, 8526846

Int. Cl.[4] F42B *15/10*

U.S. Cl. 102—377 4 Claims



1. An expulsion motor for fitting over the aft body portion of a missile which includes a main body portion and an aft body portion housing propulsion efflux outlet means, said expulsion motor comprising:

inner and outer generally cylindrical wall portions together defining a generally annular chamber for an expulsion charge, said inner wall portion defining a bore into a major part of which the aft body portion of the missile extends in use;

an end wall portion defining an outlet for expulsion efflux including means for deflecting said efflux to thereby impart a spin torque to said expulsion motor;

an obturator rib projecting partially radially inwardly adjacent the propulsion motor efflux outlet means when said motor is fitted to the missile, whereby in use efflux exhausting from said outlet means impinges upon said obturator rib;

torque transfer means for transferring the spin torque to the missile; and

means for releasably attaching said expulsion motor to the aft body portion of the missile for longitudinal separation therebetween on application of a separation force developed by impingement of propulsion efflux of the missile on said rib.

**4,745,862**

## HOLDER FOR A MINE FUZE FOR AN ANTITANK MINE

Claes Arnell, Torshälla, and Stig Risberg, Eskilstuna, both of Sweden, assignors to Affärsverket FFV, Eskilstuna, Sweden

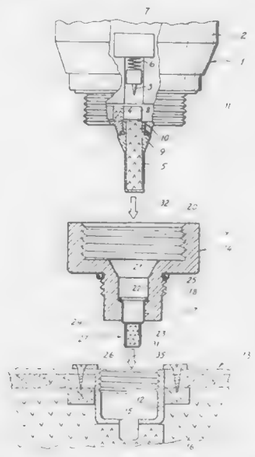
PCT No. PCT/SE86/00171, § 371 Date Dec. 23, 1986, § 102(e) Date Dec. 23, 1986, PCT Pub. No. WO86/06469, PCT Pub. Date Nov. 6, 1986

PCT Filed Apr. 14, 1986, Ser. No. 9,334

Claims priority, application Sweden, Apr. 23, 1985, 8501973

Int. Cl.[4] F42B *23/26;* F42C *19/02*

U.S. Cl. 102—424 3 Claims



1. A holder for a mine fuze for an antitank mine, in which the fuze incorporates a booster charge, a detonator for firing the booster charge, and a spring-biased firing pin for firing the detonator, characterized in that the holder is detachably conntectable to the mine fuze; and in that the holder with the fuze attached is intended to fit into a mine-fuze location provided in the antitank mine, in which location the booster charge is in detonating relationship with a high explosive charge contained by the mine, and the holder is also provided with connecting means for at least one initiating means for initiating the firing of one or more additional explosive charges which additional charges are located in the ground at a distance from the mine fuze, the booster charge being in fuzed relationship with the initiating means when the fuze and holder are attached, thereby enabling the mine fuze with the holder attached thereto to be primed selectively in the antitank mine in the fuze-location adapted for the holder, or to be primed in the ground as a booby trap for initiating firing of the additional explosive charges.

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**4,745,863**

## METHOD FOR PRINTING A TUBULAR FABRIC

Akira Takezaki, 41-11, Oaza-Ogaito, Kumatori-cho, Sennan-gun, Osaka, Japan

Filed Jan. 30, 1987, Ser. No. 8,844

Claims priority, application Japan, Feb. 6, 1986, 61-25230; Jan. 23, 1987, 62-14794

Int. Cl.[4] B41F *17/00*

U.S. Cl. 101—426 4 Claims

1. A method for printing a tubular fabric comprising:

(1) inserting, into the tubular fabric, an underplate made in the shape of a polygonal tube that can be transformed in shape along the lines of the angles;

(2) making the fabric flat along appropriate lines of angles in said polygonal tube;

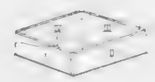
(3) doing printing on or near the center of the front surface of the fabric, corresponding to the front surface of said flat shape;



(4) turning over the fabric with said flat shape; doing printing in the same way on or near the center of the back surface of the fabric, corresponding to the back surface of said flat shape;

(5) bringing back said flat shape to its original shape;

(6) making the fabric flat again along different lines of angles in said polygonal tube, in such a manner that a different flat shape is formed from the polygonal tube, with the above-mentioned two regions of the fabric that have been printed at the sides of this second flat shape;



(7) doing printing in the same manner on or near the center of the front surface of the fabric, corresponding to the front surface of said second flat shape;

(8) turning over the fabric with said second flat shape; and

(9) doing printing in the same manner on or near the center of the back surface of the fabric, corresponding to the back surface of said second flat shape, whereby a continuous printed design can be printed around the circumference of the tubular fabric.

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**4,745,864**

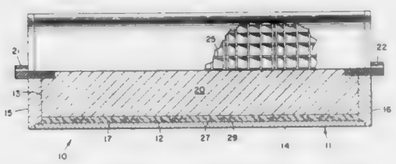
## EXPLOSIVE FRAGMENTATION STRUCTURE

Gerald G. Craddock, Arlington, Tex., assignor to LTV Aerospace & Defense Company, Dallas, Tex.

Filed Dec. 21, 1970, Ser. No. 99,887

Int. Cl.[4] F42B *13/18*

U.S. Cl. 102—491 15 Claims



1. An explosive structure of the fragmentation type, comprising:

an outer casing having an inner surface defining a chamber;

means for propagating shock waves across the inner surface from a selected one of at least first and second detonation points within the casing;

first means directing shock waves, propagated from the first detonation point, against at least a selected portion of the inner surface in a first pattern for scoring and weakening the casing along first, segment-defining lines;

second means directing shock waves, propagated from the second detonation point, against the selected portion of the inner surface in a second pattern for scoring and weakening the casing along second, segment-defining lines, the segments of the second pattern being larger than the segments of the first pattern; and

means for fragmenting the casing along the resulting, segment-defining lines scored in the casing.

**4,745,865**

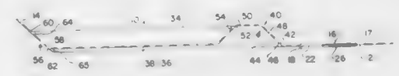
## CARRIER STORAGE TRACK FOR POWER AND FREE CONVEYORS

Noel F. Dehne, Farmington Hills, Mich., assignor to Jervis B. Webb Company, Farmington Hills, Mich.

Filed May 20, 1987, Ser. No. 52,847

Int. Cl.[4] B61B *10/00;* B65G *17/42*

U.S. Cl. 104—172.3 3 Claims



1. In a power and free conveyor having a power track, power means supported by the power track and including an endless driven chain equipped with longitudinally spaced pushers; a main carrier track normally arranged in vertically spaced relation with the power track, and a plurality of carriers mounted on the main carrier track; each carrier comprising a leading driving trolley having a driving dog engageable by one of said pushers and operating means for disengaging the driving dog therefrom, a first load carrying trolley trailing the driving trolley, a tow bar connecting the first load carrying trolley to the driving trolley at a first longitudinal spacing along the main carrier track, a second load carrying trolley trailing the first load carrying trolley, and load carrying structure connecting the second load carrying trolley to the first load carrying trolley at a second longitudinal spacing along the main carrier track;

storage track means for accumulating a plurality of carriers in a minimum spatial requirement, said storage track means comprising;

first and second parallel load tracks for said first and second load carrying trolleys, respectively, said first and second load tracks being spaced apart transversely a load track distance less than said second longitudinal spacing;

a driving trolley track arranged in vertically spaced relation with said power track, said driving trolley track being located transversely intermediate and parallel to said first and second load tracks, said driving trolley track being spaced transversely from said first load track by a driving track distance less than said said first longitudinal spacing; and

an entrance section connecting said main carrier track to said first and second load tracks and to said driving trolley track, said entrance section comprising:

a first junction connecting said main carrier track to said second load track and to a transition track,

first junction switch means for diverting said driving trolley and said first load carrying trolley to said transition track and for diverting said second load carrying trolley to said second load track, said power track being arranged in vertically spaced relation with said transition track;

a second junction connecting said transition track to said first load track and to said driving trolley track,

said transition track having a first portion extending from said first junction at an acute angle to said second load track and a second portion extending from said first portion to said second junction in parallel relation to said second load track at said load track distance, said driving trolley track extending from said second junction toward said second load track to said driving track distance from said first load track at an acute angle thereto, and

second junction switch means for diverting said driving trolley to said driving trolley track and said first load carrying trolley to said first load track whereby said tow bar and load carrying structure are placed in a jackknifed relation on said parallel first and second load and driving trolley tracks.

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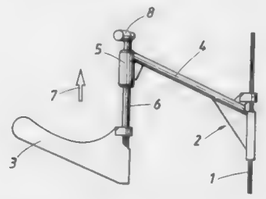


**4,745,866**

## DEVICE FOR MOUNTING A BOW ON A REVOLVING CABLE OF A SKI LIFT AND BOW ASSEMBLY FOR A SKI LIFT

**Max Bruckschlögl, Au 132, A-4823 Steeg, Austria**

**Filed Apr. 3, 1987, Ser. No. 33,751**
**Claims priority, application Austria, Apr. 25, 1986, 1122/86**
**Int. Cl.[4] B61B** *11/00, 12/00*
**U.S. Cl. 104—173.2** **11 Claims**



1. In a device for mounting a bow on a revolving cable of a ski lift, comprising

a holder, which defines a first axis and is adapted to be mounted on said cable for rotation about said first axis in a position in which said first axis coincides with the axis of said cable, and

mounting means, which are carried by said holder and adapted to be connected to said bow,

the improvement residing in that

said mounting means comprise a swivelarm, which protrudes from said holder and has an outer end remote from said holder, and pivot means for pivotally connecting said bow to said swivelarm at said outer end about a second axis, which is approximately parallel to said first axis, and

a handle is carried by said mounting means and adapted to be operatively connected to said bow and operable to pivotally move said bow about said second axis to allow a ski user to hold his or her hand on said handle in a natural position to rotate said bow to its position of use for easily adjusting said bow height without a need to shift said cable.

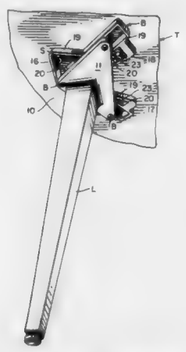
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**4,745,867**

## LEG ATTACHMENT BRACKET FOR PRESSBOARD TABLES

**Leo P. Niemiec, Northfield, Ill., assignor to Lawnware Products, Inc., Morton Grove, Ill.**

**Filed Dec. 1, 1987, Ser. No. 127,199**
**Int. Cl.[4] F16M** *11/16*
**U.S. Cl. 108—157** **14 Claims**



1. A table and leg assembly, comprising a horizontal table top having a planar bottom surface and a pressboard core, a molded plastic bracket positioned on said bottom surface, said bracket having perimetric upwardly-extending flanges united by a recessed horizontally-extending web, the top edges of said flanges bearing against said bottom surface and being adhesively bonded thereto, the top of said bracket providing a plurality of sockets surrounding openings through said web, T-nuts seated in said sockets accessible through said openings from the bottom side of said bracket, a leg extending downwardly from said table top, said leg having a horizontally-projecting flange at the top thereof, said flange providing bolt attaching openings therethrough alignable with a plurality of said socket openings and T-nuts, and bolts extending through said flange openings threadedly connected to the T-nuts.

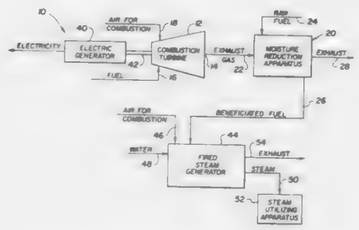
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**4,745,868**

## SYSTEM FOR AND METHOD OF PRODUCING A BENEFICIATED FUEL

**Samuel W. Seabury, 6735 Ellsworth, Dallas, Tex. 75214**

**Filed Mar. 21, 1986, Ser. No. 843,186**
**Int. Cl.[4] F23B** *7/00*
**U.S. Cl. 110—234** **18 Claims**



1. A system for producing a beneficiated fuel from a raw low ranked moisture ladened fuel, comprising: combustion turbine means for flowing exhaust gas out of an exhaust outlet at a temperature above ambient; and moisture reduction means connected to the exhaust outlet of said combustion turbine means to receive the flowing exhaust gas from the exhaust outlet of said combustion turbine means for directing the exhaust gas across the raw low ranked moisture ladened fuel such that a portion of the moisture carried by the raw fuel is removed to produce the beneficiated fuel, said moisture reduction means including drying means disposed to receive the exhaust gas flowing from the combustion turbine for continuously moving the raw fuel through the received exhaust gas, the drying means including a drum rotary dryer means for moving the raw fuel in the same direction as the flowing exhaust gas while tumbling the raw fuel being processed, dust collecting means receiving the exhaust gas from the rotary drum dryer means for removing particulate matter from the exhaust gas after the exhaust gas has moved past the rotary drum dryer means, and fan means receiving the exhaust gas from the dust collecting means for providing a balanced draft system.

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**4,745,869**

## METHOD AND APPARATUS FOR CALCINING LIMESTONE USING COAL COMBUSTION FOR HEATING

**James A. Dilmore, Irwin; Suh Y. Lee, Monroeville; William E. Young, Churchill Boro, and Wesley M. Rohrer, Jr., Pittsburgh, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Jun. 22, 1987, Ser. No. 64,723**
**Int. Cl.[4] F23D** *1/00*
**U.S. Cl. 110—347** **18 Claims**

1. A method of firing a lime kiln having a calcining chamber in rotary vessel with limestone charged to one end thereof and hot gases applied to the other end, with a hot gas stream passing therethrough countercurrent to the flow of limestone to

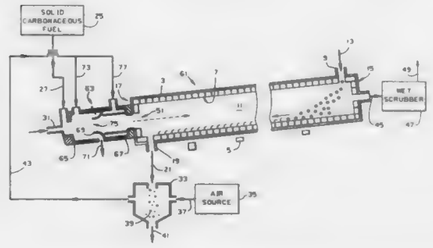


produce lime, such that the formation of a slag ring in said rotary vessel is retarded or eliminated comprising:

providing a two stage combustion unit for producing said hot gases;

charging a solid carbonaceous fuel and air in the first stage of said two stage combustion unit and combusting the fuel, with less than a stoichiometric amount of oxygen to produce substantially complete combustion of said solid carbonaceous fuel, to provide hot combustion gases and molten slag in said first stage;

removing at least 75 percent of said molten slag from said



hot combustion gases and discharging said slag from said first stage of the two stage combustion unit;

passing said hot combustion gases and any residual solid carbonaceous fuel into the second stage of said two stage combustion unit;

charging air to said second stage to effect combustion of said hot combustion gases and any residual solid carbonaceous fuel in said second stage of the two stage combustion unit, to product a hot gas stream; and

directly charging said hot gas stream into said calcining chamber for countercurrent flow therethrough relative to the flow of limestone therein, and exhaustion therefrom.

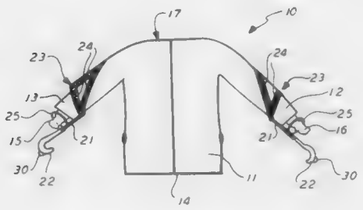
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**4,745,870**

## WINDSURFING HARNESS

**Jon P. Roth, 10 Birch St., Flemington, N.J. 08822**

**Continuation-in-part of Ser. No. 848,811, Apr. 7, 1986, abandoned. This application Aug. 26, 1987, Ser. No. 89,589**
**Int. Cl.[4] B63B** *35/00*
**U.S. Cl. 114—39.2** **15 Claims**



1. A windsurfing harness comprising:

a cross-shoulder brace;

at least two rear-arm support braces, each of said rear-arm support braces being attached to the cross-shoulder brace;

a plurality of forearm reinforcement or support straps, each such forearm reinforcement strap being attached to at least one of the rear-arm support braces;

a plurality of wrist attachment straps, each such wrist attachment strap being attached to at least one forearm reinforcement strap;

at least two hooks for attaching at least one forearm reinforcement strap to a bar-shaped member, each of said hooks including a top surface and an undersurface, said top surface including a knob;

and

two force rotation assemblies for stablizing forces applied to said windsurfing harness.

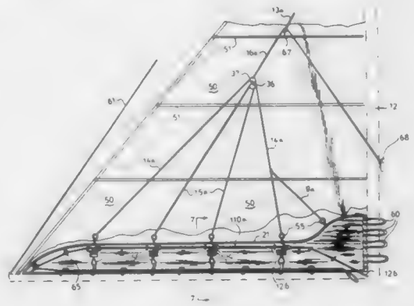
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**4,745,871**

## METHOD AND APPARATUS FOR COVERING AND CONTAINING A SAIL

**Edwin F. Wieder, 15 Jane's La., Lloyd Harbor, Huntington, N.Y. 11743**

**Continuation-in-part of Ser. No. 845,599, Mar. 28, 1986, abandoned. This application Feb. 10, 1987, Ser. No. 12,825**
**Int. Cl.[4] B63H** *9/10*
**U.S. Cl. 114—102** **20 Claims**



1. A sail cover apparatus for completely covering a sail that is slidably supported on the mast and boom of a sailboat comprising:

a pair of elongated flexible cover halves defining the sail cover and having mating lower edges for detachable securement along the foot of the sail, and upper edges for closure over the sail;

means for securing the lower edges of the cover halves adjacent to the foot of the sail disposed along the boom;

a lift line system comprising a plurality of first lines disposed on each side of said sail having their lower ends coupled adjacent to the top edges of said sail cover halves, at least one second line disposed on each side of said sail and coupled to said first lines for raising and lowering said cover halves adjacent to the sail on both sides along its full length and substantially parallel to both sides of the sail to form a sail receiving pocket to permit the sail to be lowered into the space between the sail cover havles;

means for closing the upper edges of said cover halves to encircle the sail after the sail has been lowered; and

means for collapsing and compacting said cover halves around said enclosed sail when the sail is lowered and for collapsing and compacting said cover halves along the foot of the sail when the sail is raised.

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**4,745,872**

## HANDLE DEVICE FOR JET-PROPELLED SMALL-SIZED BOAT

**Yukio Nakamura, 3-19, 1-Chome, Tengachayakita, Nishinari-Ku, Osaka-Shi, Osaka-Fu, Japan**

**Filed Jan. 9, 1987, Ser. No. 1,771**
**Int. Cl.[4] B63B** *35/86*
**U.S. Cl. 114—270** **1 Claim**

1. A jet-propelled small-sized boat, wherein the engine is mounted in a front portion thereof and a floor deck is disposed in the stern, thereof, said boat comprising:

a handle post pivotally connected at its front lower end to the stem of the boat by a transverse shaft so that it can be tilted around the axis of said shaft,

an attaching bracket for a handle bar pivotally connected to

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the rear upper end of the handle post, opposed to the floor deck, by a stud bolt so that said attaching bracket is pivotable around a vertical axis of said bolt, said attaching bracket including,

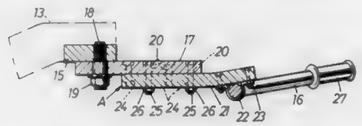
(a) a front bracket, and

(b) a rear bracket, which are each formed of a metal plate and which can be joined together,

a front end of the front bracket being pivotally connected to the rear upper end of the handle post such that it is pivotable about said stud bolt,

the handle bar formed of a metal pipe bent in an L-shape in a plan view extends from a rear end of the rear bracket,

a plurality of bolt receiving holes, a pair on each of opposite



sides, are formed in the plate surface of the front bracket in order to be selectively aligned with a plurality of bolt passage holes, a pair on each of opposite sides, formed in the plate surface of the rear bracket so as to correspond to said bolt receiving holes, and connecting bolts, a pair on each of opposite sides, are inserted into said bolt receiving holes and bolt passage holes and fixing nuts are fitted thereon,

whereby the connecting position of the rear bracket with respect to said front bracket can be adjusted by being slid longitudinally of the boat, so that the direction of the boat may be changed by the changing of the stand-on pressure on the floor deck by the rider to thus change the center of gravity to steer the boat.

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**4,745,873**

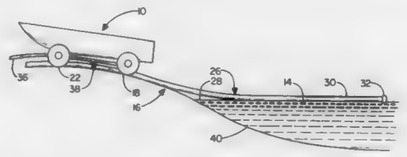
**METHOD AND APPARATUS FOR TOWING AND LAUNCHING A WATERBORNE CRAFT**

**Jerome G. Mott, 800 W. 65th St., Richfield, Minn. 55423**

**Filed Sep. 4, 1987, Ser. No. 93,493**

**Int. Cl.[4] B63B** *21/64*

**U.S. Cl. 114—344** **7 Claims**



1. Apparatus for towing and launching a waterborne craft, comprising:

(a) a pair of elongated, generally cylindrical, tubular tracks, said tracks being floatable and streamable from the shore onto the surface of a body of water into which the waterborne craft is to be launched, said tracks each having an aperture formed therein at a location therealong wherein, when said tracks are streamed on the surface of the body of water and downward pressure is applied thereto, water enters through said apertures and said tracks sink;

(b) a carriage for cradling the waterborne craft therein; and

(c) means for mounting said carriage for movement on the shore of the body of water and onto the bottom of the body of water, said mounting means comprising a first pair of coaxial, spaced wheels, each having an outer peripheral surface, concave along an axis of said wheel, through which a segment of one of said trucks on the shore is run;

(d) wherein, as said carriage is moved from the shore of the body of water and outward onto the bottom of the body of water, said wheels cause their corresponding tracks to be urged downwardly in the water and fill with water, and to be aligned on the bottom of the body of water at a distance substantially the same as that at which said wheels are spaced from each other.

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**4,745,874**

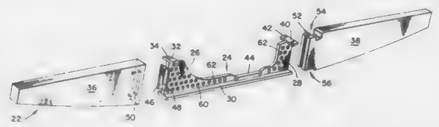
**KAYAK INTERNAL SUPPORT SYSTEMS**

**Russell H. Everett, 281 Succotash Rd., Wakefield, R.I. 02879**

**Filed Feb. 6, 1987, Ser. No. 11,546**

**Int. Cl.[4] B63B** *35/72*

**U.S. Cl. 114—347** **13 Claims**



1. Apparatus for internally supporting the cockpit portion of a kayak, said kayak having a seat, a bottom hull, a bow deck, and a stern deck, comprising:

(a) a rigid bow plate extending between the bow deck and the bottom hull along the midplane of the kayak, at least a portion of the plate forming a direct vertical connection between the bow deck and the bottom hull, said portion being adjacent to the kayak's cockpit, the upper portion of the plate including means for fastening the plate to the bow deck, said means comprising a first fastening plate which is rigidly connected to the bow plate and which transversely extends beyond that plate along the inside surface of the bow deck;

(b) a rigid stern plate extending between the stern deck and the bottom hull along the midplane of the kayak, at least a portion of the plate forming a direct vertical connection between the stern deck and the bottom hull, said portion being adjacent to the kayak's cockpit, the upper portion of the plate including means for fastening the plate to the stern deck, said means comprising a second fastening plate which is rigidly connected to the stern plate and which transversely extends beyond that plate along the inside surface of the stern deck; and

(c) means for rigidly connecting the bow plate to the stern plate, said means extending along the midline of the kayak's bottom hull and being of a length such that the point of contact of the bow plate fastening means and the bow deck is forward of the cockpit opening and the point of contact of the stern plate fastening means and the stern deck is rearward of the cockpit opening, said means comprising an elongated plate which is rigidly connected to the bow and stern plates along their bottom edges and transversely extends beyond those plates along the bottom of the kayak;

the bow plate, stern plate and connecting means defining a concave contour in the region of the cockpit opening to receive the kayak's seat and to allow the kayaker to enter and exit the kayak, the first fastening plate, the bow plate, and the elongated plate forming a first rigid supporting structure having the general shape of an I-beam between the bow deck and the bottom hull, and the second fastening plate, the stern plate, and the elongated plate forming a second rigid supporting structure having the general shape of an I-beam between the stern deck and the bottom hull.



**4,745,875**

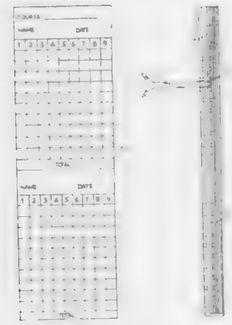
**GOLFING SCORE RECORDER**

**Robert C. Timleck, 9 Faith Avenue, Downsview, Ontario, Canada M3H 1W2**

**Filed Feb. 4, 1987, Ser. No. 10,742**

**Int. Cl.[4] A63B** *71/06*

**U.S. Cl. 116—222** **5 Claims**



1. A golf game scores recording device comprising,

a portable open top case having a transparent front panel member and a second panel member spaced from and substantially parallel to said front panel member,

a cut out portion formed in an edge of said front panel member and said second panel member along said opened top,

a plurality of openings formed in said front panel member, said openings being formed in a pattern of two groups of nine rows and having a dimension permitting a golf tee to be inserted therethrough,

a plurality of depressions formed in said second panel member on a surface therein facing said front panel member, said depressions having a pattern identical to said openings in said front panel member, and each one of said depressions being positioned directly opposite to one of said openings.

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**4,745,876**

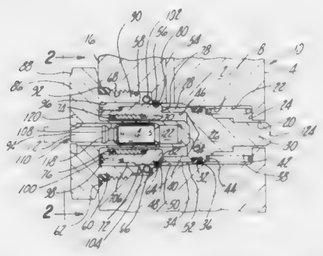
**DIFFERENTIAL PRESSURE RESPONSIVE INDICATING DEVICE**

**James C. Whiting, Royal Oak, Mich., assignor to Facet Enterprises, Inc., Tulsa, Okla.**

**Continuation of Ser. No. 570,279, Jan. 12, 1984, abandoned. This application Nov. 21, 1985, Ser. No. 800,085**

**Int. Cl.[4] G01L** *19/12*

**U.S. Cl. 116—268** **19 Claims**



17. A device for indicating a predetermined pressure differential between an inlet pressure and an outlet pressure, said device comprising:

a case having one end and an opposite end;

an internal chamber formed in said case, said internal chamber having a central axis;

a piston centrally disposed within said internal chamber, said piston being reciprocable within said internal chamber along said central axis, said piston further having an enlarged head portion sealingly engaging said case such that said piston sealingly divides said internal chamber into a first compartment adjacent said one end and a second compartment adjacent said opposite end;

a first passage means in said case communicating with said outlet pressure and extending into said first compartment of said internal chamber;

a second passage means in said case communicating with said inlet pressure and extending into said second compartment of said internal chamber;

first biasing means disposed in said first compartment and interposed said case and said piston, said first biasing means exerting a first predetermined force on said piston such as to bias said piston towards said opposite end and further such that when a predetermined pressure differential exists between said first compartment and said second compartment, said predetermined pressure differential overcomes said first predetermined force of said first biasing means to displace said piston in said internal chamber towards said one end;

a piston follower movably disposed in said second compartment and having a portion abutting said piston, said piston follower being reciprocable within said second compartment along said central axis, said piston follower being biased by said first biasing means and said piston to an initial position adjacent said opposite end;

second biasing means disposed in said second compartment, said second biasing means being interposed said case and said piston follower, said second biasing means biasing said piston follower towards said one end of said case and against said piston, said second biasing means exerting a second predetermined force on said piston follower, said second predetermined force being less than said first predetermined force;

reversible shape memory alloy temperature responsive abutment means interposed said case and said piston follower, said reversible shape memory alloy temperature responsive abutment means being responsive to the temperature in said second compartment, said reversible shape memory alloy temperature responsive abutment means preventing motion of said piston follower towards said one end when the temperature in said second compartment is below a predetermined temperature and permitting said motion when the temperature in said second compartment is above said predetermined temperature;

latching means for locking said piston follower in a shifted position after said piston follower has shifted a predetermined amount towards said opposite end, said latching means being operative to hold said piston follower in said shifted position after said predetermined pressure differential no longer exists between said first and second compartments;

reset means interconnected with said piston and extending therefrom through said first passage means, said reset means being operable to reset said piston follower to said initial position; and

indicator means centrally disposed in said internal chamber for indicating that said piston follower has moved, such that when said piston follower has been displaced a predetermined amount towards said one end, said indicator means moves from a non-indicating position within said internal chamber to an indicating protruding through said opposite end of said case.

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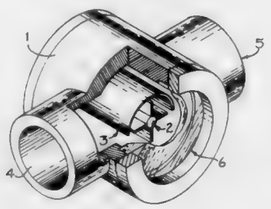


**4,745,877**

## ROTARY SIGHT FLOW INDICATOR

**Shih-Chih Chang, 2339 Davison Ave., Richland, Wash. 99352**

**Filed Jan. 12, 1987, Ser. No. 2,643**
**Int. Cl.[4] G01F** *15/00*
**U.S. Cl. 116—274** **3 Claims**



1. A rotary sight flow indicator for indicating fluid flow comprising a housing, a rotor assembly, a flow shroud, and at least one view window; said housing having an inlet port, an outlet port, at least one view port providing a mounting seat for said view window, and a cavity containing said rotor assembly therein; said rotor assembly comprising at least one rotor shaft with a plurality of radially extending blades; said rotor assembly being rotatably positioned such that its rotational axis is substantially normal to said fluid flow in said housing, said flow shroud being a semicylindrical shell coaxially aligned with said rotor; said shroud and said rotor assembly being placed within said cavity such that a substantial flow path exists between a wall of the cavity and the convex side of said shroud which allows a substantial portion of said fluid to flow through said flow path; said flow shroud being positioned over said rotor such that a substantial portion of said rotor assembly is shielded from impingement by said flow such that an asymmetric flow impinges on said rotor blades; the hydrodynamic force of said asymmetric flow impingment produces a net rotational torque on said rotor blades which cause said rotor shaft to rotate; said view port and view window being positioned to provide a view of said rotor blades, said fluid flow being detected by viewing said turning rotor blades through said view window and flow direction being indicated by the direction of rotation of said rotor blades.

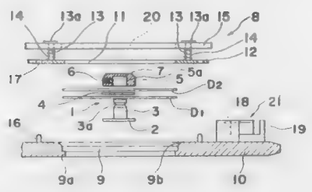
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**4,745,878**

## VAPOR MASKING DEVICE

**Katsuki Sagawa, Gifu, Japan, assignor to Sanyo Electric Co., Ltd., Japan**

**Filed Nov. 14, 1986, Ser. No. 931,229**
**Claims priority, application Japan, Nov. 15, 1985, 60-257017**
**Int. Cl.[4] B05C** *13/02*
**U.S. Cl. 118—505** **7 Claims**



1. A vapor masking device comprising in combination:
at least one first masking means including a lower first masking means for masking an inner peripheral region of a first disc, a holder stud provided in the first masking means, said holder stud being adapted to pass through a central opening in the first disc and then through a central opening in the second disc while supporting said first and second discs one above the other in spaced relationship with each other, an upper first masking means adapted to be mounted on the holder stud for masking an inner peripheral region of the upper disc; and
a second masking means including a lower seond masking means having defined therein a disc mounting opening formed with a disc receiving area for covering an outer peripheral region of the first disc mounted in the first masking means, and an upper second masking means including a cover plate having defined therein an opening of sufficient size to expose to the outside all but an outer peripheral region of the second disc when the first masking means holding the first disc and second disc is removably placed in the second masking means.

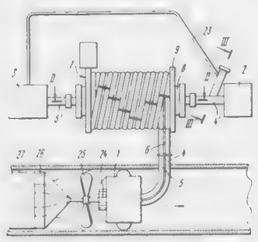
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**4,745,879**

## DEVICE FOR COATING THE INTERNAL SURFACE OF A PIPELINE WITH A CEMENT-SAND MIXTURE

**Viktor V. Shishkin, Krasnodar; Boris I. Shlatgauer, and Vladimir L. Medunitsa, both of Severo-Kazakhstanskaya, all of U.S.S.R., assignors to Trest "Juzhvodoprovod" , Krasnodar, U.S.S.R.**

**PCT No. PCT/SU85/00090, § 371 Date Jun. 9, 1986, § 102(e) Date Jun. 9, 1986, PCT Pub. No. WO86/02427, PCT Pub. Date Apr. 24, 1986**
**PCT Filed Oct. 16, 1985, Ser. No. 882,888**
**Claims priority, application U.S.S.R., Oct. 17, 1984, 3797917; Oct. 17, 1984, 3797908**
**Int. Cl.[4] B05C** *7/02, 11/04*
**U.S. Cl. 118—105** **2 Claims**



1. A device for coating the internal surface of a pipeline with a cement-sand mixture, comprising a coating application mechanism (1); systems (2 and 3) for feeding the cement-sand mixture and a working medium, respectively, connected by hoses (4 and 5) to said coating application mechanism (1); a winch having a shaft (8) and a drum (9) on said shaft; a pull rope (6) secured on said drum of said winch (7), said hoses (4) and (5) for feeding the mixture and the working medium being wound together with said rope (6) on said shaft (8) of said drum of said winch (7) and having their ends passing through said shaft (8) of said drum which is hollow, characterized in that hermetic chambers (10) communicating with the ends of said hoses (4 and 5) are provided at the ends of said shaft (8) and said chambers (10) accommodate supporting assemblies (11), each of which has an axle (13) mounted in bearings (12) and having a packing element (14) and a central duct (16) coaxial with said hose and communicating, at one side, with said chamber (10) and, at the other side, with a corresponding system.

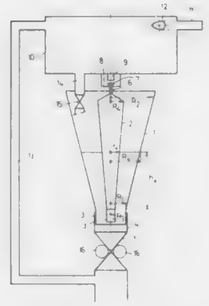


**4,745,880**

## MILKMETER FOR DETERMINING THE WEIGHT OF THE QUANTITY OF MILK ISSUED BY A COW DURING MILKING

**Jan Kummer, Leeuwarden, Netherlands, assignor to Kummer Electronics B.V., Leeuwarden, Netherlands**

**Filed Oct. 21, 1986, Ser. No. 921,617**
**Claims priority, application Netherlands, Oct. 28, 1985, 8502938**
**Int. Cl.[4] A01J** *3/00*
**U.S. Cl. 119—14.17** **8 Claims**



1. Milkmeter for determing the weight of the quantity of milk issued by a cow during milking, comprising a measuring container, a supply valve for supplying the milk to the measuring container and a discharge valve for discharging the milk from the measuring container after the measurement, and a vertically movably guided elongated float in the container, the upper end of the float cooperating with a proximity switch fixedly mounted over the upper end of the float, said switch being operable on the float rising to a height corresponding to a predetermined weight of milk in said container, for opening the discharge valve to discharge the milk from said container and, with a certain delay, for opening the supply valve for supplying fresh milk to said container for a new measurement, said measuring container and said float being both substantially shaped as a truncated cone having a vertical axis with the largest diameter at the upper end, and said float guiding means comprises a guide ring concentric with the upper end of the float, the ratio of the smallest diameters (R1:R3) of said truncated cones being equal to the ratio of the largest diameters thereof (R2:R4).

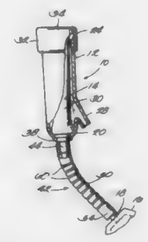
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**4,745,881**

## MILKING INFLATION

**Reed A. Larson, N. 7766 Hwy. 26, Watertown, Wis. 53094**

**Filed Sep. 8, 1986, Ser. No. 904,454**
**Int. Cl.[4] A01J** *5/01*
**U.S. Cl. 119—14.51** **8 Claims**



1. A milking inflation foı use with a teat cup assembly including a rigid shell having a lower end, said inflation being made from an elastomeric material and having an elongated tubular milking tube section extending from the lower end of the shell, said milking tube section comprising:
an elongated stem portion including upper and lower end portions, an exterior surface, and a substantially crevice-free inner wall defining a flow passage extending therethrough; and
a plurality of axially spaced, circumferentially extending grooves in the exterior surface and extending along the length of said stem portion between said upper and lower end portions, said grooves defining segments having opposed edges and being dimensioned to permit relative movement of said edges of adjacent segments and afford a predetermined degree of bending movement of one segment relative to the adjacent segment in one direction without causing substantial kinking of said step portion which reduces the internal cross sectional area of said flow passage and, after said predetermined bending, to cause said edges of adjacent segments on one side of said stem portion to abut and hinder further bending of said stem portion in said one direction said grooves and segments being further dimensioned to prevent said stem portion from collapsing when subjected internally to a reduced pressure condition during operation of a milking machine.

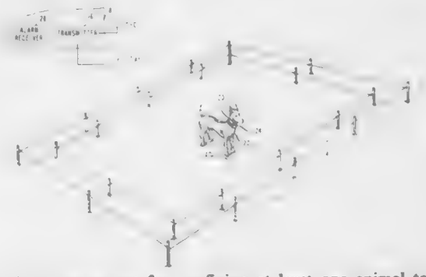
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**4,745,882**

## ELECTRONIC CONFINEMENT AND COMMUNICATIONS ARRANGEMENT FOR ANIMALS

**Robert G. Yarnall, Sr., and Robert G. Yarnall, Jr., both of Ford St., P.O. Box 356, Kimberton, Pa. 19442**

**Continuation-in-part of Ser. No. 932,608, Nov. 20, 1986. This application Jun. 12, 1987, Ser. No. 60,835**
**Int. Cl.[4] A01K** *15/00*
**U.S. Cl. 119—29** **14 Claims**



1. An arrangement for confining at least one animal to a designated area and for permitting a trainer to communicate by voice with said animal comprising:
(a) a first transmitter located at a base station capable of generating a first signal F(a) and a second signal F(b);
(b) a second transmitter placed at a predetermined location capable of generating a third signal F(e) for transmitting human voice by radio;
(c) a first signal-emitting wire responsive to said first transmitted signal F(a) and a second signal-emitting wire responsive to said second transmitted signal F(b), said first and second wires disposed in a concentric arrangement as an inner wire and an outer wire, respectively, so as to define said designated area;
(d) a receiver capable of being attached to the animal and responsive to said first, second and third transmitted signals, F(a), F(b) and F(e), said receiver including:
(i) a deterrent circuit responsive to said first transmitted signal F(A) for producing as an output a deterrent signal which is applied to the animal and a first alarm activation signal F(c);
(ii) an alarm trigger circuit responsive to said second transmitted signal F(b) for producing as an output a second alarm activation signal F(d);

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(iii) a radio receiving circuit responsive to said third signal F(e) for producing as an output the voice of said trainer audible to the animal; and

(d) an alarm receiver placed at a predetermined location including:

(i) a first alarm activation circuit responsive to said first alarm activation signal F(c) for producing as an output a first pre-alarm signal;

(ii) a second alarm activation circuit responsive to said second alarm activation signal F(d) for producing as an output a second escape alarm signal and a signal for deactivation of said first transmitter.

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**4,745,883**

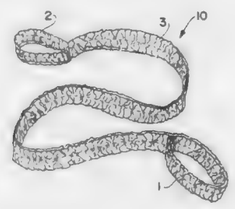
**SAFETY TETHER DEVICE**

**Colleen S. Baggetta, 2839 Andiron La., Vienna, Va. 22180**

**Filed Aug. 28, 1986, Ser. No. 901,193**

**Int. Cl.[4] A62B** *35/00*

**U.S. Cl. 119—96** **9 Claims**



1. A safety tether device, comprising:

a unitary stretch member having an inner elastic member and an outer inelastic cloth tube surrounding said inner elastic member and sewn thereto, said inner elastic member having a first length in a relaxed state and stretching to a second length in a taut state greater than the first length in the relaxed state, said inelastic cloth tube being gathered into folds about said elastic member in the relaxed state of the elastic member and unfolded to the second length of the elastic member in the taut state;

said unitary stretch member having a pair of longitudinally extending sides, a pair of transversely extending sides and a pair of end portions, a first transversely extending side being sewn to a first end portion to form a first closed wrist loop and a second transversely extending side being sewn to a second end portion to form a second closed wrist loop, said first loop being larger than said second loop in the relaxed state; and

a tether portion defined between said first and second loops, said tether portion and said first and second loops including only machine washable and dryable materials.

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**4,745,884**

**FLUIDIZED BED STEAM GENERATING SYSTEM**

**E. James Coulthard, Leicester, Mass., assignor to Riley Stoker Corporation, Worcester, Mass.**

**Filed May 28, 1987, Ser. No. 55,173**

**Int. Cl.[4] F22B** *1/00*

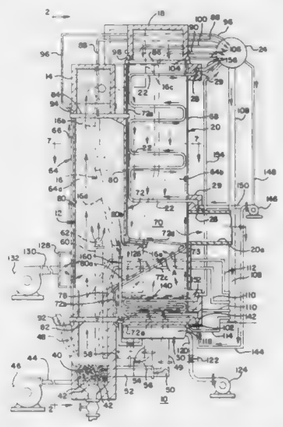
**U.S. Cl. 122—4 D** **30 Claims**

1. A fluidized bed steam generating system, comprising;

an upstanding combustion vessel for containing a recirculating flow of fluid entrained, fine solid particulate material and a dense bed section of limited space in a lower portion of said vessel containing a fluidized, coarse solid particulate material retained in said limited space as said fine solid particulate material moves through said dense bed section, fuel injection means adjacent said dense bed section for introducing fuel for combustion, and fluidizing means for injecting combustion air and gas for fluidizing said dense bed section and entraining said fine solid particulate material to flow upwardly toward an outlet adjacent the upper end of said combustion vessel;

a gas/solid separator adjacent said combustion vessel having an inlet in communication with said outlet of said combustion vessel, an outlet for separated gas and an outlet for separated fine solid particulate material;

a convection pass boiler having an inlet for hot gas adjacent an upper end in communication with said outlet for separated gas of said gas/solid separator and an outlet for cooled gas adjacent a lower end, said boiler having an enclosure formed with a waterwall adjacent said combustion vessel and boiler tubes for receiving heat from said



gases flowing downwardly from said hot gas inlet toward said cooled gas outlet; and

a heat exchanger directly below said boiler and adjacent said combustion vessel having an inlet in communication with said outlet for separated solids of said gas/solid separator and an outlet in communication with said combustion vessel for introducing said recirculating fine solid particulate material to flow upwardly therein, a fluidized bed of said fine solid particulate material maintained in said heat exchanger, a tubular heat exchange element in said bed for receiving heat therefrom, and fluid injector means for fluidizing said bed and recirculating said fine solid particulate material back into said combustion vessel.

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**4,745,885**

**COOLANT PASSAGE SYSTEM FOR V-SHAPED INTERNAL COMBUSTION ENGINE**

**Yutaka Koinuma, Tokyo, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 15, 1986, Ser. No. 919,087**

**Claims priority, application Japan, Oct. 16, 1985, 60-228926**

**Int. Cl.[4] F01P** *7/02*

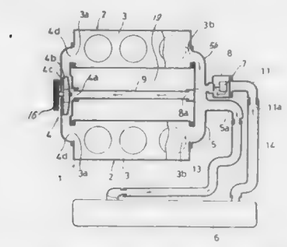
**U.S. Cl. 123—41.05** **11 Claims**

1. A coolant passage system in a V-shaped internal combustion engine having a crankshaft, a radiator, and a pair of cylinder banks having respective coolant jackets defined therein, with a V-shaped space defined between said cylinder banks, comprising:

a coolant pump disposed on one side of said cylinder banks in the direction of said crankshaft for delivering a coolant into said coolant jackets, said coolant pump having an inlet opening toward said V-shaped space;

a collecting conduit disposed on an opposite side of said cylinder banks for delivering the coolant from said coolant jackets to said radiator;

a valve casing housing a thermovalve for delivering the coolant from said radiator, said valve casing being integrally formed with said collecting conduit and having an outlet opening toward said V-shaped space; and



a connecting pipe interconnecting said inlet and said outlet and disposed in said V-shaped space.



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**4,745,886**

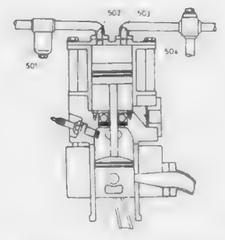
**BACK AND FORTH MOTION TYPE OF THE INTERNAL ENGINE WITH THE SEPARATE GAS CHAMBER AND ITS APPLICATION EQUIPMENT**

**Tai-Her Yang, 5-1 Taipin St., Si-Hu Town, Dzan-Hwa, Taiwan**

**Filed Oct. 25, 1985, Ser. No. 791,461**

**Int. Cl.[4] F02B** *33/10*

**U.S. Cl. 123—71 R** **8 Claims**



1. An internal combustion engine, comprising:

an engine block having an upper cylindrical gas chamber and a lower cylindrical gas chamber, a bottom portion of said upper gas chamber serving as a compression chamber for gases introduced into said lower gas chamber, said lower chamber serving as a combustion chamber;

a piston assembly comprised of a lower piston located in said lower gas chamber, an upper piston located in said upper gas chamber and dividing said upper chamber into two portions including a top upper chamber portion and the bottom upper chamber portion, and a shaft connecting said upper and lower pistons for moving both upper and lower pistons in phase with one another;

sealing means for permitting reciprocating movement of said connecting shaft within said upper and lower chambers and for providing a seal between said upper and lower chambers;

cooling means jacketing said sealing means for cooling said sealing means,

upper chamber intake means for allowing gas to be introduced into said bottom portion of said upper gas chamber;

upper chamber intake valve means for preventing gas from exiting from said bottom portion of said upper gas chamber through said upper chamber intake means;

an inter-chamber passageway in said engine block for permitting flow of gas from said bottom portion of said upper chamber directly to said lower chamber;

automatically controlled lower chamber intake valve means for controlling flow of gas from said inter-chamber passageway to said lower chamber;

lower chamber exit means for permitting the contents of said lower gas chamber to be discharged from said chamber;

one-way fluid inflow means communicating with said top portion of said upper chamber, and permitting a fluid to be drawn into said top portion of said upper chamber when said upper piston moves away from said upper chamber;

one-way fluid outflow means communicating with said top portion of said upper chamber, and permitting a fluid to be pumped out of said top portion of said upper chamber when said upper piston moves toward said upper chamber;

a fuel source for providing fuel to said lower chamber, wherein the fuel from the fuel source passes in sequence through said upper chamber intake means, said lower portion of said upper chamber, said inter-chamber passageway in said engine block, and said automatically operated lower chamber intake valve means prior to entry into said lower chamber; and

ignition means for igniting the gaseous contents of said lower chamber, said ignition means automatically periodically being energized and unenergized in coordination with the automatic operation of said automatically controlled lower chamber intake valve means.

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**4,745,887**

**ENGINE PROVIDED WITH COOLING DEVICE IN MOTORCYCLE**

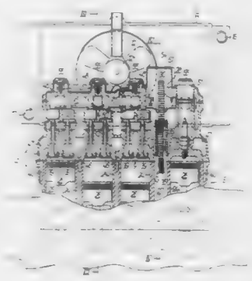
**Hiroyuki Ito; Kazuoki Ukiana, and Kaoru Wachigai, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 18, 1987, Ser. No. 27,579**

**Claims priority, application Japan, Mar. 18, 1986, 61-60404; Mar. 18, 1986, 61-39626[U]**

**Int. Cl.[4] F01L** *1/04*

**U.S. Cl. 123—90.31** **2 Claims**



1. An engine provided with a cooling device in a motorcycle, wherein the engine is constructed as an OHC type multicylinder engine arranged on a body frame of the motorcycle and has a plurality of cylinders aligned in a direction perpendicular to a longitudinal direction of said body frame, comprising a radiator disposed forwardly of said engine and having a forced cooling fan, and a timing transmission device for driving a valve-actuating cam shaft of said engine arranged so as to deviate toward one side from a center of a cylinder block in the alignment direction of said cylinders, said timing transmission device and said forced cooling fan of said radiator being arranged in side-by-side fashion in a lateral direction of said body frame.

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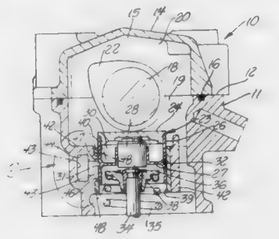


**4,745,888**

## TAPPET SLEEVE LUBRICATION

**Gerald E. Kapp, Lansing, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Jul. 13, 1987, Ser. No. 72,365**
**Int. Cl.⁴ F01M** *1/06*
**U.S. Cl. 123—90.33** **3 Claims**



1. In combination,
a non-ferrous body containing a lubricant distribution gallery,
a sleeve of material diverse from that of the body and cast within the non-ferrous material thereof to form internally a bore for the reciprocating movement of a lubricated member, said sleeve having an opening on a side toward the lubricant gallery through which there protrudes an extension of the non-ferrous material to form a portion of the bore, said sleeve having externally and in the opening an interface with the non-ferrous material of the body, and
an oil feed passage from the gallery through the non-ferrous material extension to the bore, said feed passage being wholly within the non-ferrous material and free of any intersection with the diverse material interface, whereby any leakage of pressure oil directly from the feed passage through the interface is avoided.

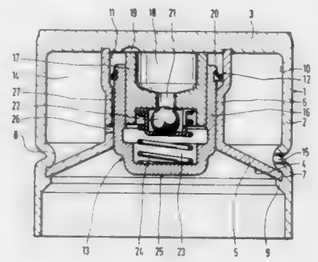
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**4,745,889**

## HYDRAULIC VALVE TAPPET

**Walter Speil, Ingolstadt, Fed. Rep. of Germany, assignor to Motomak Motorenbau, Maschinen-und Werkzeugfabrik, Konstruktionen GmbH, Fed. Rep. of Germany**

**Filed Jul. 1, 1986, Ser. No. 880,805**
**Claims priority, application Fed. Rep. of Germany, Aug. 8, 1985, 3528432**
**Int. Cl.⁴ F01L** *1/24*
**U.S. Cl. 123—90.55** **5 Claims**



1. A self-adjusting hydraulic valve tappet arranged in a guide bore of a cylinder head of an internal combustion engine and contacted at one end face by a control cam and abutting with a second end face against the end of a valve stem, the tappet consisting of a cup-shaped housing (1) comprising a hollow cylindrical wall (2) closed at one end by an end member (3) against the outside of which the cam abuts, and a cylindrical guide sleeve (6,28) concentric with the cylindrical wall (2), said guide sleeve emanating from the end member (3) extends to the center of an annular flange element (5,29), which at its outer circumference merges into the cylindrical wall (2) of the housing (1) to define an annular oil reservoir (14) between the cylindrical wall (2) and the cylindrical guide sleeve (6,28), the oil reservoir being supplied with oil through a bore (15) leading to the outside of the housing, a self-adjusting hydraulic play compensating element (13) guided in the guide sleeve for slidable longitudinal movement and comprising an inner piston (17) and an outer piston (16) surrounding said inner piston, both pistons being guided for slidable longitudinal movement within each other to define an oil pressure chamber (23), which through a bore (21) closed by a check valve (22) in the inner piston (17) is connected to a centric oil reservoir (18) arranged in the inner piston (17), and defined, on the one hand, by the wall of the inner piston (17) and, on the other hand, by the inner surface (10) of the end member (3), against which the inner piston (17) abuts with its end face, the outer piston (16) being guided for slidable longitudinal movement in the cylindrical guide sleeve (6,28) with its closed end abutting against the end of the valve stem, characterized in that the guide sleeve has at a point distant from the end member (3) an intake port (26,31,53) that opens into a duct extending to the end member (3), which is defined, on the one hand, by the outer surface of the outer piston (16) and, on the other hand, by the bore of the guide sleeve (6), and an oil transfer port (19,34) leading into the centric oil reservoir (18) is provided at the end of the inner piston (17) facing the end member (3).

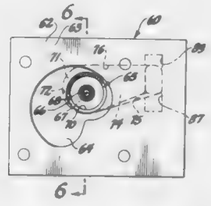
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**4,745,890**

## ENGINE WITH FLUIDIC VARIABLE SWIRL PORT

**Floyd A. Wyczalek, Birmingham, Mich., and Patrick A. Ferguson, High Point, N.C., assignors to General Motors Corporation, Detroit, Mich.**

**Filed Oct. 1, 1986, Ser. No. 914,082**
**Int. Cl.⁴ F01L** *3/00*
**U.S. Cl. 123—188 M** **10 Claims**



1. A fluidic variable swirl intake port for an internal combustion engine, said port comprising
a circular throat centered on a valve axis and terminating along the axis in an annular valve seat,
an entry chamber surrounding the valve axis on the other side of the throat from the valve seat, said chamber being open along one side in a plane normal to said axis and having the remaining sides defined by a curved wall extending around the axis and providing substantial volume surrounding the axis for flow through the throat,
an inlet duct extending from the open side of the entry chamber at a substantial angle laterally from the valve axis, said duct having generally straight sides of limited maximum curvature extending essentially tangent to the entry chamber defining curved wall, and generally parallel roof and floor portions connecting the sides, and
a control port opening to the inlet duct through one of the sides at a substantial distance from the valve axis for the delivery of control fluid into the port laterally to the direction of inlet flow through the duct to urge the entering flow toward one side of the duct and the entry chamber, thereby creating substantial swirl in the fluid flow entering the valve throat and passing by the valve seat.

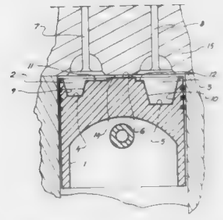


**4,745,891**

## OTTO CYCLE INTERNAL COMBUSTION ENGINE GIVING INCREASED PERFORMANCE

**Umberto Cola, Via Giovanni Papini, 32 Roma, Italy 00137**

**Filed Jul. 8, 1986, Ser. No. 883,128**
**Claims priority, application Italy, Sep. 10, 1985, 48542 A/85**
**Int. Cl.⁴ F02F** *3/26*
**U.S. Cl. 123—193 P** **8 Claims**



1. An improvement in a piston-type internal combustion engine, in particular an Otto cycle engine, giving increased performance, characterized in that use is made of a first and second separate in-piston combustion chambers formed in the crown of each piston of said engine, each of said combustion chambers being shaped as a sector of an annulus the center of which coincides with the center of the piston crown, the volume of said first combustion chamber being larger than the volume of said second combustion chamber such that during said compression stoke a pressure differential will be created between said first and said second combustion chambers, said combustion chambers located in positions corresponding, respectively, to that of an inlet valve via which fuel-air mixture is admitted, and to that of an exhaust valve via which post-combustion gases are expelled; and in that communication is enabled between said first and second combustion chambers with said piston at top dead center, by way of a gap such that a channelized flow of combustion gases is created from said first combustion chamber of larger volume to said second combustion chamber of smaller volume immediately prior to and at the moment of ignition, said gap existing between said crown of said piston and a cylinder head of said engine.

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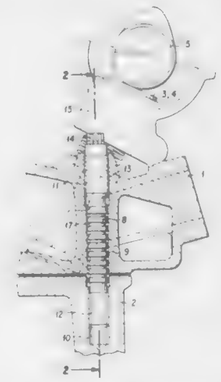
**4,745,892**

## INTERNAL COMBUSTION ENGINE

**Max Ruf, Obereisesheim, and Erwin Korostenski, Oedheim, both of Fed. Rep. of Germany, assignors to Audi AG, Ingolstadt, Fed. Rep. of Germany**

**Filed Jun. 16, 1986, Ser. No. 874,578**
**Claims priority, application Fed. Rep. of Germany, Jun. 28, 1985, 3523191**
**Int. Cl.⁴ F02F** *7/00*
**U.S. Cl. 123—193 CH** **6 Claims**

1. An internal combustion engine having a cylinder crank case and a cylinder head connected to the crank case by differential screw fasteners, each of which extends through a bore in the cylinder head and is screwed into a threaded bore in the cylinder crank case, each differential screw fastener having two threaded sections of which the first section has a larger external diameter and a smaller pitch than the second section, the bore in the cylinder head having an internal thread which corresponds to the first threaded section of the screw fastener and the bore in the cylinder crank case having an internal thread which corresponds to the second section of the screw fastener each said differential screw fastener being free screw heads and screw nuts so as to retain said first threaded section of said differential screw fastener within said cylinder head



solely by differences in the pitch of the first and second sections.

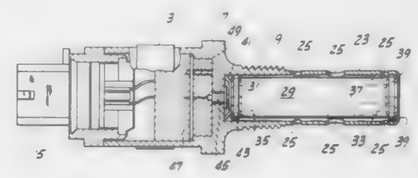
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**4,745,893**

## DIGITAL OIL LEVEL SENSOR

**Kim Wesley Atherton; A. Brinkley Barr; Thomas M. Harmon; Michael M. Van Schoiack; Marvin E. Vandehey; Richard D. Weyerts, all of King County; Charles R. Clow, and Patrick H. Mawet, both of Snohomish County, all of Wash., assignors to Caterpillar Inc., Peoria, Ill.**

**Filed Dec. 3, 1986, Ser. No. 937,553**
**Int. Cl.⁴ F01M** *1/00*
**U.S. Cl. 123—196 S** **26 Claims**



1. An oil level sensor suitable for use with internal combustion engines, transmissions, differentials, vehicular oil systems, and the like comprising:
a sensor body adapted to be mounted to the block, casing or the like of an oil-containing reservoir;
a probe including a pair of electrodes forming a capacitor, said probe extending from said sensor body so as to at least partially immerse the capacitor in oil during normal conditions of use to detect the level thereof, at least one of said electrodes being substantially insulated so that the apparent capacitance of the capacitor is relatively insensitive to any change in the conductivity of the oil a high temperatures; and
means responsive to the capacitance of said capacitor for signalling the level of the oil, said capacitance being a function of said oil level.

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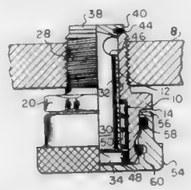


**4,745,894**

## OIL DRAIN VALVE

**Robert A. Laipply, and Paul J. E. Fournier, both of Jackson, Mich., assignors to Aeroquip Corporation, Jackson, Mich.**

**Filed Sep. 25, 1987, Ser. No. 100,887**
**Int. Cl.[4] F01M** *1/00*
**U.S. Cl. 123—196 R** **9 Claims**



1. An oil drain fitting for internal combustion engines comprising, in combination, an elongated tubular body having an inner end and an outer end, a passage axially extending through said body intersecting said ends, an external thread defined on said body adjacent said inner end for threading said body into an engine drain hole, valve operating attachment means defined on said body adjacent said outer end, a tubular valve axially reciprocally mounted within said passage having an open end adjacent said body outer end and a closed end adjacent said body inner end, a valve seat defined on said body adjacent said inner end, a valve head defined on said valve closed end engagable with said seat when said valve is axially positioned to a closed position, a port defined in said valve adjacent said head communicating with the interior of said valve whereby oil will flow into said valve when said valve is axially positioned to an open position when said head disengages said seat, spring means mounted on said body axially biasing said valve toward said closed position, and valve actuating means defined on said valve for axially displacing said valve from said closed position to said open position.

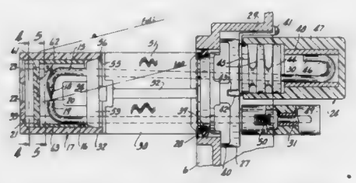
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**4,745,895**

## LIQUID MONITORING APPARATUS

**Richard W. Seilenbinder, Hales Corners, and Edward B. Hajec, Brookfield, both of Wis., assignors to Briggs & Stratton Corp., Brookfield, Wis.**

**Continuation of Ser. No. 787,517, Oct. 15, 1985, abandoned. This application Mar. 27, 1987, Ser. No. 32,985**
**Int. Cl.[4] F22B** *5/02*
**U.S. Cl. 123—196 S** **47 Claims**



1. A submersible sensor adapted to be immersed in a submerging liquid within a containing means for sensing electrically different conductive mediums in said liquid, said submerging liquid having a minimum selected level and a maximum selected level in said containing means, comprising first and second electrodes spaced from each other with opposed ends to define a sensing gap, means in said sensing gap between said electrodes to vary the conductivity of the gap with the conductivity of the mediums in said gap, a flow control enclosure secured defining a chamber about said opposed ends of said electrodes and said gap, said flow control enclosure having mounting means for attachment to said containing means and said flow control enclosure includes at least one first opening means located to establish flow of said submerging liquid into said chamber at a rapid inflow rate to immerse said opposed ends and at least one second opening means constructed and arranged to establish the flow of said submerging liquid from the chamber at an outflow rate less than said flow rate of said first opening in response to movement of submerging liquid about the enclosure, and said first opening means being located to introduce liquid into said chamber with said liquid level substantially at the minimum selected level and below the maximum level to maintain flow into said first opening means and said liquid in said chamber flowing from said chamber through said second opening means with said submerging liquid substantially at said minimum level and below said minimum level.

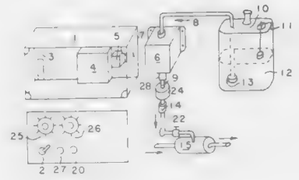
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**4,745,896**

## UPPER CYLINDER AREA LUBRICATION SYSTEM

**Robert A. Schultz, 907 Town & Country Blvd., Suite 202, Houston, Tex. 77024**

**Filed Oct. 5, 1987, Ser. No. 104,356**
**Int. Cl.[4] F01M** *1/00*
**U.S. Cl. 123—196 M** **11 Claims**



1. An upper cylinder area lubrication system for an internal combustion engine, comprising

conduit means connected to the upper cylinder area of an internal combustion engine for introducing lubricant thereto,

lubricant supply means including

a reservoir for containing a lubricant suitable for introduction to the upper cylinder area of said internal combustion engine, and

an electric pump connected to said reservoir and said conduit means, and

timer means for automatically and alternately operating said pump on for relatively short periods of time and off for relatively long periods of time while the internal combustion engine is running.

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**4,745,897**

## AUTOMATIC ELECTRONIC AND MECHANICAL SYSTEM TO AVOID VEHICLE THEFT

**José O. V. Tejeda, Juan de la Barrera 33, Circ. Heroes, Cd. Satelite, C.P. 53100, Edo. de Mexico, Mexico**

**Filed Dec. 22, 1986, Ser. No. 945,003**
**Int. Cl.[4] B60R** *25/04*
**U.S. Cl. 123—198 B** **1 Claim**

1. An automatic vehicle anti-theft system having an anti-theft mode and an anti-hijack mode, for a vehicle having both an ignition switch S 1 and an open door switch S 3 for a door, comprising in combination;

(a) an electrically controlled fuel supply system 53 supplied with switched electrical current by said ignition switch S 1;

(b) a momentary switch S 2 supplied with switched electrical current by said ignition switch S 1;

(c) an electronic valve between said electrically controlled fuel supply system 53 and the ground;

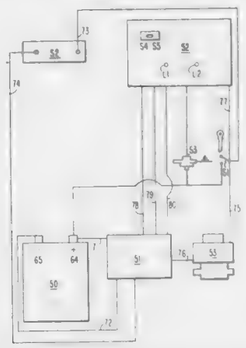
(d) said electronic valve normally closed and opened by a voltage applied to its gate and remaining open thereafter;

(e) said momentary switch S 2 supplying a voltage to the gate of said electronic valve to open said electronic valve whenever said ignition switch is on;

(f) said electronic valve operating said electrically controlled fuel supply system 53 when said ignition switch S 1 is closed and then said momentary switch S 2 is thereafter closed;

(g) said open door switch S 3 open when the door is closed and closed when said door is open;

(h) said open door switch S 3 controlling said electronic



valve to close said electronic valve when said open door switch S 3 is closed;

(i) an open door override switch S 4 to selectively disable said open door switch S 3 and to disable said anti-hijack mode; and,

(j) a valet parking override switch S 5 to selectively disable the anti-theft mode while the vehicles in the valet mode;

whereby said automatic vehicle anti-theft system permits the owner of said vehicle to disable either of two protection modes.



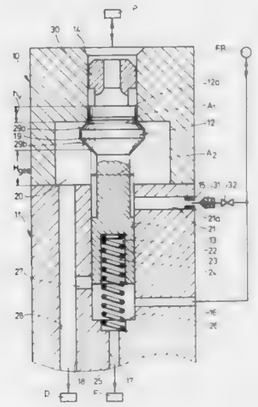
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**4,745,898**

## PRE-INJECTION APPARATUS FOR INTERNAL COMBUSTION ENGINES

**Walter Egler, and Nestor Rodriquez-Amaya, both of Stuttgart, Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Aug. 31, 1987, Ser. No. 91,138**
**Claims priority, application Fed. Rep. of Germany, Sep. 1, 1986, 3629751**
**Int. Cl.[4] F02M** *39/00*
**U.S. Cl. 123—300** **23 Claims**



1. A pre-injection apparatus for internal combustion engines comprising a housing, a high pressure fluid source, a low pressure fuel pump, a pre-injection slide that controls fuel flow to a pre-injection pressure chamber (20), said pre-injection slide having an enlarged area in said pre-injection pressure chamber said enlarged area forming first and second valve faces, said pre-injection pressure chamber having first and second valve seats, said pre-injection slide having an upper end subjected to a fuel pressure generated by said high-pressure fuel source and which undergoes a displacement determining a pre-injection quantity, a spring chamber (24) at a lower end of said pre-injection slide within said housing, a conduit connection between said spring chamber (24) and said fuel injection line, said pre-injection slide enabling a main injection by opening a fuel injection line leading to a nozzle, whereby during a first partial pre-injection stroke ($h_v$) of said pre-injection slide (12), a connection of the high-pressure side to the injection line (28) is kept sealed thereby forming a pressure intensification by means of a pressure stage ($A_2 < A_1$) at the pre-injection slide (12) from said spring chamber (24), which transfers a pre-injection quantity to the injection line (28), opening said pre-injection pressure chamber (20) toward the high-pressure side, causes a drop of the nozzle pressure, and the high-pressure side is relieved until a final stroke of the pre-injection slide and a magnetic valve (32, 32') is provided which communicates at least indirectly with the pre-injection pressure chamber (20) to shut-off control of said pre-injection.

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**4,745,899**

## METHOD AND APPARATUS FOR CONTROLLING THE SOLENOID CURRENT OF A SOLENOID VALVE WHICH CONTROLS THE AMOUNT OF SUCTION OF AIR IN AN INTERNAL COMBUSTION ENGINE

**Takeo Kiuchi, and Akimasa Yasuoka, both of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Toyko, Japan**

**Filed Oct. 20, 1986, Ser. No. 920,390**
**Claims priority, application Japan, Oct. 21, 1985, 60-233354**
**Int. Cl.[4] F02D** *41/16*
**U.S. Cl. 123—339** **6 Claims**



1. A method of controlling the solenoid current of a solenoid valve which controls suction air in an internal combustion engine, said method comprising the steps of:

calculating a solenoid current control value as a function of engine operating conditions;

detecting an engine coolant temperature corresponding to the solenoid temperature;

determining a temperature correction value in accordance with the solenoid temperature; and

calculating a driving signal for controlling the operation of said solenoid as a function of the solenoid current control value and the temperature correction value.

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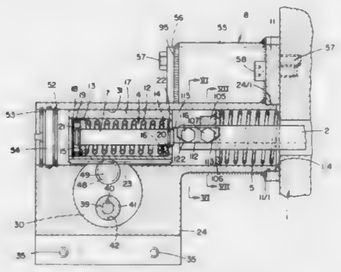


4,745,900

## CONTROL DEVICE FOR THE ADJUSTMENT OF THE INJECTION TIMING AND/OR THE DELIVERY RATE OF A FUEL INJECTION PUMP

Hubert Thudt, Puchheim/Bahnhof, Fed. Rep. of Germany, assignor to MAN Nutzfahrzeuge GmbH, Munich, Fed. Rep. of Germany

Filed Jul. 20, 1987, Ser. No. 75,116
Claims priority, application Fed. Rep. of Germany, Jul. 25, 1986, 3625235; Apr. 18, 1987, 3713288
Int. Cl.[4] F02M *39/00*
U.S. Cl. 123—357 16 Claims



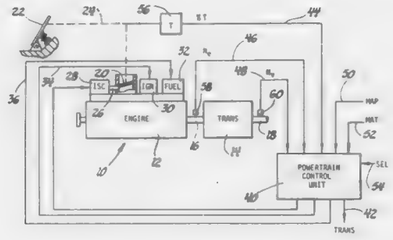
1. A control device for the setting of the timing and/or the delivery rate of a fuel injection pump (1) for IC engines in which the setting signals of a microprocessor are able to be transmitted by an electrical stepper motor (3) via motion transmitting members (6 and 7) with an intermediately placed spring force storage means (4) to a control rod (2) and a return compression spring (5) is provided for the return of the control rod (2) into its zero delivery setting, the spring force storage means (4) having two spring plates (13 and 14) able to be moved in opposite directions and having a tensioned compression spring (12) between them, the maximum distance apart of the plates (13 and 14) being limited by abutments (15 and 16) in a surrounding housing (17), the stepper motor (3) on the one hand and the control rod (2) on the other hand being connected with the spring force storage means (4) through an intermediate motion transmitting member (6 and 7, respectively) and the motion transmitting member on the control rod side is a force transmitting rod (7) which extends through the two spring plates (13 and 14) and has abutments (21 and 22), which cooperate with the sides, remote from the compression spring of the spring force storage means, of the spring plates characterized in that the housing (55) of a mechanical tachometer generator (8) feeding signals to the microprocessor and, separately from this, a housing (24) containing the motion transmitting member (6), the spring force storage means (4), the force transmitting rod (7) and the return compression spring (5) are fixedly mounted on a base plate (11), in that on opposite sides of this housing (24) the stepper motor (3) and a step generator (10) detecting the steps thereof, each having their own housing (25 and 33, respectively), are flange-mounted, in that the stepper motor (3), the motion transmitting member (6) on the stepper motor side, the spring force storage means (4), the force transmitting rod (7) and the return spring (5) form a sub-assembly mounted on the base plate (11), and in that the base plate (11) is adapted to be flange-mounted with the aid of locating means (92, 93; 103 and 104) on the fuel injection pump (1) with the production of positionally correct operative connections of the power transmitting rod (7) and the control rod (2) on the one hand and of the injection pump shaft (9) and the tachometer generator (8) on the other hand, the rotating part (59) of the tachometer generator (8) having been previously mounted on the injection pump shaft (9) or mounted in the housing (55) of the tachometer generator (8).

4,745,901

## CONTROL METHOD FOR PROTECTING AN IC ENGINE DURING EXTENDED HEAVY LOADING

Mark G. Reifenberger, Grosse Pointe Park; David C. Poirier, Troy; Michael A. Davis, Pontiac; Harold M. Martin, Southfield, and Gary J. Brand, Novi, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Feb. 24, 1987, Ser. No. 17,769
Int. Cl.[4] F02P *5/15*; F02D *41/10*
U.S. Cl. 123—416 6 Claims




1. A control system for a spark ignition internal combustion engine including spark timing means for initiating engine combustion events in accordance with a spark timing signal, and fuel delivery control means for delivering fuel to the engine, the engine having a tuning range of speeds during which there is increased tendency for engine knock and/or preignition to occur, the control system comprising:

optimum performance control means effective during engine operation for which engine performance concerns predominate for (1) supplying the spark timing means with a spark timing signal corresponding to an empirically determined MBT setting for substantially maximum engine torque and (2) causing the fuel delivery control means to deliver an extra amount of fuel to the engine if the engine speed is in said tuning range, permitting continued safe operation with the spark timing means controlled to said MBT setting;

reduced performance control means activateable during engine operation for which engine protection concerns predominate for overriding said optimum performance control means by supplying the spark timing means with a spark timing signal which progressively retards the spark timing from the MBT setting to a predetermined value at which engine operation may be continued at a reduced performance level without incurring engine damage;

timing means for identifying periods of heavy engine loading above a threshold engine speed and load, and for integrating such periods over time to define cumulative heavy loading indication; and

engine protection means effective when the cumulative heavy loading indication exceeds a reference time for activating the reduced performance control means to protect the engine from damage.

4,745,902

## IGNITION TIMING CONTROL METHOD FOR INTERNAL COMBUSTION ENGINE

Shizuo Yagi, Asaka; Yoshiaki Hirosawa, Shiki; Makoto Kawai, Tokorozawa; Yorihisa Yamamoto, Shiki; Haruhiko Yoshikawa, Niiza, and Kenichi Nakamuna, Fujimi, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 30, 1986, Ser. No. 868,588
Claims priority, application Japan, May 30, 1985, 60-117231; Aug. 9, 1985, 60-175176; Aug. 9, 1985, 60-175177
Int. Cl.[4] F02P *5/10*
U.S. Cl. 123—425 21 Claims

1. An ignition timing control method for an internal combustion engine mounted on a vehicle, having a cruising speed not dependent on engine speed as a prime mover thereof, said method comprising the steps of:

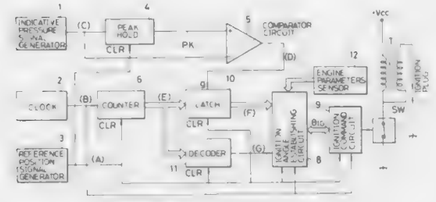
generating a reference position pulse every time the rotational angle position of said internal combustion engine reaches a reference crank angle position;

generating an indicative pressure signal which is representative of the inner pressure in the combustion chamber of said engine;

detecting the maximum peak position of said indicative pressure signal during an internal between two consecutive ones of said reference position pulses so as to produce an indicative pressure peak position signal representing the maximum peak position in the crank angle of said engine; and

establishing a next-cycle ignition angle at which said engine is to be ignited within the next engine cycle, in accordance






with said indicative pressure peak position signal, said step of establishing the next-cycle ignition angle including,

a first step of detecting engine parameters of said engine,

a second step of taking said indicative pressure peak position signal in synchronism with the engine operation,

a third step of establishing a target crank position in accordance with the cruising speed of said vehicle,

a fourth step of comparing the taken indicative pressure peak position signal with said target peak position so as to produce a discrimination signal indicating a relation between said taken indicative pressure peak position signal and the established target crank position, and

a fifth step of determining said next-cycle ignition angle in synchronism with the engine operation by modifying a previous cycle ignition angle which has been determined in a previous engine cycle, in accordance with said discrimination signal.

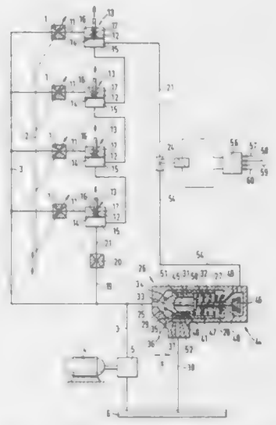
4,745,903

## PRESSURE REGULATING VALVE

Karl Gmelin, Flein, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Struttgart, Fed. Rep. of Germany

Filed Mar. 26, 1987, Ser. No. 30,189
Claims priority, application Fed. Rep. of Germany, Jul. 12, 1986, 3623666
Int. Cl.[4] F02M *39/00*
U.S. Cl. 123—452 5 Claims

1. A pressure regulating valve, in particular for a fuel injection system comprising a valve housing having a slide bore defined therewithin and a regulating piston disposed in said slide bore, said regulating piston being displaceable to a variable extent in said slide bore as a function of pressure of a medium supplied thereto counter to force of a regulating spring, said regulating piston including a valve closing element arranged to cooperate with a first valve seat, said first valve seat being adapted to connect to fuel inlet lines of said fuel injection system, said valve closing element having a radially outwardly directed regulating face extending downstream thereof, the regulating face adapted to selectively access an outflow opening provided through the slide bore to communicate with a return fuel line upon a minimum displacement of the regulating piston being effected by pressure applied by the medium, said minimum displacement being travel of said regulating piston for a predetermined displacement path (s) in an axial direction away from the valve seat toward the outflow opening, said regulating piston further including a bypass conduit extending from the regulating face of said piston through a portion of said piston and terminating at a circumferential wall thereof in a relief opening, the relief opening being adapted to communicate with the outflow opening during that interval of path in which the piston has travelled a displacement path less than said predetermined displacement path (s).

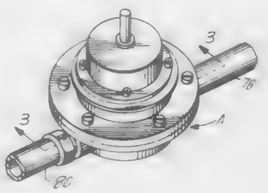


4,745,904

## VACUUM CONTROLLED VARIABLE PRESSURE FUEL REGULATOR AND CARBURETOR

Toby T. Cagle, deceased, late of Bellflower, Calif. (by Gary A. Cagle, administator), assignor to Cagle Corporation, Long Beach, Calif.

Continuation-in-part of Ser. No. 68,190, Aug. 20, 1979, abandoned, which is a continuation of Ser. No. 803,597, Jun. 6, 1977, abandoned. This application Jul. 28, 1980, Ser. No. 172,986
Int. Cl.[4] F02B *33/00*
U.S. Cl. 123—512 13 Claims




1. In the combination of an internal combustion engine having a carburetor with a needle valve and a float bowl, a fuel pump for delivering fuel to the carburetor past the needle valve and a regulator for adjusting the pressure of the fuel at the needle valve, an improvement in the regulator comprising:

(a) valve means operable to control the flow of fuel through the regulator and the pressure of fuel at the needle valve;

(b) a first diaphragm coupled to the valve means and responsive to fuel pressure downstream of the valve means to tend to close the valve means and reduce the pressure of fuel at the needle valve;

(c) biasing means opposing the fuel pressure to urge the valve means towards an open position and increase the fuel pressure at the needle valve, the biasing means and fuel pessure acting on the first diaphragm effecting a valve

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opening corresponding to a substantially reduced fuel pressure at the needle valve from the fuel pump delivery pressure under engine operating conditions corresponding to manifold pressure at low to moderate values and partial engine load;

(d) a second diaphragm of the regulator;

(e) means of the regulator to exert engine manifold pressure onto one side of the second diaphragm;

(f) biasing means acting on the second diaphragm to urge it toward a fixed position;

(g) means coupling the first and second diaphragms together at a predetermined high absolute manifold pressure less than that pressure corresponding to fully open throttle to urge the first diaphragm and the valve means towards the open position; and

(h) the second diaphragm responding to engine manifold pressure such that it moves and uncouples from the first diaphragm at manifold pressures below the predetermined high pressure;

whereby, at high engine load conditions fuel pressure delivered from the regulator increases with engine load to a maximum and at low engine load conditions the fuel pressure delivered by the regulator remains substantially constant at a low value.

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**4,745,905**

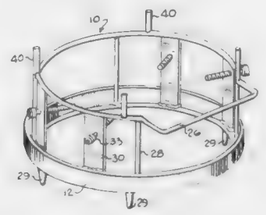
**UTENSIL-HOLDER**

**Lloyd P. Lucky, P.O. Box 670803, Chugiak, Ak. 99567**

**Continuation of Ser. No. 798,274, Nov. 15, 1985, abandoned, which is a continuation-in-part of Ser. No. 696,292, Mar. 1, 1985, Pat. No. 4,638,786. This application Jul. 20, 1987, Ser. No. 75,275**

**Int. Cl.⁴ F24C** *15/30*

**U.S. Cl. 126—24** **2 Claims**



1. A utensil-holder for preventing movement of a cooking utensil placed on a cooking surface, said cooking surface having holes, comprising:

(a) frame means including:

(i) first ring means having a substantially circular shape;

(ii) second ring means having a substantially circular shape;

(iii) means for supporting said second ring means a predetermined distance above said first ring means;

(iv) securing means for securing said first ring means to said cooking surface, said securing means including a plurality of attachment means extending below said first ring means, said attachment means being operative to engage said holes in said cooking surface; and,

(b) adjustment means in said frame means for adjusting said holder to accomodate various utensil sizes; and,

(c) a plurality of extension pins extending upwardly from said frame means for preventing lids on said utensils from sliding off during cooking.

**4,745,906**

**PASSIVE HEAT TRANSFER DEVICE**

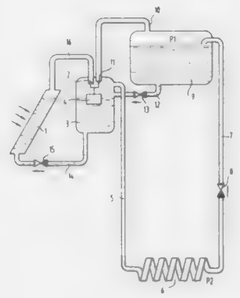
**Gianfranco DeBeni, Cadrezzate, and Rudolf Friesen, Biandronno, both of Italy, assignors to European Atomic Energy Community (EURATOM), Ispra, Italy**

**Filed May 15, 1987, Ser. No. 49,898**

**Claims priority, application Luxembourg, May 22, 1986, 86434**

**Int. Cl.⁴ F24J** *2/40*

**U.S. Cl. 126—419** **4 Claims**



1. In a passive heat transfer device comprising: a vaporizable liquid circulation loop having a boiler connected in series with a condenser mounted below the boiler, said loop carrying a vaporizable liquid for transferring heat from said boiler constituting a heat source by means of said vaporizable liquid, said boiler having a vapour space, said device further including a liquid tank having a vapour space and being connected in said loop in series with said condenser and positioned above said boiler and between said condenser and said boiler, such that said boiler furnishes during a first cycle phase, vapour to the condenser which then supplies the tank with liquid, and receiving, during the second cycle phase, liquid from said tank, the improvement comprising:

a vapour separator (3) having a vapour space, and being positioned within said loop and interposed between the boiler (1) and the condenser (6) and between the tank and said boiler and a float valve (2, 4, 11) disposed inside said vapour separator, said float valve including means communicating, during the first cycle phase, the vapour space of the separator with the vapour space of the boiler and for cutting off communiction between the vapour space of the separator and the vapour space of the tank (9) and during a second cycle phase, communicating the vapour space of the separator with the vapour space of the tank and cutting off communication between the vapour space of the separator and the vapour space of the boiler such that the quantity of hot vapour transferred from the boiler to the tank (9) during the second phase of the cycle is quite limited, the tank (9) is essentially prevented from heating up above the temperature at which liquid is fed thereto from the condenser (6), the vapour descending from the separator to the condenser is relatively dry thereby reducing the quantity of a liquid to be transferred from the condenser to the tank (9) and thereby improving the heat transfer efficiency especially during periods of low supply of heat to said heat source.



**4,745,907**

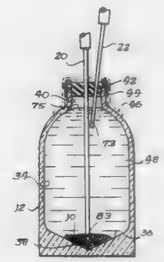
**SYSTEM AND METHOD FOR DELIVERING INSOLUBLE MATERIALS INTO A LIVING BODY**

**John L. Russel, Jr., Alpharetta, and John L. Carden, Tucker, both of Ga., assignors to Nuclear Medicine, Inc., Atlanta, Ga.**

**Continuation of Ser. No. 761,736, Aug. 1, 1985, abandoned. This application Sep. 16, 1987, Ser. No. 98,744**

**Int. Cl.⁴ A61M** *37/04*; **A61N** *5/01*

**U.S. Cl. 128—1.1** **8 Claims**



1. A vial assembly for use in a system for delivering an amount of glass microspheres containing a radioactive isotope entrained in a liquid having a lower density than said microspheres into the body of a living mammal, said vial assembly comprising:

a vial having a bottom wall and a sidewall defining an interior which is substantially symmetrical about a vertical axis, an open mouth at the top of said vial, said bottom wall having a surface that is substantially in the shape of an inverted cone to define a depression for receiving a supply of said microspheres and said sidewall having a substantially smooth inner surface;

a supply of said microspheres disposed in said depression; and

a septum closing the mouth of said vial.

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**4,745,908**

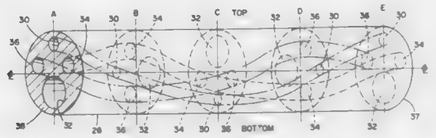
**INSPECTION INSTRUMENT FEXIBLE SHAFT HAVING DEFLECTION COMPENSATION MEANS**

**John L. Wardle, Shelton, Conn., assignor to Circon Corporation, Santa Barbara, Calif.**

**Filed May 8, 1987, Ser. No. 47,750**

**Int. Cl.⁴ A61B** *1/06*

**U.S. Cl. 128—6** **18 Claims**



1. An instrument of a generally tubular flexible shape for accessing a target area, the instrument having a proximal region thereof, a distal region thereof, and a shaft therebetween, said shaft comprising:

structural core means of a substantially flexible material with a first longitudinal axis and a first pre-determined length, said core means comprising a channel means at least partially offset from said first longitudinal axis and having a second pre-determined length; and

deflection compensation means to compensate for channel means deformation in said core caused by shaft deflection.

**4,745,909**

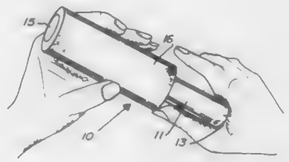
**COLD MASSAGE TOOL AND METHOD OF USE THEREOF**

**Robert J. Pelton, P.O. Box 143, Nevada City, Calif. 95955, and William M. Zulim, 9820 Tender Blossom Way, Stockton, Calif. 95209**

**Filed May 15, 1987, Ser. No. 50,730**

**Int. Cl.⁴ A61F** *7/10*

**U.S. Cl. 128—24.1** **12 Claims**



1. A hand-held cool massage tool for applying pressure to traditional accupressure points, comprising:

a closed, tube of thin-walled aluminum or stainless steel having one rounded end and one open end closed by a cap,

a non-conductive heat-insulating and anti-slipping tube open at both ends and shorter than said closed tube, encircling and tightly engaged with said closed tube from a point adjacent to said cap end and extending toward but well short of said rounded end, to provide a handle, and

a water-based material filling said closed tube,

whereby said water-based material can be frozen through a change-of-state condition by placing said tool in a freezing environment, the tool thereafter being used to apply pressure at cold temperatures to traditional acupressure points on a human body by bringing said rounded end into contact, with pressure, on said pressure points.

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**4,745,910**

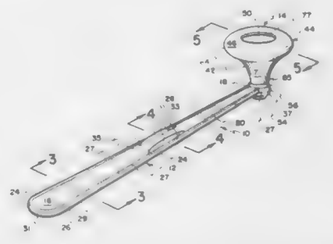
**PERCUSSOR TO AID IN REMOVAL OF LUNG SECRETIONS, AND METHODS**

**H. Kirt Day, Ogden, and John Goodrich, Taylorsville, both of Utah, assignors to Ballard Medical Products, Midvale, Utah**

**Filed Apr. 8, 1987, Ser. No. 35,850**

**Int. Cl.⁴ A61H** *31/00*

**U.S. Cl. 128—28** **15 Claims**



3. A hammer-shaped manual percussor for mobilizing lung secretions comprising a relatively long, relatively slender handle having proximal end to be gripped in one hand of the user, the percussor further comprising a hollow, relatively soft cupular one-piece elastomeric head attached at the top thereof and having a longitudinal axis disposed in substantially transverse relation to the longitudinal axis of the handle and comprising a chamber-forming bell-shaped housing comprising a first wall section which continuously curves downwardly and outwardly away from the axis of the head and a second wall section which integrally merges with the first wall section and thereafter curves continuously downwardly and inwardly

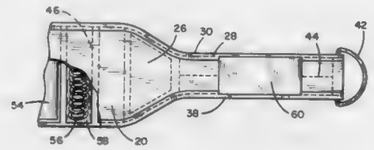
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toward the axis of the head, a constricted substantially diametral reduced chamber opening at the bottom of the percussor head and a thin wall lip, the lip being directed inwardly toward the axis of the head and spanning between the chamber opening and an annular cantilever site where the lip is integrally joined to the second wall section, the lip comprising a large flat yieldably exposed bottom impact surface area.

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**4,745,911**
**SUPPORT DEVICE FOR WEIGHTLIFTING**
**Mark R. Bender, 155 Cedar St., Ashland, Wis. 54806**
**Filed Aug. 6, 1986, Ser. No. 893,878**
**Int. Cl.[4] A61F** *5/02*
**U.S. Cl. 128—78** **18 Claims**




1. A device for supporting the lumbar region of the body of an individual, comprising:

an elongate belt having a medial section including a pliable first layer, and a pliable second layer corresponding in size and shape to the first layer, said layers connected to one another by stitching along the peripheries thereof, and means comprising transverse stitching through said first and second layers for segmenting the space between said layers into a series of elongate, generally uniform and transverse compartments arranged substantially uniformly along substantially the length of said medial section, the longitudinal distance between centers of adjacent compartments being less than twice the compartment width; a plurality of elongate flexure members, each flexure member contained in one of said compartments and each compartment containing one flexure member, oriented transversely of said medial section and spanning substantially the width thereof, said flexure members having sufficient stiffness cooperating to provide a backing for said medial section while flexing to allow limited flexure of said medial section about axes running longitudinally thereof; said belt further including a first lapping means attached to a first end of said medial section and extended longitudinally therefrom; and a second lapping means attached to a second and opposite end of said medial section and extended longitudinally therefrom;

a first connecting means mounted on said first lapping means; and

a second connecting means mounted on said second lapping means and adapted to releasably engage said first connecting means to secure said belt in a wrapping configuration about the lumbar region of an individual, with said medial section positioned against the lower back of the individual and substantially centered thereon.

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**4,745,912**
**ORTHOPEDIC CASTING BANDAGE**
**Arthur W. McMurray, Aberdeen, N.C., assignor to McMurray Fabrics, Inc., Aberdeen, N.C.**
**Filed Nov. 21, 1986, Ser. No. 933,737**
**Int. Cl.[4] A61F** *5/04*
**U.S. Cl. 128—90** **12 Claims**

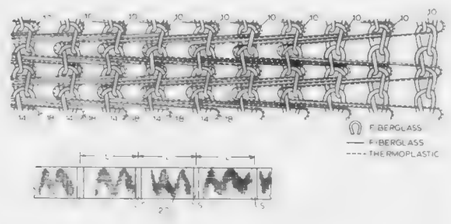
1. An elongate anti-raveling, anti-fraying, warp-knitted orthopedic casting bandage fabric comprising:

(a) a first set of continuous multifilament fiberglass yarns forming lengthwise extending chains of spaced-apart loops;

(b) a second set of lengthwise spaced apart inlay continuous filament fiberglass yarns extending widthwise of the fabric and interlaced with said chains of loops;

(c) a third set of lengthwise spaced-apart inlay thermoplastic yarns contributing at least about five percent of the fabric weight and having a melting temperature substantially below the heat cleaning temperature for a fabric formed of said fiberglass yarns and extending widthwise of the fabric, said thermoplastic yarns of said second set being laid in with and running immediately adjacent said fiberglass yarns of said second set and also interlaced with said chains of loops to form an open knit construction, the extent of inlay for yarns in said second and third sets being substantially less than the width of said fabric and within the range of a two to six needle underlap; and

(d) a series of narrow widthwise extending sections of fabric oriented perpendicular to the lengthwise direction of and equally spaced apart lengthwise of the fabric and containing a melt of said thermoplastic yarns so as to at least partially envelop said first and second sets of said fiberglass yarns in said sections such that when said sections are cut through individual casting bandages are formed with substantially flexible, non-raveling, non-fraying, leading and trailing edges thereof.




8. A resin-impregnated, warp-knitted elongate casting bandage comprising:

(a) a warp-knitted casting bandage fabric formed of chains of spaced-apart loops of fiberglass yarns joined by widthwise extending thermoplastic and fiberglass yarns, said thermoplastic yarns comprising at least about five percent of the weight of the fabric and said widthwise extending yarns being inlayed together with the extent of inlay for individual yarns being within the range of two to six needle underwrap and extending less than the width of the fabric, said thermoplastic yarns being heat bonded at widthwise extending railing and leading edges of the casting bandage and said thermoplastic yarns melted at a temperature substantially below the heat cleaning temperature of a fabric formed of said fiberglass yarns and with the melt thereof being employed to bond said fiberglass yarns together to prevent unravelling and fraying of said edges;

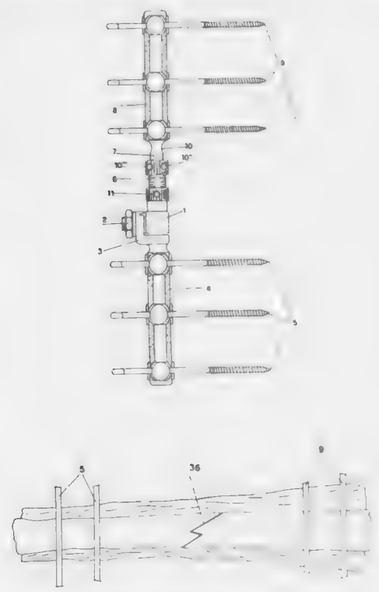
(b) a liquid resin impregnating said casting bandage and capable of curing to form a rigid cast; and

(c) a package for said casting bandage to prevent curing of said casting bandage prior to use.

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**4,745,913**
**APPARATUS FOR THE STABILIZATION OF BONE FRACTURES**
**Enrico Castaman, Contra S. Bortolo 59, and Lino Borghettino, Via Battaglione Aosta 14, both of Vicenza 1-36100, Italy**
**PCT No. PCT/IT85/00045, § 371 Date Jun. 24, 1986, § 102(e) Date Jun. 24, 1986, PCT Pub. No. WO86/02822, PCT Pub. Date May 22, 1986**
**PCT Filed Nov. 7, 1985, Ser. No. 885,570**
**Claims priority, application Italy, Nov. 8, 1984, 85660 A/84**
**Int. Cl.[4] A61B** *17/60*
**U.S. Cl. 128—92 ZW** **6 Claims**

1. An external device for use in orthopedic surgery for fixing pins adapted to be secured to bone fragments, comprising a pivot block (1, 26), at least one carrier bar (4, 8, 19) fixed to said pivot block, bone-traversing pins adapted for insertion into bone fragments, at least one first element (12) for securing the pins to said carrier bar, said carrier bar having in part a rough surface, means for locking said first element (12) to said carrier bar, said means consisting of a stirrup (14) and a washer (15)





located on either side of said carrier bar, said stirrup and said washer having at least the surface in contact with said rough surface of said bar covered with a deformable lining, a second element (13) for clamping said stirrup and said washer to said first element (12).

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**4,745,914**
**MEDULLARY CAVITY BARRIER**
**Otto Frey, Winterthur, and Rudolf Koch, Berlingen, both of Switzerland, assignors to Sulzer Brothers Ltd., Winterthur and Protek AG, Berne, both of, Switzerland**
**Filed Sep. 3, 1986, Ser. No. 903,553**
**Claims priority, application Switzerland, Oct. 10, 1985, 4373/85**
**Int. Cl.[4] A61F** *2/28*
**U.S. Cl. 128—92 VP** **10 Claims**




1. A medullary cavity barrier for insertion in a tubular bone, said barrier comprising a one piece metal body having a rosette shape with at least three radially extending leaves, each said leaf being elastically and permanently deformable, said body being permeable to blood and fat and impermeable to bone cement.



**4,745,915**
**SURGICAL DRAPE**
**Clarence R. Enright, Grey Eagle; Leland W. Annett, Lake Elmo, and David B. Padget, Woodbury, all of Minn., assignors to Medical Concepts Development, Inc., St. Paul, Minn.**
**Filed Sep. 4, 1986, Ser. No. 903,443**
**Int. Cl.[4] A61B** *19/08*; **A61M** *27/00*
**U.S. Cl. 128—132 D** **14 Claims**



1. A drape for preventing contamination of an incision area during a surgical procedure, comprising:

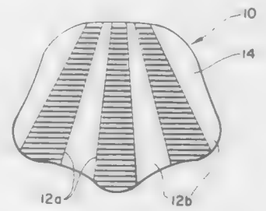
(a) a protective film for covering a patient's body during a surgical procedure, said film having a window formed therein;

(b) means, proximate said window, for adhering said protective film to the patient's body with said window overlying the incision area; and

(c) an elongated pull-tab for exposing said adhering means to the patient's body for securing said protective film thereto, said pull-tab extending, initially, toward, and overlying said window, and thereafter back upon itself to dispose a distal end thereof remote from said window; p1 (d) wherein said adhering means is exposed by manipulating said pull-tab remote from said window.

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**4,745,916**
**SUN BLOCK AND GLARE REFLECTIVE TAPES AND PATCHES**
**Brett P. Seber, 25002 Adelanta Dr., Laguna Niguel, Calif. 92677**
**Filed Feb. 13, 1987, Ser. No. 14,701**
**Int. Cl.[4] A61F** *13/00*
**U.S. Cl. 128—155** **7 Claims**




1. Composite tape and patch materials for applying to skin areas of human individuals to block harmful sun exposure and provide glare protection comprised of:

(a) a layer of flexible non-woven fabric material formed of random-spun or spunbonded synthetic fibers selected from the group consisting of polyester fibers, polyamide fibers, blends of polyester and polyamide fibers and blends of polyester or polyamide fibers and cellulosic fibers, said non-woven fabric material being capable of blocking harmful ultra-violet radiation and having a printable surface on one side thereof for receiving printed designs, graphics and photographs; and

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(b) a relatively thin adhesive coating on the side of said non-woven fabric material opposite the side of said fabric material having a printable surface thereon, said adhesive coating being skin-compatible, non-toxic, hypo-allergenic and non-irritating and selected from the group consisting of emulsion based, solvent based and hot melt type adhesives, and said adhesive being pressure sensitive having greater cohesion to itself and adhesion to said non-woven fabric material than its adhesion to a skin surface.

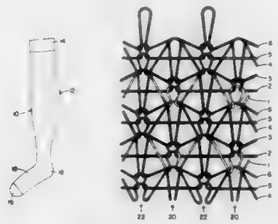
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**4,745,917**

## THERAPEUTIC STOCKING

**James H. Hasty, Glenview, and Betsy C. Westlake, Palatine, both of Ill., assignors to The Kendall Company, Boston, Mass.**

**Filed Sep. 11, 1985, Ser. No. 774,778**
**Int. Cl.[4] A61F** *13/00*
**U.S. Cl. 128—165** **54 Claims**



1. A therapeutic stocking for deep venous insufficiency of the leg comprising, a boot portion for covering a substantial portion of the leg, said boot portion having an ankle portion for exerting a substantial compressive pressure against the region of the ankle, a calf portion for exerting approximately 50% of the compressive pressure exerted by the ankle portion in the region of the calf, and a thigh portion for exerting approximately 26% of the compressive pressure exerted by the ankle portion in the region of the mid-thigh.

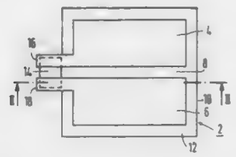
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**4,745,918**

## NEUTRAL ELECTRODE AND TERMINAL CLAMP THEREFOR

**Peter Feucht, Feurigstr. 54, 1000 Berlin 62, Fed. Rep. of Germany**

**Filed Nov. 10, 1986, Ser. No. 929,570**
**Claims priority, application Fed. Rep. of Germany, Dec. 16, 1985, 3544483**
**Int. Cl.[4] A61B** *17/36*
**U.S. Cl. 128—303.13** **16 Claims**



1. A neutral electrode useful during high-frequency surgery for conducting a high-frequency surgical current from a patient, comprising:
- an electrode split into at least first and second flat partial electrodes;
- an insulating strip separating said partial electrodes from one another; and
- an electrical resistance placed between said partial electrodes and in electrically conductive contact with each of said partial electrodes, wherein each said partial electrode has an electrically conducting protrusion making contact with said resistance, each protrusion, as viewed from the side, is bent into a "U"-shape, and at least a portion of said resistance is placed within the interior space of each of said "U"-shaped protrusions, thereby making forced contact with said protrusions.

7. A combination including a neutral electrode useful during high-frequency surgery for conducting a high-frequency surgical current from a patient, said combination comprising:
- a neutral electrode split into at least first and second flat partial electrodes;
- an electrically insulating strip separating said partial electrodes one from another;
- an electrical resistance placed between said partial electrodes and in electrically conductive contact with a portion of each of said partial electrodes, said portions of partial electrodes and said resistance being formed into an electrical contact; and
- a terminal clamp including a housing having two electrically connecting leads, said clamp providing a releasably engageable electrical connection of said connecting leads to said electrical contact.

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**4,745,919**

## TRANSLUMINAL LYSING SYSTEM

**Mark A. Bundy, 101 Pine Dr., Covington, La. 70433, and Larry J. Leyser, 1611 Broadway St., New Orleans, La. 70811**

**Division of Ser. No. 697,341, Feb. 1, 1985, Pat. No. 4,653,496. This application Nov. 19, 1986, Ser. No. 878,857**
**The portion of the term of this patent subsequent to Mar. 31, 2004, has been disclaimed.**
**Int. Cl.[4] A61B** *17/32*
**U.S. Cl. 128—305** **3 Claims**



1. A Transluminal Lysing System for the removal of stenotic and occlusive lesions from vascular lumens comprising:
- a cutting helix further comprising;
  - a wire coiled helically, having a generally uniform axial pitch so as to form a tubular coil of multiple turns of wire, having a distal end and proximal end so that when the coil is engaged in lesion material rotations of the coil will induce distal longitudinal advancement of the coil,
  - a means for support, translation, rotation, and communication with the coil attached to the proximal end of the coil and being of generally tubular construction of sufficient length to provide for operation of the coil from a location outside the vascular lumen,
  - a sharply disposed entrance tip formed by the last distal turn of wire in the coil tip being displaced inwardly toward the central axis of the coil to provide for first cutter means as the coil is rotated into lesion material and to guide lesion material between the next proximal turn of wire as the coil is rotated,
- the wire making up the coil having;
  - a cross-section normal to its length having two opposing oblique corners sharpened such that when coiled the sharpened edges project in the distal and proximal directions on each turn of the coil so as to contact or come closest to contact at the outer most circumference of the successive turns of the coil to provide for second cutting means as lesion material is passed successively from the entrance tip to the coil and between the sharpened corners, as the coil is rotated, the sharpened corners also acting as third cutting means during translation of the coil, and the wire normal cross-section also such that when coiled a continuous helical ridge or protuberance is formed on the inner surface of the coil to entrap and retain excised lesion material for removal from the vascular lumen.



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**4,745,920**

## APPARATUS AND METHOD FOR TRIGGERING THERAPEUTIC SHOCK WAVES

**Bernd Forssmann, Friedrichshafen; Wolfgang Hepp, Immenstaad; Klaus Ackern, Ganting, and Christian Chaussy, Munich, all of Fed. Rep. of Germany, assignors to Dornier System GmbH, Friedrichshafen, Fed. Rep. of Germany**

**Division of Ser. No. 894,739, Aug. 11, 1986, Pat. No. 4,685,461, which is a continuation of Ser. No. 722,126, Apr. 10, 1985, abandoned, which is a continuation of Ser. No. 443,567, Nov. 22, 1982, abandoned. This application Aug. 10, 1987, Ser. No. 83,196**
**Claims priority, application Fed. Rep. of Germany, Nov. 25, 1981, 3146628**
**The portion of the term of this patent subsequent to Aug. 11, 2004, has been disclaimed.**
**Int. Cl.[4] A61B** *17/22*
**U.S. Cl. 128—328** **6 Claims**




1. In an apparatus for applying shock wave treatments to matter located at a place within the body of a patient spaced from the patient's heart by focusing shock waves from a shock wave generator means located outside the patient's body so that such waves pass through body tissue to said matter to treat such matter, said apparatus including means for passing pulses of energy to said generator means for generating shock waves, an improved shock wave triggering system for use during the treatment of patients who might be subject to extrasystole stimulation, said triggering system comprising
- EKG signal pick up means adapted to respond to the patient's heartbeat cycle,
- means operatively connected to said EKG signal pick up means and to said means for passing pulses of energy to said generator means for enabling generation of a shock wave only during a safe zone in the S-T interval of the patient's heartbeat cycle, and
- manually operable physician's switch means operatively connected to said means for passing pulses of energy to said generator means for preventing the passage of a pulse to said generator means except when the physician has activated said switch means, so that a shock wave can be generated only at a time when both the physician's switch means has been activated and said safe zone has been reached in the heartbeat cycle.

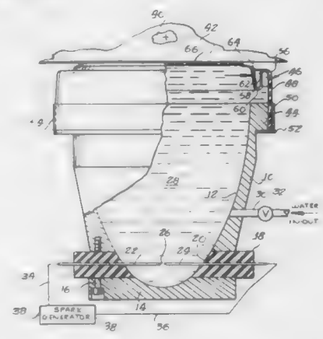
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**4,745,921**

## PLEATED DIAPHRAGM FOR COUPLING KIDNEY STONE DISINTEGRATOR TO HUMAN BODY

**Christopher Nowacki, Arlington Heights; Alfred G. Brisson, Kildeer, and Exequiel Dela-Cruz, Arlington Heights, all of Ill., assignors to Trutek Research, Inc., Lake Zurich, Ill.**

**Filed Dec. 23, 1986, Ser. No. 945,850**
**Int. Cl.[4] A61B** *17/22*
**U.S. Cl. 128—328** **9 Claims**




1. An extracorporeal kidney stone disintegrator comprising an ellipsoidal reflector having an axis of rotation and having an open end, means providing a spark gap in said reflector at the first focus point thereof, a flexible cap closing the otherwise open end of said reflector, and a body of liquid filling said reflector and said cap, said cap being adapted for disposition against a human body having therein a concretion such as a kidney stone to be disintegrated, the reflector being positioned so that the concretion lies on the second focus point of said reflector, generation of a spark gap across said spark gap causing generation of a shock wave focussed on said concretion and coupled to said concretion by said body of liquid and the tissues of said human body through said cap, said cap having an annular pleat enhancing flexibility of said cap, said cap including a central body contacting portion, a depending skirt mounted on said reflector, and said pleat being disposed between said central body contacting portion and said skirt, said central body contacting portion having a first predetermined thickness, said skirt having a second predetermined thickness greater than said first predetermined thickness, and said pleat having a thickness intermediate the thickness of said skirt and said central body contacting poriton.

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**4,745,922**

## CERVICAL HEAT TRANSFER AND IMMOBILIZATION DEVICE

**Kenneth G. Taylor, 1421 Rock Springs Ct. #2, Atlanta, Ga. 30306**

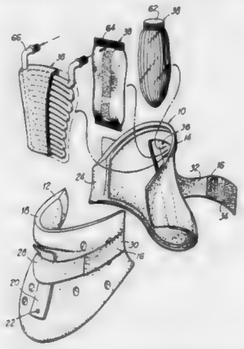
**Filed Jul. 11, 1986, Ser. No. 884,913**
**Int. Cl.[4] A61F** *7/00*
**U.S. Cl. 128—380** **5 Claims**

1. A collar for immobilizing a person's neck and inducing hypothermia in the person's cervical cord and an area of the back of the person's neck above or adjacent to the cervical cord, comprising:
- (a) a front section comprising a generally U-shaped flexible portion having an exterior and an interior surface and formed of polymeric foam material; and a front rigid member attached to the exterior surface of the flexible portion to support the flexible portion and to allow the flexible portion to conform to the person's neck;
- (b) a rear section comprising a generally U-shaped flexible portion having an exterior and an interior surface and formed of polymeric foam material; a rear rigid member attached to the exterior surface of the flexible portion and

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oriented to be generally parallel to the person's cervical cord when the collar is worn to support the flexible portion and to allow the flexible portion to conform to the person's neck; and a cavity formed in the rear flexible portion so as to be at least partially overlain by the rear rigid member, to open on the interior surface of the rear section only over an area corresponding to said area of the back of the person's neck above or adjacent to the cervical cord, and dimensioned to correspond to said area;

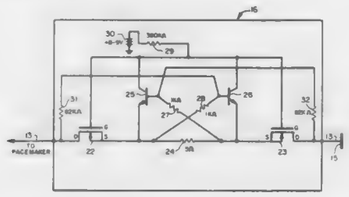


(c) a cooling medium in the cavity for inducing hypothermia in the cervical cord; and

(d) a strap attached to the rear section so as to overlie at least a portion of the rear section cavity, which strap contains at least one section of hook and loop fastener material and which strap retains the front and rear sections together and forces the rear rigid member and the cooling medium against the person's neck to increase the hypothermic effect on the cervical cord.

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**4,745,923**
**PROTECTION APPARATUS FOR PATIENT-IMPLANTABLE DEVICE**
**William L. Winstrom, Andover, N.J., assignor to Intermedics, Inc., Angleton, Tex.**
**Filed Nov. 20, 1985, Ser. No. 799,804**
**Int. Cl.[4] A61N** *1/36*
**U.S. Cl. 128—419 PG** **16 Claims**



1. An apparatus for protecting an implantable electrical device having a plurality of electrically conductive terminals, including output and return terminals and electrically conductive leads connected to said terminals against excessive currents comprising:

means connected to form an electrically conductive low-impedance path for connection in circuit with at least one of said leads;

means connected to form an electrically conductive high-impedance path for connection in circuit with said at least one lead;

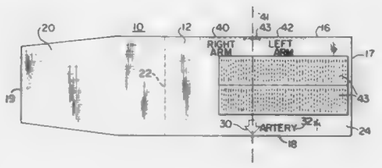
means for generating a signal representative of the current flowing in said low-impedance path;

switch means for opening and closing said low-impedance path; and

means responsive to said signal representative of said current for controlling said switch means to open said low-impedance path when said current exceeds a predetermined level so that said current flows in said high-impedance path, whereby the current flowing into said electrical device is limited to a safe level.

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**4,745,924**
**BLOOD PRESSURE CUFF**
**Gray E. Ruff, Hillsboro, Oreg., assignor to SpaceLabs, Inc., Bothell, Wash.**
**Continuation-in-part of Ser. No. 880,249, Jun. 30, 1986, Pat. No. 4,716,906. This application Mar. 4, 1987, Ser. No. 21,830**
**Int. Cl.[4] A61B** *5/02*
**U.S. Cl. 128—686** **7 Claims**



1. A blood pressure cuff adapted to be positioned on a limb of a body, comprising:

an elongated flexible band having first and second ends, said band having a body side face intended for engagement with the limb and an outward face, said band having a compartment therein which is partially open to ambient atmosphere through an elongated opening in said band;

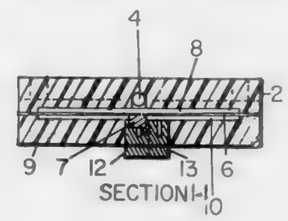
means attached to said band for closing over a center portion of said elongated opening to form a pair of openings; and

an inflatable bladder having a centerline, said bladder being removably confined within said compartment by said means attached to said band in either a first position or a second position rotated 180° from said first position, with the centerline substantially aligned with an artery in said limb in either said first or second position when said band is properly positioned on said limb, said bladder having a portion protruding out from said compartment through one of said pair of openings which are spaced apart from one another on either side of said centerline and said means attached to said band, said protruding portion protruding through a first one of said openings when said bladder is in said first position and a second one of said openings when said bladder is in said second position.

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**4,745,925**
**OPTOELECTRONIC INHALATION SENSOR FOR MONITORING INHALATION AND FOR INHALATION THERAPY**
**Henry G. Dietz, 80 Salisbury Ave., Garden City, N.Y. 11530**
**Filed Oct. 6, 1986, Ser. No. 916,660**
**Int. Cl.[4] A61B** *5/08*
**U.S. Cl. 128—725** **7 Claims**

1. An optoelectronic inhalation sensor for detecting inspiration during breathing cycles of air-breathing animals including humans comprising, means connectable operatively to the respiratory system of an animal or human and having a flexible sensing diaphragm at a calibrated position for sensing individual negative pressures developed at each inspiration during each breathing cycle of said animal or human during breathing thereof, optoelectrical means including sensing means for automatically sensing each movement of the diaphragm in response to said negative pressure developed during the breathing cycles of said animal or human, means in said optoelectrical means for developing an electrical signal at each sensed movement of said diaphragm in response to sensing of the individual negative pressure developed at each said inspiration, means for connecting the sensor to a source of a breathable gas, and means to apply said electrical signal to said source of breathable gas for control of supply of said gas to the sensor



for inhalation through said means connectable operatively to said air-breathing animal including humans during inhalation periods of said breathing cycles.

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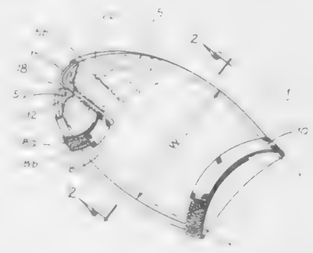
**4,745,926**
**REFLUX PANTS**
**Dana L. Hlusko, 5312 Marlington Dr., Virginia Beach, Va. 23462**
**Filed Apr. 21, 1986, Ser. No. 853,887**
**Int. Cl.[4] A61F** *5/37*
**U.S. Cl. 128—134** **7 Claims**



1. A pair of reflux pants which are adapted to maintain an infant having gastroesophageal reflux at a predetermined position on an inclined surface, said pants comprising a front panel and a rear panel, the front and rear panels being integrally and foldably connected to each other at respective lower surfaces of said panels, each of said panels having first and second side portions, respectively, and an upper edge, said front panel side portions being adapted to be selectively attached to said rear panel side portions by releasable connecting means positioned on said panel side portions, wherein, when said panel side portions are attached to each other a continuous waistband is formed which is adapted to surround the waist of said infant, said reflux pants further comprising two substantially parallel, elongated straps extending upwardly from said upper edge of said front panel, said two elongated straps being connected to each other by a third, relatively short strap attached to both of said parallel straps, said third strap being generally transversely arranged with respect to said first and second straps and generally parallel with respect to said upper edge of said front panel, wherein each of said elongated straps has a first end which is attached to said front panel and a second, free end, the free end of each of said elongated straps being adapted to be detachably connected to said rear panel when said reflux pants are positioned about an infant, wherein said first, second, and third straps comprise means for detachably connecting said reflux pants about the torso of said infant and means for stabilizing said infant in a predetermined position on said inclined surface, said reflux pants further comprising relatively short fourth and fifth straps extending from said first and second straps, respectively, said fourth and fifth straps each having a first end attached to one of said first and second straps, respectively, and a second, free end, the free ends of each of said fourth and fifth straps comprising means for attaching said pants to said inclined surface.

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**4,745,927**
**ORTHOPEDIC SHOE CUSHION INSERT APPARATUS AND A METHOD OF PROVIDING SAME**
**N. Lee Brock, 1623 W. El Rio Dr., Apt. 144, Tucson, Ariz. 85745**
**Filed Sep. 12, 1986, Ser. No. 906,832**
**Int. Cl.[4] A43B** *7/26*
**U.S. Cl. 128—581 R** **9 Claims**



8. A method of providing an orthopedic shoe insert device for immobilizing a wearer's arthritic toes, or any joint thereof, said method comprising the steps of:

(a) providing a cushioned, semi-rigid plate member means for supporting a wearer's forefoot area, especially arthritic toes including:

(i) providing an upper plate member means,

(ii) providing a lower plate member means and

(iii) providing a cushioning means fixedly positioned between said upper plate member means and said lower plate member means and thereby joining said upper and lower plate member means;

(b) providing an external, replaceable, covering member on both sides of said plate member means and providing a connecting portion between said upper and lower plate member means;

(c) providing a frontal slit portion on said plate member means defining a first support portion for supporting a wearer's great toe and a second support portion for supporting a wearer's lesser toes, said plate member means conforming substantially to the shape of said wearer's forefoot;

(d) providing a first attachment means, removably coupled around said first support portion;

(e) providing a second attachment means, removably coupled around a back portion of said plate member means;

(f) firmly wrapping said wearer's great toe using said first attachment means and thereby immobilizing said great toe and substantially limiting movement of said lesser toes and relieving arthritic pain in any of said wearer's toes, especially the great toe which is immobilized;

(g) firmly wrapping around said wearer's forefoot using said second attachment means and thereby firmly retaining said shoe insert device beneath said wearer's forefoot; and

(h) inserting a wearer's foot with said shoe insert firmly positioned beneath said wearer's forefoot into a shoe apparel.

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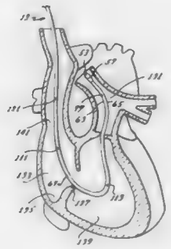


**4,745,928**

## RIGHT HEART EJECTION FRACTION AND CARDIAC OUTPUT CATHETER

William E. Webler, Laguna Niguel; Edward E. Elson, Anaheim, and Michael D. Quinn, El Toro, all of Calif., assignors to American Hospital Supply Corporation, Deerfield, Ill.

Division of Ser. No. 570,631, Jan. 13, 1984, Pat. No. 4,632,125.
This application May 1, 1986, Ser. No. 858,448
Int. Cl.[4] A61B *5/02*
U.S. Cl. 128—692 8 Claims



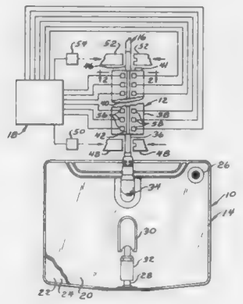
1. An apparatus for injecting an injectate into the heart and making temperature measurements, said apparatus comprising:
an elongated flexible tube having a longitudinal axis, proximal and distal ends, a distal end portion which includes said distal end, a peripheral wall, at least one lumen extending longitudinally within the tube and an injectate port opening in said peripheral wall;
said tube being sized to pass through a vein, the right atrium and the right ventricle to the pulmonary artery with the distal end portion being positionable in the pulmonary artery;
a temperature sensor;
means for mounting the temperature sensor on said distal end portion of the tube whereby the temperature sensor is adapted to be positioned in the pulmonary artery and can obtain temperature information about fluid in the pulmonary artery, said injectate port opening proximally of the temperature sensor and being about 21 centimeters from the distal end;
means for transmitting the temperature information proximally of the temperature sensor along the tube;
said injectate port being located and oriented on said tube so that the injectate port is in the right atrium closely adjacent the tricuspid valve and so that injectate can be injected through the lumen and the injectate port generally toward the inferior vena cava and countercurrent to the blood flow from the inferior vena cava, and
said distal end portion being curved with such curve having an inside and an outside, said injectate port being located proximally of the curved distal end portion, said tube having a dividing plane which separates the outside of the curve from the inside of the curve and which extends along the longitudinal axis of the tube to divide the tube longitudinally into first and second half sections which include the outside and the inside of the curve, respectively, and said injectate port has a central axis in the first half section of the tube.

**4,745,929**

## LIQUID DRAINAGE SYSTEM WITH LIGHT EMITTERS AND DETECTORS

Brian H. Silver, Skokie, Ill., assignor to The Kendall Company, Boston, Mass.

Continuation of Ser. No. 813,830, Dec. 27, 1985, abandoned, which is a continuation of Ser. No. 484,074, Apr. 11, 1983, abandoned. This application Feb. 11, 1987, Ser. No. 13,309
Int. Cl.[4] A61M *1/00*
U.S. Cl. 128—771 5 Claims



1. A urine drainage system, comprising:
a container having a cavity to receive the urine;
an array of a plurality of associated pairs of light emitters and light detectors disposed generally vertically along the container, each of said associated pairs of emitters and detectors being changeable between a first state with the light from the emitters impinging upon the associated detectors, and a second state with the light from the emitters passing away from the associated detectors dependent upon the presence of urine in the container between the emitters and detectors with only one detector being associated with each emitter, and with the emitters and detectors being located outside said container; and
central processing unit means being programmed for ascertaining the urine level in the cavity in all of the following ways any one of which may be selected: activating only the associated pair of emitter and detector above the urine level previously detected by a lower associated pair of emitter and detector; sequentially activating associated pairs of emitters and detectors until the urine level in the cavity is ascertained; or simultaneously activating all the associated pairs of emitters and detectors to ascertain the urine level in the cavity.

**4,745,930**

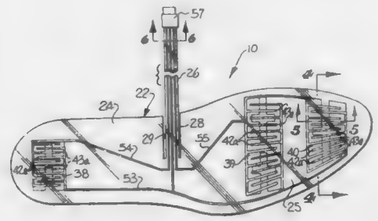
## FORCE SENSING INSOLE FOR ELECTRO-GONIOMETER

Richard G. Confer, Chattanooga, Tenn., assignor to Chattanooga Corporation, Chattanooga, Tenn.

Filed Oct. 16, 1986, Ser. No. 919,880
Int. Cl.[4] A61B *5/10*
U.S. Cl. 128—779 18 Claims

1. A flexible force sensing insole adapted to be placed inside a shoe to permit an analysis of the walking or running gait of the wearer, comprising
a relatively thin, flexible planar body member shaped to generally conform to the outline of a wearer's foot and so as to define a heel portion adapted to underlie the heel of the wearer's foot, a forward portion adapted to underlie the ball and toe portions of the wearer's foot, and a laterally extending integral strip having a remote free end and which is adapted to flex and extend outwardly from the wearer's shoe, said body member including an open internal heel chamber in said heel portion and an open internal forward chamber in said forward portion, with each of said chambers including opposing, normally spaced apart inner surfaces,
contact switch means including a pair of electrical contacts disposed in each of said chambers of said body member such that said contacts of each pair are actuated upon a compressive force being applied to said insole in alignment with the associated chamber, with each of said pair of electrical contacts comprising a plurality of parallel, laterally spaced apart fingers extending in a row across the associated chamber, with alternate fingers being part of one of the electrical contacts and intervening fingers being part of the other electrical contact, and with the row of fingers being adhered to one of said opposing inner surfaces of the associated chamber, and an area of electrically





conductive material on the opposing inner surface of each chamber, so that the fingers are adapted to be moved into contact with said conductive material upon a compressive force being applied to the insole in alignment with the associated chamber to establish electrical contact between adjacent fingers,
a plurality of electrically conductive lines positioned in said body member and connected to respective ones of each of said contacts, with said lines having portions thereof extending along the length of said strip to said free end thereof, and
electrical terminal means mounted on the free end of said strip and in electrical contact with each of said conductive lines for permitting attachment of said conductive lines to an external electrical coupler.

**4,745,931**

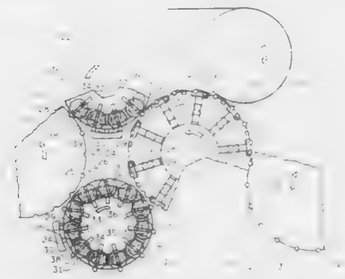
Patent Not Issued For This Number

**4,745,932**

## FILTER ASSEMBLY MACHINE

Riccardo Mattei, and Alberto Manservigi, both of Bologna, Italy, assignors to G.D. Societá per Azioni, Bologna, Italy

Filed Jul. 7, 1986, Ser. No. 882,683
Claims priority, application Italy, Jul. 10, 1985, 3493 A/85; Sep. 11, 1985, 3542 A/85
Int. Cl.[4] A24C *5/47, 5/58*
U.S. Cl. 131—94 14 Claims



1. A filter assembly machine (1) comprising an input roller (2)(45) having a number of spaced peripheral seats (3) for respective cigarette groups (4), each group comprising two coaxial cigarette lengths and a double filter arranged therebetween; and a rolling unit (7)(44)(47)(48) for said groups; said rolling unit comprising first (6) and second conveying means (22,23) (22,40)(23,41)(49) for said groups, supply means (10) to supply each said group with a connecting strip (8), and wrapping means to wrap each said strip about the respective double filter and the ends of the two cigarette lengths facing said double filter; said first conveying means having spaced group support means (11,12) cooperating with said input roller for successively receiving said groups from said input roller, and for advancing said groups along a first portion of a given route; said second conveying means being a speed-change conveying means which are substantially tangent with said first conveying means, and cooperate with said group support means for successively receiving said groups from said first conveying means, and feeding said groups at reduced speed along a second portion of said route, said second route portion being located in series in relation to said first route portion; said supply means cooperating with said first conveying means to supply each said group with the respective connecting strip as said group is displaced by said first conveying means along said first route portion; and said wrapping means comprising at least one rolling bed (24) cooperating with said second conveying means to define therewith a rolling channel (30) for said groups.

**4,745,933**

## METHOD AND APPARATUS FOR SECURING HAIRPIECES TO A WEARER'S HEAD

Ann M. Saenger, 3262-A San Amadeo, Laguna Hills, Calif. 92653

Filed Jan. 27, 1986, Ser. No. 822,338
Int. Cl.[4] A41G *3/00*
U.S. Cl. 132—53 4 Claims



1. A foundation for a wearer's head for holding a wig on a premade wig base, said foundation comprising:
a stretch stocking-type foundation cap having an open end and a rounded closed end which generally conforms to the shape of a wearer's head crown, said cap being made of a rollable flexible material permitting same to be placed upon a wearer's head, pulled down near the ears and to be rolled backward and upwardly upon itself to form a filler receiving pocket, which pocket, when formed, acts as a raised circular ridge to receive an outer periphery of said premade wig base and tends to hold same in place on the wearer's head;
an elastic band surrounding the open end of said foundation cap to form an elasticized open end of said cap, said open end, when rolled back and away from the wearer's scalp, forming a stretchable, flexible filler-receiving pocket which elastically forms said circular ridge above the wearer's forehead, above the wearer's ears at the sides and the lower back crown of the wearer's head; and
a flexible circular skirt with one edge loose and one edge fixed near a midpoint location between the closed end and the elasticized open end of said foundation cap for receiving additional filler which conforms the foundation cap to the wearer's head in a shape to fittably receive the premade base of a wig to be worn and, if said circular skirt is not needed for said additional filler material, said loose skirt naturally conforms to the cap when the wig is in place.

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**4,745,934**

## ADHESIVE TAB SYSTEM

**Rolf Mast, Chino; Jerome D. Muchin, Los Angeles, and Joseph A. Neri, Newhall, all of Calif., assignors to Lee Pharmaceuticals Inc., South El Monte and Acutek Adhesive Specialties, Ingelwood, both of, Calif.**

**Filed Oct. 3, 1986, Ser. No. 915,295**
**Int. Cl.[4] A45D** *29/00;* **A01N** *1/00, 3/00;* **A61F** *13/02*
**U.S. Cl. 132—73** **12 Claims**

1. In the method of mounting and adhering an artificial nail to a natural finger which includes the steps of:
(1) providing an adhesive tab for covering a substantial portion of the area of the outside surface of the natural nail upon which it is desired to mount an artificial nail;
(2) providing a superposed plastic artificial fingernail;
(3) securing one side of said tab to the outer surface of said natural nail; or the inner surface of said artificial nail;
(4) aligning and pressing said artificial nail, said tab, and said natural nail to adhere the artificial nail to the natural nail in superposed relationship;
the improvement wherein the adhesive tab comprises:
a highly tacky continuous, generally self-sustaining film of pressure sensitive adhesive without any imbedded supporting film for the bonding of two variably curved surfaces in superposed relationship, especially where said two surfaces are a natural fingernail and a superimposed plastic artificial fingernail, the minimum thickness of said film being at least about 8 mils and not more than about 12 mils, and the minimum adhesion in the Tinius Olsen test of at least 15, said self-sustaining film being formed by combining two-pre-formed pressure sensitive adhesive films.

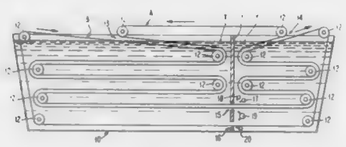
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**4,745,935**

## SUBMERGED NOZZLES IN TWO-ZONE BATH WHERE CONVEYOR BELTS PASS THROUGH A SLOTTED WALL

**Joseph C. D'Alterio, 64 Sugar Maple La., Glen Cove, N.Y. 11542**

**Filed Oct. 8, 1986, Ser. No. 917,106**
**Int. Cl.[4] A23P** *1/00*
**U.S. Cl. 134—75** **14 Claims**



1. In apparatus for treating a product in a liquid bath having two different temperature zones separated by a slotted wall which comprises at least two continuous conveyor belts arranged to transport said product while captured between said belts through one of said zones, through a slot in said wall, and through the other of said zones, the improvement comprising a plurality of nozzles positioned with their orifices directed to eject pressurized fluid streams through said slot in said wall into one of said zones to entrain liquid of said liquid bath through said slot.

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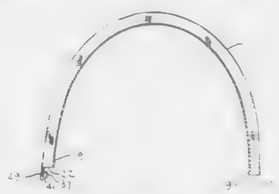
**4,745,936**

## TENT

**Michael J. Scherer, Berkeley, Calif., assignor to American Recreation Products, Inc., New Haven, Mo.**

**Filed Apr. 1, 1987, Ser. No. 32,536**
**Int. Cl.[4] E04H** *15/40*
**U.S. Cl. 135—104** **15 Claims**

1. A tent having a plurality of sleeve means each of which, on erection of the tent, extends in an arch from one point adjacent the lower edge of the tent to an opposite point adjacent the lower edge, each sleeve means being closed at one end thereof and open at its other end for the insertion therein of a flexible, resilient rod for holding the tent erect with the rod curved into an arch and holding the sleeve means in an arch, said tent having at the open end of each sleeve a strap extending out from said open end of the sleeve, said strap being formed at its outer end with a rod-end-receiving pocket, the pocket being spaced from said open end of the sleeve means for the insertion of the rod into the sleeve means through the open end of the sleeve means and for bending of the rod and insertion of its end extending out of the open end of the sleeve means into the pocket to hold the rod bent into an arch, the



pocket being at one face of the strap, a flexible tongue secured to said strap inwardly of said pocket extending lengthwise of said strap on said one face thereof and of such length as to be capable of being folded back on itself to form a loop insertable in the pocket with an elongate loose end portion extending out of the pocket, said strap having a hand-grasp extension from said pocket, the tongue being foldable around the said end of the rod and the latter with the tongue folded therearound being insertable in the pocket as facilitated by pulling on the strap via said hand-grasp extension, removal of the end of the rod from the pocket being facilitated by pulling on the strap via said hand-grasp extension and on the end of the tongue.

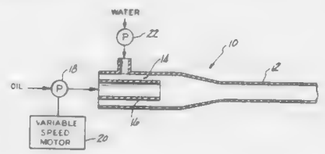
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**4,745,937**

## PROCESS FOR RESTARTING CORE FLOW WITH VERY VISCOUS OILS AFTER A LONG STANDSTILL PERIOD

**Konstantin Zagustin; Emilio Guevara, both of Caracas, and Gustavo Nunez, El Cafetal, all of Venezuela, assignors to Intevep, S.A., Caracas, Venezuela**

**Filed Nov. 2, 1987, Ser. No. 116,480**
**Int. Cl.[4] F17D** *1/16*
**U.S. Cl. 137—13** **11 Claims**




1. A process for restarting core flow of viscous oil within a pipe line after an interruption in said flow which comprises:
initiating the flow of a low viscosity fluid into an inlet portion of said pipeline;
gradually increasing the flow of said low viscosity fluid until a desired steady state condition is reached; and
initiating the flow of said viscous oil into said inlet portion of said pipeline after the low viscosity fluid reached said steady state condition.

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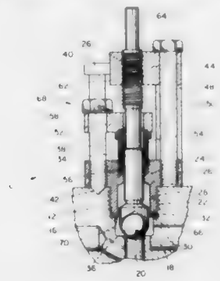
**4,745,938**

## OUTSIDE SEAL AND YOKE VALVE

**Spencer M. Nimberger, and Alan F. Chou, both of Houston, Tex., assignors to Precision General, Inc., Houston, Tex.**

**Filed Oct. 2, 1987, Ser. No. 104,170**
**Int. Cl.[4] F16K** *43/00, 41/02*
**U.S. Cl. 137—15** **17 Claims**

1. An OS&Y valve of the type including a valve body having an inlet port, an outlet port, and a valve seat, a bonnet base securable to the valve body and having an aperture for receiving a valve stem, the valve stem carrying a sealing member for sealing engagement with the valve seat upon rotation and axial movement of the valve stem with respect to the valve body, a compressible sealing material positioned within an upwardly extending annulus between the valve stem and the bonnet base for sealing engagement therebetween, an axial movable and selectively positionable packing bar for controlling axial compression of the sealing material, and a yoke secured to the bonnet base for threadably receiving the valve stem, the valve further comprising:
the valve body having a planar upper face, a cavity adjacent the planar upper face and extending into the valve body, and a pocket having threaded sidewalls axially spaced between the planar upper face and the valve seat, the pocket further defining a metallic sealing surface axially spaced opposite the planar upper face with respect to the threaded sidewalls;
the bonnet base having a threaded portion for engagement



with the threaded sidewalls of the valve body pocket, a planar base surface, a plurality of threaded passageways, and a metallic end surface for sealing engagement with the metallic sealing surface fo the valve body;
an axial spacing between the planar base surface and the metallic end surface of the bonnet base being such that the metallic end surface contacts and sealingly engages the metallic sealing surface of the valve body when the planar base surface of the bonnet base engages the planar upper face of the valve body;
a packing bolt threaded to one of the plurality of threaded passageways in the bonnet base and passing through the planar upper face of the valve body and extending into the cavity in the valve body for limiting inadvertent axial rotation of the bonnet base relative to the valve body;
removable securing means for rigidly connecting and disconnecting the yoke and the bonnet base; and
a side surface of the yoke for a preventing inadvertent rotation of the packing bolt.

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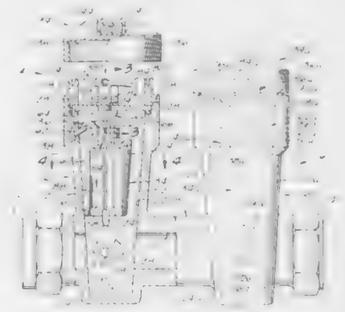
**4,745,939**

## SHOCK ACTUATED SHUT-OFF VALVE WITH GASTIGHT RESET SYSTEM

**Charles W. Greer, San Carlos; Andrew F. Asbra, Rancho Mirage, both of Calif., and Martin R. Asbra, 2475 Butternut Dr., Hillsborough, Calif. 94010, assignors to Andrene Associates and Martin R. Asbra, both of Burlingame, Calif., a part interest**

**Filed May 7, 1987, Ser. No. 47,174**
**Int. Cl.[4] F16K** *17/36*
**U.S. Cl. 137—38** **20 Claims**

1. A shock-actuated shut-off valve for fluid flow lines which comprises:
a valve housing having a central chamber in communication with hollow inlet and outlet conduits and with a hollow, outwardly enclosed stowage arm in upward, substantially plumb communication with the central chamber;
valve element support means secured to the inner wall of said stowage arm, a valve element disposed in said stowage arm, said valve element having a valve head and valve body interconnected by a valve neck, with said valve head being distal to the central chamber and being in engagement with and releasably supported by said support means for maintaining said valve element in a releasably supported position, said releasably supported valve element being in spaced relationship to the inner wall of the stowage arm to provide valve element clearance between said support means and said wall, whereby lateral dislodgment of the valve element from the support means effects transition of the valve element through the stowage arm to the central chamber, with the valve body sealingly engaging said chamber with respect to at least one of the inlet and outlet conduits;
a vertically disposed valve element aperture extending through said valve element, said valve element aperture incorporating non-occlusive abutment means;
an inner closure disposed in the stowage arm at a locus above the valve element, and means for sealingly securing the periphery of the inner closure about the inner wall of the stowage arm;
a vertically disposed, inner closure aperture extending



through said inner closure, said inner closure aperture being in substantially superimposed alignment with said valve element aperture;
a tether extending through said inner closure aperture and through said valve element aperture, said tether being in sealingly slidable relationship with said inner closure aperture and in spaced relationship to said valve element aperture, said tether having an upper end section and lower end section, said upper end section incorporating handle means disposed proximate to the upper surface of the inner closure and said lower end section incorporating lift means disposed in a static position, in said housing, below said abutment means, said lift means being in traversable alignment with said valve element aperture and in spaced relationship to said abutment means to permit transition of said valve element to said central chamber and to permit said lift means to liftingly engage said abutment means;
whereby the application of upward force to said handle means, when said valve element is sealingly disposed in the central chamber, causes said lift means to engage said abutment means and transport said valve element upwardly to a stop position at the underside of said inner closure, with said valve head, during the upward transition of said valve element, engaging and deflecting about said support means to effect seating alignment of said valve head with said support means, and the subsequent application of downward force to said handle means initially causes said valve element to descend to its releasably supported position, with said valve head engaging said support means and thereafter causes said lift means to disengage from said abutment means and descend to its static position.

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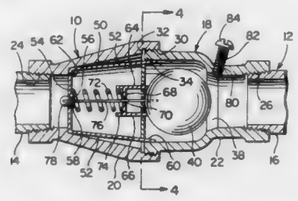


**4,745,940**

## SAFETY VALVE WITH RESET

Laurice D. Ely, 660 W. 17th St., Unit 29, Costa Mesa, Calif. 92627

Filed Apr. 8, 1987, Ser. No. 35,894
Int. Cl.[4] F16K *17/36*
U.S. Cl. 137—39 9 Claims



1. A safety valve with reset for use in earthquake areas and other environments in which pipelines and the like for conveying flammable liquids and/or gasses or conveying toxic fluids and/or gasses may be subject to fracturing due to excessive vibration or relative shifting of longitudinally spaced portions of the pipeline or exposure to extreme heat, said safety valve incorporating a hollow valve body including inlet and outlet ports, the interior of said body defining an internal passageway therein communicating said ports, said valve body being adapted to be serially connected in a pipeline with adjacent sections of said line opening into said inlet and outlet ports, said passageway defining a valve seat intermediate said ports, a valve member mounted in said body for shifting relative thereto into and out of closed position in seated engagement with said seat, bias means operatively associated with said valve member yieldingly biasing said valve member toward said closed position, and frangeable retaining means retaining said valve member in an open position out of seated engagement with said seat against the biasing action of said bias means, said frangeable retaining means being frangeable upon said valve body experiencing vibrations above a predetermined magnitude, whereby said valve member will be released for movement under the biasing action of said bias means toward a closed position seated against said seat, said bias means including spring means mounted from said body and yieldingly biasing said valve member toward said closed partition, said retaining means including a rod of frangeable material under longitudinal tension by said spring means and having one end anchored relative to said valve member and a second end anchored relative to said body, said second end of said frangeable rod being anchored relative to said body through the utilization of fusible link means.

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**4,745,941**

## VALVE SYSTEM FOR OXYGEN ENRICHMENT OF A FLOW OF PRESSURIZED COMBUSTION AIR

Leif Nilsson, Lidingo, Sweden, assignor to AGA Aktiebolag, Sweden

Filed Nov. 19, 1986, Ser. No. 932,915
Claims priority, application Sweden, Nov. 22, 1985, 8505515
Int. Cl.[4] G05D *11/03;* F16K *3/30, 31/365*
U.S. Cl. 137—114 10 Claims

1. A valve device for enrichment of a flow of a first gas such as a combustion gas with a flow of a second gas such as oxygen, wherein the valve device comprises:

(a) body means for connection to a supply line that carries a flow of the first gas, and having an elongate tubular portion for extending centrally into the supply line to define a dispensing location for a second gas near the center of the supply line;

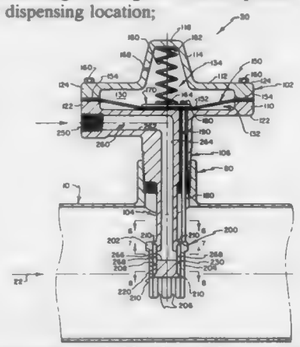
(b) the body means having structure that defines a chamber that is divided into a first portion and a second portion by a membrane that is clamped by the body means so as to extend across the chamber, with the membrane providing a gas-tight seal between the first portion and the second portion to prevent the flow of gases between the first and second portions of the chamber, and with at least a portion of the membrane being movable within the chamber relative to the body means in first and second opposed directions of movement;

(c) biasing means including a spring member carried in a selected one of the first and second portions of the chamber for biasing the membrane in said first direction of movement;

(d) at least one elongate rod-shaped member connecting with the movable port on of the membrane and being movable therewith relative to the body means in said first and second directions of movement, and being biased by the action of the biasing means in said first direction of movement;

(e) duct means defined by the body means for communicating the second portion of the chamber with the supply line for admitting supply line pressure to the second portion of the chamber to act on the membrane to bias the movable portion of the membrane in said second direction of movement, said duct means also serving to support the rod-shaped member for movement therethrough relative to the body means in said first and second directions of movement;

(f) passage means defined by the body means for connection with a source of the second gas and for ducting said flow of the second gas through the tubular portion of the body to the dispensing location;



(g) valving means carried by the tubular portion of the body for defining valve discharge opening means at the dispensing location including a valving member that is movable to selectively open and close the discharge opening means for selectively opening and closing to provide a desired flow of the second gas from the passage means into a flow of the first gas within the supply line, the valving member being connected to the rod-shaped member and being operable in response to movement of the rod-shaped member to open and close the discharge opening means to permit the prevent the passage of the second gas into the flow of the first gas, the valving means having:

(i) discharge opening means that is formed on a tubular portion of the body means and is positioned by the body means at a location that is substantially central with respect to the cross-section of the supply line that carries the flow of the first gas;

(ii) sleeve means for defining the movable valving member and for extending about the tubular portion of the body means for movement axially along the tubular portion of the body means to selectively open and close the discharge opening means to permit and prevent the second gas to discharge from the discharge opening means into the flow of the first gas; and,

(iii) the sleeve means being connected to the rod-shaped member for movement therewith to a closed position to close the discharge opening means in response to movement of the rod-shaped member in said first direction, and to an open position to open the discharge opening means in response to movement of the rod-shaped member in said second direction.

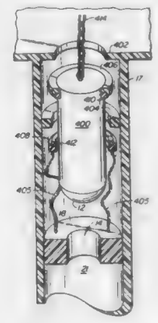


**4,745,942**

## FLOW REGULATING DEVICE

John L. Delwiche, Exxon USA, Marine Department, P.O. Box 1512, Houston, Tex. 77001

Division of Ser. No. 628,821, Jul. 9, 1984, Pat. No. 4,632,139, which is a division of Ser. No. 291,355, Aug. 10, 1987, Pat. No. 4,458,714. This application Dec. 30, 1986, Ser. No. 947,692
Int. Cl.[4] B01D *17/025*
U.S. Cl. 137—172 3 Claims



1. A device for regulating the flow of a first fluid and a second fluid through a flow aperture, the fluids being immiscible with each other and having different densities, the flow regulating device comprising

a moveable plug having a density which is less than the density of the denser fluid but greater than the density of the less dense fluid so that the plug floats in the denser fluid and sinks in the less dense fluid, the plug being moveable between a first and a second position; the plug assuming the first position when the surface level, with respect to the flow aperture, of the denser fluid is greater than a predetermined amount, and, the plug assuming the second position when the surface level with respect to the flow aperture of the denser fluid is less than the predetermined amount; the plug permitting the flow of fluid through the flow aperture when the plug is located at the first position and blocking the flow of fluid through the flow aperture when the plug is located at the second position; and

latching means for securing the plug in the second position when the surface level with respect to the aperture of the less dense fluid exceeds a predetermined amount, wherein the plug has a vertical axis and further wherein the latching means include

a first collar, which is mounted to the plug concentric with the vertical axis of the plug, the first collar having a first plurality of magnetic elements embedded therein, the magnetic elements each having a predetermined orientation;

a second collar, which is moveably positioned about the plug and oriented coaxially with the vertical axis of the plug, the second collar having a density which is less than the density of the less dense fluid, the second collar having a second plurality of magnetic elements embedded therein, the magnetic elements of the second plurality each having a predetermined orientation so that the second collar is magnetically attractive to the first collar, and so that the second collar is attracted to and becomes magnetically coupled to the first collar whenever the second collar is positioned within a short distance from the first collar; and

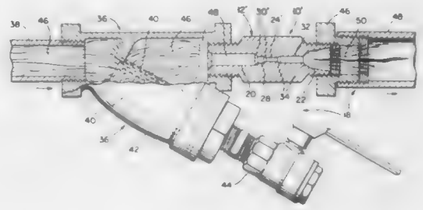
retaining means for restraining the movement of the plug once the second collar has been magnetically coupled to the first collar.

**4,745,943**

## CONTINUOUS FLOW STEAM CONDENSATE REMOVAL DEVICE

Erik M. Mortensen, 14 Greentree Dr., West Chester, Pa. 19380

Filed Apr. 28, 1987, Ser. No. 43,601
Int. Cl.[4] B01D *46/10;* F15D *1/02*
U.S. Cl. 137—177 12 Claims



1. A continuous flow steam condensate removal device comprising:

an elongated tubular unitary one-piece body having an entrance end, an intermediate portion and an exit end;

a cylindrical Venturi-type nozzle of relatively small diameter in the intermediate portion of said unitary one-piece body and extending along the longitudinal axis thereof;

an elongated cylindrical upstream condensate collection passageway of larger diameter than said Venturi-type nozzle in said unitary one-piece body, said upstream condensate collection passageway extending from adjacent the entrance end of said unitary one-piece body and along the longitudinal axis of said unitary one-piece body to adjacent said Venturi-type nozzle;

a downstream cylindrical discharge-transition passageway of larger diameter than said Venturi-type nozzle in said unitary one-piece body and extending along the longitudinal axis of the unitary one-piece body from adjacent said Venturi-type nozzle;

a conically-shaped downstream condensate discharge passageway in said unitary one-piece body extending along the longitudinal axis of said unitary one-piece body, and flaring continuously outward in a downstream direction from adjacent an exit end of said downstream cylindrical discharge-transition passageway to substantially the exit end of said unitary one-piece body; and

a conically-shaped internal portion in said unitary one-piece body and interconnecting the exit end of said downstream cylindrical discharge-transition passageway and said conically-shaped condensate discharge passageway, said conically-shaped interconnecting portion and said conically-shaped condensate discharge passageway flaring outward at different respective angles to the longitudinal axis of said unitary one-piece body.

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**4,745,944**

## SELF-CLEANING, FLUID PRESSURE BIASED GATE VALVE

Armand Francart, Jr., R.D. 2, Box 119Z, Landenberg, Pa. 19350

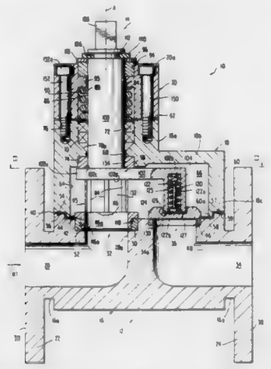
Filed Oct. 15, 1987, Ser. No. 108,673
Int. Cl.[4] B08B *3/00, 9/06;* F16K *1/18*
U.S. Cl. 137—238 13 Claims

1. In a gate valve including a valve casing defining a closed valve chamber, inlet and outlet ports opening to said chamber, a rotatable valve actuator assembly including a drive shaft mounted for rotation about the shaft axis within said casing, said assembly including an arm integral with said shaft and projecting therefrom radially internally within said chamber, a swingable gate valve disk operatively connected to said arm and mounted for movement within said casing between positions covering and uncovering said outlet port, the improvement wherein:

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said drive shaft is mounted for rotation within said valve casing to the side of said chamber opposite said inlet port with said shaft aligned with said inlet port, a hollow cage is fixed to said shaft, coaxial therewith and aligned with and facing said inlet port, said cage having at least one radial window whereby fluid flow entering the chamber through said inlet port to said outlet, said flow passes from



said inlet axially through said cage and impinges on said actuator assembly coaxially of said shaft, in line with the shaft axis whereby the forces developed by the incoming flow to said chamber are absorbed and dissipated through the shaft while preventing shaft deflection, and said flow deflects radially through the at least one radial window continuously purges the valve chamber when rotated during valve opening and closing.

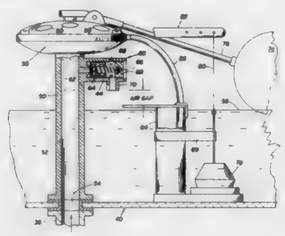
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**4,745,945**

**THERMAL EXPANSION RELIEF ARRANGEMENT FOR CLOSED PLUMBING SYSTEM**

**Louis M. Miller, Dracut, Mass., assignor to Watts Regulator Company, Dracut, Mass.**

**Filed Sep. 23, 1986, Ser. No. 910,532**
**Int. Cl.[4] F16K *49/00***
**U.S. Cl. 137—334** **8 Claims**



6. In a fill valve assembly adapted for use in a toilet flush tank having an overflow drain therein, said assembly comprising a body defining a chamber for water from a water inlet pipe, means for mounting said body in said tank, a fill valve in communication with said water inlet pipe, and a float means for actuating said fill valve for flow of water from said inlet pipe therethrough into said tank,

the improvement wherein

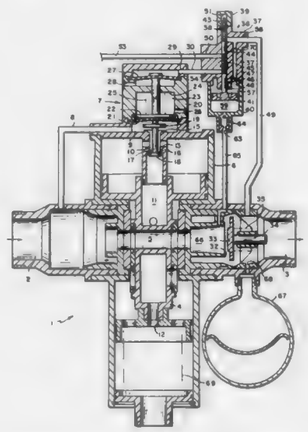
said fill valve assembly further comprises a pressure relief valve disposed in communication, through said body, with said water inlet pipe, said pressure relief valve comprising a body and pressure relief means adapted to activate at a predetermined pressure to allow flow of water therethrough into said toilet flush tank, thereby permitting locating said pressure relief means in and discharging said volume of wastewater into the confined enclosure of said toilet flush tank.

**4,745,946**

**PIPE SEPARATOR**

**Johann H. Kern, Wimpasing 4, D-8221 Vachendorf, Fed. Rep. of Germany**

**PCT No. PCT/EP86/00336, § 371 Date Jan. 28, 1987, § 102(e) Date Jan. 28, 1987, PCT Pub. No. WO86/07400, PCT Pub. Date Dec. 18, 1986**
**PCT Filed Jun. 5, 1986, Ser. No. 17,162**
**Claims priority, application Fed. Rep. of Germany, Jun. 5, 1985, 3520250**
**Int. Cl.[4] F16K *21/00***
**U.S. Cl. 137—614.2** **16 Claims**



1. Pipe separator comprising blocking means being movable in response to pressure from an inlet of the pipe separator and to the action of biasing means and connecting in a first position the inlet with an outlet of the pipe separator and separating in a second position the inlet from the outlet; a control valve being a differential pressure valve or pressure comparing valve, in one state of operation the pressure prevailing at the inlet acting on a first side of the control valve and the pressure prevailing at the outlet acting on a second side of the control valve, the control valve comprising means response to the difference of the pressure acting on the first side and the pressure acting on the second side for switching the blocking means into a first and second position, respectively; a shutoff valve biased into a position blocking the flow from the inlet to the outlet; a valve opening in a first position a first connection between the ambient pressure and the second side of the control valve and connecting in the first position in case the shutoff valve is closed the inlet side of the shutoff valve with the outlet of the pipe separator and opening in a second position another connection between the outlet and the second side of the control valve via closing the first connection.

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**4,745,947**

**STEAM JACKETED OUTLET REDUCER NOZZLE**

**Richard E. Rehbein, Valparaiso, Ind., assignor to Pullman Rail Leasing, Inc., Chicago, Ill.**

**Filed Oct. 31, 1986, Ser. No. 925,286**
**Int. Cl.[4] F16K *49/00***
**U.S. Cl. 137—340** **22 Claims**

1. An outlet for a railway tank car body having an interior adapted to receive and carry cargo, said tank car body having an opening therein communicating with the interior thereof, said outlet comprising:

a valve structure mounted on the tank car body for selectively covering and uncovering the opening;

the valve structure including a valve member movable supported on the valve structure for movement with respect to the opening for the selective covering and uncovering thereof;

said valve member extending outwardly of the car beyond the valve structure when moved to uncover the opening;

a nozzle member supported on the valve structure and comprising:

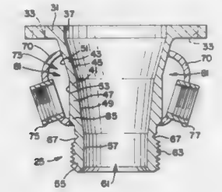
a mounting portion mounted on the valve structure;

said mounting portion having an inlet opening therein communicating with the opening, said inlet opening being large enough to receive the valve member therein when the valve member is moved to uncover the opening;

a taper portion formed integral with the mounting portion and extending away from the car, said taper portion having a space therein communicating with the inlet opening;

an outlet portion formed integral with the taper portion and having an outlet opeing smaller thant he inlet opening, said outlet opening communicating with the space in the taper portion whereby the contents of the railway car pass through the valve means and the nozzle member to be removed from the car;

said outlet portion including securing means for connecting the outlet portion to a receiving means for receiving the contents of the car passing through the nozzle member



whereby standard-sized receiving means adapted for connection to an outlet smaller than the valve member may be used to receive cargo from said car through said valve structure; and

said taper portion including a first taper segment portion formed integral with the mounting portion and a second taper segment portion connected with the first taper segment portion;

said first and second taper segment portions being disposed with respect to each other to produce an indentation inwardly of the nozzle member in the outer surface portion of the nozzle member; and

a steam heating member connected with the nozzle member, said steam heating member having an inner surface portion and each of the taper segment portions having an outer surface portion, said inner surface portion of said steam heating member and said outer surface portions of said first and second taper segment portion defining a steam heating space therebetween;

steam inlet means and steam outlet means being connected with the steam heating member for introducing steam into said steam heating space to facilitate passage of congealable contents the car through said nozzle member by heating said contents in the nozzle member.

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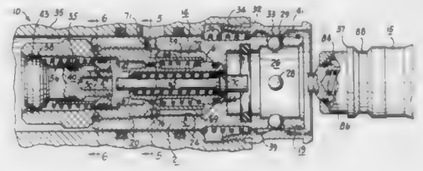
**4,745,948**

**COUPLING DEVICE**

**Wayne E. Wilcox, Union City, and Michael J. Varasso, Corry, both of Pa., assignors to Snap-Tite, Inc., Union City, Pa.**

**Filed Jun. 6, 1983, Ser. No. 501,082**
**Int. Cl.[4] F16L *37/28***
**U.S. Cl. 137—614.05** **10 Claims**

1. In a coupler having first and second coupler parts and first and second check valves respectively located therein which parts are capable of being coupled when the parts are under fluid pressure; the improvement of actuating means movable between first and second positions, said actuating means in one of said positions being operably connected to the check valve in one of the coupler parts to hold the check valve in open position in connected condition of the first and second coupler parts and under conditions of fluid flow through the connected coupler parts, said actuating means being separate from and



movabale relative to the check valve in the other of the coupler parts, and fluid pressure actuated lock means for locking said actuating means in said one of said positions.

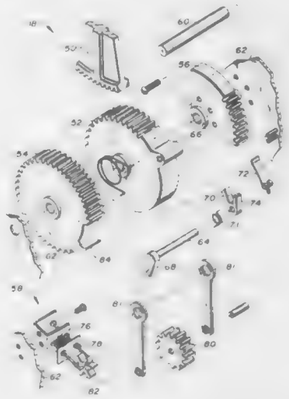
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**4,745,949**

**MECHANICALLY TIMED MIXING FAUCET FOR AIRCRAFT LAVATORIES AND THE LIKE**

**Ichiro Nakamura, 5900 119th Ave., SE., Bellevue, Wash. 98006**

**Filed May 22, 1987, Ser. No. 53,059**
**Int. Cl.[4] F16K *31/00***
**U.S. Cl. 137—624.12** **16 Claims**



1. A faucet assembly for use in aircraft lavatories and the like, comprising:

a handle movable between a closed position and an open position;

valve means for drawing liquid from at least one of first and second inlets and mixing and discharging the liquids from an outlet when the handle is in the open position, and preventing such discharge when the handle is in the closed position;

a rotatable drive wheel;

coupling means for rotating the drive wheel when the handle is moved between the closed position and the open position;

a rotatable timer wheel;

first latch means for mechanically latching the drive wheel to the timer wheel when the handle is moved toward the open position;

a check wheel fixedly mounted relative to the drive wheel;

second latch means for mechanically releasing the first latch means and latching the drive wheel to the check wheel when the handle is in the open position;

timer means for counterrotating the timer wheel at a given rate after the drive wheel is unlatched from the timer wheel;

releasing means for releasing the second latch means after a given degree of counterreaction of the timer wheel; and biasing means for biasing the handle toward the closed position.

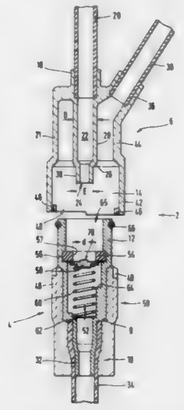
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**4,745,950**

## CONNECTOR FOR PERITONEAL DIALYSIS

**Bernd Mathien, Spiessen-Elfersberg, Fed. Rep. of Germany, assignor to Fresenius AG, Bad Homburg, Fed. Rep. of Germany**

**Filed Apr. 11, 1986, Ser. No. 850,854**
**Claims priority, application Fed. Rep. of Germany, Apr. 12, 1985, 3513205**
**Int. Cl.[4] A61M** *5/14, 1/28*
**U.S. Cl. 137—798** **13 Claims**



1. A continual ambulant peritoneal dialysis tube connection device comprising:
- a male connector piece having a central tube section joined to and surrounded by a protective sleeve, a receiving region between said central tube and protective sleeve, a first connection means for connecting a first dialysis solution bag, and a third connection means for connecting a second dialysis solution bag;
- a female connector piece having a valve means, an introduction portion, a second connection means for connecting a peritoneal catheter, and an annular seal;
- said valve means having a valve plate for providing a fluid barrier in its uncoupled state prohibiting the flow of fluids through its elongated axial direction;
- said introduction portion forming a liquid-tight seal between said protective sleeve on said male connector piece and said female connector piece after being inserted into said receiving region.;
- said first connection means being in fluid communication with said central tube section;
- said valve means cooperating with said central tube section and the inserted position of said female connector within said protective sleeve providing for selective fluid communication between any two of said first connection means, said second connection means, and said third connection means;
- said central tube section having a mouth opening forming a fluid-tight seal with said valve plate when said mouth opening contacts said valve plate,
- whereby said male connector piece (**6**) in a first coupling position with said female connector piece (**4**) in fluid-tight manner with said annular seal (**66**) effects a first fluid passage from said first connection means (**18**) to said third connection means (**36**), when in a second coupling position by said central tube section (**22**) of said male connector piece (**6**) interacting with said valve means (**52**) within said female connector piece (**4**) opens said valve, said mouth opening (**24**) of said central section (**22**) having a fluid-tight sealing manner on said valve plate (**58**) and said front portion (**30**) passing through an opening (**57**) of said annular seal (**56**) to effect a second fluid passage from said second connection means (**32**) to said third connection means (**36**), and when in a third coupling position said main portion (**28**) of said central tube section (**22**) of said male connector piece (**6**) forming a fluid-tight seal with said annular seal (**56**) of said female connector piece (**4**) and said valve plate (**58**) being tilted from said mouth opening (**24**) of said central tube section (**22**) forming a third fluid passage from said first connection means (**18**) to said second connection means (**32**), each of the coupling positions are predetermined and lockable by a connecting means.

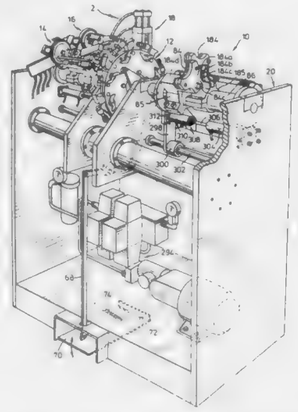
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**4,745,951**

## COIL SPRING HOOKING METHOD AND APPARATUS

**Arthur W. E. Guenther, 1153 Pioneer Rd., Burlington, Ontario, Canada L7M 1K5**

**Filed Jul. 19, 1982, Ser. No. 399,840**
**Int. Cl.[4] B21F** *35/02*
**U.S. Cl. 140—103** **34 Claims**



1. Apparatus for forming at least one laterally extending leg of a coil spring blank into a hook, comprising:
- movable carriage means for advancement through a succession of stations, including releasable means to clamp the spring blank at the first of said stations;
- bending means at the second of said stations to bend the leg of the spring blank into a position transverse to the coils of the blank;
- hooking means at the third of said stations to bend the leg to form a hook; and
- cutting means at the fourth of said stations to sever the free end of the hook to a predetermined length.

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**4,745,952**

## STRUCTURE AND METHOD FOR HANDLING HAZARDOUS WASTE MATERIALS

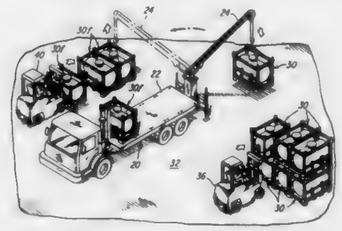
**Henry C. French, Knoxville, Tenn., assignor to Dempster Systems Inc., Toccoa, Ga.**

**Filed Jan. 20, 1987, Ser. No. 4,896**
**Int. Cl.[4] B65B** *3/04*
**U.S. Cl. 141—1** **9 Claims**

1. The method of processing hazardous waste materials comprising:
- placing a hazardous waste container unit upon a transport vehicle, the hazardous waste container unit including a hazardous waste container,



- attaching the hazardous waste container unit to the transport vehicle,
- transporting the hazardous waste container unit to a hazardous waste generation site,
- releasing the hazardous waste container unit from attachment to the transport vehicle,
- removing the hazardous waste container unit from the transport vehicle,
- positioning the hazardous waste container unit at a hazardous waste generation site at which hazardous waste materials are generated,
- placing hazardous waste materials into the hazardous waste container of the hazardous waste container unit at the hazardous waste generation site,
- placing the hazardous waste container unit having hazardous waste materials in the hazardous waste container thereof upon a transport vehicle,



- attaching the hazardous waste container unit to the transport vehicle,
- transporting the hazardous waste container unit with hazardous waste materials in the hazardous waste container thereof to a hazardous waste materials collection site having a hazardous waste material collection receiver,
- releasing the hazardous waste container unit from attachment to the transport vehicle,
- emptying the hazardous waste container of the hazardous waste container unit into the hazardous waste material collection receiver,
- and cleaning the hazardous liquid waste container unit including the hazardous waste container thereof for transportation to a hazardous waste generation site for reuse of the hazardous waste container unit.

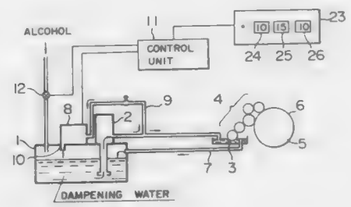
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**4,745,953**

## DEVICE AND METHOD FOR CONTROLLING THE CONCENTRATION OF AQUEOUS SOLUTION OF ALCOHOL

**Michiaki Kobayashi, Washimiya; Daiji Suzuki, Urawa, and Kenji Yamada, Tokyo, all of Japan, assignors to Dai Nippon Insatsu Kabushiki Kaisha, Tokyo, Japan**

**Filed Nov. 25, 1986, Ser. No. 934,790**
**Claims priority, application Japan, Nov. 26, 1985, 60-263787; Jun. 23, 1986, 61-144746; Jun. 26, 1986, 61-148144**
**Int. Cl.[4] B65B** *3/04*
**U.S. Cl. 141—1** **21 Claims**




15. A method for measuring a concentration of an aqueous solution of alcohol comprising measuring the concentration of alcohol in said aqueous solution of alcohol in response to a result of detection of the concentration of alcohol gas in a space which is partially defined by the boundary surface of said aqueous solution of alcohol.

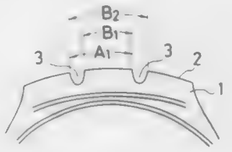
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**4,745,954**

## TREAD PATTERN

**Kiyoshi Toyohara, Hiratsuka; Kojiro Ishikawa, Yokohama, and Tadanobu Nagumo, Hiratsuka, all of Japan, assignors to The Yokohoma Rubber Co., Ltd., Tokyo, Japan**

**Filed Aug. 11, 1986, Ser. No. 895,105**
**Claims priority, application Japan, Aug. 15, 1985, 60-178577**
**Int. Cl.[4] B60C** *11/06*
**U.S. Cl. 152—209 R** **1 Claim**




1. A tread pattern for pneumatic tires, which is suitably used for a tire in a wheel of a vehicle running on a road surface having longitudinal grooves in said rod surface having a pitch a and a groove width b and extending in the cartravelling direction, and which said pattern has in its ground-contacting surface at least two linear grooves extending in the circumferential direction of said tire, said tread pattern being characterized in that said linear grooves are of a width larger than the width b of each groove in said road surface, the positions of said linear grooves in said ground-contacting surface of said tire being restricted by Ai and Bj which satisfy the equations,

$$am+(b+2)\leqq Ai\leqq a(m+1)-(b+2)$$

and

$$an-b\leqq Bj\leqq an+b$$

wherein Ai is the distance between rib edges of linear grooves on the same side of said tire surface and larger than zero; Bj is the distance between rib edges of linear grooves on the different sides of said tire surface and larger than zero; m and n are each zero or one of the natural numbers i is 1, 2, 3, . . . ; and j is 1, 2, 3, . . .

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**4,745,955**

## PNEUMATIC TIRE FOR PASSENGER CAR

**Tuneo Morikawa, Hadano, and Shuji Takahashi, Hiratsuka, both of Japan, assignors to The Yokohama Rubber Co., Ltd., Tokyo, Japan**

**Filed May 28, 1986, Ser. No. 867,841**
**Int. Cl.[4] B60C** *9/04, 9/18*
**U.S. Cl. 152—527** **3 Claims**

1. A pneumatic tire for a passenger car having a belt cover layer disposed on a belt layer, cords used in said belt cover layer comprising nylon 46 fiber cords having a tensile strength of at least 7.5 g/d, an initial modulus of at least 25 g/d, a dry heat shrinkage ratio at 150° C. of up to 3.0% and a twist coefficient K, represented by the following formula, within a range of from 1,000 to 2,500:

$$K=T\sqrt{D}$$

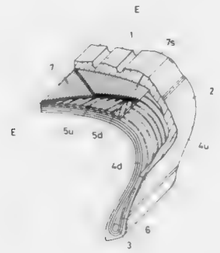
where
T: number of turns per 10 cm of cords,
D: total denier of cords.

2. A pneumatic tire for a passenger car having a carcass

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layer of a double-layer structure, cords used for the carcass cords comprising nylon 46 fiber cords having a tensile strength of at least 7.5 g/d, an initial modulus of at least 25 g/d, a dry heat shrinkage ratio at 150° C. of up to 3.0% and a twist coefficient K, expressed by the following formula within a range of 1,000 to 2,500; cords of one of the layers and those of the other layer being crossed with one another at an angle of from 5° to 40°:



$$K = T\sqrt{D}$$

wherein

T: number of turns per 10 cm of cords,

D: total denier of cords.

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**4,745,956**

**PNEUMATIC TIRES WITH SPECIFIED BELT CORD PROPERTIES**

**Akira Yagi, Suginami; Tatsuro Shimada, Musashimurayama, and Kazuomi Kobayashi, Kodaira, all of Japan, assignors to Bridgestone Corporation, Tokyo, Japan**

**Filed Mar. 5, 1985, Ser. No. 708,476**

**Claims priority, application Japan, Mar. 5, 1984, 59-40534**

**Int. Cl.⁴ D02G *3/48;* B60C *9/20***

**U.S. Cl. 152—527** **7 Claims**



1. A pneumatic radial tire for use in passenger cars comprising; a carcass as a reinforcement for a tire casing and a belt consisting of two parallel arranged steel belt layers each containing steel cords therein, the cords of which layers being crossed with each other with respect to the mid-circumferential line of the tire, a cap composed of textile cords surrounding an outer periphery of each of at least both side ends of the steel belt layers and optionally a layer composed of textile cords disposed under said cap and surrounding an outer periphery of each of at least both side ends of the steel belt layers, said steel belt layers each composed of a rubberized layer containing flexible and stretchable steel cords of strand construction twisted in the same direction, each cord having a bending resistance with a range of 5 to 1.4 gf/mm as a ratio of load to unit deflection under loading in three-point bending test and an elongation under a load of 3 kgf within a range of 0.5 to 2% in tension test.

**4,745,957**

**TIRE BREAKER BELTS AND METHOD OF MAKING**

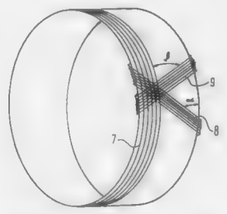
**Anthony J. M. Sumner, Near Stratford-on-Avon, England, assignor to Apsley Metals Limited a British Company, United Kingdom**

**Filed May 8, 1985, Ser. No. 731,725**

**Claims priority, application United Kingdom, May 22, 1984, 8413093**

**Int. Cl.⁴ B60C *9/22, 9/17***

**U.S. Cl. 152—531** **7 Claims**



1. A tire with a breaker belt comprising a core ply of elastomeric material reinforced by substantially parallel cords extending longitudinally of the core ply such that the cords are substantially parallel to the mid-circumferential plane of said tire, and two encasing plies, each encasing ply comprising a continuous winding of a single tire cord reinforcement embedded in elastomeric material, said tire cord reinforcement traversing the core ply at an acute angle to said mid-circumferential plane and being wound to position each turn of said winding adjacent to the previous turn around the core ply so that said tire cord reinforcement has upper and lower traversing cords both at the same angle and in the bias direction, the two encasing plies each being wound at a different acute angles relative to the reinforcing cords.

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**4,745,958**

**TIRE-RIM VEHICLE WHEEL ASSEMBLY**

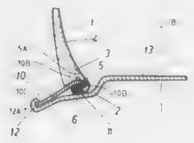
**Erich Kresta, Perchtoldsdorf, Austria, assignor to Semperit Reifen Aktiengesellschaft, Vienna, Austria**

**Filed May 13, 1985, Ser. No. 733,461**

**Claims priority, application Austria, May 28, 1984, 1758/84**

**Int. Cl.⁴ B60C *15/00;* B60B *21/10***

**U.S. Cl. 152—540** **13 Claims**



1. A tire-rim vehicle wheel assembly comprising:

a tire rim possessing two seat surfaces;

a tire;

said tire comprising a uni-ply or a multi-ply carcass having two free end regions;

said tire further comprising two bead regions and two bead cores, each of which bead cores is associated with a related one of said two bead regions;

said two bead regions being seated at related ones of said two seat surfaces of said tire rim;

each said free end region of the carcass of said tire being anchored in a related one of said two bead regions by extending around a related one of said two bead cores;

two bead rings defining holding members axially holding related one of said bead regions of the tire at said related seat surfaces of the tire rim;

each one of said two bead rings possessing a first end region associated with one of said two bead regions of said tire and anchored in said one of said two bead regions of said tire and a second end region associated with said tire rim and releasably locked at said tire rim;

said rim-associated second end region of each one of said two bead rings being expandable in a resilient manner; and

two bead fillers, each of which is made of an elastomeric material and each of which constitutes one of said two bead cores.



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**4,745,959**

**DRIVE MECHANISM FOR MOVABLE CLOTH AWNINGS**

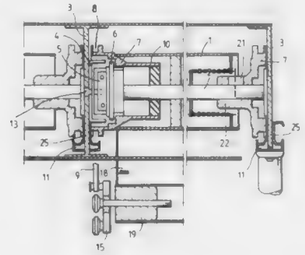
**Wolfgang Rist, Weberstrasse 18, 6900 Heidelberg, Fed. Rep. of Germany**

**Filed Dec. 16, 1986, Ser. No. 942,279**

**Claims priority, application Fed. Rep. of Germany, Dec. 24, 1985, 3546093**

**Int. Cl.⁴ E04F *10/06***

**U.S. Cl. 160—66** **5 Claims**



1. Drive mechanism in combination with movable cloth awnings wherein the cloth awning is carried on a tubular roll-up shaft (**1**) coupled to a motor driven drive shaft (**2**) with a pulley (7,7') for a draw-cord at each end of the drive shaft, the leading edge of the cloth awning being attached to a pull tab (**19**), each pulley being provided with a draw-cord guide groove (**8**) in which rides a draw-cord (**9**), the draw-cord also passing over a redirecting roller at the outer end of a separate guide track member and leading back to the draw-cord pulley, characterized in that: there are guide track members (**11**) for a roller carriage (**15**), each guide track being supported by end support plates (**3**) and having an open groove (**14**) opposed to a related guide channel (**8**), the pull tab (**19**) being attached to the roller carriage, and each guide track member having a guide chamber (**16**) for storing the pull cord; further that there is a motor head (**5**) at one end of the roll-up shaft with the end support plates (**3**) on the motor head side having a mounting (**4**) which serves as motor bearing, and that the draw-cord pulley (**7**) on the motor head side is rotatably mounted over both the mounting (**4**) and the motor head (**5**) and wherein each end support plate (**3**) has plug-type connection (**25**) in the form of a depending flange received within a medial chamber (**26**) of the related guide track member (**11**).

**4,745,960**

**COLLAPSIBLE PARTITION ASSEMBLY**

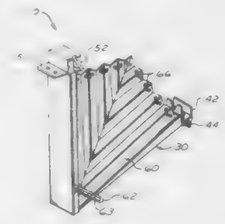
**S. J. Karp, 1828 Boulevard, West Hartford, Conn. 06107**

**Continuation-in-part of Ser. No. 835,176, Mar. 3, 1986, Pat. No. 4,642,605. This application Jan. 5, 1987, Ser. No. 516**

**The portion of the term of this patent subsequent to Feb. 10, 2004, has been disclaimed.**

**Int. Cl.⁴ E06B *3/94***

**U.S. Cl. 160—84.1** **10 Claims**



1. A collapsible partition assembly:

elongated frame means adapted to be mounted for disposition in a generally upright orientation;

elongated arm means pivotally mounted at a first end thereof to said frame means, said arm means being pivotal between a first generally upright position wherein said frame means and arm means are generally parallelly oriented and cooperate to form an enclosure and a second position wherein said arm means projects away from said frame means to open the said enclosure;

foldable partition means having first and second edge portions, said first edge portion being connected in fixed relationship to said frame means and said second edge portion being connected in fixed relationship to said arm means, said partition means being substantially entirely enclosable in said enclosure when said arm means is in the first position, said partition means being expandable to form a substantially rectangularly shaped panel when said arm means is in said second position; and

latch means for holding said arm means in said first position.

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**4,745,961**

**RAPID PROCESS FOR FABRICATING IMPROVED DENTAL REFRACTORY MODELS**

**Anthony R. Salandra, Emerson, N.J., assignor to J. F. Jelenko & Co., Armonk, N.Y.**

**Continuation-in-part of Ser. No. 772,840, Sep. 5, 1985, abandoned, which is a division of Ser. No. 632,363, Jul. 19, 1984, abandoned, Continuation of Ser. No. 777,820, Sep. 19, 1985, abandoned, which is a continuation-in-part of Ser. No. 632,363, Jul. 19, 1984, abandoned. This application Mar. 18, 1987, Ser. No. 27,425**

**Int. Cl.⁴ B22C *3/00;* A61C *11/00***

**U.S. Cl. 164—14** **8 Claims**

1. A process of fabricating a dental model comprising

providing an unhardened, porous refractory model containing moisture therein, the outer surface of said model having pore openings in it, and

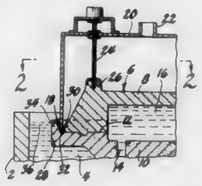
applying a solution containing about 1 to 2 percent by volume of an element of the group consisting of methyl 2-cyanoacrylate and ethyl 2-cyanoacrylate in a solvent to said outer surface, whereby the viscosity of the solution is made to approximate that of water, to quickly penetrate said pores and to make said outer surface smooth and nonporous,

whereby said model is hardened, and said outer surface is made nonporous and smooth by said applying.

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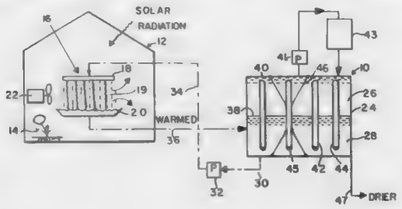
**4,745,962**
## COUNTERGRAVITY CASTING APPARATUS
**James B. Mercer, Saginaw, and Karl D. Voss, Standish, both of Mich., assignors to General Motors Corporation, Detroit, Mich.**
**Filed Jul. 27, 1987, Ser. No. 77,891**
**Int. Cl.[4] B22D** *18/06*
**U.S. Cl. 164—255** **3 Claims**



1. Apparatus for shaping a metal article in a bottom-gated mold by the vacuum-induced, countergravity casting method wherein the mold is immersed in an underlying melt of said metal and evacuated to draw said melt up into said mold, said apparatus comprising:
- a gas-permeable cope portion of said mold defining a mold cavity for shaping said article, said cope portion having a peripheral edge defining a first sealing face on its underside between said edge and said cavity;
- a drag portion of said mold further defining said cavity and having a second sealing face on its topside surrounding said cavity;
- means for sealingly engaging said first and second sealing faces one to the other at a parting line therebetween;
- a flange on said drag portion extending outboard said second sealing face beyond said peripheral edge, said flange having a substantially flat upper surface portion and an upstanding levee portion circumscribing said upper surface portion to substantially isolate said upper surface portion from said melt when said mold is immersed in said melt;
- a vacuum chamber atop said drag portion and enclosing said cope portion, said chamber having a lip on its underside sealingly engaged with said upper surface portion; and
- means for evacuating said chamber sufficiently to draw said melt up into said mold when it is immersed in said melt.

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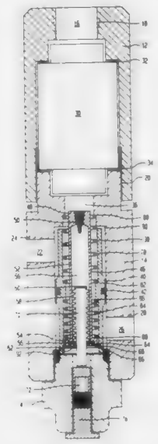
**4,745,963**
## HEAT EXCHANGER AND SYSTEMS AND METHODS FOR USING THE SAME
**Gad Assaf, Rehovot, Israel, assignor to Geophysical Engineering Company, Seattle, Wash.**
**Division of Ser. No. 558,436, Dec. 6, 1983, Pat. No. 4,583,370. This application Nov. 18, 1985, Ser. No. 798,841**
**Int. Cl.[4] F25B** *17/00*
**U.S. Cl. 165—1** **18 Claims**




1. A method for conditioning the air of an enclosure such as a greenhouse utilizing a heat exchanger that includes a housing containing upper and lower layers of fluids, the fluid of the lower layer being concentrated brine and the fluid in the upper layer being fresher than the brine in the lower layer, stratification means for preventing mixing of the two layers, and heat transfer means for enhancing transfer of heat between the layers, said method comprising the steps of:
- (a) during the day, contacting the air with brine drawn from the lower layer of the heat exchanger for drying the air and heating the contacted brine;
- (b) during the day, returning contacted brine to the upper portion of said lower layer of the heat exchanger whereby, during the day, heat absorbed by the contacted brine is transferred to the upper layer of the stratified heat exchanger; and
- (c) transferring heat from the upper layer of the heat exchanger to the ambient atmosphere.

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**4,745,964**
## STEAM TRAP AND DIVERTER APPARATUS
**Joseph H. Mower, Carmel, and Kevin B. Kline, Indianapolis, both of Ind., assignors to ITT Corporation, New York, N.Y.**
**Filed Sep. 21, 1987, Ser. No. 99,415**
**Int. Cl.[4] G05D** *23/12*
**U.S. Cl. 165—40** **20 Claims**

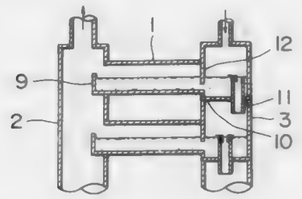


1. A steam trap and diverter valve apparatus comprising:
- an upper housing having a condensate input port;
- a steam trap mounted in said upper housing;
- a lower housing coupled to said upper housing and retaining said steam trap in said upper housing, said lower housing having a condensate return line port and a condensate discharge port;
- a diverter valve mounted in said lower housing including
- a cylindrical piston slidably mounted in said lower housing and having an upper sealing seat surface and a lower sealing seat surface, said upper sealing seat surface cooperating with a sealing surface in said lower housing to form an upper sealing seat,
- an upper spring member fixedly retained within an upper portion of said piston and an inner lip portion of said lower housing,
- an expansion thermostat mounted and retained within said piston and spaced from said steam trap,
- a lower spring member fixedly retained within a lower portion of said piston and an outer ledge portion of said thermostat, and
- means for adjusting said thermostat;
- end nut means for retaining said valve in said lower housing and having a surface cooperating with said piston to form said lower sealing seat; and
- said steam trap is set to discharge condensate at a first predetermined temperature into a cavity between said trap and said diverter valve, and at said first predetermined temperature said upper sealing seat is normally open and said lower sealing seat is normally closed, such that said condensate is discharged through said condensate return line port.



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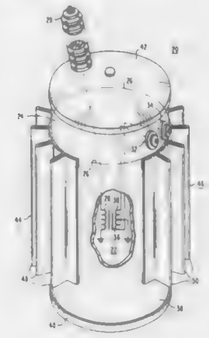
**4,745,965**
## SEPARATE TYPE HEAT EXCHANGER
**Akiji Katsura; Shiro Endo; Tatsuya Koizumi, all of Tokyo; Junji Sotani, Yokohama, and Yuichi Kimura, Yokohama, all of Japan, assignors to Furukawa Electric Co., Ltd., Tokyo, Japan**
**Continuation of Ser. No. 709,149, Mar. 7, 1985, abandoned. This application Aug. 11, 1986, Ser. No. 894,738**
**Claims priority, application Japan, Mar. 7, 1984, 59-43532; Jun. 12, 1984, 59-120158; Sep. 21, 1984, 59-198104**
**Int. Cl.[4] F28D** *15/02*
**U.S. Cl. 165—104.14** **2 Claims**




1. A separate type heat exchanger comprising (A) an evaporation section which comprises a plurality of evaporation pipes having their axes arranged in a horizontal direction, a first vapor header means connected to one end of said evaporation pipes and a first condensed liquid header means connected to the opposite end of said evaporation pipes; (B) a condensation section which comprises a plurality of condensation pipes, a second vapor header means connected to one end of said condensation pipes and a second condensed liquid header means connected to the other end of said condensation pipes; (C) a vapor pipe connecting said first and second vapor header means; (D) a condensed liquid pipe connected said first and second condensed liquid header means; (E) a working fluid sealed within said heat exchanger; said condensation section (B) being provided above said evaporation section (A) and said evaporation section (A), vapor pipe (C), condensation section (B) and condensed liquid pipe (D) providing a circulation path wherein the working fluid which is evaporated at the evaporation section (A) flows through the vapor pipe (C) to the condensation section (B) and working fluid which is condensed in the condensation section (B) flows through the condensed liquid pipe (D) to the evaporation section; and (F) means provided in said evaporation section to prevent the flow of vapor from the evaporation section (A) to the condensation section (B) through the condensed liquid pipe (D) without increasing the pressure in said condensed header means, said means (F) comprising a plurality of choke plates horizontally disposed in said condensed liquid header pipe, overflow pipes passing through said choke plates and extending above said choke plates a sufficient distance to maintain a liquid level above said choke plates, and a baffle closing an upper portion of each of said evaporation pipes, said baffles projecting downwardly a sufficient distance to terminate within the liquid confined by said choke plates and said header pipe.

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**4,745,966**
## HEAT EXCHANGERS AND ELECTRICAL APPARATUS HAVING HEAT EXCHANGERS
**Randall N. Avery, Bogart, Ga., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**
**Filed Jul. 22, 1986, Ser. No. 888,656**
**Int. Cl.[4] H01F** *27/12*
**U.S. Cl. 165—104.33** **29 Claims**



1. Electrical apparatus comprising:
- a tank having a tank wall,
- fluid dielectric means in said tank,
- heat producing means in the tank, surrounded by said fluid dielectric means,
- and heat exchanger means,
- said heat exchanger means having peripheral edges connected to the tank wall, and a plurality of fins which extend in spaced parallel relation between predetermined peripheral edges,
- the spaced fins of said heat exchanger means each defining a cavity which is in fluid flow communication with said fluid dielectric means,
- said heat exchanger means including a metallic sheet member having a predetermined thickness dimension,
- said metallic sheet member having a plurality of folds, including edge folds which increase the thickness dimension along predetermined peripheral edges of said heat exchanger means beyond said predetermined thickness dimension, and spaced transverse folds arranged to provide:
- (a) edge fold portions between the spaced fins which function as part of the peripheral edges of said heat exchanger means which are connected to said tank, and
- (b) edge fold portions in each fin which are adjacent to other edge fold portions, which adjacent edge fold portions are joined together,
- whereby the connection between the heat exchanger means and the tank wall is strengthened without adding significantly to the weight of the heat exchanger means.

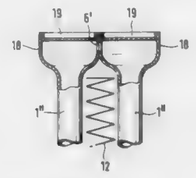
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**4,745,967**
## HEAT EXCHANGER, PARTICULARLY A REFRIGERANT EVAPORATOR
**Josef Kern, Alfdorf, Fed. Rep. of Germany, assignor to Süddeutsche Kühlerfabrik Julius Fr. Behr GmbH & Co. KG, Stuttgart, Fed. Rep. of Germany**
**Filed Jan. 27, 1986, Ser. No. 823,008**
**Claims priority, application Fed. Rep. of Germany, Jan. 26, 1985, 3502619**
**Int. Cl.[4] F25B** *39/02;* **F28F** *1/14*
**U.S. Cl. 165—150** **4 Claims**

1. A refrigerant evaporator, comprising:
- a plurality of adjacent hollow flat tubes arranged parallel to and separate from one another;
- a plurality of ribs disposed between said adjacent flat tubes;

inserted caps for sealing both top and bottom ends of said flat tubes; and

connecting means for fluidly connecting said adjacent flat tubes, said connecting means including connecting openings in both end areas of each said flat tube, said connecting openings being spaced from the respective top and bottom ends of said flat tubes and opening in opposite




directions and extending transversely to the longitudinal extent of said flat tubes to provide a zig-zag flow through said flat tubes,

wherein the flat tubes have widened parts of said adjacent flat tubes which are in contact with one another, and

wherein said connecting means are openings in said widened parts of said flat tubes.

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**4,745,968**

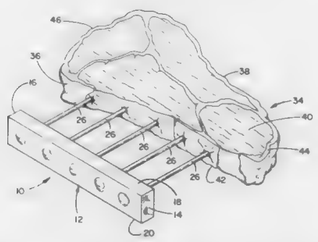
**COOKING SPIKE APPARATUS**

**Jim P. Demos, 203 Burnt Leaf La., Brentwood, Tenn. 37027**

**Filed Sep. 16, 1981, Ser. No. 302,541**

**Int. Cl.[4] A47J** *37/04*

**U.S. Cl. 165—185** **7 Claims**




1. A cooking spike apparatus for being inserted into a generally vertical edge of a steak having a predetermined length, width and thickness, the length and width of the steak being substantially greater than the thickness, for transmitting heat to the center of the steak while it is cooking on a generally horizontal grill comprising:

a horizontal heat-absorbing rod for being positioned adjacent to the generally vertical edge of the steak and immediately above the adjacent to the grill to absorb heat from the grill, said rod having a selected thickness, having a length of about the length of the steak and having a width of about the thickness of the steak; and

a plurality of heat-conducting spikes having a diameter substantially smaller than the width of heat-absorbing rod extending from the midsection of said rod in a generally horizontal direction perpendicular to the width of said rod, said plurality of spikes being positioned in a row along the midsection of said rod and being oriented in a parallel, co-planar relationship for being inserted into the generally vertical edge of the steak and for being positioned in a spaced apart parallel relationship with the grill, so that the heat transmitted from the grill is absorbed by said rod and transmitted through said spikes into the center interior of the steak.

**4,745,969**

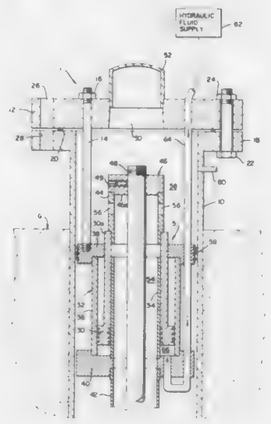
**IN-CASING HYDRAULIC JACK SYSTEM**

**Tom Henderson, 303 E. Kern St., Taft, Calif. 93268-0253**

**Filed Mar. 27, 1987, Ser. No. 30,613**

**Int. Cl.[4] E21B** *43/00*

**U.S. Cl. 166—68.5** **20 Claims**




1. An in-casing hydraulic jack system for operating well bottom pumping units via a sucker rod string and polish rod, comprising a jack unit having a hydraulic cylinder with top and bottom ends and a piston positioned for reciprocation within the hydraulic cylinder, mounting means connected to said jack unit for suspending said jack unit fully within a well casing, sealing means carried by the jack unit for producing a seal between said jack unit and the interior of said well casing, connecting means at the bottom end of the hydraulic cylinder for connecting said jack unit to a top end of a well fluid delivery tubing, attaching means for attaching a top end of a polish rod to said piston of the jack unit so as to be displaceable in conjuction therewith, access means disposed above said jack unit for enabling insertion and removal of the polish rod while said jack unit is suspended in the well casing, hydraulic fluid supply means connected to said hydraulic cylinder for producing reciprocation of said piston within said cylinder by delivery of hydraulic fluid to the hydraulic cylinder in a manner so as to produce an upward stroking of said polish rod, and discharge means in said jack unit for enabling well fluid delivered by said well fluid delivery tubing to bypass said sealing means so as to be discharged from said well casing at a location above said seal means.

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**4,745,970**

**ROTATING HEAD**

**Robert M. Bearden, Fort Smith, and W. A. Haynes, Greenwood, both of Ark., assignors to Arkoma Machine Shop, Fort Smith, Ark.**

**Continuation of Ser. No. 468,931, Feb. 23, 1983, abandoned. This application Mar. 17, 1986, Ser. No. 840,600**

**Int. Cl.[4] E21B** *33/03*

**U.S. Cl. 166—84** **18 Claims**

1. A rotating head adapted for use in drilling a well borehole at a well drilling site wherein drilling fluid is passed into the well borehole and wherein some of the drilling fluid is passed from the well borehole and wherein a rotatable kelly, having a non-circular cross section, extends into the well borehole during the drilling operations, comprising:

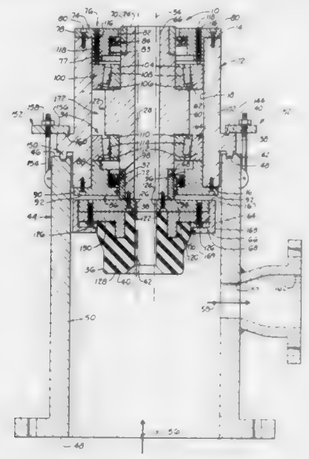
an outer barrel having an upper end, lower end and an outer barrel bore extending therethrough and intersecting the upper and lower ends thereof;

an inner barrel having an upper end, lower end and an inner barrel bore extending therethrough and intersecting the upper and lower ends thereof, at least a portion of the inner barrel being disposed in the outer barrel bore and a portion of the kelly being extendable through the inner barrel bore during the drilling operations;

means for providing a fluid seal between the inner and outer barrels;

means for rotatingly supporting the inner barrel on the outer barrel; and

a rotary drive member connected to the lower end portion of the inner barrel and having a drive bore extending through a portion thereof, the drive bore having a circular



shaped cross section, a portion of the kelly being extendable through the drive bore in the rotary drive member during the drilling operations and the rotary drive member grippingly and sealingly engaging the portion of the kelly extending therethrough, the rotation of the kelly causing the rotary drive member to rotate due to the gripping engagement therebetween and causing the rotation of the inner barrel due to the connection of the inner barrel and the rotary drive member, the gripping engagement between the rotary drive member and the kelly providing the sole means for rotating the inner barrel and the rotary drive member connected thereto.

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**4,745,971**

**MULTIPLE STRING WELL PACKER**

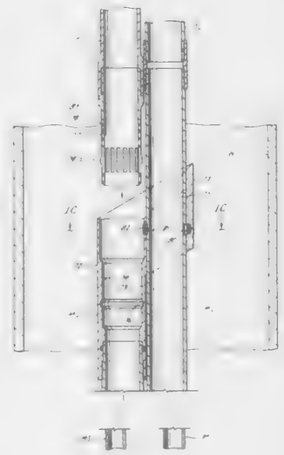
**Neil H. Akkerman, Houston, Tex., assignor to AVA International Corporation, Houston, Tex.**

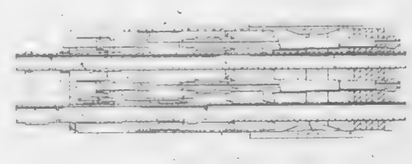
**Continuation of Ser. No. 489,737, Apr. 29, 1983, abandoned, which is a continuation-in-part of Ser. No. 435,675, Oct. 21, 1982, Pat. No. 4,505,332. This application Jun. 3, 1985, Ser. No. 740,827**

**Int. Cl.[4] F21B** *23/00*

**U.S. Cl. 166—120** **22 Claims**

1. A multiple string well packer, comprising body means disposable within a well bore, a packing and slip assembly carried by the body means for expansion and contraction into and out of engagement with the bore, first and second mandrels having means for connection to first and second well pipe strings, respectively, and extending vertically through the body means, means connecting the first mandrel to the body means, whereby the body means may be lowered with the first well pipe string to a desired level in the bore, said means connecting the first mandrel to the body means including releasable latch means preventing expansion of said assembly as the body means is so lowered, means for releasing said latch means and expanding the assembly in order to set the packer when the body means has been so lowered, means for causing the assembly to contract in order to unset the packer in response to raising of the first well pipe string following disconnection of the first mandrel from the body means, means connecting the second mandrel to the body means, and means on the second mandrel for connecting the second mandrel to the first mandrel, and thereby preventing raising of the first well pipe string when the first mandrel is disconnected from the body means,





automatically in response to lowering of the second well pipe string into connection with the second mandrel, said last-mentioned means connecting the second mandrel to the first mandrel being releasable upon raising of the second well pipe string, whereby said first well pipe string may be raised to unset the packer and retrieve it from the well bore.

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**4,745,972**

**WELL PACKER HAVING EXTRUSION PREVENTING RINGS**

**Merle L. Bell, New Waverly, and Martin P. Coronado, Huntsville, both of Tex., assignors to Hughes Tool Company, Houston, Tex.**

**Filed Jun. 10, 1987, Ser. No. 60,564**

**Int. Cl.[4] E21B** *33/128*

**U.S. Cl. 166—134** **6 Claims**

1. A well packer for use in maintaining sealing integrity between inner and outer concentric conduits under downhole temperature and pressure conditions in a subterranean well, the well packer comprising:

a centrally located, tubular mandrel;

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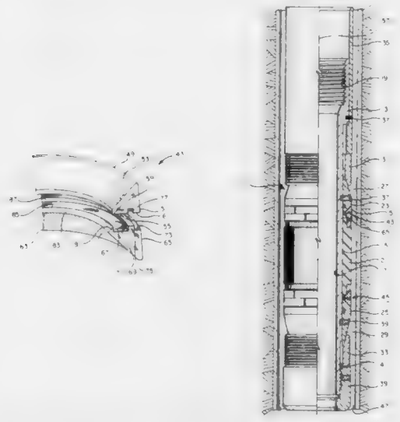


an annular packing element carried about said tubular mandrel, which is radially expandable under axial compression;

upper and lower axially shiftable annular shoulders respectively disposed on opposite sides of said packing element on said mandrel, at least one of said shoulders being movable towards and away from the other shoulder;

an extrusion preventing device located between each shoulder and the packing element, each extrusion preventing device being radially expandable into abutment with the inner surface of the outer conduit upon movement of the first and second shoulders toward each other to compress the packing element, each extrusion preventing device including an outer split ring having a generally triangular cross-section defined by a cylindrical abutment surface for abutment with the inner surface of the outer conduit, a tapered sidewall engageable with one of said shoulders, and a planar surface which is substantially normal to the longitudinal axis of the packer, the planar surface having an innermost radial extent which joins said tapered sidewall and an outermost radial extent which joins said cylindrical abutment surface, the extrusion preventing device also including an inner split ring reversely arranged to the outer ring, the inner ring having a generally triangular cross-section defined by a cylindrical abutment surface for abutment with the inner surface of the outer conduit, a tapered sidewall engageable with said packing element, and a planar surface which is substantially normal to the longitudinal axis of the packer, the planar surface having an innermost radial extent which joins said tapered sidewall and an outermost radial extent which joins said cylindrical abutment surface so that the cylindrical abutment surfaces are continuous, the ring planar surfaces being keyed to one another for circumferential sliding movement with respect to one another; and

wherein the planar surface of the inner ring is provided with a circumferential land which joins the innermost radial extent thereof for engaging the innermost radial extent of the outer ring to prevent extrusion of the packing element between the mandrel and said extrusion preventing member.



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**4,745,973**

**SELECTIVE RUNNING TOOL FOR WELLS**

**James E. Semar, Rte. 2, Box 247, New Iberia, La. 70560**

**Filed Apr. 23, 1987, Ser. No. 41,460**
**Int. Cl.[4] E21B** *23/02*
**U.S. Cl. 166—217** **18 Claims**

1. A downhole running tool for positioning and locking tool support mandrels within landing nipples of thin production tubing string of a well, comprising:

(a) housing means adapted for connection to a tool string and forming an internal receptacle;

(b) an elongated core member being disposed within said internal receptacle and being telescopically movable to collapsed and extended positions defined by spaced stops formed by said housing means, a portion of said elongated core member extending from said housing for connection with a tool support mandrel;

(c) releasable retainer means normally retaining said elongated core member at a substantially fixed set position within said internal receptacle and being released responsive to engagement with said landing nipple during upward movement of said downhole running tool to thus permit collapsing telescoping movement of said elongated core to a mandrel locating position within said internal receptacle, said releasable retainer means comprising:

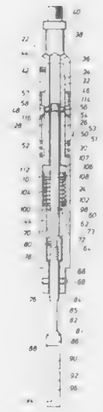
(1) locking lug means being movably retained by said housing means and being movable between core restraint and core release positions, in said core restraint position said locking lug means restraining telescopically collapsing movement of said elongated core member within said internal receptacle;

(2) a collet member being linearly movable relative to said housing and forming a plurality of collet fingers, said collet member being normally located at a locking position securing said locking lug means at said core restraint position and being linearly movable to a lug release position by collet restraining engagement of said collet fingers with said landing nipple during upward movement of said downhole running tool through said landing nipple;

(3) means urging said collet member toward said locking position;

(d) means urging said elongated core member toward said telescopically collapsed position thereof; and

(e) means responsive to downward jarring of said housing means against said elongated core member for releasing said elongated core member for linear movement to its fully telescopically collapsed position within said internal receptacle.



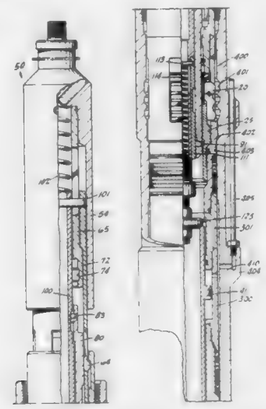


**4,745,974**

**WELL TOOL LOCK MANDREL AND HANDLING TOOLS THEREFOR**

**Brian D. Higgins, Grand Prairie, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.**

**Filed Dec. 22, 1986, Ser. No. 945,028**
**Int. Cl.[4] E21B** *23/02*
**U.S. Cl. 166—217** **21 Claims**



1. A lock mandrel and running tool assembly for setting and locking a well tool in a landing nipple along a well bore comprising:

a lock mandrel having a body provided with at least one side window; a support shoulder on said body for supporting said mandrel in a no-go landing nipple; a radially movable locking dog in said side window; a longitudinally movable expander sleeve in said body movable within said dog for expanding and locking said dog outwardly and releasing said dog for inward movement, said expander sleeve having an internal annular recess for engagement by a handling tool to move said sleeve upwardly and downwardly and an external annular latch boss along an upper end portion thereof; and a latch ring in said body around said expander sleeve above said locking dog for engagement with said latch boss on said sleeve when said sleeve is at an upper locking position to releasably hold said sleeve in said upper position; and

said running tool including a head assembly for connection with an operating tool string; an upper retainer dog assembly supported from said head assembly for releasably coupling said running tool with the body of said lock mandrel; a lower locking lug assembly supported from said head assembly for releasably coupling said running tool with said expander sleeve of said lock mandrel to move said expander sleeve between locking and release positions; said upper retainer dog assembly including upper and lower setting sleeves telescopically coupled together, said lower setting sleeve also comprising a component of said lower locking lug assembly and including an expandable locking lug for releasable engagement with said expander sleeve of said lock mandrel; a longitudinal core extending through said upper and lower assemblies from said head assembly coupled with said upper retainer dog assembly and having means along the lower end thereof for engagement with the operating piston of a safety valve connected with said lock mandrel for holding said safety valve open during installation, a transfer lug carried by said lower setting sleeve and operable between said upper setting sleeve and said core for releasably coupling said upper and lower setting sleeves together; an insertion sleeve on said core positioned in concentric slidable relation between said core and said lower setting sleeve, said insertion sleeve having an external annular release recess for receiving an inward portion of said locking lug, and being movable between lug locking and lug release positions on said core within said lower setting sleeve, and a spring within said core and said insertion sleeve biasing said insertion sleeve to a locking position on said core within said locking lug.

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**4,745,975**

**WATER WELL COMPLETION APPARATUS AND METHOD OF USE**

**Delbert Price, Ben Wheeler, Tex., assignor to Larry Ray Price, Ben Wheeler, Tex.**

**Filed Mar. 23, 1987, Ser. No. 29,191**
**Int. Cl.[4] E21B** *43/04, 47/04*
**U.S. Cl. 166—250** **16 Claims**



1. An apparatus for setting a well screen, placing a well seal, and placing packing material in a partially cased water well bore having a well casing extending continuously from the top of the well bore toward the bottom of the well bore and ending short of the bottom of the well bore to divide the well bore into an upper cased portion and a lower uncased portion, comprising:

a first elongate cylindrical housing, having a hollow interior, open first and second ends and a central longitudinal axis, for positioning a well screen below the casing in the uncased portion of the well bore and positioning the well seal above the lower end of the casing in the cased portion of the well bore, forming a passageway for the flow of water from the interior of said well screen upward through the interior of said first elongate cylindrical housing to the cased portion of the well bore above said well seal, said first elongate cylindrical housing including a plurality of first apertures disposed in and penetrating said first elongate cylindrical housing to form a passage for conducting packing sand from the interior of said first elongate cylindrical housing to the uncased portion of the well bore on the exterior of said well screen and below said well seal;

a second elongate cylindrical housing with a hollow interior, open first and second ends and a central longitudinal axis, having an elongate hollow cylindrical insert with first and second ends concentrically disposed in the interior of said second elongate cylindrical housing and interconnected at the second, upper, end of said elongate hollow cylindrical insert to the second, upper, end of said elongate cylindrical housing;

a plurality of second apertures penetrating said elongate hollow cylindrical insert for conducting packing sand from the interior of said elongate hollow cylindrical insert through said first apertures in said first elongate cylindri-

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cal housing to the uncased portion of the well bore on the exterior of said well screen and below said well seal;

an open-ended hollow cylindrical sleeve with first and second ends slideably disposed in the interior of said first elongate cylindrical housing and first bias means to bias said open-ended hollow cylindrical sleeve toward a rest position near the second, upper end of said first elongage cylindrical housing for closing said first apertures in said first elongate cylindrical housing;

an open-ended hollow cylindrical collar with first and second ends, slideably disposed on the exterior of said elongate hollow cylindrical insert and second bias means to bias said open-ended hollow cylindrical collar toward a rest position near the first, lower, end of said elongate hollow cylindrical insert;

a first attachment means for attaching a well screen to the first, lower, end of said first elongate cylindrical housing, and a second attachment means for attaching the second, upper, end of said second elongate cylindrical housing to a string of drill pipe; and

an open-ended hollow cylindrical coupler ring for releaseably interconnecting the second, upper, end of said first elongate cylindrical housing to the first, lower, end of said second elongate cylindrical housing.

**15**. In the completion of a water well having a well casing extending continuously from the top of the well bore toward the bottom of the well bore, following the steps of setting a well screen near the bottom of the well bore, setting a well seal within the well casing above the well screen but below the top of a static column of water which will be produced by the well, and placing packing sand on the exterior of the well screen below the well seal with a completion apparatus which includes an air jet portion, attached to he bottom of a string of hollow drill pipe, which air jet portion forms a flow path for air from the interior thereof to the annular space between the exterior thereof and the well casing, a method of determining the height of the static column of water produced by the well into the well casing above the well seal prior to withdrawing the string of drill pipe and attached air jet portion of the completion apparatus from the well bore comprising the steps of

allowing a sufficient period of time for the water flowing into the casing to reach a static level;

raising the string of drill pipe and attached air jet portion of the completion apparatus a measured distance from the position of the well seal in the casing to a position above the top of the column of water in the casing;

introducing pressurized air into the top of the string of drill pipe and forcing air to flow down the drill pipe the the air jet portion of the completion apparatus, through the flow path to the annular space in the casing, and up the annular space to the top of the well, and lowering the string of drill pipe and attached air jet portion of the completion apparatus slowly in the well bore until water is entrained in the flow of air to the top of the well; and

measuring the distance traveled back down the well bore to the point of water entrainment at the top of the column of water, and calculating the height of such column above the well seal from the measured distances and known dimensions of the components of the completion apparatus.

**16**. In the completion of a water well having a well casing extending continuously from the top of the well bore toward the bottom of the well bore, following the steps of setting a well screen near the bottom of the well bore, setting a well seal within the well casing above the well screen but below the top of a static column of water which will be produced by the well, and placing packing sand on the exterior of the well screen below the well seal with a completion apparatus which includes an air jet portion, attached to the bottom of a string of hollow drill pipe, which air jet portion forms a flow path for air from the interior thereof to the annular space between the exterior thereof and the well casing, a method of determining the flow rate of the well prior to withdrawing the string of drill pipe and attached air jet portion of the completion apparatus from the well bore comprising the steps of

lowering the string of drill pipe and attached portions of the completion apparatus until the bottom of the completion apparatus is at the level of the well seal;

removing water from the well bore above the air jet portion of the completion apparatus by forcing pressurized air down the interior of the string of hollow drill pipe, to the interior of the air jet portion of the completion apparatus, through the flow path to the well bore on the exterior of the air jet portion of the completion apparatus, and up the well bore through the annular space between the well bore and the exterior of the air jet portion of the completion apparatus and of the string of drill pipe, to entrain such water in the air stream and force such water upward through such annular space and out the top of the well bore;

raising the string of drill pipe and attached air jet portion of the completion apparatus a sufficient measured distance up the well casing to raise the air flow pathe above the present level of water in the well but below the top of the static column of water which will be produced by the well, while continuing the flow of air; and

measuring the elasped time until water is again entrained in the flow of air from the top of the well bore, and calculating the flow rate of the well from the measurement of elapsed time, the known cross-sectional area of the well casing, and the know volume of the components of the completion apparatus.

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**4,745,976**

## METHOD FOR SELECTIVELY PLUGGING THE MORE PERMEABLE REGIONS OF AN UNDERGROUND FORMATION HAVING NON-UNIFORM PERMEABILITY

**Jeffrey H. Harwell, and John F. Scamehorn, both of Norman, Okla., assignors to Board of Regents for the University of Oklahoma, Norman, Okla.**

**Filed Sep. 18, 1986, Ser. No. 908,634**
**Int. Cl.[4] E21B** *43/22, 33/138*
**U.S. Cl. 166—273** **1 Claim**




**1**. A method for selectively plugging the more permeable regions of an underground formation having non-uniform permeability, comprising:

injecting into the formation a first surfactant solution in an amount effective to contact a substantial portion of the surface area of the highly permeable regions of the formation, which first surfactant solution is characterized as having a selected chromatographic velocity and as being capable of reversibly adsorbing onto the surface of the pores of the formation;

after injecting the first surfactant solution, a water-soluble spacer fluid in an amount sufficient to place the first surfactant solution a selected distant into the formation, the spacer fluid being characterized as having a pre-injection viscosity about equal to the first surfactant solution; and

after injecting the space fluid, a second surfactant solution in an amount about equal to the amount of the first surfactant solution, and characterized as having a pre-injection viscosity about equal to the first surfactant solution and the spacer fluid, and as having a selected chromatographic velocity which is higher than the chromatographic velocity of the first surfactant solution, and as having a composition such that it will be capable of interacting physically with the first surfactant solution to produce a phase change so that the product of such interaction is capable of at least partially plugging the pores of the formation in which such product is placed.



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**4,745,977**

## METHOD FOR RESISTING CORROSION IN GEOTHERMAL FLUID HANDLING SYSTEMS

**William W. Love, La Habra Heights, and Carl J. Cron, Placentia, both of Calif., assignors to Union Oil Company of California, Los Angeles, Calif.**

**Filed Apr. 12, 1985, Ser. No. 722,785**
**Int. Cl.[4] E21B** *43/00;* **C22F** *1/18*
**U.S. Cl. 166—369** **14 Claims**

**1**. A method for resisting corrosion while conducting a flow of hot, corrosive geothermal fluid, the method comprising the steps of:

(a) forming a fluid conducting element of a beta and alpha titanium-base product produced by heating to form a metastable beta titanium matrix, and thereafter head treating said matrix to form sufficient alpha phase therein providing an increase in ultimate tensile strength of at least about 10,000 psi over that of the matrix before said heat treating, said beta and alpha titanium-base product so formed having an average valence electron density of between about 4.15 and about 4.35, said composition consisting essentially of:

(i) a total of between about 2 and about 10 weight percent of one or more beta eutectoid elements, selected from the group consisting of iron, manganese, chromium and cobalt, except that the maximum individual weight percent of iron is about 5 percent, of manganese is about 5.5 percent, of chromium is about 9 percent, and of cobalt is about 4 percent:

(ii) between about 4 and about 10 weight percent of vanadium;

(iii) between about 3 and about 6 weight percent of molybdenum;

(iv) between aout 2 and about 5 weight percent of aluminum; and

(v) the balance titanium; and

(b) flowing said geothermal fluid through said fluid conducting element.

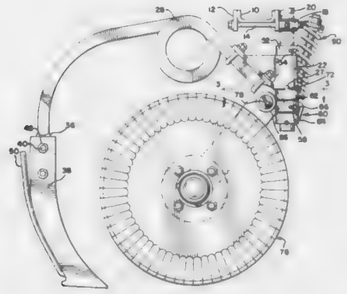
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**4,745,978**

## MOUNTING ARRANGEMENT FOR A COULTER AND KNIFE

**Gerald E. Williamson, 802 W. Jefferson, Macomb, Ill. 61455**

**Filed Feb. 2, 1987, Ser. No. 10,268**
**Int. Cl.[4] A01B** *79/02, 61/04, 49/06*
**U.S. Cl. 172—166** **6 Claims**



**1**. A mounting arrangement for a coulter and knife including a vertically disposed shank adapted to be connected to a portable frame and further adapted to support a coulter wheel assembly and a knife blade, a first mounting collar positioned on said vertical shank and rotatable with respect thereto, a coulter wheel assembly connected to said first mounting collar, a second mounting collar positioned on said vertical shank and rotatable with respect thereto, a spring arm secured at one end to said second mounting collar, a knife blade secured to and supported by said spring arm and located behind and aligned with said coulter wheel, locking means connecting said first mounting collar and said second mounting collar to provide conjoint rotation of said knife blade and said coulter wheel about said vertical shank.

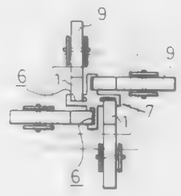
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**4,745,979**

## METHOD AND APPARATUS FOR DRIVING DRAIN BOARD

**Tatsuo Morimoto, Ashiya, Japan, assignor to Kazuko Morimoto; Mayumi Morimoto and Kayoko Imajo, all of Hyogo, Japan**

**Filed Feb. 12, 1986, Ser. No. 828,779**
**Claims priority, application Japan, Feb. 14, 1985, 60-26715**
**Int. Cl.[4] E02B** *11/00*
**U.S. Cl. 173—22** **4 Claims**




**1**. Apparatus for simultaneously driving a plurality of vertical drain boards having upper and lower ends into a foundation soil comprising a derrick; a hollow vertical mandrel having upper and lower ends suspended from said derrick having a like plurality of longitudinal through-slots each adapted to receive a drain board therethrough; means to releasably secure the lower ends of said drain boards adjacent the lower end of said mandrel; means to drive said mandrel with said drain boards into a foundation soil; means to actuate said releasable means to disengage said lower ends of said drain boards from said releasable means; means to rotatably mount a plurality of drain board coils on the top of said derrick with each coil positioned adjacent a through-slot to feed lead ends of the drain board coils into and downwardly inside said through slots to the lower end of said mandrel; said releasable means comprising an actuator, a plurality of arms pivotally secured to said actuator and securable to the lead ends of said plurality of drain board coils; and means to pivot said arms downwardly, whereby said mandrel may be withdrawn from said foundation soil while leaving said drain boards in place in said foundation soil; and whereby upward shifting of said mandrel disengages said arms from the lead ends of said drain board coils.

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**4,745,980**

## AUTO-HAMMER DRIVER

**Te-Shun Chung, No. 230-16, Lin Lo Road, Lin Lo Hsiang, Pingtung Hsien, Taiwan**

**Filed Nov. 25, 1986, Ser. No. 934,680**
**Claims priority, application Taiwan, Mar. 30, 1985, 74202286**
**Int. Cl.[4] B25D** *15/00*
**U.S. Cl. 173—93.7** **1 Claim**

**1**. An auto-hammer driver for loosening a bolt or nut comprising:

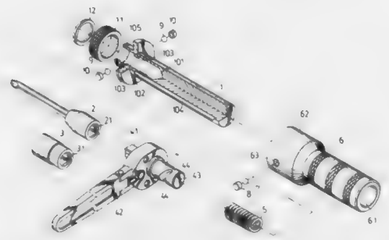
(a) a cylindrical body having a work end, an impact end, a work side portion and a work end surface with an out-

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ward flange provided on the work side portion thereof, said cylindrical body having a hollow work side portion with an inner cavity in the work end surface thereof and a pair of opposed radial circular holes provided through said hollow work side end portion of said body, and an annular groove provided in the outer surface of said cylindrical body on the work side of said circular holes;

(b) a rotary member having a work end, an impact end, and a central portion thereof comprising a driving head at the work end portion thereof, a ratcheted radial arm projecting from the central portion thereof, a cylindrical axial impact-side portion of said rotary member having a diameter slightly less than the inside diameter of the inner cavity of the cylindrical body for insertion into said inner cavity of said cylindrical body, said cylindrical axial impact-side portion of the rotary member further provided with a pair of opposing V-shaped slots on its surface, a pair of aligned push balls each restrictedly received in one of said V-shaped slots, a compression spring disposed within the inner cavity of the cylindrical body and abutting the impact end of the cylindrical axial impact-side portion for biasing the rotary member away from the cylindrical body, a pair of aligned cylindrical plugs with



inner and outer ends, each received in one of the radial circular holes of the cylindrical body and including a curved concavity at the inner end thereof for restricting one of said push balls to move synchronously back and forth with said cylindrical body and to roll within said V-shaped slots;

(c) a socket member removably mounted on the work end of the rotary member for driving said bolt or nut;

(d) a blocking ring member removably sleeved on said cylindrical body at the work end around the circular holes for confining the cylindrical plugs within said circular holes;

(e) a C-shaped retaining ring having a notch for removable sleeving on the cylindrical body in said annular groove on the work end of the blocking ring;

(f) a tubular hollow impact member, axially slidably sleeved on the impact end of the cylindrical body for hammering against the outward flange of said body; and

(g) means for guiding said impact member to slide axially on the cylindrical body in straight line motion;

whereby when the impact member is hammered on the outward flange of the cylindrical body, that body and the push balls move back and forth in the V-shaped slots of the rotary member thereby driving the socket member to rotate.

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**4,745,981**

**HYDRAULIC IMPACT TOOL**

**Robert J. Buske, Corsicana, Tex., assignor to Consolidated Technologies Corp., Denver, Colo.**

**Filed Jul. 30, 1985, Ser. No. 760,389**

**Int. Cl.[4] B23B *45/16***

**U.S. Cl. 173—119** **5 Claims**

1. A hydraulic impact tool, comprising:

a housing, having a bore;

a working tool, one of the working tool being mounted within the bore;

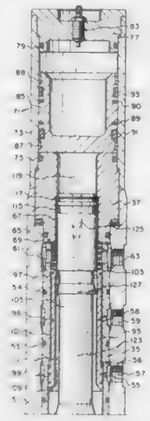
a ram, reciprocally disposed within the housing, the ram having a piston portion having a diameter smaller than the diameter of the bore;

energy storage means for accelerating the ram to deliver a blow to the working tool when the ram is released;

a valve slide, reciprocally disposed around the ram, the valve slide having an upper sealing portion for sealingly engaging the circumference of the bore, the valve slide having a lower sealing portion for sealingly engaging the circumference of the bore and the piston portion of the ram, thereby dividing the bore into upper, intermediate, and lower annular chambers, and the valve slide having an inside diameter which is larger than the outside diameter of the ram;

a high pressure hydraulic fluid inlet port for supplying high pressure fluid to the intermediate annular chamber to force the lower sealing portion of the valve slide into sealing engagement with the piston portion of the ram;

an intermediate pressure hydraulic fluid inlet port for supplying intermediate pressure fluid to the lower annular



chamber to force the ram and the valve slide away from the working tool when the ram and the valve slide are in sealing engagement;

a first return line hydraulic fluid outlet port for exhausting said intermediate pressure fluid from the upper annular chamber while said upper chamber is open to said lower chamber, thereby permitting said ram to be driven downwardly; and

a second return line hydraulic fluid outlet port for exhausting said high pressure fluid from the intermediate annular chamber, thereby interrupting said sealing engagement of said valve slide and said ram, which causes said upper chamber to open to said lower chamber, such that said intermediate pressure hydraulic fluid inlet port need not be simultaneously closed to permit said ram to be driven downwardly, said fluid from said intermediate annular chamber being capable of being maintained at a different pressure than the fluid from said fluid from said upper annular chamber.

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**4,745,982**

**ADJUSTABLE BENT SUB**

**Kenneth H. Wenzel, 3668-93 Street, Edmonton, Alberta, Canada T6E 5N3**

**Filed Nov. 28, 1986, Ser. No. 935,735**

**Int. Cl.[4] E21B *7/08***

**U.S. Cl. 175—74** **9 Claims**

1. An adjustable bent sub for use in directional drilling in earth formations, comprising:

(a) a first member having:

i. a primary axis; and



ii. external, cylindrical surface means defining a secondary axis disposed at a predetermined offset angle with respect to said primary axis;

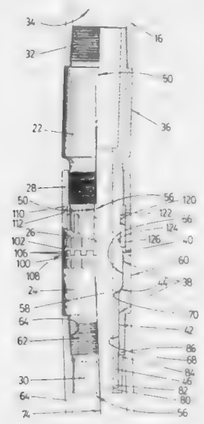
(b) a tubular second member secured to said first member against axial displacement and having:

i. a primary axis;

ii. internal, cylindrical surface means defining a secondary axis disposed at a predetermined offset angle with respect to said second member primary axis, said internal surface being adapted to telescopically receive said first member external surface in sliding fit relation for rotation about said secondary axis; and

iii. first clutch means extending axially from one end thereof;

(c) locking sleeve means telescopically receiving and non-



rotatably coupled to said external surface means of said first member and having second clutch means extending axially of one end thereof toward said second member, said sleeve means being axially movable on said first member between an engaged position whereat said first and second clutch means are interengaged and non-rotatably couple said second member and said first member in a predetermined augular position and a disengaged position whereat said locking sleeve is axially displaced from said second member and said first and second clutch means are disengaged from one another so as to permit angular adjustment of said second member with respect to said first memeber; and

(d) means threaded onto said external surface of said first member for securing said sleeve in said engaged position thereof.

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**4,745,983**

**BIT SEAT PROTECTOR DEVICE FOR DRILLING SYSTEMS OR THE LIKE**

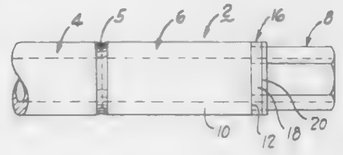
**John L. Moorehead, Mentor, and Ray H. Shaw, Willowick, both of Ohio, assignors to Sandvik Rock Tools, Inc., Bristol, Va.**

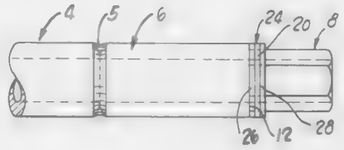
**Filed Dec. 17, 1986, Ser. No. 942,906**

**Int. Cl.[4] E21B *17/07, 17/10***

**U.S. Cl. 175—320** **4 Claims**

1. A drill rod system of the type for mounting a drill bit for rotary drilling and for removing particulate materials by means of a vacuum, said system comprising at least one hollow drill rod member adapted for receiving drilled particulate materials therethrough, one end of said drill rod member adapted to detachably mount a drill bit having a head portion and an integral male socket portion adapted to be interiorly mounted within said drill rod member, said head and socket portions together defining a peripheral shoulder surface adapted for thrust bearing engagement on the confronting surface of said drill rod member, and a deformable protector element adapted to be disposed between said shoulder surface portion and the confronting surface of said drill rod member for receiving axial thrust load forces from said drill bit, said protector element being of a generally flat construction having an upper planar surface and a lower planar surface separated by a generally uniform thickness and being of a generally ring-like configuration confined by a central opening, the opening being sized to receive said male socket portion, and said protector element





being made form a deformable material having a lesser hardness as compared to the material of said drill bit and said drill rod members; and

wherein said protector element is of a composite construction including at least one flat layer of a malleable metal alloy material and a second flat adhesively bonded layer of a polymeric material, the composite protector element being of uniform thickness.

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**4,745,984**

**ELECTRIC POWER STEERING SYSTEM FOR VEHICLES**

**Yasuo Shimizu, Tochigi, Japan, assignor to Giken Kogyo Kabushiki Kaisha Honda, Tokyo, Japan**

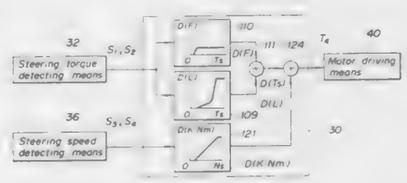
**Filed Jul. 17, 1986, Ser. No. 886,473**

**Claims priority, application Japan, Aug. 6, 1985, 60-173466**

**The portion of the term of this patent subsequent to Aug. 25, 2004, has been disclaimed.**

**Int. Cl.[4] B62D *5/04***

**U.S. Cl. 180—79.1** **8 Claims**




1. An electric power steering system (50) for vehicles having an electromagnetic servo device (1) including an input shaft (5) operatively connected to a steering wheel, an output shaft (6) operatively connected to a steered wheel, an electric motor (14) for operatively supplying auxiliary torque to said output shaft (6), steering torque detecting means (32) for detecting steering torque (Ts) acting on said input shaft (5), steering speed detecting means (36) for detecting the steering speed of said steering wheel, and drive control means (30, 40) which receives an output signal ($S_1$, $S_2$) from said steering torque detecting means (32) and an output signal ($S_3$, $S_4$) from said steering speed detecting means (36) and feeds said electric

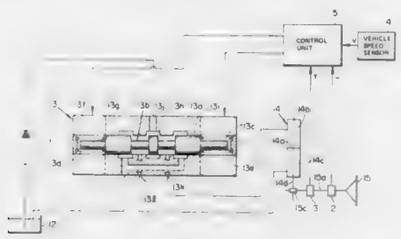
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motor (**14**) with a motor drive signal in accordance with said output signals ($S_1$, $S_2$, $S_3$, $S_4$), wherein:
said drive control means (**30**, **40**) comprises:
means (**109**, **110**; **200**) for determining a component (D(L)) of said motor drive signal (Va) that corresponds to the road surface side load and a component (D(F)) of said motor drive signal (Va) that corresponds to the load due to friction elements of said electromagnetic servo device (**1**), depending on said output signal ($S_1$, $S_2$) from said steering torque detecting means (**32**);
means (**121**) for determining a component (D(K·Nm)) of said motor drive signal (Va) that corresponds to the steering speed, depending on said output signal ($S_3$, $S_4$) from said steering speed detecting means (**36**); and
means (**111**, **124**, **40**; **200**, **124**, **40**) for summing said road surface side load component (D(L)), said frictional load component (D(F)), and said steering speed component (D(K·Nm)) to thereby determine the magnitude of said motor drive signal (Va) and outputting said motor drive signal (Va) to said electric motor (**14**).

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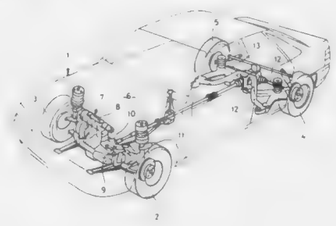
**4,745,985**
**AUTOMOTIVE VEHICLE POWER-STEERING SYSTEM AND METHOD**
**Masafumi Nakayama; Tokiyoshi Yanai; Hirotsugu Yamaguchi; Yutaka Aoyama, and Moritsune Nakata, all of Kanagawa, Japan, assignors to Nissan Motor Company Limited, Yokohama, Japan**
**Filed Mar. 12, 1985, Ser. No. 710,669**
**Claims priority, application Japan, Mar. 14, 1984, 59-48524**
**Int. Cl.⁴ B62D** *5/06, 5/087*
**U.S. Cl. 180—142** **11 Claims**

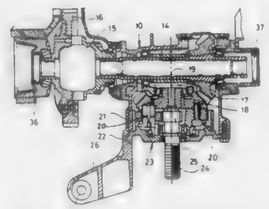


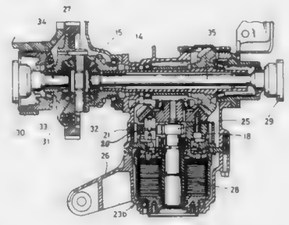

**1**. An automotive power-steering system comprising:
a steering mechanism means associated with a steering wheel for performing vehicular steering operation;
a first sensor means for monitoring a magnitude of said steering mechanism deviation from a neutral position of said steering mechanism means, said first sensor means producing a first sensor signal representative of a deviation magnitude of said steering mechanism means;
a second sensor means for monitoring a manual steering force applied through said steering wheel and for producing a second sensor signal representative of the steering force applied;
a power-assist actuator means, associated with said steering mechanism means, for augmenting a manual steering force and for transmitting the augmented steering force to said steering mechanism means, said power-assist actuator operating said steering mechanism means at a shifted position corresponding to an angular position of said steering wheel; and
a control means for deriving a first control signal for controlling operation of said actuator means toward a first steering direction toward which said steering wheel is operated, and for deriving a second control signal for directing said actuator to operate said steering mechanism means toward said neutral position when said second sensor signal is indicative of no steering force applied and said first sensor signal is indicative of deviation of said steering mechanism from said neutral position during a set period of time starting from a point in time at which the steering force falls to zero when the deviation of said steering mechanism is of at least a given value.

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**4,745,986**
**MOTOR VEHICLE WITH FRONT-MOUNTED TRANSVERSE POWER UNIT**
**Peter-Hans Hanenberger, Wiesbaden-Nordenstadt, Fed. Rep. of Germany, assignor to General Motors Corporation, Detroit, Mich.**
**Filed Jun. 17, 1987, Ser. No. 63,013**
**Claims priority, application Fed. Rep. of Germany, Jun. 27, 1986, 3621620**
**Int. Cl.⁴ B60K** *17/04, 17/22, 17/344*
**U.S. Cl. 180—233** **3 Claims**







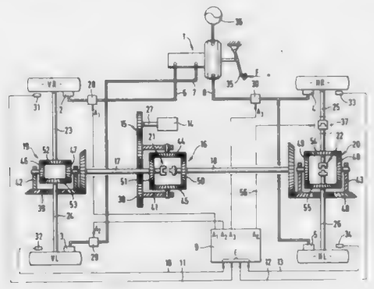
**1**. A motor vehicle with a front-mounted transverse power unit which comprises a gearbox disposed next to an engine, a differential case driven by an output gear of the gearbox and a transfer case having a hollow shaft extending parallel to the engine and driven by the differential case, characterized in that the transfer case has a connection adapted for optional connection to an intermediate member which comprises a fluid friction clutch and which is coupled to a propeller shaft leading to the rear wheel drive for four-wheel drive, or to an intermediate member which comprises a power take-off shaft and which is directly connected to the propeller shaft leading to the rear-wheel drive for exclusive rear-wheel drive, in that the differential case is optionally provided with differential gears which drive axle shafts which drive the front wheels for front-wheel drive or four-wheel drive, and in that the differential case has a lateral outlet which is closed by a cover and the transfer case has a lateral outlet which is closed by an additional cover when the differential case does not have any gears and the transfer case is connected to the intermediate member which comprises a power take-off shaft and which is directly connected to the



propeller shaft leading to the rear-wheel drive for exclusive rear-wheel drive.

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**4,745,987**
**SLIP CONTROL BRAKE SYSTEM FOR ALL WHEEL DRIVE MOTOR VEHICLES**
**Gunther Buschmann, Griesheim, Fed. Rep. of Germany, assignor to Alfred Teves GmbH, Frankfurt am Main, Fed. Rep. of Germany**
**Continuation of Ser. No. 755,933, Jul. 16, 1985, abandoned. This application Mar. 17, 1987, Ser. No. 28,000**
**Claims priority, application Fed. Rep. of Germany, Jul. 20, 1984, 3426747**
**Int. Cl.⁴ B60K** *17/35*
**U.S. Cl. 180—197** **9 Claims**

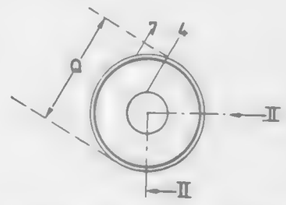


**1**. A slip-controlled brake system for a wheeled motor vehicle including a plurality of axles, at least one of said axles being split, means for applying motive power to all wheels, a differential for each of said axles for compensating position differences between individual wheels of said vehicles, a plurality of wheel sensors equal in number to the number of wheels and adapted to determine a rotational velocity condition of said wheels and to develop a signal of said condition, analyzer means connected to each of said sensors for receiving said signals and to derive, by analysis and logical interpretation of said signals, at least one brake pressure control signal, a plurality of brake pressure modulators adapted to accept and be controlled by said control signal in a manner suitable to brake pressure in the event of imminent locking of a wheel brake, and further including a disconnecting clutch assembled in said at least one split axle, said analyzer means electrically coupled to said disconnecting clutch for disengaging said disconnecting clutch in response to said to least one brake pressure control signal whereby driving torque from said differential to a wheel is eliminated by said clutch upon derivation of a brake pressure control signal that is transmitted by said analyzer indicating need for slip control.

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**4,745,988**
**DEVICE FOR CONDUCTING AWAY THE EXHAUST GASES FROM INTERNAL COMBUSTION ENGINES**
**Jean Hardt, Benken, and Jakob Widrig, Winterthur, both of Switzerland, assignors to Swiss Aluminium Ltd., Chippis, Switzerland**
**Division of Ser. No. 395,726, Jul. 6, 1982, which is a division of Ser. No. 155,458, Jun. 2, 1980, Pat. No. 4,352,408. This application Nov. 23, 1983, Ser. No. 554,523**
**Claims priority, application Switzerland, Jun. 6, 1979, 5250/79**
**The portion of the term of this patent subsequent to Oct. 5, 1999, has been disclaimed.**
**Int. Cl.⁴ F01N** *1/02*
**U.S. Cl. 181—249** **1 Claim**

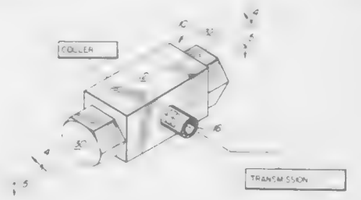
**1**. An aluminum silencing system comprising an exhaust pipe, a sleeve-shaped silencer enclosing a portion of said exhaust pipe and forming a chamber around said exhaust pipe wherein said portion of said exhaust pipe enclosed by said silencer is provided with perforations, said silencer having two sleeve-shaped parts joined together, said sleeve-shaped parts being provided on one end thereof with collars for fitting said sleeve-shaped parts on said exhaust pipe and on the other end thereof with locking means for joining said sleeve-shaped parts




together, said locking means comprises a profiled shape extending around the circumference of said sleeve-shaped parts wherein the profiled shape on one of said two sleeve-shaped parts is telescopically received in the profiled shape on the other of said two sleeve-shaped parts such that said sleeve-shaped parts are joined together radially to their longitudinal axis.

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**4,745,989**
**VALVE FOR DRAINING AUTOMATIC TRANSMISSION FLUID AND METHOD OF USING SAME**
**John G. DiMatteo, 2807 W. Ave. M-12, Lancaster, Calif. 93536**
**Filed Jun. 17, 1987, Ser. No. 63,546**
**Int. Cl.⁴ F01M** *11/04*
**U.S. Cl. 184—1.5** **15 Claims**




**1**. A valve in combination with a vehicular automatic transmission and transmission cooler, comprising:
a valve comprising a main housing having a hollow interior volume through which may flow a fluid, said main housing having a first, second, third and fourth side wall;
slide control means mounted for sliding movement in said interior volume, said slide control means comprising a first passageway, and a second passageway spaced from said first passageway, said first passageway allowing for flow of fluid through said slide control means along a first path, and said second passageway allowing for flow of fluid along a second path spaced from said first path;
said main housing having a first inlet port means formed in said first side wall, and a second outlet port means formed in said second side wall in fluid communication with said first inlet port means via said hollow interior volume;
said main housing further comprising at least one additional port means at said third side wall, said slide control means having an end positioned adjacent said at least one additional port means;
spring means for biasing said slide control means into a first state thereof where said first passageway fluidly connects said first and second port means so that fluid may pass therethrough, said first state preventing the flow of fluid through said second passageway;
means operatively associated with said at least one addi-

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tional port means for overcoming the force of said spring means for positioning said slide control means in a second state thereof where said second passageway fluidly connects said first inlet port means with said at least one additional port means to direct the flow of fluid outwardly through said at least one additional port means;

a vehicular automatic transmission and cooler therefor;

means for connecting the outlet of said automatic transmission to the inlet of said cooler for circulating the automatic transmission fluid through said cooler;

said valve being interposed with said means for connecting such that the automatic transmission fluid flows through said valve during passage to said cooler;

said means for connecting comprising a first portion having a first end connected to said outlet of said transmission, and a second end; and a second portion having a first end connected to said inlet of said cooler and a second end;

said second end of said first portion being coupled to said first inlet port means of said main housing, and said second end of said second portion being coupled to said second outlet end of said main housing, whereby said valve may be used to empty old fluid from the transmission while new oil is being added.

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**4,745,990**

## LUBRICANT INJECTOR AND APPARATUS FOR LUBRICATING MOVING POINTS OF LUBRICATION

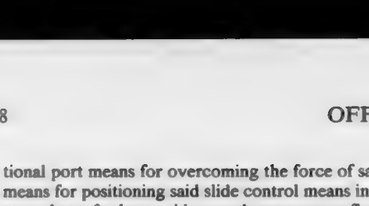
**Horst Saretzky, Ennepetal, and Siegfried Bemba, Rommerskirchen, both of Fed. Rep. of Germany, assignors to De Limon Fluhme GmbH & Co., Düsseldorf, Fed. Rep. of Germany**

**Filed Mar. 31, 1987, Ser. No. 32,837**

**Claims priority, application Fed. Rep. of Germany, Jan. 13, 1987, 3700782**

**Int. Cl.⁴ F16N** *13/16*

**U.S. Cl. 184—15.2** **11 Claims**



1. A lubricant injector for an apparatus for lubricating moving points of lubrication, especially rollers of a chain conveyer where the bearings of the rollers can be refilled with lubricant via a lubricant fitting onto which said injector can be pressed during the lubricating process, said lubricant injector having a housing with an inlet for receiving lubricant, and an injector tip for placement on said lubricant fitting, with a spring-loaded feed piston being disposed in said housing and serving to transfer lubricant from said inlet to said injection tip; said injector further comprises:

a spring-loaded movable piston that is disposed in said housing and is actuated with compressed air, with said injector tip being connected to said movable piston; an annular gap that communicates with said lubricant inlet is provided between said housing and said movable piston, with the latter having a discharge end, facing said injector tip, that is provided with a coaxially disposed cylinder chamber; said movable piston also has a bore that connects said annular gap and said cylindrical chamber; and

a cylindrical body, for a spring-loaded control piston and said feed piston, that is disposed in said cylindrical chamber, with play, in such a way that a transfer passage is provided that leads from one side of said feed piston to an opposite side thereof that communicates with said injector tip, with said feed piston being disposed between said control piston and said injector tip; said cylindrical body is furthermore disposed in said cylindrical chamber in such a way as to leave free a preliminary control chamber that communicates with said bore to establish said communication between said annular gap and said cylindrical chamber; on that side of said feed piston remote from said injector tip, said cylindrical body also has first channel means, controlled by said control piston, for receiving lubricant from said preliminary control chamber, and second channel means that can communicate with said first channel means and said transfer passage to effect said transfer of lubricant from said lubricant inlet to said injector tip.

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**4,745,991**

## SPEED CONTROL APPARATUS FOR A.C. ELEVATOR

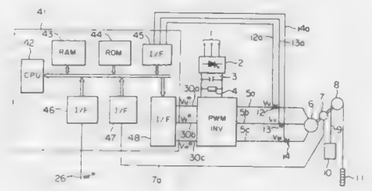
**Tooru Tanahashi, Inazawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan**

**Filed Apr. 1, 1987, Ser. No. 32,539**

**Claims priority, application Japan, Apr. 3, 1986, 61-77069**

**Int. Cl.⁴ B66B** *1/30*; **H02P** *5/40*

**U.S. Cl. 187—119** **11 Claims**



1. A speed control apparatus for an A.C. elevator, comprising:

an inverter which inverts D.C. power into A.C. power of variable voltage and variable frequency,

a cage driving motor which is supplied with the A.C. power from said inverter and which drives a cage of the elevator,

a speed detector which detects a speed of said motor,

a current detector which detects a primary current of said motor,

an integration circuit which integrates an output of said current detector and which is reset at every fixed period,

a holding circuit which holds an output of said integration circuit for a predetermined time, and

control means for controlling the primary current and a frequency of said motor with an output of said speed detector and an output of said holding circuit, thereby to control said inverter so as to control a torque current and an exciting current of said motor independently of each other.

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**4,745,992**

## BRAKE SHOE ASSEMBLY RETAINER AND LINING WEAR SENSOR

**George Lusa, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.**

**Filed May 29, 1987, Ser. No. 57,357**

**Int. Cl.⁴ F16D** *66/02, 55/224*

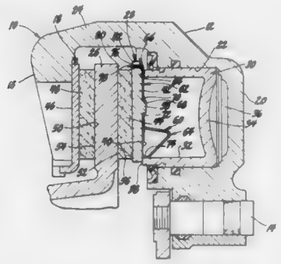
**U.S. Cl. 188—1.11** **6 Claims**

2. For use in a disc brake having a brake shoe assembly and a cup-shaped piston for moving the brake shoe assembly into and out of engagement with a rotatable disc to be braked, the brake shoe assembly including a backing plate having a friction lining on one side having a friction braking surface for braking engagement with the disc, the piston having an inner wall and an annular end engaging the other side of the backing plate, the other side of the backing plate having a boss formed thereon extending into the piston, a combined brake shoe assembly retainer and lining wear sensor comprising:

a flat sheet stock spring body having a main body section provided with a center opening for receiving the backing



plate boss and provided with means for gripping the boss and securing said spring body to the backing plate, one spring body end having a retainer section formed by a reversely bent extension of said spring body main body section and terminating in a planar free end adapted to engage the inner wall of the piston adjacent the piston annular end and retain the brake shoe assembly to the piston, and the opposite end of said spring body having a friction lining wear sensing tab formed therefrom, said tab extending outwardly from said main body section and adapted to extend through an opening formed in the backing plate and the friction lining and terminate beyond the backing plate and a portion of the friction lining adjacent the backing plate of a thickness which when the lining has been worn to that thickness the wear sensor should be activated, said tab having its outer end adapted to engage the disc during brake actuation when the friction lining has worn to that thickness where the wear sensor should be activated and to vibrate said tab and at least a part of said spring body main body section and generate an audible warning signal indicating that sufficient lining wear has occurred to require, such warning.



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**4,745,993**

## CENTRIFUGAL CHAIN ASSEMBLY FOR A MOTOR VEHICLE

**Gerd Schulz, Besselstrasse 9, and Hans-Peter Hartleif, Rotbergskamp 20c, both of 2100 Hamburg 90, Fed. Rep. of Germany**

**Filed Mar. 12, 1986, Ser. No. 838,664**

**Claims priority, application Fed. Rep. of Germany, Mar. 14, 1985, 3509061; Mar. 14, 1985, 3509062; Mar. 14, 1985, 3509063**

**Int. Cl.⁴ B60T** *1/00*

**U.S. Cl. 188—4 B** **48 Claims**



1. A centrifugal chain assembly for a motor vehicle, said chain assembly being mountable on either side of a vehicle and being mountable on vehicles of different types and sizes, said centrifugal chain assembly comprising holder means fixed at one side to the motor vehicle, a skid prevention device carried by said holder means, said skid prevention device including a centrifugal wheel carrying a plurality of lengths of chain, a pivot arm, said centrifugal wheel being rotatably mounted on said pivot arm and being pivotable by means of a pivotation mechanism from a rest position to an operative position in which said centrifugal wheel is urged against a side wall, facing inwardly of the motor vehicle, of a motor vehicle wheel so as to be rotated by the motor vehicle wheel, said holer means comprising two spaced holder members, a carrier bolt connected to said holder members, an adjustably positioned pivot bearing mounted to said carrier bolt, a plug member carried by said pivot bearing, a carrier element, means interconnecting said carrier element and said centrifugal wheel, said carrier element being supported from said first named plug member and having a plug-receiving bushing formed therein.

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**4,745,994**

## ANGULAR DECELERATION SENSOR

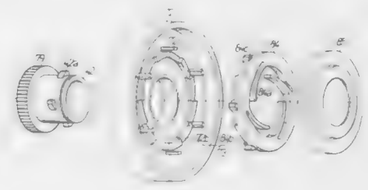
**Tetsuo Tsuchida, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Aug. 1, 1986, Ser. No. 892,578**

**Claims priority, application Japan, Aug. 2, 1985, 60-170858**

**Int. Cl.⁴ B60T** *13/06*

**U.S. Cl. 188—181 A** **10 Claims**



1. An angular deceleration sensor wherein a flywheel is rotatably and axially slidably supported on a drive shaft operatively connected to a detected subject which rotates in a fixed direction, and between the drive shaft and the flywheel are interposed in series a clutch which normally transmits a driving torque from the drive shaft to the flywheel and is adapted to slip to allow an overrunning rotation of the flywheel when an angular deceleration in excess of a predetermined value occurs in the subject, and a cam mechanism for imparting an axial displacement to the flywheel in response to the overrunning rotation of the flywheel, the axial displacement of the flywheel being output as an angular deceleration signal, said clutch comprising a unidirectional clutch which assumes a locked state when the drive shaft is in a drive side position relative to the flywheel, wherein said unidirectional clutch comprises engaging projections provided on one of a drive shaft side and a flywheel side, and resilient pawls provided on the other side and engageable with said engaging projections.

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**4,745,995**

## SLIP-CONTROLLED BRAKE SYSTEM

**Hans Wupper, Friedrichsdorf/Ts., Fed. Rep. of Germany, assignor to Alfred Teves GmbH, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Dec. 22, 1986, Ser. No. 944,652**

**Claims priority, application Fed. Rep. of Germany, Jan. 2, 1986, 3602133**

**Int. Cl.⁴ B60T** *8/00*

**U.S. Cl. 188—181 A** **1 Claim**

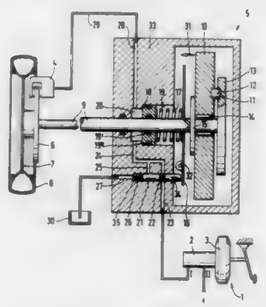
1. A slip-controlled brake system for an automotive vehicle having vehicle wheels, said system comprising, in combination:

a braking pressure modulator operated as a function of wheel deceleration and having an inert mass which is coupled to a shaft connected to a slip-controlled wheel of

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the vehicle, said mass rotating with said shaft of said slip-controlled wheel and being axially displaceable against a resetting force upon a deceleration of said slip-controlled wheel, and said mass actuating a valve member after a wheel deceleration threshold has been exceeded, thereby bringing about a modulation of the pressure in the brake of the slip-controlled wheel wherein the resetting force opposite to the axial displacement of said mass (10) is variable as a function of the braking pressure in the wheel brake (4) of the slip-controlled vehicle wheel (7, 8); and



wherein a return spring (17) is provided in a cylindrical bore which surrounds said shaft between said slip-controlled wheel and said mass, wherein the end of said cylindrical bore which faces said slip-controlled wheel terminates into a pressure chamber which communicates with and is acted upon by the braking pressure in the wheel brake (4), and wherein a resetting piston (18) is provided in said cylindrical bore between said chamber and said return spring for the generation of the resetting force.

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**4,745,996**

**BRAKE RING FOR BRAKE DISKS, ESPECIALLY OF DISK BRAKES FOR RAIL VEHICLES**

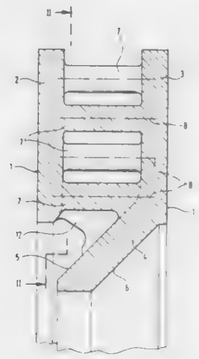
**Xaver Wirth, Ismaning, Fed. Rep. of Germany, assignor to Knorr-Bremse GmbH, Munich, Fed. Rep. of Germany**

**Filed Sep. 24, 1982, Ser. No. 423,338**

**Claims priority, application Fed. Rep. of Germany, Oct. 19, 1981, 3141434**

**Int. Cl.⁴ F16D** *65/12, 65/847*

**U.S. Cl. 188—218 XL** **5 Claims**



1. Brake ring for a brake disk, especially for a rail vehicle, comprising

(a) two annular bodies (2, 3), arranged at a distance adjacent to one another, their outer surfaces (1) facing away from each other and subjected to the action of brake shoes;

(b) stud bolts (7) bridging the entire distance between said annular bodies (2, 3), said stud bolts being attached to said annular bodies (2, 3) and being substantially uniformly and uninterruptedly distributed over their entire surfaces at a distance (A) from each other and parallel to the axis of said brake disk, said stud bolts (7), as seen in axial direction, being arranged in a symmetrical pattern, the axes (8) of said stud bolts (7) extending through the intersecting points of three systems, of straight lines (9, 10 and 11) located in one radial plane, the first of these systems of straight lines (9) consisting of straight, parallel lines and the second and third of these systems of straight lines (10 and 11) being formed by rotating said first system of straight lines (9) 60° and 120°, respectively.

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**4,745,997**

**OFFSET DETECTING DEVICE FOR TROLLEY-ASSISTED VEHICLES**

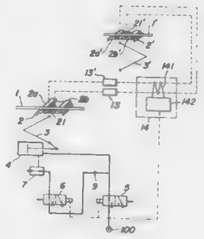
**Hidetoshi Takei, Ayase; Takumi Nozaka, Atsugi, and Teruo Minami, Kawasaki, all of Japan, assignors to Toyo Denki Seizo Kabushiki Kaisha and Komatsu, Ltd., both of Tokyo, Japan**

**Filed Jul. 22, 1987, Ser. No. 76,336**

**Claims priority, application Japan, Jul. 29, 1986, 61-176583**

**Int. Cl.⁴ B60L** *5/04, 9/00*

**U.S. Cl. 191—87** **4 Claims**



1. Offset condition detecting device of pantograph for trolley-assisted vehicles powered by an engine driven generator in non-trolley mode, and operated by outer power supply collected by a pair of vehicle mounted pantographs from two-line contact wires of an overhead system in trolley mode,

the improvement comprising a contact element for detecting offset condition of the pantograph from the contact wire, the contact element being mounted on the pantograph in an electrically insulated manner from collector sliding plate,

a current limiting impedance element connected in a circuit between the collector sliding plate of one pantograph of a pair and the offset condition detecting element on the other pantograph, and

current detecting means for detecting electric current flowing through said current limiting impedance element,

wherein the pair of pantographs are retracted down at emergency base when the detected current flowing through said impedance element exceeds a predetermined value.



**4,745,998**

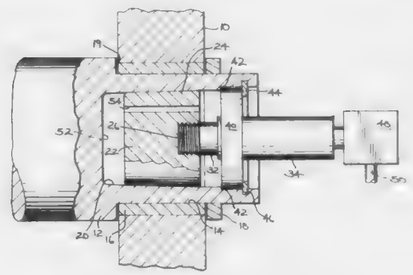
**DISENGAGEABLE FRICTION COUPLING FOR RELEASABLY JOINING AN ELEMENT ABOUT A SHAFT**

**John J. Stilin, Milwaukee, Wis., assignor to The Falk Corporation, Milwaukee, Wis.**

**Filed Oct. 9, 1986, Ser. No. 917,530**

**Int. Cl.⁴ F16D** *13/14*

**U.S. Cl. 192—74** **4 Claims**



1. A disengageable friction coupling, comprising:

a hollow shaft of ductile material and defining a continuous tapered inner surface;

an element defining an internal opening which is mounted about said hollow shaft in the region of said tapered inner surface, the opening having a diameter slightly larger than the outer diameter of said hollow shaft when said hollow shaft is in its normal, undeformed state;

a plug located inside said hollow shaft in the region of said element, said plug having a tapered outer surface adapted to mate with the tapered inner surface of said hollow shaft; and

a double acting ram connected to said plug and mounted to said shaft such that, when said driver drives in one direction, it presses said plug into said shaft so as to substantially elastically deform said shaft radially outward for frictional engagement with said element, and, when said driver drives in the other direction, it pulls said plug outward, allowing said shaft to return substantially to its normal, unstressed shape, releasing said shaft from frictional engagement with said element, said driver being nonrotatable with respect to said plug as the driver drives in both directions.

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**4,745,999**

**CLUTCH OPERATING CYLINDER FOR A PRESSURE-MEDIUM OPERATED CLUTCH**

**Franz Brugger, Winnenden; Franz Moser, Wendlingen, and Thomas Ruhl, Ostfildern, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany**

**Filed Jun. 2, 1987, Ser. No. 56,708**

**Claims priority, application Fed. Rep. of Germany, Jun. 2, 1986, 3618525**

**Int. Cl.⁴ F16D** *25/08*

**U.S. Cl. 192—83** **7 Claims**

1. A clutch operating cylinder for a pressure-medium operated clutch which is arranged in a power train of a motor vehicle equipped with a control of the drive power, with release piston means which is axially displaceable in a cylindrical housing and which acts via a push rod on a clutch release fork imposed upon by restoring spring means, comprising:

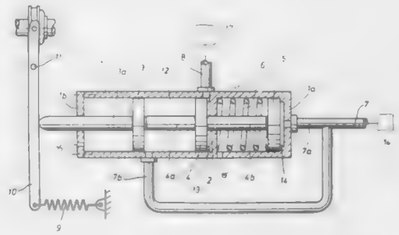
partition means for dividing said housing into first and second chambers, said release piston means having a rest position in an axially middle region of said first chamber;

second coaxial piston means in said first chamber having a rest position substantially adjacent said partition means;

third coaxial piston means in said second chamber;

spring means between said partition means and said third coaxial piston means for holding said third coaxial piston means in a rest position at a first end wall of said housing;

first and second piston rods on either side of said second coaxial piston means, said first piston rod supporting said release piston means when said release piston means is in said rest position, and said second piston rod extending through said partition means and contacting said third piston means in said rest positions of said second and third coaxial piston means;



a pressure medium line connectable to an input cylinder of the clutch and opening both through said first end wall into said second chamber and also into said first chamber closest to said rest position of said release piston means between said release piston means and said second coaxial piston means; and

a further pressure medium line connectable to a pressure accumulator and which can be shut off, said further pressure medium line opening into said first chamber between said partition means and said second coaxial piston means.

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**4,746,000**

**CURVED ESCALATOR**

**Hiroshi Nakatani, Inazawa; Makoto Tomidokoro, Ichinomiya, and Hiroshi Yoshikawa, Inazawa, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan**

**Continuation of Ser. No. 526,132, Aug. 24, 1983, abandoned.**

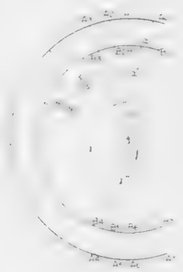
**This application Dec. 16, 1985, Ser. No. 808,386**

**Claims priority, application Japan, Sep. 14, 1982, 57-159862; Sep. 14, 1982, 57-159876; Oct. 19, 1982, 57-183315; Nov. 2, 1982, 57-192712**

**The portion of the term of this patent subsequent to May 5, 2004, has been disclaimed.**

**Int. Cl.⁴ B66B** *21/02*

**U.S. Cl. 198—328** **5 Claims**



1. A curved escalator comprising:

an inextensible endless belt means;

a plurality of segment steps of fixed width with an outer end and an inner end attached to said endless belt means;

means for driving said endless belt means in a loop disposed along a stairway path and means for guiding said belt means about said loop, said stairway path being curved in

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plan and having an intermediate section that has a predetermined constant slope angle, upper and lower landing sections that have substantially zero slope angle, and transition sections connecting said intermediate section to said upper or lower section that have sloping angles for smooth connection of the sections, said upper and lower horizontal sections being curved with constant radii of curvature about a center of curvature, said intermediate constant slope section being curved with constant radius of curvature about a center of curvature which is smaller than the radii of curvature of said upper and lower horizontal sections, and said upper and lower transition sections having radii of curvature about a center of curvature which gradually vary in accordance with the change in slope angle of said transition section, the center of curvature of the transition sections gradually shifting between the center of curvature of the intermediate constant slope section and the centers of curvature of the upper and lower horizontal sections such that the outer step end travels along a path having a radius related to the slope at the outer end determined by the relationship

$$R_1(\theta_1)=(R_1(R_1-R_2)\cos\theta_1)/(R_1\cos\theta_1-R_2\cos\theta_2)$$

and the inner step end travels along a path having a path related to the slope at the inner end determined by the relationship

$$R_2(\theta_2)=(R_2(R_1-R_2)\cos\theta_2)/(R_1\cos\theta_1-R_2\cos\theta_2)$$

where

$R_1(\theta_1)$: radius of curvature of the outer end at an arbitrary position

$R_2(\theta_2)$: radius of curvature of the inner end at an arbitrary position

$R_1$: radius of curvature of the outer end at the upper and lower landing sections

$R_2$: radius of curvature of the inner end at the upper and lower landing sections

$\theta_1$: slope angle of the outer end

$\theta_2$: slope angle at the inner end;

whereby the angular speed of the outer and inner ends of said steps is equal so that said belt means need not have the length adjusted.

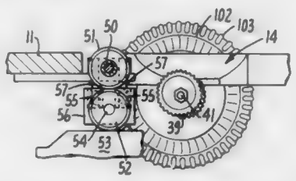
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**4,746,001**

## APPLE ORIENTING DEVICE

**Oldrich J. Tichy, Concord, Calif., assignor to Atlas Pacific Engineering Company, Pueblo, Colo.**

**Filed Nov. 10, 1986, Ser. No. 928,881**
**Int. Cl.[4] B65G 47/24**
**U.S. Cl. 198—385** **2 Claims**




1. In combination with a fruit orientor including a support movable over a path in a horizontal plane, at least one receptacle in said support having an open bottom and a frusto-conical side wall, a first shaft rotatably mounted on the underside of said support and extending to a position below the open bottom of said receptacle, and a first eccentric wheel mounted on said first shaft for rotation in a vertical plane in said open bottom, the improvement which comprises:

(a) a second shaft rotatably mounted in said support adjacent to one end of said receptacle and parallel to said first shaft;

(b) a plurality of upper rollers rigidly mounted to said second shaft, said upper rollers being of a diameter such that their periphery extends into and above the receptacle so as to engage a fruit therein;

(c) means for rotating said second shaft and upper rollers intermittently including

(d) a set of driver rollers mounted below said upper rollers;

(e) resilient means for biasing said drive rollers away from said upper rollers; and

(f) a cam track adapted to intermittently urge said drive rollers up into contact with said upper rollers whereby said upper rollers are rotated.

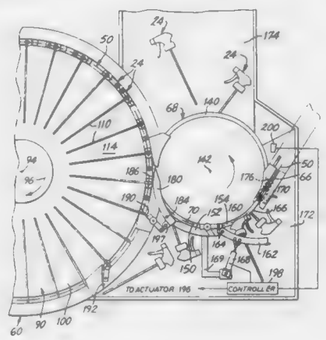
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**4,746,002**

## JAM COMPENSATION IN DELIVERING DISPENSER CAP ASSEMBLIES

**Peter Wysocki, Haworth, N.J., assignor to PMC Industries, Hackensack, N.J.**

**Filed Apr. 29, 1987, Ser. No. 43,768**
**Int. Cl.[4] B65G 37/00**
**U.S. Cl. 198—367** **13 Claims**




1. In apparatus for orienting and delivering dispenser cap assemblies advanced along a path of travel extending downstream from a supply of randomly oriented cap assemblies, the apparatus including orienting means located along the path of travel and having means rotatable about a generally vertical axis for receiving the randomly oriented cap assemblies, orienting at least some of the cap assemblies and delivering the oriented cap assemblies serially, in prescribed orientation, to a generally horizontal first segment of the path of travel, and transfer means located along a transition segment of the path of travel for transferring the oriented cap assemblies from the first segment downstream to a further segment of the path of travel, the improvement in which the transfer means delivers a stabilized stream of appropriately oriented cap assemblies to the further segment of the path of travel, the improvement comprising:

a guide track intercepting the first segment of the path of travel at a transfer point between the first segment and the transition segment, the guide track extending along the transition segment to guide the oriented cap assemblies along the transition segment, through a jam-prone portion of the path of travel, toward the further segment, the guide track including

a gate section mounted for swinging movement toward and away from the transition segment, between a first position wherein the gate section is integrated with the guide track to guide the cap assemblies along the transition section, and a second position wherein the gate section is displaced away from the transition segment to establish an opening in the guide track, at the jam-prone portion of the path of travel, through which the opening cap assemblies jammed in the jam-prone portion will leave the path of travel;

a diverter section extending along the guide track between the transfer point and the gate section and having a diverter tip adjacent the transfer point at the entrance to the transition segment, the diverter section being mounted for swinging movement between a first position wherein the diverter tip intercepts the first segment and directs cap assemblies into the transition segment, and a second position wherein the diverter tip enters the path of travel to close the entrance to the transition segment and divert cap assemblies out of the path of travel so as to preclude travel of the cap assemblies to the jam-prone portion; and

actuating means for moving the diverter section to the second position thereof when the gate section is in the second position thereof.



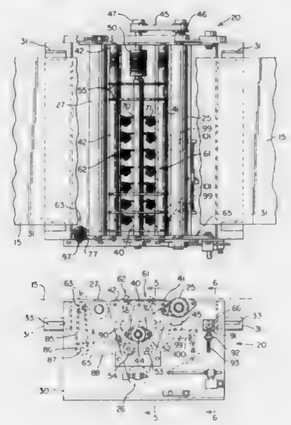
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**4,746,003**

## DIVERTING CONVEYOR

**Thomas C. Yu, Cincinnati, and Richard W. Kelsey, West Chester, both of Ohio, assignors to The Buschman Company, Cincinnati, Ohio**

**Filed Sep. 10, 1986, Ser. No. 905,430**
**Int. Cl.[4] B65G 47/46**
**U.S. Cl. 198—367** **12 Claims**



1. A sortation conveyor system for cartons and other articles including a frame defining a main line and at least one branch line having the upstream end thereof leading from one side of said frame to receive articles diverted thereto from said main line, comprising:

(a) power operated conveying means for conveying successive articles along said main line in a predetermined plane,

(b) said conveying means having a transversely extending gap therein adjacent said upstream end of said branch line,

(c) a diverter frame mounted for up and down movement on said main frame below said gap,

(d) a plurality of diverter wheels mounted on said diverter frame for rotation on axes canted with respect to the length of said main line whereby said wheels define a course directed toward said branch line,

(e) means establishing a lowered limit position for said diverter frame wherein said diverter wheels are below said conveying means plane and a raised limit position wherein said diverter wheels extend above said plane through said gap to engage and divert an article to said branch line from said main line,

(f) said diverter frame including an arm extending downstream beyond said gap,

(g) a further diverter wheel mounted on said arm downstream from said gap and adjacent but spaced laterally outwardly from said conveying means and positioned between said conveying means and the upstream end of said branch line,

(h) said further diverter wheel being mounted for rotation on an axis substantially parallel with said axes of said plurality of diverter wheel and being movable with said diverter frame to said raised position, and

(i) means for driving all of said diverter wheels whereby if an article engaged by said plurality of diverter wheels travels beyond said gap on said main line in partially laterally offset relation with said conveying means, said further diverter wheel will maintain the leading end of said article above said conveying means plane while supplementing the diverting action of the other said diverter wheels.

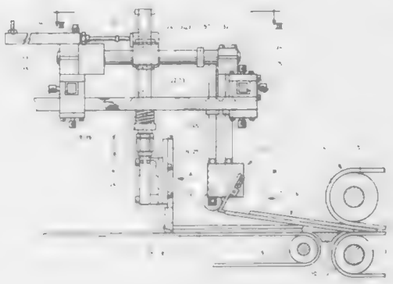
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**4,746,004**

## DEVICE FOR FORMING SEPARATE BATCHES OF FLAT ELEMENTS RUNNING IN A FLOW

**Markus Hess, Cheseaux, and Jean-Bernard Morisod, Crissier, both of Switzerland, assignors to Bobst SA, Switzerland**

**Filed Nov. 10, 1986, Ser. No. 928,569**
**Claims priority, application Switzerland, Nov. 11, 1985, 4827/85**
**Int. Cl.[4] B65H 33/12**
**U.S. Cl. 198—423** **7 Claims**



1. In a device for forming separate batches of flat objects, particularly for forming batches of folded box blanks being delivered in a flow from a processing machine, said device including a belt conveyor being arranged to receive a discharge from a delivery station of the processing machine, counting means for determining the number of blanks passing therebeneath in the flow of blanks, separating means for removing a batch of counted blanks from the flow of blanks and control means for actuating the separating means, the improvements comprising the separating means including a stop, means mounting the stop adjacent the surface of the conveyor belt for both movement parallel to the surface of the belt and perpendicular to said surface, first means for moving the stop towards a first horizontal position adjacent the counting means, second means for moving the stop between a first vertical position adjacent the surface of the belt to a second vertical position raised above the surface of the belt to allow passage of a batch of blanks therebeneath, third means for driving the conveyor belt at a linear speed of discharge for the processing machine, fourth means for driving the belt at a speed greater than the linear speed of the discharge of the processing machine and said control means including switch means being engaged when the stop is moved to the first horizontal position, said switch means actuating the fourth means to accelerate the speed of the belt to rapidly remove a batch from beneath the stop for a predetermined time interval.

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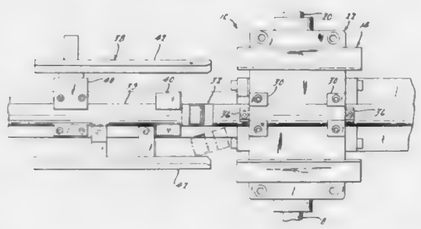


**4,746,005**

## PALLET LOCATING, CLAMPING, ROTATING AND TRANSFER ASSEMBLY

**Frank Bihary, Kinnelon; Alfred J. Huber, Clifton; Henry N. Shoiket, Rutherford, and William F. Crawford, Upper Montclair, all of N.J., assignors to Standard Tool & Manufacturing Co., Lyndhurst, N.J.**

**Filed Apr. 30, 1987, Ser. No. 44,812**
**Int. Cl.[4] B65G** *37/00*
**U.S. Cl. 198—465.1** **12 Claims**



**1**. A workpiece transfer assembly enabling a workpiece affixed to a pallet to be rotated comprising:

a pallet supporting means,

a first transfer bar segment,

bearing means carried by said pallet supporting means for supporting said first transfer bar segment for longitudinal movement about its longitudinal axis,

a rotary indexing table for rotating said pallet supporting means,

an intermediate transfer section for transporting said pallet to or from said pallet supporting means,

a second transfer bar segment carried by said intermediate transfer section,

transfer bar actuation means for longitudinally moving said transfer bar segments along said longitudinal axis, and

interlocking means on at least one of the ends of said first transfer bar segment and on at least one end of said second transfer bar segment for enabling said longitudinal movement along said longitudinal axis to be transmitted between said transfer bar segments when they are longitudinally aligned, but permitting said first transfer bar segment to rotate out of engagement with said second transfer bar segment when said rotary indexing table is rotated, whereby a workpiece supported by said pallet may be rotated to a desired rotated position at a work station and thereafter returned to a position of longitudinal alignment between said transfer bar segments for indexing along said transfer line.

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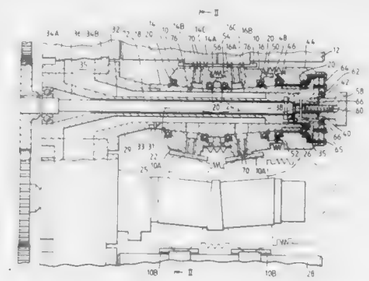
**4,746,006**

## FILTER CIGARETTE MANUFACTURE

**John E. Nixon, and Robert E. Williams, both of High Wycombe, England, assignors to Molins Machine Co, Inc., Bucks, England**

**Filed May 16, 1986, Ser. No. 864,134**
**Claims priority, application United Kingdom, May 17, 1985, 8512559**
**Int. Cl.[4] B65G** *47/24*
**U.S. Cl. 198—458** **10 Claims**

**1**. Apparatus for separating axially-aligned rods of the cigarette industry comprising a first pair of conical drums rotatably mounted on a non-rotatable first common sleeve and arranged to receive respectively the two rods of each pair to be separated, the axes of rotation of the drums being inclined so as to separate the rods carried by the respective drums; a second pair of conical drums rotatably mounted on a non-rotatable second common sleeve and arranged to receive the cigarettes from the first pair of conical drums, the second pair of conical drums having axes inclined so as to space the rods further apart while returning the rods to axially-aligned orientations; and means for receiving the spaced apart rods from the second pair of conical drums, in which each sleeve is slideably mounted on a support member so that each sleeve, independently of the



other sleeve, can be slid axially off the corresponding support member, after which the drums are removable by sliding off opposite ends of the sleeve.

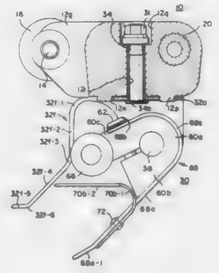
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**4,746,007**

## SINGLE GRIPPER CONVEYOR SYSTEM

**J. D. Houseman, Lake Saint Louis, Mo., assignor to Quipp Incorporated, Miami, Fla.**

**Filed Feb. 20, 1986, Ser. No. 831,186**
**Int. Cl.[4] B65G** *17/06*
**U.S. Cl. 198—470.1** **14 Claims**



**14**. A gripper conveyor system adapted to support a gripper assembly and being comprised of interconnecting members pivotally linked to one another in an end-to-end fashion to form a conveyor assembly;

a gripper assembly being secured to one of said interconnecting members;

said gripper assembly comprising a pair of cooperating gripper jaw members;

one of said gripper jaw members being integral with the mounting bracket which is secured to said interconnecting member;

the remaining gripper jaw member being pivotally mounted to said support bracket and having one end spaced from the mounting portion being movable between a first position substantially engaging said one of said gripper jaw members and a second position displaced from said one of said gripper jaw members;

a pin for pivotally mounting said remaining movable jaw member to said mounting bracket;

said movable jaw member further comprising a lever arm mounted upon said pivot pin;

a rotatable roller being secured to said lever arm;

clutch means secured to said mounting bracket having a portion thereof encircling said pivot pin for exerting a strong force against rotation of said pivot in a first direction and for exerting a weak force upon said pivot pin when it is rotated in the second direction.



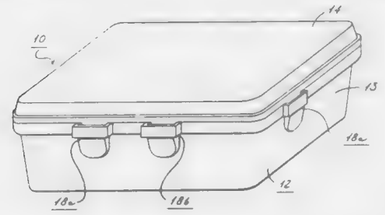
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**4,746,008**

## CHILD-RESISTANT BOX FOR STORAGE OF HAZARDOUS MATERIALS

**Karen H. Heverly, and Larry R. Heverly, both of 894 Village Cir., Blue Bell, Pa. 19422**

**Filed Jul. 1, 1987, Ser. No. 68,444**
**Int. Cl.[4] H45C** *13/10*
**U.S. Cl. 206—1.5** **18 Claims**



**1**. In a child-resistant box containing a lid, a receptacle portion with a bottom and a sidewall, said sidewall containing at least one bend, and multiple sets of latches releasably retaining said lid to said receptacle, said latches of each set spaced a distance apart greater than the span of a child's hand, the improvement which comprises

attaching the lid to the receptacle using a hinge means;

positioning the latches around the receptacle so that an adult's hand must reach around a bend of the sidewall to actuate each set of latches;

wherein each latch comprises a locking means and a retaining means, and said locking means and said retaining means being integral with the box.

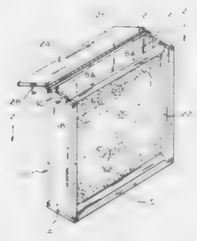
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**4,746,009**

## CARRYING AND DISPLAY CASE

**Harold N. Liberman, Monee, Ill., assignor to Wholesale Electrical Distributors, Inc., Frankford, Ill.**

**Filed Feb. 9, 1987, Ser. No. 12,263**
**Int. Cl.[4] B65D** *23/12*
**U.S. Cl. 206—44.11** **3 Claims**



**1**. A carrying case for a display board that carries information and product samples, said carrying case comprising a body having a hollow interior, said body defining at least one pair of opposed, interior-facing slots for slideably receiving opposed edges of a display board, said body defining an open aperture generally parallel to said slots and free of closure means to expose one face of a display board carried therein, a hinged lid rotatable between positions opening and closing one end of said opposed slots, and latch means for locking said hinged lid in in closed position, said carrying case containing at least one display board having edges retained by said one pair of opposed slots, said display board carrying outwardly projecting electrical components, said slots being positioned so that said board and samples do not touch the carrying case except at the periphery of said board.

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**4,746,010**

## BOX CONVERTIBLE TO FOOD ITEM TRAY

**Stephen Fournier, 74 Tremont St., Hartford, Conn. 06105**

**Filed Jun. 30, 1986, Ser. No. 880,141**
**Int. Cl.[4] B65D** *5/00, 5/54*
**U.S. Cl. 206—45.14** **1 Claim**



**1**. A box of card stock for packaging a predetermined plural number of food items, said box convertible into two identical trays, each for holding at least one said food item after preparation, said box having recess producing score line means along which portions of said box are separable from each other to produce the trays, each having at least one exposed recess for holding a said prepared item, said box being in the form of a rectangular solid having parallel rectangular top and bottom panels, parallel rectangular front and back panels and parallel rectangular left and right end panels and said box including additional score line means including an additional score line defining a plane parallel to said front and back panels and bisecting said left and right end panels and said top and bottom panels and extending completely around said box in said end panels and said top and bottom panels, said box being separable along said additional score line into two like portions, and said recess producing score line means including a first closed score line having parallel side portions in said front panel parallel to said end panels, parallel side portions in said top and bottom panels parallel to said end panels and forming continuations of said parallel portions in said front panel, and arcuate portions in said top and bottom panels joining said parallel portions, said first score line located entirely on one side of said additional score line, and said recess producing score line means further includes a second closed score line having parallel side portions in said back panel parallel to said end panels, parallel side portions in said top and bottom panels parallel to said end panels and forming continuations of side parallel portions in said back panel, and arcuate portions in said top and bottom panels parallel to said end panels and forming continuations of said parallel portions in said top and bottom panels joining said parallel portions, said second score line located entirely on the other side of said additional score line, whereby separation of said box along said additional score line provides each of said two trays with an open base and removal of the card stock from within said first closed score line provides one of said two trays with a food article holding recess and removal of card stock from within said second closed score line provides the other of said two trays with a food article holding recess.

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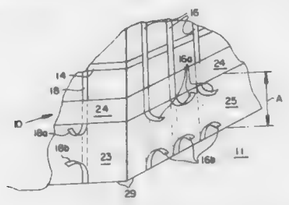


4,746,011

## STRAPPED BALE HAVING MEANS WHICH RESTRAIN THE STRAPS THEREOF UPON SEVERING AND METHOD OF FORMING THE SAME

Samuel S. McNair, Jr., Pembroke, and Robert J. Shea, Blacksburg, both of Va., assignors to Celanese Corporation, New York, N.Y.

Filed Aug. 6, 1986, Ser. No. 893,742
Int. Cl.[4] B65B 27/12; B65D 71/02
U.S. Cl. 206—83.5 10 Claims



1. A bale of compressed textile fibrous material comprising a continuous cover for covering and containing said material, at least one tensioned steel strap encompassing the covered mass and compressing said mass through said cover, and restraining tape generally transversely extending over said at least one steel strap and affixed to said at least one steel strap and to portions of said continuous cover laterally adjacent said at least one steel strap, wherein said restraining tape constitutes the means for attaching said at least one steel strap relative to said bale and for defining a zone of said steel strap adjacent thereto in which said steel strap may be severed to minimize outward lashing thereof.

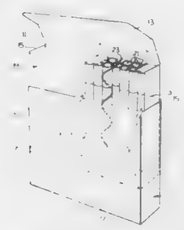
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4,746,012

## SMOKER'S PACKAGE INCLUDING A CIGARETTE OR CIGAR PULLING STRING

Laval Simard, 893, des Rochers, St-Félicien, Quebec, Canada G0W 2N0

Filed Jan. 28, 1987, Ser. No. 7,659
Int. Cl.[4] B65D 85/10, 85/12
U.S. Cl. 206—254 5 Claims



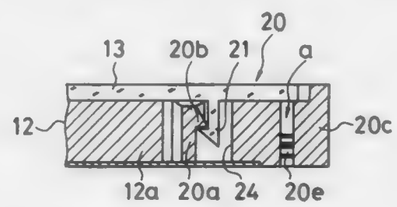
1. In combination with a smoker's package of the type comprising a container enclosing a plurality of tobacco rolls, each tobacco roll being removable from said container through a pull on said tobacco roll in a direction generally parallel to the longitudinal axis thereof, a tobacco roll ejector device comprising an elongated flexible element spirally wound on a tobacco roll along a substantial portion of the length thereof, said elongated flexible element frictionally engaging the tobacco roll for driving the tobacco roll out of said container through a pull on said elongated flexible element in a direction generally parallel to the longitudinal axis of the tobacco roll.

4,746,013

## DISC CARTRIDGE WITH RELEASABLE LOCKING MEANS

Akira Suzuki, and Yoshikazu Ishimatsu, both of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Sep. 9, 1987, Ser. No. 95,034
Claims priority, application Japan, Sep. 16, 1986, 61-14956[U], Sep. 16, 1986, 61-141957[U]; Mar. 25, 1987, 62-43774[U]
Int. Cl.[4] B65D 85/57; G11B 23/04
U.S. Cl. 206—309 12 Claims



1. A disc cartridge comprising:
(a) a housing main body for rotatably housing therein a disc-shaped recording medium;
(b) a lid hinged to said housing main body to be freely rotatable; and
(c) locking means provided on said housing main body, wherein said locking means is formed of a flexible single arm member having an engagement portion engageable with an engaging member formed on said lid and having elasticity, an operation portion for elastically deforming said single arm member to thereby release the engagement of said engagement portion with said engaging member of said lid, and a guide member for guiding said operation portion rectilineally.

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4,746,014

## GOLF CLUB PROTECTIVE DEVICE

Roland A. Very, 122 Lake Placid Close, SE., Calgary, Alberta, Canada T2J 5A5

Filed Aug. 19, 1987, Ser. No. 86,878
Claims priority, application Canada, Aug. 20, 1986, 516357
Int. Cl.[4] A63B 55/00
U.S. Cl. 206—315.6 18 Claims



1. A protective device for storing a golf club comprising:
an elongated tube within which said golf club is adapted to be stored,
resilient spring means operatively associated with said tube for biasing the position of said tube,
said spring means having a resilient restoration force when deformed which is less than the combined weight of said tube and said golf club and is greater than the weight of said tube.

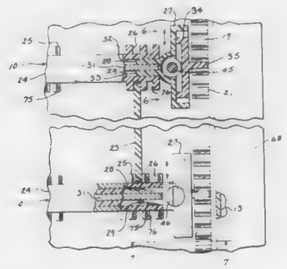


4,746,015

## ADJUSTABLE CIRCUIT BOARD HOLDER ASSEMBLY

Edward M. Kaucic, Watertown, Wis., assignor to Menasha Corporation, Neenah, Wis.

Filed Jun. 20, 1986, Ser. No. 876,775
Int. Cl.[4] H05K 1/18
U.S. Cl. 206—334 18 Claims



1. An adjustable mounting device adapted to be connected to a wall surface of a container box and a holding member for holding circuit boards or the like so as to provide for incremental adjustment of the holding member comprising:
a first member adapted for placement in contact with said wall surface of said container;
means extending from said first member for engagement with said wall surface to restrict movement of said first member in a lateral direction;
first guide way means extending from said first member;
a second member adapted for connection with said holding member for articles to be placed in said container;
second guide way means extending from said second member; and
screw thread means operatively associated with said first and second members, said screw thread means and said first and second guide way means constructed and arranged to effect movement of said second member in a lateral direction when said first member is restricted in movement in said lateral direction

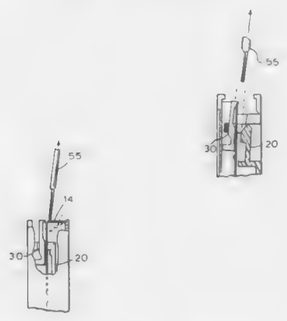
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4,746,016

## BLADE REMOVAL AND/OR MOUNTING MECHANISM AND DISPENSER, EXTRACTOR-DISPOSAL APPARATUS INCLUDING SAME

Stanley B. Pollak, Huntington, N.Y., and William Blasnik, Englewood, N.J., assignors to The Research Foundation of State University of New York, Albany, N.Y.

Filed Mar. 26, 1987, Ser. No. 31,094
Int. Cl.[4] B65D 83/00
U.S. Cl. 206—356 14 Claims



1. A mechanism for removing a blade having an elongated slot mounting means from a blade handle which has a mounting boss for insertion into said elongated slot, comprising
a blade well for receipt of said blade upon dismounting from said handle,
a handle guid forming one side of a blade and handle passageway into said well said handle guide having a flexible body portion being sufficiently flexible to allow deflection of said handle away from said blade for withdrawal of said boss out of mating relationship with said elongated slot,
blade extracting means located on a side of said passageway generally opposite said handle guide, said extracting means having a blade retaining projection arranged adjacent said passageway adapted to be actuated to a position to prevent withdrawal of said blade from said well, and
actuation means located fore actuation of said blade extracting means as a direct result of the deflection of said handle sufficient to disengage said boss out of mating relationship with said elongated slot, whereby a blade mounted on said handle is engaged by said retaining projection for removal as said handle is withdrawn from said passageway.

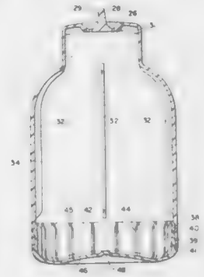
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4,746,017

## SAFETY CONTAINER FOR GLASS VIALS

David S. Howard, Middlesex, N.J., and Michael S. Roehm, Evansville, Ind., assignors to Bristol-Myers Company, New York, N.Y.

Filed Aug. 18, 1987, Ser. No. 86,348
Int. Cl.[4] B65D 81/02, 23/08
U.S. Cl. 206—438 6 Claims

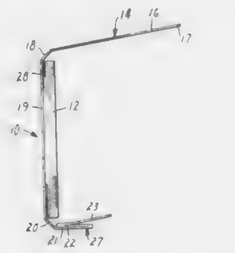


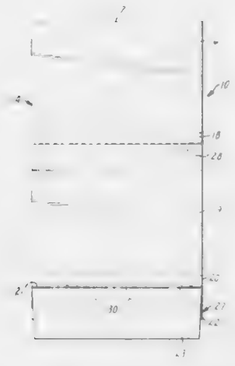
1. A protective container for encasing medication filled glass vials comprising:
an annular base;
a generally cylindrically shaped body having a top, an open bottom, and a plurality of spaced longitudinal ribs disposed on the interior thereof, said body being shaped to generally conform to the exterior of a glass vial to be protected so that said longitudinal ribs will engage the vial and hold it firmly in position while providing an air cushion between the vial and said protective container to further protect the vial;
means disposed at said bottom of said body to receive said annular base in a snap fit tamper resistant manner; and
an aperture disposed at said top of said body to permit access to the contents of a vial held in said protective container without disturbing the protective function of said container, said aperture having a frangible sealing means disposed therein,
whereby, when a glass vial is inserted in said body, and said annular base is snapped into said body, the glass vial will be protected from breakage or tampering, but the contents of the vial may be accessed by removing said frangible means and inserting a syringe inserted through said aperture and a stopper disposed in the top of the vial.

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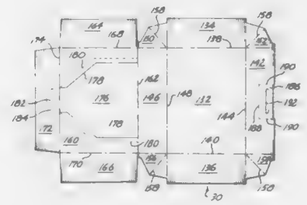
**4,746,018**
**PAD ENCLOSURE**
David C. Mueller, Ashland, Ohio, assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.
Filed Sep. 11, 1986, Ser. No. 906,334
Int. Cl.[4] B65D *73/00*
U.S. Cl. 206—447 5 Claims





1. An enclosure for a pad of notepaper having front, rear, top and bottom surfaces, said enclosure comprising a rectangular elongate sheet of stiff paper material, said paper material having spaced transverse scores and being bent at said scores to define sequentially along the length of said sheet an upper front portion having a distal end part and being adapted to overlie a major part of the front surface of the pad, a top portion adapted to overlie and to be coextensive with the top surface of the pad, a rear portion adapted to overlie and be coextensive with the rear surface of the pad, a bottom portion adapted to overlie and be coextensive with the bottom surface of the pad, a lower face portion, a foldback portion and a guide portion, said foldback portion being parallel to and along the surface of said face portion adapted to be adjacent the pad and said guide portion extending parallel to and along and past the surface of said foldback portion opposite said face portion with said face, foldback and guide portions being attached together adjacent the proximal end of said guide portion while not being attached to said rear portion to provide a bottom front structure adapted to overlie a minor part of the front surface of the pad and to define a recess between said guide and foldback portions adapted to frictionally and removably receive the distal end part of said upper front portion with said engaged upper front portion and bottom front structure overlying and being coextensive with the front surface of the pad, with both the upper front portion and the lower front structure being pivotable away from the front of the pad upon removal of the distal end part of said upper front portion from said recess to afford access to the entire front of the pad.

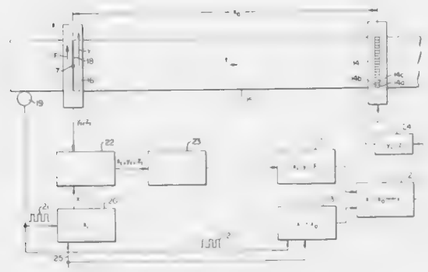
**4,746,019**
**END FILL MICROWAVABLE AND/OR OVENABLE CONTAINER**
Donald R. Prater, Beaverton, Oreg., assignor to Ridgeway Packaging Corp., Redmond, Wash.
Filed Apr. 20, 1987, Ser. No. 40,255
Int. Cl.[4] B65D *5/54*
U.S. Cl. 206—625 12 Claims



1. container that is filled with a product through one end prior to being sealed, and which is made with a waterproof material suitable for holding the product while it is heated in an oven, comprising:
a first panel having four edges, each defined by a fold line;
a second panel having four edges, each defined by a fold line;
a front sidewall;
a rear sidewall;
a first and a second end wall;
a first and a second end flap;
a front flap;
the first panel being connected along fold lines at opposite edges to the front sidewall and the rear sidewall, and along fold lines at two other edges to the first and the second end wall, respectively, the front and rear sidewalls and the first and second end walls all being connected by four gusseted corners;
the second panel being connected along fold lines at opposite edges to the rear sidewall and the front flap, and along fold lines at two other edges to the first and the second end flap, respectively, the second panel including a tear-open access flap defined by a first pair of partially die cut lines and by a second pair of partially die cut lines, extending generally parallel to and offset from each other toward one of the front flap and the first and second end flaps and terminating at a perforation line that defines a reclosure tab disposed on the one flap;
the front sidewall being folded to overlie the front flap and being adherently secured and sealed thereto;
one of the first end flap and the first end wall being folded to overlie the other and being adherently secured and sealed to the other, one of the second end flap and the second end wall being folded to overlie the other and being adherently secured and sealed to the other after the container is filled with the product;
a tab receiver disposed on one of the front sidewall and the end walls, defined by a pair of perforated lines, the tab receiver including a slot disposed in overlying relationship to the reclosure tab; and
the first panel, the first and the second end walls, the front and the rear sidewalls, and the four gusseted corners together defining a generally integral leakproof tray to hold the food product for heating in the oven.



**4,746,020**
**METHOD AND AN APPARATUS FOR MARKING FAULTS ON RAPIDLY MOVING MATERIAL WEBS**
Christoph Schenk, Icking, Fed. Rep. of Germany, assignor to Erwin Sick GmbH Optik-Elektronik, Waldkirch, Fed. Rep. of Germany
Continuation-in-part of Ser. No. 627,385, Jul. 3, 1984, abandoned. This application Jul. 24, 1986, Ser. No. 890,796
Claims priority, application Fed. Rep. of Germany, Jul. 12, 1983, 3325125
Int. Cl.[4] B07C *5/342*; B05C *11/00*
U.S. Cl. 209—3.3 8 Claims



1. An apparatus for marking faults on rapidly moving material web, or for sorting out faulty pieces of material, the apparatus comprising:
a fault detection scanning device for cyclically scanning a web transverse to its longitudinal direction to detect potential faults and generate potential fault signals;
a memory for storing fault signals and corresponding web coordinates;
a marking or sorting device provided at a defined distance from the fault detection scanning device for making an appropriate mark on the web, or for sorting out an appropriate part of the web;
a fault signal analyzer means connected to the fault detection scanning device for storing the potential fault signals, and for examining the potential fault signals independently of the speed of the web, to establish whether the potential fault signals are true fault signals or structure signals, and for then delivering the true fault signals which are found and the corresponding web coordinates to the fault signal memory, which stores the true fault signals and corresponding web coordinates, likewise independently of the speed of advance of the web;
a comparator connected to the fault signal memory; and
a longitudinal coordinate counter connected to the comparator;
said comparator being operative for checking at short time intervals whether a true fault signal is present in the fault signal memory corresponding to each longitudinal coordinate, which said comparator receives from the longitudinal coordinate counter at the moment the part of the web having the corresponding longitudinal coordinate moves past the marking or sorting device and for transmitting marking or sorting signal to the marking or sorting device when a true fault signal corresponding to the longitudinal coordinate received from the longitudinal coordinate counter is present in the fault signal memory, said marking or sorting device being operatively connected to said comparator for making an appropriate mark on the web, or sorting out an appropriate part of the web, in response to the marking or sorting signal from said comparator.

**4,746,021**
**WINDOW SHELF ASSEMBLY**
Diane E. Helmholdt, and Charles D. Helmholdt, both of 7070 Thornapple River, Caledonia, Mich. 49316
Filed Aug. 8, 1986, Ser. No. 894,644
Int. Cl.[4] A47F *5/08*
U.S. Cl. 211—90 16 Claims



1. A shelf assembly adapted to mount to a wall adjacent a window frame, said window frame comprising an upper horizontal portion, a lower horizontal portion and a pair of said portions, wherein said shelf assembly comprises:
a bridge on each side of said shelf assembly, mountable to said wall adjacent said window frame and comprising a pair of uprights, with each of said uprights comprising a long vertical part, a short vertical part and a central part connected to and between said short and long vertical parts and angled with respect thereto, and each pair of said uprights being adapted to mount to said wall in inverse relationship so that said short vertical parts engage said wall substantially above and below said upper and lower horizontal portions, respectively, and said long vertical parts are positioned in front of said side portions in overlapping spaced-apart relationship so as to define a channel therebetween; and
at least one shelf comprising mounting means extending longitudinally of said shelf and received in said channels to mount said shelf to and between said bridges at transverse ends of said shelf.

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**4,746,022**
**COLLAPSIBLE THREE DIMENSIONAL SUPPORT STRUCTURE**
Junior H. Benham, 10045 NE. 17th, Bellevue, Wash. 98004
Filed Feb. 24, 1987, Ser. No. 17,489
Int. Cl.[4] A47F *5/00*
U.S. Cl. 211—195 7 Claims

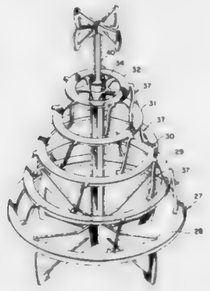
1. A collapsible three dimensional structure comprising;
a base including an upright post member with a free end and laterally extending legs at the opposite end thereof, said leg members comprising a first cross arm formed integrally with said post forming diametrically extending first legs and a second cross arm forming diametrically extending second legs, said first and second cross arms including notch means for press fitting said arms into engagement to form said base;
a cover framework comprising a disc having a plurality of radially spaced concentric rings, elongated flexible connector means connected between each concentric ring, said connector means being constituted and arranged to permit the concentric rings to be separated by displace-

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ment axially along an axis normal to their common center point and rotated to form a conically shaped framework; and

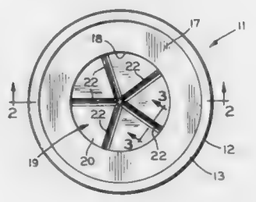
means for connecting the center most ring of said disc to the free end of said upright post and the outermost ring to said legs comprising first attachment means on said legs for engaging and retaining the outermost ring of said disc, and



second retaining means on the free end of said post member and the innermost ring of said disc for securing said innermost ring to the post, whereby said disc may be expanded and supported by said base and the innermost ring may be secured to the free end of said post, said rings separated axially along an axis normal to their common center point, and the outermost ring engaged with said legs to form said conical shaped framework.

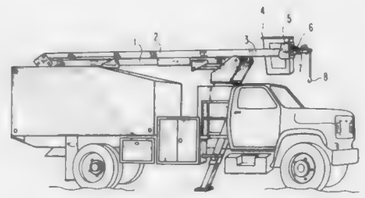
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**4,746,023**
**PUNCTURABLE OIL SEAL**
**Jerome G. Belter, Mt. Prospect, Ill., assignor to Dana Corporation, Toledo, Ohio**
**Filed Jul. 29, 1987, Ser. No. 78,981**
**Int. Cl.[4] F16J *15/10***
**U.S. Cl. 277—237 R** **20 Claims**



1. A seal assembly for an aperture formed in a housing of a vehicle engine, comprising:
- a tubular shell adapted to be retained in an aperture in a housing of a vehicle engine;
- a generally radially extending flange formed at one end of said shell; and
- a sealing membrane having a generally circular central portion encircled by a rim portion molded about and bonded to said flange, said central portion having at least one groove formed in a surface thereof for defining a reduced thickness wall at a bottom of said groove whereby when pressure is applied to said sealing membrane said reduced thickness wall tends to rupture prior to the rupture of any other portion of said sealing membrane.

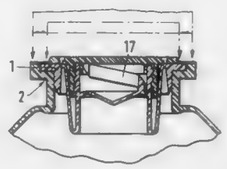
**4,746,024**
**AERIAL BOOM WITH TENSIOMETER**
**David Hensler, Fort Wayne, Ind., assignor to Hydra-Tech, Inc., Ft. Wayne, Ind.**
**Filed Apr. 7, 1987, Ser. No. 35,536**
**Int. Cl.[4] B66C *13/16***
**U.S. Cl. 212—158** **18 Claims**



1. A boom including a load indicating mechanism comprising in combination:
- an aerially articulable boom having a free end,
- a bucket mounted on the free end of said boom,
- first and second cable receiving means mounted on the free end of said boom,
- a tensiometer having a retractable cable receiving means,
- said tensiometer being mounted on the free end of said boom at the midpoint between said first and second cable receiving means and perpendicular thereto whereby said retractable cable receiving means is deflected by a cable running between said first and second cable receiving means when tension is applied to said cable,
- said tensiometer having a load indicator responsive to pressure applied to said retractable cable receiving means,
- such that said load indicator is readable by a person in said bucket.

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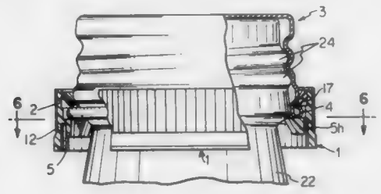
**4,746,025**
**PLASTIC CONTAINER CLOSURE AND METHOD OF MAKING IT**
**Günter J. Krautkrämer, Budenheim, and Alexander Schmitz, Niedernhausen, both of Fed. Rep. of Germany, assignors to Jacob Berg GmbH & Co. KG, Budenheim, Fed. Rep. of Germany**
**Filed Aug. 8, 1986, Ser. No. 894,661**
**Claims priority, application Fed. Rep. of Germany, Aug. 10, 1985, 3528815**
**Int. Cl.[4] B65D *39/04***
**U.S. Cl. 215—232** **14 Claims**



1. A container closure, which comprises a plastic container neck defining a container opening, and a plastic neck insert with a central opening, said container neck and neck insert having exterior sealing edges, the plastics of said neck and neck insert having different melting temperatures, said neck insert being positioned inside the opening of said container neck so their respective sealing edges are aligned in a common exterior plane substantially immediately adjacent to one another, said container neck and neck insert being welded together by simultaneously melting said aligned, adjacent sealing edges.



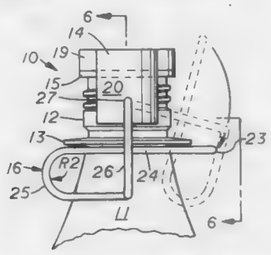
**4,746,026**
**TAMPER-PROOF CLOSURE**
**Heinz Leonhardt, Bedburg, Fed. Rep. of Germany, assignor to Vereinigte Aluminium-Werke Aktiengesellschaft, Fed. Rep. of Germany**
**Filed Apr. 22, 1987, Ser. No. 41,602**
**Claims priority, application Fed. Rep. of Germany, Apr. 23, 1986, 3613782**
**Int. Cl.[4] B65D *41/34***
**U.S. Cl. 215—252** **8 Claims**



1. A closure for sealing threaded bottles, jars or similar containers, comprising:
- a metallic cap;
- a plastic collar having an upper attachment part adapted to releasably engage said cap, said collar further including an interior security ring spaced from said collar and attached thereto by means of a plurality of fracturable integrally formed links and at least one non-fracturable connecting web, said security ring further comprising a plurality of claws adapted to engage the undersurface of a rim beneath threaded portion of said bottles, jars or similar containers.

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**4,746,027**
**REUSABLE SEALING CAP FOR BOTTLES**
**Chester C. Coker, P.O. Box 1676, McAllen, Tex. 78502**
**Filed Apr. 27, 1987, Ser. No. 42,739**
**Int. Cl.[4] B65D *45/16***
**U.S. Cl. 215—293** **10 Claims**

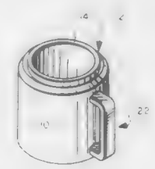


1. A reusable sealing cap for bottles of the type having a flat radially extending circular flange on the neck of the bottle spaced below the top edge of the mouth of the bottle comprising;
- a generally cylindrical inverted cup-shaped cap member having a flat top wall adapted to be removably received on the open mouth of the bottle and circumferentially spaced side portions depending therefrom which at least partially surround the upper neck portion of the bottle,
- a resilient seal carried in said cap member to sealably enclose the open mouth of the bottle, and
- a movable spring wire lever member pivotally mounted on said cap and bent in a configuration to form a flange engaging portion to be slidably received beneath the circular flange and a spring tension portion to create a compressive force between said cap and said circular flange sufficient to compress said resilient seal and effect a liquid tight seal on the open mouth of the bottle when the flange engaging portion is beneath the circular flange,

said lever member pivotally movable between an unsealing position with the flange engaging portion spaced outwardly of the circular flange and a sealing position with the flange engaging portion spring biased against the underside of the circular flange.

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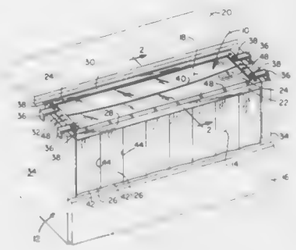
**4,746,028**
**THERMALLY INSULATING SLEEVE FOR A CYLINDRICAL BEVERAGE CONTAINER**
**Robert D. Bagg, 387 Chestnut St., Oneonta, N.Y. 13820**
**Filed Oct. 14, 1986, Ser. No. 918,133**
**Int. Cl.[4] B65D *23/08, 23/10***
**U.S. Cl. 220—85 H** **1 Claim**



1. A wrap around apparatus for thermally insulating the outside of a tubular container comprising:
- a flexible and resilient tubular sleeve of insulating material;
- said sleeve having two axially and linearly displaced openings;
- a rigid C-shaped axially disposed handle means perpendicular and external of said sleeve having an axial elongated web portion and two inwardly projecting spaced tang portions defining a hand opening for gripping the handle means;
- said tang portions extending internally of said sleeve through said openings in the sleeve,
- an axially disposed mounting flange positioned inside of the sleeve and secured to the two inwardly projecting tang portions of the handle means.

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**4,746,029**
**SELF-CLOSING COOLER CURTAIN**
**John P. Tyner, III, Brandon, and Duke A. Reddoch, Jackson, both of Miss., assignors to Bear Creek Industries, Inc., Brandon, Miss.**
**Filed Apr. 9, 1987, Ser. No. 36,498**
**Int. Cl.[4] B65D *51/00***
**U.S. Cl. 220—229** **21 Claims**



1. Article storage apparatus comprising:
- wall means defining a housing having an opening providing access to the interior of said housing; and
- a plurality of flexible self-closing curtain elements extending across said opening, adjacent pairs of said elements being relatively movable between a closed position in which the elements of the pair thereof are closely adjacent and combinatively define an air barrier to impede air movement

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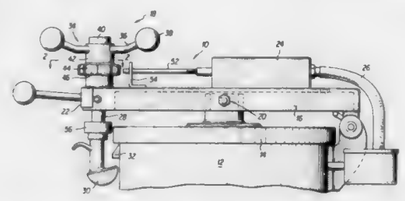
through a portion of said opening, and an open position in which said elements in the pair thereof are spaced further apart to provide access therebetween to said interior of said housing through said opening.

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**4,746,030**
**PRESSURE VESSEL INTERLOCK**

**Valentino Gabriele, 10109 Bird River Rd., Baltimore, Md. 21220, and Donald K. Ossmus, 8630 Hoerner Ave., Baltimore, Md. 21234**

**Filed Nov. 24, 1987, Ser. No. 124,928**
**Int. Cl.[4] B65D** *45/00*
**U.S. Cl. 220—316** **10 Claims**



1. Apparatus for securing a lid of a pressure vessel over an opening thereof, the pressure vessel having a catch located on the body of the vessel, comprising:

a bar pivotally connected at a first end to the vessel and engaging the lid at a location along the length of the bar;

latching means carried on a second, free end of the bar for biasing the bar against the lid to force the lid into a secured position over the opening of the vessel, a portion of the latching means engaging the catch on the body of the vessel for latching the bar and associated lid over the opening, the latching means further comprising an elongated spindle carried in and extending through a recess in the free end of the bar, the spindle terminating at one end in a hook element constituting the aforesaid portion of the latching means which is adapted to engage the catch on the body of the vessel, the other end of the spindle having a threaded portion, and, a hub having a threaded bore extending therethrough and matingly receiving at least a portion of the threaded portion of the spindle therewithin, the hub being rotatable to cause the spindle to be displaced longitudinally within the threaded bore by virtue of the action of the mating threads of the bore and spindle, thereby to displace the hook element relative to the catch to latch or unlatch the bar and associated lid over the opening of the vessel;

a hub element carried by the hub and having a plurality of slots disposed therein, the slots facing outwardly of the hub element and each slot being defined by an abutment surface and a sloping surface extending from an innermost edge of the abutment surface to an outermost edge of an adjacent slot;

locking means carried by the bar and disposed adjacent to the hub for inhibiting the rotation of the hub in a direction which would open the lid during the existence of hazardous pressure conditions within the pressure vessel, the locking means comprising a pin mounted for horizontal movement to engage a distal end of the pin within one of the slots to inhibit rotation of the hub, and, pressure exerting means engaging an anterior end of the pin for exerting pressure on the pin to displace said pin into engagement with the hub element, the pressure exerting means being responsive to pressure conditions existing within the pressure vessel, the hub being rotatable to tighten the latching means after engagement of the pin within one of the slots, the distal end of the pin riding over the sloping surface of one of the slots to be displaced from said slot on tightening rotation of the hub and to engage the adjacent slot in the direction of tightening and to contact the abutment surface of said adjacent slot; and,

means connected to the safety interlock means for operating the safety interlock means.

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**4,746,031**
**CASE-TYPE CONTAINER INCLUDING TWO PARTS JOINED AT AN INCORPORATED HINGE**

**André Grandmottet, Pierre de Bresse, France, assignor to Etablissements Mayet Incorporated, Pierre de Bresse, France**

**Filed Jun. 19, 1987, Ser. No. 63,833**
**Claims priority, application France, Jun. 20, 1986, 86 08974**
**Int. Cl.[4] B65D** *53/00*
**U.S. Cl. 220—337** **5 Claims**

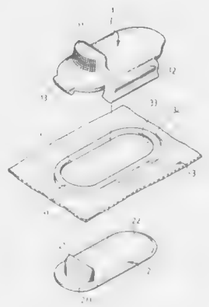
1. A container of the type including two pivoting parts, such as a body (**1**) and a lid (**2**) which are joined to one another by a swivel joint and which are respectively integrally connected with a cap (**3**) and a pivot pin (**8**) constrained to interlock in order to determine a pivoting assembly held in place by an element (**11**) connected on top of said assembly, characterized in that the two pivoting parts (**1** and **2**) have uninterrupted contours of their outer edges (**1***a* and **2***a*) and in that the connected element (**11**) is provided with at least one internal opening (**20–21**) enabling the passage of arms (**9** and **10**) which are integrally connected with the pivot pin (**8**) and with the lid (**2**), at a substantial distance (x) from its outer edge (**2***a*).

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**4,746,032**
**QUICK-RELEASE RESEALABLE BEVERAGE CAN COVER ASSEMBLY**

**Dar S. Huang, No. 142, Lan Keng Li, Tou Fen Jenn, Miaoli Hsien, Taiwan, assignor to Meei Huey Tai, Chang Hwa and Dar Sheng Huang, Miaoli Hsien, both of, Taiwan**

**Filed Aug. 18, 1987, Ser. No. 86,714**
**Int. Cl.[4] B65D** *43/20*
**U.S. Cl. 220—256** **1 Claim**



1. A quick-release resealable cover assembly for use on beverage cans comprising:

(A) a can lid (**3**) with a safety rim (**31**) thereon;

(B) an upper slide piece (**1**); said upper slide piece (**1**) having a push knob (**11**) projecting substantially vertically upwards from a top surface thereof; a retainer clip (**13**) forming an integral piece with and extending outwards from a lateral end of said upper slide piece (**1**) closest to a crimped edge of the can lid (**3**); said retainer clip (**13**) being rounded on a bottom surface thereof; said upper slide piece (**1**) also having side grips (**12**) on two lengthwise sides thereof; said side grips (**12**) being pre-stressed to push inwardly against a lower outer edge of said safety rim (**31**);

(C) a lower slide piece (**2**); said lower slide piece (**2**) having an insert (**21**) projecting from a top surface thereof; an apex (**211**) of said insert (**21**) being plastically welded to said insert cavity (**14**) of said upper slide piece (**1**); and

(D) a protective and sealing coating on the lower surface of said can lid (**3**) and said lower slide piece (**2**).



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**4,746,033**
**DISPENSING APPARATUS**

**Peter Morellini, Post Office Box 188, Ingham, Queensland 4850, Australia**

**PCT No. PCT/AU85/00281, § 371 Date Aug. 25, 1986, § 102(e) Date Aug. 25, 1986, PCT Pub. No. WO86/02806, PCT Pub. Date May 22, 1986**
**PCT Filed Nov. 12, 1985, Ser. No. 897,370**
**Claims priority, application Australia, Nov. 12, 1984, PG8084; Nov. 29, 1984, PG8339; Sep. 19, 1985, PH2495**
**Int. Cl.[4] A01M** *25/00*
**U.S. Cl. 222—129** **10 Claims**



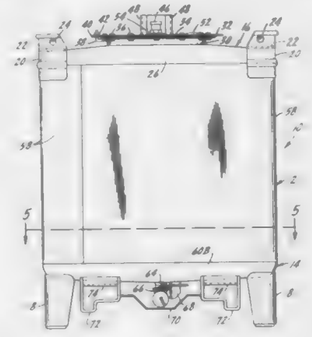
1. Apparatus for dispensing granular, pelletized, or particulate material or the like, said apparatus including a first elongated hollow member defining a reservoir for material to be dispensed, container means supported on said hollow member and communicating with the interior thereof whereby material within said hollow member may pass into said container means, cover means supported on said hollow member and at least partially shielding said container means, water receptacle means supported on said hollow member, at least one further elongated member releasably mounted to said first hollow member and defining a reservoir for water, outlet aperture means for said water at the operative lower end of said further elongated member whereby water may be supplied therethrough to said water receptacle means, and means associated with said apparatus and extending on the operative lower side of said container means for engagement with the ground so as to support said apparatus in an upstanding attitude.

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**4,746,034**
**PORTABLE LIQUID CONTAINER**

**Ali D. Ata, Chicago, and Edward W. Olewinski, Stickney, both of Ill., assignors to Nalco Chemical Company, Naperville, Ill.**

**Continuation of Ser. No. 788,487, Oct. 17, 1985, abandoned. This application Feb. 13, 1987, Ser. No. 15,516**
**Int. Cl.[4] B67D** *5/60*
**U.S. Cl. 222—143** **9 Claims**



1. A portable, stackable container for liquids, constituting a first container on which a second like container may be stacked, comprising:

a shell having four side walls of stainless steel in a generally rectangular configuration;

a stainless steel bottom wall closing the bottom of the shell and including triangular portions with the apex thereof displaced considerably nearer one side of the bottom wall than the opposed side, each triangular portion having a base adjoining a side wall and sloping downwardly, and a delivery opening at the apex of the bottom wall triangulation to assure complete drainage of liquid;

a delivery hose underneath the bottom wall, including a valve connected to the delivery opening in association therewith, access to the valve being facilitated by the closer position of the delivery opening aforesaid;

a stainless steel top wall enclosing the side walls of the shell and sloping upwardly to meet an enlarged opening which is normally closed by a removable lid, removal of the lid allowing cleaning equipment to be inserted through the enlarged opening and cleaning fluids to be drained therefrom upon inversion of the container, said lid having a filling opening, which filling opening is offset from the delivery opening and positioned nearer one side of the top wall than the opposed side to facilitate connection of said hose to the filling opening of a like, second container also having a delivery opening in the bottom wall offset from a filling opening in the top wall;

two elongated fork lift channels attached to the underside of the bottom well, each channel including a horizontal top plate which is spaced in protecting relation from the bottom wall to provide a lifting surface for the forks of a lift truck beneath the bottom wall while the channels allow for transporting, inversion and cleaning of the container when supported by a fork lift;

a plurality of bottom legs adjacent the four corners of the shell and extending downwardly therefrom to support the container;

a plurality of upwardly opening leg positioners, one for each leg, near the top of the container and also positioned at the corners of the shell to receive the legs of a second like container stacked thereon; and

horizontal support plates mounted to said leg positioners for supporting the legs of the second container without engagement between the legs and the top wall of the container therebeneath.

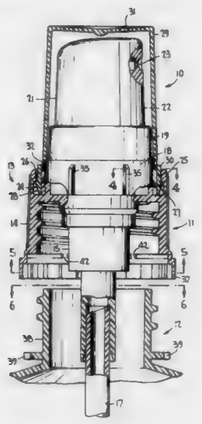
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**4,746,035**
## LIQUID DISPENSER HAVING A TAMPERPROOF OVERCAP

**Walter F. Anderson, West Covina, and Richard P. Grogan, Downey, both of Calif., assignors to Calmar, Inc., Watchung, N.J.**

**Filed Dec. 8, 1986, Ser. No. 938,841**
**Int. Cl.[4] B67D *5/32*; B65D *41/32***
**U.S. Cl. 222—153** **5 Claims**



1. A liquid dispenser comprising, a dispenser body, a closure cap for mounting said body on a container of liquid to be dispensed, said body including a manual actuator having a discharge opening for dispensing liquid, and a protective overcap of inverted cup-shaped configuration overlying said actuator, interengaging means on said overcap and said closure cap for non-removably retaining said overcap on said closure cap, circumferentially spaced apart, cooperating stop means on said overcap and said closure cap permitting limited turning movement of said overcap about the central axis of said body, said overcap having a side wall containing a line of weakening located outwardly of said interengaging means to facilitate separation of said overcap along said line upon application of an external force for permitting access to said actuator.

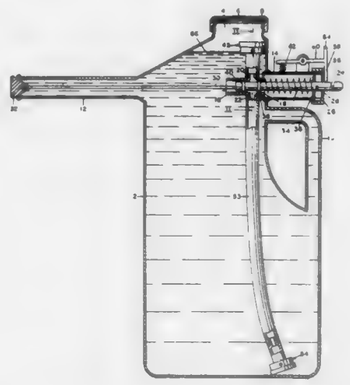
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**4,746,036**
## GASOLINE CONTAINER

**Marvin M. Messner, Rte. 1 - Box 128, Stanberry, Mo. 64489**

**Filed Feb. 2, 1987, Ser. No. 9,874**
**Int. Cl.[4] B67D *3/00***
**U.S. Cl. 222—484** **3 Claims**

1. A container comprising:
a. a hollow container body,
b. a pouring spout interconnected into said body and extending outwardly therefrom,
c. a main valve releasably closing said spout,
d. spring means biasing said main valve to a closed position,
e. operating means carried by said container body remotely from said spout and being manually operable to overcome said biasing means and to move said main valve to an open position,
f. means providing an elongated first air passage within said container and having its ends opening respectively into the upper and lower portions of said container body, and also providing a second air passage interconnecting said first air passage, intermediate its ends, to the exterior of said container body, and
g. a pair of pressure-actuated valves disposed respectively in the upper and lower ends of said first air passage, each of said valves being operable to close and seal the associated end of said first air passage whenever said valve is submerged in the liquid contents of said container, and to



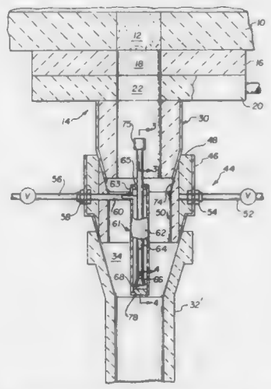
open whenever said valve is not submerged in the container contents.

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**4,746,037**
## APPARATUS FOR UNPLUGGING A VESSEL DISCHARGE PORT

**Michael F. Harasym, Havertown, Pa., assignor to Vesuvius Crucible Company, Pittsburgh, Pa.**

**Filed Nov. 14, 1986, Ser. No. 930,484**
**Int. Cl.[4] C21C *5/48***
**U.S. Cl. 222—591** **5 Claims**



1. Improved apparatus for unplugging a vessel discharge port, comprising:
an annular member having a refractory inner surface,
a housing supported within said member and substantially coaxial therewith,
a conduit extending from the exterior of the annular member radially inwardly to the interior of the housing for introducing pressurized gas into said housing,
said housing having an upper end disposed above and proximate the elevation of said conduit,
a tube at least partially disposed within said housing and substantially coaxial therewith, said tube having an upper end disposed outside the housing and provided with an opening and a bottom outwardly flared portion disposed within the housing,
a bushing disposed within and secured to said housing, said bushing defining a stop surface for said bottom flared portion of said tube,



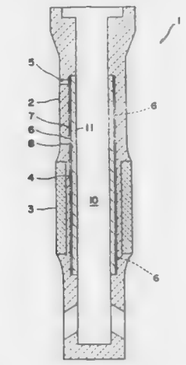
said tube being guided for upward movement by said bushing along the central longitudinal axis of said housing, said tube being open at said bottom flared portion so that pressurized gas in said housing may enter the tube and discharge through said opening at said tube upper end, and
said apparatus further including a combustible charge or material disposed within said tube and having a portion which extends above the elevation of said tube upper end.

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**4,746,038**
## GAS-BLOW CASTING NOZZLE

**Yasunori Ohwada; Shiro Sukenari, both of Ohita; Haruyoshi Kimura, and Hiroyuki Shiokawa, both of Kitakyushu, all of Japan, assignors to Nippon Steel Corporation, Tokyo and Kurasaki Refractories Co., Ltd., Fukuoka, both of, Japan**

**Filed Jul. 7, 1986, Ser. No. 882,662**
**Claims priority, application Japan, Jul. 10, 1985, 60-105888[U]**
**Int. Cl.[4] B22D *11/10***
**U.S. Cl. 222—603** **9 Claims**



1. A gas-blow casting nozzle comprising a nozzle body having a pouring passage, a gas-permeable sleeve disposed in said nozzle body, said gas-permeable sleeve having an outer cylindrical wall and said nozzle body having an inner cylindrical wall portion with said outer cylindrical wall and said inner cylindrical wall portion being radially spaced from one another to define a hollow chamber therebetween, and a plurality of joint parts in said hollow chamber, the joint parts being axially and circumferentially spaced from each other and extending between said inner cylindrical wall portion of said nozzle body and said outer cylindrical wall of said gas-permeable sleeve, the total of the area of said spaced joint parts being about 30 to 70% of the total area of said hollow chamber, the shortest distance from any point in any joint part to the periphery of the joint part being 2.5 times or less than the radial thickness of said gas-permeable sleeve.

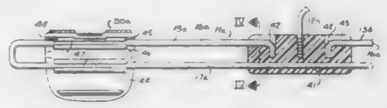
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**4,746,039**
## SLIDING CLAMP HANGER

**John H. Batts, East Grand Rapids; Howard DeMaagd, Wyoming, and Judd Garrison, Grand Rapids, all of Mich., assignors to Batts, Inc., Zeeland, Mich.**

**Filed Dec. 12, 1986, Ser. No. 941,097**
**Int. Cl.[4] A41D *27/22***
**U.S. Cl. 223—96** **16 Claims**

1. An adjustable garment hanger having an elongated body of non-circular cross section-and means for suspending said body from a support, article clamps slidably mounted on and for movement along said body, each of said article clamps having support means on one leg thereof holding said clamp against pivotal movement about the longitudinal axis of said body and a second leg pivotally secured to said first leg at a point above said body and forming an article receiving chamber between said legs; means for holding said second leg in closed, article clamping position; said body extending through



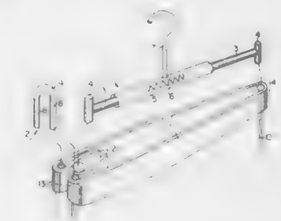
said chamber between said first and second legs; said support means forming socket elements projecting into said chamber, said socket elements embracing and, with sufficient friction to resist creep lengthwise of said body, engaging said body.

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**4,746,040**
## TROUSER HANGER

**Martin G. Hazenveld, 49, Marine Parade, Avalon, N.S.W. 2107, Australia**

**PCT No. PCT/NL86/00011, § 371 Date Nov. 28, 1986, § 102(e) Date Nov. 28, 1986, PCT Pub. No. WO86/05669, PCT Pub. Date Oct. 9, 1986**
**PCT Filed Apr. 2, 1986, Ser. No. 942,418**
**Claims priority, application Netherlands, Apr. 2, 1985, 8500975**
**Int. Cl.[4] A41D *27/22***
**U.S. Cl. 223—96** **13 Claims**



1. A trouser hanger assembly for suspending a pair of trousers in folded, vertical condition from the waistband thereof, which comprises the combination of resilient means for spreading the waistband into flat, stretched condition, and second means cooperable with the resilient means for anchoring the resilient means at one end within the waistband in opposition to the stretched condition of the waistband.

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**4,746,041**
## ALL PURPOSE CONVERTIBLE RACK

**Lynn R. Cook, 6001 Kent Rd., Fort Wayne, Ind. 46816, and John W. Waltemath, Fort Wayne, Ind., assignors to Lynn R. Cook, Fort Wayne, Ind.**

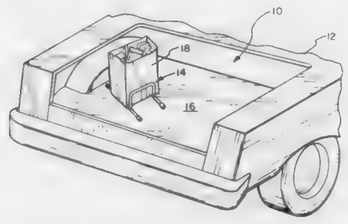
**Filed Jan. 27, 1987, Ser. No. 7,098**
**Int. Cl.[4] B60R *7/00***
**U.S. Cl. 224—42.42** **21 Claims**

1. An all-purpose rack for holding articles, comprising:
a pair of mated opposite end parts each being composed of separate hollow tubular members including a base portion and a separate upstanding portion supported on said base portion, said members being connected together to form a plurality of slidable and pivotable joints coupling said respective end parts and said members of each said end part together in mated relationships with the upstanding portions being spaced apart so as to define an article holding region between said upstanding portions; and
an elongate, endless, elastic loop member extending along a path within the hollow interior of said mated tubular members of said respective rack end parts so as to resiliently retain said upstanding and base portions intercon-

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nected together while allowing said members to slide and pivot relative to one another at their mated joints for expanding and contracting said article holding region of



said rack and converting said rack to any one of a plurality of different operative configurations adapting said rack to hold articles having diverse shapes.

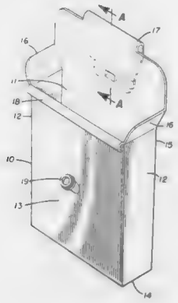
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**4,746,042**

**PORTABLE PAINT BRUSH HOLDER AND KIT**

**Richard C. King, 6380 Almaden, San Jose, Calif. 95120**

**Filed May 21, 1986, Ser. No. 866,131**
**Int. Cl.[4] A45F** *5/00*
**U.S. Cl. 224—148** **1 Claim**



1. A portable paint brush holder for carrying a wet paint brush on the person of the painter attachable to the belt of the painter by attachment means, the paint brush holder comprising:

(a) a bottom portion, vertical front wall, vertical rear wall, vertical opposing sidewalls forming an enclosure defining a receptacle having a top opening for receiving the brush portion of a conventional paint brush having the handle of the paint brush extending upwardly, wherein the vertical rear wall and sidewalls of the paint brush holder adjacent to the person of the painter includes splashguard means extending above said enclosure for preventing the splashing of paint on the person of the painter, said splashguard means being higher than the front wall of the enclosure away from the person of the painter, including angled and upwardly flared side splashguard means extending outwardly from the top side portions of the opposing sidewalls to prevent the paint from splashing onto the person of the painter;

(b) single attachment means for attaching the paint brush holder to the belt of the painter wherein said attachment means is located on the exterior surface of the paint brush holder adjacent to the person of the painter and comprises a downwardly opening spring clip having an inverted U-shaped closed top loop portion and a self locking bottom portion including a pair of interengaging arcuate clip portions projecting away from the rear wall of said holder, and

fitting means, separate and apart from the top opening of said receptacle, secured on an outer side of one of said front wall and sidewalls to project outwardly therefrom for communicating paint within said receptacle.

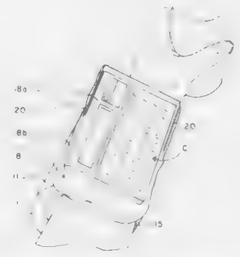
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**4,746,043**

**ENCLOSURE FOR DEVICES SUCH AS CALCULATORS**

**David R. Booker, 4130 Westland Cir., Anchorage, Ak. 99517**

**Filed Aug. 5, 1986. Ser. No. 893,162**
**Int. Cl.[4] A45F** *3/14*
**U.S. Cl. 224—219** **15 Claims**



1. An enclosure for a device which has numerous closely spaced keys which when depressed operate the device,

said enclosure holding and supporting said device and having a plastic transparent window extending over said keys, said window being of material so highly flexible that the user of the device may apply force through the window to depress any single key without the window operating any other key,

strap means attached to the enclosure for supporting the enclosure on the forearm of the user with the keys visible to the user through said window,

said enclosure having a back side, a first side and a pad positioned between the back side and said forearm,

said pad extending away from said first side of said enclosure so that said pad may be partly folded to provide a prop for holding the enclosure at an acute angle to a horizontal surface when the device is positioned on said surface.

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**4,746,044**

**BACK-PACK WITH STAND AND DETACHABLE CHILD CARRIER**

**Juarez D. Arvizu, and Edna I. Arvizu, both of 105 Giffen, San Manuel, Ariz. 85631**

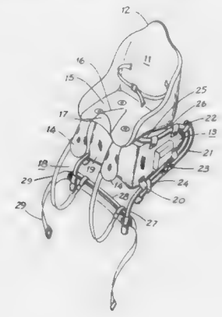
**Filed Dec. 17, 1986, Ser. No. 942,607**
**Int. Cl.[4] A45F** *4/02;* **A47D** *13/02*
**U.S. Cl. 224—161** **6 Claims**

1. An improved back pack and detachable shoulder child carrier apparatus, comprising:

a rigid and lightweight back pack frame structure adapted with a platform means for detachably mounting a child carrier, a pair of laterally spaced side members, a rear leg stand hingeably attached to said laterally spaced side members, said back pack frame structure being designed for an adult wearer such that said platform means will fit rearwardly at shoulder level on the back of said adult wearer, said platform means having a front portion being proximate to the back of said adult wearer and a rear portion being farther from said back than said front portion, said platform means also having a plurality of platform support members, said platform support members being adapted with a plurality of child carrier mounting holes, said pair of laterally spaced side members extending closer from said rear portion of said platform means and then curving frontwardly in a direction of the front portion and terminating vertically at a vertical plane perpendicular to said front portion of said platform means to form a front leg portion for said back pack frame structure, said front leg portion having a lower end, said front leg portion having a cross support member between said pair of laterally spaced side members, said pair of laterally spaced side members further being provided with clip attachment means for detachably securing thereto said rear leg stand when not being used, said rear leg stand being latchably and rearwardly extendable from said laterally spaced side members to complement said front leg portion to enable said back pack frame structure to stand in an upright position;

a child carrier constructed of lightweight material, such as plastic, detachably mounted to said platform means, including a seat having a seat front portion provided with a





saddle bow for improved crotch support for a child being carried and also to improve the weight distribution of said carrier between the left and right side of said adult wearer's back when said child carrier is connected to said frame structure, said saddle bow having a collar cutout portion formed to allow forward adjustment of said seat and thus provide a more comfortable fit of said child carrier about the neck and shoulders of said adult wearer;

a pair of leg flaps detachably mounted between said seat and said platform means, said leg flaps being manufactured from a cool, lightweight and washable fabric and used to protect said adult wearer's clothing from getting soiled while carrying a child; and

a back pack attached to said frame structure.

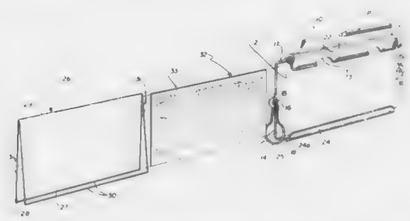
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**4,746,045**

**GOLF SCORECARD HOLDER**

**Donald E. Schweim, 411 Forest Heights, North Mankato, Minn. 56001**

**Filed Feb. 17, 1987, Ser. No. 15,688**
**Int. Cl.[4] B60R** *9/08*
**U.S. Cl. 224—274** **3 Claims**



1. A scorecard holder device for attachment to a golf bag, comprising:

a flat generally rectangular-shaped body formed of transparent moldable plastic material and having first and second longitudinal edges and end edges, said body having a clamping surface,

said first longitudinal edge portion of said body including a curved portion extending away from said clamping surface and then towards and into engaging relation with the clamping surface to define a clamping element, a terminal portion integral with said clamping element and extending upwardly and outwardly from said clamping surface and cooperating with said curved portion to define an elongate recess shaped and dimensioned for releasably and frictionally engaging a pencil and defining a pencil engaging means, said clamping element and said terminal portion having a plurality of longitudinally spaced apart recesses therein for facilitating removal of the pencil within said pencil engaging means,

said second longitudinal edge portion including a curved lip extending upwardly and inwardly with respect to said clamping surface,

an elongate generally flat rectangular transparent card containing an envelope including upper and lower panels secured together along a fold line, said envelope having width dimensions only slightly less than the width dimension of said body, a generally rectangular-shaped scorecard positioned between the panels of said envelope, said envelope being positioned upon said clamping surface of said body and engaged along one edge thereof by said clamping element, the opposed edge portion of said envelope positioned within the confines of said curved lip,

and means for attaching said body to a golf bag.

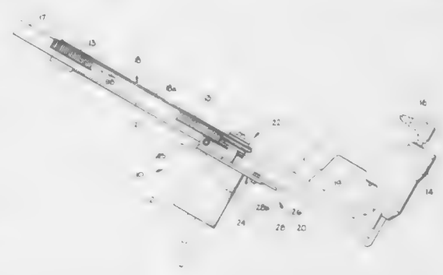
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**4,746,046**

**FASTENER ADVANCING DEVICE**

**Maurice D. Frye, Mt. Orab, Ohio, assignor to Senco Products, Inc., Cincinnati, Ohio**

**Filed Jun. 30, 1986, Ser. No. 880,057**
**Int. Cl.[4] B25C** *5/16*
**U.S. Cl. 227—120** **16 Claims**



1. A device for advancing fasteners along a guide means for a fastener driving tool comprising:

(a) a plate assembly connected to said guide means, said plate assembly including

(i) a base plate connected to said guide means and projecting from one side thereof and including an aperture near its central portion; and

(ii) a pivot plate pivotally connected to and aligned with said base plate, said pivot plate having an aperture aligned with said base plate aperture;

(b) drive means connected to said pivot plate opposite said base plate, said drive means having a rotatable shaft projecting through said apertures of said base and pivot plates; and

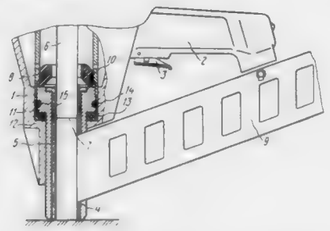
(c) clutch means mounted on said rotatable shaft for frictionally engaging and advancing said fasteners along said guide means.

**4,746,047**

## HAND-HELD FASTENING ELEMENT DRIVING TOOL

**Vitaly T. Boiko, Khimki; Boris G. Goldshtein, Moscow; Antanas-Sharunas A. Maljukyavichus, Vilnjus; Marlen A. Shneiderman; Karl K. Dubov, both of Moscow; Arkady A. Buravtsov; Vladimir A. Gordeev, both of Vilnjus, and Grigory I. Grechushkin, Moscow, all of U.S.S.R., assignors to Moskovskoe Naucho-Rpoizvodstvennoe Objedinenie PO Mekhanizirovannomu Stroitelnomu Instrumentu I Otdelchnym Mashinam, Khimki, U.S.S.R.**

**Filed Jan. 28, 1987, Ser. No. 8,448**
**Int. Cl.⁴ B25C** *1/04, 7/00*
**U.S. Cl. 227—120** **14 Claims**



1. A hand-held fastener driving tool comprising:
a housing;
a handle secured to said housing;
a cylindrical bore in said housing;
a barrel holder mounted in said bore and having one end thereof enclosed in said housing;
said barrel holder being axially movable in said bore;
a barrel coupled to said barrel holder;
a striker mounted for reciprocatory movement in said barrel;
an actuator accommodated in said housing and connected to said striker to impart reciprocatory movement thereto;
a housing shoulder provided on the inner surface of said cylindrical bore;
a barrel holder shoulder provided at the end of said barrel holder mounted in said bore of said housing;
a first elastic member provided between said housing shoulder and said cylindrical barrel holder shoulder, said housing shoulder acting upon said barrel holder through the agency of said first elastic member;
a second elastic member provided between the outer peripheral surface of said barrel holder shoulder and the inner surface of said cylindrical bore, said second elastic member being mounted in a groove provided in the outer surface of said barrel holder; and
a magazine for fasteners having one end thereof rigidly secured to said barrel holder for feeding said fasteners to said barrel and the other end thereof pivotally connected to said handle for rotation in a plane drawn through the axis of said barrel.

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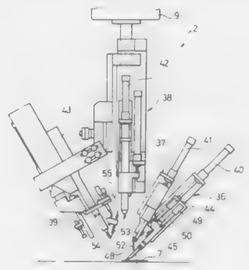
**4,746,048**

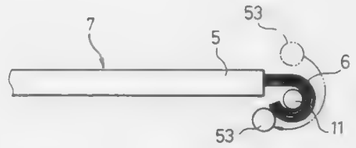
## PRINTED CIRCUIT BOARD JUMPER WIRE WIRING DEVICE

**Seiji Kawaguchi, Tokyo, Japan, assignor to Apollo Seiko Ltd., Tokyo, Japan**

**Filed Mar. 13, 1987, Ser. No. 25,751**
**Claims priority, application Japan, Apr. 9, 1986, 61-80222**
**Int. Cl.⁴ B23K** *1/12*
**U.S. Cl. 228—5.1** **7 Claims**

1. A printed circuit board jumper wire wiring device for connecting a jumper wire to two pins of a printed circuit board, comprising:
setting finger means for gripping each end of said jumper wire and for respectively positioning both ends of said jumper wire within the vicinity of said two pins of said printed circuit board to which said jumper wire ends are to be soldered, respectively;
a wrapping mechanism which has at its end a wrapping pin means for coiling a conductor part of each end of said





jumper wire around each of said pins of said printed circuit board; and
a soldering mechanism for soldering each of said coiled conductor parts to each of said pins of said printed circuit board.

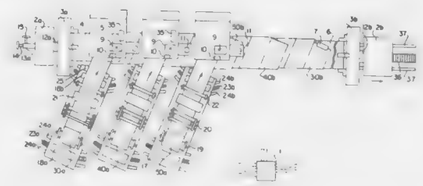
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**4,746,049**

## APPARATUS FOR FABRICATING MULTI-LAYER SPIRAL TUBES

**Tsutomu Oe; Sadatomi Uemukai; Tadao Ozaki; Katsuzo Sudo, and Yoshinori Yuzaki, all of Hiroshima, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Continuation-in-part of Ser. No. 782,267, Sep. 30, 1985, abandoned. This application Sep. 22, 1986, Ser. No. 929,954**
**Claims priority, application Japan, Dec. 4, 1984, 59-254988**
**Int. Cl.⁴ B23K** *5/02*
**U.S. Cl. 228—17.7** **1 Claim**



1. An apparatus for fabricating a multi-layer spiral tube, said apparatus comprising:
a rotatable wrapping drum around which a first web forming the innermost layer of the multi-layer spiral tube is spirally wrapped during the fabrication of the multi-layer spiral tube;
a chuck located at one end of said wrapping drum for rotatably supporting said one end of said wrapping drum;
a first drive means operatively connected to said chuck and



wrapping drum for rotating said wrapping drum supported by said chuck about an axis of rotation;
a rotatable take-up drum to which the lead edge of the first web is attached, said take-up drum having the same outer diameter as said wrapping drum and having an axis of rotation extending coaxial to said axis of rotation of said wrapping drum;
a second drive means operatively connected to said take-up drum for rotating said take-up drum about said axis of rotation thereof after said innermost layer is attached thereto at the same rate as said first drive means rotates said wrapping drum;
means operatively connected to said rotatable take-up drum for translating said take-up drum in a direction extending along said axis of rotation thereof towards said wrapping drum and away from said wrapping drum after said lead edge of the first web is attached to said take-up drum for advancing the first web spirally wrapped around said wrapping drum for forming the innermost layer of the multi-layer spiral tube;
a first web feed device adjacent said wrapping drum for feeding the first web forming the innermost layer of the multi-layer spiral tube to said wrapping and take-up drums;
a first wrapping device adjacent the outer periphery of said wrapping drum, said first web feed device feeding said first web between said first wrapping device and said outer periphery of said wrapping drum, said first wrapping device comprising
first depressing means for pressing the first web against the outer periphry of said take-up drum, and first attaching means for joining adjacent side edges of the first web spirally wrapped around said wrapping drum;
a second web feed device for feeding a second web corresponding to an outer layer of the multi-layer spiral tube, said second web device spaced from said first web feed device in a direction away from said wrapping drum for feeding the second web on top of and around the first web, after the lead edge of said second web is attached to the innermost layer, in an orientation and direction in which the side edges of the second web do not overlie said adjacent side edges of the first web joined by said first welding means; and
a second wrapping device associated with said second web feed device, the second web feed device feeding said second web between said second wrapping device and the first web formed as the inner most layer on top of which the second web is fed, said second wrapping device comprising
second depressing means for pressing the second web against the innermost layer of the multi-layer spiral tube, and second attaching means for joining adjacent side edges of the second web after it is wrapped around the innermost layer.

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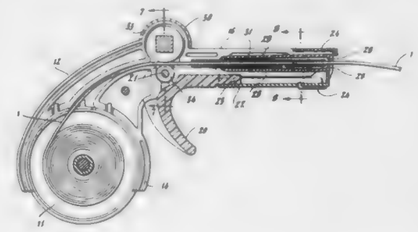
**4,746,050**

## SOLDER REMOVAL DEVICES

**Frank Brown, Ward Rd., Cape Porpoise, Me. 04014**

**Filed Jan. 20, 1987, Ser. No. 5,145**
**Int. Cl.⁴ B23K** *3/00*
**U.S. Cl. 228—57** **10 Claims**

1. Apparatus for manipulating a ribbon-like continuum of material adapted to receive and retain liquid comprising,
handle means for hand-holding said apparatus,
receptacle means for holding a continuum of said material,
positioning means including a tubular channel for selectively locating the outermost end portion of said continuum at a desired location,
path means for guiding said continuum from said recepatacle means to said positioning means,
rotary drive means for causing said continuum to move selectively to and fro between said receptacle means and said positioning means,



and trigger actuated cutting means adapted for cutting off the outermost portion of said continuum after it has become liquid-laden.

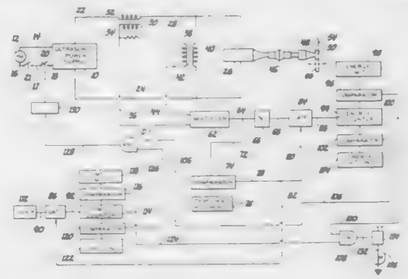
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**4,746,051**

## ULTRASONIC WELDING CONTROL

**David A. Peter, Anderson, Ind., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Dec. 8, 1982, Ser. No. 447,777**
**Int. Cl.⁴ B23K** *20/10*
**U.S. Cl. 228—102** **5 Claims**



1. A method of ultrasonic welding, the steps comprising, initiating welding by continuously applying power to ultrasonic welding apparatus that is operative to weld a pair of metallic parts, detecting when the applied power exceeds a power threshold, monitoring elapsed time beginning when said power threshold is exceeded, monitoring the level of energy applied to said welding apparatus beginning when said power threshold is exceeded, and terminating the application of welding power to the welding apparatus when both elapsed time and energy level have each exceeded predetermined values.

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**4,746,052**

## TAMPER EVIDENT PACKAGING AND METHOD

**Mark M. Schmissrauter, Signal Mountain, Tenn., assignor to Textile Printing Company, Chattanooga, Tenn.**

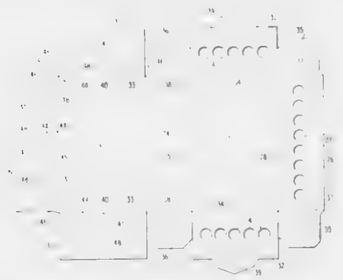
**Filed Apr. 28, 1987, Ser. No. 43,598**
**Int. Cl.⁴ B65D** *5/42*
**U.S. Cl. 229—102** **11 Claims**

1. A tamper evident package structure comprising a pair of superposed hinged closure flaps, at least one closure flap constructed of material covered with a strippable skin layer, said one closure flap having scoring line means formed through the skin layer thereof to define a gluing area, said one flap having an unscored area defined by said scoring line means adjacent to and connecting said gluing area on the skin layer to the skin layer beyond said scoring line means, the other closure flap having a window aperture formed therethrough adapted to register with said unscored area, and
glue applied to the gluing area bounded by the scoring line

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means of said one flap and being adhered to the opposing face of the other flap when said flaps are in superposed package-closing relationship, whereby pulling open of said other flap causes said glue to strip the skin layer in said gluing area from said one flap and adherence of the



skin layer in said gluing area to said other flap with the creation of a torn fragment of the skin layer at least in the unscored area of said one flap permanently visible through said window aperture of the other flap when the other flap is resealed on said one flap in superposed relationship therewith.

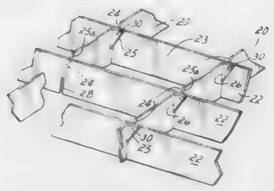
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**4,746,053**

## INTERIORLY LOCKED PARTITION ASSEMBLY

**Glenn R. Nichols, Wyoming, Mich., assignor to Bradford Company, Holland, Mich.**

**Filed Apr. 9, 1987, Ser. No. 36,907**
**Int. Cl.[4] B65D** *5/48*
**U.S. Cl. 229—120.36** **7 Claims**



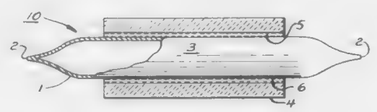
1. a partition assembly for use in a container for dividing the internal space of the container, the partition assembly having a first planar divider extending in one direction and a second planar divider extending in a direction intersecting the first divider, the first divider and second divider having interengaging vertical slots which are locked at the point of intersection, the slot of the first divider being at least partially formed by a tab defined by a diagonal cut extending from a top edge of the first divider downwardly and diagonally to intersect a vertical score line connecting the tab to the first divider, said vertical score line of said divider being substantially colinear with the vertical slot of said second divider, said tab being folded along said score line away from the plane of said first divider and into the plane of said second divider, and the tab being permanently joined to the second divider.

**4,746,054**

## METHOD OF JOINING CONCENTRIC CYLINDERS

**Robert R. Moats, Mt. Prospect, and Woodrow L. Bowen, Barrington, both of Ill., assignors to Northrop Corporation, Hawthorne, Calif.**

**Continuation-in-part of Ser. No. 770,892, Aug. 29, 1985, abandoned. This application Feb. 24, 1987, Ser. No. 18,327**
**Int. Cl.[4] B23K** *31/02, 31/06*
**U.S. Cl. 228—122** **15 Claims**



1. A method of making a metal-lined ceramic structure from a ceramic cylindrical member having a relatively small inner diameter thereof on the order of 0.100 inches and a ductile metal cylinder having a relatively small outer diameter thereof on the order of but slightly less than the inner diameter of the ceramic cylindrical member, comprising:

applying a thin moly-maganese metallic coating to the inner surface of the ceramic cylinder bore,

overcoating said moly-maganese metallic coating with a thin nickel plating,

applying a thin coating of silver to the outer cylindrical surface of said metal cylinder,

inserting the silver coated metal cylinder within the metallic coated bore of said ceramic cylinder,

forming an airtight seal at one end of the silver coated metal cylinder,

placing a predetermined quantity of liquid water within the metal cylinder,

forming an airtight seal at the other end of the silver coated metal cylinder wherein the predetermined quantity of liquid water is contained within the sealed metal cylinder,

heating the sealed metal cylinder and the surrounding ceramic cylinder to a temperature of at least 850 degrees centigrade in a hydrogen atmosphere and vaporizing said liquid water contained in said sealed ductile metal cylinder to expand said ductile material into intimate contact with the inner bore of said ceramic cylinder and producing a molten state of the metallic coating, silver and nickel and to braze the inner metal cylinder to the surrounding ceramic cylinder,

cooling the brazed cylinders to room temperature and returning said vaporized water to a liquid at atmospheric pressure,

severing the sealed ends from the metal cylinder extending beyond the ends of the ceramic cylinder, and

removing said liquid water from said metal cylinder.

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**4,746,055**

## METHOD AND CONNECTING MATERIAL FOR THE METALLIC JOINING OF PARTS

**Peter Ingram, Hemsbach; Bernd Jahnke, Neckargemuend, and Arno Neidig, Plankstadt, all of Fed. Rep. of Germany, assignors to Brown, Boveri & Cie AG, Mannheim, Fed. Rep. of Germany**

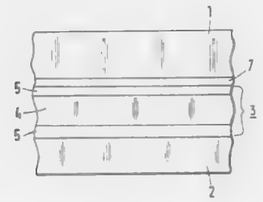
**Continuation of Ser. No. 811,944, Dec. 20, 1985, abandoned. This application May 22, 1987, Ser. No. 71,561**
**Claims priority, application Fed. Rep. of Germany, Dec. 21, 1984, 3446780**
**Int. Cl.[4] B23K** *31/02, 35/26*
**U.S. Cl. 228—122** **5 Claims**

1. Method for the metallic joining of component parts which are formed of semiconductor components with metallization on a surface, metallic components or metallic substrates, which comprises:

(a) arranging component parts with their metallic surfaces to be joined facing each other,



(b) inserting between the metallic surfaces to be joined a composite multilayer material of at least three layers, with a core layer formed solely from a metallic foil made of lead, with a thickness of 20 to 60 μm and coated on both sides with a surface layer of tin with a thickness between 0.5 and 2 μm forming a lower melting eutectic with the internal layer surface, and



(c) joining the component parts with the inserted composite multilayer material at a temperature of 180° C. to 350° C. to effect melting of the surface layers of the compsite multilayer material directly facing the metallic surfaces to be joined without melting or only melting the rim of the interior layer of the composite multilayer material.

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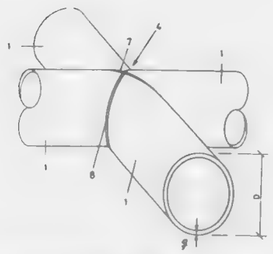
**4,746,056**

## METHOD OF JOINING TUBULAR STEEL LATTICE MEMBERS AND A DEVICE FOR USE IN THE EXECUTION OF THE METHOD

**Kjeld Thomsen, Fagerbo 18, 2950 Vedbaek, Denmark**

**Filed Jan. 21, 1987, Ser. No. 5,724**
**Claims priority, application Denmark, Jan. 23, 1986, 350/86**
**Int. Cl.[4] B23K** *31/02, 31/06*
**U.S. Cl. 228—170** **5 Claims**





1. A method of joining tubular lattice members of a weldable material in a space structure which is built up over box-shaped modules, and where the members are joined in the corners of the box-shaped modules under formation of lattice nodes, said method comprising the steps of:

(a) shaping one of the ends of each of respective four first members in two plane sections at an angle of 45° to the longitudinal axes of said respective first members for abutting placement in the same plane,

(b) placing said shaped ends of said four first members at right angles to an assembling device having four orthogonal half-elliptical surfaces and each surface having a circumference which fits with respective said abutting shaped ends of said first members to form a backing,

(c) welding abutting shaped ends of said four first members together with I-welds towards the backing provided by the half-elliptical surfaces of said assembly device to form lattice nodes, and

(d) welding oblique space lattice members to respective said lattice nodes.

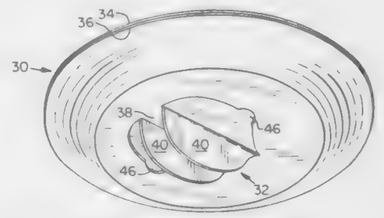
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**4,746,057**

## FINGER-STABILIZED EATING PLATE

**Otto W. Wagner, 2927 E. Burnside St., Portland, Oreg. 97214**

**Filed Mar. 25, 1986, Ser. No. 843,635**
**Int. Cl.[4] B65D** *5/00*
**U.S. Cl. 229—1.5 H** **11 Claims**



1. A finger-stabilized eating plate comprising:

(a) a plate body, and

(b) on the underside of the plate body, centrally thereof, finger-gripping means located and dimensioned for gripping between the fingers of the plate user by laterally exerted finger pressure, the finger gripping means terminating at one end inwardly of the outer perimeter of the underside of the plate body bottom sufficiently to nest the plate body bottom in the palm of the hand of the plate user when the fingers of the plate user grip the finger-gripping means, said finger gripping means being sized such that said finger gripping means terminate adjacent the back of the fingers when the plate is held in the palm of the hand with the finger gripping means gripped between the fingers.

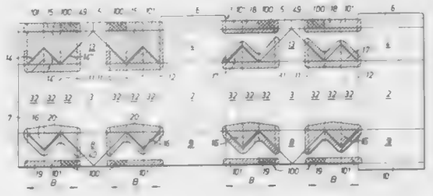
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**4,746,058**

## MATERIAL FOR PACKING CONTAINERS

**Jörgen Niske, Lund, Sweden, assignor to Tetra Pak International AB, Lund, Sweden**

**Filed Jan. 22, 1986, Ser. No. 821,339**
**Claims priority, application Sweden, Jan. 25, 1985, 8500350**
**Int. Cl.[4] B65D** *3/00*
**U.S. Cl. 229—3.5 MF** **7 Claims**



1. A blank for packing containers comprising:

a carrier layer of paper material having inner and outer surfaces, a layer of aluminum foil, adhesive means for

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joining said foil layer to the inner surface of said carrier layer, said carrier layer and said foil layer having a plurality of parallel crease lines to form three adjacent panel regions capable of being folded and joined to each other in Z-shaped configuration to produce a joint having said foil layer in opposing relation to each other in two adjacent panel regions, and predetermined portions of said foil layer being removed from said carrier layer on two of said panel regions.

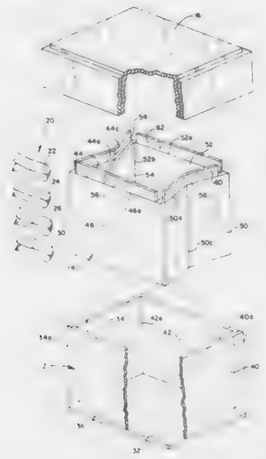
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**4,746,059**

## COLLAPSIBLE CONTAINER AND A METHOD FOR LOADING A PRODUCT INTO AND UNLOADING THE PRODUCT FROM A COLLAPSIBLE CONTAINER

**Miles N. Jackson, Cobourg, Canada, assignor to General Foods Inc., Don Mills, Canada**

**Filed Apr. 1, 1987, Ser. No. 33,321**
**Int. Cl.[4] B65D** *5/36*
**U.S. Cl. 229—23 R** **4 Claims**



1. A collapsible container for holding a product, comprising:
an outside member including a bottom section and four foldably interconnected, planar outside panels, each of the outside panels being connected to and extending upward from the bottom section, with adjacent outside panels generally at a right angle to each other, and wherein the outside member forms a container interior to receive the product;
an inside member including four reinforcing panels positioned inside and abutting against the outside panels of the outside member, each of the reinforcing panels having an upper fold edge and an upper flap connected to the upper fold edge and extending inward, generally horizontally therefrom, over the container interior;
said upper flaps include a first, a second, a third, and a fourth upper flap;
first end portions of the first and second upper flaps overlap and form a first overlapping section;
a second end portion of the second upper flap and a first end portion of the third upper flap overlap and form a second overlapping section;
a second end portion of the third upper flap and a first end portion of the fourth upper flap overlap and forms a third overlapping section;
second end portions of the fourth and first upper flaps overlap and form a fourth overlapping section;
connecting means releasably connecting together the upper flaps to hold the upper flaps generally horizontal, and to hold the reinforcing panels and the outside panels vertical against the weight of the product;
said connecting means includes a first, a second, a third, and a fourth chip;
the first clip is releasably mounted on and clamps together the first end portions of the first and second upper flaps;
the second clip is releasably mounted on and clamps together the second end portion of the second flap and the first end portion of the third flap;
the third clip is releasably mounted on and clamps together the second end portion of the third clip and the first end portion of the fourth clip;
the fourth clip is releasably mounted on and clamps together the second end portions of the fourth and first upper flaps; and
a lid member releasably secured and extending over the container interior to cover the product.

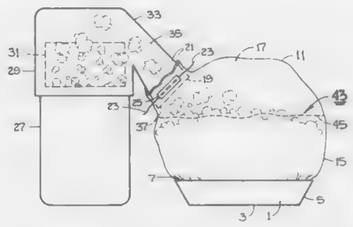
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**4,746,060**

## POPPED CORN RECEPTACLE

**James E. Morehouse, 1060 Meadow Lake Dr., #8, Vista, Calif. 92084**

**Filed Jun. 11, 1987, Ser. No. 60,499**
**Int. Cl.[4] B65D** *77/02, 81/34*
**U.S. Cl. 229—101** **6 Claims**



1. A combination popping corn receptacle, popped corn server and storage container comprising:
(a) a base having a flat bottom defined by short, upwardly-exending bordering side walls to form a shallow depression therein; and,
(b) an expansible pouch, folded substantially flat to fit in said depression comprising, in its expanded form:
(1) a bottom portion for attachment to said base from which said pouch expands upward;
(2) conterminous side walls extending upward from said bottom portion forming a rotund, bowl-like receptacle for receiving popped corn therein;
(3) a top cover integral with said side walls to form an enclosed pouch;
(4) said pouch having formed therein an aperture, bounded by a plurality of outwardly extending flaps integral therewith, adapted to register with and receive therein the terminal end of the discharge chute of a hot-air type corn popper, said flaps adapted to be deformed to generally seal about chutes of various sizes and shapes;
(5) first means in said pouch to exhaust hot gasses therefrom while retaining the popped corn, unpopped corn and late popping corn therein; and,
(6) second means laterally surrounding said side wall for completely separating said top cover from said pouch to open said pouch and provide an open receptacle atop said bottom portion for containing and serving popped corn therein;
(7) said pouch comprised of a sheet-like material adapted to be folded in fixed configuration to store popped corn therein.

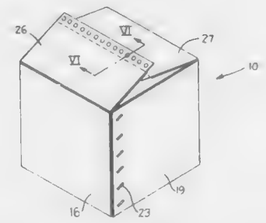


**4,746,061**

## TAMPER-PROOF SHIPPING CONTAINER

**George B. Arvanigian, 5029 Angling Rd., Kalamazoo, Mich. 49002**

**Filed Apr. 10, 1987, Ser. No. 36,780**
**Int. Cl.[4] B65D** *5/02*
**U.S. Cl. 229—102** **4 Claims**



1. A top-opening, tubular, tamper-evident container formed from a unitary blank of foldable multi-ply corrugated cardboard, the multi-ply corrugates cardboard defining said blank including a thin outer facing sheet and a thin inner facing sheet which are laminated together through at least one intermediate corrugated sheet, comprising:
a pair of opposed side wall panels and a pair of opposed end wall panels foldable joined to each other along parallel longitudinal fold lines to form a tubular structure open at the top and bottom ends;
top and bottom closure means for sealingly closing the opposite ends of said tubular structure in such a manner than either end can be opened without visually indicating that the carton has been opened in the event than an attempt is made to reseal it;
at least one said closure means including:
(a) a first closure flap foldably joined to one of said side panels along an edge thereof and projecting inwardly so as to partially close off the open end of the tubular structure, and a second closure flap foldably joined to the other side panel along an edge thereof and projecting inwardly therefrom toward said first closure flap to partially close off the open end of the tubular structure, said first and second closure flaps when in a closing position being disposed substantially within the same plane and in substantially perpendicular relationship to said side panels, said first and second closure flaps having free edges which extend longitudinally of the respective flaps and are disposed in closely adjacent but opposed relationship when the first and second closure flaps are in said closing position;
(b) tamper-indicating sealing means integrally associated with and directly sealingly cooperating between said first and second closure flaps in the vicinity of the free edges thereof;
(c) said tamper-indicating sealing means including a securing strip which projects outwardly beyond the free edge of said first closure flap so as to directly overlap the outer surface of said second closure flap when said closure flaps are in said closing position, said securing strip being an integral extension of said outer facing sheet, the underside of said securing strip being adhesively secured to the outer surface of said second closure flap, said securing strip having a series of cuts formed therethrough in spaced relationship longitudinally therealong so that said cuts are distorted if the seal between said securing strip and said second closure flap is broken;
(d) said tamper-indicating sealing means including a visually distinct indicator means provided on the outer surface of the second closure flap adjacent to the free edge thereof and extending longitudinally therealong, said visually distinct indicator means being disposed directly under the cuts in said securing strip when the latter is sealingly engaged with said second closure flap;
(e) said indicator means comprising an indicator strip which is of selected width and which extends longitudinally throughout the length of the second closure flap in closely adjacent relationship to the free edge, said indicator strip having a color which is different from the color of the outer surface of said second closure flap; and
(f) said cuts defining geometric shapes which are disposed substantially in spaced relationship longitudinally along the scuring strip, a plurality of said cuts defining each geometric shape so that breakage of the seal between the securing strip and said second closure flap causes at least some of said geometric shapes to be at least partially torn from the securing strip so as to form discrete openings which extend through said strip.

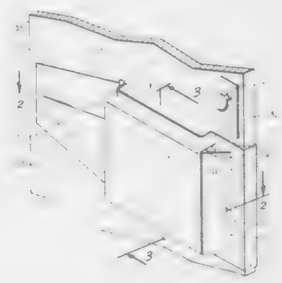
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**4,746,062**

## NEWSPAPER CONTAINER

**Thomas Bartylla, 5368 Portland Ave., White Bear Lake, Minn. 55110**

**Filed Sep. 18, 1987, Ser. No. 98,287**
**Int. Cl.[4] A47G** *29/12*
**U.S. Cl. 232—1 C** **9 Claims**



1. A container mountable to a door for receiving and retaining newspapers and the like, comprising:
(a) a generally upright housing having means for mounting the housing to a door, the housing having a generally vertical opening adjacent one edge and having an upwardly open opening; and
(b) a drawer carried within the housing and having an open top to receive a newspaper or the like deposited within the upwardly open opening of the housing, the drawer being slidable outwardly of the housing through said vertical opening to enable a newspaper within the drawer to be removed, said drawer having a manually graspable handle adjacent the vertical opening in the housing and having a portion extending substantially to said end of the housing, the drawer portion and housing end being so positioned as to closely confront a door jamb when mounted to a door such that when the said door is closed, said drawer is prevented from being withdrawn from the housing.

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**4,746,063**

## CLEANING OF SPRAYING APPARATUS

**Gary S. Roberts, 15 Normanhurst Avenue, Bournemouth, BH8 9NN, England**

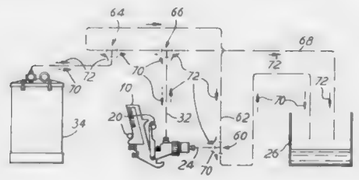
**Filed Nov. 3, 1986, Ser. No. 925,927**
**Claims priority, application United Kingdom, Nov. 5, 1985, 8527244; Mar. 19, 1986, 8606832**
**Int. Cl.[4] B05B** *15/02*
**U.S. Cl. 239—1** **10 Claims**

9. A pressure feed spraying means cleaning assembly comprising a pressure feed spraying means having a spraying outlet and having an inlet for pressurized liquid to be sprayed and an

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inlet for compressed gas for use in normal spraying; conduit means adapted to be sealingly coupled at its proximal end to the spraying outlet; cleaning liquid reservoir means coupled to the distal end of the conduit means; and fluid flow control means whereby cleaning fluid is passable through the spraying



means along a flow path including the inlet for pressurized liquid to be sprayed, the spraying outlet, and the conduit means sealingly coupled thereto; the fluid flow control means including means adapted for alteration of the direction of the flow of cleaning fluid through the spraying means.

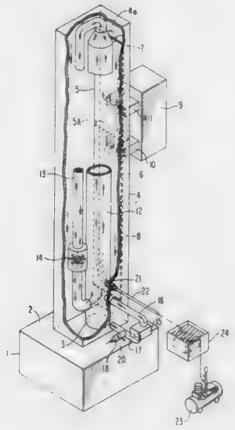
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**4,746,064**

## SNOW GENERATING AND SNOWFALL APPARATUS

**Kenji Isono; Jutaro Kobayashi, both of Tokyo; Takehiko Gonda, Ageo; Yoshio Sasyo, Funabashi; Nagaichi Suga, and Shinichi Katayanagi, both of Tokyo, all of Japan, assignors to Suga Weathering Technology Foundation, Tokyo, Japan**

**Filed Oct. 17, 1986, Ser. No. 920,194**
**Int. Cl.[4] A01G** *15/00*
**U.S. Cl. 239—14.2** **4 Claims**



4. A snow generating and snowfall apparatus comprising:
a vertically extending cooling tower having the bottom end closed;
a first air cooler connected to said tower for cooling the air in said tower;
an inner cylinder positioned in said cooling tower and extending in the lengthwise direction thereof and having a bottom end opening out of said closed bottom end;
a circulating passage connecting the top end of said inner cylinder and a lower end portion thereof to each other;
a humidifier connected to the lower portion of said inner cylinder for feeding water vapor into said inner cylinder in the vicinity of the lower end thereof for forming a cloud in said inner cylinder which can rise to the top thereof while being overcooled;
means connected to said inner cylinder in the vicinity of said humidifier for feeding a snow-generating material consisting of ice crystals into said inner cylinder; and
a variable speed blower in an intermediate portion of said circulating passage for, during normal operation, removing only some of the cloud from the top end of said inner cylinder, while maintaining the supercooled cloud therein, and recirculating it to the lower end portion of said inner cylinder for thus causing it to carry the ice crystals upwardly into the overcooled cloud.

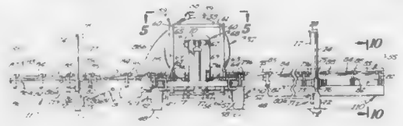
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**4,746,065**

## CROP SPRAYER

**Norman S. Gorder, Rte. 1, Gary, Minn. 56545**

**Continuation-in-part of Ser. No. 542,575, Oct. 17, 1983, Pat. No. 4,629,123. This application Oct. 16, 1986, Ser. No. 919,694**
**Int. Cl.[4] B05B** *1/20*
**U.S. Cl. 239—168** **4 Claims**



1. A crop sprayer including a main frame, ground engaging wheels connected to the main frame, a spray tank mounted on said frame and adapted to contain a liquid agricultural chemical therein,
an elongate horizontally disposed boom assembly extending transversely of said main frame and including an elongate central boom, a pair of similar elongate outer booms, each having its inner end pivotally connected to an outer end of said central boom for pivoting movement of each outer boom about a vertical axis,
a pair of castor wheel assemblies, means connecting the outer end portion of each outer boom with one of said castor wheel assemblies and permitting vertical translation of the outer boom assembly relative to the associated castor wheel assembly,
a spray device on said boom assembly including a plurality of spray nozzles connected in communicating relation to the tank and being operable to spray the liquid agricultural chemical upon a standing crop,
a vertically disposed support frame on said mounting frame and extending upwardly therefrom,
means on said central boom engaging said support frame for permitting vertical translation of the central boom relative to the support frame,
power means on said support frame, means connecting said power means with said central boom whereby actuation of said power means will cause vertical translation of said central boom relative to said support frame,
elongate flexible tensioning means interconnecting said support frame with said castor wheel assemblies and being engaged by said central boom and said outer booms whereby, when said power means is actuated to produce upward translation of said central boom, said tensioning means will be tensioned to cause simultaneous upward translation of said outer booms relative to said castor wheel assemblies.

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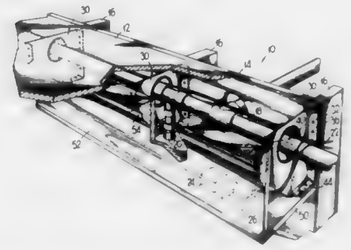
**4,746,066**

## RETROFIT SPRINKLER SYSTEM

**Chris M. Kitchens, Duluth, Ga., assignor to Peachtree Interior Builders, Ltd., Norcross, Ga.**

**Filed Mar. 5, 1987, Ser. No. 22,188**
**Int. Cl.[4] B05B** *15/06;* **E04B** *5/48*
**U.S. Cl. 239—283** **2 Claims**

1. A retrofit sprinkler system, comprising:
a. a number of brackets, each comprising a central member having a wall-mounting flange attached thereto for mounting the bracket to a wall adjacent the ceiling, a support opening in the central member, said support opening being J-shaped and oriented for access adjacent the front mounting surface, wherein the front mounting surface is slideably adjustable toward and away from the wall-mounting flange, a planar front mounting surface, and a planar bottom mounting surface;



b. flexible pipe, with sprinkler heads attached thereto and connected to a water source, the flexible pipe being supported in the openings of the brackets;
c. a facade fastened to the front mounting surfaces; and
d. a soffit having sprinkler head openings fastened to the bottom mounting surfaces.

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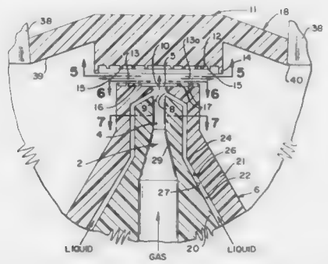


**4,746,067**

## LIQUID ATOMIZING DEVICE AND METHOD

**Steven A. Svoboda, 1180 Z Star Rt., Sonora, Calif. 95370**

**Filed Nov. 7, 1986, Ser. No. 928,842**
**Int. Cl.[4] A61M** *11/00*
**U.S. Cl. 239—338** **1 Claim**




1. A device for aerosolizing a liquid with a gas comprising:
a. a container for holding said liquid;
b. a venturi tube having an upstream opening adapted for connection to a source of pressurized gas, a throat portion, a gas discharge opening, and a liquid and gas discharge opening;
c. liquid conduit means connected to said container holding said liquid and having a liquid discharge opening adjacent the downstream end of said throat portion of said venturi tube;
d. said venturi tube is dimensioned and positioned to withdraw said liquid fluid from said container through said conduit means and to project a mixture of said liquid and gas out said liquid and gas discharge opening at high velocity in a directed stream in a first direction;
e. a deflector member positioned adjacent and disposed from said discharge opening of said venturi tube and having a surface formed with a generally planar surface intersecting said directed stream and causing a dispersion of said liquid and gas forming a flow mass in a second direction at an angle to said first direction; and
f. said deflector member is formed with a projection member disposed at an angle to said deflector surface and disposed at an angle from said liquid and gas discharge opening of said venturi tube, causing turbulence in said flow mass;
g. said structure resulting in said liquid being dispersed as a fine mist in a flow of said gas;
h. said liquid and gas discharge opening is formed in a discharge surface which is generally parallel with said deflector surface; and
i. said discharge surface is formed with a plurality of concentric ring projections for creating turbulence in said flow mass.

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**4,746,068**

## MICRO-NEBULIZER FOR ANALYTICAL INSTRUMENTS

**Paul C. Goodley, and Harvey D. Loucks, Jr., both of Cupertino, Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Oct. 29, 1986, Ser. No. 924,709**
**Int. Cl.[4] B05B** *7/10*
**U.S. Cl. 239—405** **21 Claims**



1. A nebulizer comprising:
a first member having a first abutment surface, said first member being provided with an outlet orifice extending through said first member and opening on said first abutment surface;
a second member having a second abutment surface, said second member being provided with a gas inlet orifice and a liquid inlet orifice extending through said second member and opening on said second abutment surface, where said first abutment surface is juxtaposed with said second abutment surface such that said outlet orifice and said gas inlet orifices are substantially aligned; and
groove means coupling said liquid inlet orifice to said substantially aligned outlet orifice and gas inlet orifice, said groove means being provided in at least one of said first abutment surface and said second abutment surface, said groove means opening tangentially upon said substantially aligned outlet orifice and gas inlet orifice;
whereby fluid may flow from said gas inlet orifice and said liquid orifice to said outlet orifice, where gas flowing out of said groove means and tangentially into said substantially aligned outlet orifice and gas inlet orifice creates a swirling vortex therein.

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4,746,069

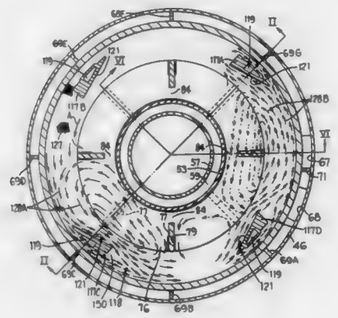
## CENTRIFUGAL MEDIA MILL

Raymond A. Entrikin; Roy A. Nelson, and Randolph C. Grieves, all of South Haven, Mich., assignors to Epworth Manufacturing Co., Inc., South Haven, Mich.

Continuation of Ser. No. 831,233, Feb. 19, 1986, abandoned, which is a division of Ser. No. 688,267, Jan. 2, 1985, Pat. No. 4,582,266, which is a continuation of Ser. No. 422,419, Sep. 23, 1982, abandoned. This application Mar. 24, 1987, Ser. No. 31,142

Int. Cl.[4] B02C *23/36*

U.S. Cl. 241—27 3 Claims



1. A method for effecting, in a mill containing a particulate-containing substance, a reduction in size of said particluate, the steps comprising:

placing said substance an a comminuting media into a comminuting vessel having a finite depth and having a centrally disposed shaft therein affixed to said vessel;

rotating said vessel and said shaft;

centrifically flinging all of said comminuting media radially outwardly in response to said rotating of said vessel and said shaft at a sufficient speed, thereby causing all of said comminuting media to rotate enmasse with said vessel and move into an upright cylindrical column over the full depth of the vessel spaced radially outwardly from said shaft;

splitting said column of comminuting media along the full depth of said vessel into a radially inner portion and a radially outer portion by causing the rotating columnar mass of comminuting media to encounter at least one stationary deflector in said vessel that is equidistantly spaced from the wall of said vessel over the full depth of said vessel;

deflecting only said radially inner portion of said comminuting media in a radially inwardly direction, and then centrifical flinging said radially inner portion radially outwardly;

causing said radially outer portion of said comminuting media to arcuately move past said deflector on a radially outer side thereof;

imparting shear and impact forces on said particulate by contacting said particulate with said comminuting media that is moving radially inwardly, radially outwardly, and arcuately and said arcuate movement of said radially outer portion of said commuting media; and

controlling the speed of rotation of said comminuting vessel and said shaft to a selected speed, thereby causing said media to exert the requisite amount of said shear and said impact forces on said particulate in said particulate-containing substance, thereby effectively reducing the size of said particulate to a desired size.

4,746,070

## ROLL REFINER AND METHOD FOR OPERATING SAME

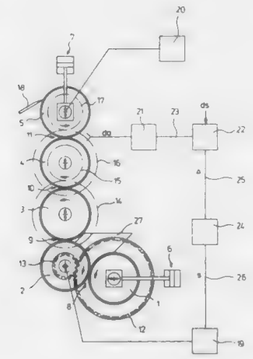
Werner R. Kuster, Niederuzwil, Switzerland, assignor to Gebruder Buhler AG, Uzwil, Switzerland

Continuation of Ser. No. 687,500, Jan. 2, 1985, abandoned, which is a continuation of Ser. No. 418,569, Sep. 15, 1982, abandoned. This application Jul. 22, 1986, Ser. No. 888,276

Claims priority, application Switzerland, Sep. 16, 1981, 5972/81

Int. Cl.[4] B02C *4/04*

U.S. Cl. 241—37 1 Claim



1. A roller refiner for processing viscous materials by homogenizing and grinding, said roller refiner comprising:

at least two groups of rollers in abutment to form a contiguous system with input and output ends and the first of said groups being feed rollers and the second of said groups being output rollers, at least one roller in said first group being fixed in position,

bias means for applying a predetermined force onto one of said second group of rollers toward said first group of rollers so that all rollers between said fixed roller and said one of said second group of rollers automatically assume new positions in order to keep forces applied therebetween constant,

means for variably driving at least one of said feed rollers independently of said output rollers,

means for driving said output rollers at a constant speed independent of said variable driving means,

means for directly measuring the gap between any two rollers in said output group, said measurement being independent of the temperature of said rollers,

means for comparing the gap value to a predetermined desired value, and

feedback means for adjusting the speed of said first feed roller in response to the difference between the measured gap value and the predetermined value.

4,746,071

## PROCESS FOR CRACKING BLOSSOM POLLEN

Ulrich Grünhoff, and Lutz Urbat, both of Bad Hönningen, Fed. Rep. of Germany, assignors to Kohlensaeurewerk Deutschland GmbH, Bad Hoenningen, Fed. Rep. of Germany

Filed Mar. 13, 1986, Ser. No. 839,272

Claims priority, application Fed. Rep. of Germany, Mar. 19, 1985, 3509759

Int. Cl.[4] B02C *9/04*

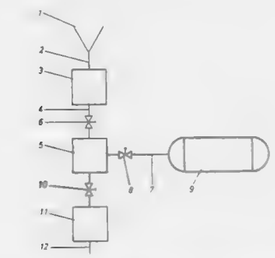
U.S. Cl. 241—2 8 Claims

1. A process for cracking grains of blossom pollen comprising the steps of:

(a) drying the blossom pollen in a first treatment stage at a temperature not exceeding 50° C. to a moisture content of not greater than 8 percent by weight, and



(b) pressurizing the dried blossom pollen with a gas which is inert to the pollen in a subsequent treatment stage, and



then abruptly depressurizing the pollen, thereby fracturing the pollen grains.

4,746,072

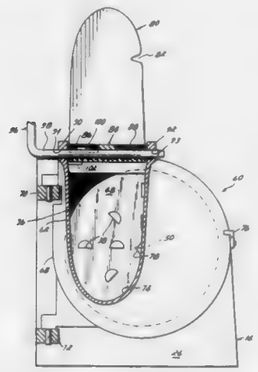
## SHREDDER ATTACHMENT FOR A FOOD PROCESSOR

Melvin E. Bricker, Cincinnati, Ohio, assignor to Bricker Products, Inc., Cincinnati, Ohio

Division of Ser. No. 734,909, May 16, 1985, Pat. No. 4,629,132. This application Sep. 9, 1986, Ser. No. 905,172

Int. Cl.[4] B02C *10/22*

U.S. Cl. 241—92 2 Claims



1. In a food processor for shredding food product, a shredder attachment comprising:

a housing;

a slicer plate having an outer periphery, said slicer plate being rotatable within said housing for slicing food product;

a feed chute having an interior adapted to receive food product, said feed chute being operably mounted to said housing and communicating with said housing for directing food product toward said slicer plate;

a pusher plate movable within said interior of said feed chute for pushing food product along said feed chute and against said slicer plate for slicing; and

splitter means having a knife-edge projection mounted to an inner surface of said interior of said feed chute and extending outwardly from said inner surface upstream relative to said slicer plate and terminating at a point within said feed chute so that said splitter means does not contact an opposite inner surface, said splitter means; directing food product pushed along said feed chute toward said outer periphery of said slicer plate and slicing through food product moving therepast to avoid binding, crushing or bruising of the food product pushed through said feed chute.

4,746,073

## RECOVERY OF ALEURONE CELLS FROM WHEAT BRAN

Bruce A. Stone, and James Miniffe, both of Melbourne, Australia, assignors to La Trobe University, Victoria, Australia

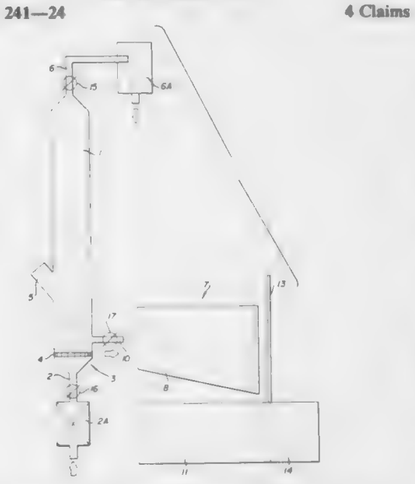
PCT No. PCT/AU85/00066, § 371 Date Nov. 22, 1985, § 102(e) Date Nov. 22, 1985, PCT Pub. No. WO85/04349, PCT Pub. Date Oct. 10, 1985

Continuation of Ser. No. 815,096, filed as PCT AU85/00066, Mar. 29, 1985, published as WO85/04349, Oct. 10, 1985, abandoned. Filed Jun. 10, 1987, Ser. No. 59,238

Claims priority, application Australia, Apr. 2, 1984, PG4377

Int. Cl.[4] B02C *9/04*

U.S. Cl. 241—24 4 Claims



1. A method for the physical separation and recovery of aleurone cell particles and pericarp-testa particles present in commercial wheat bran, which comprises:

(A) hammer-milling commercial wheat bran whereby the bran is broken and reduced into particles which consist predominantly of pericarp-testa particles and aleurone cell particles having particle sizes within the sieve mesh range of larger than about 130μm and smaller than about 290 μm, as well as particles smaller than about 40 μm; and

(B) fractionating the aleurone cell particles from the pericarp-testa particles by:

(i) sizing the hammer-milled bran so as to obtain a sized-fraction of particles within the sieve mesh range of larger than about 130 μm and smaller than about 290 μm,

(ii) size-classifying said fraction of particles within the sieve mesh range of larger than about 130 μm and smaller than about 290 μm so as to remove those particles which are smaller than about 40 μm and electrostatically charge the remaining aleurone cell particles and pericarp-testa particles differentially by triboelectrification, by means of substantially dry air stream elutriation of said particles within the sieve mesh range of about 130 μm and 290 μm size sieve in an elutriator columkn so as to remove those particles which are smaller than about 40 μm and electrostatically charge the remaining aleurone cell particles and pericarp-testa particles differentially by rubbing against one another and/or against the side wall of the elutriator column, and

(iii) electrostatically separating the size-classified remaining aleurone cell particles from pericarp-testa particles by passing an air stream entraining said electrostatically charged remaining aleurone cell particles and pericarp-testa particles through an electric field generated by an electrostatic separator, whereby said particles in the air stream are fractionated by the differential of their electric charges and deflected into separate receiver bins.

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4,746,074

## GRINDING DEVICE FOR DRUM-TYPE CHOPPER

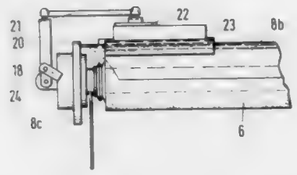
Eberhard Wistuba, Rettenbach; Martin Nusser, Niederstotzingen, and Xaver Lenzer, Koetz, all of Fed. Rep. of Germany, assignors to Karl Mengele & Söhne GmbH & Co., Günzberg, Fed. Rep. of Germany

Filed Oct. 7, 1986, Ser. No. 916,284

Claims priority, application Fed. Rep. of Germany, Oct. 8, 1985, 3535909

Int. Cl.[4] B02C *18/16*; B24B *19/00*

U.S. Cl. 241—101.2 7 Claims




1. In a drum type chopper comprising a cutter drum rotatable about a stationary axis with said drum being elongated in the axial direction and having an outer circumferential surface, at least one cutter mounted on said drum and extending in the axial direction thereof and said cutter having a cutting edge at the outer circumferential surface of said drum, a counter knife mounted outwardly of the circumferential surface of said drum so that the cutting edge of said cutter rotates past said counter knife for effecting a cutting action, said cutting edge of said cutter facing said counter knife requires sharpening, a cylindrical grinding wheel located outwardly from the circumferential surface of said cutter drum for sharpening the cutting edge of said cutter, means for moving said grinding wheel between a grinding position adjacent the circumferential surface of said cutter drum and a rest position spaced outwardly from the circumferential surface, said grinding wheel having an axis of rotation parallel to the axis of said cutter drum, means for rotating said grinding wheel and means for reciprocating said grinding wheel in the direction of the axis of rotation thereof, wherein the improvement comprises that said grinding wheel extends in the direction of the axis of rotation for a length corresponding approximately the axial length of said cutter drum, and said means for rotating and means for reciprocating having a common axis so that said grinding wheel reciprocates along the axis of rotation thereof, said grinding wheel comprises a shaft forming said common axis, said means for rotating connected to one end of said shaft and in axial alignment therewith for rotating said grinding wheel and said reciprocating means connected to the other end of said shaft for reciprocating said grinding wheel on the common axis formed by said shaft.

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4,746,075

## PRECISION COIL WINDING MACHINE AND METHOD

Gary K. Hoxit, Easley, S.C., assignor to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 678,857, Dec. 6, 1984, abandoned. This application Aug. 29, 1986, Ser. No. 902,015

Int. Cl.[4] B65H *54/20*, *57/28*

U.S. Cl. 242—7.16 5 Claims

1. Apparatus for precision winding of successive turns of a coiled wire on bobbins to make coils comprising:

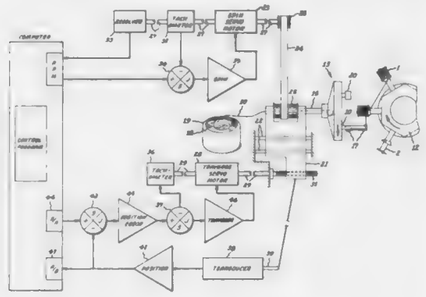
means for holding a bobbin at a winding station,

a spinning and traversing fly head winder for wrapping wire around the bobin at said station,

spin servo motor means coupled to said winder, an electronic spin amplifier therefor, and feedback means providing electrical signals indicative of the angular position of said winder,

traverse servo motor means varying the linear position of said winder, a traverse electronic amplifier therefor, and feedback means providing electrical signals indicative of the linear position of said winder,

computer means including a memory for storing data for defining a coil winding profile having a predetermined ideal position for said successive turns of wire, a pair of input channels for receiving the electrical signals from said feedback means, and a pair of output channels to said



electronic amplifiers for transmitting control signals thereto,

said computer means being programmed to read said electrical signals and provide control signals to said output channels causing said fly head winder to place each turn of said wire at said predetermined ideal position for said turn without dependence on the lay of the previous turn.

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4,746,076

## WINDER DEVICE

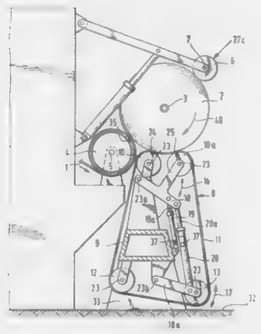
Kauko Tomma, Helsinki, and Seppo Saukkonen, Vantaa, both of Finland, assignors to Oy Wärtsilä Ab, Helsinki, Finland

Filed Nov. 4, 1986, Ser. No. 927,261

Claims priority, application Finland, Nov. 20, 1985, 854571

Int. Cl.[4] B65H *16/10*, *18/16*

U.S. Cl. 242—66 23 Claims



1. A winder device for winding a moving web, such as paper or cardboard web, to form a roll of considerable weight, said roll being carried by support members giving said roll peripheral support, said support members comprising a movable support belt device and a rotatable winder drum which is spaced from the support belt device about the periphery of the roll, said support members being arranged to form the main support of said roll, said support belt device including a support belt having a portion between two rotatable support elements, which support belt portion has a surface of contact with said roll giving said roll support, said surface of contact being arranged to be continuously enlarged when said roll grows, in order to eliminate the risk of roll damage due to excess support pressure when winding heavy rolls, the web being conducted to the roll about the periphery of the winder drum and through the space between the winder drum and the support belt device.



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4,746,077

## CONTROL DEVICE FOR A DRAG MECHANISM IN A SPINNING TYPE FISHING REEL

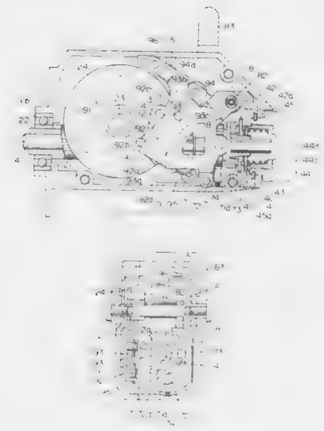
Junichi Toda, Sakai, Japan, assignor to Shimano Industrial Company Limited, Osaka, Japan

Filed May 27, 1986, Ser. No. 867,017

Claims priority, application Japan, May 30, 1985, 60-117177; Dec. 16, 1985, 60-193083

Int. Cl.[4] A01K *89/01*

U.S. Cl. 242—84.5 A 9 Claims



1. A spinning type fishing reel comprising:

a reel body,

a rotary frame supported rotatably to said reel body,

a spool shaft,

a spool supported on said shaft,

a drag mechanism for applying a resistance against rotation of said spool,

a changeover control mechanism for changing over said drag mechanism between an operating state in which said spool is subjected to a rotational resistance applied by said drag mechanism and an operation releasing state in which said operating state of said drag mechanism is released to enable said spool to be freely rotatable, and

a return mechanism which, when said drag mechanism is released from said operating state, automatically restores said changeover control mechanism from a condition causing said drag mechanism to occupy said operation releasing state to a condition causing said drag mechanism to occupy said operating state following rotation of said rotary frame.

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4,746,078

## REEL LIFTING AND SUPPORT DEVICE

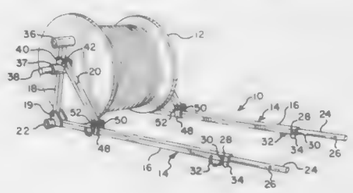
William H. Setzke, Rte. 1, Box 52A, Frankfort, Ill. 60423

Filed Nov. 14, 1986, Ser. No. 931,409

Int. Cl.[4] B65H *54/553*, *75/40*

U.S. Cl. 242—94 6 Claims

1. An easily collapsible, easily transportable and compact device for safely lifting, supporting and moving cable reels, said device consisting of a pair of units, each unit including a longitudinally extending lower support arm defining a fulcrum at one end thereof, an upper support arm pivotally connected to said lower support arm at the fulcrum end, a brace connectable between said lower and upper support arms adapted to assume a locked position, said brace rigidly supporting said upper arm at an acute angle with respect to said lower arm and adapted to assume a collapsed position in which said upper arm, said lower arm and said brace are all substantially parallel such that said device is substantially compact, releasable fastening means releasably connectable between a lower end of said brace and one of said support arms operable such that when so connected, said brace and said upper arm assume said locked position but when released, said brace and said upper arm assume said collapsed position, said releasable fastening means also engageable with an upper end of said brace when said brace is in said collapsed position to secure said unit in said collapsed position for ease of storage and transport at least one



socket carried by said upper arm, said socket defining a substantially cylindrical tube adapted to receive a horizontal support for said cable reel, said device operable such that when one of said units is disposed on either side of a reel and a horizontal support is inserted through said socket of said first unit, through a central aperture of said reel and through said socket of said second unit, said device is operative to rollably transport said reel from one location to another by either pushing or pulling said lower arm and said device is operative to lift said reel by pivoting about said fulcrum until said reel is raised above its support surface and then to support said reel above said support surface for rotation of said reel and removal of the contents thereof.

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4,746,079

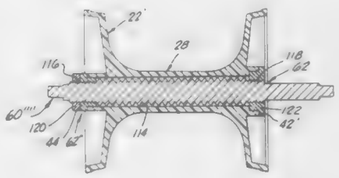
## SPOOL FOR FISHING REEL

Carl W. Newell, 955 Avonoak, Glendale, Calif. 91206

Filed May 22, 1986, Ser. No. 865,773

Int. Cl.[4] B65H *75/02*, *54/553*, *75/14*, *75/18*

U.S. Cl. 242—129.7 10 Claims



1. A spool of engineering polymer for use in a fishing reel for the winding and unwinding of fishing line thereon, said spool adapted for rotary mounting in said fishing reel, said spool comprising:

an annular line receiving core having opposed end areas;

a pair of annular end plates each projecting radially from and merging with one of said end areas, said plates each having an annular interior sloping surface flowing from said annular core wherein there is formed an annular recess therebetween to receive said fishing line, each of said annular end plates having an exterior annular recess with a centrally located hub and a plurality of strengthening ribs radiating from each of said hubs in said recesses;

said core and said pair of annular end plates are of unitary single construction;

a shaft of other than said spool material extending beyond

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said pair of annular end plates for journaling in said fishing reel to facilitate rotation of said spool within said reel, said shaft having a shaft core and said shaft being fitted into said annular core and said end plates;

locking means in the form of at least one interruption along said shaft core upsetting the surface of said shaft core to present a surface area to assure a locking fit to prevent lateral movement of said shaft within said space and restrict unwanted shrinking of said polymer as it dries associated with said shaft and said annular core, and threads on the portions of said shaft projecting beyond said respective hubs, and nuts thereon adapted to be tightened against said hubs to assure addition prevention of lateral movement of said shaft independent of said spool.

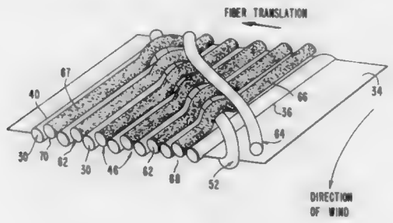
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**4,746,080**

**METHOD OF WINDING OPTICAL FIBER ON A BOBBIN**

**George T. Pinson, Huntsville, Ala., assignor to The Boeing Company, Seattle, Wash.**

**Filed Mar. 31, 1987, Ser. No. 32,243**
**Int. Cl.[4] B65H** *55/04*
**U.S. Cl. 242—177** **12 Claims**




1. A method of winding a continuous optical fiber on a bobbin comprising:

winding a first compact layer of said fiber in a first direction around said bobbin from a start end proximate one axial end of said bobbin to a finish end proximate the other axial end of said bobbin, the turns of said fiber in said first compact layer being in virtual axial contact with each other and defining a plurality of generally parallel grooves in the surface of said first compact layer;

winding a first crossover layer of said fiber in said first direction over said first compact layer from the finish end to proximate the start end thereof, said crossover layer including at least one turn of said fiber disposed at an angle to the turns and grooves in said first compact layer; and

thereafter alternately winding a plurality of said compact layers and crossover layers in said first direction around said bobbin, each said compact layer axially extending from a start end aligned with a start set-back groove in the preceding compact layer axially spaced from the start end thereof to a finish end aligned with a finish set-back groove in the preceding compact layer axially spaced from the finish end thereof, and each said crossover layer axially extending from the finish end to proximate the start end of the preceding compact layer.

12. A bobbin with optical fiber wound thereon, said bobbin comprising a plurality of alternating compact and crossover layers of said fiber wound in one direction around said bobbin, each said compact layer extending axially of said bobbin from a start end proximate one end of said bobbin to a finish end proximate the other end of said bobbin and including a plurality of turns of fiber in virtual axial contact with each other which define a plurality of generally parallel grooves in the surface of the compact layer, the turn defining the start and finish ends of each compact layer being respective aligned with start and finish set-back grooves in the surface of the immediately preceding compact layer, said set back grooves being axially spaced from the respective start and finish ends of said preceding compact layer, and each crossover layer extending axially of the bobbin from proximate the finish end of the preceding compact layer to proximate the start end of the preceding compact layer and including one or more turns of fiber axially spaced from each other and disposed at an angle to the turns and grooves of the preceding compact layer.

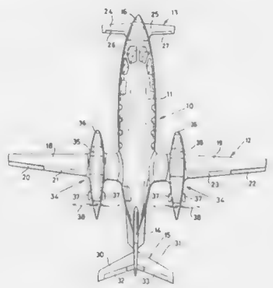
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**4,746,081**

**AIRCRAFT**

**Alessandro Mazzoni, Genova, Italy, assignor to Industrie Aeronautiche e Rinaldo Piaggio S.p.A., Italy**

**Filed May 27, 1982, Ser. No. 382,664**
**Claims priority, application Italy, Jan. 25, 1982, 19275 A/82**
**Int. Cl.[4] B64L** *5/02*
**U.S. Cl. 244—89** **1 Claim**



1. A three-lift surface aircraft characterized in that it comprises, in combination:

a fuselage having a minimum aerodynamic resistance and the external outline of which is absolutely devoid of any curvature discontinuities,

a main wing forming a main lift surface equipped with wing flaps and ailerons, placed across said fuselage at a level about midway thereof,

a front tab forming a front lift surface, rigidly connected to the front end of said fuselage and having an area less than one third of the area of said main wing, composed of two symmetrical half-tabs relative to the centre line of the aircraft and rigidly connected together so as to form a negative dihedron and positioned beneath the plane of said main wing and being equipped with wing flaps,

a vertical tail plane, equipped with a rudder, installed behind said main wing,

a horizontal tail plane forming a rear lift surface having an area less than one third of the area of said main wing, consisting of two half-planes which are symmetrical relative to the centre line of the aircraft and are connected rigidly together so as to form a negative dihedron, mounted in elevation on said vertical tail plane, and being equipped with elevators,

two turbopropeller engines which drive propellers positioned behind said main wing, installed on said wing in a position symmetrical relative to the middle plane of the aircraft,

a passenger compartment placed in said fuselage ahead of said main wing,

a front landing gear which can fully be retracted within the fuselage, and

two main rear landing gears which can completely be retracted within said fuselage behind the passenger compartment thereof.

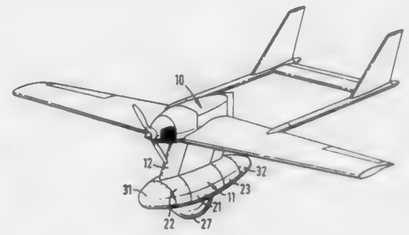


**4,746,082**

**AIRCRAFT AND A SYSTEM INCLUDING AIRCRAFT BORNE APPARATUS**

**Philip W. Syms, Bournemouth, and Douglas R. Taylor, Kent, both of England, assignors to Flight Refuelling Ltd. and GEC Avionics Ltd., both of, England**

**Filed Feb. 13, 1986, Ser. No. 829,291**
**Int. Cl.[4] B64C** *1/36*
**U.S. Cl. 244—137.4** **12 Claims**




1. An aircraft comprising a first airframe portion including wings, power plant, and control means and systems required for independent flight, and another portion which is a payload carrier and which is supported from said first airframe portion, outside said first airframe portion from which it is spaced, by support means which allow angular movement, at least in roll, of said payload carrier portion relative to said first airframe portion whereby the attitude of said payload carrier portion can be controlled independently of the attitude of said first airframe portion, each said portion having an external surface which is a respective part of the external surface of the aircraft that is exposed to the atmosphere when the aircraft is in flight.

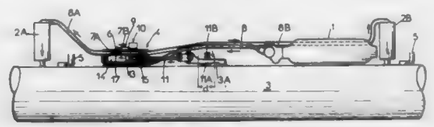
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**4,746,083**

**DEVICE FOR EJECTING A LOAD SLUNG UNDER A HIGH-PERFORMANCE AIRCRAFT**

**Gérard Dupin, Clamart, and Moise DuPont, Colombes, both of France, assignors to Avions Marcel Dassault-Breguet Aviation, Vaucresson, France**

**PCT No. PCT/FR85/00323, § 371 Date Jun. 25, 1986, § 102(e) Date Jun. 25, 1986**
**PCT Filed Nov. 15, 1985, Ser. No. 885,571**
**Claims priority, application France, Nov. 16, 1984, 84 17494**
**Int. Cl.[4] B64D** *1/02*
**U.S. Cl. 244—137.4** **4 Claims**




1. A mechanism for detaching an elongated load from support elements located on the underside of an aircraft and for ejecting the elongated load in a controlled manner away from the aircraft, the elongated load having a front end and a rear end, said mechanism comprising

a front fluid jack module which is attachable to said aircraft and is capable of contacting the front end of said elongated load to move said front end away from said aircraft at a controlled speed,

a separate rear fluid jack module which is attachable to said aircraft and is capable of contacting the rear end of said elongated load to move said rear end away from said aircraft at a controlled speed, said rear fluid jack module being independently attachable to said aircraft from said front fluid jack module,

fluid supply means on said aircraft for providing a fluid under pressure,

a control device which comprises a release/ejection module which is attachable to said aircraft separately from said front fluid jack module and said rear fluid jack module and which includes an inlet channel, two outlet channels, and a double-needle servo-slide valve movable between said two outlet channels to control the ratio of fluid under pressure that flows through each of said two outlet channels from said inlet channel,

a first supply line connected between said fluid supply means and said inlet channel of said control device,

second and third supply lines respectively connected between said two outlet channels of said control device and said respective front and said rear fluid jacks, and

detachment means for detaching said elongated load from said support elements, said detachment means comprising a connection rod having a first end connected to said release/ejection module and a second end, and a latch means attached to the second end of said connection rod, said latch means being cooperable with a boss on said elongated load to axially move said elongated load and cause detachment thereof from said support elements upon axial movement of said connection rod by said release/ejection module,

said control device operating to control the ratio of fluid under pressure that flows into said second and third supply lines from said first supply line and thus the speed at which said front and rear fluid jacks move said respective front and rear ends of said elongated load away from said aircraft and thus the angular pitching speed imparted to said elongated load.

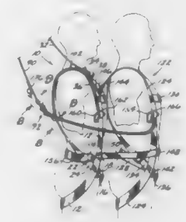
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**4,746,084**

**TANDEM PARACHUTE HARNESS**

**Edward T. Strong, 5062 Downing St., Orlando, Fla. 32809**

**Filed Jun. 23, 1986, Ser. No. 877,271**
**Int. Cl.[4] B64D** *17/30*
**U.S. Cl. 244—151 R** **25 Claims**



1. Tandem parachute apparatus comprising

a first body harness having a pair of shoulder straps;

rigid fittings attached to respective ones of the shoulder straps, each of said fittings having a medial portion connected directly to the shoulder strap and first and second end portions on opposite sides of said medial portion;

canopy risers connected to the first end portions of the fittings; and

a second body harness connected to the second end portions of the fittings.

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**4,746,085**

## METHOD FOR DETERMINING THE EARTH'S MAGNETIC FIELD AND A SATELLITE'S ATTITUDE FOR ATTITUDE CONTROL

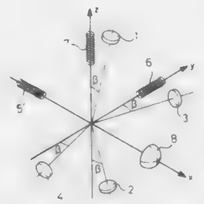
**Ernst Brüderle, Ottobrunn, Fed. Rep. of Germany, assignor to Messerschmitt-Bölkow-Blohm GmbH, Munich, Fed. Rep. of Germany**

**Filed Feb. 26, 1987, Ser. No. 19,485**

**Claims priority, application Fed. Rep. of Germany, Feb. 28, 1986, 3606636**

**Int. Cl.[4] B64G *1/32***

**U.S. Cl. 244—166** **4 Claims**



**1**. A method for determining the earth's magnetic field, and selectively, a satellite's attitude as a prerequisite for the attitude control of said satellite in a known earth orbit, said satellite including magnetic coils, gyros sun sensors and reaction and-/or flywheels, and is continuously oriented with an x-axis of a coordinate system (x, y, z) integral with the satellite directed towards the center of the sun and which, with respect to an absolute reference coordinate system (X, Y, Z) whose X-axis coincides with the x-axis, is rotated around said x-axis, at an instant $t_0$, through an angle of rotation $\alpha$ as well as being able to rotate with an angular velocity $\omega$, characterized in that the method comprises:

measuring, at three instants ($t_0$, $t_1$, $t_2$) succeeding each other and respectively spaced by time intervals $\Delta t_1 (t_0 < t < t_1)$ and $\Delta t_2 (t_1 < t < t_2)$, angular momentum components ($H_y$, $H_z$) of the satellite oriented perpendicularly to the x-axis, wherein throughout one of the two time intervals, no magnetic moment is generated, while during the other time interval, a constant magnetic moment $M_x$ in direction of the x-axis is generated;

calculating, from the measured angular momentum components $H_y(t_0)$, $H_y(t_1)$, $H_y(t_2)$, $H_z(t_0)$, $H_z(t_1)$ and $H_z(t_2)$, the earth's magnetic field components $B_y(t_0)$ and $B_z(t_0)$, in accordance with the equations:

$$B_y(t_0) = Q_2\{H_z(t_2) - Q_{31}H_z(t_1) + Q_{21}H_z(t_0) + \omega\Delta t_2[H_y(t_1) - H_y(t_0)]\}$$

$$B_z(t_0) = Q_2\{-H_y(t_2) + Q_{31}H_y(t_1) - Q_{21}H_y(t_0) + \omega\Delta t_2 \cdot [H_z(t_1) - H_z(t_0)]\}$$

with respect to the coordinate system (x, y, z) integral with the satellite wherein $Q_2 = 1/(M_x\Delta t_2)$, $Q_{31} = \Delta t_3/\Delta t_1$, $Q_{21} = \Delta t_2/\Delta t_1$, $\Delta t_3 = t_2 - t_0 = \Delta t_2 + \Delta t_1$, $\Delta t_1 = t_1 - t_0$, $\Delta t_2 = t_2 - t_1$; and

selectively calculating the angle of rotation $\alpha$, in accordance with

$$\text{Cos } \alpha = \frac{B_y(t_0)B_Y(t_0) + B_z(t_0)B_Z(t_0)}{B_Y^2(t_0) + B_Z^2(t_0)}$$

whereby the components of the earth's magnetic field $B_Y(t_0)$ and $B_Z(t_0)$ on the known terrestrial orbit are utilized with reference to the absolute reference coordinate system (X, Y, Z).

**4,746,086**

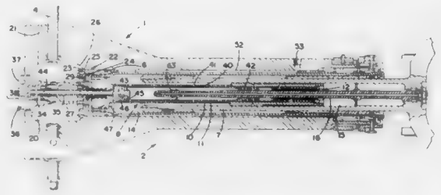
## NOSE LANDING GEAR JUMP STRUT ASSEMBLY

**George R. Happ, Aurora, Ohio, assignor to Pneumo Abex Corporation, Boston, Mass.**

**Filed Mar. 9, 1987, Ser. No. 23,276**

**Int. Cl.[4] B64C *25/10***

**U.S. Cl. 244—104 R** **37 Claims**



**1**. A jump strut assembly which is extendable on command for rotating the nose of an airplane upwardly during the take-off ground run comprising a main housing cylinder adapted to be affixed to the nose of the airplane, a jump cylinder axially movable within said main housing cylinder between a retracted position and an extended position relative to said main housing cylinder, lock means for releasably locking said jump cylinder against extension when in the retracted position, lock release means for releasing said lock means, fluid pressure means acting on said jump cylinder for moving said jump cylinder to the extended postion upon release of said lock means, a main strut piston axially movable within said jump cylinder, and means for preventing relative movement between said main strut piston and jump cylinder during movement of said jump cylinder to the extended position.

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**4,746,087**

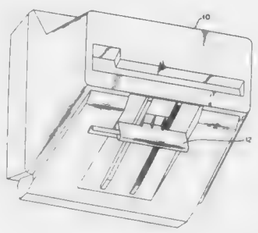
## TILT MECHANISM FOR DISPLAY TERMINAL

**Larry G. Beaton, Garner, N.C., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Mar. 30, 1987, Ser. No. 32,118**

**Int. Cl.[4] A45D *19/04***

**U.S. Cl. 248—1 I** **7 Claims**



**1**. A tilt mechanism for a display terminal comprising:

first and second parallel members defining a channel extending from the front of the display terminal toward the rear at the bottom surface of the display terminal, at least one of said parallel members having a movement-inhibiting surface; and

a movable support having

a base plate selectively movable within the channel defined by said first and second parallel members, and

a terminal supporting pedestal extending from said base plate, said terminal supporting pedestal including a locking surface which may be brought into engagement with the movement-inhibiting surface when said base plate has reached a desired position within the channel.



**4,746,088**

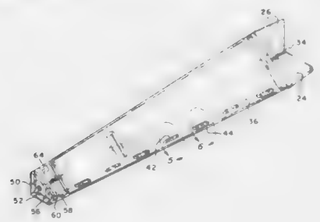
## PLASTIC WASHTUB LEG

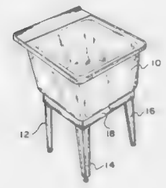
**Kurt J. Kruger, Huntington, Conn., assignor to Spartan Industries, Inc., Pennsauken, N.J.**

**Filed Feb. 27, 1987, Ser. No. 20,062**

**Int. Cl.[4] A47B *91/00***

**U.S. Cl. 248—188.8** **5 Claims**





**1**. A plastic leg for a washtub comprising a substantially flat and rigid elongated plastic preform, said preform including a pair of elongated spaced apart grooves formed therein and extending throughout substantially the entire length thereof, said grooves dividing said preform into three substantially parallel elongated sections and forming living hinges so that said preform can be folded into a substantially prism shape having a triangular cross section, and means for maintaining said preform in its folded condition including a plurality of apertures formed in said plastic preform along one edge thereof and a plurality of cooperating tabs extending from said preform along the opposite edge thereof, said tabs extending through said apertures when said preform is folded into its prism shape so that the free ends of said tabs are accessible from the exterior of said leg, each of said tabs including a shoulder portion which is adapted to fit over the upper surface of said apertures on the exterior of said leg to prevent said tabs from being withdrawn from the apertures after they pass therethrough, said shoulder portions extending in directions substantially perpendicular to the axes of said apertures, some of said shoulder portions extending in a direction different from the remaining shoulder portions.

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**4,746,089**

## MAGNETIC FUEL TANK CAP HOLDING SYSTEM

**Earl Clapper, 1428 E. 3rd St., Long Beach, Calif. 90802**

**Filed Mar. 23, 1987, Ser. No. 28,868**

**Int. Cl.[4] A47F *5/00***

**U.S. Cl. 248—309.4** **9 Claims**

**1**. A method of holding an automotive vehicle fuel tank cap during refueling, which cap has an exteriorly facing top portion and an interiorly directed portion with means for contacting and engaging a filler neck comprising: mounting a magnet upon the inside of an automotive vehicle fuel tank inlet access door, removing said fuel tank cap from the fuel tank inlet, and placing said exteriorly facing portion of said fuel tank cap against said magnet, whereby said fuel tank cap is releasably held to said fuel tank inlet access door by the force of magnetism so that said interiorly directed portion of said cap is held



directed away from and out of contact with said fuel tank inlet access door.

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**4,746,090**

## HAIR DRYER HOLDER

**Ronald L. Hamilton, 9343 Comstock Dr., Cincinnati, Ohio 45231**

**Filed Jan. 2, 1987, Ser. No. 57**

**Int. Cl.[4] A47F *5/00***

**U.S. Cl. 248—314** **3 Claims**



**1**. A wall mountable adjustable holder device for a hand held dryer allowing rotational and vertical movement of the hair dryer according to the needs of the user, said device comprising:

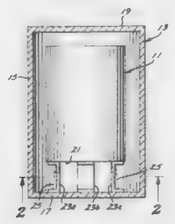
(a) a holder member having a receiving hole in one extremity with a slot extending vertically through the hole's depth, said receiving hole being dimensioned to receive a handle of the hair dryer and hold it securely in place while allowing the hair dryer to revolve freely according to the user's needs and said slot being sufficiently wide to accommodate an electric cord extending from the hair dryer, and further having a recess extending through another extremity, said recess having at least one rigid protrusion attachment means extending from a deepest part of the recess; and

(b) a wall mount base capable of being permanently attached to a wall with complimentary receiving means on a front section to receive the rigid protrusion attachment means of the holder member, said complimentary receiving means being a series of keyhole shaped openings arranged vertically along the front section of the wall mount base, with each opening dimensioned to receive the rigid protrusion to securely hold the holder member in varying vertical positions, further wherein the depth of the wall mount base approximates the depth of the recess in the holder member extremity.

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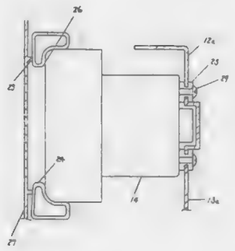
**4,746,091**
**CONSTANT FORCE SUSPENSION SYSTEM**
**Irwin Baker, Rancho Palos Verdes, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.**
**Filed Jun. 19, 1986, Ser. No. 876,011**
**Int. Cl.[4] F16M** *11/16*
**U.S. Cl. 248—603** **1 Claim**



1. Apparatus for rigidly mounting an object on a mounting surface in such a fashion that forces applied to the object from the surface are substantially constant, regardless of any uniform expansion or contraction of the surface relative to the object, said apparatus comprising:
- an object to be mounted on said mounting surface, said object having a predetermined, central reference location on it;
- at least three planar support legs connected between said mounting surface and said object each at a support location radially spaced from said central reference location and angularly spaced from adjacent support locations, each of said support legs being oriented with its plane substantially perpendicular to a radial axis; and
- means for securing said support legs to said object and to said mounting surface, said means for securing including flat end sections projecting away from opposite ends of each support leg and hinge means for pivotally securing said end sections to the opposite ends of said support legs and being adapted to permit limited pivoting movement of each support leg in a radial plane but resist pivoting movement of each leg in a plane perpendicular to the radial plane.

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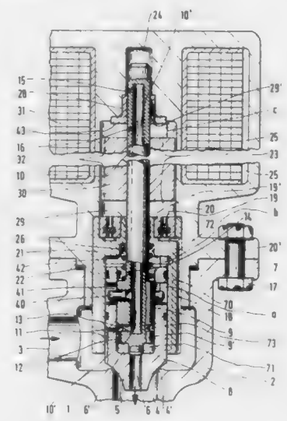
**4,746,092**
**APPARATUS FOR SUPPORTING AN ELECTRIC BLOWER OF A VACUUM CLEANER**
**Seizo Hayashi, Oumi Hachiman; Hidenori Kitamura, Yokaichi, and Yuichi Shimizu, Oumi Hachiman, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan**
**Filed Feb. 13, 1987, Ser. No. 14,615**
**Claims priority, application Japan, Feb. 14, 1986, 61-31474**
**Int. Cl.[4] H02K** *5/24*
**U.S. Cl. 248—638** **7 Claims**



1. A vacuum cleaner having a housing and an electric blower having front and rear portions supported with respect to said housing by a supporting apparatus, said supporting apparatus comprising a front supporting member positioned between said front portion of said electric blower and said housing and a rear supporting member positioned between said rear portion of said electric blower and said housing, said front supporting member having a portion which is under a back pressure of said electric blower and said back pressure receiving portion having a cross section of a wedge-like configuration so as to be intruded by said back pressure between said blower rear portion and said front supporting member, said rear supporting member being fixed to said electric blower and said housing to prevent said electric blower from being moved in its thrust direction.

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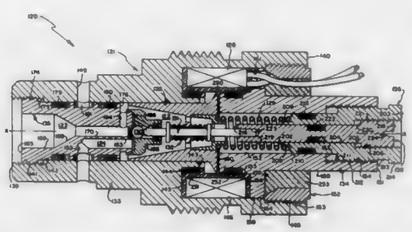
**4,746,093**
**PILOTED VALVE**
**Georges Scanderbeg, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland**
**Filed Oct. 1, 1987, Ser. No. 103,455**
**Claims priority, application Switzerland, Oct. 1, 1986, 3924/86**
**Int. Cl.[4] F16K** *31/02*
**U.S. Cl. 251—30.04** **10 Claims**



1. A valve comprising
- a casing having a first pressure chamber, a pressure medium inlet for supplying a pressure medium into said pressure chamber, a pressure medium outlet for expelling pressure medium from said pressure chamber, a first valve seat about said outlet;
- a main lid movably mounted in said pressure chamber between a closed position seated on said valve seat and an open position spaced from said valve seat, said lid having a valve chamber therein, at least one bore communicating said valve chamber with said pressure chamber, a passage communicating with said outlet and a second valve seat about said passage;
- a pilot lid disposed in said valve chamber coaxially of said main lid for movement between a closed position seated on said second valve seat and an open position spaced from said second valve seat;
- a spindle connected to said pilot lid and having two spaced apart coaxial guide members for guiding said pilot lid in said valve chamber, said guide members sub-dividing said valve chamber into a first component chamber near said outlet, a second component chamber remote from said outlet and a communicating chamber between and communicating with said component chambers, said communicating chamber being in communication with said bore in said main lid with said pilot lid in said closed position thereof and being blocked from said bore by one of said guide members with said pilot lid in said open position thereof;
- housing means having an equalizing chamber receiving a distal end of said spindle and being in continuous communication with said valve chamber and a second pressure chamber between said equalizing chamber and said valve chamber and said second pressure chamber being in continuous communication with said first pressure chamber;
- a magnet armature mounted on said spindle and slidably mounted in said second pressure chamber and an electromagnetic winding about said armature for moving said pilot lid;
- a first abutment surface within said main lid for limiting an opening movement of said pilot lid relative to said main lid when a portion of said pilot lid abuts said first abutment surface;
- a second abutment surface on said casing within said second component chamber for limiting an opening movement of said main lid relative to said casing when a portion of said main lid abuts said second abutment surface;
- a third abutment surface on said housing means within said second pressure chamber for limiting an opening movement of said pilot lid relative to said casing when said armature abuts said third abutment surface wherein said abutment surfaces are disposed relative to each other so that the maximum stroke of said pilot lid relative to said casing is greater than the maximum stroke of said pilot lid relative to said main lid and less than the sum of said latter stroke and the maximum stroke of said main lid relative to said casing.

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**4,746,094**
**PULSE-WIDTH-MODULATED SOLENOID VALVE**
**Richard D. Cummins, Orchard Park, N.Y., assignor to Moog Inc., East Aurora, N.Y.**
**Filed Nov. 13, 1986, Ser. No. 930,750**
**Int. Cl.[4] F16K** *31/06*
**U.S. Cl. 251—129.14** **25 Claims**



1. In a pulse-width-modulated solenoid valve having a body provided with a chamber, said body being provided with inlet and outlet openings communicating with said chamber, said body also having a seat mounted fast to said body and surrounding one of said openings and facing into said chamber, an armature mounted in said chamber for movement toward and away from said seat, a coil mounted on said body and adapted to be selectively energized to move said armature in one direction relative to said body, and return means urging said armature to move in the opposite direction relative to said body, the improvement which comprises:
- a valve element mounted for movement with said armature toward and away from said seat and also mounted for movement relative to said armature, said element being movable in one of said directions to sealingly engage said seat to prevent flow through said one opening, said valve element having two opposed surfaces of substantially equal area exposed to a fluid pressure in said one opening such that said valve element is balanced against variations in the fluid pressure in said one opening, said valve element being mounted on said armature such that when said element engages said seat the momentum of the mass of said armature will not exert a substantial force against said seat,
- whereby the life of the seal between said element and seat will be extended.

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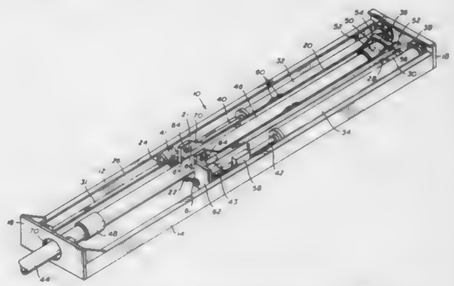
**4,746,095**
**BONNET LOCK**
**Walter T. Roush, Houston, Tex., assignor to Anderson, Greenwood & Co., Bellaire, Tex.**
**Filed Sep. 14, 1987, Ser. No. 96,729**
**Int. Cl.[4] F16K** *31/44*
**U.S. Cl. 251—367** **18 Claims**



1. In a valve having a valve body including a fluid inlet port and a fluid outlet port defining a fluid passage through said valve body, a bonnet mounted on said valve body, and a valve stem rotatable within said bonnet and carrying a valve element for selectively controlling fluid flow through the valve, the improvement comprising a bonnet lock means cooperating with said bonnet for preventing relative rotation between said bonnet and said valve body, wherein said bonnet lock means includes a lock pin mounted on said valve body adjacent said bonnet, a bonnet lock mounted about said bonnet and a jam nut threadably mounted on said bonnet and in retaining engagement when with said bonnet lock.

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**4,746,096**
**APPARATUS FOR DRIVING AN ELONGATE MEMBER THROUGH THE GROUND**
**David A. Donnell, P.O. Box 768, Winnsboro, La. 71295, and Robert F. Holden, P.O. Box 5315, Longview, Tex. 75608**
**Filed Nov. 4, 1986, Ser. No. 926,972**
**Int. Cl.[4] E21B** *19/00*
**U.S. Cl. 254—29 R** **22 Claims**



1. An apparatus for driving an elongate member through the ground comprising:
- a frame assembly having at least one longitudinal support member, a first end member attached to one end of said support member in the direction said elongate member is driven, and a second end member attached to the other end of said support member;
- a tray substantially parallel to and engaging said support member and adapted to support a portion of said elongate

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member, said tray being capable of longitudinal displacement within said assembly and having first and second ends, said first end of said tray being proximal said first end member and said second end being distal said first end member;

a moveable end plate adapted to contact one end of said elongate member and capable of being inserted within said tray in a first position proximate said second end of said tray and in a second position intermediate said first position and said first end of said tray; and

means for displacing said tray longitudinally within said assembly.

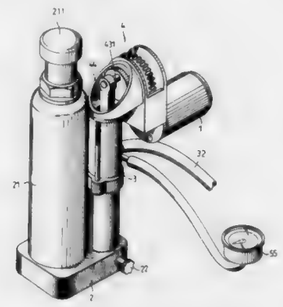
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**4,746,097**

## HIGH EFFICIENCY HYDRAULIC JACK/AIR PUMP

**Yo C. Chung, No. 20-100, Tsu Shi Village, Shui Shang Hsiang, Chia I. Hsien, and Richard Lee, No. 419, Sec. 4, An Ho Rd., Tainan City, both of Taiwan**

**Filed Mar. 10, 1987, Ser. No. 24,027**
**Int. Cl.[4] B66F *3/24***
**U.S. Cl. 254—93 H** **1 Claim**



1. A hydraulic jack / air pump comprising:

(A) a base comprising a lift structure, a cylinder block structure and a motor assembly, said motor assembly comprising a motor gear which drives a reduction gear which drives a cam which drives a camshaft;

(B) a motor having a bimetallic overload switch electrically in series with an electric motor;

(C) a connector rod driving a pneumatic head; said pneumatic head urging an extension rod to reciprocate; said extension rod having a hydraulic head fixed on a lower end thereof; said connector rod being driven by said camshaft;

(D) an air inlet with a spring-loaded inlet stop protruding therefrom, said inlet stop being retained by a countersink which is on the inside face of an inlet plug, said inlet plug being threadably secured in said cylinder block structure; and

(E) a discharge passage, said discharge passage being normally closed by an exit stop, said exit stop being spring-loaded against a discharge plug, said discharge plug having a nozzle threadably secured therein, and said discharge plug being threadably secured in said cylinder block structure.

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**4,746,098**

## APPARATUS FOR REMOVING AND REPLACING MANHOLE COVERS AND GRATINGS

**Eugene V. Abarotin, Murrysville, Pa., assignor to Design & Analysis of Mechanisms & Structures, Inc., Murrysville, Pa.**

**Filed Aug. 26, 1987, Ser. No. 89,570**
**Int. Cl.[4] B66F *11/00***
**U.S. Cl. 254—130** **17 Claims**

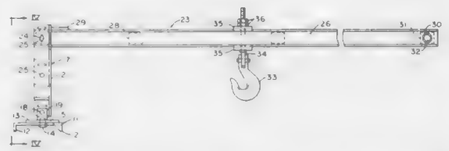
1. Apparatus for removing and replacing manhole covers and gratings comprising:

a base;

a first member mounted on the base for rotation about an axis perpendicular to the base;

a pivotable post mounted on the first member for rotation about an axis perpendicular to the axis of rotation of the first member and equipped at a plurality of elevationally different positions for the selective attachment of a lever;

a lever detachably engaged at one end to the pivotable post



at one of said elevationally different positions, said lever including two spaced parallel longitudinal structural channels connected to form a rigid beam, said beam having a stop that butts against said pivotable post;

means attached to the lever at the end opposite said pivotable post to serve as a handle; and

means for engaging a load located in the space between said structural channels and adjustable longitudinally of said lever within said space.

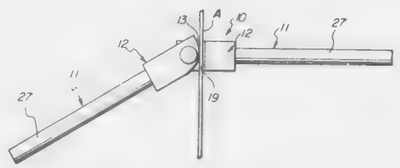
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**4,746,099**

## CAM ACTION FISH TAPE PULLER

**Edward L. Lopes, 466 N. Richard, Orange, Calif. 92667**

**Filed Mar. 9, 1987, Ser. No. 23,653**
**Int. Cl.[4] B65H *59/00***
**U.S. Cl. 254—134.3 FT** **8 Claims**



1. A tool for gripping a tape comprising:

(a) a first jaw piece having a block-shaped rear section, said block-shaped rear section having an essentially flat front surface, and having a forward extending jaw member of less transverse thickness than said rear section, said forward extending jaw member having a convex front surface,

(b) a second jaw piece, identical to said first jaw piece, and

(c) pivot means joining said first and second jaw pieces with said convex front surface of said forward extending jaw member of said first jaw piece adjacent said front surface of said block-shaped rear section of said second jaw member, the axis of said pivot means being disposed transversely to said first and second jaw pieces and located eccentrically with respect to said convex front surface of said forward extending jaw member, whereby pivoting said jaw pieces in a vertical plane reduces the spacing between said jaw surfaces.

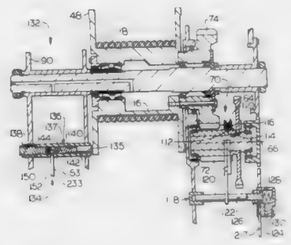


**4,746,100**

## WINCH DRAG BRAKE APPARATUS

**Richard G. Davenport, Metamora; Duane R. Smith, Oswego, and R. Paul Cobb, Washington, all of Ill., assignors to Caterpillar Inc., Peoria, Ill.**

**Filed Dec. 24, 1986, Ser. No. 946,256**
**Int. Cl.[4] B66D *5/26*; F16D *65/14***
**U.S. Cl. 254—379** **20 Claims**



1. A winch drag brake apparatus for a winch having a drum, a power train for controllably rotating the drum, a primary brake mechanism having an engaged position for preventing rotation of the power train and a disengaged condition, and disconnect means for uncoupling the power train adjacent the drum in a disengaged position thereof, the drag brake apparatus comprising:

control mechanism means including a single control lever assembly for controlling operation of the power train, the primary brake mechanism, and the disconnect means, the control lever assembly being movable to a preselected region for effecting the disengaged position of the disconnect means; and

auxiliary brake means for limitedly restricting rotation of the drum when the control lever assembly is in the preselected region, the primary brake mechanism is in the disengaged condition, and the disconnect means is in the disengaged position by providing a first drag brake mode for substantially freespool operation of the drum and a second drag brake mode for controlled load dropping operation of the drum in response to selective operation of the control lever assembly of the control mechanism means.

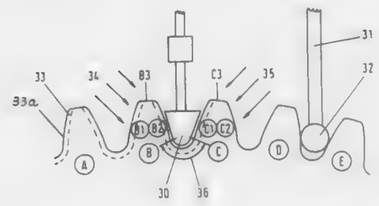
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**4,746,101**

## INDUCTION HARDENING OF GEAR TEETH

**John R. A. Scott, Hawcoat, England, assignor to Vickers Shipbuilding and Engineering Limited, Barrow-in-Furness, United Kingdom**

**Division of Ser. No. 631,923, Jul. 18, 1984, Pat. No. 4,589,935.**
**This application May 5, 1986, Ser. No. 859,825**
**Claims priority, application United Kingdom, Jul. 22, 1983, 8319788**
**Int. Cl.[4] C21D *9/32***
**U.S. Cl. 266—83** **9 Claims**



1. Induction hardening apparatus for hardening of the flank and root curve surfaces of the teeth of a gear so as to provide a surface-hardened layer along said surfaces, the apparatus comprising:

an electrically energizable inductor head having an external profile substantially matching that of the space defined between a pair of adjacent gear teeth;

means for causing guided relative traversing movement of the inductor head along said space, while maintaining predetermined clearances between the outer surface of the inductor head and the root and flank surfaces of the pair of gear teeth so as to heat said root and flank surfaces;

a coolant tank having means for mounting the gear therein so as to be totally immersed in coolant when the tank is charged with coolant; and

means for directng coolant onto the tips and unheated flanks of said pair of gear teeth and into the space between the pair of gear teeth ahead of and behind the inductor head during the traversing movement of the inductor head.

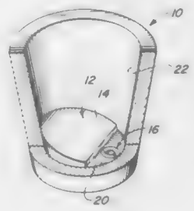
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**4,746,102**

## DRAIN HOLE DESIGN FOR LADLE

**Herbert L. Gilles, Macungie; Manfred Schmidt, Bethlehem, and Alan W. Cramb, Pittsburgh, all of Pa., assignors to Bethlehem Steel Corporation, Bethlehem, Pa.**

**Filed Mar. 20, 1987, Ser. No. 28,434**
**Int. Cl.[4] C21C *5/42***
**U.S. Cl. 266—236** **2 Claims**



1. In a metallurgical ladle for holding molten metal having a layer of slag thereon, said ladle having a multi-diameter drain hole and a drain hole closing valve in the bottom for controlling the discharge of the molten metal, said multi-diameter drain hole having a small diameter discharge portion immediately above said closing valve, a medium diameter middle portion above and of a diameter 3–6 times greater than the diameter of said small diameter discharge portion, and a large diameter entry portion above said middle portion and of a diameter 9–15 times greater than the diameter of said small diameter discharge portion.

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**4,746,103**

## LANCE FOR BLOW-REFINEMENT IN CONVERTER

**Nobuyoshi Takashiba; Shinji Kojima; Rinzo Tachibana; Takayasu Yamada, and Fumiaki Yoshikawa, all of Kurashiki, Japan, assignors to Kawasaki Steel Corporation, Hyogo, Japan**

**Filed Aug. 18, 1986, Ser. No. 897,524**
**Claims priority, application Japan, Aug. 20, 1985, 60-182437; Jan. 10, 1986, 61-3240**
**Int. Cl.[4] C21C *5/32***
**U.S. Cl. 266—266** **15 Claims**

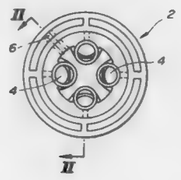
1. A lance for blow-refinement in a converter comprising:

a pressurized oxygen source;

a primary nozzle having an outlet directed toward the surface of a molten metal bath in said converter and capable of forming a high-pressure high-velocity primary oxygen jet for agitating said molten metal and inducing a chemical reaction therewith;

an auxiliary nozzle for forming an auxiliary oxygen jet for inducing secondary combustion of carbon monoxide generated in the reaction induced by said primary oxygen jet,

said auxiliary nozzle directing said auxiliary oxygen jet to a point where the resulting jet forms a combustion zone in which said carbon monoxide oxidizes above said molten metal surface; and



means, incorporated in said auxiliary nozzle, for limiting the velocity of oxygen flow toward said combustion zone through said auxiliary nozzle and for adjusting the velocity of said auxiliary oxygen jet within said combustion zone to approximately the flame propagation speed therein.

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**4,746,104**

## HYDRAULIC EXHAUST PIPE HANGER MOUNT

**Edward P. Probst, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.**

**Filed Dec. 8, 1986, Ser. No. 938,808**
**Int. Cl.⁴ F16F *15/04*; B60K *13/04*; E21F *17/02***
**U.S. Cl. 267—140.1** **4 Claims**



1. A hydraulic mount assembly, comprising:
first and second mounting members;
a first resilient body member connected to said first mounting member, said first resilient body member including a first wall portion of relatively high stiffness and a second wall portion of relatively low stiffness;
a second resilient body member connected to said second mounting member, said second resilient body member having a third wall portion of relatively intermediate stiffness and being connected to said first resilient body member so as to form a closed chamber that is filled with damping liquid;
and an orifice plate dividing said chamber into two communicating cavities to effect damping, a first cavity being formed between said first resilient body member and said orifice plate and a second cavity being formed between said second resilient body member and said plate; the ratio of the stiffness of the first, second and third wall portions is approximately 2:0.25:1; tensile loading of said mount assembly causing said third wall portion of said resilient body to stretch and produce an increase in volume in said second cavity causing damping liquid to flow from said first cavity into said second cavity, and the second wall portion to flex inwardly to accommodate the flow of liquid; compressive loading of said mount assembly causing said third wall portion of said resilient body to bulge and produce a decrease in volume of said second cavity causing damping liquid to flow from said second cavity into said first cavity and the second wall portion to flex outwardly to accommodate the flow of liquid.

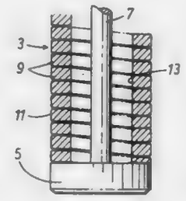
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**4,746,105**

## FILTERS AND VALVES

**William Allison, Preston, England, assignor to Parkman Group Professional Services Limited, Liverpool, England**

**Filed Aug. 28, 1986, Ser. No. 901,897**
**Int. Cl.⁴ F16F *9/34*; B03C *1/30***
**U.S. Cl. 267—174** **19 Claims**



1. An adjustable element for use in a fluid treatment apparatus, said element comprising a coiled spring, the individual coils of the spring having a generally rectangular transverse cross-section, with the surface of said coils being surface-hardened, the coils each having curved tangentially interengaging end faces, and substantially planar surfaces lying substantially parallel to the axis of the spring, said planar surfaces thus forming substantially smooth inner and outer surfaces for the element.

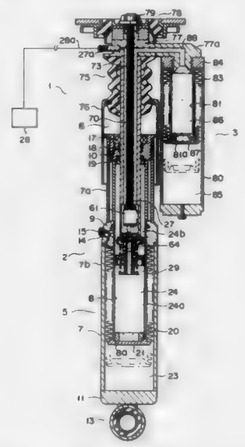
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**4,746,106**

## CAR SUSPENSION SYSTEM

**Takeo Fukumura, Yokohama, Japan, assignor to NHK Spring Co., Ltd., Yokohama, Japan**

**Filed Mar. 19, 1987, Ser. No. 27,797**
**Claims priority, application Japan, Aug. 15, 1986, 61-191262; Aug. 15, 1986, 61-191263**
**Int. Cl.⁴ B60G *17/08*; F16F *9/50***
**U.S. Cl. 267—218** **8 Claims**



1. A car suspension system comprising:
a cylinder piston mechanism including at least one cylinder housing and a rod, said rod being fitted in the cylinder housing, for reciprocation in the axial direction thereof, said cylinder piston mechanism having therein a main gas chamber containing gas and a main oil chamber filled with oil, said main gas chamber changing its capacity as the rod reciprocates;
a sub-tank located outside the cylinder piston mechanism, and having therein a sub-gas chamber containing gas and a sub-oil chamber filled with oil;
oil-circulating means connecting the main and sub-oil chambers, so that the oil flows between the two oil chambers;
damping-force generating means disposed inside the cylinder piston mechanism, and dividing the main oil chamber into first and second portions, said damping-force generating means having an orifice for connecting the first and second portions, whereby the motion of the rod is damped by viscous resistance produced when the oil in the main oil chamber passes through the orifice; and
a control valve attached to the oil-circulating means connecting the main and sub-oil chambers, said valve being adapted to connect the two oil chambers when open, and to isolate the oil chambers from each other when closed.



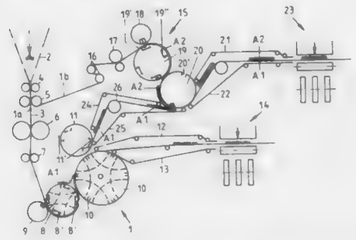
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**4,746,107**

## VERSATILE PRINTED COPY SEVERING, FOLDING AND ASSEMBLING APPARATUS

**Eckhard Schneider, Stadtbergen, and Erwin Saalfrank, Neusäss, both of Fed. Rep. of Germany, assignors to M.A.N. Roland Maschinenfabrik AG, Offenbach am Main, Fed. Rep. of Germany**

**Filed Mar. 31, 1987, Ser. No. 32,858**
**Claims priority, application Fed. Rep. of Germany, Apr. 26, 1986, 3614263**
**Int. Cl.⁴ B41F *13/56***
**U.S. Cl. 270—21.1** **6 Claims**



1. Versatile printed copy severing, folding and assembling apparatus, adpated to receive a first and, selectively, a second printed web or web portions, severing the web (3) or web portions (1*a*, 1*b*) into copy products of respectively different types (A1, A2), and selectively folding and assembling said different types of products together, or separately, in accordance with the selected assembly or folding pattern or mold, comprising, in accordance with the invention,
a first transverse severing and folding unit (1; 8, 9, 10) receiving the web (3) or the first web portion (1*a*), severing said web or web portion and forming a first type copy product (A1) having a first transverse fold, said first transverse severing and folding unit including a first folding flap cylinder (10);
a second transverse severing and folding unit (15; 18, 19, 20) receiving, selectively, the second web portion (1*b*) and forming a second transversely folded copy product (A2) having a first transverse fold, the second transverse severing and folding unit (15; 18, 19, 20) including a second folding flap cylinder (20);
said first and said second severing and folding units being positioned in vertically staggered locations;
an intermediate transport system (11, 24, 25) selectively receiving the first type copy products (A1) from the first tranverse severing and folding unit (1; 8, 9, 10) and supplying said first type copy products with predetermined alignment on the second folding flap cylinder (20);
said second folding flap cylinder transporting the second type copy products (A2) together with the first type copy products (A1) about a portion of its circumference;
an output transport system (21, 22) receiving the second and selectively the first copy products from the second folding flap cylinder (20);
and a folder (23) for forming a further fold in the copy products delivered thereto by said output transport system.

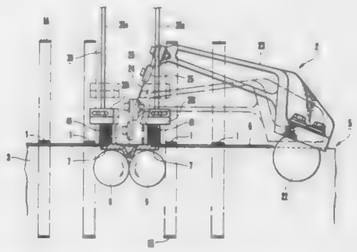
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**4,746,108**

## CHOPPER DEVICE FOR USE IN A FOLDER

**Seiki Hirayama, and Shigeaki Kurihara, both of Ibaraki, Japan, assignors to Komori Printing Machinery Co., Ltd., Tokyo, Japan**

**Filed Dec. 3, 1986, Ser. No. 937,304**
**Int. Cl.⁴ B42C *1/00***
**U.S. Cl. 270—45** **8 Claims**



1. A chopper device for use in a folder for applying chopper folding to a signature, which is subjected to parallel folding at a parallel folding device of said folder and then is conveyed through a conveying path having a conveying belt, in a direction perpendicular to the parallel folding direction, comprising:
an opening and a mouthpiece disposed below the conveying path, said opening being elongated in the conveying direction;
a chopper blade which lowers when said signature is stopped at a predetermined position for forcing said signature into said opening;
chopper blade moving means for moving said chopper blade upwardly and downwardly;
a pair of rollers disposed below said opening, said pair of rollers being in contact with each other, respectively, in order to grip said signature forced into said opening by said chopper blade and then to deliver said signature to a delivery conveyor; and
signature edge holding means provided on both longitudinal sides of said opening in parallel relation to said chopper blade, for slidably holding both side portions of said signature being chopper folded when said signature is lowered by said pair of rollers through said opening.

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**4,746,109**

## APPARATUS FOR ASSEMBLING CONTINUOUS PRINTED FORMS IN STORAGE TRAYS

**Zakhar Bar, Hicksville, and Herbert Weisman, deceased, late of Miller Place, both of N.Y., assignors to Bowe Systems & Machinery Corporation, Hicksville, N.Y.**

**Filed Jun. 17, 1985, Ser. No. 745,644**
**Int. Cl.⁴ B65H *45/22***
**U.S. Cl. 270—95** **12 Claims**

1. An apparatus for stacking continuously printed individual forms in trays, comprising:
cutting means for cutting a sheet of forms printed in a continuous manner into individual forms;
sequencing means operatively connected to said cutting

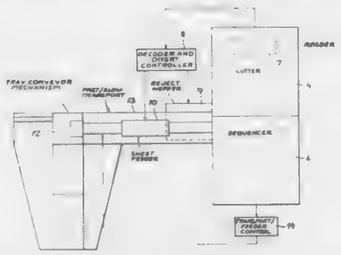
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means for ordering said individual forms in a predetermined sequence;

a plurality of open-sided trays;

transporting means operatively connected to said sequencing means for transporting said individual forms, said transporting means comprising shingling means for causing said individual forms to overlap and forming an assembly of forms for facilitating uniform stacking of said individual forms in said trays, said shingling means being




operatively connected to said transporting means for laterally inserting said assembly of forms in said open sided trays; and

tray conveying means operatively coupled to said shingling means for vertically positioning one of said trays to receive said assembly of individual forms from said shingling means and for thereafter displacing each tray into a substantially recumbent position upon full loading of said trays.

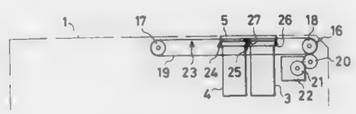
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**4,746,110**

**DEALING PORT MECHANISM IN BANKNOTE DEPOSITING AND DISPENSING MACHINE**

**Teruhisa Chiba, Urawa, Japan, assignor to Laurel Bank Machines Co., Ltd., Tokyo, Japan**

**Filed Jun. 18, 1986, Ser. No. 875,541**
**Claims priority, application Japan, Jul. 2, 1985, 60-144941**
**Int. Cl.[4] B65H** *5/00*
**U.S. Cl. 271—3.1** **2 Claims**




1. A dealing port mechanism for depositing and dispensing bills in a bill depositing and dispensing machine, said dealing port mechanism comprising:

a depositing port,

a dispensing port located adjacent to said depositing port,

a single shutter plate slidably mounted above said depositing port and said dispensing port so as to be movable above said depositing port and said dispensing port,

a plurality of sensors for detecting the position of said shutter plate and for generating position signals,

means for slidably moving said shutter plate in a direction above said depositing port and said dispensing port in accordance with a desired mode of operation, and

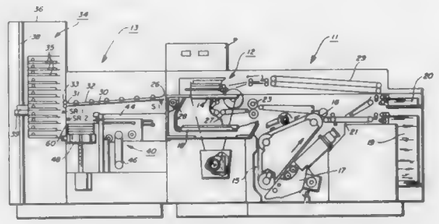
each of said position signals being used by said moving means for moving said shutter plate to a desired position, said moving means moving said shutter plate between a first position where at least one of said depositing port and said dispensing port are covered, and a second position where at least one of said depositing port and said dispensing port are open.

**4,746,111**

**SYSTEM FOR CONTROLLING SORTER INDEXING**

**Raymond A. Naramore, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Jun. 9, 1986, Ser. No. 872,337**
**Int. Cl.[4] B65H** *39/11*
**U.S. Cl. 271—287** **1 Claim**



1. In a copier having a processor for reproducing information to-be-copied on copy sheets and a sorter arranged adjacent a copy receiving position to receive successive copy sheets in bins thereof and to collate the same into booklets, the improvement including:

drive means connected to said sorter for imparting indexing movement to the bins thereof relative to said copy receiving position,

means for directing the copy sheets from the processor to the bins of said sorter while said bins are being indexed relative to said position,

a control system comprising means for timing successive copy sheets being directed from the processor to said sorter by said directing means, and means, in communication with said timing means, for calculating a difference in time between successive copy sheets and for transmitting a signal, as a function thereof, to said drive means to adjust the indexing movement imparted to the bins of said sorter by said drive means, said drive means being responsive to the signal for accelerating or decelerating the bins of the sorter.

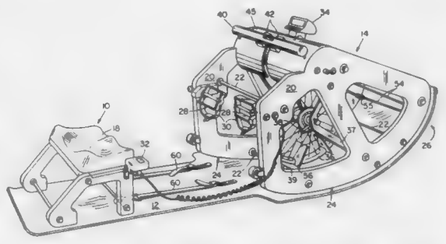
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**4,746,112**

**EXERCISE ROWING MACHINE**

**James E. Fayal, 57 S. Village Green, Ipswich, Mass. 01938**

**Filed Oct. 2, 1986, Ser. No. 914,638**
**Int. Cl.[4] A63B** *69/06*
**U.S. Cl. 272—72** **24 Claims**



1. An exercise rowing machine for use by a rower comprising:

a stationary seat;

a rocker assembly positioned adjacent to the seat;

coupling means for coupling the seat relative to the rocker assembly;

oar handle simulating means adapted to be grasped by the rower;

resistance means for providing resistance to the pull of the oar handle simulating means such that rowing is simulated when the oar handle simulating means is pulled by the rower; and

foot members fixed to the rocker asembly aganist which the rower's leg force operates to cause the rocker assembly to rock.

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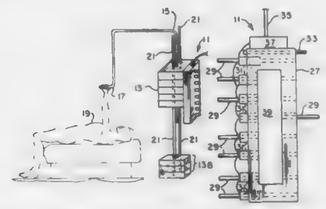


**4,746,113**

**AUTOMATICALLY ADJUSTABLE EXERCISE EQUIPMENT, AND CONTROL SYSTEM AND METHOD THEREFOR**

**Robert M. Kissel, 757A Windy Ridge, Manchester, Mo. 63021**

**Filed Feb. 24, 1987, Ser. No. 17,857**
**Int. Cl.[4] A63B** *21/00*
**U.S. Cl. 272—118** **23 Claims**



1. A control system for a weight training machine of the type having a vertical stack of weights selectively securable to a lifting bar or the like, each weight including an opening therein communicating with a corresponding opening in the lifting bar by means of which a pin inserted therein may removably secure said weight to the lifting bars, whereby said secured weight and the weights thereabove in the stack are lifted as a unit when the lifting bar is lifted, means operatively connected to the lifting bar and manually operable by the user to lift the lifting bar and the weights carried thereby to provide exercise for the user, said control system comprising:

a body carrying a plurality of pins vertically fixed with respect to the body, said body being fixedly alignable with respect to the top of the weight stack so that the pins carried by the body are aligned with corresponding openings in the weights;

means for selectively driving each pin from a retracted position in which the pin is not inserted in its corresponding weight opening to an extended position in which the pin is inserted in the corresponding opening; and

means for providing a signal representative of momentary muscular failure of the user and for controlling the pin driving means in response to the momentary muscular failure signal to retract the pin supporting the stack of weights being lifted and insert a second pin in the opening in its weight to automatically decrease the weight being lifted, said providing and controlling means being further responsive to a second, later signal representative of momentary muscular failure of the user to retract said second pin and insert a third pin in the opening in its weight to automatically decrease the weight being lifted a second time.

15. A method of operating a weight training exercise machine having a plurality of machine selectable weights to be repetitively lifted during an exercise by a user, comprising the steps of:

(1) electronically measuring at least one time associated with a repetition of the exercise by the user, said time being a function of the muscular state of the user at that point during the exercise;

(2) automatically and without human intervention changing the weight being lifted upon the electronically measured time falling outside a predetermined range so as to maximize the muscular effort exerted by the user; and

(3) repeating steps (1) and (2) for each repetition of the exercise until the occurrence of a predetermined condition signalling the end of the exercise.

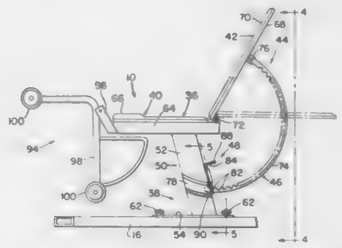
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**4,746,114**

**ADJUSTABLE SEAT ASSEMBLY FOR EXERCISE APPARATUS**

**Sherman P. Grider, Walnut, Calif., assignor to Bollinger Industries, Irving, Tex.**

**Filed Oct. 6, 1986, Ser. No. 915,987**
**Int. Cl.[4] A63B** *17/00*
**U.S. Cl. 272—123** **7 Claims**



1. In an exercise apparatus, the combination comprising:

an elongate base member,

a generally upright pedestal above said base member having a lower end adjacent the base member and an upper end,

means mounting the lower end of said pedestal on said base member for adjustment of the pedestal along said base member, a bench including a seat portion mounted on the upper end of said pedestal, a back portion extending from said seat portion toward one end of said base member and beyond said pedestal, and means pivotally mounting said back portion on said seat portion for rotation of the back portion relative to said seat portion toward and away from said base member about a normally horizontal axis along an edge of the seat portion transverse to the base member,

back support means including a back support member extending between said back portion and said pedestal for releasably securing said back portion in various angular positions relative to said seat portion,

an upright weight support frame at said one end of said base member for supporting an exercise weight such as a barbell above the level of said bench, and wherein

said bench and pedestal are adjustable as a unit lengthwise of said base member and toward and away from said support frame to locate said bench in a selected exercise position relative to said frame.

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**4,746,115**

**EXERCISING DEVICE WITH CONTROLLABLE FORCE PATTERN**

**Thomas E. Lahman, 5133 N. 32nd Pl., Phoenix, Ariz. 85018**

**Filed Mar. 9, 1987, Ser. No. 23,855**
**Int. Cl.[4] A63B** *21/00*
**U.S. Cl. 272—130** **10 Claims**

1. An exercising device with controllable force patterns comprising:

a rigid frame,

a force controlling means and a user interaction means for contacting a body part of the user for receiving user exerted forces,

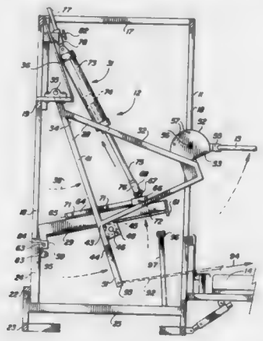
said force controlling means comprising a fluid operated cylinder pivotally mounted at one end to said frame and comprising a piston movably mounted in said cylinder and a piston rod attached to said piston and extending outwardly of the other end of said cylinder, and a force transmitting means pivotally mounted on said frame and

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connected to said user interaction means for moving said piston rod and piston responsive to user exerted forces,

a lever means pivotally connected at one point to the rigid frame and at another point to said piston rod, and



wherein said force transmitting means engages said lever means variably along its length, thereby effecting the movement of the piston rod to create a continuously changing mechanical advantage by continuously changing the relationship between the force transmitting means and the force controlling means.

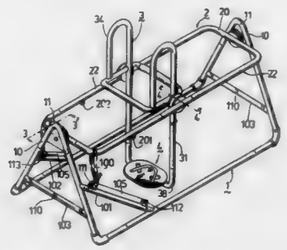
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**4,746,116**

**UNIVERSAL PHYSICAL EXERCISING DEVICE**

**Taichi Inada, 120-banchi, 1-Chome, Niwai-Chou, Sumiyoshi-ku, Osaka City, Japan**

**Filed Jul. 11, 1986, Ser. No. 884,401**
**Int. Cl.[4] A63B *21/00***
**U.S. Cl. 272—144** **2 Claims**



1. In a universal physical exercising device including a collapsible base supporting frame, a rectangular horizontal frame pivotally connected to an upper end of said collapsible base supporting frame and an adjustable vertical frame structure having an L-shaped portion formed at a lower end thereof pivotally coupled to said rectangular horizontal frame; the combination therewith comprising:

(a) a hand holding means provided at an upper end of said adjustable vertical frame for gripping at alternate positions during various exercises;

(b) pedal means affixed to said L-shaped portion of said adjustable vertical frame structure, said pedal means having a pair of foot toggle elements and a foot engaging safety member provided thereon; and

(c) anchoring means respectively provided on said collapsible base supporting frame, said rectangular horizontal frame and said adjustable vertical frame for detachably securing said horizontal frame to said collapsible base supporting frame and said adjustable vertical frame to said rectangular horizontal frame in performing various exercises, whereby exercises which require a swinging to-and-fro, moving left-and-right and rotating 360 degrees can be either vertically or horizontally performed accordingly, said pedal means being of elliptical shape and said foot engaging safety member comprises a safety belt, said elliptical pedal means further comprising a belt fastener provided at a middle portion of said safety belt, an adjusting mechanism, including a sliding track fixed along a center line between said foot toggle elements, a sliding block with a lock catch movably provided on said sliding track for detachable engagement with said belt fastener, and an adjusting rod disposed at said sliding block so that, by operating said adjusting rod, said safety belt can be properly adjusted about the user's heels.

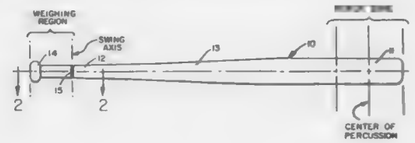
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**4,746,117**

**TUBULAR BATS WITH OPTIMIZED POWER ZONE**

**Marion L. Noble, Manhattan, Kans., and John S. Eck, Toledo, Ohio, assignors to Kansas State University Research Foundation, Manhattan, Kans.**

**Filed Jul. 24, 1985, Ser. No. 758,314**
**Int. Cl.[4] A63B *59/06***
**U.S. Cl. 273—72 A** **1 Claim**




1. An aluminum bat for playing softball or baseball formed of a generally cylindrical aluminum tube providing a larger diameter barrel portion extending inwardly from its outer end, a smaller diameter grip portion adjacent its inner end, and a connecting portion extending therebetween, said inner end terminating in a hand-retaining knob, said bat having a normal swing axis located so that the batter's hands can be placed together on the grip portion with the swing axis therebetween, wherein the improvement comprises: employing as said hand-retaining knob a solid metal knob secured to the inner end of said bat having sufficient weight to provide a power zone of longitudinal width having its outer boundary coinciding substantially with the outer end of the bat, said power zone consisting of the area on said barrel portion where the reaction impulse at the swing axis is less than 10% of the ball impulse on the barrel portion, said swing axis being marked by indicia means on the outside of said grip portion.

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**4,746,118**

**BATTING AID**

**Dennis Deveney, 27 Lindbergh Pkwy., Waldwick, N.J. 07463**

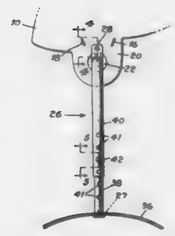
**Filed Jun. 30, 1986, Ser. No. 880,147**
**Int. Cl.[4] A63B *69/40***
**U.S. Cl. 273—26 C** **11 Claims**

1. An improved batting aid for a batter in combination with a batting helmet worn by a batter, comprising restraining means of predetermined length disposed between the helmet and the shoulder of the batter, said restraining means cooperatively engaging said helmet and including means for securing



said restraining means with the shoulder of a batter such that said helmet and the shoulder are maintained in a relatively





fixed position and turning of the head of a batter is limited in movement in at least one direction.

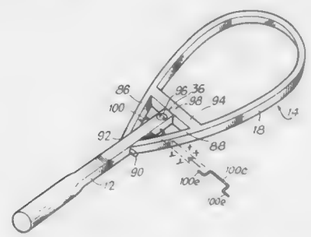
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**4,746,119**

**BALL-GAME RACKET WITH FOLDABLE AND SEPARABLE FRAME OR BODY**

**Patrick Jeanrot, 51, Avenue Lucien Barraut, 94500 Champigny S/Marne, France**

**PCT No. PCT/FR86/00024, § 371 Date Sep. 22, 1986, § 102(e) Date Sep. 22, 1986, PCT Pub. No. WO86/04251, PCT Pub. Date Jul. 31, 1986**
**PCT Filed Jan. 24, 1986, Ser. No. 910,396**
**Claims priority, application France, Jan. 24, 1985, 85 01018; May 30, 1985, 85 08117**
**Int. Cl.[4] A63B *49/02***
**U.S. Cl. 273—73 C** **2 Claims**



1. A racket for ball games comprising a handle and a head pivotally attached with respect thereto, said head comprising a frame including two arms extending on either side of the handle and converging into contact therewith, cooperative stop lug and notch means interposed between said head and handle for disposing said head and handle in an aligned position, said handle extending between said arms and having an end portion abutting said frame, locking means interposed between said end portion of said handle and said frame for locking said handle to said frame in said aligned position, a pivot pin linking said arms of said head and said handle, said pivot pin having two axes lying substantially in the plane of said head and offset with respect to each other in the longitudinal direction of said handle, said pin being substantially in the form of an Omega, having a center portion defining a first said axis of said two axes, and having co-axial distal arms defining a second axis of said two axes, said center portion of said pin extending through said handle and said distal arms of said pin extending through said arms of said frame, said racket further comprising vibration dampening means interposed between said handle and said frame.

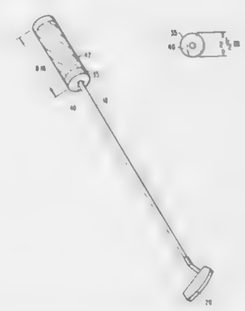
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**4,746,120**

**GOLF CLUB PUTTER AND HANDGRIP THEREFOR**

**Richard M. Mockovak, 1995 W. 116th St., Carmel, Ind. 46032**

**Filed Nov. 28, 1986, Ser. No. 935,957**
**Int. Cl.[4] A63B *53/14***
**U.S. Cl. 273—81.5** **16 Claims**



1. A golf putter for providing a more stable and controllable grip between the hands of an average sized golfer, comprising:

a shaft;

a putter head rigidly attached at one end of said shaft, said head having a face; and

a grip attached to said shaft at the opposite end thereof, said grip including a cylindrical body having a uniform diameter of at least two and one half inches over its entire length of at least eight inches.

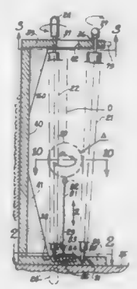
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**4,746,121**

**THREE-BAR AND BALL GAME APPARATUS AND METHOD OF USING SAME**

**Constant V. David, 4952 Field St., San Diego, Calif. 92110**

**Filed Feb. 6, 1987, Ser. No. 11,583**
**Int. Cl.[4] A63B *67/14***
**U.S. Cl. 273—110** **32 Claims**



1. A game apparatus, comprising:

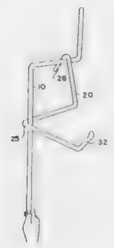
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three elongate bars positioned generally parallel and having a generally circular cross-section that gradually increases and decreases in diameter along a longitudinal axis thereof;
means for supporting a first end of each of the bars so that the first end can be freely articulated about a corresponding reference point and rotated about its longitudinal axis;
means for holding a second end of each of the bars for perpermitting manually induced movement toward and away from each other along a lateral path, for permitting the second ends to be manually moved to articulate the first ends about their corresponding reference points and for permitting the second ends to be manually rotated about their corresponding longitudinal axes;
a ball located between the three bars and supported by the external surface of each one of the bars by means of point contact;
means located on at least one first bar for urging the ball to move lengthwise along the bars against a resisting force when said bar is rotated about its longitudinal axis, said bars being so located as to restrain said ball against lateral movement; and
a structure for connecting the supporting means of the first ends to the holding means of the second ends.

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**4,746,122**
**HANG-UP TOY PUZZLE GAME**
**Henry F. Fitzgerald, 277 Belfort St., Jacksonville, Fla. 32204**
**Filed Jul. 27, 1987, Ser. No. 77,756**
**Int. Cl.[4] A63F** *9/08*
**U.S. Cl. 273—153 R** **7 Claims**

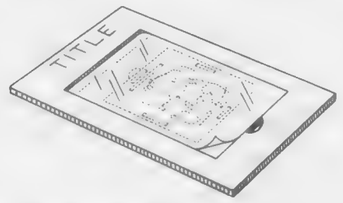



4. A puzzle game comprising a shaped wire hanging member and a shaped wire handle member, said hanging member being suspended in various positions from said handle member, said handle member being shaped in the form of two spaced substantially parallel leg sections joined by a substantially straight mid-section oriented at an acute angle to both said leg sections and with all said sections lying in a common plane, said mid-section being located in an intermediate location along the longitudinal axis of said handle member, each of said spaced leg sections extending substantially beyond, and in a direction away from said mid-section in the direction of said longitudinal axis of said handle member so that said hanging member may be freely suspended from either leg section in a plane generally perpendicular to each of said leg sections and without striking said mid-section or the other of said leg sections when so suspended.

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**4,746,123**
**METHOD FOR SCRAMBLING AND UNSCRAMBLING ILLUSTRATIONS/A PUZZLE DRAWING GAME**
**Jack E. Skirvin, 317 E. Tenth St., Bloomington, Ind. 47401**
**Filed Feb. 11, 1987, Ser. No. 13,636**
**Int. Cl.[4] A63F** *9/06;* **G09B** *11/04*
**U.S. Cl. 273—153 R** **1 Claim**

1. A method of forming a scrambled illustration and of unscrambling the scrambled illustration comprising the steps of providing a square card, transposing a first plurality of lines in a first color from an illustration to the card when the card is in a predetermined orientation relative to the illustration, inscribing the name of the first color on the card so that the name is upright when the card is in said predetermined orientation, rotating the card 90 degrees with respect to the illustration and transposing a second plurality of lines in a second color from the illustration to the card, inscribing the name of the second color on the card such that the name is upright when the card has been rotated said 90 degrees, rotating the card a further 90 degrees in the same direction with respect to the illustration and transposing a third plurality of lines in a third color from the illustration to the card, inscribing the name of the third color on the card such that the name is upright when the card has been rotated said further 90 degrees, rotating the card an additional 90 degrees in the same direction with respect to the illustration and transposing a fourth plurality of lines in a fourth color to the card, and inscribing the name of the fourth




color on the card such that the name is upright when the card has been rotated said additional 90 degrees, the first, second, third and fourth pluralities of lines comprising all of the lines constituting the illustration but in scrambled form, the illustration being unscrambled by providing a holding panel having a receptacle sized to receive said card, providing a pad of transparent paper sheets, providing a drawing board having a receptacle sized to receive said pad, disposing said pad in said drawing board receptacle, disposing said card in said holding panel receptacle, disposing said panel under the top sheet of said pad of sheets such that said colored lines on said card are visible through said top sheet, tracing on said sheet those lines which correspond in color to the name which is upright, removing the card from the holding panel, rotating it in 90 degree increments and tracing those lines on said top sheet which correspond in color to the color name which appears upright after each 90 degree rotation until the scrambled illustration on the card is recomposed in unscrambled form on the top sheet.

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**4,746,124**
**GOLF PUTTER**
**Edward V. Comitz, 4602 E. La Cienega, Tucson, Ariz. 85712**
**Filed Apr. 21, 1986, Ser. No. 854,029**
**Int. Cl.[4] A63B** *69/36, 53/04*
**U.S. Cl. 273—164** **5 Claims**

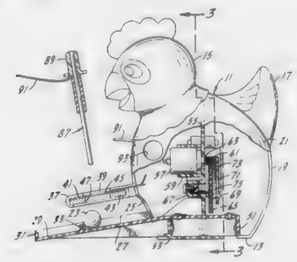


1. An improvement to a golf putter head of the type having a first ball striking face and an opposite side, a toe and a heel at opposite ends of said face, and an elongated hosel having a longitudinal axis, said hosel attached at a point proximate said face, said hosel adapted to be partially surrounded and held by an associated golf club shaft, said face and said opposite side each having parallel bottom edges opposite said point where said hosel attaches with a known thickness between said parallel edges, said face also having a "sweet spot" area for ball impact proximate said hosel, said face additionally angled with respect to the longitudinal axis of the hosel, said improvement adapted to align the ball striking face to the cup and to align the face for striking in the "sweet spot" area, the improvement comprising:
a pair of protrusions formed on said hosel, said protrusions protruding from opposite sides of said hosel, each of said protrusions characterized by a flat face, said flat faces parallel to each other and having a determined thickness between said faces equal to the known thickness between said parallel edges opposite said point where said hosel attaches, said parallel flat faces also parallel to the bottom edges of the ball striking face and the opposite side of the golf putter head, said protrusions increasing the weight of said golf putter head proximate said "sweet spot" to enlarge said "sweet spot area"; and
said golf putter head including a centrally located longitudinal slot formed in said head from the toe to the heel, said golf putter head adapted to be aligned for striking the ball to the cup and aligning for striking the ball in the sweet spot area by sighting said protrusions parallel flat faces to said ball striking face and opposite side bottom parallel edges and said longitudinal slot adapted to impart "spring" to said head when striking the ball whereby said golf putter head may be correctly aligned for striking the golf ball and propelling it to the cup and also thereby making it easier for the golfer to hit the golf ball on the sweet spot.



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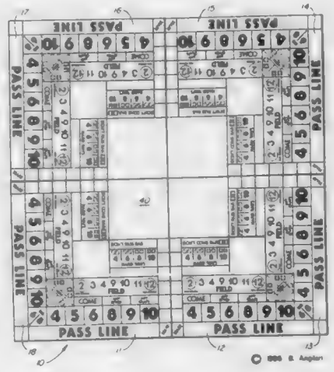
**4,746,125**
**MANIPULATIVE GAME**
**Gordon A. Barlow, Glenview, Ill., assignor to Gordon Barlow Design, Skokie, Ill.**
**Filed Jun. 5, 1987, Ser. No. 58,407**
**Int. Cl.[4] A63F** *9/00*
**U.S. Cl. 273—1 GC** **3 Claims**



1. A game including:
a hollow housing having an outlet opening for a marble,
an inclined ramp leading from the marble outlet opening,
a detent in the inclined ramp sufficient to restrain movement of a marble past the detent on the ramp,
a shield extending over the detent to restrict access to a marble retained by the detent,
an opening extending through the shield permitting generally vertical access to a marble held by the detent,
an electrically conductive ring encircling the opening,
a circular magnet mounted on the electrically conductive ring generally coaxial therewith,
a metal probe having an insulated handle,
an insulated electric wire connecting the metal probe to a battery power supply, a direct current miniature motor and the electrically conductive ring so that engagement of the metal probe with the electrically conductive ring completes a circuit and actuates the direct current electric motor, and
means connected to the electric motor to indicate that the circuit has been completed.

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**4,746,126**
**COMBINATION CRAPS AND CARD GAME**
**Benjamin T. Angileri, 1357 Box Canyon Rd., San Jose, Calif. 95120**
**Filed Feb. 12, 1986, Ser. No. 828,843**
**Int. Cl.[4] A63F** *3/00*
**U.S. Cl. 273—249** **10 Claims**




1. Game apparatus for a number of players comprising:
a board having designated thereon a first series of craps playing areas in a repetitive pattern at defined positions around the board for accepting wagering chips by individual players at said defined positions;
craps betting numerals indicia from numeral 2 to numeral 12 marked within said craps playing areas and having a set reward in accordance with game rules;
a pack of conventional poker playing cards an equal number of which are dealable to said number of players;
a pair of dice to be thrown by a player, each die having a plurality of indicia on the faces thereof for determining a winning position when the sum of top surface numbers on said dice when thrown correspond to those marked areas where a wagering chip has been placed by a player and for determining which playing card having a sum generally corresponding to said sum of said top surface numbers on said dice is to be discarded by a player in accordance with game rules.

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**4,746,127**
**ADJUSTABLE CLAMPING BAND FOR GASKETS AND METHOD FOR USING SAME**
**James Westhoff, Langhorne, and James A. Kelly, Warrington, both of Pa., assignors to A-Lok Products, Inc., Tullytown, Pa.**
**Continuation-in-part of Ser. No. 68,562, Jun. 30, 1987. This application Aug. 20, 1987, Ser. No. 87,522**
**Int. Cl.[4] F16J** *15/52*
**U.S. Cl. 277—1** **24 Claims**

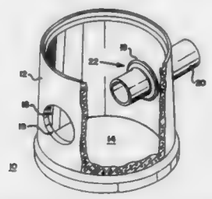
1. A clamping apparatus including a clamping band for clamping a gasket against an opening in a sidewall so as to form a fluid-tight seal between said gasket and said sidewall, said clamping band comprising:
a substantially annular-shaped member having a discontinuity so as to define first and second ends thereof;
one of said ends having a reduced cross section relative to the nominal cross section of said clamping band;
said opposite end having an elongated slot for slidably receiving said projection;

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first locking means provided along at least one surface of said projection;

an opening provided in said clamping band and communicating with said elongated slot;



second locking means insertable through said opening and cooperating with said first locking means when positioned in said opening to lock said projection in said slot to prevent displacement of said clamping band from its annular dimension.

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**4,746,128**

## CASSETTE SHAFT SEAL

**Gerhard Freiwald, Hemsbach, Fed. Rep. of Germany, assignor to Firma Carl Freudenberg, Weinheim/Bergstr., Fed. Rep. of Germany**

**Filed Jun. 11, 1987, Ser. No. 60,508**

**Claims priority, application Fed. Rep. of Germany, Nov. 11, 1986, 3638515**

**Int. Cl.[4] F16J** *15/32*

**U.S. Cl. 277—45** **5 Claims**



1. In a cassette shaft seal, comprising an outer ring and an inner ring of opposite angular profile which together enclose an annular chamber of substantially rectangular cross section, the outer ring being provided with at least one sealing lip lying against the inner ring and with a means for loosely holding a relatively rotatable, axially projecting flange of the inner ring, and a communicating gap being present between the annular chamber and the sealed space which is defined on the one side by the inner ring flange, the improvement comprising a plurality of segmental cutouts in said outer ring, on the side facing away from the flange, uniformly distributed around the circumference of the seal, said segmental cutouts forming passages between the annular chamber and the space that is to be sealed.

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**4,746,129**

## EXPANSION JOINT STRIP SEAL

**Guy S. Puccio, 28 Sargent Dr., Amherst, N.Y. 14226**

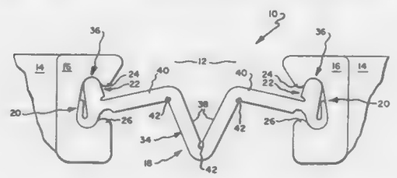
**Filed Sep. 14, 1987, Ser. No. 96,915**

**Int. Cl.[4] F16J** *15/10*; **E01C** *11/10*

**U.S. Cl. 277—205** **7 Claims**

1. An expansion joint strip seal for bridging a gap between a pair of elongated members each having a cavity of generally C-shaped cross section for mounting said seal, each said cavity having a seal assembly opening facing towards said gap and extending lengthwise of its one of said members between opposed projecting portions defined by its one of said members, each said cavity being bounded by a pair of retaining recesses arranged adjacent said projecting portions on opposite sides of said opening and a rear wall interconnecting said retaining recesses and facing towards said opening, the spacing between said retaining recesses defining the height of said cavity and the spacing between said rear wall and said projecting portions defining the depth of said cavity, said seal comprising:

an elongated resiliently deformable strip having a web portion sized to bridge said gap and a pair of mounting bead portions joined to opposite edges of said web portion and adapted for insertion one within each said cavity through said opening thereof for mounting said strip on said members, each of said mounting bead portions having a main mounting portion and a tongue portion, said main mounting portion having in cross section opposed mounting portions generally conforming to the shape of said retaining recesses and an interconnecting portion having a first



side joined to one of said edges of said web portion and a second oppositely facing side, said opposed mounting portions are spaced apart through a distance essentially corresponding to said height of said cavity, said first and second sides of said connecting portion are spaced apart through a distance less than said depth of said cavity, said tongue portion is cantilever supported by said main mounting portion and projects transversely away therefrom in a direction away from said web, said tongue portion has a length as measured between a free end surface thereof and said second side less than said height of said cavity, but greater than the difference between said depth of said cavity and the distance between said first and second sides of said connecting portion, and said tongue has a transverse dimension essentially equal to said difference.

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**4,746,130**

## FLAT GASKET-TYPE SEAL FOR PLACEMENT BETWEEN MACHINE PARTS INCLUDING HYDRAULIC CONTROL PANELS

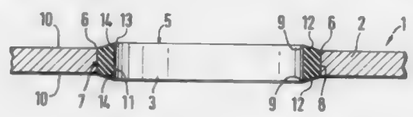
**Berthold W. Abele, Walheim, Fed. Rep. of Germany, assignor to KSA Dichtsysteme GmbH & Co. KG, Vaihingen an der Enz, Fed. Rep. of Germany**

**Filed Jan. 15, 1986, Ser. No. 819,149**

**Claims priority, application Fed. Rep. of Germany, Jul. 18, 1985, 8520709[U]**

**Int. Cl.[4] F16J** *15/10*

**U.S. Cl. 277—228** **3 Claims**



1. A flat gasket-type seal for placement between machine parts to seal the latter relative to one another in hydraulic technique, especially hydraulic control panels, to seal them relative to one another; said seal comprises:

a metal plate having parallel side surfaces against which said parts that are to be sealed are pressed; said metal plate has at least one hole, each of which has a peripheral surface; and

at least one elastomeric sealing ring, each of which is disposed in a respective one of said holes of said metal plate; each of said sealing rings has an outer periphery that rests against said peripheral surface of the associated hole, with the outer periphery of a given sealing ring, in the region between said two parallel side surfaces of said metal plate, being secured to the associated peripheral surface of a given hole via a vulcanization bond, said outer periphery of a given one of said sealing rings being mechanically roughened and/or chemically dissolved to promote said vulcanization bond; each of said sealing rings being provided with two sealing portions, each of which extends beyond said vulcanization bond on a respective one of said parallel side surfaces of said metal plate and each of which extends beyond the plane of a given one of said parallel side surfaces of said metal plate; the cross-sectional width of said sealing ring in the plane of said metal plate corresponding approximately to the thickness of said metal plate; each of said sealing rings being provided with an inner peripheral surface, the length of which, as measured transverse to the planes of said parallel side surfaces of said metal plate, is greater than the length of said outer periphery of said sealing ring; said inner peripheral surface of a given one of said sealing rings having two oppositely disposed edges, with a respective inclined surface extending inwardly from a given one of said edges to said outer periphery and vulcanization bond; each of said inclined surfaces delimits an approximately triangular one of said sealing portions of said sealing ring; said metal plate being provided with two to twenty of said holes, each of which has secured to its peripheral surface, via one of said vulcanization bonds, a given one of said sealing rings, said metal plate being provided with three to six of said holes; said metal plate being provided with through-bores disposed outwardly of the vicinity of a group of said holes in which are vulcanized securing rings, said through-bores being disposed in corner regions of said metal plate.



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**4,746,131**

## APPARATUS FOR INTERNAL CHUCKING OF SOFT THREE-JAW CHUCKS ON LATHES

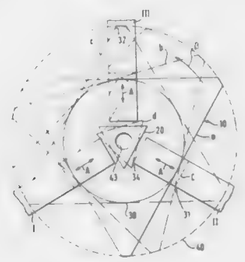
**Adam Mathes, Vogelsangstr. 7, 7403 Ammerbuch 4, Fed. Rep. of Germany**

**Filed Dec. 12, 1986, Ser. No. 941,110**

**Claims priority, application Fed. Rep. of Germany, Dec. 18, 1985, 3544799; Apr. 29, 1986, 3614501**

**Int. Cl.[4] B23B** *25/06*

**U.S. Cl. 279—1 SJ** **15 Claims**



1. An apparatus for internal chucking of a soft three-jaw chuck on lathes to enable the three jaws to subsequently be bored out to a highly precise ultimate chucking dimension, wherein two rotating triangular clamping plates are disposed in any desired rotational position one relative to the other, in which, with said two clamping plates being located in any desired position one relative to the other, common positions of contact result from said jaws of said three-jaw chuck from the edges of said two clamping plates that are then canted one relative to the other; said clamping plates having the external configuration of an equilateral triangle; said clamping plated being insertable in said soft three-jaw chuck whereby a predetermined chucking dimension range is covered thereby.

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**4,746,132**

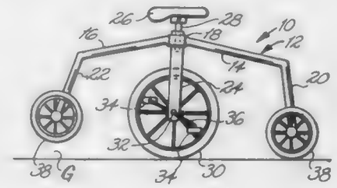
## MULTI-WHEELED CYCLE

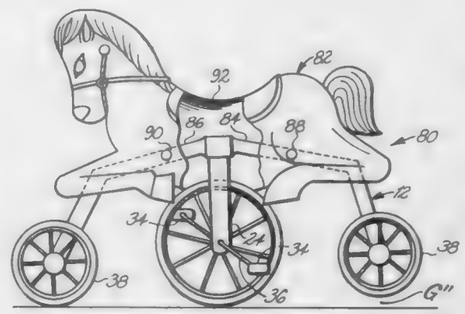
**Robert W. Eagan, 1302 NE. 4th Ter., Cape Coral, Fla. 33909**

**Filed Feb. 6, 1987, Ser. No. 11,608**

**Int. Cl.[4] A63H** *17/00*; **B62H** *1/12*; **B62K** *5/00*

**U.S. Cl. 280—1.13** **16 Claims**





1. A multi-wheeled cycle operable as a unicycle comprising:

a frame having a mid-portion and first and second portions extending from said mid-portion in opposite directions;

a vertical axis extending through said mid-portion of said frame at the center thereof;

said frame mid-portion including a user support means located on said vertical axis for supporting the user while seated with legs astride said frame;

a main wheel rigidly connected for rotation to, and disposed from, said frame mid-portion in a fork;

said fork being generally upright, located on said vertical axis and having an upper end, and said main wheel having a horizontal axis located on said vertical axis;

a collar on said frame mid-portion having a vertical portion for receiving and supporting said upper end of said fork;

said main wheel having opposing pedals disposed from a crank operatively connected to said main wheel on said horizontal axis for propelling said cycle;

at least one auxiliary wheel rigidly connected for rotation to said frame first portion;

at least two spaced apart auxiliary wheels rigidly connected for rotation to said frame second portion;

the axes of rotation of said auxiliary wheels generally horizontal and parallel;

the bottom of said main wheel lying below the plane formed by the bottoms of said auxiliary wheels.

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**4,746,133**

## AUTOMATIC LEVELING SYSTEM

**Paul E. Hanser, Wilton; Carl H. Meier, Davenport, and Leroy A. Vanroekel, Wilton, all of Iowa, assignors to HWH Corporation, Moscow, Iowa**

**Filed Feb. 19, 1987, Ser. No. 16,245**

**Int. Cl.[4] B60S** *9/00*

**U.S. Cl. 280—6 R** **47 Claims**

1. In combination for use in a vehicle having a front, a back and sides to level the vehicle relative to gravity,

a plurality of jacks each disposed at an individual position

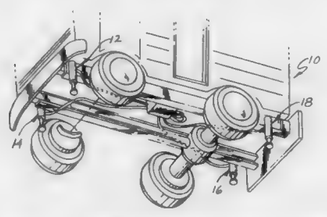
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relative to the vehicle and in displaced relationship to the other jacks for adjusting the vertical position of the vehicle relative to gravity in accordance with the operation of pairs of adjacent jacks,

means disposed relative to the vehicle for sensing the tilting of the vehicle from a level disposition relative to gravity,

means responsive to the sensing means for operating at particular times pairs of adjacent jacks in a particular



order to obtain an adjustment in the vertical position of the vehicle from side and front to back to obtain a resultant leveling of the vehicle to gravity, and

the means for sensing the tilting of the vehicle senses a low corner and with the means for operating pairs of jacks additionally operating an individual jack to correct the low corner before the pairs of the jacks are operated to level the vehicle.

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**4,746,134**

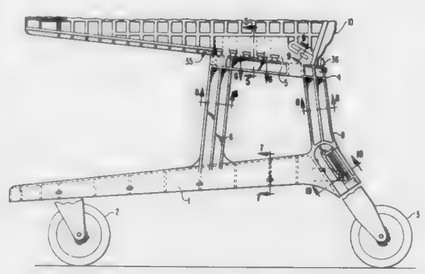
**PLASTIC WHEELED CART CHASSIS HAVING A REINFORCED STRUCTURE**

**Houston Rehrig, 505 S. Orange Grove Blvd., Pasadena, Calif. 91105**

**Continuation-in-part of Ser. No. 729,936, May 3, 1985, abandoned. This application Mar. 20, 1987, Ser. No. 28,448**

**Int. Cl.[4] B62D** *39/00*

**U.S. Cl. 280—33.99 R** **11 Claims**



1. A plastic wheeled cart frame for use with a bottom-supported basket having a downwardly facing basket mounting portion, said frame comprising:

a molded longitudinally extending base having spaced side beams and a transverse front assembly integrally molded with and interconnecting said side beams, said side beams and said front assembly each having a downwardly open inverted U-shaped recess;

reinforcing members disposed in each of said recesses;

means for connecting the ends of said reinforcing member in said front assembly to said reinforcing members in said side beams;

front and rear wheels supporting said base, means for mounting said front wheels on said reinforcing member for said front assembly and means for mounting a rear wheel at the rear ends of each of said side beams and for interconnecting the same to said reinforcing members in said side beams, and

a basket support molded integrally with and upstanding from said base and having an upwardly facing frame mounting portion adapted to mate with said basket mounting portion.

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**4,746,135**

**PEDAL CRANK DRIVEN TRICYCLE**

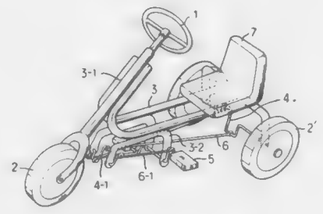
**Myung K. Oh, 9-85, Tuck Eun-Ri, Shin Do-Eup, Koyang-goon, Kyung Gi-Do, Rep. of Korea**

**Filed Dec. 18, 1986, Ser. No. 943,369**

**Claims priority, application Rep. of Korea, Dec. 21, 1985, 17268/85**

**Int. Cl.[4] B62M** *1/02*

**U.S. Cl. 280—262** **13 Claims**



1. A non-motorized tricycle comprising:

a frame having a seat for supporting a rider;

a front wheel ahd two rear wheels;

steering means pivotably supported by said frame and supporting said front wheel; and

crank drive means for rotating said rear wheels and propelling said tricycle, said crank drive means comprising; a pedal crank rotatably supported by said frame and having crank portions and pedals engageable by the feet of the rider; at least one bracket secured to, and extending downwardly from, said frame; an auxiliary crank member rotatably mounted in said bracket and having two first crank portions and two second crank portions; a rear axle rotatably mounted to said frame and secured to said rear wheels, said rear axle having two crank portions; two main crank rods articulated between said crank portions of said axle and said first crank portions of said auxiliary crank member; and two auxiliary crank rods articulated between said second crank portions of said auxiliary crank member and said pedal crank whereby said crank drive means causes rotary movement imposed on said pedals by the rider to be converted by said crank member and said axle into rotation of said rear wheels.

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**4,746,136**

**BICYCLE FRAME AND BICYCLE**

**Francis G. Kirk, 12, Kenworthy Road, Braintree, Essex, England**

**PCT No. PCT/GB86/00132, § 371 Date Nov. 19, 1986, § 102(e) Date Nov. 19, 1986, PCT Pub. No. WO86/05458, PCT Pub. Date Sep. 25, 1986**

**PCT Filed Mar. 10, 1986, Ser. No. 945,673**

**Claims priority, application United Kingdom, Mar. 20, 1985, 8507166; Aug. 14, 1985, 8520379**

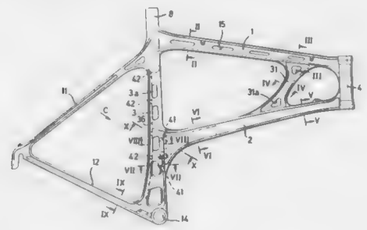
**Int. Cl.[4] B62K** *19/12, 19/02*

**U.S. Cl. 280—281 R** **3 Claims**

1. A bicycle frame including a saddle stem and a head interconnected by upper and lower bars, in which at least the saddle stem, the upper bar and part of the lower bar are integrally cast



in a lightweight metal or alloy, characterised in that at least one element of the frame is cast in an open section which is



subsequently closed by means of a second casting secured in the open section.

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**4,746,137**

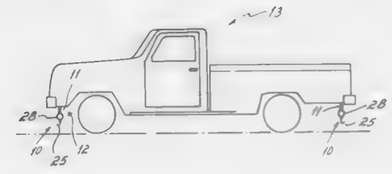
**TOWING APPARATUS**

**Daniel L. Bolser, 1720 S. State Rte. 133, Blanchester, Ohio 45107**

**Filed Jan. 27, 1987, Ser. No. 6,739**

**Int. Cl.[4] B60D** *1/18*

**U.S. Cl. 280—480** **3 Claims**



1. Towing apparatus comprising:

a vehicle having a chassis;

at least one pair of chains, each of said chains having a first end and a second end;

means securing the first ends of said chains to the chassis of said vehicle on opposite sides thereof adjacent and inward of at least one end of the vehicle;

a hook connected to the second end of each of said chains, the length of the chains being such that each of said hooks normally clears the surface of the ground when the chain hangs from the vehicle, but the hook may project outwardly beyond the front or rear end of the vehicle for towing; and,

a resilient, lightweight ball mounted on each of said chains intermediate said first and second ends, each of said lightweight resilient balls having a diameter of sufficient dimension to prevent said chain and its respective hook from contacting the underside of said vehicle while said vehicle is moving by being interposed between the underside of said vehicle and said chain, and contacting the underside of the vehicle during towing.

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**4,746,138**

**TRAILER HITCH ASSEMBLIES**

**Loyal W. James, Route 4, Box 454, Chico, Calif. 95926**

**Filed Aug. 24, 1987, Ser. No. 88,406**

**Int. Cl.[4] B60D** *1/06*

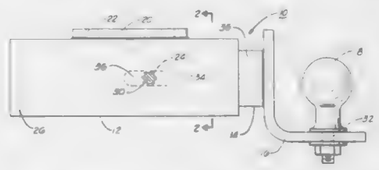
**U.S. Cl. 280—487** **12 Claims**

1. An improved trailer hitch for attachment to a towing vehicle, comprising:

a receiver tube having first and second side walls and means attached thereto for securing to the towing vehicle, said receiver tube having transversely aligned holes formed through respective first and second side walls;

a draw bar tube having first and second side walls and opposite first and second end walls to define an elongate void and having transversely aligned elongated slots formed through first and second side walls, said draw bar tube being closely received within said receiver tube;

resilient spring block means for filling said draw bar tube elongate void and having a transverse pin hole there-



through which is centrally aligned with said elongated slots;

trailer hitching means secured to a first end wall of said draw bar tube; and

a hitch pin for securing through each of said receiver tube holes, the elongated slots and said pin hole.

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**4,746,139**

**MODIFIED UNIVERSAL SKI BINDING FOR USE WITH DIFFERENT SKI BOOTS, AND BOOTS SPECIFIC TO CERTAIN BINDINGS**

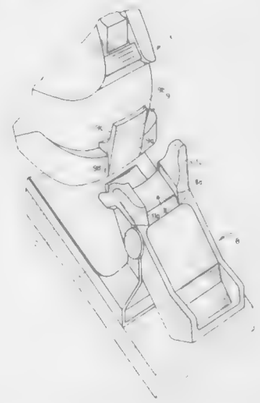
**Jean-Pierre Dimier, Rumilly, and Roger Pascal, Annecy Le Vieux, both of France, assignors to Salomon S.A., Annecy, France**

**Filed Jan. 14, 1985, Ser. No. 690,882**

**Claims priority, application France, Jan. 12, 1984, 84 00390**

**Int. Cl.[4] A63C** *9/084*

**U.S. Cl. 280—631** **3 Claims**

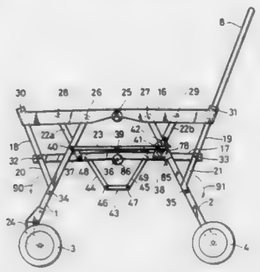


1. In combination a modified universal binding adapted to be mounted on a ski and a boot, said modified universal binding comprising at least one jaw for securing said boot to said ski, said ski boot comprising at each of its ends at least one standardized retention and release zone comprising means for engaging at least one corresponding standardized retention and release zone on the jaw of said binding to allow for the insertion of the boot and the safe maintenance of the boot on the ski, and wherein at least one of the ends of said boot comprises a blocking means adapted to engage a corresponding portion provided on the jaw of the binding in a manner so as to allow for the utilization of the boot only with modified bindings having standardized retention and release zones adapted whereby the blocking means does not interfere with the insertion of the boot, said blocking means contributing substantially

no retention including no lateral or vertical retention of said boot by said modified universal binding, said blocking means being a projection comprising a transverse posterior surface inclined from bottom to top towards the rear, beginning at the median portion of the lower edge of the heel of said ski boot, a relatively thin upper edge, an interior surface connecting the upper edge to the lower portion of the upper of the boot, and two vertical longitudinal lateral surfaces beginning at the posterior portion of the heel and the horizontal upper edge of the heel.

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**4,746,140**
**BABY CARRIAGE**
**Kenzou Kasai, Osaka, Japan, assignor to Aprica Kasai Kabushikikaisha, Osaka, Japan**
**Filed Jul. 31, 1986, Ser. No. 891,736**
**Claims priority, application Japan, Jul. 31, 1985, 60-170416**
**Int. Cl.[4] B62B *7/08***
**U.S. Cl. 280—642** **4 Claims**

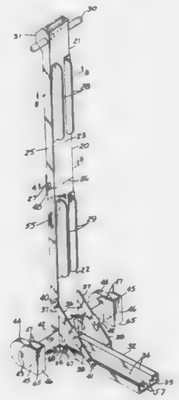


1. A baby carriage comprising a pair of front legs (1), a pair of rear legs (2), a seat section (60, 61), and lateral frames (5) each extending between the front and rear legs on a respective side of said baby carriage, wherein each lateral frame is foldable in a lateral plane of the baby carriage, whereby when the lateral frames assume an extended state, said front and rear legs are spaced away from each other to establish an opened state of the baby carriage, while when the lateral frames assume the folded state, said front and rear legs are moved toward each other to estabish a closed state of the baby carriage, wherein each of said lateral frames (5) includes an upper lateral rod member (10) and a lower lateral rod member (11) which are both foldable and which are disposed one above the other, and prop rods connecting said upper and lower lateral rod members to each other, said upper lateral rod member having opposite ends turnably connected to said front and rear legs so that said upper lateral rod member extends between said front and rear legs (1, 2) on the same side, said upper lateral rod member being turnably connected to upper ends of said prop rods (18, 19), the lower ends of said prop rods having one of respective ends of reverse-turn rods (20, 21) turnably connected thereto, the other ends of said reverse-turn rods being turnably connected to the front and rear legs, and wherein the lower lateral rod member is turnably connected at its opposite ends to said one of the respective ends of said reverse-turn rods.

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**4,746,141**
**DOOR CARRIER**
**William E. Willis, P.O. Box 37207, Tallahassee, Fla. 32315**
**Filed Jun. 23, 1986, Ser. No. 877,143**
**Int. Cl.[4] B25B *11/00***
**U.S. Cl. 280—655** **20 Claims**

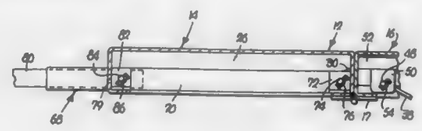
1. A foldable door carrier comprising an elongated vertical support beam hinged medially of its length to form an upper beam section and a lower beam section with said upper beam section being foldable rearwardly to a position substantially parallel with said lower beam section, each of said sections having a pair of parallel guide flanges aligned with each other and adapted to receive an edge of a door therebetween, said upper section having at its upper end a handle means for manually holding and guiding said carrier, said lower section having a pair of widely spaced wheels for rollable transportation of said carrier, a horizontal elongated support beam having one end portion adjacent to and extending forwardly from the bottom of said lower beam section, means for pivotally mounting said one end portion to said lower beam section adjacent its said bottom, said horizontal support beam being foldable rearwardly to a position substantially parallel to and in contact with said lower beam section, said upper beam section and said



horizontal support beam being on opposite sides of said lower beam section while in a folded position, said horizontal support beam having parallel spaced flanges extending lengthwise thereof between said one end portion and the free end of said horizontal support beam and adapted to receive the edge of a door therebetween, said parallel spaced flanges and said pair of parallel guide flanges being in substantial alignment and forming a vertical plane into which is positionable a door and said flanges of said horizontal support beam being sufficiently spaced apart to permit said flanges of said lower beam section to be receivable therein.

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**4,746,142**
**FOLDABLE AUTOMOBILE TRAILER**
**James E. Davis, 15609 Renner Rd., Olathe, Kans. 66062**
**Continuation of Ser. No. 818,343, Jan. 10, 1986, abandoned. This application Aug. 26, 1987, Ser. No. 89,676**
**Int. Cl.[4] B62D *63/00***
**U.S. Cl. 280—656** **3 Claims**



1. A trailer which may be selectively disassembled and folded to a relatively small profile package comprising:
- a forward bed section having a top and four normally upright sides fixedly connected to said top;
- a rearward bed section having a top and four normally upright sides fixedly coupled to said top of said rearward bed section;
- a pair of wheels;
- axle means releasably coupled to said pair of wheels;

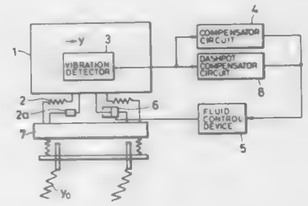


- spring means detachably connecting said axis means to one of said bed sections;
- hinge means interconnecting said forward bed section and said rearward bed section for enabling selective movement of said forward bed section relative to said rearward bed section between an unfolded, use position and a folded orientation to present a compartment which is substantially enclosed by said top and said four sides of both said forward bed section and said rearward bed section, said compartment being of a size sufficient for carrying said pair of wheels, said axle means, and said spring means and
- a removable tongue assembly for towing said trailer including an elongated tongue having a rear portion and an elongated member having a front portion and a rear portion,
- said tongue rear portion and said member front portion being complementally configured for enabling sliding, telescopic reception of one of said tongue rear portion and said member front portion into the other of said tongue rear portion and said member front portion to an assembled orientation and for establishment of a connection therebetween,
- said sides of said forward bed section including a front side having structure defining an aperture and a rear side disposed adjacent said hinge means in spaced, parallel relation to said front side,
- said forward bed section including a bracket connected to said rear side and a support connected to said front side adjacent said aperture and aligned with said bracket,
- said tongue assembly when in said assembled orientation being received through said aperture with said connection being disposed adjacent said support, with said member extending across said forward bed section with said rear portion of said member being located adjacent said bracket,
- said tongue assembly including means for releasably securing said member front portion to said support and means for releasably securing said member rear portion to said bracket,
- said tongue assembly being removable from said aperture in order to increase the available volume of said compartment when said forward bed section and said rearward bed section are in said folded orientation,
- said tongue and said member both being of a length to be completely received in said compartment when said forward bed section and said rearward bed section are in said folded orientation and
- wherein said member when secured to said bracket extends through said aperture, and wherein said tongue rear portion also extends through said aperture when said tongue assembly is in said assembled orientation.

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**4,746,143**
**VIBRATION CONTROL APPARATUS FOR VEHICLES**
**Isao Okamoto, Musashino; Katsuyuki Terada, Kudamatsu; Hiromi Go, Kudamatsu; Michio Sebata, Kudamatsu; Hiroshi Higaki, Kudamatsu, and Hideo Takai, Hikari, all of Japan, assignors to Japanese National Railways and Hitachi Ltd., both of Tokyo, Japan**
**Filed Jan. 29, 1987, Ser. No. 8,337**
**Claims priority, application Japan, Jan. 29, 1986, 61-15672**
**Int. Cl.[4] B60G *21/00***
**U.S. Cl. 280—707** **7 Claims**

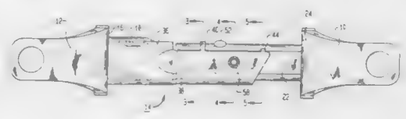
1. A vibration control apparatus for a vehicle having a vehicle body and a truck thereunder comprising:
- springs through which said vehicle body is disposed on said truck;
- damping means interposed between said vehicle body and said truck for dempending vibration of said vehicle body;
- vibration detector means for detecting vibration of said vehicle body;
- a compensator circuit which compensates for a detection output of said vibration detector means regarding phase and gain and produces a control output for cancelling vibraiton of said vehicle body transmitted from said truck;
- a fluid operating mechanism connected to said vehicle body on one side and to said truck on another side so as to control the relative displacement between said vehicle body and said truck and suppresses vibration of said vehicle body;




- fluid control means for controlling said fluid operating mechanism with the control output produced by said compensator circuit; and
- damping control means for recognizing an operating state of said fluid operating mechanism and suppressing the damping function of said damping means in correspondence with the operating state of said fluid operating mechanism.

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**4,746,144**
**BREAKAWAY STEERING ASSEMBLY**
**David A. Kulczyk, Torrington, Conn., assignor to The Torrington Company, Torrington, Conn.**
**Filed Sep. 2, 1986, Ser. No. 903,942**
**Int. Cl.[4] B62D *1/18***
**U.S. Cl. 280—777** **3 Claims**



1. A breakaway steering assembly comprising: a first member having an axially extending enclosing wall forming an enclosed hollow part and a channel formed by walls axially extending from the enclosed part to an axial end of the first member; a second member within said channel; a breakable connection between the second member and the channel walls adapted to normally secure the first member and the second member together for operation as a unit; a deflection mechanism connected to the enclosing wall of the first member and extending into the channel, said deflection mechanism being adapted to move the second member outwardly from the channel if the breakable connection is broken; an integral alignment tab extending inwardly from the top of each sidewall of the channel and in contact with the top of the second member and adapted normally to keep the second member within the channel and aligned with the channel, said tabs being also adapted to deflect when the second member exerts a predetermined force against the tabs as the second member is moved outwardly by the deflection mechanism after the breakable connection is broken.

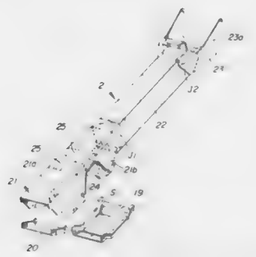
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**4,746,145**
**CHASSIS FRAME FOR RIDER-CONTROLLED WORKING VEHICLE**

**Noriyasu Furuichi; Masahiro Yamamoto; Yuji Kishizawa, and Kenji Nakamura, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Feb. 14, 1986, Ser. No. 829,767**
**Claims priority, application Japan, Feb. 14, 1985, 60-26995; Feb. 14, 1985, 60-18301[U]; Feb. 14, 1985, 60-19583[U]; Feb. 14, 1985, 60-19664[U]**
**Int. Cl.⁴ B62D *21/04***
**U.S. Cl. 280—786** **9 Claims**



1. A chassis frame in a rider-controlled working vehicle having an engine, a gear transmission, and a differential, comprising:
- a front frame member having a substantially channel-shaped cross section opening downwardly, said engine being mounted on said front frame member;
- a rear frame member having a substantially channel-shaped cross section opening upwardly, said gear transmission being connected to a rear end of the rear frame member; and
- a central frame in the form of a tubular body having a substantially rectangular cross section and positioned between said front and rear frame members, said front, rear, and central frame members having confronting ends joined in interfitting relation;
- said differential being housed in said front frame member; and
- said gear transmission being connected to said engine by a first propeller shaft, said differential being connected to said gear transmission by a second propeller shaft, and said central frame accommodating said second propeller shaft.

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**4,746,146**
**VEHICLE CONSTRUCTION**

**Hirokazu Hirabayashi, Ebina City, and Hajime Masagaki, Fujisawa City, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama City, Japan**

**Filed Nov. 25, 1986, Ser. No. 939,661**
**Claims priority, application Japan, Dec. 2, 1985, 60-271114**
**Int. Cl.⁴ B62D *21/00***
**U.S. Cl. 280—795** **17 Claims**

1. A vehicle construction comprising:
- a vehicle body having first and second rear side members which are oppositely disposed and spaced from each other;
- a rear suspension member disposed under said vehicle body and extending laterally with respect to said vehicle body, said rear suspension member being formed to comprise first and second end portions which are respectively secured to said first and second rear side members, and a central portion located between and formed integrally with said first and second end portions;
- a wheel supporting member for rotatably supporting a rear wheel;
- first link members for movably connecting said rear suspension member and said wheel supporting member so that said wheel supporting member is vertically swingable; and



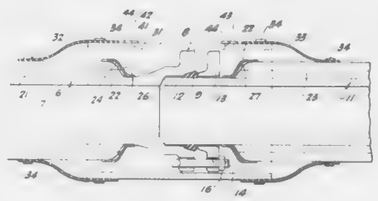
- a rigid connecting member for rigidly connecting said rear suspension member central portion and said vehicle body.

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**4,746,147**
**PIPE JOINT**

**Grant W. Walker, Sacramento, Calif., assignor to ECW, Inc., Rio Linda, Calif.**

**Filed Apr. 9, 1987, Ser. No. 36,383**
**Int. Cl.⁴ F16L *59/00***
**U.S. Cl. 285—53** **1 Claim**



1. In a joint for two pipes both extending along an axis: a first pipe having a bell with a first radially outstanding flange; a second pipe having a spigot disposed in said bell; a deformable gasket surrounding said spigot and disposed in said bell; a compression ring disposed around said spigot and having a second radially outstanding flange; means including a bolt passing through said first radially outstanding flange and through said second radially outstanding flange for pressing said compression ring against said gasket; the combination of a first insulation layer having a first layer end, said first layer being disposed around and in contact with said first pipe in position to leave a first axial space between said first layer end and said first flange and to locate said first layer end radially inward of the periphery of said first radially outstanding flange; a second insulation layer having a second layer end, said second layer being disposed around and in contact with said second pipe in position to leave a second axial space between said second layer end and said second flange and to locate said second layer end radially inward of the periphery of said second outstanding flange; a first garter of heat-shrinkable material surrounding and in contact with said first pipe and overlying said first layer end; a second garter of heat-shrinkable material surrounding and in contact with said second pipe and overlying and in contact with said second layer end; a coaxial sleeve surrounding said first garter, said second garter, said first flange, said second flange and said compression ring; a first cuff surrounding one end of said sleeve and said first insulation layer; a second cuff surrounding the other end of said sleeve and said second insulation layer; means affording access to the interior of said sleeve and of said first cuff and of said second cuff; and a foam mass within said sleeve and said first cuff and said second cuff.

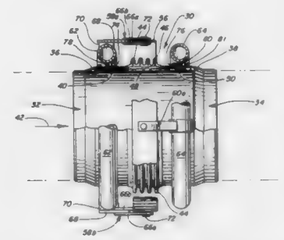


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**4,746,148**
**LIMITING STRUCTURE FOR AXIAL EXPANSION JOINT**

**Gregory A. Perkins, San Antonio, Tex., assignor to Flexonics Inc., Bartlett, Ill.**

**Filed Feb. 27, 1987, Ser. No. 19,647**
**Int. Cl.⁴ F16L *27/00***
**U.S. Cl. 285—114** **18 Claims**



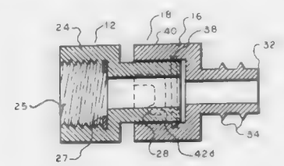
1. A limiting structure for restraint of pressure thrust loads of an expansion joint between two pipe ends, comprising:
- shear lugs rigidly fixed around each pipe end, each shear lug having an outer diameter;
- a pair of torodial limiting rings about the pipe ends, said rings being circular in cross-section;
- stop rings fixed to each limiting ring, said stop rings having inner diameters less than said outer diameter; and
- means for securing the limiting rings at an axial spacing with the shear lugs disposed between the stop rings.

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**4,746,149**
**COUPLER FOR WATER LINE**

**Albert L. Thompson, Rt. 1, Box 180,, West Hamlin, W. Va. 25571**

**Filed Jul. 7, 1987, Ser. No. 70,398**
**Int. Cl.⁴ F16L *55/00***
**U.S. Cl. 285—175** **3 Claims**



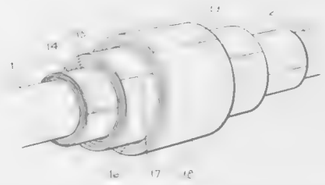
1. A coupling for detachably connecting two water conduits such as a garden hose to another garden hose or water connection, comprising first and second units each having a pair of oppositely extending male and female tubular ends each suitable for mating connection, the female end of each unit being of larger outside diameter than the outside diameters of the male ends of the units and substantially of the same diameter as the female end of the other unit, the female end of the first unit being internally threaded for connection with an externally threaded hose fitting or faucet, the female end of the second unit having an elongated internal cylindrical surface extending from the outer extremity of the second unit's female end, the male end of the first unit having an elongated external cylindrical surface adapted to slide within and against said internal cylindrical surface, the second unit's female end having a slot and a separate groove which interrupt its said cylindrical surface, said groove being indented into and extending circumferentially around the inside of the second unit's female end between the slot and the innermost end of said internal cylindrical surface, an elastic O-ring seated in the groove, a portion of the O-ring being engageable with and compressible against said internal cylindrical surface, the slot extending from the outer extremity of the second unit's female end initially along part of the length of the second unit's female end and then partly around its circumference, and a stud extending radially outwardly from said outer cylindrical surface, the stud being adapted to enter and move along the slot when the first unit's male end is pressed into the second unit's female end and then twisted to bring the stud into the circumferential portion of the slot to lock the units together, and the O-ring being effective not only to control escape of water between the said internal and external cylindrical surfaces but also to grip said external cylindrical surface and thereby frictionally oppose relative movement of the units and thus movement of the stud out of its locking position until the units are disconnected by manual override of the O-ring's frictional grip.

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**4,746,150**
**JOINT FOR JOINING TOGETHER TWO PIPE ENDS**

**Per I. Persson, Nora, and Bengt Persson, Olofström, both of Sweden, assignors to Nitro Nobel AB, Gyttorp and AB Volvo, Goteborg, both of, Sweden**

**Continuation of Ser. No. 618,515, Jun. 8, 1984, abandoned. This application Apr. 27, 1987, Ser. No. 42,716**
**Claims priority, application Sweden, Jun. 9, 1983, 8303264**
**Int. Cl.⁴ F16L *13/06***
**U.S. Cl. 285—286** **5 Claims**



1. In a joint for joining together abutting ends of two pipes, comprising:
- an inner peripheral body to be joined to the abutted ends at the interior surface of said pipes for joining the pipes together, by explosive detonation within the pipes; and
- an annular outer peripheral body at the exterior of the abutted ends which functions as a support during the explosive detonation;
- the improvement wherein said outer peripheral body comprises a plurality of metal strips, each wound a plurality of times upon itself to form a tube having an outer surface, each said strip having an end which is part of the outer surface of a tube and is welded to the outer surface to which it is adjacent, said plurality of strips forming a plurality of tubes arranged one on top of another, each said strip having a different width, the width of the strips decreasing as the distance from the pipes increases,
- said tubes being deformed by said explosive detonation and removed subsequent to said explosive detonation by breaking said weld and unwinding said strips, to expose said abutted ends,
- and said inner peripheral body forming a joint which is coplanar with the interior surfaces of said two pipes.

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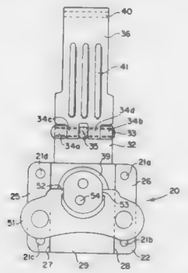


**4,746,151**

## HALF-TURN INDUSTRIAL FASTENER

**Cuyler Hoen, Rensselaer, and Frederick J. Pufpaff, Loudonville, both of N.Y., assignors to Simmons Fastener Corporation, Albany, N.Y.**

**Continuation of Ser. No. 764,943, Aug. 12, 1985, abandoned.**
**This application Apr. 6, 1987, Ser. No. 35,225**
**Int. Cl.[4] E05C** *5/02*
**U.S. Cl. 292—111** **8 Claims**



1. An industrial fastener comprising a keeper plate member to be fastened to one panel and a turn member to be fastened to another panel;

said turn member comprising a base member, a slide member, a hook member, turning means and hinge means;

said hinge means pivotally connecting said hook member and said slide member and including a spring to pivotally spring-load said hook-member so that it tends to spring away from said keeper plate when said hook member is unlocked from said keeper plate;

said slide member being a sheet metal member having a flat portion which slides within said base member to be extended or withdrawn and has an elongated cam slot transverse to the direction of said movement;

said base member being a one-piece integral member having a top wall portion, a bottom wall portion and a bent-back U-connection portion which connects said top wall portion and said bottom wall portion, said bottom and top wall portions between them forming a guideway for said slide member and grasping said slide member with spring force to provide a restraining pressure on said slide member, said base member having two opposite elongated side wall portions perpendicular to said U-connection plate and in the same plane thereof, said sidewall portions forming a guideway for said slide member, said base member having at its top wall an opening therein;

said turning means protruding through said base member opening and including means to rotate said turning means and also including a cam member being eccentric as to the center of said turning means; wherein said turning means is rotated to move said cam member about the center of said base member opening and within said cam slot to thereby slide forward and withdraw said slide member and thereby grasp and pull together said keeper plate and said turn member.

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**4,746,152**

## DOOR LOCK

**Robert L. Willcox, 6636 E. 88 St., Tulsa, Okla. 74133**

**Filed Aug. 27, 1987, Ser. No. 90,218**
**Int. Cl.[4] E05C** *1/10*
**U.S. Cl. 292—150** **10 Claims**

1. A bolt mountable on adjacent members to hold the members lockably secure, comprising:

a bolt assembly mountable on a first member of the pair of adjacent members, including

a slide bolt movable slidably in the bolt assembly and comprising

an elongated, flat member having a first end and a second end,

a slide bolt control stem at the first end,

a locking pin opening adjacent the second end adaptable to receive a locking pin, and

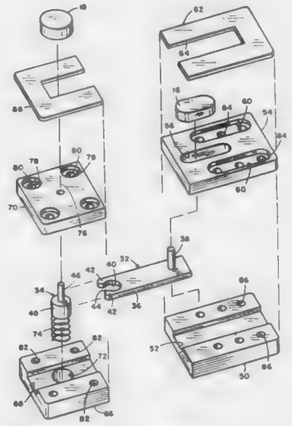
a pair of shoulders at the second end spaced apart to define a narrow passageway communicating with the locking pin opening,

a slide block mountable on the first member of the pair of adjacent members and slidably supporting the slide bolt,

a slide plate having a longitudinal slot receiving therethrough the slide bolt control stem, the slide plate positioned upon the slide block, the slide plate cooperating with the slide block to form a recess therebetween for the slide bolt,

a keeper assembly mountable on the second member of the pair of adjacent members, adaptable to receive and hold securably therein the slide bolt, and comprising

a button block mountable on the second member of the



pair of adjacent members to slidably support the slide bolt when in a locked position, and having an opening therein to receive a locking pin member, the locking pin member comprising

a pin fitting lockably into the locking pin opening of the slide bolt and to fit into the button block opening,

a spring member positioned in the button block opening and below the pin urging the pin out of the button block opening, and

a stem secured axially on the top of the pin, the stem adapted to be received between the shoulders of the slide bolt to permit the pin to be positioned within the locking pin opening, and

a button plate positioned upon the button block and cooperating with the button block to form a recess therebetween in line with the recess of the bolt assembly to receive the slide bolt in a locking position, and including a bore therethrough for reciprocal movement of the locking pin member stem, with the button plate restraining upward movement of the pin.

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**4,746,153**

## CLOSURE PANEL PULL DOWN MECHANISM

**David E. Compeau, Mt. Clemens; Howard W. Kuhlman, Troy, and Lloyd W. Rogers, Utica, all of Mich., assignors to General Motors Corporation, Detroit, Mich.**

**Filed May 22, 1987, Ser. No. 52,914**
**Int. Cl.[4] E05C** *13/06*
**U.S. Cl. 292—216** **3 Claims**

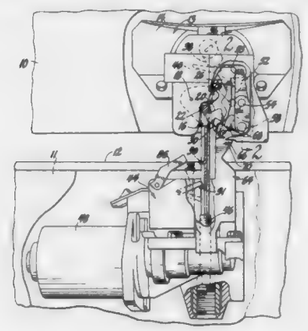
1. In a vehicle body including a compartment panel spring-loaded for movement between open and closed positions with



respect to a compartment defined by a body panel, a latch and pull down mechanism comprising:

a latch assembly mounted on one of the panels and having a latch bolt spring biased to an unlatched position and a detent lever for holding the latch bolt in the latched position;

a pull down mechanism mounted on the other panel and including a striker mounted thereon by a motorized drive unit for movement between an extended position where the striker is engageable by the latch bolt of the latch assembly to latch the panels together upon partial closing movement of the closure panel, and a retracted position in which the closure panel is in the closed position;



means adapted to operate the motorized drive unit to move the striker to retracted position to pull the closure panel to the closed position in response to latching engagement between the striker and the latch assembly,

remote opening means actuable by the user for selectively operating the mounted drive unit to move the striker from the retracted position toward the extended position,

and cam means acting in response to motorized movement of the striker from its retracted position toward its extended position to cam the detent lever to a position releasing the detent lever from the latch bolt whereby the latch bolt is spring biased to the unlatched position thereby disconnecting the latch assembly from the striker and freeing the compartment panel for spring-loaded movement to the open position.

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**4,746,154**

## TUBULAR LOCK WITH AN ADJUSTABLE DEVICE FOR TWO-SIZE SETTING

**Yau C. Fang, Chiaya, Taiwan, assignor to Posse Lock Manufacturing Co., Ltd., Chiayi, Taiwan**

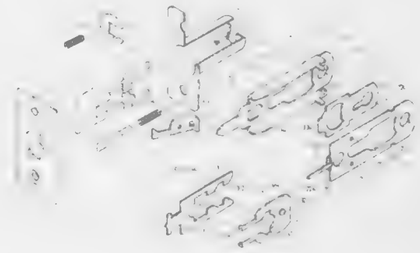
**Filed Feb. 2, 1987, Ser. No. 9,889**
**Int. Cl.[4] E05C** *1/16*
**U.S. Cl. 292—337** **6 Claims**

1. A tubular lock with an adjustable device for fixing the lock in two different sizes comprising,

a lock cylinder having a faceplate, a fixing plate and a cylinder which contains inside an anti-burglar set and has a bottom cut with a hole for combining with a combining set,

a combining set comprising an outer U-shaped combining plate having two position holes, a hole between said position holes, bent upper and lower sides and a stopping key at each end of the upper and lower sides, and a lid plate which has two position holes and a hole between said position holes as said outer combining plate does, two inward protrusion means to stop the movement of an auxiliary extending plate, and hook means to hook against one end of the hole in said cylinder,

a moving set comprising a moving plate, an extending plate and an auxiliary extending plate which are all combined between said outer combining plate and said lid plate, said moving plate having a neck means to combine with a dead bolt, one set of tooth means to be moved by an arc-shaped plate of a knob, and another set of tooth means to be leaned against by two bent protrusions of said extending plate; said extending plate having two protrusion means to lean against a set of tooth means of said moving plate, a hole means to be moved by said arc-shaped plate, and a pin means to insert in and move along a guiding hole of said auxiliary extending plate; said auxiliary extending plate having said guiding hole for said pin means of said extending plate to move inside and to be stopped at its end when a hole of said auxiliary extending plate is located just against a hole of said extending plate, a round hole means for a bolt of the knob to be inserted in, a wall means to move along on two stopping keys and to be stopped at a certain point when retracting, and shoulder means to be



stopped by two inward protrusions of said lid plate when moving inward,

an anti-burglar set comprising a dead bolt, and anti-burglar bolt, a stopping plate and two coil springs, and having characteristic that inward movement of said auxiliary extending plate can adjust the lock to the short size, activating one hole means of said extending plate to locate against one set of the tooth means of said moving plate so that the arc-shaped plate can fit in and move said hole means of said extending plate and said tooth means of said moving plate, and that outward pulling of said auxiliary extending plate can adjust the lock to the long size, activating said protrusion means of said extending plate to lean against another set of tooth means of said moving plate so that said arc-shaped plate can move said extending plate and then said moving plate.

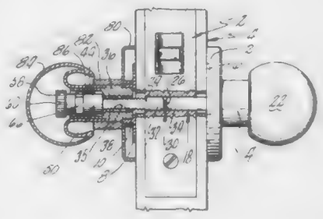
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**4,746,155**

## WORKING TRIM FOR MORTISE LOCK

**LeRoy Hart, Farmington, Conn., assignor to Emhart Industries, Inc., Farmington, Conn.**

**Filed Mar. 31, 1983, Ser. No. 481,030**
**Int. Cl.[4] E05B** *3/00*
**U.S. Cl. 292—351** **12 Claims**



1. Working trim for a door lock for a door, said trim including an adapter plate mounted on said door, a noncircular spin-

dle extending from said door through said adapter plate, a shank adapter slidably received on said spindle for rotation therewith, retaining means positioned on the noncircular spindle for axially retaining said shank adapter on said spindle in one direction and said adapter plate retaining said shank adapter in the other direction, said retaining means and said adapter plate sandwiching said shank adapter therebetween for preventing axial movement of said adapter, lock operating means removably mounted on said shank adapter for rotation therewith, said shank adapter being radially spaced from said retaining means for receiving a radially extending retaining member biased radially outward into engagement with said lock operating means for removably mounting said lock operating means on said shank adapter.

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**4,746,156**

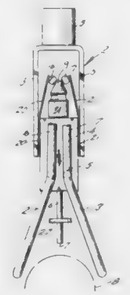
**GOLF BALL RETRIEVER**

**Donald R. Kremer, 3795 Sherman, North Bend, Oreg. 97459**

**Filed May 21, 1987, Ser. No. 52,476**

**Int. Cl.[4] A63B** *57/00*

**U.S. Cl. 294—19.2** **7 Claims**



1. A golf ball retriever comprising in combination,
a handle,
a base attached to said handle,
a pair of ball engaging members each of said members terminating downwardly in a ball engaging portion for ball retention and each member terminating upwardly in arm means,
pivot means swingably mounting said members intermediate their ends on said base,
a locking pin slidably carried by said base and having a golf ball engageable first end, a limit stop on said locking pin,
a cam at the remaining end of said pin and positionable by the pin intermediate said arm means of said ball engaging members to cause said ball engaging portion of each of said members to pivot toward one another into ball engagement upon contact of said first end of the pin with a golf ball, said cam having a taper,
biasing means acting on said arm means and urging same toward one another and into cam engagement, and
said cam manually positionable to permit said biasing means to move said ball engaging members apart for ball discharge.

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**4,746,157**

**LIFTING DEVICE FOR SETTING FLOATING OBJECTS AFLOAT IN THE WATER AND RAISING THEM, PARTICULARLY BOATS**

**Pierre Magneville, Vernouillet, France, assignor to Institut Francais de Petrole, Malmaison, France**

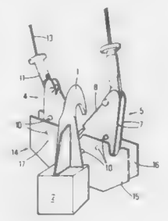
**Filed Dec. 10, 1986, Ser. No. 940,488**

**Claims priority, application France, Dec. 11, 1985, 85 18568**

**Int. Cl.[4] B63B** *23/00;* **B66C** *1/36*

**U.S. Cl. 294—82.27** **12 Claims**

1. A lifting device for setting floating objects afloat, particularly boats, and raising them again including a coupling element suspended from handling means and a single open hook secured to the object, whose concavity is turned downwards, wherein said hook is provided with a lower concave face wider than the opposite face and with lateral faces substantially flat and slanted with respect to each other and with a narrower tip portion and the coupling element includes a housing for the



hook associated with deformable means adapted for being applied against the lateral faces of the hook when this latter comes into abutment against the bottom of the housing, said hook and said deformable means being so dimensioned that lowering and lateral movement of the coupling element results in a release of said hook.

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**4,746,158**

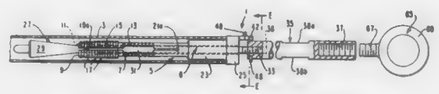
**SECONDARY-SIDE TUBE GRIPPER**

**Kevin L. Fields, Chambersburg, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Continuation of Ser. No. 631,351, Jul. 16, 1984, abandoned. This application Sep. 29, 1986, Ser. No. 912,690**

**Int. Cl.[4] B25B** *1/00;* **B66C** *1/00*

**U.S. Cl. 294—94** **20 Claims**



1. A gravity operated tube gripper for gripping the inner walls of a single, substantially vertically oriented tube located within a densely packed array of tubes when said gripper is lowered into an upper open end of said tube from a position above said tube, comprising:
(a) a gripping means including a collet assembly having an expandable collet at one end which is insertable within a tube, and a collet expander for selectively engaging and expanding said expandable collet;
(b) a suspension member having a distal end, and a proximal end that is connected to said expander and detachably connected to said collet assembly for suspending said collet assembly over said expander, and for transmitting a torsional force to said expander, and
(c) a stop collar on the end of said collet assembly opposite said expandable collar for seating said collet assembly on the open end of the tube so that the stop collar bears the weight of said collet assembly;
(d) a latch means which is rotatably and remotely operable only by rotating the distal end of the suspension member when the stop collar bears the weight of the collet assembly on the open end of the tube in order to transmit a torsional force to said expander for selectively detaching said collet assembly from said suspension member so that gravity causes said expandable collet to forcefully engage said expander and expand said expandable collet into gripping contact with the inner walls of said tube,
wherein the maximum cross sectional area of said tube gripper is only slightly in excess of the outer diameter of said tube to facilitate the manipulation of the gripper within said densely packed array of tubes.

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**4,746,159**

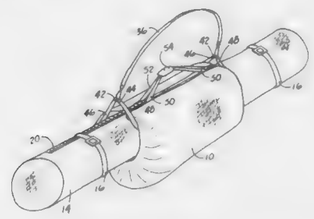
**COMBINATION SKI AND BOOT BAG**

**Rod P. Webb, 1629 Carlisle, Oklahoma City, Okla. 73120, and Jean Webb, 1518 Wildwood Ct., Stillwater, Okla. 74075**

**Filed Aug. 10, 1987, Ser. No. 83,237**

**Int. Cl.[4] A63C** *11/00;* **B65B** *11/00*

**U.S. Cl. 294—147** **14 Claims**



1. A combination ski and boot bag for concurrently transporting skis and ski boots comprising:
an elongated ski compartment for containing a pair of skis;
a pair of lateral boot compartments connected to a central portion of the ski compartment on opposite sides thereof for containing a pair of boots with one boot in each of the boot compartments disposed on opposite sides of the ski compartment;
at least one carrying strap secured to a central portion of the ski compartment for carrying the combination ski and boot bag; and
means for forming and defining an enclosed space between said boot compartments for receiving end portions of said ski compartment when said ski compartment is empty whereby said combination ski and boot bag can be folded into a compact configuration both when a pair of boots are contained therein, and also when no boots or skis are contained therein.

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**4,746,160**

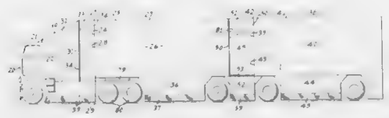
**STREAMLINED TRUCK WITH SEMITRAILER**

**Robert L. Wiesemeyer, Rte. 24, Box 1122, Baldwin, Fla. 32234**

**Filed Jun. 30, 1986, Ser. No. 880,025**

**Int. Cl.[4] B62D** *35/00*

**U.S. Cl. 296—1 S** **3 Claims**



1. A streamlined highway truck including a tractor with a cab having a roof and two side sections, a semitrailer having a front, a top and two side sections and being pivotally joined by a fifth wheel to said tractor, and a second trailer having a front, a top, and two side sections and being attached to the rear of said semitrailer; said tractor having a top panel extending from said roof to adjacent the front edge of the top of said semitrailer and two side panels extending from the side sections of said cab to the side sections of said semitrailer, said side panels extending vertically from adjacently above ground level to a juncture with said top panel, each of said side panels including a rigid portion connected to the side section of said cab and a vertical strip portion hingedly connected to said rigid portion and adapted to swing outwardly to accommodate an angular relationship of less than 180° between the side panel of the tractor and the adjacent side section of the semitrailer, said strip portions, being spring biased to remain aligned with their respective rigid portions, said semitrailer having side panels extending downwardly from the bottom of the side sections to adjacently above ground level from adjacent the tractor wheels under the front of the semitrailer to adjacent the semitrailer wheels adjacent the rear of the semitrailer; two connector panels hingedly attached to the rear vertical edges of the respective side sections of said semitrailer and extending rearwardly to the front edges of the respective side sections of said trailer from the top of said side sections to adjacently above ground level, said connector panels being adapted to swing outwardly to accommodate an angular relationship of less than 180° between adjacent side sections of the semitrailer and the trailer respectively, and being spring biased to remain aligned with the respective side sections of said semitrailer to which they are attached; said connector panels having an upper portion and a lower portion, said upper portion extending from the top of said semitrailer to the bed of said semitrailer, and said lower portion extending from the bed of said semitrailer to adjacently above the ground level, said upper and lower portions being hingedly connected to each other along a horizontal line with said lower portion adapted to swing upward and lie flat against the outside of said upper portion.

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**4,746,161**

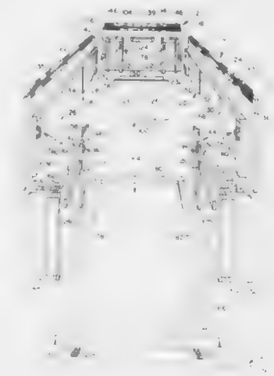
**TRUCK BED INTERIOR**

**Gary W. Futrell, 5509 Kanehill, Lakewood, Calif. 90713**

**Filed Apr. 24, 1987, Ser. No. 42,327**

**Int. Cl.[4] B60P** *3/32;* **B60R** *9/06*

**U.S. Cl. 296—24 R** **10 Claims**



1. A removable truck bed furnishing assembly comprising:
a substantially rigid backboard with cushioning thereon adapted to extend across an internal width of a truck bed at a forward bulkhead thereof,
left and right substantially rigid sideboards adapted to extend along an internal length of the truck bed and which are shaped at both longitudinal ends to rest on the bottom of a truck bed, and which define vertically recessed centers to bridge rear wheel wells in a truck bed, and also having longitudinal seat support rails mounted above said vertically recessed centers, and additionally having cushioning thereon,
left and right side seat supports each having a pair of upright adjacent partitions joined together at a vertical hinge, and each adjacent pair begin relatively foldable about said hinge to a right angle orientation and having interiorly directed cushioning thereon,
cushioned seats positionable atop said side seat supports and said seat support rails of said sideboards to cover the wheel wells of said truck bed,

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a floor for positioning on the bottom of the bed of said truck between said side seat supports and having a rigid backing with upwardly directed cushioning thereon,

a cushioned tailgate cover adapted to be mounted upon an interior surface of a truck bed tailgate, said cover including a flexible skirt adapted to extend beneath said floor, and

a plurality of releasable fasteners comprised of separable pieces which are laterally immobilized in vertical alignment and separable in vertical misalignment, said fasteners coupled to releasably interconnect said side seat supports to said sideboards and to said backboard.

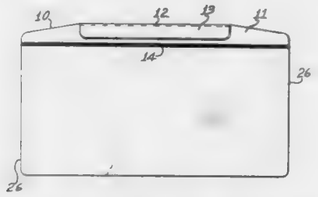
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**4,746,162**

## PORTABLE GLARE SHIELD FOR SIDE WINDOW OF AUTOMOBILE

**Raymond L. Maness, P.O. Box 176, Atlantic Beach, Fla. 32233**

**Filed Nov. 12, 1986, Ser. No. 929,432**
**Int. Cl.⁴ B60J** *3/00*
**U.S. Cl. 296—97 R** **16 Claims**




1. A portable glare shield for removable attachment to the inside of a raiseable and lowerable side window of a vehicle, said glare shield being a sheet of semiflexible transparent material which transmits 20% to 40% of incident light, said sheet having an upper edge which includes a reverse bend adapted to clip over the upper edge of said window, said reverse bend including a top leg slightly longer than the thickness of said side window, a short leg bent at an angle of 60°–80° to one end of said top leg, said top leg being bent at an angle of 60°–80° with said sheet.

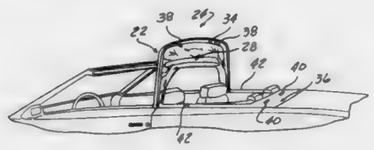
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**4,746,163**

## COMBINED REMOVABLE PANEL-CONVERTIBLE TOP SYSTEM

**Peter P. Muscat, Northville, Mich., assignor to Jubbu Designers Inc., Livonia, Mich.**

**Filed May 16, 1986, Ser. No. 863,867**
**Int. Cl.⁴ B60J** *7/12, 7/185*
**U.S. Cl. 296—120 R** **14 Claims**




1. A top system for an automobile having an automobile body defining a passenger compartment having a forward and a rear section and including a windshield frame having a horizontal top member extending across the front of the forward section, said top system comprising:

a convertible top extendible over said rear section of said passenger compartment, including a foldable frame covered with fabric, said convertible top adapted to be raised to extend over said rear section from a lowered stowed position, and a storage space formed in said auto body receiving said convertible top in said stowed position;

a rigid panel configured to overlie said forward section between said raised convertible top and said windshield frame top member and means for releasably locking said panel to said windshield frame top member and to said raised convertible top;

a tonneau cover configured to overlie said storage space, said tonneau cover hinged along a rear transverse side to be adapted to be raised to provide access to said storage space; said convertible top foldable frame including a main bow member movable to be in a raised position extending vertically and arching over said passenger compartment with said convertible top raised, said main bow including lower ends on either side thereof, each pivotally mounted in a respective side well region of said storage space, to be rotated from a lowered stowed position to a raised position, and bracing means attached to said tonneau cover and said main bow lower ends, said bracing means interengaged to act when said tonneau panel is lowered and overlying said storage space to brace said main bow in said vertical position,

whereby a partially or completely open top may alternatively be provided for said automobile passenger compartment by removal of said panel only or by removal of said panel and lowering of said convertible top.

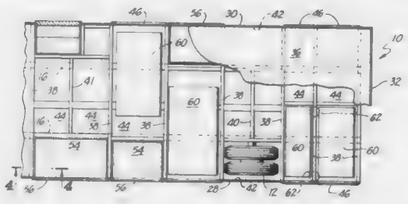
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**4,746,164**

## MOTORHOMES

**John C. Crean, Corona del Mar, Calif., assignor to Fleetwood Enterprises, Inc., Riverside, Calif.**

**Continuation of Ser. No. 768,714, Aug. 23, 1985, abandoned.**
**This application Mar. 10, 1987, Ser. No. 23,959**
**The portion of the term of this patent subsequent to Mar. 1, 2005, has been disclaimed.**
**Int. Cl.⁴ B60P** *3/36*
**U.S. Cl. 296—164** **7 Claims**




1. In a motorhome including a chassis, said chassis having front and rear ends, sides extending between said ends and a chassis frame extending generally between said ends and located so as to be accessible at the top of said chassis, said motorhome also including wheel means for supporting said chassis on the ground and motor means for use in connection with said wheel means in order to propel said motorhome, said motorhome further including a driver's compartment located on said chassis frame adjacent to the front end of said chassis, said driver's compartment floor being located higher above the ground that that part of said chassis frame to the rear of said driver's compartment floor, said motorhome also including a motorhome floor supported by said chassis frame so as to extend generally from the rear of said driver's compartment floor to the rear of said chassis and body means enclosing space above said driver's compartment floor and said motorhome floor, the improvement which comprises:

joist means for supporting said motorhome floor located on and secured to said chassis frame to the rear of said driver's compartment floor, said joist means including a plurality of vertically oriented joists spaced from one another and extending parallel to one another generally between the sides of said motorhome,

said joist means serving to position said motorhome floor a sufficient distance above the ground so that the said motor home floor is on the same level as said driver's compartment floor, and

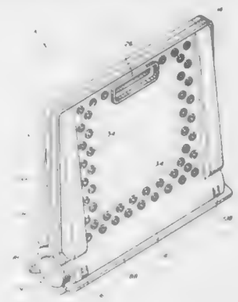
a series of tanks, each of said tanks serving a function in connection with said motorhome, each of said tanks being located in a space between adjacent joists above said chassis and below said motorhome floor,

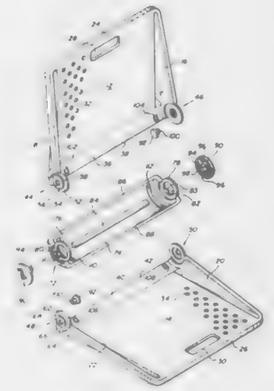
door means for enclosing spaces between at least some of said joists so as to enclose at least some of said tanks, said door means providing access to those of said tanks located between joists adjacent to said door means,

storage locker means located at the sides of said body means between some of said joists, said storage locker means extending downwardly from said joists and being accessible from the exterior of said motorhome.



members, forming together when coupled to each other the hinged connection therebetween, and a bottom member forming part of and rotatably supporting the side wall members in their coupled position.





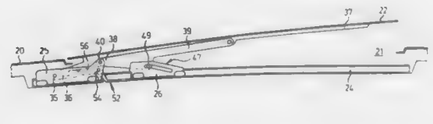
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**4,746,165**

## VEHICLE ROOF HAVING AN OPERATING DEVICE FOR SWINGING AND SLIDING A COVER

**Arpad Fuerst, Munich, and Burkhard Reinsch, Neuried, both of Fed. Rep. of Germany, assignors to Webasto-Werk W. Baier GmbH & Co., Stockdorf, Fed. Rep. of Germany**

**Filed Jul. 2, 1987, Ser. No. 69,107**
**Claims priority, application Fed. Rep. of Germany, Jul. 12, 1986, 3623537**
**Int. Cl.⁴ B60J** *7/047, 7/19*
**U.S. Cl. 296—216** **23 Claims**




1. A vehicle roof of the type having an operating device by which at least one cover of a cover arrangement is, from a position closing a roof opening, in a fixed roof surface swung into a raised position and from said raised position slid rearwardly above said fixed roof surface each side of the roof opening under a fixed roof surface, a first slider and a second slider connected to a drive device and guided in a slidable manner in each guide rail; wherein the cover is pivotally connected, at a front end, to the first slider, and, rearwardly of the front end, is pivotally connected to a first end of a raising lever, the raising lever being pivotally connected at a second, opposite, end to said first slider and intermediate said first and second ends being connected by a lifting device to said second slider, the lifting device acting for raising and lowering of the cover during relative movement between the first and second sliders, and wherein a locking device prevents the cover from sliding in relation to the guide rails during swinging of the cover between the closed position and the raised position.

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**4,746,166**

## COMBINED PORTABLE SEAT AND CARRYING CASE

**Yiftah Sadan, Beit Zera, Israel, assignor to "Ar-Kal" Plastics Products Beit Zera, Israel**

**Filed Sep. 15, 1987, Ser. No. 96,950**
**Claims priority, application Israel, Sep. 15, 1986, 80026**
**Int. Cl.⁴ A47C** *4/52*
**U.S. Cl. 297—17** **10 Claims**

1. A combined portable seat and carrying case comprising first and second side wall members hinged to each other and rotatable between a closed, case-fashion position and an open, seat-fashion position, characterized in that the side wall members are identical, each comprising at each side thereof a pair of outwardly directed, concentric circular bearing surfaces, one being formed outside a projection and the other inside a recess, the projecting bearing surface of one side matching the recessed bearing surface of the other side of each of the side wall

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**4,746,167**

## PORTABLE, KNOCK-DOWN MASSAGE CHAIR

**David A. Palmer, 1596 Post St., San Francisco, Calif. 94109; Serge J. L. Bouyssou, 471 Mississippi St., San Francisco, Calif. 94107, and James Everett, 600 E. Todd Rd., Santa Rosa, Calif. 95407**

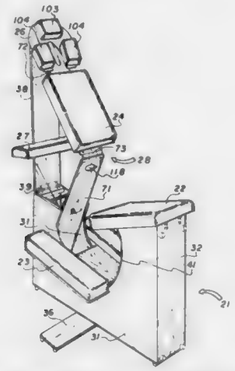
**Filed Dec. 29, 1986, Ser. No. 946,793**
**Int. Cl.⁴ A47C** *7/50*
**U.S. Cl. 297—423** **27 Claims**

1. A portable, knock-down chair construction, comprising; a portable case, a seat member, means for removably supporting said seat member on a portion of said case, a brace assembly extendable from a storage position within said case to an extended support position extending out of said case, a chest support, means for securing said chest support to said brace assembly in the extended support position; said seat member, said brace assembly, and said chest support dimensioned to be stored together within said case; said brace assembly including upper and lower rigid brace members; means for joining confronting ends of said brace members in hinged relationship; said chest support including a padded member, said upper brace member including opposed, longitudinally extending edges, and said padded member including means for engaging said edges in frictional, sliding fashion; further including a face cradle disposed adjacent to said chest support in the extended position, said face cradle also including means for engaging said edges of said upper brace member in frictional, sliding fashion, said face cradle being dimensioned to be stored within

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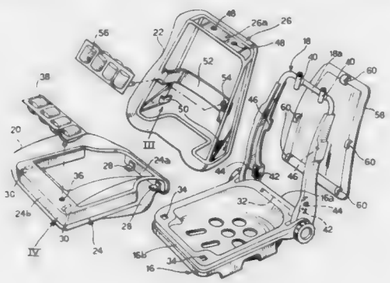
said case with said chest support, said brace assembly, and said seat member, said face cradle including a generally U-shaped panel in inverted position, and a trio of cushions secured to the



base and each leg of said U configuration, and said upper brace member including a slot extending therethrough, said slot being disposed in registration with the space between said legs of said U-shaped panel of said face cradle.

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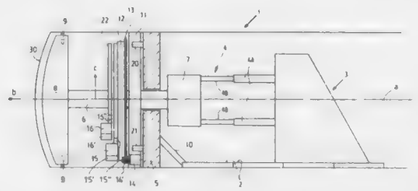
**4,746,168**
**MOTOR VEHICLE SEAT**
**Roberto Bracesco, Turin, Italy, assignor to S.I.C.A.M., S.p.A., Turin, Italy**
**Filed Jul. 22, 1986, Ser. No. 888,922**
**Claims priority, application Italy, Aug. 9, 1985, 53697/85[U]**
**Int. Cl.[4] A47C *7/02***
**U.S. Cl. 297—443** **6 Claims**



1. A motor vehicle seat comprising a seat part and a back part, wherein at least one of said seat part and said back part includes:
- a support frame;
- a padding of foamed plastic material having an outer cover;
- an attachment counterframe incorporated within said padding;
- rapid engagement coupling means provided on said support frame and said attachment counterframe, for releasably connecting said attachment counterframe and said padding carried thereon to the support frame, said coupling means including at least one coupling member on one of said support frame and said counterframe, said coupling member further being snap-engageable in a cooperating aperture of the other one of said support frame and said counterframe, so as to rigidly connect the counterframe to the support frame without deformation of the counterframe, said coupling member being located at a position which is accessible from under the support frame when said counterframe is connected to the support frame, and said coupling member being resiliently deformable, as a result of an external action, into a contracted configuration to permit disengagement of the counterframe from the support frame.

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**4,746,169**
**APPARATUS FOR EXCAVATING PASSAGES**
**Kurt Bergmann, Vienna; Konrad Schoen, Kapfenberg, both of Austria, and Udo Wenzel, Essen, Fed. Rep. of Germany, assignors to Vereinigte Edelstahlwerke AG, Vienna, Austria**
**Filed May 20, 1986, Ser. No. 864,848**
**Claims priority, application Austria, May 23, 1985, 1560/85**
**Int. Cl.[4] E21D *23/00***
**U.S. Cl. 299—33** **20 Claims**



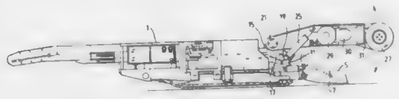
1. An apparatus for excavating passages such as tunnels, shafts, or the like, comprising:
- at least one boring head;
- said at least one boring head, in its operative position, substantially extending throughout the cross section of the passage to be excavated;
- at least one drive unit for driving said boring head;
- thrust means for displacing said at least one boring head in a predetermined axial driving direction towards an excavation face of said passage during an excavating operation;
- support means supporting said at least one boring head in said passage intermediate said at least one boring head and said at least one drive unit during said excavating operation;
- at least one drilling mount for drilling holes substantially transversely to said predetermined axial driving direction;
- said at least one drilling mount being arranged intermediate said at least one boring head and said support means supporting said at least one boring head;
- at least one carrier carrying said at least one drilling mount and being located intermediate said at least one boring head and said support means supporting said at least one boring head;
- said at least one drilling mount being displaceably arranged at said at least one carrier;
- mounting means for displaceably mounting said at least one drilling mount relative to said at least one carrier;
- positioning means for fixing said at least one carrier in preselected rotational positions relative to said predetermined axial driving direction and
- said positioning means displacing and fixing said at least one carrier in preselected axial positions relative to said predetermined axial driving direction independent of said at least one drive unit for driving said boring head.

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**4,746,170**
**MINING MACHINERY**
**Michael Etherington, Retford, and Hugh Wilson, Worksop, both of United Kingdom, assignors to Dosco Overseas Engineering Limited, Tuxford, Nr. Newark, United Kingdom**
**Filed Feb. 3, 1986, Ser. No. 825,455**
**Claims priority, application United Kingdom, Feb. 20, 1985, 8504383**
**Int. Cl.[4] E21C *25/52, 25/66***
**U.S. Cl. 299—75** **10 Claims**

1. A mining machine for mining mineral seams containing minerals of different hardness, said machine comprising a chassis having thereon mounting means for mounting different mining attachments on said machine, said mounting means comprising support means having a plurality of securing means by means of which each of said attachments may be supported on and secured to said machine, and wherein one of said attachments comprises a continuous miner, said continuous miner including a pivot mounting having a pivot axis, said pivot mounting being complementary with said support means and having pivot mounting securing means which are complementary with said securing means on said support means to enable said pivot mounting to be secured to said support means, and a cutting boom, pivotally mounted on and movable in a vertical plane about the pivot axis of the pivot mounting, the cutting boom carrying thereon a rotatable cylindrical





continuous miner cutter head with the axis of said cutter head arranged horizontally, and wherein another of said mining attachments comprises a roadheader turntable assembly, said roadheader turntable assembly comprising a slewing unit which is complementary with said support means and has slewing unit securing means which are complementary with said securing means on said support means to enable said slewing unit to be secured to said support means, and a turntable rotatably mounted on said slewing unit about a vertical axis, said turntable having a bearing support thereon, and a roadheader boom mounted on said bearing support, with a cutter head on its free end, the arrangement being such that the pivot mounting and the turntable assembly are removably mountable on the mounting means and interchangeable, whereby the machine can alternatively be used as a continuous miner or a roadheader for mining said mineral of different hardness.

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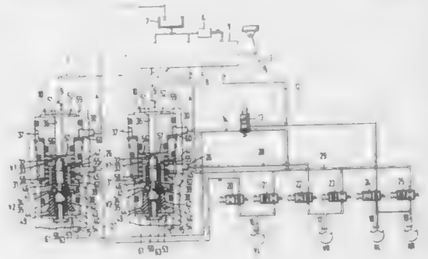
**4,746,171**
**PARKING BRAKE SYSTEM FOR RAILWAY VEHICLES**
**Thomas H. Engle, Clayton, N.Y., assignor to General Signal Corporation, Stamford, Conn.**
**Filed Nov. 19, 1986, Ser. No. 932,418**
**Int. Cl.[4] F16D *65/14***
**U.S. Cl. 303—13** **9 Claims**



1. A fluid brake control system for a railway vehicle having a brake pipe, control valve device, brake cylinder, and a brake rigging, and having means including the control valve device and brake cylinder for selectively controlling the brake rigging in accordance with variations in fluid pressure with the brake pipe;
- (a) fluid pressure releaseable spring handbrake cylinder means for controlling the brake rigging,
- (b) manually operable handbrake application and release means having an axially operable handbrake rod for controlling the brake rigging,
- (c) the manually operable handbrake application and release means having locking means for at times locking the handbrake rod against axial movement in one direction, and
- (d) linkage means having a laterally operable link having a central fulcrum point pivotally connected to said handbrake rod for connecting the spring handbrake brake cylinder to the link at one side of the fulcrum point and the brake cylinder to the link at the opposite side of the fulcrum point for operating the brake rigging selectively to application and release positions by either the spring brake cylinder or the manual handbrake rod independently.

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**4,746,172**
**SWITCH VALVE ARRANGEMENT**
**Dietmar Gath, Schoeffengrund, and Holger von Hayn, Frankfurt am Main, both of Fed. Rep. of Germany, assignors to Alfred Teves GmbH, Frankfurt am Main, Fed. Rep. of Germany**
**Filed Dec. 5, 1986, Ser. No. 938,586**
**Claims priority, application Fed. Rep. of Germany, Dec. 5, 1985, 3542961**
**Int. Cl.[4] B60T *17/18***
**U.S. Cl. 303—92** **2 Claims**



1. A switch valve arrangement for a dual-circuit hydraulic brake system with slip control for use with automotive vehicles having vehicle wheels with wheel brakes, said arangement comprising, in combination:
- a pedal operated brake booster;
- a tandem master brake cylinder operatively coupled to said brake booster, said master brake cylinder having first and second working chambers;
- first and second switch valves each having a first inlet chamber respectively connected to one of said working chambers and each of said switch valves having an outlet chamber respectively connected to a selected one of said vehicle wheel brakes by way of a normally open brake control valve, and each of said switch valves having a second inlet chamber connected to said brake booster by way of a normally closed main control valve;
- wherein when said main control valve is closed pressure is supplied from the first inlet chambers of said switch valves to the respective selected ones of said wheel brakes; and,
- wherein when said main control valve is switched to its open position in response to a slip control signal the resulting pressure at the second inlet chambers of said switch valve closes the pressure communication between said first inlet chambers of said switch valves and the outlet chambers of said switch valves, and opens the pressure communication between said second inlet chambers and said outlet chambers of said switch valves.

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**4,746,173**

## SLIP-CONTROLLED BRAKE SYSTEM FOR ALL-WHEEL DRIVEN AUTOMOTIVE VEHICLE

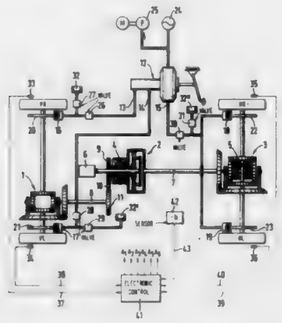
**Helmut Fennel, Bad Soden; Hans Wupper, Friedrichsdorf; Gunther Buschmann, Griesheim, and Norber Ehmer, Bad Soden, all of Fed. Rep. of Germany, assignors to Alfred Teves GmbH, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Oct. 2, 1986, Ser. No. 914,341**

**Claims priority, application Fed. Rep. of Germany, Oct. 2, 1985, 3535090**

**Int. Cl.⁴ B60T** *8/26, 8/32*

**U.S. Cl. 303—100** **3 Claims**



1. A slip-controlled brake system for an all-wheel driven automotive vehicle having front and rear axles and having vehicle wheels and wheel brakes and being equipped with differential locks, said system comprising, in combination:

a plurality of electrically actuated brake pressure modulators respectively coupled to said wheel brakes for reducing braking pressure in response to slip control signals;

a plurality of sensors respectively coupled to said wheels for providing signals indicative of wheel rotational behavior;

means coupled to said sensors for providing an output signal indicative of said wheel rotational behavior;

means responsive to said output signal for applying a first set of slip control signals to the modulators associated with the wheels of said front axle;

means responsive to said output signal for applying a second set of slip control signals to the modulators associated with the wheels of said rear axle; and,

wherein said second set of slip control signals modulates the braking pressure reduction at the rear wheel at a control rate which is less than the control rate of said first set of slip control signals means for continuously engaging said differential lock while providing said slip control signals.

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**4,746,174**

## METHOD AND BRAKE SYSTEM FOR TRACTION SLIP CONTROL

**Gunther Buschmann, Griesheim, Fed. Rep. of Germany, assignor to Alfred Teves GmbH, Frankfurt am Main, Fed. Rep. of Germany**

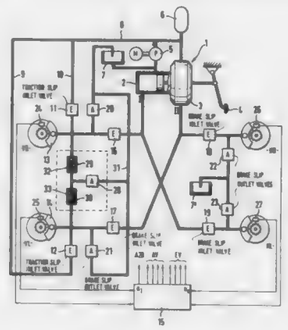
**Filed Nov. 14, 1986, Ser. No. 931,553**

**Claims priority, application Fed. Rep. of Germany, Nov. 14, 1985, 3540366**

**Int. Cl.⁴ B60K** *28/16;* **B60T** *8/32*

**U.S. Cl. 303—110** **7 Claims**

1. A method for traction slip control in automotive vehicles with the aid of wheel brakes which are actuated by pressure fluid and which are connected for the development of braking pressure to an auxiliary-pressure source for specific intervals derived from the rotational behavior of the wheels, said method comprising the steps of: determining an initial phase time period related to the time period of the lost travels and clearances of said wheel brakes; and, metering an amount of traction slip brake pressure into the wheel brakes (13, 14) of the driven wheels (VR, VL) at the beginning of traction slip brake



actuation and during said initial phase, which amount is just sufficient to overcome lost travels and clearances.

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**4,746,175**

## DETACHABLE RECEPTACLE AND STRIPPING APPARATUS FOR STRIPPING LAGGING

**William J. Hamlet, 17 Gleneagles Way, East Hamersley, and Gordon S. Hatch, 6 College Road, Gooseberry Hill, both of Australia**

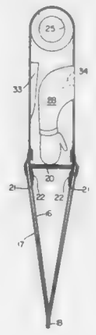
**PCT No. PCT/AU86/00065, § 371 Date Dec. 22, 1986, § 102(e) Date Dec. 22, 1986, PCT Pub. No. WO86/05431, PCT Pub. Date Sep. 25, 1986**

**PCT Filed Mar. 13, 1986, Ser. No. 945,658**

**Claims priority, application Australia, Mar. 13, 1985, PG9702**

**Int. Cl.⁴ B65D** *30/2*

**U.S. Cl. 312—1** **15 Claims**



1. A detachable receptacle for attachment to a protective stripping means used for stripping fibrous cladding material from an elongate body, said stripping means having a body closure for a portion of said elongate body, said stripping means defining an interior space about said body with an open bottom and means for securing to said body, said receptacle being adapted to collect said stripped material, said receptacle comprising: a flexible envelope of substantially impermeable material defining an interior space having an opening at the top, to allow for the deposition of said cladding material therein, and a sealed bottom; an outer cover enclosing said envelope except for said opening, said outer cover attached to said envelope only at the bottom of said envelope and at a bottom region of said cover for independent manipulation of said envelope with repsect to said cover; fastening means to integrally connect said envelope to the bottom opening provided on said stripping means enabling communication between the stripping means and envelope interiors via respective bottom and top openings; envelope closure means provided on an inner top region of said envelope and disposed proximately below said fastening means for closing the envelope opening, isolating said fastening means, and substantially sealing the contents of the envelope during attachment or detachment to said stripping means independently of said fastening means; and means for releasably and sealingly attaching said cover to said stripping means along exteriors thereof.



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**4,746,176**

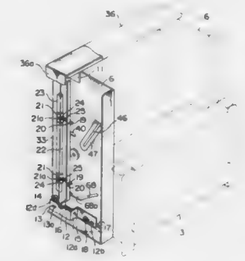
## TOWEL DISPENSER

**Masanobu Nishiyama; Haruo Nishimura, both of Osaka; Katsuji Nakano, Nishinomiya; Tatsuo Ozaki; Teruo Yamada, both of Kyoto; Koichi Nakagawa, Kobe, and Akira Kitamoto, Ikoma, all of Japan, assignors to Duskin Co., Ltd., Osaka and Matsushita Electric Industrial Co., Ltd, Kadoma, both of, Japan**

**Filed Dec. 30, 1986, Ser. No. 947,779**

**Int. Cl.⁴ B65H** *19/10*

**U.S. Cl. 312—38** **5 Claims**



1. A towel dispenser for storing and supplying in longitudinally successive increments, a towel of indeterminate length, said dispenser including:

a holder for a convolutely-wound, multiple-increment roll of said towel on a shaft which has respective end portions protruding from each of two axially-opposite ends of said roll by respective predetermined amounts, said holder including:

a pair of opposed side walls which are laterally spaced from one another;

means for mounting said sidewalls so that they extend in respective planes which are oriented vertically and extend in a forward-rearward direction, relative to said dispenser;

said two sidewalls at corresponding locations located intermediate the vertical and front-to-rear extents of said sidewalls and wholly bounded by outer peripheries of the respective sidewalls, being provided with respective slots which are elongated obliquely so as to extend upwardly-forwardly and downwardly-rearwardly, so as to have an upper end and a lower end;

each said slot being defined by a corresponding opening formed through the respective sidewall, each opening having a perimetrically-extending edge, each said sidewall perimetrically of the respective opening except at the upper end thereof, being bounded by a medially-bent flange, said edges, except at said upper ends, thereby lying more medially of said dispenser than said respective planes of said sidewalls by an amount which is at least as great as the sum of said predetermined amounts by which said shaft end portions protrude from said roll of towel, and means defining an upwardly and forwardly-accessible entrance into and exit from said slots at said upper ends, so that said roll of towel, on said shaft, while being held horizontally and axially aligned transversally of said dispenser, may be installed in and removed from said holder from frontally of said dispenser, by respectively sliding said shaft protruding end portions down into and up out of said slots through said entrance and exit means.

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**4,746,177**

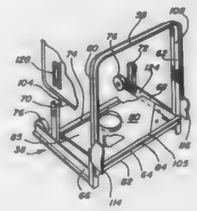
## SUPPORT ASSEMBLY FOR PLASTIC TUB DISHWASHER

**William T. Lampman, St. Joseph Township, Berrien County, and Mark A. Burdorff, Lincoln Township, Berrien County, both of Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.**

**Filed Nov. 17, 1986, Ser. No. 931,623**

**Int. Cl.⁴ A47B** *77/06*

**U.S. Cl. 312—228** **10 Claims**



1. A tub assembly for a dishwashing apparatus, said tub assembly comprising:

a flexible tub defining a wash chamber and having a front opening, a bottom wall, a back wall, a top wall, spaced side walls, and laterally oppositely projecting first and second lugs on the tub side walls,

each said lug having a free edge;

a frame having

(a) an upwardly facing ledge for supporting a first portion of the tub;

(b) a collar for extending around the side walls and top wall of the tub with the tub in assembled relationship with the frame;

(c) first and second, laterally spaced, upstanding leg members at the rear of the frame for engagement with the side walls of the flexible tub,

said first and second upstanding leg members having facing surfaces spaced apart a distance less than the spacing between the free edges of the laterally projecting lugs,

there being a lug-receiving opening in each of the facing surfaces of the upstanding legs at a top portion thereof;

(d) first and second elongate side supports each extending between the collar and one of the first and second upstanding legs and twistable about its length;

(e) means mounting the first upstanding leg member to the first side support so that the lug-receiving opening in the first upstanding leg member aligns with the first lug with the tub and frame assembled and so that the top portion of the first upstanding leg member can be flexed laterally outwardly by twisting the first side support about its length; and

(f) means mounting the second upstanding leg member to the second side support so that the lug-receiving opening on the second upstanding leg member aligns with the second leg with the tub and frame assembled and so that the top portion of the second upstanding leg member can be flexed laterally outwardly by twisting the second side support about its length,

whereby said tub and frame can be snap connected to each other by urging the first and second lugs downwardly against the first and second upstanding leg members thereby flexing the top portions of the first and second upstanding leg members from an unflexed state away from each other to thereby permit seating of the first and second lugs in the lug-receiving openings and movement of the top portion of the first and second upstanding leg members back to their unflexed state to

lock the tub and frame together in assembled relationship.

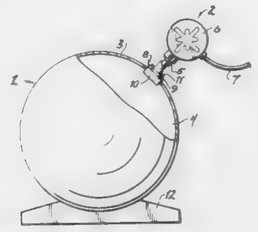
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**4,746,178**

## LIGHT PIPE FOR ILLUMINATING THE INTERIOR OF A PRESSURE VESSEL

**Thomas M. Canty, 483 Fruitwood Ter., Williamsville, N.Y. 14221**

**Filed Mar. 26, 1987, Ser. No. 31,254**
**Int. Cl.[4] G02B *6/00*; F21V *7/04***
**U.S. Cl. 350—96.10** **9 Claims**



1. A light pipe unit for supplying illumination to the interior of a vessel which comprises means for attachment to said vessel, a metallic housing and a light pipe, said light pipe comprising an elongated rod constructed of a fiber optic material said rod encased in a tubular metallic housing, said rod having fixed to its distal end portion a glass disc, and a glass laminate fixed to the bottom portions of said disc and said metallic housing forming thereby a substantially corrosion-proof seal across the entire distal end portion of said light unit, said light pipe constructed from a material selected from the group consisting of acrylics, glases and mixtures thereof, said laminate is a glass constructed from a material selected from the group consisting of borosilicate glass, soda lime glass, MICA glass and mixtures thereof, and wherein said glass disc is fused to the distal end interior portion of said metallic housing.

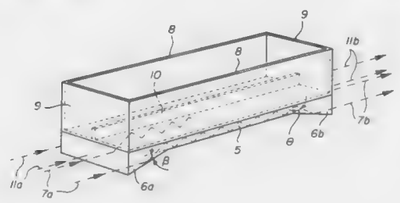
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**4,746,179**

## WAVEGUIDE TO BE USED AS OPTICAL PROBE IN MULTIPLE INTERNAL REFLECTION SPECTROSCOPIC ANALYSIS

**Claus Dahne, Onex; André Bregnard, Le Lignon; Georges Revillet, Onex, and Ranald M. Sutherland, Carouge, all of Switzerland, assignors to Battelle Memorial Institute, Carouge, Switzerland**

**Filed Jun. 30, 1986, Ser. No. 880,548**
**Claims priority, application Switzerland, Jul. 1, 1985, 2799/85**
**Int. Cl.[4] G02B *6/00***
**U.S. Cl. 350—96.10** **19 Claims**



1. Waveguide apparatus for use in substance analysis, comprising:

waveguide means having a surface area in contact with a substance, for transmitting electromagnetic radiation along an axis of said waveguide means whereby propagation characteristics of said radiation are altered in accordance with properties of said substance;

waveguide entrance prism means positioned at a radiation entrance end of said waveguide means, for guiding radiation into said waveguide means, said prism means including a first face arranged at an angle with said waveguide axis to cause said radiation entering said prism means to propagate along said waveguide means; and

longitudinal partitioning means positioned adjacent said waveguide means substantially parallel to said waveguide axis, for partitioning said waveguide surface area into at least two parts.

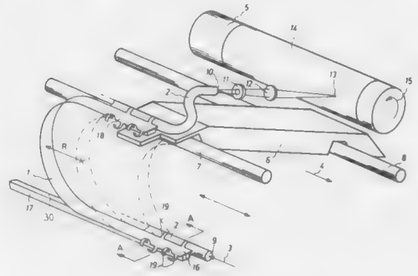
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**4,746,180**

## DEVICE FOR LIGHT TRANSMISSION

**Manfred Deisler, Flintbek; Horst Lachenmann, Mielkendorf; Helmut Lange, Schoenkirchen; Ulrich Parl, Raisdorf, and Holger Suhr, Kiel, all of Fed. Rep. of Germany, assignors to Dr. Ing. Rudolf Hell GmbH, Kiel, Fed. Rep. of Germany**

**Filed Oct. 18, 1985, Ser. No. 788,876**
**Claims priority, application European Pat. Off., Oct. 30, 1984, 84113092.5**
**Int. Cl.[4] G02B *6/00, 6/14***
**U.S. Cl. 350—96.10** **14 Claims**



1. In a device for a light transmission between a stationary position and a movable location, said device comprising a fiber optical waveguide and one guide element for said fiber optical waveguide, said guide element having one ned connected to the stationary position and the other end being connected to the movable location, the improvements comprising means for maintaing the same bends and stresses on the fiber optical waveguide as the movable location moves relative to the stationary position, said means comprising the guide element being flexible and having a U-shaped configuration with a pair of legs extending from a curved portion of a fixed radius, one leg of the pair connected to the stationary position and the other leg of the pair connected to the movable location, said fiber optical waveguide being connected to the guide element with substantially the same curvature so that as the movable location shifts relative to the stationary position the radius of curvature is maintained as the lengths of the legs of the U-shaped configuration change.

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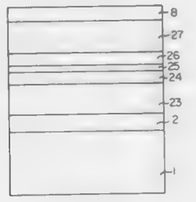
**4,746,181**

## OPTICAL SEMICONDUCTOR DEVICE

**Toshiro Hayakawa; Takahiro Suyama, and Saburo Yamamoto, all of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Jun. 20, 1985, Ser. No. 746,710**
**Claims priority, application Japan, Jun. 25, 1984, 59-132194**
**Int. Cl.[4] G02B *6/10***
**U.S. Cl. 350—96.12** **5 Claims**

1. An optical semiconductor device comprising an active region confined by optical waveguiding structures, wherein each of said optical waveguiding structures is a superlattice layer in which layers of a first binary compound are alternately



stacked with layers of a second binary compound, said first and second binary compounds having one common element.

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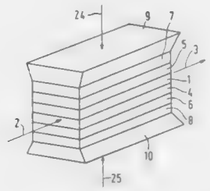


**4,746,182**

## PHASE-MATCHED MAGNETOOPTICAL MODE CONVERTER

**Hans O. B. Dammann, Tangstedt; Elke B. Pross, Hamburg; Gert Rabe, Pinneberg; Wolfgang F. M. Tolksdorf, Tornesch, and Manfred B. Zinke, Hamburg, all of Fed. Rep. of Germany, assignors to U.S. Philips Corp., New York, N.Y.**

**Filed Jun. 9, 1986, Ser. No. 872,363**
**Claims priority, application Fed. Rep. of Germany, Jun. 12, 1985, 3520991**
**Int. Cl.[4] G02B *6/10*; G02F *1/01***
**U.S. Cl. 350—96.13** **16 Claims**



1. A magnetooptical waveguide device for the conversion of modes of propagation of the device, which device comprises layes which are epitaxially applied to a substrate layer and of which at least the waveguide layer in which the modes propagate consists of a magnetooptical transparent material which for mode conversion can be acted upon by a magnetic field, whilst further means for matching the phase velocities of the TE and of the TM modes, are provided, characterized in that, for matching the phase velocities, the waveguide structure is arranged in an equipment by which an adjustable mechanical deformation force is exerted on the waveguide structure.

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**4,746,183**

## ELECTRICALLY CONTROLLED INTEGRATED OPTICAL SWITCH

**Richard A. Soref, Newton Centre, and Joseph P. Lorenzo, Stow, both of Mass., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Continuation-in-part of Ser. No. 831,895, Feb. 24, 1986. This application May 18, 1987, Ser. No. 50,358**
**Int. Cl.[4] G02B *6/10***
**U.S. Cl. 350—96.14** **10 Claims**

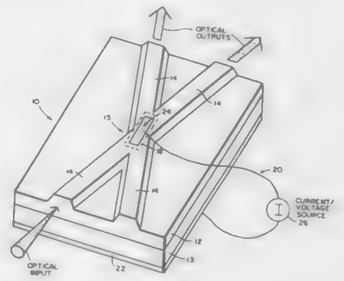
1. An electrooptic switch comprising:

(a) a silicon substrate;

(b) a crystalline silicon layer deposited upon said silicon substrate, said crystalline silicon layer formed into two intersecting waveguides having a common area which comprises a p-n junction capable of forming a variable mirror for selectively diverting optical signals;

(c) a passivating layer substantially covering said crystalline silicon layer;

(d) a first contact electrically connected to said waveguide common area; and



(e) a second contact electrically connected to said waveguide common area, said first and second electric contacts for providing an electric current through said switch in order to activate said p-n junction and selectively divert light travelling through said waveguide common area.

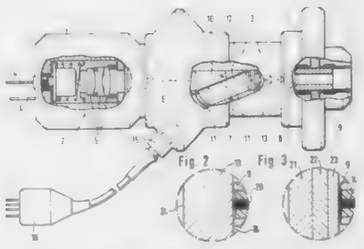
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**4,746,184**

## LIGHT COUPLER FOR OPTICAL REFLECTOMETRY

**Ing. A. Gäng, Stuttgart, Fed. Rep. of Germany, assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Jul. 9, 1986, Ser. No. 883,886**
**Claims priority, application European Pat. Off., Jul. 10, 1985, 85108585.2**
**Int. Cl.[4] G02B *6/26*; G01N *21/00***
**U.S. Cl. 350—96.15** **9 Claims**



1. A light coupler, suitable for coupling a light beam travelling along an incident direction from a source of light into an optical fiber, said coupler comprising:

a polarized beam splitter oriented to receive an incident beam of light and transmit a portion of this light;

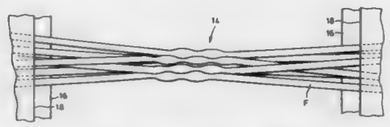
means for depolarizing the light transmitted through the beam splitter; and

means for holding an optical fiber at a point that receives the light transmitted through the beam splitter and the depolarizer and for directing that portion of the light reflected from within the optical fiber back to the polarized beam splitter.

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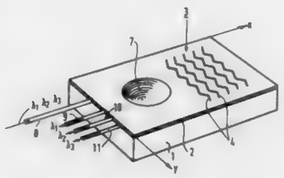
**4,746,185**
**OPTICAL FIBRE COUPLERS**
**Ferrydon Shahidi-Hamedani, 2114A Danforth Avenue, Toronto, Canada M4C 1J9**
**Filed Jun. 23, 1986, Ser. No. 877,524**
**Int. Cl.[4] G02B *6/26***
**U.S. Cl. 350—96.15** **16 Claims**



1. An optical fibre coupler formed from fibres having a glass core and a glass cladding layer of lower refractive index, whrein the fibres coupled have portions with a greatly reduced thickness of cladding layer and untapered cores which converge into a coupling zone formed without drawing from glass of the cores and claddings of the fibres, blended by fusion so that glass in the coupling zone has a refractive index intermediate between that of the core and the cladding, and wherein means are provided peripherally directly surrounding the coupling zone to prevent escape of light therefrom.

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**4,746,186**
**INTEGRATED OPTICAL MULTIPLEXER/DEMULTIPLEXER UTILIZING A PLURALITY OF BLAZED GRATINGS**
**Antonius J. A. Nicia, Eindhoven, Netherlands, assignor to U.S. Philips Corp., New York, N.Y.**
**Continuation of Ser. No. 675,685, Nov. 28, 1984. This application Aug. 31, 1987, Ser. No. 94,069**
**Claims priority, application Netherlands, Dec. 15, 1983, 8304311**
**Int. Cl.[4] G02B *6/10*; H04B *9/00***
**U.S. Cl. 350—96.13** **20 Claims**

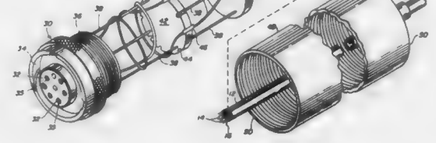


1. A reflection grating comprising:
a substrate;
a light-conducting layer on the substrate; and
a plurality of elongated perturbations extending in a direction of elongation in the light-conducting layer, said perturbations being spaced apart from each other a substantially constant distance in a longitudinal direction transverse to the direction of elongation, each perturbation having the shape of a blazed grating, portions of different blazed grating perturbations which correspond to each other in the longitudinal direction extending parallel to each other, said plurality of perturbations reflecting light in the light-conducting layer which is incident on the perturbations at a first angle of incidence, said first angle of incidence being transverse to the direction of elongation, said plurality of perturbations diffracting different wavelengths of light incident at the first angle of incidence, said different wavelengths being diffracted in different directions.

10. An optical multiplexer/demultiplexer comprising:
a substrate;
a light-conducting layer on the substrate;
a planar lens in the light-conducting layer; and
a plurality of elongated perturbations extending in a direction of elongation in the light-conducting layer, said perturbations being spaced apart from the planar lens in a longitudinal direction transverse to the direction of elongation, said perturbations being spaced apart from each other a substantially constant distance in the longitudinal direction, each perturbation having the shape of a blazed grating, portions of different blazed grating perturbations which correspond to each other in the longitudinal direction extending parallel to each other, said plurality of perturbations reflecting light in the light-conducting layer which is incident on the perturbations at a first angle of incidence, said first angle of incidence being transverse to the direction of elongation, said plurality of perturbations diffracting different wavelengths of light incident at the first angle of incidence, said different wavelengths being diffracted in different directions.

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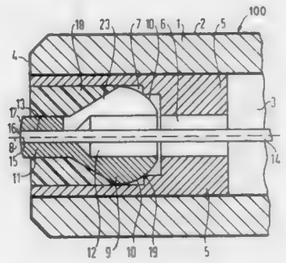
**4,746,187**
**KINK-FREE FIBER OPTIC CABLE CONNECTOR**
**Arnold Flores, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**
**Filed Oct. 7, 1985, Ser. No. 784,969**
**Int. Cl.[4] G02B *6/36***
**U.S. Cl. 350—96.20** **2 Claims**



1. A kink-free fiber optic cable connector for a cable having a plurality of optical fibers and strength wires comprising:
first connector body means for receiving the fiber optic cable and clamping the strength wires thereof;
second connector body means for receiving the optical fibers of the cable;
a plurality of rods interconnecting the first and second connector body means in a substantially aligned spaced relationship for receiving the optical fibers;
a transverse member mounted on the rods between the first and second connector body means provided with peripheral recesses each sized to receive a respective optical fiber to allow each fiber to be appropriately looped around the rods without kinks between the first and second connector body means for minimizing strain on and kinking of the optical fibers, the optical fibers are disposed in the recesses of the transverse member and are wound around the rods between the first and second connector body means;
means for retaining the optical fibers in the recesses of the transverse member; and
a housing threaded on the second connector body means and containing the first connector body means, the plurality of rods, and the transverse member.



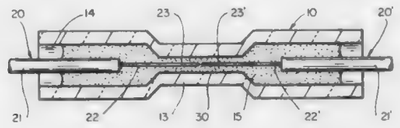
**4,746,188**
**LIGHT WAVEGUIDE PLUG**
**Herbert Löffler, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany**
**Filed Jun. 19, 1986, Ser. No. 875,958**
**Claims priority, application Fed. Rep. of Germany, Jun. 21, 1985, 3522288**
**Int. Cl.[4] G02B *6/36***
**U.S. Cl. 350—96.20** **7 Claims**



1. In a light waveguide plug having a plug pin, which has outside guide surfaces parallel to an axis of the plug, and a swivel member seated in the plug pin in a clamp seat, said swivel member having a stem-like projection which is directed towards a free end of the plug pin and in which an end portion of an optical fiber is fixed, said stem-like projection having a free end with an end face in which an end face of the optical fiber is flushed to form an optical coupling surface for the light waveguide plug, the improvement comprising the free end faces of the stem-like projection of the swivel member and the optical fiber being provided with a convex curved surface, said convex curved surface of the free end of the stem-like projection being dimensioned to project from the plug pin so that the stem-like projection forms an adjustment element of the swivel member at the free end of the plug pin and can be grasped from the outside of the waveguide plug.

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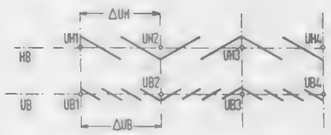
**4,746,189**
**OPTICAL FIBER ADHESIVE JOINT TUBE**
**John P. Arrington, San Mateo; Nelson M. Shen, San Jose; Wendell W. Moyer, Atherton; David R. Myers, Mountain View, and David E. James, Pasadena, all of Calif., assignors to Raychem Corporation, Menlo Park, Calif.**
**Continuation-in-part of Ser. No. 464,805, Feb. 8, 1983, abandoned, and a continuation-in-part of Ser. No. 465,362, Feb. 10, 1983, abandoned. This application Oct. 16, 1985, Ser. No. 787,951**
**Int. Cl.[4] G02B *6/38***
**U.S. Cl. 350—96.21** **26 Claims**



1. An article for joining ends of two optical fibers each including a core and a cladding, comprising:
a generally tubular container having first and second opposite ends and a central region therebetween the central region having a cross-sectional area smaller than cross-sectional area of the opposite container ends, liquid curable adhesive being disposed within the central region,
the central region cross-sectional area being substantially larger than a cross-sectinal area of the first and second ends of the first and second fibers to be joined so as to allow the first and second fiber ends to be moved within the adhesive and the container central region relative to one another in amounts sufficient such that cores of the first and second fibers can be optimally alligned when claddings of the fiber ends are misaligned, a diameter of the central region being more than 1.2 times as large as a cladding diameter of each of the first and second optical fiber ends so that cores of the fibers can be optimally aligned.

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**4,746,190**
**OPTICAL CABLE HAVING A PLURALITY OF MAIN BUNDLES**
**Ulrich Oestreich, and Gernot Schöber, both of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany**
**Filed Oct. 21, 1986, Ser. No. 921,191**
**Claims priority, application Fed. Rep. of Germany, Oct. 22, 1985, 3537553**
**Int. Cl.[4] G02B *96/23***
**U.S. Cl. 350—96.23** **22 Claims**



1. In an optical cable having a plurality of main bundles with each of the main bundles being constructed of a plurality of sub-bundles having at least one optical waveguide, the improvements comprising the main bundles being stranded with a changing direction of lay at reversing points to form a cable core, the sub-bundles being stranded with changing direction of lay at reversing locations, the spacing between the reversing locations for the sub-bundles and the spacing between the reversing points for the main bundles being approximately the same and the spacing between the reversing points of the main bundles in comparison to the reversing locations of the sub-bundles being selected to be smaller than or equal a usual length of a cable sleeve so that when placing a cable sleeve on the optical cable, at least one reversing location and one reversing point will be positioned within the sleeve.

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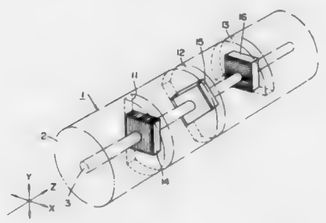
**4,746,191**
**OPTICAL SWITCH**
**Shojiro Kawakami; Makoto Minakata, both of Sendai; Mitsuhiro Takata, and Sachio Toyota, both of Mishima, all of Japan, assignors to Sumitomo Special Metal Co., Ltd., Osaka, Japan**
**Filed Jul. 8, 1987, Ser. No. 71,135**
**Claims priority, application Japan, Jul. 11, 1986, 61-164491**
**Int. Cl.[4] G02B *6/16***
**U.S. Cl. 350—96.29** **11 Claims**

1. An optical switch comprising:
an optical fiber;
a groove formed in the fiber and extending across the core of the fiber;
a block of PLZT disposed in the groove so as to cover the whole cross section of the core and to interconnect the divided portions of the core, the block constituting an electric field-inducing wavelength plate for inducing an electric field which is perpendicular to the axis of the core; and
one or two polarizers disposed close to or in contact with one or both end surfaces of the electric field-inducing wavelength plate which extend at right angles to the axis of the core, each polarizer at least covering the whole cross section of the core, each polarizer consisting of

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alternate laminations of a metal and a dielectric, the laminations being stacked in a direction perpendicular to the



axis of the core, each dielectric lamination being thicker than each metal lamination.

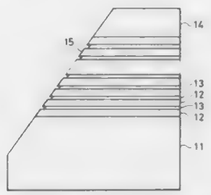
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**4,746,192**

## DIFFRACTION GRATING AND PROCESS FOR PRODUCING THE SAME

**Shigekazu Minagawa, Tokyo, Japan, assignor to Hitachi, Ltd., Tokyo, Japan**

**Filed Jun. 18, 1986, Ser. No. 875,677**
**Claims priority, application Japan, Jun. 28, 1985, 60-140383**
**Int. Cl.⁴ G02B *5/18***
**U.S. Cl. 350—162.2** **11 Claims**



1. A diffraction grating comprising first crystal layers and second crystal layers alternately disposed epitaxially on a single crystal substrate, the end faces of the first crystal layers being formed on one flat crystallographic plane other than the plane of growth while the end faces of the second crystal layers being retracted from the end faces of the first crystal layers.

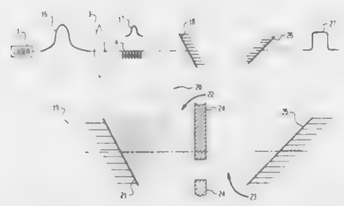
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**4,746,193**

## APPARATUS FOR STABILIZATION OF HIGH SPEED OPTICAL PULSES

**Jonathan P. Heritage, Red Bank, and Andrew M. Weiner, Eatontown, both of N.J., assignors to Bell Communications Research, Inc., Livingston, N.J.**

**Filed Nov. 26, 1986, Ser. No. 936,488**
**Int. Cl.⁴ G02B *27/46***
**U.S. Cl. 350—162.12** **18 Claims**



1. A method of generating a high speed opticle pulse comprising the steps of:

generating an optical pulse with a laser,

focusing said optical pulse into an optical fiber so that stimulated Raman scattering occurs to produce an enchanced optical pulse,

spatially dispersing the frequency components of the enhanced optical pulse to produce a dispersed beam in which the extent of spatial dispersion corresponds to the frequency of the frequency component;

providing an asymmetrically patterned opaque film in the path of said dispersed beam at a focal plane of said dispersed beam to transmit only a portion of the frequency components of said beam, thereby producing a modified beam, and

recombining the frequency components of said modified beam to substantially the same spatial distribution as said optical pulse.

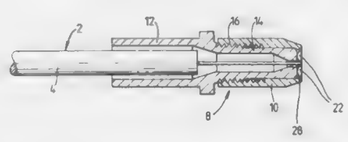
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**4,746,194**

## METHOD OF MOUNTING AN END PORTION OF AN OPTICAL FIBRE IN AN OPTICAL FIBRE CONNECTOR

**Peter Rasmussen, Rallarbäcksvägen 8, Marieholm, S-330 33 Hillerstorp, Sweden**

**Filed Jul. 3, 1985, Ser. No. 751,494**
**Claims priority, application Sweden, Jul. 17, 1984, 8403740**
**Int. Cl.⁴ G02B *6/00***
**U.S. Cl. 350—320** **3 Claims**



1. A method for mounting and fixing an optical fibre in an optical fibre connector element, in which centering elements are moved into engagement with the envelope of an end portion of the optical fibre as well as with a surface portion of the connector element surrounding said envelope to provide points of contact between the centering elements and the end portion of the optical fibre and further points of contact between the centering elements and said surface portion of the connector element surrounding said envelope and in which the space between the envelope of the fibre end portion and the surface portion of the connector element surrounding said envelope is supplied with a curable material, characterized in that an end portion of the connector element including the centering elements and the fibre end portion is machined away, up to a plane positioned inside the points of contract between the centering elements and the fibre end portion and the further points of contact between the centering elements and the surface portion of the connector element surrounding the fibre end portion, so as to eliminate contact between the centering elements and the optical fibre and between the centering elements and the connector element said machining taking place after the end portion of the optical fibre has been moved into engagement with the centering elements and has been fixed by means of the curable material.

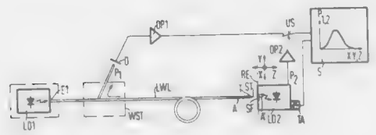


**4,746,195**

## METHOD FOR ADJUSTING COUPLING OPTICS AND THE END OF A WAVEGUIDE RELATIVE TO A SEMICONDUCTOR LASER

**Franz Auracher, Baierbrunn; Rudolf Keil, Munich; Julius Wittmann, Deisenhofen; Hans-Ludwig Althaus, Lappersdorf, and Gerhard Kuhn, Alteglofsheim, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Mar. 13, 1985, Ser. No. 711,415**
**Claims priority, application Fed. Rep. of Germany, Apr. 11, 1984, 3413667**
**Int. Cl.⁴ G02B *6/00*; H01S *3/18*; G01B *11/00***
**U.S. Cl. 350—320** **8 Claims**



1. In a method for adjusting a coupling optic, which is provided at the end of the optical waveguide, for coupling light into a waveguide from a semiconductor laser so that the laser light emitted by the semiconductor laser is coupled to the waveguide via the coupling optic with the optimum coupling efficiency, said method including the steps of longitudinally adjusting the position of the coupling optic in a longitudinal direction extending along the optical axis of the waveguide adjacent the end with the coupling optic from an emitting surface of the laser and transversely adjusting the coupling optic and laser relative to each other in orthogonal directions in a plane extending transverse to the optical axis of the waveguide with each adjusting step including coupling light into the waveguide and coupling optic, measuring the light power of the coupled light and moving the waveguide and coupling optic relative to the laser to obtain an optimum measured value, the improvements comprising performing the step of longitudinal adjusting for the longitudinal spacing first and then the step of transverse adjusting independent of each other; said step of longitudinal adjusting including providing a reference plane extending perpendicular to the optical axis of the waveguide and coupling optic, providing a reflecting surface in the reference plane, projecting light from the waveguide through the coupling optics onto the reflecting surface, measuring the intensity of the reflected light coupled back into the waveguide, adjusting the axial position of the waveguide and coupling optic relative to the reflecting surface to obtain the optimum value, and then fixing the waveguide relative to the reference plane; and the step of transverse adjusting in the orthogonal direction including coupling light into the waveguide and coupling optic by providing an additional source of additional light at a point spaced from the coupling optic, said additional light having a longer waveguide than the light of the semiconductor laser when operated as a laser, coupling the additional light from the additional source into the waveguide to be projected through the coupling optical onto the semiconductor laser, providing detector means to determine the intensity of light traveling in the waveguide by passively operating the semiconductor laser as a detector to detect the intensity of the light being projected thereon, and moving the coupling optic in both orthogonal directions relative to the semiconductor laser to obtain the optimum value for the intensity of the light.

**4,746,196**

## MULTIPLEXED DRIVING METHOD FOR AN OPTICAL SWITCHING ELEMENT EMPLOYING FERROELECTRIC LIQUID CRYSTAL

**Takao Umeda, Mito; Tetsuya Nagata; Yuzuru Simazaki, both of Hitachi; Tatsuo Igawa, Kitaibaraki, and Yasuro Hori, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed May 5, 1987, Ser. No. 46,171**
**Claims priority, application Japan, May 9, 1986, 61-104620**
**Int. Cl.⁴ G02F *1/13*; G09G *3/00***
**U.S. Cl. 350—332** **10 Claims**



1. A multiplexed driving method of an light shuttering element employing ferroelectric liquid crystal with a negative dielectric anisotropy including a plurality of signal electrodes and of common signal electrodes arranged in matrix and a ferroelectric liquid crystal layer disposed between the signal electrodes and the common signal electrodes so as to constitute a plurality of pixels at the respective facing portions of the signal electrodes and the common signal electrodes comprises:

a step of applying a multi polar pulse with a predetermined amplitude and duration on one of the common signal electrodes to select pixels covered thereby for information writing during a first information writing period, applying either a light transmitting signal voltage of first polarity or a light cutoff signal voltage of second polarity on the respective signal electrodes depending on a first set of input signals during the first information writing period, and applying an AC voltage with a predetermined amplitude and frequency on the other common signal electrodes during the first information writing period, whereby either first or second information writing voltages formed in combination with the multi polar pulse and the light transmitting signal voltage and the light cutoff signal voltage and being enough to determine one of the light transmitting and cutoff statuses are applied on the respective first selected pixels, and either first or second status holding voltages formed in combination with the AC voltage and the light transmitting signal voltage and the light cutoff signal voltage and being enough to hold the previously written statuses are applied on the respective first non-selected pixels; and

a step of applying the multi polar pulse with the predetermined amplitude and duration on another one of the common signal electrodes to select pixels covered thereby for information writing during a second information writing period, applying either the light transmitting signal voltage of first polarity or the light cutoff signal voltage of second polarity on the respective signal electrodes depending on a second set of input signals during the second information writing period and applying the AC voltage with the predetermined amplitude and frequency on the common signal electrodes other than the one applied with the multi polar pulse during the second information writing period, whereby either the first or second information writing voltages formed in combination with the multi polar pulse and the light transmitting signal voltage and the light cutoff signal voltage and being enough to deter-

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mine one of the light transmitting and cutoff statuses are applied on the respective second selected pixels, and either the first or second status holding voltages formed in combination with the AC voltage and the light transmitting signal voltage and the light cutoff signal voltage and being enough to hold the previously written statuses are applied on the respective second non-selected pixels.

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4,746,197

## DRIVING CIRCUIT FOR LIQUID CRYSTAL DISPLAY DEVICE

**Shyusuke Endo, Mobara; Toshiyuki Sakuma, Ouharamachi; Toshimitsu Matsudo, Mobara, and Kiyoshige Kinugawa, Mutsuwamachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jul. 24, 1986, Ser. No. 888,864**
**Claims priority, application Japan, Aug. 2, 1985, 60-169807**
**Int. Cl.⁴ G02F *1/13***
**U.S. Cl. 350—333** **12 Claims**

1. A liquid crystal display device comprising:
a liquid crystal module including a liquid crystal display panel having a plurality of liquid crystal picture elements arranged in a matrix form, and driving circuits for applying driving signals to signal electrodes and to scanning electrodes of said liquid crystal display panel, respectively;
a control circuit for controlling operations of said liquid crystal module; and
a means for inverting polarity of a voltage that is to be applied to a liquid crystal layer by generating a control signal M' having a period mτ which signal inverts said polarity of said voltage to be applied to said liquid crystal layer whenever a clock signal having a period τ is counted a predetermined number m/2.
wherein if a period of a frame frequency is nτ and an arbitrary integer is L,
(1) m is set to be 2n/(2L−1), or
(2) m is set to be n/L and said control signal M' is inverted per said frame period nτ, or
(3) m is set to satisfy L−½<n/m<L, or
(4) m is set to satisfy L−1<n/m<L−½ and said control signal M' is inverted per said frame period nτ, and furthermore
if the least common multiple of 2n and m be H, values of m are set so that both H/(2n) and H/m are not simultaneously odd numbers.

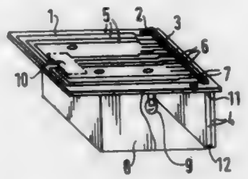
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4,746,198

## DEVICE FOR AN ELECTRICALLY CONDUCTIVE CONNECTION BETWEEN A LIQUID CRYSTAL CELL AND CIRCUIT BOARD

**Holm Baeger, Schwalbach a. T., Fed. Rep. of Germany, assignor to VDO Adolf Schindling AG, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Jan. 2, 1987, Ser. No. 62**
**Claims priority, application Fed. Rep. of Germany, Feb. 7, 1986, 3603819**
**Int. Cl.⁴ G02F *1/13***
**U.S. Cl. 350—336** **12 Claims**




1. A device providing an electrically conductive connection of a liquid-crystal cell to a printed circuit board, the device comprising
means for orienting the liquid-crystal cell and the circuit board substantially perpendicularly to each other, said cell and said board each having conductive paths, said conductive paths being perpendicular to each other; and
means for connecting together the conductive paths of said cell with corresponding ones of the conductive paths of said board, said connecting means including solder disposed within an angle formed by the conducting paths.

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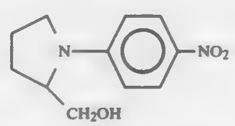
4,746,199

## NON-LINEAR OPTIC PROCESS USING N-(4-NITROPHENYL)-2-(HYDROXYMETHYL)-PYRROLIDINE AND DEUTERATED DERIVATIVES THEREOF

**Jean-Francois Nicoud, 32, rue de Gometz, 91140 Bures sur Yvette, and Joseph Zyss, 28, rue Desaix, 75015 Paris, both of France**

**Division of Ser. No. 733,420, May 13, 1985, Pat. No. 4,622,409, which is a continuation of Ser. No. 460,773, Jan. 25, 1983, abandoned. This application Jul. 8, 1986, Ser. No. 883,321**
**Claims priority, application France, Jan. 26, 1982, 82 01166**
**Int. Cl.⁴ G02B *5/23***
**U.S. Cl. 350—354** **2 Claims**

1. In a process comprising the application of an organic compound to non-linear optics, the step of introducing, as the essential active component, in optoelectronic devices, an optically pure paranitroaniline derivative of the formula




and exhibiting high optoelectronic second order harmonic qualities.

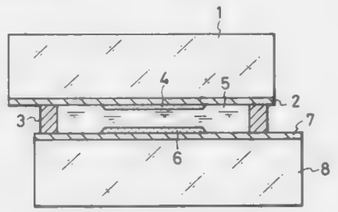
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4,746,200

## ELECTROCHROMIC DISPLAY DEVICE HAVING WHITE COUNTER ELECTRODE

**Tomo'o Kamigaki, Furukawa, Japan, assignor to Alps Electric Co., Ltd., Japan**

**Filed May 16, 1986, Ser. No. 863,971**
**Claims priority, application Japan, May 16, 1985, 60-105383**
**Int. Cl.⁴ G02F *1/01***
**U.S. Cl. 350—357** **4 Claims**




1. An electrochromic display device in which an electrolyte is disposed between a display electrode and a counter electrode, and an electrochromic substance layer is formed at least to the inside of said display electrode, wherein said counter electrode comprises a layer containing a white redox substance providing a white reflection background.

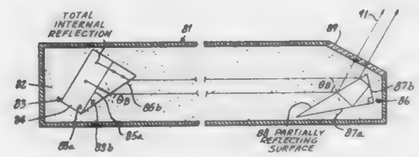


4,746,201

## POLARIZING APPARATUS EMPLOYING AN OPTICAL ELEMENT INCLINED AT BREWSTER'S ANGLE

**Gordon Gould, 1200 N. Nash Ave., Arlington, Va. 22209**

**Division of Ser. No. 823,665, Aug. 11, 1977, which is a division of Ser. No. 498,065, Aug. 16, 1974, Pat. No. 4,053,845, which is a continuation of Ser. No. 644,035, Mar. 6, 1967, abandoned, and Ser. No. 804,540, Apr. 6, 1959, abandoned, said Ser. No. 644,035, is a division of Ser. No. 804,540, , and a continuation-in-part of Ser. No. 804,539, Apr. 6, 1959, abandoned. This application Jan. 16, 1978, Ser. No. 869,831**
**Int. Cl.⁴ G02B *27/28, 5/30***
**U.S. Cl. 350—394** **3 Claims**




1. In combination:
a source of unpolarized light rays;
means for directing certain of said unpolarized light rays to multiply traverse a predetermined path;
an optical element having a first surface; and
means for mounting said optical element to intersect said unpolarized light rays with a line perpendicular to said first surface inclined to said path substantially at Brewster's angle thereby passing one polarization of said light rays and reflecting some of the light rays of the other polarization upon each traversal of said predetermined path.

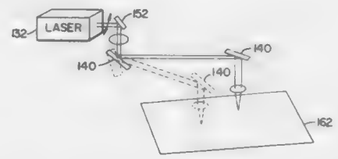
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4,746,202

## POLARIZATION PRESERVING REFLECTOR AND METHOD

**Bruce E. Perilloux, and Dennis G. Fischer, both of Auburn, Calif., assignors to Coherent, Inc., Palo Alto, Calif.**

**Continuation of Ser. No. 754,023, Jul. 11, 1985, abandoned. This application Oct. 15, 1987, Ser. No. 107,906**
**Int. Cl.⁴ G02B *27/28, 1/10;* B23K *9/00***
**U.S. Cl. 350—394** **13 Claims**




1. A laser system for machining a work piece comprising:
a laser source for generating a beam of linearly polarized radiation;
means for focusing the radiation onto the surface of a work piece; and
delivery means for transmitting the radiation beam from the laser source to the focusing means, said delivery means including quarter wave optical element for converting the linearly polarized beam into a circularly polarized beam, said delivery means further including at least one polarization preserving reflecting element having an average reflectance of at least 99.5 percent of the incoming radiation beam, said polarization preserving reflecting element for maintaining the polarization state of the incoming radiation beam through varying angles of incidence such that the phase shift induced by said polarization preserving reflecting element is less than 2.5 degrees from zero for angles of incidence between zero and 75 degrees whereby the polarization state of the beam delivered to the focusing means will be substantially circular thereby preserving the quality of the machining operation.

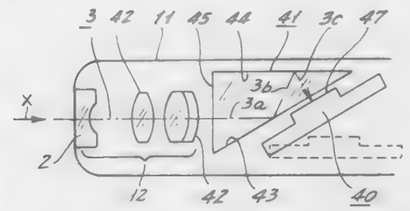
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4,746,203

## OPTICAL SYSTEM FOR ENDOSCOPE

**Kimihiko Nishioka; Tsutomu Yamamoto; Susumu Takahashi, and Akira Yokota, all of Hachioji, Japan, assignors to Olympus Optical Co., Ltd., Japan**

**Division of Ser. No. 765,355, Aug. 13, 1985, Pat. No. 4,720,178. This application Sep. 11, 1987, Ser. No. 96,344**
**Claims priority, application Japan, Aug. 15, 1984, 59-169380; Sep. 19, 1986, 61-221572**
**Int. Cl.⁴ A61B *1/04;* G02B *5/04, 5/22, 5/30***
**U.S. Cl. 350—401** **13 Claims**




1. An image pickup means for an endoscope having an elongated housing at its distal end portion wherein said image pickup means is disposed;
said image pickup means comprising solid-state image sensor means including a pickup surface, and an optical system that directs light downstream along an optical path from a distal free end of said housing to impinge upon said pickup surface;
said housing having a longitudinal axis;
said image sensor means being longitudinally inclined from end to end,
said optical path having an oblique segment that is inclined substantially with respect to said longitudinal axis;
said pickup surface being oblique with respect to and extending across said longitudinal axis, and being disposed on the oblique segment to receive light that is directed downstream along said oblique segment.

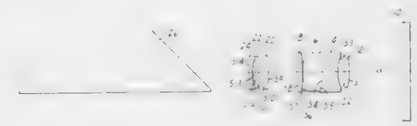
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4,746,204

## ZOOM LENS HAVING MAGNIFICATION FACTORS IN THE RANGE OF 14X TO 32X FOR MICROGRAPHIC APPLICATIONS

**Gerhardt H. Pareigat, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Apr. 1, 1987, Ser. No. 33,053**
**Int. Cl.⁴ G02B *15/14, 17/08***
**U.S. Cl. 350—423** **2 Claims**



1. A variable focal length lens systems for use in micrographic projectors and printers comprising lenses according to the following Table:

VOL
1090
ISS
4
MY
24
1988
UMI



| SURFACE | RADIUS OF CURVATURE | THICKNESS | SEPARATION | TOLERANCE |
|---|---|---|---|---|
| S1 | −868.220 | | | |
| | | 1.30 | | 0.100 |
| S2 | 17.797 | | | |
| | | | 1.42 | 0.020 |
| S3 | −43.933 | | | |
| | | 1.20 | | 0.050 |
| S4 | −153.369 | | | |
| | | | 1.80 | 0.020 |
| S5 | 33.187 | | | |
| | | 2.21 | | 0.100 |
| S6 | −112.047 | | | |
| | | | 1.000–27.592 | |
| S7 | n/a | | | |
| | | | 1.00 | |
| S8 | 57.411 | | | |
| | | 2.55 | | 0.10 |
| S9 | −79.230 | | | |
| | | | 0.10 | 0.050 |
| S10 | 19.688 | | | |
| | | 8.20 | | 0.050 |
| S11 | −28.261 | | | |
| | | 6.28 | | 0.050 |
| S12 | 17.217 | | | |
| | | | 2.56 | 0.050 |
| S13 | 162.895 | | | |
| | | 12.0 | | 0.05 |
| S14 | −40.416 | | | |

| SURFACE | INDEX OF REFRACTION | DECENTRATION | TILT |
|---|---|---|---|
| S1 | | | |
| | 1.83400 | 0.015 | 0.056 |
| S2 | | | |
| S3 | | | |
| | 1.83400 | 0.030 | 0.057 |
| S4 | | | |
| S5 | | | |
| | 1.78470 | 0.015 | 0.053 |
| S6 | | | |
| S7 | | | |
| S8 | | | |
| | 1.74100 | 0.020 | 0.046 |
| S9 | | | |
| S10 | | | |
| | 1.48749 | 0.015 | 0.062 |
| S11 | | | |
| | 1.67270 | | |
| S12 | | | |
| S13 | | | |
| | 1.77250 | 0.020 | 0.067 |
| S14 | | | |

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**4,746,205**

## HIGH ENERGY LASER BEAM REPLICA PRODUCING METHOD AND SYSTEM

**Michael A. Cross, Severna Park, and Edward W. Nichols, Reisterstown, both of Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Jan. 30, 1987, Ser. No. 9,842**
**Int. Cl.[4] G02B** *7/00, 27/10, 5/08, 5/10*
**U.S. Cl. 350—574** **16 Claims**

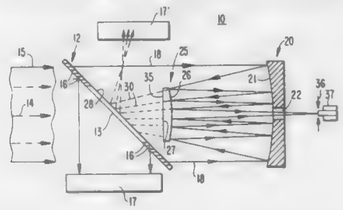
1. A system for producing from a laser beam source an attenuated fiducial replica of the high energy laser beam far field pattern, comprising

first deflecting means for non-dissipatively deflecting a fraction of laser beam energy of the incident laser beam source in an angular direction with respect to the axis of the incident laser beam;

means for transmitting undeflected laser beam energy having energy substantially greater than energy ultimately delivered to the replica to be produced in a forward direction substantially parallel to the axis of an incident laser beam source;

means having a central aperture for reflecting said transmitted laser beam energy in a rearward direction surrounding the axis of the laser beam source;

optical folding means disposed between said transmitting means and said reflecting means in axial alignment with said reflecting means aperture to re-reflect in a forward direction surrounding the axis of said transmitted beam toward said reflecting means a fractional portion of the reflected laser beam energy a predetermined number of times for producing in a focal plane substantially on the



axis of the transmitted beam a far field replica of the laser beam source having attenuated energy corresponding to the final re-reflected fractional portion of the reflected fraction, said optical folding means being disposed and configured to have an effective focal length substantially longer than the physical length of the system;

second deflecting means disposed and opposite the first deflecting means for deflecting non-dissipatively in an angular direction the laser energy reflected by said reflecting means; and

means disposed off-axis of the transmitted and reflected beams for absorbing the laser energy deflected by said first and second deflecting means.

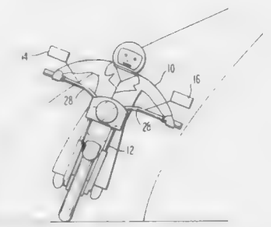
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**4,746,206**

## MOTORCYCLE WITH AUTOMATICALLY ADJUSTABLE MIRROR TO REDUCE IMAGE MOVEMENT

**John E. Kusztos, 15 Kingswharf Pl., Waldorf, Md. 20601, and James Y. Pearce, 26 Seneca La., Stafford, Va. 22554**

**Filed Nov. 12, 1986, Ser. No. 929,301**
**Int. Cl.[4] B60R** *1/06;* **G02B** *7/18, 5/08, 27/64*
**U.S. Cl. 350—605** **13 Claims**



1. In combination with a motorcyle, a motorcycle mirror mount for automatically positioning a rear view mirror of the motorcycle to reduce movement of the image of nearby objects in the rear view provided by the mirror to an operator on the motorcycle during sideways tilting of the motorcycle, said mirror mount comprising:

a mirror;

support means;

means for attaching said support means on the motorcycle;

means for mounting said mirror to said support means while permitting pivoting of said mirror relative to said support means about a pair of genreally orthogonal axes to position said mirror to provide to the motorcycle operatior an image of nearby objects to the rear of the motorcycle;

tilt sensing means for sensing tilting of the mirror and providing a signal representative of the direction and degree of the sensed tilting; and

control means responsive to the signal from said tilt sensing means for pivoting said mirror relative to said support means to a position reducing movement of the image of the nearby objects, as viewed by the motorcycle operator, thereby providing to the motorcycle operator substantially the same view of the nearby objects regardless of the direction and degree of sideways tilting.



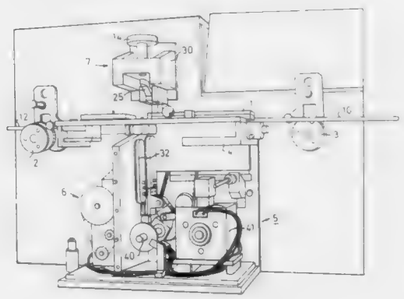
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**4,746,207**

## AUTOMATIC PRINTING MACHINE FOR PRINTING TEXT ON CINEMATOGRAPHIC FILM

**Björn Selin, Solna, Sweden, assignor to AB Film Teknik, Solna, Sweden**

**PCT No. PCT/SE86/00067, § 371 Date Oct. 22, 1986, § 102(e) Date Oct. 22, 1986, PCT Pub. No. WO86/05005, PCT Pub. Date Aug. 28, 1986**
**PCT Filed Feb. 17, 1986, Ser. No. 930,180**
**Claims priority, application Sweden, Feb. 20, 1985, 8500882**
**Int. Cl.[4] G03B** *21/32*
**U.S. Cl. 352—90** **3 Claims**



1. An automatic printing machine for printing text on cinematographic film, said machine comprising

(a) a film transport path (8) having a film-feed means incorporating a gripping mechanism (4) for feeding the film intermittently frame by frame;

(b) a printing-block position located in the film transport path;

(c) a pressure plate (31);

(d) means for synchronized movement of the pressure plate with the gripping mechanism towards and away from the printing-block position for printing said text;

(e) a counter-pressure plate (16) mounted on the side of the film transport path (8) remote from the printing-block position;

(f) a pressure-generating means for producing a variable pressure force between the pressure plate (31) and the counter-pressure plate (16);

(g) a first printing-block transport path (10) intended for the supply of printing blocks and extending parallel with the film transport path (8) along one edge side thereof;

(h) insertion means (61, 62) for moving a printing block along a glide path from the first printing-block transport path (10) to the printing block position;

(i) a second printing-bock transport path (12) which also extends parallel with the film transport path and which receives a printing block displaced from the printing block position, the counter-pressure plate (16) being journalled for linear movement in an open supporting bracket structure (30) attached to a stanchion;

(j) a first electric force-generator (25–28) independent of the supporting bracket structure and arranged to influence the counter-pressure plate (16) in its direction of linear movement towards the film transport path with a variable force, said first force-generator being independent of the supporting bracket structure (30) and including a rotary magnet (27) which is provided with a crank (28) acting on one end of a two-arm lever (25) the other end of which is placed against a stem (17) attached to the counter-pressure plate (16) and displaceable in the supporting bracket structure, whereby the counter-pressure exerted by the counter-pressure plate can be regulated by varying the strength of a current supplied to the rotary magnet.

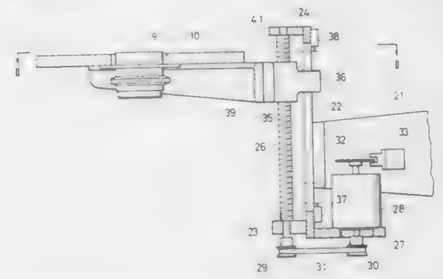
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**4,746,208**

## METHOD AND AN APPARATUS FOR EXPANDING MAGNIFICATION RANGE OF A PHOTOGRAPHIC PROJECTOR

**Makoto Kitai, and Takashi Omori, both of Kyoto, Japan, assignors to Dainippon Screen Mfg. Co., Ltd., Japan**

**Filed Apr. 3, 1986, Ser. No. 847,945**
**Claims priority, application Japan, Apr. 3, 1985, 60-69067**
**Int. Cl.[4] G03B** *21/22*
**U.S. Cl. 353—101** **8 Claims**



1. A photograph projector, comprising:

(A) an original picture frame for holding an original picture;

(B) a lens holder for holding a projecting lens, said lens holder being moveable in a direction parallel to an optical axis of said lens between uppermost and lowermost positions, a lens seating plate forming part of said lens holder and supporting said lens, said lens seating plate normally supporting said lens at a predetermined position relative to said lens holder but being moveable relative to said lens holder along said axis;

(C) an easel for supporting a photosensitive material along a reproduction plane, said original picture, said lens and said reproduction plane all being disposed along said optical axis; and

(D) first means for determining if said projector can be focused with a desired magnification with said seating plate being located at said predetermined position;

(E) second means responsive to said first means for moving said lens holder, with said seating plate being situated at said predetermined position, and at least one of said original picture frame and said easel to the locations required to focus said projector with said desired magnification, if said first means determines that said projector can be focused with the desired magnification with said seating plate being located at said predetermined position; and

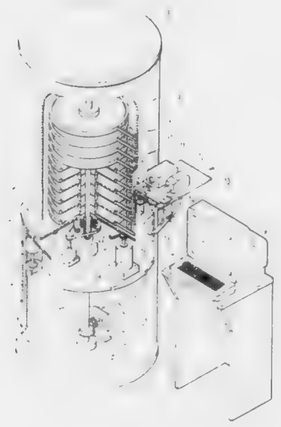
(F) third means responsive to said first means for moving said seating plate relative to said lens holder and moving said lens holder and at least one of said original picture frame and said easel to focus said projector with said desired magnification if said first means determines that said projector cannot be focused with a desired magnification with said seating plate being located at the predetermined position.

**4,746,209**

## DEVICE FOR STORING AND HANDLING SLIDES

**Ettore Corrado, Brebbia, Italy, assignor to European Atomic Energy Community (EURATOM), Luxembourg**

**Filed Mar. 6, 1987, Ser. No. 22,896**
**Claims priority, application Luxembourg, Mar. 6, 1986, 86348**
**Int. Cl.⁴ G03B *23/08***
**U.S. Cl. 353—25** **6 Claims**



1. In a device for storing and handling slides for their selective display, comprising at least one storage rack for slides, means for displacing the racks under the control of a data processing machine so that any selected slide may appear in front of an extraction window, means for extracting the selected slide through said window towards at least one display position or vice-versa, and a projection unit in juxtaposition to said window permitting the extracted slide to be displayed on a screen, the improvement wherein there exists a plurality of circular storage racks (**6**) forming a unit of racks stacked according to a common vertical axis, said means for displacing the racks comprise a reversible motor (**27**) for vertically displacing the unit of racks (**6**), a cylindrical envelope encloses the unit of racks and the means for displacing the racks and the extraction window is (**7**) is cut out in a cylindrical wall (**8**) of said envelope, a motor (**18**) is mounted within said cylindrical envelope for rotating the unit of racks about said axis, the racks (**6**) rest on a disk (**16**), an elevator plate underlies said disk and said disk is carried by said elevator plate (**17**), said motor (**18**) driving the unit of racks into rotation is mounted on said elevator plate, a motor (**27**) drives a vertical threaded shaft (**24**) supported by a bottom (**26**) of the device and is engaged with a nut (**23**) which is immobile in rotation and which is fixed to the elevator plate (**17**) to effect vertical displacement of the racks and wherein the data processing machine (**3**) controls the extraction and the replacement of a slide (**31**) in accordance with the memorized sequence selected previously by the user and with the instantaneous position of the unit of racks.

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**4,746,210**

## CENTRIFUGE STROBE METHOD AND CIRCUIT

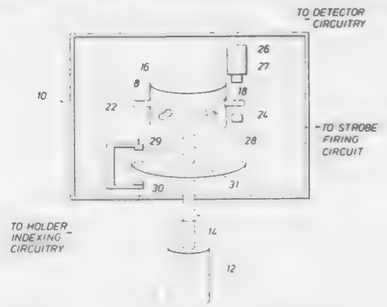
**Rocco DiFoggio, Houston, and Gordon L. King, Bellaire, both of Tex., assignors to Shell Oil Company, Houston, Tex.**

**Continuation of Ser. No. 812,605, Dec. 23, 1985, abandoned.**
**This application Feb. 17, 1987, Ser. No. 16,515**
**Int. Cl.⁴ G01P *3/40***
**U.S. Cl. 356—23** **8 Claims**

7. A circuit for activating a strobe for a centrifuge having a rotatable rotor, comprising:

detector means for detecting a preselected centrifuge holder proximate said detector means, and

means responsive to said detector means for generating a signal to cause such a strobe to reach maximum intensity at a predetermined angle of rotation of such a rotor for any rotational speed of such a rotor for such a centrifuge,




with the start of said angle determined by the detection of said preselected holder by said detector means.

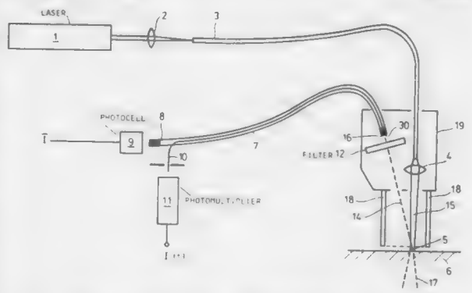
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**4,746,211**

## REAL TIME VELOCITY DETERMINATION

**Bernhard Ruth, Echingen-Dietersheim; Diether Hains, Aisbach, and Wilhelm Waidelich, München, all of Fed. Rep. of Germany, assignors to Gesellschaft für Strahlen- und Unweltforschung mbH, München, Fed. Rep. of Germany**

**Filed Jan. 17, 1985, Ser. No. 692,923**
**Claims priority, application Fed. Rep. of Germany, Jan. 18, 1984, 3401535**
**Int. Cl.⁴ G01P *3/36*; A61B *5/02***
**U.S. Cl. 356—28.5** **7 Claims**




1. A circuit for producing a representation of the velocity of an object in a given direction, which representation is proportional in amplitude to the velocity, by directing coherent radiation to the object in a direction substantially perpendicular to the given direction to produce a speckle pattern of radiation scattered from the object, the speckle pattern exhibiting a speckle spectrum which has, at a measuring location, a time dependency which is a function of movement of the object, said circuit comprising: first input means connected for producing a first signal representative of the instantaneous speckle intensity of the scattered radiation at the measuring location; second input means connected for producing a second signal representative of the average intensity of the scattered radiation at the measuring location; linear filter means connected to said first input means for linearly filtering the first signal; lowpass filter means connected to said linear filter means for receiving the linearly filtered first signal and passing only low frequency components of the first signal; RMS1DC-converter with first integrating means connected to said lowpass filter means for forming an integrated signal having a value representative of the integral of the low frequency components of the first signal; dividing means connected to receive the integrated signal from said first integrating means and to receive the second signal from said second input means for forming a signal representing the quotient of the value of the integrated signal divided by the value of the second signal; and second integrating means connected to said dividing means for forming an output signal representative of the time integral of the signal formed by said dividing means, which output signal corresponds to the representation of the velocity of the object.

6. A device for producing signals representative of the instantaneous speckle intensity and average intensity, at a measuring location, of a radiation speckle pattern produced by directing coherent radiation to an object from which the radiation is scattered to form the speckle pattern, comprising: a bundle of optical fibers, with one end of the bundle being arranged to be disposed at the measuring location; a first radiation detector connected to receive radiation from one of said fibers for producing the signal representative of the instantaneous speckle intensity; and a second radiation detector connected to receive radiation from all of the other fibers of said bundle for producing the signal representative of the average intensity.



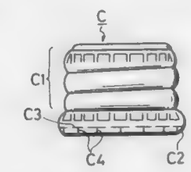
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**4,746,212**

## BOTTLE CAP INSPECTION APPARATUS

**Masao Sudo, Kawaguchi, and Toshiyuki Shimizu, Funabashi, both of Japan, assignors to Hajime Industries Ltd., Tokyo, Japan**

**Filed Mar. 24, 1986, Ser. No. 843,158**
**Claims priority, application Japan, Mar. 29, 1985, 60-65585**
**Int. Cl.⁴ G01N *21/90***
**U.S. Cl. 356—240** **2 Claims**




1. A bottle cap inspection apparatus comprising:

(a) a circular shaped light source which is placed to irradiate a cap on a bottle mouth from its above;

(b) a photoelectric conversion sensor placed above said cap for receiving a reflected light on said cap;

(c) an electronic processor for precessing an electrical signal from said photoelectric conversion sensor to inspect defects of said cap;

said bottle being placed under said photoelectric conversion sensor in a manner that the center axis of said bottle coincides with an optical axis of said photoelectric conversion sensor, the center of said circular light source coinciding with said optical axis; and

(d) an optical mask comprising a disc made of opaque material having at its center a concentric through-hole defining the outer peripheral surface of the conical shaped visual field of said photoelectric conversion sensor, and an outer peripheral edge defining the inner peripheral surface of the conical shaped irradiation range of said circular light source, said mask being located between said light source and said cap on the bottle mouth such that it defines an outer peripheral surface of a visual field of said photoelectric conversion sensor looking at said bottle mouth as well as an inner peripheral surface of the irradiation range onto said bottle mouth from said circular light source as different conical shapes, a portion of the said bottle mouth cap to be inspected being located in a vicinity of a crossing portion of the outer peripheral surface of the conical shaped visual field of said photoelectric conversion sensor with the inner peripheral surface of the irradiation range of said circular light source.

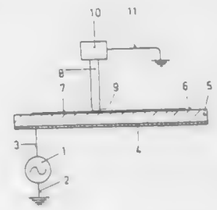
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**4,746,213**

## PROCESS AND DEVICE FOR TESTING LIQUID MEDICAMENTS

**Dieter Knapp, Fahrenbacher Str. 22, D-6149 Fürth/Odw., Fed. Rep. of Germany**

**PCT No. PCT/EP85/00444, § 371 Date May 16, 1986, § 102(e) Date May 16, 1986, PCT Pub. No. WO86/01892, PCT Pub. Date Mar. 27, 1986**
**PCT Filed Sep. 4, 1985, Ser. No. 866,609**
**Claims priority, application Fed. Rep. of Germany, Sep. 18, 1984, 3434154**
**Int. Cl.⁴ G01N *21/68, 21/69*; G03B *41/00***
**U.S. Cl. 356—311** **9 Claims**



1. Process for the testing of liquid drugs characterized in that in a thin, approximately wedge shaped layer of the liquid drug an electric corona discharge is triggered, the image whereof is optically recorded and evaluated.

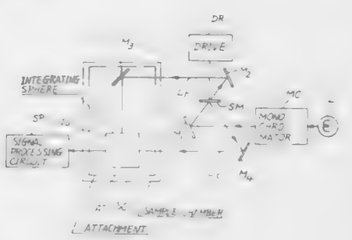
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**4,746,214**

## SPECTROPHOTOMETER

**Osamu Akiyama, and Seiji Goto, both of Kyoto, Japan, assignors to Shimadzu Corporation, Japan**

**Filed Sep. 22, 1986, Ser. No. 910,383**
**Claims priority, application Japan, Sep. 30, 1985, 60-218775**
**Int. Cl.⁴ G01J *3/42***
**U.S. Cl. 356—325** **8 Claims**




1. A spectrophotometer comprising:

a light source for emitting a beam of light over a range of wavelengths;

a monochromator for receiving said light to produce monochromatic light of a selected wavelength;

a sample chamber;

an attachment removably set in said sample chamber;

a plurality of integrating spheres of different types;

means for fixing a selected one of said integrating spheres to said attachment detachably so as to be exchanged for a different one of said integrating spheres;

optical means for directing said monochromatic light into said selected integrating sphere; and

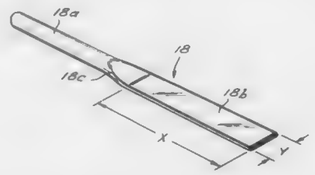
means for measuring the light emerging from said selected integrating sphere.

**4,746,215**

## PARTICLE COUNTER AIR INLET ASSEMBLY

**Kenneth P. Gross, San Carlos, Calif., assignor to Pacific Scientific Company, Anaheim, Calif.**

**Filed Apr. 24, 1986, Ser. No. 855,808**
**Int. Cl.⁴ G01N** *21/05, 21/53*
**U.S. Cl. 356—339** **17 Claims**




1. An instrument for analyzing and counting particles in air or other gas, comprising a system for transmitting a jet of gas through a concentrated light beam in a test cell so as to illuminate the jet and cause light to be scattered by particles in the jet, said system including a gas inlet nozzle forming and directing the jet into the test cell, said nozzle having a flattened, thin walled tip portion with a generally rectangular interior cross section that produces a thin flat jet in which the longer dimension of the cross section of the jet is much greater than the shorter dimension, and the length of said nozzle flattened portion is at least three times greater than said cross section longer dimension, with the result being that the jet formed by the nozzle has very laminar flow as it passes through said beam.

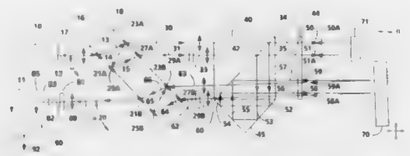
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**4,746,216**

## ANGLE MEASURING INTERFEROMETER

**Gary E. Sommargren, Madison, Conn., assignor to Zygo Corporation, Middlefield, Conn.**

**Continuation-in-part of Ser. No. 845,926, Mar. 28, 1986. This application Jun. 12, 1986, Ser. No. 873,420**
**The portion of the term of this patent subsequent to Jan. 5, 2005, has been disclaimed.**
**Int. Cl.⁴ G01B** *9/02*
**U.S. Cl. 356—349** **137 Claims**



1. An angle measuring plane mirror interferometric system comprising: a pair of plane mirrors being angularly variable with respect to each other by a variable angle between said pair of plane mirrors; source means for emitting an input beam comprising two stabilized orthogonally polarized optical frequencies; means optically coupled to said input beam for converting said input beam into two separated parallel orthogonally polarized beams; means optically disposed in the path of one of said two separated parallel orthogonally polarized beams for converting said two separated parallel orthogonally polarized beams into two separated parallel beams having the same polarization; means optically coupled to said two separated parallel same polarized beams for causing each of said separated parallel same polarized beams to be reflected once by each one of said pair of angularly variable plane mirrors to produce two parallel output beams having the same polarization; means optically disposed in the path of one of said two separated same polarized parallel output beams for converting said two separated same polarized parallel output beams into two separated orthogonally polarized parallel output beams; means optically coupled to said two separated parallel orthogonally polarized output beams for converting said two separated parallel orthogonally polarized output beams into a single output beam having a pair of orthogonally polarized frequency components, with a phase difference therebetween being directly proportional to said variable angle between said pair of plane mirrors; means optically coupled to said single output beam for mixing said orthogonally polarized components thereof and producing an electrical measurement signal therefrom; and means operatively connected to said electrical measurement signal for extracting a difference in phase from said electrical measurement signal, variations in said extracted phase difference being proportional to angular changes in said variable angle between said pair of plane mirrors; whereby an optical configuration in which the angular measurements are extremely insensitive to three dimensional displacement of said plane mirrors is provided for said interferometric system.

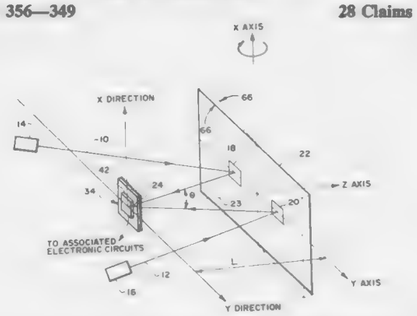
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**4,746,217**

## INTERFEROMETRIC TILT SENSOR

**Sandor Holly, Woodland Hills, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.**

**Filed May 22, 1987, Ser. No. 52,928**
**Int. Cl.⁴ G01B** *9/02*
**U.S. Cl. 356—349** **28 Claims**




1. A method for remotely sensing the angular displacement of a test surface, comprising:

a. producing two collimated light beams of substantially the same intensity which are coherent with respect to one another, one of said beams having a different frequency from the other beam, the frequency difference, Δf, being within the radio frequency (RF) range;

b. directing each of said light beams toward separate optically reflective, good optical quality target areas on said test surface, said light beams being directed to reflect off of their respective target areas and to converge at a distance from said test surface thus forming a fringe pattern at said distance in an interference zone and producing an optical radiation field which is spatially and temporally modulated by the Δf, said fringe pattern continuously moving laterally along a direction perpendicular to the fringe planes of the interference zone at a rate equal to Δf;

c. positioning a sampling means within the interference zone for sampling the laterally moving fringe pattern, said sampling means having at least one sampling aperture exposed to said interference zone, said at least one sampling aperture lying in a plane substantially perpendicular to a plane formed by the converging light beams, and having a width smaller than the effective spatial period of the fringe field, $\lambda_{es}$, where $\lambda_{es}=\lambda_s/\cos\phi$, $\lambda_s$ being the spatial period of the fringe field and $\phi$ being the angular deviation of the plane of the sampling aperture from a plane which is perpendicular to said fringe planes;

d. positioning a light detector to receive said modulated optical radiation which is sampled from the interference zone, said modulated optical radiation being converted into a sample electronic signal by associated electronic circuits; and

e. sensing rotation of said test surface about the X-axis which is normal to the converging light beams by comparing the phase of said sample electronic signal to the phase of a reference electronic signal having a frequency equal to Δf.



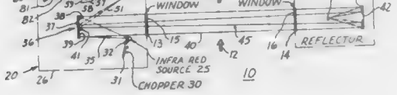
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**4,746,218**

## GAS DETECTORS AND GAS ANALYZERS UTILIZING SPECTRAL ABSORPTION

**Harry C. Lord, III, Pasadena, Calif., assignor to Syconex Corporation, Duarte, Calif.**

**Continuation-in-part of Ser. No. 619,818, Jun. 12, 1984, Pat. No. 4,632,563, which is a continuation-in-part of Ser. No. 470,146, Feb. 28, 1983, abandoned. This application Sep. 5, 1986, Ser. No. 904,163**
**The portion of the term of this patent subsequent to Dec. 30, 2003, has been disclaimed.**
**Int. Cl.⁴ G01N** *21/35*
**U.S. Cl. 356—437** **20 Claims**




1. In an instrument for detecting the presence of, or for measuring the concentration of a gas in a stream of other gases, utilizing a beam of spectral energy which has passed through or emanated from at least some part of said stream, an analyzer comprising:

a plurality of nararow band pass filter means;

an initial reflector;

a rotatable deflector, comprising a pair of deflecting reflectors rotatably carried by it, said deflecting reflectors forming an angle with one another, the center of rotation of said deflector lying inside said angle;

means for rotating said deflector;

a spectral source or a spectral detector, said filter means, initial reflector, rotatable deflector and source or detector being fixedly located relative to one another such that fixed beam segments of said beam are formed between the initial reflector and the rotatable deflector, and between the rotatable deflector and the source or detector, and an angularly movable beam segment of said beam is formed between each of the deflecting reflectors of the rotatable deflector and the locus of said filter means which movable beam segments can be moved from filter means to filter means as the consequence of rotation of the rotatable deflector, a first of said movable beam segments extending from one of said deflecting reflectors to said locus, and the other of said movable beam segments extending from the said locus to the other of said deflecting reflectors; and

reflecting means adjacent to each said filter means for reflecting the beam from one of said deflecting reflections movable beam segments to the other, after the beam has passed through the respective filter means at least once.

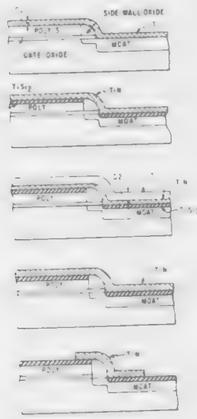
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**4,746,219**

## LOCAL INTERCONNECT

**Thomas C. Holloway; Thomas E. Tang, both of Dallas; Che-Chia Wei, Plano; Roger A. Haken, Richardson, and David A. Bell, Dallas, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Continuation of Ser. No. 837,468, Mar. 7, 1986, Pat. No. 4,657,628, which is a continuation-in-part of Ser. No. 729,318, May 1, 1985. This application Nov. 12, 1986, Ser. No. 929,963**
**Int. Cl.⁴ H01L** *23/48, 29/46, 21/306;* **B44C** *1/22*
**U.S. Cl. 357—23.11** **16 Claims**




1. An integrated circuit local interconnect product fabricated by a process comprising the steps of:

(a) providing a partially fabricated integrated circuit structure including a plurality of moat regions separated from one another by oxide regions, said moat regions incorporating active devices therein;

(b) depositing a thin layer of metal consisting predominantly of titanium overall;

(c) depositing a relatively inert material over said metal layer in locations defining local interconnect pathways thereunder;

(d) reacting said partially fabricated structure in an atmosphere containing a high portion of nitrogen so that the portions of said metal layer over moat regions are converted to a first layer predominantly of titanium silicide covered by a second layer predominantly of titanium nitride, and so that the portions of said metal layer over oxide regions are converted predominantly to titanium nitride; and

(e) etching away portions of said metal layer not covered by said relatively inert material so that local interconnects of titanium nitride remain in said local interconnect pathways.

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**4,746,220**

## SCREW TYPE EXTRUDING OR KNEADING MACHINE AND SCREW USED THEREIN

**Kiyoshi Sukai, Tokyo; Keizo Ichii; Shigeru Takane, both of Toyohashi; Takayuki Yoshikawa; Hiroshi Inada, both of Nagoya, and Takao Yamada, Nishikamo, all of Japan, assignors to Noritake Co., Limited, Aichi and Mitsubishi Rayon Engineering Co., Ltd., Tokyo, both of, Japan**

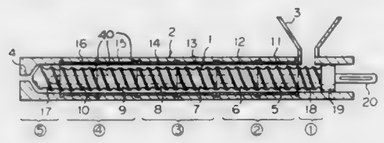
**Filed Apr. 15, 1986, Ser. No. 852,220**
**Claims priority, application Japan, Apr. 18, 1985, 60-081442; Apr. 18, 1985, 60-081443**
**Int. Cl.⁴ B01F** *7/08*
**U.S. Cl. 366—79** **14 Claims**

1. A screw type machine that works a material, said machine

comprising a screw axially disposed for revolving in a vessel, wherein:

(a) at least a part of the outside surface of said screw that comes into contact with the material to be worked comprises a plurality of ceramic members and the remainder of said screw comprises a plurality of metal members;

(b) at least a part of the inside surface of said vessel that comes into contact with the material to be worked comprises a plurality of ceramic members and the remainder of said vessel comprises a plurality of metal members;



(c) said ceramic members of both said screw and said vessel are dismountable and replaceable; and

(d) buffer means for distributing stress uniformly, for absorbing stress caused by heat changes, and for absorbing mechanical shocks are interposed between said ceramic members and said metal members in both said screw and said vessel, said buffer means being a heat resistance synthetic film selected from the group consisting of polyimide, polyamide, polysulfone, and synthetic rubber films.

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**4,746,221**

**STIRRER FOR USE IN LIQUID STORAGE TANKS**

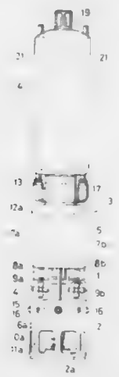
**Katsuji Okumura; Hiroshi Maeda, and Isao Taoka, all of Tokyo, Japan, assignors to Nippon Mining Co., Ltd. and Automax Kabushiki Kaisha, both of Tokyo, Japan**

**Filed May 8, 1986, Ser. No. 861,012**

**Claims priority, application Japan, May 14, 1985, 60-102118; May 14, 1985, 60-102119**

**Int. Cl.⁴ B01F *7/00***

**U.S. Cl. 366—142** **13 Claims**



**1. A stirrer which stirs a liquid as it moves through the liquid in a storage tank, comprising an elongated skeletal frame having a longitudinal axis which is generally vertically disposed during operation of the stirrer in said storage tank, said frame having an upper portion and a lower portion, buoyancy tanks mounted on said upper portion of said frame, said buoyancy tanks being elongated and having longitudinal axes which are parallel to said longitudinal axis of said frame, said buoyancy tanks providing vibration dampening and a vertical restoring force to the stirrer to thereby provide vertical orientational stability as the stirrer moves through said liquid in said storage tank, an elliptical housing fixed to the lower end of said frame, a flow plate on said lower portion of said skeletal frame overlying said housing and disposed in a plane generally parallel to the longitudinal axis of said frame, a first and second motor-driven rotor in said housing to provide for vertical propulsion of the stirrer, said first and second rotors each having a rotational axis which is parallel to said longitudinal axis of said frame such that each of said first and second rotors provide a fluid flow directed parallel to said longitudinal axis of said frame and with portions of each of said flow paths passing on opposite sides of said flow plate, a third and fourth motor-driven rotor mounted on said lower portion of said frame for providing horizontal propulsion of said stirrer with said third rotor being disposed on one side of said flow plate and said fourth rotor being disposed on the opposite side of said flow plate, said third and fourth rotors each having a rotational axis which is disposed perpendicular to said longitudinal axis of said frame such that each of said third and fourth rotors provide a fluid flow path perpendicular to said longitudinal axis of said frame and with the flow path of said third rotor passing on one side of said flow plate and the flow path of said fourth rotor passing on said opposite side of said flow plate, said flow plate thereby providing for straight line movement of the stirrer in a horizontal direction as said third and fourth rotors are operated.**

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**4,746,222**

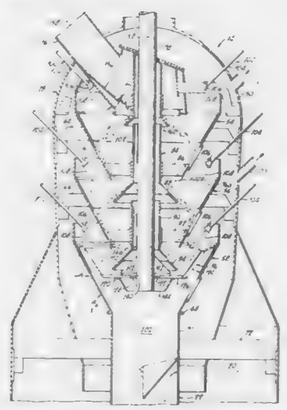
**MIXING AND COOLING APPARATUS FOR HOT, PARTICULATE MATTER**

**Delwin E. Cobb, Macomb, Ill.; Chien-Cheng J. Shih, Irvine, and Charles F. Griswold, Brea, both of Calif., assignors to Union Oil Company of California, Los Angeles, Calif.**

**Filed Oct. 30, 1987, Ser. No. 115,165**

**Int. Cl.⁴ B01F *7/16, 15/06***

**U.S. Cl. 366—147** **54 Claims**



**1. Apparatus for packed bed, gravity flow mixing of particulate matter, the apparatus comprising:**

**a. a mixing vessel having a vertical axis having a particulate matter inlet opening in upper regions and a particulate matter discharge opening in lower regions;**

**b. mixing means disposed in said vessel for mixing a packed bed of particulate matter flowing therethrough, said mixing means including:**

**i. a mixer shaft rotatably mounted along said vessel vertical axis, said shaft having a first portion disposed inside a packed bed flow region of the vessel and a second portion disposed outside of said packed bed flow region;**

**ii. a plurality of similar mixing blades;**

**iii. means connecting said mixing blades to the shaft second portion so that each of the blades is upwardly and outwardly inclined at an average inclination angle which is at least about 30° with respect to a plane orthogonal to said vertical axis; and**



**iv. means disposed upstream of the mixing blades and inwardly of major portions of the blades for at least partially supporting the weight of particulate matter in the vessel and for diverting the particulate matter outwardly towards said mixing blades as the blades are rotated; and**

**c. means connected to said shaft second portion for causing rotation of said shaft and the mixing blades connected thereto in a given mixing direction.**

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**4,746,223**

**METER FOR INTEGRATING THE OPERATING TIME OF A STEAM TRAP**

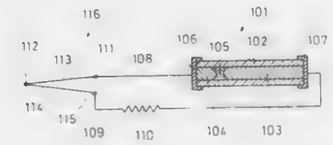
**Osamu Miyata; Takayoshi Osumi; Shizuma Oishi; Hideaki Yumoto, and Yoshihiko Hasegawa, all of Hyogo, Japan, assignors to TLV Co., Ltd., Kakogawa, Japan**

**Filed Aug. 29, 1985, Ser. No. 770,688**

**Claims priority, application Japan, Sep. 19, 1984, 59-197635**

**Int. Cl.⁴ F16T *1/00*; G01K *3/04***

**U.S. Cl. 374—103** **1 Claim**



**1. A meter for integrating the operating time of a steam trap comprising: an instrument for integrating the time of power application, said instrument consisting of a transparent vessel containing an electrolyte between two columns of mercury across which a DC voltage is applied for the electrolytic deposition of mercury from one of said columns to the other, the distance of the resulting displacement of said electrolyte indicating the time of power application; and a thermocouple including a hot junction and at least one cold junction connected to said instrument; said instrument and the cold junction of said thermocouple being disposed in a casing which is thermally insulated from the hot junction of said thermocouple; said meter being mounted relative to said steam trap in such a way that said hot junction is located to sense operational temperatures of said steam trap; said meter further comprising a casing having a portion defining an elongate internal cavity with said instrument being located at one end thereof and with said hot junction being located at the opposite end thereof and with thermocouple wires extending within said elongate internal cavity connecting together said instrument with said hot junction; said casing being attached to a pipe within which the temperature is to be sensed with said hot junction in close proximity to said pipe, with a band being provided encircling said pipe and connecting said casing thereto, and a tightening member being threadedly engaged with said casing and having one end of said band fixed thereto and the opposite end of said band adjustably attached thereto.**

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**4,746,224**

**SCANNING TYPE, RADIANT-ENERGY RESPONSIVE TEMPERATURE MEASURING APPARATUS**

**Masashi Mizuno, and Mitsuo Utsuno, both of Aichi, Japan, assignors to Daido Tokushuko Kabushiki Kaisha, Nagoya, Japan**

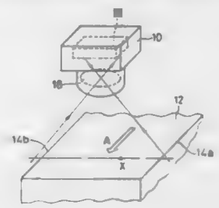
**Filed Dec. 19, 1986, Ser. No. 943,489**

**Claims priority, application Japan, Dec. 19, 1985, 60-286169**

**Int. Cl.⁴ G01K *13/06, 1/16*; G01J *5/00***

**U.S. Cl. 374—124** **4 Claims**

**1. A radiant-energy temperature measuring apparatus of a scanning type for measuring temperatures of an object, having a light-sensitive device including a linear array of a plurality of light-sensitive elements which are responsive to respective amounts of radiant energy produced at different points of said object and at different points of areas adjacent to and outside edges of said object arranged on a straight line corresponding to said linear array, said light-sensitive elements generating photoelectric signals corresponding to said respective amounts of radiant energy received from points of said object or from points of said areas adjacent to and outside the edges of said object, the apparatus further having means for determining a temperature of said object at a desired one of said different points thereof, based on the photoelectric signal generated by one of said plurality of light-sensitive elements which optically matches said desired one point of the object, said radiant-energy temperature measuring apparatus comprising:**



**edge detecting means for detecting an edge of said object in correspondence to one of said elements, based on said photoelectric signals generated by said plurality of light-sensitive elements; and**

**selector means for selecting said desired one of the different points of the object, by designating a number of the light-sensitive elements as counted from said one element corresponding to said detected edge of the object, to said one light-sensitive element which optically matches said desired one point, said selector means applying said photoelectric signal generated by said one light-sensitive element, to said temperature determining means.**

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**4,746,225**

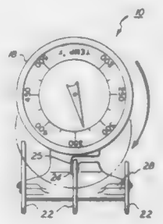
**INSTRUMENT ASSEMBLY SUPPORT**

**John B. Ashe, Asheville, N.C., assignor to Figgie International Inc., Richmond, Va.**

**Filed Dec. 17, 1986, Ser. No. 942,697**

**Int. Cl.⁴ G01K *1/14***

**U.S. Cl. 374—208** **15 Claims**



**1. An instrument assembly adapted for mounting on a portion of a wire rack and comprising:**

**a stand having a base portion and an upright portion;**

**a case mounted on a pivot about a pivot center line to said upright portion of said stand, said case having a case periphery spaced from said base portion; and**

**said case being rotatable with respect to said stand wherein upon such rotation, said case periphery approaches said base portion of said stand for clamping a wire portion therebetween and for thus securing said instrument assembly to said portion of a wire rack.**

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**4,746,226**

## PACKAGING CONTAINER

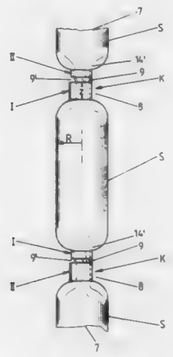
**Alfred von Schuckmann, Kevelaer, Fed. Rep. of Germany, assignor to Bramlage Gesellschaft mit beschraenkter Haftung, Oldenburg, Fed. Rep. of Germany**

**Filed Oct. 24, 1986, Ser. No. 923,129**

**Claims priority, application Fed. Rep. of Germany, Oct. 24, 1985, 3537766**

**Int. Cl.⁴ B65D** *33/16*

**U.S. Cl. 383—71** **7 Claims**



1. A storage container for paste-like substances such as mayonaisse, formed in the shape of a bag having collapsible walls, for use within a pump-operated dispenser device, said storage bag comprising a wall formed of a segmentally crimped tube, a clamp tightly sealing one end of said bag, said clamp being part of a double clamping device having an intermediate transverse separation band therebetween, so that at least one segment of said clamping device facing the bag cavity may be detached from the crimp, said removable clamp segment having a greater length than the other segment of said double clamp so that a large substance free area results upon removal of the clamp segment so that loss of any paste-like substance is avoided.

**4,746,227**

## SLIDE GUIDE OF PRESS

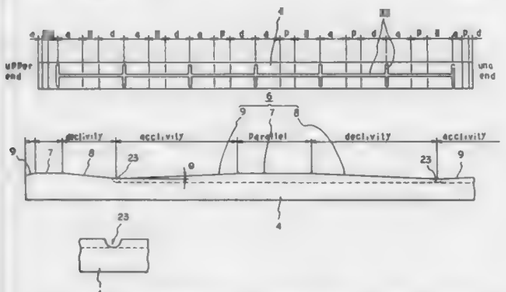
**Mitsuo Sato, Sagamihara, Japan, assignor to Aida Engineering, Ltd., Sagamihara, Japan**

**Continuation-in-part of Ser. No. 656,896, Oct. 2, 1984, abandoned. This application Aug. 5, 1986, Ser. No. 893,159**

**Claims priority, application Japan, Nov. 11, 1983, 58-212184**

**Int. Cl.⁴ F16C** *33/10, 29/02, 29/12*

**U.S. Cl. 384—13** **4 Claims**




1. A slide guide for guiding the press slide of an ascending and descending press comprising:

a press frame having a front, a rear, and right and left sides;

a press slide having a front, a rear and right and left sides and having four corners slidably guided on said press frame;

a slide gib on said press frame at each corner of said press slide and having two longitudinal plane sliding services, the slide gibs on the left side having respectively a forward and a rearwardly facing sliding surface and two sliding surfaces facing towards the right, and the slide gibs on the right side having respectively a forwardly and a rearwardly facing sliding surface and two sliding surfaces facing toward the left;

adjustable means on said frame operatively connected to the slide gibs at the front for adjusting the front gibs forwardly and rearwardly;

two liners mounted on each corner of each slide, each said liner having a longitudinal plane sliding surface facing oppositely to a respective sliding surface on the respective slide gib at each corner for sliding engagement therewith;

said liners having sliding surfaces opposite to the forwardly and rearwardly facing sliding surfaces on said gibs being fixed to said slide;

said liners having sliding surfaces opposite to the right and left facing sliding surfaces on said gibs being adjustably mounted on said slide by adjustable means for adjustment to the right and left, respectively, said liner adjustment means comprising an adjusting plate for each said liner disposed opposite to respective right and left facing sliding surfaces on said gibs;

the sliding surfaces on each liner comprising a plurality of spaced faces parallel to the plane surface of a respective opposite sliding surface on a respective gib, a declivity extending from one end thereof at the upper end of a respective parallel face and slanting in a direction away from the plane sliding surface of the respective gib, and an acclivity extending from the other end of said declivity to the lower end of another respective parallel face and slanting at an angle with respect to said declivity.

**4,746,228**

## LINEAR MOTION ROLLING CONTRACT BEARING ASSEMBLY USING A ROLLER HAVING A TRUNCATED DOME END

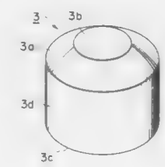
**Takahiro Shimo, Chigasaki, Japan, assignor to Nippon Thompson Co., Ltd., Japan**

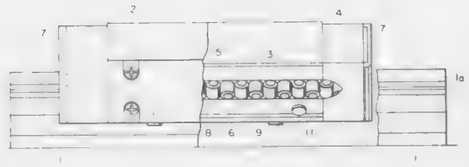
**Filed Dec. 30, 1986, Ser. No. 947,774**

**Claims priority, application Japan, Dec. 30, 1985, 60-298359**

**Int. Cl.⁴ F16C** *29/06*

**U.S. Cl. 384—44** **8 Claims**





1. A linear motion rolling contact bearing assembly comprising:

a rail extending straight over a desired length and provided with at least one first guide groove;

a slider subassembly mounted on said rail so as to provide a relative linear motion therebetween, said slider subassembly being provided with at least one endless circulating path, part of which is defined by said first guide groove; and

a plurality of rollers provided in said endless circulating path, each of said rollers being generally cylindrical in shape and having a flat end surface at a first end and a truncated dome-shaped end surface at a second end which is opposite to said first end.



**4,746,229**

## SUPPORTING AND CARRYING DEVICE FOR A ROTATABLE MEMBER

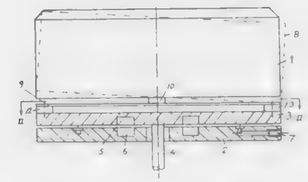
**Bjorn Lind, Billdal, Sweden, assignor to Aktiebolaget SKF, Goteborg, Sweden**

**Filed Jun. 18, 1987, Ser. No. 64,093**

**Claims priority, application Sweden, Jul. 7, 1986, 8603002**

**Int. Cl.⁴ F16C** *32/06*

**U.S. Cl. 384—124** **3 Claims**



1. A device for supporting and carrying a rotatable member (1), incorporating a supporting element (2) having a support surface upon which the member (1) is rotatably supported and radially displaceable, characterized by a bearing part (3) provided between the rotatable member and the supporting element, which bearing part is equipped with a surface intended for cooperation with an opposed supporting surface on the supporting element, whereby the bearing part is rotatable and radially displaceable upon the supporting surface, the bearing part further being equipped with means (9, 10, 11, 12, 13) for supporting the rotatable member on the bearing part, said means incorporating deformable members (9), which allow a tilting of the rotatable member on the bearing part (3).

**4,746,230**

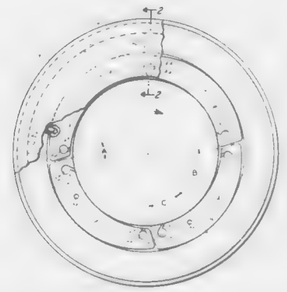
## TILT PAD JOURNAL BEARING

**Richard C. Jensen, Greensburg, Pa., assignor to Elliott Turbomachinery Co., Inc., Jeannette, Pa.**

**Filed Feb. 17, 1984, Ser. No. 581,020**

**Int. Cl.⁴ F16C** *17/03*

**U.S. Cl. 384—311** **12 Claims**



1. A bearing assembly for supporting a shaft for rotational displacement which comprises:

a plurality of bearing pads spaced about the shaft, at least one of said pads defining a lubricant feed channel located toward the leading edge of the pad and extending axially through the pad through which lubricant may be supplied to the shaft-pad interface, and a lubricant discharge channel located toward the trailing edge of the pad and extending axially through the pad for receiving lubricant supplied to the shaft-pad interface by the feed channel;

a retainer positioned radially outward from the pads for securing the pads in position, said retainer including means for preventing at least one pad from rotating with the shaft and further defining lubricant delivery means positioned to supply lubricant to the lubricant feed channel of the bearing and wherein at least one bearing pad further defines a lubricant distributor extending from the lubricant feed channel to the shaft-pad interface being angled in the direction of rotation of the shaft to promote the establishment of a lubricant film between a shaft and a pad.

**4,746,231**

## BEARING DEVICE FOR SMALL ROTARY MACHINES

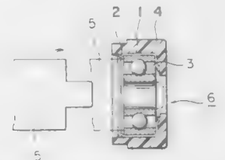
**Michio Hoshino, Matsudo, Japan, assignor to Mabuchi Motor Co., Ltd., Japan**

**Continuation of Ser. No. 865,161, May 19, 1986. This application Sep. 28, 1987, Ser. No. 102,251**

**Claims priority, application Japan, May 23, 1985, 60-77023[U]**

**Int. Cl.⁴ F16C** *19/06*

**U.S. Cl. 384—537** **8 Claims**



1. A bearing device for small rotary machinery comprising, a ball bearing having a cylindrical outer race, a cylindrical cap having an open end with a flange portion, said race being press fit into said cap so that said bearing is disposed in said cap, a housing made of synthetic resin and having a cylindrical recess with an inner wall, said cap being fit into said cylindrical recess with said flange portion being deformed into a V-shaped cross section projecting and bearing against said inner wall and over said race to retain said cap and said bearing in said housing.

**4,746,232**

## LOW FRICTION CROSS ROLLER BEARING

**Georg Gugel, D-8552 Höchstadt, Fed. Rep. of Germany**

**Filed Nov. 7, 1986, Ser. No. 928,438**

**Claims priority, application Fed. Rep. of Germany, Nov. 11, 1985, 8532126[U]**

**Int. Cl.⁴ F16C** *19/30, 19/50, 33/58*

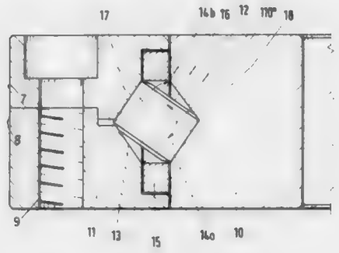
**U.S. Cl. 384—619** **16 Claims**

1. A roller bearing assembly comprising two concentric supporting rings having mutually facing circumferential surfaces, V-shaped grooves having opposed groove faces in said mutually facing circumferential surfaces, cylindrical rollers disposed in said grooves with successive rollers being offset from one another by an angle of from about 100 to 130 degrees, each of said cylindrical rollers having longitudinal end portions formed as partial conical guide surfaces which taper from the outer cylindrical surface of the roller toward the axis of the roller, said guide surface being in rolling engagement with one

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of the respective groove faces of the V-shaped groove such that roller bearing support is provided between said guide



surface and the engaged groove face during operation of the roller bearing assembly.

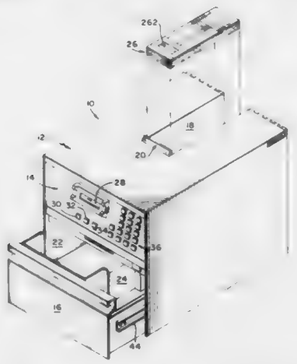
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**4,746,233**

## AUTOMATIC PRINTING APPARATUS UTILIZING TURNAROUND DOCUMENT

**Ignacio B. Garcia de Osuna, Miami; Bernard Parker, Key Biscayne; Warren C. Winter, Hollywood; Terry L. Slorek, Plantation; Rafael E. Zorrilla, Cooper City; Edward N. Doty, Pompano Beach, all of Fla., and Hari Matsuda, Evanston, Ill., assignors to Coulter Electronics, Inc., Hialeah, Fla.**

**Filed Aug. 20, 1986, Ser. No. 898,465**
**Int. Cl.[4] B41J** *3/50*
**U.S. Cl. 400—73** **13 Claims**



**1.** Automatic printing apparatus **(10)** for use with a plurality of sheet items **(26)**, each said sheet item **(26)** initially bearing machine and human readable data, each said sheet item initially being employed to identify and accumulate individual, original data and thereafter being reemployed as a final repository for additional data; said apparatus having:

moving means **(54)** for moving each said sheet item **(26)** in an initial direction and path of movement from an input hopper **(20)** to a data reading and printing station **(128)** including printing means **(152)** and then into output means **(22)**, scanning and reading means **(186)** for scanning and reading said original data on each said item **(26)**, and memory storage means **(270)** coupled to said scanning and reading means **(186)** for storing said data from each of said items **(26)**, the improvement comprising:

said memory storage means **(270)** also being coupled to an external source of data (S-Plus); and

said output means **(22)** comprising a plurality of output hoppers **(22, 24)** arranged within a movable drawer **(16)** in said printing apparatus, and said hoppers **(22, 24)** are movable within said drawer from side to side transverse to the direction of item movement in response to said control output;

comparing means **(268, 270)** for comparing said scanned original data from each of said items **(26)** with stored data received from said external source of data (S-Plus) and for obtaining a comparison result;

data processing means **(268)** coupled to said external source of data and also to said memory storage means **(270)** and to said scanning and reading means **(186)** for interpreting said comparison result to provide a control output **(276)** for controlling the position of said output means **(22, 24)**; and

said printing station **(128)** being coupled to said data processing means **(268)** and responsive to said control output for acknowledging said comparison result and for causing said printing means **(152)** to print on said item **(26)**, as the result of said comparison, the additional data inputted to said data processing means **(268)** from said external source.

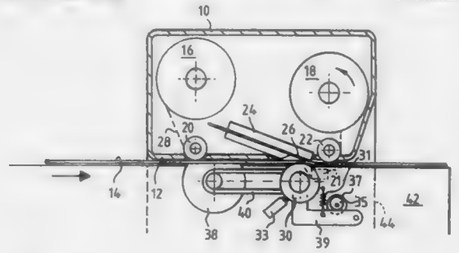
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**4,746,234**

## RELATING TO POSTAL FRANKING MACHINES

**Alan Harry, Royston, England, assignor to Francotyp-Postalia GmbH, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 631,211, Jul. 16, 1984, abandoned. This application Feb. 6, 1986, Ser. No. 826,557**
**Claims priority, application United Kingdom, Jul. 23, 1983, 8319921**
**Int. Cl.[4] B41J** *3/20, 11/20*
**U.S. Cl. 400—120** **9 Claims**



**1.** as follows: Postal franking apparatus for franking envelopes and the like of non-uniform thickness comprising:

(a) memory means for storing fixed and variable information to be printed onto an envelope;

(b) means for inputting information to said memory means to change some or all of the information stored therein;

(c) means for reading out information from said memory means to form printing control signals;

(d) a printing station through which an envelope to be franked can be transported;

(e) thermal printing means which includes a source of ink carried by a ribbon means and applied to the thermal printing means; and

(f) means for supplying the printing control signals to said thermal printing means; wherein

(g) a rotatable backing device confronting said thermal printing means to form together therewith a driving nip between which an envelope passes during printing, said backing device being a driven backing roller engaging said envelope and having a resilient deformability in a direction perpendicular to the surface of said envelope, said deformability varying differentially at discrete intervals along a line perpendicular to the direction of transport of the envelope; wherein

(h) both the fixed and variable information being printed by thermal printing means which comprises a flexible, resilient plate of thermally and electrically insulating material fixedly mounted at said printing station, said plate being elongate in a direction transverse to the direction of transport of the envelope through said printing station and



bearing a continuous elongated longitudinal conductive track to which a large plurality of electrical connections are made along the length thereof, and said supplying means comprises means for supplying electrical currents to a selected combination of discrete positions along the track corresponding to selected ones of the connections, the combination of current-supplied positions varying in predetermined relationshp to the transport of the envelope, the track being of a high resistivity such that the current-supplied positions along the track and hence the ink are locally heated and ink which is contiguous with the elongated conductive track is deposited onto the envelope only at a said heated localities, thereby to frank the envelope with both fixed and variable information.

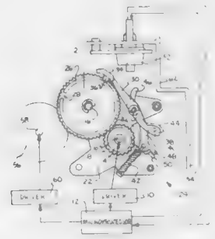
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**4,746,235**

## PRINTING ELEMENT HOMING DEVICE

**Hans W. Mueller, and Kenneth D. Vought, both of Cortland, N.Y., assignors to Smith Corona Corporation, Cortland, N.Y.**

**Filed Oct. 15, 1986, Ser. No. 918,965**
**Int. Cl.[4] B41J** *1/30*
**U.S. Cl. 400—144.2** **12 Claims**



**1.** In an impact printing device including a carrier moveable along a print line direction during a printing operation, a printing element having a home position and mounted on the carrier for movement therewith, means including a motor for rotating the printing element to its home position, and an improved printing element homing device comprising:

a. a switch for energizing the motor; and

b. switch control means mounted on the carrier;

c. means for moving said carrier and switch control means mounted thereon to a first predetermined position;

d. said control means responsive to movement to the first predetermined position for closing the switch means for energizing the motor to move the printing element to its home position;

e. means for moving said carrier and switch control means thereon to a second predetermined position; and

f. said control means responsive to said movement of the switch control means to the second predetermined position for latching the printing element in its home position and deenergizing the motor.

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**4,746,236**

## PRINTER WITH A MOTOR CONTROLLED BY CHOPPING MEANS

**Junji Shioda, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan**

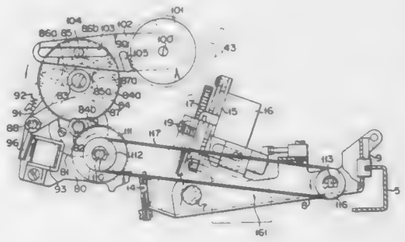
**Filed Dec. 27, 1985, Ser. No. 813,883**
**Claims priority, application Japan, Dec. 28, 1984, 59-275212**
**Int. Cl.[4] B41J** *23/34*
**U.S. Cl. 400—187** **5 Claims**

**1.** A printer which has a printing hammer, a printing ribbon interposed between the printing hammer and a printing medium, a printing medium feed mechanism including a platen movable with the printing medium thereon, and a printing section including a printing ribbon feed mechanism for feeding the printing ribbon and a hammer actuating mechanism for actuating the printing hammer, said printer comprising:

a single DC motor supplied with a predetermined supply voltage;

transmission means for selectively connecting the motor to the printing medium feed mechanism and the printing section, said transmission means including electromagnetic means operative selectively to transmit the driving force of the motor to the printing section and the printing medium feed mechanism, whereby said printing section and the printing medium feed mechanism are operated respectively;

chopping means operative chop the predetermined supply voltage so as to reduce the driving force and rotating speed of the motor;



signal generating means for generating a printing signal commanding the operation of the printing section and a feed signal commanding the operation of the printing medium feed mechanism; and

control means responsive to the signals generated by the signal generating means for controlling the chopping means and the electromagnetic means, said control means rendering the printing section through the electromagnetic means operative and the chopping means and the printing medium feed mechanism inoperative when the signal generating means generates the printing signal, and rendering the chopping means and the printing medium fee mechanism through the eletromagnetic means operative and the printing section inoperative when the signal generating means generates the feed signal.

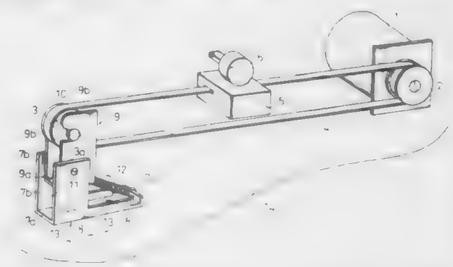
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**4,746,237**

## TENSION ADJUSTING DEVICE OF CARRIAGE TRANSFER BELT

**Takashi Takeda, Iwate, Japan, assignor to Alps Electric Co., Ltd., Japan**

**Filed Jun. 4, 1986, Ser. No. 870,779**
**Claims priority, application Japan, Jun. 4, 1985, 60-83391[U]**
**Int. Cl.[4] B41J** *19/56*
**U.S. Cl. 400—335** **4 Claims**



**1.** A tension adjusting device for a carriage transfer belt which extends lengthwise in a longitudinal direction of a chas-

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sis with a driving source at one end and is entrained over a tension pulley at an opposite end, comprising:

a first bracket having a lower longitudinally extending plate mounted to said chassis, a mounting plate fixed so as to extend in an upright direction from said lower plate, and means for adjustably setting the position of said first bracket in the longitudinal direction of said chassis so that it can be fixed in a desired longitudinal position for putting tension on the tension pulley;

a second bracket pivotably mounted at an intermediate portion thereof to said mounting plate of said first bracket so as to pivotably extend in an upright direction from said lower plate, and having said tension pulley supported at an upper end of said second bracket; and

a spring coupled between a lower end of said second bracket and an end of said lower plate of said first bracket so as to apply a spring-biased rotative lever force to said tension pulley supported on said upper end of said second bracket in the opposite longitudinal direction from said driving source using said intermediate portion as a fulcrum, such that said tension pulley applies a tension force on said belt.

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**4,746,238**

## STICK SWAB WITH AUGURED HEAD

**Robert A. Levine, 31 Pilgrim La., Guilford, Conn. 06437**

**Filed Nov. 3, 1986, Ser. No. 925,979**

**Int. Cl.[4] B05C** *21/00*

**U.S. Cl. 401—196** **7 Claims**



1. A stick swab for cleaning bodily orifices such as the ear, and comprising: a stick portion; means forming elongated swab heads on each end of said stick portion, one of said swab heads having an enlarged helical ribe with a left hand spiral, and the other of said swab heads having an enlarged helical rib with a right hand spiral when said stick swab is viewed in elevation; and means visible on said stick portion for indicating a direction for rotating said stick swab about its axis, which direction will cause both of said swab head ribs to augur material out of the orifice when said swab heads are inserted into the orifice.

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**4,746,239**

## SUPPORT STRUCTURE WHICH CAN BE PUT TOGETHER FROM SHEET METAL PARTS

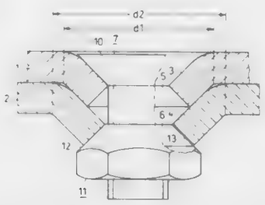
**Ulrich Marquardt, Berlin, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany**

**Filed Oct. 29, 1986, Ser. No. 924,696**

**Claims priority, application Fed. Rep. of Germany, Nov. 11, 1985, 3540329**

**Int. Cl.[4] B25G** *3/00;* **F16D** *1/00*

**U.S. Cl. 403—24** **1 Claim**




1. A support structure assembled from sheet metal parts wherein the sheet metal parts comprise side walls and cross beams connecting the side walls together of a housing of a low-voltage circuit breaker, said sheet metal parts being provided with funnel-shaped rimmed holes each having the same funnel angle and having openings disposed centrally through the rimmed holes, said parts adapted to be connected by a countersunk screw and nut means, said nut means comprising a conical nut having a conical surface having an angle the same as an inner conical surface of the opening of a corresponding rimmed hole, the rimmed holes of the two parts overlying one another in the assembled condition.

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**4,746,240**

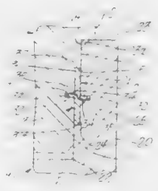
## SELF CRIMPING CONNECTION FOR INNER AND OUTER MEMBERS AND METHOD OF ASSEMBLING THE SAME

**Carl D. Tarum, Saginaw, and D. Craig Cook, Frankenmuth, both of Mich., assignors to General Motors Corporation, Detroit, Mich.**

**Filed Apr. 1, 1987, Ser. No. 32,640**

**Int. Cl.[4] B25G** *3/28;* **F16G** *11/00;* **B21D** *39/00;* **B23P** *11/00*

**U.S. Cl. 403—282** **4 Claims**



1. A self crimping connection for inner and outer members includes an inner member having a body portion with one end thereof provide with a stepped diameter cylindrical surfaces defining an external inboard wall and an outboard wall of reduced diameter relative to the inboard wall with said inboard wall and said body portion, and said outboard wall and inboard wall being interconnected by first and second flat shoulders, respectively and having an annular slot in said outboard wall; an outer member having a body portion with a stepped bore in one end thereof defining a circular internal outboard wall and an inboard wall each of a diameter slidably receiving said inboard wall and said outboard wall of said first member, respectively, with said outboard wall being connected to said inboard wall by a flat shoulder and having an annular groove therein, said outboard wall of said outer member defining with said outboard wall of said inner member between said second flat shoulder and said flat shoulder an annulus chamber when said first shoulder is in abutment against the outer end surface of said outer member; and, first and second bushings means positioned in said annulus chamber with said first bushing means having one end thereof in abutment with said second shoulder and its opposite end portions extending into said annular groove in said outboard wall of said outer member and, said second bushing means having one end thereof in abutment against said flat shoulder and its opposite end portions extending into said annular slot inner said inner member.

4. A method of assembling an inner member to an outer member by self crimping connection, said method including providing said inner member with stepped external diameter walls to thus define an annular outboard wall and an inboard wall of greater diameter that is connected to said outboard wall by a flat first shoulder, and to the main body portion by a flat second shoulder, providing said outboard wall with an annular groove intermediate the end thereof; providing said outer member with a stepped bore at one end thereof so as to define circular, inboard and outboard walls each of a diameter so as to slidably receive said outboard and inner walls, respectively, of said inner member, with said inboard and outboard walls of said outer member being interconnected by a flat shoulder, placing a ring-like second bushing having a body portion and spaced apart cam/crimp portions integral with one end of said body portion so as to encircle said outboard wall of said outer member in abutment against said flat shoulder, placing a ring-like first bushing having a body portion with spaced apart cam/crimp portions extending therefrom so as to encircle said outboard wall of said inner member with the opposite end of said body portion of said first bushing in abutment against said first shoulder, inserting said inner member with said first bushing into said outer member until said cam/crimp portions of said first bushing engage said cam/crimp portions of said second bushing and, then axially moving said inner member into said outer member with a sufficient axial force whereby a portion of said cam/crimp portion of said first bushing are crimped into locking engagement inside said annular groove in said outer member by the sliding engagement of said cam/-crimp portions of said first bushing against the said cam/crimp portions of said second bushing and a portion of said cam/-crimp portions of said second bushing are crimped into locking engagement inside said annular groove in said inner member by the sliding engagement of said cam/crimp portions of said second bushing against the said cam/crimp portions of said first bushing.

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**4,746,241**

## HINGE CLAMP FOR SECURING A SENSOR MODULE ON A POWER TRANSMISSION LINE

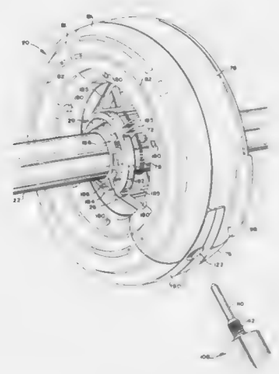
**John E. Burbank, III, Ridgefield, Conn., assignor to Niagara Mohawk Power Corporation, Syracuse, N.Y.**

**Division of Ser. No. 484,681, Apr. 13, 1983, Pat. No. 4,689,752.**

**This application Mar. 31, 1986, Ser. No. 846,551**

**Int. Cl.[4] B25G** *3/00;* **F16D** *1/00*

**U.S. Cl. 403—344** **10 Claims**



1. Apparatus for mounting a sensing device on a power line conductor comprising:

a generally toroidal shaped housing for containing said sensing device, said housing comprising two semi-annular housing sections with opposed clamping faces;

a hinge mechanism comprising a pair of hinge pins for connecting each of said housing sections to said mechanism and for enabling said sections to move to an open position to admit said power line conductor and for enabling said sections to move to a closed position about said conductor;

a pair of section operating members each attached between one of said hinge pins and a clamping face of one of said sections;

a loop of cable mounted about said section operating members where said operating members attach to said opposed clamping faces; and

cable pulling means for pulling said loop of cable and drawing said section operating members together whereby said opposed faces move toward each other and said housing moves toward a closed position.

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**4,746,242**

## FLEX-LOCK DOVETAIL MOUNTING APPARATUS FOR RADIO TRANSCEIVERS AND ACCESSORIES

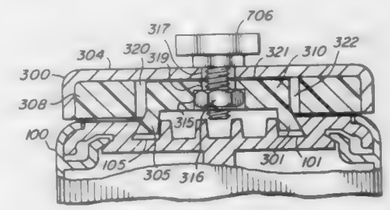
**Nicholas Mischenko, Mt. Prospect, Ill., assignor to Motorola, Inc., Schaumburg, Ill.**

**Division of Ser. No. 858,427, May 1, 1986, Pat. No. 4,681,476.**

**This application Mar. 23, 1987, Ser. No. 28,859**

**Int. Cl.[4] F16B** *2/14*

**U.S. Cl. 403—373** **4 Claims**




1. Improved dovetail mounting apparatus for retaining a housing having on one side thereof at least two channels producing a dovetail, comprising:

a base plate having a flat portion on a first end thereof and a channelled portion formed by first and second raised sides and a second end thereof;

a first slide plate attached to said channelled portion of said base plate and having at least two rails for inserting into corresponding ones of said channels of said housing;

a second slide plate attached to said channelled portion of said base plate and having at least two rails producing a dovetail, each rail of said second slide plate being substantially aligned with a corresponding one of said rails of said first slide plate for inserting into a corresponding one of said channels of said housing;

means attached to said second slide plate for forcing said channels away from said rails of said second slide plate thereby producing friction between said rails of said second slide plate and said channels of said housing; and

means coupled to said flat portion of said base plate for locking said housing in said channelled portion of said base plate.

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**4,746,243**

## APPARATUS AND METHOD FOR RAPID REPAIR OF DAMAGED AIRFIELD RUNWAYS

**Gary D. Perry, Lubbock, Tex., assignor to Eagle-Picher Industries, Inc., Cincinnati, Ohio**

**Filed May 29, 1986, Ser. No. 867,934**

**Int. Cl.[4] E01C** *5/00, 11/02*

**U.S. Cl. 404—35** **18 Claims**

11. A covering for a breach in a trafficable surface, comprising:

(a) a mat for overlying the breach, said mat having opposed leading and trailing edges;

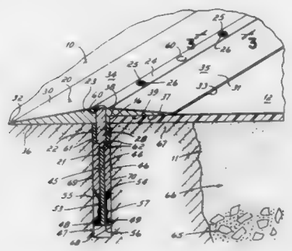
(b) an elongated anchor adapted to be secured within a slot in said surface, said slot lying substantially adjacent and parallel to at least one of said leading and trailing edges;

(c) a generally horizontally extending threshold joined to the upper end of said anchor, said threshold having a ramp flange and an opposed clamp flange, said ramp flange having an underside adapted to rest atop said surface, said clamp flange having a recess forming an underside surface which captures at least a portion of at least one of said leading and trailing edges beneath said threshold when said anchor is secured within said slot.

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18. The method of repairing a cratered runway, comprising the steps of:
(a) covering the crater with a mat;
(b) cutting a slot into the runway along an edge of said mat;
(c) securing within said slot the vertically depending elongated anchor of an elongated member of substantially



T-shaped cross-section, said elongated member having in addition to said anchor a ramp flange and an opposed clamp flange, said ramp flange having an underside resting atop said runway, said clamp flange having a recess forming an underside surface which captures at least a portion of an edge of said mat beneath said clamp flange when said anchor is secured within said slot.

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**4,746,244**

## APPARATUS FOR THE GENERATION OF HYDROELECTRIC POWER AND METHOD OF MANUFACTURING AND INSTALLING SAME

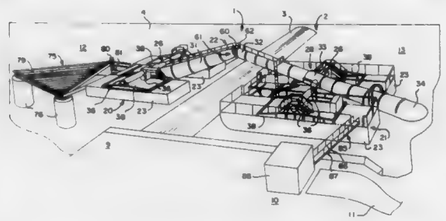
**Kenneth R. Broome, Reading, Pa., assignor to Williams and Broome, Inc., Exton, Pa.**

**Continuation-in-part of Ser. No. 773,408, Sep. 6, 1985, abandoned, which is a continuation of Ser. No. 597,465, Apr. 6, 1984, Pat. No. 4,540,313. This application Aug. 15, 1986, Ser. No. 897,104**

**The portion of the term of this patent subsequent to Feb. 3, 1904, has been disclaimed.**

**Int. Cl.⁴ E02B *9/00***

**U.S. Cl. 405—78** **69 Claims**



1. An apparatus for generating hydroelectric power in association with damming means spanning at least portions of a fluid flow, said apparatus comprising:
a first body adapted for floating and located adjacent to and upstream of said damming means, said first floating body supporting means for withdrawing fluid from said fluid flow;
a second body adapted for floating and located adjacent to and downstream of said damming means, said second floating body supporting means for generating said power in response to a received water flow and head; and
penstock means having respective ends attached to and extending between portions of the first floating body and portions of the second floating body so that said fluid withdrawing means is placed in fluid communication with said power generating means, and so that fluid withdrawn by said fluid withdrawing means is capable of being delivered over the damming means to said power generating means to develop said water flow and head.

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**4,746,245**

## OFFSHORE DRILLING AND/OR PRODUCTION SYSTEM

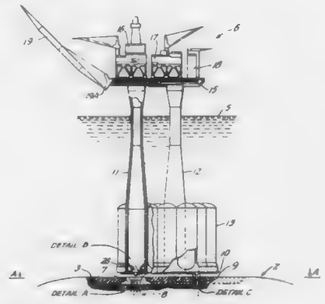
**Harald J. Mork, Sandnes, Norway, assignor to Den norske stats oljeselskap a.s., Norway**

**Filed Feb. 28, 1986, Ser. No. 834,798**

**Claims priority, application Norway, Mar. 1, 1985, 850836**

**Int. Cl.⁴ E02B *17/00***

**U.S. Cl. 405—224** **18 Claims**



1. An offshore drilling system comprising:
(a) a substantially flat drilling template having a well hole therein for drilling a well therethrough and a guide hole therein for aligning a gravity platform over said well hole; said template fixed to a surface that defines the bottom of the water, said template being below water level;
(b) said gravity platform comprising:
(i) a deck positioned above water level;
(ii) a base of cells positioned below water level;
(iii) a guide pin attached to said base for fitting into said guide hole; and
(iv) a substantially vertical shaft connected at one end to said deck and at the other end to said base, said shaft having a vertical through hole, said vertical through hole having an opening at said other end that mates with said well hole in said template such that said well hole communicates through said vertical through hole to said deck.

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**4,746,246**

## REMOTELY ACTUATED CUTTING ASSEMBLY FOR BROKEN UNDERWATER GUIDELINES

**William S. Cowan, and Douglas D. Hall, both of Houston, Tex., assignors to National-Oilwell, Houston, Tex.**

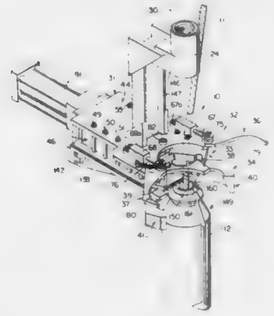
**Filed Oct. 14, 1981, Ser. No. 311,261**

**Int. Cl.⁴ E21B *7/12***

**U.S. Cl. 405—191** **15 Claims**

1. An apparatus for remotely cutting a broken guideline extending from an underwater guide post, the combination comprising:
a frame;
clamping means, coupled to said frame, for releasably clamping said frame to the guide post in a predetermined location on the guide post;
a pair of opposed cutting jaws pivotally coupled to said frame above said clamping means; and
remotely actuated power means, coupled to said frame and including a member engageable with both of said cutting jaws, for pivoting said cutting jaws across the longitudinal axis of the broken guideline to sever the guideline from the guide post,
said cutting jaws and said clamping means being spaced apart by a fixed distance so that the lowermost part of said cutting jaws is immediately adjacent the top of the guide post when said clamping means clamps said frame to the





guide post in said predetermined location on the guide post.

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**4,746,247**

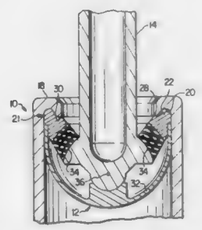
## STABILIZING RING FOR INTERLOCKING LOAD RING/BACK FLANGE INTERFACE

**Edward J. Arlt, III; Frank J. Kovitch; Donald MacLachlan, and Charles M. Reinhardt, all of Arlington, Tex., assignors to Lockheed Corporation, Calabasas, Calif.**

**Filed Jan. 30, 1987, Ser. No. 8,946**

**Int. Cl.⁴ B63B *21/50***

**U.S. Cl. 405—224** **8 Claims**



1. An improved keyhole latch assembly comprising:
a hollow receptable having sides and an open end;
a non-continuous load ring having an underside formed integrally with said receptacle and extending inwardly from said sides, said underside of said load ring having a first mating surface;
a flex joint and latch assembly having a back flange defining an upper suface, said upper surface having a second mating surface, complementary to said first mating surface, for interlocking said underside of said load ring with said upper surface of said back flange of said flexible joint and latch assembly;
one of said first and second mating surfaces being a groove and the other of said first and second mating surface being a protrusion for mating with said groove;
a tension member attached to said flex joint and latch assembly for exerting a tensioning force which urges said first mating surface of said load ring and said complementary second mating surface of said upper surface of said flex joint and latch assembly into interlocking engagement;
said hollow receptacle having an opening formed in one of said sides to allow insertion of said flex joint and latch assembly and a portion of said tension member;
whereby the flex joint and latch assembly and portion of the attached tension member are inserted into the keyhole so that said complementary second mating surface of the upper surface on the back flange of the flex joint and latch assembly is urged into interlocking engagement with the first mating surface of the underside of the load ring of the hollow receptacle due to the biasing force exerted by said tension member.

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**4,746,248**

## ANCHOR BOLT ASSEMBLY

**Jack W. Lillis, Berryville, Va., and Ronald D. Unger, Martinsburg, W. Va., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Feb. 19, 1987, Ser. No. 16,395**

**Int. Cl.⁴ E21D *20/02***

**U.S. Cl. 405—260** **7 Claims**



1. A bolt assembly for securing a bolt in a bore hole having a settable bonding material therein comprising in combination
(a) an elongated bolt,
(b) means for mixing at least a portion of said bonding material in said bore hole upon rotation of said bolt,
(c) support means engaged by said bolt for applying force against an area surrounding the mouth of said bore hole comprising first and second support members positioned on said bolt, said first member having a planar surface adjacent to said area and an opposing surface releaseably adhered to a contiguous surface of said second member by a latent lubricating material, said lubricating material becoming an active lubricant in response to heat generated during rotation of said bolt, and
(d) means for tensioning said bolt in said bore hole as said bonding material sets to a hardened state.

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**4,746,249**

## PUMPABLE BACKFILL MATERIAL OF HIGH STRENGTH

**Jeffrey G. Haigh, Coleshill, England, and Andrew J. Marsh, Alberton, South Africa, assignors to Fosroc International Limited, Birmingham, England**

**Filed Jul. 2, 1986, Ser. No. 881,380**

**Claims priority, application United Kingdom, Jul. 4, 1985, 8516961**

**Int. Cl.⁴ E02D *3/00, 15/00***

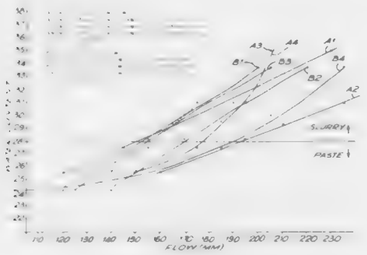
**U.S. Cl. 405—264** **10 Claims**

1. A pumpable backfill slurry for use in forming a load bearing backfill in mining or tunnelling, comprising the fines derived from the treatment of ore bearing rocks, and water; and an additive comprising a settable pozzolanic reinforcing material in a concentration which will cause the placed backfill to have load bearing properties, a lubricant to facilitate the pumpability of the slurry, and a plasticizer to exert a plasticizing effect on the solids of the slurry, the concentration of the lubricant and the plasticizer being selected so that the slurry may readily be pumped and in which the water comprises up to

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about 28% by weight of the slurry, whereby a paste like slurry is formed, which will flow in a non-turbulent manner when




pumped and wherein said slurry will set in layers to form a set material substantially free of weakening voids.

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**4,746,250**

**DEVICE FOR INTRODUCING A DOSED QUANTITY OF POWDER INTO A CARRIER GAS STREAM**

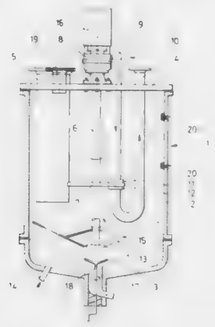
**Fritz Schoppe, Gustav-Adolf-Strasse 5, D-8192 Geretsried 2, Fed. Rep. of Germany**

**PCT No. PCT/DE85/00016, § 371 Date Sep. 9, 1986, § 102(e) Date Sep. 9, 1986, PCT Pub. No. WO86/04316, PCT Pub. Date Jul. 31, 1986**

**PCT Filed Jan. 21, 1985, Ser. No. 920,983**

**Int. Cl.⁴ B65G** *53/46*

**U.S. Cl. 406—63** **13 Claims**



**1**. An apparatus for the dosed incorporation of a dust-like substance into a carrier gas stream being under increased pressure, comprising means for providing said carrier gas stream, a reservoir for receiving solid dust, means for converting the dust to a flowable state, a rotatingly driven disc submerged in the dust within said reservoir, and a tube traversing said reservoir and conveying the carrier gas stream, said tube being severed in the region of said disc and including two openings each having an opening area and enclosing therebetween, in sandwiched fashion, a partial area of said disc provided with passage holes, said passage holes having a length and a hydraulic diameter, wherein the ratio that said length bears to said hydraulic diameter is smaller than 5 and the dimensions of the disc holes and of the opening area of the tube as well as the arrangement of the holes are so selected that only approximately 4 to 8 holes are located in the opening area at a time and that a hole enters said opening area upon rotation of said disc when almost a third of the cross-section of a directly preceding hole is already located within said opening area, and wherein said means for providing said carrier gas stream are adapted to provide a dynamic pressure of said carrier gas stream of at least 10 mm column of water.

**4,746,251**

**METHOD OF DIGITIZING A PROFILE LOCUS**

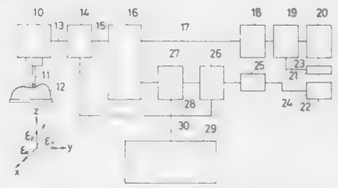
**Hirofumi Yoshikawa, and Yuso Matsunaga, both of Hiroshima, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Japan**

**Filed Jan. 23, 1986, Ser. No. 821,707**

**Claims priority, application Japan, May 24, 1985, 60-110160**

**Int. Cl.⁴ B23Q** *35/14;* **G05B** *19/18*

**U.S. Cl. 409—84** **5 Claims**



**1**. In a profiling method for performing NC working on the basis of locus data obtained by profiling a shape of a model by a stylus in a profiling machine, a method of digitizing profile locus data comprising steps of: rounding position data of a surface of the model, obtained by adding a position signal of the profiling machine and a displacement signal from a tracer head, at each sampling time upon profiling operation by means of a low-pass filter having a changeable time constant; and automatically changing the time constant of said filter in response to a rate of change of the shape of the model, wherein the time constant of said filter is decreased when the rate of change of the shape of the model increases.

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**4,746,252**

**SPINDLE OF A MACHINE TOOL**

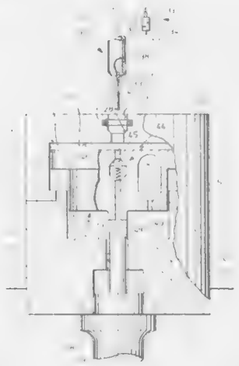
**Richard Jesinger, Esslingen am Neckar, Fed. Rep. of Germany, assignor to Fortuna-Werke Maschinenfabrik GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed May 20, 1987, Ser. No. 52,629**

**Claims priority, application Fed. Rep. of Germany, May 21, 1986, 3617103**

**Int. Cl.⁴ B23C** *5/26;* **B23B** *31/10*

**U.S. Cl. 409—233** **14 Claims**



**1**. A spindle of a machine tool mounted for rotation about a longitudinal axis and comprising:

drive means for driving a rotating part of said spindle at at least 30,000 revolutions per minute;

clamping means for clamping and releasing a tool resp.;

energy storing means assuming a first state of charge when said tool is not clamped and assuming a second state of charge resp. to tighten said clamping means when said tool is to be clamped;

actuating means for effecting a change between said first and second state of charge of said energy storing means;

releasable connection means for supplying an external force to said actuating means for effecting said change, said clamping means, said energy storing means, said actuating means and said connection means being all arranged in said rotating part of said spindle.



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**4,746,253**

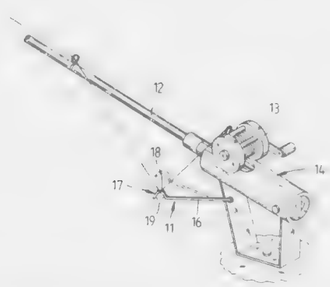
**FISHING LINE MOVEMENT INDICATOR**

**Billy R. Simmons, Odenville, Ala., assignor to Nancy B. Crews, Odenville, Ala.**

**Filed Aug. 6, 1987, Ser. No. 82,330**

**Int. Cl.⁴ A01K** *97/00*

**U.S. Cl. 43—17** **5 Claims**



**1**. An attachment for providing a visual indication of line movement for use with a fishing rod or rod holder comprising:

(a) a first elongated portion lying in a plane transverse to the longitudinal axis of said rod, said elongated portion being resilient and having greater flexibility than said rod at its tip; and

(b) a line engaging portion formed on said elongated portion distal said rod and terminating said elongated portion;

(c) said elongated portion and said line engaging portion being made from spring steel wire of about 0.024 inch diameter;

(d) said wire being sheathed in lightweight plastic having luminescent properties.

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**4,746,254**

**MATERIAL HANDLING ATTACHMENT FOR A TRACTOR HAVING A MULTIPLE-POINT HITCH ASSEMBLY INCLUDING A HIGH-LIFT MECHANISM**

**Joseph W. Langenfeld, and Neal W. Westendorf, both of Onawa, Iowa, assignors to Westendorf Mfg. Co., Inc., Onawa, Iowa**

**Continuation-in-part of Ser. No. 814,043, Dec. 27, 1985. This application Sep. 15, 1986, Ser. No. 907,322**

**Int. Cl.⁴ B66C** *3/02*

**U.S. Cl. 414—703** **1 Claim**

**1**. In combination,

a tractor having a vertically movable three-point hitch assembly provided thereon, said hitch assembly being vertically movable between a lower position and an upper position,

a high-lift mechanism secured to said three-point hitch assembly comprising a frame means having upper and lower ends, a first elongated arm means pivotally secured, at one end, to said frame means adjacent the upper end thereof and extending therefrom, a second elongated arm means pivotally secured, at one end, to said frame means below the pivotal connection of said first arm means and said frame means, means operatively connected to said second arm means for pivotally moving the other end of said second arm means between upper and lower positions,

bucket support frame means pivotally secured to the said other ends of said first and second arm means for vertical movement therewith whereby said bucket support frame means may be independently vertically moved relative to said frame means of said high-lift mechanism, said bucket support frame means being vertically movable between upper and lower positions relative to said frame means of said high-lfit mechanism,

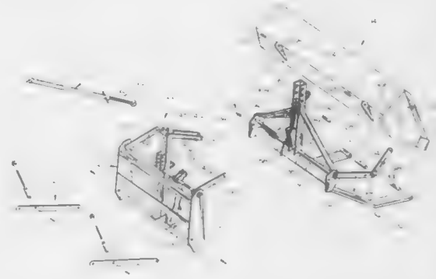
a materials handling bucket pivotally mounted on said bucket support frame means and being movable between working and dumping positions,

and linkage means operatively interconnecting said bucket, said bucket support frame means and said high-lift mechanism which positions said bucket in its working position when said bucket support frame means is in its said lower position and which automatically positions said bucket in its dumping position when said bucket support frame means is in its said upper position,

said bucket support frame means comprising an elongated horizontally disposed support positioned transversely with respect to the longitudinal axis of the tractor and having opposite ends,

an upstanding post means secured at its lower end to said support at the center of said support, said other end of said second arm means being pivotally secured to said support,

the said other end of said first arm means being pivotally secured to said upstanding post means adjacent the upper end thereof,



said linkage means comprising a horizontally disposed shaft operatively rotatably mounted on said support and being parallel thereto, an actuator means mounted on said shaft to cause the rotation of said shaft,

connection means extending between said actuator means and said high-lift mechanism whereby upward movement of said bucket support frame means relative to said high-lift mechanism will cause said shaft to be rotated, by said actuator means in a first direction,

first and second arms rigidly secured to the opposite ends of said shaft and extending therefrom, first and second spaced-apart support arms rigidly secured, at one end thereof, to said support and extending therefrom,

the other ends of said first and second support arms being pivotally secured to said bucket,

first and second elongated links pivotally secured at one end to the said other ends of said first and second arms respectively, the other ends of said links being pivotally secured to said bucket, the relationship of said bucket, links, arms and support arms being such that said bucket will pivotally move to its working position when said bucket support frame means is in its said lower position and will remain so until said bucket support frame means is raised to a predetermined height relative to said high-lift mechanism.

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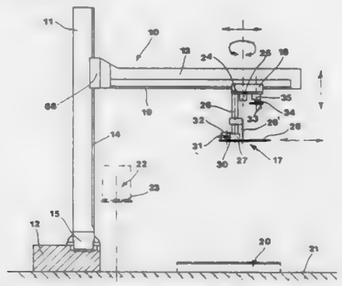


**4,746,255**

## MACHINE FOR AUTOMATICALLY LOADING PALLETS

**Graziano Roccabianca, Via Roma 84, S.M. Camisano Vicentino (VI), and Claudio Santacà, Via Lungochiampo, 34 Montebello Vicentino, both of Italy**

**PCT No. PCT/IT86/00044, § 371 Date Jan. 27, 1987, § 102(e) Date Jan. 27, 1987, PCT Pub. No. WO86/07579, PCT Pub. Date Dec. 31, 1986**
**PCT Filed Jun. 19, 1986, Ser. No. 12,667**
**Claims priority, application Italy, Jun. 19, 1985, 22218 B/85[U]**
**Int. Cl.⁴ B65G** *57/06*
**U.S. Cl. 414—84** **2 Claims**



1. Machine for automatic transfer of objects especially packages of books, from a line or point of arrival or of production to loading pallets and for placing said objects in the best or preferred way on the pallets or else for transferring said objects from the pallets to lines or points of further processing or use, comprising a grab for picking up and setting down the objects especially packages of books, controlled by an electronic control panel directly from a computer to take up any position in space in relation to the objects and the pallets, characterized in that the grab is provided with horizontal blades mounted for axial translation through a horizontal slit passing from one side to the other of a support located at the lower extremity of a vertical arm, the blades moving through the slit from the rear face to the front face of the arm to pick up the object and moving through the slit from the front face to the rear face of the arm to release the object, the blades being enclosed in an annular sheath of flexible material, the ends of which are attached to the front and rear sides respectively of the arm above the slit, such that the blade slide through the slit within the sheath and the sheath lies between the blades and the object, rearward movement of the blades resulting in release of the object onto a receiving surface without friction between the objects, the blades and the sheath.

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**4,746,256**

## APPARATUS FOR HANDLING SENSITIVE MATERIAL SUCH AS SEMICONDUCTOR WAFERS

**Edward F. Boyle, and G. Scott Wilkins, both of Gig Harbor, Wash., assignors to Roboptek, Inc., Gig Harbor, Wash.**

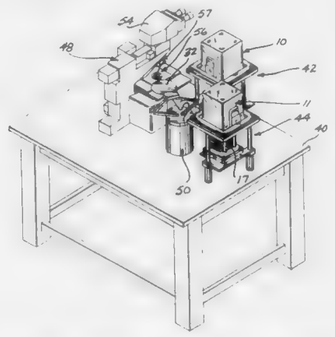
**Filed Mar. 13, 1986, Ser. No. 839,790**
**Int. Cl.⁴ B65G** *65/34;* **B65H** *5/08*
**U.S. Cl. 414—217** **15 Claims**

1. An apparatus for handling a sensitive material in a self-contained environment, the sensitive material being stored in a box having a cover, a bottom, means for releasably connecting and sealing the cover to the bottom, and a carrier for supporting the sensitive material, the apparatus comprising:

a base;

a canopy attached to the base so as to create an enclosed space therebetween, the canopy including a port door releasably secured to the canopy, the port door including an upper surface adapted for supporting the bottom of the box;

manipulator means comprising a robot assembly for both moving the carrier out of the cover after the box has been positioned on the port door and for transferring the sensitive material between the carrier and another location within the enclosed space; and



electronic control means for controlling the manipulator means.

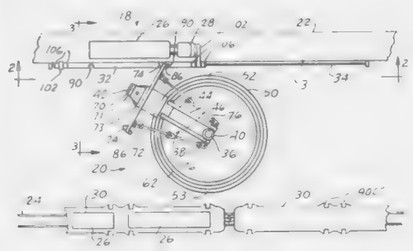
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**4,746,257**

## ROAD-RAIL TRAILER AND CONTAINER TRANSFER SYSTEM

**Barry, Leonard D., 19300 Pennington, Detroit, Mich. 48221**

**Filed Jun. 3, 1985, Ser. No. 740,368**
**Int. Cl.⁴ B65G** *67/02*
**U.S. Cl. 414—392** **4 Claims**



1. In a system for use with a highway operable vehicle of the type used to haul a load, said system allowing the vehicle to operate a rotary loader to transfer the load between the vehicle and the loader, said loader being of the type having a turntable loadspreader mounted to turn horizontally on the radial end of a load support arm that rotates horizontally about a pivot to load or unload the highway vehicle; said system including in combination a driveway for the vehicle, a track and a coupling runner mounted to travel on said track along the side of said driveway facing said loader, retractable means on said runner for extending over said driveway for engaging said highway vehicle on said driveway with said runner for moving said runner along said track by driving said highway vehicle or to retract and permit the vehicle to pass thereby, said rotary loader having said pivot spaced from said side for said loader to make a transfer arc over said driveway, coupling means for engaging and aligning said rotary loader with said runner for moving said loader with said coupling runner when said retractable means is moved by said vehicle in alignment for the loader to transfer a load between said loadspreader and said vehicle.

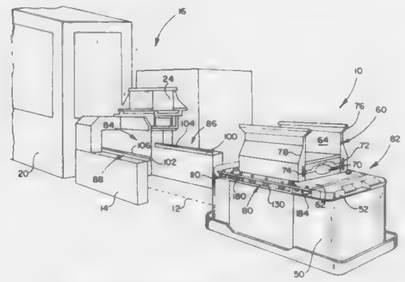


**4,746,258**

## FLOATING TABLE FOR ARTICLE TRANSPORT VEHICLE

**Weston R. Loomer, Florence, and Randall P. Coons, Fort Mitchell, both of Ky., assignors to Litton Systems, Inc., Del.**

**Filed Sep. 13, 1985, Ser. No. 775,633**
**Int. Cl.⁴ B65G** *67/02*
**U.S. Cl. 414—401** **9 Claims**



1. A guided vehicle; comprising:

(a) vehicle body means;

(b) article carrier means carried by said vehicle body means for relative movement with respect to said vehicle body means but so as to occupy a predetermined position of predetermined alignment with respect to said vehicle body means;

(c) carrier mounting means mounting said article carrier means to said vehicle body means for said relative movement with respect to said vehicle body means and so as to facilitate disposition of said article carrier means in said predetermined position of predetermined alignment;

(d) said carrier mounting means including a predetermined number of ball transport means arranged in at least two parallel rows, each of said parallel rows being spaced from the other and including at least two of said ball transport means;

(e) mounting means including a plurality of mounting plates carried by said article carrier means so that each of said mounting plates is disposed for coaction with one of said predetermined ball transport means;

(f) said carrier mounting means being responsive to the application of generated forces to said article carrier means and/or to said carrier means to permit movement of said article means from said predetermined position of predetermined alignment to a position displaced therefrom; and

(g) said carrier mounting means further upon removal of said generated forces automatically effecting movement of said article carrier means back to said predetermined position of predetermined alignment.

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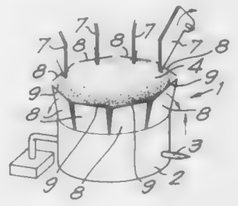
**4,746,259**

## APPARATUS FOR REMOVING THE WRAPPER FROM A WRAPPED FIBRE BUNDLE

**Leonel Boucherie, Roeselare-Rumbeke, Belgium, assignor to Firma G.B. Boucherie, naamloze venoot-schap, Izegem, Belgium**

**Division of Ser. No. 826,952, Feb. 4, 1986, Pat. No. 4,680,850.**
**This application Apr. 29, 1987, Ser. No. 43,822**
**Claims priority, application Belgium, Feb. 26, 1985, 2/60629**
**Int. Cl.⁴ B65B** *21/02, 69/00;* **B65G** *65/04, 65/34*
**U.S. Cl. 414—412** **10 Claims**

1. Arrangement for removing the wrapper from a fibre bundle comprising the combination of a wrapped fibre bundle holding magazine (16), a clamping part (13) for gripping said fibre bundle (1) at said wrapper (2), a cutting part (14) for partly cutting along the length of said wrapper (2), a folding part (15) for folding over the cut length of said wrapper thereby partly freeing said bundle of fibres (4) from said wrapper (2); and a pair of fibre-gripping tongs (11) that can act on the freed part of said bundle of fibres (4) to remove said bundle



of fibres from said wrapper and carry same away to a suitable arrangement.

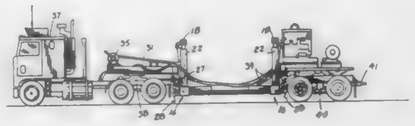
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**4,746,260**

## TRANSPORT AND LIFTING APPARATUS FOR RAILWAY CARS

**Don Norvell, P.O. Box 62, Pasco, Wash. 99301**

**Filed Mar. 6, 1987, Ser. No. 22,737**
**Int. Cl.⁴ B60P** *1/64, 3/40*
**U.S. Cl. 414—460** **5 Claims**



1. An apparatus for facilitating the lifting and the transporting of a railway car following removal of its supporting wheel trucks from beneath a pair of transverse frames that are located inwardly adjacent to the outer ends of the railway car and are attached to a central longitudinal beam extending beneath the railway car, comprising:

first and second independently movable wheel-supported frames;

an elevationally adjustable forklift assembly movably mounted on each wheel-supported frame, each forklift assembly having an upright member adapted to abut one outer end of a railway car located between them, and also having a perpendicular protruding lower member adapted to be engaged beneath the outer end of a railway car for lifting purposes;

power means operably mounted between each wheel-supported frame and its forklift assembly for selectively imparting elevational movement to the forklift assembly relative to the frame;

releasable securing means on the wheel-supported frames engageable with a railway car for preventing longitudinal movement of it relative to the abutting forklift assemblies;

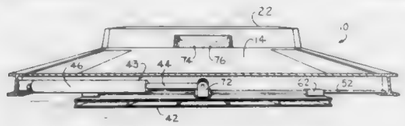
the perpendicular protruding member comprising a pair of longitudinally hollow horizontal arms spaced transversely from one another by a distance sufficient to straddle the central longitudinal beam beneath a railway car while engaged beneath one of its outer ends; and

the securing means including an extendible member entrained through at least one arm and having one end adapted to be selectively secured to a transverse frame member of the railway car adjacent the outer end engaged by it, the remaining end of the extendible member being secured to one of the arms to maintain an operative section of the extendible member between the transverse frame member and the forklift assembly in tension.

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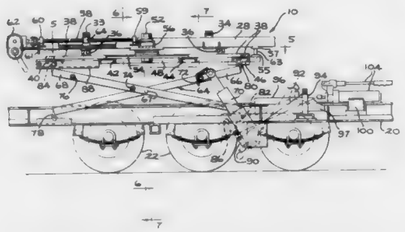
**4,746,261**
**SELF-LOADING TILT-BED TRAILER HAVING TRANSVERSE BED REALIGNMENT MEANS**
**Donald R. Landoll; Alfred R. Belknap; Michael C. Domine, and Kyle D. Swart, all of Marysville, Kans., assignors to Landoll Corporation, Marysville, Kans.**
**Filed Feb. 2, 1987, Ser. No. 9,680**
**Int. Cl.[4] B60P *1/04***
**U.S. Cl. 414—475** **12 Claims**



1. In a trailer for loading and hauling large objects, the improvement comprising:
an elongated tiltable bed normally disposed in a substantially horizontal road traveling position;
a mechanism coupled with said bed for tilting the latter about a tranverse horizontal axis from said road traveling position to a downwardly and rearwardly inclined position;
means for pivotally coupling a front end of said bed to a towing tractor for pivotal movement of said bed relative to the tractor about a substantially vertical axis; and
an alignment assembly coupled with said bed for adjustably moving the rear end of the bed about said vertical axis when the bed is in said inclined position to align the bed with the object to be loaded.

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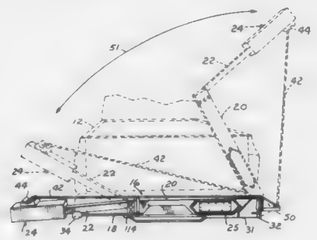
**4,746,262**
**APPARATUS FOR HANDLING AND TRANSPORTING DOUBLE FRAME STRUCTURES**
**Roger K. Anderson, New Middletown, Ind., assignor to E. H. Hughes Co., Inc., Louisville, Ky.**
**Filed Jul. 15, 1986, Ser. No. 885,771**
**Int. Cl.[4] B60P *1/02***
**U.S. Cl. 414—495** **7 Claims**



1. An apparatus for lifting, supporting and transporting, in an essentially fully assembled state, a machine having an elongated double frame, said apparatus comprising
a chassis,
lifting means attached to said chassis for lifting and lowering an elongated double frame machine,
a pair of spaced, parallel extending guideways disposed level with one another for supporting the double frame of said machine thereon rotatably attached to an upper end of said lifting means for vertical movement with said lifting means, said guideways also being rotatable relative to said chassis in a horizontal plane at any vertical position of said lifting means,
means for locking said guideways in alignment with said chassis to prevent said rotation,
a pair of plates slidably disposed in said guideways upon which said double frame is adapted to rest, and
means for moving said plates along said guideways to shift the load presented by said double frame.

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**4,746,263**
**VEHICLE BUMPER STORED CRANE HOIST**
**Larry D. Cook, Shawnee, Okla., assignor to Jo Ellen Watson, Shawnee, Okla.**
**Filed Nov. 10, 1986, Ser. No. 929,578**
**Int. Cl.[4] B60P *1/00, 1/04***
**U.S. Cl. 414—543** **6 Claims**



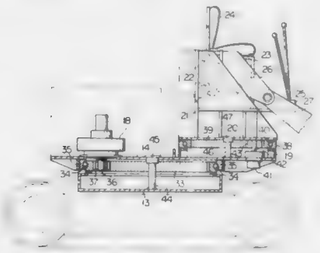
1. In a mobile vehicle having a load supporting platform, an electrical system a source of electrical energy and having a rear bumper structure, the improvement comprising:
telescoping hoist means including a boom and mast means pivotally connected with one end of the bumper structure for vertical movement as a unit about a horizontal axis from a horizontal bumper stored position to an upright mast with boom extended operating position;
jack means telescopically extended from the pivotally connected end portion of the mast when erected upright for supporting a hoist means carried load from the end of the boom;
power winch means including a motor mounted on the free end portion of said boom and operatively connected with the vehicle source of electrical energy for a hoist means self-erecting action; and,
cooperating stop means at the pivotally connected end of the mast for interrupting the hoist self-erecting action when the axis of the mast reaches the vertical.

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**4,746,264**
**EARTH-WORKING MACHINE**
**Mitsuhiro Kishi, and Yokichi Nagasawa, both of Ashikaga, Japan, assignors to Kabushiki Kaisha Hikoma Seisakusho, Tochigi, Japan**
**Continuation of Ser. No. 817,151, Jan. 2, 1986, abandoned, which is a continuation of Ser. No. 570,535, Jan. 13, 1984, abandoned. This application Oct. 16, 1986, Ser. No. 920,924**
**Claims priority, application Japan, Feb. 12, 1983, 58-22350; Mar. 4, 1983, 58-35440; Mar. 4, 1983, 58-35441; Sep. 7, 1983, 58-164736; Nov. 18, 1983, 58-217573**
**Int. Cl.[4] E02F *5/02***
**U.S. Cl. 414—687** **12 Claims**

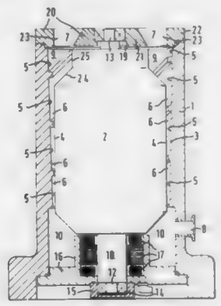
1. An earth-working machine comprising:
a mobile chassis;
a first gear fixedly mounted on said mobile chassis;
a turntable coaxially rotatably mounted on said first gear;
a carriage rotatably mounted on said turntable in eccentric relation thereto and having a second gear;
an earth-working mechanism mounted on said carriage;
a first hydraulic motor mounted on said turntable and having a first pinion held in driving mesh with said first gear for rotating said turntable about its own axis;
a second hydraulic motor mounted on said turntable and having a second pinion held in driving mesh with said second gear for rotating said carriage about its own axis;
a first angle detector provided between said mobile chassis and said turntable, and composed of first reference angle positioning means fixed to said mobile chassis and disposed in coaxial relation to a rotating center of said turntable and a first relative angle positioning means fixed to said turntable and disposed adjacent to said first reference angle positioning means in coaxial relation to a rotating center of said turntable for detecting a relative angle of rotation of said turntable with respect to said chassis;
a second angle detector provided between said turntable and said carriage, and composed of second reference angle positioning means fixed to said turntable and disposed in coaxial relation to a rotating center of said carriage and second relative angle positioning means fixed to said carriage and disposed adjacent to said second reference angle positioning means in coaxial relation to a rotating center of said carriage for detecting a relative angle of said carriage with respect to said turntable;
an electric control system responsive to signals from said first and second angle detectors for controlling said first and second hydraulic motors to rotate said turntable and said carriage at a prescribed angle displacement ratio; and
wherein said first and second reference angle positioning means comprise magnetic disks having magnetic polarities arranged at equal intervals around peripheral edges thereof; and said first and second relative angle positioning means comprise magnetic pick-ups disposed adjacent to said magnetic disks and rotatable around peripheral edges of said magnetic disks.





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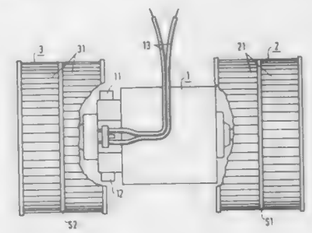
**4,746,265**
**HIGH-VACUUM MOLECULAR PUMP**
**Waltherus J. Th. H. Luijten, Almelo, Netherlands, assignor to Ultra-Centrifuge Nederland B.V., Almelo, Netherlands**
**Filed Dec. 14, 1982, Ser. No. 449,691**
**Claims priority, application Netherlands, Dec. 14, 1981, [illegible]105614**
**Int. Cl.[4] F01D *1/36***
**U.S. Cl. 415—90** **6 Claims**



1. High-vacuum molecular pump comprising at least two coaxial elements mounted rotatably with respect to each other and close to each other so that a narrow pump space is formed between said elements, at least one helical groove in one of said elements and extending through the pump space, and a substantially annular gas supply chamber at an end of a pair of said elements which is bounded by parts of said elements, which annular gas supply chamber is arranged between a gas supply and the pump space and is in communication therewith, wherein the parts of said elements which bound the annular gas supply chamber are so shaped that near the gas supply the annular gas supply chamber is wide relative to the pump space and narrows gradually downstream towards the pump space, and wherein said helical groove continues beyond the pump space and along the full axial length of the annular gas supply chamber.

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**4,746,266**
**RADIAL BLOWER**
**Heinrich Kirchner, Wurzburg, and Udo Winter, Kurnach, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany**
**Filed Sep. 8, 1987, Ser. No. 94,392**
**Claims priority, application Fed. Rep. of Germany, Sep. 19, 1986, 3631942**
**Int. Cl.[4] F04D *29/66***
**U.S. Cl. 415—119** **6 Claims**



1. A radial blower of the type including two blower wheels arranged in an axially spaced relation on a blower shaft; wherein each of said blower wheels comprises a blower wheel hub mounted upon said blower shaft and a blower blade circle mounted upon said blower wheel hub in a radially spaced position relative to said blower wheel hub by means of a plurality of spokes; said spokes defining tangential spaces therebetween;
an improvement comprising:
the spokes of one of said blower wheels, as seen in the direction of an axis defined by said blower shaft, being angularly offset from the spokes of the other of said blower wheels in the circumferential direction by a fixed circumferential angle of rotation equal to approximately one half the circumferential angle between the spokes of said blower wheels.

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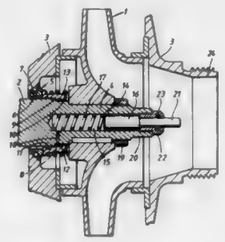
**4,746,267**
**PUMP ARRANGEMENTS**
**George H. Higgins, Lemington Spa, England, assignor to Godiva Fire Pumps Limited, Warwick, England**
**Filed Mar. 24, 1986, Ser. No. 843,477**
**Claims priority, application United Kingdom, Feb. 28, 1986, [illegible]604970**
**Int. Cl.[4] F04D *29/10***
**U.S. Cl. 415—140** **15 Claims**

1. A coupling arrangement for coupling a pump arrangement to further equipment, the coupling arrangement having a first coupling member comprising: a first rotatable shaft; a hydraulic chamber in said shaft; and piston means within said shaft, said piston means having a part extending from said shaft and being displaceable to pressurize said hydraulic chamber,

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and the coupling arrangement having a second coupling member for coupling to the first member and comprising a second



rotatable shaft having a surface for engaging said part of said piston means during coupling.

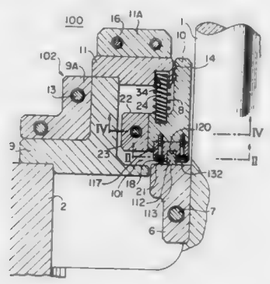
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4,746,268

## END FACE MECHANICAL SHAFT SEAL FOR USE IN HYDRAULIC MACHINES AND SEAL RING ASSEMBLY FOR USE IN THE SHAFT SEAL

Osamu Sugimoto, Suita; Teiji Horita, Hikone; Katsutoshi Nii; Koozi Aizawa, both of Hitachi; Kazuhiko Kawaike; Ichiro Hitomi, both of Katsuta, and Hisao Inoue, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo and The Kansai Electric Power Co. Ltd., Osaka, both of, Japan

Filed Jul. 29, 1987, Ser. No. 79,043
Int. Cl.[4] F04D *29/08*
U.S. Cl. 415—170 R 15 Claims



1. A seal ring assembly for use in an end face mechanical shaft seal, comprising:

an annular ring casing having a substantially annular end face formed therein with a substantially annular groove;

a seal ring partly received in said groove and secured to said ring casing by an adhesive;

said seal ring being formed by a plurality of segments each having a substantially arcuate cross-section, substantially cylindrical radially inner and outer surfaces, axial end faces and side faces;

said segments being disposed in said annular groove with one of the end faces of each segment received in said groove and the other end face being offset from said end face of said ring casing axially outwardly thereof;

said segments being arranged in circumferentially side-by-side abutting relationship with each other to form said seal ring;

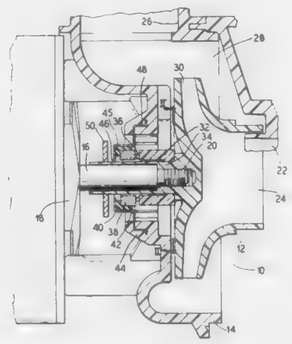
the other end faces of respective segments being included in a substantially the same plane to provide a substantially smooth and circumferentially substantially continuous sealing surface.

4,746,269

## SEAL COOLING FOR PLASTIC PUMPS

Alfred Raab, Brampton, Canada, assignor to Jacuzzi Inc., Little Rock, Ark.

Filed May 22, 1986, Ser. No. 865,818
Int. Cl.[4] F04D *29/10*
U.S. Cl. 415—170 A 15 Claims



14. In a centrifugal pump having a thermally non-conductive plastic pump body, a rotatable impeller mounted on a rotatable drive shaft, and a mechanical seal between said pump body and said drive shaft separating a dry zone from a wet zone and comprising a rotatable seal member and a non-rotatable seal member, a cooling arrangement for said mechanical seal comprising:

a thin metal thermally conductive stamping, cup shaped in configuration,

having an outer rim held in an adjoining portion of the thermally non-conductive plastic pump body and

having an inner periphery defined by an aperture through which said drive shaft extends, said inner periphery projecting away from said plastic pump body into an exposed position in the dry zone outside the pump body and surrounding the shaft, and

a retaining member positioned between said stamping and said non-rotatable seal member sufficiently thin so as to transfer heat from said non-rotatable seal member to said stamping,

whereby, said stamping is thermally connected to said mechanical seal and operates as a heat sink and radiator to dissipate the heat buildup of the seal into the dry zone by radiation cooling.

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4,746,270

## ENGINE WATER PUMP ASSEMBLY AND METHOD OF MAKING SAME

Keith F. Hale, Rochester Hills; Joseph Paliwoda, W. Bloomfield, and Verle Propst, Rochester, all of Mich., assignors to Deco-Grand, Inc., Troy, Mich.

Filed Jul. 20, 1987, Ser. No. 75,407
Int. Cl.[4] F04D *29/04*
U.S. Cl. 415—170 A 7 Claims

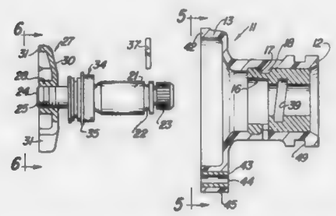
1. In an automotive engine water pump assembly having a rotatable shaft with a drive end provided with connection means for rotating the shaft and an opposite impeller end upon which a water impeller is mounted, and with the shaft being divided along its length into a bearing portion adjacent the drive end and a sealing portion adjacent the impeller end; and having a bearing surrounding the shaft bearing portion; with a housing having a body surrounding the shaft and bearing along their lengths and having an enlarged chamber around the impeller end of the shaft, within which the impeller is positioned; and a seal surrounding the shaft seal portion for sealing against the flow of water from the housing impeller chamber to the housing bearing surrounding part, the improvement comprising:



said bearing being formed of a unitary, tubular bushing whose interior surface is adjacent the overlapped bearing portion of the shaft;

and said bearing having an integral, annular flange formed on one end for surrounding the part of the shaft sealing portion which is adjacent the shaft bearing portion;

the housing being formed of an integral plastic molding, with the bearing being bonded to the surrounding surface of the interior of the wall of the housing body;



and said seal extending within and sealing the shaft against said bearing flange;

whereby the housing and bearing may be formed in a single subassembly, and the shaft and seal may be formed as a separate subassembly, and the shaft and seal subassemblies may be inserted in an axial direction into the housing through the impeller chamber to position the shaft bearing portion within the bearing for assembly of the pump.

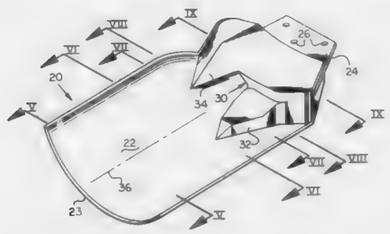
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4,746,271

## SYNTHETIC FAN BLADE

Jamie C. Wright, Mason, Mich., assignor to Hayes-Albion Corporation, Jackson, Mich.

Filed Mar. 25, 1987, Ser. No. 29,975
Int. Cl.[4] B63H *1/06, 1/26*
U.S. Cl. 416—132 A 8 Claims



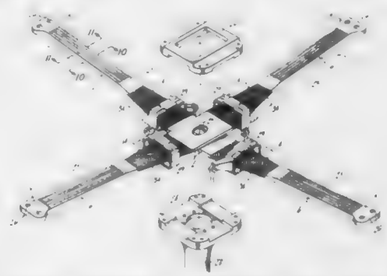
1. A fan blade characterized by its efficiency of material utilization comprising, in combination, an elongated blade body having an outer air flow portion, an inner root portion, a transition portion between said air flow and root portions and a longitudinal axis, a plurality of transverse sections defined on said blade body perpendicular to said body axis each having a neutral axis defining the minimum resistance to primary blade body bending, the material of said body being increasingly offset from said neutral axis from the intersection of said air flow and transition portions to said root portion such that the moment of inertia of said transverse sections from the intersection with said air flow portion to said root portion uniformly increases.

4,746,272

## LOBED COMPOSITE FLEXBEAM

William L. Noehren; Edward S. Hibyan, both of Trumbull, Conn., and Francis E. Byrnes, White Plains, N.Y., assignors to United Technologies Corporation, Hartford, Conn.

Filed Jul. 23, 1986, Ser. No. 888,612
Int. Cl.[4] B64C *27/38*
U.S. Cl. 416—134 A 9 Claims



1. A flexbeam (10) having a hub portion (12), a flap flexure portion (14) outboard of the hub portion, a lag-torsion flexure portion (16) outboard of the flap flexure portion, and a blade attachment portion (18) outboard of the lag-torsion portion, and having fibers (32) of composite material extending longitudinally the length of the flexbeam, characterized by:

a plurality of longitudinal lobes (98A–98G, 100A–100G) defined by a plurality of radiused grooves (90A–90F, 92A–92F) extending into the lag-torsion flexure portion of the flexbeam from the upper and lower surfaces (94, 96) of the lag-torsion flexure portion to a central planar portion (102) of the lag-torsion flexure portion, the grooves being radiused at their bases to enhance the torsion flexure characteristics of the lag-torsion flexure portion.

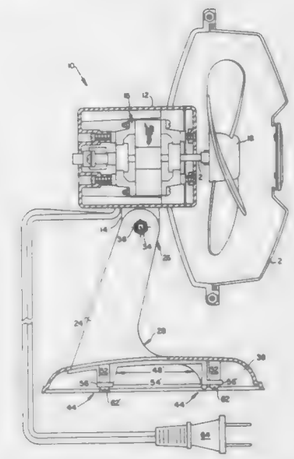
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4,746,273

## FAN BASE AND STAND CONSTRUCTION

Chieh Sun, Cresta Palos Verdes Estates, Calif., assignor to Tatung Company of America, Inc., Long Beach, Calif.

Filed Aug. 4, 1986, Ser. No. 892,849
Int. Cl.[4] F01D *29/60*
U.S. Cl. 416—244 R 3 Claims



1. In an electric fan assembly which includes an electric motor, a motor housing, a fan driven by the motor, a support arm for attachment to and support of the motor housing, and a

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base member for attachment to and support of the support arm, the improvement comprising:

said support arm being of elongated hollow configuration with a large base-engaging end and a smaller forked end for attachment to the motor housing;

said base member being of a generally upside-down dish-shaped configuration with a generally flat central wall which has a large central opening therein;

said support arm being adapted to be inserted through said central opening of said base member so that the external circumferential surface of said support arm proximate its large end then laterally engages the circumferential wall of said base member opening for laterally supporting said arm;

said support arm also having separate, circumferentially spaced fastening means at its large end which then extend into the interior of said base member; and

said base member within its interior having separate, circumferentially spaced fastening means which cooperate with said fastening means of said arm for supporting said arm both longitudinally and laterally.

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**4,746,274**

## PORTABLE BLOWER

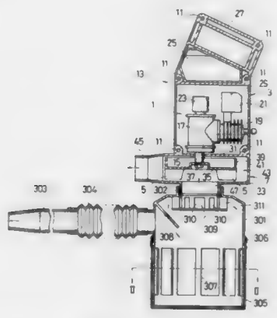
**Katsumi Kiyooka; Akira Gaomh, and Hideko Inomata, all of Tokyo, Japan, assignors to 501 Komatsu Zenoah Company, Japan**

**Division of Ser. No. 882,590, Jul. 7, 1986. This application Jul. 27, 1987, Ser. No. 78,401**

**Claims priority, application Japan, Jul. 10, 1985, 60-104026; Jul. 10, 1985, 60-104027; Jul. 10, 1985, 60-104028**

**Int. Cl.**[4] **F04B** *17/00, 35/00*

**U.S. Cl. 417—234** **12 Claims**



1. A portable blower comprising:

a casing provided with a handle and including therein an engine chamber and a fan chamber, said fan chamber being arranged under said engine chamber with a partition wall between them and having a suction mouth and a discharge mouth;

an engine and a fuel tank which are arranged within said engine chamber, said engine comprising a horizontally disposed engine cylinder, a crankcase, a cantilever-type crank shaft, a carburetor, and a muffler; and

a blower fan and an air passage which are arranged within said fan chamber, said air passage connecting said suction mouth with said discharge mouth to provide communication between them,

wherein said crankcase is disposed laterally adjacent to said engine cylinder and connected thereto, said crank shaft extending downwardly from said crankcase into said fan chamber through said partition wall, said carburetor being disposed above said crankcase and connected thereto, said muffler being disposed above said engine cylinder and connected thereto, and said blower fan being fixed to a lower end of said crank shaft and driven by said engine to suck air from atmosphere and blow air to atmosphere.

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**4,746,275**

## MULTI-PISTON SWASH PLATE TYPE COMPRESSOR WITH INTERNAL LUBRICATING ARRANGEMENT

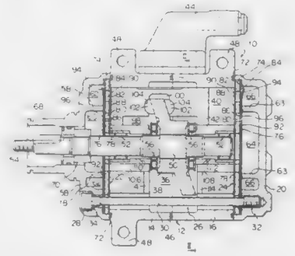
**Hidekazu Iwamori; Makoto Ohno; Hideo Mori, and Shinji Mizuno, all of Kariya, Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Aichi, Japan**

**Filed Dec. 22, 1986, Ser. No. 944,936**

**Claims priority, application Japan, Dec. 25, 1985, 60-295998**

**Int. Cl.**[4] **F04B** *1/16, 1.18*

**U.S. Cl. 417—269** **6 Claims**



1. A multi-piston swash plate type compressor with an internal lubricating arrangement for an air conditioning system used in a vehicle such as an automobile which comprises, in combination:

a cylinder block means in which a swash plate chamber is formed for receiving a swash plate member therein, and which has cylinder bores concentrically formed with respect to a central axis of said cylinder block means, each of said cylinder bores receiving a piston member so as to be slidably engaged with said swash plate member to reciprocate said piston member in the corresponding cylinder bore by rotation of said swash plate member, said swash plate chamber being adapted to be fed with a refrigerant including a lubrication oil from an evaporator of the air conditioning system, said swash plate member being fixedly mounted on a shaft member which extends into said swash plate chamber through an axial bore formed in said cylinder block means, and which is adapted to be connected to a prime motor of the vehicle for rotation of said swash plate, said shaft member being rotatably supported in the axial bore of said cylinder block means by thrust bearing means provided around said shaft member at the sides of said swash plate member and by radial bearing means provided within said axial bore;

housing means provided on said cylinder block means for forming a suction chamber which is communicated with said cylinder bores through the intermediary of a valve element and a discharge chamber which is communicated with said cylinder bores through the intermediary of a valve element, said suction chamber being in communication with said swash plate chamber through said axial bore of said cylinder block means, said discharge chamber being adapted to be connected to a condenser of the air conditioning system for feeding a compressed refrigerant thereto; and

passage means including at least one through passage which is formed in said cylinder block means and which opens at a first end thereof into said suction chamber and at a second end thereof into said swash plate chamber in the vicinity of said thrust bearing means for feeding the refrigerent including a lubricating oil from said swash plate chamber to said suction chamber, and a groove which is radially formed on a wall surface of said cylinder block means forming said swash plate chamber and which is led into the second end of said through passage, whereby a



flow of said refrigerant is guided along said groove toward the center of said swash plate chamber to positively lubricate said thrust bearing means and then introduced into the at least one through passage, said pasasge means further including a branch passage which directly branches off from said at least one through passage for introducing the refrigerant from the swash plate and to the suction chamber through said at least one through passage, said branch passage opening into said axial bore and oriented toward said radial bearing means so that a part of said refrigerant passing through said through passage is directed to said radial bearing means provided within said axial bore to positively lubricate saids radial bearing.

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**4,746,276**

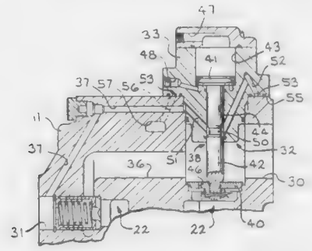
## GEAR PUMP HAVING CONDITIONAL DRY VALVE CLOSURE STRUCTURE

**James R. McBurnett; James M. Eley, and Kuldip Raina, all of Corinth, Miss., assignors to Dana Corporation, Toledo, Ohio**

**Filed Feb. 27, 1987, Ser. No. 20,007**

**Int. Cl.**[4] **F04B** *49/02, 49/08*

**U.S. Cl. 417—295** **10 Claims**



1. A pump for selectively generating a flow of pressurized fluid to a hydraulic system from a reservoir comprising:

an inlet port communicating with the reservoir;

an outlet port communicating with the hydraulic system;

a pumping chamber formed within the pump communicating with said inlet port and said outlet port;

pumping means disposed in said pumping chamber and adapted to draw fluid through said inlet port from the reservoir and to generate a flow of pressurized fluid through said outlet port to the hydraulic system;

dry valve means selectively movable between an opened position, wherein the flow of fluid from said inlet port to said pumping chamber is unobstructed, and a closed position, whereby the flow of fluid from said inlet port to said pumping chamber is obstructed; and

means responsive to the pressure of the fluid in said outlet port for preventing said dry valve means from being moved from said opened position to said closed position when the outlet port fluid pressure exceeds a predetermined magnitude.

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**4,746,277**

## ROTARY COMPRESSOR WITH PRESSURE PULSE SUPPRESSION

**Rune V. Glanvall, Norrköping, Sweden, assignor to Stal Refrigeration AB, Norrköping, Sweden**

**Filed Jan. 29, 1987, Ser. No. 8,009**

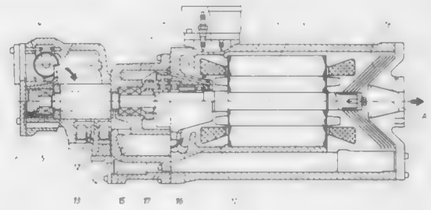
**Claims priority, application Sweden, Jan. 31, 1986, 8600426**

**Int. Cl.**[4] **F04B** *39/00;* **F04C** *29/06*

**U.S. Cl. 417—312** **3 Claims**

1. In a rotary screw compressor for use in refrigeration and heat pump systems, said rotary screw compressor including an elongated housing means having an inlet port for operating medium at a low pressure and an outlet port for operating medium at a high pressure, a discharge gate located within the housing means and between the inlet port and the outlet port for dividing said housing means into a first portion and a second portion, a rotor located in the first portion of said housing means, and a drive motor for said rotor located in said second portion of said housing means,

the improvement wherein said rotary screw compressor includes means in said second portion of said housing means defining first, second and third chambers between



said discharge gate and said drive motor and a first channel extending between said first and second chambers and a second channel extending between said second and third chambers, said first chamber being in direct communication with said discharge gate, said second chamber having a larger volume than said first chamber and said third chamber having a larger volume than said second chamber.

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**4,746,278**

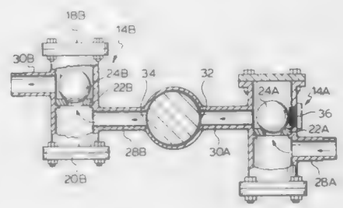
## DISPLACEMENT PUMP DESIGNED FOR CLEANING

**James K. Henderson, 11 Parkend Ave., Brampton, Ontario, Canada L6Y 1B4**

**Filed Aug. 26, 1987, Ser. No. 89,420**

**Int. Cl.**[4] **F04B** *21/02*

**U.S. Cl. 417—454** **3 Claims**



1. In a displacement pump including a displacement chamber, a plunger reciprocable therein, inlet and outlet ports to and from said chamber, a one-way gravity ball inlet valve and valve chamber and a one-way gravity ball outlet valve and valve chamber connecting to said inlet and outlet ports respectively, the improvement comprising:

a generally horizontal conduit connecting said inlet port and said inlet valve chamber,

a generally horizontal conduit connecting said outlet port to said outlet valve chamber,

said conduits and their connecting ports being located opposite each other,

said conduits being aligned,

a removable plug located in one of said valve chambers on the side thereof remote from said displacement chamber,

said plug being located in alignment with said aligned conduits, whereby when said plug is removed an aligned cleaning passage may be provided extending through the port defined by said port, across one valve chamber, through the corresponding aligned conduit, across the displacement chamber through the other aligned conduit, and across the other valve chamber,

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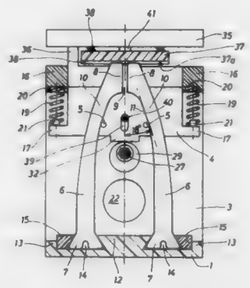
said inlet valve and valve chamber, outlet valve and valve chamber and plunger and displacement chamber being designed so that the components thereof may be moved clear of said passage when said cleaning passage is used.

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**4,746,279**
**HOSE PUMP**

**Paul Manella, Dübendorf, Switzerland, assignor to Doltron AG, Dübendorf, Switzerland**

**Filed May 2, 1986, Ser. No. 859,001**
**Claims priority, application Switzerland, May 2, 1985, 1864/85**
**Int. Cl.[4] F04B *43/12, 45/08***
**U.S. Cl. 417—474** **2 Claims**

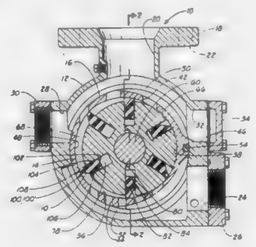


1. An improved hose pump including a first and a second pressure member which are arranged next to one another, with a drive to drive the pressure members jointly, in such a way that the second member is actuated, in dependence on the first member, in a direction transverse relative to the direction of movement of the first member, in order to vary a hose cross section successively in two directions transverse relative to one another, the first pressure member being a plate which is movable to-and-fro relative to a counter-pressure surface and which is provided with two projections on the side facing the second pressure member, and the second pressure member having two limbs which are movable to-and-fro relative to the hose and have a middle portion and against which the projections rest in order to actuate the limbs, and with a frame, in which the pressure members and the drive are arranged and which has a baseplate, the improvement comprising resilient elements assigned to the plate forming the first pressure member, in order to generate a force assisting the movement of the plate away from the counter-pressure surface; limbs forming the second pressure member of identical design, wherein said limbs are fastened to the baseplate by means of first portions formed at one end, in such a way that second portions formed at the other ends are parallel to and near one another and the surfaces, facing one another, of the middle portions are inclined relative to one another, a projection is formed on the baseplate and against which rest the first portions of the limbs, and two fastening members rest against the first portion of the limbs and are fastened on the baseplate, in order to maintain the limbs on the baseplate, and the first portion is made dovetail-shaped, in such a way that the first portion widens towards the end of the limb.

**4,746,280**
**SLIDING VANE PUMP**

**Willie Wystemp, and Michael F. Hughes, both of Oklahoma City, Okla., assignors to Corken International Corporation, Oklahoma City, Okla.**

**Filed Feb. 19, 1987, Ser. No. 16,287**
**Int. Cl.[4] F04C *18/344***
**U.S. Cl. 418—268** **21 Claims**



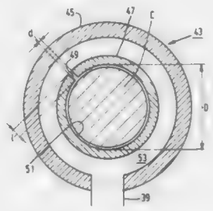
1. A vane for use in a sliding vane pump, said vane comprising:
a first edge adapted to be a radially inner edge when said vane is in an operating position in said pump;
first and second sides extending from said first edge;
a second edge adapted to be a radially outer edge when said vane is in said operating position, said second edge being spaced from said first edge and extending from said first side;
a face portion extending inwardly with respect to said second edge and interconnecting said second edge and said second side; and
passageway means extending from said first edge and intersecting a portion of said second edge and a portion of said face portion.

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**4,746,281**
**APPARATUS FOR RENDERING THE CABLE CORE OF A TELECOMMUNICATION CABLE LONGITUDINALLY WATER-TIGHT**

**Johannis A. B. M. Laugs, Gouda; Johannes N. M. Van Leeuwen, Nuenen, and Hillebrand J. J. Kraakman, Geldrop, all of Netherlands, assignors to N.K.F. Groep B.V., Rijswijk, Netherlands**

**Filed Jan. 27, 1986, Ser. No. 822,998**
**Claims priority, application Netherlands, Jan. 28, 1985, 8500221; Dec. 9, 1985, 8503381**
**Int. Cl.[4] B29C *45/07, 45/20***
**U.S. Cl. 425—113** **6 Claims**



1. An apparatus for rendering a cable core longitudinally water-tight comprising:
an injection head having a housing with a cylindrical passage chamber and an injection nipple with an injection orifice radially directed to the cable, wherein said injection nipple is rotatably journalled in the housing of the injection head and wherein said injection head is displaceable in a reciprocating movement,



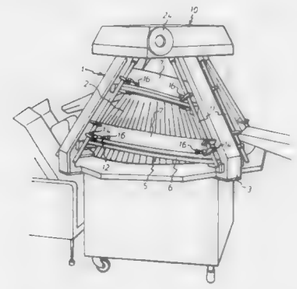
means for guiding the injection head,
means for providing the reciprocating displacement of the injection head, and
means for supplying a sealing material to the injection nipple so that the sealing material is intermittently injected at a velocity of about 100 m/s or greater into the cable core.

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**4,746,282**
**DOUGH ROUNDING MACHINE WITH ADJUSTABLE TROUGH**

**Leif Nilsson, and Torsten Skoog, both of Glimakra, Sweden, assignors to Glimek AB, Glimakra, Sweden**

**Filed Nov. 26, 1986, Ser. No. 935,010**
**Claims priority, application Sweden, Nov. 27, 1985, 85055945**
**Int. Cl.[4] B29B *7/10***
**U.S. Cl. 425—150** **2 Claims**



1. A dough rounding machine comprising a conical drum rotatable about a vertical axis, a frame disposed around the drum and a trough which is formed between a jacket of the drum and a number of trough elements mounted on the frame and extending helically adjacent the jacket, each trough element comprising a rail fixedly mounted in the frame and abutting the drum, and a wall portion positioned on the rail and displaceable relative to the jacket, a control unit for adjusting a width of the trough, said unit comprising rotatable rods extending from a lower part towards an upper part of the drum and substantially parallel to the drum jacket, and link means for moving said wall portion when said rods are rotated, said link means interconnecting said rods and said wall portion, said control unit further comprising shafts mounted on the frame, said shafts having ends interconnected by pairs of bevel pinions, and each shaft comprising two worms cooperating each with one worm wheel attached to the end of each rod.

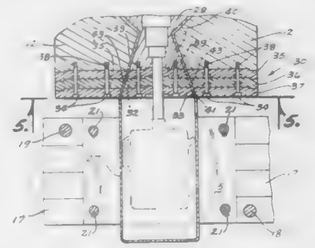
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**4,746,283**
**HEAD TOOLING PARISON ADAPTER PLATES**

**Gerald R. Hobson, 825 First Ave. NE., Waverly, Iowa 50677**

**Filed Apr. 1, 1987, Ser. No. 32,547**
**Int. Cl.[4] B29C *49/04***
**U.S. Cl. 425—528** **3 Claims**

1. Plastic blow molding equipment consisting of:
a die housing having a tubular chamber disposed therein, said tubular chamber having an outlet in said die housing, said die housing including an inner portion on the inside of said tubular chamber and an outer portion on the outside of said tubular chamber;
head tooling attached to said die housing, said head tooling having a tubular passageway therethrough of an unequal diameter throughout the length thereof, said tubular passageway in said head tooling being in communication with the outlet in the die housing;
adjusting means associated with said head tooling for forming a parison outlet of an adjustable size, said adjusting means including an inner section defining the lower portion of the inside of said tubular passageway and an outer section defining the lower portion of the outside of said tubular passageway, said inner section including a plurality of inner plates each having a progressively larger outer diameter from one end of head tooling to the other end thereof and said outer section including a plurality of outer plates each having an inner surface with progressively larger diameter from the said other end of the head tooling to the said one end thereof;



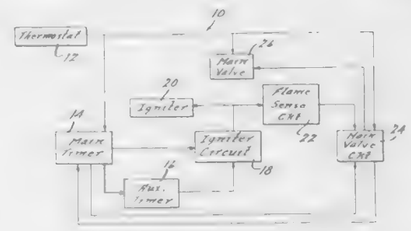
means for delivering a deformable material in a plastic condition to said tubular chamber and forcing such deformable material through said tubular chamber in the die housing and through the tubular passageway in the head tooling to form a parison attached to the outlet of said head tooling; and
means for removing or adding one or more of said inner and outer plates for adjusting the size of the parison outlet in the head tooling.

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**4,746,284**
**HOT SURFACE DIRECT IGNITION SYSTEM FOR GAS FURNACES**

**Frederick J. Geary, Holland, Mich., assignor to Robertshaw Controls Company, Richmond, Va.**

**Division of Ser. No. 624,014, Jun. 25, 1984, Pat. No. 4,643,668.**
**This application Oct. 10, 1986, Ser. No. 917,800**
**The portion of the term of this patent subsequent to Feb. 17, 2004, has been disclaimed.**
**Int. Cl.[4] F23N *5/00***
**U.S. Cl. 431—70** **3 Claims**




1. A hot surface direct ignition system for gas furnaces and the like, said system comprising, in combination, a high voltage circuit adapted to be connected to a source of high voltage AC current, said high voltage circuit including a silicon carbide hot surface igniter disposed in the path of incoming gas and being subjected to the heat of the flame when gas ignition is obtained whereby flame rectification is effected by said igniter, a low voltage circuit adpated to be connected to a source of low voltage AC current, said low voltage circuit including a thermostatically actuated switch controlling the energization of said low voltage circuit, an electrically operable gas valve, and first and second relays, said first relay having normally open contacts in said high voltage circuit connected in series with said igniter and controlling the energization of said ig-

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niter, said second relay having normally open contacts controlling the energization of said gas valve and normally closed contacts controlling the application of low voltage to said low voltage circuit, means for energizing said first relay and said igniter upon closure of said thermostatically actuated switch, first timing means effective to maintain the energization of said first relay and said igniter for a first predetermined period of time, means effective to open said gas valve after said first predetermined period of time to initiate the flow of gas, means operable upon the opening of said gas valve and maintaining the energization of said first relay and said igniter for a second predetermined period of time less than said first predetermined period of time and thereafter deenergizing said first relay, a Darlington transistor controlling the energization of said first relay, a field effect transistor controlling the energization of said second relay, a programmable unijunction transistor connected to said thermostatically actuated switch and controlling the energization of said Darlington transistor and said field effect transistor during said first predetermined period of time and said second predetermined period of time, and means responsive to flame rectification effected by said igniter after deenergization of said first relay for maintaining energization of said second relay and said gas valve by controlling the energization of said field effect transistor.

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**4,746,285**

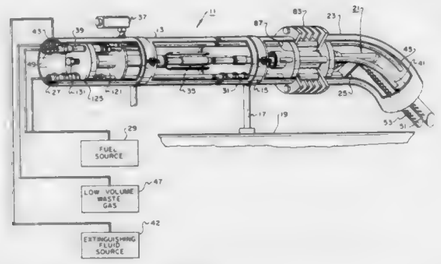
**IGNITER FOR GAS DISCHARGE PIPE WITH A FLAME DETECTION SYSTEM**

**Romeo E. Guerra, 6118 Walnut Hill La., Dallas, Tex. 75234**

**Division of Ser. No. 859,363, May 5, 1986, Pat. No. 4,678,430, which is a division of Ser. No. 743,428, Jun. 11, 1985, Pat. No. 4,595,354. This application Jun. 26, 1987, Ser. No. 67,623**

**Int. Cl.[4] F23G** *7/08*

**U.S. Cl. 431—202** **4 Claims**




1. In an igniter for a gas discharge pipe of the type having a tubular housing adapted to be mounted to the pipe, a fuel line extending into the housing for delivering gaseous fuel, means for creating a spark to ignite the fuel, an improved nozzle comprising in combination:

a tubular member having an upstream end in communication with the fuel line and a closed downstream end, the nozzle having a plurality of slots in its sidewall for discharging combustion gas, at least some of the slots adjacent the upstream end having a greater opening area than the slots at the downstream end.

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**4,746,286**

**BURNER FOR A GASEOUS FUEL**

**Leslie C. Shirvill, Ince, England, assignor to Shell Oil Company, Houston, Tex.**

**Filed Jul. 29, 1987, Ser. No. 78,952**

**Claims priority, application United Kingdom, Oct. 14, 1986, 8624632**

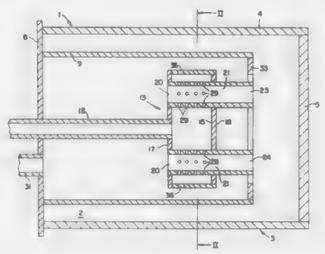
**Int. Cl.[4] F23D** *14/12*

**U.S. Cl. 431—328** **9 Claims**

1. A burner for gaseous fuel comprising:

a burner outer wall consisting at least partly of a porous medium and defining an inner distribution zone;

an oxidant supply conduit concentrically mounted within said distribution zone, said conduit debouching in said distribution zone;



a mixing head concentrically mounted within said oxidant supply conduit, which mixing head comprises a closed, walled box having plurality of open-ended, apertured mixing tubes extending through said box for mixing fuel and oxidant, and a fuel supply conduit disposed to supply fuel solely to said mixing head.

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**4,746,287**

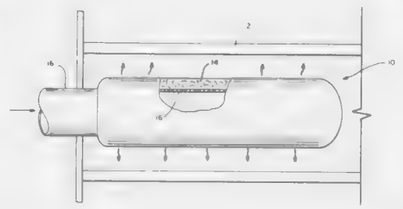
**FIBER MATRIX BURNER COMPOSITION WITH ALUMINUM ALLOYS AND METHOD OF FORMULATION**

**John J. Lannutti, Palo Alto, Calif., assignor to Gas Research Institute, Chicago, Ill.**

**Filed Jan. 17, 1986, Ser. No. 820,720**

**Int. Cl.[4] F23D** *14/14;* **C04B** *38/06;* **B28B** *1/16*

**U.S. Cl. 431—328** **8 Claims**



1. A fiber matrix burner made by the process of preparing an aqueous slurry comprising inorganic fibers, an inorganic binding agent gel, a non-reactive vaporizable filler and a powdered, normally non-flammable aluminum alloy with a melting point between 660° C. and 1000° C., said alloy being incorporated into the slurry in the proportion of ¼ to 4 grams per gram of said fibers, withdrawing moisture from the slurry while accreting the fibers on the surface of a foraminous support to form a burner structure, heating the structure to remove residual moisture, and heating the structure at a temperature sufficient to vaporize the filler to produce a matrix of interconnected pores throughout the structure with the fibers having a coating which includes the aluminum alloy.

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**4,746,288**

**COMPACT CARTRIDGE LIGHTER HAVING FUEL VAPORIZATION ELEMENT IN COMBINATION WITH LIQUID BARRIER FILTER**

**Walter O. Graham, 1073 Lime Ave., Long Beach, Calif. 90813**

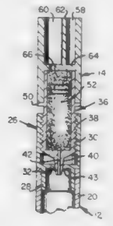
**Filed Apr. 14, 1986, Ser. No. 851,964**

**Int. Cl.[4] F23D** *14/28;* **F23Q** *1/02*

**U.S. Cl. 431—344** **14 Claims**

1. A lighter comprising the combination of a fuel container for storing a liquid fuel therein, a fuel vaporization element having an interior cavity with an end wall and an elongated nozzle extending from the end wall, the fuel vaporization element being located outside of and communicating with the fuel container via the elongated nozzle thereof extending into the fuel container from outside of the fuel container, the fuel vaporization element having a passage therein extending through the nozzle thereof from the end wall and providing for the formation and passage of fuel vapors therethrough from the liquid fuel in the fuel container, a valve, a spark assembly disposed adjacent the valve, and a filter disposed within the interior cavity of the fuel vaporization element between the passage in the nozzle of the fuel vaporization element and the valve, the filter being disposed in contact with the nozzle of the fuel vaporization element at the passage and forming a barrier to liquid fuel while passing vaporized fuel therethrough to the valve.





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**4,746,289**

**HEAT TREATING PROCESS, HOOD FOR CARRYING OUT THIS PROCESS, AND ITS USE IN HEAT TREATING FURNACES**

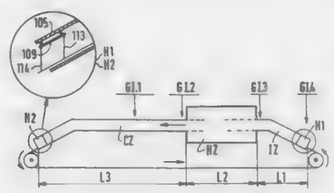
**Vincent Guillaume, La Rochette, France, assignor to L'Air Liquide, Paris, France**

**Filed May 30, 1986, Ser. No. 868,944**

**Claims priority, application France, Jun. 5, 1985, 85 08470**

**Int. Cl.[4] F27B** *9/28;* **F26B** *19/00*

**U.S. Cl. 432—8** **6 Claims**




1. A process for heat treating parts in a continuous furnace which furnace comprises an inlet zone, an outlet zone, at least one heat treating zone and means for producing an atmosphere of non-reactive gas under the heat treating conditions in said inlet zone so as to substantially avoid entry of air into the furnace, said process comprising the steps of:

(a) feeding the parts to be treated in succession into the furnace in a given direction;

(b) injecting an atmosphere of a given composition into said heat treating zone; and

(c) preventing entry of air into the furnace by:

(i) creating a substantially homogeneous screen of said atmosphere of non-reactive gas by injecting in said inlet zone the non-reactive gas in a plane through which extends said direction of feed of the parts to be treated, said injection being made under such conditions that a substantially laminar flow condition is maintained substantially throughout the height of said screen of non-reactive gas; and

(ii) controlling the rate of flow of non-reactive gas injected in said inlet zone by injecting said non-reactive gas with a flow rate equal to the flow rate of air which enters the furnace owing to natural convection phenomena in the absence of said injection of non-reactive gas, so that the injected, non-reactive gas is substituted for air which, in the absence of the homogeneous, laminar screen, would be sucked into the furnace due to natural convection phenomena.

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**4,746,290**

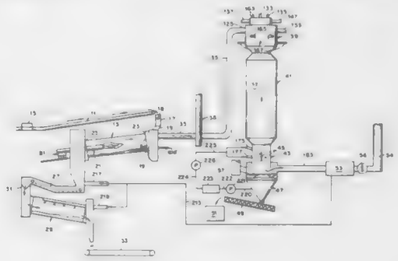
**METHOD AND APPARATUS FOR TREATING WASTE CONTAINING ORGANIC CONTAMINANTS**

**Steven G. DeCicco, Knoxville; Sung K. Lee, Clinton; Rudy G. Novak, Knoxville; William E. Wass, and Kai K. Mak, both of Concord, all of Tenn., assignors to International Technolgy Corporation, Knoxville, Tenn.**

**Filed May 29, 1986, Ser. No. 869,200**

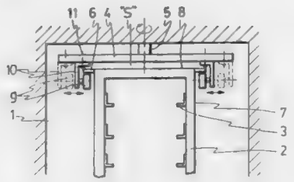
**Int. Cl.[4] F27D** *7/00*

**U.S. Cl. 432—19** **3 Claims**



1. The method of removing unwanted organic materials from a matrix in a countercurrent, direct fired, rotary kiln having a burner which is selectively positionable along the length of said kiln, comprising the steps of feeding the matrix into one end of said kiln and discharging the treated matrix from the other end of said kiln, delivering hydrocarbon fuel to the burner together with sufficient air at the point of combustion to essentially only effect combustion of the fuel to maintain the kiln at a temperature at from about 1300°–1800° F. and develop a substantially non-oxidizing material treatment environment between said burner and the point of entry of said matrix into said kiln, conducting off-gas from the kiln at its matrix feed end to a subsequent treatment means, positioning the burner at a selectable location along the length of said kiln spaced from the feed end a sufficient distance to dry, desorb, and pyrolyze substantially all of said unwanted organic materials by the time they reach the position of said burner and further defining a second material treatment zone between said burner and said discharge end, and admitting auxiliary air to said second material treatment zone thereby maintaining an oxidizing atmosphere in the area of said kiln between said burner and the discharge end of said kiln whereby the volume of combustion air and auxiliary air is less than enough to completely oxidize said unwanted organic materials that have been evaporated, desorbed or pyrolyzed and retaining the matrix in said material treatment zone a sufficient period of time to oxidize any remaining organic materials prior to discharge from said kiln.

**4,746,291**
**BAKERY AND PASTRY OVEN**
**Jose L. Cistero, San Sebastian Guipuzcoa, Spain, assignor to Industrial Saiva, S.A., Guipuzcoa, Spain**
**Filed Jul. 28, 1987, Ser. No. 78,529**
**Claims priority, application Spain, May 21, 1987, 8701700**
**Int. Cl.[4] F27D** *3/12*
**U.S. Cl. 432—241** **1 Claim**




1. Improved bakery and pastry oven which, being of the type which includes, on the upper surface of its cooking chamber, a rotating platform driven by a motor-reducer group, to which may be coupled, suspended therefrom, a tray-carrying truck provided with blocks for sliding on a set of rollers which are related to the said rotating platform, is essentially characterised in that the said sliding blocks are located on the side walls of the truck structure, such that in its coupled position the upper surface of the said truck is notably close to the rotating platform, thereby making the most of the useful capacity of the oven cooking chamber, the rollers on which slide the mentioned blocks being in turn located on angular supports which constitute physically independent elements from the rotating platform, the said supports being fitted to the platform with the aid of screws which play within slit holes, such that the said slit holes allow, prior to tightening of the said screws, the adjustment of the distance between the said angular supports, in order that the rotating platform assembly may be capable of receiving tray-carrying trucks of varying width, adjusting exactly to the dimensional requirements thereof, it having been further foreseen that the said blocks, in addition to defining the conventional slope or inclined plane for the transversal displacement and simultaneous elevation of the said truck on the rollers of the rotating platform, include respective arcuate sections at their ends, each section having a downwardly facing concavity therein, wherein are automatically housed the corresponding rollers in the fully introduced position of the tray-carrying truck within the oven.

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**4,746,292**
**TOOL AND METHOD FOR REMOVING A PARTED ENDODONTIC FILE**
**William B. Johnson, 4254 E. 78th St., Tulsa, Okla. 74136**
**Filed Apr. 2, 1987, Ser. No. 33,251**
**Int. Cl.[4] A61C** *3/00*
**U.S. Cl. 433—141** **6 Claims**

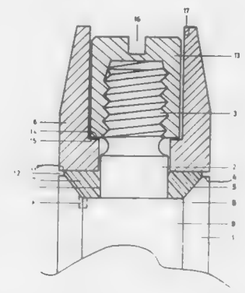
1. A tool for removing a parted endodontic file from the root canal of a tooth in which a portion of the length of the file adjacent the part is exposed comprising:
an elongated tubular shaft having a proximal end and a distal end and having an internal diameter at least in the area at said proximal end greater than the exterior diameter of the exposed portion of the file to be removed whereby the shaft proximal end may be extended over the parted file to telescopically receive the exposed end portion of the parted file therein;
an enlarged diameter handle portion secured to said shaft at said proximal end; and
vent means spaced from said distal end of said shaft communicating the interior of said shaft with the exterior whereby a liquid adhesive may be applied to said shaft



distal end and in which the adhesive will be drawn into said shaft by capillary action.

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**4,746,293**
**CONNECTING DEVICES**
**Dan Lundgren, Kyrkvägen 5, S-430 80 Hovås, and Izidor Brajnovic, Narvavägen 10C, S-552 59 Jönköping, both of Sweden**
**Filed Sep. 16, 1986, Ser. No. 907,914**
**Claims priority, application Sweden, Sep. 16, 1985, 8504275**
**Int. Cl.[4] A61C** *8/00*
**U.S. Cl. 433—173** **6 Claims**



1. A connecting device for dental prosthesis for connecting a first portion of a prosthesis partially implanted into body tissue to a second peri-tissual outer portion of the prosthesis, the first portion including an anchorage unit for implantation into tissue and a spacer having a lower collar-shaped part disposed on the anchorage unit and a screw member extending upwardly from the lower part, the lower collar-shaped part having a top surface including a horizontal portion and an inclined portion, said connecting device comprising:
an outer, cylindrical sleeve member having a top portion and a lower base, said sleeve having an outer surface for connection to an outer prosthesis portion, said sleeve member being inserted over the screw member, with the surface of said lower base facing the top surface of the collar-shaped part of the spacer and terminating at a distance therefrom to form an annular space therebetween;
means for securing said sleeve member to the spacer; and,
a resilient member positioned within said annular space and substantially corresponding to the shape of said annular space for providing a better stress distribution between the implanted and peri-tissual outer portion of the prosthesis, said resilient member being dimensioned to provide a gap between said lower base surface of said sleeve and the horizontal portion of the top surface of the collarshaped portion of the spacer.

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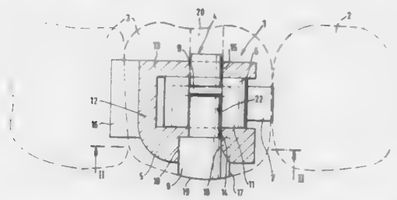
**4,746,294**
**CYLINDRICAL THREADED PIN FOR DENTAL PROSTHESIS IMPLANTATIONS**
**Domenico Colombo, Via Musa, 4, Como, and Ugo Pasqualini, Via Borgonuovo, 26, Milano, both of Italy**
**Filed Jan. 30, 1987, Ser. No. 8,691**
**Claims priority, application Italy, Mar. 27, 1986, 53199/86[U]**
**Int. Cl.[4] A61C** *8/00*
**U.S. Cl. 433—174** **3 Claims**



1. In a cylindrical threaded pin for implantation use in dentistry for insertion in a bone tunnel made by a pointed milling cutter in a jaw-bone, said pin comprising an elognated cylindrical stem provided with a head at one end thereof and with an external thread upon said stem at a second end thereof, said stem being of a diameter to fit within the bone tunnel,
the improvement wherein the depth of said thread is substantially 1/10 of the diameter of said stem;
the included angle of said thread is substantially 35° defining a cutting thread for threading into and retainingly engaging the jawbone;
the pitch of said thread is substantially the same as the diameter of said stem;
and
a downwardly extending point at said second end having a shape corresponding to the bit of said milling cutter.

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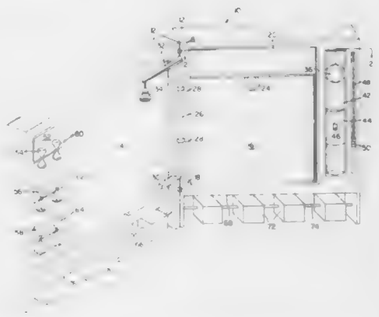
**4,746,295**
**CONNECTING ELEMENT FOR DETACHABLY CONNECTING A PARTIAL DENTURE TO A REMAINING SET OF TEETH**
**Manfred Kipp, Rustringer Str. 1a, 2945 Sande 1, Fed. Rep. of Germany**
**Filed Aug. 4, 1986, Ser. No. 893,096**
**Claims priority, application Fed. Rep. of Germany, Aug. 6, 1985, 3528144; Apr. 9, 1986, 3611901**
**Int. Cl.[4] A61C** *13/12*
**U.S. Cl. 433—182** **7 Claims**



1. A connecting element for detachably connecting a partial denture with a remaining set of teeth, comprising:
a joint having an axle in the form of a bolt displaceably supported in the joint transversely to the row of teeth,
said joint including two ring shaped bolt receiving devices,
a first one of said bolt receiving devices being connectable with the partial denture and a second one of said bolt receiving devices being connectable with the remaining set of teeth, said bolt connecting said first and second bolt receiving devices with each other and being displaceably supported in said first bolt receiving device, and
a flexible arresting or locking pin projecting into the path of displacement of said bolt and which is arranged on said first bolt receiving device, said arresting pin being engageable in two grooves arranged in said bolt transverse to the longitudinal axis thereof, each wall area of section of said grooves closest to the face sides or said bolt forming a stop limiting the path of displacement of said bolt, the wall of said first bolt receiving device having two aligned holes for receiving the ends of said arresting pin and an oblong recess arranged in the wall between said holes for receiving said pin and extending parallel to said pin.

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**4,746,296**
**LEARNING DEVICE FOR INFANTS**
**Ronna L. Tulgan, 53 Amherst Rd., Pelham, Mass. 01002**
**Filed Feb. 19, 1987, Ser. No. 16,554**
**Int. Cl.[4] A63B** *69/00*
**U.S. Cl. 434—247** **9 Claims**

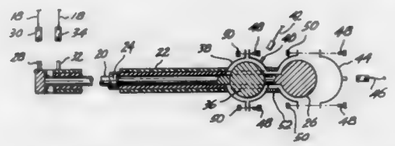


1. A learning device for an infant which comprises
a frame means
two mirrors enclosed by said frame means and connected to each other by hinge means, said hinge means adapted to permit said mirrors to be positioned substantially perpendicular to each other,
at least one shade positioned to expose or cover at least one of said mirrors,
a first housing having an opening in said frame and containing a first object,
a transparent retainer positioned within said first housing and extending the length of said first housing opening
an opaque sleeve slidably mounted on said transparent retainer,
said first object being attached to a flexible line exposed for grasping by said infant,
a rod having a handle rotatably mounted on said frame and positioned between said mirrors,
and a second object attached to said rod, said second object being positioned to be viewed in either of said mirrors.

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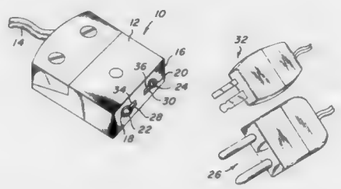
**4,746,297**
**ROTATIVE ELECTRICAL CONNECTOR**
**James R. Soleau, P.O. Box 33222, Seattle, Wash. 98133**
**Continuation-in-part of Ser. No. 719,074, Apr. 2, 1985, Pat. No. 4,624,141. This application Nov. 24, 1986, Ser. No. 934,306**
**Int. Cl.[4] H01R** *39/02*
**U.S. Cl. 439—8** **10 Claims**



1. A rotative electrical connector for electrically connecting a plurality of wires including:
a first inner spherical conductive member electrically connected to a first wire;
an outer spherical shell substantially encompassing said spherical member, said shell electrically connected to a second wire;
means for electrically connecting said spherical member to said spherical shell;
a first conductive rod affixed to said spherical member, said first wire being connected to said first conductive rod;
a second conductive rod surrounding said first conductive rod, said second conductive rod being insulated from said first conductive rod;
a second inner spherical conductive member affixed to a first end of said second conductive rod, said second inner spherical conductive member having a bore formed therethrough through which said first conductive rod passes, said first conductive rod being insulated from said second inner spherical conductive member;
means for attaching a third wire to said second conductive rod;
an outer spherical bearing assembly substantially surrounding said second inner spherical conductive member, said second inner spherical conductive member being rotatable within said outer spherical bearing assembly;
means for electrically connecting said second inner spherical conductive member with said outer spherical bearing assembly; and
means for connecting a fourth wire to said spherical outer bearing assembly so that an electrical connection is maintained between said third wire and said fourth wire.

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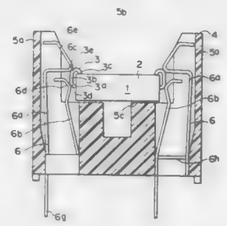
**4,746,298**
**UNIVERSAL CONNECTOR FOR THERMOCOUPLES**
**Milton B. Hollander, Stamford, Conn., assignor to Omega Engineering, Inc., Stamford, Conn.**
**Filed Jul. 15, 1986, Ser. No. 885,724**
**Int. Cl.[4] H01R** *13/02*
**U.S. Cl. 439—222** **4 Claims**



1. A universal polarized connector for thermocouple connections and the like comprising,
a body having a first pair of sockets therein, said sockets being substantially circular and having differing diameters to visually indicate polarization, and a second pair of sockets therein, said second pair of sockets respectively having an elongated slot-like configuration,
said second pair slot sockets lying in spaced end-to end relation substantially in a plane extending through the longer dimension of said slot sockets and substantially parallel to a line joining said circular sockets,
each slot of said second pair along intersecting a respective said circular slot to be open therewith whereby polarized varying-width blades of a plug member when inserted into said second pair of sockets may extend partially into said first pair of circular sockets,
means providing thermoelectric alloy contact within each said socket,
means interconnecting a respective one of said contacts of said first pair with the intersecting one of said contacts of said second pair, and,
lead means extending from said contacts.

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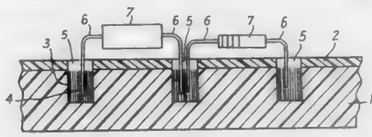
**4,746,299**
**IC CONNECTOR**
**Noriyuki Matsuoka, and Tomio Sasaki, both of Tokyo, Japan, assignors to Yamaichi Electric Mfg. Co., Ltd., Tokyo, Japan**
**Filed Mar. 11, 1987, Ser. No. 24,788**
**Claims priority, application Japan, May 2, 1986, 61-67375[U]**
**Int. Cl.[4] H01R** *23/72*
**U.S. Cl. 439—70** **3 Claims**



1. An IC connector for an IC package having a plurality of vertically extending J bend type lead wires arranged in parallel rows along the side surfaces of the IC package main body, each lead wire having a vertical portion and a bent portion at each end thereof extending into the package main body, said connector comprising:
a main body having a package accommodating recess therein defined by opposite side walls; and
a plurality of contacts in spaced opposed parallel rows along the inner sides of the opposite side walls, each contact having a first elastic contacting piece extending upwardly and then inwardly and unwardly in said accommodating recess and being resiliently movable toward and away from the corresponding side wall for, when an IC package is inserted into said connector, engaging with a corresponding lead wire at the bent portion which is at the upper end of the vertical portion for exerting an inward and downward force on the lead wire, and a second elastic contacting piece having a first part spaced inwardly in said accommodation recess from the upwardly extending part of said first elastic contacting piece, and having a further part extending from the upper end of said first part in an outward direction and being resiliently movable toward and away from the corresponding side wall independently of said first elastic contacting piece for, when an IC package is inserted into said connector, engaging with the same lead wire as said first elastic contacting piece and at the bent portion which is at the lower end of the vertical portion for exerting a contacting force thereon.



**4,746,300**
**MOUNTING PANEL FOR REMOVABLE ELEMENTS**
**Gilles Thevenin, 14d rue René Coty, 71100 Chalon-sur-Saone, France**
**Filed Dec. 3, 1986, Ser. No. 937,310**
**Claims priority, application European Pat. Off., Jun. 9, 1986, 86401236.4**
**Int. Cl.[4] H01R** *9/09;* **H05K** *3/30*
**U.S. Cl. 439—82** **7 Claims**



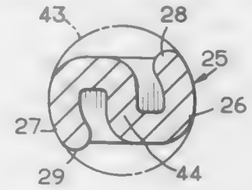
1. A mounting panel for removable elements, in particular for educational toys, for effecting simple "in the air" electronic assemblies of the "Eiffel Tower" assembly type, from elementary components having legs for mounting the removable elements onto said mounting panel, comprising:
a support pierced with holes opening into at least one face of the support;
in each said holes, tufts of hairs parallel to each other thus forming studs which may be used for fixing longitudinally therein the legs of components to be mounted on the panel, said tufts of parallel hairs being engaged in the respective holes of said support while having said hairs in said hole adjacent to each other in the manner of the hairs of a brush;
said tufts of hairs being cut flush with the face of the support in which said holes open out;
in each said hole said tufts of hairs are packed so that each hair forms a sort of U in the hole; and
said U-shaped hairs of each said tuft being fixed in said hole by means of a nail driven into the bottom of the hole.

6. A method of fabricating a mounting panel for removable elements, in particular for educational toys, for effecting simple "in the air" electronic assemblies of the "Eiffel Tower" assembly type, from elementary components having legs for mounting the removable elements onto said mounting panel, comprising:
piercing a support to provide holes opening into at least one face of the support;
inserting into said holes tufts of hair parallel to each other thus forming studs which may be used for fixing longitudinally therein said legs of the components to be mounted on said panel;
engaging the tufts of paralle hairs in the respective holes of said support while leaving a part of the hairs extending outwardly in the manner of the hairs of a brush;
cutting the tufts of hairs flush with the face of the support in which the holes open out;
packing the tufts of haris in each hole so that each hair forms a sort of U in the hole; and
fixing the U-shaped hairs of each tuft in the hole by means of a nail driven into the bottom of the hole.

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**4,746,301**
**S-SHAPED COMPLIANT PIN**
**Edward H. Key, R.D. 1, Box 148B, Hershey, Pa. 17033**
**Filed Oct. 29, 1986, Ser. No. 924,271**
**Int. Cl.[4] H01R** *13/428*
**U.S. Cl. 439—82** **15 Claims**

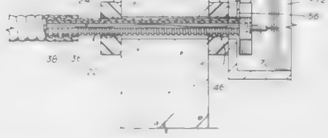
1. In an electrical connection apparatus including a mounting board having a plurality of spaced holes of a wide range of sizes therein and a plurality of contact pins adapted to be partially contained in said board holes, the improvement wherein each of said contact pins has a press-fit section comprising, in cross-section, a double curved or arcuate, generally "S"-shaped segment having a substantially uniform thickness and having smooth, continuous inner and outer curved surfaces and which remains open in that the end portions of such "S"-shaped segment do not abut one another and have a freedom of movement both before and after said press-fit section is



inserted into said hole, said press-fit section being dimensioned and formed of a material whereby said press-fit section undergoes plastic deformation in a substantial portion thereof upon insertion into any one of said wide range of holes.

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**4,746,302**
**INSULATING BOLT**
**Charles E. Brown, 9222 Benchley, Houston, Tex. 77099**
**Filed Dec. 22, 1986, Ser. No. 941,591**
**Int. Cl.[4] H01R** *4/66, 13/648*
**U.S. Cl. 439—95** **16 Claims**



1. Apparatus for securing a first member having an opening therein to a second member having an opening therein, said apparatus for further attaching to a third threaded member, comprising:
a threaded shaft comprised of electrically non-conducting material for passage through the openings in the first and second members, having one end thereof flared for placement against the first member, and having a channel extending from one end of said shaft along the length thereof to said flared end, said threaded shaft for threaded attachment to the third threaded member;
securing means having an opening therein for communicating along the length of said threaded shaft, and having a protruding member attached to said securing means and protruding into the opening in said securing means for communicating with the channel in said threaded shaft, rotatable about said threaded shaft so that the protruding member is movable from a first position communicating with the channel to a second position communicating with the threads in said threaded shaft;
electrical grounding means for placement in the channel in said threaded shaft, communicating between the first member and the third threaded member.

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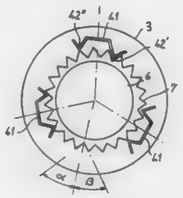


**4,746,303**

## ELECTRICAL CONNECTOR WITH ANTI-DECOUPLING DEVICE

**Christine Cobraiville, Chatou; Pascal Chirot, Le Chesnay; Didier Doret, Verneuil Sur Seine, and Emile Lesaint, Les Ulis, all of France, assignors to Amphenol Corporation, Wallingford, Conn.**

**Filed Sep. 8, 1986, Ser. No. 904,599**
**Claims priority, application France, Sep. 13, 1985, 85 13631**
**Int. Cl.[4] H01R** *13/623*
**U.S. Cl. 439—321** **6 Claims**



1. An electrical connector incorporating a male shell comprising a cylindrical metal body in which is lodged at least one contact of a first type, a female shell comprising a cylindrical metal body in which is lodged at least one contact of a second type which is adapted to cooperate with said contact of the first type, an assembly nut mounted to rotate on one of the shells and becoming fixed by rotation on an outer surface of the other shell, and means to prevent the accidental uncoupling of the assembly nut comprising a radial set of teeth carried either by the assembly nut or by the shell carrying the nut and extending toward the other of the two elements and by means cooperating with the set of teeth and fixed on the other element, wherein said means cooperating with the set of teeth is constituted by at least one blade fixed so as to form two lever arms, each lever arm bearing a tooth which is adapted to cooperate with the set of teeth, the spacing between the two teeth being chosen so that only one of the teeth will be in engagement at a particular time and wherein said blade is rotatably mounted on an axis parallel to the main axis of the connector against the bottom wall of the nut or on the shell carrying the nut.

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**4,746,304**

## CONNECTION APPARATUS FOR CONNECTING ELECTRICAL DEVICES

**Naoki Asai, Nagano, Japan, assignor to Seiko Epson Kabushiki Kaisha, Tokyo, Japan**

**Filed May 2, 1986, Ser. No. 858,624**
**Claims priority, application Japan, May 10, 1985, 60-68864[U]; May 10, 1985, 60-99366**
**Int. Cl.[4] H01R** *13/629, 13/64*
**U.S. Cl. 439—248** **36 Claims**

1. A connection apparatus for connecting a first face of a first electrical device to a second face of a second electrical device and electrically connecting the first and second devices, comprising:

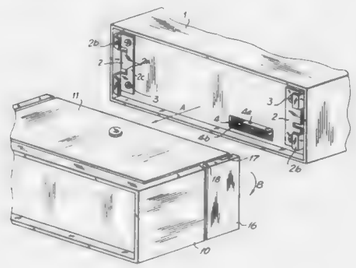
first and second hook means coupled in spaced relation to the first face of the first electrical device;

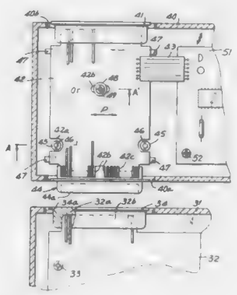
pivot means in facing relation to the first hook means coupled to the second face of the second electrical device for releasably engaging with said first hook means, said second electrical device being pivotable about the engagement of the first hook means and the pivot means between a proximate position where the second hook means is proximate the second face of the second electrical device and a spaced position where the second hook means is spaced apart from the second face of the second electrical device;

locking means displaceably mounted on said second face of the second electrical device for releasably engaging with said second hook means when said locking means is in a first position and said second electrical device is in said proximate position, and disengaging with said second hook means when said locking means is in a second position;

the second electrical device having a second connector with electrical contacts and a shell connector with a camming surface;

the first electrical device having a first connector including a substrate having electrical contacts for coupling with the second connector; and





means for moving the substrate relative to the second connector so that the electrical contacts on the second connector and substrate align and provide an electrical connection between the first and second electrical devices;

whereby the movement of the locking means from the second position to the first position when the first hook means and pivot means are engaged serves to hold the electrical devices together and form an electrical connection between them.

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**4,746,305**

## HIGH FREQUENCY COAXIAL CONNECTOR

**Shinji Nomura, Yokohama, Japan, assignor to Taisho Electric Industrial Co. Ltd., Tokyo, Japan**

**Filed Apr. 24, 1987, Ser. No. 42,134**
**Claims priority, application Japan, Sep. 17, 1986, 61-143187[U]**
**Int. Cl.[4] H01R** *13/62*
**U.S. Cl. 439—319** **5 Claims**

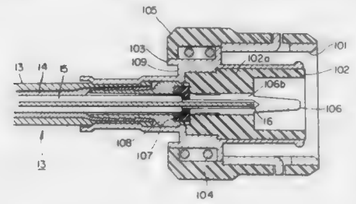
1. A high frequency coaxial cable connector of the bayonet type for use with a high frequency coaxial cable of the type having an internal lead wire;

an outer installation means and an inner installation means;

said outer installation means comprising an external locking sleeve having a bayonet connection groove and a connecting claw, an internal contact sleeve having a longitudinal end portion coaxially disposed within said external locking sleeve, said internal contact sleeve having an internal



contact portion and an external flange stopper, said flange stopper being in contact with one longitudinal end of said external locking sleeve, said internal contact sleeve also having a receiving portion for receiving said coaxial cable, a cylindrical insulating body having an internal opening and an external contact section received in said contact portion of said internal contact sleeve, an outer insulation sleeve having one part disposed about said external locking sleeve and another part about an intermediate portion of said internal contact sleeve such as to provide a gap between said another part of said outer insulation sleeve and said intermediate portion of said internal contact sleeve, said outer insulation sleeve having a longitudinal rear edge wall, a coil spring within said gap and disposed between said rear edge wall of said outer insulation sleeve



and said flange stopper of said internal contact sleeve, said outer insulation sleeve having a locking opening for receiving said connecting claw of said locking sleeve to thereby lock said locking sleeve and said outer insulation sleeve together,

said inner installation means comprising a central contact pin having an external support portion disposed in said internal opening of said cylindrical insulating body of said outer installation means, said central contact pin receiving said internal lead wire of said coaxial cable, said central contact pin having an inner longitudinal end, an insulation plate in contact with said inner longitudinal end of said central contact pin, and an inside sleeve extending into said receiving portion of said internal contact sleeve of said outer installation means and having a longitudinal end recess for receiving said insulation plate.

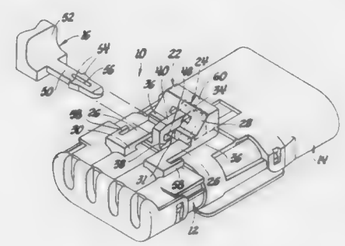
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**4,746,306**

## ELECTRICAL CONNECTOR LOCK WITH GAUGE PIN

**John A. Yurtin, Southington; Robert G. Plyler, Vienna, and Andrew M. Spisak, Youngstown, all of Ohio, assignors to General Motors Corporation, Detroit, Mich.**

**Filed Mar. 26, 1982, Ser. No. 362,495**
**Int. Cl.[4] H01R** *13/627, 13/639*
**U.S. Cl. 439—357** **3 Claims**



1. In an electrical connector having dielectric conenctor bodies which are coupled and locked together by a deflectable lock member of one connector body which snaps past and engages a rigid lock member of the other connector body, the combination comprising:

said deflectable lock member including a cantilevered arm having a slot which extends through a fire end of the cantilevered arm and a lock shoulder which is in the slot and faces toward an opposite end of the cantilevered arm,

said rigid lock member including a loop which has one end insertable into the slot of the cantilevered arm and a lock shoulder which faces an opposite end of the loop,

said loop having a portion disposed in the slot of the cantilevered arm and cooperatively forming a gauge hole of predetermined minimum size with the deflectable lock member when the connector bodies are coupled and locked together by the lock shoulders, and

a gauge pin having a shank of substantially the same predetermined minimum size disposed in the gauge hole, to indicate that the connector bodies are locked together by the lock shoulders and to prevent deflection of the deflectable lock member and consequent disengagement of the lock shoulders.

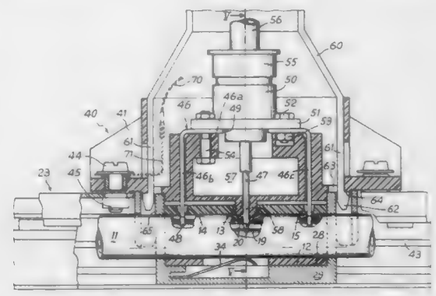
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**4,746,307**

## COAXIAL CABLE TRANSMISSION SYSTEM

**Jean Joly, Houilles, and Yves Oehlert, Rueil Malmaison, both of France, assignors to La Telemecanique Electrique, France**

**Filed Apr. 15, 1987, Ser. No. 38,551**
**Claims priority, application France, Apr. 17, 1986, 86 05507**
**Int. Cl.[4] H01R** *4/24*
**U.S. Cl. 439—394** **13 Claims**



1. In a transmission system including a coaxial cable having inner and outer conductors and an insulating sheath and tapping boxes positioned at tapping positions along said coaxial cables, said tapping boxes lodging a tapping cable in turn comprising inner and outer conductors and having inner and outer connection elements respectively establishing through the insulating sheath an electric connection between the inner conductor and the outer conductor of the coaxial cable and between the corresponding inner and outer conductors of the tapping cable,

the coaxial cable of said transmission system is pre-equipped with tapping sleeves, these sleeves being fixed to the coaxial cable and being spaced apart over its length at a predetermined pitch, the respective tapping sleeves and the respective tapping boxes having mutual positioning and fixing means,

each tapping sleeve is provided with at least one closable central well and the inner connecting element passes through said well and cooperates with the tapping box and makes contact with the inner conductor of the coaxial cable.

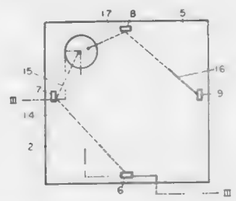
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**4,746,308**
## CARPET TILE FLOOR COVERING SYSTEM WITH ELECTRIC OR ELECTRONIC FUNCTIONS

**Jean-Louis Mutte, Montmorency, France, assignor to Heuga France S.A.R.L., Les Ulis Cedex, France**

**Filed Oct. 20, 1986, Ser. No. 921,953**
**Int. Cl.[4] H01R *4/24***
**U.S. Cl. 439—426** **6 Claims**



1. A carpet tile floor covering system which comprises, in combination:
(a) a flooring surface;
(b) a plurality of removable carpet tiles on said floor surface, the carpet tiles having a visible wear surface and a foundation layer with a lower face, at least one carpet tile having an electric or electronic function and which electric function carpet tile comprises:
(i) a fixed electrical function means secured through the carpet to provide an electrical connection on the wear surface of the electric carpet tile;
(ii) first and second, electrically spaced apart terminals in the said lower face of the foundation layer, the first and second terminals provide respectively for the electrical conduction of opposite electrical phases; and
(iii) electrical wire means to connect electrically the first and second of said terminals to the said electric function means;
(c) generally parallel, first and second, electrically conducting strip means on the same general plane on said flooring surface and positioned to provide electrical power of opposite electrical phases to the said first and second electrical terminals; and
(d) a low voltage power supply means to provide electrical power to said first and second conducting strips whereby low voltage electrical power is provided from the source through said conducting strips to said terminals and to said electrical function means on the carpet face.

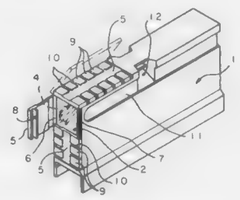
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**4,746,309**
## CLOSURE ELEMENT FOR MULTI-POLE ELECTRICAL CONNECTOR

**Willi Dürkop, Demtold; Hartmut Schmode, Blomberg; Klaus Strate, Detmold; Walter Hanning, Hiddenhausen, and Ferdinand Steinkuhle, Paderborn, all of Fed. Rep. of Germany, assignors to C. A. Weidmüller GmbH & Co, Detmold, Fed. Rep. of Germany**

**Filed Mar. 12, 1987, Ser. No. 25,006**
**Claims priority, application European Pat. Off., Mar. 12, 1986, 86103330.6**
**Int. Cl.[4] H01R *13/58***
**U.S. Cl. 439—471** **8 Claims**

1. A closure element for a multi-pole electrical connector, comprising in combination
a hood-shaped body having narrow end sides and an upper side, a first opening provided in one of said end sides and a second opening provided in said upper side and bordering with said first opening for selectively leading out a bundle of conductors connected with the electrical connector, each of said openings having one edge and another opposite edge;
means for closing said openings and including two closing pieces each foldably connected with one edge and releasably securable to the opposite edge of a respective one of said openings, each of said closing pieces being transversely separable into a plurality of partial segments which are formed so that upon separation they release a required passage for the conductor bundle in the respective opening, and at the same time remain foldably connected with the one edge of the respective opening so as to form pull release means in the region of the passage for the conductor bundle.

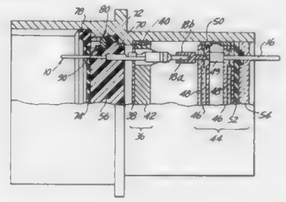


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**4,746,310**
## ELECTRICAL CONNECTOR HAVING TRANSIENT SUPPRESSION AND FRONT REMOVABLE TERMINALS

**Ronald W. Morse; Leonard A. Krantz, Jr., and Richard L. Paul, all of Sidney, N.Y., assignors to Amphenol Corporation, Wallingford, Conn.**

**Filed Nov. 3, 1986, Ser. No. 926,741**
**Int. Cl.[4] H01R *13/66***
**U.S. Cl. 439—620** **5 Claims**



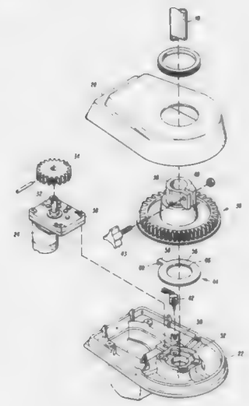
1. An electrical connector comprising a metallic shell having a front and a rear end portion, a plurality of terminals disposed in the shell each having a forward and a rearward end portion, each forward end portion being releasably disposed in the front end portion of said shell and separable from its rearward end portion and each rearward end portion being non-removably mounted in the rear end portion of said shell, means for grounding the terminals to the shell, circuit protection means disposed on the forward end portion of each terminal and electrically connected to the grounding means for protecting the terminals from over voltages, filter means disposed on the rearward end portion of each terminal for protecting the terminals from frequency interference and access means for allowing removal of selected terminal end portions from the front end portion of the shell, the access means comprising the front end portion of said shell being internally threaded rearwardly of its front end face, a dielectric insert receiving the forward end portions of the terminals being disposed in the front end portion of said shell, and externally threaded locking means adapted to be releasably threaded into the front end portion of said shell for retaining the insert within the shell.



**4,746,311**
## STEERING DRIVE SYSTEM FOR ELECTRIC FISHING MOTORS

**Tom J. Kraus, Sherrill, Iowa, assignor to The Eska Company, Dubuque, Iowa**

**Filed Jul. 15, 1986, Ser. No. 885,859**
**Int. Cl.[4] B63H *21/17***
**U.S. Cl. 440—6** **6 Claims**



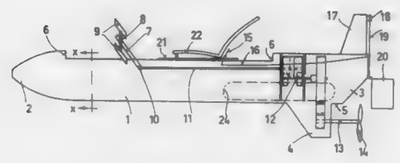
1. A drive system for steering an electric trolling motor for boats in which the motor assembly is supported at the lower end of a vertical motor tube, said drive system comprising drive means operatively connected to the motor tube for rotating the motor tube to steer the boat, the drive means including a driven member rotatable at the same rate of rotation as the motor tube, a steering motor for driving the drive means, switch means for turning the steering motor off, an actuator intermittently rotatable with the driven member to actuate the switch means, the switch means being located in the path of rotation of the actuator, and means combined with the driven member to rotate the actuator only after the driven member has rotated through a predetermined arc of rotation.

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**4,746,312**
## OCCUPANT-PROPELLED MARINE VESSEL

**José Matos Teodosio, and Manuel Martin Garcia, both of Ramón Talero, 20, El Repilago-Jabugo (Huelva), Spain**

**Filed Oct. 24, 1985, Ser. No. 790,850**
**Claims priority, application Spain, Oct. 29, 1984, 282328**
**Int. Cl.[4] B63B *35/72***
**U.S. Cl. 440—21** **7 Claims**



1. An occupant-propelled marine vessel, comprising:
(a) an elongated main body buoyant in water and being of streamlined construction, said body extending from a bow at the front of the body along a longitudinal axis to a stern at the rear of the body, said body having a submerged keel lying in a vertical plane longitudinally extending centrally through the body, and a single submerged rudder mounted at the stern for pivoting movement about a vertical axis normal to said longitudinal axis, said body further having an above-water deck and an interior below the deck;
(b) a pair of side arms mounted at opposite sides, and extending transversely, of the main body;
(c) a pair of side floats buoyant in water and being of streamlined construction, said side floats being respectively mounted at outer ends of the side arms at opposite sides of the vertical plane;
(d) a seat mounted on the deck for adjustment along the longitudinal axis; and
(e) occupant-propulsion means for enabling a seated occupant to forwardly propel the vessel by the use of the occupant's feet, including
(i) a pedal shaft in front of the seat and extending along an inclined pedal axis from the interior both forwardly and upwardly through the deck,
(ii) two foot pedals connected above the deck to the pedal shaft at opposite sides thereof and engageable with the occupant's feet, for repetitively driving the pedal shaft in alternate directions about the inclined pedal axis,
(iii) a drive shaft within the interior of the body and extending longitudinally along a drive axis, said drive shaft being operatively connected to the pedal shaft and being turnable in alternate directions about the drive axis,
(iv) an outboard propeller mounted at the stern on an output shaft for joint rotation with the output shaft about an output axis parallel to the longitudinal axis, and
(v) a reversing transmission within the interior of the body and operatively connected between the drive shaft and the output shaft, for converting the alternate turning of the drive shaft into a uni-directional rotation of the output shaft together with the propeller, thereby forwardly propelling the vessel regardless of the direction in which the drive shaft is turned, said reversing transmission including a primary gear mounted on the drive shaft for joint turning in alternate directions about the drive axis, a secondary gear in meshing engagement with the primary gear and turnable in alternate directions by the primary gear about a first gear axis parallel to the drive axis, and a pair of tertiary gears colinearly mounted on a gear shaft extending along a second gear axis parallel to the first gear axis, one of the tertiary gears being in meshing engagement with the primary gear and operative for turning the gear shaft solely in one predetermined direction, the other of the tertiary gears being in meshing engagement with the secondary gear and operative for turning the gear shaft solely in said same one predetermined direction.

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**4,746,313**
## WEBBED SWIMMING AID

**Ken W. Bray, 6313 Shelter Creek, San Bruno, Calif. 94066; Sandra Rhodes, Berkeley, and Richard Mayers, Richmond, both of Calif., assignors to Ken W. Bray, San Diego, Calif.**

**Continuation of Ser. No. 946,668, Dec. 31, 1986, abandoned, which is a continuation of Ser. No. 727,694, Jan. 26, 1985, abandoned. This application Aug. 21, 1987, Ser. No. 88,988**
**Int. Cl.[4] A63B *31/04***
**U.S. Cl. 441—57** **20 Claims**



16. A hand fin swimming aid comprising:

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a first sheet of a thin, stiff, flexible, substantially water impermeable material shaped to conform substantially to the shape of the entire palm side of an outspread hand except the fingertips,

a second sheet of an elastic, thin, flexible, porous material shaped to conform generally to at least the outspread fingers and a portion of back of the palm, the first sheet being relatively stiffer than the second sheet,

connecting means for affixing the first and second sheets together to define passageways therebetween for the thumb and fingers, said passageways being open-ended to permit at least the tips but not substantially more than the outermost phalange of the fingers to extend therethrough.

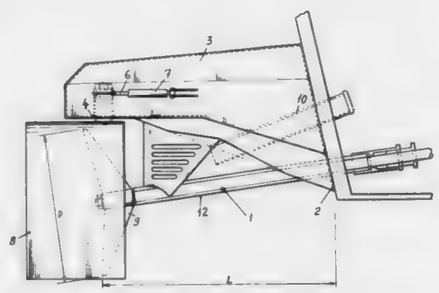
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**4,746,314**

## COMBINED PROPULSION AND STEERING SYSTEM FOR A MOTOR BOAT WITH AN INBOARD ENGINE

**Renato Levi, Via Besana, 5, 20122 Milano, Italy**

**Filed Jun. 3, 1986, Ser. No. 870,019**
**Claims priority, application Italy, Oct. 11, 1985, 22495 A/85**
**Int. Cl.⁴ B63H *5/06***
**U.S. Cl. 440—66** **3 Claims**



1. A combined propulsion and steering system for motor boat with inboard engines, comprising:

a propeller shaft projecting from the lower part of the tramsom of said motor boat, and having its free end located at the waterline of said motor boat,

a semi-submersible propeller screw carried at the end of said propeller shaft,

a deflector tunnel extending over and to the sides of said propeller screw,

means mounting said deflector tunnel such that it is turnable about a substantially vertical axis,

wherein the ratio between the distance, measured in a horizontal plane, from the center of the rear face of the screw hub to the lower rear end of the hull of said motor boat and the outer diameter of said propeller screw lying between 0.8 and 1.8.

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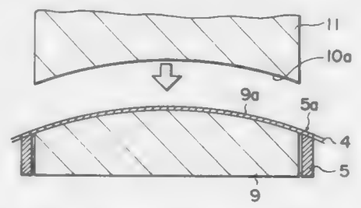
**4,746,315**

## PRODUCTION OF COLOR SELECTION MECHANISM FOR CATHODE-RAY TUBE

**Hiroji Sumiyoshi, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan**

**Filed Jun. 23, 1986, Ser. No. 877,479**
**Claims priority, application Japan, Jun. 27, 1985, 60-140918**
**Int. Cl.⁴ H01J *9/00***
**U.S. Cl. 445—37** **3 Claims**

1. A process of producing a color selection mechanisms for a cathode-ray tube, comprising the steps of perforating a plurality of electron beam passing openings in rows and columns in a cold rolled thin metal plate to form a color selection electrode, bending the color selection electrode within the elastic limit of the material of the electrode while said material still evidence residual stress into a curved facial shape having substantially a cylindrical face as a basic facial shape thereof without drawing said metal plate, and fixing the color selection



electrode in that curved condition on a substantially rigid frame.

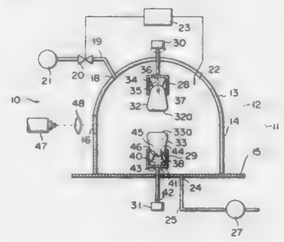
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**4,746,316**

## METHOD FOR MANUFACTURING A LUMINOUS TUBE FOR DISCHARGE LAMP

**Shigeru Sudo, Kawasaki; Masahiko Hirose, Tokyo; Masaaki Yada, Kawasaki, and Hitoshi Imamura, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Continuation of Ser. No. 299,921, Sep. 8, 1981, which is a continuation of Ser. No. 857,998, Dec. 6, 1977, abandoned. This application Aug. 17, 1982, Ser. No. 408,876**
**Claims priority, application Japan, Dec. 7, 1976, 51-146110; Dec. 10, 1976, 51-147849; Dec. 14, 1976, 51-149359; Jan. 12, 1977, 52-1455**
**Int. Cl.⁴ H01J *9/40***
**U.S. Cl. 445—43** **7 Claims**



1. A method of manufacturing a luminous tube for a discharge lamp by a laser light source utilizing a closed container with a window positioned in a wall portion thereof and which comprises material which transmits laser light and including a tubular component of a cylindrical discharge vessel and a first and second high-fusion-point metal cap component, said first and second components each having an electrode, a sealing portion, and a glass solder member, which comprises:

positioning in said container said tubular component and said first and second components adjacent each other so that each said sealing portion is disposed in contact with said glass solder member so as to be subsequently fused together by heating;

positioning a short cylinder in said container to be heated by photo energy of said laser light source so as to surround a point of contact of said tubular component and said first and second components with said glass solder member;

maintaining the atmosphere inside said container at the same level as that of an atmosphere of a desired gas to be enclosed in the luminous tube, said gas atmosphere being formed from a stream of said desired gas introduced into said container;

successively applying laser light from said laser light source from outside said container to said cylinder through said window so as to heat said cylinder by the photo energy of said laser light and to fuse each said glass solder member by the heat of said cylinder while said stream of said desired gas is introduced into said container; and

successively sealing said tubular component to said first and second components to produce the luminous tube and to enclose said gas atmosphere within the luminous tube.



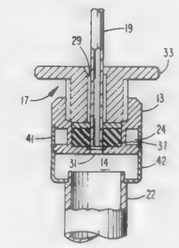
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**4,746,317**

## ELECTRON TUBE EVACUATING MANIFOLD SYSTEM

**Donald B. Kaiser, Lancaster, and Robert W. Groff, Manheim, both of Pa., assignors to RCA Corporation, Princeton, N.J.**

**Continuation-in-part of Ser. No. 927,438, Nov. 6, 1986, abandoned. This application Nov. 30, 1987, Ser. No. 129,360**
**Int. Cl.⁴ H01J *9/385***
**U.S. Cl. 445—73** **7 Claims**



1. A manifold system for simultaneously evacuating a plurality of electron tubes each having an exhaust tubulation comprising:

At least one manifold section having an evacuation chamber extending the length of said manifold section;

an electron tube mounting section extending along said manifold section, said mounting section having a plurality of evacuation apertures communicating with said evacuation chamber by means of a plurality of communicating apertures, said mounting section having protecting means circumscribing said communicating apertures to protect said exhaust tubulations from damage;

a plurality of electron tube mounting members for individually hermetically mounting said electron tubes to said mounting section, said mounting members each having means to sealingly receive the tubulations of tubes to be evacuated and to communicate said tubulations through said communicating apertures with said evacuation chamber; and

means for evacuating gases from said tubes and from said evacuation chamber, said means extending into said evacuation chamber.

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**4,746,318**

## MATERNITY EXERCISE GARMENT

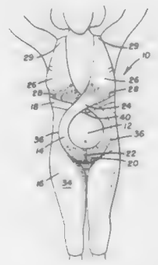
**Nanette C. Moyer, 940 Alma Place, Oakland, Calif. 94610**

**Filed Aug. 31, 1987, Ser. No. 91,204**
**Int. Cl.⁴ A41C *1/08***
**U.S. Cl. 450—155** **11 Claims**

1. An elasticized abdominal and breast support garment comprising:

a support band formed to surround and support the uterine area of a wearer, the band narrowing and crossing over itself at the base of the wearer's sternum, then widening to form breast cups, then narrowing again to form straps passing over the shoulders of the wearer, the straps crossing at mid back, with the ends of each strap fixed at the level of the base of the wearer's sternum to the opposite breast cup from whence the strap emanated;

an elasticized pair of exercise tights affixed to the inferior side of the breast cups at the upper end of said tights and



to the lateral and inferior sides of the support band in the abdominal area of said tights.

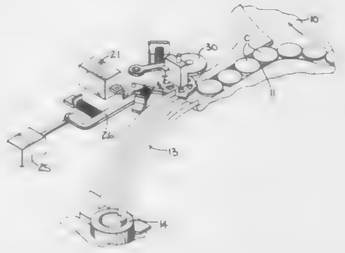
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**4,746,319**

## COUNT MECHANISM FOR COIN DISPENSING MACHINE

**Robert L. Zwieg, and Charles T. Bergman, both of Watertown, Wis., assignors to Brandt, Inc., Watertown, Wis.**

**Filed Apr. 14, 1981, Ser. No. 253,914**
**Int. Cl.⁴ G07D *9/04***
**U.S. Cl. 453—32** **14 Claims**



1. A count mechanism for a coin dispenser which moves coins single file along a track, said mechanism comprising:

a rotatable wheel having a plurality of equally spaced points about its periphery which lie in the path of travel of coins on said track and which is indexed one point by the passage of each coin;

a detent biased against the periphery of the wheel and tending to settle between successive points to retard rotation of the wheel; and

a latch engagable with anyone of the points of said wheel to prevent rotation of said wheel and therby halt the flow of coins past said wheel after the passage of any number of coins.

14. A method of testing the operability of an optical sensor which responds to the passage of spaced reflective areas to produce a logic low signal for a counter having one logic level when a reflective area is adjacent the sensor and a logic high when a reflective area is not adjacent the sensor, comprising:

providing a second logic level whose logic high is in the range of the upper limit of the logic low signal of said sensor;

comparing the signals at the two logic levels; and

producing a signal when the sensor signal is a logic high in the second logic level.

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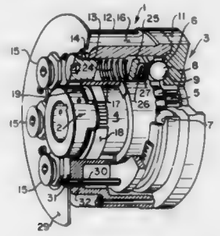
## TORQUE LIMITING CLUTCH

**Thomas C. Kilwin, Bridgeton, Mo., assignor to Unidynamics Corporation, St. Louis, Mo.**

**Continuation-in-part of Ser. No. 103,844, Dec. 14, 1979, Pat. No. 4,373,923. This application Mar. 26, 1981, Ser. No. 248,020**

**Int. Cl.⁴ F16D** *7/06*

**U.S. Cl. 464—36** **1 Claim**



1. An improved torque limiting clutch for use in retaining driving and driven members together during normal usage of machinery but effecting disconnection of said members when a maximum predetermined torque is exceeded, comprising, said clutch including a driving member and a driven member, said driving member including a shaft coupling element extending substantially through the driven member, an integral flange extending from the inner end of the driving member, a series of detent means, said detent means arranged for containment by said flange, said driving member flange having at least one opening therethrough for loosely containing said detent means therein, said driven member including a connecting rotatable element, said rotatable element having a surface contacted by said detent means, said surface including a seat for each detent means and normally seating a detent means during routine machinery usage, said surface including a race means upon which the detent means ride when the driving and driven members of the clutch disconnect as when the predetermined torque is exceeded, structured support means connecting with said rotatable element of the driven member, said support means extending concentrically of the length of said clutch, spring biasing means arranged within said structured support means and at one end pressuring against the detent means to maintain their seating relationship within the rotatable element seats as during a normal operating condition of the clutch and accompanying machinery, at least one adjustment means provided contacting the opposite end of said spring means, said adjustment means connecting with the structured support means and capable of being readjusted for varying the pressure applied upon the detent means and consequently the amount of excessive torque required before clutch disconnection occurs, a first race comprising an annular ring contacting the detent means upon a side opposite from their seating within the rotatable element seats, a second race arranged spacedly from said first race, radial bearing means arranged intermediate said races, said spring biasing means disposed against said second race for urging and maintaining the detent means seating upon said first race and to facilitate movement for the detent means to unseat from the rotatable element seats, switch means responsive to the movement of one of said races during detent means unseating and effecting shut-off of the driving member during clutch disconnection, including rod means at one end secured to the said second race, said rod means at the opposite end extending out of the structured support means, a plate means securing to the opposite end of the rod means and positioned for contacting and actuating the switch means during clutch disconnection.

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**4,746,321**

## AUTOMATIC MACHINE FOR FORMING BOXES OF THE DOUBLE-PLINTH TYPE

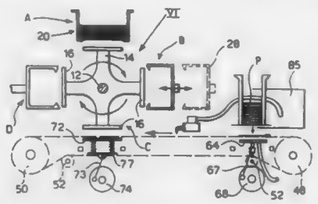
**Pio G. Benedicenti, Chieri, Italy, assignor to Cartotecnica Chierese S.p.A., Chieri, Italy**

**Filed Dec. 2, 1986, Ser. No. 937,162**

**Claims priority, application Italy, Jun. 24, 1986, 67508 A/86**

**Int. Cl.⁴ B31B** *1/00*

**U.S. Cl. 493—14** **9 Claims**



1. An automatic machine for forming boxes having a bottom, a lid opposite the bottom and hinged thereto, and side walls extending between the bottom and the lid, including a cross-shaped rotor rotatable about a horizontal axis, at least four forming heads carried by the rotor and movable successively, as a result of the rotation of the rotor, between an upper station for the supply of punched sheets of cardboard and the application of a liquid glue to predetermined zones of the sheets, a front station for forming the containers by cooperation of the heads with an erection mould, a lower waitng station, and a rear station for discharge of the boxes, and suction members provided on the forming heads, wherein the supply station is adapted to receive punched sheets shaped so as to define the bottom, the side walls, the lid and a first plinth associated with the lid, and wherein the machine further includes a store for the supply of auxiliary cardboard sheets for constituting a second plinth of the box associated with the bottom of the latter, and actuator means for selectively taking up an auxiliary sheet form the store, applying a predetermined quantity of liquid glue to one face thereof, and subsequently for bringing the auxiliary sheet into contact with the bottom of a formed box carried by one of the forming heads at the lower waiting station in order to join them by gluing; said acutator means comprising:

stepwise conveyor means located beneath the rotor, between the store disposed in front of the machine and the lower waiting station;

take-up means located beneath the store and provided with suction members for taking an auxiliary sheet selectively from the store and transferring it to the conveyor means;

liquid glue supply means associated with the conveyor means and arranged to deposit the glue on the auxiliary sheet; and

lifting means located beneath the lower waiting station and arranged to take the auxiliary sheet from the conveyor means and bring it into contact with the bottom with the formed box carried by the forming head.



**4,746,322**

## HAIR DYE COMPOSITION AND PROCESS FOR USING THE SAME

**Walter C. Herlihy, Watertown, Mass., assignor to Repligen Corporation, Cambridge, Mass.**

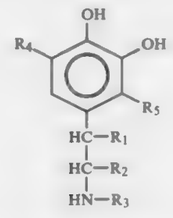
**Continuation of Ser. No. 828,129, Feb. 11, 1986, abandoned, which is a continuation-in-part of Ser. No. 664,113, Oct. 22, 1984, abandoned, which is a continuation-in-part of Ser. No. 598,466, Apr. 9, 1984, abandoned. This application May 11, 1987, Ser. No. 52,172**

**Int. Cl.⁴ A61K** *7/13*

**U.S. Cl. 8—405** **25 Claims**

1. An aqueous dye composition for dyeing hair which does not dye the skin comprising:

(1) at least one water soluble dye precursor of the formula



wherein

$R_1$, $R_2$ can be the same or different and are:

H, alkyl or 1–4C, $NH_2$, OH, COOR′ wherein R′ is alkyl of 1–4C or H, $CONH_2$, halogen, OR″ wherein R″ is alkyl of 1–4C, $CH_2OH$, $CH_2NH_2$, CONR′R″ wherein R′ and R″ can be the same or different;

$R_3$ is H or alkyl of 1–4C or COR″;

$R_4$, $R_5$ can be the same or different and are:

H, alkyl of 1–4C, $NH_2$, OH, COOH, $CONH_2$, halogen, OR″, $NO_2$, $SO_3$, HNR″, or NR″R″;

(2) an alkali metal or alkaline earth metal salt of iodate or periodate;

(3) at least one organic dye dispersing agent that is compatible with the dye precursor used and will not react with the iodate or periodate oxidant; and

(4) water.

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**4,746,323**

## WATER-SOLUBLE VINYL SULFONYL-TYPE REACTIVE MONOAZO YELLOW DYESTUFFS MIXTURES WITH HIGH COLOR YIELD

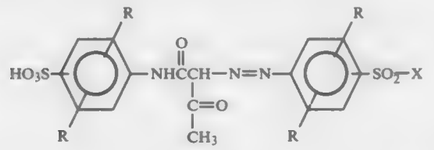
**Thomas S. Phillips, West Warwick, and Anthony J. Corso, Coventry, both of R.I., assignors to Hoechst Celanese Corporation, Somerville, N.J.**

**Continuation-in-part of Ser. No. 848,888, Apr. 7, 1986, Pat. No. 4,699,624. This application Aug. 24, 1987, Ser. No. 88,770**

**Int. Cl.⁴ C09B** *67/02, 62/00*

**U.S. Cl. 8—527** **16 Claims**

1. A water-soluble, fiber-reactive, yellow, azo dyestuff mixture comprising a first and a second, azo dyestuff having the following general formula in their free acid form:



wherein X is $-CH{=}CH_2$ or $-CH_2-CH_2-Z$ wherein Z is —OH, —Cl, —Br, $-OSO_3H$, $-SSO_3H$, $-OPO_3H_2$ or $-N(R_1)_2$, wherein $R_1$ is independently selected from a one to four carbon-atom, lower alkyl and hydrogen;

wherein said first dye, the moieties R are positioned in ring positions 2,5,2′,5′ and wherein the moieties —SO, —X, $-HO_3S-$ are positioned in ring positions 4,4′;

wherein said second dye, the moieties R are positioned in ring positions 2,5,2′,4′ and the moiety $-HO_3S-$ is positioned in ring position 4 and the moiety $-SO_2-X$ is positioned in ring position 5′;

wherein the moiety R is independently selected from lower alkyl and lower alkoxy having one to four carbon atoms with the proviso: (1) that said first or said second dye contain at least one R moiety selected from lower alkyl; (2) that each of said dye contain at least two R moieties selected from lower alkoxy and (3) that the mixture of said dye has a higher color yield value than the color yield value of said first or said second dyestuff.

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**4,746,324**

## ISOTHERMAL RAPID-DYEING PROCESS FOR WOOL WITH VINYL SULFONE TYPE REACTIVE DYES AND SULFURIC ACID ADDED AT DYEING TEMPERATURE

**Hans-Ulrich von der Eltz, Frankfurt am Main; Karl-Heinz Röstermundt, Eschborn; Klaus Türschmann, Hofheim am Taunus, and Joachim W. Lehmann, Kelkheim, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Dec. 16, 1986, Ser. No. 942,530**

**Claims priority, application Fed. Rep. of Germany, Dec. 18, 1985, 3544793**

**Int. Cl.⁴ D06P** *1/38, 3/14*

**U.S. Cl. 8—549** **9 Claims**

1. A process for the level dyeing of wool or of the wool portion of fiber blends by the exhaust dyeing technique in a strongly acidic medium with aqueous liquors of reactive dyes which have in their molecule at least one grouping which, under fixing conditions, reacts with the fiber via the vinylsulfonyl form by nucleophilic addition, which comprises heating the exhaust liquor which contains such dyes of the vinylsulfonyl type, but no acid or acid-donating agents required for fixing the dyes, together with the material to be dyed to the dyeing temperature within the range from 95° C. to 106° C. as rapidly as possible and in one step, then, on reaching the dyeing temperature and while maintaining appropriate isothermal conditions for dye fixation, adding sulfuric acid to the hot dyebath incrementally within a period of 10 to 45 minutes, and dyeing the wool at pH values between 2 and 3.

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**4,746,325**

## PROCESS FOR PRODUCING COAL-WATER SLURRY AT HIGH CONCENTRATION

**Yoshinobu Nakamura, Funabashi; Tadao Goto, Chiba; Isao Fujikura; Yazaemon Morita, both of Tokyo; Shinichi Okada, and Masao Inagaki, both of Chiba, all of Japan, assignors to Fuji Oil Co., Ltd. and Toho Chemical Industry Co., Ltd., both of Tokyo, Japan**

**Filed Jul. 18, 1986, Ser. No. 886,622**

**Claims priority, application Japan, Jul. 23, 1985, 60-163234**

**Int. Cl.⁴ C10L** *1/32*

**U.S. Cl. 44—51** **19 Claims**

1. A process for producing a coal-water slurry having a high coal concentration, a low viscosity and a satisfactory flowing property and stability, comprising admixing a dispersant with a coal-water mixture to form the coal-water slurry, wherein said dispersant is an alkali neutralized surface active agent prepared by the sulfonation and followed by the subsequent oxidation of at least one hydrocarbon, having a molecular weight of greater than 170 and a H/C atomic ratio of from 0.5 to 1.7, selected from distilled petroleum oils, petroleum pitches, asphalts, distilled coal oils, coal pitches or coals, to form a hydrocarbon product containing hydrophilic groups comprising mainly of sulfonic groups and carboxylic groups, wherein the amount of sulfonic groups comprised in the formed hydrocarbon product is from 0.2 to 8 meq/g and the amount of total acidic groups comprised in the formed hydrocarbon product is from 2 to 15

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meq/g, and neutralizing the formed hydrocarbon product with an alkali to produce the alkali neutralized surface agent.

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**4,746,326**

## CETANE NUMBER OF DIESEL FUEL BY INCORPORATING POLYNITRATE ESTERS AND STABILIZERS

**Tsoung Y. Yan, Philadelphia, Pa., assignor to Mobil Oil Corporation, New York, N.Y.**

**Division of Ser. No. 798,517, Nov. 15, 1985, Pat. No. 4,705,534. This application Sep. 22, 1987, Ser. No. 99,862**

**Int. Cl.[4] C10L 1/18**

**U.S. Cl. 44—53** **18 Claims**

1. A liquid fuel composition adapted for use in a diesel engine, comprising liquid alcohol and a cetane number-increasing amount of a mixture of fuel-soluble polynitrate esters and stabilizers selected from the group consisting of diphenyl amine, diethyl diphenylurea and 2-dinitrodiphenylamine.

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**4,746,327**

## ETHYLENE-UNSATURATED, ESTER-SUBSTITUTED OLEFIN TERPOLYMER FLOW IMPROVERS

**Granville L. Smyser, Plainfield, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.**

**Filed Mar. 25, 1985, Ser. No. 715,628**

**Int. Cl.[4] C10L 1/14**

**U.S. Cl. 44—62** **3 Claims**

1. A distillate fuel composition having improved cold-flow plugging point and improved pour point properties comprising a distillate fuel and about 10–2,500 parts of an ethylene-unsaturated, ester-substituted olefin terpolymer per million parts of the distillate fuel, wherein the unsaturated ester comprises vinyl acetate and the substituted olefin comprises 2,4,4-trimethyl-1-pentene, 2,4,4-trimethyl2-2-pentene, 2,4,4,6,6,-pentamethyl-1-heptene, 2,4,4,6,6,-pentamethyl-2-heptene, cis- or trans-,2,24,6,6-pentamethyl-3-heptene, 2-neopentyl-1-pentene or mixtures thereof.

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**4,746,328**

## STABILIZED FUEL OIL CONTAINING A DISPERSANT

**Naoyuki Sakamoto; Hirokazu Kawashimo, both of Yokohama; Koji Kishimoto, Wakayama; Takayuki Ikenaga, Wakayama; Yoshihide Watanabe, Wakayama, and Shigemi Hayashi, Wakayama, all of Japan, assignors to Kao Corporation and Karonite Chemical Co., Ltd., both of Tokyo, Japan**

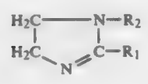
**Filed Jul. 18, 1986, Ser. No. 886,822**

**Claims priority, application Japan, Jul. 19, 1985, 60-159559; Sep. 30, 1985, 60-217525; Sep. 30, 1985, 60-217526; Apr. 23, 1986, 61-94075**

**Int. Cl.[4] C10L 1/18, 1/22, 1/24, 1/26**

**U.S. Cl. 44—72** **19 Claims**

1. A residual fuel oil which comprises (1) 15 to 79.95 wt. % of a thermal cracking oil, (2) 20 to 80 wt. % of a diluent selected from cracked cycle oil, kerosene or gas oil and (3) 0.05 to 5 wt. % of a dispersant selected from the group consisting of (A), (B), (C), (D), (E), (F), (G), (H), (I), and (J),
in which:
(A) has the formula (A-1):



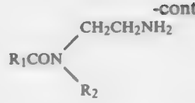
(A-1)

wherein $R_1$ is a hydrocarbon group having 7 to 23 carbon atoms, and $R_2$ is a hydrogen atom or a hydrocarbon group having 1 to 22 carbon atoms;
(B) has the formula (B-1) or (b-2):



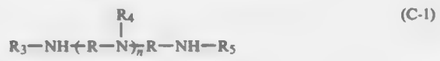
(B-1)

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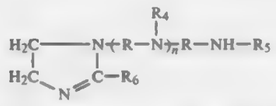


(B-2)

wherein $R_1$ is a hydrocarbon group having 7 to 23 carbon atoms, and $R_2$ is a hydrogen atom of a substituent selected from the group consisting of a hydrocarbon group having 1 to 22 carbon atoms and an aminoalkyl, an acylaminoalkyl or a hydroxyalkyl group having 2 to 44 carbon atoms;
(C) has the formula (C-1), (C-2) or (C-3):

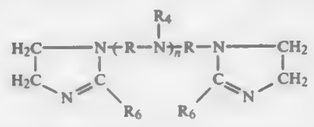


(C-1)



(C-2)

wherein $R_3$ and $R_4$ are each a hydrogen atom or an acyl group having 8 to 22 carbon atoms, $R_5$ is an acyl group having 8 to 22 carbon atoms, $R_6$ is a hydrocarbon group having 7 to 23 carbon atoms, R is an alkylene group having 2 to 4 carbon atoms, and n is an integer of from 1 to 4;

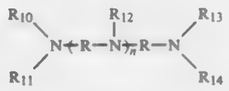


(C-3)

wherein $R_4$ is a hydrogen atom, $R_6$ is a hydrocarbon group having 7 to 23 carbon atoms, R is an alkylene group having 2 to 4 carbon atoms, and n is an integer of from 1 to 4;
(D) and (E) having the formulae (D-1) and (E-1), respectively:

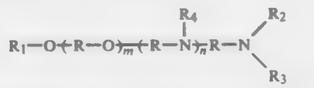


(D-1)



(E-1)

wherein $R_7$ is a hydrocarbon group having 9 to 22 carbon atoms, $R_8$ and $R_9$ are each a hydrogen atom or a hydrocarbon group having 8 to 22 carbon atoms, $R_{10'}$, $R_{11'}$, $R_{12'}$, $R_{13}$ and $R_{14}$ are each a hydrogen atom or a hydrocarbon group having 8 to 22 carbon atoms with the proviso that at least one of $R_{10}$ through $R_{14}$ comprises an alkylene group, R is an alkylene group having 2 to 4 carbon atoms, and n is 0 or an integer of 1 to 9;
(F) has the formula (F-1):

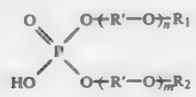


(F-1)

wherein $R_1$ is a hydrocarbon group having 12 to 36 carbon atoms, $R_2$ and $R_3$ are each a hydrogen atom, $R_4$ is a hydrogen atom or a hydrocarbon group having 8 to 22 carbon

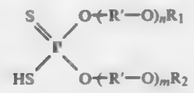


atoms, R is an alkylene group having 2 to 4 carbon atoms, n is 0 or an integer of 1 to 9, and m is an integer of 1 to 15;
(G) has the formula (G-1):



(G-1)

wherein $R_1$ is a hydrogen atom or a hydrocarbon group having 8 to 30 carbon atoms, $R_2$ is a hydrogen atom or a hydrocarbon group having 8 to 30 carbon atoms, R′ is an alkylene group having 2 to 4 carbon atoms, and n and m are each 0 or an integer of 1 to 15, with the proviso that both $R_1$ and $R_2$ are not simultaneously a hydrogen atom;
(H) is a salt of (G), wherein the salt is selected from the group consisting of an alkali metal salt, an alkaline earth metal salt, an amine salt and a zinc salt;
(I) has the formula (I-1);



(I-1)

wherein $R_1$ is a hydrogen atom or a hydrocarbon group having 8 to 30 carbon atoms, $R_2$ is a hydrogen atom or a hydrocarbon group having 8 to 30 carbon atoms, R′ is an alkylene having 2 to 4 carbon atoms and n and m each are zero or an integer of 1 to 15, with the proviso that both $R_1$ and $R_2$ are not simultaneously a hydrogen atom; and
(J) is a salt of (I), wherein the salt is selected from the group consisting of an alkali metal salt, an alkaline earth metal salt, an amine salt and a zinc salt.

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**4,746,329**

## METHANOL FUEL REFORMER

**Larry G. Christner, Newtown; Steven A. Koehler, Bethel, and George Steinfeld, Southbury, all of Conn., assignors to Energy Research Corporation, Danbury, Conn.**

**Filed Nov. 26, 1986, Ser. No. 935,180**

**Int. Cl.[4] B01J 8/04**

**U.S. Cl. 48—61** **10 Claims**

1. A methanol fuel reformer comprising:
a first bottom wall;
a first cylindrical side wall extending upwardly from said bottom wall;
a second cylindrical side wall interior of and spaced from said first cylindrical wall, the bottom end of said second cylindircal side wall being above the bottom end of said first cylindrical side wall and the top end of said second cylindrical side wall being below the top end of said first cylindrical side wall;
a third cylindrical side wall interior of and spaced from said second cylindrical side wall, the bottom end of said third cylindrical side wall being above the bottom end of said second cylindrical side wall and the top end of said third cylindrical side wall being above the top end of said second cylindrical side wall;
a fourth cylindrical side wall interior of and spaced from said third cylindrical side wall, the bottom end of said fourth cylindrical side wall being perforated and extending to the bottom end of said third cylindrical side wall and the top end of the fourth cylindrical side wall being above the top end of the third cylindrical side wall;
a fifth cylindrical side wall interior of and spaced from said fourth cylindrical side wall, the bottom end of said fifth cylindrical side wall extending to the bottom end of said fourth cylindrical side wall and the top end of the fifth cylindrical side wall extending to a point between the top end of the fourth cylindrical side wall and the top end of the third cylindrical side wall;
a sixth cylindrical side wall interior of and spaced from said fifth cylindrical side wall, the bottom end of said sixth cylindrical side wall extending to the bottom end of the second cylindrical side wall and the top end of the sixth cylindrical side wall extending to a point below the top end of the fifth cylindrical side wall;
a first top wall connecting the top end of said first cylindrical side wall to said third cylindrical side wall at a point below the top end of said third cylindrical side wall;
a second top wall connecting the top end of said third cylindrical side wall to said fourth cylindrical side wall at a point below the top end of said fourth cylindrical side wall;
a third top wall situated at the top end of said fourth cylindrical side wall closing the top end of the interior space defined by said fourth cylindrical side wall;
a fourth top wall situated at the top end of said fifth cylindrical side wall closing the top end of the interior space defined by said fifth cylindrical side wall;
a fifth top wall situated at the top end of said sixth cylindrical side wall closing the top end of the interior spaced defined by said sixth cylindrical side wall;
a second bottom wall connecting the bottom ends of said third, fourth and fifth cylindrical side walls;
a third bottom wall connecting the bottom ends of the second and sixth cylindrical side walls;
a fourth bottom wall situated at the bottom end of said sixth cylindrical wall closing the bottom end of the interior space defined by said sixth wall;
said first and second cylindrical side walls forming a first annular chamber, the bottom end of said first annular chamber being in communication with a source of combustion products;
said second and third cylindrical side walls forming a second annular chamber surrounded by said first annular chamber, the top end of said second annular chamber being in communication with the top end of said first annular chamber;
said fifth and sixth cylindrical side walls forming a third annular chamber surrounded by said second annular chamber, the bottom end of said third annular being in communication with the bottom and of said second annular chamber;
said fourth and fifth cylindrical side walls forming a fourth annular chamber in surrounding relationship to said third annular chamber and surrounded by said second annular chamber, said fourth annular chamber having a wick disposed therein;
said third and fourth cylindrical side walls forming a fifth annular chamber in surrounding relationship to said fourth annular chamber and surrounded by said second annular chamber, the bottom end of said fifth annular chamber being in communcation with the bottom end of said fourth annular chamber;
a catalyst disposed in said fifth annular chamber;
combustion products exhaust means communicating with the top end of said third annular chamber for exhausting combustion products from said third annular chamber;
fuel inlet means communicating with the top end of said fourth annular chamber for delivering fuel to said wick;
combustion products inlet means communicating with the top end of said fourth annular chamber and said exhaust means for delivering exhausted combustion products to said fourth annular chamber; and
reformed gas outlet means communicating with the top end of said fifth annular chamber for extracting reformed gas from said fifth chamber.

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**4,746,330**

## METHOD AND APPARATUS FOR LAPPING REEL MOWERS

**Curtis D. Johnson, 1019 N. Terrace Dr., Webster City, Iowa 50595**

**Continuation of Ser. No. 819,927, Jan. 17, 1986, abandoned. This application Jul. 13, 1987, Ser. No. 72,787**

**Int. Cl.[4] B24B** *3/42*

**U.S. Cl. 51—26** **8 Claims**

1. A lapping apparatus for rotating and sharpening the blades of a reel mower with a framework above and in front of the reel which partially restricts access to the reel in a direction perpendicular thereto, said apparatus comprising in operative combination:

(a) a base;

(b) an endless belt;

(c) a plurality of protuberances, extending radially outward from said endless belt, for engaging the blades;

(d) a guide means, associated with said base, for receiving said endless belt and maintaining said protuberances in engagement with the blades;

(e) a power means associated with said base for rotating said endless belt;

(f) said endless belt being operatively associated with said power means at a drive point and operatively associated with said guide means at a guide point;

wherein said base, guide means, power means and endless belt are arranged so that they are low enough to be slid underneath said framework and below and in front of said reel to allow the protuberances extending from said endless belt to engage the blades of the reel mower from underneath, to cause said blades to rotate in a first direction, when said endless belt is rotated in an opposite direction, whereby the blades of the reel mower are lapped while they rotate.

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**4,746,331**

## DETECTING, MEASURING AND APPLYING BACK CORONA PARAMETERS ON AN ELECTROSTATIC PRECIPITATOR

**Rodney J. Truce, 29 Douglas Street, Sherwood, Queensland, 4075, Australia**

**Continuation of Ser. No. 766,339, Aug. 16, 1985, abandoned, which is a continuation of Ser. No. 479,070, Mar. 21, 1983, abandoned. This application Jun. 11, 1986, Ser. No. 872,908**

**Claims priority, application Australia, Jul. 24, 1981, PE9888**

**Int. Cl.[4] B03C** *3/68*

**U.S. Cl. 55—4** **10 Claims**

1. A method for detecting back corona in an operating electrostatic precipitator which is energized by a control unit that allows an energization level to be varied, said method comprising the steps of:

monitoring a minimum voltage level of an AC component of an emitter or high tension voltage in order to detect at least one of a constant level or decrease in said minimum voltage level during an increase in said energization level, and a decrease in said minimum voltage level when said energization level remains constant; and

detecting the presence of back corona based on said monitoring of said minimum voltage level.

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**4,746,332**

## PROCESS FOR PRODUCING HIGH PURITY NITROGEN

**Masaomi Tomomura; Tetsuro Haga; Shunsuke Nogita, all of Hitachi; Kiyoshi Ichihara, Kudamatsu, and Takazumi Ishizu, Hikari, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Sep. 25, 1986, Ser. No. 911,451**

**Claims priority, application Japan, Sep. 27, 1985, 60-212657**

**Int. Cl.[4] B01D** *53/22*

**U.S. Cl. 55—62** **5 Claims**

1. A process for producing nitrogen having purity of 99.9999% or more, which comprises

(a) adsorption step of contacting a starting gas mixture that is one obtained from a rectifying column in a low temperature separating apparatus for air and that comprises 99.9% by volume or more of nitrogen and 0.1% by volume or less of oxygen with A-type zeolite as an adsorbent packed in an adsorption column at an adsorption temperature of −100° to −196° C. to remove oxygen from the starting gas mixture by adsorption and to give highly pure nitrogen, and

(b) a desorption step of heating the adsorption column at a temperature higher than the adsorption temperature to desorb the adsorbed oxygen from the adsorbent for regeneration; a gas containing a large amount of nitrogen flowing out of an adsorption column being returned to the rectifying column or to a starting gas mixture supplying portion and a gas containing a small amount of nitrogen flowed out of the adsorption column being exhausted outside of the system.

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**4,746,333**

## METHOD FOR PRODUCING AN INTEGRAL ASYMMETRIC GAS SEPARATING MEMBRANE AND THE RESULTANT MEMBRANE

**Klaus V. Peinemann, Lauenburg, and Ingo Pinnau, Hamburg, both of Fed. Rep. of Germany, assignors to Kernforschungszentrum Karlsruhe GmbH, Karlsruhe, Fed. Rep. of Germany**

**Filed Jul. 15, 1986, Ser. No. 885,833**

**Claims priority, application Fed. Rep. of Germany, Jul. 15, 1985, 3525235**

**Int. Cl.[4] B01D** *53/22, 13/04;* **C08J** *9/28*

**U.S. Cl. 55—158** **20 Claims**

1. An integral asymmetric membrane for separating gases, manufactured by

mixing a membrane-former, a halogenated hydrocarbon solvent, and a pore-forming agent which is not a solvent for said membrane-former to form a mixture,

casting said mixture to form a film, and

contacting said film with an organic precipitation agent to form a membrane.

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**4,746,334**

## POLY(DISUBSTITUTED ACETYLENE)/POLYORGANOSILOXANE GRAFTCOPOLYMER AND MEMBRANE FOR GAS SEPARATION

**Kiyohide Matsui; Yu Nagase, and Masaki Uchikura, all of Sagamihara, Japan, assignors to Sagami Chemical Research Center, Tokyo and Tosoh Corporation, Yamaguchi, both of, Japan**

**PCT No. PCT/JP86/00507, § 371 Date Jun. 8, 1987, § 102(e) Date Jun. 8, 1987, PCT Pub. No. WO87/02046, PCT Pub. Date Apr. 9, 1987**

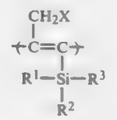
**PCT Filed Oct. 3, 1986, Ser. No. 58,230**

**Claims priority, application Japan, Oct. 7, 1985, 60-224595**

**Int. Cl.[4] B01D** *13/00*

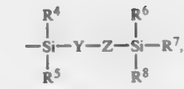
**U.S. Cl. 55—158** **1 Claim**

1. Membrane for separating mixed gases prepared from a poly(disubstituted acetylene)/polyorganosiloxane graft copolymer, comprising repeating units expressed by the following general formula:



where $R^1$–$R^3$ are the same or different groups selected from alkyl, substituted alkyl, phenyl, and substituted phenyl groups and X is a hydrogen atom or a group expressed by the following general formula:





and $R^1$–$R^3$ and X may be different for different repeating units, Y is an oxygen atom or a divalent organic group, Z is a polyorganosiloxane chain and $R^4$–$R^8$ are an alkyl, a substituted alkyl, a phenyl or a substituted phenyl group which may be the same or different from, the ratio in moles of the repeating units on the main chain, poly(substituted acetylene), to the repeating units on the side chain, polyorganosiloxane, being in the range of from 90/10 to 10/90 and the molecular weight being not less than 10,000.

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**4,746,335**

## DEGASIFIER

**Jörg Reimann, Karlsruhe, and Hans-Jörg Brinkmann, Gondelsheim, both of Fed. Rep. of Germany, assignors to Kernforschungszentrum Karlsruhe GmbH, Karlsruhe, Fed. Rep. of Germany**

**Filed Sep. 25, 1987, Ser. No. 101,140**

**Claims priority, application Fed. Rep. of Germany, Oct. 1, 1986, 3633379**

**Int. Cl.[4] B01D** *19/00*

**U.S. Cl. 55—170** **7 Claims**

1. A degasifier for the separation of gases and vapors from gas-liquid and vapor-liquid mixture streams within a pipeline, comprising:

(a) a housing;

(b) a pipe section extending across said housing and having means for connection in said pipeline, said housing having a cross-section substantially larger than said pipe section;

(c) an upwardly projecting branch conduit connected to said pipe section for the delivery of gas or vapor-liquid mixtures from said pipe section to the interior of said housing;

(d) said pipe section having openings providing for communication with the lower part of the housing interior for the return of the liquid from said housing interior to said pipeline; and

(e) said housing having a cover arranged in spaced relationship above a top opening of said branch conduit.

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**4,746,336**

## GAS FILTRATION UNIT

**Guy F. Mignot, Mignot Industries, c/o Telbot Fishing, Old Pavillion Street, New Mauritius Docks, Port Louis, Mauritius**

**Filed Feb. 23, 1987, Ser. No. 17,699**

**Claims priority, application South Africa, Feb. 24, 1986, 86/1365**

**Int. Cl.[4] B01D** *47/02*

**U.S. Cl. 55—225** **10 Claims**

1. A gas filtration unit comprising a liquid container, at least one intake gas inlet tube, extending from a source of inlet gas downwardly into the container and opening at a high liquid level within the container, at least one filtered gas outlet formed above the high liquid level in the container and means for automatically varying the liquid level between the high liquid level and a low liquid level, which is below the inlet tube opening, in dependence on the rate of gas flow through the container, said dependence being such that the liquid level goes down as the gas flow rate increases and the liquid level goes up as the gas flow rate decreases.

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**4,746,337**

## CYCLONE SEPARATOR HAVING WATER-STEAM COOLED WALLS

**Byram J. Magol, Covent Station; John D. Fay, Randolph, and Michael Garkawe, Madison, all of N.J., assignors to Foster Wheeler Energy Corporation, Clinton, N.J.**

**Filed Jul. 6, 1987, Ser. No. 69,930**

**Int. Cl.[4] B01D** *51/00*

**U.S. Cl. 55—269** **7 Claims**

1. A cyclone separator comprising an inner cylinder; an outer cylinder extending around said inner cylinder in a coaxial relationship to define an annular chamber between the two cylinders, said outer cylinder comprising a plurality of tubes extending vertically and circumferentially in a parallel relationship for at least a portion of their lengths, a portion of said tubes being bent from the plane of said outer cylinder to form an inlet opening in a tangential relationship to said outer cylinder for receiving gases containing solid particles and directing same through said annular chamber for separating the solid particles from said gases by centrifugal forces, the separated gases exiting through said inner cylinder and the separated solids falling to the bottom of said outer cylinder for disposal, said tubes being bent radially inwardly towards said inner cylinder to support said inner cylinder; and means for passing water-steam through said tubes to cool said outer cylinder.

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**4,746,338**

## GAS FILTER

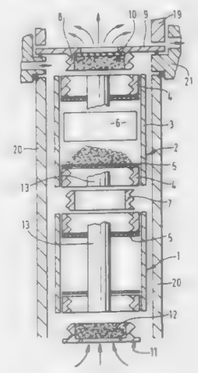
**Clifford C. B. Williams, Tamworth, United Kingdom, assignor to Willpower Compressed Air Systems Limited, Bristol, England**

**Filed Apr. 10, 1987, Ser. No. 37,227**

**Claims priority, application United Kingdom, Apr. 15, 1986, #609156**

**Int. Cl.[4] B01D** *19/00*

**U.S. Cl. 55—275** **9 Claims**



1. A gas filter through which gas is passed to remove contaminants, comprising a plurality of filter sections including gas purifying substances, having transparent walls and that are joined one to another in end-to-end relationship for gas to be filtered to pass through each filter section in turn, the filter sectins being removably mounted in a housing that has a closure cap at one end that is removable to permit mounting of the filter sections in the housing, the housing including connection means having gas inlet and outlet connections, this connection means being disposed to be undisturbed by removal of the filter sections, the housing having a transparent wall, the filter sections being provided with an internal water sensitive or oil sensitive contaminant sensitive strip, and these sensitive strips being viewable through the transparent walls of the filter sections and the housing, instructive material carried by the filter sections also being visible through the housing.

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**4,746,339**

## FILTERING APPARATUS

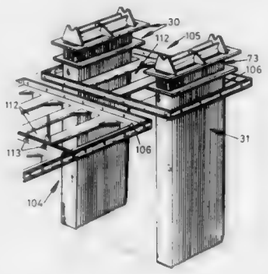
**Robin Millard, Prestbury, England, assignor to Tilghman Wheelabrator Limited, England**

**Continuation of Ser. No. 762,710, Aug. 5, 1985, abandoned. This application Mar. 9, 1987, Ser. No. 22,589**

**Claims priority, application United Kingdom, Aug. 6, 1984, 8419977; Feb. 19, 1985, 8504267; Feb. 20, 1985, 8504319**

**Int. Cl.[4] B01D *46/00***

**U.S. Cl. 55—302** **20 Claims**




1. A filter comprising a pre-pleated fabric filter bag having an open end and a closed end and side walls formed of adjacent pleats extending between said open end and closed end,

an apertured plastics end cap integrally moulded with the open end of the filter bag, said end cap having an internal configuration of side-by-side grooves each of which receives a pleat of the filter bag, and

an internal reinforcing cage detachably located within the filter bag, said cage extending into each of the pleats of the filter bag and corresponding portions of the end cap.

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**4,746,340**

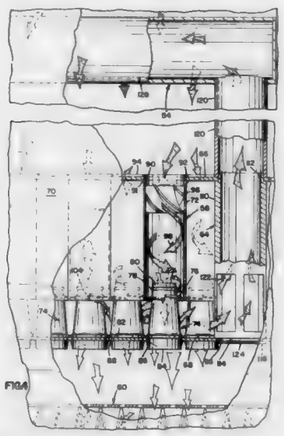
## AIR CLEANER APPARATUS

**Reynold F. Durre, and Dennis A. Nordberg, both of Eden Prairie, Minn., assignors to Donaldson Company, Inc., Minneapolis, Minn.**

**Filed Oct. 28, 1986, Ser. No. 924,061**

**Int. Cl.[4] B01D *45/12***

**U.S. Cl. 55—347** **8 Claims**



1. Air cleaner apparatus, comprising:

an enclosure including a pair of spaced-apart side plates;

an array of regularly arranged vortex separators extending between said side plates, each of said vortex separators including an inlet for receiving an uncleaned mixture of air and particulates from external of said enclosure and a first outlet for directing cleaned air to external of said enclosure and a second outlet for directing scavenged air and particulates to internal of said enclosure, each of said vortex separators also including a first tube having a first end attached to one of said side plates and a second end spaced from the other of said side plates, each of said vortex separators further including means for maintaining a pressure differential across said second outlet, said pressure differential maintaining means including means for increasing velocity of scavenged air to aid in keeping the particulates in said scavenged air in suspension in said enclosure; and

means for exhausting said scavenged air and particulates from said enclosure to an outlet means, said exhausting means including means for radially receiving said scavenged air and axially directing said scavenged air toward said outlet means, said exhausting means including means for holding said side plates spaced apart, said holding means including a second tube.

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**4,746,341**

## POROUS CERAMIC FILTER AND PROCESS OF PRODUCING THE SAME

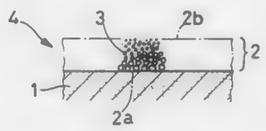
**Tadanori Komoda, Toyoake, Japan, assignor to NGK Insulators, Ltd., Japan**

**Filed Apr. 16, 1986, Ser. No. 852,758**

**Claims priority, application Japan, Apr. 17, 1985, 60-81972**

**Int. Cl.[4] B01D *50/00***

**U.S. Cl. 55—487** **6 Claims**




1. A process of producing a porous ceramic filter consisting of a planar porous support formed of a ceramic material, and a filtering layer formed on an upper surface of said porous ceramic support, comprising the steps of:

preparing a suspension containing a ceramic powder of a particle size distribution;

holding said planar porous support such that said upper surface extends substantially horizontally, and holding said upper surface of said porous support in contact with said suspension while maintaining said suspension in a stationary state, so that particles of said ceramic powder are sedimented by gravity and thereby deposited on said upper surface of said porous support, in the order of size of said particles, whereby an unfired layer for said filtering layer is formed of the deposited particles of said ceramic powder on said upper surface of said porous ceramic support, said particle size distribution of said ceramic powder being determined such that the particle size of said unfired layer for said filtering layer decreases substantially continuously in a direction from a bottom toward an exposed surface of said unfired layer, from a maximum at said bottom to a minimum on said exposed surface;

removing aqueous components from said porous ceramic support and said unfired layer of the deposited particles, and

firing said porous ceramic support and said unfired layer, into the porous ceramic layer.



**4,746,342**

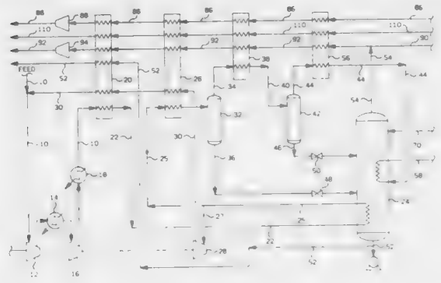
## RECOVERY OF NGL'S AND REJECTION OF $N_2$ FROM NATURAL GAS

**Bradley W. DeLong, and Michael L. Gray, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Continuation of Ser. No. 802,493, Nov. 27, 1985, abandoned. This application Jul. 10, 1987, Ser. No. 71,839**

**Int. Cl.[4] F25J *3/02***

**U.S. Cl. 62—24** **13 Claims**



1. A method of separating a super-pressured sub-cooled feed gas, predominating in methane and containing significant amounts of ethane and higher hydrocarbons and nitrogen, said feed gas being at a pressure substantially above atmospheric pressure and a temperature substantially below atmospheric temperature sufficient to form a vapor phase and liquid phase, comprising:

(a) separating said feed gas, in at least one separation step, to produce a methane- and nitrogen-enriched first vapor phase and an ethane and higher hydrocarbon-enriched first liquid phase;

(b) fractionating said first liquid phase, in a first fractionation zone, under conditions sufficient to produce a product, methane-enriched, second vapor phase and a product, ethane and higher hydrocarbon-enriched, second liquid phase;

(c) fractionating said first vapor phase, in a second fractionation zone, under conditions sufficient to produce a nitrogen-enriched, third vapor phase and a methane-enriched, third liquid phase; and

(d) fractionating said third vapor phase, in a third fractionation zone, under conditions sufficient to produce a product, nitrogen-enriched, fourth vapor phase and a product, methane-enriched fourth liquid phase.

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**4,746,343**

## METHOD AND APPARATUS FOR GAS SEPARATION

**Takazumi Ishizu, Hikari; Masahiro Yamazaki, Kudamatsu; Shozi Koyama, Yamaguchi; Kazunori Nagae, Hikari, and Junichi Hosokawa, Kudamatsu, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

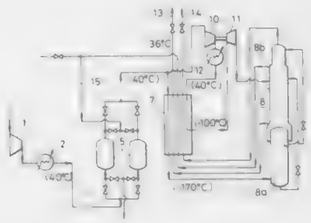
**Filed Oct. 30, 1986, Ser. No. 924,771**

**Claims priority, application Japan, Oct. 30, 1985, 60-241402**

**Int. Cl.[4] F25J *3/06***

**U.S. Cl. 62—38** **23 Claims**

1. A method of gas separation comprising the steps of: after compressing a flow of raw gas and removing water and carbon dioxide therefrom, dividing the flow of compressed raw gas, having the water and carbon dioxide removed therefrom, into first and second flows at a stage before a main heat exchanger; supplying said first flow of gas to the warm-end side of said main heat exchanger so as to provide a cooled raw gas by means of a low temperature return gas; supplying said cooled raw gas to a gas separator section; supplying said second flow of gas to a compressor of an expander compressor so as to provide a pressurized gas; cooling said pressurized gas to a degree substantially equal to the warm-end temperature of said main heat exchanger, and thereafter supplying said pressurized gas to the warm-end side of said main heat exchanger; and



supplying said pressurized gas cooled by said main heat exchanger to an expansion turbine of said expander compressor, thereby generating a cold.

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**4,746,344**

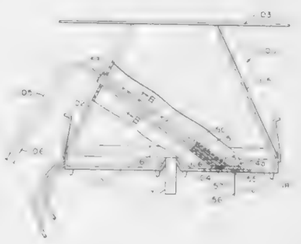
## FIBER FORMING BUSHING AND METHOD FOR PROVIDING

**John J. Kuhn, Gibsonia, and Eugene J. Palamara, Butler, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.**

**Filed Feb. 2, 1987, Ser. No. 13,473**

**Int. Cl.[4] C03B *37/07***

**U.S. Cl. 65—1** **5 Claims**



1. A bushing comprising a bottom, sidewalls surrounding the bottom thereby forming a container for molten glass, a plurality of orifices positioned in said bottom and arranged to permit molten glass to flow therethrough to produce a multiplicity of individual molten glass streams from which glass fibers may be formed, a thermocouple assembly including a tube, a pair of thermocouple wires transversing said tube, a plate member affixed to an end of the tube and having the thermocouple wire junction embedded therein, and means for attaching the underside of the said plate member to the bottom of the bushing said means being spaced from said thermocouple wire junction on said plate.

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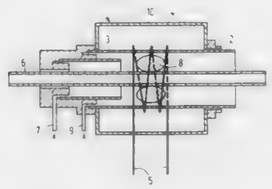


**4,746,345**

## METHOD OF MANUFACTURING SOLID GLASS PREFORMS FROM HOLLOW PREFORMS

**René A. M. Pluijms; Jacob W. de Ruiter, both of Eindhoven; Hubertus J. E. M. Schrans, Winschoten, and Johannes P. de Meij, Eindhoven, all of Netherlands, assignors to U.S. Philips Corp., New York, N.Y.**

**Division of Ser. No. 759,568, Jul. 26, 1985, abandoned, which is a continuation-in-part of Ser. No. 697,553, Feb. 1, 1985, abandoned. This application Oct. 2, 1986, Ser. No. 915,917**
**Claims priority, application Netherlands, Jul. 13, 1984, 8402225**
**Int. Cl.⁴ C03B** *37/027*
**U.S. Cl. 65—2** **9 Claims**



1. A method of manufacturing solid glass preforms, said method comprising the steps of:

providing a hollow tubular glass preform having a length such that its central axis is arranged horizontally with respect to gravity;

heating the tubular preform at a heating zone in order to collapse a portion of the tubular preform at the heating zone; and

moving the heating zone along the length of the tubular preform until the entire tubular preform is collapsed into a solid glass preform;

wherein the step of heating the tubular preform comprises the step of contacting the tubular preform with a plasma symmetrically surrounding the prreform and generated in a plasma gas outside the preform via a plasma generating means, the plasma being generated by an alternating electric field having a frequency less than substantially 12 mhz but sufficiently high to be able to ignite and maintain a plasma in the plasma gas such that the space between the plasma generating means and the tubular preform remains substantially filled with plasma during substantially the entire collapsing of the tubular preform.

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**4,746,346**

## METHOD FOR PRODUCING AIR-TIGHT, HEAT-RESISTANT PLATE

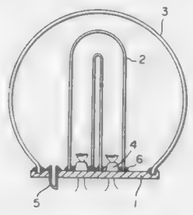
**Tadaki Murakami; Kiyoshi Takata; Kazuharu Kato; Kazuo Okahashi, all of Amagasaki; Hitoshi Yamazaki, and Takao Takeda, both of Kamakura, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Jan. 27, 1987, Ser. No. 7,094**
**Claims priority, application Japan, Jan. 27, 1986, 61-15517**
**Int. Cl.⁴ C03C** *27/00*
**U.S. Cl. 65—43** **3 Claims**

1. A method for producing an air-tight, heat-resistant plate which comprises steps of:

(a) preparing a shaping material by mixing 25 to 45% by weight of an inorganic filler consisting essentially of 100 parts by weight of alumina powder and 15 to 50 parts by weight of silica powder; and 55 to 75% by weight of glass powder having a glass transition point of 500° C. or above and a thermal expansion coefficient of from $8.5\times10^{-6}$/° C. to $11.5\times10^{-6}$/° C.;

(b) forming said shaping material into a shaped body of a desired configuration by an ordinary forming method; and



(c) heating to burn said shaped body at a temperature, at which said glass powder becomes molten and fused, thereby obtaining a burned body.

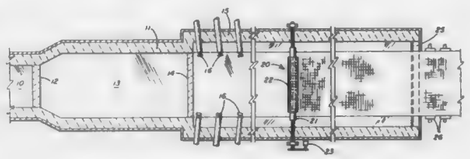
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**4,746,347**

## PATTERNED FLOAT GLASS METHOD

**John E. Sensi, Arnold, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.**

**Filed Jan. 2, 1987, Ser. No. 29**
**Int. Cl.⁴ C03B** *18/06*
**U.S. Cl. 65—94** **9 Claims**



1. A method of making patterned float glass comprising: forming molten glass into a flat glass ribbon while supported on a pool of molten metal, attenuating the glass ribbon to substantially its final thickness, imparting a pattern to the attenuated ribbon by deforming upper surface portions of the ribbon while the viscosity of the glass is sufficient to retain the pattern and while the ribbon remains on the molten metal, after imparting the pattern to the ribbon drawing the ribbon along the molten metal pool with substantially constant speed so as to minimize stretching, thereby maintaining the pattern undistorted, and withdrawing the patterned ribbon from the molten metal pool.

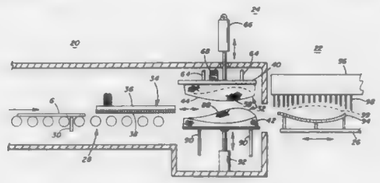
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**4,746,348**

## HORIZONTAL PRESS BENDING APPARATUS AND METHOD

**Robert G. Frank, Murrysville, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.**

**Filed Dec. 29, 1986, Ser. No. 947,254**
**Int. Cl.⁴ C03B** *23/03, 27/00*
**U.S. Cl. 65—104** **26 Claims**



1. An apparatus for shaping heat softened sheet material comprising:



means to heat said sheet to its heat softened temperature;

means to transfer said sheet to a shaping station including;

an upper vacuum mold with a shaping surface having a generally concave downward elevational configuration corresponding to a desired configuration of said sheet; and

a lower mold with a shaping station complementing said shaping surface of said upper mold;

means to press said sheet between said upper and lower molds;

a support ring having a sheet supporting surface with an elevational contour corresponding to the contour of said shaped sheet slightly inboard of said sheet perimeter immediately after shaping;

means to move said ring from a first position between said upper and lower moles to a second position adjacent said upper and lower molds;

means to deposit said sheet on said ring when said ring is in said first position; and

means to cool said sheet while supported on said ring when said ring is at said second position.

6. A tempering ring for supporting hot shaped sheet material having a generally concave downward elevational configuration comprising:

means to support said shaped sheet slightly inboard of said sheet perimeter;

first means to mount a first portion of said support means to a frame;

second means to mount a second portion of said support means to said frame; and

means to slideably move said first and second portions of said support means relative to each other while supporting said hot shaped sheet.

19. A method of shaping heat softenable sheet material comprising:

heating said sheet to its heat softened temperature;

positioning said heat softened sheet at a shaping station including an upper mold with a shaping surface having a generally concave downward elevational configuration and a vertically aligned lower mold with a shaping surface generally complementing the shaping surface of said upper mold;

pressing said sheet between said upper and lower molds;

depositing said shaped sheet on a support ring;

removing said ring with said shape sheet supported thereon from said shaping station; and

cooling said sheet.

22. A method of supporting hot shaped sheet material comprising:

supporting the periphery of said shaped sheet on a tempering ring in an initial configuration immediately after shaping while said sheet is in a shaped and expanded configuration;

cooling said shaped sheet such that said sheet shrinks in dimensions; and

adjusting said tempering ring to a final configuration such that said ring supports said sheet about said periphery after said sheet has been cooled.

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**4,746,349**

## METHOD AND COMPOSITIONS FOR SUPPRESSING THE NITRIFICATION OF AMMONIUM IN PLANT GROWTH MEDIUM

**Robert H. Becker, Pennington, N.J., assignor to American Cyanamid Company, Stamford, Conn.**

**Filed Aug. 6, 1986, Ser. No. 893,838**
**Int. Cl.⁴ C05F** *11/08;* **A61K** *35/66*
**U.S. Cl. 71—6** **24 Claims**

1. A method for suppressing the nitrification of ammonium nitrogen in plant growth medium or soil, said method comprising: distributing in the plant growth medium or soil, a nitrification-inhibiting amount of an ionophore or salt thereof.

15. A fertilizer composition useful for suppressing nitrification of ammonium nitrogen in plant growth medium or soil and preventing rapid loss of ammonium nitrogen therefrom and improving plant nutrition therein, said fertilizer comprising: a reduced nitrogen fertilizer as a source of ammonium nitrogen and a nitrification-inhibiting amount of an ionophore.

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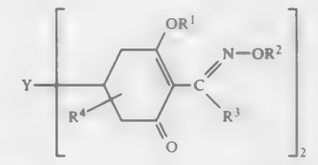
**4,746,350**

## HERBICIDAL BIS(CYCLOHEXANE-1,3-DIONE)DERIVATIVES

**Keith G. Watson, Melbourne, Australia, assignor to Imperial Chemical Industries PLC, London, England**

**Filed Apr. 14, 1986, Ser. No. 851,150**
**Claims priority, application Australia, May 6, 1985, PH0439**
**Int. Cl.⁴ A01N** *43/00*
**U.S. Cl. 71—88** **11 Claims**

1. A compound of formula I



I

wherein:

Y is a bond or a linking group chosen from the group consisting of:



$C_1$ to $C_8$ optionally branched alkylene; $C_1$ to $C_4$ optionally branched alkyleneoxy - or alkylenethio $C_1$ to $C_4$

Z is selected from the group O, S, NH or $NCH_3$;

n is zero or an integer selected from 1 to 4;

m is zero or an integer selected from 1 and 2;

X, which may be the same or different, are independently selected from the group consisting of: halogen; nitro; $C_1$ to $C_6$ alkyl; $C_1$ to $C_6$ alkyl substituted with halogen; hydroxy; $C_1$ to $C_6$ alkoxy; $C_1$ to $C_6$ alkylthio; sulfamoyl; N-($C_1$ to $C_6$ alkyl)sulfamoyl; N,N-di($C_1$ to $C_6$ alkyl)sulfamoyl; the group C(=O)A wherein A is selected from the group consisting of hydrogen, hydroxy, $C_1$ to $C_6$ alkoxy, $C_1$ to $C_6$ alkylthio, amino, N-($C_1$ to $C_6$ alkyl) amino, N,N-di($C_1$ to $C_6$ alkyl)amino, $C_1$ to $C_6$ alkyl, and $C_1$ to $C_6$ haloalkyl; the group $NR^5R^6$ wherein $R^5$ and $R^6$ are independently selected from the group consisting of hydrogen, $C_1$ to $C_6$ alkyl, $C_2$ to $C_6$ alkanoyl, $C_1$ to $C_6$ alkylsulfonyl, and benzoyl; and the group —$(CH_2)_q$— which bridges two adjacent carbon atoms and wherein q is an integer selected from 3 or 4;

$R^1$ is selected from the group consisting of: hydrogen; an acyl group; and an inorganic or organic cation;

$R^2$ is selected from the group consisting of: $C_1$ to $C_6$ alkyl; $C_2$ to $C_6$ alkenyl; $C_2$ to $C_6$ haloalkenyl; $C_3$ to $C_6$ alkynyl; and substituted $C_1$ to $C_6$ alkyl wherein the alkyl group is substituted with a substituent selected from the group consisting of halogen, phenyl, and substituted phenyl wherein the benzene ring is substituted with from one to three substituents selected from the group consisting of halogen, and $C_1$ to $C_6$ alkyl;

$R^3$ is selected from the group consisting of: $C_1$ to $C_6$ alkyl; and

$R^4$ is selected from the group consisting of: hydrogen; $C_1$ to $C_6$ alkyl; and ($C_1$ to $C_6$ alkoxy) carbonyl.

7. A herbicidal composition comprising as active ingredient a herbicidally effective amount of a compound as defined according to claim 1 and a carrier therefor.

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**4,746,351**

## HERBICIDALLY ACTIVE SUBSTITUTED PHENOXY BENZOXAZOLE (OR BENZOTHIAZOLE)

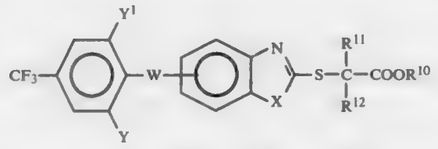
**Donald R. Nielsen, Wadsworth, Ohio, assignor to PPG Industries, Inc., Pittsburgh, Pa.**

**Filed May 12, 1986, Ser. No. 861,817**

**Int. Cl.**[4] **A01N** *43/02, 43/00;* **C07D** *277/70, 263/58*

**U.S. Cl. 71—90** **4 Claims**

**1**. A compound of the formula:



**Y** and **Y**[1] are independently hydrogen or halogen;
**X** and **W** are independently oxygen or sulfur; and
$R^{10}$, $R^{11}$ and $R^{12}$ are independently hydrogen or $C_1$ to $C_4$ alkyl.

**4**. In a method of controlling weeds growth wherein a herbicidally effective amount of herbicide is applied to the situs of the weeds, the improvement residing in using as the herbicide a compound or mixture of compounds defined by claims 1 or 2.

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**4,746,352**

## 3-(5-CARBOXY-4-SUBSTITUTED-PHENYL)-(THIO)URACIL-ESTERS AND SALTS

**Jean Wenger, Uster, and Paul Winternitz, Greifensee, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

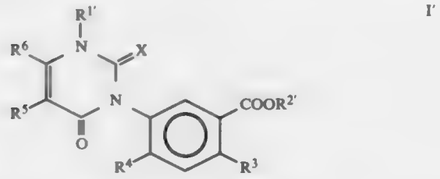
**Filed Mar. 10, 1986, Ser. No. 837,986**

**Claims priority, application Switzerland, Mar. 20, 1985, 1240/85; Feb. 6, 1986, 460/86**

**Int. Cl.**[4] **A01N** *43/54, 43/10;* **C07D** *239/95, 239/96*

**U.S. Cl. 71—90** **21 Claims**

**16**. A weed control composition, characterized in that it contains an effective amount of at least one compound of the formula



wherein
$R^{1'}$ signifies hydrogen, $C_{1-4}$-alkyl, $C_{2-4}$-alkenyl, $C_{2-4}$-alkynyl, $C_{2-6}$-alkoxyalkyl, formyl, $C_{2-6}$-alkanoyl or $C_{2-6}$-alkoxycarbonyl,
$R^{2'}$ signifies hydrogen, $C_{1-6}$-alkyl, $C_{2-4}$-alkenyl, $C_{2-4}$-alkynyl or $C_{2-6}$-alkoxyalkyl,
$R^3$ signifies halogen or nitro,
$R^4$ signifies hydrogen or halogen,
$R^5$ signifies hydrogen, halogen, $C_{1-4}$alkyl, chloromethyl, bromomethyl, hydroxymethyl, ($C_{1-5}$alkoxy)methyl, ($C_{1-5}$-alkylthio)methyl, cyano, nitro or thiocyanato,
$R^6$ signifies hydrogen, $C_{1-4}$-alkyl or $C_{1-4}$-fluoroalkyl, or
$R^5$ and $R^6$ together signify tri- or tetramethylene in whcih one methylene can be replaced by oxygen or sulphur and which is optionally substituted with $C_{1-3}$-alkyl, and
X signifies oxygen or sulphur, with the provisos that (i) $R^6$ is $C_{1-4}$-alkyl or $C_{1-4}$-fluoroalkyl when $R^5$ is fluorine and (ii) $R^6$ is hydrogen or $C_{1-4}$-alkyl and X is oxygen when $R^5$ is cyano

as well as formulation adjuvants.

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**4,746,353**

## HERBICIDAL SULFONAMIDES

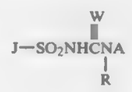
**George Levitt, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 849,618, Apr. 11, 1986, abandoned, which is a continuation-in-part of Ser. No. 739,214, May 30, 1985, abandoned. This application Nov. 24, 1986, Ser. No. 934,118**

**Int. Cl.**[4] **C07D** *401/14, 405/14, 409/14;* **A01N** *43/54*

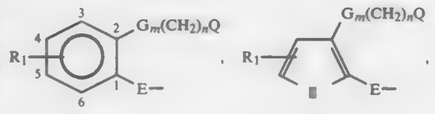
**U.S. Cl. 71—90** **108 Claims**

**1**. A compound of the formula:



I

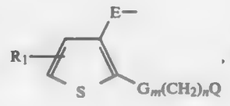
wherein
J is



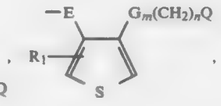
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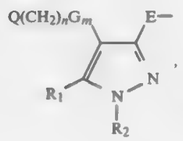
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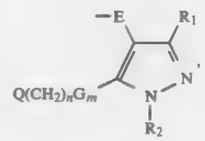
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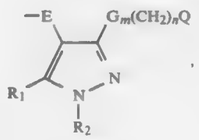
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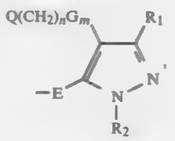
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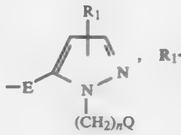
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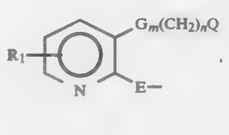
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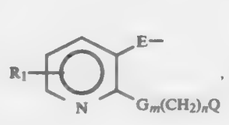
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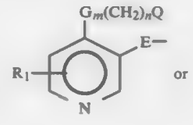
J-9



J-10



J-11

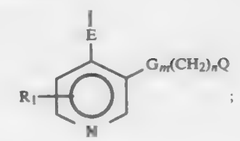


J-12

or



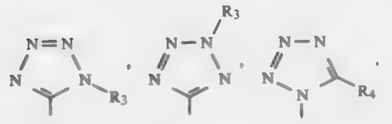
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J-13

;

W is O, S or $NR_X$;
$R_X$ is H, OH, $C_1$–$C_3$ alkyl, $C_1$–$C_3$ alkoxy, allyloxy, propargyloxy, $C_1$–$C_3$ haloalkyl, $C_1$–$C_3$ haloalkoxy or $NR_YR_Z$;
$R_Y$ is H or $C_1$–$C_3$ alkyl;
$R_Z$ is $C_1$–$C_3$ alkyl;
G is O, S, SO or $SO_2$;
m is 0 or 1;
n is 0, 1 or 2;
R is H or $CH_3$;
E is a single bond, $CH_2$ or O;
Q is



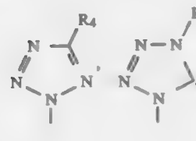
Q-1



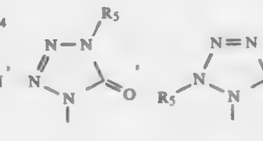
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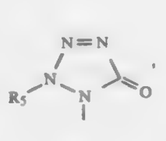
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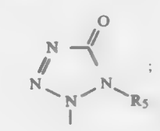
Q-4



Q-5



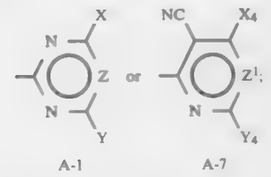
Q-6



Q-7

;

$R_1$ is H, $C_1$–$C_3$ alkyl, $C_1$–$C_3$ haloalkyl, halogen, nitro, $C_1$–$C_3$ alkoxy, $SO_2NR_aR_b$, $C_1$–$C_3$ alkylthio, $C_1$–$C_3$ alkylsulfinyl, $C_1$–$C_3$ alkylsulfonyl, CN, SCN, $CO_2R_c$, $C_1$–$C_3$ haloalkoxy, $C_1$–$C_3$ haloalkylthio, amino, $C_1$–$C_3$ alkylamino, di($C_1$–$C_3$ alkyl)amino or $C_1$–$C_2$ alkyl substituted with $C_1$–$C_2$ alkoxy, $C_1$–$C_2$ haloalkoxy, $C_1$–$C_2$ alkylthio, $C_1$–$C_2$ haloalkylthio or CN;
$R_2$ is H, $C_1$–$C_3$ alkyl, allyl or phenyl;
$R_3$ is H, $C_1$–$C_6$ alkyl, $C_3$–$C_6$ cycloalkyl, $C_1$–$C_6$ haloalkyl, $CH_2$-($C_2$–$C_5$ alkenyl), $CH_2$($C_2$–$C_5$ haloalkenyl), $CH_2$($C_2$–$C_5$ alkynyl), $CH_2$($C_2$–$C_5$ haloalkynyl), $C_6H_5$ or $C_1$–$C_4$ alkyl substituted with $C_1$–$C_2$ alkoxy, $C_1$–$C_2$ alkylthio, $C_1$–$C_2$ alkylsulfinyl or $C_1$–$C_2$ alkylsulfonyl;
$R_4$ is H, halogen, $C_1$–$C_6$ alkyl, $C_3$–$C_6$ cycloalkyl, $C_1$–$C_6$ haloalkyl, $C_2$–$C_6$ alkenyl, $C_2$–$C_6$ haloalkenyl, $C_2$–$C_6$ alkynyl, $C_3$–$C_6$ haloalkynyl, $C_6H_5$, $C_1$–$C_4$ alkoxy, $C_1$–$C_4$ haloalkoxy, $C_1$–$C_4$ alkylthio, $C_1$–$C_4$ alkylsulfinyl, $C_1$–$C_4$ alkylsulfonyl, $OCH_2CH_2O$-($C_1$–$C_2$ alkyl) or di($C_1$–$C_3$ alkyl)amino;
$R_5$ is H, $C_1$–$C_3$ alkyl, $C_1$–$C_3$ haloalkyl, allyl or propargyl;
$R_a$ is H, $C_1$–$C_4$ alkyl, $C_2$–$C_3$ cyanoalkyl, methoxy or ethoxy;
$R_b$ is H, $C_1$–$C_4$ alkyl or $C_3$–$C_4$ alkenyl; or
$R_a$ and $R_b$ may be taken together as —$(CH_2)_3$—, —$(CH_2)_4$—, —$(CH_2)_5$— or —$CH_2CH_2OCH_2CH_2$—;
$R_c$ is $C_1$–$C_4$ alkyl, $C_3$–$C_4$ alkenyl, $C_3$–$C_4$ alkynyl, $C_2$–$C_4$ haloalkyl, $C_1$–$C_2$ cyanoalkyl, $C_5$–$C_6$ cycloalkyl, $C_4$–$C_7$ cycloaklylalkyl or $C_2$–$C_4$ alkoxyalkyl;
A is



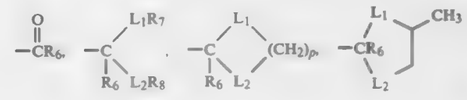
A-1



A-7

;

X is H, $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkoxy, $C_1$–$C_4$ haloalkoxy, $C_1$–$C_4$ haloalkyl, $C_1$–$C_4$ haloalkylthio, $C_1$–$C_4$ alkylthio, halogen, $C_2$–$C_5$ alkoxyalkyl, $C_2$–$C_5$ alkoxyalkoxy, amino, $C_1$–$C_3$ alkylamino, di($C_1$–$C_3$ alkyl)amino or $C_3$–$C_5$ cycloalkyl;
Y is H, $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkoxy, $C_1$–$C_4$ haloalkoxy, $C_1$–$C_4$ haloalkylthio, $C_1$–$C_4$ alkylthio, $C_2$–$C_5$ alkoxyalkyl, $C_2$–$C_5$ alkoxyalkoxy, amino, $C_1$–$C_3$ alkylamino, di($C_1$–$C_3$ alkyl)amino, $C_3$–$C_4$ alkenyloxy, $C_3$–$C_4$ alkynyloxy, $C_2$–$C_5$ alkylthioalkyl, $C_2$–$C_5$ alkylsulfinylalkyl, $C_2$–$C_5$ alkylsulfonylalkyl, $C_1$–$C_4$ haloalkyl, $C_2$–$C_4$ alkynyl, azido, cyano,



or —$N(OCH_3)CH_3$;
p is 2 or 3;
$L_1$ and $L_2$ are independently O or S;
$R_6$ is H or $CH_3$;
$R_7$ and $R_8$ are independently $C_1$–$C_6$ alkyl;
Z is CH, $CCH_3$, $CC_2H_5$, CCl or CRr;
$X_4$ is $CH_3$, $OCH_3$, $OC_2H_5$, $CH_2OCH_3$ or Cl;
$Y_4$ is $CH_3$, $OCH_3$, $OC_2H_5$ or Cl; and
$Z^1$ is N;

and their agriculturally suitable salts; provided that
(a) when X is Cl, F, Br or I, then Z is CH and Y is $OCH_3$, $OC_2H_5$, $N(OCH_3)CH_3$, $NHCH_3$, $N(CH_3)_2$ or $OCF_2H$;
(b) when X or Y is $C_1$ haloalkoxy, then Z is CH;
(c) when J is J-9 and n is 0, then Q is Q-1 or Q-2;
(d) when E is O, then J is J-1;
(e) when W is S, then A is A-1, R is H, and Y is $CH_3$, $OCH_3$, $OC_2H_5$, $CH_2OCH_3$, $C_2H_5$, $CF_3$, $SCH_3$, $OCH_3CH{=}CH_2$, $OCH_2C{\equiv}CH$, $OCH_2CH_2OCH_3$, $CH(OCH_3)_2$ or



;

(f) when the total number of carbon atoms in X and Y is greater than 4, then the carbon content of $R_1$, $R_3$, $R_4$ and $R_5$ must each be less than or equal to 2;
(g) $X_4$ and $Y_4$ cannot simultaneously be Cl;
(h) when J is J-1 and m is 0, then n is 0; and
(i) when n is 0 and m is 1, then Q is Q-1 or Q-2.

**69**. A composition suitable for controlling the growth of undesired vegetation which comprises an effective amount of a compound of claim 1 and at least one of the following: surfactant, solid or liquid diluent.

**4,746,354**

## 4-NITRO-1-PHENYLPYRAZOLES, COMPOSITION CONTAINING THEM, AND METHOD OF USING THEM TO COMBAT UNWANTED VEGETATION

**Reinhold Gehring, Wuppertal; Uta Jensen-Korte, Düsseldorf; Otto Schallner, Monheim; Jörg Stetter, Wuppertal; Hans-Joachim Santel, Leverkusen; Robert R. Schmidt, Bergisch Gladbach, and Wolfgang Behrenz, Overath, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

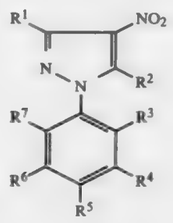
**Filed Mar. 4, 1986, Ser. No. 836,268**

**Claims priority, application Fed. Rep. of Germany, Mar. 16, 1985, 3509567**

**Int. Cl.[4] A01N *43/56*; C07D *231/16***

**U.S. Cl. 71—92** **15 Claims**

1. A method of combating unwanted vegetation which comprises applying to such vegetation or to a locus from which it is desired to exclude such vegetation a herbicidally effective amount of at least one 4-nitro-1-phenyl-pyrazole of the formula



in which

$R^1$ and $R^2$ each independently is hydrogen, or alkyl, hydroxyalkyl, alkoxyalkyl, alkylthioalkyl or halogenoalkyl with in each case up to 4 carbon atoms in the individual alkyl parts and, where appropriate, up to 9 halogen atoms, or cycloalkyl with 3 to 7 carbon atoms,

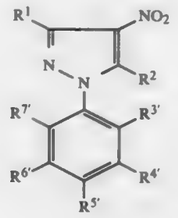
$R^3$, $R^4$, $R^5$, $R^6$ and $R^7$ each independently is hydrogen, halogen, cyano, nitro, or alkyl, alkoxy, alkylthio, alkylsulphinyl, alkylsulphonyl or alkoxycarbonyl with in each case up to 4 carbon atoms in the individual alkyl parts, or $-(X)_n-R^8$,

X is oxygen, sulphur, sulphinyl or sulphonyl,

n is 0 or 1, and

$R^8$ is halogenoalkyl with up to 4 carbon atoms and and up to 9 halogen atoms.

8. A 4-nitro-1-phenyl-pyrazole of the formula



in which

$R^1$ and $R^2$ each independently is hydrogen, or alkyl, hydroxyalkyl, alkoxyalkyl, alkylthioalkyl or halogenoalkyl with in each case up to 4 carbon atoms in the individual alkyl parts and, where appropriate, up to 9 halogen atoms, or cycloalkyl with 3 to 7 carbon atoms,

$R^3$, $R^4$, $R^5$, $R^6$ and $R^7$ each independently is hydrogen, halogen, cyano, nitro, or alkyl, alkoxy, alkylthio, alkylsulphinyl, alkylsulphonyl or alkoxycarbonyl with in each case up to 4 carbon atoms in the individual alkyl parts, or $-(X)_n-R^8$,

X is oxygen, sulphur, sulphinyl or sulphonyl,

n is 0 or 1, and

$R^8$ is halogenoalkyl with up to 4 carbon atoms and and up to 9 halogen atoms,

but wherein

at least one of the radicals $R^{3'}$, $R^{4'}$, $R^{5'}$, $R^{6'}$ or $R^{7'}$ is cyano, or alkylthio, alkylsulphinyl, alkylsulphonyl, alkoxycarbonyl with in each case 1 to 4 carbon atoms in the individual alkyl parts, or $-(X)_n-R^8$,

or wherein

at least three of the radicals $R^{3'}$, $R^{4'}$, $R^{5'}$, $R^{6'}$ or $R^{7'}$ are halogen atoms, but in the case where $R^1$ and

$R^2$ simultaneously are hydrogen, at least one of the radicals $R^{3'}$, $R^{4'}$, $R^{5'}$, $R^{6'}$ or $R^{7'}$ is other than fluorine.

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**4,746,355**

## BENZYLSULFONYLUREAS AND ARYLSULFAMOYLUREAS

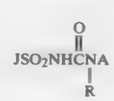
**Robert J. Pasteris, and Mark E. Thompson, both of Wilmington, Del., assignors to E. I. Du Pont De Nemours and Company, Wilmington, Del.**

**Division of Ser. No. 686,796, Dec. 26, 1984, Pat. No. 4,609,395, which is a continuation-in-part of Ser. No. 585,170, Mar. 1, 1984, abandoned. This application Jul. 16, 1986, Ser. No. 886,151**

**Int. Cl.[4] C07D *251/16, 401/12, 417/12*; A01N *43/66***

**U.S. Cl. 71—93** **22 Claims**

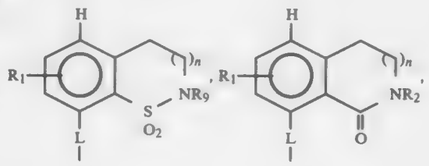
1. A compound of the formula



I

and agriculturally suitable salts thereof, wherein

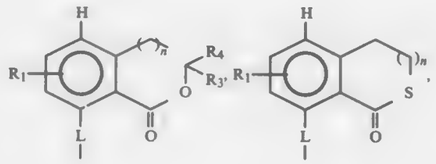
J is



$J_1$



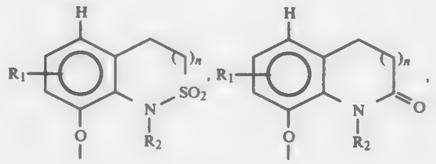
$J_2$



$J_3$



$J_4$



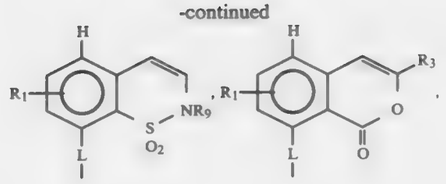
$J_5$



$J_6$



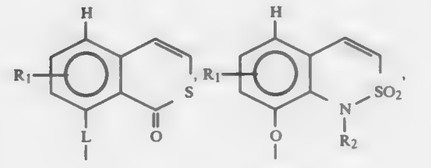
-continued



$J_7$



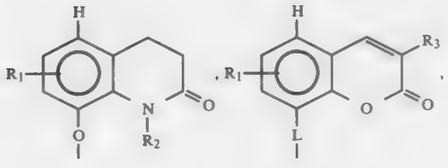
$J_8$



$J_9$



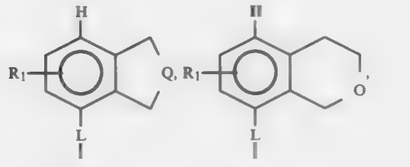
$J_{10}$



$J_{11}$



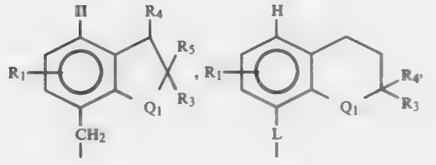
$J_{12}$



$J_{13}$



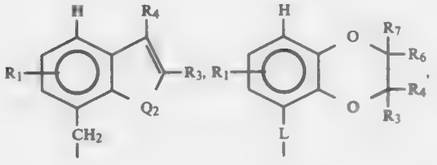
$J_{14}$



$J_{15}$



$J_{16}$

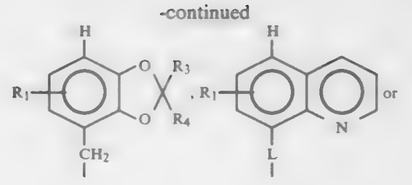


$J_{17}$



$J_{18}$

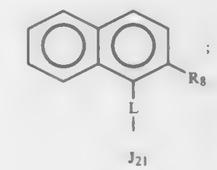
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$J_{19}$



$J_{20}$



$J_{21}$

n is 0 or 1;

L is $CH_2$ or O;

Q is $CH_2$ or O;

$Q_1$ is O, S or $SO_2$;

$Q_2$ is O or S;

R is H or $CH_3$;

$R_1$ is H, F, Cl, Br, $CH_3$ or $OCH_3$;

$R_2$ is H or $C_1$–$C_3$ alkyl;

$R_3$ is H or $CH_3$;

$R_4$ is H or $CH_3$;

$R_5$ is H, $CH_3$ or $C_2H_5$;

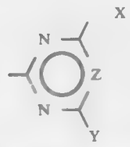
$R_6$ is H or $CH_3$;

$R_7$ is H or $CH_3$;

$R_8$ is F, Cl, Br, $OCH_3$, $SCH_3$, $SO_2CH_3$, $CO_2CH_3$, $SO_2N(CH_3)_2$ or $OSO_2CH_3$;

$R_9$ is H, OH, $C_1$–$C_6$ alkyl, $C_1$–$C_6$ haloalkyl, $C_1$–$C_6$ alkoxyalkyl, $C_3$–$C_6$ alkenyl, $C_3$–$C_6$ alkynyl, $C_1$–$C_6$ alkoxy, phenyl $C_3$–$C_6$ cycloalkyl, $C_4$–$C_7$ cycloalkylalkyl, $C_1$–$C_6$ alkylcarbonyl, $C_1$–$C_6$ alkoxycarbonyl, benzyl, $C_3$–$C_4$ haloalkenyl, $C_3$–$C_6$ haloalkynyl, $C_3$–$C_6$ alkylcarbonylalkyl, $C_3$–$C_6$ alkoxycarbonylalkyl or $C_1$–$C_4$ cyanoalkyl;

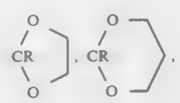
A is



A-1

X is $CH_3$, $OCH_3$, $OCH_2CF_3$ or $OCF_2H$;

Y is $C_1$–$C_3$ alkyl, $CH_2F$, cyclopropyl, C≡CH, $OCH_3$, $OC_2H_5$, $CH_2OCH_3$, $NH_2$, $NHCH_3$, $N(CH_3)_2$, $OCH_2CH_2F$, $CF_3$, $SCH_3$, $OCH_2CH{=}CH_2$, $OCH_2C{\equiv}CH$, $OCH_2CH_2OCH_3$, $CR(OCH_3)_2$,



$CR(OCH_2CH_3)_2$ or $OCF_2H$; and

Z is N; provided that

X and Y are other than $OCF_2H$.

9. A composition for the control of undesirable vegetation consisting essentially of a compound of claim 1 and at least one of (a) a surface active agent, and (b) a solid or liquid diluent.

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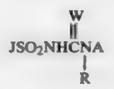
**4,746,356**

## HERBICIDAL SULFONAMIDES

**David L. Douglass, and Marcus P. Moon, both of Wilmington, Del., assignors to E. I. DuPont De Nemours and Company, Wilmington, Del.**

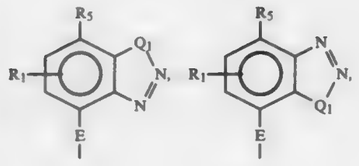
**Continuation-in-part of Ser. No. 868,239, May 23, 1986, abandoned. This application Apr. 16, 1987, Ser. No. 39,492**
**Int. Cl.[4] C07D** *403/12, 417/12;* **A01N** *43/66, 43/70*
**U.S. Cl. 71—93** **51 Claims**

1. A compound of the Formula I:

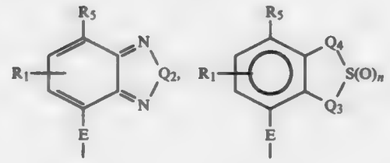


I

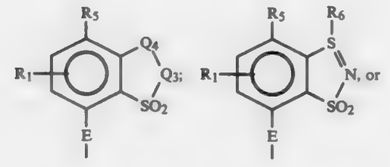
wherein
J is



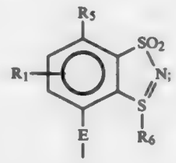
J-1 J-2



J-3 J-4

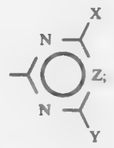


J-5 J-6



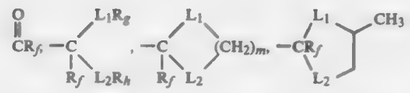
J-7

W is O or S;
R is H or $CH_3$;
E is a single bond, $CH_2$ or O;
$R_1$ is H, $C_1$–$C_3$ alkyl, $C_1$–$C_3$ haloalkyl, halogen, nitro, $C_1$–$C_3$ alkoxy, $SO_2NR_aR_b$, $C_1$–$C_3$ alkylthio, $C_1$–$C_3$ alkylsulfinyl, $C_1$–$C_3$ alkylsulfonyl, $CH_2CN$, CN, $CO_2R_c$, $C_1$–$C_3$ haloalkoxy, $C_1$–$C_3$haloalkylthio, $C_2$–$C_4$ alkoxyalkyl, $C_2$–$C_4$ alkylthioalkyl, $CH_2N_3$ or $NR_dR_e$;
$R_a$ is H, $C_1$–$C_4$ alkyl, $C_2$–$C_3$ cyanoalkyl, methoxy or ethoxy;
$R_b$ is H, $C_1$–$C_4$ alkyl or $C_3$–$C_4$ alkenyl; or
$R_a$ and $R_b$ may be taken together as —$(CH_2)_3$—, —$(CH_2)_4$—, —$(CH_2)_5$— or —$CH_2CH_2OCH_2CH_2$—;
$R_c$ is $C_1$–$C_4$ alkyl, $C_3$–$C_4$ alkenyl, $C_3$–$C_4$ alkynyl, $C_2$–$C_4$ haloalkyl, $C_2$–$C_3$ cyanoalkyl, $C_5$–$C_6$ cycloalkyl, $C_4$–$C_7$ cycloalkylalkyl or $C_2$–$C_4$ alkoxyalkyl;
$R_d$ and $R_e$ are independently H or $C_1$–$C_2$ alkyl;
$Q_1$ is S, $SO_2$ or $NR_2$;
$Q_2$ is O, S or $NR_2$;
$Q_3$ is O, S or $NR_3$;
$Q_4$ is O, S or $NR_4$;
n is 0, 1 or 2;
$R_2$ is H, $C_1$–$C_3$ alkyl, phenyl, benzyl, $CH_2CH{=}CH_2$, $CH_2C{\equiv}CH$, CN, $C_1$–$C_3$ haloalkyl, OH, $OCH_3$ or $OC_2H_5$;
$R_3$ is H or $C_1$–$C_3$ alkyl;
$R_4$ is H or $CH_3$;
$R_5$ is H, halogen, $CH_3$, $CH_2CH_3$, $OCH_3$, $OCH_2CH_3$, $OCF_2H$ or halomethyl;
$R_6$ is $C_1$–$C_4$ alkyl;
A is



A-1

X is H, $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkoxy, $C_1$–$C_4$ haloalkoxy, $C_1$–$C_4$ haloalkyl, $C_1$–$C_4$ haloalkylthio, $C_1$–$C_4$ alkylthio, $C_2$–$C_5$ alkoxyalkyl, $C_2$–$C_5$ alkoxyalkoxy, amino, $C_1$–$C_3$ alkylamino, di($C_1$–$C_3$ alkyl)amino or $C_3$–$C_5$ cycloalkyl;
Y is H, $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkoxy, $C_1$–$C_4$ haloalkoxy, $C_1$–$C_4$ haloalkylthio, $C_1$–$C_4$ alkylthio, $C_2$–$C_5$ alkoxyalkyl, $C_2$–$C_5$ alkoxyalkoxy, amino, $C_1$–$C_3$ alkylamino, di($C_1$–$C_3$ alkyl)amino, $C_3$–$C_4$ alkenyloxy, $C_3$–$C_4$ alkynyloxy, $C_2$–$C_5$ alkylthioalkyl, $C_1$–$C_4$ haloalkyl, $C_2$–$C_4$ alkynyl, azido, cyano, $C_2$–$C_5$ alkylsulfinylalkyl, $C_2$–$C_5$ alkylsulfonylalkyl,



$NR_dR_e$($C_2$–$C_3$ cyanoalkyl) or $N(OCH_3)CH_3$;
m is 2 or 3;
$L_1$ and $L_2$ are independently O or S;
$R_f$ is H or $C_1$–$C_3$ alkyl;
$R_g$ and $R_h$ are independently $C_1$–$C_3$ alkyl;
Z is N;
and their agriculturally suitable salts; provided that
(a) X or Y is other than $C_1$ haloalkoxy;
(b) when W is S, then E is a single bond, R is H, Y is $CH_3$, $OCH_3$, $OC_2H_5$, $CH_2OCH_3$, $C_2H_5$, $CF_3$, $SCH_3$, $OCH_2CH{=}CH_2$, $OCH_2C{\equiv}CH$, $OCH_2CH_2OCH_3$, $CH(OCH)_2$ or 1,3-dioxolan-2-yl;
(c) when the total number of carbons of X and Y is greater than four, then the number of carbons of $R_1$ must be less than or equal to two;
(d) $Q_3$ and $Q_4$ are not simultaneously S;
(e) when J is J-5, then $Q_3$ is $NR_3$ and $Q_4$ is $NR_4$;
(f) when n is O, then $Q_3$ is $NR_3$ and $Q_4$ is $NR_4$; and
(g) when $R_5$ is other than H, then R is H, $R_1$ is H, W is O, and E is a single bond.

35. A method for controlling the growth of undesired vegetation which comprises applying to the locus to be protected an effective amount of a compound of claim 1.



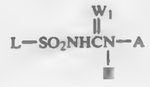
**4,746,357**

## HERBICIDAL ACETYLENIC TRIAZINES

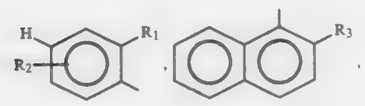
**Steven P. Artz, Kennett Square, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Division of Ser. No. 748,642, Jun. 27, 1985, Pat. No. 4,689,069, which is a continuation-in-part of Ser. No. 638,962, Aug. 8, 1984, abandoned. This application May 21, 1987, Ser. No. 52,610**
**Int. Cl.[4] C07D** *251/16, 401/12, 417/12;* **A01N** *43/68*
**U.S. Cl. 71—93** **39 Claims**

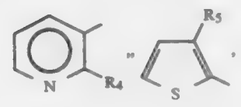
1. A compound of the formula



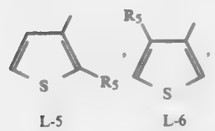
and agriculturally suitable salts thereof wherein
$W_1$ is O or S;
R is H or $CH_3$;
L is



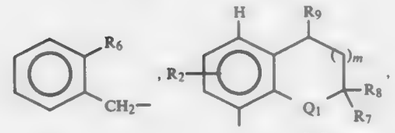
L-1 L-2



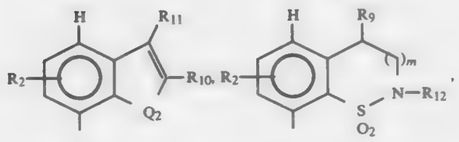
L-3 L-4



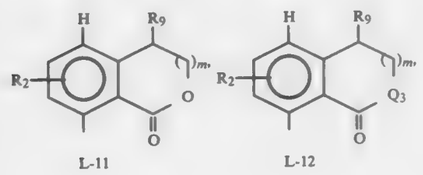
L-5 L-6



L-7 L-8

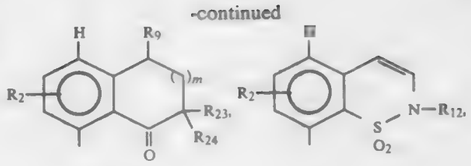


L-9 L-10

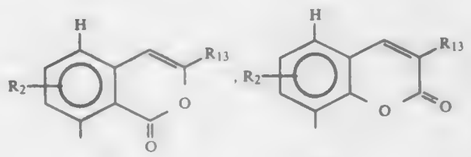


L-11 L-12

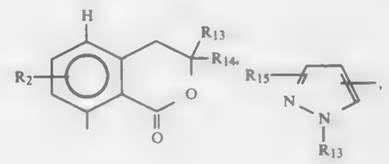
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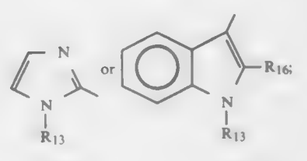
L-13 L-14



L-15 L-16

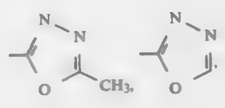


L-17 L-18

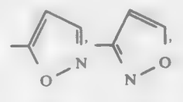


L-19 L-20

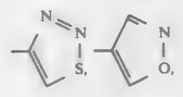
$R_1$ is $OCH_2CH_2OCH_3$, $CO_2R_{17}$, $SO_2NR_{18}R_{19}$, $SO_2N(OCH_3)CH_3$, $OSO_2R_{20}$, $WCF_3$, $WCHF_2$, $C_3$–$C_4$ alkenyloxy, $C_3$–$C_4$ alkynyloxy, $C_1$–$C_2$ alkyl substituted with $OCH_3$ or $OCH_2CH_3$, $C_6H_5$, $C_3$–$C_4$ alkynyl, $CH{=}CHCF_3$, $CH{=}CHBr$, or Q;
Q is



Q-1 Q-2



Q-3 Q-4

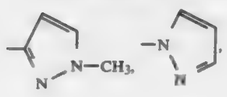


Q-5 Q-6

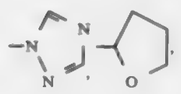
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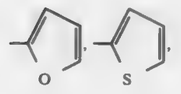
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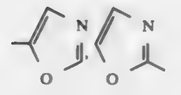
Q-7 Q-8



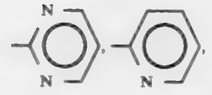
Q-9 Q-10



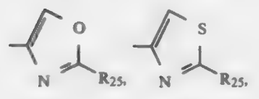
Q-11 Q-12



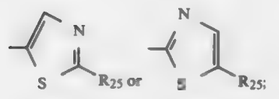
Q-13 Q-14



Q-15 Q-16



Q-17 Q-18



Q-19 Q-20

$R_2$ is H, F, Cl, Br, $CF_3$, $C_1$–$C_2$ alkyl, $C_1$–$C_2$ alkoxy, $C_1$–$C_2$ alkylthio, $C_2$–$C_3$ alkoxyalkyl, $C_2$–$C_3$ alkylthioalkyl or $OCF_2H$;

$R_3$ is H, $CH_3$, $OCH_3$, F, Cl, Br, $SO_2N(CH_3)_2$, $OSO_2CH_3$ or $S(O)_nCH_3$;

$R_4$ is $CH_3$, $CH_2CH_3$, $OCH_3$, $OCH_2CH_3$, F, Cl, Br, $SO_2NR_{18}R_{19}$, $SO_2N(OCH_3)CH_3$, $S(O)_nR_{21}$, $C_3$–$C_4$ alkenyloxy, $CH_2OCH_3$ or $CH_2OCH_2CH_3$;

$R_5$ is $C_1$–$C_3$ alkyl, F, Cl, Br, $NO_2$, $CO_2R_{17}$, $SO_2NR_{18}R_{19}$, $SO_2N(OCH_3)CH_3$ or $S(O)_nR_{21}$;

$R_6$ is Cl, $NO_2$, $CO_2CH_3$, $CO_2CH_2CH_3$, $SO_2N(CH_3)_2$, $OSO_2CH_3$, $SO_2CH_3$, $SO_2CH_2CH_3$, $OCH_3$ or $OCH_2CH_3$;

$R_7$ is H, $CH_3$ or $CH_2CH_3$;

$R_8$ is H, $CH_3$ or $CH_2CH_3$;

$R_9$ is H or $CH_3$;

$R_{10}$ is H or $CH_3$;

$R_{11}$ is H or $CH_3$;

$R_{12}$ is H, $C_1$–$C_5$ alkyl, $C_2$–$C_3$ alkoxycarbonyl, $C_2$–$C_3$ alkylcarbonyl, $C_1$–$C_3$ alkyl substituted by 1–3 halogens selected from 0–3 F, 0–3 Cl or 0–1 Br, $C_2$–$C_4$ alkyl substituted by $OCH_3$, $C_3$–$C_4$ alkenyl, $C_3$–$C_4$ alkynyl or benzyl;

$R_{13}$ is H or $C_1$–$C_3$ alkyl;

$R_{14}$ is H or $CH_3$;

$R_{15}$ is $C_1$–$C_3$ alkyl, F, Cl, Br, $NO_2$, $CO_2R_{17}$, $SO_2NR_{18}R_{19}$, $SO_2R_{21}$ or $OCF_2H$;

$R_{16}$ is H, $CO_2CH_3$, $CO_2CH_2CH_3$, $SO_2CH_3$ or $SO_2CH_2CH_3$;

$R_{17}$ is $C_1$–$C_4$ alkyl, $CH_2CH_2OCH_3$, $CH_2CH_2Cl$ or $CH_2CH{=}CH_2$;

$R_{18}$ is H or $C_1$–$C_3$ alkyl;

$R_{19}$ is $C_1$–$C_3$ alkyl;

$R_{20}$ is $C_1$–$C_3$ alkyl or $N(CH_3)_2$;

$R_{21}$ is $C_1$–$C_3$ alkyl or $CH_2CH{=}CH_2$;

$R_{22}$ is H or $C_1$–$C_3$ alkyl;

$R_{23}$ is H or Cl;

$R_{24}$ is H or Cl;

$R_{25}$ is H or $CH_3$;

m is 0 or 1;

n is 0 to 2;

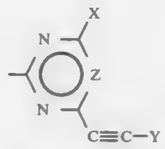
$Q_1$ is O, S, $SO_2$ or $NR_{14}$;

$Q_2$ is O or S;

$Q_3$ is S or $NR_{22}$;

W is O, S or $SO_2$;

A is



A-1

X is H, $C_1$–$C_3$ alkyl, $C_1$–$C_3$ alkoxy, $C_1$–$C_3$ haloalkyl, $C_1$–$C_3$ haloalkoxy, $C_2$–$C_4$ alkoxyalkoxy, $C_1$–$C_3$ alkylamino, di($C_1$–$C_2$ alkyl)amino, amino or cyclopropyl;

Y is H, $C_1$–$C_5$ alkyl, Br, I, phenyl optionally substituted with $CH_3$, $OCH_3$, halogen, $NO_2$, $CF_3$ or $SCH_3$, or $C_1$–$C_3$ alkyl substituted with OH, $OCH_3$, $OC_2H_5$ or F; and

Z is N;

provided that

(i) the total number of carbon atoms of $R_{18}$ and $R_{19}$ is less than or equal to four;

(ii) when m is 1, then $R_9$ is H;

(iii) when L is L-17, then $R_{13}$ and $R_{14}$ are not simultaneously H;

(iv) when L is L-18, then $R_{15}$ is adjacent to the sulfonylurea bridge $SO_2NHC(W_1)N(R)A$;

(v) when L is L-8 and $Q_1$ is $NR_{14}$, then m is 1;

(vi) when the total number of carbon atoms of X and Y is greater than four, then the combined number of carbons of the substituents on L is less than or equal to four; and

(vii) when L is L-8, L-9, L-11, L-12 or L-17 and $R_2$ is $C_2$–$C_3$ alkoxyalkyl or $C_2$–$C_3$ alkylthioalkyl, then Y is other than H or $C_1$–$C_2$ alkyl.

22. A composition for the control of undesirable vegetation consisting essentially of a compound of claim 1 and at least one of (a) a surface active agent, and (b) a solid or liquid diluent.

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**4,746,358**

**PHENYL-SUBSTITUTED SULFONAMIDES**

**Linda G. Carter, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

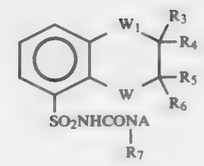
**Division of Ser. No. 828,249, Feb. 11, 1986, Pat. No. 4,659,368, which is a continuation-in-part of Ser. No. 649,542, Sep. 11, 1984, Pat. No. 4,595,407, which is a division of Ser. No. 437,366, Nov. 1, 1982, Pat. No. 4,502,882, which is a continuation-in-part of Ser. No. 363,379, Mar. 29, 1982, abandoned. This application Jan. 27, 1987, Ser. No. 7,912**

**Int. Cl.[4] A01N *43/66*; C07D *407/12***

**U.S. Cl. 71—93** **10 Claims**

1. A compound selected from





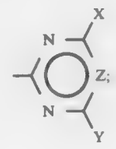
wherein

W is O;

$W_1$ is O;

$R_3$, $R_4$, $R_5$, $R_6$ and $R_7$ are independently H or $CH_3$;

A is



X is $CH_3$, $OCH_3$, or Cl;

Y is $C_2H_5$, $CH_3$, $OCH_3$, $OC_2H_5$, $CH_2OCH_3$, $NH_2$, $NHCH_3$, $SCH_3$, $N(CH_3)_2$, $CH(OCH_3)_2$ or



and

Z is N.

5. A composition suitable for controlling the growth of undesired vegetation which comprises an effective amount of a compound of claim 1 and at least one of the following: surfactant, solid or liquid diluent.

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**4,746,359**

**HYDROXYACETIC ACID AMIDE DERIVATIVES, AND HERBICIDAL COMPOSITIONS CONTAINING THEM**

**Shinzo Someya, Tokorozawa; Seigo Koura, Tokyo; Mikio Ito, Tokuyama; Akira Nakanishi, Yokohama, and Yuji Nonaka, Tokuyama, all of Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Yamaguchi and Agro-Kanesho Co., Ltd., Tokyo, both of, Japan**

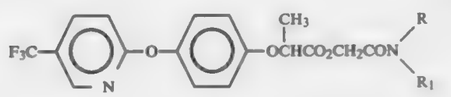
**Filed May 12, 1987, Ser. No. 48,757**

**Claims priority, application Japan, May 21, 1986, 61-116344**

**Int. Cl.[4] A01N *43/40*; C07D *213/64***

**U.S. Cl. 71—94** **6 Claims**

1. A hydroxyacetic acid amide derivative having the formula:



(I)

wherein each of R and $R_1$ which may be the same or different, is an alkyl, alkenyl, alkynyl or alkoxyalkyl group having from 1 to 4 carbon atoms, provided that R and $R_1$ are not simultaneously alkyl groups.

5. A herbicidal composition comprising a herbicidally effective amount of a hydroxyacetic acid amide derivative of the formula I as defined in claim 1 and an agricultural adjuvant.

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**4,746,360**

II

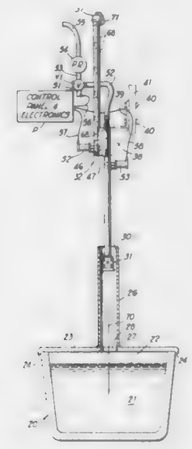
**IRON ALLOYS, PROCESS AND APPARATUS FOR INTRODUCING HIGHLY REACTIVE METALS INTO MOLTEN METAL AND PROCESS AND PRODUCT FOR REMOVING IMPURITIES FROM MOLTEN METAL**

**George A. Calboreanu, Augusta, Ga., assignor to GIW Industries, Inc., Grovetown, Ga.**

**Filed Jul. 18, 1985, Ser. No. 756,417**

**Int. Cl.[4] C21C *7/02***

**U.S. Cl. 75—53** **12 Claims**



1. A process for removing impurities from a molten metal comprising:

(a) producing a bullet having a body containing a reactive substance which will come into direct contact with the molten metal and vaporize when introduced into the molten metal and react with the impurities in the molten metal to form a reaction product which will separate from the molten metal and a nose on one end of said body, said nose being heavier than the molten metal and formed of a metal or metals which are to remain with the molten metal when it is solidified;

(b) disposing said bullet nose down above said molten metal; and

(c) propelling said bullet toward and into said molten metal at a velocity sufficient for the bullet to penetrate into said molten metal for vaporizing and reacting said substance with said impurities to produce said reaction product and for melting said nose for remaining with said molten metal.

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**4,746,361**

**CONTROLLING DISSOLVED OXYGEN CONTENT IN MOLTEN STEEL**

**Howard M. Pielet, Munster; Larry A. Frank, Crown Point, both of Ind.; William Edgar, Glenwood, Ill., and Milan Alavanja, Crown Point, Ind., assignors to Inland Steel Company, Chicago, Ill.**

**Filed Apr. 3, 1987, Ser. No. 34,331**

**Int. Cl.[4] C21C *7/00***

**U.S. Cl. 75—53** **21 Claims**

1. A method for treating, outside of a steel refining furnace, a bath of molten steel containing carbon and dissolved oxygen, said method comprising the steps of:

preparing untreated molten steel in a steel refining furnace;

pouring said untreated molten steel into a vessel to form therein a bath of molten steel;

covering said bath in said vessel with a slag layer;

diluting the slag in said slag layer with a diluent oxide;

said slag layer comprising an oxide other than said diluent

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oxide which, in the percentage thereof existing in the undiluted slag, was in or was moving toward equilibrium with the dissolved oxygen in said bath;

and stirring said bath;

said diluting step comprising decreasing the percentage of said other oxide in said slag, thereby disrupting said equilibrium or said movement thereto, and causing to form, at the molten steel bath-slag layer interface, additional amounts of said other oxide which are absorbed into said slag layer as a result of the tendency to reestablish an equilibrium between said other oxide in the slag layer and the dissolved oxygen in the bath;

whereby the dissolved oxygen content of said bath is decreased while the formation of oxides within said bath is avoided.

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**4,746,362**

## CRUCIBLE FOR THE THERMAL ANALYSIS OF ALUMINUM ALLOYS

**Jean Morice, and Jean-Jacques Perrier, both of Paris, France, assignors to Aluminum Pechiney, Paris, France**

**Filed Mar. 25, 1987, Ser. No. 29,989**

**Claims priority, application France, Mar. 27, 1986, 86 04655**

**Int. Cl.[4] C22B *21/00***

**U.S. Cl. 75—68 R** **5 Claims**

1. A crucible for the thermal analysis of an aluminum alloy comprising a bottom and at least one of its side walls is at least partially covered with a film of a red phosphorus refining agent.

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**4,746,363**

## REACTION SINTERED CERMET

**Thomas P. DeAngelis, Big Flats, N.Y., assignor to Corning Glass Works, Corning, N.Y.**

**Continuation of Ser. No. 454,669, Dec. 30, 1982, abandoned. This application Jun. 19, 1987, Ser. No. 64,837**

**The portion of the term of this patent subsequent to Apr. 30, 2002, has been disclaimed.**

**Int. Cl.[4] C22C *29/14***

**U.S. Cl. 75—244** **19 Claims**

1. A reaction sintered cermet body consisting of a fine-grained, homogeneous, intimate interdispersion of:

(a) 40–95 mole percent of first phase or phases having a maximum grain size substantially not greater than 10 μm and being boride, nitride, silicide, sulfide or combination thereof of one or more of the elements of Groups 2a, 3a exclusive of B, 4a, 2b, 3b including lanthanide and actinide series elements, 4b, 5b, 6b, 7b and 8;

(b) 5–60 mole percent of second phase or phases being metal, alloy, intermetallic compound or combination thereof of one or more of the elements of Groups 3a exclusive of B, 4a, 2b, 4b, 5b, 6b, 7b, iron, cobalt and nickel; and

(c) optionally diluent selected from nonreacted portion of reactants forming the first and second phases and preformed material that is the same as the first and/or second phases;

which body contains 0 to 4 weight percent oxygen and is prepared by the process comprising:

(d) admixing particulate exothermic reactants of maximum particle size substantially not greater than 150 μm and being elements, compounds, intermetallic compounds, alloys or combination thereof in stoichiometric proportions to substantially form the first and second phases, and

(e) shaping and heating the admixture to form the reaction sintered body, and heating being done in nonreactive atmosphere and at temperature at which the reaction and sintering occurs between the reactants to substantially form the first and second phases.

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**4,746,364**

## FLOWING CONCRETE AND PROCESS OF PRODUCING THE SAME

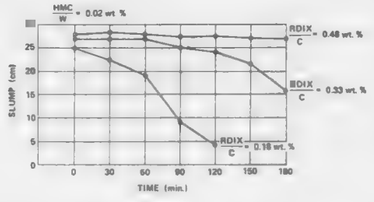
**Toru Kawai; Takeji Okada, and Gaku Matsumoto, all of Tokyo, Japan, assignors to Shimizu Construction Co., Ltd., Japan**

**Filed Jul. 10, 1986, Ser. No. 883,916**

**Claims priority, application Japan, Jul. 12, 1985, 60-153818**

**Int. Cl.[4] C04B *24/10, 24/30***

**U.S. Cl. 106—90** **6 Claims**




1. A process of producing a flowing concrete, comprising the steps of:

(a) kneading a cement, water, aggregates, a superplasticizer and a segregation-controlling agent into a base concrete having a water-cement ratio of about 25 to about 35%, the segregation-controlling agent contained in an amount of about 0.02 to about 0.1 wt. %, based on the water and including a methylcellulose compound, and the superplasticizer contained in an amount of about 0.25 to about 0.6 wt. % based on the cement;

then, (b) adding about 0.25 to about 0.6 wt. %, in terms of the solid, of a flowing agent based on the cement to the base concrete, the flowing agent including a sulfonic acid/formaldehyde high condensate and a polyvinyl alcohol; and

further (c) kneading the base concrete with the flowing agent into the flowing concrete.

6. A flowing concrete prepared by the process of claim 1, 2, 3, 4 or 5.

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**4,746,365**

## UTILIZATION OF LATEXES WITH HYDRAULIC CEMENT AND GYPSUM COMPOSITIONS

**Warner K. Babcock, Stamford, and David A. Ruefenacht, New Canaan, both of Conn., assignors to Construction Products Research, Inc., Fairfield, Conn.**

**Continuation-in-part of Ser. No. 702,541, Feb. 19, 1985, abandoned. This application Feb. 2, 1987, Ser. No. 14,169**

**Int. Cl.[4] C04B *7/32, 24/34***

**U.S. Cl. 106—104** **35 Claims**

1. A method for reducing the wet expansion and drying shrinkage of an aluminous cement which comprises adding thereto:

(a) gypsum in an amount above about 5 to about 55 percent by weight based on the amount of the aluminous cement to reduce drying shrinkage; and

(b) a first polymer latex emulsion such that the percent polymer solids based on the amount of the aluminous cement and gypsum is about 1 to 25 percent by weight to reduce wet expansion.



**4,746,366**

## PROCESS AND LACQUER FOR THE PRODUCTION OF SCRATCH-RESISTANT COATINGS

**Gottfried Philipp, Kist, and Helmut Schmidt, Höchberg, both of Fed. Rep. of Germany, assignors to Fraunhofer-Gesellschaft zur Förderung der Angewandten Forschung E.V., Munich, Fed. Rep. of Germany**

**Division of Ser. No. 705,638, Feb. 26, 1985, abandoned. This application Mar. 17, 1986, Ser. No. 839,916**

**Claims priority, application Fed. Rep. of Germany, Feb. 27, 1984, 3407087**

**Int. Cl.[4] C09K *3/00;* B32B *27/36***

**U.S. Cl. 106—287.19** **15 Claims**

1. A process for the production of scratch-resistant transparent coatings, which comprises applying to a substrate, and hardening, a lacquer which has been obtained by hydrolytic precondensation of

(a) at least one zirconium compound, which is soluble in the reaction medium, of the formula I:

$$MR_4 \quad (I)$$

in which M denotes zirconium and R represents halogen, hydroxyl, alkoxy, acyloxy or a chelating ligand; and

(b) at least one organo functional silane of the formula II:

$$R_m'(R''Y)_nSiX_{(4-m-n)} \quad (II)$$

in which R′ denotes alkyl or alkenyl, R″ represents alkylene or alkenylene, wherein said R′ or R″ radicals are uninterrupted or are interrupted by oxygen or sulfur atoms or —NH— groups, X denotes hydrogen, halogen, hydroxyl, alkoxy, acyloxy or the group $—NR'''_2$, wherein R‴ is hydrogen or alkyl or one of each, Y is halogen or an unsubstituted or substituted amino, amide, aldehyde, alkylcarbonyl, carboxyl, mercapto, cyano, alkoxy, alkoxycarbonyl, sulfonic acid, phosphoric acid, acryloxy, methacryloxy, epoxy or vinyl group; m and n have the value 0, 1, 2 or 3, and m+n have the value 1, 2 or 3, with a smaller amount of water than the stoichiometrically required amount for complete hydrolysis of the hydrolyzable groups; and subsequently further condensing the reaction mixture by adding at least an amount of water required to hydrolyze the remaining hydrolyzable groups.

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**4,746,367**

## SUPERPLASTICIZER COMPOSITION FOR USE WITH HYDRAULIC CEMENTS

**Wilfred C. Meyer, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.**

**Filed Dec. 17, 1986, Ser. No. 943,296**

**Int. Cl.[4] C04B *24/28, 24/04, 24/06***

**U.S. Cl. 106—314** **15 Claims**

1. An improved superplasticizer composition for use in hydraulic cement mixtures comprising a sulfonated copolymer of styrene and alpha-methylstyrene or a salt thereof, wherein the mol ratio of styrene to alpha-methylstyrene is from 30:70 to 70:30 and the weight average molecular weight is from about 5,000 to 20,000, together with from about 5 to about 20% of a salt of gluconic acid and from about 7.5 to about 20% of an antifoam agent, both being based on the weight of the copolymer.

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**4,746,368**

## DECOLORIZATION OF AQUEOUS SACCHARIDE SOLUTIONS AND SORBENTS THEREFOR

**Dieter Frank, Naperville; Lincoln D. Metcalfe, LaGrange, and John Y. G. Park, Naperville, all of Ill., assignors to Akzo America Inc., New York, N.Y.**

**Filed Feb. 28, 1986, Ser. No. 834,941**

**Int. Cl.[4] C13P *3/12;* C13J *1/02***

**U.S. Cl. 127—55** **20 Claims**

1. A process for the removal of impurities comprising phenolics or amino nitrogen from an aqueous saccharide solution comprising contacting said aqueous saccharide solution with a sorbent which selectively adsorbs said impurities, thereby removing said impurities from said aqueous saccharide solution, said sorbent comprising a cellular or isotropic microporous hydrophobic polymeric support having pores from about 0.1 to about 50.0 micron average pore diameter and comprising a synthetic hydrophobic thermoplastic polymer selected from the group consisting of aliphatic olefinic polymers, on the surface of which support a cationic nitrogenous surfactant has been deposited, the molecules of which surfactant contain at least one alkyl group of at least 8 carbon atoms, the depositing of said surfactant on said support having been effected by contacting said support with a solution of said surfactant in a solvent which is completely miscible with said aqueous saccharide solution, the solution of said surfactant in said solvent having a maximum sorbent wetting rate of at least 100 $g/m^2 \cdot min.$, and a sorbent bed retention of at least 140% based on the bed interstitial volume, the partitioning coefficient of said impurities in said surfactant and solvent deposited on said support, as compared to in water, being at least 20.

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**4,746,369**

## PEROXIDE SELECTIVE STRIPPING COMPOSITIONS AND METHOD

**Thomas E. Sullivan, Hamden, and Thomas W. Bleeks, New Haven, both of Conn., assignors to Enthone, Incorporated, West Haven, Conn.**

**Continuation of Ser. No. 776,560, Sep. 16, 1985, abandoned, which is a division of Ser. No. 717,608, Apr. 1, 1985, Pat. No. 4,608,091, which is a continuation of Ser. No. 338,805, Jan. 11, 1982, abandoned. This application Feb. 24, 1987, Ser. No. 18,224**

**Int. Cl.[4] C23G *1/02, 1/02, 1/00;* C11D *7/18***

**U.S. Cl. 134—3** **2 Claims**

1. A method for the selective stripping of tungsten carbide coatings for metal substrates comprising:

(a) contacting the substrate with an aqueous solution comprising about 75–250 g/l of a peroxide agent, an effective amount of a phosphonic acid and the remainder being water;

(b) immersing the substrate in the solution at a temperature of about 20°–55° C. until the coating is substantially removed from the substrate; and

(c) removing the substrate from the solution.

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**4,746,370**

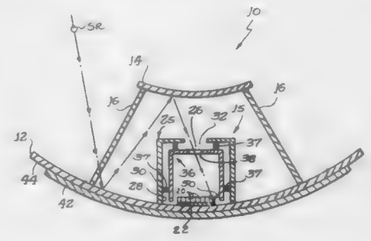
## PHOTOTHERMOPHOTOVOLTAIC CONVERTER

**Lawrence D. Woolf, Carlsbad, Calif., assignor to GA Technologies Inc., San Diego, Calif.**

**Filed Apr. 29, 1987, Ser. No. 43,941**

**Int. Cl.[4] H02N *6/00***

**U.S. Cl. 136—246** **18 Claims**




1. A photothermophotovoltaic energy conversion system for converting solar energy to electrical energy, comprising:

a radiator; and

photovoltaic cell means for receiving incoming electromagnetic radiant energy including said solar energy and con-

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verting a first portion of said incoming energy to electrical energy and having reflecting means for reflecting a second portion of said incoming energy to said radiator;

said radiator being disposed to receive said second portion of said energy from said at least one photovoltaic cell and be heated thereby for radiating energy back to said photovoltaic cell means for subsequent energy conversion therein.

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**4,746,371**

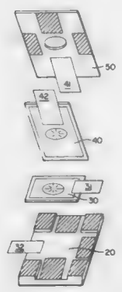
**MECHANICALLY STACKED PHOTOVOLTAIC CELLS, PACKAGE ASSEMBLY, AND MODULES**

**Paul S. McLeod, Berkeley; John A. Cape, San Rafael; Lewis M. Fraas, El Sobrante, and Larry D. Partain, Richmond, all of Calif., assignors to Chevron Research Company, San Francisco, Calif.**

**Continuation-in-part of Ser. No. 740,362, Jun. 3, 1985, Pat. No. 4,658,086, and a continuation-in-part of Ser. No. 921,566, Oct. 21, 1986. This application Dec. 18, 1986, Ser. No. 944,402**

**Int. Cl.⁴ H01L** *31/06, 25/08*

**U.S. Cl. 136—249** **18 Claims**




1. An apparatus comprising mechanically stacked photovoltaic cells, comprising:

a package comprising a bottom heat spreader and a top heat spreader, wherein said heat spreaders are electrically insulated from each other but are thermally connected to each other, wherein said top heat spreader has a space therein to provide for the passage of solar radiation;

a bottom photovoltaic cell having opposed major surfaces and having an anode and a cathode, wherein the major surface of said bottom photovoltaic cell opposed to solar radiation is thermally bonded to said bottom heat spreader;

first electrically contacting means for electrically contacting the anode of said bottom photovoltaic cell;

second electrically contacting means for electrically contacting the cathode of said bottom photovoltaic cell;

a top photovoltaic cell having opposed major surfaces, having an anode and a cathode, and being electrically insulated from said bottom photovoltaic cell, wherein the major surface of said top photovoltaic cell incident to solar radiation is thermally bonded to said top heat spreader, and wherein said top photovoltaic cell has a bandgap energy responsive to solar radiation of shorter wavelengths than the bandgap energy to said bottom photovoltaic cell;

third electrically contacting means for electrically contacting the anode of said top photovoltaic cell; and

fourth electrically contacting means for electrically contacting the cathode of said top photovoltaic cell.

**4,746,372**

**AMORPHOUS SILICON SOLAR CELLS**

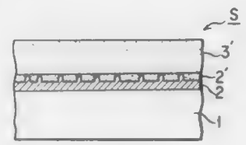
**Jun Tajika, Hiratsuka; Seijiro Sano, Chigasaki; Tsuneo Miyake, Isehara, and Osamu Kuboi, Chigasaki, all of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan**

**Continuation-in-part of Ser. No. 646,261, Aug. 3, 1984, abandoned. This application Apr. 18, 1986, Ser. No. 853,322**

**Claims priority, application Japan, Sep. 26, 1983, 58-176464**

**Int. Cl.⁴ H01L** *31/06*

**U.S. Cl. 136—258** **7 Claims**




1. An amorphous silicon solar cell comprising a glass substrate, a transparent conductive film formed on said glass substrate by electron-beam vapor deposition and having micro-columns of fine cubic crystals irregularly formed thereon, a plurality of amorphous silicon layers formed on said transparent conductive film, and a metal electrode formed on the amorphous silicon layers, characterized in that said micro-columns formed on the transparent conductive film have a density of 30 to 90 columns/$\mu m^2$ and each column is 500 to 1,000 angstroms in height and in diameter.

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**4,746,373**

**METHOD OF MANUFACTURING COMPOUND SUPERCONDUCTORS**

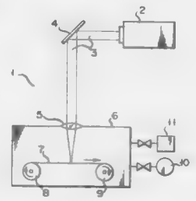
**Yutaka Yamada, Kawasaki; Satoru Murase; Mitsuo Sasaki, both of Yokohama; Ei Nakamura, Yokosuka; Hiroaki Kumakura; Kazumasa Togano, both of Ibaraki, and Kyoji Tachikawa, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki and National Research Institute for Metals, Tokyo, both of, Japan**

**Filed May 14, 1986, Ser. No. 863,189**

**Claims priority, application Japan, May 16, 1985, 60-102762; Oct. 29, 1985, 60-240542**

**Int. Cl.⁴ H01L** *39/24*

**U.S. Cl. 148—11.5 P** **51 Claims**




1. A method of manufacturing a compound superconductor comprising:

(a) preparing a starting body by mixing powders containing components of a compound superconductor to be manufactured; and

radiating a laser beam on at least one part of the starting body to heat and melt the starting body, thereby producing a layer of the compound superconductor in the starting body.



**4,746,374**

**METHOD OF PRODUCING TITANIUM ALUMINIDE METAL MATRIX COMPOSITE ARTICLES**

**Francis H. Froes, Xenia, and Daniel Eylon, Dayton, both of Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Feb. 12, 1987, Ser. No. 13,817**

**Int. Cl.⁴ C22F** *1/18;* **B32B** *15/14*

**U.S. Cl. 148—11.5 F** **11 Claims**



1. A method for fabricating a titanium alloy composite consisting of at least one filamentary material selected from the group consisting of silicon carbide, silicon carbide-coated boron, boron carbide-coated boron, and silicon-coated silicon carbide, and a titanium-aluminum base alloy containing about 10 to 50 atomic percent aluminum and about 80 to 50 atomic percent titanium which comprises the steps of:

(a) providing rapidly-solidified foils, having an average beta grain size of about 2 to 20 microns, of said alloy;

(b) fabricating a preform consisting of alternating layers of at least one of said filamentary materials and said foil; and

(c) applying heat at a level of about 0° to 250° C. below the beta transus temperature of said alloy and applying a pressure of about 5 to 40 ksi for about 0.25 to 24 hours, to consoliate said preform.

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**4,746,375**

**ACTIVATION OF REFRACTORY METAL SURFACES FOR ELECTROLESS PLATING**

**Charles D. Iacovangelo, Niskayuna, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Filed May 8, 1987, Ser. No. 47,739**

**Int. Cl.⁴ C21D** *1/74*

**U.S. Cl. 148—20.3** **8 Claims**

1. A method of catalytically activating a refractory metal surface for the subsequent electroless plating of metal thereon; said method comprising treating the surface while heated in a carburizing atmosphere under conditions which cause carbon to react with refractory metal atoms at the surface, said carburizing treatment followed by the electroless plating of a metal selected from the group consisting of nickel, cobalt, and gold onto the refractory surface.

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**4,746,376**

**METHOD OF PREVENTING DIFFUSION OF $N_2$, $O_2$ OR C IN SELECTED METAL SURFACES**

**Charles M. Bessey, Plymouth, Mich., assignor to Kolene Corporation, Detroit, Mich.**

**Filed Oct. 22, 1986, Ser. No. 924,294**

**Int. Cl.⁴ B23K** *35/24*

**U.S. Cl. 148—27** **7 Claims**

1. A method for preventing the diffusion of nitrogen, oxygen or carbon into a selected surface of a metal at elevated heat treating temperatures comprising, providing an aqueous mixture of a refractory material selected from the group of zircon and aluminosilicate, sodium silicofluoride and a sodium silicate binder, coating the selected surface with said mixture, allowing said mixture to cure, subjecting the work piece to an elevated temperature in the presence of nitrogen or oxygen or carbon or combinations thereof, cooling the work piece, and thereafter removing said coating from work piece.

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**4,746,377**

**SEMICONDUCTOR DEVICE WITH THERMALLY OXIDIZED INSULATING AND ARSENIC DIFFUSION LAYERS**

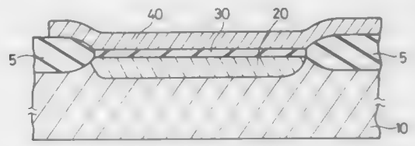
**Kiyoteru Kobayashi, and Hideaki Arima, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Jan. 28, 1986, Ser. No. 823,251**

**Claims priority, application Japan, Mar. 8, 1985, 60-47032**

**Int. Cl.⁴ H01L** *21/425*

**U.S. Cl. 148—33.3** **3 Claims**




1. A semiconductor device formed on a silicon substrate, comprising

a silicon oxide film (30) obtained by thermal oxidation of an arsenic diffusion layer (20) formed in the surface of said silicon substrate, said arsenic diffusion layer (20) having a surface arsenic concentratin within a range of $5\times10^{18}$ $cm^{-3}$ to $5\times10^{19}$ $cm^{-3}$.

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**4,746,378**

**PROCESS FOR PRODUCING $SM_2CO_{17}$ ALLOY SUITABLE FOR USE AS PERMANENT MAGNETS**

**Andrew G. Wysiekierski; Robert W. Fraser, and Maurice A. Clegg, all of Fort Saskatchewan, Canada, assignors to Sherritt Gordon Mines Limited, Toronto, Canada**

**Continuation of Ser. No. 700,916, Feb. 12, 1985, abandoned. This application Nov. 12, 1986, Ser. No. 930,062**

**Claims priority, application United Kingdom, Feb. 13, 1984, 8403751**

**Int. Cl.⁴ H01F** *1/04*

**U.S. Cl. 148—101** **13 Claims**

1. A process for producing an $Sm_2CO_{17}$ alloy suitable for use as a permanent magnet, said alloy consisting essentially of by weight 22.5 to 23.5% Sm as an effective amount, 20.0 to 25.0% Fe, 3.0 to 5.0% Cu, 1.4 to 2.0% Zr as an effective amount, minor amounts of oxygen and carbon, an additional amount of Sm in the range of from about 4 to about 9 times the oxygen content of the alloy, an additional amount of Zr in the range of from about 5 to 10 times the carbon content of the alloy, the balance being cobalt, and optionally praseodymium in partial replacement of the samarium, and optionally another group IVB or VB transition element in at least partial replacement of zirconium, the process comprising:

providing said alloy as a powder compact,

sintering said alloy at an elevated temperature to achieve a high density and high remanence,

determining the solid+liquid/solid phase transformation temperature of said alloy,

cooling the sintered alloy in a controlled manner from the sintering temperature to a solution heat treatment temperature marginally below the solid+liquid/solid phase transformation temperature to put the alloy constituents into a substantially uniform 2–17 Sm-Co solid solution,

holding the alloy at the solid solution heat treatment temperature,

quenching the alloy to room temperature,

reheating the alloy to a first aging temperature to transform the 2–17 Sm-Co solid solution into a structure comprising

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a network of the 1-5 Sm-Co phase within a 2-17 Sm-Co matrix,

cooling the alloy to a second aging temperature in a controlled manner to cause regions of 2-17 Sm-Co phase to nucleate coherently within the 1-5 Sm-Co phase network and create lattice strain which results in high coercivity and good loop squareness, and

cooling the alloy to room temperature.

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**4,746,379**

## LOW TEMPERATURE, HIGH STRENGTH NICKEL-PALLADIUM BASED BRAZING ALLOYS

**Anatol Rabinkin, Morris Plains, N.J., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.**

**Filed Aug. 25, 1987, Ser. No. 89,276**
**Int. Cl.[4] C27C *19/00*; B23K *35/30***
**U.S. Cl. 148—403** **8 Claims**

1. An alloy having a composition represented by the formula:

$$Cr_aPd_bB_cSi_dCo_eMo_fNi_{bal}$$

plus incidental impurities, where the subscripts are in atom percent and "a" is in the range of 0 to about 10, "b" is in the range of about 25 to about 35, "c" is in the range of 0 to about 13, "d" is in the range of 0 to about 13, "e" is in the range of about 5 to about 20, "f" is in the range of 0 to about 5, and the sum of c+d is in the range of about 10 to about 13.

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**4,746,380**

## EXPLOSIVE COMPOUND COMPRISING AMMONIUM NITRATE AND GLYCINE

**John Cooper, Ayr, Scotland, and Vladmir Sujansky, Burwood, Australia, assignors to Imperial Chemical Industries PLC, London, England**

**Filed May 26, 1987, Ser. No. 53,690**
**Claims priority, application United Kingdom, Jun. 11, 1986, 8614228**
**Int. Cl.[4] C06B *45/00***
**U.S. Cl. 149—2** **14 Claims**

1. A crystalline association compound of two moles of ammonium nitrate and one mole of glycine.

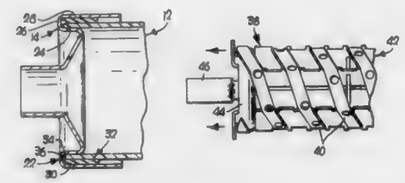
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**4,746,381**

## METHOD OF MAKING AN END CAP CONNECTION FOR A FLUID-RESISTANCE ELECTRICAL DEVICE

**Delbert R. Parker, and Daren A. Clark, both of Centralia, Mo., assignors to A. B. Chance Company, Centralia, Mo.**

**Filed May 5, 1986, Ser. No. 859,488**
**Int. Cl.[4] B32B *31/20***
**U.S. Cl. 156—69** **6 Claims**



1. A method of mechanically connecting and sealing a hollow, cylindrical member to an end piece comprising:

placing a quantity of initially flowable, curable synthetic resin adhesive sealing material within an annular, generally U-shaped channel of said end piece wherein said channel is defined by opposed cylindrical sidewalls and curved portions connecting said sidewalls to a bottom portion;

moving an end portion of said member in a direction toward said channel bottom portion of said end piece through a displacement sufficient to cause substantially the entire area of an annular, outer-most end of said cylindrical member to move into direct contact with said sealing material;

continuing to move the end portion of the member toward said channel bottom portion to cause a cylindrical surface of said end portion and a circular corner disposed between said cylindrical surface of said end portion and said annular end to slide along one of said end piece sidewalls in substantially complete circumferential contact therewith, said cylindrical surface of said end portion and said circular corner being of a diameter substantially equal to the diameter of said one sidewall in contact therewith to thereby align said member to said end piece while shifting a portion of said sealing material along and across the surface of said outermost, annular end and re-distributing certain portions of said sealing material toward other areas of said channel;

engaging in direct contact said corner of said annular end with one of said curved portions of said end piece such that said end of said member is retained by said one curved portion in spaced relation to said bottom portion of said channel;

curing said synthetic resin adhesive; and

magneforming said end piece walls at a time subsequent to said step of curing said adhesive to compress said end portion of said tubular member and thereby prestress said adhesive for substantially precluding subsequent disengagement of said adhesive from said tubular member.

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**4,746,382**

## COMPOSITION TO IMPROVE ADHESIVENESS OF PREPASTED WALLPAPER AND METHOD OF USE

**William H. Logan, Montreal, Canada, assignor to Swing Paints, Ltd., Montreal, Canada**

**Filed Sep. 5, 1986, Ser. No. 903,965**
**Int. Cl.[4] E04B *2/00***
**U.S. Cl. 156—71** **17 Claims**

1. In a method of preparing pre-pasted wallpaper for hanging against a flat surface wherein said pre-pasted wallpaper is contacted with warm water, the improvement which comprises adding to said warm water a composition comprising a wetting agent capable of improving the adhesiveness of said pre-pasted wallpaper without causing any bleeding thereof.

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**4,746,383**

## CONTINUOUS FOAMED-IN-PLACE DOOR PANEL MANUFACTURING PROCESS

**Howard A. Bacon, Richardson, Tex., and Roy E. Palmer, Williamsport, Pa., assignors to Overhead Door Corporation of Texas, Dallas, Tex.**

**Filed Apr. 17, 1987, Ser. No. 39,618**
**Int. Cl.[4] B32B *31/06***
**U.S. Cl. 156—79** **9 Claims**

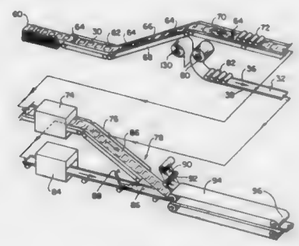
1. A continuous automated method of manufacturing insulated door panels having first and second spaced apart skins separated by a foam core, comprising the steps of:

(a) continuously connecting discrete first longitudinal skin segments end to end by means of flexible joints to form a string of said first skin segments;

(b) conveying said string of first skin segments to a foamable liquid injection station;

(c) conveying a second skin material to said injecting station;

(d) injecting foamable liquid at said injecting station between said string of first skin segments and said second skin material; and



(e) maintaining said string of first skin segments and second skin material in a spaced-apart, opposed relationship during the foaming of said foamable liquid.

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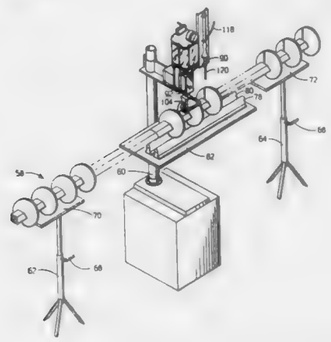


**4,746,384**

## APPARATUS AND METHOD FOR PERMANENTLY JOINING PLASTIC SCREW CONVEYOR FLIGHTS

**Michael K. Tan, Metairie, La., assignor to The Laitram Corporation, Harahan, La.**

**Filed Apr. 20, 1987, Ser. No. 39,697**
**Int. Cl.[4] B32B *31/06***
**U.S. Cl. 156—82** **5 Claims**



1. Apparatus for bonding at least two confronting edges of flights of adjacent integrally molded screw conveyor modules comprising:

means for supporting a plurality of integrally molded plastic screw conveyor modules in axial alignment and with an edge of the flight member of one of said plurality in confronting relationship with and edge of the flight member of another one of said plurality;

means for enclosing said confronting edges and maintaining said edges in a fixed position, said enclosing means including at least one passage from outside said enclosing means to said confronting edges;

means for providing a gas having an elevated temperature through a passage to said confronting edges to heat said edges substantially to the melting temperature of said plastic modules; and

means for injecting a plastic material under temperature and pressure through a passage of said enclosing means between said heated and confronting edges of said modules to bond or join an edge of one module of said plurality to the confronting edge of an adjacent module of said plurality.

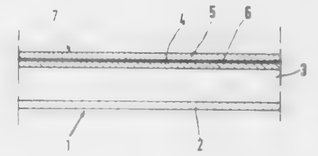
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**4,746,385**

## PROCESS FOR COVERING AN INTERIOR PART WITH A LAYER OF LEATHER

**Dieter Wagner, Oberriexingen; Axel Braeuer, Guentersleben, and Eugen Schray, Oberriexingen, all of Fed. Rep. of Germany, assignors to Dr. Ing. h.c.F. Porsche Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany**

**Filed Feb. 20, 1987, Ser. No. 16,948**
**Claims priority, application Fed. Rep. of Germany, Feb. 27, 1986, 3606375**
**Int. Cl.[4] B32B *31/24, 9/04***
**U.S. Cl. 156—155** **28 Claims**



1. Process for covering an interior part comprising:

subjecting a leather layer to a heat treatment,

applying a water-soluble protective film to a decorative upper side of the leather,

cleaning by means of a solvent an area of the interior part that is to be covered,

applying an adhesive agent to the cleaned area of the interior part and to a backside of the leather layer,

ventilating the adhesive agents on the interior part and on the leather layer,

applying the backside of the leather layer to the interior part in the area having said adhesive agent applied thereto,

removing the water-soluble protective film from the decorative upper side of the leather, and

hardening the adhesive agent.

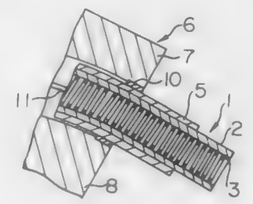
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**4,746,386**

## METHOD OF PRODUCING CONTINUOUS FIBER REINFORCED BENT RESIN PIPE

**Shigeru Sato, Sagamihara; Fumiko Sato, Kamakura, and Toshihiro Ichijo, Sagamihara, all of Japan, assignors to Nitto Boseki Co., Ltd., Gonome Fukushima, Japan**

**Filed Oct. 20, 1986, Ser. No. 921,055**
**Claims priority, application Japan, Oct. 19, 1985, 60-232341**
**Int. Cl.[4] B29C *53/60, 53/82***
**U.S. Cl. 156—175** **11 Claims**



1. A method of producing a continuous fiber reinforced bent resin pipe, comprising the steps of: winding a continuous reinforcing fiber on the outer surface of a tube-like flexible core mold while said core mold is straight in shape, said flexible core mold being capable of keeping a cross section defined in radial direction when the core mold is bent and being straight when unloaded; said core mold having a flexible sleeve of given inner diameter and a coil tension spring of given outer diameter slightly smaller than said inner diameter and loosely slidably inserted in the flexible sleeve with a slight radial clear-

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ance therebetween corresponding to the difference between said outer diameter and said inner diameter whereby said spring provides both stiffness to said sleeve in the radial direction and flexibility for permitting bending of the core mold substantially in any direction without deformation of its radial cross section; bending the core mold on which said continuous fiber has been wound and placing the same in a cavity defined by an outer mold comprising split molds each having an inner surface forming the predetermined outer configuration of a bent pipe; supplying a liquefied synthetic resin between said outer and core molds; curing the resin to integrate both the fiber and resin, and then removing the molded product from said outer mold and removing said core mold from said molded product.

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**4,746,387**

## CLOSURE AND METHOD AND APPARATUS FOR MANUFACTURING THEREOF

**Philip M. Wright, 15530 E. Salt Lake Ave., City of Industry, Calif. 91744, and Donald Didier, 15371 Feldspar Dr., Chino Hills, Calif. 91709**

**Continuation of Ser. No. 744,529, Jun. 14, 1985, abandoned, which is a division of Ser. No. 664,767, Oct. 25, 1984, Pat. No. 4,544,080. This application May 18, 1987, Ser. No. 54,099**

**Int. Cl.⁴ B65D** *41/32*

**U.S. Cl. 156—201** **3 Claims**



1. The method of forming a closure which comprises

moving an endless strip of a material comprising a flexible base layer and plastic layer in a continuous path through a plurality of stations,

folding a longitudinal edge of the strip bringing the plastic layers into engagement as the strip is moved in a continuous path,

thereafter cutting the folded edge of the strip to form longitudinally space integral double layer tabs along the edge from the folded edge as the strip is moved continuously, each layer comprising a base layer and a plastic layer having a fold line forming the free edge of the tab, the plastic layers being in contact,

folding the tabs as the strip is moved continuously to bring the base layer of each tab into engagement with the base layer of the strip,

cutting the composite panels with the integral folded double layer tab from the strip as the strip is moved continuously,

moving closure bodies successively in a predetermined path, each closure body having a central opening,

bringing composite panels successively into contact with the plastic layer of each said panel into contact with the closure body,

applying pressure to said composite panels and closure bodies as they are moved in said predetermined path,

bonding said composite panels to said closure bodies and simultaneously bonding said two portions of each tab while pressure is being applied to said composite panels and closure bodies.

**4,746,388**

## CORRECTION METHOD

**Masatsugu Inaba, Settsu, and Takumi Murasaki, Neyagawa, both of Japan, assignors to Fuji Kagakushi Kogyo Co., Ltd., Osaka, Japan**

**Division of Ser. No. 709,045, Mar. 7, 1985, Pat. No. 4,634,629. This application Sep. 2, 1986, Ser. No. 902,759**

**Claims priority, application Japan, Mar. 9, 1984, 59-45950; Nov. 27, 1984, 59-251176**

**Int. Cl.⁴ B44C** *1/17;* **B32B** *1/00;* **B41J** *11/60*

**U.S. Cl. 156—241** **11 Claims**

1. A method for removing correctable images, applied to an original sheet by means of type ink containing a resin as the main component thereof, with a lift-off correction element which comprises:

(a) using as a correction element a pressure-sensitive lift-off correction element having a pressure-sensitive adhesive layer containing a tackifier resin which is a resin other than the resin present in the correctable images to be removed from the original sheet, and a sufficient amount of a plasticizer which is capable of plasticizing the resin of said correctable images but is not capable of plasticizing said tackifier resin;

(b) impacting the pressure-sensitive adhesive layer of said correction element against the correctable images which are typed onto an original sheet to adhere the correctable images to the adhesive layer, and removing the adhesive layer from the original sheet, whereby the correctable images which are adhered to the adhesive layer and removed from the original sheet are rendered adhesive by said plasticizing action to permit additional correctable images of type of ink to be adhered in registration thereover; and

(c) repeating the correcting operation of step (b) several times over the same areas of the adhesive layer still bearing the correctable image removed in the previous step (b) to provide the same quality of image-removal as the first time.

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**4,746,389**

## METHOD FOR PRODUCING A CLEAN, HIGHLY CONDUCTIVE SURFACE FOR MATING COMPOSITE ARTICLES

**Rocco R. DiGenova, Wallingford, Conn., assignor to United Technologies Corporation, Hartford, Conn.**

**Filed Aug. 4, 1987, Ser. No. 81,192**

**Int. Cl.⁴ B32B** *31/18*

**U.S. Cl. 156—247** **23 Claims**



1. A method for producing a composite article which includes a clean, highly conductive mating surface for conductively bonding with adjacent structures, said article including a continuous conductive layer for lightning or electromagnetic interference shielding, said method comprising:

(1) placing a nonporous tape in a mold in an area requiring the mating surface;

(2) overlaying the nonporous tape with at least one layer of conductive material;

(3) placing a barrier tape over the conductive layer above the nonporous tape, sandwiching the conductive layer therebetween;

(4) installing one or more structural plies over the mesh and barrier tape to a desired thickness;

(5) curing to form a composite article; and

(6) removing the nonporous tape to expose an essentially resin free conductive mating surface.



**4,746,390**

## METHOD FOR JOINING A SEMICONDUCTOR CHIP TO A CHIP CARRIER

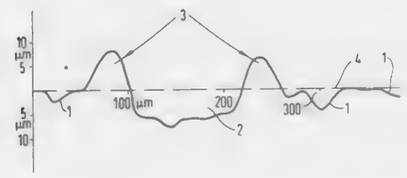
**Radim Badalec; Werner Baumgartner, and David Cutter, all of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Jul. 29, 1982, Ser. No. 402,847**

**Claims priority, application Fed. Rep. of Germany, Aug. 20, 1981, 3132983**

**Int. Cl.⁴ B29C** *65/16*

**U.S. Cl. 156—272.8** **6 Claims**




1. Method of joining a semiconductor chip to a chip carrier by cementing or soldering, which comprises treating an area of the semiconductor chip to be joined to the carrier with a laser beam, adjusting the energy of the laser beam to produce depressions in the semiconductor chip by localized melting of the semiconductor material of the chip and to at least partially pile melted semiconductor material on the surface of the semiconductor chip at the edge of the depression, and applying cement or solder between the treated area of the semiconductor chip containing the depressions and the piled material and the carrier.

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**4,746,391**

## APPARATUS FOR CONTINUOUS WELDING OR SEALING OF SEAMS OF PLASTIC FILMS

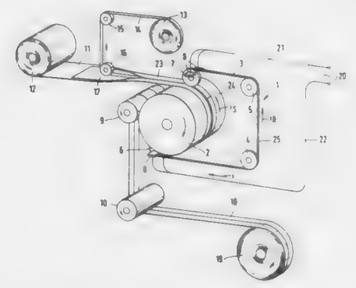
**Klaus Heyse, Bad Soden, and Ludwig Klenk, Hallgarten, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Dec. 1, 1986, Ser. No. 936,384**

**Claims priority, application Fed. Rep. of Germany, Nov. 29, 1985, 3542256**

**Int. Cl.⁴ B32B** *31/08, 31/20;* **B31B** *21/60*

**U.S. Cl. 156—359** **17 Claims**



1. An apparatus for the continuous welding or sealing of seams of plastic films comprising:

a rotatable sealing drum;

means for supplying a plurality of plastic film edges to said sealing drum in a contiguous seam arrangement;

means for guiding said plastic film over a partial periphery of said sealing drum;

means for supplying a sealing strip, and for positioning said sealing strip so as to cover the seam of said plastic film edges;

at least one endless heating band;

means including a plurality of deflecting/tensioning rollers, for pressing said at least one endless heating band radially against said partial periphery of said rotating sealing drum; and

means for heating said at least one endless heating band comprising a plurality of feed rollers for said at least one heating band supplying electrical current for resistance heating of said at least one heating band, said rollers resting against said partial periphery of said sealing drum, the position of one or more of said rollers being adjustable along the partial periphery of said sealing drum in order to vary the lengths of sealing and return strands of said at least one heating band and to set the electrical resistance, whereby the heating ability of said return strand can be controlled to prevent damage as a result of overheating, and at least one sliding contact provided on each of said feed rollers for supplying the electrical current.

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**4,746,392**

## METHOD FOR PRODUCING AN IDENTIFICATION CARD WITH AN INTEGRATED CIRCUIT

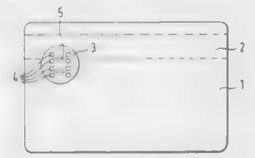
**Joachim Hoppe, Munich, Fed. Rep. of Germany, assignor to GAO Gesellschaft fur Automation und Organisation mbH, Munich, Fed. Rep. of Germany**

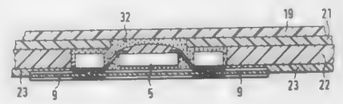
**Continuation of Ser. No. 562,217, Dec. 16, 1983, abandoned. This application Sep. 22, 1986, Ser. No. 910,351**

**Claims priority, application Fed. Rep. of Germany, Dec. 28, 1982, 3248385**

**Int. Cl.⁴ B32B** *31/00*

**U.S. Cl. 156—244.12** **5 Claims**




1. A method of producing an identification card including an IC module comprising the steps of:

(a) providing an IC module mounted on a carrier element;

(b) providing at least one identification card layer with a recess layer in dimension than said IC module;

(c) suspending said IC module within said recess so that empty space exists substantially completely around said IC module in said recess; and

(d) introducing an amount of polymer material having a consistency which ranges from pasty to liquid and being capable of cross-linking to form a solid elastomeric material into said recess so as to fill said empty space around said IC module thereby resulting with a completely encased IC module; prior to

(e) applying a cover film to said identification card layer; and

(f) subjecting such cover film and at least one identification card layer to laminating heat and pressure to form a laminated identification card layer construction and to permit said polymer to cross-link only during or after the laminating process and form into a solid elastomeric material whereby an identification card is produced having sub-

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stantially flat surfaces essentially devoid of deformations in the area of the IC module.

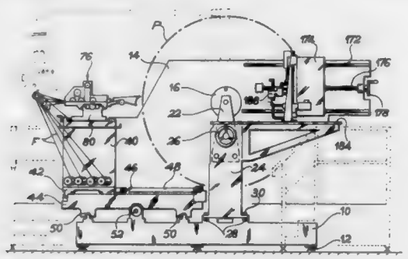
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**4,746,393**

## APPARATUS AND METHOD FOR THE PRODUCTION OF HOLLOW BODIES OF REVOLUTION FORMED FROM THREADS EXTENDING IN THREE DIFFERENT DIRECTIONS

**Jean-Francois Ephere, Pessac; Serge Durand, Cestas; Bruno Bompard, Lyon, and Alain Bruyere, Villefontaine, all of France, assignors to Commissariat a l'Energie Atomique, Paris and Etablissements Brochier, Decines Charpieu Cedex, both of, France**

**Filed Sep. 16, 1986, Ser. No. 907,965**
**Claims priority, application France, Sep. 18, 1985, 85 13823**
**Int. Cl.[4] B65H** *81/00*
**U.S. Cl. 156—361** **6 Claims**



**1. A machine for the production of hollow bodies of revolution formed from threads extending in three directions, called the radial, axial and circumferential directions, wherein it comprises a chassis, a headstock mounted at one end of the chassis, a spindle supported in rotary manner by the headstock, means for controlling the rotation of the spindle, a tailstock mounted at the other end of the chassis in front of the spindle and defining therewith a substantially horizontal common axis, means for displacing the tailstock along said axis, a mobile support able to successively receive several interchangeable working subassemblies constituted by a retaining ring implantation subassembly and a winding subassembly, mounted on one side of the chassis with respect to said axis, first means for displacing the support parallel to said axis at a speed proportional to the rotation speed of said spindle, second means for controlling a fast displacement of the support parallel to said axis, means for displacing the support perpendicular to said axis, in order to follow a first pattern having the profile of the part or body to be produced, a weaving assembly mounted on the other side of the chassis with respect to said axis and having a beam supporting in a mobile manner a weaving carriage and means for moving the carriage along the beam in reciprocating manner, the weaving carriage supporting a weaving means via means for displacing the latter perpendicular with respect to said beam so as to follow a second pattern, the end of the beam adjacent to the headstock being articulated on a carriage, which can be moved perpendicularly to said axis by appropriate regulating means, the opposite end of the weaving beam being mounted on a slide fixed to the chassis.**

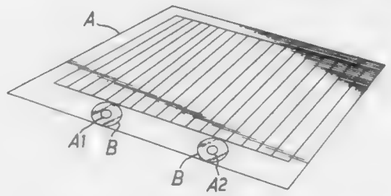
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**4,746,394**

## PAPER PUNCH WITH PUNCHED-HOLE REINFORCING PIECE STICKING MECHANISM

**Norio Sueta, Chiba, and Hiroyasu Hoshino, Tokyo, both of Japan, assignors to Elm Industry Co., Ltd., Tokyo, Japan**

**Filed Nov. 21, 1986, Ser. No. 933,216**
**Claims priority, application Japan, Jan. 11, 1986, 61-3984**
**Int. Cl.[4] B32B** *31/04, 31/18*
**U.S. Cl. 156—513** **13 Claims**




**1. A paper punch comprising:**
**(a) a base;**
**(b) a handle for moving up and down a punching rod engaged to said handle, said handle being rotatably mounted on said base by means of a spindle;**
**(c) a first mechanism to send out a carrying-tape carrying a large number of pieces to reinforce punched holes in a sheet of paper by the length of a single reinforcing-piece interlockingly with the motion of said handle;**
**(d) a second mechanism to place a reinforcing-piece in the desired position on the paper placed on said base, the reinforcing-piece being stuck to the paper by means of an adhesive coated on one side thereof;**
**(e) a third mechanism to punch a binding hole through the reinforcing-piece and the paper**
**(f) means for preventing said punching rod from descending to perform a punching operation while the carying-tape is sent out by the length of one reinforcing-piece in the early stage of the descending stroke of said handle;**
**(g) a fourth mechanism to press the reinforcing-piece placed in the desired position on the paper thereagainst before a hole is punched therethrough by said punching rod;**
**(h) a recess provided in the rear portion of said base to accommodate a cassette containing the carrying-tape;**
**(i) a pair of supports having a spindle that rotatably supports said handle mounted in the front part of said base in such a manner as to leave a clearance to insert the paper between said base and said supports; and**
**(j) a spring coiled around said spindle and resiliently interposed between said supports and said handle so that said handle is constantly urged toward the raised position.**

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**4,746,395**

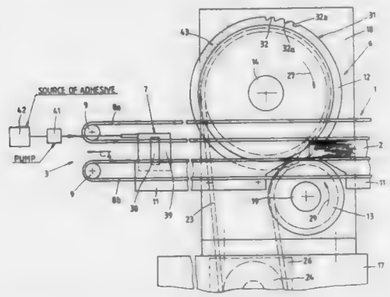
## APPARATUS FOR BONDING STACKED SHEETS TO ONE ANOTHER

**Siegfried Lampe, Ellerbek, and Bernd Ramcke, Hamburg, both of Fed. Rep. of Germany, assignors to E.C.H. Will (GmbH & Co.), Nedderfeld, Fed. Rep. of Germany**

**Filed Jan. 7, 1987, Ser. No. 1,006**
**Claims priority, application Fed. Rep. of Germany, Jan. 17, 1986, 3601187**
**Int. Cl.[4] B32B** *31/18*
**U.S. Cl. 156—524** **18 Claims**

**1. Apparatus for bonding together sheets along one edge face of each of a series of stacks of overlapping sheets, comprising means for transporting the stacks of the series along a predetermined path; means for trimming the one edge face of each stack of the series in a first portion of the path, including a rotary knife having a cutting edge and means for roughening the one edge face of each of the series of stacks in the course of the trimming operation, said roughening means comprising teeth in said cutting edge; and means for applying adhesive to the roughened and trimmed edge face of each stack of the series in a second portion of the path.**





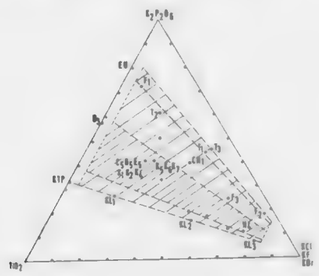

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**4,746,396**

## PROCESS FOR THE FLUX SYNTHESIS OF CRYSTALS OF THE $KTIOPO_4$ POTASSIUM TITANYL MONOPHOSPHATE TYPE

**Gérard Marnier, Jarville, France, assignor to Centre National de la Recherche Scientifique, Paris, France**

**Filed Jul. 28, 1986, Ser. No. 889,777**
**Claims priority, application France, Jul. 26, 1985, 85 11520**
**Int. Cl.[4] C30B** *9/12*
**U.S. Cl. 156—623 R** **17 Claims**



**1. An improved flux process for making crystals selected from the group consisting of KTP, $K_aRb_{1-a}TP$ with $0 \leqq a \leqq 1$ and RbTP comprising:**
**1-forming a flux composition by combining (a) titanium oxide, (b) oxides, oxide precursors or salts of the constituents of said KTP, $K_aRb_{1-a}TP$ or RbTP compound, or said KTP, $K_aRb_{1-a}TP$ or RbTP compound prepared beforehand, the proportions of said compounds being such that the ratio of the molar fraction of alkali oxide and of the molar fraction of $P_2O_5$ is equal to 1 or comprised between 1 and 2, (c) a halide flux selected from Cl, F or Br of the alkali metal constituent of said KTP, $K_aRb_{1-a}TP$ and RbTP compound, the proportions of (a), (b) and (c) being such that a low viscosity mixture is obtained at a temperature of 600°-800° C., that the formation of $K(Ti)_2(PO_4)_3$ is avoided, and that when the molar fraction of alkali oxide is different from the molar fraction of $P_2O_5$ the weight amount of said halide flux is higher than 50% with respect to $K_2O$ and $P_2O_5$;**
**2—heating the mixture of (a), (b) and (c) to a plateau temperature of 600° to 1100° C.;**
**3—cooling the mixture to approximately ambient temperature at a rate less than approximately 50° C./h; and**
**4—separating the KTP, $K_aRb_{1-a}TP$ and RbTP compound crystals from the vitreous material formed during the process.**

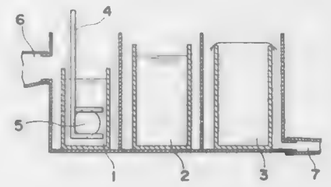
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**4,746,397**

## TREATMENT METHOD FOR PLATE-SHAPED SUBSTRATE

**Nobuhisa Maeda, Yamatotakada; Takashi Suzuki, Toyonaka, and Shigeyuki Yamamoto, Nara, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Jan. 15, 1987, Ser. No. 3,716**
**Claims priority, application Japan, Jan. 17, 1986, 61-8208; Jan. 17, 1986, 61-8209; Jan. 17, 1986, 61-8210**
**Int. Cl.[4] H01L** *21/306;* **B44C** *1/22;* **C03C** *15/00, 25/06*
**U.S. Cl. 156—637** **17 Claims**



**1. A treating method for a plate-shaped substrate comprising the steps of exposing a substrate to be treated to liquid or gas material which is soluble with treatment liquid and has a hydrophilic base and a hydrophobic base within the molecule of itself, thereafter dipping the substrate in the treatment liquid to apply the treatment, then removing said treatment liquid from the treated substrate.**

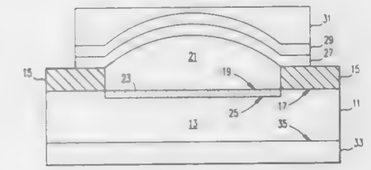
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**4,746,398**

## GALLIUM ARSENIDE PLANAR TUNNEL DIODE METHOD

**Hormoz M. Motamedi; John G. Richards, and Hector H. Flores, all of San Jose, Calif., assignors to FEI Microwave, Inc., Sunnyvale, Calif.**

**Division of Ser. No. 842,584, Mar. 21, 1986, abandoned. This application Jun. 18, 1987, Ser. No. 63,376**
**Int. Cl.[4] B44C** *1/22;* **H01L** *21/58, 21/60;* **C03C** *15/00*
**U.S. Cl. 156—644** **4 Claims**



**1. A method for making a gallium arsenide planar tunnel diode comprising the steps of:**
**heavily doping a wafer of gallium arsenide to form a P region;**
**forming an insulating layer on an upper surface of the wafer;**
**making an opening through the insulating layer;**
**applying tin through the opening onto the exposed upper surface of the wafer in the presence of an oxidization inhibitor, the inhibitor being operative to prevent either the tin or the surface of the wafer from oxidizing and thereby to ensure intimate contact between the tin and the surface of the wafer;**
**applying heat to the tin and the wafer in the presence of a scavenging agent to melt the tin on the surface of the wafer and thereby cause individual atoms of the tin to**

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diffuse into the upper surface of the wafer a distance of several atomic layers to form a heavily doped N region, the scavenging agent being operative to prevent oxidation of either the tin or the wafer; and

applying an electrical contact material to the tin.

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**4,746,399**

## METHOD FOR MAKING METALLIC PATTERNS

**Christopher G. Demmer, Saffron Walden, and Edward Irving, Burwell, both of England, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Filed Jun. 8, 1987, Ser. No. 59,646**

**Claims priority, application United Kingdom, Jun. 18, 1986, 8614868**

**Int. Cl.[4] C23F *1/02*; B44C *1/22*; C03C *15/00, 25/06***

**U.S. Cl. 156—656** **12 Claims**

1. A method for making metallic pattern on a substrate having a surface comprising bare metal in predetermined areas and metal coated by a resist in remaining areas which comprises (i) protecting the bare metal by electrodepositing a resin thereon, (ii) while leaving the electrodeposited resin substantially uncured, removing the resist from said remaining areas using a solvent which will not remove the electrodeposited resin, thereby exposing metal in said remaining areas, (iii) etching the metal exposed in (ii) using an etchant which does not remove the electrodeposited resin, and (iv) removing the electrodeposited resin with a suitable solvent.

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**4,746,400**

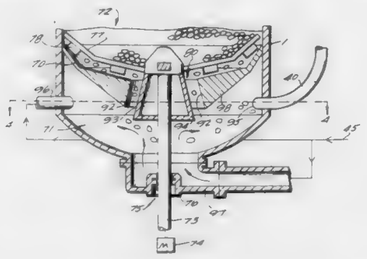
## METHOD OF TREATING CELLULOSIC CHIPS IN A VESSEL WITH A FALSE BOTTOM

**Michael I. Sherman, Glens Falls, N.Y., and Johan C. F. C. Richter, St. Jean Cap Ferrat, France, assignors to Kamyr, Inc., Glens Falls, N.Y.**

**Division of Ser. No. 62,189, Jul. 30, 1979, Pat. No. 4,432,836. This application May 5, 1983, Ser. No. 492,035**

**Int. Cl.[4] D21C *3/24***

**U.S. Cl. 162—17** **7 Claims**



1. A method of continuously treating cellulosic chips material or the like, utilizing an upright cylindrical vessel having a bottom, a false bottom disposed above the bottom, a scraper disposed above the false bottom, an outlet from the bottom, and an inlet at the top the outlet arranged so that liquid with entrained chips material or the like must flow tangentially relative to the vessel wall in order to exit the vessel; said method comprising the steps of:

(a) feeding chips material or the like into the vessel inlet;

(b) treating the chips material or the like in the vessel with a treating liquid;

(c) maintaining the temperature within the vessel at the area of the scraper at a first temperature which is low enough so that substantial loss of strength of the chips material or the like does not result from mechanical action exerted on the chips material or the like by the scraper;

(d) effecting feeding of chips material or the like through an opening in the false bottom into the vessel bottom; and

(e) introducing liquid at a second temperature into the vessel bottom, below the false bottom, to entrain chips material or the like therein and flush the entrained chips material or the like out the outlet, said second temperature being substantially greater than said first temperature, by introducing liquid into the vessel bottom both tangentially at about the same vertical level as the outlet, and upwardly from the lowest point of the bottom.

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**4,746,401**

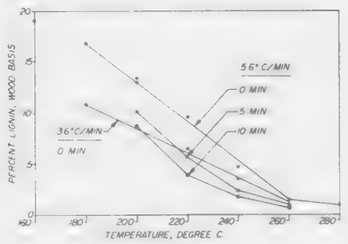
## PROCESS FOR EXTRACTING LIGNIN FROM LIGNOCELLULOSIC MATERIAL USING AN AQUEOUS ORGANIC SOLVENT AND AN ACID NEUTRALIZING AGENT

**Ronnie S. Roberts; John D. Muzzy, both of Atlanta, Ga., and George S. Faass, Bensalem, Pa., assignors to Georgia Tech Research Corp., Atlanta, Ga.**

**Continuation-in-part of Ser. No. 537,032, Sep. 29, 1983, abandoned. This application Jan. 6, 1986, Ser. No. 816,456**

**Int. Cl.[4] D21C *3/20***

**U.S. Cl. 162—72** **18 Claims**




1. A process for extracting lignin from lignocellulosic material to recover reactive lignin and to yield high quality cellulosic pulp, which comprises the steps of:

(a) impregnating lignocellulosic material with a liquor which comprises an aqueous organic solvent, capable of solvating lignin, and an acid neutralizing agent;

(b) cooking the lignocellulosic material in its liquor by heating the liquor with the impregnated lignocellulosic material submerged therein from a temperature of about 150° C. through a temperature range of 150°–175° C. to a selected maximum temperature in the maximum temperature range of 200° C. to 280° C. and then cooling the liquor with material submerged therein to a temperature of less than about 150° C.;

(c) maximizing reactive lignin solvation while suppressing cellulose degradation during step (b) by:

i. controlling the amount of neutralizing agent in step (a) and controlling the time at which the liquor with the impregnated resin is within the temperature range of 150°–175° C. to a range of 4–10 minutes to achieve a pH for step (b) of from 6.0 to 8.0 in the liquor before heating above 175° C. in step (b), and

ii. controlling the time at which the liquor is at the selected maximum temperature during step (b) in inverse relation to the selected maximum temperature so that the time at which the liquor is held at the selected maximum temperature of 200° C. is at least about 25–30 minutes and for correspondingly lesser times at selected maximum temperatures greater than 200° C. by rapidly cooling the liquor from the selected maximum temperature to said temperature of less than about 150° C. to terminate step (b); and

(d) recovering reactive lignin and high quality cellulose pulp from the cooled liquor.



**4,746,402**

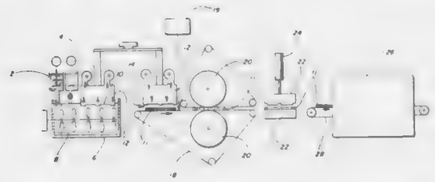
## GASKET FORMING PROCESS

**Michael J. Maloney, and Helmut F. Prahl, both of Madison, Wis., assignors to Fel-Pro Incorporated, Skokie, Ill.**

**Filed Apr. 21, 1986, Ser. No. 853,984**

**Int. Cl.[4] D21J *3/00***

**U.S. Cl. 162—108** **12 Claims**



1. A process of forming an individual gasket with a minimal production of waste material which comprises:

(a) providing suitable fibers to be formed into a gasket preform;

(b) mixing said fibers with a binder in water to form a fiber-binder aqeuous mixture;

(c) depositing and partially dewatering said fiber-binder aqueous mixture on a preform forming screen in a predetermined pattern thereby forming, from the deposited mixutre and prior to any trimming, a gasket preform with apertures in predetermined locations in the gasket preform to obtain a partially dewatered gasket preform;

(d) pressing said partially dewatered gasket preform thereby to remove excess water therefrom; and

(e) heating said pressed gasket preform in a curing chamber to cure said binder therein, thereby to form, from the heated preform, a gasket.

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**4,746,403**

## HIGH TEMPERATURE PAPER-LIKE MATERIALS

**Kenneth K. Ko; Shelly S. Niznik; Thomas M. Tymon, all of Lancaster, and Richard A. Brubacker, Willow Street, all of Pa., assignors to Armstrong World Industries, Inc., Lancaster, Pa.**

**Continuation-in-part of Ser. No. 742,878, Jun. 10, 1985. This application Feb. 27, 1986, Ser. No. 833,248**

**Int. Cl.[4] D21H *1/08***

**U.S. Cl. 162—108** **22 Claims**

1. A fire-resistant paper-like material, which coprises a fabric embedded in a layered silicate material wherein the silicate is selected from synthetic mica and vermiculite and wherein the silicate material has interstitial cations selected from (1) cations of guanidine, aminoguanidine, diaminoguanide, methyl-guanidine, tetramethylguanidine, melamine, 2-aminopyridine, and 2,6-diaminopyridine; and (2) a protonated diamino functional compound having the formula:

$$R_3N—(CX_2)_n—NR_3$$

wherein (a) each $R_3$ is hydrogen, (b) each X is hydrogen, and (c) n represents an integer from 2 to 15.

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**4,746,404**

## CHIP PRESTEAMING AND AIR WASHING

**Oliver A. Laakso, Haralyn (West), #2 Middle Road, Smiths Parish, Bermuda (3-18)**

**Division of Ser. No. 605,915, May 1, 1984, Pat. No. 4,632,729. This application Sep. 17, 1986, Ser. No. 908,335**

**Int. Cl.[4] D21C *1/02***

**U.S. Cl. 162—232** **8 Claims**

1. Apparatus for treating comminuted material, comprising:

a vertical steaming vessel;

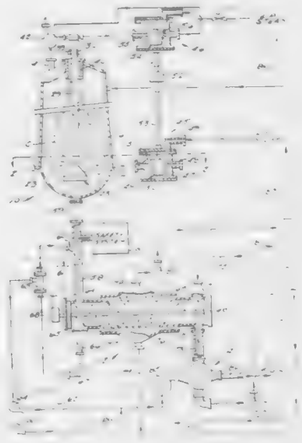
means for introducing low pressure steam into said vertical steaming vessel;

a first vertically extending chute operatively connected to said vertical steaming vessel at the top end of said chute;

a generally horizontally extending vessel having a generally horizontal axis, and having material conveyance means disposed therein;

said first vertical chute operatively connected at the bottom thereof to a first end of said generally horizontal vessel;

means for circulating liquid through said generally horizontally extending vessel in a direction generally perpendicular to the axis of said generally horizontal vessel, said means including screen means disposed in said vessel and extending generally parallel to the axis thereof;



a second chute comprising a generally vertically extending discharge chute extending generally downwardly from a second end of said horizontal vessel; and

a high pressure transfer device operatively connected to said second chute.

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**4,746,405**

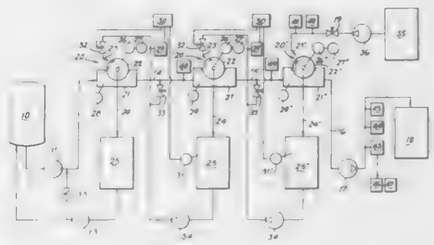
## SYSTEM FOR CELLULOSE PULP WASHING CONTROL

**Khaim Lisnyansky, Chester, and William E. Blecha, Warwick, both of N.Y., assignors to International Paper Company, Purchase, N.Y.**

**Division of Ser. No. 646,416, Aug. 31, 1984, abandoned. This application Dec. 11, 1986, Ser. No. 940,268**

**Int. Cl.[4] D21C *9/02, 9/06***

**U.S. Cl. 162—252** **9 Claims**



1. An instrumentation and control system for a counter-current pulp washing system, in which a pulp slurry flows through one or more washing stages in one direction and a stream of wash liquor flows through the washing stages in the opposite direction, for adjusting one or more operating condition variables of the pulp washers of a washing stage so that impurities

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dissolved in the pulp slurry are removed from the pulp slurry and deposited in the stream of wash liquor using a minimum amount of wash liquor, comprising:

(a) means for measuring soda loss in the pulp washing system and generating a first signal representative of the soda loss;

(b) mean for measuring dilution factor of the pulp washing system and generating a second signal representative of the dilution factor;

(c) means for measuring displacement ratio of the pulp washing system and generating a third signal representative of the displacement ratio;

(d) means for measuring wash liquor ratio of the pulp washing system and generating a fourth signal representative of the wash liquor ratio;

(e) means responsive to the first, the second and the third signals,

(1) means for determining when a decrease in the displacement ratio accompanies an increase in soda loss,

(2) means for maintaining the dilution factor at a predetermined value, and

(3) means for generating a fifth signal to indicate when a decrease in displacement ratio has accompanied an increase in soda loss;

(f) means for optimizing the washer efficiency of at least one washing stage when the fifth signal indicates a decrease in displacement ratio has accompanied an increase in soda loss, with the optimizing means further comprising,

(1) means for monitoring the fourth signal and adjusting the flow of shower liquor to maintain the wash liquor ratio at a target value,

(2) means for monitoring and controllably varying individual operating condition variables while monitoring the third signal to determine, for each of the operating condition variables, the value which corresponds to the maximum displacement ratio and for maintaining the operating condition variables at the values which correspond to the maximum displacement ratio, and

(3) means for generating a sixth signal to indicate that the maximum displacement ratio has been achieved; and

(g) means responsive to the first, the second, the fifth, and the sixth signals, for adjusting the soda loss or dilution factor of the system to a predetermined range of values, when the sixth signal indicates that the maximum displacement ratio has been achieved or when the fifth signal indicates that no decrease in displacement ratio accompanied an increase in soda loss.

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**4,746,406**

## PYROLYZING PLASTIC OR RUBBER WASTES

**Hinrich Timmann, Hamburg, Fed. Rep. of Germany, assignor to Brown, Boveri & Cie AG, Mannheim, Fed. Rep. of Germany**

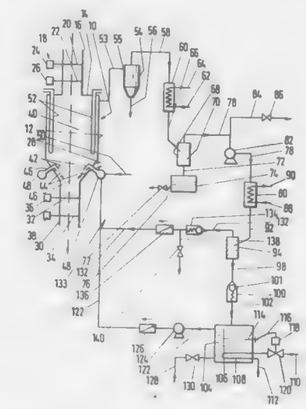
**Filed Dec. 19, 1986, Ser. No. 945,299**

**Claims priority, application Fed. Rep. of Germany, Dec. 23, 1985, 3545954**

**Int. Cl.⁴ C10B** *47/24, 53/00*

**U.S. Cl. 201—25** **4 Claims**

1. A method for pyrolyzing material containing polastic or rubber waste, comprising; thermally decomposing the material in a pyrolysis zone at substantially atmospheric pressure to produce a pyrolysis gas, cooling the pyrolysis gas to a temperature of approximately 100° to 150° C. so that a part thereof forms a hot condensate, separating the hot condensate from the remainder of the pyrolysis gas, subjecting a flow of the remainder of the pyrolysis gas in a cooling stage to a temperature of approximately 0.5° to 2° C. and to a pressure increase of approximately 0.8 to 1.4 bar and producing a cold condensate, separating the cold condensate produced in the cooling stage, reducing the pressure on the cold condensate to a lower pressure, and heating the cold condensate to approximately 18° to 30° C. at the reduced lower pressure so as to liberate $C_4$ hydrocarbon compounds in gaseous form from the condensate and



returning the gaseous $C_4$ hydrocarbon compounds to the pyrolysis zone.

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**4,746,407**

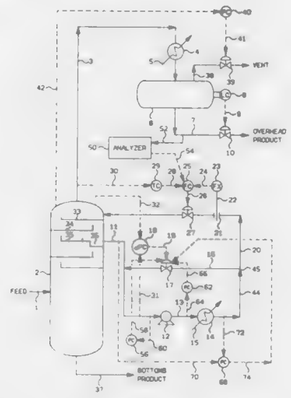
## FRACTIONATOR REFLUX PUMP METHOD AND APPARATUS

**John S. Olson, Borger, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Feb. 20, 1987, Ser. No. 17,284**

**Int. Cl.⁴ B01D** *3/42*

**U.S. Cl. 203—1** **30 Claims**




17. A method comprising passing a feed stream to be fractionated into a fractional distillation zone, withdrawing a bottoms product stream from a lower portion of said fractional distillation zone, withdrawing a vaporous overhead stream from an upper portion of said fractional distillation zone, passing said vaporous overhead stream into a condensing zone and therein at least partially condensing said vaporous overhead stream into a condensate, withdrawing said condensate along with any uncondensed portion of said vaporous overhead stream, passing said condensate and said any uncondensed portion of said vaporous overhead stream into an accumulation zone, withdrawing condensate from said accumulation zone as an overhead product stream, withdrawing an uncondensed portion of said vaporous overhead stream from said accumulation zone, passing a fluid distillate stream from an upper portion of said fractional distillation zone into a pumping zone and therein increasing the pressure of said fluid distillate stream, withdrawing said fluid distillate stream of increased pressure from said pumping zone, passing the thus withdrawn fluid distillate stream into a cooling zone and therein cooling said fluid distillate stream, withdrawing the thus cooled fluid distillate stream from said cooling zone, passing the thus withdrawn cooled fluid distillate stream to an upper portion of said fractional distillation zone as reflux only when the rate at which said fluid distillate stream is withdrawn from an upper portion of said fractional distillation zone is greater than or substantially equal to the rate at which said cooled fluid distillate stream is withdrawn from said cooling zone, and passing the thus withdrawn cooled fluid distillate stream back to said pumping zone when the rate at which said fluid distillate stream is withdrawn from an upper portion of said fractional distillation zone is substantially less than the rate at which said cooled fluid distillate stream is withdrawn from said cooling zone.



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**4,746,408**

## MULTI LAYER CORROSION RESISTANT COATING

**Jacob Hyner, Waterbury, and Steven Gradowski, Torrington, both of Conn., assignors to Whyco Chromium Company, Inc., Thomaston, Conn.**

**Filed Nov. 5, 1987, Ser. No. 117,794**

**Int. Cl.⁴ C25D** *5/10*

**U.S. Cl. 204—40** **17 Claims**

1. A process for providing corrosion resistance to a ferrous metal substrate comprising the steps of:

(a) applying a first layer of nickel or a nickel alloy over said metal substrate;

(b) applying a second layer of galvanically protective zinc metal over said first layer; and

(c) applying a third layer of a zinc alloy containing a major amount of zinc and an alloying metal selected from the group consisting of nickel, cobalt and iron over said galvanically protective metal layer.

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**4,746,409**

## PROCESS FOR STOPPING AND RESTARTING AN ELECTROLYTIC REFINING INSTALLATION

**Armand Savajols, Le Palais Sur Vienne, France, assignor to Compagnie Generale d'Electrolyse du Palais, Paris, France**

**Filed Jun. 23, 1987, Ser. No. 65,388**

**Claims priority, application France, Jun. 25, 1986, 86 09409**

**Int. Cl.⁴ C25C** *1/12*

**U.S. Cl. 204—107** **6 Claims**

1. In a process for the electrolytic refining of copper by electrolysis current of a predetermined nominal intensity in an installation comprising electrolysis tanks including soluble anodes of copper to be refined, cathodic plates on which the refined copper is to be deposited, and an aqueous electrolyte based on copper sulfate, sulfuric acid and additive agents of thiourea, HCl and gelatine, auxiliary heating means which maintain said electrolyte at about 50° to 60° C., means continuously circulating said electrolyte and further tanks for the formation of cathodic starting sheets from mother plates,

the improvement comprising a method for stopping said electrolysis for a prolonged period and subsequently restarting said electrolysis, comprising the sequential steps of:

(a) for stopping said electrolysis,

(a1) progressively reducing the $Cu^{2+}$ concentration in the electrolyte by about 10% while maintaining additions of said additive agents,

(a2) simultaneously interrupting said electrolysis current, said circulation, and said heating,

(a3) reducing the level of electrolyte to slightly below the top edge of the cathodic plates, and

(a4) covering the electrolysis tanks with a thermal insulating lining and allowing the electrolyte to crystallize in the electrolysis tanks with formation of fine crystals of $CuSO_4$ and

(b) for restarting said electrolysis,

(b1) restoring circulation of the electrolyte,

(b2) about 24 hours after restoring circulation of the electrolyte, restoring heating of the electrolyte and addition of thiourea and HCl additives at a normal rate,

(b3) about 48 hours after restoring heating, and with an electrolyte temperature of at least about 45° C., determining the composition and homogeneity of the electrolyte and making any corrections necessary,

(b4) restoring the electrolysis current at an initial intensity of less than about 10% of the nominal intensity, and simultaneously restoring addition of gelatine, and

(b5) progressively increasing in steps every few hours, the intensity of the electrolysis current, each said step increase being of a value approximately equal to the intensity at which current was restored, the frequency of said step increase being such that nominal current intensity is attained about 48 hours after restoring current.

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**4,746,410**

## CURRENT COLLECTING ASSEMBLY FOR A ROTATABLE BODY

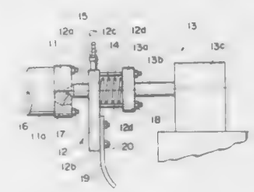
**Takeshi Domoto, Ageo, and Yoshi Kanno, Hitachi, both of Japan, assignors to Mitsui Kinzoku Kogyo Kabushiki Kaisha, Tokyo and Kabushiki Kaisha Takahashi Denki Seisakusho, Hitachi, both of, Japan**

**Filed Feb. 9, 1987, Ser. No. 12,268**

**Claims priority, application Japan, Feb. 13, 1986, 61-27793**

**Int. Cl.⁴ C25D** *17/00*

**U.S. Cl. 204—216** **14 Claims**



1. A current collecting assembly for a body mounted to rotate about a shaft (16) comprising current collector means (11), current conductor means (12) adapted to be connected to a current supply conductor (19) and means (13,14) for pressing a contact portion (12*a*) of the current conductor means (12) against the current collector means (11) with a predetermined pressure, characterised in that means (12*b*) for water cooling the contact portion (12*a*) are provided and that the current collector means (11) are adapted to be removably connected to the shaft (16).

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**4,746,411**

## ACIDIC SULFATE CONTAINING BATH FOR THE ELECTRODEPOSITION OF ZINC/IRON ALLOYS

**Klaus-Peter Klos; Karl-Heinz Lindemann, and Hermann Dousbach, all of Trebur, Fed. Rep. of Germany, assignors to Elektro-Brite GmbH, Trebur/Industriegebiet, Fed. Rep. of Germany**

**Filed May 29, 1987, Ser. No. 56,550**

**Claims priority, application Fed. Rep. of Germany, Jun. 9, 1986, 3619385**

**Int. Cl.⁴ C25D** *3/56*

**U.S. Cl. 204—44.2** **3 Claims**

1. An acidic sulfate containing zinc and iron containing bath for the electrodeposition of lustrous zinc/iron alloy coatings onto iron containing 0.5 to 2 moles/l of zinc sulfate and 0.5 to 2 moles/l of ferrous sulfate, 0.1 to 0.5 mole/l of a conductive

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salt, 0.01 to 0.2 mole/l of citric acid and 0.1 to 0.5 mole/l of sodium acetate, the bath having a pH of 1 to 3.5 and containing further additives characterised in that it contains as further additives 0.02 to 1.0 gs/l of saccharin, in addition or in place of the saccharin 0.01 to 1.0 gs/l of naphthalene mono-, -di-or-tri-sulfonate and a condensation product thereof with formaldehyde, respectively, and/or 0.2 to 4.0 gs/l of organic complexing agent for iron and, in addition, one or more compounds selected from the group consisting of: 0.02 to 2.0 gs/l of an alkali metal cumene sulfonate, 0.01 to 1.0 g/l of a collagen hydrolyzate having a mean monecular weight of 500 to 2000 and 0.01 to 2 gs/l of a reducing agent for $Fe^{3+}$ selected from a group consisting of alkali metal bisulfate, alkali metal dithionite and hydroxy ammonium chloride.

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**4,746,412**

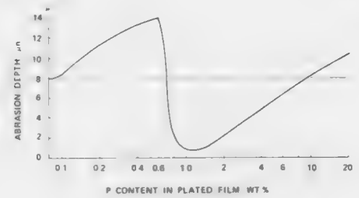
**IRON-PHOSPHORUS ELECTROPLATING BATH AND ELECTROPLATING METHOD USING SAME**

**Hiroki Uchida, Neyagawa; Yosiomi Aoyagi; Tsuyoshi Uotani, both of Hirakata; Yoshio Takagi, Toyota; Shinji Kato, Toyota, and Hitoshi Ozawa, Toyota, all of Japan, assignors to C. Uyemura & Co., Ltd., Osaka and Toyota Jidosha Kabushiki Kaisha, Aichi, both of, Japan**

**Filed Jul. 3, 1986, Ser. No. 881,796**

**Int. Cl.[4] C25D** *3/56*

**U.S. Cl. 204—44.7** **17 Claims**




1. An iron-phosphorus electroplating bath comprising a ferrous ion, hypophosphorous acid and/or a hypophosphite, and an aluminum ion, wherein the ferrous ion is present in an amount of 20 to 80 grams, the hypophosphorous acid and/or hypophosphite is present in an amount of 0.01 to 15 grams calculated as $NaH_2PO_2.H_2O$, and the aluminum ion is present in an amount of 0.05 to 5 grams per liter of the bath.

7. An iron phosphorus electroplating bath comprising a ferrous ion and phosphorous acid and/or a phosphite as essential ingredients, wherein the ferrous ion is present in an amount of 20 to 80 grams, and the phosphorous acid and/or phosphite is present in an amount of 0.01 to 20 grams calculated as $NaH_2PO_3.2H_2O$ per liter of the bath.

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**4,746,413**

**PROCESS FOR REGENERATING AND DETOXIFYING ELECTROLYTES USED IN THE ELECTROCHEMICAL TREATMENT OF METAL**

**Paul G. Pott, Wermelskirchen, and Wilhelm Götzelmann, Stuttgart, both of Fed. Rep. of Germany, assignors to Cohausz & Florack, Düsseldorf, Fed. Rep. of Germany**

**Filed Dec. 2, 1986, Ser. No. 936,840**

**Claims priority, application Fed. Rep. of Germany, Dec. 4, 1985, 3542820**

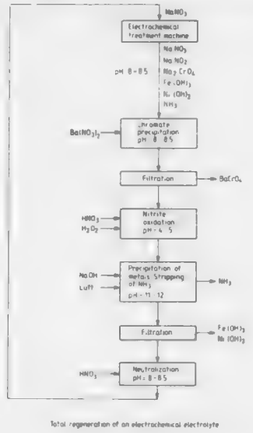
**Int. Cl.[4] C25F** *3/02*

**U.S. Cl. 204—129.75** **8 Claims**

1. A method for regenerating and detoxifying electrolytes which contain sodium nitrate and are used in electrochemical treatment of metallic workpieces, wherein reaction products, formed during the treatment, which interfere with the treatment or are toxic are removed as harmless substances by:

(a) adjusting the electrolyte to a pH value within the range from 4 to 5 and oxidizing the nitrite with hydrogen peroxide to the nitrate;

(b) raising the pH value to 11 to 12, precipitating the metal




Total regeneration of an electrochemical electrolyte

hydroxides and stripping the ammonia produced by said treatment by passing air into the electrolyte;

(c) precipitating the heavy metal hydrolisates; and

(d) neutralizing the electrolyte to a pH value of 8 to 8.5.

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**4,746,414**

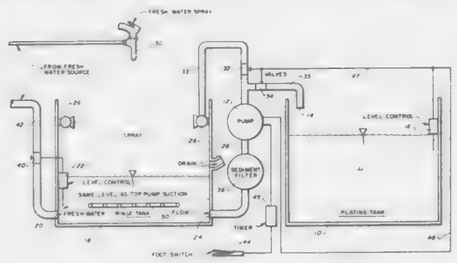
**ZERO DISCHARGE SPRAY RINSE SYSTEM FOR ELECTROPLATING OPERATIONS**

**Charles J. Carpenter, Panama City, Fla., and Winston de Monsabert, Camarillo, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Sep. 8, 1987, Ser. No. 96,572**

**Int. Cl.[4] C21D** *21/06, 21/08, 21/20*

**U.S. Cl. 204—240** **20 Claims**




1. An electroplating system for eliminating the discharge of contaminated rinse water to industrial waste for treatment, comprising:

(a) a plating tank means for containing a plating bath;

(b) a rinse tank means for containing rinse water;

(c) said rinse tank means including a freshwater inlet means, a rinse water outlet, an overflow drain, a first control means, and a spray rinsing system;

(d) said spray rinsing system including an initial spray means using rinse water from said rinse tank for initially rinsing plated parts, and a final spray means using fresh water from a freshwater source for finally rinsing plated parts; sprayed rinse water from said initial spray means and from said final spray means falling back into said rinse tank means for reuse;

(e) a pump means operable to pump rinse water from said rinse tank for use in said initial spray means for rinsing plated parts and alternatively to said plating tank for adding make up water to the plating bath;

(f) valve means operable to direct water flow from said pump means to either of said initial spray means and said plating tank means bath;

(g) switch means for normally activating said pump means to pump rinse water to said initial spray means;

(h) a second control means located in said plating tank means; said second control means operable to be activated by the level of the bath in said plating tank means for actuating said valve means and said pump means to cause rinse water to be pumped to said plating tank means for adding water as needed to said plating bath to make up for evaporation losses;

(i) said first control means being operable to actuate a fresh-water valve means to allow fresh water to flow into said rinse tank means for maintaining the level of the rinse water in said rinse tank means above the level of said rinse water outlet;

wherein, under normal operations, freshwater added to the system for spraying operations will not exceed the amount of water lost by evaporation in the system, and no rinse water is discharged to waste.

2. A system as in claim 1 wherein filter means is used to prevent harmful solid materials from entering the system and said pump means includes sediment filter means.



24. An electrolytic cell as claimed in claim 23 which is a monopolar electrolytic cell, which comprises a plurality of monopolar electrodes as claimed in any one of claims 1, 2, 4 to 16 and 17 to 22, and which comprises a separator positioned between each anode and adjacent cathode.

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**4,746,415**

**ELECTRODE**

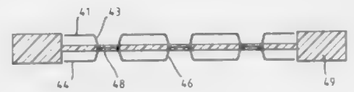
**Thomas W. Boulton, and Brian J. Darwent, both of Frodsham, England, assignors to Imperial Chemical Industries PLC, London, England**

**Filed Dec. 2, 1986, Ser. No. 936,910**

**Claims priority, application United Kingdom, Dec. 16, 1985, 8530893**

**Int. Cl.[4] C25B** *9/00, 9/04, 11/03, 11/10*

**U.S. Cl. 204—253** **25 Claims**




1. An electrode which comprises

a wall of plastics material,

an electrically-conductive electrode surface on one side of the wall and displaced therefrom,

an electrically-conductive electrode surface on the opposite side of the wall and displaced therefrom,

at least one electrically-conductive connecting member in electrical contact at one end thereof with one of the electrode surfaces,

at least one electrically-conductive connecting member in electrical contact at one end thereof with the other of the electrode surfaces,

and in which the ends of the electrically-conductive connecting members opposite to the ends thereof which are in electrical contact with the electrode surfaces are embedded in the wall of plastics material and make electrical contact with each other within the wall of plastics material.

23. An electrolytic cell which comprises a plurality of electrodes as claimed in any one of claims 1 to 16 and 17 to 22.

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**4,746,416**

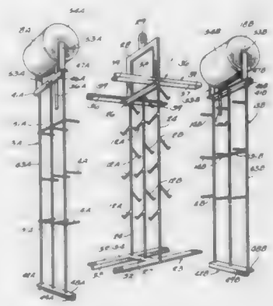
**HANGER FOR USE IN ELECTROCOATING**

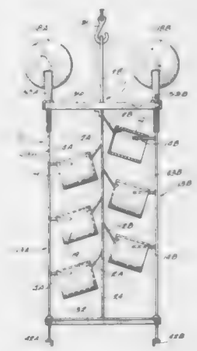
**Ronald G. Jacob, Watertown, Wis., assignor to Western Industries Inc., Milwaukee, Wis.**

**Filed Mar. 7, 1986, Ser. No. 837,419**

**Int. Cl.[4] C25D** *17/06, 17/05;* **B05C** *13/00, 3/00*

**U.S. Cl. 204—297 W** **10 Claims**





1. A hanger, comprising:

an elongated support frame having a plurality of arms extending therefrom;

an elongated movable frame mounted on said support frame for lengthwise movement relative to said support frame, said movable frame having a plurality of arms extending therefrom and being positioned to allow a plurality of objects to be supported on said hanger, each of said objects being supportable by a pair of one of said arms of said support frame and one of said arms of said movable frame;

stop means for limiting movement of said movable frame to a lowermost position relative to said support frame; and

a hollow tank secured to an upper end portion of said movable frame for lifting said movable frame relative to said support frame when said hanger is lowered into a liquid bath, and tilting said objects supported on said pairs of arms, said tank having a ventilation tube for preventing said hollow tank from exploding when said tank is heated.

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**4,746,417**

## MAGNETRON SPUTTERING CATHODE FOR VACUUM COATING APPARATUS

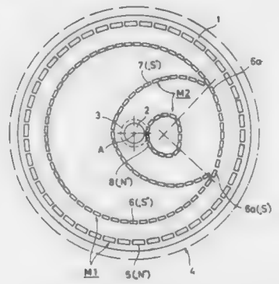
**Dagmar Ferenbach, Aachen; Gerhard Steiniger, Offenbach, and Jürgen Müller, Frankfurt am Main, all of Fed. Rep. of Germany, assignors to Leybold-Heraeus GmbH, Cologne, Fed. Rep. of Germany**

**Filed Aug. 15, 1986, Ser. No. 896,927**

**Claims priority, application Fed. Rep. of Germany, Jun. 6, 1986, 3619194**

**Int. Cl.[4] C23C *14/34***

**U.S. Cl. 204—298** **3 Claims**




1. Magnetron sputtering cathode for vacuum coating apparatus, comprising: a circular target plate of the material that is to be sputtered, and at least one magnet system which is disposed in back of the target plate and includes two closed rows of permanent magnets in which the magnets of each row have the same polarity, but the magnets of each of the two rows being of opposite polarity, such that over the target plate at least one closed tunnel is formed of magnetic lines of force issuing from the one row of magnets and returning to the other row of magnets, and drive means for the continuous rotation of the magnet system about the central axis of the target plate,

in the marginal area of the target plate a first magnet system including said two closed rows of permanent magnets being disposed for the production of a first magnetic tunnel substantially concentric with the axis of rotation, and

between the axis of rotation and the first magnet system an eccentrically offset second magnet system being disposed, which produces a second magnetic tunnel which extends only over a sector of the target plate, such that, upon a common rotation of the two magnet systems the elements of surface of the target plate are exposed to the product of residence time times intensity such that the target plate is ablated more uniformly in the middle area and more strongly at the margin, so that a substrate placed opposite the target plate is uniformly coated.

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**4,746,418**

## POLYMETALLIC REFORMING CATALYSTS, THEIR PREPARATION AND USE IN REFORMING

**William C. Baird, Jr., Baton Rouge, La., assignor to Exxon Research and Engineering Company, Florham Park, N.J.**

**Filed Jan. 12, 1987, Ser. No. 2,157**

**Int. Cl.[4] C10G *35/06***

**U.S. Cl. 208—139** **6 Claims**

1. A process for improving the octane quality of a naphtha comprising contacting said naphtha at reforming conditions with a catalyst composite comprising an iridium component in concentration ranging from about 0.001 percent to about 2 percent dispersed throughout, and bound within an alumina support matrix, a platinum component in concentration ranging from about 0.001 percent to about 2 percent dispersed upon said iridium-containing alumina support, and a halogen component dispersed thereon in concentration ranging from about 0.01 percent to about 2 percent, based on the total weight of the catalyst, said iridium component being dispersed throughout and bound within said alumina support even when the composition is subjected to temperatures ranging above about 426.7° C. at oxygen concentrations ranging above about 0.1 percent, based on the volume of the gas contacted with the catalyst, for periods ranging from about 1 hour to about 48 hours.

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**4,746,419**

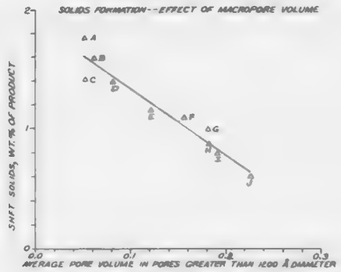
## PROCESS FOR THE HYDRODEMETALLATION HYDRODESULFURATION AND HYDROCRACKING OF A HYDROCARBON FEEDSTOCK

**Lawrence B. Peck, Glen Ellyn, Ill.; Albert L. Hensley, Munster, Ind., and George L. Ott, Naperville, Ill., assignors to Amoco Corporation, Chicago, Ill.**

**Continuation of Ser. No. 811,722, Dec. 20, 1985, abandoned. This application Jul. 9, 1987, Ser. No. 71,478**

**Int. Cl.[4] C10G *45/04, 47/11***

**U.S. Cl. 208—213** **9 Claims**




1. A process for the hydrodemetallation, hydrodesulfurization, and hydrocracking of a hydrocarbon feedstock containing asphaltenes, and Shell hot filtration solids precursors and conversion of at least 30 vol. % of the feedstock fraction boiling over 1,000° F. to material boiling below 1,000° F. wherein the formation of Shell hot filtration solids is maintained below a level of about 1.0 wt. % which comprises contacting said feedstock in at least one ebullated bed with hydrogen under hydrocracking conditions with a catalyst comprising a porous inorganic oxide wherein said catalyst has a pore volume of pores having a diameter greater than about 1,200 Angstroms of about 0.2 to about 0.3 cc/gm and has no more than about 0.15 cc/gm pore volume in pores having a diameter greater than about 4,000 Angstroms.

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**4,746,420**

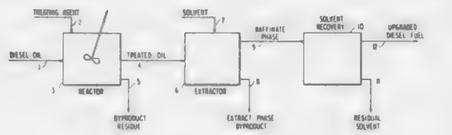
## PROCESS FOR UPGRADING DIESEL OILS

**Saeed T. Darian, Amherst, Mass., and Sayed-Hamid Arabshahi, Fayetteville, Ark., assignors to REI Technologies, Inc., Tex.**

**Filed Feb. 24, 1986, Ser. No. 832,197**

**Int. Cl.[4] C10G *17/02, 21/00, 27/04, 27/14***

**U.S. Cl. 208—222** **99 Claims**




1. A process for upgrading diesel oil comprising the steps of:
(1) reacting the diesel oil with a nitrogenous treating agent;
(2) contacting the diesel oil from step (1) above with

(a) a primary solvent selected from the group consisting of organic solvents having a dipole moment of about 1.3 or greater and mixtures thereof, with the proviso that alkyl amines and alkanol amines are excluded, or a water mixture of the primary solvent comprising about 50% by weight or less water and;

(b) a cosolvent different from the primary solvent selected from the group consisting of an alcohol having 1 to 4 carbon atoms, an aldehyde having 1 or 2 carbon atoms, a ketone having 3 carbon atoms, a carboxylic acid having 1 or 2 carbon atoms and mixtures thereof, or a water mixture of the cosolvent comprising about 50% by weight or less water;

wherein the primary solvent and the cosolvent are each immiscible with the diesel oil or are in combination immiscible with the diesel oil, and

(3) separating the diesel oil from step (2) above from the primary solvent and from the cosolvent to recover upgraded diesel fuel with inproved cetane number.



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**4,746,421**

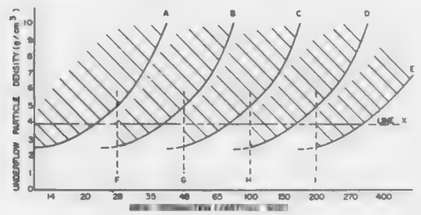
## DENSITY CLASSIFICATION OF PARTICULATE MATERIALS BY ELUTRIATION METHODS

**David M. Turbitt, Apt. #3, 141 King Street East, Kingston, Ontario, Canada K7L 2Z9**

**Continuation-in-part of Ser. No. 568,093, Jan. 4, 1984, Pat. No. 4,554,066. This application Jul. 9, 1985, Ser. No. 753,066**

**Int. Cl.[4] B03B *7/00***

**U.S. Cl. 209—3** **17 Claims**




13. An apparatus for separating particulate high density materials from associated particulate lower density materials comprising a pluraltiy of elutriation column units in a series, the units being provided with means to pass the overflow from each unit into the next unit of the series, and means to progressively vary the average vertical flow rate in each successive unit, each unit being provided with an outlet for underflow, means being provided to collect the underflow from each unit, a screen being associated with each unit in the series with the exception of the first unit, the screen mesh size varying progressively through the series and being selected according to the average vertical flow rate in order to pass higher density particulate materials but retain the lower density particulate materials, each column unit including a primary separation section with a secondary separation section immediately thereabove, and a primary sedimentation chamber and a secondary sedimentation chamber, the primary sedimentation chamber being in direct communication with the primary separation section and being positioned immediately below it, and the secondary sedimentation chamber being directly below the primary sedimentation chamber, one or more column units in the series employing a primary extraction tank from which liquid bearing solids in suspension are extracted and employed in whole or in part as a separation medium within the system.

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**4,746,422**

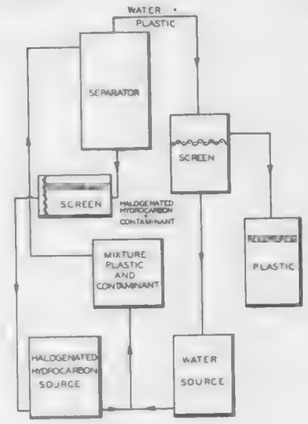
## METHOD FOR THE SEPARATION OF A MIXTURE OF PLASTIC AND CONTAMINANT

**Michael J. Grimm, Maumee, Ohio, assignor to Rutgers University, Piscataway, N.J.**

**Continuation-in-part of Ser. No. 759,218, Jul. 26, 1985, abandoned. This application Mar. 12, 1987, Ser. No. 24,827**

**Int. Cl.[4] B03B *5/34, 5/44***

**U.S. Cl. 209—172** **15 Claims**




1. A method for the separation of a mixture of plastic particles and a contaminant, which comprises the steps of:

(a) applying a two-phase solution composed of a halogenated hydrocarbon in a liquid state and water to the mixture of plastic and contaminant;

(b) placing said two-phase solution and the mixture of plastic and contaminant in a separator;

(c) rotating said two-phase solution and the mixture of plastic and contaminant in the separator whereby the plastic contained in the mixture of plastic and contaminant having a density less than said halogenated hydrocarbon of said two-phase solution is separated by gravitation from the contaminant and carried by said water of said two-phase solution, and said contaminant contained in the mixture of plastic and contaminant having a density greater than said halogenated hydrocarbon of said two-phase solution is separated by gravitation from the plastic and carried by said halogenated hydrocarbon of said two-phase solution;

(d) ejecting the plastic and said water from one part of the separator and ejecting the contaminant and said halogenated hydrocarbon from another part of the separator; and

(e) recovering the plastic.

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**4,746,423**

## IN-WELL PUMP SKIMMER

**Donald L. Moyer, Harrisburg, Pa., assignor to R. E. Wright Associates, Middletown, Pa.**

**Filed Sep. 15, 1986, Ser. No. 907,456**

**Int. Cl.[4] E21B *43/38;* E02B *15/04***

**U.S. Cl. 210—104** **7 Claims**

1. An apparatus for removing lighter-thanwater contaminants from within a well comprising:

container means, closed except for an open top, supported within a well at a depth below the water table within the well including a dividing means to separate the container means into two chambers, one lower than the other, with a flow passage between the two chambers;

first pumping means with its inlet located in the lower por-

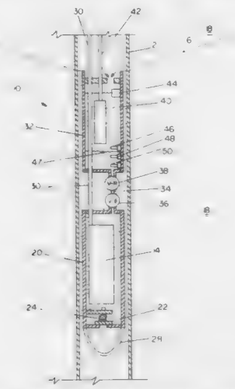
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tion of the container means and connected so it raises liquid to the ground surface and out of the well;

second pumping means with its inlet located in the upper portion of the container means and connected so it raises liquid to the ground surface and out of the well with the first pumping means located in the lower chamber and the second pumping means is located in the upper chamber;

first sensor means located within the container means and between the inlets of the two pumping means controlling the first pumping means and distinguishing between water and a second liquid of lower specific gravity than water, so that as the second liquid approaches the inlet of the first pumping means, the first sensor means causes the first



pumping means to reduce the quantity of liquid pumped, and as the second liquid rises to a predetermined level above the inlet of the first pumping means the first pumping means increases the quantity of liquid pumped; and

second sensor means located in the container means controlling the second pumping means and distinguishing between the presence and absence of a liquid other than water, so that the second pumping means is started when the liquid other than water has reached a predetermined level above the inlet of the second pumping means, and the second sensing means turns off the second pumping means when water approaches the inlet of the second pumping means.

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**4,746,424**

## FLOATING SWIMMING POOL SKIMMER

**Richard H. Drew, 756 Camino Ricardo, Moraga, Calif. 94556**

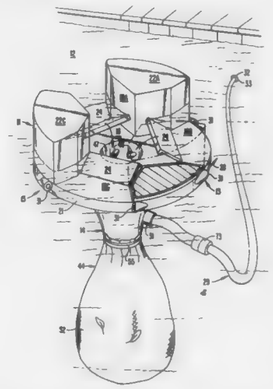
**Filed Nov. 3, 1986, Ser. No. 926,508**
**Int. Cl.⁴ E04H** *3/20*
**U.S. Cl. 210—169** **38 Claims**

1. Apparatus for removing bloating debris from the surface of a pool of liquid, comprising:

a body floatable on said pool surface;

propulsion means on said body for driving said body over said pool surface while repeatedly switching the direction of motion of said body over said pool surface among a plurality of preselected directions independently of forces external to said body, and

collecting means on said body for receiving and entrapping debris, said collecting means carried on a central area of said body to cooperate with said propulsion means such that debris approached by said body as said body is driven by said propulsion means over said pool surface along



each of said preselected directions is received and entrapped thereby.

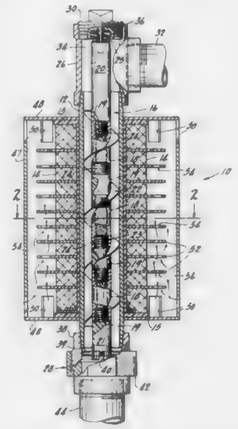
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**4,746,425**

## COOLING SYSTEM FOR ELECTROMAGNETIC WATER TREATING DEVICE

**Ray E. Stickler, 9909 W. Hawthorne Rd., Mequon, Wis. 53092; William J. Ganley, Mequon, and Samuel L. Foster, Eagle, both of Wis., assignors to Ray E. Stickler, Milwaukee, Wis.**

**Filed Aug. 27, 1986, Ser. No. 900,750**
**Int. Cl.⁴ C02F** *1/48*
**U.S. Cl. 210—175** **16 Claims**



1. A device for treating an aqueous solution with magnetic lines of force, said device including:

conduit means through which the solution passes,

an electromagnetic coil surrounding said conduit means,

a housing surrounding said coil and spaced therefrom defining a gap,

and a plurality of spaced apart cooling fins extending through said coil and outwardly past the surface thereof and into the gap between said coil means and said housing,

each of said cooling fins having a plurality of spaced apart holes formed therein and in the portion thereof between the surface of said coil and the outer periphery of said cooling fins,

the holes in adjacent cooling fins being staggered relative to those in each adjacent cooling fin so that cooling air passing through said openings is forced to flow in a tortuous flow path between said fins and in a circumferential direction along the surface of said coil.

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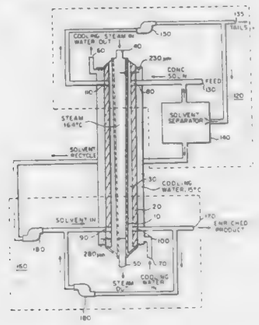


**4,746,426**

## LIQUID-PHASE THERMAL DIFFUSION ISOTOPE SEPARATION APPARATUS AND METHOD HAVING TAPERED COLUMN

**William M. Rutherford, Dayton, Ohio, assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Dec. 4, 1985, Ser. No. 804,413**
**Int. Cl.⁴ B01D** *17/09*
**U.S. Cl. 210—176** **12 Claims**



1. A thermal diffusion apparatus for separating isotopes suspended in a solution comprising:

a vertical first wall having a first temperature;

a vertical second wall disposed substantially adjacent said first wall, and arranged to diverge from said first wall toward a bottom of said first and second walls, thereby defining a slit between said first and second walls which tapers bottom to top, said second wall having a second temperature substantially different from said first temperature;

means, in fluid communication with said slit, for introducing said solution into said slit; and

means, in fluid communication with said slit, for maintaining a flow of solvent from the bottom to the top of said slit.

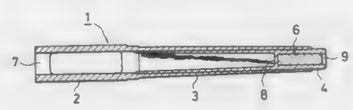
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**4,746,427**

## OIL FILTER FOR TRANSMISSION

**Moritoshi Fukuda, and Mashaharu Kojima, both of Yokohama, Japan, assignors to Nifco Inc., Yokohama, Japan**

**Filed Sep. 3, 1986, Ser. No. 904,059**
**Claims priority, application Japan, Sep. 9, 1985, 60-136803[U]**
**Int. Cl.⁴ B01D** *35/06*
**U.S. Cl. 210—223** **1 Claim**



1. An oil filter for a transmission having a hollow cylindrical structure having an axial dimension and having axially spaced inlet and outlet ends and comprising a coaxial cylindrical stem having an oil inlet adjacent said inlet end, a support frame extending axially from said stem, said stem and support frame being constituted by a one piece molding of a synthetic resin, and a coaxial substantially cylindrical net having an interior and an exterior supported by said support frame and having the interior thereof open to said oil inlet for receipt of contaminated oil to be passed through said screen from said interior to said exterior, wherein a magnet holder is provided integrally with said support frame adjacent said outlet end and extending axially beyond said cylindrical net, and a magnet is mounted in said magnet holder and extending axially beyond said cylindrical net to trap metal particles passing through and axially beyond said net, said magnet holder partially isolating said magnet from the interior of said cylindrical net, said magnet being cylindrical, and said magnet holder comprising a pair of substantially parallel arms extending axially from said frame and having inner surfaces which are substantially portions of a cylinder for holding said cylindrical magnet and said arms having a length which is a plurality of times the diameter of the magnet.

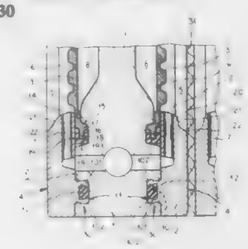
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**4,746,428**

## FILTER PLATE

**Werner Junker, Illerkirchberg, and Franz Heckl, Senden, both of Fed. Rep. of Germany, assignors to Lenser Verwaltungs-GmbH, Senden, Fed. Rep. of Germany**

**Continuation of Ser. No. 722,261, Apr. 11, 1985, abandoned. This application Nov. 5, 1986, Ser. No. 928,645**
**Claims priority, application Fed. Rep. of Germany, Apr. 17, 1984, 3414550**
**Int. Cl.⁴ B01D** *25/12*
**U.S. Cl. 210—230** **3 Claims**



1. A filter press comprising a stack of filter assemblies and respective filter layers positioned between said assemblies, each of said assemblies comprising:

a support plate (1) having a peripheal bulge formed along an inner part of said plate and on opposite sides thereof with sealing slots (16) opening in opposite directions;

a respective flexible filter wall (3) lying along each side of said support plate (1) and defining with the support plate (1) inwardly of the respective sealing slot (16) a respective pressure chamber (8), each of said filter walls (3) having an annular flange (18) projecting away from said chamber;

a unitary respective flange-type seal (19) enclosing by direct contact the respective flange (18), having respective lips (19.1) flanking opposite sides of said flange (18), and being disposed in the respective sealing slot (16); and

a respective frame (2) separate from said plate (1) and said filter wall (3), overlying each side of said bulge and connected thereto by a sealing joint bridging directly confronting surfaces of each side of the bulge and a respective groove (11) formed in one of said surfaces and having undercut walls, and a respective rib (10) projecting from said other of said surfaces and diverging therefrom and receivable in said groove (11) to elastically lock therein, said frame (2) having an inwardly projecting plate portion distal from said joint (30) and overhanging said seal (19) and said slot to sealingly retain said flange and said seal (19) in said slot, said seal (19) being spaced from said joint (30) by a distance sufficient to ensure that the elasticity of said inwardly projecting plate portion will enable said inwardly projecting plate portion to deflect sufficiently upon release of a closing pressure on the filter press to

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enable relief of pressure from the respective pressure chamber past the respective seal (19).

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**4,746,429**

## MEMBRANE FILTER PLATE WITH A CARRIER PLATE AND SEALING RIM

**Reimund Stanik, Bischof-Ketteler-Strasse 10, 8952 Marktoberdorf, Fed. Rep. of Germany**

**Filed May 20, 1986, Ser. No. 865,183**

**Claims priority, application Fed. Rep. of Germany, Jun. 10, 1985, 8516901[U]; European Pat. Off., Apr. 29, 1986, 86105923.6**

**Int. Cl.[4] B01D** *25/12*

**U.S. Cl. 210—231** **12 Claims**

1. Membrane filter plate for a filter press, with a carrier plate, a membrane arranged on one side of the carrier plate and provided with spacing bosses for the engagement of a filter cloth and a sealing rim surrounding said carrier plate and membrane and joining the same together in a substantially fluid-tight manner, the inner face of the sealing rim parallel to the carrier plate median plane on the side having the membrane being arranged in spaced manner from the membrane plane in the normal unloaded position thereof, the carrier plate engagement surface facing the membrane sloping towards the carrier plate median plane in a transition region between the connecting line of the membrane to the sealing rim and the central region of the carrier plate, in which the latter runs parallel to the carrier plate median plane, whereby the carrier plate bearing surface facing the membrane runs from the connecting line of the membrane to the sealing rim for producing one desired bending line for the filtration or squeezing phase initially substantially parallel to the carrier plate median plane, then slopes at an angle of 3° to 15° towards the same and then extends substantially parallel to the carrier plate median plane over essentially the entire central region of the carrier plate, characterized in that the sealing rim frame (16) and membrane (18) are constructed as a one-piece, plastics material frame membrane (16, 18), and that said frame member is detachably connected with said carrier plate, and that the carrier plate (10) on its side facing the sealing rim frame (16) is constructed with a portion of lesser thickness in the vicinity of the latter and with a projecting step (34) between said portion of lesser thickness and the central region and that the sealing rim frame (16) has a set-back step (28) in the vicinity of the transition region which cooperates with the projecting step (34) for centering the frame membranes (16, 18) with respect to the carrier plate (10).

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**4,746,430**

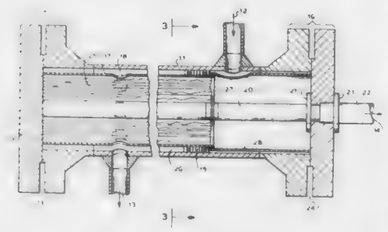
## FLUID SEPARATION MODULE

**Thomas E. Cooley, Houston, Tex., assignor to W. R. Grace & Co., New York, N.Y.**

**Filed Oct. 11, 1985, Ser. No. 786,757**

**Int. Cl.[4] B01D** *13/00, 53/22*

**U.S. Cl. 210—321.85** **23 Claims**



1. An improved spiral wound membrane filter apparatus comprising a containment vessel having an inlet and an outlet for a feed stream and an outlet for a permeate stream and further comprising a spiral wound membrane having a permeate conduit which communicates with said permeate outlet within said containment vessel, the improvement comprising a cylindrical liner insert having a smoothly finished interior surface in which said spiral wound membrane is removably contained in sealed relation to said smooth surface, said cylindrical liner insert being offset from the wall of said containment vessel and supported within said containment vessel by a gasket such that the spiral wound membrane may be removed while the liner insert and gasket remain in place within the containment vessel.

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**4,746,431**

## DEVICE FOR THE COLLECTION OF WATER IN A GRANULAR MATERIAL BED FILTER

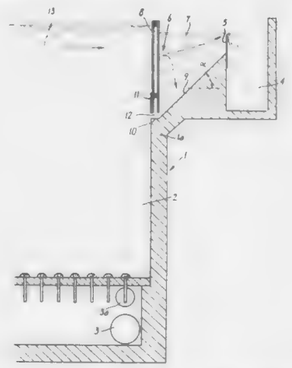
**Jean-Philippe Gibaud, Paris; Jean Durot, Villepreux, and Robert Louboutin, Crespieres, all of France, assignors to Degremont, S. A., France**

**Filed Apr. 18, 1986, Ser. No. 853,747**

**Claims priority, application France, Apr. 19, 1985, 85 05986**

**Int. Cl.[4] B01D** *23/10*

**U.S. Cl. 210—274** **8 Claims**



1. An apparatus for the collection of water from a filter comprising a bed of granular filtration material contained in a filter having a discharge side wall, means for passing water and air through the bed of granular filtration material operably associated with the filter, and means for discharging water from the filter attached to said discharge side wall, said means for discharging comprising an outer chute provided with a weir for the discharge of water, an intermediate collection zone located between the filter and the outer chute defined by a vertical perforated wall situated in vertical alignment with the discharge side wall, the weir and a floor slanting downwardly, inwardly from the weir to the discharge side wall, said slanting floor connecting the weir for the discharge of water to the discharge side wall situated below the vertical perforated wall.

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**4,746,432**

## FILTER ELEMENT WITH ZIG-ZAG PLEATS

**Yoshihiro Taki, Nagoya; Hajime Akado, Anjo; Keizo Funae, and Satoshi Inukai, both of Kariya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan**

**Continuation of Ser. No. 661,188, Oct. 15, 1984, Pat. No. 4,640,779. This application Dec. 8, 1986, Ser. No. 939,154**

**Claims priority, application Japan, Oct. 18, 1983, 58-194605; Feb. 20, 1984, 59-31204; Mar. 12, 1984, 59-47640; Apr. 23, 1984, 59-82762; Jun. 28, 1984, 59-134778; Jun. 28, 1984, 59-134779**

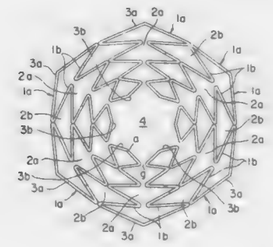
**The portion of the term of this patent subsequent to Feb. 3, 2004, has been disclaimed.**

**Int. Cl.[4] B01D** *27/06*

**U.S. Cl. 210—493.5** **19 Claims**

1. A filter element including a generally ring-like structure including a plurality of generally radial sections each converging generally radially inwardly and having a plurality of generally circumferential zigzag pleats of a filtering sheet material, said radial sections being circumferentially arranged such that the radially inner ends of said radial sections cooperate to define a central space disposed substantially centrally of said ring-like structure and generally radial spaces are defined between said radial sections, the zigzag pleats of each radial section having circumferential dimensions which are substantially gradually decreased radially inwardly of said ring-like structure, some of said radial spaces being radially inwardly open to said central space and being closed at the radially outer ends by said filtering sheet material, the other radial spaces being closed at the radially inner ends by said filtering sheet material, said radially inwardly open radial spaces and the other radial spaces being circumferentially alternately arranged, and said radially inwardly open radial spaces being closed at the axially opposite ends by end walls.





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**4,746,433**

## PROCESS FOR THE ANAEROBIC TREATMENT OF ORGANIC SUBSTRATES

**Ernst Nöbl, Reifgasse 4/10, A-3500 Krems a.d. Donau, Austria, and Astrid Nobl, Donau, Austria, assignors to Ernst Nöbl, Krems a.d. Donau, Austria**

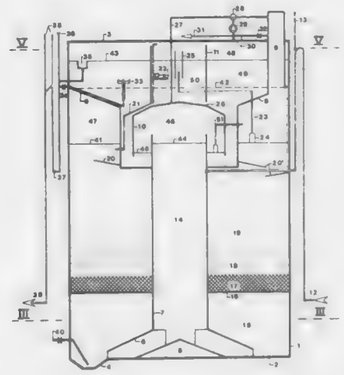
**PCT No. PCT/AT85/00003, § 371 Date Dec. 19, 1985, § 102(e) Date Dec. 19, 1985, PCT Pub. No. WO85/03695, PCT Pub. Date Aug. 29, 1985**

**PCT Filed Feb. 12, 1985, Ser. No. 786,807**

**Claims priority, application Austria, Feb. 14, 1984, 461/84**

**Int. Cl.[4] C02F** *3/28*

**U.S. Cl. 210—603** **12 Claims**



1. A process for the anaerobic treatment of fluids containing organic substrates, comprising

mixing an organic substrate with biomass;

passing a rising flow of said substrate and said biomass through a bed of filler bodies to which a sludge bed is attached,

lifting said filler bodies and said sludge bed upward counter to the force of gravity;

allowing said filler bodies and said sludge bed to settle downward under the influence of gravity;

traversing a portion of said rising substrate through said filler bodies and said sludge bed as said filler bodies and said sludge bed settle downward;

separating settled sludge from floating sludge under the influence of gravity;

removing said settled sludge;

partially discharging fluid associated with said floating sludge; and

recycling said remaining sludge by mixing said sludge with newly introduced substrate.

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**4,746,434**

## PROCESS FOR TREATING SOUR WATER IN OIL REFINERIES

**Colin G. Grieves, Batavia, Ill.; Robert J. Baechle, Savannah, Ga.; John M. Considine, Savannah, Ga., and Lawrence M. Bristow, Savannah, Ga., assignors to Amoco Corporation, Chicago, Ill.**

**Filed Jun. 24, 1987, Ser. No. 65,857**

**Int. Cl.[4] C02F** *1/26, 3/02*

**U.S. Cl. 210—610** **20 Claims**



1. An oil refinery process, comprising the steps of:

discharging waste water from refinery equipment; contacting said waste water with oil; and extracting phenols from said waste water with said oil.

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**4,746,435**

## BIOCHEMICAL PROCESS FOR PURIFYING CONTAMINATED WATER

**Hisao Onishi, Hiroshima, and Ryozo Numazawa, Otake, both of Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 308,884, Oct. 5, 1981, abandoned. This application Feb. 28, 1983, Ser. No. 470,138**

**Claims priority, application Japan, Oct. 13, 1980, 55-142801**

**Int. Cl.[4] C02F** *3/04*

**U.S. Cl. 210—615** **5 Claims**

1. A process for purifying contaminated water containing biochemical oxygen demand sources and nitrogen sources, which comprises establishing both aerobic bacteria and anaerobic bacteria in a microorganism layer on one side of a gas permeable membrane, supplying oxygen-containing gas to one side of said gas permeable membrane in sufficient pressure to pass through the membrane and the microorganism layer on the other side of the membrane, and contacting contaminated liquid with the microorganism layer, the concentration of oxygen dissolved in the liquid being from 1 to 7 ppm, thereby to remove at a high efficiency biochemical oxygen demand sources and nitrogen sources in the contaminated water simultaneously.

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**4,746,436**

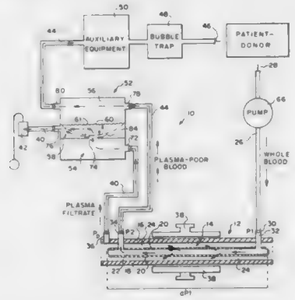
## MEMBRANE PLASMAPHERESIS APPARATUS AND PROCESS WHICH UTILIZE A FLEXIBLE WALL TO VARIABLY RESTRICT THE FLOW OF PLASMA FILTRATE AND THEREBY STABILIZE TRANSMEMBRANE PRESSURE

**Clinton V. Kopp, and James Hitchcock, both of Barrington, Ill., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.**

**Continuation of Ser. No. 542,565, Oct. 19, 1983, abandoned, which is a continuation of Ser. No. 277,428, Jun. 25, 1981, abandoned. This application Dec. 15, 1986, Ser. No. 942,062**

**Int. Cl.⁴ B01D** *13/00*

**U.S. Cl. 210—637** **20 Claims**




1. A membrane plasmapheresis process which comprises the steps of

introducing a flow of whole blood subject to a predetermined inlet pressure into a fluid path defined by membrane fluid path means, across a membrane, the membrane having a pore size suited for filtering plasma from the whole blood,

conducting plasma-poor blood from the defined membrane fluid path through a plasma-poor blood fluid path defined by plasma-poor blood fluid path means, subject to a plasma-poor blood pressure which is subject to random variations,

conducting plasma filtrate from the defined membrane fluid path through a filtrate fluid path defined by filtrate-fluid path means, subject to a plasma filtrate pressure which is initially less than the plasma-poor blood pressure,

diverting the plasma filtrate in the defined filtrate fluid path through an intermediate fluid pathway defined by intermediate fluid pathway means, the defined intermediate fluid pathway having a filtrate inlet defined by filtrate inlet means, said filtrate inlet means further defining a filtrate inlet axis such that the plasma filtrate enters the defined intermediate fluid pathway from the defined filtrate fluid path through the defined filtrate inlet generally along the defined axis thereof, and a filtrate outlet defined by filtrate outlet means, through which the plasma filtrate exits the defined intermediate fluid pathway and returns to the defined filtrate fluid path, and

variably restricting flow of plasma filtrate through the defined filtrate inlet by placing between the defined plasma-poor blood fluid path and the defined intermediate fluid pathway a flexible wall means generally oppositely spaced from and in facing relationship to the defined filtrate inlet, the flexible wall means moving in response to a pressure differential between the plasma-poor blood and the plasma filtrate, toward and away from the defined filtrate inlet in a path defined generally along the defined axis of the defined filtrate inlet to establish and thereafter maintain substantial equilibrium between the pressure of the plasma filtrate and the pressure of the plasma-poor blood, despite random variations in the plasma-poor blood pressure.

**4,746,437**

## METHOD AND APPARATUS FOR CONCENTRATION AQUEOUS SOLUTION AND METHOD AND APPARATUS FOR RECOVERING TEMPERATURE

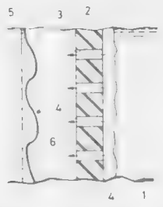
**Yasuo Koseki, Hitachiohta; Sankichi Takahashi, Hitachi; Katsuya Ebara, Mito; Osamu Kuroda, and Hideaki Kurokawa, both of Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Feb. 22, 1985, Ser. No. 704,577**

**Claims priority, application Japan, Feb. 27, 1984, 59-37086**

**Int. Cl.⁴ B01D** *13/00*

**U.S. Cl. 210—640** **16 Claims**



1. A method comprising: providing an alternative to heating an aqueous solution above its boiling temperature in order to concentrate a solute in said solution to at least 30%, by,

contracting aqueous solution concentration step in which an aqueous solution containing a solute at a concentration of at least 30% by weight with a membrane through which vapor can permeate, but not liquid, the water contained in said aqueous solution being evaporated at an interfacing of the aqueous solution with said membrane and the vapor permeating through said membrane, said membrane being a hydrophobic porous membrane having pores therethrough, the pores having a size such that the vapor can pass through the pores but the aqueous solution cannot pass through the pores, the aqueous solution being heated to a temperature below the boiling point thereof; and

diluting the resultant concentrated solution from said aqueous solution concentration step so as to obtain a temperature higher or lower than that of said aqueous solution.

**4,746,438**

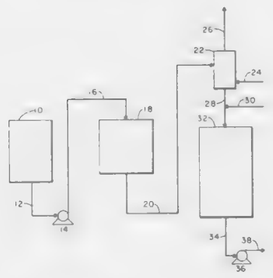
## METHOD FOR PURIFYING CONTAMINATED WATERS

**Olen L. Riggs, Jr., Oklahoma City, Okla., assignor to Kerr-McGee Chemical Corporation, Oklahoma City, Okla.**

**Filed Oct. 1, 1987, Ser. No. 103,462**

**Int. Cl.⁴ C02F** *1/20, 1/42*

**U.S. Cl. 210—664** **11 Claims**



1. A method for preparing a substantially nonscaling and noncorroding boiler feed water supply from a water source contaminated with alkaline earth metal cations and dissolved hydrogen sulfide and carbon dioxide gases comprising the steps of:



passing said contaminated water source through a demineralization zone, the contaminated water source being passed through the demineralization zone at a rate of flow sufficient to effect removal of a substantial portion of the alkaline earth metal cation contaminants therefrom to provide a demineralized first effluent water stream having a pH of less than about 3.5 and containing the dissolved hydrogen sulfide and carbon dioxide gaseous contaminants;

recovering the demineralized first effluent water stream from the demineralization zone;

introducing the recovered demineralized first effluent water stream into a degasification zone, the first effluent water stream being introduced into the degasification zone in a countercurrent flow relationship with a degasification medium to effect removal of the dissolved hydrogen sulfide and carbon dioxide gaseous contaminants therefrom and to provide a demineralized and degasified second effluent water stream; and

recovering the demineralized and degasified second effluent water stream from the degasification zone and introducing into the second effluent water stream a pH modifying agent in an amount sufficient to adjust the pH of the second effluent water stream to a value in the range of from about 9.0 to about 10.0 and provide a pH adjusted effluent stream comprising the nonscaling and noncorroding boiler feed water supply.

**4,746,439**

## PROCESS FOR REMOVAL OF HEAVY METAL CONTAMINATION IN WASTE WATER

**Mildred M. Newman, Littleton, Colo., assignor to Manville Corporation, Denver, Colo.**

**Filed May 15, 1987, Ser. No. 50,351**

**Int. Cl.⁴ C02F** *1/42*

**U.S. Cl. 210—688** **12 Claims**

1. A process for the decontamination and removal of at least one metal ion selected from the group consisting of Ag, Pb, Cr (III), Zn, and Ni from contaminated waste waters containing at least one of said metal ions, the process consisting essentially of the steps of: (a) contacting said contaminated waters at a pH in the range of 4 to 6 with an alkaline earth silicate solid having a surface area in the range of about 0.1–1000 $m^2/g$, and (b) thereafter filtering said alkaline earth silicate solid from said contaminated waste waters to remove said metal ion.

**4,746,440**

## PROCESS AND APPARATUS FOR THE SEPARATION OF EMULSIONS OR OF SOLIDS FROM A SUSPENSION OF SOLIDS AND A LIQUID BY MEANS OF PRESSURE OR TURBO FLOTATION

**Hanspeter Seeger, Dottingen, Fed. Rep. of Germany, assignor to Ystral GmbH, Ballrechten-Dottingen, Fed. Rep. of Germany**

**Continuation of Ser. No. 662,184, Oct. 18, 1984, abandoned. This application Sep. 10, 1986, Ser. No. 906,634**

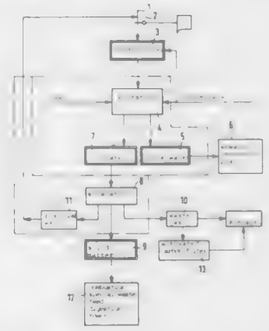
**Claims priority, application Fed. Rep. of Germany, Oct. 20, 1983, 3338171**

**Int. Cl.⁴ B01D** *17/04*

**U.S. Cl. 210—703** **17 Claims**

1. An apparatus for separating oil from emulsions or solids from a suspension of solids and a liquid, by means of pressure or turbo-flotation,

comprising a vessel having an upper inlet to which an emulsion or suspension to be separated is supplied on the top side of said vessel close to the surface of said emulsion or suspension, and a lower outlet from which the residual phase of the emulsion or suspension is removed at or near the bottom side of said vessel, said upper inlet and said lower outlet being arranged to cause the emulsion or suspension to flow downwardly in said vessel, said vessel comprising a single gasifying device which disperses a gas counter-currently to downwardly flowing emulsion or suspension at a lower location within said vessel between said upper inlet and said lower outlet, said gasifying device including means for simultaneously mechanically breaking up said emulsion or separating asid suspension while said gas is dispensed, and an upper outlet for the removal of foam laden with the oil phase of said emulsion or with the solids of said suspension which foam is formed on the surface of said emulsion or suspension, said gasifying device having stator pipe, a rotor shaft coaxial to the stator pipe, a rotor at one end of the rotor shaft outside the stator pipe, a drive at the other end of the rotor shaft, a device for supplying said gas to the space between the rotor shaft and the stator pipe, and a hollow, cylindrical stator secured to the stator pipe, which encircles the rotor and the bottom of the stator pipe, a dispersing element and a flow element on said stator below said rotor so that said emulsion or said suspension is draw into said gas in parallel flow, the dispersion element and the flow element dispersing said gas therein and releasing said gas, finely dispersed, below the rotor.



5. A method of separating emulsions or liquid suspensions comprising:

(a) introducing the emulsion or suspension to be separated into a vessel through an upper inlet near the top of said vessel to attain a level of the emulsion or suspension in the vessel;

(b) mechanically separating the constituents of the emulsion or suspension while simultaneously introducing and dispersing a gas therein to form a foam, the introducing of said gas occurring within the vessel at a location substantially below said surface level and below the location at which step (a) is performed in said vessel so that said gas flows upwardly through said emulsion or suspension;

(c) removing the foam from the vessel at a location above said surface level; and

(d) removing liquid from the vessel at a location below that whereby step (b) is performed so that said emulsion or suspension flows downwardly in said vessel and in counter-current relation to said gas.

**4,746,441**

## METHOD OF PURIFYING BRINE FOR ELECTROLYTIC CHEMICAL PRODUCTION

**Aisaburo Yagishita, Nagoya, and Fumio Hine, Kasugai, both of Japan, assignors to Kabushiki Kaisha Sanshin Seisakusho, Aichi, Japan**

**Filed Feb. 21, 1986, Ser. No. 831,807**

**Int. Cl.⁴ C02F** *1/58*

**U.S. Cl. 210—712** **2 Claims**

1. A method for preparing purified brine comprising the steps of:

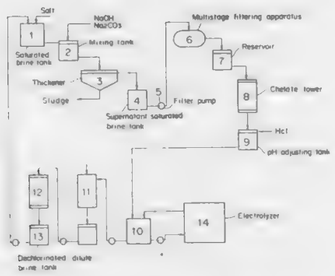
preparing saturated brine by dissolving salt in at least one of a dilute brine recovered from a brine electrolyzer and pure water;

mixing alkaline solution containing at least one of caustic

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soda and sodium carbonate with the saturated brine to percipitate unsoluble matters;
separating the precipitated unsoluble matters from the saturated brine by depositing the precipitated unsoluble matters in a tank to obtain supernatant brine;
filtering the supernatant brine by a filtering apparatus to remove residual unsoluble matters remaining in the supernatant brine to obtain purified brine;
adjusting the pH of the purified brine with hydrochloric acid to produce high-purity brine for electrolyzation of salt;
interrupting the operation of the filtering apparatus when the filtering apparatus is clogged;




supplying an acidic solvent containing hydrochloric acid to the filtering apparatus for regenerating the filtering apparatus by dissolving the unsoluble matters trapped by the filtering apparatus;
cleaning the filtering apparatus by suppyling a washing liquid selected from purified brine, pure water, alkaline solution and salt solution through the filtering apparatus;
recovering all or part of both the acidic solvent and washing liquid used for regeneration of the filtering apparatus; and,
utilizing the recovered acidic solvent and washing liquid in preparing the saturated brine.

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**4,746,442**

## PROCESS FOR THE REMOVAL OF METALS FROM WATERS CONTAINING THEM

**Vincenzo Calemma; Roberto Menicagli, and Riccardo Rausa, all of San Donato Milanese, Italy, assignors to Eniricerche S.p.A., Milan, Italy**

**Filed Mar. 5, 1987, Ser. No. 22,265**
**Claims priority, application Italy, Mar. 14, 1986, 19765 A/86**
**Int. Cl.[4] C02F *1/62***
**U.S. Cl. 210—725** **6 Claims**

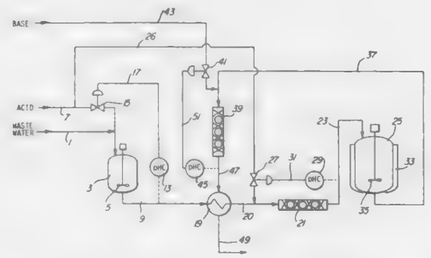
1. A process for the removal of metals from waters containing them, comprising treating the waters with an aqueous solution of alkaline salts of humic acids, wherein said solution is obtained by the dry oxidation of coal with oxygen or mixtures including oxygen and nitrogen, carried out at a temperature of from 120° to 350° C., under an oxygen partial pressure of from 0.1 to 10 abs. atm, for a contact time of from 15 to 600 minutes, and thereafter extracting the raw oxidation product with an alkaline solution; said aqueous solution being introduced into the waters, wherein the humic acid salts perform a flocculating action, with the pH being adjusted to a value within the range of from 1.5 to 5.5.

**4,746,443**

## BENTAZON CONTAINING WASTEWATER TREATMENT

**Mao-Yao Huang, Riverview; Joseph F. Louvar, Lincoln Park, both of Mich.; Albrecht Muller, Ludwigshafen, Fed. Rep. of Germany; Hanspeter Hansen, Ludwigshafen, Fed. Rep. of Germany, and Hans Merkle, Ludwigshafen, Fed. Rep. of Germany, assignors to BASF Corporation, Wyandotte, Mich.**

**Filed Dec. 18, 1986, Ser. No. 942,999**
**Int. Cl.[4] C02F *1/02***
**U.S. Cl. 210—752** **8 Claims**




1. A process for treating alkaline wastewater containing 3-isopropyl-2,1,3-benzothiadiazin-4-one-2,2-dioxide (bentazon) comprising:
adjusting the pH of said wastewater to a value of about 0.2 to a value less than 7, then heating to a temperature of at least about 60° C. and a pressure of from 0 to 500 psig for a period of from about five minutes to 50 hours, to decompose said bentazon and reduce the bentazon content of said wastewater.

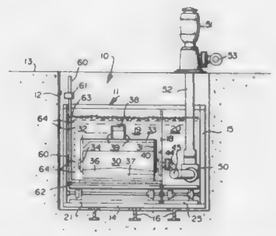
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**4,746,444**

## PREVENTION OF CHIP BUILD-UP IN FILTRATION EQUIPMENT

**John L. Creps, Rudolph, Ohio, assignor to Henry Filters, Inc., Bowling Green, Ohio**

**Filed Feb. 6, 1987, Ser. No. 11,534**
**Int. Cl.[4] B01D *17/035***
**U.S. Cl. 210—803** **6 Claims**



1. In a method for operating a chip separating system including a tank containing dirty liquid having relatively light, but heavier than the liquid, machining chips floatable on the liquid surface, chip-liquid separation means immersed in the dirty liquid and means adjacent the bottom of the tank for removing chips from the tank, the improvement including preventing a build-up of the chips on the liquid surface by sinking the floating chips to adjacent the bottom of the tank, comprising the steps of causing the floating chips to sink to adjacent the bottom of the tank by periodically injecting a gas under pressure into the dirty liquid adjacent the bottom of the tank, bubbling the gas upwardly through the liquid to form bubbles adjacent the liquid surface sufficiently large to burst at the liquid surface in proximity to the floatable chips, and wet the surfaces of the floating chips utilizing the liquid agitated by the bursting air bubbles to cause the surface wetted chips to sink below the liquid surface into the liquid and removing the sunken chips from the tank.

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**4,746,445**

## PROCESS FOR MANUFACTURING BENTONITE AGGLOMERATES

**Barry M. Weinstein, Old Bridge, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.**

**Continuation of Ser. No. 646,984, Sep. 4, 1984, abandoned, which is a division of Ser. No. 366,587, Apr. 8, 1982, Pat. No. 4,488,972. This application Apr. 7, 1986, Ser. No. 849,240**
**Int. Cl.[4] C11D *3/08, 3/12;* C22B *1/14;* D06M *11/06***
**U.S. Cl. 252—8.6** **5 Claims**



1. A process for manufacturing bentonite in particulate form, suitable for mixing with particulate detergent compositions so as to impart fabric softening properties to such compositions, which bentonite particles are agglomerates of finely divided bentonite, which comprises agglomerating finely divided bentonite particles, of sizes less than No. 325 sieve, U.S. Sieve Series, to bentonite particles which are irregular in shape and craggy in appearance, of sizes essentially in the No's. 10–100 sieves range, of a bulk density in the range of 0.7 to 0.9 g./ml., a moisture content of 11 to 13%, and a frangibility of less than 30, by continuously moving a mass of finely divided bentonite particles, of sizes less than No. 325 sieve, in an agglomerating apparatus, spraying moving surfaces of a curtain of the finely divided bentonite particles of the moving mass thereof with an aqueous solution of sodium silicate, which is of a concentration in the range of 2 to 20%, and which is at a temperature in the range of 65° to 85° C., with the amount of such sodium silicate solution sprayed being such as to have the final dried agglomerated bentonite particles of this process contain in the range of about 2 to 4% of sodium silicate, and keeping the finely divided mass of bentonite and resulting agglomerate particles of bentonite in motion until a major proportion of the mass is in the form of agglomerated particles which are irregular in shape and craggy in appearance, of sizes in the range of No's. 10-100 sieves, and of a moisture content of in the range of 23 to 31%, and drying the moistened and agglomerated particles to a moisture content in the range of 11 to 13%.

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**4,746,446**

## MODIFIED SUCCINIMIDES

**Robert H. Wollenberg, San Rafael; Frank Plavac, Novato, and Timothy R. Erdman, San Rafael, all of Calif., assignors to Chevron Research Company, San Francisco, Calif.**

**Division of Ser. No. 864,166, May 16, 1986, which is a division of Ser. No. 722,939, Apr. 12, 1985, Pat. No. 4,612,132, which is a continuation-in-part of Ser. No. 632,777, Jul. 20, 1984, abandoned. This application Aug. 27, 1987, Ser. No. 90,187**
**Int. Cl.[4] C10M *133/44, 139/00***
**U.S. Cl. 252—49.6** **48 Claims**

1. A product prepared by the process which comprises reacting (a) a polyamino alkenyl or alkyl succinimide wherein one or more of the nitrogens of the polyamino moiety is substituted with a hydroxyhydrocarbyl oxycarbonyl wherein the hydroxyhydrocarbyl group of said hydroxyhydrocarbyl oxycarbonyl contains from 2 to 20 carbon atoms and 1 to 6 hydroxy groups with the proviso that there is no hydroxy substitution on the hydrocarbyl carbon atom attaching the hydroxyhydrocarbyl group to the oxy atom of the oxycarbonyl group and with the further proviso that when more than one hydroxy group is contained in the hydroxyhydrocarbyl group, no more than one hydroxy group is attached to the same carbon atom and the number of carbon atoms in the hydroxyhydrocarbyl group is minimally one greater than the number of hydroxy groups, with (b) a boron compound selected from the group consisting of boric acid, boron oxides, boron halides and esters of boric acid employing from about 0.1 equivalents to 10 equivalents of boron compound per equivalent of the polyamino alkenyl or alkyl succinimide of (a) above.

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**4,746,447**

## CARBONATE TREATED HYDROCARBYL-SUBSTITUTED POLYAMINES

**Robert H. Wollenberg, San Rafael, Calif., assignor to Chevron Research Company, San Francisco, Calif.**

**Filed Jan. 10, 1986, Ser. No. 818,433**
**Int. Cl.[4] C10M *133/44***
**U.S. Cl. 252—51.5 A** **57 Claims**

1. A procuct prepared by the process which comprises contacting at a temperature sufficient to cause reaction a hydrocarbyl-substituted polyamine having an average molecular weight in the hydrocarbyl group of about 750 to 10,000 and also having at least one primary or secondary amine with a cyclic carbonate wherein the molar charge of the cyclic carbonate to the basic nitrogen of the hydrocarbyl-substituted polyamine is from greater than 1:1 to about 10:1.

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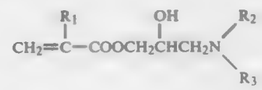
**4,746,448**

## COLD ROLLING OIL FOR STEELS

**Kazuhito Kenmochi; Hideo Abe; Toru Sasaki; Takeshi Yoshimoto, all of Chiba; Hiroyuki Nagamori, Wakayama, and Hiroyuki Matsuda, Kainan, all of Japan, assignors to Kao Corporation and Kawasaki Steel Corporation, both of Kobe, Japan**

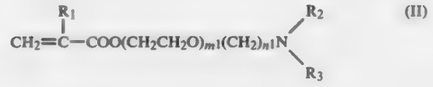
**Filed Mar. 17, 1986, Ser. No. 839,994**
**Claims priority, application Japan, Apr. 3, 1985, 60-70450**
**Int. Cl.[4] C10M *101/04, 105/134***
**U.S. Cl. 252—56 S** **13 Claims**

1. A water emulsifiable cold rolling oil for steels comprising:
(A) 40 to 90 wt.% of a monoester of a $C_{12-22}$ carbon atom content aliphatic carboxylic acid and a $C_{1-12}$ carbon atom content aliphatic alcohol;
(B) 0.5 to 10 wt.% of at least one dimer acid or polymerized acid prepared from a $C_{16-20}$ carbon atom content aliphatic unsaturated acid;
(C) (i) 2 to 40 wt% of a polyester having a molecular weight of 750 to 7500 which is obtained by heating at least one dimer acid or polymerized acid prepared from a $C_{16-20}$ carbon atom content aliphatic unsaturated acid with a polyol, thereby forming a polyester and reacting the remaining carboxyl groups or hydroxyl groups of the resulting polyester with an alcohol having 1 to 22 carbon atoms or an aliphatic acid having 12 to 22 carbon atoms, or (ii) 10 to 25 wt% of a fat and fatty oil; and
(D) 0.1 to 10 wt% of a polymer compound containing nitrogen atoms in a molecule having a molecular weight of 1000 to 1000,000, said molecule being selected from the group consisting of compounds of formulas (a) through (h):
(a) a homopolymer or copolymer of nitrogen-containing monomers of the following formulae (I) through (IX) of salts thereof:



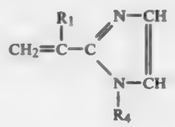

(I)

in which $R_1$ represents H or $CH_3$, $R_2$ and $R_3$ independently represent H or an alkyl group having 1 to 3 carbon atoms;



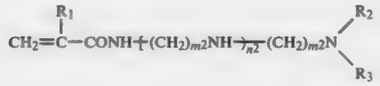
(II)

in which $m^1$ is a value of 1 to 3, $n^1$ is a value of 1 to 3, and $R_1$, $R_2$ and $R_3$ have the same meanings as defined above, respectively;



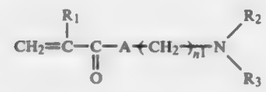
(III)

in which $R_4$ represents H, or an alkyl or alkylol group having 1 to 3 carbon atoms, and $R_1$ has the same meaning as defined in formula (I):



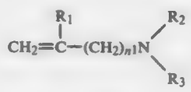
(IV)

in which $m^2$ and $n^2$ are, respectively, a value of 0 to 3, and $R_1$, $R_2$ and $R_3$ have the same meanings as defined in formula (I):



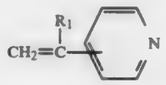
(V)

in which A represents —O— or —NH—, and $R_1$, $R_2$, $R_3$ and n have the same meanings as defined in formulae (I) and (II):



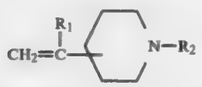
(VI)

in which $R_1$, $R_2$, $R_3$ and $n^1$ have the same meanings as defined in formulae (I) and (II):



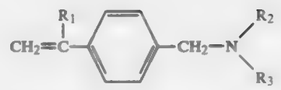
(VII)

in which $R_1$ has the same meaning as defined in formula (I) and pyridine is substituted at the 2 or 4 position;



(VIII)

in which $R_1$ and $R_2$ have, respectively, the same meanings as defined in formula (I) and pyridine is substituted at the 2 or 4 position; and



(IX)

in which $R_1$, $R_2$ and $R_3$ have, respectively, the same meanings as defined in formula (I);

(b) copolymers of at least one of the nitrogen-containing monomers of formulae (I) through (IX) or salts thereof and at least one vinyl monomer selected from the group consisting of $\alpha,\beta$-unsaturated carboxylic acids or salts or derivatives thereof, sulfonic acid group-containing vinyl compounds or salts thereof, acrylonitrile, vinyl pyrrolidone, and aliphatic olefins having 2 to 20 carbon atoms;

(c) salts or quaternary ammonium salts of ring-opened polymers of ethyleneimine;

(d) salts or quaternary ammonium salts of polycondensates of aliphatic dicarboxylic acids and polyethylene-polyamines or dipolyoxyethylenealkylamines;

(e) dihaloalkane-polyalkylenepolyamine polycondensates;

(f) epihalohydrin-amine polycondensates;

(g) salts of chitosan, or starch or cellulose or cationized products thereof; and

(h) polyether polyols or derivatives thereof having a molecular weight of 5000 to 600,000 and obtained by adding alkylene oxides to polyalkylimines having 6 to 200 nitrogen atoms or derivatives thereof.

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**4,746,449**

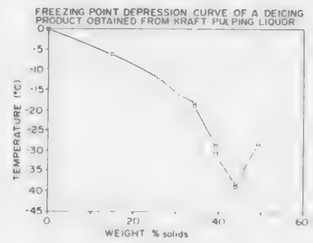
## DEICING PRODUCT OBTAINED FROM PULP MILL BLACK LIQUOR

**Terence E. Peel, Hudson Heights, Canada, assignor to Domtar Inc., Montreal, Canada**

**Division of Ser. No. 799,865, Nov. 20, 1985. This application Sep. 28, 1987, Ser. No. 102,006**

**Int. Cl.⁴ C09K** *3/18*

**U.S. Cl. 252—70** **5 Claims**




1. A deicing product as obtained by:

(a) using a black liquor having a pH of at least 6.5 and containing lignin, lignin degradation products and including lignin cellulose fragments and hemicelluloses, acids of the group consisting of acetate, carbonate, formate, pseudolactate, and having at least one cation selected from the group consisting of sodium, potassium, magnesium and calcium, as obtained from a pulp mill operation using a pulping process,

(b) fractionating said black liquor from step (a) into a low molecular weight fraction wherein the compounds present in said fraction have molecular weight of less than 500 and wherein said fraction comprises based upon the total weight of solid in said fraction, between 12% and 75% acetate salts, trace amounts and 36% carbonate salts, 1 and 24% formate salts, 1 and 32% pseudolactate salts and wherein the cation of said salts is at least one member selected from the group consisting of: sodium, potassium, magnesium and calcium, and wherein said fraction further comprises lignin fractions having molecular weights of less than 500 and sugars having molecular weight of about 150 to 180, and the weight of said sugars and said lignin are less than 25% based upon said total weight of salts, said step (b) thereby maximizing the production of said salts,

said fractionating in step (b) being selected from one of the group of methods consisting of:

(i) control of partial wet oxidation of the black liquor under pressure and at a temperature between 140° and 230° C. to breakdown the high molecular weight fraction containing lignin, lignin degradation products and including lignin cellulose fragments and hemicelluloses, into low molecular weight fractions consisting of compounds having molecular weight of less than 500, and simultaneously during said control of partial wet oxidation, to favourably increase said salts, said control being obtained by the oxidation period, the temperature and pressure, and the amount and nature of the oxidation source, and

(ii) direct membrane filtration to obtain the low molecular weight fraction wherein the compounds present have a molecular weight of less than 500 collected as the permeate, and said permeate as a whole constitutes said deicer, and wherein prior to said membrane filtration, said black liquor is filtered to remove large suspended particles and part of the high molecular weight fractions,

(c) concentrating said low molecular weight fraction as obtained from step (b) to produce a concentrated deicing product,

said product having between 20% and 100% total solid concentration, wherein the compounds present have a molecular weight of less than 500 and wherein said fraction comprises based upon the total weight of solid in said fraction, between 12% and 75% acetate salts, trace amounts and 36% carbonate salts, 1 and 24% formate salts, 1 and 32% pseudolactate salts and wherein the cation of said salts is at least one member selected from the group consisting of: sodium, potassium, magnesium and calcium, and wherein said fraction further comprises lignin fractions having molecular weights of less than 500 and sugars having molecular weight of about 150 to 180, and the weight of said sugars and said lignin are less than 25% based upon said total weight of solids.

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**4,746,450**

## FUNCTIONAL FLUIDS AND CONCENTRATES THICKENED WITH ASSOCIATIVE POLYETHER THICKENERS CONTAINING CERTAIN PRIMARY AMINES

**Mark A. Frentrup, Redford; Stanley T. Hirozawa, Birmingham, and Charles F. Deck, Trenton, all of Mich., assignors to BASF Corporation, Parsippany, N.J.**

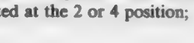
**Filed Dec. 8, 1986, Ser. No. 939,352**

**Int. Cl.⁴ C10M** *173/02, 119/18, 137/06*

**U.S. Cl. 252—75** **20 Claims**

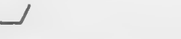
7. A functional fluid which comprises

A. a metal dialkyldithiophosphate selected from the group consisting of:



(I)

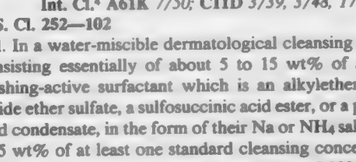
wherein each R is individually linear or branched alkyl, alkenyl, aryl, arylalkyl, or alkylaryl groups having from 3 to 24 carbon atoms;



(II)

wherein each R is individually a linear or branched alkyl, alkenyl, aryl, arylalkyl, or alkylaryl groups having from 3 to 24 carbon atoms and

B. a primary amine compound selected from the group consisting of compounds having the following structural formula:



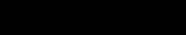
(III)

wherein m and n are both numbers from 0 to about 25 and m+n equals at least 1, and $R_1$ and R2 are independently selected from H and a lower alkyl group having from 1 to about 4 carbon atoms;



(IV)

where R is an alkoxy group, having 1 to 4 carbon atoms and is n is a whole number from 2 to 4;



(V)

where R is an alkylene group having from 2 to 8 carbon atoms; and



(VI)

wherein R is an alkylene group having from 3 to 4 carbon atoms; and wherein the weight ratio of A:B is about 1:0.1 to 1:5, and

C. a functional fluid thickener.

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**4,746,451**

## SELF-DECONTAMINATING CLEANSING PREPARATIONS

**Klaus Hachmann, Hilden; Karlheinz Disch, Haan, and Klaus Bansemir, Langenfeld, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany**

**Filed Jul. 30, 1986, Ser. No. 892,023**

**Claims priority, application Fed. Rep. of Germany, Aug. 10, 1985, 3528843**

**Int. Cl.⁴ A61K** *7/50;* **C11D** *3/39, 3/48, 17/08*

**U.S. Cl. 252—102** **16 Claims**

1. In a water-miscible dermatological cleansing concentrate consisting essentially of about 5 to 15 wt% of at least one washing-active surfactant which is an alkylether sulfate, an amide ether sulfate, a sulfosuccinic acid ester, or a protein-fatty acid condensate, in the form of their Na or $NH_4$ salts; about 0.5 to 5 wt% of at least one standard cleansing concentrate additive; and having a viscosity of about 500 to 5,000 mPas,

the improvement of rendering said cleansing concentrate microbially self-decontaminating while maintaining its viscosity and water miscibility by incorporating therein ingredients consisting of:

(A) about 0.05 to 2 wt% of hydrogen peroxide;

(B) about 0.2 to 5 wt% of a fatty acid alkanolamide which is a combination of coconut oil fatty acid diethanolamide and oleic acid diethanolamide in a weight ratio of about 0.2–5:1;

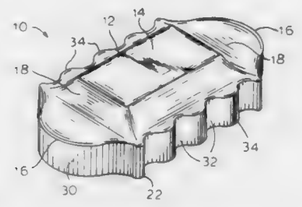
(C) about 0.5 to 3 wt% of at least one water-soluble salt, which is ammonium sulfate; sodium chloride, potassium chloride, sodium sulfate, or potassium citrate; and

(D) at least one standard cosmetic preservative, either not present or present in at least a minimally preservative-effective amount, all wt% being based upon the total formulation weight, and wherein said viscosity is maintained after incorporating all of the above ingredients.

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**4,746,452**
**EASY TO HOLD LUBRICOUS COMPOSITION ARTICLES**
William E. Marek, Grand Junction, Colo., assignor to Christen Charls, N.Y.
Filed Oct. 10, 1986, Ser. No. 917,616
Int. Cl.[4] A61K *7/40, 7/48, 7/50;* C11D *17/00*
U.S. Cl. 252—134 3 Claims




1. An article of manufacture, useful for the application of a lubricous composition, which comprises;
a body, adapted by size and configuration to be hand-held and fabricated from a lubricous composition, said body having
(a) a first surface defined by a first, outer peripheral boundary and having
(i) a first peripheral margin zone extending inwardly of the peripheral margin; and
(ii) a first center zone spaced inwardly from the peripheral boundary and defined on its outer perimeter by the peripheral margin;
said first center zone being elevated with respect to the peripheral margin zone;
said peripheral margin zone being concave when viewed in cross-section along a line transverse to the axis of the peripheral margin running parallel to the first outer boundary;
said concavity having an arc such that the first digit of an operator's finger may be inserted into the peripheral margin zone to engage the article;
(b) a second surface defined by a second, outer peripheral boundary having
(i) a second peripheral margin zone extending inwardly of the second, outer peripheral boundary; and
(ii) a second center zone spaced inwardly from the second peripheral boundary and defined on its outer perimeter by the second peripheral margin;
said second center zone being elevated with respect to the second peripheral margin zone;
said second peripheral margin zone being concave when viewed in cross-section along a line transverse to the axis of the peripheral margin running parallel to the second outer boundary;
said concavity of the second peripheral margin having an arc such that the first digit of an operator's finger may be inserted into the second peripheral margin zone to engage the article in a finger hold;
said first and second peripheral margin zones being endless grooves; of the first and second center zones being substantially flat; and
(c) a third surface extending between and defined by the first and the second peripheral boundaries together, said third surface serving to space the first peripheral boundary from the second peripheral boundary;
said first and said second peripheral boundary being substantially parallel and co-extensive, each with the other;
said first and said second peripheral boundary together, when viewed along a line transverse to their parallel axis, presenting a closed serpentine line of a plurality of concavities and a plurality of convexities, both uniformly distributed over the entire third surface, said concavites having a sufficient arc to receive a portion of an operator's finger in the concavity, in a finger hold, said article having the configuration substantially as shown in FIGS. 1 and 3.

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**4,746,453**
**CLEANING COMPOSITION FOR ELECTROCLEANING COLD-ROLLED STEEL**
Pao-Yuan Chen; Sen-Thann Shen, and Ping-Cherng Sun, all of Kaohsiung, Taiwan, assignors to China Steel Corporation, Kaohsiung, Taiwan
Filed Nov. 7, 1986, Ser. No. 928,875
Int. Cl.[4] C11D *7/14*
U.S. Cl. 252—135 9 Claims

1. A cleaning composition for electrolytically cleaning cold-rolled steelwork comprising from about 20 to about 60 percent by weight of alkali metal hydroxide, from about 20 to about 60 percent by weight of a silicate, and from about 0.1 percent to about 20 percent by weight of a non-ionic surface-active agent, in which said non-ionic surface active agent includes a major amount of lauryl polyethylene glycol ether with average 10 ethylene oxide units, and a minor amount of nonyl phenyl ethylene glycol ether.

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**4,746,454**
**ORGANIC DISH AND HAND WASHING COMPOUND CONTAINING RAW POTATO PULP**
Leon Iknadossian, P.O. Box 2022, City of Industry, Calif. 91746
Filed Sep. 21, 1987, Ser. No. 98,920
Int. Cl.[4] C11D *1/04, 3/34, 3/382, 17/08*
U.S. Cl. 252—170 1 Claim

1. A composition for washing dishes and hands comprising about 88.5% raw potato pulp, about 1.0% sodium bisulphite, about 0.5% sodium stearyl fumerate, about 5.0% denatured 190 proof alcohol, about 5.0% nonionic surfactant, and a trace of artificial food coloring and fragrance.

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**4,746,455**
**LIQUID DETERGENT COMPOSITION FOR CLOTHING ARTICLES**
Koichi Matsuda, Utsunomiya; Atsuo Nakae, Saitama; Moriyasu Murata, and Akira Suzuki, both of Utsunomiya, all of Japan, assignors to KAO Corporation, Tokyo, Japan
Filed Jun. 22, 1987, Ser. No. 64,706
Claims priority, application Japan, Jun. 27, 1986, 61-151139; Oct. 1, 1986, 61-234176; Oct. 31, 1986, 61-259922; Apr. 16, 1987, 62-94040; Apr. 17, 1987, 62-94962
Int. Cl.[4] C11D *3/37*
U.S. Cl. 252—174.23 4 Claims

1. A liquid detergent composition for clothing articles comprising the following ingredients (A)', (B-1) and (B-2):
(A)' 0.01 to 5 wt. % of a polymer in the form of a polymer latex having a cationic group or a tertiary amino group and having an average particle size (average in weight) of from 0.005 to 0.2 micrometers with a content of the polymer whose size is in the range of from 0.005 to 0.2 micrometers being not less than 95 wt. % of the total of the polymer latex;
(B-1) 10 to 50 wt. % of a nonionic surface active agent; and
(B-2) 0.01 to 10 wt. % of an anionic surface active agent.



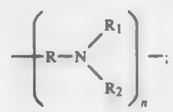
**4,746,456**
**DETERGENTS CONTAINING GRAFT COPOLYMERS OF POLYALKYLENE OXIDES AND VINYL ACETATE AS ANTIREDEPOSITION INHIBITORS**
Alexander Kud, Eppelsheim; Guenther Schulz; Wolfgang Trieselt, both of Ludwigshafen, and Heinrich Hartmann, Limburgerhof, all of Fed. Rep. of Germany, assignors to Basf Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany
Filed Oct. 2, 1986, Ser. No. 914,267
Claims priority, application Fed. Rep. of Germany, Oct. 12, 1985, 3536530
Int. Cl.[4] C11D *3/37*
U.S. Cl. 252—174.24 15 Claims

1. A detergent comprising surfactants, builders, bleaches and conventional additives, which contains, as an added soil antiredeposition agent, from 0.1 to 3% by weight of a graft copolymer which is obtainable by grafting (a) a polyalkylene oxide having a number average molecular weight of from 2000 to 100,000 and based on ethylene oxide, propylene oxide and/or butylene oxide with (b) vinyl acetate in a weight ratio (a):(b) of from 1:0.2 to 1:10.

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**4,746,457**
**FLOCCULATION OF SUSPENDED SOLIDS FROM AQUEOUS SOLUTIONS**
Denis E. Hassick, Monroeville, and Joseph P. Miknevich, Coraopolis, both of Pa., assignors to Calgon Corporation, Pittsburgh, Pa.
Filed Mar. 5, 1987, Ser. No. 22,181
Int. Cl.[4] C02F *1/56*
U.S. Cl. 252—181 10 Claims

1. A composition for reducing turbidity in aqueous systems comprising:
(a) aluminum chloride; and
(b) at least one water-soluble polymer selected from the group consisting of:
(i) water-soluble polyamines represented by structure (I)



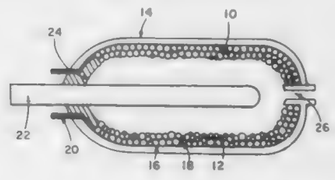
(I)

wherein $R_1$ and $R_2$, which may be the same or different, are selected from the group consisting of straight or branched $C_1$–$C_8$ alkyl, substituted straight or branched $C_1$–$C_8$ alkyl and hydrogen; wherein R is selected from the group consisting of straight or branched $C_1$–$C_8$ alkyl and substituted straight or branched $C_1$–$C_8$ alkyl; and wherein n ranges from 2–50,000; and
(ii) water-soluble $C_1$–$C_8$ dialkyl diallyl ammonium polymers; wherein the weight ratio of (a):(b) is at least 20:1, on an active basis.

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**4,746,458**
**PHOTOVOLTAIC MATERIAL**
Gregory R. Brotz, P.O. Box 1322, Sheboygan, Wis. 53081
Division of Ser. No. 588,344, Mar. 12, 1984, Pat. No. 4,628,143. This application Aug. 1, 1986, Ser. No. 891,582
Int. Cl.[4] H01L *29/02;* C09K *11/06, 11/08*
U.S. Cl. 252—301.16 2 Claims

1. A photovoltaic material comprising:
an open-cellular foam material having an internal surface area; and a photoelectric semiconductor material layer on said foam's internal surface area.




2. The material of claim 1 further including a phosphor layer on said photoelectric material layer.

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**4,746,459**
**SELF-DISPERSING TIN OXIDE SOLS**
Morris Kaplan, Houston, Tex., assignor to Nalco Chemical Company, Oak Brook, Ill.
Continuation of Ser. No. 639,637, Aug. 10, 1984, abandoned, which is a continuation-in-part of Ser. No. 510,806, Jul. 5, 1983, Pat. No. 4,488,984. This application Jan. 9, 1987, Ser. No. 4,761
The portion of the term of this patent subsequent to Sep. 16, 2003, has been disclaimed.
Int. Cl.[4] B01J *13/00*
U.S. Cl. 252—313.1 2 Claims

1. An aqueous sol composition consisting of tin sols useful in restoring the activity of metal contaminated molecular sieve cracking catalysts which comprises a major portion of an aqueous tin sol containing between 1–50% by weight of tin oxide as $SnO_2$ and between 0.1–20% by weight of a compatible water-soluble surfactant which is capable of producing a water-in-oil emulsion and having an HLB of at least 6.0.

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**4,746,460**
**PREPARATION OF EMULSIONS**
Spencer E. Taylor, Camberley, England, assignor to The British Petroleum Company p.l.c., London, England
Filed Nov. 22, 1985, Ser. No. 800,959
Claims priority, application United Kingdom, Dec. 7, 1984, 8431012
Int. Cl.[4] B01J *13/00*
U.S. Cl. 252—314 7 Claims

1. A method for the preparation of an HIPR emulsion of oil in water which method comprises the steps of (a) generating a foam by beating a gas into an aqueous solution of a surfactant and (b) dispersing the foam into the oil under low shear conditions in the range 10 to 1,000 reciprocal seconds in such manner that an emulsion is formed comprising distorted oil droplets having mean droplet diameters in the range 2 to 50 microns, separated by aqueous films, to 98% by volume of the liquid content of the emulsion being oil.

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**4,746,461**
**METHOD FOR PREPARING 1,4-DIAMINOANTHRAQUINONES AND INTERMEDIATES THEREOF**
Alfred G. Zielske, Pleasanton, Calif., assignor to The Clorox Company, Oakland, Calif.
Division of Ser. No. 868,884, May 23, 1986, Pat. No. 4,661,293, which is a continuation of Ser. No. 556,835, Dec. 1, 1983, abandoned. This application Dec. 23, 1986, Ser. No. 945,906
Int. Cl.[4] C11D *15/02, 13/00*
U.S. Cl. 260—370 11 Claims

1. A 9,10-anthraquinone having a tosyloxy group and an amino group substituted on one ring thereof, said amino group and said tosyloxy group being in a para relationship on said one ring.

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**4,746,462**

## PHOSPHORIC ESTER COMPOUND

**Michiei Nakamura, Soka; Hitoshi Takeuchi, Saitama; Tetujiro Takahashi; Minoru Takizawa, both of Koshigaya, and Shojiro Horiguchi, Omiya, all of Japan, assignors to Dainichiseika Color & Chemicals Mfg. Co., Ltd., Tokyo, Japan**

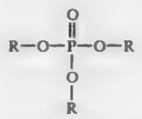
**Filed Jan. 23, 1986, Ser. No. 824,577**

**Claims priority, application Japan, Feb. 21, 1985, 60-033492; Sep. 25, 1985, 60-210291**

**Int. Cl.⁴ C07F** *9/09*

**U.S. Cl. 260—403** **5 Claims**

1. A phosphoric ester compound represented by the formula



where at least one R is a polyester residue derived from an aliphatic hydroxyl-terminated polyester obtained by heating an aliphatic hydroxy-carboxylic acid having 4 to 30 carbons atoms to achieve self-polycondensation to form a polyester having an average molecular weight of about 500 to 5,000, and any remaining R is a hydrogen atom, a cation, or a residue of an alcohol.

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**4,746,463**

## PROCESS FOR PRODUCING NOVEL PRODUCTS BY HYDROGEN FLUORIDE WITH ESTERS OF FATTY ACIDS

**Heinz-Rudi Feist; Hans Buchwald, both of Hanover; Boleslaus Raschkowski, Wiedensahl, and Werner Rudolph, Hanover, all of Fed. Rep. of Germany, assignors to Kali-Chemie Aktiengesellschaft, Fed. Rep. of Germany**

**Division of Ser. No. 655,568, Sep. 28, 1984, Pat. No. 4,659,493. This application Dec. 9, 1986, Ser. No. 939,722**

**Claims priority, application Fed. Rep. of Germany, Oct. 3, 1983, 3335870; Jul. 18, 1984, 3426438**

**Int. Cl.⁴ C11C** *3/02*

**U.S. Cl. 260—410.9 R** **21 Claims**

1. A process comprising the step of reacting hydrogen fluoride with at least one unsaturated wax at a temperature of less than 100° C., said unsaturated wax having a melting point less than about 60° C., wherein said hydrogen fluoride and said unsaturated wax are present in a molar ratio between 2:1 and 15:1, and wherein said reaction is carried out at a pressure between about 3 and about 10 bar.

7. Unsaturated wax derivatives comprising the product produced by a process comprising the steps of reacting hydrogen fluoride with at least one unsaturated wax at a temperature of less than 100° C., said unsaturated wax having a melting point less than about 60° C., wherein said hydrogen fluoride and said unsaturated wax are reacted in a molar ratio between about 2:1 and about 15:1, and wherein said reaction is carried out at a pressure between about 3 and about 10 bar.

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**4,746,464**

## PROCESS FOR EXTRACTING FAT FROM AN ANIMAL MATERIAL

**Christian Mange, Paris, and Jean-Yves Toze, Chantilly, both of France, assignors to Clextral, Courbevoie, France**

**Filed Apr. 17, 1986, Ser. No. 853,075**

**Claims priority, application France, Apr. 17, 1985, 85 05806**

**Int. Cl.⁴ C11B** *1/00*

**U.S. Cl. 260—412** **8 Claims**

1. A process for extracting fat from an animal material consisting of cells limited by a protein tissue and containing at least fatty material and water, comprising the steps of

(a) melting the fat and then extracting it continuously by passing the animal material through at least two successive zones, a melting zone (B) and at least one extraction zone (C), of a single housing in the form of an elongate sleeve (1) equipped, in the melting zone (B), with heating means (13) and, in the extraction zone (C), with filtering walls (16) for the passage of the melted fat, said sleeve (1) encasing two overlapping conveyor screws (2) driven in rotation; and

(b) subjecting the animal material, introduced continuously via a feed orifice (11) located at the upstream end of the sleeve (1) and driven downstream as a result of the rotation of the screws (2), successively, in the melting zone (B), to progressive heating up to the water vaporization temperature, with the combined effect of kneading and of an increase in pressure to a sufficient level to maintain the superheated water in the dissolved state, and then to sudden expansion with evaporation of the water and discharge of the steam via an orifice (14) made in the central part of the sleeve (1);

(c) maintaining the material dried in this way, as a result of the heating of the sleeve, at the melting temperature of the fat; and then

(d) subjecting the material, in the extraction zone (C), to an increase in pressure capable of separating the melted fat, discharged via the filtering walls (16), from the residue discharged via an orifice (17) located at the downstream end of the sleeve.

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**4,746,465**

## PROCESS FOR PREPARING A SCALING INHIBITOR

**Galina F. Yaroshenko, ulitsa Udaltsova, 14, kv. 120; Nina M. Dyatlova, 2 Samotechny pereulok, 4, korpus 1, kv. 4; Natalya E. Khavchenko, ulitsa Chugunnye vorota, 5, korpus 3, kv. 47; Ljudmila V. Krinitskaya, ulitsa Scherbakovskaya, 7, kv. 74, all of Moscow; Leonid T. Dytjuk, ulitsa Narodnaya, 13, kv. 51; Rafail K. Samakaev, ulitsa Chkalova, 28, kv. 70, both of Orenburg; Vladimir I. Gusev, ulitsa Ulyanovykh, 57/2, kv. 20, Kazan; Leonid I. Kutyanin, ulitsa Zoi Maresevoi, 15, kv. 21, Volgograd; Nikolai A. Dobroradnykh, ulitsa Generala Shumilova, 31, kv. 44, Volgograd; Evgeny D. Kisil, bulvar Engelsa, 10, kv. 168, Volgograd; Yakov L. Uskach, ulitsa Pisemskogo, 22, kv. 12, Volgograd, and Nikolai V. Matievsky, ulitsa Bystrova, 80a, kv. 24, Volgograd, all of U.S.S.R.**

**Continuation of Ser. No. 566,213, Dec. 28, 1983, abandoned, and a continuation of Ser. No. 542,002, Oct. 14, 1983, abandoned. This application Jan. 14, 1986, Ser. No. 818,866**

**Int. Cl.⁴ C07F** *9/09*

**U.S. Cl. 260—502.5 E** **3 Claims**

1. A process for preparing a scaling inhibitor comprising reacting amines selected from the group consisting of 1,3-diaminopropanol-2, polyhydroxypropylenepolyamines of the general formula:



wherein n is 2 to 20, and a mixture of said amines, with formaldehyde and phosphorus trichloride in an aqueous medium at a temperature of from 35° to 50° C.; said formaldehyde and phosphorus trichloride being used in amounts smaller than their respective stoichiometric amounts as calculated for the starting amines.



**4,746,466**

## ULTRASONIC ATOMIZING APPARATUS

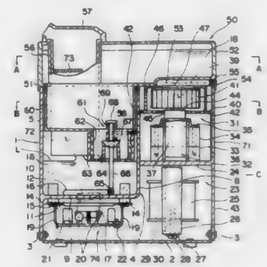
**Minoru Takahashi, Tokyo, Japan, assignor to TDK Corporation, Tokyo, Japan**

**Filed Nov. 20, 1986, Ser. No. 932,819**

**Claims priority, application Japan, Mar. 3, 1986, 61-29243[U]; Jun. 18, 1986, 61-93116[U]; Jun. 18, 1986, 61-93117[U]**

**Int. Cl.⁴ B01F** *3/04*

**U.S. Cl. 261—30** **11 Claims**



1. An ultrasonic atomizing apparatus comprising:

a main body having the shape of a bottomed box;

a water tank provided on top of said main body in an upper opening of the same;

a partition wall partitioning an interior of said main body under said water tank into first and second sections;

an atomizing chamber formed in an upper portion of said first section to receive water from said water tank;

an atomizing unit provided on a bottom wall of said atomizing chamber to atomize the water supplied into said atomizing chamber, and including a piezoelectric oscillator and a piezoelectric oscillator driving circuit;

an electric fan provided within said second section of said main body to blow the mist produced in said atomizing chamber;

a power transformer disposed within said second section of said main body in a vertical positional relationship to said electric fan to supply power to said electric fan and the driving circuit of said atomizing unit; and

an exhaust duct communicating with the upper portion of said atomizing chamber, and arranged so as to discharge upward the mist blow by said electric fan.

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**4,746,467**

## PROCESS FOR PRODUCING MICROCAPSULES

**Masahiro Sakamoto, and Sadao Takahashi, both of Oiso, Japan, assignors to Jujo Paper Co., Ltd., Tokyo, Japan**

**Filed Jun. 12, 1986, Ser. No. 873,585**

**Claims priority, application Japan, Jul. 17, 1985, 60-156042**

**Int. Cl.⁴ B01J** *13/02*

**U.S. Cl. 264—4.7** **10 Claims**

1. Process for producing microcapsules which use an aminoaldehyde resin as a capsule-wall comprising:

preparing a hydrophobic core substance;

preparing separately a continuous phase by dissolving an anionic water-soluble copolymer in water and then dissolving a capsule-forming material in the resultant solution;

adding said core substance to said continuous phase while stirring to form an emulsion; and

adjusting the pH of said emulsion to about 3–7.5;

wherein said anionic water soluble copolymer consists of at least three monomers including acrylic acid, styrene-sulfonic acid, and alkylacrylate or alkylmethacrylate having alkyl group with at most 6 carbon atoms, in the absence of either or both of hydroxylalkylacrylate and hydroxyalkylmethacrylate; and said anionic water-soluble copolymer is used in an amount of 0.5–7.0% by weight, based on the capsuleforming system.

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**4,746,468**

## METHOD OF PREPARING CERAMIC MICROSPHERES

**Yoshiharu Ozaki, Musashino; Mitsushi Wadasako, Hashima; Toshihiro Kasai, Tokyo, and Yoshinori Shinohara, Saitama, all of Japan, assignors to Mitsubishi Mining & Cement Co., Ltd., Tokyo, Japan**

**Filed May 16, 1986, Ser. No. 864,015**

**Claims priority, application Japan, May 17, 1985, 60-103824**

**Int. Cl.⁴ B29B** *9/08*; **C04B** *35/64*

**U.S. Cl. 264—9** **25 Claims**

1. A method for producing ceramic microspheres comprising in combination the steps of forming a mechanical suspension of a ceramic fine powder in water, dispersing said suspension in droplet form into a liquid medium which is immiscible with water, non-reactive with the fine powder, has substantially the specific gravity as the suspension, and has a boiling point higher than water, to form spherical particles and drying and calcining the resultant particles.

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**4,746,469**

## METHOD FOR PREPARING PLATED DENTURES

**Atsushi Yamashita, Okayama, Japan, assignor to G-C Dental Industrial Corp., Tokyo, Japan**

**Filed Oct. 30, 1986, Ser. No. 924,761**

**Claims priority, application Japan, Nov. 15, 1985, 60-255116**

**Int. Cl.⁴ A61C** *13/10*

**U.S. Cl. 264—18** **1 Claim**



1. A method for directly preparing a plated denture with photo-polymerizable resins having varied viscosities, which comprises the steps of:

allowing a photo-polymerizable resin having a relatively high viscosity to come into pressure contact with a gypsum model and, thereafter, polymerizing and curing said resin by irradiation of active energy beams to prepare a basic plate;

applying a photo-polymerizable resin having a lower viscosity which is lower than that of said basic plate resin upon the inner face of said basic plate and taking a corrected impression in the oral mouth and, thereafter, polymerizing and curing said resin by irradiation of active energy beams to form a plate having the corrected impression;

applying a photo-polymerizable resin having a much lower viscosity upon the inner face of said plate having the corrected impression and taking a functional impression in the oral mouth and, thereafter, polymerizing and curing said resin by irradiation of active energy beams;

using a photo-polymerizable resin having a relatively high viscosity to form an alveolar ridge portion on the outside of the thus obtained plate and arranging artificial teeth on said plate and, thereafter, polymerizing and curing said resin by irradiation of active energy beams; and

using a photo-polymerizable resin having a medium viscosity to form a gingival portion and, thereafter, polymerizing and curing said resin by irradiation of active energy beams to form a plated denture.

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**4,746,470**

## PROCESS FOR THE PREPARATION OF CARBON FIBERS HAVING STRUCTURE REFLECTED IN CROSS SECTIONAL VIEW THEREOF AS RANDOM MOSAIC

**Hiroto Fujimaki, Kokubunji; Ikuo Seo, Iwaki; Kiyoshi Tagaya, Iwaki, and Yasuo Sakaguchi, Iwaki, all of Japan, assignors to Kureha Kagaku Kogo Kabushiki Kaisha, Japan**

**Continuation of Ser. No. 352,533, Feb. 26, 1982, abandoned. This application Apr. 18, 1984, Ser. No. 601,122**
**Claims priority, application Japan, Mar. 12, 1981, 56-35576**
**Int. Cl.[4] D01D *5/18;* D01F *9/14***
**U.S. Cl. 264—29.2** **1 Claim**




1. In a process for preparing carbon fibers showing, under a polarization microscope, a random-mosaic structural pattern in the cross-section thereof perpendicular to the fiber axis, and a diameter of 5 to 30 microns, comprising melt-spinning a mesophase-pitch showing, under a polarization microscope, more than 85% of an optically anisotropic region, containing 30 to 65% by weight of a quinoline-insoluble component and subjecting the thus prepared pitch fibers to infusibilization, carbonization and further to graphitization, the improvement comprising:

melt-spinning a mesophase-pitch having a viscosity of 20 to 50 poise at a melt-spinning temperature of 330 to 450 degrees Celsius, while subjecting said mesophase pitch to rotary centrifugal spinning in a rotary centrifugal spinning machine at a peripheral velocity of the rotating nozzle of 300 to 1000 m/min., while exposing said spun mesophase-pitch fibers to a flow of a gas spouting into the spinning direction at a temperature of 280 to 400 degrees Celsius and at a linear velocity of 80 to 160 m/sec.

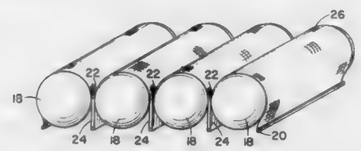
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**4,746,471**

## METHOD OF CONSTRUCTING A REINFORCED CONCRETE STRUCTURE

**Loren E. Hale, 7301 E. 66th, Tulsa, Okla. 74133**

**Continuation-in-part of Ser. No. 671,791, Nov. 14, 1984, abandoned, which is a continuation of Ser. No. 421,566, Sep. 22, 1985, abandoned. This application Oct. 15, 1986, Ser. No. 919,625**
**Int. Cl.[4] E04G *11/02, 11/04***
**U.S. Cl. 264—32** **9 Claims**




1. A method of construction a cement building comprising the steps of:

(a) providing a foundation having two sides and adapted to accept a plurality of parallel cylindrical closed inflatable forms in contact with each other and further adapted to accept inner support members between said cylindrical inflatable forms;

(b) providing a plurality of interior vertical support members along a line of contact between each pair of said parallel cylindrical inflatable forms;

(c) providing a substantially horizontal, load bearing, roof support member along the line of the contact between each pair of said parallel cylindrical inflatable forms and wherein each said horizontal roof support member is supported by a respective plurality of said vertical support members along the same line of contact;

(d) placing a plurality of parallel cylindrical inflatable forms within foundation on each side of said substantially horizontal roof support members;

(e) anchoring a flexible wire mesh to said foundation along the sides or said foundation substantially parallel to the direction of said plurality of cylindrical inflatable forms and anchoring said flexible wire mesh to each or said horizontal roof support members such that said flexible wire mesh will conform to and substantially cover the entire exterior surface of said inflatable forms when inflated;

(f) inflating said plurality of parallel cylindrical inflatable forms to prestress said flexible wire mesh, said forms contacting each other after inflation;

(g) applying a wet cementitious material to the prestressed wire meshed exterior of said inflatable forms and roof support members; and

(h) allowing said cementitious material to set and harden before deflating and removing said inflatable forms.

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**4,746,472**

## ULTRATHIN POLYARYLATE POLYMER FILMS AND THEIR PREPARATION

**Rachel S. Kohn, Springfield, N.J., assignor to Hoechst Celanese Corporation, Somerville, N.J.**

**Filed Oct. 10, 1986, Ser. No. 917,725**
**Int. Cl.[4] B29C *41/12***
**U.S. Cl. 264—41** **20 Claims**

1. A process for preparing a polyarylate polymer film having a thickness of about 500 angstroms or less and containing no macroscopic holes, wherein the process comprises:

(a) preparing a casting solution containing a polyarylate polymer in 1,2,3-trichloropropane at about the three to about the twelve percent by weight level based upon the total weight of the casting solution;

(b) depositing the casting solution on water to form a free-standing film; and

(c) removing the film from the water.

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**4,746,473**

## ULTRATHIN BLENDED CELLULOSE NITRATE POLYMER FILMS AND THEIR PREPARATION

**Rachel S. Kohn, Springfield, N.J., assignor to Hoechst Celanese Corporation, Somerville, N.J.**

**Filed Oct. 10, 1986, Ser. No. 917,425**
**Int. Cl.[4] B29C *41/12***
**U.S. Cl. 264—41** **15 Claims**

1. A process for preparing a blended, cellulose nitrate polymer film having a thickness of about 400 angstroms or less and containing no macroscopic holes, wherein the process comprises:

(a) preparing a casting solution containing a cellulose nitrate polymer at about the two to about the eight percent by weight level and a methacrylate polymer at about the one to about the five percent by weight level, based upon the total weight of the casting solution, in about a 4:6 to about a 6:4 by volume ratio of a $C_1$–$C_4$ lower alkyl and a $C_5$–$C_{10}$ higher alkyl acetate, respectively;

(b) depositing the casting solution on water to form a free-standing film; and

(c) removing the film from the water.



**4,746,474**

## ULTRATHIN POLYIMIDE POLYMERS FILMS AND THEIR PREPARATION

**Rachel S. Kohn, Springfield, N.J., assignor to Hoechst Celanese Corporation, Somerville, N.J.**

**Filed Oct. 10, 1986, Ser. No. 917,731**
**Int. Cl.[4] B29C *41/12***
**U.S. Cl. 264—41** **16 Claims**

1. A process for preparing a polyimide polymer film having a thickness of about 400 angstroms or less and having no macroscopic holes, wherein the process comprises:

(a) preparing a casting solution containing a polyimide polymer at about the two to about the twelve percent by weight level, based upon the total weight of the casting solution, in 1,2,3-trichloropropane;

(b) depositing the casting solution on water to form a free-standing film; and

(c) removing the film from the water.

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**4,746,475**

## ULTRATHIN CELLULOSE ESTER POLYMER FILMS AND THEIR PREPARATION

**Rachel S. Kohn, Springfield, N.J., assignor to Hoechst Celanese Corporation, Somerville, N.J.**

**Filed Oct. 10, 1986, Ser. No. 917,982**
**Int. Cl.[4] B29C *41/12***
**U.S. Cl. 264—41** **13 Claims**

1. A process for preparing a cellulose ester polymer film having a thickness of about 400 angstroms or less and containing no holes more than about one micron in diameter, wherein the process comprises:

(a) preparing a casting solution containing a cellulose ester polymer at about the two to about the twelve percent by weight level, based upon the total weight of the casting solution, in about a 85:52:13 to about a 100:45:5 by volume ratio of 1,2,3-trichloropropane:methylene chloride:methanol;

(b) depositing the casting solution on water to form a free-standing film; and

(c) removing the film from the water.

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**4,746,476**

## ULTRATHIN POLYPHENYLENE OXIDE POLYMER FILMS AND THEIR PREPARATION

**Rachel S. Kohn, Springfield, N.J., assignor to Hoechst Celanese Corporation, Somerville, N.J.**

**Filed Oct. 10, 1986, Ser. No. 917,998**
**Int. Cl.[4] B29C *41/12***
**U.S. Cl. 264—41** **23 Claims**

1. A process for preparing a polyphenylene oxide polymer film having a thickness of 400 angstroms or less and having no holes about one micron or more in diameter wherein the process comprises:

(a) preparing a polymer solution containing a polyphenylene oxide polymer, having a molecular weight, Mw, greater than about 1000, at about the two to about the twelve percent level, based upon the total weight of the casting solution, in a mixture of chlorinated solvents;

(b) depositing the polymer solution on about 60 to about 85 percent aqueous ortho-phosphoric acid to form a free-standing film; and

(c) removing the film from the aqueous ortho-phosphoric liquid.

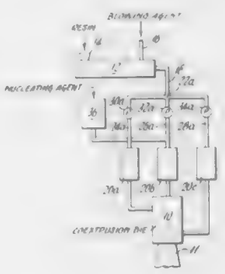


**4,746,477**

## PRODUCTION OF PARTIALLY FOAMED EXTRUDED PLASTIC PRODUCTS

**Sheldon M. Wecker, Libertyville, and Lou Kohl, Palatine, both of Ill., assignors to James River-Norwalk, Inc., RiverPark, Conn.**

**Filed Jun. 18, 1986, Ser. No. 875,856**
**Int. Cl.[4] C08J *9/34, 9/12;* B29C *47/06, 67/22***
**U.S. Cl. 264—45.5** **15 Claims**




1. In a method of making an extruded plastic product having a foamed core layer and a substantially unfoamed skin layer contiguous and bonded thereto, by forcing contiguous concurrent flows of a resin in a fluent extrudable state to and through a coextrusion die at a predetermined temperature for respectively forming said core and skin layers, wherein the core-forming flow comprises a resin containing a blowing agent and a nucleating agent in proportions effective to cause foaming of the core layer and the skin-forming flow comprises said resin containing said blowing agent but at last substantially free of any nucleating agent, and wherein said blowing agent, said nucleating agent, and said temperature are mutually selected such that foaming occurs in the core layer and the skin layer remains at least substantially unfoamed downstream of the die, the improvement which comprises the combination of steps of

(a) establishing an advancing stream of the resin in fluent state having the blowing agent incorporated therein in a proportion as aforesaid, and

(b) dividing the advancing stream into separate streams and separately conducting the separate streams to the coextrusion die to respectively constitute the core-forming flow and the skin-forming flow therein, while

(c) selectively adding the nucleating agent, in a proportion as aforesaid, only to that one of the separate streams which constitutes the core-forming flow.

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**4,746,478**

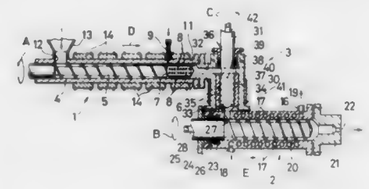
## METHOD AND APPARATUS FOR PRODUCTION OF FOAMED THERMOPLASTIC MATERIAL

**Hiromu Fujisaki, Saitama; Motoshige Hayashi, and Motokazu Yoshii, both of Nara, all of Japan, assignors to Sekisui Kaseihin Kogyo Kabushiki Kaisha, Nara, Japan**

**Filed Jul. 23, 1986, Ser. No. 888,592**
**Claims priority, application Japan, Jul. 24, 1985, 60-163564; Sep. 5, 1985, 60-196747**
**Int. Cl.[4] B29C *67/22, 47/50, 47/64***
**U.S. Cl. 264—53** **11 Claims**

1. A method for producing a foamed thermoplastic material comprising melting and extruding said thermoplastic material by means of a screw extruder; adding a foaming agent to the molten thermoplastic; mixing said foaming agent and molten thermoplastic in a mixing means and cooling the resultant mixture of foaming agent and thermoplastic to a temperature suitable for foaming in a cooling means; said mixing means comprising a rotor supported in a stator so as to form a gap for the passage of the mixture of foaming agent and thermoplastic during rotation of the rotor; said rotor having semi-spherical cavities formed on the outer face thereof and said stator having

semi-spherical cavities formed on the inner face thereof, the cavities on said rotor and the cavities on the stator being arranged to overlap with each other during rotation of the rotor



and to cause transfer of the mixture of foaming agent and thermoplastic between the cavities during passage of the mixture through said mixing means.

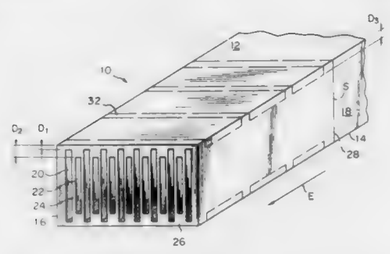
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**4,746,479**

## METHOD OF MANUFACTURING A BLOCK-TYPE HEAT EXCHANGE ELEMENT

**Kenichi Hanaki, Kariya, and Kazuhiro Inoguchi, Okazaki, both of Japan, assignors to Nippon Soken, Inc., Nishio, Japan**

**Filed Nov. 9, 1984, Ser. No. 669,877**
**Claims priority, application Japan, Dec. 29, 1983, 58-247230**
**Int. Cl.⁴ B29C *47/00***
**U.S. Cl. 264—62** **26 Claims**



1. A method of manufacturing a block-type heat exchange element including a block having mutually opposed first and second surfaces and mutually opposed third and fourth surfaces intersecting said first and second surfaces, said block having a series of discrete first fluid channels extending therethrough between said first and second surfaces and a series of discrete second fluid channels extending therethrough between said third and fourth surfaces independently from said first fluid channels, said method comprising the steps of:
(a) preparing a molding material in an extrusion moldable state;
(b) extruding said molding material to form a continuous molding having a predetermined transversal cross-sectional configuration and having mutually opposed, continuous first and second surfaces forming said first and second surfaces of the block and extending in parallel to the direction of extrusion, said continuous molding having a series of discrete first passages extending therethrough in parallel to the direction of extrusion and each having an elongated cross-sectional configuration extending toward said continuous first and second surfaces up to a predetermined first depth therefrom, said continuous molding further having a series of discrete second passages extending there through in parallel to the direction of extrusion and each having an elongated cross-sectional configuration extending toward said continuous first and second surfaces up to a predetermined second depth therefrom, said second depth being greater than said first depth, said second passages being arranged alternately with said first passages and separated from said first passages by partition walls extending toward said continuous first and second surfaces and extending in the direction of extrusion, said second passages forming said second fluid channels in said block;
(c) setting said continuous molding;
(d) cutting said continuous molding in the transverse direction at a predetermined length to form a molding section having end surfaces forming said third and fourth surfaces of the block, said first and second passages being opened by said cutting into said third and fourth surfaces;
(e) closing openings of said first passages opened into said third and fourth surfaces by a closure material; and
(f) cutting out at least parts of said molding section along said first and second surfaces at a predetermined third depth intermediate to said first and second depth until said first passages are opened into said first and second surfaces to form said first fluid channels.

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**4,746,480**

## PROCESS FOR PROVIDING A PROTECTIVE OXIDE COATING ON CERAMIC FIBERS

**Terence J. Clark, Summit, N.J., assignor to Hoechst Celanese Corporation, Somerville, N.J.**

**Filed Aug. 11, 1986, Ser. No. 895,420**
**Int. Cl.⁴ C04B *35/00, 41/50***
**U.S. Cl. 264—62** **3 Claims**

1. A process for improving the thermal stability of ceramic fibers by providing a protective oxide coating on said ceramic fibers comprising: forming a ceramic fiber by pyrolyzing a fiber spun from a polysilazane preceramic polymer and after pyrolysis heat treating said ceramic fiber in an inert gas containing 10 ppm to 10,000 ppm as $O_2$ of an oxygen-containing gas to form an in situ oxide coating on said ceramic fiber.

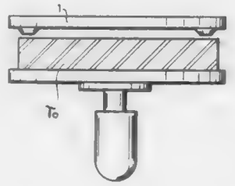
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**4,746,481**

## PROCESS FOR ACCELERATING HARDENING OF CEMENT WITH FIBRE-REINFORCED AND CEMENT-BOUND PLATES

**Ernó Schmidt, Szombathely, Hungary, assignor to Nyugatmagyarorszagi Fagazdasagi Kombinat, Szombathely, Hungary**

**Filed Jan. 22, 1986, Ser. No. 821,263**
**Claims priority, application Hungary, Jan. 23, 1985, 260/85**
**Int. Cl.⁴ C04B *15/14***
**U.S. Cl. 264—82** **5 Claims**



1. A process for accelerating the hardening of cement in a composition containing water, cement and fibrous material, comprising the steps of:
(a) forming said composition into a predetermined shape having an outer perimeter portion extending about the outer perimeter of said predetermined shape and an internal portion within the confines of said outer portion,
(b) positioning said predetermined shape of said composition between the pressure plates of a press,
(c) utilizing said pressure plates to compress said internal portion of the formed shape of said composition to a first predetermined density,
(d) utilizing said pressure plates to compress said outer perimeter portion of the formed shaped of said composition to a second predetermined density, said second predetermined density being greater than said first predetermined density and being of sufficient density to compress said outer perimeter portion to a gas leak tight condition,
(e) applying $CO_2$ to said internal portion of the formed shape of said composition, whereby said $CO_2$ is confined to be within said internal portion by said pressure plates and said gas leak tight compressed outer perimeter portion.



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**4,746,482**

## METHOD FOR THE MANUFACTURE OF A THERMOPLASTIC MOLDING MATERIAL CONTAINING POLYPHENYLENE ETHER

**Wilfried Ribbing, Dorsten; Hans Jadamus, Marl, and Hans-Eberhard von Portatius, Dorsten, all of Fed. Rep. of Germany, assignors to HULS Aktiengesellschaft, Marl, Fed. Rep. of Germany**

**Filed Dec. 29, 1986, Ser. No. 947,273**
**Claims priority, application Fed. Rep. of Germany, Feb. 7, 1986, 3603798**
**Int. Cl.⁴ B29B *7/84***
**U.S. Cl. 264—102** **13 Claims**

1. A method for the manufacture of molding materials containing polyphenylene ether, comprising the steps of:
(i) degasifying molten polyphenylene ether for a period of time from about 0.1 to about 3 minutes in a temperature range from about 290°–370° C.;
(ii) adding at least one additional molten polymer to said degasified molten polyphenylene ether; and
(iii) blending said degasified molten polyphenylene ether and said addittional molten polymer,
wherein the residual content of volatile components in said degasified molten polyphenylene ether is less than 500 ppm.

7. A molding material comprising polyphenylene ether and comprising less than 500 ppm volatile components, obtained by the method of claim 1.

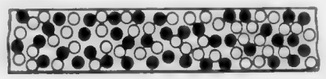
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**4,746,483**

## PROCESS FOR THE MANUFACTURE OF CATALYST MOLDING

**Claus Flockenhaus, Essen; Karl-Heinz Laue, Hattingen; Klaus Merkel; Erich Hackler, both of Essen; Johann Jansen, Duisburg; Arnold Max, Bottrop; Werner Stender, Raesfeld; Reinhard Kruse, Wesel; Hartmut Kainer, Wiesbaden; Daniel Grimm, Schlangenbad-Bärstadt, and Blagoje Levkov, Wiesbaden, all of Fed. Rep. of Germany, assignors to Didier Engineering GmbH, Essen and Didier Werke AG, Wiesbaden, both of, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 904,175, Sep. 5, 1986, and a continuation-in-part of Ser. No. 887,366, Jul. 17, 1986, and a continuation-in-part of Ser. No. 831,142, Feb. 19, 1986, Pat. No. 4,695,559. This application Sep. 9, 1986, Ser. No. 905,752**
**Claims priority, application Fed. Rep. of Germany, Sep. 10, 1985, 3532207**
**Int. Cl.⁴ B01J *27/043, 27/047;* B29C *43/02, 43/32***
**U.S. Cl. 264—120** **20 Claims**



● $H_3PO_4$

○ $H_2SO_4$

1. A process for the manufacture of molded catalytic bodies, said process comprising the steps of:
(a) selecting a natural raw material in a naturally occurring form, said natural raw material containing at least one catalytic material selected from the group consisting of $Fe_2O_3$, $Cr_2O_3$, $TiO_2$, $NbO_2$, $WO_3$, $V_2O_5$ and $MoO_3$;
(b) screening said natural raw material to a maximum grain size of about 0.25 mm;
(c) mixing said screened natural raw material obtained from step (b) with concentrated sulphuric acid in the proportions of about 20 to about 60 ml of concentrated sulphuric acid per 1000 g of screened natural raw material;
(d) placing an external mold on a support member;
(e) filling said external mold with the mixture obtained from step (c);
(f) placing a cover member on said mold;
(g) subjecting the assembly obtained from step (f) to a pressure of approximately 500 bar to manufacture said molded catalytic body;
(h) thereafter, subjecting said assembly comprising said molded catalytic body to a drying process at a temperature of approximately 150° C.; and
(i) thereafter, subjecting said assembly comprising said molded catalytic body to a calcining process at a temperature of approximately 450° C.

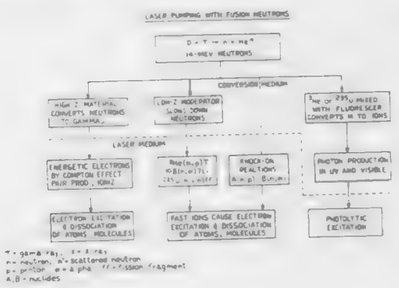
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**4,746,484**

## FUSION REACTOR PUMPED LASER

**Daniel L. Jassby, Princeton, N.J., assignor to The United States of America as represented by the Department of Energy, Washington, D.C.**

**Filed Sep. 4, 1987, Ser. No. 92,987**
**Int. Cl.⁴ G21B *1/00;* H01S *3/09***
**U.S. Cl. 376—146** **20 Claims**




1. A nuclear pumped laser comprising:
a toroidal fusion reactor, said reactor generating energetic neutrons;
an annular gas cell disposed around the outer periphery of said reactor, said cell including an annular reflecting mirror disposed at the bottom of said cell and an annular output window disposed at the top of said cell;
a gas lasing medium disposed within said annular cell for generating output laser radiation;
neutron reflector material means disposed around said annular cell for reflecting neutrons incident thereon back into said gas cell;
neutron moderator material means disposed between said reactor and said gas cell and between said gas cell and said neutron reflector material for moderating the energy of energetic neutrons from said reactor;
converting means for converting energy from said moderated neutrons to energy pumping means for pumping said gas lasing medium; and
beam compactor means for receiving output laser radiation from said annular output window and generating a single output laser beam therefrom.

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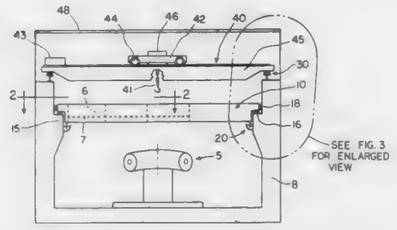


**4,746,485**

## ROTATING SHIELDED CRANE SYSTEM

John C. Commander, Idaho Falls, Id., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Nov. 19, 1986, Ser. No. 932,078
Int. Cl.[4] G21C *13/00, 19/00*
U.S. Cl. 376—206 20 Claims




1. A rotating, radiation-shielded crane system comprising:
a generally cylindrical, radiation-shielding wall, the top of said wall forming a first annular ledge;
a second annular ledge integrally attached to the inner surface of said shielding wall;
a generally cylindrical ceiling made of radiation shielding material, said ceiling including a flange portion on the top thereof and a body portion, said flange portion associated with said second annular ledge such that said ceiling is supported thereby, the volume inside said wall and said ceiling forming a test cell;
a rotatable crane disposed above said ceiling such that said crane is outside of said test cell;
removable access means in said ceiling for allowing said crane to access the inside of said test cell from the top of said ceiling;
means for sealing the interface between the inner surface of said shielding wall and said ceiling.

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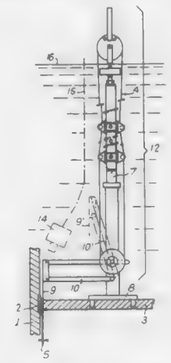
**4,746,486**

## DEVICE FOR CHECKING CLEARANCE BETWEEN THE PERIPHERY OF THE UPPER CORE PLATE AND THE INNER SURFACE OF THE CORE ENCLOSURE OF A PRESSURIZED WATER NUCLEAR REACTOR

Alain Frizot, Montcenis; Gerard Cadaureille, Saint Bonnet de Mure; Jean-Christophe Lalere, Lyon, and Jean-Yves Machuron, Le Creusot, all of France, assignors to Framatome, Courbevoie, France

Filed Aug. 14, 1986, Ser. No. 895,981
Claims priority, application France, Aug. 14, 1985, 85 12399
Int. Cl.[4] G21C *17/00*
U.S. Cl. 376—245 4 Claims

1. In a pressurized water nuclear reactor comprising a vessel containing a core, a core enclosure enclosing said core, an upper core plate placed above said core inside said core enclosure with a clearance between the periphery of said upper core plate and an inner surface of said core enclosure, the improvement consisting of a device for checking said clearance in said vessel filled with water comprising
(a) a vertical supporting structure (**17**) including a base (**8**) equipped with means (**20**) for engaging and centering in an upper face of said upper core plate (**3**);
(b) a plurality of calibrated feeler blades (**9**) of different thicknesses;
(c) means for introducing said blades into a gap present between said periphery of said upper core plate (**3**) and said inner surface of said core enclosure (**1**), said means comprising a plurality of articulated assemblies (**10**) in the form of parallelogram linkages which are substantially parallel to each other and vertical, each comprising two parallel bars (**24***a*, **24***b*) one of whose ends is articulated to said vertical structure (**7**) around two horizontal hinge pins (**28***a*, **28***b*) situated one vertically above the other, and a vertical connecting bar (**25**) articulated to the other end of said parallel bars (**24***a*, **24***b*), each of said articulated assemblies (**20**) carrying a vertical said calibrated feeler blade (**9**) at its end close to said connecting bar (**25**), so that different calibrated feeler blades (**9**) having different thicknesses are arranged in sequence along the periphery of said upper core plate (**3**), and a pivoting assembly associated with each of said articulated assemblies (**10**) and controlled from the upper part of said vertical structure



(**7**), for moving the calibrated feeler blades (**9**) in a substantially vertical direction, selectively either downward and towards said gap between said upper core plate (**3**) and said core enclosure (**1**), or upwards; and
(d) visual observation means for determining the possibility of introducing each of said feeler blades (**9**) of a specified thickness, consisting of a video camera (**14**) arranged in the vicinity of said feeler blades, enabling the introduction of each of said blades (**9**) in succession to be monitored by remote control.

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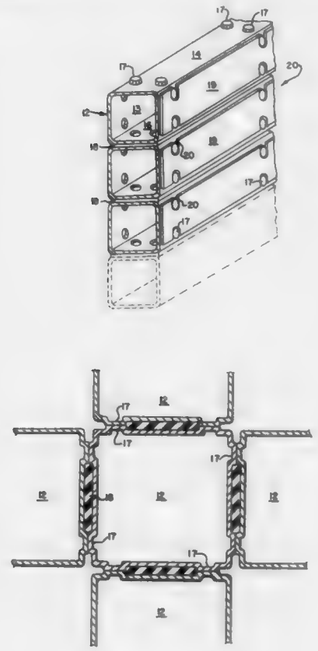
**4,746,487**

## STORAGE RACK FOR NUCLEAR FUEL ASSEMBLIES

William J. Wachter, Wexford, Pa., assignor to U.S. Tool & Die, Inc., Allison Park, Pa.

Filed Jun. 10, 1981, Ser. No. 272,331
Int. Cl.[4] G21C *19/40*
U.S. Cl. 376—272 7 Claims

1. A storage rack for nuclear fuel assemblies comprising a plurality of nestable storage tubes, each having a polygon cross-section;
said tubes being nested with cell walls of one tube aligned with and confronting cell walls of other tubes;
each said cell wall having an array of embossed buttons so arranged that buttons of one cell wall engage buttons of a confronting cell wall, and the engage buttons are welded together to secure the tubes;
at least one layer of neutron-poison material comprising a flexible, resilient pad interposed between the aligned cell walls;



whereby a major portion of the total outer surface area of each confronting cell wall is engaged with said layer of neutron-poison material.

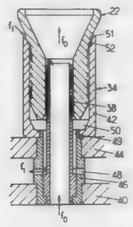
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**4,746,488**

## HYDRAULIC HOLDING DOWN DEVICE FOR A NUCLEAR FUEL ASSEMBLY

Louis Pradal, Lyons, and Gérard Chiarelli, Jonage, both of France, assignors to Framatome, Courbevoie, France

Filed Jul. 29, 1986, Ser. No. 890,436
Claims priority, application France, Jul. 29, 1985, 85 11556
Int. Cl.[4] G21C *15/00*
U.S. Cl. 376—352 6 Claims




1. A nuclear reactor having:
a pressure vessel;
a core within said pressure vessel;
a bed plate supporting said core;
an outlet plenum located above said core for receiving coolant which has circulated upwardly from under said bedplate and through said core,
said core comprising a plurality of upstanding sheathless fuel assemblies each having a bundle of fuel rods carried by a structure consisting of a lower end piece engaged into said bed-plate, an upper end piece, tie rods connecting said upper end piece and lower end piece and grids spaced apart along the tie rods;
wherein:
said bed-plate defines an inner volume containing coolant at a pressure lower than the coolant pressure under said bed plate.
the lower end piece of each of said fuel assemblies has a downwardly directed extension having a cross-sectional area smaller than the cross-sectional area of the fuel assembly above the bed-plate;
said bed-plate has a plurality of support means each for receiving and supporting one said lower end piece, each defining with a downwardly facing external surface of said lower end piece extension an annular chamber communicating with said volume and surrounding said extension; and
said bed-plate and lower end piece are formed with aligned vertical passage means for straight unobstructed axial coolant flow without any angular deviation or bends from under said bed-plate into said fuel assembly and with leak means defining a coolant leak path having a first leg from a lower portion of said core to said annular chamber and a second leg from said passage to said annular chamber.

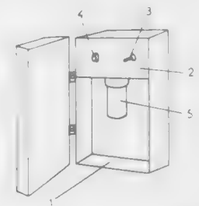
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**4,746,489**

## METHOD FOR DECONTAMINATING AND CLEANING OCULAR PROSTHESES, PARTICULARLY CONTACT LENSES, AND DEVICE FOR IMPLEMENTING SUCH METHOD

Noel Arnold, Colmar, France, assignor to Yves Nold, Thionville, France

PCT No. PCT/FR85/00184, § 371 Date May 5, 1986, § 102(e) Date May 5, 1986, PCT Pub. No. WO86/00721, PCT Pub. Date Jan. 30, 1986
PCT Filed Jul. 3, 1985, Ser. No. 848,438
Claims priority, application France, Jul. 4, 1984, 84 10728
Int. Cl.[4] A61L *2/20, 7/00;* B01J *19/08*
U.S. Cl. 422—29 9 Claims



1. A process for disinfecting ocular prostheses, comprising the steps of generating ozone by ionization in an ionizing tube using an electric circuit, in the absense of ultraviolet radiation; causing said ozone to migrate across a hydrophobic semipermeable membrane; and causing the said ozone to diffuse directly from said membrane into an isotonic solution in which the lenses are immersed for a predetermined duration.

4. A device for disinfecting ocular prostheses comprising:
a container having on one of its faces, a control panel provided with an on/off switch and a luminous indicator and being electrically connected to a control circuit means for timing a disinfecting process, a cylindrical body positioned within said container and having an ionizing tube therein, said ionizing tube being electrically connected to said control circuit means for generating ozone in said cylindrical body, means removably connecting a removable receptacle within said container for receiving ocular prostheses to be disinfected, said receptacle being in fluid communication with said cylindrical body and a hydrophobic semipermeable membrane mounted within said

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container and positioned between said receptacle and said cylindrical body containing said ionizing tube for admitting ozone generated by said ionizing tube into said receptacle for disinfecting prostheses received therein.

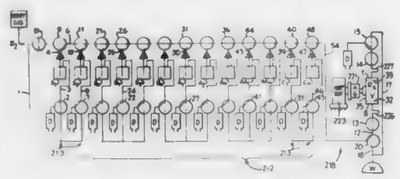
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**4,746,490**

## SOLID PHASE PEPTIDE SYNTHESIZER

**Hossain H. Saneii, 6159 Torrington Rd., Kalamazoo, Mich. 49009**

**Continuation of Ser. No. 534,529, Sep. 22, 1983, abandoned. This application Feb. 6, 1986, Ser. No. 827,174**
**Int. Cl.[4] C07K** *1/08;* **C12M** *1/00;* **G05B** *17/00*
**U.S. Cl. 422—62** **16 Claims**



1. Appparatus usable for peptide synthesis and the like, comprising:

a reaction vessel;

a plurality of supply valves connected in series in a supply line, the supply line having an upstream end and a downstream end, said supply valves each being constructed so as to provide alternate flow paths therethrough corresponding to alternate first and second postions thereof, said valves each being positionable in said first position for fluid flow therethrough from said upstream end of the line to said downstream end of said line;

a plurality of reagent containers for containing respective reagents, and reagent flow lines connecting said reagent containers to said supply line, said supply valves each being in flow communication with a corresponding one of said flow lines, said supply valves each in its said second position connecting one of said reagent containers through the portion of said supply line downstream thereof and disconnecting said downstream portion of said supply line from the portion of said supply line upstream thereof;

means for connecting the downstream end of said supply line to said reaction vessel;

means responsive to shifting of one of said supply valves to its second position for moving reagent liquid from the corresponding said reagent container, through the portion of said supply line extending downstream of said one of said supply valves in its second position, toward said reaction vessel;

a source of inert gas under pressure;

a gas flow line connecting said gas source to the upstream end of said supply line and including an on/off valve actuable for blowing liquid out of said supply line, with said supply valves in their first position;

said means for moving regent liquid including a plurality of pressurizing and venting valves, pressurizing flow lines connecting each said pressurizing and venting valve to a corresponding reagent container and further gas flow lines connecting said pressurizing and venting valves to said gas source, said pressurizing and venting valves each having a first position for venting said corresponding reagent container and an alternate second position connecting said corresponding reagent container to said pressurized gas source for pressurizing said corresponding reagent container from said pressurized gas source, such that with said supply valve and the corresponding pressurizing and venting valve in their second positions, reagent liquid from the corresponding reagent container is supplied through the portion of said supply line which is positioned downstream of said second positioned supply valve and the downstrem ones of said supply valves in their first positions to flow toward said reaction vessel; and

a plurality of preadjustable flow restriction means each interposed in a corresponding one of said reagent flow lines between one of said reagent containers and the corresponding supply valve of said supply line and adjustable for the same flow rate into said reaction vessel regardless of which of said reagent containers is supplying said reaction vessel, to allow accurate loading of said reaction vessel by timing open periods of said supply valves.

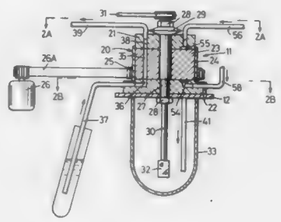
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**4,746,491**

## SERIAL DILUTION OF LIQUID SAMPLES

**L. Erik Öhlin, Stocksund, Sweden, assignor to Swelab Instrument AB, Johanneshov, Sweden**

**Continuation of Ser. No. 477,724, Mar. 22, 1983, abandoned. This application Sep. 28, 1984, Ser. No. 655,992**
**Claims priority, application Sweden, Mar. 27, 1982, 8201791**
**Int. Cl.[4] G01N** *1/10, 21/11, 31/16, 35/06*
**U.S. Cl. 422—103** **4 Claims**



1. A valve device for use in apparatus for serial dilution of liquid samples, comprising:

(a) a valve housing having a sample inlet connectable to a source of liquid sample, a diluent inlet connectable to a source of liquid diluent, a third inlet and a first outlet, both being connectable to a first sample recipient, a second outlet connectable to a second sample recipient, pairs of first and second pump connection ports connectable to pump means for conveying liquid sample and diluent within said valve device, said pair of second pump connection ports forming said diluent inlet;

(b) a valve body mounted in said housing for movement therein and having a passageway of predetermined volume opening into opposite surfaces of said valve body, said passageway in a first valve body position connecting said sample inlet with one of said pair of first pump connection ports, in a second valve body position connecting one of said pair of second pump connection ports with said first outlet, in a third valve body position connecting said third inlet with the other of said pair of first pump connection ports, and in a fourth valve body position connecting the other of said pair of second pump connection ports with the second outlet; and

(c) a valve body actuator for selectively moving said valve body relative to said housing into one of said aforementioned valve body positions;

(d) said housing having recesses which are open towards said opposite valve body surfaces and in register with the path along which the ends of said passageway move during movement of said valve body between said second and third valve body positions, said recesses being connectable with a wash liquid conveying system and in at least one valve body position between said second and third valve body positions communicating simeultaneously with said passageway.

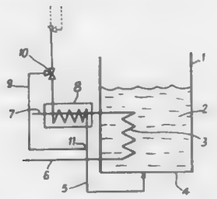


**4,746,492**

## APPARATUS FOR THE CONTROL OF HEAT ENERGY EXCHANGED WITH A FLUIDIZED BED

**Guy Marlair, Douai, France, assignor to Charbonnages de France, Paris, France**

**Filed Jul. 31, 1986, Ser. No. 891,181**
**Claims priority, application France, Aug. 5, 1985, 85 11942**
**Int. Cl.[4] F27B** *15/18*
**U.S. Cl. 422—146** **2 Claims**



1. Apparatus for controlling heat energy exchanged between a heat-transfer fluid and a fluidization enclosure comprising: a fluidization grid, means for introducing particulate solid reactants into said enclosure above the fluidization grid, a fluidizing gas delivery duct which penetrates into said enclosure from externally thereof and is connected with said fluidization grid for directing a fluidizing gas through the fluidization grid for fluidizing said solid reactants, an internal heat exchanger at least partly immersed in the fluidized bed and carrying a heat-transfer fluid respectively delivered thereto and discharged therefrom by means of heat transfer fluid delivery and discharge ducts which respectively penetrate into and out of said enclosure from and to externally of said enclosure, said apparatus further comprising:

(a) an external heat exchanger disposed externally of said fluidization enclosure and fed, on respective sides thereof, via the fluidizing gas delivery duct upstream of said fluidization gird and, said heat transfer fluid discharge duct downstream of said internal heat exchanger, and

(b) a controllable-flow duct having one end fitted with a flow-control valve in the fluidizing gas delivery duct upstream of the external heat exchanger and upstream of the fluidization grid for regulating flow of said fluidizing gas through said external heat exchanger.

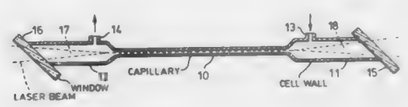
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**4,746,493**

## WAVEGUIDE REACTION CELL

**James A. O'Neill, 24 Mabelle Avenue, Apt. 2707, Toronto, Ontario, Canada M9A 4X8**

**Division of Ser. No. 743,084, Jun. 10, 1985, Pat. No. 4,622,115. This application Sep. 15, 1986, Ser. No. 907,245**
**Int. Cl.[4] B01J** *1/10;* **B01K** *1/00*
**U.S. Cl. 422—186** **5 Claims**




1. A waveguide reaction cell for promoting photochemical reactions in gases, comprising dielectric means defining an elongated passage of uniform cross section throughout its length, the passage communicating at its ends with a gas inlet chamber and a gas outlet chamber, respectively, and defining a capillary gas flow path therebetween, each said chamber having a window transparent to laser radiation and being configured to encompass a cone of laser radiation of increasing fluence from the window to the adjacent end of said passage, said passage-defining means being configured to propogate a selected fluence of the laser radiation along said passage in one or more selected waveguide modes, a gas inlet to the gas inlet chamber, and a gas outlet to the gas outlet chamber.

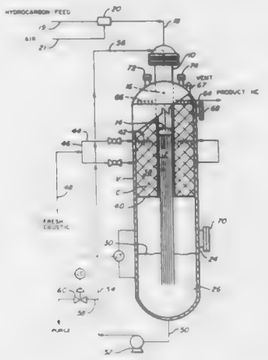
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**4,746,494**

## TREATMENT OF SOUR HYDROCARBON DISTILLATE

**Ralph E. Maple, and Felipe J. Suarez, both of Houston, Tex., assignors to Merichem Company, Houston, Tex.**

**Division of Ser. No. 739,563, May 20, 1985, Pat. No. 4,675,100. This application Jul. 21, 1986, Ser. No. 887,346**
**Int. Cl.[4] C10G** *19/00, 19/02;* **B01J** *8/00*
**U.S. Cl. 422—189** **18 Claims**



6. Apparatus for use in sweetening a mercaptan-containing sour hydrocarbon distillate by the catalytic oxidation of the mercaptans therein to disulfides, comprising:

a vertical reaction vessel including a vertical conduit within said reaction vessel, said conduit having an upstream end and a downstream end;

a fiber bundle secured within said conduit at said upstream end thereof and extending out said downstream end into a separation zone defined within the reaction vessel;

a catalyst bed in annular arrangement about said conduit above said separation zone;

means for introducing a first liquid caustic stream onto an upstream end of said fiber bundle;

means for introducing said sour hydrocarbon distillate into said upstream end of said conduit;

means for introducing a second liquid caustic stream into said catalyst bed; and

means for removing the sweetened hydrocarbon distillate from the top of said catalyst bed.

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**4,746,495**

## INSTALLATION FOR CHEMICAL CONVERSION OF A GAS MIXTURE CONTAINING HYDROGEN AND HYDROCARBONS

**Jean-Louis Mingaud, Paris; Christian Piard, Le Pecq; Pierre Cros, and Jacques Vanrenterghem, both of Paris, all of France, assignors to Electricite de France, Paris and SPIE-Batignolles, Puteaux, both of, France**

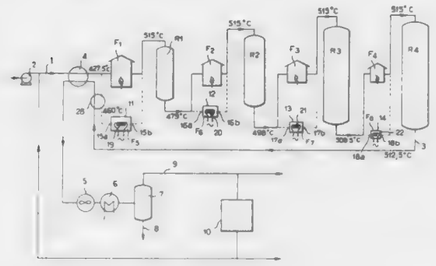
**Continuation of Ser. No. 581,046, Feb. 17, 1984, abandoned. This application Mar. 10, 1986, Ser. No. 838,438**
**Claims priority, application France, Feb. 21, 1983, 83 02764**
**The portion of the term of this patent subsequent to Mar. 18, 2003, has been disclaimed.**
**Int. Cl.[4] C10G** *35/04;* **B01J** *8/04*
**U.S. Cl. 422—190** **4 Claims**

1. An installation for the chemical conversion of a gas mixture containing hydrogen and hydrocarbons, comprising a series of reactors having means for subjecting a gas mixture containing hydrogen and hydrocarbons to endothermic reactions at temperatures within the range of about 350° C. to 900° C. under high pressure and in the presence of a catalyst, and a

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plurality of furnaces with one of said plurality of furnaces being located before and in flow communication with each reactor in order to heat the gas mixture prior to introduction into its respective reactor, wherein each one of said plurality of furnaces is constituted by means defining an enclosure which has a lower inlet and an upper outlet for a gas mixture and contains bare electric resistors and conductors for the supply of electric current to said resistors, wherein each one of said plurality of furnaces further comprises a central duct having a lower end directly connected to said lower inlet and an upper end facing said upper outlet, said central duct having therein a plurality of superposed modules which are removable independently of each other, each module comprising a plurality of electric resistance elements, each said plurality of electric



resistance elements being made up of banks of metallic strips, said strips being parallel to each other and to the direction along which a gas mixture flows between said inlet and said outlet of the means defining an enclosure, said strips having cut-out portions which permit enhanced resistance per unit area without affecting the free flow of gas to be heated between said strips, a peripheral zone within each one of said plurality of furnaces and surrounding said central duct, each said peripheral zone containing the conductors for the supply of electric current to the resistance elements, and a plurality of passages formed between the central duct and the peripheral zone in order that a small proportion of a gas flow which passes through the central duct may be permitted to flow within the peripheral zone.

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**4,746,496**

## CASE FOR STERILIZATION AND STERILE STORAGE OF OBJECTS

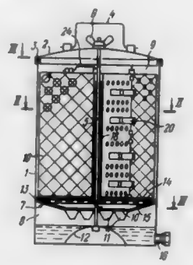
**Oleg A. Sorochenko, and Viktor M. Gutorov, both of Kharkov, U.S.S.R., assignors to Kharkovsky Nauchno-Issledovatelsky Institut Obschei I Neotlozhnoi Khirugii, Kharkov, U.S.S.R.**

**PCT No. PCT/SU83/00048, § 371 Date Dec. 9, 1985, § 102(e) Date Dec. 9, 1985, PCT Pub. No. WO85/02773, PCT Pub. Date Jul. 4, 1985**

**PCT Filed Dec. 21, 1983, Ser. No. 773,005**

**Int. Cl.⁴ A61L** *2/00, 2/18*

**U.S. Cl. 422—292** **4 Claims**



1. A case for sterilization and sterile storage of objects comprising: a hermetic housing with a cover plate, a first partition having one or more holes dividing the interior of the housing into two sections, a first section for containing a volatile sterilizing liquid, and a second section for storing objects and for accommodating instrument holders, wherein the first section for the volatile sterilizing liquid is disposed in the bottom portion of the housing, and wherein the holes of the first partition are grouped in the central part thereof with each of the holes having a coaxial tube having a free end facing the interior of the first section, each said tube tapering inwardly toward its free end, the first section including a spherical projection on a wall opposite to the partition and in front of the holes, the spherical projection being equal in size to the area occupied by the holes and having its convex side facing the interior of the first section for the sterilizing liquid.

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**4,746,497**

## PROCESS FOR THE PRODUCTION OF HIGH PURITY ZIRCONIA

**David H. Jenkins, East Bentleigh; Martin R. Houchin, Pascoe Vale, and Hari N. Sinha, Surrey Hills, all of Australia, assignors to Commonwealth Scientific and Industrial Research Organization**

**Filed Sep. 24, 1986, Ser. No. 923,143**

**Claims priority, application Australia, Feb. 1, 1985, PG9105**

**Int. Cl.⁴ C01G** *25/02*

**U.S. Cl. 423—82** **15 Claims**

1. A process for the production of high-purity zirconia, which consists essentially of the steps of leaching dissociated zircon or zirconiferous material consisting essentially of a mixture of zirconia and silica with concentrated sulphuric acid, and thereafter separating the resulting zirconium-containing product from silica or any other unattacked impurity, characterized in that water formed during the leaching reaction is continuously removed from the system in such a way as to maintain the sulphuric acid concentration at about 98%, so that the leaching temperature is in the range from about 300° C. to the maximum boiling point of the concentrated acid.

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**4,746,498**

## PROCESS FOR REDUCING GASEOUS SULFUR DIOXIDE CONTENT OF FLUE GASES BY PREHEATING COALS PRIOR TO BURNING SUCH COALS AND BY CONTROLLING COMBUSTION TEMPERATURE LEVELS

**Virgil J. Barczak; John O. Bodman, and John A. L. Campbell, all of Oklahoma City, Okla., assignors to Kerr-McGee Coal Corporation, Oklahoma City, Okla.**

**Filed Aug. 27, 1984, Ser. No. 644,597**

**The portion of the term of this patent subsequent to Feb. 24, 2004, has been disclaimed.**

**Int. Cl.⁴ B01J** *8/00;* **C01B** *17/00;* **F23J** *11/00;* **F23B** *7/00*

**U.S. Cl. 423—244** **2 Claims**

1. A process for reducing the gaseous sulfur oxide content of flue gases produced by burning coal, comprising the steps of:

transporting coal containing sulfur and weakly bound cations selected from the group consisting of alkali metals and alkaline earth metals in ion exchangeable form from a storage zone to a combustion zone;

preheating the coal, while so transporting the coal from the storage zone to the combustion zone, at a preheat temerature level ranging from about 200° C. to less than about 600° C. for a preheat period of time ranging from at least one minute to less than the time required for complete combustion of such coal by contacting the coal to be preheated with at least a portion of the flue gases produced by burning the coal and passed from the combustion zone, the flue gases providing at least some of the heat for preheating the coal;

burning the preheated coal in the combustion zone at a combustion temperature level and for a combustion period of time thereby producing heated flue gases and an ash residue, a substantial portion of the sulfur in the coal being converted to sulfates remaining in the ash residue thereby reducing the gaseous sulfur dioxide content in the flue gases produced by burning such coals; passing the flue gases from the combustion zone; and

controlling the combustion temperature level in the combustion zone within a range of from about 450° C. to about 1000° C. to increase the amount of sulfur being converted to sulfates and remaining in the ash residue.



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**4,746,499**

## METHOD OF DECONTAMINATING A LOCATION CONTAINING PYROPHORIC $P_4$-CONTAMINATION

**Auston K. Roberts, Chino; William E. Trainer, Anaheim, both of Calif., and David L. Biederman, Columbia, Tenn., assignors to Stauffer Chemical Company, Westport, Conn.**

**Continuation-in-part of Ser. No. 894,529, Aug. 8, 1986, Pat. No. 4,686,094. This application Jul. 27, 1987, Ser. No. 78,426**

**The portion of the term of this patent subsequent to Aug. 11, 2004, has been disclaimed.**

**Int. Cl.⁴ C01B** *25/01, 25/02, 25/04*

**U.S. Cl. 423—322** **4 Claims**

1. A method of decontaminating a location containing pyrophoric $P_4$-contamination which comprises: (1) bringing to said location a portable vehicle which comprises at least one of the following: a scrubber, a source of an oxygen-containing gas, a pump, means to convey the oxygen-containing gas to the $P_4$-contaminated material, when said material is under a protective blanket of a nonflammable fluid, and means to convey the effluent resulting from the treatment of said $P_4$-contaminated material with the oxygen-containing gas, while it is blanketed with the nonflammable fluid, to either suitable treatment or recovery means; and (2) contacting the $P_4$ contamination, while it is under a protective blanket of a nonflammable fluid, with an oxygen-containing gas to thereby render it less pyrophoric.

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**4,746,500**

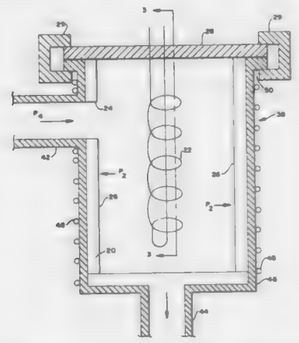
## PNICTIDE TRAP FOR VACUUM SYSTEMS

**Robert W. Parry, Salt Lake City, Utah; John A. Baumann, Ossining, and Rozalie Schachter, Flushing, both of N.Y., assignors to Stauffer Chemical Company, Westport, Conn.**

**Division of Ser. No. 581,101, Feb. 17, 1984, Pat. No. 4,613,485. This application Jul. 16, 1986, Ser. No. 886,567**

**Int. Cl ⁴ B01D** *3/10*

**U.S. Cl. 423—322** **20 Claims**



7. A method of removing gas from a vacuum system including the steps of:

cracking said gas to a form having a higher sticking coefficient than the uncracked gases, and

causing said cracked gas to flow against a surface having a temperature at which said cracked gas condenses so that said cracked gas adheres to and forms a film on said surface.

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**4,746,501**

## PROCESS FOR PREPARING TRANSITION METAL NITRIDES AND TRANSITION METAL CARBONITRIDES AND THEIR REACTION INTERMEDIATES

**Leon Maya, Oak Ridge, Tenn., assignor to United States Department of Energy, Washington, D.C.**

**Division of Ser. No. 939,920, Dec. 9, 1986. This application Aug. 6, 1987, Ser. No. 82,173**

**Int. Cl.⁴ C01B** *21/06*

**U.S. Cl. 423—413** **6 Claims**

1. A process for making a precursor to ceramics comprising:

placing a transition metal halide and an alkali metal borohydride in liquid ammonia solvent resulting in the formation of an insoluble transition metal haloamide and soluble by-products, alkali metal halide and ammonium borohydride;

separating said insoluble transition metal haloamide from said solvent and said soluble by-products;

reacting said transition metal haloamide with a salt in liquid ammonia, said salt being one that will react by displacing the halogen atom of said transition metal haloamide and yield a precursor to ceramics.

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**4,746,502**

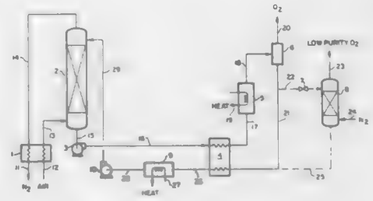
## LIQUID PHASE THERMAL SWING CHEMICAL AIR SEPARATION

**Donald C. Erickson, Annapolis, Md., assignor to Air Products and Chemicals, Inc., Allentown, Pa.**

**Filed Aug. 26, 1985, Ser. No. 769,633**

**Int. Cl.⁴ C01B** *13/00*

**U.S. Cl. 423—579** **7 Claims**



1. A continuous process for producing oxygen from cleaned and dried air and a liquid oxygen acceptor consisting essentially of a mixture of alkali metal nitrate and nitrite salt, comprising the steps of:

(a) countercurrently contacting the air at a pressure between 1 and 25 ATA in an adiabatic absorber with the acceptor which has been cooled to below about 540° C., thereby oxidizing the acceptor;

(b) heating the oxidized acceptor to at least about 580° C. by sensible heat exchange with oxygen depleted acceptor of step (e);

(c) further heating the oxidized acceptor to at least about 620° C. from a source of heat consisting of less than 80 kcal per mole of $O_2$ produced;

(d) separating product oxygen from the heated acceptor, whereby oxygen depleted acceptor is obtained;

(e) cooling the oxygen depleted acceptor to below about 580° C. by sensible heat exchange with the oxidized accept of step (b);

(f) further cooling the oxygen depleted acceptor to below about 540° C. by external heat rejection;

(g) recycling the cooled acceptor to step (a) by pumping to elevated pressure;

(h) maintaining the absolute absorber pressure at greater than one to no more than four times the absolute pressure of the step (d) desorption; and

(i) recovering at least 80% of the oxygen in the supply air as product.

**4,746,503**

## METHOD OF TREATING ALUMINA TO INCREASE SLURRY LIFE

**David A. Barclay, Ponca City, Okla., and Daniel T. Plummer, Houston, Tex., assignors to Vista Chemical Company, Houston, Tex.**

**Filed Oct. 9, 1986, Ser. No. 917,661**
**Int. Cl.[4] C01F** *7/02*
**U.S. Cl. 423—630** **12 Claims**

1. A method of treating alumina for use in forming dispersions of said alumina exhibiting inhibited gellation, comprising:
providing a dry, particulate, alumina; and
contacting said particulate alumina with a gaseous carbon dioxide medium.

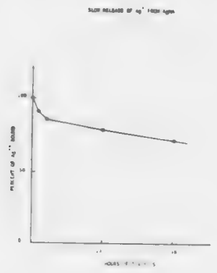
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**4,746,504**

## HEAVY METAL SALTS OF HYALURONIC ACID AND THEIR USE AS ANTIMICROBIAL AGENTS

**Abraham Nimrod, and Benjamin Greenman, both Rehovot, Israel, assignor to Bio-Technology General Corp., New York, N.Y.**

**Filed Mar. 14, 1986, Ser. No. 840,419**
**Int. Cl.[4] A61K** *43/00;* **A01N** *63/02, 55/02, 31/295*
**U.S. Cl. 424—1.1** **22 Claims**



1. A heavy metal salt of hyaluronic acid selected from the group consisting of silver, gold, cerium and tungsten.

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**4,746,505**

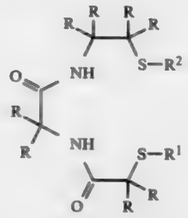
## TECHNETIUM RADIODIAGNOSTIC FATTY ACIDS DERIVED FROM BISAMIDE BISTHIOL LIGANDS

**Alun G. Jones, Newton Centre; John Lister-James, Wellesley, and Alan Davison, Needham, all of Mass., assignors to President and Fellows of Harvard College, Cambridge; Children's Medical Center Corp., Boston and Massachusetts Institute of Technology, Cambridge, all of, Mass.**

**Filed Apr. 26, 1985, Ser. No. 727,582**
**Int. Cl.[4] A61K** *43/00, 49/02, 49/00;* **C07C** *149/23*
**U.S. Cl. 424—1.1** **27 Claims**

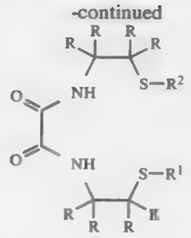
1. Compounds useful for forming technetium-99m radioimaging agents having the structural formulae:

I

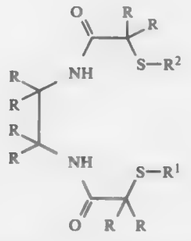


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II



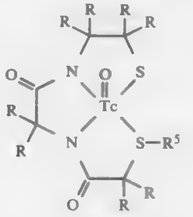
III



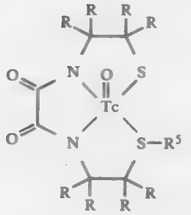
wherein each R is independently selected from hydrogen, substituted or unsubstituted lower alkyl, substituted or unsubstituted lower alkoxy, or $COR^4$ wherein $R^4$ is selected from substituted or unsubstituted lower alkoxy; or two R's can be taken together to form a lower alkylidene or hydrocarbon ring; one of $R^1$ or $R^2$ is selected from hydrogen or a thiol protecting group; the other of $R^1$ or $R^2$ is a $C_{14}$ to $C_{24}$ fatty acid group; and pharmaceutically acceptable salts thereof.

10. A technetium complex having the structural formula:

IV

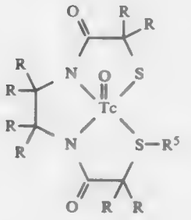


V



or

VI



wherein each R is independently selected from hydrogen,



substituted or unsubstituted lower alkyl, substituted or unsubstituted lower alkoxy, or $COR^4$ wherein $R^4$ is selected from substituted or unsubstituted lower alkoxy; or two R's can be taken together to form a lower akylidene group or a hydrocarbon ring; and $R^5$ is a $C_{12}$ to $C_{24}$ fatty acid group;
and pharmaceutically acceptable salts thereof.

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**4,746,506**

## ORGANIC NITRATE DRUG MIXTURES RESISTANT TO DETONATION BY FIRE

**Matthew J. Lynch, Wilmington, Del., assignor to ICI Americas Inc., Wilmington, Del.**

**Continuation of Ser. No. 428,378, Sep. 29, 1982, abandoned. This application Apr. 17, 1984, Ser. No. 600,557**
**Int. Cl.[4] A61K** *31/21;* **A61N** *33/48*
**U.S. Cl. 424—2** **1 Claim**

1. A composition comprising a blend containing 1 part by weight nitroglycerine, 9 parts by weight lactose and 0.05–0.2 parts by weight of an alkaline material selected from the group consisting of magnesium hydroxide, magnesium carbonate, calcium carbonate, sodium bicarbonate, sodium hydroxide and sodium carbonate.

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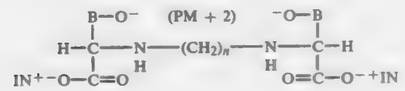
**4,746,507**

## EDHPA BASED CONTRAST AGENTS FOR MR IMAGING, APPARATUS AND METHODS

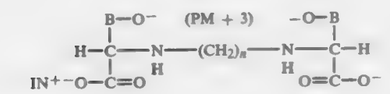
**Steven C. Quay, Menlo Park, Calif., assignor to Salutar, Inc., Sunnyvale, Calif.**

**Filed Apr. 2, 1985, Ser. No. 719,165**
**Int. Cl.[4] A61K** *49/00*
**U.S. Cl. 424—9** **38 Claims**

35. The method of imaging a subject with a magnetic resonance (MR) imaging system employing an EDHPA based paramagnetic contrast agent EDHPA'(PM), comprising the steps of:
PROVIDING a physiologically tolerable contrast agent EDHPA'(PM) having the general form:



or



where:
"PM" is a paramagnetic metal ion bound by chelation within the EDHPA';
"B" is a benzene ring bonded to the acetic carbon, with only the "O⁻" phenol radical at the ortho position,
or, a benzene ring bonded to the acetic carbon, with the "O⁻" phenol radical plus a para position phenol radical selected from the group consisting of

| | |
|---|---|
| alkyl: | $-(CH_2)-CH_3$, |
| carboxyl: | $-COO^-$, |
| nitro: | $-NO_2$, and |
| sulfonic acid: | $-SO_3^-$; |

"n" is, from 2 to 4 inclusive, methyl groups within the methyl chain connecting the two Nitrogen atoms; and
"IN⁺" is a chemically inert cation for balancing the charge the contrast agent molecule;
whereby the contrast agent causes a reduction in the T1 relaxation time near the region of interest within the subject;
INTRODUCING the EDHPA'(PM) contrast agent into the subject;
WAITING for the phenol radicals to cooperate with the in vivo environment; and
IMAGING the region of interest within a subject with the MR system to obtain a contrast agent enhanced image.

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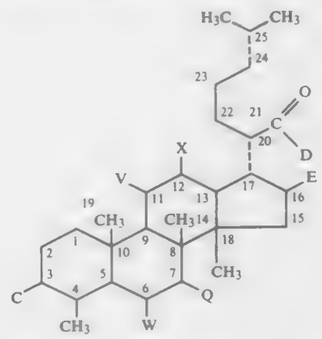
**4,746,508**

## DRUG ADMINISTRATION

**Martin C. Carey, Wellesley; Alan C. Moses, Waban, and Jeffrey S. Flier, West Newton, all of Mass., assignors to Beth Israel Hospital Assn. and The Brigham and Womens Hospital, Inc., both of Boston, Mass.**

**Continuation-in-part of Ser. No. 501,187, Jun. 6, 1983, Pat. No. 4,548,922. This application May 25, 1984, Ser. No. 614,115**
**The portion of the term of this patent subsequent to Oct. 22, 2002, has been disclaimed.**
**Int. Cl.[4] A61K** *39/00, 31/56, 37/26*
**U.S. Cl. 424—88** **76 Claims**

1. A composition useful for the prevention or treatment of a human or animal disorder or for the regulation of a human or animal physiological condition comprising, in admixture;
as an active ingredient, a biologically-effective amount of a peptide specific for the particular disorder or condition; and
(b) as an adjuvant, a biocompatible, water-soluble, fusidic acid derivative which has the formula:



wherein a dashed line represents a single or a double bond;
D represents a group having a molecular weight below about 600 daltons which renders an effective amount of said steroid water-soluble within a range of about pH 2 to about pH 12;
E and G each represent OAc, OH, a lower alkyl group or a lower heteroalkyl group;
W represents OAc or H; and
Q, V and X each represent H or OH, said steroid containing from two to three polar functions, exclusive of the function represented by D; said adjuvant being capable of increasing peptide permeability of a human or animal mucosal surface across which the peptide is to be administered, in an amount effective to increase the permeability of said mucosal surface to said peptide.

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4,746,509
**TRANSDERMAL MEDICAMENT**

Johnny Haggiage, Lyons, and Christian Pusineri, Serezin du Rhone, both of France, assignors to Rhone-Poulenc Sante, Courbevoie, France

Continuation of Ser. No. 592,817, Mar. 23, 1984, abandoned. This application Feb. 3, 1987, Ser. No. 14,190
Claims priority, application France, Mar. 24, 1983, 83 04839
Int. Cl.[4] A61L *15/03;* A61F *13/00;* A61K *9/70*
U.S. Cl. 424—449 18 Claims

1. A transdermal medicament comprising 10 to 20% of a transdermally active ingredient selected from the group consisting of antianginal agents, antiemetic agents, anticholinergic agents, non-steroid anti-inflammatory agents, steroid anti-inflammatory agents, antihypertensive agents, beta-blockers, vasodilators, neuroleptic agents, tranquillizers, bronchodilators, antispasmodic agents and hormones and 10 to 20% of a non-ionic emulsifying agent selected from the group consisting of polycondensates of ethylene oxide with a fatty acid or fatty alcohol, sorbitan esters, triglycerides with free hydroxyl group, polypropylene glycol monoglycerides and polyglycerol esters, the said active ingredient being dispersed in crystalline or solubilized form in a non-crosslinked, film-forming homogeneous, thermoplastic, elastomeric, water-insoluble polymer selected from the group consisting of polyurethanes based on a polyether or polyester, polyamides, polyesters, polyethers, and polyolefins, the said percentages being by weight based on the said film-forming polymer.

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4,746,510
**COSMETIC COMPOSITION FOR THE TREATMENT OF THE HAIR AND SKIN COMPRISING A POWDER OF FLOWERS OR FLOWER TOPS AND A COHESION AGENT**

Jean-Francois Grollier, Paris; Josiane Allec, Pierrefitte; Chantal Fourcadier, Paris; Georges Rosenbaum, Asnieres, and Patrick Darmenton, Villejuif, all of France, assignors to L'Oreal, Paris, France

Division of Ser. No. 603,737, Apr. 25, 1984, Pat. No. 4,581,230, which is a division of Ser. No. 352,105, Feb. 25, 1982, Pat. No. 4,459,285. This application Feb. 24, 1986, Ser. No. 832,338
Claims priority, application Luxembourg, Feb. 27, 1981, 83173
Int. Cl.[4] A61K *7/06, 35/78, 47/00*
U.S. Cl. 424—74 6 Claims

1. A cosmetic composition for application to the hair or skin comprising, in an aqueous medium, particles of pulverized flowers or flower tops having a granulometry lower than 125 microns and a cohesion agent present in an amount effective to maintain the homogeniety of said composition, said cohesion agent being a thickening agent, or an emulsion selected from a water-in-oil or an oil-in-water emulsion, said particles resulting from the pulverization of flowers or flower tops selected from the group consisting of amaryllis, colombine, anemone, sweet woodruff, azalea, balsamine, begonia, bougainvillea, camellia, capanula, star thistle and honeysuckle, said thickening agent being selected from the group consisting of gum arabic, karaya gum, gum tragacanth, guar gum, carob bean gum, tara gum, pectines, alginates, carraghenates, agar-agar, fur cellaria, starches, the water soluble portions of mucilagenous plants selected from the group consisting of mullein, wild chamomile, fenugreek, marsh mallow, mallow, flax, limes, psyllium, plantain, borage, star thistle, alder buckthorn, common comfrey, asparagus, senna and lichen, methyl cellulose, hydroxymethyl cellulose, hydroxyethyl cellulose, hydroxypropyl cellulose, hydroxypropylmethyl cellulose, sodium polyacrylate, polyvinyl alcohol and carboxylic polymer derivatives of acrylic acid, said particles being present in an amount of at least 5 pecent by weight based on the total weight of said composition and said cohesion agent being present in an amount of 0.1 to 20 weight pecent of said composition.

4,746,511
**LIPOPOLYSACCHARIDE AND PROCESS FOR PREPARATION THEREOF**

Hiroshi Kobatake, Kyoto; Takahiro Suekane, Iburagi; Kazuhiro Kumagai, Kyoto, and Osamu Ohya, Nishinomiya, all of Japan, assignors to Chisato Maruyama and Zeria Shinyaku Kogyo Kabushiki Kaisha, both of Tokyo, Japan

Continuation of Ser. No. 585,418, Mar. 2, 1984, abandoned. This application Jul. 28, 1986, Ser. No. 889,957
Claims priority, application Japan, Mar. 4, 1983, 58-35621
Int. Cl.[4] A61K *39/02;* C12P *19/04, 7/64;* C07H *1/100*
U.S. Cl. 424—92 12 Claims

1. A lipopolysaccharide isolated from a Mycobacterium or a Propionibacterium comprising 53 to 63% of a polysaccharide consisting of D-arabinose and D-mannose in the ratio of 1:3-4 and 37 to 47% of a fatty acid having 14–19 carbon atoms bonded to the polysaccharide through an ester linkage.

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4,746,512
**ANTICARIOGENIC OR ANTIPERIODONTITIC AGENT**

Yasuo Kawai, Atsugi, and Kazuoki Ishihara, Tokyo, both of Japan, assignors to Kabushiki Kaisya Advance Kaihatsu Kenkyujo, Tokyo, Japan

Filed Mar. 8, 1985, Ser. No. 709,668
Claims priority, application Japan, Mar. 9, 1984, 59-43829; Oct. 9, 1984, 59-210536
Int. Cl.[4] A61K *39/09, 39/02;* C12N *1/20;* A01N *63/02*
U.S. Cl. 424—92 2 Claims

2. An anticariogenic or antiperiodontitic composition comprising an anticariogenically or antiperiodontitically effective amount of dead cells, water-soluble extracts, or combinations of dead cells and water-soluble extracts of microorganisms selected from the group consisting of *Streptococcus faecium* FERM BP-712, *Streptococcus faecium* FERM BP-714, *Streptococcus equinus* FERM BP-716, *Lactobacillus fermentium* FERM BP-715, *Lactobacillus salivarius* FERM BP-713, and combinations thereof, and an orally acceptable carrier.

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4,746,513
**MICROCAPSULES AND METHOD FOR THEIR PRODUCTION**

Geoffrey W. Smith, King's Lynn, England, assignor to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 648,993, Sep. 10, 1984, abandoned. This application Apr. 8, 1986, Ser. No. 849,366
Claims priority, application United Kingdom, Sep. 20, 1983, 8325061
Int. Cl.[4] A01N *25/10, 25/28;* B01J *13/02*
U.S. Cl. 424—408 6 Claims

1. Microcapsules incorporating a volatile active material, comprising a matrix of a water-reswellable gel, the gel being in particulate form and having physically incorporated therein during cross-linking, particles of a filler material having a sorptive capacity of at least 100 percent w/w, the said filler material having the said volatile active material absorbed therein and/or adsorbed thereon, the filler material being fumed or precipitated silica.

2. A method of producing microcapsules incorporating an active material, which method comprises forming microcapsules of a water-reswellable gel having incorporated therein particles of a filler having a sorptive capacity of at least 100 percent, by cross-linking a cross-linkable polymeric material in an aqueous medium in the presence of the sorptive filler material, and drying the gel microcapsules to produce water-reswellable microcapsules, wherein the method includes the step of providing the volatile active material absorbed in or adsorbed on the filler material, wherein the filler material is fumed or precipitated silica.



4,746,514
**HYDROGEL MATERIALS FORMED BY RADIATION POLYMERIZATION OF CARBOHYDRATES AND UNSATURATED MONOMERS**

Kevin J. Warne, Swindon, England, assignor to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed Sep. 11, 1985, Ser. No. 775,003
Claims priority, application United Kingdom, Sep. 11, 1984, 8422950
Int. Cl.[4] A61F *13/00;* C08F *2/54*
U.S. Cl. 424—445 31 Claims

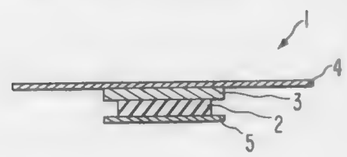
1. An homogeneous hydrogel material comprising a water-soluble organic material, selected from the group consisting of monosaccharides, disaccharides, trisaccharides, tetrasaccharides, and pentasaccharides and derivatives thereof, radiation crosslinked in aqueous solution with at least one water-soluble ethylenically unsaturated compound having at least one hydrophilic group appendant thereto.

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4,746,515
**SKIN PERMEATION ENHANCER COMPOSITIONS USING GLYCEROL MONOLAURATE**

Yu-Ling Cheng, Cupertino; Diane E. Nedberge, Los Altos, and Edna Sugihara, Mountain View, all of Calif., assignors to ALZA Corporation, Palo Alto, Calif.

Filed Feb. 26, 1987, Ser. No. 19,470
Int. Cl.[4] A61F *13/00*
U.S. Cl. 424—449 13 Claims




1. A composition of matter for application to a body surface or membrane to deliver a biologically active agent by permeation through a body surface or membrane comprising, in combination: a biologically active agent and a permeation enhancing amount of glycerol monolaurate whereas said agent and glycerol monolaurate are dispersed within a carrier.

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4,746,516
**PHARMACEUTICAL COMPOSITIONS CONSISTING OR CONSISTING ESSENTIALLY OF FREEZE-DRIED DRUG-CARRYING LIPOSOMES**

Luigi Moro, Cairate; Guido Neri, and Alessandro Rigamonti, both of Milan, all of Italy, assignors to Farmitalia Carlo Erba S.p.A., Milan, Italy

Continuation of Ser. No. 712,447, Mar. 18, 1985, abandoned, which is a continuation-in-part of Ser. No. 596,846, Apr. 4, 1984, abandoned, which is a continuation of Ser. No. 111,837, Jan. 4, 1980, Pat. No. 4,460,577, which is a continuation-in-part of Ser. No. 945,515, Sep. 25, 1978, abandoned. This application Oct. 22, 1986, Ser. No. 921,856
Int. Cl.[4] A61K *9/10, 31/74, 31/70*
U.S. Cl. 424—450 2 Claims

1. A stable pharmaceutical composition consisting essentially of drug-carrying liposomes when prepared according to the process as hereinafter defined, said drug being selected from the group consisting of doxorubicin hydrochloride and aminosidine sulphate, and said process comprising:
(a) contacting a liposome suspension with an ion-exchange resin capable of selectively binding non-entrapped drug by mixing said suspension with said resin;
(b) separating said resin-bound drug from said suspension by passing said mixture through a filter medium capable of retaining said resin and filtering said suspension; and
(c) stabilizing said filtrate by lyophilization.

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4,746,517
**PRODUCTION OF BEER**

Paul Ducroo, Phalempin, France, assignor to Gist-Brocades S.A., Prouvy, France

Filed Dec. 2, 1986, Ser. No. 936,806
Claims priority, application European Pat. Off., Dec. 3, 1985, 85202017.1
Int. Cl.[4] C12C *5/02, 9/00;* C12R *1/645*
U.S. Cl. 426—12 4 Claims

1. A process for improving the filterability of wort or beer comprising treating said wort or beer with xylanase produced by *Disporotrichum dimorphosporum* in an amount effective to improve the filterability.

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4,746,518
**PROCESS FOR THE PREPARATION OF ALCOHOL-FREE DRINKS WITH A YEAST AROMA**

Fritz Schur, Magden, Switzerland, assignor to Brauerei Feldschlosschen, Switzerland

Continuation of Ser. No. 715,583, Mar. 25, 1985, Pat. No. 4,661,355, which is a continuation of Ser. No. 366,118, Apr. 7, 1982, abandoned. This application Feb. 24, 1987, Ser. No. 17,354
Claims priority, application Switzerland, Jan. 4, 1982, 11/82
The portion of the term of this patent subsequent to Apr. 28, 2004, has been disclaimed.
Int. Cl.[4] C12C *11/00;* C12G *1/00*
U.S. Cl. 426—15 1 Claim

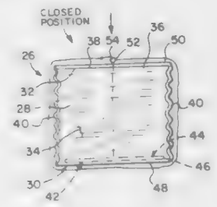
1. In a process for preparation of a beverage having a yeast aroma which comprises isolating yeast from a fermentation process and removing fermented liquid of said fermentation process from the yeast, contacting said isolated yeast with an aqueous liquid containing nutrients, flavour substances or a combination thereof suitable for human consumption and removing the yeast totally from said aqueous liquid to provide said beverage, the improvement which comprises carrying out said contacting at a temperature of about −0.4° C. or below for a period of time sufficient to have aroma substances of the yeast diffuse from the cells thereof into said aqueous liquid, to have aroma reactions between the yeast and said aqueous liquid take place, or both, said aqueous liquid having a dry substance content of about 6 to 12% by weight, said isolated yeast being employed at a ratio of 0.1 to 4 liters on a nonwatered, thick liquid basis per hectoliter of said aqueous liquid and wherein substantially no production of alcohol occurs during the process.

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4,746,519
**COFFEE BAGS**

Darlene J. Wright, R.R. #3, Oregon, Ill. 61061, and George Spector, 233 Broadway, Rm. 3615, New York, N.Y. 10007

Filed Dec. 22, 1986, Ser. No. 944,940
Int. Cl.[4] B65B *29/02*
U.S. Cl. 426—83 2 Claims




1. A coffee bag comprising:

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(a) a portion of very fine ground coffee for making an individual cup of coffee;
(b) a cylindrical housing having an open top and fabricated out of water-permeable paper material and containing said very fine grounds of coffee therein;
(c) a perforated disc heat sealed to and around the perimeter of said open top of said housing;
(d) a pair of spring strips restraining said housing in a collapsed condition, each of said spring strips being vertically suspended from an opposite edge of said perforated disc and attached along the side of said housing, the spring strips are such that when said housing is inserted into liquid said spring strips will extend downwardly aided by the then soggy coffee grounds weight to help said housing to expand to an extended position; and
(e) means for agitating said ground coffee within said housing when said bag is inserted into said liquid; said agitating means comprising a member having a plurality of radial fingers located in the bottom of said housing below said very fine ground coffee and an elastic cord extending upwardly from the center of said member and out through said perforated disc so that when a person pulls said elastic cord after the housing is inserted within a cup of hot water, said member with said radial fingers will agitate said very fine ground coffee; said coffee bag further comprising an eyelet mounted adjacent to the top center of said perforated disc and a hook attached to the free end of said elastic cord with said elastic cord wrapped from top to bottom around said housing with said hook removably engaging said eyelet to help keep said housing in said collapsed position.

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**4,746,520**

## SWEETENING PRODUCT, METHOD FOR THE MANUFACTURING THEREOF AND PLANT FOR THE WORKING OF THIS METHOD

**Georges J. Smits, Gijzegem, and Andre H. Bausier, Jodoigne, both of Belgium, assignors to Raffinerie Tirlemontoise, Societe Anonyme, Brussels, Belgium**

**Filed May 6, 1986, Ser. No. 860,180**
**Claims priority, application Belgium, May 6, 1985, 214966**
**Int. Cl.⁴ A23L** *1/236*
**U.S. Cl. 426—103** **12 Claims**

1. A sweetening product comprising by weight, 94 to 96.5% sugar, sugar-derived alcohol or mixtures thereof; 3 to 5.5% of an artificial sweetener or sweetening mixture with high sweetening power, 0.1 to 0.4% food organic acid, 0.2 to 0.5% bicarbonate, and such a water amount that the end product contains at the most 0.1 weight % water.

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**4,746,521**

## METHOD OF MANUFACTURING A FOOD CONTAINING SOYBEAN PROTEIN ISOLATE

**Shichiro Niwano, Nishinomiya, and Norihumi Idomoto, Nabari, both of Japan, assignors to Tajimaya Food Company, Ltd., Itami, Japan**

**Filed Mar. 2, 1987, Ser. No. 20,769**
**Claims priority, application Japan, Mar. 1, 1986, 61-44550**
**Int. Cl.⁴ A21D** *2/26;* **A23L** *1/20*
**U.S. Cl. 426—241** **6 Claims**

1. A method of manufacturing a food which comprises adding to 100 parts by weight of a mixture comprising a soybean protein isolate and wheat flour in a weight ratio of 40 to 60:60 to 40, a mixture containing one or both of 10 to 30 parts by weight of egg white and 10 to 30 parts by weight of whole egg, and 0.2 to 3 parts by weight of a leavening agent, and heating the mixture in an irradiation chamber at a suitable microwave frequency under air flow, said air being at a temperature sufficient to permit efficient evaporation of water and to prevent condensation of the evaporated water on the walls of the irradiation chamber.

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**4,746,522**

## COMPOSITION AND METHOD FOR TREATING MEAT TO REDUCE MOISTURE LOSS DURING COOKING

**Miles D. Wofford, Rt. 1 Box 222C, Anthony, N. Mex. 88021, and John M. Wofford, 5718 Macon Ln., El Paso, Tex. 79924**

**Filed Feb. 19, 1986, Ser. No. 830,865**
**Int. Cl.⁴ A23L** *1/00*
**U.S. Cl. 426—243** **35 Claims**

1. A liquid slurry composition for treating meat to reduce moisture loss incurred during cooking comprising:
(a) from about 0.003% to about 1.98% by weight of about 1% to 10% acetic acid solution,
(b) from about 0.102% to about 1.98% by weight of gelatin,
(c) from about 1.05% to about 27.50% by weight of starch,
(d) from about 0.003% to about 13.75% by weight of sodium chloride,
(e) from about 0.003% to about 5.50% by weight of a phosphate salt, and
(f) the balance being non-halogenated water.

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**4,746,523**

## METHOD AND APPARATUS FOR PREPARING A SHAPED ICE CONFECTION PRODUCT

**Gary N. Binley, Kettering, England, assignor to Thomas J. Lipton, Inc., Englewood Cliffs, N.J.**

**Filed May 6, 1986, Ser. No. 860,070**
**Claims priority, application United Kingdom, May 9, 1985, 8511701**
**Int. Cl.⁴ A23G** *9/26, 9/00*
**U.S. Cl. 426—249** **11 Claims**

1. In a method of preparing a shaped ice confection product comprising introducing a deformable partly frozen ice mixture composition into a cavity of a mold to form a shaped ice confection product, demolding the shaped ice confection product in a solid state and thereafter cooling the shaped ice confection product to harden it,
the improvement comprising the step of introducing the partly frozen ice mixture composition into the cavity while under pressure and while it comprises separate ice crystals and a continuous liquid phase in relative amounts sufficient to maintain the shape of the ice mixture composition if unsupported, said mold being closed except for venting openings.

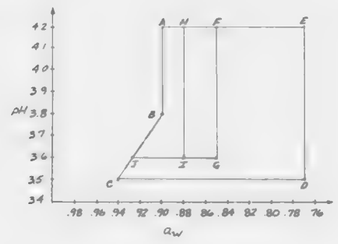
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**4,746,524**

## MICROBIOLOGICALLY-RESISTANT SAUCES AND DRESSINGS AND METHOD FOR THEIR PREPARATION

**Richard S. Meyer, Tacoma, Wash., assignor to Curtice-Burns, Inc., Rochester, N.Y.**

**Filed Sep. 25, 1986, Ser. No. 912,305**
**Int. Cl.⁴ A23L** *1/24, 1/39*
**U.S. Cl. 426—330** **18 Claims**




1. A method for formulating sauces and dressings containing a plurality of ingredients that resist the growth of microorganisms therein comprising lowering the pH and water activity of the ingredients used to prepare the sauces and dressings such that when the ingredients are mixed the product sauces and dressings have a pH and water activity falling within the polygon ABCDE of FIG. 1.

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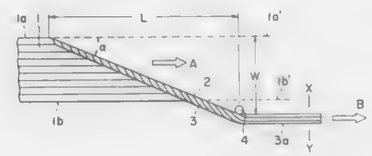


**4,746,525**

## PROCESS FOR SHAPING FISH-PASTE PRODUCTS FROM FISH PASTE MATERIALS

**Shobun Goto, Shiogama; Jiro Sugihara, Miyagi, and Masayoshi Yabusaki, Shiogama, all of Japan, assignors to Kabushiki Kaisha Kibun, Tokyo, Japan**

**Continuation of Ser. No. 630,760, Jul. 13, 1984, abandoned. This application Jun. 22, 1987, Ser. No. 63,761**
**Claims priority, application Japan, Jul. 26, 1983, 58-136541**
**Int. Cl.⁴ A23L** *1/325;* **A23P** *1/00*
**U.S. Cl. 426—383** **3 Claims**




1. A process for shaping fish-paste products from fish paste materials which process comprises the steps of:
(1) preparing a sheet composed of all of the fish paste materials in the product, said sheet having specific width and indefinite length and having incised lines or grooves formed in the lengthwise direction of the sheet on at least one of the two surfaces of the sheet;
(1) causing the sheet to travel in its length-wise direction by applying tension to at least its front end in the lengthwise direction;
(3) spirally and obliquely curling the thus traveling sheet at the front end portion thereof into a curled body having a lateral edge of the sheet as a core and extending obliquely to the sheet traveling direction and outward beyond the opposite lateral edge of the sheet;
(4) pulling the resulting curled body in a direction substantially parallel to the sheet-moving direction, the curled body being inflected at a point on or outside a line determined by extending the line of said opposite lateral edge of the sheet, at which point the curled body is supported by a guide post means against the force biasing the curled body so that the curled body tends to be parallel to the sheet-moving direction due to the pulling, said guide post means being a roller with its axis perpendicular to the plate of the surface of the sheet, which roller has a substantially constant diameter along the axis, and said curled body traveling in contact with the surface of the roller at substantially a predetermined location along the length of the roller, thereby causing said tension to be applied to the sheet and the sheet to be rolled up into a rolled-up article; and then
(5) subjecting the rolled-up article to further processing.

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**4,746,526**

## METHOD FOR PREPARING PREBAKED, OVEN READY, CHEMICALLY LEAVENED FROZEN BISCUITS

**Leo P. Carroll, Louisville, Ky., assignor to Liqui-Dri Foods, Inc., Louisville, Ky.**

**Filed May 29, 1987, Ser. No. 55,358**
**Int. Cl.⁴ A21D** *13/00, 15/00*
**U.S. Cl. 426—496** **8 Claims**

1. The process for producing a consumer-ready pre-baked chemically leavened frozen biscuit comprising the steps:
a. preparing a biscuit dough, and shaping the dough into a raw biscuit preform,
b. baking the preform to bake out the interior to a temperature of at least 165° F. resulting in a freshly baked biscuit, having a substantially horizontal upper crust,
c. tempering the freshly baked biscuit by adding moisture to the upper crust of the freshly baked biscuit in an amount sufficient to raise the moisture content of the upper crust to at least 16%, to produce a tempered baked biscuit,
d. freezing the resulting tempered baked biscuit resulting in a frozen biscuit,
e. baking the frozen biscuit by placing the frozen biscuit directly into a hot oven and subjecting the frozen biscuit to time-temperature baking conditions sufficient to raise the internal temperature of the biscuit to at least about 165° F. which would otherwise be a regular baking cycle, and,
f. removing the resulting consumer ready article from the oven.

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**4,746,527**

## DRINK COMPOSITION

**Theo W. Kuypers, Richigen, Switzerland, assignor to Nestec S.A., Vevey, Switzerland**

**Continuation of Ser. No. 700,198, Feb. 11, 1985, abandoned. This application Oct. 15, 1986, Ser. No. 918,660**
**Claims priority, application Switzerland, Feb. 20, 1984, 806/84**
**Int. Cl.⁴ A23C** *1/04;* **A23G** *1/00;* **A23L** *2/40;* **A23F** *5/40*
**U.S. Cl. 426—569** **8 Claims**

1. A particulate powder-form composition comprising particles having cavities containing gaseous contents and comprising by weight from 0.2% to 28% fats, 5% to 16% lactic proteins and 16% to 62% lactose, such that the ratio by weight of lactic proteins to lactose is from 1:3.5 to 1:5, up to 60% carbohydrates, other than lactose, and a stabilizing salt selected from the group consisting of a citrate in an amount of 0.6% to 1% by weight of the composition and a phosphate in an amount of 0.3% to 0.5% by weight of the composition.

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**4,746,528**

## GEL SYSTEM

**Colin T. Prest, Stathern, Nr. Melton Mowbray, and Keith Buckley, Melton Mowbray, both of England, assignors to Mars G.B. Limited, London, England**

**Continuation of Ser. No. 808,164, Dec. 12, 1985, abandoned. This application Aug. 29, 1986, Ser. No. 903,857**
**Claims priority, application United Kingdom, Dec. 14, 1984, 8431699**
**Int. Cl.⁴ A23L** *1/04*
**U.S. Cl. 426—573** **21 Claims**

1. A gellable composition adaptable to the formation of an unsterilized gel having superior gel strength, said composition comprising a mixture of (1) gellan, (2) xanthan gum, and (3) a galactomannan and/or glucomannan gum capable of forming a gel with xanthan gum, wherein the ratio by weight of (1):[(2)+(3)] is 1:≧2.

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**4,746,529**

## PROCESS AND APPARATUS FOR THE CONTINUOUS REFINING OF ROLLING STOCK AS THE STARTING PRODUCT FOR CHOCOLATE

**Rudolf Rapp, Überlingen, Fed. Rep. of Germany, assignor to Werner & Pfleiderer GmbH, Stuttgart, Fed. Rep. of Germany**

**PCT No. PCT/EP85/00214, § 371 Date Dec. 20, 1985, § 102(e) Date Dec. 20, 1985, PCT Pub. No. WO85/05012, PCT Pub. Date Nov. 21, 1985**
**PCT Filed May 9, 1985, Ser. No. 817,732**
**Claims priority, application Fed. Rep. of Germany, May 9, 1984, 3417126**
**Int. Cl.⁴ A23G** *1/00*
**U.S. Cl. 426—660** **14 Claims**

1. A process for continuously producing chocolate from a mixture comprising a thin-layered-roasted cocoa mass, water, carbohydrates and milk components, said carbohydrates and

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milk components being present in said mixture on a dry basis in an amount of up to 20% by weight, and said mixture having been rolled to form rolling stock material as the starting material, comprising continuously introducing said rolling stock material into an open, heatable system and spreading and degassing said rolling stock material under a negative pressure between 20 and 200 mbar and refining the same, thereafter continuously supplying gas or air, or a mixture of gas and air, at temperatures between 80° C. and 120° C., to the refined spreaded and degassed rolling stock material and intimately mixing and plasticizing said spreaded and degassed rolling stock material, and thereafter continuously introducing the intimately mixed and plasticized rolling stock material into a closed system and subjecting said intimately mixed and plasticized rolling stock mixture to shearing and mixing forces therein and homogenizing the same and forming a chocolate end product.

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**4,746,530**

## MAKING A NATURAL FOOD PEANUT PUNCH

**Abadan J. Abdul, 3850 Finch Ave. E., Suite 207A, Agincourt, Ontario, Canada**

**Filed Jun. 15, 1987, Ser. No. 61,808**
**Int. Cl.[4] A23C** *9/154, 9/156;* **A23L** *1/20*
**U.S. Cl. 426—580** **4 Claims**

1. A method of making a peanut based punch beverage formed from ingredients;

(A) liquid skim milk over 80% by weight;

(B) fine sugar under 10% by weight; stabilizer under 1% by weight;

(C) peanut butter under 10% by weight; liquid caramel under 1% by weight;

said method comprising the steps of;

(1) preblending ingredients (B);

(2) adding preblended ingredients (B) to ingredients (A) and agitate at medium speed for about 5 minutes to form a mixture of ingredients (A) and (B);

(3) heating the mixture of step (2) to about 72° C. and adding ingredients (C) during agitation to form a mixture of ingredients (A), (B) and (C) while maintaining a temperature at about 72° C. with continuous agitation at medium speed for about 10 minutes.

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**4,746,531**

## SWINE FEED

**Raymon W. Lush, Bloomfield, Nebr., assignor to Bloomfield Feed Mill, Inc., Bloomfield, Nebr.**

**Filed Apr. 18, 1986, Ser. No. 853,570**
**Int. Cl.[4] A23K** *1/00*
**U.S. Cl. 426—623** **6 Claims**

1. In a transition feed for swine for weaning piglets from a sow to a dry feed, said transition feed including as ingredients at least one or more animal protein products, marine products, milk products, grain products, plant protein products, processed gain by-products and natural and artificial flavors in proportions to balance the feed ration for protein, fiber, energy and palatability, the improvement comprising the inclusion of mature sweet corn as an ingredient of said transition feed in a proportion with respect to the other of said ingredients thereof such that the palatability of said transition feed is enhanced and said transition feed is balanced for protein, fiber, energy and palatability.

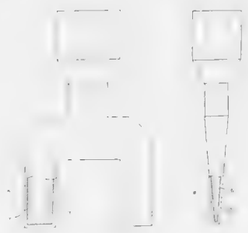
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**4,746,532**

## METHOD FOR THE PRODUCTION OF ENDOSSEOUS IMPLANTS

**Kazuo Suzuki, and Mitsuo Ito, both of Shiojiri, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan**

**Filed Jul. 29, 1986, Ser. No. 890,287**
**Claims priority, application Japan, Aug. 8, 1985, 60-175569**
**Int. Cl.[4] B05D** *1/08*
**U.S. Cl. 427—2** **9 Claims**



1. In a method for producing endosseous implants comprising thermally spraying a ceramic material onto the surface of a metallic titanium core material, the improvement which comprises subjecting the metallic titanium core material to a surface oxidation treatment by heating the core material at a temperature of 400° to 800° C. in air and then thermally spraying the ceramic material onto the surface of the metallic titanium core material, wherein the ceramic material is aluminum oxide, hydroxyapatite or a mixture thereof.

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**4,746,533**

## PROCESS FOR COATING A METALLIC SURFACE WITH A VITREOUS ENAMEL

**William A. Hubbard, Towson, Md., assignor to Mobay Corporation, Pittsburgh, Pa.**

**Filed Dec. 19, 1986, Ser. No. 944,635**
**Int. Cl.[4] B05D** *7/00, 1/06, 1/36, 3/02*
**U.S. Cl. 427—27** **6 Claims**

1. A process for coating a metallic surface with vitreous enamel in which a cleaning pre-treatment to remove surface oil from the metallic surface to be coated with the vitreous enamel is not required comprising:

(a) applying an enamel-forming material to a metallic surface coated with a polybutene as the surface oil; and

(b) firing the thus-coated metal surface at a temperature sufficiently high to cause the enamel-forming material to form a vitreous enamel coating.

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**4,746,534**

## METHOD OF MAKING A THERMOCOUPLE

**R. Michael Phillippi, Highland, Md.; David C. Greenspan, Vienna, Va.; Richard T. Ellis, Columbia; Tadeusz M. Drzewiecki, Silver Spring, both of Md.; Taki Negas, Frederick, Md.; Ernie Tokay, Reston, and James R. Bush, Alexandria, both of Va., assignors to System Planning Corporation, Arlington, Va.**

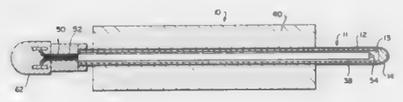
**Division of Ser. No. 775,183, Sep. 12, 1985, Pat. No. 4,721,534.**
**This application Nov. 10, 1987, Ser. No. 119,122**
**Int. Cl.[4] B05D** *3/06*
**U.S. Cl. 427—37** **2 Claims**

1. A method of making a protective sheath for a thermocouple comprising:

(a) providing a metal tube having one end closed;

(b) plasma arc-spraying a layer of molybdenum over the outer surface of said metal tube under conditions to produce a coating of molybdenum having a porosity of from about 4 to about 33%;

(c) plasma arc-spraying a series of at least two layers of a cermet comprising $Al_2O_3$–$Cr_2O_3$-Mo on the resulting porous molybdenum-coated metal tube, the concentration of molybdenum in each cermet layer decreasing in proceeding from the inner to the outer layer, the plasma arc spraying conditions being controlled to produce a porosity of from about 4 to about 33% in said cermet layers;



(d) plasma arc spraying a coating of substantially pure $Al_2O_3$-$Cr_2O_3$ on the outermost cermet layer, applied in step (c) under conditions to produce an $Al_2O_3$-$Cr_2O_3$ layer having a porosity of from about 4 to about 33%.

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**4,746,535**

## METHOD OF MAKING PHOTOSENSORS

**Masaki Fukaya, Yokohama; Toshiyuki Komatsu, Yamato; Tatsumi Shoji, Hiratsuka; Masaru Kamio, Atsugi, and Nobuyuki Sekimura, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Japan**

**Division of Ser. No. 781,733, Sep. 30, 1985, Pat. No. 4,724,323.**
**This application Sep. 25, 1987, Ser. No. 101,949**
**Claims priority, application Japan, Oct. 4, 1984, 59-207091; Oct. 5, 1984, 59-208363; Oct. 8, 1984, 59-209661; Oct. 9, 1984, 59-210493; Oct. 11, 1984, 59-211464**
**Int. Cl.[4] B05D** *3/06*
**U.S. Cl. 427—39** **1 Claim**




1. A method of making a photosensor by depositing a photoconductive layer under a plasma of glow discharge, said photosensor comprising said photoconductive layer formed on a substrate, said layer containing amorphous silicon, and a pair of electrodes provided on the same surface of said photoconductive layer, the spacing between said electrodes of said pair constituting at least a part of a photoreceptor, said method including the steps of first performing deposition with relatively large discharge power, and then continuing the deposition while decreasing the discharge power slowly, thereby forming the photoconductive layer, the refractive index of at least a portion of which varies continuously through the thickness of the layer.

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**4,746,536**

## METHOD FOR SELECTIVE CHEMICAL PLATING

**Yukio Ichikawa, and Satoshi Usui, both of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 17, 1986, Ser. No. 945,298**
**Claims priority, application Japan, Dec. 18, 1985, 60-285242**
**Int. Cl.[4] B05D** *3/06*
**U.S. Cl. 427—54.1** **5 Claims**

1. In the process of selectively chemical plating on a formed article composed of a polyarylene sulfide or a composition comprising a polyarylene sulfide as the predominant resin component which comprises irradiating a portion not to be plated of the formed article with light of a wavelength from about 300 to about 404 nm from an ultraviolet light source and then subjecting the formed article to chemical plating.

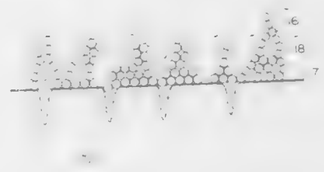
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**4,746,537**

## METHOD OF COATING POROUS CERAMIC STRUCTURES WITH γ-ALUMINA

**Akira Takeuchi; Yukihisa Takeuchi, both of Aichi, and Hitoshi Yoshida, Okazaki, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan**

**Continuation of Ser. No. 815,826, Jan. 2, 1986, abandoned. This application Jul. 13, 1987, Ser. No. 73,344**
**Claims priority, application Japan, Jan. 9, 1985, 60-2592**
**Int. Cl.[4] B05D** *3/06, 7/22*
**U.S. Cl. 427—37** **5 Claims**



1. A method of coating a porous ceramics structure with γ-alumina comprising the steps of: generating an arc discharge between the surface of aluminum in molten state and an aluminum electrode so as to generate aluminum vapor; oxidizing said aluminum vapor to form fine particles of γ-alumina; causing both the γ-alumina fine particles and a carrier gas comprising an oxidizing gas containing oxygen to flow through pores of said porous ceramics structure so that said γ-alumina fine particles are deposited in three-dimensional and columnar form on the surface of the skeleton of said structure around said pores; and heating said structure with said γ-alumina fine particles deposited thereto to a predetermined temperature thereby fixing said γ-alumina fine particles to the surface of said skeleton.

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**4,746,538**

## PROCESS FOR DEPOSITING A THIN LAYER OF A MATERIAL ON THE WALL OF A HOLLOW BODY

**Jean M. Mackowski, Villeurbanne, France, assignor to Centre National de la Recherche Scientifique (CNRS), Paris, France**

**Filed Jan. 12, 1987, Ser. No. 2,265**
**Claims priority, application France, Jan. 14, 1986, 86 00586**
**Int. Cl.[4] B05D** *3/06*
**U.S. Cl. 427—38** **26 Claims**

1. A process of depositing a material on at least a surface of a container, said container having an inner surface defining an internal volume of said container and an outer surface, said process comprising:

providing a cathode within said container spaced adjacent an inner surface of said container, wherein said cathode has a variable apparent and effective volume, such that said cathode can be inserted into said container and then radially extended so as to substantially fill said internal volume of the container;

providing an electrode spaced adjacent with an outer surface of said container;

providing a closure lid for said container, wherein said cathode is arranged in an air tight manner in said closure lid and electrically insulated therefrom;

evacuating said container;

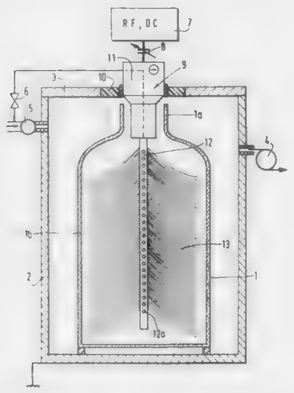
providing an adjusted flow of a gaseous complex into said evacuated container, said gaseous complex comprising a source of the material which is to be deposited;

polarizing said cathode, wherein said polarizing step causes the formation of a plasma of said gaseous complex, from

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which plasma said material is deposited onto a surface of said container; and




removing any undeposited remaining constituents of said gaseous complex from said container by evacuating said remaining constituents from said container.

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**4,746,539**

## PURIFICATION OF CANCER-ASSOCIATED PROTEIN AND PREPARATION OF ANTIBODY THERETO

**Thomas E. Webb; Dorothy E. Schumm and Margaret Hanausek-Walaszek, all of Columbus, Ohio, assignors to The Ohio State University Research Foundation, Columbus, Ohio**

**Filed Nov. 23, 1983, Ser. No. 554,439**

**Int. Cl.⁴ C12Q** *1/00;* **C12P** *21/00, 21/02;* **A61K** *39/00*

**U.S. Cl. 424—85** **22 Claims**

1. A protein preparation comprising a cancer-associated phosphoprotein having the following characteristics:

(a) not being precipitated by 30% saturated aqueous ammonium sulfate solution at 25° C.;

(b) having a molecular weight of approximately 60,000,

(c) being precipitated from aqueous solution by 3.3% streptomycin sulfate;

(d) having substantially no autophosphorylation activity but being phosphorylated with adenosine triphosphate in the presence of an exogenous protein kinase;

(e) having substantially no protein kinase activity;

(f) having the capacity to liberate ribonucleic acid from cell nuclei;

(g) being substantially free of albumin; and

(h) normally absent from the maternal blood of noncancerous normal pregnant mammals of the species in which said protein is being determined,

said protein preparation having an RNA-releasing activity of at least about 10 units per milligram of total protein in said protein preparation.

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**4,746,540**

## METHOD FOR FORMING ALLOY LAYER UPON ALUMINUM ALLOY SUBSTRATE BY IRRADIATING WITH A $CO_2$ LASER, ON SUBSTRATE SURFACE, ALLOY POWDER CONTAINING SUBSTANCE FOR ALLOYING AND SILICON OR BISMUTH

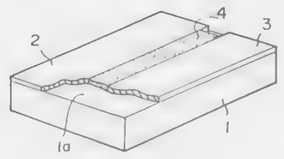
**Minoru Kawasaki; Soya Takagi; Kazuhiko Mori, and Shinji Kato, all of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan**

**Filed Aug. 8, 1986, Ser. No. 894,941**

**Claims priority, application Japan, Aug. 13, 1985, 60-178430; Aug. 13, 1985, 60-178431**

**Int. Cl.⁴ B05D** *3/06*

**U.S. Cl. 427—53.1** **4 Claims**




1. A method for forming an alloy layer on a surface of an aluminum alloy substrate comprising:

disposing a powder for alloying upon the surface of said aluminum alloy substrate, said powder for alloying comprising a mixture of a powder of bismuth and a powder of a substance to be alloyed with said aluminum alloy substrate, the average particle size of said bismuth powder in said powder for alloying being not more than about −42 mesh and the bismuth content of said powder for alloying being at least 21%; and

irradiating said powder for alloying as disposed upon said surface of said aluminum alloy substrate with a $CO_2$ laser so as to melt and fuse said powder for alloying and a surface portion of said aluminum alloy substrate thereby to alloy them together;

wherein the composition, particle size and disposition on said surface of said aluminum alloy substrate of said powder for alloying, the composition and dimensions of said aluminum alloy substrate, the power output, output mode, beam pattern and beam scanning speed of said laser, and the atmosphere of melting and fusing of said powder for alloying and the surface portion of said aluminum alloy substrate are such that, when neither silicon nor bismuth are included in said powder for alloying, substantially no alloy layer is formed on the surface portion of said aluminum alloy substrate; and

wherein bismuth is incorporated in said powder for alloying so that said alloy layer is formed at an alloying rate which is substantially proportional to the content of bismuth and increases to be substantially 100 percent before the content of bismuth reaches approximately 50 percent.

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**4,746,541**

## ELECTRICALLY CONDUCTIVE THERMALLY STABILIZED ACRYLIC FIBROUS MATERIAL AND PROCESS FOR PREPARING SAME

**Yusuf M. F. Marikar, Scotch Plains, and Michael M. Besso, West Orange, both of N.J., assignors to Hoechst Celanese Corporation, Somerville, N.J.**

**Filed Dec. 16, 1985, Ser. No. 809,654**

**Int. Cl.⁴ B05D** *5/12*

**U.S. Cl. 427—126.1** **54 Claims**

1. A process for preparing an electrically conductive fibrous material from a thermally stabilized acrylic fibrous material comprising the steps of:

(a) contacting said thermally stabilized acrylic fibrous material with a source of cuprous ions to produce a cuprous ion-impregnated thermally stabilized acrylic fibrous material; and

(b) contacting the resulting cuprous ion-impregnated thermally stabilized acrylic fibrous material with a sulfiding agent capable of sulfiding said cuprous ions to form electrically conductive covellite copper sulfide in association with said thermally stabilized acrylic fibrous material.






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**4,746,542**

## COATING METHOD FOR USE IN THE PRODUCTION OF MAGNETIC RECORDING MEDIUM

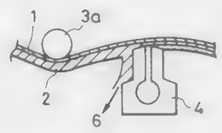
**Naoyoshi Chino; Yasuhito Hiraki, and Tsunehiko Sato, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Nov. 25, 1986, Ser. No. 934,897**

**Claims priority, application Japan, Nov. 21, 1985, 60-262223**

**Int. Cl.⁴ H01F** *10/02*

**U.S. Cl. 427—131** **6 Claims**




1. A coating method for use in producing a magnetic recording medium, comprising the steps of

moving an elongated support;

applying a first coating solution to a first surface of said moving support in an amount of no more than 60 milliliter/$m^2$; and

before said first coating solution has dried, applying a second coating solution to a surface of said first coating solution with an extrusion head pressed against said surface of said first coating solution and a second surface of said support opposed to said first surface not being supported at said extrusion head, said second coating solution being applied in an amount not exceeding 50 milliliter/$m^2$.

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**4,746,543**

## COMPOSITION AND METHOD FOR DUST CONTROL

**K. James Zinkan, Chagrin Falls, and Louis J. Koenig, Jr., Parma, both of Ohio, assignors to Zinkan Enterprises, Inc., Cleveland, Ohio**

**Division of Ser. No. 807,174, Dec. 10, 1985. This application Aug. 17, 1987, Ser. No. 85,808**

**Int. Cl.⁴ B05C** *1/16;* **B05D** *7/00;* **C08K** *5/06*

**U.S. Cl. 427—136** **8 Claims**

1. A method of controlling dust which comprises treating the dust particles near the point of generation with an effective amount of an aqueous solution of water-soluble polymers, which comprises:

(a) about 1 to 99 parts by weight of water,

(b) about 0.001 to 10 parts by weight of at least one water-soluble anionic acrylic polymer having an average molecular weight ranging up to about twenty million derived from a monomer selected from the group consisting of acrylamides, acrylonitriles, acrylic acid, methacrylic acid, and the salts and esters of acrylic and methacrylic acids,

(c) about 0.005 to 20 parts by weight of a water-soluble nonioric alkylene glycol polymer having an average molecular weight ranging from about 200 to 15,000,

(d) about 1.0 to 35 parts by weight of at least one water-soluble nonionic polyalkoxy alcohol surfactant having an average molecular weight ranging from about 200 to 15,000, and

(e) about 0.5 to 25 parts by weight of at least one water-soluble anionic surfactant selected from the group consisting of sulfonates, sulfates, and succinates.

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**4,746,544**

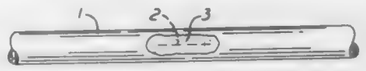
## PROCESS FOR APPLYING A SEALANT COMPOSITION

**Thieo E. Hogen-Esch, Gainesville, Fla., assignor to Renbec International Corp., Brooksville, Fla.**

**Filed Jan. 2, 1987, Ser. No. 195**

**Int. Cl.⁴ B32B** *35/00*

**U.S. Cl. 427—140** **27 Claims**




1. A process for applying a sealant comprising the steps of:

(a) applying a layer of an alpha-cyanoacrylate over the rupture or opening to be sealed and over the area adjacent to said rupture or opening, said alpha-cyanoacrylate being liquid at 20° C. and having the formula $CH_2$=C(CN)—COOR wherein R is a hydrocarbon radical selected from the group consisting of aliphatic, aromatic and cycloaliphatic hydrocarbon groups of 1–10 carbon atoms and alkoxy, chloro and fluoro derivatives of said hydrocarbon groups in which alkoxy groups there are 1–4 carbon atoms therein; and

(b) spreading on the said layer of alpha-cyanoacrylate a layer of a powder comprising rubber.

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**4,746,545**

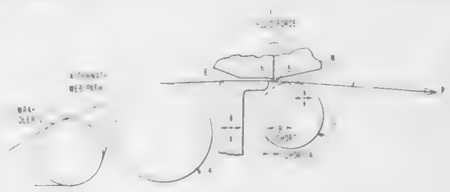
## FLUID COATING AND WEB-HANDLING METHOD AND APPARATUS PARTICULARLY ADAPTED FOR LOW-TENSION AND/OR UNEVENLY THICK WEBS

**Frederic S. McIntyre, Wellesley, Mass., assignor to Acumeter Laboratories, Inc., Marlborough, Mass.**

**Filed Dec. 16, 1985, Ser. No. 809,488**

**Int. Cl.⁴ B05D** *5/00, 1/26;* **B05C** *3/18, 3/20*

**U.S. Cl. 427—176** **20 Claims**



1. A method of supporting webs of non-woven and low-tension web materials, including materials of uneven thickness, drawn along a longitudinal path with relatively low tension past a fluid-coating nozzle at one side of the web to resist deflection of the web laterally of said path upon the intermittent ejection of the fluid from the nozzle upon the web, that comprises, drawing the web as it enters the region of the nozzle over and in supporting contact with an entrance web-supporting surface at the opposite side of the web and substantially or almost coplanar with the nozzle fluid-ejecting aperture and extending to a point just prior to the nozzle aperture; carrying

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the web beyond said point longitudinally past said nozzle aperture and over an exiting web-support surface at said opposite side of the web, and adjusting the unsupported distances between said point and said nozzle aperture and said nozzle aperture and said exiting web-support surface to minimize the moment of web deflection that otherwise would be caused by the force of fluid ejection application from the nozzle aperture upon the web to compensate for web speed variation and provide substantially the same coating weight of fluid application to the web substantially irrespective of web speed and web thickness variation or irregularities.

**10**. Fluid coating and web handling apparatus adapted for non-woven and other low-tension web materials including materials of uneven thickness and that transversely distort and longitudinally crease if drawn with high web tension, said apparatus having, in combination, a coating fluid nozzle applicator provided with an aperture for ejecting fluid upon one side of a web drawn along a longitudinal path past the same, the force of fluid ejection application from the nozzle aperture upon the web being sufficient to produce a substantial moment of web deflection in the absence of web support at the opposite side of the web proximate the nozzle aperture, means for driving the web along said path towards and past the nozzle aperture; and means minimizing the moment of web deflection that would otherwise be caused by the force of fluid ejection application from the nozzle aperture upon the web so as to to compensate for web speed variation and provide substantially the same coating weight of fluid application to the web substantially irrespective of web speed and web thickness variation or irregularities, the last-mentioned means including an entrance web-supporting surface at the opposite side of the web, substantially coplanar with said path, substantially or almost coplanar with said nozzle aperture and extending to a point just prior to the nozzle aperture and over which surface the web is drawn toward said nozzle aperture, an exiting web-support surface at said opposite side of the web and over which the web is drawn after passing the nozzle aperture, and means for adjusting the unsupported distances between said point and said nozzle aperture and said nozzle aperture and said exiting web-support surface.

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**4,746,546**

## METHOD OF FORMING ENDLESS WIRE BELT FOR PAPER MACHINES OR THE LIKE

**Wolfgang Bachmann, Dreieich-Sprendlingen, and Dieter Spahn, Hanau, both of Fed. Rep. of Germany, assignors to Asten Group, Inc., Charleston, S.C.**

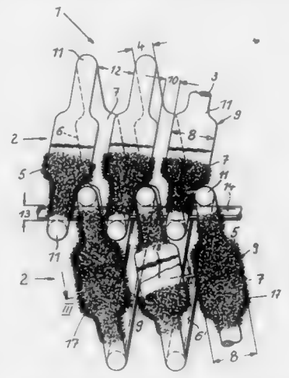
**Continuation of Ser. No. 716,358, Mar. 26, 1985, Pat. No. 4,654,122. This application Feb. 24, 1987, Ser. No. 18,293**

**The portion of the term of this patent subsequent to Mar. 31, 2004, has been disclaimed.**

**Int. Cl.[4] B05D** *1/16;* **D21F** *1/10, 7/08*

**U.S. Cl. 427—206** **21 Claims**

**1**. A method of forming an endless belt for paper machines, with a number of helices which consist of opposing winding legs and headcurves joining said winding legs together and into whose intermediary spaces the headcurves of the neighboring helix are entered to a degree that there develops between the two helices a range of overlapping into which a pintle rod is inserted, including the step of providing at least the supporting winding legs (**5** or **5'**) of the helices (**2**) with a layer (**17**) of the fiber segments (**21**), comprising individual



fibers which are independently adhered to the winding legs (**5** and **5'**).

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**4,746,547**

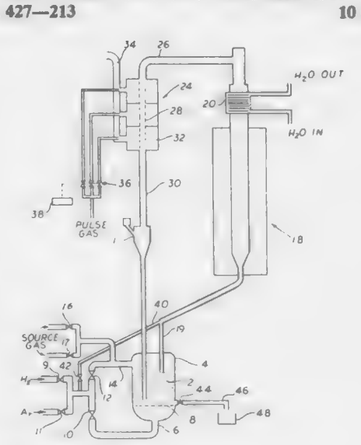
## METHOD AND APPARATUS FOR CIRCULATING BED COATER

**Lloyd C. Brown; Charles C. Adams, both of San Diego, and Gottfried E. A. Besenbruch, Solana Beach, all of Calif., assignors to GA Technologies Inc., San Diego, Calif.**

**Filed Dec. 29, 1986, Ser. No. 946,818**

**Int. Cl.[4] B05C** *3/04, 3/08, 19/02;* **B05D** *1/22*

**U.S. Cl. 427—213** **10 Claims**



**1**. A method for coating small particles comprising:

A. establishing a fluidized bed reservoir of particles to be coated,

B. entraining a portion of the fluidized particles in the reservoir in a flowing transport gas stream to provide a mixture of transport gas and entrained particles, said transport gas stream including a decomposible gas fraction,

C. transporting the mixture of transport gas and entrained particles from the fluidized bed through a furnace spaced from the reservoir at a flow rate sufficient to prevent agglomeration of the particles,

D. heating the mixture of transport gas and entrained particles in the furnace to above the decomposition temperature of the decomposible gas.

E. separating the particles from the exhaust transport gas, and



F. reintroducing the particles into the fluidized bed reservoir.

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**4,746,548**

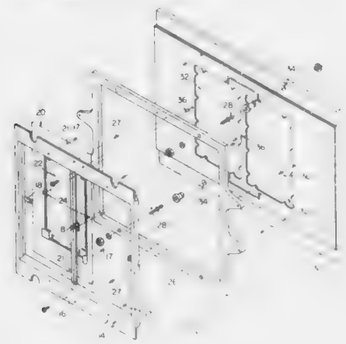
## METHOD FOR REGISTRATION OF SHADOW MASKED THIN-FILM PATTERNS

**Robert A. Boudreau, Hampton, N.H., and Robert J. Wilkie, South Berwick, Me., assignors to GTE Products Corporation, Danvers, Mass.**

**Filed Oct. 23, 1985, Ser. No. 790,695**

**Int. Cl.[4] C23C** *16/04*

**U.S. Cl. 427—248.1** **6 Claims**



**1**. Method of aligning thin-film structure patterns on a substrate formed with the use of an apertured mask in a vacum deposition system, said method comprising the steps of:

positioning a mask holder assembly within a deposition chamber, said mask holder assembly having primary datum pins protruding therefrom and including said apertured mask as part thereof, said mask having secondary mask alignment apertures disposed on each side of said apertured mask;

positioning a substrate carrier within said deposition chamber spaced from said mask holder assembly, said carrier having said substrate supported therein, said substrate carrier having primary datum apertures for engaging said primary datum pins and having secondary datum pins protruding therefrom for engaging with said secondary mask alignment apertures;

engaging said mask holder assembly with said substrate carrier within said deposition chamber such that they are in operative contact, such that said primary datum pins are engaged with said primary datum apertures and said secondary datum pins are engaged with said secondary mask alignment apertures;

positioning a magnet in said deposition chamber adjacent the side of said substrate carrier opposite said mask holder assembly such that said apertured mask is held in operative contact with said substrate;

vacuum-depositing a thin-film structure material through said apertured mask; and

removing said magnet from said substrate carrier and disengaging said mask holder assembly from said substrate carrier, thereby resulting in the formation of said thin-film structures on said substrate.

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**4,746,549**

## METHOD FOR FORMING THIN FILM OF REFRACTORY MATERIAL

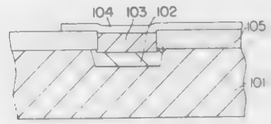
**Hitoshi Ito, Mitaka, and Takahiko Moriya, Yokosuka, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Continuation of Ser. No. 777,516, Sep. 19, 1985, abandoned. This application Jan. 15, 1987, Ser. No. 3,550**

**Claims priority, application Japan, Sep. 21, 1984, 59-198072**

**Int. Cl.[4] C23C** *16/08*

**U.S. Cl. 427—253** **4 Claims**




**1**. A method for selectively forming a thin film of a refractory metal on a silicon surface partially covered with an insulating layer having an opening, comprising the steps of:

(a) depositing selectively a refractory metal layer on said silicon surface according to selective vapor phase deposition by using a mixed gas comprising:

(i) a halogen compound of a refractory metal,

(ii) a hydrogen gas, and

(iii) one of a halide gas and a halogen gas, the halogen element constituting the halide gas (a)(iii) or the halogen gas (a)(iii) being less electro-negative than the halogen constituting said halogen compound (a)(i) of said refractory metal, and

(b) selectively forming said thin film in said opening by a chemical reaction of the silicon surface with said halogen compound of said refractory metal.

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**4,746,550**

## USE OF PERFLUOROPOLYETHER DERIVATIVES FOR PROTECTING STONE MATERIALS FROM ATMOSPHERIC AGENTS

**Ezio Strepparola, Bergamo; Gerardo Caporiccio; Adolfo Pasetti, both of Milan, and Franco Piacenti, Florence, all of Italy, assignors to Ausimont S.p.A., Milan and Centro Nazionale Della Ricerche, Rome, both of, Italy**

**Filed Sep. 23, 1986, Ser. No. 910,659**

**Claims priority, application Italy, Sep. 24, 1985, 22258 A/85**

**Int. Cl.[4] B05D** *3/02*

**U.S. Cl. 427—385.5** **4 Claims**

**1**. A process for processing marble, stones, tiles, cement, gypsum or wood and other article manufactured from such materials utilized in particular in building, from the degradation caused by atmospheric agents and pollutants, by applying onto the surface of said materials a protective agent selected from the class consisting of perfluoropolyethers having functionalized end groups and belonging to one of the following groups:

(I) $Rf—O(C_3F_6O)_m(CFXO)_n—CFX—Y—Z_p$

where Rf is a perfluoroalkyl group having 1 to 3 carbon atoms; $(C_3F_6O)$ and (CFXO) are oxyperfluoroalkylene units statistically distributed along the chain, and X=F or $CF_3$;

m and n are integers or n=O (m always being≠O) and m/n varies from 5 to 40 when n≠O;

p may be 1 or 2;

the mean molecular weight varies from 500 to 10,000, and preferably from 900 to 6,000;

Y is a divalent or trivalent organic linking radical;

Z is a functional group capable of forming a chemical and/or physical bond with the above said material to be protected and is selected from the class consisting of:

Z(1) equals a non-aromatic, non-fluorinated organic radical, free from active hydrogen atoms, containing

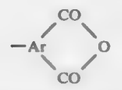
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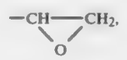
two or more electron doublets-donor heteroatoms, or an aromatic radical, either containing or not containing heteroatomns, capable of giving rise to coordinate bonds or to charge-transfer bonds, thus causing adsorption phenomena kinds on the substrate;

Z(2) equals —CONR$^2$R$^3$, —COOR, wherein R is H or an alkyl group with 1 to 8 carbon atoms, an aromatic or alkylaromatic group such as benzyl, where the aromatic groups may contain, as substituents, alkyl or polyethoxy groups,

R$^2$ and R$^3$ are H or an alkyl group having 1 to 8 carbon atoms or a substituted phenyl group;



where Ar is an aromatic group;
OH, NCO,



—NHR, —COR, $SiR_t(OR)_{3-t}$ with t ranging from 0 to 2, and R is the same as defined hereinabove;

Z(3) is a radical of class Z(1) containing one or more substituents indicated in class Z(2), or a group containing unsaturation of the ethylenic polymerizable type;

Z(4) is a radical of class Z(1) containing one or more of the substituents indicated in class Z(2);

(II) AO—$(C_2F_4O)_p(CF_2O)_q$—A′

where units $(C_2F_4O)$ and $(CF_2O)$ are statistically distributed along the chain;

p and q are integers such that p/q may vary from 5 to 0.3, and preferably from 2.5 to 0.7;

A′=—CFX—Y—$Z_p$

A is A′ or a perfluoroalkyl having 1 to 3 carbon atoms;

p, X, Y and Z are the same as defined hereinabove; the mean molecular weight varying from 1,000 to 20,000, and preferably from 1,800 to 8,000;

(III) perfluoropolyethereal compounds containing units $(C_3F_6O)$, $(C_2F_4O)$ and (CFXO) statistically distributed along the chain with the indicated end groups A and A′ as specified hereinbefore, and having a molecular weight ranging from 500 to 20,000;

(IV) difunctional or monofunctional perfluoropolyethereal compounds comprising the units:



where $R_4$ and $R_5$ may be alike or different from each other and are selected from the class consisting of H, Cl and F, and where said units may be statistically distributed along the polymer chain; having a mean molecular weight ranging from 1,500 to 8,000; and wherein a fluorine atom or the perfluoromethylene units may be substituted by H, Cl or by perfluoroalkoxyl or perfluoroalkyl.

**4,746,551**

## REHYDRATABLE POLYACRYLAMIDE GELS

**Robert C. Allen, Isle of Palms, S.C., and Bertold J. Radola, Munich, Fed. Rep. of Germany, assignors to Micro-Map, Inc., Boca Raton, Fla.**

**Filed Aug. 24, 1984, Ser. No. 643,727**
**Int. Cl.$^4$ B05D** *3/02*
**U.S. Cl. 427—389.7** **10 Claims**

1. A process for the production of a rehydratable polyacrylamide gel comprising:

(a) polymerizing acrylamide monomers on a hydrophilic support material to form a gel, wherein the resulting polyacrylamide is covalently bonded to the support;

(b) removing from the gel any residual components of the polymerization;

(c) adding a stabilizing amount of a stabilizer which consists essentially of one or more polysaccharides; and

(d) drying the gel.

**4,746,552**

## METHOD OF FINISHING A CONCRETE STRUCTURE

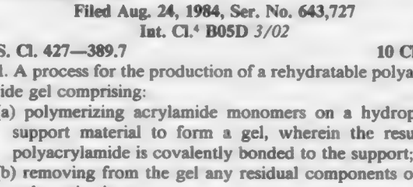
**Minoru Tokumoto, Ikomagun, and Motoyuki Takagi, Osaka, both of Japan, assignors to National Starch and Chemical Corporation, Bridgewater, N.J.**

**Filed Jun. 11, 1987, Ser. No. 61,843**
**Claims priority, application Japan, Jun. 25, 1987, 61-151919**
**Int. Cl.$^4$ B05D** *3/02*
**U.S. Cl. 427—393.6** **4 Claims**

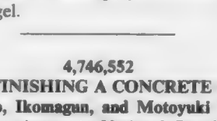
1. A method of finishing a concrete structure, which comprises the steps of: (a) coating an aqueous synthetic resin emulsion on the bare surface of a concrete structure, (b) substantially drying the film formed by the emulsion, and (c) forming a cement-based finish layer predominantly made up of cement and water on top of the dried emulsion film; wherein the aqueous synthetic resin emulsion is an acrylic ester copolymer comprising either one or both of a repeating unit of formula I



and a repeating unit of formula II



and a repeating unit of formula III



the copolymer having a glass transition point in the range of −10° C. to 20° C.; where R is a hydrogen atom or a methyl group; $R_1$ and $R_2$ may be the same or different and are a methyl group or an ethyl group; $R_3$ is a $C_1$–$C_{12}$ alkyl group or a cyclo-



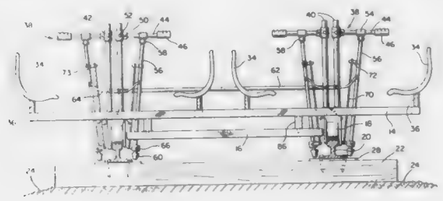
alkyl group; A is —O— or —NH—, X is chlorine, bromine, or iodine; Y is an organic or inorganic anion; and n is 2 or 3.

**4,746,553**

## LIQUID INJECTION MACHINE

**Joseph T. Crisafulli, P.O. Box 865, Glendive, Mont. 59330**

**Filed Aug. 7, 1987, Ser. No. 82,520**
**Int. Cl.$^4$ B05D** *1/02, 7/06*
**U.S. Cl. 427—397** **9 Claims**



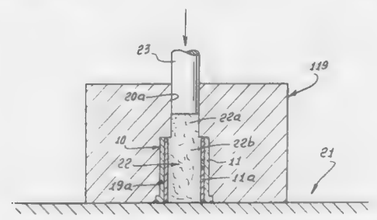
1. An apparatus for applying wood preservative material onto railroad cross ties which support railroad rails with tie plates interconnecting the rails and ties with the tie plates including spike holes with certain of the spike holes being unused comprising a mobile frame, a nozzle registrable with an unused spike hole, means supporting the nozzle from the mobile frame for movement into alignment with an unused spike hole and for generally vertical movement into engagement with the unused spike hole, and means supplying pressurized wood preservative to the nozzle for discharging wood preservative liquid through the unused spike hole onto the upper surface of the cross tie underlying the tie plate.

**4,746,554**

## PUMP LINERS AND A METHOD OF CLADDING THE SAME

**Gunes M. Ecer, Irvine, Calif., assignor to CDP, Ltd., Newport Beach, Calif.**

**Continuation of Ser. No. 689,312, Jan. 7, 1985, Pat. No. 4,603,062. This application May 30, 1986, Ser. No. 868,991**
**The portion of the term of this patent subsequent to Jul. 29, 2003, has been disclaimed.**
**Int. Cl.$^4$ B05D** *7/14*
**U.S. Cl. 427—191** **7 Claims**



1. The method of cladding the surface of a metal object, which includes the steps:

(a) applying a powder metal layer on said surface, the metal layer comprising a metal powder and a material selected from the group consisting of a metal oxide or oxides, borides and carbides,

(b) applying a pressure transmitting and flowable grain into contact with said layer,

(c) and pressurizing said grain to cause sufficient pressure transmission to the powder metal layer to consolidate same, said pressurizing carried out by transmitting force to the grain along a primary axis, said layer extending about said axis and spaced therefrom, whereby force is transmitted by the grain away from said axis and against said layer,

(d) said method including providing a die having a first chamber receiving said object, the die having a second chamber containing grain communicating with said grain in the cavity, said pressurizing of the grain being carried out by pressurizing the grain in the second chamber,

(e) and including transmittng pressure from the grain in the second chamber to only a medial portion of the grain in the first chamber everywhere spaced from said layer.

**4,746,555**

## FIRE RETARDANT COMPOSITION

**John S. Luckanuck, Burlington, Canada, assignor to Radix-x/World Ltd., Ontario, Canada**

**Filed Feb. 26, 1987, Ser. No. 19,512**
**Claims priority, application Canada, Apr. 4, 1986, 505878**
**Int. Cl.$^4$ B27N** *5/02;* **C09D** *5/16;* **E04B** *1/74*
**U.S. Cl. 428—35** **42 Claims**



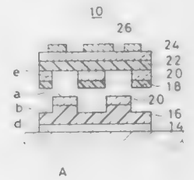
1. A fire retardant core for a wooden door which is a cured pressed sheet of a composition consisting essentially of (a) 30 to 75% by weight of an inert mineral filler selected from perlite and vermiculite; (b) 10 to 30% by weight of wood chips and (c) from 3 to 15% by weight of a binder which is a mixture of an alkali metal silicate and a curable phonolic resin, at least one of which is present in dry form.

**4,746,556**

## EASILY BREAKABLE STICKING MATERIAL

**Tadashi Matsuguchi, Suita, and Noboru Matsuguchi, Ashiya, both of Japan, assignors to Daimatsu Kagaku Kogyo Co., Ltd., Osaka, Japan**

**Filed Mar. 18, 1986, Ser. No. 840,761**
**Claims priority, application Japan, Mar. 28, 1985, 60-67293; Jun. 28, 1985, 60-143537**
**Int. Cl.$^4$ A61F** *13/02*
**U.S. Cl. 428—40** **23 Claims**



1. An easily breakable sticking material which comprises a surface layer having an upper surface and a lower surface,

a first peel off layer located on said lower surface of said lower surface layer and having an upper surface and a lower surface,

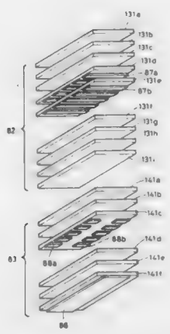
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a breakable layer laminated on said lower surface of said first peel-off layer and having an upper surface and a lower surface,
a second peel-off layer formed on a portion of said lower surface of said breakable layer and having an upper surface and a lower surface,
a covering layer formed on said lower surface of said second peel-off layer and on a portion of said lower surface of said breakable layer and having an upper surface and a lower surface,
an adhesive layer formed on the lower surface of said covering layer,
said breakable layer is formed of a material which is relatively easily breakable compared with that of said surface layer and said covering layer so that the breakable layer is readily breakable,
a first adhesive having an adhesive force "a" between said first peel-off layer and said breakable layer, and a second adhesive having an adhesive force "b" between said second peel-off layer and said covering layer with "a">"b".

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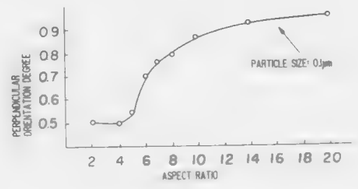
**4,746,557**
**LC COMPOSITE COMPONENT**
**Yukio Sakamoto; Takeshi Tanabe; Yasuo Fujiki; Hiromichi Sakai; Kunisaburo Tomono; Michihiro Murata; Harufumi Mandai; Yasuyuki Naito, all of Nagaokakyo, and Hidemichi Mori, Fukui, all of Japan, assignors to Murata Manufacturing Co., Ltd., Japan**
Filed Dec. 8, 1986, Ser. No. 939,346
Claims priority, application Japan, Dec. 9, 1985, 60-190167[U]; Dec. 9, 1985, 60-190168[U]
Int. Cl.[4] B32B *3/10*; H05K *1/00*; H03H *7/00*; H01G *4/10*
U.S. Cl. 428—138 14 Claims




1. An LC composite component comprising:
a laminated and cofired ceramic sintered body having a top surface and a bottom surface which define therebetween a thickness direction, comprising at least one magnetic green sheet laminated and cofired with at least one dielectric green sheet, said ceramic sintered body being thereby provided with at least one magnetic region and at least one dielectric region along the direction of thickness;
wherein said magnetic region comprises Ni-Zn system ferrite and said dielectric region comprises composite perovskite material containing lead;
at least one inductive inner electrode being provided in said magnetic region of said sintered body and extending between a pair of first side surfaces opposite each other on said sintered body to define an inductance unit in said magnetic region;
first and second capacitive electrodes being located opposite to each other in said dielectric region to enclose a portion of said dielectric region along the direction of thickness to define a capacitor unit in said dielectric region;
a pair of first outer electrodes electrically connected with said inductive inner electrode and formed on said pair of first side surfaces of said sintered body; and
a second outer electrode provided on a surface of said sintered body other than said first side surfaces,
said first capacitive electrode being electrically connected with at least one of said pair of first outer electrodes, and
said second capacitive electrode being electrically connected with said second outer electrode.

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**4,746,558**
**MAGNETIC RECORDING MEDIUM**
**Toru Shimozawa; Kazunori Tamazaki, both of Saku, and Masaharu Nishimatsu, Komoro, all of Japan, assignors to TDK Corporation, Tokyo, Japan**
Filed Mar. 19, 1986, Ser. No. 841,224
Claims priority, application Japan, Mar. 27, 1985, 60-60963
Int. Cl.[4] G11B *5/70*
U.S. Cl. 428—141 3 Claims




1. A magnetic recording medium comprising a non-magnetic substrate and a magnetic recording layer formed on the substrate consisting essentially of a single layer of barium ferrite magnetic powder, perpendicularly oriented, dispersed in a resin binder, wherein said recording layer contains carbon black, has a surface roughness of at most 0.08μ as measured by a 20 point average method and wherein said barium ferrite magnetic powder has a partilce size of at most 0.02μ and an aspect ratio of at least 6, characterized in that an undercoating layer comprising a radiation curable binder and carbon black, is provided beneath the magnetic recording layer.

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**4,746,559**
**MAGNETIC RECORDING MEDIUM**
**Yasuo Nishikawa, and Tadashi Ishikuro, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**
Filed Nov. 18, 1986, Ser. No. 931,828
Claims priority, application Japan, Nov. 18, 1985, 60-257988
Int. Cl.[4] G11B *5/72*
U.S. Cl. 428—142 15 Claims

1. A magnetic recording medium comprising a non-magnetic support having provided thereon a ferromagnetic metal thin film provided with a layer containing a compound having a mercapto group which has a molecular weight of from about 78 to about 10,000, wherein: said compound having a mercapto group also has an ester bond; the layer containing the compound having a mercapto group has a thickness of 0.5 mg/m$^2$ to 100 mg/m$^2$ and wherein said compound having a mercapto group and an ester bond is represented by general formula

A—COO—B

wherein one of A and B represents a hydrocarbon group substituted with one or more mercapto groups, and the other represents a hydrocarbon group, or both of A and B independently represent a hydrocarbon group substituted with one or more mercapto group.

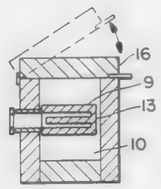


**4,746,560**
**DECORATIVE COMPOSITE PANEL**
**Herbert A. Goeden, Solon, Ohio, assignor to The Glastic Company, Cleveland, Ohio**
Filed Nov. 19, 1986, Ser. No. 932,928
Int. Cl.[4] A63D *1/04*
U.S. Cl. 428—151 20 Claims

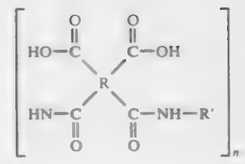
1. A synthetic composite panel comprising:
a reinforced base portion comprised of a plurality of layers of glass mat impregnated with a polyester resin, said layers of glass mat including at least one thick fiber/low density glass mat and at least one thin fiber/high density glass mat;
an overlying polyester resin-impregnated graphic print sheet; and
a transparent polyester resin overlay, said layers of glass mat disposed within said base portion in predetermined positions to balance the residual stresses within said panel during the setting of said resins.

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**4,746,561**
**POLYIMIDE-CONTAINING COVER LAYER FOR A PRINTED CIRCUIT ELEMENT**
**Ernst F. Kundinger, Breuberg/Neustadt; Erich Klimesch, Erlenbach; Hans-Georg Zengel, Kleinwallstadt, all of Fed. Rep. of Germany, and Jeffery D. Lasher, Tolland, Conn., assignors to Akzo N.V., Netherlands**
Filed Feb. 24, 1986, Ser. No. 832,229
Claims priority, application Fed. Rep. of Germany, Feb. 25, 1985, 3506526
Int. Cl.[4] B32B *3/00, 27/08*
U.S. Cl. 428—209 10 Claims



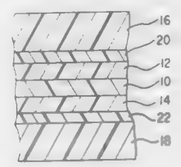

1. A printed circuit element comprising:
at least one metallic conductor layer, said conductor layer having an outer portion;
at least one insulating layer joined to said metallic conductor layer; and
at least one cover layer joined to at least one said outer portion of said conductor layer or electrical components contained on said outer portion of said conductor layer, said cover layer comprising:
a laminate of an intractable fully aromatic polyimide, said aromatic polyimide being insoluble in phenolic solvents; and
a heat sealable high temperature adhesive arranged between said laminate and at least one of said outer portion of said conductor layer and said electrical components, wherein said aromatic polyimide is obtained by the process comprising the steps of:
reacting an aromatic tetracarboxylic acid or the dianhydride thereof and an aromatic diamine in the molar ratio of said tetracarboxylic acid or dianhydride to said diamine in the range of 0.95 to 1.05 in a polar organic solvent to form a polymeric composition comprising a polymeric acid having the formula:




wherein
R is an aromatic tetravalent radical,
R' is a divalent aromatic radical and
n has a value sufficient for the formation of a polyamide acid with a $\eta$ red of 0.5 or higher;
extruding a film of said polyamide acid onto a metallic foil;
removing the solvent from said film in a first stage, said first stage having a temperature in the range of from 100° to 200° C., whereby substantially all of the solvent is removed and said polyamide acid is partially cured to polyimide;
further curing said partially cured polyamide acid to form an insoluble, intractable polyimide in a second stage, said second stage having a temperature of at least 200° C., whereby at least 95% of said polyamide acid is converted to said polyimide, without the application of a roller on said film to remove the solvent; and
removing the metallic foil by etching.

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**4,746,562**
**PACKAGING FILM**
**Ennis M. Fant, Greenville, S.C., assignor to W. R. Grace & Co., Cryovac Div., Duncan, S.C.**
Filed Feb. 28, 1986, Ser. No. 834,694
Int. Cl.[4] B32B *7/02*
U.S. Cl. 428—213 13 Claims




1. A multilayer coextruded film comprising:
(a) a core layer comprising an ethylene vinyl alcohol copolymer;
(b) two intermediate layers each comprising a polyamide;
(c) two outer layers each comprising a blend of from about 85% to about 99% of a linear low density polyethylene and from about 1% to about 15% of an anti-blocking agent; and
(d) two layers of adhesive polymeric material disposed between respective intermediate and outer layers.

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**4,746,563**
**MULTILAYER COATED CEMENTED CARBIDES**
**Minoru Nakano, and Masaaki Tobioka, both of Itami, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan**
Filed May 2, 1985, Ser. No. 729,973
Claims priority, application Japan, May 14, 1984, 59-94716
Int. Cl.[4] B32B *7/02, 9/00*; B24D *3/02*; C23C *16/00*
U.S. Cl. 428—216 6 Claims

1. A multilayer coated cemented carbide comprising a substrte of cemented carbide, an inner layer contacted with the surface of the substrate and an outer layer contacted with the inner layer, the said inner layer being at least one layer consist-

ing of at least one member selected from the group consisting of carbides, nitrides, carbonitrides, carboxynitrides, oxynitrides, boronitrides and borocarbonitrides of Ti, and the said outer layer being a multilayer with a total thickness of 5 to 20 μm, consisting of a plurality of $Al_2O_3$ layers each having a thickness of 0.01 to 2 μm, each consisting of an $Al_2O_3$ film in which titanium oxide is dissolved and being respectively divided by interlayers each having a thickness of 0.5 to 2 μm and each consisting of at least one member selected from the group consisting of TiC, TiN, TiCN, TiCNO, TiCO, TiNO, Ti oxides, Ti(B, N), Ti(B, N, C), SiC, AlN and AlON.

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**4,746,564**

## PROCESS FOR PRODUCING A LOW DENSITY FOAMED POLYETHYLENE

**Yong W. Shin, 5670 W. Olympic Blvd., Los Angeles, Calif. 90036**

**Filed Jun. 14, 1985, Ser. No. 744,747**

**Claims priority, application Rep. of Korea, Apr. 4, 1985, 1985/2293**

**Int. Cl.[4] C08J** *9/00*

**U.S. Cl. 428—219** **3 Claims**

1. A low density article possessing excellent buoyancy, thermal-resistance and water repellency comprising a flexible, expanded, closed-cell polyethylene sheet having a thickness of 0.5 to 1.0 mm, a density ranging from about 0.0251 to 0.0285 g/cm$^3$, a buoyancy such that 300g of the polyethylene keep more than about 130kg of weight afloat, a water absorption of about 0.0041 g/cm$^3$ for a thickness of the polyethylene and a thermal transmittance of about 6.70 w/m$^2$C and a thermal transmission of about 52.5% for a 1mm thickness of the polyethylene.

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**4,746,565**

## FIRE BARRIER FABRICS

**Richard A. Bafford, Aiken, S.C., and Hans R. Hoernle, Augusta, Ga., assignors to United Merchants and Manufacturers, Inc., New York, N.Y.**

**Filed Sep. 26, 1986, Ser. No. 912,264**

**Int. Cl.[4] B32B** *3/00*

**U.S. Cl. 428—251** **20 Claims**

1. A flame resistant fire barrier fabric comprising a preformed self-extinguishing thermoplastic face fabric laminated to an underlying glass fabric comprising glass fibers coated with a thin adherent encapsulating coating that substantially minimizes fiber to fiber self abrasion, and wherein the porosity of the fire barrier fabric does not exceed about 300 cubic feet per square foot per minute when measured at a pressure of one-half inch of water.

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**4,746,566**

## OPTICALLY ANISOTROPIC MELT FORMING AROMATIC COPOLYESTERS BASED ON T-BUTYL-4-HYDROXYBENZOIC ACID

**Mark S. Connolly, Wilmington, Del., assignor to E. I. DuPont de Nemours and Company, Wilmington, Del.**

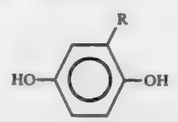
**Filed May 6, 1987, Ser. No. 46,560**

**Int. Cl.[4] B32B** *27/00*

**U.S. Cl. 428—290** **23 Claims**

1. A copolyester capable of forming an optically anisotropic melt consisting essentially of:

I. an aromatic diol component consisting of about 55 to 95 mole % of one or more diols of the formula




where R is selected from the group consisting of H, $C_1$–$C_4$ alkyl or alkoxy, $C_6$–$C_{10}$ aryl or aryloxy, and halogen; and about 5 to 45 mole % of one or more polyaromatic diols;

II. a dicarboxylic acid component selected from a "para"- or "meta"-oriented aromatic dicarboxylic acid or mixtures of such acids, provided that no more than 60 mole % of the dicarboxylic acid component comprises a naphthalene dicarboxylic acid; and

III. an aromatic hydroxycarboxylic acid consisting of about 25 to 100 mole % of t-butyl-4-hydroxybenzoic acid and about 0 to 75 mole % of 4-hydroxybenzoic acid, provided that when R=H, the aromatic hydroxycarboxylic acid component consists solely of a t-butyl-4-hydroxybenzoic acid;

where said copolyester contains equal chemical equivalents of components I and II and contains about 15 to 60 mole %, based on total moles of I plus II plus III, of component III.

16. A composite structure consisting essentially of (a) a copolyester of claim 1 and (b) either a fibrous substrate or a particulate filler.

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**4,746,567**

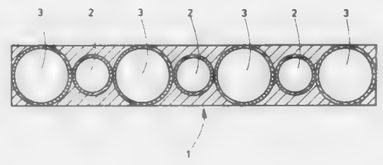
## PAPER PRODUCT FOR STORING FRAGRANCES

**Jean-Claude E. Zelter, Grasse, France, assignor to Ylang, Grasse, France**

**Filed Dec. 22, 1986, Ser. No. 944,218**

**Int. Cl.[4] B01J** *13/02*

**U.S. Cl. 428—321.5** **6 Claims**




1. A paper product for storing a fragrance comprising a paper support and microcapsules containing a fragrance, the said microcapsules being incorporated in the paper support, said fragrance being releasable upon crushing of the microcapsules by rubbing or like action, said paper product being further characterized in that in addition to said microcapsules containing a fragrance, said paper support incorporates neutral microcapsules without fragrance which are disposed in the paper support in a manner to serve as shock-absorbing means to protect the said microcapsules containing a fragrance from accidental crushing.

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**4,746,568**

## HEAT-RESISTANT COATING COMPOSITION AND HEAT-RESISTANT COAT

**Tooru Matsumoto, Asaka; Satoshi Ishikawa; Eiji Nakamura, both of Saitama; Tomio Izuoka, Nabari, and Tomoyuki Okada, Tsu, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo; Mie Yushikako Kabushiki Kaisha, Nabari and Sankei Giken Kogyo Kabushiki Kaisha, Tokyo, all of, Japan**

**Division of Ser. No. 769,838, Aug. 27, 1985, Pat. No. 4,657,963. This application Feb. 12, 1987, Ser. No. 13,815**

**Claims priority, application Japan, Aug. 28, 1984, 59-177544**

**Int. Cl.[4] B32B** *19/02, 33/00*

**U.S. Cl. 428—323** **3 Claims**

1. A heat-resistant coat applied onto a metal surface provided with fine protrusions having overhanging portions, said coat being composed of a lower layer and an upper layer,

wherein said lower layer is formed from a coating composition comprising:

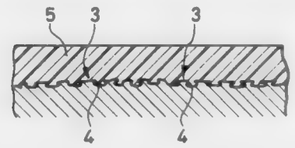
(a) 50–80% by weight of a pulverized inorganic material consisting essentially of (i) a mixture of powder particles consisting essentially of at least one compound selected from the group consisting of aluminum phosphate, zinc molybdate and calcium carbonate, (ii) plate-shaped powder particles consisting essentially of aluminum silicate or magnesium silicate, and (iii) metallic zinc powder, wherein the amount of the mixture of powder particles (i) is 20–55% by weight of the pulverized inorganic material, and the amount of metallic zinc powder is 40–70% by weight of the pulverized inorganic material; and

(b) 20–50% by weight of a mixture of a modified silicone resin and an aluminum chelate compound selected from the group consisting of ethyl acetate aluminum di-isopropylate and aluminum tri-ethylacetoacetate, wherein the amount of aluminum chelate is 0.5–4% by weight of the mixture (b), and the modified silicone resin consists of 20–40% by weight of at least one resin selected from the group consisting of phenol resin, epoxy resin, acrylic resin and polyester resin and 80–60% by weight of a silicone resin;

said pulverized inorganic material (a) being bound by said mixture (b) of modified silicone resin and aluminum chelate compound; and

wherein said upper layer is formed from a heat resistant coating composition consisting essentially of silicone resin and metal oxides.






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**4,746,569**

## LONGITUDINAL MAGNETIC COATED RECORDING MEDIUM

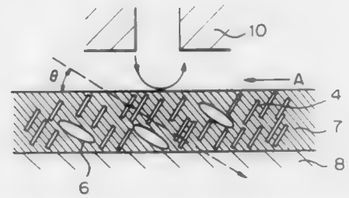
**Jun Takahashi, Zama; Shigeru Fukushima, Tokyo; Toshikatu Narumi, Kawasaki; Ken-ichi Itoh, Yamato, and Seiya Ogawa, Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

**Filed May 14, 1986, Ser. No. 863,039**

**Claims priority, application Japan, May 20, 1985, 60-107635; Sep. 3, 1985, 60-194076; Apr. 7, 1986, 61-078159; Apr. 7, 1986, 61-078160; Apr. 8, 1986, 61-079170; Apr. 9, 1986, 61-080064; Apr. 9, 1986, 61-080065**

**Int. Cl.[4] G11B** *5/70*

**U.S. Cl. 428—323** **10 Claims**




1. A longitudinal magnetic coated recording medium, comprising:

a nonmagnetic substrate having a magnetic film formed thereon including a magnetic film plane; and

plane magnetic particles, each having an easy magnetization axis perpendicular to a major surface thereof and dispersed in said magnetic film, the orientation angle of said particles being in the range of from −30° to +30°, said orientation angle being determined by an angle where the ratio of residual magnetization to saturation magnetization Mr/Ms, is largest, and said orientation angle being defined as the angle between the magnetic film plane and said easy axis of magnetization.

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**4,746,570**

## HEAT-RESISTANT, HIGHLY EXPANSIBLE SHEET MATERIAL FOR SUPPORTING CATALYST CARRIER AND PROCESS FOR THE PREPARATION THEREOF

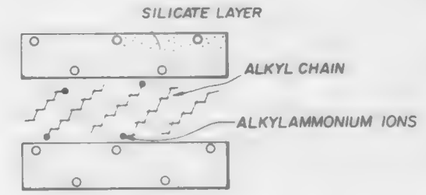
**Tooru Suzaki; Yoshihiro Kanome, both of Toyota; Masaomi Hayakawa, Gifu, and Kunihiko Miyashita, Oogaki, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota and Ibiden Kabushiki Kaisha, Oogaki, both of, Japan**

**Continuation of Ser. No. 774,076, Sep. 9, 1985, abandoned. This application Sep. 28, 1987, Ser. No. 102,261**

**Claims priority, application Japan, Sep. 20, 1984, 59-195689**

**Int. Cl.[4] B32B** *19/06, 27/04, 29/06*

**U.S. Cl. 428—327** **8 Claims**




1. In a heat-resistant, highly expansible sheet material for supporting a catalyst carrier comprising 40 to 80% by weight of an unexpanded vermiculite, 10 to 50by weight of an inorganic fiber having a crystalization temperature of not lower than 850°C., 0.1 5% by weight of a natural organic fiber, 0.1 to 5 % by weight of an inorganic binder and 0.1 to 4% by weight of an organic binder, the improvement wherein at least a part of cations contained between layers of said unexpanded vermiculite is replaced by an alkylammonium ion.

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**4,746,571**

## X-RAY DETECTOR EFFICIENCY STANDARD FOR ELECTRON MICROSCOPES

**Thomas F. Kelly, Madison, Wis., assignor to Wisconsin Alumni Research Foundation, Madison, Wis.**

**Filed Aug. 1, 1986, Ser. No. 893,044**

**Int. Cl.[4] B32B** *9/00;* **G01N** *23/00;* **G21K** *7/00;* **H01K** *1/08*

**U.S. Cl. 428—328** **15 Claims**




1. An X-ray detector efficiency standard for electron microscopes, comprising:

(a) a substrate layer;

(b) a plurality of substantially spherical particles in an amount sufficient to calibrate the X-ray detector, wherein each of the particles has a diameter sufficient to determine the length of an electron path, wherein the particles are distributed on the substrate, the particles formed of pure elements or stoichiometric compounds of known composition which yield characteristic emitted X-ray photons of

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known energy in response to incident electrons and having diameters such that the effects of fluorescence and absorption in the spherical particles on X-rays emitted as a result of electron beam interaction with the spherical particles is negligible, and the particles are substantially electron transparent.

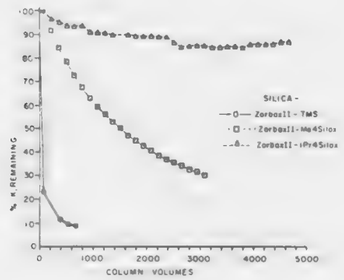
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**4,746,572**

## STRUCTURES SURFACE MODIFIED WITH BIDENTATE SILANES

**Joseph L. Glajch, and Joseph J. Kirkland, both of Wilmington, Del., assignors to E. I. DuPont de Nemours and Company, Wilmington, Del.**

**Filed Nov. 28, 1986, Ser. No. 936,085**
**Int. Cl.[4] B32B** *9/00, 9/04;* **B01D** *15/08;* **B01J** *20/10*
**U.S. Cl. 428—403** **27 Claims**




1. An improved support comprising a substrate and a bidentate silane attached to the substrate, the bidentate silane containing at least two silicon atoms bridged by certain groups, so arranged that at least a seven-membered ring system is formed in the following manner:




where, $R_1$–$R_4$=alkane, substituted alkane, alkene, substituted alkene, aryl, or substituted arryl; Y=—$CH_2$—, —$CH_2CH_2$—, —$(CH_2)n$—, —(CHZ—CHZ)—, or —$(CH_2)_nCHZ$—, where Z=alkane, substituted alkane, alkene, substituted alkene, aryl, substituted aryl, halogen, hydroxyl, hydrogen, nitrile, primary, secondary or tertiary or tetralkylamine, carbonyl, carboxyl, amide, sulfonic acid, nitro, nitroso, sulfonamide, etc., n=1–6, and A are the atoms on the substrate surface to which the silane is covalently attached.

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**4,746,573**

## FLOWING (FREE-FLOWING) GRANULAR COMPOSITIONS BASED ON FLUORINATED ELASTOMERS

**Vincenzo Arcella, Novara; Gaetano Bianchi, San Donato Milanese, and Dionisio D'Auria, Milan, all of Italy, assignors to Ausimonth S.p.A., Milan, Italy**

**Filed Mar. 25, 1986, Ser. No. 843,604**
**Claims priority, application Italy, Mar. 29, 1985, 20162 A/85**
**Int. Cl.[4] B32B** *19/00;* **C08L** *27/12*
**U.S. Cl. 428—407** **14 Claims**

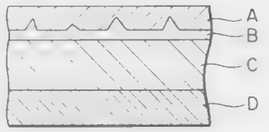
1. A free-flowing granular composition based on fluoroelastomers containing dispersed on their surface an anti-caking agent, characterized in that said anti-caking agent is a polyolefin in a powdery form, in quantities between 5% and 70% by weight.

**4,746,574**

## ANTISTATIC SHEETING

**Eiji Hattori, Suzuka, and Mitsuji Ebara, Ageo, both of Japan, assignors to Asahi Chemical Polyflex Ltd., Tokyo, Japan**

**Continuation of Ser. No. 778,982, Sep. 23, 1985, abandoned. This application Feb. 25, 1987, Ser. No. 18,863**
**Claims priority, application Japan, Sep. 25, 1984, 59-199975; Sep. 27, 1984, 59-200398**
**Int. Cl.[4] B32B** *9/00, 23/02;* **B65D** *73/02*
**U.S. Cl. 428—409** **20 Claims**




1. An antistatic sheet material consisting of:
a substrate layer comprising a transparent plastic substance;
an electroconductive layer disposed on one surface of said substrate layer;
a surface layer comprising a transparent plastic substance disposed on said electroconductive layer to a thickness of 10 μm to 0.2 μm; and
carbon black, contained in said electroconductive layer in an amount of 0.8 to 0.01 g/$m^2$, which partially protrudes into said surface layer.

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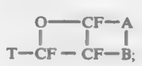
**4,746,575**

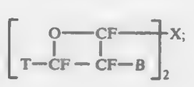
## PROCESS FOR LUBRICATING ACCESSORIES OF CASSETTES CONTAINING MAGNETIC TAPES

**Mario A. Scarati; Carlo Tognoni, both of Milan; Piero Giunti, Brescia; Luigi Salvioli, Brescia, and Gian M. Sigismondi, Brescia, all of Italy, assignors to Ausimont S.p.A., Milan, Italy**

**Filed Jul. 1, 1986, Ser. No. 880,919**
**Claims priority, application Italy, Jul. 3, 1985, 21417 A/85**
**Int. Cl.[4] B32B** *27/00;* **C10M** *105/08*
**U.S. Cl. 428—421** **5 Claims**

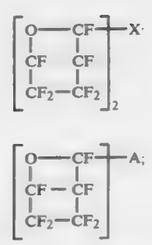
1. A process for protecting magnetic tapes from friction and wear caused by the metallic or nonmetallic accessory elements, which constitute the cassette, during their operation, characterized in that said accessory elements are lubricated with a perfluoropolyethereal fluid having a viscosity ranging from 10 to 1500 cSt at 20° C. and comprising compounds having units selected from the class consisting of:
(A1) ($C_3F_6O$) and (CFXO) statistically distributed along the perfluoropolyether chain, where X is equal to —F, —$CF_3$;
(A2) ($C_3F_6O$);
(A3) ($C_3F_6O$), ($C_2F_4O$), (CFXO), statistically distributed along the perfluoropolyether chain, where X is equal to —F, —$CF_3$;
(A4) ($C_2F_4O$), ($CF_2O$) statistically distributed along the perfluoropolyether chain;
(A5) ($C_3F_6O$), including furthermore the characteristic group —$CF(CF_3)$—$CF(CF_3)$—;
(A6) an oxetane ring of the formula selected from:


(1)


(2)

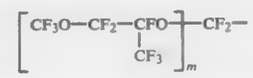
in which at least one of the groups linked to the ring contains an ethereal oxygen atom, and at least one of the groups does not contain ethereal oxygen atoms; or an oxetane ring of the formula selected from:



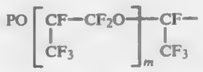

(3)


(4)

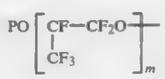
in which the group linked to the ring contains at least one ethereal oxygen atom; and where A=F, a perfluoroalkyl radical with 1 to 8 carbon atoms, a group



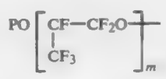
in which m is an ineger from 0 to 5 (extremes included), a group



in which P is a perfluoroalkyl radical containing 1 to 8 carbon atoms and m is defined as hereinabove; B and T, like or unlike each other, may be: F, a perfluoroalkyl radical with 1 to 7 carbon atoms, a group



in which m and P are the same as defined hereinabove, X is equal to —$CF_2O$ $(CF_2O)_p$ $(C_2F_4O)_q$ $CF_2$ , in which p and q, like or unlike each other, are integers from 0 to 5 (extremes included), and where the sum p+q is at least equal to 1, or a group —$(CF_2)_r$—, in which r is an integer from 1 to 8; and characterized in that at least one of groups A, B, T in class (1), or B, T, X in class (2) contains one or more ethereal oxygen atoms, and in classes (3) and (4) the groups X and A are selected from the abovesaid radicals containing ethereal oxygen atoms; and furthermore characterized in that when one of radicals B or T is equal to the group



(A7) ($CD_2CF_2CF_2O$), where D is H or F; and
(A8) ($CF_2CF_2O$).

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**4,746,576**

## WRITING SCREEN

**Takahiro Ozu; Keizo Abe, and Masayoshi Tsujii, all of Yokkaichi, Japan, assignors to Mitsubishi Petrochemical Company Limited, Tokyo, Japan**

**Filed Dec. 23, 1986, Ser. No. 945,852**
**Claims priority, application Japan, Dec. 25, 1985, 60-296497**
**Int. Cl.[4] B32B** *27/06*
**U.S. Cl. 428—421** **2 Claims**

1. A writing screen, on which writing with a marker and erasing an ink of the marker with an eraser can be carried out, comprising a substrate structure and an overlayer on the surface thereof of a film comprising a vinylidene fluoride copolymer resin having a ratio of the existing amount of fluorine atoms (F) and that of carbon atoms (C), F/C, on the surface in the range of 0.7 to 1.5, which ratio is measured by X-ray photoelectron spectroscopy, which copolymer resin consists of 95 to 70% by weight of vinylidene fluoride and 5 to 30% by weight of hexafluoropropylene, said film being produced by melt molding.

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**4,746,577**

## OPTICAL WAVEGUIDES CONTAINING COMPOSITIONS HAVING NON-LINEAR OPTICAL PROPERTIES

**Philippos Pantelis, Ipswich, and Graham J. Davies, Woodbridge, both of England, assignors to British Telecommunications Public Limited Company, London, England**

**Division of Ser. No. 808,995, Dec. 16, 1985. This application Feb. 24, 1987, Ser. No. 17,837**
**Claims priority, application United Kingdom, Dec. 14, 1984, 8431682**
**Int. Cl.[4] C08L** *27/16*
**U.S. Cl. 428—421** **17 Claims**

1. A laminate having waveguide properties consisting of a light guiding layer enclosed between two confining layers in which the guiding layer is formed of a composition consisting essentially, in parts by weight based on the total composition, of:
(A) 10% to 99.9% of a vinylidene fluoride polymer,
(B) 0.1% to 50% of an additive that is an organic compound having non-linear optical properties, and
(C) 0% to 60% of a polymeric auxiliary component material for enhancing the compatibility of components (A) and (B).

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**4,746,578**

## GLAZE COMPOSITIONS FOR CERAMIC SUBSTRATES

**Kazuo Kondo; Tatsunori Kurachi, and Masahiko Okuyama, all of Aichi, Japan, assignors to NGK Spark Plug Co., Ltd., Japan**

**Continuation-in-part of Ser. No. 689,690, Jan. 8, 1985, abandoned. This application Apr. 3, 1986, Ser. No. 847,480**
**Claims priority, application Japan, Jan. 9, 1984, 59-1694; Jan. 24, 1984, 59-10812**
**Int. Cl.[4] C03C** *8/00*
**U.S. Cl. 428—432** **6 Claims**

1. A glaze composition for a ceramic substrate consisting of 55 to 75 mol % $SiO_2$, 1 to 15 mol % $Al_2O_3$, 3 to 20 mol % CaO, 1 to 13 mol % BaO and 0.1 to 5 mol % $Y_2O_3$.

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**4,746,579**

## ETHYLENE VINYL ACETATE COMPOSITIONS FOR DIELECTRIC SEALING APPLICATIONS

**Marie E. Yannich, Cranbury, and Howard G. Katz, Hightstown, both of N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.**

**Division of Ser. No. 869,560, Jun. 2, 1986, Pat. No. 4,684,689. This application May 7, 1987, Ser. No. 46,761**
**Int. Cl.[4] B32B** *27/30*
**U.S. Cl. 428—522** **9 Claims**

1. A dielectrically-sealable article comprising a substrate coated or impregnated with an emulsion binder comprising a blend of a polyvinyl halide emulsion and an aqueous emulsion comprising a vinyl ester of an alkanoic acid interpolymerized with:
(a) 5 to 28% by weight of ethylene;
(b) 0.5 to 4% by a weight of an N-methylol containing copolymerizable monomer;
(c) 0 to 3% by weight of a latex stabilizer; and
(d) 0 to 1% by weight of at least one polyunsaturated copolymerizable monomer,

the binder having a Tg of −15° to +35° C. and being buffered to a pH greater than 7.

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**4,746,580**

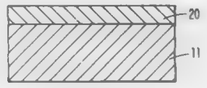
## READ-ONLY MAGNETIC RECORDING MEDIA

**Ross W. Bishop, and Arthur E. Moxley, both of Longmont, Colo., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Continuation of Ser. No. 480,635, Mar. 31, 1983, abandoned. This application Mar. 6, 1986, Ser. No. 837,659**

**Int. Cl.⁴ H01F** *10/02*

**U.S. Cl. 428—557** **18 Claims**




1. A method of forming a magnetic data pattern of discrete, isolated, metal bits which define a magnetic data track, in-situ directly on a nonmagnetic substrate, consisting essentially of:
(a) forming a photoresist layer on a nonmagnetic substrate selected from polyester film or nonmagnetic stainless steel;
(b) exposing said photoresist layer in the pattern of the data pattern;
(c) developing the photoresist, to thereby leave discrete, isolated voids in said photoresist layer which expose underlying substrate in the pattern of said magnetic data pattern;
(d) vacuum depositing a magnetic metal on the remaining photoresist and in the voids;
(e) removing the remaining photoresist and the metal contained thereon, thereby leaving islands of metal directly on said substrate in the pattern of said magnetic data pattern; and
(f) permanently magnetizing said metal portions by subjecting said metal portions to a steady-state magnet field, to thereby form permanent read-only magnetic media whose magnetic data pattern is formed in-situ.

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**4,746,581**

## MULTIFILAMENTARY SUPERCONDUCTIVE WIRES COMPOSED OF FILAMENTS $NB_3SN$ OR $V_3GA$ CLAD IN COPPER OR COPPER ALLOYS AND PROCESS FOR MANUFACTURING SUCH WIRES

**Rene Flükiger, Karlsruhe, Fed. Rep. of Germany, assignor to Kernforschungszentrum Karlsruhe GmbH, Karlsruhe, Fed. Rep. of Germany**

**Filed Sep. 5, 1986, Ser. No. 903,988**

**Claims priority, application Fed. Rep. of Germany, Sep. 6, 1985, 3531770**

**Int. Cl.⁴ H01B** *12/00*

**U.S. Cl. 428—614** **19 Claims**

12. A process for producing a multifilamentary, copper or copper alloy clad superconductive wire comprising a superconductive, intermetallic compound $Nb_3Sn$ or $V_3Ga$, having an A-15 crystal structure, and at least one additive metal from the group consisting of rare earth elements of atomic number 57 to 71, Th, U, Ti, Zr, Hf, V, Nb, Ta, Mo, Fe, Co, Ni, Pd, Cu, Ag, Al, and Pt, said at least one additive present in the wire within the A-15 phase in the form of uniformly and finely distributed, at least partially undissolved inclusions at grain boundaries of the crystals and/or at an interface between the A-15 phase and the copper or copper alloy, or at an interface between the A-15 phase and a separate phase, wherein said at least partially undissolved inclusions of said additive metal are axially parallel comprising steps for:
(a) mixing a metallic powder of at least one of said additive metals or of at least one alloy of at least two of said additive metals with a powder of
($a_1$) niobium; or
($a_2$) at least one Nb alloys from the group consisting of Nb-Ta, Nb-Ti, and Nb-Zr; or
($a_3$) vanadium; or
($a_4$) at least one V alloys from the group consisting of V-Ta, V-Nb, V-Ti, and V-Zr; with all powders having grain sizes in a range between 0.1 μm and 400 μm diameter and a percentage y of the additive metal or metals in the powder mixture corresponds to a weight percentage value within the limits of $0.1 \leqq y \leqq 50$;




(b) filling the powder mixture obtained from (a) into a compactible and evacuatable container of copper or a copper alloy, removing any enclosed quantity of air and then compacting the powder mixture together with the closed container by uniaxial or isostatic pressing until a powder density of more than 90% theoretical density is obtained; and
(c) shaping the compacted container into a wire having a diameter in a range from 0.5 mm to 15 mm and after removal of the outer Cu or Cu alloy layer and alloying the wire with Sn or GA to form $Nb_3Sn$ wire or $V_3Ga$ wire.

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**4,746,582**

## CERAMIC-METAL COMPOSITE BODY

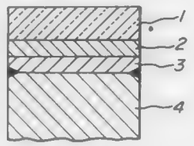
**Nobuo Tsuno, Kasugai, Japan, assignor to NGK Insulators, Ltd., Japan**

**Filed Jan. 9, 1987, Ser. No. 1,750**

**Claims priority, application Japan, Feb. 5, 1986, 61-22067**

**Int. Cl.⁴ B32B** *15/04*

**U.S. Cl. 428—627** **4 Claims**




1. A ceramic-metal composite body comprising:
(a) a ceramic member;
(b) a ferrous metal member joined to said ceramic member;
(c) an intermediate metallic member joined to said ferrous metal member; and
(d) an aluminum member bonded to said intermediate metallic member by welding.



**4,746,583**

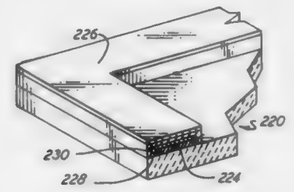
## CERAMIC COMBINED COVER

**Richard J. Falanga, Utica, N.Y., assignor to Indium Corporation, New Hartford, N.Y.**

**Filed Nov. 21, 1986, Ser. No. 933,568**

**Int. Cl.⁴ B32B** *15/04*

**U.S. Cl. 428—632** **12 Claims**




1. A ceramic sealing cover for a semiconductor package comprising
a flat ceramic sealing member having one side facing said package, said one side having a perimeter; and
a plural layer sealing ring formed at said perimeter and adhered to said perimeter, said sealing ring including
a metallized layer formed on said ceramic sealing member,
an electroplated nickel layer followed by an electroplated gold layer, and
a solder layer affixed over said electroplated gold layer.

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**4,746,584**

## NOVEL AMORPHOUS METAL ALLOYS AS ELECTRODES FOR HYDROGEN FORMATION AND OXIDATION

**Michael A. Tenhover, Solon, and Robert K. Grasselli, Aurora, both of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio**

**Filed Jun. 24, 1985, Ser. No. 747,985**

**Int. Cl.⁴ B32B** *15/01;* **C22C** *19/05;* **C25B** *11/04*

**U.S. Cl. 428—670** **10 Claims**

1. An anode comprising:
a substrate material; and
an amorphous metal alloy coated on said substrate having the formula

$$Ni_nE_eF_fG_g$$

where
E is Mo, W, Cr and mixtures thereof;
F is Pt, Pd, Rh, Ir and mixtures thereof;
G is Al, Ga and mixtures thereof;
n is from about 30 to 90 percent;
e is from about 10 to 50 percent;
f is from about 0 to 25 percent;
g is from about 10 to 40 percent; and $n+e+f+g=100$, with the proviso that when E is Mo, G is Ga and when G is Al, E is W, Cr and mixtures thereof.

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**4,746,585**

## COMB-TYPE BIPOLAR STACK

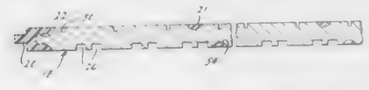
**Edward Stoner, Greensboro, N.C.; William F. Klems, Royal Oak, Mich., and Paul S. Sapienza, Greensboro, N.C., assignors to Energy Development Associates, Inc., New York, N.Y.**

**Filed Apr. 7, 1986, Ser. No. 849,001**

**Int. Cl.⁴ H01M** *4/86, 10/36*

**U.S. Cl. 429—67** **14 Claims**

1. An intermediate bus assembly for a battery system comprising:
an electrically conductive bus member having a pair of generally flat opposing faces,
an electrically non-conductive frame molded around the periphery of said bus member; and
strap means integrally formed with said frame for reinforcing the edges of said bus assembly, said strap means comprises a plurality of elongated straps which connect two opposite sections of said frame and wherein said straps are spaced in parallel along the length of said bus member such that the greatest concentration of said straps occurs in the proximity of the center of said bus member.



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**4,746,586**

## SEPARATORS FOR ALKALINE DRY BATTERIES

**Kazuo Mizutani, and Shoichi Murakami, both of Ibaragi, Japan, assignors to Kuraray Company Limited, Kurashiki, Japan**

**Filed Dec. 9, 1986, Ser. No. 939,691**

**Claims priority, application Japan, Dec. 27, 1985, 60-297943**

**Int. Cl.⁴ H01M** *2/16*

**U.S. Cl. 429—145** **2 Claims**

1. A paper for alkaline dry battery separator, said paper comprising a polyvinyl alcohol fiber having a fineness of not greater than 0.8 denier and a cellulosic fiber having a fineness of not less than 1.0 denier, the weight ratio of said polyvinyl alcohol fiber and said cellulosic fiber being in the range of 15:85 through 85:15.

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**4,746,587**

## ELECTRON EMISSIVE MASK FOR AN ELECTRON BEAM IMAGE PROJECTOR, ITS MANUFACTURE, AND THE MANUFACTURE OF A SOLID STATE DEVICE USING SUCH A MASK

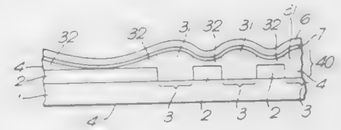
**Keith H. Nicholas, Reigate, England, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Sep. 2, 1986, Ser. No. 903,044**

**Claims priority, application United Kingdom, Sep. 20, 1985, 8523298**

**Int. Cl.⁴ G03F** *9/00*

**U.S. Cl. 430—5** **18 Claims**




1. An electron emissive mask for exposing an electron sensitive resist using an electron beam image projector, which mask includes a substrate transparent to ultraviolet radiation, patterning means on a major surface of the substrate for patterning the ultraviolet radiation transmitted by the substrate, and a photoemissive coating responsive to ultraviolet radiation and present over the patterning means, the patterning means comprising a mask pattern having apertures transparent to ultraviolet radiation and masking areas, whereby ultraviolet radiation transmitted by the pattern apertures effects photoemission of electrons in a corresponding pattern from the photoemissive coating, characterised in that the masking areas are partially transparent to the ultraviolet radiation transmitted by the substrate, in that the patterning means further comprises a modifying layer to modify ultraviolet radiation transmitted by the apertures and by the masking areas of the mask pattern, and in that the transparency of the modifying layer to the ultraviolet radiation varies dependent on position with respect to the mask pattern whereby the ultraviolet radiation transmitted to

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the photoemissive coating effects photoemission of electrons from the photoemissive coating over the apertures and over the masking areas to provide a patterned electron beam which forms a proximity effect corrected electron image of the mask pattern in the electron sensitive resist layer.

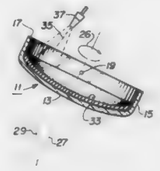
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**4,746,588**

## METHOD FOR PREPARING A PHOTOSENSITIVE FILM ON A GLASS SURFACE

**Lawrence H. Ditty, and Victor C. Sledzinski, both of Salem Township, Wayne County, Pa., assignors to RCA Corporation, Princeton, N.J.**

**Filed Nov. 25, 1985, Ser. No. 802,021**
**Int. Cl.[4] G03C *5/00*; B05D *5/00***
**U.S. Cl. 430—23** **13 Claims**



1. In a method for preparing a photosensitive film on a glass surface of a CRT panel including dispensing a quantity of an aqueous emulsion containing the ingredients of said film on said surface, sloshing said quantity of emulsion to distribute said emulsion over said surface, whereby said emulsion is prone to form bubbles therein, leveling said distributed emulsion on said surface, and then drying said leveled emulsion, the additional step of contacting said distributed emulsion with a mist consisting essentially of an organic, surface-tension-reducing liquid during said leveling step, so as to burst bubbles that have formed and to level accumulations of emulsion formed by said bubbles.

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**4,746,589**

## DEVELOPING METHOD IN ELECTROPHOTOGRAPHY USING OSCILLATING ELECTRIC FIELD

**Satoshi Haneda, and Seiichiro Hiratsuka, both of Hachioji, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Japan**

**Continuation of Ser. No. 4,295, Jan. 5, 1987, abandoned, which is a continuation of Ser. No. 800,441, Nov. 21, 1985, abandoned, which is a continuation of Ser. No. 593,352, Mar. 26, 1984, Pat. No. 4,557,992. This application Jul. 31, 1987, Ser. No. 81,575**
**Claims priority, application Japan, Mar. 31, 1983, 58-57446; Jun. 2, 1983, 58-96900; Jun. 2, 1983, 58-96901; Jun. 2, 1983, 58-96902; Jun. 2, 1983, 58-96903; Jun. 3, 1983, 58-97973**
**Int. Cl.[4] G03G *13/09***
**U.S. Cl. 430—120** **58 Claims**

1. A developing method comprising the steps of supplying a developer having magnetic carrier particles and toner particles on a developer feeding carrier to form a developer layer, the average particle size of the carrier particles being from 5 to 50 μm, the average particle size of the toner particles being up to 20 μm, and the thickness of said developer layer being higher than the distance between the developer feeding carrier and an image retainer,

conveying the developer layer into an oscillating electric field, and

developing a latent image on the image retainer by the developer inside the oscillating electric field.

**4,746,590**

## PROCESS FOR PRODUCING TONERS FOR USE IN ELECTROPHOTOGRAPHY

**Hideaki Kasai, Tatsuno, and Mitsugu Fujioka, Toyonaka, both of Japan, assignors to Nagase Chemicals, Ltd. and Nagase & Company, Ltd., both of Osaka, Japan**

**Filed Dec. 23, 1986, Ser. No. 945,553**
**Claims priority, application Japan, Dec. 23, 1985, 60-291771; May 24, 1986, 61-119598**
**Int. Cl.[4] G03G *9/08***
**U.S. Cl. 430—137** **10 Claims**

1. A process for producing toners for use in electrophotography which comprises: dyeing resin particles which have a predetermined particle size with a dye in an aqueous medium in such amounts that the weight ratio of the medium to the resin particle is not less than about 5, in the presence of silica powder in an amount of up to 10% by weight based on the weight of the resin particles at temperatures of not less than the softening point of the resin but more than temperatures higher than the softening point by about 40° C. under vigorous stirring.

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**4,746,591**

## PROCESS FOR PRODUCING PRESENSITIZED LITHOGRAPHIC PRINTING PLATE WITH LIQUID HONED ALUMINUM SUPPORT SURFACE

**Hirokazu Sakaki; Akira Shirai; Akio Uesugi, and Tsutomu Kakei, all of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Continuation of Ser. No. 631,416, Jul. 16, 1984, abandoned. This application Sep. 4, 1986, Ser. No. 903,907**
**Claims priority, application Japan, Jul. 14, 1983, 58-128228**
**Int. Cl.[4] G03C *1/94, 1/96, 1/54***
**U.S. Cl. 430—168** **21 Claims**

1. A process for preparing a presensitized lithographic printing plate precursor which comprises the steps of:

(a) liquid-honing a surface of an aluminum sheet by jetting a high-pressure liquid from at least one nozzle at a high flow rate, joining a slurry containing a fine powder of an abrasive with the jetted high-pressure liquid stream, and directing the resulting mixed stream to strike against a surface of the aluminum sheet; then

(b) electrochemically graining the surface of the aluminum sheet in an electrolyte comprising hydrochloric acid, nitric acid, or a mixture thereof and thereafter

(c) coating a layer of a light-sensitive composition comprising (1) a diazo resin and a binder or (2) an o-quinonediazide compound on said surface.

19. A presensitized lithographic printing plate precursor produced by the process of claim 1.

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**4,746,592**

## COLOR CORRECTION IN NEGATIVE IMAGES USING POSITIVE IMAGING CHEMISTRY

**Kin K. Lum, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Aug. 27, 1986, Ser. No. 900,938**
**Int. Cl.[4] G03C *5/54, 7/26***
**U.S. Cl. 430—223** **7 Claims**

1. A color diffusion transfer photographic recording material comprising a support having thereon at least one photosensitive silver halide emulsion layer having associated therewith a positive working redox dye image-providing compound and a negative working redox dye image-providing compound each of which compounds being nondiffusible in alkaline medium having a pH of 11 or greater, whereby both a positive and a negative diffusion transfer dye image can be formed, wherein one of said compounds releases dye as a direct function of silver halide development and the other of said compounds releases dye as an inverse function of silver halide development to provide color correction for the dye image.



**4,746,593**

## SILVER HALIDE RADIATION-SENSITIVE PHOTOGRAPHIC MATERIALS

**Jonathan P. Kitchin, Hertford, and Kevin P. Hall, Harlow, both of England, assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Jul. 2, 1986, Ser. No. 881,081**
**Claims priority, application United Kingdom, Jul. 4, 1985, 8516934**
**Int. Cl.[4] G03C *1/02, 1/06, 1/42***
**U.S. Cl. 430—264** **19 Claims**

1. A negative-acting photographic element comprising a support having coated thereon one or more layers of a radiation-sensitive silver halide emulsion, at least one of the layers containing a hydrazine compound characterized in that the one or more radiation-sensitive silver halide layers contain a first silver halide emulsion having an average grain size of from 0.to 0.4 microns and a second silver halide emulsion of particles with an average grain volume of less than one half that of the particles of the first emulsion, wherein one or more silver halide layers have a distribution of grains therein such that for the combined emulsions a plot of total volume of grain against grain size exhibits at least two distinct peaks, one peak lying in the range 0.1 to 0.4 microns.

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**4,746,594**

## SILVER HALIDE PHOTOGRAPHIC MATERIAL FOR PHOTOMECHANICAL PROCESS AND REDUCTIVE PROCESSING METHOD USING THE SAME

**Yasuo Kasama; Inoue Nobuaki, and Ken-ichi Kuwabara, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Continuation of Ser. No. 800,101, Nov. 22, 1985, abandoned, which is a continuation of Ser. No. 573,176, Jan. 23, 1984, abandoned. This application Mar. 2, 1987, Ser. No. 21,570**
**Claims priority, application Japan, Jan. 24, 1983, 58-9612**
**Int. Cl.[4] G03C *1/02, 5/42***
**U.S. Cl. 430—264** **20 Claims**

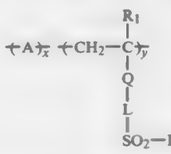
1. A silver halide photographic material for a photomechanical process, comprising:

a support having thereon;

a light-sensitive silver halide eumulsion layer; and

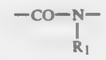
a hydrophilic colloidal light-insensitive upper layer provided on the surface of the emulsion layer facing away from the support;

the light insensitive upper layer containing and being hardened by a polymeric hardener having a repeating unit represented by the following formulae (I), (II), or (III),

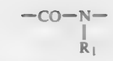


(I)

wherein A represents an ethylenic unsaturated monomer capable of copolymerizing with the monomer unit shown on its right side; Q represents $-CO_2-$,



or an arylene group containing 6 to 10 carbon atoms; L represents a divalent group having 3 to 15 carbon atoms containing at least either $-CO_2-$ or



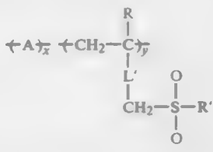
or a divalent group having 1 to 12 carbon atoms containing at least one bonding selected from a class consisting of —O—,



—CO—, —SO—, $-SO_3-$,

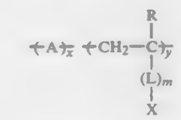


$R_1$ in formula (I), in Q, and in L independently represents a hydrogen atom or a lower alkyl group containing 1 to 6 carbon atoms; $R_2$ represents a vinyl group or a functional group corresponding to the precursor thereof, which have the formulae $-CH=CH_2$ and $-CH_2CH_2X$, respectively wherein X represents a group capable of being replaced by a nucleophilic group, or a group capable of being released by a base in a form of HX; and x and y each represent a mole % fraction, and x ranges from 0 to 99 and y ranges from 1 to 100;



(II)

wherein A represents an ethylenic unsaturated monomer unit capable of undergoing copolymerization with the monomer unit shown on the right side thereof, or a mixture of such monomers; x and y each represents a mole fraction, and x ranges from 10 to 95% and y ranges from 5 to 90%, R represents a hydrogen atom, or an alkyl group containing 1 to 6 carbon atoms; R′ represents $-CH=CH_2$, or $-CH_2CH_2X$, wherein X represents a group capable of being replaced by a nucleophilic group, or a group capable of being released by a base in a form of HX; and L′ represents a linking group selected from alkylene groups, arylene groups containing 6 to 12 carbon atoms, —COZ— or $-CPZR_3$, wherein $R_3$ represents alkylene containing 1 to 6 carbon atoms, or arylene containing 6 to 12 carbon atoms; and Z represents an oxygen atom or —NH;



(III)

wherein A represents an ethylenic unsaturated monomer unit capable of copolymerizing with the monomer unit shown on the right side thereof; R represents a hydrogen atom, or an alkyl group containing 1 to 6 carbon atoms; L represents a divalent linking group containing 1 to 20 carbon atoms; X represents an active ester group; x and y each represents a mole % fraction, and x ranges from 0 to 95 and y ranges from 5 to 100; and m is 0 to 1;

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and wherein the light-insensitive upper layer has a melting time greater than the melting time of the silver halide emulsion layer, and the emulsion contains a hydrophilic colloidal binder comprising gelatin and the at least one additive selected from the group consisting of starch, modified starch and macromolecular polysaccharide produced from starch using a microbial fermentation process.

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**4,746,595**

## SUBBED SUPPORTS FOR IMAGING MATERIALS

**James F. Sanders, St. Joseph, Wis., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Apr. 22, 1986, Ser. No. 854,840**
**Int. Cl.[4] G03C *1/76, 1/68***
**U.S. Cl. 430—271** **10 Claims**

1. A photosensitive proofing element comprising a transparent polymeric substrate having a subbing layer on at least one surface thereof comprising a substantially aliphatic polymer having urea and biuret linkages and adhered to said subbing layer a negative acting photopolymerizable composition comprising by weight:
10–60% of a polyethylenically unsaturated acryloyl or methacryloyl monomer,
10–60% of a polyethylenically unsaturated polymer having acryloyl or methacryloyl groups,
10–60% of a polyketone resin binder,
0.1–20% of a free radical photoinitiator and a spectral sensitizer for said photoinitiator, and
2–50% of a colored pigment.

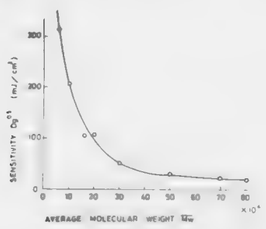
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**4,746,596**

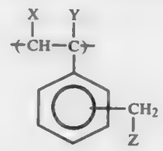
## METHOD FOR MICROFABRICATION OF PATTERN ON SUBSTRATE USING X-RAY SENSITIVE RESIST

**Nobuyuki Yoshioka, and Yoshiki Suzuki, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 27, 1985, Ser. No. 813,864**
**Int. Cl.[4] G03C *5/00***
**U.S. Cl. 430—325** **3 Claims**




1. A method for microfabrication of a pattern on a substrate comprising the steps of:
forming a thin film of X-ray sensitive resist of chlorinated polymethylstyrene on said substrate, wherein said chlorinated polymethylstyrene has an average molecular weight of 400,000–700,000 and a chlorine content of 20–40 wt. % and contains fundamental monomer structure of



where X, Y and Z are individually hydrogen or chlorine and at least one of X, Y and Z is chlorine instead of hydrogen, selectively exposing said film to $PdL_\alpha$ radiation, and developing said exposed film with a developer comprising ethoxyethanol or methoxyethanol.

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**4,746,597**

## IMAGE DELETION FLUID FOR PRINTING PLATE

**Bruce A. Zellmer, Hudson, Wis., and David R. Boston, Woodbury, Minn., assignors to Minnesota Mining and Manufacturing Co., St. Paul, Minn.**

**Filed Oct. 22, 1986, Ser. No. 921,759**
**Int. Cl.[4] G03C *11/04, 5/00***
**U.S. Cl. 430—331** **9 Claims**

1. A silver image deletion fluid comprising an acidic aqueous solution of:
(a) iodine;
(b) an effective excess of iodide ion; and
(c) an effective amount of a hydrophilic-matrix-forming agent.

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**4,746,598**

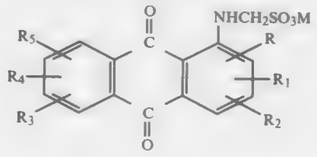
## PROCESSING OF COLOR PHOTOGRAPHIC MATERIAL UTILIZING A STABILIZING SOLUTION AFTER FIXING

**Masayuki Kurematsu, and Shigeharu Koboshi, both of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 809,522, Dec. 16, 1985, abandoned. This application Feb. 26, 1987, Ser. No. 21,530**
**Claims priority, application Japan, Dec. 21, 1984, 59-271327**
**Int. Cl.[4] G03C *7/40, 5/24, 11/00, 7/26***
**U.S. Cl. 430—372** **18 Claims**

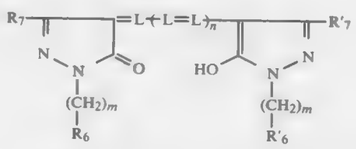
1. In a method of processing a light-sensitive silver halide color photographic material including development and fixing steps, the improvement comprising
after fixing the light sensitive silver halide photographic material by processing the light-sensitive silver halide color photographic material with a processing solution having fixing ability; the step of
processing the fixed material in the presence of at least one compound of the Formulae (I), (II), (II′) and (II″), with a water washing-substitutive stabilizing solution substantially without carrying out washing with water, said at least one compound represented by the Formulae (I), (II), (II′) and (II″) being shown below:

Formula (I)

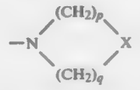


wherein R, $R_1$, $R_2$, $R_3$, $R_4$ and $R_5$ each represent a hydrogen atom, a halogen atom, a hydroxy group, an alkyl group, an alkoxy group, a sulfo group or $—NHCH_2SO_3M$ (M represents a cation),

Formula (II)

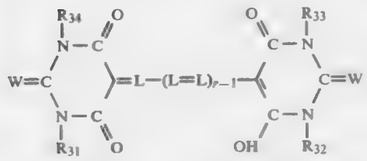


wherein $R_6$ and $R_6'$ each represent a hydrogen atom, an unsubstituted alkyl group, a substituted alkyl group, an unsubstituted aryl group, a substituted aryl group, an unsubstituted heterocyclic group or a substituted heterocyclic group; $R_7$ and $R_7'$ each represent a hydroxy group, an alkoxy group, a substituted alkoxy group, a cyano group, a trifluoromethyl group, —$COOR_8$, —$CONHR_8$, —$NHCOR_8$, an amino group, a substituted amino group substituted with an alkyl group having 1 to 4 carbon atoms or a cyclic amino group represented by the Formula:



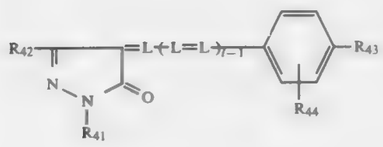
(wherein p and q each represent 1 or 2, and X represents an oxygen atom, a sulfur atom or a —$CH_2$— group); $R_8$ represents a hyrogen atom, an alkyl group or an aryl group; L represents a methyne group; n represents 0, 1 or 2; m represents 0 or 1,

Formula (II′)

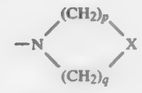


wherein r represents an integer of 1 to 3; W represents an oxygen atom or a sulfur atom; L represents a methyne group; $R_{31}$–$R_{34}$ each represent a hydrogen atom, an alkyl group, an aryl group, an aralkyl group or a heterocyclic group, at least one of which is a substituent other than hydrogen atom,

Formula (II″)



wherein l represents an integer of 1 or 2; L represents a methyne group; $R_{41}$ represents an alkyl group, an aryl group or a heterocyclic group; $R_{42}$ represents a hydroxy group, an alkyl group, an alkoxy group, a substituted alkoxy group, a cyano group, a trifluoromethyl group, —$COOR_8$, —$CONHR_8$, —$NHCOR_8$, an amino group, a substituted amino group substituted with an alkyl group having 1 to 4 carbon atoms or a cyclic amino group represented by the Formula:



(wherein p and q each represent 1 or 2, and X represents an oxygen atom, a sulfur atom or a —$CH_2$— group); $R_8$ represents a hyrogen atom, an alkyl group or an aryl group; $R_{43}$ represents a —$OZ_1$ group or a



group; $Z_1$, $Z_2$ and $Z_3$ each represent a hydrogen atom or an alkyl group, $Z_2$ and $Z_3$ being either the same or different or alternatively being bonded to each other to form a ring; and $R_{44}$ represents a hydrogen atom, an alkyl group, a chlorine atom or an alkoxy group.

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**4,746,599**

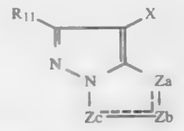
## SILVER HALIDE COLOR PHOTOSENSITIVE MATERIALS

**Naoyasu Deguchi, and Nobutaka Ohki, both of Minamiashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Apr. 28, 1987, Ser. No. 43,593**
**Claims priority, application Japan, May 1, 1986, 61-101683**
**Int. Cl.[4] G03C *7/26, 7/18***
**U.S. Cl. 430—504** **11 Claims**

1. A silver halide color photosensitive material comprising, on a support, at least one cyan coloring red-sensitive silver halide emulsion layer, at least one magenta coloring green-sensitive silver halide emulsion layer and at least one yellow coloring blue-sensitive silver halide emulsion layer, characterized in that at least one coupler represented by the formula (I) is contained in at least one green-sensitive emulsion layer, and a cyan gradation is added to a specific image of a region in which yellow and/or magenta image density obtained by color development exceeds 0.7, so as to increase cyan image gradation in the specific image region independently of the cyan density in the cyan coloring red-sensitive layer and as the yellow and/or magenta image density in the specific image region increases:

(I)



wherein $R_{11}$ represents a hydrogen atom or a substituent, X represents a hydrogen atom or a group which can be released upon a coupling reaction with an oxidized product of an aromatic primary amine developing agent, and Za, Zb and Zc each represents a machine, substituted methine, =N— or —NH— group; one of the Za—Zb bond and Zb—Zc bond is a double bond and the other is a single bond; when Zb—Zc is a carbon-to-carbon double bond, it may compose a part of a condensed aromatic bond; $R_{11}$ or X may form a higher polymer including a dimer or more; and when Za, Zb or Zc is the substituted methine, a higher polymer including a dimer or more may be formed through the substituted methine.

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**4,746,600**

## LIGHT-SENSITIVE SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL WITH NON-DIFFUSABLE LIGHT-INSENSITIVE DYE LAYER

**Yoshikazu Watanabe; Hiroshi Shimazaki; Toshifumi Iijima; Yoshiro Shigetomi, and Toshihiko Yagi, all of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan**

**Filed Jun. 26, 1986, Ser. No. 879,147**
**Claims priority, application Japan, Jul. 1, 1985, 60-145101; Aug. 28, 1985, 60-188773; Jan. 20, 1986, 61-9788**
**Int. Cl.[4] G03C *1/46, 7/32, 1/08, 5/54***
**U.S. Cl. 430—505** **27 Claims**

1. A light-sensitive silver halide color photographic material comprising
a support,
a red sensitive emulsion group having at least two layers with color sensitivities which are substantially the same and different light sensitivities, a first of said red sensitive layers being disposed closer to the support than all other of the red sensitive layers,
a green sensitive emulsion group having at least two layers with color sensitivities which are substantially the same and different light sensitivities, a first of said green sensi-

VOL 1090 ISS 4 MY 24 1988 UMI



tive layers being disposed closer to said support than all other green sensitive layers; and

a plurality of light-insensitive hydrophilic colloidal layers;

a DIR compound, or precursor thereof by reaction with an oxidized form of a color developing agent, being contained in at least one of said red sensitive emulsion layers, said green sensitive emulsion layers and said light-insensitive hydrophilic colloidal layers; and wherein either:

A. at least one layer of said light insensitive hydrophilic colloidal layers contains a non-diffusible red absorptive dye and is located further from the support than said first red sensitive layer; or

B. at least one layer of said light sensitive hydrophilic colloidal layers contains a non-diffusible green absorptive dye and is located further from the support than said first green sensitive layer; or

both conditions A and B.

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**4,746,601**

## SILVER HALIDE PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL

**Keiji Mihayashi; Hidetoshi Kobayashi, and Shunji Takada, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Continuation of Ser. No. 681,753, Dec. 14, 1984, abandoned. This application Mar. 9, 1987, Ser. No. 22,479**

**Claims priority, application Japan, Dec. 15, 1983, 58-237106**

**Int. Cl.[4] G03C** *1/08, 1/485*

**U.S. Cl. 430—543** **12 Claims**

1. A silver halide photographic light-sensitive material comprising a support having provided thereon at least one photographic layer including at least one silver halide emulsion layer, wherein

at least one silver halide emulsion layer contains silver halide grains whose average value of the diameter corresponding to the projected area of a group of silver halide grains that take 40% of the total projected area of whole silver halide grains present in said silver halide emulsion layer is at least 1.5 μm, and

at least one photographic layer contains at least one compound capable of imagewise releasing a fogging agent or a precursor thereof or a development accelerator or a precursor thereof corresponding to a quantity of developed silver upon development, wherein said compound is present in an amount of $10^{-8}$ to 0.5 mole per mole of said silver halide grains.

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**4,746,602**

## SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL

**Michio Ono, and Kozo Aoki, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

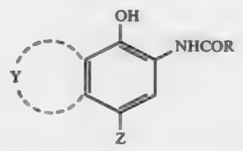
**Filed Apr. 30, 1987, Ser. No. 44,270**

**Claims priority, application Japan, Apr. 30, 1986, 61-100222**

**Int. Cl.[4] G03C** *7/34*

**U.S. Cl. 430—549** **21 Claims**

1. A silver halide color photographic material comprising a support having provided thereon at least one silver halide emulsion layer containing a cyan-dye-forming coupler represented by formula (I)




(I)

wherein Y represents an atomic group forming an at least 7-membered nitrogen-containing heterocyclic ring containing at least one —NHCO— group; Z represents a hydrogen atom or a group releasable upon coupling with an oxidation product of a color developing agent; R represents an aliphatic group, an aromatic group, a heterocyclic group, or a substituted amino group; or any of R, Z, and Y form a dimer or higher polymer.

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**4,746,603**

## NEGATIVE TYPE SILVER HALIDE PHOTOGRAPHIC EMULSIONS

**Seiji Yamashita; Naoto Ohshima, and Shunji Takada, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Jul. 3, 1986, Ser. No. 882,010**

**Claims priority, application Japan, Jul. 4, 1985, 60-147121**

**Int. Cl.[4] G03C** *1/08*

**U.S. Cl. 430—603** **8 Claims**

1. A negative type silver halide photographic emulsion formed by growing silver halide grains in the presence of a water-soluble iridium salt in a molar ratio of $3\times10^{-4}$ mol or more to the amount of the total silver halides used in the formation of the silver halide grains and then chemically sensitizing the surfaces of the grains formed with a sulfur compound or with a sulfur compound and a gold compound.

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**4,746,604**

## SPECIFIC BINDING ASSAYS UTILIZING A VIABLE CELL AS A LABEL

**Solomon Mowshowitz, New York, N.Y., assignor to Enzo Biochem, Inc., New York, N.Y.**

**Filed May 24, 1985, Ser. No. 738,135**

**Int. Cl.[4] G01N** *33/53, 33/554*

**U.S. Cl. 435—7** **8 Claims**

1. An assay composition for detecting an analyte in a sample, which composition comprises (i) an analyte specific component capable of forming a specific complex with said anaylyte and (ii) a detectable component comprising an organism selected from the group consisting of microorganisms, fungal cells, plant cells and animal cells capable of growth or reproduction, which detectable component has been attached to said analyte specific component.

7. An assay method for detecting an analyte in a sample, which method comprises the steps of:

a. affixing said sample suspected of containing said analyte to a solid support;

b. combining said affixed analyte with a composition comprising (i) an analyte specific component capable of forming a specific complex with said analyte and (ii) a detectable component comprising an organism selected from the group consisting of microorganisms, fungal cells, plant cells and animal cells capable of growth or reproduction, which detectable component has been attached to said analyte specific component to form a resultant complex;

c. separating non-complexed detectable component from said complex; and

d. placing said complex in an appropriate environment to encourage growth or replication of said detectable component, wherein growth or replication is proportional to analyte concentration.

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**4,746,605**

## PROCESS AND A REAGENT FOR THE DETERMINATION OF LOW DENSITY LIPOPROTEINS (LDL)

**Lorenz Kerscher, Starnberg; Joachim Ziegenhorn, Starnberg, and Sigbert Schiefer, Pahl, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany**

**Filed Oct. 2, 1984, Ser. No. 656,954**

**Claims priority, application Fed. Rep. of Germany, Oct. 26, 1983, 3338836**

**Int. Cl.[4] G01N** *33/92*

**U.S. Cl. 435—7** **17 Claims**

1. A process for the determination of low density lipoprotein (LDL) in a body fluid sample comprising adding an amount of high density lipoprotein (HDL) specific antibodies or reactive fragments thereof sufficient to precipitate said HDL completely and a mixture of polyanion and divalent cation sufficient to precipitate very low density lipoprotein (VLDL) and to enhance precipitation of the antibody-HDL complex without precipitation of LDL to the body fluid sample, wherein said polyanion is dextran sulphate, heparin, phosphotungstic acid or polyvinyl sulphate and said divalent cation is a calcium, magnesium or manganese ion, thereafter separating off the supernatant which is formed and determining the LDL or one of its components in the supernatant.



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**4,746,606**

## BILIRUBIN-SPECIFIC ENZYME AND ITS ANALYTICAL USE

**Tai W. Wu, and Edward R. Scalice, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed May 27, 1986, Ser. No. 866,845**

**Int. Cl.[4] C12Q** *1/26, 1/00*

**U.S. Cl. 435—25** **20 Claims**

1. A bilirubin-specific enzyme preparation isolated from a plant of the Compositae family which degrades bilirubin at a pH in the range of from about 7 to about 10 and a temperature in the range of from about 20° to about 50° C., and has a $K_m$ for bilirubin of about $1.5\times10^{-5}$ molar and a pH optimum of about 7.4 as measured in phosphate buffer at 37° C.

3. An assay composition for the determination of an analyte other than bilirubin in a liquid suspected of containing an analyte and in which bilirubin is an interferent for said determination, said composition comprising an interactive composition for said analyte and a bilirubin-specific enzyme isolated from a plant of the Compositae family which degrades bilirubin at a pH in the range of from about 7 to about 10 and a temperature in the range of from about 20° to about 50° C., has a $K_m$ for bilirubin of about $1.5\times10^{-5}$ molar and a pH optimum of about 7.4 as measured in phosphate buffer at 37° C., and reduces bilirubin interference with said determination.

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**4,746,607**

## USE OF SUBSTITUTED QUINONE ELECTRON TRANSFER AGENTS IN ANALYTICAL DETERMINATIONS

**Albert J. Mura; Patricia M. Scensny; Vanessa R. Lum, all of Rochester, and Robert T. Belly, Webster, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Feb. 7, 1985, Ser. No. 699,374**

**Int. Cl.[4] C12Q** *1/02, 1/26;* **G01N** *33/00, 33/50*

**U.S. Cl. 435—25** **20 Claims**

1. A composition for the determination of an analyte in a liquid, said composition comprising:

(a) an at least partially substituted benzo- or naphthoquinone electron transfer agent (ETA) which is capable of being reduced by said analyte and has an $E_{\frac{1}{2}}$ of from about −320 to about +400 mV as measured in an aqueous buffer solution at pH 7,

(b) a reducible compound which provides a detectable species when reduced by said reduced ETA, and

(c) a buffer which maintains the pH of said composition at pH 9 or less,

said reducible compound being selected from the group consisting of

tetrazolium salts

dichloroindophenol dyes, and

compounds of the structure $CAR—R^1)_n$ wherein CAR— is an aromatic or quinone nucleus, $R^1$ is a moiety which comprises a shiftable detectable species, and n is 1 or 2, provided that said reducible compound is capable of being reduced at a pH of 9 or less to release said shiftable detectable species, and further provided that when $R^1$ is replaced with H, $CAR—H)_n$ has an $E_{\frac{1}{2}}$ of either at least about +100 mV when measured in water, or of at least about −650 mV when measured in acetonitrile.

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**4,746,608**

## PROCESS FOR PRODUCING PEPTIDES

**Tamio Mizukami, Machida; Seiga Ito, Sagamihara; Tetsuo Oka, Yokohama, and Tatsunari Nishi, Tokyo, all of Japan, assignors to Kyowa Hakko Kogyo Co., Ltd., Tokyo, Japan**

**PCT No. PCT/JP83/00273, § 371 Date Apr. 12, 1985, § 102(e) Date Apr. 12, 1985, PCT Pub. No. WO85/01066, PCT Pub. Date Mar. 14, 1985**

**PCT Filed Aug. 22, 1983, Ser. No. 732,828**

**Int. Cl.[4] C12P** *21/00, 21/02, 21/04;* **C12N** *15/00, 1/20, 1/00*

**U.S. Cl. 435—68** **12 Claims**

1. A process for producing a human peptide which comprises the steps of culturing in a medium a microorganism which harbors a recombinant DNA comprising a gene coding for said peptide, a vector and a promoter, said microorganism being capable of producing the peptide, accumulating the peptide in the culture broth, and recovering the peptide from the culture broth, wherein the culturing step is conducted at a temperature 10° to 25° C. lower than the optimum growth temperature for the microorganism and within the range of 15° to 30° C.

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**4,746,609**

## RESTRICTION ENDONUCLEASE CLEAVING PALINDROMIC DNA

**Bryan Bolton, Clayton-Le-Moors, Great Britain; Michael J. Comer, Bernried, Fed. Rep. of Germany; Christoph Kessler, Munich, Fed. Rep. of Germany, and Georg Nesch, Raisting, Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany**

**Filed Jun. 10, 1985, Ser. No. 742,800**

**Claims priority, application Fed. Rep. of Germany, Jun. 13, 1984, 3421937; Apr. 4, 1985, 3512435**

**Int. Cl.[4] C12P** *19/34;* **C12N** *9/22;* **C12R** *1/025;* **C07H** *21/04*

**U.S. Cl. 435—91** **4 Claims**

1. Method of obtaining DNA sequences which are characterized by terminal nucleotide sequences indicated by the arrows:




comprising contacting a DNA sample with endonuclease Asp 718 and $Mg^{2+}$ to cleave DNA at the sites indicated by the arrows.

2. Restriction endonuclease Asp 718, which cleaves DNA in a palindromic recognition sequence at a site indicated by the arrows:



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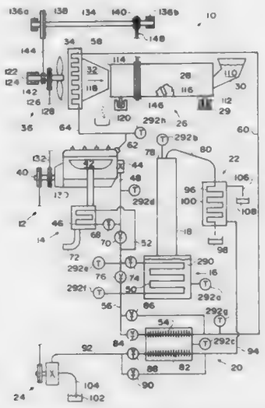


**4,746,610**

## EFFICIENT USE OF THERMAL ENERGY FROM AN INTERNAL COMBUSTION ENGINE IN ETHANOL PRODUCTION

R. Wayne Smith, Warsaw, Ind., assignor to Douglas W. Wills, Indianapolis, Ind.; Linda Wills Maher, Corrales, N. Mex. and Nancy Wills Coffin, Auburn, Ind., a part interest to each

Filed Feb. 2, 1983, Ser. No. 463,123
Int. Cl.[4] C12P *7/06;* B01D *3/00*
U.S. Cl. 435—161 39 Claims



1. A method for producing alcohol, which method comprises:
(a) providing a mixture of a fermentable material and water;
(b) controlling the temperature of said mixture of fermentable material and water to ferment said fermentable material into alcohol and thereby produce a mixture of alcohol and water;
(c) supplying thermal energy to said mixture of alcohol and water to distill said alcohol;
(d) providing an internal combustion engine of the type that adds thermal energy to a liquid coolant as said coolant flows through cooling passages of said engine;
(e) providing a liquid coolant;
(f) directing said liquid coolant through said cooling passages, whereby the thermal energy of said coolant is increased;
(g) utilizing thermal energy of exhaust gases of said internal combustion engine to increase the thermal energy of said coolant;
(h) utilizing the thermal energy of said coolant for said supplying step (c); and
(i) loading the mechanical output of said internal combustion engine to increase the thermal energy of said engine.

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**4,746,611**

## PROCESS FOR RECOVERING CELLULASES

Shizu Fujishima, Ikeda; Fumiko Yaku, Suita, and Einosuke Muraki, Osaka, all of Japan, assignors to Agency of Industrial Science & Technology, Tokyo, Japan

Filed Dec. 30, 1985, Ser. No. 814,478
Claims priority, application Japan, Jan. 10, 1985, 60-3055; Jan. 22, 1985, 60-10223
Int. Cl.[4] C12N *9/42;* C12R *1/66*
U.S. Cl. 435—209 21 Claims

1. A process for recovering cellulases from a saccharified solution obtained by saccharifying a cellulosic material by using said cellulases, which comprises the steps of:
(1) acidifying said saccharified solution,
(2) adding chitosan and/or partially deacetylated chitin to said saccharified solution previously acidified in the preceding step and dissolving the same therein,
(3) alkalifying the resulting solution to thereby precipitate said cellulases adsorbed by the chitosan and/or partially deacetylated chitin, and
(4) separating the cellulases adsorbed by the chitosan and/or partially deacetylated chitin.

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**4,746,612**

## AOTUS INTERSPECIES HYBRIDOMAS AND MONOCLONAL RECEPTORS PRODUCED THEREBY

Harold A. Stanley, La Jolla, and Robert T. Reese, San Diego, both of Calif., assignors to Scripps Clinic & Research Foundation, La Jolla, Calif.

Filed Oct. 12, 1984, Ser. No. 660,478
Int. Cl.[4] C12N *5/00, 15/00;* C07K *15/04*
U.S. Cl. 435—240.27 34 Claims

1. A process for preparing Aotus monoclonal receptor molecules that immunoreact with a *Plasmodium falciparum* comprising the steps of:
(a) collecting antibody-producing cells from *Aotus trivirgatus* immunized by a protein of *Plasmodium falciparum;*
(b) fusing said cells with cells of a mouse myeloma cell line to form hybridomas, said myeloma cells containing about the same number of chromosomes per cell as do the antibody-producing cells, said fusion being carried out in the presence of a cell fusion promoter;
(c) cloning said hybridomas in a culture medium selective for hybridoma growth;
(d) assaying and selecting said cloned hybridomas for the ability to secrete receptor molecules that immunoreact with said predetermined antigen;
(e) subcloning to monoclonicity a selected hybridoma;
(f) culturing the selected, subcloned hybridoma of step (e); and
(g) collecting the monoclonal receptors secreted by said cultured hybridoma of step (f).

18. *Aotus trivirgatus*-mouse hybridoma-secreted monoclonal receptor molecules that:
(a) immunoreact with a protein of *Plasmodium falciparum;*
(b) are bound by polyclonal antibodies raised to antibodies of *Aotus trivirgatus;* and
(c) are not substantially bound by polyclonal antibodies raised to mouse antibodies.

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**4,746,613**

## POULTRY DISEASES BACTERIN PREPARATION

Robert W. Wichmann, 21 College Park, Davis, Calif. 95616

Filed Mar. 2, 1984, Ser. No. 585,519
Int. Cl.[4] C12N *1/20;* A61K *39/102*
U.S. Cl. 435—253 8 Claims

1. A method of preparing bacterins for the immunization of fowl which comprises:
(a) inoculating an embryonic fowl tissue culture consisting essentially of fragmented embryo with a serotype of bacteria,
(b) incubating said tissue culture to permit growth of said serotype of bacteria,
(c) recovering the serotype of bacteria from the said tissue culture,
(d) inactivating the said serotype of bacteria,
(e) mixing the inactivated serotype of bacteria with an adjuvant.

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**4,746,614**

## EXTRACTION DEVICE

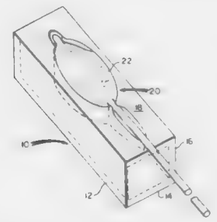
Mark J. Devaney, Jr., Rochester, and Thomas W. Glanville, Churchville, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 18, 1987, Ser. No. 98,247
Int. Cl.[4] C12M *1/30*
U.S. Cl. 435—295 8 Claims

1. A device for extracting biological materials from a swab-like collector using a pipette, the device comprising:



a container having an internal surface defining a major cavity for confining an extracting liquid medium, and
means in said container defining a notch extending into a portion of said internal surface, said notch being configured to receive a swab-like collector and to hold such a collector in said major cavity, said notch having one end that is deeper within said cavity than the rest of said notch, said end being configured to hold the absorbent end of such a collector,



and centering means in said container for centering a pipette for aspiration of such extracting medium, said centering means being disposed generally about a line that intersects said notch at a point generally adjacent said one end,
whereby the maximum amount of extracting medium and biological material is aspiratable out of said major cavity and such a collector, respectively, by a pipette positioned on said line.

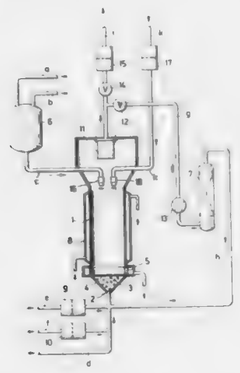
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**4,746,615**

## STERILIZABLE FLUIDIZED BED FERMENTER

Rainer Buchholz, Unnau-Korb; Hans-Matthias Deger, Hofheim am Taunus; Hartmut Voelskow, Hattersheim, and Rolf Woernle, Bad Soden am Taunus, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Filed Jul. 28, 1987, Ser. No. 78,681
Claims priority, application Fed. Rep. of Germany, Jul. 30, 1986, 3625698
Int. Cl.[4] C12M *1/12*
U.S. Cl. 435—311 5 Claims



1. A sterilizable fluidized bed fermenter for carrying out low-moisture fermentations, in which use is made of microorganisms which are cultured under sterile conditions in the fluidized bed fermenter itself, which is initially operated as a bubble column, and are converted into fluidizable granules, which has the following features
(a) the fluidized bed fermenter (1) has at the bottom an orifice (2) for introducing a stream of gas, and an inlet bottom section (3) with a perforated or sintered disk (4) for distributing the stream of gas,
(b) one or more filter elements (5) are mounted on the side of the bottom part of the fluidized bed fermenter and can be used to draw off the used culture broth under sterile conditions,
(c) there is provision of a reservoir (6) which is provided with a steam line (a) and a substrate line (b), from which the fluidizable granules can be sprayed with nutrient solution through a line (c) and a nozzle (16),
(d) there is a temperature-controllable air humidifier (7) which prevents the microorganisms being dried out by the stream of gas, and
(e) there is a device for introducing superheated steam, a jacket heat-exchanger or a heating element (8) for sterilizing all the fittings of the fluidized bed fermenter which are in direct contact with the microorganisms.

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**4,746,616**

## METHOD OF TREATING A CONSUMABLE PRODUCT AND PACKAGING FOR CONSUMABLE PRODUCTS TO INDICATE THE PRESENCE OF CONTAMINATION

David E. Honigs, Brier; Jonathan H. Perkins, and Bradley J. Tenge, both of Seattle, all of Wash., assignors to The Board of Regents of the University of Washington, Seattle, Wash.

Filed Jul. 16, 1988, Ser. No. 886,528
Int. Cl.[4] G01N *33/02*
U.S. Cl. 436—20 73 Claims

1. A method of treating a container for enclosing an ingestible product intended for human consumption, to indicate the presence of a foreign toxic contaminating substance intentionally introduced into the container as a result of tampering with said product, comprising:
providing a container for enclosing the ingestible product intended for human consumption;
treating a surface of the container that will be in contact with the product intended for human consumption, with a non-toxic colorimetric indicator, leaving a substantially dry residue capable of reacting with the foreign toxic contaminating substance so as to generate a detectable colorimetric signal indicating that said foreign toxic contaminating substance has been introduced into the container after the container was first filled with the product and sealed.

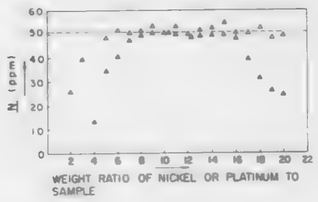
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**4,746,617**

## METHOD OF ANALYZING NITROGEN CONTAINED IN TITANIUM GROUP METAL OR ALLOY THEREOF

Masayoshi Okamura, Kobe; Kiyoshi Matsuda, Takasago; Hiromichi Yamada, Akashi; Hiromi Umeda, and Masami Tomimoto, both of Himeji, all of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Division of Ser. No. 739,271, May 30, 1985, Pat. No. 4,673,655.
This application Jan. 15, 1987, Ser. No. 3,614
Int. Cl.[4] G01N *33/20;* C01G *23/00;* C22C *14/00*
U.S. Cl. 436—75 7 Claims




1. A method for quantitatively analyzing the nitrogen-content of a titanium group metal or an alloy of a titanium group metal, said method comprising:

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(i) melting a sample of a titanium group metal or an alloy in an inert gas atmosphere in the presence of nickel, said nickel being present in an amount corresponding to 7 to 16 times by weight the weight of the sample whereby nitrogen is extracted therefrom;
(ii) subjecting extracted nitrogen to quantitative analysis.

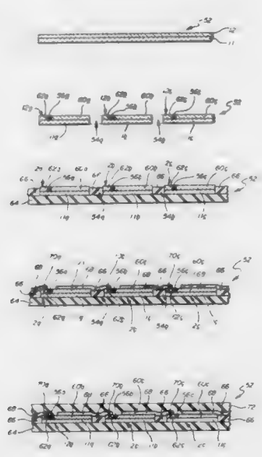
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**4,746,618**

## METHOD OF CONTINUOUSLY FORMING AN ARRAY OF PHOTOVOLTAIC CELLS ELECTRICALLY CONNECTED IN SERIES

**Prem Nath, Rochester, and Timothy Barnard, Lake Orion, both of Mich., assignors to Energy Conversion Devices, Inc., Troy, Mich.**

**Filed Aug. 31, 1987, Ser. No. 91,475**
**Int. Cl.⁴ H01L** *31/18*
**U.S. Cl. 437—2** **15 Claims**



1. A method of continuously electrically interconnecting in series a continually moving array of discrete photovoltaic cells formed from a single large area photovoltaic cell, said method including the steps of
providing an elongated, continuous web of photovoltaic cell material, said continuous web comprising a continuous substrate upon which a plurality of continuous thin film layers of semiconductor alloy material are disposed;
continuously moving said photovoltaic cell material to a take-up station;
forming n slits, where n is an integer equal to or greater than 1, photovoltaic cell material for dividing said material into n+1 smaller area cells; each said slit extending through the semiconductor alloy material and the substrate and being of a length selected to include a non-slitted connector between each terminus of said slit and the edge of said cell proximate thereto so that said connectors are adapted to maintain the structural integrity of said elongated web;
establishing electrical series communication between adjacent smaller area cells disposed on opposite sides of said slit; and
severing said connectors, whereby said continuous web of photovoltaic cell material is converted into an array of discrete photovoltaic cells electrically interconnected in series.

12. An improved method of electrically connecting in series an array of smaller area photovoltaic cells formed from a continuous elongated web of photovoltaic cell material, said web formed from continuous layers of semiconductor alloy material deposited onto an elongated web of substrate material; said method including the steps of:
forming a plurality of discrete smaller area photovoltaic cells from said web of cell material; and
electrically interconnecting said discrete cells in series while maintaining said web in continuous motion.

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**4,746,619**

## METHOD OF MANUFACTURING AN IMAGE DETECTION DEVICE FOR RADIOGRAPHIC PURPOSES

**Meindert J. M. Beerlage, Pijnacker, Netherlands, assignor to B.V.Optische Industrie"De Oude Delft" , Delft, Netherlands**

**Filed Jul. 27, 1987, Ser. No. 79,084**
**Claims priority, application Netherlands, Aug. 7, 1986, 8602021**
**Int. Cl.⁴ H01L** *31/18, 27/14*
**U.S. Cl. 437—3** **3 Claims**

1. Method for the manufacture of an image-recording device in which at least a matrix consisting of rows and columns of image-recording elements is formed in a substrate of semi-conductor material, characterized in that a protective layer is applied to the surface of the matrix of image-recording elements, after which grooves are provided in this layer with a depth which is at most equal to the thickness of the protective layer which grooves extend between the rows and columns of image-recording elements, and in that subsequently a layer of CsI is applied by vapor deposition on the upper side of the protective layer.

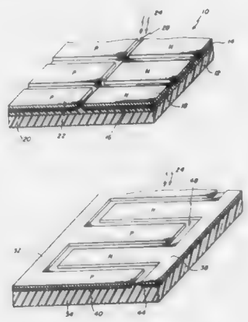
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**4,746,620**

## LATERAL P-I-N PHOTODETECTOR

**Vicky Diadiuk, Bedford, and Steven H. Groves, Lexington, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.**

**Continuation of Ser. No. 689,873, Jan. 9, 1985, abandoned. This application Jul. 23, 1986, Ser. No. 888,950**
**Int. Cl.⁴ H01L** *21/225, 21/285*
**U.S. Cl. 437—3** **8 Claims**



1. A method of forming a light responsive rectifying photodetector comprising the steps of:
a. forming a semi insulating body of InP by doping an InP body with a deep compensating dopant to achieve a carrier concentration at least equal to about the intrinsic level of $4\times10^6$ carriers/cm$^3$;
b. evaporating on a major surface of said body, a first patterned thin strip of contact metal doped with p-type dopant and a second patterned thin strip of contact metal doped with n-type dopant, said patterns being separated by a relatively small gap exposing an active intrinsic region of said i-type body;
c. subjecting said patterned body to a heat treatment in which the strips are heated causing the formation of low resistance p-type and n-type contact electrodes thereby concurrently forming a planar p-i-n rectifying function laterally along said major surface.

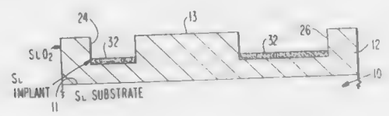


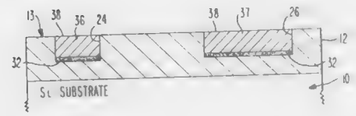
**4,746,621**

## PLANAR TUNGSTEN INTERCONNECT

**David C. Thomas, Wilkes-Barre, Pa., and S. Simon Wong, Ithaca, N.Y., assignors to Cornell Research Foundation, Inc., Ithaca, N.Y.**

**Filed Dec. 5, 1986, Ser. No. 938,498**
**Int. Cl.⁴ H01L** *21/425, 21/443*
**U.S. Cl. 437—24** **11 Claims**




1. A method of forming an interconnect level for VLSI devices, comprising:
forming on a planar surface of a VLSI wafer a first silicon dioxide dielectric layer, said first layer having a planar top surface;
forming a second layer of a second dielectric material on said top surface of said first layer to produce a composite dielectric;
patterning and etching said composite dielectric to produce at least one interconnect channel in said first layer, said channel extending through said second layer, whereby said second layer forms a mask for said channel in said first layer;
implanting silicon in the exposed bottom surface of said silicon dioxide interconnect channel through said mask;
removing said mask;
selectively depositing a refractory metal in said interconnect channel to fill said channel to the level of said planar top surface of said first layer to thereby form a metal interconnect line, said line and said first layer forming a first planar interconnect level.

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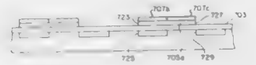
**4,746,622**

## PROCESS FOR PREPARING A CHARGE COUPLED DEVICE WITH CHARGE TRANSFER DIRECTION BIASING IMPLANTS

**Gilbert A. Hawkins, Mendon; David L. Losee, Fairport, and Robert L. Nielsen, Pittsford, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Oct. 7, 1986, Ser. No. 916,259**
**Int. Cl.⁴ H01L** *29/78*
**U.S. Cl. 437—26** **13 Claims**

1. A process of fabricating at a region of a first conductivity type in a semiconductive substrate a two phase or virtual phase charge coupled device having at least one set of gate electrodes, wherein initially a conductive gate electrode forming layer used to form said one set of gate electrodes overlies said region and an interface barrier means limits charge conduction therebetween, comprising
(i) implanting a dopant in said semiconductive substrate region within laterally spaced local zones through said gate electrode forming layer,
(ii) forming spaced barriers each having a first barrier segment overlying alternate spaced local zones and a second contiguous barrier segment overlying alternate intervals between spaced local zones,
(iii) selectively removing said conductive gate electrode forming layer in areas not protected by said spaced barrier to form said one set of gate electrodes, and
(iv) locating a second set of gate electrodes between adjacent electrodes of said one set,
characterized in that said one set of gate electrodes are formed in edge alignment with said spaced zones by the steps of
(a) locating on said gate electrode forming layer a coating of a barrier forming layer which can be converted to a removal resistant form,
(b) forming over said barrier forming layer a pattern forming layer and removing portions of said pattern forming layer to produce a series of laterally spaced pattern layer segments and openings therebetween,
(c) through the openings, said barrier forming layer, and said gate electrode forming layer implanting said dopant in





said semiconductive substrate region within said laterally spaced local zones,
(d) removing said barrier forming layer exposed by alternate of the openings,
(e) converting that portion of said barrier forming layer exposed by remaining openings to a removal resistant form to produce said first barrier segments overlying alternate spaced local zones, and
(f) removing the pattern layer segments and portions of the barrier forming layer corresponding to alternate pattern layer segments to form said second barrier segments contiguous with said first barrier segments and overlying alternate intervals between said spaced local zones,
each of steps (a) trough (f) being performed at a temperture below that required for lattice or intesticial migration in said semiconductive substrate.

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**4,746,623**

## METHOD OF MAKING BIPOLAR SEMICONDUCTOR DEVICE WITH WALL SPACER

**Richard H. Lane, San Jose, Calif., assignor to Signetics Corporation, Sunnyvale, Calif.**

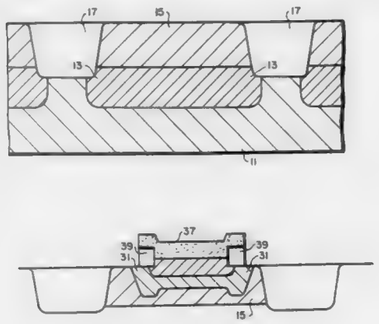
**Filed Jan. 29, 1986, Ser. No. 809,653**
**Int. Cl.⁴ H01L** *21/265, 21/283*
**U.S. Cl. 437—28** **9 Claims**

1. A method of fabricating a semiconductor device on a semiconductor substrate of a first conductivity type including providing a region of a second conductivity type on said substrate; growing an epitaxial layer of said second conductivity type on said region and separating said layer into isolated zones; forming a mesa on a selected zone; covering a portion of said selected zone adjacent said mesa with insulating material; first doping said mesa by ion implantation to change its conductivity to said first type, said doping extending below said mesa and into said portion of said selected zone adjacent said mesa and under said insulating material a predetermined distance; further doping said mesa by ion implantation to change its conductivity back to said second type, said further doping extending under said insulating material a distance less than said predetermined distance; covering said mesa and a portion of said insulating material with a conducting layer; and etching

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said conducting layer and said insulating material to expose part of said selected zone of said first conductivity type while



leaving insulating material adjacent said mesa and between said conducting layer and said portion of said selected zone of said first conductivity type adjacent said mesa.

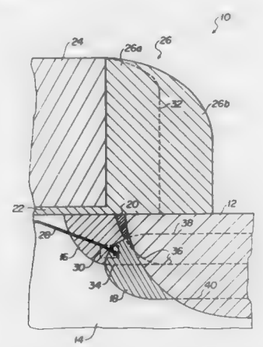
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**4,746,624**

**METHOD FOR MAKING AN LDD MOSFET WITH A SHIFTED BURIED LAYER AND A BLOCKING REGION**

**Kit M. Cham, Sunnyvale, and Paul V. Voorde, Mtn. View, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Oct. 31, 1986, Ser. No. 926,318**
**Int. Cl.[4] H01L** *21/265*
**U.S. Cl. 437—44** **9 Claims**



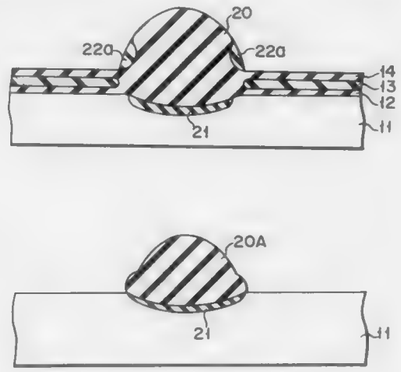
1. A method for producing an n-channel MOSFET device in a semiconductor substrate comprising the steps of:
- forming a gate structure over a region of said substrate;
- forming a lightly doped n-type tip region in said substrate in substantial alignment with said gate structure;
- forming first spacer means having a first width against said gate structure;
- implanting an n-type buried region;
- forming second spacer means having a second width greater than said first width against said gate structure; and
- forming a heavily doped n-type source region and a heavily doped n-type drain region wherein said buried region has a doping level intermediate to that of said tip region and said drain region; and
- forming a blocking region between said tip region and said drain region after forming said first spacer means but before forming said second spacer means.

**4,746,625**

**A METHOD OF MANUFACTURING SEMICONDUCTOR ELEMENTS-ISOLATING SILICON OXIDE LAYERS**

**Sigeru Morita, Hachioji, and Masakazu Kakumu, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Feb. 17, 1987, Ser. No. 15,037**
**Claims priority, application Japan, Jun. 9, 1986, 61-133212**
**Int. Cl.[4] H01L** *21/425, 21/473*
**U.S. Cl. 437—63** **10 Claims**



1. A method of manufacturing semiconductor element-isolating silicon oxide layers comprising the steps of:
- forming a first silicon oxide layer on a semiconductor substrate;
- depositing a first polycrystalline silicon layer on said first silicon oxide layer;
- forming a second silicon oxide layer on said first polycrystalline silicon layer;
- providing an acidproof layer on said second silicon oxide layer;
- selectively eliminating that portion of said acidproof layer corresponding to a semiconductor element-isolating region to be formed;
- selectively removing said second silicon oxide layer with the retained portion of said acidproof layer used as a mask thereby exposing a portion of said first polycrystalline silicon layer;
- ion-implanting an impurity used for forming a channel stopper in the semiconductor substrate by applying a photoresist coated on said acidproof layer during the selective elimination of the portion of said acidproof layer, said acidproof layer and second silicon oxide layer all used as masks;
- selectively growing a silicon layer on said exposed portion of said first polycrystalline silicon layer after the elimination of said photoresist;
- subjecting said silicon layer and said first polycrystalline layer to selective thermal oxidation with said retained portion of said acidproof layer used as a mask thereby forming a semiconductor element-isolating insulation layer having an annular groove;
- eliminating said retained portion of said acidproof layer;
- filling said annular groove in the side walls of said semiconductor element-isolating insulation layer with a silicon oxide; and
- exposing by etching that portion of the surface of the semiconductor substrate which is formed to be a semiconductor element region.

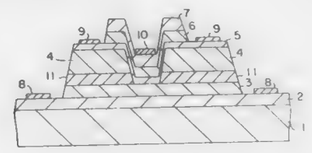


**4,746,626**

**METHOD OF MANUFACTURING HETEROJUNCTION BIPOLAR TRANSISTORS**

**Kazuo Eda, Hirakata; Masanori Inada, Nara, and Yorito Ota, Kobe, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Continuation-in-part of Ser. No. 875,878, Jun. 18, 1986, abandoned. This application May 8, 1987, Ser. No. 48,470**
**Claims priority, application Japan, Jun. 21, 1985, 60-136402; Jun. 21, 1985, 60-136405; Jun. 21, 1985, 60-136409; Jun. 24, 1985, 60-137261**
**Int. Cl.[4] H01L** *21/203*
**U.S. Cl. 437—107** **12 Claims**



1. A method of manufacturing a III-V compound hetero-junction bipolar transistor comprising the steps of:
- forming a first collector layer which is substantially an electrode extraction layer on a semi-insulating semiconductor substrate;
- forming a second collector layer on said first collector layer;
- forming a semi-insulating semiconductor layer on said second collector layer;
- forming a first base layer on said semi-insulating layer;
- removing at least a part of said first base layer and said semi-insulating semiconductor layer to form a cut portion with slant wall so that said second collector layer is partly exposed to said cut portion;
- epitaxially growing a second base layer on said first base layer to be a first external base region, on a said slant wall to be a second external base region, and on the exposed portion of second collector layer to be a base region;
- epitaxially growing a first emitter layer on said second base layer, wherein the energy band gap of said first emitter layer is greater than the energy band gap of said second base layer so that a heterojunction is formed by said first emitter layer and said second base layer;
- epitaxially growing a second emitter layer which is substantially an electrode extraction layer o said first emitter; and
- forming an emitter electrode, at least one base electrode and at least one collector electrode on said second emitter layer at a portion in said cut portion, said first external base region and said first collector layer, respectively.

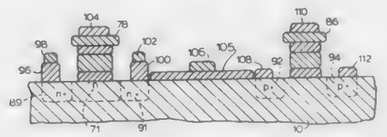
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**4,746,627**

**METHOD OF MAKING COMPLEMENTARY GAAS HETEROJUNCTION TRANSISTORS**

**Rainer Zuleeg, San Juan Capistrano, Calif., assignor to McDonnell Douglas Corporation, Long Beach, Calif.**

**Filed Oct. 30, 1986, Ser. No. 924,883**
**Int. Cl.[4] H01L** *21/263, 21/26, 21/203*
**U.S. Cl. 437—126** **9 Claims**



1. A planar process for fabricating at least one n-type MESFET transistor and at least one p-type MODFET transistor comprising:
- forming a first layer of intrinsic GaAs of a thickness of from about 1 to about 5 microns on a first surface of a semi-insulating wafer by molecular beam epitaxy (MBE);
- forming a second layer of updoped AlGaAs of a thickness of from about 50 to about 100 Angstroms atop the first layer by MBE;
- forming a third layer of p-type AlGaAs of a thickness of from about 300 to about 500 Angstroms atop the second layer by MBE;
- forming a fourth cap layer of p+ AlGaAs having a p-type impurity concentratin of about $10^{18}cm^{-3}$ atop the third layer by MBE;
- establishing the channel region of the n-type transistor by ion implantation of n-type impurity ions through a fifth layer of $Si_3N_4$ of about 500 to about 1,000 Angstroms thickness to establish the channel in the first layer of gallium arsenide;
- striping away the fifth layer;
- laying down gate electrodes of a refractory metal compound for the n- and p-type transistors;
- establishing source and drain regions for the n- and p-type transistors by ion implatation of respective n- and p-type impurities through a sixth $Si_3N_4$ layer having an effective thickness similar to the fifth layer;
- annealing the structure at about 800° C. for about 1–10 minutes; and
- depositing electrode metallizations atop the respective source and drain regions of the n- and p-type transistor.

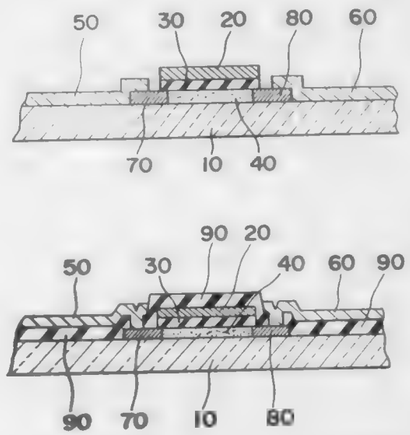
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**4,746,628**

**METHOD FOR MAKING A THIN FILM TRANSISTOR**

**Yutaka Takafuji; Kohbei Kishi, both of Nara, and Kohzo Yano, Yamatokoriyama, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Division of Ser. No. 643,354, Aug. 22, 1984, abandoned. This application Aug. 29, 1986, Ser. No. 902,114**
**Claims priority, application Japan, Aug. 26, 1983, 58-156748**
**Int. Cl.[4] H01L** *21/225, 21/385, 21/44, 21/48*
**U.S. Cl. 437—160** **13 Claims**



1. A method for making a thin film transistor comprising the steps of:
- forming a thin film semiconductor layer entirely on a substrate,
- etching said semiconductor layer into a predetermined semiconductor pattern, so as to form an etched semiconductor layer
- depositing, in succession, a gate insulation film and a gate electrode film entirely over said etched semiconductor layer,

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applying an alignment mask over said gate electrode film corresponding to said predetermined semiconductor pattern, said alignment mask forming a gate pattern for both said gate electrode film and said gate insulation film,

etching said gate electrode and gate insulation films to form gate insulation and gate electrode films having self-aligned structures in said gate pattern over said semiconductor layer in said semiconductor pattern, and to form exposed portions of said semiconductor layer,

removing said alignment mask,

depositing a metal layer over said substrate, said semiconductor layer, said gate electrode film, and said gate insulation film,

diffusing metal atoms from said metal layer into said exposed portions of said semiconductor layer, thereby forming a first and a second low resistance area,

forming a source electrode by etching and deposition on said substrate, said source electrode contacting said first low resistance portion, and

forming a drain electrode by etching and deposition on said substrate, said drain electrode contacting said second low resistance portion.

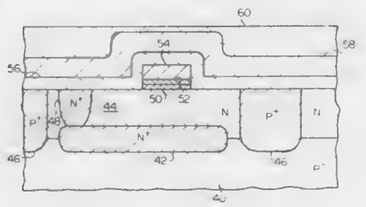
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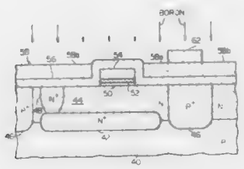
**4,746,629**

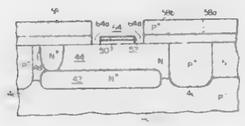
## PROCESS OF FABRICATING SEMICONDUCTOR DEVICE INVOLVING PLANARIZATION OF A POLYSILICON EXTRINSIC BASE REGION

**Osamu Hasegasaki, Shizuoka, Japan, assignor to Yamaha Corporation, Shizuoka, Japan**

**Filed Jul. 9, 1987, Ser. No. 72,166**
**Claims priority, application Japan, Jul. 11, 1986, 61-163336**
**Int. Cl.[4] H01L** *21/225, 21/385*
**U.S. Cl. 437—162** **9 Claims**




**1**. A process of fabricating a semiconductor device comprising the steps of

(a) preparing a doped semiconductor layer,

(b) forming a dielectric layer overlying the doped semiconductor layer,

(c) forming a first insulator layer on the dielectric layer,

(d) selectively etching said dielectric layer and said insulator layer to form a bump region comprising coextensively patterned portions of the dielectric and insulator layers,

(e) forming a second insulator layer partly on said doped semiconductor layer and partly on said bump region,

(f) conformally forming on the second insulator layer an undoped polycrystalline semiconductor layer having a step portion,

(g) forming on the polycrystalline semiconductor layer a planarizing layer covering the step portion of the polycrystalline semiconductor layer,

(h) etching back said polycrystalline semiconductor layer and said planarizing layer until said second insulator layer has a surface portion exposed over said bump region,

(i) selectively etching said first and second insulator layers with the remaining portion of said polycrystalline semiconductor layer used as a mask for forming an opening in part extending to the surface of said dielectric layer and having a marginal groove portion extending to the surface of said doped semiconductor layer, and

(j) thereafter forming various desired device regions through and in alignment with said opening.

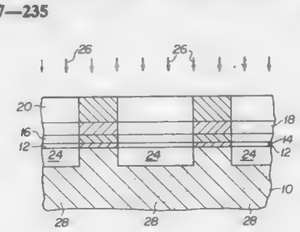
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**4,746,630**

## METHOD FOR PRODUCING RECESSED FIELD OXIDE WITH IMPROVED SIDEWALL CHARACTERISTICS

**Chi-Hung Hui, Cupertino; Paul V. Voorde, Mountain View, and John L. Moll, Palo Alto, all of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Sep. 17, 1986, Ser. No. 908,485**
**Int. Cl.[4] B05D** *5/12, 1/32;* **C23C** *16/00*
**U.S. Cl. 437—235** **13 Claims**




**1**. A method for producing field isolation regions for a silicon-based semicondutor substrate comprising:

forming four-layer blocking structures over field regions of said substrate by:

forming a first insulation layer of a silicon oxide over a surface of said substrate;

forming a first inhibiting layer of a silicon nitride over said first insulation layer;

forming a second insulation layer of a silicon oxide over said first inhibiting layer, said second insulation layer being thicker than said first insulation layer;

forming a second inhibiting layer of a silicon nitride over said second insulation layer, said second inhibiting layer being thicker than said first inhibiting layer;

patterning said first insulation layer, said first inhibiting layer, said second insulation layer, and said second inhibiting layer such that portions of said substrate surface where said isolation regions are to be formed become uncovered, and such that remaining portions of said substrate surface are covered by four layer insulation/inhibiting/insulation-/inhibiting blocking structures; and

forming field isolation regions at portions of said surface of said substrate which are not covered by said blocking structures.

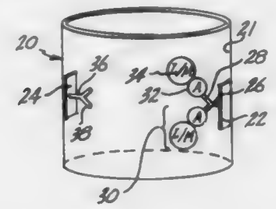


**4,746,631**

## IMMUNOASSAY METHOD, DEVICE, AND TEST KIT

**James A. Clagett, Seattle, Wash., assignor to Ultra Diagnostics Corporation, Seattle, Wash.**

**Filed May 9, 1985, Ser. No. 732,445**
**Int. Cl.[4] G01N** *33/53, 33/543*
**U.S. Cl. 436—518** **48 Claims**




**1**. A method of detecting an analyte in a test fluid, comprising the steps of:

providing a reaction chamber having nonoverlapping first and second reaction surfaces, the reaction chamber being adapted to receive and retain a predetermined volume of the test fluid in fluid communication with the first and second reaction surfaces, the first reaction surface having an analyte binding partner immobilized thereon, the analyte binding partner having an analyte conjugate reversibly bound thereto, the analyte conjugate comprising a ligand/marker conjugated to an analyte component, the analyte conjugate having a higher disassociation constant than the analyte with reference to the immobilized analyte binding partner, and the second reaction surface having a ligand/marker binding partner immobilized thereon;

introducing a volume of the test fluid into the reaction chamber in fluid communication with the first and second reaction surfaces;

retaining the volume of test fluid in the reaction chamber to permit two reactions to occur: a first reaction between analyte and analyte binding partner at the first reaction surface, the analyte thereby proportionally displacing analyte conjugate into the volume of test fluid, and a second reaction between the displaced analyte conjugate and ligand/marker binding partner at the second reaction surface, the displaced analyte conjugate thereby becoming sequestered on the second reaction surface; and,

thereafter measuring the activity of sequestered ligand-/marker on the second reaction surface, the measured activity being a function of the analyte concentration that is referable to standards and controls.

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**4,746,632**

## INORGANIC CRYSTALLINE FIBERS

**James E. Flannery, and Dale R. Wexell, both of Corning, N.Y., assignors to Corning Glass Works, Corning, N.Y.**

**Filed Sep. 8, 1986, Ser. No. 904,663**
**Int. Cl.[4] C03C** *10/16, 13/00*
**U.S. Cl. 501—3** **2 Claims**

**1**. Inorganic crystalline fibers containing an amount of $MoO_3$ and/or $WO_3$ and/or $As_2O_3$ up to about 5% by weight total and wherein the predominant crystal phase is selected from the group consisting of a fluormica, fluor-magnesio-richterite, lithium-containing proto-amphibole, canasite, potassium and/or sodium fluorrichterite, fluorapatite, and a fluoride-containing, spodumene-solid solution crystal.

**4,746,633**

## FAST FADING PHOTOCHROMIC GLASS

**Jean-Pierre Mazeau, and Michel Prassas, both of Avon, France, assignors to Corning Glass Works, Corning, N.Y.**

**Filed Feb. 10, 1986, Ser. No. 827,939**
**Claims priority, application France, Jul. 11, 1985, 85 10626**
**Int. Cl.[4] C03C** *4/06, 3/11*
**U.S. Cl. 501—13** **8 Claims**

**1**. A transparent, comfort photochromic glass which, in bodies of 2 mm cross section, will exhibit the following optical properties:

(a) a clear (undarkened) luminous transmittance higher than 88%;

(b) a darkened luminous transmittance after 15 minutes' exposure to actinic radiation over the temperature range of 0°–25° C. higher than 35%, but less than 60%;

(c) a darkened luminous transmittance after 15 minutes' exposure to actinic radiation at a temperature of 40° C. lower than 63%; and

(d) a faded luminous transmittance after five minutes' removal from actinic radiation of at least 75%;

said glass having a base composition consisting essentially, expressed in terms of weight percent on the oxide basis, of about

| | | | |
|---|---|---|---|
| $SiO_2$ | 46–60 | MgO | 0–3.5 |
| $B_2O_3$ | 16–28 | CaO | 0–6 |
| $Al_2O_3$ | 4–11 | SrO | 0–6 |
| $ZrO_2$ | 2–6 | BaO | 0–6 |
| $Al_2O_3 + ZrO_2$ | 6–13 | MgO + CaO + SrO + BaO | 1–7 |
| $Li_2O$ | 2–5 | $P_2O_5$ | 0–5 |
| $Na_2O$ | 0–4 | $TiO_2$ | 0–3 |
| $K_2O$ | 2.5–9 | | |

and containing photochromic elements, as analyzed in weight percent, of about

| | | | |
|---|---|---|---|
| Ag | 0.13–0.18 | Br | 0.08–0.14 |
| Cl | 0.16–0.34 | CuO | 0.001–0.004 |

said photochromic elements satisfying the ratios

$$Br:(Cl+Br) \geqq 0.24 \text{ and } 0.25 \leqq Ag:(Cl+Br) \leqq 0.60$$

and wherein $6 \leqq Al_2O_3+ZrO_2 \leqq 15$, when the composition contains $P_2O_5$, and wherein the cationic ratio $Li_2O:Li_2O+Na_2O+K_2O=0.4–0.8$.

**5**. A transparent, dark photochromic glass which, in bodies of 2 mm cross section, will exhibit the following optical properties:

(a) a clear (undarkened) luminous transmittance higher than 88%;

(b) a darkened luminous transmittance after 15 minutes' exposure to actinic radiation over the temperature range of 0°–25° C. lower than 35%;

(c) a darkened luminous transmittance after 15 minutes' exposure to actinic radiation at a temperature of 40° C. lower than 58%; and

(d) a faded luminous transmittance after five minutes' removal from actinic radiation of at least 70%;

said glass having a base composition consisting essentially, expressed in terms of weight percent on the oxide basis, of about

| | | | |
|---|---|---|---|
| $SiO_2$ | 46–60 | MgO | 0–3.5 |
| $B_2O_3$ | 16–28 | CaO | 0–6 |
| $Al_2O_3$ | 4–11 | SrO | 0–6 |
| $ZrO_2$ | 2–6 | BaO | 0–6 |
| $Al_2O_3 + ZrO_2$ | 6–13 | MgO + CaO + SrO + BaO | 1–7 |
| $Li_2O$ | 2–5 | $P_2O_5$ | 0–5 |
| $Na_2O$ | 0–4 | $TiO_2$ | 0–3 |

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| | |
|---|---|
| $K_2O$ | 2.5–9 |

and containing photochromic elements, as analyzed in weight percent, of about

| | | | |
|---|---|---|---|
| Ag | 0.15–0.3 | Br | 0.07–0.14 |
| Cl | 0.2–0.45 | CuO | 0.004–0.016 |

said photochromic elements satisfying the ratios

$$Br:(Cl+Br)\geqq 0.24 \text{ and } 0.25\leqq Ag:(Cl+Br)\leqq 0.60$$

and wherein $6\leqq Al_2O_3+ZrO_2\leqq 15$, when the composition contains $P_2O_5$, and wherein the cationic ratio $Li_2O:Li_2O+Na_2O+K_2O=0.4–0.8$.

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**4,746,634**

**SOLARIZATION-RESISTANT GLASS MICROSHEET**

**Paul S. Danielson, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.**

**Filed May 28, 1987, Ser. No. 55,015**
**Int. Cl.[4] C03C *3/093;* C03G *4/08***
**U.S. Cl. 501—67** **2 Claims**

1. A glass suitable for the fabrication of glass sheeting having a thickness ranging between about 0.002"–0.025" which strongly resists solarization and exhibits an ultraviolet radiation cutoff at 370 nm consisting essentially, expressed in terms of weight percent on the oxide basis, of:

| | | | |
|---|---|---|---|
| $Na_2O$ | 6.75–7.75 | $B_2O_3$ | 8.75–10 |
| $K_2O$ | 6.25–7.0 | $SiO_2$ | 59–63 |
| ZnO | 6.5–7.5 | $CeO_2$ | 4–6 |
| $Al_2O_3$ | 2–2.5 | $TiO_2$ | 1–3 |
| $Sb_2O_3$ | 0–0.5 | $CeO_2 + TiO_2$ | 6–8. |

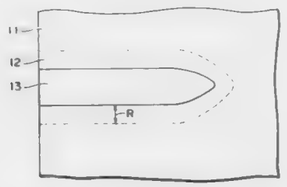
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**4,746,635**

**HIGH STRENGTH AND HIGH HARDNESS ALUMINA-ZIRCONIA-SILICON CARBIDE SINTERED CERAMIC COMPOSITE AND ITS MANUFACTURING PROCESS**

**Sigeo Inoue; Tetsuo Uchiyama, both of Kumayaya; Toshio Hirai, Izumi, and Koichi Niihara, Yokosuka, all of Japan, assignors to Kabushiki Kaisha Riken, Tokyo; Toshio Hirai, Izumi and Koichi Niihara, Yokosuka, all of, Japan**

**Filed May 19, 1986, Ser. No. 864,353**
**Claims priority, application Japan, May 25, 1985, 60-112744; Feb. 28, 1986, 61-43519**
**Int. Cl.[4] C04B *35/56;* C01B *33/26***
**U.S. Cl. 501—89** **11 Claims**




1. An alumina-zirconia-silicon carbide sintered ceramic composite having high strength and high hardness, said sintered ceramic composite being prepared from a mixture consisting essentially of 5 to 50 volume percent of partially stabilized zirconia powder of mean particle size between 0.1 and 1.0 μm, 3 to 40 volume percent of silicon carbide whiskers of 1 μm or less in diameter with an aspect ratio between 3 and 200, said aspect ratio being the ratio of the length of a whisker to its diameter, the balance of said mixture being substantially alumina powder, wherein the sum of the amounts of zirconia and silicon carbide accounts for 55 volume percent at most of the total powder mixture.

5. A process for manufacturing an alumina-zirconia-silicon carbide sintered ceramic composite having high strength and high hardness, said process comprising the steps of preparing a mixture by mixing 5 to 50 volume percent of partially stabilized zirconia powder of mean particle size between 0.1 and 1.0 μm, 3 to 40 volume percent of silicon carbide whiskers of 1 μm or less in diameter with an aspect ratio between 3 and 200, said aspect ratio being the ratio between the length of a whisker and its diameter, the balance of said mixture being substantially alumina powder, wherein the sum of the amounts of zirconia and silicon carbide accounts for 55 volume percent at most of the total mixture; molding the obtained mixture into a molded body, and then sintering the molded body at a temperature between 1400° and 1800° C.

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**4,746,636**

**SILICON NITRIDE SINTERED BODY**

**Kiyoshi Yokoyama, Hayato, Japan, assignor to Kyocera Corporation, Kyoto, Japan**

**Filed Mar. 20, 1986, Ser. No. 841,552**
**Int. Cl.[4] C04B *35/58***
**U.S. Cl. 501—97** **8 Claims**

1. A silicon nitride body comprising (i) 80 to 99% by weight of silicon nitride (ii) and 1 to 20% by weight of a strontium component, a tungsten component and a rare earth element component, wherein the atomic ratio of strontium to the rare earth element is in the range of from 0.01 to 100, the atomic ratio of tungsten to the rare earth element is in the range of from 0.01 to 100, and the relative density ratio to the theoretical density is at least 95%.

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**4,746,637**

**ALUMINUM NITRIDE SINTERED BODY AND PROCESS FOR PRODUCING THE SAME**

**Mituo Kasori, Kawasaki; Kazuo Shinozaki; Kazuo Anzai, both of Tokyo, and Akihiko Tsuge, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Japan**

**Filed Jul. 31, 1985, Ser. No. 760,772**
**Claims priority, application Japan, Nov. 8, 1984, 59-234093; Mar. 13, 1985, 60-48257**
**Int. Cl.[4] C04B *35/58***
**U.S. Cl. 501—98** **13 Claims**

1. An aluminum nitride sintered body comprising aluminum nitride, at least one rare earth element-aluminum compound and at least one alkaline earth metal-aluminum compound selected from the group consisting of a calcium-aluminum compound, a strontium-aluminum compound and a barium-aluminum compound, wherein (i) the weight ratio of said alkaline earth metal-aluminum compound to said rare earth element-aluminum compound ranges from about 1:9 to 9:1 and (ii) the total amount of said rare earth element-aluminum compound and said alkaline earth metal-aluminum compound ranges between 0.01 and 20% by weight.

3. The aluminum nitride sintered body according to claim 1, wherein the ratio of said alkaline earth metal-aluminum compound to said rare earth-aluminum compound ranges from 1:3 to 3:1.

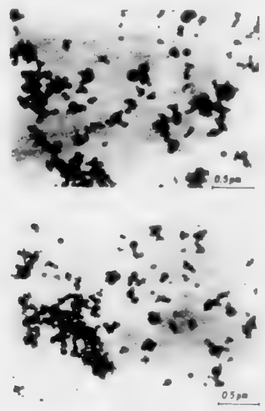


**4,746,638**

**ALUMINA-TITANIA COMPOSITE POWDER AND PROCESS FOR PREPARING THE SAME**

**Saburo Hori, and Yoshio Ishii, both of Iwaki, Japan, assignors to Kureha Chemical Industry Co., Ltd., Tokyo, Japan**

**Filed Sep. 26, 1986, Ser. No. 912,512**
**Claims priority, application Japan, Sep. 27, 1985, 60-214237**
**Int. Cl.[4] C04B *35/10;* C01G *23/07***
**U.S. Cl. 501—127** **6 Claims**




1. Alumina-titania composite powder comprising spherical particles, each of which contains about 30 to 80 wt % of δ-phase or γ-phase alumina and about 70 to 20 wt % of titania comprising rutile-phase in the majority, is substantially free from α-phase and amorphous alumina, and is substantially free from X-phase ($3Al_2O_3$-$TiO_2$) and aluminum titanate-phase.

6. A process for preparing an alumina-titania composite powder comprising spherical particles, each of which contains about 30 to 80 wt % of δ-phase or γ-phase alumina and about 70 to 20 wt % of titania comprising rutile-phase in the majority, is substantially free from α-phase and amorphous alumina, and is substantially free from X-phase and amorphous alumina, and is substantially free from X-phase ($3Al_2O_3$-$TiO_2$) and alumina titanate-phase comprising the steps of: (a) blowing a vapor mixture of $AlCl_3$ and $TiCl_4$ into burning flame to effect oxidation, process further comprises (b) maintaining the temperature of a mixing section, where a combustible gas, an oxidizing gas, $AlCl_3$ gas, $TiCl_4$ gas and a carrier gas are mixed and subjected to combustion, at about 1450° C. or higher and lower than the melting point of aluminum titanate, (c) maintaining the temperature of an outlet portion of a reacting section connected to the mixing section at about 800° C. or higher, (d) providing an average total gas retention time in the mixing section and the reacting section of 20 to 500 msec, and (e) subjecting the resustling composite powders to calcination at 700° to 900° C.

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**4,746,639**

**DIELECTRIC CERAMIC COMPOSITION**

**Harunobu Sano, Nagaokakyo; Yukio Sakabe, Funai, and Goro Nishioka, Ibaraki, all of Japan, assignors to Murata Manufacturing Co., Ltd., Japan**

**Filed Jun. 12, 1987, Ser. No. 62,165**
**Claims priority, application Japan, Jun. 14, 1986, 61-138897**
**Int. Cl.[4] C04B *35/46, 35/50***
**U.S. Cl. 501—136** **7 Claims**

1. A dielectric ceramic composition consisting essentially of a basic component composed of 35 to 70 wt % of $SrTiO_3$, 0.5 to 16 wt % of $MgTiO_3$, 1.0 to 12 wt % of $CaTiO_3$, 5 to 32 wt % of $Bi_2O_3$ and 5 to 16 wt % of $TiO_2$, and additives composed of CuO, $MnO_2$ and $CeO_2$, the contents of said additives per 100 parts by weight of the main component being 0.05 to 1.0 parts by weight for CuO, 0.02 to 0.5 parts by weight for $MnO_2$, and 1.0 to 8.0 parts by weight for $CeO_2$.

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**4,746,640**

**PROCESS FOR PURIFYING AND RECOVERING CATALYST SOLUTION CONTAMINATED DURING THE CARBONYLATION OF METHYL ACETATE AND/OR DIMETHYLETHER**

**Heinz Erpenbach, Köln; Klaus Gehrmann, and Winfried Lork, both of Erftstadt, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Hurth Knapsack, Fed. Rep. of Germany**

**Filed Mar. 16, 1987, Ser. No. 25,962**
**Claims priority, application Fed. Rep. of Germany, Mar. 29, 1986, 3610603**
**Int. Cl.[4] B01J *31/40, 38/68;* C07C *51/56, 67/36***
**U.S. Cl. 502—24** **5 Claims**

1. A process for purifying and recovering catalyst solution contaminated during the carbonylation of methyl acetate, dimethylether, or a mixture thereof, containing carbonyl complexes of rhodium, quaternary heterocyclic aromatic nitrogen compounds or quaternary organophosphorus compounds as organic promoters, or alkali metal salts or compounds of a carbonyl-yielding non noble metal as inorganic promoters, or a mixture of the said organic and inorganic promoters, undistillable organic contaminants as well as acetic acid, acetic anhydride and ethylidene diacetate, which comprises: subjecting the contaminated catalyst solution in a first processing stage to extraction with a dialkylether and alkanol, each of which has from 1–4 carbon atoms per alkyl group, 0.5 to 20 parts by weight dialkylether and 0.03 to 0.4 part by weight alkanol being used per part by weight contaminated catalyst solution, thereby freeing said contaminated catalyst solution from its organic contaminants, from acetic acid, acetic anhydride and ethylidene diacetate, and separating an ether phase from a purified promoter-containing catalyst solution; treating the ether phase in a second processing stage with iodine and/or methyl iodide; separating precipitated promoter-containing catalyst complex and dissolving said precipitated promoter-containing catalyst complex in the purified catalyst solution coming from the first processing stage to form a united purified catalyst solution; separating the ether phase into its constituents by distilling it; using recovered dialkylether and alkanol again in the extraction stage; preparing fresh catalyst solution from the recovered mixture of acetic acid, acetic anhydride and ethylidene diacetate and from the united purified catalyst solution and distilling off residual dialkylether and alkanol from the fresh catalyst solution and discarding the organic contaminants retained in the residue of the ether phase distillation.

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**4,746,641**

**AMMOXIDATION OF PARAFFINS AND CATALYSTS THEREFOR**

**Andrew T. Guttmann, Maple Heights; Robert K. Grasselli, Aurora, and James F. Brazdil, Mayfield Village, all of Ohio, assignors to Standard Oil Company, Cleveland, Ohio**

**Continuation-in-part of Ser. No. 643,208, Aug. 22, 1984, abandoned. This application Apr. 17, 1985, Ser. No. 724,226**
**Int. Cl.[4] B01J *21/02, 27/198, 27/057, 21/08***
**U.S. Cl. 502—202** **5 Claims**

1. A complex metal oxide catalyst, which is essentially free of bismuth, having the elements and the proportions which are represented by the following empirical formula:

$$VSb_mA_aB_bC_cO_x,$$

where

A is one or more of W, Sn, B, Mo and Ge and includes at least 0.2 atoms of W per atom of V;

B is one or more of Fe, Co, Ni, Cr, Mn, Zn, Se, Te and As;

C is one or more of an alkali metal, Ca, Sr, Ba, Tl

and where m is greater than 1 and up to 20; a is 0.4–10; b is 0–5;

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c is 0–1; a is equal to or less than m; b is equal to or less than m; wherein x is determined by the oxidation state of the other elements present, and wherein the antimony has an average valency higher than +3 and the vanadium has an average valency lower than +5, wherein crystalline $Sb_2O_4$ is present in said catalyst, and wherein the foregoing catalyst is on an inorganic oxide support material selected from alumina and silica-alumina which is 50 to 100 weight percent alumina.

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**4,746,642**

## VAPOR PHASE NITRATION CATALYSTS

**Ignatius Schumacher, Ballwin, Mo., assignor to Monsanto Company, St. Louis, Mo.**

**Filed Nov. 14, 1984, Ser. No. 671,359**
**Int. Cl.[4] B01J** *27/02, 27/24, 23/00*
**U.S. Cl. 502—216** **6 Claims**

1. A nitration promoting catalyst consisting essentially of the adduct of:

(a) a Group 4b-Group 3b mixed oxide composition represented by the empirical formula:

$$(M^1_aM^2_bO_c)_x(NO_2)_y$$

wherein $M^1$ is at least one element selected from Group 4b of the Periodic Table of the Elements, $M^2$ is at least one element selected from Group 3b of the Periodic Table of the Elements, a is 1, b is 0 to 20, c is a number taken to satisfy the average valences of $M^1$ and $M^2$ in the oxidation states in which they exist in the composition, x is 1, and y is 0 to c, and

(b) a catalytically effective amount of sulfur trioxide.

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**4,746,643**

## METHOD FOR THE PREPARATION OF A CATALYST FOR THE DEHYDROGENATION OF $C_3$–$C_5$ PARAFFINS

**Franco Buonomo, San Donato Milanese; Rodolfo Jezzi, San Vito Chietino; Bruno Notari, San Donato Milanese, all of Italy; Gheorghiy R. Kotelnikov, Yaroslavl, U.S.S.R.; Konstantinovic R. Michailov, Yaroslavl, U.S.S.R., and Victor A. Patnov, Yaroslavl, U.S.S.R., assignors to Snamprogetti S.p.A., Milan, Italy and Niimsk, Yaroslavl, U.S.S.R.**

**Filed Jun. 16, 1986, Ser. No. 874,579**
**Claims priority, application Italy, Jun. 17, 1985, 21180 A/85**
**Int. Cl.[4] B01J** *23/04, 23/26*
**U.S. Cl. 502—243** **13 Claims**

1. A method for the preparation of a catalyst for the dehydrogenation of $C_3$-$C_5$ paraffins, on the basis of aluminum, chromium, potassium and silicon, comprising (1) calcining aluminum oxide having the form of microspheres a first time at temperatures of from 500° to 700° C., (2) calcining the aluminum oxide a second time at temperatures higher than 1000° C., (3) impregnating the calcined product with a solution containing chromium and potassium compounds, or with separate solutions of said chromium and potassium compounds, (4) drying the product and then impregnating it with a solution of a silicon compound, and (5) drying and calcining the product at temperatures of up to 700° C.

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**4,746,644**

## RECORDING MATERIAL

**Masataka Kiritani; Toshiharu Tanaka, and Toshimasa Usami, all of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Oct. 9, 1985, Ser. No. 785,689**
**Claims priority, application Japan, Oct. 9, 1984, 59-212246**
**Int. Cl.[4] B41M** *5/16, 5/18, 5/22*
**U.S. Cl. 503—209** **9 Claims**

1. A recording material comprising a support having provided thereon, microcapsules containing a basic leuco dye dissolved in an organic solvent, an ultraviolet absorbent present in an amount of from 0.01 to 10.0% by weight based on said organic solvent, and at least one 2-mercaptobenzothiazole.

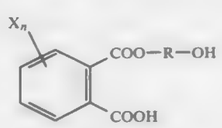
**4,746,645**

## HEAT-SENSITIVE RECORDING MATERIAL

**Teijiro Kitao, Tondabayashi; Mitsuru Kondo, Hyogo; Toshitake Suzuki, Kobe; Masayuki Omatsu, Nishinomiya; Hironori Fujii, Sennan, and Kenji Minami, Sennan, all of Japan, assignors to Kanzaki Paper Manufacturing Company, Limited, Tokyo and Sugai Chemical Industry Co., Ltd., Wakayama, both of, Japan**

**Filed Dec. 16, 1986, Ser. No. 942,400**
**Claims priority, application Japan, Dec. 24, 1985, 60-290974**
**Int. Cl.[4] B41M** *5/18*
**U.S. Cl. 503—210** **6 Claims**

1. A heat-sensitive recording material comprising a base sheet and a heat-sensitive record layer formed over the base sheet and comprising a colorless or pale-colored basic dye and a color developing material capable of forming a color when contacted with the dye, the heat-sensitive recording material being characterized in that the heat-sensitive record layer contains a color developing material comprising at least one multi-valent metal salt of a halophthalic acid derivative represented by the formula




(I)

wherein R represents a divalent saturated or unsaturated $C_2$–$C_{12}$ aliphatic hydrocarbon group which may optionally have a hydroxyl, $C_1$–$C_3$ acyloxy or phenyl group as a substituent or a divalent saturated or unsaturated $C_4$–$C_6$ aliphatic hydrocarbon group containing one or two ether bonds, X is a halogen atom 1 and n is an integer of 1–4.

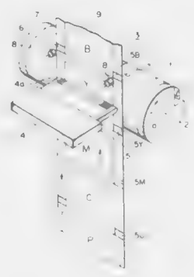
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**4,746,646**

## PRINTING PAPER FOR THERMAL TRANSFER PRINTING

**Toshiaki Nakanishi, Chiba; Daiju Kohga, Tokyo; Yoshihiko Kawano, Tokyo, and Toshiki Okazaki, Tokyo, all of Japan, assignors to Sony Corporation and Honshu Seishi Kabushiki Kaisha, both of Tokyo, Japan**

**Filed Apr. 25, 1986, Ser. No. 855,635**
**Claims priority, application Japan, Apr. 26, 1985, 60-90275; Apr. 26, 1985, 60-99274**
**Int. Cl.[4] B41M** *5/26*
**U.S. Cl. 503—227** **7 Claims**



1. A printing paper for thermal transfer printing comprising a substrate, and a dye acceptor layer formed on one surface of said substrate to receive a sublimable dye transferred from a dye carrier ribbon in contact with said dye acceptor layer upon selective heating of said dye carrier ribbon, said dye acceptor layer consisting essentially of a coating of a resinous binder uniformly dispersing a pigment therein and forming a plurality of micropores and a resin which has good affinity for the sublimable dye being impregnated in said coating and uniformly covering the surface of said micropores, said dye acceptor layer having a cumulative pore volume of from 0.2 to 0.6 $cm^3/g$ and the pigment having a median pore diameter of from 0.2 to 2.0 micron.



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**4,746,647**

## PURIFYING PROTEIN OR PEPTIDE RECOMBINANT DNA PRODUCTS BY ELECTROSEPARATION

**Stefan Svenson, Brättnevägen 12, S-122 43 Enskede, Sweden**

**PCT No. PCT/SE85/00218, § 371 Date Mar. 27, 1986, § 102(e) Date Mar. 14, 1986, PCT Pub. No. WO85/05631, PCT Pub. Date Dec. 19, 1985**
**PCT Filed May 24, 1985, Ser. No. 834,336**
**Claims priority, application Sweden, May 28, 1984, 8402861**
**Int. Cl.[4] C07K** *1/14, 3/12, 3/14;* **C12N** *15/00*
**U.S. Cl. 514—3** **6 Claims**

1. A method of purifying a protein/peptide product produced by rDNA techniques using a microbial cloning host, to remove charged hydrophobic contaminants which originate from the microbial cloning host and which form epitopes and fusion epitopes with the product, which comprises subjecting the product containing the epitopes and fusion epitopes to electroseparation under conditions which separate the hydrophobic contaminant from the product to yield a purified product which will not give rise to immune reactions upon administration to mammals, including man.

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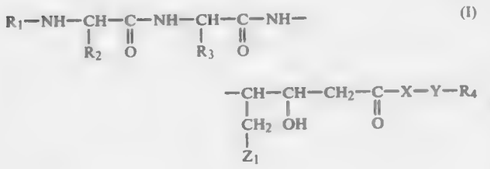
**4,746,648**

## PEPTIDE DERIVATIVES WHICH INHIBIT RENIN AND ACID PROTEASES

**Jean Wagnon; Georges Callet, both of Montpellier; Jean-Pierre Gagnol, Saint Martin de Londres; Dino Nisato, Saint Georges D'Orques, and Catherine Cazaubon, Montpellier, all of France, assignors to Institut National de la Recherche Medicale Sanofi, France**

**Filed Feb. 5, 1986, Ser. No. 826,375**
**Claims priority, application France, Feb. 12, 1985, 85 01981; Feb. 12, 1985, 85 01982**
**Int. Cl.[4] A61K** *37/43;* **C07K** *5/02, 7/06*
**U.S. Cl. 514—17** **7 Claims**

1. A peptide derivative of formula (I):



(I)

in which:

$R_1$ represents an alkylcarbonyl or alkoxycarbonyl group;

$R_2$ represents phenyl or benzyl;

$R^3$ represents:

(a) phenyl, cyclopentyl, cyclohexyl, a thienyl unsubstituted or substituted by a methyl, a thiazolyl unsubstituted or substituted by a method, an imidazolyl unsubstituted or substituted by a methyl;

(b) a methylene substituted by:

a carboxyl esterified by a lower alkyl or a benzyl,

a carbamoyl substituted by one or two alkyls or by a phenyl,

a lower alkoxy, a benzyloxy, a pyridylmethyloxy,

an imidazolyl substituted by a methyl, an ethyl or a trifluoromethyl, or

a pyridyl; or

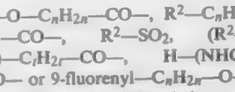
(c) an ethylene substituted by:

a phenyl, or

a free carbamoyl or a carbamoyl substituted by one or two alkyls or by a phenyl;

$R_4$ represents a hydroxyl, a lower alkoxy, a benzyloxy or a free amino group or an amino group substituted by one or two lower alkyl groups;

$Z_1$ represents isopropyl, phenyl or cyclohexyl, respectively forming with the radical:



the residue of the amino acid statin, namely (3S,4S)-4-amino-3-hydroxy-6-methylheptanoic acid, of (3S,4S)-4-amino-3-hydroxy-5-phenylpentanoic acid (AHPPA) or of (3S,4S)-4-amino-5-cyclohexyl-3-hydroxypentanoic acid (ACHPA); and

X-Y is a dipeptide which is Ala-Sta, Ala-Leu, Leu-Phe, or Val-Sta;

and pharmaceutically acceptable salts thereof with mineral or organic acids or alkali metals or alkaline earth metals.

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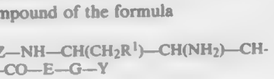
**4,746,649**

## DIAMINO ACID DERIVATIVES

**Peter Raddatz, Darmstadt, and Claus Schmitges, Gross-Umstadt, both of Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft mit beschraenkter Haftung, Darmstadt, Fed. Rep. of Germany**

**Division of Ser. No. 735,247, May, 1985, Pat. No. 4,666,888.**
**This application Apr. 2, 1987, Ser. No. 33,366**
**Claims priority, application Fed. Rep. of Germany, May 18, 1984, 3418491**
**The portion of the term of this patent subsequent to May 19, 2004, has been disclaimed.**
**Int. Cl.[4] A61K** *37/02;* **C07K** *5/02, 5/10*
**U.S. Cl. 514—18** **10 Claims**

1. A compound of the formula



wherein

X is H, $R^2$—O—$C_nH_{2n}$—CO—, $R^2$—$C_nH_{2n}$—O—CO—, $R^2$—$C_nH_{2n}$—CO—, $R^2$—$SO_2$, ($R^2$—$C_nH_{2n}$)—L(-$R^2$—$C_rH_{2r}$)—$C_tH_{2t}$—CO—, H—$(NHCH_2CH_2)_n$—NH—$CH_2CO$— or 9-fluorenyl—$C_nH_{2n}$—O—CO—,

Z is 3 or 4 amino acid radicals bonded to one another in a peptide-like manner and being Abu, Ada, Ala, Arg, Dab, Gly, His, Ile, Leu, tert.-Leu, Lys, Met, Nbg, Nle, N-Me-His, N-Me-Phe, Orn, Phe, Pro, Ser, Thr, Tic, Trp, Tyr or Val,

$R^1$ is H, A, cycloalkyl of 3–7 C atoms, Ar or $C_pH_{2p}$-W,

E is absent or is Ala, Gly, Ile, Leu, tert.-Leu, Met, Ser, or Tyr Val, —NH—$CH(CH_2R^1)$—$CH(NH_2)$—$CH_2CO$—,

Y is —O—$C_mH_{2m}$—$R^3$, —NH—$C_mH_{2m-1}(R^3)_2$ or $NA_2$,

$R^2$ is A, cycloalkyl of 3–7 C atoms, benzyl or Ar,

L is CH or N,

$R^3$ is H, A, cycloalkyl of 3–7 C atoms, Ar, pyridyl, imidazolyl, piperidyl, N-benzyl-piperidyl or piperazinyl,

W is OH, $NH_2$, OA, NHA or $NA_2$,

A is alkyl of 1–6 C atoms,

Ar is phenyl, phenyl substituted by A, AO, F, Cl, Br, I, $CF_3$ or $NH_2$, or naphthyl, and

each of m, n, p, r and t independently is 0, 1, 2, 3, 4 or 5,

or a pharmacologically acceptable salt thereof.

VOL 1090 ISS 4 MY 24 1988 UMI



**4,746,650**

## POLYCYCLIC ETHER ANTIBIOTIC

**Walter P. Cullen, East Lyme, Conn.; Hiroshi Maeda, Aichi, Japan; John C. Ruddock, Canterbury, England, and Junsuke Tone, Chita, Japan, assignors to Pfizer Inc., New York, N.Y.**

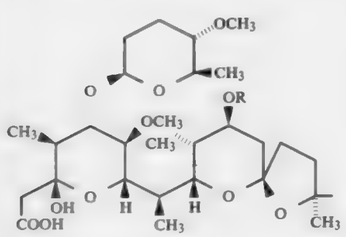
**Filed Jun. 21, 1985, Ser. No. 747,613**

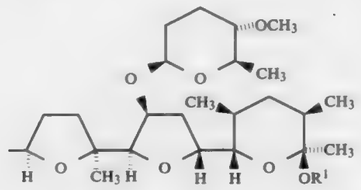
**Claims priority, application United Kingdom, Jul. 12, 1984, 8417785**

**Int. Cl.[4] A61K** *31/71;* **C07H** *17/04;* **C12P** *17/18;* **A23G** *3/00*

**U.S. Cl. 514—27** **6 Claims**

1. An antibiotic of the formula:





and pharmaceutically acceptable cationic salts thereof, wherein either R and $R^1$ are each hydrogen; R is hydrogen and $R^1$ is methyl; or R and $R^1$ are both methyl.

5. A method for controlling coccidial infections in poultry which comprises administering to said poultry an anticoccidially effective amount of an antibiotic compound according to claim 1.

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**4,746,651**

## ANTIMICROBIAL CHEMOTHERAPEUTIC POTENTIATION USING SUBSTITUTED NUCLEOSIDE DERIVATIVES

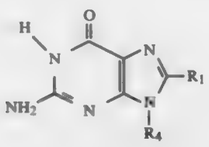
**Michael G. Goodman, Rancho Santa Fe, Calif., assignor to Scripps Clinic and Research Foundation, La Jolla, Calif.**

**Continuation of Ser. No. 546,679, Nov. 1, 1983, Pat. No. 4,643,992. This application Nov. 15, 1985, Ser. No. 798,629**

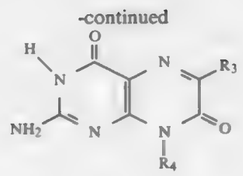
**Int. Cl.[4] A61K** *31/70*

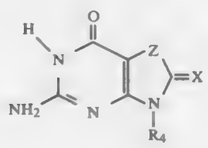
**U.S. Cl. 514—45** **38 Claims**

1. An antimicrobial composition comprising a diluent amount of a physiologically tolerable carrier admixed with two active ingredients, said active ingredients comprising (1) an effective amount of an antibiotic and (2) a potentiating amount of an immune response-enhancing agent, said agent having a structure that conforms to a formula selected from the group consisting of



-continued





wherein

Z is N—$R_2$, O, or S;

$R_1$ contains fewer than about 15 atoms and has a Hammett substituent sigma constant for ionization of a meta-substituted benzoic acid that is greater than that of hydrogen;

$R_2$ is a radical selected from the group consisting of lower alkyl, lower beta-alkenyl, benzyl, hydroxy lower alkyl, polyhydroxy lower alkyl, lower alkylene lower alkylcarboxylate, lower alkanoyl, lower alkylcarboxy, lower alkoxy lower alkyl carbonyl, and lower alkyl carboxamido in which the carboxamido group has the formula $CONR_9R_{10}$ wherein $R_9$ and $R_{10}$ are the same or different and are selected from the group consisting of hydrogen and lower alkyl or $NR_9R_{10}$ together form a heterocyclic ring having five or six atoms in the ring;

X is oxygen or sulfur;

$R_3$ is a radical selected from the group consisting of hydrogen, lower alkyl, hydroxy lower alkyl, polyhydroxy lower alkyl, phenyl, phenyl-lower alkyl, lower alkyl phenyl, lower alkoxy phenyl, halophenyl, trifluoromethyl phenyl, hydroxy, oxo, lower alkoxy, phenyl-lower alkoxy, halo, mercapto, thioxo, lower alkylthio, phenyl-lower alkylthio, lower alkanoyl, carboxy, lower alkoxy carbonyl, lower alkylcarboxy, lower alkylene lower alkylcarboxylate, lower alkoxy lower alkyl carbonyl, and lower alkyl carboxamido in which the carboxamido group has the formula $CONR_9R_{10}$ wherein $R_9$ and $R_{10}$ are the same or different and are selected from the group consisting of hydrogen and lower alkyl or $NR_9R_{10}$ together form a heterocyclic ring having five or six atoms in the ring;

$R_4$ is a beta-bonded aldoglycoside radical selected from the group consisting of 1′-aldopentosidyl, 1′-aldohexosidyl, mono-deoxygenated 1′-aldopentosidyl, and mono-deoxygenated 1′-aldohexosidyl and their O-substituted lower alkyl, lower alkanoyl, benzyl and benzoyl derivatives wherein an O-substituent if present on one oxygen is present on all available ring substituent oxygens;

the pharmaceutically acceptable salts of said agent; and the tautomers thereof.

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**4,746,652**

## METHOD OF INDUCING DIURESIS WITH LYSOPHOSPHOLIPIDS

**Vardaman M. Buckalew, Jr., and Albert L. Rauch, both of Winston-Salem, N.C., assignors to Wake Forest University, Winston-Salem, N.C.**

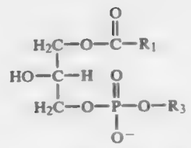
**Filed Nov. 18, 1986, Ser. No. 932,462**

**Int. Cl.[4] A61K** *31/685*

**U.S. Cl. 514—77** **7 Claims**

1. A method of inducing diuresis in a human or animal subject in need of said treatment comprising administering to the subject in an amount effective to increase the subject's renal excretion of sodium, a compound or a pharmaceutically acceptable salt thereof, said compound being of the formula





wherein $R_1$ is an alkyl group having from 12 to 24 carbon atoms, or an alkenyl group having from 12 to 24 carbon atoms with not more than four carbon-carbon double bonds, and wherein $R_3$ is selected from the class consisting of $—CH_2CH_2N^+(CH_3)_3$, $—CH_2CH_2NH_3^+$, and $—CH_2CHNH_3^+COO—$.

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**4,746,653**

## CERTAIN HETERO PHOSPHONIC ACID DERIVATIVES OF 2-PIPERIDINE OR 2-TETRAHYDROPYRIDINECARBOXYLATES AND ESTERS THEREOF WHICH ARE USEFUL FOR THE TREATMENT OF DISORDERS RESPONSIVE TO BLOCKADE OF THE NMDA RECEPTOR IN MAMMALS

**Alan J. Hutchison, Vernona; Kenneth R. Shaw, and Josef A. Schneider, both of Millburn, all of N.J., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

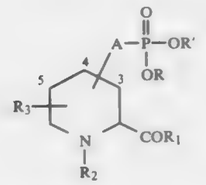
**Filed Feb. 28, 1986, Ser. No. 834,672**

**Int. Cl.[4] C07F** *9/58, 9/65;* **A61K** *31/675*

**U.S. Cl. 514—89** **16 Claims**

1. A compound of the formula

(II)



or a compound of formula II with a double bond present between the 3 and 4 or between the 4 and 5 carbon atoms of the piperidyl ring, so as to form a tetrahydropyridinyl ring in which the phosphono bearing chain is attached at the 3, 4, or 5-position of the piperidinyl or tetrahydropyridinyl ring, and wherein R and R′ represent hydrogen, lower alkyl, benzyl, benzyl substituted on phenyl by halogen, lower alkyl or lower alkoxy, lower alkanoyloxymethyl, lower alkanoyloxymethyl substituted on oxymethyl by lower alkyl, cyclohexyl or cyclopentyl; $R_2$ represents hydrogen, lower alkyl, aryl-lower alkyl or lower alkanoyl; $R_3$ represents hydrogen, lower alkyl or aryl-lower alkyl; $COR_1$ represents carboxy or carboxy derivatized in the form of a pharmaceutically acceptable ester; A represents

$$(CH_2)_m\text{-}X\text{-}(CH_2)_n \qquad (A)$$

$(CH_2)_m$ being attached to the ring, wherein m represents zero, 1, 2 or 3; n represents 1, 2 or 3; X represents O, S, SO, $SO_2$, CO-$NR_b$, $R_b$N-CO or N-Ra; Ra represents hydrogen, lower alkyl, aryl, aryl-lower alkyl or acyl; $R_b$ represents hydrogen, lower alkyl or aryl-lower alkyl; and wherein one or more of carbon atoms within A may be substituted by lower alkyl; acyl in the above definitions represents lower alkanoyl, lower alkoxycarbonyl, aryl-lower alkanoyl or aryl-lower alkoxycarbonyl; aryl in the above definitions represents phenyl or phenyl substituted by lower alkyl, lower alkoxy or halogen; and carboxy esterified in form of a pharmaceutically acceptable ester represents lower alkoxycarbonyl, (amino, mono- or di-lower alkylamino)-substituted straight chain $C_2$–$C_5$-lower alkoxycarbonyl, carboxy substituted lower alkoxycarbonyl, lower alkoxycarbonyl-substituted lower alkoxycarbonyl, benzyloxycarbonyl, pyridylmethoxycarbonyl, lower alkanoyloxy-substituted methoxycarbonyl, (lower alkanoyloxy or lower alkoxy)-substituted lower alkoxymethoxycarbonyl, bicyclo[2,2,1]heptyloxycarbonyl-substituted methoxycarbonyl, 3-phthalidoxycarbonyl, (lower alkyl, lower alkoxy, halo)-substituted 3-phthalidoxycarbonyl or lower alkoxycarbonyloxy-lower alkoxycarbonyl; or a pharmaceutically acceptable salt thereof.

11. A method of blocking the N-methyl-D-aspartate excitatory amino acid receptor in a mammal comprising the administration to a mammal in need thereof of a correspondingly effective amount according to a compound of claim 1.

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**4,746,654**

## ANTI-INFLAMMATORY PRODUCTS DERIVED FROM METHYLENE-DIPHOSPHONIC ACID, AND PROCESS FOR THEIR PREPARATION

**Jean C. Breliere; Xavier Emonds-Alt, both of Montpellier, and Georges Garcia, Saint-Gely-du-Fesc, all of France, assignors to Sanofi, Paris, France**

**Continuation of Ser. No. 518,427, Jul. 29, 1983. This application Apr. 24, 1986, Ser. No. 858,573**

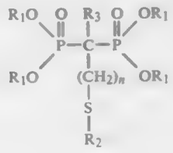
**Claims priority, application France, Jul. 29, 1982, 82 13250**

**Int. Cl.[4] A61K** *31/66;* **C07F** *9/38*

**U.S. Cl. 514—108** **2 Claims**

1. A method for treating inflamation which comprises administering to an animal in need of such treatment an anti-inflammatory effective amount of a methylene-diphosphonic acid compound having the formula

(I)



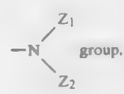
in which:

$R_1$ is hydrogen or a straight or branched lower alkyl group having from 1 to 4 carbon atoms,

$R_2$ is:

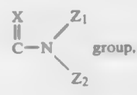
hydrogen,

an alkyl group having from 1 to 16 carbon atoms which is unsubstituted or substituted by a phenyl group, a hydroxyl group, a thiol group, one or more halogen atoms,



where $Z_1$ and $Z_2$, considered independently of one another, are hydrogen or a lower alkyl group,

a phenyl group which is unsubstituted or substituted one or more times by halogen, a nitro group, a lower alkyl group, a lower alkoxy group, trifluoromethyl, an $NH_2$ group, or a COOH group, or



where X is oxygen or sulfur and $Z_1$ and $Z_2$ are as defined above,

$R_3$ is hydrogen or a hydroxyl group, and

n is an integer between 0 and 10, except that n cannot be 0 if $R_3$ is OH, or a salt of such compound with an organic or inorganic bases when $R_1$=H.

VOL 1090 ISS 4 MY 24 1988 UMI



**4,746,655**

## FUSED AROMATIC-SPIROPIPERIDINE OXAZEPINONES(AND THIONES)

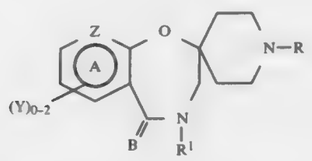
**Albert D. Cale, Jr., Mechanicsville, Va., assignor to A. H. Robins Company, Incorporated, Richmond, Va.**

**Filed Jun. 10, 1987, Ser. No. 60,265**

**Int. Cl.**[4] **A61K** *31/55;* **C07D** *267/14, 267/08*

**U.S. Cl. 314—211** **12 Claims**

1. A compound selected from the group having the formula:



wherein;

A represents an aromatic ring, selected from benzo when Z is carbon or pyrido[3,2-f], when Z is nitrogen, either of which rings may be optionally substituted on carbon by one or two radicals selected from the group consisting of nitro, halo, loweralkyl, loweralkoxy, diloweralkylamino, amino, phenyl or trifluoromethyl;

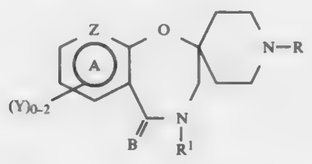
B is selected from oxygen or sulfur;

$R^1$ is selected from the group consisting of loweralkyl, cycloalkyl, having 3–9 carbon atoms cycloalkyl-loweralkyl wherein the cycloalkyl portion has 3–9 carbon atoms or phenyl-loweralkyl of which phenyl may be optionally substituted by one to three radicals selected from halo, loweralkyl, loweralkoxy, nitro or trifluoromethyl;

R is selected from the group consisting of loweralkyl, cycloalkyl, or phenyl-loweralkyl of which phenyl may be optionally substituted by one to three radicals selected from loweralkyl, loweralkoxy, or trifluoromethyl, and the pharmaceutically acceptable salts thereof.

9. A pharmaceutical composition suitable for counteracting histamine comprising:

(a) an effective amount of a compound selected from the group having the formula:



wherein;

A represents an aromatic ring, having two of its carbon atoms held mutually with the oxazepine moiety, selected from benzo when Z is carbon or pyrido[3,2-f], when Z is nitrogen, either of which rings may be optionally substituted on carbon by one or two Y radicals selected from the group consisting of nitro, halo, loweralkyl, loweralkoxy, diloweralkylamino, amino, phenyl or trifluoromethyl;

B is selected from oxygen or sulfur;

$R^1$ is selected from the group consisting of loweralkyl, cycloalkyl, having 3–9 carbon atoms cycloalkyl-loweralkyl wherein the cycloalkyl portion has 3–9 carbon atoms or phenyl-loweralkyl of which phenyl may be optionally substituted by one to three radicals selected from halo, loweralkyl, loweralkoxy, nitro or trifluoromethyl;

R is selected from the group consisting of loweralkyl, cycloalkyl, or phenyl-loweralkyl of which phenyl may be optionally substituted by one to three radicals selected from loweralkyl, loweralkoxy, or trifluoromethyl, and the pharmaceutically acceptable salts thereof and

(b) a pharmaceutically acceptable carrier therefor.

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**4,746,656**

## 1,2,4,7-TETRAHYDRO-2-OXOPYRAZOLO[1,5-A]PYRIMIDINE DERIVATIVES

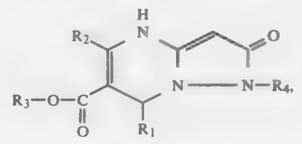
**Karnail Atwal, Cranbury, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.**

**Filed Jul. 21, 1986, Ser. No. 887,397**

**Int. Cl.**[4] **C07D** *487/04, 403/14, 417/14;* **A61K** *31/505*

**U.S. Cl. 514—212** **18 Claims**

1. A compound having the formula



or a pharmaceutically acceptable salt thereof wherein

$R_1$ is aryl;

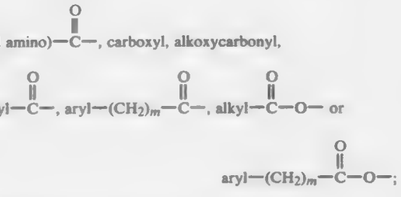
$R_2$ is hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, aryl, $-(CH_2)_n-Y_1$, or halo substituted alkyl;

$R_3$ is hydrogen, alkyl, cycloalkyl, aryl, $-(CH_2)_n-Y_2$, $-(CH_2)_p-Y_3$, or halo substituted alkyl;

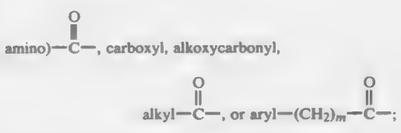
$R_4$ is hydrogen, alkyl, alkenyl, alkynyl, $-(CH_2)_n-Y_2$, $-(CH_2)_p-Y_3$, halo substituted alkyl, or



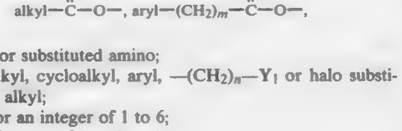
$Y_1$ is cycloalkyl, aryl, hydroxyl, alkoxy, aryl—$(CH_2)_m$—O—, mercapto, alkylthio, aryl—$(CH_2)_m$—S—, amino, substituted amino, carbamoyl,



$Y_2$ is cycloalkyl, aryl, carbamoyl,



$Y_3$ is hydroxyl, alkoxy, aryl—$(CH_2)_m$—O—, mercapto, alkylthio, aryl—$(CH_2)_m$—S—,



amino, or substituted amino;

$Y_4$ is alkyl, cycloalkyl, aryl, $-(CH_2)_n-Y_1$ or halo substituted alkyl;

m is 0 or an integer of 1 to 6;

n is an integer of 1 to 6; and



p is an integer of 2 to 6;

wherein the term "cycloalkyl" refers to cycloalkyl groups having 3,4,5,6 or 7 carbon atoms;

the term "aryl" refers to phenyl and phenyl substituted with one, two or three alkyl, alkoxy, alkylthio, halo, nitro, cyano, hydroxy, amino, alkylamino, dialkylamino, trifluoromethyl, isothiocyanato, isocyanato, or difluoromethoxy groups; and

the term "substituted amino" refers to a group of the formula $-NZ_1Z_2$ wherein $Z_1$ is hydrogen, alkyl or aryl—$(CH_2)_m$— and $Z_2$ is alkyl or aryl—$(CH_2)_m$— or $Z_1$ and $Z_2$ taken together with the nitrogen atom to which they are attached are 1-pyrrolidinyl, 1-piperidinyl, 1-azepinyl, 4-morpholinyl, 4-thiamorpholinyl, 1-piperazinyl, 4-alkyl-1-piperazinyl, 4-arylalkyl-1-piperazinyl, 4-diarylalkyl-1-piperazinyl, or 1-pyrrolidinyl, 1-piperidinyl, or 1-azepinyl substituted with alkyl, alkoxy, alkylthio, halo, trifluoromethyl or hydroxy.

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**4,746,657**

## FUSED AROMATIC TETRAHYDROAZEPINONES (AND THIONES)

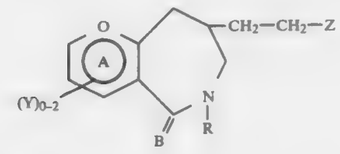
**Albert D. Cale, Jr., Mechanicsville, Va., assignor to A. H. Robins Company, Incorporated, Richmond, Va.**

**Filed Jul. 13, 1987, Ser. No. 72,649**

**Int. Cl.**[4] **C07D** *223/16, 471/04;* **A61K** *31/55*

**U.S. Cl. 514—215** **9 Claims**

1. A compound selected from the group having the formula:



wherein

A represents an aromatic ring selected from benzo when Q is carbon and from pyrido[3,2-c] when Q is nitrogen, either of which rings may be optionally substituted by one or two Y radicals, the same or different, selected from the group consisting of halo, loweralkyl, loweralkoxy, diloweralkylamino, nitro, phenyl and trifluoromethyl;

B is selected from oxygen and sulfur;

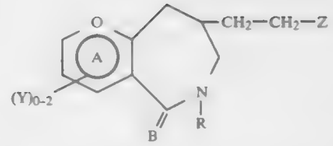
R is selected from the group consisting of loweralkyl, cycloalkyl and phenyl-loweralkyl, wherein phenyl may be optionally substituted by one or two radicals, the same or different, selected from halo, loweralkyl, loweralkoxy, nitro and trifluoromethyl;

Z is selected from the group consisting of $-NR^1R^2$, 1H-pyrazol-1-yl and 1H-imidazol-1-yl;

$R^1$ and $R^2$ may be the same or different and are selected from the group consisting of loweralkyl, cycloalkyl having 3-9 carbon atoms and phenyl-loweralkyl, wherein phenyl may be optionally substituted by 1 or 2 radicals, the same or different, selected from halo, loweralkyl, loweralkoxy, nitro, trifluoromethyl and cyano; or

$R^1$ and $R^2$ together with the adjacent nitrogen atom may form a heterocyclic ring structure selected from the group consisting of 1-azetidinyl, 1-pyrrolidinyl, 2,5-dimethyl-1-pyrrolidinyl, 2-methyl-1-pyrrolidinyl, 1-piperidinyl, 4-substituted-1-piperidinyl, 4-[bis(4-fluorophenyl)methyl]-1-piperidinyl, 4-morpholinyl, 1-piperazinyl, 4-substituted-1-piperazinyl, 1,2,3,6-tetrahydopyridin-1-yl, 1H-pyrrol-1-yl and 2,5-dihydro-1H-pyrrol-1-yl; the ooptical isomers thereof and pharmaceutically acceptable salts thereof.

4. A method of counteracting histamine in a living animal body, which method comprises administering to said animal body an effective amount of a compound selected from the group having the fomula:



wherein

A represents an aromatic ring selected from benzo when Q is carbon and from pyrido[3,2-c] when Q is nitrogen, either of which rings may be optionally substituted by one or two Y radicals, the same or different, selected from the group consisting of halo, loweralkyl, loweralkoxy, diloweralkylamino, nitro, phenyl and trifluoromethyl;

B is selected from oxygen and sulfur;

R is selected from the group consisting of loweralkyl, cycloalkyl and phenylloweralkyl, wherein phenyl may be substituted by one or two radicals, the same or different, selected from halo, loweralkyl, loweralkoxy, nitro and trifluoromethyl;

Z is selected from the group consisting of $-NR^1R^2$, 1H-pyrazol-1-yl and 1H-imidazol-1-yl;

$R^1$ and $R^2$ may be the same or different and are selected from the group consisting of loweralkyl, cycloalkyl having 3–9 carbon atoms and phenyl-loweralkyl, wherein phenyl may be optionally substituted by 1 or 2 radicals, the same or different, selected from halo, loweralkyl, loweralkoxy, nitro, trifluoromethyl and cyano; or

$R^1$ and $R^2$ together with the adjacent nitrogen atom may form a heterocyclic ring structure selected from the group consisting of 1-azetidinyl, 1-pyrrolidinyl, 2,5-dimethyl-1-pyrrolidinyl, 2-methyl-1-pyrrolidinyl, 1-piperidinyl, 4-substituted-1-piperidinyl, 4-[bis(4-fluorophenyl)methyl]-1-piperidinyl, 4-morpholinyl, 1-piperazinyl, 4-substituted-1-piperazinyl, 1,2,3,6-tetrahydopyridin-1-yl, 1H-pyrrol-1-yl and 2,5-dihydro-1H-pyrrol-1-yl; the optical isomers thereof and pharmaceutically acceptable salts thereof.

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**4,746,658**

## 2-PHENYL-IMIDAZO-PYRAZINES, -PYRIDAZINES AND -TRIAZINES

**Volkhard Austel; Norbert Hauel, both of Biberach; Joachim Heider, Warthausen; Manfred Reiffen, Biberach; Jacobus C. A. Van Meel, Biberach, and Willi Diederen, Biberach, all of Fed. Rep. of Germany, assignors to Dr. Karl Thomae GmbH, Biberach, Fed. Rep. of Germany**

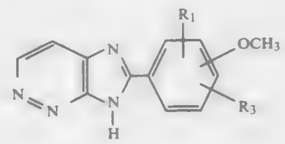
**Continuation of Ser. No. 905,484, Sep. 8, 1986, abandoned, which is a division of Ser. No. 675,299, Nov. 27, 1984, Pat. No. 4,656,171. This application Jul. 9, 1987, Ser. No. 71,329**

**Claims priority, application Fed. Rep. of Germany, Dec. 23, 1983, 3346640**

**Int. Cl.**[4] **A61K** *31/50;* **C07D** *487/04*

**U.S. Cl. 514—248** **13 Claims**

1. A compound of the formula

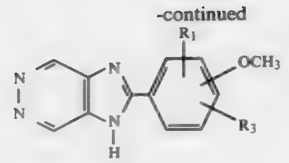


or

VOL 1090 ISS 4 MY 24 1988 UMI



-continued



wherein

$R_1$ is methanesulfonyloxy, methanesulfonylamino, N-methylmethanesulfonylamino, aminosulfonyl, methylaminosulfonyl or dimethylaminosulfonyl; and

$R_3$ is hydrogen or methoxy;

a tautomer thereof; or a non-toxic, pharmacologically acceptable acid addition salt thereof.

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**4,746,659**

**DIASTEREOMERS OF 10-ALKYL-10-DEAZAMINOPTERINS AND PROCESS FOR PREPARING THE SAME**

**Joseph I. DeGraw; Pamela H. Christie, both of Sunnyvale, Calif., and Francis M. Sirotnak, New York, N.Y., assignors to SRI International, Menlo Park, Calif. and Sloan Kettering Institute for Cancer Research, New York, N.Y.**

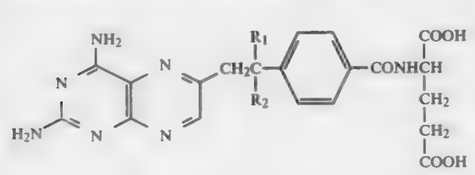
**Filed Dec. 30, 1985, Ser. No. 814,720**

**The portion of the term of this patent subsequent to Jan. 18, 2000, has been disclaimed.**

**Int. Cl.[4] A61K** *31/505;* **C07D** *475/08*

**U.S. Cl. 514—249** **47 Claims**

1. The resolved d,L and l,L-diastereomers of 10-alkyl-10-deazaminopterin compounds having the formula:



wherein:

$R_1$ and $R_2$ are both selected from the group consisting of hydrogen and alkyl having from one to about eight carbon atoms, $R_1$ is different from $R_2$, and at least one of $R_1$ and $R_2$ is alkyl.

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**4,746,660**

**PROCESS FOR REDUCING REFLEX TACHYCARDIA IN THE TREATMENT OF HYPERTENSION EMPLOYING A COMBINATION OF A DIAZACYCLOPENTENE DERIVATIVE AND A PYRIDAZINONE DERIVATIVE**

**Jürgen Biedermann, Pulheim-Stommeln; Harald Borbe, Cologne; Erich Graf, Kerpen; Gerd Hilboll, and Gerrit Prop, both of Pulheim, all of Fed. Rep. of Germany, assignors to A. Natternabb & CIE GmbH, Cologne, Fed. Rep. of Germany**

**Division of Ser. No. 705,668, Feb. 26, 1985, Pat. No. 4,661,487.**

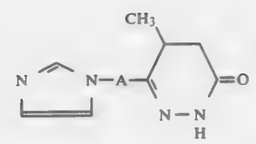
**This application Jan. 21, 1987, Ser. No. 5,622**

**Claims priority, application Fed. Rep. of Germany, Mar. 1, 1984, 3407509**

**Int. Cl.[4] A61K** *31/415, 31/495*

**U.S. Cl. 514—252** **2 Claims**

1. Process for reducing reflex tachycardia occurring in the treatment of hypertension and thromboembolic diseases in humans with compounds of formula I



I

wherein A is a member selected from the group consisting of the 2,5-thienylene and 2,4-thienylene groups, comprising administering to the humans an effective amount of a combination of the compound of formula I and a compound selected from the group consisting of (±)- and (−)-2-[1-(2,6-dichlorophenoxy)-ethyl]-1,3-diazacyclopent-2-ene hydrochloride in a weight ratio of from 150:1 to 10:1.

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**4,746,661**

**PHENYLPIPERAZINE PROPYLOXYQUINOLINONES AND METHODS FOR SEDATING AND INHIBITING AGGRESSION IN LIVESTOCK THEREWITH**

**Rudolf Lattrell, Königstein; Peter Klatt, Kelkheim; Hermann Gerhards, Hofheim am Taunus, and Fritz Bauer, Bad Soden am Taunus, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

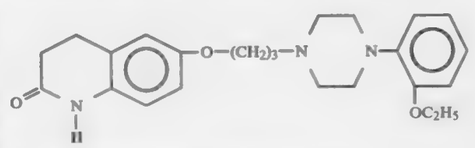
**Continuation of Ser. No. 799,820, Nov. 20, 1985, abandoned. This application Feb. 26, 1987, Ser. No. 21,523**

**Claims priority, application Fed. Rep. of Germany, Nov. 22, 1984, 3442570**

**Int. Cl.[4] A61K** *31/495;* **C07D** *401/12*

**U.S. Cl. 514—253** **5 Claims**

1. A method for the sedation of and inhibition of aggression in livestock, which comprises administering to said livestock an effective amount of a compound of the formula



or of a physiologically acceptable salt thereof.

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**4,746,662**

**TREATMENT OF ARTHRITIS WITH 3,5-DICHLOROMETHOTREXATE**

**Suresh S. Kerwar, Ossining, and Adolph E. Sloboda, New City, both of N.Y., assignors to American Cyanamid Company, Stamford, Conn.**

**Filed Feb. 20, 1987, Ser. No. 17,286**

**Int. Cl.[4] A61U** *31/505*

**U.S. Cl. 514—258** **4 Claims**

1. A method for the treatment of arthritis and progressive joint deterioration characterized by administering an effective amount of N-{3,5-dichloro-4-[(2,4-diamino-6-pteridylmethyl)-methylamino]benzoyl}glutamic acid or a pharmaceutically acceptable salt thereof to a patient having such conditions.



**4,746,663**

**PYRAZOLO[4,3-D]PYRIMIDINE DERIVATIVE, PROCESS FOR ITS PRODUCTION, AND ANTIHYPERLIPIDEMIC OR ANTIATHEROSCLEROTIC AGENT CONTAINING IT**

**Yoshihiro Fujikawa, Sakura; Mikio Suzuki, Chiba; Mitsuaki Sakashita, Urawa; Nobutomo Tsuruzoe, Kuki, and Tadashi Miyasaka, Yokohama, all of Japan, assignors to Nissan Chemical Industries Ltd., Tokyo, Japan**

**Filed Jul. 30, 1986, Ser. No. 890,549**

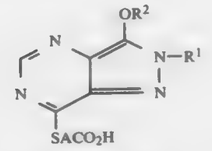
**Claims priority, application Japan, Aug. 1, 1985, 60-169987**

**The portion of the term of this patent subsequent to Mar. 31, 2004, has been disclaimed.**

**Int. Cl.[4] A61K** *31/415;* **C07D** *487/04*

**U.S. Cl. 514—258** **12 Claims**

1. A pyrazolo[4,3-d]pyrimidine derivative having the formula:



wherein $R^1$ is lower alkyl or phenyl which is unsubstituted or substituted by a lower alkyl, a lower alkoxy or a halogen substituent; $R^2$ is a saturated or unsaturated, straight chain or branched aliphatic group having from 2 to 22 carbon atoms or phenyl-lower alkyl with the phenyl group unsubstituted or substituted by a lower alkyl, a lower alkoxy or a halogen substituent; and A is an alkylene group having from 1 to 3 carbon atoms which is unsubstituted or substituted by no more than two methyl groups, or a pharmaceutically acceptable salt thereof.

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**4,746,664**

**SUBSTITUTED-3,4-DIHYDRO-4-(2,4,6-TRIMETHOXY-PHENYLIMINO)-2(1H)-PYRIMIDONES USEFUL AS CARDIOTONIC, ANTIHYPERTENSIVE, CEREBROVASCULAR VASODILATOR AND ANTI-PLATELET AGENT**

**Takao Takaya, Kawanishi; Masayoshi Murata, Osaka, and Kiyotaka Ito, Ibaragi, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan**

**Division of Ser. No. 588,902, Mar. 12, 1984, Pat. No. 4,612,376. This application Jun. 5, 1986, Ser. No. 870,826**

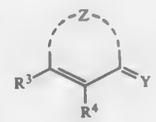
**Claims priority, application United Kingdom, Mar. 25, 1983, 8308290; Jun. 7, 1983, 8315542; Oct. 18, 1983, 8327859**

**The portion of the term of this patent subsequent to Sep. 16, 2003, has been disclaimed.**

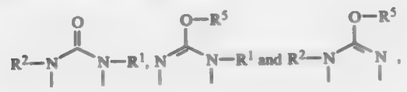
**Int. Cl.[4] A61K** *31/495;* **C07D** *239/47, 239/54, 239/56*

**U.S. Cl. 514—274** **6 Claims**

1. A compound of the formula



wherein Z is a group selected from



in which

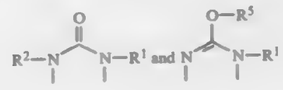
$R^1$ and $R^2$ are each hydrogen, $C_2$–$C_6$ alkenyl, phenyl($C_1$–$C_6$)alkyl, $C_1$–$C_6$ alkyl, or $C_1$–$C_6$ alkyl substituted with one epoxy, or with one hydrogen and one amino, or with one hydroxy and one $C_1$–$C_6$ alkylamino, and $R^5$ is $C_1$–$C_6$ alkyl,

$R^3$ is hydrogen, phenyl, phenyl substituted with mono-, di- or tri-$C_1$–$C_6$ alkoxy, or with mono- or di-halogen, or with one $C_1$–$C_6$ alkoxy and one $C_1$–$C_6$ alkyl, 2-, 3- or 4-pyridyl, or 2-, 3- or 4-pyridyl substituted with one $C_1$–$C_6$ alkyl at the N-position,

$R^4$ is hydrogen, $C_1$–$C_6$ alkyl, phenyl or phenyl substituted with mono- or di-$C_1$–$C_6$ alkoxy, and

$R^6$ is $C_1$–$C_6$ alkyl; cyclo($C_3$–$C_6$)alkyl; phenyl($C_1$–$C_6$)alkyl; phenyl($C_1$–$C_6$)alkyl substituted with mono- or di-$C_1$–$C_6$ alkoxy; 2-, 3- or 4-pyridyl; thiadiazolyl; thiadiazolyl substituted with one $C_1$–$C_6$ alkyl; phenyl; phenyl substituted with tri-$C_1$–$C_6$ alkyl at the 2-, 4- and 6-position of the phenyl ring, or with mono-, di- or tri-$C_1$–$C_6$ alkoxy, or with mono- or di-hydroxy, or with mono- or di-halogen, or with one halogen and one $C_1$–$C_6$ alkyl, or with one $C_1$–$C_6$ alkoxy, or with one $C_1$–$C_6$ alkoxy having one epoxy, or with one $C_1$–$C_6$ alkoxy having one hydroxy and one amino, or with one $C_1$–$C_6$ alkoxy having one hydroxy and one $C_1$–$C_6$ alkylamino;

provided that $R^3$ is not hydrogen when $R^4$ is hydrogen, and that $R^4$ is phenyl or phenyl substituted with mono- or di-$C_1$–$C_6$ alkoxy when Z is a group of the formula:



in which $R^1$ and $R^2$ are each hydrogen or $C_1$–$C_6$ alkyl and $R^5$ is $C_1$–$C_6$ alkyl, $R^3$ is phenyl or phenyl substituted with mono-, di or tri-$C_1$–$C_6$ alkoxy or with mono- or di-halogen, and $R^6$ is phenyl substituted with tri-$C_1$–$C_6$ alkyl at the 2-, 4- and 6-position of the phenyl ring, or with mono-, di- or tri-$C_1$–$C_6$ alkoxy, or with mono- or di-hydroxy, or with mono- or di-halogen, or with one halogen and one $C_1$–$C_6$ alkyl, and pharmaceutically acceptable salts thereof.

6. A cardiotonic, antihypertensive, cerebrovascular vasodilative and anti-platelet aggregation pharmaceutical composition comprising an effective amount of a compound of claim 1 in association with a pharmaceutically acceptable, substantially nontoxic carrier or excipient.

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**4,746,665**

**NITRO DERIVATIVES OF VINBLASTINE-TYPE BISINDOLES, AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM**

**Csaba Szántay; Lajos Szabó; Katalin Honty; Tibor Keve; Tibor Ács; Sándor Eckhardt; János Sugár; Zsuzsa Somfai; Evá Iván, and Zsuzsa Kneffel, all of Budapest, Hungary, assignors to Richter Gedeon Vegyeszeti Gyar, Budapest, Hungary**

**Filed Jun. 12, 1986, Ser. No. 873,537**

**Claims priority, application Hungary, Jun. 12, 1985, 2302/85**

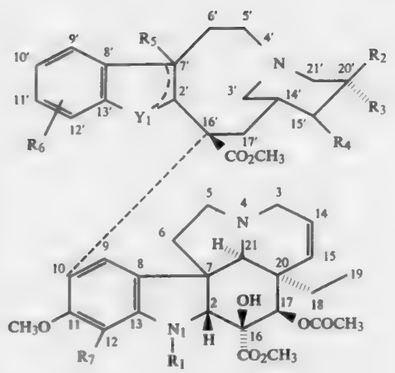
**Int. Cl.[4] A61K** *31/475;* **C07D** *519/04*

**U.S. Cl. 514—283** **3 Claims**

1. A nitro derivative of the formula (I),

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(I)

wherein
$R_1$ is a methyl or a formyl group;
$R_2$ is a hydroxy or ethyl group of $\beta$-position;
$R_3$ is an ethyl group of $\alpha$-position;
$R_4$ is a hydrogen atom; or
$R_3$ and $R_4$ together is an oxygen bridge or a double bond;
$R_5'$, $R_6$ and $R_7$ are nitro groups or hydrogen atoms with the proviso that simultaneously only one of $R_5$, $R_6$ and $R_7$ is a hydrogen atom; and
Y is —N= when $R_5$ is a nitro grop; whereas
Y is —NH— when $R_5$ is a hydrogen atom and a valence bond exists between the $C_2'$ and $C_7'$ atoms,
as well as their pharmaceutically acceptable acid addition salts.

**3**. A pharmaceutical composition having a cytostatic effect which comprises: a nitro derivative of the formula (I) as the active ingredient, wherein $R_1'$, $R_2'$, $R_3'$, $R_4'$ $R_5'$, $R_6$, $R_7$ and Y are as defined in claim **1**, or a pharmaceutically acceptable acid addition salt thereof in admixture with a pharmaceutically acceptable carrier and/or additive.

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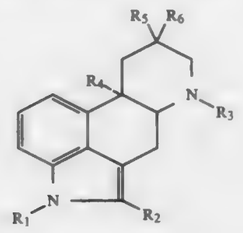
**4,746,666**

## ERGOLINE COMPOUNDS USEFUL AS ANTIPARKINSON AGENTS

**Luigi Bernardi; Sergio Mantegani; Aldemio Temperilli, all of Milan; Gabriella Traquandi, Cornate d'Adda, and Alessandro Rossi, Milan, all of Italy, assignors to Farmitalia Carlo Erba S.p.A., Milan, Italy**

**Filed Jun. 16, 1986, Ser. No. 874,413**
**Claims priority, application United Kingdom, Jun. 19, 1985, 8515528**
**Int. Cl.[4] A61K** *31/48;* **C07D** *457/04*
**U.S. Cl. 514—288** **4 Claims**

**1**. An ergoline compound of the formula I,



I

wherein
$R_1$ represents a hydrogen atom or a methyl group;
$R_2$ represents a hydrogen or halogen atom, a methyl or cyano group, an alkylthio group having from 1 to 4 carbon atoms or a phenylthio group;
$R_3$ represents a hydrocarbon group selected from the group consisting of alkyl, cycloalkyl, alkylcycloalkyl, alkenyl, and alkyynyl groups having from 1 to 4 carbon atoms;
$R_4$ represents a hydrogen atom or a methoxy group; and
either
(i) $R_5$ represents a hydrogen atom and $R_6$ represents a group of the formula —CH=CH—CONH$R_7$, wherein $R_7$ represents a 2-thiazolyl, 3-pyridazinyl, 1,3,4-thiadiazol-2-yl or 4-pyrimidinyl group unsubstituted or substituted by one or two halogen atoms, alkyl groups having from 1 to 4 carbon atoms, alkoxy groups having from 1 to 4 carbon atoms, alkylthio groups having from 1 to 4 carbon atoms, dialkylamino groups in which each alkyl groups has from 1 to 4 carbon atoms, or
(ii) $R_5$ and $R_6$ taken together represent a group of the formul =CHCONH$R_7$, wherein $R_7$ is as defined above;
or a pharmaceutically acceptable salt thereof.

**4**. A pharmaceutical composition comprising an ergoline derivative of claim **1** or a pharmaceutically acceptable salt thereof in an amount sufficient to display activity on the central nervous system, in admixture with a pharmaceutically acceptable diluent or carrier.

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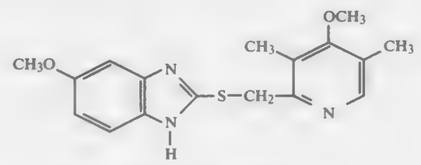
**4,746,667**

## PHARMACEUTICAL COMPOSITION CONTAINING 2-(2-BENZIMIDAZOLYL THIOMETHYL) PYRIDINE

**Enar I. Carlsson, Västra Frölunda; Hakan S. Larsson, Rävlanda; Gunhild W. von Wittken Sundell, Askim; Viola I. Samuelsson-Junggren, Mölnlycke, and Kenneth Lundström, Svanesund, all of Sweden, assignors to Aktiebolaget Hassle, Sweden**

**Continuation-in-part of Ser. No. 804,328, Dec. 4, 1985, abandoned, which is a continuation of Ser. No. 620,527, Jun. 12, 1984, abandoned, which is a continuation of Ser. No. 400,388, Jul. 21, 1982, abandoned. This application Dec. 10, 1986, Ser. No. 939,274**
**Claims priority, application Sweden, Aug. 13, 1981, 8104811**
**Int. Cl.[4] A61K** *31/415*
**U.S. Cl. 514—338** **3 Claims**

**1**. A pharmaceutical preparation for treating gastrointestinal inflammatory disease in mammals containing as an active ingredient a compound of the formula



or a therapeutically acceptable salt thereof.

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**4,746,668**

## METHOD FOR TREATING RETINOPATHY

**Takao Sato; Shinichiro Ashida; Kyoko Sakuma, all of Tokyo, Japan, assignors to Daiichi Seiyaku Co., Ltd., Tokyo, Japan**

**Filed Aug. 14, 1986, Ser. No. 896,366**
**Int. Cl.[4] A61K** *31/44*
**U.S. Cl. 514—341** **4 Claims**

**1**. A method for treating diabetic retinopathy which comprises administering a therapeutically effective amount of 2-(2-phenyl-2-(2-pyridyl))ethyl-2-imidazoline or a pharmaceutically acceptable salt thereof to a patient having retinopathy.



**4,746,669**

## SUBSTITUTED THIAZOLES AS IMMUNOREGULANTS

**Charles G. Caldwell, Scotch Plains; Ihor Kopka, Newark; Milton L. Hammond, Sommerville, and Robert A. Zambias, Springfield, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.**

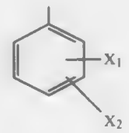
**Continuation of Ser. No. 812,471, Dec. 23, 1985, abandoned. This application Mar. 26, 1987, Ser. No. 30,313**
**Int. Cl.[4] A61K** *31/38;* **C07D** *409/04, 409/06, 217/04, 277/22*
**U.S. Cl. 514—342** **9 Claims**

**1**. A compound of formula

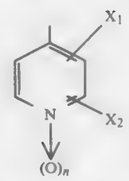


(I)

or a pharmaceutical salt thereof wherein one of $Ar^1$ and $Ar^2$ is
(a) phenyl of formula

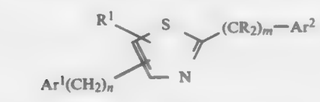


and the other is
(b) 5-(4-pyridyl) of formula



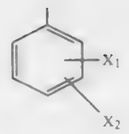
(wherein $X_1$ and $X_2$ independently are
(1) hydrogen;
(2) halo;
(3) —$OR_a$ where $R_a$ represents H or $C_{1-6}$ alkyl;
(4) $C_{1-6}$ alkylthio;
(5) $C_{1-6}$ alkyl;
(6) —$CF_3$;
(7) phenyl;
(8) —CN;
(9) —$NR_aCOR_b$ wherein $R_b$ is H or $C_{1-6}$ alkyl;
(10) —$NO_2$;
(11) —$NR_aR_b$;
(12) —$CONR_aR_b$;
R is hydrogen;
$R^1$ is $R_a$; and
m and n independently are 0 or 1.

**4**. A pharmaceutical composition for the prevention, control or treatment of autoimmune and chronic inflammatory diseases comprising a pharmaceutical carrier and therapeutically effective amount therefore of a compound of formula (I)

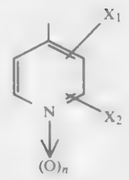


(I)

or a pharmaceutical salt thereof wherein one of $Ar^1$ and $Ar^2$ is
(a) phenyl of formula



and the other is
(ù) 5-(4-pyridyl) of formula



wherein
$X_1$ and $X_2$ independently are
(1) hydrogen;
(2) halo;
(3) —$OR_a$ where $R_a$ represents H or $C_{1-6}$ alkyl;
(4) $C_{1-6}$ alkylthio;
(5) $C_{1-6}$ alkyl;
(6) —$CF_3$;
(7) phenyl;
(8) —CN;
(9) —$NR_aCOR_b$ wherein $R_b$ is H or $C_{1-6}$ alkyl;
(10) —$NO_2$;
(11) —$NR_aR_b$;
(12) —$CONR_aR_b$;
R is hydrogen;
$R^1$ is $R_a$; and
m and n independently are 0 or 1.

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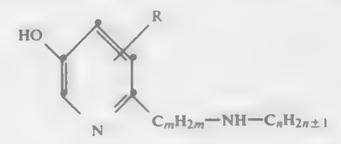
**4,746,670**

## USE OF 2-AMINOALKYL-5-PYRIDINOLS AS NOOTROPIC AGENTS AND ANTIDEPRESSANTS

**Cesare Mondadori, Aesch, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Filed Apr. 1, 1987, Ser. No. 37,911**
**Claims priority, application Switzerland, Apr. 11, 1986, 1432/86**
**Int. Cl.[4] A61K** *31/44*
**U.S. Cl. 514—347** **12 Claims**

**1**. A method of treating a depressive condition or a nootropically active agent responsive condition in a mammal in need thereof, comprising administering to said mammal an antidepressively or nootropically effective amount of a secondary 2-aminoalkyl-5-pyridinol of the general formula I



(I)

wherein R is hydrogen or lower alkyl, m is an integer from 2 to 4 and n is an integer from 1 to 7, or an acid addition salt thereof.

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**4,746,671**

## PHARMACEUTICAL USE OF [[[(3-PYRIDINYL)METHYLEN]AMINO]OXY]ALKANOIC ACIDS AND ESTERS

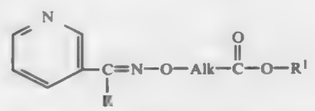
**Eddy J. E. Freyne, Rumst; Alfons H. M. Raeymaekers, Beerse; Victor Sipido, Merksem, all of Belgium, and Marc G. Venet, Paris, France, assignors to Janssen Pharmaceutica N.V., Beerse, Belgium**

**Continuation-in-part of Ser. No. 794,999, Nov. 4, 1985, abandoned. This application Jul. 23, 1986, Ser. No. 888,670**

**Int. Cl.[4] A61K** *31/44;* **C07D** *213/55, 405/06, 401/06*

**U.S. Cl. 514—357** **29 Claims**

1. A method of treating clinical conditions which are related to the production of thromboxane $A_2$, prostacyclin and/or prostaglandin $D_2$, $E_2$ and $F_{2\alpha}$, which method comprises the systemic administration to mammels of an effective amount of a compound having the formula



(I)

a N-oxide form, a pharmaceutically acceptable acid-addition, metal or amine substitution salt, or a possible stereochemically isomeric form thereof, wherein:

R is hydrogen, $C_{1\text{-}10}$alkyl, trifluoromethyl, Ar or Ar($C_{1\text{-}10}$alkyl); wherein Ar is phenyl, naphthalenyl, pyridinyl, pyrimidinyl, furanyl or thienyl, said phenyl and naphthalenyl are each optionally substituted with up to 3 substituents being each independently $C_{1\text{-}6}$alkyl, $C_{1\text{-}6}$alkyloxy, mono- and di($C_{1\text{-}6}$alkyloxy)methyl, amino, $C_{1\text{-}6}$alkylcarbonylamino, carboxyl, formyl, halo, hyroxy, nitro or trifluoromethyl;

$R^1$ is hydrogen or $C_{1\text{-}6}$alkyl; and

Alk is a $C_{2\text{-}10}$alkanediyl radical;

provided that the [[(3-pyridinyl)methylen]amino]oxy radical and the —$COOR^1$ radical are not bound to the same carbon atom.

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**4,746,672**

## OXIDES OF 1,2,5-THIADIAZOLES, THEIR USE IN PHARMACEUTICAL COMPOSITIONS

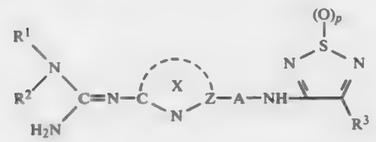
**Tobias O. Yellin, Fremont, Calif.; Philip N. Edwards, Bramhall, and Michael S. Large, Congleton, both of England, assignors to ICI Americas Inc., Wilmington, Del.**

**Filed May 10, 1982, Ser. No. 376,395**

**Int. Cl.[4] A61K** *31/41;* **C07D** *417/12*

**U.S. Cl. 514—362** **10 Claims**

1. A guanidine derivative of the formula I:



I

in which $R^1$ and $R^2$, which may be the same or different, are hydrogen atoms or branched or unbranched 1–10C alkyl, 3–8C cycloalkyl or 4–14C cycloalkylalkyl radicals, each alkyl, cycloalkyl or cycloalkylalkyl radical being optionally substituted by one or more halogen atoms selected from fluorine, chlorine and bromine atoms, provided that at least one of $R^1$ and $R^2$ is a halogen-substituted alkyl, halogen-substituted cycloalkyl or halogen-substituted cycloalkylalkyl radical, and provided that there is no halogen substituent on the carbon atom of the alkyl, cycloalkyl or cycloalkylalkyl radical which is directly attached to the nitrogen atom;

in ring X the dotted line is a double bond on one side of the nitrogen atom and Z is carbon or nitrogen atom such that ring X is 5-membered aromatic heterocyclic ring which contains at least one nitrogen atom and may optionally contain one or two additional hetero atoms selected from oxygen, nitrogen and sulphur atoms, and is selected from the group oxazole, thiazole, imidazole, 1,2,4-thiadiazole, 1,2,4-oxadiazole, 1,2,3-triazole, 1,2,4-triazole and pyrazole, which heterocyclic ring may, where possible, carry one or two optional substituents, the optional substituents on ring X being selected from fluorine, chlorine, bromine atoms and 1–6C alkyl, 1–6C alkoxy, 1–6C alkylthio, trifluoromethyl, hydroxy and amino radicals;

—A— is a 1–8C alkylene chain which is optionally substituted by one or two 1–3C alkyl radicals and into which is optionally inserted, as part of the backbone of the chain, one or two groups selected from oxygen and sulphur atoms and NH, 1–6C N-alkyl cis and trans vinylene, ethynylene, phenylene and 5–7C cycloalkyl radicals provided that no two insertions selected from oxygen and sulphur atoms and NH and N-alkyl radicals are directly attached one to the other and provided that when an insertion is directly attached to the NH radical it is other than oxygen or sulphur atom or an NH or N-alkyl radical, or —A— is a 5–7C cycloalkylene or phenylene radical;

P is 1 or 2;

$R^3$ is a hydroxy radical or a radical of the formula $NR^4R^5$ in which $R^4$ and $R^5$, which may be the same or different, are hydrogen atoms or radicals selected from 1–6C alkyl, 3–6C alkenyl, 3–6C alkynyl, 3–6C cycloalkyl, 4–10C cycloalkylalkyl, 2–6C hydroxyalkyl, 3–8C alkoxyalkyl, 3–8C alkylthioalkyl, 2–6C aminoalkyl, 3–8C alkylaminoalkyl, 4–12C dialkylaminoalkyl, amino, 1–6C alkylamino, 2–10C dialkylamino, 2,2,2-trifluoroethyl, 2-fluoroethyl, hydroxy, 1–6C alkoxy, 2,3-dihydroxypropyl, cyano, 2–6C cyanoalkyl, amidino, 2–6C alkylamidino, with the proviso that $R^4$ and $R^5$ cannot both be cycloalkyalkyl, amino, alkylamino, dialkylamino, hydroxy, alkoxy, cyano, amidino or alkylamidino radicals,

and the pharmaceutically-acceptable acid-addition salts thereof.

7. A guanidine derivative selected from 3-amino-4-[2-(2-[2,2,2-trifluoroethyl]guanidino)thiazol-4-ylmethylthio]ethylamino-1,2,5-thiadiazole 1-oxide and the pharmaceutically-acceptable acid-addition salts thereof.

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**4,746,673**

## FUNGICIDAL IMIDAZOL-1-YL-CARBOXYLIC ACID ESTER DERIVATIVES

**Tetsuya Imai, Naruto, and Hisashi Takao, Tokushima, both of Japan, assignors to Otsuka Kagaku Kabushiki Kaisha, Osaka, Japan**

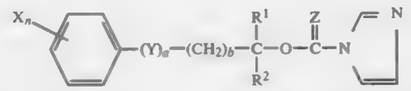
**Filed Jan. 6, 1987, Ser. No. 920**

**Claims priority, application Japan, Jan. 16, 1986, 61-7731; Feb. 14, 1986, 61-31400; Dec. 12, 1986, 61-297186**

**Int. Cl.[4] A01N** *43/50;* **C07D** *233/60*

**U.S. Cl. 514—399** **8 Claims**

6. A fungicidal composition comprising a fungicidally effective amount of an active component and a carrier, the active component being an imidazolo-1-yl-carboxylic acid ester derivative represented by the formula



wherein $R^1$ is lower alkyl, $C_{3\text{-}8}$ cycloalkyl, or $R^3(CH_3)_2C$— (wherein $R^3$ is halogenomethyl, acetyloxymethyl, propionyloxymethyl, benzoyloxymethyl optionally having a halogen atom, $C_{1\text{-}3}$ alkyl or $C_{1\text{-}3}$ alkoxy on the phenyl ring, or lower alkoxycarbonyl), $R^2$ is a hydrogen atom, lower alkyl or $C_{3\text{-}8}$ cycloalkyl, X is a hydrogen atom, halogen atom, lower



alkyl, $C_{3\text{-}8}$ cycloalkyl, lower alkenyl, lower alkoxy, lower alkenyloxy, lower alkynyloxy, lower alkylthio, $C_{1\text{-}6}$ haloalkyl, $C_{2\text{-}6}$ haloalkenyl, substituted or unsubstituted phenyl, substituted or unsubstituted benzyl, substituted or unsubstituted phenoxy (wherein the substituents on the phenyl ring of phenyl, benzyl and phenoxy are selected from the group consisting of halogen atom, lower alkyl, lower alkoxy, nitro and cyano), nitro, cyano, —$COR^4$ (wherein $R^4$ is lower alkoxy, lower alkenyloxy, benzyloxy, lower alkylamino or anilino) or



(wherein $R^5$ and $R^6$ are each lower alkyl, acetyl, propionyl, benzoyl optionally having a halogen atom, $C_{1\text{-}3}$ alkyl or $C_{1\text{-}3}$ alkoxy on the phenyl ring, methylsulfonyl, ethylsulfonyl, benzensulfonyl optionally substituted with a halogen atom, $C_{1\text{-}3}$ alkyl or $C_{1\text{-}3}$ alkoxy on the phenyl ring, or lower alkoxycarbonyl, or one of $R^5$ and $R^6$ is a hydrogen atom and the other is lower alkoxycarbonyl, acetyl, propionyl, benzoyl, methylsulfonyl or toluene sulfonyl), n is an integer of from 1 to 3, Y and Z are the same or different and are each an oxygen atom or sulfur atom, a is 0 or 1, and b is 1 or 2.

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**4,746,674**

## MELATONIN COMPOSITIONS AND USES THEREOF

**Walter Pierpaoli, Ebmatingen, Switzerland, and William Regelson, Richmond, Va., assignors to Cellena (Cell Engineering) AG, Zurich, Switzerland**

**Filed Aug. 27, 1985, Ser. No. 770,054**

**Int. Cl.[4] A61K** *31/40, 31/405*

**U.S. Cl. 514—415** **19 Claims**

1. A method for conditioning the skin of a human host to improve its cosmetic and physical appearance which comprises topically administering to a site on the skin of said host an effective amount of a composition comprising a melatonin and a pharmaceutical carrier for causing improvement in the cosmetic and physical appearance of said skin.

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**4,746,675**

## EXTERNAL PHARMACEUTICAL COMPOSITION

**Yuji Makino, and Yoshiki Suzuki, both of Hino, Japan, assignors to Teijin Limited, Osaka, Japan**

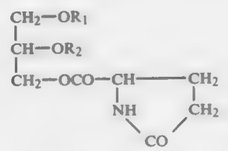
**Continuation of Ser. No. 595,835, Apr. 2, 1984, abandoned. This application Oct. 27, 1986, Ser. No. 924,189**

**Claims priority, application Japan, Apr. 4, 1983, 58-57908**

**Int. Cl.[4] A61K** *31/40*

**U.S. Cl. 514—423** **10 Claims**

1. A method for administering a pharmacologically active agent to a warm-blooded animal, which comprises externally applying (A) a pharmaceutically effective amount of the pharmacologically active agent selected from the group consisting of an anti-inflammatory agent, an agent for the circulatory system, an anti-ulcer agent, a hormone, an agent for the respiratory system, an agent for the central nervous system, a biological material and an agent for the metabolic system, in combination with (B) a penetration enhancer of the following formula (I)



(1)

wherein $R_1$ and $R_2$ are identical or different and each represents a hydrogen atom, an alkyl group having 1 to 25 carbon atoms, an alkenyl group having 2 to 25 carbon atoms, a ($C_{1\text{-}24}$ alkyl)carbonyl group or a ($C_{2\text{-}24}$ alkenyl)carbonyl group, provided that $R_1$ and $R_2$ are not hydrogen atoms at the same time, or $R_1$ and $R_2$, taken together, may form a group of the following formula (a)



(a)

in which $R_3$ and $R_4$ are identical or different and each represents a hydrogen atom, an alkyl group having 1 to 24 carbon atoms or an alkenyl group having 2 to 24 carbon atoms,

to the surface of the skin or mucosa of the warm-blooded animal to enhance the penetration of a pharmaceutically effective amount of the pharmacologically active agent through the skin or mucosa.

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**4,746,676**

## CARBOXYALKYL DIPEPTIDE COMPOUNDS

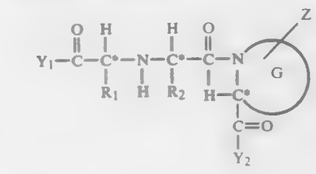
**Edward S. Neiss, New Canaan; John T. Suh, Greenwich, both of Conn.; John R. Regan, Mamaroneck, N.Y.; Jerry W. Skiles, Tuckahoe, N.Y.; Jeffrey N. Barton, New York, N.Y., and Paul Menard, Tuckahoe, N.Y., assignors to Rorer Pharmaceutical Corporation, Fort Washington, Pa.**

**Filed Sep. 12, 1984, Ser. No. 649,797**

**Int. Cl.[4] A61K** *31/40;* **C07D** *207/14*

**U.S. Cl. 514—423** **10 Claims**

1. A compound of the formula



wherein

$Y_1$ and $Y_2$ are independently OH or alkoxy having 1 to 8 carbon atoms;

$R_1$ is H, $C_1$–$C_8$-alkyl, phenyl-$C_1$–$C_8$-alkyl or indanyl;

$R_2$ is H, $C_1$–$C_8$-alkyl or amino-$C_1$–$C_8$-alkyl;

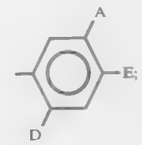
$R_3$ is H or $C_{1\text{-}8}$ alkyl;

G with the nitrogen and carbon to which it is joined forms a proline,

Z is —$(CH_2)_i$—$N(R_3)SO_2$—M; =$N(CH_2)_i$—$SO_2$—M; —$(CH_2)_i$—$N(R_3)$—M; =$N(CH_2)_i$—M; =CH—$(CH_2)_i$—C(O)—M; or —$(CH_2)_i$—$N(R_3)$—C(O)—M;

i is 0 to 6 inclusive;

M is



A is $SO_2NH_2$ or halogen;

D is $SO_2NH_2$ or halogen;

E is $SO_2NH_2$, halogen, or $NH_2$

or a pharmaceutically acceptable acid addition, alkali or alkaline earth metal salt.

9. A method of relieving hypertension in a host suffering therefrom, comprising administering to said host a therapeuti-

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cally effective amount of a compound or salt according to claim 1.

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**4,746,677**

## PYRROLIDINE DERIVATIVES, INSECTICIDAL COMPOSITIONS AND USE

**Michael D. Turnbull, Reading, and Ian T. Kay, Penzance, both of England, assignors to Imperial Chemical Industries PLC, London, England**

**Division of Ser. No. 941,101, Dec. 12, 1986, Pat. No. 4,696,926. This application Jul. 1, 1987, Ser. No. 68,526**

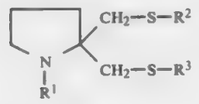
**Claims priority, application United Kingdom, Dec. 19, 1985, 8531284; Dec. 19, 1985, 8531285**

**Int. Cl.[4] A01N *43/36*; C07D *207/08***

**U.S. Cl. 514—423** **4 Claims**

1. A compound of formula (IB):

(IB)



or a salt thereof;

wherein

$R^1$ is alkyl, aralkyl or acyl; and

$R^2$ and $R^3$ are $SO_2R^4$ is optionally substituted aryl, optionally substituted alkyl, aralkyl or cycloalkyl.

3. An insecticidal or nematocidal composition comprising a compound of formula (IB) as defined in claim 1 in combination with an agriculturally acceptable carrier.

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**4,746,678**

## PHENANTHRENE DERIVATIVES

**Pál Benkó , Budapest; Tibor Zsolnai, Debrecen; Márta Kininczky; László Pallos, both of Budapest; Irén Zsolnai née Csillag, Debrecen; Péter Tétényi, and Jenö Bernáth, both of Budapest, all of Hungary, assignors to EGIS Gyoryszergyar, Budapest, Hungary**

**Filed Jun. 4, 1986, Ser. No. 870,402**

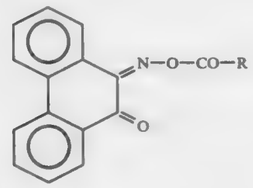
**Claims priority, application Hungary, Jun. 4, 1985, 2194/85**

**Int. Cl.[4] A61K *31/15***

**U.S. Cl. 514—640** **12 Claims**

1. A phenanthrene derivative of the formula I

(I)

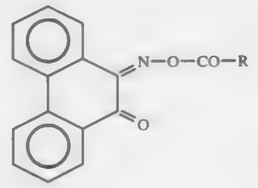


wherein,

R stands for $C_{1\text{-}10}$ alkylamino; $C_{1\text{-}10}$ alkylthio; $C_{1\text{-}5}$ alkoxy; unsubstituted phenylamino; or phenyl or phenylamino substituted on the phenyl ring by one or more identical or different $C_{1\text{-}4}$ alkyl, $C_{1\text{-}4}$ alkoxy, nitro, amino, cyano and-/or halogen substituent(s).

9. A composition for use in combatting harmful fungi in plants which comprises: a fungicidally effective amount of a compound of the formula I

(I)



wherein,

R stands for $C_{1\text{-}10}$ alkylamino; $C_{1\text{-}10}$ alkylthio; $C_{1\text{-}5}$ alkoxy; or phenyl or phenylamino, the two latter groups being optionally substituted on the phenyl ring by one or more identical or different $C_{1\text{-}4}$ alkyl, $C_{1\text{-}4}$ alkoxy, nitro, amino, cyano and/or halogen substituent(s) combined with a diluent or solvent which is suitable for use in applying the composition to the plants.

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**4,746,679**

## NOVEL PHARMACEUTICAL COMPOSITIONS IMPROVING THE PSYCHOMOTOR PERFORMANCES AND A PROCESS FOR PRODUCING THE SAME

**Anne Rolland, 45 rue Lamarck, 75018 Paris, France**

**Filed Jun. 24, 1986, Ser. No. 878,019**

**Claims priority, application France, Jun. 24, 1985, 85 09572**

**Int. Cl.[4] A61K *31/135***

**U.S. Cl. 514—646** **2 Claims**

1. A method for alleviating the decrease of psychomotor performance in depressed or tired humans in need of such alleviation which consists in administering to such humans a safe but effective amount of 2,2-bis phenoxy-NN-dimethyl ethylamine or an acid addition salt thereof.

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**4,746,680**

## THERAPEUTIC AGENTS

**James E. Jeffery; Antonin Kozlik, and Eric C. Wilmshurst, all of Nottingham, United Kingdom, assignors to The Boots Company p.l.c., England**

**Continuation of Ser. No. 365,285, Apr. 5, 1982, Pat. No. 4,522,328. This application Apr. 19, 1985, Ser. No. 725,206**

**Claims priority, application United Kingdom, Apr. 6, 1981, #110709**

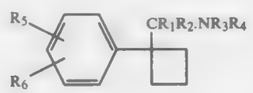
**The portion of the term of this patent subsequent to Jun. 11, 2002, has been disclaimed.**

**Int. Cl.[4] A01N *33/02***

**U.S. Cl. 514—646** **34 Claims**

1. A compound of the formula I:

I



or a pharmaceutically acceptable salt thereof in which $R_1$ is branched chain alkyl of up to 6 carbon atoms, in which $R_2$ is selected from the group consisting of H and alkyl groups containing 1 to 3 carbon atoms; in which $R_3$ and $R_4$, which are the same or different, are selected from the group consisting of H, straight or branched chain alkyl groups containing 1 to 4 carbon atoms, alkenyl groups having 3 to 6 carbon atoms, alkynyl groups having 3 to 6 carbon atoms, cycloalkyl groups in which the ring contains 3 to 7 carbon atoms, and a group of formula CHO; in which $R_5$ and $R_6$, which are the same or different, are selected from the group consisting of H, halo, trifluoromethyl, alkyl groups containing 1 to 3 carbon atoms, alkoxy groups containing 1 to 3 carbon atoms, alkythio groups containing 1 to 3 arbon atoms and phenyl, or $R_5$ and $R_6$, together with the carbon atoms to which they are attached, form



a second benzene ring optionally substituted by at least one halo, alkyl or alkoxy group containing 1 to 4 carbon atoms or the substituents of the second benzene ring together with the two carbon atoms to which they are attached form a further benzene ring.

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**4,746,681**

## MOLDED POLYUREA ARTICLES AND A PROCESS FOR THE PRODUCTION THEREOF

**Friedhelm Pilger, Cologne; Reinhold Franzen, Leverkusen, both of Fed. Rep. of Germany, and Wolfgang Reichmann, Pittsburgh, Pa., assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Apr. 10, 1987, Ser. No. 36,834**

**Claims priority, application Fed. Rep. of Germany, Apr. 25, 1986, 3613973**

**Int. Cl.[4] C08G *18/14***

**U.S. Cl. 521—51** **5 Claims**

1. A process for the production of a molded polyurea part having a density of from 200 to 600 kg/m$^3$ and a compact skin by reacting in a closed mold a mixture of

(a) at least one diisocyanate or polyisocyanate having only aromatically bound isocyanate groups,

(b) a polyether or mixture of polyethers having an average molecular weight of from 1800 to 12,000 containing 2 to 3 isocyanate-reactive groups of which at least 90% are aromatically bound primary and/or secondary amino groups,

(c) a diamine having a molecular weight of from 180 to 400 having a primary and/or secondary aromatically bound amino groups which diamine is used in a quantity no greater than 10 wt. % based on weight of (b) and

(d) a foaming agent

in quantities such that an isocyanate index of from 70 to 130 is maintained.

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**4,746,682**

## POLYURETHANE FLAME RETARDANT

**Joseph Green, East Brunswick, N.J., assignor to FMC Corporation, Philadelphia, Pa.**

**Filed Apr. 1, 1987, Ser. No. 32,655**

**Int. Cl.[4] C08G *18/30***

**U.S. Cl. 521—107** **7 Claims**

1. A liquid composition suitable as a flame retardant additive for a polyurethane foam consisting essentially of a polybrominated diphenyl oxide and an alkylated triaryl phosphate ester, the polybrominated diphenyl oxide and triaryl phosphate being provided in sufficient quantity to provide about 0.7 to 4 parts by weight bromine per part by weight of triaryl phosphate.

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**4,746,683**

## POLYETHER SILICONE COPOLYMERS WITH SECONDARY OR TERTIARY HYDROXY TERMINATION FOR STABILIZING HIGH RESILIENCY URETHANE FOAM

**John A. Kilgour, Putnam Valley, N.Y., assignor to Union Carbide Corporation, Danbury, Conn.**

**Filed Sep. 29, 1987, Ser. No. 102,368**

**Int. Cl.[4] C08J *9/00***

**U.S. Cl. 521—112** **9 Claims**

1. A method of improving the breathability of a polyurethane foam which comprises forming a reaction mixture of a polyol, catalyst, isocyanate, blowing agent and surfactant and thereafter reacting said reaction mixture to form a polyurethane foam characterized by employing as the surfactant a mixture of substituted and unsubstituted polydialkylsiloxane copolymers containing from two to ten silicon atoms and having a mole average of at least 0.5 silicon bonded polyoxyalkylene groups per copolymer molecule, said groups consisting of:

A. hydroxy terminated polyoxyalkylene groups wherein:

1. 50 to 100 percent by weight of the hydroxy terminated polyoxyalkylene groups are of the formula:

$$-C_nH_{2n}-O-(C_2H_4O)_b-(C_3H_6O)_c-(Q)_d-H$$

wherein n has a value of 2 to 4; b has a value of 0 to 10; c has a value of 0 to 10; b+c has a value of 1 to 10; d has a value of 1 to 3; and Q is an oxyalkylene group having a secondary or tertiary carbon atom adjacent to the terminal oxygen atom, and wherein

2. 0 to 50 percent by weight of the hydroxy terminated polyoxyalkylene groups are of the formula:

$$-C_nH_{2n}-O-(C_2H_4O)_b-(C_3H_6O)_c-H$$

wherein n, b and c have values as defined above but can be different; and

B. non-hydroxy terminated polyoxyalkylene groups of the formula:

$$-C_nH_{2n}-O-(C_2H_4O)_b-(C_3H_6O)_c-X$$

wherein n, a, b, and c have values defined above but can be different; and X is an alkyl or acyl group containing one to four carbons;

wherein the hydroxy terminated polyoxyalkylene group having the secondary or tertiary carbon atom must be present in an amount equal to at least 5 to 100 percent by weight of all the polyoxyalkylene groups present.

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**4,746,684**

## POLYURETHANE DISPERSION AND EMULSION, SHEET-LIKE POROUS MATERIAL AND PRODUCTION PROCESS THEREOF

**Katsumi Kuriyama, Koshigaya; Misao Ichihara, Matudo; Iwao Misaizu, Ageo, and Masashi Kashimura, Tokyo, all of Japan, assignors to Dainichiseika Color & Chemicals Mfg. Co., Ltd. and Ukima Colour & Chemicals Mfg. Co., Ltd., both of Tokyo, Japan**

**Filed May 13, 1987, Ser. No. 49,338**

**Claims priority, application Japan, May 21, 1986, 61-114837; May 21, 1986, 61-114838**

**Int. Cl.[4] C08G *18/14***

**U.S. Cl. 521—137** **6 Claims**

1. A polyurethane dispersion comprising;

(A) an organic solvent;

(B) a polyurethane resin having a molecular weight of 20,000–500,000; and

(C) fine particles obtained from an active-hydrogen containing polyfunctional compound, which contains functional groups having a molecular weight of 50 or smaller per functional group, and an organic polyisocyanate.

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**4,746,685**

## LIGHT CURABLE DENTAL COMPOSITION

**Eiichi Masuhara; Yoshinori Kadoma, both of Tokyo; Takeo Matsumoto, Ibaragi; Takeshi Komai, Aichi; Eiichi Yamada, Ibaragi; Osamu Nakachi, Yokohama, and Godo Irukayama, Ibaragi, all of Japan, assignors to Nippon Oil and Fats Co., Ltd., Tokyo, Japan**

**Filed Aug. 23, 1985, Ser. No. 768,546**

**Claims priority, application Japan, Aug. 31, 1984, 59-180268; Dec. 29, 1984, 59-275895; Feb. 26, 1985, 60-35342**

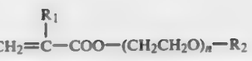
**Int. Cl.[4] A61K *6/08*; C08F *2/50, 4/14, 4/36***

**U.S. Cl. 522—13** **16 Claims**

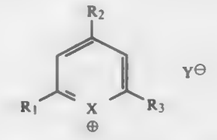
1. A light curable dental paste comprising an ethylenic unsaturated compound, a light polymerization initiator, a high polymer surface active agent and fine particles of an inorganic filler, said high polymer surface active agent being a copolymer which is prepared by copolymerizing an unsaturated monomer represented by the following general formula (III) of:

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wherein $R_1$ is a hydrogen atom or a methyl group, $R_2$ is an alkyl group having 1 to 4 carbon atoms or a phenyl group, and n is an integer of 1 to 15; with an unsaturated ester copolymerizable with said monomer represented by the general formula (III), said light polymerization initiator comprising a combination of an organic peroxide and a pyrylium salt compound represented by the following general formula (I) of:



wherein $R_1$, $R_2$ and $R_3$ each represents the same or different atom or group and stands for a hydrogen atom, a halogen atom, an alkyl group, a haloalkyl group, an ethylenyl group, a styryl group, an alkoxy group, a phenyl group, a naphthyl group, an alkylphenyl group, an alkoxyphenyl group, a hydroxyphenyl group, a halophenyl group, a nitrophenyl group, an aminophenyl group, an alkylaminophenyl group, an alkylaminostyryl group, a nitro group, an amino group or a hydroxyl group, X stands for an oxygen atom or a sulfur atom and Y for an anionic functional group.

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**4,746,686**

**VISIBLE LIGHT ACTIVATED CAVITY LINER**

**Duncan E. Waller, Ypsilanti, Mich., assignor to Kerr Manufacturing Company, Romulus, Mich.**

**Filed Apr. 17, 1987, Ser. No. 39,287**

**Int. Cl.⁴ C08F** *2/50, 20/20;* **C08K** *3/32, 3/40*

**U.S. Cl. 522—14** **5 Claims**

2. A visible light activated cavity liner in the form of a paste which comprises in weight percent:

| | |
|---|---|
| Ethoxylated Bisphenol A Dimethacrylate | 15–60 |
| Barium Sulfate | 10–50 |
| Basic Fluoro-Alumino Silicate Glass Powder | 5–30 |
| Synthetic Hydroxyapatite | 5–30 |
| Hydroxyethyl Methacrylate | 2–20 |
| Yellow Pigment Blend | 0.1–5.0 |
| Gray Pigment Blend | 0.1–5.0 |
| Methacryloxypropyltrimethoxy Silane | 0.1–5.0 |
| Tertiary Amine Reducing Agent | 0.05–2.0 |
| α Diketone Photosensitizer | 0.01–2.0 |

with said paste, prior to photopolymerization being capable of wetting and chemically bonding to tooth structure, and after photopolymerization being capable of bonding to composite restorative material used to complete the filling of a dental cavity.

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**4,746,687**

**HIGH TEMPERATURE PROFILE MODIFICATION AGENTS AND METHODS FOR USING SAME**

**Roderick G. Ryles, Milford; Albert G. Robustelli, Darien, both of Conn., and James V. Cicchiello, Ryebrook, N.Y., assignors to American Cyanamid Company, Stamford, Conn.**

**Filed May 2, 1985, Ser. No. 729,512**

**Int. Cl.⁴ E21B** *43/22, 33/138*

**U.S. Cl. 523—130** **10 Claims**

1. A gellable composition compising:

(a) water;

(b) a water-thickening and cross-linkable amount of a water dispersible polymer consisting essentially of:

(i) from about 30 to about 99 mol % of 2-acrylamido-2-methylpropane-sulfonic acid units or salts thereof; and

(ii) from about 70 to 1 mol % of acrylic acid units or salts thereof; and

(c) an amount of a polyvalent metal capable of cross-linking said polymer to form a stable gel, wherein said polyvalent metal in component (c) is priovided in the form of a redox couple, said redox couple comprising (i) at least one oxidizing agent comprising a water soluble compound of said polyvalent metal in its highest valence state and being capable of being reduced to a lower valence state and being selected from the group consisting of hexavalent chromium compounds and permanganates and (ii) a reducing agent effective to reduce the higher valence metal in oxidizing agent (i) to a lower polyvalent valence state.

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**4,746,688**

**REMOLDABLE, WOOD-FILLED ACOUSTIC SHEET**

**Leo T. Bistak, Sterling Heights, and Daniel C. Himebaugh, Ann Arbor, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.**

**Filed May 21, 1987, Ser. No. 52,680**

**Int. Cl.⁴ C08K** *3/34, 7/00, 11/00*

**U.S. Cl. 523—220** **25 Claims**

1. An extrudable composition suitable for producing remoldable panels having sound-deadening properties, said extrudable composition comprising a mixture of: (A) 100 parts by weight polyolefin resin having a softening point of at least about 120° C.; (B) between about 20 and about 150 parts by weight cellulosic particulate filler having a length/diameter ratio between about 1 and about 10 and a particle size between about 0.01 and about 15 mm; and (C) between about 20 and about 120 parts by weight crosslinked elastomeric rubber particles having an average particle diameter of less than about 50 microns and being dispersible in said extrudable mixture.

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**4,746,689**

**METHOD OF MAKING AN ANTI-FUGATIVE ANTI-FOGGING COMPOUND, SAID PRODUCTS AND FILM MADE THEREFROM**

**Carl M. Sullivan, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Filed Jul. 21, 1986, Ser. No. 887,481**

**Int. Cl.⁴ C08K** *5/10*

**U.S. Cl. 523—348** **4 Claims**

1. A method of compounding linear low density polyethylene (LLDPE) with tackifiers and anti-fogging agents to yield a composition that can be extruded to yield a film having non-fugative anti-fog and tack properties, comprising dry blending under high shear agitation the tackifier, anti-fogging agent and at least a significant part to all of the linear low density polyethylene, if only part of LLDPE added initially, then the rest is added and dry blending is repeated on the total blend to give a dry mixture, passing the dry mixture through an extruder to yield strands, chopping said strands to yield particulates, feeding said particulates to a film extruder to form a film.

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**4,746,690**

**WATER-SOLUBLE POLYMER COMPOSITIONS**

**Peter Busch, Erkrath, and Klaus Thiele, Langenfeld, both of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany**

**Filed May 16, 1986, Ser. No. 864,637**

**Claims priority, application Fed. Rep. of Germany, May 24, 1985, 3518673**

**Int. Cl.⁴ A61K** *7/06, 31/74*

**U.S. Cl. 524—27** **12 Claims**

1. A polymer composition in powdered form which is readily soluble in water which comprises (1) from about 5% to about 99% by weight of at least one solid, finely divided, water-soluble cationic polymer and (2) from about 1% to about 95% by weight of at least one solid, finely divided, water-soluble anionic surfactant wherein the finely divided, water-soluble cationic polymer has a particle size such that at least about 69% by weight of the particles are no larger than 45 microns and at least about 98% by weight of the particles are no larger than about 105 microns, and the particle size of the finely divided, water-soluble amonic surfactant does not exceed a size which is five times larger than that of the cationic polymer.

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**4,746,691**

**METHOD OF PIGMENTING WATER-ABSORBABLE PLASTICS**

**Ari Fuhrman, Miami Beach, Fla., assignor to Color Optics, Ltd., Scarsdale, N.Y.**

**Continuation of Ser. No. 724,039, Apr. 17, 1985, Pat. No. 4,638,025, which is a continuation of Ser. No. 347,082, Feb. 8, 1982, abandoned. This application Jan. 20, 1987, Ser. No. 4,676**

**The portion of the term of this patent subsequent to Jan. 20, 2004, has been disclaimed.**

**Int. Cl.⁴ G02C** *7/04;* **C08F** *220/28*

**U.S. Cl. 524—40** **7 Claims**

1. A method for producing a colored, water-absorbable soft contact lens blank, which comprises:

(a) melting a cellulose acetate butyrate (CAB) binder;

(b) pre-dispersing at least one pigment into the molten CAB;

(c) cooling and crushing the pigmented CAB binder into a particulate product;

(d) dispersing the particulate product in 2-hydroxyethylmethacrylate (HEMA) containing crosslinking agent, in proportions such that the resulting dispersion contains from about 96 to 99% by weight HEMA and from about 0.4 to 0.74% CAB by weight;

(e) gelling the HEMA dispersion of the pigmented CAB; and

(f) polymerizing the gelled dispersion within a mold to produce the desired colored, water-absorbable soft contact lens blank.

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**4,746,692**

**POLYOLEFIN COMPOSITIONS FOR USE WITH WATER SYSTEMS**

**Earl E. Hayden, Katy, Tex., assignor to Shell Oil Company, Houston, Tex.**

**Filed May 5, 1986, Ser. No. 859,979**

**Int. Cl.⁴ C08K** *5/34*

**U.S. Cl. 524—100** **6 Claims**

1. A composition for a chlorinated hot water supplying pipe consisting essentially of a blend of

(a) about 95.5 to about 99.5 percent by weight of said isotactic 1-butene homopolymer;

(b) about 0.1 to about 0.4 percent by weight of N,N'-bis(2,2,6,6-tetramethyl-4-piperidinyl)-1,6-hexane diamine polymer with 2,4,6-trichloro-1,3,5-triazine and 2,4,4-trimethyl-1,2-pentanamine;

(c) about 0.10 to about 0.90 by weight of said hindered phenolic thermal stabilizer having a molecular weight above 530 and selected from the group consisting of: 1,3,5-trimethyl-2,4,6-tris(3,5-di-tert-butyl-4-hydroxy-benzyl)benzene, octadecyl 3,5-di-tert-butyl-4-hydroxyhydrocinnamate, tetrakis[methylene(3,5-di-tert-butyl-4-hydroxy-hydro-cinnamate)]methane, 1,3,5-tris(4-tert-butyl-3-hydroxy-2,6-dimethylbenzyl)-1,3,5-triazine-2,4,6-(1H,3H,5H)-trione, bis-[3,3-bis(4'hydroxy-3'tert.butyl-phenyl)butanoic acid]-glycolester, tris(3,5-di-t-butyl-4-hydroxybenzyl)isocyanurate and mixtures thereof;

(d) about 0.05 to about 0.4 percent by weight of said nucleating agent;

(e) about zero to about 3 percent by weight of said pigment; and

(f) about zero to about 2 percent by weight of said filler.

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**4,746,693**

**POLYALKYLSILSESQUIOXANE COATING COMPOSITION**

**Martin G. Meder, Hightstown, N.J., assignor to RCA Corporation, Princeton, N.J.**

**Filed Dec. 12, 1986, Ser. No. 941,151**

**Int. Cl.⁴ C08K** *5/10*

**U.S. Cl. 524—306** **14 Claims**

1. A process of forming a coating composition comprising:

(a) combining: one or more silanes represented by the formula $R—Si(OR)_3$ wherein the groups represented by R are the same or different and are lower alkyl containing 1 to 6 carbon atoms, halolower alkyl containing 1 to 6 carbon atoms, phenyl or substituted phenyl, with the proviso that at least one group represented by R is lower alkyl; an effective amount of a nonvolatile, nonionic catalyst; a nonionic fluorochemical surfactant; and an amount of water representing from about 10 to about 95 mole percent of the moles of silanes present;

(b) agitating the mixture to form an emulsion; and

(c) maintaining said emulsion for a time sufficient to partially hydrolyze and condense said silanes to the extent permitted by the amount of water present.

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**4,746,694**

**MELT PROCESSABLE POLYESTER CAPABLE OF FORMING AN ANISOTROPIC MELT COMPRISING A RELATIVELY LOW CONCENTRATION OF 6-OXY-2-NAPHTHOYL MOIETY, 4-OXYBENZOYL MOIETY, 2,6-DIOXYNAPHTHALENE MOIETY, AND TEREPHTHALOYL MOIETY**

**Larry F. Charbonneau, Chatham; Gordon W. Calundann, North Plainfield, both of N.J., and Brian C. Benicewicz, Santa Fe, N. Mex., assignors to Hoechst Celanese Corporation, Somerville, N.J.**

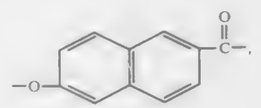
**Filed Jul. 6, 1987, Ser. No. 69,784**

**Int. Cl.⁴ C08G** *69/44*

**U.S. Cl. 524—602** **26 Claims**

1. A melt processable polyester capable of forming an anisotropic melt phase at a temperature below approximately 325° C. consisting essentially of the recurring moieties I, II, III, and IV wherein:

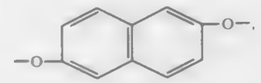
I is



II is



III is

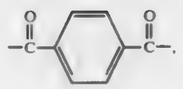


and

IV is

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where the aromatic rings of the moieties illustrated optionally may include substitution of at least some of the hydrogen atoms present thereon selected from the group consisting of an alkyl group of 1 to 4 carbon atoms, an alkoxy group of 1 to 4 carbon atoms, halogen, phenyl, and mixtures of the foregoing, and wherein said polyester comprises 3 to 10 mole percent of moiety I, 40 to 75 mole percent of moiety II, 7.5 to 27.5 mole percent of moiety III, and 7.5 to 27.5 mole percent of moiety IV.

12. A molding compound comprising the melt processable polyester of claim 1 which incorporates approximately 1 to 60 percent by weight of a solid filler and/or reinforcing agent.

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**4,746,695**

**COMPOSITION FOR SIMULATED LEAD STRIPS**

**Arturo Berly, Värdshusv. 38, S-145 50 Norsborg(SE), Sweden**

**PCT No. PCT/SE85/00418, § 371 Date Jun. 27, 1986, § 102(e) Date Jun. 27, 1986, PCT Pub. No. WO86/02599, PCT Pub. Date May 9, 1986**

**PCT Filed Oct. 28, 1985, Ser. No. 882,919**

**Claims priority, application Sweden, Oct. 29, 1984, 8405390**

**Int. Cl.[4] C08K** *3/10;* **B44F** *1/06*

**U.S. Cl. 524—13** **12 Claims**

1. Composition for simulated lead strips for leaded windows, characterized in that it consists of

| | |
|---|---|
| 50–75 | weight % binder, |
| 5–15 | weight % of at least one pigment, |
| 5–20 | weight % vegetable oil, and |
| 10–30 | weight % filling, |

the binder being a polymer binder selected from the group consisting of polyvinyl alcohol adhesives, polyurethane adhesives and synthetic rubber adhesives.

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**4,746,696**

**POLYVINYLPYRROLIDONE SHAPED ADHESIVE CONTAINING AMINOCARBOXYLIC ACID OR CORRESPONDING LACTAM**

**Gerhard Gierenz, Solingen, and Gabriella Kraus, Neuss, both of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany**

**Filed Feb. 27, 1987, Ser. No. 20,002**

**Claims priority, application Fed. Rep. of Germany, Feb. 27, 1986, 3606382**

**Int. Cl.[4] C08K** *5/34*

**U.S. Cl. 524—98** **28 Claims**

1. In a shaped adhesive composition comprising a soap gel of polyvinylpyrrolidone in an aqueous organic medium with a soap-forming gelling agent, the improvement comprising the additional presence of a modifying additive which is a $C_2$–$C_{12}$-aminocarboxylic acid, a corresponding lactam, or a mixture thereof.

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**4,746,697**

**ANTISTATIC RESIN COMPOSITION**

**Naoya Yamaguchi; Sigeyosi Koyabu, and Tomoji Mizutani, all of Yatsushiro, Japan, assignors to Kohjin Co., Ltd., Tokyo, Japan**

**Filed Mar. 25, 1986, Ser. No. 844,040**

**Claims priority, application Japan, Jul. 10, 1985, 60-153179**

**Int. Cl.[4] C08K** *5/20, 3/28;* **C08L** *23/00*

**U.S. Cl. 524—230** **7 Claims**

1. An antistatic resin composition which comprises a thermoplastic resin and an antistatic composition comprising lithium nitrate and a surface active agent which is at least one member selected from the group consisting of alkylamines containing an alkyl group with 8 to 22 carbon atoms and derivatives thereof, alkyldiamines containing an alkyl group with 8 to 22 carbon atoms, alkylpolyamines containing an alkyl group with 8 to 22 carbon atoms, alkylamides containing an alkyl group with 8 to 22 carbon atoms, esters of polyols with higher fatty acids containing an alkyl group with 7 to 21 carbon atoms, and higher alcohols having 7 to 21 carbon atoms; said resin composition being prepared by preparing a solution of the lithium nitrate in water wherein the amount of water is from 1.8 to 5.2 moles, inclusive of the water of crystallization of the lithium nitrate, per 1 mole of the lithium nitrate, mixing the aqueous solution of the lithium nitrate with the surface active agent in a molten state, the amount of which is from 5 to 500 parts by weight based on 100 parts by weight of the lithium nitrate as an anhydrous salt, yielding an antistatic composition in the form of a homogeneous mixture, an kneading the antistatic composition with the thermoplastic resin in a molten state in a proportion of 0.05 to 20% by weight of the antistatic composition to the resin, thereby obtaining an antistatic resin composition which contains substantially no visible coarse particles of said lithium nitrate.

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**4,746,698**

**METHOD OF PREVENTING CORROSION OF APPARATUS FOR MELT-PROCESSING POLYARYLENE THIOETHERS**

**Toshitaka Kouyama; Takao Iwasaki; Takayuki Katto, and Zenya Shiiki, all of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Nov. 5, 1986, Ser. No. 927,825**

**Claims priority, application Japan, Nov. 8, 1985, 60-250444**

**Int. Cl.[4] C08K** *5/09, 3/22*

**U.S. Cl. 524—396** **11 Claims**

1. A method of preventing corrosion of a melt-processing apparatus for processing a polyarylene thioether at a temperature higher than the melting point thereof, which comprises adding to 100 parts by weight of the polyarylene thioether 0.001 to 10 parts by weight of at least one member selected from the group consisting of $Ca(OH)_2$, CaO, BaO and BaO/$BaCO_3$ admixture.

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**4,746,699**

**CURABLE SILICONE COMPOSITIONS**

**Frank J. Modic, Scotia, N.Y., assignor to General Electric Company, Waterford, N.Y.**

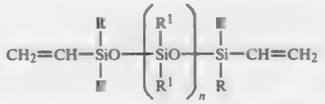
**Continuation of Ser. No. 593,455, Mar. 26, 1984, abandoned, which is a division of Ser. No. 511,704, Jul. 7, 1983, Pat. No. 4,500,584. This application Jun. 3, 1987, Ser. No. 57,750**

**Int. Cl.[4] C08L** *83/05, 83/07*

**U.S. Cl. 524—413** **20 Claims**

1. A curable silicone coating composition which is resistant to dirt pickup after curing, consisting essentially of:

(a) 100 parts of a liquid vinyl chainstopped polysiloxane having the formula,



where R and $R^1$ are monovalent hydrocarbon radicals free of aliphatic unsaturation with at least 50 mole percent of the $R^1$ groups being methyl, and where n has a value sufficient to provide a viscosity of up to about 2,000,000 centipoise at 25° C.;

(b) 100–200 parts of a resinous organopolysiloxane copolymer selected from the group consisting of:



(i) resinous organopolysiloxane copolymer comprising $(R^2)_3SiO_{0.5}$ units and $SiO_2$ units, where $R^2$ is selected from the group consisting of vinyl radicals and monovalent hydrocarbon radicals free of aliphatic unsaturation, where the ratio of $(R^2)_3SiO_{0.5}$ units to $SiO_2$ units is from about 0.5:1 to about 1:1, and where from about 1.5 to about 10 mole percent of the silicon atoms contain silicon-bonded vinyl groups; and

(ii) resinous organopolysiloxane copolymers comprising $(R^3)_3SiO_{0.5}$ units, $(R^3)_2SiO$ units and $SiO_2$ units, where $R^3$ is selected from the group consisting of vinyl radicals and monovalent hydrocarbon radicals free of aliphatic unsaturation, where from about 1.5 to about 10 mole percent of the silicon atoms contain silicon-bonded vinyl groups, and where the ratio of $(R^3)_3SiO_{0.5}$ units to $SiO_2$ units is from about 0.5:1 to about 1:1 and the ratio of $(R^3)_2SiO$ units to $SiO_2$ units may range up to 0.1:1;

(c) a platinum catalyst; and

(d) a liquid organohydrogenpolysiloxane having the formula,

$$(R)_a(H)_bSiO_{\frac{4-a-b}{2}}$$

sufficient to provide from about 0.5 to about 1.0 silicon-bonded hydrogen atoms per silicon-bonded vinyl group, where R is as previously defined, a has a value of from about 1.0 to about 2.1, b has a value of from about 0.1 to about 1.0, and the sum of a and b is from about 2.0 to about 2.7, there being at least two silicon-bonded hydrogen atoms per molecule.

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**4,746,700**

**PROCESS FOR PREPARING VINYL ALCOHOL COPOLYMER**

**Hiroshi Takida, Takatsuki, Japan, assignor to Nippon Fohsei Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan**

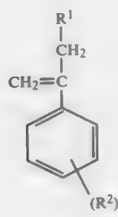
**Filed Feb. 26, 1986, Ser. No. 832,880**

**Claims priority, application Japan, Feb. 26, 1985, 60-38079**

**Int. Cl.[4] C08F** *8/00*

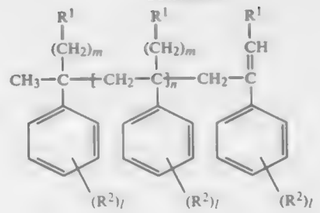
**U.S. Cl. 525—59** **8 Claims**

1. A process for preparing a vinyl alcohol copolymer, which comprises adding at least one olefin derivative containing phenyl group selected from the group consisting of the derivatives of the following formulas (I), (II) and (III) to a solution of a copolymer of vinyl acetate, an olefin selected from the group consisting of ethylene, propylene, isobutylene, α-octene, α-dodecene, and α-octadecene, and up to small amounts of a monomer copolymerizble with the olefin and vinyl acetate; when the predetermined polymerization conversion has been attained, removing unpolymerized monomer; and hydrolyzing the copolymer;

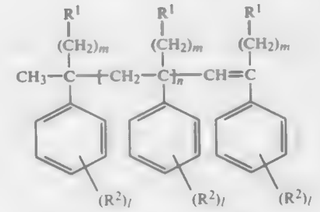


(I)

-continued



(II)



(III)

wherein $R^1$ is hydrogen atom or an alkyl group; $R^2$ is hydrogen atom, an alkyl group, an alkoxyl group, amino group, nitro group, carboxyl group, or an ester group; m is 0 to 1; n is 0 or an integer of 1 to 3; and l is 0 or an integer of 1 to 5; and said monomer copolymerizable with the olefin and vinyl acetate is selected from the group consisting of an olefin; an unsaturated acid, an anhydride, a salt, a monoester or a dialkyl ester thereof; a nitrile; an amide; an olefin sulfonic acid or salt thereof; an alkyl vinyl ether; a vinyl ketone; N-vinylpyrrolidone; vinyl chloride and vinylidene chloride.

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**4,746,701**

**THERMOPLASTICS MOULDING COMPOSITIONS BASED ON POLYSILOXANE/POLYCARBONATE BLOCK COPOLYMERS**

**Hans-Jürgen Kress; Winfried Paul, both of Krefeld; Horst Peters, Leverkusen; Jochen Schoeps, Krefeld, and Karl-Heinz Ott, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Continuation of Ser. No. 832,945, Feb. 26, 1986, abandoned. This application Nov. 24, 1986, Ser. No. 934,066**

**Claims priority, application Fed. Rep. of Germany, Feb. 26, 1985, 3506655; Jun. 1, 1985, 3519690**

**Int. Cl.[4] C08L** *69/00*

**U.S. Cl. 525—67** **9 Claims**

1. A thermoplastic molding composition comprising

(A) 20 to 80 parts by weight of a poly(diorganosiloxane)/polycarbonate block copolymer,

(B) 70 to 5 parts by weight of a graft polymer having a graft base selected from the group consisting of EPDM rubber, alkylacrylate rubber, and a rubber polymerized from a diene monomer and a grafted phase derived from an ethylenically unsaturated monomer, and

(C) 5 to 600 parts by weight of a rubber free thermoplastic polymer or copolymer derived from at least one vinyl monomer, wherein the sum of A+B+C+ is 100 and wherein said A is characterized in that its weight average molecular weight, determined by ultracentrifugation or by scattered light is 10,000 to 30,000 and in that its content of said poly(diorganosiloxane) structural units is between 0.5 and 10 percent relative to its weight and in that its degree of polymerization is between 5 and 100 and is further characterized in that it is prepared in the two phase boundary process using polyorganosiloxane which contains αω-bis-hydroxyaryloxy end groups and a chain stopper selected from the group consisting of a monoalkylphenol and a halogenocarbonic acid ester of a monoalkylphenol, a dialkylphenol, and a halogenocarbonic acid

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ester of a dialkylphenol said alkyl substituents having 8 to 20 carbon atoms.

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**4,746,702**

## FLUID ORGANOSILICONIC COMPOSITION AND PROCESS FOR PREPARING IT

**Alberto Greco, Dresano, and Gabriele Lugli, San Donato Milanese, both of Italy, assignors to Enichem Sintesi S.p.A., Palermo, Italy**

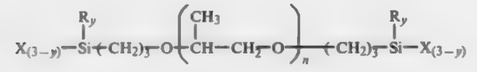
**Filed Jan. 14, 1987, Ser. No. 3,079**

**Claims priority, application Italy, Jan. 15, 1986, 19080 A/86**

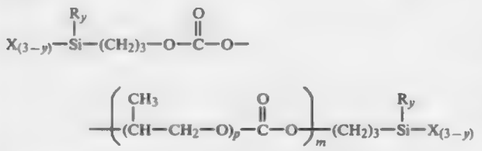
**Int. Cl.⁴ C08F** *8/00*

**U.S. Cl. 525—100** **11 Claims**

1. An organosiliconic fluid composition comprising a liquid phase and a solid polymeric phase, which solid polymeric phase is isoluble and dispersed in said liquid phase, said fluid composition having a viscosity of from 5,000 to 100,000 cps at the temperature of 25° C., wherein said fluid composition is obtained by polymerizing, under the influence of free-radical initiators, styrene, or a mixture of one or more vinyl-functional monomers containing at least 15% by weight of styrene, in the presence of a liquid polyoxyproplyenediol-α,ω-bis-allyl silylate having formula (I):



or in the presence of a liquid polycarbonate of polyoxypropylenediol-α,ω-bis-allyl silylate having formula (II):



wherein:

R is an alkyl ($C_1$–$C_{10}$) radical;

X is a hydrolyzable radical selected from alkoxy, aminooxy or acyloxy radicals;

y is 0, 1 or 2;

p is a number ranging from about 10 about 100;

m and n are integers such as to give to compounds (I) and (II) an average molecular weight of from 2000 to 20,000;

the polymerization being continued until an amount of from 5 to 50% by weight of the solid and dispersed phase is formed in the composition.

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**4,746,703**

## ORIENTED PLASTIC FILM HAVING SPECIFIC SURFACE TOPOGRAPHY

**Hermann Dallmann; Walter Seifried, both of Wiesbaden; Werner Schaefer, Hofheim-Diedenbergen; Siegfried Janocha, Wiesbaden, and Harmut Hensel, Schlangenbad, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Jan. 8, 1986, Ser. No. 817,214**

**Claims priority, application Fed. Rep. of Germany, Jan. 15, 1985, 3501017**

**Int. Cl.⁴ C08L** *67/02*

**U.S. Cl. 525—176** **7 Claims**

1. A biaxially oriented polyester film comprising a polyester matrix with from 0.005 to 5 percent by weight, based upon the total weight of said polyester film, of crosslinked organic particles having an average particle size range of from 0.001 to 5.0 microns, with a ratio of the weight average particle diameter to the number average particle diameter of 1.1 or less, said particles being substantially homogeneously dispersed throughout and covalently bonded to said polyester matrix, with at least one major surface of said polyester film having a mean surface roughness value Ra of from 0.005 to 0.10 micron, said major surface having a plurality of protrusions comprising said crosslinked organic particles, each surrounded by a de-



pression, said film produced by a sequential melt extrusion, cooling, orientation, and crystallization process in which polyester cast sheet is heated to a temperature above its glass transition temperature after the cooling step and prior to the orientation step.

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**4,746,704**

## CHEMICALLY MODIFIED POLYOLEFIN

**Christer Bergström; Barbro Björkvall, both of Helsinki; Bengt Stenlund, Porvoo; Jouko Huttunen, Porvoo, and Carl-Johan Johansson, Porvoo, all of Finland, assignors to Neste Oy, Finland**

**Filed Nov. 18, 1986, Ser. No. 931,851**

**Claims priority, application Finland, Nov. 21, 1985, 854608**

**Int. Cl.⁴ C08F** *265/00, 265/04, 267/00, 267/06*

**U.S. Cl. 525—301** **2 Claims**

1. A chemically modified polyolefin having good adhesion to metals and other polar substances, said modified polyolefin having itaconic acid grafted thereto,

wherein the polyolefin is ethylene butylacrylate (EBA)

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**4,746,705**

## VINYL CHLORIDE POLYMER COMPOSITION CONTAINING (METH)ACRYLATE-ALPHA METHYL STYRENE COPOLYMER

**Andrew Courtis, Frodsham, England, and Marcel B. Elser, Sins, Switzerland, assignors to Imperial Chemical Industries PLC, London, England**

**Filed Mar. 12, 1986, Ser. No. 839,175**

**Claims priority, application United Kingdom, Mar. 15, 1985, [redacted]**

**Int. Cl.⁴ C08F** *14/06, 14/08, 265/04*

**U.S. Cl. 525—308** **25 Claims**

1. A vinyl chloride polymer composition comprising a mixture of a vinyl chloride polymer and at least one alkyl (meth)acrylate copolymer, wherein the admixture of said vinyl chloride polymer and said at least one alkyl (meth)acrylate copolymer has been effected by polymerisation in aqueous suspension of the monomer(s) to form said vinyl chloride polymer in the presence of 0.1 to 20 weight % (based on the weight of monomer(s) used for the vinyl chloride polymerisation) of said at least one alkyl (meth)acrylate copolymer, and wherein said alkyl (meth)acrylate copolymer is a copolymer formed from the copolymerisation by a bulk phase process of at least one alkyl (meth)acrylate of 2 to 8 carbon atoms in the alkyl group with 1 to 50% by weight (based on the weight of alkyl (meth)acrylate charged) of alpha methyl styrene and 0 to 30 % by weight (based on the weight of alkyl (meth)-acrylate charged) of one or more other copolymerisable monomers, and has a weight average molecular weight within the range of from 10,000 to 100,000.



**4,746,706**

## POLYOLEFIN PARTICLES AND PROCESS FOR PREPARING THE SAME

**Masao Nakagawa, Kobe, Japan, assignor to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan**

**Division of Ser. No. 859,589, May 5, 1986, Pat. No. 4,665,102. This application Mar. 2, 1987, Ser. No. 20,978**

**Claims priority, application Japan, May 8, 1985, 60-97548**

**Int. Cl.⁴ C08F** *8/18, 100/00*

**U.S. Cl. 525—334.1** **6 Claims**

1. A particle of a polyolefin whose surface region is chlorinated to the extent such that the chlorine concentration measured by an X-ray microanalyser and corresponding to the maximum peak in the region between the surface and the 200 μm inner position is at least 10% by weight calculated from the relative X-ray intensity ratio to a standard substance.

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**4,746,707**

## PROCESS FOR THE SELECTIVE HYDROGENATION OF UNSATURATED COMPOUNDS

**Paul Fiedler, Cologne; Hartmuth Buding, Dormagen; Rudolf Braden, Odenthal-Scheuren, and Joachim Thörmer, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Aug. 1, 1986, Ser. No. 891,618**

**Claims priority, application Fed. Rep. of Germany, Aug. 16, 1985, 3529252**

**Int. Cl.⁴ C08F** *8/04*

**U.S. Cl. 525—338** **8 Claims**

1. Process for the selective hydrogenation in the homogeneous phase of ethylenically unsaturated compounds carrying nitrile groups, characterised in that the catalyst used is a compound corresponding to the following general formula:

$$RuH_m(R_1CO_2)_n(L)_p$$

wherein

$R_1$ represents optionally substituted alkyl, aryl, cycloalkyl or aralkyl;

L represents a phosphane or arsane;

m represents 0 or 1;

n represents 1 or 2; and

p represents 2 or 3.

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**4,746,708**

## HYDROXYALKYL- AND AMINOALKYL-FUNCTIONALIZED POLYPHENYLENE ETHERS

**Paul D. Sybert, Pittsfield, Mass., assignor to General Electric Company, Schenectady, N.Y.**

**Continuation-in-part of Ser. No. 866,661, May 27, 1986. This application Aug. 29, 1986, Ser. No. 901,858**

**Int. Cl.⁴ C08G** *65/48*

**U.S. Cl. 525—392** **18 Claims**

1. A functionalized polyphenylene ether containing at least one moiety having the formula

(I)



wherein $R^1$ is a polyvalent bridging radical containing at least one hydrocarbon group, each Y is $OR^2$—XH or two adjacent Y's taken together are $NR^2$—XH, $R^2$ is a lower alkylene, cycloalkylene or arylene radical, X is O or NH and m is from 1 to about 10.

**4,746,709**

## COPOLYMERS OF POLYPHENYLENE OXIDES AND POLYARYLATES

**Markus Matzner, Edison, N.J., and Donald M. Papuga, Danbury, Conn., assignors to Amoco Corporation, Chicago, Ill.**

**Continuation of Ser. No. 777,579, Sep. 19, 1985, abandoned, which is a continuation of Ser. No. 701,813, Feb. 19, 1985, abandoned, which is a continuation of Ser. No. 564,391, Dec. 22, 1983, abandoned. This application Jul. 28, 1986, Ser. No. 889,305**

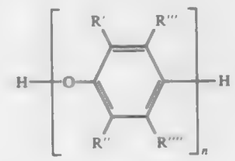
**Int. Cl.⁴ C08G** *81/00, 63/18*

**U.S. Cl. 525—397** **4 Claims**

1. A copolymer comprising:

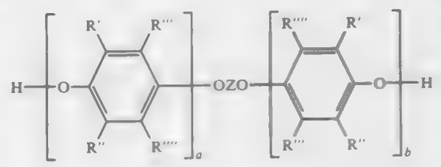
I. from 30 to 70 weight percent of a polyphenylene oxide selected from the following formulae:

(i)



wherein n is at least equal to 10, the R's are independently hydrogen, a hydrocarbon radical, a halohydrocarbon radical having at least 2 carbon atoms between the halogen atoms and phenol nucleus, a hydrocarbonoxy radical, or a halohydrocarbonoxy radical having at least two carbon atoms between the halogen atoms and phenol nucleus, and

(ii)



(I)

wherein independently each —OZO— is a divalent aromatic residue derived from a quinone, Z is a divalent arylene radical, a and b are at least equal to 1, the sum of a plus b is at least equal to 10, the R's are as heretofore defined, and combinations of (i) and (ii) and;

II. from 70 to 30 weight percent of a polyarylate derived from a dihydric phenol and at least one aromatic dicarboxylic acid and having a reduced viscosity of from 0.2 to greater than about 1.0 dl/gm, as measured in chloroform (0.5 g/dl chloroform) at 25° C.

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**4,746,710**

## SHAPED ARTICLE FORMED FROM A BLEND OF A POLY(ARYL ETHER) AND A POLYCARBONATE AND/OR A POLYARYLATE

**Barry L. Dickinson, and Lloyd M. Robeson, both of Whitehouse Station, N.J., assignors to Amoco Corporation, Chicago, Ill.**

**Filed Sep. 6, 1985, Ser. No. 773,113**

**Int. Cl.⁴ C08L** *67/00*

**U.S. Cl. 525—439** **15 Claims**

1. A shaped article having a tensile impact strength as measured by ASTM D-1822 after 80 cycles of steam sterilization at 270° F. of greater than 50 ft.-lbs./in.² formed from a blend consisting essentially of a poly(aryl ether) resin and a polyarylate resin wherein said poly(aryl ether) resin comprises from about 30 to about 80 weight percent of the article.

VOL 1090 ISS 4 MY 24 1988 UMI



4,746,711

## MIXTURES OF AROMATIC POLYCARBONATES AND AROMATIC POLYESTER-CARBONATES, AND THEIR USE FOR THE PRODUCTION OF MOULDINGS, FILMS, FIBRES, FILAMENTS AND COATINGS

Volker Serini; Dieter Freitag, both of Krefeld, and Dietrich Rathmann, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

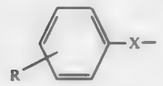
Filed Oct. 14, 1986, Ser. No. 918,787
Claims priority, application Fed. Rep. of Germany, Oct. 23, 1985, 3537622
Int. Cl.[4] C08L *67/02, 69/00*
U.S. Cl. 525—439 9 Claims

1. Mixtures consisting of: I. an aromatic polycarbonate and II. an aromatic polyester-carbonate, characterized in that:

(a) the mixture contains 5 to 70% by weight of I and 95 to 30% by weight of II, the percentages of I and II relating to the sum of I+II,

(b) the ester group content of the polyester-carbonate II is 60 to 95 mol%, relative to the sum of ester and carbonate groups in II, and

(c) at least one of the components I and II contains end groups of the formula



(I)

wherein

—X— represents —O— or —CO— and

R represents a branched alkyl radical having 8 to 9 C atoms, subject to the proviso that the proportion of methyl hydrogen atoms in the alkyl radical R is 47 to 89%, relative to the total of the hydrogen atoms in the alkyl radical, and that R is in the o-position or in the p-position.

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4,746,712

## PROCESS FOR PRODUCING AN OLEFIN COPOLYMER RUBBER

Yoshihide Yamazaki; Kazumi Uchimura; Satoshi Yamashita, and Mikio Takeuchi, all of Yokkaichi, Japan, assignors to Japan Synthetic Rubber Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 850,067, Apr. 7, 1986, Pat. No. 4,695,614, which is a continuation of Ser. No. 702,062, Feb. 15, 1985, abandoned. This application Feb. 17, 1987, Ser. No. 15,022
Claims priority, application Japan, Mar. 2, 1984, 59-38671
Int. Cl.[4] C08F *2/02*
U.S. Cl. 526—132 19 Claims

1. A process for producing an olefin copolymer rubber, which comprises:

copolymerizing ethylene, at least one α-olefin and at least one non-conjugated diene in a slurried state in a liquid-state α-olefin with substantially no solvent being present for the resulting copolymer in the presence of a catalyst consisting of an organoaluminum compound selected from the group consisting of trialkylaluminum and a dialkylaluminum monohalide and a modified vanadium compound obtained by contacting a vanadium compound with at least one modifying compound which is dibutyl maleate, or a borate of the formula: $B(OR)_3$, wherein R is a hydrocarbon group of 1 to 20 carbon atoms.

4,746,713

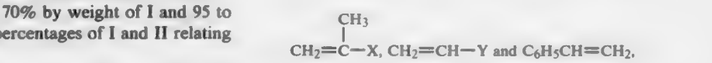
## BIMETALLIC CATALYTIC CHAIN TRANSFER AGENTS FOR MOLECULAR WEIGHT CONTROL IN FREE RADICAL POLYMERIZATION

Andrew H. Janowicz, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 797,476, Nov. 13, 1985, abandoned. This application Oct. 14, 1986, Ser. No. 916,926
Int. Cl.[4] C08F *2/40*
U.S. Cl. 526—170 12 Claims

1. A process for free radical polymerization of unsaturated monomer wherein molecular weight control is effected by means of a chain transfer agent, comprising:

contacting one unsaturated monomer selected from the group consisting of monomers having the formulae



wherein

X is COOR or CN,

Y is COOR or CN, and

R is at least one moiety selected from the group consisting of $C_6H_5$, alkyl, glycidal, hydroxyalkyl, allyloxyethyl, 2,4-hexadienyl, dialkyl aminoalkyl, and $C_zH_{2z+1}$ where z is an integer from 1 to 12, inclusive,

with a catalytically effective amount of a free radical initiator in the presence of a bimetallic catalytic chain transfer agent; said bimetallic catalytic chain transfer agent having the formula



wherein, for each occurrence,

A is an unsubstituted cyclopentadienyl anion or a cyclopentadienyl anion substituted with at least one substituent selected from the group consisting of $C_6H_5$, $C_yH_{2y+1}$, $SiR_3$, $PR_2$, and $CO_2R$;

L is CO, $(C_6H_5)_3P$, $(C_6H_5O)_3P$, $R_3P$, $(RO)_3P$;

M is Cr, Mo, W, Fe, Ru, Os;

R is $C_yH_{2y+1}$;

x is 3 when M is Cr, Mo, or W, and 2 when M is Fe, Ru or Os; and

y is an integer from 1 to 12, inclusive;

said free radical, initiator being capable of initiating polymerization of said monomers in the absence of said bimetallic catalytic chain transfer agent.

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4,746,714

## STABILIZED ACRYLIC RESIN

Harry J. Spinelli; Christopher Scopazzi, both of Wilmington, Del., and Joseph A. Antonelli, Riverton, N.J., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 17, 1986, Ser. No. 875,059
Int. Cl.[4] C08L *51/00, 33/08, 33/10*
U.S. Cl. 525—286 9 Claims

1. A stabilized acrylic resin having

(a) a core of acrylic polymer which is non-soluble in organic solvent and, grafted thereto,

(b) a plurality of substantially linear stabilizer components having an acrylic backbone, each of which is soluble in organic solvent and has one end of the stabilizer molecule grafted to the core,

the stabilized acrylic resin being substantially free from non-polymerizable linear polymer.

9. A process for the preparation of a stabilized acrylic resin comprising bringing into contact an unsaturated acrylic monomer with a catalyst system in the presence of an initiator containing silicon, tin or germanium and which has a first functional group as part of the structure to give a polymer chain having the first functional group at one end; and

bringing the resulting polymer chain into contact, under reaction conditions, with a molecule having a second functional group which is reactive with the first functional group and which can be polymerized with other polymerizable monomers to provide a stabilizing component having an acrylic backbone, and bringing the resulting stabilizing component into contact, under reaction conditions, with unsaturated monomer to produce the stabilized acrylic resin.

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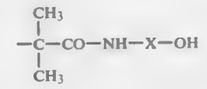
4,746,715

## PROCESS FOR THE PRODUCTION OF HYDROXYTELECHELIC POLYMERS AND THEIR USE AS COMPONENTS OF POLYURETHANE ELASTOMERS

Renate Dworczak; Bernd Trathnigg; Hans Junek, all of Graz, and Andreas Schmidt, Hainburg, all of Austria, assignors to Lim Kunststoff-Technologie Gesellschaft m.b.H., Kittsee, Austria

Filed Mar. 14, 1986, Ser. No. 840,285
Claims priority, application Austria, Mar. 15, 1985, 770/85
Int. Cl.[4] C08G *18/38*
U.S. Cl. 526—211 7 Claims

1. A process for the production of polyurethanes using a diol and a diisocyanate, comprising the improvement of using a diol with at least one terminal group of the formula:



wherein X is a straight or branched alkylene group with 2 to 12 carbon atoms.

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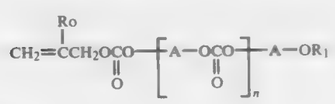
4,746,716

## COMPOSITIONS FOR PRODUCING POLYMERS OF HIGH REFRACTIVE INDEX AND LOW YELLOWNESS

Stephanie J. Oates, Wadsworth, Ohio, assignor to PPG Industries, Inc., Pittsburgh, Pa.

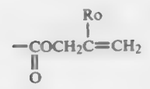
Continuation of Ser. No. 814,344, Dec. 27, 1985, abandoned. This application Dec. 3, 1986, Ser. No. 937,257
The portion of the term of this patent subsequent to Nov. 11, 2003, has been disclaimed.
Int. Cl.[4] C08F *18/24*
U.S. Cl. 526—314 18 Claims

1. A compound represented by the formula



wherein

(a) $R_1$ is



or hydrogen;

(b) each Ro of the compound is independently hydrogen, halo, or alkyl;

(c) each A of the compound is independently represented by the formula



(d) each R of the compound is independently hydrogen, halo, or a monovalent organo group containing from 1 to about 12 carbon atoms;

(e) each Q of the compound is independently oxy, sulfonyl, thio, alkanediyl, or alkylidene; and

(f) the value of n is an integer in the range of from 0 to about 4.

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4,746,717

## ISOCYANATE-TERMINATED SULFOCOMPOUNDS

Wayne K. Larson, Maplewood, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 739,542, May 30, 1985, abandoned, which is a continuation-in-part of Ser. No. 562,459, Dec. 16, 1983, Pat. No. 4,558,149. This application Jan. 22, 1987, Ser. No. 9,616
Int. Cl.[4] C08G *18/32*
U.S. Cl. 528—68 7 Claims

1. A symmetric isocyanate-terminated sulfocompound having a single central sulfo group consisting essentially of the reaction product of polyisocyanate and sulfopolyol or sulfopolyamine which is the reaction product of one mole of a sulfodicarboxylic acid and two moles of an aliphatic polyol or polyamine having two or more hydroxyl or amino groups attached to a linear chain and having a molecular weight of up to 2000.

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4,746,718

## NOVEL OLIGOMERIC DIAMINE HARDENERS AND THEIR USE FOR CURING EPOXY RESIN SYSTEMS

Hugh C. Gardner, Somerville, and Linda A. Domeier, Flemington, both of N.J., assignors to Amoco Corporation, Chicago, Ill.

Filed Apr. 6, 1987, Ser. No. 34,553
Int. Cl.[4] C08G *59/50*
U.S. Cl. 528—98 15 Claims

1. A diamine having the structure:



wherein X is $—SO_2—$ or —CO—, Y is O or S, and Ar comprises from 1 to about 80 interconnected aryl radicals.

10. In a resin formulation comprising 100 parts by weight of a curable mixture of epoxy resin and diamine hardener having an amine group/epoxy group molar ratio of from about 0.3/1 to about 1.8/1, from 0 to about 30 parts by weight of a thermoplastic and from 0 to about 400 pbw of fiber reinforcement, the improvement wherein the diamine hardener comprises at least one oligomer diamine having the structure:



wherein X is $—SO_2—$ or —CO—, Y is 0 or 5, and Ar comprises from 1 to 80 interconnected aryl radicals.

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**4,746,719**

## RAPID PREPARATION OF POLYETHERAMIDE FROM BIS-OXAZOLINE, POLYPHENOL AND CARBONIUM ION SALT CATALYST

**Anil B. Goel, Worthington, and Omar Tiba, Dublin, both of Ohio, assignors to Ashland Oil, Inc., Ashland, Ky.**

**Filed Jun. 3, 1987, Ser. No. 57,476**
**Int. Cl.[4] C08G** *8/10, 85/00, 69/00*
**U.S. Cl. 528—137** **12 Claims**

1. The process for preparing a polymeric composition comprising reacting a mixture of a polyphenolic compound and a bis-oxazoline compound in the presence of a carbonium ion salt having the formula $Ph_3CX$ wherein Ph represents a phenyl group and X represents $BF_4$, $PF_6$, $SbF_6$, $AsF_6$, $BPh_4$ or $ClO_4$.

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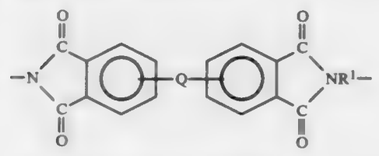
**4,746,720**

## POLYIMIDES AND METHOD FOR MAKING

**Donald R. Berdahl, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Filed Oct. 20, 1986, Ser. No. 921,035**
**Int. Cl.[4] C08G** *8/02, 14/00*
**U.S. Cl. 528—176** **10 Claims**

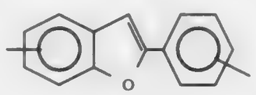
1. A solvent resistant polyimide having a glass transition temperature of at least 230° C. consisting essentially of chemically combined units of the formula,



where Q is a divalent radical selected from —O—, —S—,



and —ORO—, R is selected from $C_{(6-30)}$ divalent aromatic organic radicals, and $R^1$ is



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**4,746,721**

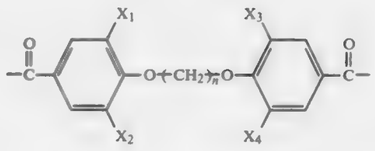
## COPOLYESTER

**Ryuzo Ueno, Nishinomiya; Yoshiyasu Masada, Hirakata; Taihei Hamasaki, Itami, and Toru Mori, Takarazuka, all of Japan, assignors to Kabushiki Kaisha Ueno Seiyaku Oyo Kenkyujo, Osaka, Japan**

**Filed Aug. 5, 1986, Ser. No. 893,206**
**Claims priority, application Japan, Aug. 13, 1985, 60-176902; Jan. 17, 1986, 61-6483; Jan. 17, 1986, 61-6484**
**Int. Cl.[4] C08G** *63/02*
**U.S. Cl. 528—191** **16 Claims**

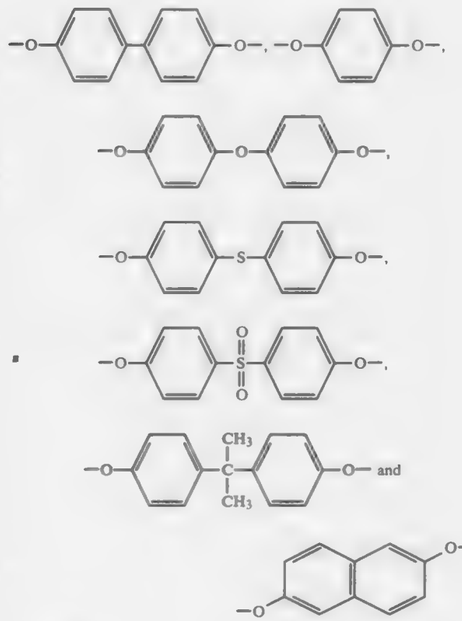
1. A melt-processable copolyester composed of the following structural units (I), (II) and (III) and/or (IV) as main structural components, wherein

unit (I) is represented by the formula



wherein $X_1$, $X_2$, $X_3$ and $X_4$, independently from each other, represent H, F, Cl, Br, $CH_3$ or $C(CH_3)_3$, provided that $X_1$ to $X_4$ do not simultaneously represent H, and n is 2 or 4,

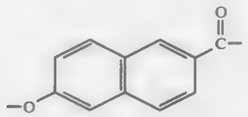
unit (II) is at least one unit selected from the group consisting of



unit (III) is



and unit (IV) is



wherein at least one of the hydrogen atoms in each aromatic ring in units (II), (III) and (IV) may be substituted by an alkyl or alkoxy group having 1 to 4 carbon atoms or a halogen atom; and

the proportion of unit (I) is 2.5 to 35 mole%, the proportion of unit (II) is 2.5 to 35 mole%, and the proportion of unit (III), (IV) or a combination of units (III) and (IV) is 30 to 95 mole%.



**4,746,722**

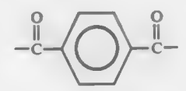
## CHOLESTERIC LIQUID CRYSTAL POLYESTERS

**Shigeki Iida, Yokohama; Yoshihiro Kobori, Kamakura; Hajime Hara, Fujisawa; Tomohiro Toya, and Tetsuo Satoh, both of Yokohama, all of Japan, assignors to Nippon Oil Company, Limited, Tokyo, Japan**

**Filed Jun. 22, 1987, Ser. No. 65,312**
**Claims priority, application Japan, Jun. 26, 1986, 61-148170**
**Int. Cl.[4] C08G** *63/02, 63/76*
**U.S. Cl. 528—194** **4 Claims**

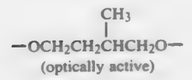
1. A cholesteric liquid crystal polyester consisting essentially of the following structural units (A), (B), (C) and (D):

(A)



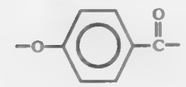
(B) $-OCH_2CH_2O-$

(C)



(optically active)

(D)



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**4,746,723**

## PROCESS FOR THE PRODUCTION OF A POLYPHENYLENE ETHER PROTECTED FROM MOLECULAR WEIGHT DEGRADATION

**Martin Bartmann, Recklinghausen; Klaus Burzin, Marl, and Klaus Bevers, Reken, all of Fed. Rep. of Germany, assignors to Chemische Werk Hüls Aktiengesellschaft, Marl, Fed. Rep. of Germany**

**Filed May 13, 1985, Ser. No. 733,634**
**Claims priority, application Fed. Rep. of Germany, May 25, 1984, 3419601**
**Int. Cl.[4] C08G** *65/38*
**U.S. Cl. 528—212** **16 Claims**

1. A process for the production of a polyphenylene ether by quenching a transition metal catalyzed oxidative coupling reaction of a di-ortho-substituted phenol, and separation of the metal component, said process comprising:

1. removing the oxygen required for the coupling reaction,
2. contacting the reaction solution with hydrogen sulfide, a solution containing sulfide ions or a mixture thereof, and
3. separating the resulting precipitate.

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**4,746,724**

## HYDROLYTIC PROCESS FOR THE PREPARATION OF A MELT STABLE POLYCAPROLACTAM

**Christiaan Nap, Schinnen; Robert Kirschbaum, Limbricht, and Pierre J. Franssen, Schinnen, all of Netherlands, assignors to Stamicarbon, B.V., Netherlands**

**Filed Jun. 16, 1986, Ser. No. 874,997**
**Claims priority, application Netherlands, Jul. 16, 1985, 8502038**
**Int. Cl.[4] C08G** *69/16*
**U.S. Cl. 528—318** **9 Claims**

1. A process for the preparation of a melt-stable polyamide for the melt spinning of textile yarn comprising, polymerizing E-caprolactam monomer in the presence of water and a chain length regulating agent, to form a polycaprolactam; solidifying said polycaprolactam, then extracting and drying said polycaprolactam; and subjecting the dried polycaprolactam to a heat treatment wherein said heat treatment is conducted at a temperature from about 110° to about 190° C., and in an inert gas atmosphere or under a vacuum for a period between about 2 and about 20 hours; and wherein said chain length regulating agent is present in an amount whereby the relative viscosity of the polyamide, measured on a solution of 1 g polymer in 100 ml 96 wt% sulphuric acid in water at 25° C., increases by not more than 0.5 unit during said heat treatment.

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**4,746,725**

## CYCLIC POLYCARBONATE-POLYEPOXIDE REACTION PRODUCT AND METHOD FOR THEIR PREPARATION

**Thomas L. Evans, Clifton Park, N.Y.; Niles R. Rosenquist, Evansville, and Edgar E. Bostick, Mt. Vernon, both of Ind., assignors to General Electric Company, Schenectady, N.Y.**

**Filed Feb. 25, 1987, Ser. No. 19,153**
**Int. Cl.[4] C08G** *63/62*
**U.S. Cl. 528—370** **16 Claims**

1. A method for preparing a resinous composition which comprises reacting at an elevated temperature, in the presence of a polycarbonate formation catalyst, a composition comprising cyclic polycarbonate oligomers with at least one polyepoxy compound.

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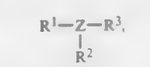
**4,746,726**

## CYCLE POLYCARBONATE OLIGOMERS: INHIBITION AND CONTROL OF POLYMERIZATION TO LINEAR POLYCARBONATE WITH LEWIS ACID

**Thomas L. Evans, Clifton Park, and Carol B. Berman, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Filed Oct. 30, 1986, Ser. No. 924,713**
**Int. Cl.[4] C08G** *63/62*
**U.S. Cl. 528—371** **16 Claims**

1. A composition comprising at least one cyclic polycarbonate oligomer; about 0.005–5.0 mole percent, based on structural units in said oligomer, of a Lewis acid of the formula



(I)

wherein Z is boron or aluminum and each of $R^1$, $R^2$ and $R^3$ is a hydrocarbon or hydrocarbonoxy radical containing up to about 10 carbon atoms; and about 0.001–1.0 mole percent, based on structural units in said oligomer, of a basic polycarbonate formation catalyst.

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**4,746,727**

## CURABLE COMPOSITION FROM ETHYLENICALLY UNSATURATED MONOMERS AND POLYARYLCYANATE ESTER COMPOSITION

**Gary W. Bogan, Lake Jackson, Tex., and Peter A. Lucas, Allentown, Pa., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Feb. 11, 1986, Ser. No. 828,465**
**The portion of the term of this patent subsequent to Oct. 16, 2001, has been disclaimed.**
**Int. Cl.[4] C08G** *83/00*
**U.S. Cl. 528—392** **17 Claims**

1. A curable composition comprising an ethylenically unsaturated monomeric composition; and a major amount of a polyarylcyanate ester composition which has at least two arylcyanate ester moieties bridged by a nonaromatic polycyclic aliphatic moiety; wherein the polyarylcyanate ester composition is substantially soluble in the ethylenically unsaturated monomeric composition.

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**4,746,728**

## 8-GLYCINE, DES-19-LEUCINE-CALCITONIN

**Ronald C. Orlowski, Frankfort, and Jay K. Seyler, Bourbonnais, both of Ill., assignors to Armour Pharmaceutical Company, Blue Bell, Pa.**

**Filed May 5, 1986, Ser. No. 859,569**

**Int. Cl.[4] C07K** *7/36*

**U.S. Cl. 530—307** **9 Claims**

1. 8-Glycine, des-19-leucine-Calcitonin, wherein the calcitonin is salmon, eel or chicken.

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**4,746,729**

## CARTILAGE-DERIVED LEUKOCYTE ELASTASE-INHIBITOR

**Klaus E. Kuettner, 426B W. Webster, Chicago, Ill. 60614; Dominique Tripier, D-6239 Eppstein; Dietrich Brocks, D-6200 Wiesbaden 42, both of Fed. Rep. of Germany, and Michael T. DiMuzio, 411 S. Sangamon, #4D, Chicago, Ill. 60607**

**Filed Jul. 30, 1986, Ser. No. 890,749**

**Int. Cl.[4] A61K** *37/12, 37/02*

**U.S. Cl. 530—353** **13 Claims**

1. A substantially purfied protein or a pharmaceutically acceptable salt thereof, said protein having a molecular weight of 10,000-30,000 Dalton, an isoelectric point greater than 9.5, and an aminoterminal amino acid sequence of

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     1                5
H—Lys—X—Phe—Lys—Val—Asp—Val—Leu—Ala—

                    10                  15
                —Ala—Leu—X—Phe—Asn—Ala—
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wherein each X may be identical or different and each denotes a naturally occurring amino acid or a tryptic cleavage product that has the amino acid sequence

-Gly-Ala-Asn-Ala-Val-Asn-.

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**4,746,730**

## BIO-AVAILABLE IRON-PROTEIN DERIVATIVES AND PROCESS FOR THEIR PREPARATION

**Luigi De Ambrosi, Santhià , and Piergiuseppe Pagella, Alessandria, both of Italy, assignors to Mediolanum Farmaceutici, Milan, Italy**

**Continuation-in-part of Ser. No. 927,450, Nov. 6, 1986, abandoned. This application Jul. 17, 1987, Ser. No. 74,862**

**Claims priority, application Italy, Nov. 6, 1985, 22730 A/85**

**Int. Cl.[4] C07K** *13/00;* **A61K** *37/14*

**U.S. Cl. 530—385** **10 Claims**

1. Bio-available iron-protein derivatives having an iron content of from 2% to 20% by weight and a nitrogen content of from 12% to 16% by weight obtained by reacting acetylated globin with an iron compound selected from the group consisting of ferric chloride, iron fructate and iron saccharate.

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**4,746,731**

## ISOLATED TISSUE PROTEIN $PP_{18}$

**Hans Bohn, Marburg, and Wilhelm Winckler, Wenkbach, both of Fed. Rep. of Germany, assignors to Behringwerke Aktiengesellschaft, Marburg/Lahn, Fed. Rep. of Germany**

**Filed May 17, 1985, Ser. No. 735,060**

**Claims priority, application Fed. Rep. of Germany, May 21, 1984, 3418888**

**Int. Cl.[4] C07K** *3/00, 15/00, 15/06, 15/14*

**U.S. Cl. 530—394** **1 Claim**

1. An isolated, concentrated tissue protein, $PP_{18}$, obtained by fractionating an extract of human organs, said tissue protein having:

(a) an electrophoretic mobility in the region of that of $\beta_1$-globulins;

(b) an isoelectric point between 5.6 and 6.2;

(c) a sedimentation coefficient $s_{20,w}$ of 5.0±0.2 S;

(d) a molecular weight determined in an ultracentrifuge of 82,300±5,600; and

(e) a carbohydrate fraction of 2.3±1.3 g/100 g (mannose 0.15±0.1, xylose 0.5±0.5, galactose 0.5±0.2, glucose 0.2±0.1, N-acetylglucosamine 0.7±0.2, and N-acetylneuraminic acid 0.25±0.2, each g/100 g).

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**4,746,732**

## REACTIVE DISAZO DYES CONTAINING HALOPYRIMIDYL AND SULFONYL GROUPS

**Athanassios Tzikas, Pratteln, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Filed Jul. 30, 1984, Ser. No. 636,363**

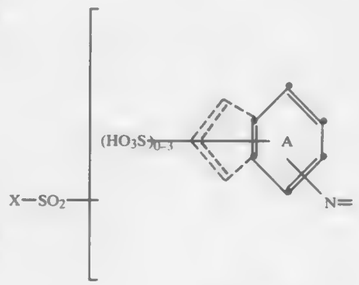
**Claims priority, application Switzerland, Jul. 29, 1983, 4170/83**

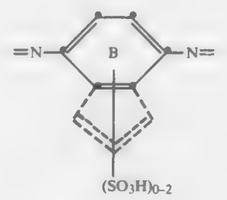
**Int. Cl.[4] C09B** *62/03, 62/513;* **D06P** *1/38, 3/66*

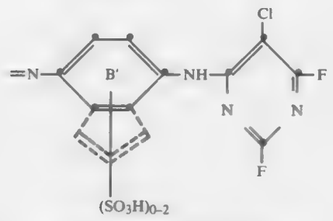
**U.S. Cl. 534—637** **2 Claims**

1. A reactive dye of the formula

(2)




in which X is vinyl, β-sulfatoethyl, βthiosulfatoethyl, β-chloroethyl or β-acetoxyethyl, and the benzene and naphthalene rings A, B and B′, independently of one another, are unsubstituted or substituted by a member selected from the group consisting of alkyl having 1 to 4 carbon atoms, alkoxy having 1 to 4 carbon atoms, acylamino having 1 to 8 carbon atoms, amino, alkylamino having 1 to 4 carbon atoms, phenylamino, N,N-di-β-hydroxyethylamino, N,N-di-β-sulfatoethylamino, sulfobenzylamino, N,N-disulfobenzylamino, alkoxycarbonyl having 1 to 4 carbon atoms in the alkoxy radical, alkylsulfonyl having 1 to 4 carbon atoms, trifluoromethyl, nitro, cyano, halogen, carbamoyl, N-alkylcarbamoyl having 1 to 4 carbon atoms in the alkyl radical, sulfamoyl, N-alkylsulfamoyl having 1 to 4 carbon atoms, N-(β-hydroxyethyl)-sulfamoyl, N,N,-di-(β-hydroxyethyl)-sulfamoyl, N-phenylsulfamoyl, ureido, hydroxyl, carboxyl, sulfomethyl and sulfo.

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**4,746,733**

## WATER-SOLUBLE TRIPHENDIOXAZINE DISAZO DYES

**Anthony G. W. Baxter, Manchester; Stephen B. Bostock, Bury, and David Greenwood, Oldham, all of England, assignors to Imperial Chemical Industries PLC, London, England**

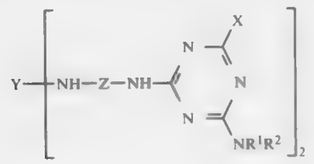
**Filed Aug. 12, 1985, Ser. No. 765,000**

**Claims priority, application United Kingdom, Aug. 24, 1984, 8421555**

**Int. Cl.[4] C09B** *43/16;* **C09D** *11/00, 11/02, 11/16*

**U.S. Cl. 534—797** **6 Claims**

1. A water-soluble dye, free from cellulose reactive groups, of the formula:




wherein

$R^1$ is $-(C_aH_{2a}O)_m(C_bH_{2b}O)_nH$;

$R^2$ is H or $-(C_aH_{2a}O)_m(_bH_{2b}O)_nH$; or

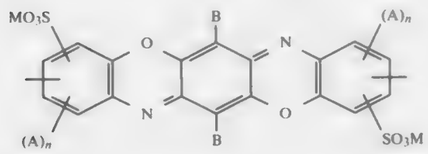
$R^1$ and $R^2$ together with the nitrogen atom form a morpholine ring;

a and b are different and are from 2 to 8;

m is from 1 to 10;

n is from 0 to 9;

Y is a triphendioxazinylene group of the formula,




II

wherein A independently is halogen, $C_{1-4}$-alkyl or $C_{1-4}$-alkoxy, n is 0 to 3, and B is halogen;

M is selected from H, ammonium, alkali metal, tetra(hydroxyethyl)ammonium and mono, di, tri or tetraalkyl ammonium;

X is a monoazo chromophore consisting essentially of benzene, naphthalene, or monocyclic heteroaryl diazo and coupling components each of which is unsubstituted or substituted by $C_{1-4}$-alkyl, $C_{1-4}$-alkoxy, $C_{1-4}$-alkylcarbonylamino, mono- or di-$C_{1-4}$-alkylamino, aminosulphonyl, aminocarbonyl, mono- or di-$C_{1-4}$-alkyl-aminosulphonyl, mono- or di-$C_{1-4}$-alkylaminocarbonyl, nitro, phenylamino, ureido, halogen, carboxylate or hydroxy, the monoazo chromophore being linked to the triazine nucleus by




in which $R^3$ is H, $C_{1-4}$-alkyl or phenyl;

and

Z is $C_{2-4}$-alkylene, phen-1,4-ylene, 2-sulphophen-1,4-ylene and 2,5-disulphophen-1,4-ylene.

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**4,746,734**

## PARTIALLY METHYLATED CYCLODEXTRINS AND PROCESS FOR PRODUCING THE SAME

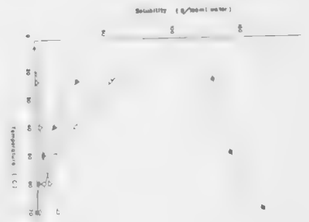
**Yukio Tsuchiyama, Yokohama; Michikatsu Sato, Fujisawa; Yoshiaki Yagi, Fujisawa, and Tomoyuki Ishikura, Chigasaki, all of Japan, assignors to Sanraku Incorporated, Tokyo, Japan**

**Continuation-in-part of Ser. No. 830,394, Feb. 18, 1986, abandoned. This application Feb. 27, 1987, Ser. No. 20,250**

**Claims priority, application Japan, Feb. 28, 1985, 60-040291**

**Int. Cl.[4] C08B** *37/00*

**U.S. Cl. 536—103** **8 Claims**



1. A partially methylated β-cyclodextrin composition having an average degree of methylation of hydroxyl groups at different positions in all glucose units involved of about 53–64% for the 2-position, about 38–51% for the 3-position, and about 70–100% for the 6-position.

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**4,746,735**

## REGIOSPECIFIC ARYL NITRATION OF MESO-SUBSTITUTED TETRAARYLPORPHYRINS

**William J. Kruper, Jr., Sanford, and Thomas A. Chamberlin, Midland, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.**

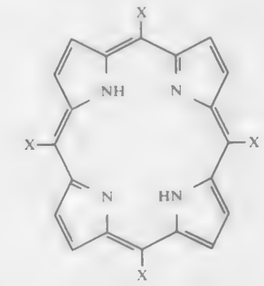
**Filed Nov. 21, 1986, Ser. No. 933,503**

**Int. Cl.[4] C07D** *487/22*

**U.S. Cl. 540—145** **32 Claims**

1. A process for the direct nitration of a tetraarylporphyrin compound comprising contacting a tetraarylporphyrin compound of the formula

(II)




or a metallo derivative thereof wherein

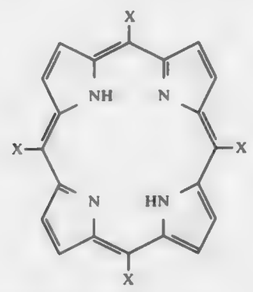
each X represents an aryl moiety each of which is unsubstituted or independently substituted with up to four same or different substituents selected from the group consisting of aryl, alkyl, halo, alkylaryl, alkoxy, or carboalkoxy with a molar excess of from about 10:1 to about 300:1 of a nitrating agent in a suitable solvent in the presence of an amount of sulfuric acid that is less than equimolar relative to the

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amount of nitrating agent under conditions such that at least one peripheral aryl moiety is nitrated.

31. A process for preparing an amino tetraarylporphyrin which comprises contacting a tetraarylporphyrin compound of the formula



(II)

or a metallo derivative thereof wherein

each X represents an aryl moiety each of which is unsubstituted or independently substituted with up to four same or different substituents selected from the group consisting of aryl, alkyl, halo, alkylaryl, alkoxy, or carboalkoxy with a molar excess of from about 10:1 to about 300:1 of a nitrating agent in a suitable solvent in the presence of an amount of sulfuric acid that is less than equimolar relative to the amount of nitrating agent under conditions such that at least one pripheral aryl moiety is nitrated; and reducing the nitrated tetraarylporphyrin to its amino derivative.

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**4,746,736**

**CARBAPENEM ANTIBIOTICS**

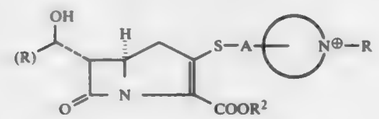
**Choung U. Kim, Manlius, N.Y., assignor to Bristol-Myers Company, New York, N.Y.**

**Division of Ser. No. 705,780, Feb. 22, 1985, Pat. No. 4,644,041, which is a continuation-in-part of Ser. No. 530,011, Sep. 9, 1983, abandoned, which is a continuation-in-part of Ser. No. 425,755, Sep. 28, 1982, abandoned. This application Oct. 24, 1986, Ser. No. 923,065**

**Int. Cl.[4] C07D *487/04;* A61K *31/40***

**U.S. Cl. 540—350** **65 Claims**

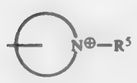
1. A compound having the formula



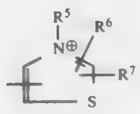
wherein

A is $C_1$–$C_6$ straight or branched chain alkylene;

$R^2$ is hydrogen, an anionic charge or a conventional readily removable carboxyl protecting group, providing that when $R^2$ is hydrogen or a protecting group, there is also present a counter ion; and

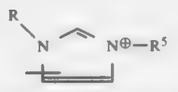


represents a radical of the formula



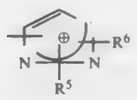
(b)

wherein $R^5$ is $C_1$–$C_4$ alkyl and $R^6$ and $R^7$ are hydrogen or $C_1$–$C_4$ alkyl;



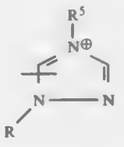
(c)

wherein $R^5$ is $C_1$–$C_4$ alkyl and R is $C_1$–$C_4$ alkyl or phenyl($C_1$–$C_4$)alkyl;



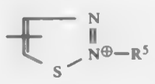
(d)

wherein $R^5$ is $C_1$–$C_4$ alkyl or carboxy($C_1$–$C_4$ alkyl and $R^6$ is $C_1$–$C_4$ alkyl or carboxy($C_1$–$C_4$)alkyl)



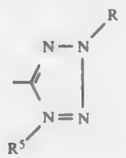
(e)

wherein $R^5$ is $C_1$–$C_4$ alkyl and R is $C_1$–$C_4$ alkyl;



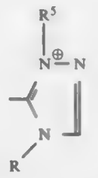
(f)

wherein $R^5$ is $C_1$–$C_4$ alkyl;



(g)

wherein $R^5$ is $C_1$–$C_4$ alkyl and R is $C_1$–$C_4$ alkyl; or



(h)

wherein $R^5$ is $C_1$–$C_4$ alkyl and R is $C_1$–$C_4$ alkyl; or a pharmaceutically acceptable salt thereof.



**4,746,737**

**PHENYL GUANIDINOBENZOATE DERIVATIVES WHICH HAVE PROTEASE INHIBITORY ACTIVITY**

**Setsuro Fujii, Kyoto; Eizou Hattori, Sakado; Mitsuteru Hirata, Saitama; Koichiro Watanabe, Niiza; Tomio Ohta, Sayama; Nobuo Yokoo, Sayama, and Masahiko Nagakura, Sayama, all of Japan, assignors to Kowa Co., Ltd., Nagoya, Japan**

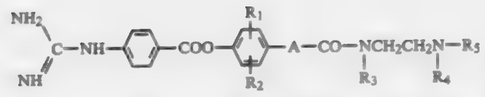
**Filed Jul. 16, 1986, Ser. No. 886,046**

**Claims priority, application Japan, Jul. 26, 1985, 60-165236**

**Int. Cl.[4] C07D *243/08, 265/30***

**U.S. Cl. 540—575** **29 Claims**

1. A benzoyl ester of the following formula (I), and acid addition salts thereof,



in which $R_1$ and $R_2$ are the same or different and represent a hydrogen atom or a lower alkoxy group having from 1 to 6 carbon atoms; A represents a single bond, or a linear or branched lower alkylene group or a lower alkenylene group having 1 to 6 carbon atoms; $R_3$ and $R_4$ are the same or different and represent a hydrogen atom or a lower alkyl group, or $R_3$ and $R_4$ join together to form a lower alkylene group having from 2 to 6 carbon atoms; $R_5$ represents a group of the formula, —X—$(CO)_n$—Y in which X represents a single bond, or a linear or branched lower alkylene group or alkenylene group having from 1 to 6 carbon atoms; n is 0 or 1; Y represents a hydrogen atom, a cycloalkyl group having from 3 to 8 carbon atoms, a phenyl group, a naphthyl group, a hydroxyl group, a lower alkoxy group having from 1 to 6 carbon atoms, a benzyloxy group or a group of the formula,



in which $R_6$ and $R_7$ are the same or different and represent a hydrogen atom, a linear or branched lower alkyl group having from 1 to 6 carbon atoms, a phenyl group, a naphthyl group, a lower alkylcarbonyl group having from 2 to 7 carbon atoms, a lower alkoxycarbonyl group having from 2 to 7 carbon atoms, a benzyloxycarbonyl group, an alkoxycarbonylalkyl group in which each alkyl group has from 1 to 6 carbon atoms, an aminoalkyl group having from 1 to 6 carbon atoms, a monoalkylaminoalkyl group in which each alkyl group has from 1 to 6 carbon atoms, or join together to form a heterocyclic ring selected from the group consisting of pyrrolidine, piperidine, morpholine, piperazine, and homopiperazine, and the ring may be substituted by a lower alkyl group having from 1 to 6 carbon atoms, a hydroxyl group, a lower alkoxy group having 1 to 6 carbon atoms, a lower alkoxycarbonyl group having from 1 to 6 carbon atoms or an oxo group, or $R_4$ and $R_5$ join together to form a heterocyclic ring selected from the group consisting of piperidine and morpholine.

**4,746,738**

**TETRAHYDRO-1,3-THIAZIN-2,4-DIONE DERIVATIVES**

**Wolfgang Hanefeld, Marburg, Fed. Rep. of Germany; Rudi Röthlisberger, Marly, and Friedrich Noser, Bonnefontaine, both of Switzerland, assignors to Wella Aktiengesellschaft, Darmstadt, Fed. Rep. of Germany**

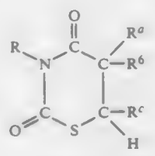
**Continuation of Ser. No. 653,238, Sep. 7, 1984, abandoned. This application Mar. 24, 1987, Ser. No. 30,247**

**Claims priority, application Fed. Rep. of Germany, Feb. 12, 1983, 3304871**

**Int. Cl.[4] A61K *31/38;* C07D *279/06, 279/04***

**U.S. Cl. 544—54** **16 Claims**

1. A tetrahydro-1-thiazine-2,4-dione having the following formula (III):



(III)

wherein R represents H, alkyl (C1–C4), phenyl, phenyl alkyl (C1–C4), phenyl substituted in para positioning with alkyl (C1–C4), halogen, nitro, alkoxy (C1–C4), phenyloxy or cyano, phenyl alkyl (C1–C4) substituted in para positioning in the phenyl moiety with alkyl (C1–C4), halogen, nitro, alkoxy (C1–C4), phenyloxy or cyano, $R^a$ and $R^b$ are independently H, phenyl, phenyl substituted in para positioning with alkyl (C1–C4), halogen, nitro, alkoxy (C1–C4), phenyloxy or cyano, $R^c$ is H, alkyl (C1–C4) or phenyl, provided that $R^a$, $R^b$ and $R^c$ simultaneously denote H only when R is phenyl alkyl (C1–C4) substituted in the phenyl moiety, and R denotes H only when $R^a$ and $R^b$ are each phenyl and $R^c$ is H.

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**4,746,739**

**DISPERSANTS**

**Keith Yeats, Cramlington; Ian D. Eeles, Washington, and Graham C. Battersby, Macclesfield, all of United Kingdom, assignors to International Paint public limited company, United Kingdom**

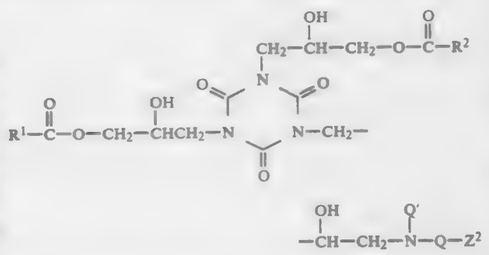
**Filed Jul. 11, 1986, Ser. No. 893,549**

**Claims priority, application United Kingdom, Nov. 23, 1984, 8429686**

**Int. Cl.[4] C07D *251/00***

**U.S. Cl. 544—222** **10 Claims**

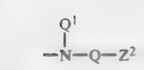
1. A compound suitable for use as a dispersant for a pigment in an organic solvent, said compound being selected from the group consisting of (a) compounds of the formula



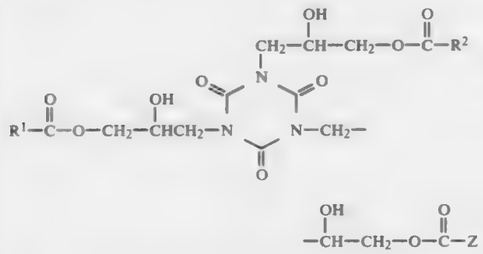
wherein $R^1$ and $R^2$ are solvent-compatible organic radicals of molecular weight at least 200 which are the same or different, the average molecular weight of the solvent-compatible radicals $R^1$ and $R^2$ being at least 500. Q is a divalent organic group, $Q^1$ is hydrogen or a monovalent organic group and $Z^2$ is a polar group,

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being a pigment-compatible radical, and (b) compounds of the formula



where $R^1$ and $R^2$ are hereinabove defined and Z is a pigment-compatible radical containing a polar group.

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**4,746,740**

**ISOINDOLINE COLORANTS**

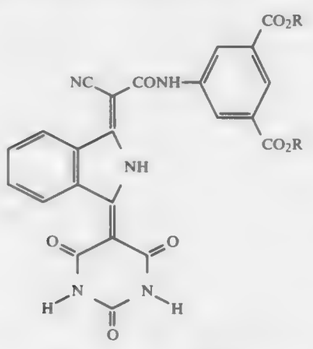
**Wolfgang Lotsch, Beindersheim, and Reinhard Kemper, Heidelberg, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Filed Jul. 17, 1986, Ser. No. 886,318**

**Int. Cl.⁴ C09B** *57/04*

**U.S. Cl. 544—300** **3 Claims**

1. An isoindoline colorant of the formula



where the R's independently of one another are each methyl or ethyl.

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**4,746,741**

**N,N'-BIS[2-(3-METHYLPHENYL)ETHYL]-PERYLENE-3,4:9,10-BIS (DICARBOXIMIDE) COMPOUND USE THEREOF IN MULTI-ACTIVE PHOTOCONDUCTIVE INSULATING ELEMENTS EXHIBITING FAR RED SENSITIVITY**

**William J. Staudenmayer, Pittsford, and Michael T. Regan, Fairport, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Division of Ser. No. 875,915, Jun. 19, 1986. This application Aug. 14, 1987, Ser. No. 67,337**

**Int. Cl.⁴ C07D** *471/06*

**U.S. Cl. 546—37** **1 Claim**

1. As a composition of matter, the compound N,N'-bis[2-(3-methylphenyl)ethyl]-perylene-3,4:9,10-bis(dicarboximide).

**4,746,742**

**ANALOGS OF NONREDUCING MONOSACCHARIDE MOIETY OF LIPID A**

**Akira Hasegawa; Makoto Kiso, both of Gifu, and Kazuyuki Morihara, Osaka, all of Japan, assignors to Toho Yakuhin Kogyo Kabushiki Kaisha, Osaka, Japan**

**Filed Nov. 12, 1986, Ser. No. 930,361**

**Claims priority, application Japan, Nov. 28, 1985, 60-268802; Jul. 24, 1986, 61-174436; Aug. 11, 1986, 61-188215**

**Int. Cl.⁴ C07H** *5/04*

**U.S. Cl. 536—53** **8 Claims**

1. 2-Deoxy-4-O-phosphono-2-[(3'R)-3'-tetradecanoyloxytetradecanamido]-3-O-[(3'R)-3'-tetradecanoyloxytetradecanoyl]-D-glucose.

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**4,746,743**

**PROCESS FOR PRODUCING 2,2,4-TRIMETHYL-1,2-DIHYDROQUINOLINE**

**Masakatsu Yoshimura, Sakai; Takeo Fujii, Toyonaka; Kikumitsu Inoue, Nishinomiya; Masahito Umehara, Toyonaka, and Hideo Nagasaki, Osaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan**

**Filed Jun. 21, 1985, Ser. No. 747,554**

**Claims priority, application Japan, Jun. 29, 1984, 59-135995**

**Int. Cl.⁴ C07D** *215/06*

**U.S. Cl. 546—181** **2 Claims**

1. In a process for producing 2,2,4-trimethyl-1,2-dihydroquinoline by reacting aniline with at least one member selected from the group consisting of acetone, diacetone alcohol and mesityl oxide at a temperature of 80°–150° C. in the presence of a catalyst, the improvement which comprises using, as said catalyst, a catalyst consisting essentially of hydrogen fluoride and boron trifluoride, the molar ratio of hydrogen fluoride/boron trifluoride being 0.2–2/1 and the total amount of the hydrogen fluoride and boron trifluoride being 0.005 to 0.1 mole per mole of aniline.

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**4,746,744**

**METHOD OF PREPARATION OF 3,5-DICHLORO-2,4,6-TRIFLUOROPYRIDINE**

**Charles A. Wilson, Pittsburg, and Alexander P. Fung, Martinez, both of Calif., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Oct. 22, 1986, Ser. No. 921,563**

**Int. Cl.⁴ C07D** *213/61*

**U.S. Cl. 546—345** **9 Claims**

1. An improved process for the preparation of 3,5-dichloro-2,4,6-trifluoropyridine from the reaction of pentachloropyridine and potassium fluoride wherein the improvement comprises contacting the pentachloropyridine and potassium fluoride in N-methylpyrrolidone solvent at about 100° C. to about 170° C. in the substantial absence of water and initiators.

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**4,746,745**

**1,3,4-THIADIAZOLINE-5-SULFONAMIDES**

**Thomas H. Maren, University of Florida, College of Medicine, Dept. of Pharmacology & Therapeutics, Gainesville, Fla. 32610**

**Division of Ser. No. 729,907, May 3, 1985, Pat. No. 4,619,939, which is a continuation of Ser. No. 442,672, Nov. 18, 1982, abandoned, which is a continuation-in-part of Ser. No. 319,093, May 29, 1981, abandoned, which is a continuation-in-part of Ser. No. 167,220, Jul. 9, 1980, abandoned. This application Jun. 19, 1986, Ser. No. 845,579**

**Int. Cl.⁴ C07D** *285/12, 285/14*

**U.S. Cl. 548—139** **2 Claims**

1. The compound 2-trifluoroacetylimino-3-methyl-$\Delta^2$-1,3,4-thiadiazoline-5-sulfonamide.



**4,746,746**

**MITOMYCIN ANALOGS**

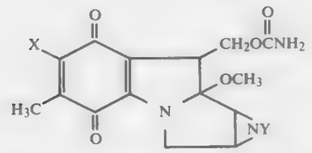
**William A. Remers, Tucson, Ariz., assignor to University Patents, Inc., Westport, Conn.**

**Continuation of Ser. No. 464,612, Feb. 7, 1983, abandoned. This application Jul. 22, 1985, Ser. No. 757,194**

**Int. Cl.⁴ C07D** *487/12;* **A61K** *31/40, 31/425*

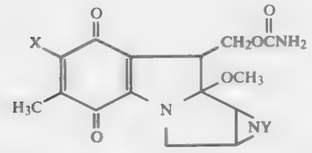
**U.S. Cl. 548—159** **10 Claims**

1. Compounds of the formula



wherein: Y is hydrogen or lower alkyl; and X is an anilino radical substituted with an acetamino, acetyl, carbamido, cyano or carboxy group.

3. Compounds of the formula

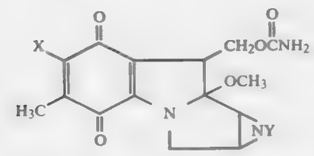


wherein: Y is hydrogen or lower alkyl; and X is a radical of the formula,



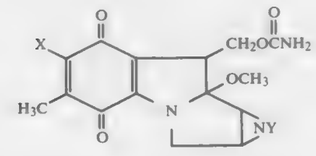
wherein R is hydrogen or a lower alkyl and R' is a nitrogen containing heterocyclic radical selected from the group consisting of amino substituted triazolyl, and benzothiazolyl substituted with a nitro or halo group.

5. A compound of the formula,



wherein Y is hydrogen or lower alkyl; and X is an anilino radical substituted with a nitro group.

7. A compound of the formula,

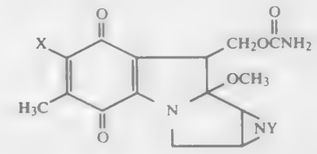


wherein Y is hydrogen or lower alkyl and X is a radical of the formula,



wherein R is a hydrogen or a lower alkyl and R' is isothiazolyl having a lower alkyl substituent.

9. Compounds of the formula



wherein: Y is hydrogen or lower alkyl; and X is a radical of the formula:



wherein R is hydrogen and R' is a substituted lower alkyl radical selected from the group consisting of an amino substituted lower alkyl, hydroxy substituted lower alkylamino lower alkyl, an hydroxy substituted lower alkoxy lower alkyl, an imidazolyl substituted lower alkyl, a nitro substituted imidazolyl substituted lower alkyl, a mono- or di-hydroxy substituted phenyl lower alkyl, and a nitro substituted pyridylamino lower alkyl.

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**4,746,747**

**ANISOLE DERIVATIVES**

**Yoshiharu Morita, Yokohama; Naoshi Imaki, Atsugi; Hisao Takayanagi, Yokohama; Yuki Takuma, and Tadashi Shirasaka, both of Machida, all of Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo, Japan**

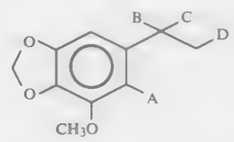
**Filed Aug. 28, 1986, Ser. No. 901,367**

**Claims priority, application Japan, Sep. 6, 1985, 60-197189**

**Int. Cl.⁴ C07D** *317/48, 405/06, 491/056*

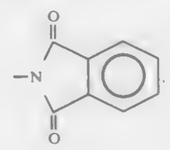
**U.S. Cl. 549—437** **13 Claims**

1. An anisole derivative represented by the following formula (I):



wherein:

(1) A, B and C are each a hydrogen atom, D represents —OH, a halogen atom, $—CO_2R^1$ of which $R^1$ represents a lower alkyl group, $—OSO_2R^2$ of which $R^2$ represents a lower alkyl group, or



or

(2) A and C are each a hydrogen atom, B is—OH, D represe-

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dents $—CO_2R^3$ of which $R^3$ represents a lower alkyl group; or

(3) A is a hydrogen atom, B and C form an oxo group =0 together, D represents $—CO_2R^4$ of which $R^4$ represents a lower alkyl group; or

(4) B and C are each a hydrogen atom, D is a halogen atom, A represents —CHO.

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**4,746,748**

**METHOD FOR REDUCING HYDROXOCOBALT (III) SCHIFF BASE COMPLEX**

**Kunihiro Aoki, Tokyo, and Shunsuke Minami, Kanagawa, both of Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan**

**Filed Dec. 12, 1986, Ser. No. 941,125**

**Claims priority, application Japan, Dec. 13, 1985, 60-280783; Dec. 13, 1985, 60-280784**

**Int. Cl.⁴ C07F *15/06***

**U.S. Cl. 556—34** **11 Claims**

1. A method for reducing a hydroxocobalt (III) Schiff base complex to a cobalt (II) Schiff base complex by heating the former complex to a temperature below the decomposition point of the later complex.

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**4,746,749**

**PROCESS FOR PRODUCING SILVER OXALATE**

**Naohiro Nojiri, Tsuchiura; Yukio Sakai, and Tomoatsu Iwakura, both of Ami, all of Japan, assignors to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan**

**Filed Jul. 7, 1987, Ser. No. 70,805**

**Int. Cl.⁴ C07F *1/10***

**U.S. Cl. 556—114** **11 Claims**

1. A process for producing silver oxalate, which comprises reacting

(a) one member selected from the group consisting of oxalic acid and oxalic acid salts as one reactant, with

(b) a silver salt as the other reactant, at a pH of not more than 5 in an aqueous medium thereby to precipitate silver oxalate.

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**4,746,750**

**SYNTHESIS OF SILYL KETENE ACETAL FROM ALLYL 2-ORGANOACRYLATES**

**Anthony Revis, Freeland, Mich., assignor to Dow Corning Corporation, Midland, Mich.**

**Filed Aug. 31, 1987, Ser. No. 91,166**

**Int. Cl.⁴ C07F *7/08, 7/18***

**U.S. Cl. 556—443** **21 Claims**

1. A process for preparing bis(silyl)ketene acetal having the formula,

$$(CH_3)RC{=}C(OSiR'_3)_2,$$

wherein, R is selected from a group consisting of alkyl groups, aryl groups, alkaryl groups, and substituted alkyl, aryl, and alkaryl groups; and each $R^i$ is independently selected from a group consisting of alkyl groups, aryl groups, alkaryl groups, substituted alkyl, aryl, and alkaryl groups, alkoxy groups, halogen atoms, and organosiloxy groups, said process comprising

(A) contacting an allyl 2-organoacrylate having the formula,

$$CH_2{=}CR\overset{O}{\overset{\|}{C}}OCH_2CH{=}CH_2,$$

wherein R is defined above, with a trisubstituted silane having the formula,

$$R'_3SiH,$$

wherein $R^i$ is defined above, in the presence of a rhodium catalyst; and

(B) separating and isolating the bis(silyl)ketene acetal.

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**4,746,751**

**SILICONE REACTIVE/FLUORESCENT SILANE DYE COMPOSITIONS**

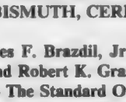
**Henry W. Oviatt, Jr., and Cary J. Reich, both of Laguna Hills, Calif., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.**

**Filed May 7, 1987, Ser. No. 47,690**

**Int. Cl.⁴ C07F *7/08, 7/18***

**U.S. Cl. 556—456** **12 Claims**

1. A silane dye composition having the formula



wherein Q is a fluorescent dye group; Z is a $C_{1\text{-}30}$ hydrocarbon radical; R is a hydrogen atom or a $C_{1\text{-}12}$ hydrocarbon radical; and G is a functional group capable of reacting with a silicone polymer functional group.

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**4,746,752**

**PREPARATION OF HYDROGENOSILANES BY REDISTRIBUTION**

**Jean-Luc Lepage, Sainte-Foy-les-Lyon, and Gerard Soula, Meyzieu, both of France, assignors to Rhone-Poulenc Specialites Chimiques, Courbevoie, France**

**Continuation of Ser. No. 655,719, Sep. 28, 1984, abandoned. This application Mar. 6, 1986, Ser. No. 837,053**

**Claims priority, application France, Sep. 28, 1983, 83 15403**

**Int. Cl.⁴ C07F *7/08, 7/18***

**U.S. Cl. 556—469** **9 Claims**

1. A process for the preparation of hydrogenated silane, comprising redistributing (1) a silane having the formula $H_mSiX_{4-m}$ in which X is halogen or an alkoxy group and m is an integer equal to 0, 1, 2 or 3, by reacting said silane with (2) an alkyl or aryl hydrosilane having the formula $R_nH_pSiX'_{4-(n+p)}$ in which X' is halogen or an alkoxy group, R is an alkoxy or aryl group and n and p, which may be identical or different, are integers equal to 1, 2 or 3, with the proviso that $n+p \leqq 4$, in the presence of (3) a catalytically effective amount of a catalyst comprising (i) a quaternary ammonium salt having the formula $R'_4NY$ or a quaternary phosphonium salt having the formula $R'_4PY$, in which formulae R', which may be identical or different, are each a monovalent hydrocarbon radical and Y is halogen, (ii) a tertiary amine of the general formula NR'R''R''', in which R', R'' and R''', which may be identical or different, are monovalent hydrocarbon radicals, or (iii) an ion exchange resin comprising tertiary amine or quaternary ammonium groups.

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**4,746,753**

**PREPARATION OF ACRYLONITRILE FROM PROPYLENE, OXYGEN AND AMMONIA IN THE PRESENCE OF AN ALKALI METAL PROMOTED BISMUTH, CERIUM, MOLYBDENUM, TUNGSTEN CATALYST**

**James F. Brazdil, Jr., Lyndhurst; Dev D. Suresh, Macedonia, and Robert K. Grasselli, Chagril Falls, all of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio**

**Continuation of Ser. No. 258,708, Apr. 29, 1981, abandoned. This application Jul. 1, 1986, Ser. No. 880,657**

**Int. Cl.⁴ C07C *120/14***

**U.S. Cl. 558—324** **3 Claims**

2. A process for ammoxidizing propylene to produce acrylonitrile wherein propylene, ammonia and an oxygen-containing gas are contacted with an ammoxidation catalyst at elevated temperature to produce said acrylonitrile, said ammoxidation catalyst having the formula:

$$A_aBi_bCe_cW_dMo_fO_x$$

wherein

A is selected from the group consisting of alkali metal Tl, Sm Ag, Cu, Cr, Sb, Te, Ti, Zr, Th, V or mixtures provided that A must include at least about 0.04 of at least one alkali metal;

a is about 0.04 to 6;

b is 0.01 to 24;

c is 0.01 to 24;

f+d is 12; provided that both f and d are greater than zero;

x is a number sufficient to satisfy the valency requirements of the other elements present;

said catalyst being free of iron and the combination of Te with alkali metal, Tl, Sm, Ag and/or Cu wherein the molar ratio of (Bi+Ce):(W+V+Mo) is in the range from $\frac{1}{2}$ to 5/6 inclusive.

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**4,746,754**

**PREPARATION OF CARBONATE DIISOCYANATES AND RELATED COMPOUNDS**

**Eric W. Otterbacher; Abel Mendoza, both of Midland, and Cynthia L. Rand, Sanford, all of Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed May 16, 1986, Ser. No. 864,062**

**Int. Cl.⁴ C07B *43/10*; C07C *118/02, 119/048***

**U.S. Cl. 558—269** **20 Claims**

1. A tertiary alkyl isocyanate compound selected from



wherein m is at least 2, X is a halogen, $R_a$ is an inertly substituted or unsubstituted polyvalent hydrocarbon moiety, and each Q independently is a moiety of the formula:



wherein each R independently is aryl or lower alkyl, with the proviso that two R moieties which are bonded to a common carbon atom can combine to form a cycloaliphatic ring, and each Ar independently is a divalent aromatic moiety.

19. A process comprising contacting phosgene and an α-aminoalkylphenol represented by the formula:



in the presence of pyridine and a halogenated hydrocarbon reaction medium under reaction conditions such that there is formed a diisocyanate having the formula:



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**4,746,755**

**PREPARATION OF HYDRANTOIC ACIDS AND HYDANTOINS**

**Albertha M. Paul, Holliston, and Harold H. Freedman, Newton Center, both of Mass., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed May 6, 1986, Ser. No. 860,161**

**Int. Cl.⁴ C07C *99/00***

**U.S. Cl. 562—450** **9 Claims**

1. A method for reacting water soluble, organic solvent insoluble amino compounds with highly water reactive isocyanates comprising:

dissolving said isocyanate in an organic solvent which is insoluble to slightly soluble in water and has a degree of electrophilicity suficient to attract the amino constituent of said amino compound;

dissolving said amino compound in water;

rapidly mixing the resulting solutions together, wherein said organic solvent is ethyl acetate.

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**4,746,756**

**PHOTOCONDUCTIVE IMAGING MEMBERS WITH NOVEL FLUORINATED SQUARAINE COMPOUNDS**

**Peter M. Kazmaier; Giuseppa Baranyi, both of Mississauga, and Rafik O. Loutfy, Willowdale, all of Canada, assignors to Xerox Corporation, Stamford, Conn.**

**Division of Ser. No. 748,285, Jun. 24, 1985, Pat. No. 4,621,038. This application Aug. 21, 1986, Ser. No. 899,197**

**The portion of the term of this patent subsequent to Jun. 4, 2002, has been disclaimed.**

**Int. Cl.⁴ C07C *85/00, 85/02, 85/06***

**U.S. Cl. 564—307** **7 Claims**

1. Symmetrical fluorinated squaraine compounds of the following formula:



wherein $R_1$, $R_2$ and $R_3$ are selected from the group consisting of alkyl, aryl, and heterocyclic substituents, subject to the provision that each $R_1$, $R_2$ and $R_3$ represent identical substituents:

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**4,746,757**

**PROCESS FOR PRODUCING (2-HYDROXY-2-PROPYL)-NAPHTHALENE COMPOUNDS**

**Takashi Terauchi; Tadashi Nakamura, and Shoichi Hoshi, all of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Jul. 17, 1986, Ser. No. 887,119**

**Claims priority, application Japan, Jul. 19, 1985, 60-159924**

**Int. Cl.⁴ C07C *27/16***

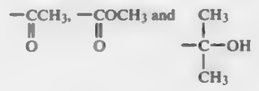
**U.S. Cl. 568—815** **8 Claims**

1. A process for producing a (2-hydroxy-2-propyl)-naphthalene compound which comprises the step of oxidizing a naphthalene compound having at least one isopropyl group on the naphthalene ring in the presence of 0.05 to 10 mols of peroxodi-

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sulfate per mol of the isopropyl group in the reaction system at a temperature of 0° to 120° C. in a mixed solvent of water and an organic polar solvent, the naphthalene compound being naphthalene or a substituted naphthalene derivative having one or more substituents selected from the group consisting of —COOH,



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**4,746,758**

## PROCESSES FOR PREPARING IODINATED AROMATIC COMPOUNDS

**Mark Rule; Donald W. Lane; Thomas H. Larkins, Jr., and Gerald C. Tustin, all of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Sep. 29, 1986, Ser. No. 912,806**
**Int. Cl.⁴ C07C *17/12, 17/156***
**U.S. Cl. 570—206** **10 Claims**

1. A method for iodinating naphthalene in the 2-position by reacting napththalene with a source of iodine in the presence of a source of molecular oxygen over a zeolite catalyst containing sodium, potassium, rubidium or cesium ions.

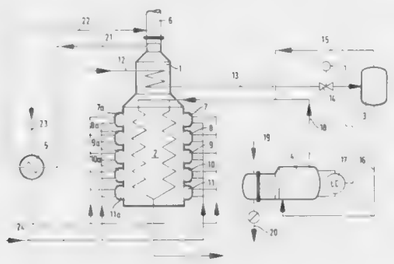
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**4,746,759**

## PROCESS FOR THERMAL CRACKING OF 1,2-DICHLOROETHANE TO FORM VINYL CHLORIDE

**Gerhard Dummer, Burgkirchen; Klaus Haselwarter, Emmerting; Hermann Klaus, Marktl; Ludwig Schmidhammer, Haiming, and Rudolf Strasser, Burghausen, all of Fed. Rep. of Germany, assignors to Wacker-Chemie GmbH, Fed. Rep. of Germany**

**Filed Oct. 27, 1986, Ser. No. 923,327**
**Claims priority, application Fed. Rep. of Germany, Dec. 6, 1985, 3543222**
**Int. Cl.⁴ C07C *17/24, 17/34***
**U.S. Cl. 570—226** **2 Claims**



1. In a process for the preparation of vinyl chloride by thermal cracking of 1,2-dichloroethane obtained in liquid form in the purification by distillation at a temperature from 120° C. to 155° C. under corresponding pressures and vaporization, without intermediate storage, in an extenal vaporizer with addition of carbon tetrachloride as a cracking promoter, at temperatures from 400° to 600° C. under a pressure from 10 to 16 bar absolute and with conversions from 50 to 60% at residence times from 0.1 to 30 seconds in the reaction zone and with partial utilization of the heat content of the flue gases from the cracking furnace firing for preheating liquid 1,2-dichloroethane to almost the boiling point at the corresponding pressure before it enters the external vaporizer, and with the use of air preheated to about 100° C for the cracking furnace firing the improvement comprising

(a) maintaining the carbon tetrachloride content in the liquid 1,2-dichloroethane between 0.10 and 0.15% by weight, based on 1,2-dichloroethane, and at the same time adjusting the chloroform content in the liquid 1,2-dichloroethane to below 200 mg/kg of 1,2-dichloroethane;

(b) preheating the liquid 1,2-dichloroethane, which is at 125° to 155° C. and contains carbon tetrachloride according to (a), in the convection section of the cracking furnace at a liquid pressure of 15 to 31 bar absolute almost to the boiling point, with utilization of a major part of the heat content of the flue gases having a temperature of 670° to 700° C. from the cracking furnace firing, and expanding the preheated liquid 1,2-dichloroethane to a pressure from 10 to 16 bar absolute after it has left the convection section of the cracking furnace, about 18 to 70% by weight of the total 1,2-dichloroethane being vaporized;

(c) separating the 1,2-dichloroethane obtained as vapor in Step b) from the liquid fraction, then vaporizing this liquid fraction in an external vaporizer at a pressure of 10 to 16 bar absolute and feeding the combined streams of dichloroethane vapor, which also contain the carbon tetrachloride in the form of vapor, to the reaction zone of the cracking furnace at such rates that the hourly loading is 1,100 to 1,500 tons of 1,2-dichloroethane per $m^2$ of cracking tube cross-section; and

(d) setting 1,2-dichloroethane conversions from 60 to 70% at a mean residence time from 10 to at most 15 seconds, based on the fired part of the reaction zone, by firing the cracking furnace so that the temperature level is 425° to 455° C. even in the region of the transition from the shock section to the radiant section of the reaction space, the temperatures are 460° to 480° C. approximately in the middle of the reaction zone and the remainder of total energy required is already supplied at about 75 to 85% of the total tube length of the reaction zone comprising the shock section and the radiant section to maintain exit temperatures from 485° to 510° C. at the coil end.

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**4,746,760**

## PROCESS FOR FUNCTIONALIZING ALKANES

**Robert G. Bergman, Kensington, Calif.; Andrew H. Janowicz, Wilmington, Del., and Roy A. Periana, Berkeley, Calif., assignors to Chevron Research Company, San Francisco, Calif.**

**Continuation-in-part of Ser. No. 619,886, Jun. 12, 1984, Pat. No. 4,511,745. This application Feb. 21, 1985, Ser. No. 703,640**
**The portion of the term of this patent subsequent to Apr. 16, 2002, has been disclaimed.**
**Int. Cl.⁴ B01J *19/12;* C07C *17/00;* C07F *15/00***
**U.S. Cl. 570—241** **24 Claims**

1. A process for functionalizing saturated hydrocarbons comprising:

(a) reacting said saturated hydrocarbons of the formula:

$R_1H$

wherein H represents a hydrogen atom; and $R_1$ represents a saturated hydrocarbon radical, with a metal complex of the formula:

$CpRh[P(R_2)_3]H_2$

wherein
Cp represents an alkyl cyclopentadienyl radical;
Rh represents a rhodium atom;
P represents a phosphorus atom;
$R_2$ represents an alkyl group;
H represents a hydrogen atom,
in the presence of ultraviolet radiation to form a hydridoalkyl complex of the formula:

$CpRh[P(R_2)_3](R_1)H$

(b) reacting said hydridoalkyl complex with an organic halogenating agent to form the corresponding haloalkyl complex of step (a) having the formula



$CpRh[P(R_2)_3](R_1)(X);$

where X represents a halogen atom selected from bromine, iodine and chlorine and,

C) reacting said haloalkyl complex formed in (b) with halogen to form the alkyl halide of said saturated hydrocarbon.

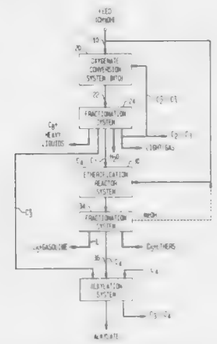
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**4,746,761**

## PROCESS FOR COVERTING METHANOL TO ALKYL ETHERS

**Amos A. Avidan, Mantua; Frederick J. Krambeck, Cherry Hill, and Samuel A. Tabak, Wenonah, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 886,996, Jul. 18, 1986, Pat. No. 4,684,757. This application Jul. 2, 1987, Ser. No. 65,775**
**The portion of the term of this patent subsequent to Aug. 4, 2004, has been disclaimed.**
**Int. Cl.⁴ C07C *1/20, 2/00***
**U.S. Cl. 585—331** **9 Claims**



1. A process for converting oxygenate feedstock comprising methanol to liquid hydrocarbons comprising the steps of

(a) contacting the feedstock with zeolite catalyst in a primary catalyst stage at elevated temperature and moderate pressure to convert feedstock to hydrocarbons comprising $C_2$–$C_7$ olefins and $C_8$+ liquid hydrocarbons;

(b) cooling and separating the primary stage effluent to recover a liquid $C_8$+ hydrocarbon stream and a light hydrocarbon stream rich in $C_2$–$C_7$ olefins including propylene and $C_4$–$C_7$ isoalkenes;

(c) compressing at least a portion of the olefinic light hydrocarbon stream to condense a liquid olefinic hydrocarbon stream rich in $C_4$–$C_7$ isoalkenes and recovering a gaseous stream rich in ethene and propene;

(d) reacting the isoalkenes with methanol in a secondary stage etherification zone by contacting the isoalkenes and methanol with an acid etherification catalyst to produce $C_5$–$C_8$ methyl isoalkylethers;

(e) fractionating the secondary stage effluent to obtain a liquid ether and $C_5$+ hydrocarbon stream and an olefinic $C_4$ stream rich in unreacted butenes and isobutane;

(f) reacting the butene-rich olefinic stream from step (e) with isobutane in a catalytic alkylation stage in contact with acid alkylation catalyst to convert at least a portion of olefins to alkylate gasoline; and

(g) recycling ethene and/or propene in a gaseous stream to the primary catalytic stage.

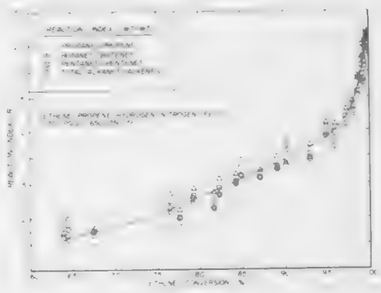
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**4,746,762**

## UPGRADING LIGHT OLEFINS IN A TURBULENT FLUIDIZED CATALYST BED REACTOR

**Amos A. Avidan, Mantua; Tai-Sheng Chou, Sewell; Hartley Owen, Belle Mead; Jorge L. Soto, Westville, and Samuel A. Tabak, Wenonah, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 824,473, Jan. 31, 1986, Pat. No. 4,689,205, which is a division of Ser. No. 733,994, May 14, 1985, Pat. No. 4,579,999, which is a continuation-in-part of Ser. No. 692,261, Jan. 17, 1985, Pat. No. 4,543,435. This application Jan. 23, 1987, Ser. No. 6,407**
**Int. Cl.⁴ C07C *2/12***
**U.S. Cl. 585—415** **15 Claims**



1. A fluidized bed catalytic process for conversion of a light olefinic gas feedstock comprising at least 2 mol % ethene and having a total $C_2$–$C_3$ alkene content up to 40 wt%, to hydrocarbon rich in $C_4$+ aliphatics and aromatics, comprising the steps of

maintaining a turbulent fluidized bed in a reactor operating at a pressure in the range from about 410 to 2500 kPa, and temperature of about 315° to 510° C., said catalyst being a particulate zeolite having a silica:alumina molar ratio in the range from about 20:1 to about 200:1, an apparent particle density of about 0.9 to 1.6 g/$cm^3$, a size range of about 20 to 100 microns, and average catalyst particle size of about 20 to 100 microns containing about 10 to 25 weight percent of fine particles having a particle size of less than 32 microns;

passing hot light olefinic gas feedstock in the substantial absence of added propane upwardly through the fluidized catalyst bed in a single pass under turbulent flow conditions which provide reaction severity conditions sufficient to convert at least about 70% of feedstock ethene;

maintaining turbulent fluidized bed conditions at a superficial feedstock velocity of about 0.3 to 2 meters per second, through the reactor bed having an average fluidized bed density, measured at the bottom of the reaction zone, in the range from about 300 to 500 kg/$m^3$; and

recovering hydrocarbon product containing a major amount of $C_4$+ hydrocarbons, at least 6% isobutane, and containing propane and propene in a ratio in the range from about 0.2:1 to 5:1.

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**4,746,763**

## PROCESS FOR PRODUCING AROMATIC COMPOUNDS FROM $C_2$–$C_6$ ALIPHATIC HYDROCARBONS

**Joseph A. Kocal, Gurnee, Ill., assignor to UOP Inc., Des Plaines, Ill.**

**Filed Apr. 22, 1987, Ser. No. 41,279**
**Int. Cl.⁴ C07C *2/42, 2/76***
**U.S. Cl. 585—417** **13 Claims**

1. A process for the dehydrocyclodimerization of $C_2$–$C_6$ aliphatic hydrocarbons comprising passing a feed stream comprising a $C_2$–$C_6$ aliphatic hydrocarbon component into a reac-

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tion zone and contacting the $C_2$-$C_6$ aliphatic hydrocarbon comprising feed stream with two discrete catalysts wherein the first discrete catalyst comprises a ZSM-5 zeolite component, a phosphorus-containing alumina component, and a metal component selected from the elements of Groups IIB–IVB of the Periodic Table of the Elements and wherein the second discrete catalyst, which is free of said ZSM-5 zeolite component, comprises a catalytic component of lesser acidity than the ZSM-5 zeolite component of the first discrete catalyst, said catalytic component being selected from the group consisting of crystalline aluminosilicates, metal oxides, amorphous silicaalumina, and crystalline silica and wherein the second discrete catalyst also comprises a phosphorus-containing alumina component and wherein the reaction zone is maintained at hydrocarbon conversion conditions sufficient to produce a product containing aromatic compounds.

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**4,746,764**

## CATALYTIC PROCESS FOR THE CONVERSION OF HYDROCARBONS

**Susan L. Lambert, Rolling Meadows; R. Joe Lawson, Palatine, and Russell W. Johnson, Elmhurst, all of Ill., assignors to UOP Inc., Des Plaines, Ill.**

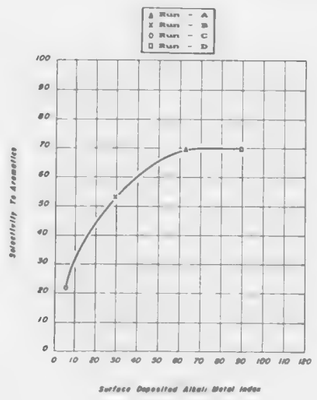
**Continuation-in-part of Ser. No. 871,976, Jun. 9, 1986, Pat. No. 4,652,689, which is a division of Ser. No. 734,308, May 15, 1985, Pat. No. 4,619,906, and a continuation-in-part of Ser. No. 668,102, Nov. 5, 1984, Pat. No. 4,623,632. This application Dec. 8, 1986, Ser. No. 939,337**

**The portion of the term of this patent subsequent to Mar. 24, 2004, has been disclaimed.**

**Int. Cl.**[4] **C07C** *2/52*

**U.S. Cl. 585—419** **5 Claims**

1. A dehydrocyclization process characterized in that it comprises contacting at catalytic dehydrocyclization conditions a hydrocarbon charge stock with a catalytic composite comprising a non-matrix supported nonacidic L-zeolite, a catalytically effective amount of a Group VIII metal component, and sufficient surface-deposited alkali metal to provide a surface-deposited alkali metal index of from about 40 to about 500, where the catalytic composite is prepared without subjecting the L-zeolite to a solution having a pH of greater than 9 and without appreciable loss of $SiO_2$ from the L-zeolite.






**4,746,765**

## COPLANAR RF DOOR SEAL

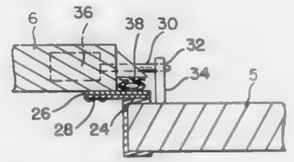
**Orville B. Mallott, 30430 8th SW., Federal Way, Wash. 98003**

**Continuation-in-part of Ser. No. 626,331, Jun. 29, 1984, Pat. No. 4,656,312. This application Dec. 29, 1986, Ser. No. 946,766**

**The portion of the term of this patent subsequent to Apr. 7, 2004, has been disclaimed.**

**Int. Cl.**[4] **H05K** *9/00*

**U.S. Cl. 174—35 GC** **4 Claims**




1. A door leaf and frame assembly for a room that is shielded against leakage of electromagnetic radiation when the door leaf is in its closed position comprising:

a. a rectangular door leaf having four corners;

b. a door frame on which said door leaf is mounted, the door frame on one side of the door leaf and defining a rectangular passage opening; the door frame opposing and spaced outwardly from the borders of said door leaf all the way around the passage opening;

c. a first series of flexible cantilevered metal sheets comprised of individual flexible metal sheets arranged end to end and forming seams therebetween, the first series of metal sheets located between said door leaf and said door frame all the way around said door leaf and said door frame, when said door leaf is closed, the first series of flexible metal sheets having at least one curved portion in a corner of said door leaf and said door frame;

d. a second series of flexible cantilevered coplanar metal sheets, the second series of flexible metal sheets adjacent to said first series of flexible metal sheets and located between said door leaf and said door frame, and so arranged end to end as to overlap the seams made by said first series of flexible metal sheets to minimize electromagnetic leakage through said door leaf and said door frame when said door leaf is closed; and

e. holding means to hold said first and said second series of flexible metal sheets in contact with said door leaf and said door frame when said door leaf is closed.

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**4,746,766**

## SHIELDED FLEXING CONNECTOR

**Roger R. Soulard, Dracut, Mass., assignor to Wang Laboratories, Inc., Lowell, Mass.**

**Filed Mar. 11, 1987, Ser. No. 24,735**

**Int. Cl.**[4] **H02G** *11/00;* **H05K** *9/00;* **H01B** *7/04;* **B41J** *25/28*

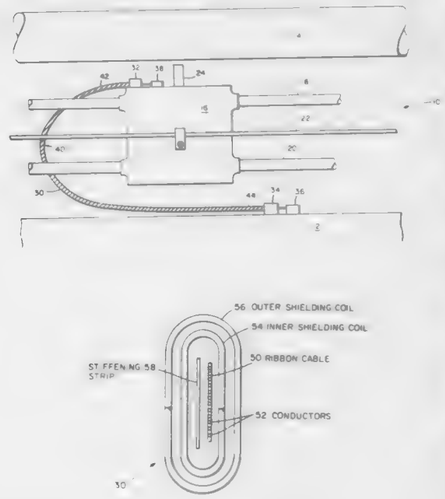
**U.S. Cl. 174—36** **4 Claims**

1. A flexing connector for making a plurality of electrical connections between a stationary terminal on a stationary component of a machine such as a printer and a moving terminal on a movable component of said machine, said flexing connector comprising

a flat ribbon cable having a plurality of distinct electrical conductors therein running parallel the length of said ribbon cable, said conductors for providing electrical connections between said stationary terminal and said moving terminal, said cable having a movable loop between a portion affixable to said stationary component and a portion affixable to said movable component,

an inner coil of hardened steel shielding material wound in a helicoidal form of a first chirality and having a generally flat cross-section, said inner coil coiling around said ribbon cable and being electrically connectable to a ground structure of said machine, and

an outer coil of hardened steel shielding material wound in a helicoidal form of a second chirality and having a generally flat cross-section, said outer coil coiling around said inner coil and being electrically connectable to a ground structure of said machine.




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**4,746,767**

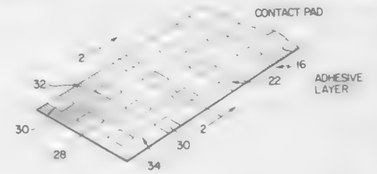
## SHIELDED ELECTRICAL CABLE CONSTRUCTION

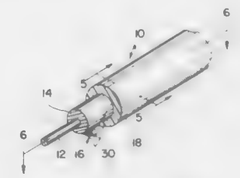
**Joel D. Gruhn, Hickory, N.C., assignor to Neptco Incorporated, Pawtucket, R.I.**

**Filed Feb. 27, 1987, Ser. No. 19,679**

**Int. Cl.**[4] **H01B** *7/34*

**U.S. Cl. 174—36** **15 Claims**



15. A shielded cable comprising an elongated conductor wire, a dielectric core over said conductor wire, and a metallic shielding tape over said core, said shielding tape having opposite longitudinally extending first and second edge portions adjacent opposite longitudinally extending first and second edges thereof, respectively, said shielding tape being wrapped over said core so that the second edge portion of said tape overlaps the first edge portion thereof, said tape comprising a metallic layer extending substantially across the width of said

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tape and having substantially smooth inner and outer metallic surfaces, and an adhesive layer between the inner surface of the portion of said metallic layer in said second edge portion and the outer surface of the portion of said metallic layer in said first edge portion, said adhesive layer being preprinted on the portion of said metallic layer in one of said first or second edge portions to define a plurality of localized metallic contact pads thereon where said metallic layer is not coated by said adhesive layer, said adhesive layer bonding said second edge portion to said first edge portion, the inner and outer surfaces of said metallic layer contacting each other in at least a portion of said contact pads.

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**4,746,768**

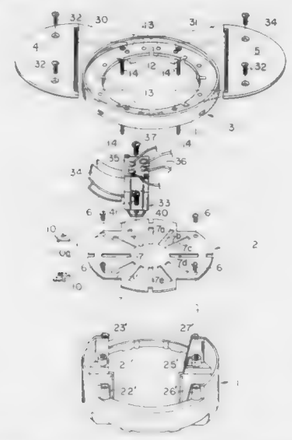
## RECESSED INSERT FOR CONNECTING FLAT CONDUCTOR CABLE TO A CELLULAR RACEWAY

**Richard D. Benscoter, Vienna, W. Va., assignor to Butler Manufacturing Company, Kansas City, Mo.**

**Continuation of Ser. No. 944,014, Dec. 22, 1986. This application Sep. 22, 1987, Ser. No. 99,721**

**Int. Cl.⁴ H02G** *3/12*

**U.S. Cl. 174—48** **3 Claims**



1. An insert to be mounted in a concrete floor and connected to a cellular raceway having at least a power cell for feeding undercarpet flat conductor cable from the power cell, the insert comprising:

first means to be secured to said power cell;

a mounting plate connected to said means;

a plurality of radially extending slots in said mounting plate, the slots being angularly spaced apart and each slot being for use in mounting nut means to receive a bolt on a transition block connected to an end of flat conductor cable;

at least a pair of nut means to be respectively slidably mounted in a selected pair of said slots;

an adjusting ring including:

an annular support flange;

a plurality of pairs of cover hold-down nut means formed in said support flange;

a plurality of adjusting screws connected with and supporting said adjusting ring and respectively threaded into said first means;

a pair of semi-circular cover plates mounted on said support flange and having facing edges which are slotted to form an elongated opening for receiving a flat conductor cable;

said covers being shiftable on the support flange so that the elongated opening can be oriented in a plurality of different receiving positions to receive, from any one of a plurality of azimuthal directions, a flat conductor cable and said pairs of cover hold-down nut means respectively providing for the covers to be secured to the support flanges in any of said receiving positions;

a transition block for interconnecting the power conductors from a power cell to the conductors of a flat conductor cable, the block including a pair of bolts for connecting the transition block to said mounting plate; and

selected pairs of said slots providing that said transition block connected to flat conductor cable and entering the afterset from any one of a plurality of said azimuthal directions will be aligned whereby said bolts in the transition block can be received by a selective pair of slots and held in position by said nut means mounted in the selected pair.

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**4,746,769**

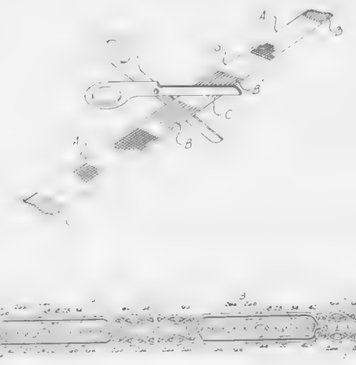
## MULTILAYER WOVEN HIGH DENSITY ELECTRICAL TRANSMISSION CABLE AND METHOD

**Douglas E. Piper, Greenville, S.C., assignor to Woven Electronics Corporation, Mauldin, S.C.**

**Continuation-in-part of Ser. No. 625,660, Jun. 28, 1984, Pat. No. 4,559,411. This application Sep. 3, 1985, Ser. No. 772,125**

**Int. Cl.⁴ H01B** *7/08;* **D03D** *15/00*

**U.S. Cl. 174—117 M** **22 Claims**



1. A woven, high frequency multilayer electrical transmission cable comprising:

(a) a double layer section which includes:

(i) a first woven transmission cable layer including a first plurality of warp elements extending longitudinally in a warp direction in said cable interwoven with a weft element, at least a number of said first plurality of warp elements consisting of first electrical signal conductors; and

(ii) a second woven transmission cable layer which includes a second plurality of warp elements extending longitudinally in a warp direction interwoven with said weft element wherein at least a number of said warp elements consist of second electrical signal conductors; and

(iii) a plurality of warp binder elements woven between said first and second cable layers binding said first and second cable layers together as integral cable structure;

(b) a breakout section formed at each end of said double layer section including a woven tab section wherein said warp binder elements and said weft element are interwoven together; and

(c) said first signal conductors being broken out of said first cable layer on a first side of said double layer section at said breakout section, and said second signal conductors being broken out of said second cable layer on a second side of said double layer section at said breakout section, opposite to said first side; said first and second conductors



being broken out in a manner in which said first and second signal conductors are free on either side of said woven tab section for connection to a terminal connector.

15. A method of weaving a high density, high speed multilayer electrical signal transmission cable comprising:

weaving a first cable layer which includes a number of first electrical signal conductors extending longitudinally in the cable layer in a warp direction interwoven with a weft element;

weaving a second cable layer section which includes a number of second electrical signal conductors extending longitudinally in said cable layer in a warp direction interwoven with said weft element;

simultaneously weaving said first and second cable layers in a manner in which said first and second cable layers are flush with one another, and weaving warp binding elements between said first and second cable layers to bind said layers together in said flush configuration as unitary multilayer cable structure;

breaking out said first and second signal conductors at each end of said first and second cable layers on sides of said unitary multilayer cable structure in a manner in which said first and second signal conductors are not woven; and

terminating said first and second signal conductors at each end of said first and second cable layers by connection to terminal connectors.

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**4,746,771**

## SLIDE SWITCH

**Manfred Koslar, Berlin, Fed. Rep. of Germany, assignor to Createc Gesellschaft für Elektrotechnik mbH, Berlin, Fed. Rep. of Germany**

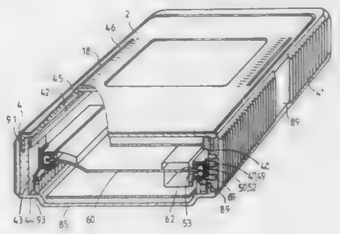
**PCT No. PCT/DE86/00141, § 371 Date Nov. 26, 1986, § 102(e) Date Nov. 26, 1986, PCT Pub. No. WO86/05920, PCT Pub. Date Oct. 9, 1986**

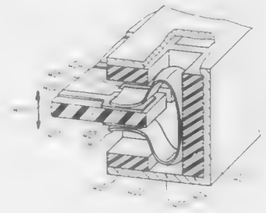
**PCT Filed Mar. 27, 1986, Ser. No. 5,192**

**Claims priority, application Fed. Rep. of Germany, Mar. 27, 1985, 3511600**

**Int. Cl.⁴ H01H** *15/06*

**U.S. Cl. 200—16 D** **20 Claims**





1. A multi-pole slide switch for an electrical signal processing apparatus comprising:

a printed circuit board having an insulated support layer and fixed contact areas provided on both sides of said insulated support layer, said insulated support layer including an edge; and

a switch slider having substantially omega-shaped contact elements enclosing said edge of said support layer and resiliently contacting said contact areas that are respectively opposite one another, said switch slider being movable parallel to said edge for causing said contact elements to alternately contact different contact areas, said switch slider having chamber-like recesses in which said contact elements are loosely inserted, and said contact elements being movable in said recesses in a direction transverse to said fixed contact areas and transverse to the direction in which said switch slider is movable.

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**4,746,770**

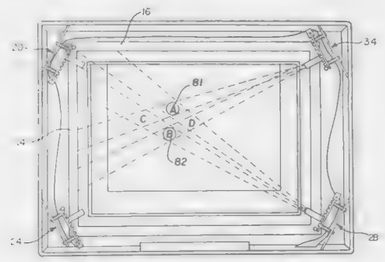
## METHOD AND APPARATUS FOR ISOLATING AND MANIPULATING GRAPHIC OBJECTS ON COMPUTER VIDEO MONITOR

**Paul McAvinney, Pittsburgh, Pa., assignor to Sensor Frame Incorporated, Pittsburgh, Pa.**

**Filed Feb. 17, 1987, Ser. No. 14,943**

**Int. Cl.⁴ G08C** *21/00;* **G01S** *5/16*

**U.S. Cl. 178—18** **42 Claims**



1. A method of manipulating graphic objects comprising

providing a frame, and a plurality of optical sensors generally facing the frame interior,

illuminating at least a portion of the space defined by said frame,

employing a plurality of light occluding objects to obstruct a portion of the light from reaching at least certain elements of said sensors, and

emitting signals from said sensors corresponding to the positions of said light occluding objects with respect to said frame.

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**4,746,772**

## ADJUSTABLE POSITION INDICATING APPARATUS

**Loren L. Bovee, and Larry L. Swartz, both of Marshalltown, Iowa, assignors to Fisher Controls International, Inc., Marshalltown, Iowa**

**Filed Sep. 23, 1986, Ser. No. 910,646**

**Int. Cl.⁴ H01H** *3/00, 9/00*

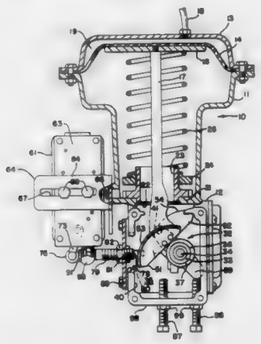
**U.S. Cl. 200—17 R** **9 Claims**

1. Position indicating apparatus for use with a movable mechanism having at least one preselected position, said apparatus comprising a lever, means mounting said lever for angular rotation on an axis, first means fastened to and rotatable with said lever and having an actuating surface, said surface

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having a radius which gradually increases in the circumferential direction about said axis, said lever being connectable to and angularly movable with the mechanism, position sensor means mounted adjacent said lever, said first means moving with said lever and moving to a first location relative to said sensor means when said mechanism moves said lever and is at



said preselected position and actuating said sensor means when said mechanism is moved to said preselected position, means for adjustably mounting said sensor means for movement toward and away from said actuating surface, first stop means, means adjustably mounting said first stop means for movement toward and away from said lever, said stop means being engageable with said lever.

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**4,746,773**

## CONNECTOR FOR AUTOMATICALLY MAINTAINING THE INTEGRITY OF A COMMUNICATIONS NETWORK

**R. Bruce McClure, Harvard, and William P. Lane, Taunton, both of Mass., assignors to Apollo Computer, Inc., Chelmsford, Mass.**

**Continuation-in-part of Ser. No. 567,229, Dec. 30, 1983, abandoned. This application Dec. 23, 1985, Ser. No. 812,197**

**Int. Cl.[4] H01R** *13/00*

**U.S. Cl. 200—51.09** **29 Claims**

1. In a communications network of the type having a plurality of communications nodes interconnected through at least one network signal conducting path wherein the network signal conducting path is broken and reconnected through a node signal conducting path when a node is connected into the network, the improved connector for permitting attachment and removal of nodes from the network without allowing an error-creating discontinuity of the network signal conducting path comprising:

line closing connector means adapted for connection into the network signal conducting path for opening and closing the network signal conducting path between input and output points;

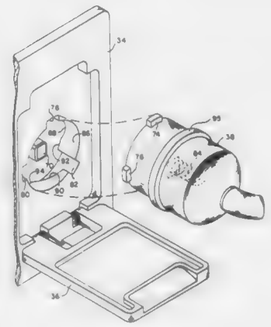
node connecting means adapted for connecting and disconnecting the node signal conducting path to the network signal conducting path between said input and output points; and

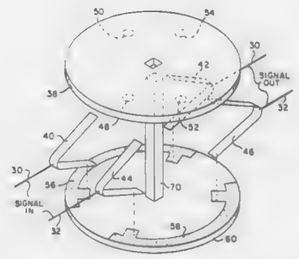
network connecting means responsive to said node connecting means for causing said line closing connector means to open and close the network signal conducting path such that the network signal conducting path is completed through said line closing connector means at substantially all times that a node is not connected into the network at the connector, said line closing connector means is disconnected from between said input and output points when said node connecting means connects the node signal conducting path to the network signal conducting path when a node is being attached to the network, and said line closing connector means is connected between said input and output points when said node connecting means disconnects the node signal conducting path from the network signal conducting path when a node is being disconnected from the network; the connector further comprising,

a mounting socket containing said line closing connector means and said network connecting means;

a plug containing connectable ends of the node signal conducting path, said plug being adapted to fit into said mounting socket in a first point of orientation relative thereto and rotate therein between said first point and a second point, said plug further including activation means for engaging said network connecting means and for causing said network connecting means to open and close the network signal conducting path between said input and output points as said plug is rotated within said socket;

safety interconnect means operably connected to said plug and socket for locking said plug into said socket as said plug is rotated away from said first point; and,






biasing means for applying a rotary biasing force against said plug towards said first point during rotation between said first point and a third point disposed between said first and second points, for applying a rotary biasing force against said plug towards said second point during rotation between said third point and said second point, for allowing said activation means to cause said line closing connector means to disconnect said input and output points only after said plug has been rotated past said third point in the direction of said second point; and for requiring said activation means to cause said line closing connector means to connect said input and output points before said plug has been rotated to said third point in the direction of said first point whereby said plug is biased towards a locked and electrically connected condition when inserted and rotated past said third point and is biased back towards an unlocked and releasable condition with electrical connection contact having not been made when inserted and not rotated past said third point.



**4,746,774**

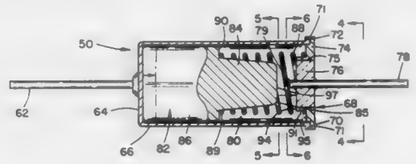
## MINIATURE ACCELERATION SWITCH

**Leonard P. Tetrault, Northport, and James R. Miller, Center Moriches, both of N.Y., assignors to Aerodyne Controls Corporation, Ronkonkoma, N.Y.**

**Filed Sep. 28, 1987, Ser. No. 103,121**

**Int. Cl.[4] H01H** *35/14*

**U.S. Cl. 200—61.45 R** **11 Claims**



1. A miniature acceleration switch, comprising:

a hollow cylindrical electrically conductive metal shell closed at one end and open at its other end to define a cylindrical chamber therein;

an electrically conductive metal mass axially movable in said chamber, said mass having:

a cylindrical section having one end normally disposed adjacent said closed end of said shell in axial alignment therewith, and having a diameter slightly smaller than that of said chamber to slide freely in said shell; and

a frustoconical section integral with the other end of said cylindrical section and in axial alignment therewith, said frustoconical section having a diameter at its widest end smaller than said diameter of said cylindrical section to define an annular shoulder at the other end of said cylindrical section;

a header closing said chamber at the other end of said shell, said header having:

an electrical conductive metal ring secured to said shell;

a central insulator bonded to and inside of said ring; and

a first circuit lead extended axially through said insulator and bonded thereto, said lead having a tip end projecting slightly into said chamber axially thereof, said frustoconical section having a narrow other end normally spaced from said tip end of said lead; and

a cylindrical, electrically conductive, metal coil spring in said chamber extending axially thereof and axially receiving the entire length of said frustoconical section of said mass, one end of said spring bearing on said annular shoulder and the other end of said spring bearing on said ring of said header; whereby said mass moves axially in said chamber against increasing axial load in said spring to compress the spring when a force of acceleration of sufficient magnitude is applied to said mass, until said mass contacts said tip of said lead in direct electrical circuit therewith.

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**4,746,775**

## FLUID FLOW SWITCH ASSEMBLY

**Jose C. Pena, and Rolando J. Pena, both of 3809 Park Ave., Union City, N.J. 07087**

**Filed Dec. 17, 1985, Ser. No. 810,666**

**Int. Cl.[4] H01H** *35/40*

**U.S. Cl. 200—81.9 R** **7 Claims**

1. An improved fluid flow switch assembly which comprises:

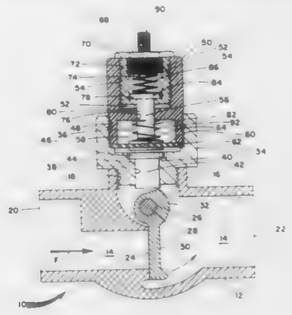
a conduit member having an area of predetermined cross-section and a port portion;

a plate member disposed over said predetermined cross-sectional area and mounted for rotation in said conduit member, said plate member including a cammed surface portion;

an insulating sleeve member cooperating with said port portion of said conduit member;

a first conductive member disposed in said insulating sleeve member; and

a second conductive member positioned in said port portion



of said conduit member whereby rotation of said plate member in response to fluid flow through said conduit member causes said cammed surface portion thereof to move said second conductive member into contact with said first conductive member and thereby for closing an electrical circuit between said conductive members.

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**4,746,776**

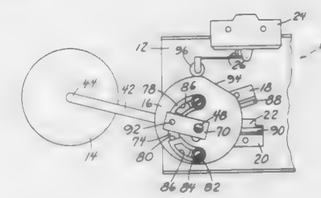
## FLOAT-ACTUATED SWITCHING ASSEMBLY

**Garrett A. Komaniak, Benton Harbor, Mich., assignor to Webster Electric Company, Inc., Racine, Wis.**

**Filed Jul. 22, 1987, Ser. No. 76,218**

**Int. Cl.[4] H01H** *35/18*

**U.S. Cl. 200—84 R** **19 Claims**



1. In a float-actuated switching assembly of the type with a switch element, a float, and means to link the float and the switch element, the improvement comprising:

a base having the switch element secured on it;

a carrier movably secured to the base and linked to the switch element to move it between off and on positions;

upper and lower brackets on the carrier;

a pusher linked to the float and movable between the brackets as the float moves;

means adjacent to the carrier to limit carrier movement to between first and second positions, the limit means having first and second stops;

means on the carrier positioned to contact the stops to stop carrier movement;

means to releasably hold the contact means against one of the stops as the pusher moves toward and applies initial force to one of the brackets,

whereby when sufficient force is applied the holding means is released such that the carrier moves quickly to actuate the switch.

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**4,746,777**

## VACUUM SWITCHING TUBE

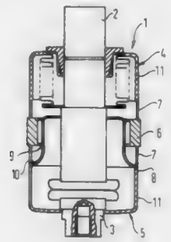
**Guenther Bialkowski; Burkhard Mick, and Klaus Oberndorfer, all of Berlin, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Mar. 9, 1987, Ser. No. 23,827**

**Claims priority, application Fed. Rep. of Germany, Jul. 11, 1986, 3623457**

**Int. Cl.[4] H01H** *33/66*

**U.S. Cl. 200—144 B** **6 Claims**



1. A vacuum switching tube comprising:
a ring-shaped ceramic part including a pair of annular faces;
a pair of cap-shaped metal parts each including a thick-walled portion, and at a transition thereto, a thin-walled portion connected blunt to respective faces of said ceramic ring;
a pair of contacts each extending through a respective thick-walled portion to a location adjacent the other such contact; and
a generally bell-shaped vapor shield surrounding one of said contacts and including a cylindrical portion comprising an edge matched to the dimensions of said thin-walled portions and connected to one of said cap-shaped metal parts at the respective transition.

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**4,746,778**

## CIRCUIT BREAKER WITH AN ACTUATING DEVICE AND AN ENERGY ACCUMULATOR

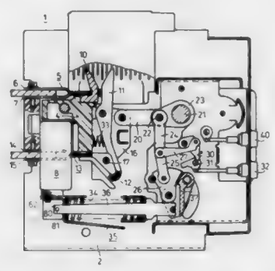
**Ulrich Marquardt, Berlin, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany**

**Filed Nov. 26, 1986, Ser. No. 935,040**

**Claims priority, application Fed. Rep. of Germany, Nov. 29, 1985, 3542746**

**Int. Cl.[4] B21J** *5/06;* **H05B** *1/00*

**U.S. Cl. 200—153 SC** **5 Claims**



1. An energy accumulator adapted to be used within a circuit breaker, the circuit breaker comprising a support structure including side walls and an actuating device cooperating with said energy accumulator, the energy accumulator being an independent subassembly comprising at least one spring, a push rod for introducing a tensioning force on said spring or for applying a force accumulated in the spring to the actuating device of said circuit breaker, a stationary abutment for said spring being provided comprising a cross piece dimensioned to fit in the space between said side walls of said circuit breaker and means for keeping said spring in a cocked position approximately as in operation while said subassembly is not connected to said circuit breaker, whereby said energy accumulator can be inserted into and removed from said circuit breaker when said spring is in the cocked position.

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**4,746,779**

## CONTACT ARRANGEMENT FOR SWITCHGEAR

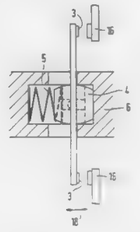
**Johann Drexler, Schwandorf, and Erwin Flierl, Kuemmersbruck, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Continuation of Ser. No. 716,847, Mar. 28, 1985, abandoned. This application Oct. 29, 1986, Ser. No. 924,704**

**Claims priority, application Fed. Rep. of Germany, Mar. 29, 1984, 3411687**

**Int. Cl.[4] H01H** *1/32*

**U.S. Cl. 200—248** **5 Claims**



1. In a contact arrangement for switchgear with multiple disconnects having parallel-connected contact points of two contact bridges having long sides or widths and a longitudinal axis aligned in a contact actuation link using a spring collar and a contact pressure spring, said spring collar having ends, four sliding guide surfaces on at least one end, said surfaces defining extended areas directly opposed to each other, said spring collar also having cutouts running transverse to the line of action of said spring collar in said contact actuation link into which the contact bridges with the spring collar can be inserted and locked in place transverse to the longitudinal axis, the improvement wherein:
the spring collar is constructed of thermoplastic material, is essentially a rectangular parallelepiped in shape and is rounded on said all four sliding guide surfaces of said at least one end of the spring collar in the contact actuation link running transverse to the longitudinal axis of the contact bridge;
the contact actuation link is U-shaped on at least one end; and
the spring collar extends beyond the long sides or widths of the contact bridges and is surrounded by the U-shaped end of said actuation link and rounded in the extended area on each of the sliding surfaces directly opposed to each other.

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**4,746,780**

## ONE-SCREW MOUNTING SYSTEM FOR GANGED COMPONENTS

**John Resh, Valparaiso, Ind., assignor to McGill Manufacturing Company, Inc., Valparaiso, Ind.**

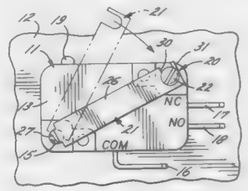
**Filed Sep. 1, 1987, Ser. No. 91,720**

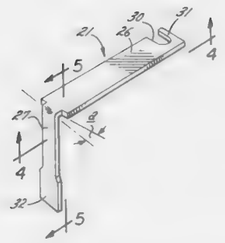
**Int. Cl.[4] H01H** *9/08*

**U.S. Cl. 200—294** **11 Claims**

1. A combination of, first and second components, and means for fastening said components in ganged relation on a mounting member having a hole and having a projection spaced from said hole, each component having first and second holes capable of being alined with the first and second holes of the other component, said means comprising a screw sized to extend through the first holes of said components and to thread into the hole in said mounting member thereby to partially fasten said components to said mounting member, said projection extending into a portion of the second hole of said first component and preventing said first component from turning about the axis of said screw, a fastening element having a first leg extending through the second hole of said second component and into the second hole of said first component, and said fastening element having a second leg connected with and extending generally perpendicular to said first leg and adapted to be secured releasably to said second component whereby said fastening element cooperates with said first component and said projection to prevent said second component from turning about the axis of said screw.





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**4,746,781**

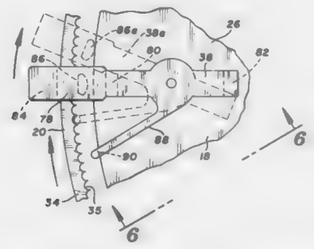
## PORTABLE TURNTABLE FOR USE IN MICROWAVE OVENS AND HAVING A MOVABLE DETENT FOR SELECTIVELY ALLOWING AND PREVENTING TURNTABLE ROTATION

**H. David Dalquist, III, Minnetonka; Lloyd G. Keleny, Champlin; Jorgen A. Jorgensen, Bloomington, and Douglas J. Kluge, Golden Valley, all of Minn., assignors to Northland Aluminum Products, Inc., Minneapolis, Minn.**

**Filed Jul. 1, 1987, Ser. No. 68,577**

**Int. Cl.[4] H05B** *6/78*

**U.S. Cl. 219—10.55 F** **15 Claims**



1. An apparatus for supporting and rotating food as it is cooked, including:
a substantially enclosed housing;
a turntable including a circular, substantially planar and horizontal platform for supporting food, and a turntable shaft of a non-circular horizontal cross-section projected substantially downwardly from the center of said platform;
a turntable drive means in said housing having a rotatable drive shaft, and means forming in said drive shaft a bore of non-circular horizontal cross-section conforming to said turntable shaft, wherein said turntable shaft projects through an opening in said housing to engage said drive shaft at said bore for rotation of said turntable, along with said drive shaft, relative to said housing and in a first direction about a vertical drive axis at the center of said turntable; and
a detent member mounted with respect to said housing for movement in substantially said first direction to a first position, and in a second and opposite direction away from said first position to a second position; wherein an end portion of said detent member is positined to engage said turntable whenever said detent member is at least proximate said first position, any turntable rotation after such engagement tending to move said detent member to said first position to prevent further rotation of said turntable;
said detent member further having a projection positioned to contact said housing as said detent member is moved in said second direction to prevent movement of said detent member in said second direction beyond said second position.

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**4,746,782**

## METHOD FOR SECURING CUT PIECES IN SPARK EROSIVE CUTTING

**Benno Weber, Porto Ronco, Switzerland, assignor to AG fur industrielle Elektronik AGIE, Losone b. Locarno, Losone, Switzerland**

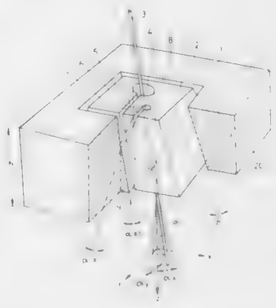
**Continuation of Ser. No. 617,628, Jun. 6, 1984, Pat. No. 4,571,477. This application Feb. 14, 1986, Ser. No. 829,839**

**Claims priority, application Switzerland, Jun. 9, 1983, 3173/83**

**The portion of the term of this patent subsequent to Feb. 18, 2003, has been disclaimed.**

**Int. Cl.[4] B23H** *7/06*

**U.S. Cl. 219—69 M** **3 Claims**



1. In the spark erosive cutting of a conductive workpiece by a tool electrode under the control of a digital tool control system, the method of securing to the workpiece a workpiece part which is to be cut from the workpiece along a preprogrammed cutting path where the workpiece part is secured to the workpiece by a web of workpiece material extending between the workpiece and the workpiece part in which the preprogrammed cutting path comprises first and second intersecting cutting paths of different cutting angles, characterized in that in a first traverse of the preprogrammed cutting path along the first cutting path a first erosion treatment is performed by the tool electrode leaving a portion of the cutting

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path uncut to initially form the web; subsequently the tool electrode performs at least one additional erosion treatment along the preprogrammed cutting path in which the cutting position of the tool electrode between said first and second cutting paths is modified incrementally in consideration of the width of the tool electrode and the cutting gap between the tool electrode and the workpiece so that the workpiece volume between said first and second cutting paths is completely eroded; and before completing a final erosion treatment along the preprogrammed cutting path the tool electrode is passed through a modified cutting angle setting to maintain a residual web section of workpiece material between the workpiece and the workpiece part, said residual web section extending over part of the height of cut in the workpiece along only one of the first and second cutting paths and being configured so that it may be broken and the workpiece part detached from the workpiece upon application of a predetermined breakoff force.

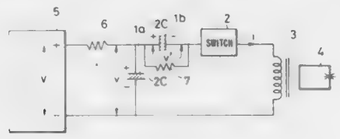
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**4,746,783**

## WELDING CURRENT CONTROL CIRCUIT FOR SPOT WELDER

**Yoshikazu Shibuya, and Hideaki Toya, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**PCT No. PCT/JP86/00482, § 371 Date May 19, 1987, § 102(e) Date May 19, 1987**
**PCT Filed Sep. 16, 1986, Ser. No. 58,222**
**Claims priority, application Japan, Sep. 19, 1985, 60-205213**
**Int. Cl.⁴ B23K** *11/26*
**U.S. Cl. 219—113** **2 Claims**




1. A welding current control circuit for a spot welder, comprising:
- first electrolytic capacitor means connected in parallel with a DC source;
- second electrolytic capacitor means which is connected in series with said DC source and is substantially equal in capacitance to said first electrolytic capacitor means and which is shunted by a resistor;
- switch means connected in series with said second electrolytic capacitor means; and
- welding circuit means connected in series with said switch for welding materials which are to be welded, and
- wherein the series/parallel arrangement of said first and second electrolytic capacitor means of substantially equal capacitances is such that, the transient voltages across said first and second electrolytic capacitor means is prevented from changing polarity during the time when the charge current of said first electrolytic capacitor means is caused to flow in said welding circuit means.

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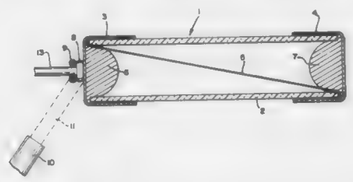
**4,746,784**

## METHOD OF ATTACHING A LEAD TO A METAL END CAP OF A SAFETY FUSE

**Leendert Vermij, Buren, Netherlands, assignor to Littelfuse-Tracor, B.V., Utrecht, Netherlands**

**Filed Jun. 5, 1986, Ser. No. 871,112**
**Claims priority, application Netherlands, Jun. 11, 1985, 8501677**
**Int. Cl.⁴ B23K** *26/00*
**U.S. Cl. 219—121 LD** **10 Claims**

1. A method of attaching a lead to a metal end cap of an otherwise complete miniature-type safety fuse having a fuse element secured to the interior of said end caps by connecting means, characterized in that the attaching is effected by a soldering operation which comprises holding one end of said lead against sa'd end cap, wherein the region where attachment is to take place there is a given amount of solder, and



supplying to said region a metered amount of energy in the form of one or more energy pulses producing over a given period enough total energy to melt said quantity of solder, but of insufficient total energy to penetrate through said end cap and adversely affect the bonding of said fuse element thereto.

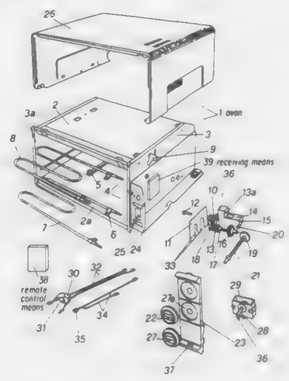
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**4,746,785**

## SELF CONTAINED ELECTRIC OVEN FOR DOMESTIC APPLICATION WITH BAKING ROOM DIRECTLY CONTROLLED BY THERMOSTAT

**Giuseppe De Longhi, Treviso, Italy, assignor to De' Longhi S.p.A., Italy**

**Filed Jul. 24, 1986, Ser. No. 888,932**
**Claims priority, application Italy, Jul. 24, 1985, 82539 A/85**
**Int. Cl.⁴ F24C** *7/08;* **H05B** *1/02;* **F27D** *11/02*
**U.S. Cl. 219—386** **9 Claims**




1. Self-contained electrical oven for domestic application with a baking room directly controlled by a thermoregulating means, comprising a baking room (4) having structural members including opposed bases (2, 2*a*), opposed side walls (3, 3*a*), a bracket (24), and a cover (26), as well as a thermostat (10) assembled in the baking room by means of a shaped bracket (14) and provided with sensors (18) oriented towards a housing (9) in the wall (3) of the baking room (4) formed also of the bases (2, 2*a*) with connectors (5, 6) for electrical resistances (7, 8) and of the bracket (24) for fastening of control and supplying devices (16, 17, 19, 21 to 23, 27, 29 to 37), the sensors (18) of the thermostat (10) being protected by a shaped plate (11) provided with openings (33) said plate being arranged in the side wall (3) facing the baking room (4) of the oven (1), characterized in that the sensors (18) of the thermostat (10) directly sense the heat in the baking room (4) heated by the electrical resistances (7, 8) through an opening fixed in housing (9) and the openings (33) of the shaped plate (11), the electrical resistances being placed in the opposed bases (2, 2*a*) and being servo-controlled by the control and supplying devices (16, 17, 19, 21 to 23, 27, 29 to 37).

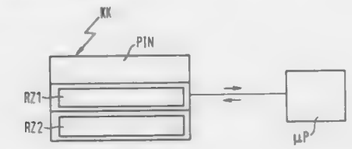


**4,746,786**

## METHOD AND APPARATUS FOR EVALUATING UNITS STORED ON CREDIT CARDS

**Wolfgang Heberle, Wolfratshausen, and Max Ludwig, Munich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany**

**Filed Oct. 14, 1986, Ser. No. 917,969**
**Claims priority, application Fed. Rep. of Germany, Nov. 19, 1985, 3541014**
**Int. Cl.⁴ G06K** *5/00*
**U.S. Cl. 235—380** **2 Claims**




1. A method for the evaluation of used fee units of a card owner and of a central evaluation location which are stored on credit cards for automatic vendors, particularly for telecommunications equipment connected to a switching center, whereby the credit card is provided with personal identification features, comprising the steps of storing used fee units in at least one counter (RZl, RZ2) arranged on the credit card, calling in the current reading thereof by the central evaluation location (uP) at intervals unknown to the card owner, particularly, at randomly oriented intervals and comparing in the evaluation location the current reading with the most recently called-in counter reading, and charging the account of the card owner with the difference between the old and the new fee units.

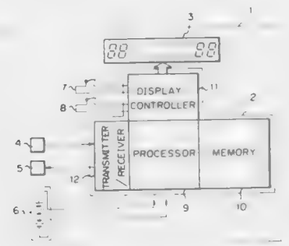
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**4,746,787**

## IC CARD WITH DISPLAY AND CARD RECORDING AND READING DEVICE

**Shin-ichi Suto, and Toshihiko Okada, both of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan**

**Filed Jul. 17, 1985, Ser. No. 756,082**
**Claims priority, application Japan, Jul. 20, 1984, 59-149386; Jul. 27, 1984, 59-155495**
**Int. Cl.⁴ G06K** *19/00*
**U.S. Cl. 235—379** **3 Claims**




1. An IC card with a display for storing transaction data from a card recording and reading device in combination with the card recording and reading device and for displaying it, comprising:
- (a) a transmitter means and a receiver means respectively connected electrically and optically with a receiver part and a transmitter part of the card recording and reading device;
- (b) a transmitter/receiver part for transmitting and receiving data to and from the card recording and reading device via said transmitter means and said receiver means;
- (c) a processing unit for processing said data;
- (d) a memory part for storing transaction data contained within said data processed in said processing unit in conformity with the development of an associated transaction;
- (e) a display part for displaying one of said transaction data stored in said memory part;
- (f) a first operating switch for sequentially switching the display of the transaction data presently displayed on said display part to that of new transaction data one at a time;
- (g) a second operating switch for sequentially switching the display of the transaction data presently displayed on said display part to the previously transaction data one at a time;
- (h) an operation and display control part for controlling said display part so as to display said transaction data stored in said memory part in conformity with operations of said first operating switch and said second operating switch;
- (i) wherein said data received from the card recording and reading device via said receiver means includes one of either a display instruction to instruct new transaction data to be displayed or a display instruction to instruct the previous transaction data to be displayed; and
- (j) wherein said operation and display control part, upon reception of said display instruction by said transmitter/-receiver part, displays and controls said transaction data stored in said memory part, whereby desired data stored in said memory part is displayed on said display part based upon said instruction provided via said transmitter/-receiver part or based upon operations of said first and second operating switches.

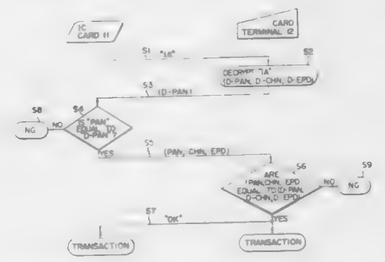
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**4,746,788**

## IDENTIFICATION SYSTEM FOR AUTHENTICATING BOTH IC CARD AND TERMINAL

**Shigeyuki Kawana, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan**

**Filed Sep. 15, 1986, Ser. No. 907,677**
**Claims priority, application Japan, Sep. 17, 1985, 60-204696**
**Int. Cl.⁴ G06F** *15/20*
**U.S. Cl. 235—380** **6 Claims**




1. An identification system comprising:
IC card means;
IC card terminal means capable of electrically communicating with the IC card means when the IC card means is loaded thereon;
said IC card means including first memory means for storing at least data unique to said IC card means and encrypted unique data obtained by encrypting said unique data;
said IC card terminal means including decrypting means for decrypting said encrypted unique data stored in said first memory means to derive decrypted unique data;
said IC card means further including first comparing means for comparing said decrypted unique data sent from said IC card terminal means with said unique data stored in said first memory means so as to judge whether said unique data is coincident with said decrypted unique data; and
said IC card terminal further including second comparing

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means for comparing said decrypted unique data with said unique data stored in said first memory means and sent from said IC card means so as to judge whether said unique data is coincident with said decrypted unique data, thereby confirming identities of both said IC card means and said IC card terminal means.

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**4,746,789**

## READING DEVICE FOR BAR CODES

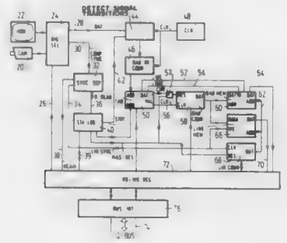
**Antonius C. M. Gieles; Hendrikus P. M. Sterken, and Willem J. Venema, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Oct. 28, 1985, Ser. No. 791,857**

**Claims priority, application Netherlands, Nov. 2, 1984, 8403323**

**Int. Cl.[4] G06K** *7/10*

**U.S. Cl. 235—463** **16 Claims**



1. A reading device for a bar code provided in/on a carrier, which reading device includes:

a scanning device for line-wise scanning the bar code,

a decision element which is connected to the scanning device in order to form a bivalent signal from the signal of the scanning device,

a code regenerator which is connected to the decision element in order to form a code sequence consisting of valid bar widths from the lengths of successive intervals of the bivalent signal,

a bar counter which is connected to an output of the code regenerator in order to count the number of valid bars, and

an output element which is connected to the code regenerator in order to validate a code sequence and to present a validated code on a user output,

characterized in that the code regenerator includes an address counter for a table memory which counts down the lengths of the intervals, the table memory identifying a valid bar width in the location thus addressed or indicating an invalid bar width, the table thus addressed having a validity range of at least two successive address counter positions for each nominal bar width, the address range of the table memory covering at least two different sequences of consecutively successive invalid counter positions which are separated from one another by at least one sequence of valid counter positions, the table memory containing a sequence of at least two tables of increasing scale, for each table there being provided for each nominal bar width a tolerance range between a largest permissible actual bar width and a smallest permissible actual bar width, said tolerance range amounting to at least a factor 1½.

**4,746,790**

## METHOD AND APPARATUS FOR MEASURING A DISTANCE

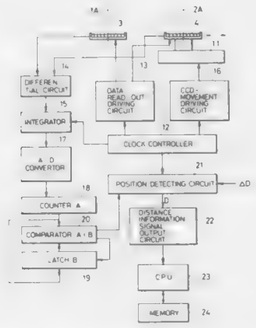
**Kanehiro Sorimachi, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 796,313, Nov. 8, 1985, abandoned. This application Sep. 16, 1987, Ser. No. 97,426**

**Claims priority, application Japan, Nov. 12, 1984, 59-236837**

**Int. Cl.[4] G01J** *1/36*

**U.S. Cl. 250—201** **7 Claims**



1. A method for measuring the distance from a detecting apparatus to each of a plurality of objects, the apparatus having two optical systems which have optical axes parallel with each other, and two corresponding detecting means on which images of each object are respectively formed by said two optical systems, the optical systems and the corresponding detecting means being arranged with predetermined positional relationships therebetween, the method comprising the steps of;

(a) obtaining correlation between illumination distributions of object images respectively formed on said two detecting means;

(b) changing at least one of said positional relationships on the basis of the correlation obtained in step (a);

(c) determining the change in at least one of the positional relationships between said two optical systems and said two detecting means when a desired correlation is obtained in steps (a) and (b);

(d) determining the distance between each object and said apparatus on the basis of the change in at least one of the positional relationships determined in step (c);

(e) performing steps (a) through (d) for each of the objects; and

(f) storing information corresponding to the distance and direction of each object from the apparatus in a memory.

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**4,746,791**

## FIBER OPTIC SENSOR WITH AN OPTICAL MODULATOR HAVING A PERMANENT MAGNET FOR THE DETECTION OF THE MOVEMENT OR POSITION OF A MAGNETIC COMPONENT

**Werner Forkel, Stuttgart, Fed. Rep. of Germany, assignor to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany**

**Filed Nov. 26, 1986, Ser. No. 935,205**

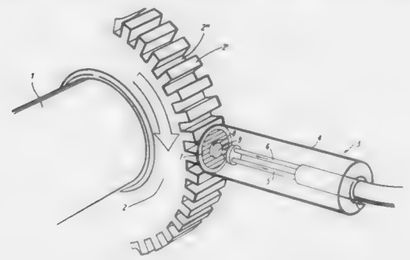
**Claims priority, application Fed. Rep. of Germany, Nov. 28, 1985, 3542042**

**Int. Cl.[4] G01D** *5/34;* **G01P** *3/48, 3/54*

**U.S. Cl. 250—231 SE** **18 Claims**

1. Fiber optic sensor for the detection of the movement or position of a component, in particular of the speed of rotation or of the angle of rotation of a shaft, having a movement generator exhibiting magnetically highly effective and magnetically weekly effective regions, such as a ferromagnetic movement generator constructed as a toothed wheel or as a perforated or slotted diaphragm, which sensor exhibits a light transmitter and at least one light guide in a housing, and a light irradiated by the light transmitter is coupled into the light guide via an optical modulator in order to influence the light by the scanned movement generator, both the light transmitter and also thelight guide being connectable to an electronic analyzing system wherein the optical modulator has at least a





permanent magnet and a modulator part disposed in a housing of the sensor in an end region of the housing facing the movement generator, wherein the modulator part is mounted to be movable relative to the light transmitter and the light guide, so that a change-caused by the movement generator-in the course of the field lines emanating the permanent magnet, causes a movement of the modulator part.

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**4,746,792**

## OPTICAL TRANSDUCER ELEMENT AND DISPLACEMENT METER COMPRISING SUCH AN ELEMENT

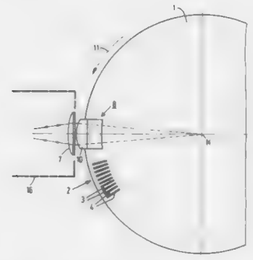
**Jan G. Dil, Almelo, Netherlands, assignor to U.S. Philips Corp., New York, N.Y.**

**Filed Oct. 1, 1986, Ser. No. 914,050**

**Claims priority, application Netherlands, Oct. 1, 1985, 8502679**

**Int. Cl.[4] G01D** *5/34*

**U.S. Cl. 250—231 SE** **20 Claims**



1. An optical transducer element for converting displacements, in a given direction, of an object connected to said element into an optical signal,

said element comprising a flat body having a plurality of dark first strips and a corresponding plurality of bright second strips, said first strips and said second strips alternating respectively in said direction,

characterized in that each of said first strips is formed by a phase grating, each phase grating extending in a longitudinal direction orthogonal to said given direction, and comprising a multiplicity of grating lines disposed transversely to said longitudinal direction at a first level, alternating with respective intermediate grating lands disposed at a second level differing from said first level,

said grating lines having a same transmittivity or reflectivity as said intermediate grating lands, and said lines and lands each having a same width in said longitudinal direction,

said first and second levels being so spaced that, responsive to a first radiation beam being incident on the element in a first direction, to produce a second radiation beam originating from the element having a part in a direction generally parallel to said first direction, a phase difference of 180° is introduced between a zero-order sub-beam and a first-order sub-beam originating from said element, thereby introducing dark bands into said part of said second radiation beam.

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**4,746,793**

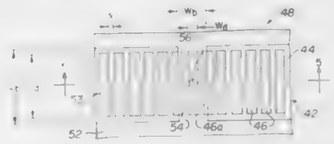
## MASK FOR SPECTROPHOTOMETER PHOTODIODE ARRAY HAVING A BRIDGE PORTION THAT SUBSTANTIALLY COVERS EACH PHOTODIODE

**George W. Hopkins, II, Sunnyvale, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Sep. 10, 1986, Ser. No. 905,987**

**Int. Cl.[4] H01J** *5/16, 40/14*

**U.S. Cl. 250—237 R** **22 Claims**



1. A mask for an array of spatially arranged photo-sensitive members, said mask comprising:

support means; and

a bridge member coupled to said support means having a lateral dimension greater than a lateral dimension of a selected photo-sensitive member of said array, said bridge member being adapted to shade said selected photo-sensitive member from a majority of the radiation generally impinging on said array.

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**4,746,794**

## MASS ANALYZER SYSTEM WITH REDUCED DRIFT

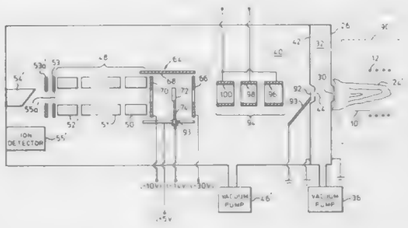
**John B. French, Thornhill; Donald J. Douglas, Toronto; John E. Fulford, Holland Landing, all of Canada, and Peter Arrowsmith, San Jose, Calif., assignors to MDS Health Group Limited, Etobicoke, Canada**

**Filed Oct. 20, 1986, Ser. No. 920,539**

**Claims priority, application Canada, Oct. 24, 1985, 493,741**

**Int. Cl.[4] H01J** *49/26*

**U.S. Cl. 250—288** **13 Claims**



1. Apparatus for sampling an ion signal into a vacuum chamber, comprising:

(a) means for generating an ion signal,

(b) a vacuum chamber including an orifice plate defining a wall of said vacuum chamber,

(c) said orifice plate having an orifice therein adjacent said

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means for generating an ion signal, for sampling said ion signal through said orifice into said vacuum chamber,
(d) mass analyzer means in said chamber for analyzing said ion signal,
(e) ion focussing means between said orifice and said mass analyzing means for focussing ions from said orifice into said mass analyzing means,
(f) and a shadow stop in said vacuum chamber and located substantially immediately adjacent said orifice and on a line between said orifice and said ion focussing means, for reducing debris accumulating on said focussing means.

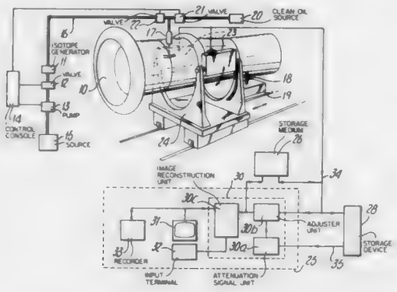
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**4,746,795**

## METHOD OF AND APPARATUS FOR ANALYZING FLUID FLOWS WITHIN HOLLOW BODIES

**Peter A. E. Stewart, Bristol; Michael R. Hawkesworth, Birmingham, and Roger C. Witcomb, Bristol, all of England, assignors to Rolls-Royce plc, London, England**

**Continuation of Ser. No. 318,939, Nov. 6, 1981. This application Jan. 16, 1987, Ser. No. 5,313**
**Claims priority, application United Kingdom, Nov. 15, 1980, 8036725**
**Int. Cl.[4] G01T *1/16*; G21H *5/02***
**U.S. Cl. 250—303** **22 Claims**




1. A method of reproducing a representation of the flow path of a liquid flowing inside a hollow inorganic body comprising the steps of:
injecting into the liquid a quantity of a positron radioactive isotope label which has no detrimental reaction with the liquid or body structure;
detecting radiation emitted due to the annihilation of electrons by the positrons emitted by the isotope label, as it is carried with the liquid along the liquid flow path, by fixed detector apparatuses positioned at locations outside the body and which produce output signals responsive to the detected radiation, including attentuated radiation, for producing a first representation indicative of the flow of the liquid;
generating a second representation indicative of the spatial distribution of the structure of the body which surrounds the liquid flow and of the materials from which each major part of it is constructed, the second representation including a plurality of codes representing the differing attenuating properties at a plurality of locations within the body;
producing from said second representation attenuating effect information relating to the attenuation of the radiation as it passes through locations having differing attenuating properties;
generating attenuation compensation factors from the attenuating effect information; and
combining said detector output signals with said attenuation compensation factors to produce adjusted output signals representing the flow path of the liquid corrected for the attenuating effects of the materials of, which the inorganic body is constructed.

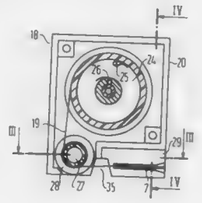
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**4,746,796**

## COROTRON WIRE CASSETTE FOR ELECTROPHOTOGRAPHIC PRINTER OR COPIER DEVICES

**Karl Heigl, Kirchheim, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Oct. 20, 1986, Ser. No. 920,711**
**Claims priority, application Fed. Rep. of Germany, Nov. 25, 1985, 3541592**
**Int. Cl.[4] H01T *19/00***
**U.S. Cl. 250—324** **20 Claims**




1. A corona-generating means for an electrophotographic printer device comprising:
a cassette releasably secured in a fixed position in a cassette receptacle of the printer device, a corotron wire electrode retractably mounted in said cassette, and
said electrode including end means for selectively engaging with a movable means in said printer device wherein said electrode is withdrawable from said cassette into a work position, and retractable into said cassette for selective replacement of said cassette.

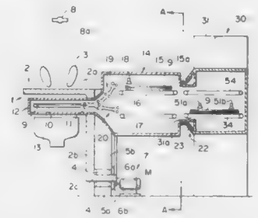
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**4,746,797**

## RADIATION IMAGE RECORDING AND READ-OUT APPARATUS

**Takaaki Yamamoto, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Feb. 27, 1986, Ser. No. 833,700**
**Claims priority, application Japan, Mar. 1, 1985, 60-40687**
**Int. Cl.[4] G01T *1/161, 1/105***
**U.S. Cl. 250—327.2** **10 Claims**



1. A radiation image recording and read-out apparatus comprising:
(i) an image recording section provided with a radiation source for emitting a radiation to a stimulable phosphor sheet via an object, a sheet holding means for holding said stimulable phosphor sheet at an image recording position which faces said radiation source, a first stacking means for stacking stimulable phosphor sheets carrying no radiation image stored therein, a second stacking means for stacking stimulable phosphor sheets carrying a radiation image stored therein, and a conveyance means for conveying the stimulable phosphor sheets stacked at said first stacking means one by one to said sheet holding means and conveying each said stimulable phosphor sheet carrying a radiation image stored therein from said sheet holding means to said second stacking means,
(ii) an image read-out section provided with an image read-out means for scanning said stimulable phosphor sheet carrying a radiation image stored therein at said image recording section with stimulating rays which cause said stimulable phosphor sheet to emit light in proportion to the stored radiation energy and detecting the emitted light to obtain an electric image signal, a third stacking means for stacking the stimulable phosphor sheets carrying a radiation image stored therein and conveyed from said second stacking means, a conveyance means for conveying the stimulable phosphor sheets stacked at said third stacking means one by one to said image read-out means, and a sheet feed means for temporarily stacking the stimulable phosphor sheets carrying no radiation image stored therein and feeding them to said first stacking means when necessary,
(iii) a light-tight connection means for rotatably connecting said image recording section with said image read-out section, and
(iv) a rotation drive means for rotating said image recording section around a predetermined axis,
such that said stimulable phosphor sheet is transferred via said light-tight connection means between said sheet feed means at said image read-out section and said first stacking means at said image recording section, and between said second stacking means at said image recording section and said third stacking means at said image read-out section.



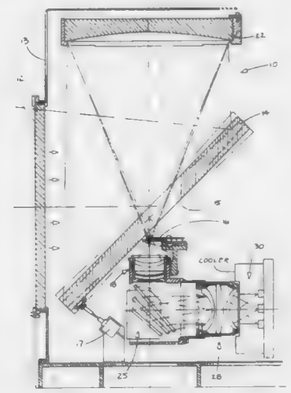
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**4,746,798**

## COMPACT OPTICAL WAVELENGTH DISCRIMINATOR RADIOMETER

**Max Amon, Maitland, and Jefferson E. Odhner, Orlando, both of Fla., assignors to Martin Marietta Corporation, Bethesda, Md.**

**Filed Aug. 18, 1986, Ser. No. 897,671**
**Int. Cl.[4] G01J *1/00***
**U.S. Cl. 250—339** **33 Claims**



1. Non-prismatic apparatus for selectively separating predetermined wavelengths or bandwidths of radiant energy from a beam of polychromatic radiant energy, comprising:
(a) a first radiant energy deflecting member of plano parallel construction, supported in a position of radiant energy deflecting alignment relative to the beam, said first deflecting member selectively deflecting a first wavelength or bandwidth of radiant energy contained in the beam while permitting the remainder of the beam to pass through; and
(b) a second radiant energy deflecting member of plano parallel construction, supported in a relatively closely spaced, overlapping alignment with said first deflecting member and in a position of radiant energy deflecting alignment with respect to the beam after the passage of the beam through said first deflecting member, the spacing and alignment between said first and second deflecting members being such that the radiant energy deflected by said second deflecting member passes along a path that is in part through said first deflecting member.

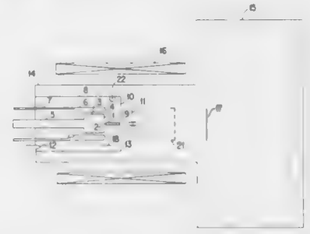
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**4,746,799**

## ATOMIC JET RADIATION SOURCE

**Michael R. McMillan, 19151 Stedwick Dr., Gaithersburg, Md. 20879**

**Filed Jul. 30, 1986, Ser. No. 890,556**
**Int. Cl.[4] H01J *27/02***
**U.S. Cl. 250—423 R** **15 Claims**



1. An atomic jet plasma and light source comprising:
a jet of atoms or molecules issuing into a vacuum region containing free electrons from a pinhole in a gas cell containing said atoms or molecules in a gas state at about 1–100 atmospheres;
high frequency electric field means for accelerating said electrons and establishing and maintaining a discharge in an electron-atom collision zone located between the pinhole and a point up to 200 pinhole diameters downstream in the jet from the pinhole, thereby producing plasma and light which radiate outward from the collision zone.

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**4,746,800**

## POSITIONING DEVICE COMPRISING A Z-MANIPULATOR AND A θ-MANIPULATOR

**Jan Van Eijk, Eindhoven; Marinus A. Van Den Brink, Veldhoven; Johannes M. M. Van Kimmenade, Veldhoven, and Hubert A. M. Neilen, Veldhoven, all of Netherlands, assignors to ASM Lithography B.V., Veldhoven, Netherlands and U.S. Philips Corporation, New York, N.Y.**

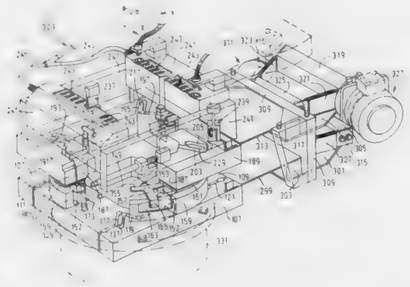
**Filed Sep. 22, 1986, Ser. No. 910,101**
**Claims priority, application Netherlands, Mar. 27, 1986, 8600785**
**Int. Cl.[4] G21K *5/10***
**U.S. Cl. 250—442.1** **11 Claims**

1. A positioning device comprising a Z-manipulator for translation in a predetermined axis of an orthogonal coordinate system, said Z-manipulator comprising a first support and a second support, said first support being rotatable about said predetermined axis with respect to said second support, an object holder which is displaceable by means of the Z-manipulator in the predetermined axis, means connecting said object holder to one of said supports for providing said object holder with a substantially frictionless and hysteresis-free translational movement in said predetermined axis, a θ-manipulator for rotation about said predetermined axis, means connecting said object holder to said θ-manipulator for provid-

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ing said object holder with substantially frictionless and hysteresis-free rotation about said predetermined axis, first elastic coupling members, said first and second supports being secured to each other by said first elastic coupling members, one of said two supports occupying a fixed position along the predetermined axis of the coordinate system, wherein separator means which is elastically deformable in the direction of



the predetermined axis couples the Z-manipulator to the $\theta$-manipulator, and whereby due to elastic deformation of said first elastic coupling members, said separator means upon relative rotation of said first support with respect to said second support produces a translation of the object holder in the direction of the predetermined axis without rotation of the object holder about said predetermined axis.

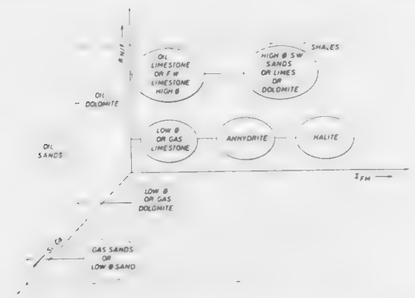
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**4,746,801**

## METHOD AND APPARATUS FOR DIFFERENTIATING LOW POROSITY LIMESTONES FROM HIGH POROSITY GAS SANDS

**Harry D. Smith, Jr., Houston, and Michael P. Smith, Spring, both of Tex., assignors to Halliburton Company, Duncan, Okla.**

**Filed Dec. 23, 1985, Ser. No. 812,884**
**Int. Cl.[4] G01V** *5/10*
**U.S. Cl. 250—270** **9 Claims**




**1**. A borehole logging method for differentiating low porosity limestones from high porosity gas sands, comprising:

(a) generating, in the borehole, a plurality of repetitive relatively short duration discrete bursts of fast neutrons which are rapidly moderated by interaction with nuclei of materials in the borehole and surrounding earth formations and slowed down to thermal energy, creating a repetitive succession of thermal neutron populations in the borehole and surrounding earth formations,

(b) detecting during the interval between neutron bursts at least at two spaced locations from said neutron generating location gamma radiation attributable to the capture of thermal neutrons by the nuclei of elemental constituents of substances in the borehole and in the earth formation in the vicinity of the borehole and generating count rate signals representative thereof,

(c) combining said count rate signals measured at least at one of said two spaced locations according to a predetermined relationship to derive at least one measurement signal representative of a thermal capture cross section of the earth formation medium in the vicinity of the borehole,

(d) combining at least some of said representative count rate signals detected at each of said two spaced locations from said neutron generating location to obtain a ratio signal indicative of formation hydrogen index,

(e) detecting, in the borehole, gamma radiations and separating therefrom by energy discrimination gamma radiation representative of silicon in and about the borehole and generating a silicon count signal representative thereof,

(f) detecting, in the borehole, gamma radiations and separating therefrom by energy discrimination gamma radiations representative of calcium and chlorine in and about the borehole and generating a calcium plus chlorine count signal representative thereof, and

(g) combining the silicon and calcium plus chlorine representative count signals according to a predetermined relationship and using said combined signals together with said hydrogen index indicating signal and said earth formation thermal neutron capture cross section representative signal used as a direct indicator of chlorine content of the earth formations to provide a measurement indicator signal differentiating low porosity limestones from high porosity gas sands.

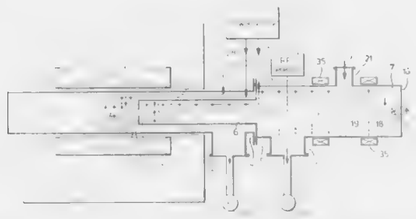
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**4,746,802**

## ION CYCLOTRON RESONANCE SPECTROMETER

**Hanspeter Kellerhals, Uster, Switzerland, assignor to Spectrospin AG, Zurich, Switzerland**

**Filed Oct. 28, 1986, Ser. No. 924,854**
**Claims priority, application Fed. Rep. of Germany, Oct. 29, 1985, 3538407**
**Int. Cl.[4] B01D** *59/44*
**U.S. Cl. 250—291** **7 Claims**



**1**. An ion cyclotron resonance spectrometer, comprising:

magnet means for generating a constant magnetic field which is homogeneous in space defined by the magnet means;

first and second cells arranged in the magnetic field, each of the cells being provided with electrodes forming an ion trap in each cell when corresponding potentials are applied, the cells being separated from each other by a common partition wall having an opening to permit ion transfer between the cells, the wall extending perpendicularly to the direction of the magnetic field;

pumping means connected to the first and second cells for creating different vacuum conditions in the cells;

ionization means for ionizing a sample and creating ions in the first cell evacuated to a lesser vacuum;

transmitter/receiver means connected to the second cell evacuated to a higher vacuum;

power source means for supplying the electrodes with potentials permitting the ions, selectively, to be retained in the respective ion traps or to be released for distribution between the first cell and the second cell; and

a section of the first cell projecting out of the space defined by the magnet means and being located in the area of its stray field so that access to the first cell is not obstructed by the magnet means, wherein the ionization means is connected to this outer section of the first cell.

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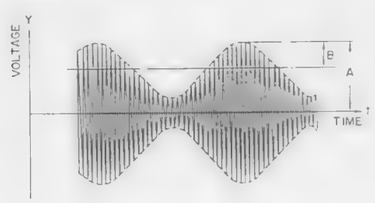


**4,746,803**

## METHOD OF FORMING A SINGLE CRYSTAL SEMICONDUCTOR LAYER FROM A NON-SINGLE-CRYSTALLINE MATERIAL AND APPARATUS FOR FORMING THE SAME

**Tomoyasu Inoue, Tokyo; Hiroyuki Tango, Yokohama; Kyoichi Suguro, Kawasaki; Iwao Higashinakagawa, Kawasaki, and Toshihiko Hamasaki, Kawasaki, all of Japan, assignors to Agency of Industrial Science and Technology, Tokyo, Japan**

**Division of Ser. No. 762,374, Aug. 5, 1985. This application Sep. 8, 1986, Ser. No. 904,942**
**Claims priority, application Japan, Feb. 15, 1985, 60-26181; Apr. 10, 1985, 60-74373; Apr. 10, 1985, 60-74374; Apr. 10, 1985, 60-74375; Apr. 10, 1985, 60-74376; Apr. 10, 1985, 60-82299**
**Int. Cl.[4] H01J** *3/28;* **H01L** *21/26*
**U.S. Cl. 250—492.2** **28 Claims**




**1**. An apparatus for forming a single crystal semiconductor layer from a non-single-crystalline material having a surface, comprising:

means for radiating an energy beam;

means for rapidly oscillating the energy beam with a high frequency signal having a modulated amplitude in first one and opposite directions to form a beam locus having a varying width on the surface of the non-single-crystalline material;

means for deflecting the beam at a constant rate in a second direction different from the first direction; and

means for applying the oscillated and deflected beam to the surface of the non-crystalline material to anneal the surface radiated by the beam locus, thereby forming a single crystal semiconductor layer on the annealed surface.

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**4,746,804**

## PHOTOSENSITIVE PIXEL WITH EXPOSED BLOCKING ELEMENT

**Koichi Kitamura, Troy; Louis D. Swartz, Holly; Clive Catchpole, Birmingham, and Zvi Yaniv, Farmington Hills, all of Mich., assignors to Ovonic Imaging Systems, Inc., Troy, Mich.**

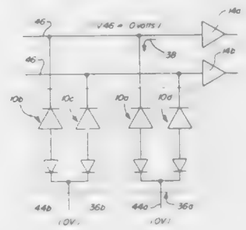
**Continuation of Ser. No. 907,926, Sep. 16, 1986, Pat. No. 4,714,836. This application Sep. 8, 1987, Ser. No. 93,842**
**Int. Cl.[4] H04N** *3/14*
**U.S. Cl. 250—578** **21 Claims**

**1**. A photoresponsive pixel for generating a signal indicative of the radiation emanating from an image-bearing surface, said pixel including:

a photogenerative element formed of a given number of layers of semiconductor alloy material and providing a detectible signal corresponding to the quantity of radiation incident thereupon;

at least one blocking element formed on the same number of layers of semiconductor alloy material as the photogenerative layer and electrically connected to the photogenerative element so as to selectively block the flow of current thereto;

said blocking element including a photogenerative region at least partially unshielded from said incident radiation; and



said photogenerative element and said blocking element closely spaced relative to one another so as to receive radiation from substantially the same portion of the image-bearing surface.

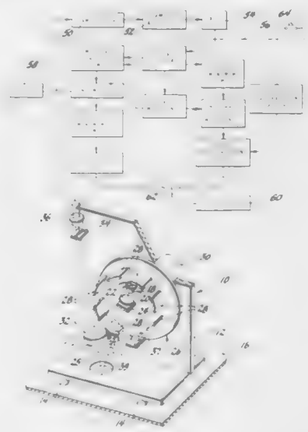
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**4,746,805**

## COMBINED DISTINCTNESS OF IMAGE AND GLOSS METER

**Thomas T. Stapleton, Bloomfield Hills, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Nov. 18, 1986, Ser. No. 931,852**
**Int. Cl.[4] G01N** *21/55*
**U.S. Cl. 250—571** **3 Claims**



**1**. A combined distinctness of image meter and gloss meter for measuring the reflective quality of a surface comprising:

a light source and a light detector for respectively illuminating a surface being inspected and receiving light reflected from the surface,

an aperture near one of the source and the detector,

a motor driven chopper blade in the light path for interrupting the illumination and causing a reflection of the edge of the blade in the finish,

means for focusing the reflected image of the blade onto the detector whereby the detector signal varies as a function of the total light and the scattered light received by the detector, and

an electrical circuit responsive to the detector signal for determining the difference of the total light and the scattered light received by the detector to achieve a gloss

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measurement and for determining the distinctness of image.

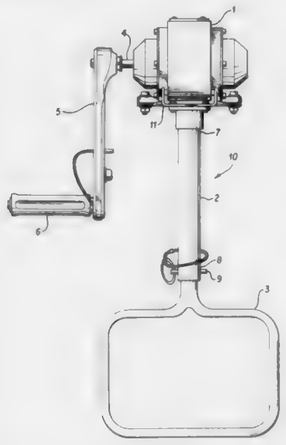
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**4,746,806**

## MANUALLY OPERATED ELECTRICAL GENERATOR APPARATUS

**Carl J. Campagnuolo, Potomac; Paul S. Clohan, Jr., Olney, and John W. Hopkins, Columbia, all of Md., assignors to United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Aug. 17, 1987, Ser. No. 87,944**
**Int. Cl.[4] F03G *5/06***
**U.S. Cl. 290—1 R** **12 Claims**



1. A portable manually cranked electrical generator apparatus comprising:
a manually cranked generator;
a rigid support member having a first end attached to said manually cranked generator and a second end:
a rigid stirrup fixedly attached to the second end of said rigid support member and sized to accommodate an operator's foot so that the operator anchors the apparatus by placing his foot through said stirrup while simultaneously operating said manually cranked generator.

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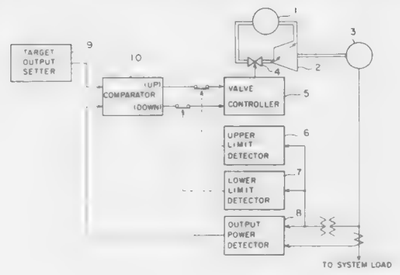
**4,746,807**

## AUTOMATIC CONTROL SYSTEM FOR CONTROLLING THE OUTPUT POWER OF A POWER PLANT

**Isao Furo, and Suketsugu Kabayama, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Jan. 28, 1987, Ser. No. 7,470**
**Claims priority, application Japan, Jan. 29, 1986, 61-18747**
**Int. Cl.[4] F01D *17/04***
**U.S. Cl. 290—40 C** **5 Claims**

1. An automatic control system for a power plant incorporating a torque generation means which produces a constant torque and a generator which converts the torque produced by said torque generation means into an electrical output, said control system comprising:
a torque control means which controls the amount of torque produced by said torque generation means;
an output signal target setting means which sets, as an output signal, a target value of torque output necessary for a certain electrical output;
a comparison means which compares a detected output of a power system connected to said power plant with said target value;
a command output setting means which cuts a command output provided by said comparison means to said power plant at an upper limit and lower limit of frequency of output to said power system, and validates the command output only when the system frequency is within a certain range; and
a power generation control means which receives a torque generation down command produced by said comparison




means when the detected value is larger than the target value and a torque generation up command produced when the detected value is smaller than the target value only when the system output frequency is within the range as set by said command output setting means, and provides a control signal to said torque control means.

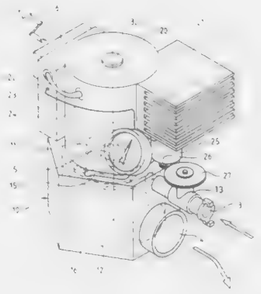
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**4,746,808**

## PORTABLE HYDROELECTRIC GENERATOR UNIT

**Charles Kaeser, 18, chemin de Rennier, Pully, Switzerland**

**PCT No. PCT/CH86/00078, § 371 Date Feb. 3, 1987, § 102(e) Date Feb. 3, 1987, PCT Pub. No. WO86/07414, PCT Pub. Date Dec. 18, 1986**
**PCT Filed Jun. 3, 1986, Ser. No. 19,975**
**Claims priority, application France, Jun. 4, 1985, 85 08520**
**Int. Cl.[4] F03B *1/00***
**U.S. Cl. 290—52** **12 Claims**



1. a portable hydroelectric generator set comprising:
(a) a hydraulically multi-jet Pelton type turbine including:
(i) a body having a water inlet for connection to a source of water under pressure and a water discharge conduit;
(ii) a turbine wheel being mounted on a shaft and rotating in air within said body, said turbine wheel having a plurality of blades;
(iii) an annular distribution chamber located within said body and being arranged substantially coaxially with said turbine wheel, said annular distribution chamber being in communication with said water inlet, said annular distribution chamber having a wall, said wall having a plurality of openings facing said turbine wheel;
(iv) a flow control valve in said water inlet for controlling the water flow rate entering said turbine;



(v) a plurality of injectors, each injector comprising a tubular member fitted into one of said plurality of openings and having an open end to generate a water jet directed onto said blades of said turbine wheel;
(b) an electric generator having a shaft connected to said turbine wheel; and
(c) an output power regulating device comprising an electronic regulator electrically connected to a power output of said generator set and electric actuating means adapted to control said flow control valve.

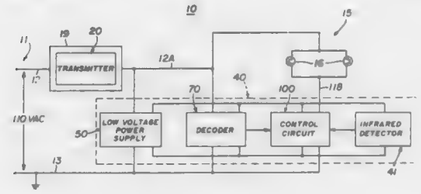
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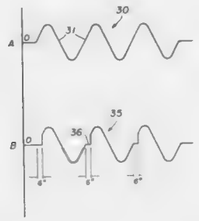
**4,746,809**

## AC POWER LINE SIGNALING SYSTEM

**Charles E. Coleman, Fort Collins, and Paul A. Staby, Golden, both of Colo., assignors to Pittway Corporation, Northbrook, Ill.**

**Filed Oct. 30, 1986, Ser. No. 925,076**
**Int. Cl.[4] H04M *11/04*; H02J *3/02, 1/00***
**U.S. Cl. 307—1** **20 Claims**



1. A system for electrical signaling over an AC power distribution circuit carrying a periodic AC voltage having a positive zero crossing and a negative zero crossing during each cycle, said system comprising: transmitter means coupled to the AC power distribution circuit for imposing control signals thereon solely by increasing the duration of at least one zero crossing in each cycle of the AC voltage, and receiver means coupled to the AC power distribution circuit for detecting said control signals.

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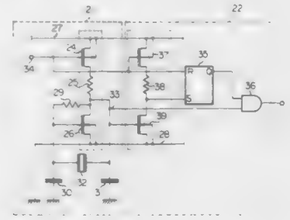
**4,746,810**

## PULSE GENERATING CIRCUIT

**Yasushi Takahashi, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed Aug. 28, 1987, Ser. No. 90,485**
**Claims priority, application Japan, Aug. 28, 1986, 61-203027**
**Int. Cl.[4] H03K *3/00, 5/153*; H03B *5/30***
**U.S. Cl. 307—106** **13 Claims**

8. A pulse generating circuit producing a pulse train consisting of a number of pulses each having a preselected pulse height, comprising:
(a) a control node applied with a control signal;
(b) a resonant circuit operative to produce an oscillation signal;
(c) a first inverter circuit operative to produce a raw pulse train at an output node thereof based on said oscillation signal in the presence of said control signal, said raw pulse train consisting of a number of pulses including at least one pulse having a pulse height shorter than the preselected pulse height;
(d) a second inverter circuit coupled in series to said first inverter circuit and operative to produce a dummy voltage level at an output node thereof in the presence of said control signal; and



(e) a logic circuit having a threshold voltage thereof and activated to produce said pulse train based on said raw pulse train when the dummy voltage level excesses the threshold voltage thereof, wherein said first inverter circuit is identical in circuit arrangement with said second inverter circuit.

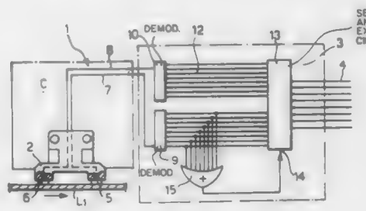
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**4,746,811**

## DEVICE FOR PICKING UP CONTROL SIGNALS FOR CONVEYOR UNITS, PARTICULARLY CARRIAGES OF CONVEYOR LINES FOR INDUSTRIAL PLANTS

**Roberto Agujaro, Turin, Italy, assignor to Pianelli & Traversa S.a.s., Italy**

**Filed Jan. 28, 1987, Ser. No. 7,700**
**Claims priority, application Italy, Jan. 28, 1986, 52902/86[U]**
**Int. Cl.[4] G05B *11/00***
**U.S. Cl. 307—147** **5 Claims**




1. A control system for a conveyor unit movable along a predetermined path said system comprising a transmission line for movement control signals adapted to extend along said path, the transmission line being divided into several successive sections which can convey respective control signals and are separated by isolation gaps of predetermined width, each of which extends between two of the sections,
two pick-up elements adapted to be mounted on a conveyor unit for movement along said transmission line to receive signals therefrom said two pick-up elements being aligned with each other in the direction of movement of the conveyor unit so as to be positioned respectively upstream and downstream in the direction of movement of the conveyor unit and being separated by a distance, with reference to the predetermined width, such that, duing traversal of the gaps, at least one of the two pick-up elements is adjacent a section of said transmission line to receive signals from the transmission line, and
signal treatment circuit means sensitive to the signals received by the two pick-up elements to distinguish at least a first and a second operative condition corresponding respectively to the reception of a single control signal by

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at least one of the two pick-up elements and the reception of two different control signals by the two pick-up elements, and to generate selectively an output control signal corresponding respectively to the single control signal in the first operative condition and to one and only one of the two different control signals in the second operative condition.

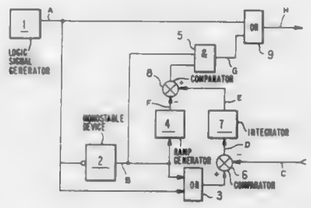
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**4,746,812**

## PROCESS FOR CONTROL OF THE INSTANT OF OPENING OF AN INTERRUPTER, AND CORRESPONDING LOGIC CIRCUIT

**Jean-Marie Andrejack, Avon, and Henri Foch, Toulouse, both of France, assignors to Jeumont-Schneider Corporation, Puteaux cedex, France**

**Filed Apr. 14, 1986, Ser. No. 851,251**
**Claims priority, application France, Apr. 17, 1985, 85 05760**
**Int. Cl.[4] H03K** *17/56, 3/33, 5/13*
**U.S. Cl. 307—240** **9 Claims**




1. A method for controlling switching of an interrupter from a closed state to an open state such that said interrupter reaches said open state at a predetermined instant, comprising terminating a first closing command signal to said interrupter at a predetermined time interval in advance of said predetermined instant and upon termination of said first closing command signal applying a second closing command signal to said interrupter, said second closing command signal having a duration equal to the difference between the duration of said predetermined interval and the actual time required for said interrupter to pass from said closed state to said open state.

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**4,746,813**

## SWITCHING CIRCUIT FOR INDUCTIVE LOAD WITH RFI SUPPRESSION

**Robert J. Disser, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.**

**Filed Jun. 4, 1987, Ser. No. 58,248**
**Int. Cl.[4] H03K** *17/60, 3/01, 17/687;* **G05F** *1/40*
**U.S. Cl. 307—248** **4 Claims**



1. A switching circuit comprising, in combination:
an electric power supply having a supply voltage;
an inductive load with a parallel freewheeling diode, the freewheeling diode being of the type which becomes a momentary short circuit as it is changed from a forward to a reverse biased condition;
a semiconductor switch connected in series with the inductive load across the electric power supply, the semiconductor switch having main electrodes and a control electrode defining a control voltage and further having internal capacitance between the control electrode and each of the main electrodes;
switch control means effective to change the semiconductor switch from a nonconducting to a conducting state by sourcing current to the control electrode to charge the internal capacitance and raise the control voltage, the switch control means being responsive to the voltage across the load to produce a lower current rate to the control electrode while the voltage across the load indicates a condition other than reverse bias for the freewheeling diode in order to reduce RFI by slowing the switching of the semiconductor switch while the freewheeling diode is recovering and a higher current rate as soon as the voltage across the load indicates reverse bias for the freewheeling diode in order to minimize time spent in the active conduction region of the semiconductor switch and thus minimize resultant heat generation during switching.

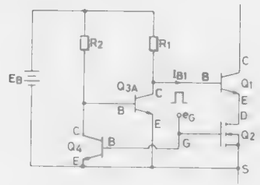
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**4,746,814**

## SEMICONDUCTOR DEVICE FOR CONDUCTING PRIMARY CURRENT UPON RECEIPT OF A CONTROL SIGNAL

**Hisao Shigekane, Kanagawa, Japan, assignor to Fuji Electric Company Ltd., Japan**

**Filed Jun. 17, 1986, Ser. No. 875,336**
**Claims priority, application Japan, Jun. 17, 1985, 60-131296**
**Int. Cl.[4] H03K** *17/60, 17/687*
**U.S. Cl. 307—255** **7 Claims**




1. A semiconductor device for conducting primary current upon receipt of a control signal comprising:
(a) a first transistor having a control electrode and a primary current path;
(b) a second transistor having a control electrode for receiving said control signal and having a primary current path coupled in series with said primary current path of said first transistor at a common junction of said first and second transistors, the resultant series connected primary current paths also coupled to receive said primary current;
(c) a secondary current source coupled to said control electrode of said first transistor;
(d) a third transistor having a control electrode and having a current path coupled to shunt secondary current from said secondary current source away from said control electrode of said first transistor upon conduction of said third transistor; and
(e) a fourth transistor having a control electrode coupled to receive said control signal and having a current path coupled to conduct current from said secondary current source upon conduction of said fourth transistor and upon corresponding conduction of said second transistor in response to said control signal, said control electrode of said third transistor coupled at the junction of said secondary current source and said current path of said fourth transistor, said fourth transistor having a polarity to render said fourth transistor non-conductive in response to said control signal rendering said second transistor non-conductive and said third transistor having a polarity to render said third transistor conductive in response to non-conduction of said fourth transistor to thereby shunt said secondary current away from said control electrode of said first transistor upon non-conduction of said second transistor.



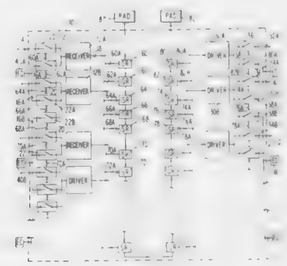
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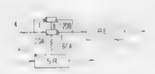
**4,746,815**

## ELECTRONIC EC FOR MINIMIZING EC PADS

**Harsaran S. Bhatia, Hopewell Junction; Mario E. Ecker, Poughkeepsie, both of N.Y.; Harry J. Jones, Austin, Tex., and Shashi D. Malaviya, Hopewell Junction, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Jul. 3, 1986, Ser. No. 881,755**
**Int. Cl.[4] H03K** *3/26, 3/335*
**U.S. Cl. 307—303** **32 Claims**





1. An integrated circuit device containing a minimum number of EC pads but permitting EC of at least two adjacent receivers or drivers or a combination thereof in a chip, comprising:
a module for carrying on a surface thereof at least one integrated circuit chip,
a first plurality of EC pads disposed on said surface of said module; and
an integrated circuit chip including a plurality of receiver circuits and driver circuits, each receiver circuit and driver circuit having a first signal line connected thereto, a second signal line going to a point external to the chip, and at least one EC signal line, said integrated circuit chip further including switching means for connecting only one of said second signal line and said at least one EC signal line to said first signal line, and means for connecting each of a second plurality of said EC pads to a different set of at least three EC signal lines from receiver circuits, driver circuits, or a combination thereof.

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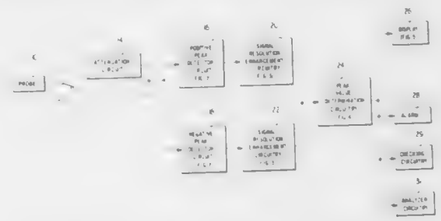
**4,746,816**

## SPIKE DETECTOR CIRCUITRY

**Ole V. Olesen, Annapolis, Md., assignor to Pace Incorporated, Laurel, Md.**

**Division of Ser. No. 535,925, Sep. 26, 1983, Pat. No. 4,639,618.**
**This application Dec. 2, 1986, Ser. No. 936,778**
**Int. Cl.[4] H03K** *5/153*
**U.S. Cl. 307—351** **16 Claims**

1. Circuitry for detecting a pulse of short duration including
storage means for storing the peak amplitude of said pulse;
signal resolution enhancement means responsive to said storage means for establishing a plurality of channels respectively corresponding to a plurality of signal amplitude ranges where the range of signal amplitudes for each successive range is larger than that of the range preceding it, said signal resolution means including signal amplification means for each range; and
peak signal detecting means responsive to said signal resoltuion enhancement means for (a) scanning said channels,



(b) selecting one of said channels, said selected channel being such that said peak amplitude falls within the range for said channel, and (c) detecting said peak amplitude of the pulse.

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**4,746,817**

## BIFET LOGIC CIRCUIT

**Dennis C. Banker, Newburgh; Allan H. Dansky, Poughkeepsie; Jack A. Dorler, Holmes; Walter S. Kiara, Hopewell Junction; Frank M. Masci, Wappingers Falls; Steven J. Zier, Hopewell Junction, and Adrian Zuckerman, Poughkeepsie, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Mar. 16, 1987, Ser. No. 26,229**
**Int. Cl.[4] H03K** *17/04, 19/01*
**U.S. Cl. 307—446** **30 Claims**



1. A BIFET circuit, comprising:
at least one input line and an output line;
a CFET logic circuit having an input terminal connected to said at least one input line, said CFET logic circuit for generating different signals on a first and a second control lines in accordance with the signal values on said at least one input line;
a push-pull circuit connected to said first and second control lines and formed of bipolar transistors for driving current into said output line if said first control line is in a predetermined value range, and for sinking current from said output line if said second control line is in a predetermined value range;
a power supply; and
resistive means for connecting said power supply to provide a current of a desired polarity through said CFET logic circuit to said second control line to thereby cause said push-pull circuit to sink current from said output line even after said output line drops in voltage.

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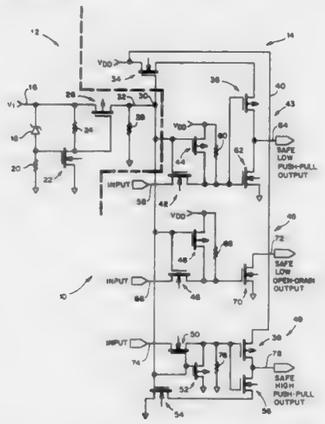


**4,746,818**

## CIRCUIT FOR MAINTAINING THE STATE OF AN OUTPUT DESPITE CHANGES IN THE STATE OF INPUT

**Warren G. Hafner, Lake Carmel, N.Y., assignor to Pitney Bowes Inc., Stamford, Conn.**

**Filed Mar. 12, 1985, Ser. No. 710,798**
**Int. Cl.⁴ H03K** *19/092, 17/16, 19/003*
**U.S. Cl. 307—363** **9 Claims**



1. A low voltage control circuit having at least one input terminal and at least one output terminal, said circuit being operative for maintaining said at least one output terminal in known state regardless of the state of an input at the input terminal when at least one voltage to be monitored is below a predetermined limit voltage, comprising:

control means for providing a deactivating output voltage when the voltage to be monitored is below the predetermined limit voltage;

output means electrically coupled to said control means for receiving the deactivating output voltage from said control means and for receiving at least one input voltage from said input terminal;

said output means being deactivated in response to the deactivating output voltage to provide a known voltage level at the output terminal until the voltage to be monitored reaches the predetermined limit voltage whereupon said control means will provide an activating output voltage to said output means to enable the voltage level at the output terminal to be controlled by the voltage level of the input;

said control means including a voltage limit means connected to receive the voltage to be monitored for establishing the predetermined limit voltage; and;

said voltage limit means including a Zener diode coupled in series with a biasing resistor, said Zener diode being connected to receive the voltage to be monitored and the resistor being grounded, the junction of the Zener diode and the biasing resistor providing the limiting voltage.

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**4,746,819**

## PHASE SHIFTING CIRCUIT FOR PULSE SIGNALS

**Shigeru Kashiwagi, Noda, Japan, assignor to Victor Company of Japan, Ltd., Tokyo, Japan**

**Filed Dec. 9, 1986, Ser. No. 939,631**
**Claims priority, application Japan, Dec. 10, 1985, 60-277436**
**Int. Cl.⁴ H03K** *5/13, 5/22, 3/284*
**U.S. Cl. 307—511** **10 Claims**

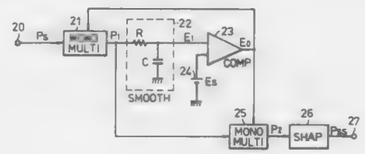
1. A phase shifting circuit for shifting a phase of an input pulse signal, said phase shifting circuit comprising:

a first delay circuit for delaying said input pulse signal so as to produce a first pulse signal having a first pulse width;

a second delay circuit for delaying said first pulse signal so as to produce a second pulse signal having a second pulse width;

a smoothing circuit for smoothing said first pulse signal; and

a comparing circuit for comparing an output signal level of said smoothing circuit with a predetermined reference level so as to produce a control signal dependent on a difference between the two compared levels, said control signal being supplied to said first and second delay circuits to control delay times thereof so that said first and second pulse widths respectively become constant,



said second delay circuit producing said second pulse signal as an output pulse signal of the phase shifting circuit having a period essentially identical to that of said input pulse signal but having a phase which is shifted by a predetermined quantity with respect to the phase of said input pulse signal, said predetermined quantity being substantially constant regardless of a period of said input pulse signal.

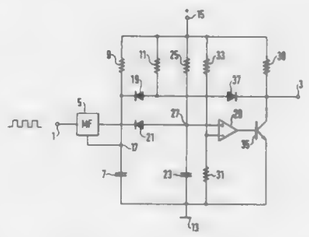
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**4,746,820**

## PULSE FREQUENCY RESPONSIVE SWITCH

**Rainer Fey, Schweinfurt, Fed. Rep. of Germany, assignor to Fichtel & Sachs AG**

**Filed Feb. 9, 1987, Ser. No. 12,293**
**Claims priority, application Fed. Rep. of Germany, Mar. 29, 1986, 3610605**
**Int. Cl.⁴ H03K** *9/06, 5/13*
**U.S. Cl. 307—524** **5 Claims**



1. A switch controllable as a function of a pulse rate of a sequence of pulses, comprising:

(a) a monoflop triggerable by an edge in each of the pulses in said pulse sequence;

(b) a capacitor-resistor network coupled to a control input of said monoflop for determining a triggering time of said monoflop, said network including a controllable switch for changing the resistance therein, whereby a first switching position sets a first triggering time in said monoflop and a second switching position sets a second triggering time which is shorter than said first triggering time;

(c) an integration circuit connected to an output of said monoflop for integrating the output therefrom; and

(d) a comparator connected to an output of said integration circuit for comparing the integrated output to a reference voltage, an output of said comparator being connected to a control input of said controllable switch in said network, whereby, when the integrated output is lower than said reference voltage, said controllable switch is set in the first switching position, and when the integrated output is higher than said reference voltage, said controllable switch is set in the second switching position.



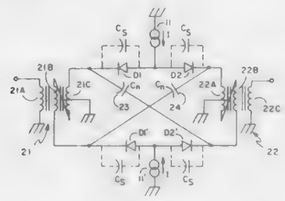
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**4,746,821**

## CONSTANT PHASE LIMITING INDEPENDENT OF INPUT SIGNAL AMPLITUDE

**David E. Norton, Burlington, Mass., assignor to Adams-Russell Co. Inc., Waltham, Mass.**

**Filed Feb. 14, 1986, Ser. No. 829,626**
**Int. Cl.⁴ H03K** *5/08, 3/26, 17/74*
**U.S. Cl. 307—565** **4 Claims**



1. In a diode limiting circuit having at least a first pair of first and second oppositely poled diodes connected together at a node and in series between an input and output with each of said diodes characterized by a shunt diode capacitance of value $C_S$ in parallel with the diode junction and biased by a constant current source connected to said node, the improvement for providing limiting with constant transmission phase substantially independent of input signal level at said input comprising,

means for providing a current path from said input to said output for carrying current substantially equal in amplitude and opposite in phase to that which flows through said shunt diode capacitance to negate the undesirable phase shift caused by the current which flows through said shunt diode capacitance.

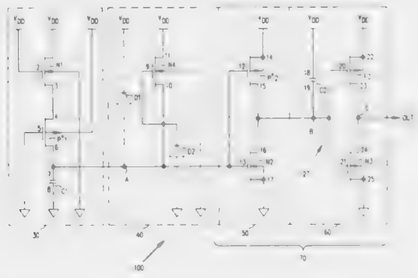
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**4,746,822**

## CMOS POWER-ON RESET CIRCUIT

**John Mahoney, San Jose, Calif., assignor to Xilinx, Inc., San Jose, Calif.**

**Filed Mar. 20, 1986, Ser. No. 841,910**
**Int. Cl.⁴ H03K** *17/22*
**U.S. Cl. 307—594** **18 Claims**



1. A CMOS power-on reset circuit comprising:

an initializing circuit having an input terminal and an output terminal, said initializing circuit providing a first constant voltage signal to said output terminal in response to a supply voltage rising above a first selected value;

a delay circuit, responsive to said supply voltage for providing a first intermediate signal, said delay circuit comprising

a resistive means having an output terminal and a first terminal;

a capacitor having a first and a second plate, said first plate of said capacitor being connected to said output terminal of said resistive means, said second plate of said capacitor for connecting to a reference voltage;

wherein said resistive means conducts if and only if said supply voltage rises above a third selected value;

wherein said supply voltage is applied to said first terminal of said resistive means;

wherein said first intermediate signal is provided to said output terminal of said resistive means after said supply voltage rises above said third selected value; and further

wherein said first intermediate signal rises above a second selected value on said output terminal of said resistive means a selected period of time after said supply voltage rises above said first selected value such that said initializing circuit provides a first constant output signal;

an inverting means having an input terminal and an output terminal, said input terminal of said inverting means being connected to said output terminal of said resistive means and said output terminal of said inverting means being connected to said input terminal of said initializing circuit, said input terminal of said inverting means receiving said first intermediate signal and said inverting means providing a second intermediate signal, complementary to said first intermediate signal, to said input terminal of said initializing circuit in response to said first intermediate signal rising above said second selected value on said output terminal of said resistive means, said second intermediate signal causing said initializing circuit to provide a second constant voltage signal to said output terminal of said initializing circuit.

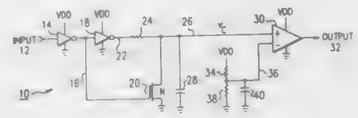
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**4,746,823**

## VOLTAGE-INSENSITIVE AND TEMPERATURE-COMPENSATED DELAY CIRCUIT FOR A MONOLITHIC INTEGRATED CIRCUIT

**Robert D. Lee, Denton, Tex., assignor to Dallas Semiconductor Corporation, Dallas, Tex.**

**Filed Jul. 2, 1986, Ser. No. 881,136**
**Int. Cl.⁴ H03K** *5/13, 17/56, 3/26*
**U.S. Cl. 307—601** **9 Claims**



1. A delay circuit fabricated in a monolithic integrated circuit, said delay circuit having an input node for receiving an input signal, having a first DC reference voltage node for receiving a first DC reference voltage, having a second DC reference voltage node for receiving a second DC reference voltage, and having a first internal signal node, a second internal signal node, and an output node, comprising:

a. means responsive to a logic state transition of said input signal for providing a signal on said first internal signal node that transitions substantially from said first DC reference voltage to said second DC reference voltage;

b. a first resistive element connected between said first internal signal node and said second internal signal node;

c. a capacitive element connected between said second internal signal node and said first DC reference voltage node;

d. voltage divider means coupled between said first DC reference voltage node and said second DC voltage reference node for generating on a third DC voltage reference node a third DC reference voltage having a value equal to said first DC reference voltage plus a substantially fixed

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percentage of the voltage difference between said first and second DC reference voltages; and

e. a voltage comparator having two inputs and an output, one of said voltage comparator inputs being connected to said second internal signal node, the other of said voltage comparator inputs being coupled to said third DC reference voltage node, the output of said voltage comparator being coupled to the output node of said delay circuit, said voltage comparator generating a logic state transition on its output when the voltage on said second internal signal node transitions from being less than said third DC reference voltage to greater than said third DC reference voltage;

whereby a delay output signal may be provided and whereby the amount of delay is substantially independent of variations in the voltage difference between said first and second reference voltages.

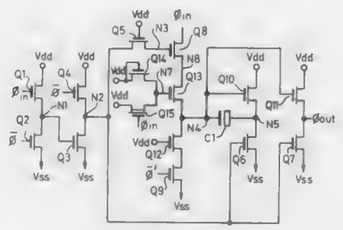
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**4,746,824**

**HIGH POTENTIAL HOLD CIRCUIT**

**Koichi Magome; Hiroyuki Koinuma, and Haruki Toda, all of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Oct. 21, 1986, Ser. No. 921,272**
**Claims priority, application Japan, Oct. 25, 1985, 60-239012**
**Int. Cl.⁴ H03K** *5/13, 19/003;* **G11C** *27/02*
**U.S. Cl. 307—605** **16 Claims**




1. A high potential hold circuit comprising:

a high potential node;

a high potential hold enhancement mode MOS transistor for holding a potential of the high potential node by setting the high potential hold transistor in a non-conducting state after the node is charged, having one terminal connected to a first input signal and a second terminal connected to the high potential node;

an enhancement mode MOS transistor for discharging the potential of the high potential node, having one terminal connected to the ground potential, a second terminal connected to the high potential node and a gate connected to a second input signal;

a field relaxation enhancement mode MOS transistor located between a high potential node and a high potential hold transistor; and

means for charging and discharging a potential of a gate of the field relaxation transistor having a depletion mode MOS transistor located between the gate of the field relaxation enhancement mode MOS transistor and a power supply.

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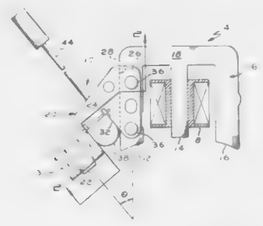
**4,746,825**

**ALTERNATOR CORE ATTACHMENT**

**Russell D. Phelon, Longmeadow, Mass., assignor to R. E. Phelon Company, Inc., East Longmeadow, Mass.**

**Continuation of Ser. No. 373,175, Apr. 29, 1982, abandoned.**
**This application Feb. 26, 1987, Ser. No. 19,040**
**Int. Cl.⁴ H22K** *11/00*
**U.S. Cl. 310—70 R** **2 Claims**

1. Generator coil/core attachment for the stator of a magneto coil mounted on the pole of a ferromagnetic core having a plurality of radially extending poles disposed adjacent the circular path of a rotor, including permanent magnet flux generating means, said attachment comprising an integral flux carrying core of laminated construction including one radially extending leg having a generator coil mounted thereon, a cross bar portion and a laminated mounting flange portion which serves as a portion of a flux path for said generator coil and is adapted to be connected against the outer surface of one of the poles of the magneto core, said attachment including a side



edge surface underlying said flange, said side edge surface lying at an oblique angle to the axis of said one radially extending leg and being abutted against the outer side surface of one of said magneto poles, the tip of said leg being disposed adjacent the same circular path as the tips of said magneto poles, whereby said attachment provides a flux path for the generator coil, said flux path including said one leg, the cross bar, the mounting flange and the pole of the magneto coil onto which said flange is mounted.

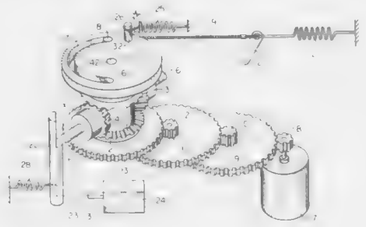
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**4,746,826**

**ELECTROMAGNETIC CLUTCH APPARATUS**

**Charles F. Burney, Orland, Calif., assignor to A.R.A. Manufacturing Company of Delaware, Inc., Grand Prairie, Tex.**

**Filed Jul. 27, 1987, Ser. No. 78,080**
**Int. Cl.⁴ H02K** *7/10;* **F16H** *3/44*
**U.S. Cl. 310—78** **7 Claims**



1. A clutch apparatus of the positive engagement type for reversibly enabling a mechanical linkage between a driving motor and said motor's mechanical load utilizing a differential gear cluster comprising:

a driving bevel gear mechanically connected to said driving motor and rotating about a fixed axis means;

a driven bevel gear mechanically connected to a mechanical load and also rotating about said fixed axis means;

an interposing gear with teeth meshing with the teeth of both said driving bevel gear and said driven bevel gear and rotating about a rotatable axis means perpendicular to said fixed axis means in such manner as to impart no torque to said driven gear as said interposing gear is made to rotate by said driving gear if said rotatable axis is free to rotate about said fixed axis; and

a mechanical stop means for reversibly enabling and disabling the free rotation of said rotatable axis means about said fixed axis means thereby reversibly disabling and enabling, respectively, the mechanical linkage between said driving gear and said driven gear.

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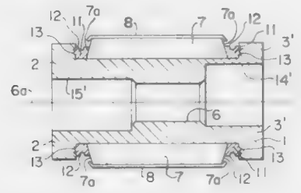


**4,746,827**

**ROTOR FOR ELECTRIC MOTOR**

**Izumi Ochiai; Hideo Hashida; Yoshio Asahino, and Nobuhiko Yokota, all of Tochigi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Feb. 17, 1987, Ser. No. 15,630**
**Claims priority, application Japan, Feb. 28, 1986, 61-41745**
**Int. Cl.⁴ H02K** *21/14*
**U.S. Cl. 310—156** **5 Claims**




1. A rotor for an electric motor, comprising:

an iron core having flange portions at both ends thereof;

a magnet disposed on the outer periphery of said iron core; and

holding means provided between said flange portions and end portions of said magnet for holding said magnet between said flange portions, said holding means being arranged to hold said end portions of said magnet,

wherein said holding means comprises wire members provided between said collar portions and said end portions of said magnet, said wire members being capable of urging said magnet toward said iron core, thereby fixing said magnet on the outer periphery of said iron core.

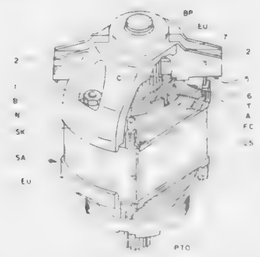
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**4,746,828**

**MOLDED ELECTRIC MOTOR HOUSING AND BRUSH HOLDER UNIT**

**Willard Nado, Trumbull; Robert Lockwood, Milford, and John Sherman, Westport, all of Conn., assignors to Electrolux Corporation, Stamford, Conn.**

**Filed Feb. 9, 1987, Ser. No. 12,786**
**Int. Cl.⁴ H02K** *5/16*
**U.S. Cl. 310—90** **23 Claims**



1. In an electric motor having a stator assembly, a rotor or armature, spaced end housings or caps operatively connected to and supporting said stator assembly and said armature, said stator assembly including field coil winding and terminals attached thereto, the armature having a commutator at one end thereof; the improvement comprising the end housing supporting the commutator end of said armature including a molded, generally U-shaped, plastic construction defining a bight portion, spaced legs defining skirt-like portions, and generally opposed, elongated, open-ended, tubular brush holders, said bight portion, spaced legs and brush holders being of integral one-piece plastic construction, said brush holders extending generally radially outwardly from said bight portion thereof and circumferentially spaced relative to said skirt-like portions and in linear alignment with terminals of the field coil windings, a conductive spring biased brush assembly confined within each plastic brush holder and engageable with said commutator, conductive contact means supported by each plastic brush holder and including a first portion retaining a brush assembly in said brush holder, said contact means being in electrical communication with an adjacent brush assembly, said conductive contact means including a second portion in direct contact with an adjacent terminal of the field coil windings, thereby forming a leadless connection therebetween.

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**4,746,829**

**BRUSH GEAR ASSEMBLY**

**Georg Strobl, Repulse Bay, Hong Kong, assignor to Johnson Electric Industry Manufactory, Limited, Chai Wan, Hong Kong**

**Filed Jul. 30, 1986, Ser. No. 890,826**
**Int. Cl.⁴ H02K** *13/00*
**U.S. Cl. 310—239** **10 Claims**



1. A brush leaf assembly for use in a motor, said brush leaf assembly comprising:

a substantially planar elongated flat leaf spring terminating at one end in a brush-receiving portion, and at the other end in a terminal -mating portion;

a substantially planar terminal element terminating at one end in a terminal adapted to receive a connection to a power source, and at the other end in a brush leaf-mating portion;

means for securing said terminal-mating portion to said brush leaf-mating portion;

a brush;

means defined in said substantially planar elongated flat leaf spring for holding said brush;

one end of said brush leaf-mating portion being bent to define a first planar arm, said first planar arm being bent to a first predetermined angle relative to an elongated rectangular portion of said substantially planar terminal element;

one end of said terminal-mating portion being bent to define a second planar arm, said second planar arm being bent to a second predetermined angle relative to a planar spring portion of said substantially planar elongated flat leaf spring;

said substantially planar terminal element and said substantially planar elongated flat leaf spring being positioned relative to each other so that said second planar arm contacts said elongated rectangular portion of said substantially planar terminal element and said first planar arm contacts said planar spring portion; and wherein said second predetermined angle is less than 90°,

said first predetermined angle being less than said second predetermined angle for pressing said first planar arm against said planar spring portion to cause intimate contact between said planar spring portion and said first planar arm at an edge of said first planar arm, said edge of said first planar arm forming a fulcrum for said planar spring portion.

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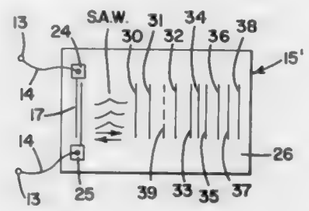


4,746,830

## ELECTRONIC SURVEILLANCE AND IDENTIFICATION

William R. Holland, 1237 Weathervane La., Apt. 3-C, Akron, Ohio 44313

Filed Mar. 14, 1986, Ser. No. 839,418
Int. Cl.[4] H01L *41/08*
U.S. Cl. 310—313 D 11 Claims




1. A passive surface acoustic wave transponder device comprising electrical input and output connections, a substantially ominidirectional antenna generally coupled to said connections, a substrate having a surface of piezoelectric material, an electrode transducer contacting said surface of said substrate and connected to said input to launch said wave upon selective electromagnetic excitation of said antenna by a field broadcast from a transceiver remote from said antenna and device, and a plurality of encoded transducers disposed along the path of said wave for reflection of echoes thereof to said output without electrodes and conversion of said wave to a voltage at said encoded transducers.

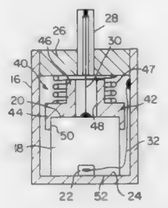
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4,746,831

## ULTRASONIC TRANSRECEIVER

Kouji Ichino, Tokyo, Japan, assignor to Kaijo Denki Co., Ltd., Japan

Filed Mar. 20, 1986, Ser. No. 841,660
Claims priority, application Japan, Mar. 27, 1985, 60-44501[U]; Jul. 11, 1985, 60-106151[U]
Int. Cl.[4] H01L *41/08*
U.S. Cl. 310—334 15 Claims




1. An ultrasonic transreceiver comprising:
a housing;
a piezoelectric transducer arranged in said housing and provided with a positive electrode and a negative electrode;
a plug mounted with respect to said housing; and
bias means for forcedly pressing said piezoelectric transducer against said housing;
wherein said biasing means downwardly forcedly press said piezoelectric transducer against a bottom wall of said housing,
wherein said biasing means comprise a holding member fitted on an upper portion of said piezoelectric transducer and a compressed coiled spring fitted on said holding member and interposed between said plug and said holding member,
wherein said holding member comprises a lower enlarged portion and an upper reduced portion of smaller diameter upwardly projecting from said enlarged portion,
said lower enlarged portion comprising a counter-bore like recess in which an upper portion of said piezoelectric transducer is adapted to be fittedly retained,
wherein said spring is situated about said upper reduced portion,
and additionally comprising
an insulating member through which said plug is mounted with respect to said housing, and
said holder extends close to said insulating member and is spaced a short distance therefrom,
whereby said transducer is constrained against lateral wobbling.

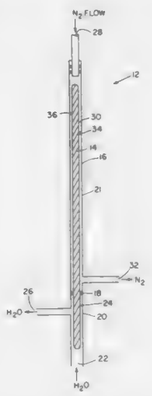
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4,746,832

## CONTROLLING THE VAPOR PRESSURE OF A MERCURY LAMP

Mark W. Grossman, Belmont, and William A. George, Rockport, both of Mass., assignors to GTE Products Corporation, Danvers, Mass.

Filed Dec. 31, 1985, Ser. No. 816,558
Int. Cl.[4] H01J *61/24, 61/34*
U.S. Cl. 313—22 13 Claims




1. A method for controlling the vapor equilibrium pressure of mercury in a mercury lamp, which comprises:
establishing and controlling two discrete temperature zones within the lamp, said first zone being a cold spot and said second zone being at a temperature greater than the first zone, thereby producing a controlled vapor equilibrium pressure throughout the lamp allowing control of the selectivity and intensity of the linewidth of the radiation emitted from the lamp.

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4,746,833

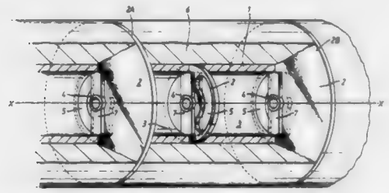
## COUPLED CAVITY TRAVELLING WAVE TUBES

Robin C. M. King, Ongar; Richard G. Carter, Carnforth, and Alan Griggs, Maldon, all of United Kingdom, assignors to English Electric Valve Company Limited, Chelmsford, England

Filed Apr. 17, 1986, Ser. No. 853,267
Claims priority, application United Kingdom, Apr. 24, 1985, 8510443; Jan. 30, 1986, 8602293
Int. Cl.[4] H01J *25/34*
U.S. Cl. 315—3.5 21 Claims

1. A coupled cavity travelling wave tube comprising: a hollow tube having at least one transverse wall, said transverse wall including material of relatively low thermal conductivity and having an aperture therein through which an electron beam is arranged to pass during operation of the travelling wave tube; and an elongate member of relatively high thermal conductivity material attached to said transverse wall and





extensive in a path from said aperture to a heat sink to provide a thermal conduction path from said aperture to said heat sink.

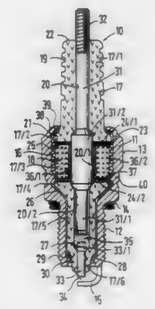
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4,746,834

## IGNITION PLUG FOR INTERNAL COMBUSTION ENGINES

Adalbert Bäuerle, Kornwestheim; Ludwig Barthelmä , Kornwestheim; Walter Benedikt, Kornwestheim; Werner Herden, Gerlingen; Walter Holl, Stuttgart; Gerhard Liebing, Stuttgart; Jürgen Schmatz, Mundelsheim; Siegbert Schwab, Maichingen, and Walter Würth, Bietigheim-Bissingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

PCT No. PCT/DE86/00198, § 371 Date Jan. 20, 1987, § 102(e) Date Jan. 20, 1987, PCT Pub. No. WO86/07207, PCT Pub. Date Dec. 4, 1986
PCT Filed May 10, 1986, Ser. No. 27,200
Claims priority, application Fed. Rep. of Germany, May 31, 1985, 3519513; Jan. 10, 1986, 3600511
Int. Cl.[4] H01N *13/38*
U.S. Cl. 313—137 10 Claims




1. In an ignition plug for internal combustion engines, comprising a tubular metal housing, which is provided with fastening means for installation in an internal combustion engine, at least one ground electrode at an end portion thereof on a combustion chamber side, said housing having a longitudinal borehole, an electrical insulating body, at least one longitudinal portion of which is inserted in said borehole in a gastight manner, said insulating body at least partially forming a dielectric structural component part which is in an operating connection with said metal housing and comprises a through borehole; a connection pin enclosed in said through borehole and seated in the latter; a middle electrode positioned in said through borehole; said connection pin being in an operating connection with said dielectric structural component part and electrically connected on the combustion chamber side with said middle electrode which is in an operating connection with said at least one ground electrode via a spark gap, the improvement comprising said insulating body (17) being formed of a plurality of longitudinal portions (17/1 to 17/5), at last one (17/3) of which is said dielectric structural component part, which is dimensioned in such a way that it imparts to said ingition plug (10) a total capacity of 120 to 500 pF, some of said longitudinal portions being annular electrical insulating elements (17/2, 17/4) arranged between separating surfaces (23, 24/1, 24/2, 37) extending transversely through said insulating body (17), said electrical insulating elements (17/2, 17/4) resting securely against respective separating surfaces (23, 24/1; 24/2, 37) and being made of a material which is elastic at all temperatures occurring in this area of said ignition plug (10).

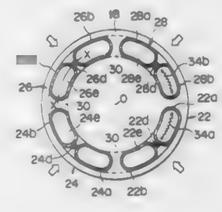
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4,746,835

## FLUORESCENT LAMP DEVICE HAVING OVAL CROSS SECTIONAL TUBES

Hitoshi Imamura, Yokohama; Akihiro Inoue, Chigasaki, and Hidenori Ito, Yokosuka, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 26, 1986, Ser. No. 912,126
Claims priority, application Japan, Sep. 28, 1985, 60-215503
Int. Cl.[4] H01J *61/30, 61/88*
U.S. Cl. 313—493 10 Claims




1. A fluorescent lamp device comprising:
a main body including a base, said main body having a central axis therethrough;
a fluorescent lamp supported by said main body and eletrically connected to said base, said fluorescent lamp including a plurality of glass tubes having;
a plurality of straight portions,
at least one curved portion which communicates between said straight portions,
two substantially flat faces which are parallel to a major cross sectional axis of said straight portions of said glass tubes,
said plurality of glass tubes being fixed to said main body at an end of said straight portions;
said plurality of glass tubes being arranged so that side edge faces of said straight portions of different glass tubes, which are perpendicular to said major cross sectional axes, along with each other and said glass tubes being further arranged so that said plurality of straight portions constitute a substantially cylindrical wall coaxial with said central axis of said main body;
connecting members connecting said plurality of glass tubes with one another, thereby defining a zigzagging discharge channel.

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4,746,836

## FLAT CATHODE RAY DISPLAY TUBE

David L. Emberson, Kenley, England, assignor to U.S. Philips Corp., New York, N.Y.

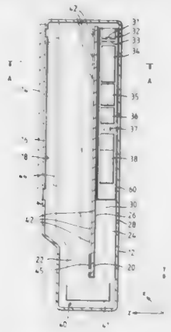
Filed Mar. 24, 1987, Ser. No. 29,841
Claims priority, application United Kingdom, Apr. 25, 1986, 8610226
Int. Cl.[4] H01J *29/48, 29/86*
U.S. Cl. 313—422 7 Claims

1. A flat cathode ray display tube comprising an envelope including a substantially flat, transparent, faceplate carrying a phosphor screen, means for producing an electron beam and directing the beam parallel to the faceplate through a first region towards a reversing lens which turns the beam so that it

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travels in the opposite direction parallel to the faceplate through a second region, first deflection means intermediate the electron beam producing means and the reversing lens for deflecting the beam in a plane substantially parallel to the faceplate to effect line scanning, and second deflection means



in the second region for deflecting the electron beam toward the screen and operable to effect field scanning, characterized in that the tube includes means within the envelope for magnetically shielding a part only of the electron beam path in the first region over a predetermined distance.

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**4,746,837**

## COLOR DISPLAY TUBE DEFLECTION UNIT WHICH CORRECTS LEFT-RIGHT RASTER DISTORTION

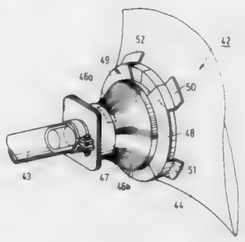
**Nicolaas G. Vink, Eindhoven, Netherlands, assignor to U.S. Philips Corp., New York, N.Y.**

**Filed Dec. 22, 1986, Ser. No. 945,418**

**Claims priority, application Netherlands, Dec. 23, 1985, [redacted]**

**Int. Cl.[4] H01F *3/12*; H01J *29/76***

**U.S. Cl. 313—431** **4 Claims**



1. A deflection unit for a color display tube having an envelope comprising a neck portion, a funnel portion and a rectangular picture screen, said deflection unit comprising: a magnetizable annular core of tapered cylindrical shape which extends with increasing diameter towards the screen of the display tube, ending prior thereto, such end of said core having a planar annular face; a pair of line deflection coils positioned within said core; a pair of vertical deflection coils positioned on said core and which are coaxial with the line deflection coils; and a raster distortion correction device having four magnetic pole shoes respectively positioned at respective corners of a rectangle facing the picture screen and extending substantially parallel to the funnel portion of the display tube, said pole shoes being affixed to and receiving magnetic flux from a pair of flux collector members of magnetizable material, so that a pincushion-shaped distortion of the deflection field produced by the vertical deflection coils is formed between said pole shoes; characterized in that said flux collector members are substantially planar and are positioned facing and parallel to the planar end face of said core, at a predetermined spacing therefrom, so as to divert flux from said core to said pole shoes.

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**4,746,838**

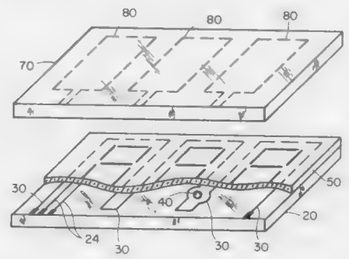
## INK FOR FORMING RESISTIVE STRUCTURES AND DISPLAY PANEL CONTAINING THE SAME

**Nicholas W. Kay, Medford, N.J., assignor to Telegenix, Inc., Cherry Hill, N.J.**

**Filed Jul. 30, 1986, Ser. No. 890,470**

**Int. Cl.[4] H01J *17/00***

**U.S. Cl. 313—519** **10 Claims**



1. An ink for use in forming resistor structures comprising a mixture of two compositions one of which includes silver and the other of which includes nickel, the nickel having the characteristic of becoming resistive when fired in air, said silver being in the form of flakes and powder and said nickel being in the form of a spherical powder, said resistor structure formed of said ink being adapted for use in a gas display device.

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**4,746,839**

## SIDE-COUPLED STANDING-WAVE LINEAR ACCELERATOR

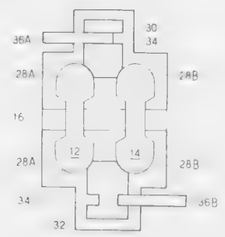
**Chudo Kazusa, and Masaharu Yoneda, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan**

**Filed Jun. 16, 1986, Ser. No. 874,846**

**Claims priority, application Japan, Jun. 14, 1985, 60-129671**

**Int. Cl.[4] H01J *25/00***

**U.S. Cl. 315—5.41** **4 Claims**



1. A side-coupled standing-wave linear accelerator for accelerating a particle beam comprising:

a cascade of accelerating resonant cavities linearly located along the axis of the particle beam, and

coupled in series through drift tubes coupling together said accelerating resonant cavities in series for allowing passage of the particle beam therethrough,

a side-coupling cavity electromagnetically coupling together each pair of adjacent accelerating resonant cavities,

at least a pair of first and second bistable side-coupling cavities which electromagnetically couple one pair of adjacent acclerating resonant cavities, said first bistable side-coupling cavity being coupled to an upstream cavity of said one pair of adjacent accelerating resonant cavities, upstream relative to the direction of said particle beam,

a first coupling iris coupling said first bistable side-coupling cavity to said upstream cavity, said first coupling iris of a size corresponding to a first coupling coefficient,

said first bistable side-coupling cavity being coupled to a downstream cavity of said one pair of adjacent accelerating resonant cavities, downstream relative to said particle beam direction,

a second coupling iris coupling said first bistable side-coupling cavity to said downstream cavity said second coupling iris of a size corresponding to a second coupling coefficient larger than said first coefficient,

said second bistable side-coupling cavity coupled to said upstream cavity through a third coupling iris of a size corresponding to a third coupling coefficient and to said downstream cavity through a fourth coupling iris of a size corresponding to a fourth coupling coefficient smaller than said third coefficient,

each of said first and second bistable side-coupling cavities having means being switchable between a first state of electromagnetically coupling said one pair of adjacent accelerating cavities and a second state of electromagnetically decoupling said one pair of adjacent accelerating cavities, whereby the degree of coupling between said one pair of adjacent accelerating cavities can be discretely changed by selectively switching said first and second bistable side-couple cavities into anyone of the first and second states.



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**4,746,840**

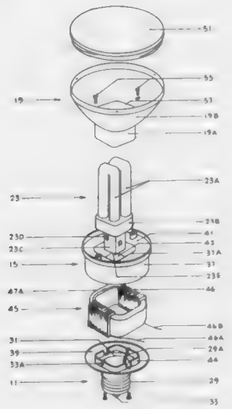
## FLUORESCENT REFLECTOR LAMP ASSEMBLY

**Kenneth S. Lim, 47 St. James Pl., Piedmont, Calif. 94611**

**Filed Apr. 6, 1987, Ser. No. 35,016**

**Int. Cl.[4] H01J *7/44***

**U.S. Cl. 315—58** **25 Claims**



1. A fluorescent reflector lamp assembly employing at least one fluorescent illuminator tube assembly and a reflector comprising:

a screw-type base connector adapted to engage screw-type sockets for incandescent bulbs;

a ballast housing formed of a heat insulating material and connected to the base connector to define a central recess and an annular, hollow enclosure that surrounds the central recess;

a ballast core and a coil means formed thereabout for mounting within the annular enclosure;

a reflector member having a generally tubular base for mounting within the central recess defined by the ballast housing, the reflector member further having an integral reflector shell, said shell and base being formed of substantially heat conductive material with the interior surface of the shell being a reflective material for reflecting heat and light;

means mounted in said recess to receive the base of the reflector member and a fluorescent illuminator tube assembly in heat-transfer engagement with a substantial area of the wall of said reflector member base whereby heat is conductively dissipated from the ballast core and illuminator tube assembly while light and heat are reflected from the reflective interior surface of the reflector member; and

connecting means to electrically connect the coil means to provide electrical energy for illumination of the fluorescent illuminator tube assembly.

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**4,746,841**

## FLUORESCENT LAMP OPERATING DEVICE

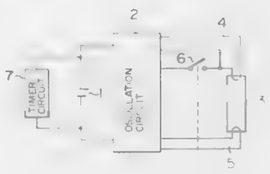
**Soichiro Ogawa, Tokyo, Japan, assignor to Hitachi, Ltd., Tokyo, Japan**

**Filed Jul. 8, 1986, Ser. No. 883,048**

**Claims priority, application Japan, Jul. 10, 1985, 60-150188**

**Int. Cl.[4] H05B *41/18, 36/17***

**U.S. Cl. 315—102** **8 Claims**




1. A fluorescent lamp operating device comprising:

a power supply;

a high-frequency power converter circuit for converting the output power from said power supply into a high frequency power and including a transformer;

a lighting circuit operatively connected to a secondary side of said transformer for lighting a fluorescent lamp;

a preheating circuit operatively connected to said secondary side of said transformer for continuously preheating the filament of said fluorescent lamp while said power supply is turned on;

a switch circuit including diodes and a transistor circuit operatively inter-connected, said switch circuit being provided in said lighting circuit and being connected in series with said fluorescent lamp; and

a control circuit for turning off said lighting circuit for a predetermined period by first turning off said transistor circuit during said predetermined period in response to the turn-on of said power supply thereby actuating said preheating circuit to preheat the filament during said predetermined period prior to actuating said lighting circuit, said control circuit turning on said transistor circuit at the end of said predetermined period thereby actuating said lighting circuit.

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**4,746,842**

## CIRCUIT ARRANGEMENT FOR GENERATING A SAWTOOTH-SHAPED SIGNAL FOR THE FIELD DEFLECTION IN A PICTURE DISPLAY DEVICE

**Edward M. Ponte; Steven J. van Raalte, and Dirk J. A. Teuling, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Oct. 14, 1986, Ser. No. 918,416**

**Claims priority, application Netherlands, Oct. 14, 1985, [redacted]**

**Int. Cl.[4] H01J *29/70, 29/76***

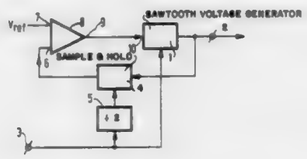
**U.S. Cl. 315—403** **6 Claims**

1. A circuit arrangement for generating a sawtooth-shaped signal for the field deflection in a picture display device with

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an amplitude which is substantially independent of the field frequency, the circuit arrangement comprising: a sawtooth generator which is triggerable by a field synchronizing signal and which has an output terminal for making the sawtooth-shaped signal available, comparison means for comparing the value of the sawtooth-shaped signal during the occurrence of a




sampling pulse with a reference value and said comparison means applying a control signal to a control input of the sawtooth generator for controlling the slope of the generated sawtooth-shaped signal and means for applying sampling pulses whose repetition frequency is substantially equal to the nth part of the field frequency, where n is an integer which is larger than 1.

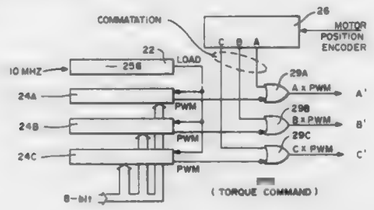
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**4,746,843**

**MOTOR CONTROL CIRCUIT AND DRIVE AMPLIFIER FOR A PERMANENT MAGNET DC TORQUE MOTOR**

**Jon C. Taenzer, Palo Alto, Calif., assignor to Adept Technology, Inc., San Jose, Calif.**

**Filed Jan. 25, 1985, Ser. No. 694,705**
**Int. Cl.[4] H02P** *6/02*
**U.S. Cl. 318—138** **20 Claims**



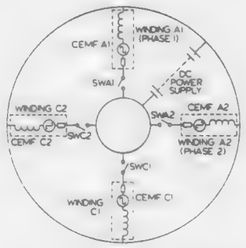

1. A control system for a permanent magnet multi-phase, brushless DC torque motor comprising a permanent magnet rotor, at least three coils surrounding the rotor for positioning the rotor, a plurality of amplifiers, one of said amplifiers being coupled across each of said coils for separately controlling the current flowing in each said coil, each said amplifier comprising means for providing bipolar drive current signals to each of said coils, a control system comprising means for providing commutation/torque command signals to each of said amplifiers, and each said amplifier comprising means for converting said commutation/torque command signals into current control signals and amplifier means for converting the current control signals into bipolar drive current signal which is the output of each of said amplifiers.

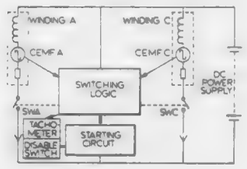
**4,746,844**

**CONTROL AND OPERATION OF BRUSHLESS CONTINUOUS TORQUE TOROID MOTOR**

**John S. MacKelvie, Keene, and Eric Whiteley, Peterborough, all of Canada, assignors to Maghemite Inc., Vancouver, Canada**

**Filed Jul. 16, 1986, Ser. No. 886,165**
**Claims priority, application United Kingdom, Jul. 16, 1985, 8517908; Sep. 18, 1985, 8523100**
**Int. Cl.[4] H02K** *29/00;* **H02P** *6/02*
**U.S. Cl. 318—254** **11 Claims**




1. In a brushless direct-current motor comprising a permanent magnet rotor having a plurality of magnetic poles and a stator bearing windings arranged to interact with the magnetic field produced by the magnetic poles so as to produce torque from D.C. current applied to said windings, the improvement wherein:

said stator windings are ranged to produce an essentially continuous torque from at least two separate phase windings from D.C. current pulses each of about one-half the duration of a two-pole cycle of rotor movement,

each phase winding is sub-divided into a plurality of coil groups each of which is mounted in stator mounting slots in said stator displaced from the next coil group by approximately one rotor pole pitch,

each coil group is sub-divided into two parallel winding circuits wound into the same stator slots and arranged to produce a reverse polarity in each circuit upon actuation, and

an electronic control circuit for the motor comprising an electronic power switch for each said winding circuit arranged to be turned on and off in parallel for those winding circuits intended to be operated in parallel.

11. A method of controlling the alternate application of D.C. pulses to a brushless D.C. motor comprising a permanent magnet rotor having a plurality of magnetic poles and a stator bearing windings arranged to interact with the magnetic field produced by the magnetic poles and including two sets of individual electrical coils connected in series within each set and each set spanning one rotor pole pitch, the individual coils in each set being offset from each other by one-half rotor pole pitch, which comprises the steps of sensing CEMF voltage generated by the one of said sets of individual electrical coils to which a D.C. current pulse is not being applied, and controlling switching of the D.C. current to said one set of coils in response to a change in polarity of said sensed CEMF.

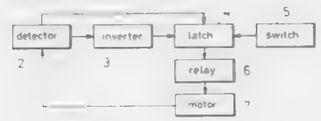


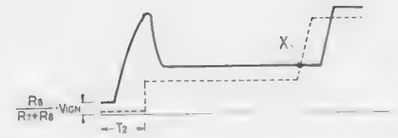
**4,746,845**

**CIRCUIT FOR PREVENTING THE ERRONEOUS OPERATION OF A MOTOR CONTROL DEVICE FOR LIFTING AND LOWERING A POWER WINDOW**

**Ken Mizuta, and Shiro Kondo, both of Miyagi, Japan, assignors to Alps Electric Co., Ltd., Japan**

**Continuation-in-part of Ser. No. 760,470, Jul. 30, 1985, abandoned. This application Oct. 16, 1986, Ser. No. 920,898**
**Claims priority, application Japan, Jul. 30, 1984, 59-157298**
**Int. Cl.[4] H02P** *1/22*
**U.S. Cl. 318—286** **5 Claims**




1. A circuit for preventing the erroneous operation of a motor control device for lifting and lowering a power window having a drive motor for lifting and lowering the window glass, means for detecting when any foreign matter is caught between the window glass and a window frame when the window glass is lifted and lowered, said detecting means including sensor means for measuring a current characteristic value of said drive motor based on the load torque relative to supplied current and comparator means for comparing the present motor current characteristic value measured by said sensor means and a motor current characteristic value measured a predetermined of time before said present motor current characteristic value and providing a foreign matter detection signal if a difference value as the result of the comparison is greater than a predetermined range, and means for preventing the output of said foreign matter detection signal for a predetermined of time after the operation of an actuation switch for starting said drive motor.

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**4,746,846**

**DIRECT CURRENT MOTOR CONTROL, AND USES TO MEASURE FORCE, AND WITH A PHYSICAL EXERCISE DEVICE**

**Louis Champavier, Les Gipières, 06370 Mouans Sartoux, France**

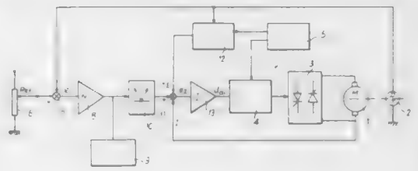
**Filed Apr. 16, 1986, Ser. No. 852,535**
**Claims priority, application France, Apr. 16, 1985, 85 05691**
**Int. Cl.[4] G05B** *5/00*
**U.S. Cl. 318—619** **11 Claims**

1. A control device for a direct current machine powered by a set of rectifier bridges comprising:

an external speed control loop including means for generating a speed signal representative of the actual speed of rotation of the machine, first comparing means for comparing said speed signal to a reference signal and generating a speed error signal, and first amplifying means for amplifying said speed error signal and generating a current reference signal;

an internal current control loop including second comparing means for comparing the actual current in the machine to said current reference signal and generating a current error signal, and second amplifying means for amplifying said current error signal and generating a control signal;

a control circuit for controlling said set of rectifier bridges, said control circuit being responsive to said control signal; and



a current limiter connected between the output of said first amplifying means and the input of said internal current control loop, said current limiter including means for generating a first signal corresponding to the current required to compensate for the losses of the machine, means for providing a second signal corresponding to the useful current, and adding means for adding said first and second signals.

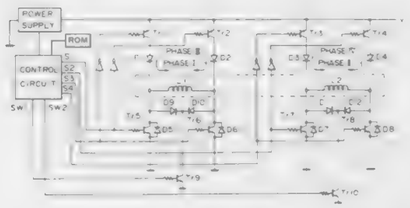
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**4,746,847**

**CONTROL SYSTEM FOR A STEPPING MOTOR**

**Noriyuki Kikugawa, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed May 14, 1986, Ser. No. 863,072**
**Claims priority, application Japan, May 17, 1985, 60-104007**
**Int. Cl.[4] H02P** *8/00*
**U.S. Cl. 318—696** **16 Claims**




1. A control method for a stepping motor comprising:

driving said stepping motor during a first time duration;

subsequently, during a second time duration, driving said stepping motor in a one phase-on mode and flowing a loop current to a coil of the phase which was not concerned in the driving of said stepping motor in each excitation interval of the one phase-on mode, thereby obtaining a braking force; and

bringing said motor to an objective position in a third time duration.

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**4,746,848**

**WEFT YARN FEEDING DEVICE FOR A LOOM**

**Kosuke Maenaka; Kensuke Wakamatsu, both of Matsuto; Yoshitsugu Tamura, and Yoshitaka Fujita, both of Kanazawa, all of Japan, assignors to Tsudakoma Corp., Ishikawa, Japan**

**Filed Nov. 14, 1986, Ser. No. 931,481**
**Claims priority, application Japan, Dec. 13, 1985, 60-191979[U]; Apr. 11, 1986, 61-53536[U]; May 2, 1986, 61-103676; Jun. 9, 1986, 61-88340[U]**
**Int. Cl.[4] G05B** *19/29*
**U.S. Cl. 318—603** **18 Claims**

1. A weft yarn feeding device (1) for measuring and winding

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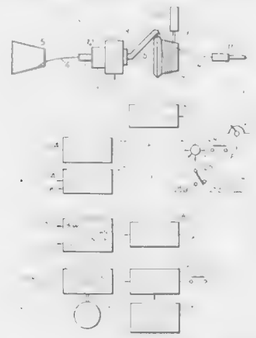


a weft yarn (4) around the circumference of a stationary measuring and storing drum (7) by the rotary motion of a rotary yarn guide (6) and storing the weft yarn (4) on the measuring and storing drum (7) for picking, which comprises:

(a) a feed motor (8) for rotating the rotary yarn guide (6);

(b) a drive control unit (3) for driving the feed motor (8); and

(c) a command control unit (2) which provides command signals for controlling the feed motor (8), said command control unit (2) comprising a rotation detector (15) for



detecting the number of rotations of the crankshaft (14) of the loom, a rotation detector (12) for detecting the number of rotations of the output shaft of the feed motor (8), an arithmetic and storage device (13) which adds rotation signals given thereto by the rotation detector (15) and subtracts rotations signals given thereto by the rotation detector (12), and a command signal generator (18) which converts the output signal of the arithmetic and storage device (13) into a command signal and gives the command signal to said drive control unit (3).

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**4,746,849**

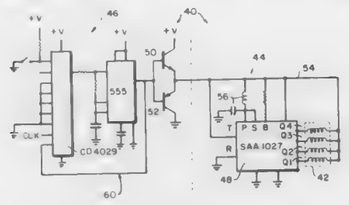
**TWO LEAD BIDIRECTIONAL STEPPING MOTOR CONTROL**

**Hermann Rosshirt, Bristol, Conn., assignor to North American Philips Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 943,473, Dec. 16, 1986, abandoned. This application Mar. 4, 1987, Ser. No. 21,873**

**Int. Cl.[4] H02P** *8/00*

**U.S. Cl. 318—696** **6 Claims**




1. A control circuit for a bidirectional variable speed stepping motor having a plurality of coils comprising:

a power source;

a motor drive logic circuit disposed adjacent said motor, including pulse-to-step logic means having a trigger input, a set input, and a power input;

two wires connecting said power source to said motor drive logic circuit, one of said wires being a power supply line;

means to modulate said power supply line with short duration pulses by switching off said power source for periods of very short duration, whereby the number and duration of said pulses signal a sequence to said pulse-to-step logic means;

said modulated power supply line being connected to a common point of said motor coils and to the trigger input of said pulse-to-step logic means so that each pulse advances said stepping motor by one step and said pulses further control the direction of rotation, speed and angular distance of said stepping motor;

said power supply line being also connected through a low pass filter to the power input and the set input of said motor drive logic circuit whereby said pulses are not recognized by said power input, said set input and said motor.

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**4,746,850**

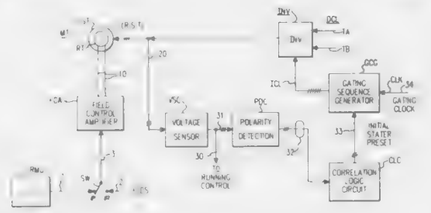
**START-UP SYSTEM FOR A SYNCHRONOUS MOTOR DRIVE**

**Alberto Abbondanti, Plum Boro, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Feb. 12, 1987, Ser. No. 14,423**

**Int. Cl.[4] H02P** *5/40*

**U.S. Cl. 318—723** **6 Claims**




1. In a load commutated inverter synchronous motor drive having an inverter including a plurality of thyristors controlled for conduction in a firing sequence related to a direction of motor rotation for providing under normal operation AC power to a synchronous motor having rotor windings and stator windings; the method of starting the motor from a rotor rest position with all the thyristors being initially in the OFF state; comprising the steps of:

applying to the rotor windings a modulated field current to induce phase voltages into the respective said stator windings;

deriving with said induced phase voltages a present combination of polarity signals;

said present combination of polarity signals being correlated to a predetermined firing sequence of thyristors characterizing said rotor rest position;

initiating said firing sequence of the thyristors in accordance with said predetermined firing sequence;

thereby to cause motion of the rotor with a maximal torque in said direction; and

applying a normal field current to said rotor winding for normal motor operation thereafter in said direction.

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**4,746,851**

**CHARGING SET FOR THE REGENERATIVE RECHARGING OF DRY BATTERIES**

**Mallász Ottó, Visegrádi u. 33/b, 1132 Budapest, and Tibor Mallász, Majakovszkij u. 56, 1068 Budapest, both of Hungary**

**Filed Apr. 22, 1986, Ser. No. 854,848**

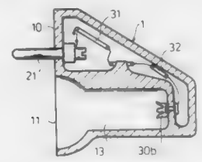
**Int. Cl.[4] H02J** *7/00;* **H01M** *10/46*

**U.S. Cl. 320—2** **6 Claims**

1. An improved charging apparatus for the regenerative recharging of dry batteries, said apparatus having a hollow casing formed of any suitable insulating material and having at least a pair of mains contact pins held in a pre-determined standard spaced relationship by a pin plug preferably being of the kind applicable to any type of standardized mains sockets by being provided with an insulated distance shaft of suitable cross-sectional shape and protruding length, said casing having an aperture conforming in size and shape for removably receiving at least one dry battery of normal, standardized type for the purpose of recharging, said casing also having contactors affixed to said casing in said aperture, said contactors formed into at least partially spring biassed or spring-like bare metallic contactors configured to match the pole terminals of the particular type(s) of dry batteries for which the casing is formed, said apparatus further having charging means connected in series between said mains contact pins and said bare metal contactors to which the dry battery to be recharged is electrically connected upon its insertion in said aperture of said casing, the improvement comprising:

the charging means comprises at least one current-limiting resistance and at least one rectifying diode that are connected in series between said mains contact pins and said bare metal contactors;

said contactors matching and electrically contactable with the pole terminals of the at least one dry battery to be recharged when a battery is inserted in said aperture;




said casing shaped to exclude access to any bare metal area of either the inserted dry battery or any live contactors or component parts of the charging means while the mains contact pins is connected to the mains and a battery is inserted in said aperture, during a normal recharging operation;

said current-limiting resistance is subdivided into at least two resistors each of which is directly connected to one of the mains contact pins;

a circuit breaker switch having at least a pair of normally-open contacts that are simultaneously engaged into their electrically closed position only by the mechanical force of fully inserting said mains contact pins into said mains socket; and

each of said normally-open contacts being directly connected to one of said mains contact pins.

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**4,746,852**

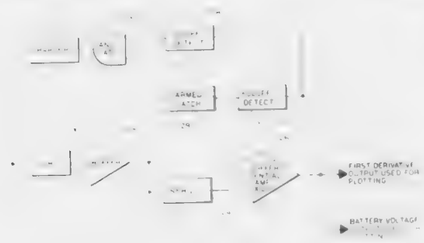
**CONTROLLER FOR BATTERY CHARGER**

**Ray J. Martin, Lawndale, Calif., assignor to Christie Electric Corp., Torrance, Calif.**

**Continuation-in-part of Ser. No. 665,924, Oct. 29, 1984, abandoned. This application Sep. 3, 1985, Ser. No. 771,824**

**Int. Cl.[4] H02J** *7/04;* **H01M** *10/44*

**U.S. Cl. 320—20** **7 Claims**




1. A controller for a battery charger, including in combination:

a differential amplifier having first and second inputs and an output;

a first sample and hold circuit having the battery voltage connected as an input and providing an output as one input to said differential amplifier;

a second sample and hold circuit having the output of said first sample and hold circuit as an input and providing an output as the other input to said differential amplifier;

an AND gate having first and second inputs and an output, with the AND gate output controlling the battery charger;

a first slope detector having the output of said differential amplifier as an input and providing an output when a slope of a first sign is detected;

a second slope detector having the output of said differential amplifier as an input and providing an output when a slope of the opposite sign is detected, with said second slope detector output connected as one input to said AND gate; and

a latch circuit having the output of said first slope detector connected as input and providing an output as the other input to said AND gate.

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**4,746,853**

**BATTERY JUMPER CABLE ASSEMBLY**

**Roger Ingalls, 761 San Pablo Ave., Sunnyvale, Calif. 94086**

**Continuation of Ser. No. 793,924, Nov. 1, 1985, abandoned. This application Mar. 19, 1987, Ser. No. 28,060**

**Int. Cl.[4] H02J** *7/00, 7/10*

**U.S. Cl. 320—25** **5 Claims**




1. A jumper cable assembly for connecting a live battery with a dead battery having a residual voltage thereon comprising:

a first pair of jumper cables adapted to be releasably coupled to and to extend outwardly from the terminals of the live battery;

a second pair of jumper cables adapted to be releasably coupled to and to extend outwardly from the terminals of the dead battery, one of the cables of the first pair being coupled directly to one of the cables of the second pair, the other cables of the first and second pairs being spaced apart;

actuatable means movable into and out of bridging relationship to said other cables for electrically interconnecting said other cables, whereby the batteries willl be coupled together; and

means responsive to the residual voltage of the dead battery and coupled with said interconnecting means for selectively moving the same into said bridging relationship, said moving means including a silicon controlled rectifier having a gate, a solenoid coupling the silicon controlled rectifier across the live battery, said solenoid being coupled to said actuatable means for actuating the same when the silicon controlled rectifier is conductive, and switch means coupled with the gate of said silicon controlled rectifier and one of said second cables for only momentarily applying the voltage of the dead battery to the gate of said silicon controlled rectifier to cause conduction of current therethrough.

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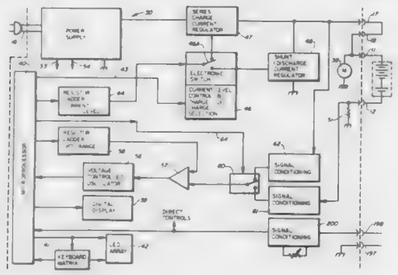


**4,746,854**

## BATTERY CHARGING SYSTEM WITH MICROPROCESSOR CONTROL OF VOLTAGE AND CURRENT MONITORING AND CONTROL OPERATIONS

William Baker, Indianapolis; James C. Stevens, Plainfield, and Phong B. Chau, Indianapolis, all of Ind., assignors to Span, Inc., Indianapolis, Ind.

Filed Oct. 29, 1986, Ser. No. 925,832
Int. Cl.[4] H02J *7/04*
U.S. Cl. 320—40 16 Claims



1. Control apparatus for battery current control, comprising:
battery terminals, power supply means, charging means coupling said power supply means to said battery terminals for supplying a charging current to a battery coupled to said battery terminals, voltage monitoring means coupled to said battery terminals, microprocessor means coupled to said voltage monitoring means for register of digital data corresponding to the voltage at said battery terminals and coupled to said charging means to apply a control signal thereto, said digital data including present battery voltage data corresponding to the voltage at said battery terminals at the time of register of said data, memory means associated with said microprocessor means for storage of digital data including peak voltage data reflecting the peak voltage reached in a charging operation and threshold data corresponding to a certain drop in voltage from said peak voltage, said microprocessor means being arranged to effect a charging operation in which said charging means is operated to apply a high charging current to said battery terminals and in which monitoring and control operations are periodically effected, each monitoring and control operation including registering of present battery voltage data and a comparison of said peak voltage data and the registered present battery voltage data, update of said peak voltage data when and only when said registered present battery voltage data has a value which is higher than the value of said peak voltage data and application of a control signal to said charge control means to stop application of a high charging current when said present battery voltage data has a value less than the value of said peak voltage data and when at the same time the difference between such values is greater than a threshold value corresponding to said threshold data.

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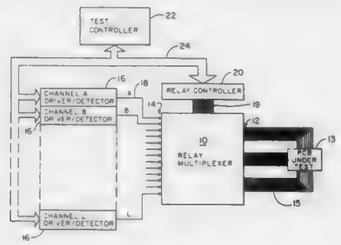
**4,746,855**

## RELAY MULTIPLEXING FOR CIRCUIT TESTERS

Joseph F. Wrinn, North Quincy, Mass., assignor to Teradyne, Inc., Boston, Mass.

Continuation of Ser. No. 589,577, Mar. 14, 1984. This application Jun. 26, 1987, Ser. No. 67,143
Int. Cl.[4] G01R *31/02, 31/28*
U.S. Cl. 324—73 R 7 Claims

1. Relay multiplexer circuitry for selectively connecting channels of a tester to selected tests pins electrically connected to nodes of a circuit under test, said pins being larger in number than said channels, said circuitry comprising
channel nodes connected to said channels,
pin nodes connected to said pins, and
relays wired for selectively making at least some of said pin nodes connectable to at least two said channels each so as to connect a said pin node to a said channel node when said relay is closed and not connect a said pin node to a said channel node when said relay is open,
at least some of said pin nodes, channel nodes and relays being wired so as to be organized in a group such that each



said pin node of said group is connectable through said single relays to a unique combination of said channel nodes within said group and is not connectable through single said relays to other said channel nodes within said group, the number of pin nodes P in said group being greater than the number of channel nodes C in said group.

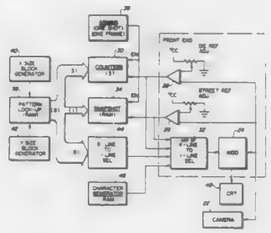
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**4,746,856**

## SEMICONDUCTOR TESTING AND APPARATUS THEREFOR

Laurence L. Allred, Jr., and Bradley N. Lange, both of Chandler, Ariz., assignors to Advanced Semiconductor Materials America, Inc., Tempe, Ariz.

Division of Ser. No. 363,641, Mar. 18, 1985, Pat. No. 4,520,313. This application Mar. 20, 1985, Ser. No. 714,194
Int. Cl.[4] G01R *31/02, 31/28*
U.S. Cl. 324—158 R 8 Claims



1. An apparatus for testing a semiconductor die surrounded by a border region, comprising:
first scanning means for scanning preselected regions of a video scene of a semiconductor die to generate digital video signals corresponding thereto;
memory means for storing a first digitized video signal, said memory means connected to said first means;
counter means for storing a second digitized signal; and
comparison means for examining the contents of said memory means to locate an edge of said semiconductor die and the contents of said counter means to locate defects in the surface of said semiconductor die, said comparison means operably connected to said counter means and said memory means.

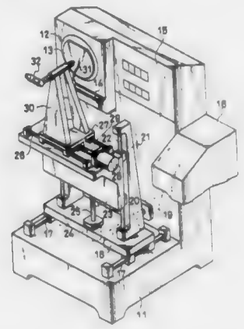


**4,746,857**

## PROBING APPARATUS FOR MEASURING ELECTRICAL CHARACTERISTICS OF SEMICONDUCTOR DEVICE FORMED ON WAFER

Takamasa Sakai, Kusatsu Motohiro Kono, Kyoto; Takayuki Umaba, Kusatsu; Yoshiyuki Nakagawa, Kyoto, and Yoshihiro Koyama, Takatsuki, all of Japan, assignors to Danippon Screen Mfg. Co. Ltd., Kyoto, Japan

Filed Sep. 2, 1986, Ser. No. 903,021
Claims priority, application Japan, Sep. 13, 1985, 60-201638; Apr. 28, 1986, 61-96637
Int. Cl.[4] G01R *31/02, 1/06*
U.S. Cl. 324—158 F 11 Claims



1. A probing apparatus for measuring electrical characteristics of a semiconductor device formed on a wafer, comprising:
means for holding said wafer in a vertical or slightly leaned position on a frame;
nozzle means, provided below said wafer holding means, adapted to supply inert gas upwardly along the device-bearing surface of said wafer;
a contact needle adapted to be brought into contact with a desired portion of said device so as to collect information on electrical characteristics at said portion;
three-directional drive means for holding said needle on said frame in such a way that said needle is caused to move vertically and horizontally along the device-bearing surface of said wafer and is brought into releasable contact with said desired portion of said device-bearing surface of said wafer; and
a microscope provided in such a way that the tip of said needle being substantially at the center of the microscope's field of view, said microscope being movable together with said needle along said device-bearing surface of said wafer.

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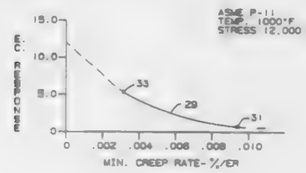
**4,746,858**

## NON DESTRUCTIVE TESTING FOR CREEP DAMAGE OF A FERROMAGNETIC WORKPIECE

Michael J. Metala; William G. Clark, Jr., both of Murrysville, and Warren R. Junker, Monroeville, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jan. 12, 1987, Ser. No. 2,538
Int. Cl.[4] G01R *33/12;* G01N *27/72, 27/90*
U.S. Cl. 324—200 9 Claims

1. A method of determining creep damage in a ferromagnetic workpiece, said method comprising the steps of:
placing an eddy current coil adjacent to the ferromagnetic workpiece which has been previously subjected to a prolonged period of stress at elevated temperature;
applying an alternating current signal to said eddy current coil to induce eddy currents in the ferromagnetic workpiece;
measuring the current passing through said coil as influenced by said workpiece; and




comparing said current measurement with a current calibrated to known creep damage to determine the creep damage.

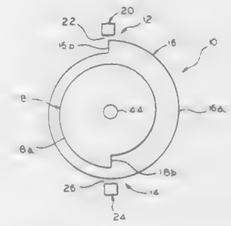
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**4,746,859**

## POWER AND TEMPERATURE INDEPENDENT MAGNETIC POSITION SENSOR FOR A ROTOR

Khalid Malik, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Dec. 22, 1986, Ser. No. 944,958
Int. Cl.[4] G01B *7/30*
U.S. Cl. 324—208 43 Claims



35. A method for accurately determining the angular position of a rotor with a magnetic position sensor, said magnetic position sensor including first and second ensor means disposed relative to target means operatively associated with said rotor to rotate therewith to define first and second air gaps therebetween, respectively, the angular position being determined independent of power supply and temperature variations, comprising the steps of:
adding rotor angle-related linearly variable output signals from said first and second sensor means of said magnetic position sensor, said output signals being indicative of said magnetic field intensity in said first and second air gaps;
subtracting said rotor angle-related linearly variable output signals from said first and second sensor means of said magnetic position sensor, said output signals changing in magnitude with changes in the length of said first and second air gaps;
said output signals being dependent upon the angular position of said rotor at any point in time; and
dividing said added output signals by said subtracted output signals to produce a numerical value representative of the accurate angular position of said rotor;
said numerical value being independent of power supply and temperature variations.

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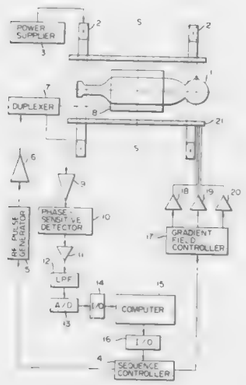


**4,746,860**

## MAGNETIC RESONANCE IMAGING SYSTEM

**Kozo Satoh, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Mar. 30, 1987, Ser. No. 31,132**
**Claims priority, application Japan, Mar. 31, 1986, 61-72921**
**Int. Cl.[4] G01R** *33/20*
**U.S. Cl. 324—309** **15 Claims**




**1.** A magnetic resonance imaging system wherein a living subject to be examined is placed in a uniform static magnetic field, a radio frequency field for exciting a magnetic resonance phenomenon, a first gradient field having a magnetic gradient along a first direction, which is used for determining an image slice where the magnetic resonance phenomenon is to be excited, a second gradient field having a magnetic gradient along a second direction, perpendicular to the first direction, which is used for phase-encoding echo information based on the magnetic resonance phenomenon, and a third gradient field having a magnetic gradient along a third direction, perpendicular to the first and second directions, which is used for reading out the echo information based on the magnetic resonance phenomenon, are applied to the object to be examined in the static magnetic field, in a pulse manner and in accordance with a predetermined sequence, so that an echo signal based on the magnetic resonance phenomenon occurring in the subject being examined is acquired, and image reconstruction data including phase and amplitude information is obtained from the echo signal, so as to obtain reconstructed image information, comprising:

correction data generating means which uses the second gradient field for reading out the echo information based on the magnetic resonance phenomenon, and applies the second gradient field, the radio frequency field, and the first gradient field for determining the image slice, to the subject being examined in the static magnetic field, in accordance with the predetermined sequence, without applying a gradient field for phase-encoding the echo information, and acquires the echo signal, so as to extract data corresponding to the image reconstruction data along an encoding axis, thereby obtaining correction data; and

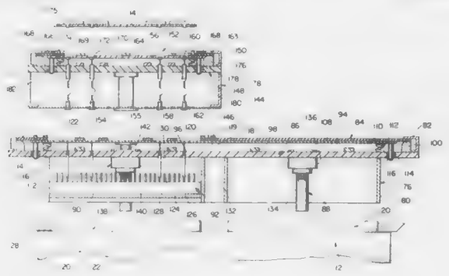
correcting means for correcting at least one of a phase and an amplitude of the image reconstruction data, using the correction data obtained by said correction data generating means.

**4,746,861**

## TEST FIXTURE FOR PRINTED CIRCUIT BOARD ASSEMBLY

**Robert J. Nesbitt, North Attleboro, Mass., assignor to TTI Testron, Inc., Cumberland, R.I.**

**Filed Aug. 21, 1986, Ser. No. 899,736**
**Int. Cl.[4] G01R** *31/02*
**U.S. Cl. 324—158 F** **11 Claims**



**3.** In a test fixture for testing a printed circuit board assembly on a computerized test system wherein the test fixture is receivable and securable on said test system and deformable in response to the application of vacuum thereto to electrically interconnect said printed circuit board assembly to said test system and wherein said test system includes vacuum means for deforming said fixture, the improvement comprising a base which is receivable on said test system and a test head which is receivable on said base and adapted to receive said printed circuit board assembly thereon, said base comprising a first diaphragm having a first open receiving frame therein which is adapted to receive said test head therein, said first diaphragm communicating with said vacuum means and being deformable for electrically interconnecting said test head to said test system when said test head is received in said open receiving frame and vacuum is applied to said first diaphragm, said test head comprising a second diaphragm having a second open receiving frame therein which is adapted to receive said printed circuit board assembly therein, said second diaphragm communicating with said vacuum means and being deformable to electrically connect said printed circuit board assembly to said test head when said printed circuit board assembly is received in said second open receiving frame and vacuum is applied to said second diaphragm and to thereby also electrically interconnect said printed circuit board assembly to said test system when said test head is electrically interconnected to said test system.

**4,746,862**

## APPARATUS FOR DETECTING BOTH ROTATIONAL SPEED AND REFERENCE ROTATIONAL ANGLE OF A ROTARY MEMBER

**Yasuhiro Ueki, Sagamihara, Japan, assignor to Victor Company of Japan Ltd., Japan**

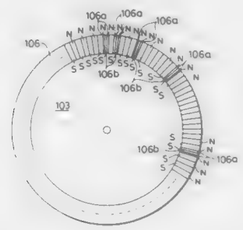
**Filed May 13, 1986, Ser. No. 863,256**
**Claims priority, application Japan, May 14, 1985, 60-71223[U]; May 27, 1985, 60-78817[U]; May 27, 1985, 60-78818[U]**
**Int. Cl.[4] G01P** *3/44, 3/487;* **G01B** *7/30*
**U.S. Cl. 324—208** **8 Claims**

**1.** Apparatus for producing a signal indicative of a rotational speed of a rotary member and another signal indicative of a reference rotational angle of said rotary member, comprising:

(a) a plurality of magnetized elements arranged circumferentially on said rotary member, said plurality of magnetized elements having normal-pitch elements and small-pitch elements which are arranged in a predetermined fashion or pattern given by $2^n \cdot K$ in units of said normal-pitch where n=1, 2, 3, . . . and K is a positive integer, the number of said small-pitch elements being at least three, and the distance between any two consecutive small-pitch elements being different from another;

(b) a plurality of signal generating circuits arranged circumferentially on a stator to oppose said plurality of magnetized elements when said rotary member rotates, said plurality of signal generating circuits being connected in series to form a series circuit so as to develop a resultant voltage across two terminals of said series circuit with said signal generating circuits being caused by said magnetized elements to generate a voltage, said plurality of signal generating circuits having normal-pitch circuits and small-pitch circuits which are arranged in said predetermined






fashion or pattern so that said normal-pitch magnetized elements face said normal-pitch circuits and said small-pitch magnetized elements face said small-pitch circuits respectively only once per rotation of said rotary member over a predetermined angle;

(c) a first comparator responsive to said resultant voltage and to a first threshold voltage for producing said signal indicative of a rotational speed; and

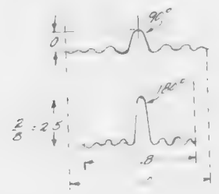
(d) a second comparator responsive to said resultant voltage and to a second threshold voltage, which is different from said first threshold voltage, for producing said other signal indicative of a reference rotational angle of said rotary member.

**4,746,863**

## CONTIGUOUS SLICES IN MULTI-SLICE MRI

**Lawrence E. Crooks, Richmond; David A. Feinberg, Berkeley, and John C. Hoenninger, III, Oakland, all of Calif., assignors to The Regents of the University of California, Berkeley, Calif.**

**Filed Nov. 7, 1985, Ser. No. 795,914**
**Int. Cl.[4] G01R** *33/20*
**U.S. Cl. 324—304** **28 Claims**




**1.** An improved magnetic resonance imaging method comprising:

using a train of plural RF NMR nutation pulses, each occurring during imposition of a magnetic gradient pulse, to elicit NMR RF spin echo responses from a succession of selected slices or planar volumes of an object to be imaged;

producing $\phi_1$ and $\phi_2$ RF NMR nutation pulses and controlling the time domain envelope of said $\phi_1$ and $\phi_2$ RF NMR nutation pulses and the magnitude of said magnetic gradient pulses to effect a succession of angular nuclei nutations within and across substantially all of each slice to elicit at least one NMR spin echo response therefrom; and

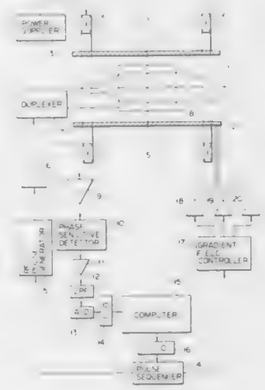
controlling the frequency spectrum of said RF NMR nutation pulses to cause said succession of selected slices to be substantially contiguous.

**4,746,864**

## MAGNETIC RESONANCE IMAGING SYSTEM

**Kozo Satoh, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Mar. 30, 1987, Ser. No. 31,461**
**Claims priority, application Japan, Mar. 31, 1986, 61-72910**
**Int. Cl.[4] G01R** *33/20*
**U.S. Cl. 324—309** **5 Claims**




**1.** A magnetic resonance imaging system comprising: static magnetic field application means for applying a uniform static magnetic field to an object to be examined; excitation means for applying a radio-frequency magnetic field for exciting a magnetic resonance phenomenon to said object to be examined; gradient field application means for applying, to said object to be examined, a first gradient field which has a magnetic gradient along a first direction and is used for determining a slice to be imaged in which the magnetic resonance phenomenon is excited, a second gradient field which has a magnetic gradient along a second direction perpendicular to the first direction and is used for phase-encoding echo data based on the magnetic resonance phenomenon, and a third gradient field which has a magnetic gradient along a third direction perpendicular to the first and second directions, and is used for reading out the echo data based on the magnetic resonance phenomenon; control means for controlling said excitation means and said gradient field application means so as to apply the pulsed radio-frequency magnetic field and the pulsed first to third gradient fields in accordance with a predetermined sequence; signal acquisition means for acquiring an echo signal based on the magnetic resonance phenomenon generated in the object to be examined; and image reconstruction means for obtaining an image of magnetic resonance data from the echo signal, said control means comprising

first echo control means for alternately and repetitively executing a first operation for applying the third gradient field while repetitively inverting it so as to produce the echo signal, and a second operation for applying, as the radio-frequency magnetic field, a 180° pulse which can compensate for an echo signal phase error due to a nonuniformity and offset of the static magnetic field so as to generate the echo signal, and

second echo control means for inverting the second gradient field each time the 180° pulse is applied.

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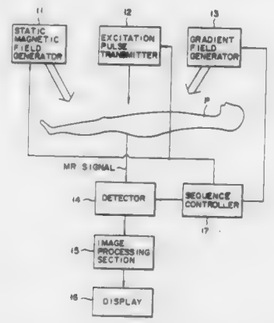


**4,746,865**

## METHOD AND SYSTEM FOR MAGNETIC RESONANCE IMAGING

Takao Kasugai, Ootawara, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Oct. 31, 1986, Ser. No. 925,233
Claims priority, application Japan, Nov. 2, 1985, 60-247798
Int. Cl.[4] G01R *33/20*
U.S. Cl. 324—309 9 Claims




1. A magnetic resonance imaging method comprising the steps of:
(a) applying predetermined magnetic fields to an object to cause a magnetic resonance phenomenon therein;
(b) collecting magnetic resonance signals produced by the magnetic resonance phenomenon;
(c) obtaining original image pixel data representing a distribution of magnetic resonance data from the magnetic resonance signals obtained in the collecting step;
(d) detecting a maximum amplitude value of the original image pixel;
(e) setting a threshold value in accordance with said maximum amplitudes value; and
(f) performing arithmetic processing using said original image pixel data exceeding in amplitude the threshold value to obtain processed image data.

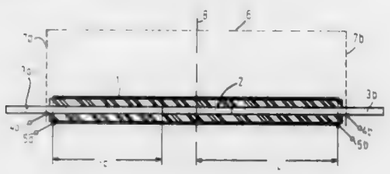
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**4,746,866**

## HIGH-FREQUENCY COIL SYSTEM FOR A MAGNETIC RESONANCE IMAGING APPARATUS

Peter K. H. Röschmann, Hamburg, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, Tarrytown, N.Y.

Filed Nov. 3, 1986, Ser. No. 926,475
Claims priority, application Fed. Rep. of Germany, Nov. 2, 1985, 3538952
Int. Cl.[4] G01R *33/20*
U.S. Cl. 324—318 16 Claims



1. A high-frequency coil system for a magnetic resonance imaging apparatus, said coil system comprising a system of conductors having a hollow, cylindrical outer conductor with two coupling apertures, a dielectric disposed within said outer conductor and at least two inner conductors arranged inside said dielectric for displacement with respect to said outer conductor and means for interconnecting said at least two inner conductors so that a high frequency current will flow between said outer conductor and at least one of said inner conductors via capacitance between said at least one inner conductor and said outer conductor.

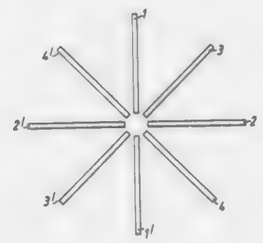
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**4,746,867**

## ANTENNA ASSEMBLY FOR MICROWAVE REFLECTION SURVEY EQUIPMENT

David J. Gunton, Stakeford, United Kingdom, assignor to British Gas Corporation, London, England

Filed Oct. 17, 1985, Ser. No. 788,580
Claims priority, application United Kingdom, Oct. 17, 1984, 8426246
Int. Cl.[4] G01V *3/12*; G01S *13/06*; H01Q *15/08, 21/26*
U.S. Cl. 324—329 6 Claims



1. An antenna assembly for use in the detection of objects buried in the ground, said assembly radiating microwave electromagnetic output radiation downwardly into the ground and receiving as input radiation said output radiation after reflection from said objects, said assembly comprising:
(a) a plurality of antennas each having at least one pair of conductive elements each having first surfaces facing towards the ground, said output radiation being radiated from said first surfaces of at least one radiating pair of said pairs of elements and said input radiation being received in said first surfaces of at least one receive pair of said pairs of elements, said radiating and receive pairs of elements being mutually electrically orthogonal to suppress direct breakthrough of radiation therebetween;
(b) said first surfaces having a cladding of uniform substantially lossless solid dielectric material having a relative permittivity of at least 3.5, said cladding being the only part of said assembly between said first surfaces and the ground;
(c) said cladding comprising a slab of said dielectric material, said slab having an upper surface facing away from the ground and a lower surface facing towards the ground and having a thickness between said surfaces of at least one twentieth of the wavelength $\lambda_d$ in said dielectric material of the lowest fequency portion of said radiation to be radiated from said assembly;
(d) said first surface of each of said elements being directly and entirely engaged by said upper surface of said slab;
(e) said elements having outer element peripheries as seen in plan, said slab having a slab periphery as seen in plan, and said element peripheries being spaced inwardly from said slab periphery as seen in plan;
(f) said slab being effective at least:
(i) to ensure that the remainder of said assembly in use shall be separated from the ground by at least said thickness of said slab;
(ii) to ensure that said at least one radiating pair radiate said output radiation preferentially downwardly through said slab away from said at least one receive pair; and
(iii) to increase the electrical size of said antenna elements compared with their electrical size in the absence of such slab.

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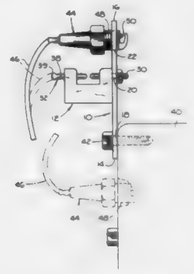


**4,746,868**

## SPARK PLUG AND WIRE TESTING UNIT

Jack D. Davis, 402 E. Mary St., Valdosta, Ga. 31601

Filed Feb. 3, 1986, Ser. No. 825,331
Int. Cl.[4] F02P *17/00*
U.S. Cl. 324—400 3 Claims



1. A spark plug and wire testing unit for use with an engine having a head and including spark plugs with spark gaps and each having an element in electrical contact with the engine, the engine also including an ignition system having wires leading individually to the spark plugs and normally detachably connected thereto, the testing unit comprising,
a mounting plate of electrically conductive material having a near end and a remote end, and having mounting means at the near end for mounting on the engine, and mounting means at the remote end for mounting a spark plug on the mounting plate,
the mounting plate when mounted on the engine being in electrical contact engagement therewith, and the spark plug when mounted on the mounting plate having its said element in electrical contact engagement with the mounting plate and with its spark gap exposed to view,
an electrode unit mounted on the mounting plate and including a body of block-like form with a pair of parallel arms including an inner arm and an outer arm, spaced apart and having outer broad surfaces, the electrode unit being so mounted with the outer surface of the inner one of the parallel arms engaging the mounting plate and the arms thereby disclosed parallel with the mounting plate,
the electrode unit including inner and outer electrodes mounted in the inner and outer parallel arms respectively, and forming a spark gap therebetween positioned in the space between the parallel arms and exposed to view,
the inner electrode extending through the inner parallel arm in which it is mounted and operable for securing the electrode unit to the mounting plate, and being in electrical contact engagement with the mounting plate, and
the outer electrode extending through the outer parallel arm in which it is mounted and having means for detachably connecting a wire normally connected with a said spark plug.

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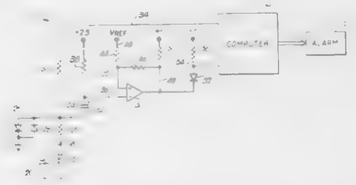
**4,746,869**

## CIRCUIT FOR TESTING INDUCTIVE COILS

Thomas G. Schrag, Hesston, Kans.; Charles F. Hood, and Scott A. Morton, both of Ranchester, Wyo., assignors to Hesston Corporation, Hesston, Kans.

Filed Jun. 10, 1987, Ser. No. 61,093
Int. Cl.[4] G01R *31/06*
U.S. Cl. 324—546 19 Claims

1. A circuit for testing the electrical integrity of an inductive coil or solenoid, said circuit comprising:
activatible voltage means for selectively imposing a direct current voltage on said coil or solenoid for inducing a current flow therethrough in response to said voltage;
means for detecting said current flow and for producing a current flow signal indicative of the magnitude of said current flow;
comparator means operatively coupled with said detecting means for receiving said current flow signal, for receiving a reference signal indicative of a reference current flow magnitude, and for comparing said current flow signal with said reference signal for producing a first comparison signal when said current flow magnitude is less than said reference magnitude and a second comparison signal



when said current flow magnitude is greater than said reference magnitude; and
determining means operatively coupled with said comparator means for receiving said comparison signals and for determining whether said first comparison signal is received during a first point in time occuring after said voltage is imposed and whether said second comparison signal is received during a later second point in time while said voltage is still imposed whereby determining reception of said respective comparison signals during said respective points in time is a test indicative of the electrical integrity of said coil or solenoid

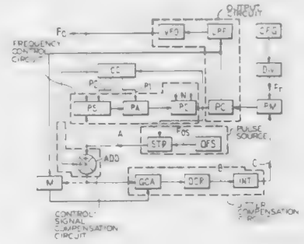
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**4,746,870**

## WIDE RANGE FREQUENCY SYNTHESIZER WITH REDUCED JITTER

Michael J. Underhill, Faygate, United Kingdom, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 920,491, Oct. 17, 1986, abandoned, which is a continuation of Ser. No. 461,805, Jan. 28, 1983, abandoned. This application Jun. 23, 1987, Ser. No. 65,631
Claims priority, application United Kingdom, Mar. 19, 1982, 8208096
Int. Cl.[4] H03L *7/18*; H03B *19/00*
U.S. Cl. 328—14 15 Claims



1. A frequency synthesizer for providing an output signal having a frequency different from that of a signal having a given frequency by a selected offset frequency, comprising
a frequency control circuit, receiving said output signal or said signal having a given frequency as an input, for producing a reduced frequency pulse train having a frequency dependent on but less than the frequency of said one of said signals, said reduced frequency pulse train

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having jitter frequency components due to inequality in periods of time between successive pulses of the reduced frequency pulse train,

an output circuit, receiving said reduced frequency pulse train, and having an output which is said output signal, and

a jitter compensation circuit connected to said frequency control circuit for receiving a jitter-containing input therefrom, and providing an output connected to said output circuit for reducing jitter in the period of said output signal which would otherwise be caused as a result of said inequality,

characterized in that said jitter compensation circuit comprises an analog integrator, and a d.c. removal circuit, for removing any d.c. voltage from a signal representative of the jitter, said analog integrator filtering said signal representative of the jitter,

the synthesizer further includes a control device having at least one control signal output,

said frequency control circuit comprises means responsive to said at least one control signal output for canceling extra cycles from, and adding extra cycles to, said input, for reducing the relative strength of any spurious signal in said output signal resulting from imperfect compensation by said jitter compensation circuit, and

the synthesizer comprises a control signal compensation circuit connected to said control device, for compensating for jitter that would otherwise by caused by the control signal.

2. A synthesizer as claimed in claim 1, characterized in that said means responsive to said control signal output cancels extra cycles according to a first pulse sequence, and adds extra cycles according to a second pulse sequence, said first and second pulse sequences being interspersed.

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**4,746,871**

## DIFFERENTIAL SWITCHED CAPACITOR INTEGRATOR USING A SINGLE INTEGRATION CAPACITOR

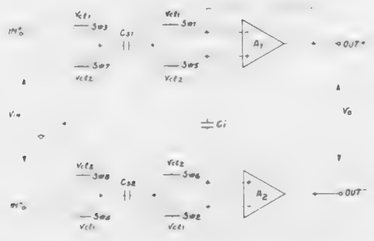
**Alejandro de la Plaza, Bergamo, Italy, assignor to SGS Microelettronica S.p.A., Catania, Italy**

**Filed Oct. 15, 1986, Ser. No. 919,058**

**Claims priority, application Italy, Oct. 29, 1985, 22641 A/85**

**Int. Cl.[4] G06G** *7/18;* **H03K** *5/00*

**U.S. Cl. 328—127** **4 Claims**



1. A differential switched capacitor integrator, operable for sampling analog differential signals coupled to two differential input terminals and for providing corresponding selectively filtered differential output signals at two differential output terminals, comprising:

two paths relative to said two differential input and output terminals at a floating potential with respect to a common ground terminal, said two paths being substantially identical and each path including:

(a) a first switch connected between a corresponding one of said input terminals and a first plate of a sampling capacitor;

(b) a second switch connected between said first plate and ground;

(c) a third switch connected between a second plate of said sampling capacitor and a corresponding one of said output terminals;

(d) a fourth switch connected between the second plate of said sampling capacitor and to a corresponding one of two plates of a floating integration capacitor;

two unity gain buffers, each respectively integrated in one of said two paths, each of said buffers having a non-inverting and an inverting input terminal and an output terminal constituting one of said two differential output terminals of the integrator, the output terminal of each unity gain buffer being short-circuited to its corresponding inverting input terminal, the non-inverting terminal of each unity gain buffer being connected to a corresponding one of the two plates of said floating integration capacitor; and

first and second non-overlapping clock signals being applied, respectively, to said first and third switches and to said second and fourth switches.

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**4,746,872**

## DIFFERENTIAL PHASE SHIFT KEYING DEMODULATOR

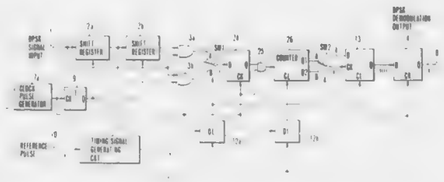
**Shigeo Yamagata, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed May 19, 1988, Ser. No. 865,065**

**Claims priority, application Japan, May 24, 1985, 60-111471**

**Int. Cl.[4] H04L** *27/22*

**U.S. Cl. 329—50** **18 Claims**



1. A differential phase shift keying demodulator comprising:

(a) delay means for delaying a signal modulated by differential phase shift keying;

(b) comparison means for comparing the output signal of said delay means and said modulated signal obtained without being delayed; and

(c) sampling means for sampling the output signal of said comparison means a plurality of times for the period of delay effected by said delay means.

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**4,746,873**

## FM DEMODULATORS

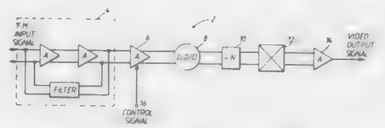
**Nicholas P. Cowley, Wroughton, England, assignor to Plessey Overseas Limited, Ilford, England**

**Filed Aug. 20, 1986, Ser. No. 898,176**

**Claims priority, application United Kingdom, Aug. 22, 1985, 8521061**

**Int. Cl.[4] H03D** *3/00*

**U.S. Cl. 329—110** **8 Claims**



1. An FM demodulator comprising a gain control circuit arranged to provide a substantially constant level of an FM output signal afforded thereto, and an injection locked oscillator divider being afforded the FM output signal from the gain control circuit, wherein the gain control circuit is provided with a control node arranged to receive a control signal for further controlling the level of the FM signal from the gain control circuit, the control signal being selected in dependence upon the strength on the FM input signal to be demodulated, whereby the degree of threshold extension provided by the demodulator can be programmed in accordance with the strength of the FM input signal.



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**4,746,874**

## CIRCUIT LAYOUT FOR SIGNAL AMPLIFICATION

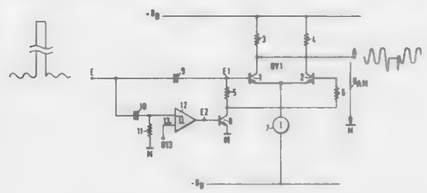
**Gerhard Forster, and Konrad Hirsch, both of Ulm, Fed. Rep. of Germany, assignors to Licentia Patent-Verwaltungs-GmbH, Frankfurt and TELEFUNKEN electronic GmbH, Heilbronn, both of, Fed. Rep. of Germany**

**Filed Oct. 7, 1986, Ser. No. 916,223**

**Claims priority, application Fed. Rep. of Germany, Oct. 8, 1985, 3535882**

**Int. Cl.[4] H03F** *3/45*

**U.S. Cl. 330—252** **5 Claims**



1. A circuit layout for signal amplification by means of a differential amplifier (DV1) and a first capacitor (9) at one of its two inputs for signal coupling,

wherein one input of the differential amplifier (DV1) to which the first capacitor (9) is connected, is connected via a first resistor (5), and the other input of the differential amplifier (DV1) is connected via a second resistor (6), jointly via an electronic switch (8), to reference potential (M),

the electronic switch (8) is controllable by a comparator (12), a reference voltage source ($U_{13}$) is connected to one input of the comparator (12) and an RC element (11, 10) to the other input,

the resistor (11) of the RC element is connected to reference potential (M) and the capacitor (10) of the RC element to the input (E) of the circuit layout,

the time constant of the RC element (10, 11) of the comparator (12) is of the same order of magnitude as the product of the capacitance of the first capacitor (9) and the resistance value of the first resistor (5), and the time constant formed by the first capacitor (9) and the first resistor (5) is substantially smaller than the time constant formed by the first capacitor (9) and the input resistance of the differential amplifier (DV1).

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**4,746,875**

## DIFFERENTIAL AMPLIFIER USING N-CHANNEL INSULATED-GATE FIELD-EFFECT TRANSISTORS

**Paul O'Leary, Gundelfingen, Fed. Rep. of Germany, assignor to Deutsche ITT Industries GmbH, Freiburg, Fed. Rep. of Germany**

**Filed Mar. 19, 1987, Ser. No. 27,742**

**Claims priority, application European Pat. Off., Mar. 21, 1986, 86103882.6**

**Int. Cl.[4] H03F** *3/45, 3/16*

**U.S. Cl. 330—253** **1 Claim**

1. An integrated circuit comprising:

a voltage bus and a circuit ground;

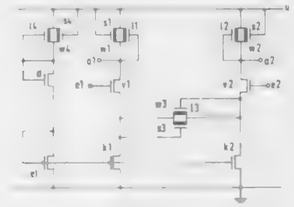
a differential amplifier having first and second n-channel, insulated-gate, field effect amplifier transistors of an enhancement type, each of said first and second amplifier transistors having a source, drain and gate, said source and drain of each of said amplifier transistors forming a source-drain section, each said source-drain section having first and second ends, one of said first and second ends corresponding to the source and the other of said first and second ends corresponding to the drain;

a first constant-current transistor, having a source, drain and gate, one of the source and drain of said first constant-current transistor electrically connected to said second end of said source-drain section of said first amplifier transistor, the other of said source and drain of said first constant-current transistor electrically connected to said circuit ground;

a second constant-current transistor, having a source, drain and gate, one of the source and drain of said second constant-current transistor electrically connected to said second end of said source-drain section of said second amplifier transistor, the other of said source and drain of said second constant-current transistor electrically connected to said circuit ground;

a transistor of an enhancement type having a source; drain and gate, one of said source and drain electrically connected to said gate so that said transistor operates as a diode, one of said source and drain being a first end of said transistor and the other of said source and drain being a second end of said transistor;

a constant-current input transistor of an enhancement type, having a source, drain and gate, said source and gate forming a source-drain section of said constant-current input transistor having first and second ends, one of said first and second ends of said source-drain section corresponding to the source and the other of said first and



second ends corresponding to the drain, the first end electrically connected to said circuit ground, the second end of said source-drain section electrically connected to said gate of said constant-current input transistor and also connected to said gate of said first constant-current transistor and said gate of said second constant-current transistor, said second end further electrically connected to said first end of said transistor operating as a diode; and

first, second, third and fourth depletion resistors, each of said first, second, third and fourth depletion resistors comprising:

a load transistor of a depletion type, having a source, drain and gate, said gate of said load transistor electrically connected to said source of said load transistor, said source and drain forming a source-drain section having a first end corresponding to one of said source and drain and having a second end corresponding to the other of said source and drain; and

a shunt transistor, having a source, drain, and gate, said source and drain forming a source-drain section, said gate of said shunt transistor connected to said drain of said shunt transistor, the source-drain section of said shunt transistor electrically connected in parallel with the source-drain section of said load transistor,

wherein:

said first end of said source-drain section of said load transistor of said first depletion resistor is electrically connected to said first end of said source-drain section of said first amplifier transistor, and said second

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end of said load transistor of said first depletion resistor is electrically connected to said voltage bus;

said first end of said source-drain section of said load transistor of said second depletion resistor is electrically connected to said first end of said source-drain section of said second amplifier transistor, and said second end of said load transistor of second depletion resistor is electrically connected to said voltage bus;

said first end of said source-drain section of said load transistor of said third depletion resistor is electrically connected to said second end of said source-drain section of said first amplifier transistor, and said second end of said load transistor of said third depletion resistor is electrically connected to said second end of said second amplifier transistor; and

said first end of said source-drain section of said load transistor of said fourth depletion resistor is electrically connected to said second end of said transistor operating as a diode, and said second end of said load transistor of said fourth depletion resistor is electrically connected to said voltage bus;

and wherein:

said load transistor and said shunt transistor of said third depletion resistor each includes a depletion channel having a length and a width, the width-to-length ratio of said depletion channel of said load transistor of said third depletion resistor being substantially equal to the width-to-length ratio of said depletion channel of said shunt transistor of said third depletion resistor; and

each of said load transistors of said first, second and fourth depletion resistors and each of said shunt transistors of said first, second and fourth depletion resistors includes a depletion channel having a length and a width, the width-to-length ratio of the depletion channel of the load transistor of each of said first, second and fourth depletion resistors differing from the length-to-width ratio of the corresponding shunt transistor of each of said first, second and fourth depletion resistors.

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**4,746,876**

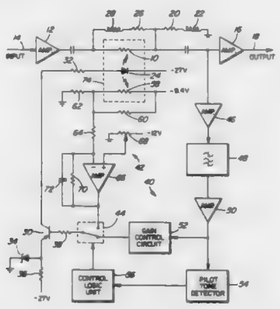
**ATTENUATOR CONTROL ARRANGEMENTS**

**Antoni J. Sibiga, Dollard des Ormeaux, Canada, assignor to Northern Telecom Limited, Montreal, Canada**

**Filed Dec. 22, 1986, Ser. No. 944,023**

**Int. Cl.[4] H03G** *3/30, 17/00*

**U.S. Cl. 330—284** **4 Claims**



1. An attenuator control arrangement comprising:

an attenuator comprising a first potential divider including a first light-dependent resistance;

a second potential divider including a second light-dependent resistance;

a light source for illuminating the first and second light-dependent resistances;

control means responsive to a control signal for controlling the light source thereby to control the magnitudes of the first and second light-dependent resistances;

means for producing a first control signal in response to differences between a potential derived from the second potential divider and a reference potential;

means for producing a second control signal in dependence upon a level of a predetermined signal at an output of the attenuator; and

switching means responsive to the absence or presence of the predetermined signal for selecting respectively the first or second control signal as the control signal for the control means, whereby the attenuator has an attenuation determined by respectively the reference potential or the level of the predetermined signal.

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**4,746,877**

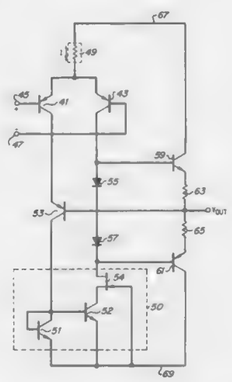
**DIRECT-COUPLED WIDEBAND AMPLIFIER**

**Barry Siegel, San Jose, Calif., assignor to Elantec, Milpitas, Calif.**

**Filed Sep. 25, 1986, Ser. No. 911,517**

**Int. Cl.[4] H03F** *3/45*

**U.S. Cl. 330—255** **9 Claims**



8. An amplifier circuit comprising:

a differential input stage including a pair of transistors of one conductivity type with base electrodes connected to receive inverting and non-inverting applied signals, and having emitter electrodes connected together to receive bias signal, and having collector electrodes;

an output stage having substantially unity voltage gain coupled to receive signal appearing on the collector electrode of the transistor in the input stage which has the inverting input;

a gain stage of substantially unity voltage gain coupled to receive the output of the output stage and coupled to the collector electrode of the transistor in the input stage which has the non-inverting input for supplying to said collector electrode the current which is conducted through said gain stage; and

bias means coupled to the emitter electrodes of the transistors in the input stage, and to said gain stage and to the collector electrode of the transistor which has the inverting input for maintaining the currents in the collector electrodes of the transistors in the input stage substantially constant.



**4,746,878**

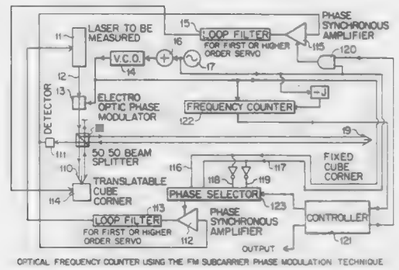
**C. W. LASER WAVEMETER/FREQUENCY LOCKING TECHNIQUE**

**Gregory M. Cutler, Mountain View, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Division of Ser. No. 727,457, Apr. 26, 1985. This application Jul. 8, 1986, Ser. No. 883,238**

**Int. Cl.[4] H03L** *7/16*

**U.S. Cl. 331—9** **16 Claims**




OPTICAL FREQUENCY COUNTER USING THE FM SUBCARRIER PHASE MODULATION TECHNIQUE

1. A method of determining the value of a first frequency $f_0$, said method comprising the steps of:

(a) for a measurable frequency $f_f$, setting the ratio of $f_0/f_f$ to a controllable value L;

(b) measuring the value $f_{f1}$ of $f_f$ for L equal to an initial value $L_0$;

(c) for fixed $f_0$, incrementing L by a known amount Q to a value $L'=L_0+Q$;

(d) measuring the value $f_{f2}$ or $f_f$ when $f_0=L'*f_f$ and

(e) calculating $f_0$ in terms of Q, $f_{f1}$ and $f_{f2}$.

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**4,746,879**

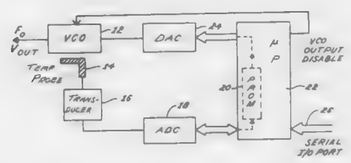
**DIGITALLY TEMPERATURE COMPENSATED VOLTAGE-CONTROLLED OSCILLATOR**

**John Y. Ma, 499 Dundee Ave., Milpitas, Calif. 90535, and Steven Weiss, 4876 Caroline Way, San Jose, Calif. 95124**

**Filed Aug. 28, 1986, Ser. No. 901,439**

**Int. Cl.[4] H03B** *5/04;* **H03L** *1/02*

**U.S. Cl. 331—44** **16 Claims**




16. A method for maintaining the output frequency $f_o$ of a voltage controlled oscillator (VCO) stabilized at a desired value over a selected temperature range, including the steps of:

calibrating the VCO by determining at each of a series of discrete temperature levels represented by corresponding digital values and spread over said temperature range, the tuning voltage $V_c$ required to maintain the output frequency of said VCO at said desired value;

digitizing and storing said determined $V_c$ values within the VCO in a manner allowing them to be subsequently retrieved by using the corresponding digital temperature values as indices,

sensing and digitizing the ambient temperature of the VCO during its operation;

using the sensed digital temperature value as an index to retrieve the corresponding stored digital $V_c$ value;

converting the digital $V_c$ value to its corresponding analog voltage form;

feeding the analog tuning voltage to the VCO in order to maintain its output frequency at the desired value; and

sensing from a location remote to said VCO, when the output frequency of the VCO at different ambient temperatures shifts by a predetermined value from said desired frequency value and in response thereto calculating and transmitting to the VCO an offset value which when added to each of the stored digital $V_c$ values before it is converted to corresponding analog form and fed to the VCO produces a predetermined shift in the VCO output frequency.

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**4,746,880**

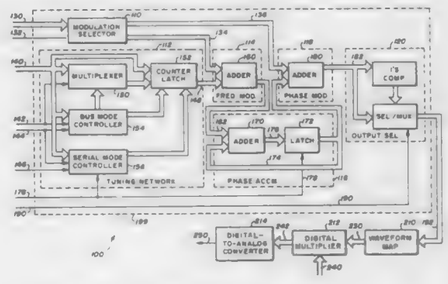
**NUMBER CONTROLLED MODULATED OSCILLATOR**

**Earl W. McCune, Jr., Santa Clara, Calif., assignor to Digital RF Solutions Corporation, Santa Clara, Calif.**

**Filed Feb. 6, 1987, Ser. No. 11,613**

**Int. Cl.[4] H03C** *1/00, 3/00*

**U.S. Cl. 332—16 R** **9 Claims**




1. An oscillator comprising in combination:

a frequency modulator including an adder having a first set of addend inputs for receiving signals representing a first digital number, a second set of addend inputs for receiving signals representing a second digital number, and a set of outputs at which said frequency modulator adder develops signals representing the sum of the value of said first and said second numbers;

a phase accumulator including an adder having a first set of addend inputs connected to said set of outputs of said frequency modulator adder for receiving said frequency modulator adder developed sum signals, a second set of addend inputs for receiving signals representing a stored number, and a set of outputs at which said phase accumulator adder develops signals representing the sum of the value of said frequency modulator adder developed sum and said stored number and a latch having a set of data inputs connected to said set of outputs of said phase accumulator adder for receiving said phase accumulator adder developed sum signals, a clock input for connection to receive an externally generated clocking signal, and a set of data outputs connected to said second set of phase accumulator adder addend inputs, said phase accumulator latch for latching the state of said phase accumulator adder developed sum signals at each of a series of times delineated by said clocking signal to develop said stored number signals;

a phase modulator including an adder having a first set of addend inputs for receiving signals representing a third digital number, a second set of addend inputs connected to said set of outputs of said phase accumulator latch for receiving said stored number signals, and a set of outputs at which said phase modulator adder develops signals representing the sum of the value of said third number and the value of said stored number; and

a modulation selector for connection to receive externally generated signals representing a fourth digital number, for

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connection to receive an externally generated selecting signal, connected to said first set of frequency modulator adder addend inputs, and connected to said first set of phase modulator adder addend inputs, said modulation selector for developing said first digital number signals and said third digital number signals so that the value of one of said first and said third numbers is the same as the value of said fourth number as determined by the state of said selecting signal.

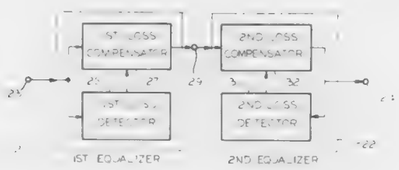
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**4,746,881**

## EQUALIZER FOR FREQUENCY INDEPENDENT AND DEPENDENT TRANSMISSION LOSS COMPONENTS WITH A PILOT USED FOR THE FREQUENCY INDEPENDENT COMPONENT

**Toshio Suzuki; Satoshi Hiraide, and Takashi Shinozuka, all of Tokyo, Japan, assignors to NEC Corporation, Japan**

**Filed May 22, 1985, Ser. No. 736,943**
**Claims priority, application Japan, May 24, 1984, 59-105162**
**Int. Cl.[4] H04B** *3/12, 3/14*
**U.S. Cl. 333—16** **14 Claims**




2. In an automatic equalizer responsive to an equalizer input signal supplied through a transmission path with said input signal being subjected to a transmission loss for producing an equalizer output signal, said transmission loss being classified into a first loss component having substantially no frequency dependency and a second loss component having substantially a frequency dependency, respectively, said automatic equalizer comprising a first and a second equalizer for separately compensating for said first and second loss components, respectively; the improvement comprising:

said input signal comprising a pilot signal in addition to an information signal, said information signal experiencing both said first and second loss components and said pilot signal experiencing only said first loss component; and that:

said first equalizer comprises:

first loss component response means coupled to respond to said input signals received over said transmission path and responsive to a pilot signal component derived from said pilot signal and having said no frequency dependency for detecting said first loss component to produce a control signal; and having:

first loss component compensating means responsive to said input and control signals for compensating for said first loss component to produce an intermediate output signal including said information signal;

said second amplifier comprising:

second loss component detecting means responsive to said intermediate output signal to produce a second control signal indicating an amount of compensation required for said second loss component; and

second loss compensating means responsive to said intermediate output signal including said information signal for compensating for said second loss component in response to said second control signal produced by said second loss component detecting means; and

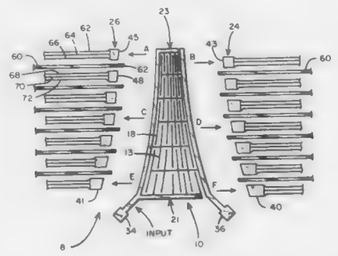
means responsive to the output of said second equalizer for providing an output signal from said automatic equalizer.

**4,746,882**

## SAW MULTIPLEXER USING TAPERED TRANSDUCERS

**Leland P. Solie, Mahomet, Ill., assignor to Unisys Corporation, Blue Bell, Pa.**

**Filed Jun. 24, 1987, Ser. No. 65,760**
**Int. Cl.[4] H03H** *9/145, 9/64*
**U.S. Cl. 333—196** **5 Claims**




1. A SAW multiplexing device comprising

a substrate suitable for conducting surface acoustical waves (SAWs),

transducer means formed of interdigital, electrode fingers located on said substrate for launching a plurality of SAW components, each of which comprise a predetermined center frequency and a band of frequencies about said center frequency, and each of which travels along its own predetermined path on said substrate wherein said fingers exhibit a variable separation along the length of said transducer means, and

a plurality of pickup means each disposed on said surface so as to receive one of said SAW components, wherein said pickup means are each constructed to be selectively responsive to the center frequency and the band of frequencies around said center frequency of an associated one of said SAW components, and said center frequency and said band of frequency are determined by the spacing dimensions of said fingers of said transducer means at a predetermined portion of said transducer means, and wherein said interdigital electrode fingers are each formed as segments of hyperbolic curves positioned such that the spacing between said fingers varies from point-to-point along said transducer means and the spacing between said fingers is substantially constant at any given point, and said electrode fingers comprise a pair of outer electrode fingers and a plurality of inner electrode fingers, said outer electrode fingers are relatively wider than said inner electrode fingers, said inner electrode fingers are subdivided into a plurality of hyperbolically curved sections, and said transducer means comprises interconnection electrode connection means for connecting each of said sections to one of said outer electrode fingers.

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**4,746,883**

## EVANESCENT MODE MICROWAVE BANDPASS FILTER WITH A ROTATABLE CRANK SHAPE COUPLING ANTENNA

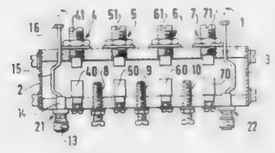
**Marc Sauvage, Nanterre, and Marie-Christine Henriot, Clichy, both of France, assignors to Alcatel Thomson Faiscaeux Hertziens, France**

**Filed Jun. 13, 1986, Ser. No. 874,183**
**Claims priority, application France, Jun. 13, 1985, 85 08966**
**Int. Cl.[4] H01P** *1/20*
**U.S. Cl. 333—202** **4 Claims**

1. A tunable microwave bandpass filter operating in the evanescent mode, of the type comprising a waveguide body, at least one terminal of the coaxial type mounted to said waveguide body, the improvement wherein said terminal is equipped with a crank-shaped coupling antenna in the form of wire having axially aligned ends, and an integral, intermediate



U-shaped axially offset bend therebetween, and means for mounting said antenna for rotation about a longitudinal axis aligned through said ends, for adjusting the coupling between said antenna and said filter, wherein said waveguide body filter comprises a filter casing having opposed, spaced waveguide walls and being closed by two end plates, and at least one tunable resonator comprising a fixed resonator part mounted to one waveguide wall coaxial with and spaced from an axial adjustable resonator part mounted to the other opposed waveguide wall, input and output terminals for said waveguide body



filter mounted to one waveguide wall of said casing and adjacent said at least one tunable resonator, at least one of said input and output terminals comprising, a coaxial receptacle, a hole within a wall of the waveguide adjacent said at least one resonator, a bush mounted within said hole and said crank-shaped coupling antenna having one end thereof passing through said insulating bush and coupled to said coaxial receptacle and being rotatably coupled thereto, and wherein said crank-shaped coupling antenna has said integral, intermediate U-shaped axially offset bend disposed internally of said waveguide body.

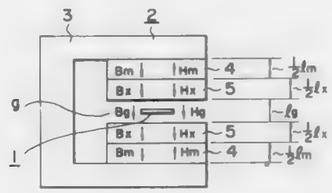
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**4,746,884**

## YIG THIN FILM MICROWAVE APPARATUS

**Yoshikazu Murakami, Kanagawa; Hideo Tanaka; Masami Miyake, both of Miyagi; Seigo Ito, Tokyo; Hitoshi Tamada, and Toshiro Yamada, both of Kanagawa, all of Japan, assignors to Sony Corporation, Tokyo, Japan**

**Filed Jul. 9, 1986, Ser. No. 883,603**
**Claims priority, application Japan, Jul. 9, 1985, 60-150430; Feb. 28, 1986, 61-43206**
**Int. Cl.[4] H01P** *7/00, 7/08*
**U.S. Cl. 333—234** **2 Claims**




1. YIG thin film microwave apparatus comprising a YIG thin film utilizing a ferrimagnetic resonance effect, a magnetic circuit having a gap of length lg, said YIG thin film being provided with a bias magnetic field perpendicular to a film surface of said YIG thin film device, said magnetic circuit including a permanent magnet having a thickness lm and a soft magnetic plate having a thickness lx in its flux path, said permanent magnet satisfying the characteristics

$$Br^{o} > (fo/\gamma) + Nz^{Y}4\pi Mso^{Y}$$

$$\alpha 1^{B} > \frac{Nz^{Y}4\pi Mso^{Y}}{(fo/\gamma) + Nz^{Y}4\pi Mso^{Y}} \cdot \alpha 1^{Y}$$

said soft magnetic plate satisfying the characteristics

$$4\pi Mso^{X} < (fo/\gamma) + Nz^{Y}4\pi Mso^{Y}$$

$$\alpha 1^{x} < \frac{Nz^{Y}4\pi Mso^{Y}}{(fo/\gamma) + Nz^{Y}4\pi Mso^{Y}} \cdot \alpha 1^{Y}$$

wherein

fo is resonance frequency of said YIG thin film device,

$\gamma$ is gyromagnetic ratio of said YIG thin film

$Nz^{Y}$ is demagnetization factor of said YIG thin film

$4\pi Mso^{Y}$ is saturation magnetization of said YIG thin film at room temperature,

$4\pi Mso^{X}$ is saturation magnetization of said soft magnetic plate,

$Br^{o}$ is remanence of said permanent magnet at room temperature,

$\alpha 1^{B}$ is first order temperature coefficient of the remanence of said permanent magnet near room temperature,

$\alpha 1^{Y}$ is first order temperature coefficient of the saturation magnetization of said YIG thin film near room temperature,

$\alpha 1^{X}$ is first order temperature coefficient of the saturation magnetization of said soft magnetic plate near room temperature

and, said thickness lm and lx being selected to reduce temperature dependency of the resonance frequency.

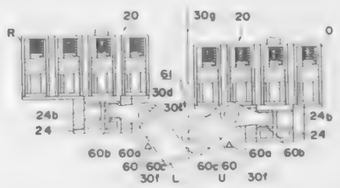
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**4,746,885**

## ELECTROMAGNETIC APPARATUS COMBINED A PAIR OF CONTACTORS INTO ONE UNIT

**Haruo Ogata, Nagaokakyo, and Takashi Tanaka, Takatsuki, both of Japan, assignors to Omron Tateisi Electronics, Co., Kyoto, Japan**

**Filed Sep. 3, 1986, Ser. No. 903,298**
**Claims priority, application Japan, Sep. 6, 1985, 60-198303**
**Int. Cl.[4] H01H** *9/20, 33/46*
**U.S. Cl. 335—160** **3 Claims**




1. An electromagnetic apparatus combined with a at least a pair of contactors into one unit, comprising:

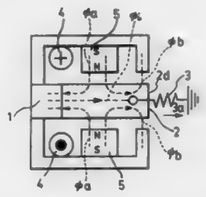
a casing having at least two compartments, wherein each compartment accommodates at least one of the pair of contactors, and wherein each of the pair of contactors opens and closes a fixed contact by means of a movable contact provided in a movable insulation stand through a movable polar member to be reciprocating in accordance with excitation and de-magnetization of an electromagnetic device, and wherein the movable insulation stand being provided with an embracing member having an engaging groove to be opened rightly to the direction of the movement thereof, and

an interlocking mechanism provided on the casing with a pair of interlock levers, each of which has an end which is rotatably inserted into the engaging groove of the embracing member of the movable insulation stand, wherein the pair of interlock levers are arranged in order to interfere with each other so that the pair of contactors are adapted to operate one by one for prohibiting the simultaneous operations of the conductors.

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**4,746,886**
**ELECTROMAGNETIC ACTUATOR**
**Tokio Uetsuhara, Urawa, Japan, assignor to Mitsubishi Mining & Cement Co. Ltd., Tokyo and Iwasaki Electronics Co., Ltd., Kyoto, both of, Japan**
**PCT No. PCT/JP85/00536, § 371 Date Apr. 23, 1986, § 102(e) Date Apr. 23, 1986, PCT Pub. No. WO86/02484, PCT Pub. Date Apr. 24, 1986**
**PCT Filed Sep. 26, 1985, Ser. No. 860,344**
**Claims priority, application Japan, Oct. 9, 1984, 59-211862; Jan. 17, 1985, 60-6599**
**Int. Cl.⁴ H01F** *7/08*
**U.S. Cl. 335—230** **2 Claims**

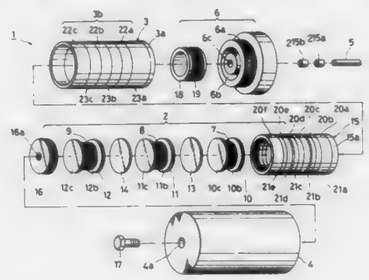


1. An electromagnetic actuator comprising;
a permanent magnet (**5**); a pole piece (**16**) having a first pole face secured to a first pole face of the permanent magnet (**5**); a pair of movable iron cores (**2**) so arranged that the inner end faces (**2***a*) of the both cores (**2**) can be moved close to or apart from a pair of second pole faces (**16***a*) of the pole pieces (**16**) and are connected through a non-magnetic connecting shaft (**8**); a stationary iron core (**1**) having first pole faces (**1***f*) facing respectively a side surface (**2***b*), meeting at a right angle with the inner end face (**2***a*), of each of the movable iron core (**2**) through a fine gap (**1***n*) and a second pole face(**1***l*) secured to a second pole face of the permanent magnet (**5**); a pair of dividing magnetic paths (**17**) having a required magnetic reluctance and each dividing magnetic path (**17**) being fixed to an outer end face (**2***h*) of each the movable iron core (**2**); and a winding element (**4**) for energizing the magnetic circuit consisting the stationary iron core (**1**), the movable iron cores (**2**), the pole pieces (**16**), and the dividing magnetic paths(**17**).

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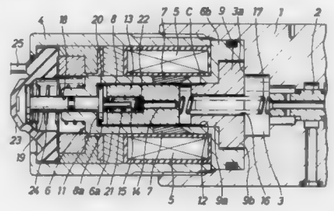
**4,746,887**
**HOLLOW CYLINDRICAL MOVABLE BODY FOR AN ELECTROMAGNET**
**Osamu Nogata; Takashi Kajima, both of Kobe, and Toshiharu Ozaki, Ohsaka, all of Japan, assignors to Techonological Research Association, Tokyo, Japan**
**Filed Sep. 3, 1985, Ser. No. 771,772**
**Claims priority, application Japan, Sep. 6, 1984, 59-187034; Sep. 6, 1984, 59-187035**
**Int. Cl.⁴ H01F** *7/08*
**U.S. Cl. 335—261** **11 Claims**

1. An electromagnetic actuator comprising:
a hollow cylindrical movable body including a stack of hollow cylindrical magnetic members interposed with hollow cylindrical non-magnetic members, said movable body having a wall thickness of substantially 1 mm; and an associated fixed body, including a stack of magnetic yokes each carrying an electrical coil adapted to be energized to create a magnetic field to effect movement of said movable body.



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**4,746,888**
**SOLENOID FOR ELECTROMAGNETIC VALVE**
**Koji Ichihashi; Kyoji Tanaka, and Wataru Takahashi, all of Higashimatsuyama, Japan, assignors to Diesel Kiki Co., Ltd., Tokyo, Japan**
**Filed Jul. 8, 1987, Ser. No. 71,259**
**Claims priority, application Japan, Jul. 18, 1986, 61-109256[U]**
**Int. Cl.⁴ H01F** *7/08*
**U.S. Cl. 335—262** **5 Claims**

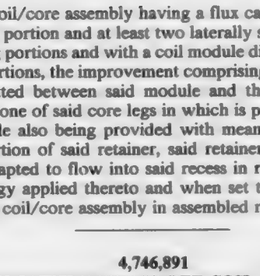


1. A solenoid for an electromagnetic valve comprising an exciting coil, a tubular hollow inner housing with a shaft sleeve portion thereof disposed within said coil, a tubular slide guide having a bottom and made of a non-magnetic material which is contained within said housing, a stopper with a stationary shaft portion fitted in an opened end of said slide guide, and a plunger, which is driven by the electromagnetic force of said coil, slidably contained within said slide guide between the end face of said shaft portion and the bottom of said slide guide.

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**4,746,889**
**METHOD OF MAKING A MAGNET ARRANGEMENT AND MAGNET ARRANGEMENT MADE BY THE METHOD**
**Karl H. Rivoir, Am Nagoldhang 5, 7350 Pforzheim, Fed. Rep. of Germany**
**Filed Aug. 11, 1987, Ser. No. 84,450**
**Claims priority, application Fed. Rep. of Germany, Aug. 27, 1986, 3629085**
**Int. Cl.⁴ H01F** *7/00*
**U.S. Cl. 335—296** **9 Claims**

1. A method of making a magnet arrangement, including a cylindrical magnet, pole shoes surrounding and resting against the magnet, the pole shoes formed of hollow cylinder sections, two cover plates placed on the end faces of the magnet and of the pole shoes, the cover plates connected to the pole shoes, wherein the inner surfaces of the pole shoes facing the magnet have before being placed on the magnet a radius different from the radius of the outer cylindrical surface of the magnet, comprising placing the pole shoes against the magnet, pressing the pole shoes against the magnet until the radius of the outer surface of the magnet and the radius of the inner surfaces of the pole shoes are equal, and welding the cover plates and the pole shoes together.



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**4,746,890**
**MOUNTING FOR IGNITION MODULE**
**Francis P. Buckley, Springfield, and Antonio Gomes, Jr., East Longmeadow, both of Mass., assignors to R. E. Phelon Company, Inc., East Longmeadow, Mass.**
**Filed Nov. 20, 1987, Ser. No. 123,560**
**Int. Cl.⁴ H01F** *27/30*
**U.S. Cl. 336—197** **5 Claims**

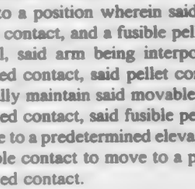


1. In a coil/core assembly having a flux carrying core with a cross-bar portion and at least two laterally spaced, generally parallel leg portions and with a coil module disposed on one of said leg portions, the improvement comprising a thermoplastic retainer fitted between said module and the opposed inner portion of one of said core legs in which is provided a recess, said module also being provided with means to receive and hold a portion of said retainer, said retainer including a lug portion adapted to flow into said recess in response to ultrasonic energy applied thereto and when set therein, serves to fasten said coil/core assembly in assembled relation.

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**4,746,891**
**HIGH SATURATION THREE COIL CURRENT TRANSFORMER**
**Henry J. Zylstra, Alburnette, Iowa, assignor to Square D Company, Palatine, Ill.**
**Filed Apr. 19, 1985, Ser. No. 725,071**
**Int. Cl.⁴ H01F** *27/30, 40/06*
**U.S. Cl. 336—171** **11 Claims**

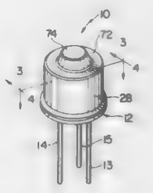
1. A current transformer and conductor combination, said current transformer producing a current proportional to the current through the conductor, said current transformer and conductor combination comprising:
only one generally U-shaped conductor having a first leg and a second leg, the first leg being approximately parallel to the second leg, the current flow in the first leg being opposite to the current flow in the second leg,
a generally O-shaped ferromagnetic core surrounding the first leg of said conductor, said core having a first portion located between the first leg and the second leg of said conductor,



a first coil and a second coil, each coil surrounding a portion of said core other than the first portion, said first and second coils being electrically connected, and
a third coil surrounding the first portion of said core, said third coil being electrically connected in series with said first and second coils.

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**4,746,892**
**THERMALLY ACTUATED LATCH FOR ELECTRICAL CIRCUITS**
**Keith M. Musto, Warwick, R.I., assignor to Elmwood Sensors, Inc., Pawtucket, R.I.**
**Filed Apr. 17, 1987, Ser. No. 40,569**
**Int. Cl.⁴ H01H** *37/76*
**U.S. Cl. 337—403** **8 Claims**



1. A thermally actuated latch comprising a base made of an electrical insulating material, a housing on said base and including a wall, a fixed contact on said base, a resiliently movable contact arm, a movable contact on said arm, said arm being resiliently biased to a position wherein said movable contact engages said fixed contact, and a fusible pellet in said housing adjacent said wall, said arm being interposed between said pellet and said fixed contact, said pellet communicating with said arm to normally maintain said movable contact in spaced relation to said fixed contact, said fusible pellet being deformable upon exposure to a predetermined elevated temperature to enable said movable contact to move to a position of engagement with said fixed contact.

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**4,746,893**
**PRESSURE TRANSDUCER WITH SEALED CONDUCTORS**
**Peter J. Shak, Hoffman Estates, Ill., assignor to Motorola, Inc., Schaumburg, Ill.**
**Continuation-in-part of Ser. No. 696,933, Jan. 31, 1985, Pat. No. 4,617,606. This application Aug. 29, 1986, Ser. No. 902,338**
**Int. Cl.⁴ G01L** *1/22*
**U.S. Cl. 338—5** **12 Claims**

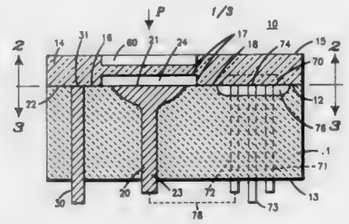
1. A pressure transducer comprising:
a nonconductive base having external top and bottom sur-

VOL 1090 ISS 4 MY 24 1988 UMI



faces, said base top surface having a central area effectively substantially surrounded by nonconductive planar portions of said base top surface;

a silicon diaphragm, comprising a preformed silicon substrate, having top and bottom surfaces with said diaphragm bottom surface joined to said base top surface surrounding portions, a recessed portion of one of said diaphragm bottom surface and said base top surface spaced apart from and facing the other of said diaphragm bottom surface and said base top surface, a portion of said silicon diaphragm forming at least part of a pressure sensing element movable with respect to said base top surface in response to sensed pressure variations, planar portions of said diaphragm bottom surface and said surrounding planar portions of said base top surface being peripheral to said recessed portion and being anodically bonded together;



a plurality of semiconductor components, which components respond to changes of said pressure sensing element provided in response to sensed pressure, synthesized in an area of said silicon diaphragm, prior to bonding said silicon substrate to said base, and electrically connected to a plurality of bonding pads provided on said silicon diaphragm bottom surface; and

a plurality of conductors, each sealed in said base and extending from at least said base top surface surrounding portions bonded to said diaphragm to another base surface, flat end portions of each of said conductors being effectively coplanar with said base top surface surrounding portions and being connected to and contacting associated ones of said pads on said silicon diaphragm, thereby providing external access to said semiconductor component bonding pads from said another base surface via said conductors sealed in said base.

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**4,746,894**

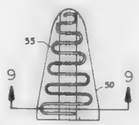
**METHOD AND APPARATUS FOR SENSING POSITION OF CONTACT ALONG AN ELONGATED MEMBER**

**Maurice Zeldman, 1401 Pueblo Dr., Pittsburgh, Pa. 15228**

**Filed Jan. 21, 1986, Ser. No. 820,385**

**Int. Cl.[4] H01C** *10/10*

**U.S. Cl. 338—99** **23 Claims**





1. A sensing apparatus comprising at least one elongated member extending from a base member, touch positional sensing means disposed along at least a substantial part of said elongated member, said sensing means comprising an elongated resistance element disposed along said elongated member and elongated shunting means disposed in a generally side-by-side relation with said resistance element with a gap therebetween, a source of electrical potential connected at least one end of said resistance element, and resistance sensing means connected to one end of said resistance element and to said shunting means for sensing the resistance of the resistance element between a given reference point or points on said resistance element and a point or points of contact between said resistance element and said shunting means along said position sensing means, whereby the relative position of said point or points of contact along said position sensing means can be determined.

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**4,746,895**

**CERAMIC ELECTRONIC COMPONENTS**

**Toshikazu Kato, and Koichi Nitta, both of Yokaichi, Japan, assignors to Murata Mfg. Co., Ltd., Japan**

**Filed Nov. 18, 1986, Ser. No. 931,792**

**Claims priority, application Japan, Nov. 29, 1985, 60-270182**

**Int. Cl.[4] H01C** *1/02*

**U.S. Cl. 338—272** **7 Claims**



1. A ceramic electronic component which comprises a generally elongated ceramic body and a metal cap mounted on each end of the ceramic body, said each end of the ceramic body having a peripheral edge rounded to have a predetermined first radius of rounding, said metal cap having an interior corner rounded to have a predetermined second radius of rounding, said first radius of rounding being greater than said second radius of rounding.

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**4,746,896**

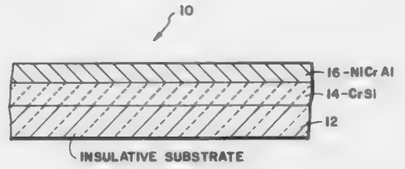
**LAYERED FILM RESISTOR WITH HIGH RESISTANCE AND HIGH STABILITY**

**James G. Mcquaid, Mineral Wells, and Stanley L. Bowlin, Weatherford, both of Tex., assignors to North American Philips Corp., New York, N.Y.**

**Filed May 8, 1986, Ser. No. 861,039**

**Int. Cl.[4] H01C** *1/012*

**U.S. Cl. 338—314** **9 Claims**




1. A high stability metal film having a sheet resistance of 2000 to 15000 ohms per square comprising:

an insulative substrate;

a first layer of a first conductive metal having a positive TCR and a negative TCR Slope reactively deposited on said substrate and annealed;

a second layer of a second conductive metal having a negative TCR and a positive TCR Slope deposited coextensively over said annealed first layer and annealed with said first layer.

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**4,746,897**

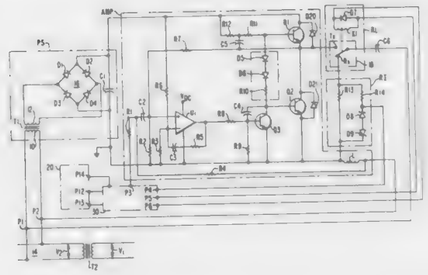
**APPARATUS FOR TRANSMITTING AND RECEIVING A POWER LINE**

**Kenneth C. Shuey, Raleigh, N.C., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Continuation of Ser. No. 575,125, Jan. 30, 1984, abandoned. This application Apr. 2, 1987, Ser. No. 35,255**

**Int. Cl.[4] H04M** *11/04*

**U.S. Cl. 340—310 R** **11 Claims**



1. Apparatus for transmitting and receiving carrier signals in communication with a power line, comprising:

means for amplifying a modulated signal and producing an amplified output signal;

means for electrically filtering said output signal, said filtering means being electrically connected to a burden which is connectable in electrical communication with said power line;

means for providing said burden for an incoming signal from said power line;

switching means having a first position for directly connecting said burden in electrical communication with said power line and a second position for disconnecting said burden from electrical communication with said filtering means;

means for providing a voltage feedback for said amplifying means; and,

means for providing a current feedback for said amplifying means.

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**4,746,898**

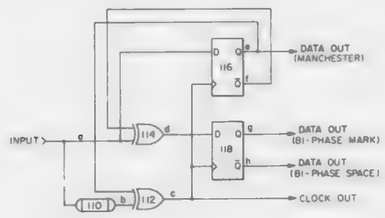
**BI-PHASE DECODER**

**Peter V. Loeppert, Hoffman Estates, Ill., assignor to Gould Inc., Rolling Meadows, Ill.**

**Filed Oct. 20, 1986, Ser. No. 920,625**

**Int. Cl.[4] H03M** *5/12*

**U.S. Cl. 340—347 DD** **1 Claim**




1. A bi-phase decoder for receiving a data stream signal encoded in a bi-phase level, mark or space format and producing a level data signal, a mark data signal, a space data signal and a clock signal, comprising:

input means for receiving a data stream signal;

delay means connected to said input means for delaying said data stream signal;

a level signal feedback loop;

a first exclusive OR gate connected to said delay means for receiving said delayed data stream signal and connected to said level signal feedback loop, said first exclusive OR gate producing a clock signal;

a first D-type flip-flop having a data signal input terminal, a clock signal input terminal, a level signal output terminal and an inverted level signal output terminal, said first D-type flip-flop receiving said data stream signal at said data signal input terminal and said clock signal at said clock signal input terminal and producing a level signal at said level signal output terminal and an inverted level signal at said inverted level signal output terminal, said level signal output terminal being connected to said level signal feedback loop and supplying said level signal thereto;

an inverted level signal feedback loop coupled to said inverted level signal output terminal of said first D-type flip-flop, and receiving said inverted level signal therefrom;

a data exclusive OR gate connected to said input means to receive said data stream signal therefrom and to said inverted level signal feedback loop to receive said inverted level signal therefrom, said data exclusive OR gate producing a data OR gate signal in response to said data stream signal and said inverted level signal; and

a second D-type flip-flop having a data input terminal, a clock signal input terminal, a mark signal output terminal and a space signal output terminal, said data signal input terminal being connected to said data exclusive OR gate and receiving said data OR gate signal therefrom and said clock signal input terminal being connected to said first exclusive OR gate and receiving said clock signal therefrom, said second D-type flip-flop producing a bi-phase mark signal at said mark signal output terminal and a bi-phase space signal at said space signal output terminal in response to said inverted level signal and said clock signal.

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**4,746,899**

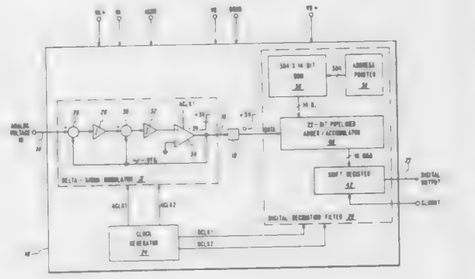
**METHOD FOR REDUCING EFFECTS OF ELECTRICAL NOISE IN AN ANALOG-TO-DIGITAL CONVERTER**

**Eric J. Swanson, Buda; Navdeep S. Sooch, and David J. Knapp, both of Austin, all of Tex., assignors to Crystal Semiconductor Corporation, Austin, Tex.**

**Filed Oct. 7, 1986, Ser. No. 916,160**

**Int. Cl.[4] H03M** *1/08*

**U.S. Cl. 340—347 AD** **4 Claims**



2. In conjunction with an integrated circuit having an analog-to-digital converter included therein, said analog-to-digital converter being of the type having an analog front-end of the oversampling type coupled to a digital decimation filter, a method for reducing deleterious effects of electrical noise

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coupled into the analog circuitry of said analog-to-digital converter, said electrical noise being generated by the switching action of the circuitry comprising said decimation filter, said method comprising:

a. providing a slave clock signal to said decimation filter for synchronously clocking the logic circuitry comprising said decimation filter;
b. reducing the number of gate delays subsequent to the leading edge of said slave clock signal by synchronously pipelining the arithmetic operations of said decimation filter;
c. providing a sampling clock signal to said analog front-end; and
d. sampling the analog input voltage during a sampling portion of the period of said sampling clock signal and terminating the sampling of the analog input voltage shortly prior to the leading edge of said slave clock signal.

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**4,746,900**

**SIGNAL PROCESSING CIRCUIT**

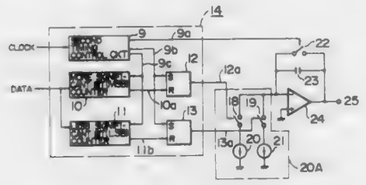
**Toshifumi Shibuya, Tokohama; Hiroshi Endoh, Toyokawa; Yoshimi Iso, Yokohama; Takao Arai, Yokohama, and Hiroo Okamoto, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Dec. 8, 1986, Ser. No. 938,965**

**Claims priority, application Japan, Dec. 6, 1985, 60-273219; Feb. 7, 1986, 61-23712**

**Int. Cl.⁴ H03M** *1/50*

**U.S. Cl. 340—347 AD** **9 Claims**




1. A signal porocessing circuit, comprising:
integrating means including a capacitor for integrating a constant current as a function of time;
a first circuit constituting pulse duration generating means for determining the integration time;
a second circuit including at least a current switch circuity for turning on and off the current supplied from current source means in dependence on said integration time;
said first and second circuits being implemented as integrated circuits separately in respective chips;
said first circuit being integrated by complementary MOS FET process on a same semiconductor substrate together with at least a digital signal processing circuit constituting error correction processing means for processing a PCM signal; and
said second circuit being realized through bipolar process.

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**4,746,901**

**HIGH PRECISION ANALOG TO DIGITAL CONVERTER**

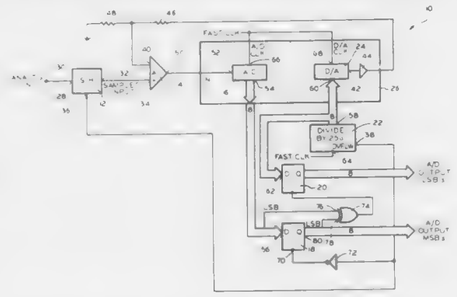
**Richard D. Smith, Shelton, Conn., assignor to ITT Corporation, New York, N.Y.**

**Filed Aug. 15, 1985, Ser. No. 766,095**

**Int. Cl.⁴ H03K** *13/02*

**U.S. Cl. 340—347 AD** **22 Claims**

1. An analog to digital converter for quantizing an analog signal comprising:
input means for receiving said analog signal;
quantizing means coupled to said input means for quantizing said analog signal to one level of a first predetermined number of discrete levels representing a first portion of said analog signal; and
second means coupled to said input means and to said quantizing means for incrementally decreasing said analog signal applied to said quantizing means and including means responsive to said quantizing means for providing a quantization of the remaining portion of said analog signal



to one sublevel of a second predetermined number of discrete sublevels when said analog signal is decreased to a level which is one quantized discrete level less than said one level.

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**4,746,902**

**ARRANGEMENT FOR COMPENSATING FOR NON-LINEAR DISTORTION IN AN INPUT SIGNAL TO BE DIGITIZED AND AN ECHO CANCELLING SYSTEM COMPRISING SUCH A ARRANGEMENT**

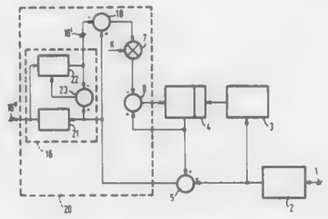
**Simon J. M. Tol, and Kornelis J. Wouda, both of Eindhoven, Netherlands, assignors to AT&T, Berkely Heights, N.J. and Philips Telecommunications B. V., Hilversum, Netherlands**

**Filed Mar. 20, 1987, Ser. No. 28,641**

**Claims priority, application Netherlands, Mar. 28, 1986, 8600815**

**Int. Cl.⁴ H03M** *1/06*

**U.S. Cl. 340—347 CC** **12 Claims**



1. An arrangement for compensating for non-linear distortion in an input signal to be digitized, comprising an analogue-to-digital converter for converting the input signal into an amplitude-time discrete output signal, characterized in that there are provided means for deriving a set of coefficients associated with an orthogonal signal representation of a signal which is related to the input signal, a memory in which a Table of correction values can be stored, means for addressing the memory for reducing a correction value from the Table, each coefficient determining an address for the memory, means for summing the read correction values and the output signal of the analogue-to-digital converter for providing a linearized signal, and an adaptive control loop having means for determining a linear approximation of the input signal, means arranged for determining the difference between the linearized signal and the signal which is a representation of the linear approximation of the input signal, means for determining a new correction value from this difference and the correction value read, and means for substituting in the Table the new correction value for the correction value read.



**4,746,903**

**PARALLEL ALGORITHMIC DIGITAL TO ANALOG CONVERTER**

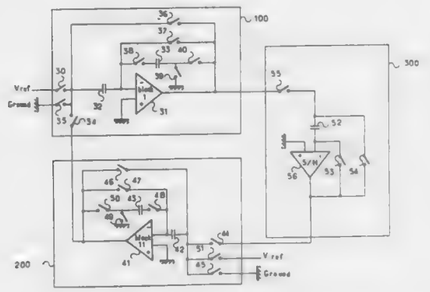
**Jean-Christophe Czarniak, Saint Paul; Michel F. Ferry, Vallauris, and Christian Jacquart, Gattieres, all of France, assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Dec. 17, 1986, Ser. No. 942,745**

**Claims priority, application European Pat. Off., Dec. 30, 1985, 85430046.4**

**Int. Cl.⁴ H03M** *1/66*

**U.S. Cl. 340—347 DA** **4 Claims**




1. A digital to analog converter for converting an N bit digital word into its analog representation, characterized in that it includes:
means for splitting the N bit word and creating n sections (n≠1 and n≠N) of N/n bits each,
means for processing each section independently, including means for changing each elementary bit of a section into its analog representation and means for combining arithmetically the different analog representations relating to a section to obtain a section partial result and for storing the result of the arithmetic combination and,
means for adding the various section partial results to provide the analog representation of said N bit word.

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**4,746,904**

**Patent Not Issued For This Number**

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**4,746,905**

**SOUND PRODUCING DEVICE**

**Masanori Harima, Haibara, and Kohsho Ohshima, Yamatokoriyama, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan**

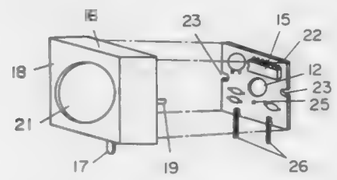
**PCT No. PCT/JP82/00449, § 371 Date Jul. 22, 1983, § 102(e) Date Jul. 22, 1983, PCT Pub. No. WO83/02030, PCT Pub. Date Jun. 9, 1983**

**Continuation of Ser. No. 522,364, Jul. 22, 1983, abandoned. This PCT application Nov. 24, 1982, Ser. No. 887,388**

**Claims priority, application Japan, Nov. 25, 1981, 56-189731**

**Int. Cl.⁴ G08B** *3/00*

**U.S. Cl. 340—384 E** **4 Claims**




1. A sound producing device comprising:
a sound producer for producing a sound in response to a predetermined electric signal, said sound producer having a peripheral edge;
a resonance box made of resin, said peripheral edge of said sound producer being held in said resonance box by being molded in the resin of said resonance box for mounting said sound producer in one end of said resonance box, and closing one said end of said resonance box, the other end of said resonance box opposed to said sound producer being open; and
a lid mounted in said open end of said resonance box and closing said resonance box, said lid being a printed circuit board having an unobstructed sound release hole therethrough having a size for permitting the sound to be effectively released from said resonance box, said sound release hole being open to the outside of said resonance box, said printed board having an oscillation circuit thereon electrically connected to said sound producer.

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**4,746,906**

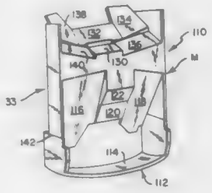
**DUAL TECHNOLOGY INTRUDER DETECTION SYSTEM WITH MODULAR OPTICS**

**David B. Lederer, Rochester, N.Y., assignor to Detection Systems, Inc., Fairport, N.Y.**

**Filed Jun. 30, 1986, Ser. No. 880,197**

**Int. Cl.⁴ G08B** *19/00, 13/18*

**U.S. Cl. 340—522** **3 Claims**




1. In a dual-technology intruder detection system comprising (a) a first intruder-detecting subsystem including active means for transmitting energy into a broad field of view in which intrusion is anticipated, and means for sensing variations in said energy as modified by objects moving within said broad field of view; and (b) a second intruder-detecting subsystem including passive means for sensing radiation emanating from objects within a plurality of discrete narrow fields of view within said broad field of view, the improvement wherein said second subsystem includes a folded, modular, reflective optical system comprising (i) a fixed concave reflector for focusing radiation incident thereon onto a radiation-sensitive detector, (ii) a multifaceted reflector comprising a plurality of planar reflective facets arranged in two discrete sets, each set of facets cooperating with said concave reflector to define a plurality of discrete narrow fields of view arranged in a predetermined pattern, the field pattern of one set differing from that of the other, and (iii) means for supporting said multifaceted reflector in either of two operative positions relative to said concave reflector, whereby either one or the other field pattern is provided by said optical system.

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**4,746,907**

**TOWEL CABINET REPLENISHMENT INDICATION AND IDENTIFICATION SYSTEM**

**William Zehnder, Jr., 713 S. Main St., Frankenmuth, Mich. 48734**

**Filed Oct. 21, 1985, Ser. No. 789,407**

**Int. Cl.⁴ G08B** *25/00, 13/14;* **B65H** *19/00*

**U.S. Cl. 340—525** **11 Claims**

1. A towel cabinet indicating and identifying system for indicating that the supply of toweling in one of a plurality of such cabinets has been soiled and requires replacement comprising:
a. a plurality of cabinets having elongate toweling dispensing slotted openings from which towel webs may be dispensed, and return openings through which the webs may

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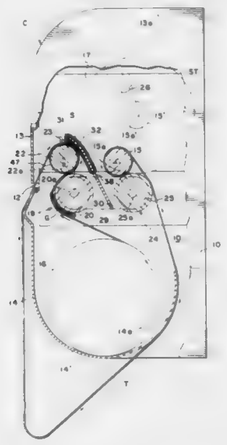


be returned to the cabinets, the webs normally depending from the cabinets in loops which are accessible to the hands of users;

b. a clean toweling supply roller system mounted within each of said cabinets for web unwinding rotary travel;

c. a used toweling wind-up roller system mounted within each cabinet for rewinding the soiled web;

d. said supply roller system in each cabinet including an axially extending roller with an electrically conductive substantially peripherally continuous strip on its peripheral face curved to the configuration of said face, and a second axially extending member having an axially extending curved face, mounted within each cabinet adjacent and paralleling each said roller and normally biased to engage said strip, normally separated from said strip by the web, said member having an electrically conductive strip mounted thereon in confronting relation with said strip on said roller and adapted to electrically engage with said strip on the said roller when the terminal end of the



towel web is withdrawn from between said roller and member;

e. and a multiple indicator system electrically connected with the respective strips in each cabinet energized by the electrical engagement of the respective strips in a given cabinet when a given towel web terminal end is withdrawn from between them, said indicator system having means adapted to connect to a power source and means for identifying which cabinet has strips in electrically conducting engagement,

f. said member comprising a generally vertically disposed shield plate, mounted to separate the supply roller system from the said used towel wind-up roller system, and having a portion curved to match the said roller of the supply roller system, said strip on the shield plate having a configuration to match, at least partly, the configuration of the said strip on said roller of the supply roller system to provide a substantial area of contact when the terminal end of the web is withdrawn.

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**4,746,908**

**DUAL-STATUS, MAGNETICALLY IMAGABLE ARTICLE SURVEILLANCE MARKER**

**Samuel Montean, Blaine, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Sep. 19, 1986, Ser. No. 909,467**

**Int. Cl.[4] G08B** *13/24*

**U.S. Cl. 340—551** **42 Claims**

1. A marker for use in an electronic article surveillance system having within an interrogation zone an alternating magnetic field, said marker comprising

at least one substantially two dimensional piece of low coercive force, high permeability material having overall dimensions such as to prevent the production of a characteristic response when the marker is exposed to a said alternating field, and

at least one piece of remanently magnetizable material adjacent at least a portion of the piece of low coercive force material,



whereby magnetization of said remanently magnetizable material in a predetermined pattern creates a corresponding field which biases only those portions of said piece of low coercive force material adjacent to the magnetized predetermined pattern, and thereby inhibits magnetic flux changes in those adjacent portions the dimensions of the remaining, non-biased portions of said piece of low coercive force material being such that a characteristic reponse will result when the marker is in a said field.

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**4,746,909**

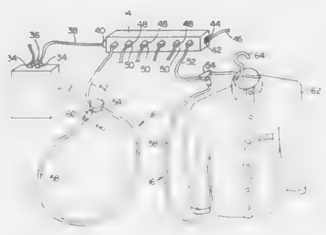
**MODULAR SECURITY SYSTEM**

**Marcia Israel, 7710 Haskell Ave., Van Nuys, Calif. 91406, and Leo R. Close, Sepulveda, Calif., assignors to Marcia Israel, Van Nuys, Calif.**

**Filed Sep. 2, 1986, Ser. No. 902,484**

**Int. Cl.[4] G08B** *13/12*

**U.S. Cl. 340—568** **27 Claims**



1. A security system comprising the combination of:

a plurality of electrical circuits, each designed to physically interconnect with a different article to be secured;

means coupled to each of the plurality of electrical circuits for sensing each change of state of any of the plurality of electrical circuits, a change of state of an electrical circuit being producted by connection of the electrical circuit and also being produced by disconnection of the electrical circuit, and the means for sensing providing a change of state signal upon sensing of a change of state; and

means responsive to change of state signal from the means for sensing for activating an alarm.



**4,746,910**

**PASSIVE INFRARED INTRUSION DETECTOR EMPLOYING CORRELATION ANALYSIS**

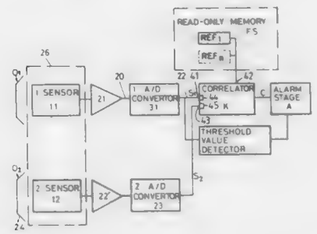
**Gustav Pfister, Uetikon, and Peter Wägli, Breurgarten, both of Switzerland, assignors to Cerberus AG, Männedorf, Switzerland**

**Continuation-in-part of Ser. No. 533,938, Sep. 20, 1983, abandoned. This application Oct. 3, 1986, Ser. No. 915,057**

**Claims priority, application Switzerland, Oct. 1, 1982, 5795/82**

**Int. Cl.[4] G08B** *13/18*

**U.S. Cl. 340—567** **12 Claims**




1. A passive infrared detector for determining the presence of an intruder possessing a temperature differing from the ambient temperature, comprising:

at least one sensor element generating an electrical signal as a function of infrared radiation impinging upon said at least one sensor element;

at least one optical system for focusing the infrared radiation upon said at least one sensor element;

said at least one optical system imaging infrared radiation upon said at least one sensor element which infrared radiation emanates from a number of predetermined separate fields of view;

an evaluation circuit operatively connected with said at least one sensor element and delivering an output signal dependent upon changes in the impinging radiation;

said evaluation circuit comprising:

a correlator; and

storage means for storing a predetermined number of reference signals which are representative of typical movement patterns of intruders;

said correlator correlating by means of a correlation method said electrical signals generated by said at least one sensor element with said reference signals stored in said storage means;

said correlator delivering an output signal corresponding to the correlation of the electrical signal generated by said at least one sensor element and the reference signals; and

said evaluation circuit further comprising an alarm stage arranged in circuit after the correlator for delivery an alarm signal when the correlation between the electrical signal generated by said at least one sensor element and at least one of said stored reference signals as well as the amplitude of said electrical signal simultaneously exceed a predetermined value.

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**4,746,911**

**ALARM DEVICE FOR ISOLATED PIPE SYSTEMS**

**Allan Laine, Lulea, Sweden, assignor to Rune Helmersson, Umea, Sweden**

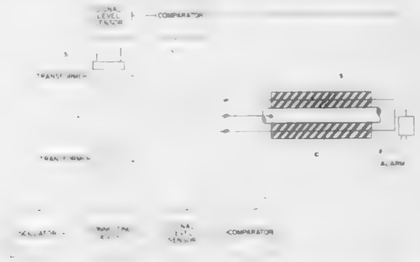
**Continuation of Ser. No. 649,670, Sep. 12, 1984, abandoned. This application Jul. 9, 1987, Ser. No. 70,618**

**Claims priority, application Sweden, Dec. 8, 1983, 8306789**

**Int. Cl.[4] G08B** *21/00*

**U.S. Cl. 340—605** **2 Claims**

1. A device for issuing an alarm in a carrier pipe which is surrounded by insulation having a predetermined resistance upon a change in resistance, comprising: an alarm wire having a predetermined resistance and extending along said pipe in said insulation, oscillator means, first transformer means, connecting means having an input connected to said oscillator means and an output to said first transformer means, said first transformer means being connected to said pipe for supplying a signal thereto from said connecting means, first signal lever sensor means connected to an output of said connecting means, first comparator means connected to said first signal lever sensor means, second transformer means arranged in series with said first transformer means via said wire, second signal level sensor means connected to said second transformer



means, and second comparator means connected to said second signal level sensor means, said wire and said pipe being galvanically separated from other measuring equipment, whereby a change in the resistance of the insulation will change the output from said connecting means being supplied to said first signal level sensor means and compared in said first comparator means with a reference signal level, and part of the input signal to said connecting means being supplied to said second signal level sensor means and compared in said second comparator means with a reference signal level, whereby an alarm will be issued.

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**4,746,912**

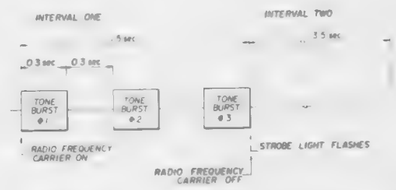
**EMERGENCY ALARM METHOD AND SYSTEM UTILIZING CROSS CUEING AND RANGING TECHNIQUES**

**Thomas Clifford, 6 Massachusetts Ave., Massapequa, N.Y. 11758; Carl E. Schwab, 34 Longwood Dr., Huntington Station, N.Y. 11746, and Bernard L. Jansen, 529 Asharoken Ave., Northport, N.Y. 11768**

**Filed Aug. 30, 1985, Ser. No. 770,923**

**Int. Cl.[4] G08B** *3/00*

**U.S. Cl. 340—691** **12 Claims**




1. A method of operating an emergency signalling unit worn by a fireman or other worker in a potentially dangerous environment, which emits at least audio and visible alarm signals, comprising,

arranging said audio alarm signals to occur in a cyclical manner, wherein each cycle comprises a first interval consisting of a predetermined number of successive tone emissions occurring in predetermined time relationship to each other and a second interval which is longer than said first interval during which no tone emissions occur, and

arranging said visible alarm signal to be emitted immediately

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following a predetermined one of said successive tone emissions.

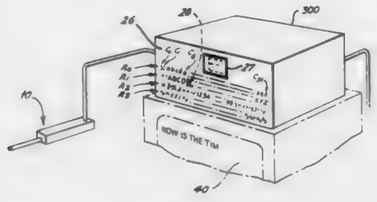
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**4,746,913**

## DATA ENTRY METHOD AND APPARATUS FOR THE DISABLED

**Arthur C. Volta, 1422 Arnold Ave., Roslyn, Pa. 19001**

**Continuation-in-part of Ser. No. 602,969, Apr. 23, 1984, abandoned. This application Jun. 9, 1986, Ser. No. 872,269**
**Int. Cl.[4] G09G *3/02***
**U.S. Cl. 340—706** **20 Claims**



1. An improved method of selecting an element of a group comprising steps of:
(a) serially scanning the elements of the group at a rate which is proportional to a user controlled continuously variable volitional signal;
(b) stopping said serial scanning step under an ambient condition.
(c) selecting the said element of the group by changing the user controlled volitional signal in a direction or magnitude different from that which is applied under scanning step (a).

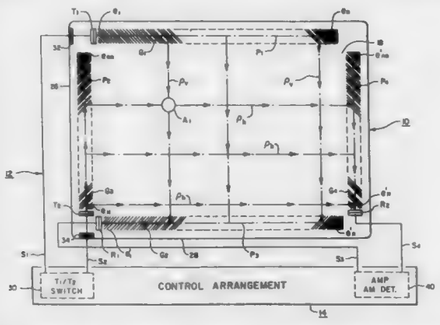
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**4,746,914**

## CATHODE RAY TUBE FOR USE IN A TOUCH PANEL DISPLAY SYSTEM

**Robert Adler, Northfield, Ill., assignor to Zenith Electronics Corporation, Glenview, Ill.**

**Continuation-in-part of Ser. No. 698,306, Feb. 5, 1985, Pat. No. 4,750,176. This application Jun. 6, 1985, Ser. No. 741,975**
**The portion of the term of this patent subsequent to Oct. 13, 2004, has been disclaimed.**
**Int. Cl.[4] G09G *1/00***
**U.S. Cl. 340—712** **14 Claims**




1. A cathode ray tube for use in a touch panel display system capable of recognizing touch positions along a predetermined coordinate axis on a touch surface of said system, said tube comprising:
a transparent glass faceplate having a touch surface capable of propagating surface acoustic waves and being so characterized that a touch on said surface causes a perturbation, in the form of at least a partial absorption of energy, of a surface wave propagating through the region of the touch;
input surface wave transducer means mechanically and acoustically coupled to said touch surface of said faceplate and useful when excited for launching a burst of surface waves on said surface;
at least one array of wave-reflective elements in or on said touch surface of said faceplate for directing surface wave components, derived from said burst of surface waves launched by said input transducer means, across said touch surface of said faceplate; and
output surface wave transducer means also mechanically and acoustically coupled to said touch surface for receiving said surface wave components.

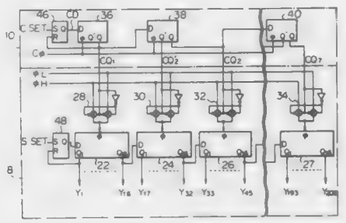
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**4,746,915**

## DRIVE CIRCUIT FOR MATRIX DISPLAY DEVICE

**Fukuo Sekiya, Tokorozawa, Japan, assignor to Citizen Watch Company Limited, Tokyo, Japan**

**Continuation of Ser. No. 573,087, Jan. 23, 1984, abandoned. This application Nov. 24, 1986, Ser. No. 935,104**
**Claims priority, application Japan, Jan. 21, 1983, 58-008524**
**Int. Cl.[4] G09G *3/36***
**U.S. Cl. 340—719** **3 Claims**



1. A drive circuit for a matrix display device, comprising:
means for providing a clock signal and a second signal;
a control circuit responsive to said clock signal for producing a plurality of sequentially occuring control pulses of fixed duration with adjacent pulses timewise overlapping;
a plurality of successive selection circuits each having an output terminal and inputs coupled to receive said clock signal, said second signal and a separate successive control pulse, each selection circuit being responsive to the reception of a control pulse for applying the clock signal to the respective output terminal and responsive to the absence of the respective control pulse to apply the second signal to the respective output terminal;
whereby said clock signal appears at the output terminals of successive selection circuits during successive time intervals of fixed duration and said second signal appears at the output terminal of all of said selection circuits to which the respective control pulse is not currently supplied;
a plurality of cascade connected electrode drive shift register circuits for producing sequential electrode selection signal pulses, each said shift register circuit comprising a plurality of series connected shift register stages for producing a separate group of said sequential signal pulses, successive shift register circuits having clock input terminals connected to the output terminal of separate successive selection circuits, and means connecting the last stage of each shift register circuit to the input of the first stage of the next successive shift register circuit; and
means providing an input pulse and applying said input pulse to the first of said shift register circuits whereby said input pulse is successively transferred between the stages of said shift register circuits and between the last stage of each shift register circuit and the input of the next successive shift register circuit;
said control pulses having durations whereby the overlap between adjacent control pulses occurs during the transition of supplying said input pulse to the last stage of one of said shift register circuits and supplying said input pulse to the input of the succeeding shift register circuit whereby said clock signal is supplied simultaneously to both of said shift register circuits groups during a time interval of duration at least equal to one half period of clock signal.



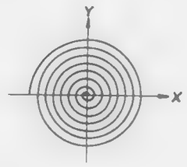
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**4,746,916**

## METHOD OF AND AN APPARATUS FOR DISPLAYING A PICTURE

**Yukiharu Sanbe, Tokyo, Japan, assignor to Taito Corporation, Tokyo, Japan**

**Continuation of Ser. No. 580,603, Feb. 16, 1984, abandoned. This application Apr. 30, 1987, Ser. No. 45,762**
**Claims priority, application Japan, Feb. 28, 1983, 58-031018**
**Int. Cl.[4] G09G *1/14***
**U.S. Cl. 340—744** **20 Claims**




1. A game comprising:
a screen,
a console,
a read-only memory in which a program for the game, and picture data for display on said screen, have been recorded,
a central processing unit which receives signals from said memory, and generates control signals for controlling the display on said screen in response to an input from said console,
means for producing time-spaced illuminated spots on said screen,
scanning means under the control of said central processing unit for producing a picture by positioning a first group of said spots on said screen along a first spiral path with each spot occurring at a distance along said path which is directly related to the elapsed time of occurrence of the spot, for thus displaying a picture at the location of the first spiral path,
said scanning means producing a second picture by further positioning a second group of said time-spaced illuminated spots along a second spiral path on said screen with each spot of said second group being positioned along said second spiral path at a distance directly related to the elapsed time of occurrence of the spot for thus displaying a picture at the location of the second spiral path,
said first and second spiral paths occurring at different locations on said screen, and the second one occurring sufficiently soon after the first one that the pictures at the two different locations appear simultaneously to the human eye,
said pictures being at least a part of said game.

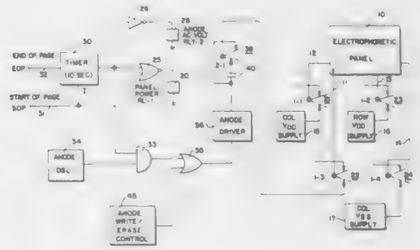
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**4,746,917**

## METHOD AND APPARATUS FOR OPERATING AN ELECTROPHORETIC DISPLAY BETWEEN A DISPLAY AND A NON-DISPLAY MODE

**Frank J. Di Santo, North Hills, and Denis A. Krusos, Lloyd Harbor, both of N.Y., assignors to Copytele, Inc., Huntington Station, N.Y.**

**Filed Jul. 14, 1986, Ser. No. 885,538**
**Int. Cl.[4] G09G *3/00***
**U.S. Cl. 340—787** **15 Claims**




1. A method of operating an electrophoretic display during a non-display mode to increase the life and resolution of said display, said display of the type having an anode electrode and a cathode electrode, comprising the steps of:
applying an alternating voltage of a selected magnitude and frequency for a predetermined time between the anode and cathode electrodes during said non-display mode, said selected magnitude and frequency and said predetermined time being chosen to cause electrophoretic pigment particles in said electrophoretic display to be suspended between said cathode and anode and remain suspended between said cathode and anode during said non-display mode.

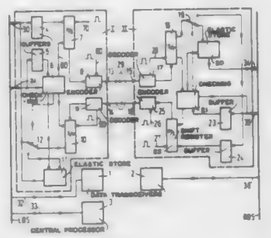
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**4,746,918**

## SPLIT BUS SYSTEM INTERFACE

**Gerardus J. P. Dijkers, Hilversum, and Adrianus H. Dieleman, Eindhoven, both of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Dec. 10, 1986, Ser. No. 940,474**
**Claims priority, application Netherlands, Dec. 18, 1985, 8503476**
**Int. Cl.[4] H04Q *9/00***
**U.S. Cl. 340—825.060** **4 Claims**




1. A bus system comprising:
first and second bus halves, each half comprising a plurality of parallel lines for transmitting handshake signals, data signals and command signals;
a central processor connected to one of said bus halves for transmitting commands over said first bus half;
a plurality of communicating devices connected to said first and second bus halves for transmitting and receiving data signals and check signals;

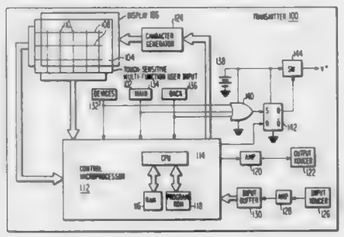
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a first interface including a parallel series converter having an input connected to said first bus half and an output;
a second interface having a series parallel converter having an input, and an output connected to an input of an elastic buffer storage means, said elastic storage means having a parallel output connected to said second bus half; and
a connection path extending between said first interface parallel/series converter output and said second interface series/parallel converter input, whereby a device connected to one bus half communicates handshake signals with an interface connected to said one bus half, and data received by said second interface is stored in said elastic store and then retransmitted over said second bus half.

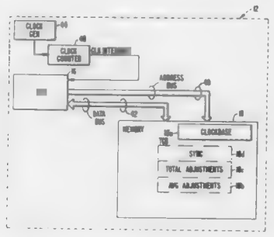
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**4,746,919**
**REMOTE CONTROL SYSTEM WITH KEY FUNCTION DISPLAY PROVISIONS**
**Glenn A. Reitmeier, West Trenton, N.J., assignor to RCA Licensing Corporation, Princeton, N.J.**
**Filed Mar. 28, 1986, Ser. No. 845,184**
**Int. Cl.[4] H04Q** *1/00, 7/00*
**U.S. Cl. 340—825.56** **5 Claims**



1. A remote control system for at least one controlled device, comprising:
a transmitter unit including user entry means having a plurality of multi-function key elements; output means for transmitting, when a key element is operated, a remote control message identifying the operation of said key elements; and display means for displaying information identifying the functions associated with said key elements;
a receiver unit associated with said controlled device and including input means for receiving said remote control message; key function memory means for storing character-representative information for identifying the functions of said key elements of said transmitter unit and corresponding control information for various steps of a control sequence for controlling said controlled device; and output means coupled to said key function memory means for transmitting a key function display message including character-representative information of a next step of said control sequence in response to said remote control message and also information identifying said controlled device; and wherein
said transmitter unit further includes input means for receiving said key function display message and for coupling the associated character-representative information to said display means to cause said key function information to be displayed;
said transmitter unit still further includes memory means for storing said device identifying information included in said key function display message; and
said remote control message transmitted by said transmitter unit includes said device identifying information stored in said memory means.

**4,746,920**
**METHOD AND APPARATUS FOR CLOCK MANAGEMENT**
**Eric P. Nellen, San Jose, and Glenn R. Peterson, Santa Clara, both of Calif., assignors to Tandem Computers Incorporated, Cupertino, Calif.**
**Filed Mar. 28, 1986, Ser. No. 845,280**
**Int. Cl.[4] H04Q** *9/00;* **H04J** *3/06*
**U.S. Cl. 340—825.140** **10 Claims**



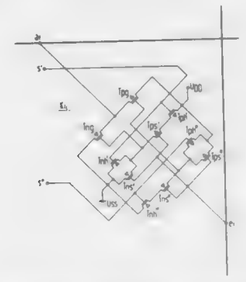
1. In a multiprocessor system of the type including a plurality of individual processor units coupled to one another by an interprocessor bus for communication therebetween, each processor unit including means for maintaining a processor clock capable of providing a value indicative of real time, a method of synchronizing the processor clock, comprising:
forming a time synchronization message in a first one of the processor units;
the first processor unit communicating the time synchronization message on the interprocessor bus sequentially to designated ones of the processor units, the time synchronization message including a separate first bit field identifying the first processor unit as the originator of the time synchronization message and the processor units designated to receive the time synchronization message, a second bit field containing an indication of processor clock time, and a third bit field representative of the number of processor-to-processor transits taken by the time synchronization message;
each of the designated processor units in sequence:
receiving the time synchronization message,
replacing the content of the second bit field with a sum of the original content of the third bit field and a value indicative of the receiving processor unit's processor clock, and
retransmitting the time synchronization message on the processor bus,
at the first one of the processor units, adjusting the processor clock according to the content of the time synchronization message.

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**4,746,921**
**BROADBAND SIGNAL SPACE SWITCHING APPARATUS**
**Ruediger Hofmann, Gilching, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**
**Filed Oct. 27, 1986, Ser. No. 923,769**
**Claims priority, application Fed. Rep. of Germany, Nov. 4, 1985, 3539101**
**Int. Cl.[4] H04Q** *9/00*
**U.S. Cl. 340—825.870** **1 Claim**

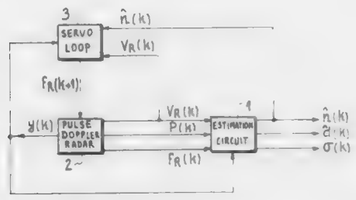
1. In a broadband signal space switching device of the type in which a matrix of signal input lines and signal output lines form crosspoints, in which a respective switching element is connected to the signal input line and the signal output line of a respective crosspoint, the switching elements of said crosspoints being controllable by decoder-controlled crosspoint-associated memory elements which have first and second outputs, the improvement wherein each of said switching elements comprises:
a complementary metal-oxide-semiconductor (CMOS) NOR gate connected across first and second CMOS voltage sources which correspond to CMOS voltage levels, and including a first signal input connected to the respective signal input line, and a second signal input connected to an output of the respective crosspoint-associated memory cell;
a CMOS NAND gate connected across said CMOS voltage sources and including a first input connected to said signal input line and a second input connected to a complementary output of said memory cell; and
a CMOS push-pull output circuit including an output connected to the respective signal output line, the control electrode of its one CMOS transistor connected to the output of said CMOS NAND gate and the second control electrode of the other transistor connected to the output of said CMOS NOR gate,
said CMOS push-pull output circuit connected across said first and second CMOS voltage sources.





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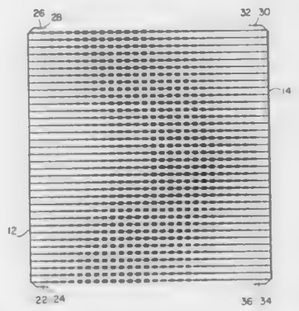
**4,746,922**
**METHOD OF AND DEVICE FOR REMOVING RANGE AMBIGUITY IN A PULSE-DOPPLER RADAR AND RADAR INCLUDING SUCH A DEVICE**
**Michel Prenat, Paris, France, assignor to Thomson- CSF, Paris, France**
**Filed May 6, 1982, Ser. No. 377,451**
**Claims priority, application France, May 15, 1981, 81 09759**
**Int. Cl.[4] G01S** *13/12*
**U.S. Cl. 342—88** **2 Claims**




1. A device for removing range ambiguity in a pulse Doppler radar having a high repetition frequency $f_R(k)$ which varies at times $T_k = k\Delta t$, where $\Delta t$ is the duration of a measurement cycle, operating in the tracking mode, and including a measurement circuit which supplies the measured ambiguous range corresponding to the repetition frequency $f_R(k)$ and an estimation circuit which supplies an estimation of the ambiguity number and of the radar-to-target range as well as the standard deviation of the error in the estimated range corresponding to the repetition frequency $f_R(k)$, device wherein the repetition frequency is controlled by a servo-loop which, from the measured ambiguous range and from the estimated ambiguity number at the repetition frequency $f_R(k)$ calculates the repetition frequency $f_R(k+1)$ to be used for the following measurement cycle, such that the ambiguity number at $f_R(k+1)$ remains constant, the servo-loop having a transfer function which is of the first order and being composed of the following circuits connected in series:
a first subtraction circuit in which the quantity $c/4\ f_R(k)$, is subtracted from the measured ambiguous range supplied by the radar, c being the velocity of the light;
an amplifier having a gain G;
a second substration circuit in which the output signal of the amplifier is reduced by the variation of the radar-to-target range during the time lapse $\Delta t$, said variation being calculated by a first circuit which multiplies by the duration $\Delta t$ the radial velocity of the target relative to the radar as supplied by the pulse Doppler tracking radar;
a second circuit multiplying the output signal of the second subtraction circuit by a coefficient $1/[n(k)+0.5]$ calculated by a first calculating circuit supplied with the estimated ambiguity number n(k) corresponding to the repetition frequency $f_R(k)$;
an adding circuit the first input of which receives the output signal of the second multiplying circuit and which delivers a signal equal to $c/2\ f_R(k+1)$ and applied to its second input through a delay circuit having a transfer function $z^{-1}$;
a second calculating circuit supplied with the output signal $c/2\ f_R(k+1)$ of the adding circuit and delivering the repetition frequency $f_R(k+1)$ which is supplied to the pulse Doppler radar for the following measurement cycle.

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**4,746,923**
**GAMMA FEED MICROSTRIP ANTENNA**
**Leonard Schwartz, Montville, N.J., and Robert Bevan, Pleasantville, N.Y., assignors to The Singer Company, Stamford, Conn.**
**Filed May 17, 1982, Ser. No. 378,575**
**Int. Cl.[4] G01S** *13/60;* **H01Q** *1/28, 3/22*
**U.S. Cl. 342—117** **1 Claim**




1. A method for achieving frequency/temperature compensation for a gamma feed microstrip antenna for Doppler navigation systems, said antenna being of the type having an axis of travel and having a longitudinal axis of symmetry, said axis of symmetry intersecting said axis of travel and being disposed perpendicular thereto and comprising:
a forward firing gamma feed means disposed parallel to the axis of travel and disposed perpendicular to the axis of symmetry and having first and second ends;
a backward firing gamma feed means disposed parallel to the forward firing feed means and disposed perpendicular to said axis of symmetry;
a plurality of parallel gamma feed radiating arrays transversely connected between the feed means and disposed parallel to said axis of symmetry;
means connected to the ends of the feed means for providing

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four input ports to the antenna, wherein each array includes
(a) first impedance transformer means connected at a first end thereof to the forward firing feed means;
(b) serially connected radiating elements of preselected sizes connected at a first end thereof to a second end of the transformer means, said radiating elements being arranged symmetrically about said axis of symmetry;
(c) second impedance transformer means connected at a first end thereof to the backward firing feed means and at a second end thereof to the second end of the serially connected radiating elements; and
(d) link means connected between the radiating elements for establishing a preselected array phase;
said method comprising the steps;
generating four separate beams in response to the sequential excitation of said four corresponding antenna input ports;
sampling and storing the returned signal from each said port; and
averaging the signals returned to the ports.

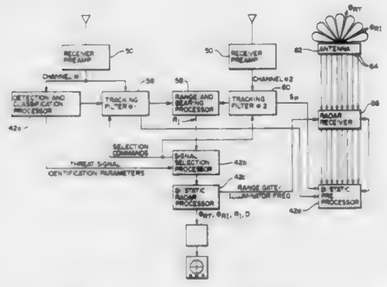
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**4,746,924**

## APPARATUS AND METHODS FOR LOCATING A TARGET UTILIZING SIGNALS GENERATED FROM A NON-COOPERATIVE SOURCE

**Fred M. Lightfoot, Vashon, Wash., assignor to The Boeing Company, Seattle, Wash.**

**Continuation-in-part of Ser. No. 782,501, Sep. 30, 1985. This application Nov. 20, 1985, Ser. No. 799,912**
**Int. Cl.[4] G01S *3/02***
**U.S. Cl. 342—453** **17 Claims**



1. In a receiver aircraft on a predetermined route of flight, apparatus for locating a position of a reflector of electromagnetic signals relative to a receiver of said electromagnetic signals, said apparatus comprising:
a. first means for processing a plurality of said received electromagnetic signals which are characterized by their generation from a plurality of signal emitters which are both unassociated from and non-cooperative with said receiver, and for generating a first signal output of said processed signals, said signal emitters including (i) known signal emitters having locations and signal characteristics which are known prior to said flight and which are known to be receivable along said route of flight, and (ii) unknown signal emitters having locations and signal characteristics which are not known prior to said flight and which are also receivable along said route of flight;
b. second means for selecting one of said received signals having a first component which is reflected from said reflector, and a second nonreflected component, in a manner that said selected signal is an optimum signal for locating the position of said reflector, said second means including
(1) means for determining the geographical locations of said signal emitters relative to the aircraft,
(2) computer means including
(a) memory means for storing, prior to the flight,
(i) known signal characteristics including signal frequencies, of the known signal emitters,
(ii) known geographical locations of the known signal emitters, and (iii) selection data for selecting signal characteristics and geographical locations of said unknown signal emitters which are optimum for locating the position of the reflector,
(b) means, responsive to said first signal output, for comparing the characteristics and locations of the received signals with the signal characteristics and locations of the known signal emitters, so as to identify the known received signals along the route of flight,
(c) means, responsive to said first signal output, for comparing the characteristics and locations of the unknown signal emitters with the selection data so as to select at least one unknown signal emitter for locating the position of the reflector,
(d) means for comparing the identified known signals with the selected unknown signal and for selecting the optimum signal therefrom based on their relative signal qualities including signal strength and freedom from clutter;
c. third processing means including
(1) means for determining a time interval between receipt of the first reflected signal component and the second nonreflected signal component, and
(2) means, responsive to the determined time interval, for defining a length of an electromagnetic signal path of the first signal component.

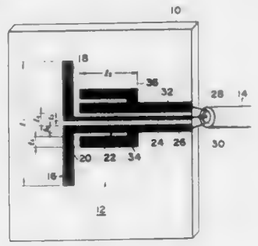
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**4,746,925**

## SHIELDED DIPOLE GLASS ANTENNA WITH COAXIAL FEED

**Haruhiko Toriyama, Toyota, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan**

**Filed Jul. 25, 1986, Ser. No. 889,465**
**Claims priority, application Japan, Jul. 31, 1985, 60-117809[U]; Aug. 2, 1985, 60-171369**
**Int. Cl.[4] H01Q *1/32***
**U.S. Cl. 343—713** **18 Claims**



1. A glass antenna formed in a pattern on the surface of glass mounted on a vehicle and connected to a feeder, comprising:
(a) a pair of dipole antenna elements having a strip configuration and disposed to longitudinally extend in one direction, said pair of dipole antenna elements forming in combination a substantially straight line between longitudinal axes thereof;
(b) a central lead wire led out from one end of either one of said dipole antenna elements in a direction substantially perpendicular to the longitudinal axis of said antenna element;
(c) a first shielding lead wire led out from one end of the other dipole antenna element in a direction substantially perpendicular to the longitudinal axis of said antenna element and apart from said central lead wire;
(d) a second shielding lead wire disposed in such a manner that it extends substantially parallel with and apart from said central lead wire so as to interpose said central lead wire between the same and said first shielding lead wire; and
(e) a pair of balanced-to-unbalanced transformers branching off from the respective intermediate portions of said first and second shielding lead wires so as to extend adjacent to but apart from respective intermediate portions of said pair of dipole antenna elements,
whereby washing and garaging of the vehicle are facilitated.



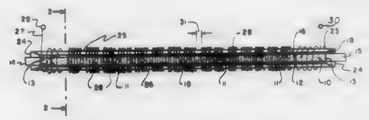
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**4,746,926**

## PHASE SCAN ANTENNA

**Richard A. Stern, Allenwood; Richard W. Babbitt, Fairhaven, and John J. Borowick, Bricktown, all of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Sep. 29, 1986, Ser. No. 913,806**
**Int. Cl.[4] H01Q *1/00***
**U.S. Cl. 343—787** **6 Claims**



1. A phase scan antenna comprising
a ferrite rod having a longitudinally-extending series of longitudinally-spaced apart narrow slots along a first side thereof for radiating electromagnetic wave energy from both said first rod side and an oppositely-disposed second rod side when the ends of said rod are coupled to a source of said energy, each of said slots being substantially perpendicular to the longitudinal axis of said rod;
waveguide means coupled to the ends of said rod for coupling said rod to a source of electromagnetic wave energy to be radiated;
a channel-shaped substrate member fabricated of a low loss material having a low dielectric constant and having the web and flange sides thereof extending the length of said rod, said substrate member having the flange sides thereof mounted on third and fourth rod sides which are substantially perpendicular to said first and second rod sides and the web side thereof facing said second rod side;
a channel-shaped metal member having the web and flange sides thereof extending the length of said rod, said metal member having the flange sides thereof abutting the flange sides of said substrate member and the web side thereof abutting the web side of said substrate member; and
magnetic biasing means mounted on said metal member for producing a magnetic field in said rod along said longitudinal axis, whereby said flange sides of said metal member suppress Faraday rotation of electromagnetic wave energy in said rod caused by said magnetic field to thereby cause scanning of the antenna and said web side of said metal member reflects electromagnetic wave energy radiated from said second rod side to thereby enhance electromagnetic wave energy radiated from said first rod side.

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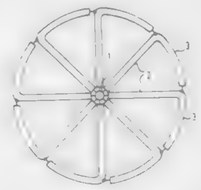
**4,746,927**

## VOR ANTENNA DESIGN

**Alistair Towle, Willowdale, Canada, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Nov. 1, 1985, Ser. No. 794,206**
**Claims priority, application Canada, Nov. 8, 1984, 467390**
**Int. Cl.[4] H01Q *7/04***
**U.S. Cl. 343—842** **3 Claims**

1. A VOR antenna array comprising a first plurality of radiating elements lying along a common circumference, each radiating element comprising a coaxial feedline having a center conductor and an outer conductor, extending from an open end along an arc of said circumference in a first direction and thence extending at a bend point radially inward to a common feed point, said open end of each radiating element having a



center conductor connected to the outer conductor of an adjacent radiating element at a bend point to form a closed array of said radiating elements.

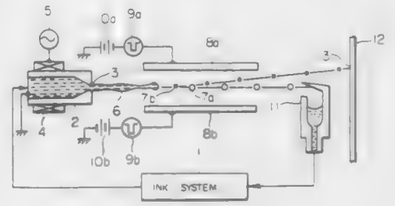
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**4,746,928**

## MICRO-DOT INK JET RECORDER

**Takahiro Yamada, Ibaraki; Yasumasa Matsuda, Hitachi; Makoto Yoshino, Ebina, and Masatoshi Sakata, Yokohama, all of Japan, assignors to Hitachi, Ltd. and Hitachi Koki, Co. Ltd., both of Tokyo, Japan**

**Filed Sep. 2, 1986, Ser. No. 902,561**
**Claims priority, application Japan, Sep. 6, 1985, 60-195914**
**Int. Cl.[4] G01D *15/18***
**U.S. Cl. 346—75** **5 Claims**




1. An ink jet recorder for recording information on a recording medium using ink dots comprising:
means for emitting ink alternately in the form of ink droplets having large and small diameters, said ink droplets of small diameter having a predetermined diameter; and
electrode means for selectively charging only said small diameter ink droplets of said ink droplets and deflecting them toward said recording medium in a predetermined direction, wherein said ink has a property meeting the requirement

$$K \leq N^n \times T^m$$

where T represents the surface tension of the ink, N represents the viscosity thereof, and n, m, and K are positive constants, and K is set to such a value that the diameter of the small diameter droplets is substantially maintained at said predetermined diameter at the highest operation temperature of said recorder.

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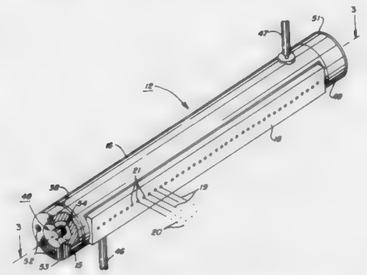


**4,746,929**

## TRAVELING WAVE DROPLET GENERATOR FOR AN INK JET PRINTER

**Larry W. Lin, Cupertino, Calif.; Joel W. Grover, Pittsford, and Eugene Behun, Rochester, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Jan. 16, 1987, Ser. No. 4,017**
**Int. Cl.[4] G01D *15/18*; H01L *41/08***
**U.S. Cl. 346—75** **6 Claims**



1. A traveling wave droplet generator for a continuous stream ink jet printer comprising:

an elongated tube with a linear series of parallel passageways through the tube wall which are perpendicular to the axial length of the tube;

a nozzle plate having a plurality of nozzles therein, the nozzle plate being fixedly attached to the tube with its nozzles aligned and coaxial with the passageways of the tube;

a piezoelectric driver assembly having a flexible member being mounted on one end of the tube for generating sound waves;

an anechoic terminator being positioned within the traveling wave tube and at the end opposite to the end with the piezoelectric driver assembly;

a first opening being located near one end of the traveling wave tube in the vicinity of the piezoelectric driver assembly for receiving pressurized ink and a second opening being located near the other end of the traveling wave tube in the vicinity of the anechoic terminator for selectively venting air from the traveling wave tube;

means for supplying pressurized ink to the traveling wave tube via the first opening; and

means to drive the piezoelectric driver assembly.

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**4,746,930**

## THERMAL PRINTING HEAD

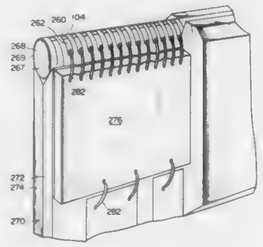
**Takashi Shimazaki, Yokohama, and Kunihiko Miura, Hiratsuka, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Jul. 9, 1986, Ser. No. 883,720**
**Claims priority, application Japan, Jul. 16, 1985, 60-156502; Jul. 31, 1985, 60-167743**
**Int. Cl.[4] G01D *15/10***
**U.S. Cl. 346—76 PH** **20 Claims**

1. A thermal head which is used in a printer and produces heat in response to an image forming signal, comprising:

a heating element adapted to produce heat when supplied with electric power;

a mounting member carrying thereon the heating element and a lead-out electrode for supplying electric power to the heating element, said mounting member being formed from a metal material into a rod-shaped structure, so that the heating element and the lead-out electrode are



mounted on the peripheral surface of the rod-shaped structure, with an insulating material interposed.

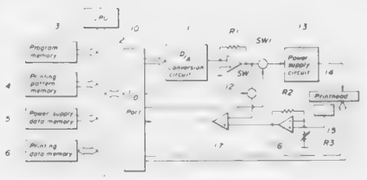
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**4,746,931**

## THERMAL HEAD TEMPERATURE CONTROL DEVICE

**Akira Okuda, Iwate, Japan, assignor to Kabushiki Kaisha Sato, Japan**

**Filed Apr. 1, 1986, Ser. No. 846,967**
**Claims priority, application Japan, Apr. 8, 1985, 60-72589**
**Int. Cl.[4] G01D *15/10*; B41J *3/20***
**U.S. Cl. 346—76 PH** **9 Claims**



1. A thermal printing head for printing various kinds of print type, such as bar codes, ordinary characters, and the like, comprising:

a variable output power supply for supplying electric power to said thermal printing head;

a power supply data memory having stored therein power supply control data for each kind of said print type to be printed;

means for determining the kind of a currently printed print type; and

control means, responsive to the determination made by the determining means, and connected to said thermal printing head, to said variable output power supply and to said power supply data memory for controlling the level of the electric power supplied to said thermal printing head by said variable output power supply as a function of the power supply control data and the currently printed print type.

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**4,746,932**

## THERMAL LABEL PRINTER HAVING I/O CAPABILITIES

**Yo Sato, Tokyo, Japan, assignor to Kabushiki Kaisha Sato, Japan**

**Filed Apr. 18, 1986, Ser. No. 853,684**
**Claims priority, application Japan, Apr. 19, 1985, 60-82199**
**Int. Cl.[4] G01D *15/10*; B65C *9/18*; B41J *3/20*; G06K *19/00***
**U.S. Cl. 346—76 PH** **11 Claims**

1. A portable device for receiving information located on packages and for printing data on a print medium for the packages, the device comprising:



first input means for receiving the information located on the packages;

memory means for storing the information located on the packages and for storing predetermined package related data;

a printer for printing the data on the print medium;

control means connected to the printer, to the first input means and to the memory means for receiving the information from the first input means and for transferring the information to the memory means, for developing data, based on the predetermined package related data and the information contained on the packages, which data is to be printed on the print medium, and for controlling the



printer unit means and the memory means to retrieve the data from the memory means and to cause the data to be printed, by the printer on the print medium; and

I/O port means connected to and controlled by the control means and effective for providing bi-directional data communications between the portable device and an external electronic data processing device, the control means being effective to enable the information received by the first input means and the predetermined package related data to be transmitted to the external data processing device and to enable transmission of the package related data from the external data processing device to the memory means of the portable device.

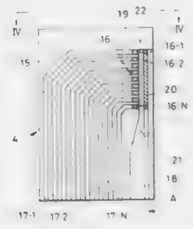
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**4,746,933**

## THERMAL RECORD-ERASE HEAD

**Osamu Asakura, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 29, 1986, Ser. No. 946,956**
**Claims priority, application Japan, Dec. 28, 1985, 60-297556**
**Int. Cl.[4] G01D *15/10*; B41J *3/00***
**U.S. Cl. 346—76 PH** **11 Claims**



1. A thermal head adapted for use in thermal printing utilizing an ink sheet carrying ink thereon for image recording on a recording sheet, comprising:

a substrate;

recording heat-generating members provided on said substrate for image recording on said recording sheet by transferring the ink of said ink sheet to said recording sheet; and

a lift-off heat-generating member provided on said substrate at the rear side of said recording heat-generating members with respect to the recording direction, for lifting off the ink, which has been transferred from said ink sheet to said recording sheet by the heat generated by said recording heat-generating members, from said recording sheet.

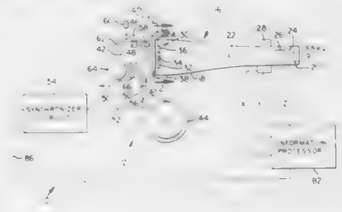
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**4,746,934**

## COLOR IMAGE COPYING SYSTEM USING A CATHODE-RAY TUBE WITH DIFFRACTION GRATING FACE PLATE

**Susan C. Schoening, Portland, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.**

**Filed Jul. 7, 1986, Ser. No. 882,750**
**Int. Cl.[4] G01D *9/42, 15/06*; H04N *1/46***
**U.S. Cl. 346—110 R** **16 Claims**



1. In an image copying system that includes display apparatus which for each image emits a series of components in first and second colors that exit a face plate and accumulate in a region of a light-sensitive medium to form therein a permanent color copy of the image, the improvement comprising:

wavelength selective means positioned to receive and disperse light rays carrying the first color component to form a first focal configuration in a first location and light rays carrying the second color component to form a second focal configuration in a second location; and

positioning means to position the light-sensitive medium in synchronism with the emission of the image components such that the region is aligned in the first location for exposure to the first color component and in the second location for exposure to the second color component.

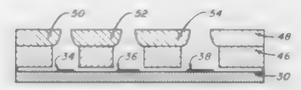
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**4,746,935**

## MULTITONE INK JET PRINTER AND METHOD OF OPERATION

**Ross R. Allen, Ramona, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Nov. 22, 1985, Ser. No. 801,030**
**Int. Cl.[4] G01D *15/16***
**U.S. Cl. 346—140 R** **3 Claims**



1. A scanning printhead for ejecting ink drops into pixels in a predetermined binary sequence of drop volumes including, in combination:

(a) a thin film resistor substrate having a plurality of thin-film heater resistors thereon for generating vapor bubbles in the ink to effect the generation of ink-droplets,

(b) a barrier layer disposed on said thin film resistor substrate and having a plurality of channels defining a plurality of different binary drop volumes and forming respectively a plurality of drop generators,

(c) a drop generator orifice plate disposed on said barrier member and having respectively a plurality of different

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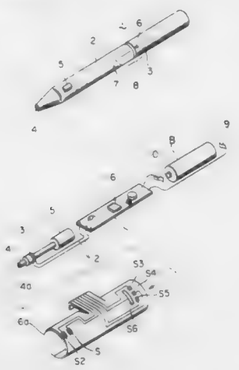
orifice diameters representative of said predetermined binary sequence of drop volumes and disposed respectively over said plurality of heater resistors and barrier channels, said orifices being in a row, whereby said drop generators may be sequentially fired by the application of electrical pulses to said heater resistors as said print head is scanned in relative motion with respect to ink receiving paper whereby ink drops can be ejected in said predetermined sequence.

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**4,746,936**
**INK JET PEN**

**Hiroshi Takahashi, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 926,880, Nov. 5, 1986, abandoned, which is a continuation of Ser. No. 738,547, May 28, 1983, abandoned, which is a continuation of Ser. No. 449,502, Dec. 13, 1982, abandoned. This application Jun. 15, 1987, Ser. No. 61,774**
**Claims priority, application Japan, Dec. 22, 1981, 56-206113**
**Int. Cl.[4] G01D** *15/16*
**U.S. Cl. 346—140 R** **13 Claims**



1. An ink jet pen, comprising:
a pen-shaped case;
an ink emission means housed within a portion of said case;
an ink emission control means for controlling said ink emission means housed within said case, wherein said ink emission control means stores a plurality of ink emission patterns and includes an ink emission pattern switch for selecting one of said ink emission patterns;
a switch means provided on the outer surface of said case, said switch means being connected to the ink emission control means for instructing said ink emission means to emit ink; and
power source means housed within said case for supplying power to said ink emission means and said ink emission control means.

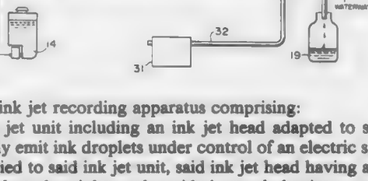
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**4,746,937**
**CONTROL APPARATUS FOR AN ON-DEMAND INK JET PRINTING ELEMENT**

**Roberto Realis Luc, Ivrea, and Alessandro Crotti, Strambino, both of Italy, assignors to Ing. C. Olivetti & C., S.p.A., Turin, Italy**

**Filed May 23, 1986, Ser. No. 866,246**
**Claims priority, application Italy, Jun. 10, 1985, 67537 A/85**
**Int. Cl.[4] G01D** *15/16*
**U.S. Cl. 346—140 R** **10 Claims**

1. A printing apparatus having at least one on demand ink jet printing element comprising a container made of insulating material for containing an electrically conductive ink, said container having a nozzle, a first electrode in contact with the ink, and a second electrode located adjacent the outlet edge of said nozzle, said apparatus also comprising printing control means for generating voltage pulses between said first electrode and said second electrode to create an electric current in the ink so as to cause a drop of ink to be expelled through the nozzle, wherein said printing control means include:
a signal generator for generating a logic signal for each drop to be expelled,
a first circuit directly responsive to said logic signal for generating a first voltage pulse having such a duration as to raise the temperature of the ink into the nozzle up to close to the vaporization point of the ink,



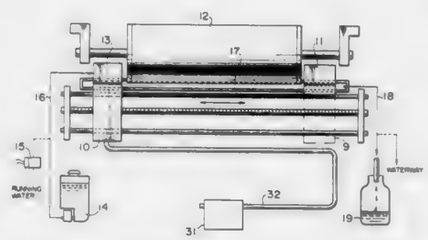

a delay circuit connected to said signal generator for outputting a signal delayed with respect to said signal a predetermined time,
a second circuit responsive to said delayed signal for generating a second voltage pulse so as to suddenly create a bubble of vapor in the nozzle to expel a drop of ink, and
adjusting means substantially responsive to the ink temperature for controlling said first circuit so as to alter the duration of said first voltage pulse an amount inversely proportional to the variations of said ink temperature.

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**4,746,938**
**INK JET RECORDING APPARATUS WITH HEAD WASHING DEVICE**

**Kiyoshi Yamamori, Yokohama; Yuuji Mogi, Sagamihara; Shigeyoshi Hasegawa, Tsukui; Tamotsu Kojima, Sashima, and Sadashi Higuchi, Kawasaki, all of Japan, assignors to Matsushita Electric Industrial Co. Ltd., Osaka, Japan**

**Filed Jul. 7, 1986, Ser. No. 882,511**
**Claims priority, application Japan, Jul. 11, 1985, 60-152670; Sep., 1985, 60-195124; Sep. 4, 1985, 60-195125; Sep. 4, 1985, 60-195127; Sep. 4, 1985, 60-195128**
**Int. Cl.[4] G01D** *15/18*
**U.S. Cl. 346—140 R** **1 Claim**



1. An ink jet recording apparatus comprising:
an ink jet unit including an ink jet head adapted to selectively emit ink droplets under control of an electric signal applied to said ink jet unit, said ink jet head having an air nozzle and an ink nozzle, said air nozzle having an opening coaxial with an opening of said ink nozzle;
a recording medium mounting means for mounting a recording medium at a position opposite said ink jet unit;
a head washing unit, disposed at a position beyond one end of said recording medium mounting means, for washing said ink jet unit, said head washing unit being movable towards and away from said ink jet unit;
means for supplying a predetermined amount of cleaning liquid to said head washing unit when printing is finished;



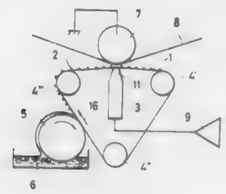
means for draining soiled cleaning liquid away from said ink jet unit after a washing operation is completed;
a carriage said ink jet unit;
a guide shaft on which said carriage is slidably mounted such that said carriage is movable along said guide shaft; and
means for removing droplets of said cleaning liquid from a surface of said ink jet head after printing is finished; and
wherein said head washing unit includes a washing nozzle for spraying said cleaning liquid, a liquid receiving box slidable towards and away from the ink jet unit, and moving means for moving said liquid receiving box in response to movement of said carriage and said ink jet unit carried thereby.

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**4,746,939**
**PICTURE RECORDING APPARATUS**

**Masatsugu Kikuchi, and Syoji Wakoh, both of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Japan**

**Filed Dec. 3, 1981, Ser. No. 326,976**
**Claims priority, application Japan, May 8, 1981, 56-68248**
**Int. Cl.[4] G01U** *15/00*
**U.S. Cl. 346—153.1** **6 Claims**



1. A picture recording apparatus, comprising:
an endless dielectric belt having a plurality of magnetic poles arranged thereon which are spaced apart from one another;
a multiple stylus electrode assembly having an electrode surface, said surface being in contact with an inner surface of said endless dielectric belt;
means for applying a magnetic fluid or magnetic powder onto said plurality of magnetic poles to form magnetic rise elements on said endless dielectric belt;
means for transporting a recording sheet so that said recording sheet is spaced from top surfaces of said magnetic rise elements;
means for transporting said endless dielectric belt, said endless dielectric belt and said recording sheet being transported in synchronization with each other; and
means for applying a signal voltage to said multiple stylus electrode assembly.

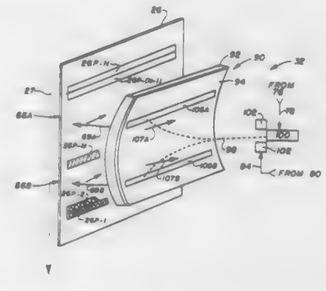
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**4,746,940**
**LINE SCANNER TO REDUCE BANDING**

**Danny L. Y. Lee, West Chester, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Nov. 25, 1986, Ser. No. 934,827**
**Int. Cl.[4] G01D** *15/14*
**U.S. Cl. 346—160** **16 Claims**

12. A method for producing an image having reduced banding comprising the steps of:
(a) scanning an imaging beam having a finite width along at least a first and a second parallel scanning position line spaced from each other a preselected number of beam widths;
(b) advancing the imaging element in a direction transverse to the scanning position lines at a constant rate to bring a first portion thereof under the first scanning position line;
(c) modulating the imaging beam with image bearing information as the beam scans the first portion of the imaging element when that first portion is under the first scanning position line to produce on the imaging element a first intermediate scanned line, the beam having approximately one-half of a predetermined magnitude of imaging radiation intensity;
(d) further advancing the imaging element in the direction transverse to the scanning position lines at a constant rate to bring a second portion of the imaging element under the first scanning position line, the beam having approximately one-half of a predetermined magnitude of imaging radiation intensity;
(e) modulating the imaging beam with image bearing information to produce a second intermediate line on the second portion of the imaging element, the beam having approximately one-half of a predetermined magnitude of imaging radiation intensity;
(f) determining when the first intermediate scanned line has advanced to a location coincident with the second scanning position line;



(g) modulating the imaging beam with the same image bearing information used to produce the first intermediate scanned line and scanning the imaging beam across the imaging element along the second scanning position line to produce a first final scanned line, the beam having approximately one-half of a predetermined magnitude of imaging radiation intensity;
(h) determining when the second intermediate scanned line has advanced to a location coincident with the second scanning position line; and
(i) modulating the imaging beam with the same image bearing information used to produce the second intermediate scanned line and scanning the imaging beam across the imaging element along the second scanning position line to produce a second final scanned line, the beam having approximately one-half of a predetermined magnitude of imaging radiation intensity.

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**4,746,941**
**DOT PRINTER WITH TOKEN BIT SELECTION OF DATA LATCHING**

**Hieu T. Pham, Webster; Yee S. Ng, Fairport; Eric K. Zeise, Pittsford; Kenneth D. Kieffer, and Pin S. Tschang, both of Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Oct. 13, 1987, Ser. No. 107,315**
**Int. Cl.[4] H04N** *1/00*
**U.S. Cl. 364—519** **8 Claims**

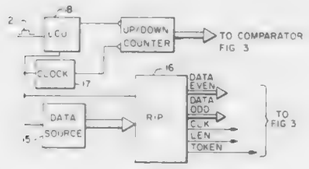
1. A dot printer apparatus comprising:
a recording head having a plurality of recording elements for dot-recording on a recording medium;
driving means for selectively driving said plurality of recording elements in accordance with respective image data signals;
said driving means including respective data register means associated with each recording element for storing said image data signals;
data bus means for carrying image data signals;

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means commonly connecting said data bus means to said data register means;

a multistage bi-directional shift register means for outputting sequentially at respective stages a token bit signal for




sequentially selecting a respective data register means for accepting image data signals; and

means connected to said bi-directional shift register means for establishing the direction of shifting of said token bit signal along said shift register means.

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**4,746,942**

**PHOTOCOMPOSING MACHINE AND METHOD**

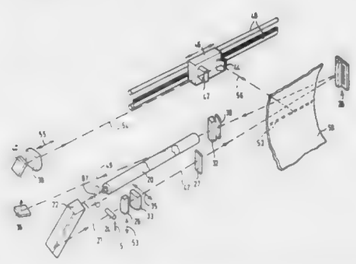
**Michel Moulin, Chemin du Russel, 15, CH 1-25 Saint Sulpice, Switzerland**

**Continuation of Ser. No. 800,519, Nov. 21, 1985, abandoned. This application Nov. 27, 1987, Ser. No. 127,627**

**Claims priority, application United Kingdom, Nov. 23, 1985, 8529629**

**Int. Cl.⁴ B41B** *19/00*

**U.S. Cl. 354—5** **42 Claims**



1. A photocomposing method for recording information on a photoreceptor comprising the steps of forming a thin, elongated polarized light beam, projecting said light beam into a light shutter unit comprising a linear column of coterminous individually controllable elementary areas located on a common substrate of polarization-altering material, and an output polarizing filter, selectively affecting the passage of light through said unit by selective energization of said coterminous elementary areas, directing emerging light rays to a stationary collimating optical system, directing the collimated light rays emerging from said optical system to an imaging second optical system, moving said second optical system in a direction perpendicular to the illuminated linear areas of said substrate, and controlling said selectively affected light through said shutter unit by the motion of said second optical system in order to build up images.

**4,746,943**

**FILM TRACKING MECHANISM**

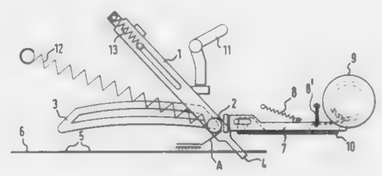
**Roland W. Kohl, Hong Kong, Hong Kong, assignor to Dialbright Company, Ltd., Hong Kong, Hong Kong**

**Filed Jan. 13, 1987, Ser. No. 2,801**

**Claims priority, application United Kingdom, Jan. 14, 1986, 8600770**

**Int. Cl.⁴ G03B** *1/22, 17/36*

**U.S. Cl. 354—215** **10 Claims**



1. A film tracking mechanism for a camera, comprising a track having forward and rear portions and defining exclusively a continuous loop, a tracking member, means on said tracking member for slidably and pivotably mounting said tracking member in said camera, a tracking pin on said tracking member engaging said track for slidable movement theralong, means on said tracking member for engagement with a film during movement of said tracking pin along said forward portion, and means for disengaging said tracking member from said film and for moving said tracking pin along said rear portion.

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**4,746,944**

**HANDGRIP FOR ATTACHMENT TO OPTICAL PHOTOGRAPHIC EQUIPMENT**

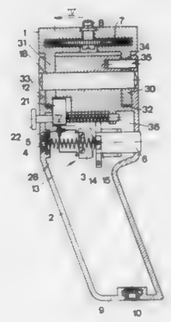
**Reinhard Hiesinger, Ottobeuren, Fed. Rep. of Germany, assignor to Firma Novoflex Fotogeratebau Karl Miller, Memmingen, Fed. Rep. of Germany**

**Filed Jul. 15, 1986, Ser. No. 885,652**

**Claims priority, application Fed. Rep. of Germany, Jul. 31, 1985, 3527368**

**Int. Cl.⁴ G03B** *29/00, 17/56*

**U.S. Cl. 354—82** **20 Claims**



1. A handgrip for attachment to optical photographic equipment comprising:

a handle;

a mounting member;

an operating wheel movably mounted on said mounting member;

a threaded pin connected to said operating wheel f releasably connecting the handgrip to the equipment;

a trigger mounted on said handle;



operating means for operating the equipment in response to operation of said trigger;

lug means projecting from said mounting member;

pivot pin means on said handle pivotally connecting said lug means to said handle so that said mounting member is rotatable about the pivot pin axis relative to said handle; and

interengageable locking means on said handle and mounting member for releasably locking said mounting member in a selected position of rotation relative to said handle.

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**4,746,945**

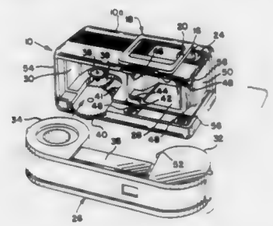
**MINIATURE 110 CAMERA**

**Kwok Y. Chan, North Point, Hong Kong, assignor to W. Haking Enterprises Limited, North Point, Hong Kong**

**Continuation-in-part of Ser. No. 882,087, Jul. 3, 1986. This application Jul. 24, 1986, Ser. No. 890,488**

**Int. Cl.⁴ G03B** *13/02, 17/02, 17/42*

**U.S. Cl. 354—204** **23 Claims**



1. In a camera for use with a cassette having lobe-shaped laterally projecting dispensing and take-up end sections respectively forming therein a film dispensing chamber and a take-up chamber, said take-up chamber including a take-up spool having an externally accessible drive gear attached thereto, said lobe-shaped sections being interconnected by a substantially straight conduit-forming section interconnecting the dispensing and supply sections, said camera including a housing with shutter cocking and release means and user-operated film winding means, said housing having a cassette insertion aperture at the back thereof which exposes the rear interior of said housing and means for releasably retaining an inserted cassette, the rear interior of said housing having at one portion thereof an imaging station for receiving said conduit-forming section of an inserted cassette and having adjacent to said imaging station at least partial take-up section accepting chamber configured to accept said cartridge take-up section, said take-up section-accepting chamber of said housing having gearing means coupled to said film winding means for engaging and driving said take-up spool drive gear, the improvement comprising:

said housing being configured so that at least the outermost end of said cassette dispensing section of said inserted cassette extends beyond the maximum lateral dimension of said housing, said housing including a wall disposed between said imaging station and the confronting inner portion of said dispensing section of an inserted cassette.

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**4,746,946**

**MINIATURE CAMERA SHUTTER MECHANISM**

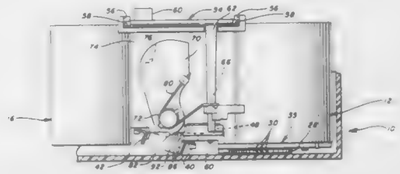
**Kwok Y. Chan, North Point, Hong Kong, assignor to W. Haking Enterprises Limited, North Point, Hong Kong**

**Filed Jun. 11, 1987, Ser. No. 61,536**

**Int. Cl.⁴ G03B** *9/10*

**U.S. Cl. 354—250** **6 Claims**

1. In a still camera having a camera body adapted to accept a film cassette, a shutter, a shutter-actuating slider member having a shutter striker portion for striking said shutter to momentarily move it to a light-passing position, spring means for biasing said slider member toward a shutter-striking position, slider member mounting means for supporting said slider member for movement between an initial fully energized position where said spring means is stressed said shutter-striking position, a film perforation engaging member affixed to said slider member and adapted to enter a film perforation and be moved by the film to return the slider member to said energized position during a film winding operation, means for retaining said slider member at said energized position after film advance when a cassette is installed, manually operated release means for releasing said slider member from said energized position, film winding means including means configured for engagement with an inserted film cassette for advancing the film, and film wind termination means for locking said film winding means against further advancing operation when said slider member is moved to said energized position, said slider member being movable in a direction laterally of its direction of movement between said initial energized position and said shutter-striking position, the movement of said slider member in said lateral direction moving said film perforation engaging



member into and out of a film perforation, said release means being movable by the operator from an initial to a picture-taking position to move said slider member in said lateral direction to remove said film perforation engaging member from a film perforation to enable said slider member to move from its energized toward said shutter-striking position, the improvement comprising:

slider member latching means including a first latching shoulder portion affixed to said slider member and a second latching shoulder portion affixed to said housing, said latching shoulder portions being disposed for confronting one-way latching engagement at a point immediately prior to complete film advance to prevent return motion beyond said point of said slider member under the force of said biasing spring, and further configured so that a given degree of lateral movement of said film perforation engaging member from said film-engaging position towards a withdrawn position moves said first latching shoulder portion out of confrontation with said second latching shoulder portion.

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**4,746,947**

**EXPOSURE CALCULATING DEVICE**

**Masaaki Nakai, Kawachinagano, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed Feb. 25, 1986, Ser. No. 832,702**

**Claims priority, application Japan, Feb. 25, 1985, 60-36019; Mar. 19, 1985, 60-55017**

**Int. Cl.⁴ G03B** *3/00, 15/05, 7/28*

**U.S. Cl. 354—402** **7 Claims**

1. An exposure calculating device, comprising:

means for measuring brightness of a measuring area with dividing the measuring area into a plurality of light measuring regions and producing a plurality of light measuring signals corresponding to each brightness of each of the light measuring regions;

means for illuminating the measuring area;

means for producing an instruction signal;

means for storing a light measuring signal indicating the brightness of a measuring region positioned in the center of the measuring area in response to the instruction signal;

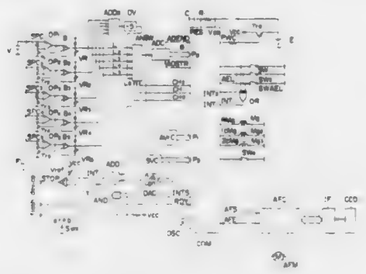
means for selecting, based on the stored light measuring signal and plurality of light measuring signals, a light

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controlled region in which the amount of flash light should be controlled, from a plurality of light controlled regions that are determined by dividing the measuring area; and

means for controlling the amount of flash light to illuminate the selected light controlled region,



wherein the selecting means includes means for calculating each difference between the stored light measuring signal and each of the plurality of light measuring signals, means for detecting a light measuring region in which the calculated difference is minimum, and means for selecting a light controlled region in accordance with the detected light measuring region.

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**4,746,948**

**FOCUS DETECTION DEVICE**

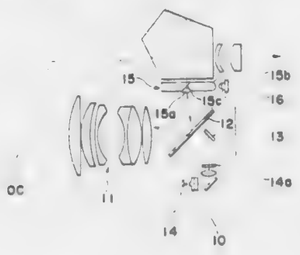
**Toru Matsui, Sakai, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed Jun. 24, 1986, Ser. No. 877,782**

**Claims priority, application Japan, Jun. 24, 1985, 60-138457**

**Int. Cl.[4] C03B *3/00***

**U.S. Cl. 354—408** **7 Claims**



1. A focus detection device for detecting the condition of focusing on a predetermined focal plane of an objective lens comprising:

(A) a refocusing means for refocusing an image on said focal plane which is arranged behind said focal plane;

(B) a light receiving means for receiving the image formed by said refocusing means;

(C) a focus detection means for detecting the condition of focusing on said predetermined focal plane of the objective lens according to outputs of said light receiving means;

(D) an electrochromic means arranged in front of said light receiving means (B) in which the color density is varied according to electric power applied thereto; and

(E) a control means for controlling the electric power to be applied to said electrochromic means according to a color temperature of light incident into said objective lens.

**4,746,949**

**IMAGE SENSING APPARATUS**

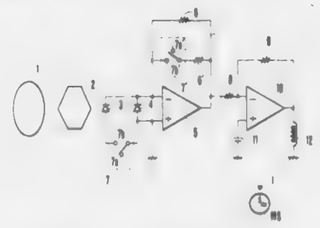
**Masahiro Takei, Kanagawa, and Tadashi Okino, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 682,797, Dec. 18, 1984. This application Sep. 12, 1986, Ser. No. 907,139**

**Claims priority, application Japan, Dec. 22, 1983, 58-243447**

**Int. Cl.[4] G03B *7/08***

**U.S. Cl. 354—429** **36 Claims**



1. An image sensing apparatus, comprising:

(a) photometric means for measuring the luminance of an object to be photographed:

(b) mode selection means for selecting the image sensing mode of the image sensing apparatus between a one-shot picture taking mode and a continuous picture taking mode; and

(c) characteristic control means arranged to change the photometric characteristic of said photometric means according to the selected position of said mode selection means.

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**4,746,950**

**COLOR COPIER**

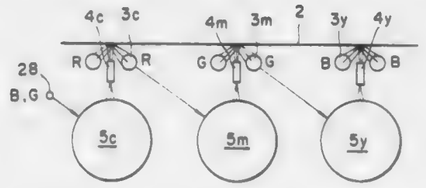
**Mitsuru Mamizuka, Tokyo; Hideya Furuta, Yokohama; Yutaka Koizumi, Kawasaki, and Yoshihiro Sakai, Tokyo, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan**

**Filed Jan. 8, 1986, Ser. No. 817,041**

**Claims priority, application Japan, Jan. 9, 1985, 60-1808; Jan. 9, 1985, 60-1809; Feb. 7, 1985, 60-16106[U]; Feb. 7, 1985, 60-16107[U]; Feb. 7, 1985, 60-16108[U]; Feb. 9, 1985, 60-17255[U]; Feb. 9, 1985, 60-17256[U]; Feb. 9, 1985, 60-17257[U]**

**Int. Cl.[4] G03G *15/01***

**U.S. Cl. 355—4** **11 Claims**



1. A copying apparatus comprising:

holding means driven to move along a first predetermined path in a reciprocating manner for holding thereon an original to be copied;

scanning means for scanning said original while said holding means moves in a forward direction along said first predetermined path;

a plurality of imaging means for forming thereon toner images of different color components of said original;

transporting means for transporting a transfer medium along a second predetermined path, which is generally in parallel with said first predetermined path, in a direction opposite to said forward direction, to thereby transfer said toner images one after another in sequence from said plurality of imaging means to said transfer medium to obtain a reproduced color copy of said original;

wherein said scanning means includes a like plurality of illuminating light sources for illuminating said original and exposure systems each for the corresponding one of said plurality of imaging means, each of said plurality of exposure systems exposing said original to the corresponding one of said imaging means to form a particular color component image of said original under color separation;

wherein each of said plurality of imaging means includes a photosensitive drum driven to rotate in a predetermined direction and having an imaging surface around its periphery, primary charging means for uniformly charging said imaging surface so as to be later selectively dissipated by a light image of said original applied by the corresponding one of said plurality of exposure systems to form an electrostatic latent image, developing means for developing said latent image with toner of selected color to form a toner image of selected color, and image transferring means for transferring said toner image of selected color to said transfer medium; and

wherein each of said plurality of imaging means further includes a first light irradiating means for irradiating, with light of a first color, said imaging surface of said drum after formation of said toner image of selected color, and a second light irradiating means for irradiating, with light of a second color, said imaging surface of said drum after image transfer.

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**4,746,951**

**COLOR IMAGE FORMING APPARATUS HAVING AN IMPROVED ARRANGEMENT FOR MOUNTING DEVELOPING DEVICES THEREON**

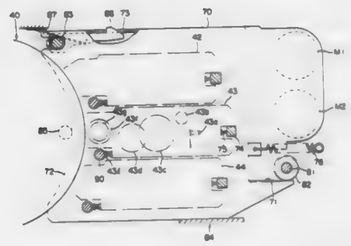
**Kazushi Hayakawa, Tokyo; Noboru Hatakeyama, Kanagawa; Hitoshi Tamura, and Tadashi Izawa, both of Tokyo, all of Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan**

**Filed Nov. 3, 1986, Ser. No. 926,331**

**Claims priority, application Japan, Nov. 11, 1985, 60-253496; Nov. 11, 1985, 60-173916[U]**

**Int. Cl.[4] G03G *15/01***

**U.S. Cl. 355—4** **5 Claims**



1. A color image forming apparatus for conducting multi-color development having

a body,

a photosensitive drum (40) mounted on said body,

an integral casing (70) mounted on said body and movable to either a fixed operating position with respect to said drum or a service position away from said drum,

a plurality of developing devices (42, 43, 44) removably mounted on said integral casing,

wherein the improvement comprises,

a plurality of insertion portions on said integral casing, each adapted to receive one of said developing devices in an operating position,



means (74, 75) for removably mounting one of said developing devices in each of said insertion portions, and

a reference means (90, 43*l*) on said integral casing abuttable by each of said developing devices to locate all of said developing devices at predetermined optimum operating positions with respect to said drum, so that any one of said developing devices may be selected for operation without movement of said selected developing device or movement of said integral casing relative to said drum.

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**4,746,952**

**DEVELOPING DEVICE**

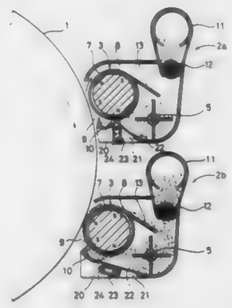
**Toshiaki Kusuda, Osaka; Takeshi Tsuda, Sakai, and Masakatsu Akashi, Yahata, all of Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan**

**Filed Apr. 14, 1986, Ser. No. 851,640**

**Claims priority, application Japan, Apr. 17, 1985, 60-82959**

**Int. Cl.[4] G03G *15/01, 15/08***

**U.S. Cl. 355—4** **6 Claims**



3. A developing device having two or more developing units arranged around a photoreceptor drum, each developing unit of said developing units developing an image of different color on said drum than the color of the image developed on said drum by the other of said developing units, each said developing unit being composed respectively of a housing having an elastic body in the bottom thereof for containing a developer of a selected color, a developing roller in said housing facing said photoreceptor drum for transferring said developer from said housing to said drum and a doctor blade for controlling the thickness of the developer deposited on the peripheral surface of said developing roller, a magnet movably provided under the elastic body of each said developing unit, and an operation control means connected to said magnet for moving said magnet so as to push up said elastic body to shut off supply of said developer to said drum when development of an image of said selected color on said drum is not required.

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**4,746,953**

**MEMBRANE STRIP CONTROL**

**Ruediger W. Knodt, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Oct. 8, 1986, Ser. No. 916,766**

**Int. Cl.[4] G03G *15/00***

**U.S. Cl. 355—7** **5 Claims**

1. In a copier having a controller and a platen upon which an original is placed for exposure, a control system for entering dimensional data into the controller, the control system comprising:

a first electrically sensitive membrane strip disposed along one axis of the platen,

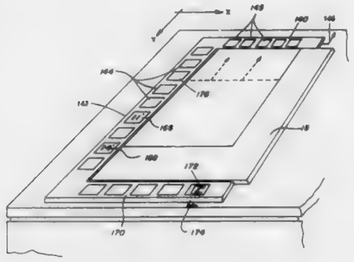
a second electrically sensitive membrane strip disposed along another axis of the platen, the membrane strips being conterminous with the edges of the platen, said membrane strips being formed with touch sensitive por-

VOL 1090 ISS 4 MY 24 1988 UMI



tions such that touching by an operator effects a signal indicative of the location of the touch contact,

means connecting said strips to the controller for transmitting said signals thereto as indicative of the dimension of the original along the effected edge thereof, and



a third electrically sensitive membrane strip, said third electrically sensitive membrane strip electrically connected to the controller and including a conversion switch, activation of said conversion switch enabling the touching of said touch sensitive portions to selectively edit segments of the document related thereto.

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**4,746,954**

## IMAGE FORMING APPARATUS WITH TONER SCATTERING CONTROL

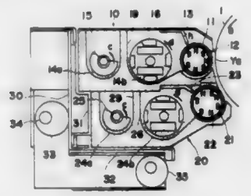
**Masami Matuura, Kanagawa; Ichizo Nagata, Machida, and Kuniaki Kamimura, Ebina, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed May 6, 1986, Ser. No. 860,217**

**Claims priority, application Japan, May 14, 1985, 60-103468; Aug. 30, 1985, 60-192549; Dec. 9, 1985, 60-277250; Dec. 14, 1985, 60-281717**

**Int. Cl.⁴ G03G *15/08***

**U.S. Cl. 355—14 D** **6 Claims**



1. An image forming apparatus having a plurality of developing units, one of which is selectively used for development, said image forming apparatus comprising:

an electrostatic latent image bearing member;

a developing sleeve provided at each of the developing units for moving a developer to a position opposite the image bearing member;

developing unit selecting means for positioning the developing sleeve of one of the developing units selected at a position opposite the image bearing member and moving the developing sleeve of another developing unit from the position opposite the image bearing member;

control means for stopping movement of the developer positioned on an outer periphery of the developing sleeve of the developing unit not selected by the selecting means;

developer removing means for causing the developing unit selecting means to select the developing unit not used for development to remove and collect the developer positioned on the outer periphery of the developing sleeve thereof; and

input means for providing an input signal in order to specify the developing unit to be selected by said developing unit selecting means.

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**4,746,955**

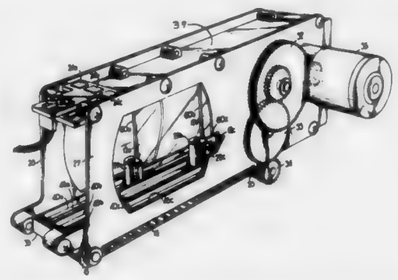
## COLOR FILTER INTERPOSITIONING MECHANISM FOR COLOR ELECTROPHOTOGRAPHY

**Dan L. Slayton, Lilburn, and Wayne C. Jones, Duluth, both of Ga., assignors to Colorocs Corporation, Norcross, Ga.**

**Filed Sep. 16, 1986, Ser. No. 907,987**

**Int. Cl.⁴ G03B *27/72, 27/76***

**U.S. Cl. 355—35** **10 Claims**



1. An apparatus in an electrophotographic print mechanism, for a selectively interposing color filters comprising:

a plurality of color filter assemblies, disposed for movement into an optical path;

means for moving each of said filter assemblies into said optical path, said means including an endless belt moveable in a circuitous path to selectively engage and move, one at a time, each filter assembly of said plurality of filter assemblies; means for removing each of said filter assemblies from said optical path; and

means for holding said color filter assemblies in a laterally spaced apart relationship.

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**4,746,956**

## MICROFILM PRINTER APPARATUS AND METHOD

**Bruce A. Holroyd, Fairport, and Eugene W. Lachut, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Dec. 29, 1986, Ser. No. 947,456**

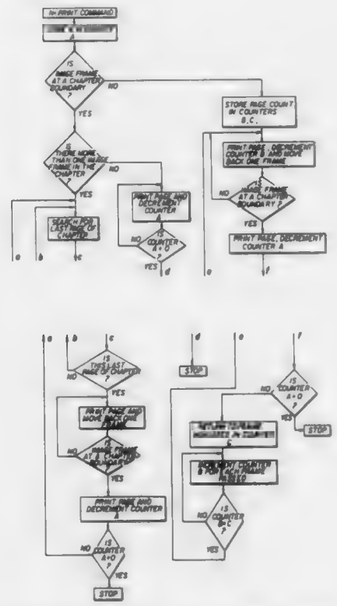
**Int. Cl.⁴ G03B *27/52, 27/46***

**U.S. Cl. 355—41** **7 Claims**

1. In a microfilm printer apparatus that includes means for storing signals corresponding to a selectable first variable number of prints to be made of each of a second variable number of image frames on a microfilm; means, in response to a print signal, for automatically producing collated sets of said number of prints of each of said number of image frames; and characterized by



means for automatically distinguishing between chapters of image frames on said microfilm and, in response to said



print signal, printing only the selected number of prints of a variable number of image frames in a chapter.

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**4,746,957**

## VARIABLE MAGNIFICATION COPY MACHINE

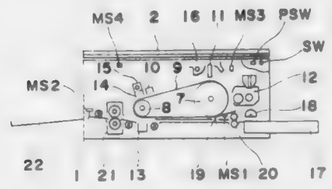
**Haruo Nishiyama, Kyoto, and Masaru Tsuji, Nara, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Jul. 17, 1986, Ser. No. 886,342**

**Claims priority, application Japan, Jul. 17, 1985, 60-159430; Jul. 17, 1985, 60-159431; Jul. 17, 1985, 60-159432**

**Int. Cl.⁴ G03G *15/00***

**U.S. Cl. 355—55** **6 Claims**



1. A variable magnification copy machine in which either a two revolution process wherein erasing and cleaning of a photo-sensitive means is carried out once in one copying cycle or a three revolution process wherein said erasing and cleaning of the photo-sensitive means is carried out twice in one copying cycle can be selected and in which a copying magnification is variable by varying a document scanning speed, said copy machine comprising:

means for selecting said two revolution process when an equal magnification mode is chosen; and

means for switching from said two revolution process to said three revolution process when an enlargement mode is chosen.

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**4,746,958**

## METHOD AND APPARATUS FOR PROJECTION PRINTING

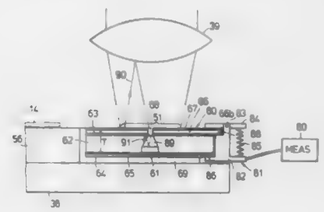
**Masahiro Yamakawa, Kawasaki, Japan, assignor to Fujitsu Limited, Kawasaki, Japan**

**Filed Jun. 18, 1987, Ser. No. 63,471**

**Claims priority, application Japan, Jun. 18, 1986, 61-142545**

**Int. Cl.⁴ G03B *27/74, 27/80, 27/32***

**U.S. Cl. 355—68** **11 Claims**



1. A method of projection printing for partially exposing a substrate by projecting an image of a pattern on said substrate by use of an optical system to irradiate a light from a light source onto said substrate via a mask which has said pattern formed thereof, said method comprising the steps of:

(a) irradiating the light obtained via said optical system on photodetector means arranged on a first plane which is approximately the same as a second plane on which the exposure takes place on said substrate so as to measure an illuminance within a predetermined portion of an exposure region on said first plane;

(b) successively moving said photodetector means on said first plane to a plurality of arbitrary positions within said exposure region so as to measure illuminances within a plurality of predetermined portions of said exposure region and to obtain an illuminance distribution within said exposure region;

(c) adjusting said optical system when the obtained illuminance distribution is non-uniform so as to obtain a uniform illuminance distribution; and

(d) placing said mask between said light source and said substrate so as to project the image of said pattern and partially expose said substrate by use of the light having the uniform illuminance distribution within said exposure region.

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**4,746,959**

## ONE-TRANSISTOR MEMORY CELL FOR LARGE SCALE INTEGRATION DYNAMIC SEMICONDUCTOR MEMORIES AND THE METHOD OF MANUFACTURE THEREOF

**Wolfgang Mueller, Putzbrunn, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany**

**Filed Jan. 14, 1985, Ser. No. 691,393**

**Claims priority, application Fed. Rep. of Germany, Apr. 25, 1984, 3415455**

**Int. Cl.⁴ H01L *29/78, 29/04*; G11C *11/34***

**U.S. Cl. 357—23.6** **1 Claim**

1. A semiconductor memory comprising:

a plurality of one-transistor memory cells including a shared doped semiconductor body which comprises a boundary surface;

each of said one-transistor memory cells comprising:

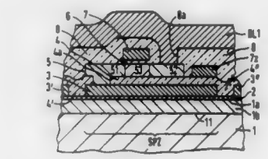
a first insulating layer carried on said boundary surface;

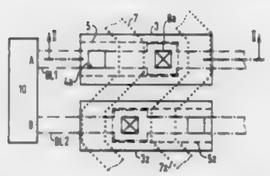
a conductive layer carried on said first insulating layer and constituting a first electrode of a storage capacitor and a section of said semiconductor body forming a second electrode of the storage capacitor connected to a reference potential;

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a second insulating layer carried on said conductive layer;
a recrystallized semiconductor layer, including spaced first and second regions constituting source and drain zones, carried on said second insulating layer with said first region extending through said second insulating layer and connected to said conductive layer, said recrystallized semiconductor layer extending laterally, at most, to the edge of said conductive layer;
a third insulating layer carried on said recrystallized semiconductor layer;
a gate carried above the space between said first and second regions on said third insulating layer;
said semiconductor body comprising a zone extending inwardly from said boundary surface and highly doped with respective said semiconductor body to provide rapid charging and discharging of said storage capacitor;



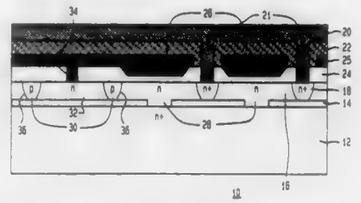


said zone being doped with an impurity having a conductivity opposite that of said doped semiconductor body;
a fourth insulating layer carried by said gate and said semiconductor layer;
a bit line carried by said fourth insulating layer above said gate and extending there through and connected to said second region;
said plurality of memory cells being disposed in pairs with said recrystallized semiconductor layers thereof offset relative to one another in the direction of the appertaining bit lines, said bit lines being folded for each pair of cells and extending parallel to one another; and
each of said gates constituting a portion of the selection line extending above its respective conductive layer of the respective cell and laterally of the recrystallized layer of the other cell.

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**4,746,960**
**VERTICAL DEPLETION-MODE J-MOSFET**
**Stephen J. Valeri, Warren; Bernard A. MacIver, Lathrup Village, and Kailash C. Jain, Sterling Heights, all of Mich., assignors to General Motors Corporation, Detroit, Mich.**
**Filed Jul. 27, 1987, Ser. No. 77,742**
**Int. Cl.⁴ H01L *29/78, 29/80***
**U.S. Cl. 357—23.7** **9 Claims**

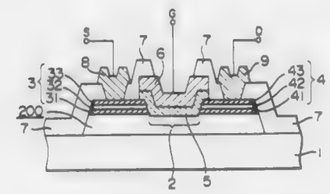
1. A vertical j-MOSFET transistor comprising a plurality of cells connected in parallel between a common drain electrode and a common source electrode, the cells being aligned in a two-dimensional regular array except at localized sites spaced apart in the array, and means at each such site for serving as a sink and for collecting minority charge carriers which tend to build up at each interface of a channel region and gate electrode of the transistor when a voltage is applied to the gate



electrode for depleting the channel region of majority charge carriers.

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**4,746,961**
**FIELD EFFECT TRANSISTOR**
**Nobutake Konishi, Hitachiota; Kenji Miyata, Katsuta; Yoshikazu Hosokawa, Hitachiota; Takaya Suzuki, and Akio Mimura, both of Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**
**Filed Jun. 8, 1987, Ser. No. 59,785**
**Claims priority, application Japan, Jun. 11, 1986, 61-133689**
**Int. Cl.⁴ H01L *29/78, 27/12, 29/161, 29/12***
**U.S. Cl. 357—23.7** **7 Claims**



1. A field effect transistor comprising:
a source region and a drain region formed in a semiconductor layer;
a channel region disposed between said source region and said drain region in said semiconductor layer; and
a gate electrode disposed opposite to said channel region through an insulating film;
whereby at least one of said source region and said drain region is of multi-layered structure, in which high impurity concentration portions and low impurity concentration portions are alternately superposed on each other so that a high impurity concentration portion is in contact with said channel region and that another high impurity concentration portion is in contact with a source electrode and a drain electrode, respectively.

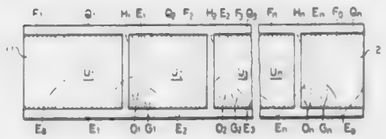
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**4,746,962**
**PHOTOELECTRIC CONVERSION DEVICE AND METHOD OF MAKING THE SAME**
**Shunpei Yamazaki, Tokyo, Japan, assignor to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan**
**Filed Aug. 29, 1985, Ser. No. 770,555**
**Claims priority, application Japan, Aug. 29, 1984, 59-181096; Aug. 29, 1984, 59-181097**
**The portion of the term of this patent subsequent to May 21, 2002, has been disclaimed.**
**Int. Cl.⁴ H01L *27/14***
**U.S. Cl. 357—30** **5 Claims**

1. A photoelectric conversion device comprising:
a substrate having an insulating surface; and
a plurality n of semiconductor photoelectric conversion



elements $U_1$ to $U_n$ sequentially formed side by side on the substrate and connected in series one after another;
wherein the photoelectric conversion semiconductor elements $U_i$ (i=1, 2, 3, . . . n) have a first electrode $E_i$ formed on the substrate, a non-single-crystal semiconductor laminate member $Q_i$ formed on the first electrode $E_i$ and a second electrode $F_i$ formed on the non-single-crystal semiconductor laminate member $Q_i$, the non-single-crystal semiconductor laminate member $Q_i$ having at least a first non-single-crystal semiconductor layer having a P or N conductivity type, a second non-single-crystal semiconductor layer of intrinsic type and a third non-single-crystal semiconductor layer having a same conductivity as the first non-single-crystal semiconductor layer;
wherein the first electrodes $E_j$ and $E_{j+1}$ are separated by a first groove $G_j$;
wherein the non-single-crystal semiconductor laminate member $Q_{j+1}$ has an extending portion $Q'_{j+1}$ which extends to non-single-crystal laminate member $Q_j$ and down to the substrate in the groove $G_j$;
wherein the second electrode $F_{j+1}$ (j=1, 2 . . . (n−1)) extends on the extending portion $Q'_{j+1}$ of the non-single-crystal semiconductor laminate member $Q_{j+1}$;

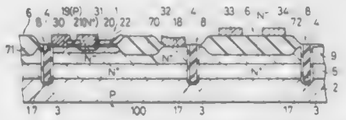


wherein the second electrodes $F_j$ and $F_{j+1}$ are separated by an isolating groove $H_j$ opposite the first electrode $E_j$;
wherein the non-single-crystal semiconductor laminate member $Q_j$ has a second groove $O_j$ extending between the first electrode $E_j$ and the second electrode $F_{j+1}$;
wherein the second electrode $F_{j+1}$ is coupled with the first electrode $E_j$ through a coupling portion $K_j$ formed by an extension of the second electrode $F_{j+1}$ and extending into the second groove $O_j$ to couple with the first electrode $E_j$; and
wherein at least the second non-single-crystal semiconductor layer of the non-single-crystal semiconductor laminate member $Q_j$ has a semiconductor region between the first electrode $E_j$ and the second electrode $F_j$, the semiconductor region has a conductivity higher than the second non-single-crystal semiconductor layer of the extending portion $Q'_j$ of the non-single-crystal semiconductor laminate member $Q_j$ and the region of the second non-single-crystal semiconductor layer of the non-single-crystal semiconductor laminate member $Q_j$ underlying the isolating groove $H_j$.

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**4,746,963**
**ISOLATION REGIONS FORMED BY LOCOS FOLLOWED WITH GROOVE ETCH AND REFILL**
**Akihisa Uchida; Daisuke Okada; Toshihiko Takakura, all of Koganei; Katsumi Ogiue, Tokyo; Yoichi Tamaki, Kokubunji, and Masao Kawamura, Fuchu, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**
**Continuation of Ser. No. 529,132, Sep. 2, 1983, abandoned. This application Dec. 29, 1986, Ser. No. 946,778**
**Claims priority, application Japan, Sep. 6, 1982, 57-153910**
**Int. Cl.⁴ H01L *21/76, 21/95***
**U.S. Cl. 357—50** **42 Claims**

1. A semiconductor device comprising:
(a) a semiconductor body having a major surface;
(b) an isolation region which electrically isolates said major surface of said semiconductor body into a plurality of semiconductor regions and which consists of a groove extended with a substantially constant width in the major surface of said semiconductor body and a burying material filling up said groove;
(c) a semiconductor element which is formed within each of selected first semiconductor regions among said plurality of semiconductor regions, said each first semiconductor region having at least a thin oxide film formed by oxidizing its major surface;
(d) a thick oxide film which is formed within at least one second semiconductor region, different from said first semiconductor regions, among said plurality of semiconductor regions so as to cover substantially the whole



surface thereof, the thick oxide film being formed on said major surface of the semiconductor body, which thick oxide film is thicker than said thin oxide film formed on the major surface of said each first semiconductor region, and which thick oxide film is an oxide film formed by local oxidation of the major surface of said at least one second semiconductor region, wherein the groove is a groove formed after forming of the thick oxide film; and
(e) wiring layers which extend on said thick oxide film within said at least one second semiconductor region, and which are used for interconnecting the semiconductor elements.

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**4,746,964**
**MODIFICATION OF PROPERTIES OF P-TYPE DOPANTS WITH OTHER P-TYPE DOPANTS**
**Sheldon Aronowitz, San Jose, Calif., assignor to Fairchild Semiconductor Corporation, Cupertino, Calif.**
**Filed Aug. 28, 1986, Ser. No. 901,502**
**Int. Cl.⁴ H01L *29/167, 29/78, 29/36***
**U.S. Cl. 357—63** **6 Claims**



1. A monolithic integrated circuit device having a p-type region adjacent a p-n junction which provides desired electrical characteristics, said p-type region being the product resulting from the process of simultaneously diffusing two different p-type impurities into said region such that interstitial ions of both said impurities attract one another in said region.

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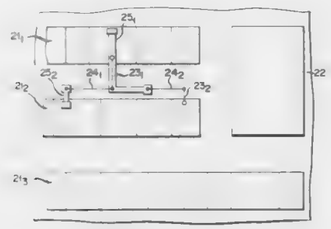


**4,746,965**

## INTEGRATED SEMICONDUCTOR CIRCUIT DEVICE

**Hiroaki Nishi, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Saiwai, Japan**

**Filed Nov. 18, 1985, Ser. No. 799,093**
**Claims priority, application Japan, Mar. 29, 1985, 60-63450**
**Int. Cl.⁴ H01L** *23/48, 29/52*
**U.S. Cl. 357—68** **15 Claims**



1. An integrated semiconductor circuit device comprising:
(a) a semiconductor substrate;
(b) a plurality of cell arrays formed in parallel on said substrate;
(c) wiring formed in at least first, second and third wiring layers on said substrate for connecting said cell arrays, each layer including wires arranged in predetermined parallel wire tracks,
the direction of a wire track of a second layer wire being originally determined in a first direction parallel to the cell arrays,
the direction of a wire track of first and third layer wires being originally determined in a second direction orthogonal to the first direction,
said first layer wire and said third layer wire overlapping each other,
one of said first layer wire and said overlapping third layer wire having a bent portion formed on a wire track orthogonal to the second direction, and
said one of said first layer wire and said overlapping third layer wire at said bent portion, and the other of said first and third layer wires, connected to respective second layer wires on the same wire track of said first direction.

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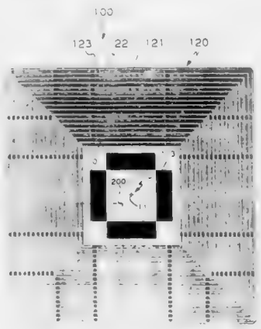
**4,746,966**

## LOGIC-CIRCUIT LAYOUT FOR LARGE-SCALE INTEGRATED CIRCUITS

**Joseph M. Fitzgerald; Pho H. Nguyen, and Robert R. Williams, all of Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Oct. 21, 1985, Ser. No. 789,868**
**Int. Cl.⁴ H01L** *23/48, 29/44, 29/52, 29/60*
**U.S. Cl. 357—68** **16 Claims**

1. An integrated-circuit chip, comprising:
a substrate having a central point substantially in the center of the area of said chip, having a single relatively small central area including said central point, and having a much larger peripheral area completely surrounding said central area;
multiple signal-circuit cells and signal-interconnection means thereamong located in said peripheral area, said cells and interconnection means forming substantially all of the signal circuits and signal interconnections on said chip;
a ring of multi-device input/output-circuit cells disposed about said central point in said central area;
conductive means for connecting said signal-circuit cells in said peripheral area to said input/output cells in said central area;
an array of off-chip contacts located within said central area, said array including substantially all of the off-chip contacts of said chip;



conductive means for connecting said input/output-circuit cells to said off-chip contacts.

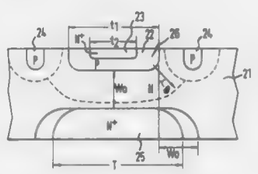
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**4,746,967**

## SEMICONDUCTOR DEVICE

**Takao Emoto, Yokosuka, and Takeo Shiomi, Kawasaki, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Continuation of Ser. No. 774,718, Sep. 11, 1985, abandoned. This application May 11, 1987, Ser. No. 47,598**
**Claims priority, application Japan, Sep. 25, 1984, 59-200106**
**Int. Cl.⁴ H01L** *29/06*
**U.S. Cl. 357—88** **6 Claims**



1. A semiconductor device comprising:
a semiconductor substrate of a first conductivity type, said substrate having opposed sides;
a first impurity region of a second conductivity type formed in one side of said semiconductor substrate, said first impurity region and said substrate forming a PN junction therebetween, said PN junction having a curved portion such that said PN junction extends from a predetermined depth of said substrate to said one side of said substrate;
a first highly doped impurity region of the first conductivity type formed in the other side of said semiconductor substrate opposite said first impurity region and satisfying:

$$t1 \leq T \leq t1 + 2W0,$$

where t1 is the width of the first impurity region,
T is the width of the first highly doped impurity region, and
W0 is the separation, in the depth direction, between said first impurity region and said first highly doped impurity region.

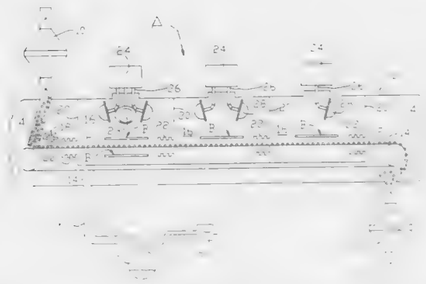


**4,746,968**

## COMBINED MICROWAVE AND THERMAL DRYING APPARATUS

**Frederick C. Wear; Garret G. Heil, and Howard F. McKinney, all of St. Louis County, Mo., assignors to McDonnell Douglas Corporation, St. Louis, Mo.**

**Filed Mar. 30, 1987, Ser. No. 31,354**
**Int. Cl.⁴ H05B** *6/72*
**U.S. Cl. 219—10.55 F** **27 Claims**



1. In combination with a vessel that encloses a chamber, a product that contains moisture and is supported in the chamber, and means for introducing microwave radiation into the chamber remote from the product to elevate the temperature of the moisture in the product so that moisture escapes from the product, the improvement residing in a thermal radiator within the chamber for directing infrared radiation toward product to also elevate the temperature of the product so as to contribute to the escape of moisture therefrom, said radiator comprising a substantially rigid metal plate positioned remote from location at which microwave energy is introduced into the chamber and having a major surface area presented toward the product, but being spaced from the product, the plate having a multitude of apertures configured to permit substantial amounts of microwave radiation of random polarization to pass through the plate and on to the product where the product is supported; and heating means attached to the plate for transferring heat into the plate, so as to elevate the temperature of the plate along the major surface area thereof that is prevented toward the product, whereby the plate directs thermal radiation to the product.

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**4,746,969**

## VIDEO SIGNAL PROCESSING DEVICE FOR LINE SEQUENTIAL SIGNALS

**Somei Kawasaki, Tokyo, Japan, assignor to Canon Kabushiki Kaisha**

**Filed May 22, 1986, Ser. No. 866,330**
**Claims priority, application Japan, May 24, 1985, 60-111469**
**Int. Cl.⁴ H04N** *9/70, 9/81*
**U.S. Cl. 358—26** **20 Claims**



1. A video signal processing device for processing video signals which include line sequential signals including plural kinds of signals, comprising:
(a) detecting means for detecting the kinds of said line sequential signals, respectively, for every line scanning period;
(b) arranging means for rearranging said line sequential signals into line simultaneous signals on the basis of an output signal of said detecting means; and
(c) inhibiting means for inhibiting said line simultaneous signals from being produced from said device on the basis of the output signal of said detecting means.

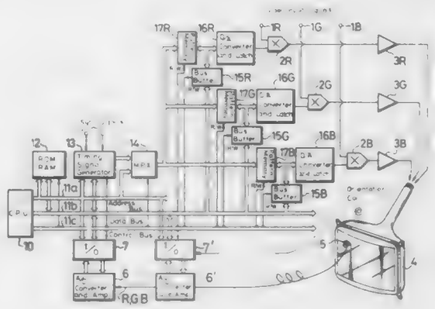
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**4,746,970**

## WHITE UNIFORMITY CORRECTING APPARATUS FOR A THREE-COLOR DISPLAY WHEREIN CORRECTION SIGNALS ARE STORED IN A MEMORY

**Hiromu Hosokawa, Chiba; Ryosuke Ashiya, Tokyo, and Koichi Momoi, Kanagawa, all of Japan, assignors to Sony Corporation, Tokyo, Japan**

**Filed Jan. 14, 1986, Ser. No. 819,154**
**Claims priority, application Japan, Jan. 9, 1985, 60-1788**
**Int. Cl.⁴ H04N** *9/73, 9/12, 9/16, 17/02*
**U.S. Cl. 358—29** **3 Claims**



1. A dynamic white uniformity correcting apparatus for a three-color display, said display being for displaying a color picture in response to three primary color signals and comprising a cathode-ray tube, said cathode-ray tube comprising means for emitting a plurality of electron beams and a display screen divided into a plurality of incremental areas, said display further comprising deflection means for scanning said plurality of electron beams across said display screen to produce said color picture in response to said three primary color signals, said apparatus comprising: a correction signal generating means for generating at least two correction signals for each incremental area of said display screen, said correction signal generating means comprising a correction signal storage means for storing said correction signals; at least two amplitude modulators, each of said amplitude modulators being for adjusting the level of a different one of said three primary color signals in response to a corresponding one of said correction signals; and means for reading out said correction signals from said correction signal storage means as said plurality of electron beams are scanned across corresponding incremental areas of said display screen, and for supplying said read-out correction signals to said amplitude modulators to adjust the levels of the corresponding primary color signals, thereby correcting the white uniformity of said color picture displayed on said display screen, wherein said correction signal storage means comprises a plurality of pattern memories, each of said pattern memories corresponding to a different orientation of said display screen relative to the earth's magnetic field, and wherein said reading out means reads out said correction signals from the pattern memory corresponding to the particular

VOL 1090 ISS 4 MY 24 1988 UMI



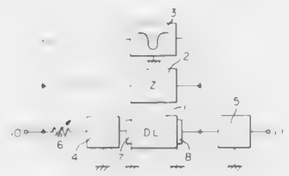
orientation of said display screen relative to the earth's magnetic field.

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**4,746,971**
**COMB-SHAPE RESPONSE FILTER HAVING ULTRASONIC DELAY LINE**

**Etsuji Kimura, Kamakura; Nobuhiro Yokoo, and Shigeru Ueno, both of Yokohama, all of Japan, assignors to Asahi Glass Company Ltd., Tokyo, Japan**

**Filed Jun. 26, 1986, Ser. No. 878,851**
**Claims priority, application Japan, Jun. 27, 1985, 60-139148**
**Int. Cl.[4] H04N** *9/78*
**U.S. Cl. 358—31** **7 Claims**



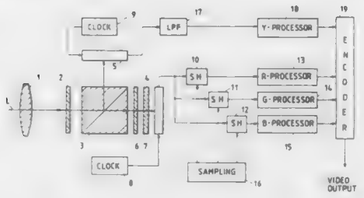

1. A filter having a comb-shaped response, comprising:
an input terminal;
an output terminal;
an ultrasonic delay device coupled to said input terminal and having an output coupled to said output terminal;
an impedance element connected in parallel with said ultrasonic delay device between said input terminal and said output of said ultrasonic delay device;
a band elimination filter connected in parallel with said ultrasonic delay device and in parallel with said impedance element, between said input terminal and said output of said ultrasonic delay device.

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**4,746,972**
**IMAGING APPARATUS WITH BIDIRECTIONALLY TRANSFERRABLE IDENTICAL CHARGE TRANSFER DEVICES FOR CONVERTING MIRROR IMAGES**

**Itsuo Takanashi, Yokohama; Shintaro Nakagaki, and Hiroshi Nishiyama, both of Kanagawa, all of Japan, assignors to Victor Company of Japan, Ltd., Yokohama, Japan**

**Filed Jun. 29, 1984, Ser. No. 626,043**
**Claims priority, application Japan, Jul. 1, 1983, 58-119774; Jul. 6, 1983, 58-122862; Jul. 8, 1983, 58-124436**
**Int. Cl.[4] H04N** *9/09, 3/15, 5/335, 9/097*
**U.S. Cl. 358—43** **3 Claims**



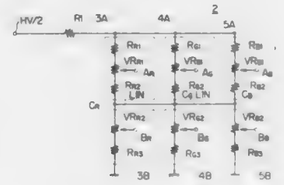

1. A solid state color image pickup apparatus comprising:
a single semi-transparent mirror for splitting an incident optical image into first and second optical images of like wavelength components and directing said first and second images onto first and second intersecting planes, respectively, so that said first and second images are in mirror-image relationship to each other on said planes with respect to a line of intersection between said first and second planes;
a first solid-state area imager located on said first plane; and
a second solid-state area imager identical to said first solid-state area imager, the second solid-state area imager being located on said second plane;
wherein each of said first and second solid-state area imagers comprises an image sensor for generating charges, a first bidirectional charge transfer means connected to said image sensor and a second bidirectional charge transfer means connected to said first bidirectional charge transfer means, charge transfer directions of said first and second charge transfer means being perpendicular to each other;
said solid-state color image pickup apparatus further comprising:
means for driving the first and second bidirectional charge transfer means of each said first and second solid-state area imagers so that signals derived from said first and second solid-state area imagers will produce identical electronic images;
luminance signal processing circuit means responsive to an output signal from said first solid-state area imager for generating a luminance signal;
chrominance signal processing circuit means responsive to an output signal from said second solid-state area imager for producing a chrominance signal; and
encoding means for generating a composite color television signal from said luminance and chrominance signals;
said first and second solid-state area imagers being interline-transfer solid-state area imagers;
said image sensor comprising a plurality of linear arrays of light-sensitive elements for generating charges in response to an incident optical image;
said first bidirectional charge transfer means comprising a plurality of vertically-extending bidirectional charge transfer means connected to said plurality of linear arrays;
said second bidirectional charge transfer means comprising a first horizontally-extending bidirectional charge transfer means connected to one end of each of said plurality of vertically-extending bidirectional charge transfer means;
each of said first and second interline-transfer solid-state area imagers further comprising a first readout means connected to one end of said first horizontally-extending bidirectional charge transfer means;
each of said first and second interline-transfer solid-state area imagers further comprising a second readout means connected to the other end of said first horizontally-extending bidirectional charge transfer means; and
said driving means comprising means for driving the first horizontally-extending bidirectional charge transfer means of each of said first and second interline-transfer solid-state area imagers in a selected one of two opposite directions;
wherein said second bidirectional charge transfer means further comprises a second horizontally-extending bidirectional charge transfer means connected to the opposite end of each of said plurality of vertically-extending bidirectional charge transfer means;
each of said first and second interline-transfer solid-state area imagers further comprises a third and a fourth readout means connected to opposite ends of said second horizontally-extending bidirectional charge transfer means; and
said driving means further comprises means for driving said second horizontally-extending bidirectional charge transfer means in a selected one of two opposite directions and means for driving said plurality of vertically-extending charge transfer means in a selected one of two opposite directions.



**4,746,973**
**FOCUS BLOCK FOR A THREE-TUBE COLOR VIDEO PROJECTOR**

**Satoshi Ohsuga, Saitama; Masayuki Ohmori, and Yasunobu Kawahata, both of Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan**

**Filed May 11, 1987, Ser. No. 48,620**
**Claims priority, application Japan, May 14, 1986, 61-072534[U]**
**Int. Cl.[4] H04N** *9/31*
**U.S. Cl. 358—60** **7 Claims**



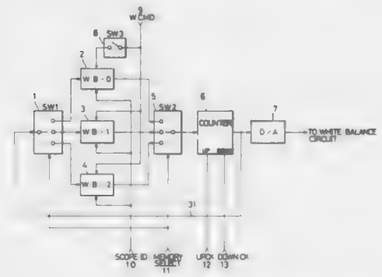

1. A focus block in a three-tube color video projector comprising separate focus block sections for the red, green and blue colors, each including a focus adjusting circuit and a brightness adjusting circuit which are connected together in series wherein; the intermediate connecting points between each of said focus adjusting circuits and each of said brightness adjusting circuits of the focus block sections are connected to each other.

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**4,746,974**
**ENDOSCOPIC APPARATUS**

**Satoshi Matsuo, Tochigi, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Feb. 5, 1987, Ser. No. 11,113**
**Claims priority, application Japan, Feb. 6, 1986, 61-24646**
**Int. Cl.[4] H04N** *9/73;* **A61B** *1/04*
**U.S. Cl. 358—98** **10 Claims**

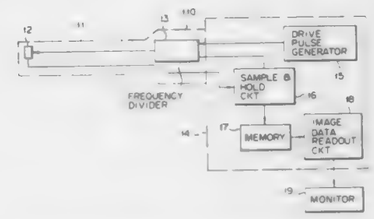



1. An endoscopic apparatus having a solid state image pickup elements to obtain an image data and a white balance circuit for adjusting a white balance of the obtained image data, comprising:
means for memorizing a correction data for the obtained image data corresponding to a predetermined white balance;
means for varying the correction data from said memory means and supplying the varied correction data to the white balance circuit; and
means for feeding back the varied correction data to the memory means to thereby start the various correction data in the memory means.

**4,746,975**
**ELECTRONIC ENDSCOPE APPARATUS**

**Hisao Ogiu, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Japan**

**Filed Dec. 4, 1986, Ser. No. 937,749**
**Claims priority, application Japan, Dec. 6, 1985, 60-274750**
**Int. Cl.[4] H04N** *7/18*
**U.S. Cl. 358—98** **11 Claims**




1. An electric endoscope apparatus comprising:
an endoscope having a distal portion containing a solid-state image sensor which has a predetermined number of pixels and is designed to be driven by drive signals, to output image signals;
a driving section including drive signal means, provided in said endoscope and connected to said image sensor for outputting the drive signals having a frequency which is determined by the number of pixels in said image sensor;
signal-processing means provided outside said endoscope and connected to said image sensor and said drive signal means, for processing the image signals supplied from said image sensor, in synchronism with the drive signals for driving said image sensor, to output video signals; and
display means connected to said signal-processing means, for displaying an endoscopic image represented by the video signals supplied from said signal-processing means.

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**4,746,976**
**STAR SIGHTINGS BY SATELLITE FOR IMAGE NAVIGATION**

**Ahmed A. Kamel, Sunnyvale; Donald E. Ekman, Santa Clara; John Savides, Los Altos Hills, and Gerald J. Zwirn, Mountain View, all of Calif., assignors to Ford Aerospace & Communications Corporation, Detroit, Mich.**

**Filed May 23, 1986, Ser. No. 867,356**
**Int. Cl.[4] H04N** *7/18*
**U.S. Cl. 358—103** **13 Claims**

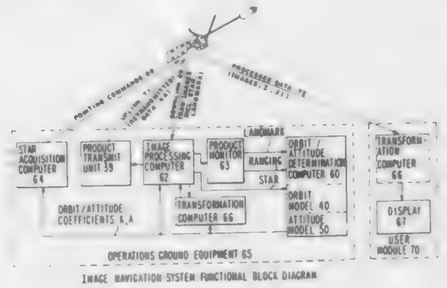



IMAGE NAVIGATION SYSTEM FUNCTIONAL BLOCK DIAGRAM

1. A system for performing image navigation of a camera on board a satellite, said system comprising:
a three-axis stabilized satellite orbiting a celestial body;
at least a first camera on board the satellite for gathering data from scenes of the celestial body;

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means for periodically commanding an optical component of the camera to slew in two orthogonal dimensions to detect, by means of a one-dimensional array of detector elements, preselected stars just beyond the limb of the celestial body and any atmosphere of the celestial body;

coupled to the camera, means for processing signals produced by the camera in response to detection of the preselected stars, to generate precise measurements of locations of the preselected stars; and

coupled to the processing means, means for feeding the measured star locations to an image navigation computer which determines the attitude of the camera with respect to the celestial body.

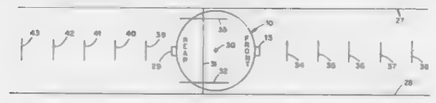
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**4,746,977**

## REMOTELY OPERATED STEERABLE VEHICLE WITH IMPROVED ARRANGEMENT FOR REMOTE STEERING

**John R. White, Oak Ridge, Tenn., assignor to Remote Technology Corporation, Oak Ridge, Tenn.**

**Filed Mar. 12, 1987, Ser. No. 25,154**
**Int. Cl.[4] H04N** *7/18*
**U.S. Cl. 358—103** **12 Claims**



1. A remotely operated steerable vehicle comprising:

a vehicle for traversing a surface;

a propulsion system for propelling said vehicle along a surface carried by said vehicle;

a camera carried by said vehicle showing the field of view of the direction in which the vehicle is to travel;

a remote station separated from said vehicle;

a control system at said remote station for directing the movements of said vehicle;

a viewing screen at said remote station representing said field of view as seen by said camera; and

a left guideline and a right guideline on said screen which converge upwardly toward one another representing the outermost boundaries of the approximate width of the area traversed by said vehicle if it moves in a straight line directly forward in the direction of said field of view.

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**4,746,978**

## IMAGE SIGNAL QUANTIZING METHOD AND APPARATUS

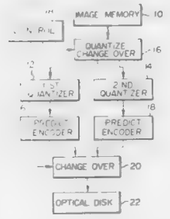
**Kazuo Shimura, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Feb. 17, 1987, Ser. No. 15,473**
**Claims priority, application Japan, Feb. 14, 1986, 61-30195**
**Int. Cl.[4] H04N** *7/01*
**U.S. Cl. 358—133** **12 Claims**

1. A method of quantizing image signals, which comprises the steps of:

(i) dividing an image into a plurality of minute unit regions in the course of quantization of image signals, and

(ii) quantizing the image signals in the respective minute unit regions by applying a plurality of quantization characteristics that result the numbers of levels after quantization being approximately equal to each other and positions of quantization steps being deviated from each other in the quantization width direction, said quantization characteristics being changed over between the respective minute unit regions.




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**4,746,979**

## VIDEO MEMORY DEVICE CAPABLE OF SIMULTANEOUSLY READING A PLURALITY OF PICTURE ELEMENTS

**Kazuo Kashigi, Tokyo, Japan, assignor to NEC Corporation, Japan**

**Continuation of Ser. No. 696,351, Jan. 30, 1985, abandoned. This application Oct. 2, 1987, Ser. No. 105,514**
**Claims priority, application Japan, Jan. 31, 1984, 59-16441**
**Int. Cl.[4] H04N** *5/14, 7/14*
**U.S. Cl. 358—134** **4 Claims**



1. A video memory device for storing a succession of picture elements, said video memory device comprising

a plurality of memroy units,

input delivering means for successively delivering said picture elements to said plurality of memory units

means for enabling each of said memory units one at a time to sotre successive said picture elements in different ones of said memory units, and

access means for simultaneously accessing at least two of said memory units to concurrently produce at least two of the picture elements consecutive to one another in said succession of picture elements from said at least two of said memory units.

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**4,746,980**

## VIDEO PROCESSING SYSTEM

**Alfred C. Petersen, 7223 N. Hamilton, Chicago, Ill. 60645**

**Filed Feb. 4, 1985, Ser. No. 697,901**
**Int. Cl.[4] H04N** *5/14*
**U.S. Cl. 358—160** **36 Claims**

1. Apparatus for acquiring image pixels from an image information source defining pixels of an image in a predetermined image array format, the apparatus comprising:

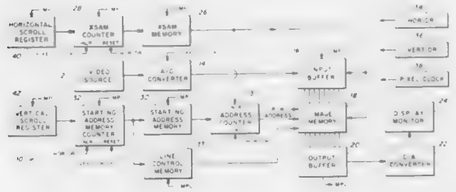
means for acquiring image pixels from the image information source and storing the acquired image pixels in an addressable format;

line control data means having stored therein information defining predetermined lines of said predetermined image array format along which pixels are to be acquired, wherein said line control data means includes a sequential data array having an entry for each line of said predetermined image array format, said entry being a first predetermined digital code for representing that a line includes at least one image pixel to be acquired and a second predetermined digital code for representing that a line does not include any image pixels to be acquired;

pixel sample data means having stored therein information defining predetermined pixels along each of said lines of said predetermined image array which are to be acquired;

means responsive to said line control data means and said pixel sample data means for acquiring the predetermined pixels and controlling the storing of the acquired pixel information in said storing means.





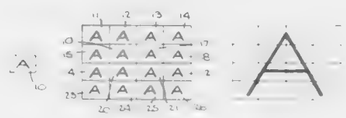

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**4,746,981**

## MULTIPLE SCREEN DIGITAL VIDEO DISPLAY

**Joseph Nadan, New York, N.Y.; Edward Bahr, Maywood, N.J., and Paul Noble, New York, N.Y., assignors to Imtech International, Inc., New York, N.Y.**

**Filed Jun. 16, 1986, Ser. No. 874,630**
**Int. Cl.[4] H04N** *5/14, 5/262*
**U.S. Cl. 358—160** **19 Claims**



7. An apparatus for producing display signals, from video signals, for producing an image that contains only a portion of the image information of said video signals, wherein said video signals contain successively occurring video field data of first and second interlaced fields of a full image, the video data of each field comprising successively occurring video line data corresponding to successive scan lines of the respective fields; said apparatus comprising:

memory means,

means applying said video signals to said memory means for storing therein at least a portion of the video line data of each said field,

and means for reading said memory means to produce said display signals,

said reading means comprising means for sequentially reading video line data corresponding to determined scan lines of the full image a plurality of times for each of said fields while omitting the reading of video line data corresponding to determined scan lines of said display signals, whereby the physical relationship of the scan lines of the first and second fields is maintained in said first mentioned image.

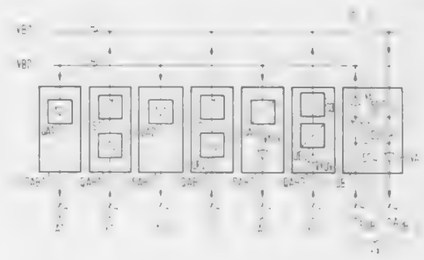
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**4,746,982**

## EQUIPMENT FOR THROUGH-CONNECTING COLOR TELEVISION SIGNALS

**Manfred Seen, Weilheim, and Hans Schneider, Munich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Apr. 8, 1987, Ser. No. 37,390**
**Claims priority, application Fed. Rep. of Germany, Apr. 11, 1986, 3612276**
**Int. Cl.[4] H04N** *5/268*
**U.S. Cl. 358—181** **8 Claims**



1. Equipment for through-connecting color television signals between a broadband network (BN) and video sources (VQ) and video sinks (VK) which are connected thereto, comprising a first video bus (VB1), a plurality of switch sets (S1 through S3) connected to said first video bus (VB1), a plurality of source connection assemblies (QAB1 through QAB3) connectible to said first video bus by said switch sets (S1 through S3), a second video bus (VB2), a plurality of sink connection assemblies (SAB1 through SAB3) connected to said second video bus, a switch-over-assembly (UB) with its input lines ($L_E$) and output lines ($L_A$) connected to said broadband network (BN), interface switch sets (SS1, SS2 and SS3), said switch-over assembly connectible to said video buses (VB1, VB2) by said interface switch sets (SS1, SS2, SS3), a first one (SS1) of said interface switch sets connected between said input lines ($L_E$) and said second video bus (VB2), a second one (SS2) of said interface switch sets connected between said first video bus (VB1) and said output lines, and a third one (SS3) of said interface switch sets connected between said first video bus (VB1) and said second video bus (VB2).

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**4,746,983**

## PICTURE-IN-PICTURE TELEVISION RECEIVER WITH SEPARATE CHANNEL DISPLAY

**Kunio Hakamada, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan**

**Filed Dec. 19, 1986, Ser. No. 944,660**
**Claims priority, application Japan, Dec. 28, 1985, 60-297328; Jan. 8, 1986, 61-1643**
**Int. Cl.[4] H04N** *9/64, 5/262*
**U.S. Cl. 358—183** **11 Claims**

1. A television receiver comprising:

(a) a cathode ray tube having a picture screen which is divisible into a main picture screen and one or more sub-picture screens inset into the main picture screen;

(b) a main picture circuit for selecting a first video signal from a plurality of video signals and supplying it as the main picture screen video signal;

(c) a sub-picture circuit for selecting a second video signal from a plurality of video signals and supplying the selected video signal as a sub-picture video signal for one or more of said sub-picture screens inset into the main picture screen of said cathode ray tube;

(d) a composing circuit for composing the selected video signal for a main picture screen of said cathode ray tube and the selected video signal for a sub-picture screen which is inset into a part of said main picture screen into

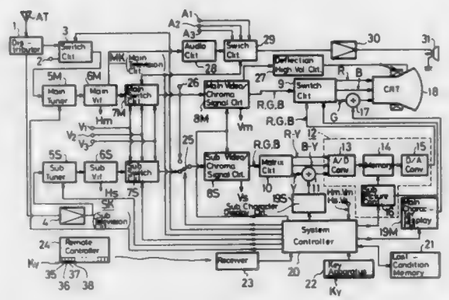
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a composite signal which is supplied to the cathode ray tube;

(e) a first adder for adding a picture discrimination indication signal to said video signal for said main picture screen;

(f) a second adder for adding a picture discrimination indication signal to said video signal for said sub-picture screen; and



(g) a system control circuit for controlling said main and sub-pictures circuits, said composing circuit and said first and second adders such that said sub-picture discrimination signal is displayed on said sub-picture screen whenever said sub-picture circuit selects a different second video signal from said plurality of signals.

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**4,746,984**

**SOLID STATE IMAGE SENSOR WITH LATERAL-TYPE STACTIC INDUCTION TRANSISTORS**

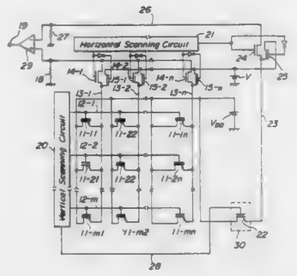
**Kazuya Matsumoto, and Tsutomu Nakamura, both of Ina, Japan, assignors to Olympus Optical Co., Ltd., Japan**

**Filed Apr. 21, 1986, Ser. No. 853,876**

**Claims priority, application Japan, Apr. 24, 1985, 60-86530; May 20, 1985, 60-107248**

**Int. Cl.[4] H04N** *3/14*

**U.S. Cl. 358—213.12** **23 Claims**



1. A solid state image sensor comprising:

a semiconductor substrate having a major surface;

a number of lateral type static induction transistors constituting pixels and arranged in said semiconductor substrate in a matrix, each of said lateral type static induction transistors comprising a source and drain regions formed in said major surface of the substrate in such a configuration that a source-drain current flows in parallel with the major surface of the substrate; and

scanning means for selecting said lateral type static induction transistors successively by a source-gate selection method and for reading out a video signal from a selected lateral type static induction transistor by a source follower configuration;

said scanning means comprising:

a horizontal scanning circuit having outputs for generating horizontal scanningg signals,

a vertical scanning circuit having outputs for generating vertical scannin signals,

a video bias voltage source to which drain terminals of all the lateral type static induction transistors are commonly connected,

a plurality of column lines each connected to respective source terminals of lateral type static induction transistors aligned on respective columns,

a plurality of column selection switches each connected to respective column lines and having control terminals connected to the outputs of the horizontal scanning circuit,

a video line connected commonly to the column selection switches,

a load resistor connected between said video line and a ground potential,

a plurality of row lines each connected to respective outputs of the vertical scanning circuit as well as to gate terminals of lateral type static induction transistors aligned on respective rows, and

a video output terminal connected to a junction between the video line and the load resistor.

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**4,746,985**

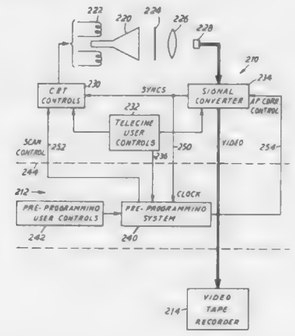
**GENERATING PICTURE EFFECTS IN VIDEO SIGNALS**

**Christopher J. Waldron, Harston; Michael J. Meadows, Bishop's Stortford; Jeremy A. Rodgers, Welwyn Garden City, and Ronald W. J. Mumford, Hitchin, all of England, assignors to Rank Cintel Limited, United Kingdom**

**Continuation-in-part of Ser. No. 722,153, Apr. 11, 1985, Pat. No. 4,694,345. This application Dec. 11, 1986, Ser. No. 940,562**

**Int. Cl.[4] H04N** *3/36, 5/208*

**U.S. Cl. 358—216** **57 Claims**



22. A method of operating a flying spot telecine to produce a video signal representing an image on a transparent film portion, the method including supplying a focus waveform to increase the size of the spot during at least part of its scan, and thereby defocusing at least a portion of said image.

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**4,746,986**

**MANIFOLD ANALOG/DIGITAL FACSIMILE APPARATUS**

**Toshiaki Tanigawa, Atsugi, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan**

**Filed Feb. 27, 1986, Ser. No. 833,258**

**Claims priority, application Japan, Mar. 4, 1985, 60-41246; Mar. 9, 1985, 60-45749**

**Int. Cl.[4] H04N** *1/00*

**U.S. Cl. 358—256** **7 Claims**

1. A manifold facsimile apparatus capable of selectively communicating with an analog facsimile apparatus which uses an analog communication network and a digital facsimile apparatus which uses a digital communication network, comprising:

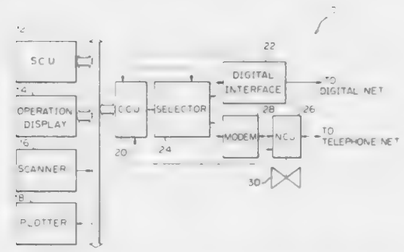
digital interface means for connecting the apparatus to the digital network;

analog interface means for connecting the apparatus to the analog network;

communication control means for selectively performing digital data link control and analog data link control; and

selector means for connecting one of said digital interface means and said analog interface means to said communication control means;





said communication control means being constructed to select by said selector means one of said digital interface means and said analog interface means which is called prior to the other to enter into a reception control procedure which matches to the selection while holding the interface means which is not called in a busy state, and to select said digital interface means when called by said digital interface means and said analog interface means at the same time.

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**4,746,987**

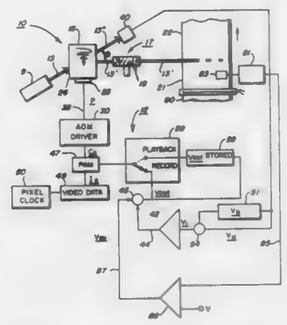
**MODULATOR CONTROL FOR AUTOMATICALLY OVERCOMING INTENSITY VARIATIONS IN A LASER SCANNER**

**James C. Traino, Fairport; Leon C. Williams, Penfield; Kwokleung Yip, Webster, and J. Terrence Flynn, Fairport, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Filed May 21, 1986, Ser. No. 865,321**

**Int. Cl.[4] H04H** *1/04*

**U.S. Cl. 358—285** **10 Claims**



1. The method for stabilizing the intensity of a light beam source in a scanner having a recording member. modulating means for modulating the light beam to provide non-writing and writing beams in accordance with image signals, an rf power source for said modulating means, and means for scanning the writing beam across the recording member to expose the recording member and write images thereon page by page in conformance with the image signals, comprising the steps of:

a. detecting the intensity of said light beam during scanning of said writing beam to provide an intensity signal by

1. detecting the intensity of said non-writing beam output by said modulating means in between successive image pages on said recording member to provide a first intensity signal;

2. storing said first intensity signal;

3. detecting the intensity of said non-writing beam output by said modulating means during writing of images by said writing beam to provide a second intensity signal; and

4. differencing said first and second intensity signals to provide said intensity signal;

b. comparing said intensity signal with a preset beam intensity setpoint signal to provide an intensity correction signal; and

c. combining said intensity correction signal with said image signals to continuously adjust said rf power source for said modulating means so as to maintain uniform diffraction efficiency of said modulating means while modulating said beam in accordance with said image signals.

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**4,746,988**

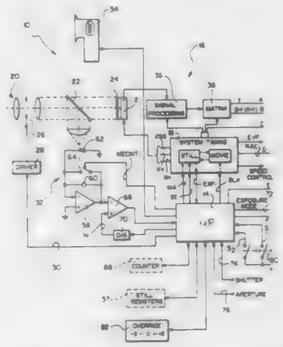
**EXPOSURE CONTROL APPARATUS FOR A STILL VIDEO CAMERA HAVING AN ELECTRONIC VIEWFINDER**

**Thomas C. Nutting, Fairport, and Richard A. Shroyer, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Jun. 30, 1986, Ser. No. 880,461**

**Int. Cl.[4] H04N** *5/238*

**U.S. Cl. 358—228** **4 Claims**



1. In a still video camera that includes an electronic viewfinder for previewing a video image of an object and an image sensor that receives image light from the object and operates thereupon either as a signal source for the viewfinder or as a signal source for a still image processed by the camera, the camera further including a photosensor for generating a signal corresponding to the brightness of the image light and diaphragm means for establishing an aperture through which the image light passes, the improvement wherein the camera comprises:

means dependent upon an output of the photosensor for concurrently determining the correct exposure conditions for both still and moving pictures produced from the same image light;

means for storing said correct exposure conditions for a still picture;

means for controlling said diaphragm means according to said correct exposure conditions for a moving picture while the viewfinder is being used for previewing the video image;

a shutter release for initiating a still exposure; and

means responsive to the actuation of said shutter release for

VOL 1090 ISS 4 MY 24 1988 UMI



operating the image sensor as a signal source for a still image and for coincidentally retrieving said stored correct exposure conditions and controlling said diaphragm means according to said correct exposure conditions for a still picture.

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**4,746,989**

**CONTACT-TYPE IMAGER FOR SCANNING MOVING IMAGE-BEARING MEMBERS**

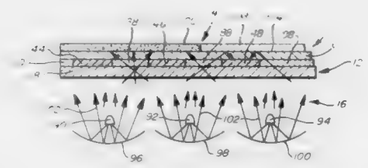
**Vincent D. Cannella, Birmingham; Zvi Yaniv, Farmington Hills, and Robert R. Johnson, Farnklin, all of Mich., assignors to Energy Conversion Devices, Inc., Troy, Mich.**

**Continuation-in-part of Ser. No. 912,477, Sep. 29, 1986, Pat. No. 4,691,244. This application Oct. 30, 1986, Ser. No. 924,729**

**The portion of the term of this patent subsequent to Sep. 1, 2004, has been disclaimed.**

**Int. Cl.⁴ H04N** *1/024*

**U.S. Cl. 358—294** **32 Claims**



1. Apparatus capable of providing electrical signals representative of an image on a moving image-bearing member, said apparatus including a photosensitive array of deposited semiconductor light sensitive elements, each of said elements being non-light transmissive, non-apertured, continuous and adapted to receive light from a corresponding small area portion of an image-bearing member and generate a detectable signal representative of the intensity of received light; the improvement comprising, in combination:

said array including at least one column of light sensitive elements operatively disposed so as to cover at least a portion of at least one dimension of an image-bearing member;

spacing means for closely positioning said light sensitive elements in juxtaposed relation relative to an image-bearing member so as to proximity focus light onto said light sensitive elements from corresponding small area portions of said member; and

means for moving an image-bearing member past said light sensitive elements.

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**4,746,990**

**DETACHABLE UNIT ELECTRONIC CAMERA**

**Akira Katoh; Masatoshi Ida, both of Hachioji; Yutaka Yunoki, Kunitachi; Hisayuki Harada, Hachioji; Manabu Inoue, Kokubunji, and Yoshio Fukuda, Hino, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed Nov. 12, 1985, Ser. No. 797,025**

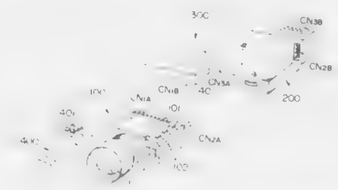
**Int. Cl.⁴ H04N** *9/79, 5/781*

**U.S. Cl. 358—310** **21 Claims**

13. A devoted playback apparatus, comprising:

a magnetic disc and magnetic reproducing means for reading a signal previously recorded on the magnetic disc; and

a picture monitor unit including a reproduced signal processing circuit responsive to a signal reproduced by the magnetic reproducing means for producing a reproduced luminance signal and reproduced color difference signals, an encoder responsive to an output from the reproduced signal processing circuit to produce a composite color video signal, and a display for displaying a picture based on an output signal from the encoder the record/playback unit and the picture monitor unit being physically coupled together by cooperating coupling means, said cooperating coupling means including means for activating said reproducing means only when cooperating coupling means are connected together.



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**4,746,991**

**RECORDING CHARACTERISTIC EVALUATION OF A RECORDING MEDIUM WITH A TIME SEQUENCE OF TEST SIGNALS**

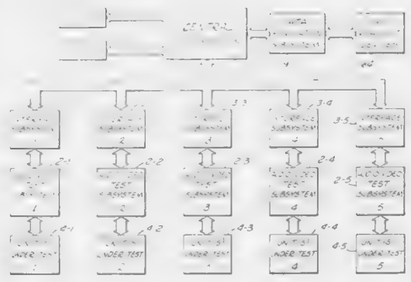
**Edward Efron, Irvine; James O. McPherson, Newport Beach, and Young B. Kim, Long Beach, all of Calif., assignors to Discovision Associates, Costa Mesa, Calif.**

**Filed Jan. 12, 1982, Ser. No. 339,011**

**The portion of the term of this patent subsequent to Jun. 19, 2001, has been disclaimed.**

**Int. Cl.⁴ G11B** *27/36, 23/18*

**U.S. Cl. 358—335** **2 Claims**



1. A method of evaluating recording characteristics of a recording medium, comprising the steps of:

recording a timed sequence of separate analog audio test signals onto each of a plurality of audio channels in a commonly timed sequence in lead-in portions before, and lead-out portions after, prerecorded information on said plurality of channels of said recording medium;

reproducing said test signals from said recording medium to produce a corresponding timed sequence of reproduced test signals from each of said audio channels;

comparing said reproducted test signals of one of said plurality of audio channels with said reproduced test signals of another of said audio channels to produce comparison data; and

comparing said comparison data with test standards correlated with said comparison data.



**4,746,992**

**APPARATUS FOR REPRODUCING VIDEO SIGNALS**

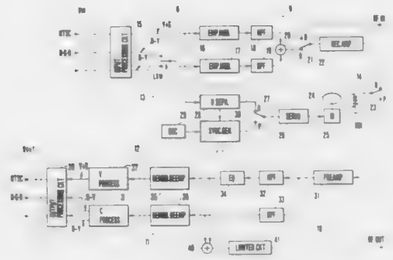
**Seiji Hashimoto, Kanagawa; Tsuguhide Sakata, Tokyo, and Akihiko Tojo, Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha**

**Filed Jul. 2, 1985, Ser. No. 751,068**

**Claims priority, application Japan, Jul. 3, 1984, 59-138252; Jul. 3, 1984, 59-138253; Jul. 3, 1984, 59-138254; Jul. 3, 1984, 59-138255**

**Int. Cl.⁴ H04N** *5/782, 9/80*

**U.S. Cl. 358—310** **23 Claims**



1. An apparatus for reproducing color video signals from a recording medium on which the color video signals, including at least line sequential color difference signals, are recorded, comprising:

(A) a reproduction head which traces the recording medium to reproduce the color video signals recorded on the recording medium;

(B) interpolating means for interpolating the color video signal reproduced by said head, said interpolating means combining an undelayed line sequential color difference signal component with a delayed line sequential color difference signal component to output an interpolated color video signal; and

(C) output means for outputting the color video signal as reproduced by said head.

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**4,746,993**

**ELECTRONIC STILL CAMERA WITH INDICATOR FOR NUMBER OF TRACKS AVAILABLE FOR VIDEO AND/OR AUDIO RECORDING**

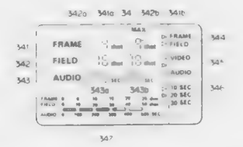
**Kanehiro Tada, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan**

**Filed May 21, 1986, Ser. No. 865,283**

**Claims priority, application Japan, May 31, 1985, 60-118180**

**Int. Cl.⁴ H04N** *5/781*

**U.S. Cl. 358—335** **23 Claims**




1. An electronic still camera comprising:

an image pick-up means for picking up video data;

a data recording means, including a recording medium having a given number of recording areas, each adequate for storing one field of video data, for recording said video data picked up by said image pick-up means;

a detector means for detecting the number of said recording areas already storing video data and producing a detector signal representative of the number of already recorded recording areas; and

an indicator means for visually displaying data concerning the use and availability of space on said recording medium.

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**4,746,994**

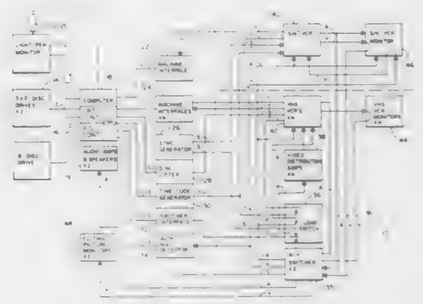
**COMPUTER-BASED VIDEO EDITING SYSTEM**

**Adrian B. Ettlinger, Hastings-on-Hudson, N.Y., assignor to Cinedco, California limited partnership and Ediflex, both of Burbank, Calif.**

**Filed Aug. 22, 1985, Ser. No. 768,491**

**Int. Cl.⁴ H04N** *5/782*

**U.S. Cl. 360—13** **17 Claims**



1. A computer-based video editing system of the type having a master video storage machine and a plurality of video playback machines, each such video playback machine having a duplicate copy of the material transferred from media in the master machine, each such copy, including the original copy in the master machine, haviang a selection of takes, including both picture and sound components of an artistic work such as a dramatic work consisting of the performance of a plurality of lines of dialogue, the system also having a system computer for uniquely designating picture and sound track segments in each take for selection of a sequence of segments of picture and sound track from the available takes of the work; the system comprising:

means for numerically correlating said picture and sound track segments to respective lines of dialogue in the written script of the work being edited,

means for selectively switching picture and sound track segments from said playback machines onto blank media in said master machine for generating an edited version of said work, and

means for generating a complete data file corresponding to the edited version of said work which may be used for preparation of a final version of said dramatic work in the medium in which it is to be published.

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**4,746,995**

**DISK CERTIFIER**

**Ruediger F. Rauskolb, 3766 Cass Way, Palo Alto, Calif. 94306**

**Filed Apr. 17, 1986, Ser. No. 853,194**

**Int. Cl.⁴ G11B** *27/36;* **G01R** *33/12*

**U.S. Cl. 360—31** **4 Claims**

4. An apparatus for performing analog operations on at least 5 disk drives comprising:

drop out detection means, hereinafter DO detection means, for detecting missing bits in a first recorded signal, said DO detection means having a DO signal input line for receiving said first recorded signal;

track average amplitude and modulation means, hereinafter

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TAA/MOD means, for measuring average signal amplitude and modulation of said first recorded signal, said TAA/MOD means having a TAA/MOD signal input line for receiving said first recorded signal;

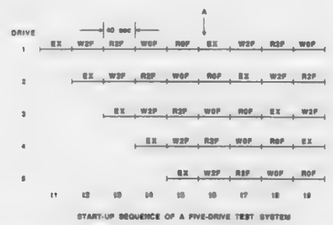
extra pulse detection means, hereinafter EP detection means, for detecting extra bits in a second signal resulting after said first recorded signal has been erased, said EP detection means having an EP signal input line for receiving said second signal;

write 2F and write gate generator means, hereinafter W2F/OF generator means, for providing write frequency signals and a write gate signal, said W2F/0F generator having a W2F output signal line for providing a write 2F signal and having a write gate output signal line for providing a write gate signal,

multiplexor means for providing a write zero F signal, said multiplexor means having a W0F output signal line for providing said write zero F signal;

said multiplexor means also for coupling said disk drives to said DO signal input line, to said TAA/MOD signal input line, to said EP signal input line, to said W2F output signal line, to said gate output signal line, and to said W0F output signal line according to the following schedule:

during a time interval t1, coupling a first drive to said EP signal input line, coupling a second drive to said gate output signal line and to said WOF output signal line, coupling a third drive to said TAA/MOD input signal line and to said DO signal input line and coupling a fourth drive to said W2F output signal line and to said gate output signal line;




during a time interval t2 after t1, coupling said second drive to said EP signal input line, coupling said third drive to said W0F output signal line and to said gate output signal line coupling said fourth drive to said TAA/MOD input signal line and to said DO signal input line, and coupling a fifth drive to said W2F output signal line and to said gate output signal line;

during a time interval t3 after t2, coupling said first drive to said W2F output signal line and to said gate output signal line, coupling said third drive to said EP signal input line, coupling said fourth drive to said W0F output signal line and to said gate output signal line, and coupling said fifth drive to said TAA/MOD signal input line and to said DO signal input line;

during a time interval t4 after t3, coupling said first drive to said TAA/MOD signal input and to said DO signal input line coupling said second drive to said W2F output signal line and to said gate output signal line, coupling said fourth drive to said EP signal input line, and coupling said fifth drive to said W0F signal output line and to said gate output signal line;

during a time interval t5 after t4, coupling said first drive to said W0F output signal line and to said gate output signal line, coupling said second drive to said TAA/MOD signal input line and to said DO signal input line, coupling said third drive to said W2F output signal line and to said gate output signal line, and coupling said fifth drive to said EP input signal line;

computer means for controlling said multiplexor and for causing said multiplexor to repeat said schedule N times, where N is an integer greater than zero.

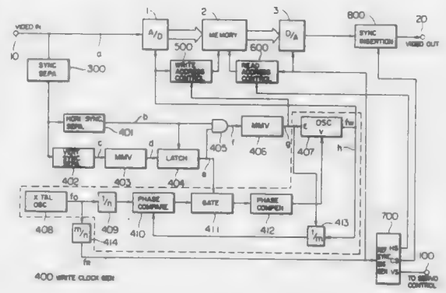
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**4,746,996**

## SKEW ERROR CORRECTION CIRCUIT FOR VIDEO SIGNAL REPRODUCING APPARATUS

**Takashi Furuhata; Hitoaki Owashi, both of Yokohama, and Michio Hibi, Osaka, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jun. 26, 1985, Ser. No. 748,906**
**Claims priority, application Japan, Jun. 26, 1984, 59-131700**
**Int. Cl.[4] H04N** *5/78*
**U.S. Cl. 360—36.2** **7 Claims**




1. A skew correction circuit for correcting a skew error included in an input signal, said input signal being a video signal which is recorded on and reproduced from tracks on a magnetic tape at each predetermined interval, said track for recording being formed on the tape at a predetermined inclination by a plurality of rotary heads, the video signal thus recorded and reproduced having a skew error such that a time base changes stepwise, comprising:

(a) separation means for separating synchronization information included in said input signal;

(b) a write clock signal generating circuit means for generating write clock signals, including an oscillation circuit generating write clock signals, a reference signal generating circuit generating a reference signal, a phase comparator circuit for comparing the reference signal of said reference signal generating circuit or a frequency-divided signal thereof with said write clock signal of said oscillation circuit or a frequency-divided signal thereof so as to output a phase error signal corresponding to a phase difference as the comparison result, voltage control means for voltage controlling the oscillation frequency of said oscillation circuit, and feedback means for negatively feeding back said phase error signal to said voltage control means;

(c) synchronization information supplying means for injecting said separated synchronization information to said oscillation circuit to synchronize the phase of starting of oscillation by said oscillation circuit with the phase of said synchronization information and for controlling the oscillation for an interval when the injected synchronization is absent;

(d) read clock signal generating circuit for generating read clock signals having a stable frequency;

(e) a memory in which said input signal sequentially sampled is written in accordance with said write clock signals and is then sequentially read out in accordance with said read clock signals;

(f) counter means for counting said write clock signals and outputting a signal indicating the termination of sampling when the count reaches a predetermined value;

(g) head switching signal receiving terminal means for receiving a head switching signal for controlling the timing of switching of said plurality of rotary heads, and

(h) latch means connected with said counter means and said head switching signal receiving terminals means for latching the head switching signal by the sampling termination signal from said counter means, and for generating a latched head switching signal, whereby said plurality of rotary heads are switched sequentially in accordance with the latched head switching signal.



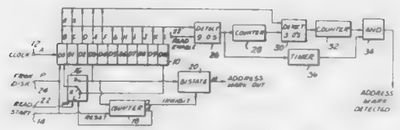
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**4,746,997**

## METHOD AND APPARATUS FOR GENERATING/DETECTING AND ADDRESS MARK

**Louis J. Shrinkle, and Nicolas C. Assouad, both of Boulder, Colo., assignors to MiniScribe Corporation, Longmont, Colo.**

**Filed Feb. 10, 1986, Ser. No. 828,211**
**Int. Cl.[4] G11B** *5/09*
**U.S. Cl. 360—49** **60 Claims**




1. A method of generating an address mark that is distinguishable from informational data, comprising the steps of: (a) generating a data level transition; (b) generating a constant data level free of data level transitions for a first predetermined time duration following said data level transition; (c) repeating steps (a) and (b) a first pre-established number of times; (d) generating another data level transition after steps (a) and (b) have been repeated said first pre-established number of times; (e) generating another constant data level free of data level transitions for a second predetermined time duration following the data level transition of step (d); and (f) repeating steps (d) and (e) a second pre-established number of times.

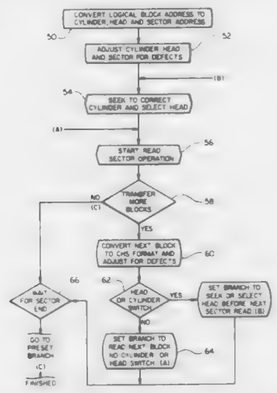
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**4,746,998**

## METHOD FOR MAPPING AROUND DEFECTIVE SECTORS IN A DISC DRIVE

**Don M. Robinson, Santa Clara County, and Henry E. Davenport, Santa Cruz County, both of Calif., assignors to Seagate Technology, Inc., Scotts Valley, Calif.**

**Filed Nov. 20, 1985, Ser. No. 800,062**
**Int. Cl.[4] G11B** *15/18, 5/09*
**U.S. Cl. 360—72.1** **7 Claims**




1. In a disc drive with at least one disc, a transducer for reading and writing data on said disc, and means for positioning said transducer relative to said disc, said positioning means being responsive to position commands to position said head relative to said disc, the improvement comprising means for storing a list of defective tracks and blocks on tracks of said disc outside the user accessible list of tracks, means for accessing said list and means for modifying said positioning commands by said stored list to access tracks on said disc.

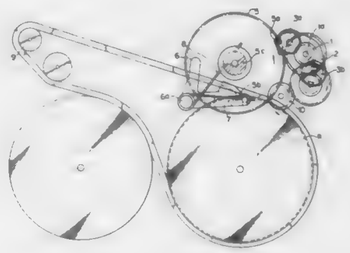
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**4,746,999**

## EJECT MECHANISM FOR CASSETTE PLAYER

**Toshihiro Ikahata; Satoshi Takagi; Hideki Hayashi, and Masahiro Uno, all of Tokyo, Japan, assignors to Clarion Co., Ltd., Tokyo, Japan**

**Filed Mar. 24, 1986, Ser. No. 843,065**
**Claims priority, application Japan, Mar. 25, 1985, 60-58549; Mar. 25, 1985, 60-58550; Mar. 29, 1985, 60-63436**
**Int. Cl.[4] G11B** *15/00, 21/02*
**U.S. Cl. 360—96.5** **10 Claims**



1. A cyclic actuator mechanism for a cassette tape player comprising:

a forward/backward rotating gear rotatable either forward or backward according to the directional rotation of a rotational drive source coupled thereto;

gear mounting means supported pivotally about the rotational axis of said forward/backward rotating gear;

rotating means for urging said gear mounting means in the rotational direction of said forward/backward rotating gear;

forward and reverse drive switching gears supported pivotally on said gear mounting means so that they are engaged with said forward/backward rotating gear;

an intermittent gear having a gear portion for selectively engaging either one of said switching gears according to the angular position of said gear mounting means and having a cutaway portion configured for disengagement therefrom at an intitial position of said intermittent gear when said forward drive switching gear is disposed for engagement therewith; and

releasable locking means responsively coupled to the rotation of said intermittent gear and having associated therewith operating means for operating said locking means to an arresting condition by a terminal portion of the rotation of said intermittent gear so as to arrest the rotation of said intermittent gear at said initial position and operable to a releasing condition by a partial reverse rotation of said intermittent gear from said initial position and including means for maintaining said releasing condition throughout subsequent forward rotation until said intermittent gear again is rotated to said terminal portion of the movement thereof.

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**4,747,000**

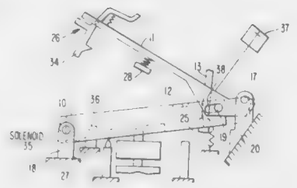
## MULTIPLE PIVOTED CARTRIDGE RECEIVER

**Robert J. Godsoe, Tucson, Ariz., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Continuation of Ser. No. 433,484, Oct. 8, 1982, abandoned. This application Sep. 13, 1985, Ser. No. 789,912**

**Int. Cl.[4] G11B** *5/008, 15/00, 17/00*

**U.S. Cl. 360—96.6** **8 Claims**




1. A data cartridge holder, comprising:

a frame;

a tray having a front end and a back end, said tray being pivotally coupled to said frame at the front end of said tray by a front pivot;

a cover having a front end and a back end and overlying said tray, said cover being pivotally coupled to said frame at the back end of said cover by a back pivot;

a pair of transversely spaced apart pivot pins coupled to said cover and located between the front end and the back end of said cover, said pivot pins being in motion while said cover is moving;

a pair of transversely spaced apart slots disposed in said tray for receiving said pivot pins, said slots being in motion while said tray is moving, said slots and said pivot pins forming a single intermediate pivot connection between said tray and said cover which in combination with said front and back pivots raises and lowers said tray to limit the vertical space required in the receiving position;

a spring means disposed between said tray and said frame for yieldably urging said tray and said cover to pivot from an operating position to a receiving position; and

a means for latching said tray and said cover in an operating position.

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**4,747,001**

## DISK CARTRIDGE AND DEVICE FOR DRIVING THE SAME

**Noriyoshi Kokubo, Ebina; Yoshitaka Iwabuchi, Yamato; Yoshimasa Fujimoto, Sagamihara, and Shohji Morioka, Maebashi, all of Japan, assignors to Victor Company of Japan, Limited, Kanagawa, Japan**

**Filed Jul. 7, 1986, Ser. No. 882,664**

**Claims priority, application Japan, Jul. 11, 1985, 60-153049**

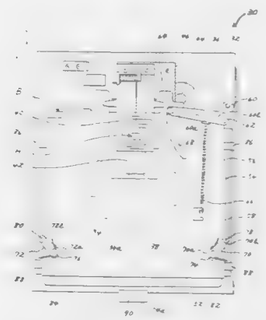
**Int. Cl.[4] G11B** *23/02*

**U.S. Cl. 360—97** **17 Claims**

1. A device which is compatible for selectively loading either a first disk cartridge in which a first disk is encased or a second disk cartridge in which a second disk is encased and wherein the radius of said first disk is different from the radius of said second disk, said first cartridge having a first width extending over substantially the whole length of the first cartridge in the intended direction of cartridge insertion, said second cartridge consisting of a front portion having a width equal to said first width and a rear portion having a width greater than said first width, said device comprising:

chassis means; and

cartridge guiding and loading means supported by said chassis means for selectively loading either said first cartridge or said second cartridge, said cartridge guiding and loading means comprising guide means for guiding either said first or said second cartridge as said first or second cartridge is selectively loaded into the device, said guide means being moveable between first and second positions such that when in said first position, said guide means guides said first cartridge and said front portion of said



second cartridge during said selective loading and when in said second position, said guide means guides said rear portion of said second cartridge during loading of said second cartridge.

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**4,747,002**

## DISK CLAMPING MECHANISM

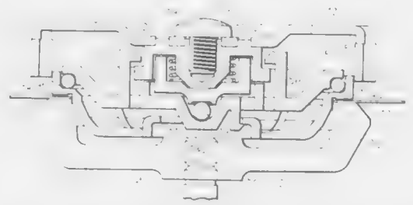
**Makito Takikawa, and Motohiro Shimaoka, both of Furukawa, Japan, assignors to Alps Electric Co., Ltd., Japan**

**Filed Jul. 15, 1986, Ser. No. 886,208**

**Claims priority, application Japan, Jul. 15, 1985, 60-106872[U]**

**Int. Cl.[4] G11B** *17/028, 5/016;* **A63D** *7/00*

**U.S. Cl. 360—99** **6 Claims**



1. A disk clamping mechanism for centering and clamping a magnetic recording disk having a center hole, comprising:

a lower, rotatable spindle hub having an upper peripheral surface on which a disk is placed in a horizontal plane for rotation about a vertical rotational axis, and a central recess for centering the center hole of the disk;

an upper clamping mechanism including;

a rotary system having a center projecting portion inserted in the center hole of the disk and the central recess of the spindle hub for centering the disk on the spindle hub in alignment with the rotational axis, and a peripheral portion having a lower surface for clamping the disk around its center hole on the upper surface of the spindle hub, the rotary system being rotatable with the spindle hub to drive the disk in rotation;

a nonrotational system having means for holding the rotary system and for moving it toward and away from the spindle hub; and

means for rotatably joining said rotary system and said nonrotational system including a joining member forming a center pivot point aligned with the rotational axis between the rotary system and the nonrotational system, wherein the center pivot point of the joining member is located in the center projecting portion of the rotary system below the plane of the lower surface of the peripheral portion, so that as the center projecting portion is inserted in the central recess of the spindle hub, the center pivot point is positioned below the plane of the disk,

whereby as the center projecting portion is fully inserted and the peripheral portion of the rotary system engages the upper surface of the spindle hub to center and clamp the disk thereon, the rotary system correctly centers itself with respect to the spindle hub and any tilt between the lower surface of the peripheral portion and the plane of the disk during movement of the rotary system toward the spindle hub is corrected by movement of the peripheral portion in response to the moment of pivoting force defined by the position of the joining member below the plane of the disk.



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**4,747,003**

## HEAD SHIFTING DEVICE FOR INFORMATION RECORDING AND/OR REPRODUCING APPARATUS

**Nobuo Tezuka, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Japan**

**Continuation of Ser. No. 643,255, Aug. 22, 1984, abandoned. This application Oct. 28, 1986, Ser. No. 925,518**

**Claims priority, application Japan, Aug. 23, 1983, 58-153677; Aug. 23, 1983, 58-153678**

**Int. Cl.[4] G11B** *5/55, 5/58*

**U.S. Cl. 360—106** **13 Claims**



1. In a recording or reproducing apparatus including a recording and/or reproducing head using a rotary type record bearing medium having a recording surface, a device for linearly and intermittently shifting said recording and/or reproducing head along the recording surface of the medium, comprising:

(A) a head carriage for carrying said head, said carriage being linearly movable along a first axis to shift the head along the recording surface of the medium and having a cam slot formed along a second axis which forms a predetermined angle relative to said first axis;

(B) an engaging member engaged with said cam slot of said head carriage; and

(C) a drive mechanism for linearly moving said engaging member along a third axis which forms angles relative to said first and second axis so that the engaging member moves said head carriage through said cam slot.

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**4,747,004**

## MAGNETIC HEAD POSITIONING APPARATUS

**Jagmohan S. Kukreja, Claremont; John C. Van Valkenburgh, and Kurt A. Buckland, both of Irvine, all of Calif., assignors to Archive Corporation, Costa Mesa, Calif.**

**Filed Apr. 7, 1986, Ser. No. 849,146**

**Int. Cl.[4] G11B** *5/55*

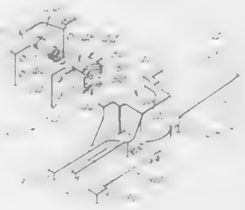
**U.S. Cl. 360—106** **7 Claims**

1. In a tape drive having a magnetic read/write head and a motor which rotationally drives an externally threaded lead screw, an apparatus for mounting the magnetic head on the lead screw so that rotation of the lead screw causes movement of the head relative to a length of magnetic tape within the tape drive, said apparatus comprising:

a carriage on which the magnetic head is mounted, said carriage including a recess which substantially surrounds and conforms to the lead screw so that said carriage slides relative to the lead screw in a direction substantially parallel to the longitudinal axis of the lead screw;

a partial nut having a front and a rear, said front positioned opposite said recess and having an arcuate surface having at least one thread segment mating with the threading on the lead screw;

means for securing said partial nut to said carriage so as to permit motion of said partial nut relative to said carriage only in a direction toward said lead screw;



a cap secured to said carriage, said cap located opposite said recess and spaced directly behind the rear of said partial nut; and

a spring for biasing said partial nut so that said thread segment engages the lead screw, said spring extending between said cap and the rear of said partial nut and oriented so that the longitudinal axis of said spring is substantially parallel the direction of movement of said partial nut, said spring applying a consistent, predetermined force on said partial nut, so that said head does not move appreciably relative to the lead screw unless the lead screw is rotated, thus allowing the head to be precisely positioned by rotation of the lead screw, enabling the recording of multiple tracks on said magnetic tape.

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**4,747,005**

## AUTOMATIC DISC SEPARATING AND FEEDING APPARATUS FOR DISC COPYING MACHINE

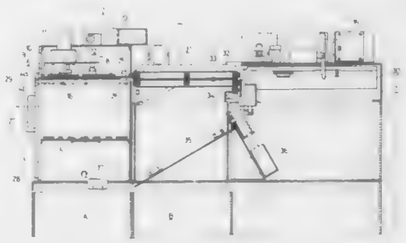
**Noriyuki Seki, Tokyo, Japan, assignor to Kabushiki Kaisha Graphico, Tokyo, Japan**

**Filed Apr. 5, 1985, Ser. No. 720,269**

**Claims priority, application Japan, Apr. 7, 1984, 59-51287[U]**

**Int. Cl.[4] G11B** *5/012;* **B65H** *3/08;* **B65G** *59/00*

**U.S. Cl. 360—98** **3 Claims**



1. An automatic disc separating and feeding apparatus for a disc copying machine, comprising:

a receiving chamber for receiving discs therein;

a supporting plate arranged in said receiving chamber to support a plurality of stacked discs thereon;

a lifting device connected to said supporting plate for constantly keeping an uppermost one of said stacked discs at a predetermined position;

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a disc sucking and sliding device positioned above said receiving chamber, said disc sucking and sliding device including a stationary plate formed with a plurality of through-holes and a sliding plate formed with a plurality of through-holes and arranged to overlap and be intimately in contact with a lower surface portion of said stationary plate and such that said through-holes of said stationary plate and said sliding plate selectively overlap one another so as to form air vents which allow for a variable application of suction force therethrough to said uppermost one of said stacked disc;

said through-holes of said stationary plate and sliding plate forming together an air vent varied in size depending upon the sliding action of said sliding plate;

a negative pressure chamber communicated with said disc sucking and sliding device on said receiving chamber;

means connected to said sliding plate for reciprocating said sliding plate; and

a transport device positioned adjacent said disc sucking and sliding device for receiving said uppermost stacked disc from said disc sucking and sliding device and for transporting said uppermost disc to said disc copying machine.

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**4,747,006**

**MAGNETIC HEAD HAVING FLUID PRESSURE MEANS**

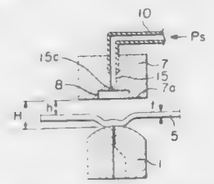
**Hiroshi Miwa, and Youichi Muratomi, both of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Jun. 9, 1986, Ser. No. 871,865**

**Claims priority, application Japan, Jun. 13, 1985, 60-128675; Dec. 18, 1985, 60-285014; Feb. 21, 1986, 61-36563**

**Int. Cl.[4] G11B** *15/60, 5/10, 17/32*

**U.S. Cl. 360—130.3** **9 Claims**




1. A magnetic head for a moving magnetic medium, comprising:

a magnetic pole having a magnetically sensitive means extending to a first surface past which a magnetic medium moves;

a medium supporter having a second surface facing said first surface such that the magnetic medium may move therebetween, said medium supporter including a central cavity extending to said second surface, said second surface including a flat portion formed around said cavity;

means including a throttle portion for supplying pressurized fluid to said cavity such that said fluid can escape through a space H between said first surface and said flat portion of said second surface,

wherein said space H is smaller than $h_1+t$, wherein $h_1$ is the larger of two values satisfying the equation:

$$\int_0^s (Ps - Pa)ds = 0$$

wherein:

the area of said cavity $>D_2\pi$ $(H-t)$,

s is a position on said second surface,

$D_2$ is the diameter of said cavity,

t is equal to the thickness of the tape,

Pa is atmosphere pressure,

Ps is the pressure of said pressurized fluid in said cavity,

and wherein $(H-t)$ plus the depth of said cavity is greater than $h_1$,

whereby the magnetic medium contacts said first surface at said magnetic medium and whereby said magnetic medium is supported by said supporter via a film of said fluid.

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**4,747,007**

**SPRING MEANS FOR BIASING A TAPE AGAINST A HEAD INSERTED IN A CASSETTE**

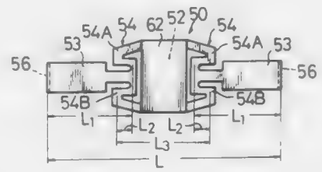
**Masaru Ikebe; Kimio Tanaka; Takateru Satoh, and Haruo Shiba, all of Nagano, Japan, assignors to TDK Corporation, Japan**

**Filed Sep. 13, 1985, Ser. No. 775,526**

**Claims priority, application Japan, Sep. 17, 1984, 59-140741[U]**

**Int. Cl.[4] G11B** *23/02, 15/60*

**U.S. Cl. 360—132** **5 Claims**




1. Spring means for biasing a tape against a head inserted in a cassette, said spring means comprising

a spring having

a central portion having a length and a width,

two intermediate portions, connected to opposite sides of said central portion in the length direction thereof,

each said intermediate portion comprising

a first pair of arms, with each said arm of said first pair connected to said central portion and extending away from said central portion in the length direction thereof,

a second pair of arms, each arm of said second pair connected to a respective arm of said first pair and extending toward said central portion from the connection with said arm of said first pair, such that each said intermediate portion is bent by about 180° in the length direction at connection of said arm of said first pair with said arm of said second pair, and

a connecting member connecting ends of said arms of said second pair which are opposite the connections with said arms of said first pair, each said connecting member extending in the width direction of said central portion, and said arms of said second pair being situated inwardly of said arms of said first pair of each said intermediate section, in the width direction, and

a pair of side portions, each said side end portion connected to a respective connecting member of a respective intermediate portion between connection of said arms of said second pair, and extending away from said central portion in the length direction thereof, said side end portions each being formed to be seated in or about a holder in the cassette,

wherein an effective length $L_0$ of said spring when the tape is biased is equal to a sum of distances in the length direction of said central portion, as follows:

distance, $L_3$, between connection of said first and second pairs of arms of opposite intermediate portions,

twice a distance $L_2$ between the connection of said arms of said first and second arm pairs, and connection of said connecting member to said arms of said second pair $(2L_2)$, and

twice a distance $L_1$ of said end portion from connection with said respective connecting member to an edge of said respective end portion adapted to seat in or about a respective holder $(2L_1)$, and

said effective length $L_0$ is greater than unbiasing length L of said spring or straight distance between the respective holders, by about four times said distance $L_2$, or $4L_2$.

whereby change in pressure applied to said spring means is minimized relative to amount of deformation of said spring.



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**4,747,008**

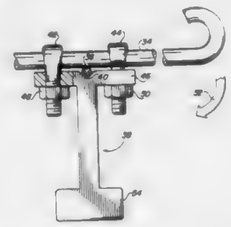
**BROKEN CONDUCTOR GUARD SYSTEM FOR POWER DISTRIBUTION SYSTEMS**

**Irving Reedy, 3560 Holiday Ave., Apopka, Fla. 32703**

**Filed Aug. 7, 1987, Ser. No. 82,729**

**Int. Cl.[4] H02G** *7/18*

**U.S. Cl. 361—107** **8 Claims**



1. A broken conductor guard system for a single neutral power distribution system of the type in which at least one high-voltage power conductor is suspended between power poles, a neutral conductor being similarly suspended between the poles vertically below the high-voltage conductor, the broken conductor guard system comprising:

a broken conductor guard comprising an elongated rod having hook-shaped ends;

clamping means for attaching said guard to a neutral conductor in a horizontal plane and transverse to the neutral conductor; and

means coupled to said clamping means for suspending a stabilizing mass below the neutral conductor for stabilizing said guard in said horizontal plane.

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**4,747,009**

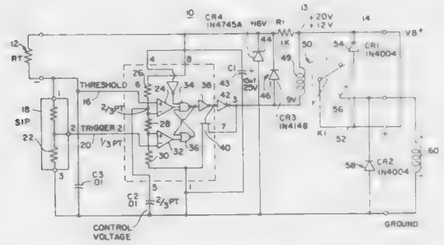
**AIR CONDITIONER CLUTCH CONTROL DEVICE**

**Jimmie D. Gillett, Garland, and Richard R. Garcia, Plano, both of Tex., assignors to Ranco Electronics Division, Irving, Tex.**

**Continuation-in-part of Ser. No. 601,270, Apr. 17, 1984, abandoned. This application Apr. 7, 1986, Ser. No. 849,151**

**Int. Cl.[4] H01H** *47/26*

**U.S. Cl. 361—165** **13 Claims**




1. An air conditioner clutch control device for an automobile or the like comprising:

(a) a resistive circuit having a terminal for connection to a source of power, said circuit including a variable resistance means whose resistance is responsive to temperature changes, said variable resistance means having a first terminal for connection to a power source and a second terminal, and a power divider means connected to the second terminal of said variable resistance means, said power divider means having first and second power dividers having first and second outputs for outputting signals indicative of a range of temperatures including first and second temperature indicating transition points;

(b) first and second state signal producing means including first and second power dividers connected for connection to the power source for producing first and second reference voltages corresponding to the first and second temperature transition points; first and second comparator means connected to receive, respectively, the voltage output of the first power divider of the variable resistance means and the first reference voltage, and the voltage output of the second power divider of the variable resistance means and the second reference voltage for producing first and second difference signals indicative of the first and second temperature transition points; logic signal producing means connected to receive the first and second difference signals for producing a first state signal when the voltage output of the first divider of the variable resistance means exceeds the first reference voltage and a second state signal when the voltage output of the second divider of the variable resistance of means falls below the second reference voltage; and a power switching means connected to receive the logic first and second state signals for switching power from a source or power on and off;

(c) a low voltage control means connected across the first and second state signal producing means for protecting said first and second state signal producing means from power supply transients and reversed polarity signals [to ground whereby the first and second state signal producing means is damage protected];

(d) an inductive switching means and a diode, said inductive switching means for connection to the source of power and a junction of the diode and the power switching means of the first and second state signal producing means, said diode for shunting the inductive energy of the inductive switching means in part away from the first and second state signal producing means during power switching and said inductive switching means coacting with the diode for attenuating any self-induced transients; said inductive switching means responsive to the on/off state of the power switching means for outputting air conditioner compressor clutch control signals; and

(e) an air conditioner compressor clutch control relay switch means [connected to the inductive switching means and] responsive to the control signals of the inductive switching means for selectively turning the air conditioner on at the first temperature transition point for cooling down to the second temperature transition point and off at the second transition point until the temperature rises to the first transition point.

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**4,747,010**

**BI-STABLE ELECTROMAGNETIC DEVICE**

**Eric W. Bayer, North East, Pa., assignor to General Electric Company, Erie, Pa.**

**Filed Apr. 16, 1987, Ser. No. 39,202**

**Int. Cl.[4] H01H** *9/24, 47/04*

**U.S. Cl. 361—210** **7 Claims**

1. A bi-stable electromagnetic device comprising:

(a) an E-shaped frame of magnetizable material having first and second generally parallel outer legs and a center leg projecting from a common base;

(b) a rocker-type armature of magnetizable material spanning the distal ends of said outer legs and having a mid-region pivotally supported on the distal end of said center leg for reciprocal movement between a first position in which the distal end of said first outer leg abuts the armature near one end thereof, and a second position in which the distal end of said second outer leg abuts the armature near the opposite end thereof;

(c) a pair of magnetizable cores mounted on said base in the interleg spaces of said frame;

(d) first and second multi-turn helical coils respectively encircling said pair of cores;

(e) first and second permanent magnets disposed between the base of said frame and said first and second coils, respectively, the magnetic field of said first magnet being normally effective when said armature is in its first position releasably to latch said armature in that position and the magnetic field of said second magnet being normally effective when said armature is in its second position releasably to latch it in that position;

(f) first and second magnetic flux diverters interposed between the respectively associated coils and permanent

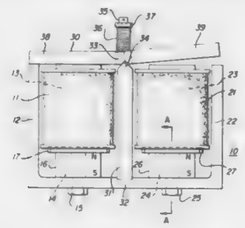
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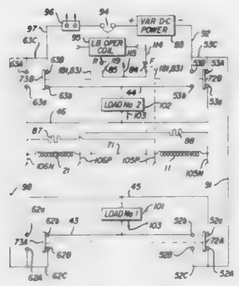


magnets, each diverter extending beyond the magnet in opposite directions toward said center leg and toward the adjacent outer leg of said frame, respectively; and

(g) means for connecting said coils to a direct current source having relatively positive and negative control power terminals, said connecting means including selectively operative means for providing alternative first and second paths in which direct current can flow from said source through said coils;

(h) said coils being wound so that when said first current path is effective the resulting current in said first coil produces a strong magnetic field that aids the magnetic field associated with said first permanent magnet and






attracts said armature to its first position while the magnetic field associated with said first permanent magnet is shifted from said armature to a path including said second diverter by an opposing magnetic field produced by current in said second coil, whereas when said second current path is effective the current in said second coil produces a strong magnetic field that aids the magnetic field of said second magnet and attracts said armature to its second position while the magnetic field of said first magnet is shifted from said armature to a path including said first diverter by an opposing magnetic field produced by current in said first coil, the strength of said opposing magnetic fields being a predetermined fraction of that of said strong fields.

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**4,747,011**

**ANTI-STATIC CHAIR**

**David Lissner, 5250 Briggs Ave., La Crescenta, Calif. 91214**

**Continuation-in-part of Ser. No. 704,162, Feb. 22, 1985, Pat. No. 4,625,257, which is a continuation of Ser. No. 672,617, Nov. 19, 1984, abandoned. This application Nov. 7, 1986, Ser. No. 928,531**

**The portion of the term of this patent subsequent to Nov. 25, 2003, has been disclaimed.**

**Int. Cl.⁴ H05F** *3/02*

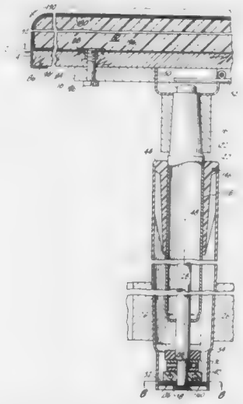
**U.S. Cl. 361—212** **17 Claims**

1. A chair for discharging a static electrical charge carried by an occupant of the chair, the chair comprising:

(a) a seat comprising an electrode for discharging a static electrical charge carried by the occupant;

(b) means for connecting the electrode to a source of ground potential; and

(c) means for limiting electrical current flow between the electrode and the means for grounding, the limiting means comprising a first resistor connected in series between the electrode and the source of ground potential, and a second resistor connected in parallel with the first resistor, the



first and second resistors having approximately equal resistance.

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**4,747,012**

**APPARATUS FOR SUPPLYING HIGH AND MEDIUM OUTPUT VOLTAGES WITH A SINGLE TRANSFORMER, HAVING SWITCHABLY VARIABLE FEEDBACK MEANS FOR CONTROLLING THE INPUT CURRENT TO THE TRANSFORMER**

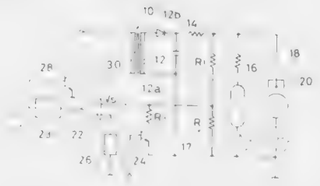
**Yukio Maeba, and Kiyoteru Igashira, both of Nagaokakyo, Japan, assignors to Murata Manufacturing Co., Ltd., Japan**

**Filed Jan. 7, 1987, Ser. No. 1,515**

**Claims priority, application Japan, Jan. 10, 1986, 61-2297 [U]; Jan. 10, 1986, 61-2298[U]**

**Int. Cl.⁴ H01T** *23/00;* **H02M** *3/335*

**U.S. Cl. 361—235** **6 Claims**



1. A high-voltage power supply apparatus, comprising:

a transformer having an input winding and an output winding,

a medium voltage circuit and a high voltage circuit connected in parallel to each other between one end of said output winding and a reference potential,

a voltage dividing circuit wherein at least two resistors are connected in series and which receives and divides a voltage correlating to an output voltage of said output winding,

controlling means for controlling the amount of an AC current flowing into the input winding of said transformer in accordance with an output voltage of said voltage dividing circuit,

a switching circuit connected in parallel with one resistor of said voltage dividing circuit, and

means for turning said switching circuit on or off to vary the magnitude of the output voltage of said voltage dividing circuit, and thereby controlling the magnitude of the output voltage from said output winding;

wherein said high voltage circuit includes a device which stops operation of said high voltage circuit and puts it virtually in the turn-off state when the output voltage of said output winding is lower than a predetermined value.



**4,747,013**

**ELECTRICAL CAPACITOR WITH TEAROFF INTERRUPTER**

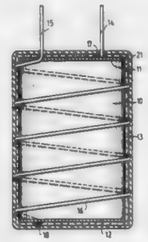
**Rudolf Dexel, Berlin, and Wolfhart Dunkel, Annatal, both of Fed. Rep. of Germany, assignors to Licentia Patent-Verwaltungs GmbH, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Feb. 13, 1987, Ser. No. 14,501**

**Claims priority, application Fed. Rep. of Germany, Feb. 15, 1986, 3604887; Nov. 21, 1986, 3639791**

**Int. Cl.⁴ H01G** *1/11, 7/00*

**U.S. Cl. 361—272** **25 Claims**



1. An electrical capacitor comprising: a coil composed of metal coatings and having opposed end faces; contact layers applied to the end faces of said coil for contacting said metal coatings; a hard and brittle casing firmly adhering to, and enclosing, said coil; and connecting means for connecting said contact layers to external terminals, said means including a tearable interrupter conductor conductively connecting one said contact layer to one external terminal and disposed to rupture, and thus break the connection between said capacitor and the one external terminal, in response to enlargement of said coil due to fault, wherein: said interrupter conductor has a spiral form composed of a plurality of turns wrapped around said coil; said casing is constituted by a coating having a thickness of 0.5 to 1.5 mm applied to said coil; said capacitor is disposed such that expansion of said coating in the radial direction of said coil is unimpeded; and said interrupter conductor is firmly bonded to said coating over the entire circumference of said coating such that in response to the application of a radial outward force by said coil to said coating, said coating ruptures without impediment and thus, at any location about the circumference of said coil, effects rupture of said interrupter conductor.

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**4,747,014**

**REDUCTION-REOXIDATION TYPE SEMICONDUCTOR CERAMIC CAPACITOR AND METHOD OF MANUFACTURING THEREOF**

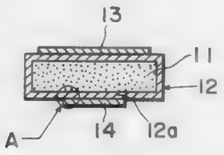
**Daisuke Kaino; Katsuhiko Arai; Junichi Watanabe, and Kazuo Sasazawa, all of Tokyo, Japan, assignors to Taiyo Yuden Kabushiki Kaisha, Tokyo, Japan**

**Filed Feb. 25, 1987, Ser. No. 18,893**

**Claims priority, application Japan, Feb. 27, 1986, 61-42518**

**Int. Cl.⁴ H01G** *4/10, 7/00*

**U.S. Cl. 361—321** **5 Claims**




1. A reduction-reoxidation semiconductor ceramic capacitor comprising:

(a) a semiconductor ceramic body having opposite surfaces;

(b) reoxidated dielectric ceramic layers formed on said surfaces of said semiconductor ceramic body; and

(c) at least a pair of electrodes formed on the surfaces of said reoxidated dielectric ceramic layers, wherein one of said electrodes is made of an electrically conductive material containing at least one substance selected from the group consisting of Zn, Al, Ni, Sn and compounds thereof, and extremely small quantities of said at least one substance being diffused into the interparticle spaces in the interior of the adjacent reoxidated dielectric ceramic layer so that said semiconductor ceramic body and said one electrode are directly electrically connected with each other by means of said at least one substance.

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**4,747,015**

**GAS INSULATED SWITCHING APPARATUS**

**Kiyoshi Okumura; Kazuaki Oishi, and Masahira Sakurai, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Apr. 7, 1987, Ser. No. 35,435**

**Claims priority, application Japan, Apr. 7, 1986, 61-78369**

**Int. Cl.⁴ H02B** *1/20*

**U.S. Cl. 361—341** **8 Claims**



1. A gas insulated switching apparatus comprising:

a pair of conductors disposed in a section of a casing having a plurlaity of gas sections, wherein each section is filled with high insulation gas and sealed from each other;

a low impedance device connected between the conductors; and

a pair of disconnectors each having a collector, a stator and a needle, said disconnectors connected to one of the conductors, one of said collector and stator of each disconnector being mounted on said conductor so that the needle of each disconnector penetrates through and is connected via said mounted one of said collector and stator to one of the conductors in the same gas tube casing section accomodating said pair of conductors, said pair of disconnectors being in the same gas section as said low impedance device.

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**4,747,016**

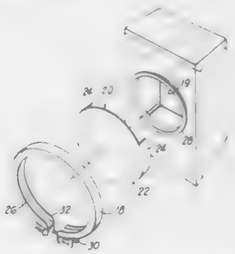
**TAMPER-RESISTANT REMOVABLE COVER FOR A UTILITY BOX ASSEMBLY**

**Clifford E. Sloop, Sr., P.O. Box 1574, Columbus, Ga. 31902**

**Filed Nov. 29, 1985, Ser. No. 803,130**

**Int. Cl.⁴ H02B** *9/00*

**U.S. Cl. 361—364** **8 Claims**

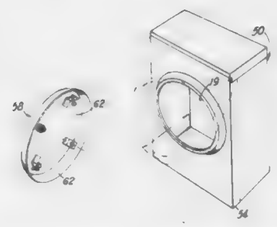


1. A tamper-resistant removable cover installed over the

VOL 1090 ISS 4 MY 24 1988 UMI



socket portion of a door of a utility meter box assembly, said box assembly having existing securing means for attaching conventional closure means over said socket portion, said cover comprising a plate member of sufficient dimension to



cover said socket portion, thereby replacing said conventional closure means, and flange means disposed at intervals and depending from the outer edge of said plate member engaging the securing means and fastening said cover over said socket portion.

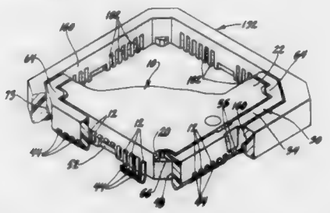
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**4,747,017**

## SURFACE MOUNTABLE INTEGRATED CIRCUIT PACKAGE EQUIPPED WITH SOCKETS

**Mark A. Koors, Kokomo, Ind., and Phillip A. Lutz, Raleigh, N.C., assignors to General Motors Corporation, Detroit, Mich.**

Filed May 27, 1986, Ser. No. 866,973
Int. Cl.[4] **H05K** *1/14, 5/02*
U.S. Cl. 361—395 2 Claims



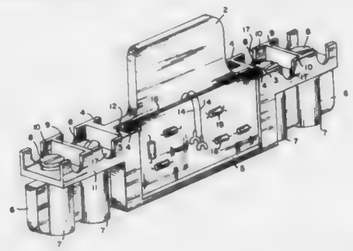
1. A semiconductor integrated circuit package for use in a system, said system having a circuit board equipped with upstanding socket pins, said package comprising a first and a second supplementary member affixed thereto for forming package leads into a predetermined configuration and for protecting that conformation once so formed, said first and second supplementary member each having an annular body defined by an inner surface and an outer surface, said first supplementary member having projections on said inner surface to space package leads, an edge of the inner surface in contact with said package leads and package leads wrapped around an end of said first supplementary member onto an opposite face of said member, effective to provide a physical engagement between said first supplementary member and said package leads such that said first supplementary member not only shapes said package leads into a predetermined conformation but helps retain them in that conformation once so formed, said second supplementary member having on the annular body an inner surface containing recessed sockets to nest the ends of said formed package leads such that the ends of said formed package leads frictionally engage said socket pins upstanding on the circuit board, said second supplementary member being removably mounted on said first supplementary member to shield the ends of said formed package leads from unwanted deformation and damage.

**4,747,018**

## CARRIER FOR ELECTRONIC CIRCUIT BOARDS

**David M. Munsey, Bridgton, and David H. Dowler, Raymond, both of Me., assignors to GTE Products Corporation, Stamford, Conn.**

Filed Mar. 6, 1987, Ser. No. 2,587
Int. Cl.[4] **H05K** *1/02, 5/00*
U.S. Cl. 361—399 10 Claims



1. A holder for electronic circuit boards, said holder being adapted to be disposed in a telephone network interface device, said holder comprising:

a backing member adapted to serve as a central support for said holder, said backing member having two ends and a face portion, said face portion serving as the front of said holder; and

a pair of channel members disposed on the face portion of said backing member, the interiors of said channel members being spaced from and opposing each other in a face to face relation; and

bottom wall means connecting said channel members and said backing member, whereby pocket means for the disposition of a circuit board is, formed and a circuit disposed in said pocket means;

laterally extending flange means disposed on each of said two ends of said backing member, said flange means allowing said holder to be disposed in slots in said telephone network interface device.

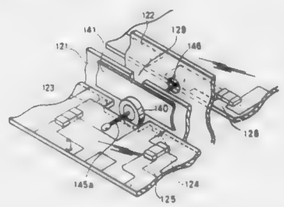
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**4,747,019**

## FEEDTHROUGH CAPACITOR ARRANGEMENT

**Katsuo Ito, Kanazawa; Bunjiro Murata, Komatsu; Yoji Maeda, Matto; Masao Uno, Komatsu; Kazunori Kinoshita, and Kazuhiro Tsuji, both of Kanazawa, all of Japan, assignors to Murata Manufacturing Co., Ltd., Japan**

Filed Dec. 9, 1985, Ser. No. 806,670
Claims priority, application Japan, Dec. 14, 1984, 59-265045; Sep. 2, 1985, 60-134319[U]
Int. Cl.[4] **H05K** *9/00*
U.S. Cl. 361—424 12 Claims



1. A feedthrough capacitor arrangement comprising:

a frame having a first recess extending from an edge of said frame, to an inner portion spaced away from said edge of said frame;

at least one printed circuit board placed adjacent to said frame substantially in a plane near said inner portion of said first recess;

a feedthrough capacitor placed in said first recess, said feedthrough capacitor including an outer electrode and a central electrode; and

a shield member pressing said feedthrough capacitor placed in said first recess in association with said frame,

said outer electrode of said feedthrough capacitor being soldered to said frame and said shield member, and said central electrode of said feedthrough capacitor being soldered to a conductor pattern on said printed circuit board.



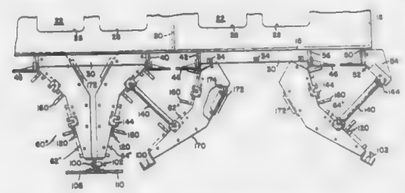
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**4,747,020**

## WIRE DISTRIBUTION APPARATUS

**Patrick Brickley, Long Lake; Larry Gonier, Inver Grove Heights; James Dewey, Plymouth, and Karl H. Pohl, Buffalo, all of Minn., assignors to ADC Telecommunications, Inc., Minneapolis, Minn.**

Filed May 16, 1986, Ser. No. 864,023
Int. Cl.[4] **H02B** *1/02*
U.S. Cl. 361—428 10 Claims



1. A wire distribution apparatus comprising:

a frame member having a plurality of opposing spaced apart walls defining a first chamber, said frame having an access face having openings in communication with said chamber;

a termination module having a first panel and a second panel each extending between first and second edges and means detachably connecting first edges of said first and second panels, said second edges of said first and second panels spaced apart with opposing surfaces of said first and second panels defining a module interior;

mounting means mounting said termination modules to said frame member with said module interior disposed in communication with at least one of said openings, said mounting means including fist pivot means pivotally connecting said first panel to said frame and second pivot means pivotally connecting said second panel to said frame with said first and second panels each pivotable between a first position with said first and second panels joined at said first edges and a second position with said first and second panels pivoted away from one another; and

electrical connector means disposed on at least one of said first and second panels receiving a first plurality of electrical conductors extending through at least one of said openings from said first chamber and electrically connecting said first plurality of electrical conductors with a second plurality of electrical condutors extending exterior of said first chamber.

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**4,747,021**

## ELECTROLYTIC CAPACITOR

**Takeshi Morimoto; Toshiya Matsubara; Yoshiki Hamatani, and Shigeo Komatsu, all of Yokohama, Japan, assignors to Asahi Glass Company Ltd., Tokyo and Elna Company Ltd., Fujisawa, both of, Japan**

Filed Aug. 11, 1987, Ser. No. 83,973
Claims priority, application Japan, Aug. 15, 1986, 61-190613; Sep. 30, 1986, 61-229761
Int. Cl.[4] **H01G** *9/02*
U.S. Cl. 361—433 11 Claims

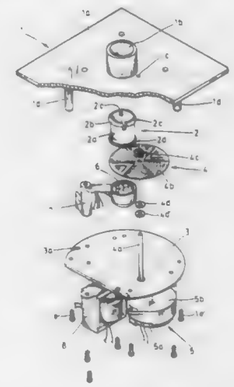
1. An electrolytic capacitor comprising a capacitor element and an electrolyte impregnated to the element, wherein the electrolyte comprises benzoic acid or its salt and an aliphatic saturated dibasic carboxylic acid having an odd number of carbon atoms or its salt.

**4,747,022**

## STRUCTURE OF OPTICAL FIBER DECORATING LAMP

**Chuen-Hwa Lin, Fl. 2-5, No. 202, Nan-King E. Rd., Sec. 5, Taipei, Taiwan**

Filed Mar. 24, 1986, Ser. No. 842,815
Int. Cl.[4] **F21V** *8/00*
U.S. Cl. 362—32 4 Claims



1. An optical fibre decorating lamp comprising:

a partition board having a body with a cylindrical projection at its center for holding a respective bundle seat, a hole for holding a respective color filter shaft, a plurality of connecting posts beneath said body to connect a respective bottom plate with screws beneath said connecting posts, and a light shield beneath said body to cover heat dissipation holes on a respective base block;

a bundle seat, said bundle seat having a body with a first, lower gear end and a second, upper end in the form of a wedge flange, a plurality of grooves extending in said body and said wedge flange to ease upward movement of said bundle seat when compressing said wedge flange so that said bundle seat can pass through said cylindrical projection in and be moveably connected to said partition board;

a bottom plate connected to the lower ends of said connecting posts by means of screws and having a positioning groove at its edge for positioning purpose;

a rotatable color filter fixed between said partition board and a respective motor;

a motor operatively connectable to said bottom plate, said motor comprising a motor shaft for connecting to said motor a transparent plastic color disc with different colors, a pinion and associated packings, said color discs including transparent plastic films having patterns and stripes of different colors located just beneath said bundle seat, said pinion for driving said gear end for rotating said bundle seat and respective optical fibers fixed to said bundle seat, with one end of said motor shaft on which is mounted said color filter fixed to said partition board and the other end is passing through said bottom plate, and being adapted to be driven by said motor;

a lamp socket pivotally and sleeved located on a respective connecting post, said lamp socket upon being installed on its connecting post can rotate around the connecting post, said lamp socket including a socket which can be bent through at least about 90° to facilitate replacement of the respective bulb, and including a plurality of reflecting mirrors arranged in different degrees in said socket to enhance sparkling effect of the optical fiber decorating lamp and to minimize heat energy emitting toward the optical fiber in order to preclude burning of the optical fiber;

a sleeve which has a hook for rotating the lamp socket;

a stop pin on the hook for positioning within said groove of said bottom plate and to fix the lamp socket at its normal position;

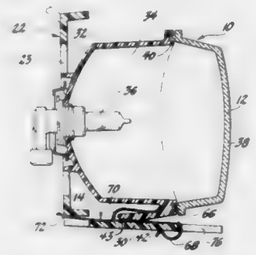
VOL 1090 ISS 4 MY 24 1988 UMI



a bulb as a light source of the present invention; and
a transformer fixed on said bottom plate as a power source for said optical fiber decorating lamp.

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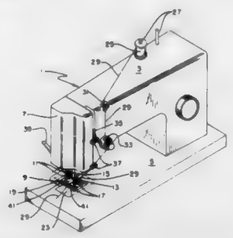
**4,747,023**
**VEHICLE HEADLAMP ASSEMBLY**
**Daniel A. Ball, Anderson, and Patrick J. Hurley, Fortville, both of Ind., assignors to General Motors Corporation, Detroit, Mich.**
**Filed Jul. 14, 1987, Ser. No. 73,087**
**Int. Cl.[4] B60Q** *1/06*
**U.S. Cl. 362—66** **3 Claims**



1. The combination of a lamp body mounted to a support panel at the front end of a motor vehicle so as to allow selective adjustable movement of said lamp body about a vertical aim axis and a horizontal aim axis, said support panel including a substantially vertically oriented wall and a substantially horizontally oriented wall, said lamp body including a reflector member formed with first and second parabolic cavities located side by side for providing light beams forwardly of the motor vehicle, first and second support shoes secured to said reflector member below said first and second cavities, respectively, a spring plate member formed with a pair of laterally spaced clips which fasten said spring plate member to the frontal portion of said horizontally oriented wall of said support panel and having a pair of spring members biasing said first and second support shoes towards engagement with said horizontally oriented wall, a pivot arm fixed to said spring plate member between said pair of spring members and having its rear end fastened to said horizontally oriented wall of said support panel so as to cooperate with said pair of clips and prevent movement of said spring plate member relative to said support panel, the front end of said arm serving to accommodate a stud member secured to said reflector member so as to allow adjustable movement of said lamp body about said vertical aim axis while permitting said support shoes to slide fore and aft of the associated spring members during such adjustable movement of said lamp body.

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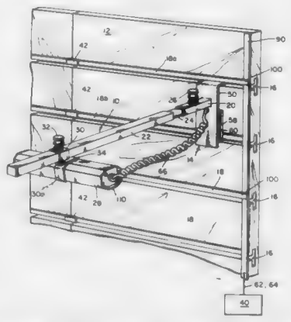
**4,747,024**
**ILLUMINATION DEVICE FOR SEWING MACHINES**
**Mary Guthier, 522 S. 9th St., Reading, Pa. 19602**
**Filed Mar. 20, 1987, Ser. No. 28,232**
**Int. Cl.[4] D05B** *79/00*
**U.S. Cl. 362—90** **6 Claims**



1. A sewing machine having a reciprocating needle, a power foot at least partially surrounding the needle, a throat plate located under the foot, a bobbin located under the throat plate, and a slide plate abutting the throat plate in planar sliding contact to provide access to the bobbin, the improvement comprising:
a planar electroluminescent light positioned directly beneath the foot whereby a work piece is illuminated from its underside as the work piece moves under the food and is being sewn by the needle.

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**4,747,025**
**LOW VOLTAGE LIGHTING FIXTURE WITH TRACK ELECTRODES**
**Daniel W. Barton, 17170 Courtney La., Huntington Beach, Calif. 92649**
**Filed Sep. 30, 1986, Ser. No. 913,331**
**Int. Cl.[4] F21S** *1/02*
**U.S. Cl. 362—147** **4 Claims**



1. An apparatus for lighting a slatwall, comprising:
a. At least two track electrodes, one said track electrode disposed in one slot of the slatwall and said second track electrode disposed in an ajacent slot in said slatwall;
b. at least one mounting bracket, said mounting bracket including a bracket body having an upper end and a lower end, said upper end terminating in a hook for retaining said bracket by gravity, a lower electrical contact plate fixed to said lower end of said bracket and electrically insulated therefrom, said hook inserted into the slot in the slatwall wherein the upper track electrode is disposed, retaining said mounting bracket therein and making electrical contact with said upper track electrode, and said lower electrical contact plate resting against and making electrical contact with said adjacent track electrode;
c. a supporting arm connected to said at least one bracket;
d. a lamp housing attached to said supporting arm;
e. means for conducting electricity from said bracket and from said lower contact plate to said lamp housing; and
f. means for conducting electricity to said at least two track electrodes.

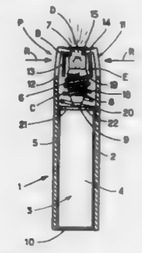
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**4,747,026**
**ELECTRIC TORCH OR FLASHLIGHT**
**Jean-Pierre Rousseau, 96, Rue de Miromesnil, 75008 Paris, France**
**Filed Dec. 29, 1986, Ser. No. 947,012**
**Claims priority, application France, Jan. 2, 1986, 86 00005**
**Int. Cl.[4] F21L** *7/00*
**U.S. Cl. 362—203** **10 Claims**

1. An electric torch, comprising a case elongated along a longitudinal direction, a source of electrical energy mounted therein, an electric light bulb optically connected to the case exterior and supported at one end of said case, means of electrical connection to form an electrical circuit to the bulb from the source of electricity, and pressure means located at one of the longitudinal ends of the case, said pressure means being able to be manipulated by the user to close the electrical circuit, said means including at least one pressure-transmitting surface in



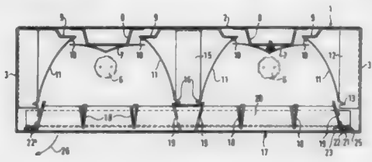
the form of at least one strip partially cut out of the shell of said case connected to said case at an edge thereof, a complementary surface means positioned in the case movable along a longitudinal direction, at least one of said pressure-transmitting and said complementary surface means being tilted with respect to the longitudinal direction so that pressure exerted



along the radial direction on said pressure means causes a radial displacement of said pressure-transmitting surface and, through the interaction of said pressure-transmitting surface with said complementary surface means, a longitudinal displacement of said complementary surface means to close the electrical circuit to illuminate the bulb.

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**4,747,027**
**FLUORESCENT LAMP LIGHT UNIT**
**Bernhard Rieger, Lüdenscheid, Fed. Rep. of Germany, assignor to Friedhelm Hirt Leuchten, Luedenscheid, Fed. Rep. of Germany**
**Filed Apr. 29, 1987, Ser. No. 43,825**
**Claims priority, application Fed. Rep. of Germany, May 22, 1986, 8613788[U]**
**Int. Cl.[4] F21V** *7/06;* **G02B** *5/10*
**U.S. Cl. 362—217** **5 Claims**

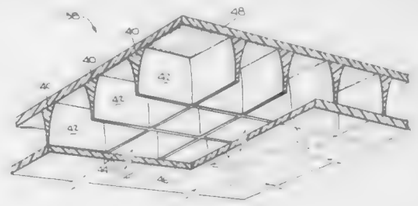


1. A fluorescent lamp light unit with a rectangular housing, one double parabolic head mirror, two side mirrors, and two raster mirrors being provided for each fluorescent lamp, characterized in that each side mirror is held under prestressing, on the one hand, on the head wall of the housing beneath the edge of the double parabolic head mirror and, on the other hand, on frontal nose-shaped receptions.

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**4,747,028**
**LOW-MAINTENANCE, LOW-GLARE LUMINAIRE**
**Alfred G. Piotrovsky, New Hyde Park, N.Y., assignor to Metropolitan Life Insurance Company, New York, N.Y.**
**Continuation of Ser. No. 813,685, Dec. 27, 1985, abandoned.**
**This application May 26, 1987, Ser. No. 56,258**
**Int. Cl.[4] F21V** *5/02*
**U.S. Cl. 362—224** **21 Claims**

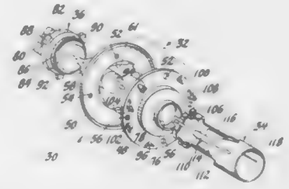
1. A lighting fixture comprising
an open housing with a base portion and a side wall portion extending outwardly from said base portion adjacent the periphery thereof to form an exposed interior portion of said housing;
a source of light disposed within said interior portion of said housing;
a cellular louver mounted on said side wall portion of said housing and extending across said exposed interior portion therein, said cellular louver containing an array of a plurality of openings extending substantially parallel to one another for directing light from said light to outside the fixture; and
a pair of sheets of translucent material secured to opposite



sides of said louver in sandwiched relation and overlying the openings therein to prevent the entry of dust into the openings in the cellular louver.

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**4,747,029**
**HEADLAMP ASSEMBLY**
**Martin K. Liverance, Royal Oak, Mich.; David R. McMahan, and Bartly A. Haydu, both of Anderson, Ind., assignors to General Motors Corporation, Detroit, Mich.**
**Filed Nov. 13, 1986, Ser. No. 930,741**
**Int. Cl.[4] H01R** *33/00*
**U.S. Cl. 362—226** **4 Claims**



1. In combination with a plastic reflector for a vehicle headlamp in which the rear of the reflector has a circular opening, a retainer assembly secured to said rear of said reflector in a predetermined position relative to said opening and adapted to receive three radially extending and circumferentially spaced retainer members projecting outwardly from a collar formed as a part of a replaceable light bulb assembly,
said retainer assembly including an inner disk member and an outer disk member fastened together so as to form a retainer section having a ring-like cavity substantially the same in axial dimension as said collar for accommodating said collar and said retainer members on said light bulb assembly,
said outer disk member formed with three circumferentially spaced access slots for receiving said retainer members of said light bulb assembly and permitting said collar and said retainer members to move into said ring-like cavity until said collar contacts said inner disk member after which said light bulb assembly is rotated into a locked position relative to said retainer assembly, and spring members carried by said outer disk member for continuously urging said collar into contact with said inner disk member during the rotation of said light bulb assembly toward said locked position,
said inner disk member having a central opening through which the light bulb of said light bulb assembly extends for proper positioning relative to said reflector when said light bulb assembly attains said locked position.

VOL 1090 ISS 4 MY 24 1988 UMI

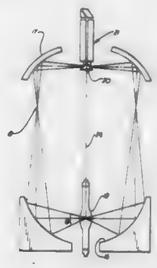


**4,747,030**

## ILLUMINATION SYSTEM

**Abe Offner, Darien, Conn., and Eugene Waluschka, Somers, N.Y., assignors to The Perkin-Elmer Corporation, Norwalk, Conn.**

**Filed Aug. 13, 1986, Ser. No. 896,486**
**Int. Cl.[4] F21V *1/00***
**U.S. Cl. 362—302** **28 Claims**



1. An illumination system, comprising:
a first light source having a length along an axis of symmetry emitting light with angular uniformity in a 360° azimuth about said axis of symmetry;
first means dividing said azimuthally uniform light into a plurality of sections equal in azimuthal extent;
second means recombining said sections into adjacent secondary light sources such that said angular uniformity of light distribution is preserved and oriented about parallel axes in each of said secondary light sources;
whereby said uniform 360° azimuthal emission of said first light source is converted into a second light source having an area equal to the sum of areas of said secondary light sources.

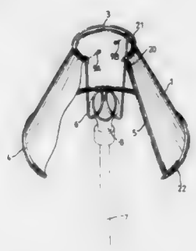
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**4,747,031**

## ASSEMBLED LAMPSHADE

**Mycoh Huang, Fl. 4 84 Min Chin Street, Yungho, Taipei Hsien, Taiwan**

**Continuation-in-part of Ser. No. 940,338, Dec. 11, 1986, Pat. No. 4,688,155. This application Jul. 9, 1987, Ser. No. 71,298**
**Int. Cl.[4] F21V *1/06***
**U.S. Cl. 362—352** **3 Claims**



1. An assembled lampshade comprising:
a sector shade, having four arrays of apertures near its top, bottom and two side edges;
a top spiral connector connected to the top edge of said sector shade, through said array of apertures provided near the top edge of said sector shade;
a bottom spiral connector connected to the bottom edge of said sector shade, through said array of apertures provided near the bottom edge of said sector shade;
a side spiral connector, connecting the two side eages of said sector shade together through said two arrays of apertures provided near the two side edges of said sector shade;
an open-ended top ring inserted through said top spiral connector with its two ends detachably engaged to form a closed ring;
an open-ended bottom ring inserted through said bottom spiral connector with its two ends opposite each other;
a lateral rib inserted through said side spiral connector, and detachably engaged with said top ring at its one end and with said two opposite ends of said bottom ring at its other end so that said two opposite ends of said bottom ring are detachably engaged with each other through said lateral rib; and
a mounting member adapted to mount said sector shade to a lamp shade, and having two ends detachably connected to said top ring.

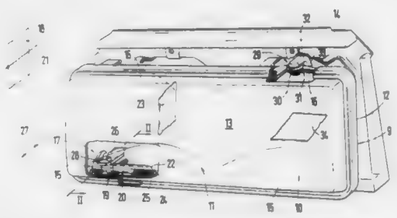
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**4,747,032**

## AIR-VENT HEADLIGHT FOR MOTOR VEHICLES

**Walter Weber, Reisensburg, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Mar. 10, 1987, Ser. No. 24,375**
**Claims priority, application Fed. Rep. of Germany, May 9, 1986, 3615576**
**Int. Cl.[4] F21V *29/00***
**U.S. Cl. 362—294** **10 Claims**



1. An air-vent headlight for motor vehicles, comprising a structural unit formed by a reflector, an incandescent lamp and a lens, said structural unit having an inner space closed from the atmosphere; an air inlet arrangement and an air outlet arrangement both provided on said unit for air exchange in said inner space, particularly during the travel of a vehicle, said outlet arrangement having an outlet tube which is positioned approximately transversely to the direction of travel of the vehicle, said outlet tube having a front side which is inclined so that vacuum occurs in said outlet tube during the travel of the vehicle, said inlet arrangement having an inlet tube extending towards the direction of travel of the vehicle, an inclination of said front side being such that one edge (**24**) of said outlet tube is longer than another edge which lies diametricallly opposite to said one edge, said outlet tube having an axis and a slot formed in the region of said longer edge and extending parallel to said axis.

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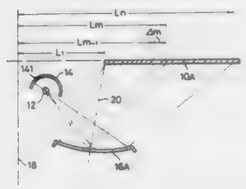
**4,747,033**

## ILLUMINATING DEVICE

**Yuji Yasuda, Kanagawa, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan**

**Filed Oct. 15, 1985, Ser. No. 787,110**
**Claims priority, application Japan, Oct. 12, 1984, 59-213975; Oct. 25, 1984, 59-224983**
**Int. Cl.[4] F21V *7/04***
**U.S. Cl. 362—296** **7 Claims**

1. An illuminating device for uniformly illuminating a planar object through a transparent plane-parallel plate, comprising a reflecting mirror having a reflecting surface defined as a curved surface of revolution and a light source, said reflecting surface having an axis of revolution extending perpendicularly to a plane to be illuminated and disposed outside of an illuminated zone, said reflecting surface being shaped so as to reflect



light from said light source toward said plane to be illuminated at a luminous flux density proportional to the distance from said axis and correcting for variations in the transmissivity of said transparent plane-parallel plate.

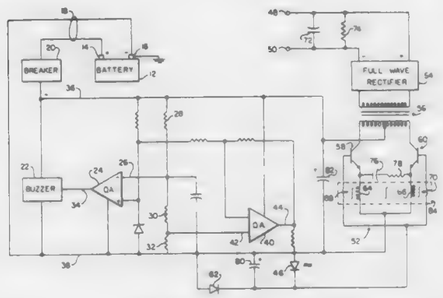
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**4,747,034**

## HIGH EFFICIENCY BATTERY ADAPTER

**David V. Dickey, 1675 El Caserio Ct., San Luis Obispo, Calif. 93401, assignor to David V. Dickey and Carol S. Dickey, both of San Luis Obispo, Calif.**

**Filed Mar. 5, 1987, Ser. No. 22,106**
**Int. Cl.[4] H02M *3/335***
**U.S. Cl. 363—23** **1 Claim**




1. A DC to DC converter powered by a battery that has a positive terminal and a negative terminal and that provides current at an input voltage measured with respect to the negative terminal, said DC to DC converter comprising:
an operational amplifier coupled to the battery and responsive to the input voltage and so biased that when the input voltage is less than a certain voltage $V_0$, the output voltage of said operational amplifier is at the potential of the negative terminal of the battery, and when the input voltage increased above $V_0$, the output voltage of said operational amplifier increases in relation to the input voltage, until when the input voltage reaches a certain voltage $V_1$ indicating the battery is fully charged, the output voltage of said operational amplifier equals $V_1$;
an oscillator circuit that includes two transistors that alternately conduct current, each of said two transistors having a base, a collector, and an emitter, said oscillator circuit further comprising:
one saturable reactor having two primary windings and two feedback windings;
a resistor;
a capacitor; and,
an output transformer having a center-tapped primary winding, the center tap connected to the positive terminal of the battery, and each end of the primary winding connected to the collector of one of said two transistors;
each emitter connected to the negative terminal of the battery through a primary winding of said saturable reactor;
each base connected to the output of said operational amplifier through a feedback winding of said saturable reactor so that the two transistors do not conduct and start oscillation unless the output voltage of said operational amplifier is greater than a certain voltage $V_2$;
the emitters connected by said resistor and said capacitor connected in series so that under lightly-loaded conditions when the current supplied by the transistors to the primary windings of said output transformer is minimal, said saturable reactor operates in a self-resonant mode to minimize power loss in said two transistors.

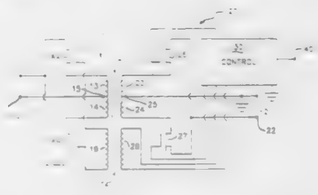
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**4,747,035**

## ISOLATOR FOR POWER SYSTEM INSTRUMENT

**Howard H. Bobry, 16006 Village Creek Dr., Suite C, Mill Creek, Wash. 98012**

**Continuation-in-part of Ser. No. 697,152, Feb. 1, 1985, Pat. No. 4,669,037. This application Dec. 22, 1986, Ser. No. 944,008**
**The portion of the term of this patent subsequent to May 26, 2004, has been disclaimed.**
**Int. Cl.[4] H02M *3/335*; H01J *29/52*; H04N *5/04***
**U.S. Cl. 363—24** **6 Claims**



1. An instrument isolator for isolating a voltage signal at a floating potential, applied to a pair of input terminals of one circuit, from an electrical instrument at ground potential adapted to receive and process said voltage signal and having a display consisting of a periodically repeated electronic image with a time interval between images initiated by a cyclically triggered signal, comprising:
a first transformer with a center-tapped first primary winding, a center-tapped first secondary winding and a core magnetically coupling the first primary and second secondary windings;
terminal means coupling said voltage signal directly to the center tap of said first primary winding;
a modulator circuit connected to said first primary winding for alternately applying said voltage signal to opposite sections of said first primary winding and including modulator switching elements for alternately switching said modulator circuit at a suitable modulating frequency;
a demodulator circuit connected to said first secondary winding for alternately connecting each end of the first secondary winding to a common return point to demodulate the output signal from the center tap of the first secondary winding and including demodulator switching elements in phase with said modulator switching elements for alternately switching said demodulator circuit;
control means for operating said modulator switching elements and said demodulator switching elements to provide a time interval between alternating pulses of said modulating frequency so as to avoid overlap between half cycles; and
a second transformer with a second primary winding and a second secondary winding magnetically coupled to said second primary winding; said control means being operatively connected to said second primary winding and said modulator switching elements being operatively connected to said second secondary winding;
said control means being operatively connected to said

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electrical instrument whereby said trigger signal synchronizes said time interval between images with said time interval between alternating pulses of said modulating frequency,

whereby the demodulator output signal is representative of said input voltage signal and electrically isolated from said input terminals and said time interval between pulses is not visible on said instrument display.

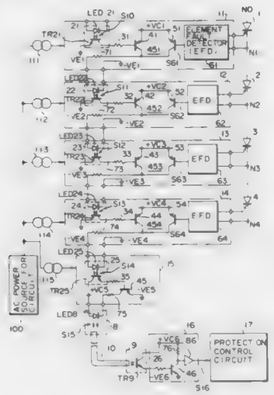
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**4,747,036**

## FAULT DETECTOR APPARATUS HAVING SERIAL FAULT-DETECTION SIGNAL PATH

**Kohsaku Ichikawa, Tokyo; Yukinori Tsuruta, Sagamihara, and Yuji Hashiya, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Dec. 15, 1986, Ser. No. 941,836**
**Claims priority, application Japan, Dec. 16, 1985, 60-282405**
**Int. Cl.⁴ H02H** *7/125*
**U.S. Cl. 363—54** **11 Claims**




11. A fault detector apparatus for a power converter having arms, each containing a plurality of semi-conductor switching elements, and an electric circuit, set at a lower potential than said arms, for detecting whether or not any of said switching elements is faulty, said apparatus comprising:

a pluraltiy of fault-detecting circuits, connected to the switching elements of each of said arms, for generating fault signals when said switching elements malfunction;

a plurality of intermediate signal-transmitting circuits, connected among said fault-detecting circuits, for transmitting a DC-isolated intermediate signal, corresponding to the fault signal generated from one of said fault-detecting circuits, to another one of said fault-detecting circuits;

a plurality of OR circuits, coupled to said fault-detecting circuits, respectively, for supplying one of said intermediate signal-transmitting circuits with a second Dc-isolated intermediate signal, which represents the logical sum of said DC-isolated intermediate signal and the fault signal generated by another one of said fault-detecting circuits;

one light guide, provided for each of said arms, for transmitting, in the form of an optical signal, a Dc-isolated intermediate signal supplied from one of said OR circuits, as a fault detection signal, to said electric circuit; and

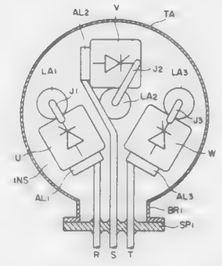
said intermediate signal-transmitting circuits including signal couplers, connected in series, in the order of potential gradation, each for transmitting said DC-isolated intermediate signal.

**4,747,037**

## HIGH-VOLTAGE THYRISTOR CONVERSION/INVERSION APPARATUS

**Toshiaki Yoshizumi, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**PCT No. PCT/JP85/00254, § 371 Date Nov. 1, 1985, § 102(e) Date Nov. 1, 1985, PCT Pub. No. WO85/05233, PCT Pub. Date Nov. 21, 1985**
**PCT Filed May 8, 1985, Ser. No. 800,648**
**Claims priority, application Japan, May 8, 1984, 59-93499**
**Int. Cl.⁴ H02H** *7/125*
**U.S. Cl. 363—54** **1 Claim**




1. In a high-voltage thyristor conversion/inversion apparatus wherein a bridge circuit is constructed of valves of six arms and lightning arresters which are connected in parallel with the respective valves; a high-voltage thyristor conversion/inversion apparatus characterized in that the valves and lightning arresters of each portion corresponding to three arms, which are connected to a DC bus of identical sign, are received in a single sealed tank;

wherein said valves are arranged concentrically at equal intervals in said sealed tank and wherein said lightning arresters each of which is disposed on one side of the corresponding valve are arrayed in a straight line.

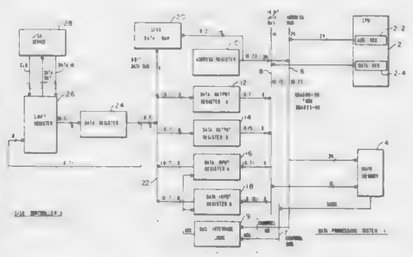
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**4,747,038**

## DISK CONTROLLER MEMORY ADDRESS REGISTER

**John W. Bradley, West Peabody; Edward F. Getson, Jr., Lynn, and Bruce R. Cote, Dracut, all of Mass., assignors to Honeywell Bull Inc., Minneapolis, Minn.**

**Continuation of Ser. No. 657,715, Oct. 4, 1984, abandoned. This application Sep. 4, 1987, Ser. No. 94,052**
**Int. Cl.⁴ G06F** *13/00*
**U.S. Cl. 364—200** **2 Claims**



2. Buffer storage and addressing apparatus in a disk controller used for transferring data words between a storage disk and a main memory, said buffer storage apparatus comprising

a first memory for storing blocks of data words being transferred between said disk and said main memory;

first register means receiving individual words from said first memory for storage in said main memory or receiving individual words from said main memory for storage in said first memory to create blocks of words that are to be stored on said disk; and

addressing control means receiving a first address and a first indication of which way data words are to be transferred between said disk and said memory;

when data words are being transferred from said main memory to said disk, said addressing control means reads a first two byte word from said main memory at a location therein addressed by said first address and stores said first word in said first register means, said addressing control means then incrementing said first address to generate a second address and a third address used to sequentially address two locations in said first memory in which are respectively stored a first byte and a second byte of said first word, and said third address is also then used to read a second word from said main memory for storage in said first register means and subsequent transfer to said first memory means, and

when data words are being transferred from said disk to said main memory means via said first memory means, said addressing control means addresses said first memory means using a fourth address to read a first byte of a two byte third word therefrom which is stored in said first register means, said control means incrementing said fourth address to generate fifth and sixth addresses, said fifth address then being used to address said first memory to read a second byte of said third word therefrom which is stored in said first register means, said sixth address then being used by said addressing control means to address said main memory and both bytes of said third word are stored therein from said first register means, and finally said control means addresses said first memory means using said sixth address to read out a first byte of a two byte fourth word for storage in said first register means to be subsequently stored in said main memory.

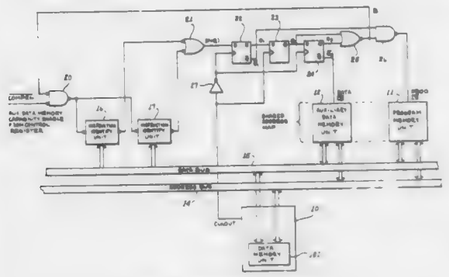
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**4,747,039**

## APPARATUS AND METHOD FOR UTILIZING AN AUXILIARY DATA MEMORY UNIT IN A DATA PROCESSING SYSTEM HAVING SEPARATE PROGRAM AND DATA MEMORY UNITS

**Kenneth W. Murray, West Lothian, Scotland, assignor to Burr-Brown Corporation, Tucson, Ariz.**

**Filed Aug. 9, 1985, Ser. No. 764,215**
**Claims priority, application United Kingdom, Mar. 23, 1985, 8507617**
**Int. Cl.⁴ G06F** *12/00*
**U.S. Cl. 364—200** **17 Claims**



1. A data processing system comprising:

a data memory unit;

a program memory unit connected to said data memory unit for transferring data between said program memory unit and said data memory unit in response to at least one special instruction;

an auxiliary data memory unit; and

selection means connected to said auxiliary data memory unit and to said program memory unit and responsive to said at least one special instruction for activating said auxiliary data memory unit and inactivating said program memory.



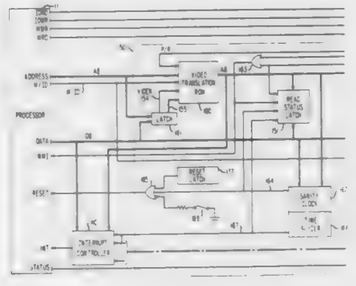
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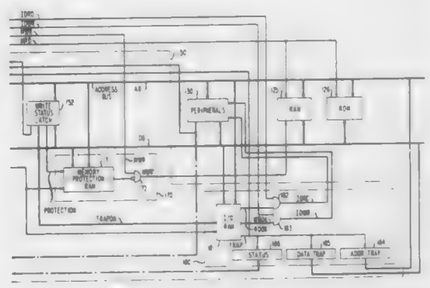
**4,747,040**

## DUAL OPERATING SYSTEM COMPUTER

**David R. Blanset, Middletown, N.J.; David A. Butterfield, Sylmar, Calif.; Kenneth M. Keverian, Westfield, N.J.; Charles S. Kline, Sherman Oaks, and Gerald J. Popek, Los Angeles, both of Calif., assignors to American Telephone & Telegraph Company, New York, N.Y.; AT&T Information Systems, Inc., Morristown, N.J. and Locus Computing Corporation, Santa Monica, Calif.**

**Filed Oct. 9, 1985, Ser. No. 785,842**
**Int. Cl.⁴ G06F** *9/38*
**U.S. Cl. 364—200** **4 Claims**





1. A digital computer capable of concurrently executing at least first and second programs, said computer comprising

a processor having a protected mode of operation and a non-protected mode of operation,

means for causing said first and second programs to be executed in said protected and non-protected modes of said processor, respectively, and

means operative prior to at least the initiation of the execution of said second program for identifying individual addressable entities in said computer to which access by said second program is to be inhibited and operative when said second program is executing for inhibiting access to said individual entities.

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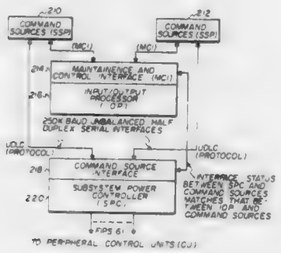


4,747,041

## AUTOMATIC POWER CONTROL SYSTEM WHICH AUTOMATICALLY ACTIVATES AND DEACTIVATES POWER TO SELECTED PERIPHERAL DEVICES BASED UPON SYSTEM REQUIREMENT

Gary L. Engel, Wyoming; Paul J. Georgeson, Minneapolis; Douglas R. Mueller, Shoreview; John M. Quernemoen, New Brighton, and Bruce C. Todd, Blaine, all of Minn., assignors to Unisys Corporation, Blue Bell, Pa.

Filed Jun. 27, 1983, Ser. No. 508,296
Int. Cl.[4] G06F *15/56, 9/00*
U.S. Cl. 364—200 4 Claims




1. A selective, automatic power control system for data processing equipment, said data processing equipment having a plurality of power controlling command sources connected to a plurality of controlled units via a plurality of interface connecting means, each of said interface connecting means comprising:

selective automatic power control means connected to said plurality of power controlling command sources to automatically activate power to elected ones of said controlled units when such activation is required by any one of said plurality of power controlling command source means of said data processing equipment and to automatically deactivate power to said selected controlled units when their performance is no longer required by said data processing equipment, and including status indicating means to report back such activation/deactivation status of each of the plurality of controlled units to each of the plurality of command sources to thereby conserve the electricity previously required to constantly maintain power to controlled units during time periods when their operative performance is not required by said data processing equipment, said selective automatic power control means further comprising:

(a) a common microcontroller bus;

(b) a main microcontroller coupled thereto for control thereof;

(c) an identical redundant microcontroller similarly coupled to said common microcontroller bus;

(d) a memory means also coupled to said bus to provide storage;

(e) a pair of parallel input/output means coupled to said bus to provide information to and from said bus;

(f) a power control means coupled between said bus and a power source;

(g) each of said parallel input/output means also having connected thereto a relay bus;

(h) a plurality of relay cards connected to each of said relay buses; and

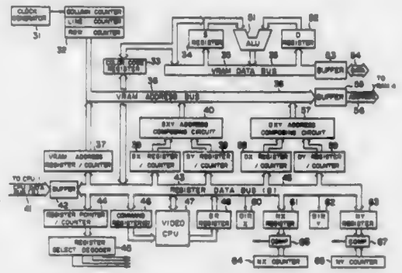
(i) each of said relay cards having a plurality of power interfaces for individual connection to each of a plurality of peripheral control devices.

4,747,042

## DISPLAY CONTROL SYSTEM

Takatoshi Ishii, Tokyo; Ryozo Yamashita, Kawasaki, and Kazuhiko Nishi, Kobe, all of Japan, assignors to Ascii Corporation, Tokyo, Japan

Filed Dec. 19, 1984, Ser. No. 683,696
Claims priority, application Japan, Dec. 20, 1983, 58-240727; Mar. 29, 1984, 59-59642
Int. Cl.[4] G06F *3/14*
U.S. Cl. 364—200 5 Claims




1. A data transfer control system for data transfer between data areas included in a memory unit for logically forming a display plane, comprising:

means for specifying a start point of transfer in a source area;

means for specifying a beginning point of transfer into a destination area;

means for holding amounts of data in a horizontal direction to be transferred;

means for holding amounts of data in a vertical direction to be transferred;

means for holding data which changes an order of position where the data in said source area is read out in either the left or the right direction; and

means for holding data which changes an order of position where the data in said source area is read out in either an up or a down direction;

characterized in that said data transfer between areas is executed by reading out data in said source area specified by means for specifying a start point of transfer in a source area, for holding amounts of data in a horizontal direction to be transferred, for holding amounts of data in a vertical direction to be transferred and for holding data which changes the order of position from said memory unit and writing said read-out sequentially into said destination area so that when said source area is set in a main memory and said destination area is set in VRAM, a CPU writes into a predetermined data register and the content written into said predetermined data register is ready out by a video CPU to perform a data transfer, and when said destination area is set in said main memory and said source area is set in VRAM, said video CPU writes into said predetermined data register and the contents of said predetermined data register are read out by said CPU to perform a data transfer.

4,747,043

## MULTIPROCESSOR CACHE COHERENCE SYSTEM

Paul K. Rodman, Ashland, Mass., assignor to Prime Computer, Inc., Natick, Mass.

Continuation of Ser. No. 579,087, Feb. 10, 1984, abandoned. This application Mar. 27, 1987, Ser. No. 32,990
Int. Cl.[4] G06F *15/16*
U.S. Cl. 364—200 6 Claims

1. A multiprocessor system comprising:

A. a main memory means for storing main memory data at locations therein, and an associated memory bus coupled thereto,



B. n data processors, where n is an integer greater than one, each data processor being coupled to said memory bus, and each data processor including:

i. a central processing unit (CPU),

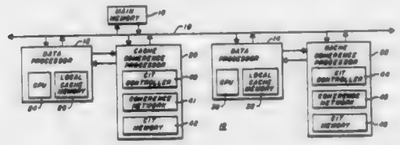
ii. a local cache memory connected with said central processing unit and including means for storing cache data therein at internal locations, said cache data corresponding to main memory data stored in corresponding locations in said main memory,

iii. means connected with said central processing unit and with said local cache memory for transferring cache data from selected locations in said local cache memory to said central processing unit,

iv. cache data means connected with said central processing unit and with said local cache memory and being responsive to said central processing unit for generating cache data and for storing said generated cache data in selected locations in said local cache memory,

v. detection means for each data processor and connected with said cache data means for determining when said cache data means stores said generated cache data in its local cache memory means and for determining the location of said generated cache data stored in the local cache memory,

vi. cache change means for each data processor and connected with said detection means and responsive to a determination that said cache data means stores generated cache data in its local cache memory means, for generating a cache change signal, said cache change signal being representative of the location of said generated cache data stored in the local cache memory,




vii. means connected with said memory bus for transmitting said cache change signal to said other data processors, said cache change signal being transmitted substantially concurrently with the generation and storage of cache data by said cache data means,

C. n cache coherence processors (CCP's), each CCP being connected with a corresponding one of said data processors, and including:

i. cache invalidate tag (CIT) memory including means for storing a CIT data word associated with each of the locations in the local cache memory associated with said CCP,

ii. means connected with said memory bus for receiving said cache change signals from said other data processors,

iii. means for loading said CIT memory including:

a. means responsive to the CPU of the corresponding data processor for loading said locations of said CIT memory with CIT data words corresponding to the cache data at the respective locations in said local cache memory associated with said CPU,

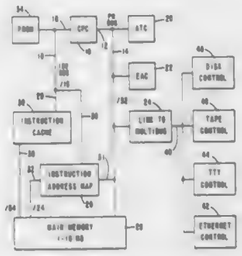
b. means responsive to a cache change signal received from another said data processor for modifying the contents of a location of a CIT memory corresponding to the location of said generated cache data of said other data processor, whereby said location of said CIT memory stores a linked list of cache invalidate words, each cache invalidate word including a flag portion representative of the occurrence of said generation and storage and including a pointer portion representative of the location in said CIT memory storing the next previously stored cache invalidate word.

4,747,044

## DIRECT EXECUTION OF SOFTWARE ON MICROPROGRAMMABLE HARDWARE

Carson T. Schmidt, Poway; Chenyu Chzo, San Diego; Gregory D. Brinson, Escondido; Jerrold L. Allen; Barry L. Loges, both of San Diego; Timothy G. Goldsbury, Escondito; Robert O. Gunderson, Poway, and Jerry K. Herreweyers, San Diego, all of Calif., assignors to NCR Corporation, Dayton, Ohio

Filed Aug. 23, 1984, Ser. No. 643,512
Int. Cl.[4] G06F *13/08*
U.S. Cl. 364—200 37 Claims




1. A data processing system comprising:

a main memory for storing therein data and microinstructions;

a central processing chip having a data terminal and an instruction terminal;

processor memory bus means connected between said main memory and said central processing chip data terminal for the transmission of data address bits and data therebetween;

instruction bus means connected between said central processing chip instruction terminal and said main memory for the transmission of instructions address bits and instructions therebetween;

instruction address means connected between said processor memory bus means, said instruction bus means and said processor memory bus means, said instruction address means for receiving from said central processing chip, said data address bits as a first portion of a fetching address and said instruction address bits as a second portion of said fetching address, and responsive to said fetching address, fetching from said main memory, said addressed microinstruction stored therein; and

transmitting means for transmitting said fetched addressed microinstruction over said instruction bus means to said central processing chip for direct execution by said central processing chip.

4,747,045

## INFORMATION PROCESSING APPARATUS HAVING AN INSTRUCTION PREFETCH CIRCUIT

Hisao Harigai; Toshiya Takahashi, and Tamotsu Iwasaki, all of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Jun. 26, 1985, Ser. No. 749,143
Claims priority, application Japan, Jun. 26, 1984, 59-131476
Int. Cl.[4] G06F *9/22*
U.S. Cl. 364—200 11 Claims

1. An information processing apparatus with an instruction prefetch function, said apparatus being responsive to instruction signals and break signals from an external source, each said break signal corresponding to a respective instruction signal but being independent of the nature of the instruction signal or the result of an execution of the instruction signal, and comprising:

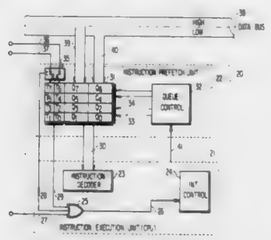
an execution unit responsive to said instruction signals for executing at least one of several instructions at a time,

an instruction prefetch unit for storing instruction signals and break signals, said unit being connected to said execu-

VOL 1090 ISS 4 MY 24 1988 UMI



tion unit and having an instruction storage means for conducting instruction read-in and read-out operations for temporarily storing at least one of said several instruction signals and an indication storage means for storing at least one break signal designating a break operation that is to occur in relation to said stored instruction signals, said break signals stored in said indication storage means corresponds to respective instruction signals stored in said instruction storage means in a 1:1 relationship and said



indication storage means operating to read-in and read-out break signals in synchronism with the read-in and read-out operations of said instruction storage means,

read means coupled to said instruction storage means and said indication storage means for reading the content of said instruction storage means and the content of said indication storage means, and

stopping means responsive to said read means for stopping an execution of the read-out instruction signals in said execution unit in response to the read-out break signal.

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**4,747,046**

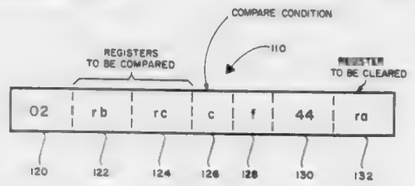
**MECHANISM FOR COMPARING TWO REGISTERS AND STORING THE RESULT IN A GENERAL PURPOSE REGISTER WITHOUT REQUIRING A BRANCH**

**Allen J. Baum, Palo Alto; Terrence C. Miller, Menlo Park, and David A. Fotland, San Jose, all of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Jun. 28, 1985, Ser. No. 750,809**

**Int. Cl.⁴ G06F *9/22***

**U.S. Cl. 364—200** **2 Claims**




1. A computer device comprising:

an instruction further comprising:

a. a first field for specifying a preselected condition in a comparison of two values;

b. a second field for specifying one of said two values;

c. a third field for specifying the other of said two values;

d. a fourth field for specifying a register to be cleared unconditionally; and

e. a fifth field for specifying the class of instruction;

wherein said first, second, third, fourth, and fifth fields form a single instruction;

means responsive to said instruction for accessing and clearing said register unconditionally;

means for reading said two values specified by said second field and said third field;

means for comparing said two values wherein said means for comparing is coupled to said means for reading; and

means for nullifying a subsequent instruction without branching wherein said means for nullifying acts in response to said means for comparing.

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**4,747,047**

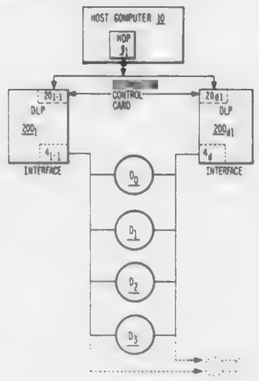
**DATA TRANSFER SYSTEM USING TWO PERIPHERAL CONTROLLERS TO ACCESS DUAL-PORTED DATA STORAGE UNITS**

**Ronald S. Coogan, Trabuco Canyon, and Toan D. Dang, El Toro, both of Calif., assignors to Unisys Corporation, Detroit, Mich.**

**Filed Dec. 6, 1985, Ser. No. 805,649**

**Int. Cl.⁴ G06F *13/14***

**U.S. Cl. 364—200** **13 Claims**




1. In a data transfer network wherein a host computer means uses a plurality of peripheral-controllers for accessing selected disk drive units in a group or peripherals having a plurality of disk drive units, which have different operating parameters from each other, the network for effectuating rapid Read/-Write operations between said host computer and selected disk drive units comprising, in combination:

(a) said host computer means for selectively transferring I/O commands to a first and second peripheral-controller means and for selectively sending data to or receiving data from a selected disk drive unit via said first and second peripheral-controller means; said host computer means including:

(a1) means for testing the operability of said first and second peripheral-controller means;

(a2) means for selecting and using the operable one of said first and second peripheral-controller means should one of said peripheral controller means be tested as being inoperable;

(b) said first and second peripheral-controller means for selectively communicating with said main host computer and connected to respective first and second communication ports on each said disk drive unit; and wherein each of said peripheral controllers includes:

(b1) means for storing particular operating parameters for each disk drive unit;

(b2) means for executing data transfers to/from a particular disk drive unit through usage of the particular operating parameters;

(c1) said group of peripherals consisting of a plurality of disk drive units wherein each disk drive unit includes:

(c) said first communication port connected to said first peripheral-controller;

(c2) said second communication port connected to said second peripheral-controller.



**4,747,048**

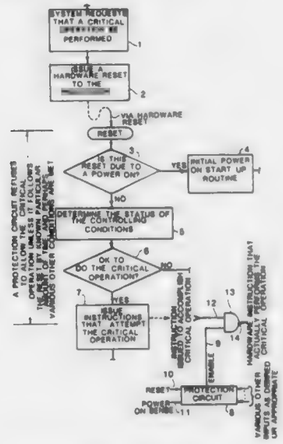
**METHOD AND APPARATUS FOR PREVENTING PERFORMANCE OF A CRITICAL OPERATION UNLESS SELECTED CONTROL CONDITIONS ARE SATISFIED**

**Joseph E. Mueller, Loveland, Colo., assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Mar. 21, 1986, Ser. No. 842,508**

**Int. Cl.⁴ G06F *15/46***

**U.S. Cl. 364—300** **16 Claims**




1. A method, in a system controlled by a processor executing object programming, for preventing performance of an operation unless a selected control condition is satisfied, the method comprising the steps of:

disabling the operation except at such times when it is enabled by the step of enabling the operation recited below;

responding to a request to perform the operation by directing the processor to a particular object program location associated with such requests;

detecting an event indicative that the processor will reach the particular location; and then

checking with the processor the selected control condition; and then

issuing a confirmation signal provided the selected control condition is satisfied; and

enabling the operation in response to a confirmation signal occurring within a second time interval commencing at the expiration of a first time interval commencing with the detecting step.

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**4,747,049**

**POINT OF SALE DEVICE FOR THE COLLECTION OF SALES DATA**

**Hugh W. Richardson, Shenton Park; Donald K. Philp, Caulfield; Raymond V. Lewis, Applecross, and Bernard T. Eastman, City Beach, all of Australia, assignors to Motorcharge Pty. Ltd., West Perth, Australia**

**PCT No. PCT/AU82/00095, § 371 Date Dec. 16, 1983, § 102(e) Date Dec. 16, 1983, PCT Pub. No. WO83/00575, PCT Pub. Date Feb. 17, 1983**

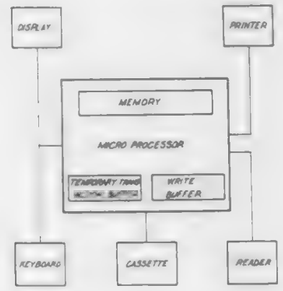
**PCT Filed Jun. 11, 1982, Ser. No. 491,428**

**Claims priority, application Australia, Aug. 5, 1981, PF0063**

**Int. Cl.⁴ G06F *15/22, 3/02, 3/08***

**U.S. Cl. 364—405** **14 Claims**

1. A self-contained intelligent point of sale device for the collection of sales data on presentation of a valid identification card, said device comprising a miroprocessor having a memory and a buffer, a keyboard for entering information concerning one or more transactions into the buffer, a read/write store interfaced with the microprocessor, said read/write store being operable in a read mode for entering into the memory data enabling recognition of the valid card and operable in a write mode for receiving and storing data, and a reader interfaced with a microprocessor for reading data from the identification card, said microprocessor comparing data from the identification card against the data stored in the memory for




verifying a valid identification card, the information concerning the transaction entered into the buffer being transferred to and stored in the recording unit read/write store together with data from the identification card upon the verification of a valid identification card.

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**4,747,050**

**TRANSACTION SECURITY SYSTEM USING TIME VARIANT PARAMETER**

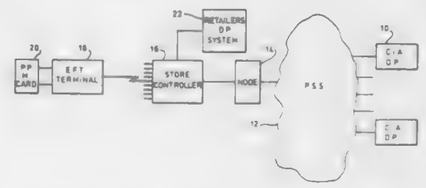
**Bruno Brachtl, Herrenberg, Fed. Rep. of Germany; Christopher J. Holloway, London, United Kingdom; Richard E. Lennon, Saugerties, N.Y.; Stephen M. Matyas, Kingston, N.Y.; Carl H. Meyer, Kingston, N.Y., and Jonathan Osess, Hurley, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Continuation of Ser. No. 4,818, Jan. 6, 1987, abandoned, which is a continuation of Ser. No. 649,441, Sep. 11, 1984, abandoned. This application Aug. 28, 1987, Ser. No. 91,310**

**Claims priority, application United Kingdom, Sep. 17, 1983, 8324917**

**Int. Cl.⁴ H04L *9/02; G07F 7/10***

**U.S. Cl. 364—408** **1 Claim**




1. An electronic funds transfer (EFT) system in which EFT terminals are connected through a local data processing center to a public switch system, a plurality of card-issuing agencies' data processing centers are also connected to the public switch system and each user of the EFT system has a personal secure intelligent bank card on which is stored a personal account number (PAN) and a personal key (KP), the system including:

first local data processing center means at each local data processing center to generate session keys (KS) for each of its locally attached terminals, and to transmit an associated session key to a respective terminal;

at each terminal means to store the session key;

first card means to generate and store a transaction variable for each transaction initiated at the terminal and to transfer the transaction variable to the terminal;

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first terminal means to encipher sensitive data under the session key whenever a transaction request message is generated;

second terminal means to generate a transaction variable for each transaction initiated at the terminal and to combine the transaction variable generated at the terminal with the transaction variable received from the card to form a composite transaction variable;

third terminal means to transfer the transaction variable generated at the terminal and a message request including the terminal-generated composite transaction variable enciphered under KS to the user's card and means on the card to generate a composite transaction variable from the transaction variable generated and stored on the card and the transaction variable received from the terminal and means on the card to generate a message authentication code (MAC) using a time variant key based upon the user's PAN, KP and the card-generated composite transaction variable;

second card means to return the message request and the MAC to the terminal and subsequently transmit it to local processing center;

second local data processing center means at each local data processing center to encipher the appropriate session key under a cross-domain key whenever a transaction request message is received and to add the enciphered key to the message;

first node means at each processing node of the public switch system to translate the enciphered session key from encipherment under a received cross-domain key to a transmission cross-domain key;

first card-issuing agency's data processing center means at the card-issuing agency's data processing center to decipher the enciphered session key and to use the key to decipher any sensitive data contained in the request message; and

second card-issuing agency's data processing center means to regenerate the message authentication code using the time variant key which is generated from parameters based upon the PAN and KP and the received composite transaction variable for comparison with the message authentication code included in the received message.

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**4,747,051**

## DEVICE FOR MODIFYING TRAVELING SPEED OF A MOTOR VEHICLE

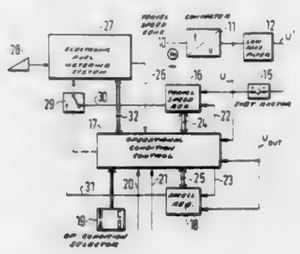
**Dieter Hall, Schwieberdingen, and Albrecht Sieber, Ludwigsburg, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Mar. 3, 1986, Ser. No. 835,561**

**Claims priority, application Fed. Rep. of Germany, Mar. 21, 1985, 3510174**

**Int. Cl.⁴ B60K** *31/00*

**U.S. Cl. 364—426** **7 Claims**



1. A device for modifying traveling speed of a vehicle having an electronic fuel metering system, comprising a traveling speed regulator having one input for a desired traveling speed signal, another input for an actual traveling speed signal and an output delivering a traveling speed regulating signal; an acceleration/deceleration regulator having one input for a desired acceleration/deceleration signal; another input for actual acceleration/deceleration signal and an output for delivering acceleration/deceleration regulating signal; means for generating said actual traveling speed signal; means for generating said acceleration/deceleration signal; means for controlling operational condition of the vehicle; a condition selector activated by the operator of the vehicle to apply to said controlling means a selection signal for setting a desired acceleration or deceleration operational mode; switching means controlled by said controlling means for switching-on either a traveling speed regulation or an acceleration/deceleration regulation by applying to said fuel metering system said traveling speed regulating signal or said acceleration/deceleration regulating signal; said fuel metering system delivering to said controlling means a fuel dose signal corresponding to an amount of metered fuel; said controlling means delivering to said one input of the traveling speed regulator said desired traveling speed signal and to said one input of the acceleration/deceleration regulator said desired acceleration/deceleration signal; and said controlling means switching-on said acceleration/deceleration regulation in response to said selection signal and setting a first initial value of said acceleration/deceleration regulating signal in dependency of said fuel dose signal and, upon cancellation of said selection signal, said controlling means switching-on said traveling speed regulation and simultaneously applying to said traveling speed regulator a new desired traveling speed signal corresponding to the actual traveling speed signal at the time point of the cancellation of said selection signal, and when at the end of a transition interval in which the rate of the actual acceleration/deceleration signal has approximately reached zero, setting the desired traveling speed signal to a value of the actual traveling speed signal at the end of the transition interval.

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**4,747,052**

## RADIATION IMAGE PROCESSING

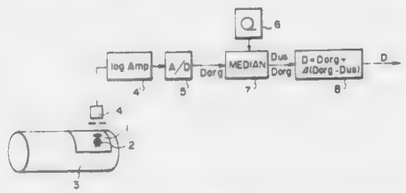
**Kazuhiro Hishinuma; Takeshi Funahashi; Masamitsu Ishida, all of Kanagawa, Japan, and James T. Karam, Jr., Monroe, Conn., assignors to Philips Medical Systems, Inc., Shelton, Conn.**

**Filed Oct. 28, 1985, Ser. No. 791,678**

**Claims priority, application Japan, Nov. 14, 1984, 59-240361; Nov. 14, 1984, 59-240362**

**Int. Cl.⁴ H04N** *1/40*

**U.S. Cl. 364—414** **13 Claims**




1. An X-ray image processing method comprising the steps of:

scanning an original X-ray image to photoelectrically read, and produce an electrical image signal from, X-ray image information;

converting said electric image signal into a plurality of digital signals (Dorg) which represent respective picture elements of said X-ray image;

calculating a median value (Dus) for a group of said digital signals in a mask of a predetermined size;

filtering said electrical image signal using the filter

$$D' = Dorg + \beta(Dorg - Dus)$$



where D' is a filtered image signal and $\beta$ is a frequency emphasizing coefficient; and

reproducing a visible image of said X-ray image from the filtered image signal;

thereby emphasizing particular frequency components and objects in said visible image signal.

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**4,747,053**

## ELECTRONIC DICTIONARY

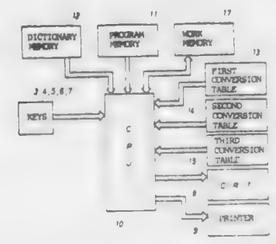
**Motokazu Yoshimura, Nagoya; Tsuyoshi Nishibu, Anpachi, and Seiko Ishikawa, Hekinan, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan**

**Filed May 16, 1986, Ser. No. 863,798**

**Claims priority, application Japan, May 20, 1985, 60-108847; May 20, 1985, 60-108848**

**Int. Cl.⁴ G06F** *15/38*

**U.S. Cl. 364—419** **7 Claims**




1. An electronic dictionary system which comprises:

an electronic dictionary memory in which a plurality of word data each representing a word are stored in a predetermined order, and each word data comprises a data division and an additional division,

said data division for each word data containing a combination of one or more compressed parts selected from among a first compressed part, a second compressed part and a third compressed part, the first compressed part being selected from a first set of codes indicating the number of first characters that are common between the word corresponding to the word data and the word corresponding to the preceding word data stored in the electronic dictionary, the second compressed part being selected from a second set of codes indicating a suffix which appears in the word, and the third compressed part being a sequence of codes selected from a third set of alphanumeric codes, and the sequence of codes respectively representing each alphanumeric character of the corresponding word whichis not encompassed by said first and second compressed parts of the data division,

said additional division for each word data containing an additional code identifying the combination of compressed parts in said data division for the word data;

means for reading the word data in the electronic dictionary memory;

means responsive to said additional code for determining the combination of compressed parts in the data division for each word data read by said reading means; and

means responsive to said determining means for decoding into the corresponding word the codes of the combination of compressed parts contained in the data division of each word data read by the reading means.

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**4,747,054**

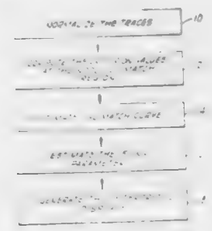
## METHOD FOR NON-LINEAR SIGNAL MATCHING

**Chittibabu Chittineni, Ponca City, Okla., assignor to Conoco Inc., Ponca City, Okla.**

**Filed Nov. 28, 1984, Ser. No. 675,738**

**Int. Cl.⁴ G01V** *1/36, 1/30*

**U.S. Cl. 364—421** **23 Claims**



1. A method of signal matching for seismic signals containing a time analog response to reflection of seismic energy from an earth structure, the time analog response for the earth structure having a differing, non-linearly related time base in the signals, comprising:

(a) storing first and second seismic signals that have been generated as a time analog response to a source of seismic energy transmitted into the earth and reflected by earth structure;

(b) processing said first and second seismic signals to correlate the time analog response to the same earth structure and deriving optimal match curve data that relates the time base of the first seismic signal to the time base of the second seismic signal over the time range of said first and second seismic signals;

(c) converting the first and second seismic signals as a function of the optimal match curve data to estimate an output parameter data signal descriptive of a combined property of said first and second seismic signals to time analog responses from the same earth structure at differing time bases; and

(d) displaying said output parameter data signal to generate a visual display of the time and magnitude of the output parameter data signal.

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**4,747,055**

## DRIVING STATUS DISCRIMINATION DEVICE FOR A MOTOR VEHICLE

**Kunihiko Eto, Toyota; Yutaka Mori, Okazaki; Shigeo Tanooka, Okazaki, and Akihiro Ohno, Okazaki, all of Japan, assignors to Toyoda Koki Kabushiki Kaisha, Okazaki, Japan**

**Filed Mar. 7, 1986, Ser. No. 837,140**

**Claims priority, application Japan, Mar. 27, 1985, 60-62939; Mar. 28, 1985, 60-64093**

**Int. Cl.⁴ B62D** *6/00;* **G06F** *15/20*

**U.S. Cl. 364—424** **4 Claims**

1. A driving status discrimination device for a motor vehicle having a steering wheel manually rotatable by a driver, comprising:

steering angle detection means for detecting the rotational angle of said steering wheel so as to output a steering angle signal representing said detected rotational angle;

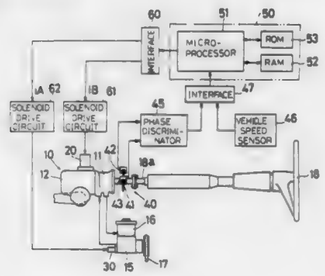
data storage means for receiving said steering angle signal from said detection means at a predetermined interval so as to store a plurality of said steering angle signals, said data storage means being operable for deleting the oldest one of said steering angle signals each time a new steering angle signal is received after said plurality of steering angle signals stored therein reaches a predetermined number; and

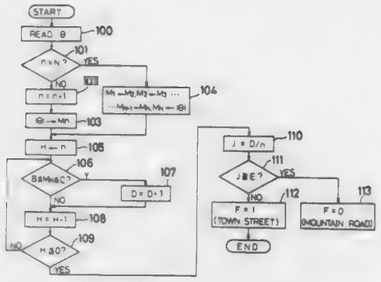
a processing means for classifying said plurality of steering angle signals stored in said data storage means into first

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and second class signals, the value of each of said first class signals belonging to any of a relatively narrow interval including a center value of said plurality of steering angle signals and other intervals except for a relatively wide interval including said center value, said second class signals being the remainder of said plurality of steering angle signals;




for calculating an index value which represents the driving status of said vehicle, based upon said second class signals and all of said steering angle signals stored in said data storage means; and

for discriminating a mountain road driving and a town street driving from each other responsive to said index value so as to selectively output a mountain road signal and a town street signal.

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4,747,056

**AUTOMATIC TRANSMISSION CONTROL APPARATUS**

Mitsuo Yamamoto, Okazaki; Norishige Yoshikawa, Chita, and Nobuyoshi Nagura, Anjo, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Japan

Filed Nov. 27, 1985, Ser. No. 802,399
Claims priority, application Japan, Nov. 29, 1984, 59-252500
Int. Cl.[4] B60K *41/08*; G06F *15/50*
U.S. Cl. 364—424.1 1 Claim

1. An automatic transmission control apparatus comprising:

speed sensor means for detecting the velocity of a vehicle;

throttle opening sensor means for detecting the throttle opening of an engine;

shift position sensor means for detecting the position of a shift lever;

rotational sensor means for detecting the rotation of the engine;

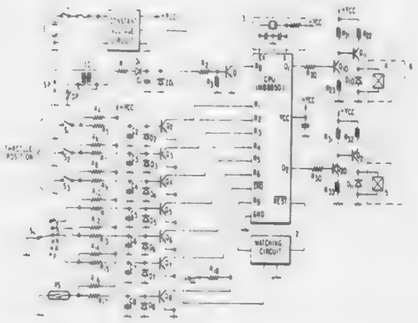
shifting means for shifting the automatic transmission in accordance with the signals from said speed sensor means, said throttle opening sensor means and said shift position sensor means; and

control circuit means including micro-computer means connected to said sensor means and said shifting means comprising

means for detecting an abrupt loss of the signal from said speed sensor means;

means for controlling said shifting means for shifting the automatic transmission to higher gear ratio in response to detection of said abrupt loss of signal;

means for detecting when the engine rotation is under a predetermined level; and



means for permitting the shifting of the automatic transmission in response to the position signal from said shift lever position sensor under a condition of failure of the vehicle velocity signal after detecting the abrupt loss of the vehicle velocity signal and detecting when the engine rotation is under said predetermined level.

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4,747,057

**ELECTRONIC POSTAGE METER HAVING POWER UP AND POWER DOWN PROTECTION CIRCUITRY**

Peter C. DiGiulio, Easton, Conn.; Warren G. Hafner, Lake Carmel, N.Y., and Henry Stalzer, Danbury, Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Mar. 12, 1985, Ser. No. 710,873
Int. Cl.[4] G06F *1/00, 13/20, 15/20*
U.S. Cl. 364—464 4 Claims

1. In an electronic postage meter which includes a processing means, a regulated power supply connected to the processing means, an unregulated power supply connected to the processing means, a system clock connected to the processing means, and a memory means operatively connected to the processing means, means for preventing any signal produced by the processing means from reaching the memory means during the powering up or the powering down of the unregulated power supply, regulated power supply and system clock associated with the postage meter, the preventing means comprising,

a first means for monitoring the unregulated power supply,

a second means for monitoring the regulated power supply,

means for detecting the frequency of the system clock, and

means responsive to the first monitoring means, second monitoring means and the detecting means for preventing any signal from reaching the memory means produced by the processing means until the regulated power supply, unregulated power supply and system clock have reached appropriate levels.

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4,747,058

**CODE LINE DISPLAY SYSTEM**

Benedict C. M. Ho, Waterloo, Canada, assignor to NCR Corporation, Dayton, Ohio

Filed Dec. 15, 1986, Ser. No. 941,976
Int. Cl.[4] G06K *5/00*
U.S. Cl. 364—478 19 Claims

1. A document processing system comprising:

a document track and mving means for moving documents



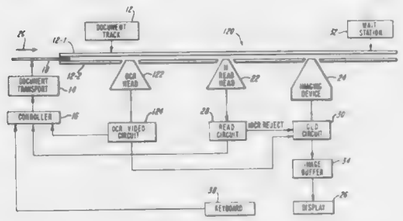
in a feeding direction at a constant velocity serially in spaced relation along said document track;

reading means including a read head for reading a line of character data from said documents being moved in said document track;

an imaging means positioned downstream along said feeding direction from said read head for generating image data of at least a portion of each of said documents including said line of character data passing said reading means;

said reading means also including a read circuit for reading said line of character data and also for determining when a particular character in said line of character data on a document is not read correctly and for issuing a reject signal in response thereto;

a display circuit for receiving said image data from said image means and for converting said image data to binary data;



said display circuit also receiving said reject signal and geneating a marker which indicates the position in said binary data of a rejected character in said line of character data;

a buffer for storing said binary data and said marker for each said document; and

a display coupled to said buffer for displaying said binary data and said marker for a said line of character data to facilitate the entry of the data;

said display circuit also including delaying means for delaying each said reject signal by a fixed amount of time which corresponds to the time that a location on a said document takes in being moved physically from said reading means to said imaging means to enable said marker to be positioned adjacent to the corresponding said rejected character when displayed on said display.

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4,747,059

**PROCESS AND APPARATUS FOR NAMING CHEMICAL STRUCTURES AND THE APPLICATION THEREOF**

Kenzo Hirayama, Kanagawa, and Tamano Taizo, Hyogo, both of Japan, assignors to Suntory Limited, Osaka, Japan

Continuation-in-part of Ser. No. 681,688, Dec. 14, 1984, abandoned. This application Dec. 16, 1985, Ser. No. 809,514
Int. Cl.[4] G06F *3/14, 15/20*
U.S. Cl. 364—496 26 Claims

1. A method for naming a chemical compound comprising the steps of:

presetting name stems and predetermined first, second and third rules in a memory of a data processing device:

inputting input data representative of a chemical compound to be named into said data processing system through an input means;

breaking down said input data into a plurality of data components, each of which is representative of an individual constituent element of said compound;

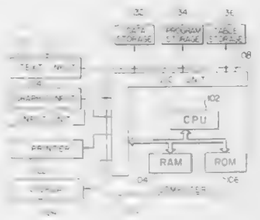
identifying a first data component of said data components, said first data component constituting the core of said compound according to said predetermined first rules;

naming said first data component according to said predetermined second rules;

establishing a connection table on the basis of said first component and storing said connection table in a connection table memory;

naming a second data component of said data components according to said predetermined third rules;

modifying said connection table in said connection table memory by adding the name given for said second component to said connection table;




repeating said steps of naming said second component and modifying said connection table for all of the second components on said compound; and

determining name of said compound based on said connection table and displaying the determined name.

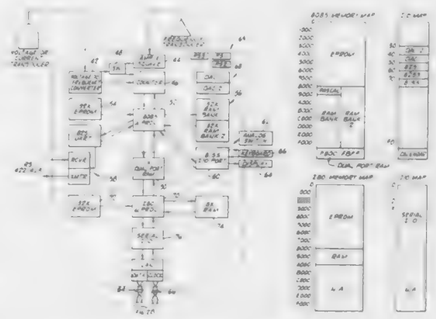
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4,747,060

**DATA ACQUISITION MODULE AND METHOD**

Leslie R. Sears, III; Stephen F. Crain, and Don M. Roberts, all of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Filed Mar. 31, 1986, Ser. No. 846,533
Int. Cl.[4] G06F *15/20, 15/48*
U.S. Cl. 364—481 17 Claims



1. A data acquisition apparatus, comprising:

input means for receiving electrical signals from at least one transducer;

digital storage means for storing digital signals corresponding to the electrical signals received by said input means;

first microcomputer means, connected to said input means and said digital storage means, for transferring the digital signals into said digital storage means;

second microcomputer means, connected to said digital storage means, for transferring the digital signals out of said digital storage means onto a transmission line; and

output means for controlling an analog switch in response to said first microcomputer means.

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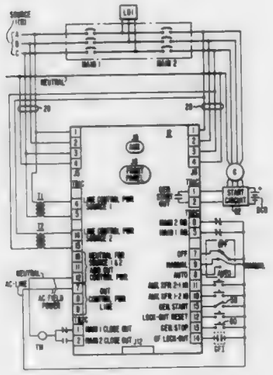


**4,747,061**

## AUTOMATIC TRANSFER SWITCH FOR A WIDE RANGE OF SOURCE VOLTAGE

James L. Lagree, Plum Borough, and Joseph C. Engel, Monroeville Boro, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 17, 1986, Ser. No. 840,270
Int. Cl.[4] G01R *21/00*; H02H *3/26*
U.S. Cl. 364—483 7 Claims



1. An electrical transfer switch of a type which performs an electrical function as a result of sensed line voltage on an electrical line, comprising:

voltage sensing means interconnected with said line for providing a voltage sensing means output current which is related to said line voltage;

ranging means interconnected with said voltage sensing means for receiving said voltage sensing means output current as an input therefor and for providing a related ranging means output current which is a predetermined fraction (1/K) of said voltage sensing means output current;

integrating means interconnected with said ranging means for receiving said ranging means output current as an input therefor and for integrating said latter current over a predetermined period of time for providing an output analog voltage at the end of said period of time which is related to said line voltage;

analog-to-digital converter means interconnected with said integrating means for converting said analog voltage to a digital number, the maximum value of said digital number not exceeding Q bits;

function means interconnected with said analog-to-digital converter means for utilizing said digital number as an input and for performing said electrical function in relationship to said digital number; and

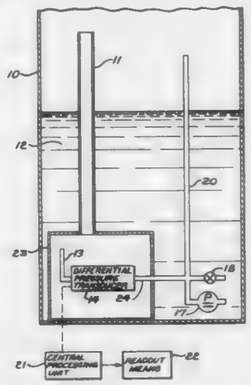
control means interconnected with said ranging means and said function means for reducing said fraction (1/K) by a predetermined amount when the maximum value of said line voltage is in a range which will cause said analog voltage to be of a value which will lead to a digital number which exceeds Q bits while concurrently causing said function means to increase the value attributed to said digital number by said predetermined amount to compensate for the reduction.

**4,747,062**

## METHOD AND APPARATUS FOR DETECTING THE LEVEL OF A LIQUID IN A TANK

Norman D. Esau, Naperville, Ill., assignor to Amoco Corporation, Chicago, Ill.

Filed Dec. 24, 1984, Ser. No. 686,097
Int. Cl.[4] G01F *23/14*; G01L *13/00*
U.S. Cl. 364—509 16 Claims




7. An apparatus for measuring the level of liquid in a vessel comprising:

(a) at least one generally upright column disposed within and fixedly secured to the vessel, the column having a top portion open to the interior of the vessel above the liquid level and a bottom portion extending to about the bottom of the vessel;

(b) pump means for adjusting the level of the liquid in the column with liquid from the vessel to a predetermined level, the pump means being in communication with the bottom portion of the column; and

(c) monitoring means in communication with the interior of the vessel and the column for determining the liquid level in the vessel.

**4,747,063**

## METHOD OF DETERMINING AN OPTIMUM SET VALUE FOR A SIDE TRIMMING MACHINE

Satoru Kuramoto, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed May 6, 1986, Ser. No. 860,298
Claims priority, application Japan, May 7, 1985, 60-95631
Int. Cl.[4] G01B *11/02*; B64D *15/00*
U.S. Cl. 364—563 2 Claims

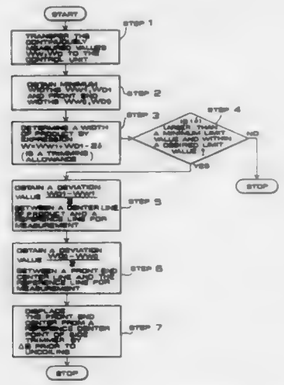
1. A method of determining an optimum set value for a side trimming machine to trim an elongate sheet stock such as a hoop of steel, comprising the steps of

(a) measuring continuously respective widths of both side portions of a work side portion and a drive side portion, of the elongate stock as the stock advances, the two side portions extending in a laterally adjacent relation and being divided by a reference line on the stock;

(b) analyzing said respective widths of the work side and drive side portions obtained in said measuring step for finding out respective minimum values of said widths; and



(c) determining on the basis of said respective minimum values respective set positions of the side cutter blades of



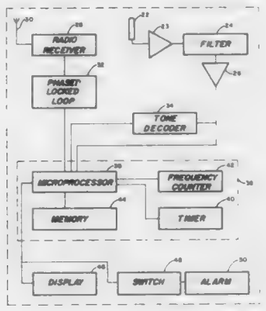

the side trimming machine which trim the work side portion and the drive side portion, respectively.

**4,747,064**

## APPROACHING VEHICLE INFORMING SYSTEM AND METHOD

Robert D. Johnston, 431 Thorne Dr., Browasburg, Ind. 46112

Continuation-in-part of Ser. No. 590,862, Mar. 19, 1984, abandoned. This application Oct. 3, 1986, Ser. No. 914,789
Int. Cl.[4] G06F *15/20*; G01C *15/20*
U.S. Cl. 364—569 16 Claims




1. Approaching vehicle informing system comprising:

transmitting means for simultaneously transmitting a pulse of electromagnetic waves of a first frequency and a pulse of acoustic waves of a second frequency;

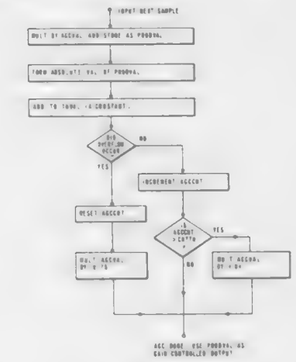
receiving means, remotely located from said transmitting means, for receiving said pulses of electromagnetic and acoustic waves and including timing circuitry responsive to the time relationship in reception of said pulse of electromagnetic waves and said pulse of acoustic waves and including frequency circuitry responsive to the frequency of said pulse of acoustic waves as received to produce a message representing the amount of time until said transmitting means and said receiving means meet.

**4,747,065**

## AUTOMATIC GAIN CONTROL IN A DIGITAL SIGNAL PROCESSOR

Lynn P. West, Austin, Tex., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 11, 1985, Ser. No. 786,911
Int. Cl.[4] G06F *7/38*; H04L *27/08*
U.S. Cl. 364—715 19 Claims



1. A method of providing automatic gain control of input signals in a signal processor, said method comprising the steps of:

multiplying a sample of an input signal by a predetermined automatic gain control signal to form a product term;

adding a predetermined threshold value to an absolute value of said product term;

determining whether said addition of said absolute value of said product term and said predetermined threshold value created an overflow condition; and

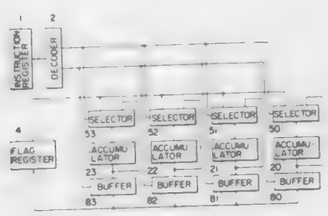
reducing said predetermined automatic gain control signal in response to said overflow condition.

**4,747,066**

## ARITHMETIC UNIT

Masahiko Sumi, Chigasaki, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Jan. 20, 1984, Ser. No. 572,313
Claims priority, application Japan, Jan. 22, 1983, 58-8883
Int. Cl.[4] G06F *7/38*
U.S. Cl. 364—715 12 Claims




1. An arithmetic unit of the type having a decoder circuit for decoding an instruction, a first memory circuit, which has a plurality of bits and can be accessed in parallel, and a second memory circuit, and wherein said arithmetic unit is operative in response to an instruction signal decoded by said decoder circuit, characterized in that:

each data input bit of said first memory is provided with a selection circuit for selecting one of the data stored in said first memory circuit or said second memory circuit so as

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to write the selected data into each bit of said first memory circuit, and

when said instruction signal specifies writing the data stored in said second memory circuit into a specified bit in said first memory circuit, only the selection circuit corresponding to said specified bit is so selected, such that the data stored in said second memory circuit is written into said specified bit of said first memory circuit, and

said arithmetic unit, further characterized in that said first memory circuit comprises registers which store results of operations of said arithmetic unit, while said secind memory circuit is a flag register in which is stored a condition code.

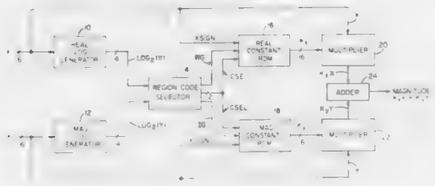
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**4,747,067**

## APPARATUS AND METHOD FOR APPROXIMATING THE MAGNITUDE OF A COMPLEX NUMBER

**Anthony J. Jagodnik, Jr., Bolton, and Ronald C. Evett, Hollis-ton, both of Mass., assignors to Raytheon Company, Lexing-ton, Mass.**

**Filed Oct. 14, 1986, Ser. No. 918,751**
**Int. Cl.[4] G06F** *7/38*
**U.S. Cl. 364—715** **39 Claims**



1. Apparatus for approximating a magnitude of a complex number having a real component X and an imaginary component Y comprising:

means for generating a logarithm of an absolute value of said real component X and a logarithm of an absolute value of said imaginary component Y of said complex number;

means coupled to said logarithm generating means for selecting a scaling constant pair in accordance with an address formed by said logarithm of said absolute value of said real component X and said logarithm of said absolute value of said imaginary component Y, said constant pair comprising a real constant $K_x$ and an imaginary constant $K_y$; and

means coupled to said constant pair selecting means, to said real component X, and to said imaginary component Y for computing said approximate magnitude of said complex number.

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**4,747,068**

## ADAPTIVE FILTER

**Johannes O. Voorman, and Louis J. van Mal, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Oct. 10, 1986, Ser. No. 918,171**
**Claims priority, application Netherlands, Oct. 10, 1985, 8502767**
**Int. Cl.[4] G06F** *7/38;* **H03H** *21/00*
**U.S. Cl. 364—724** **1 Claim**

1. An adaptive filter comprising:

a delay circuit having a plurality of outputs, for delaying an input signal to be filtered;

a plurality of coefficient control circuits coupled to the outputs of said delay circuit;

an adder circuit coupled at its inputs to the outputs of said coefficient control circuits;

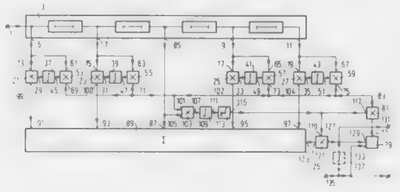
a plurality of first integrator circuits, the output of each being coupled to an input of a corresponding coefficient control circuit;

a plurality of first multiplier circuits, the output of each being coupled to the input of a corresponding first integrtor circuit, and each having one of its inputs coupled to an output of said delay circuit;

a correction signal generating circuit coupled at its output to an input of each first multiplier circuit;

a second multiplier circuit coupled at one input to an output of said delay circuit and coupled at another input to the output of said correction signal generating circuit;

a second integrator circuit coupled at its input to the output of said second multiplier circuit;



a third multiplier circuit having a substantially exponential transfer characteristic, the input of said third multiplier circuit being coupled to the output of said second integrator circuit; and

a control signal multiplier circuit for sending control signals from its output to an input of said correction signal generating circuit, said control signal multiplier circuit being coupled at one of its inputs to the output of said adder circuit, and said control signal multiplier circuit being coupled at another of its inputs to an output of said third multiplier circuit.

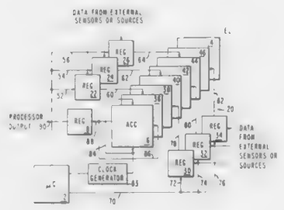
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**4,747,069**

## PROGRAMMABLE MULTISTAGE LENSLESS OPTICAL DATA PROCESSING SYSTEM

**Jan Grinberg, Los Angeles, and Bernard H. Soffer, Pacific Palisades, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Continuation of Ser. No. 713,064, Mar. 18, 1985, abandoned. This application Jul. 2, 1987, Ser. No. 70,083**
**Int. Cl.[4] G06G** *9/00*
**U.S. Cl. 364—807** **24 Claims**



1. Apparatus for processing an optical data beam to selectively perform optical computation from a plurality of performable optical computations, comprising:

(a) modulator means including a plurality of modulator planes for spatially modulating said optical data beam,



(b) means for the lensless interconnection of respective ones of said plurality of modulator planes so as to provide for the focusless transfer of said optical data beam between respective said plurality of modulator planes; and

(c) means for providing data to selected modulator planes, said data being provided in a manner dependent on the desired optical computation, so as to permit the programmable processing of said desired optical computation.

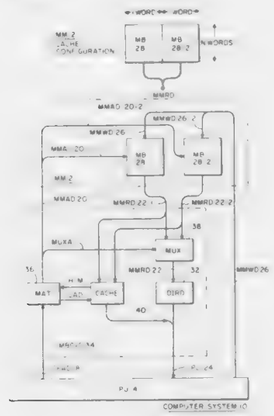
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**4,747,070**

## RECONFIGURABLE MEMORY SYSTEM

**Robert R. Trottier; James B. MacDonald, both of Lowell; John M. Martins, Wilmington, all of Mass., and Dennis J. Kayser, Hudson, N.H., assignors to Wang Laboratories, Inc., Lowell, Mass.**

**Filed Jan. 9, 1984, Ser. No. 568,997**
**Int. Cl.[4] G06F** *3/00*
**U.S. Cl. 364—900** **8 Claims**



1. In a memory means for a data processing system, the data processing system including means for generating first addresses corresponding to data to be read from the memory means and the memory means including a plurality M of memory bank means having separate data output paths and wherein the memory bank means data output paths are configured into a single one bank wide direct output path and the memory bank means are addressed by the first addresses as a sequential one bank wide by M bank deep memory, means for reconfiguring the memory means, comprising:

means responsive to the first addresses for providing second corresponding addresses for addressing the memory bank means as a parallel M bank wide by single bank deep memory to read information from M bank locations in parallel,

means for reconfiguring the memory bank means data output paths into M parallel bank output data paths, the bank output reconfiguring means responsive to the first addresses for selecting corresponding ones of the M parallel bank output data paths as a memory means output path, and

cache means connected in parallel with the M parallel bank output data paths and the memory means output path and responsive to the second addresses for storing information appearing upon the non-selected ones of the M parallel bank output data paths for subsequent transfer to the memory means output path,

the cache means being responsive to the subsequent first addresses for transferring to the memory means output path previously non-selected data stored in the cache means when the information specified by a present first address has been previously stored in the cache means.

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**4,747,071**

## DATA TRANSFER APPARATUS AND SYSTEM

**Yukio Sato, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 439,536, Nov. 5, 1982, abandoned. This application Jan. 21, 1986, Ser. No. 820,820**
**Claims priority, application Japan, Nov. 9, 1981, 56-178408; Nov. 26, 1981, 56-188365; Dec. 4, 1981, 56-194447; Dec. 4, 1981, 56-194448; Dec. 11, 1981, 56-198386**
**Int. Cl.[4] G06F** *9/00*
**U.S. Cl. 364—900** **11 Claims**



1. A data transfer system in which a plurality of data transfer apparatuses are adapted for mutual exchange of data, each said apparatus comprising:

a computer for processing data, having on one chip a read only memory, a random access memory and an arithmetic logic unit, wherein said arithmetic logic unit processes the plural bits of serial data received through an input port means in accordance with a predetermined program stored in said read only memory, said read only memory stores a serial-to-parallel data conversion program and said arithmetic logic unit takes said plural bits of serial data to store the taken bits of serial data in said random access memory and produces plural bits of parallel data by reading out the bits stored in said random access memory;

communication means for receiving data to be processed by said computer from another of said apparatuses;

means for setting said apparatus to be a master apparatus or a slave apparatus relative to said other apparatus in data transfer;

means operable prior to the reception of the data to be processed from said other apparatus by way of said communication means, for discriminating a characteristic of data transmission by said other apparatus, if said one apparatus is set to be a slave apparatus; and

means for controlling the data reception by said communication means in accordance with the characteristic discriminated by said discriminating means so as to render a data reception characteristic of said one apparatus compatible with the discriminated data transmission characteristic of said other apparatus.

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**4,747,072**

## PATTERN ADDRESSABLE MEMORY

**Ian N. Robinson, Mountain View, and Alan L. Davis, Half Moon Bay, both of Calif., assignors to Fairchild Camera and Instrument Corporation, Mountain View, Calif.**

**Filed Aug. 13, 1985, Ser. No. 765,370**
**Int. Cl.[4] G06F** *7/22*
**U.S. Cl. 364—900** **16 Claims**

1. A memory system for the storage and retrieval of data sequences of symbols in response to a query sequence of one or more symbols comprising:

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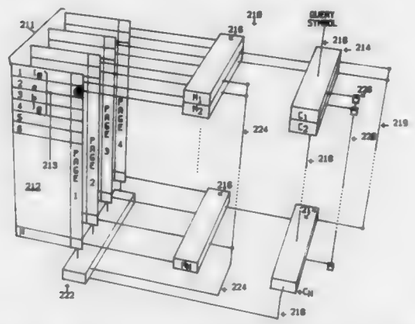


means coupled to said memory system for receiving a query symbol;

memory means comprising a plurality of contiguous memory slots for the storage of one or more data sequences of symbols, one of said symbols being stored in each of said slots;

means operatively connected to each of said slots for indicating a state for each of said slots, said indicating means having two states, an active and an inactive state;

means responsive to a first signal being coupled to said memory system for initially setting the indicated state of each said indicating means to said active state;



comparing means for comparing the data sequence symbol stored in each said slot having said indicating means in said active state with said query symbol in said receiving means, said comparing means including means for changing the state of said indicating means to the inactive state after said comparison has been made and means for setting the state of the indicating means operatively connected to the next said slot to the active state if said data sequence symbol corresponds to said query symbol; and

means responsive to a second signal being coupled to said memory system for retrieving each stored data sequence of symbols in which at least one of the symbols in such data sequence of symbols is stored in a slot whose corresponding indicating means is in said active state.

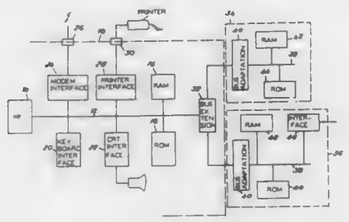
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**4,747,073**

## TERMINAL FOR COMMUNICATION WITH A REMOTE DATA PROCESSING SYSTEM

**Alain Desbois, Benodet, and Jean-Claude Palous, Quimper, both of France, assignors to Matra Communication**

**Filed Sep. 19, 1985, Ser. No. 777,597**
**Claims priority, application France, Sep. 19, 1984, 84 14379**
**Int. Cl.[4] G06F *3/14***
**U.S. Cl. 364—900** **6 Claims**



1. Videotext terminal for receiving and issuing digital data on a telephone carrier, comprising:

a processor;

display means;

input/output means for connection with said telephone carrier;

memory means including at least a non-volatile memory containing an operation resident program and a RAM memory;

an internal bus connected to said processor, display means, input/output means and memory means for carrying data therebetween; and

connector means connected to said internal bus via bus extension means and arranged to removably receive any one of a plurality of different external modules;

said resident program including:

an external module handling protocol arranged for interfacing internal protocols stored in said memory means with any one of said external modules and achieving compatibility therebetween and

an internal software module operatively connected to said bus extension means, having a routing assembly for transferring information to and from a connected one of said external modules; and a module handling assembly arranged for checking data contained in said connected one of said external modules and having the capability to enable and disable said connected one of said external modules and to accept and reject said connected one of said external modules.

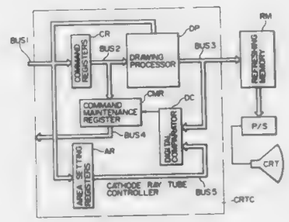
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**4,747,074**

## DISPLAY CONTROLLER FOR DETECTING PREDETERMINED DRAWING COMMAND AMONG A PLURALITY OF DRAWING COMMANDS

**Shigeaki Yoshida, 3161-77, Irumagawa, Sayama-shi, Saitama, Japan**

**Continuation of Ser. No. 609,439, May 11, 1984, abandoned.**
**This application Jan. 27, 1987, Ser. No. 6,963**
**Claims priority, application Japan, May 13, 1983, 58-82618**
**Int. Cl.[4] G06F *15/00, 3/14*; G09G *1/14***
**U.S. Cl. 364—900** **9 Claims**



1. A display controller for a system having a microcomputer for generating drawing commands, a refresh memory for storing image data and a display device connected to said refresh memory for displaying said image data, said display controller comprising:

a drawing processor including a random access memory, a read only memory, an arithmetic logic unit, a register and a command decoder, said drawing processor being responsive to receipt of a plurality of drawing commands from said microcomputer for generating address signals and data signals representing image data by processing each drawing command supplied thereto and for supplying said address signals and data signals to said refresh memory, so that images are displayed on a display device on the basis of the data stored in said refresh memory; and

a digital comparator connected to said drawing processor for comparing an address signal outputted from the drawing processor with a predetermined address signal which uniquely identifies at least a portion of a single selected image corresponding to one of said plurality of drawing commands and for producing an output signal when comparison is detected; and



means responsive to said output signal of the digital comparator for detecting a single particular drawing command among said plurality of drawing commands processed by said drawing processor and for supplying an output to said microcomputer indicating the detected drawing command.

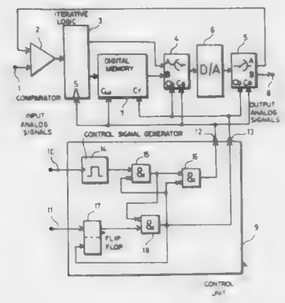
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**4,747,075**

## APPARATUS FOR STORING ANALOG SIGNAL SAMPLES

**Lars G. Berggren, Gothenburg, Sweden, assignor to Telefonaktiebolaget LM Ericsson, Stockholm, Sweden**

**Filed Feb. 14, 1986, Ser. No. 829,789**
**Claims priority, application Sweden, Mar. 8, 1985, 8501142**
**Int. Cl.[4] G11C *27/00***
**U.S. Cl. 365—45** **7 Claims**



1. Apparatus for storing and retrieving analog signal samples comprising:

(a) means including a closed loop for convering by an iterative process an incoming analog signal sample to a digital sample, said loop including a digital-analog converter having an input and an output, an analog comparator having first and second inputs and an output, said first input receiving the analog signal sample, and an iterative logic having an input connected to the output of said comparator for producing by an iterative process a digital sequence of an analog signal at the output of the comparator, said iterative logic having an output which can be connected to said converter, said output of said converter being connectable to said second input of said comparator such that in said closed loop the analog signal at the output of the comparator travels to said iterative logic whose output digital signal travels to said converter and the resulting analog signal is then fed to the second input of the comparator;

(b) a digital memory having a writing input and reading output, said output of said interative logic being connected to the writing input of said digital memory;

(c) disconnection means for disconnecting the digital-analog converter from the loop and connecting the converter input to the reading output of the memory, the output signal at said converter then constituting the output of the apparatus; and

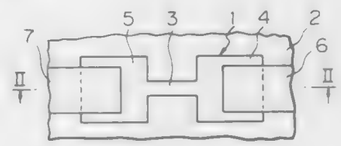
(d) control means operatively connected to the memory and to said disconnection means for preventing, in an iterative process in progress in said iterative logic, reading a digital sample stored in the memory, and for controlling, by connection of the converter to the memory and to said output of the apparatus, reading from the memory and conversion of the digital sample to an analog sample for supply at the output of the apparatus.

**4,747,076**

## METHOD OF WRITING INFORMATION INTO A FUSE-TYPE ROM

**Ryoichi Mukai, Kanagawa, Japan, assignor to Fujitsu Limited, Kawasaki, Japan**

**Continuation of Ser. No. 563,656, Dec. 20, 1983, abandoned.**
**This application Jun. 10, 1987, Ser. No. 59,140**
**Claims priority, application Japan, Dec. 25, 1982, 57-226520**
**Int. Cl.[4] G11C *17/00***
**U.S. Cl. 365—96** **9 Claims**



1. A method of writing information into a fuse-type ROM provided with fuses which are formed on an insulating film on a substrate, connected to conductor lines, and covered by a protective film, comprising the step of selectively and electrically blowing the fuses by applying a ramp voltage having a substantially linearly increasing gradient to a peak value at a rate of $10^3$ to $10^5$ volts/second so that the protective film is not broken.

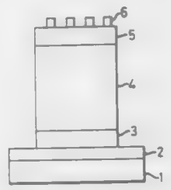
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**4,747,077**

## METHOD OF DETECTING THE CONDUCTANCE STATE OF A NON-VOLATILE MEMORY DEVICE

**Peter J. Hockley, and Michael J. Thwaites, both of Hook, England, assignors to The British Petroleum Company p.l.c., London, England**

**PCT No. PCT/GB84/00420, § 371 Date Jul. 22, 1985, § 102(e) Date Jul. 22, 1985, PCT Pub. No. WO85/02709, PCT Pub. Date Jun. 20, 1985**
**PCT Filed Dec. 6, 1984, Ser. No. 760,740**
**Claims priority, application United Kingdom, Dec. 10, 1983, 8333033; Dec. 6, 1984, PCT/GB84/00420**
**Int. Cl.[4] G11C *11/42***
**U.S. Cl. 365—113** **7 Claims**



1. A process for detecting the conductance state of a non-volatile memory device which is switchable between a high conductance and a low conductance state and which comprises a plurality of amorphous or microcrystalline semiconductor layers at least one of which is a p-type layer in contact with an n or i-type layer, said device being formed by applying a sufficiently high voltage across said layers, characterised by irradiating the device with light of a wavelength which causes band to band excitation and of an intensity which produces a detectable photovoltaic response and using the photovoltaic response to determine the conductance state of the device.

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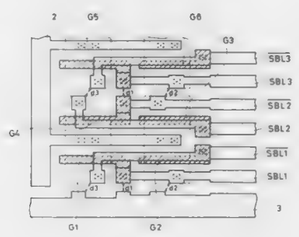


**4,747,078**

## SEMICONDUCTOR MEMORY DEVICE

**Hiroshi Miyamoto, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Jan. 27, 1986, Ser. No. 823,099**
**Claims priority, application Japan, Mar. 8, 1985, 60-47240**
**Int. Cl.[4] G11C *11/40***
**U.S. Cl. 365—51** **4 Claims**




1. A dynamic random access memory, comprising:
a plurality of field effect transistors, said field effect transistors comprising memory cells of a memory cell array; a plurality of bit lines substantially parallel to one another, capacitances between said plurality of bit lines approximately equal; a sense amplifier array comprising a plurality of sense amplifiers connected to said memory cell array said DRAM further comprising:
means for substantially equalizing the capacitance associated with an outermost sense amplifier lead in said sense amplifier array and the capacitances associated with remaining leads in the sense amplifier array.

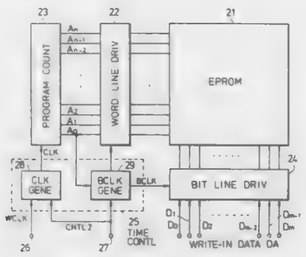
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**4,747,079**

## WRITE CIRCUIT FOR AN ERASABLE PROGRAMMABLE READ ONLY MEMORY DEVICE OF A MICROCOMPUTER

**Satoru Yamaguchi, Nagoya, Japan, assignor to Fujitsu Limited, Kawasaki, Japan**

**Filed Sep. 17, 1986, Ser. No. 908,208**
**Claims priority, application Japan, Sep. 17, 1985, 60-206072**
**Int. Cl.[4] G11C *11/40***
**U.S. Cl. 365—189** **10 Claims**




1. A write circuit for an erasable programmable read only memory device of a microcomputer, said microcomputer including a program counter for providing an address and operating in synchronization with machine clock signals, said write circuit comprising:
a clock generating circuit, coupled to receive an external clock signal and the machine clock signals, for supplying a clock signal to said program counter in response to the external clock signal and the machine clock signals so as to successively increment the address produced in the program counter, the external clock signal having a frequency lower than the frequencies of the machine clock signals, the clock signal having different frequencies during a normal operation mode and a write-in operation mode so that the address produced in the program counter is successively incremented in synchronization with the machine clock signals during the normal operation mode and is successively incremented in synchronization with the external clock signal during the write operation mode; and
a bit line clock generating circuit, coupled to receive the machine clock signals and a least significant bit of the address from the program counter, for generating a bit line clock signal for inhibiting a write-in data from being written into the erasable programmable read only memory device in response to the machine clock signals and least significant bit of the address during a time period in which the address changes.

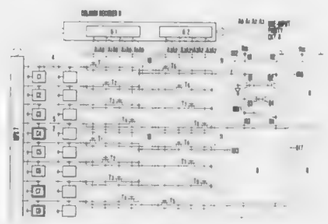
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**4,747,080**

## SEMICONDUCTOR MEMORY HAVING SELF CORRECTION FUNCTION

**Junzo Yamada, Atsugi, Japan, assignor to Nippon Telegraph & Telephone Corporation, Tokyo, Japan**

**Filed Nov. 3, 1986, Ser. No. 926,699**
**Int. Cl.[4] G11C *13/00, 11/40***
**U.S. Cl. 365—200** **14 Claims**



1. A semiconductor memory having a self correction function, comprising:
a matrix of cells divided into a plurality of area groups, each of which consists of physically adjacent memory cells and parity cells for forming horizontal and vertical parity codes together with the data in said memory cells, each cell of said area groups being arrayed so as not to belong to the same horizontal and vertical arrays for said horizontal and vertical parity codes;
a word line for simultaneously selecting said cells;
a plurality of bit lines for exchanging data with said cells;
a horizontal selector means associated with each area group for selecting data of the horizontal group to which a memory cell to be checked belongs through said bit lines;
a vertical selector means associated with each group for selecting data of the vertical group to which a memory cell to be checked belongs through said bit lines;
means coupled to the outputs of said horizontal and vertical selector means for performing a parity check of the output data of said horizontal and vertical selectors; and
means for automatically correcting a bit error using the output from said parity check means.

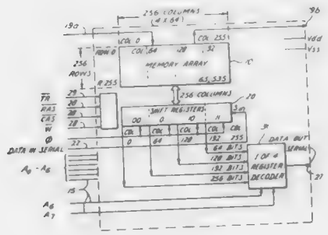


**4,747,081**

## VIDEO DISPLAY SYSTEM USING MEMORY WITH PARALLEL AND SERIAL ACCESS EMPLOYING SERIAL SHIFT REGISTERS SELECTED BY COLUMN ADDRESS

**Andrew Heilveil; Jerry R. VanAken; Karl M. Guttag; Donald J. Redwine; Raymond Pinkham, and Mark F. Novak, all of Houston, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Dec. 30, 1983, Ser. No. 567,110**
**Int. Cl.[4] G11C *8/00***
**U.S. Cl. 365—219** **6 Claims**




1. A memory device comprising:
an array of memory cells, said memory cells arranged in rows and columns;
address input means, for receiving row address signals and column address signals;
row decode means, for selecting a row in said array responsive to a row address signal received by said address input means;
column decode means, for selecting a column in said selected row responsive to a column address signal received by said address input means;
random input means, for writing data to said memory cell selected by said column decode means;
random output means, for presenting the contents of said memory cell selected by said column decode means;
a register comprised of a plurality of memory cells;
means for transferring the contents of the memory cells in said selected row of said array into the memory cells of said register;
serial output means, connected to a selected memory cell in said register, for presenting the contents of said selected memory cell in said register;
transfer control means, responsive to a transfer control signal, for selectively enabling and disabling said transferring means so that, when said transferring means is disabled, data may be written to and read from any of said memory cells in said array independently from the presentation of data by said serial output means;
serial selecting means for selecting a memory cell in said register to be connected to said serial output means, responsive to said address input means receiving a column address signal after said transferring means is enabled; and
means, responsive to a serial clock signal, for shifting to the serial output means the contents of another memory cell in said register so that, upon a series of said serial clock signals, the contents of a series of memory cells in said register will be presented by said serial output means;
wherein said serial selecting means comprises:
a plurality of taps, each of said taps connected to a preselected memory cell in said register;
an output circuit, connected to said serial output means; and
decode means, responsive to said address input means receiving a column address signal after said transferring means is enabled, for connecting said output circuit to the tap corresponding to said column address signal.

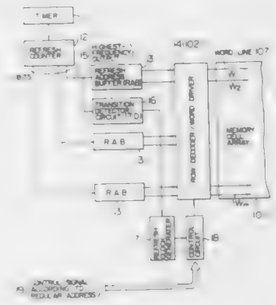
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**4,747,082**

## SEMICONDUCTOR MEMORY WITH AUTOMATIC REFRESH MEANS

**Osamu Minato; Toshiaki Masuhara, both of Tokyo; Katsuhiro Shimohigashi, Musashimurayama; Shoji Hanamura, Kokubunji; Shigeru Honjyo, Hachioji; Nobuyuki Moriwaki, Kodaira, and Fumio Kojima, Higashiyamato, all of Japan, assignors to Hitachi Ltd. and Hitachi VLSI Eng. Corp., both of Tokyo, Japan**

**Continuation-in-part of Ser. No. 801,765, Nov. 26, 1985. This application Jul. 21, 1987, Ser. No. 76,174**
**Claims priority, application Japan, Nov. 28, 1984, 59-249551; Nov. 28, 1984, 59-249552; Jul. 21, 1986, 61-169693**
**Int. Cl.[4] G11C *8/00***
**U.S. Cl. 365—222** **11 Claims**




1. A semiconductor memory comprising:
a memory cell array including a plurality of memory cells, said memory cells being arranged in the form of a matrix;
decoding means for selecting a desired one of said memory cells; and
automatic refresh means including a timer, a refresh counter for generating a plurality of pulse signals which are different in frequency from each other and are used as refresh address signals, on the basis of the output of said timer, a refresh address buffer for converting each of said refresh address signals into positive and negative signals, a transition detector circuit for detecting a logical change in a refresh address formed of said refresh address signals, a refresh clock generator for generating a basic clock signal for a refresh operation, on the basis of the output of said transition detector circuit, and a control circuit which delivers a decoder activation signal for controllably activating said decoding means and a refresh address activation signal for controlling the transmission of said refresh address from said refresh address buffer to said decoding means, on the basis of said basic clock signal for refresh operation, each formed on a semiconductor chip mounted with said memory cell array, for automatically performing a periodic refresh operation on the basis of said basic clock signal, said automatic refresh means being provided with means for performing one of a read operation and a write operation each based upon a regular address signal asynchronous with the periodic refresh operation, in preference to the periodic refresh operation.

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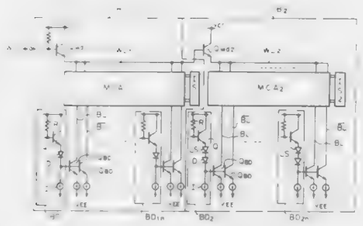


**4,747,083**

## SEMICONDUCTOR MEMORY WITH SEGMENTED WORD LINES

**Tetsuya Nakajima, Yokohama, and Masaki Nagahara, Kawasaki, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

**Filed Jun. 28, 1984, Ser. No. 625,674**
**Claims priority, application Japan, Jun. 29, 1983, 58-115881**
**Int. Cl.[4] G11C *8/00***
**U.S. Cl. 365—230** **7 Claims**



1. A semiconductor memory device, operatively connected to a word decoder which generates a word selection signal at a memory selection time, said memory device comprising:

a plurality of memory cells, each of said memory cells comprising a pair of bipolar transistors cross-coupled to form a flip-flop;

a plurality of initial word drivers, each operatively connected to the word decoder and activated by the word selection signal from the word decoder;

a plurality of bit line pairs operatively connected to said memory cells;

a plurality of bit drivers, each operatively and respectively connected to one of said bit line pairs, for specifying a desired one of said memory cells in combination with the word selection signal;

a plurality of word lines, operatively and respectively connected to said initial word drivers and said memory cells, forming cross points with said bit line pairs, said memory cells being located at the cross points, each of said word lines being divided into a plurality of word line segments, a first word line segment of each of said word lines being directly activated to carry a word line signal by one of said initial word drivers in dependence upon the word selection signal;

segment word drivers operatively connected between the word line segments, one of said segment word drivers being activated when the word selection signal activates a corresponding initial word driver operatively connected via a corresponding first word line segment to the one of said segment word drivers, each of said segment word drivers being formed by a single word driver transistor operatively connected to a following second word line segment and having a base operatively connected to the corresponding first word line segment; and

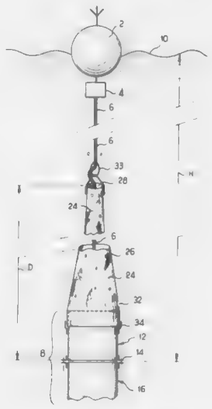
level shifting means, operatively connected to said bit line pairs, for shifting downward bit line voltage levels corresponding to the second word line segments, so that a voltage difference between each of the word line segments and each of said bit lines forming cross points therewith does not vary due to the single word driver transistor in each of said segment word drivers.

**4,747,084**

## ENERGY GENERATORS INITIATED BY SEA WATER FOR ACOUSTIC BUOYS AND ACOUSTIC BUOYS EQUIPPED WITH SUCH GENERATORS

**James Parlant, Ruelle, France, assignor to ETAT Francais, France**

**Filed Sep. 23, 1986, Ser. No. 910,673**
**Claims priority, application France, Oct. 10, 1985, 85 15006**
**Int. Cl.[4] H04B *1/59***
**U.S. Cl. 367—3** **9 Claims**



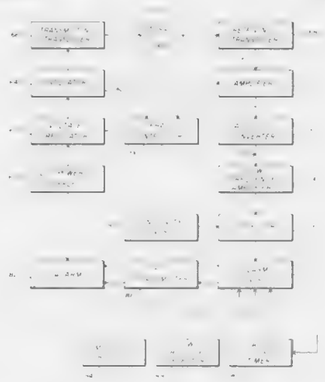
1. A sea water initiated energy generator for a sonobuoy comprising a bubble guide sleeve for directing gas bubbles originating from a chemical reaction of the generator, said bubble guide sleeve having a lower part overlapping an upper part of the generator acting as a hood thereover, and an open end through which said bubbles escape, said open end being spaced a distance from a transducer of the sonobuoy sonar.

**4,747,085**

## METHOD AND APPARATUS FOR MONITORING SWIMMING POOLS

**Gerald W. Dunegan, 3303 Country Club, Stafford, Tex. 77477, and Donald S. Kuhnel, Houston, Tex., assignors to Gerald W. Dunegan, Stafford, Tex.**

**Continuation-in-part of Ser. No. 605,896, May 1, 1984, abandoned. This application Feb. 24, 1986, Ser. No. 832,211**
**Int. Cl.[4] G08B *21/00***
**U.S. Cl. 367—93** **15 Claims**



1. Apparatus for monitoring unauthorized or unintentional entry of a person or animal into a swimming pool, comprising:



an oscillator circuit for continuously generating an oscillating electrical voltage of a preselected frequency;

an electro-acoustical transmitting transducer means positioned below the surface of the water in said swimming pool and in contact with the water for permeating ultrasonic sound waves throughout said water in said pool in response to said oscillator circuit, said transmitting transducer means being mounted at a downwardly projecting angle of between 5° and 30°;

transducer means positioned below said surface of said water and in contact with the water for receiving said ultrasonic sound waves from throughout said water and generating an electrical signal in response to said ultrasonic sound waves;

amplifying means for increasing the strength of a portion of said electrical signal having a frequency in the range of from 0.2 Hz to 25 Hz;

water-resistant housing means for sealing at least portions of said electro-acoustical transmitter and said receiving transducer from said water;

a detector circuit for monitoring said amplified portion of said electrical signal and generating an alarm signal in response to a change in said amplified portion of said electrical signal; and

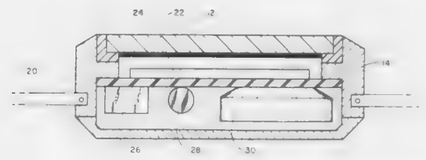
an alarm indicator responsive to said alarm signal.

**4,747,086**

## DIGITAL WATCH WITH FLUORESCENT DISPLAY AND MERCURY COATED CRYSTAL

**Borliam Shaw, 704 Lookout Dr. #1, Los Angeles, Calif. 90012**

**Filed Aug. 25, 1987, Ser. No. 89,167**
**Int. Cl.[4] G04C *17/00***
**U.S. Cl. 368—239** **4 Claims**



1. In a digital watch having a casing, electronic time keeping components disposed in said casing, a display for displaying the time and date and a glass crystal covering said display, the improvement comprising:

a coating of mercury on an inner surface of said glass crystal; and said display comprising a fluorescent digital display.

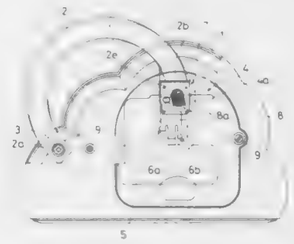
**4,747,087**

## ALARM CLOCK

**Shoichi Sakuma, Tokyo, Japan, assignor to Seikosha Co., Ltd., Tokyo, Japan**

**Filed Jan. 13, 1987, Ser. No. 2,855**
**Claims priority, application Japan, Jan. 20, 1986, 61-5994[U]**
**Int. Cl.[4] G04B *23/00***
**U.S. Cl. 368—262** **9 Claims**

1. An alarm clock comprising: a clock case containing a clock movement; a pivotable handle having one end thereof pivotably mounted on the clock case; an alarm on/off lever mounted to undergo vertical movement with respect to the clock case to thereby activate and deactivate an alarm; and an interlocking mechanism for effecting vertical movement of the alarm on/off lever in response to pivotal movement of the handle, the interlocking mechanism having means connecting the handle to the alarm on/off lever at all positions of the alarm on/off lever and comprising a projection formed on either the alarm on/off lever of the handle, and a recessed portion formed in the other of the alarm on/off lever or the handle and coacting with the projection to convert the pivotal movement of the handle into vertical movement of the alarm on/off lever.

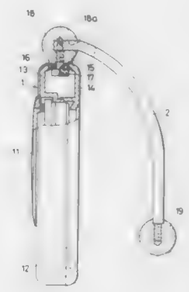


**4,747,088**

## TABLE CLOCK

**Motoyuki Suzuki, Tokyo, Japan, assignor to Seikosha Co., Ltd., Tokyo, Japan**

**Filed Jul. 25, 1986, Ser. No. 890,757**
**Claims priority, application Japan, Jul. 26, 1985, 60-114554[U]**
**Int. Cl.[4] G04B *37/00***
**U.S. Cl. 368—316** **4 Claims**



1. A table clock comprising: a clock case having front and back case sections; and means for adjusting the angle of inclination at which said clock case rests upon a support surface, said means comprising rotatable stand means mounted for rotation at a top end portion of said clock case and rotatable into any of a number of selected directions around the clock, said stand means being configured in the shape of a side of the clock case so as to support the clock case at any of a number of desired angles of inclination relative to the support surface in response to rotation of said stand means about said clock case, means defining a hole in the top end portion of the clock case, a washer secured in the hole, a screw member extending through the washer, an ornamental member connected to the screw member and mounted to undergo turning movement relative to the clock case, one end of said stand means being connected to the ornamental member to undergo turning movement therewith, and an ornamental ball connected at the other end of said stand means for resting on the support surface.

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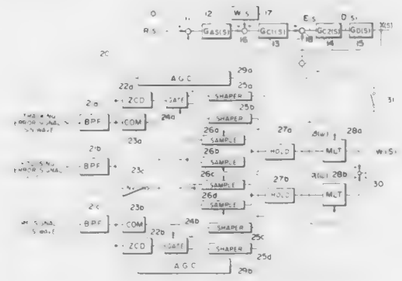


**4,747,089**

## METHOD AND APPARATUS FOR FOCUSING SERVO CONTROL

**Naoya Eguchi, Tokyo; Mikio Sigiki, Kanagawa, and Hitoshi Okada, Chiba, all of Japan, assignors to Sony Corporation, Tokyo, Japan**

**Filed Dec. 9, 1986, Ser. No. 939,614**
**Claims priority, application Japan, Dec. 21, 1985, 60-286917**
**Int. Cl.[4] G11B** *7/00, 20/22*
**U.S. Cl. 369—45** **5 Claims**



1. A focusing control method employing a photodetector for generating a focusing error signal, a tracking error signal and an RF signal, and a closed loop focusing servo circuit responsive to the focusing error signal applied thereto for focusing a light spot in position on an optical disc, comprising the steps of:

detecting the focusing error signal synchronously with the tracking error signal to produce a first periodic function signal;

detecting the focusing error signal synchronously with the RF signal to produce a second periodic function signal;

converting the tracking error signal into a sin-wave signal having a predetermined amplitude;

converting the RF signal into a cos-wave signal having a predetermined amplitude;

multiplying the first periodic function signal by the cos-wave signal to produce a first component signal;

multiplying the second periodic function signal by the sin-wave signal to produce a second component signal;

adding the first and second component signals to produce a composed disturbance signal; and

subtracting the composed disturbance signal from the focusing error signal applied to said focusing servo circuit, thereby canceling a disturbance superimposed on the focusing error signal applied to the focusing servo circuit.

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**4,747,090**

## INTEGRAL PICKUP FOR AN OPTICAL DIGITAL DISC USING SAW DEFLECTION AND LENSES

**Tsukasa Yamashita, Nara; Nobuhisa Inoue, Kyoto; Kazuhiko Mori, Mishima; Masaharu Matano, Kyoto, and Isao Taguchi, Nagaokakyo, all of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan**

**Filed Oct. 13, 1983, Ser. No. 559,050**
**Claims priority, application Japan, Oct. 14, 1982, 57-180257; Oct. 29, 1982, 57-190645**
**Int. Cl.[4] G11B** *7/135, 7/09;* **G02B** *6/12*
**U.S. Cl. 369—45** **2 Claims**

1. A pickup for an optical digital data storage comprising:

a base plate formed on its surface with a light transmission path;

a light emitting portion integrally formed on said base plate, for propagating a light beam to said light transmission path;

a surface acoustic wave generating portion integrally formed on said base plate, for propagating a surface acoustic wave on said light transmission path in a directon to deflect said light beam within a plane of said light transmission path;

lens means for projecting said light beam outside said light transmission path, and effecting a two-dimensional focusing of said projected beam and adjustment of focal position, said lens means comprises (a) a grating lens formed on the transmission path to focus the light beam propagating on the light transmission path within the plane of the transmission path, (b) electrodes formed on said transmission path near said grating lens to vary the refractive index of said grating lens in response to an applied voltage, (c) a second grating lens formed on said transmission path to obliquely upwardly project the light beam having passed through said grating lens from the surface of said transmis-



sion path and focus said projected light beam on said optical data storage, and (d) electrodes formed on said transmission path near said second grating lens to vary the refractive index of said second grating lens in response to an applied voltage;

a light receiving portion comprising a combination of a plurality of light receiving elements disposed at suitable intervals from the projected position of said light beam to receive a reflected light of said light beam; and

a control portion for receiving an output of said light receiving portion to process a signal and supplying the control signal to the surface acoustic generating portion and lens portion, thereby effecting the control of a deflection angle of the light beam, two-dimensional focusing of the projected beam and control of focal position.

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**4,747,091**

## SEMICONDUCTOR LASER DRIVE DEVICE

**Masanori Doi, Akishima, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed Jul. 14, 1986, Ser. No. 884,978**
**Claims priority, application Japan, Jul. 25, 1985, 60-164813; Oct. 7, 1985, 60-223240**
**Int. Cl.[4] G11B** *7/00, 27/36*
**U.S. Cl. 369—116** **5 Claims**

1. A semiconductor laser drive device comprising:

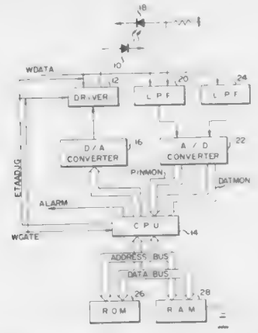
APC (automatic power control) means for energizing a semiconductor laser, detecting an intensity of a laser beam, comparing a desired intensity and the detected intensity, and for controlling a drive current to match the detected intensity with the desired intensity;

first means for energizing said APC means at a first time point and for storing a plurality of drive currents which correspond to a plurality of intensities and are controlled by said APC means;

second means for energizing said APC means at a second time point later than the first time point with the drive current corresponding to one of the intensities stored in said first means; and



third means for, when the drive current corresponding to said one of the intensities is changed by said APC means at the second point of time, correcting the drive current



corresponding to one of the other intensities and for energizing said APC means with the corrected drive current at a third time point later than the second time point.

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**4,747,092**

## SOUND REPRODUCTION APPARATUS

**Gordon A. McGregor, 9 Mafeking Terrace, Neilston, Refrewshire, and Alexander D. McLachlan, 2 Craigfaulds Avenue, Paisley, Refrewshire, both of Scotland**

**Filed May 13, 1986, Ser. No. 862,748**
**Int. Cl.[4] G11B** *21/16*
**U.S. Cl. 369—247** **3 Claims**



1. Sound reproduction apparatus comprising a rotatable turntable for an audio disc, carried in a support structure, and a pick up arm for tracking an audio disc on said turntable wherein said pick up arm is mounted on a wall of a building structure such that the pick up arm is vibrationally isolated from said support structure.

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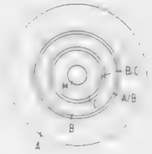
**4,747,093**

## DISC-SHAPED INFORMATION CARRIER AND METHOD OF MANUFACTURING IT

**Karsten Benne; Hermann Koop, both of Ronnenberg, and Hans Schüddekopf, Hanover, all of Fed. Rep. of Germany, assignors to Polygram International Holding B.V., Baarn, Netherlands**

**Continuation-in-part of Ser. No. 843,466, Mar. 24, 1986. This application Sep. 9, 1986, Ser. No. 905,811**
**Claims priority, application Fed. Rep. of Germany, Mar. 29, 1985, 3511712**
**Int. Cl.[4] G11B** *3/70, 5/84;* **B44C** *1/22;* **C03C** *15/00*
**U.S. Cl. 369—280** **17 Claims**

1. A disc-shaped information carrier, optically readable in reflection, provided with an annular information zone, which is bounded by a concentric inner zone and a concentric outer zone, wherein the information carrier comprises a transparent substrate which has a readout side and a back which has a reflective coating, characterized in that said carrier comprises means whereby, as seen from the readout side, any light impinging on the outer zone is reflected at least partially diffusely or is absorbed at least partially by the information carrier, so



that optical effects presesnt in said information carrier which impair the appearance of the information carrier at said outer zone are at least partially covered or concealed.

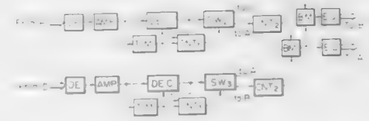
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**4,747,094**

## SIGNAL COUPLING SYSTEM FOR OPTICAL REPEATER SYSTEM

**Haruo Sakaguchi; Norio Seki, both of Tokyo; Shu Yamamoto, Kanagawa, and Yoshinao Iwamoto, Saitama, all of Japan, assignors to Kokusai Denshin Denwa Co., Ltd., Tokyo, Japan**

**Filed Sep. 9, 1985, Ser. No. 773,971**
**Claims priority, application Japan, Sep. 11, 1984, 59-188801**
**Int. Cl.[4] H04B** *9/00*
**U.S. Cl. 370—4** **6 Claims**



1. An optical fiber digital signal branch-transmission system comprising:

at least three signal transmitter-receivers each located at different destination locations, each signal transmitter-receiver to transmit a bit-multiplexed information signal after multiplexing information based on a bit-multiplex operation, said bit-multiplexed information signal being transmitted to other signal transmitter-receivers and, each signal transmitter-receiver to receive and to demultiplex the bit-multiplexed information signal from said other signal transmitter-receivers at said different destination locations;

a single signal coupler to branch off said bit-multiplexed information signals from said signal transmitter-receivers and to couple branched off bit-multiplexed information signals to a same destination location;

optical fiber transmission lines connecting each said signal transmitter-receiver to said signal coupler through at least one optical repeater, said signal coupler exchanging said bit-multiplexed information signals among said signal transmitter-receivers based upon said bit-multiplex operation,

said signal coupler having a first means for demultiplexing the multiplexed-signals from said signal transmitter-receivers by deriving control signals from said bit-multiplexed information signals and for distributing the bit-multiplexed information signals allocated in time slots for their destinations into each different destination locations, and

a second means for multiplexing distributed information signals for the same destination into each different destination location by detecting the phase differences between

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said distributed information signals and by automatically adjusting phase relationships between said distributed information signals for bit-synchronization.

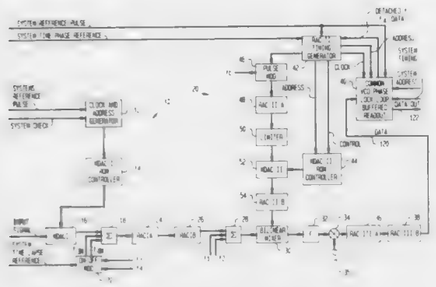
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**4,747,095**

## SAW DEMODULATOR EMPLOYING CORRECTIVE FEEDBACK TIMING

**Rex J. Crookshanks, Palos Verdes Estates, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Jul. 2, 1986, Ser. No. 881,300**
**Int. Cl.[4] H04J *4/00***
**U.S. Cl. 370—70** **19 Claims**



12. For use in a digital communications system having a digital system time base, a demodulator for converting frequency division multiplexed signals to time division multiplexed signals, comprising:

means for receiving a frequency division multiplexed signal having plural frequency bands each conveying a signal with successive symbol segements;

analog dispersion means for introducing differential delays in said frequency division multiplexed signal as a monotonic delay function of frequency so as to stagger the signals concurrently received by said receiving means;

means for generating a predetermined frequency sweep;

means for mixing the symbol segments with said predetermined frequency sweep so as to produce a series of frequency sweep signals;

means for receiving and converting said frequency sweep signals into respective pulses defining a time division multiplexed signal; and,

means for reading out the respective pulses defining said time division multiplexed signal from said converting means at the rate of said digital system time base, said readout means including

(1) means for introducing first and second reference signals into said frequency division multiplexed signal, said first and second reference signals respectively having frequencies above and below the bandwidth of said frequency division multiplexed signal,

(2) means connected with said frequency sweep signal converting means for converting pulses into digital data,

(3) means connected with said pulse converting means for storing digital data, and

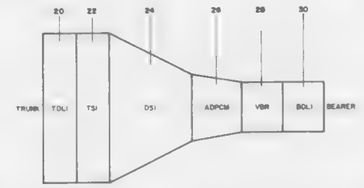
(4) means coupled with said pulse converting means for receiving digital data corresponding to said reference signals and for generating timing control signals for reading out digital data from said storing means to said communications system at the time base rate of said system.

**4,747,096**

## COMBINATION TASI AND ADPCM APPARATUS

**Joshua Pinsecki, Ramat-Gan; Silvain Schaffer, Ramat Hasharon; Aharon Segev, Kiron; Jacob Ben-Zeev, Jerusalem, and Teodor Henquin, Kiron, all of Israel, assignors to ECI Telecom Limited, Tel Aviv, Israel**

**Filed Apr. 17, 1986, Ser. No. 853,412**
**Claims priority, application Israel, Apr. 17, 1985, 74965**
**Int. Cl.[4] H04J *3/17***
**U.S. Cl. 370—81** **18 Claims**




1. A digital circuit multiplication system for interconnecting a transmission trunk link having a plurality of communication channels to a second plurality of telephone communication trunks, said communication channels being transmitted via a bearer bit stream, the second plurality exceeding the first plurality, and comprising:

transmission apparatus at a first end of the transmission trunk link including means for detecting signals on said second plurality of telephone communication trunks and means for assigning each telephone communication line on which signals are present to an available one of the first plurality of communication channels and for providing assignment messages indicating such assignments;

adaptive differential pulse code modulation transmitting means operative to be coupled to said first plurality of communications channels and to transmit speech signals in bit reduced form;

combining means for receiving the output of adaptive differential pulse code modulation transmitting means and combining said output with said assignment messages along the first plurality of communications channels;

signal receiving and message detection means at a second end of the transmission trunk link and being operative to receive the speech signals and assignment messages transmitted via said combining means and to strip the assignment messages therefrom; and

receiving apparatus coupled to said signal receiving and message detection means including means for receiving said assignment messages and assigning each of the first plurality of communication channels carrying signals to a corresponding one of said second plurality of telephone communication lines in accordance with assignment information received from said transmission apparatus.

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**4,747,097**

## MULTIPLEX TRANSMISSION SYSTEM

**Harutada Ohya, Tokyo; Katsutoshi Tagami, Saitama; Yoshikazu Tsuchiya, Saitama; Kazuo Nakamura, Saitama; Hayato Muneyuki, Saitama; Yoshio Mase, and Masaru Nishijimi, both of Tokyo, all of Japan, assignors to Oki Electric Industry Co., Ltd. and Honda Giken Kogyo Kabushiki Kaisha, both of Tokyo, Japan, a part interest**

**Filed Mar. 12, 1986, Ser. No. 839,707**
**Claims priority, application Japan, Mar. 12, 1985, 60-48841; Mar. 12, 1985, 60-48845**
**Int. Cl.[4] H04J *1/16, 3/14***
**U.S. Cl. 370—88** **19 Claims**

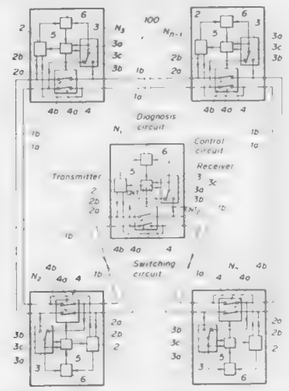
1. A multiplex transmission system comprising:

a signal transmission path connecting a plurality of communication nodes in a communication loop; and

a plurality of communication nodes coupled for communication with each other via the signal transmission path, each node being respectively connectable to control a different unit of electrical equipment, each of said nodes comprising:

a transmitter connected to seize control of the signal transmission path and transmit a prepared signal to said signal transmission path;

a receiver connected to receive a prepared signal generated by a different one of the plurality of communicating nodes from said signal transmission path; and




a control circuit coupled to control the transmitter, the receiver and a connected electrical unit, he control circuit storing a unique node address from a set of ordered addresses assigned to different communication nodes within the system and having a monitor interval timer that is set upon receipt of the prepared signal from a different node over the signal transmission path, the control circuit commanding the transmitter to seize control of the signal transmission path and transmit a prepared signal in sequential order of the stored unique address or upon an occurrence of a timeout from the monitor interval timer, whichever occurs first.

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**4,747,098**

## ZERO BYTE ADDRESS LINKED LIST

**Zheng F. Huang, Ft. Lauderdale, and William M. Robbins, Hollywood, both of Fla., assignors to Racal Data Communications Inc., Sunrise, Fla.**

**Filed Nov. 13, 1986, Ser. No. 930,178**
**Int. Cl.[4] H04J *3/00, 3/12***
**U.S. Cl. 370—99** **4 Claims**

| ORIGINAL FRAME | |
|---|---|
| BYTE NO. | DATA BIT 1-8 |
| 0 | 0 |
| 1-4 | DATA |
| 5 | 0 |
| 6-15 | DATA |
| 16 | 0 |
| 17-23 | DATA |
| 24 | 0 |
| 25-28 | DATA |
| 29 | 0 |
| 30-127 | DATA |

| ZBALL FRAME | | | |
|---|---|---|---|
| BYTE NO. | CONT. BIT (BIT 1) | BITS 2-8 | FLAG BIT |
| 0 | 1 | 0 | 1 |
| 1-4 | DATA | | |
| 0 | 1 | 16 | |
| 6-15 | DATA | | |
| 16 | 1 | 24 | |
| 17-23 | DATA | | |
| 24 | 1 | 29 | |
| 25-28 | DATA | | |
| 29 | 1 | 29 | |
| 30-127 | DATA | | |

1. A method of encoding data into a frame, comprising the steps of:

providing a frame having a plurality of byte locations for storing a plurality of bytes each associated with one of said byte locations;



storing the value of the initial byte location of said frame in a temporary register;

searching all byte locations of said frame after said initial byte location for a first byte location containing zero;

storing an address of a first byte location containing zero in said initial byte location of said frame;

storing the value of said initial byte stored in said temporary register in said first byte location; and

storing non-zero valued bytes of information in their associated byte locations of said frame.

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**4,747,099**

## PCM COMMUNICATION APPARATUS

**Kiyokazu Suga, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed May 27, 1986, Ser. No. 867,067**
**Claims priority, application Japan, May 25, 1985, 60-111355**
**Int. Cl.[4] H04J *3/00***
**U.S. Cl. 370—77** **11 Claims**



1. A PCM communication apparatus which encodes an input signal on each of a plurality of channels according to a predetermined encoding rule and multiplexes the encoded data on the respective channels comprising:

a plurality of channel units, each including encoding means for encoding an input signal according to the encoding rule and, while the input signal is absent, generating a particular code, and code converting means responsive to an output of said encoding means for inverting codes of those bits which correspond to ZERO code positions of said particular code; and

a multiplexer unit including means for coupling data lines to a reference voltage, said channel units being individually connected to the data lines, a plurality of code reconverting means each for reinverting those codes at bit positions which are to be inverted by said code converting means, and multiplexing means for time division multiplexing outputs of said code reconverting means.

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**4,747,100**

## TOKEN PASSING NETWORK UTILIZING ACTIVE NODE TABLE

**J. Monte Roach, Ann Arbor, Mich.; Lester A. Jones, Mentor, Ohio; Wayne C. Van Sickle, South Euclid, Ohio, and Ronald E. Schultz, Solon, Ohio, assignors to Allen-Bradley Company, Inc., Milwaukee, Wis.**

**Filed Aug. 11, 1986, Ser. No. 895,267**
**Int. Cl.[4] H04J *3/26***
**U.S. Cl. 370—86** **15 Claims**

1. A method for operating a station on a token passing logical ring network, the station including a memory for storing data for use by the station, the method comprising the steps of:

(a) receiving messages from the network, said messages containing information fields identifying the source, the destination, and the type of the message;

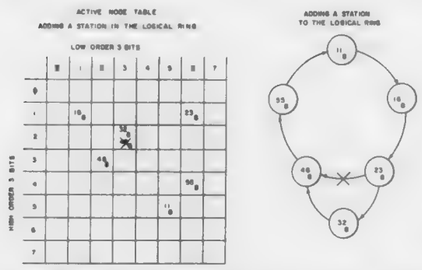
(b) decoding the type of the message from said type information field;

(c) establishing an Active Node Table in said memory by

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repeating steps (a) and (b) for every message on the network, and if the type of the message as decoded in steb (b) is a token pass, then storing the source and destination information from every such token pass message in the Active Node Table to indicate that both the source and



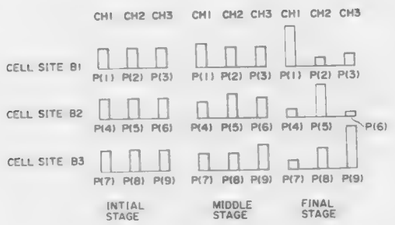

the destination are in the logical ring and that the destination follows the source in the sequence of passing the token, thereby updating the Active Node Table with the identity of every station in the logical ring and the sequence in which the token is passed.

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**4,747,101**
**METHOD OF DETERMINING OPTIMAL TRANSMISSION CHANNEL IN MULTI-STATION COMMUNICATIONS SYSTEM**

**Yoshihiko Akaiwa; Yukitsuna Furuya, and Kazutomo Kobayashi, all of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan**

**Filed Apr. 22, 1986, Ser. No. 854,961**
**Claims priority, application Japan, Apr. 22, 1985, 60-85836; Jun. 5, 1985, 60-122223; Oct. 11, 1985, 60-226245; Oct. 16, 1985, 60-231657**
**Int. Cl.[4] H04Q *11/00***
**U.S. Cl. 370—95** **6 Claims**



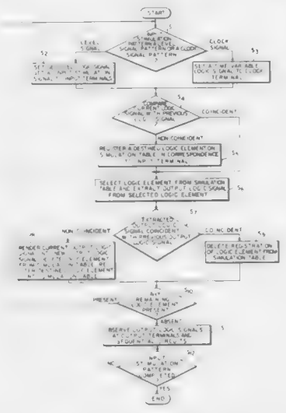

1. In a multi-station communications system utilizing a plurality of channels in common, a method of determining the order of transmission channels to be used at each station utilizing a transmission priority assigned to each channel, comprising the steps:
(a) receiving a transmission request;
(b) selecting the channel with the highest transmission priority among the channels not in use at the station;
(c) determining whether the selected channel is used at another station;
(d) in the event that the selected channel is not used at another station, the transmission priority of the selected channel is raised and the transmission is performed via the selected channel; and
(e) in the event that the selected channel is used at another station, the transmission priority of the selected channel is lowered and, thereafter, a channel is selected which has the next highest transmission priority among the channels not in use at the station;
(f) determining whether the channel selected at step (e) is used at another station;
(g) in the event that the channel selected at step (e) is not used at another station, the channel is employed for transmission; and
(h) in the event that the channel selected at step (e) is used at another station, steps (e) and (f) are repeated.

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**4,747,102**
**METHOD OF CONTROLLING A LOGICAL SIMULATION AT A HIGH SPEED**

**Shigehiro Funatsu, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed Mar. 28, 1986, Ser. No. 845,244**
**Claims priority, application Japan, Mar. 30, 1985, 60-64973**
**Int. Cl.[4] G01R *31/28*; G06F *11/00***
**U.S. Cl. 371—23** **5 Claims**



1. A method of controlling a logical simulation of a logic circuit comprising a plurality of logic elements which can be simulated by forming a shift register string which is capable of carrying out a serial shift operation, said logical simulation being progressive in accordance with a simulated table on which said logic elements are described, said method comprising the steps of:
providing an input stimulation signal for accessing said logic circuit; and
controlling operation of said logic elements by the use of said simulation table said controlling step including the step of directly setting said input stimulation signal into said logic elements on said simulation table without said serial shift operation to make said logic circuit carry out said logical simulation.

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**4,747,103**
**SIGNAL PROCESSING APPARATUS FOR CORRECTING DECODING ERRORS**

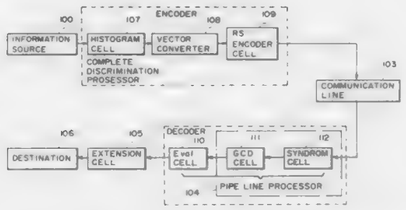
**Keiichi Iwamura; Hideki Imai, both of Yokohama, and Yasunori Dohi, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 20, 1986, Ser. No. 841,771**
**Claims priority, application Japan, Mar. 21, 1985, 60-057048; Mar. 21, 1985, 60-057049; Mar. 21, 1985, 60-057050; Mar. 21, 1985, 60-057051; Mar. 21, 1985, 60-057052**
**Int. Cl.[4] G06F *11/10***
**U.S. Cl. 371—37** **6 Claims**

1. A signal processing apparatus for processing signals comprising three types of cells which include (1) first cell means for producing syndromes, (2) second cell means for producing an



error position polynomial and an error evaluation polynomial, and (3) third cell means for estimating and correcting, errors in



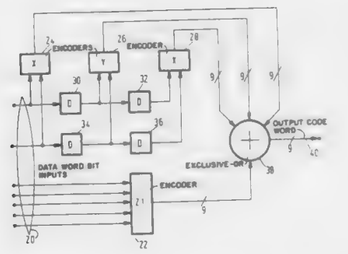

position and size in the decoding of a BCH code wherein said cells are one-dimensionally arranged.

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**4,747,104**
**DATA TRANSMISSION SYSTEM EMPLOYING A COMBINATION OF BLOCK ENCODING AND CONVOLUTION ENCODING FOR ERROR PROTECTION**

**Philippe M. O. A. Piret, Lasne, Belgium, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Jun. 5, 1986, Ser. No. 871,013**
**Claims priority, application European Pat. Off., Jun. 14, 1985, 85200939.8**
**Int. Cl.[4] G06F *11/10***
**U.S. Cl. 371—39** **7 Claims**



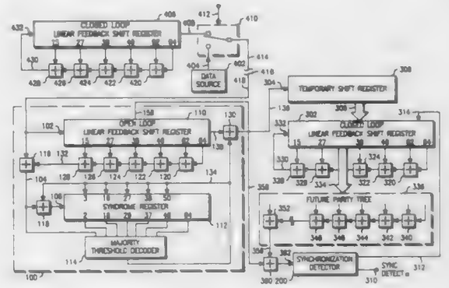

1. A transmission system for successive data words each comprising a sequence of bits of successive levels of significance, such transmission system comprising a transmitting station and a receiving station interconnected by a transmission medium, said transmitting station comprising an encoder system for redundantly encoding each of such successive data words with redundancy bits; characterized in that said encoder system comprises:
a first encoder which by matrix multiplication encodes a set of less significant bits of each such successive data word into a first proto-code word;
a second encoder which by further matrix multiplication encodes the remaining more significant bits of each data word into a set of "n" further proto-code words, such second encoder comprising a plurality of delay elements for imparting respective different delays to said further protor-code words, such delays being in multiples of the recurrence times of the successive data words; and
modulo-two adding means connected to said first and second encoders for bitwise adding said first proto-code word and said "n" further proto-code words, such "n" further proto-code words corresponding to "n" different data words, so as to derive a final code word having an extended bit length with respect to the bit length of a data word and which comprises a block code of the less significant bits of a data word and a convolutional code of the more significant bits of such data word, said modulo-two adding means having an output connected to said transmission medium.

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**4,747,105**
**LINEAR FEEDBACK SEQUENCE DETECTION WITH ERROR CORRECTION**

**Alan L. Wilson, Hoffman Estates; Michael W. Bright, Arlington Heights, and Eric F. Ziolko, Schaumburg, all of Ill., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Sep. 3, 1986, Ser. No. 903,335**
**Int. Cl.[4] G06F *11/10***
**U.S. Cl. 371—47** **20 Claims**




1. A circuit for detecting whether a synchronization sequence that has been generated according to a known algorithm is present within a received data stream that may have become corrupted by errors, comprising:
error-correction means, to which the received data stream couples, for producing from the received data stream an error-corrected stream in which, if the synchronization sequence is present in the received data stream, at least some of the errors in the synchronization sequence will have been corrected;
local sequence generation means, coupled to the error-correction means, for genernating a local sequence by applying the known algorithm to the error-corrected stream;
shifted local sequence generation means, coupled to the local sequence generation means, for generating a shifted local sequence by obtaining a shifted version of the local sequence;
correlation means, coupled to the received data stream and the shifted local sequence generation means, for determining a degree of correlation between the received data stream and the shifted local sequence; and
detection means, coupled to the correlation means, for indicating detection if the degree of correlation exceeds a detection threshold.

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**4,747,106**
**PARITY CHECKER CIRCUIT**

**Akihiko Wakimoto, Takarazuka, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan**

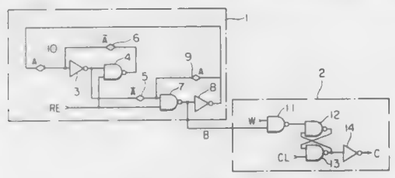
**Filed Oct. 31, 1985, Ser. No. 793,293**
**Claims priority, application Japan, Nov. 1, 1984, 59-230843**
**Int. Cl.[4] G06F *11/10***
**U.S. Cl. 371—49** **2 Claims**

1. A parity checker circuit for performing a parity check in the serial transfer of data in an integrated circuit comprising an odd or even decision circuit including a pair of feedback logic circuits, each comprising a plurality of logic gates and a transmission gate, said transmission gate being operable in accordance with said data stream so as to open or close said feedback logic circuits, wherein said odd or even decision circuit provides means for receiving sequential bits constituting a data stream and generating an output signal having a level which becomes high or low after reception of the data stream and

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representing whether the number of "1" or "0" in the data is odd or even, and a parity flag circuit connected to receive the output signal from said decision circuit and operable in accordance with a write signal received simultaneously with the high or low level output signal and, in response to said signals, for outputting a parity flag indicative of the parity of the data stream.



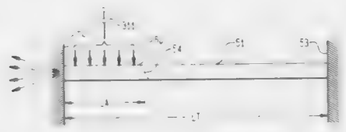
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**4,747,107**

## SINGLE MODE INJECTION LASER

**Stewart E. Miller, Middletown Township, Monmouth County, N.J., assignor to Bell Communications Research, Inc., Livingston, N.J.**

**Continuation-in-part of Ser. No. 773,123, Sep. 6, 1985, abandoned. This application Oct. 8, 1986, Ser. No. 916,638**
**Int. Cl.[4] H01S *3/19***
**U.S. Cl. 372—44** **13 Claims**



1. An injection laser comprising:
an active material disposed in a laser cavity,
means for injection pumping the active material with an injection current to produce radiation having longitudinal modes,
characterized in that
the laser further comprises means for spreading the longitudinal modes so that some adjacent longitudinal modes overlap, the means for spreading comprising means for modulating a current through the laser at a modulating frequency corresponding to the wavelength separation of the longitudinal modes.

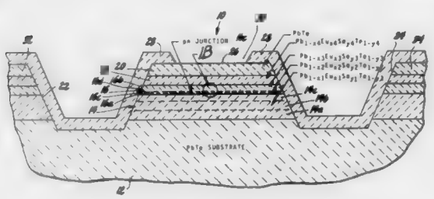
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**4,747,108**

## LEAD-EUROPIUM-SELENIDE-TELLURIDE DIODE LASER

**Dale L. Partin, Sterling Heights, and Joseph P. Heremans, Troy, both of Mich., assignors to General Motors Corporation, Detroit, Mich.**

**Filed Jun. 30, 1986, Ser. No. 879,881**
**Int. Cl.[4] H01S *3/19***
**U.S. Cl. 372—44** **19 Claims**



1. A double heterojunction semiconductor diode laser with an increased operating temperature, wherein the improvement comprises:
a first confinement layer of a semiconductor material having the formula $Pb_{1-x1}Eu_{x1}Se_{y1}Te_{1-y1}$;
an optical cavity having two surfaces, comprising:
(a) a quantum well layer of a semiconductor material having the formula $Pb_{1-x2}Eu_{x2}Se_{y2}Te_{1-y2}$, where $x1>x2$, one of said two surfaces being adjacent said first confinement layer, said quantum well layer having a thickness approximately equal to the deBroglie wavelength of charge carriers in the quantum well layer, and
(b) a waveguide layer of semiconductor material having the formula $Pb_{1-x3}Eu_{x3}Se_{y3}Te_{1-y3}$, where $x2<x3<x1$;
a second confinement layer of a semiconductor material having the formula $Pb_{1-x4}Eu_{x4}Se_{y4}Te_{1-y4}$, where $x4>x3$, said second confinement layer being adjacent the other of said two optical cavity surfaces; and
pn junction surface defining two conductivity-type regions in said laser, the semiconductor material in one said region being doped p-type and semiconductor material in the other said region being doped n-type.

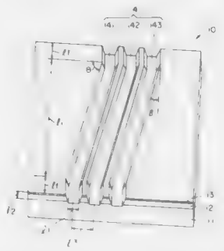
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**4,747,109**

## SEMICONDUCTOR LASER ARRAY DEVICE

**Mototaka Taneya, Nara; Mitsuhiro Matsumoto; Sadayoshi Matsui, both of Tenri, and Seiki Yano, Kashihara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Jul. 2, 1986, Ser. No. 881,096**
**Claims priority, application Japan, Jul. 12, 1985, 60-154716**
**Int. Cl.[4] H01S *3/19***
**U.S. Cl. 372—48** **1 Claim**



1. In a semiconductor laser array device comprising a plurality of index-waveguides in a parallel manner, said index-waveguides are at an angle of inclination from a line perpendicular to each of both facets of the laser array device, and both end portions of each of said index-waveguides are at right angles to the facets.

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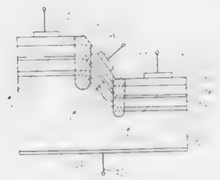
**4,747,110**

## SEMICONDUCTOR LASER DEVICE CAPABLE OF EMITTING LASER BEAMS OF DIFFERENT WAVELENGTHS

**Yasuhito Takahashi, Hirakata; Mototsugu Ogura, Takaichi, and Nobuyasu Hase, Atsugi, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan**

**Filed Feb. 13, 1986, Ser. No. 829,090**
**Claims priority, application Japan, Feb. 13, 1985, 60-25508; Feb. 20, 1985, 60-32041**
**Int. Cl.[4] H01S *3/19***
**U.S. Cl. 372—50** **20 Claims**

1. A semiconductor laser device comprising:
a compound semiconductor substrate;
a first semiconductor layer disposed on said compound semiconductor substrate;
a second semiconductor layer disposed on said first semiconductor layer, said second semiconductor layer having at least three thin film layers of at least two different semiconductor compounds, said thin film layers being laminated with the different semiconductor compound layers alternating;
an electrically isolating region extending through the thickness of said second semiconductor layer and electrically dividing said second semiconductor layer into first and second portions which differ in quantum level from each other;
a third semiconductor layer disposed on said second semiconductor layer;



first and second electrodes disposed on said third semiconductor layer in positions for supplying current to said first and second portions, respectively; and
a third electrode disposed on said substrate at the surface thereof opposite to said first and second electrodes,
whereby when a voltage is applied between said third and first electrodes and said third and second electrodes, laser beams having different wavelengths are emitted from said first and second portions of said second semiconductor layer, respectively.

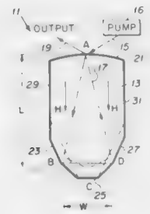
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**4,747,111**

## QUASI-PLANAR MONOLITHIC UNIDIRECTIONAL RING LASER

**William R. Trutna, Jr., Atherton, and Moshe Nazarathy, Mountain View, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Feb. 13, 1987, Ser. No. 14,751**
**Int. Cl.[4] H01S *3/16, 3/083***
**U.S. Cl. 372—94** **15 Claims**




1. A laser resonator comprising:
a solid-state laser medium;
means for defining within said solid-state laser medium a resonant unidirectional ring including at least four non-coplanar reflection vertices, the maximum minor angle defined by intersections of pairs of planes defined by respective sets of three of said reflection vertices being less than 45°.



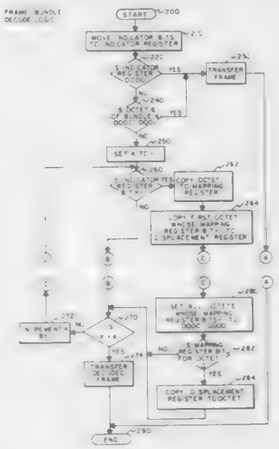
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**4,747,112**

## DECODING METHOD FOR T1 LINE FORMAT FOR CCITT 32K BIT PER SECOND ADPCM CLEAR CHANNEL TRANSMISSION AND 64 KBPS CLEAR CHANNEL TRANSMISSION

**Ernest E. Blondeau, Jr., Phoenix, and Stephen J. Czarnecki, Scottsdale, both of Ariz., assignors to GTE Communication Systems Corporation, Phoenix, Ariz.**

**Filed Sep. 2, 1986, Ser. No. 902,826**
**Int. Cl.[4] H04L *25/49*; H04J *3/06, 3/12***
**U.S. Cl. 375—20** **17 Claims**




1. In a data transmission system having first and second digital switching systems connected via T1 line transmission facilities for bidirectional data transmission, a decoding method for T1 line zero bit suppression comprising the steps of:
receiving an encoded T1 line frame including a plurality of bundled channels;
testing indicator bits of said received T1 line frame to determine whether any channel of said T1 line frame has been altered for said transmission;
first transferring said received T1 line frame as received, performed in response to said indicator bits showing that no alteration have been made to said received T1 line frame;
decoding mapping bits of said received T1 line frame to determine which channels of one said bundle of said received T1 line frame have been altered for said encoded transmission;
replacing the contents of each said altered channel of said bundle with zeroes;
iterating said steps of decoding and replacing for each of said bundles of said received T1 line frame; and
second transferring said received T1 line frame with said altered channels being replaced with zeroes.

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**4,747,113**

## PROCESS FOR THE BASE BAND MODULATION OF A DATA SIGNAL, AS WELL AS THE CORRESPONDING MODULATION AND DEMODULATION APPARATUSES

**Alain Viallevieille, Versailles, France, assignor to Etablissement Public Telediffusion de France, France**

**Filed Aug. 1, 1986, Ser. No. 892,829**
**Claims priority, application France, Aug. 2, 1985, 85-11864**
**Int. Cl.[4] H03M *7/00***
**U.S. Cl. 375—25** **9 Claims**

1. A process for the base band modulation of a data signal formed from a succession of bits at rate T, the modulated signal comprising a sequence of bit intervals at rate, T, in which a bit

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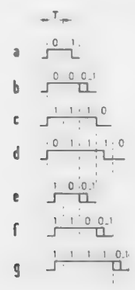


of a counter for counting errors detected by said error detect-
bit interval and a bit of the second logic state 1 by a transition in the center of a bit interval, wherein:

(a) a bit is marked with the value 0 if it follows a bit not marked with the value 0 or a sequence of three consecutive bits not marked with the value 1,

(b) a bit is marked with the value 1 if it follows a bit of value 0 or a sequence of three consecutive bits not marked with the value 1,

(c) by exception to the rules in the above paragraphs (a) and (b), in the case where these rules lead to the marking of the first bit of a sequence 1110, called a particular sequence,




formed from three bits of value 1, followed by a bit of value 0, said particular sequence is coded in the following way:

(c1) if the bit preceding said particular seuence is a marked bit of value 0, only the third bit of value 1 of said particular sequence is marked, by a bit interval center transition, and

(c2) if the bit preceding the first bit of said particular sequence is not a marked bit of value 0, the first bit of value 1 of this particular sequence is marked, as is the bit of value 0 of said particular sequence, each by a bit interval start transition.

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**4,747,114**

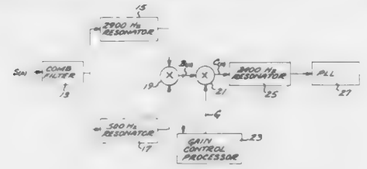
## MODEM CLOCK WITH AUTOMATIC GAIN CONTROL

**Aldo A. Martinez, Miami, Fla., assignor to Racal Data Communications Inc., Sunrise, Fla.**

**Filed Sep. 24, 1984, Ser. No. 654,187**

**Int. Cl.[4] H04L** *27/08, 7/06*

**U.S. Cl. 375—98** **14 Claims**




1. A modem clock recovery system comprising:

a comb filter responsive to a data modulated received signal for providing a comb filter output;

resonator means responsive to said comb filter output for providing Nyquist band edge components:

means responsive to said Nyquist band edge components for providing a reference signal having a clock timing component; and

gain control means responsive to said reference signal for adaptively controlling the gain of said reference signal having a clock timing component.

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**4,747,115**

## BUS-REDUNDANCY TYPE APPARATUS FOR A TRANSMITTING SYSTEM

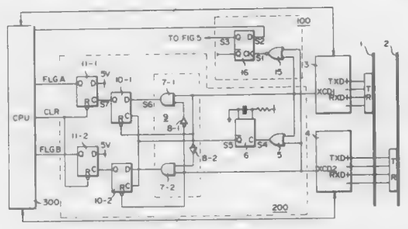
**Shigeo Nambu, Fuchu, Japan, assignor to Kabushiki Kaisha Toshiba, kawasaki, Japan**

**Filed Jul. 28, 1986, Ser. No. 889,627**

**Claims priority, application Japan, Jul. 26, 1985, 60-165534; Mar. 31, 1986, 61-71173**

**Int. Cl.[4] H04L** *1/20, 1/22*

**U.S. Cl. 375—100** **5 Claims**




1. A bus-redundancy type apparatus for a transmitting system, comprising:

first and second transmission lines respectively provided as a normally operating transmission line and a stand-by transmission line for data transmission in a transmission system, in which bus access control is performed;

first and second carrier-detection means for receiving transmission data from said respective first and second transmission lines and for detecting carrier components in said transmission data;

carrier-disappearance detection means for receiving the results of detection by said first and second carrier-detection means and for providing a carrier-disappearance signal when it is detected that neither of said first and second carrier detection means detects any carrier component;

transmission line-switching command means for providing a transmission line-switching command to select either one of said first and second transmission lines;

switching means for selecting transmission data from said first and second transmission lines, to be received; and

control means for receiving a carrier-disappearance signal from said carrier-disappearance detection means and a transmission line-switching command from said transmission line switching command means and supplying said transmission line-switching command to said switching means at the time of reception of said carrier-disappearance signal.

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**4,747,116**

## SYNC SIGNAL DETECTING DEVICE

**Hiroaki Yajima, and Youichirou Tsuda, both of Saitama, Japan, assignors to Pioneer Electric Corporation, Tokyo, Japan**

**Filed Mar. 21, 1986, Ser. No. 842,582**

**Claims priority, application Japan, Mar. 22, 1985, 60-41312[U]**

**Int. Cl.[4] H04L** *7/00*

**U.S. Cl. 375—114** **6 Claims**

1. A sync signal detecting device comprising:

sync signal pattern generating means for generating a sync signal pattern corresponding to an expected sync signal pattern contained in a digital signal;

sync signal detecting means for comparing said digital signal with said sync signal pattern generated by said pattern generating means to detect a sync signal in said digital signal;

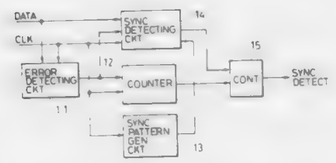
error detecting means for detecting errors in said digital signal;



a counter for counting errors detected by said error detecting means; and

means for producing a detection signal as follows:

when, in the case where no error is detected by said error detecting means, said means for producing is able to produce said detection signal when said sync signal detecting means detects said sync signal pattern, and




when, in the case errors are detected by said error detecting means, said means for producing is able to produce said detection signal when both the number of errors detected is equal to or less than a predetermined value, and a part of said digital signal which is not coincident with said sync signal pattern is a part where an error has been detected.

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**4,747,117**

## DEVICE FOR DETERMINING LOCAL ABSORPTION VALUES IN A SLICE OF A BODY, AND AN ARRAY OF DETECTORS FOR SUCH A DEVICE

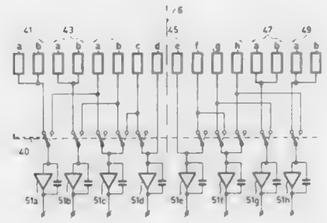
**Cornelis B. J. D. Albrecht; Roland A. J. O. Van Witteveen, and Frans W. Zonneveld, all of Eindhoven, Netherlands, assignors to U.S. Philips Corp., New York, N.Y.**

**Continuation of Ser. No. 898,790, Aug. 18, 1986, abandoned, which is a continuation of Ser. No. 123,638, Feb. 22, 1980, abandoned, which is a continuation of Ser. No. 948,282, Oct. 3, 1978, abandoned. This application Jun. 17, 1987, Ser. No. 63,738**

**Claims priority, application Netherlands, Oct. 11, 1977, 7711120**

**Int. Cl.[4] H05G** *1/60*

**U.S. Cl. 378—019** **10 Claims**




1. A device for determining local radiation absorption values in a slice of a body having a central axis, comprising:

at least one radiation source for generating a fan-shaped beam of radiation which irradiates the slice of the body and which passes through the slice in different directions, said radiation source being situated on a first side of the central axis;

an array of detector elements, having uniform dimensions and behavior, for detecting the radiation emitted by the radiation source, said array being situated on a second side of the central axis opposite said radiation source, each of said detector elements generating an output signal;

means connected to the output signal from each detector element for separately time-integrating the output signals from each detector element;

means for adding the integrated output signals from a group of detector elements, the sum being an integrated detector signal which is electrically isolated from the integrated detector signal of any other detector element or group of detector elements; and

switchable means for connecting the integrated output signals from at least two groups of detector elements to the adding means, said switchable means connecting the integrated output signals of only one group of detector elements at a time.

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**4,747,118**

## X-RAY EXAMINATION SYSTEM AND METHOD OF CONTROLLING AN EXPOSURE THEREIN

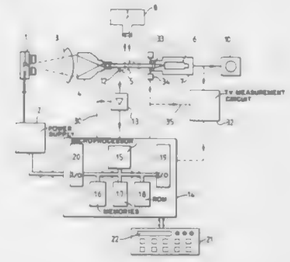
**Willem E. Spaak, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Apr. 25, 1986, Ser. No. 856,611**

**Claims priority, application United Kingdom, Apr. 29, 1985, 8510863**

**Int. Cl.[4] H05G** *1/34*

**U.S. Cl. 378—110** **12 Claims**




2. In an X-ray examination system generator which includes an X-ray tube, a controllable power supply, sensing means for sensing X-radiation beyond an object under examination which is located in the path of X-radiation from the X-ray tube, X-ray exposure control means connected to the sensing means which apply a predetermined tube voltage V and tube current I to the X-ray tube to perform an exposure measurement during which the sensed radiation is measured and use the measurement to calculate an exposure value $I_{EXP}$ of a switch-on tube current which, together with the predetermined tube voltage V, will provide a predetermined exposure density E during an exposure having a predetermined duration $T_{EXP}$:

which system further includes an X-ray image intensifier and wherein the sensing means comprise light sensitive means which determine the luminous intensity of at least part of an output image of the X-ray image intensifier: the improvement wherein:

the light sensing means include means which provide an output signal LI which is representative of the luminous intensity of at least part of an output image of the image intensifier; and

the exposure control means first use the output signal to carry out an exposure measurement during a fluoroscopy procedure using a tube voltage $V_{FL}$ and a tube current $I_{FL}$ and thereafter use said output signal to calculate an exposure value $I_{EXP1}$ for a switch-on tube current for application at a tube voltage $V_{FL}$, from the tube current $I_{FL}$, the luminous intensity LI and further include means which respond to the selection of a tube voltage $V_{EXP}$ for performing an exposure, $V_{EXP}$ being different from the tube voltage $V_{FL}$ used during fluoroscopy, to calculate a new exposure value $I_{EXP2}$ for the tube current control variable by means of the relationship

$$I_{EXP2} \simeq I_{EXP1} \times |V_{FL}/V_{EXP}|$$

where p is a function inter alia of the tube voltage.

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**4,747,119**

## CEILING MOUNT FOR AN X-RAY RADIATOR

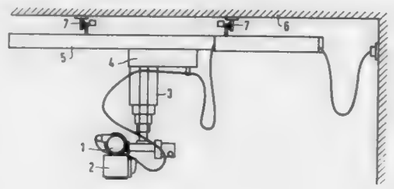
**Lothar Heinz, Neunkirchen, and Thomas Schmitt, Forchheim, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Mar. 24, 1986, Ser. No. 843,379**

**Claims priority, application Fed. Rep. of Germany, May 2, 1985, 8512989[U]**

**Int. Cl.⁴ H05G *1/02***

**U.S. Cl. 378—197** **9 Claims**



2. A ceiling mount for an X-ray radiator comprising:

a carriage carrying said X-ray radiator;

said carriage being displaceably guided by rails;

a friction block, motor-displaceable perpendicular to the rail direction, being attached to said carriage for locking said carriage;

said friction block being secured to a holder which is resiliently seated perpendicular to the corresponding rail;

said holder including a latch facing said allocated rail which interacts with corresponding latches on said rail;

said holder being selectively movable between three positions by means of a motor, said holder latch being held away from said rail latch permitting free movement of said carriage on said rail in a first holder position, said holder being held sufficiently close to said rail to permit said rail latch to engage with said holder latch as said carriage is moved along said rail in a second holder position, and said friction block held in said holder being pressed against said rail in a third holder position to provide said latching of said carriage to said rail.

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**4,747,120**

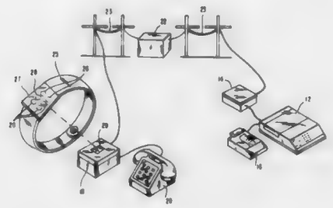
## AUTOMATIC PERSONNEL MONITORING SYSTEM

**Steven L. Foley, Ft. Lauderdale, Fla., assignor to Digital Products Corporation, Ft. Lauderdale, Fla.**

**Filed Aug. 13, 1985, Ser. No. 765,343**

**Int. Cl.⁴ H04M *1/26***

**U.S. Cl. 379—38** **57 Claims**



1. A monitoring system for monitoring the presence of a person at a remote location through a telephone line, comprising:

means at a central location for automatically establishing a telephone link between the central and remote locations;

an object;

means for attaching said object to said person and indicating if said attachment has been tampered with; and

decoder means at the remote location said decoder means including means for receiving said object and means for producing a verification signal and transmitting the verification signal to said central location upon insertion of said object into said object-receiving means.

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**4,747,121**

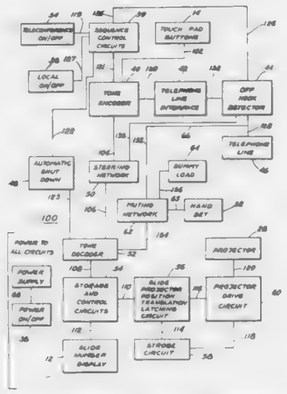
## REMOTE CONTROL SLIDE PROJECTOR MODULE

**Albert J. Nash, Merrick; Richard Chan, Brooklyn, and Joseph Vitale, West Babylon, all of N.Y., assignors to Educational Technology, Inc., Merrick, N.Y.**

**Filed May 1, 1986, Ser. No. 858,028**

**Int. Cl.⁴ H01N *7/14***

**U.S. Cl. 379—53** **20 Claims**



1. A slide projector control module to operate one or more slide projectors located at one or more different locations, each said slide projector having a slide tray, and each said control module comprising;

means connecting each slide projector with a control module;

remote means using conventional telephone lines to connect each said slide projector and each said control module at each location so that the same slide is viewed at all locations;

local means electrically associated with said remote means to render said remote means inoperative to operate the slide projector only at its location with its associated control module;

switch means to operate said remote means to connect and disconnect said remote means from a key pad from the remote projectors; and

muting means connected with said telephone lines to mute touch tone signals.

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**4,747,122**

## MOBILE PAGING CALL BACK SYSTEM AND RELATED METHOD

**Jai P. Bhagat, and William D. Hays, both of Jackson, Miss., assignors to Mobile Communications Corporation of America, Jackson, Miss.**

**Filed Oct. 27, 1986, Ser. No. 923,206**

**Int. Cl.⁴ H01Q *7/00***

**U.S. Cl. 379—57** **1 Claim**

1. A mobile paging and radio telephone call back system comprising:

a mobile radio telephone having means for digitally controlling dialing of said telephone in response to control head signals;

radio pager means for receiving radio broadcast paging signals which include data representing a telephone number and for providing as an output data which represents that telephone number;

a mobile power supply coupled to power both said mobile radio telephone and said radio pager means;

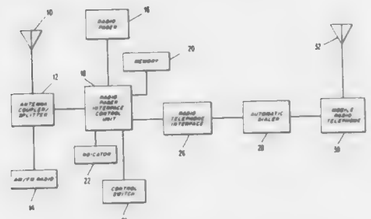
a memory;

indicator means for providing a signal to a system operator;

control switch

manual dialer means, coupled to said mobile radio telephone for generating control head signals for digitally controlling dialing of said mobile radio telephone;

control unit means for interconnecting said radio pager means, said memory, said indicator, said control switch and said manual dialer means, said control unit means including:



(a) interface means for converting said data representing said telephone number to corresponding control head signals for use by said mobile telephone; and

(b) a logic circuit: (i) to provide verification that valid data representing a telephone number has been received from said radio page, (ii) to store said data, after said verification in said memory, (iii) to activate said indicator, after said verificatin, to provide a signal indicating that validated data has been received, and (iv) to either transfer said stored data from said memory to said interface means for use therein to generate said corresponding control head signals to dial said mobile radio telephone or to erase said data from said memory, in response to activation of said control switch; and

means for mounting said system to a mobile vehicle.

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**4,747,123**

## MF SIGNAL TRANSMITTING CONTROL APPARATUS/METHOD FOR USE IN CORDLESS TELEPHONE SYSTEM

**Masayuki Makino, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed Mar. 7, 1986, Ser. No. 837,222**

**Claims priority, application Japan, Mar. 8, 1985, 60-46157**

**Int. Cl.⁴ H04Q *7/04***

**U.S. Cl. 379—62** **12 Claims**

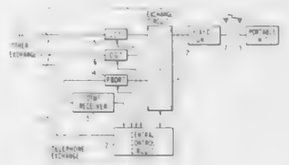
1. A multi-frequency (MF) signal transmitting control apparatus for use in a cordless telephone system which comprises a fixed unit connected to an exchange and a portable unit connectable to said fixed unit by a radio channel, comprising:

means for sending a dial signal from said portable unit to said fixed unit, said dial signal including a dial signal discrimination code and a dial number code following said dial signal discrimination code;

audio circuit means for forming an audio channel between said exchange and said portable unit;

means for detecting said dial signal to provide detected dial signal discrimination and dial number codes to said audio circuit means;

control section means for keeping said audio circuit means turned off for a first prescribed length of time after receiving said detected dial signal discrimination code and, after the lapse of said first prescribed length of time, sending from said fixed unit to said exchange an MF signal corresponding to said detected dial number code, wherein said first prescribed length of time is sufficient to enable all of



said MF signal to be sent to said exchange without interference.

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**4,747,124**

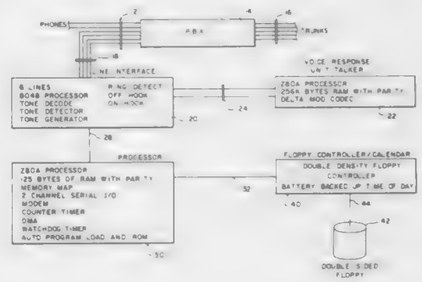
## PBX TELEPHONE CALL CONTROL SYSTEM

**David J. Ladd, Las Gatos, Calif., assignor to Opcom, San Jose, Calif.**

**Continuation-in-part of Ser. No. 425,227, Sep. 28, 1982, abandoned. This application May 6, 1985, Ser. No. 731,171**

**Int. Cl.⁴ H04M *3/50, 3/58***

**U.S. Cl. 379—67** **13 Claims**



1. A call control system for being coupled to a PBX-type exchange (hereinafter said PBX) in order to control the routing of telephone calls from one or more calling parties through said PBX between a plurality of incoming external trunks and a plurality of internal telephone subscriber lines connected to internal telephones, comprising

a line interface unit connected to some of said internal subscriber lines for simulating a plurality of telephone extensions which can be called by said one or more calling parties through said incoming external trunks or through said internal telephones connected to others of said internal telephone subscriber lines to provide a multiple cell processing capability, said line interface unit including

means for detecting that a calling party using one of said incoming external trunks or said internal telephones is calling one of said plurality of simulated extensions,

means for answering said calling party on one of said incoming external trunks or said internal telephones and informing said calling party to signal a certain extension number

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corresponding to one of said internal telephones connected to one of said internal telephone subscriber lines,
DTMF means responsive to a signaled extension number for receiving and decoding said signaled extension number from said calling party, and
means for signaling said PBX to attempt a transfer of said caling party to said extension having said certain number.

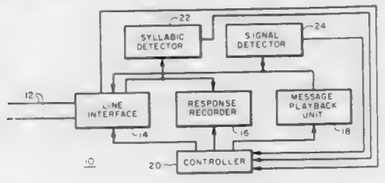
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**4,747,125**

## PROGRAMMED CONVERSATION RECORDING SYSTEM WITH VARIABLE PATIENCE INTERVAL

**Gregory D. Buchberger, 500 Huntington Commons Rd., Mt. Prospect, Ill. 40200, and Peter F. Theis, 3203 Bay View La., McHenry, Ill. 60050**

**Filed Dec. 2, 1986, Ser. No. 937,047**
**Int. Cl.[4] H04M** *11/10*
**U.S. Cl. 379—67** **17 Claims**




1. In a response recording system of the type comprising means for automatically presenting a caller with at least one message and means for automatically recording a caller response to said at least one message during a recording period, the improvement comprising:
means for automatically detecting a pause in the caller response;
means for providing a patience interval which varies during the recording period as a function of the duration of the caller response; and
means for automatically terminating the recording period when the duration of the pause exceeds the patience interval.

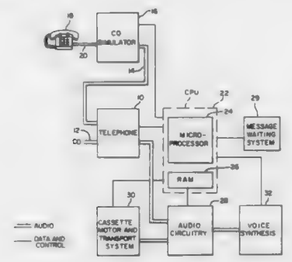
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**4,747,126**

## VOICE MAIL SYSTEM ON MAGNETIC TAPE

**William G. Hood, Tigard; Thomas D. Klarquist, Beaverton; Kai-Dick Lee, Portland; Bruce C. Nepple, Portland; Daniel C. Olin, Portland; Lawrence B. Park, Aloha, and Michael C. Park, Portland, all of Oreg., assignors to A T & E Corporation, San Francisco, Calif.**

**Continuation-in-part of Ser. No. 703,249, Feb. 20, 1985, abandoned. This application Feb. 27, 1986, Ser. No. 833,888**
**Int. Cl.[4] H04M** *1/65*
**U.S. Cl. 379—74** **25 Claims**




14. A voice mail system for recording audio messages transmitted by a user over a telephone line to the system and for subsequently forwarding the messages to recipients designated by mailbox identifiers transmitted by the user, comprising:
a magnetic tape divided into a plurality of message cells;
means, coupled to said telephone line, for recognizing an incoming call and placing the system in an active state;
decoder means coupled to said telephone line for decoding control signals including mailbox identifiers transmitted on said telephone line;
processing means coupled to said decoder means for controlling the operation of said voice mail system;
message recording means, controlled by said processing means and coupled to said telephone line, for recording audio messages in said message cells;
memory means, controlled by said processing means, for storing cell locations in which messages have been recorded and mailbox identifiers associated with the stored cell locations;
means for switching the system to an idle state after an audio message has been recorded and after the memory means has stored the cell location and mailbox identifier;
indicator means located at a location remote from the message recording means, controlled by said processing means, for indicating the presence of a new recorded audio message in the system in association with a recipient's mailbox identifier;
means for the recipient to switch the system to an active state;
playback means, controlled by said processing means and coupled to said telephone line, for playing a message recorded in a cell in response to a recipient's generated control signal which includes the mailbox identifier associated with the recorded message; and
means for returning the system to the idle state following the playback of a message.

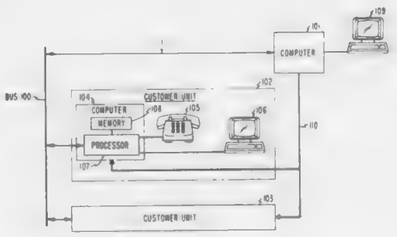
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**4,747,127**

## CUSTOMER PROGRAMMABLE REAL-TIME SYSTEM

**Terris L. Hansen, Aurora; Wayne E. Hyatt, Glenview; Deborah D. Kimminau, Aurora; Wu-Hon F. Leung, Downers Grove; Todd C. Morgan, Oak Park, and Paul M. Zislis, Northbrook, all of Ill., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Dec. 23, 1985, Ser. No. 812,941**
**Int. Cl.[4] H04M** *11/00*
**U.S. Cl. 379—94** **36 Claims**




1. A telecommunication switching system for the communication of voice and data among a plurality of customer interface units and said system assuming a plurality of states and generating a plurality of signals, comprising:
means responsive to a first program routine for controlling the communication functions of said telecommunication switching system to provide a first set of services by being responsive to said plurality of states and said plurality of signals from said telecommunication switching system;
means defined by a second program routine for compiling source code instructions for a new service for said telecommunication switching system;
said controlling means comprises means defined by a third program routine for updating said first program routine with the compiled source code instructions thereby modifying said first set of services and adding said new service; and
means defined by a fourth program routine for activating the updated portion of said first program routine thereby providing said new service on said telecommunication switching system.



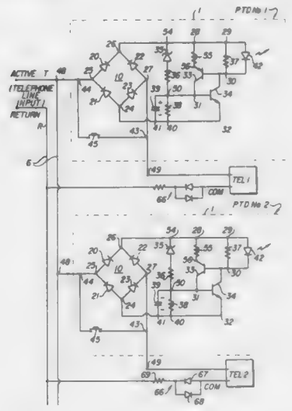
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**4,747,128**

## TELEPHONE PRIVACY PROTECTOR

**Kwok-Leung Chan, 33875 Juliet Cir., Freemont, Calif. 94536, and Shiu-Pong Lee, 8533 Liman Way, Rohnert Park, Calif. 94928**

**Filed May 22, 1986, Ser. No. 865,682**
**Int. Cl.[4] H04M** *1/68*
**U.S. Cl. 379—194** **11 Claims**




1. Telephone privacy protector to be interposed between a common exchange line and each one of at least two telephones sharing the line, the privacy protector comprising: a voice connecting circuit connected between a respective phone and the line; a control circuit, having a self-latching complementary transistor circuit, operatively engaging the connecting circuit, having an on- and an off-state, trigger means having a threshold voltage responsive to the line voltage controllingly engaging the control circuit to trigger it into its on-state to provide a voice connection between the telephone and the common line in response to the line voltage exceeding said threshold votlage; a privacy by-pass pushbutton for by-passing said connecting circuit; and a light indicator in series connection with said control circuit for visually indicating a privacy by-pass condition.

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**4,747,129**

## TELEPHONE RING REGISTERING DEVICE

**Morris Ostrowiecki, 5-21-11 Jingumae, Sibuya-Ku, Tokyo, Japan**

**Continuation of Ser. No. 734,864, May 16, 1985. This application Mar. 24, 1987, Ser. No. 30,248**
**Int. Cl.[4] H04M** *1/65*
**U.S. Cl. 379—199** **16 Claims**

14. A time recording device for a telpehone answering machine which comprises:
means for generating signals representative of the present time;
means for detecting that the answering machine has been activated into the playing mode of a pre-recorded message;
means for activating the record mode of operation of a messages to be recorded magnetic tape storage means for a predetermined period of time when said detecting means detects that the answering machine has been activated into the playing mode of a pre-recorded message;
means for recording an audio signal represenative of the present time on the messages to be recorded magnetic tape during said predetermined period of time, so that the time each incoming call occured may be indicated at the beginning of each respective message.



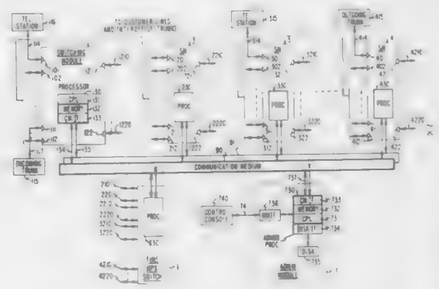
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**4,747,130**

## RESOURCE ALLOCATION IN DISTRIBUTED CONTROL SYSTEMS

**Jen-Lie Ho, Naperville, Ill., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Dec. 17, 1985, Ser. No. 810,070**
**Int. Cl.[4] H04Q** *3/42, 11/04*
**U.S. Cl. 379—269** **20 Claims**

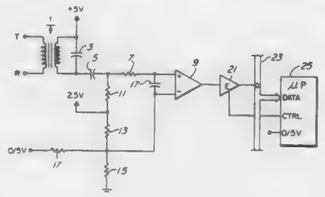


1. In a distributed control system having at least one shared resource and comprising a plurality of processors each having its own local data base, a method of hunting for an available shared resource, comprising the steps of:
a. selecting, in a first one of said processors, a shared resource, using data in the local data base of that processor, as the hunted resource;
b. broadcasting from said first one of said processors to others of said plurality of processors a data message comprising an identity of said selected shared resource; and
c. in response to said message, changing the local data base of each of said other processors to indicate that said selected shared resource is not available.

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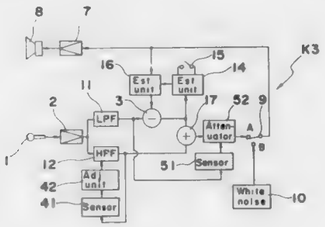
**4,747,131**
## DIAL TONE DETECTOR
**Patrick R. Beirne, Kanata, Ontario, Canada, assignor to Mitel Datacom Inc., Boca Raton, Fla.**
**Filed Aug. 21, 1986, Ser. No. 898,590**
**Claims priority, application Canada, Nov. 22, 1985, 496063**
**Int. Cl.[4] H04M *1/00***
**U.S. Cl. 379—372** **13 Claims**




1. A method of detecting the presence on a conductor, of a dual tone signal comprised of a first signal of first predetermined frequency and a second signal of second predetermined frequency greater than said first frequency, comprising the steps of:
(a) generating a predetermined threshold signal,
(b) monitoring said conductor for the presence of a signal having amplitude greater than said predetermined threshold signal,
(c) in the event of detection of a signal having amplitude greater than said threshold signal, detecting the periods of a predetermined number of successive cycles of said signal, and
(d) in the event successive ones of said detected periods are the same, providing an indication that said signal is a single tone, and in the event successive ones of said detected periods are different, detecting an average value of said periods, and in the event said average value corresponds to a frequency which is greater than or equal to said first predetermined frequency and less than or equal to said second predetermined frequency, generating an output signal indicative of the presence of said dual tone signal.

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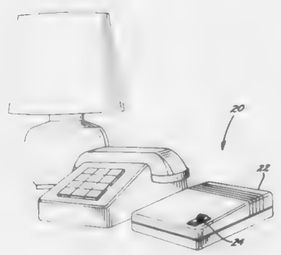
**4,747,132**
## HOWLING CANCELLER
**Satoru Ibaraki, Higashiosaka; Hiroki Furukawa, Neyagawa, and Hiroyuki Naono, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**
**Filed Apr. 3, 1985, Ser. No. 719,740**
**Claims priority, application Japan, Apr. 9, 1984, 59-70305; Jun. 11, 1984, 59-119347; Jun. 15, 1984, 59-123064; Sep. 4, 1984, 59-185536**
**Int. Cl.[4] H04B *3/23***
**U.S. Cl. 379—390** **10 Claims**




1. A howling canceller comprising:
a group of filters for dividing an output of a microphone into a plurality of frequency bands, which includes a first filter having a pass band lower than that of any other one of said filters;
a subtracter;
an impulse response estimation unit for estimating an impulse response of an echo path from a loudspeaker to said first filter by using an output of said subtracter;
an echo signal estimation unit for producing, by using an estimated impulse response outputted from said impulse response estimation unit and an input signal applied to said loudspeaker, an approximate echo signal such that said subtracter subtracts an output of said echo signal estimation unit from an output of said first filter;
an adder for adding an output of said subtracter to outputs of said filters other than said first filter;
a low-frequency howling sensor for detecting howling in the pass band of said first filter; and
an overall-frequency attenuator for attenuating an output of said adder when the howling in the pass band of said first filter has been detected by said low-frequency howling sensor.

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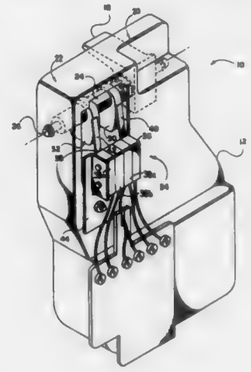
**4,747,133**
## TELEPHONE LIGHT ADAPTER
**Joseph F. Valenzona, 13739 Destino Pl., Cerritos, Calif. 90701, and Richard W. Faith, Oxnard, Calif., assignors to Joseph F. Valenzona, La Mirada, Calif.**
**Filed Mar. 2, 1987, Ser. No. 20,384**
**Int. Cl.[4] H04M *1/00***
**U.S. Cl. 379—376** **24 Claims**




1. A telephone light adapter for announcing an incoming telephone call and for visual assistance comprising, in combination:
housing means for enclosing said telephone light adapter;
control means mounted within said housing means for receiving an input signal from a telephone line and further including a circuit for controlling the connection of an alternating current power source to a light fixture;
direct current supply means in electrical communication with said circuit for supplying direct current voltage to said control means;
logic means located within said circuit for recognizing an incoming telephone call and for signaling for the connection of the alternating current power source to said light fixture;
connection means located within said circuit for receiving a signal from sid logic means and for connecting said light fixture to said alternating current power source upon the receipt of a telephone call; and
switch circuit means located within said connection means, said switch circuit means having an optical transducer in communication with said logic means, said switch circuit means for providing amplification of a parameter flowing in said transducer wherein said amplified parameter triggers a component for providing a completed circuit for said light fixture.



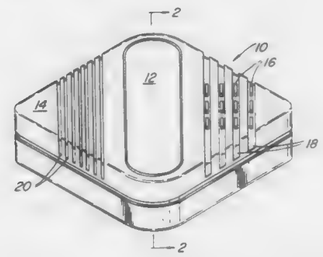
**4,747,134**
## PAY TELEPHONE HOOK SWITCH ASSEMBLY
**Eddie L. Holland, and David E. Jekot, both of Cumming, Ga., assignors to Phillips & Brooks, Inc., Cumming, Ga.**
**Filed Jun. 4, 1987, Ser. No. 57,327**
**Int. Cl.[4] H01H *21/08, 21/82;* H04M *1/08***
**U.S. Cl. 379—424** **12 Claims**



1. A telephone hook switch assembly, comprising:
a housng defining first and second cavities;
a shaft rotatably mounted in the housing;
a hook switch lever mounted on the shaft and rotatable therewith in the first housing cavity;
a switch assembly having snap-action switches positioned in the second housing cavity; and
sequencing means, responsive to rotation of said hook switch lever, for opening and closing said snap-action switches in a predetermined sequence.

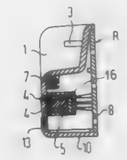
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**4,747,135**
## POP UP TELEPHONE
**Ronald C. Banko, North Wales, Pa., assignor to Ron Banko Design, Inc., North Wales, Pa.**
**Filed Oct. 24, 1984, Ser. No. 664,271**
**Int. Cl.[4] H04R *1/02, 1/06***
**U.S. Cl. 379—436** **7 Claims**




1. A telephone comprising: a handset, a body having a recess, the handset being flush within the body and being at rest in the recess, and latch means for releasing and raising the handset from the recess of the body when required for use, the handset being releasable from the recess when the handset is pressed down.

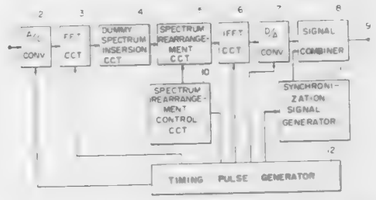
**4,747,136**
## REST FOR THE RECEIVER OF AN AUTOMOBILE TELEPHONE
**Reinhold Kiesewetter, Neufahrn, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**
**Filed Nov. 15, 1985, Ser. No. 798,307**
**Claims priority, application Fed. Rep. of Germany, Nov. 29, 1984, 3443645**
**Int. Cl.[4] H04R *1/04, 1/06;* A47F *5/00;* H04B *1/38***
**U.S. Cl. 377—455** **10 Claims**




1. A rest for an automobile telephone receiver having an earpiece and a metal plate adjacent the earpiece, comprising:
a substantially planar base plate including mounting holes;
a generally cuboid shaped housing mounted over said base plate;
means for fastening said housing to said base plate;
said housing having a depression shaped to receive the earpiece of the automobile telephone receiver and having slots formed in said housing at opposing lateral portions of said depression;
a wedge mounted in each of said slots for engagement with opposing lateral portions of the telephone earpiece;
an elevated portion of said housing spaced from said depression and having a pair of openings; and
a magnet mounted in said elevated portion including a pair or retaining plates extending through respective ones of said pair of openings for magnetic coupling with the metal plate of the telephone receiver;
whereby the earpiece of the telephone receiver is selectively receivable in the depression of said housing with the metal plate of the receiver magnetically engaged to said magnet through said pair of retaining plates.

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**4,747,137**
## SPEECH SCRAMBLER
**Akira Matsunaga, Tokyo, Japan, assignor to Kokusai Denshin Denwa Kabushiki Kaisha, Tokyo, Japan**
**Filed Jun. 30, 1986, Ser. No. 880,273**
**Claims priority, application Japan, Jul. 16, 1985, 60-155230**
**Int. Cl.[4] H04L *9/00***
**U.S. Cl. 380—6** **10 Claims**




1. A speech scrambler comprising an input terminal for voice signals, an A/D converter for converting a signal received at the input terminal into a digital signal, an FFT circuit for transforming the digital signal into a frequency domain signal, a dummy sprectrum insertion circuit for dividing a spectrum obtained by said FFT circuit into a plurality of blocks each comprised of consecutive FFT coefficients and

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calculating as a function of the FFT coefficients from the FFT circuit the total energy of each block so that blocks having energy below a given threshold energy value are replaced by a corresponding dummy spectrum, a spectrum rearrangement circuit receptive of the frequency domain signal with dummy spectra and for rearranging the frequency domain signal blocks in accordance with a given rule, a spectrum rearrangement control circuit for determining said rule, an IFFT circuit receptive of the rearranged frequency domain signal and for transforming it into a time domain signal, a D/A converter for converting said time domain signal into an analog signal, a synchronous signal generator for generating a synchronizing signal, a signal combiner for combining into a combined signal, the last mentioned analog signal and the synchronizing signal, and an output terminal for outputting said combined signal.

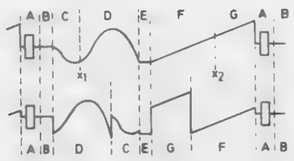
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**4,747,138**

## METHOD OF SCRAMBLING TELEVISION PICTURES AND ARRANGEMENT FOR DESCRAMBLING THE PICTURES THUS SCRAMBLED

**Gérard J. M. Marie, Santeny-Villecresnes, and Jean-Pierre Arragon, Roissy, both of France, assignors to La Radiotechnique, Suresnes, France**

**Filed Aug. 29, 1983, Ser. No. 527,620**
**Claims priority, application France, Sep. 14, 1982, 82 15533**
**Int. Cl.⁴ H04N** *7/167*
**U.S. Cl. 380—14** **3 Claims**




1. A method of scrambling television pictures in which measures have been taken to provide that the video signals of the scanning lines are cut in periods located between the line blanking periods in a pseudo-random position and that the sequence of the portions thus formed is changed, characterized in that for M.A.C. video signals transmission systems of the time-division multiplex type for analog chrominance and luminance components separated by a reference period, said components are each divided, on transmission, in the periods located between the line blanking periods, one after the other, into two consecutive signals (C, D) and (F, G) of which the first signals (C) and (F) are then delayed for the duration of the second signals (D) and (G), and the second signals (D) and (G) are advanced for the duration of the first signals (C) and (F), the reference period (E) separating these components being excluded from this component-dividing and change-of-sequence operations and said processing operation being intended to be applied on reception in the opposite sense.

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**4,747,139**

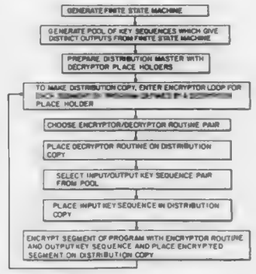
## SOFTWARE SECURITY METHOD AND SYSTEMS

**James L. Taaffe, 74 Appleton St., Arlington, Mass. 02174**

**Continuation of Ser. No. 644,556, Aug. 27, 1984, abandoned, and a continuation-in-part of Ser. No. 644,555, Aug. 27, 1984, and Ser. No. 644,800, Aug. 27, 1984. This application Oct. 21, 1986, Ser. No. 921,851**
**Int. Cl.⁴ H04L** *9/00*
**U.S. Cl. 380—44** **4 Claims**

1. A system for processing encrypted information, the system comprising:

key generator hardware for processing an input key associated with the encrypted information according to an alogorithm to generate a unique output key, the decryption key generator comprising a single chip microprocessor programmed as a finite state machine which, in each of a plurality of states, responds to one of a plurality of predetermined input words to change to another of a plurality of states and output a corresponding output key word, a plurality of repeatable output key word sequences being generated only with predetermined input key word sequences with each word of a repeatable output sequence




being dependent on the present state of the microprocessor and on an input word to the microprocessor which is acceptable at that state; and

decryptor means for receiving the encrypted information and a corresponding output key from the key generator hardware and for decrypting the received encrypted information based on the received output key.

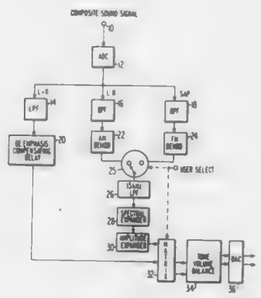
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**4,747,140**

## LOW DISTORTION FILTERS FOR SEPARATING FREQUENCY OR PHASE MODULATED SIGNALS FROM COMPOSITE SIGNALS

**John J. Gibson, Princeton, N.J., assignor to RCA Corporation, Princeton, N.J.**

**Filed Dec. 24, 1986, Ser. No. 946,042**
**Int. Cl.⁴ H04H** *5/00*
**U.S. Cl. 381—13** **10 Claims**




1. Apparatus for separating a phase or frequency modulated signal from a composite signal, comprising:

a source of composite signal including a phase or frequency modulated component;

a comb filter having a frequency response defined by a plurality of alternating amplitude nulls and a maxima and wherein a frequency spectrum between two successive ones of said nulls encompasses the entire frequency spectrum occupied by said component to be separated;

a bandpass filter having a pass-band including the frequency spectrum occupied by said component which pass-band is wider than and spans the frequency spectrum between said two successive ones of said nulls;

means for coupling said comb filter and said bandpass filter in series with said source, wherein said comb filter defines the pass-band frequency response and said bandpass filter provides signal attenuation outside of said pass-band in the series combination of said comb filter and said bandpass filter.



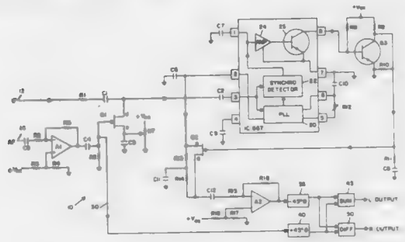
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**4,747,141**

## AM STEREO SIGNAL DECODER

**Leonard R. Kahn, 137 E. 36th St., New York, N.Y. 10016**

**Filed Oct. 24, 1983, Ser. No. 544,752**
**Int. Cl.⁴ H04H** *5/00*
**U.S. Cl. 381—11** **12 Claims**




1. An improved stereo radio receiver capable of operating in monophonic (mono) and stereophonic (stereo) reception modes, wherein the improvement comprises:

means for determining whether said receiver is in a condition for properly decoding stereo information from a received signal and for developing a control signal indicative thereof;

and means responsive to said control signal and controlling the translation of decoded stereo information in said receiver, for enabling such translation to begin at a selected perceptible time after said control indicates that the receiver is in a condition for properly decoding stereo information, thereby intentionally delaying the beginning of translation of decoded stereo information in said receiver: whereby said receiver intentionally initially operates in its mono mode upon being tuned to a stereo station and before changing to its stereo mode.

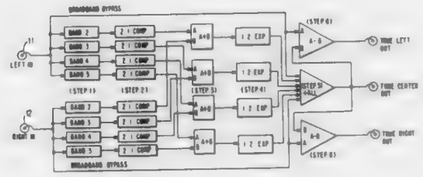
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**4,747,142**

## THREE-TRACK STEROPHONIC SYSTEM

**David A. Tofte, 1445 SE. Maple, Milwaukie, Oreg. 97222**

**Filed Jul. 25, 1985, Ser. No. 758,770**
**Int. Cl.⁴ H04S** *3/00*
**U.S. Cl. 381—27** **1 Claim**




1. A three-track stereophonic system, comprising:

a stereo source having left and right channels; first and second groups of pass-band filters, each group comprising a plurality of filters, the inputs of the filters of said first group being responsive to said left channel, and the inputs of the filters of said second group being responsive to said right channel;

a plurality of compressors, each compressor having its input coupled to a corresponding output of each filter, and each compressor administering a 2:1 logarithmic compression to the signal input thereto;

a plurality of expanders responsive to the outputs of said compressors;

a central amplifier means responsive to the outputs of said expanders to provide a third channel.

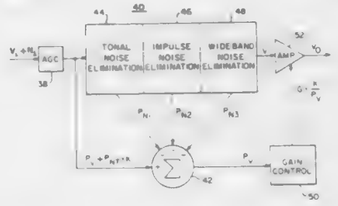
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**4,747,143**

## SPEECH ENHANCEMENT SYSTEM HAVING DYNAMIC GAIN CONTROL

**Brian W. Kroeger, Ellicott City, and John J. Kurtz, Catonsville, both of Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Jul. 12, 1985, Ser. No. 755,235**
**Int. Cl.⁴ G10L** *5/00*
**U.S. Cl. 381—47** **12 Claims**




1. A speech enhancement system having dynamic gain control, said system comprising:

means for providing a constant amplitude composite speech and noise signal from an applied variable amplitude composite speech and noise signal;

means for processing said constant amplitude composite signal, said processing means performing one or more processes for extracting noise power from said constant amplitude composite signal, thereby providing one or more extracted noise power values and a processed speech output;

means for subtracting all of said noise power values from said constant amplitude composite signal to provide a gain control signal value;

multiplying means for amplifying said processed speech output by a variable ratio; and

means for controlling the variable ratio of said multiplying means, with the controlling being dependent upon said gain control signal value.

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**4,747,144**

## AMPLIFIER WITH AUTOMATIC INHIBITION OF ACOUSTIC FEEDBACK

**Daniël J. H. Admiraal, Lieshout, and Benjamin Lopes Cardozo, Eindhoven, both of Netherlands, assignors to U.S. Philips Corporation, Tarrytown, N.Y.**

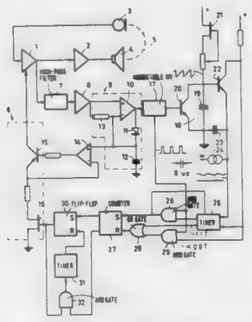
**Continuation of Ser. No. 6,144, Jan. 24, 1979, Pat. No. 4,525,856, which is a continuation of Ser. No. 847,042, Oct. 31, 1977, abandoned. This application Mar. 20, 1985, Ser. No. 713,960**
**Claims priority, application Netherlands, Nov. 8, 1976, 7612358**
**The portion of the term of this patent subsequent to Jun. 25, 2002, has been disclaimed.**
**Int. Cl.⁴ H04M** *1/20;* **H04R** *3/02*
**U.S. Cl. 381—93** **7 Claims**

1. An audio amplifier circuit for suppressing signals which exhibit a regular periodic pattern characteristic of an acoustic feedback signal comprising, an input terminal for an audio signal, an output terminal for the audio signal, gain controlled amplifier means coupled between said input and output terminals, means for selectively adjusting the gain of said gain controlled amplifier means, a filter coupled to the amplifier means so as to pass a band of frequency components of the audio

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signal, and a periodicity detector coupled to the output of the filter and operative to discriminate between said acoustic feedback signal exhibiting said regular periodic pattern and signals



having an irregular pattern to derive a control signal for operating said gain adjusting means to reduce the gain of the amplifier means upon detection of said acoustic feedback signal.

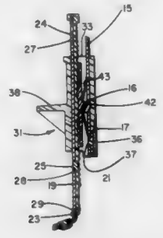
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**4,747,145**

**EARCUP SUSPENSION FOR HEADPHONE**

**Christopher D. Wiegel, Minneapolis, Minn., assignor to Telex Communications, Inc., Minneapolis, Minn.**

**Filed Nov. 24, 1986, Ser. No. 934,126**
**Int. Cl.[4] H04M *1/05***
**U.S. Cl. 381—183** **11 Claims**



1. In a headset including a headband having at least one lower end and an earcup depending therefrom, vertical adjustment apparatus comprising in combination;

a housing having a vertically disposed slot, stationarily mounted on the lower end of a headphone headband;

earcup mounting means having a vertically extending member, vertically, slidably disposed in said slot and including an inwardly facing rack; and

detenting means, including an inwardly extending rack having at least two teeth disposed on a rearwardly extending portion stationarily disposed in said slot and in facing engagement with said rack.

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**4,747,146**

**SYSTEM FOR DETECTING DIFFERENCE BETWEEN IMAGE ON PRIMARY SHEET AND IMAGE ON SECONDARY SHEET**

**Nobuyuki Nishikawa, Fujimi; Yoshimitsu Mori, Kitamoto; Joji Honda, Tokyo, and Kiyotaka Hara, Ohmiya, all of Japan, assignors to Kyodo Printing Co., Ltd., Tokyo, Japan**

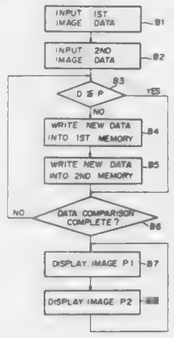
**Filed May 6, 1985, Ser. No. 731,103**
**Claims priority, application Japan, May 9, 1984, 59-092292**
**Int. Cl.[4] G06H *9/00***
**U.S. Cl. 382—1** **6 Claims**

1. A system for detecting a difference between an image on a primary sheet and an image on a secondary sheet, the image on the secondary sheet being reproduced from the image on the primary sheet, said system comprising:

(a) data producing means for producing a plurality of first image data representative respectively of a predetermined number of first image elements constituting the image on the primary sheet and a plurality of second image data representative respectively of the predetermined number of second image elements constituting the image on the secondary sheet, the value of each of said first and second image data specifying an optical density of the respective first and second image elements;

(b) memory means for storing said first and second image data;

(c) a microprocessor unit programmed to compare each two corresponding first and second image data with each other to determine whether a difference in value between said two corresponding first and second image data is above a predetermined level, said microprocessor unit being programmed to write into said memory means two new image data, corresponding respectively to said two corresponding first and second image data and specifying an emphasized value difference therebetween;




(d) display means including a display screen;

(e) timer means for producing a timer signal; and

(f) reading means for reading from said memory means said new first image data and said first image data other than that corresponding to said first new image data, and said new second image and said second image data other than that corresponding to said new second image data, and said reading means being responsive to said timer signal to alternately reading these first image data and these second image data at a predetermined time interval, so that a first image represented by these first image data and a second image represented by these second image data are alternately displayed on the screen of said display means at said time interval.

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**4,747,147**

**FINGERPRINT RECOGNITION AND RETRIEVAL SYSTEM**

**Malcolm K. Sparrow, 127 Linton Road, Loose, Maidstone, MEI5, OAL, England**

**Continuation-in-part of Ser. No. 771,188, Sep. 3, 1985, abandoned, which is a continuation-in-part of Ser. No. 766,331, Aug. 16, 1985, abandoned. This application Jun. 16, 1986, Ser. No. 875,023**
**Int. Cl.[4] G06K *9/00***
**U.S. Cl. 382—4** **86 Claims**

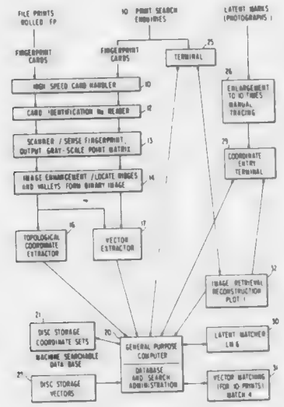
1. In a fingerprint recognition system, apparatus for extracting topological coordinates from a known fingerprint and storing composite sets of extracted topological coordinates in a machine searchable fingerprint database comprising:

means for establishing a scanning line,



means for selecting a predetermined point on said scanning line,

means for scanning said known fingerprint in a predetermined scan pattern by progressive movement of said scanning line over said known fingerprint, including each successive topological characteristic in said predetermined scan pattern and determining the scan location data (M) of each said successive topological characteristic relative to said scanning line and scanning pattern,




means for determining the number of ridge lines (R) between said predetermined point on said scanning line and each said successive topological characteristic,

means for assigning a predetermined type code (T) to each successive topological characteristic, and

means for storing said type code (T), scan location data (M) and the number of ridge lines (R) for each known fingerprint in a machine searchable database.

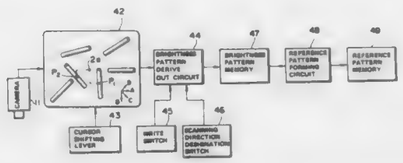
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**4,747,148**

**METHOD OF IDENTIFYING OBJECTS**

**Yuji Watanabe, and Toshiaki Kondo, both of Hirakata, Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan**

**Filed Apr. 9, 1984, Ser. No. 598,379**
**Claims priority, application Japan, Apr. 11, 1983, 58-63370; Apr. 27, 1983, 58-74464; May 4, 1983, 58-78792; May 11, 1983, 58-82394**
**Int. Cl.[4] G06K *9/00***
**U.S. Cl. 382—10** **7 Claims**




1. A method of recognizing objects comprising the steps of:

extracting a brightness pattern $A(Ca_1, Ca_2, \ldots Ca_n)$ including n picture image data points from picture image data in a predetermined field of view in which a plurality of objects to be detected are present;

determining an average value $\overline{Ca}$ from said brightness pattern by using an equation

$$Ca = \sum_{i=1}^{n} Cai/n;$$

determining a pattern A' $(C'a_1, C'a_2, \ldots C'a_n)$ obtained by converting said brightness pattern in connection with a deviation from said average value according to an equation

$$C'ai = Cai - Ca;$$

determining a pattern A'' $(C''a_1, C''a_2, \ldots C''a_n)$ obtained by normalizing said pattern A' according to an equation

$$C''ai = \frac{C'a_i}{\sqrt{\sum_{i=1}^{n} (C'a_i)^2}};$$

preparing a reference pattern B $(Cb_1, Cb_2, \ldots Cb_n)$ comprising n picture image data points representing as brightness values the configuration of an object to be detected;

determining a pattern B' obtained by converting said reference pattern B in connection with a deviation from an average value of said reference pattern B;

calculating inner products of said patterns A'' and B' and of said patterns A' and B', and

identifying said objects by using said products as evaluation values.

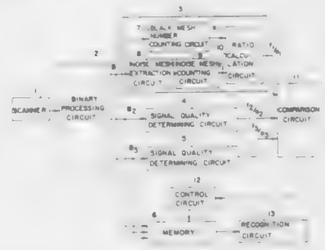
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**4,747,149**

**OPTICAL CHARACTER RECOGNITION APPARATUS**

**Tetsuo Umeda, and Shigenobu Kasuya, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan**

**Filed Mar. 17, 1987, Ser. No. 26,890**
**Claims priority, application Japan, Mar. 17, 1986, 61-58585**
**Int. Cl.[4] G06K *9/36***
**U.S. Cl. 382—18** **5 Claims**




1. An optical character recognition apparatus comprising:

means for optically scanning a prescribed scanning area to produce a scanned signal corresponding to a character contained in said prescribed scanning area;

means responsive to said scanned signal for producing a plurality of binary signals each having a different characteristic, each binary signal being quantized to construct said prescribed scanning area of a plurality of meshes arranged to form a matrix and being represented by black meshes each indicating a part of said character and by white meshes each indicating a background;

means for counting black meshes contained in said prescribed scanning area with respect to said plurality of binary signals to deliver a plurality of black mesh numbers corresponding to said plurality of binary signals, respectively;

means for counting insulated meshes with respect to said plurality of binary signals to deliver a plurality of noise

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mesh numbers corresponding to said plurality of binary signals, said insulated mesh being a white mesh surrounded by black meshes and a black mesh surrounded by white meshes;

means for calculating a plurality of ratios between said plurality of black mesh numbers and said plurality of noise mesh numbers, said plurality of ratios corresponding to said plurality of binary signals, respectively;

means for determining an optimum binary signal from said plurality of binary signals on the basis of comparison of said plurality of ratios calculated by said calculating means; and

means for recognizing said character contained in said prescribed scanning area on the basis of said optimum binary signal determined by said determining means.

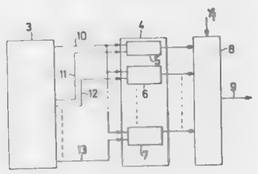
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**4,747,150**

## APPARATUS FOR DETECTING SUDDEN CHANGES OF A FEATURE IN A REGION OF AN IMAGE THAT IS DIVIDED INTO DISCRETE PICTURE ELEMENTS

**Hans Knutsson; Gösta Granlund, and Josef Bigun, all of Linköping, Sweden, assignors to Context Vision AB, Linkoping, Sweden**

**Filed May 21, 1986, Ser. No. 865,341**
**Claims priority, application Sweden, May 23, 1985, 8502571**
**Int. Cl.[4] G06K *9/48***
**U.S. Cl. 382—21** **7 Claims**



1. Apparatus comprising:

first means for recording a first image of a physical object or scene and dividing said first image into discrete picture elements;.

second means for transforming said first image which has been divided into discrete picture elements into a vector representation, said vector representation comprising complex valued signals,

third means for accessing said complex valued signals from a plurality of picture elements which collectively form a plurality of overlapping regions of a vector valued image, one complex valued signal for each picture element of said plurality of picture elements, each of said complex valued signals having a phase which describes feature class and a magnitude which describes certainty in feature assertion, said complex valued signals representing said feature;

fourth means for accessing at least two collections of corresponding complex valued multiplication factor signals for each picture element of said plurality of picture elements, each of said complex valued multiplication factor signals having a phase and a magnitude, said at least two collections of corresponding complex valued multiplication factor signals forming at least two corresponding masks which represent a predetermined, idealized variation of said feature in a respective region of said plurality of overlapping regions;

fifth means coupled to said third means and said fourth means for correlating said complex valued image signals, for each region of said plurality of overlapping regions, to said at least two collections of said corresponding complex valued multiplication factor signals of a respective region, so that at least two measurement signals are outputted by said third means for each region of said plurality of overlapping regions; and,

sixth means coupled to said fifth means and inputting said at least two signals for norming and summing said at least two measurement signals so that a complex valued output signal is outputted by said sixth means for each region of said plurality of overlapping regions thereby producing a second image representing characterizing properties of a recorded image of said physical object or scene.

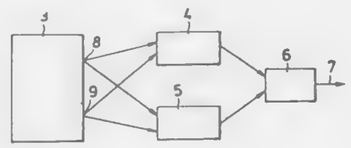
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**4,747,151**

## APPARATUS FOR DETERMINING THE DEGREE OF VARIATION OF A FEATURE IN A REGION OF AN IMAGE THAT IS DIVIDED INTO DISCRETE PICTURE ELEMENTS

**Hans Knutsson, and Gösta Granlund, both of Linköping, Sweden, assignors to Context Vision AB, Linkoping, Sweden**

**Filed May 21, 1986, Ser. No. 865,350**
**Claims priority, application Sweden, May 23, 1985, 8502569**
**Int. Cl.[4] G06K *9/48***
**U.S. Cl. 382—21** **11 Claims**



1. Apparatus comprising:

first means for recording a first image of a physical object or scene and dividing said first image into discrete picture elements;

second means for transforming said first image which has been divided into discrete picture elements into a vector representation, said vector representation comprising complex valued signals,

third means for accessing said complex valued signals from a plurality of picture elements which collectively form a plurality of overlapping regions of a vector valued image, one complex valued signal for each picture element of said plurality of picture elements, each of said complex valued signals having a phase which describes feature class and a magnitude which describes certainty in feature assertion, said complex valued signals representing said feature;

fourth means for accessing a corresponding complex valued multiplication factor signal for each picture element in said plurality of picture elements, each of said complex valued multiplication factor signals having a phase and a magnitude, the complex valued multiplication factor signals, for each region of said plurality of overlapping regions, collectively forming a mask which represents a predetermined idealized variation of said feature in a respective region of said plurality of overlapping regions; and,

fifth means coupled to each of said third and fourth means for receiving and processing, for each region of said plurality of overlapping regions, said complex valued signals and said complex valued multiplication factor signals to measure, for each region of said plurality of overlapping regions, the correspondence between the collection of complex valued signal, for each region of said plurality of overlapping regions, which characterizes the degree of variation of said feature therein thereby producing a second image representing characterizing properties of a recorded image of said physical object or scene.



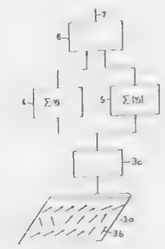
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**4,747,152**

## APPARATUS FOR DETERMINING THE DEGREE OF CONSISTENCY OF A FEATURE IN A REGION OF AN IMAGE THAT IS DIVIDED INTO DISCRETE PICTURE ELEMENTS

**Hans Knutsson; Martin Hedlund, and Gösta Granlund, all of Linköping, Sweden, assignors to Context Vision AB, Linköping, Sweden**

**Filed May 21, 1986, Ser. No. 865,343**
**Claims priority, application Sweden, May 23, 1985, 8502570**
**Int. Cl.[4] G06K *9/48***
**U.S. Cl. 382—21** **11 Claims**



1. Apparatus comprising:

first means for recording a first image of a physical object or scene and dividing said first image into discrete picture elements;

second means for transforming said first image which has been divided into discrete picture elements into a vector representation, said vector representation comprising vector valued signals,

third means for accessing said vector valued signals from a plurality of picture elements which collectively form a plurality of overlapping regions of a vector valued image, one vector valued signal for each element of said plurality of picture elements, each of said vector valued signals having a vector direction which describes features class and a vector magnitude which describes certainty in feature assertion;

fourth means coupled to said accessing means for producing a first vector valued output signal for each region of said plurality of overlapping regions, said first vector valued output signal, in each respective region, being representative of vector valued signals which have been rotated a predetermined amount and then subjected to a weighted summation;

fifth means coupled to said accessing means for producing a second output signal, for each region of said plurality of overlapping regions, representative of weighted summation of said magnitude of said vector valued signals in each respective region; and,

sixth means coupled to said fourth and fifth means for norming said first vector valued output signal, for each region of said plurality of overlapping regions, with respect to the sum of said second output signal, for each region of said plurality of overlapping regions, and a reference signal, for each region of said plurality of overlapping regions thereby producing a second image representing characterizing properties of a recorded image of said physical object or scene.

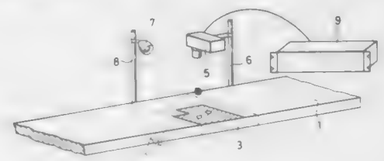
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**4,747,153**

## DEVICE AND METHOD FOR PATTERN RECOGNITION

**Hidehiko Kouno, Ibaragi; Toshiaki Amano, and Takayuki Aoki, both of Kanagawa, all of Japan, assignors to Japan as Represented by Director General of Agency of Industrial Science and Technology and Amada Company, Limited, both of, Japan**

**Filed Mar. 7, 1985, Ser. No. 709,194**
**Claims priority, application Japan, Mar. 8, 1984, 59-44670; Mar. 8, 1984, 59-44671; Mar. 8, 1984, 59-44672**
**Int. Cl.[4] G06K *9/46***
**U.S. Cl. 382—25** **11 Claims**



1. A pattern recognition device comprising:

image pickup means for detecting a pattern of a figure to be identified and for producing a corresponding binary coded figure pattern;

shape discerning means for projecting said figure pattern on mutually perpendicular X and Y axes, deriving a histogram of said figure for each of said X and Y projections, and first order differentiating said histograms along said X and Y axes to produce a series of characteristic values for said figure pattern, said characteristic values for said figure pattern being defined as a set of numbers for all possible combinations of the array of signs of the positive and negative pulses occurring in the first order differentiation waveform of said histograms; and

processing means for comparing said figure pattern values to predetermined values of known figure patterns, to identify said figure to be identified.

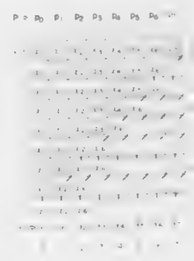
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**4,747,154**

## IMAGE DATA EXPANDING AND/OR CONTRACTING METHOD AND APPARATUS

**Kazufumi Suzuki, Kawasaki, Japan; Katsura Kawakami, Cheshire, United Kingdom; Shigeo Shimazaki, Kawasaki, Japan; Yuetsu Ochiai, Sagamihara, Japan; Etsuko Hirokami, Tokyo, Japan, and Hiroaki Kotera, Kawasaki, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Sep. 28, 1984, Ser. No. 655,690**
**Claims priority, application Japan, Sep. 29, 1983, 58-182110; Oct. 6, 1983, 58-187882; Oct. 14, 1983, 58-192755; Oct. 14, 1983, 58-192757; May 21, 1984, 59-102143; Jul. 27, 1984, 59-157821**
**Int. Cl.[4] G06K *9/42***
**U.S. Cl. 382—47** **12 Claims**



1. A method for contracting image data, wherein a reference mask pattern comprising at least binary data ($P_1, P_2, \ldots, P_n$) which is applied to image data ($x_1, x_2, \ldots, x_n$) to be contracted (where n is an integer greater than 2) is provided, and wherein said image data ($x_1, x_2, \ldots, x_n$) to be contracted are moved

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within a matrix including n rows and n columns from the n-th row toward the first row, and when said reference mask pattern $P_i$ (where i is an integer in the range of $1 \leqq i \leqq n$) has a first value, the image data located at a position $(a_{i,j})$ of said matrix are discarded while the image data located at a position $(a_{i,j})$ (where $i+1 \leqq j \leqq n$) of said matrix are moved to a position $(a_{i-1,j-1})$ within said matrix, and when said reference mask pattern has a second value, the image data located at a position $(a_{i,j-1})$ of said matrix are moved to the position $(a_{i-1,j-1})$ of said matrix.

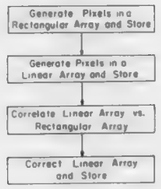
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**4,747,155**

## MOTION COMPENSATION FOR ELECTRO-OPTICAL CAMERA IMAGERY

**Charles R. Dotson, Litchfield Park, Ariz., assignor to Loral Corporation, New York, N.Y.**

**Filed Sep. 2, 1986, Ser. No. 902,854**
**Int. Cl.[4] G06K** *9/00*
**U.S. Cl. 382—42** **14 Claims**




1. A process for correcting image distortion in an image array, comprising:
- generating a first rectangular array of an image of interest;
- generating a second linear array of an image maintained within said image of interest;
- correlating the image of said first array with the image of said second array;
- determining an error between said images of said first and second arrays;
- adjusting said image of said second array to correct for said error; projecting said first and second images onto said rectangular and linear arrays by a focusing means, said arrays sharing a common focal plane for respectively receiving said image; and
- generating said rectangular and linear arrays by storing charges on a plurality of charge coupled devices;

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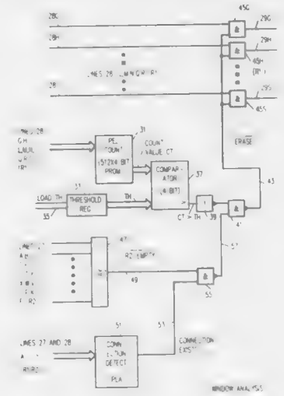
**4,747,156**

## IMAGE PREPROCESSING PROCEDURE FOR NOISE REMOVAL

**Friedrich M. Wahl, Langnau am Albis, Fed. Rep. of Germany, assignor to International Business Machines Corporation, New York, N.Y.**

**Filed Jun. 17, 1986, Ser. No. 875,169**
**Claims priority, application European Pat. Off., Dec. 17, 1985, 85116114.1**
**Int. Cl.[4] G06K** *9/40*
**U.S. Cl. 382—54** **11 Claims**

1. A method for improving an image represented by a raster pattern of black and white picture elements, for removing noise, characterized by the steps of:
- scanning the image to obtain for successive window areas an inner window (R1) and a surrounding outer window (R2) of black and white pixels, both windows having a given size;
- detecting for each such window area
  - (a) whether the number (CT) of black picture elements in the inner window exceeds a given threshold value (TH), and
  - (b) whether any black picture element exists in the outer window and whether a black picture element in the inner window is connected to at least one black picture element in the other window;
- determining, in dependence of the results of the detecting steps a and b, the contents of the respective window for



further processing, by either maintaining the picture elements of the respective inner window of the input image unchanged, or by modifying them according to a given rule.

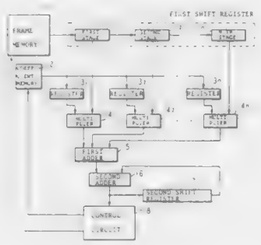
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**4,747,157**

## SPATIAL PRODUCT SUM CALCULATING UNIT

**Mitsuo Kurakake, and Shoichi Otsuka, both of Hino, Japan, assignors to Fanuc Ltd., Minamitsuru, Japan**

**PCT No. PCT/JP86/00185, § 371 Date Dec. 3, 1986, § 102(e) Date Dec. 3, 1986, PCT Pub. No. WO86/06187, PCT Pub. Date Oct. 23, 1986**
**PCT Filed Apr. 14, 1986, Ser. No. 945,790**
**Claims priority, application Japan, Apr. 18, 1985, 60-83334**
**Int. Cl.[4] G06K** *9/36*
**U.S. Cl. 382—41** **1 Claim**




1. A spatial product sum calculating unit which calculates the spatial product sum of each of a plurality of picture element data stored in a frame memory, through utilization of load coefficients with N rows and N columns prestored in a coefficient memory, characterized by the provision of:
- a first shift register having N stages;
- N registers for setting therein N load coefficients;
- N multipliers for multiplying the outputs of the registers and the outputs of the corresponding stages of the first shift register;
- a first adder for adding the outputs of the N multipliers;
- a second shift register having stages of the same number as the plurality of picture element data stored in the frame memory in the row direction;
- a second adder for adding the outputs of the first adder and the second shift register, the added output being applied to the second shift register; and
- a control circuit which sets the load coefficients of one row in the N registers from the coefficient memory and effects control for all the rows of the coefficient memory so that the plurality of picture element data in the frame memory, corresponding to the load coefficients set in the N registers, are entered into the first shift register in a sequential order, whereby data which is output from the second adder during the control for the last row of the coefficient memory is obtained as the result of the spatial product sum calculation for each of the plurality of picture element data of one row which are candidates for processing.



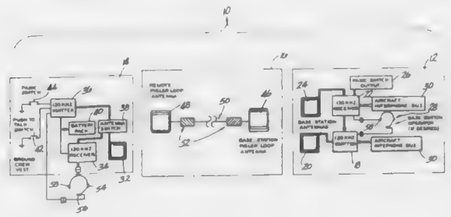
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**4,747,158**

## CORDLESS COMMUNICATIONS SYSTEM

**Joshua I. Goldberg, Woodbridge; Benjamin G. Lardiere, Jr., Milford; Bruce E. McCoy, Prospect, and John J. Riter, Jr., Meriden, all of Conn., assignors to Data Products New England, Inc., Wallingford, Conn.**

**Continuation-in-part of Ser. No. 808,606, Dec. 13, 1985, which is a division of Ser. No. 693,114, Jan. 22, 1985, Pat. No. 4,584,707.**
**This application Oct. 1, 1986, Ser. No. 914,080**
**Int. Cl.[4] H04B** *7/15, 5/00*
**U.S. Cl. 455—11** **4 Claims**



1. A cordless communications system wherein transmission is made and received via magnetic lines of induction comprising:
- a base station, at least one mobile station and at least one PIGLER unit disposed between said base station and said at least one mobile station;
- said base station having a first base magnetic loop antenna and a second base magnetic loop antenna for transmission and reception of magnetic signals, base transmitting means coupled to said first base magnetic loop antenna for transmitting a first signal to said PIGLER unit, base receiving means coupled to said second base magnetic loop antenna for receiving a second signal from said PIGLER unit;
- said at least one mobile station having a mobile magnetic loop antenna coupled to an antenna switch having first and second operating positions, mobile receiving means coupled to said mobile magnetic loop antenna when said antenna switch is in said first position for receiving said first signal from said PIGLER unit, mobile transmitting means coupled to said mobile magnetic loop antenna when said antenna switch is in said second position for transmitting said second signal to said PIGLER unit; and
- said at least one PIGLER unit having a first PIGLER loop antenna proximate to said base station and a second PIGLER loop antenna proximate to said at least one mobile station and means for coupling said first PIGLER loop antenna to said second PIGLER loop antenna wherein said first PIGLER loop antenna receives said first signal from said base transmitting means and retransmits said first signal to said second PIGLER loop antenna and wherein said second PIGLER loop antenna receives said second signal from said mobile transmitting means and retransmits said second signal to said first PIGLER loop antenna.

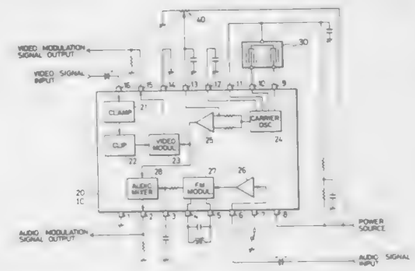
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**4,747,159**

## RF MODULATOR

**Masashi Kato, Kakuda, Japan, assignor to Alps Electric Co., Ltd., Japan**

**Filed Jul. 18, 1986, Ser. No. 887,906**
**Claims priority, application Japan, Jul. 24, 1985, 60-113354[U]; Jul. 24, 1985, 60-113355[U]**
**Int. Cl.[4] H01Q** *11/02;* **H03Q** *3/20*
**U.S. Cl. 455—116** **4 Claims**




1. In an RF modulator, for converting video and audio signal inputs to modulated video and audio signal outputs, having a resonance element for generating a resonance signal of a given frequency, and a modulator circuit including a carrier oscillator connected to the resonance element for receiving the resonance signal and providing a carrier wave output, an RF amplifier connected to the carrier oscillator for amplifying the level of the carrier wave output, a video signal modulator connected to the RF amplifier for modulating the video signal input with the amplified carrier wave output to provide the modulated video signal output, and an audio signal mixer connected to the RF amplifier for mixing the amplified carrier wave output with a frequency modulated audio signal generated from the audio signal input to provide the modulated audio signal output,
- the improvement comprising a gain adjusting circuit connected to said RF amplifier for adjusting a gain of the RF amplifier to thereby adjust the level of the amplified carrier wave output provided by the RF amplifier if the resonance element is changed so as to have a different resonance signal characteristic.

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**4,747,160**

## LOW POWER MULTI-FUNCTION CELLULAR TELEVISION SYSTEM

**Bernard Bossard, Medfield, Mass., assignor to Suite 12 Group, Freehold, N.J.**

**Filed Mar. 13, 1987, Ser. No. 25,720**
**Int. Cl.[4] H04B** *1/10*
**U.S. Cl. 455—33** **20 Claims**



1. A low power, multi-function cellular television system including a plurality of low power cell node transmitter and a plurality of receivers comprising:

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a plurality of substantially omni-directional transmitting antennas connected to cell node transmitter stations; and,

a plurality of directional receiving antennas connected to subscriber receiver stations and directed to receive a television signal from only one of said omni-directional transmitting antennas.

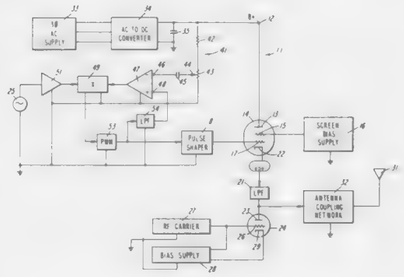
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**4,747,161**

**AM-RF TRANSMITTER WITH COMPENSATION FOR POWER SUPPLY VARIATIONS**

**Gilmer L. Hulsey, Greenville, N.C., and Bryan A. Weaver, Dallas, Tex., assignors to Varian Associates, Inc., Palo Alto, Calif.**

**Filed Feb. 25, 1986, Ser. No. 832,807**
**Int. Cl.[4] H04B *1/04***
**U.S. Cl. 455—108** **17 Claims**




1. Apparatus for transmitting a radio frequency carrier amplitude modulated by an information signal comprising a transmitter stage having a DC power supply terminal, and an antenna output terminal on which is derived a signal in the form of an amplitude modulated radio frequency carrier, a DC power supply including an AC to DC converter connected to said DC power supply terminal, said converter including reactances having a resonant frequency, the converter being such that the DC voltage applied by said supply to said DC power supply terminal is reduced to such an extent as to induce distortion in the amplitude modulated radio frequency carrier at the antenna output terminal in response to positive amplitude variations of the information signal approaching the resonant frequency being coupled to the DC power supply terminal, and means connected between the source of the information signal and the transmitter stage for modifying the amplitude of the information signal applied to the transmitter stage so the amplitude of the transmitter stage amplitude modulation increases when the transmitter stage amplitude modulation approaches or is approximately equal to the resonant frequency and the transmitter stage is modulated by positive amplitudes, the information signal amplitude being modified so said distortion is substantially prevented.

# DESIGNS

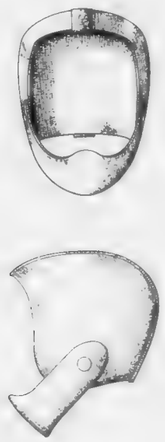
MAY 24, 1988

**295,800**

**CROCHETED FOOTBALL HELMET CAP**

**Sylvester Shelton, Jr., 7903 Center Pkwy., Sacramento, Calif. 95823**

**Filed Jul. 9, 1985, Ser. No. 753,061**
**Term of patent 14 years**
**U.S. Cl. D2—249**



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**295,801**

**SET OF BRUSH HEADS FOR MOUNTING IN A DENTAL UNIT**

**Hans Olsen, Copenhagen, Denmark, assignor to Aktiebolaget Svensk Eldental, Falun, Sweden**

**Filed Sep. 24, 1984, Ser. No. 654,189**
**Claims priority, application Denmark, Mar. 29, 1984, 296/84**
**Term of patent 14 years**
**U.S. Cl. D4—101**

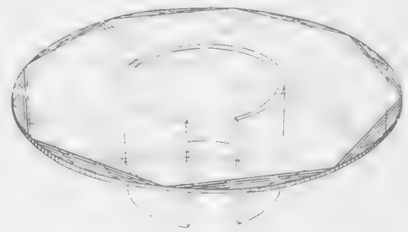


**295,802**

**TABLE TOP**

**Herbert Abraham, Suffern, N.Y., assignor to Hill Manufacturing Corp., Newburgh, N.Y.**

**Filed Nov. 8, 1985, Ser. No. 803,883**
**Term of patent 14 years**
**U.S. Cl. D6—511**



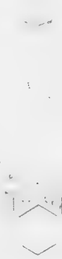
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**295,803**

**WORK TABLE LEGS**

**Harry L. Weitzman, 144 Green Ridge Ave., White Plains, N.Y. 10605**

**Filed Jun. 24, 1985, Ser. No. 747,885**
**Term of patent 14 years**
**U.S. Cl. D6—495**



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**295,804**

**CHEST OF DRAWERS**

**Rose Tarlow, 405 S. Bedford Dr., Beverly Hills, Calif. 90212**

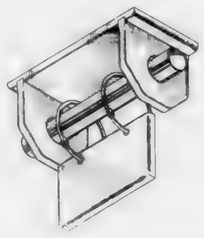
**Filed Jun. 11, 1985, Ser. No. 743,621**
**Term of patent 14 years**
**U.S. Cl. D6—441**



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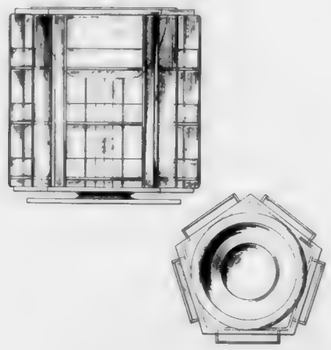
295,805
**RECIPE HOLDER**
Sarah Stocker, 707 S. Broadway, Yorktown, Ind. 47396
Filed Aug. 5, 1985, Ser. No. 762,298
Term of patent 14 years
U.S. Cl. D6—513



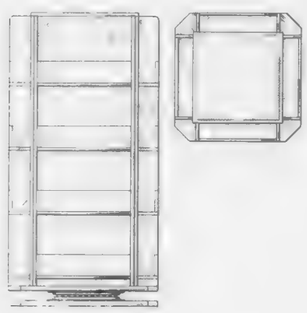
295,806
**FRAME STAND**
Arthur K. Wilson, 87 Laurentide Drive, Don Mills, Ontario, Canada M3A 3E3
Filed Nov. 12, 1985, Ser. No. 804,004
Claims priority, application Canada, Oct. 4, 1985, 04-10-85-4
Term of patent 14 years
U.S. Cl. D6—462



295,807
**CARD DISPLAY STAND**
Arlene Kyler, 3445 Park Ave., Oceanside, N.Y. 11572
Filed Jul. 19, 1985, Ser. No. 757,078
Term of patent 14 years
U.S. Cl. D6—457



295,808
**CARD DISPLAY STAND**
Arlene Kyler, 3445 Park Ave., Oceanside, N.Y. 11572
Filed Jul. 19, 1985, Ser. No. 757,075
Term of patent 14 years
U.S. Cl. D6—457

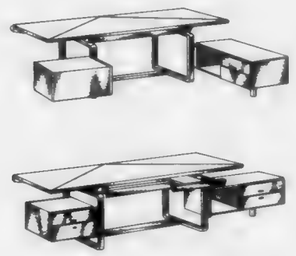


295,809
**DUMBBELL RACK**
Douglas P. Green, 2016 Yorktown Ct. South, League City, Tex. 77573
Filed Oct. 17, 1985, Ser. No. 788,016
Term of patent 14 years
U.S. Cl. D6—468

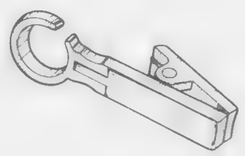




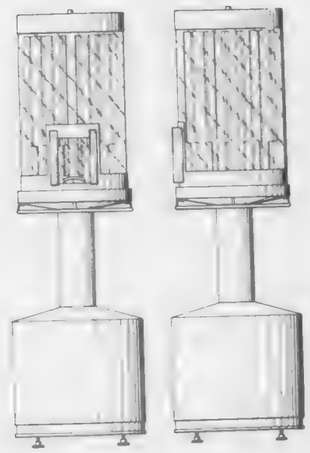
295,810
**DESK WITH PIVOTABLE STORAGE UNITS**
Roberto Saporiti, Gallarate, Italy, assignor to Saporiti Italia S.p.A., Italy
Filed Jul. 9, 1985, Ser. No. 753,218
Claims priority, application Italy, Jan. 14, 1985, 20495
Term of patent 14 years
U.S. Cl. D6—422



295,811
**HANGER FOR GLOVES, CLOTHES OR THE LIKE**
Jenny I. M. Larsson, Smedsbacksgatan 9, S-115 39 Stockholm, Sweden
Filed Jan. 23, 1986, Ser. No. 821,907
Claims priority, application Sweden, Aug. 16, 1985, 85-1935
Term of patent 14 years
U.S. Cl. D6—326



295,812
**REFRIGERATED DISPENSER DISPLAY STAND**
James A. Dyment, New Richmond; Norbert C. Albers; Harvey W. Benison, both of Cincinnati; Karl E. Haschart, and John S. Veach, both of Cincinnati, all of Ohio, assignors to Dyment Limited, Ontario, Canada
Filed Aug. 12, 1985, Ser. No. 764,849
Term of patent 14 years
U.S. Cl. D6—472



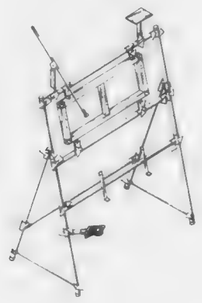
295,813
**DISPENSER RACK FOR BEVERAGE CONTAINERS**
Samuel B. Rowse, Brookline, and Robert Y. Grant, Mason, both of N.H., assignors to New England Apple Products Co., Inc., Littleton, Mass.
Filed Dec. 23, 1985, Ser. No. 812,013
Term of patent 14 years
U.S. Cl. D6—408



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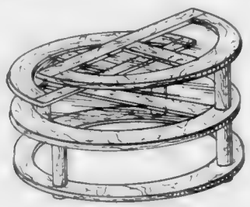
295,814
ADJUSTABLE SUPPORT STAND FOR A MUSICAL INSTRUMENT
Tai-Wu Chang, 2F1., No. 23, Sec. 1, Chung Hsiao W. Rd., Taipei, Taiwan
Filed Aug. 9, 1985, Ser. No. 764,050
Term of patent 14 years
U.S. Cl. D6—429



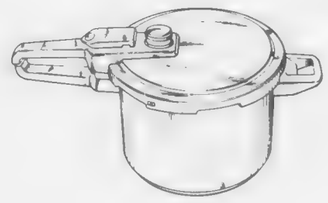
295,815
ADJUSTABLE TABLE
Lester Beall, Jr., Denver, N.C., assignor to CM Furniture Co., Maiden, N.C.
Filed Sep. 24, 1985, Ser. No. 779,576
Term of patent 14 years
U.S. Cl. D6—430



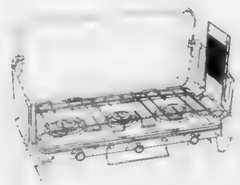
295,816
ADJUSTABLE TABLE
Lester Beall, Jr., Denver, N.C., assignor to CM Furniture Co., Maiden, N.C.
Filed Sep. 24, 1985, Ser. No. 779,575
Term of patent 14 years
U.S. Cl. D6—430



295,817
PRESSURE COOKER
Christian Sebillotte, Selongey, France, assignor to SEB, Selongey, France
Filed Jul. 16, 1985, Ser. No. 755,714
Claims priority, application France, Jan. 25, 1985, 850.302
Term of patent 14 years
U.S. Cl. D7—358

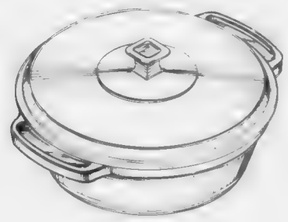


295,818
COMBINATION BURNER UNIT WITH SIDE PANELS AND GRILL PLATE
Ming K. Chan, 1st Floor, 58 Hung To Road, Kowloon, Hong Kong
Filed Jan. 28, 1985, Ser. No. 695,621
Claims priority, application United Kingdom, Sep. 5, 1984, 1 021 906
Term of patent 14 years
U.S. Cl. D7—332

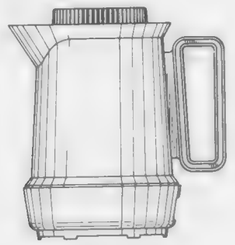




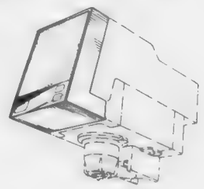
295,819
COVERED DISH OR SIMILAR ARTICLE
Michael J. Mercadante, Boston, Mass., assignor to Anchor Hocking Corporation, Lancaster, Ohio
Division of Ser. No. 564,309, Dec. 22, 1983. This application Jun. 9, 1986, Ser. No. 872,431
Term of patent 14 years
U.S. Cl. D7—17



295,820
ELECTRICALLY HEATED PITCHER FOR LIQUIDS
Norman C. Minsky, West Bend, Wis., and William C. Cesaroni, Glenview, Ill., assignors to Dart Industries Inc., Deerfield, Ill.
Filed Aug. 7, 1985, Ser. No. 763,848
Term of patent 14 years
U.S. Cl. D7—317



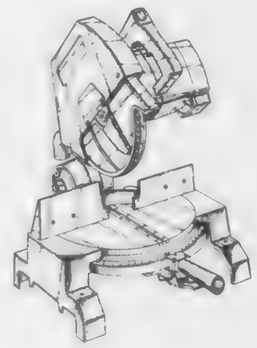
295,821
CONTROL PANEL FACE PLATE FOR A BEVERAGE DISPENSER VALVE
William F. Stembridge, College Park; James C. Sturrock, Atlanta, and W. Frank Stembridge, III, East Point, all of Ga., assignors to The Coca-Cola Company, Atlanta, Ga.
Filed Jul. 31, 1984, Ser. No. 636,456
Term of patent 14 years
U.S. Cl. D7—398



295,822
MICROWAVE OVEN
Masayoshi Kubo; Masuo Ichihara; Katsutoshi Kido; Tomoyasu Hiratsuka, and Kensuke Mizuma, all of Nara, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed Jun. 17, 1985, Ser. No. 744,878
Claims priority, application Japan, Dec. 20, 1984, 59-52522
Term of patent 14 years
U.S. Cl. D7—351



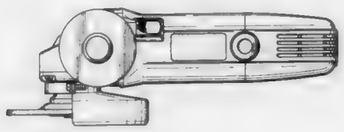
295,823
COMBINED CIRCULAR SAW AND MITERBOX UNIT
Louis C. Brickner, Jr., Pittsburgh, Pa.; Jerry D. Skipworth, Burkesville, Ky., and Steven W. Ashworth, Blawnox, Pa., assignors to Delta International Machinery Corp., Pittsburgh, Pa.
Filed Apr. 3, 1986, Ser. No. 846,544
Term of patent 14 years
U.S. Cl. D8—66

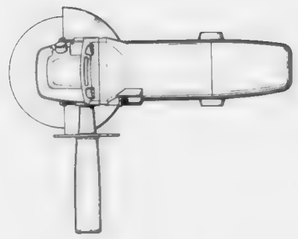


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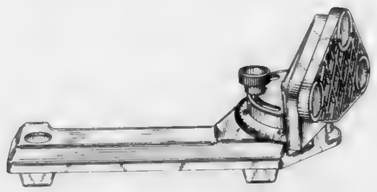


295,824
**PORTABLE ELECTRIC GRINDER**
Kiyoshi Hoshino, Tokyo, and Kazuyuki Takahashi, Hiroshima, both of Japan, assignors to Ryobi Ltd., Hiroshima, Japan
Filed May 22, 1985, Ser. No. 736,903
Claims priority, application Japan, Nov. 22, 1984, 59-48083
Term of patent 14 years
U.S. Cl. D8—62

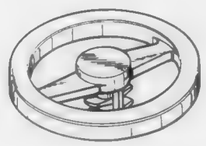




295,825
**MITRE BOX**
Kurt Persson, Mattmar, Sweden, assignor to Nobex Aktiebolag, Halsbacken, Sweden
Filed Jun. 26, 1986, Ser. No. 879,162
Claims priority, application Sweden, Jan. 27, 1986, 86-0189
Term of patent 14 years
U.S. Cl. D8—71



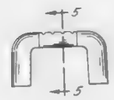
295,826
**FASTENER OR THE LIKE**
Hiroshi Osada, Yokohama, Japan, assignor to Nifco Inc., Yokohama, Japan
Filed Dec. 10, 1985, Ser. No. 807,361
Claims priority, application Japan, Jun. 26, 1985, 60-27056
Term of patent 14 years
U.S. Cl. D8—382





295,827
**PULL**
E. Burton Benjamin, Highland Park, Ill., assignor to Amerock Corporation, Rockford, Ill.
Filed May 27, 1986, Ser. No. 867,303
Term of patent 14 years
U.S. Cl. D8—317

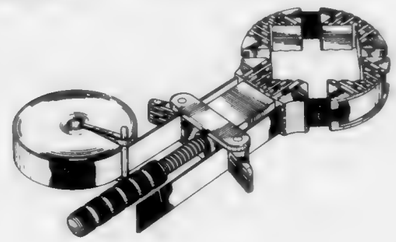


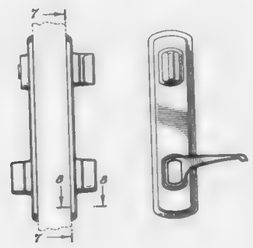




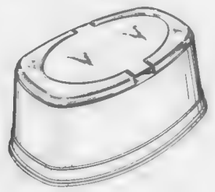

295,828
**PICTURE-FRAMING CLAMP OR THE LIKE**
Friedrich Wolff, Remscheid, Fed. Rep. of Germany, assignor to Werkzeug GmbH, Fed. Rep. of Germany
Filed Nov. 26, 1985, Ser. No. 805,300
Claims priority, application Fed. Rep. of Germany, May 31, 1985, 5MR285
Term of patent 14 years
U.S. Cl. D8—71



295,829
**COMBINED LATCH AND DEADBOLT UNIT**
Charles J. Ortega, Hollywood; Paul D. Fleming, Glendale, and David L. O'Day, Canoga Park, all of Calif., assignors to W & F Manufacturing, Inc., Glendale, Calif.
Filed Dec. 20, 1985, Ser. No. 811,710
Term of patent 14 years
U.S. Cl. D8—301




295,830
**CONTAINER**
Henry L. Holly, North Brunswick, N.J., assignor to Personal Products Company, Milltown, N.J.
Filed May 1, 1985, Ser. No. 729,447
Term of patent 14 years
U.S. Cl. D9—420



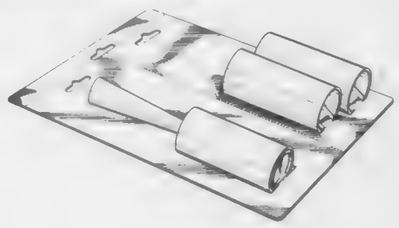
295,831
**DISPENSING CLOSURE**
Kenard E. Urion, Woodbury, N.J., assignor to Scott Paper Company, Philadelphia, Pa.
Filed Nov. 20, 1985, Ser. No. 805,170
Term of patent 14 years
U.S. Cl. D9—438



295,832
**CARTON**
Ronald L. Shelton, Cincinnati, Ohio, assignor to Jung Corporation, Cincinnati, Ohio
Filed Aug. 12, 1985, Ser. No. 764,792
Term of patent 14 years
U.S. Cl. D9—415



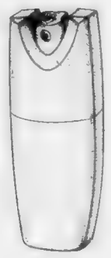
295,833
**COMBINED DISPLAY CARD, LINT ROLLER AND ROLLER REFILLS PACKAGE**
Eric M. Roth, 153 Lake Drive N., Keswick, Ontario, Canada L4P 3C8
Filed Jul. 26, 1985, Ser. No. 759,247
Term of patent 14 years
U.S. Cl. D9—337



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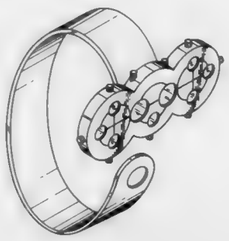
295,834
DISPENSING CONTAINER
James R. Crapser, Racine, Wis., assignor to S. C. Johnson & Son, Inc., Racine, Wis.
Filed Jun. 28, 1985, Ser. No. 749,853
Term of patent 14 years
U.S. Cl. D9—300



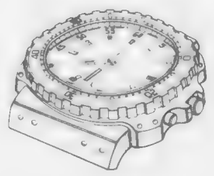
295,835
WATER CONTAINER
Raoul Gautier, Belmont-sur-Vair, 88800 Vittel, France
Filed Sep. 13, 1984, Ser. No. 650,046
Claims priority, application France, Mar. 22, 1984, 104
Term of patent 14 years
U.S. Cl. D9—305



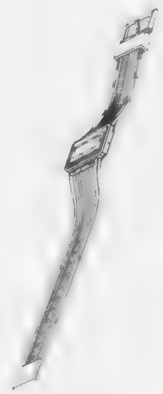
295,836
BASEBALL COUNTER-SORTER
Bryan Campbell, 424 W. Mulberry St., Lancaster, Ohio 43130
Filed Jul. 12, 1985, Ser. No. 754,073
Term of patent 14 years
U.S. Cl. D10—46.1



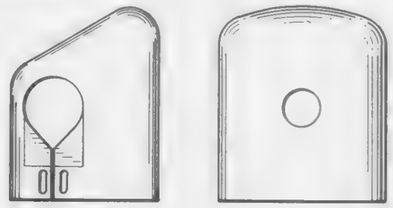
295,837
WRIST WATCH
Takashi Takeichi, Hamuramachi, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan
Filed Oct. 23, 1985, Ser. No. 790,413
Claims priority, application Japan, May 14, 1985, 60-19817
Term of patent 14 years
U.S. Cl. D10—39



295,838
WRIST WATCH
Toshiya Ando, Murayama, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan
Filed Oct. 23, 1985, Ser. No. 790,412
Claims priority, application Japan, May 28, 1985, 60-22166
Term of patent 14 years
U.S. Cl. D10—32

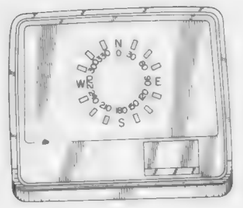


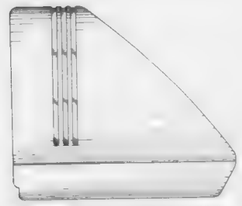
295,839
GAS REGULATOR COVER
Michael J. O'Brien, R.R. 1, Box 2010, and Keith L. Prescott, R.R. 1, Box 2045, both of Cambridge, Vt. 05444
Filed Jul. 22, 1985, Ser. No. 757,437
Term of patent 14 years
U.S. Cl. D10—103





295,840
ELECTRONIC COMPASS
Kazumi Sakai, Tokyo, Japan, assignor to Car Mate Manufacturing Company Limited, Tokyo, Japan
Filed Oct. 15, 1985, Ser. No. 787,745
Claims priority, application Japan, Apr. 12, 1985, 60-14978
Term of patent 14 years
U.S. Cl. D10—68

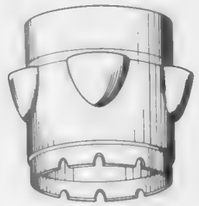




295,841
WRIST WATCH
Hayao Kano, Saitama, Japan, assignor to Citizen Watch Co., Ltd., Tokyo, Japan
Filed Oct. 28, 1985, Ser. No. 791,896
Claims priority, application Japan, May 17, 1985, 60-20381
Term of patent 14 years
U.S. Cl. D10—39



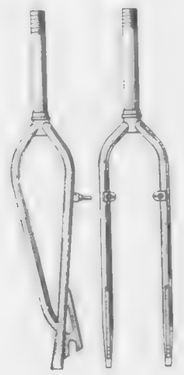
295,842
STACKABLE POCKET PLANTER
Larry W. Gay, 1992 Johnson Ave., San Luis Obispo, Calif. 93401
Filed Dec. 20, 1985, Ser. No. 811,694
Term of patent 14 years
U.S. Cl. D11—152



295,843
BUDDHA FIGURINE
Joseph A. Bell, P.O. Box 6766, Gold Coast Mail Centre, Qld. 4217, Australia
Filed Oct. 9, 1984, Ser. No. 658,818
Claims priority, application Australia, Jul. 23, 1984, 8266/84
Term of patent 14 years
U.S. Cl. D11—160



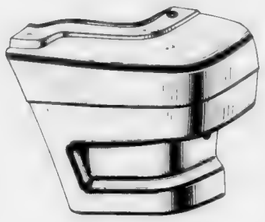
295,844
BICYCLE FORK
Norman Levine, 2205 NW. 30th Pl., Pompano Beach, Fla. 33060
Filed Sep. 13, 1985, Ser. No. 776,131
Term of patent 14 years
U.S. Cl. D12—118



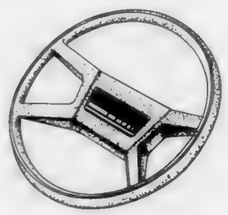
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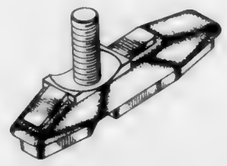
295,845
**AUTOMOBILE CORNER BUMPER**
Ryoichi Soma, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan
Filed Dec. 23, 1985, Ser. No. 812,852
Term of patent 14 years
U.S. Cl. D12—172



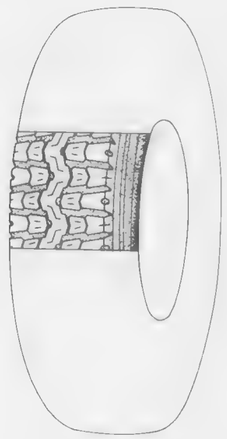
295,846
**STEERING WHEEL**
Warwick M. Whitley, II, Panama City, Fla., assignor to Attwood Corporation, Lowell, Mich.
Filed May 6, 1985, Ser. No. 730,802
Term of patent 14 years
U.S. Cl. D12—176



295,847
**BICYCLE BRAKE SHOE**
Richard C. Everett, 225 S. Sunshine La., West Linn, Oreg. 97221
Filed Aug. 9, 1985, Ser. No. 764,139
Term of patent 14 years
U.S. Cl. D12—180



295,848
**VEHICLE TIRE**
Giuliano Ghilardi, Viale Marelli, Italy, assignor to Pirelli Coordinamento Pneumatici S.p.A., Italy
Filed Aug. 14, 1985, Ser. No. 765,532
Claims priority, application Italy, Feb. 15, 1985, 20807/85[U]
The portion of the term of this patent subsequent to Jun. 9, 2001, has been disclaimed.
Term of patent 14 years
U.S. Cl. D12—147

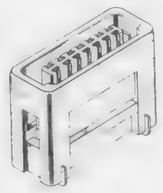


295,849
**LIGHT SOCKET**
Jesus Borja, Glenview, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.
Filed Nov. 22, 1985, Ser. No. 806,194
Term of patent 14 years
U.S. Cl. D13—25

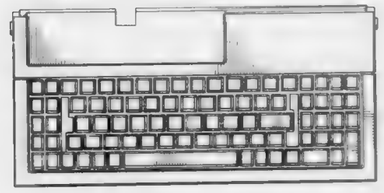




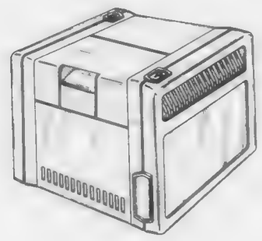
295,850
**ELECTRIC CONNECTOR OR THE LIKE**
Sigeru Kikuta, Tokyo, Japan, assignor to Hirose Electric Co., Ltd., Tokyo, Japan
Filed Mar. 28, 1985, Ser. No. 719,716
Claims priority, application Japan, Sep. 28, 1984, 59-40320; Sep. 28, 1984, 59-40322; Sep. 28, 1984, 59-40323; Sep. 28, 1984, 59-40324; Sep. 28, 1984, 59-40325; Feb. 26, 1985, 60-7256; Feb. 27, 1985, 60-7503; Feb. 27, 1985, 60-7504
Term of patent 14 years
U.S. Cl. D13—24



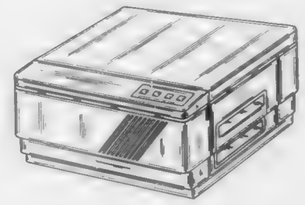
295,851
**EXPANSION KEYBOARD MODULE FOR MICROPROCESSOR OR THE LIKE**
Kenneth H. Harlan, and Jeffrey L. Harlan, both of Claremont, Calif., assignors to Personal Integrated Computer, Newport Beach, Calif.
Filed Jul. 23, 1984, Ser. No. 633,355
Term of patent 14 years
U.S. Cl. D14—100



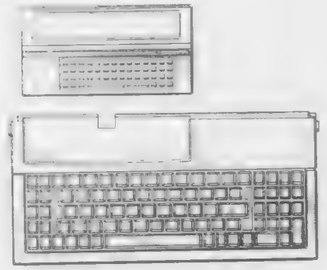
295,852
**OPTICAL SCANNER**
Seymour Naps, Oceanside, N.Y.; Anthony L. Nieves, Wayne, and Bahram N. Ansary, Montclair, both of N.J., assignors to Electronic Information Technology, Inc., West Fairfield, N.J.
Filed May 2, 1986, Ser. No. 859,875
Term of patent 14 years
U.S. Cl. D14—107



295,853
**PRINTER**
Yoshihisa Ooie, Osaka, Japan, assignor to Sharp Corporation, Osaka, Japan
Filed May 23, 1986, Ser. No. 867,732
Claims priority, application Japan, Nov. 28, 1985, 60-49864
Term of patent 14 years
U.S. Cl. D14—111



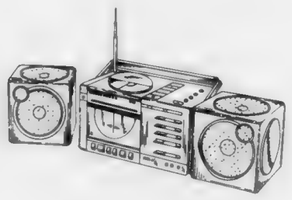
295,854
**COMBINED MICROPROCESSOR AND EXPANSION KEYBOARD MODULE THEREFOR**
Kenneth H. Harlan, and Jeffrey L. Harlan, both of Claremont, Calif., assignors to Personal Integrated Computer, Newport Beach, Calif.
Filed Jul. 23, 1984, Ser. No. 633,356
Term of patent 14 years
U.S. Cl. D14—100



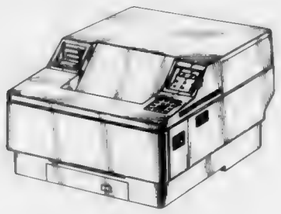
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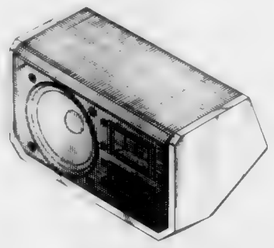
295,855
COMBINED CASSETTE TAPE RECORDER AND COMPACT DISC PLAYER
Bon H. Koo, Buchonshi, Rep. of Korea, assignor to Goldstar Co., Ltd., Seoul, Rep. of Korea
Filed Dec. 27, 1985, Ser. No. 813,722
Claims priority, application Rep. of Korea, Jun. 29, 1985, 85-9060
Term of patent 14 years
U.S. Cl. D14—5



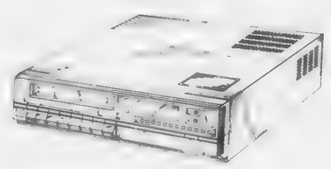
295,856
PRINTER FOR ELECTRONIC COMPUTERS
Kunio Hara, Chiba, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed May 6, 1986, Ser. No. 859,900
Claims priority, application Japan, Nov. 19, 1985, 60-48138
Term of patent 14 years
U.S. Cl. D14—111



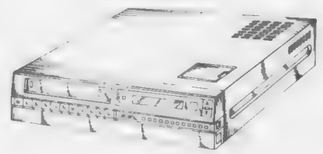
295,857
SPEAKER
Mitsukatsu Nagashima, Tokyo, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan
Filed Jun. 17, 1985, Ser. No. 745,096
Claims priority, application Japan, Jan. 19, 1985, 60-1528
Term of patent 14 years
U.S. Cl. D14—34



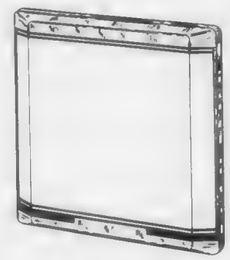
295,858
VIDEO CASSETTE RECORDER
Kyu S. Shim, Seoul, Rep. of Korea, assignor to Goldstar Co., Ltd., Seoul, Rep. of Korea
Filed Dec. 20, 1985, Ser. No. 811,346
Claims priority, application Rep. of Korea, Jun. 27, 1985, 85-8961
Term of patent 14 years
U.S. Cl. D14—2



295,859
VIDEO CASSETTE RECORDER
Jae J. Shim, Kyungki, Rep. of Korea, assignor to Goldstar Co., Ltd., Seoul, Rep. of Korea
Filed Dec. 27, 1985, Ser. No. 813,962
Claims priority, application Rep. of Korea, Jun. 27, 1985, 85-8963
Term of patent 14 years
U.S. Cl. D14—2



295,860
LOUDSPEAKER CABINET
Albertus Van Dorssen, Best, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Sep. 9, 1985, Ser. No. 774,199
Claims priority, application United Kingdom, Mar. 20, 1985, 1.025.684
Term of patent 14 years
U.S. Cl. D14—33

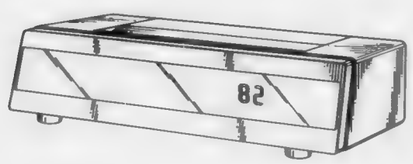




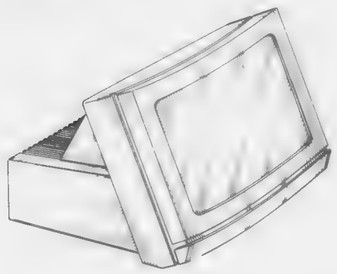
295,861
MICROPHONE SHIELDER
Hiroshi Kubota, Kobe, Japan, assignor to Toa Tokushi Denki Kabushiki Kaisha, Kobe, Japan
Filed Jan. 3, 1986, Ser. No. 815,948
Claims priority, application Japan, Jul. 3, 1985, 60-28450
Term of patent 14 years
U.S. Cl. D14—12



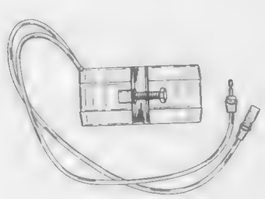
295,862
CATV CONVERTER
Hiroshi Yonekura, and Yutaka Kono, both of Osaka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed Oct. 17, 1984, Ser. No. 661,628
Claims priority, application Japan, Apr. 19, 1984, 59-15846
Term of patent 14 years
U.S. Cl. D14—84




295,863
VIDEO DISPLAY TERMINAL
James E. Sacherman, Palo Alto, Calif., assignor to Wyse Technology, San Jose, Calif.
Filed Oct. 11, 1985, Ser. No. 786,877
Term of patent 14 years
U.S. Cl. D14—113

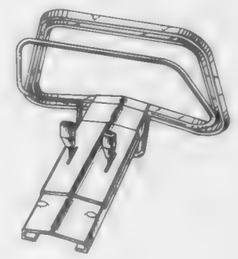


295,864
ELECTRIC HEATING UNIT FOR ATTACHMENT TO AN AUTOMOTIVE OIL FILTER
Ilkka Toivio, and Terttu Toivio, both of Likolammenkatu 15, 15850 Lahti, Finland
Filed Aug. 7, 1985, Ser. No. 763,408
Claims priority, application Finland, Feb. 15, 1985, 13085
Term of patent 14 years
U.S. Cl. D15—5





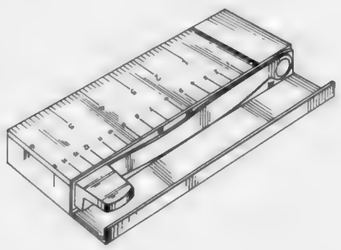
295,865
OPERATING HANDLE FOR A LAWN MOWER
Lars-Göran Rosenblad, Grönna, Sweden, assignor to Husqvarna Aktiebolag, Sweden
Filed Oct. 18, 1985, Ser. No. 789,127
Claims priority, application Sweden, Apr. 19, 1985, 851022
Term of patent 14 years
U.S. Cl. D15—18



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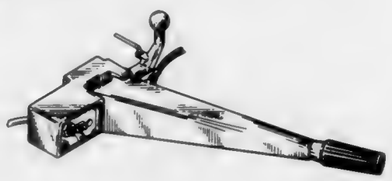


295,866
PAPER CUTTING DEVICE
Alan Davis, 17 Scheneck Ave., Great Neck, Long Island, N.Y. 11021
Filed Sep. 5, 1986, Ser. No. 904,254
Term of patent 14 years
U.S. Cl. D15—127

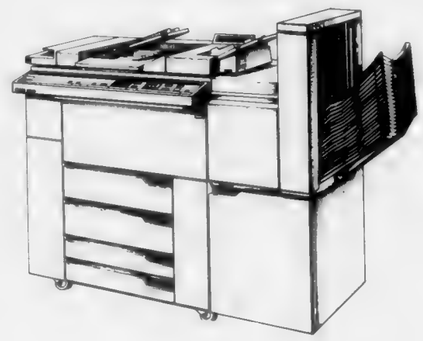




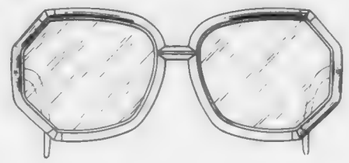
295,867
COMBINED TILLER ARM AND CONTROL PANEL FOR AN OUTBOARD MOTOR
James R. Walsh, Oshkosh, Wis., assignor to Brunswick Corporation, Skokie, Ill.
Filed Dec. 23, 1985, Ser. No. 812,228
Term of patent 14 years
U.S. Cl. D15—4



295,868
COPYING MACHINE WITH DOCUMENT HANDLER AND SORTER
Donald W. Carr, Binghamton, and Andrew T. Serbinski, Brooklyn, both of N.Y., assignors to Savin Corporation, Stamford, Conn.
Filed Sep. 6, 1985, Ser. No. 773,234
Term of patent 14 years
U.S. Cl. D16—30



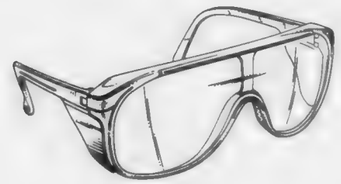
295,869
SUNGLASSES
Jean-Pierre Lamy, Geneva, Switzerland, assignor to Lamy Optic Industries, Inc., Miami, Fla.
Filed Jun. 6, 1985, Ser. No. 741,685
The portion of the term of this patent subsequent to Aug. 5, 2000, has been disclaimed.
Term of patent 14 years
U.S. Cl. D16—102



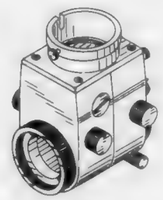




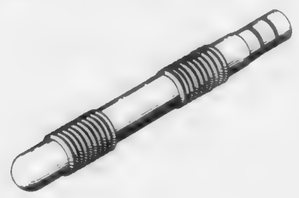
295,870
PAIR OF SPECTACLES
Jean F. Laterre, Divonne les Bains, France, assignor to Christian Dalloz S.A., St. Claude, France
Filed Oct. 2, 1986, Ser. No. 914,746
Term of patent 14 years
U.S. Cl. D16—112



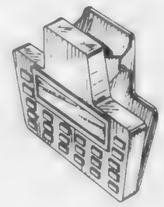
295,871
IMAGE SWITCHING ATTACHMENT FOR A TELESCOPE OR SIMILAR OPTICAL INSTRUMENT
Jeffrey R. Charles, 12402 N. 38th St., Phoenix, Ariz. 85032
Filed Jan. 3, 1985, Ser. No. 688,560
Term of patent 14 years
U.S. Cl. D16—130



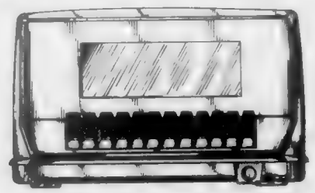
295,872
SLIP-ON GRIP FOR MUSICAL DRUMSTICKS
Angelo N. Koumarianos, 287 Main St., South River, N.J. 08882
Filed Nov. 4, 1985, Ser. No. 766,194
Term of patent 14 years
U.S. Cl. D17—22

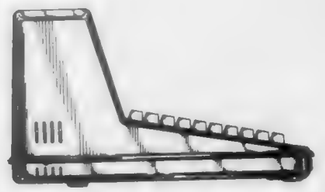


295,873
CALCULATOR COMBINED WITH CLIP
Danny C. H. Chau, Kowloon, Hong Kong, assignor to Dah Sun Electronics Company Limited, Hong Kong, Hong Kong
Filed Nov. 20, 1985, Ser. No. 805,165
Claims priority, application United Kingdom, Jul. 5, 1985, 1027727
Term of patent 14 years
U.S. Cl. D18—2



295,874
CASH REGISTER HOUSING
Anthony Maladra, Moorestown; Charles A. Hardin, Hainesport; Richard A. Duda, Laurel Springs, and George L. Horton, Englewood, all of N.J., assignors to Comtrex Systems Corporation, Mt. Laurel, N.J.
Filed May 20, 1985, Ser. No. 735,962
Term of patent 14 years
U.S. Cl. D18—4

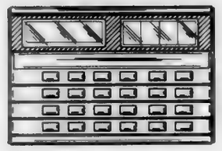




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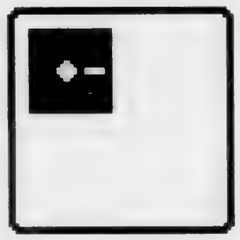


295,875
**ELECTRONIC CALCULATOR**
Takahisa Yubisui; Hiroshi Sakaguchi, and Katsuhiro Iida, all of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Nov. 27, 1985, Ser. No. 806,846
Claims priority, application Japan, May 30, 1985, 60-23113
Term of patent 14 years
U.S. Cl. D18—7





295,876
**ICON FOR VIRTUAL FLOPPY DISK OR THE LIKE**
Doris E. Wells-Papanek; William L. Verplank, both of Menlo Park, and Norman L. Cox, Mountain View, all of Calif., assignors to Xerox Corporation, Stamford, Conn.
Filed Dec. 9, 1985, Ser. No. 806,726
Term of patent 14 years
U.S. Cl. D18—27



295,877
**ICON FOR CANVAS OR THE LIKE**
Doris E. Wells-Papanek; William L. Verplank, both of Menlo Park, and Norman L. Cox, Mountain View, all of Calif., assignors to Xerox Corporation, Stamford, Conn.
Filed Dec. 9, 1985, Ser. No. 807,045
Term of patent 14 years
U.S. Cl. D18—27

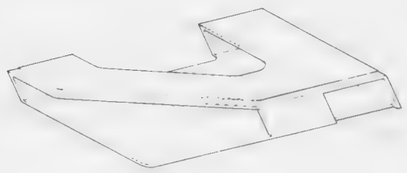


295,878
**DUAL APPLICATOR MARKING INSTRUMENT**
John Lovell, 4617 Central Ave., North, Ste. C, Knoxville, Tenn. 37912
Filed Jun. 10, 1985, Ser. No. 743,050
Term of patent 14 years
U.S. Cl. D19—43





295,879
**MEMO HOLDER OR THE LIKE**
Gerald J. Klodt, Madison, Wis., assignor to W. T. Rogers Company, Madison, Wis.
Filed Oct. 1, 1985, Ser. No. 782,376
Term of patent 14 years
U.S. Cl. D19—92





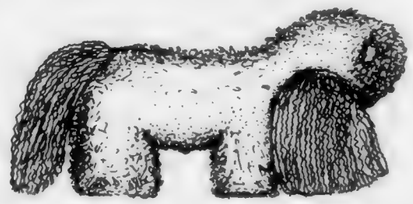
295,880
**MOVABLE BEAR SCULPTURE**
Glen R. Stokey, and Bonetta M. Stokey, both of 308 S. Huntington Ave., San Dimas, Calif. 91773
Filed Sep. 13, 1985, Ser. No. 775,812
Term of patent 14 years
U.S. Cl. D21—159



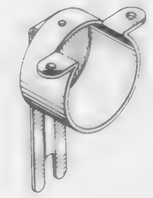
295,881
**TOY STUFFED ANIMAL**
Michael J. Cassaro, 130 Farm St., Wakefield, Mass. 01880
Filed Dec. 17, 1985, Ser. No. 810,043
Term of patent 14 years
U.S. Cl. D21—161



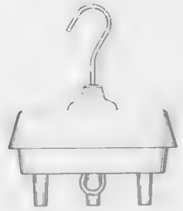
295,882
**YARN DOG**
Charles Atkins, P.O. Box 33, Terre Haute, Ind. 47808
Filed Sep. 30, 1985, Ser. No. 782,045
Term of patent 14 years
U.S. Cl. D21—161



295,883
**GOLF BALL HOLDER**
John Allen, 5897 Avenue Juan Bautista, Riverside, Calif. 92509
Filed Nov. 1, 1985, Ser. No. 793,953
Term of patent 14 years
U.S. Cl. D21—234



295,884
**INSECT GUARD**
Charles R. Johnson, 6786 Pembroke, San Antonio, Tex. 78240
Filed Aug. 21, 1985, Ser. No. 767,883
Term of patent 14 years
U.S. Cl. D22—119



295,885
**FISH LURE**
Timothy D. Richards, P.O. Box 177, Percy, Ill. 62272
Filed Apr. 1, 1985, Ser. No. 718,106
Term of patent 14 years
U.S. Cl. D22—132



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295,886
**PRESSURIZED FUEL TANK**
Glen Dolton, Wichita, and Frank T. Schmidt, Mulvane, both of Kans., assignors to The Coleman Company, Inc., Wichita, Kans.
Filed Dec. 5, 1986, Ser. No. 938,768
Term of patent 14 years
U.S. Cl. D23—205

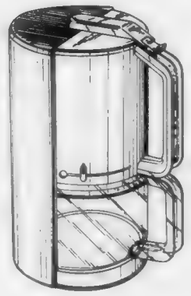




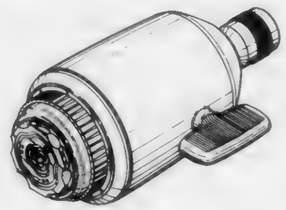
295,887
**WATER PURIFICATION UNIT**
David H. Hopkins, Escondido, Calif., assignor to Nimbus Water Systems, Inc., Escondido, Calif.
Filed Jan. 30, 1986, Ser. No. 824,134
Term of patent 14 years
U.S. Cl. D23—207



295,888
**WATER FILTER**
Rolf G. Schulein, Singhofen, and Rainer Friedrich, Nassau/-Lahn, both of Fed. Rep. of Germany, assignors to Leifheit AG, Nassau/Lahn, Fed. Rep. of Germany
Filed Jul. 1, 1986, Ser. No. 881,010
Claims priority, application Fed. Rep. of Germany, Jan. 8, 1986, DE 6 MR 1511
Term of patent 14 years
U.S. Cl. D23—207

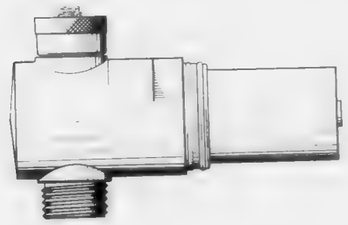


295,889
**SHOWER HEAD**
Andreas Haug, Altensteig, and Hans-Peter Leins, Rohrdorf, both of Fed. Rep. of Germany, assignors to Hans Grohe GmbH & Co. KG, Fed. Rep. of Germany
Filed Sep. 4, 1985, Ser. No. 772,352
Term of patent 14 years
U.S. Cl. D23—229





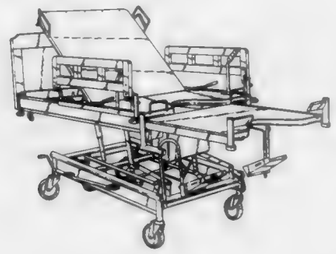
295,890
**TIMER-CONTROLLED VALVE FOR A LAWN SPRINKLER**
Kenneth J. Bruninga, Mapleton; Douglas C. Fletcher, Peoria, both of Ill., and Ronald G. Hayes, Batavia, Ohio, assignors to L. R. Nelson Corporation, Peoria, Ill.
Filed Jul. 17, 1985, Ser. No. 755,817
Term of patent 14 years
U.S. Cl. D23—245



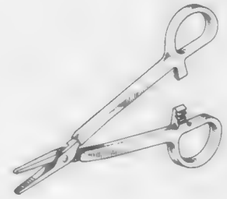
295,891
**IONIZATION AIR CLEANER**
Sun Shin-Ching, 3F. No. 32, 132nd Lane, and Chou Jing-Win, No. 8, 12th Alley, 8th Lane, Chung-Shan N. Road, Sec. 1, both of Taipei, Taiwan
Filed Jul. 29, 1986, Ser. No. 891,104
Term of patent 14 years
U.S. Cl. D23—364



295,892
**OBSTETRIC BED**
Mats Feldt, Rosenlund, Sweden, assignor to Landstingens Inkopscentral, LIC, Ekonomisk Forening, Solna, Sweden
Filed Jul. 25, 1985, Ser. No. 758,976
Claims priority, application Sweden, Jan. 28, 1985, 85-0197
Term of patent 14 years
U.S. Cl. D24—3



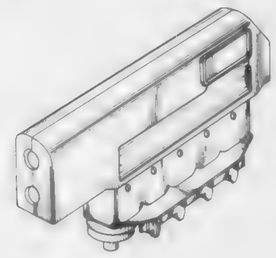
295,893
**DISPOSABLE SURGICAL CLAMP**
Edward J. Sharkany, Huntington, and John C. O'Donnell, Stratford, both of Conn., assignors to Acme United Corporation, Fairfield, Conn.
Filed Sep. 25, 1985, Ser. No. 780,009
Term of patent 14 years
U.S. Cl. D24—27



295,894
**DISPOSABLE SURGICAL SCISSORS**
Edward J. Sharkany, Huntington, and John C. O'Donnell, Stratford, both of Conn., assignors to Acme United Corporation, Fairfield, Conn.
Filed Sep. 26, 1985, Ser. No. 780,215
Term of patent 14 years
U.S. Cl. D24—28



295,895
**COMBINED WASHER AND ASPIRATOR FOR WASHING BEADS IN AN IMMUNOASSAY REACTION WELL**
Paul L. Eck, Deerfield, Ill., assignor to Abbott Laboratories, North Chicago, Ill.
Filed Aug. 30, 1985, Ser. No. 771,534
Term of patent 14 years
U.S. Cl. D24—29



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295,896
**BREAST PUMP**
Archie W. Van Meter, Barrington, and Anthony F. Pakosta, Naperville, both of Ill., assignors to Mega Corporation, Schaumberg, Ill.
Filed Aug. 30, 1985, Ser. No. 770,983
Term of patent 14 years
U.S. Cl. D24—51



295,897
**COMBINED SPLINT HOLDER AND WRIST SUPPORT**
Sally E. Thimm-Kelly, 961 Lake Watch Ct., Stone Mountain, Ga. 30088
Filed Aug. 23, 1985, Ser. No. 768,619
Term of patent 14 years
U.S. Cl. D24—64



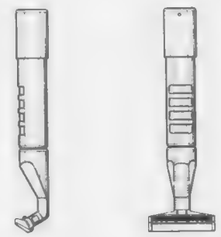
295,898
**BUILDING**
Carl A. Rupp, 1112 W. Walden Park Dr., Salt Lake City, Utah 84107
Filed Mar. 25, 1985, Ser. No. 715,487
Term of patent 14 years
U.S. Cl. D25—22



295,899
**AUTOMOBILE REAR COMBINATION LAMP**
Hirofumi Ienaga, Kanagawa, Japan, and Thomas H. Semple, Olivenhain, Calif., assignors to Nissan Motor Co., Ltd., Yokohama, Japan
Filed Oct. 29, 1985, Ser. No. 792,526
Term of patent 14 years
U.S. Cl. D26—28

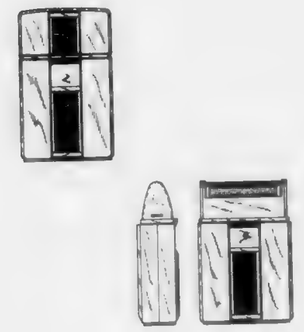


295,900
**RAZOR OR SIMILAR ARTICLE**
Giampiero Bonori, No. 4 Don Marella, Bologna, Italy
Filed Jun. 13, 1986, Ser. No. 874,380
Term of patent 14 years
U.S. Cl. D28—46





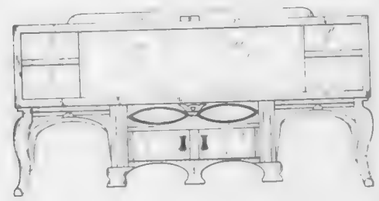
295,901
**ELECTRIC DRY SHAVER WITH COVER**
Hans T. Meelen, Drachten, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Sep. 23, 1985, Ser. No. 778,649
Claims priority, application Benelux, Apr. 26, 1985, 60025-00
Term of patent 14 years
U.S. Cl. D28—49



295,902
**HELMET**
Andrew J. Foulkes, Beaumaris, Australia, assignor to Rosebank Plastics Pty. Ltd., Victoria, Australia
Continuation-in-part of Ser. No. 458,065, Jan. 14, 1983, Pat. No. Des. 280,945. This application Jan. 29, 1985, Ser. No. 696,255
Claims priority, application Australia, Jul. 29, 1982, 1075/82
The portion of the term of this patent subsequent to Oct. 15, 1999, has been disclaimed.
Term of patent 14 years
U.S. Cl. D29—15



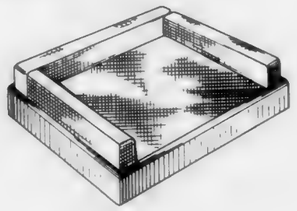
295,903
**AQUARIUM TANK**
Thomas Johnson, 392 Winewood St., San Diego, Calif. 92114
Filed Dec. 13, 1985, Ser. No. 808,735
Term of patent 14 years
U.S. Cl. D30—105



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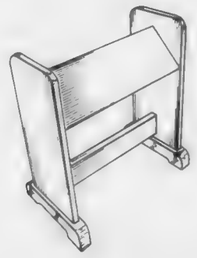
295,904
**BED FOR PETS**
Franklin McMahon, New York, N.Y., assignor to Pacific Industries, Corp., Dallas, Tex.
Filed Dec. 10, 1986, Ser. No. 940,639
Term of patent 14 years
U.S. Cl. D30—118



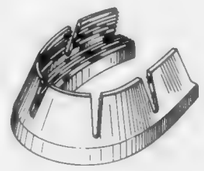
295,905
**BASE FOR A PIG FEEDER**
Ray E. Swartzendruber, Syracuse, and Keith Coffman, Leesburg, both of Ind., assignors to Chore-Time Equipment, Inc., Milford, Ind.
Filed Feb. 28, 1985, Ser. No. 706,717
Term of patent 14 years
U.S. Cl. D30—131



295,906
**SADDLE STAND**
William W. Wilson, 15 Leo Street, Fawkner, Victoria 3060, Australia
Filed May 23, 1986, Ser. No. 841,720
Claims priority, application Australia, Sep. 4, 1985, 2458/85
Term of patent 14 years
U.S. Cl. D30—143



295,907
**HORSESHOE**
V. Gail Decker, Valley View, Tex., assignor to K & D Plastics, Gainsville, Tex.
Filed Apr. 1, 1985, Ser. No. 718,735
Term of patent 14 years
U.S. Cl. D30—147



295,908
**JEWELED COLLAR**
Elliott H. Wharton, P.O. Box 338, Damascus, Ohio 44619
Continuation of Ser. No. 881,463, Jul. 2, 1986, which is a continuation-in-part of Ser. No. 643,244, Aug. 22, 1984. This application Feb. 6, 1987, Ser. No. 12,040
Term of patent 14 years
U.S. Cl. D30—152





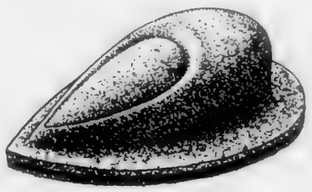
295,909
**JEWELED COLLAR**
Elliott H. Wharton, P.O. Box 338, Damascus, Ohio 44619
Continuation of Ser. No. 881,462, Jul. 2, 1986, which is a continuation-in-part of Ser. No. 643,302, Aug. 22, 1984. This application Feb. 6, 1987, Ser. No. 12,039
Term of patent 14 years
U.S. Cl. D30—152



295,910
**CONTAINER FOR VACUUM CLEANER ACCESSORIES**
Andrew C. Hill, Rocky Mount, N.C., assignor to W. R. Grace & Co., Cryovac Div., Duncan, S.C.
Filed Jun. 20, 1985, Ser. No. 747,093
Term of patent 14 years
U.S. Cl. D32—31



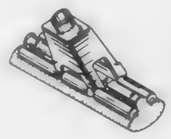
295,911
**SCRUBBER**
Jon R. Zogg, Brooklyn, N.Y., assignor to Colgate-Palmolive Co., New York, N.Y.
Filed Nov. 5, 1986, Ser. No. 928,137
Term of patent 14 years
U.S. Cl. D32—40



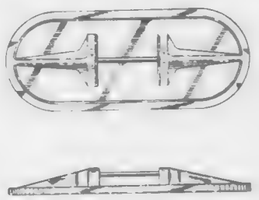
295,912
**WRINGER MOP HEAD WITH SCRUBBER**
David A. Jones, Dayton, and William J. O'Neil, Jr., Cincinnati, both of Ohio, assignors to The Drackett Company, Cincinnati, Ohio
Filed Mar. 19, 1986, Ser. No. 845,080
Term of patent 14 years
U.S. Cl. D32—44



295,913
**WRINGER MOP HEAD**
David A. Jones, Dayton, and William J. O'Neil, Jr., Cincinnati, both of Ohio, assignors to The Drackett Company, Cincinnati, Ohio
Filed Apr. 16, 1986, Ser. No. 852,914
Term of patent 14 years
U.S. Cl. D32—44



295,914
**DUST MOP FRAME**
Theron C. Moss; William H. Kenney, both of Cleveland; Earl V. Boring, Jr., McDonald; H. Edwin Cross, Sr., and John H. Ruston, both of Cleveland, all of Tenn., assignors to Seco Industries, Inc., Cleveland, Tenn.
Filed Jan. 13, 1986, Ser. No. 818,020
Term of patent 14 years
U.S. Cl. D32—50



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# LIST OF PATENTEES

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## PATENTS WERE ISSUED ON THE 24TH DAY OF MAY, 1988

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. B. Chance Company: *See*—
Parker, Delbert R.; and Clark, Daren A., 4,746,381, Cl. 156-69.000.

A. H. Robins Company, Incorporated: *See*—
Cale, Albert D., Jr., 4,746,655, Cl. 314-211.000.
Cale, Albert D., Jr., 4,746,657, Cl. 514-215.000.

A-Lok Products, Inc.: *See*—
Westhoff, James; and Kelly, James A., 4,746,127, Cl. 277-1.000.

A. Natternabb & CIE GmbH: *See*—
Biedermann, Jurgen; Borbe, Harald; Graf, Erich; Hilboll, Gerd; and Prop, Gerrit, 4,746,660, Cl. 514-252.000.

A.R.A. Manufacturing Company of Delaware, Inc.: *See*—
Burney, Charles F., 4,746,826, Cl. 310-78.000.

A T & E Corporation: *See*—
Hood, William G.; Klarquist, Thomas D.; Lee, Kai-Dick; Nepple, Bruce C.; Olin, Daniel C.; Park, Lawrence B.; and Park, Michael C., 4,747,126, Cl. 379-74.000.

AB Film Teknik: *See*—
Selin, Bjorn, 4,746,207, Cl. 352-90.000.

AB Volvo: *See*—
Persson, Per I.; and Persson, Bengt, 4,746,150, Cl. 285-286.000.

Abarotin, Eugene V., to Design & Analysis of Mechanisms & Structures, Inc. Apparatus for removing and replacing manhole covers and gratings. 4,746,098, Cl. 254-130.000.

Abbondanti, Alberto, to Westinghouse Electric Corp. Start-up system for a synchronous motor drive. 4,746,850, Cl. 318-723.000.

Abdelrahman, Mona; Deetz, David W.; and Zook, J. David, to Honeywell Inc. Membrane-selective vapor sensing. 4,745,796, Cl. 73-26.000.

Abdul, Abadan J. Making a natural food peanut punch. 4,746,530, Cl. 426-580.000.

Abe, Hideo: *See*—
Kenmochi, Kazuhito; Abe, Hideo; Sasaki, Toru; Yoshimoto, Takeshi; Nagamori, Hiroyuki; and Matsuda, Hiroyuki, 4,746,448, Cl. 252-56.00S.

Abe, Hitoshi; and Kobayashi, Akira, to Kyoritsu Seiki Corporation. Tool holder in machining center. 4,745,674, Cl. 29-568.000.

Abe, Keizo: *See*—
Ozu, Takahiro; Abe, Keizo; and Tsujii, Masayoshi, 4,746,576, Cl. 428-421.000.

Abe, Takahiro: *See*—
Tsukada, Hisashi; Abe, Takahiro; Ishihara, Sugio; Taira, Junichi; and Akabane, Hiroo, 4,745,763, Cl. 62-66.000.

Abele, Berthold W., to KSA Dichtsysteme GmbH & Co. KG. Flat gasket-type seal for placement between machine parts including hydraulic control panels. 4,746,130, Cl. 277-228.000.

Abt, Franz; Kern, Manfred; Klingele, Robert; and Staudenrausch, Georg, to Albert Handtmann Maschinenfabrick GmbH & Co. KG. Machine for filling receptacles or sausage skins with sausage meat. 4,745,659, Cl. 17-35.000.

Ackeret, Peter, to Licinvest AG. Device for the cyclic rearrangement of a pile of sheets. 4,745,697, Cl. 40-513.000.

Ackern, Klaus: *See*—
Forssmann, Bernd; Hepp, Wolfgang; Ackern, Klaus; and Chaussy, Christian, 4,745,920, Cl. 128-328.000.

Acs, Tibor: *See*—
Szantay, Csaba; Szabo, Lajos; Honty, Katalin; Keve, Tibor; Acs, Tibor; Eckhardt, Sandor; Sugar, Janos; Somfai, Zsuzsa; Ivan, Eva ; and Kneffel, Zsuzsa, 4,746,665, Cl. 514-283.000.

Acumeter Laboratories, Inc.: *See*—
McIntyre, Frederic S., 4,746,545, Cl. 427-176.000.

Acutek Adhesive Specialties: *See*—
Mast, Rolf; Muchin, Jerome D.; and Neri, Joseph A., 4,745,934, Cl. 132-73.000.

Adams, Charles C.: *See*—
Brown, Lloyd C.; Adams, Charles C.; and Besenbruch, Gottfried E. A., 4,746,547, Cl. 427-213.000.

Adams-Russell Co. Inc.: *See*—
Norton, David E., 4,746,821, Cl. 307-565.000.

ADC Telecommunications, Inc.: *See*—
Brickley, Patrick; Gonier, Larry; Dewey, James; and Pohl, Karl H., 4,747,020, Cl. 361-428.000.

Adept Technology, Inc.: *See*—
Taenzer, Jon C., 4,746,843, Cl. 318-138.000.

Adler, Robert, to Zenith Electronics Corporation. Cathode ray tube for use in a touch panel display system. 4,746,914, Cl. 340-712.000.

Admiraal, Daniel J. H.; and Lopes Cardozo, Benjamin, to U.S. Philips Corporation. Amplifier with automatic inhibition of acoustic feedback. 4,747,144, Cl. 381-93.000.

Advanced Semiconductor Materials America, Inc.: *See*—
Allred, Laurence L., Jr.; and Lange, Bradley N., 4,746,856, Cl. 324-158.00R.

Aerodyne Controls Corporation: *See*—
Tetrault, Leonard P.; and Miller, James R., 4,746,774, Cl. 200-61.45R.

Aeroquip Corporation: *See*—
Laipply, Robert A.; and Fournier, Paul J. E., 4,745,894, Cl. 123-196.00R.

Affarsverket FFV: *See*—
Arnell, Claes; and Risberg, Stig, 4,745,862, Cl. 102-424.000.

AG fur industrielle Elektronik AGIE, Losone b. Locarno: *See*—
Weber, Benno, 4,746,782, Cl. 219-69.00M.

AGA Aktiebolag: *See*—
Nilsson, Leif, 4,745,941, Cl. 137-114.000.

Agency of Industrial Science & Technology: *See*—
Fujishima, Shizu; Yaku, Fumiko; and Muraki, Einosuke, 4,746,611, Cl. 435-209.000.
Inoue, Tomoyasu; Tango, Hiroyuki; Suguro, Kyoichi; Higashinakagawa, Iwao; and Hamasaki, Toshihiko, 4,746,803, Cl. 250-492.200.

Agro-Kanesho Co., Ltd.: *See*—
Someya, Shinzo; Koura, Seigo; Ito, Mikio; Nakanishi, Akira; and Nonaka, Yuji, 4,746,359, Cl. 71-94.000.

Agujaro, Roberto, to Pianelli & Traversa S.a.s. Device for picking up control signals for conveyor units, particularly carriages of conveyor lines for industrial plants. 4,746,811, Cl. 307-147.000.

Ahrweiler, Josef: *See*—
Richardt, Urban; and Ahrweiler, Josef, 4,745,789, Cl. 72-255.000.

Aida Engineering, Ltd.: *See*—
Sato, Mitsuo, 4,746,227, Cl. 384-13.000.

Air Products and Chemicals, Inc.: *See*—
Erickson, Donald C., 4,746,502, Cl. 423-579.000.

Aisin Seiki Kabushiki Kaisha: *See*—
Masumoto, Tsuyoshi; Mizutani, Uichiro; Ishii, Masami; Motoyama, Hiroshi; Yabuno, Ryohei; and Oka, Tetsuo, 4,745,806, Cl. 73-295.000.
Yamamoto, Mitsuo; Yoshikawa, Norishige; and Nagura, Nobuyoshi, 4,747,056, Cl. 364-424.100.

Aisin-Warner Kabushiki Kaisha: *See*—
Kano, Takenori; Kawamoto, Mutsumi; and Iwatsuki, Tatsuya, 4,745,819, Cl. 74-701.000.

Aisin-Warner Limited: *See*—
Nishikawa, Seiichi; Harada, Yoshiharu; Fukumura, Kagenori; Hayakawa, Yoichi; and Kawai, Masao, 4,745,826, Cl. 74-866.000.

Aizawa, Junichi: *See*—
Hayakawa, Tsuyoshi; Watanabe, Isato; Yamauchi, Satoru; Kondo, Isao; and Aizawa, Junichi, 4,745,682, Cl. 29-840.000.

Aizawa, Koozi: *See*—
Sugimoto, Osamu; Horita, Teiji; Nii, Katsutoshi; Aizawa, Koozi; Kawaike, Kazuhiko; Hitomi, Ichiro; and Inoue, Hisao, 4,746,268, Cl. 415-170.00R.

Akabane, Hiroo: *See*—
Tsukada, Hisashi; Abe, Takahiro; Ishihara, Sugio; Taira, Junichi; and Akabane, Hiroo, 4,745,763, Cl. 62-66.000.

Akado, Hajime: *See*—
Taki, Yoshihiro; Akado, Hajime; Funae, Keizo; and Inukai, Satoshi, 4,746,432, Cl. 210-493.500.

Akaiwa, Yoshihiko; Furuya, Yukitsuna; and Kobayashi, Kazutomo, to NEC Corporation. Method of determining optimal transmission channel in multi-station communications system. 4,747,101, Cl. 370-95.000.

Akashi, Masakatsu: *See*—
Kusuda, Toshiaki; Tsuda, Takeshi; and Akashi, Masakatsu, 4,746,952, Cl. 355-4.000.

Akiyama, Osamu; and Goto, Seiji, to Shimadzu Corporation. Spectrophotometer. 4,746,214, Cl. 356-325.000.

Akiyama, Yoshihisa: *See*—
Araki, Hiroshi; Aso, Toshiyuki; and Akiyama, Yoshihisa, 4,745,673, Cl. 29-56.800.

Akkerman, Neil H., to AVA International Corporation. Multiple string well packer. 4,745,971, Cl. 166-120.000.

Aktiebolaget Hassle: *See*—
Carlsson, Enar I.; Larsson, Hakan S.; von Wittken Sundell, Gunhild W.; Samuelsson-Junggren, Viola I.; and Lundstrom, Kenneth, 4,746,667, Cl. 514-338.000.

Aktiebolaget SKF: *See*—
Lind, Bjorn, 4,746,229, Cl. 384-124.000.

Akzo America Inc.: *See*—
Frank, Dieter; Metcalfe, Lincoln D.; and Park, John Y. G., 4,746,368, Cl. 127-55.000.

Akzo N.V.: *See*—
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Barton, Daniel W. Low voltage lighting fixture with track electrodes. 4,747,025, Cl. 362-147.000.

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Janowicz, Andrew H.: *See—*
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Janssen Pharmaceutica N.V.: *See—*
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Japan Aircraft Mfg. Co., Ltd.: *See—*
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Japan as Represented by Director General of Agency of Industrial Science and Technology: *See—*
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Japan Steel Works, Ltd., The: *See—*
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Japan Synthetic Rubber Co., Ltd.: *See—*
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Japanese National Railways: *See—*
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Jassby, Daniel L., to United States of America, Energy. Fusion reactor pumped laser. 4,746,484, Cl. 376-146.000.

Jeanrot, Patrick. Ball-game racket with foldable and separable frame or body. 4,746,119, Cl. 273-73.00C.

Jeffery, James E.; Kozlik, Antonin; and Wilmshurst, Eric C., to Boots Company p.l.c., The. Therapeutic agents. 4,746,680, Cl. 514-646.000.

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Jenkins, David H.; Houchin, Martin R.; and Sinha, Hari N., to Commonwealth Scientific and Industrial Research Organization. Process for the production of high purity zirconia. 4,746,497, Cl. 423-82.000.

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Jensen, Richard C., to Elliott Turbomachinery Co., Inc. Tilt pad journal bearing. 4,746,230, Cl. 384-311.000.

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Johnson, Douglass M. Gutter with cleaning apparatus. 4,745,709, Cl. 52-2.000.

Johnson Electric Industry Manufactory, Limited: *See—*
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Johnson, Emil R. Air-powered vacuum-producing apparatus. 4,745,655, Cl. 15-409.000.

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Johnston, Robert D. Approaching vehicle informing system and method. 4,747,064, Cl. 364-569.000.



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Yamamoto, Takaaki, to Fuji Photo Film Co., Ltd. Radiation image recording and read-out apparatus. 4,746,797, Cl. 250-327.200.
Yamamoto, Tamotsu, to Fuji Tekko Co., Ltd. Transfer system to selectively perform the two-wheeled and four-wheeled driving operations for use in automobiles. 4,745,825, Cl. 74-665.0GA.
Yamamoto, Tsutomu: *See*—
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Huth, Stanley W.; Lam, Sam W.; and Kiral, Richard M., Re. 32,672, Cl. 252-95.000.

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Stembridge, William F.; Sturrock, James C.; and Stembridge, W. Frank, III, 295,821, Cl. D7-398.000.
Stembridge, William F.; Sturrock, James C.; and Stembridge, W. Frank, III, to Coca-Cola Company, The. Control panel face plate for a beverage dispenser valve. 295,821, 5-24-88, Cl. D7-398.000.
Stocker, Sarah. Recipe holder. 295,805, 5-24-88, Cl. D6-513.000.
Stokey, Bonetta M.: *See—*
Stokey, Glen R.; and Stokey, Bonetta M., 295,880, Cl. D21-159.000.
Stokey, Glen R.; and Stokey, Bonetta M. Movable bear sculpture. 295,880, 5-24-88, Cl. D21-159.000.
Sturrock, James C.: *See—*
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Swartzendruber, Ray E.; and Coffman, Keith, to Chore-Time Equipment, Inc. Base for a pig feeder. 295,905, 5-24-88, Cl. D30-131.000.
Takahashi, Kazuyuki: *See—*
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Takeichi, Takashi, to Casio Computer Co., Ltd. Wrist watch. 295,837, 5-24-88, Cl. D10-39.000.
Tarlow, Rose. Chest of drawers. 295,804, 5-24-88, Cl. D6-441.000.
Thimm-Kelly, Sally E. Combined splint holder and wrist support. 295,897, 5-24-88, Cl. D24-64.000.
Toa Tokushi Denki Kabushiki Kaisha: *See—*
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Toivio, Ilkka; and Toivio, Terttu, 295,864, Cl. D15-5.000.
U.S. Philips Corporation: *See—*
Meelen, Hans T., 295,901, Cl. D28-49.000.
Van Dorssen, Albertus, 295,860, Cl. D14-33.000.
Urion, Kenard E., to Scott Paper Company. Dispensing closure. 295,831, 5-24-88, Cl. D9-438.000.
Van Dorssen, Albertus, to U.S. Philips Corporation. Loudspeaker cabinet. 295,860, 5-24-88, Cl. D14-33.000.
Van Meter, Archie W.; and Pakosta, Anthony F., to Mega Corporation. Breast pump. 295,896, 5-24-88, Cl. D24-51.000.
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Wells-Papanek, Doris E.; Verplank, William L.; and Cox, Norman L., 295,876, Cl. D18-27.000.
Wells-Papanek, Doris E.; Verplank, William L.; and Cox, Norman L., 295,877, Cl. D18-27.000.
W & F Manufacturing, Inc.: *See—*
Ortega, Charles J.; Fleming, Paul D.; and O'Day, David L., 295,829, Cl. D8-301.000.
W. R. Grace & Co., Cryovac Div.: *See—*
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Walsh, James R., to Brunswick Corporation. Combined tiller arm and control panel for an outboard motor. 295,867, 5-24-88, Cl. D15-4.000.
Weitzman, Harry L. Work table legs. 295,803, 5-24-88, Cl. D6-495.000.
Wells-Papanek, Doris E.; Verplank, William L.; and Cox, Norman L., to Xerox Corporation. Icon for virtual floppy disk or the like. 295,876, 5-24-88, Cl. D18-27.000.
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Werkzeug GmbH: *See—*
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Wharton, Elliott H. Jeweled collar. 295,908, 5-24-88, Cl. D30-152.000.
Wharton, Elliott H. Jeweled collar. 295,909, 5-24-88, Cl. D30-152.000.
Whitley, Warwick M., II, to Attwood Corporation. Steering wheel. 295,846, 5-24-88, Cl. D12-176.000.
Wilson, Arthur K. Frame stand. 295,806, 5-24-88, Cl. D6-462.000.
Wilson, William W. Saddle stand. 295,906, 5-24-88, Cl. D30-143.000.
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Yubisui, Takahisa; Sakaguchi, Hiroshi; and Iida, Katsuhiro, to Sharp Corporation. Electronic calculator. 295,875, 5-24-88, Cl. D18-7.000.
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# LIST OF PLANT PATENTEES

Buck, Griffith J., to Iowa State University Research Foundation, Inc. Rose plant named Bucaroo. 6,183, 5-24-88, Cl. 1.000.
California Florida Plant Company: *See*—
Uchida, Jun J.; and Grotta, Barbara J., 6,187, Cl. 71.000.
Grotta, Barbara J.: *See*—
Uchida, Jun J.; and Grotta, Barbara J., 6,187, Cl. 71.000.
Hvid, Soeren, to L. Daehnfeldt A/S. Begonia plant named 'Mona'. 6,185, 5-24-88, Cl. 68.000.
Hvid, Soeren, to L. Daehnfeldt A/S. Begonia plant named 'Lisa'. 6,186, 5-24-88, Cl. 68.000.
Iowa State University Research Foundation, Inc.: *See*—
Buck, Griffith J., 6,183, Cl. 1.000.
Kent Incorporated Society for Promoting Experiments in Horticulture, The: *See*—
Tobutt, Kenneth R., 6,184, Cl. 34.000.
L. Daehnfeldt A/S: *See*—
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Hvid, Soeren, 6,186, Cl. 68.000.
National Seed Development Organisation Limited: *See*—
Tobutt, Kenneth R., 6,184, Cl. 34.000.
Tobutt, Kenneth R., to Kent Incorporated Society for Promoting Experiments in Horticulture, The; and National Seed Development Organisation Limited. Columnar apple tree—Maypole variety. 6,184, 5-24-88, Cl. 34.000.
Uchida, Jun J.; and Grotta, Barbara J., to California Florida Plant Company. Carnation plant named Jun. 6,187, 5-24-88, Cl. 71.000.



# CLASSIFICATION OF PATENTS

## ISSUED MAY 24, 1988

NOTE.—First number, class; second number, subclass; third number, patent number

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255 4,745,641
661 4,745,642

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455 4,745,648
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**CLASS 232**

1 C 4,746,062

**CLASS 235**

379 4,746,787
4,746,786
4,746,788
463 4,746,789

**CLASS 239**

1 4,746,063
14.2 4,746,064
4,746,065
283 4,746,066
338 4,746,067
405 4,746,068

**CLASS 241**

2 4,746,071
24 4,746,073
27 4,746,069
37 4,746,070
92 4,746,072
101.2 4,746,074

**CLASS 242**

7.16 4,746,075
4,746,076
84.5 A 4,746,077
4,746,078
129.7 4,746,079
177 4,746,080

**CLASS 244**

89 4,746,081
104 R 4,746,086
137.4 4,746,082
4,746,083
151 R 4,746,084
4,746,085

**CLASS 248**

1 I 4,746,087
188.8 4,746,088
309.4 4,746,089
314 4,746,090
603 4,746,091
638 4,746,092

**CLASS 250**

201 4,746,790
231 SE 4,746,791
4,746,792
237 R 4,746,793
270 4,746,801
288 4,746,794
291 4,746,802
303 4,746,795
324 4,746,796
327.2 4,746,797
339 4,746,798
423 R 4,746,799
442.1 4,746,800
492.2 4,746,803
571 4,746,805
578 4,746,804

**CLASS 251**

30.04 4,746,093
129.14 4,746,094
367 4,746,095

**CLASS 252**

8.6 4,746,445
49.6 4,746,446
51.5 A 4,746,447
56 S 4,746,448
70 4,746,449
75 4,746,450
95 Re.32,672
102 4,746,451
134 4,746,452
135 4,746,453
170 4,746,454
174.23 4,746,455
174.24 4,746,456
181 4,746,457
301.16 4,746,458
313.1 4,746,459
314 4,746,460

**CLASS 254**

29 R 4,746,096
93 H 4,746,097
130 4,746,098
134.3 FT 4,746,099
379 4,746,100

**CLASS 260**

370 4,746,461
403 4,746,462
410.9 R 4,746,463
412 4,746,464
502.5 E 4,746,465

**CLASS 261**

30 4,746,466

**CLASS 264**

4.7 4,746,467
9 4,746,468
4,746,469
26 Re.32,673
29.2 4,746,470
32 4,746,471
41 4,746,472
4,746,473
4,746,474
4,746,475
4,746,476
45.5 4,746,477
53 4,746,478
4,746,479
4,746,480
82 4,746,481
102 4,746,482
120 4,746,483

**CLASS 266**

83 4,746,101
236 4,746,102
266 4,746,103

**CLASS 267**

140.1 4,746,104
174 4,746,105
218 4,746,106

**CLASS 270**

21.1 4,746,107
45 4,746,108
95 4,746,109

**CLASS 271**

3.1 4,746,110
287 4,746,111

**CLASS 272**

72 4,746,112
118 4,746,113
123 4,746,114
130 4,746,115
144 4,746,116

**CLASS 273**

1 GC 4,746,125
26 C 4,746,118
72 A 4,746,117
73 C 4,746,119
81.5 4,746,120
110 4,746,121
153 R 4,746,122
4,746,123
164 4,746,124
249 4,746,126

**CLASS 277**

1 4,746,127
45 4,746,128
205 4,746,129
228 4,746,130
237 R 4,746,023

**CLASS 279**

1 SJ 4,746,131

**CLASS 280**

1.13 4,746,132
6 R 4,746,133
33.99 R 4,746,134
262 4,746,135
281 R 4,746,136
4,746,137
487 4,746,138
631 4,746,139
642 4,746,140
655 4,746,141
4,746,142
707 4,746,143
777 4,746,144
4,746,145
795 4,746,146

**CLASS 285**

53 4,746,147
114 4,746,148
175 4,746,149
4,746,150

**CLASS 290**

1 R 4,746,806
40 C 4,746,807
52 4,746,808

**CLASS 292**

111 4,746,151
150 4,746,152
216 4,746,153
337 4,746,154
351 4,746,155

**CLASS 294**

19.2 4,746,156
82.27 4,746,157
94 4,746,158
147 4,746,159

**CLASS 296**

1 S 4,746,160
24 R 4,746,161
97 R 4,746,162
120 R 4,746,163
164 4,746,164
216 4,746,165

**CLASS 297**

17 4,746,166
423 4,746,167
443 4,746,168

**CLASS 299**

33 4,746,169
75 4,746,170

**CLASS 303**

13 4,746,171
92 4,746,172
100 4,746,173
110 4,746,174

**CLASS 307**

1 4,746,809
106 4,746,810
147 4,746,811
240 4,746,812
248 4,746,813
255 4,746,814
303 4,746,815
351 4,746,816
446 4,746,817
475 4,746,818
511 4,746,819
524 4,746,820
565 4,746,821
594 4,746,822
601 4,746,823
605 4,746,824

**CLASS 310**

70 R 4,746,825
4,746,826
4,746,828
156 4,746,827
239 4,746,829
313 D 4,746,830
334 4,746,831

**CLASS 312**

1 4,746,175
38 4,746,176
228 4,746,177

**CLASS 313**

22 4,746,832
137 4,746,834
422 4,746,836
431 4,746,837
493 4,746,835
519 4,746,838

**CLASS 314**

211 4,746,655

**CLASS 315**

3.5 4,746,833
5.41 4,746,839
58 4,746,840
102 4,746,841
403 4,746,842

**CLASS 318**

138 4,746,843
254 4,746,844
4,746,845
439 Re.32,674
603 4,746,848
619 4,746,846
4,746,847
4,746,849
723 4,746,850

**CLASS 320**

2 4,746,851
20 4,746,852
25 4,746,853
40 4,746,854

**CLASS 324**

73 R 4,746,855
158 F 4,746,857
4,746,861
158 R 4,746,856
4,746,858
4,746,859
4,746,862
304 4,746,863
309 4,746,860
4,746,864
4,746,865
318 4,746,866
329 4,746,867
400 4,746,868
546 4,746,869

**CLASS 328**

14 4,746,870
127 4,746,871

**CLASS 329**

50 4,746,872
110 4,746,873

**CLASS 330**

252 4,746,874
253 4,746,875
255 4,746,877
284 4,746,876

**CLASS 331**

9 4,746,878
44 4,746,879

**CLASS 332**

16 R 4,746,880

**CLASS 333**

16 4,746,881
196 4,746,882
202 4,746,883
234 4,746,884

**CLASS 335**

160 4,746,885
230 4,746,886
261 4,746,887
262 4,746,888
296 4,746,889

**CLASS 336**

171 4,746,891
197 4,746,890

**CLASS 337**

403 4,746,892

**CLASS 338**

4,746,893
99 4,746,894
272 4,746,895
314 4,746,896

**CLASS 340**

310 R 4,746,897
347 AD 4,746,899
4,746,900
4,746,901
347 CC 4,746,902
347 DA 4,746,903
347 DD 4,746,898
384 E 4,746,905
522 4,746,906
525 4,746,907
551 4,746,908
567 4,746,910
568 4,746,909
605 4,746,911
691 4,746,912
706 4,746,913
712 4,746,914
719 4,746,915
744 4,746,916
787 4,746,917
825.1 WD 4,746,918
825.140 4,746,920
825.56 4,746,919
825.87 4,746,921

**CLASS 342**

4,746,922
117 4,746,923
453 4,746,924

**CLASS 343**

713 4,746,925
787 4,746,926
842 4,746,927

**CLASS 346**

75 4,746,928
4,746,929
76 PH 4,746,930
4,746,931



4,746,932
4,746,933
110 R 4,746,934
140 E 4,746,935
4,746,936
4,746,937
4,746,938
153.1 4,746,939
160 4,746,940

**CLASS 348**

96.10 4,746,178
4,746,179
4,746,180
96.12 4,746,181
96.13 4,746,182
4,746,186
96.14 4,746,183
96.15 4,746,184
4,746,185
96.20 4,746,187
4,746,188
96.21 4,746,189
96.23 4,746,190
96.29 4,746,191
162.12 4,746,193
162.2 4,746,192
320 4,746,194
4,746,195
332 4,746,196
333 4,746,197
336 4,746,198
354 4,746,199
357 4,746,200
394 4,746,201
4,746,202
401 4,746,203
423 4,746,204
574 4,746,205
605 4,746,206

**CLASS 352**

90 4,746,207

**CLASS 353**

25 4,746,209
101 4,746,208

**CLASS 354**

4,746,942
82 4,746,944
204 4,746,945
215 4,746,943
250 4,746,946
402 4,746,947
408 4,746,948
429 4,746,949
637 4,746,732

**CLASS 355**

4 4,746,950
4,746,951
4,746,952
7 4,746,953
14 D 4,746,954
35 4,746,955
41 4,746,956
55 4,746,957
4,746,958

**CLASS 356**

23 4,746,210
28.5 4,746,211
240 4,746,212
311 4,746,213
325 4,746,214
339 4,746,215
349 4,746,216
4,746,217
437 4,746,218

**CLASS 357**

23.11 4,746,219
23.6 4,746,959
23.7 4,746,960
4,746,961
30 4,746,962
50 4,746,963
63 4,746,964
68 4,746,965
4,746,966
88 4,746,967

**CLASS 358**

26 4,746,969
29 4,746,970
31 4,746,971
43 4,746,972
60 4,746,973
98 4,746,974
4,746,975
103 4,746,976
4,746,977
133 4,746,978
134 4,746,979
160 4,746,980
4,746,981
181 4,746,982
183 4,746,983
213.12 4,746,984
216 4,746,985
4,746,988
256 4,746,986
4,746,987
294 4,746,989
310 4,746,990
4,746,992
335 4,746,991
4,746,993

**CLASS 360**

13 4,746,994
31 4,746,995
36.2 4,746,996
49 4,746,997
72.1 4,746,998
96.5 4,746,999
96.6 4,747,000
4,747,001
98 4,747,005
4,747,002
4,747,003
4,747,004
130.3 4,747,006
132 4,747,007

**CLASS 361**

107 4,747,008
165 4,747,009
210 4,747,010
212 4,747,011
235 4,747,012
272 4,747,013
321 4,747,014
341 4,747,015
364 4,747,016
395 4,747,017
4,747,018
424 4,747,019
428 4,747,020
433 4,747,021

**CLASS 362**

32 4,747,022
4,747,023
90 4,747,024
147 4,747,025
203 4,747,026
217 4,747,027
224 4,747,028
226 4,747,029
294 4,747,032
296 4,747,033
302 4,747,030
352 4,747,031

**CLASS 363**

23 4,747,034
24 4,747,035
54 4,747,036
4,747,037

**CLASS 364**

4,747,038
4,747,039
4,747,040
4,747,041
4,747,042
4,747,043
4,747,044
4,747,045
4,747,046
4,747,047
4,747,048
405 4,747,049
408 4,747,050
414 4,747,052
419 4,747,053
421 4,747,054
424 4,747,055
424.1 4,747,056
426 4,747,051
4,747,057
478 4,747,058
481 4,747,060
483 4,747,061
4,747,059
509 4,747,062
519 4,746,941
563 4,747,063
4,747,064
715 4,747,065
4,747,066
4,747,067
724 4,747,068
4,747,069
4,747,070
4,747,071
4,747,072
4,747,073
4,747,074

**CLASS 365**

45 4,747,075
51 4,747,078
4,747,076
113 4,747,077
189 4,747,079
4,747,080
219 4,747,081
222 4,747,082
230 4,747,083

**CLASS 366**

79 4,746,220
142 4,746,221
147 4,746,222

**CLASS 367**

3 4,747,084
93 4,747,085

**CLASS 369**

4,747,086
4,747,087
4,747,088

**CLASS 369**

45 4,747,089
4,747,090
4,747,091
116 4,747,092
247 4,747,093
4,747,093

**CLASS 370**

4 4,747,094
70 4,747,095
77 4,747,099
81 4,747,096
86 4,747,100
88 4,747,097
95 4,747,101
99 4,747,098

**CLASS 371**

23 4,747,102
37 4,747,103
39 4,747,104
47 4,747,105
49 4,747,106

**CLASS 372**

44 4,747,107
4,747,108
48 4,747,109
50 4,747,110
94 4,747,111

**CLASS 374**

103 4,746,223
124 4,746,224
4,746,225

**CLASS 375**

20 4,747,112
25 4,747,113
98 4,747,114
100 4,747,115
114 4,747,116

**CLASS 376**

146 4,746,484
206 4,746,485
245 4,746,486
272 4,746,487
352 4,746,488

**CLASS 377**

455 4,747,136

**CLASS 378**

019 4,747,117
110 4,747,118
197 4,747,119

**CLASS 379**

38 4,747,120
53 4,747,121
57 4,747,122
4,747,123
67 4,747,124
4,747,125
74 4,747,126
4,747,127
194 4,747,128
199 4,747,129
269 4,747,130
372 4,747,131
376 4,747,133
4,747,132
424 4,747,134
436 4,747,135

**CLASS 381**

6 4,747,137
14 4,747,138
44 4,747,139

**CLASS 381**

11 4,747,141
13 4,747,140
27 4,747,142
47 4,747,143
93 4,747,144
183 4,747,145

**CLASS 382**

1 4,747,146
4,747,147
10 4,747,148
18 4,747,149
21 4,747,150
4,747,151
4,747,152
25 4,747,153
41 4,747,157
42 4,747,155
47 4,747,154
4,747,156

**CLASS 383**

71 4,746,226
103 B1 3,799,427

**CLASS 385**

13 4,746,227
44 4,746,228
124 4,746,229
311 4,746,230
537 4,746,231
619 4,746,232

**CLASS 400**

73 4,746,233
120 4,746,234
144.2 4,746,235
187 4,746,236
335 4,746,237

**CLASS 401**

196 4,746,238

**CLASS 403**

24 4,746,239
282 4,746,240
344 4,746,241
373 4,746,242

**CLASS 404**

35 4,746,243

**CLASS 405**

78 4,746,244
132 Re.32,675
191 4,746,246
224 4,746,245
4,746,247
260 4,746,248
264 4,746,249

**CLASS 406**

63 4,746,250

**CLASS 409**

84 4,746,251
233 4,746,252

**CLASS 414**

4,746,255
217 4,746,256
392 4,746,257
401 4,746,258
412 4,746,259
4,746,260
475 4,746,261
495 4,746,262
543 4,746,263
687 4,746,264
703 4,746,254

**CLASS 415**

4,746,265
119 4,746,266
140 4,746,267
170 A 4,746,269
4,746,270
170 R 4,746,268

**CLASS 416**

132 A 4,746,271
134 A 4,746,272
244 R 4,746,273

**CLASS 417**

234 4,746,274
269 4,746,275
295 4,746,276
312 4,746,277
454 4,746,278
474 4,746,279

**CLASS 418**

268 4,746,280

**CLASS 422**

29 4,746,489
62 4,746,490
103 4,746,491
146 4,746,492
4,746,493
189 4,746,494
190 4,746,495
292 4,746,496

**CLASS 423**

4,746,497
244 4,746,498
322 4,746,499
4,746,500
413 4,746,501
579 4,746,502
630 4,746,503

**CLASS 424**

1 1 4,746,504
4,746,505
2 4,746,506
4,746,507
74 4,746,510
85 4,746,539
88 4,746,508
92 4,746,511
4,746,512
4,746,513
445 4,746,514
449 4,746,509
4,746,515
450 4,746,516

**CLASS 425**

113 4,746,281
150 4,746,282
528 4,746,283

**CLASS 426**

12 4,746,517
15 4,746,518
83 4,746,519
103 4,746,520
241 4,746,521
243 4,746,522
249 4,746,523
330 4,746,524
383 4,746,525
496 4,746,526
569 4,746,527
573 4,746,528
4,746,530
623 4,746,531
4,746,529

**CLASS 427**

4,746,532
27 4,746,533
37 4,746,534
4,746,537
4,746,538
39 4,746,535
53.1 4,746,540
54.1 4,746,536
126.1 4,746,541
131 4,746,542
136 4,746,543
140 4,746,544
176 4,746,545
191 4,746,554
206 4,746,546
213 4,746,547
248 1 4,746,548
253 4,746,549
385.5 4,746,550
389 7 4,746,551
393 6 4,746,552
397 4,746,553

**CLASS 428**

35 4,746,555
40 4,746,556
138 4,746,557
141 4,746,558
142 4,746,559
151 4,746,560
209 4,746,561
213 4,746,562
216 4,746,563
219 4,746,564
251 4,746,565
290 4,746,566
321.5 4,746,567
323 4,746,568
4,746,569
327 4,746,570
328 4,746,571
4,746,572
407 4,746,573
4,746,574
421 4,746,575
4,746,576
4,746,577
4,746,578
432 4,746,579
522 4,746,580
557 4,746,581
614 4,746,582
627 4,746,583
632 4,746,584
670 4,746,585
145 4,746,586

**CLASS 430**

5 4,746,587
23 4,746,588
120 4,746,589
137 4,746,590
4,746,591
223 4,746,592
264 4,746,593
4,746,594
271 4,746,595
325 4,746,596
331 4,746,597
372 4,746,598
4,746,599
505 4,746,600
543 4,746,601
549 4,746,602
603 4,746,603

**CLASS 431**

70 4,746,284
202 4,746,285
328 4,746,286
4,746,287
344 4,746,288

**CLASS 432**

8 4,746,289
19 4,746,290
241 4,746,291

**CLASS 433**

141 4,746,292
173 4,746,293
174 4,746,294
182 4,746,295

**CLASS 434**

247 4,746,296

**CLASS 435**

7 4,746,604
4,746,605
25 4,746,606
4,746,607
68 4,746,608
91 4,746,609
161 4,746,610
209 4,746,611
240 27 4,746,612
253 4,746,613
295 4,746,614
311 4,746,615

**CLASS 436**

20 4,746,616
75 4,746,617
518 4,746,631

**CLASS 437**

2 4,746,618
3 4,746,619
4,746,620
24 4,746,621
26 4,746,622
4,746,623
4,746,624
63 4,746,625
107 4,746,626
126 4,746,627
160 4,746,628
162 4,746,629
235 4,746,630

**CLASS 439**

8 4,746,297
70 4,746,299
4,746,300
4,746,301
95 4,746,302
222 4,746,298
248 4,746,304
319 4,746,305
321 4,746,303
357 4,746,306
394 4,746,307
426 4,746,308
471 4,746,309
620 4,746,310

**CLASS 440**

6 4,746,311
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| 4,746,270 | 4,746,474 | 4,746,741 | 41 : 4,745,651 | 48 : 4,745,637 | 4,745,881 |
| 4,746,271 | 4,746,475 | 4,746,774 | 4,745,702 | 4,745,642 | 4,745,895 |
| 4,746,284 | 4,746,476 | 4,746,815 | 4,745,801 | 4,745,680 | 4,745,911 |
| 4,746,367 | 4,746,480 | 4,746,817 | 4,745,924 | 4,745,771 | 4,745,998 |
| 4,746,376 | 4,746,484 | 4,746,818 | 4,746,019 | 4,745,772 | 4,746,015 |
| 4,746,443 | 4,746,541 | 4,746,906 | 4,746,057 | 4,745,802 | 4,746,319 |
| 4,746,450 | 4,746,579 | 4,746,912 | 4,746,156 | 4,745,811 | 4,746,402 |
| 4,746,490 | 4,746,653 | 4,746,917 | 4,746,934 | 4,745,838 | 4,746,416 |
| 4,746,618 | 4,746,656 | 4,746,941 | 4,747,126 | 4,745,840 | 4,746,425 |
| 4,746,686 | 4,746,669 | 4,746,953 | 4,747,142 | 4,745,850 | 4,746,458 |
| 4,746,688 | 4,746,682 | 4,746,956 | 42 : 4,745,635 | 4,745,864 | 4,746,571 |
| 4,746,735 | 4,746,693 | 4,746,981 | 4,745,671 | 4,745,868 | 4,746,595 |
| 4,746,750 | 4,746,694 | 4,746,987 | 4,745,703 | 4,745,896 | 4,746,597 |
| 4,746,754 | 4,746,709 | | | | |

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| 04 : 295,871 | 295,887 | 295,895 | 295,874 | 295,816 | 47 : 295,878 |
| 06 : 295,800 | 295,903 | 295,896 | 36 : 295,802 | 295,910 | 295,914 |
| 295,804 | 09 : 295,893 | 18 : 295,805 | 295,803 | 39 : 295,812 | 48 : 295,809 |
| 295,829 | 295,894 | 295,882 | 295,807 | 295,832 | 295,884 |
| 295,842 | 12 : 295,844 | 295,905 | 295,808 | 295,836 | 295,907 |
| 295,851 | 295,846 | 20 : 295,886 | 295,852 | 295,908 | 49 : 295,898 |
| 295,854 | 13 : 295,821 | 25 : 295,819 | 295,866 | 295,909 | 50 : 295,839 |
| 295,863 | 295,897 | 295,881 | 295,868 | 295,912 | 55 : 295,820 |
| 295,876 | 17 : 295,827 | 33 : 295,813 | 295,904 | 295,913 | 295,834 |
| 295,877 | 295,849 | 34 : 295,830 | 295,911 | 41 : 295,847 | 295,867 |
| 295,880 | 295,885 | 295,831 | 37 : 295,815 | 42 : 295,823 | 295,879 |
| 295,883 | 295,890 | 295,872 | | | |

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| 06 : 6,187 | 19 : 6,183 | | | | |

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C. William Verity, *Secretary*
PATENT AND TRADEMARK OFFICE
Donald J. Quigg, *Commissioner*

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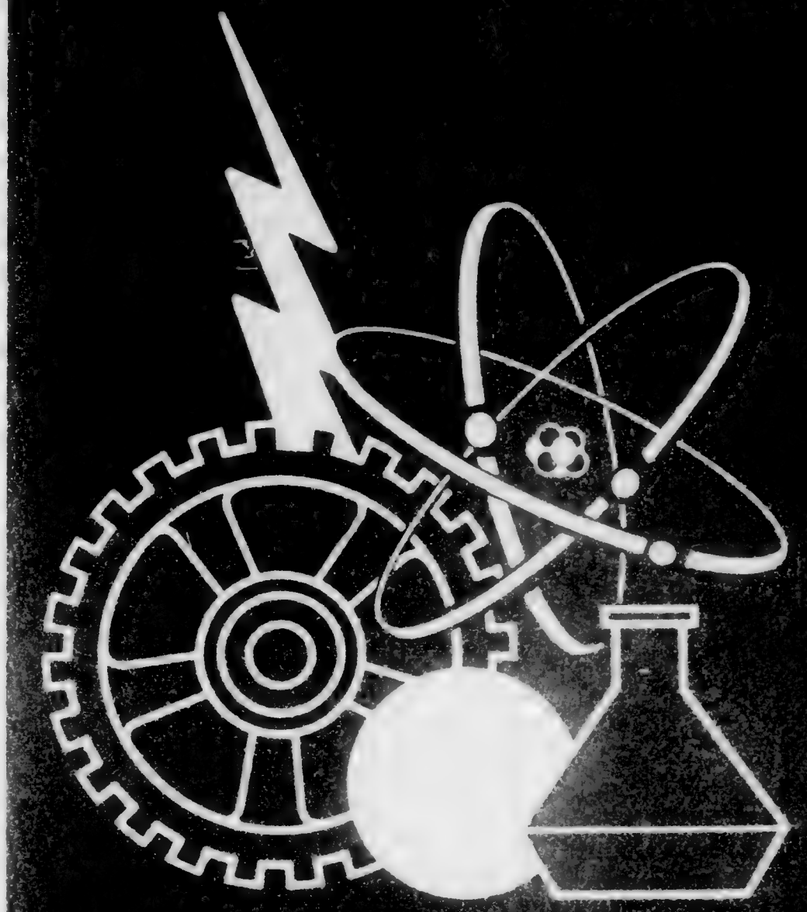
# OFFICIAL GAZETTE

of the

## UNITED STATES PATENT AND TRADEMARK OFFICE

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May 31, 1988



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May 31, 1988 Volume 1090 Number 5

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# PATENT AND TRADEMARK OFFICE NOTICES

### Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1076 O.G. 3 on Mar. 3, 1987.

For use of the European Patent Office as a Searching Authority for PCT applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as a Preliminary Examining Authority for PCT applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987.

Certain domestic PCT fees for international applications have been changed effective Oct. 5, 1985 in the rule change notice titled "Revision of Patent Fees" published at 1057 O.G. 24 on Aug. 20, 1985.

The Search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar with regard to the German Mark as of Mar. 15, 1988, and was announced in the *Official Gazette* at 1087 O.G. 24 on Feb. 16, 1988.

Domestic PCT Fees for Chapter II, effective July 1, 1987, were announced in the *Official Gazette* at 1079 O.G. 32 on June 16, 1987.

International PCT fees were changed on July 1, 1987 due to a difference in the exchange rate of the U.S. dollar with regard to the Swiss Franc and were announced in the *Official Gazette* at 1079 O.G. 50 on June 23, 1987.

International PCT Chapter II fees which were effective July 1, 1987, were announced in the *Official Gazette* at 1079 O.G. 50 on June 23, 1987. The elimination of multiple handling fees and the supplement to the handling fee under PCT Rule 57 was announced at 1085 O.G. 34 on Dec. 22, 1987.

The withdrawal of the Japanese declaration under PCT Article 64(2)(a), concerning the requirement for a Japanese translation of the international application within 20 months from the priority date when Japan is elected under PCT Chapter II, as from Dec. 8, 1987, was announced at 1085 O.G. 34 on Dec. 22, 1987.

National stage fees effective July 1, 1987, for entering the U.S. Patent and Trademark Office as a designated or elected Office were changed effective July 1, 1987, and were announced in the *Official Gazette* at 1079 O.G. 32 on June 16, 1987.

The current schedule of PCT fees is as follows:

| | |
|---|---|
| Transmittal fee: | 170.00 |
| Search Fee | |
| U.S. Patent and Trademark Office as Searching Authority (ISA) | |
| —No corresponding prior U.S. national application filed: | 520.00 |
| —Corresponding prior U.S. national application filed: | 350.00 |
| —Supplemental search fee, per additional invention | 140.00 |
| European Patent Office as Searching Authority | 1300.00 |
| Preliminary examination fee | |
| U.S. Patent and Trademark Office as Preliminary Examining Authority (IPEA) | |
| —Search fee paid to USPTO as Searching Authority | 370.00 |
| —Additional examination fee, per additional invention | 125.00 |
| —Searching Authority not the USPTO | 570.00 |
| —Additional examination fee, per additional invention | 190.00 |
| International fees | |
| Basic fee: | 485.00 |
| Basic Supplemental fee (for each page over 30): | 10.00 |
| Designation fee per country or region for the first 10 national or regional offices: | 120.00 |
| Designation fee for 11th and subsequent designations: | No Charge |
| Handling fee: | 150.00 |

U.S. National Stage fees

| | Small Entity | Non-small Entity |
|---|---|---|
| U.S. Patent and Trademark Office was Preliminary Examining Authority (IPEA) | 150.00 | 300.00 |
| USPTO was ISA but not IPEA | 170.00 | 340.00 |
| USPTO was neither ISA nor IPEA | 225.00 | 450.00 |
| USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(1) to (4) | 25.00 | 50.00 |
| —For each independent claim in excess of 3 | 17.00 | 34.00 |
| —For each claim in excess of 20 | 6.00 | 12.00 |
| —For each application containing a multiple dependent claim | 55.00 | 110.00 |
| —Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39.1 | 55.00 | 110.00 |
| —Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39.1 | 26.00 | 26.00 |

DONALD J. QUIGG,
Mar. 21, 1988. *Assistant Secretary and Commissioner of Patents and Trademarks.*

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### Status of Appeal Cases

**The date of Examiner's Answer of Oldest Ex Parte Appeals Awaiting Assignment to Panel for A Decision Without A Hearing as of April 30, 1988.**

| | | |
|---|---|---|
| Chemical Discipline | – | April 17, 1987 |
| Mechanical Discipline | – | June 3, 1987 |
| Electrical Discipline | – | March 11, 1986 |





**The Date of Examiner's Answer of Oldest Ex Parte Appeals Awaiting Hearing as of April 30, 1988.**

| | | |
|---|---|---|
| Chemical | – | March 3, 1986 |
| Electrical | – | March 5, 1986 |
| Mechanical | – | March 4, 1986 |

**Board of Patent Appeals and Interferences Decisions Rendered in Ex Parte Appeals During the Month of April 1988.**

| | |
|---|---|
| Affirmed | 209 |
| Affirmed-in-Part | 45 |
| Reversed | 140 |
| Total Decided | 394 |

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### Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on applications filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Oct. 5, 1985. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the grant.

Attention is drawn to the patents which were issued on May 28, 1985, for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,519,097 through 4,520,508
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months are set forth in 37 CFR 1.20(e) and (h), as amended effective Oct. 5, 1985, which are reproduced below:

37 CFR §1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant . . . $ 225.00"

"(h) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)) . . . . . $ 225.00
By other than a small entity . . . . . $ 450.00"

The amounts of the surcharges as amended effective Oct. 5, 1985, are set forth in 37 CFR 1.20 (k) and (l) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982 . . . . . $ 110.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity (§1.9(f)) . . . . . $ 55.00
By other than a small entity . . . . . $ 110.00"

Section 1.20 paragraph (m) as amended as a result of enactment of Public Law 98–622 effective Nov. 8, 1984, is reproduced below:

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay in payment is shown to the satisfaction of the Commissioner to have been unavoidable . . . . . $ 500.00"

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### Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

*PATENTS WHICH EXPIRED MARCH 13, 1988, DUE TO FAILURE TO PAY MAINTENANCE FEES*

| Patent Number | Serial Number | Issue Date |
|---|---|---|
| 4,435,858 | 06/395,123 | 3/13/84 |
| 4,435,859 | 06/350,026 | 3/13/84 |
| 4,435,869 | 06/239,210 | 3/13/84 |
| 4,435,870 | 06/361,427 | 3/13/84 |
| 4,435,871 | 06/341,510 | 3/13/84 |
| 4,435,872 | 06/376,732 | 3/13/84 |
| 4,435,879 | 06/388,658 | 3/13/84 |
| 4,435,882 | 06/503,075 | 3/13/84 |
| 4,435,884 | 06/306,416 | 3/13/84 |
| 4,435,888 | 06/318,822 | 3/13/84 |
| 4,435,891 | 06/435,360 | 3/13/84 |
| 4,435,892 | 06/356,246 | 3/13/84 |
| 4,435,915 | 06/340,969 | 3/13/84 |
| 4,435,921 | 06/365,489 | 3/13/84 |
| 4,435,923 | 06/360,736 | 3/13/84 |
| 4,435,944 | 06/389,584 | 3/13/84 |
| 4,435,951 | 06/279,903 | 3/13/84 |
| 4,435,954 | 06/333,443 | 3/13/84 |
| 4,435,956 | 06/320,420 | 3/13/84 |
| 4,435,959 | 06/275,787 | 3/13/84 |
| 4,435,963 | 06/258,287 | 3/13/84 |
| 4,435,964 | 06/405,150 | 3/13/84 |
| 4,435,973 | 06/325,052 | 3/13/84 |
| 4,435,975 | 06/334,746 | 3/13/84 |
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| 4,436,004 | 06/354,482 | 3/13/84 |
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| 4,436,010 | 06/273,654 | 3/13/84 |
| 4,436,014 | 06/348,045 | 3/13/84 |
| 4,436,015 | 06/420,123 | 3/13/84 |
| 4,436,024 | 06/334,415 | 3/13/84 |
| 4,436,032 | 06/340,833 | 3/13/84 |
| 4,436,036 | 06/402,498 | 3/13/84 |
| 4,436,039 | 06/399,247 | 3/13/84 |
| 4,436,043 | 06/375,922 | 3/13/84 |
| 4,436,047 | 06/375,254 | 3/13/84 |
| 4,436,051 | 06/344,271 | 3/13/84 |
| 4,436,057 | 06/344,271 | 3/13/84 |

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| Patent Number | Serial Number | Issue Date |
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| 4,436,061 | 06/319,886 | 3/13/84 |
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| 4,436,101 | 06/479,278 | 3/13/84 |
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| 4,436,105 | 06/318,188 | 3/13/84 |
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| Patent Number | Serial Number | Issue Date |
|---|---|---|
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| 4,437,094 | 06/311,513 | 3/13/84 |
| 4,437,096 | 06/335,593 | 3/13/84 |
| 4,437,098 | 06/315,148 | 3/13/84 |
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| 4,437,179 | 06/270,462 | 3/13/84 |
| 4,437,186 | 06/362,989 | 3/13/84 |
| 4,437,189 | 06/277,997 | 3/13/84 |

**Notification of Acceptance of Delayed Payment of Maintenance Fee (35 U.S.C. 41(c); 37 CFR 1.378)**

The patents listed below are considered as not having expired but are subject to the conditions set forth in 35 U.S.C. 41(c)(2), in view of the Petition to Accept Late Payment of the maintenance fees which has been GRANTED BY THE COMMISSIONER OF PATENTS AND TRADEMARKS, as provided for under 35 U.S.C. 41(c)(1) and 37 CFR 1.378.

| Patent No. | Serial No. | Patent Date | Application Filing Date | Delayed Payment Acceptance Date |
|---|---|---|---|---|
| 4,366,778 | 06/247,929 | 1/4/83 | 3/26/81 | 5/2/88 |
| 4,404,689 | 06/219,138 | 9/20/83 | 12/22/80 | 5/2/88 |
| 4,414,830 | 06/323,065 | 11/15/83 | 11/19/81 | 5/2/88 |
| 4,423,563 | 06/431,339 | 1/3/84 | 9/30/82 | 5/2/88 |

**REISSUE APPLICATIONS FILED**

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.19(a)).

**4,411,273,** Re. S.N. 146,375, Filed Jan. 21, 1988, Cl. 128/731, SYSTEM AND METHOD FOR ELECTRODE PAIR DERIVATIVES IN ELECTROENCEPHALOGRAPHY, E. Roy John, Owner of Record: *New York Medical College, New York, N.Y.,* Attorney or Agent: Eliots Gerber, Ex. Gp.: 335

**4,514,552,** Re. S.N. 055,508, Filed May 29, 1987, Cl. 526/301, ALKALI SOLUBLE LATEX THICKENERS, Gregory D. Shay, et al., Owner of Record: *Desoto Inc., Des Plaines, Ill.,* Attorney or Agent: Douglas A. Bingham, et al., Ex. Gp.: 155

**4,554,646,** Re. S.N. 123,106 Filed Nov. 19, 1987, Cl. 365/189, SEMICONDUCTOR MEMORY DEVICE, Masahiko Yoshimoto, et al., Owner of Record: *MitsubiDenki Kabushiki Kaisha, Tokyo, Japan,* Attorney or Agent: Allan M. Lowe, et al., Ex. Gp.: 233

**4,564,102,** Re. S.N. 143,960, Filed Jan. 14, 1988, Cl. 198/341, METHOD AND APPARATUS FOR TRANSPORTATION OF MATERIALS, Kinji Mori, et al., Owner of Record: *Hitachi Ltd., Tokyo, Japan,* Attorney or Agent: Donald R. Antonelli, et al., Ex. Gp.: 317

**4,566,089,** Re. S.N. 169,913, Filed Jan. 21, 1988, Cl. 369/45, DEVIATION CORRECTION APPARATUS FOR OPTICAL DISC LIGHT BEAMS, Kenjiro Kime, Owner of Record: *Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan,* Attorney or Agent: John H. Mion, et al., Ex. Gp.: 235

**4,575,227,** Re. S.N. 165,041, Filed Feb. 26, 1988, Cl. 355/56, COPYING MACHINE HAVING A CAPABILITY OF REPRODUCING IMAGES AT DIFFERENT MAGNIFICATIONS, Masazumi Ito, et al., Owner of Record: *Monolta Camera, Osaka, Japan,* Attorney or Agent: Harold L. Jackson, Ex. Gp.: 211

**4,575,498,** Re. S.N. 167,325, Filed Mar. 11, 1988, Cl. 514/43, METHOD FOR RESTORING DEPLETED PURINE NUCLEOTIDE POOLS, Edward W. Holmes, Owner of Record: *Duke University, Durham, N.C.,* Attorney or Agent: Richard E. Jenkins, Ex. Gp.: 183

**4,576,098,** Re. S.N. 168,355, Filed Mar. 15, 1988, Cl. 104/172.3, AUTOMOBILE CONVEYOR, James A. Belanger, et al., Owner of Record: *Belanger, Inc., Northville, Mich.,* Attorney or Agent: Jerold I. Schneider, Ex. Gp.: 312

**4,577,883,** Re. S.N. 171,903, Filed Mar. 22, 1988, Cl. 280/491D, VEHICLE TOW BAR, Lee H. Duncan, Owner of Record: *Inventor,* Attorney or Agent: Oliver D. Olson, Ex. Gp.: 316

**4,577,919,** Re. S.N. 173,335, Filed Mar. 24, 1988, Cl. 439/597, BOOT AND SHIELDED CABLE CONNECTOR, Mark H. Waters, Owner of Record: *AMP Inc., Harrisburg, Pa.,* Attorney or Agent: Jay L. Seitchik, Ex. Gp.: 322

**4,579,033,** Re. S.N. 173,742, Filed Mar. 25, 1988, Cl. 84/314N, LOCKING NUT ASSEMBLY FOR A GUITAR, William H. Edwards, Owner of Record: *Inventor,* Attorney or Agent: William Jackson, Ex. Gp.: 211

**4,582,543,** Re. S.N. 173,916, Filed Mar. 22, 1988, Cl. 148/11.5C, METHOD OF PRODUCING ELECTRICAL CONDUCTOR, Osao Kamada, Owner of Record: *Hitachi Cable Ltd., Tokyo, Japan,* Attorney or Agent: Richard C. Sughrue, et al., Ex. Gp.: 111

**4,584,097,** Re. S.N. 079,629, Filed July 30, 1987, Cl. 252/61, NEUTRAL HYDROCARBOXYCARBONYL THIONOCARBAMATE SULFIDE COLLECTORS, Yun-Lung Fu, Owner of Record: *American Cyanamid Co., Hartford, Conn.,* Attorney or Agent: Frank M. Van Riet, et al., Ex. Gp.: 115

**4,608,670,** Re. S.N. 170,197, Filed Mar. 18, 1988, Cl. 365/205, CMOS SENSE AMPLIFIER WITH N-CHANNEL SENSING, Charvaka Duvvury, Owner of Record: *Texas Instruments Inc., Dallas, Tex.,* Attorney or Agent: Rodney M. Anderson, et al., Ex. Gp.: 233

**4,658,914,** Re. S.N. 158,828, Filed Feb. 19, 1988, Cl. 175/40, CONTROLLING SULFIDE SCAVENGER CONTENT OF DRILLING FLUID, Stephen D. Matz, et al., Owner of Record: *Shell Oil Co., Houston, Tex.,* Attorney or Agent: Denise Y. Wolfs, et al., Ex. Gp.: 356

**4,661,067,** Re. S.N. 168,006, Filed Mar. 3, 1988, Cl. 433/181, PERMANENT DENTAL PROSTHESIS AND METHOD, Arthur E. Harvey, Sr., et al., Owner of Record: *Inventor,* Attorney or Agent: Elliot A. Salter, et al., Ex. Gp.: 333

**4,683,305,** Re. S.N. 171,414, Filed Mar. 21, 1988, Cl. 540/533, OBTAINING CAPROLACTAM BY CLEAVING OLIGOMERS OF CAPROLACTAM,

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Hugo Fuchs, et al., Owner of Record: *BASF Aktiengesellschaft, Ludwigshafen, Germany,* Attorney or Agent: Herbert B. Keil, et al., Ex. Gp.: 129

**4,691,621,** Re. S.N. 169,335, Filed Mar. 16, 1988, Cl. 92/184, PISTON-AND-CYLINDER ARRANGEMENT WITH RADIALLY YIELDABLE PISTON HEAD, Larry D. Hall, Owner of Record: *Moog Inc., Aurora, N.Y.,* Attorney or Agent: Peter K. Sommer, et al., Ex. Gp.: 341

**4,693,229,** Re. S.N. 152,233, Filed Feb. 4, 1988, Cl. 124/41A, PROJECTILE SHOOTING GUIDE FOR BOWS, Jim Z. Nishioka, Owner of Record: *Inventor,* Attorney or Agent: None, Ex. Gp.: 351

**4,699,725,** Re. S.N. 168,433, Filed Mar. 15, 1988, Cl. 252/70 MAGNESIUM CALCIUM ACETATE PRODUCTS AND PROCESS FOR THEIR MANUFACTURE, Alan B. Gancy, Owner of Record: *Inventor,* Attorney or Agent: None, Ex. Gp.: 115

**4,699,941,** Re. S.N. 125,411, Filed Nov. 25, 1987, Cl. 524/308, THERMOPLASTIC ELASTIC ADHESIVES, Catherine E. Salerno, Owner of Record: *National Starch and Chemical Corp., Bridgewater, N.J.,* Attorney or Agent: Edwin M. Szala, et al., Ex. Gp.: 155

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**REQUESTS FOR REEXAMINATION FILED**

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

**4,305,296,** Reexam. No. 90/001,500, Requested: Apr. 29, 1988, Cl. 73/626, ULTRASONIC IMAGING METHOD AND APPARATUS WITH ELECTRONIC BEAM FOCUSING AND SCANNING, Philip S. Greene, et al., Owner of Record: *SRI International, Menlo Park, Calif.,* Attorney or Agent: Victor R. Beckman, Ex. Gp.: 150, Requester: Owner

**4,349,923,** Reexam. No. 90/001,499, Requested: Apr. 26, 1988, Cl. 4/542, JET NOZZLE ASSEMBLY FOR THERAPY BATHS, Philip E. Chalberg, Owner of Record: *Inventor, Orange, Calif.,* Attorney or Agent: Leonard Tachner, Ex. Gp.: 240, Requester: Vico Products Mfg. Co. Inc., S. El Monte, Calif.

**4,545,830,** Reexam. No. 90/001,497, Requested: Apr. 18, 1988, Cl. 156/48, METHOD OF SEALING PRESSURIZED ELECTRICAL CABLE WHILE UNDER PRESSURE, Zoltan B. Dienes, et al., Owner of Record: *Thomas & Betts Corp., Bridgewater, N.J.,* Attorney or Agent: Roger M. Rodrick, Ex. Gp.: 130, Requester: Owner

**4,573,203,** Reexam. No. 90/001,501, Requested: Apr. 29, 1988, Cl. 383/8, REUSABLE PLASTIC BAG WITH LOOP HANDLE, Harry R. Peppiatt, Owner of Record: *Paramount Packaging Corp., Chalfont, Pa.,* Attorney or Agent: Seidel, Gonda, et al., Ex. Gp.: 240, Requester: Cello Bag Co., Inc., Tuknila, Wash.

**4,581,794,** Reexam. No. 90/001,503, Requested: Apr. 29, 1988, Cl. 28/141, AUTOMATIC SEAMING MACHINE FOR FABRIC BELTS, Malcolm Oldroyd, et al., Owner of Record: *Asten Group, Inc., Charleston, S.C.,* Attorney or Agent: Volpe & Koenig, Ex. Gp.: 240, Requester: Owner

**4,666,575,** Reexam. No. 90/001,502, Requested: Apr. 26, 1988, Cl. 204/105, METHOD OF RECOVERING GALLIUM FROM SCRAP CONTAINING GALLIUM, Shigeki Kubo, Owner of Record: *Sumitomo Metal Mining Co., Ltd., Tokyo, Japan,* Attorney or Agent: Watson, Cole, et al., Ex. Gp.: 110, Requester: Connolly & Hutz, Wilmington, Del.

**4,668,196,** Reexam. No. 90/001,498, Requested: Apr. 21, 1988, Cl. 440/26, MANUALLY POWERED BOAT, Charles E. Billmayer, Owner of Record: *Leisure Life Ltd., Grand Rapids, Mich.,* Attorney or Agent: Price, Heneveld, et al., Ex. Gp.: 310, Requester: K.L. Industries Inc., Grand Rapids, Mich.

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**Errata**

"All reference to Patent No. 4,736,866 to Robin E. Possey of Ireland for 'NECK FRAME FOR A CONTAINER' appearing in the Official Gazette of Apr. 12, 1988 should be deleted since no patent was granted."

"All reference to Patent No. 4,741,146 to Mariano B. Rialp of Spain for 'PACKAGING DEVICE AND METHOD FOR BOTTLE CAP SLEEVES' appearing in the Official Gazette of May 3, 1988 should be deleted since no patent was granted."

"All reference to Patent No. 4,741,183 to Dennis E. Smith, et al. of New Zealand for 'DRIVES FOR CLOTHES WASHING MACHINES' appearing in the Official Gazette of May 3, 1988 should be deleted since no patent was granted."

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**Department of Commerce**
**Patent and Trademark Office**
**37 CFR Parts 1 and 2**

**[Docket No. 80480–8080]**
**Communications with the Office of the Solicitor**

*Agency:* Patent and Trademark Office, Commerce.
*Action:* Final rule; technical amendments.
*Summary:* On Mar. 24, 1987, final rules regarding the address of certain communications to the Patent and Trademark Office were issued. (52 FR 9394, Mar. 24, 1987.) Also, on Mar. 7, 1985 and Aug. 11, 1986, final rules regarding the court review of decisions by the Patent and Trademark Office Board of Patent Appeals and Interferences and the Trademark Trial and Appeal Board, respectively, were issued. (50 FR 9383, Mar. 7, 1985 and 51 FR 28710, Aug. 11, 1987.)

This notice makes technical corrections to §§1.1, 1.302 and 2.145(b) by specifying the address to which correspondence should be sent to the Office of the Solicitor. The change reflects existing practice consistent with rules of court governing service of court papers on the Solicitor. The change also will expedite the processing of other non-court communications with the Office of the Solicitor.
*Effective Date:* June 9, 1988
*For Further Information Contact:* John H. Raubitschek by telephone at [703] 557–4035 or by mail marked to his attention and addressed to Box 8, Commissioner of Patents and Trademarks, Washington, D.C. 20231.
*Supplementary Information:* The Patent and Trademark Office (PTO) finds for good cause that because the technical changes made by this rule will have no substantive effect, it is unnecessary to seek prior public comment of this rule under 5 U.S.C. 553. Because a notice of proposed rulemaking and an opportunity for public comment is not required for this technical amendment, this rule is also exempt from the provisions of the Regulatory Flexibility Act requiring a regulatory flexibility analysis. The PTO has determined that this rule is not a major rule within the meaning of section 1(b) of Executive Order 12291. The PTO has also determined that this rule has no federalism implications affecting the relationship between the national government and the States as outlined in Executive Order 12612. This rule does not contain a collection of information for purposes of the Paperwork Reduction Act.



*List of subjects:*

Administrative practice and procedure, Courts, Inventions and patents, Trademarks

For the reasons set forth above, 37 CFR Parts 1 and 2 are amended as follows:

Part 1 — Rules of Practice in Patent Cases

1. The authority citation for 37 CFR Part 1 continues to read as follows:

*Authority:* 35 U.S.C. 6, unless otherwise noted.

2. Section 1.1 [Amended]

Section 1.1 is amended by adding new paragraph (g)

* * * * *

(g) All communications relating to pending litigation which are required by the Federal Rules of Civil or Appellate Procedure or by a rule or order of a court to be served on the Solicitor shall be hand-delivered to the Office of the Solicitor or shall be mailed to: Office of the Solicitor, P.O. Box 15667, Arlington, Va. 22215 or such other address as may be designated in writing in the litigation. All other communications to the Office of the Solicitor should be addressed to: Box 8, Commissioner of Patents and Trademarks, Washington, D.C. 20231. Any communication which does not involve pending litigation which is received at P.O. Box 15667 will not be filed in the Office but will be returned. See § §1.302(c) and 2.145(b)(3) for filing a notice of appeal to the U.S. Court of Appeals for the Federal Circuit.

3. Section 1.302 [Amended]

Section 1.302 is amended by adding new paragraph (c)

* * * * *

(c) A notice of appeal, if mailed to the Office, shall be addressed as follows: Box 8, Commissioner of Patents and Trademarks, Washington, D.C. 20231.

Part 2 — Rules of Practice in Trademark Cases

4. The authority citation for 37 CFR Part 2 continues to read as follows:

*Authority:* 15 U.S.C. 1123; 35 U.S.C. 6, unless otherwise noted.

5. Section 2.145(b) [Amended]

Section 2.145(b) is amended by adding new paragraph (b)(3).

* * * * *

(b)(3) The notice, if mailed to the Office, shall be addressed as follows: Box 8, Commissioner of Patents and Trademarks, Washington, D.C. 20231.

DONALD J. QUIGG
May 3, 1988. *Assistant Secretary and Commissioner of Patents and Trademarks.*

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### Status of PTO Services

The following is an update of the status of PTO services for April 1988:

| Service Item | FY 1988 Goal (Calendar Days*) | Monthly Average (Calendar Days*) |
|---|---|---|
| Filing Receipts: | | |
| Patents | 22 | 46 ** |
| Trademarks | 30 | 44 |
| Patent/Trademark Copies: | | |
| Special Window Coupons | 24 Hours | 17 Hours |
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| Mail Coupons | 12 | 5 |
| Letter Orders | 16 | 11 |
| Certified Copies: | | |
| Trademark Registrations | 21 | 33 |
| Applications-As-Filed | 17 | 12*** |
| File-Wrapper/Contents | N/A | 15 |
| Walk-up Certification | 1 | 1 |
| Trademark Search Library: | | |
| Filing Pending Marks | 21 | 34 |
| Filing Reg. Certificates | Issue Date | Issue Date |
| Filing Temp. Drawings | 6 | 13 |
| Assignments: | | |
| Recording Patent Assignments | 20 | 12 |
| Receipt Date of Patent Documents Returned | | Apr. 18, 1988 |
| Recording Trademark Assignments | 20 | 20 |
| Receipt Date of Trademark Documents Returned | | Apr. 11, 1988 |
| Avg. Days from Issue Fee Payment to Issue Date | 90–100 | 91 |
| Issue Fee Receipts Mailed | 4 weeks prior to Issue Date | On schedule |
| Patent Copies Available | 95% on Issue Date | 99% on Issue Date |
| Trademark Copies Available | 95% on Issue Date | 99% on Issue Date |

* Unless otherwise noted.
** Backlog created due to unusually high number of applications being received. The average days to process have decreased by 3 since last month. Extra resources are being applied and further improvements are expected.
*** The 5% of orders for which fiche are not on site are not included in calculations.

*IMPROVEMENTS TO SERVICES*

- *Recently Issued Design Patents* — Based on suggestions by members of the public, recently issued design patents contained in bound volumes have been moved to the Public Search Room. The suggestion was based on the fact that the bound volume area closes by 5:00 p.m. each day, while the Patent Search Room is open until 8:00 p.m. each day.

- *New Photocopies and Reader/Printers* — The PTO's facilities management contract with TS Infosystems, Inc. (TSI), expired on Apr. 30, 1988. The new contractor is Dynamic Concepts, Inc. (DCI). The impact to the public was minimal, as the transition occurred over a weekend. DCI hired TSI's on-site management and key operators. All 30 photocopiers have been replaced with new Pitney Bowes M750s. The majority of the reader/printers (17) have been replaced with new Cannon NP 780s. The PTO has assumed responsibility for the cashier's window for purchasing CopiShare Cards, but DCI still has responsibility for the encoder function.

- *Information Contacts* — For your convenience and reference, an updated Information Contacts — Subject Index is provided in this Notice.

*HELPFUL HINTS*

- *Care in Handling and Ordering Files* — To aid in maintaining the integrity of the contents of PTO files ordered by members of the public, users should ensure that all documents are properly sequenced and neatly replaced in the file once the review or photocopying process is completed.

  To eliminate unnecessary delays when ordering Trademark files, requesters should complete all required information blocks on form PTO-1538 (Order and Charge for Trademark Files). Failure to properly complete the form is the primary reason for requests not being quickly processed. Submitting a completed form will reduce the number of requests that have to be returned and thus reduce the overall time required to fill the request.



- *Assignment Processing* — When signing an original document, BLUE ink pen should be used. When signatures are in black ink, they can not always be identified as original signatures. In such cases the document must be returned, thus delaying the recording process.

May 6, 1988

THERESA A. BRELSFORD.
*Assistant Commissioner*
*for Administration.*

* * * * *

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| Box 5 | "No fee" mail related to trademarks. |
| Box 6 | Mail for the Office of Procurement. |
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| Box AF | Expedited procedure for processing amendments and other responses after final rejection. |
| Box FWC | Requests for File Wrapper Continuation Applications. (under 37 CFR 1.62) |
| Box Interference | Communications relating to interferences and applications and patents involved in interference. |
| Box Issue Fee | Issue Fee Transmittals (PTOL Form 85) and associated fees and corrected drawings. |
| Box M. Fee | Correspondence related to a patent that is subject to the payment of a maintenance fee. |
| Box Non-Fee Amendment | Non-fee amendments to patent applications. |
| Box OED | Mail for the Office of Enrollment and Discipline. |
| Box Pat. Ext. | Applications for patent term extension. |
| Box PCT | Mail related to applications filed under the Patent Cooperation Treaty. |
| Box Reexam | Requests for Reexamination. |
| Box SN | For fee and petitions under 37 CFR 1.182 to obtain date received and/or serial number for patent applications *prior* to the Office's standard notification (return post card or the Official "Filing Receipt," "Notice to File Missing Parts," or "Notice of Incomplete Application"). |
| Patent Application | New patent application and associated papers and fees. |
| Trademark Application | New Trademark application and associated papers and fees. |

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# PATENT NOTICES

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| Re. 30,910 | 4,669,705 | 4,695,276 | 4,707,641 |
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| D. 294,240 | 4,670,850 | 4,695,632 | 4,708,605 |
| 3,842,433 | 4,672,005 | 4,695,739 | 4,709,113 |
| 4,083,734 | 4,673,052 | 4,696,524 | 4,709,278 |
| 4,093,476 | 4,673,707 | 4,697,106 | 4,709,487 |
| 4,254,996 | 4,674,100 | 4,697,531 | 4,709,805 |
| 4,347,101 | 4,675,257 | 4,697,598 | 4,709,864 |
| 4,358,887 | 4,675,301 | 4,697,894 | 4,710,549 |
| 4,409,638 | 4,676,185 | 4,698,801 | 4,710,599 |
| 4,423,073 | 4,676,803 | 4,699,488 | 4,710,745 |
| 4,435,778 | 4,676,846 | 4,699,882 | 4,710,996 |
| 4,450,795 | 4,679,818 | 4,699,899 | 4,711,035 |
| 4,478,964 | 4,680,482 | 4,700,342 | 4,711,144 |
| 4,516,641 | 4,680,483 | 4,700,470 | 4,711,418 |
| 4,533,749 | 4,681,366 | 4,700,844 | 4,712,135 |
| 4,543,359 | 4,681,455 | 4,700,920 | 4,712,746 |
| 4,567,738 | 4,681,975 | 4,701,320 | 4,712,837 |
| 4,586,521 | 4,682,255 | 4,701,597 | 4,712,984 |
| 4,602,153 | 4,683,773 | 4,701,622 | 4,713,084 |
| 4,619,928 | 4,684,706 | 4,701,840 | 4,713,217 |
| 4,624,626 | 4,684,965 | 4,702,137 | 4,713,227 |
| 4,625,053 | 4,685,120 | 4,702,331 | 4,713,653 |
| 4,628,559 | 4,685,446 | 4,702,744 | 4,713,661 |
| 4,629,336 | 4,685,956 | 4,702,771 | 4,713,895 |
| 4,629,942 | 4,685,969 | 4,703,095 | 4,714,114 |
| 4,630,690 | 4,687,342 | 4,703,134 | 4,714,316 |
| 4,631,389 | 4,687,748 | 4,703,994 | 4,714,326 |
| 4,632,680 | 4,688,189 | 4,704,426 | 4,714,404 |
| 4,632,986 | 4,689,099 | 4,704,443 | 4,715,379 |
| 4,635,215 | 4,689,137 | 4,704,687 | 4,715,383 |
| 4,639,371 | 4,690,304 | 4,704,824 | 4,715,454 |
| 4,639,444 | 4,690,388 | 4,704,957 | 4,716,159 |
| 4,641,527 | 4,690,532 | 4,705,269 | 4,716,251 |
| 4,649,357 | 4,691,645 | 4,705,473 | 4,716,680 |
| 4,656,082 | 4,691,892 | 4,706,372 | 4,716,755 |
| 4,657,577 | 4,693,158 | 4,706,663 | 4,716,868 |
| 4,657,849 | 4,693,319 | 4,706,669 | 4,717,639 |
| 4,659,774 | 4,693,751 | 4,706,724 | 4,718,132 |
| 4,661,303 | 4,693,992 | 4,706,726 | 4,718,278 |
| 4,661,553 | 4,694,013 | 4,706,921 | 4,719,004 |
| 4,661,780 | 4,694,018 | 4,707,043 | 4,719,571 |
| 4,664,732 | 4,694,095 | 4,707,111 | 4,720,092 |
| 4,666,910 | 4,694,174 | 4,707,468 | 4,720,459 |
| 4,667,389 | 4,694,372 | 4,707,629 | 4,728,537 |





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## PATENT EXAMINING CORPS

**RENE D. TEGTMEYER, Assistant Commissioner**

**JAMES E. DENNY, Deputy Assistant Commissioner**

**CONDITION OF PATENT APPLICATIONS AS OF April 9, 1988**

| PATENT EXAMINING GROUPS | Actual Filing Date of Oldest New Case Awaiting Action |
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| **CHEMICAL EXAMINING GROUPS** | |
| GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director | 1-12-87 |
| ORGANIC CHEMISTRY GROUP 120—S. N. ZAHARNA, Director | 9-3-85 |
| SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. F. WHITE, Director | 4-15-87 |
| HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director | 12-9-86 |
| BIOTECHNOLOGY, GROUP 180—S. N. ZAHARNA, Acting Director | 10-24-85 |
| **ELECTRICAL EXAMINING GROUPS** | |
| INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—G. GOLDBERG, Director | 4-21-86 |
| SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director | 10-14-85 |
| INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—E. LEVY, Director | 2-6-86 |
| PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX, Director | 11-12-86 |
| ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director | 2-17-87 |
| COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260—S. G. KUNIN, Director | 7-17-86 |
| DESIGN, GROUP 290—K. L. CAGE, Director | 4-17-85 |
| **MECHANICAL EXAMINING GROUPS** | |
| HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director | 3-13-87 |
| MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—VACANT, Director | 10-04-85 |
| MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—VACANT, Director | 2-18-86 |
| SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—D. J. STOCKING, Director | 2-20-87 |
| GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director | 7-1-87 |

**Expiration of patents:** The patents within the range of numbers indicated below expire during April 1988, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents . . . . . Numbers 3,573,336 to 3,576,935, inclusive

Plant Patents . . . . . Numbers 3,037 to 3,053 inclusive

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# REEXAMINATIONS

MAY 31, 1988

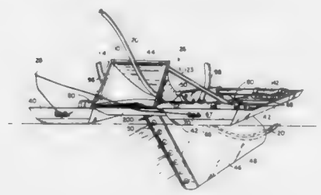
Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

**B1 3,638,439 (859th)**

## EMBEDDING CAHLELIKE MEMBERS

**Otto C. Niederer, Old Lyme, Conn., assignor to Aqua-Tech, Inc., Norwick, Conn.**

**Reexamination Request No. 90/001,177, Feb. 24, 1987.**
**Reexamination Certificate for Patent No. 3,638,439, issued Feb. 1, 1972, Ser. No. 19,853, Mar. 16, 1970.**
**Int. Cl.[4] F16L *1/00*; E02F *5/02***
**U.S. Cl. 405—159**



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claim **18** is confirmed.

Claims **1**, **2**, **4**, **5**, and **7–17** are cancelled.

Claims **3** and **6** are determined to be patentable as amended.

**3**. [The apparatus of claim **1**] *Apparatus for embedding a cablelike member under water, comprising*

*a water bed contacting support assembly,*

*an entrance guide having a longitudinal axis,*

*a depressor extending generally along a continuation of said axis rearward of said entrance guide,*

*a jet assembly extending beneath said depressor, and, connected to said jet assembly,*

*a source of fluid under pressure for creating a jet flow at a flow rate sufficiently high and a pressure sufficiently low to temporarily liquefy water bed soil in the path of said member without substantial permanent soil displacement,*

wherein said flow rate is at least 500 gallons/minute and said pressure is no more than 150 p.s.i.

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**B1 4,232,679 (860th)**

## PROGRAMMABLE HUMAN TISSUE STIMULATOR

**Joseph H. Schulman, Los Angeles, Calif., assignor to Pacesetter Systems, Inc., Sylmar, Calif.**

**Reexamination Request Nos. 90/000,677, Dec. 4, 1984 and 90/000,700, Dec. 31, 1984.**
**Reexamination Certificate for Patent No. 4,232,679, issued Nov. 11, 1980, Ser. No. 762,626, Jan. 26, 1977.**
**Int. Cl.[4] A61N *1/36***
**U.S. Cl. 128—419 PG**

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **22–35** are cancelled.

Claims **1**, **2**, **6**, **10**, **11**, **14**, **15** and **21** are determined to be patentable as amended.

Claims **3–5**, **7–9**, **12**, **13**, and **16–20**, dependent on an amended claim, are determined to be patentable.

New claims **36** and **37** are added and determined to be patentable.

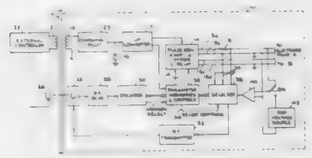
**1**. A programmable human tissue stimulator system comprising:

an implanted stimulating signal generator for generating body tissue stimulating pulses responsive to control signals,

an implanted memory means for storing control signals for controlling said stimulating signal generator,

external control means for generating a plurality of sets of signals, each set including control signals, and signals which represent a memory address in said memory means,

external means for transmitting said generated sets of signals;



an implanted receiver for receiving said sets of transmitted signals,

implanted means for verifying that the received signals in each set are accurate and for producing an accurate signal when each signal in a set has substantially either a first waveform or a second waveform,

an implanted [memory address] *temporary storage* means for storing the memory address which is represented by the memory address representing signal in the set[;] *in response to the generation of said accurate signal,*

implanted means [responsive to said accurate signal] for entering selected ones of the received control signals in each set in the memory means at the memory address stored in said [memory address] *temporary storage* means, and

implanted means for controlling said implanted stimulating signal generator with control signals from said memory.

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**B1 4,330,574 (861st)**

## FINISHING METHOD FOR CONVENTIONAL HOT DIP COATING OF A FERROUS BASE METAL STRIP WITH A MOLTEN COATING METAL

**Marvin B. Pierson, Franklin, and Charles Flinchum, Hamilton, both of Ohio, assignors to Armco Inc., Middletown, Ohio**

**Reexamination Request No. 90/001,287, Jul. 15, 1987.**
**Reexamination Certificate for Patent No. 4,330,574, issued May 18, 1982, Ser. No. 191,857, Sep. 29, 1980.**
**Continuation-in-part of Ser. No. 30,660, Apr. 16, 1979, abandoned.**
**Int. Cl.[4] B05D *3/02***
**U.S. Cl. 427—319**

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claim **3** is cancelled.

Claim **1** is determined to be patentable as amended.

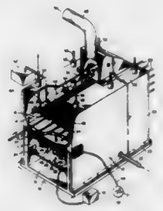
VOL 1090 ISS 5 MY 31 1988 UMI



Claims 2 and 4–15, dependent on an amended claim, are determined to be patentable.

New claims 16 and 17 are added and determined to be patentable.

1. A finishing process for conventional continuous hot-dip, two-side coating of a ferrous base metal strip with a molten coating metal of the type wherein said ferrous base metal strip is caused to enter a bath of said molten coating metal contained in a coating pot, said ferrous base metal strip having been treated to bring it to a coating temperature sufficiently high to prevent casting of said coating metal thereon and low enough



to prevent excess coating metal-base metal alloying and to render the surfaces of said strip clean and free of oxide as it passes through said molten coating metal bath, said finishing process comprising the steps of providing an enclosure in sealed relationship with said bath for said two-side coated ferrous base metal strip as it exits said bath and an exit in said enclosure for said coated strip, maintaining a non-oxidizing atmosphere within said enclosure, locating a jet finishing nozzle to either side of said coated strip within said enclosure, jet finishing said coated strip with a non-oxidizing gas and maintaining said jet finishing gas and said atmosphere within said enclosure at an oxygen level of less than about [1000] *200* ppm, whereby to render said two-sided coated strip uniform in appearance and coating thickness.

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**B1 4,436,684 (862nd)**

**METHOD OF FORMING IMPLANTABLE PROSTHESES FOR RECONSTRUCTIVE SURGERY**

**David N. White, Palo Alto, Calif., assignor to Contour Med Partners, Ltd., Mountain View, Calif.**

**Reexamination Request No. 90/001,283, Jul. 13, 1987.**
**Reexamination Certificate for Patent No. 4,436,684, issued Mar. 13, 1984, Ser. No. 384,646, Jun. 3, 1982.**
**Int. Cl.[4] B23Q *33/00*; A61B *6/03*; A61F *2/28*; B23Q *15/14***
**U.S. Cl. 264—138**




AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 14–16, 18, 20, 24 and 26–28 are cancelled.

Claims 1–10, 12, 13, 17, 19, 23, 25, 29 and 31 are determined to be patentable as amended.

Claims 11, 21, 22 and 30 dependent on an amended claim, are determined to be patentable.

New claims 32–34 are added and determined to be patentable.

1. A method of fabricating a three dimensional corporeal model of a structure internal to a body, comprising:

subjecting the body to radiant energy to produce radiant energy responses internal to said body, the radiant energy selected to produce radiant energy responses that are characteristic of a selected physical property of substances detectable exterior of the body;

detecting produced radiant energy responses to obtain [representations] *a plurality of two dimensional digital representations, the two dimensional digital representations being spaced along a third dimension to produce a digital data set representative* of [substances at locations internal to the body defining] structures internal to said body three-dimensionally;

[generating from the representations of the substances a set of three dimensional coordinates] *selecting a particular structure internal to the body, the selecting step including selecting from among the digital data set representative of structures internal to the body a selected subject of digital coordinates defining the surface of the selected structure, the selected subset comprising three dimensional digital coordinates* defining a three dimensional representation of [a] *the* selected structure internal to the body; and

directing a sculpting tool into a workpiece *directly* in accordance with the [generated set of] three dimensional *digital* coordinates to form a *three dimensional* corporeal model corresponding to the three dimensional representation of the selected structure.

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**B1 4,464,224 (863rd)**

**PROCESS FOR MANUFACTURE OF HIGH BULK PAPER**

**Geza A. Matolcsy, Oakville, Canada, assignor to CIP Inc., Montreal, Canada**

**Reexamination Request No. 90/000,999, Apr. 29, 1986.**
**Reexamination Certificate for Patent No. 4,464,224, issued Aug. 7, 1984, Ser. No. 393,721, Jun. 30, 1982.**
**Int. Cl.[4] D21H *5/24***
**U.S. Cl. 162—111**

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claim 10 is cancelled.

Claims 1 and 3 are determined to be patentable as amended.

Claims 2, 4–9 and 11–15, dependent on an amended claim, are determined to be patentable.

New claims 16–29 are added and determined to be patentable.

1. A process for the manufacture of high bulk *soft tissue* paper or a high bulk *soft tissue* layer of a multi-layered *tissue* paper, said paper or layer being creped *and said paper having a basis weight up to 60 g/m$^2$*, in which an aqueous slurry consisting essentially of ligno-celluloaic fibers *and including such fibers* in a paper-making bond forming state is dewatered in contact with a foraminous surface to form a web which is subsequently pressed and dried, characterized in that dry fibers consisting essentially of ligno-cellulosic fibers of the type which when fully wetted have interfiber bonding capacity are introduced into the slurry and interspersed with said bond forming state fibers shortly before formation of the web and in such manner that the web incorporates initially dry fibers which entered the slurry in said introducing step and which [remain incompletely wetted] *retain a solids content of at least 50%* by reason of having a short water contact time of less than 45 minutes



while the web is formed and pressed and is creped by being passed over a [Yankee] *yankee* cylinder, the amount of said [incompletely wetted] *initially dry* fibers being between 10% and 80% of the total fibers used to form the web, *said bond forming state fibers being unrefined or refined only to a level such that the density of the creped web is between 0.06 and 0.20 g/cm$^3$ measured by a caliper gauge at 42.2 g/cm$^2$ pressure with an anvil area of 6.45 cm$^2$.*

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**B1 4,641,780 (864th)**

**SPRAYING APPARATUS**

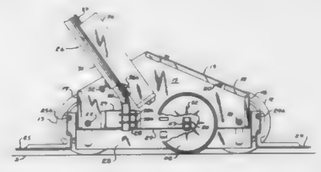
**Thomas J. Smrt, 172 S. Northwest Hwy., Cary, Ill. 60013**

**Reexamination Request No. 90/001,273, Jul. 1, 1987.**
**Reexamination Certificate for Patent No. 4,641,780, issued Feb. 10, 1987, Ser. No. 278,164, Jun. 29, 1981.**
**Int. Cl.[4] B05B *1/28***
**U.S. Cl. 239—150**

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 1–8 are cancelled.

[1. In a spraying apparatus having means for spraying material onto a surface to be sprayed, a pair of spaced-apart discs rotatably mounted on the spraying apparatus, the discs being engageable with the surface to be sprayed whereby the discs rotate over the surface as the spraying apparatus is moved over the surface, each of the discs including a circular wall and an axially extending flange which extends from the circular wall toward the other disc, each of the flanges having an axially extending outer edge and terminating in a radially inwardly extending retaining lip whereby the flange and the lip provide



a well for material which is sprayed onto the flange, each of the discs including a radially outwardly extending rim which projects radially beyond said outer edge of the flange and which engages the surface to be sprayed whereby the outer edge of the flange is spaced from the surface by the rim, and a plurality of generally radially extending ribs on the circular wall for trapping material which is sprayed onto the disc.]

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Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 32,678

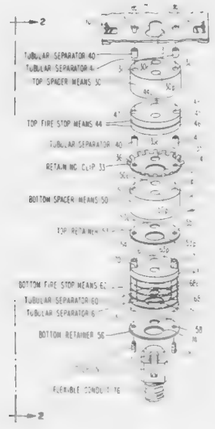
## ECONOMY POKE-THRU

Richard D. Benscoter, Vienna; Robert W. Hadfield, and Timothy S. Bowman, both of Parkersburg, all of W. Va., assignors to Butler Manufacturing Company, Kansas City, Mo.

Original No. 4,573,297, dated Mar. 4, 1986, Ser. No. 535,620, Sep. 26, 1983. Application for reissue Nov. 13, 1986, Ser. No. 930,544

Int. Cl.[4] E04B *5/48*

U.S. Cl. 52—221 13 Claims




*13. A thru-floor unit for a poke-thru assembly, the thru-floor unit to be mounted in a bore in concrete of a floor of a building and comprising:*

*a pair of elongated mounting screws each having threads;*

*a bottom retainer having a pair of threaded apertures each comprising a nut respectively receiving the threads of said mounting screws;*

*top spacer means made of insulating, non-intumescent material and spaced from said bottom retainer and having clearance holes receiving said mounting screws;*

*a cylindrically-shaped retaining clip disposed in the space between said bottom retainer and said top spacer means and made of resilient material and having a seat section and a plurality of fingers around the periphery thereof, the seat section having clearance holes receiving said mounting screws and the fingers being for use in engaging the side of said bore to retain the thru-floor unit therein;*

*fire stop means made of intumescent material and disposed in the space between said bottom retainer and said top spacer means and having clearance holes receiving said mounting screws;*

*said bottom retainer, said fire stop means, said retaining clip, and said top spacer means each having at least one power opening and at least one communication opening, the respective power openings being aligned to provide at least one passageway for power conductors from underneath said floor through the thru-floor unit and the respective communications openings being aligned to provide at least one passageway for communication conductors from underneath said floor through the thru-floor unit;*

*coupling means connected to said bottom retainer in alignment with said passageway for power conductors for use in connecting power conduit means to the unit; and*

*said bottom retainer, said fire-stop means, and retaining clip, and said top spacer means each being dimensioned to provide for each to be received by and moved in said bore.*

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Re. 32,679

## PRESSURE AIR MANIFOLD AND OUTLETS SYSTEM FOR GRAIN HEADER OR HARVESTER CUTTING PLATFORMS

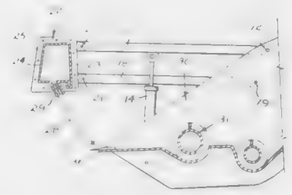
Donald G. Brooks, Scarborough, Australia, assignor to Harvestaire Pty. Ltd., Australia

Original No. 4,406,112, dated Sep. 27, 1983, Ser. No. 325,887, Nov. 30, 1981. Application for reissue Sep. 26, 1985, Ser. No. 781,119

Claims priority, application Australia, Mar. 3, 1981, PE7820

Int. Cl.[4] A01D *57/22*

U.S. Cl. 56—12.9 21 Claims



1. Improved pressure air manifold and outlets system for grain header or harvester cutting platform having a frame, a cutter bar assembly and a feed auger, comprising

a manifold extending across and above the cutting platform, mounting means mounting the manifold to the frame,

a plurality of outlet tubes depending from said manifold, each said outlet tube terminating in outlet means at its end above said cutter bar assembly and adjacent to the front edge thereof, each said outlet tube being directed to discharge in a generally rearward and lateral direction, and

a blower, drive means coupled to the blower, and conduit means coupling said blower to said manifold

and outlet means for providing a continuous curtain of air substantially across the cutting platform *each tube having substantially equal internal cross sectional size throughout its length to the outlet means.*

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Re. 32,680

## PROTECTIVE COVER FOR HUMAN LIMB JOINTS

Susan Pompa, Lincolnwood, Ill., assignor to S. J. Kaplan and Associates, Inc., Lincolnwood, Ill.

Original No. 4,471,770, dated Sep. 18, 1984, Ser. No. 404,431, Aug. 2, 1982. Application for reissue Apr. 17, 1985, Ser. No. 724,291

Int. Cl.[4] A61F *13/00*

U.S. Cl. 128—132 R 8 Claims

*3. A protective cover adapted to be applied to a human limb joint such as the elbow or the heel, the limb having members directed generally transversely relative to each other, comprising,*

*a fleece incorporating a base and fibers thereon, and including a first piece and a second piece, originally independent of and separate from each other,*

*the first piece being of U shape formation, and including a pair of parallel legs and a bight interconnecting the legs, the legs being thereby spaced apart and the first piece defining a first open end and a second open end, and having a marginal edge of U shape at each end, said legs extending circumferentially at least a portion of one of the members of the wearer's limb,*

*the second piece being positioned transversely across the space*

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*between the legs at said first end and secured to the first piece at the corresponding marginal edge of the latter,*

*the fleece being oriented with the fibers directed inwardly to engage the wearer's limb, and the base directed outwardly, and*

*releasable securing means on the first piece including interconnectable elements on respective ones of the legs thereof, certain of said elements extending over and across said space when the elements are respectively interconnected,*

*said first and second pieces constituting, except for said securing means, the entire protective cover, and constituting the entire portions engagable with the wearer's limb, and the entire portions having exterior surfaces engaging external objects which the wearer's limb engages, the fibers being distributed throughout the area of the base.*

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**Re. 32,681**

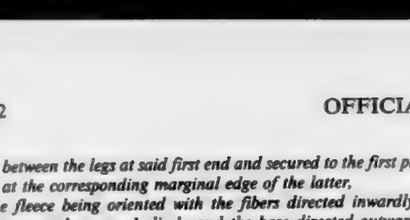
**THREE WHEEL VEHICLE**

**Travis M. Randolph, P.O. Box 505, and Charles P. Schreiner, P.O. Box 711, both of Saugatuck, Mich. 49453**

**Original No. 4,408,776, dated Oct. 11, 1983, Ser. No. 251,216, Apr. 6, 1981. Application for reissue Oct. 11, 1985, Ser. No. 786,813**

**Int. Cl.⁴ B62K** *5/04, 21/00;* **B62M** *1/02*

**U.S. Cl. 280—261** **14 Claims**



*8. A three wheel vehicle comprising:*

*a frame having front and rear ends;*

*a pair of wheels rotatably mounted on either side near one end of said frame;*

*a strut member having its proximal end pivotably mounted in a generally horizontal plane at the center of the other end of said frame with its distal end extending rearwardly with respect to said frame;*

*a fork rotatably mounted at the distal end of said strut member so as to be rotatable about a generally vertical axis;*

*a steerable wheel rotatably mounted in said fork;*

*steering means including means for rotating said fork about a generally vertical axis to turn said vehicle and means for simultaneously pivoting said strut member in a generally horizontal plane to displace said fork laterally with respect to the vehicle in a direction opposite the direction of turning the vehicle; and*

*means on said frame for driving at least one of said wheels.*

*9. A three wheel vehicle according to claim 8 wherein said proximal end of said strut member is pivotably mounted at the center of said frame by means of a generally vertical shaft rigidly affixed to said proximal end of said strut member, said shaft being rotatably mounted about a generally vertical axis at the center of said frame.*

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**Re. 32,682**

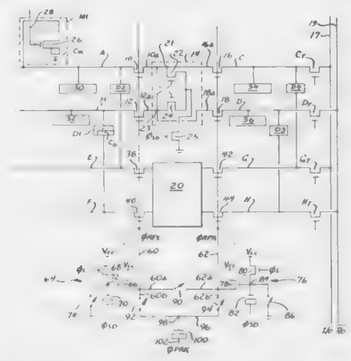
**FOLDED BIT LINE-SHARED SENSE AMPLIFIERS**

**Sargent S. Eaton, and David Wooten, both of Colorado Springs, Colo., assignors to INMOS Corporation, Colorado Springs, Colo.**

**Original No. 4,351,034, dated Sep. 21, 1982, Ser. No. 195,728, Oct. 10, 1980. Application for reissue Aug. 12, 1985, Ser. No. 764,739**

**Int. Cl.⁴ G11C** *13/00*

**U.S. Cl. 365—189** **12 Claims**



1. In an MOS memory having a plurality of memory cells each having a memory cell capacitor adapted to be charged so as to reflect the logic state of its memory cell, having a plurality of bit lines with associated isolation transistors and word lines for accessing a particular memory cell, and having a plurality of input/output buss lines for reading the logic state of the accessed memory cell, a folded bit line-shared sense amplifier arrangement for sensing the state of an accessed memory cell, comprising:

a shared sense amplifier positioned between and coupled to first and second bit lines (*A, C*) via first and second isolation transistors and positioned between and coupled to third and fourth bit lines (*B, D*) via third and fourth isolation transistors, said first and said third bit lines being adjacent each other and said second and said fourth bit lines being adjacent each other;

*said third bit line (B) having a dummy cell (DI) associated therewith for use when reading a memory cell (MI) associated with said first bit line (A);*

*said shared sense amplifier providing signals to only one pair of input/output buss lines, said buss line being located on only one side of said sense amplifier and being coupled to said second and fourth bit lines;*

decoding means for selectively activating said first and third isolation transistors to couple said first and third bit lines, *and thereby said accessed memory cell and said dummy cell,* to said shared sense amplifier; and

means for enabling said shared sense amplifier to latch in a state indicative of the difference in voltage between said first bit line and said third bit line, said difference representing the logic state of the accessed memory cell,

said decoding means selectively conditioning said second and fourth isolation transistors to couple said latched state of said shared sense amplifier to [the] *said one pair of* input/output buss lines via said second and fourth bit lines *regardless of whether the accessed memory cell is positioned between the input/output buss line and the shared sense amplifier or the shared sense amplifier is positioned between the accessed memory cell and the input/output buss,* so as to read the voltage state of the accessed memory cell[;].



**Re. 32,683**

**STACKED MARINE SEISMIC SOURCE**

**Clifford H. Ray, Houston, Tex., assignor to Fairfield Industries, Inc., Houston, Tex.**

**Original No. 4,493,061, dated Jan. 8, 1985, Ser. No. 380,569, May 21, 1982. Continuation-in-part of Ser. No. 291,269, Aug. 10, 1981, Pat. No. 4,441,174. Application for reissue Dec. 2, 1985, Ser. No. 803,345**

**The portion of the term of this patent subsequent to Apr. 3, 2001, has been disclaimed.**

**Int. Cl.⁴ G01V** *1/36, 1/38*

**U.S. Cl. 367—23** **7 Claims**



1. A marine seismic wave source, including a plurality of individual gas expansible sources, each of said sources producing a primary shock wave into the water from the location where said source is positioned, each of said sources also producing an after-shock wave into the water a predetermined time after said primary shock wave, comprising;

a first of said individual sources towed at a first depth below the surface of the water, the negative portion of said primary wave from said first source being separated from the positive portion thereof dependent on the round-trip acoustical travel time of the source impulse to the water surface, the positive portion of the after shock wave therefrom occurring at a time after the primary shock wave dependent on the pressure of the water at said first depth, the negative portion of said after shock wave being separated from its positive portion by the same time separation that the negative portion of the primary wave is separated from its positive portion,

a second of said individual sources towed [ahead of said first individual source] at a second depth below the surface of the water greater than said first depth, the negative portion of said primary wave from said second source being separated from the positive portion thereof dependent on the round-trip acoustical travel time of the source impulse to the water surface, the positive portion of the after-shock wave therefrom occurring at a time after the primary shock wave dependent on the pressure of the water at said second depth, the negative portion of said after-shock wave being separated from its positive portion by the same time separation that the negative portion of the primary wave is separated from its positive portion.

the round-trip time for said second source being longer than the round-trip time for said first source, the pressure for said second source being greater than the pressure for said first source, thereby causing the relative time of arrival of said after shock for said second source to be shorter than for said first source,

said positive portions of the primary waves from said first and second sources occurring substantially simultaneously at a location below said second source before the negative portion of the primary wave from said first source occurs at said location, which is then followed by the negative portion of the primary wave from said second source at said location, said [primary] *positive* and negative portions of said first source and second source after-shock waves occurring at respectively different times at said location,

whereby, said positive portions of said primary shock wave energy accumulates and said negative portions of said primary shock wave energy and said positive and negative portions of said after-shock wave energy do not accumulate.

**Re. 32,684**

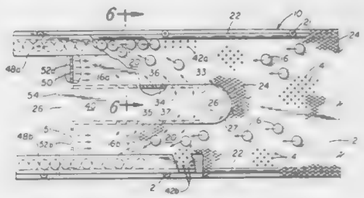
**AIR TABLE SYSTEM**

**Ronald A. Lenhart, Lakewood, Colo., assignor to Precision Metal Fabricators, Inc., Arvada, Colo.**

**Original No. 4,462,720, dated Jul. 31, 1984, Ser. No. 474,822, Mar. 10, 1983. Division of Ser. No. 321,391, Nov. 16, 1981, which is a continuation of Ser. No. 138,006, Apr. 7, 1980, Pat. No. 4,347,022, which is a continuation-in-part of Ser. No. 947,441, Oct. 2, 1978, abandoned. Application for reissue Oct. 25, 1985, Ser. No. 791,539**

**Int. Cl.⁴ B65G** *51/03*

**U.S. Cl. 406—84** **11 Claims**



1. An air table apparatus for the transport of objects *en masse* from an upstream location to a downstream location, said apparatus comprising:

a *generally horizontal* table having a surface, edges and an underside with a prearranged pattern of air jet openings in *substantially* the *entire* surface slanted in a downstream direction of object movement and communicating the surface and the underside *for supporting and transporting the containers;*

a single file conveying zone at said downstream location;

[solid] *imperforate* cover means spaced above said surface of said table a distance slightly greater than the longitudinal dimension of the objects being transported and positioned at least over said single file conveying zone;

a plenum connectable to a source of air under pressure underlying and attached to said underside of said table surface to supply air through said jet openings to lift, support and move the objects *en masse* from said upstream location to said downstream location;

side means positioned along the edges of said table surface between said cover and said table surface; and

blow back air jets connected to a source of air under pressure for supplying air under pressure into said single file conveying zone in opposition to the direction of normal flow of the objects.

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**Re. 32,685**

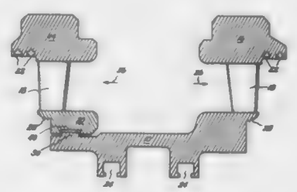
**DOUBLE FLOW REHEAT DIAPHRAGM**

**John M. Hess, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Original No. 4,392,778, dated Jul. 12, 1983, Ser No. 249,894, Apr. 1. 1981, Application for reissue Feb. 13, 1984, Ser. No. 579,468**

**Int. Cl.⁴ F01D** *9/04*

**U.S. Cl. 415—139** **12 Claims**



13. An inner web of a diaphragm for use in a double flow section of a steam turbine having a rotor shaft with a plurality of bucket wheels affixed thereto, said wheels rotate about the

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axis of said shaft between a plurality of stationary nozzle rings formed by curved partitions, said web comprising:

a first cylindrical shell formed in two joinable halves for surrounding a portion of said rotor shaft, [said first shell having at least two circular grooves on the inner periphery thereof for holding steam packing material in close proximity to said rotor shaft,] said first shell [also] having a surface surrounding the outer periphery of a first end thereof for attachment of curved partitions and including a second end which is axially displaced from said first end;

a second cylindrical shell formed in two joinable halves for surrounding the second end of said first shell, said second shell also having a surface around the outer periphery thereof for attachment of curved partitions; and

means for joining said second shell to said first shell, said joining means permitting limited axial movement between said first and said second shell.

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**Re. 32,686**

## DIGITAL FREQUENCY LOCK TUNING SYSTEM

**Chuck Dages, Rivervale, N.J., assignor to General Instrument Corporation, New York, N.Y.**

**Original No. 4,476,584, dated Oct. 9, 1984, Ser. No. 10,408, Feb. 8, 1979. Application for reissue Oct. 8, 1986, Ser. No. 916,708**

**Int. Cl.[4] H04B** *1/16*

**U.S. Cl. 455—182** **2 Claims**

1. A closed loop digital tuning system, the system comprising,

oscillator means responsive to a variable control voltage for generating an oscillation having a frequency dependent on the magnitude of said control voltage,

sampling means for sampling the actual output frequency of said oscillation means for a predetermined interval of time and for generating a first digital word representing the actual value of said frequency,

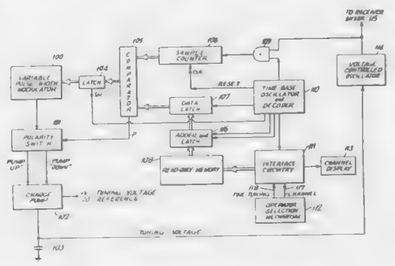
[means responsive to incoming channel information for generating a selected one of a plurality of address words, each address word representing a particular operating channel in a CATV system,

memory means for storing a plurality of second digital words, each of said second digital words representing any desired frequency of oscillation for said oscillator means,

means responsive to the address words for retrieving from said memory means one of said second digital words, the particular location of said second digital word within said memory means being identified by said address word representing a particular operating channel in said CATV system,]

*memory means responsive to incoming channel information for providing one of a plurality of second digital words, each of said second digital words representing a particular frequency of oscillation for said oscillator means,*

means for storing the second digital word retrieved from said memory means,



comparator means for comparing the values of said first digital word with the value of said stored second digital word, and means responsive to a difference in value between said first digital word and said stored second digital word determined by said comparator means for varying said control voltage for said oscillator means, whereby said actual frequency value is changed to said desired frequency value, wherein there is further included means responsive to fine tuning information for retrieving a third digital word from said memory means, means for adding said third digital word to said second digital word, and means for applying the sum of said second and third digital words to said comparator means.

# PLANT PATENTS

## GRANTED MAY 31, 1988

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

**6,188**

### MINIATURE ROSE PLANT NAMED FREE SPIRIT

**Leslie E. Strawn, 10422 Morningside Ave., Garden Grove, Calif. 92643**

**Filed Aug. 19, 1986, Ser. No. 876,205**

**Int. Cl.[4] A01H** *5/00*

**U.S. Cl. Plt.—7** **1 Claim**

1. A new and distinct variety of miniature rose plant, hardy, dwarf, bushy, upright, rounded, much branched habit, substantially as illustrated and described; characterized by buds and flowers which are in a color hue similar to Puerto Rico (Floribunda — U.S. Plant Pat. No. 3,519) and giving the coloring effect of deep salmon; and resembling Rise and Shine (Miniature — U.S. Plant Pat. No. 4,231) in form and size, having buds and flowers of a distinct and unusual appearance as compared to other miniature rose plants; said flowers being fully double, unique in its exhibition form and further characterized by its vigor, abundance of bloom and foliage and ease of propagation from soft wood cuttings and by budding.

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**6,189**

### MINIATURE ROSE PLANT

**Leslie E. Strawn, 10422 Morningside Dr., Garden Grove, Calif. 92686**

**Filed Jun. 20, 1986, Ser. No. 879,791**

**Int. Cl.[4] A01H** *5/00*

**U.S. Cl. Plt.—8** **1 Claim**

1. A new and distinct variety of miniature rose plant of hardy, dwarf, bushy, upright, rounded, much branched habit substantially as illustrated and described, characterized by buds and flowers which are in a color hue similar to Garden Party (Hybrid tea—U.S. Plant Pat. No. 1,814, expired) giving a coloring effect of creamy white with pale yellow undertones and resembling Cupcake (Miniature—U.S. Plant Pat. No. 4,835) in form and size; having buds and flowers of a distinct and unusual appearance as compared to other miniature rose plants; said flowers being fully double, unique in its ovoid form with high centers and further characterized by its vigor, abundant foliage and ease of propagation from soft wood cuttings and by budding, and with and abundance of flowers.

**6,190**

### APPLE TREE: SANDIDGE VARIETY

**Charles R. Sandidge, Jr., 5618 Entiat River Rd., Entiat, Wash. 98822**

**Filed Apr. 16, 1986, Ser. No. 852,542**

**Int. Cl.[4] A01H** *5/03*

**U.S. Cl. Plt.—35** **1 Claim**

1. A new and distinct variety of apple tree, substantially as shown and described.

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**6,191**

### STRAWBERRY PLANT NAMED 'SWEDE'

**Harold A. Johnson, Jr.; Amado Q. Amorao, and Joseph I. Espejo, Jr., all of Watsonville, Calif., assignors to Driscoll Strawberry Associates Inc., Watsonville, Calif.**

**Filed May 12, 1986, Ser. No. 862,347**

**Int. Cl.[4] A01H** *5/03*

**U.S. Cl. Plt.—48** **1 Claim**

1. The new and distinct variety of strawberry plant herein described and illustrated, and identified by the characteristics enumerated above.

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**6,192**

### BIRCH TREE

**Wallace H. SaBell, Lakewood, Colo., assignor to J. Frank Schmidt & Son Co., Boring, Oreg.**

**Filed Jan. 8, 1985, Ser. No. 689,812**

**Int. Cl.[4] A01H** *5/00*

**U.S. Cl. Plt.—51** **1 Claim**

1. A new and distinct variety of birch tree, substantially as herein shown and described, characterized particularly as to novelty by white bark, a pyramidal shaped crown, strong arching upright branches, resistance to Winter die-back and large foliage.

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**6,193**

### ALSTROEMERIA VARIETY 'STALBEL'

**Jacob van Andel, Aalsmeer, Netherlands, assignor to Von Staaveren B.V., Aalsmeer, Netherlands**

**Filed Jun. 11, 1986, Ser. No. 872,869**

**Int. Cl.[4] A01H** *5/00*

**U.S. Cl. Plt.—68** **1 Claim**

1. A new and distinctive alstroemeria hybrid, substantially as herein shown and described, characterized by its very large blossoms having large and generally ovate white outer petals each of which is marked by a pair of dark streaks at the petal apex and the inner petals being long, elliptic form with the main portion of the petal body being yellow and the tip portions being white with the entire body of the petal being marked with numerous short pencil stripes extending outwardly from the base of the petal to all of its margins.

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# PATENTS

## GRANTED MAY 31, 1988

### ERRATA

| For CLASS | See PATENT NO. |
|---|---|
| 374-149 | 4,747,712 |
| 417-420 | 4,747,744 |
| 431-326 | 4,747,781 |
| 260-513 | 4,747,967 |
| 260-415 | 4,747,969 |
| 261-096 | 4,747,970 |
| 524-013 | 4,748,166 |
| 524-410 | 4,748,167 |
| 524-474 | 4,748,168 |
| 524-500 | 4,748,169 |
| 548-202 | 4,748,243 |
| 313-486 | 4,748,391 |
| 354-145 | 4,748,462 |

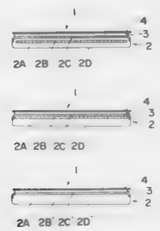
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# PATENTS

GRANTED MAY 31, 1988

## GENERAL AND MECHANICAL

**4,747,162**
**DISPOSABLE PERSPIRATION ABSORBING PAD**
**Fumie Yanagihara, 4-10-16 Kugayama, Suginami-ku, Tokyo, Japan**
**Filed Mar. 31, 1987, Ser. No. 33,337**
**Claims priority, application Japan, Apr. 1, 1986, 61-47057[U]**
**Int. Cl.[4] A41D** *27/12*
**U.S. Cl. 2—53** **10 Claims**



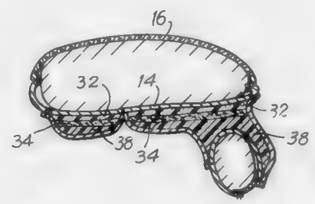

1. A perspiration absorbing pad adapted for attachment to an underarm portion of one's clothes, said pad comprising:
a pad body including at least one layer of cotton or water absorbing paper and a layer of a water absorbing high-molecular material selected from the group consisting of starch-acrylonitrile, polyacrylic acid and starch-acrylic acid in powder or sheet form, said layers being formed into substantially an oval shape such that the ratio between a radius of curvature ($r_1$) forming an outer peripheral edge on one side of said oval shape and a radius of curvature ($r_2$) forming the opposing outer peripheral edge is

$$r_2 \geqq 1.5r_1$$

and such that a whole exterior surface of said pad body is covered by a nonwoven fabric or water absorbing paper having a waterproof film formed on one surface thereof adapted for contact with said clothes; and
adhesive means arranged on at least one portion of an outer surface of said pad body adapted for contact with said clothes.

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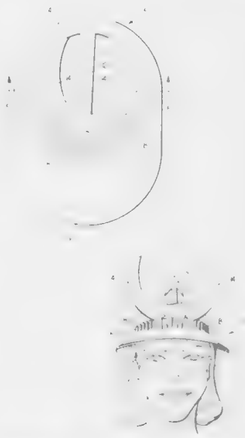
**4,747,163**
**CYCLIST GLOVES**
**Mark A. Dzierson, 209 S. William St., Johnstown, N.Y. 12095**
**Filed Mar. 26, 1987, Ser. No. 31,244**
**Int. Cl.[4] A41D** *19/00*
**U.S. Cl. 2—161 A** **7 Claims**




1. A cyclist glove comprising a flexible shell including a palm side, an outside, glove fingers, and a glove thumb, said palm side of said shell having permanently secured thereto a layer of resilient padding extending from the heel of said palm side toward said glove fingers and across the crotch between the glove index finger and said glove thumb, said resilient padding layer comprising an elastomeric layer, an external layer, and a fibrous batting layer disposed between said elastomeric layer and said external layer.

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**4,747,164**
**HAT AND METHOD FOR MAKING A HAT**
**Robert W. Foulke, Dana Point, Calif., assignor to Packaging Industries Group, Inc., Hyannis, Mass.**
**Filed May 8, 1987, Ser. No. 47,300**
**Int. Cl.[4] A42B** *1/20*
**U.S. Cl. 2—171** **16 Claims**



1. A hat comprising:
a brim portion defining an outer perimeter of the hat,
an open crown portion defining an inner perimeter of the brim portion, and
a plurality of head-conforming adjacent slits in a head-adjacent edge of the brim portion extending toward the outer perimeter of the hat,
wherein at least one portion between said head-conforming adjacent slits extends from the head-adjacent edge of the brim portion forming a decorative portion which stands up when the hat is worn by a user.

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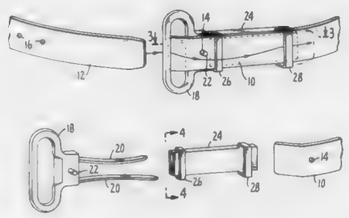
**4,747,165**
**BELT AND BUCKLE**
**Karl A. Limbach, 49 Bellevue, Belvedere, Calif. 94920**
**Filed Sep. 2, 1986, Ser. No. 903,037**
**Int. Cl.[4] A41F** *9/00*
**U.S. Cl. 2—322** **3 Claims**

1. A belt having a buckle end with at lest one hole and free end with a series of holes by which the belt can be buckled at a series of different lengths,
a body member slidably received on the buckle end of the belt and adapted to be slid off and on the belt,
a tool slidably received in the body member, and
a pin rigidly attached to the tool and extending through the hole in the buckle end of the belt and adapted to engage the holes of the series of holes in the free end of the belt with the pin removable from the hole in the buckle end of the belt to permit removal of the tool from the belt and from the body member
in which the tool is a two spring cork puller with the springs

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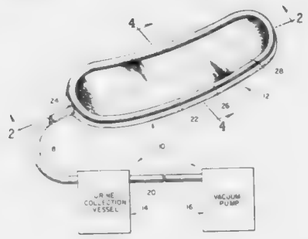
thereof slidably received in the body member generally parallel to the length of the belt, and the pin is rigidly

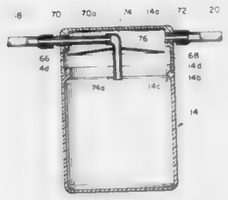


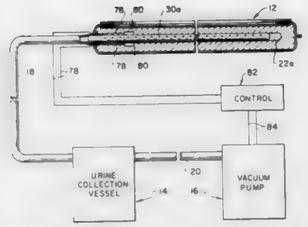
mounted in the cork puller generally perpendicular to the length of the belt.

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**4,747,166**
**FLUID ASPIRATION SYSTEM FOR THE MANAGEMENT OF URINARY INCONTINENCE**
**David H. Kuntz, 11810 Bel Terrace, Los Angeles, Calif. 90049**
**Filed May 15, 1987, Ser. No. 50,048**
**Int. Cl.[4] A47K** *11/00*
**U.S. Cl. 4—144.1** **15 Claims**







**1.** A system for the receiving and disposing of human urine excreted from an incontinent patient comprising:

(a) an absorptive pad adapted to be placed adjacent the urinary opening of an incontinent patient, said pad having an inner core of urine-absorptive material, an upper pad facing layer of liquid-permeable hydrophobic material in contact with said patient in the area of said opening, and a lower pad backing layer of impermeable material, and said pad enclosing a flexible perforated tube extending over the length of said pad and having a fluid outlet connector means at one end thereof adjacent an edge of said pad;

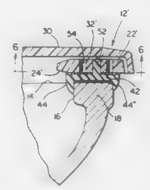
(b) a vacuum source;

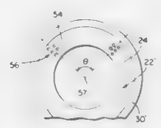
(c) a urine collection vessel; and

(d) vacuum tubing coupling said flexible perforated tube within said pad to said collection vessel and coupling said collection vessel to said vacuum source whereby urine from said patient entering said absorptive pad through said facing layer is drawn through said absorptive pad to said perforated tube and to said collection vessel.

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**4,747,167**
**NON-SHIFTABLE TOILET SEAT ASSEMBLY**
**Harold D. Adams, P.O. Box 5546, Greenville, Miss. 38701**
**Filed Dec. 23, 1986, Ser. No. 945,503**
**Int. Cl.[4] A47K** *13/00, 17/00*
**U.S. Cl. 4—234** **9 Claims**





**1.** For use with a toilet bowl having a load supporting surface defining an opening, a toilet seat component having another load supporting surface and hinge means mounting the component on the toilet bowl for pivotal displacement to a lowered position in substantial alignment with said opening, a plurality of bumpers adapted to be seated on at least one of the load supporting surfaces, means for removably retaining the bumpers seated on said one of the load supporting surfaces in adjusted positions, the toilet seat component being displaceable to the lowered position thereof into engagement with the bumpers in said adjusted positions thereof, and means for attaching the bumpers to the toilet seat component in response to said engagement of the bumpers while in the adjusted positions seated on said one of the load supporting surfaces.

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**4,747,168**
**POOL RECOVERY APPARATUS**
**Peter Sing, 168-10 84th Ave., Jamaica Hill, N.Y. 11432**
**Filed Jul. 8, 1986, Ser. No. 883,381**
**Int. Cl.[4] E04H** *3/19*
**U.S. Cl. 4—504** **7 Claims**

**1.** Pool recovery apparatus for automatically lifting a person or an object from the water in a swimming pool, which comprises:

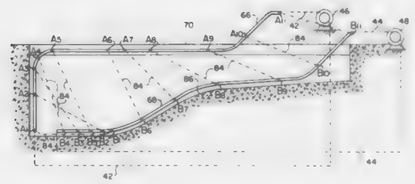
a swimming pool with its bottom having a deep horizontally disposed portion at one end, a shallow horizontally disposed portion at its opposite end and a sloping center portion therebetween;

a flexible net, substantially rectangular in shape and dimensioned to cover generally said deep-end portion of said swimming pool bottom and normally to be positioned



thereon, said net extending laterally from said wall to side wall of said pool and extending longitudinally from the end wall of said deep-end portion of said pool bottom to the point where said sloping center portion of said pool bottom starts upwardly and the pool depth begins to diminish;

automatic lifting means for raising said net from said deep-end portion of said pool bottom angularly through and out of the water to a position above and proximate said shallow end portion of said pool, thus accomplishing the desired recovery, said automatic lifting means comprising spaced parallel upper and lower tubular guide tracks, said tracks being located adjacent to, and extending along, the side walls of said multiple level swimming pool, said swimming pool extending from a deep depth to a shallow depth between said corresponding side walls, each of said



upper and lower tubular tracks being provided with a guide, each of said guides being connected to one corner of said net, each of said parallel upper tracks being contoured to follow along each upper side edge of said pool, downwardly adjacent and along said deep-end end wall and upwardly above said opposite shallow end of said pool, so that said guides, when pulled by said automatic lifting means, follow said guide tracks and slidably carry said corners of the deep-end edge of said net, held by said guides in said upper tracks, upwardly, then horizontally and finally upwardly above said shallow end of said pool;

means for producing a signal to cause said automatic lifting means to move said net through, above and from the water in said swimming pool; and

means for energizing said automatic lifting means in response to said signal.

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**4,747,169**
**PORTABLE SINK WITH PRESSURIZED WATER SUPPLY**
**Rene F. Valbuena, 23235 Sky Dr., El Toro, Calif. 92630**
**Filed Jul. 28, 1986, Ser. No. 889,770**
**Int. Cl.[4] A47K** *1/00*
**U.S. Cl. 4—625** **9 Claims**

**1.** A portable sink comprising,

an assembly of components, the components including,

a main case having a bottom element, surrounding side walls and an open top,

an inside case having a bottom element, surrounding wall elements and an open top,

a sink bowl unit,

the inside case and the sink bowl unit being removably mounted in the main case, in side-by-side relation,

gas pressure means in the main case, and conduit means leading from the gas pressure means to the interior of the inside case and including valve means normally closing the conduit means to the inside case,

a supply tank removably mounted in the inside case, and including means responsive to the insertion of the supply tank in the inside case for opening said valve means and conducting compressed gas from the conduit means to the interior of the supply tank,

the inside case including spacing means for forming a bottom space between the supply tank and the bottom element of the main case,

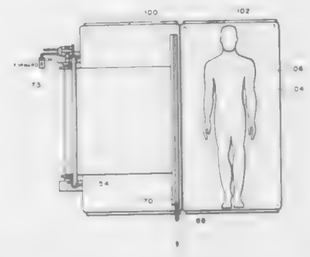


said valve means being positioned in the bottom of the inside case and extending upwardly thereinto, and

the valve opening means being mounted in the bottom of the supply tank, and the supply tank including a vertical air pipe therein leading from the valve opening means to a position adjacent the top of the supply tank.

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**4,747,170**
**PATIENT MOVER**
**Bobby W. Knouse, 1253 Seacliff #7, Ventura, Calif. 93003**
**Filed Aug. 15, 1986, Ser. No. 897,125**
**Int. Cl.[4] A61G** *7/10*
**U.S. Cl. 5—81 B** **9 Claims**



**1.** An apparatus for moving a patient from one horizontal supporting surface to another horizontal supporting surface comprising: a support structure comprising a floor stand with rolling means, an upright frame comprised of a pair of vertical standards that rotatably support an elongated roller, a web, adapted to be wound on said roller, having a first edge connected to the roller, and a sheet gripping means connected to a second edge of the web that is parallel to said first edge of the web, said sheet gripping means comprising two parallel, hollow slotted tubes having a length of at least two and one-half feet, one of said tubes having a cylindrical bore communicating with one of said slots, and an elongated rod that has a polygonal cross section and is adapted to securely and frictionally hold an edge of a patient supporting bed sheet in one of said slotted tubes when the elongated rod is inserted in said slotted tube, whereby upon the rotation of the roller, the web can pull a patient lying on said patient supporting bed sheet from one

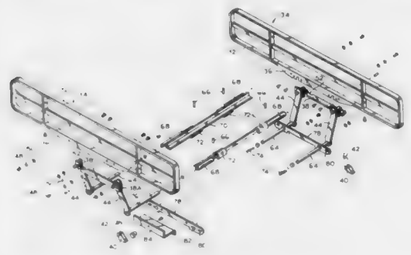
VOL 1090 ISS 5 MY 31 1988 UMI



horizontal supporting surface to another horizontal supporting surface.

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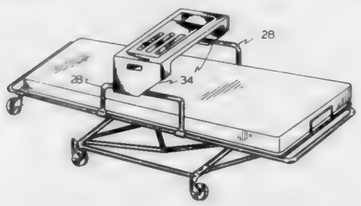
4,747,171
**HOSPITAL BED RAIL ASSEMBLY**
**Philip Einsele, Charlotte, and Robert B. Sanchez, Matthews, both of N.C., assignors to Simmons Healthcare, Inc., Charlotte, N.C.**
**Filed Aug. 12, 1986, Ser. No. 895,767**
**Int. Cl.[4] A47C *21/08***
**U.S. Cl. 5—425** **18 Claims**



1. A hospital bed comprising:
a bed frame;
first and second substantially parallel slide tubes mounted to said bed frame and extending laterally with respect thereto;
first and second mounting shafts slidably positioned, respectively, within said first and second slide tubes and rotatable therein;
first and second pivot arms secured, respectively, to said first and second mounting shafts;
a safety rail mounted to said first and second pivot arms;
abutment means mounted to at least one of said first and second mounting shafts and rotatable therewith; and
stop means mounted to said bed frame for abutting said abutment means when said abutment means is in a first rotational position, but allowing said abutment means to move thereby when said abutment means is in a second rotational position as said mounting shafts slide within said slide tubes.

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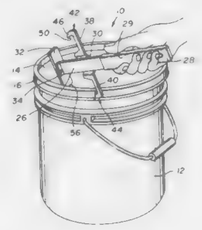
4,747,172
**MEDICAL DEVICE TRANSPORTER**
**Larry Hohol, Hunlock Creek, Pa.; Donald D. deVries, Jr., Balboa Island, Calif., and Howard Konishi, Woodinville, Wash., assignors to Penox Technologies, Inc., Pittston, Pa.**
**Filed Nov. 2, 1984, Ser. No. 667,889**
**Int. Cl.[4] A47B *23/02*; A47C *21/00***
**U.S. Cl. 5—507** **11 Claims**



1. A unitary bridge apparatus for holding patient instrumentation on a stretcher comprising:
means for mounting said instrumentation on said apparatus;
means for mounting equipment monitoring displays on said apparatus;
means for storing probes for said instrumentation on said apparatus; and
resilient downwardly dependent legs having:
recesses therein adapted for mounting said apparatus on the side bars of a stretcher in a snap action for securing said apparatus to said stretcher; and
angled surfaces adapted for permitting said apparatus to rest in a stable, tilted position on a horizontal surface.

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4,747,173
**CONTAINER OPENING TOOL**
**Fernand Marceau, R.R. 1, Box 160, Wheatfield, Ind. 46392**
**Filed Apr. 13, 1987, Ser. No. 37,326**
**Int. Cl.[4] B67B *7/44***
**U.S. Cl. 7—156** **3 Claims**



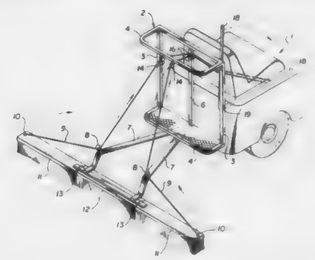
1. A tool for use in opening and/or reopening a bulk container of the type having a plastic lid which is mounted to the container by means of an annular rim having a lip that engages an annular rib on the container, the tool comprising: an elongate flat member having a distal end and a proximal end, said proximal end forming a handle; a flat base member at the distal end of said elongated member mounted thereto to be in a plane perpendicular to that of said handleforming flat member and to project outward therefrom by a predetermined distance above and below said handle-forming member; and a first and second flat hook structure members projecting one above and one below said handle-forming member at a position spaced a predetermined distance from said handle-forming member, said first and second hook structure members each having an outwardly disposed end portion, each end portion terminating in a hook shaped structure including an arm extending toward said base member, one arm on a side facing said handle-forming member having an arcuate pry-bar configuration and said other arm on a side facing said handle-forming member having a cutting edge, said hook structure members and said base member being so sized and arranged that the base member may be placed on the top of the plastic lid of the bulk container and one hook structure member hooked under the annular rim of the lid for alternatively prying it upward or slicing it upward by pivoting the handle upward, and the opposite action achieved by inverting the tool and doing the same with it.

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4,747,174
**GROOMING ATTACHMENT FOR RECONDITIONING THE PLAYING SURFACE OF A TENNIS COURT**
**James H. Hightower, 172 N.E. Surfside Ave., Port St. Lucie, Fla. 33452**
**Filed Jul. 27, 1987, Ser. No. 78,057**
**Int. Cl.[4] E01H *1/02***
**U.S. Cl. 15—78** **3 Claims**

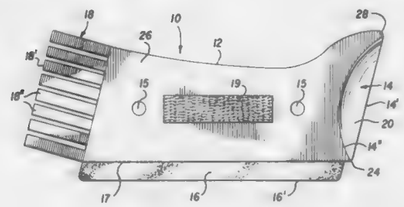
1. A grooming attachment employed in the regrooming of the playing surface area of a tennis court comprising a motorized vehicle for pulling the attachment over the said area, a pair of uprights and cross bars mounted rearwardly of the said vehicle, a central upright bar extending between said upright and cross bars, a draw bar secured to said vehicle, pulleys secured to said draw bar, pulleys mounted on said upright and cross members, cables extending through all of the aforesaid pulleys and one end thereof secured to an operating handle, the opposite end of said cables secured to anchors provided on each of a pair of pivoted brushes whereby upon actuation of the said handle, the said brushes may be elevated to an upright vertical inoperative position from a substantially horizontal operative position to thus enable the towing vehicle and attachment secured thereto to be driven on to and from the playing area of a tennis court.





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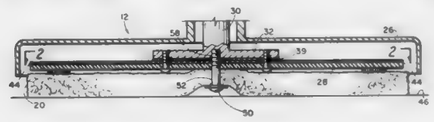
4,747,175
**FROST AND ICE SCRAPER**
**Robert D. Durgin, 13821 Artic Ave., Rockville, Md. 20853**
**Filed Jul. 16, 1987, Ser. No. 74,026**
**Int. Cl.[4] A47L *1/08***
**U.S. Cl. 15—105** **9 Claims**



1. An apparatus for scraping ice, snow, and frost from the windows of automobiles comprising:
a one-piece body having a hand gripping edge along one side,
a fixed frost scraping edge at one end of said body, displaceable frost and ice scraping means at an opposite end of said body,
liquid removal means on an edge of said body opposite said hand gripping edge,
and means on said body to permit fixed storage of said apparatus.

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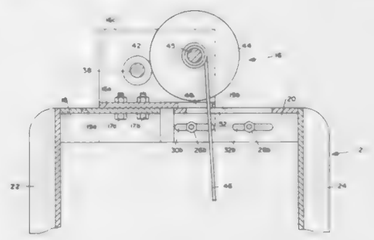
4,747,176
**PADHOLDER FOR FLOOR POLISHER**
**Eugene R. Parks, Tulsa, Okla., assignor to Daisy Janitorial Service, Inc., Tulsa, Okla.**
**Filed Jun. 1, 1987, Ser. No. 56,959**
**Int. Cl.[4] A47L *11/164***
**U.S. Cl. 15—230.16** **3 Claims**



1. A novel padholder for a floor polishing or burnishing apparatus having a rotating drive shaft and a circular pad to polish or burnish a floor which comprises: a plurality of planar, resilient arms radiating from a center point; spring means for each arm, each spring means extending from said center point along said arm in order to urge said arm toward said floor; means to detachably connect said circular pad to said padholder; and means to connect said rotating drive shaft to said padholder at said center point.

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4,747,177
**CHIMNEY SWEEP SYSTEM**
**Lowell Drechsel, Erhard, Minn., assignor to Delayne Drechsel; Randy Drechsel and William Lacey Pensley, all of Minneapolis, Minn., a part interest to each**
**Filed Jul. 25, 1986, Ser. No. 889,175**
**Int. Cl.[4] F23J *3/00***
**U.S. Cl. 15—243** **1 Claim**



1. A chimney sweep system comprising:
a. a chimney support assembly including two right angle vertical arms, two horizontal channeled support arms, two vertical right angle flanges extending downwardly from the lower inner sides of the vertical support arms, two side plates fitted over opposite outer sides of the horizontal channeled support arms, and a slotted hole through one horizontal support arm through which passes a suspension chain;
b. a winch including a horizontal assembly plate, two vertical top assembly plates connected perpendicularly to the horizontal assembly plate, a slotted hole in the horizontal assembly plate allowing downward passage of the suspension cable, a drive shaft which rotates by a handle or other suitable power drive mechanism, a smaller drive shaft gear meshing with a larger winch gear mounted on a shaft drum thereby providing a mechanical ratio for winding and unwinding the suspension cable;
c. upper and lower solid scrapers each including four upwardly concaved edges, two rectangular void areas defined by two outer segmented bars and by two center members, two curved adjustment member supports fastened to the lower sides of the segmented bars, and a support bar positioned perpendicular to a flexing parallelogram for attachment to said parallelogram;
d. a flexing parallelogram including two horizontal arms connected by swivel bushings on each end to two vertical arms, a limit chain attached to the vertical arms, and a weight cable with a weight attached thereto connected to one vertical arm, said weight cable extending through one void area of the lower scraper; and,
e. a collection bag with its four corners attached to corresponding corners of the lower scraper, said collection bag including elastic extending through and along its uppermost perimeter.

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**4,747,178**

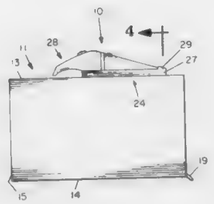
## FIREPLACE CLEANING DEVICE

**Kenneth P. Breitbach, 1526 W. 13th, Port Angeles, Wash. 98362**

**Continuation-in-part of Ser. No. 773,180, Sep. 6, 1985, abandoned. This application Jun. 1, 1987, Ser. No. 56,718**

**Int. Cl.[4] A47L** *7/00*

**U.S. Cl. 15—339** **10 Claims**



1. A cleaning receptacle for removing ashes off of a fireplace hearth in combination with a portable vacuum device mounted thereon, which comprises:

a container for receiving ashes having spaced side panels, a top and bottom panel, a rear end panel and a front end open at the bottom portion with a partial front panel closing the top portion,

a small first opening extending through the top panel adjacent to the front end,

an inner horizontal panel connected at the outer end edge to the bottom lateral edge of the partial panel, and an inner end extending rearwardly between said top panel and the bottom panel,

a holding member mounted on said top panel with a bottom second opening disposed over the first opening, the holding member being adapted to support a portable vacuum device having a vacuum intake opening in registry with said first opening and the second opening in communication with the container interior, and

means for removing the ashes from a fireplace with said container adapted to engage a mound of ashes for depositing therein and, in cooperation with the vacuum of the vacuum device, suppress a substantial amount of dust arising therewith.

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**4,747,179**

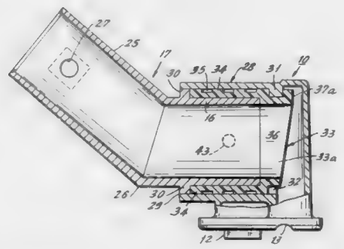
## NOZZLE WITH IMPROVED COUPLING FOR A VACUUM DEVICE

**Robert C. Berfield, Jersey Shore, Pa., assignor to Shop-Vac Corporation, Williamsport, Pa.**

**Filed May 29, 1987, Ser. No. 55,689**

**Int. Cl.[4] A47L** *9/02*

**U.S. Cl. 15—415 R** **8 Claims**



1. A nozzle assembly for a vacuum device comprising:

a nozzle having a first end communicating outside the nozzle and having a second end defining a first opening of generally cylindrical shape and having an interior; a first ring portion on the nozzle interior, in the first opening;

a hollow coupling having a hollow coupling arm of generally cylindrical shape for insertion into the first opening and having an exterior opposed to the interior of the first opening, whereby the exterior of the coupling arm and the interior of the first opening define an interface region between them;

a nonmetallic sleeve encasing the coupling arm received within the first opening, contacting the interior of the nozzle, and forming a bearing between the coupling arm and the first opening;

a second complementary ring portion on the sleeve, the first and second ring portions being shaped such that with the nozzle and the coupling arm at one respective rotative orientation, the first and second ring portions pass by one another for permitting insertion and removal of the coupling arm in the first opening, and at a second rotative orientation, the ring portions engage for prohibiting the bypassage and thereby locking the nozzle and the coupling together.

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**4,747,180**

## CASTOR INCORPORATING A BRAKING MECHANISM

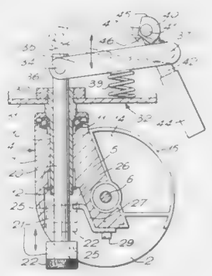
**Stafford T. Screen, Stourbridge, England, assignor to Colson Castors (U.K.), West Bromwich, United Kingdom**

**Filed Jun. 16, 1986, Ser. No. 874,952**

**Claims priority, application United Kingdom, Jun. 17, 1985, 8515266**

**Int. Cl.[4] B60B** *33/02*

**U.S. Cl. 16—35 R** **14 Claims**



1. A castor comprising:

mounting means for said castor,

a body carried by said mounting means for rotation about an upright swivel axis,

wheel means mounted on said body for rotation about a wheel axis spaced from said swivel axis,

an elongate brake element axially slidable along said swivel axis between an inoperative position in which the lower end of said brake element is above a support surface on which said wheel means rests and a braking position in which said lower end brakingly engages said support surface,

an elongate resilient operating element carried by said mounting means and having a movable end engaged with said brake element at the upper end thereof, and

control means selectively operable to act on said operating element to effect movement of said movable end thereof to thereby move said brake element between said positions thereof wherein said control means slidably engages said operating element between the ends thereof, the end of said operating element remote from said movable end and remote from the swivel axis being fixed to said mounting means.



**4,747,181**

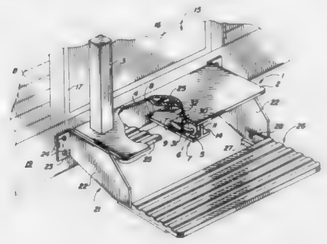
## DOOR RETAINER

**Charles L. Davis, 1506 S. Lake Harris Rd., White Oak, Tex. 75693**

**Filed Jun. 18, 1987, Ser. No. 63,452**

**Int. Cl.[4] E05F** *5/00*

**U.S. Cl. 16—82** **15 Claims**



1. A door retainer for mounting on a door step and blocking the door of a recreational vehicle, comprising a step plate adapted to fit on the door step; door stop means fixedly carried by said step plate in close proximity to the door; a rear plate downwardly extending from said step plate in fixed relationship, said rear plate engaging an edge of the door step; and keeper means extending beneath the door step, said keeper means releasably connected to both said step plate and said rear plate for securing said step plate on the door step and preventing the door from opening past a predetermined point.

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**4,747,182**

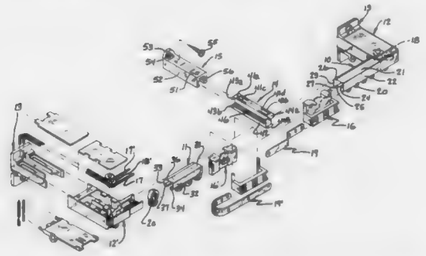
## DRAPERY TRAVERSE ROD AND SUPPORT BRACKET

**Ronald G. Darner, Fort Atkinson, Wis., assignor to Graber Industries, Inc., Madison, Wis.**

**Filed Dec. 16, 1986, Ser. No. 943,377**

**Int. Cl.[4] A47H** *15/00*

**U.S. Cl. 16—87.4 R** **12 Claims**



1. A drapery traverse rod and support therefor comprising, telescopically adjustable inner and outer hollow rods each having a trackway extending lengthwise thereof and means defining a generally dovetail shaped mounting rail along a rear side of the inner and outer rods, wherein the inner rod rail has a different shape from the outer rod rail, an elongated rod engaging bracket having a pair of outer rod engaging jaws at one end adapted to engage the mounting rail on the outer rod and a pair of inner rod engaging jaws at the other end adapted to engage the mounting rail on the inner rod, wherein the inner rod engaging jaws have a different shape from the outer rod enaging jaws a mounting bracket having forward and rear ends and means at the rear end thereof adapted for attachment to a mounting surface, and means for selectively and reversibly mounting the rod engaging bracket on the mounting bracket with either said pair of outer rod engaging jaws or said pair of inner rod engaging jaws of said rod engaging bracket disposed forwardly of the forward end of the mounting bracket.

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**4,747,183**

## TEMPLE BIASING EYEGLASS SPRING HINGE

**Günther Drlik, Pforzheim, Fed. Rep. of Germany, assignor to OBE-Werk Ohnmacht & Baumgartner GmbH & Co. KG, Ispringen, Fed. Rep. of Germany**

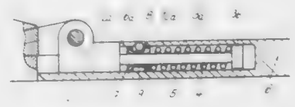
**Continuation of Ser. No. 701,733, Feb. 14, 1985, abandoned. This application Dec. 29, 1986, Ser. No. 945,229**

**Claims priority, application Fed. Rep. of Germany, Jun. 30, 1984, 3424263**

**The portion of the term of this patent subsequent to Jul. 24, 2001, has been disclaimed.**

**Int. Cl.[4] G02C** *5/22*

**U.S. Cl. 16—228** **7 Claims**



1. In a spring hinge for eyeglasses, comprising:

a rim-side hinge member comprising rim-side bearing eye means,

a bow-side hinge member comprising bow-side bearing eye means pivotally connected to said rim-side bearing eye means,

a receptacle,

a plunger rod connected to said bow-side hinge member and extending into said receptacle,

a plunger head mounted on said plunger rod slidably mounted in said receptacle,

a compression spring slidably mounted on said plunger rod and bearing at one end on said plunger head, and

a stop contained in and axially fixed to said receptacle and engaging the other end of said spring, which is under initial stress,

the improvement comprising:

said receptacle is constituted by an end portion of a bow, said end portion is formed with an axial blind bore occupying a substantial portion of said end portion inner space and defining the walls of said receptacle, said walls constitute walls of said end portion of the bow, said walls being thin or narrow relative to the width of the bow,

said stop is constituted by a separate stop member, which is slidably mounted on said plunger rod and positively connected to said receptacle,

said walls being formed on one side with an open-ended longitudinal slot,

said bow-side hinge member having a key portion slidably positioned in said slot, and

quick release locking means are provided which positively connect said stop member to said receptacle under the action of said spring, said stop member being provided with an annular recess, said receptacle having one open end facing said bow-side hinge member, and said receptacle being adapted to receive said plunger head and said stop member through said one open end, whereby said spring hinge can be assembled or taken apart by access to only said one open end of said receptacle.

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**4,747,184**

## ANIMAL STUNNING EQUIPMENT

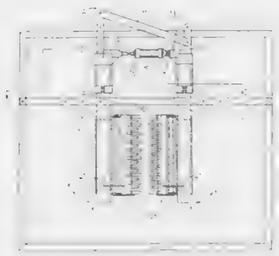
**Ronald M. Winsloe, Invercargill, New Zealand, assignor to Alliance Freezing Company (Southland) Limited, Ocean Beach, New Zealand**

**Filed Nov. 24, 1986, Ser. No. 934,455**

**Claims priority, application New Zealand, Nov. 25, 1986, 214315**

**Int. Cl.[4] A22B *3/06***

**U.S. Cl. 17—1 E** **6 Claims**



1. Automatic stunning apparatus comprising:

two sets of electrodes arranged as a pair,

a frame in which said sets of electrodes are movably mounted,

means for moving said sets of electrodes relative to said frame, between a stunning position and a withdrawn position,

transport means capable of transporting an animal towards said frame and through said frame along a line of approach,

said sets of electrodes each including an elongate array of electrically conductive contact elements, which when said sets of electrodes are at rest at said stunning position is oriented with the long axis of said elongate array extending substantially vertically and substantially parallel to the long axis of the other said elongate array,

said elongate arrays of electrically conductive contact elements being arranged on opposite sides of said line of approach when said sets of electrodes are at rest at said stunning position, with said electrically conductive contact elements projecting transversely across said line of approach, forming an electrifiable barrier extending substantially completely across said line of approach, with which an animal transported by said transport means along said line of approach will in normal use make frontal face contact,

wherein said means for moving said sets of electrodes relative to said frame can move said sets of electrodes substantially transversely relative to said line of approach away from each other to said withdrawn position, such that when said sets of electrodes are at rest at said withdrawn position, a gap is provided between said sets of electrodes, through which said transport means can move an animal without said animal contacting said electrically conductive contact elements.

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**4,747,185**

## ELECTRICAL APPARATUS FOR THE ELECTROCUTION OF CATTLE

**Fred E. Thacker, 91113 Sunderman Rd., Springfield, Oreg. 97477**

**Filed Jan. 12, 1987, Ser. No. 2,372**

**Int. Cl.[4] A22B *3/06***

**U.S. Cl. 17—1 E** **8 Claims**

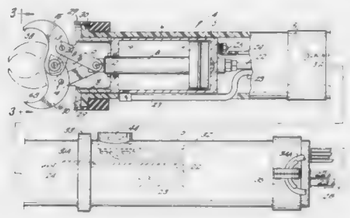
1. A handheld tool for administering electrical current to an animal for electrocution of the animal, said tool comprising in combination,

an elongate body adapted for gripping adjacent one end,

pivot means carried at the remaining end of said body,

conductive jaws having pivoted ends supported by said pivot means carried by said elongate body and distal ends for penetration of the animal hide and into forceful contact with a skeletal portion of the animal, said jaws adapted to receive an electrical charge,

a pressure responsive cylinder with a piston rod housed within said elongate body,



linkage comprising links coupling said piston rod to said jaws at points intermediate the pivoted and distal ends of each jaw and imparting opening and closing movement to the jaws about said pivot means, and

switch means on said elongate body for controlling current flow to said jaws.

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**4,747,186**

## METHOD FOR STUFFING SAUSAGES

**Robert V. Spike, 21 Woonona Avenue, Wahroonga, New South Wales, Australia (2067)**

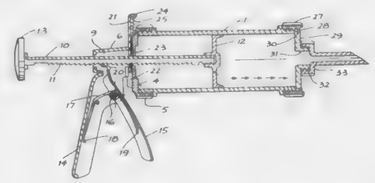
**PCT No. PCT/AU85/00193, § 371 Date Apr. 10, 1986, § 102(e) Date Apr. 10, 1986, PCT Pub. No. WO86/01374, PCT Pub. Date Mar. 13, 1986**

**PCT Filed Aug. 19, 1985, Ser. No. 863,258**

**Claims priority, application Australia, Aug. 28, 1984, PG6807**

**Int. Cl.[4] A22C *11/04***

**U.S. Cl. 17—49** **4 Claims**



1. A method of stuffing a sausage casing which comprises the steps of:

loading a sausage mix into the cylinder of a stuffing horn having at one end thereof a nozzle of sufficient length to accommodate a substantial length of axially compressed sausage casing, which nozzle communicates with the exterior of the cylinder, the stuffing horn being of a size and weight such that it may readily be held in one hand by a person using it, the cylinder having piston means therein actuable to force the sausage mix towards said one cylinder end and out of said nozzle, the horn having actuating means operable without the use of the other hand of the person for actuating said piston means;

positioning an empty, axially compressed sausage casing on said nozzle with the other hand and holding it by finger pressure;

operating said actuating means to force the sausage mix toward said nozzle, so that it is extruded from said nozzle to fill said casing and remove the casing from the nozzle; and

dividing said filled casing into lengths to form a sausage.



**4,747,187**

## METHOD AND APPARATUS FOR OPENING SERIALLY POSITIONED FIBER BALES

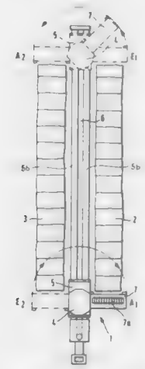
**Ferdinand Leifeld, Kempen, Fed. Rep. of Germany, assignor to Trützschler GmbH & Co. KG, Monchen-Gladbach, Fed. Rep. of Germany**

**Filed Dec. 19, 1986, Ser. No. 943,936**

**Claims priority, application Fed. Rep. of Germany, Dec. 21, 1985, 3545686**

**Int. Cl.[4] D01G *7/06***

**U.S. Cl. 19—80 R** **5 Claims**



1. In a bale opener including a carriage arranged for floor travel along a travelling path; a tower mounted on the carriage for travel therewith as a unit and for rotation relative to the carriage about a vertical axis through 180° at ends of the travelling path; an opening device mounted on the tower and projecting laterally therefrom; said opening device including a generally horizontally supported opening roller arranged for rotation and for travel above serially positioned fiber bales for removing fiber tufts from top faces of the fiber bales; and drive means for rotating said tower through 180° ; the improvement wherein said drive means includes an rpm-controllable electric motor and a control means operatively connected with said electric motor for setting predetermined rpm's therefore.

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**4,747,188**

## WEB-LAYING

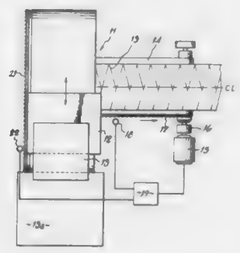
**Roy Cooper, Bolton, and Barrie Sedgely, Sandbach, both of England, assignors to Cosmopolitan Textile Company Limited, Cheshire, England**

**Filed Jan. 2, 1987, Ser. No. 105**

**Claims priority, application United Kingdom, Jan. 15, 1986, 8600901**

**Int. Cl.[4] D01H *5/38***

**U.S. Cl. 19—300** **9 Claims**



1. A control system for a web-laying machine having reciprocating carriage means laying a web in folds on travelling conveyor means, comprising variable speed drive means driving one of said carriage and conveyor means, conveyor measuring means measuring the travel of said conveyor means between reversals of direction of said carriage means, and control means controlling said drive means in accordance with the measured travel.

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**4,747,189**

## SWIVEL-HEAD BUTTON

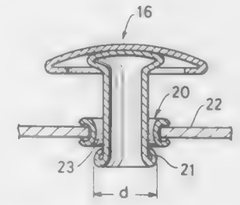
**Yoshihiko Hasegawa, Kawasaki, Japan, assignor to Scovill Japan Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 22, 1987, Ser. No. 41,173**

**Claims priority, application Japan, Jul. 29, 1986, 61-115301[U]**

**Int. Cl.[4] A44B *1/18***

**U.S. Cl. 24—90 R** **4 Claims**




1. A swivel-head button comprising a button member with a cylindrical member upstanding from a flange and an attaching member with an opening in the center in which said cylindrical member is received, the bottom end of said cylindrical member being provided with a fulcrum part for swivelling head movement having an outer diameter larger than the opening of said attaching member.

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**4,747,190**

## APPARATUS FOR INFLATING A LENGTH OF TUBULAR MATERIAL

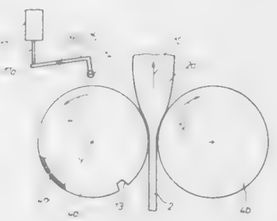
**Werner Koch, Wald-Michelbach, Fed. Rep. of Germany, assignor to Bruckner Apparatebau GmbH, Erbach/Odenwald, Fed. Rep. of Germany**

**Filed Jan. 9, 1987, Ser. No. 2,240**

**Claims priority, application Fed. Rep. of Germany, Jan. 10, 1986, 3600558**

**Int. Cl.[4] D06C *3/00*; D06B *5/08***

**U.S. Cl. 26—74** **3 Claims**



1. Apparatus for inflating a continously moving length of tubular material (2) with a gaseous medium, containing

(a) a nozzle tube (4*a*) which is arranged at right angles to the length of material (2), is in contact with the length of material and has at least one nozzle (4*a'*) for discharging the gaseous medium into the tubular material

(b) an arrangement for controlling the discharge of the gaseous medium from the nozzle (4*a'*), characterised by the following features:

(c) the nozzle tube (4*a*) is arranged so as to be rotatable,

(d) an arrangement (13, 14) is provided which locks the

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nozzle tube (4a) in an angular position in which the nozzle (4a') is in contact with the length of material (2) during the discharge of the gaseous medium from the nozzle (4a'),

(e) the nozzle tube (4a) is mounted so as to be freely rotatable and to be entrained by the moving material (2) when the nozzle tube is not locked.

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**4,747,191**

## PROCESS FOR MANUFACTURING A SABOT ARRANGEMENT FOR A SUB-CALIBER FIN-STABILIZED PROJECTILE FOR A LARGE CALIBER WEAPON

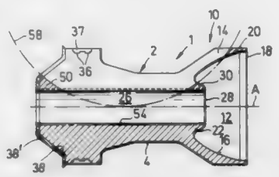
**Patrick Montier; Pierre A. Moreau, both of Bourges; Jean-Claude Sauvestre, St. Doulchard, all of France; Walter Simon, Herzogenrath; Bernhard Bisping, Ratingen; Peter Wallow, Duesseldorf, and Klaus Gersbach, Willich, all of Fed. Rep. of Germany, assignors to Rheinmetall GmbH, Duesseldorf, Fed. Rep. of Germany and L'Etat Francais represente par le Delegue General pour l'Armement, Paris, France**

**Continuation-in-part of Ser. No. 733,965, May 14, 1985, Pat. No. 4,702,172, which is a continuation-in-part of Ser. No. 642,713, Aug. 20, 1984, abandoned, which is a division of Ser. No. 299,099, Sep. 3, 1981, abandoned. This application Sep. 16, 1985, Ser. No. 776,388**

**Claims priority, application Fed. Rep. of Germany, Sep. 3, 1980, 3033041**

**Int. Cl.⁴ F42B** *13/16*

**U.S. Cl. 29—1.23** **3 Claims**



1. An improved process for producing a segmented sabot for a subcaliber projectile, said sabot defines a plurality of radial slots and coaxially surrounds said projectile, a corresponding plurality of stamped sheet metal blanks, each blank is disposed in one of said slots so as to form at least a portion of the inner contour of said sabot, first form-locking means on said sabot and second form-locking means on said subcaliber projectile interacting with said first form-locking means for detachably mounting said sabot on said subcaliber projectile, the improvement comprising

(a) cutting a plurality equiangularly disposed radial slots;

(b) joining the sheet metal blanks to each other at a portion of their inner contours via a hardened solidified filling material of lower density than said sheet metal blanks by filling said slots with said material;

(c) each sheet blank has a first inner surface forming at least a portion of said form-locking means, said first inner surface being spaced from the axis of the sub-caliber projectile a distance correspanding substantially to the radius of the sub-caliber projectile, said sheet metal parts being disposed in said radial slots being equiangularly spaced from each other;

(d) at least two adjoining sheet metal blanks being disposed in an axial plane of the sub-caliber projectile and form at their rear a surface which receives a push that is transmitted to the adjoining portion of the sabot;

(e) filling those portions of each radial slot which are not occupied by a corresponding metal blank with said hardenable solidified filler material; and

(f) providing means for bridging over the push receiving surface which means rupture no later than immediately after the projectile has exited from a gun barrel.

**4,747,192**

## METHOD OF MANUFACTURING AN ULTRASONIC TRANSDUCER

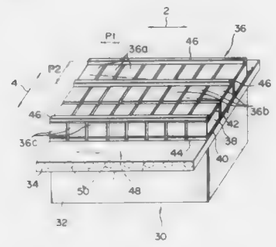
**Haruyasu Rokurota, Ootawara, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Continuation of Ser. No. 686,911, Dec. 27, 1984, abandoned. This application Aug. 14, 1986, Ser. No. 896,346**

**Claims priority, application Japan, Dec. 28, 1983, 58-245166**

**Int. Cl.⁴ H01L** *41/22*

**U.S. Cl. 29—25.35** **4 Claims**



1. A method of manufacturing an ultrasonic transducer, which comprises the steps of:

forming an arrangement of a plurality of conductors penetrating an insulation member having first and second planes, thereby effecting electrical conduction between said first and second planes;

forming a printed circuit on the second plane of the insulation member to be connected to the conductors;

forming first and second electrodes on surfaces of a plate-shaped piezoelectric element, respectively, to provide a plate-shaped ultrasonic transducer member;

directly fixing the unltrasonic transducer member to the first plane of the insulation member with an electrically conductive adhesive, so as to effect connection between the second electrode and said conductors; then

cutting out notches in the plate-shaped ultrasonic transducer member corresponding to the arrangement of the conductors to divide it into a plurality of individual ultrasonic transducer isolated elements each individual element having a respective conductor;

forming a ground electrode connected to the first electrodes adhering an ultrasonic wave absorber to the second plane of the insulation member, thereby dampening the vibrations of the transducer elements.

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**4,747,193**

## PALLET SUPPLY APPARATUS FOR MACHINE TOOL

**Akitake Hashidate, Zama, and Katsuyuki Nakamura, Machida, both of Japan, assignors to Makino Milling Machine Co., Ltd., Tokyo, Japan**

**Filed Aug. 19, 1986, Ser. No. 898,137**

**Claims priority, application Japan, May 20, 1986, 61-113474**

**Int. Cl.⁴ B23Q** *7/00*

**U.S. Cl. 29—33 P** **20 Claims**

1. A pallet supply apparatus for at least one machine tool arranged along a predetermined arranging line, the apparatus having a plurality of pallet supports, each pallet support being capable of supporting a pallet, comprising:

a first row of pallet supports disposed along a line including at least one pallet exchange station which is disposed immediately in front of said machine tool;

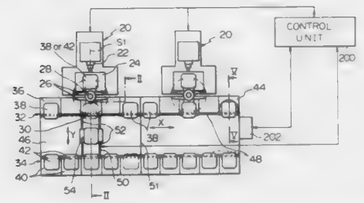
means for exchanging pallets between said machine tool and said pallet exchange station;

a second row of pallet supports disposed in parallel with said first row of pallet supports and placed at a predetermined distance from said first row;

guide means in parallel with said two rows and disposed therebetween; and



a pallet carrier movable along said guide means and movable at a right angle to said guide means, the pallet carrier having means for lifting a pallet from beneath, or lowering



a pallet onto one of said pallet supports of said first and second rows when said pallet carrier arrives at a point under the pallet.

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**4,747,194**

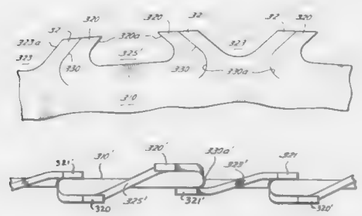
## TIRE RASP BLADE

**Samuel R. Wood, Warrawee, and James S. Pincott, West Ryde, both of Australia, assignors to Spencer Industries Pty. Ltd., Auburn, Australia**

**Continuation-in-part of Ser. No. 783,170, Oct. 2, 1985, abandoned. This application Nov. 7, 1986, Ser. No. 928,473**

**Int. Cl.⁴ B23D** *71/00*

**U.S. Cl. 29—78** **13 Claims**



1. A tire rasp blade, comprising:

a blade body having an outer edge which is a segment of a circle;

a plurality of teeth formed at said outer edge in sets of four;

a first pair of teeth and a second pair of teeth in each set, with the two pairs disposed at opposite angles of inclination to each other;

said outer edge having a first recess in each set formed between the two pairs of teeth in each set;

the lead tooth in each pair of teeth having its leading edge formed by a second recess which extends from said outer edge;

the trailing tooth in each pair of teeth being formed between the edge of said first recess and a narrow slit extending inwardly from said outer edge;

said slit extending inwardly into said blade body to terminate at a depth greater than the depth of said second recess and being curved away from said first recess and also extending inwardly of the depth of said first recess; and the blade body being angled at the termination of each slit to displace each tooth laterally, said extension of said slits into the blade body enabling such displacement to commence inwardly of the recesses which provides increased strength and reduces breakage of the teeth in actual use.

**4,747,195**

## ROLL FOR USE IN A PAPER MACHINE

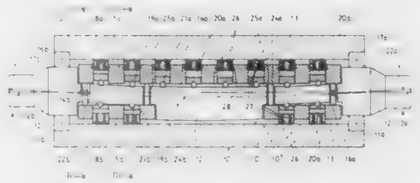
**Jorma Snellman, Jyviskylä, Finland, assignor to Valmet Oy, Finland**

**Filed Nov. 25, 1986, Ser. No. 934,807**

**Claims priority, application Finland, Nov. 27, 1985, 854693**

**Int. Cl.⁴ B21B** *27/00*

**U.S. Cl. 29—116 R** **22 Claims**



1. A roll for use in a paper machine, such as a calender roll or a dewatering press roll, comprising:

a central axle fixed against rotation, having at least one axially extending groove formed therein;

a cylindrical roll mantle rotatably mounted on said axle;

an elongated cylinder block separate from said central axle and situated in said axially-extending groove, said cylinder block having a plurality of cylinders formed therein;

a plurality of pressure-actuated pistons situated in respective cylinders and adapted to be loaded against an inner surface of said mantle; and

means for supporting said elongated cylinder block with said pistons situated in said cylinders thereof on said central axle only in the regions of the ends of said elongated cylinder block;

wherein each of said cylinders comprises a bore extending in a substantially radial direction of said roll, with each said pressure-actuated piston being situated in a respective bore and constituting an outer piston situated therein; and additionally comprising

a plurality of inner pistons, each said inner piston situated in a respective bore between said outer piston and said axle, and defining a space for fluid between said respective inner and outer pistons;

said pistons and cylinder block forming a glide shoe arrangement loading the inner surface of said mantle.

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**4,747,196**

## CLARIFIER

**John G. Moir, Johannesburg, South Africa, assignor to Envirotech (Proprietary) Limited, Isando, South Africa**

**Filed Sep. 30, 1986, Ser. No. 913,353**

**Claims priority, application South Africa, Oct. 2, 1985, 85/7608**

**Int. Cl.⁴ E01D** *43/00*

**U.S. Cl. 29—163.5 F** **22 Claims**

1. A clarifier for use in a vessel having an inlet and an outlet for receiving a stream of mixture of carrier fluid and solids suspended therein, said vessel defining a flow path between said inlet and said outlet, said clarifier comprising:

a pair of supports mounted upright within said vessel and spaced apart from each other, each of said supports having a channel therein which extends along a height of said support;

a plurality of integral carrier pipes, each of said carrier pipes possessing a sidewall and two opposing ends, said sidewall defining a hollow interior cavity and at least one orifice which communicates with said interior cavity, each of said opposing ends having a flange which is slidably receivable within said channel whereby each of said carrier pipes is mounted on said supports to extend from one support to the other and wherein said carrier pipes are slidably removable from said supports;

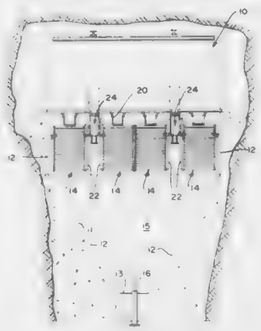
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a plurality of integral "V"-shaped flow directing members, one of said members being detachably placed atop each of said carrier pipes to rest thereon, such that an apex of each said "V"-shaped flow directing member is directed upwards, wherein an association of said carrier pipes, said directing members and said supports forming a vertical stacked array of settling compartments, each of which is in communication with said mixture flow path through an entry way, each of said compartments being adapted to receive a quantity of said mixture containing a carrier fluid and solids suspended within said carrier fluid whereby said carrier fluid is received through said pipe orifice under clarified conditions, whereas said solids settle toward one of said flow directing members eventually being discharged from said compartment through said entry way;

means of withdrawing said clarified carrier fluid from said carrying pipes;

wherein said clarifier further includes means for enabling disassembly into its separate components namely said supports, said carrier pipes and said flow directing members; said supports, said carrier pipes and said directing



members being dimensioned and configured to be transportable through spatially restricted environments, and for enabling said clarifier to be transported through and thereafter be installed in spatially confined environments.

16. A method comprising constructing a clarifier which includes assembling a stacked array of settling compartments by enabling disassembly of the components of said clarifier sufficient to further enable transport and reassembly thereof spatially confined environment by,

providing a pair of uprights, a plurality of pipes each having a sidewall defining a hollow cavity therein that is accessible through an open end and a plurality of orifi defined in the sidewall, and a plurality of flow directing members;

securing a first pipe between the uprights;

placing a first flow directing member on the first pipe;

securing a second pipe between the uprights on the first flow directing member;

placing a second flow directing member on the second pipe; and

successively securing further pipes and placing further flow directing members between said uprights one on top of another.

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**4,747,197**

**MACHINE FOR APPLYING T-MOLDING**

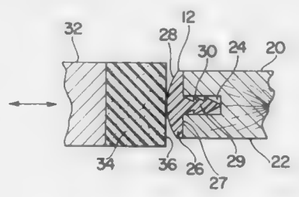
**Eli A. Charron, 103 Sycamore St., Swansea, Mass. 02777**

**Filed Mar. 30, 1987, Ser. No. 31,361**

**Int. Cl.[4] H01B *13/22***

**U.S. Cl. 29—235** **10 Claims**

1. A hand-guided machine for applying a strip of T-molding to the edge of a planar object having opposed top and bottom surfaces and having a peripheral edge with a slot for receiving said T-molding such as a table top wherein said T-molding has an inward barb adapted to extend into said slot and a first strip end which first engages said slot and a free or trailing strip end, said machine comprising a frame including a housing at the rear end thereof, said housing in turn supporting a contact actuated vibratory hammer having an impact member outwardly extending from the forward end of said housing and having a face for contacting said T-molding first strip and which projects into said object surface peripheral edge, at least one support shelf forwardly extending from said housing so as to overlie said object surface and provided with a contact member for contacting said object, feed means for said strip of



said T-molding supported adjacent said housing for positioning said strip between said peripheral edge surface and said contact member, separate handles outwardly projecting from said machine in spaced relation from each other such that an operator may firmly operatively grasp said machine, there being upper and lower opposed support shelves forwardly extending from said housing and each such shelf provided with an object surface contacting member, the contacting members of said opposed shelves extending towards each other but spaced from each other a distance approximating that of said object thickness such that said contacting members essentially support the machine on said object top surface.

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**4,747,198**

**METHOD AND APPARATUS FOR DETECTING HOLD-POSITION OF ELECTRONIC COMPONENT, AND APPARATUS FOR MOUNTING ELECTRONIC COMPONENT**

**Koichi Asai; Mamoru Tsuda, and Yasuo Muto, all of Chiryu, Japan, assignors to Fuji Machine Mfg. Co., Ltd., Japan**

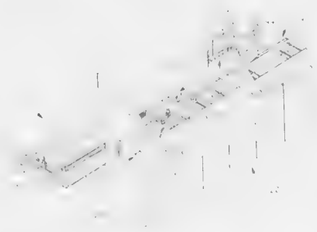
**PCT No. PCT/JP86/00020, § 371 Date Sep. 12, 1986, § 102(e) Date Sep. 12, 1986, PCT Pub. No. WO86/04479, PCT Pub. Date Jul. 31, 1986**

**PCT Filed Jan. 20, 1986, Ser. No. 908,017**

**Claims priority, application Japan, Jan. 21, 1985, 60-8809; Jan. 21, 1985, 60-8810; Jan. 21, 1985, 60-8811**

**Int. Cl.[4] B23Q *17/22***

**U.S. Cl. 29—407** **14 Claims**



1. A method of detecting a hold-position of an electronic component in which said electronic component is held by a sucking pipe of an electronic-component holding apparatus by means of vacuum suction through said sucking pipe, the outline of said sucking pipe being wholly enclosed by the outline of the held electronic component as viewed in a direction parallel to a center line of said sucking pipe, said method being characterized by comprising the steps of:

emitting light beams from one side of said electronic component in said direction toward said electronic component held by said sucking pipe;

taking a whole projection of said electronic component on the other side of said electronic component, said whole projection including said outline of said electronic component as viewed in said direction; and

detecting a position of said whole projection, thereby detecting said hold-position of said electronic component.



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**4,747,199**

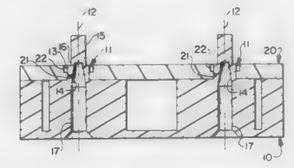
**METHOD OF SECURING MATING PARTS TOGETHER**

**Robert D. Kitchen, Freeport, Ill., assignor to Honeywell Inc., Minneapolis, Minn.**

**Division of Ser. No. 435,133, Oct. 18, 1982, abandoned. This application May 14, 1984, Ser. No. 609,939**

**Int. Cl.[4] B29C *65/56*; B23P *11/00*; B21D *39/00***

**U.S. Cl. 29—416** **5 Claims**



1. A method of securing mating parts together, comprising:

forming a plurality of body parts with a plurality of integral plastic projections thereon, each projection extending along an axis and including a tubular portion having a tapered bore therein whose cross section decreases with distance away from the body part, a plug having a cross section perpendicular to the axis larger than the cross section of at least a portion of the bore, and a frangible web axially connecting said plug to the end of said tubular portion remote from the body;

forming a plurality of cover parts with a plurality of apertures therethrough adapted to mate with the plurality of projections on said plurality of body parts;

positioning a first one each of said body and cover parts together in a mating relationship; and

displacing at least one of said plugs so that its connecting web is ruptured and the plug is urged into the bore in the tubular portion of a plastic projection of said first body part, thereby causing said tubular portion to expand and secure said projection in the mating aperture.

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**4,747,200**

**METHOD OF ASSEMBLING A TRIPOD UNIVERSAL JOINT**

**Dean A. Olson, II, Rockford, Ill., assignor to Rockford Acromatic Products Co., Rockford, Ill.**

**Filed Apr. 3, 1987, Ser. No. 33,782**

**Int. Cl.[4] B23P *17/00***

**U.S. Cl. 29—423** **6 Claims**

1. A method of assembling a universal joint, said universal joint comprising:

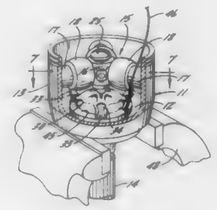
(A) a generally cup-shaped housing having a bottom wall and having an annular side wall, a spider located in said housing in spaced relation from said bottom wall; said spider having a center portion and having angularly spaced trunnions extending generally radially from said center portion and fixed to said side wall, and a roller rotatably and slidably supported on each of said trunnions;

(B) a forked shaft having angularly spaced jaws separated by angularly spaced slots defining raceways, said slots being sized to receive said rollers; and

(C) a retaining clip made of resiliently yieldable material, said clip having a base portion and having legs spaced angularly around and extending axially from the base portion of said clip, said legs being adapted to interlock with the jaws of said shaft to hold said shaft in assembled relation with said spider; said method comprising the steps of:

(a) fixing said housing in an upright position with said bottom wall facing upwardly;

(b) placing a spacer made of resiliently flexible material on



the bottom wall of said housing adjacent the center thereof; said spacer having a flexible line attached thereto;

(c) locating the free end of said flexible line outside of said housing;

(d) placing said clip in said housing with the legs of said clip extending upwardly and with

the base portion of said clip resting on said spacer;

(e) inserting said shaft downwardly into said housing to cause the slots in said shaft to slip over said rollers and to cause the jaws of said shaft to snap into interlocking relation with the legs of said clip; and

(f) removing said spacer from said housing by pulling upwardly on the free end portion of said flexible line.

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**4,747,201**

**BOOSTERLESS PERFORATING GUN**

**Joseph F. Donovan, Tomball; Gregg W. Stout, Montgomery, and Phillip W. Schmuck, Spring, all of Tex., assignors to Baker Oil Tools, Inc., Orange, Calif.**

**Division of Ser. No. 743,578, Jun. 11, 1985, Pat. No. 4,635,734. This application Oct. 3, 1986, Ser. No. 914,939**

**Int. Cl.[4] B23P *19/04***

**U.S. Cl. 29—433** **11 Claims**

6. The method of assembling a multi-section perforating gun for a subterranan well having a plurality of tubular carriers supporting a plurality of shaped charge containers with the primer ends of such containers disposed adjacent the axis of the tubular carrier, comprising the sequential steps of:

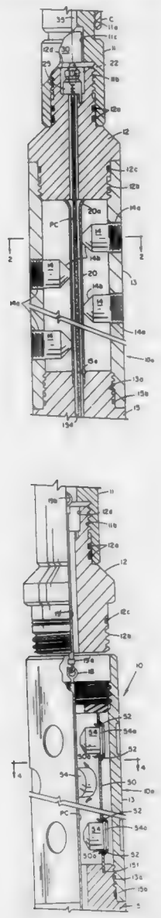
(1) successively assembling and inserting the tubular carriers, devoid of booster charges, in the well so that all shaped charge containers are below the surface;

(2) inserting a continuous length of primer cord along the

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axis of the tubular carriers to lie adjacent the primer ends of each shaped charge container; and



(3) assembling a firing mechanism, including a primer charge, in operative relationship to the top end of said primer cord.

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**4,747,202**

**METHOD OF FASTENING PANELS USING BLIND FASTENERS WITH DEFORMABLE DRIVE NUTS**

**Edward H. Beals, Long Beach, Calif., assignor to Monogram Industries, Inc., Culver City, Calif.**

**Division of Ser. No. 860,550, May 7, 1986. This application Mar. 16, 1987, Ser. No. 26,432**
**Int. Cl.⁴ B23D** *11/00*
**U.S. Cl. 29—437** **7 Claims**

1. A method of fastening overlapped outer and inner panels using a fastener of the type having a generally tubular fastener body having an enlarged body head, an internally threaded drive nut in contact with the fastener body head for resisting rotation of the fastener body, a deformable sleeve at an opposite end of the fastener body from the body head, an externally threaded drive stem extending through the drive nut in threaded engagement therewith and through aligned bores in the sleeve and the fastener body to exert force upon the sleeve to bulge it laterally upon motion of the stem in an axially outward direction relative to the fastener body caused by rotation of the stem in one direction relative to the drive nut, the method comprising the steps of:

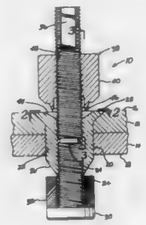
inserting the fastener through aligned openings in the panels to be fastened together until the body head engages an outer surface of the outer panel with the sleeve positioned beyond the inner surface of the inner panel;

gripping the drive nut to hold it against rotation, while

applying torque to the outer region of the stem to turn the stem in the one direction until the sleeve has been bulged laterally to a fully set condition overlying the inner surface of the inner panel; and

deforming the underside of the drive nut against the outer surface of the fastener body head to provide a positive mechanical engagement between the drive nut and the fastener body during turning motion of the stem to set the fastener.

7. A method of assembling a fastener of the type having a generally tubular fastener body having an enlarged head with



an irregularly shaped outer surface, an internally threaded drive nut having a deformable surface for contact with the irregularly shaped surface on the fastener body head, a deformable sleeve at an opposite end of the fastener body from the body head, an externally threaded drive stem having an enlarged stem head, the stem being adapted to extend through the drive nut in threaded engagement therewith and through aligned bores in the sleeve and the fastener body to exert force upon the sleeve to bulge it laterally upon motion of the stem in an axially outward direction relative to the fastener body caused by rotation of the stem in one direction relative to the drive nut, the method comprising the steps of:

mounting the sleeve and the fastener body on the stem so that the sleeve abuts the stem head;

threading the drive nut onto the stem until the deformable surface of the drive nut contacts the irregularly shaped surface on the fastener body head; and

deforming the deformable surface of the drive nut against the irregularly shaped surface of the fastener body head.

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**4,747,203**

**PRODUCTION METHOD FOR BALL SUPPORT STRUCTURES**

**Hisashi Yukita; Hisanobu Kanamaru, both of Katsuta, and Masaharu Okazaki, Kanasago, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed May 11, 1987, Ser. No. 48,723**
**Claims priority, application Japan, May 14, 1986, 61-108505**
**Int. Cl.⁴ B23P** *15/10*
**U.S. Cl. 29—439** **10 Claims**

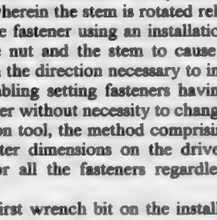
1. A production method for ball support structures, which method comprises the steps of:

forming in a first member a ball-receiving recess having a semispherical portion and a cylindrical recess opening portion extending from an end of said semispherical portion;

forming a through hole in said first member on the opposite side to said cylindrical recess opening;

inserting a ball portion of a second member in said ball-receiving recess;

axially pressing said first member around said cylindrical recess opening so as to form an annular flat recess around said cylindrical recess opening thereby to provide a partially spherical contact portion contacting said ball portion at said cylindrical recess opening; and



axially pushing said ball portion of said second member from the opposite side to the second member inserting direction so as to slightly separate axially said second member from said first member.

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**4,747,204**

**METHOD OF INSTALLING DRIVE NUT BLIND FASTENERS WITH CAP NUTS**

**John D. Pratt, Rancho Cucamonga, and Victor Belanger, Huntington Beach, both of Calif., assignors to Monogram Industries, Inc., Culver City, Calif.**

**Division of Ser. No. 784,348, Oct. 4, 1985, Pat. No. 4,681,494. This application May 22, 1987, Ser. No. 26,984**
**Int. Cl.⁴ B21D** *39/00;* **B23D** *11/02*
**U.S. Cl. 29—523** **10 Claims**



1. A method of installing fasteners of the type having a fastener body, a drive nut in contact with the fastener body for restraining rotation thereof, and a threaded drive stem extending through a bore in the fastener body and a threaded bore in the drive nut, wherein the stem is rotated relative to the drive nut to install the fastener using an installation tool which engages the drive nut and the stem to cause relative rotation therebetween in the direction necessary to install the fastener, the method enabling setting fasteners having drive stems of different diameter without necessity to change the wrench bits of the installation tool, the method comprising the steps of:

providing outer dimensions on the drive nuts which are constant for all the fasteners regardless of drive stem diameter;

providing a first wrench bit on the installation tool which does not rotate relative to the tool and which can separately engage each drive nut by axial motion onto and off the drive nut to restrain it against rotation;

fixedly mounting a cap nut on the outer end of the drive stem of each fastener to be set, the cap nuts having outer dimensions which are constant for all the fasteners regardless of drive stem diameter;

providing a second wrench bit on the installation tool which rotates concentrically with respect to the first wrench bit but is spaced axially therefrom and which can engage the cap nut by axial motion onto and off the cap nut to rotate it; and

successively moving the setting tool axially onto and off the cap nut and drive nut of each fastener to install the fasteners without changing the wrench bits.

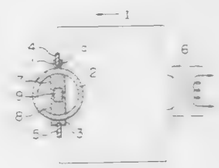
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**4,747,205**

**METHOD OF PRODUCING A MOTOR FRAME FOR AN ELECTRIC MOTOR**

**Tohru Gotoh, Nagoya, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Nov. 10, 1986, Ser. No. 928,402**
**Claims priority, application Japan, Nov. 8, 1985, 60-250030**
**Int. Cl.⁴ H02K** *15/14*
**U.S. Cl. 29—596** **3 Claims**



1. A method of producing a motor frame for an electric motor which comprises:

a step of forming a heat radiation fin by bending a rectangular metallic plate,

a step of forming a dummy fin from a material having electric conductivity,

a step of disposing the heat radiation fin and the dummy fin on the outer circumferential surface of a frame body which has been formed in a cylindrical form so as to be symmetric with respect to the axial center line of the frame body, said dummy fin having a shape to fit the outer circumferential surface of the frame body over a surface area larger than that between said frame body and said heat radiation fin,

a step of disposing upper and lower core electrodes in the frame body so as to be in contact with the inner circumferential wall of the frame body and to respectively oppose the heat radiation fin and the dummy fin.

a step of respectively connecting movable and stationary electrodes to the heat radiation fin and the dummy fin, and

a step of applying an electric current to said electrodes sufficient to melt-bond only the heat radiation fin, but not said dummy fin, to the frame body by projection welding, whereby said dummy fin disperses thermal stresses.

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**4,747,206**

**METHOD OF PRODUCING ELECTRICAL COIL UNITS, PARTICULARLY FOR IGNITION APPARATUS**

**Nils A. Agren; Rolf L. Rask, and Lars-Olof Ottosson, all of Åmål, Sweden, assignors to Aktiebolaget Svenska Elektromagneter, Åmål, Sweden**

**Filed Jul. 3, 1986, Ser. No. 882,092**
**Claims priority, application Sweden, Jul. 4, 1985, 8503343**
**Int. Cl.⁴ H01F** *7/06*
**U.S. Cl. 29—605** **3 Claims**

1. A method for producing ignition transformers for an ignition apparatus, comprising the steps of:

attaching a first wire end of a first wire to a first terminal pin;

winding said first wire on a first bobbin section to form a first winding;

attaching a second end of said first wire to a second terminal pin;

attaching a first wire end of a second wire to a third terminal pin;

winding said second wire on said first bobbin section over said first winding to form a first partial winding;

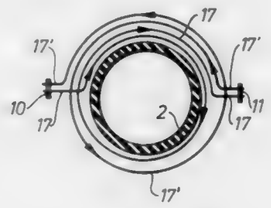
attaching said second wire to a fourth terminal pin;

winding said second wire on said first bobbin section in an

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opposite winding direction as said over the first winding to form a second partial winding; and




attaching said second wire to said third terminal pin so that first and second partial windings are in parallel and wound in opposite direction and together form a second winding.

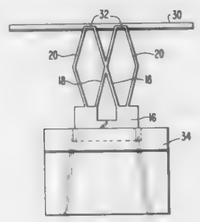
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**4,747,207**

## MANUFACTURE OF MAGNETIC CORES FROM BLANKS OF MAGNETICALLY PERMEABLE SHEET MATERIAL

**Erick O. Schonstedt, Reston, and Mohammed M. Hamzezadeh, Fairfax, both of Va., assignors to Schonstedt Instrument Company, Reston, Va.**

**Filed Dec. 1, 1986, Ser. No. 936,629**
**Int. Cl.[4] H01F 7/06**
**U.S. Cl. 29—605** **6 Claims**




1. A method of making a magnetic core, that comprises the steps of forming from magnetically permeable sheet material a blank having a magnetic core preform portion including strip elements of said material that are partially separated from adjacent portions of the blank, attaching one end of the blank to an elongated support, attaching a weight to an opposite end of the blank, winding the preform portion and other, stabilizing portions of the blank upon the support, while applying tension to the wound portions of the blank by virtue of the weight, until the preform portion and stabilizing portions are wrapped about the support, and maintaining the wound configuration of the preform portion of the blank while removing the remainder of the blank therefrom.

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**4,747,208**

## DEVICE FOR ASSEMBLING RETURN BEND TO COIL

**Carlo Sbalchiero, Fagagna, and Brazzale Giorgio, Creazzo, both of Italy, assignors to Burr Oak Tool & Gauge Co., Sturgis, Mich.**

**Continuation of Ser. No. 618,972, Jun. 11, 1984, Pat. No. 4,683,649. This application Apr. 14, 1987, Ser. No. 38,255**
**The portion of the term of this patent subsequent to Aug. 4, 2004, has been disclaimed.**
**Int. Cl.[4] B23P 15/26**
**U.S. Cl. 29—726** **9 Claims**

1. An assembly device for assembling a member having plural and spaced end segments with parallel axes thereon to a workpiece having plural and spaced sets of end segment receiving means with parallel axes thereon, a spacing between said axes of said end segment receiving means in each set corresponding to the spacing of said axes of said end segments from each other, comprising:

frame means;

workpiece support means mounted on said frame means for supporting said workpiece, said workpiece support means being movable in a plane to bring each set of end segment receiving means into a working zone;

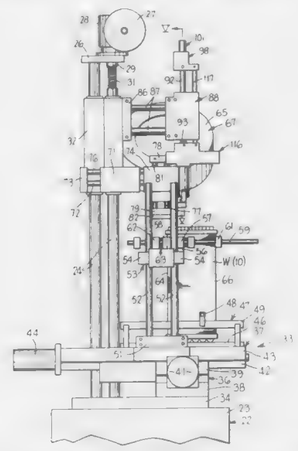
member supply means mounted on said frame means;

member transport means for transporting a member from said member supply means to a workpiece mounted on said workpiece support means, said member transport means including the following:

member gripping means for gripping and holding said member in an initial first oriented position relative to a workpiece mounted on said workpiece support means and relative to said plural and spaced end segment receiving means on said workpiece;

first drive means for orienting said member gripping means about an axis of rotation perpendicular to said plane so that a selected one of the plural and spaced end segments of said member becomes aligned with a selected set of said plural and spaced end segment receiving means on said workpiece;

second drive means for effecting a movement of said member gripping means perpendicular to said plane between



first and second positions corresponding to toward and away from, respectively, the workpiece on said workpiece support means, so that a movement of said member gripping means to said first position effects a delivery of said member to said working zone and a simultaneous insertion of said end segments thereon into said end segment receiving means;

release means for effecting a release of the holding relation between said member gripping means and said member in response to said member gripping means attaining said first position sequentially followed by a movement, caused by said second drive means, of said member gripping means away from said first position toward said second position without a member held therein, and by a reorientation, caused by said first drive means, of said member gripping means about said axis of rotation to said initial first oriented position thereof;

third drive means for effecting a movement of said workpiece support means to bring a set of open end segment receiving means into said working zone; and

carrier means for selecting a member from said member supply means and for shifting said member from said member supply means to said member gripping means, said carrier means including a carriage and support means



for supporting said carriage for movement between said member supply means and said member gripping means, said carriage including orienting means for orienting said axes of said end segments into a predefined orientation parallel to said axes of end segment receiving means, and said support means including reciprocal drive means effecting said movement of said carriage between said member supply means and said member gripping means, said reciprocal drive means effecting a movement of said orienting means into engagement with said end segments as well as out of engagement with said end segments, said reciprocal drive means also effecting a lateral movement of said carriage away from said member supply means in response to said reciprocal drive means orienting said carriage and said orienting means toward and into engagement with said end segments, and a lateral movement toward said member supply means in response to said reciprocal drive means orienting said carriage and said orienting means away from and out of engagement with said end segments.

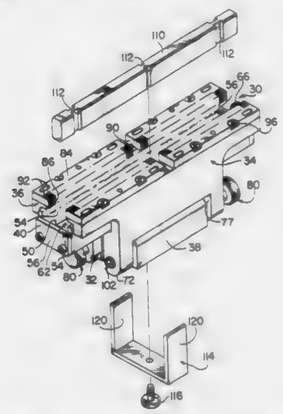
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**4,747,209**

## CONTACT ALIGNMENT TOOL

**Richard L. Schaeffer, Carlisle; Robert Volinskie, Hershey; Robert L. Bendorf, Lemoyne, and Scott A. Keener, Annville, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.**

**Continuation-in-part of Ser. No. 887,665, Jul. 17, 1986. This application Feb. 27, 1987, Ser. No. 20,001**
**Int. Cl.[4] H05K 13/04**
**U.S. Cl. 29—741** **17 Claims**




1. A tool for aligning contacts of an electrical connector with conductive areas of a circuit board, comprising:

support means having a connector receiving recess located adjacent a top surface thereof, the connector receiving recess cooperates with the connector to accurately locate and maintain the connector in the tool;

alignment means movably mounted to the support means, the alignment means being movable between a first position and a second position;

comb means provided at ends of the alignment means, the comb means positioned to cooperate with contacts of the connector when the alignment means is in the second position; and

adjustment means which cooperate with the support means and the alignment means, the adjustment means being movable between a first aligned position and a second aligned position, such that as the adjustment means is moved, the alignment means is moved in a direction transverse to the path of motion of the alignment means as it is moved between the first and the second position, the movement of the adjustment means insures that the comb means of the alignment means is properly aligned with spaces between the contacts of the connector when the alignment means is placed in the second position, thereby insuring that the contacts are accurately located and maintained between the comb means as the circuit board is inserted into the electrical connector.

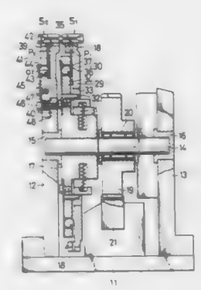
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**4,747,210**

## SLIDER HOLDER FOR APPLICATION OF DOUBLE SLIDERS TO A SLIDE FASTENER CHAIN

**Yasutoshi Suzuki, Kurobe, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan**

**Filed Jul. 13, 1987, Ser. No. 72,758**
**Claims priority, application Japan, Jul. 15, 1986, 61-108290[U]**
**Int. Cl.[4] B23P 19/04**
**U.S. Cl. 29—768** **2 Claims**



1. An apparatus for holding a pair of sliders for application to a slide fastener chain, comprising:

(a) a frame;

(b) a shaft rotatably mounted on and extending between a pair of spaced walls of said frame;

(c) an indexing plate fixedly mounted on said shaft for corotation therewith and having a plurality of angularly spaced slider supports each for carrying one slider thereon;

(d) a drive mechanism operatively connected with said shaft for intermittently rotating said indexing plate to angularly move said slider supports successively through a first position to receive sliders one at a time, and a second position to apply one slider on a slide fastener chain; and

(e) an auxiliary slider support detachably connected to one of said walls for carrying one slider and disposed in lateral alignment with one of said slider supports which has been brought into said second position, said auxiliary slider support being reversible in position relatively to said one slider holder in such a manner that the distance between said one slider support and said auxiliary support varies upon reversal of said auxiliary slider support.

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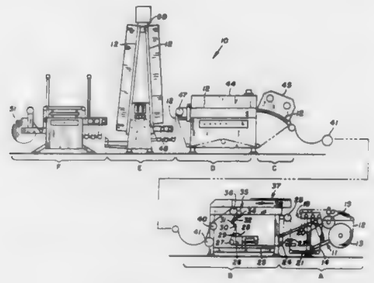


4,747,211

## METHOD AND APPARATUS FOR PREPARING CONDUCTIVE SCREENED THROUGH HOLES EMPLOYING METALLIC PLATED POLYMER THICK FILMS

Kenneth B. Gilleo, Northfield; Stephen E. Chabot, Apple Valley, and Marion A. Tibesar, Northfield, all of Minn., assignors to Sheldahl, Inc., Northfield, Minn.

Continuation-in-part of Ser. No. 12,624, Feb. 9, 1987, abandoned. This application Jun. 5, 1987, Ser. No. 58,520
Int. Cl.[4] H04K *3/10*
U.S. Cl. 29—852 20 Claims



1. In the method of preparing conductive bridges to electrically couple discrete electrical conductors arranged on opposed surfaces of a common substrate with the conductive bridge extending along and through the walls of a bore formed through the common substrate as a continuation of the respective opposed electrical conductors, said method comprising the steps of:

(a) preparing a screen layout of the circuit pattern to be formed and mounting said screen layout under tension for use in printing a delineated curable liquid conductive ink coating defining the said circuit pattern to be formed upon the substrate surface;

(b) preparing a supply web of a generally impervious flexible substrate to receive said circuit pattern and with bores being formed therein to accommodate electrical interconnects between circuit patterns to be formed on the opposed major surfaces thereof;

(c) superimposing said flexible substrate upon a generally porous non-woven flexible vacuum diffusing carrier web pervious to air but impervious to said curable liquid conductive ink for simultaneous passage with said substrate as a web pair through a substrate printing zone;

(d) passing said superposed substrate vacuum diffusing carrier web pair along a path within a substrate printing zone wherein said web pair traverses the surface of a printing bed plater with the printing bed having an outer surface enclosing a hollow core and with a plurality of bores formed through said outer surface to provide a perforated printing surface, moving said printing bed plate surface relative to a screen print layout while carrying said web pair thereover;

(e) coupling the hollow core of said printing bed to a source of vacuum;

(f) applying a layer of said curable liquid conductive ink coating upon the surface of said flexible substrate through said screen layout while simultaneously applying vacuum to the hollow core of said printing bed and through the bores formed through the annular wall thereof and through said air-pervious vacuum diffusing carrier web.

5. Apparatus for the preparation of conductive bridges to electrically coupled discrete electrical conductors arranged on opposed surfaces of a common substrate with the conductive bridge extending along and through the walls of a bore formed through the common substrate as a continuation of the respective opposed electrical conductors, said apparatus comprising:

(a) printing screen retaining means arranged to support a screen print layout for use in printing a delineated circuit pattern with curable liquid conductive ink upon a substrate surface, said printing screen retaining means including mounting means for guidably maintaining said screen print layout in operative disposition within a printing station;

(b) a printing station for receiving a substrate to be printed, and means for applying a layer of a curable liquid conductive ink upon selected regions of the surface of a substrate positioned within said printing station;

(c) means for guidably moving a supply web of a generally impervious flexible substrate through said printing station to receive said circuit pattern in the form of a layer of a curable liquid conductive ink and with bores being formed therein to accommodate electrical interconnects between circuit patterns to be formed on the opposed major surfaces of said substrate;

(d) means for guidably moving a generally porous, non-woven flexible vacuum diffusing carrier web pervious to air but impervious to said curable liquid conductive ink for simultaneous passage with said substrate as a web apir through said printing station;

(e) said printing station including a printing cylinder having an outer annular wall surrounding a hollow core and with a plurality of bores formed through said annular wall to provide a perforated cylindrical surface, mounting means for said printing cylinder arranged to rotatably support said printing cylinder for axial rotation within said printing station in registration with and in synchronism with said printing screen;

(f) means for rotating said printing cylinder at a rate synchronized with the lineal movement of said superposed web pair through said printing station;

(g) means coupling the hollow core of said printing cylinder to a source of vacuum; and

(h) means for applying a layer of said curable liquid conductive ink coating upon the surface of said flexible substrate through said screen layout while simultaneously applying vacuum to the hollow core of said printing cylinder and through the bores formed in the annular wall thereof and through said air-pervious vacuum diffusing carrier web.

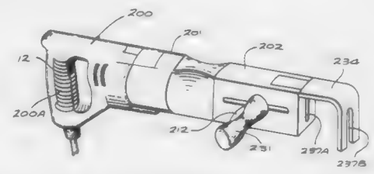
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4,747,212

## PLASTIC PIPE CUTTER

Richard S. Cavdek, 8936 Foothill Blvd., Sunland, Calif. 91040

Filed Dec. 19, 1985, Ser. No. 810,701
Int. Cl.[4] B23D *21/06;* B26B *27/00;* B26D *3/16*
U.S. Cl. 30—92 8 Claims




1. A plastic pipe cutter comprising:

a hollow body;

an elongated screw drive member journaled for rotation within said body between opposite end walls thereof;

traveler means secured to said elongated screw drive member within said body to be driven linearly upon rotation of the elongated screw drive member;

means defining a cradle recess for receiving a length of pipe within said cradle and extending generally transverse to the length of said elongated screw drive member;

a blade coupled to said traveler for linear movement into and out of said circuit recess upon rotation of said elongated drive member; and

means for driving said elongated screw drive member in two directions to advance said blade into the cradle recess and to retract said blade therefrom;

whereby a plastic pipe positioned within said cradle recess will be cut by said blade upon advance of said blade into the cradle recess and movement of said blade will be terminated at the end of travel with said traveler means remaining in free wheeling relationship with said elongated screwdrive means;

switching means engagable by said traveler means at each end of travel of said blade for terminating movement of said blade with said traveler means in engagement with said elongated screw drive member;

said switching means comprising a series of switches including a manually operated reversing switch and including a normally closed first switch at the outermost end of travel of said travel means in series with the forward travel contacts of said manually operating reversing switch;

a normally open second switch connected in parallel with said first switch and positioned to close responsive to end of travel in a retraction direction of said traveler means;

a normally open third switch in series with the reversing contacts of said manually operated reversing switch positioned to close responsive to end of cutting stroke travel of said traveler means; and

a normally closed fourth switch in parallel with said third switch positioned to open in response to end of travel of said traveler means in a retraction direction;

whereby said apparatus will advance in a cutting mode when said manual switch is in a forward switched position until the travel means reaches the end of the cutting stroke whereupon further forward movement of said traveler means is disabled until said manually operated reversing switch is operated in a retraction direction.



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4,747,213

## TOOL SUPPORT

Leonard J. Armstrong, 27 Clove Lakes Pl., Staten Island, N.Y. 10310

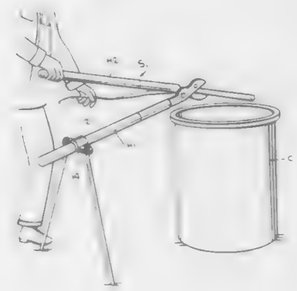
Filed Mar. 17, 1986, Ser. No. 839,924
Int. Cl.[4] F41G *1/38*
U.S. Cl. 30—296 R 4 Claims

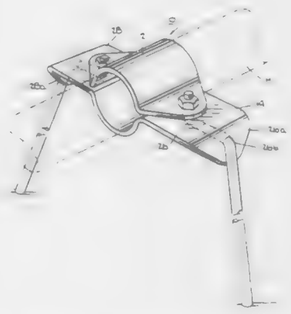
1. A tool support that can be provided as a kit and for supporting a tool having at least one handle, said tool support comprising:

clamping means for securely holding a handle of a tool, said clamping means including two clamping members for holding the tool handle therebetween, each said clamping member including engaging portions for cooperating with said engaging portions on the other said clamping member and an arcuate portion generally partially circular in cross-section, said engaging portions including flanges, having holes therein, extending in generally diametrically opposed directions from the ends of said arcuate portion;

leg means adapted to be attached to said clamping means for supporting the tool on a surface, said leg means including two leg members adapted to be attached to said cooperating engaging portions for urging said clamping members together with the tool handle therebetween, each of said leg members including a rod for extending through said holes in said flanges, each said rod having fastening means at an end thereof for urging said cooperating flanges together; and

anti-twist means for rigidly securing said leg means to said clamping means to prevent relative rotation therebetween, said anti-twist means including tabs depending from the distal ends of said flanges on one of said clamping members, each said tab having a hole therein through which one end of one of said leg members extends, and an L-shaped offset portion at said one end of each said rod, the extreme of each said L-shaped offset portion extending through said holes in said cooperating flanges and the intermediate portion of each said L-shaped offset portion





extending through one of said holes in said depending tabs.

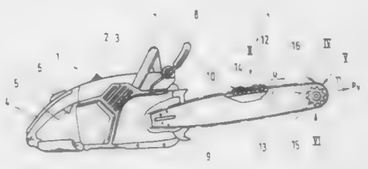
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4,747,214

## SAW CHAIN FOR A MOTOR-DRIVEN CHAIN SAW

Manfred Fischer, Asperg; Klaus Dussler, Weinstadt; Wilfried Linke, Winnenden, and Werner Hartmann, Ostfildern, all of Fed. Rep. of Germany, assignors to Andreas Stihl, Waiblingen, Fed. Rep. of Germany

Filed Oct. 29, 1987, Ser. No. 114,557
Claims priority, application Fed. Rep. of Germany, Nov. 29, 1986, 3640871
Int. Cl.[4] B27B *17/04*
U.S. Cl. 30—384 11 Claims



1. A saw chain for a motor-driven chain saw having a housing with a guide bar mounted thereon, the guide bar having upper and lower edges and a nose sprocket journalled at its forward end so as to be freely rotatable, the sprocket having a plurality of teeth and each two mutually adjacent ones of said teeth having respective adjacent tooth flanks conjointly defining a tooth gap having an opening angle $\gamma$, the saw chain comprising:

a plurality of links interconnected by rivet pins or the like to

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form an endless saw chain guided on said guide bar on said edges and on said nose sprocket;

a first portion of said links being cutting links and a second portion of said links being drive links;

each one of said cutting links including: a plate-like cutting-link body having an upwardly extending rearward portion defining a cutting tooth; a forward upwardly extending portion defining a depth limiter; a forward bore opening for accommodating one of said rivet pins therein to define a forward cutting-link pivot axis; and, a rearward bore opening for accommodating an other one of said rivet pins therein to define a rearward cutting-link pivot axis;

each one of said drive links being a plate-like body having a forward bore and a rearward bore for accommodating two of said pins to define respective forward and rearward drive-link pivot axes;

each one of said cutting links being pivotally connected with a forward drive link directly forward thereof so that the rearward drive-link pivot axis of the latter is coincident with said forward cutting-link pivot axis and each one of said cutting links also being pivotally connected with a rearward drive link directly rearward thereof so that the forward drive-link pivot axis of the latter is coincident with said rearward cutting-link pivot axis;

each one of said drive links being configured to engage one of said tooth gaps when entering said nose sprocket and having two downwardly extending drive-link flanks for contact engaging corresponding ones of said tooth flanks of said tooth gap, one of said drive-link flanks being a forward drive-link flank and the other one of said drive-link flanks being a rearward drive-link flank;

said cutting link being atop one of the teeth of said nose sprocket in a first orientation with said forward and rearward drive links being in corresponding tooth gaps on opposite sides of said tooth;

said cutting tooth having a tooth roof extending rearwardly from said cutting edge thereof to define a free angle with a tangent to the circle traced by said cutting edge as the latter moves around the forward end of said guide bar, said free angle being determinative of the cut into wood for said first orientation;

at least one of said drive-link flanks of each of said drive links having a contour different from the contour of said tooth flanks and said one drive-link flank of said drive link being so configured that said drive link with a section of its forward drive-link flank contact engages the tooth flank corresponding thereto so as to be pivotally movable within said tooth gap from a normal first position of said drive link corresponding to said first orientation of said cutting link to a second position in response to a reaction load applied to the saw chain wherein said cutting link is shifted to a second orientation on said one tooth in which the magnitude of said free angle is reduced thereby reducing or eliminating kickback.

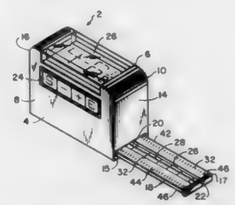
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**4,747,215**

## ELECTRONIC TAPE MEASURE

**Jack Walkus, 1664 Roselawn Ave., Schenectady, N.Y. 12306**

**Filed Nov. 24, 1986, Ser. No. 933,980**
**Int. Cl.⁴ G01B** *3/10*
**U.S. Cl. 33—140** **4 Claims**



1. An electronic tape linear measuring device comprising a case, a flexible tape, means within said case for winding and unwinding said tape, said case also enclosing electronic calculator means, said calculator means connected to an electronic digital display viewable on the exterior of said case, magnetic sensing means operatively connected to said calculator means and capable of sensing the length of said flexible tape extending from said case, said sensing means within said case and adjacent said flexible tape as it exits said case, said tape comprising a nonmetallic plastic material, having a top surface and a bottom surface, a recess along the longitudinal axis in the top surface of said tape, a magnetic recording tape molded in said recess with the recording surface on top thereof and slightly before the level of the top surface of said flexible tape, said magnetic recording tape having recorded therein spaced length units for sensing by said sensing head to thereby determine the length of the measuring tape extended from said case.

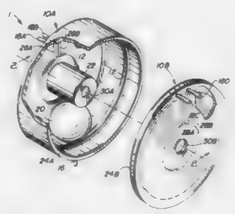
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**4,747,216**

## CLINOMETER/ACCELEROMETER AND METHOD

**Vincent M. Kelly, and Madelyn I. Kelly, both of P.O. Box 449, Prescott, Ariz. 86301**

**Filed Jan. 23, 1987, Ser. No. 6,485**
**Int. Cl.⁴ G01C** *9/06*
**U.S. Cl. 33—366** **16 Claims**



1. A clinometer comprising:

(a) a housing surrounding an annular cavity, a vertical wall bounding one side of the cavity;

(b) a first annular resistive layer disposed on the vertical wall, the first annular resistive layer having a first end and a second end separated by a first narrow gap, and first and second terminals connected to the first and second ends, respectively;

(c) a spherical conductive ball;

(d) a circular race conductor disposed in the cavity and supporting the conductive ball and urging the conductive ball against the first annular resistive layer, and a third terminal connected to the race conductor;

(e) means for applying a positive voltage to the first terminal and a negative voltage to the second terminal, the conductive ball receiving a resistive division voltage representative of the angle of inclination of the clinometer and conducting the resistive division voltage to the race conductor for angles of inclination of approximately ±178 degrees; and

(f) means connected to the third terminal and responsive to the resistive division voltage for producing a readout of the ma9nitude and polarity of the angle of inclination.

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**4,747,217**

## PENDULUM STYLE LEVEL

**Stanley L. Austin, 13010 Courtney Dr., Bellevue, Nebr. 68123**

**Continuation-in-part of Ser. No. 835,643, Mar. 3, 1986, abandoned. This application Sep. 14, 1987, Ser. No. 96,039**
**Int. Cl.⁴ G01C** *9/12*
**U.S. Cl. 33—391** **11 Claims**

1. A level, comprising:



an elongated frame having straight and parallel top and bottom edges, front and back sides, and opposite ends,

said frame having an aperture through said front and back sides,

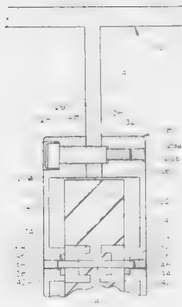
front and back generally transparent panels adapted for closing opposite ends of said aperture,

coacting means on said transparent panels and frame for positively positioning said panels on the frame in a fixed position thereon,

a pendulum having front and back sides, a weighted end and an opposite end,

means for rotatably supporting said pendulum on said panels for rotation about an axis extended front to back through said frame,

said opposite end of the pendulum having a true vertical indicator means aligned with said axis and center of gravity of the pendulum whereby said true vertical indicator means gravitates toward a position directly above said axis in response to movement of the frame to a position with said axis horizontally disposed,



inclination idicia on said transparent panels for registration with said true vertical indicator means to indicate the angle of the top and bottom edges, and

said means for rotatably supporting said pendulum comprising a pivot shaft means having front and rear end portions protruding from the front and back sides of said pendulum respectively, said pivot shaft means being fixed to said pendulum for axial movement therewith,

each of said front and back panels having an aperture therein for receiving a respective end portion of said pivot shaft means, and

means for adjusting the axial position of said pivot shaft end portions in said aperture,

each of said generally transparent panels having interior and exterior faces, the interior face of each panel including a bushing supported within said socket and substantially filling the diameter thereof for accurate positioning of the bushing on said panel and said pivot shaft end portion extending through said bushing for engaging said means for adjusting the axial position of said pivot shaft end portions.

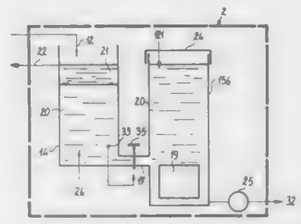
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**4,747,218**

## LIMITING OF CORROSION IN MACHINE FOR REFLOW SOLDERING IN VAPOR PHASE

**Xavier Saint Martin, Plaisir, France, assignor to Compagnie d'Informatique Militaire Spatial et Aeronautique, Paris, France**

**PCT No. PCT/FR86/00111, § 371 Date Dec. 2, 1986, § 102(e) Date Dec. 2, 1986**
**PCT Filed Apr. 2, 1986, Ser. No. 946,570**
**Claims priority, application France, Apr. 2, 1985, 85 05011**
**Int. Cl.⁴ F26B** *11/18;* **F27B** *15/00*
**U.S. Cl. 34—73** **8 Claims**



1. A machine for reflow soldering in vapor phase comprising a tank containing a primary liquid at boiling point and a vaporized secondary liquid, designed to limit losses of primary liquid, said machine further including washing means for washing said secondary liquid, water-removal means for removing water from the secondary liquid, a storage vessel for secondary liquid fed from the water-removal means, a fluid coupling between said washing means and said water-removal means, valve means for hermetic sealing of the fluid coupling for sealing said washing means from said water-removal means, and a water level detector associated with said washing means and means for controlling said valve means coupled to said water level detector.

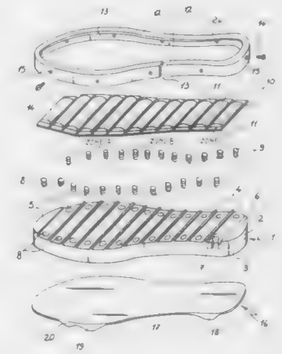
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**4,747,219**

## SHOE SOLE WHICH AFFORDS A RESILIENT, SHOCK-ABSORBING IMPACT

**Antonino Ammendolea, via A. De Pretis, 115, 20142 Milano, Italy**

**Filed Mar. 20, 1987, Ser. No. 28,488**
**Claims priority, application Italy, Mar. 24, 1986, 19849 A/86**
**Int. Cl.⁴ A43B** *3/12, 13/08, 13/18*
**U.S. Cl. 36—28** **6 Claims**



1. A sole for footwear comprising an inner sole and an outsole, said inner sole having a plurality of ridges arranged transversaly to the longitudinal direction of the foot, said ridges forming a plurality of channels therebetween, a plurality of

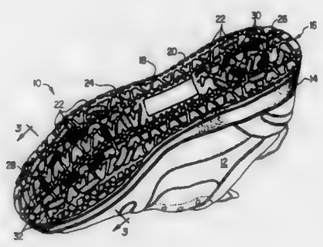
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blocks held within said channels, cavities in said channels, at least one part of springs sealed in said cavities, the outer sole having three projections, the first projection being located in the area of the heel, the second projection being located in the area of the metatarsus and the third projection being located in the area of the phalanges, said projections decreasing in height from the first projection to the second projection and from the second projection to the third projection, said inner sole being mounted in said outsole by means of an annular welt.

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**4,747,220**
**CLEATED SOLE FOR ACTIVEWEAR SHOE**
**James C. Autry, Dallas, Tex., and Lin Yung-Mao, Taichung, Taiwan, assignors to Autry Industries, Inc., Dallas, Tex.**
**Filed Jan. 20, 1987, Ser. No. 4,679**
**Int. Cl.[4] A43C *15/02*; A43B *5/00***
**U.S. Cl. 36—59 R** **6 Claims**

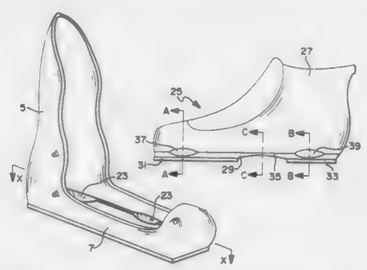


1. A shoe comprising:
an upper;
a midsole for attachment to said upper and having a midsole bottom surface;
a cleat layer having a substantially flat member joined to said midsole bottom surface, said cleat layer further comprising a plurality of cleats formed on said flat member and depending therefrom; and
an outsole for disposal beneath and joined to said flat member and having a plurality of perforations each in registry with a respective cleat, each cleat inserted through a respective perforation, a bottom surface of the shoe formed by said outsole and said cleat;
said outsole including heel and forefoot areas corresponding to the heel and forefoot of the foot of the wearer, a first concentric set of said cleats formed about a center in said heel area, a second concentric set of said cleats formed about a center in said forefoot area, such that said concentric sets are disposed to receive the main weight of the wearer.

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**4,747,221**
**SKI BOOT AND SPORT SHOE ASSEMBLY**
**Jaye B. Hayes, 691 Orchard Dr., NW., Lancaster, Ohio 43130**
**Filed Jun. 2, 1986, Ser. No. 869,279**
**Int. Cl.[4] A43B *5/04, 7/14, 3/26***
**U.S. Cl. 36—119** **8 Claims**

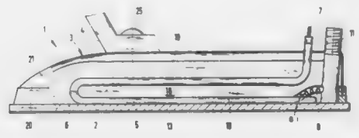
1. A ski boot system for rigidly mounting any one of a plurality of varying sized inner sport shoes within a single outer ski boot, comprising:
rigid mounting means provided on each one of said varying sized sport shoes; and
support means having surfaces complementary to said mounting means and provided in said outer ski boot for registering with said mounting means and for supporting



any one of said varying sized sport shoes so as to provide a rigid connection therebetween.

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**4,747,222**
**HIGH-PRESSURE STEAM FLATIRON**
**Günther Riba, Rosenbergstr. 26, D-5455 Hardert, Fed. Rep. of Germany 44**
**PCT No. PCT/EP86/00215, § 371 Date Nov. 21, 1986, § 102(e) Date Nov. 21, 1986, PCT Pub. No. WO86/06116, PCT Pub. Date Oct. 23, 1986**
**PCT Filed Apr. 15, 1986, Ser. No. 946,715**
**Claims priority, application Fed. Rep. of Germany, Apr. 16, 1985, 3513508**
**Int. Cl.[4] D06F *75/06***
**U.S. Cl. 38—77.7** **9 Claims**



1. A flatiron comprising a base element configured as a plane plate with an ironing bottom; a casing element with a handle; a heating coil attached to the plane plate on top thereof; evaporator means designed as a tubular coil and attached to the plane plate on top thereof, the evaporator means communicating with the bottom side of the base element through bores; and thermostat means for regulating the adjustable temperature of the base element.

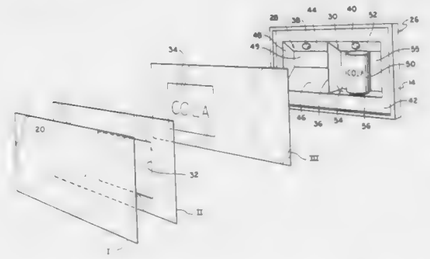
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**4,747,223**
**MIRRORED COMMUNICATION SYSTEM**
**Cesar Borda, 666 E. Ocean Boulevard #2606, Long Beach, Calif. 90802**
**Filed Nov. 13, 1985, Ser. No. 797,572**
**Int. Cl.[4] G09F *13/12***
**U.S. Cl. 40—219** **16 Claims**

1. A communication apparatus comprising:
partially transparent mirror means extending continuously over a preselected area and having a distribution of reflective material which varies in optical density over the area to define a plurality of partially transparent regions different from one another in optical transmittance;



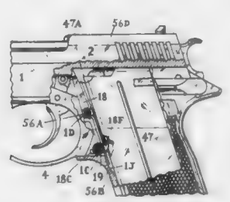
means for providing images behind the mirror means at said regions; and



means for selectively backlighting said regions so that the images become visible from the front of the mirror means.

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**4,747,224**
**FIREARM MAGAZINE CATCH**
**David E. Smith, Rose Bank, 40 Berry Lane, Wootton, Northamptonshire NN4 0JX, England**
**Filed Jun. 26, 1987, Ser. No. 67,615**
**Claims priority, application United Kingdom, Jun. 26, 1986, 8615611**
**Int. Cl.[4] F41C *25/06***
**U.S. Cl. 42—7** **9 Claims**



1. A fire-arm comprising a frame provided with a grip portion having a space therein adapted to receive a cartridge magazine of the box type, said magazine having a forwardly facing surface and a rearwardly facing surface, one of said surfaces having detent means therein; a catch member mounted for pivotal movement about an axis extending transversely of said frame for movement of a catch thereon into and away from a detent engaging position in which it is adapted to engage with the detent of a magazine when such magazine is received in said space, said frame having two side walls between which said catch member extends, said side walls being pierced with opposite holes; a pair of release buttons, one in each hole, each said release button having inner and outer ends and having a flange at its inner end retaining it in its hole, said catch member having a pair of inclined cam surfaces thereon with the inner ends of the buttons engaging respective ones of said inclined cam surfaces whereby upon pressing of either button into the frame the catch member will pivot to move the catch away from its detent engaging position; and a catch return spring comprising two legs engaging the frame joined by a bight portion, the bight portion engaging the catch member to urge the catch member to pivot towards its catch engaging position and the two legs also engaging respective ones of the buttons to urge them outwardly to project through the holes.

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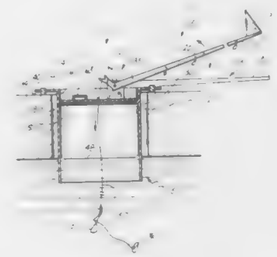
**4,747,225**
**WEAPON BARREL WITH METALLORGICALLY BONDED WEAR RESISTANT LINER**
**Manfred Gstettner; Bruno Hribernik, and Alexander Kohnhauser, all of Kapfenberg, Austria, assignors to Vereinigte Edelstahlwerke Aktiengesellschaft (VEW), Vienna, Austria**
**Filed Dec. 14, 1983, Ser. No. 561,279**
**Claims priority, application Austria, Dec. 23, 1982, 4679/82**
**Int. Cl.[4] F41C *21/02*; B22F *7/04***
**U.S. Cl. 42—76.02** **12 Claims**



1. A weapon barrel comprising a liner and at least one jacket tube, the liner and the at least one jacket tube being made of different metallic materials, said weapon barrel being produced by the method comprising the steps of:
providing an encasing tube defining the jacket tube and having two ends and made of a tough alloy;
placing into said encasing tube a packing of a highly wear-resistant, powdery material for forming the liner;
closing said encasing tube at said ends thereof and evacuating the same;
heating said encasing tube after closing the same to a temperature of at least 900° C., but below the melting points of said encasing tube and said packing and simultaneously subjecting said closed encasing tube to a pressure of at least 900 bar to form a compound body with a substantially full-area metallurgical bond between said encasing tube and the powdery material which has been compressed, and
mechanically working said compound body to form said weapon barrel.

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**4,747,226**
**ICE FISHING ACCESSORY**
**Harry V. Todd, 2429 Windmill View, El Cajon, Calif. 92020**
**Filed Aug. 10, 1987, Ser. No. 83,173**
**Int. Cl.[4] A01K *97/01***
**U.S. Cl. 43—4** **20 Claims**



1. A fishing assembly adapted to prevent an ice hole from freezing, comprising:
a tubular hollow elongated sleeve for fitting inside the ice hole;
a flange means secured to said sleeve for retaining it securely in position inside the ice hole;
cover means secured removably to the upper end of said sleeve for closing it over;

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said cover means defining an entranceway to the ice hole; and

means for supporting said cover means entirely within the hollow interior of said sleeve at a substantial distance from the upper edge thereof, thereby tending to prevent inadvertent dislodgement thereof.

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**4,747,227**

**FISHING ROD AND METHOD OF ASSEMBLING SUCH**

**James H. Kress, Satellite Beach, Fla., assignor to Tournament Tackle, Inc., Satellite Beach, Fla.**

**Filed Jun. 27, 1986, Ser. No. 879,600**
**Int. Cl.[4] A01K *87/02***
**U.S. Cl. 43—18.1** **17 Claims**



1. A method of assembling a foregrip to a fishing rod with the fishing rod being cut to create a pair of rod portions each having a pair of opposite end sections, a generally tubular receptacle, an enlargement body having a pair of opposite end portions with a bore interposed therebetween, and a hardenable adhesive material, the method comprising the steps of:

hardening the hardenable adhesive material in place between the tubular receptacle and one of the opposite end sections of one of the rod portions inserted into the tubular receptacle;

securing one of the opposite end sections of the other of the rod portions in the bore of the enlargement body adjacent one of the opposite end portions thereof by hardening the hardenable adhesive material in place between the bore and the one opposite end of the other rod portion;

inserting the tubular receptacle into the bore of the enlargement member adjacent the other of the opposite end portions thereof;

releasable retaining the tubular receptacle against displacement with respect to the bore of the enlargement body; and

providing a foregrip having a pair of generally opposite ends with a generally conic inner circumferential surface interposed therebetween, and a generally conic outer circumferential surface on the enlargement body and wherein the method comprises the intermediate step of associating the conic inner circumferential surface of the foregrip about the one rod portion and moving the conic inner circumferential surface of the foregrip at least in part into wedging engagement with at least a part of the conic outer circumferential surface of the enlargement body.

6. A fishing rod comprising:

a generally elongate rod member;

a generally conic enlargement on said rod member;

a foregrip releasable retained in an assembled position in wedging engagement with said generally conic enlargement on said rod member against movement relative to said rod member, and said foregrip including an outer circumferential surface with at least a part thereof extending substantially the length of said foregrip and being eccentric with respect to said rod member and adjustably disposed in a preselected angular position generally circumferentially about said rod member part so as to extend generally radially therefrom when the foregrip is in its assembled position; and

means mounted on the rod and associated with the forward end of said foregrip for releasably retaining said foregrip against movement from the assembled position.

13. A foregrip adapted for releasable securement to a fishing rod, the foregrip comprising:

a body having a pair of generally opposite end portions;

a generally conic inner circumferential surface within said body and interposed between said opposite end portions thereof;

an outer circumferential surface on said body interposed between said opposite end portions thereof and with at least a part of said outer circumferential surface being eccentrically arranged with said conic inner circumferential surface and extending substantially the length of said foregrip;

an inner member having a generally conic outer surface for mating with said inner surface of said body, said inner member being adapted for fixed attachment to a fishing rod; and

means mounted on the inner member abutting at least one end of said body for releasably securing said body to said inner member.

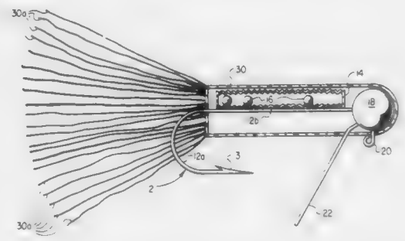
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**4,747,228**

**FISHING LURE**

**Johnnie Giovengo, Jr., P.O. Box 513, Loving, N. Mex. 88256**

**Filed Apr. 20, 1987, Ser. No. 40,630**
**Int. Cl.[4] A01K *85/00***
**U.S. Cl. 43—42.31** **11 Claims**



1. A fishing lure assembly comprising a hook, a closed hollow cylinder disposed adjacent said hook having a cylindrical inner wall and two end portions, said cylindrical inner wall being roughened along its entire length, and at least one member disposed in said cylinder and adapted to move in said cylinder to generate a noise when the lure assembly is moved in water to attract fish to said hook.

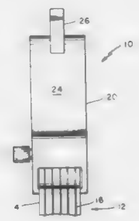
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**4,747,229**

**CRAWLING SLUG AND PEST EXTERMINATOR**

**Carl F. Chambers, Robinston, Me. 04671**

**Filed Oct. 27, 1986, Ser. No. 923,646**
**Int. Cl.[4] A01M *1/22***
**U.S. Cl. 43—112** **20 Claims**



1. A crawling slug and pest exterminator comprising: an elongate strip for deployment at the boundary of an area to be protected, said strip comprising an elongate base of flexible dielectric insulating material suitable for rolling up the strip in a roll for storage and for unrolling the strip for placement on the ground or other boundary surface, a plurality of flexible electrical conductors mounted in parallel spaced apart relationship along the base, said conductors being exposed over the upper surface of the conductors for contacting a crawling slug or pest passing over the strip, said conductors being spaced apart in parallel a distance less than the average length of the target slugs or pests to be exterminated, the odd number conductors being electrically connected with first coupling means for coupling to the ground voltage side of a battery or portable DC voltage source, the even number conductors being electrically connected with second coupling means for coupling to the high voltage side of the battery or portable DC voltage source, said odd and even conductors and first and second coupling means thereby forming parallel open circuits closed by crawling slugs or pests passing over the strip when the strip is unrolled and deployed at the boundary of an area to be protected.

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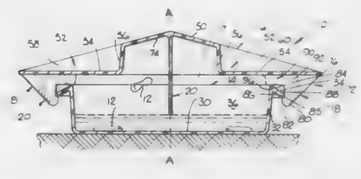


**4,747,230**

**SLUG TRAP**

**Dean R. Zalesky, Aurora, Colo., assignor to Randean, Inc., Aurora, Colo.**

**Filed Feb. 25, 1987, Ser. No. 18,963**
**Int. Cl.[4] A01M *1/00***
**U.S. Cl. 43—121** **9 Claims**



1. A slug trap device for use in a garden area or the like for luring and trappingly collecting slugs comprising:

a container means for receiving and containing slug bait therein and for receiving and containing slugs therein which are attracted to said bait, having a circular bottom wall and an upstanding generally cylindrical sidewall integrally formed with said circular bottom wall and an outwardly and downwardly extending annular lip integrally formed with said sidewall at an upper portion thereof adapted to provide a ramp surface for facilitating the ingress of slugs into said container means and also adapted to coact with latch means, said bottom wall and said sidewall defining a cylindrical container cavity;

lid means for covering said container means for shielding said container means from rain, said lid means comprising a generally conically shaped wall having an upper surface and a lower surface and adapted to extend a substantial radial distance beyond said container means annular lip for making the device resistant to being overturned by an animal, wind or the like;

lid attachment means for releaseably attaching said lid means to said container means comprising at least a first and second circumferentially compact latch means fixedly attached to said lid means at said bottom surface thereof near the periphery of said lid means, said first and second latch means having an inwardly opening, generally hook shaped portion adapted to latchingly engage said outwardly and downwardly extending annular lip portion;

lid axial spacing means fixedly associated with a peripheral portion of said lid means for uniformly spacing an axially opposite portion of said lid means at a relatively constant axial distance from said container means for providing an annular axial gap of sufficient dimension to allow ingress of slugs into said container threrethrough whereby a means of enabling slugs to enter said container means is provided without providing holes in said lid means or said container means; and

said lid means being supported entirely on an upper peripheral portion of said container means whereby the need for lid support structure on said container means circular bottom wall is obviated.

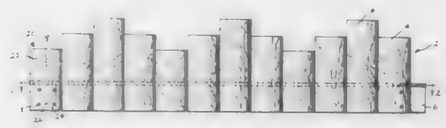
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**4,747,231**

**LANDSCAPE EDGING**

**Larry R. LeMay, and Sharon M. LeMay, both of Rte. 2 Box 176A, Holcombe, Wis. 54745**

**Filed Aug. 19, 1986, Ser. No. 897,926**
**Int. Cl.[4] A01G *1/00***
**U.S. Cl. 47—33** **9 Claims**



1. A landscape edging comprising a plurality of vertically-placed log sections removably engaged adjacent to each other on a length of flexible non-corrodable strip material, each length of strip material having two longitudinal edges and a bead-shaped projection along the length of said strip engaging in a bead-shaped portion of a slot cut vertically through one end of each log section, whereby a required length of landscape edging is formed by securing end log sections to said length of flexible strip material.

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**4,747,232**

**VEHICLE FRAMELESS DOOR WINDOW STABILIZER**

**Randy L. Stephenson, Brighton, and Larry A. Lohr, Howell, both of Mich., assignors to Cars & Concepts, Inc., Brighton, Mich.**

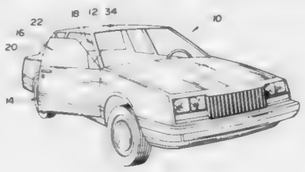
**Filed Aug. 1, 1986, Ser. No. 892,804**
**Int. Cl.[4] E05D *13/00***
**U.S. Cl. 49—452** **13 Claims**

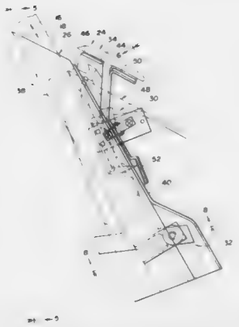
1. In a vehicle including a side door opening and a side door for opening and closing the door opening, said side door including a frameless type door window movable vertically between open and closed positions, and said side door window having front and rear vertical edges and a top edge extending between the front and rear vertical edges, a window stabilizer comprising: a molded plastic stabilizer member having a vertical groove that slidably receives one of the vertical edges of the side door window to control the path of movement and positioning thereof in the closed position; the groove of the stabilizer member converging in an upward direction and having an upper end that tapers horizontally away from the vertical edge of the side door window received by the groove; the stabilizer member being slidably engaged at the upper end of the groove with both oppositely facing surfaces of the side door window at the vertical edge thereof received by the

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groove; and an adjustable connection that supports the stabilizer member on the door while permitting adjustment to





control the horizontal positioning of the top edge of the window in the closed position.

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**4,747,233**

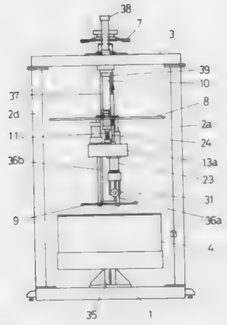
**DRIVING APPARATUS FOR WORK HOLDING SHAFTS IN GYROFINISHING MACHINE**

**Hisamine Kobayashi, and Toshiharu Shimizu, both of Nagoya, Japan, assignors to Tipton Manufacturing Corporation, Nagoya, Japan**

**Filed Sep. 17, 1986, Ser. No. 908,503**

**Int. Cl.[4] B24B** *31/00*

**U.S. Cl. 51—7** **3 Claims**



1. In a gyrofinishing machine including gyratory shafts for holding individual workpieces, containers for containing flowing abrasive media for subjecting the surfaces of the workpieces to the abrading action of the abrasive media flowing within the containers, and a driving apparatus for the gyratory shafts, the improvement comprising said driving apparatus having

a housing for each of the gyratory shafts, each said housing being vertically adjustable, each said gyratory shaft being journaled within the corresponding housing; and

means for driving each said gyratory shaft for rotation and accomodated within the corresponding housing, said driving means including a pinion secured to each said gyratory shaft, a rack meshing with said pinion, and means for causing the reciprocating motion of said rack for reciprocating each said driven gyratory shaft.

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**4,747,234**

**APPARATUS FOR FINE-MACHINING CRANKSHAFT PINS**

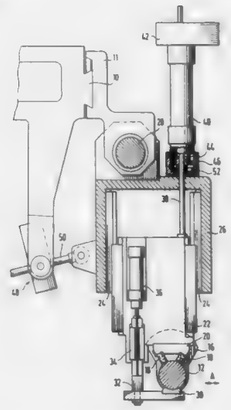
**Wilfried Weber, Moesingen, Fed. Rep. of Germany, assignor to Maschinenbau Grieshaber GmbH & Co., Wolfach, Fed. Rep. of Germany**

**Filed Sep. 26, 1986, Ser. No. 911,774**

**Claims priority, application Fed. Rep. of Germany, Jun. 20, 1986, 8616462**

**Int. Cl.[4] B24B** *5/00*

**U.S. Cl. 51—154** **6 Claims**



1. Apparatus for fine-machining the pins of rotating crankshafts and the like comprising, in combination:

(a) grinding means arranged for engaging a workpiece to be machined; and

(b) biasing means arranged engaging the workpiece in an area opposite engagement of the workpiece by the grinding means for creating a predetermined force between the grinding means and the workpiece to be machined, said biasing including:

(1) carrier means for supporting the grinding means;

(2) carriage means mounted on the carrier means for sliding movement toward and away from a workpiece to be machined;

(3) shoe means mounted in the carriage means for movement therethrough and arrangeable biasingly engaging a workpiece to be machined;

said biasing means further including holder means fixed to the carriage means; and fluid motor means mounted on the carrier means and connected to the carriage means for moving the carriage means toward and away from a workpiece to be machined.



**4,747,235**

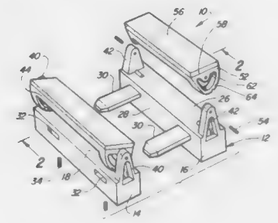
**DEVICE FOR SHARPENING BROADHEADS**

**Raymond G. Priebe, P.O. Box 691, Grayling, Mich. 49738**

**Filed Mar. 6, 1987, Ser. No. 22,877**

**Int. Cl.[4] B24D** *15/02*

**U.S. Cl. 51—211 R** **5 Claims**



1. A device of sharpening broadheads comprising

a base,

a first hone,

a second hone,

means for pivotally mounting said first hone to said base about a first axis,

means for pivotally mounting said second hone to said base about a second axis,

wherein said first and second axes are spaced apart and parallel to each other

wherein each of said pivotal mounting means comprises detent means for releasably locking each of said hones at at least two predetermined angular positions of said hones with respect to said base.

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**4,747,236**

**METHOD FOR WORKING, BY METAL-CUTTING PROCESSES, THE SURFACES OF PROFILES HAVING A NON-CIRCULAR CONTOUR, IN PARTICULAR CAMSHAFTS**

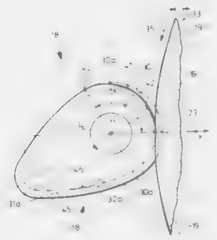
**Horst J. Wedeniwski, Remshalden-Grunbach, Fed. Rep. of Germany, assignor to Fortuna-Werke Maschinenfabrik GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Aug. 13, 1986, Ser. No. 896,520**

**Claims priority, application Fed. Rep. of Germany, Aug. 14, 1985, 3529099**

**Int. Cl.[4] B24B** *19/12*

**U.S. Cl. 51—281 C** **4 Claims**



1. A method of metal cutting a cam blank to produce a cam having a circumferential cam profile which includes a base circle, said method comprising the steps of:

applying a metal cutting tool to the blank at a point thereon located radially outwardly from the base circle of said cam profile;

rotating the blank through an arc no greater than 180° while simultaneously effecting a feed mode of operation in which the tool and blank are fed toward one another until the tool reaches a point on the base circle which is offset by no more than 180° from the point at which the tool is applied to the blank; and

thereafter rotating the cam through an angle of substantially 360° while simultaneously effecting a path controlled mode of operation in which the tool is maintained on said circumferential cam profile to remove all material on the blank outwardly of said cam profile.

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**4,747,237**

**METHOD FOR MANUFACTURING A FINISHED TURBINE BLADE FROM A RAW WORKPIECE**

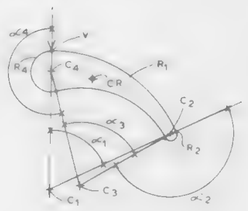
**Karl-Heinz Giebmanns, 1 Ledgemoor La., Westport, Conn. 06880**

**Continuation-in-part of Ser. No. 876,809, Jun. 20, 1986, Pat. No. 4,686,796. This application Apr. 3, 1987, Ser. No. 35,538**

**The portion of the term of this patent subsequent to Aug. 18, 2004, has been disclaimed.**

**Int. Cl.[4] B24B** *5/00;* **B21K** *1/20;* **B23P** *13/00*

**U.S. Cl. 51—328** **4 Claims**



1. A method for manufacturing a finished turbine blade from a raw workpiece comprising the following steps:

beginning with a raw unfinished workpiece of suitable size, and

(1) selecting an arbitrary center of rotation of the workpiece for mounting the workpiece on a spindle,

(2) defining each of a plurality of profiles of the workpiece in a respective number of planes perpendicular to said spindle axis, each profile being defined as a series of circle segments each circle segment having a center and an angular length,

(3) measuring each respective distance from the center of rotation to each circle segment center,

(4) plotting on a data receiving medium the hypothetical paths of the center of rotation of the workpiece in each of said planes perpendicular to the spindle axis, each said hypothetical path being the path the center of rotation would follow if the center of rotation were rotated in series about each of said circle segment centers through each of said respective angular lengths, each of said hypothetical paths being a series of circle segments defined by a series of end points, each end point corresponding to each of said circle segments,

(5) synchronizing (a) movement of a sanding shoe axis in the vertical direction and (b) movement of the workpiece in a horizontal direction perpendicular to the spindle axis of rotation and (c) rotation of the workpiece on the spindle axis such that

as the workpiece rotates through an angular length defined in step 2, the horizontal position of the workpiece and vertical position of the shoe are moved in a circular path, said path having a radius equal to the corresponding distance measured in step 3, in the respective plane perpendicular to the spindle axis from the respectine end point corresponding to the respective angular length to the next respective end point in the series of end points defined in step 4,

(6) repeating step 5 for each circle segment in series,

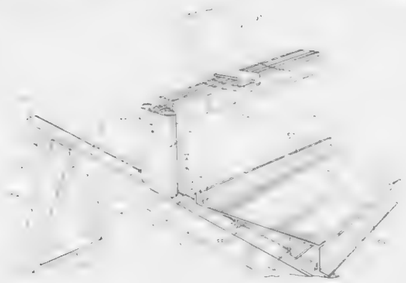
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(7) incrementing the positioin of the workpiece in a horizontal direction parallel to the spindle axis, and
(8) repeating steps 5 through 7 for each profile of the workpiece until the turbine blade is completely polished.

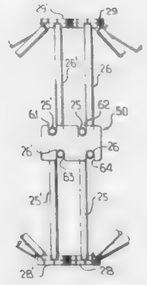
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**4,747,238**
**TERRACE INSTALLATION**
**Ulf Wikström, Alnö , and Ruben Madsen, Sundsvall, both of Sweden, assignors to Sit Down Aktiebolag, Sundsvall, Sweden**
**PCT No. PCT/SE86/00179, § 371 Date Dec. 31, 1986, § 102(e) Date Dec. 31, 1986, PCT Pub. No. WO86/06433, PCT Pub. Date Nov. 6, 1986**
**PCT Filed Apr. 18, 1986, Ser. No. 10,132**
**Claims priority, application Sweden, Apr. 30, 1985, 8502099**
**Int. Cl.⁴ E04H** *3/12*
**U.S. Cl. 52—8** **11 Claims**



1. A portable terrace installation with seats, including one or more sections, each section comprising:
a pair of sloping joists;
a number of upright seating beam pillars connected to said sloping joists;
a corresponding number of parallel and horizontal seating beams connected to said beam pillars and extending between opposite beam pillars on said pair of joists, each seating beam having opposite ends and having a height which is greater than its width, each said beam pillar having a side facing said seating beam;
a flat floor surface extending between said seating beams and connected to said joists;
a number of free standing trestles for supporting said joists;
a first connecting element provided on said side of said beam pillar facing said seating beam, said first connecting element extending essentially vertically along said side, said first connecting element having a length essentially as long as the height of said seating beam or longer, said first connecting element comprising a female member open at an upper end thereof, said female member being terminated by a support surface;
a second connecting element connected to each end of said seating beam and being essentially vertical, said second connecting element comprising a male member having a height essentially the same as the height of said seating beam, said first and second connecting elements being connectable to join a seating beam with opposite beam pillars without a wedge effect between said male and female members until said male member rests against said support surface of said female member, said male member including a sideways extending waist member terminating with a widened portion for preventing said seating beam and said beam pillar from separating from each other due to tractive forces on said seating beam or sideways effects on said beam pillars or said joists.

**4,747,239**
**BRACKETS FOR CONNECTING ADJACENT EXHIBIT FRAMES TOGETHER**
**Theodore R. Zeigler, 9923 Indian Queen Point Rd., Oxon Hill, Md. 20022**
**Filed Nov. 17, 1983, Ser. No. 552,719**
**Int. Cl.³ E04H** *12/18*
**U.S. Cl. 52—109** **10 Claims**



1. The combination of a pair of collapsible and expandable structures and a bracket for releasably securing the pair of structures together comprising a plurality of pairs of crossed rods defining each of said pair of structures, means for interconnecting said plurality of pairs of crossed rods of each structure for effecting movement thereof between a collapsed position at which said rods are disposed in a compact bundle of side-by-side rods and an erected expanded position a which each structure includes a lateral upstanding side defined by at least two crossed rods disposed in a generally X-shaped pattern, said structures being positioned with their lateral upstanding sides immediately adjacent each other, said bracket spanning said lateral upstanding sides, said bracket including first and second means for slidingly engaging, releasably securing and slidingly disengaging said bracket to one rod of each of said two crossed rods of each lateral side, respectively, whereby said bracket can be moved toward and away from the interconnecting means to respectively engage and disengage the bracket relative to the rods.

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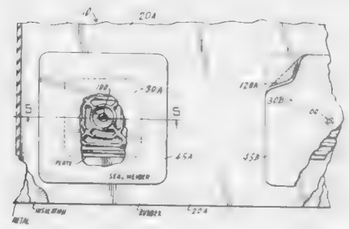
**4,747,240**
**ENCAPSULATED PCM AGGREGATE**
**Walter E. Voisinet, Colden, N.Y.; Deall Daymon, Richardson, Tex., and John A. Slyh, Lansdale, Pa., assignors to National Gypsum Company, Dallas, Tex.**
**Filed Aug. 6, 1981, Ser. No. 290,617**
**Int. Cl.⁴ F24D** *5/10;* **F04B** *1/76*
**U.S. Cl. 52—173 R** **14 Claims**

1. An inorganic cementitious interior building material comprising primarily inorganic material and including a cementitious ingredient for binding together all of the elements of said building material and, dispersed therewithin, a substantial and up to about 75% by volume portion of small particles of a phase change material having a substantial latent heat of fusion at a temperature in the range of about 10° C. to 30° C., said phase change material being in a form which retains its particle integrity during repeated cycles of melting and freezing.

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**4,747,241**
**DEVICE FOR FACILITATING INSTALLATION OF RUBBER ROOF SHEETS**
**Robert E. Whitman, 1-2143 Sherwood La., Swanton, Ohio 43558**
**Filed Aug. 9, 1985, Ser. No. 764,101**
**Int. Cl.⁴ E04D** *5/14*
**U.S. Cl. 52—173 R** **1 Claim**

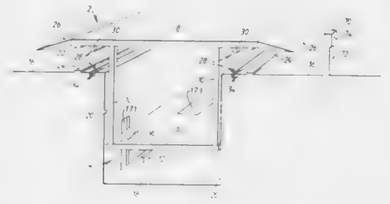
1. A base bonding plate member used to help affix rubber roof sheets to the upper surface of a roof structure, said base bonding plate member comprising:
(a) a rectangularly-shaped base member, having an upper surface and a lower surface, and having a perimeter edge which perimeter edge defines the outer limits of such plate, said base plate member having on its upper surface a circular inner ridge which encircles an opening to receive a longitudinal fastening device, and wherein said base member has on its upper surface a plurality of additional concentric ridges of square-shaped configurations which are radially outwardly of said circular ridge, and wherein there are a plurality of longitudinal straight ridges extending radially outwardly from the circular ridge to the perimeter of said base member;
(b) removable adhesive means on the upper surface of said base member adapted to be placed and removed from the upper surface of said base member to aid in sealing the rubber roof to the bonding plate base member.





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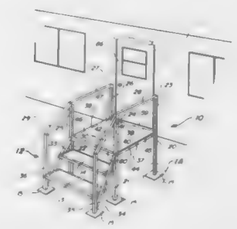
**4,747,242**
**TWO LEVEL STRUCTURE FOR PARKING VEHICLES OR STORING GOODS**
**Einar Aarstad, Lysaker, Norway, assignor to Up and Down Garage System A/S, Stabekk, Norway**
**Filed Jun. 10, 1986, Ser. No. 872,653**
**Claims priority, application United Kingdom, Jul. 1, 1985, 8516564**
**Int. Cl.⁴ E01F** *9/00*
**U.S. Cl. 52—174** **5 Claims**



1. A two level structure for parking vehicles or storing goods, which structure comprises:
(i) a sunken pit;
(ii) first and second spaced apart platform members which are for receiving the vehicles or the goods;
(iii) support means which is mounted on the first platform member and which supports the second platform member in a fixed horizontal position above the first platform member;
(iv) an access hatch which is provided in the first platform member and which is for permitting access to the pit beneath the first platform member;
(v) mover means for moving the platform members from a first position in which the first platform member is in the pit and the second platform member is at ground level to a second position in which the first platform member is at ground level and the second platform member is above ground level;
(vi) a water sealing arrangement for preventing the ingress of water into the pit;
(vii) emergency stop means for automatically stopping the descent of the first and second platform members in the event that the second platform members encounters an obstacle;
(viii) a water drainage arrangement for draining water from the bottom of the pit;
(ix) a peripheral overlap portion which extends from the second platform member to overlap the rim of the pit and which is such that it is strong enough to withstand the weight of vehicles being parked running over it; and
(x) ramp members which are positioned around the edges of the second platform member and which are pivotally attached to the second platform member in order to allow for variations in ground level over different parts of the ground around the rim of the pit;
the water sealing arrangement comprising an elongate seal provided on a lower surface of the overlap portion of the second platform member and spaced inwardly of a peripheral edge of said overlap portion, and a complementary elongate seal provided on the ground around the rim of the pit and spaced radially outwardly from the rim of the pit, the two seals being arranged to be in water-sealing cooperating registry when the second platform member is at ground level; and
the emergency stop means comprising a pressure responsive spring biased electrical contact member which is provided on the overlap portion of the second platform member between the elongate seal and the rim of the pit, and a channel provided in the ground around the rim of the pit between the said complementary elongate seal and the rim of the pit, the pressure responsive spring biased electrical contact member being such that it normally locates in the channel and such that it operates to activate the emergency stop means if it is prevented by the obstacle from normally locating in the channel.

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**4,747,243**
**COLLAPSIBLE PORCH**
**Kenneth L. Anstead, 190 Green Acres Dr., Anderson, Calif. 96007**
**Filed May 1, 1987, Ser. No. 44,749**
**Int. Cl.⁴ E04B** *1/343*
**U.S. Cl. 52—184** **10 Claims**



1. A portable collapsible porch for use with campers, camping trailers and the like, comprising:
a platform structure having a top surface and a bottom surface and consisting substantially of:
a first rod having a left end and a right end;
a second rod having a left end and a right end oriented substantially parallel to said first rod;
a third rod having a first end pivotally attached to said left end of said first rod and a second end;
a fourth rod having a first end pivotally attached to said left end of said second rod and a second end pivotally attached to said second end of said third rod;

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a fifth rod having a first end pivotally attached to said right end of said first rod and a second end, and

a sixth rod having a first end pivotally attached to said right end of said second rod and a second end pivotally attached to said second end of said fifth rod,

so that said platform structure folds into a compact substantially rectangular unit for storage;

a first leg attached to said platform structure near said left end of said first rod;

a second leg attached to said platform structure near said right end of said first rod;

a third leg attached to said platform structure near said left end of said second rod;

a fourth leg attached to said platform structure near said right end of said second rod;

a stairway structure attached to said platform structure, and

a protective rail structure positioned above said top surface of said platform structure to ensure the safety of individuals using said portable collapsible porch.

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**4,747,244**

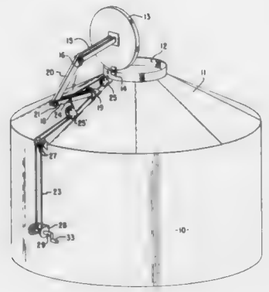
**BIN CAP OPERABLE FROM THE GROUND**

**Glenes O. Christianson, P.O. Box 182, Spicer, Minn. 56288**

**Filed Feb. 25, 1987, Ser. No. 18,931**

**Int. Cl.[4] E04N** *7/22, 7/30;* **B65D** *43/26*

**U.S. Cl. 52—192** **3 Claims**



1. For a metal bin adapted to stand on the ground and having side walls, a roof on said side walls and a cap hingedly connected to said roof and adapted to cover an opening formed in said roof; a closing mechanism comprising a linkage including an arm fixed to said cap, a second arm pivotally mounted on said roof and a link pivotally connected to both arms to transmit motion from one arm to another; a rope attached to said second arm and extending in opposite directions therefrom; pulleys mounted on said roof substantially in the plane of movement of said second arm, one pulley being mounted on each side of the pivoted mounting of said second arm; said rope being entrained over said pulleys to provide positive pulling of said second arm in both directions about said pivoted mounting.

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**4,747,245**

**REFRIGERATOR DOOR ASSEMBLY AND METHOD**

**Stephen C. Lesmeister, and Thomas E. Jenkins, both of Louisville, Ky., assignors to General Electric Company, Louisville, Ky.**

**Filed Jun. 11, 1987, Ser. No. 60,684**

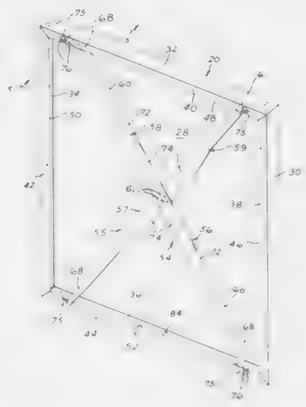
**Int. Cl.[4] E04C** *2/34*

**U.S. Cl. 52—309.7** **6 Claims**

1. A refrigerator door assembly comprising:

an outer metal rectangular shaped shell having a base panel, four upwardly turned side panels on each side and perpendicular to the base panel and two sets of two opposite facing inturned flanges, each flange being perpendicular to each of the side panels and having free terminal edges; and

two cross braces, each having two legs, each of the legs having at one end a U-shaped channel section having an offset portion terminating with a flat tab, an intermediate



section and a flat section at the end opposite channel section, the flat sections of two legs being rigidly secured to each other to accommodate the desired brace length to diagonally span the door such that the cross braces form an X and the flat tabs of each brace are secured to one set of opposite facing flanges.

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**4,747,246**

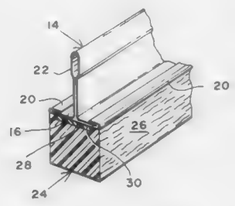
**SUSPENDED CEILING STRUCTURE**

**James V. Sanborn, 214 SW. 21st Ter., Ft. Lauderdale, Fla. 33301**

**Filed Mar. 6, 1987, Ser. No. 22,995**

**Int. Cl.[4] E04C** *2/38*

**U.S. Cl. 52—311** **2 Claims**



1. A suspended ceiling having a multiplicity of rectilinear panels held within a co-planar matrix of inverted T-grid elements having horizontal and vertical components, each vertical component suspended from a natural ceiling, the improvement comprising:

a plurality of imitation beams secureable to said horizontal component of said inverted T-grid elements after installation of said suspended ceiling has occurred, each of said imitation beams themselves comrising:

(a) an elongate rectilinear element complemental on at least one surface with said horizontal component of said T-grid elements, said one surface of said horizontal component comprising a ferro-magnetic material; and

(b) means for effecting a press-fit securement of said elongate element to said horizontal component of said T-grid element, said press-fit means imbedded within said complemental surface of said elongate rectilinear element said press-fit means comprising a permanent magnet,



whereby an imitation beam structure for a suspended ceiling may be achieved through the affixation of said rectilinear elements to said horizontal components of said matrix of inverted T-grid elements.

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**4,747,247**

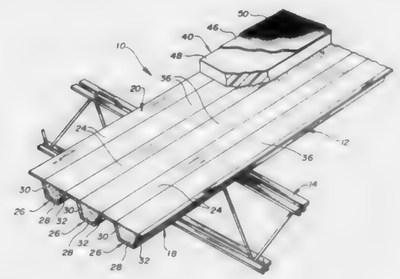
**ROOF SYSTEM**

**Wayne E. Petersen, Jr., Granville; Gordon P. Petrash, Newark; David L. Roodvoets, Westerville, and Elizabeth A. Riley, Newark, all of Ohio, assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Sep. 19, 1986, Ser. No. 909,352**

**Int. Cl.[4] C04B** *5/00*

**U.S. Cl. 52—408** **13 Claims**



1. A fire retardant roof structure comprise a deck with a plurality of alternating troughs and crests, a meltable plastic insulation layer overlying said deck and a fire retardant comprising a plurality of non-flammable absorbent strips, said absorbent strips being comprised of a loose packed, granular material disposed in said troughs for retarding the flow of liquid and vaporous insulation material during a fire by absorbing the liquid and vaporous insulation material flow in the trough.

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**4,747,248**

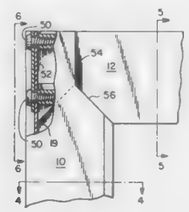
**CORNER CONSTRUCTION FOR EXTRUDED FRAME COMPONENTS**

**Robert L. Fahs, Elkhart, Ind., assignor to Philips Industries Inc., Dayton, Ohio**

**Filed May 14, 1987, Ser. No. 49,880**

**Int. Cl.[4] E04C** *2/38*

**U.S. Cl. 52—455** **4 Claims**



1. In a rectangular frame for a storm door or the like, in which extruded aluminum frame members forming the rails and stiles of the rectangular frame are joined together at the corners, the improvement comprising:

a first hollow box-like extruded frame member and having a generally planar front side wall and a parallel generally spaced-apart planar back side wall,

and and inner and outer side wall connecting webs extending between said front and back side walls,

a second hollow box-like extruded frame member also having generally planar and parallel spaced-apart front and back side walls, which walls have substantially the same dimensions in width as the corresponding said side walls of said first member,

said second frame member also having inside and outside connecting webs extending between said front and back side walls,

the spacing between the front and back side walls of said first member being greater than the spaced-apart distances of the corresponding said side walls of said second member permitting said second member side walls to be telescoped in closely fitted relation to the inside surfaces of the corresponding walls of said first member,

the opposite ends of each of said first members having a transverse inner portion of side walls thereof trimmed off along a longitudinal length approximately equal to the transverse width of said back side wall, said trimmed portion terminating at a sloping wall leading to the inside edges thereof at an angle of generally 45°,

said second members at each end thereof having formed therein a generally V-shaped notch extending inwardly from the inner side thereof and defining an included angle of about 90° extending 45° either side of a transverse line normal to the longitudinal length of said second member, and

one side wall of said notch terminating at the butt end of said second member and extending a depth corresponding to the depth of said trimmed portion of said first member, with said butt terminal end adapted to seat against the inside surface of the outside connecting web of said first member and with one side of said notch seated against said sloping wall, and

means retaining said frame members in said abutting seated relation.

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**4,747,249**

**SUBPURLIN AND ATTACHMENT ASSEMBLY**

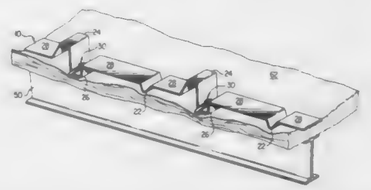
**John R. Bell, III, Germantown; Robert E. Hodges, Jr., Memphis, both of Tenn., and Harold E. Martin, LaGrange, Ga., assignors to AMCA International Corporation, Hanover, N.H.**

**Continuation-in-part of Ser. No. 794,076, Nov. 1, 1985, Pat. No. 4,676,042. This application Jan. 14, 1987, Ser. No. 931,401**

**The portion of the term of this patent subsequent to Jun. 30, 2004, has been disclaimed.**

**Int. Cl.[4] E04D** *1/34*

**U.S. Cl. 52—543** **5 Claims**



1. A unitary slider assembly for interconnecting a subpurlin having an elongate slot therein and a roof structural assembly, comprising:

a member defining a sliding surface for contacting the subpurlin on one side of the subpurlin around the elongated slot, said member further having a ferrule extending from the sliding surface through the elongated slot and an ending beyond the opposite surface of the subpurlin to define a bearing surface; and

said member further having a portion extending therefrom and curved about an edge of the subpurlin to define a washer proximate the bearing surface, said portion being resilient to permit the portion to be deflected so that the washer moves away from the bearing surface to slide the slider assembly over the edge of the subpurlin with the ferrule extending through the elongate slot, said washer

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and ferrule having an aperture formed therethrough for receiving a fastener to fasten the subpurlin to the roof structural assembly so that the subpurlin can slide relative to the slider and roof structural assembly along the direction of the elongated slot.

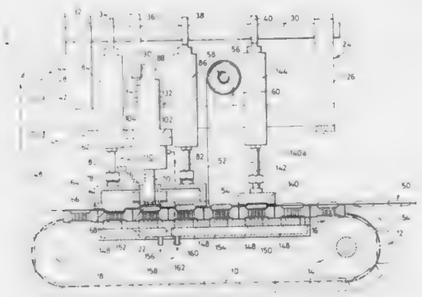
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**4,747,250**

## MACHINE MANUFACTURING PAPER BAGS CONTAINING SOME SUBSTANCE TO PREPARE INFUSIONS OR INFUSED BEVERAGES

**Luigi Rossi, Via Alessandria 1 15055, Pontecurone (Alessandria), Italy**

**Filed Nov. 10, 1986, Ser. No. 929,680**
**Claims priority, application Italy, Nov. 11, 1985, 23784/85[U]**
**Int. Cl.[4] B65B** *31/00*
**U.S. Cl. 53—511** **6 Claims**



1. A machine for packaging a continuous horizontal strip constituted by a lower horizontal ribbon of filter paper having recesses disposed in regularly spaced longitudinally separated position, the recesses being filled with a powdered substance, and an upper horizontal ribbon of filter paper overlying and sealed to the lower ribbon and also sealingly separated each recess with the substance sealed therein, thereby forming individual packets disposed longitudinally end to end and individually separable from the remainder of the strip, said machine comprising;

a longitudinally elongated horizontal flat table top having oppositely disposed feed and discharge ends and having longitudinally spaced vertical bores extending between top and bottom horizontal surfaces of the top;

first means to feed an endless chain horizontally along the top surface of the top in the longitudinal direction in successive like discrete steps from the feed end to the discharge end, said chain being formed by a series of longitudinally spaced like horizontally disposed links secured end to end, each link having a cup shaped recess extending downwardly from a top horizontal surface thereof and also having spaced vertical bores which extend from the bottom of the link recess to the surface of the table top, each discrete step moving the chain along a longitudinal length of a single link;

second means to feed said lower ribbon on top of the chain to cover the top horizontal surfaces of all of the horizontal links;

a first station disposed adjacent the feed end of the top and provided with a vertically elongated member which has upper and lower ends and which moving in timed relationship with the first means is first lowered from a raised position at which the lower end of the member is spaced above the ribbon into a lowered position at which the lower end presses a section of the portion of the underlying lower ribbon into the recess of the underlying link to form a recess in said lower ribbon portion and then is returned to the raised position;

a second station disposed in longitudinally spaced position between the first station and the discharge and provided with third means which operating in timed relationship with the first means fills the recess of the underlying portion of the lower ribbon with a metered quantity of said substance;

a third station disposed in longitudinally spaced position between the second station and the discharge and provided with fourth means which operating in timed relationship with the first means tamps down the substance in the recess in the underlying lower ribbon portion;

fifth means disposed in longitudinally spaced position between the third station and the discharge end to feed the top ribbon over the lower ribbon as the lower ribbon is moved longitudinally from the third station toward the discharge end;

a fourth station disposed in longitudinally spaced position between the fifth means and the discharge end and provided with sixth means to seal the overlying portion of the upper ribbon to the underlying portion of the lower ribbon and to sealingly separate each recess with the substance sealed therein to form said packets;

seventh vacuum operating means associated with the first and second stations and disposed underneath the table top, said seventh means cooperating with the vertical bores in the links and table top to assist the member by vacuum action informing the recesses in the lower ribbon and to remove any scattered substance powders, the seventh means being deactivated during each filling operation at the second station; and

eighth vacuum operating means associated with the third and fourth station and the fifth means and disposed underneath the table top, the eighth means cooperating with the vertical bores in the links and table top to continuously remove scattered substance powders.

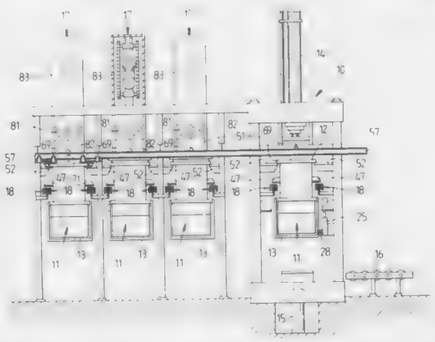
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**4,747,251**

## PORTABLE BIN TRANSFER SYSTEM

**Donald W. Van Doorn; James B. Hawkins; Francis W. Carpenter, III; Wilbur G. Hudson; Tommy W. Webb, and William D. Beeland, all of Columbus, Ga., assignors to Lummus Industries, Inc., Columbus, Ga.**

**Division of Ser. No. 788,623, Oct. 17, 1985, Pat. No. 4,617,862.**
**This application Sep. 2, 1986, Ser. No. 902,607**
**Int. Cl.[4] B65G** *57/00*
**U.S. Cl. 53—250** **10 Claims**



1. An apparatus for moving bins into and out of a station wherein said bins are filled or emptied such that said bins may be transported to a remote location comprising in combination:

(a) a driven shuttle movable selectively through said station and outwardly thereof to bin receiving and discharging positions, said shuttle having a pair of synchronously driven frame members spaced apart for receiving said bins therebetween;

(b) controllable lift means mounted as cooperative pairs on the ends of said frame members for lifting and supporting said bins intermediate said frame members in said station and lowering said bins for removal to said remote location, such that an empty bin and a full bin may be simultaneously supported at the ends of said frame members and moved by said shuttle to and from said station; and

(c) means for supporting said shuttle beneath said spaced apart frame members.



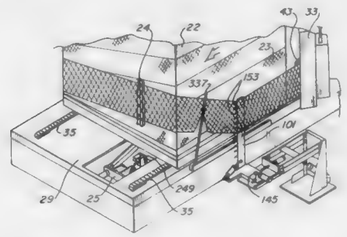
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**4,747,252**

## MATERIAL POSITIONING AND SECURING APPARATUS AND PROCESS

**Milton W. Kapke, Golden, Colo., assignor to Goldco Industries, Inc., Golden, Colo.**

**Filed Dec. 19, 1986, Ser. No. 943,741**
**Int. Cl.[4] B65B** *13/04*
**U.S. Cl. 53—399** **12 Claims**



1. In a device having wrapping means for wrapping material around a plurality of units to form a retainable assemblage with the material being held around said unit by a material engaging member, said device having receiving means at a wrapping station for receiving said plurality of units, and said wrapping means and said receiving means being relatively rotatable, a material positioning and securing apparatus comprising:

manipulation means for engaging said wrapping material and maintaining said material adjacent to said plurality of units until said relative rotation between said wrapping means and said receiving means has occurred to cause initial wraps of said material to be wrapped around said plurality of units, and for thereafter releasing said material prior to wrapping the final wraps of said material around said plurality of units; and

application means for supplying and positioning said material engaging member adjacent to said plurality of units between wraps of said material so that said material engaging member engages and substantially maintains the positioning of at least one of said final wraps with respect to other wraps to thereby securely maintain said material around said plurality of units and thus maintain the relative positioning of said units formed into said assemblage.

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**4,747,253**

## METHOD AND AN APPARATUS FOR THE PROPORTIONING OF THE CONTENTS DURING THE MANUFACTURE OF PACKING CONTAINERS

**Diethard Schulte, Hochheim/Main, Fed. Rep. of Germany, assignor to Tetra Pak International AB, Lund, Sweden**

**Continuation of Ser. No. 819,480, Jan. 16, 1986, abandoned, which is a continuation of Ser. No. 532,482, Sep. 15, 1983, abandoned. This application Apr. 17, 1987, Ser. No. 39,764**
**Claims priority, application Sweden, Sep. 27, 1982, 8205496**
**Int. Cl.[4] B65B** *9/10, 3/26*
**U.S. Cl. 53—433** **12 Claims**

1. A method for manufacturing and filling packing containers, comprising the steps of:

forming a tube from a continuous web of packing material and advancing said tube continuously downwardly in a vertical direction;

conducting a liquid continuously into said tube through a delivery pipe having an outlet for the liquid;

supplying a gas at a predetermined rate to said delivery pipe upstream from said outlet to produce a foamed mixture of said gas and said liquid in predetermined proportions;

filling said tube with said foamed gas-liquid mixture from said pipe to a predetermined level above said outlet;

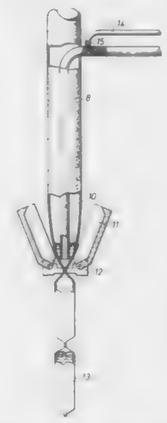
compressing a first portion of the tube together and sealing the tube at a location below said predetermined level;

shaping a second portion of said tube into a packing container, said second portion of said tube being between said first portion and said predetermined level; and subsequently

compressing a third portion of the tube together and sealing said third portion of said tube at a location between said predetermined level and said second portion; whereby said liquid contents subsequently settle and the gas forms an air space in said container according to said predetermined proportions.

7. An apparatus for manufacturing and filling packing containers comprising:

means for feeding a continuous web in a vertical direction and for shaping said continuous web into a tube;



means for sealing a first portion of said tube at a transverse zone thereof so as to form the bottom of a packing container;

a first feed pipe for continuously conducting liquid contents into said tube and terminating adjacent said transverse zone;

a second feed pipe connected to said first feed pipe at a location exterior of said tube for continuously supplying a pressurized gas to the first feed pipe and for mixing the gas and liquid contents in said first feed pipe in predetermined proportions to form a foamed mixture;

an extension of said first feed pipe delivering said foamed mixture and filling said tube to a predetermined level in said tube above said transverse zone;

means for shaping a second portion of said tube into a packing container while said mixture fills said tube to said predetermined level, said second portion of said tube being between said first portion and said predetermined level; and

means for sealing a third portion of said tube at a location between said predetermined level and said second portion to form said packing container having a top portion below said predetermined level so as to fill the container with the liquid contents and the gas defining a predetermined headspace.

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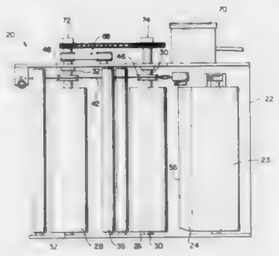


**4,747,254**

## WEB THREADING DEVICE

**Joseph R. Lancaster, Louisville, Ky., assignor to Lantech, Inc., Louisville, Ky.**

**Filed Jan. 2, 1987, Ser. No. 228**
**Int. Cl.[4] B65B *11/04***
**U.S. Cl. 53—556** **23 Claims**



1. A method for threading the leading end of a web through a web path between a series of rollers on shafts in a stretch wrap web dispenser having means for driving at least two of the rollers at different relative speeds for prestretching the web between said at least two of the rollers while wrapping the load, comprising:

attaching the leading end of the web to a leader line which is located along a leader path on one side of the series of rollers, the leader path having portions generally parallel to but beside the web path;

maintaining the leader line in a retracted position in a leader line retractor during attahcment to the leading end of the web;

disabling the driving means to prevent said at least two of the rollers from being driven at substantially different relative speeds, to prevent the web from being substantially prestretched while being threaded through the web path and to reduce the force required to draw the web through the web path with the leader line means;

manually drawing the leader line and the leading end of the web through the leader path while drawing a section of the web which follows the leading end of the web through the web path between the series of rollers without substantially prestretching the web, simultaneously storing energy in the leader line retracter;

disengaging the leading end of the web from the leader line;

withdrawing the leader line to the retracted position in the retractor by using the stored energy in the retractor; and

enabling the driving means to allow the web to be prestretched in the web dispenser while stretch wrapping a load.

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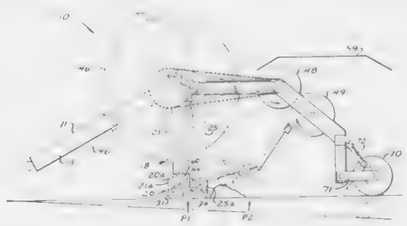
**4,747,255**

## CUTTER-BAR SUPPORT

**Thomas V. Roden, 3775 Co. Hwy. I, Saukville, Wis. 53080**

**Continuation-in-part of Ser. No. 796,516, Nov. 8, 1985, abandoned, which is a continuation of Ser. No. 113,053, Jan. 17, 1980, abandoned. This application Mar. 26, 1986, Ser. No. 844,457**
**Int. Cl.[4] A01D *75/18, 34/04, 67/00***
**U.S. Cl. 56—10.4** **7 Claims**

1. In an agricultural mower apparatus, the combination comprising: a main frame having support wheels; a cutter assembly including a cutter frame, guard means mounted on said cutter frame, and reciprocating cutter bar means received in said guard means; a parallel linkage suspension means for suspending said cutter assembly from said main frame with said cutter blade means located near the ground, said suspension means including first and second front swing arms each having a first end pivotally attached to said main frame near the forward portion thereof and a second end pivotally attached to said cutter assembly, said first and second front swing arms being attached to said main frame and said cutter assembly at opposite sides thereof; and first and second rear swing arms each having a first end pivotally attached to said main frame behind the respective first ends of said front swing arms and a second end pivotally attached to said cutter assembly, said first and second rear swing arms being attached to said main frame and said cutter assembly at opposite sides thereof, said swing arms in the use position hanging in a substantially vertical orientation and movable in a pendulum-like manner away from the use position, allowing said cutter assembly to move rearwardly and upwardly to a clearance position above and behind the use position, whereby the primary component of initial



movement of said cutter assembly from its use position is rearward when an obstruction is struck, and the vertical component of movement of said cutter assembly becomes increasingly greater with continued movement of said cutter assembly toward said clearance position, and the transverse distance between the sides of said cutter assembly being sufficient so that each side may swing to said clearance position substantially independently of the other side such that when the obstruction is located toward one side of said cutter assembly, that side swings toward said clearance position and out of the way of the obstruction and the other side of said cutter assembly remains in cutting relation with said crops.

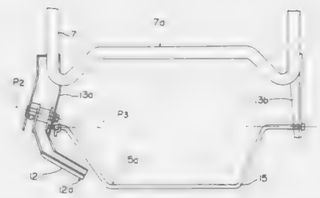
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**4,747,256**

## LEVER MOUNTING STRUCTURE FOR LAWN MOWER

**Hirofumi Sadakane, Kawachinagano, Japan, assignor to Kubota, Ltd., Osaka, Japan**

**Filed Dec. 30, 1986, Ser. No. 947,931**
**Claims priority, application Japan, Feb. 17, 1986, 61-32510**
**Int. Cl.[4] A01D *69/00*; G05G *1/00***
**U.S. Cl. 56—11.3** **11 Claims**



1. A control lever mounting structure for a walking operator type grass cutting vehicle, comprising;

a steering handle including a grip portion,

a first control lever operatively connected to a cutting blade drive clutch and attached to said steering handle to be pivotable on a first axis to shift in fore-and-aft directions of the vehicle between a clutching position adjacent said grip portion and a declutching position away from said grip portion, and

a second control lever operatively connected to a wheel drive clutch and attached to said steering handle to be pivotable on a second axis to shift in the fore-and-aft directions of the vehicle between a clutching position adjacent said grip portion and a declutching position away from said grip portion,

wherein said first axis and said second axis are inclined relative to each other so that at least one of said first and second control levers is movable sideways as said one of the levers makes a pivotal movement, whereby as a result of said relative inclination said first and second control levers are in contact with each other when in said clutching positions adjacent said grip portion and separated from each other when in said declutching positions away from said grip portion, said second control lever being positioned, when both of said levers are in said clutching position, to block said first control lever and inhibit the return of said first control lever to said declutching position.

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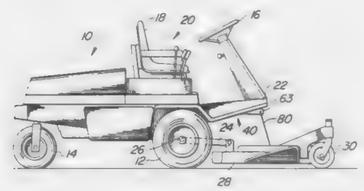


**4,747,257**

## WEIGHT TRANSFER CONTROL FOR A FRONT MOUNT MOWER

**Wayne R. Hutchison, Mayville, Wis., assignor to Deere & Company, Moline, Ill.**

**Filed May 13, 1986, Ser. No. 862,860**
**Int. Cl.[4] A01D *34/03***
**U.S. Cl. 56—15.8** **14 Claims**



1. In a weight transfer control for use in conjunction with a drive vehicle having a front mounted implement attached thereto, said implement including ground engaging structure disposed to support the weight of said implement, the improvement comprising:

a manually operated actuator attached to said drive vehicle and being selectively movable between a disengaged position and a fully engaged position by selective application of force by an operator;

a linkage attached to and interconnecting said actuator and said implement, said linkage including a lift spring disposed to transmit said applied force from said actuator to transfer a portion of the weight of said implement to said drive vehicle; and

an over-center actuator assist spring attached to and interconnecting said linkage and said drive vehicle, said actuator assist spring being disposed to bias the actuator toward the disengaged position and then aid in reducing the effort required to move the actuator when the actuator assist spring moves to an over-center position.

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**4,747,258**

## MOWER UNIT BASKET LATCH

**Donald G. Martinez, P.O. Box 584, Calistoga, Calif. 94515**

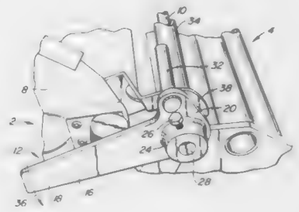
**Filed Dec. 30, 1986, Ser. No. 947,733**
**Int. Cl.[4] A01D *34/48***
**U.S. Cl. 56—199** **13 Claims**

1. A method for securing at least one catch basket hook of a catch basket to a mower unit, the catch basket hook of the type having a downwardly facing opening for engaging a support element on the mower unit, the method comprising:

securing a keeper assembly to the mower unit adjacent the support element, the keeper assembly generally movable between latched and unlatched positions;

positioning the keeper assembly in the unlatched position to permit access to the support element by the basket hook;

placing the at least one basket hook over the support element;



moving the keeper assembly from the unlatched position to the latched position at which the hook is captured between the keeper assembly and the support element; and

maintaining the keeper assembly in the latched position by rotationally biasing the keeper assembly around the supporting element and towards the basket hook.

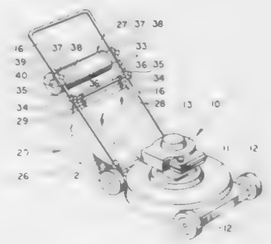
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**4,747,259**

## GRASS CATCHING ASSEMBLY AND DISPOSABLE BAG THEREFOR

**Daniel J. Kline, 1709 Marks Ave., and Kenneth A. Roberts, Jr., 1532 Osage Ave., both of Akron, Ohio 44305**

**Filed Oct. 1, 1986, Ser. No. 914,013**
**Int. Cl.[4] A01D *34/70, 34/48***
**U.S. Cl. 56—202** **12 Claims**



1. In combination with a lawn mower having a handle and a grass discharge area, a grass catching assembly comprising, an adapter assembly through which mowed grass may pass, means to attach one end of said adapter assembly to the grass discharge area of the lawn mower so that mowed grass being discharged will pass through said adapter assembly, a disposable bag having a front open mouth and rear closed end for catching the grass, means to attach said mouth of said disposable bag to the other end of said adapter assembly, a supply roll of disposable bags, and support means connected to the handle of the lawn mower to carry said supply roll of disposable bags.

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**4,747,260**

## FIELD CHOPPER/BLOWER WITH GROUND-FOLLOWING INTAKE

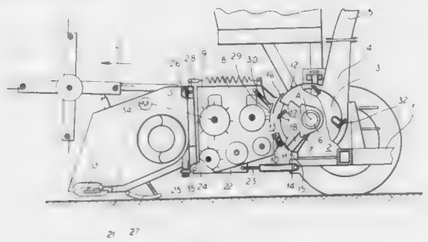
**Günter Petrasch, Bischofswerda; Lutz Müller; Dieter Berth, both of Neustadt, and Hans P. Spaida, Oppach, all of German Democratic Rep., assignors to Veb Kombinat Fortschritt Landmaschinen, Neustadt/Sachsen, German Democratic Rep.**

**Filed Dec. 16, 1986, Ser. No. 942,532**

**Claims priority, application German Democratic Rep., Dec. 17, 1985, 284418**

**Int. Cl.[4] A01D** *49/00*

**U.S. Cl. 56—505** **6 Claims**



1. A field chopper comprising:
a frame adapted to travel along the ground in a normal travel direction;
a main housing fixed on the frame and defining a generally cylindrical chopping chamber centered on an axis transverse to the direction and having relative to the direction a front radially open intake opening and a rear outlet angularly offset therefrom;
an intake housing separate from the main housing and, having a front end turned forward away from the frame;
pivot means supporting the intake housing for pivoting on the frame relative to the main housing about the axis;
a counterblade
fixed on the intake housing,
defining one angular side of the intake opening, and
movable about the axis relative to the main housing jointly with the intake housing;
a rotary cutting/chopping drum rotatable in the chamber about the axis and having a blade orbitable immediately adjacent the counterblade regardless of the relative angular positions of the housings;
means at the front end of the intake housing for cutting crop;
conveyor means including conveyor elements mounted in the intake housing between the cutter means and the intake opening for conveying the cut crop in the intake housing from the cutter means to the intake opening;
drive means for rotating the drum and thereby chopping crop delivered to the intake opening by the conveyor means and for conveying the chopped crop out of the chamber through the outlet; and
shields surrounding the intake opening and carried on the housings.

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**4,747,261**

## LOAD TRANSMITTING CHAIN WITH PLATE LINKS

**Ludger Frenker-Hackfort, Herkersdorf, Fed. Rep. of Germany, assignor to Rexnord Kette GmbH & Co KG, Betzdorf, Fed. Rep. of Germany**

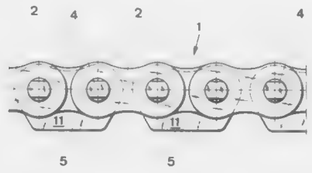
**Continuation of Ser. No. 691,661, Jan. 15, 1985, abandoned. This application Sep. 10, 1986, Ser. No. 905,870**

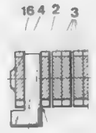
**Claims priority, application Fed. Rep. of Germany, Jan. 21, 1984, 3402102; Aug. 25, 1984, 3431317**

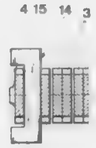
**Int. Cl.[4] F16G** *13/08*

**U.S. Cl. 59—84** **12 Claims**

1. In an elongated load transmitting flyer chain for use as a drive chain in a fork-lift truck where an hydraulic cylinder with a piston rod effects the raising and lowering of a lifting fork of the fork-lift truck, said flyer chain comprising a plurality of links extending one after the other in the elongated direction of said chain with each said link having a pair of oppositely facing outer sides and each outer side of said links having a first edge and a second edge extending in the elongated direction of said chain, each of said links including a plurality of similar metallic first link plates arranged side by side and interleaved with said first link plates of adjacent said links, said first link plates each having a pair of oppositely facing side surfaces extending in the elongated direction of said chain and each side surface having bordering edges including a first edge and a second edge extending in the elongated direction of said chain, and axially extending link pins extending transversely of the elongated direction of and through said first link plates and pivotally connecting adjacent said link together, the improvement comprising at least a part of said bordering edges of said first link plates being of curviform shape, a plurality of non-metallic protective second link plates formed of an impact resistant plastics material and extending in







the elongated direction of said chain and being in parallel relation with said first link plates for protecting the piston rod of the hydraulic cylinder, said metallic first link plates including outer first link plates forming the outer sides of said link and intermediate first link plates located inwardly of said outer first link plates, said second link plates having oppositely facing side surfaces located inwardly within each said link from said outer first link plates, said link pins extending through said second link plates, said side surfaces of said second link plates disposed generally parallel to said side surfaces of said first link plates and said side surfaces of said second link plates having bordering edges corresponding in part to the curviform shape of at least a part of the bordering edges of said first link plates and said curviform bordering edges being in general alignment in the axial direction of said link pins, at least one of said side surfaces of said second link plates being adjacent one of said intermediate first link plates and the adjacent surfaces of said



second link plates and intermediate first link plates being planar and in parallel relation, each of said protective second link plates including an integral portion which projects outwardly from said second link plate extending past at least one of said first and second edges of said similar first link plates transversely of the axial direction of said link pins, and said protective second link plates being incorporated into adjacent interconnected links for affording a continuous protection along the length of said chain so that said protective second link plates having the projecting portion thereof projecting toward a piston rod of a hydraulic cylinder on the lifting fork prevents contact between the metallic surfaces of said chain and the piston rod and said projecting portion of said protective second link plates having a dimension in the axial direction of said link pins significantly smaller than the corresponding dimension of said links so that said intermediate first link plates adjacent at least one side surface of said protective second link plates are uncovered by said second link plates.

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**4,747,262**

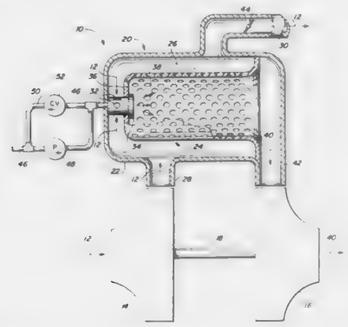
## COMPRESSOR POWER UNIT FUEL FLOW CONTROL

**Frederick C. Maynard, Phoenix, Ariz., assignor to Allied-Signal, Inc., Morris Township, Morris County, N.J.**

**Division of Ser. No. 784,400, Oct. 4, 1985, Pat. No. 4,682,469. This application Dec. 22, 1986, Ser. No. 945,940**

**Int. Cl.[4] F02C** *9/52, 9/48*

**U.S. Cl. 60—34.23** **8 Claims**



1. Apparatus for supplying fuel to a combustor having a perforated combustion liner circumscribed by an inlet plenum adapted to receive pressurized air from a source thereof, said apparatus comprising:
(a) nozzle means for receiving pressurized fuel from a source thereof and injecting the received fuel into the liner;
(b) means for supplying fuel to said nozzle means at an essentially constant pressure;
(c) means for varying the fuel pressure drop across said nozzle means, to thereby modulate the fuel flow therethrough without appreciably altering the pressure of fuel supplied to said nozzle means; and
(d) means for maintaining the absolute pressure ratio between the pressure of fuel supplied to said nozzle means and the pressure within the liner within a range between about 1.1 and about 1.3.

**4,747,263**

## CONTROL SYSTEM FOR THE FUEL CIRCUIT OF A GAS TURBINE ENGINE

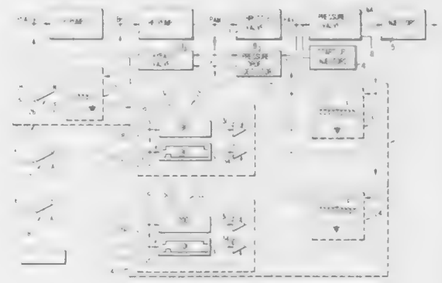
**Pierre M. H. Gerard, Vaux le Penil; Pierre M. Geyer, Melun, and Christian A. F. Parisel, Combs-La-Ville, all of France, assignors to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation "Snecma", Paris, France**

**Filed Oct. 24, 1986, Ser. No. 922,932**

**Claims priority, application France, Oct. 30, 1985, 85 16099**

**Int. Cl.[4] F02C** *9/28*

**U.S. Cl. 60—39.281** **5 Claims**



1. An electrical control system for a fuel circuit connected between a fuel reservoir and the fuel injectors of a gas turbine engine, said fuel circuit including
a low pressure pump having an inlet connected to the reservoir and an outlet,
a high pressure pump having an inlet connected to said outlet of said low pressure pump and an outlet,
a throttle valve having an inlet connected to said outlet of said high pressure pump and an outlet,
a pressurizing valve having an inlet connected to said outlet of said throttle valve and an outlet connected to said injectors,
a pressure drop detector having a first inlet connected to said inlet of said throttle valve, a second inlet connected to said outlet of the throttle valve, and an outlet, the pressure in which varies according to the prssure drop detected between said first and second inlets,
a by-pass valve having an inlet connected to said outlet of said high pressure pump, an outlet connected to said inlet of said high pressure pump, and a control inlet connected to said outlet of said pressure drop detector in order to selectively open said by-pass valve and thereby adjust the recirculated fuel from the outlet of said high pressure pump back to said inlet thereof in response to any variation of said pressure at said outlet of said pressure drop detector,
a first device including a first solenoid controlled valve capable of interrupting said connection between said outlet of said throttle valve and said second inlet of said pressure drop detector and
a second device including a second solenoid controlled valve capable of connecting said control inlet of said by-pass valve to said inlet of said low pressure pump.

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**4,747,264**

## PROCESS FOR THE AUTOMATIC REGENERATION OF A SOOT FILTER IN A PASSENGER VEHICLE HAVING A DIESEL ENGINE

**Enrique Santiago, Diedorf; Peter Kugland, Friedberg, and Alois Ulimer, Munich, all of Fed. Rep. of Germany, assignors to Zeuna-Stärker GmbH & Co. KG, Fed. Rep. of Germany**

**PCT No. PCT/EP86/00058, § 371 Date Oct. 8, 1986, § 102(e) Date Oct. 8, 1986, PCT Pub. No. WO86/04641, PCT Pub. Date Aug. 14, 1986**

**PCT Filed Feb. 4, 1986, Ser. No. 939,159**

**Claims priority, application Fed. Rep. of Germany, Feb. 9, 1985, 3504461**

**Int. Cl.⁴ F01N** *3/02*

**U.S. Cl. 60—274** **10 Claims**



1. A process for the automatic regeneration of a soot filter in an exhaust gas line of a diesel-internal combustion engine (diesel engine) in a passenger vehicle, using a throttle valve, operable by means of a control device, in the intake line in order to achieve an exhaust temperature corresponding to the ignition temperature of the soot accumulated in the soot filter, said process comprising the steps of:

(a) measuring variables in order to form input signals for the control device, said variables comprising at least the speed of the diesel engine, the back pressure of the soot filter and the exhaust temperature,

(b) comparing the speed (n) of the diesel engine, the back pressure (PVF) measured upstream of the soot filter and the exhaust temperature with preset lower limit values ng, PGU, TGU, respectively,

(c) additionally comparing the back pressure (PVF) with a preset upper limit value (PGO),

(d) causing the control device to generate a signal "close throttle valve", when all measured variables lie above the said limit values, and shifting the two limit values for the pressure, (PGU and PGO) with the speed (n) in accordance with their respective alteration.

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**4,747,265**

## DOUBLE AIR-FUEL RATIO SENSOR SYSTEM HAVING IMPROVED EXHAUST EMISSION CHARACTERISTICS

**Toshinari Nagai, Ann Arbor, Mich.; Takatoshi Masui, Mishima, and Toshiyasu Katsuno, Susono, both of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan**

**Filed Dec. 19, 1986, Ser. No. 943,797**

**Claims priority, application Japan, Dec. 23, 1985, 60-287783; Dec. 28, 1985, 60-293477**

**Int. Cl.⁴ F02D** *41/22*

**U.S. Cl. 60—274** **12 Claims**

1. A method for controlling an air-fuel ratio in an internal combustion engine having a catalyst converter for removing pollutants in the exhaust gas thereof, and upstream-side and downstream-side air-fuel ratio sensors disposed upstream and downstream, respectively, of said catalyst converter, for detecting a concentration of a specific component in the exhaust gas, comprising the steps of:

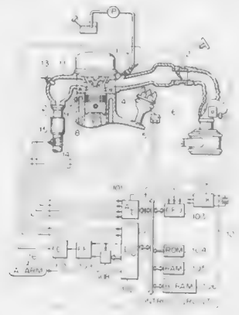
adjusting an actual air-fuel ratio in accordance with the outputs of said upstream-side and downstream-side air-fuel ratio sensors;

determining whether or not the output of said upstream-side air-fuel ratio sensor is in an abnormal state; and

generating an alarm when said upstream-side air-fuel ratio sensor is in an abnormal state;

wherein said actual air-fuel ratio adjusting step comprises the steps of:

calculating a first air-fuel ratio correction amount in accordance with the output of said upstream-side air-fuel ratio sensor;



calculating a second air-fuel ratio correction amount in accordance with the output of said downstream-side air-fuel ratio sensor; and

adjusting said actual air-fuel ratio in accordance with said first and second air-fuel ratio correction amounts;

wherein said abnormal state determining step comprises a step of determining whether or not said second air-fuel ratio correction amount is within a predetermined range, and determining that said upstream-side air-fuel ratio sensor is in an abnormal state when said second air-fuel ratio correction amount is not within said predetermined range.

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**4,747,266**

## HYDROMOTOR

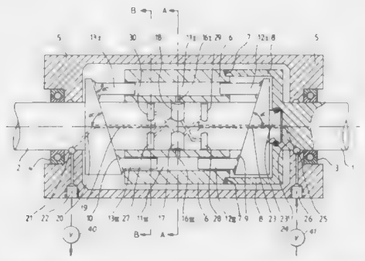
**Theodorus P. M. Cadée, Goirle, Netherlands, assignor to Volvo Car B.V., Helmond, Netherlands**

**Filed Feb. 12, 1987, Ser. No. 13,765**

**Claims priority, application Netherlands, Feb. 13, 1986, 8600353**

**Int. Cl.⁴ F16D** *31/00*

**U.S. Cl. 60—325** **9 Claims**



1. A swash plate device for use as a variable transmission, said device comprising an ingoing driving shaft comprising a widened rotor and an outgoing driven shaft coaxial with the ingoing shaft, the ingoing shaft and the outgoing shaft being journalled in a housing, the widened part of the ingoing shaft being provided with a plurality of cylindrical bores substantially parallel to its center line, each bore containing a plunger for reciprocation in said bore, at least one end of each plunger having a flat foot face at an angle α to the axis of the plunger protruding outside its bore, said outgoing shaft being provided with a swash plate having a planar face obliquely arranged at an angle α with respect to the axis of the shaft for contacting the protruding flat foot faces of the plungers, so that upon rotation of the rotor with respect to the outgoing shaft the plungers reciprocate in the bores, and

wherein each bore has a radially directed channel formed in its wall to establish a connection between the bores including a circuit containing a hydraulic medium, said circuit comprising a high-pressure chamber and a low-pressure chamber adjacent to the bore and diametrically arranged with respect to the center line of the shafts, the housing and shafts being provided with passages for said medium embouching in each of the chambers.



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**4,747,267**

## HYDRODYNAMIC COUPLING

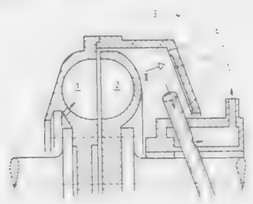
**Karl-Heinz Diele, Ellrichshausen, Fed. Rep. of Germany, assignor to Voith Turbo GmbH, Crailsheim, Fed. Rep. of Germany**

**Filed Jun. 25, 1987, Ser. No. 66,771**

**Claims priority, application Fed. Rep. of Germany, Jun. 30, 1986, 3621905**

**Int. Cl.⁴ F16D** *33/02*

**U.S. Cl. 60—351** **11 Claims**



1. A hydrodynamic coupling comprising two blade carrying coupling halves which together define a toroidal operating circuit, a coupling casing connected with the one coupling half and encompassing the other coupling half and a non-rotating scoop tube which is located in a scoop tube chamber formed between the rotary casing and the other coupling half, the position of the inlet port determining the degree of filling of the hydrodynamic coupling during operation thereof characterized by a plurality of elongated depressions, provided on the coupling casing (3) rotating with the one coupling half (1) and evenly distributed on the periphery, in the form of essentially radially extending slots (7), which extend as far as a position near the radially outermost part of the scoop tube chamber (4).

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**4,747,268**

## CONTROL MEANS FOR A PLURALITY OF MECHANICALLY COUPLED HYDROSTATIC MACHINES WITH VARIABLE VOLUME IN A DRIVE SYSTEM WITH IMPRESSED PRESSURE

**Peter Reinhardt, Lohr, Fed. Rep. of Germany, assignor to Mannesmann Rexroth GmbH, Fed. Rep. of Germany**

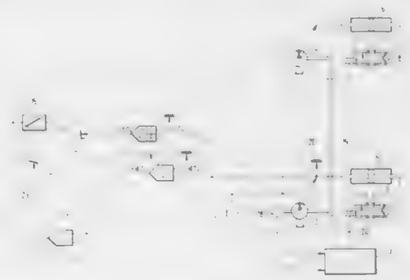
**Filed Oct. 23, 1986, Ser. No. 922,197**

**Claims priority, application Fed. Rep. of Germany, Nov. 28, 1985, 3541998**

**Int. Cl.⁴ F16D** *31/02*

**U.S. Cl. 60—426** **8 Claims**

1. Control means for a system comprised of at least first and second mechanically coupled hydrostatic machines having variable outputs, means for varying the output of each of said hydrostatic machines, a source of constant input pressure applied to each of said hydrostatic machines, the improvement comprising means for reducing the output of one of said hydrostatic machines to zero when the output of the other of said hydrostatic machines is adjusted to a value below a predetermined lower switching point and for adjusting the output of said one hydrostatic machine above zero when the output of said other hydrostatic machine is above an upper predetermined switching point for operating said other said hydrostatic



machine in a more efficient manner, adjustment of said one hydrostatic machine from the volume corresponding to the lower switching point to the zero volume and from the zero volume to the volume corresponding to the upper switching point being effected via a ramp function.

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**4,747,269**

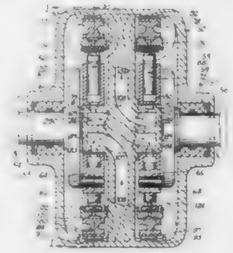
## VARIABLE SPEED POWER-TRANSMITTING SYSTEM

**Constant V. David, 4952 Field St., San Diego, Calif. 92110**

**Filed Nov. 10, 1986, Ser. No. 929,096**

**Int. Cl.⁴ F15B** *15/18*

**U.S. Cl. 60—445** **26 Claims**



1. A power-transmission system for a land vehicle comprising:

an outer structural body for mounting between a power engine and a power axle for using said power to propel the vehicle;

an input shaft for connecting an engine power-delivery shaft to the system;

an output shaft for connecting the system to the power axle;

a plurality of pistons radially slidable in a first rotor rotating about a first longitudinal axis, said pistons having their axes substantially located in a plane substantially perpendicular to the rotor longitudinal axis of rotation, each piston having a closed end protruding beyond said first rotor outer surface;

means for connecting the input shaft to the first rotor;

a plurality of pistons radially slidable in a second rotor rotating about a second longitudinal axis, said pistons having their axes substantially located in a plane substantially perpendicular to the rotor longitudinal axis of rotation, each piston having a closed end protruding beyond said second rotor outer surface;

means for connecting the output shaft to the second rotor;

a structural wall located between the first rotor and the second rotor and fixed to the outer body, said wall having

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a trunnion positioned on each one of its two sides for providing support to each one of the two rotors in its rotation thereabout;

a first non-rotatable structural ring slidable along a plane perpendicular to the first longitudinal axis and surrounding the assembly of first rotor and associated pistons, said ring having an inner surface for restraining the piston closed ends and for controlling the radial strokes of said pistons;

a second non-rotatable structural ring slidable along a plane perpendicular to the second longitudinal axis and surrounding the assembly of second rotor and associated pistons, said ring having an inner surface for restraining the piston closed ends and for controlling the radial strokes of said pistons;

a source of hydraulic fluid and associated ducting means located in the wall and the trunnions for enabling the pistons to admit said fluid in and expel said fluid out of rotor radial cavities in which said pistons are housed and radially slide;

automatic valving means located at the rotor/trunnion interfaces on the rotor inner cylindrical surface and on the cooperating cylindrical outer surface of the corresponding trunnion for timely controlling the fluid flow in and out of said piston housing rotor cavities;

means for adjusting the transversal position of each ring in response to a signal representative of the amount of eccentricity to be set between the axis of the ring inner surface and the longitudinal axis of its associated trunnion and of rotation of the associated rotor-piston assembly; and

means for insuring permanent contact between the piston closed ends and the inner surface of their associated ring;

whereby fluid is admitted in the piston housing cavities of the first rotor during one half of each one of its revolutions and then pumped out therefrom under high pressure during the other half thereof as the first rotor rotates (pump), and whereby the fluid pumped out of the first rotor cavities is then forced inside the piston housing cavities of the second rotor (motor) and then expelled out therefrom under low pressure as the second rotor pistons are urged to respond to the inwardly directed driving action exerted by their associated off-centered ring inner surface, thus causing the first rotor pistons to exert side forces on the walls of their housing cavities during their inwardly-directed radial stroke and said side forces cooperating to generate a rotational-motion resisting torque applied onto the input shaft, and conversely causing the second rotor pistons to exert side forces on the walls of their housing cavities during their outwardly-directed radial stroke and said forces cooperating to generate a rotational-motion driving torque applied onto the output shaft for transmitting the power received by the input shaft.

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**4,747,270**

## COMPRESSED AIR STARTING DEVICE

**Jürgen Klie, and Hans W. Weiss, both of Sprockhövel, Fed. Rep. of Germany, assignors to G. Düsterloh GmbH, Sprockhövel, Fed. Rep. of Germany**

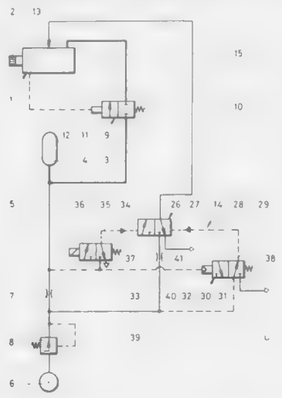
**Filed Feb. 12, 1987, Ser. No. 13,657**

**Claims priority, application Fed. Rep. of Germany, Feb. 12, 1986, 3604284**

**Int. Cl.⁴ F02N** *30/00*

**U.S. Cl. 60—627** **8 Claims**

1. A compressed air starting device comprising a starter with a starter motor operated at least indirectly from a pneumatic pressure reservoir and a meshing unit controlled by a signal input, a main valve connected in the supply line between the pressure reservoir and the starter motor, a signal connection between the meshing unit and the main valve, a control device, the control device including a sensor input for the pressure level in the pressure reservoir, a signal output connected to the signal input of the starter, a control device signal input for



introducing the starting signal, and an energy input for supplying the auxiliary energy required for generating signals.

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**4,747,271**

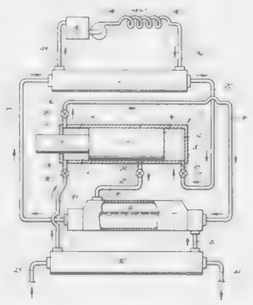
## HYDRAULIC EXTERNAL HEAT SOURCE ENGINE

**Victor H. Fischer, Las Vegas, Nev., assignor to VHF Corporation, Las Vegas, Nev.**

**Filed Jul. 18, 1986, Ser. No. 887,541**

**Int. Cl.⁴ F01K** *25/04*

**U.S. Cl. 60—670** **35 Claims**



1. A hydraulic external heat source engine comprising:

an engine housing having an interior chamber therein;

a working member disposed in the interior chamber to define in part a working chamber, the working member being displaceable from a first position to a second position in the interior chamber;

an external heat source for providing relatively hot, high pressure liquid working fluid;

means for directing the hot, high pressure working fluid from the external heat source to the working chamber in the liquid state to displace the working member from the first position towards the second position;

means for terminating the flow of hot, high pressure liquid working fluid into the working chamber at a predetermined displacement of the working member, the hot, high pressure liquid working fluid in the working chamber vaporizing after said termination of flow to develop sufficient pressure within the working chamber to further displace the working member to the second position; and

means for exhausting the working fluid from the working chamber before returning the working member to the first position.

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**4,747,272**

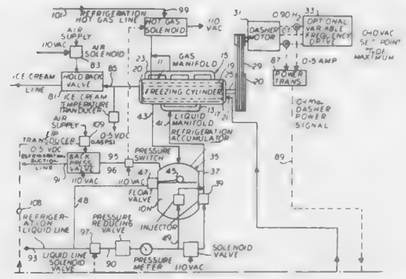
## FROZEN COMESTIBLES WITH IMPROVED OVER-RUN CONTROL

**Ronald D. Howell, Iowa City, and Robin J. Goettsch, Cedar Rapids, both of Iowa, assignors to Cherry-Burrell Corporation, Cedar Rapids, Iowa**

**Continuation-in-part of Ser. No. 784,352, Oct. 4, 1985, abandoned. This application Jun. 24, 1987, Ser. No. 65,925**

**Int. Cl.⁴ F28D** *3/00*

**U.S. Cl. 62—136** **12 Claims**



1. A system for making frozen comestibles and the like having over-run comprising a swept surface exchanger which includes a manifold cylinder in which is disposed a tube having a dasher, refrigeration means connected to the manifolded cylinder, an inlet to the tube, an outlet from the tube and an air/mix system; an improved air/mix system comprising a positive displacement pump having an inlet for a mix, a variable drive and an outlet, means for metering the flow of mix from said pump outlet and for providing a mix flow signal proportional to the flow of mix therethrough, a mix conduit connected between said flow meter and the inlet to the tube, air mass flow control means connected between said mix conduit and to a source of pressured air, electronic circuit means having flow signal input means for receiving an input flow signal and for controlling both said variable drive for said pump and the pressured air through said air mass flow control means in response thereto, and means for connecting only said mix flow signal to said flow signal input means of said electronic circuit means.

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**4,747,273**

## HEATING AND COOLING SYSTEM

**Robert E. Cook, Kankakee, Ill.; Michael J. Davidson, West Lafayette, Ind., and Maurice A. Rice, Cincinnati, Ohio, assignors to Artesian Building Systems, Lafayette, Ind.**

**Filed Mar. 5, 1987, Ser. No. 22,075**

**Int. Cl.⁴ F25B** *27/00*

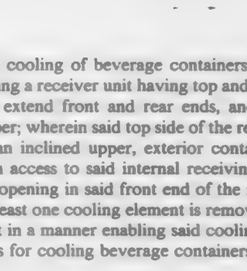
**U.S. Cl. 62—238.6** **19 Claims**

1. An improved heating and cooling system utilizing recovered heat comprising:

a water heater having a tank provided with a cold water inlet and a hot water outlet, at least one water heating means within the tank near said outlet thereby effecting a first water temperature layer within said tank, means for effecting flow of cold water at said inlet to a region within said tank distally located from said outlet and said first water temperature layer and creating a second water temperature layer within said tank, water circulation means having an inlet communicating with said second water temperature layer, pump means coacting with said water circulation means for circulating water therein, desuperheater means for raising the temperature of water received by said circulation means from said second layer, and outlet means disposed within said tank intermediate said first and second water temperature layers creating a third water temperature layer within said tank;

compressor means for effecting heating and cooling functions within the system and having an outlet means for heated compression gases communicating with said desuperheater means and the water circulating in said water circulation means and dissipating heat from said compression gases;

heat exchange means operatively connected to said compressor means; and



blower means associated with said heat exchange means to provide air flow across the heat exchange means and provide circulation of conditioned air outside a cabinet;

said blower means, heat exchange means, compressor means and tank being disposed in proximity within said cabinet the latter being insulated whereby the heat of the compression gases is substantially retained prior to reaching said desuperheater means.

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**4,747,274**

## DEVICE FOR COOLING BEVERAGE CONTAINERS, PARTICULARLY BOTTLES

**Joerg Duemmig-Zitzmann, Wertheim, Fed. Rep. of Germany, assignor to Alfi Zitzmann GmbH & Co, Wertheim, Fed. Rep. of Germany**

**Filed Jul. 10, 1987, Ser. No. 71,931**

**Claims priority, application Fed. Rep. of Germany, Jul. 10, 1986, 8618514**[U]

**Int. Cl.⁴ F25D** *3/08*

**U.S. Cl. 62—371** **20 Claims**

1. Device for cooling of beverage containers, particularly bottles, comprising a receiver unit having top and bottom sides between which extend front and rear ends, and an internal receiving chamber; wherein said top side of the receiver unit is provided with an inclined upper, exterior container support surface, wherein access to said internal receiving chamber is provided by an opening in said front end of the receiver unit, and wherein at least one cooling element is removably held by the receiver unit in a manner enabling said cooling element to serve as a means for cooling beverage containers disposed on

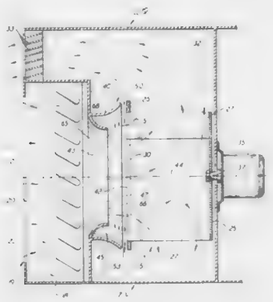
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said upper support surface and within said receiving chamber to different temperatures.

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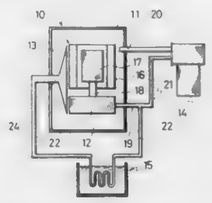
**4,747,275**
**APPARATUS FOR CONTROLLING FLOW THROUGH A CENTRIFUGAL IMPELLER**
**Yehia M. Amr, Manlius, and John F. Salvattera, Camillus, both of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.**
**Filed Sep. 18, 1987, Ser. No. 98,489**
**Int. Cl.[4] F25D *17/06***
**U.S. Cl. 62—419** **12 Claims**



1. In an air conditioning unit having a housing containing a heat exchanger and a centrifugal impeller blower has an inlet opening facing the back of the heat exchanger so that the impeller draws comfort zone air over the heat exchanger surfaces and return the air to the comfort zone, said unit further including,
   a hollow orifice mounted behind the heat exchanger having a passage for conducting comfort zone air to the inlet region of the impeller, the discharge end of the orifice being spaced from the inlet face of the impeller to provide a circular throat around the impeller, and
   a circular shield surrounding the orifice and having an end face that is positioned adjacent the inlet face of the impeller to provide a narrow gap therebetween, the width of the gap being less than the width of the throat, whereby the air flow drawn radially through said gap is expanded rapdily in the throat to reduce its velocity prior to entering the inlet region of the impeller.

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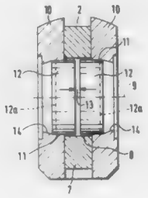
**4,747,276**
**HELIUM COMPRESSOR APPARATUS**
**Masami Kakinuma, Chiba, Japan, assignor to Seiko Seiki Kabushiki Kaisha, Chiba, Japan**
**Filed Apr. 9, 1987, Ser. No. 36,119**
**Claims priority, application Japan, Apr. 15, 1986, 61-86568**
**Int. Cl.[4] F25B *31/00***
**U.S. Cl. 62—505** **12 Claims**



5. Helium compressor means for supplying high-pressure gas to an expansion unit comprising: a gas compressor driven by a motor, said gas compressor and said motor contained within a hermetically-sealed casing: dividing means for dividing compressed gas produced by said compressor between a cooling system and the expansion unit; and means for cooling the portion of compressed gas supplied to said cooling system and returning said cooled portion to a supply port adjacent said gas compressor and said motor.

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**4,747,277**
**LATCH NEEDLE FOR A TEXTILE MACHINE**
**Sigmar Majer, Balingen, Fed. Rep. of Germany, assignor to Theodor Groz & Söhne & Ernst Beckert Nadelfabrik Commandit-Gesellschaft, Albstadt-Ebingen, Fed. Rep. of Germany**
**Filed Jan. 6, 1987, Ser. No. 881**
**Claims priority, application Fed. Rep. of Germany, Jan. 11, 1986, 3600620**
**Int. Cl.[4] D04B *35/04***
**U.S. Cl. 66—122** **10 Claims**



1. A latch needle for a textile machine, comprising:
   a needle shank having a longitudinal slot and needle shank cheeks on either side of, and delimiting, said slot, each cheek having a continuous bore therein which is coaxial with a pivot axis transverse to a longitudinal axis of said needle shank;
   a latch having a bearing bore, said latch being disposed in said slot with said bearing bore coaxially aligned with said pivot axis;
   two shaft stubs each comprised of a separate cylindrical bolt, each shaft stub being disposed with a tight, press fit in a respective one of the continuous bores of said needle shank cheeks so as to be coaxial with said pivot axis and extending into the bearing bore of said latch, said latch being displaceable in said slot and pivotally mounted by said two shaft stubs extending into said bearing bore; and
   fixing means for fixing each shaft stub against axial displacement out of the continuous bore of the respective needle shank cheek.

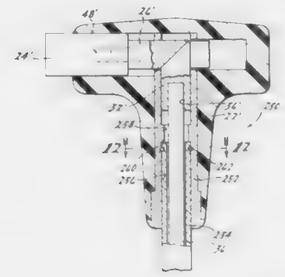
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**4,747,278**
**SHIFT LOCK**
**Paul E. Roncelli, deceased, late of Birmingham, and Bernadette Roncelli, personal representative, 4630 W. Maple, Birmingham, both of Mich. 48010, assignors to Bernedette M. Roncelli, Birmingham, Mich.**
**Continuation of Ser. No. 741,960, Jun. 6, 1985, abandoned. This application Sep. 23, 1987, Ser. No. 102,772**
**Int. Cl.[4] F16H *57/00*; G05G *5/00, 1/08***
**U.S. Cl. 70—201** **16 Claims**

1. In a motor vehicle having a shift mechanism including a releasable latch mechanism for retaining the shift lever in a preselected position, an improved locking mechanism for preventing movement of said shift lever from said preselected position, said lock system being characterized by:
   a handle member having a bore provided therein;
   a universal adapter member disposed within said bore and including an opening in one end thereof adapted to telescopically receive an end portion of said shift lever;
   means for securing said universal adapter to said shift lever; and
   selectively actuable locking means disposed within said handle member, said locking means, said locking means including a portion extending through an opening provided in said universal adapter adjacent the other end thereof so as to be operable to mechanically interlock said universal adapter and said handle member in assembled relationship and to selectively prevent release of said latching mechanism.



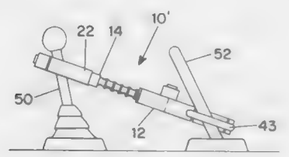
15. In a motor vehicle having a shift mechanism including a releasable latch mechanism for retaining the shift lever in a preselected position, an improved locking mechanism for preventing movement of said shift lever from said preselected position, said lock system being characterized by:
   a handle member having a bore provided therein;
   an elongated hollow universal adapter member disposed within said bore, said universal adapter having an opening in one end thereof for telescopically receiving said shift lever;



   securing means provided on said universal adapter for securing same to said shift lever, said handle member being adapted to overlie and prevent access to said securing means when assembled to said universal adapter; and
   a locking mechanism movably disposed in part within said universal adapter and being selectively operable to prevent release of said latching mechanism, said locking mechanism including means projecting through a sidewall of said universal adapter and into a receiving portion provided within said handle member to thereby mechanically interlock said universal adapter and said handle member in assembled relationship.

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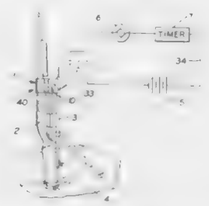
**4,747,279**
**AUTOMOBILE SECURITY DEVICE FOR LOCKING A FLOOR-MOUNTED GEARSHIFT LEVER**
**Stanley E. Solow, Plainview, N.Y., assignor to Wolo Manufacturing Corp., Deer Park, N.Y.**
**Filed May 4, 1987, Ser. No. 46,529**
**Int. Cl.[4] B60R *25/00***
**U.S. Cl. 70—238** **4 Claims**



1. An automobile security device for use with a floor-mounted hand brake, having a handle that extends from a base, and gear select lever or gearshift lever, said device comprising:
   a lock housing having a hole therethrough;
   a lock bar extending through the hole and being displaceable, along its axis, relative to the lock housing, the lock bar having a free end spaced from said housing;
   lock means associated with the lock housing for selectively engaging said lock bar at axially spaced locations;
   first engagement means fixed on said free end of said lock bar, said means including a first recess means, for engaging a first generally cylindrical member; and
   second engagement means supported by the lock housing including a second recess means for engaging a second generally cylindrical member, wherein said first and second recess means face away from one another, in axially opposite directions, and wherein said first engagement means and second engagement means define opposite ends of the security device, whereby in a car that has a floor-mounted gear select lever or gearshift level and a floor-mounted brake handle, the first engagement means can be positioned to engage the shift lever, the housing and second engagement means pulled along the lock bar, away from the first engagement means, until the second engagement means engages the base of the floor mounted brake handle, and the lock means thereafter locked so that the gearshift lever cannot be moved toward the brake handle.

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**4,747,280**
**LOCK DEVICE**
**Charles R. Shaw, Twinsburg, Ohio, assignor to Esmet, Inc., Canton, Ohio**
**Filed Apr. 20, 1987, Ser. No. 40,087**
**Int. Cl.[4] E05B *47/00***
**U.S. Cl. 70—279** **17 Claims**




1. A lock device operated independently, electrically and mechanically including:
   (a) a lock body;
   (b) lid means for locking an object on the body, pivotally movable between locked and unlocked positions;
   (c) hinge pin means for pivotally mounting the lid means on the lock body, said hinge pin means being slidably mounted with respect to the lid means and rotationally mounted with respect to the body;
   (d) mechanically actuated first detent means for locking the hinge pin means to the lid means; and
   (e) electrically actuated second detent means for locking the hinge pin against rotation with respect to the body, whereby mechanical actuation of the first detent means unlocks the hinge pin means from the lid means permitting said pin means to be slid out of locked engagement with the second detent means permitting the lid means to be moved to the unlocked position, and whereby electrical actuation of the second detent means unlocks the hinge pin means from the body permitting the lid to be moved to the unlocked position with the first detent means maintaining the hinge pin means locked to the lid means.

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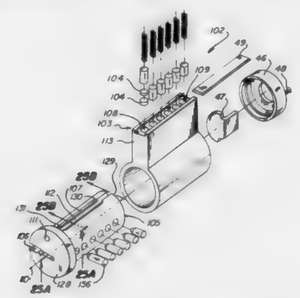
**4,747,281**
**RANDOMLY AND INTEGRALLY RE-KEYABLE LOCK APPARATUS AND METHOD**
**Brian J. Monahan, 28895 Cragmont Dr., Evergreen, Colo. 80439**
**Continuation-in-part of Ser. No. 881,227, Jul. 2, 1986. This application Mar. 27, 1987, Ser. No. 30,620**
**Int. Cl.[4] E05B *25/00***
**U.S. Cl. 70—383** **20 Claims**

1. In a lock including a housing; a bore extending through said housing parallel to an axis; a plug having a cylindrical surface and being received in said bore; said housing and said plug defining a shear interface and having aligned holes therein

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forming portions of and combining to form a plurality of pinways that are spaced in the direction of said axis and that are divided by said shear interface; said plug being rotatably received in said bore; a first tumbler stack including a first tumbler pin, a first driver pin and at least one master pin being received in said first pinway; said master pin separating said first driver pin from said first tumbler pin; a second tumbler stack in said second pinway and including a second driver pin and a second tumbler pin; and a keyway formed in said plug



and extending from said holes in said plug to said cylindrical surface of said plug; the improvement comprising:

means formed in said surface of said plug spaced from said keyway for guiding a master pin from one of said pinways to another of said pinways; and

means received in said guiding means for preventing said master pin from being received in said guiding means, said preventing means being removable from said guiding means to selectively permit reception of said master pin in said guiding means.

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**4,747,282**

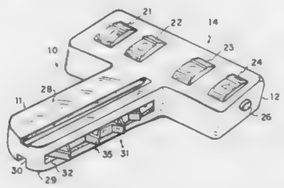
**GUARD DEVICE FOR AUTOMOBILE IGNITION LOCK**

**Albert S. Nyun, 16323 Glen Hope Dr., Valenda, Calif. 91744**

**Filed Apr. 3, 1987, Ser. No. 33,531**

**Int. Cl.[4] E05B** *17/14*

**U.S. Cl. 70—426** **8 Claims**



1. A keyhole guard device for automobile ignition locks which comprises:

a hollow handle portion with which said guard device can be held and selectively inserted and removed from an ignition lock keyway;

a combination lock means wherein the locking mechanism includes at least one main bolt, said main bolt being housed in said hollow handle portion;

a hollow blade end unitary with said hollow handle portion and its interior in communication with the interior of said hollow handle portion; and

a spring element operatively connectable to said main bolt, said spring element being adapted to assume an extended, active, position and a retracted, inactive, position;

said main bolt and said spring element being capable of selectively interacting such that the hollow blade end can be inserted into the keyway of the respective automobile ignition lock when said spring element is in its inactive position, but it can only selectively be taken out of the keyway of the respective automobile ignition lock by setting of the unlocking combination to allow actuation of said main bolt and bringing said spring element into its inactive positon.

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**4,747,283**

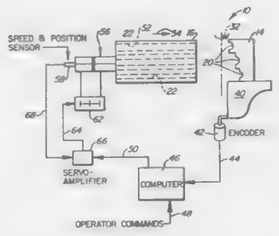
**BOOSTED DRIVE FOR PRESSURE DIE OF A TUBE BENDER**

**Carl A. Moore, Elburn, and Ralph J. Meehan, McHenry, both of Ill., assignors to Teledyne Industries, Los Angeles, Calif.**

**Filed Aug. 24, 1987, Ser. No. 88,716**

**Int. Cl.[4] B21D** *7/04, 7/12*

**U.S. Cl. 72—8** **11 Claims**




1. In combination with a tube bender supporting a rotatable bend die about which a tube may be bent and a pressure die engaging the outer surface of the portion of the tube tangential to the bend, a pressure die drive structure comprising:

means for driving said pressure die parallel with said tangential tube portion during bending;

means for sensing the drive speed of the pressure die;

means for detecting the rotation rate of the bend die;

means for converting the detected rotation rate into a centerline speed for the tube being bent around a selected bend die; and

means for controlling the pressure die drive means in response to the sensing means and converting means, to drive said pressure die at a speed which is a selected ratio to the tube centerline speed.

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**4,747,284**

**METAL SPINNING MACHINE CARRIAGE AND PROCESS FOR THE OPERATION OF A METAL SPINNING MACHINE**

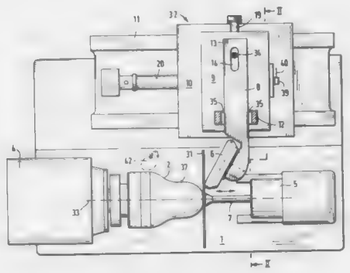
**Robert Hudson, 19402 Coralwood La., Huntington Beach, Calif. 92646**

**Filed Feb. 27, 1987, Ser. No. 19,825**

**Claims priority, application Fed. Rep. of Germany, Aug. 5, 1986, 3626495**

**Int. Cl.[4] B21D** *22/16*

**U.S. Cl. 72—83** **13 Claims**



1. A carriage for a metal spinning machine comprising a first slide movable on a machine frame; a second slide



movable on the first slide; a forming wheel mounted on a forming wheel post and movably mounted with respect to the first and second slides; biasing means and a thrust piece engaged by the biasing means and arranged between the forming wheel and the second slide; the thrust piece being operatively connected to at least one switch, the switch being connected with a control unit of the metal spinning machine; the thrust piece operatively engaging a recession rigidly connected to said forming wheel;

wherein the thrust piece and the biasing means hold the forming wheel in operable position under regular working conditions.

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**4,747,285**

**SURFACE-HARDENING OR SMOOTHING ROLLING MACHINE**

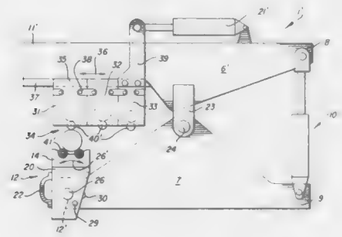
**Garri Berstein; Willi Hansen, both of Erkelenz, and Rudolf Winkens, Erkelenz-Gerderath, all of Fed. Rep. of Germany, assignors to W. Hegenscheidt GmbH, Erkelenz, Fed. Rep. of Germany**

**Filed Aug. 29, 1986, Ser. No. 902,153**

**Claims priority, application European Pat. Off., Aug. 30, 1985, 85110947.0; Jan. 14, 1986, 86100403.4**

**Int. Cl.[4] B21K** *1/08*

**U.S. Cl. 72—110** **33 Claims**



1. Surface-hardening and smoothing rolling machine for rolling at least eccentrically disposed surfaces on a workpiece, having equipment for seating and rotatably driving the workpiece, and comprising at least one movable rolling device at least including a die carrier with at least one rolling element and a die carrier with at least one backing element, said movable rolling device being movable together with the workpiece, and being arranged in a position which is linearly changeable in a radial plane of the workpiece.

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**4,747,286**

**ROLLING APPARATUS**

**Garri Berstein; Willi Hansen, both of Erkelenz, and Rudolf Winkens, Erkelenz-Gerderath, all of Fed. Rep. of Germany, assignors to W. Hegenscheidt GmbH, Erkelenz, Fed. Rep. of Germany**

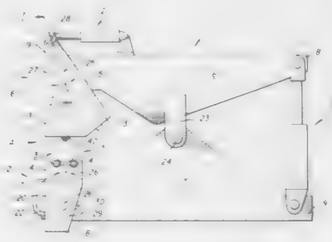
**Filed Aug. 29, 1986, Ser. No. 902,154**

**Claims priority, application European Pat. Off., Aug. 30, 1985, 85110948.8; Jan. 14, 1986, 86100402.6**

**Int. Cl.[4] B21K** *1/08*

**U.S. Cl. 72—110** **18 Claims**

1. Rolling apparatus with a driving mechanism for a workpiece to be rolled and with at least one movable rolling device comprising at least a die carrier with one rolling element and a die carrier with one backing element and including at least an additional one of said elements carried by at least one of said die carriers, at least one rolling element being changeable from one position thereof to at least another position thereof, at least one of said positions being a working position, at least one of the elements consisting of said rolling element in said working position thereof and at least one backing element associated



therewith being kinematically connectible to a power actuating device.

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**4,747,287**

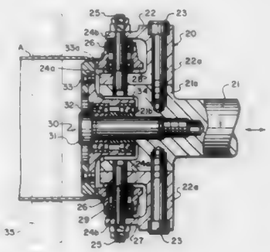
**INCLINED AXES SPIN FLANGING HEAD AND METHOD FOR USING SAME**

**Paul H. Azzaline, Crystal Lake, Ill., and Henry J. Etling, Scotch Plains, N.J., assignors to American National Can Company, Chicago, Ill.**

**Continuation-in-part of Ser. No. 231,841, Feb. 5, 1981, abandoned. This application Sep. 18, 1986, Ser. No. 908,579**

**Int. Cl.[4] B21D** *19/12*

**U.S. Cl. 72—125** **9 Claims**



1. In a method for spin flanging the open end of a cylindrical metal container the steps including:

(a) providing an inclined axis spin flanging head, said head comprising a body having a forward end and being adapted for rotation about an axis thereof, a plurality of forming rollers supported on said body at locations spaced about said body axis, and a pilot member mounted on said body for free rotation on said axis thereof, said rollers being of generally conical form, each having axially spaced opposite ends, and being mounted for free axial rotation about axes extending generally radially to said body axis, the exterior surfaces of said rollers being configured to cooperatively produce a flare in the end of a cylinder forced thereagainst, in the axial direction of said body, by reforming the material thereof, said pilot member having a circular portion disposed forwardly and coaxially on said body with its outermost circumferential edge directly in front of said rollers, the axial projection of said circumferential edge intersecting each of said rollers at a point intermediate said ends thereof;

(b) supporting said head for rotation about said body axis, and for axial reciprocation;

(c) supporting a hollow, thin-wall cylindrical metal container adjacent said head and forwardy thereof, said container having an open end and being coaxially aligned on said body axis with said open end facing said head;

(d) rotating said head; and

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(e) moving said rotating head axially to move said pilot member into said open end of said container and to cause the edge of said container surrounding said open end to contact said roller surfaces, and from the point of initial contact thereafter continuing such inward movement of said rotating head at constant velocity to effect a flaring deformation of an end portion of said container extending inwardly from said surrounding edge, said circumferential edge of said circular portion of said pilot member being of smaller diameter than said end portion, so as to provide a surface disposed closely adjacent thereto but normally with annular clearance therebetween, as said end portion is passed over said pilot member circular portion, the action of said rollers in deforming said end portion tending to induce a wave effect in said metal, and said surface of said pilot member being disposed to limit inward deflection of said metal, and thereby to prevent the wrinkling or rippling thereof that would otherwise tend to occur.

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**4,747,288**

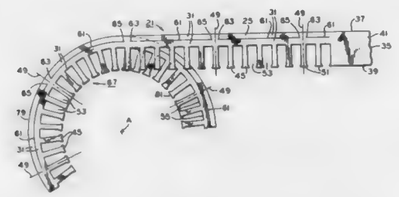
## METHOD OF FORMING AN EDGEWISE WOUND CORE

**Harold L. Fritzsche, Fort Wayne, Ind., assignor to General Electric Company, Fort Wayne, Ind.**

**Division of Ser. No. 717,037, Mar. 28, 1985, Pat. No. 4,654,552. This application Feb. 6, 1987, Ser. No. 11,564**

**Int. Cl.⁴ H02K** *15/02*

**U.S. Cl. 72—130** **22 Claims**



2. A method of forming an edgewise wound core from a lanced strip of generally thin ferromagnetic material, the lanced strip including a pair of opposite edges extending generally lengthwise thereof, a yoke section at least adjacent one of the opposite edges, a plurality of sets of separate segments in the yoke section with adjacent separate segments in the same segment sets being spaced apart generally lengthwise of the lanced strip, and a plurality of junctures between the adjacent segments in the same segment sets and joined with an adjacent juncture in at least one of the adjacent segment sets, respectively, the method comprising the steps of:

deforming the lanced strip generally edgewise thereof and forming thereby a plurality of generally helical convolutions of the lanced strip; and

deforming each of the separate segments in the yoke section generally edgewise and independently of each other and supporting each segment upon the deformation thereof at the junctures therebetween during the deforming and forming step, respectively.

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**4,747,289**

## METHOD OF FORMING SEAM-WELDED TUBES

**Masayuki Nakamura, Yokohama, Japan, assignor to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 696,597, Jan. 31, 1985, abandoned. This application Apr. 6, 1987, Ser. No. 36,151**

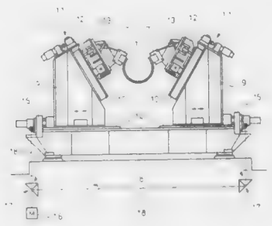
**Claims priority, application Japan, Feb. 7, 1984, 59-15535; Feb. 7, 1984, 59-20309**

**Int. Cl.⁴ B21D** *5/12;* **B23K** *31/06*

**U.S. Cl. 72—178** **3 Claims**

1. A method of forming seam-welded tubes of a diameter D from strip material, comprising the steps of positioning a plurality of sets of cage rolls along a line along which the strip material passes, with one roll of each set to one side of said line; applying the cage rolls to the strip material to form the tube so as to lower a central portion of the strip material to a base line by an amount defined as a downhill quantity; and of:

varying the downhill quantity as forming of the tube progresses, depending on thickness, substance, grade and size



of the strip material between a value greater than zero 0 and up to 1D by displacing the cage rolls at right angles with respect to the line along which the material passes, and by displacing the cage rolls along a line which is inclined with respect to the line along which the material passes.

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**4,747,290**

## ROLLER COOLING TABLE

**Peter Keating, and Kenneth Lyall, both of Mayfield, Australia, assignors to Tubemakers of Australia Pty., Ltd., Newcastle, Australia**

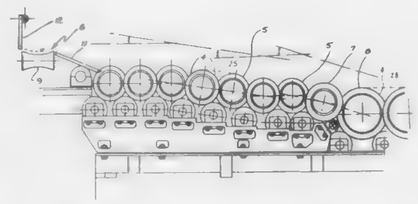
**PCT No. PCT/AU84/00265, § 371 Date Jun. 23, 1986, § 102(e) Date Jun. 23, 1986, PCT Pub. No. WO85/02796, PCT Pub. Date Jul. 4, 1985**

**PCT Filed Dec. 20, 1984, Ser. No. 770,348**

**Claims priority, application Australia, Dec. 20, 1983, PG2909**

**Int. Cl.⁴ B21B** *43/04, 45/02*

**U.S. Cl. 72—201** **5 Claims**



1. A roller cooling table for straightening and cooling hot-rolled tubes, comprising,

a series of hollow rolls with their axes substantially horizontal and parallel, and positioned adjacent one another;

means for feeding hot-rolled tubes in a plastic or semi-plastic condition onto said roller cooling table with the axes of said tubes parallel to the axes of said hollow rolls;

a first group of said rolls, located at an entry end of said table, arranged in a downwardly sloping plane;

a second group of said rolls, located downstream of the first group of said rolls, arranged in a substantially horizontal plane, the rolls of the first group having smaller diameters than the diameters of the rolls of the second group;

the first and second groups of rolls defining first and second v-shaped spaces, respectively, between all adjacent ones of said rolls, the first v-shaped spaces being samller than the second v-shaped spaces; and

means for rotating at least some of said rolls in the same direction, whereby said hot-rolled tubes in plastic to semi-plastic conditions are partially cooled and straightened in the first group of rolls and are further cooled and straightened on passage over the second group of rolls.

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**4,747,291**

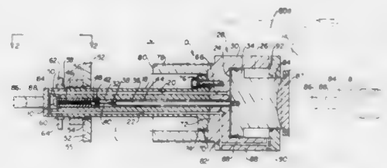
## HYDRAULIC FORCE APPLYING DEVICE IN A ROLLING MILL STAND

**Peter Kostopolos, Pittsburgh, Pa., assignor to United Engineering Rolling Mills, Inc., Pittsburgh, Pa.**

**Filed May 27, 1986, Ser. No. 867,081**

**Int. Cl.⁴ B21B** *31/08*

**U.S. Cl. 72—238** **17 Claims**



14. An arrangement for a hydraulic device of a hydralic force applying system used to adjust and maintain the gap between work rolls in a rolling mill stand having at least two upright housings each with a window, said work rolls rotatably mounted in said windows having their axis in a common vertical plane relative to said housings with a portion above said each window, said hydraulic device mounted in a bore in said portion of at least one of said housings, said hydraulic device comprising:

an elongated manifold member extending through said bore in said portion of said one housing in said vertical plane opposite said window thereof,

a piston cylinder assembly fixed attached to one end of said manifold member beneath said portion of said housing in said vertical plane and having a piston and a cylinder and sides thereof for receiving pressurized fluid for reciprocation of said piston for applying said force to said work rolls,

said elongated manifold member and said cylinder comprise cooperative passageway means including means for receiving said pressurized hydraulic fluid at a location outside said housing above said portion in said vertical plane and delivering it through said manifold member into said piston side and said cylinder side for said reciprocation of said piston cylinder assembly,

external thread means on an outer wall of said manifold member, and

an annular locking ring arranged in surrounding relation with said manifold member and having internal threads engagaeable with said external thread means on said manifold member,

said annular locking ring having surfaces abutting a top surface of said portion of said housing upon engagement of said cooperating thread means thereby supporting said manifold member in said housing in a suspended manner.

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**4,747,292**

## STRETCH FORMING APPARATUS

**Frederick R. Chornean, 2312 Grandview Ave., Manhattan Beach, Calif. 90266**

**Division of Ser. No. 868,259, May 28, 1986, Pat. No. 4,698,995. This application Jul. 17, 1987, Ser. No. 74,619**

**Int. Cl.⁴ B21D** *11/02, 25/02*

**U.S. Cl. 72—297** **9 Claims**

1. A stretch forming apparatus, comprising:

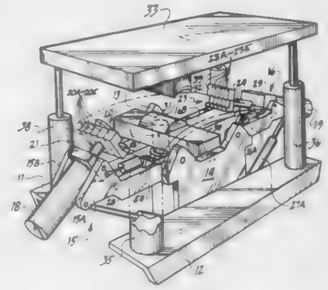
(a) an apparatus carriage;

(b) first and second arms pivotally mounted in opposed, spaced-apart relation on said carriage for independent downward vertical movement about a horizontally-disposed pivot axis;

(c) first and second tensioning means carried by said first and second arms, respectively, for independent diverging movement relative to each other for tensioning a metal sheet into its yield range unidimensionally in the direction from one of its margins to its opposite margin, each tensioning means pivoted to its respective arm about a pivot axis such that downward movement of the arm causes the tensioning means pivot axis to move downwardly;

(d) first and second gripping jaws carried by and movable with said first and second tensioning means, respectively, and adapted to receive and move into clamping engagement with the opposite margins of the metal sheet;

(e) a male draw-forming die positioned intermediate said respective first and second arms, tensioning means and jaws for having the metal sheet wrapped thereon by the



downward movement of said arms while maintaining the metal sheet in a tensioned state within its yield range; said male die being positioned on a vertically movable die table which is moved upwardly as said arms are moved downwardly, the depth of the form applied to the metal sheet resulting from the sum of the downward movement of said arms which causes the metal sheet to be wrapped onto said male die, and the upward movement of said vertically movable die table on which said male die is positioned; and

(f) a complementary female down-acting die mounted above said male die and means for reciprocating said female die downwardly into close proximity with said male die with the metal sheet wrapped in a tensioned state therebetween, whereby the metal sheet is formed into a predetermined shape, and upwardly out of proximity with said male die.

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**4,747,293**

## BENDING APPARATUS

**Sigenori Yagi, and Junosuke Yagi, both of Hyogo, Japan, assignors to Sinsei Mfg. Co., Ltd., Hyogo, Japan**

**Filed Dec. 18, 1986, Ser. No. 943,060**

**Claims priority, application Japan, Apr. 22, 1986, 61-93000**

**The portion of the term of this patent subsequent to May 19, 2004, has been disclaimed.**

**Int. Cl.⁴ B21D** *7/024*

**U.S. Cl. 72—307** **5 Claims**

1. An apparatus for bending elongated material such as wire, comprising a cylindrical blank guide (24, 25, 27) through which material to be bent is advanced lengthwise in a forward direction and which has a guide bore having an opening (26, 28) at a front end thereof that defines a bore axis and wherein the material has a close slidable fit to be confined laterally, a bending direction determination member (30) having a tip end portion and an outer peripheral portion, said bending direction determination member mounted in surrounding relation to said cylindrical blank guide (24, 25, 27) and having means thereon

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defining a bending axis (**42**) that is transverse to said bore axis, said bending direction determination member being adjustably rotatable about said bore axis for disposing said bending axis (**42**) in any desired orientation, and a bending operation member (**43**) movable in opposite directions about said bending axis (**42**) and engageable, when in operation with a portion of said material that projects forwardly beyond said front end of said cylindrical blank guide (**24, 25, 27**) for bending the same, said apparatus being characterized by:

A. said bending axis (**42**) being near said bore axis and rearwardly adjacent to said front end of said cylindrical blank guide (**24, 25, 27**);

B. said bending operation member (**43**) comprising

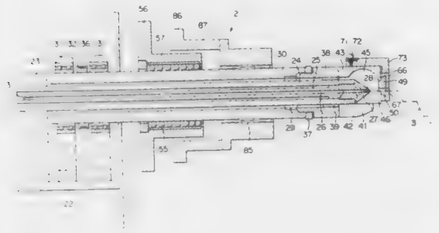
(1) a substantially U-shaped member having

(a) a pair of legs (**44**) connected by a laterally extending bight portion,

(b) an elongated slot (**45, 50**) between said legs which is of a width to closely receive the material and which has an inner end adjacent to said bight portion that is adapted to apply bending force to the material, and

(c) a flat front surface portion on each of said legs, said surface portion on one of said legs being coplanar with that on the other of said legs and extending to said slot to define a shearing edge thereat, and

(2) means (**47**) on said U-shaped member cooperating with said means that defines the bending axis (**42**) to mount said U-shaped member on said bending direction determination member (**30**) to place said flat front surface portion adjacent and forward of said front end of said cylindrical blank guide (**24, 25, 27**) with its said legs (**44**) on opposite sides of said bore axis, and to confine the U-shaped member to pivotal movement about said bending axis relative said bending direction determination member (**30**) whereby said inner end of said slot is carried across the bore axis for applying bending force to material projecting forward from the bending head;



C. a cutting blade (**66**) mounted on said bending operation member (**43**) in sliding relation to said flat front surface portion for movement in opposite directions substantially parallel to said bending axis (**42**), said cutting blade (**66**) having a cutting edge extending substantially parallel to said legs, said sliding movement of said cutting blade carrying said cutting edge across said slot to cooperate with said shearing edge for cutting through material that projects forward from the bending head;

D. a bending drum (**57**) connected to said bending operation member (**43**) and slidably mounted on said outer peripheral portion of said bending direction determination body (**30**) for axial movement relative thereto to rotate said bending operation body (**43**) about said bending axis (**42**); and

E. a cutting drum (**87**) connected to said cutting blade (**66**) and slidably mounted on said outer peripheral portion of said bending direction determination body (**30**) for axial movement relative thereto to move said cutting blade (**66**).

**4,747,294**

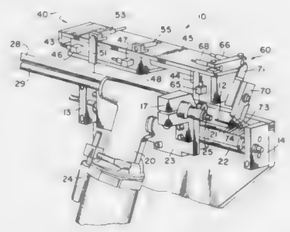
**FASTENER PRESENTATION DEVICE**

**Sidney D. Schwartz, Hamden; Thomas P. Shamaly, Shelton; Donald Viscio, and Raymond H. Varian, both of Danbury, all of Conn., assignors to USM Corporation, Farmington, Conn.**

**Filed Mar. 19, 1987, Ser. No. 27,752**

**Int. Cl.[4] B21J *15/10***

**U.S. Cl. 72—391** **21 Claims**



1. A device for automatically positioning a fastener in a predetermined, desired orientation and location, and inserting the fastener into a tool having a mechanism for engaging the fastener and installing it in a workpiece, comprising:

a transfer member having a chamber accessible via and exterior opening, said chamber being configured to loosely house a portion of the fastener;

means for inducing a negative pressure in the chamber to attract and hold the fastener therein, and for reversing the negative pressure to a positive pressure to expel the fastener;

means for transporting the transfer member between a "retracted position" removed from the workpiece and an "advanced position" aligned with the mechanism in the tool,

wherein fasteners are successively delivered from a supply to the opening of the transfer member while said transfer member is in its retracted position and under negative pressure, thereby causing the delivered fastener to be drawn into the chamber and held by the transfer member, to be subsequently transported to the advanced position where the fastener is expelled by the positive pressure to the tool mechanism.

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**4,747,295**

**TEST PIECE FOR ULTRASONIC TESTING**

**Wolf-Dieter Feist, Rettenbach; Manfred Podlech, Hebertshausen, and Johann Gollwitzer, Jetzendorf, all of Fed. Rep. of Germany, assignors to MTU Motoren- und Turbinen-Union München GmbH, Munich, Fed. Rep. of Germany**

**PCT No. PCT/DE86/00017, § 371 Date Nov. 25, 1986, § 102(e) Date Nov. 25, 1986, PCT Pub. No. WO86/04415, PCT Pub. Date Jul. 31, 1986**

**PCT Filed Jan. 21, 1986, Ser. No. 919,003**

**Claims priority, application Fed. Rep. of Germany, Jan. 25, 1985, 3502454**

**Int. Cl.[4] G01D *18/00*; G01N *29/04***

**U.S. Cl. 73—1 DV** **20 Claims**

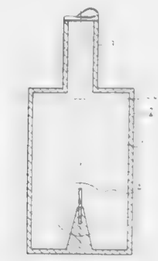
1. Device for ultrasonic testing, particularly for monitoring the measuring precision and the calibrating of at least one of high resolution ultrasonic testing apparatus and ultrasonic testing heads, of the type including a powder-metallurgically produced test piece means, said test piece means comprising:

a capsule having an interior for receiving powder;

insert means immovably fixed to said interior of said capsule for providing one of a reference defect and a reference reflector; and



powder poured in said capsule surrounding said immovably fixed insert means, said powder being subjected to



changed temperature and pressure thereby forming said test piece.

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**4,747,296**

**ELECTRONIC TONOMETER WITH BASELINE NULLING SYSTEM**

**Steven E. Feldon, San Marino; David A. Wallace, Beverly Hills; Gary Mezack, Norco, and Robert A. Monsour, Pasadena, all of Calif., assignors to Design Team Partners, Glendale, Calif.**

**Filed Sep. 27, 1985, Ser. No. 781,240**

**Int. Cl.[4] G01L *27/00***

**U.S. Cl. 73—4 R** **4 Claims**



1. A baseline nulling system in which inputs to amplifier stages are dynamically equalized prior to and during signal analysis comprising

amplifier means with a plurality of amplifier stages wherein a first stage is capacitively coupled to a second stage and said second stage is capacitively coupled to a third stage,

analysis means connected to said third stage for receiving electronic signals from said third stage, corresponding to pressure measurements,

analog switch means comprising a first analog switch and a second analog switch, said first analog switch being connected to said analysis means and to said second stage, and said second analog switch being connected to said analysis means and said third stage, and wherein said analysis means causes said first and second switches to open and close for a pre-determined period of time between the open state and closed state prior to said analysis means receiving electronic signals from said third stage and wherein said analog switch means causes the gain of said second and third stages to have a pre-determined gain when said first and second analog switches are open.

**4,747,297**

**APPARATUS FOR ANALYZING PARTICULATES**

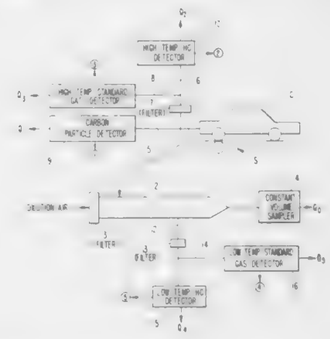
**Junji Okayama; Naoki Noguchi, and Hiroyuki Amimoto, all of Kyoto, Japan, assignors to Horiba, Ltd., Kyoto, Japan**

**Filed Feb. 9, 1987, Ser. No. 12,650**

**Claims priority, application Japan, Feb. 10, 1986, 61-27082**

**Int. Cl.[4] G01N *15/06***

**U.S. Cl. 73—28** **4 Claims**




1. An apparatus for analyzing particulates in the exhaust gas of a diesel engine, comprising:

carbon particle measuring means, including a carbon particle detector, for continuously measuring and outputting a first value indicative of the concentration of carbon particles in the exhaust gas;

first hydrocarbon measuring means, including a high-temperature hydrocarbon detector, for continuously measuring and outputting a second value indicative of the total concentration of gaseous hydrocarbon compounds including high and low boiling point gaseous hydrocarbon compounds, in a first portion of the exhaust gas while the first portion is at a high temperature immediately after being exhausted from the diesel engine;

means for diluting and cooling a second portion of the exhaust gas;

second hydrocarbon measuring means, including a low-temperature hydrocarbon detector, for continuously measuring and outputting a third value indicative of the total concentration of low boiling point gaseous hydrocarbon compounds in the second portion of the exhaust gas cooled and diluted by said diluting and cooling means;

first standard gas measuring means, including a high-temperature standard gas detector, for continuously measuring and outputting a fourth value indicative of the concentration of a standard gas found in diesel engine exhaust and which remains gaseous at room temperature, in the first portion of the exhaust gas;

second standard gas measuring means, including a low-temperature standard gas detector, for continuously measuring and outputting a fifth value indicative of the concentration of the standard gas in the second portion of the exhaust gas, the ratio of the fifth value to the fourth value being indicative of the amount of dilution of the exhaust gas by said diluting and cooling means;

calculating means, responsive to said first, second, third, fourth and fifth values, for automatically calculating and outputting

at least one value from among the values of the total concentration and weight of particulates formed of carbon particles and soluble organic fractions in the exhaust gas,

at least one value from among the values of the concentration and weight of the carbon particles, and in the exhaust gas, and

at least one value from among the values of the concentra-

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tion and weight of the high boiling point hydrocarbon compounds in the exhaust gas.

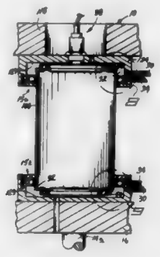
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**4,747,298**

## CONTAINER LEAK DETECTOR

**Patrick K. McDaniel, 618 The Parkway, Richland, Wash. 99352**

**Filed Dec. 4, 1986, Ser. No. 938,027**
**Int. Cl.⁴ G01M** *3/32*
**U.S. Cl. 73—49.3** **63 Claims**



3. A container testing apparatus for applying a differential pressure to a sealed container to aid in detecting leaks therein, the container having end surfaces and at least one side wall connected to the end surfaces, the apparatus comprising:

first sealing means for engaging and sealing against one of the end surfaces of the container along a first seal;

second sealing means for sealing against surfaces of the container along a second seal;

said second sealing means having an nternal expansion chamber adapted for receiving a pressurized sealing fluid therein to expand the second sealing means into sealing engagement against a side wall surface of the container, and being adapted for discharging sealing fluid therefrom to contract the second sealing means from sealing engagement with surfaces of the container;

said first and second sealing means defining at least portions of a testing fluid chamber adapted to apply a differentially pressurized testing fluid to surfaces of the container when said first and second sealing means are in sealing engagement against the container;

the first and second sealing means being connected to a testing head member having a receptacle for receiving an end of the container therein; said second sealing means being mounted along side sections of the receptacle for engaging at least one side wall of the container and sealing there against;

said first sealing means being mounted along a bottom wall of the receptacle for engaging the one end surface of the container and sealing there against;

means for providing a desired differential pressure to the testing fluid chamber and against adjacent portions of the container which are being tested;

means for transmitting pressurized sealing fluid to said internal expansion chamber; and

means for transmitting pressurized sealing from said internal expansion chamber.

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**4,747,299**

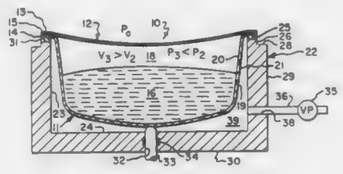
## METHOD OF TESTING A PACKAGE SEAL

**John M. Fox, Blasdell, and David C. Maloney, Alden, both of N.Y., assignors to The Aro Corporation, Bryan, Ohio**

**Filed Oct. 28, 1987, Ser. No. 114,157**
**Int. Cl.⁴ G01M** *3/36*
**U.S. Cl. 73—49.3** **4 Claims**

1. The method of testing the integrity of a seal in a package, said package having a thin-walled open-mouthed container portion and having a flexible lid portion sealed to a rim portion of said container mouth, said package having an ullage volume therewithin, which method comprises the steps of:

creating a first pressure differential to bow said lid portion into said container portion to a position of substantially maximum concavity without substantially changing said ullage volume;



creating a second pressure differential across the wall of said container portion to increase said ullage volume; and

sensing for a change in position of a portion of said container portion wall after said second pressure differential has been created;

thereby to indicate whether fluid has leaked into said package.

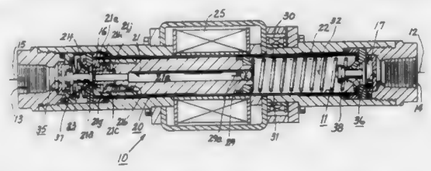
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**4,747,300**

## SENSING PUMP WITH IMPROVED DISCRIMINATION BETWEEN LIQUIDS AND GASES

**Robert E. Nelson, Rosamond, Calif., and Robert M. Nelson, Box 215, Rte. 1, Rosamond, Calif. 93560, assignors to Robert M. Nelson, Rosamond, Calif.**

**Filed Aug. 25, 1986, Ser. No. 899,928**
**Int. Cl.⁴ G01N** *7/00*
**U.S. Cl. 73—61 R** **10 Claims**



1. In a sensing system which receives and samples a fluid to determine by discrimination response the quality of the fluid in the sense of its being a liquid, a gas, or a mixture of liquid and gas, said system including a sensing pump having a body with a bore, an axis, an axially movable magnetically responsive plunger in said bore adapted for movement in a forward and in a return direction, passage means and valving means enabling transfer of said fluid past said plunger during plunger motion in the return direction, actuating coil means surrounding said plunger adapted to exert a known and repeatable axial force on said plunger, a sensing coil responsive to movement of said plunger to provide a signal proportional to the rate of displacement of the plunger, at least one port through said body and first conduitry in communication with said port, the improvement comprising a restrictor orifice in the path of fluid flow into or out of said bore so proportioned as to establish, through it, the regime of flow of liquid as that of mass transfer rather than of viscosity.

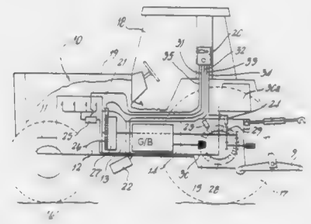


**4,747,301**

## VEHICLE PERFORMANCE MONITORING APPARATUS

**Regis Bellanger, Mississauga, Canada, assignor to Massey-Ferguson Services N.V., Curacao, Netherlands Antilles**

**PCT No. PCT/EP86/00197, § 371 Date Nov. 14, 1986, § 102(e) Date Nov. 14, 1986, PCT Pub. No. WO86/06190, PCT Pub. Date Oct. 23, 1986**
**PCT Filed Apr. 2, 1986, Ser. No. 945,060**
**Claims priority, application United Kingdom, Apr. 12, 1985, 8509488**
**Int. Cl.⁴ G01M** *15/00*
**U.S. Cl. 73—117.3** **8 Claims**



1. A vehicle performance monitoring apparatus for displaying the values of a plurality of performance parameters of a vehicle, said apparatus comprising sensing means for sensing data indicative of the performance of the vehicle, processing means for processing said data to derive said parameter values, memory means for storing performance information relating to said parameters, display means for displaying said parameter values, and operator command means for controlling the operation of the apparatus including the selection of which performance parameter is to be displayed on the display means and the initiation of processing routines by the processing means, one or more of the parameters being designated relative mode parameters and operation of the operator command means in a first predetermined manner causing the processing means to store in the memory means a current performance parameter value for each of said relative mode parameters as a reference value, subsequent operation of the operator command means in a second predetermined manner initiating operation of the apparatus in a relative mode in which a new current performance parameter value for each of the relative mode parameters is derived by the processing means and is displayable on the display means as a proportion of the reference value of each respective relative mode parameter.

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**4,747,302**

## MOUNTING FIXTURE FOR END-OF-TRAIN DEVICE OR THE LIKE

**John H. Goss, Fayetteville, Ark., assignor to American Railroad Technology, Inc., Fayetteville, Ark.**

**Filed Feb. 17, 1986, Ser. No. 15,145**
**Int. Cl.⁴ G01L** *5/28*
**U.S. Cl. 73—129** **14 Claims**

8. A fixture for mounting an apparatus housing to a railcar coupler in the flag hole thereof comprising:

an elongated, at least partially threaded, rod adapted to pass vertically through a rail coupler flag hole,

an upright member having a channel through which the upper end of said rod extends, said member having a lower end larger than said hole,

means on said upright member for securing an apparatus housing thereto,

means for limiting the movement of said rod relative to said upright member,

a collar threadedly engageable on the lower end of said rod, said collar being larger than said hole with a conformation adapted to frictionally engage in the lower mouth of said hole,

means for facilitating manual rotation of said rod thereby causing said collar to be forced upward to securely engage in said hole, and

means on said upright member lockable to prevent rotation of said rod relative thereto and undesired release to said collar from engagement with the bottom mouth of the hole in said coupler,



whereby said rod may be secured and locked in the coupler flaghole with the coupler gripped at the bottom by said threaded collar so that the apparatus housing mounted by said fixture is restrained relative to said coupler.

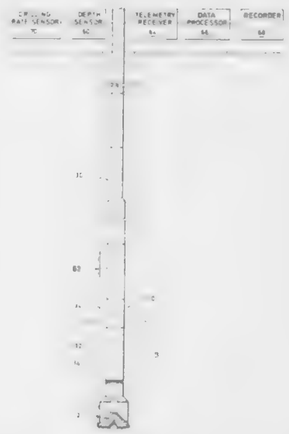
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**4,747,303**

## METHOD DETERMINING FORMATION DIP

**John E. Fontenot, Houston, Tex., assignor to NL Industries, Inc., New York, N.Y.**

**Filed Jan. 30, 1986, Ser. No. 824,186**
**Int. Cl.⁴ E21B** *47/00*
**U.S. Cl. 73—152** **31 Claims**




17. A system for determining the dip of a formation interface encountered in a drilling operation comprising:

means to measure a near bit bending moment generated by a bit encountering and passing through said interface;

means to measure the orientation of said bit bending moment while said moment is present;

VOL 1090 ISS 5 MY 31 1988 UMI



means to measure the inclination and orientation of the wellbore at the location of the interface; and

means to determine the dip of a formation interface from said near bit bending moment measurements and said orientation and inclination measurements.

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**4,747,304**

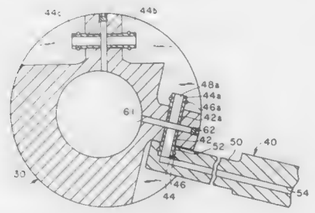
**BUNDLE CARRIER**

**Lance M. King, Garden Grove, Calif., assignor to V. E. Kuster Company, Long Beach, Calif.**

**Filed Oct. 20, 1986, Ser. No. 920,371**

**Int. Cl.[4] E21B *49/08***

**U.S. Cl. 73—155** **11 Claims**




1. In a downhole bundle carrier having means for connecting an elongate measuring instrument in one or more elongate slots therein and means for permitting fluid communication with such instrument, the improvement wherein the means for permitting fluid communication with the instrument comprises:

support means forming a passageway extending from either interior or exterior of the bundle carrier; and

pivotal instrument support means forming a fluid communication passage having one end connected to the support means and another end adapted to be connected to the instrument for fluid communication therewith, the passage in the pivotal support means forming a fluid communication path from the passageway in the support means therethrough to permit fluid communication from either the interior or the exterior of the bundle carrier to the instrument when the bundle carrier is in use; the pivotal support means being so configured and assembled with the support means of the bundle carrier as to permit the instrument to be connected thereto in non-parallel relationship to the axis of the bundle carrier and to be pivoted into a substantially parallel relationship in a slot in the bundle carrier.

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**4,747,305**

**MOVEMENT SENSING**

**John M. Evans; Keith Cameron, and Arthur A. Keeler, all of Victoria, Australia, assignors to Commonwealth of Australia, Canberra, Australia**

**PCT No. PCT/AU85/00042, § 371 Date Jan. 7, 1986, § 102(e) Date Jan. 7, 1986, PCT Pub. No. WO85/04019, PCT Pub. Date Sep. 12, 1985**

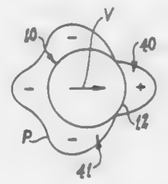
**PCT Filed Mar. 7, 1985, Ser. No. 802,004**

**Claims priority, application Australia, Mar. 7, 1984, PG3946**

**Int. Cl.[4] G01C *21/10***

**U.S. Cl. 73—182** **25 Claims**

19. A movement parameter sensing means for sensing a parameter of movement of a body (10) relatively movable in an ambient fluid in a plurality of directions relative to the configuration of the body, the body (10) having a longitudinal axis (11) and a component of the velocity of the body (10) relative to the fluid being transverse to the longitudinal axis (11) characterized in that the movement parameter sensing means comprises: a plurality of passages (15), the passages (15) having respective outer ends (17) opening to the ambient fluid at locations spaced circumferentially relative to the longitudinal axis (11) of the body (10) and arranged such that in each passage (15) a pressure differential between the outer end (17) and an opposite end (18) of that passage (15) causes fluid flow in the passage (15) related to the pressure difference; sound propagation velocity sensing means for sensing the propagation velocity of




sound within each of said passages (15) and hence determine the fluid flow velocity within each passage; and processing means (32) responsive to the flow sensing means (20), (21) and for determining from the sensed fluid flow a parameter of movement of the body (10) relative to the ambient fluid.

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**4,747,306**

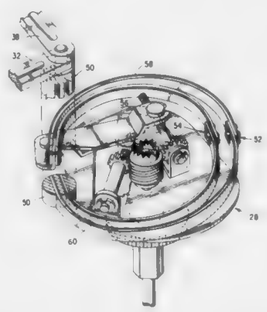
**TEMPERATURE COMPENSATING TANGENT ASSEMBLY FOR A DIAPHRAGM GAS METER**

**William P. Kiriloff, Philadelphia, Pa., assignor to American Meter Company, Philadelphia, Pa.**

**Filed May 16, 1986, Ser. No. 864,184**

**Int. Cl.[4] G01F *3/20, 15/04***

**U.S. Cl. 73—233** **5 Claims**




1. In a diaphragm gas meter tangent assembly which rotates about an axis to drive the meter valves and includes a tangent wrist connected to the meter flag assembly, a temperature compensating assembly for varying the radius of movement of said tangent wrist from said axis in accordance with variations in the temperature of the metered gas, comprising:

a first bimetal element having a first end connected to said tangent assembly to rotate with said tangent assembly around said axis; and

a second bimetal element having a first end connected to said first bimetal element second end and a second end connected to said tangent wrist;

said first and second bimetal elements being configured as circular arcs, together extending less than 360° and oriented with respect to each other to form an open C-shaped loop, and having the relative placements of their high and low expansion sides reversed with respect to each other and so configured that the path of movement of said tangent wrist with respect to said axis in response to temperature variations is along a nonlinear curve so as to maintain the valve timing substantially without change as said radius changes.

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**4,747,307**

**LIQUID FLOW METER**

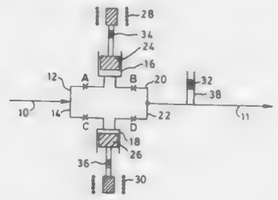
**Victor C. Humberstone, Cambridge, and Dexter R. Plummer, Bishops Stortford, both of England, assignors to Ford Motor Company, Dearborn, Mich.**

**Filed Jan. 23, 1987, Ser. No. 6,520**

**Claims priority, application United Kingdom, Jan. 25, 1986, 8601951**

**Int. Cl.[4] G01F *11/04***

**U.S. Cl. 73—243** **10 Claims**




1. A positive displacement liquid flow meter comprising:

an inlet and an outlet;

a pair of fluid lines connected in parallel between the inlet and the outlet;

two variable-volume chambers, each being coupled to one of the pair of fluid lines;

a pressure sensing device downstream of the chambers;

a pair of inlet valves, each connected to one of the pair of fluid lines upstream of one of the chambers;

a pair of outlet valves, each connected to one of the pair of fluid lines downstream of one of the chambers;

the chambers each comprise a cylinder with a moveable piston and drive means, responsive to the pressure sensing device, for moving the piston to vary the chamber volume;

control means for opening and closing the pair of inlet valves and the pair of outlet valves in a predetermined sequence to provide a continuous liquid flow from the outlet; and

an output device for measuring piston movement to indicate the quantity of liquid flowing through the meter.

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**4,747,308**

**METHOD AND APPARATUS FOR NONDESTRUCTIVELY DETERMINING THE DENSITY OF A PLURALITY OF CONTIGUOUS SEGMENTS OF A NONHOMOGENEOUS SPECIMEN**

**Jerrold E. Winandy, Mazomanie; Kent A. McDonald, Cross Plains, and Steven G. Hankel, Madison, all of Wis., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.**

**Filed Mar. 13, 1987, Ser. No. 25,749**

**Int. Cl.[4] G01M *19/00***

**U.S. Cl. 73—432.1** **11 Claims**

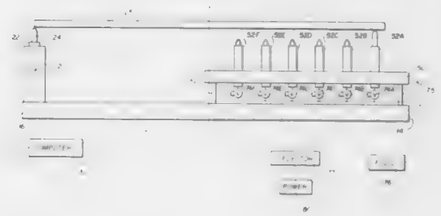
1. A process for nondestructively estimating weights of individual segments of a straight, elongated specimen having a uniform cross-section and heterogeneous density along its length, and having a predetermined total weight and length comprising

(a) maintaining said specimen in a horizontal position by supporting it at first and second points; wherein said first point is at or adjacent one end of said specimen; wherein said second point is near but not at the opposite end of said specimen; wherein that part of said specimen which extends from said second point to said opposite end defines a first specimen segment of predetermined length;

(b) measuring the downward force exerted by said specimen at said first point when said specimen is maintained in said horizontal position by said first and second support points;

(c) determining a weight for said first segment in accordance with the following formula

$$W_1=(WT-2\ (F_1))(L_s-L_1)/L_s$$



where

$W_1$ = weight of said first segment

$WT$ = total weight of said specimen

$F_1$ = measurement of said downward force at said first point

$L_1$ = length of said first segment

$L_s$ = length of said specimen

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**4,747,309**

**STRUCTURES AND METHODS OF TESTING THEM WITH LINEAR MICROPHONES**

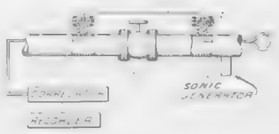
**Robert J. Weir, Richmond, England, assignor to Imperial Chemical Industries PLC, London, England**

**Filed Sep. 28, 1981, Ser. No. 306,343**

**Claims priority, application United Kingdom, Oct. 2, 1980, 8031745**

**Int. Cl.[4] G01N *29/04***

**U.S. Cl. 73—655** **6 Claims**

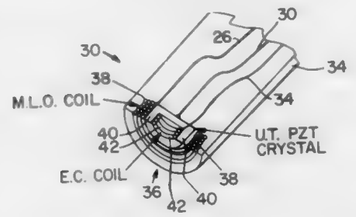



1. A structure which comprises means for testing said structure for faults, said means comprising at least one linear microphone which comprises an optical fibre sensitive to vibration from the structure, means for passing at least one carrier signal through the linear microphone in opposite directions and means to determine the position of a fault in the structure by determining the time lag necessary to produce an optimum correlation of the signal modulations produced in each direction.

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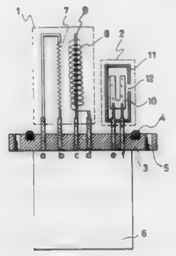
**4,747,310**
**PROBE FOR COMPOSITE ANALYZER TESTER**
**Richard M. Collins, East Setauket, and Richard F. Chance, Bayport, both of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.**
**Filed Aug. 12, 1986, Ser. No. 895,790**
**Int. Cl.[4] G01N *29/04***
**U.S. Cl. 73—661** **3 Claims**




1. A composite analyzer probe, for use with a composite analyzer tester for nondestructively testing and analyzing the physical properties and gaging the thickness of a test material, comprising a probe housing having a generally flat end surface designed to be placed flat against the surface of the test material, a magnetic induction coil positioned against said end surface with the central longitudinal axis of the coil extending substantially perpendicular thereto, a piezoelectric element positioned adjacent to said magnetic induction coil and against said end surface, and an eddy current coil positioned adjacent to both said magnetic induction coil and said piezoelctric element and against said end surface, with the central longitudinal axis of the eddy current coil extending substantially perpendicular thereto.

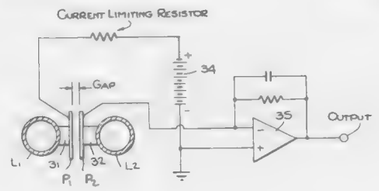
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**4,747,311**
**GAS PRESSURE GAGE**
**Hisao Hojoh, Musashino, Japan, assignor to Seiko Instruments Inc., Tokyo, Japan, a part interest**
**Filed Mar. 10, 1987, Ser. No. 24,370**
**Claims priority, application Japan, Mar. 20, 1986, 61-62393**
**Int. Cl.[4] G01L *11/00***
**U.S. Cl. 73—702** **3 Claims**




1. A gas pressure gage wherein a pressure gage using a mechanical vibrator driven by an electric field or a magnetic field and an ionization-type pressure gage are incorporated in a common flange and which is provided with a control circuit for making the pressure gage using the mechanical vibrator operate in a low-vacuum region and the ionization-type pressure gage in a highvacuum region.

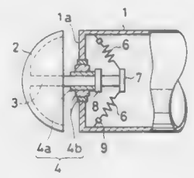
**4,747,312**
**DOUBLE-LOOP CORIOLIS TYPE MASS FLOWMETER**
**Peter J. Herzl, Morrisville, Pa., assignor to Fischer & Porter Co., Warminster, Pa.**
**Continuation-in-part of Ser. No. 831,564, Feb. 21, 1986, Pat. No. 4,691,578. This application Jul. 6, 1987, Ser. No. 69,817**
**Int. Cl.[4] G01F *1/84***
**U.S. Cl. 73—861.38** **12 Claims**




1. A mass flow flowmeter of the Coriolis type comprising:
A a pipe having an inlet and an outlet end coiled to form a double loop having identical circular loops;
B a stationary frame for supporting the double loop to anchor said pipe at the inlet end and at the outlet end and at its center which is the junction of the two loops to define a tuning fork in which the identical loops on either side of the center function as tines that are free to vibrate back and forth with respect to the center as well as to twist;
C an electromagnetic driver mounted at the vertex of the double loop, the driver when electrically energized causing the loops to vibrate in phase opposition at the natural frequency of the tuning fork;
D means to conduct the fluid through the pipe from the inlet to the outlet end thereof, thereby subjecting the double sionally oscillate in accordance with the mass flow of the fluid;
E a pair of capacitance sensors symmetrically mounted the respective loops in either side of the center whereby in signals of different magnitude as a function of mass flow; and
F means to supply the signals from the sensors to a differential amplifier whose output is substantially proportional to the mass flow rate.

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**4,747,313**
**TACTILE SENSOR**
**Tokuji Okada, Ibaraki, Japan, assignor to Agency of Industrial Science and Technology and Ministry of International Trade & Industry, both of Tokyo, Japan**
**Filed Jan. 13, 1987, Ser. No. 2,938**
**Claims priority, application Japan, Jan. 13, 1986, 61-4872**
**Int. Cl.[4] G01L *5/16***
**U.S. Cl. 73—862.04** **2 Claims**

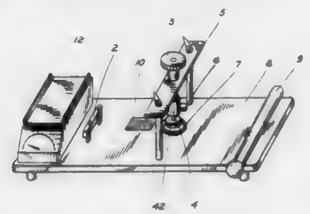



1. A tactile sensor comprising;
a hemispherical sensitive shell including a support rod extending rearward from said sensitive shell,
a cylindrical sensor body having an end plate provided with a composite bearing, in which the free end portion of said support rod is received such that said support rod is capable of axial movement, rotation and tilting in predetermined ranges;
a stopper provided on the end of said support rod to prevent detachment of said support rod from said bearing;
a plurality of elastic members each secured at one end to the inner wall of said sensor body near said end plate and coupled at the other end to the end of said support rod, for suspending said support rod at a reference position and in a reference orientation with said stopper in contact with said bearing; and
a strain gauge provided on each said elastic member.



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**4,747,314**
**RACKET TESTER**
**Ben T. Huang, 82 Ta-An St., Hsi-Chih Town, Taipei County, Taiwan**
**Filed Feb. 26, 1987, Ser. No. 19,055**
**Claims priority, application Taiwan, Nov. 13, 1986, 75,210,748**
**Int. Cl.[4] G01L *5/08*; G01N *3/20***
**U.S. Cl. 73—862.45** **5 Claims**

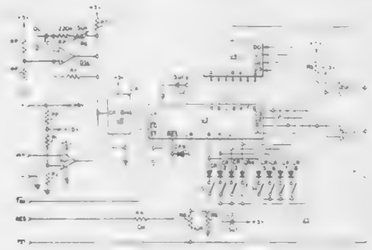



1. A racket tester comprising:
a flat plate;
a support fixed on said plate;
a knob attached with a screw rod, said knob being rotatably fixed on said support; and
a pneumatic cylinder including a piston and a pressure gauge, said piston being threadingly engaged with said screw rod, and said pressure gauge being in communication with said cylinder, so as to indicate the air pressure within said cylinder; through the assembly of the above said members, when the netting face of a racket is placed between said plate and the bottom of said cylinder, said knob being rotated thereby causing said piston to displace downwardly a specific distance, so that specific volume is established between said piston and the inner wall of said cylinder through the bottom of said cylinder in response to the tension of the netting face, thus allowing one to know the tension of said netting face from the indication on said pressure gauge.

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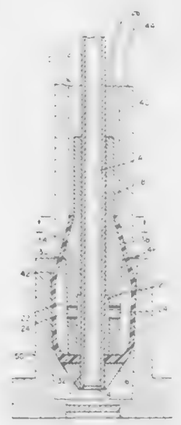
**4,747,315**
**FLUID SAMPLING**
**Harvey F. Padden, 5 Iron Forge Village South, Pompton Lakes, N.J. 07442**
**Division of Ser. No. 201,823, Oct. 29, 1980, Pat. No. 4,432,248. This application Jun. 3, 1983, Ser. No. 500,809**
**Int. Cl.[4] G01N *35/00***
**U.S. Cl. 73—863.01** **25 Claims**

1. A fluid sampler including a fluid channel having means for processing fluid, a pump for transmitting fluid through said fluid-processing means, a motor, connected to said pump, for driving said pump, power-supply means, a circuit, interconnecting said motor and power-supply means, for energizing said motor, said circuit including controllable current conducting means, connected in said circuit in series with said motor, and means, connected to said current conducting means, for controlling said current conducting means so that said current conducting means conducts the motor current, responsive continuously, as distinct from digitally, over the whole range of operation of said sampler, substantially only to the electrical loading of said motor as said loading is governed by the reaction between said fluid and said pump, and not to any pressure-actuable monitor, for continuously controlling said motor at any setting of said sampler by continuously adjusting the terminal voltage of said motor over said whole range so as to track the changes in the flow of fluid through said processing means to maintain the flow of fluid through said processing means substantially constant over said whole range.



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**4,747,316**
**PROBE-GRIPPER**
**Joshua E. Rabinovich, Newton, Mass., assignor to Millipore Corporation, Bedford, Mass.**
**Filed Mar. 5, 1987, Ser. No. 22,269**
**Int. Cl.[4] G01N *35/00***
**U.S. Cl. 73—864.73** **11 Claims**



1. A probe-gripper for automated sample preparation systems comprising:
a. a sample tube extending lengthwise of the probe through which fluid may flow, alternatively, in opposite directions,
b. an annular electrode surrounding the sample tube adjacent one of its ends,
c. a barrel surrounding at least a portion of the electrode,
d. means for connecting the barrel and the electrode to capacitance measuring means to detect changes in capacitance between them,
e. an annular, elastomeric member surrounding at least a portion of the electrode,
f. opposite end portions of the annular, elastomeric member being secured to the electrode,
g. an intermediate annular portion of the elastomeric member being free from the electrode to create an inflatable bladder, and,
h. means for conducting pressurized fluid lengthwise of the

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probe to the interior of the inflatable bladder to cause it to expand and contract into gripping and releasing positions respectively.

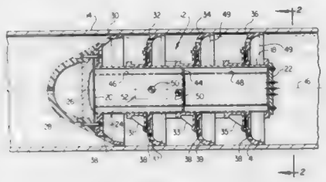
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**4,747,317**

## SYSTEM FOR SURVEYING FLUID TRANSMISSION PIPELINES AND THE LIKE

**Pedro F. Lara, Dallas, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.**

**Filed Dec. 18, 1986, Ser. No. 944,308**
**Int. Cl.[4] G01C** *9/06*
**U.S. Cl. 73—865.8** **22 Claims**



1. In a system for surveying a fluid transmission pipeline to detect changes in curvature of the course of said pipeline, a pipeline pig having a body and support means for supporting said body in said pipeline normally in a laterally fixed position with respect to the longitudinal central axis of said pipeline, said support means being adapted to provide for traversing said pig along said longitudinal axis, the improvement comprising:

an inertial reference unit mounted on said body and, including means for sensing accelerations normal to said longitudinal axis, means for sensing angular velocities normal to said longitudinal axis, means for generating signals related to said accelerations and said angular velocities, and means for recording further signals related to said signals generated by said acceleration sensing and angular velocity sensing means, said signal generating means and signal recording means being operable to generate and record signals at a rate which substantially exceeds the natural frequency of lateral vibration of said pig in said pipeline during traversal therethrough, whereby changes in curvature of said pipeline may be determined from signals recorded by said recording means while minimizing errors due to any lateral excursion of said pig in said pipeline.

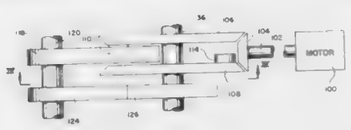
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**4,747,318**

## DRIVE FOR A MACHINE GUN

**Victor J. Forrester, Burlington, Vt., assignor to General Electric Company, Burlington, Vt.**

**Division of Ser. No. 878,470, Dec. 18, 1985. This application Mar. 23, 1987, Ser. No. 29,494**
**Int. Cl.[4] F16M** *21/40*
**U.S. Cl. 74—25** **4 Claims**




1. An external drive means, for a gun having a operating mechanism including a rocking lever journalled for oscillation about a central axis, comprising:

a motor having an output shaft which is coupled, through as oscillatory drive mechanism having less than 360° of rotation, to said rocking lever;

said drive mechanism including:

a pinion gear coupled to and driven by said motor;

said pinion gear meshed with and driving first and second mutually opposed gears, respectively journalled for rotation about a common first axis, in opposite directions of rotation;

a cam follower journalled for oscillation about a second axis, which second axis is parallel to and spaced from said first axis, to and between two angularly spaced apart dispositions through an arc which is less than 360°, and having a cleft cam surface disposed between said first and second opposed gears;

a first cam driver carried by said first opposed gear;

a second cam driver carried by said second opposed gear;

said first cam driver, as said first opposed gear is driven by said pinion, entering said cleft cam surface at one of said dispositions and swinging said cam follower to the other of said dispositions and exiting said cleft cam surface;

said second cam driver, as said second opposed gear is driven by said pinion, entering said cleft cam surface at said other of said dispositions and swinging said cam follower to said one of said dispositions and exiting said cleft cam surface.

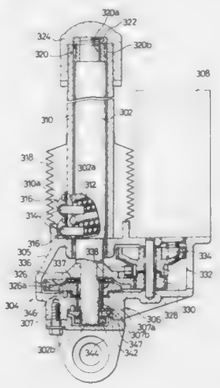
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**4,747,319**

## ACTUATOR

**Junshi Sakuta, Higashimatsuyama, Japan, assignor to Jidosha Kiki Co., Ltd., Tokyo, Japan**

**Filed Dec. 12, 1986, Ser. No. 941,252**
**Claims priority, application Japan, Dec. 16, 1985, 60-282425; May 20, 1986, 61-115414**
**Int. Cl.[4] F16H** *25/22, 57/10*
**U.S. Cl. 74—89.15** **7 Claims**



1. In an actuator comprising means defining a housing, a threaded shaft rotatably mounted within said housing, a tubular output rod fitted around said threaded shaft and capable of undergoing an elevating motion as said threaded shaft rotates, a rotary drive transmission mechanism for transmitting a rotating drive from a drive source to said threaded shaft, the improvement wherein a lock mechanism is provided for locking said rotary drive transmission mechanism when said drive source ceases to operate, wherein said rotary drive transmission mechanism comprises a first gear fixedly mounted on said threaded shaft, an intermediate shaft extending parallel to said threaded shaft, a second gear rotatably mounted on said intermediate shaft and meshing with said first gear, a third gear rotatably mounted on said intermediate shaft and driven for rotation by said drive source, and a coupling mechanism for transmitting a rotating drive between said second gear and said third gear, wherein said coupling mechanism comprises at least one recess formed in one of said second gear and said third gear and a projecting portion formed on the other of said second gear and said third gear and fitted in said one recess, wherein said projecting portion is rotatable through a given angle within said recess, and wherein said lock mechanism



comprises a first cam fixedly and concentrically mounted on said first gear, a second cam fixedly and concentrically mounted on said third gear, a lever including a pair of arms each carrying a cam follower and disposed so as to be rotatable about a point located between said arms, and a spring acting to urge a respective one of said respective cam followers against a corresponding one of said cams, said first cam having at a periphery thereof a plurality of notches which are circumferentially spaced apart at an equal interval, each notch having a bottom surface which is concentric with an outer peripheral surface of said first cam in a region where it is not notched, said second cam including a portion of an increased diameter, a portion of a reduced diameter concentric with said portion of said increased diameter, and a pair of junctures which join the opposite sides of said portion of a reduced diameter to said portion of an increased diameter, the aforementioned combination of structure satisfying the following relationships:

$$\frac{l_1}{l_2} = \frac{R_2 - R_1}{r_2 - r_1} \quad (1)$$

$$\alpha = \beta \quad (2)$$

$$\theta = \gamma \times N - \alpha \quad (3)$$

wherein:

$L_1$ represents the distance between the center of said cam follower which abuts against said first cam and said center of rotation of said lever,

$L_2$ represents the distance between the center of said cam follower which abuts against said second cam and said center of rotation of said lever,

$R_1$ represents the radius of the bottom surface of said notch in said first cam,

$R_2$ represents the radius of the outer periphery of said first cam,

$r_1$ represents the radius of said portion of a reduced diameter on said second cam,

$r_2$ represents the radius of said portion of said increased diameter of said second cam,

$\theta$ represents an angle which said portion of a reduced diameter on said second cam subtends with respect to its center,

$\alpha$ represents an angle which a juncture of said second cam subtends with respect to its center,

$\beta$ represents an angle over which the projecting portion is angularly movable within the recess of said coupling mechanism,

$\gamma$ represents an angle formed between lines which join the center of the both cam followers and the center of said first cam when said cam follower is located at either end of said notch in said first cam, and

N represents a gear ratio of said first gear to said second gear, and wherein the number of the notches in said first cam is an integral multiple of N.

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**4,747,320**

## SCREW AND NUT DRIVE WITH ROTATION LOCK

**Sven W. Nilsson, Partille, Sweden, assignor to SKF Nova AB, Goteborg, Sweden**

**Filed Nov. 20, 1986, Ser. No. 932,796**
**Claims priority, application Sweden, Dec. 18, 1985, 8505997**
**Int. Cl.[4] F16H** *57/10;* **F16D** *57/10*
**U.S. Cl. 74—411.5** **1 Claim**

1. A device for braking relative rotation of a nut (1) and a shaft (2) having a helical thread surrounded by the nut in a drive mechanism for linear movements, characterized in that the nut is connected to a torque transmitting part (3) which is rotatable in relation to the nut, the nut and the part (3) having opposing surface portions extending mainly radially perpendicular to the direction of rotation and delimiting a space (8), a helical spring (10) having a plurality of axially spaced torques engaging in the helical thread around the shaft, the spring being of a cross section to complement the thread surface and whereby a wedging action is developed between the spring and shaft when the spring is squeezed radially to increase contact pressure and thus the braking action, said spring having an end portion (11) inserted into the space (8), torque transmission taking place by squeezing the end portion of the helical spring against one of said surface portions by the other



of said surface portions, a portion (9) of the torque transmitting part (3) is arranged between two opposing surface portions in connection to the nut (1), whereby a space is formed between the portion (9) and each one of said surface portions, a portion of the spring at each of its ends being inserted in each space, respectively.

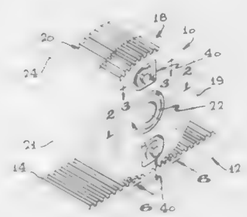
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**4,747,321**

## ANTI-BACKLASH GEAR ASSEMBLY

**Clifford L. Hannel, Los Angeles, Calif., assignor to Lockheed Corporation, Calabasas, Calif.**

**Filed Jul. 17, 1987, Ser. No. 74,653**
**Int. Cl.[4] F16H** *55/18*
**U.S. Cl. 74—440** **5 Claims**



1. An anti-backlash gear assembly comprising:

a shaft;

a first gear rotatably mounted to said shaft, said first gear having a slot therethrough;

a second gear mounted to said shaft;

a cam means rotatively mounted to said second gear having a cam surface extending into said slot;

a cam follower having first and second ends, said first end in slideable contact with said cam surface and said second end in contact with said biasing means, and;

biasing means coupled to said cam surface and one wall of said slot biasing said first and second gears in opposite angular directions about said axis of rotation.

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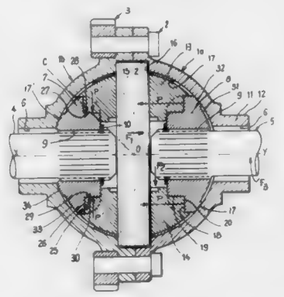


**4,747,322**

## CONTROLLED TORQUE TRANSFER DIFFERENTIAL FOR A MOTOR VEHICLE

**Michel A. Orain, Conflans Sainte Honorine, France, assignor to Glaenzer Spicer, Poissy, France**

**Filed Jul. 29, 1985, Ser. No. 759,912**
**Claims priority, application France, Aug. 1, 1984, 84 12220**
**Int. Cl.[4] F16H** *1/38*
**U.S. Cl. 74—715** **11 Claims**



1. A differential for a motor vehicle comprising a housing, a first shaft and a second shaft for driving driving wheels of a vehicle extending axially through the housing, sun gears mounted in the housing coaxially with said shafts and connected to rotate with said shafts, each of said sun gears having an axial end surface facing towards the center of said housing, a third shaft having ends fixed to the housing and perpendicular to the first and second shafts, planet gears rotatively mounted on the third shaft and each of said planet gears having an axial end surface facing towards said center of said housing, said planet gears being cooperative with said sun gears, the sun gears and the planet gears having helicospiral sets of teeth, said helicospiral sets of teeth of each of said sun gears extending from said axial end surface thereof in a first direction about a corresponding axis of rotation thereof and said helicospiral sets of teeth of each of said planet gears extending from said axial end surface thereof in a second direction about a corresponding axis of rotation thereof, said first direction being opposite to said second direction, the teeth of said sets each comprising two flanks which form an edge of a respective tooth which is inclined to a respective axial plane passing through a corresponding axis of rotation of one of said gears, with an angle measured between said respective axial plane and a tangent to said edge being preselected as a function of a desired transfer rate for the torque from one shaft to the other of said first and second shafts, and the set of teeth of each sun gear and each planet gear having, when viewed in an axial plane of the sun gears, a perpendicular section comprising segments of one of said two flanks which are perpendicular to the axis of the first and second shafts and segments of the other of said two flanks which are parallel to the axis of the first and second shafts.

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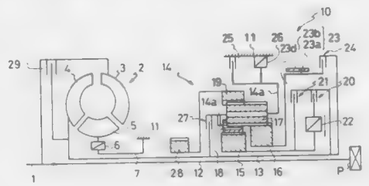
**4,747,323**

## CONTROL OF A VEHICLE POWER TRANSMISSION

**Morio Kiuchi, and Kazuo Oguri, both of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan**

**Continuation of Ser. No. 665,044, Oct. 26, 1984, abandoned.**
**This application Nov. 3, 1986, Ser. No. 926,840**
**Claims priority, application Japan, Oct. 28, 1983, 58-202042**
**Int. Cl.[4] F16H** *57/10*
**U.S. Cl. 74—763** **8 Claims**

1. A vehicle power transmission device for a front engine, front wheel drive type vehicle having an output shaft extending transversely of the vehicle, said transmission device comprising a torque converter having an input member coaxial with and adapted to be connected with an engine output shaft and an output member, a multiple stage gear transmission mechanism, a drive shaft having one end connected with the output member of the torque converter and passing through the gear mechanism, said gear mechanism including a composite type planetary gear unit including a first sun gear having a first diameter and a second sun gear having a second diameter larger than said first diameter, said first and second sun gears mounted rotatably on the drive shaft in this order as seen from the torque converter, a ring gear coaxial with the sun gears, at least one long planetary pinion which is in meshing engagement with the second sun gear and the ring gear and at least one long planetary pinion which is in meshing engagement with the second sun gear and the ring gear and at least one short planetary pinion which is in meshing engagement with the first sun gear and the long planetary pinion, first clutch means located at an end of said gear transmission opposite to said torque converter and adapted for connecting the first sun gear with the drive shaft through first one-way clutch means which permits power transmission from the drive shaft to the first sun gear, second clutch means adjacent to said first clutch means for connecting said drive shaft with the first sun gear said first clutch means including a clutch drum, a drum-shaped first piston disposed in and splined with said clutch drum for axial sliding movement, a first clutch hub disposed in said clutch drum and connected through said first one-way clutch means with the first sun gear of the gear unit, first clutch discs carried alternately by said clutch drum and said first clutch hub, and adapted to be forced by said first piston into engagement with each other, said second clutch means including a second piston disposed in said first piston for axial sliding movement, a second clutch hub disposed in said first piston and connected with the first sun gear of the gear unit, second



clutch discs carried alternately by said first piston and said second clutch hub and adapted to be forced together by said second piston for engagement with each other, first drum-type brake means having a brake drum disposed around said second clutch means and a brake band for frictional engagement with the brake drum, said brake drum being connected with said second sun gear, third clutch means disposed diametrically outward of the first clutch means and having an element carried by said brake drum for connecting the drive shaft with the second sun gear through said brake drum of the first brake means, second brake means disposed diametrically outward of the gear unit and including friction means having friction discs for frictionally constraining said planetary carrier against rotation, said second brake means including a disc carrier for carrying said discs and mounted on a stationary part of the transmission through axial splines, second one-way clutch means disposed between said first and second brake means for connecting said planetary carrier of the gear unit with a stationary part of the transmission device for allowing rotation in only one direction of the planetary carrier when said friction means of the second brake means is engaged, fourth clutch means disposed adjacent to an axial end of the gear unit adjacent to said torque converter for connecting the drive shaft with the planetary carrier, an output member mounted on said drive shaft between said torque converter and the fourth clutch means and connected with the ring gear of the gear unit, differential gear means located adjacent to the torque converter and having output shafts which are parallel with said drive shaft, said differential gear means having an input gear coaxial with said output shafts of the differential gear means and engaged with said output member through an intermediate gear having an axis parallel with said drive shaft, said second one-way clutch



means being located adjacent to said second brake means, said second one-way clutch means and said second brake means being located diametrically outward of the planetary gear unit.

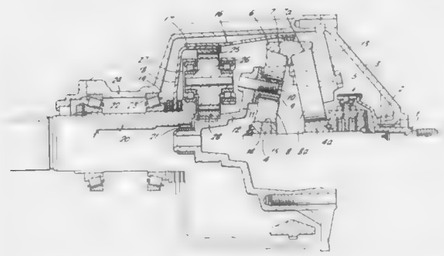
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**4,747,324**

## ROLLER DRIVE ASSEMBLIES

**Forbes G. D. Perry, Long Meadow, Church St., Charlbury, Oxford, Great Britain 0X7 3PD**

**Filed Jan. 7, 1987, Ser. No. 1,232**
**Claims priority, application United Kingdom, Jan. 8, 1986, 8600331; Feb. 27, 1986, 8604822**
**Int. Cl.[4] F16H** *15/16, 13/06*
**U.S. Cl. 74—798** **17 Claims**



1. A roller drive assembly comprising: a first bevelled central roller; a bevelled annulus coaxial with the central roller; a set of bevelled rollers each engaging the central roller and the annulus, the generatrices of the engagement surfaces of the rollers and the respective engagement surface of the annulus intersecting at a common point on the axis of the central roller; a second bevelled central roller; a rotary member common to the first and second central rollers; a second set of rollers, the second central roller being coupled to a respective bevelled drive surface of the annulus by means of the second set of rollers, the generatrices of the engagement surfaces of the second central roller and the rollers of the second set intersecting at a second point on said common axis, the bevelling of the respective sets of rollers being in opposite directions; and a fixed reaction member supporting the rollers in each respective set of rollers at evenly spaced locations about the respective central roller.

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**4,747,325**

## TRANSMISSION RATIO CONTROL SYSTEM FOR A CONTINUOUSLY VARIABLE TRANSMISSION

**Yoshihiko Morimoto, Mitaka, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 19, 1986, Ser. No. 944,348**
**Claims priority, application Japan, Dec. 25, 1985, 60-295444**
**Int. Cl.[4] B60K** *41/12, 41/18*
**U.S. Cl. 74—866** **10 Claims**

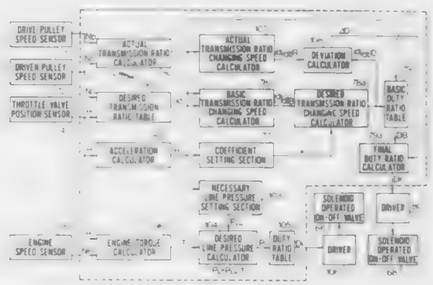
1. A control system for a continuously variable transmission for transmitting the power of an internal combustion engine to driving wheels of a motor vehicle through a clutch, having a drive pulley including a hydraulically shiftable disc and a first hydraulic cylinder for shifting the disc, and a driven pulley including a hydraulically shiftable disc and a second hydraulic cylinder for operating the disc of the driven pulley, a belt engaged with both pulleys, a transmission ratio control valve having ports and a spool, a first hydraulic circuit having a pump for supplying oil to the first hydraulic cylinder through the transmission ratio control valve, the system comprising:

first means for detecting operating conditions of the engine and the transmission and for producing a condition signal;

second means responsive to the condition signal for producing a desired rate of change of transmission ratio;

third means responsive to the desired rate of change of the transmission ratio for shifting the spool of the transmission ratio control valve dependent on the desired rate of change of the transmission ratio;

detecting means for determining actual rate of change of the transmission ratio;




fourth means responsive to the desired rate of change of the transmission ratio and to the actual rate of change of the transmission ratio for producing an error signal;

fifth means responsive to the error signal for correcting the desired rate of change of the transmission ratio.

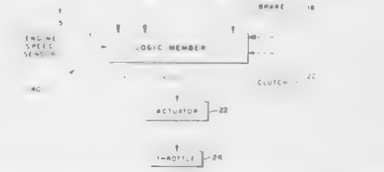
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**4,747,326**

## SPEED CONTROL SYSTEM

**Eugene R. Braun, Royal Oak, Mich., assignor to Eaton Corporation, Cleveland, Ohio**

**Filed Apr. 11, 1986, Ser. No. 850,639**
**Int. Cl.[4] B60K** *41/06*
**U.S. Cl. 74—866** **10 Claims**




1. An improved vehicular speed control system for use with vehicular transmissions having a plurality of forward gear ratios that are respectively predetermined as optimum for use at predetermined vehicular speeds, said control system comprising:

vehicular speed sensing means operative to provide a signal indicative of actual vehicular speed,

speed selector means operative to provide a control signal indicative of a particular vehicle speed selected to be maintained,

gear ratio sensor means operative to provide a signal indicative of the transmission gear ratio in use,

actuator means operative to maintain the selected vehicular speed upon receipt of the control signal, and

logic means operative to receive and process said actual vehicular speed signal, said control signal, and said gear ratio sensor signal and provide said control signal to said actuator means only when the gear ratio is that predetermined as optimum for the particular vehicular speed selected to be maintained.

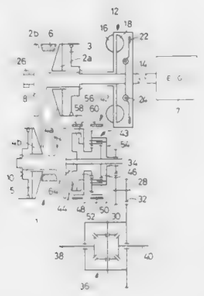
VOL 1090 ISS 5 MY 31 1988 UMI



**4,747,327**
**HYDRAULIC CONTROL APPARATUS FOR HYDRAULICALLY-OPERATED POWER TRANSMITTING SYSTEM HAVING CONTINUOUSLY VARIABLE TRANSMISSION**

**Hiroshi Itoh; Mitsuru Takada, and Nobuyuki Kato, all of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan**

**Continuation of Ser. No. 739,276, May 30, 1985. This application Sep. 23, 1987, Ser. No. 100,266**
**Claims priority, application Japan, Jun. 18, 1984, 59-123620**
**Int. Cl.[4] B60K *41/12***
**U.S. Cl. 74—868** **1 Claim**



1. A hydraulic control apparatus for controlling a hydraulically-operated power transmitting system for an automotive vehicle, the transmitting system having a continuously variable transmission of the belt-and-pulley type and an auxiliary transmission incorporating a frictional coupling assembly and coupled to the output side of the continuously variable transmission, the continuously variable transmission including a first variable-diameter pulley, a second variable-diameter pulley, a transmission belt connecting the first and second variable-diameter pulleys, and first and second hydraulic actuators for changing the effective diameters of the first and second variable-diameter pulleys, respectively, said hydraulic control apparatus comprising:

(a) first pressure-generating means for generating a first line pressure exclusively used to operate one of the first and second hydraulic actuators of the continuously variable transmission, primarily for controlling the tension of the transmission belt;

(b) second pressure-generating means for generating a second line pressure exclusively used to operate the frictional coupling assembly, said second pressure-generating means generating said second line pressure based on an output torque of an engine of the automotive vehicle and on a speed ratio of the continuously variable transmission,

wherein:

(c) said hydraulic control apparatus includes a manual valve which has at least two shift positions including a forward-drive position, and

(d) said second pressure-generating means comprises:

(i) an input port to which said first line pressure is applied while said forward-drive position is selected;

(ii) an output port from which said second line pressure is generated while said forward-drive position is selected; and

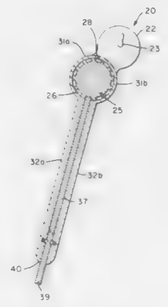
(iii) a valve spool for controlling a cross sectional area of fluid communication between said input and output ports, said valve spool receiving a speed-ratio pressure corresponding to said speed ratio, a feedback pressure corresponding to said second line pressure, and a throttle pressure corresponding to an angle of opening of a throttle valve of the engine, said speed-ratio pressure and said feedback pressure acting on said valve spool so as to move said valve spool in one of opposite directions, and said throttle pressure acting on said valve spool in the other direction.

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**4,747,328**
**SWIVEL ARM RATCHET WRENCH**

**Leslie Howard, 6018 Edge Lake Dr., Virginia Beach, Va. 23464**

**Continuation of Ser. No. 876,836, Jun. 20, 1986, abandoned. This application Jun. 29, 1987, Ser. No. 68,770**
**Int. Cl.[4] B25B *13/00***
**U.S. Cl. 81—54** **7 Claims**



1. A ratchet wrench comprising:

a rotatable shank means for receiving a socket;

a head for housing a portion of said rotatable shank means;

a ratchet means positioned within said head for determining the direction of rotation of said shank means;

a neck extending from said head and integrally terminating with a cylinder offset from said head, said cylinder having circumferentially spaced grooves which extend parallel to the axis of said cylinder and the axis of said rotatable shank, and completely surround the cylinder;

a housing for said cylinder having an arm extending therefrom, said housing being rotatably mounted on said cylinder through 360°, said arm having a longitudinal bore extending therethrough; and

an elongated locking pin mounted within said bore and of a length longer than said bore whereby an end of said pin may be seated within each of said completely surrounding spaced grooves to lock said arm relative to said neck by pushing the locking pin longitudinally from an opposing rear end.

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**4,747,329**
**MOBILE AIR-EQUIPPED TRANSFER TABLE AND METHOD OF USE**

**J. Paul Lukens, Jr., Perkasie, Pa., assignor to Phillocraft Company, Montgomeryville, Pa.**

**Division of Ser. No. 817,989, Jan. 13, 1986, abandoned. This application Nov. 12, 1986, Ser. No. 930,069**
**Int. Cl.[4] B26D *7/32***
**U.S. Cl. 83—29** **7 Claims**

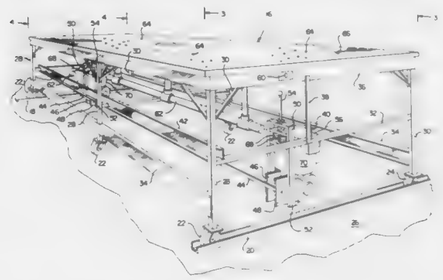
1. The method of moving heavy loads from work station to work station wherein each work station comprises an elongated, air equipped table having a top surface provided with a plurality of air openings comprising

spreading a plurality of layers of fabric upon a first table at a first work station;

positioning an air equipped transfer table adjacent to the first table;

transferring the plurality of layers of fabric from the first table to the transfer table;

moving the loaded transfer table and positioning the transfer table adjacent to a second air equipped table at a second work station; and



transferring the plurality of layers of fabric from the transfer table to the second air equipped table.



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**4,747,330**
**MAT CUTTING SYSTEM**

**Charles H. Carithers, Jr., 5752A Galland Dr., Jackson, Miss. 39236**

**Filed Dec. 1, 1986, Ser. No. 936,381**
**Int. Cl.[4] B26D *3/02***
**U.S. Cl. 83—467 A** **12 Claims**



1. A system for the precision cutting of picture mats comprising:

a flat base having a base surface;

an elongate mounting arm attached to said base, said mounting arm extending in a direction parallel to said base surface;

a mat guide bar including a first mat engaging edge surface, an opposed edge surface parallel thereto, and a bar mounting means for adjustably and detachably mounting said mat guide bar to said mounting arm such that said first edge surface and opposed edge surface of said mat guide bar extend perpendicular to the direction of said mounting arm and perpendicularly from said base surface;

a mat cutter means mounted to said base for cutting a mat along a line parallel to said first edge surface of said mat guide bar, said mat cutter means extending parallel to said mat guide bar and along said base surface;

a plurality of bar stops, each said bar stop including opposed flat sides and a bar stop mounting means for detachably mounting each said bar stop to said mounting arm such that said opposed flat sides of said bar stops are positioned parallel to said edge surfaces of said mat guide bar;

two mat stops, each said mat stop including a second mat engaging edge surface, a mat stop mounting means for detachably mounting said mat stop to said mat guide bar with said second mat engaging edge surface parallel to said first mat engaging edge surface, and an adjustment means for adjusting the position of said second edge surface relative to said first edge surface of said mat guide bar;

whereby a rectangular opening having unequal borders is easily cut by moving said mat guide bar from abutting relationship with one of said bar stops to abutting relationship with another said bar stop, and a double mat having a smaller and congruent rectangular opening is similarly cut by placement of appropriately adjusted said two mat stops on said mat guide bar during the cutting of the opening in a first mat and by the subsequent removal of said two mat stops during the cutting of the congruent opening of the double mat.

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**4,747,331**
**TRUE CUT BAGEL AND ROLL SLICER**

**Henry Policella, 108-A Oregon Ave., Bronxville, N.Y. 10708**

**Filed Jan. 6, 1987, Ser. No. 831**
**Int. Cl.[4] B26D *1/54, 7/22;* B27B *11/00, 21/00***
**U.S. Cl. 83—762** **4 Claims**



1. A true cut bagel and roll slicer which comprises:

(a) a housing having an open front and being of a size to vertically receive a bagel/roll to be cut;

(b) a top hand grip integrally formed onto a top of said housing having an elongated vertical slot extending into said housing;

(c) a door pivotable at a bottom edge to close onto said open front of said housing;

(d) a handle extending upwardly from a top of said door;

(e) a plurality of inwardly facing grip portions formed on an interior face of said door and an interior face of said housing opposite said door so that when said door is closed said grip portions will engage with the bagel/roll and hold it in a vertical position to be cut;

(f) a knife having an extended blade to fit into said elongated vertical slot so as to cut the bagel/roll in two parts;

(g) a swivel base member supporting said housing;

(h) a pivotable guide member extending upwardly from one side of said member;

(i) a slide member pivotally affixed to one end of said blade restraining said end to said guide member and preventing said blade from leaving said elongated vertical slot in said top hand grip and said housing when a person uses said knife to cut the bagel/roll into two parts and a handle on an opposite end of said blade; and

(j) means for rotating said swivel base member with respect to said housing when said knife is upwardly pivoted out of said slot such that said guide member can be positioned on the left or the right side of said hand grip whereby said handle of said knife is correspondingly selectively positioned on the right or left side to thereby accommodate right and left handed people.

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4,747,332

## ELECTRONIC MUSICAL INSTRUMENT FORMING TONES BY WAVE COMPUTATION

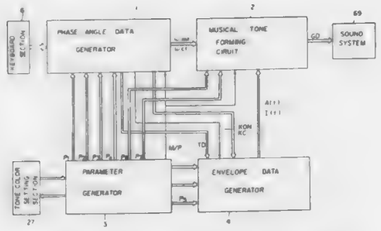
**Yasuji Uchiyama, Hamamatsu, and Hideo Suzuki, Kami, both of Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan**

**Continuation of Ser. No. 718,186, Mar. 29, 1985, Pat. No. 4,616,546, which is a continuation of Ser. No. 434,230, Oct. 14, 1982, abandoned. This application Mar. 24, 1986, Ser. No. 842,933**

**Claims priority, application Japan, Oct. 15, 1981, 56-164443**

**Int. Cl.[4] G10H** *1/06*

**U.S. Cl. 84—1.23** **6 Claims**




1. An electronic musical instrument comprising:

time channel providing means for providing repeated cycles of a plurality of correspondingly located time slots, each said corrspondingly located time slot over repeated cycles constituting a time-division-multiplexed time channel;

tone pitch information generating means for generating a pitch information signal in synchronism with each said time channel, each said pitch information signal designating a pitch of a musical tone signal to be formed during each said time channel;

parameter generating means for generating parameter signals for computing each said musical tone signal in synchronism with each said time channel, based on a modulation formula;

tone forming means for forming each said musical tone signal by repeatedly executing a signal forming computation based on said modulation formula, using said pitch information signal and said parameter signals; and

time slot assigning means for variably assigning a plural number of said cycles of said time slots, in each said time channel, to each said signal forming computation to allow execution thereof during said plural cycles, a number of said plural cycles being determined by a kind of said modulation formula.

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4,747,333

## REMOTELY CONTROLLED FOOT PEDAL OPERATED BEATERS FOR DRUMS

**Yoshihiro Hoshino, Nagoya, Japan, assignor to Hoshino Gakki Co., Ltd., Japan**

**Filed Oct. 30, 1986, Ser. No. 925,814**

**Claims priority, application Japan, Jun. 18, 1986, 61-093003[U]**

**Int. Cl.[4] G10D** *13/02*

**U.S. Cl. 84—422 R** **5 Claims**

1. A remotely controlled drum beater assembly, comprising:

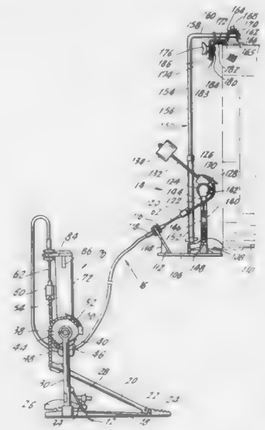
drum beater means movable for striking a drum; the drum beater means including a rod, a beater affixed to the rod and a rotatable shaft to which the rod is affixed for rotating the beater about the axis of the shaft toward and away from the surface of the drum; first spring return means for urging the beater away from the drum;

pedal means movable by a performer toward a beating position; the pedal means being separated from the drum beater means;

a transmission cable connected with the pedal means for being moved lengthwise as the pedal means is moved by a performer and the cable being connected with the beater means such that movement of the pedal means toward the beating position causes lengthwise movement of the cable which moves the beater means to strike the drum;

the drum beater means further including a sprocket on the shaft and connected to the cable such that movement of the cable in turn rotates the sprocket and thereby the shaft and moves the beater toward the drum;

the pedal means being so connected with the cable as to



move the beater to strike the drum when the pedal is moved toward the beating position; second spring return means for returning the pedal away from the beating position and for returning the cable;

the pedal means including a rotatable shaft having a first sprocket and a second sprocket fixed thereto, a first chain connected between the pedal and the first spocket and a second chain connected between the second sprocket and the cable, such that the chains move with rotation of the sprockets.

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4,747,334

## OCEAN LAUNCHING APPARATUS OF SPACE ROCKET

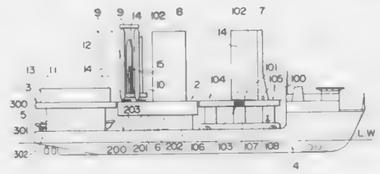
**Tsuneaki Kuriiwa, Chiba, Japan, assignor to Sankyu Inc., Fukuoka and Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, both of, Japan**

**Filed Mar. 11, 1987, Ser. No. 24,562**

**Claims priority, application Japan, Mar. 12, 1986, 61-54415**

**Int. Cl.[4] F41F** *3/04*

**U.S. Cl. 89—1.802** **10 Claims**



10. A method for launching space rockets at an optimum position on the ocean comprising the steps of:

preparing a launch pad platform for launching rockets, said platform having a floating-island structure;

preparing a vehicle assembly building platform for servicing at least one rocket before launching, said platform having a floating-island structure;

preparing at least one vehicle hangar platform for safely maintaining at least one rocket during transportation, said platform having a floating-island structure;

loading at least one rocket on the vehicle hangar platform at a rocket manufacturing site;

loading said launch pad platform, vehicle assembly platform, and vehicle hangar platform with said rocket, onto a carrier by a float-on method in a loading area;

loading at least one boat onto the carrier by a float-on method;

sailing the carrier to an intended ocean area;

floating off said boat from said carrier at said intended ocean area;

transferring the rocket from the vehicle hangar platform to the vehicle assembly building platform;

setting the rocket on a mobile launcher in the vehicle assembly building platform;

transferring the mobile launcher with rocket from the vehicle assembly building platform to the launch pad platform;

floating off the launch pad platform from the carrier;

transporting the launch pad platform by means of the boat to an intended launching position;

positioning the launch pad platform at the launching position; and

launching the rocket from the launch pad platform.



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4,747,335

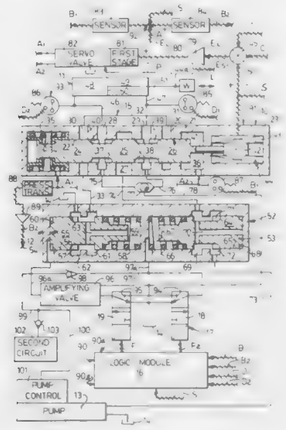
## LOAD SENSING CIRCUIT OF LOAD COMPENSATED DIRECTION CONTROL VALVE

**Tadeusz Budzich, Moreland Hills, Ohio, assignor to Caterpillar Inc., Peoria, Ill.**

**Filed Dec. 22, 1986, Ser. No. 945,149**

**Int. Cl.[4] F15B** *13/16*

**U.S. Cl. 91—361** **15 Claims**




1. In a load responsive system including a fluid power actuator operable to control a positive or negative load W, a source of pressure fluid, fluid exhaust means, flow control means of said load responsive system including a positive and a negative load pressure throttling control and first valve means operable to selectively interconnect said actuator with said source of pressure fluid and said fluid exhaust means and to direct the flow of fluid subjected to positive type and negative type load pressures, actuating means responsive to a control signal and operable to control direction of displacement and position of said first valve means, first signal generating means operable to generate a first electrical signal in response to direction of displacement of said first valve means, second signal generating means operable to generate second electrical signal in response to said laod pressure in said fluid power actuator, electric logic means having a positive and a negative load pressure identifying means and operable to process said first and said second electrical signals and to identify the type of said load pressure and operable to produce at least one actuating signal, and second valve means responsive to said actuating signal and operable to supply said identified load pressure to the respective positive or negative load pressure throttling control.

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4,747,336

## SHELL CONNECTING STRUCTURE FOR BOOSTER

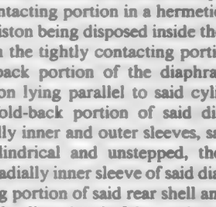
**Shintaro Uyama, Saitama, Japan, assignor to Jidosha Kiki Co., Ltd., Tokyo, Japan**

**Filed Apr. 8, 1987, Ser. No. 35,961**

**Claims priority, application Japan, Apr. 18, 1986, 61-58360[U]**

**Int. Cl.[4] F15B** *9/10*

**U.S. Cl. 91—376 R** **7 Claims**



1. A shell connecting structure for a booster including a front and a rear shell which are connected together, a power piston disposed in a space defined by the shells so as to be reciprocable in its axial direction and a diaphragm applied to the back surface of the power piston, the diaphragm extending axially forward from the periphery of the power piston and then folded back to define a fold-back portion which is U-shaped in section, the rear end of the fold-back portion being formed with a peripheral bead which is adapted to be held between the front and the rear shell in a hermetically sealed manner, the periphery of the front shell being formed with a first cylindrical portion which opens rearwardly with a first step formed in the first cylindrical portion to provide a cylindrical section of an increased diameter and a cylindrical section of reduced diameter which are located rearward and forward of the first step, respectively, the periphery of the rear shell being formed with a second cylindrical portion which extends forwardly and which is tightly folded back into contact upon itself to provide a tightly contacting portion, said tightly contacting portion having an external diameter which is less than the internal diameter of the cylindrical section of reduced diameter of the front shell by an amount which is substantially equal to or greater than the thickness of the diaphragm, the rear end of the tightly contacting portion being bent so as to extend radially outward to define a second step therein which is substantially axially opposite to the first step, the second step in the rear shell being fitted into the cylindrical section of increased diameter of the front shell so that the peripheral bead of the diaphragm is held between the first and the second step and between the internal peripheral surface of the cylindrical section of increased diameter and the outer peripheral surface of the tightly contacting portion in a hermetically sealed manner, the power piston being disposed inside the tightly contacting portion, with the tightly contacting portion being located inside the fold-back portion of the diaphragm, said tightly contacting portion lying parallel to said cylindrical sections, said U-shaped fold-back portion of said diaphragm having cylindrical radially inner and outer sleeves, said radially outer sleeve being cylindrical and unstepped, the axially central portions of said radially inner sleeve of said diaphragm and said tightly contacting portion of said rear shell and said peripheral bead being radially aligned and of decreasing axial extent, so as to occupy a generally triangular cross-sectional space, such

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triangular space having a base defined by said radially inner sleeve of said diaphragm and an apex defined by said peripheral bead.

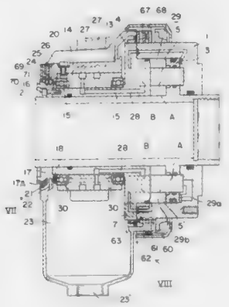
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**4,747,337**

## ROTARY FLUID CYLINDERS FOR OPERATING CHUCKS

**Kojiro Ohota, Fukuyama, Japan, assignor to Kitagawa Iron Works Co., Ltd., Fuchu, Japan**

**Filed Feb. 13, 1986, Ser. No. 829,419**
**Claims priority, application Japan, Feb. 18, 1985, 60-30077**
**Int. Cl.⁴ F15B *11/08***
**U.S. Cl. 91—420** **11 Claims**



1. A rotary fluid cylinder for operating a chuck, comprising:
a piston rod adapted to be operatively connected to a chuck;
at least two substantially parallel guide rods disposed in the axial direction of said piston rod, said guide rods each having opposite ends;
an annular piston coupled to said piston rod and being arranged substantially concentric with said piston rod, said annular piston being movable with said piston rod in the longitudinal direction of said piston rod, said guide rods being slidably received in said annular piston for guiding longitudinal movements of said annular piston;
a cylinder housing having a cylinder therein for accommodating said annular piston;
respective spring biased check valve mechanisms contained in the interior of each of said guide rods;
said cylinder housing further including support means for supporting at least one end of each of said guide rods;
pilot valve mechanisms arranged externally of said guide rods and operating said check valve mechanisms of said guide rods, said pilot valve mechanisms being formed in said support means of said cylinder housing, said pilot valve mechanisms each including a respective pilot valve chamber formed in an inner wall portion of said cylinder housing, and a pilot valve plunger means slidably mounted in a respective pilot valve chamber, said pilot valve plunger means each being operatively coupled to a respective check valve mechanism of a respective associated guide rod; and
fluid passages in said inner wall portion of said cylinder housing for communicating operating fluid to at least said pilot valve chambers.

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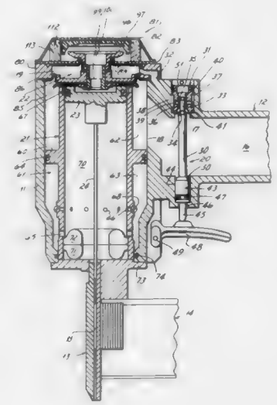
**4,747,338**

## PNEUMATIC GUN HAVING IMPROVED FIRING VALVE

**John P. Crutcher, Cincinnati, Ohio, assignor to Sencorp, Cincinnati, Ohio**

**Filed Jun. 13, 1983, Ser. No. 503,843**
**Int. Cl.⁴ F15B *11/08***
**U.S. Cl. 91—461** **11 Claims**

1. A gas operated fastener driving tool comprising:
a housing;
an upstanding cylinder disposed within said housing and defining with said housing a housing chamber adapted to receive gas under pressure;
a piston slidably mounted within said cylinder and provided with a fastener driver on the lower side thereof facing said lower cylinder end, said piston in response to pressurized gas supplied to the upper side of said piston being driven from a retracted position at the upper end of said cylinder to a driven position at the lower end of said cylinder;
valve means including a firing valve and a remote trigger valve for controlling the introduction and exhaust of pressurized gas to and from the upper end of said cylinder above said piston;
a firing valve chamber located within said housing and above said cylinder, said firing valve being reciprocable within said firing valve chamber from a lower position sealingly engaged with the top of said cylinder to a raised position remote from the top of said cylinder;
an exhaust chamber located above and sealed from said firing valve chamber;
an exhaust valve stem located within said exhaust chamber,



said exhaust valve stem being attached to and reciprocable with said firing valve;
an exhaust bore extending through said firing valve and said exhaust valve stem from the underside of said firing valve to the top side of said exhaust valve stem;
wherein said firing valve is sealingly connected to said housing by two spaced rolling diaphragm seals, said firing valve chamber being located between said rolling diaphragm seals, being sealed from said housing chamber by one of said rolling diaphragm seals, and being selectively connectable to atmosphere or to a source of pressure above that of atmospheric; and
wherein said firing valve has a bottom surface area and a top surface area, said top surface area being less than said bottom surface area, said exhaust valve stem having a pressure surface area and a smaller sealing area, said firing valve being normally biased to a lower position in which the bottom surface of said firing valve is engaged with the top of said cylinder when all three of said surfaces are exposed to a substantially identical pressure above that of the atmosphere.

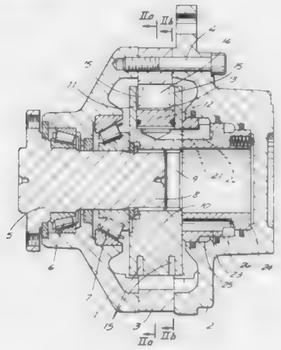


**4,747,339**

## RADIAL PISTON MACHINE

**Peter Wüsthof, Lohr, Fed. Rep. of Germany, and Sinclair Cunningham, Kinghorn, Scotland, assignors to Mannesmann Rexroth GmbH, Lohr, Fed. Rep. of Germany**

**Filed Jul. 29, 1986, Ser. No. 893,892**
**Claims priority, application Fed. Rep. of Germany, Sep. 5, 1985, 3531632**
**Int. Cl.⁴ F04B *1/10***
**U.S. Cl. 92—148** **3 Claims**



1. A radial piston machine, comprising a cam plate (3) having a cam track (17); a cylinder block (10) rotatable about an axis thereof relative to said cam plate, said cylinder block being provided with a plurality of radially extended bores (11) formed at a periphery thereof; a plurality of pistons (12) displaceably supported in said bores; and a plurality of cylindrical rollers (14) each having an axis parallel to the axis of rotation of said cylinder block and supported against the cam track of said cam plate, each of said bores having recesses (11*a*) in a region of said cam track, said rollers each having two end faces (14*b*) and being formed with portions (14*a*) provided at each end face, said portion accommodated in said recesses whereby said rollers are self-guided in said cylinder block, and wherein said recesses (11*a*) are defined by circular grooves (15) provided in said cylinder block and open at the periphery thereof and at least partially cut in a radially external region of a respective one of said bores.

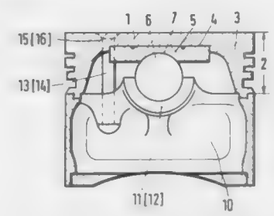
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**4,747,340**

## PISTON FOR INTERNAL COMBUSTION ENGINES

**Klaus Schellmann, Weinsberg; Siegfried Mielke, Neckarsulm, and Ulrich Landau, Oedheim, all of Fed. Rep. of Germany, assignors to Kolbenschmidt Aktiengesellschaft, Neckarsulm, Fed. Rep. of Germany**

**Filed Mar. 7, 1986, Ser. No. 837,455**
**Claims priority, application Fed. Rep. of Germany, Mar. 14, 1985, 3509103**
**Int. Cl.⁴ F16J *1/16***
**U.S. Cl. 92—222** **24 Claims**



1. In a piston for internal combustion engines having a top part including at least a piston head and a ring-carrying portion, a bottom part and means connecting the bottom part to the top part, the improvement comprising: means for movably mounting a piston pin comprising hub segments in the bottom part of the piston and a plate inserted in a mating recess on the inside of the piston head and consisting of a heat-insulating material and having a recess therein which has the shape of a segment of a cylinder having an axis that is parallel to the piston pin and wherein the means connecting the top part and the bottom part comprises at least two pins integrally formed with or embedded in the cast lower part or are inserted therein and which protrude into mating bores in the top part and are welded to the top part.

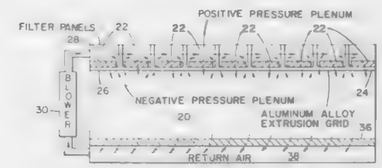
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**4,747,341**

## INTEGRAL GRID STRUCTURE FOR PROVIDING NEGATIVE PRESSURE PLENUM

**Geoffrey S. Hedrick, Malvern, Pa., assignor to Donaldson Company, Inc., Minneapolis, Minn.**

**Filed Nov. 19, 1986, Ser. No. 932,731**
**Int. Cl.⁴ F24F *3/16***
**U.S. Cl. 98—31.5** **10 Claims**




1. A system for providing an airtight/particle tight hermetically sealed clean room environment from which air is passed through a filter, said system comprising a ceiling grid having a plurality of panel supporting grid members, said grid members each having a negative pressure return integrally formed therein for preventing air leakage into said clean room environment and each comprising a circumferential mounting frame having an aperture therein; and a filter panel for each aperture, said frame being capable of mounting said filter panel therein in hermetically sealing engagement therewith for closing said aperture, said mounted filter panel comprising a filter screen disposable across said aperture for filtering said exhausted air therethrough, said integral grid member and said mounted filter panel comprising a negative pressure plenum cavity, and said integral grid member comprising a T-bar extrusion having a vertical extending web member, an upper horizontal extending cross member having two vertically extending ceiling mounting members, and a lower horizontal support member having oppositely disposed air filter supporting lips, said integral grid member comprising a plenum member which allows negative pressure to be carried around said mounted filter panel; whereby a negative pressure cavity is created in said grid with said mounted filter panel without requiring additional external members.

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**4,747,342**

## ANAEROBIC MEAT EMULSIFICATION APPARATUS

**Warren R. Schack, Leawood; Joseph S. Zeets, Olathe, and Richard G. Powers, Overland Park, all of Kans., assignors to Marlen Research Corporation, Overland Park, Kans.**

**Filed Dec. 31, 1986, Ser. No. 948,023**
**Int. Cl.⁴ A22C *17/00***
**U.S. Cl. 99—472** **7 Claims**

1. Apparatus for continuous, in-line emulsification of meat material, comprising:
emulsifier means for receiving meat material and for emulsifying the same, said emulsifier means including a housing defining a chamber presenting a meat material-receiving inlet, an outlet for discharging meat emulsion from the

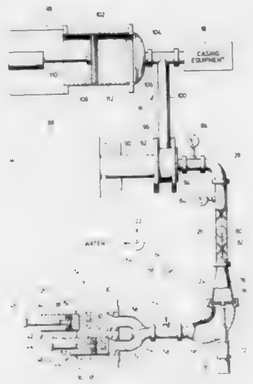
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chamber, and structure for reducing the particle size of the meat material and elevating the temperature thereof in order to produce a meat emulsion having meat fat globules entrapped by a matrix of soluble protein;

transport means coupled with said emulsifier outlet for receiving said emulsion discharged therefrom and for transporting said emulsion to a downstream location spaced from said emulsifier outlet; and

supply means coupled with said emulsifier inlet for receiving said meat material from a source thereof and for supplying said meat material under pressure to said emulsifier chamber, said supply means including



pump means for receiving and pumping said meat material to create a meat material output stream, said pump means having a pump inlet for receiving said meat material from said source, and a pump outlet for discharging said output stream under pressure; and

enclosed pipe means intercoupling said pump outlet and said emulsifier inlet for receiving said output stream from said pump outlet, for conveying said output stream under pressure to said emulsifier chamber, and for preventing contact between ambient air and said meat material during conveyance of the output stream through said pipe means, whereby said output stream of meat material is force-fed to said emulsifier chamber.

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**4,747,343**

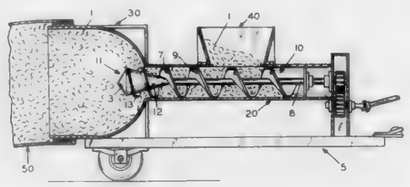
**AUGER FOR BULK MATERIAL COMPRESSORS**

**Rodney D. St. Clair, Rte. 6, Box 6523, Nampa, Id. 83651**

**Filed Sep. 11, 1987, Ser. No. 95,132**

**Int. Cl.[4] B65G** *3/04*

**U.S. Cl. 100—145** **13 Claims**



1. A bulk material compressor of the type having a feed chamber, a packing chamber, and an auger, said auger comprising an inlet portion and an outlet portion,

said inlet portion located within the feed chamber and including a shaft of substantially uniform diameter and one or more flights also of uniform diameter; and

said outlet portion located within said packaging chamber and including a conical shaft and one or more flights of uniform diameter, said conical shaft connected to and coaxial with said shaft of said inlet portion and said conical shaft increasing in diameter from its connection with said inlet portion shaft to the terminal end of said flights for gradual lateral movement and compression of material located within the packing chamber.

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**4,747,344**

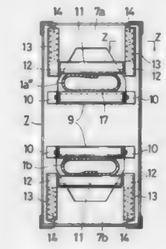
**METHOD OF CONVEYING MATERIALS AND TUBULAR BELT CONVEYOR THEREFOR**

**Kunio Hashimoto, Kitakyushu, and Haruo Okazaki, 1-2-20, Miyanomachi, Yahatahigashi-ku, Kitakyushu-shi, Fukuoka-ken, both of Japan, assignors to Haruo Okazaki, Fukuoka, Japan**

**Filed Mar. 20, 1987, Ser. No. 28,197**

**Int. Cl.[4] B65G** *15/08*

**U.S. Cl. 100—173** **4 Claims**



1. A tubular belt conveyor in which a circulating endless conveyor belt is rolled up to a tubular shape in which materials to be conveyed are enclosed for continuously conveying, the conveyor comprising:

a plurality of support frames for supporting the belt; one or more fixed rollers disposed within some of the support frames;

one or more pressing rollers disposed to get close and away with respect to the fixed rollers within the support frames; and

compression means for biasing the pressing rollers toward the fixed rollers, whereby narrow space is formed between the fixed and the pressing rollers through which the forward belt passes to be elliptically deformed so that the materials may be compressed.

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**4,747,345**

**FOIL STAMPING BED AND CYLINDER PRESS**

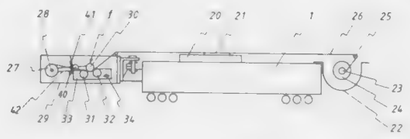
**Basil W. Josias, and Keith T. T. Josias, both of Auckland, New Zealand, assignors to North Shore Foil Stamping Specialists, Ltd., Auckland, New Zealand**

**Filed Aug. 5, 1986, Ser. No. 893,262**

**Claims priority, application New Zealand, Aug. 7, 1985, 213037**

**Int. Cl.[4] B41F** *3/18, 19/02*

**U.S. Cl. 101—27** **3 Claims**



1. A foil stamping device comprising a moving bed movable in a reciprocal manner with respect to and mounted on a frame, mounting means on said bed for holding a quantity of foil and guiding said foil to a position over said bed, pressure member means mounted on said frame for applying pressure to said bed at at least said position as said bed moves in said reciprocal manner, a roller engageable with said foil and indexing means for rotating said roller to move said foil, said indexing means comprising an elongated mechanical linkage fixed in the proximity of its ends to said frame and driving between its ends a clutch, said clutch driving said roller, and means to open said clutch on a pass of said moving bed inwardly under said pressure member means and close said clutch on a pass of said moving bed outwardly from under said pressure member means so that said mechanical linkage causes said roller to rotate and move said foil.



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**4,747,346**

**METHOD OF STENCIL PRINTING A SUBSTRATE WITH FOAM**

**Adam P. Geel, Doorwerth, Netherlands, assignor to Lantor B.V., Netherlands**

**Continuation-in-part of Ser. No. 677,480, Dec. 3, 1984, abandoned, and a continuation-in-part of Ser. No. 823,534, Jan. 29, 1986. This application Apr. 16, 1987, Ser. No. 39,122**

**Claims priority, application Netherlands, Jan. 29, 1985, 8500242**

**Int. Cl.[4] B41M** *1/12;* **D06P** *1/00*

**U.S. Cl. 101—129** **18 Claims**

1. A method of printing a substrate comprising the following steps:

a. employing at least one screen printing machine having at least one patterned stencil;

b. transferring a foam having meta-stable foam properties into said substrate through said stencil, resulting in a printed pattern; and

c. subjecting the substrate to a firation treatment by drying said printed pattern in said substrate so that said printed substrate has substantially retained the structure of said foam and the pattern of said stencil, said pattern in said printed substrate being a viscous mass in the form of a foam.

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**4,747,347**

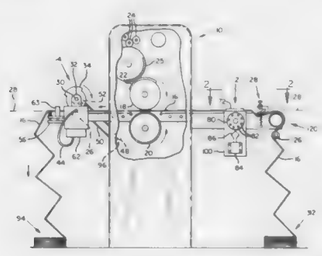
**APPARATUS FOR PROCESSING CONTINUOUS FORM**

**Jan A. McAnelly, West Linn, Oreg., assignor to Continuous Graphics, Inc., West Linn, Oreg.**

**Continuation of Ser. No. 801,733, Nov. 26, 1985, abandoned, which is a continuation-in-part of Ser. No. 749,313, Jun. 26, 1985, abandoned. This application Jun. 29, 1987, Ser. No. 77,022**

**Int. Cl.[4] B41F** *13/04, 13/54*

**U.S. Cl. 101—227** **14 Claims**



1. An apparatus for successively registering continuous paper to a processing unit such as a printer or perforator, said apparatus comprising:

(a) paper engaging means for maintaining continuous engagement with said paper while allowing said paper to move with respect to processing unit;

(b) detent means for selectively interacting with said paper engaging means to cause said paper engaging means to successively register and immobilize said paper with respect to said processing unit;

(c) said paper engagement means including substantially planar low mass rotating means for rotating about an axis substantially perpendicular to said rotating means when said paper is moving with respect to said processing unit, said rotating means defining a plane and including a plurality of peripheral projections from said plane and parallel to said axis, said peripheral projections approximating a circle, said axis and any adjacent pair of said peripheral projections defining a sector of said circle, a plurality of said sectors comprising said circle said sectors being substantially free of surfaces or projections which are parallel to said axis.

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**4,747,348**

**WASHING DEVICE FOR IMPRESSION CYLINDERS**

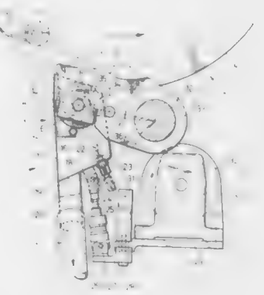
**Willi Jeschke, Heidelberg, and Klaus Dürrnagel, Meckesheim, both of Fed. Rep. of Germany, assignors to Heidelberger Druckmaschinen, Heidelberg, Fed. Rep. of Germany**

**Filed Apr. 29, 1987, Ser. No. 43,950**

**Claims priority, application Fed. Rep. of Germany, Apr. 29, 1987, 3614496**

**Int. Cl.[4] B41F** *35/00;* **B41L** *41/00*

**U.S. Cl. 101—425** **9 Claims**



1. In a washing device for an impression cylinder of a printing machine having an impression cylinder with a gripper bridge, a washing roller, means for bringing the washing roller into contact with and for lifting the washing roller away from a cylindrical jacket surface of the impression cylinder in vicinity of a gripper bridge of the impression cylinder, and means for spraying the washing roller with cleaning solution, the washing roller comprising a washing brush extending over substantially the entire length of the impression cylinder, means for driving the washing roller independently of the impression cylinder so that the washing roller is rotatable in the same direction of rotation as but at a higher speed than that of the impression cylinder and so that respective mutually opposing adjacent locations of said washing brush and said cylindrical jacket surface are travelling in opposite directions, and means for moving the washing roller automatically into its contact with the impression cylinder, said means for driving the washing roller comprising a motor firmly mounted on a frame wall of the printing machine, said motor having a shaft journal whereon a drive spur gear is fastened, said drive spur gear meshing, via two intermediate spur gears, with a spur gear fixed to a shaft of the washing brush for driving the brush, said intermediate spur gear immediately following said motor having a shaft on which an end of a respective bearing lever is mounted so as to be pivotable about the axis of said last-mentioned intermediate spur gear, the other end of the respective bearing lever being likewise rotatably mounted on said shaft of the washing brush, said bearing lever having a surface facing towards the impression cylinder and formed as a cam coopera-

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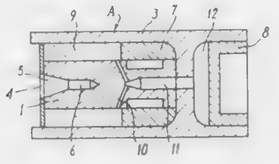
tively engageable with a support roller mounted on the gripper shaft of the gripper bridge carried by the impression cylinder.

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**4,747,349**
**APPARATUS FOR LAUNCHING BY A BULLET AMMUNITION SUCH AS A GRENADE HAVING A TRAILING TUBE TO PROVIDE A FLAT TRAJECTORY OF FIRE**

Michel Schilling, Chateauneaf s/Cher, and Luc Mitard, St Denis De Palin, both of France, assignors to Luchaire S.A., Paris, France

Continuation of Ser. No. 687,428, Dec. 28, 1984, abandoned.
This application Dec. 5, 1986, Ser. No. 939,302
Int. Cl.[4] F42B *11/42*
U.S. Cl. 102—485 2 Claims




1. In a bullet trap device for launching, by firing of a live bullet, ammunition such as a grenade having a trailing tube to impart thereto a flat trajectory of fire, such device being of the type including a body adopted to receive directly the impact of a live bullet, a tubular supporting piece for positioning said body within the trailing tube of ammunition to be launched, and a shock absorber part positioned axially between said body and a portion of said supporting piece for absorbing the impact of the live bullet, the improvement:

wherein said body is substantially cylindrical and said body and said shock absorber part comprise an integral, one-piece, solid-forged assembly with said shock absorber part having an outer size reduced from and smaller than the outer size of said body;

said portion of said supporting piece comprises a web integral with said supporting piece, with said shock absorber part abutting said web;

said shock absorber part having a resistance to compression lower than that of said web and being capable of bulging and crushing on said web under the effect of the impact of the live bullet;

an annular space provided between said tubular supporting piece and said assembly constituted by said body and said shock absorber part; and

centering ring means, separate from said supporting piece and positioned in said annular space radially between said shock absorber part and said supporting piece, for limiting bulging of said shock absorber part for maintaining said body and said shock absorber part centrally of the axis of the trailing tube of the ammunition after firing.

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**4,747,350**
**HOLLOW CHARGE**

Alexander Szecket, 10 Kenneth Avenue, Apartment 1110, Willowdale, Ontario, Canada M2N 6K6, assignor to Alexander Szecket, Willowdale; Alfredo Bentivoglio and Ricardo Rodriguez, both of Mississauga, all of, Canada

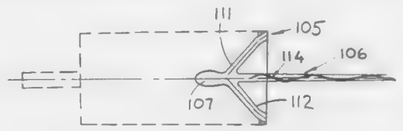
Filed Mar. 11, 1985, Ser. No. 710,433
Claims priority, application Canada, Jun. 18, 1984, 456836
Int. Cl.[4] F42B *13/12*
U.S. Cl. 102—306 6 Claims

1. In a hollow charge, including:

(a) a charge having a hollow at one end thereof;

(b) a metal liner in contact with said charge in the region of said hollow;

(c) said metal liner including two metal layers which have been metallurigically bonded by explosion welding and having a substantially waveless interfacial bond along the common interfacial region of contact;




(d) a detonator at one end of said charge; and

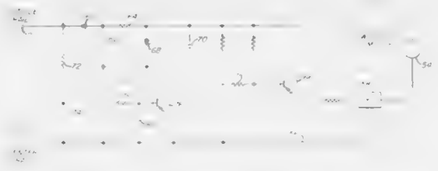
(e) said metal layers having different accoustic impedance characteristics upon detonation of said charge.

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**4,747,351**
**SOLID-STATE WHISTLE AND HORN ACTIVATION SYSTEM FOR MODEL RAILROADS**

David B. Baret, 243 Wayne Dr., Mars, Pa. 16046

Filed Dec. 18, 1985, Ser. No. 810,237
Int. Cl.[4] B60L *1/00*
U.S. Cl. 104—297 6 Claims



1. Apparatus for actuating a sounding device for a model railroad engine powered by an AC voltage impressed across two rails comprising a solid state circuit having:

means for receiving a first signal indicative of said AC voltage impressed across said two rails, said AC voltage being present to power said engine and said sounding device;

means for generating a second signal indicative of a DC biased voltage superimposed on the two rails comprising a shunt circuit coupled to the two rails which shunts the AC voltage impressed across the two rails; and

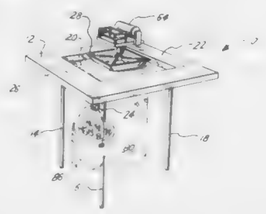
means supplied by said AC voltage for powering said sounding device responsive to times when said second signal is generated.

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**4,747,352**
**TABLE APPARATUS WITH DISPOSAL ASSEMBLY**

Ray A. Guidry, Lafayette, and James M. Marceaux, Carencro, both of La., assignors to Shells & Tails, Inc.

Filed Jul. 2, 1984, Ser. No. 627,325
Int. Cl.[4] A47B *35/00*
U.S. Cl. 108—50 1 Claim




1. A seafood table particularly suitable for the eating of shell seafood, comprising:

a. a substantially rectangular table top portion, having a perimeter section around the entire exterior of the table portion for accommodating seafood while being eaten, and a recessed section interior to the raised perimeter section for defining an area for accommodating seafood yet to be eaten;

b. a port situated in the recessed area of the top portion for disposing of shell waste therewithin;

c. a removable funnel shaped member, insertable into the port, and extruding above the top portion, for receiving the shell waste deposited therewithin from the top portion of the table to an area beneath the table, and for further preventing the seafood situated in the recessed portion from inadvertently falling into the port ; and

d. storage means, mounted on the funnel shaped portion for accommodating condiments and towels accessible to individuals seated at the table.

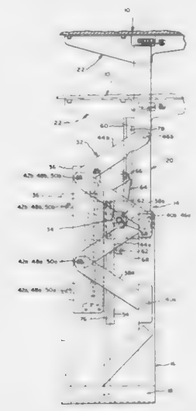


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**4,747,353**
**STRAIGHT LINE MOTION MECHANISM**

Richard L. Watt, Jamestown, N.Y., assignor to Weber-Knapp Company, Jamestown, N.Y.

Filed Oct. 14, 1986, Ser. No. 917,859
Int. Cl.[4] A47B *9/00*; F16M *11/00, 13/00*
U.S. Cl. 108—146 18 Claims



1. A straight line motion mechanism comprising in combination:

a first parallelogram linkage mechanism formed of facing first and second link members and a first pair of facing links having their opposite ends pivotally connected to said first and second link members;

a second parallelogram linkage mechanism formed of said second link member and a third link member arranged in a facing relationship to said second link member and a second pair of facing links having their opposite ends pivotally connected to said second and third link members, said first and second pairs of facing links having equal lengths; and

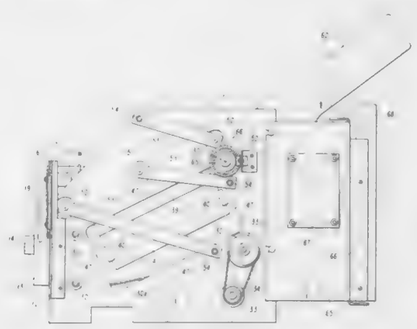
motion control means interconnecting said first and second linkage mechanisms for constraining said first and second pairs of facing links to undergo equal angular displacements about their points of pivotal connection to said first, second and third link members to effect straight line movement of said third link member relative to said first link member along a path of travel in a direction extending through said points of pivotal connection of said third link member to said second pair of facing links, and said points of pivotal connection of the ends of said first and second pairs of facing links to said second link member are coaxial with and pivot about a pair of parallel axes.

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**4,747,354**
**ENVELOPE DEPOSITORY**

Kevin A. Fee, Marion, and Mark W. Ellis, Cedar Rapids, both of Iowa, assignors to LeFebure Corporation, Cedar Rapids, Iowa

Filed Mar. 30, 1987, Ser. No. 31,762
Int. Cl.[4] G07G *5/00*
U.S. Cl. 109—24.1 6 Claims



1. In an envelope depository having forward and rearward ends, the forward end including a horizontal slot for receiving an envelope containing matter to be deposited, and envelope conveyor means having forward and rearward ends and disposed rearwardly of the envelope slot effective to convey an envelope introduced into the slot in a rearwardly direction and to discharge same from a rearward end of the conveyor means, the improvement comprising: an envelope receiver having forward and rearward ends, the envelope receiver extending in an upwardly inclined direction from the rearward end of the conveyor means effective to receive therein an envelope discharged from the rearward end of the conveyor means; envelope directing means disposed at the forward end of the envelope receiver and below said rearward end of the conveyor means, the directing means being movable in a downward direction; and a generally vertically disposed envelope chute having an upper end adjoining the forward end of the envelope receiver below the envelope directing means, said inclination of the envelope receiver and the juncture between the envelope receiver and the chute being effective to allow an envelope received in the envelope receiver as aforesaid to thereafter gravitate therefrom to against the envelope directing means and thence to be directed thereby into the envelope chute.

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**4,747,355**
**COMBUSTION APPARATUS AND METHOD OF GENERATING GAS**

Robert A. van Berkum, Box 351, Chagrin Falls, Ohio 44022

Filed Feb. 14, 1986, Ser. No. 829,195
Int. Cl.[4] F23G *5/12*
U.S. Cl. 110—229 16 Claims

1. A combustion apparatus for converting carbon-based fuels into combustible gas, said apparatus comprising:

a housing which defines an internal reaction chamber;

fuel supply means for supplying fuel to said reaction chamber such that a fuel pile of generally constant configuration is maintained in the reaction chamber;

a means for supporting said fuel pile, the fuel pile supporting means being disposed adjacent a bottom of the reaction chamber and permitting the flow of gas therethrough;

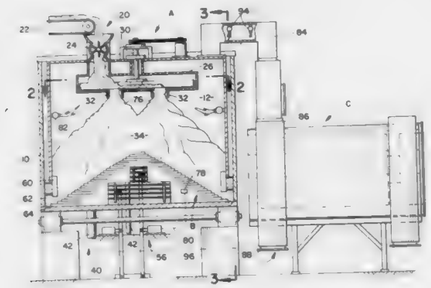
a gas inlet disposed below the fuel pile supporting means for supplying an oxygen-carrying gas through the supporting means to react chemically with the fuel in the fuel pile to generate the combustible gas;

ash removal means for removing reaction by-products from adjacent the supporting means;

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a gas outlet for transporting the generated combustible gas from said housing; and,



means for partially combusting said generated combustible gas to inhibit condensation of the vapors from the gas.

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**4,747,356**

## PROCESS OF BURNING CATTLE DUNG

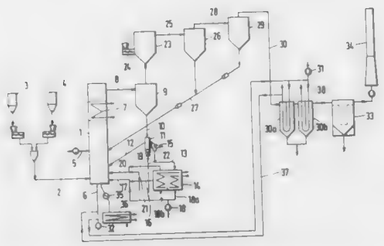
**Hans Beisswenger, Bad Soden; Fred Cappel, Dreieich; Dirk Hankel, and Walter Koch, both of Mühlheim, all of Fed. Rep. of Germany, assignors to Metallgesellschaft AG, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Feb. 4, 1987, Ser. No. 11,559**

**Claims priority, application Fed. Rep. of Germany, Feb. 12, 1986, 3604318**

**Int. Cl.[4] F23B** *7/00*

**U.S. Cl. 110—343** **5 Claims**



**1**. A process of burning cattle dung, comprising: combusting the cattle dung at a temperature of from 650° to 780° C., in the presence of one or more added aluminum-containing substances selected from the group consisting of bauxite, or aluminum compound containing ash from the burning of solid fuel, to retain a major part of the alkalies contained in the cattle dung and a substantial part of the chlorine in the resulting ash.

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**4,747,357**

## MINI SEEDER

**Bozena Kucera, 12446 Hodges, Houston, Tex. 77085**

**Filed Aug. 15, 1986, Ser. No. 856,799**

**Int. Cl.[4] A01C** *7/02*

**U.S. Cl. 111—82** **1 Claim**

**1**. A hand-operated mini seeder for selectively separating, dispensing and consecutively directing tiny seeds to a desired soil location, comprising:

an open receptacle having a base and a cylindrical rim around said base; said base having a generally flat top surface and an off-center, seed-discharge orifice; a generally U-shaped partition extending upwardly from said top surface, said partition having an arcuate wall portion around said orifice and a pair of side walls extending toward and ending near said rim, whereby said partition divides said top surface into a seed-transfer channel situated between said side walls and encompassing said orifice, and the remainder of said top surface serving, in use, as a seed storage area;

an elongated seed-discharge tube having a longitudinal bore, said tube extending downwardly from said base and being coaxial with said orifice;

a boss surrounding the lower free end of said tube; and



a substantially semi-cylindrical tine extending downwardly from said boss, whereby in use, said tine is adapted to penetrate into the soil until said boss is near the top of the soil, said storage area receives a quantity of tiny seeds thereon, said receptacle is slightly shaken to allow a few seeds to become lodged within said channel, and each seed is then individually propelled from said channel toward said orifice, down said tube, and becomes deposited on top of the underlying soil near said tine.

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**4,747,358**

## SURGICAL SUTURING MACHINE

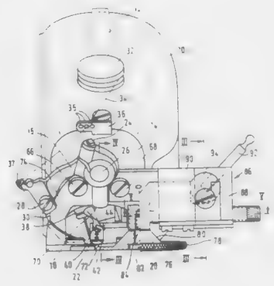
**Philip Moll, Aachen, and Georg Schlondorff, Roetgen, both of Fed. Rep. of Germany, assignors to G.M.Pfaff Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Jan. 29, 1987, Ser. No. 9,197**

**Claims priority, application Fed. Rep. of Germany, Jan. 30, 1986, 3602725; Jan. 12, 1987, 3700639**

**Int. Cl.[4] D05B** *1/00, 1/24, 27/10*

**U.S. Cl. 112—169** **17 Claims**



**1**. A surgical suturing machine for connecting tissue edges having outer surfaces using suture thread, comprising: a surgical suturing machine housing; needle means carrying the suture thread, connected to said housing for reciprocating motion for passing the suture thread through the tissue edges; thread catcher means, connected to said housing for movement



cooperating with said needle means to catch suture thread passed through the tissue edges by said needle means; drive means supported by said housing for driving the needle means so said needle means reciprocates between a first position and a second position and for driving the thread catcher in a generally elliptical path; first clamping element connected to said housing; and, a second clamping element having a cylindrical body connected to said housing and mounted for rotation, said first and second clamping elements each abutting outer surfaces of the tissue edges to position tissue edges in a clamping zone, the clamping zone being traversed by said needle means as it reciprocates between the first position and the second position, said second clamping element having a circumferential portion which rolls on the outer surface of one tissue edge as the housing is moved relative to the tissue edges.

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**4,747,359**

## APPARATUS FOR CONTROLLING THE TURN OF SHIP

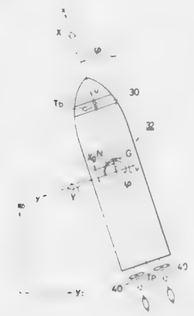
**Tetsuo Ueno, Yokohama, Japan, assignor to Tokyo Keiki Co., Ltd., Ota, Japan**

**Filed Aug. 25, 1986, Ser. No. 899,718**

**Claims priority, application Japan, Aug. 29, 1985, 60-190298**

**Int. Cl.[4] B63H** *25/04*

**U.S. Cl. 114—144 B** **6 Claims**



**1**. An apparatus for controlling the turn of a ship having at least a bow thruster which is attached on the bow and generates a thrust in lateral direction and a main propeller which is attached on the side of the stern and generates a thrust in the forward or backward direction, in which the ship is turned around the stern as a rotational center with the position of the hull held at a fixed point without forwardly or backwardly moving, said apparatus comprising:

setting means for setting a turning angular velocity in accordance with an amount of operation of said setting means;

turning angular velocity control means for controlling the thrust which is generated from said bow thrustor, said turning angular velocity control means being part of the closed loop which also has in it a representation of the setting means and an indication of

astern control means for controlling said main propeller so as to generate the backward thrust proportional to the absolute value of said turning angular velocity of the hull.

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**4,747,360**

## CONDENSER INTEGRATED TURBINE SUPPORT

**Ozcan Tuncel, Lynnfield, and Sammuel Mushnick, Sudbury, both of Mass., assignors to General Electric Company, Schenectady, N.Y.**

**Filed Jun. 24, 1983, Ser. No. 507,359**

**Int. Cl.[4] B63H** *21/06*

**U.S. Cl. 114—269** **8 Claims**

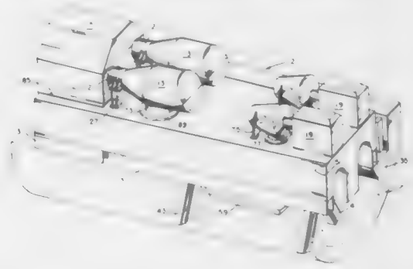
**1**. A system for supporting a marine power plant in a ship's hull wherein the marine power plant includes at least one steam turbine, the support system comprising:

a plurality of power plant support girders mounted starboard to port and spaced apart in the fore to aft direction;

plate members attached to the girders to form an enclosure;

an opening in the topside plate of the enclosure for admitting steam into the enclosure from the steam turbine;

end caps attached at opposite ends to the enclosure;



a water inlet and a water outlet attached to at least one of the end caps; and,

a drain well attached to the underside of the enclosure in fluid communication with the topside opening whereby the enclosure functions both as a power plant support and a steam condenser.

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**4,747,361**

## ARRANGEMENT ON A WATER CRAFT FOR COLLECTING OIL PRESENT ON THE WATER SURFACE, IN PARTICULAR, AMONG ICE BLOCKS.

**Lars Lundin, Porvoo, Finland, assignor to Oy Lars Lundin Patent AB, Porvoo, Finland**

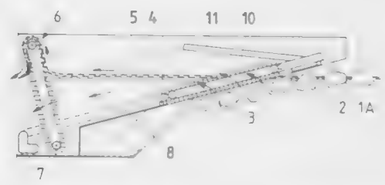
**Continuation of Ser. No. 799,378, filed as PCT FI 8.5/00021 Mar. 5, 1985, published as WO85/03917, Sep. 12, 1985**

**This application Apr. 30, 1987, Ser. No. 49,016**

**Claims priority, application Finland, Mar. 5, 1984, 840875**

**Int. Cl.[4] B63B** *35/32*

**U.S. Cl. 114—270** **3 Claims**



**1**. In a water craft arrangement for collecting oil present on the water surface, particularly among ice blocks, wherein the water craft includes a bow having a gently inclined bottom surface so that when the craft is traveling forward, ice blocks on the water surface are forced under the water along said bottom surface, intake openings in said bottom surface for the intake of oil-admixed water, means provided in the water craft for separating oil and water and pumping means for discharging the separated water, and margin portions extending along the sides of said inclined bottom surface to a greater depth than the bottom surface, the improvement comprising:

water nozzles provided on said margin portions and directed inwardly toward said bottom surface and intake openings in order to effect removal of oil from ice blocks passing along said bottom surface,

said intake openings being in the form of mutually parallel slits extending in the longitudinal direction of the water craft bow, and

slit cleaning members in the form of brush means provided at

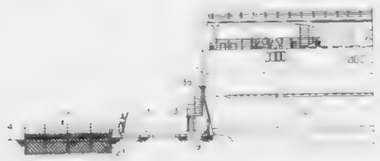
VOL 1090 ISS 5 MY 31 1988 UMI



each said slit movable therealong to prevent occlusion of the slit.

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**4,747,362**
**DOCK AND SWIMMING POOL DEVICE STOWABLE IN A SPACE IN A SHIP**
**Fred Olsen, Biskop Grinelunds vei 21, Oslo, Norway, and Lennart Apelstrand, Apelsingatan 41, Västra Frölunda, Sweden**
**Filed Mar. 3, 1987, Ser. No. 21,250**
**Int. Cl.[4] A47K** *3/00*
**U.S. Cl. 114—343** **4 Claims**

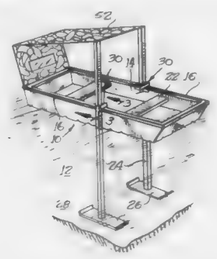


1. A collapsible pool, comprising:
a rectangular frame structure having, in an erected state of said pool, four upright sides and a bottom, said sides and bottom being covered with nets, said sides including:
two parallel longitudinal side sections each defined by upper and lower horizontal edge members and vertical edge members joining the ends of said upper and lower horizontal edge members; and
two parallel transverse side sections each having two halves defined by upper and lower horizontal edge members and vertical edge members joining the ends of said upper and lower horizontal edge members, said halves of each side section being hingedly interconnected along a vertical axis joint joining meeting edges of respective vertical edge members thereof, whereby said transverse side sections are inwardly foldable along said vertical axis joints;
said bottom including two trapezoidal frame sections each defined by a long and a short parallel edge member and angular edge members interconnecting said long and short edge members, a link section hingedly interconnected to said short edge members of said trapezoidal frame sections, and flexible means for hingedly interconnecting said long edge members of said trapezoidal frame sections to respective ones of said lower horizontal edge members of said longitudinal side sections; and
means for engaging a hoisting gear, said hoisting gear engaging means being located at a longitudinal centerline of said pool intermediate said longitudinal side sections.

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**4,747,363**
**OARLOCK STABILIZER**
**William D. MacMillan, 15407 McGinty Rd. West, Minnetonka, Minn. 55345, and Lyle W. Johnson, Jr., R.R. 4, Box 11, Willmar, Minn. 56201**
**Filed Jan. 20, 1987, Ser. No. 5,481**
**Int. Cl.[4] B63B** *39/00, 17/00*
**U.S. Cl. 114—361** **4 Claims**

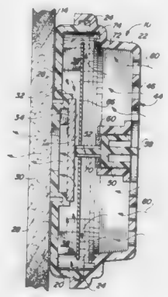
1. Clamping means for inhibiting the rocking of a boat floating on a body of water including an interior bounded on opposed sides by gunwales having top, interior, and exterior sides, the boat having oarlock socket means mounted to each gunwale interior side for receiving a pin connected to an oar for rowing said boat, said clamping means securing the boat to a pair of generally vertical upright members having lower ends in contact with a bottom of a body of water, comprising:
gunwale-engaging arm means having interior and exterior ends and an intermediate gunwale-engaging portion for engaging the top of said gunwale;
a generally vertical tubular sleeve downwardly-depending from said arm means exterior end so as to extend below said gunwale top side adjacent the exterior side of said gunwale, said tubular sleeve having an interior sidewall defining a hollow interior of generally rectangular cross-section, dimensioned to slidingly receive one said upright member having a similar cross-section;
manually-operable screw clamp means comprising a threaded shaft receivable in said tubular sleeve, a handle at one end of said shaft for threadingly advancing said shaft and a plate-like engaging means for releasably pressing said upright member against the interior side wall of said tubular sleeve; and



a mounting pin of preselected length downwardly extending from said arm means interior end so as to extend into said boat interior beneath said gunwale top side adjacent the interior side of said gunwale so as to be receivable in said oarlock socket means, said mounting pin having a free end extending below said oarlock socket means, defining an aperture for receiving a locking pin therein to prevent upward withdrawal of said mounting member through said oarlock pin-receiving socket.

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**4,747,364**
**FLOW RATE THRESHOLD SENSOR**
**Barry N. Horowitz, Las Vegas, Nev., assignor to Filter Alert Corporation, Las Vegas, Nev.**
**Filed Aug. 5, 1986, Ser. No. 893,204**
**Int. Cl.[4] G01L** *19/12*
**U.S. Cl. 116—268** **14 Claims**



3. A sensor for generating an audible tone upon the presence of a pressure differential in excess of a predetermined threshold across an air filter having an upstream side and a downstream side, said sensor comprising in combination:
(a) means for securing said sensor to the upstream side of the air filter;
(b) a first chamber within said sensor for sensing and containing an air pressure equivalent to that present at the upstream side of the air filter;
(c) a second chamber within said sensor for sensing and containing an air pressure equivalent to that present at the downstream side of the air filter;



(d) a magnetically responsive disk translatable from a first position to a second position within said sensor in response to a predetermined pressure differential threshold between the pressures within said first an second chambers;
(e) means for translating said disk, said translating means including a mandrel for translating the disk along the longitudinal axis of said mandrel and an aperture disposed in said disk for penetrably receiving said mandrel;
(f) means for restraining translation of said disk until the pressure differential threshold between said first and second chambers is exceeded, and restraining means including a magnet for magnetically attracting said disk;
(g) means for channeling a flow of air from said first chamber through said second chamber in response to translation of said disk; and
(h) means for generating an audible tone in response to the flow of air through said second chamber;
whereby, the audible tone provides an indication of the existence of a pressure differential across the air filter in excess of a predetermined threshold.

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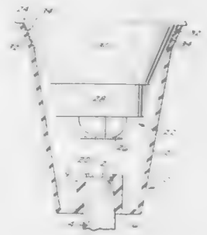
**4,747,365**
**TOILET ROLL DISPENSER**
**Klaus N. Tusch, London, England, assignor to Gry AG, Alpenstrasse, Switzerland**
**Filed Sep. 17, 1986, Ser. No. 908,675**
**Claims priority, application United Kingdom, Sep. 23, 1985, 8523484**
**Int. Cl.[4] B05C** *1/08, 1/16*
**U.S. Cl. 118—221** **8 Claims**



1. A dispenser for strip material, comprising:
(i) a body;
(ii) a holder for a roll of strip material;
(iii) a reservoir for flowable material;
(iv) a roller in the reservoir, mounted for free rotation and having a roller part which picks up flowable material for distributing same from the reservoir, which roller part has a width which is of less width than the roll of strip material; and
(v) means operable selectively to dispense dry strip material and strip material to which flowable material has been applied as a strip by said roller part of said roller in the reservoir, said means comprising:
(a) two rollers which are freely rotatable about respective axes of rotation, strip material from the roll being trained round both rollers from opposite sides of said axes and one of which rollers is mounted on an axis in a fixed plane and the other of which is mounted so that its axis can be moved below the plane of the axis of said one roller whereby the other roller is movable bodily from a rest position to a position to form a nip with the roller in the reservoir whereby the strip material is dispensed dry in the rest position and wet in the contact position.

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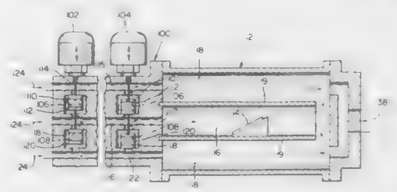
**4,747,366**
**DEVICE FOR PROTECTING WATER SPRINKLERS WHILE PAINTING**
**Robert C. Walker, 1030 S. Austin, Santa Ana, Calif. 92704**
**Filed May 12, 1987, Ser. No. 49,286**
**Int. Cl.[4] B05C** *11/16*
**U.S. Cl. 118—504** **4 Claims**



1. A device for shielding a ceiling-mounted water sprinkler, of the type having an annular beauty rim, said device comprising:
an elongate handle having an end;
a shield member having an open end and a closed end;
first means in said closed end for removable attachment to said handle end; and
second means in said open end for removable attachment to said beauty rim, said open end terminating in an outwardly-flared lip having internal dimensions generally conforming to the exterior surfaces of said rim, said second means including an adhesive tape material removably applied to the interior surface of said lip for the adhesive attachment of said second means to said beauty rim.

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**4,747,367**
**METHOD AND APPARATUS FOR PRODUCING A CONSTANT FLOW, CONSTANT PRESSURE CHEMICAL VAPOR DEPOSITION**
**John G. Posa, Lake Oswego, Oreg., assignor to Crystal Specialties, Inc., Portland, Oreg.**
**Filed Jun. 12, 1986, Ser. No. 873,582**
**Int. Cl.[4] C23C** *16/00*
**U.S. Cl. 118—715** **15 Claims**



1. An apparatus for depositing material on a substrate, comprising:
a process chamber;
a plurality of gas sources each providing a gas flow;
manifold means for directing gases selectively from the gas sources to the process chamber, the manifold means having first and second inlets for receiving gases from the gas sources, an outlet to the process chamber in communication with the inlets, and a vent in communication with the inlets; and
inlet valve means within the manifold means and operable for directing the gas flow through the first manifold inlet to the outlet and through the second manifold inlet to the vent and for simultaneously switching the gas flows through the inlets back and forth between the outlet and the vent.

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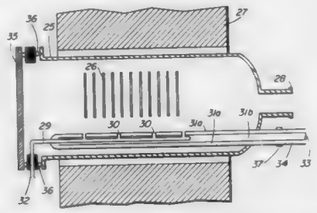


**4,747,368**

## CHEMICAL VAPOR DEPOSITION APPARATUS WITH MANIFOLD ENVELOPED BY COOLING MEANS

**Guy Brien, Farnham; Richard Cloutier, Granby; Edward C. D. Darwall, Waterloo, and Laszlo Szolgyemy, Bromont, all of Canada, assignors to Mitel Corp., Ontario, Canada**

**Continuation of Ser. No. 778,238, Sep. 20, 1985, abandoned. This application Apr. 6, 1987, Ser. No. 35,032**
**Claims priority, application Canada, May 17, 1985, 481854**
**Int. Cl.[4] C23C** *16/00*
**U.S. Cl. 118—715** **14 Claims**



1. Chemical vapor deposition apparatus, comprised of:
(a) an airtight reactor,
(b) means for supporting one or more substrates having exposed surfaces within said reactor,
(c) means for heating said substrates to a predetermined reaction temperature,
(d) manifold means disposed within said reactor, for receiving one or more reactive vapors, and having a plurality of openings therein for evenly distributing said received vapors in the vicinity of said substrates,
whereby said vapors react at said substrate surfaces at said predetermined reaction temperature causing a film to be deposited thereon, and
(e) means for evacuating spent vapors from said reactor, the improvement comprising
(f) cooling means in direct contact with and substantially enveloping said manifold means, for circulating cooling fluid therearound, said cooling means being adapted to leave said plurality of openings uncovered, thereby maintaining said manifold means at a temperature less than at least said reaction temperature such that said reactive vapors do not prematurely react within the manifold means.

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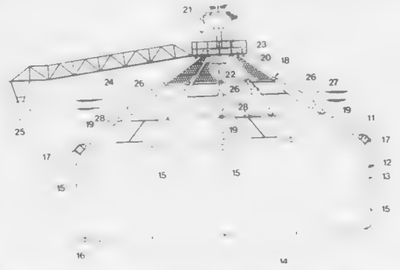
**4,747,369**

## DEVICE FOR BREEDING FISH

**Örjan Götmalm, Kullavik, Sweden, assignor to Farmocean AB, Gothenburg, Sweden**

**PCT No. PCT/SE85/00457, § 371 Date Jul. 18, 1986, § 102(e) Date Jul. 18, 1986, PCT Pub. No. WO86/03097, PCT Pub. Date Jun. 5, 1986**
**PCT Filed Nov. 14, 1985, Ser. No. 887,805**
**Claims priority, application Sweden, Nov. 21, 1984, 8405854**
**Int. Cl.[4] A01K** *61/00*
**U.S. Cl. 119—3** **9 Claims**

1. A device for breeding fish and the like in an open body of water such as the sea or a lake, said device including at least one netted bag having upper and lower portions, pontoon means for supporting the netted bag and having depth control means for varying the depth position of the device in the water, wherein the improvement comprises said pontoon means having an upper side facing generally away from the netted bag, said upper side supporting a stand and a platform carried by said stand so as to be freely rotatable with respect to said stand, said platform being articulatedly connected to a boarding gangway, said device further including sinker means connected to said lower portion of said netted bag and having tank means for raising and lowering said sinker means by control of the water ballast in said tank means whereby the



position of the netted bag relative to the water surface can be varied.

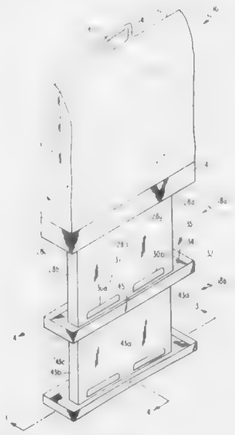
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**4,747,370**

## BIRD FEEDER SYSTEM

**Mark E. Olson, Rte. 1, Box 90, Wahkon, Minn. 56386**

**Filed May 9, 1986, Ser. No. 861,360**
**Int. Cl.[4] A01K** *39/01*
**U.S. Cl. 119—52 R** **7 Claims**



1. Bird feeding system including:
a. storage means for food; and,
b. at least a plurality of telescoping geometrical section means extending downwardly therefore, each of said telescoping sections including a feed tray, a lip about the feed tray, and a plurality of feed openings in said geometrical section means positioned adjacent to the feed tray for gravity free fall of feed from the storage means to the tray, and means for slidably retaining said telescoping section within said storage means.

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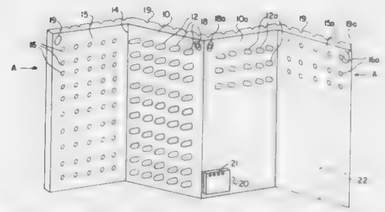
**4,747,371**

## GROOMING DEVICE

**Arthur B. Leopold, 129 Sandpiper Key, Secaucus, N.J. 07094**

**Filed Dec. 18, 1986, Ser. No. 943,201**
**Int. Cl.[4] A01K** *13/00*
**U.S. Cl. 119—83** **10 Claims**

1. An animal grooming device for use by an animal, said device including: a toothed plate member comprising a planar surface having spaced teeth coupled thereto and extending therefrom, said teeth being conical in shape and spaced on said toothed plate member said teeth having at least a first length measured from the base of said teeth to the tip thereof;
an unitary aperture plate comprising a planar surface having spaced holes said holes being conical in shape and spaced on said aperture plate in mirror image position relative to the positional spacing of said teeth on said toothed plate said aperature plate having thickness substantially less



than said first length, said aperture plate foldably attached to said toothed plate along a common edge so that said spaced holes of said aperture plate may mate with said teeth on said toothed plate for covering at least a part of the length of said teeth and for permitting another part of said teeth to extend out of the hole surrounding each tooth.

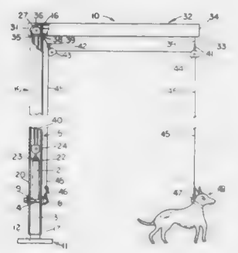
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**4,747,372**

## TETHER APPARATUS

**Michael D. Terry, and Jack M. Terry, both of 116 Sixth Ave., Sequim, Wash. 98382**

**Filed Mar. 6, 1986, Ser. No. 836,548**
**Int. Cl.[4] A01K** *1/00*
**U.S. Cl. 119—117** **13 Claims**



1. An animal tether for controlling the range of movement, which comprises:
a base member including an upstanding shaft mounted thereon and extending upwardly to a top end,
an elongated upright tube rotatably supported on the top end of the shaft, the tube comprising a lower open end,
an eyebolt having a shank extending through an upright tube sidewall near the lower end in rotational contact with the shaft top end,
a weighted body mounted on the shank and including a ring attachment on the body upper end,
a lower pulley block secured to the ring attachment,
an elongated lateral tube having a bottom portion of the inner end removed so as to straddle mount on the upright tube upper end and an opening on the bottom side of the lateral tube in proximity to an outer end,
an upper pulley block disposed in the space enclosed by the upright and lateral tubes,
means including a bolt and nut fastener for securing the upper pulley block in the enclosed space in communication with the lower pulley block and the lateral tube bottom opening,
a tether line adapted to engage said pulley blocks with multiple turns and provide a tackle so as to urge said weighted body in reciprocating movement and having a front end extending out of said lateral tube bottom opening to a first pulley connection and a rear end extending out of said upright tube lower open end to a second pulley connection,
a leash line comprising a bottom end connected to the eyebolt and a forward end passed through the second and first pulley to a collar connection with an animal, and
means for urging said weighted body into reciprocal movement responsive to animal travel away from or toward said upright tube apply tension on the leash line to prevent said line from becoming entangled on the ground or around the base member.

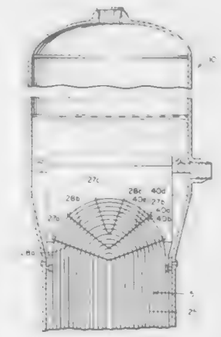
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**4,747,373**

## METHOD AND APPARATUS FOR MINIMIZING ANTIVIBRATION BAR GAPS OF A STEAM GENERATOR

**Robert M. Wepfer, Murrysville, and Hermann O. Lagally, Hempfield Township, Westmoreland County, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Apr. 24, 1986, Ser. No. 855,277**
**Int. Cl.[4] F22B** *37/24*
**U.S. Cl. 122—510** **4 Claims**



1. Antivibration bars for a steam generator comprising a housing, a bundle of U-shaped flow tubes of slightly varying diameter within said housing arranged in side-by-side columns with a varying space between each pair of side-by-side flow tubes, said varying space being in accordance with the varying diameter of each flow tube, said antivibration bars fitting between said side-by-side columns of flow tubes and comprising an elongated bar with one side having axially spaced contoured cutouts along the length thereof and the other opposite side of said bar being flat, said contoured cutouts being of a predetermined size in accordance with the varying diameter of said flow tubes in a column and being in contact therewith and whereby the opposite flat side of said bar as in contact with the outer diameter of said flow tubes in an adjacent column of flow tubes.

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**4,747,374**

## COOLING AIR ARRANGEMENT FOR AIR-COOLED INTERNAL COMBUSTION ENGINE

**Hans Stadler, Burgstrasse 28, 5060 Bergisch Gladbach 1, Fed. Rep. of Germany**

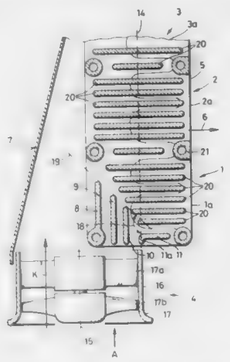
**Filed Nov. 12, 1986, Ser. No. 930,140**
**Claims priority, application Fed. Rep. of Germany, Nov. 15, 1985, 3540489**
**Int. Cl.[4] F01P** *7/02*
**U.S. Cl. 123—41.6** **20 Claims**

1. In an air-cooled internal combustion engine having a plurality of in-line cylinders, a cylinder head structure on top of the cylinders including laterally extending upright cooling fins, a blower adjacent an end cylinder of the engine operable

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to deliver a stream of cooling air which flows in a longitudinal direction relative to the in-line cylinders and a part of which strikes said cylinder head structure of said end cylinder, and air guide means for diverting a portion of said longitudinal stream



of cooling air to lateral flow across said head structure including generally longitudinally extending cooling fin parts on the portion of said cylinder head structure above said end cylinder which is struck by said stream of air delivered by said blower.

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**4,747,375**

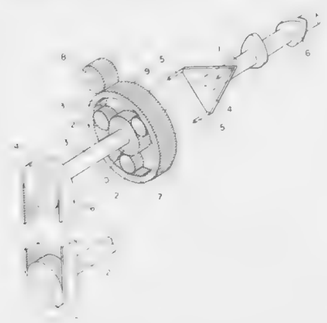
## DEVICE FOR CONTROLLING THE PHASED DISPLACEMENT OF ROTATING SHAFTS

**John K. Williams, 2975 Duke of Gloucester, East Point, Ga. 30344**

**Division of Ser. No. 541,515, Oct. 13, 1983, Pat. No. 4,583,501, which is a continuation-in-part of Ser. No. 413,520, Aug. 31, 1982, Pat. No. 4,476,823. This application Apr. 18, 1986, Ser. No. 853,405**

**Int. Cl.⁴ F01L** *1/34*

**U.S. Cl. 123—90.15** **6 Claims**



1. A device for controlling independently of either shaft the rotation of a first turning shaft in relation to a second turning shaft having a non-concentric axis of rotation relative to said first turning shaft, which comprises a plurality of planet gears rotatably mounted on gear carrier means disposed on a said first turning shaft to cause rotation of said planet gears, said plant gears being also disposed around and continuously engaging a sun gear directly mounted concentrically on a controlled rotating shaft having a common axis of rotation with a said first turning shaft, said planet gears further continuously engaging the inner periphery of a ring gear which is turned by said second turning shaft, the relative phasing rotation of said first shaft to said second shaft being controlled by means otherwise independent of said first and second shafts for turning said controlled rotating shaft on which the sun gear is mounted.

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**4,747,376**

## HYDRAULIC VALVE CLEARANCE COMPENSATION ELEMENT

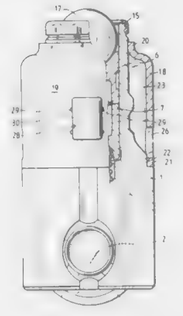
**Walter Speil, Ingolstadt, and Dieter Schmidt, Nuremberg, both of Fed. Rep. of Germany, assignors to INA Walzlager Schaeffler KG, Fed. Rep. of Germany**

**Filed Jul. 8, 1987, Ser. No. 70,895**

**Claims priority, application Fed. Rep. of Germany, Nov. 8, 1986, 3638202**

**Int. Cl.⁴ F01L** *1/24*

**U.S. Cl. 123—90.55** **11 Claims**



1. An hydraulic valve clearance compensation element comprising a housing in which a pressure piston is guided and a pressure space disposed behind the pressure piston, an oil inlet chamber with an oil inlet opening to supply oil to the pressure space, characterized in that the pressure space (**13**) and guide means (**5**) for the pressure piston (**6,7**) is formed by the base (**1**), the oil inlet chamber (**23**) is provided between the base (**1**) and a housing sleeve (**18**) which is arranged concentrically at the piston side of the base (**1**) and the oil inlet opening (**26**) is provided on the housing sleeve (**18**).

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**4,747,377**

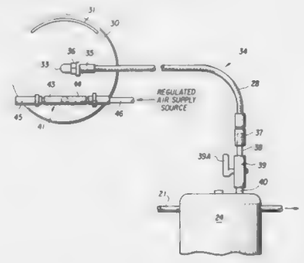
## DIESEL ENGINE PRIMER APPARATUS AND SYSTEM

**Onita Schaller, R.R. 2, Box 214, Hannibal, Mo. 63401**

**Filed Oct. 30, 1986, Ser. No. 924,753**

**Int. Cl.⁴ F02M** *63/00*

**U.S. Cl. 123—179 L** **4 Claims**




1. For use in priming a diesel engine having a primary and secondary fuel filter connected in a fuel line to injectors of the diesel engine, a diesel engine primer comprising a portable fuel/air pressurizable tank, air charging means connected to said tank to receive and regulate a predetermined head of air on a supply of diesel fuel in said pressurizable tank, a diesel fuel pick up tube extending into said tank to proximate its bottom at one end and extending externally of said tank at its top end, a hose assembly having a threaded nut engageable with a pick up tube adapter at one end, and a quick release female connector at the other end of said hose assembly for receiving the quick release male connector of an engine hook up valve connectable to the secondary filter of the engine.



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**4,747,378**

## LUBRICATING OIL FILTER FOR INTERNAL COMBUSTION ENGINES, PARTICULARLY OF MOTOR VEHICLES, WITH MEMBERS FOR MONITORING THE DEGREE OF CLOGGING OF THE FILTRATION SURFACE

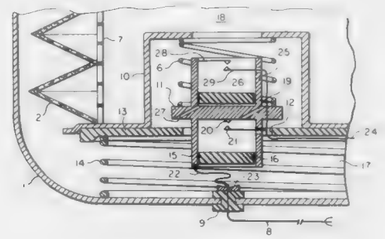
**Cantoni, Angelo, Rome, Italy, assignor to Ital Idee s.r.l. an Italian Limited Liability Company, Rome, Italy**

**Filed May 6, 1986, Ser. No. 860,022**

**Claims priority, application Italy, May 6, 1985, 48047 A/85**

**Int. Cl.⁴ F01M** *1/00*

**U.S. Cl. 123—196 A** **11 Claims**



1. A lubricating oil filter for internal combustion engines, particularly for motor vehicles, with members for monitoring the degree of clogging of the filtration surface, said lubricating oil filter comprising:

an outer casing including an end cover connectable to an engine lubrication circuit and containing passages for oil inlet and outlet, and housing a filter element through which oil passes,

a pressure relief valve preventing oil passing through said filter element upon exceeding a predetermined pressure drop,

mutually facing metal plates separated by said filter element and arranged to form a capacitor, said filter element forming a dielectric of said capacitor,

one of said mutaully facing plates being connected to the vehicle earth and the other of said mutually facing plates being connected to an electrical conductor leading to the outside of the filter,

said pressure relief valve being provided with means for connecting said electrical conductor to earth upon exceeding said predetermined pressure drop in oil flow through said filter element,

means for connecting said electrical conductor leading to the outside of the filter to earth following repeated opening movements of said pressure relief valve, and

an instrument for measuring the capacitance of said capacitor and for indicating when said electrical conductor leading to the outside of the filter has been connected to earth.

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**4,747,379**

## IDLE SPEED CONTROL DEVICE AND METHOD

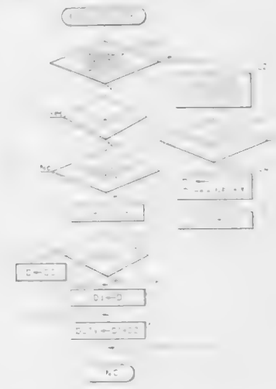
**Hidehiro Oba, Aichi, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan**

**Filed Aug. 26, 1987, Ser. No. 89,545**

**Claims priority, application Japan, Sep. 10, 1986, 61-211716**

**Int. Cl.⁴ F02D** *9/02*

**U.S. Cl. 123—339** **10 Claims**



1. An idle speed control device for adjusting a flow passage area of a bypass passage connecting portions of an intake passage upstream and downstream of a throttle valve to control an idle speed, said idle speed control device comprising:

an idle speed control valve provided in said bypass passage for changing a flow passage area thereof;

means for feedback control of the degree of opening of said idle speed control valve, said feedback control means controlling the degree of opening to maintain the idle speed at a predetermined value when a predetermined feedback condition is satisfied;

means for setting a learning value of the degree of opening of said idle speed control valve needed to maintain the idle speed at a predetermined value, said setting means determining said learning value when a predetermined learning condition is satisfied; and

means for opening said idle speed control valve which, when said feedback condition is not satisfied, maintains the degree of opening of said idle speed control valve if the present degree of opening is larger than said learning value, and increases the degree of opening of said idle speed control valve to said learning value if the present degree of opening is smaller than said learning value.

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**4,747,380**

## THROTTLE VALVE CONTROL DEVICE FOR INTERNAL COMBUSTION ENGINES

**Yuki Ejiri, and Tomoo Ito, both of Katsuta, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jul. 23, 1986, Ser. No. 888,408**

**Claims priority, application Japan, Jul. 31, 1985, 60-167595**

**Int. Cl.⁴ F02B** *77/00*

**U.S. Cl. 123—399** **4 Claims**

1. In a throttle valve control device for controlling a position of an engine throttle valve secured to a rotary shaft, which includes a control unit operative to produce a first electrical signal in accordance with a movement of an engine accelerator and an electro-mechanical force transducer operative to impart a first rotational torque to said rotary shaft and thereby to said throttle valve, said first rotational torque corresponding to said first electrical signal, the improvement comprising:

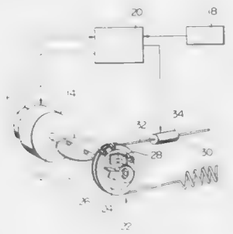
a throttle valve returning means operative to produce a second rotational torque for biasing said throttle valve to

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a fully closed position irrespective of the movement of said engine accelerator;

said control unit having means to produce a second electrical signal when the engine is in an emergency condition; and



means responsive to said second electrical signal to transmit said second rotational torque to said rotary shaft irrespective of the movement of said engine accelerator.

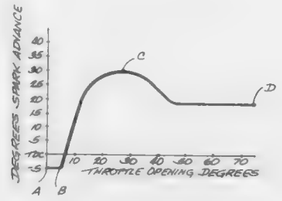
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**4,747,381**

**MARINE PROPULSION DEVICE WITH SPARK TIMING AND FUEL SUPPLY CONTROL MECHANISM**

**Gene F. Baltz, Lake Villa, Ill., and Geoffrey S. Zgorzelski, Kenosha, Wis., assignors to Outboard Marine Corporation, Waukegan, Ill.**

**Filed Aug. 31, 1987, Ser. No. 91,510**
**Int. Cl.⁴ F02P** *5/02*
**U.S. Cl. 123—413** **22 Claims**



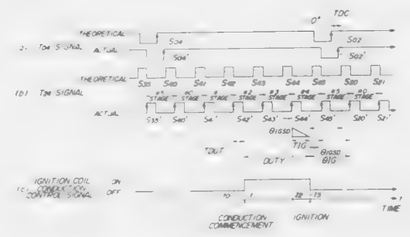

12. An engine comprising an engine block, a spark timing mechanism operable between a minimum spark advance setting and a maximum spark advance setting, a fuel supply mechanism operable between an idle setting and a full speed setting, a control lever supported by said engine block for movement between an idle position, a full speed position, a first intermediate position between said idle position and said full speed position, and a second intermediate position between said first intermediate position and said full speed position, means for displacing said fuel supply mechanism from said idle setting to said full speed setting in response to movement of said control lever from said idle position to said full speed position, and spark timing control means for permitting movement of said control lever from said idle position to said first intermediate position without displacing said spark timing mechanism from said minimum spark advance setting, for displacing said spark timing mechanism from said minimum spark advance setting to said maximum spark advance setting in response to movement of said control lever from said first intermediate position to said second intermediate position, and for displacing said spark timing mechanism from said maximum spark advance setting toward said minimum spark advance setting in response to movement of said control lever from said second intermediate position to said full speed position.

**4,747,382**

**IGNITION TIMING CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINES**

**Yoshio Suzuki, Wakoh, and Shigehiro Kimura, Niiza, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed May 21, 1986, Ser. No. 865,625**
**Claims priority, application Japan, May 27, 1985, 60-113761**
**Int. Cl.⁴ F02P** *5/04*
**U.S. Cl. 123—418** **5 Claims**




1. An ignition timing control system for an internal combustion engine having a crankshaft, comprising:

magnetic pick-up means for magnetically sensing the angular position of the crankshaft and for generating an output signal indictive thereof; and

control means for controlling the ignition timing of the engine based on the output signal from said magnetic pick-up means, wherein said control means includes correction means for correcting a basic ignition timing, which is determined in accordance with at least one engine operating parameter, by the use of a correction value, which is determined in accordance with a time delay in the generation of the output signal from said magnetic pick-up means with respect to the angular position of the crankshaft and which increases with a rise in the rotational speed of the engine.

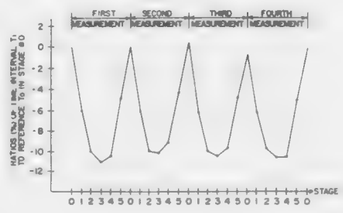
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**4,747,383**

**IGNITION TIMING CONTROL METHOD FOR INTERNAL COMBUSTION ENGINES**

**Shigehiro Kimura, Niiza; Takashi Ono, Wakoh, and Nobuyuki Narisawa, Toshima, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed May 21, 1986, Ser. No. 865,524**
**Claims priority, application Japan, May 27, 1985, 60-113756**
**Int. Cl.⁴ F02P** *5/04*
**U.S. Cl. 123—422** **3 Claims**




1. An ignition timing control method for an internal combustion engine in which an ignition advance angle value conforming to the operating condition of the engine is set, an ignition timing is obtained by applying an angle-time conversion to a crank angle extending from a reference crank angle position which corresponds to a predetermined position within an ignition cycle of the engine to a position corresponding to said ignition advance angle value, and ignition is effected upon



lapse of said ignition timing from an instant at which said reference crank angle position is sensed, the method comprising the steps of:

sensing values of the rotational speed of the engine at least at two particular crank angle positions within an immediately preceding ignition cycle

storing each of said at least two sensed rotational speed values in memory means;

calculating a ratio between said at least two rotational speed values stored in the memory means in said immediately preceding ignition cycle; and

correcting said ignition timing of a presesnt ignition cycle by using said calculated ratio.

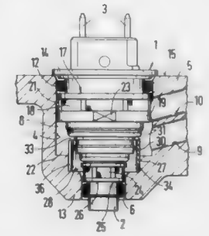
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**4,747,384**

**FUEL INJECTION SYSTEM**

**Udo Hafner, Lorch; Heinrich Knapp, Leonberg 1, and Rudolf Sauer, Benningen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Nov. 24, 1986, Ser. No. 933,959**
**Claims priority, application Fed. Rep. of Germany, Feb. 12, 1986, 3604392**
**Int. Cl.⁴ F02M** *51/08, 61/14*
**U.S. Cl. 123—470** **12 Claims**



1. A fuel injection system for internal combustion engines comprising an air intake tube and at least one fuel injection valve having at least one wall disposed in a guide bore, a nozzle body that serves to inject fuel into said air intake tube, said fuel injection valve and guide bore arranged to define an interior which is supplied with fuel through a fuel supply inlet opening, an orifice body (**30**) arranged to surround a portion of said fuel injection valve (**1**) in a spaced-apart manner, said orifice body, (**30**) including a terminal end in a direction extending upwardly away from said nozzle body (**2**) in the vicinity of said at least one wall of said fuel injection valve (**1**), thereby forming an annular flow-through region (**33, 47**) with the fuel injection valve (**1**), a filter (**24**) upstream from said nozzle having a portion thereof that extends into an area surrounded by a portion of said orifice body, and said terminal end of said orifice body and flowthrough region is located in an axial direction above said fuel supply inlet opening whereby fuel must flow upward from said inlet opening into said orifice body.

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**4,747,385**

**AIR-FUEL RATIO CONTROL SYSTEM FOR AN AUTOMOTIVE ENGINE**

**Kunihiro Abe, Mitaka, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Nov. 26, 1986, Ser. No. 936,474**
**Claims priority, application Japan, Nov. 29, 1985, 60-268917**
**Int. Cl.⁴ F02M** *7/18*
**U.S. Cl. 123—479** **6 Claims**

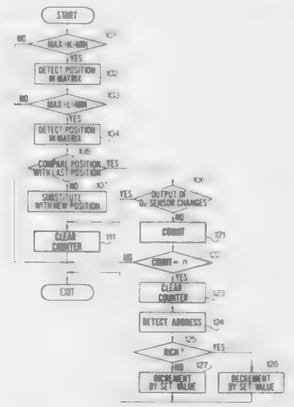
1. A system for controlling air-fuel ratio of air-fuel mixture for an automotive engine by updated data, comprising;

a table storing data at particular addresses;

an $O_2$-sensor for detecting oxygen concentration of exhaust gases of the engine and for producing an output voltage dependent on the concentration;

first means for updating the data in the table with a value relative to the output voltage;

second means for detecting deviation of the output voltage from a reference voltage corresponding to a stoichiometric air-fuel ratio and for producing a deviation signal;




third means for detecting continuation of the deviation signal during a predetermined period and for producing a continuation signal; and

fourth means responsive to the continuation signal for rewriting data at one of said particular addresses in the table to a fail safe value dependent on the value of the data existing at that address.

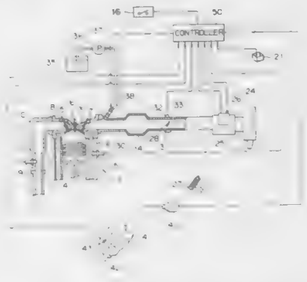
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**4,747,386**

**METHOD AND APPARATUS FOR AUGMENTING FUEL INJECTION ON HOT RESTART OF ENGINE**

**Akito Onishi, Toyota, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Japan**

**Filed Apr. 24, 1987, Ser. No. 42,425**
**Claims priority, application Japan, May 2, 1986, 61-100850; May 2, 1986, 61-100851**
**Int. Cl.⁴ F02D** *5/02*
**U.S. Cl. 123—491** **4 Claims**




1. A method for controlling air-fuel ratio of internal combustion engine by calculating the length of a basic fuel injection time on the basis of engine load, and controlling the fuel injection time of a fuel injector by correcting the basic fuel injection time according to the operating condition of the engine, said method comprising the steps of:

detecting the intake air temperature during operation of said engine;

storing the detected air temperature in a memory means

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capable of saving the stored data after stopping said engine;

computing on starting said engine the difference between the current intake air temperature of the engine in a starting state and the operating intake air temperature stored in said memory means;

searching out a hot start fuel increment coefficient from a two-dimensional map of fuel increment coefficients based on the operating intake air temperature and the difference between the starting and operating intake air temperatures; and

controlling the amount of fuel injection by increasing said basic fuel injection time according to said fuel increment coefficient.

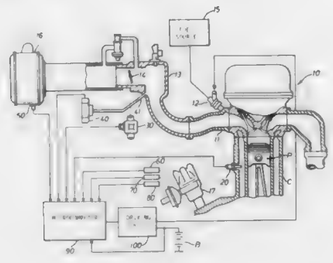
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**4,747,387**

## ELECTRONIC FUEL INJECTION CONTROL DEVICE FOR INTERNAL COMBUSTION ENGINES

**Mitsunori Takao, Kariya, and Takahiko Kimura, Nagoya, both of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan**

**Filed Apr. 20, 1984, Ser. No. 602,424**
**Claims priority, application Japan, Apr. 25, 1983, 58-072676**
**Int. Cl.⁴ F02B *3/00***
**U.S. Cl. 123—494** **5 Claims**



1. An electronic fuel injection control device for an internal combustion engine having a source of fuel, and electrically operated fuel injection means for effecting fuel supply into said engine from said source of fuel during energization thereof, said fuel injection control device comprising:

first detecting means for detecting rotational speed of said engine to produce a first signal indicative of the detected rotational speed;

second detecting means for detecting a physical value related to the operation of said engine to produce a second signal indicative of the detected physical value;

an analogue-to-digital converter for converting said second signal to a digital value;

means for providing an average of a plurality of said digital values successively converted during one rotation of said engine;

means for determining whether or not a difference between the preceding average of said digital values and the following average of said digital values is larger than a predetermined physical value indicative of a transient operation of said engine, if so determining a first optimum physical value based on an average of at least two digital values most newly converted during one rotation of said engine, and if not determining a second optimum physical value based on the average of said digital values;

means for determining an optimum fuel injection time based on one of said first and second optimum physical values and in relation to a value of said first signal and for producing an output signal indicative of said optimum fuel injection time; and

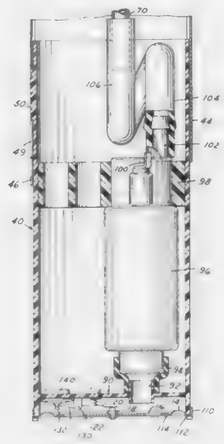
means for energizing said fuel injection means in response to said output signal for said optimum injection time.

**4,747,388**

## IN-TANK FUEL RESERVOIR AND FILTER DIAPHRAGM

**Charles H. Tuckey, Cass City, Mich., assignor to Walbro Corporation, Cass City, Mich.**

**Filed Nov. 7, 1986, Ser. No. 928,184**
**Int. Cl.⁴ F02M *37/10***
**U.S. Cl. 123—514** **17 Claims**



1. In a fuel system for an automotive vehicle having a liquid fuel tank, a powered fuel pump, and a pressure regulator to limit the pressure and volume of fuel delivered to an engine of the vehicle, the improvement which comprises a reservoir canister having a base at the bottom of the fuel tank to receive return fuel from the pressure regulator, a pump associated with in said canister with an inlet adjacent to the bottom of the canister and the bottom of the fuel tank, means to contain return fuel in said canister, a valve to open said return-fuel-containing means to admit fuel to the inlet of said pump, and means to open said valve in response to the absence of liquid fuel at the base of said canister.

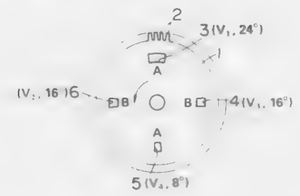
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**4,747,389**

## CRANK ANGLE DETECTING SYSTEM FOR ENGINES

**Haruo Yuzawa; Masafumi Nishiyama, both of Yokohama; Katsuyuki Nakamura, Yokosuka, and Kazuhiro Ishigami, Yokohama, all of Japan, assignors to Nissan Motor Company, Limited, Kanagawa, Japan**

**Division of Ser. No. 709,665, Mar. 8, 1985, Pat. No. 4,656,993.**
**This application Jan. 2, 1987, Ser. No. 65**
**Claims priority, application Japan, Mar. 14, 1984, 59-37182**
**Int. Cl.⁴ F02P *5/04***
**U.S. Cl. 123—643** **6 Claims**



1. An ignition system for a multi-cylinder internal combustion engine, comprising:

(a) a plurality of engine cylinders in which spark plugs are installed respectively, said cylinders being classified into a plurality of groups and each group being constituted by a pair of cylinders such that while the one cylinder is in an explosive stroke, the other is in an exhaust stroke;



(b) indicating means disposed so as to synchronize with an engine crankshaft and formed with a large number of slits and a small number of slits, the large number of slits being provided for indicating crankshaft angular positions and the small number of slits being provided for indicating predetermined piston strokes and wherein said small number of slits have mutually different widths from each other to distinguish between piston strokes of at least the groups of cylinders;

(c) sensing means for sensing crankshaft angular positions in cooperation with the large number of slits of the indicating means and outputting a crank angle signal representing the crankshaft angular position and for sensing the predetermined piston strokes in cooperation with the small number of slits and outputting different width piston stroke signals corresponding to said different width slits;

(d) discriminating means for identifying each cylinder group and outputting cylinder group identification signals on the basis of the different width stroke signals derived from the sensing means;

(e) ignition timing determining means for generating an ignition timing signal on the basis of the crank angle signal;

(f) ignition coil controlling means for generating ignition coil current signals corresponding to said cylinder group identification signals; and

(g) ignition timing controlling means for generating cylinder group ignition signals in response to the ignition coil current signals and ignition timing signal so that the spark plugs of each cylinder group are ignited at a proper time.

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**4,747,390**

## TARGET PROJECTOR

**Nelson Storm, 213 Perry St., Rossville, Ill. 60963**

**Filed Feb. 24, 1986, Ser. No. 832,533**
**Int. Cl.⁴ F41J *9/30***
**U.S. Cl. 124—6** **10 Claims**

1. A target projector for projecting a disc-like target and adapted for operation by electric power, said projector comprising:

(1) a base,

(2) a drive shaft rotatably mounted on said base,

(3) an electric motor operatively connected to said drive shaft to rotate it,

(4) a throwout bushing assembly freely carried on the drive shaft said throwout bushing including a lower yoke slidable with respect to the drive shaft but non rotatable with respect thereto and an upper yoke slidable with respect to the drive shaft and rotatable therewith,

(5) solenoid means on the base operatively connected to the lower yoke to raise and lower the throwout bushing on the drive shaft,

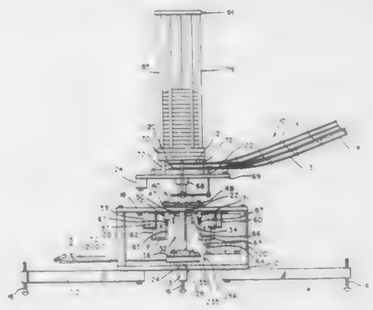
(6) a support plate affixed to the drive shaft for rotation therewith,

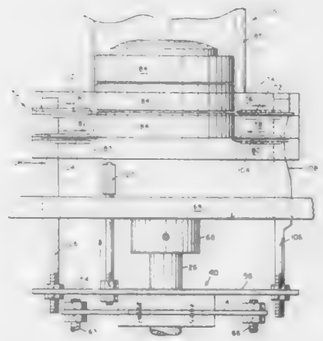
(7) a target magazine mounted in spaced relation to and above the support plate, said target magazine being adapted to carry a stack of disc-like targets,

(8) a throwing arm mounted on the support plate, said throwing arm having an inner end portion and an outer end portion with the inner end portion positioned under the target magazine,

(9) linear cam means secured to the upper yoke and in operative engagement with the target magazine for the dispensing of one target at a time from the magazine into the inner end portion of the throwing arm,

(10) Retaining means also connected to the upper yoke to protrude into the inner end portion of the throwing arm to retain the dispensed target therein,





(11) whereby with deenergization of the solenoid means the retaining means will be moved to free the target for projection by the throwing arm.

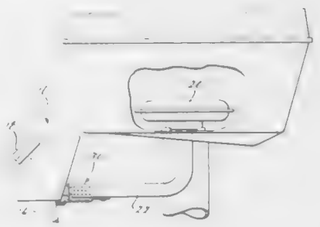
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**4,747,391**

## INSECT GUARD FOR A GAS APPLIANCE

**Joseph J. Hanagan, Freeport, and Doyle Raymer, Davis, both of Ill., assignors to King-Seeley Thermos Co., Freeport, Ill.**

**Filed Dec. 17, 1986, Ser. No. 943,122**
**Int. Cl.⁴ F24C *3/00***
**U.S. Cl. 126—41 R** **5 Claims**



1. In a gas burner apparatus having a venturi tube with a primary air intake end, an insect guard for preventing the nesting of insects in the venturi tube comprising:

a plurality of apertures formed in said intake end of said venturi tube;

each of said apertures being of a fixed size small enough to prevent passage therethrough by an insect sought to be prevented from nesting;

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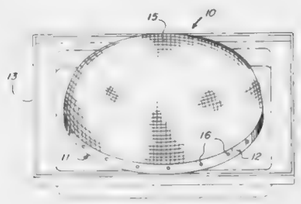


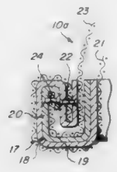
said plurality of apertures collectively defining an air intake opening in said intake end of said venturi tube;

a fuel dispensing nozzle and wherein said venturi has means at said primary air intake end for receiving said nozzle and wherein said insect guard further comprises means for forming a seal between said nozzle and said means for receiving said nozzle to prevent passage of an insect through said means for receiving said nozzle.

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**4,747,392**
**DOME SCREEN**
**Minnie C. Rogers, 39 Central Dr., Nanuet, N.Y. 10954**
**Filed Apr. 9, 1987, Ser. No. 36,368**
**Int. Cl.[4] F24C** *15/20*
**U.S. Cl. 126—299 C** **1 Claim**

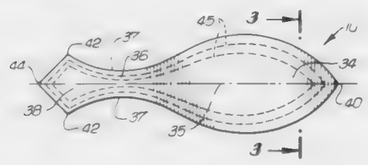



**1**. A dome screen, comprising a rim, for engaging with the top of a pan, and a screen secured to said rim, providing covering means for food being cooked in sid pan in an oven, wherein said rim is oval shaped and engaging with upper portions of sides of said pan, said rim comprising a channel in which a bottom portion of a dome shaped mesh screen is fixedly seured by a plurality of fastener which extend between solid walls of the channel with the screen sandwiched between said solid walls and wherein said dome is further comprised of two telescopic portions, one sliding within the other so as to procide a size adjustment means for co-operating with various size pans, the channel of one dome telescoping within the channel of the other dome.

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**4,747,393**
**VISCERAL RETRACTOR**
**Albert Medwid, 2320 Bath St., Santa Barbara, Calif. 93105**
**Filed Jan. 5, 1983, Ser. No. 455,811**
**Int. Cl.[4] A61B** *17/02*
**U.S. Cl. 128—20** **8 Claims**



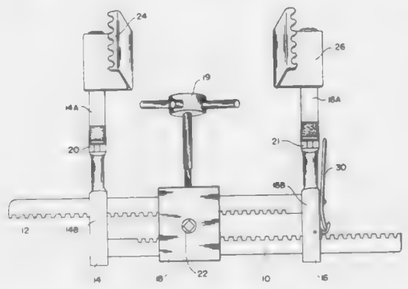

**1**. A visceral retractor for insertion through a surgical incision formed in tissue layers overlying internal patient organs to a position between the overlying tissue layers and the underlying internal organs to retract the organs from the incision and to protect the organs from being sutured during closure of the incision, the visceral retractor comprising:

an elongated, thin sheet of flexible material formed generally symmetrically about a central longitudinal axis to include a body portion of generally oval configuration at one end of said sheet with its major axis generally coinciding with said longitudinal aixs, a tail portion of generally triangular shape at the opposite end of said sheet with an apex corner disposed generally on said longitudinal axis and projected in a direction away from said body portion, said tail portion further including a pair of base corners spaced symmetrically on opposite sides of said longitudinal axis and spaced from each other by a distance less than the length of the minor axis of said body portion, and a waist regiion intermediate said body and tail portions, said waist region having smoothly contoured edges spaced symmetrically on opposite sides of said longitudinal axis and blending into said body portion and tail portion, said waist region having a transverse width less than the transverse widths of said body portion and said tail portion;

wherein said sheet is formed to have an overall length of about one foot and a thickness on the order of about one-sixteenth inch, said body portion having a major axis of about six to eight inches and a minor axis of about from four to six inches, said smoothly contoured edges of said waist region being spaced from one another by about one to one and one-half inches, and said tail portion base corners being spaced from each other by about two to three inches.

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**4,747,394**
**SPINAL RETRACTOR**
**Robert S. Watanabe, Los Angeles, Calif., assignor to Watanabe Orthopedic Systems, Inc., Los Angeles, Calif.**
**Filed Oct. 8, 1986, Ser. No. 916,943**
**Int. Cl.[4] A61B** *17/02*
**U.S. Cl. 128—20** **2 Claims**

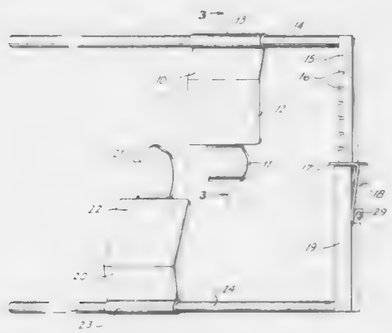



**1**. A laminectomy retractor comprising: a pair of arms each having a rectangular cross-section; a rack and pinion mechanism attached to said arms for holding said arms in spaced and parallel relationship and for displacing said arms away from one another; and a pair of blades slidably and removably mounted on respective ones of said arms to be inserted into a patient's spinal wound during a surgical procedure to space the sides of the wound apart to provide visualization of the spinal structure and to hold the sides of the wound in spaced-apart position, each of said blades including a bushing having a rectangular cross-section to be slidably received on the respective arms, so that the blades are held on the respective arms in a non-rotatable relationship so that there is no tendency for the blades to slip out of the wound as the retractor arms are spread apart, and each of said blades being configured to include a first rectangular section integral with said bushing and extending downwardly from the plane of the retractor, and a second rectangular section integral with the lower edge of said first section and inclined outwardly with respect thereto, and a series of outwardly extending teeth formed on the lower edge of said second rectangular section and extending upwardly therefrom, the teeth and configuration of the blades serving to hold the lumbar muscles when the blades are forced apart and adequately expose the facets; said a rack and pinion mechanism including a pair of racks positioned perpendicular to said arms and spaced and parallel to one another to be engaged by said pinion, the racks being attached to respective ones of said arms and slidably passing through the other ones of said arms, and said pinion being rotatably mounted between said racks and engaging said racks.



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**4,747,395**
**SURGICAL RETRACTOR FOR BONE SURGERY**
**L. Paul Brief, 18 Rockford Dr., West Nyack, N.Y. 10994**
**Filed Aug. 24, 1983, Ser. No. 526,029**
**Int. Cl.[4] A61B** *17/02*
**U.S. Cl. 128—20** **9 Claims**




**1**. A surgical retractor for bone surgery capable of being used in a vertical position during surgery comprising a pair of retractor members, each having a single element bone engaging lower section, a central, non-skeletal tissue engaging section and an upper, lever arm section; an adjustable "U" shaped expander having a pair of parallel legs attached at substantially right angles to opposite ends of an adjustable expander body section, said expander body in use having an axis parallel to the axis of the said pair of retractor members, said upper lever arm sections of said retractor having means for receiving said expander legs and enabling rotation thereon as said expander legs are moved toward or away from each other.

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**4,747,396**
**ANTI-CHOKE RELEASER**
**Samuel J. Richardson, 404 Griffith Rd., Monroe, N.C. 28110, and George Spector, 233 Broadway RM 3815, New York, N.Y. 10007**
**Filed Nov. 28, 1986, Ser. No. 936,096**
**Int. Cl.[4] A61H** *23/00, 23/06*
**U.S. Cl. 128—54** **4 Claims**

**1**. An anti-choke releaser apparatus for applying a sharp blow to upper abdomen to aid in expulsion of an obstruction in the larynx of a choking victim, said apparatus comprising:

(a) an anchor adapted to be secured to a planar surface;

(b) an elongated track member affixed at inner end to said anchor and having an outer remote end;

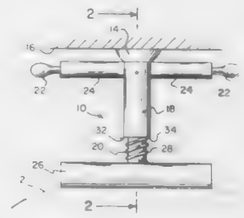
(c) a slide member reciprocable within said track member having outer and inner ends;

(d) a handgrip affixed to said track member for stabilizing and holding said apparatus;

(e) an impact member affixed to said slide member outer end;

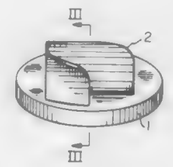
(f) an expansion spring positioned on said slide member between said track member and engaging said contact bar; and

(g) a trigger mechanism mounted in apparatus for holding said slide member in its firing position and releasing said slide member responsive to pressing said track member and anchor against said surface whereby said expansion spring will send said impact bar outwardly for applying a sharp blow to said upper abdomen.




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**4,747,397**
**FLEXIBLE PAD FOR DIRECT MYOCARDIAL TISSUE MASSAGE HAVING THUMB LOOP**
**George J. Magovern, 251 Old Mill Rd., Pittsburgh, Pa. 15238**
**Filed Jun. 12, 1986, Ser. No. 873,513**
**Int. Cl.[4] A61H** *7/00, 31/00*
**U.S. Cl. 128—61** **9 Claims**



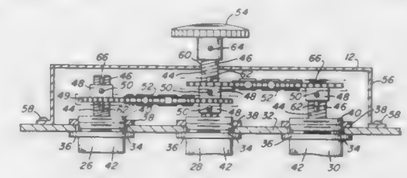

**1**. A device for facilitating manual cardiac massage, comprising:

a flexible pad wherein said pad is generally disc-shaped, and wherein said pad further has a surface thereon adapted for direct contact with myocardial tissue; and

a means for securing the thumb on one surface of said pad, whereby said pad provides a cushion between the thumb of the user and the tissue contacted therewith during cardiac massage.

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**4,747,398**
**PRESSURE ADJUSTMENT APPARATUS**
**Edward S. Wright, Allegheny, Pa., assignor to Wright Linear Pump, Inc., Imperial, Pa.**
**Filed Mar. 20, 1987, Ser. No. 28,469**
**Int. Cl.[4] A61H** *7/00*
**U.S. Cl. 128—64** **11 Claims**




**1**. In an apparatus for promoting the flow of a body fluid within a part of a human body from a distal portion thereof

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toward a proximal portion thereof by conveying air pressure via plural pressure conveying means to respective inflatable cells of a multi-cell sheath which encompasses such a part of a human body so that the inflatable cells thereof form a sequence of cells extending between such distal and proximal portions, and to thereby inflate such cells for specified periods of time with the pressure applied in each such cell being greater than the pressure applied in the next adjacent cell toward such proximal portion, and less than the pressure applied in the next adjacent cell toward such distal portion such that the pressure applied therein produces a pressure gradient from maximum pressure adjacent such distal portion to minimum pressure adjacent such proximal portion, an apparatus for adjusting the magnitude of the applied pressure in such cells comprising:

a plurality of independently adjustable pressure regulators connected, respectively, in-line with the plural pressure conveying means supplying pressure to each such cell;

each said pressure regulator including movable pressure adjustment means for adjustment of the pressure setting of the respective said regulator;

one of said pressure regulators including manual actuator means associated with the said movable adjustment means thereof to permit adjustment by hand manipulation of the pressure setting of said one regulator;

drive means associated with each said movable adjustment means and operable to provide simultaneous adjustment of the pressure settings of all of said pressure regulators upon adjustment of the pressure setting of said one pressure regulator; and

independent adjustment means associated with at least some of said pressure adjustment means to permit individual adjustment of the pressure setting of any of the respective said pressure regulators with respect to the pressure settings of any others of said pressure regulators independently of said simultaneous adjustment by operation of said drive means.

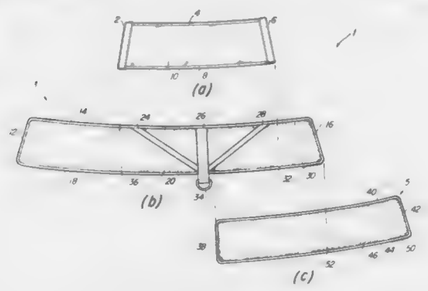
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**4,747,399**

**MEDICAL APPLIANCE HAVING AUXILIARY BELT TO PROVIDE ADJUSTABLE LENGTH RANGES**

**Roger R. Glomstead, 1390 Kirkway, Bloomfield Hills, Mich. 48013**

**Filed Apr. 30, 1987, Ser. No. 44,993**
**Int. Cl.[4] A61F** *5/04, 5/02*
**U.S. Cl. 128—75** **15 Claims**




1. A medical appliance device for use with patients of various sizes, said device comprising:

a main belt defined by inner and outer major faces, the main belt having a given width and length, the main belt having a first end section, a second end section;

an auxiliary belt defined by inner and outer major faces, the auxiliary belt having substantially the same width as the main belt;

fastening means for reusably detachably connecting the main and auxiliary belts; and

the main and auxiliary belts being sufficiently dimensioned so as to provide three continuous size ranges: a middle size range when the auxiliary belt is connected in a preset position lengthwise overlapping the second end section and at least partially overlapping the center section, a small size range when the auxiliary belt is removed, and a large size range when the auxiliary belt is moved from said preset position and attached to said main belt so that an end of the auxiliary belt is connected adjacent to the outer end of the second section of the main belt, wherein the largest size of the small range is substantially the same as the smallest size of the middle range and the largest size of the middle range is substantially the same as the smallest size of the large range to thereby provide a continuum of sizes.

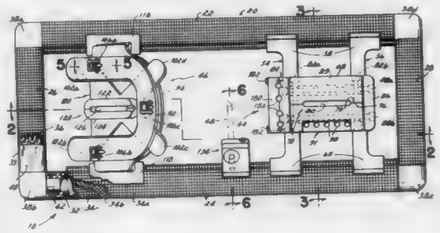
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**4,747,400**

**EXTERNAL FIXATION DEVICE**

**James B. Koeneman, Mesa; Thomas M. Hansen, Phoenix; Mark Phillips, Mesa, and Allan M. Weinstein, Paradise Valley, all of Ariz., assignors to Harrington Arthritis Research Center, Phoenix, Ariz.**

**Continuation-in-part of Ser. No. 604,047, Apr. 26, 1984, Pat. No. 4,584,995. This application Oct. 25, 1985, Ser. No. 791,222**
**Int. Cl.[4] A61F** *5/04*
**U.S. Cl. 128—92 Z** **27 Claims**



1. An external fixation device for positioning and immobilizing the distal segment and proximal segment of a fractured bone to reduce the fracture comprising:

a frame having a proximal carriage mounted at one end and a distal carriage mounted at the other end;

said proximal carriage being adapted to clamp half pins inserted in the proximal segment of the fractured bone, said proximal carriage being movable with respect to said frame to adjust the position of the proximal segment;

said distal carriage including a clamping element adapted to clamp half pins inserted in the distal segment of the fractured bone, said clamping element being movable with respect to said distal carriage along a partially spherical-shaped surface defined by a radius of fixed length having an origin at the approximate center of the fracture so as to permit precise adjustment of the position of the distal segment at the fracture for alignment with the proximal segment.

26. An external fixation device for positioning the distal segment and proximal segment of a fractured bone to reduce the fracture comprising:

a frame having a pair of spaced side rails connected to a pair of end rails;

a proximal carriage mounted to said side rails of said frame, said proximal carriage being adapted to clamp half pins inserted in the proximal segment of the fractured bone;

compliance means connected to said proximal carriage for transferring load applied to the fractured bone from the proximal segment across the fracture to the distal segment;

a distal carriage mounted to said side rails of said frame, said distal carriage including a clamping element adapted to clamp half pins inserted in the distal segment of the fractured bone, said clamping element being pivotal about the fracture so as to permit precise adjustment of the position of the distal segment for alignment with the proximal segments.



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**4,747,401**

**SURGICAL ADHESIVE DRESSING**

**William D. Potter, Bishops Stortford, and David A. Rawlings, Stansted Mountfitchet, both of United Kingdom, assignors to Smith and Nephew Associated Companies p.l.c., United Kingdom**

**Continuation of Ser. No. 794,854, Nov. 4, 1985, abandoned, which is a continuation of Ser. No. 541,324, filed as PCT GB83/00104 on Apr. 18, 1983, published as WO83/03549 on Oct. 27, 1983, Pat. No. 4,595,001. This application Nov. 3, 1986, Ser. No. 926,194**
**Claims priority, application United Kingdom, Apr. 8, 1982, 8219541**
**The portion of the term of this patent subsequent to Jun. 17, 2003, has been disclaimed.**
**Int. Cl.[4] A61L** *15/00*
**U.S. Cl. 128—156** **10 Claims**

1. A surgical dressing suitable for use on exuding wounds and on non-exuding wounds which consists essentially of a film which carries an adhesive layer for securing the dressing to the body wherein

(a) the film is continuous and comprises a polymer which in contact with water has a higher MVP than when in contact with moisture vapour but not water and

(b) the adhesive layer is adapted to allow access of water to the film when water is in contact with the adhesive layer so that

(c) said surgical dressing has a MVP of not less than 2500 $g/m^2$ when the adhesive layer is in contact with water and has a MVP of not more than 2000 $g/m^2$ when the adhesive is in contact with moisture vapour but not water.

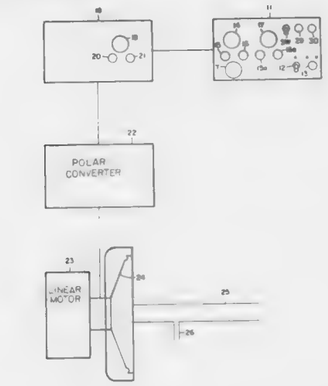
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**4,747,402**

**HIGH FREQUENCY VENTILATION METHOD**

**David M. Reese; L. Thomas Rauterkus, both of c/o Spectramed Inc., 805 Liberty La., Dayton, Ohio 45449, and Robert L. Jensen, 4719 Broom St., San Antonio, Tex. 78217**

**Continuation-in-part of Ser. No. 776,014, Sep. 13, 1985, which is a continuation-in-part of Ser. No. 728,146, Apr. 29, 1985, abandoned, which is a continuation of Ser. No. 519,387, Aug. 1, 1983, abandoned, which is a continuation-in-part of Ser. No. 485,900, Apr. 18, 1983, abandoned, which is a continuation-in-part of Ser. No. 358,648, Mar. 16, 1982, abandoned. This application Apr. 8, 1987, Ser. No. 35,900**
**Int. Cl.[4] A61M** *16/00*
**U.S. Cl. 128—204.21** **14 Claims**




1. A method of ventilating an air breathing animal comprising:

supplying a flow of gas to the first side of a piston mounted within a housing;

restricting the flow of gas supplied to the first side of the piston out of the housing to elevate the pressure on the first side of the piston;

supplying a flow of gas to the second side of the piston, the second side of the piston being connected to an air breathing animal, while the piston is alternately moved back and forth within the housing at a selected frequency, amplitude and period, thereby alternately forcing gas into and drawing gas out of the animal; and

restricting the flow of gas out of the animal to elevate the pressure on the second side of the piston.

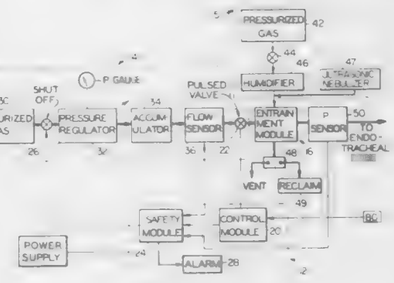
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**4,747,403**

**MULTI-FREQUENCY JET VENTILATION TECHNIQUE AND APPARATUS**

**Eric H. Gluck, West Hartford; Henry McDonald, S. Glastonbury; Jayant S. Sabnis, Glastonbury, and Bernard C. Weinberg, West Hartford, all of Conn., assignors to Advanced Pulmonary Technologies, Inc., Glastonbury, Conn.**

**Filed Jan. 27, 1986, Ser. No. 822,535**
**Int. Cl.[4] A61M** *16/00*
**U.S. Cl. 128—204.21** **21 Claims**




1. A variable frequency jet ventilator system comprising:

entrainment module means for defining an entrainment chamber having an axis and a supply outlet which is coaxial with said chamber, said entrainment module means further defining an inlet port and a constantly open vent port for said entrainment chamber, said inlet and vent ports being in uninterrupted fluid communication via said entrainment chamber whereby gas entering said entrainment chamber through said inlet port may continuously flow through said vent port, each of said ports having an axis and upstream and downstream ends, said inlet port and said vent port being generally axially aligned;

means connected to the upstream end of said inlet port for continuously supplying humidified gas to said entrainment chamber via said inlet port to thereby establish a bias flow across said entrainment chamber between said inlet and vent ports;

means for generating pulses of gas;

means for controlling said pulse generating means to vary the frequency of generation of the gas pulses;

nozzle means for imparting a high velocity to gas pulses, said nozzle means having a discharge end which opens into said entrainment chamber, said nozzle means being fluidically coupled to said pulse generating means to receive the pulses of gas whereby high velocity gas pulses are discharged into said entrainment chamber, said nozzle means being oriented to cause the discharged gas pulses to be directed along said entrainment chamber axis toward said supply outlet, said nozzle means being positioned such that high velocity gas pulses discharged from said nozzle means will entrain humidified gas from the bias flow to

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produce humidified gas pulses which exit said supply outlet; and

means coupled to said entrainment chamber supply outlet for delivering the humidified gas pulses to a patient's respiratory system.

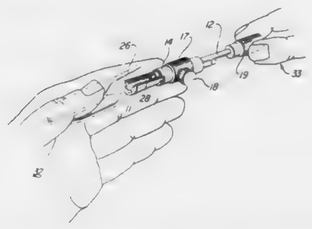
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**4,747,404**

## FOLDABLE INTRAOCULAR LENS INSERTER

**Robert S. Jampel, Bloomfield Hills, and Dian X. Shi, Detroit, both of Mich., assignors to Kresge Eye Institute of Wayne State University, Detroit, Mich.**

**Filed Nov. 10, 1986, Ser. No. 929,008**
**Int. Cl.[4] A61B *17/00, 17/28;* A61F *2/16***
**U.S. Cl. 128—303 R** **10 Claims**



1. A foldable intraocular lens inserter comprising:

an elongated tube split longitudinally to form a U-shaped in cross-section elongated base and an overlapping U-shaped elongated in cross-section cover;

said tube having an inner end portion and an outer end portion;

the cover being manually, axially slidable relative to the base for overlapping the base to form the complete tube therewith and for uncovering the base inner end portion;

guide means fixedly secured to the base outer end portion for guiding the cover for sliding along the tube axis towards and away from the tube inner end portion in axial alignment with the base and for holding the cover in overlapping position upon the base;

whereby a resiliently foldable lens may be positioned upon and folded into the base when the cover is manually slid axially in an outwardly direction relative to the tube, and may be enclosed in folded condition, within the inner end portion of the tube when the cover is slid into position for overlapping the base, and the tube may be inserted into the anterior chamber of an eye through a small incision and, thereafter, the cover may be slid outwardly for uncovering the base so as to release the folded lens within the eye chamber for resiliently unfolding therein.

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**4,747,405**

## ANGIOPLASTY CATHETER

**Michael E. Leckrone, Indianapolis, Ind., assignor to Vaser, Inc., Indianapolis, Ind.**

**Division of Ser. No. 739,986, May 31, 1985, Pat. No. 4,685,458, which is a division of Ser. No. 585,112, Mar. 1, 1984, Pat. No. 4,627,436. This application Sep. 16, 1986, Ser. No. 908,990**
**Int. Cl.[4] A61B *17/36***
**U.S. Cl. 128—303.1** **9 Claims**

1. A laser angioplasty catheter device comprising

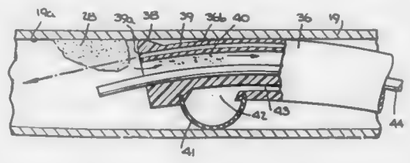
a catheter having a distal end portion adapted to be inserted within a blood vessel and a proximal end portion,

an abutment extending radially from the outer surface of the catheter adjacent the distal end portion thereof,

a fiber optic extending within the interior of the catheter from the proximal end portion thereof to adjacent the distal end portion of the catheter to deliver laser energy into the blood vessel when the fiber optic is connected to a source of laser energy,

an inflatable bladder mounted on the catheter adjacent the distal end portion thereof disposed substantially opposite to the abutment, and

means for controllably inflating the bladder when the device is disposed in a blood vessel to enable the inflated bladder to contact the inner surface of the blood vessel and urge the abutment against the inner surface of the blood vessel adjacent thereto,



whereby the laser energy is adapted to cause excision of undesired material within the blood vessel when the distal end portion of the catheter is disposed adjacent the undesired material without the laser energy being applied to the inner surface of the blood vessel

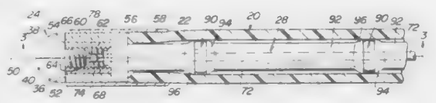
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**4,747,406**

## SHAFT DRIVEN, FLEXIBLE INTRAVASCULAR RECANALIZATION CATHETER

**John Nash, Downingtown, Pa., assignor to Intravascular Surgical Instruments, Inc., Frazer, Pa.**

**Filed Feb. 13, 1985, Ser. No. 701,063**
**Int. Cl.[4] A61F *17/32***
**U.S. Cl. 128—305** **27 Claims**



19. A flexible drive assembly comprising an elongated tubular member of unitary construction having a rear portion and a front portion, an elongated flexible member of small diameter having a longitudinal central axis extending within said tubular member from said rear end portion to said front end portion thereof, said flexible member being adapted to be rotated at a high rated speed about its central axis by a source of power coupled to its rear end portion, bearing means within said tubular member comprising plural bearing surfaces for supporting portions of said elongated flexible member at predetermined longitudinal spaced locations therealong and for maintaining said flexible member at a neutral position within said tubular member as said tubular member is bent through any angle up to a predetermined small radius of curvature, while enabling said member to be rotated about said central axis at said high rotational speed without said member going into excessive vibration, said bearing means being comprised of plural bearings, each of said bearings having an opening therein forming said bearing surface and through which said elongated flexible member extends, said bearing means being arranged to pivot with respect to said tubular member as said tubular member is bent so that said flexible member is maintained in said neutral position.

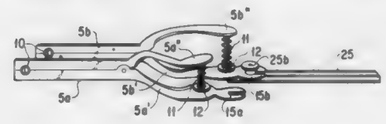


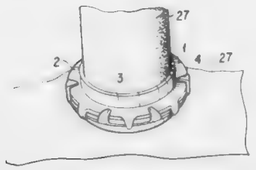
**4,747,407**

## BLOOD VESSEL ANASTOMAT

**Ying B. Liu; Heng W. Yang; Shu L. Ma; Shi Z. Liu, and Nai H. Li, all of Chongqing, China, assignors to The Field Surgery Research Department of the Third Military Medical University, Chongqing, China**

**Filed Jun. 2, 1986, Ser. No. 869,867**
**Claims priority, application China, Sep. 3, 1985, 85106639**
**Int. Cl.[4] A61B *17/04***
**U.S. Cl. 128—334 R** **11 Claims**





1. A blood vessel anastomat kit for blood vessel repair surgery for the anastomosing of a blood vessel, comprising a pair of anastomotic wheels, each of said wheels having an axially extending circular hollow body, a flange extending perpendicular at one end of said body and circumferentially and peripherally around said one end and a plurality of equally spaced short pins around the periphery of said flange and extending axially and forwardly from said flange and said body; a pair of anastomotic clamps for receiving said anastomotic wheels, each of said clamps having a pair of plates hinged together intermediate their ends, said plates at one end of said clamp each having one half of a circular groove member abutting with the other half of the circular groove member in the other of said plates in said clamp when said clamp is closed and forming therein and therebetween a clamp for receiving and retaining one of said anastomotic wheels with the axis of said wheel perpendicular to the direction said plates of said clamp are hinged to each other; at least one hook and at least one pressing needle for engaging and turning the end of a blood vessel passed through said axially extending circular hollow body of said anastomotic wheel, for deflecting said end outwardly over said perpendicular flange, for engaging said deflected end with said pins and for piercing and engaging said deflected end on said pins; an anastomotic wheel clasping plier for clasping said circular groove members on said clamps with said anastomotic wheels retained therein and said deflected ends of said blood vessel pierced and engaged on said pins and for deflecting the ends of said pins on said anastomotic wheels outwardly and around said perpendicular flange of the other of said wheels for clasping said anastomotic wheels and said ends of said blood vessels together; and a pair of lengthened handles for said anastomotic clamps.

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**4,747,408**

## PORTABLE SAUNA-BATH JACKET

**Huang Chuan-Chih, P.O. Box 10160, Taipei, Taiwan**

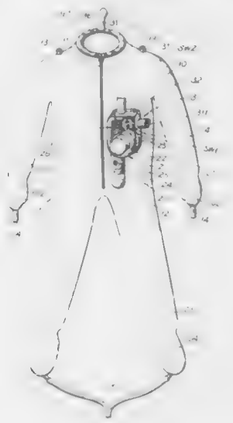
**Filed Aug. 24, 1987, Ser. No. 88,648**
**Int. Cl.[4] A61F *7/00***
**U.S. Cl. 128—400** **2 Claims**

1. A portable sauna-bath jacket comprising:

an one-piece jacket having two upper vents formed on its shoulder portions, two middle discharge tubes respectively formed on two gloves secured to two sleeves of the jacket, two lower discharge tubes respectively formed on two shoes secured to two trouser hoses of said jacket, and an annular hose with plural spray holes on said hose formed on a collar portion of said jacket;

a hot-air supplier including an air inlet pipe communicated with an air inlet port formed on a central portion of said jacket, an air fan driven by a motor mounted in a casing formed on a chest portion of said jacket, a temperature-controlled heating coil mounted in the inlet pipe for heating an air stream as driven by the fan and a suction louver formed on the casing for sucking air therein; and

a cooling-water supplier including a water inlet pipe connected with a cooling water source, a solenoid valve



connected with the water inlet pipe and mounted in said casing, and a water inlet pipe connected between said solenoid valve and said annular hose, whereby upon the switching-on operation of said hot-air supplier, a hot-air stream is delivered into said inlet port and distributed everywhere within said jacket for warming a bather and finally discharged through the upper vents, middle and lower discharge tubes; and upon the alternative switching of said solenoid valve of said cooling-water supplier by switching off said hot-air supplier, a water stream is delivered through the water pipes and said annular hose to spray cooling water through said spray holes for cooling the bather.

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**4,747,409**

## THERMAL VASCULAR DILATOR

**Per-Olof Silén, Knivsta, Sweden, assignor to Teknikhuset Swetron AB, Jarfalla, Sweden**

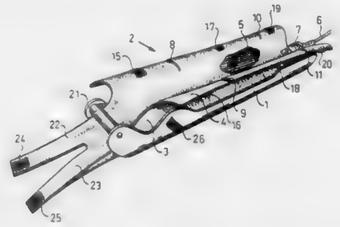
**PCT No. PCT/SE86/00215, § 371 Date Jan. 7, 1987, § 102(e) Date Jan. 7, 1987, PCT Pub. No. WO86/06622, PCT Pub. Date Nov. 20, 1986**
**PCT Filed May 7, 1986, Ser. No. 14,060**
**Claims priority, application Sweden, May 7, 1985, 8502248**
**Int. Cl.[4] A61F *7/00***
**U.S. Cl. 128—402** **5 Claims**

1. A device for dilating extremity blood vessels by thermal treatment, comprising a support member (1) of rigid material having a substantially U-shaped cross-section and adapted for receiving an extremity, a gripping handle (21) on said support

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member, and a sleeve (2) of flexible material arranged on the inside of the support member, said sleeve being adapted to be



wrapped around an extremity received in the support member, said sleeve including heat emitting means (5).

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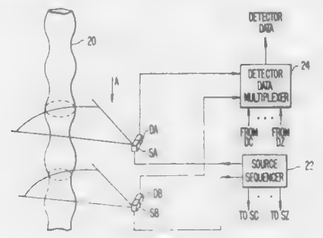
**4,747,410**
**CUSHIONED ANTI-PRONATION INSERT**
**Lee S. Cohen, 4 Nichole Dr., Media, Pa. 19063**
**Continuation of Ser. No. 801,836, Nov. 26, 1985, abandoned.**
**This application Sep. 3, 1987, Ser. No. 96,239**
**Int. Cl.[4] A61F** *5/14;* **A43B** *13/38*
**U.S. Cl. 128—581** **12 Claims**



1. An orthotic device for contact with the plantar surface of a foot to minimize pronation, comprising:
(a) a foot cushioning pad having an outline substantially conforming to the outline of a foot, said pad being composed of a foam plastic material having a compression load deflection of 15–50 pounds per square inch,
(b) an anterior extension comprising a wedge rising from the line corresponding to the metatarsal phalangeal articulation to the cuneiform metatarsal articulation, a transverse varus wedge incorporated in said anterior extension declining in thickness from the medial to the lateral border of said pad, said wedge being positioned to underlie the metatarsal heads of the foot,
(c) a medial shelf incorporated longitudinally in said anterior extension, said shelf having a relatively greater thickness and compressibility than the next thicker portion of said anterior extension and being positioned to substantially underlie and support the first ray of the foot,
(d) a heel cup extending posteriorly of said anterior extension, said heel cup defining a wall and a recessed plantar support to accomodate the calcaneus in a manner to positionally stabilize the medial tuberosity and the heel fat pad,
(e) whereby the pad resists excess foot pronation by minimizing the horizontal displacement of the medial tuberosity and fat pad, directing the heel strike force substantially along the peroneus longus, assisting to effect a proper lever adapter sequence and resisting eversion of the subtalar joints.

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**4,747,411**
**THREE-DIMENSIONAL IMAGING SYSTEM**
**Robert S. Ledley, Silver Spring, Md., assignor to National Biochemical Research Foundation, Washington, D.C.**
**Filed Mar. 28, 1984, Ser. No. 594,277**
**Int. Cl.[4] AG1B** *10/00*
**U.S. Cl. 128—660** **30 Claims**




1. A three-dimensional imaging system for obtaining a three-dimensional image of an object, comprising:
source means for sequentially transmitting ultrasonic energy toward said object in successive directions in a first scanning plane, said successive directions having increasing angular orientations with respect to a reference direction, and for repeating the sequential transmission of ultrasonic energy toward said object in said successive directions in successive scanning planes parallel to said first scanning plane;
detector means for receiving reflected energy reflected from material of said object, and for converting said reflected energy to electrical signals; and
processing means connected to said detector means for receiving said electrical signals, and for processing said electrical signals to develop reconstructed image data of said object;
wherein said detector means is disposed in an image plane displaced from said object and divided into a left image plane and a right image plane, said detector means comprising a plurality of ultrasonic transducers arranged in a line in said image plane, said line forming a boundary between said left image plane and said right image plane, said reconstructed image data comprising forward projections of said object into a first image in said left image plane and a second image in said right image plane, said first and second images forming a stereo pair;
said system further comprising display means for displaying said first and second images compositely, whereby to display said three-dimensional image of said object.

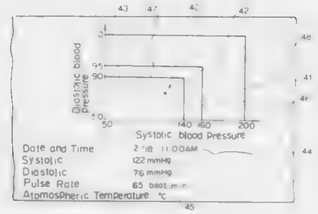
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**4,747,412**
**ELECTRONIC SPHYGMOMANOMETER WITH GRAPHICAL OUTPUT**
**Keiji Yamaguchi, Shimizu, Japan, assignor to Terumo Kabushiki Kaisha, Tokyo, Japan**
**Filed Jul. 8, 1986, Ser. No. 883,367**
**Claims priority, application Japan, Jul. 9, 1985, 60-149132; Jul. 9, 1985, 60-149133**
**Int. Cl.[4] A61B** *5/02*
**U.S. Cl. 128—683** **10 Claims**

7. An electronic sphygmomanometer comprising:
selecting means for selectively setting said electronic sphygmomanometer to one of first and second function modes;
measuring means for measuring information related to blood pressure inclusive of at least systolic and diastolic blood pressure values;



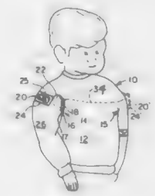
timekeeping means for clocking times at which measurements are performed by said measuring means;
memory means for storing plural sets of the information measured by said measuring means together with the times clocked by said timekeeping means when the measurements were taken;
first pattern holding means for holding a first graph pattern having a first axis along which time is plotted and a second axis along which measured systolic and diastolic blood pressures are plotted;
reading means for reading the times and the information out of said memory means in a time series;
blood pressure developing means for developing the systolic and diastolic blood pressure values from the information read out by said reading means as positions on the first graph patern using the times clocked by said timekeeping means;
line segment developing means for developing line segments connecting the systolic and diastolic blood pressure values developed by said blood pressure developing means at each of the times clocked by said tiemkeeping means, the line segments forming a bar graph pattern;
second pattern holding means for holding a second graph pattern having a first axis along which systolic blood pressure is plotted and a second axis along which diastolic blood pressure is plotted including a reference blood pressure pattern for blood pressure diagnosis superposed on the first and second graph axes;




calculating means for calculating based on the systolic and diastlic blood pressure values measured by said measuring means, a point of intersection indicating the systolic and diastolic blood pressure values on the second graph pattern held by said second pattern holding means;
intersection developing means for developing the point of intersection calculated by said calculating means as data on the second graph pattern;
printing means for recording on recording media the bar graph pattern developed by said line segment developing means in the first function mode and, in the second function mode, the second graph pattern and the data developed by said intersection developing means; and
control means for controlling transmission of the blood pressure values and the bar graph pattern developed by said blood pressure developing means and said line segment developing means, respectively, in the first function mode and, in the second function mode, controlling transmission of the second graph pattern and the data developed by said intersection developing means to said printing means, whereby in the first functon mode, the systolic and diastolic blood pressure values and the bar graph pattern are indicated and recorded on the recording media and in the second function mode, the systolic and diastolic blood pressure values are indicated and recorded on the recording media as the point of intersection on the second graph pattern and the reference blood pressure pattern is indicated and recorded in a form superposed on the point of intersection in the second graph pattern.

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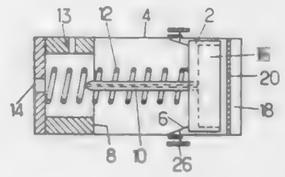
**4,747,413**
**INFANT TEMPERATURE MEASURING APPARATUS AND METHODS**
**Harry S. Bloch, 871 Green Ridge Cir., Langhorne, Pa. 19047**
**Filed Nov. 7, 1986, Ser. No. 928,441**
**Int. Cl.[4] A61B** *5/00*
**U.S. Cl. 128—736** **10 Claims**



1. An infant temperature monitoring apparatus comprising:
A garment adapted to be worn on an infant's upper torso including the infant's armpits;
temperature sensing means supported by a pocket in an armpit of the garment for sensing armpit temperature of an infant wearing the garment;
first visual display means mounted on an outer portion of the garment by a clear plastic pocket at a visible location spaced from the armpits of the garment for displaying an indication of the body temperature of an infant wearing the garment; and
first flexible connecting means for operably coupling the sensor means with the first visual display means.

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**4,747,414**
**INSTRUMENT FOR BONE MARROW PUNCTURE**
**Rémy Brossel, Paris, France, assignor to Biologie et Industrie S.A.R.L., Chaumont, France**
**PCT No. PCT/FR86/00052, § 371 Date Oct. 20, 1986, § 102(e) Date Oct. 20, 1986, PCT Pub. No. WO86/04805, PCT Pub. Date Aug. 28, 1986**
**PCT Filed Feb. 20, 1986, Ser. No. 928,245**
**Claims priority, application France, Feb. 20, 1985, 85 02452**
**Int. Cl.[4] A61B** *10/00*
**U.S. Cl. 128—754** **12 Claims**




1. An instrument for performing a bone marrow puncture, comprising:
(a) a barrel having a central axis extending between an anterior end of said barrel and a closed posterior end of said barrel;
(b) a piston located in a first axial position within said barrel and movable anteriorly along said axis away from said first axial position to a second axial position; said closed posterior end of said barrel defining, with said piston, a first closed chamber within said barrel posterior to said piston;
(c) a hollow needle that is within said barrel, is fixed to said piston, and extends anteriorly along said axis away from said piston; said needle having open anterior and posterior ends; said posterior end of said needle being in fluid-flow communication with said first closed chamber so that said

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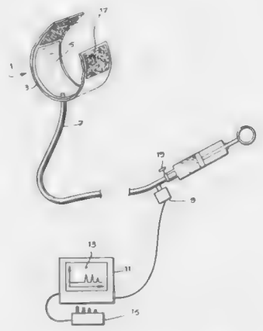
anterior end of said needle is also in fluid-flow communication with said first closed chamber through said needle;
(d) releasable means for restraining movement of said piston within said barrel along said axis away from said first axial position; and
(e) means for urging said piston to move anteriorly within said barrel a first predetermined distance along said axis from said first axial position to said second axial position so that said anterior end of said needle is urged to move: (i) said first predetermined distance along said axis and (ii) a second predetermined distance along said axis outwardly of said anterior end of said barrel; whereby said open anterior end of said needle can pierce a bone adjacent to said anterior end of said barrel and can move into marrow of said bone; and whereby said first closed chamber, defined by said piston and said closed posterior end of said barrel, becomes enlarged as said piston moves anteriorly, thereby reducing pressure in said first closed chamber and causing said marrow to be aspirated into said first closed chamber through said hollow needle and its open ends.

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**4,747,415**
**METHOD AND DEVICE FOR MEASURING PENILE RIGIDITY**

**Pierre Lavoisier, 743 Stuart, Outremont, Quebec, Canada**

**Continuation of Ser. No. 874,610, Jun. 16, 1986. This application Aug. 27, 1987, Ser. No. 90,393**
**Int. Cl.[4] A61B *5/10***
**U.S. Cl. 128—774** **9 Claims**

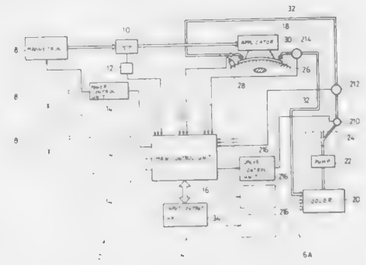


1. A method for measuring the penile rigidity of a patient comprising the steps of:
placing a plastic container on a face of a cuff comprising a non-elastic tissue band;
filling said plastic container with a liquid prior to use;
wrapping said cuff around the penis of the patient while the penis is non-erected, with said filled plastic container in direct contact with the penis;
closing said cuff to rigidly hold said filled plastic container against the penis of the patient;
sensing the liquid pressure inside said filled plastic container, and
amplifying and then recording and/or displaying the sensed pressure,
whereby any erection of the penis causes an increase in penile pressure which, in turn, compresses the liquid inside the container held in position around the patient's penis, said compression causing an increase in sensed pressure and being directly related to the penile rigidity of the patient.

**4,747,416**
**HEATING APPARATUS AND METHOD FOR HYPERTHERMIA**

**Makoto Kikuchi, 16-9, Inokashira 1-chome, Mitaka-shi, Tokyo; Shinsaku Mori, 31-6, Okusawa 1-chome, Setagaya-ku, Tokyo; Yoshio Nikawa, 26-14, Nerima 2-chome, Nerima-ku, Tokyo, and Takashige Terakawa, Tokyo, all of Japan, assignors to Tokyo Keiki Co., Ltd.; Makoto Kikuchi; Shinsaku Mori and Yoshio Nikawa, all of Tokyo, Japan**

**Filed Jul. 17, 1985, Ser. No. 756,071**
**Claims priority, application Japan, Jul. 24, 1984, 59-153678; Jul. 24, 1984, 59-153679; Jul. 24, 1984, 59-153680; Jul. 24, 1984, 59-153681; Jul. 24, 1984, 59-153682**
**Int. Cl.[4] A61N *5/00***
**U.S. Cl. 128—804** **15 Claims**



1. A heating apparatus for hyperthermia comprising:
a plurality of electromagnetic wave generation means for generating electromagnetic waves for treating a plurality of patients;
a plurality of applicators, each of which is connected to a different electromagnetic wave generation means, wherein each applicator comprises means for irradiating different patients with sufficient electromagnetic waves to treat tumors of said patients;
a plurality of cooling members, each of which is attached to one of said applicators for cooling the bodies of said patients, said cooling members each having a coolant outlet and inlet and each comprising means for recirculating the coolant through said inlet and outlet;
a plurality of internal temperature detecting means, wherein each internal temperature detecting means comprises means for detecting the temperature of a hyperthermia treatment region within the body irradiated with electromagnetic waves by one of said applicators; and
a main control unit comprising means for receiving information from said internal temperature detecting means and for controlling the output of said electromagnetic generation means as a function of the temperature detected by said plurality of internal temperature detecting means, wherein said main control unit, and said plurality of generation means and applicators together comprise means for indpendently controlling the hyperthermia treatment of different patients.

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**4,747,417**
**SPRAYABLE COMPOSITION TO PREVENT SMOKING**

**Michael D. Beskin, Riverdale, N.Y., assignor to Besco Laboratory Inc., New York, N.Y.**

**Filed Sep. 10, 1985, Ser. No. 774,464**
**Int. Cl.[4] A24F *47/00***
**U.S. Cl. 131—270** **6 Claims**

1. A pump bottle containing a sprayable composition for the prevention of smoking which consists of:
(a) 2 to 4 parts by weight of a solution of silver acetate in distilled water or deionized water at a concentration of 1.5 to 7.5 g/l; and
(b) 1 part by weight of a solution of ethanol of a pharmaceutical grade in which is dissolved an effective amount of a flavoring agent selected from the group which consists of peppermint oil, spearmint oil, wintergreen oil, cloves oil and cinnamon oil, and an amount of polysorbate 80 effective to solubilize the flavoring agent in the ethanol, and 1% to 100% distilled water or deionized water based on the weight of the composition.

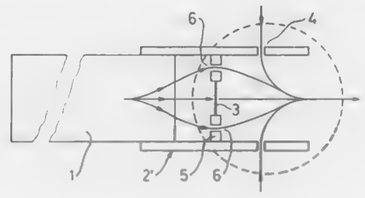


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**4,747,418**
**CIGARETTE FILTER UNIT**

**Serge Veluz, Echichens, Switzerland, assignor to Baumgartner Papiers S.A., Switzerland**

**Filed Aug. 22, 1986, Ser. No. 899,472**
**Claims priority, application Switzerland, Aug. 26, 1985, 3664/85**
**Int. Cl.[4] A24D *3/04***
**U.S. Cl. 131—331** **17 Claims**



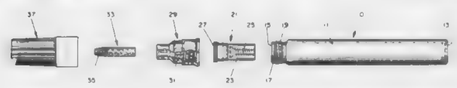
17. A cigarette filter unit, comprising at least one membrane which is in the form of a screen and is arranged in a smoke-gas flow cross section of the unit, the membrane including openings, the spatial distribution and cross sectional areas of the openings being accurately formed as to size and shape, wherein the thickness of the membrane is between 10 and 150 μm, the number of openings in the membrane is between 500 and 25,000, and the cross sectional area of each of the openings is between 80 and 3,000 $\mu m^2$; the unit also including at least one excess flow opening for smoke-gas flow paralleling flow through the membrane and having a cross section at least 10 times larger than that of the largest opening in the membrane; and the unit also including at least one ventilation opening downstream of the membrane in the direction of flow, the ventilation opening extending between the interior and exterior of the filter unit.

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**4,747,419**
**NAIL POLISH COMPOSITIONS AND MEANS FOR APPLYING SAME**

**Madeline D. Flynn, Bridgeport, and Alan J. Suares, Cheshire, both of Conn., assignors to Chesebrough-Pond's, Inc., Greenwich, Conn.**

**Filed Jun. 17, 1986, Ser. No. 875,184**
**Int. Cl.[4] A45D *29/00***
**U.S. Cl. 132—73** **30 Claims**

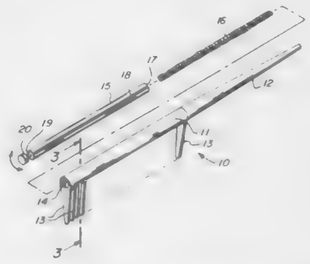


1. A novel, low viscosity nail polish composition comprising from about 2.0% to about 40.0% nitrocellulose primary film former; from about 0.6% to about 16.0% pigment; from about 5.0% to about 50.0% of a copolymer comprising hydrophobic and hydrophilic monomers; and an amount of thinner sufficient to render the Brookfield viscosity of the final composition not greater than about 200 cps.

**4,747,420**
**POCKET COLOR COMB**

**Vincent J. Alaimo, 72 Bangor St., Staten Island, N.Y. 10314**

**Filed Apr. 8, 1987, Ser. No. 36,364**
**Int. Cl.[4] A45D *24/22***
**U.S. Cl. 132—112** **5 Claims**



1. A color pocket comb, comprising, a main body, a cylinder slidably received in said main body for rotation within said main body thereby controlling a flow of dye/perfume onto strands of hair, an elongated slot in said cylinder, and a pipe cleaner received in said cylinder for retaining said dye to be dispensed through said slot and onto said strands of hair.

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**4,747,421**
**APPARATUS FOR REMOVING COVERING FILM**

**Chikara Hayashi, Chigasaki, Japan, assignor to Research Development Corporation of Japan, Chiba and Vacuum Metallurgical Co., Ltd., Tokyo, both of, Japan**

**Division of Ser. No. 711,475, Mar. 13, 1985, Pat. No. 4,631,250. This application Jul. 2, 1986, Ser. No. 881,073**
**Int. Cl.[4] B08B *11/00***
**U.S. Cl. 134—201** **8 Claims**



1. An apparatus for removing a photo resist covering film by blowing fine solid $CO_2$ particles against a covering film applied to a surface of a substrate, including a jet nozzle directly connected through a connecting pipe to a bomb containing liquefied carbonic acid gas and arranged to be directed toward a substrate having thereon a photo resist covering film to be removed, said jet nozzle providing for the conversion of said liquified carbonic acid gas into a high velocity stream of said fine solid $CO_2$ particles.

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**4,747,422**
**PNEUMATIC UMBRELLA**

**Ching-Horng Chung, No. 31, Wu Fu Street, Mei Nung Jenn, Kaohsiung Hsien, Taiwan**

**Filed May 7, 1987, Ser. No. 46,801**
**Int. Cl.[4] A45B *25/14***
**U.S. Cl. 135—20 M** **5 Claims**

1. A pneumatic umbrella mainly comprising a barrel consisting of an upper section, middle section and lower section; said upper section having a snap catch in the wall, a guide slot in

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each side of the wall, a cap with a fixed hub for main ribs at the top, and a sliding hub filled over the upper section for prop ribs hinged to the main ribs and having a cross bar to slide in the guide slots and for connecting a rod; said connecting rod with a head at the top extending downward and connected to a cone; said cone having a rod connected to a piston; said middle section being connected with the upper section by means of threads and strengthened at the joint with a reinforcing sleeve,



having a hole in the bottom for a throttle valve to fit, and an assembly of plunger, rod and tension spring; said tension spring being fitted over the plunger rod between the bottom of the middle section and an oblong plate on the rod; said plunger rod extending into the lower section, through the bottom cap screwed on the lower section, and fixed to a knob having a ring; said lower section and middle section also having an operating button and snap catch for the pneumatic umbrella to unfold or fold slowly.

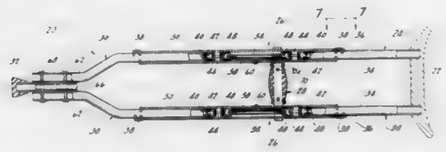
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**4,747,423**

## ADJUSTABLE AND REDUCIBLE WALKING AID AND METHOD OF USING SAME

**Ries B. Hansen, Milwaukee, Wis., and Orlando J. Casariego, Miami Springs, Fla., assignors to Ortho-Tech Industries, Inc., New Orleans, La.**

**Filed May 27, 1986, Ser. No. 867,099**
**Int. Cl.[4] A61H** *3/02*
**U.S. Cl. 135—68** **20 Claims**



**1**. A latchless walking aid having integral adjusting and folding means, including at least three tubular sections, comprising:

a first section having one or more tubular members each having a first bidirectional hinge element anchored at one end thereof,

a second section having the same number of tubular members as said first section, each of said tubular members of said second section designed to coaxially and slidably accept one tubular member of said first section and its said first hinge element to a preselected depth within said tubular member of said second section, said first section being attached to said second section by limiting means designed to limit the separation of said sections;

a third section having the same number of tubular members as said second section, said third section having a second bidirectional hinge element anchored at one end thereof, each of said tubular members of said second section designed to coaxially and slidable accept one tubular member of said third section and its said second hinge element to a preselected depth within said tubular member of said second section, said third section being attached to said second section by limiting means designed to limit the separation of said sections;

means connecting said first and second hinge elements designed to bias said hinge elements toward one another, said biasing means being generally enclosed by and passing through said second section;

wherein said means for permitting said second section to accept said first and third sections to preselected depths includes a plurality of holes in said first and third sections and pins insertable therein, said pins being further engageable with the ends of said tubular members of said second section.

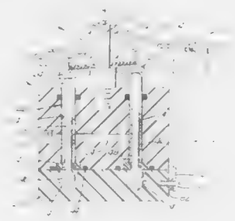
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**4,747,424**

## HYDRAULIC VALVE

**Leonard T. Chapman, 13760 Chandler Blvd., Van Nuys, Calif. 91401**

**Filed Oct. 2, 1986, Ser. No. 914,489**
**Int. Cl.[4] F15B** *13/06*
**U.S. Cl. 137—1** **22 Claims**



**1**. A valve for controlling movement of a hydraulic component, comprising, at least one supply-return port, at least one inlet-outlet port, said inlet-outlet port communicating with the controlled hydraulic component, a plurality of passageways arranged to permit communication between said supply-return ports and said inlet-outlet ports, at least one piston positioned within said passageways between said supply-return ports and said inlet-outlet ports and arragned so as to selectively permit and vary the flow through said passageways between said ports, means arranged to gradually actuate each said piston and means to precisely measure the amount of piston actuation, wherein said means to gradually actuate said pistons includes at least one actuation cam, said actuation cam having an inclinded actuation surface, a wobble plate, said wobble plate being positioned between said actuation cam actuation surface and said pistons, and means to selectively rotate said actuation cam.

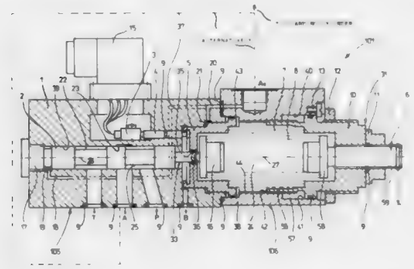


**4,747,425**

## 3-WAY PRESSURE REDUCING VALVE HAVING MEANS FOR MONITORING THE SECONDARY PRESSURE

**Peter Lauer, Lohr-Steinbach, Fed. Rep. of Germany, assignor to Mannesmann Rexroth GmbH, Lohr, Fed. Rep. of Germany**

**Filed Sep. 12, 1986, Ser. No. 906,451**
**Claims priority, application Fed. Rep. of Germany, Sep. 12, 1985, 3532592**
**Int. Cl.[4] G05D** *16/10*
**U.S. Cl. 137—116.3** **10 Claims**



**1**. A valving apparatus comprising:

a 3-way pressure reducing valve for reducing the primary pressure of a pressure medium to a secondary pressure,

secondary pressure monitoring means for monitoring the actual secondary pressure and for providing information whether or not the actual secondary pressure exceeds or is below a predetermined secondary pressure value, said secondary pressure monitoring means including second spool means,

housing means,

longitudinal bore means in said housing means,

port means provided in said housing means and connecting supply a pressure medium, load port means adapted to be supplied with pressure medium, and tank port means,

first spool means reciprocally mounted in said longitudinal bore means and adapted to provide a predetermined path of flow between said ports,

pressure chamber means at a first end of said first spool means and in fluid communication with said load port means carrying pressure medium having the secondary pressure,

first spring means arranged in said housing and adapted to act on the second end opposite to said first end of said first spool means to bias said first spool means into a first position,

second spool means reciprocally mounted in said longitudinal bore means and arranged coaxially to said first spool means,

second spring means arranged in said housing means and adapted to urge said second spool means into a first position against the force created by pressure medium having the secondary pressure which acts on said second spool means in a direction opposite to said second spring means,

a first adjustment screw for adjusting the force applied by said first spring means onto said first spool means, and comprising outer thread means for engagement with inner thread means provided on said inner longitudinal bore,

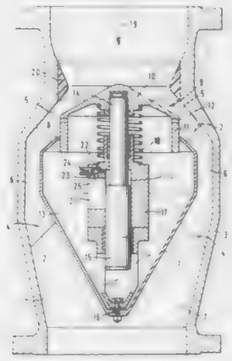
a second adjustment screw for adjusting the force applied by said second spring means onto said second spool means, and comprising outer thread means adapted for engagement with inner thread means provided on a bore in said first adjustment screw, said first and second adjustment screws being adjustable independently from each other and being coaxially arranged with respect to said first and second coaxially arranged first and second spools.

**4,747,426**

## CHECK VALVE

**Henri H. Weevers, Gouda, Netherlands, assignor to Mokveld Valves B.V., Gouda, Netherlands**

**Filed Mar. 31, 1987, Ser. No. 33,169**
**Claims priority, application Fed. Rep. of Germany, Apr. 2, 1986, 3610965**
**Int. Cl.[4] F16K** *17/30*
**U.S. Cl. 137—220** **4 Claims**



**1**. A check valve comprising an outer housing enclosing an inner space of rotational symmetry, an inner housing having a rotational symmetry, connecting lands for centrally locating the inner housing in said inner space of said outer housing to form a flow passage axially divided by said connecting lands between the inner and outer housings, a valve body held in said inner housing for shutting-off said flow passage, spring means for normally biasing said valve body into a closed position against the flow direction of a medium flowing through the flow passage, said valve body being movable coaxially out of the inner housing, said valve body having a conical facing section for cooperation with a sealing ring and a cylindrical jacket section having at least one radially extending aperture near a transition zone between said conical facing section and said cylindrical jacket section for connecting said flow passage with a space inside the inner housing, said valve body further comprising a piston and a piston rod connecting said valve body with said piston, said inner housing comprising a sleeve forming a guide channel for guiding said piston, said sleeve having a wall with at least two axially displaced radially extending openings for communicating an inner space forming said guide channel in said sleeve with an inner space inside said inner housing depending on the instantaneous position of said piston, and wherein one opening of said radially extending openings through said wall of said sleeve is arranged directly near an end face of said guide channel inside said sleeve, wherein said one opening has a cross-sectional flow area smaller than a cross-sectional flow area of any other radially extending opening through said sleeve, wherein said sleeve is provided with a threaded channel extending coaxially to said radially extending opening having said smaller cross-sectional flow area, said valve further comprising throttling means including a position adjustable threaded member threadable into said threaded channel for adjusting said smaller cross-sectional flow area of said at least one radially extending opening for controlling a damping action on said valve body.

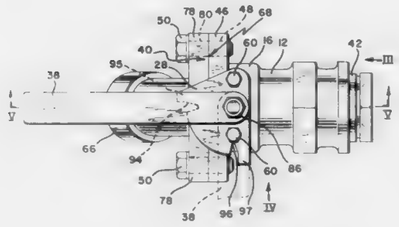
VOL 1090 ISS 5 MY 31 1988 UMI



## 4,747,427
## REVERSIBLE ANGLE COCK

Laurence G. Smith, Holden, and Francis E. Johnson, East Harwich, both of Mass., assignors to Princeton Corporation, Westboro, Mass.

Filed Mar. 16, 1987, Ser. No. 25,951
Int. Cl.[4] F16K *31/44*
U.S. Cl. 137—270 7 Claims

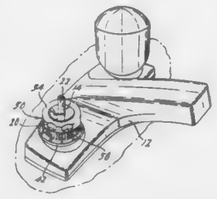


1. An angle cock which is capable of functioning in a right-handed mode or in a left-handed mode comprising:
(a) a body having a cavity, a top surface which includes an opening, and a vertical valve stem bore extending vertically from said opening to said cavity,
(b) a ball operatively located within said cavity, said ball being rotatable about a vertical axis between an open position and a first closed position and between said open position and a second closed position,
(c) a valve stem located in said valve stem bore, said valve stem having a bottom end which is operatively connected to said ball for rotation of said ball upon rotation of said valve stem, about said vertical axis and a top end projecting above said body,
(d) a handle which is operatively connected to the top end of said valve stem for rotating said valve stem about said vertical axis and rotating said ball between said open position and said first closed position which establishes said right-handed mode, for rotating said ball between said open position and said second closed position which establishes said left-handed mode,
(e) a reversible locking plate which has a pair of notches which are spaced from each other, a first flat surface, and an opposite second flat surface, said locking plate being releasably mounted on the top surface of said body in said right-handed mode so that said first flat surface faces away from said top surface and so that said handle is aligned with one of said notches when said ball is in said open position and is aligned with the other of said notches when said ball is in said first closed position, said locking plate being releasably mounted on the top surface of said body in said left-handed mode so that said second flat surface faces away from said top surface and so that said handle is aligned with one of said notches when said ball is in said open position and is aligned with the other of said notches when said ball is in said second closed position, and
(f) releasable detent means operatively connected to said handle for engaging in either said right-handed orientation or in said left-handed orientation said one notch for releasably locking said handle in said open position and for engaging said other notch for releasably locking said handle in said open position.

## 4,747,428
## FAUCET NUT HAVING AN INTEGRAL FLARED FLANGE

Dennis W. Crawford, Pontiac, and Larry G. Turner, Clarkston, both of Mich., assignors to Masco Corporation of Indiana, Indianapolis, Ind.

Filed Sep. 2, 1987, Ser. No. 92,301
Int. Cl.[4] F16K *43/00, 11/08*
U.S. Cl. 137—315 17 Claims

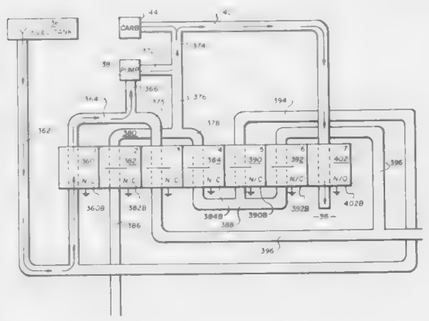


8. In a faucet assembly including a faucet body, at least one externally threaded valve body disposed within the faucet body, and a rotatably valving member having a valve stem seated within the valve body, the improvement comprising:
an integral retaining nut for securing the faucet body to the valve body and positionally maintaining the rotatable valving member within the valve body, said nut threadably engaging the valve body;
wherein said retaining nut comprises an inwardly extending annular flange formed at an upper end of said nut and a resilient annular flange formed at a lower end of said nut whereby upon attaching said nut to the valve body said upper annular flange engages the top of the valving member to secure the valving member within the valve body with the valve stem thereof extending through said upper annular flange and said lower annular flange resiliently secures the faucet body against the valve body.

## 4,747,429
## EMERGENCY FUEL TRANSFER ACCESSORY

Lowell W. Sundstrom, Jr., 9094 N. Highway 40, #17, Lake Point, Utah 84074

Filed Dec. 11, 1986, Ser. No. 940,394
Int. Cl.[4] E03B *7/00*
U.S. Cl. 137—351 16 Claims



1. A multi-use valve system for use in association with the fuel system of a vehicle engine having an interconnected fuel pump and carburetor, said valve system comprising:
an adjustable valve;
a first connection conduit associated with said valve for operably linking said valve to said vehicle's fuel pump, and carburetor to permit fuel flow through said valve and in seriatum said fuel pump and said carburetor;

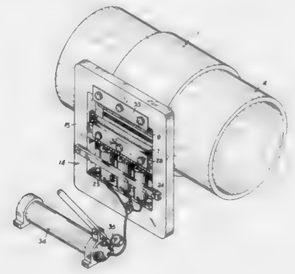


a second connection conduit associated with said valve, said second conduit being addapted for conveying fuel, dual directionally, between an interior fuel container and said valve;
a receiving conduit associated with said valve for conveying fuel dual directionally between a first exterior fuel system and said valve,
wherein said valve is positionable in two conditions; a first condition wherein said valve functions to connect said interior fuel tank to said fuel pump and said carburetor to said fuel tank whereby fuel may be drawn from said fuel tank, and passed through said fuel pump and said carburetor;
a second condition wherein said valve connects said receiving conduit to said fuel pump and further connects said carburetor to said interior fuel tank whereby fuel may be drawn from said first exterior fuel system, passed through said fuel pump and carburetor and then in part be directed to said interior fuel tank through said second conduit in a direction oppposite to the fuel flow in said first condition.

## 4,747,430
## PROCESS AND APPARATUS FOR SLEEVE REPAIR OF PIPE LINE

Paul D. Stata, 9835–106 Street, Edmonton, Alberta, Canada T5K 1C3 and Harry C. Robinson, 9204–69 Street, Edmonton, Alberta, Canada T6B 1V9

Continuation of Ser. No. 827,636, Feb. 10, 1986, abandoned. This application Aug. 7, 1987, Ser. No. 82,918
Int. Cl.[4] F16L *55/18*
U.S. Cl. 138—97 2 Claims

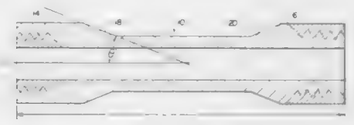


1. A process for reinforcing an internally pressurized and stressed cylindrical member, said member having a defect in its wall, comprising:
mounting a full encirclement sleeve, comprising a pair of discrete sleeve shells, around the member over the defect, each shell having first and second ends and an outwardly projecting lug attached thereto adjacent the first end of the shell, said lug extending substantially the full width of said first end, said first ends of the shells being overlapped, said shells being of an internal diameter substantially equal to the outside diameter of the cylindrical member and having a length such that, when their second ends are welded together and their first ends are pulled toward each other, tension will be applied to the shells without the first ends of the shells coming into abutment;
welding the second ends of the shells together;
applying increasing clamping force to the lugs to draw them toward each other and tension the sleeve, whereby substantially the entire internal surfaces of the shells are in contact with the outside surface of the cylindrical member, said force being generally evenly applied along the length of the lugs;
simultaneously restraining the lugs against inward pivoting movement to maintain the sleeve ends in substantial alignment;
measuring the force being applied and stopping the drawing together of the lugs when the sleeve has been tensioned a pre-determined amount and stress in the underlying portion of the cylindrical member has been reduced;
maintaining said sleeve in said tensioned condition and welding the first ends of the shells together; and
relaxing said clamping force.

## 4,747,431
## INTEGRAL JOINT FORMING OF WORK-HARDENABLE HIGH ALLOY TUBING

Dale F. LaCount, Alliance; Richard L. Holbrook, Louisville; Dean L. Mayer, Alliance, all of Ohio, and Kurt J. Kahlow, deceased, late of Reston, Va. by Ronald A. Kanlow, executor, assignors to The Babcock & Wilcox Company, New Orleans, La.

Continuation of Ser. No. 1726,208, Apr. 23, 1985, Pat. No. 4,649,728. This application Dec. 19, 1986, Ser. No. 944,477
Int. Cl.[4] F16L *9/00*
U.S. Cl. 138—109 12 Claims

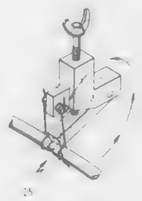


1. A tube, made from a high-alloy type 304 stainless steel material that must be cold worked at least to a minimum extent to obtain a required strength, having a constant inside diameter, a body portion, at least one enlarged end, and a transition taper between the at least one enlarged end and the body portion, with the tube being manufactured by the process of:
uniformly cold working a pre-formed tube made from a high-alloy type 304 stainless steel material that must be cold worked at least to a minimum extent to obtain a required strength by inserting a mandrel into the inside diameter of the tube and cold working the outside diameter of the pre-formed tube near said mandrel over its body and the at least one enlarged end to uniformly reduce its cross-sectional area and to increase its length, to final desired values, whereby the cold-worked tube is uniformly strengthened along its body and the at least one enlarged end.

## 4,747,432
## FLEXIBLE WIRE CLAMPING TOOL AND KIT

Barney D. Chrisley, P.O. Box 280, Ingleside, Tex. 78362

Filed Nov. 26, 1986, Ser. No. 936,644
Int. Cl.[4] B21F *9/02*
U.S. Cl. 140—102.5 13 Claims



1. A wire clamping tool, comprising:
(a) tool body means having a first part and a second part connected to each other, the first part including wire attaching means for securing opposite ends of a wire forming clamp to the first part, the second part extending between the wire clamp and the first part and being formed with means for retaining a portion of the wire

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clamp located between the wire ends against the second part; and

(b) a threaded puller threadedly secured in the first part, rotation of said puller causing movement of the second part in relation to the first part to increase the distance between the attaching means and the wire retaining means to thereby tighten the wire clamp, said first part being an L-shaped member in side elevational view having a first portion extending generally perpendicular to the second part and receiving said puller along the longitudinal axis of the first portion, said L-shaped member having a second portion generally perpendicular to the first portion and to which second portion the second part is pivotally secured, said first and second portion defining a gripping space in which the user's hand can be accommodated in gripping contact with said first and second portions.

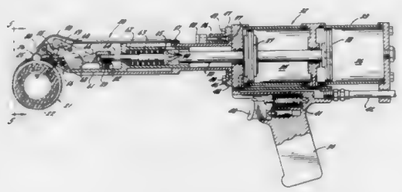
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**4,747,433**

## CLAMP TIGHTENING TOOL

**Paul H. Dixon, Belvidere, Ill., assignor to Ingemar Svenningson, Mouscron, Belgium**

**Filed Feb. 17, 1987, Ser. No. 15,794**
**Int. Cl.[4] B21F** *9/00*
**U.S. Cl. 140—150** **14 Claims**



1. A tool for tightening a clamp having an annular clamping band and having locking means for holding the band in a tightened condition, said band having a free end portion extending from said locking means, said tool comprising a body, a carriage supported by said body to move back and forth relative thereto between first and second positions, an anvil supported to move with said carriage, said anvil defining a throat for receiving at least part of the free end portion of said band, a forming punch supported to move with said carriage, said punch also being supported to move relative to said carriage between inactive and active positions, said punch being spaced from said anvil when in said inactive position thereby to permit the free end portion of said band to be threaded between said punch and said anvil, said punch being operable when moved to said active position to ram at least part of the free end portion of said band into the throat in said anvil and thereby bend the band around the punch, and actuator means which are operable when actuated to (A) first move said punch from said inactive position to said active position so as to cause said punch to bend said band and (B) thereafter move said carriage from said first position to said second position to cause said punch and anvil to tension and tighten said band.

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**4,747,434**

## BALSA WOOD STRIPPER

**James Jones, Jr., 36631 Ledgestone, Mount Clemens, Mich. 48043**

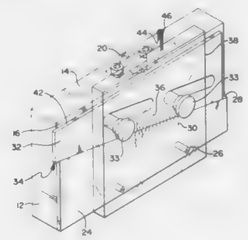
**Filed Aug. 24, 1987, Ser. No. 88,237**
**Int. Cl.[4] B27C** *1/00*
**U.S. Cl. 144—175** **20 Claims**

1. A hand-operated adjustable balsa wood stripper for stripping sheet balsa wood into strips suitable for constructing wooden models, comprising:

a base having a substantially planar upper surface and an immediately adjacent substantially planar side surface for receiving a piece of balsa wood to be stripped;

at least one fixed blade adjustably mounted on said upper surface, said at least one fixed blade being positioned on the upper surface such that a sufficient portion of the blade extends outwardly over the upper surface edge immediately adjacent the planar side surface to slice entirely through the sheet balsa wood received therethrough to slice strips;

a fixedly mounted bottom member having an inclined upper surface and scaled markings thereon is permanently attached to the lower region of the substantially planar side surface and receives thereon a slidably adjustable top member having an inclined lower surface and scaled markings which are complementary to and in contact with those of the bottom member, the upper surface of said top member not rising above the upper surface of the base;



a fence which sandwiches the top and bottom complementary members between itself and the base forms a variable depth, U-shaped channel between the base, the upper surface of the top member and the fence for receiving a sheet of balsa wood therethrough and said at least one fixed blade being positioned at the top of the channel so that a sheet of balsa wood pulled through the channel is stripped by the at least one fixed blade to slice a strip the same dimension as the channel; and

a guiding means for guiding the sheet balsa wood against the fence and positioning the wood so that the at least one blade strips the wood.

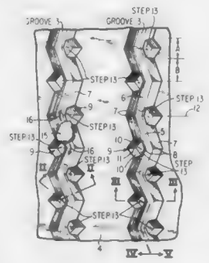
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**4,747,435**

## PNEUMATIC VEHICLE TIRE

**Hagen Trabandt, Sehnde, and Achillefs Goris, Bad Nenndorf, both of Fed. Rep. of Germany, assignors to Continental Aktiengesellschaft, Hanover, Fed. Rep. of Germany**

**Filed Jan. 24, 1986, Ser. No. 822,045**
**Claims priority, application Fed. Rep. of Germany, Jan. 25, 1985, 3502483**
**Int. Cl.[4] B60C** *11/06*
**U.S. Cl. 152—209 R** **3 Claims**



1. A pneumatic vehicle tire having a tread strip that is provided with a tread contact surface and zig-zagged or wavelike circumferential grooves that have a prescribed depth and that essentially extend in the circumferential direction of said tire so that traction of the tread strip is improved and also a tread profile is provided capable of expelling small foreign objects; said tire having the improvement therewith which further comprises:

side faces that essentially extend radially inwardly from said tread contact surface, and that delimit said circumferential grooves, with each of the latter having a base and side faces on each side of said base; the side faces on a given side of a given one of sid circumferential grooves alternately extend in a fist and a second direction relative to the circumferential direction of said tire, with adjacent ones of said side faces abutting along lines that alternately project into and away from the associated groove; notches are provided in said side faces in the region of those abutment lines that project into said grooves; each of said notches having a cutout depth in a range of approximately 70 to 90% of the depth of said circumferential grooves so that a corner step results therewith serving to form wear indicators of increased degree of wear in optical pattern of tread profile alteration and having a base that is deposed essentially as far radially inwardly of said tread contact surface as is said base of the associated groove; each of said notches is delimited by side faces that essentially extend radially inwardly from said tread contact surface and extend to said corner step of that notch to form a relatively large open space of the notches in the tread surface in such a way that foreign objects, especially small stones, can be ejected and expelled after entering the grooves; the side faces of a given one of said notches abut one another in a V-shaped manner along a line disposed in a plane of symmetry for those side faces, with said plane extending transverse to the circumferential direction of said tire and said corner step is located circumferential by in each of the notches that abut one another in the V-shaped manner, the width of the open space of a given one of said notches where its side faces abut side faces of the associated groove being approximately 0.6 to 1 times the circumferential length of an adjacent one of said side faces of said groove, with said measurements being taken in the circumferential direction of said tire in the newly maufactured state of the latter.

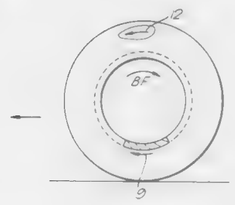
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**4,747,436**

## TIRE WITH IMPROVED BEAD REGION

**Arthur R. Williams, Solihull, England, assignor to SP Tires UK Limited, Birmingham, England**

**Filed Feb. 28, 1986, Ser. No. 834,353**
**Claims priority, application United Kingdom, Mar. 2, 1985, 8505424**
**Int. Cl.[4] B60C** *15/06, 11/04, 13/02*
**U.S. Cl. 152—209 R** **9 Claims**



1. A tire to be mounted onto a wheel of a vehicle during use, said tire comprising:

a pair of axially spaced-apart bead regions each reinforced by an annular bead hoop with a carcass reinforcing ply wrapped around one edge of said annular bead hoop;

a pair of filler strips one of each filler strips disposed within an axially outer portion of each said bead region, each of said filler strips extending circumferentially around each bead region, and positioned axially outwardly relative to said annular bead hoop;

each of said filler strips comprising a substantially weftless tire cord fabric having cords, said cords are positioned at an acute angle with respect to a circumferential centerline of said annular bead hoop in a circumferential direction of greatest torque force to be applied to the tire from the wheel;

each filler strip in each bead region having its cords oriented at substantially the same angle with respect to a predetermined tire circumferential direction so that said cords of one filler strip in one bead region are substantially parallel to said cords of the other filler strip in the other bead region; and

direction indicating means for enabling mounting of said tire on the wheel of a vehicle so that said cords are positioned at an acute angle with respect to the direction of greatest torque force to be applied to the tire from the wheel.

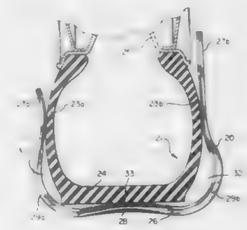
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**4,747,437**

## RESILIENT TRACTION DEVICE FOR PNEUMATIC TIRES

**James T. Magee, 17701 West Winnebago, Grayslake, Ill. 60073**

**Filed Aug. 25, 1986, Ser. No. 900,284**
**Int. Cl.[4] B60C** *27/02*
**U.S. Cl. 152—225 C** **9 Claims**



1. A resilient, unitary traction device for transverse mounting on a pneumatic tire connected to a tire rim and having a tire tread portion and a pair of sidewalls, said traction device comprising

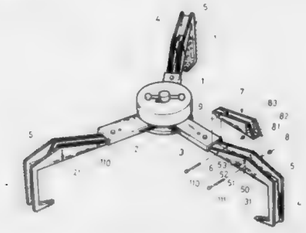
a base portion for placement adjacent to the tread section said base portion extends axially outwardly beyond said tread section for providing a larger surface area for traction on the ground and to act as a lever arm, said base portion having an upwardly curving segment which is bendable and is adapted to bear against the surface of said tire tread; and

a pair of side arms extending generally vertically from said base portion, said side arms not conforming to the identical shape of the sidewalls, and each of said side arms having a convex bottom section, said convex bottom section not being in contact with either sidewall, and each of said side arms having an inwardly converging top section for engaging a sidewall of said pneumatic tire, said base portion, said upwardly curving segment, said convex bottom sections and the inwardly converging top sections interact when the traction device is interposed between the pneumatic tire and the ground so that said upwardly curving segment is pressed downwardly towards the ground causing said convex bottom sections connected to said base portion to rotate connected said inwardly converging top sections further towards the sidewalls of the tire for better and additional gripping action while maintaining the device free of any interaction with the tire rim.

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**4,747,438**
**STRUCTURE OF AUTOMOBILE TIRE FRICTION-INCREASING AUXILIARY DEVICE**
**Lai Fu Joung, 414, Hsin I Rd., Sec. 4, Taipei, Taiwan**
**Filed Sep. 18, 1986, Ser. No. 908,677**
**Int. Cl.⁴ B60C** *27/20*
**U.S. Cl. 152—228** **1 Claim**

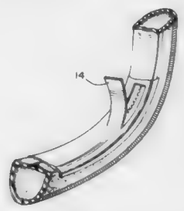


1. An improved automobile tire auxiliary device comprising a recess in the center of an outer edge surface of a claw plate, toothed faces being formed on the outer edge surface on the two sides of said recess, a lug being pivotably fastened at one end thereof in said recess in the claw plate, said lug having rows of adjustment holes provided in side surfaces thereof, rows of adjustment holes being formed in the surface of said claw plate on the two sides of said recess, said adjustment holes in said claw plate and said lug being adapted for receiving a pin therethrough for engaging said lug in a selected position with respect to the claw plate to form an integral body therewith for adjusting the lug up and down between plural outwardly extended positions and an inwardly concealed position in said recess

wherein when said auxiliary device is mounted on the tire the friction between the tire and ground is selectively increased by outwardly extending said lug installed in said recess in the outer edge of said claw plate.

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**4,747,439**
**SEAMED TUBULAR TIRES FOR CYCLES**
**Cesare Carrera, Milan, Italy, assignor to Pneumatici Clement S.p.A., Italy**
**Filed Apr. 18, 1986, Ser. No. 853,611**
**Claims priority, application Italy, Apr. 30, 1985, 20546 A/85**
**Int. Cl.⁴ B60C** *05/08*
**U.S. Cl. 152—512** **8 Claims**



1. A tubular tire for a bicycle having a radial inner periphery with a profile adapted to fit a corresponding profile of a wheel rim comprising

a carcass formed of at least one rubberized fabric strip; said rubberized fabric strip having two opposite lateral edges joined together to form a torodial body with seaming means securing said edges of the strip together around the inner periphery of said toroidal body;

an inner tube enclosed within said toroidal body;

a rubberized fabric band having an axial width sufficient to cover at least the width of the radial inner surface of said toroidal body with said inner surface facing the wheel rim and said band being bonded to said toroidal body with said band extending around the entire inner periphery of said toroidal body so as to cover the means securing the strip together;

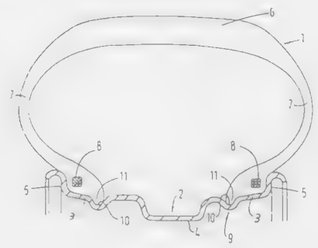
the pair of longitudinal ends of said band being circumferentially joined to each other by means of overlapping said ends;

at least two circumferentially extending fracture lines on said band, said fracture lines being positioned axially so as to be spaced from said means securing the strip together;

a non-bonded zone disposed along the axial width of the radial inner-most of the overlapping pair of ends of the band on said band so as to permit access to the band to tear it off the toroidal body along said fracture lines.

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**4,747,440**
**PNEUMATIC TIRE AND WHEEL RIM ASSEMBLIES**
**Thomas Holmes, and William S. Udall, both of Birmingham, England, assignors to Dunlop Limited a British Company, United Kingdom**
**Filed Apr. 21, 1983, Ser. No. 487,134**
**Claims priority, application United Kingdom, Apr. 21, 1982, 8211579**
**Int. Cl.⁴ B60C** *17/00, 15/024, 15/04*
**U.S. Cl. 152—516** **13 Claims**

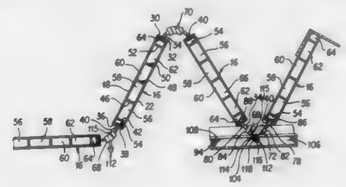


1. A pneumatic tire and one-piece wheel rim assembly comprising a tire having a tread portion connected at each edge to a respective one of a pair of sidewalls each terminating at its radially inner edge in an annular tire bead, at least one of the tire beads having an extended toe and a single bead reinforcing hoop internal of each of said beads, said bead reinforcing hoop having substantial resistance to deformation in the axial direction with an axial rigidity factor "k" greater than 8.5 $N.m^2$, but which is sufficiently deformable in the radial direction to allow the fitting of the tire to the one piece rim, said one piece wheel rim having a pair of axially spaced bead seats on each of which a respective one of said tire beads is seated, each bead seat being tapered in an axially and radially outwards direction with respect to the rotational axis of said rim and terminating at its axially outer edge in a respective tire bead retaining flange and bead retention means, comprising a circumferentially extending groove in which the extended toe portion of the at least one bead is received such that under the action of road generated forces rotation of said tire bead about said retention means is effected while in engagement therewith to retain said tire bead at the bead seat.

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**4,747,441**
**FOLDABLE COVER ASSEMBLY**
**Donald G. Apolzer, 206-286 Green Ave. West, and Charles H. Richards, 1415 Balfour St., both of Penticton, Canada**
**Filed Jun. 25, 1986, Ser. No. 878,719**
**Int. Cl.⁴ E06B** *3/94*
**U.S. Cl. 160—84.1** **17 Claims**

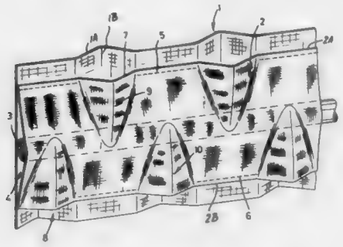
1. A foldable cover assembly comprising: a frame including a pair of parallel guide channel members; a foldable cover on the guide channel members including interconnected, alternating rigid slat members and flexible hinge members , the slat members each having a longitudinal slot extending along each end thereof, each said slot communicating with a more extensive interior cavity, the hinge members each being flexible and resilient and having a centre portion, a relatively thin flange portion extending longitudinally along each end of the centre portion, and an enlarged, elongated portion extending along an outer end of each said flange portion, the flange portions and enlarged portions being shaped so the flange portions can extend through the slots of the slat members while the enlarged portions are retained in the cavities of the slat members; connecting means for connecting every second hinge member to



each said guide channel member in a manner to permit sliding along the guide channel members and to prevent lifting of said every second hinge member away from the guide channel members so the slat members and the hinge members are flat against the guide channel members and the cover extends along the lengths of the guide channel members when the cover is unfolded, and the slat members are stacked adjacent each other in a vertical position near one end of the guide channel members and the hinge members form curved loops interconnecting adjacent slat members when the cover is folded.

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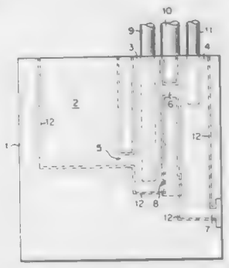
**4,747,442**
**CURTAIN**
**Heinz Bade, Greven, Fed. Rep. of Germany, assignor to Cordes Gesellschaft mit beschränkter Haftung & Co., Greven, Fed. Rep. of Germany**
**Filed Aug. 28, 1986, Ser. No. 901,758**
**Claims priority, application United Kingdom, May 29, 1986, 8613016**
**Int. Cl.⁴ A47H** *13/14*
**U.S. Cl. 160—348** **12 Claims**



1. A foldable article, particularly a curtain, comprising a flexible panel having a first side and a second side; and an elongated flexible strip-shaped member adjacent one side of said panel, said member having first and second marginal portions, said first marginal portion including first sections secured to said panel and second sections unattached to said panel wherein each of said first sections are contingent with each of said second sections to thereby define pockets, said second marginal portion including first sections secured to said panel and second sections unattached to said panel wherein each of said first sections are contingent with each of said second sections to thereby define pockets, and wherein the first sections of said first marginal portion are aligned with the second sections of said second marginal portion as considered in said strip-shaped member.

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**4,747,443**
**CASTING PROCESS**
**Robert Wilson, Dundee, Scotland, assignor to University of Strathclyde, Glasgow, Scotland**
**PCT No. PCT/GB85/00157, § 371 Date Dec. 30, 1985, § 102(e) Date Dec. 30, 1985, PCT Pub. No. WO85/04705, PCT Pub. Date Oct. 24, 1985**
**PCT Filed Apr. 11, 1985, Ser. No. 810,368**
**Claims priority, application United Kingdom, Apr. 11, 1984, 8409307**
**Int. Cl.⁴ B22D** *27/00*
**U.S. Cl. 164—58.1** **3 Claims**



1. A method of casting metal or the like comprising melting metal in a primary chamber, controllably feeding the molten metal from said primary chamber to two or more secondary chambers by passing said molten metal sequentially through first and second passage means, said first passage means connecting said primary chamber with a first secondary chamber and said second passage means connecting said first secondary chamber and a second secondary chamber, said second passage means being disposed above said first passage means, and supplying additive material to the melt in one of said secondary chambers.

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**4,747,444**
**AUTOMATED CASTING PLANT AND METHOD OF CASTING**
**John W. Wasem, Hazel Crest; Donald E. Meves, Olympia Fields, both of Ill., and Robert F. Kenzler, Milwaukee, Wis., assignors to Amsted Industries Incorporated, Chicago, Ill.**
**Filed May 2, 1985, Ser. No. 729,947**
**Int. Cl.⁴ B22D** *46/00, 47/02*
**U.S. Cl. 164—457** **6 Claims**

1. A foundry comprising a mold storage area containing a plurality of molds of each of several cavity sizes, a pouring area, means for selectively retrieving molds from said storage area, means for pouring molten metal into said molds at said pouring area, a plurality of moving cooling conveyor lines each having separate preselected cooling times and means for delivering poured molds to respective cooling conveyor lines in a preselected sequence whereby molds of the same size mold cavities will be moved through the same cooling conveyor line.

3. A method of casting a plurality of molds available from a supply of pre-assembled molds of different cavity sizes comprising preparing a heat of molten metal having a known quantity of such metal, then preselecting a plurality of such molds having a total metal containing capacity equal to said quantity and then pouring said heat until all of said molds have been poured.

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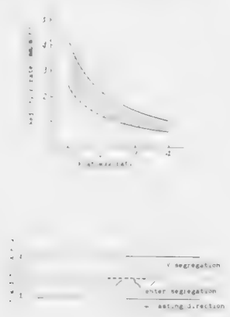


4,747,445

## CONTINUOUS CASTING METHOD

Shigeaki Ogibayashi, Kimitsu, and Kenichi Miyazawa, Kawasaki, both of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Sep. 4, 1987, Ser. No. 93,000
Claims priority, application Japan, Sep. 4, 1986, 61-206749
Int. Cl.[4] B22D *11/00*
U.S. Cl. 164—476 9 Claims



1. A method of continuously casting molten metal, which comprises continuously drawing a strand wherein that a thickness of said strand is continuously reduced at a reduction rate in a region between a point of time when a center of said strand has a temperature corresponding to a solid-phase ratio of 0.1 to 0.3 and a point of time when said temperature has dropped to a level corresponding to a solid-phase ratio at a limit of fluidization, provided that said reduction rate satisifes the following equation (1):

$$0.6\xi \leqq x \leqq 1.1\xi \quad (1)$$

where
$\xi = 4/r$, $1 \leqq r \leqq 4$,
r is a flatness ratio of the strand,
x is a reduction rate (mm/min).

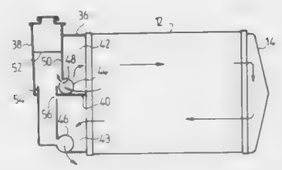
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4,747,446

## WATER BOX AND EXPANSION CHAMBER DEVICE FOR A HEAT EXCHANGER

Roberto Polidori, and Marco Broglio, both of Santena, Italy, assignors to Valeo, Paris, France

Filed Oct. 15, 1986, Ser. No. 919,030
Claims priority, application France, Oct. 15, 1985, 85 15275
Int. Cl.[4] F28D *13/00*
U.S. Cl. 165—104.32 7 Claims



1. A water box and expansion chamber device for a heat exchanger, such as a radiator in a cooling circuit for an internal combustion engine, in which the water box and the expansion chamber constitute a one-piece molded assembly, with the water box being disposed in a generally vertical position and including an internal partition dividing it into a top compartment and a bottom compartment, the top compartment having a liquid inlet fitting opening out therein and the bottom compartment having a liquid outlet fitting opening out therein, said liquid inlet and outlet fittings being integrally molded with the water box, the water box and expansion chamber device including the improvement whereby the liquid inlet fitting is substantially adjacent to said internal partition in the water box and also to the expansion chamber, and a liquid degassing passage integrally formed through a wall separating the water box and the expansion chamber and opening directly into the liquid inlet fitting and also into the expansion chamber below the level of the liquid normally contained therein.

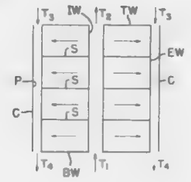
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4,747,447

## HEAT EXCHANGER

Harry J. Scanlan, 3 Cedar Pl., Garden City, N.Y. 11530, and Leif Liljegren, 550 Ramapo Valley Rd., Oakland, N.J. 07436, assignors to Leif Liljegren, Oakland, N.J. and Harry J. Scanlan, Garden City, N.Y., a part interest

Continuation-in-part of Ser. No. 339,858, Jan. 18, 1982, Pat. No. 4,521,674. This application Mar. 17, 1983, Ser. No. 476,370
Int. Cl.[4] F28D *15/00*
U.S. Cl. 165—104.34 7 Claims




1. A heat exchanger comprising a closed tubular vessel having thermally conducting peripheral walls and thermally conducting internal walls, helium gas within the vessel at a pressure of not less than about 200 kPa absolute, means for supplying heat to the vessel internal walls, whereby the internal walls transfer heat to the helium gas in at least one region thereof remote from the vessel peripheral walls, bounding walls including a wall closely spaced outwardly from and surrounding the vessel peripheral walls and defining with the vessel peripheral walls a chamber adapted to receive a dischargeable fluid to be heated, at least one inlet to the chamber adapted to admit said fluid into the chamber, and at least one outlet from the chamber spaced apart from the inlet and adapted to discharge said fluid from the chamber to establish a fluid flow therethrough, the inlet and outlet being located such that fluid flows through the chamber along a path that is continuously closely adjacent the vessel peripheral walls, whereby the helium gas transfers heat to the vessel peripheral walls which in turn transfer heat to the fluid flowing through the chamber.

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4,747,448

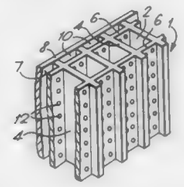
## HEAT EXCHANGERS

Carlo Beduz, and Ralph G. Scurlock, both of Southampton, England, assignors to The BOC Group, PLC, Windlesham, England

Continuation-in-part of Ser. No. 660,665, Oct. 15, 1984, abandoned. This application May 6, 1986, Ser. No. 861,668
Claims priority, application United Kingdom, Nov. 1, 1983, 8329155
Int. Cl.[4] F28F *13/00*; F25B *39/02*
U.S. Cl. 165—133 3 Claims

1. A heat exchanger comprising a core part having a hollow section defining a main flow passage for a fluid to be evaporated, the core part including a surface which together with an auxiliary surface spaced between about 50 and 3000 μm therefrom, defines a narrow channel coextensive in width with said main flow passage, at least one of said surfaces being heated and the cross-section of said narrow channel having a width to height ration of at least 10 to 1 so that, bubbles are generated from a microlayer of liquid on the heated surface and are pressed and flattened by the other surface against the heated surface; and said non-heated surface having at least one opening from the channel into the main flow passage which permits the escape of bubbles from the channel into the main flow passage to join the fluid flowing therein.





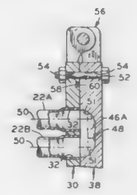
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4,747,449

## HEAT EXCHANGER FOR LIQUIDS

Shelby W. Nickell, Constantine, Mich., assignor to E. L. Nickell Co., Inc., Constantine, Mich.

Filed Jul. 25, 1986, Ser. No. 891,004
Int. Cl.[4] F28F *19/00, 9/02*
U.S. Cl. 165—134.1 3 Claims



1. A heat exchanger useful for cooling a liquid food product, said heat exchanger comprising:
an elongate shell having opposite ends and a hollow interior through which a refrigerant can be circulated;
a plurality of hollow tubes having open ends and being housed within the interior of said shell and extending in generally parallel spaced relation to one another between the opposite ends thereof for carrying the liquid food product;
a pair of electropolished tube sheets attached to the respective opposite ends of said shell, said tube sheets having respective pluralities of openings defined therethrough and supporting said hollow tubes at opposite ends thereof in communication with said openings; and
a pair of electropoilished end bonnets releasably attached to said respective tube sheets, said end bonnets having responsive pluralities of flow return pockets defined therein which communicate respective pairs of said openings and the tubes supported therein with one another independently of and separately from others of said openings and tubes;
substantially 180° of the inner periphery of each of said tube open ends mating with and being in alignment in the direction of fluid flow with respective portions of the inner periphery of a respective flow return cavity on the flat end surface of said end bonnets, whereby laminar flow of said liquid food product is promoted at the junction between said tube open ends and said flow return cavities;
said tube sheets and end bonnets having flat end surfaces which face one another and make substantially liquid tight mating contact with one another between respective tube sheet and end bonnet pairs at said opposite ends of said shell and about individual pairs of said openings and the respective pockets defined in the respective tube sheet and end bonnet;
each of said pockets being elongate and having a longitudinal axis, said longitudinal axis of each pocket extending generally parallel to said end surface of the respective end bonnet, said openings in each pair thereof communicating with one another via one of said pockets and having respective central axes which extend generally perpendicular to said longitudinal axis of said one pocket;
said each pocket also having rounded corners at opposite ends of said elongated pockets along said longitudinal axis, whereby laminar flow of said liquid food product is promoted at each corner of said each pocket;
each of said pockets having a cross-sectional flow area substantially the same as that of each of said tubes communicating with one another by the respective said pocket.

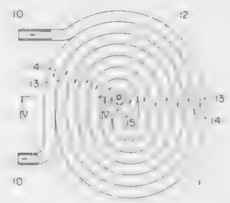
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4,747,450

## METHOD FOR PRODUCING HEAT SINK AND HEAT SINK THUS PRODUCED

Hiroo Ikegame, Tokyo; Shigeo Nonaka; Takuro Ito, both of Yokohama, and Toshiaki Matsumoto, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 18, 1986, Ser. No. 908,773
Claims priority, application Japan, Sep. 18, 1985, 60-204428
Int. Cl.[4] F28F *3/12*
U.S. Cl. 165—168 16 Claims



8. A heat sink for cooling an object, said heat sink comprising: a prefabricated pipe of a heat conductive material in which a liquid coolant for cooling the object is caused to flow, said pipe including, in integrally continuing relation, a forward flow pipe portion, a return flow pipe portion and a middle pipe portion connecting said forward and return flow pipe portions, said middle pipe portion being bent in such a manner that the forward and return flow pipe portions extend in parallel, mutually contacting relationship, said forward and return flow pipe portions being so wound around the middle pipe portion so as to form spirals thereby establishing a heat transferring relationship between adjoining surfaces of the forward and return flow pipe portions.

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4,747,451

## LEVEL SENSOR

Harold P. Adams, Jr.; David R. Hill, both of Oil City; Lee M. Richey, Franklin; Andrew B. Maitland, Cranberry, all of Pa.; William E. Banton, Derry, N.H., and David C. Taylor, Slippery Rock, Pa., assignors to Oil Well Automation, Inc., Oil City, Pa.

Filed Aug. 6, 1987, Ser. No. 82,840
Int. Cl.[4] E21B *43/00, 47/04*; F04B *49/06*
U.S. Cl. 166—53 17 Claims

1. A system for controlling production in an oil well having a casing at electrical ground potential, tubing within the casing, means for activating a pump at the lower end of the tubing comprising:
means for electrically isolating the tubing from ground potential so that the casing and tubing form a coaxial electrical conduit,
first level sensing means mounted upon the outer surface of

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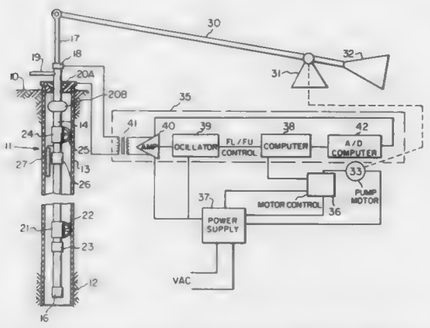


the tubing near the lower end of the tubing and means for establishing an electrical ground to the adjacent casing,

means for tuning the first level sensing means to a first electrical signal frequency such that when an electrical signal of the first frequency is transmitted down the oil well the first sensing means will be powered thereby and establish a preselected impedance between the casing and tubing according to whether liquid is detected at the sensing means,

second level sensing means mounted upon the outer surface of the tubing above the first level sensing means and means for establishing an electrical ground to the adjacent casing,

means for tuning the second level sensing means to a second electrical signal frequency such that when an electrical




signal of the second frequency is tramsmitted down the oil well the second sensing means will be powered thereby and establish an impedance between the casing and the tubing according to whether liquid is detected at the sensing means, and

control means for at spaced intervals transmitting the electrical signals of first and second frequencies down the oil well and sensing the liquid level by detecting the impedance of the conduit and the sensing means corresponding to the frequency being transmitted, and when the first sensing means indicated no liquid at the lower end of the tubing, turning off the means for activating the pump and when the second sensing means indicated liquid at the upper end of the tubing, turning on the means for activating the pump.

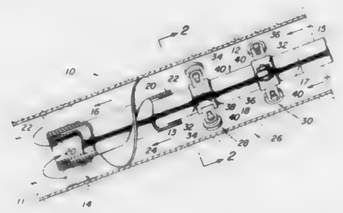
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**4,747,452**

**WELLBORE CLEANING DEVICE**

**David A. Clark, Ponca City, Okla., assignor to Conoco Inc., Ponca City, Okla.**

**Filed Sep. 30, 1986, Ser. No. 913,782**
**Int. Cl.⁴ E21B** *37/00*
**U.S. Cl. 166—311** **20 Claims**



1. A method of dislodging and removing cuttings which have settled out of a mud stream and become caked on a lower portion of a wellbore when drilling a highly-angulated wellbore, said method comprising:

inserting a scouring brush into said wellbore on a leading end of a drill string, said drill string having substantial weight per unit length;

advancing said scouring brush through a portion of the highly-angulated wellbore to be cleaned;

rotating said brush during advancement to enhance dislodgement of said caked cuttings, and the like, from said lower portion of said wellbore;

supporting said rotating brush in a position that is generally centered within the wellbore so as not to permit the weight of said drill string to ride on said brush;

reverse-circulating drilling fluid in said highly-angulated wellbore in order to entrain said recently dislodged cuttings and carry them upwardly out of said wellbore through said drill string before they have a chnace to once again settle out of the mud stream;

said rotating of said brush being performed, at least in part, using said reverse circulating fluid to produce a hydraulic pressure for rotationally driving said brush.

2. Apparatus for cleaning out a portion of an internal surface of a highly-angulated wellbore prior to running a string of casing in order to dislodge cuttings which have gravitationally settled out of a mud stream and become caked on a lower portion of said wellbore, said apparatus comprising:

a scouring brush means affixed to a leading end of a drill string, said drill string having substantial weight per unit length;

means for advancing said scouring brush means through a portion of the highly-angulated wellbore to be cleaned;

a helical driving surface affixed to said scouring brush means for rotating said scouring brush means during advancement to enhance dislodgement of said caked cuttings, and the like, from said lower portion of said wellbore;

means for supporting said brush means in a position that is generally centered within the wellbore so as not to permit the weight of said drill string to ride on said brush;

means to reverse circulate drilling fluid in said highly-angulated wellbore to entrain said recently dislodged cuttings and carry them upwardly out of said wellbore through said drill string.

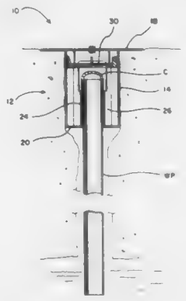
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**4,747,453**

**SECURITY COVER AND HOUSING FOR A WELL**

**Oscar Howard, Sr., Rte. 9, Box 247, Kinston, N.C. 28501**

**Filed Mar. 6, 1987, Ser. No. 22,770**
**Int. Cl.⁴ B65D** *55/14;* **E02D** *29/10;* **D21B** *33/037*
**U.S. Cl. 166—379** **15 Claims**



1. A surface security housing for securing a well of the type having an elongated vertical ground opening and a well pipe extending vertically therethrough, said well security housing comprising:

(a) a main outer structure having a surrounding wall and an opening extending completely therethrough and an outwardly projecting flange extending from the top of the main outer structure for engaging the surface of the surrounding ground opening so as to support the entire main outer structure in an inserted position within that ground opening;

(b) the well pipe aligning insert, separate and independent of the main outer structure, and adapted to be held and supported within the opening of said main outer structure, said insert including an opening for receiving the well pipe and for maintaining the well pipe in a generally centrally disposed position within the main outer structure;

(c) means for supporting said pipe aligning insert within the opening of said outer structure;

(d) detachable locking plate means for extending horizontally across the opening of said outer structure at an intermediate height level therein but at a height at least above the position normally occupied by the pipe aligning insert for securing and preventing access to the well pipe and the open ground area surrounding the same; and

(e) a detachable top plate for extending over the top of said security housing and for enclosing the top of the opening extending through the outer main structure.

15. A method of securing a well pipe within the ground comprising the steps of: forming a ground opening which includes an upper surrounding surface area; inserting an outer housing structure with a central opening extending therethrough into the formed ground opening; supporting the housing structure within the upper portion of the ground opening by projecting a flange structure from the housing structure outwardly therefrom to where the same engages the upper surrounding surface area extending around the formed ground opening; inserting a well pipe retainer within the central opening of the housing structure and retaining the well pipe retainer within the central opening of the housing structure; inserting a well pipe downwardly through the central opening of the housing structure and through an opening formed within the well pipe retainer and supporting the well pipe by engaging the same; spacing the well pipe within the ground opening and with respect to the housing structure such that the same is generally centrally spaced therein; pouring filler material between the housing structure and the well pipe retainer so as to generally fill the ground opening surrounding the well pipe; securing and preventing access to the well pipe and the open ground area surrounding the same by extending a detachable locking plate across the opening of the outer housing at an intermediate height level therein but at a height at least above the position normally occupied by the well pipe retainer; detachably securing the locking plate to the well pipe retainer; and closing the top of said main housing structure such that the same is closed and lies flush with the ground such that vehicles and the like can engage and travel thereover.

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**4,747,454**

**EXTERNAL AXIS PARALLEL ALIGNMENT SYSTEM**

**J. Philip Perryman, 6508 S. Villa, Oklahoma City, Okla. 73159**

**Filed May 12, 1986, Ser. No. 862,148**
**Int. Cl.⁴ E21B** *19/16;* **G01B** *11/26*
**U.S. Cl. 166—380** **33 Claims**



1. An apparatus for vertically aligning a second conduit with a substantially vertically disposed first conduit wherein at least a portion of the first conduit is disposed within a borehole such that a lower end of the second conduit can be connected to an upper end of the first conduit at a work floor of a rig, said apparatus comprising:

signal generating means for producing a signal representative of a vertical plumb line reference when the second conduit is substantially vertically disposed;

first support means for supporting the signal generating means, said first support means connectable to the second conduit in close proximity to an upper end thereof;

first connector means for connecting the first support means to the second conduit;

target means for receiving the signal representative of the vertical plumb line reference from the signal generating means and for indicating the vertical alignment of the second conduit with the first conduit when the lower end of the second conduit is substantially abutted with the upper end of the first conduit;

second support means for supporting said target means, said second support means connectable to the first conduit in close proximity to the upper end thereof, or in the alternative to the second conduit in close proximity to the lower end thereof, so as to be alignable with the first support bracket when the first and second conduits are vertically aligned; and

second connector means for connecting the second support means to one of the first and second conduits.

29. A method for aligning a second conduit with a first conduit wherein the first conduit is substantially vertically positioned in a bore hole such that an upper end of the first conduit extends upwardly from the bore hole, said second conduit characterized as having an upper end and a lower end, the method comprising the steps of:

connecting a signal generating unit to the second conduit so as to be disposed in close proximity to the upper end thereof, said signal generating means adapted to produce a signal in the direction of the lower end of the second conduit representative of a vertical plumb line reference of the second conduit when the second conduit is substantially vertically disposed;

hoisting the second conduit via the upper end thereof and positioning the second conduit above the first conduit such that the second conduit is substantially vertically disposed and the lower end of the second conduit substantially abuts the upper end of the first conduit;

connecting a target element to the first conduit in close proximity to the upper end thereof, or the alternative to the second conduit in close proximity to the lower end thereof, such that the target element is alignable with the signal generating unit when the second conduit is vertically disposed;

activating the signal generating unit to produce the signal representative of the vertical plumb line reference of the second conduit;

adjusting the position of the second conduit in response to the location of the signal from the signal generating unit on the target element; and

connecting the first and second conduits via their respective upper and lower end so as to provide a continuous segment of a pipe string having a substantially vertically disposed common central axis.

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**4,747,455**

**HIGH IMPACT DEVICE AND METHOD**

**James D. Cunningham, Boulder, Colo., assignor to JBD Corporation, Boulder, Colo.**

**Continuation-in-part of Ser. No. 490,677, May 2, 1983, abandoned. This application Jul. 15, 1985, Ser. No. 754,637**
**Int. Cl.⁴ B25C** *1/06*
**U.S. Cl. 173—1** **21 Claims**

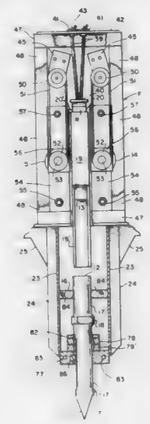
1. A method for reducing reverse shocks to rotating flywheel means of a device for producing movement of a ram

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toward a tool to produce a relatively heavy impact against said tool retained with said device after impact and wherein said ram is moved toward said tool through engagement of said ram by said rotating flywheel means, said method comprising:

causing said rotating flywheel means to engage said ram to drive said ram toward said tool;



discontinuing engagement of said flywheel means with said ram prior to said ram striking said tool; and

arresting the movement of said ram beyond a predetermined position of movement of said tool when the resistance to movement of said tool is less than a predetermined amount.

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**4,747,456**

**LOAD CELL AND TEMPERATURE CORRECTION OF THE SAME**

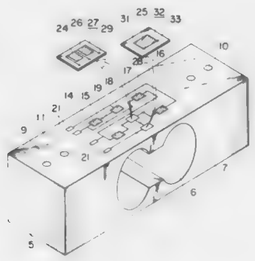
**Tohru Kitagawa, and Takaharu Yamashita, both of Shizuoka, Japan, assignors to Tokyo Electric Co., Ltd., Tokyo, Japan**

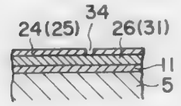
**Filed Mar. 30, 1987, Ser. No. 31,670**

**Claims priority, application Japan, Mar. 28, 1986, 61-70196**

**Int. Cl.⁴ G01G *3/14*; G01B *7/16*; G01L *1/22***

**U.S. Cl. 177—211** **8 Claims**






1. A load cell, comprising:

a beam member having a thin material deformable portion thereon;

an insulator film formed directly on a surface of said beam member;

a bridge circuit formed on said insulator film and including thin film strain gauges and a zero point balance correcting resistor wherein said thin film strain gauges are formed on said film over said thin material deformable portion of said beam;

leads of thin film conductors for connection of said bridge circuit;

a span resistor member including a first substrate applied to said insulator film away from said thin material deformable portion of said beam member and a span temperature correcting thin film resistor formed on said substrate and connected to said bridge circuit, said span temperature correcting thin film resistor having a temperature coefficient; and

a zero point resistor member including a second substrate applied to said insulator film away from said thin material deformable portion of said beam member and a zero point balance temperature correcting thin film resistor formed on said substrate and connected to said bridge circuit, said zero point balance temperature correcting thin film resistor having a temperature coefficient.

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**4,747,457**

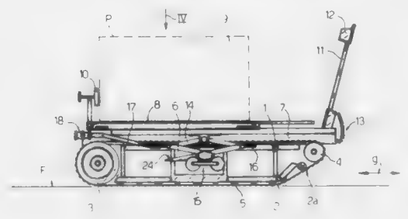
**PLATFORM TRUCK FOR TRANSPORTING BULKY LOADS**

**Gianfranco Buscaiolo, and Mario Buscaiolo, both of Villanova Monferrato, Italy, assignors to FRAMAB S.n.c., Villanova Monferrato, Italy**

**Filed Nov. 26, 1986, Ser. No. 935,507**

**Int. Cl.⁴ B62D *51/04*, *51/00***

**U.S. Cl. 180—19.1** **6 Claims**



1. A truck comprising a frame, a load supporting upper platform connected in a movable manner to said frame, first drive means carried by said frame to move said platform relative to said frame, and first and second means of advancement connected to said frame to advance said frame along a predetermined path; said first means of advancement comprising a pair of lateral crawler tracks and second drive means carried by said frame to move said tracks independently of one another, said second drive means being reversible; and said second advancement means connected substantially at the center of the longitudinal axis of said frame comprising a trolley assembly connected to said frame in a movable manner; third drive means being provided to move said trolley assembly in relation to said frame between an upper rest position above a run of said tracks, and a lower operative position below said lower run whereby said frame and load are completely supported by said trolley assembly.



**4,747,458**

**PROCESS FOR THE CONTROL OF ACTIVE MOVING BODY RELATIVE TO A LOCAL PASSIVE ENVIRONMENT WITH THE AID OF LOCAL PROXIMETRIC TRANSDUCERS**

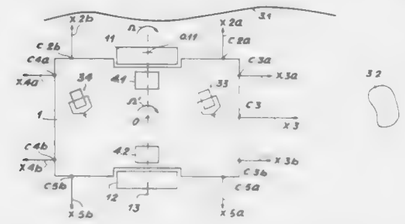
**Guy Andre, Rennes, and Bernard Espiau, Laille, both of France, assignors to Commissarist a l'Energie Atomique, Paris and Inria, Chesnay, both of, France**

**Continuation of Ser. No. 749,549, Jun. 27, 1985, abandoned. This application Nov. 24, 1986, Ser. No. 931,979**

**Claims priority, application France, Jun. 27, 1984, 84 10156**

**Int. Cl.⁴ B62D *5/04*, *1/24***

**U.S. Cl. 180—79** **8 Claims**



1. Process for control of the movements of a sensitive, active moving body, moved by at least two actuators, relative to a local, passive environment, in accordance with at least one operating mode, characterized in that it comprises, for each operating mode,

using at least two directional proximetric transducers $C_i$, having a given origin mounted at a known location on the moving body and supplying a response nearly representing the distance x separating the origin of the transducer from an obstacle in the environment, in accordance with a known detection direction with respect to the moving body;

allocating to each transducer $C_i$ a virtual elementary vectorial action $A_i$, whose modulus is defined by the relation $A_i = m_i f(x)$, $m_i$ being a coefficient constituting a virtual weighing mass of the action of said transducer and f(x) being an increasing monotonic function derived from the response of the transducer to an obstacle placed at a distance x, the application point of action $A_i$ being the origin $M_i$ of transducer $C_i$;

determining on the basis of the thus defined elementary vectorial actions $A_i$, a control screw of each actuator, the origin thereof coinciding with the origin 0 of a control frame associated with the actuators.

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**4,747,459**

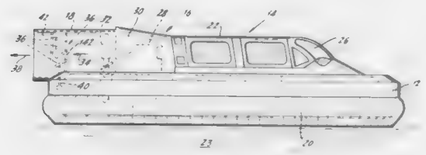
**HOVERCRAFT**

**Edison Penha, P.O. Box 477, 14075 Ribeirao Preto, Brazil**

**Filed Mar. 4, 1987, Ser. No. 21,692**

**Int. Cl.⁴ B60V *1/04***

**U.S. Cl. 180—120** **7 Claims**



1. A hovercraft, comprising:

a rigid body; a flexible skirt depending from a lower periphery of said rigid body;

a main engine and propeller for generating a main propeller thrust;

at least one thrust control vane located downstream of said propeller for dividing said main propeller thrust into a horizontal thrust component directed rearwardly of said at least one thrust control vane and a vertical thrust component directed to a location under said rigid body so as to cooperate with said flexible skirt to form an air cushion on which said hovercraft rides;

an air distribution network which distributes said vertical thrust component to direct it to said location under said rigid body and distributes said vertical thrust component substantially equally along the entire periphery of said air cushion; said air distribution network includes an air chamber extending around substantially the entire periphery of said air cushion and a plurality of localized air chambers located below said air distribution chamber at respective locations along substantially the entire periphery of said air cushion;

at least one steering control vane located downstream of said at least one thrust control vane for controlling the forward direction of said hovercraft;

a single control stick; and

means responsive to said control stick for controlling both said at least one thrust control vane and said at least one steering control vane.

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**4,747,460**

**FAIL-SAFE CIRCUIT OF A FIXED SPEED TRAVELING APPARATUS**

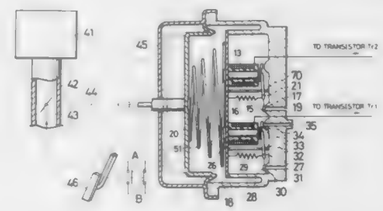
**Hideki Tomoshige; Kou Tanigawa, both of Kobe, and Shigetaka Akahori, Toyota, all of Japan, assignors to Fujitsu Ten Limited, Hyogo and Toyota Jidosha Kabushiki Kaisha, Aichi, both of, Japan**

**Filed May 22, 1986, Ser. No. 865,862**

**Claims priority, application Japan, May 24, 1985, 60-111575**

**Int. Cl.⁴ B60K *31/10***

**U.S. Cl. 180—176** **8 Claims**



1. A fail-safe circuit of a fixed speed traveling apparatus comprising:

a control valve for introducing an engine negative pressure to an actuator which controls a throttle opening degree; a release valve for introducing an atmospheric pressure to an actuator;

a control circuit for controlling the control valve and the release valve;

a means for generating a first cancel signal which makes the control circuit release a fixed speed traveling at brake ON;

a means for controlling open and close of a current passage of the release valve at brake ON; and

a means for generating a second cancel signal fed to the control circuit by detecting that the current passage of the release valve is opened.

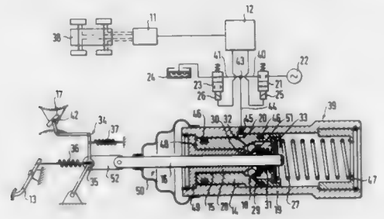
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**4,747,461**
## TRACTION SLIP CONTROL DEVICE

**Holger V. Hayn, Frankfurt/Main, and Joachim Maas, Darmstadt, both of Fed. Rep. of Germany, assignors to Alfred Teves GmbH, Frankfurt Am Main, Fed. Rep. of Germany**

**Filed May 26, 1987, Ser. No. 54,400**
**Claims priority, application Fed. Rep. of Germany, May 26, 1986, 3617631**
**Int. Cl.[4] B60T** *8/16;* **F02D** *7/00*
**U.S. Cl. 180—197** **10 Claims**



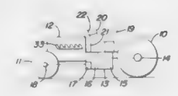
1. A traction slip control device for motor vehicles, comprising a sensor responsive to a beginning slip of a driven wheel, said sensor connected to a control circuit for operating an accelerator pedal-operated throttle valve at the vehicle engine to reduce the engine's driving power, a piston rod arranged within an axial bore in a stepped piston, said piston rod is connected to the throttle valve in parallel to the accelerator pedal, said piston rod being disconnected from said stepped piston in an inoperative position of the stepped piston and axial ball lock adapted to lock said piston rod to said stepped piston upon detection of a beginning slip, said piston rod shifts the throttle valve in a direction of throttle valve closure in opposition to a force acting upon the accelerator pedal.

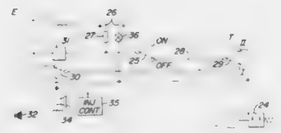
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**4,747,462**
## FOUR WHEEL DRIVE VEHICLE

**Hans Herrmann, Gondelsheim; Klaus Hauk, Altrip, and Michael Teich, Mannheim, all of Fed. Rep. of Germany, assignors to Deere and Company, Moline, Ill.**

**Continuation of Ser. No. 734,358, May 14, 1985, abandoned. This application Aug. 27, 1986, Ser. No. 902,084**
**Claims priority, application European Pat. Off., May 25, 1984, 84303567.6**
**Int. Cl.[4] B60K** *23/08*
**U.S. Cl. 180—233** **4 Claims**





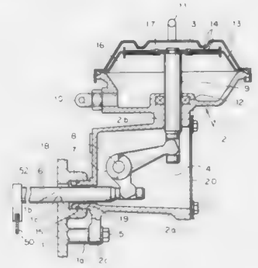
1. A four wheel drive work vehicle having drive to a main pair of wheels and selectively engageable drive to a second pair of wheels, said work vehicle comprising:
a transmission having a plurality of range gears for range selection and change-speed gears for speed selection within each range;
means within the drive train of the work vehicle for sensing an overload condition thereof; and
means for automatically engaging drive to the second pair of wheels when said overload condition is sensed, said automatic engagement means being operable only when the lowest of said plurality of range gears is selected.

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**4,747,463**
## DIAPHRAGM ACTUATOR MOUNTING ON A TRANSFER CASE

**Toshio Yoshinaka, Nagoya; Shuichiro Ida; Shuji Nagano, both of Toyota, and Hiroomi Fukaya, Takahama, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan**

**Filed Aug. 4, 1986, Ser. No. 892,379**
**Claims priority, application Japan, Aug. 30, 1985, 60-133595[U]**
**Int. Cl.[4] B60K** *17/34*
**U.S. Cl. 180—247** **12 Claims**



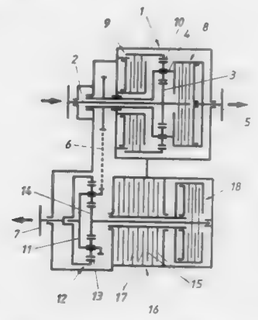
1. A transfer unit in an automobile for selectively transferring the drive power to wheels from a two wheel drive state to a four wheel drive state, and vice versa, comprising:
a transfer case including a cylindrical wall portion, said transfer case having means arranged therein to effect the transfer between the two wheel drive and the four wheel drive states and a shaft means extending through said cylindrical wall portion and having one end connected to said means to effect the transfer, the other end of said shaft means projecting outwardly from said cylindrical wall portion;
a vacuum-operated actuator having a body including a cylindrical wall portion adapted to fit in overlapping engagement with said cylindrical wall portion of said transfer case so as to define an annular space between said shaft means and an innermost one of said cylindrical wall portions, with a seal ring arranged between the cylindrical wall portions, a diaphragm mounted in said body, an actuator rod having one end connected to said diaphragm for reciprocating movement therewith, and a means for interconnecting the other end of said actuator rod and said other end of said shaft means;
means separate from said cylindrical wall portions for fastening said actuator body to said transfer case; and,
means for supplying a vacuum to move said diaphragm.



**4,747,464**
## DRIVE SYSTEM FOR MOTOR VEHICLES HAVING TWO DRIVEN AXLES

**Heribert Lanzer, Gössendorf, Austria, assignor to Steyr-Daimler-Puch AG, Vienna, Austria**

**Filed Feb. 9, 1987, Ser. No. 12,737**
**Claims priority, application Austria, Feb. 10, 1986, 315/86**
**Int. Cl.[4] B60K** *17/34*
**U.S. Cl. 180—248** **5 Claims**



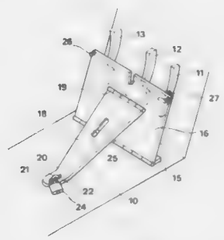
1. A drive system for a motor vehicle having a motor and first and second driven axles, comprising
a liquid friction coupling having first and second coupling halves,
a planetary gear train comprising first, second and third torque transmitting members,
means for holding said first coupling half against rotation,
means for connecting said first torque-transmitting member to said motor, and
means for connecting said second torque-transmitting member to said second coupling half,
said third torque-transmitting member being connected to said first driven axle only, and
said liquid friction coupling being operable for providing a differential drive to said first driven axle relative said second driven axle.

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**4,747,465**
## VEHICLE SECURITY DEVICE

**George Hodgson, Rough Close Cottage, 2 Tanners Ln., Berkswell, Coventry, England**

**Filed Jan. 15, 1987, Ser. No. 3,484**
**Int. Cl.[4] B60R** *25/00;* **B62H** *5/00*
**U.S. Cl. 180—287** **4 Claims**



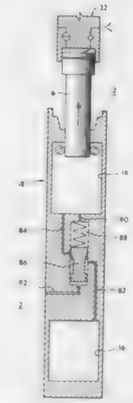
1. A vehicle securing device which comprises a covering plate fixable in a vehicle adjacent the vehicle pedals and pivotable about a first pivot axis between an operative position preventing access to and operation of the pedals and an inoperative, stowed position; a locking stay having one end and an opposite end and pivotally attached at said one end to the covering plate about a second pivot axis parallel to and spaced from the first axis, the second pivot axis being located intermediate the first pivot axis and an edge of the covering plate remote from the first pivot axis; fixing means for the locking stay whereby said opposite end of the locking stay is fixed in relation to the vehicle floor in the operative position; and releasable locking means for locking the locking stay to the fixing means, the device in the inoperative position lying with the covering plate and the locking stay extending rearwards from the pedals and on the floor of the vehicle.

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**4,747,466**
## IMPACT TOOL

**Bill L. Jaworski, 1257 S. Yank Ct., Lakewood, Colo. 80228**

**Division of Ser. No. 529,884, Sep. 6, 1983, Pat. No. 4,577,547, which is a continuation-in-part of Ser. No. 402,291, Jul. 27, 1982, abandoned. This application Mar. 11, 1986, Ser. No. 838,570**
**Int. Cl.[4] G01V** *1/04, 1/38*
**U.S. Cl. 181—120** **21 Claims**



1. A method for accelerating a mass in the environment of a surrounding liquid under high pressure such as in a wellbore, said method including the steps of:
(a) providing a chamber having at least one outlet,
(b) mounting a member in a sealing relationship in said one outlet for movement along an axis relative to said chamber,
(c) pressurizing said chamber with a gas at a pressure less than the pressure of the surrounding liquid, said member having a first portion exposed to said liquid and said member assuming a first position relative to said chamber under the force generated on the member by the high pressure of the surrounding liquid,
(d) moving said member along said axis in a first direction away from said first position,
(e) sealing said first portion of said member from exposure to the surrounding liquid,
(f) reducing the pressure on said first portion of the member to a pressure less than the high pressure of the surrounding liquid, and
(g) placing said first portion of the member in fluid communication with the surrounding, high pressure liquid to accelerate said member along said axis toward said first position in a direction opposite to said first direction.

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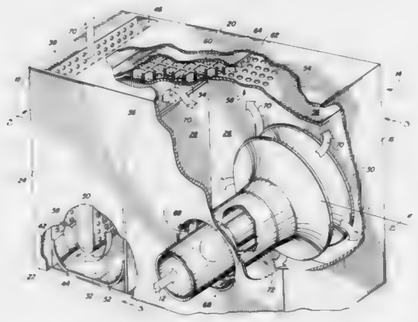


**4,747,467**

## TURBINE ENGINE NOISE SUPPRESSION APPARATUS AND METHODS

**Craig A. Lyon, Mesa; David F. Ross, and Yogendra Sheoran, both of Scottsdale, all of Ariz., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.**

**Filed Apr. 1, 1986, Ser. No. 846,771**
**Int. Cl.[4] B64F *1/26***
**U.S. Cl. 181—218** **38 Claims**



1. Compact gas turbine engine exhaust noise suppressor apparatus comprising:

(a) a chamber having an inner surface, an inlet and an outlet;

(b) baffle means within said chamber dividing said chamber into first and second subchambers communicating through a transfer passage, said second subchamber opening outwardly through said outlet;

(c) sound absorbing means positioned within said second subchamber and defining with said baffle means a serpentine flow path extending from said transfer passage to said outlet;

(d) duct means disposed within said first subchamber for receiving a flow of turbine engine exhaust gas through said inlet, diffusing the received gas, and discharging the diffused gas into said first subchamber;

(e) reactive sound attenuating means disposed within said transfer passage within said chamber and communicating with said first subchamber and said second subchamber; and

(f) resonant sound attenuating means disposed within said reactive sound attenuating means within said transfer passage within said chamber.

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**4,747,468**

## FALL ARREST DEVICE

**William E. Greenway, #3 Kilpatrick Drive, Holland Landing, Ontario, Canada (L0G 1G0)**

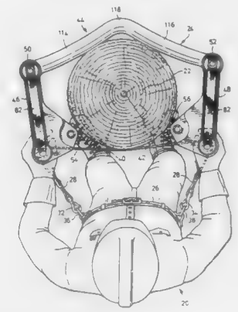
**Filed Sep. 10, 1987, Ser. No. 94,762**
**Claims priority, application Canada, Sep. 10, 1986, 517,893**
**Int. Cl.[4] A62B *35/00***
**U.S. Cl. 182—9** **11 Claims**

1. A fall arrest device for use when climbing poles using moveable foot supports, the fall arrest device being operable by the climber's hands and supporting the climber by a waist belt, the device comprising:

a yoke for engagement with a pole on the side opposite the climber, the yoke having ends and a smooth surface for contacting the pole;

a pair of arms attached pivotally to the yoke for movement, one at each of the ends and extending generally towards the climber in use, the pivotal attachments being parallel to one another on first and second axes which are generally vertical when the device is in use on the pole, the arms having handles and strap attachment means for receiving a strap to connect the climber's waist belt to the device;

rotatable engagement structures attached about respective third and fourth axes of rotation, parallel to said first and second axes, to one of each of the arms adjacent the handles, and adapted to engage the pole to limit downward sliding motion and permit movement of the device around the pole; and



said yoke and arms being proportioned for use on a pole such that when the climber leans outwardly the resultant forces exerted on the arms by the strap, through the strap attachment means, cause turning moments about said first and second axes to bring the arms inwardly towards the pole to force the engagement structures into contact with the pole.

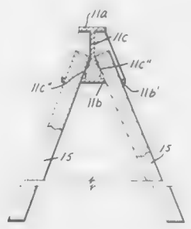
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**4,747,469**

## COLLAPSIBLE SAWHORSE ARRANGEMENT

**Theodore D. Phillips, 706 S. Kenmore Dr., Evansville, Ind. 47715**

**Filed Feb. 2, 1987, Ser. No. 9,675**
**Int. Cl.[4] B27B *21/00***
**U.S. Cl. 182—185** **4 Claims**




1. A collapsible sawhorse arrangement comprising a generally horizontal work receiving member having a first plate portion and a second plate portion at a normal relationship therewith and extending from either side thereof, pairs of openings disposed in said second plate member along said work receiving member, and supporting legs for said work receiving member extending through said openings and bearing against opposite walls of said first plate portion, where said opposite walls of said first plate portion include enlargements in frictional engagement with said supporting legs.

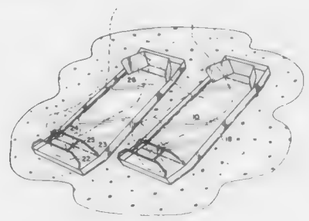


**4,747,470**

## CONCRETE FINISHERS' KNEE SKIS

**Antonio O. Fernandez, 4334 Cortez Ct., Union City, Calif. 94587**

**Filed Jun. 12, 1987, Ser. No. 60,834**
**Int. Cl.[4] A47C *7/50, 16/04***
**U.S. Cl. 182—230** **5 Claims**



1. Float apparatus for supporting cement finishers, said apparatus comprising:

an elongated rectangular body having a top surface, a smooth bottom surface, and upturned first and second end sections;

side walls on said body, the intersection of said side walls and said bottom surface having a radius of curvature of at least three-eights of an inch, and

a stirrup cage attached to the upturned second end of said body, said cage comprising longitudinally spaced first and second inverted U-shaped frames laterally attached to the top surface of said body and having interconnecting cross members to form a first opening substantially parallel with and spaced from said top surface for receiving a shoe toe of a cement finisher kneeling on said rectangular body and a second opening substantially perpendicular to said top surface and through one said inverted U-shaped frames to form a second opening for receiving the shoe toe of the cement finisher standing on said rectangular body.

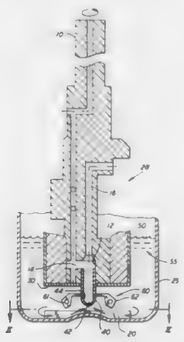
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**4,747,471**

## COMPRESSOR LUBRICATION SYSTEM

**Paul H. Ballentine, Cazenovia, and Max P. Waser, Syracuse, both of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.**

**Filed Jul. 2, 1986, Ser. No. 881,429**
**Int. Cl.[4] F04B *39/02***
**U.S. Cl. 184—6.18** **4 Claims**



1. An oil lubrication and noise suppression system for a refrigerant compressor comprising;

an oil sump;

a crankshaft rotatable about an axis and defining a centrifugal oil pump;

an oil pickup tube extending into said oil sump and secured to said crankshaft coaxial with said axis and rotatable with said crankshaft about said axis as a unit;

an impeller axially mounted on said pickup tube within said oil sump whereby upon rotation of said crankshaft, said impeller causes the production of foam in oil and the creation of a horizontal primary vortex and a vertical secondary vortex wherein said foam is forced towards said axis and the oil forced towards the outside of said oil sump; and

a baffle means mounted below said impeller at the bottom of said oil sump and defining a passage for the flow of oil in only said vertical secondary vortex whereby said vertical secondary vortex causes oil near the outside of said oil sump to flow in said defined passage towards said axis to displace said foam, said baffle means is a plurality of generally vertical plates secured to the bottom of said oil sump wherein the oil in said horizontal primary vortex is changed into oil with radial momentum and flows towards said axis in said passage defined by said vertical plates.

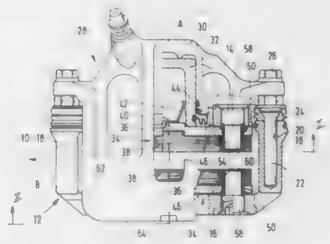
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**4,747,472**

## BRAKE PAD FOR A DISC BRAKE

**Heinrich-Bernhard Rath, Vallendar, and Ulrich Danne, Bendorf-Sayn, both of Fed. Rep. of Germany, assignors to Lucas Industries Public Limited Company, Birmingham, England**

**Filed Apr. 14, 1987, Ser. No. 38,248**
**Claims priority, application Fed. Rep. of Germany, Apr. 18, 1986, 8610698[U]**
**Int. Cl.[4] F16D *69/00***
**U.S. Cl. 188—73.1** **4 Claims**



1. A brake pad for a disc brake, comprising

a rear surface (**46**) to support the brake pad (**34**) on an actuating member (**32, 64**) of the disc brake,

a braking surface (**56**) formed by friction material (**38**),

at least one hole (**48**) to guide the brake pad (**34**) on a guide pin (**60**) of the disc brake which hole is disposed at least approximately at right angles with respect to the rear surface (**46**), and

a protective sleeve (**54**) for the guide pin (**60**) which sleeve extends coaxially with the hole (**48**) in a direction towards the plane of the braking surface (**56**) and is made of a material which wears down together with the friction material (**38**),

characterized in that the protective sleeve (**54**) is embedded in the friction material (**38**) at least for part of its length.

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**4,747,473**

## SEGMENTED FRICTION BRAKE OR CLUTCH DISC ASSEMBLY

**Lowell D. Bok, Anna; William T. Holzworth, Springfield, both of Ohio, and Robert B. Mason, Mercer Island, Wash., assignors to The B. F. Goodrich Company, Akron, Ohio**

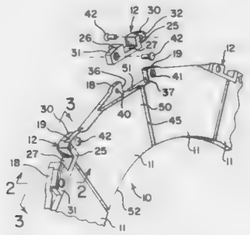
**Filed Jun. 19, 1986, Ser. No. 875,849**
**Int. Cl.[4] F16D *65/12***
**U.S. Cl. 188—73.2** **8 Claims**

1. A segmented friction brake or clutch disc having a plurality of identical arcuate segments assembled to form an annular

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disc with parallel annular surfaces, each segment having a pair of oppositely disposed sides with side edges, said side edges lie along a radial line emanating from the centerline of said annular disc, the respective sides of each of said segments being recessed along the full length of their radial sides to define off-set side portions, said recesses being on opposite sides



thereof to make adjacent side portions of adjacent segments have their off-set portions overlapping and in abutting contact, each segment having a lug on their two upper peripheral corners, and a torque link interconnects adjacent lugs of adjacent segments to maintain said segments into a rigid annular brake disc.

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**4,747,474**

## HYDRAULIC BUFFER

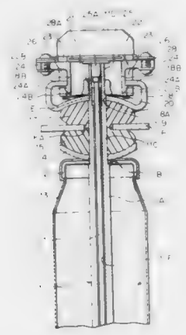
**Takashi Kimura, Kanagawa, and Osamu Matsumoto, Tokyo, both of Japan, assignors to Tokico Ltd., Kanagawa, Japan**

**Continuation-in-part of Ser. No. 811,758, Dec. 20, 1985, abandoned. This application Aug. 14, 1986, Ser. No. 896,203**

**Claims priority, application Japan, Dec. 20, 1984, 59-193464; Aug. 15, 1985, 60-125452[U]**

**Int. Cl.⁴ F16F *9/46*; B25G *3/28***

**U.S. Cl. 188—299** **7 Claims**



1. A hydraulic buffer of the type in which the damping force can be controlled and which comprises:

a piston rod projecting from a cylinder;

a bracket attached to the projecting end of said piston rod and having at least two claws which are bent inwardly to face each other;

a retainer provided with at least two fitting portions having flukes engaging with respective of said claws of said bracket;

an actuator attached to said retainer to control the damping force of the buffer; and

spring means for biasing said retainer axially of said piston rod to prevent said flukes from being disengaged from the corresponding claws of said bracket and for supporting said retainer on said bracket.

**4,747,475**

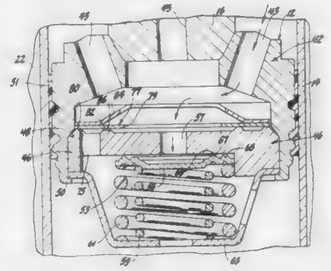
## SUSPENSION WEAR COMPENSATING SHOCK ABSORBER

**Stephen C. Hagwood, Dayton, and Michael D. Clark, Bellbrook, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.**

**Filed Dec. 22, 1986, Ser. No. 944,787**

**Int. Cl.⁴ F16F *9/50***

**U.S. Cl. 188—322.15** **5 Claims**



1. A hydraulic damper having an orifice plate with an opening therethrough, a valve disk for controlling the flow through said opening, spring means for biasing said valve disk toward said opening, said disk having a first annular seat of a first diameter and a first height encompassing said opening to sealingly engage said orifice plate and establish valving means of a first area that is displaced from said opening on the attainment of a first pressure level, said disk having a second annular seat of a second diameter less than said first diameter and encompassing said opening and having a height less than that of said first seat so that the effective area of said disk is changed only when said first seat wears to a point where said second seat effectively seals said opening in said orifice plate and is displaced from said opening only on the buildup of a pressure level greater than said first pressure level to permit the passage of fluid through said opening.

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**4,747,476**

## METHODS OF MAKING CLUTCH DRIVEN PLATES

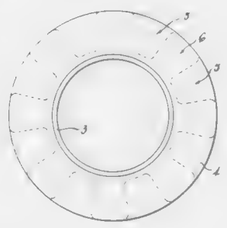
**Roy G. East, Buxton, and John D. Harding, Chapel en le Frith, both of England, assignors to Ferodo Limited, Manchester, England**

**Filed Jul. 2, 1986, Ser. No. 881,281**

**Claims priority, application United Kingdom, Jul. 16, 1985, 8517930**

**Int. Cl.⁴ F16D *69/04***

**U.S. Cl. 192—107 M** **14 Claims**



1. A method for the manufacture of a clutch driven plate consisting essentially of the following steps:

(a) forming a pair of clutch facing annuli which are substantially the density of the finished facings but in which a thermosetting binder material is substantially uncured;

(b) assembling said pair of annuli on either side of a castellated core plate for a clutch driven plate;

(c) clamping together said assembly under a pressure sufficient to ensure intimate contact between touching surfaces but insufficient to cause substantial change in the density of the annuli; and

(d) heating-curing the thermosetting binder of the annuli bonding the annuli to the core plate, wherein the clamping pressure applied to the assembly in steps (c) and (d) is sufficient to result in contact between the inner surfaces of the two annuli in the spaces between the castellations of the core plate but insufficient to result in bonding between said inner surfaces in the area of contact between them.

6. A clutch driven plate made by the method as claimed in claim 1 consisting essentially of a castellated core plate and a pair of clutch facing annuli of friction material bonded one to each side of said core plate wherein the ends of the castellations of the core plate are not enclosed by the friction material of the facings, and said friction material extends between said castellations to the extent that the inner faces of the facings contact each other to provide mutual support but remain substantially unbonded to each other.



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**4,747,477**

## ROLLER DECK LIFTING DEVICE FOR ANGULARLY DEFLECTING TRANSPORT GOODS

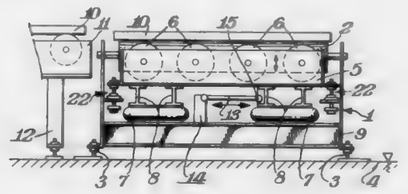
**Hermann Benz, and Reinhold Walz, both of Darmstadt, Fed. Rep. of Germany, assignors to Carl Schenck, Ag, Fed. Rep. of Germany**

**Filed Jun. 6, 1986, Ser. No. 871,383**

**Claims priority, application European Pat. Off., Aug. 31, 1985, 85 111 002.3**

**Int. Cl.⁴ B65G *13/00***

**U.S. Cl. 193—35 SS** **7 Claims**



1. A lifting device for a roller deck that changes the direction of travel of goods being transported, the roller deck having two longitudinal sides and two lateral sides and comprising a basic frame and a generally rectangular shaped lift frame mounted for movement relative to the basic frame, first rollers for transporting the goods in one direction journaled to the basic frame and second rollers for transporting the goods in another direction journaled to the generally rectangular shaped lift frame, pneumatically actuated lift bellows means mounted between the basic frame and the movable lift frame, means actuating the bellows to thereby elevate the rollers of the lift frame above the rollers of the basic frame and deactivating the bellows to lower the lift frame, and a stop arrangement mounted between the lift frame and the basic frame for limiting movement of the lift frame relative to the basic frame, the stop arrangement including upper and lower stop elements connected to the lift frame at each corner of the roller deck and a stationary tongue connected to the basic frame and disposed between each of the upper and lower stop elements for limited relative movement between the basic and lift frames and for supporting the lift frame by engaging the upper stop element.

**4,747,478**

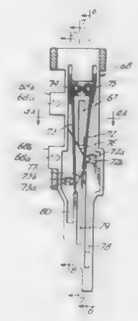
## COIN SORTER AND TOTALIZER

**Evelyn Friedman, P.O. Box 149, Whitehall, N.Y. 12887; William R. Carswell, Whitehall, N.Y.; Martin A. Borho, Whitehall, N.Y., and Nicholas J. Frandino, Whitehall, N.Y., assignors to Evelyn Friedman, Whitehall, N.Y.**

**Continuation-in-part of Ser. No. 489,848, Apr. 29, 1983, Pat. No. 4,592,461. This application Mar. 11, 1986, Ser. No. 838,526**

**Int. Cl.⁴ G07F *3/04*, *11/04***

**U.S. Cl. 194—227** **12 Claims**



1. A coin sorter for a coin operated vending machine; comprising two elongated parts defining a chamber there between, means supporting said elongated parts with one of them movable relative to the other to open said chamber, the other of said elongated parts having a coin entry slot formed therein communicating with said chamber adjacent one end thereof, said one elongated part having first and second exit openings formed therein, coin exit means forming first and second coin exit chutes between said chamber and respective first and second exit openings formed in said one elongated part; and coin guiding means comprising flap means and ramp means in said chamber, said flap means including at least a first flap and means movably supporting and biasing said first flap to its rest position, said ramp means including a first pair of spaced ramps having inclined surfaces extending substantially in a first plane and spaced so as to engage and guide a first coin of a predetermined minimum size to said first coin exit chute and thereby deflect said first flap from its rest position, said first flap being biased so that it is not moved from its rest position by a second coin too small to bridge the distance between said first pair of ramps and guides said second coin to said second coin exit chute.

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**4,747,479**

## DEVICE FOR THE TESTING AND/OR PROCESSING OF SMALL COMPONENT PARTS

**Jakob Herrman, Gollierstr. 70, 8000 Munchen 2, Fed. Rep. of Germany**

**Filed Jul. 18, 1986, Ser. No. 888,247**

**Claims priority, application Fed. Rep. of Germany, Jul. 19, 1985, 3525886**

**Int. Cl.⁴ B65G *47/00***

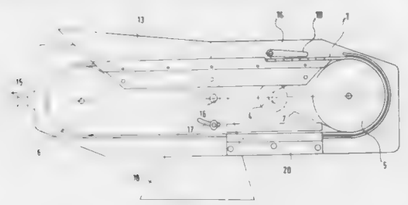
**U.S. Cl. 198—345** **7 Claims**

1. Device for supplying individual electrical component parts having end face contacts, preferably electronic microchips, to a measurement and/or processing station from a components container, into which the electrical components are introduced without being ordered, by means of a conveyor belt serving as a carrier for the electrical components, which belt moves below the components container that is provided with an exit opening at its bottom which, in comparison to the size of the components, is elongated in the movement direction of the conveyor belt and said belt includes individual accommodation areas characterized in that the accommodation areas

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of the conveyor belt are sized to the dimensions of the electrical components in such a manner that in the locale of the measurement and/or processing station, the end face contacts of the electrical components will be located in a defined position in relation to a contact element of the measurement station or a tool of the processing station and the measurement or processing station includes a swing arm extending across and above the belt which moves towards and away from the belt,



said swing arm includes a pin-like positioning element depending vertically from the swing arm and having a conical or spherical point, whereby the diameter of the pin is slightly greater than the diameter of a positioning hole in the belt thereby providing an air cushioning effect when the pin approaches the belt and the tool or contact element is also attached to the swing arm in the region of said positioning element, and a spring element is provided which presses the swing arm against the electrical component.

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**4,747,480**

**APPARATUS FOR THE EVEN ALIGNMENT OF OBJECTS UNIFORM AMONG EACH OTHER**

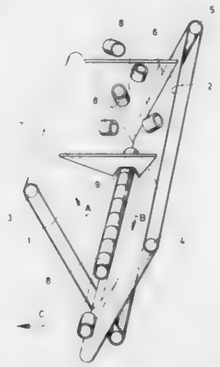
**Klaus Wedler, Mittelbiberach, and Winfried Uhl, Mengen-Ennetach, both of Fed. Rep. of Germany, assignors to Croon+Lucke Maschinenfabrik GmbH+Co. KG, Fed. Rep. of Germany**

**Filed Oct. 20, 1986, Ser. No. 921,354**

**Claims priority, application Fed. Rep. of Germany, Oct. 23, 1985, 3537597**

**Int. Cl.⁴ B65G** *47/24*

**U.S. Cl. 198—396** **8 Claims**



1. An apparatus for alignment of essentially uniform, but randomly oriented objects, comprising:

a first conveyor belt moving along a first plane in a first direction;

a second conveyor belt disposed adjacent said first conveyor belt for moving along a second plane transverse to the first plane and in a second direction transverse to said first direction and across the width of said first belt; and

means for aligning the objects disposed between said first and second conveyor belts, said means for aligning including a first stationary wall disposed between the first and second conveyor belts to form a funnel to randomly receive the objects to be aligned, said first stationary wall having a discharge opening through which the objects to be aligned are conveyed out in the second direction.

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**4,747,481**

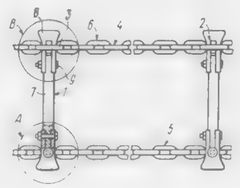
**DRAG MEMBER OF FLIGHT CONVEYER**

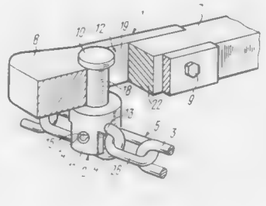
**Viktor M. Gorlov; Alexandr G. Levin, and Igor V. Spivak, all of Donetsk, U.S.S.R., assignors to Donetsky Nauchnois-sledovatelsky Ugolny Institut, Donetsk, U.S.S.R.**

**Filed Jul. 3, 1986, Ser. No. 881,952**

**Int. Cl.⁴ B65G** *19/26*

**U.S. Cl. 198—731** **4 Claims**





1. A drag member of a flight conveyer, comprising: flights of said conveyer; a pair of vertically spaced chains forming closed loops in respective horizontal planes; the chains having vertical links with straight portions, vertical studs connecting said flights to the straight portions of respective vertical links of said chains; each said flight comprising a detachable central part and two detachable end parts; each said end part of said flight being substantially U-shaped with two limbs and an opening there between, the opening accommodating a portion of said vertical stud and an end portion of said central part of the respective flight;

each said vertical stud having heads on the ends thereof, of a diameter greater than the width of said opening;

one of said heads having a through-going slot therein for joining said stud to the straight portions of the respective vertical link of said chain.

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**4,747,482**

**BOBBIN CONVEYING APPARATUS**

**Hiroaki Sanno, Nonoichi, Japan, assignor to Murao Boki Kabushiki Kaisha, Kanazawa, Japan**

**Filed Dec. 5, 1985, Ser. No. 804,613**

**Int. Cl.⁴ B65G** *47/22*

**U.S. Cl. 198—803.01** **5 Claims**

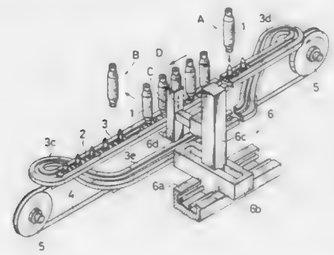
1. A bobbin conveying apparatus, which comprises:

a plurality of trays each having a bobbin supporting pin insertable in the bobbins;

first and second parallel guide rails for guiding and supporting said trays and which are assembled in loops for guiding the trays wherein an area of support of said first rail differs from that of said second rail;

a round belt running along said first and second guide rails, said belt contacting the bottom surfaces of the trays so that said trays are frictionally moved in accordance with movement of the belt and such that said trays are biased towards said second rail; and





bobbin take-up means for taking up an arrested bobbin from the tray.

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**4,747,483**

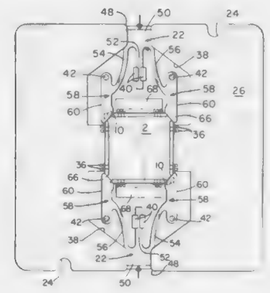
**PROTECTIVE CHIP CARRIER HANDLER**

**Dimitry G. Grabbe, Middletown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.**

**Filed Oct. 8, 1986, Ser. No. 916,583**

**Int. Cl.⁴ B65D** *73/02*

**U.S. Cl. 206—329** **20 Claims**



1. A chip carrier handler for use with a chip carrier having leads extending from a midsection of each side, the chip carrier handler comprising:

housing means having opposed first and second major surfaces;

an opening positioned in the center of the housing means, the opening extending through the housing from the first major surface to the second major surface, the opening dimensioned to receive the chip carrier;

the housing means having recesses adjacent the opening, the recesses extending from the first major surfce toward the second major surfce, the recesses dimensioned to receive the leads of the chip carrier;

securing means slidably mounted to the housing means, the securing means having chip carrier engagement means which are pivotally mounted to the housing means and which are positioned above the opening in the first position;

whereby as the chip carrier is inserted into the opening of the chip carrier handler, the securing means are slidably moved causing the engagement means to pivot, moving the engagement means away from the opening to a second position, such that the chip carrier can be inserted into the opening under reduced insertion force conditions, the chip carrier being fully inserted when the chip carrier and the housing means cooperate to define a stop position, thereby allowing the securing means to resiliently return to the unstressed position, causing the engagement means to return to the first position, thereby maintaining the chip carrier in place in the opening.

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**4,747,484**

**CONTAINER FOR VIDEO AND SOUND RECORDING MEDIA**

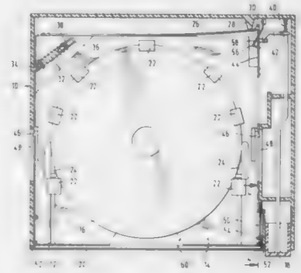
**Peter Ackeret, Kusnacht, Switzerland, assignor to IDN Invention and Development of Novelties AG, Chur, Switzerland**

**Filed Jan. 30, 1987, Ser. No. 9,390**

**Claims priority, application Fed. Rep. of Germany, Jan. 30, 1986, 3602695**

**Int. Cl.⁴ B65D** *85/672*

**U.S. Cl. 206—387** **29 Claims**



1. In a storage system for plate-like recording media, the system having a housing with an access opening in one side thereof and at least a first transport member for supporting at least one recording media, the transport member being displaceable relative to the housing under the influence of a biasing spring assembly from a storage position to an ejected position in which the recording media is rendered accessible, the system also including a manually releasable locking arrangement for retaining the transport member in the housing against the force of the biasing spring assembly, the system further having a moveable cover associated with each transport member for closing the portion of the housing access opening associated with the transport member when the transport member is in the storage position and the cover is in a first position, the cover being moved into a second position in which it is possible to remove a recording media from and return a recording media to an ejected transport member in a direction which is generally parallel to the direction of transport member motion, the improvement comprising:

energy storage means associated with each transport member, said energy storage means producing a force which causes the transport member to automatically move into the storage position after manually produced partial displacement from the ejected position toward the storage position.

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**4,747,485**

**CARTON WITH RECESSED ENDS BLANK THEREFOR**

**Jean Chaussadas, Brassioux, France, assignor to The Mead Corporation, Dayton, Ohio**

**Filed Jan. 20, 1987, Ser. No. 4,509**

**Claims priority, application United Kingdom, Jan. 20, 1986, 8601271**

**Int. Cl.⁴ B65D** *65/00*

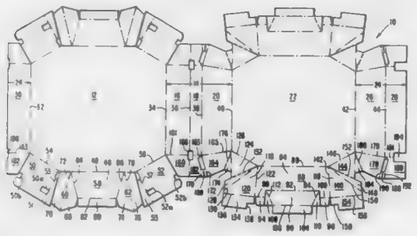
**U.S. Cl. 206—427** **14 Claims**

1. A carton enclosing a group of uniform articles such as bottles or cans disposed in at least three parallel rows and comprising at least one central row and at least two adjacent outer rows of articles arranged in mutually abutting relationship and in which the number of articles in said central row is less than that in said adjacent outer rows whereby a void is formed at each end of said group intermediate said outer rows

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of articles, the carton comprising a top and base interconnected by spaced side walls thereby forming a tubular structure and end closure panels closing each end of the tubular structure, said end closure panels at each end of the carton comprising a top end closure panel hinged to said top and having a central



portion displaced into said void and a bottom end closure panel hinged to said base and having an end flap secure to said top end closure panel within said void, characterized in that said bottom end closure panel is joined to said base along a fold line which is substantially aligned with and tangential to the end-most articles in said adjacent outer rows.

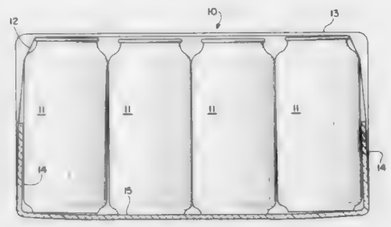
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**4,747,486**

**MULTIPACKAGE OF CONTAINERS IN A TRAY**

Edward L. Benno, 17960 W. Hwy. 120, Grayslake, Ill. 60030

Filed Mar. 25, 1987, Ser. No. 30,064
Int. Cl.[4] B65D *71/00*
U.S. Cl. 206—427 5 Claims



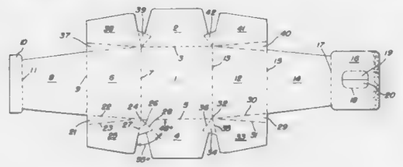
1. A package comprising a tray having a bottom wall with opposed side walls and opposed end walls extending upwardly from the periphery of said bottom wall, said tray being formed to be rectangular in shape, a plurality of containers carried in a rectangular array on said bottom wall with the dimensions of said rectangular array substantially conforming to the dimensions of said bottom wall, said side walls of said tray of a height substantially no higher than one half of the height of said containers, said end walls of said tray of a height substantially greater than one half of the height of said containers, hand holds formed in the upper central portions of each of said end walls of said tray, said tray being formed of a material and said containers being of such a weight that supporting said tray with said containers therein in a depending condition from said hand holds results in a substantial bending of said tray about a transverse central axis, and a stretched-tensioned-elastic -plastics material tube carried circumferentially about said side walls and bottom wall of said tray and the sides and upper end of said rectangular array of containers with the ends of said tube overlying the upper ends of the end ranks of said rectangular array of containers and between the planes of said end walls of said tray, and said tube being sufficiently tensioned to render said bottom wall curvilinear in an upwardly concave shape about an axis extending longitudinally centrally of said tray causing resistance in the tray for bending about said transverse central axis.

**4,747,487**

**END LOADED CARTON**

Prentice J. Wood, Hapeville, Ga., assignor to The Mead Corporation, Dayton, Ohio

Filed Sep. 29, 1987, Ser. No. 102,353
Int. Cl.[4] B65D *05/42, 65/02*
U.S. Cl. 206—429 9 Claims



1. An end loaded carton for packaging a plurality of articles and comprising top, bottom and side walls foldably adjoined to form a tubular structure, an end closure for each end of said tubular structure each of which includes a pair of triangular corner panels hingedly connected respectively with the lower parts of the end edges of said side walls and further defined by a crease line extending divergently upward from the lower corner of each side wall, a pair of closure panels foldably adjoined respectively to said corner panels along said crease lines and forming a closure structure for the lower part of each end of the carton, a bottom end panel foldably joined to each end edge of said bottom wall, and a connecting web panel foldably joined to the bottom edge of each of said closure panels along a first fold line and to each of said bottom end panels along a second fold line at each corner of the carton.

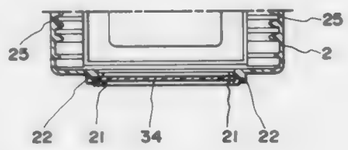
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**4,747,488**

**HARD DISK CONTAINER**

Shoji Kikuchi, c/o Tensho Electric Industrial Co., Ltd., No. 3-3,1-chome, Koyama, Shinagawa-ku, Tokyo, Japan

Filed Dec. 1, 1986, Ser. No. 937,626
Int. Cl.[4] B65D *85/57*
U.S. Cl. 206—444 2 Claims



1. A hard disk container comprising:

a container body having a plurality of spaced parallel U-shaped disk receiving grooves provided in an inner surface thereof and having end openings provided in opposite ends thereof to expose central holes of the hard disks therethrough and having upper and lower openings provided in upper and lower portions thereof, said end walls having elongated grooves opening toward each other along the spaced opposed edges of said end walls defining said end openings, and the lower edges of said end openings having an undercut portion therebeneath;

an upper cover removably mounted on the upper portion for closing said upper opening and having depending tongues on opposite ends thereof which, when said upper cover is in position, engage in said elongated grooves and tightly close said end openings;

said depending tongues each having a latch means on the lower end thereof engaging the corresponding undercut portion when said tongues are fully inserted in said end openings.

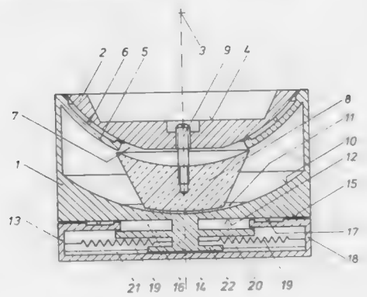


**4,747,489**

**DEVICE FOR SETTING DOWN BEVERAGE CONTAINERS, PREFERABLY IN VEHICLES**

Hergen Saalfeld, Scheunebergstrasse 23, 2870 Delmenhorst, Fed. Rep. of Germany

Filed Aug. 13, 1986, Ser. No. 896,122
Claims priority, application Fed. Rep. of Germany, Aug. 13, 1985, 8523246[U]; Dec. 24, 1985, 3546034
Int. Cl.[4] B65D *6/04, 81/00;* B60R *7/00*
U.S. Cl. 206—446 14 Claims



1. A device for holding beverage containers comprising a holder and a container receptacle seated in said holder, said receptacle adapted for pendulum movement, said holder having guide means for guiding said receptacle in its pendulum movements wherein a center of curvature of said receptacle in its pendulum movements lies above said guide means and said guide means comprises a recessed surface located on top of said holder to which recessed surface said receptacle is positively and movably attached by means for attaching said receptacle to said holder, wherein said recessed surface comprises a ball socket and said receptacle and said holder are adapted to form an interlocking ball and socket joint whereby said receptacle has a seat opposite said ball socket, said seat adapted to receive a beverage container, and a center of curvature of said ball socket lies above said receptacle.

2. A device for holding beverage containers comprising a holder and a container receptacle seated in said holder, said receptacle adapted for pendulum movement, said holder having guide means for guiding said receptacle in its pendulum movements wherein a center of curvature of said receptacle in its pendulum movements lies above said guide means, wherein said receptacle has a weight located distal from said center of curvature, and wherein said guide means comprises a recessed surface located on top of said holder to which recessed surface said receptable is positively and movably attached by means for attaching said receptacle to said holder and said recessed surface has a centrally located opening through which a weighted portion of said receptacle extends downward into said holder.

8. A device for holding beverage containers comprising a holder and a container receptacle seated in said holder, said receptacle adapted for pendulum movement, said holder having guide means for guiding said receptacle in its pendulum movements wherein a center of curvature of said receptacle in its pendulum movements lies above said guide means, further comprising a support adapted for supporting said holder upright while allowing said holder to slide horizontally, wherein said holder has (i) a flat base surface adapted for placement onto a seat surface of said support, and (ii) a tappet extending perpendicularly downward from said base through an opening in said support seat surface into said support and wherein said tappet has attached spring components which connect said tappet to side walls of said support.

11. A device for holding an open beverage container in a vehicle comprising a holder, a container receptacle, and a weight wherein said holder has an arcuate top surface adapted to receive a movably attached arcuate lower surface of said container receptacle, said top holder surface having a centrally located opening therethrough and defining with a side wall and a bottom surface of said holder an open space to accommodate arcuate movement of said weight, said weight connected to said container receptacle by centrally located connector means, said receptacle having an arcuate lower surface adapted for movable attachment to said arcuate top surface of said holder and said receptacle having a top surface adapted to receive a beverage container bottom.

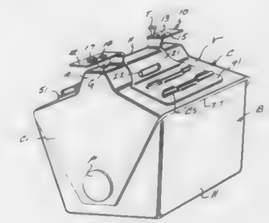
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**4,747,490**

**COOLER-GOLF CLUB CARRIER**

Fred Smith, 1830 Clark St., Long Beach, Calif. 90815

Filed Nov. 24, 1986, Ser. No. 934,544
Int. Cl.[4] A45C *11/20;* B65D *85/20;* A63B *55/10*
U.S. Cl. 206—542 1 Claim





1. In a beverage carrier characterized by a rectangular housing pivotally engaged to a N-shaped cover conformed for pivotal translation into alignment over a top opening in said housing, said cover including a handle proximate the apex thereof, the improvement comprising;

a convolved sheet structure adhesively secured to said cover and conformed for mating alignment on said cover and including a central convolution adapted to receive said apex and to engage said handle and lateral surfaces formed on either said of said central convolution each including rows of cantelevered spring tabs inclined towards each other and spaced for releasably receiving golf clubs therebetween.

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**4,747,491**

**TAB-OPENING CONTAINER**

Thomas F. Ward, Madison, Wis., assignor to Rayovac Corporation, Madison, Wis.

Filed Jun. 3, 1986, Ser. No. 870,111
Int. Cl.[4] B65D *65/26*
U.S. Cl. 206—633 4 Claims

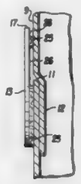
1. An easilly accessible container comprising:

(a) a sheet of wrapping material having interior and exterior sides, top and bottom ends, and top and bottom portions, respectively, between the ends; the sheet being wrapped around at least one product or product holder such that the top and bottom portion of the sheet overlap one an-

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other to form an overlap region comprising an overlapped portion of the sheet and an overlapping portion of the sheet, said top and bottom portions of the sheet being electrostatically bound in the overlap region to define a first bond;



(b) a pull tab adhesively affixed in part to the sheet to define a second bond, said pull tab comprising an adhesive-free grasping element; and

(c) said second bond being stronger than said first bond whereby a single application of an external pulling force exerted on the grasping element is sufficient to separate said top and bottom portions of the sheet.

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**4,747,492**

## NOTE SORTING AND COUNTING APPARATUS

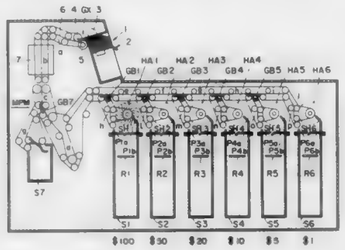
**Tetsuo Saito; Kazunori Umezaki; Toshiya Takahashi; Osami Katsumata; Mitsuo Ikemi, and Toshio Numata, all of Himeji, Japan, assignors to Glory Kogyo Kabushiki Kaisha, Himeji, Japan**

**Filed Feb. 26, 1986, Ser. No. 832,943**

**Claims priority, application Japan, Feb. 28, 1985, 60-37469; Feb. 28, 1985, 60-37470; Feb. 28, 1985, 60-37471**

**Int. Cl.[4] B07C** *5/34*

**U.S. Cl. 209—534** **7 Claims**



1. A note sorting and counting apparatus comprising:

a draw-out unit for drawing out notes in succession from a stack of notes;

a discrimination unit for discriminating at least the denomination of notes drawn out by the draw-out unit;

a sorting unit for sorting notes according to the denomination of the notes discriminated by the discrimination unit;

a plurality of temporary reserving units for temporarily reserving notes sorted by the sorting unit according to the denomination of of the notes, said receiving units including supporting plates movable between a closed position for supporting the notes and an open position for releasing the notes;

a determining unit for determining whether the temporary reserving units are filled with notes;

a plurality of containers for receiving notes from said temporary reserving units according to the denominations of the notes;

a first common driving means for lowering said supporting plates of said temporary receiving units;

clutch means for coupling said first driving means to said supporting plates;

a second common driving means for causing said supporting plates to open when said first driving means downwardly drives said supporting plates; and

a control unit for controlling said clutch means to couple said first driving means to said supporting plates when said determining unit determines that one of said temporary reserving units is filled with notes, said first driving means lowering said plates and said second driving means opening said plates to transfer the notes to said containers.

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**4,747,493**

## CASH DISPENSER

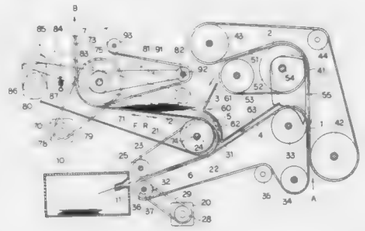
**Tomoyuki Nakanishi, Moriyama, Japan, assignor to Omron Tateisi Electronics Co., Ltd., Kyoto, Japan**

**Filed Sep. 3, 1985, Ser. No. 771,661**

**Claims priority, application Japan, Sep. 3, 1984, 59-134319[U]**

**Int. Cl.[4] B07C** *5/34*

**U.S. Cl. 209—534** **4 Claims**



1. A cash dispenser for dispensing bills stored in a cash container through a cash discharge outlet, which comprises:

(a) temporary bill collection means for temporarily collecting bills sent from the cash container;

(b) detection means for ascertaining the acceptable/unacceptable condition of a bill;

(c) rejected bill collection means for collecting rejected bills;

(d) first carrying means for carrying unacceptable bills sent from the cash container into said rejected bill collecting means whenever an unacceptable bill is detected by said detection means;

(e) second carrying means for carrying a stack of bills in said temporary bill collecting means in a lump into said rejected bill collecting means, in response to a cash collection command;

(f) third carrying means for carrying a stack of acceptable bills in said temporary bill collecting means in a lump to the cash discharge outlet in response to a cash discharge command; and

(g) limiting means disposed near a junction area between said temporary bill collecting means and said second carrying means for limiting the amount of bills being carried in the bill collection direction, wherein said limiting means includes a guide portion and a space of said second bill stack carrying means is reduced gradually in the bill collection direction by means of the guide portion.

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**4,747,494**

## COLLECTOR'S STAND

**Youree Tyson, P.O. Box 491, Eunice, La. 70535**

**Filed Feb. 10, 1987, Ser. No. 13,046**

**Int. Cl.[4] A47F** *7/00*

**U.S. Cl. 211—13** **8 Claims**

1. A stand for supporting a plurality of objects at a plurality of spaced vertical intervals, said stand comprising:

at least one support means for supporting objects;

a vertical support member on which said at least one support means is removable mounted;



a support base member coupled to said vertical support member for supporting said vertical support member in a vertical manner;

said vertical support member comprising a plurality of alternately upwardly facing and downwardly facing U-shaped elements, coupled at the respective arms and bases thereof, said support means being adapted to be mounted intermediate said couplings, the lowermost U-shaped



element being mounted on an inverted pair of U-shaped cross arm elements, said cross arm elements being mounted in angular relation to each other, and said support base member being provided with a plate member to which the lower end of the inverted pair of U-shaped cross arm elements are coupled; and

said support base member comprising a pair of cross leg members, said cross leg members being coupled in angled relation midway along their length.

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**4,747,495**

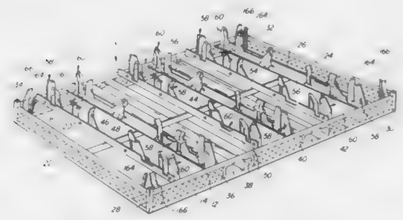
## ENGINE STORAGE AND TRANSPORTATION RACK

**Donald A. Hoss, Southfield, Mich., assignor to Chrysler Motors Corporation, Highland Park, Mich.**

**Filed Jan. 20, 1987, Ser. No. 4,938**

**Int. Cl.[4] A47F** *7/00*

**U.S. Cl. 211—13** **7 Claims**



1. An engine storage and transportation rack comprising a support frame having a longitudinal and a transverse dimension, a plurality of pairs of crossmembers extending transversely on the frame, the crossmembers of each pair and the pairs of crossmembers being spaced apart longitudinally on the frame, a plurality of pairs of engine support pods provided on the pairs of crossmembers, each pair of pods comprising a right-handed engine pod provided on one crossmember of a pair of crossmembers oppositely disposed with respect to a left-handed engine pod provided on the other crossmember of the pair of crossmembers, each pair of pods adapted to receive and support an engine with the right side of the engine received on the right-hand pod and the left side of the engine received on the left-hand pod, each pod including recess means to permit portions of an engine to project longitudinally therebeyond, the space between each pair of pods being unobstructed to permit portions of an engine to project transversely therebeyond, each pod including a plurality of downwardly angled guide surfaces to guide an engine lowered onto a pair of pods in both the longitudinal and transverse directions to a specific support position between a pair of pods, each pod having a plurality of horizontal surfaces to receive and support discrete structure on the underside of an engine with the remaining portions of an engine spaced from the pods and other portions of each pod functioning as non-load bearing but longitudinal and transverse restraining structure.

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**4,747,496**

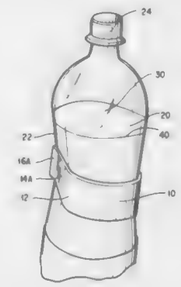
## PLASTIC BOTTLE PRESSURIZATION CLIP FOR MAINTAINING CARBONATION IN BEVERAGES

**Raphael Rendine, 1411 Sycamore St., Connellsville, Pa. 15425, assignor to Raphael Rendine and Dennis James Rendine, both of Connellsville, Pa., part interest to each**

**Filed Apr. 27, 1987, Ser. No. 43,484**

**Int. Cl.[4] B65D** *1/02, 21/08, 23/00*

**U.S. Cl. 215—101** **6 Claims**



1. A device for squeezing side walls of a flexible bottle containing a carbonated beverage, comprising a generally horseshoe-shaped clip having an arched portion, two parallel legs extending from the arched portion, and end tips flaring outwardly from each of the two parallel legs, wherein the perpendicular distance between the two parallel legs is less than the diameter of the flexible bottle, whereby sufficient pressure is maintained inside the flexible bottle so that the beverage contained therein remains carbonated.

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**4,747,497**

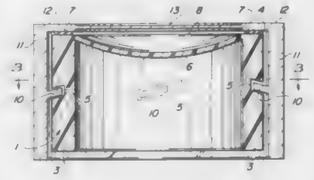
## TAMPER DETECTION CAP

**Tommy E. Holman, 8974 Marlow St., Shreveport, La. 71118**

**Filed May 8, 1987, Ser. No. 47,110**

**Int. Cl.[4] B65D** *41/04*

**U.S. Cl. 215—230** **17 Claims**



1. A tamper detection cap for attachment to a container

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having a threaded neck, comprising an inner cap provided with internal threads for threadibly engaging the threaded neck of the container; a flexible diaphragm spanning the top of said inner cap, said diaphragm adapted to flex inwardly of said inner cap into a curvature after said inner cap is threadibly tightened on the threaded neck responsive to a pressure differential across said diaphragm; at least two grooves provided in said inner cap; an outer cap adapted to enclose said inner cap and a substantially transparent window provided in said outer cap for viewing said diaphragm; and at least two retainer thread segments projecting inwardly from said outer cap in facing, skewed relationship with respect to said window, said retainer thread segments adapted for engaging said grooves, respectively, in said inner cap when said outer cap is secured to said inner cap, whereby detection of a change in said curvature of said diaphragm responsive to counterclockwise rotation of said outer cap and said inner cap and loosening of said inner cap on the threaded neck of the container is facilitated by observing said diaphragm through said transparent window.

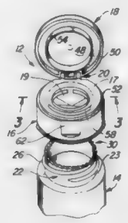
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**4,747,498**

## SAFETY DISPENSING CLOSURE-CONTAINER PACKAGE

**Peter P. Gach, Evansville, Ind., assignor to Sunbeam Plastics Corporation, Evansville, Ind.**

**Continuation-in-part of Ser. No. 879,487, Jun. 27, 1986, Pat. No. 4,682,702. This application Mar. 16, 1987, Ser. No. 26,206**
**Int. Cl.[4] B65D *41/34***
**U.S. Cl. 215—232** **21 Claims**



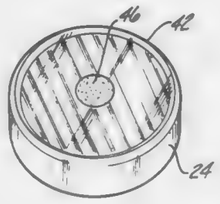
1. A safety dispensing closure and container package comprising, in combination: a container having a threaded neck terminating in an annular end wall having a plurality of circumferentially spaced ratchet teeth; a closure including a base cap, lid and a hinge connecting said lid to said base cap; said base cap having a flat top with a dispensing orifice therethrough and an annular outer skirt extending from the periphery of said top with internal threads complementary to said container threads; a plurality of circumferentially spaced ratchet teeth arranged in an annular pattern on said cap top within said outer cap skirt for coaction with said container ratchet teeth, allowing said base cap to be threaded onto said container neck, but locking with said container ratchet teeth to prevent unthreading removal of said base cap from said container neck; an inner skirt concentric with said outer skirt extending from said cap top for sealing engagement with said container neck; and said lid being movable about said hinge from a closed position covering said orifice to an open dispensing position.

**4,747,499**

## TAMPER INDICATING CLOSURE WITH ADHESIVE-ATTACHED GASKET

**Peter P. Gach, and Randall K. Julian, both of Evansville, Ind., assignors to Sunbeam Plastics Corporation, Evansville, Ind.**

**Continuation-in-part of Ser. No. 465,817, Feb. 14, 1983, abandoned, which is a continuation-in-part of Ser. No. 439,742, Nov. 8, 1982. This application Jan. 22, 1985, Ser. No. 693,328**
**Int. Cl.[4] B65D *51/22***
**U.S. Cl. 215—250** **6 Claims**



1. A tamper indicating closure assembly for use with a threaded container having an opening, the combination comprising: a closure member having a generally disc-shaped top with an annular portion surrounding a central opening and a cylindrical skirt extending therefrom having internal threads for engaging said container threads; a transparent disc-shaped liner element engageable with said annular portion to close said opening; a seal element for closing said opening in a container, said seal element being positioned in contacting relationship with the underside of said disc-shaped liner element and within said cylindrical skirt; and adhesive means on the underside of said seal element for bonding said seal element to container, said seal element being movable with said closure member into sealing engagement with a container having at least a portion continuously visible through said transparent liner element and said closure member opening to indicate the condition of said seal element, and upon removal of said seal element said liner element being engageable with said container for sealingly closing said container opening.

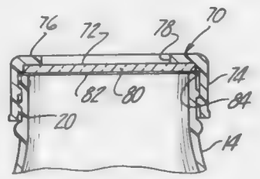
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**4,747,500**

## TAMPER INDICATING TRANSPARENT CLOSURE

**Peter P. Gach, and Randall K. Julian, both of Evansville, Ind., assignors to Sunbeam Plastics Corporation, Evansville, Ind.**

**Continuation-in-part of Ser. No. 693,328, Jan. 22, 1985, which is a continuation-in-part of Ser. No. 465,817, Feb. 14, 1983, abandoned, which is a continuation-in-part of Ser. No. 439,742, Nov. 8, 1982, abandoned. This application May 30, 1986, Ser. No. 868,713**
**Int. Cl.[4] B65D *51/22***
**U.S. Cl. 215—250** **18 Claims**



1. A tamper indicating closure for use with a container having a neck containing an opening, comprising, in combination: a body member having a generally flat top and a cylindrical skirt extending therefrom, said top having a central portion constructed of a transparent material and extending substantially continuously along one end of said skirt, said skirt containing means for detachable attachment to said container neck; a destructible seal element for closing said container opening, said seal element being constructed of a frangible material; and means for sealingly bonding said seal element to said container neck so that removal of said seal element from around said container opening results in destruction of said seal element, said seal element being visible through the top of said body member to indicate its integrity or tampering.



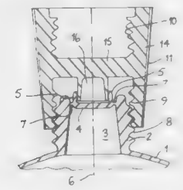
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**4,747,501**

## CONTAINER CLOSURE METHOD

**Dennis Greaves, Colchester, United Kingdom, assignor to National Plastics Limited, United Kingdom**

**Filed Jul. 8, 1987, Ser. No. 70,894**
**Int. Cl.[4] B65D *1/02***
**U.S. Cl. 215—253** **5 Claims**



1. A container and closure combination, said container having a neck and a membrane closing a passage through the container neck from inside to outside the container, and said closure being adapted for engagement on said neck and having a projecting stud for separating said membrane from the neck and removing it, said membrane having holding means defining a cavity to receive and engage the outside of said projecting stud, and a weakened region surrounding said holding means so that on application of the closure to the container the projecting stud can engage in said cavity and press on said membrane to break said weakened region leaving said membrane attached to said closure.

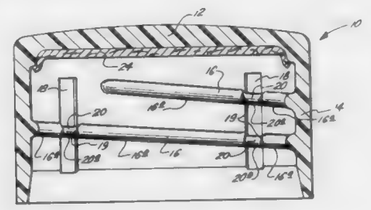
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**4,747,502**

## VENTED BEVERAGE CLOSURE

**Werner R. Luenser, Blue Island, Ill., assignor to Ethyl Molded Products Company, Richmond, Va.**

**Continuation-in-part of Ser. No. 916,236, Oct. 10, 1986, abandoned. This application Sep. 23, 1987, Ser. No. 98,084**
**Int. Cl.[4] B65D *51/16***
**U.S. Cl. 215—307** **15 Claims**



1. A thermoplastic closure suitable for fitment to a threaded container neck, comprising:
(a) a top wall,
(b) an annular sidewall downwardly depending from the top wall,
(c) a primary closure thread carried on the inside surface of the annular sidewall for cooperation with the container neck thread, said primary closure thread being divided into a plurality of primary thread segments by one or more venting grooves,
(d) at least one venting groove in the sidewall traversing the closure thread, said venting groove dividing the primary closure thread so as to form the primary thread segments,
(e) a reinforcing secondary thread within said venting groove and extending across said venting groove connecting the primary thread segments of the primary closure thread, said secondary thread having a smaller height than the primary thread segments, the lower edge portion of said secondary thread being aligned with the lower edge portion of each adjacent primary thread segment and at least the median edge portion of said secondary thread being offset from the corresponding portion of said primary thread segment, and
(f) a sealing system above the closure thread for effecting a gas-tight seal between the closure and the container.

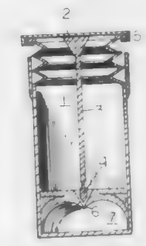
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**4,747,503**

## TAMPER RESISTANT DRUG CONTAINER

**Billy E. Dingess, P.O. Box 357, Ferrellsburg, W. Va. 25513**

**Filed Mar. 4, 1986, Ser. No. 835,949**
**Int. Cl.[4] B65D *55/02***
**U.S. Cl. 215—366** **5 Claims**



1. A tamper resistant drug container comprising in combination;
a drug compartment, said drug compartment further comprising;
a spring like bellows neck, said neck comprising linkage for a cap;
a separate compartment at the lower portion of said container, said separate compartment further comprising a bottom for said compartment, said bottom having a hole through the center of said bottom, said hole forming a funnel shaped passage from within said drug compartment to within said separate compartment;
a cap, said cap further comprising linkage for said container neck;
a plunger beginning at the inner center of said cap having a smaller portion linking a dye filled tip at said plungers opposite end and said combination further comprising means for linking said tip by way of said cap to and within said separate compartment by way of said hole.

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**4,747,504**

## AIRCRAFT CARGO CONTAINER

**Albert D. Wiseman; Bernard J. Roke; John M. Kachman; Gregg A. Delker; William F. Corcoran, all of Wilmington, Ohio; Phillip A. Boshaw, Redmond, Wash., and Gordon J. Sanden, Jr., Huntington Beach, Calif., assignors to Airborne Express, Inc., Wilmington, Ohio**

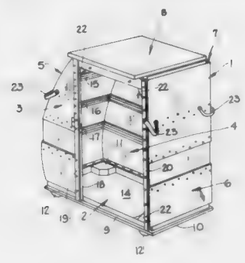
**Filed Jun. 5, 1986, Ser. No. 870,815**
**Int. Cl.[4] B65D *87/00***
**U.S. Cl. 220—1.5** **14 Claims**

1. An aircraft cargo container having two sides, an inboard end, an outboard end, a horizontal top and a horizontal bottom, said inboard end and both sides being substantially vertical, said outboard end being curved from said top to said bottom and substantially conforming to the curvature of the cabin side

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wall of an aircract fuselage, said inboard and outboard ends of said container being so dimensioned as to pass freely through an aircraft standard left side passenger door, said container sides being so dimensioned that when two such containers are located within an aircraft fuselage cabin extending end-to-end



transversely thereof with their inboard ends opposed they will substantially fill the interior cross-section of the aircraft fuselage cabin with clearance between themselves and between themselves and the aircraft fuselage, a loading opening formed in one of said container sides, and a door therefor.

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**4,747,505**

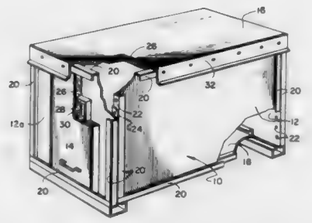
**UNITIZED CABINET DESIGN**

**William G. Hansen, Clarksville, Tenn., assignor to American Standard Inc., New York, N.Y.**

**Division of Ser. No. 901,338, Aug. 28, 1986. This application Aug. 14, 1987, Ser. No. 85,501**

**Int. Cl.[4] H02B** *1/06*

**U.S. Cl. 220—4 R** **9 Claims**



1. A frameless enclosure for air handling equipment comprising a plurality of enclosure panels each reinforced by a double-flange integrally formed along the perimeter thereof such that along a portion of the perimeter of at least one of said panels said double-flange is on only one side of said panel, and along another portion of the same perimeter said double-flange is on only the other side of said panel, said double-flange having a generally L-shaped cross-section with one leg of the flange extending substantially perpendicular to the face of said panel, and with the other leg extending from the one leg substantially parallel to the face of said panel and inward from the perimeter of said panel, said panels being interconnected to form a box-like structure that includes at least one air duct opening.

**4,747,506**

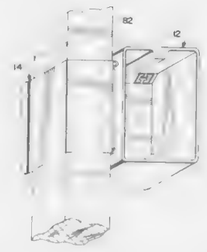
**ADJUSTABLE OUTLET BOX MOUNTING ASSEMBLY**

**Charles F. Stuchlik, III, RD1 - P.O. Box 304B, Milton, Del. 19968**

**Filed Feb. 6, 1987, Ser. No. 11,752**

**Int. Cl.[4] H02G** *3/08*

**U.S. Cl. 220—3.9** **10 Claims**



1. An adjustable outlet box mounting assembly comprising:
an outlet box having an open front face, said outlet box having an attaching portion provided on an outer surface of one side wall;
a substantially U-shaped mounting bracket having an attaching leg adjacent the outlet box, said attaching leg being slidably engaged with the attaching portion of the outlet box, said outlet box being adjustably movable forwardly and rearwardly with respect to said mounting bracket between two extreme end positions from any one end position to the other end position so that said box can be adjustably positioned with respect to said bracket in any one of a plurality of box mounting positions; and
stopping means for limiting forward and rearward travel of the outlet box relative to the mounting bracket.

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**4,747,507**

**HOLDER FOR A CONTAINER**

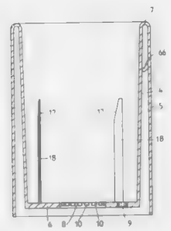
**Louis T. R. Fitzgerald, Williamstown, and Roland P. Como, Gisborne, both of Australia, assignors to Plastic Pipe Fabrication Pty. Ltd., Williamstown, Australia**

**Filed May 12, 1986, Ser. No. 862,459**

**Claims priority, application Australia, May 17, 1985, 42634/85**

**Int. Cl.[4] B65D** *23/00*

**U.S. Cl. 220—85 H** **8 Claims**



1. A holder for a container having a screw top, said holder comprising a body moulded from heat insulating material and including a recess for receiving the container so as to heat insulate the container when placed therein, said body having integrally formed therewith a top opening formation having a shape generally complementary to the screw top such that when the screw top is positioned in the formation, the top cannot be turned within the formation whereby rotation of the holder relative to the container causes unscrewing of the top from the container.



**4,747,508**

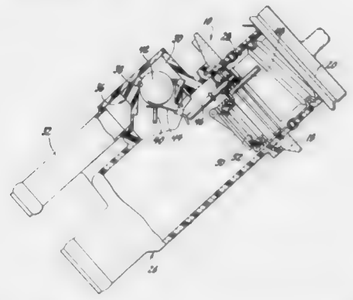
**FUEL TANK VENTING**

**Carl H. Sherwood, Brockport, N.Y., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Mar. 9, 1987, Ser. No. 23,158**

**Int. Cl.[4] B65B** *31/06*

**U.S. Cl. 220—86 R** **3 Claims**



1. In a vehicle fuel system having a fuel tank with a filler pipe having an upper end closable by a removable cap and opening to the atmosphere when said cap is removed to receive an inserted object, said system also having a fuel vapor storage canister to which said fuel tank is connected, a venting means that allows said cap to be removed while preventing pressurized fuel vapors generated in said tank when said filler pipe is closed from reaching the atmosphere, comprising,
a chamber having a first opening connected to said canister and a second opening communicating with said filler pipe below said filler pipe upper end,
a valve seat located in said chamber between said two chamber openings,
a valve movable from an open position beneath said valve seat to a closed position against said valve seat blocking communication between said two chamber openings,
valve actuation means operable by said cap to hold said ball valve in its closed position when said filler pipe is closed by said cap, and to move said ball valve to its open position as said cap is removed, and,
seal means located above said chamber second opening and below said cap, said seal means normally acting to block said filler pipe under end from the atmosphere independently of said cap while allowing said inserted object to pass through, whereby, as said cap is removed, said valve moves to its open position while said seal means independently blocks said filler pipe, so that said pressurized fuel vapors may exit through said chamber openings to be substantially stored in said canister before the inserted object passes through said seal means.

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**4,747,509**

**LID WITH DETACHABLE SEGMENT**

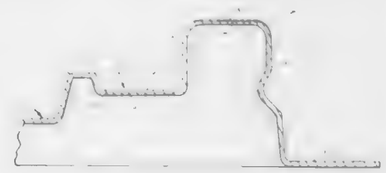
**Warren F. Florkiewicz, Paradise Valley, and Hubert E. Christian, Phoenix, both of Ariz., assignors to WMF Container Corporation, Phoenix, Ariz.**

**Continuation of Ser. No. 809,840, Dec. 13, 1985, abandoned, which is a continuation of Ser. No. 604,033, Apr. 26, 1984, abandoned. This application Jun. 9, 1987, Ser. No. 60,940**

**Int. Cl.[4] B65D** *41/48*

**U.S. Cl. 220—270** **5 Claims**

1. A lid for an open topped container, said lid being of frangible material and comprising a perimeter for engaging the edge of said open topped container, said lid comprising a central region having (a) a main planar portion and (b) a raised planar portion bounded partially by a sector of said perimeter and partially by a raised rib, and said perimeter having upper, inner and outer wall portions forming a downwardly extending U-shaped groove, score lines on said raised planar portion defining a removable movable segment thereof, said score lines comprising two lines extending from a point of intersection with each other on said raised planar portion outwardly to said perimeter, at least one of said upper and outer walls of said perimeter being scored with an extending portion of said score lines, said extending portion of said score lines being aligned with said score line at said perimeter, and being separated from said score lines by an area of unscored material comprising



substantially a wall portion; and tab means associated with said outer wall in the segment defined by said score lines, said tab means being finger movable to permit upward pressure to be applied to said perimeter and said segment, whereby the material of said lid at said score lines will be ruptured to free said segment from said container and from the remainder of said lid.

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**4,747,510**

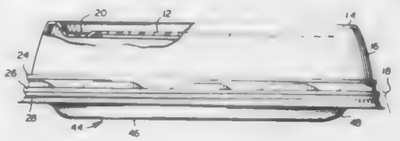
**TEAR OPEN LID**

**Anthony C. Mack, North Reading, Mass., assignor to Fort Howard Cup Corporation, Green Bay, Wis.**

**Filed Jul. 6, 1987, Ser. No. 70,218**

**Int. Cl.[4] B65D** *17/34*

**U.S. Cl. 220—270** **31 Claims**



1. A disposable lid for use with a container said lid comprising a top surface portion surrounded by depending skirt means, said depending skirt means including a pull tab extending outwardly from a lowermost edge of said depending skirt means, and wherein said depending skirt means includes plural means facilitating tearing of said lid in a first direction, upon upward exertion of force on said pull tab, and wherein said tear facilitating means do not include score lines.

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**4,747,511**

**PLUG-TYPE OPENERS FOR PLASTIC CAN ENDS**

**Herbert V. Dutt; Donald F. Yeager, both of Sarasota, and Dixie L. Weir, Brandenton, all of Fla., assignors to Sun Coast Plastics, Inc., Sarasota, Fla.**

**Filed Jul. 10, 1986, Ser. No. 884,136**

**Int. Cl.[4] B65D** *39/00*

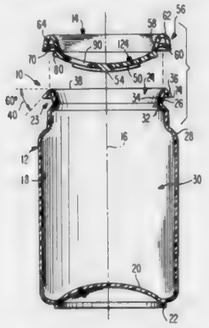
**U.S. Cl. 220—307** **16 Claims**

1. An easy-open closure for a container, comprising:
a container end having a top wall portion and means to engage a container;
a dispensing aperture in the top wall portion of said container end;
plug means shaped to snugly fit in said dispensing aperture, said plug means including
(a) a central wall portion surrounded by a depending peripheral flange extending through and engaging the peripheral edge of said aperture, and
(b) outwardly extending shoulder means engaging the top surface of said top wall, the peripheral edge of said dispensing aperture being clamped between said flange and said shoulder means to secure said plug against removal by internal pessure within a container closed by said container end;

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lift tab means formed unitarily with said plug means, said lift tab means being adapted to remove at least part of said



plug means from said dispensing aperture to permit opening of said dispensing aperture; and

tether means secured to said plug means.

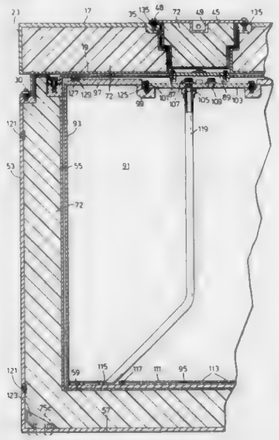
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**4,747,512**

**TRANSPORTATION PACKAGING FOR LIQUIDS**

**Kin K. Lo, 56 Chartland Boulevard South, Scarborough, Ontario, Canada M1S 2R4**

**Filed Jun. 19, 1987, Ser. No. 64,051**
**Int. Cl.[4] B65D *25/00***
**U.S. Cl. 220—444** **13 Claims**



1. A cylindrical overpack for protection of a vessel for holding radioactive or like hazardous materials during transport, comprising a circular lid having an upper and a lower circular wall, a cylindrical edge member welded at its upper and lower ends to the upper and lower walls, respectively, and heat insulative filler material disposed in the space therebetween, and a cylindrical hollow body on which the lid is secured, having concentric inner and outer cylindrical walls defining an annular space therebetween, with said outer wall of greater axial extent than said inner wall and an inner and an outer circular bottom wall welded to the lower edges of inner and outer cylindrical walls, respectively, and with said outer bottom wall offset downwardly from the inner bottom wall to define a lower space therebetween, outer and inner concentric substantially rigid ring members welded to an upper edge of the outer and of the inner cylindrical walls, respectively, and each of a rectangular cross section of axial and transverse dimension each greater than the wall thickness of the cylindrical wall to which it is welded, an annular cap member extending between and welded at its opposite edges to said outer and inner ring members, respectively, and heat insulative filler material disposed in said annular and lower spaces.

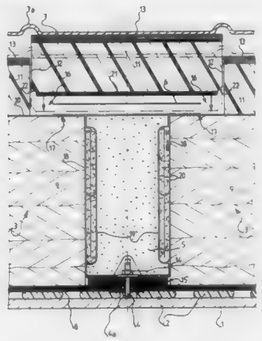
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**4,747,513**

**HEAT INSULATING WALL STRUCTURE FOR A FLUID-TIGHT TANK**

**Michel Betille, Montfort L'Amaury, and Claude Deliotte, Malakoff, both of France, assignors to Societe Nouvelle Technigaz, France**

**Filed May 29, 1987, Ser. No. 55,903**
**Claims priority, application France, Jun. 3, 1986, 86 07981**
**Int. Cl.[4] B63B *23/00***
**U.S. Cl. 220—452** **9 Claims**



1. A device forming a heat insulating wall structure of a fluid-tight heat-insulated tank, of the kind comprising an outer self-supporting or rigid wall; a substantially flexible or yielding membrane-like impervious inner wall or primary barrier spaced from said outer wall and a heat insulating intermediate material, and secured to the outer wall and serving as a bearing surface for said inner wall and essentially including a layer consisting of adjacent panels separated from each other by interposed gas-tight joint packings, wherein the improvement consists in that each interposed joint packing comprises on each of its sides at least one lateral joint consisting of a flexible expansible heat insulating material accommodated in a corresponding recess of the packing body and connected thereto, said lateral joint, after said packing having been mounted between two adjacent panels, being in free pressed bearing engagement with the neighbouring panel.

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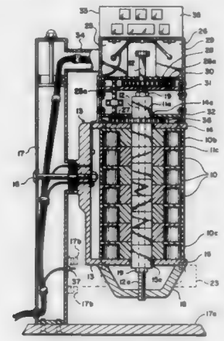
**4,747,514**

**ELECTRONICALLY CONTROLLED, PROGRAMMABLE DISPENSER FOR MEDICATIONS**

**Forrest D. Stone, Salt Lake City, Utah, assignor to John M. Trondsen, Seattle, Wash.**

**Filed Feb. 21, 1986, Ser. No. 831,810**
**Int. Cl.[4] B65D *83/04***
**U.S. Cl. 221—4** **21 Claims**

20. Sequentially operative mechanism, comprising a shaft mounted for rotation and for movement axially; several blocks unsymmetrical in axial cross-section stacked face-to-face on the shaft as a column and mounted thereon against axial movement relative thereto but so that said shaft is rotatable; several elements stacked face-to-face for rotation about the shaft, said elements being closely fitted onto said column of blocks so as to be keyed thereto for rotation therewith but permitting axial movement of said column relative thereto; means supporting said elements, said blocks, and said shaft; means for effecting axial movement of said shaft in opposite directions when rotated in opposite directions; and means for effecting block rotation, the number of the blocks in said column which are



rotated at any given time being determined by the axial positions of said blocks.

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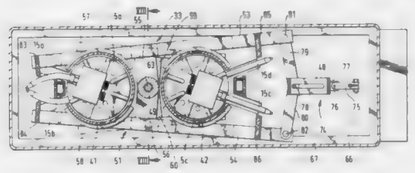


**4,747,515**

**APPARATUS FOR MOUNTING ON A LAND VEHICLE FOR THE DISTRIBUTION OF MARKERS**

**Igal Kasher, Kfar Saba, and Dan Lupu, Zahala, both of Israel, assignors to The State of Israel, Ministry of Defence, Israel Military Industries Israel**

**Filed Jul. 9, 1986, Ser. No. 883,735**
**Claims priority, application Israel, Oct. 23, 1985, 76798**
**Int. Cl.[4] B65G *59/06***
**U.S. Cl. 221—116** **4 Claims**



1. In apparatus for dispensing markers for distribution in a terrain being designed as an add-on unit for mounting on the rear of a self-propelled land vehicle, the improvement comprising:

(i) at least one vertical shaft adapted to hold a stack of foldable marker units in folded positions, each marker unit including a base plate, one visible activatable marker member hingedly connected to said base plate so as to be reciprocable between said folded and an upright position, and means for biasing the marker member into the upright position, and wherein said marker member of each marker unit is actuated by bending the same;

(ii) a delivery gate at the lower end of said at least one shaft adapted for the delivery of said marker units;

(iii) means associated with said at least one shaft for biasing a stack of marker units in folded positions in said at least one shaft towards said delivery gate thereof;

(iv) means associated with said delivery gate of said at least one shaft for sequentially releasing individual marker units comprising upper and lower shears having a common axis whose end portions are vertically spaced from each other by a distance a defined as $d<a<2d$ where d is the height of a folded marker unit, said shears being interlocked such that the movement of the shears is phased whereby when one shear converges the other spreads;

(v) controllable drive means linked to one of the shears for driving the shears; and

means associated with said lower shear for bending said marker member of a said marker unit when said marker unit is retained between said upper and lower shears, whereby said marker member is activated prior to being ejected from said delivery gate.

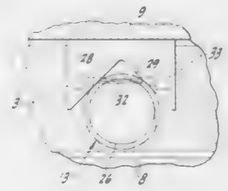
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**4,747,516**

**SOFT DRINK MAKER**

**Chester L. Baker, Sparks, Nev., assignor to Liquid Motion Industries, Co., Reno, Nev.**

**Filed Dec. 23, 1985, Ser. No. 812,862**
**Int. Cl.[4] B67D *5/56***
**U.S. Cl. 222—129.1** **2 Claims**



1. A soft drink maker comprising a counter having a dispensing station adapted to support a container, a nozzle on said counter spaced above and arranged to discharge downwardly toward said container at said station, means for supplying and controlling water to said nozzle, locator means on said counter including a pair of converging locating side walls defining a container locator, said converging walls configured to abut the sides of said container for positioning said container relative to said station and said nozzle, optical sending and receiving means recessed within said locating walls for establishing a beam between said walls in a position interruptable by said container, a manual control, and means concurrently controlled by said manual control and said optical sending and receiving means for operating said water supplying and controlling means.

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**4,747,517**

**DISPENSER FOR METERING PROPORTIONATE INCREMENTS OF POLYMERIZABLE MATERIALS**

**Duane H. Hart, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Mar. 23, 1987, Ser. No. 29,275**
**Int. Cl.[4] B65D *25/08***
**U.S. Cl. 222—137** **15 Claims**



1. Filled dispenser for simultaneously dispensing increments of extrudable materials that polymerize when mixed, while storing unused portions for later use, said dispenser having no internal valve and comprising:

a body formed with a tubular cavity and an extrusion outlet at one end of said cavity,

a piston slidably mounted within said cavity, said cavity containing between said piston and said outlet

(a) at least two extrudable materials that polymerize when

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mixed together, each extending over the length of said cavity from said piston toward said outlet, and

(b) at least one extrudable barrier layer disposed in separating relationship between said polymerizable materials, the material of said barrier layer being insoluble in each of said polymerizable materials while being dispersible in a mixture of them,

said polymerizable materials and the material of the barrier layer having sufficiently equivalent rheologies at the temperature at which they are to be extruded from said dispenser to avoid substantial intermixing until after said polymerizable materials emerge from said outlet, and to permit removal of increments of said polymerizable materials from said dispenser without causing clogging of said outlet by the unused portion of said polymerizable materials remaining within said dispenser.

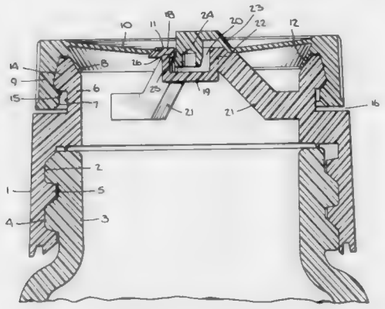
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**4,747,518**

## SQUEEZE BOTTLE SELF-CLOSING AND VENTING DISPENSING VALVE

**Robert H. Laauwe, 237 Green Ridge Rd., Franklin Lakes, N.J. 07417**

**Filed Dec. 2, 1986, Ser. No. 936,848**
**Int. Cl.[4] B05B *11/04*; B65D *47/32***
**U.S. Cl. 222—153** **1 Claim**



1. A dispensing device for a squeeze bottle having a cylindrical neck, the device comprising a base forming a cylindrical wall having a lower portion internally reduced in thickness and fitting over said neck and an upper portion externally reduced in thickness and forming an internally beveled and continuously circular rim forming a vent valve seat; said dispensing device having a cap forming a depending cylindrical flange surrounding and connected to said upper portion, said cap having a closed top having a central dispensing hole, said flange having a continuously circular elastic vent valve with an inverted conical shape extending angularly inwardly with an outside seating on said vent valve seat, said dispensing device having a venting passageway extending between a portion of the outside of said vent valve and the outside of said dispensing device between the base and the cap, said vent valve seat extending to the top of the base's said upper portion and the ouside of said vent valve completely overlapping the seat, said venting passageway further comprising at least one radially extending slot opening through the seat to the outside of the device, said cap being rotative on said base and said vent valve being rotatively slidable on said vent valve seat, said upper portion of the base's said cylindrical wall having a connection flange extending outwardly radially from said valve seat, and the cap's said depending flange having a circular inwardly extending lip snapped under said connection flange, said connection flange and said lip having intermating conical surfaces causing said depending flange of said cap to be wedged outwardly with said lip snapping under said connection flange when said cap and said base are pushed together to assemble said dispensing device, said closed top of said cap being in the form of a flexible diaphragm and said base having radially inwardly extending spokes having tips on which an annular valve head is supported, said central dispensing hole and said annular valve head forming a self closing valve having intermating conical surfaces and the diaphragm normally elastically pressing said surfaces together, whereby internal pressure on the inside of said diaphragm, produced by collapsing said bottle, forces said diaphragm upwardly and separates said surfaces so as to open said dispensing hole, said device having an inverted cup supported by said spokes and having a wall depending from said annular valve head and a mouth forming a female element of a bayonet joint; and the outside of said diaphragm being fixed to a bracket from which a male element of said joint depends into said mouth, rotation of said cap on said base causing said joint to connect and disconnect and when connected holding said diaphragm downwardly with said inter-mating conical surfaces of said hole and said annular valve head forced together.

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**4,747,519**

## HANGER SYSTEM FOR A CONTAINER

**Paul J. Green; Daniel R. Long, and Roger E. Schanzle, all of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio**

**Filed Oct. 7, 1985, Ser. No. 785,363**
**Int. Cl.[4] B67D *5/06***
**U.S. Cl. 222—181** **6 Claims**



1. A hanger system for a container, said hanger system comprising in combination:

(a) a container having side and bottom walls and a top wall including a dispensing outlet, said bottom wall having a concave portion and a centrally located substantially flat area within said concave portion;

(b) a hanger attachment lug located centrally within said flat area and being fully contained within said concave portion of said bottom wall of said container, said hanger attachment lug having a shaft portion which is substantially circular in cross-section and a retention flange extending outwardly from the distal end of said shaft portion; and

(c) a detachable hanger member having an attachment clip formed adjacent its lower portion adapted to engage the outer periphery of said shaft portion of said attachment lug below said retention flange to detachably and rotatably attach said hanger member to said container, and having a generally U-shaped upper hook portion extending upwardly from said attachment clip and being adapted to suspend said container in inverted condition, the lower surface of said attachment clip being substantially flat and corresponding to said flat portion of said bottom wall, said hanger member being attachable to said attachment lug from any direction about the periphery thereof, and once attached to said lug, being rotatable 360° thereabout to suspend said container in any such rotated position.

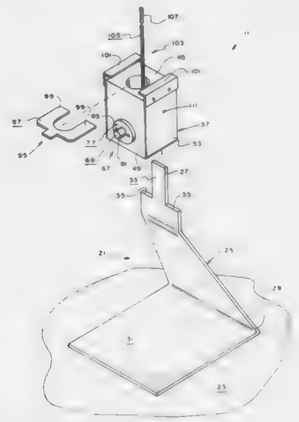


**4,747,520**

## DEVICE FOR DISPENSING LIQUID FROM A BOTTLE

**Donald W. Lane, Sr., Rte. 2, Box 315, Atoka, Tenn. 38004**

**Filed Feb. 27, 1987, Ser. No. 19,782**
**Int. Cl.[4] B67D *5/06***
**U.S. Cl. 222—181** **12 Claims**



1. A device for dispensing liquid from a bottle into a receptacle and for holding said bottle above a support surface, said bottle having a mouth and an outwardly extending flange located adjacent said mouth; said device comprising:

(a) a body having a bore therethrough, said bore having an inlet end for receiving said mouth of said bottle and having an outlet end;

(b) dispensing valve means associated with said bore for controlling the passage of liquid from said bottle through said bore;

(c) clamp means attached to said body adjacent said inlet end of said bore for allowing said inlet end of said bore of said body to be inserted over said mouth of said bottle while said bottle is in an upright position and for then engaging and clamping said flange of said bottle to said body with said mouth of said bottle located within said inlet end of said bore, said clamp means including a plate means fitting around at least a portion of said flange of said bottle when said mouth of said bottle is located within said inlet end of said bore for coacting with said body to trap said flange therebetween;

(d) a stand having a lower end for being supported on said support surface and having an upper end including a finger portion; and

(e) bracket means attached to said body for allowing said bottle and said body to be inverted as a unit after said bottle is clamped to said body and for then receiving said finger portion of said stand to removably secure said body to said stand with said bottle in the inverted position.

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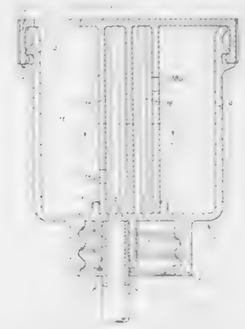
**4,747,521**

## DOSAGE DEVICE

**Ronald G. Saffron, Salisbury, England, assignor to Merck & Co., Inc., Rahway, N.J.**

**Filed Nov. 10, 1986, Ser. No. 928,359**
**Int. Cl.[4] B67D *5/06***
**U.S. Cl. 222—205** **8 Claims**

1. A dosage device on a squeeze bottle with a dip tube, for the delivery of a measured quantity of a liquid or flowable paste when said squeeze bottle is deformed to compress said liquid or flowable paste and force it up the dip tube, comprising a cup component and a compartmented component, said cup component and said compartmented component each including respective means coacting to secure said compartmented component assembled within said cup component but relatively rotatable with respect thereto about an axis, said cup component including a radially extending base wall having an opening which is radially offset from said axis and in communication with said dip tube, said compartmented component including axially extending wall means bounding a plurality of compartments each having an open end and each of which can be brought selectively, by relative rotation of the two components, into a position of alignment of its open end with said base wall opening, an outer wall portion bounding each compartment including an outlet disposed at a respective different axial spacing from said open end, said cup component and said outer wall portion bounding a dispensing space and said liquid or flowable paste enters the selected compartment from said dip tube and base wall opening, and enters the dispensing space through the outlet and any liquid or flowable paste in the dispensing space above the level of the outlet of the selected compartment is returned to the squeeze bottle through said outlet when the compression of the liquid or flowable paste is released.



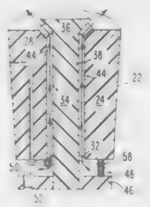
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**4,747,522**

## FLUID DISPENSING DEVICE

**Phillip McIntyre, P.O. Box 353, Titusville, N.J. 08560**

**Filed Apr. 3, 1987, Ser. No. 33,956**
**Int. Cl.[4] B65D *37/00***
**U.S. Cl. 222—213** **16 Claims**



1. A fluid dispensing device comprising:

(a) a container means comprising:

(1) an upper neck section defining an outlet therein at the uppermost end thereof;

(2) a body section adapted to receive and retain fluid therein for dispensing thereof, said body section defining a fluid chamber therein for holding undispensed fluid,

(b) a dispensing head being automatically self-closing and comprising:

(1) a housing member mounted in said outlet of said upper neck section and defining a dispensing channel extending vertically upwardly therethrough, said housing defining a valve seat adjacent to the uppermost end of said dispensing channel, said housing member including a first abut-

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ment shoulder adjacent to the lower end of said dispensing channel;

(2) a valve means movably secured to said housing member and mounted extending vertically through said dispensing channel, said valve means being adapted to selectively move between an open and a closed position to control fluid flow communication between said fluid chamber and the external environment, said valve means including:

a. a valve head selectively engageable with respect to said valve seat to close said valve means and prevent fluid flow communication between said fluid chamber and the external environment when said valve means is in the closed position, said valve head also being selectively disengageable with respect to said valve seat to allow fluid flow communication between said fluid chamber and the external environment when said valve means is in the opened position to facilitate controlled dispensing of fluid from said fluid chamber;

b. a valve stem extending from adjacent said valve head downwardly through and below said dispensing channel, said valve stem having an external diameter less than the internal diameter of said dispensing channel to define an annular dispensing conduit therebetween;

c. a valve flange mounted on said valve stem at a position below said dispensing channel, said valve flange comprising a plurality of individual strut means extending radially horizontally outwardly from said valve stem to define a second abutment shoulder at the radially outermost upwardly facing ends thereof and facing upwardly below said housing member; and

d. a biasing means including a plurality of individual spring means each abutting the radially outermost upwardly facing ends of said strut means and extending upwardly to said first abutment shoulder to exert bias thereagainst, said individual spring means being mounted below said first abutment shoulder of said housing member and above said second abutment shoulder of said valve flange and spaced outwardly from said valve stem to exert a laterally equal bias on said valve flange and said valve head downwardly with respect to said housing member to urge complete and equal abutment of said valve head with respect to said valve seat for closing of said valve means in the steady state condition.

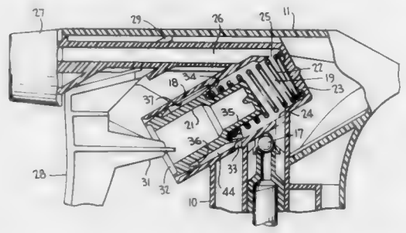
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**4,747,523**

## MANUALLY ACTUATED DISPENSING PUMP

**Douglas B. Dobbs, Yorba Linda, Calif., assignor to Calmar, Inc., Watchung, N.J.**

**Filed Jun. 19, 1987, Ser. No. 63,920**
**Int. Cl.⁴ B67D *5/40***
**U.S. Cl. 222—383** **2 Claims**



1. A manually actuated dispensing pump comprising, a pump body for mounting with a closure cap at the upper end of a container for fluent product, said pump body extending transversely above the closure cap, said body having a pump cylinder open at its outer end to atmosphere and having at its inner end region a pump chamber for a manually reciprocable piston, said pump body having venting means, said cylinder having an inlet port opening into said chamber and in communication with a valve controlled inlet passage, and said cylinder having in its lower region an outboard port positioned outwardly of said chamber and in open communication with the interior of the container, said piston having a first annular piston seal in sealing engagement with the wall of said pump chamber, and said piston having a second annular piston seal spaced outwardly of said outboard port in all operative positions of said pump piston and sealingly engaging at least a lower region of the inner surface of said cylinder in said operative positions, said piston seals being spaced apart to define an annular chamber in communication with said outboard port, said first piston seal and said inlet port being relatively positioned such that said first piston seal overlies said inlet port at a predetermined position during the inward pressure stroke of said piston to permit flow of entrapped air from said pump chamber outwardly of said pump cylinder via said annular chamber.

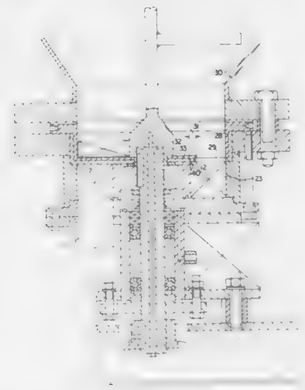
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**4,747,524**

## DEVICE FOR METERED HANDLING OF BULK MATERIALS

**Wolfgang Krambrock, Vogt, Fed. Rep. of Germany, assignor to AVT Anlagen-und Verfahrenstechnik GmbH, Vogt, Fed. Rep. of Germany**

**Filed Aug. 14, 1986, Ser. No. 896,275**
**Claims priority, application Fed. Rep. of Germany, Aug. 16, 1985, 3529480; Dec. 13, 1985, 3544014**
**Int. Cl.⁴ B65G *53/46*; G01F *11/10***
**U.S. Cl. 222—636** **10 Claims**



1. A device for metering bulk materials, comprising:

a cylindrical housing having a vertical center axis and a discharge opening;

a rotor of diameter D' rotatively mounted in said housing for rotation about said axis, said rotor including paddles extending to the radially outer periphery thereof and including a hub of outer diameter d' carrying said paddles in said housing, said paddles having top edges extending radially outwardly with respect to said axis; and

a cover plate covering said hub and said paddles, said cover plate having:

a cover plate opening therein in the shape of a segment of an annular ring having a first upper edge in the shape of a segment of a circle of diameter d centered on said axis, an outer boundary radially outside said first upper edge in the shape of a segment of a circle centered on said axis of diameter D greater than d and approximately equal to D', a second upper edge connecting said first upper edge and said outer boundary and extending over the rotary path of said paddles at a first acute angle α with respect to said top edges of said paddles as said paddles rotate therepast in said rotary path, and a third upper edge opposite said second upper edge, said diameter d of said first upper edge being greater than said outer diameter d' of said hub so as to define a first cavity in said housing below said cover plate, between said second and third upper edges, radially inside said first upper edge and radially outside said hub, and

an undercut portion below said second upper edge, having a lower edge extending over the rotary path of said paddles at a second acute angle $\beta$ with respect to said top edges of said paddles as said paddles rotated therepast in said rotary path, said undercut portion being formed between said second upper edge and said lower edge and defining a second cavity therein between said undercut portion and the upper edges of said paddles, said second upper edge and said lower edge forming stripping edges which direct particles of the bulk material radially inwardly into said first and second cavities as said rotor rotates.

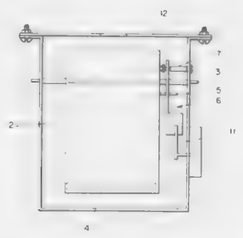
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**4,747,525**

## PERIODIC RELEASE MECHANISM

**Donald W. Pennington, 532 Woodstone Dr., Baton Rouge, La. 70808**

**Filed Apr. 24, 1987, Ser. No. 42,049**
**Int. Cl.⁴ A01K *5/02, 1/10***
**U.S. Cl. 222—650** **6 Claims**



1. A periodic release mechanism for discharging material from a partially-open, hollow container pivotally mounted on a first axle, comprising:

(a) a counter-weight for the container, which counterweight is sufficient to maintain the container in an upright position when the container is empty, but is insufficient to maintain the container in an upright position when the container is filled with material;

(b) a catcher including first and second plates disposed at an angle to one another, the first plate including a closed notch near the center and an open notch at one edge of the first plate, the catcher pivotally mounted on a second axle passing through the closed notch;

(c) a stop member extending from one side of the container, the stop member disposed in the open notch of the catcher, for holding the container in an upright position until release; and

(d) a rotating arm mounted on a third axle, the rotation of the arm defining a circle, the motion of the arm characterized as periodic and cyclic, the rotating arm making periodic contact with one face of the second plate of the catcher so as to pivot the catcher and release the stop member from the open notch, thereby emptying the contents of the container.

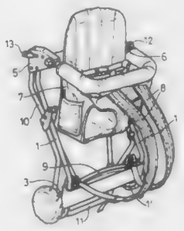


**4,747,526**

## TRANSPORTABLE INFANT SEAT

**Joaquin J. Launes, Barcelona, Spain, assignor to Play, S.A., Spain**

**Continuation of Ser. No. 783,877, Sep. 24, 1985, abandoned. This application Mar. 3, 1987, Ser. No. 22,574**
**Int. Cl.⁴ A45F *4/02***
**U.S. Cl. 224—155** **5 Claims**



1. An infant seat comprising:

a pair of spaced apart side members (1) each having upper and lower ends, each side member having at its lower end a bent laterally extending portion (1');

a pivot lever (4) pivotally connected to each laterally extending portion;

a shaft (3) mounted between said pivot levers;

a pair of wheels (2) mounted to said shaft for rotation, said pivot levers being pivotal between a raised position and a lowered position, said shaft and said wheels both being above said bent laterally extended portions with said pivot levers in their raised position, and being below said laterally extending portions with said pivot levers being in their lowered position, whereby with said pivot levers in their raised position, said wheels are peripherally protected by said bent laterally extended portions;

a head (5) connected to said upper end of each side member;

a bag support member (6) pivotally mounted between said heads;

a seat bag (7) connected to and suspended from said seat bag support member;

a cross member (9) connected between said side members for holding said side members apart, said cross member being connected between said side members at a location spaced away from said heads;

a pair of shoulder straps (8) each connected between said seat bag support member and said cross member for permitting carrying of the infant seat on the shoulders of a person; and

a U-shaped handle bar (10) connected between said heads for pivoting from a use position extending upwardly from said upper end of said side members and a folded position extending downwardly along said side members.

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**4,747,527**

## UTILITY BELT

**Frederic K. Trumpower, II, 2718 Ariane Dr., San Diego, Calif. 92117**

**Filed Feb. 25, 1987, Ser. No. 18,520**
**Int. Cl.⁴ A45F *13/00***
**U.S. Cl. 224—224** **7 Claims**

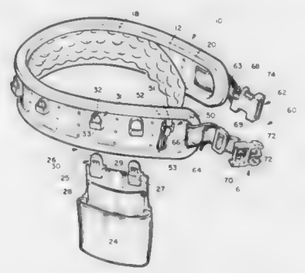
1. A utility waist belt comprising:

an elongated strip of plastic material having a predetermined width, a predetermined length and a predetermined thickness, said elongated strip having sufficient torsion resistance to prevent said elongated strip from being twisted more than 90 degrees, the longitudinal flexibility of said elongated strip being such that it can be drawn around a person's waist to form a closed loop belt, said elongated strip having an inner surface and an outer surface;

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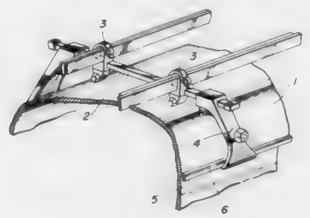
means for detachably securing the opposite ends of said elongated strip together to form a closed loop belt;
cushion means for resiliently supporting said utility belt against the waist of a person wearing said belt, said cushioning means being secured to the inner surface of said elongated strip;
resilient flanges extending outwardly from the inner surface of said elongated strip adjacent its peripheral edge to form



spaced walls between which said cushioned means is captured, said resilient flanges being formed of hollow tubing made of neoprene that functions to cushion the belt against the wearer and also effects a frictional resistance to the belts slipping downwardly under the weight of the objects carried thereby; and
means for supporting articles secured to the outer surface of said elongated strip.

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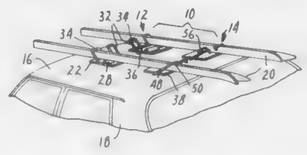
**4,747,528**
**ANTI-THEFT ROOF CARRIER STRUCTURE FOR AN AUTOMOBILE**
**Masashi Kamaya, Tokyo, Japan, assignor to PIAA Corporation, Tokyo, Japan**
**Filed Jun. 20, 1986, Ser. No. 876,463**
**Int. Cl.[4] B60R *9/00***
**U.S. Cl. 224—315** **2 Claims**



1. A lock unit of a roof carrier of a vehicle, comprising a crossbar for placing an object to be carried thereon, a plurality of stands mounted on said crossbar for supporting said crossbar on a vehicle roof, and a rotatable knob mounted on at least one of said stands, for fixing said stands at given positions on said roof of said vehicle, wherein said knob includes a locking member rotatably mounted with respect to said knob for preventing rotation of said knob, said locking member including a rotatable cam member having a camming surface and wherein said knob includes a bottom plate, a rotating member mounted on said plate and having at least one recess formed therein, a pin member movably mounted in said locking member transverse to a rotational axis of said cam member, and biasing means positioned between said rotating member and said cam member for biasing said pin member into engagement with said cam member; wherein said cam member is rotated to move said pin out of engagement with said recess, thereby preventing rotation of said knob and defining a locked state and wherein said cam member is rotated to move said pin into engagement with said recess defining an unlocked state.

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**4,747,529**
**COLLAPSIBLE SKI RACK**
**Philip D. Hinderaker, and Daniel J. Hinderaker, both of P.O. Box 33427, 2501 Hudson Rd., St. Paul, Minn. 55133-3427**
**Filed Jul. 21, 1986, Ser. No. 887,347**
**Int. Cl.[4] B60R *9/00***
**U.S. Cl. 224—325** **18 Claims**

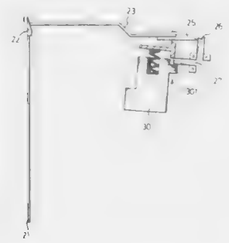


1. A car-top mountable rack for holding an elongated article such as a pair of skis, comprising at least a pair of units adapted to be positioned spaced apart from each other to cooperatively receive a said article, each unit including
(a) a substantially planar base,
(b) means for securing each said base to a substantially horizontal surface such as the top of a vehicle; and
(c) means horizontally pivotally mounted on said base for receiving and securing therein a said article, comprising:
(i) a horizontally positioned member secured to said base to allow said member to pivot about a horizontal axis,
(ii) at least a pair of spaced apart, parallel legs both mounted to the member and extending substantially normal thereto,
(iii) at least upper and lower spaced apart support members secured to said legs and extending substantially parallel to said axis, said support members thereby defining spaced apart arms for allowing one end of a said article to be slid into the opening created by said combined arms and legs, thereby receiving and supporting a said article when said legs are in a substantially vertical position and for wedging the article therebetween when the legs are pivoted into a more nearly horizontal position to prevent vertical movement of said article, and
(iv) means on the end of at least one of said support members for restricting horizontal movement of a said article when said leg is so pivoted, said wedging and restricting action thereby in concert securing a said elongated article within said two spaced apart units of said rack.

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**4,747,530**
**SAFETY PUNCHING DEVICE FOR STAPLE GUN**
**Ted S. Chang, 3f., No.27, Lane 154, Hsing I Road, Pei Tou District, Taipei, Taiwan**
**Filed Oct. 1, 1987, Ser. No. 103,274**
**Int. Cl.[4] B25C *5/15***
**U.S. Cl. 227—8** **1 Claim**

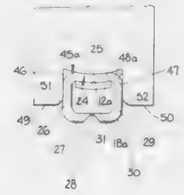
1. A safety punching device for staple guns comprising:
a safety plate vertically disposed adjacent to a front surface of a gun body, a lower end of the safety plate extending beyond an outlet of said gun body;
a tapered block engaged at an upper end of said safety plate;
a horizontal plate which is perpendicular to said safety plate contacting with the inclined surface of said tapered block at a left end thereof;
a pushing block engaged at right end of said horizontal plate;
a safety switch disposed adjacent to and controlled by said pushing block, the safety switch being serially connected to an operating switch of the gun body; and



a resilient sheet engaged with the left end of said horizontal plate when released for restoring the safety punching device to original position.

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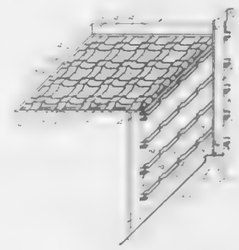
**4,747,531**
**ANVIL AND DRIVER ASSEMBLY FOR A SURGICAL SKIN STAPLING INSTRUMENT**
**Ronald J. Brinkerhoff, Moscow, Ohio, and Michael A. Murray, Bellevue, Ky., assignors to Ethicon, Inc., Somerville, N.J.**
**Filed Mar. 23, 1987, Ser. No. 29,074**
**Int. Cl.[4] B25C *5/02***
**U.S. Cl. 227—19** **15 Claims**



1. An anvil and a driver for use with a surgical stapling instrument to form and implant a surgical staple of the type having a crown portion terminating at each end in a leg portion, said anvil being mounted on said instrument, said driver being shiftably supported by said instrument, said anvil having an anvil surface, said driver having a staple forming end, said driver being shiftable by said instrument between a normal retracted position and a staple forming position, said forming end of said driver having an inverted U-shaped notch therein adapted to receive said anvil when said driver is in said staple forming position, said notch being defined by side edges for bending the staple leg portions about said anvil at their junctures with said staple crown and a transverse edge joining said side edges and adapted to contact said staple crown during the staple forming operation, there being clearance between said side edges of said driver notch and said anvil greater than the transverse cross sectional dimension of said staple leg portions when said driver is in said staple forming position, said anvil surface being concave and said crown contacting driver edge being complimentary with and configured to cooperate therewith to impart a concave bow in said staple crown when said driver is in said forming position, said bow being of such dimension as to preclude plastic deformation of said crown, whereby more generous bends with less force and without coining and slight over-bending are achieved at the junctures of said staple leg portions and said staple crown and whereby when said driver is shifted from said staple forming position to said retracted position said crown returns to its initial state compensating for spring-back at said junctures of said leg portions and said crown portion, consistantly producing the desired final formed configuration of said staple.

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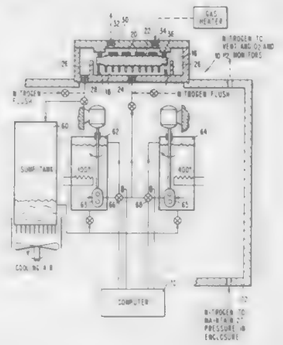
**4,747,532**
**APPARATUS FOR HOLDING ELECTRICAL OR ELECTRONIC COMPONENTS DURING THE APPLICATION OF SOLDER**
**Ah T. Sim, Block, Singapore, assignor to Sun Industrial Coatings Private Ltd., Jurong, Singapore**
**Filed Aug. 19, 1986, Ser. No. 897,824**
**Claims priority, application United Kingdom, Aug. 20, 1985, 8520844**
**Int. Cl.[4] B23K *37/04***
**U.S. Cl. 228—47** **16 Claims**



16. Apparatus for holding electrical or electronic components whilst being moved through a solder bath, including means for holding a plurality of components in an array and restricting them against movement in lateral directions and in the upwards vertical direction, wherein means for restricting vertical movement in the downwards vertical direction comprises a plurality of parallel elongate members each provided along its length with a plurality of projections adapted to engage the components and each mounted to a frame by means of a lug and slot arrangement allowing for thermal expansion, wherein the elongate members are mounted on posts which project downwardly from the frame and the elongate members are parallel to the direction of movement through the solder bath.

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**4,747,533**
**BONDING METHOD AND APPARATUS**
**Lewis D. Lipschutz, Poughkeepsie, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.**
**Filed Apr. 28, 1986, Ser. No. 856,516**
**Int. Cl.[4] B23K *3/00***
**U.S. Cl. 228—180.1** **19 Claims**



1. An apparatus for reflowing solder terminals that join an electronic element to a support substrate comprising,

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a stage for supporting said subtrate,
a quantity of liquid capable of being heated to a temperature in excess of the melting point of the solder of said solder terminals,
a means to contact a surface of said substrate with said liquid said means including at least one reservoir and a pumping means to move said liquid from said reservoir into contact with a surface, and a means to control the temperature of said liquid when in contact with said substrate to initially increase the temperature of the liquid, and subsequently to reduce the temperature of said liquid, wherein the temperature of said liquid in contact with said substrate is varied according to said control means.

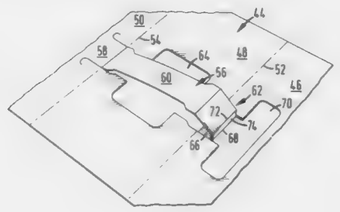
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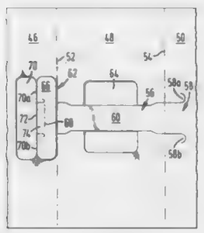
**4,747,534**

## EXTENSIBLE HANDLE FOR A CARTON AND BLANK THEREFOR

**Philippe Marie, Chateauroux, France, assignor to The Mead Corporation, Dayton, Ohio**

**Filed Apr. 6, 1987, Ser. No. 34,889**
**Claims priority, application United Kingdom, Apr. 3, 1986, 8608171**
**Int. Cl.[4] B65D** *5/46*
**U.S. Cl. 229—52 B** **5 Claims**





1. In a packaging carton of the type having a top wall panel and spaced first and second side wall panels joined to said top wall panel along fold lines and wherein said wall panels have exposed outer surfaces and opposite interior surfaces, an extensible handle struck from and spanning across said top wall panel and having opposed ends of which one end is associated with said first side wall panel and the other end is associated with said second side wall panel, said handle comprising a central hand gripping portion arranged to be lifted from a flat stowed position within said top wall panel to a raised position extending above said top wall panel, a foldable end portion hinged to at least said one end of said handle and disposed in underlying relationship with said hand gripping portion when the latter is in stowed position and folded out when the handle is grasped to lfit the carton, and an end flap hinged to said end portion and secured to the interior surface of one of the adjacent wall panels, said end portion and said end flap being provided from material struck from said first side wall panel.

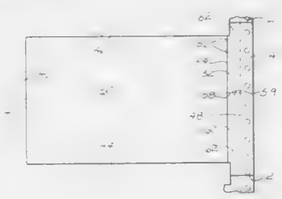
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**4,747,535**

## ENVELOPE ASSEMBLY

**Roger L. Haase, Arlington Heights, and Gary W. Fitzgibbons, Prairie View, both of Ill., assignors to Uarco Incorporated, Barrington, Ill.**

**Filed May 18, 1987, Ser. No. 50,859**
**Int. Cl.[4] B65D** *27/10*
**U.S. Cl. 229—69** **9 Claims**



1. An envelope assembly comprising first and second plies respectively defining a front and a back of an envelope;
an intermediate insert ply between said first and second plies and having a message section and an attachment section, said attachment section and said message section being connected by at least one small, frangible tie extending across a slit otherwise completely severing said sections;
means including a U-shaped glue line securing said first and second plies together and said attaching section to one of said first and second plies with said message section nested within said U-shaped glue line; and
a tab formed at least in part by said one ply and affixed to said attaching section, said tab being defined by two breakable connections, including at least one line of weakening in said one ply, to said first and second plies with said connections being offset from one another so that upon removal of said tab by breaking said connections, said insert will be exposed and said attaching section removed.

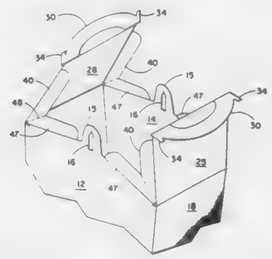
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**4,747,536**

## CARTON WITH GUSSETTED COVER PANELS AND A HANDLE

**Henry Wischusen, III, Lilburn, Ga., assignor to Rock-Tenn Company, Norcross, Ga.**

**Continuation of Ser. No. 693,595, Jan. 22, 1985, Pat. No. 4,651,919. This application Apr. 10, 1986, Ser. No. 850,147**
**Int. Cl.[4] B65D** *5/46, 5/10*
**U.S. Cl. 229—128** **4 Claims**



1. In a carton including a side wall, an end wall foldably connected to said side wall, and a top panel foldably connected along a first edge thereof to an upper edge of said end wall, said top panel being foldable to at least partially enclose said carton, the improvement comprising:
a locking tab extending from said top panel;
said side wall defining a slot adjacent to an upper edge thereof for receiving said locking tab when said top panel is folded to at least partially enclose said carton; and
means connected to said top panel and said side wall for urging said top panel upwardly and positively engaging said locking tab with said slot.

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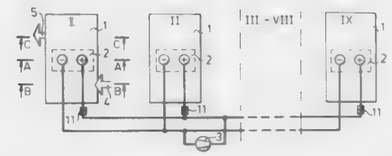


**4,747,537**

## ENERGY SAVING SYSTEM FOR CONTROLLING THE TEMPERATURE OF BUILDINGS USED FOR RAISING LARGE NUMBERS OF ANIMALS

**Ágnes Várga, Budapest, and János Gouth, Törökbálint, both of Hungary, assignors to Innofinance Általános Innovációs Pénzintézet, Budapest, Hungary**

**PCT No. PCT/HU85/00030, § 371 Date Jan. 21, 1986, § 102(e) Date Jan. 21, 1986, PCT Pub. No. WO85/05436, PCT Pub. Date Dec. 5, 1985**
**PCT Filed May 17, 1985, Ser. No. 820,479**
**Claims priority, application Hungary, May 18, 1984, 1912/84**
**Int. Cl.[4] A01K** *31/20*
**U.S. Cl. 237—14** **6 Claims**



1. An energy saving system for (1) controlling the temperature in buildings used for animal raising which have a plurality of compartmentalized areas for the containment of a plurality of living animals, and (2) reducing the spread of infection between the compartmentalized areas, wherein there is in each of said compartmentalized areas
(a) a fresh air introducing unit comprising an air duct having disposed therein a heater and a fan;
(b) at least one air exhaust unit comprising an air duct having disposed therein a biological filter to remove infective organisms, a dust filter and a fan, wherein said biological filter is saturated or impregnated with a biocide liquid for exhausting the disinfected air;
(c) at least one air treatment unit connected to a heat pump outside the compartmentalized areas for condensing water vapors generated in said compartmentalized areas, said heat pump having a heating side and a cooling side, wherein each of said air treatment units comprises
air ducts having dispersed therein a chemical filter, a biological filter, a dust filter, a vapor condenser, a fan and an after heater unit, wherein said vapor condensers recover heat obtained from said condensation and are disposed in the ducts of each of said air treatment units in parallel conection to each other through the cooling side of said heat pump in a heat exchanging relationship with said heat pump and the said after heater units are connected parallel to each other through the heating side of said heat pump.

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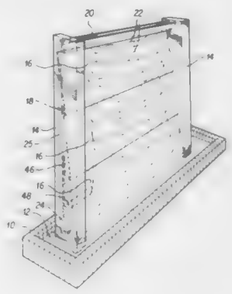
**4,747,538**

## WATER WALL

**Patricia A. Dunn, Ellicott City, Md.; Clyde T. Dunn, Strykersville, N.Y., and Gregory G. Dunn, Ellicott City, Md., assignors to Delta Tech, Inc., Ellicott City, Md.**

**Filed Mar. 10, 1986, Ser. No. 837,897**
**Int. Cl.[4] F21P** *7/00*
**U.S. Cl. 239—20** **31 Claims**

1. A water wall comprising:
base means, comprising means for containing a pool of water having a pool surface;
pump means for pumping water from said pool;
water dispersal means for providing an essentially laminar flow of water at a flow rate;
piping means, connected between said pump means and said water dispersal means;
a waterfall panel assembly comprising a number of essentially smooth members in edge-overlapping, abutting relationship to one another, the smooth members of said assembly being generally parallel to one another and having respective lower edges, surfaces for receiving said laminar flow of water, the surfaces of said smooth members being non-enclosed; and



support means for maintaining the members of said assembly at a predetermined angle of inclination with respect to the vertical, and for supporting said water dispersal means generally above said panel assembly;
wherein the flow rate of water, horizontal distance between the lower edges of ones of said smooth members of said panel assembly and the surfaces of next lower smooth members of said panel assembly, and angle of inclination of said smooth members being such that water flowing over said smooth members of said panel assembly tends to adhere thereto, whereby splashing of said water is largely avoided.

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**4,747,539**

## REVERSIBLE ON-OFF FRAGRANCE EMITTING UNIT

**Donald Spector, 380 Mountain Rd., Union City, N.J. 07087**

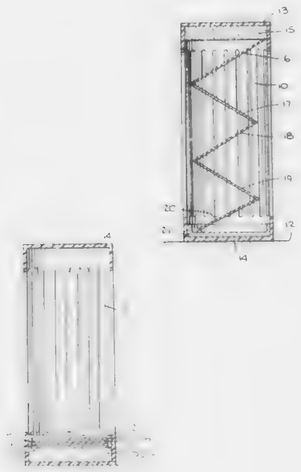
**Filed May 15, 1987, Ser. No. 49,855**
**Int. Cl.[4] A61L** *9/04*
**U.S. Cl. 239—56** **7 Claims**

1. A reversible fragrance emitting unit adapted to rest on a flat surface in either an upright position or an upside down position, the unit being automatically turned ON in one position and turned OFF in the other position, said unit comprising:
A a vented shell enclosed at one end by a flat cover and at the other end by a flat wall;
B an absorbent pad disposed within the shell and secured to said cover; and
C an accordian within the shell formed by a series of interhinged absorbent elements, the leading end of the series being joined to the pad and the trailing end to a weight whereby in one position of the unit the accordian is collapsed on the pad and compressed thereon by the weight; and in the other position, the accordian is expanded to expose the surfaces of its elements, and the weight rests on

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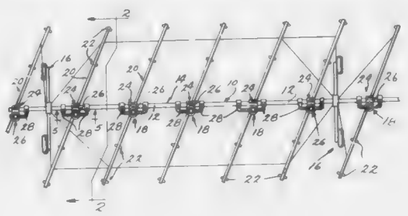
the wall, said pad and said elements being impregnated with a volatile fragrance which is emitted from the elements only when the accordian is expanded, and discharges into the atmosphere through the vented shell.

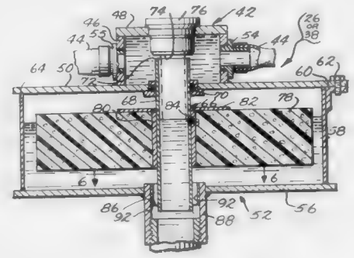


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**4,747,540**
**PRESSURE REGULATED ASSEMBLY FOR IRRIGATING AT WATER PRESSURES BELOW 10 PSI**
**Larry P. Meyer, Walla Walla, Wash., assignor to Nelson Irrigation Corporation, Walla Walla, Wash.**
**Filed Jun. 10, 1981, Ser. No. 272,086**
**Int. Cl.⁴ B05B** *15/00*
**U.S. Cl. 239—76** **8 Claims**

1. An assembly for irrigating at water pressures below 10 psi comprising
- means for discharging water at a desired discharge pressure below 10 psi onto a site to be irrigated horizontally elongated conduit means having outlet means for delivering water at a supply flow rate and at a supply pressure greater than said discharge flow rate and said discharge pressure,
- means for containing a volume of water in communication with said water discharging means having a free surface communicating with atmosphere disposed at a level above said water discharging means a height generally corresponding to said desired discharge pressure, and
- means for introducing water from the outlet means of said conduit means into said containing means sufficient to maintain the free surface of the volume of water contained therein generally at said level,
- said horizontally elongated conduit means having inlet means therein spaced horizontally a substantial horizontal distance from said outlet means for communicating with a generally constant source of water having a pressure and flow rate sufficiently greater than the supply pressure and flow rate as to insure that the interior of said horizotnally elongated conduit is at all times filled with water so that water will be available at all times at said supply pressure and supply flow rate.





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**4,747,541**
**DISPENSING APPARATUS**
**Richard L. Morine, 95 Windward Island, Clearwater, Fla. 33515, and James J. Hokes, 4313 Carrollwood Village Dr., Tampa, Fla. 33624**
**Filed Aug. 21, 1986, Ser. No. 898,716**
**Int. Cl.⁴ B05C** *5/00*
**U.S. Cl. 239—127** **16 Claims**

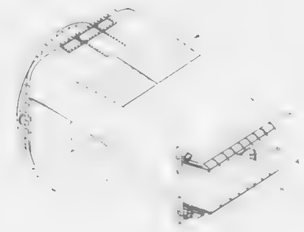


6. A liquid dispensing apparatus comprising:
- a hopper for holding a quantity of liquid to be dispensed;
- an elongated body carried from said hopper;
- a plurality of positive displacement pumps including cylinders extending from said body into said hopper and pistons extending into said cylinders from within said hopper;
- means for simultaneously reciprocating said pistons;
- separate inlet passages extending from said hopper through said body to the interior of each of said cylinders and separate outlet passages extending from each of said cylinders through said body to a point exteriorly of said body;
- a rotary valve means extending longitudinally of said body for alternately connecting all of said inlet and outlet passages with their respective cylinder in timed relationship with the movement of their respective piston;
- a discharge nozzle manifold assembly including a manifold member carrying a plurality of discharge nozzles and separate nozzle inlet passages formed from the exterior of said manifold to each of said discharge nozzles; and,
- selectively removable and replaceable connecting means positioned between said body and said manifold and having predetermined connecting passages extending therethrough for connecting selected ones of said nozzle inlet passages with said cylinder outlet passages and diverting flow from other said cylinder outlet passages and returning it to said hopper to permit the number and pattern of said discharge nozzles in use to be selectively varied without varying the operation of said pumps.



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**4,747,542**
**NOZZLE FLAP EDGE COOLING**
**Alfredo Cires, Palm Beach Gardens, and George D. Lee, West Palm Beach, both of Fla., assignors to United Technologies Corporation, Hartford, Conn.**
**Filed Apr. 14, 1987, Ser. No. 38,074**
**Int. Cl.⁴ F02K** *1/38*
**U.S. Cl. 239—127.3** **5 Claims**



1. A cooling arrangement for the trailing edge of a nozzle flap comprising a structural honeycomb planular support plate;
- a nozzle liner spaced from said support plate and forming a coolant plenum therebetween;
- a nozzle trailing edge liner secured to said nozzle liner, extending outwardly therefrom and covering the edges of said coolant plenum and said support plate;
- a baffle supported from one of said liners and sealing biased against said support plate, said baffle forming a coolant volume between the baffle and said edge liner; and
- means for passing coolant from said coolant plenum through said coolant volume in contact with said edge liner for cooling said edge liner.

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**4,747,543**
**NOZZLE FLAP COOLING LINER**
**William M. Madden, Palm Springs, Fla., assignor to United Technologies Corporation, Hartford, Conn.**
**Filed Apr. 14, 1987, Ser. No. 38,075**
**Int. Cl.⁴ F02K** *1/38*
**U.S. Cl. 239—127.3** **8 Claims**

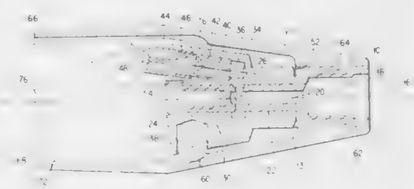
1. A cooled liner assembly for a gas turbine exhaust nozzle comprising:
- a planular support structure;
- a plurality of rows of support hinges secured to said support structure, each row in longitudinal alignment;
- a thin plate flap liner;
- a plurality of rows of flap hinges secured to said flap liner, each row in longitudinal alignment with a row of support hinges, with longitudinal clearance between said support hinges and said flap hinges for permitting relative longitudinal expansion of said liner with respect to said support plate;
- a hinge pin through each row of support hinges and the corresponding row of flap hinges;
- means for supplying cooling air under pressure between said support structure and said liner; and



said liner formed to have an arcuate shape between adjacent rows of hinges, whereby coolant pressure is resisted by hoop (membrane) stress in said liner.

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**4,747,544**
**SPRAY DEVICE**
**Josef Kränzle, Rudolf-Diesel-Str. 20, D-7918 Illertissen, Fed. Rep. of Germany**
**Filed Sep. 8, 1986, Ser. No. 904,703**
**Claims priority, application Fed. Rep. of Germany, Sep. 9, 1985, 3532045**
**Int. Cl.⁴ B05B** *3/06*
**U.S. Cl. 239—251** **21 Claims**

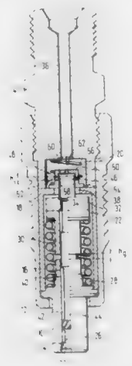


20. A spray device including a rotatable nozzle comprising:
- a central support and supply element;
- a rotational body supported on the central support and supply element for rotation about a central axis;
- at least one nozzle element attached to a face surface of the rotational body adjacent to the outlet-side of the spray device;
- an axis of the nozzle element being offset from both the central axis and the direction of rotation of the rotational body; and
- a jacket arranged coaxially to the rotational body and closely surrounding it and having a cylindrical front region projecting beyond a front face of the rotational body, the nozzle element being attached to the rotational body with such a direction that the beam ejected from the nozzle element closely passes an inner rim of a front edge of the jacket.

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**4,747,545**
**FUEL INJECTION NOZZLE FOR INTERNAL COMBUSTION ENGINES**
**Dietrich Trachte, Kornwestheim, and Helmut Giess, Aspach, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**
**Filed Sep. 30, 1982, Ser. No. 429,955**
**Claims priority, application Fed. Rep. of Germany, Jun. 7, 1982, 3221442**
**Int. Cl.⁴ F02M** *61/20*
**U.S. Cl. 239—533.9** **5 Claims**

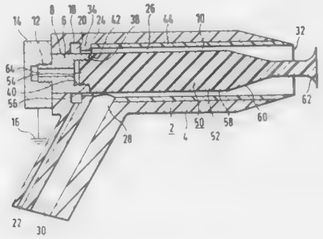


1. A fuel injection nozzle for internal combustion engines having a valve needle arranged to execute a stroke, said stroke having a length and frequency, said valve needle being urged to close by a spring means, said valve needle further being urged to open by fuel pressure and being provided with means effective to damp movement thereof only when said valve needle opens, said means being operative in accordance with at least one operating parameter of the engine, characterized in that said means comprises a timing-and-travel member responsive to at least one of the length of said stroke, the frequency of said stroke, and a fuel quantity discharged per injection cycle, said timing and travel member providing variable damping of said valve needle, the variation being provided by varying onset of damping relative to onset of injection, and further that said timing-and-travel member is coupled with the valve needle, said timing-and-travel member being arranged to move from a first position into a second position during the closing stroke of the valve needle, said timing-and-travel member being provided with a restoring spring to return said member to said first position at a retarded speed after said valve needle has closed, whereby upon an opening stroke of the valve needle said means effective to damp movement is activated to execute a retarded return movement into said first position.

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**4,747,546**
**SPRAY APPARATUS FOR ELECTROSTATIC POWDER COATING**
**Radovan Talacko, St. Gallen, Switzerland, assignor to Ransburg-Gema AG, Switzerland**
**Filed Aug. 15, 1986, Ser. No. 897,494**
**Claims priority, application Fed. Rep. of Germany, Aug. 20, 1985, 3529703**
**Int. Cl.⁴ B05B** *5/00*
**U.S. Cl. 239—707** **19 Claims**

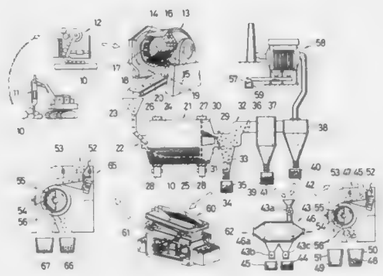
1. A spraying apparatus for spraying electrically charged powdered material, the apparatus comprising:
a main tool which is operable with any one of a plurality of different attachment tools; the main tool including a body; a powder delivery channel defined in the body along an axial direction therein, the delivery channel having an upstream end region starting at an initial section and having a downstream end region terminating in a downstream end; a mouth located at the downstream end of the delivery channel; a powder feed line for feeding powder to the initial section in the upstream region in the delivery channel; a gas feed line for supplying a gas into the delivery channel at the upstream end region thereof; and
a coupling piece disposed at the upstream region of the apparatus and accessible to the delivery channel, the coupling piece having a shape and means for securing any selected one of a plurality of different attachment tools that is introduced into the delivery channel through the



mouth thereof to the coupling piece, whereby the main tool serves as a common tool for use with the attachment tools;
a discharge electrode located in the delivery channel at the upstream end region thereof and means for connecting the discharge electrode to an electrical potential of predetermined value;
the gas feed line being located upstream in relation to the powder feed line in a configuration which is effective for blowing the gas over the discharge electrode to keep the powder away from the discharge electrode.

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**4,747,547**
**PROCESS FOR THE TREATMENT OF SLAG GENERATED IN AN IRONWORKS**
**Akihisa Harada, Kitakyushu, Japan, assignor to Nippon Jiryoku Senko Co., Ltd., Fukuoka, Japan**
**Filed Nov. 12, 1986, Ser. No. 929,454**
**Claims priority, application Japan, Jun. 11, 1986, 61-136722**
**Int. Cl.⁴ B02C** *19/12, 23/20*
**U.S. Cl. 241—19** **1 Claim**

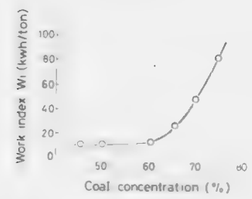


1. A process for the treatment of slag generated in an ironworks, which comprises the step of rough crushing to crush solidified slag generated in an ironworks into pieces with 50 mm or less particle size by use of a dry-type crusher, further crushing for separation to classify said roughly crushed slag into a light slag dust and a residual heavy slag with 20 mm or less particle size by use of a ventilated mill, separation by specific gravity to extract metal components having a high specific gravity from said crushed and separated residual heavy slag by use of a dry-type classifier and magnetic separation to recover magnet-adherent metals from the remaining slag from which said metal components are extracted through said step of separation by specific gravity, wherein an upward-draft type dry air vibrating classifier provided with a gradually sloped screen subjected to an updraft of air from a fan and to vibration in an ascending direction at a frequency of 5–20 Hz is used as a classifier in said step of separation by specific gravity and on said screen metal components and slag are separated so that metal components with a higher specific gravity are moved upward by the vibration of the screen and the remainder, having a lower specific gravity, is moved downward under the influence of the air updraft.



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**4,747,548**
**PROCESS FOR PRODUCING A HIGH CONCENTRATION COAL-WATER SLURRY**
**Hirofumi Kikkawa; Kazunori Shoji, and Yasuyuki Nishimura, all of Kure, Japan, assignors to Babcock-Hitachi Kabushiki Kaisha, Tokyo, Japan**
**Continuation of Ser. No. 627,963, Jul. 5, 1984. This application Nov. 17, 1986, Ser. No. 931,878**
**Claims priority, application Japan, Jul. 5, 1983, 58-121043; Jul. 5, 1983, 57-121045**
**Int. Cl.⁴ B02C** *23/18*
**U.S. Cl. 241—21** **53 Claims**

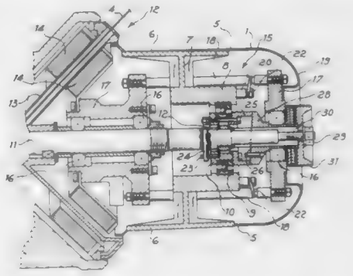



1. A process for producing a coal-water slurry in a wet mill having a plurality of stages serially arranged to have an inlet and an exit, said process comprising:
continuously operating the wet mill for milling coal fed to the mill;
feeding coal and water to the wet mill at the plurality of stages, thereby causing concentration of the coal at the inlet to be lower than concentration of the coal at the exit of the mill;
said step of feeding includes feeding a first type of coal having a Hardgrove Index of grindability of sixty or less and feeding a second type of coal having a Hardgrove Index of grindability being greater by at least eight than the Hardgrove Index of the first type of coal; and
passing the first and second types of coal and water as a coal-water slurry serially through the plurality of stages and milling the coal in the stages, thereby obtaining a broader width of particle size distribution resulting in less viscosity being obtained for the coal-water slurry than if only one type of coal was fed.

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**4,747,549**
**ACCUMULATING DEVICE FOR WEFT YARN FEEDERS TO TEXTILE MACHINES**
**Marco Balzarotti, Olgiate Olona, Italy, assignor to Sarfati & Vischiani S.p.A., Italy**
**Filed Jan. 14, 1987, Ser. No. 3,320**
**Claims priority, application Italy, Apr. 30, 1986, 20280 A/86**
**Int. Cl.⁴ B65H** *51/20*
**U.S. Cl. 242—47.12** **6 Claims**

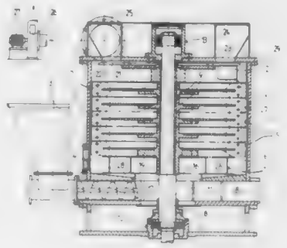
1. An accumulating device for weft yarn feeders to textile machines comprising fixed drum means having an external surface on which windings of said weft yarn are positioned, said external surface of said fixed drum means including a plurality of longitudinally extending openings, rotatable motor shaft means having a longitudinal axis within said fixed drum means, floating joint means fixed to said rotatable shaft means for rotation therewith, eccentric bush means affixed to said rotatable shaft means for rotation therewith, said eccentric bush means being mounted on said floating joint means and being angularly positionable on said floating joint means with respect to said longitudinal axis of said rotatable shaft means, yarn winding adjustment means comprising a plurality of finger members corresponding to said plurality of longitudinally extending openings in said fixed drum means, a plurality



of support members supporting said plurality of finger members, and ring support means mounting said plurality of support members, bearing means for mounting said yarn winding adjustment means on said eccentric bush means, and control means for angularly positioning said eccentric bush means with respect to said longitudinal axis of said rotatable shaft means, whereby said angular positioning of said eccentric bush means results in corresponding angular positioning of said plurality of finger members with respect to said external surface of said fixed drum means.

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**4,747,550**
**GRINDING MILL WITH MULTIPLE MILLING SECTIONS**
**Günther Jäckering, Hamm, Fed. Rep. of Germany, assignor to Altenburger Maschinen Jäckering GmbH, Hamm, Fed. Rep. of Germany**
**Filed May 16, 1986, Ser. No. 863,935**
**Claims priority, application Fed. Rep. of Germany, Dec. 7, 1985, 3543370**
**Int. Cl.⁴ B02C** *23/24*
**U.S. Cl. 241—55** **14 Claims**



1. In a grinding mill, which grinding mill includes a cylindrical stator having an inner wall and a rotor rotatable relative to the stator and having a plurality of milling plates each having a working surface facing the inner wall of the stator, the improvement wherein at least one said milling plate is provided with a cut extending perpendicular to the working surface and dividing the working surface into two parts, and the two parts of the working surface are bent in respectively opposite direc-

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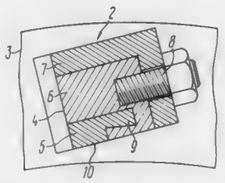
tions to constitute means for breaking up eddies of material being ground during operation of said mill.

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**4,747,551**
**DISINTEGRATING ROTOR**

**Bella U. Shagarova; Olev G. Reemet, both of Mustamyae tee, 149, kv. 113; Evgenia E. Ostapenko, Yismyae tee, 6, kv. 85, and Vladimir M. Matveev, Mustamyae tee, 169, kv. 54, all of, Tallin, U.S.S.R.**

**PCT No. PCT/SU85/00002, § 371 Date Sep. 5, 1986, § 102(e) Date Sep. 5, 1986, PCT Pub. No. WO86/04266, PCT Pub. Date Jul. 31, 1986**
**PCT Filed Jan. 17, 1985, Ser. No. 915,250**
**Int. Cl.⁴ B02C** *13/22, 13/28*
**U.S. Cl. 241—188 R** **5 Claims**



1. A disintegrating rotor having a center of rotation and a periphery comprising:

disks mounted for rotation about a common axis and in opposing relation to each other;

beaters concentrically positioned about said disks, each beater having a periphery and a hard-faced working surface;

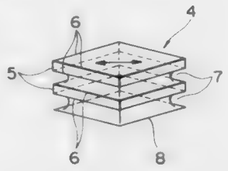
characterized in that each hard-faced working surface is formed by a plurality of materials having different wear-resistances, with said materials having a greater wear-resistance being positioned closer to the center of rotation of said rotor and said materials having a lesser wear-resistance being positioned closer to the periphery of the rotor.

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**4,747,552**
**ROLL GRINDING BLADE**

**Takao Takasaki, 4-7, Iwasaki 2-Chome, Nichinan, Miyazaki 887, Japan**

**PCT No. PCT/JP85/00430, § 371 Date May 20, 1986, § 102(e) Date May 20, 1986, PCT Pub. No. WO86/00824, PCT Pub. Date Feb. 13, 1986**
**PCT Filed Jul. 31, 1985, Ser. No. 851,140**
**Claims priority, application Japan, Jul. 31, 1984, 59-162152**
**Int. Cl.⁴ B02L** *18/18*
**U.S. Cl. 241—292.1** **2 Claims**



1. A blade for a grinding roll of a roll grinding machine comprising:

a plurality of planar blade elements coupled together in bottom-to-top, parallel relation so as to define a stack of blade elements, each said blade element having a flat, rhombic shape so as to include two acute angled corners, two obtuse angled corners and four cutting edges disposed about the periphery thereof, said stack of blade elements being adapted to be mounted to the grinding roll such that each said blade element is substantially parallel to a circumference of said grinding roll.

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**4,747,553**
**METHOD AND APPARATUS FOR TAKING UP TAPING TAPE LOADED WITH ELECTRONIC PARTS THEREIN**

**Hirotsugu Ogawa, Tokyo, Japan, assignor to FSK Corporation, Tokyo, Japan**

**Filed May 13, 1987, Ser. No. 49,321**
**Claims priority, application Japan, May 14, 1986, 61-111291**
**Int. Cl.⁴ B65H** *18/08, 81/00*
**U.S. Cl. 242—56 R** **2 Claims**



2. An apparatus for taking up a taping tape comprising a storage tape for storing electronic parts therein and a cover tape deposited on an upper surface of said storage tape, which apparatus comprises:

a take-up reel for taking up said taping tape therearound and having a core with a groove formed therein for receiving and holding a leading edge of said tape;

a guide means arranged in the vicinity of said core of said take-up reel and adapted to guide the leading end of said taping tape toward the core of said take-up reel;

a cutter means for cutting a non-deposited portion of said taping tape at the final stage of winding of said taping tape onto said take-up reel;

a holding means for holding a non-deposited portion of said cover tape of said taping tape cut by said cutter means, so as to form a tape leader;

a removing cutter means for cutting and removing a non-deposited portion of said storage tape of said taping tape cut by said cutter means;

an adhesive tape supply mechanism for supplying an adhesive tape to be applied to said tape leader; and

an adhesive tape applying means including a movable arm capable of applying and fixing said tape leader to the outermost winding of said taping tape around the core of said take-up reel with said adhesive tape.

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**4,747,554**
**APPARATUS FOR WINDING MAGNETIC TAPE**

**Toyohide Kubo, Tokushima, Japan, assignor to AWA Engineering Co., Ltd., Tokushima, Japan**

**Filed Oct. 14, 1987, Ser. No. 108,203**
**Claims priority, application Japan, Mar. 14, 1987, 62-59247**
**Int. Cl.⁴ B31F** *5/06;* **B65H** *21/00*
**U.S. Cl. 242—56 R** **2 Claims**

1. An apparatus for winding magnetic tape comprising:

(a) a retaining means for holding ends of magnetic tape, and ends of leader tape which connect to reel hubs onto which tape is wound;

(b) a cutting means for cutting leader and magnetic tapes held by the retaining means;

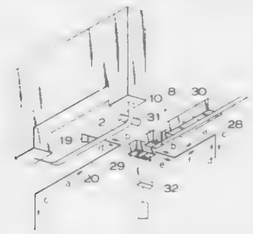
(c) a splicing means for joining abutting ends of leader and magnetic tape cut by the cutting means; and

(d) a hub rotating means for rotating the hub to which magnetic tape is connected via leader tape thus winding magnetic tape onto that hub, so that after a prescribed amount



of tape has been wound onto the reel hub, the magnetic tape is held by said retaining means, cut by said cutting means, and the cut trailing end of magnetic tape is joined to the remaining cut end of leader tape by said splicing means;

characterized in that the splicing means comprises a splicing tape feed assembly comprising a splicing tape retaining block for temporarily holding adhesive splicing tape used to join leader and magnetic tapes, a feed block which reciprocates with respect to the splicing tape retaining block and feeds adhesive splicing tape to the splicing tape retaining block, and an actuating means for reciprocating the feed block, wherein the feed block is provided with a tape attachment surface which temporarily retains adhesive splicing tape during the feed block's forward move-



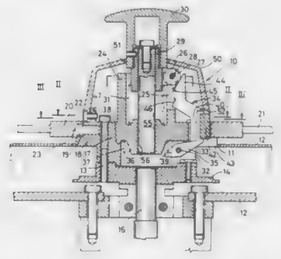
ment and releases that tape during the feed block's retreating movement, the splicing tape retaining block is provided with a tape attachment surface which releases adhesive splicing tape during the feed block's forward movement and retains that tape during the feed block's retreating movement, the feed block and splicing tape retaining block attachment surfaces are coplanar and located on either side of the adhesive splicing tape feed track, the feed lock tape attachment surface reciprocates back and forth parallel to the splicing tape retaining block tape attachment surface, and one side of the adhesive splicing tape is attached to the feed block during the feed block's forward movement and the other side of the adhesive splicing tape is attached to the splicing tape retaining block during the feed block's retreating movement.

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**4,747,555**
**LOCKING ARRANGEMENT FOR THE HUB OF A TAPE SPOOL ON A ROTATING SHAFT**

**Angelo Bosco, San Donato Milanese, and Edgardo Magnaghi, Peschiera Borromeo, both of Italy, assignors to Robotecnica S.r.l., Sesto San Giovanni, Italy**

**Filed Oct. 14, 1986, Ser. No. 918,299**
**Claims priority, application Italy, Oct. 11, 1985, 22448 A/85**
**Int. Cl.⁴ B65H** *18/10*
**U.S. Cl. 242—68.2** **11 Claims**



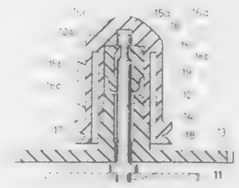
1. A locking arrangement for a tape spool hub on a rotating shaft having a central body with a common support means for the tape spool hub and the rotating shaft, means for locking said tape spool hub with respect to said support base, wherein there are at least three engaging elements that each project from a central portion of separate level means, each of said separate lever means being pivotally connected at one end thereof with the central body, control means acting on another end of the lever means to cause the lever means to pivot about said pivoted connections to an engaged position, said pivoted connections being located under said support means and said lever means causing said at least three engaging elements to be in a sloped position with respect to an interior surface of said tape spool hub so as to engage the internal surface in said sloped position upon pivoting of the lever means in response to the control means, said lever means having a sloped surface and an arched-in area at its other end which cooperates with said control means to cause the levers to be pivoted and to be retained in the pivoted engaged position, and wherein said control means moves roller means upon actuation to engage said slope surface of the lever means to cause said lever means to be pivoted and the roller means being subsequently held in said arched-in-area to retain the lever means as pivoted.

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**4,747,556**
**REEL RECEIVER FOR A MAGNETIC TAPE FEEDING DEVICE**

**Shinsaku Tanaka, Tokyo, and Tadao Arata, Inagi, both of Japan, assignors to Tanashin Denki Co., Ltd., Tokyo, Japan**

**Filed Jan. 2, 1987, Ser. No. 172**
**Claims priority, application Japan, May 29, 1986, 61-80230**
**Int. Cl.⁴ B65H** *16/02, 18/02;* **B25G** *3/10*
**U.S. Cl. 242—68.1** **6 Claims**



1. A reel receiver for a magnetic tape feeding device, comprising: a shaft member having a base end thereof secured to a chassis and having an annular groove formed around an intermediate portion thereof; a reel receiver base member mounted for rotation on said shaft member for receiving a rotating power thereon; a reel driving member having an axial center hole formed therein in which said reel receiver base member is press fitted in an integral relationship with said reel driving member, said axial center hole having an end closed by the closed top end portion of said reel driving member, said reel driving member further having a bearing recess formed in the top end portion thereof in a contiguous relationship to said axial center hole for receiving an end portion of said shaft member therein; and a cylindrical member made of an elastic material, said cylindrical member having an intermediate portion in elastic press-contact with the inner circumferential wall of said axial center hole of said reel driving member and wherein, prior to press fitting of said reel driving member and said reel receiver base member, the outer diameter of said intermediate portion of said cyindrical member is greater than the diameter of the inner bore of said axial center hole of said reel driving member, said cylindrical member having an axial center hole formed therein through which said shaft member extends, said cylindrical member having an upper end portion received in said annular groove of said shaft member and said cylindrical member having a lower end portion in elastic press-contact with the outer circumferential wall of said shaft member, to prevent said reel receiver base member from coming off said shaft member.

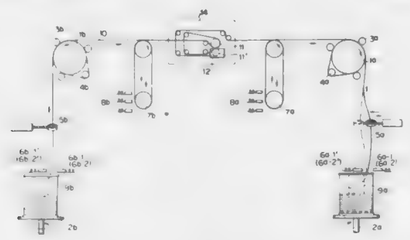
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**4,747,557**
**APPARATUS FOR INSERTING AND FEEDING FLATTENED METAL WIRE INTO AND FROM CONTAINERS**

Koji Fujimaki, Toyonaka, Japan, assignor to Daiwa Can Co., Ltd., Tokyo, Japan

Filed Apr. 30, 1986, Ser. No. 857,488
Int. Cl.[4] B21C *47/10, 47/18*
U.S. Cl. 242—83 2 Claims



1. An apparatus for inserting a flattened metal wire into a container, the flattened metal wire being formed into continuous spiral loops the flat surfaces of which are kept vertical, and the spiral loops being stacked in a staggered manner without being twisted, the apparatus comprising
- a cylindrical container having an inner and outer wall for receiving the flattened metal wire therebetween;
- a take-up drum for winding flattened metal wire fed thereto around said take-up drum;
- a dancer roll for keeping the feeding rate of the flattened metal wire to said take-up drum constant;
- a reciprocating traverse for moving reciprocatingly to determine a position at which the fed flattened metal wire is inserted into said container;
- a turntable for rotating said cylindrical container; and
- detector means for detecting the position of said dancer roll, for controlling synchronously the speed of said turntable, traverse, and take-up drum, for regulating the peripheral speed of said take-up drum to form one spiral loop of the flattened metal wire during one rotation of said turntable, and for regulating the movement of said reciprocating traverse for stacking the spiral loops of metal wire in a staggered manner and with the flat surfaces thereof being kept vertical.

2. An apparatus for feeding a flattened metal wire from a cylindrical container in which the flattened metal wire formed into continuous spiral loops the flat surfaces of which are kept vertical has been stacked in a staggered manner without being twisted, comprising
- a cylindrical container for holding flattened metal wire formed in loops;
- a take-up drum for winding flattened metal wire fed thereto around said take-up drum;
- a dancer roll for keeping the feeding rate of flattened metal wire from said take-up drum constant;
- a fixed traverse for determining a position from which the flattened metal wire is fed from said cylindrical container;
- a turntable for rotating said cylindrical container;
- first detector means for detecting the position of said dancer roll, for controlling synchronously the rotation of said turntable and take-up drum, and for regulating the peripheral speed of said take-up drum for winding the flattened metal wire the length of one loop thereof during one rotation of said turntable; and
- second detector means for detecting the position of the flattened metal wire between said fixed transverse and said cylindrical container and for controlling the rotation of said cylindrical container.

**4,747,558**
**FISHING REEL**

Masaji Saito, Tokyo, Japan, assignor to Daiwa Seiko Inc., Tokyo, Japan

Filed Feb. 2, 1987, Ser. No. 10,301
Claims priority, application Japan, Mar. 13, 1986, 61-55928
Int. Cl.[4] A01K *89/00, 89/02*
U.S. Cl. 242—84.5 A 4 Claims



1. A drag braking unit for a spool shaft in a fishing spinning reel, comprising
- a real casing having a rear portion,
- a rear-end walled cylinder projecting from said rear portion of said reel casing, having an inner circumferential surface with an axial engaging groove therein, and having an end-wall portion,
- a spool shaft supported on said rear portion of said reel casing so that said spool shaft can be turned and axially slid therein in an axial direction along said spool shaft, said spool shaft having a rear end portion extending into said cylinder,
- a drag braking member, for braking said spool shaft, fitted to a portion of said spool shaft which is in said cylinder,
- an operating cylinder supported rotatably at a supported portion thereof on said end-wall portion of said rear-end-walled cylinder and formed so as to surround an outer surface of said rear-end-walled cylinder,
- a rotatable member which is fitted in said supported portion of said operating cylinder and in said end-walled cylinder, said rotatable member being adapted to be turned unitarily with said supported portion of said operating cylinder, and
- a movable regulating member in said end-walled cylinder, which is engaged with said rotatable member so that said regulating member can be moved forward and backward in only said axial direction of said spool shaft, and which abuts on a rear portion of said drag braking member.

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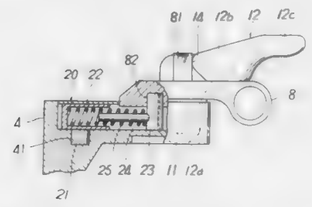
**4,747,559**
**BAIL ARM TURNING-OVER DEVICE FOR A FISHING REEL**

Yasuhiro Hitomi, Sakai, Japan, assignor to Shimano Industrial Company Limited, Osaka, Japan

Filed Apr. 25, 1986, Ser. No. 855,700
Claims priority, application Japan, May 9, 1985, 60-68487[U]
Int. Cl.[4] A01K *89/00*
U.S. Cl. 242—84.26 3 Claims

1. A bail arm turn over device for turning over a fishing reel bail arm from a line winding position to a line releasing position, said device comprising:
- a first and a second mounting arm for supporting said bail arm therebetween;
- a bail arm support supported rotatably onto a side surface of said first mounting arm;
- a first shaft mounted on said first mounting arm and supporting said bail arm support rotatably relative to said first mounting arm;
- a second shaft mounted on another side surface of said first mounting arm and having its axis oriented substantially perpendicularly relative to said first shaft, said second shaft being spaced apart from said first shaft on said first mounting arm and disposed between said first shaft and said bail arm;
- a turnover lever supported rotatably to said first mounting arm by said second shaft and having (i) a pivotal portion, (ii) a superposed portion extending from said pivotal portion toward said bail arm support and superposed on a surface of said bail arm support, and (iii) an operating portion;
- a transmission mechanism for transmitting a rotational operation of said turnover lever to turn over said bail arm, said transmission mechanism comprising an engaging projection (i) projecting from a side surface of said bail arm support, (ii) oriented transverse to said side surface of said first mounting arm at which said bail arm support is supported and (iii) disposed near a rotation axis of said bail arm support on said first shaft, said transmission mechanism further comprising an urging surface disposed at said superposed portion of said turnover lever, said urging






surface making contact with said engaging projection when said turnover lever is operated to thereby apply a torque to said bail arm support to turn over said bail arm to said line releasing position; and said first mounting arm including a bias means which, when said bail arm support is changed over to one of said fishing line winding position and said fishing line releasing position, is turned over in a biasing direction, thereby biasing said bail arm support to one of said fishing line winding position and said fishing line releasing position of said bail arm, said bias means comprising (i) a coil spring, (ii) cylinder having a closed bottom, said spring being at least partially disposed within said cylinder, said cylinder including a pivot means rotatably fitted into a hole in said first mounting arm, and (iii) a rod attached to a pin at one end, said pin being rotatably fitted within a recess in said bail arm support, said rod having a free end disposed within said cylinder and within an inner space of said coil spring, said spring being interposed between said closed bottom of said cylinder and an outer surface of said pin.

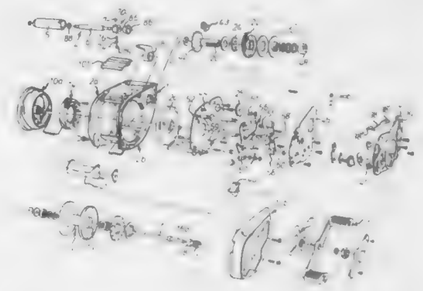
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**4,747,560**
**FISHING REEL WITH LEVEL WING**

Jarding U. Karlsson, Mörrum, Sweden, assignor to ABU Garcia Produktion AB, Svängsta, Sweden

Filed Mar. 11, 1987, Ser. No. 24,512
Claims priority, application Sweden, Mar. 13, 1986, 8601168-1
Int. Cl.[4] A01K *89/015, 89/04*
U.S. Cl. 242—84.42 6 Claims

1. A fishing reel comprising a frame and, supported by the frame, a line spool which is rotatable in one direction for winding up a fishing line therein and is rotatable in the opposite direction by a pulling force acting on the fishing line, such as during casting; a line spreading mechanism which includes a cylindrical guiding sleeve angularly movably mounted in the frame and having a wall and a longitudinal guiding slot formed in the wall thereof, a line spreading member having an outer end portion formed to serve as a line guide, and an inner end portion formed to serve as a hub for slidingly supporting said member on said sleeve, a rotatable involute screw having an endless thread and mounted within said sleeve and defining therewith an annular space, and a screw follower having one end formed for and positioned in engagement with the endless thread of the involute screw for reciporcating said line spreading member along said sleeve; said fishing reel further comprising a driving mechanism including a manually operable crank and transmission means connected to said crank and to said involute screw and disconnectable clutching means and clutch actuating means for connecting said line spool to said transmission means and for connecting said line spreading member to said involute screw to permit the line spool to be rotated in said one direction for winding up the fishing line and to permit the line spreading member to be reciprocated simultaneously with the rotation of the line spool in said one direction for spreading the fishing line in a predetermined manner along the line spool, when said disconnectable clutching means are in engagement, and to permit free rotation of the line spool in said opposite direction and movement of the line spreading member out of



engagement with the involute screw when said clutching means are disengaged; said line spreading mechanism for transmitting reciprocating movement from said screw follower to said line spreading member comprising an annular screw follower support which is mounted in said annular space in said sleeve in encompassing relationship with said involute screw and in sliding contact with the inner periphery of said sleeve, said support and said screw follower being reciprocable as a unit along the involute screw and being encapsulated in and shielded by said sleeve; driver dog supported by said annular support and comprising a biased dog pin, which extends through and is guided by said slot in said sleeve for guiding the annular support in the sleeve and which in operative position projects with an end portion out of said slot; said hub comprising engagement means for receiving said end portion of the dog pin in mutual engagement therewith for transmitting the reciprocating movement of the annular support and the screw follower to said line spreading member.

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**4,747,561**
**REEL ASSEMBLY**

Henry D. Sweeny, Kitchener, and Antonio D. Sabbadin, Waterloo, both of Canada, assignors to Swenco, Ltd., Ontario, Canada

Filed Jun. 15, 1987, Ser. No. 61,472
Claims priority, application Canada, Jul. 10, 1986, 515513
Int. Cl.[4] B65H *75/40, 75/22*
U.S. Cl. 242—96 7 Claims

1. A reel assembly for selectively winding or unwinding flexible electrically conductive material thereon or therefrom comprising:
- (a) a non-conductive reel member having a cylindrical core member and larger-diameter side plates removably attached to said core member;
- (b) frame means including a cantilevered shaft on which said member is journaled for rotation, one arm extending radially from one end of said shaft to beyond the outer rim of an adjacent side plate, and a transverse member extending

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from the free end of said arm parallel to said shaft, terminating adjacent the mid-point of said core member;

(c) crank means for imparting rotational movement to said reel member on said shaft, said crank means including an arm member removably engageable with the other end of the shaft adjacent the other sideplate, said arm member including inwardly directed projection means removably engageable with mating U-shaped slot means on said other side plate and an outwardly projecting crank handle at the free end thereof;



(d) insulated handle means connected to the free end of said transverse member at an acute angle with respect thereto for supporting said reel member during winding or unwinding; and

(e) control means on said frame mean engageable with said reel member to selectively (i) permit free-wheeling rotational movement of said reel member relative to said frame means in either a winding direction or an unwinding direction; or (ii) permit ratcheting movement of said reel member in one of said directions with consequent braking action on said reel member in the other of said directions.

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**4,747,562**

**RETRACTOR WITH BOTH EMERGENCY AND AUTOMATIC LOCKING MECHANISMS**

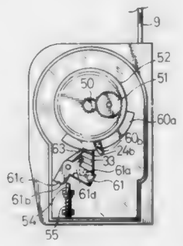
**Masahiro Tsukamoto, Fujisawa, and Katsuo Takiura, Yokohama, both of Japan, assignors to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan**

**Filed Aug. 27, 1986, Ser. No. 900,837**

**Claims priority, application Japan, Sep. 13, 1985, 60-139458[U]**

**Int. Cl.⁴ B65H** *75/48*

**U.S. Cl. 242—107.4 R** **7 Claims**



**1**. A retractor with both emergency and automatic locking mechanisms, comprising:

a base;

take-up spindle means supported rotatably on the base and biased in a webbing-winding direction;

a ratchet wheel mounted on the take-up spindle means;

a pawl member engageable with the ratchet wheel and displaceable between a first position, where the pawl member prevents any further rotation of the take-up spindle means in the webbing-releasing direction, and a second position where the pawl member is maintained out of engagement with the ratchet wheel;

control means for bringing the pawl member into the first position upon detection of a predetermined first amount of the webbing wound on the take-up spindle means through a predetermined course of operation or irrespective of the course of operation through which the webbing has been taken up on the take-up spindle means to the predetermined first amount, or into the second position upon detection of a predetermined second amount of the webbing wound on the take-up spindle means, said second amount being longer than said first amount, said control means having a first member movable responsive to each rotation of the take-up spindle means, a second member movable following the first member with the predetermined degree of free rotation relative to the first member whenever the direction of motion of the first member changes, and arm means capable of selectively taking a first state in which the arm means holds the pawl member at the first position or a second state in which the arm means is maintained out of engagement with the pawl member, said arm means being engageable only with the second member; and

an emergency locking mechanism for preventing the take-up spindle means from rotating in the webbing-releasing direction in the event of an emergency;

wherein the second member has first and second engagement portions, and the arm means has a clutch arm and a lock arm equipped with a projection, said first engagement portion being engageable with the clutch arm to bring the arm means into the first state, said second engagement portion being engageable with the projection of the lock arm to bring the arm means into the second state.

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**4,747,563**

**TAPE CASSETTE REEL**

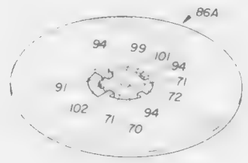
**Shin Sasaki, and Masahiro Makino, both of Miyagi, Japan, assignors to Sony Corporation, Tokyo, Japan**

**Filed Dec. 30, 1985, Ser. No. 814,389**

**Claims priority, application Japan, Jan. 19, 1985, 60-5577[U]**

**Int. Cl.⁴ B65H** *75/18*

**U.S. Cl. 242—199** **6 Claims**



**1**. A reel flange having a flange portion and a central recessed portion, for a magnetic tape cassette, comprising:

a first substantially planar surface on a first side of the flange portion;

a second substantially planar surface on a second side of the flange portion opposite to said first side;

a third planar surface on a first side of the central recessed portion;

a fourth planar surface on a second side of the central recessed portion opposite to said first side of the central recessed portion, said fourth planar surface being spaced from said first substantially planar surface by a distance greater than the distance between said first substantially planar surface and said second substantially planar surface;



said first substantially planar surface including an inner edge having a first diameter, and said third planar surface including an outer perimeter having a second diameter, said second diameter being smaller than said first diameter;

a sloping surface connecting the inner edge of said first substantially planar surface to the outer perimeter of said third planar surface, said sloping surface and said third planar surface defining a recess;

said fourth planar surface including an outer edge having a third diameter, said third diameter being equal to or less than said first diameter of the inner edge of said first planar surface and equal to or greater than said second diameter of the outer perimeter of said third planar surface, whereby a like reel flange stacked upon said reel flange would tend to tilt; and

projection means, projecting within said recess, for supporting an adjacent reel flange substantially parallel to said reel flange when the reel flanges are stacked.

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**4,747,564**

**BRAKE SYSTEM FOR MAGNETIC RECORDING AND REPRODUCING APPARATUS**

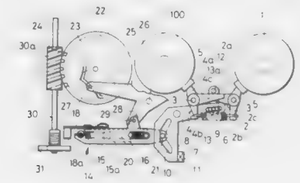
**Shinya Tsubota, Mito, Japan, assignor to Hitachi, Ltd., Tokyo, Japan**

**Filed Mar. 9, 1987, Ser. No. 23,394**

**Claims priority, application Japan, Mar. 12, 1986, 61-52355**

**Int. Cl.⁴ B65H** *16/10;* **G11B** *15/32;* **F16D** *51/00*

**U.S. Cl. 242—204** **4 Claims**



**1**. A brake system for a magnetic recording and reproducing apparatus including reel table means for driving and rotating at least one pair of reels so as to extend a magnetic tape across them, and friction members adapted to be selectively pressed against side surfaces of the reel table means said brake system comprising:

rotatably mounted brake arms each of which is provided with the friction member at one end portion thereof confronting a corresponding reel table means in a vicinity of a rotational side surface of said reel table means,

urging means for normally urging said friction members toward said reel table means through said brake arms,

a swing member for displacing said friction members in a direction away from said reel table means against a force of said urging means,

a turning arm connected to one end of said swing member, said turning arm being extensible and contractible in a direction of an axis of said turning arm so that when turned in a contracted state, it swings said swing member to bring said friction members away from respectively corresponding reel table means and that when extended, it swings said swing member in an opposite direction to press said friction members against said reel table means,

drive means for turning said turning arm in an operation mode, and drive means for extending said turning arm in a stop mode.

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**4,747,565**

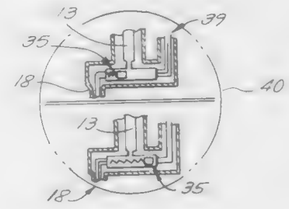
**POWERED RETRACTABLE PASSENGER RESTRAINT SYSTEM**

**Dominic J. Spinosa, Wantagh, and Frank Knoll, Huntington Station, both of N.Y., assignors to East/West Industries, Hauppauge, N.Y.**

**Filed Sep. 26, 1985, Ser. No. 780,562**

**Int. Cl.⁴ B64D** *11/06*

**U.S. Cl. 244—122 B** **24 Claims**



**1**. A powered retractable passenger restraint system for securing the occupant of a seat of a vehicle in an upright sitting position against said seat, comprising:

an upper body harness;

an upper harness retraction means connected to said upper body harness which, upon actuation, forcibly retracts said upper body harness,

a lower body harness,

a lower body harness retraction means connected to said lower body harness which, upon actuation, forcibly retracts said lower harness,

means responsive to forces of inertia for actuating said lower body harness retraction means and said upper body harness retraction means connected for actuation to each of said retraction means,

manual means for selectively actuating said lower body harness retraction means and said upper body harness retraction means connected for actuation to each of said retraction means, and

override actuation means for actuating said upper body harness retraction means and said lower body harness retraction means regardless of the condition of said other actuating means, said override actuation means connected for actuation to each of said retraction means and responsive to emergency remedy condition.

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**4,747,566**

**APPARATUS FOR PARTIALLY UNFOLDING SOLAR COLLECTORS**

**Helmut Kiendl, Munich, Fed. Rep. of Germany, assignor to Messerschmitt-Boelkow-Blohm GmbH, Munich, Fed. Rep. of Germany**

**Filed May 5, 1987, Ser. No. 46,995**

**Claims priority, application Fed. Rep. of Germany, May 6, 1986, 3615264**

**Int. Cl.⁴ B64G** *1/44*

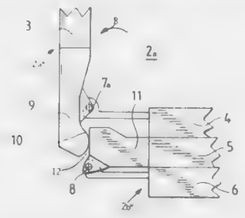
**U.S. Cl. 244—173** **5 Claims**

**1**. An apparatus for maintaining a partially unfolded state of a solar panel section forming part of a solar panel having a plurality of panel sections hinged to each other and to a body such as a satellite, comprising a first rigid stop member (**9**) extending inwardly from an outer panel section (**3**), relative to said body, a second rigid stop member (**11**) extending outwardly from an inner panel section (**5**), said first and second rigid stop members (**9**, **11**) having cooperating surface configurations (**10**, **12**) which contact each other during a partially unfolded state for maintaining said partially unfolded state, said

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cooperating surface configurations being so shaped that said first stop member can clear said second stop member for permitting a further unfolding of said solar panel in response to an unfolding force.



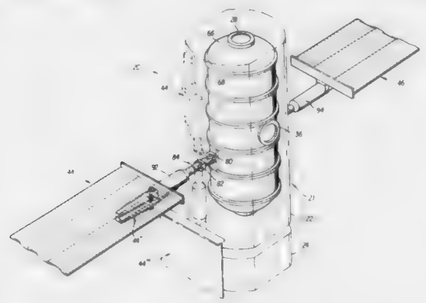
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**4,747,567**

## SPACECRAFT WITH ARTICULATED SOLAR ARRAY

**Caldwell C. Johnson; Maxime A. Faget, both of Dickinson, and David J. Bergeron, III, Friendswood, all of Tex., assignors to Space Industries, Inc., Webster, Tex.**

**Filed Mar. 20, 1985, Ser. No. 713,882**
**Int. Cl.[4] B64G *1/44***
**U.S. Cl. 244—173** **6 Claims**



1. A spacecraft comprising:
a spacecraft body;
at least one solar array extendible outwardly from the spacecraft body; and
articulation means for adjusting the position of the solar array relative to the spacecraft body independently about three axes, each of which is orthogonal to the axis adjacent to it, said articulation means comprising first, second and third single-axis rotatable couplings arranged in series, each of said rotatable couplings permitting rotation of the solar array about a different one of said three axes;
said first rotatable coupling connected between the spacecraft body and the second rotatable coupling for permitting rotation of the solar array about a first axis which has a fixed orienation with respect to the spacecraft body;
said second rotatable coupling connected between the first and third rotatable couplings for permitting rotation of the solar array about a second axis normal to the first axis, said second rotatable coupling being connected to each of said first and third rotatable couplings without any intervening degrees of rotational freedom; and
said third rotatable coupling connected between the second rotatable coupling and the solar array for permitting rotation of the solar array about a third axis normal to the second axis, said third axis having a fixed orientation relative to the array which is parallel to the longitudinal axis of the array.

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**4,747,568**

## MISSILE FLIGHT CONTROL SYSTEM

**Thomas F. Carrigan, Bradford, England, assignor to Lucas Industries plc, Birmingham, England**

**Filed Apr. 29, 1987, Ser. No. 43,856**
**Claims priority, application United Kingdom, May 9, 1986, 8611406**
**Int. Cl.[4] F42B *15/033***
**U.S. Cl. 244—3.22** **3 Claims**



1. A flight control system for a missile comprising a plurality of movable fins, a corresponding plurality of actuators for said fins and an arrangement responsive to operation of the actuators for directing gas streams transversely of the missile axis to alter orientation of the missile in a direction required by operation of the actuators, said arrangement for directing gas streams comprising a plurality of pairs of gas outlets, each of said pairs of outlets being arranged to emit gas streams in opposite directions substantially perpendicular to the missile axis, gas flow to said pairs of outlets being regulated by respective valves which are operable by respective ones of said actuators, said valves being coupled to the respective actuators through lost motion connections.

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**4,747,569**

## SUPPORT HEAD FOR A MUSICAL INSTRUMENT HOLDER OR THE LIKE

**Yoshihiro Hoshino, Nagoya, Japan, assignor to Hoshino Gakki Co., Ltd., Japan**

**Filed Jul. 13, 1987, Ser. No. 72,555**
**Int. Cl.[4] E04G *3/00***
**U.S. Cl. 248—286** **14 Claims**



1. A support head for a support rod, comprising:
a main body, an intermediate member adjacent the main body and a finishing member adjacent the intermediate member; the main body and intermediate members having respective facing first sides; first engaging means on the facing first sides for preventing relative rotation of the intermediate member with respect to the main body when the main body and intermediate member have been moved together to bring the first engaging means into engagement;
first attaching means between the main body and the intermediate member for supporting the intermediate member to enable relative rotation of the intermediate member with respect to the main body when the first engaging means are out of engagement and for drawing the main body and the intermediate member together for bringing the first engaging means into engagement and prohibiting further relative rotation of the main body with respect to the intermediate member;
the intermediate member having a first rod holding recess facing the finishing member; the finishing member having a second recess placed for cooperating with the first recess of the intermediate member, such that together the first and second recesses define an opening for receiving the support rod therein;
second means for connecting the intermediate member and the finishing member for drawing the finishing member toward the intermediate member, thereby to draw the first and second recesses together for clamping the support rod in the opening defined by the cooperating recesses, and for enabling the intermediate member and the finishing member to be moved apart for moving the recesses apart for releasing the grip upon the support rod; the support rod being longitudinally movable in the opening defined in the first and second recesses and being movable through the opening generally across the axis of rotation of the intermediate member with respect to the main body.



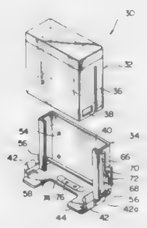
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**4,747,570**

## MOUNT FOR ELECTRONIC INSTRUMENT

**Masumi Takahashi, Tokyo, Japan, assignor to NEC Corporation, Japan**

**Filed Mar. 12, 1987, Ser. No. 25,227**
**Claims priority, application Japan, Mar. 17, 1986, 61-39272[U]**
**Int. Cl.[4] A47G *29/30***
**U.S. Cl. 248—309.1** **9 Claims**



1. A mount for an electronic instrument, comprising:
a housing for said instrument having a guide groove and a locking recess at each of both sides thereof;
a generally U-shaped metal fixture for accommodating said housing of said equipment therein, said metal fixture being provided with guide pieces, each of said guide pieces being engagable with a respective one of said guide grooves;
hooks provided on said metal fixture, each of said hooks engaging a respective one of said locking recesses when said housing is accommodated in said metal fixture, each of said hooks having a spring bias to latch into said recesses for preventing said housing from slipping out of said metal fixture;
a lever associated with each of said hooks for urging an associated one of said hooks in a direction for overcoming said spring bias to release said latch; and
a mechanism for applying a spring bias to said housing in a direction for removing said housing from said metal fixture when said spring biases acting on said hooks are overcome by an operation of said levers.

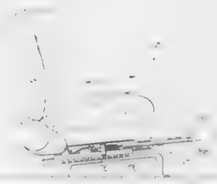
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**4,747,571**

## ADJUSTABLE SEATS AND COMPONENTS THEREFOR "A" VERSION

**Alfred Hessler, and Andrzej Bartczak, both of Markham, Canada, assignors to Magna International Inc., Markham, Canada**

**Filed Feb. 4, 1986, Ser. No. 826,668**
**Int. Cl.[4] B60N *1/06*; F16M *11/24, 13/00***
**U.S. Cl. 248—394** **36 Claims**



1. A seat adjustment assembly for adjusting the inclination and vertical position of a seat cushion of a seat above the base of the seat, the seat assembly comprising:
(a) a base;
(b) a seat cushion supported in spaced relation above the base;
(c) a support for carrying the cushion in spaced relation above the base and being secured thereto, the support carrying:
(i) a cam assembly disposed proximate the centre thereof and carrying opposed peripheral circular (convex) portions, each opposed peripheral circular portion rotatable about the centre of such circular portion and another portion adjacent each circular portion, the outer surfaces of which other portions being closer to one another than the circular portions are close to one another;
(ii) means to permit the rotation of at least one circular cam portion at a time;
(iii) a pair of pawls on either side of the cam assembly each pawl being secured for pivotal movement and having its end closest the cam assembly carrying a circular recess corresponding in shape to the circular cam portion for normally being engaged therewith
whereby rotation of at least one of the circular portions about its centre permits the end of the pawl carrying the recess to follow the outer surface of the cam assembly from the circular portion to the portion adjacent each circular portion, thereby releasing the associated pawl permitting the seat to be adjusted and means are provided to cause the pawls to follow the outer surface configuration of the cam assembly and means to return the cam assembly and pawls to their normal position.

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**4,747,572**

## COPY AND MATERIAL HOLDER

**Allan B. Weber, West Lake Rd., Tuxedo Park, N.Y. 10987**

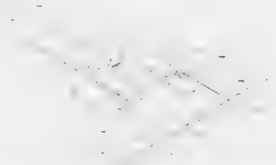
**Filed Nov. 12, 1986, Ser. No. 929,922**
**Int. Cl.[4] A47F *37/14***
**U.S. Cl. 248—442.2** **24 Claims**

1. Apparatus for holding materials which is removably attachable to adhesive material affixed to a surface, which apparatus comprises:
a head section comprising a first and a second flap section and a middle section, the first flap section being attached by a first hinge to a first end of the middle section, the second flap section being attached by a second hinge to a second end of the middle section, the first and second flap sections further comprising means for removably attaching the flaps to the adhesive material;
a T-section attached at one end by a hinge means to a side of the middle section; and
a T-insert section having means for removably interlocking the T-insert section into the T-section,

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(a) the T-section further comprises at least one first means and



(b) the T-insert section further comprises at least one second means, which first and second means together provide holding means for holding materials.

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**4,747,573**

## INNER MOLD FOR MOLDING CYLINDER

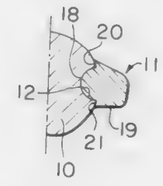
**Akira Nagashima, Kawasaki, Japan, assignor to Kioritz Corporation, Tokyo, Japan**

**Filed Jul. 9, 1987, Ser. No. 71,745**

**Claims priority, application Japan, Jul. 24, 1986, 61-112797[U]**

**Int. Cl.⁴ B29C** *39/32*

**U.S. Cl. 249—184** **2 Claims**




1. An inner mold for molding a cylinder having a bore-forming core for forming a cylinder bore, and a shell core disposed in fitting engagement with holes formed in said bore-forming core for forming a recess in the cylinder wall which may be used as a scavenging passage, the bottom surface of each of said holes of said bore-forming core being formed with an arcuately concaved surface.

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**4,747,574**

## APPARATUS FOR ACQUISITION OF THE SURFACE SHAPE OF A DISTANT OBJECT BY MEANS OF PICTURE ELEMENT SCANNING

**Otto Hofmann, Kirchstockach, Fed. Rep. of Germany, assignor to Messerschmitt-Bölkow-Blohm GmbH, Munich, Fed. Rep. of Germany**

**Filed May 15, 1986, Ser. No. 863,703**

**Claims priority, application Fed. Rep. of Germany, May 15, 1985, 3517671**

**Int. Cl.⁴ H01J** *3/14*

**U.S. Cl. 250—234** **9 Claims**

1. An apparatus for determining the shape of a surface of a distant object using picture element scanning, comprising:

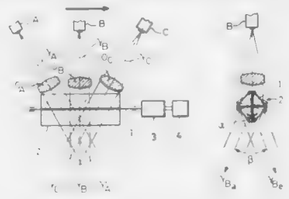
an optomechanical scanner for moving forward relative to the object surface, said scanner including:

lens means for focusing radiation from said object;

radiation detector means situated in a path of said radiation through said lens means;

a rotatable optical element located between the object and said lens means for periodically swiveling a viewing direction of said radiation detector means transversely relative to the direction of relative movement between said scanner and the object, and for successively imaging surface elements of said object surface on said radiation detector means in the form of a plurality of successive scanning traces resulting from the periodic swiveling movement;

said scanner being arranged for forming three sequences of the scanning traces with different perspective directions, one of the sequences being of middle scanning traces, another one of the sequences being of front scanning traces with a forward looking direction relative to move-



ment of the scanner, and another one of the sequences being of back traces with a rearward looking direction relative to the movement of the scanner;

an angle sensor for continuously measuring instantaneous rotational angles of said optical element; and

means for synchronously recording, at presettable time intervals, the instantaneous rotational angles supplied by said angle sensor and the radiation values of the surface elements of the object surface measured by said radiation detector means and of the respective time intervals.

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**4,747,575**

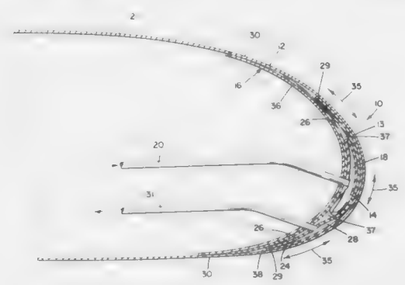
## DE-ICER

**James C. Putt, Doylestown, and Kevin L. Lefeel, Akron, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio**

**Filed Jul. 16, 1987, Ser. No. 74,196**

**Int. Cl.⁴ F16K** *31/40;* **B64D** *15/16*

**U.S. Cl. 251—30.02** **2 Claims**




1. A valve comprising: accumulator, solenoid, and poppet section;

the accumulator section including an adjustable volume accumulation chamber operably connected to an outlet and an inlet for a fluid under pressure;

the solenoid section including a fluted pilot pin operably connected to a solenoid and further including a caged ball and spring, the ball and spring being configured to forestall movement of the fluid under pressure to the outlet with the solenoid in a particular position and the flutes being configured to provide a passage for fluid under pressure from the inlet to the caged ball and spring while the solenoid is in the particular position, the solenoid section further including a primary seal operably connected to a chamber associated with the poppet section, the chamber being connected in pressurized fluid communication via the flutes whereby fluid under pressure may traverse from the inlet to the chamber, and the chamber being further operably connected whereby fluid under pressure in the chamber acts upon the primary seal and passes thereby to the outlet; and the poppet section including a shuttle configured for movement from a shut-off position whereby movement of fluid under pressure from the accumulator chamber to the outlet is substantially precluded to a release position whereby movement of fluid under pressure from the accumulator chamber is enabled, the shuttle being configured to, while in the release position, entrap a quantity of fluid under pressure in the chamber thereby substantially precluding movement of the entrapped quantity to the outlet and whereby the entrapped quantity assists in returning the shuttle to the shut-off position, the shuttle functioning thereby to oscillate rapidly between the release and shut-off positions producing thereby a chattering discharge of fluid under pressure from the accumulator chamber.



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**4,747,576**

## FLOW CONTROL VALVE

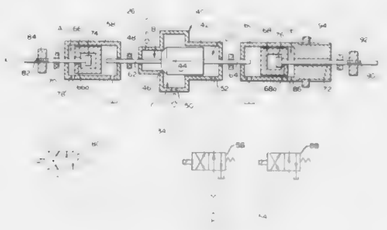
**Hiroji Saito, and Mamoru Ozeki, both of Zama, Japan, assignors to Toshiba Kikai Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 548,408, Nov. 3, 1983, abandoned. This application Mar. 17, 1986, Ser. No. 840,548**

**Claims priority, application Japan, Nov. 4, 1982, 57-192385**

**Int. Cl.⁴ F16K** *31/122*

**U.S. Cl. 251—60** **3 Claims**



1. A flow control valve comprising:

a main body including a first side wall and a second side wall defining a first chamber with a first opening and a second chamber with a second opening defined therein, a valve seat portion provided between said first chamber and second chamber, said first and second openings being selectively in communication with each other to form a fluid passage;

valve means having a first side and a second side being provided within said main body in order to prevent said first chamber from communicating with said second chamber when said valve means is seated against said valve seat and to permit said first chamber to communicate with said second chamber when said valve means is spaced away from said valve seat;

a first valve rod having a first end and a second end, said first end of said first valve rod being fixed to said first side of said valve means and the second end of said first valve rod freely extending outside from said main body;

a second valve rod having a first end and a second end, said first end of said second valve rod being fixed to said second side of said valve means and the second end of said second valve rod freely extending outside from said main body;

a first cylinder provided adjacent to said first side wall of said main body and including a first hollow piston means engageable with said second end of said first valve rod for limiting the transferring of said valve means in said main body;

a second cylinder provided adjacent to said second side wall of said main body and including a second hollow piston means engageable with said second end of said second valve rod for limiting the transferring of said valve means in said main body;

a first stopper rod extending into the hollow portion of said first cylinder to limit the movement of said first piston means mounted within said first cylinder;

a second stopper rod extending into the hollow portion of said second cylinder to limit the movement of said second piston means mounted within said second cylinder;

a first on-off valve means operatively connected to said main body for selectively supplying fluid to said main body for imparting movement to said valve means toward said first cylinder;

a second on-off valve means operatively connected to said first cylinder for selectively supplying fluid to said first cylinder for imparting movement to said first piston means and for controlling the position of said first stopper rod; and

a third on-off valve means operatively connected to said second cylinder for selectively supplying fluid to said second cylinder for imparting movement to said second piston means and for controlling the position of said second stopper rod, wherein said first chamber is formed in said main body in a direction of the movement of said valve means while said second chamber is formed in said main body in a direction perpendicular to the movement of said valve means and said first, second and third on-off valve means are selectively activated to limit transferring of said first and second valve rods to control fluid flow between said first and second openings in said main body by adjusting the spacing of the first side of said valve means relative to said valve seat, and said first hollow piston means is floatably provided in said first cylinder while said second hollow piston means is floatably provided in said second cylinder.

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**4,747,577**

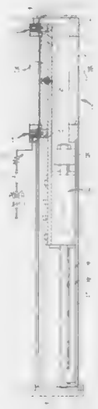
## GATE VALVE WITH MAGNETIC CLOSURE FOR USE WITH VACUUM EQUIPMENT

**Jack A. Dimock, Santa Barbara, Calif., assignor to The BOC Group, Inc., Montvale, N.J.**

**Filed Jul. 23, 1986, Ser. No. 889,442**

**Int. Cl.⁴ F16K** *3/16*

**U.S. Cl. 251—158** **19 Claims**



1. In a gate-valve apparatus of the type wherein a valve seat structure surrounds a throat portion of a fluid passageway and the flow of fluid through the throat portion is controlled by means of a gate structure translatable in a direction generally

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normal to the axis of the valve seat, the improvement comprising:

magnetic means mechanically, operatively associated with said valve-seat structure and said gate structure for selectively opening or forcing said valve-seat structure and gate structure into gas-tight sealing engagement by exerting a variable magnetically produced force between the valve seat and the gate structure with a predominant component of the force being produced in a direction parallel to the axis of the valve seat, whereby the gate valve is closed in a gas-tight manner.

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**4,747,578**

## ROTARY VALVE WITH PRESSURE URGED SEALING MEMBER

**Pekka J. Kivipelto, Helsinki, and Esko T. Yli-Koski, Kerava, both of Finland, assignors to Neles OY, Helsinki, Finland**

**Filed Aug. 20, 1986, Ser. No. 898,399**

**Claims priority, application Finland, Sep. 4, 1985, 853399**

**Int. Cl.⁴ F16K** *5/20*

**U.S. Cl. 251—159** **6 Claims**



1. A valve comprising a housing (1) provided with a flow-through passage (4), and a closing member having the shape of a rotational body and provided with an aperture (6), and turnably disposed in said flow-through passage, a sealing member (3) disposed between the closing member and the housing (1), and between the sealing member (3) and the housing (1) a space being provided in which, when the valve is in closed position, prevails a pressure urging the sealing member against the closing member (2) and from which space at least one passage is provided which leads to a point close to the sealing face (7) of said sealing member (3) and intermediate said sealing face (7) and said flow-through passage (4), the improvement comprising said rotational body being turnable from a first position wherein said rotational body closes said flow-through passage and a second position wherein said flow-through passage is opened, such that said aperture (6) is cut off from said flow-through passage when said rotational body is in said first position and communication between said aperture (6) and said flow-through passage is established as said rotational body is moved from said first position to said second position, said passage of said sealing member leading to that portion of the sealing member (3) adjacent to which open communication between said aperature (6) and the flow-through passage is first established when the valve is being opened, whereby on opening the valve a flow is produced at the site of said passage of said sealing member, this flow causing suction at the mout of the passage of said sealing member and reducing the pressure in said space so as to be lower than the pressure acting on the sealing surface (7); said space being exposed to fluid pressure only through said passage.

**4,747,579**

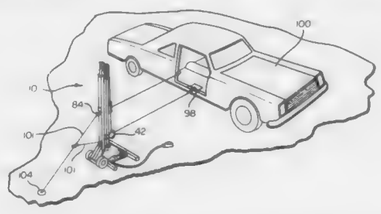
## POST FRAME MACHINE

**John W. Rich, P.O. Box 810, Elburn, Ill. 60119**

**Filed Mar. 23, 1987, Ser. No. 28,899**

**Int. Cl.⁴ B21D** *1/00*; **B66F** *5/04*

**U.S. Cl. 254—386** **3 Claims**




1. A post frame machine for applying simultaneously two pulling forces to a workpiece in two closely spaced-apart locations on said workpiece comprising:

a base having affixed thereto a pair of wheels for transporting said post frame machine;

a pair of support posts fixedly secured to said base and vertically mounted in closely spaced-apart relationship, each of said support posts having a power post telescopically disposed therein;

a first chain sprocket wheel fixedly and rotatably secured atop each of said power posts;

a fulcrum pulley secured to each of said support posts and selectively positionable along the vertical length thereof, each of said fulcrum pulleys including a second chain sprocket wheel;

a load chain associated with each of said support and power posts extendable from a workpiece beneath and around said second chain sprocket wheel and over and around said first sprocket wheel;

a first chain lock secured to each of said support posts and operable to engage a free end of said load chains to secure said load chains;

a hydraulically operated cylinder having a piston vertically disposed within each of said support posts, said pistons being coupled with said power posts whereby upon actuation of said cylinders said pistons are operable to extend said power posts to develop a pulling force on said load chains, said cylinders being operable independently of one another whereby the same or different pulling forces can be applied simultaneously to a workpiece to two closely spaced locations of the workpiece.

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**4,747,580**

## PAIR OF REFRACTORY PLATES FOR SWIVELLING OR ROTARY SLIDING CLOSURE UNIT AND METHOD OF OPERATION THEREOF

**Bernhard Tinnes, Zollikerberg, and Walter Vetterli, Winterthur, both of Switzerland, assignors to Metacon Ag, Zürich, Switzerland**

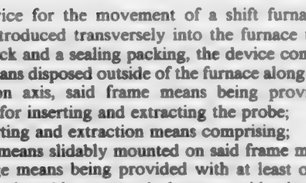
**Filed Jun. 12, 1985, Ser. No. 743,964**

**Claims priority, application Fed. Rep. of Germany, Jun. 22, 1984, 3423157**

**Int. Cl.⁴ B22D** *41/08*

**U.S. Cl. 266—44** **5 Claims**

1. In a pair of refractory plates for use in a swivelling sliding closure unit, particularly for controlling the discharge of molten metal from a metallurgical vessel, said pair of refractory plates including a stationary bottom plate having a discharge opening and to be mounted beneath a vessel with said discharge opening aligned with an outlet opening of the vessel, and a movable plate having two discharge openings, said movable plate being mounted for sliding movement with respect to said bottom plate about a center of rotation between a closed position, whereat neither of said discharge openings of said movable plate are aligned with said discharge opening of said bottom plate, and alternate open positions, whereat respective said discharge openings of said movable plate are in alignment with said discharge opening of said bottom plate, said discharge openings of said movable and bottom plates being centered on a common circular arc centered about said center of rotation, and said discharge openings of said movable plate being positioned symmetrically on opposite sides of said discharge opening of said bottom plate in said closed position, the improvement wherein:




said bottom plate has a second discharge opening at a position between said circular arc and said center of rotation; and

said discharge openings of said bottom plate are centered on a radial line extending from said center of rotation and intersecting said circular arc, said radial line corresponding to a radial center line between said discharge openings of said movable plate in said closed position.

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**4,747,581**

## DEVICE FOR THE MOVEMENT OF A SHAFT FURNACE PROBE

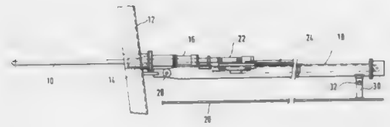
**Pierre Mailliet, 1 alee Drosbach, Howald, G.D.; Emile Lonardi, 30 rue de Schouweiler, Bascharage, G.D.; Radomir Andonov, 5 rue Belle Vue, Mamer, G.D., and Victor Kremer, 95 rue de l'Egalite, Luxembourg, G.D., all of Luxembourg**

**Filed Sep. 29, 1986, Ser. No. 912,087**

**Claims priority, application Luxembourg, Sep. 30, 1985, 86100**

**Int. Cl.⁴ G01N** *1/00*

**U.S. Cl. 266—99** **18 Claims**




1. A device for the movement of a shift furnace probe, which is introduced transversely into the furnace through a support block and a sealing packing, the device comprising:

frame means disposed outside of the furnace along the probe insertion axis, said frame means being provided with means for inserting and extracting the probe;

said inserting and extraction means comprising;

carriage means slidably mounted on said frame means, said carriage means being provided with at least one stirrup means pivotably mounted thereon, said stirrup means being pivotable about a horizontal axis at right angle to the direction of movement of said carriage means, said stirrup means including means for gripping the probe and driving it in the probe insertion direction when said carriage means is moved in the direction of the furnace; and

said carriage means comprising:

a baseplate;

a front transverse wall;

a rear transverse wall opposed from said front transverse wall, each of said walls having a cutout opening at the upper portions thereof for the passage of the probe; and

said stirrup means being mounted on said front wall and extending in the direction of said rear wall.

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**4,747,582**

## MANIPULATOR AT FURNACES

**Sven E. Bergström, Svartnäsgatan 17, 781 52 Borlänge, and Peter Gossas, Skillingsgatan 5, 781 62 Borlänge, both of Sweden**

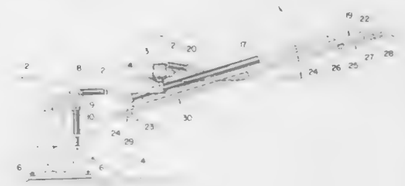
**PCT No. PCT/SE85/00380, § 371 Date Jun. 18, 1986, § 102(e) Date Jun. 18, 1986, PCT Pub. No. WO86/02437, PCT Pub. Date Apr. 24, 1986**

**PCT Filed Oct. 2, 1985, Ser. No. 876,894**

**Claims priority, application Sweden, Oct. 10, 1984, 8405060**

**Int. Cl.⁴ C21C** *5/46*

**U.S. Cl. 266—226** **9 Claims**



7. An apparatus for treating the contents in the interior of a furnace which has an opening leading to its interior, said apparatus including

a support stand which is attschable to the furnace so as to be positioned laterally of the opening in the furnace,

a swinging bracket which is attached to said support stand so as to be horizontally and vertically rotatable with respect thereto, said swinging bracket having a free end which is remote from said support stand,

a first hydraulic cylinder attached to the free end of said support stand and including a movable piston having a free end which mounts a rotatable support head,

an elongated feed table attached to said rotatable support head so as to be horizontally and vertically movable with respect thereto and also displaceable in its longitudinal direction, said elongated feed table being capable of supporting at least one elongated treatment device, and

at least one elongated treatment device mounted on said elongated feed table,

said swinging bracket and said first hydraulic cylinder being capable of moving said rotatable support head in front of the opening in said furnace and said elongated feed table being movable relative to said rotatable support head to enable each elongated treatment device supported thereon to extend through the opening in the furnace at a desired angle.

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**4,747,583**

## APPARATUS FOR MELTING METAL PARTICLES

**Eliott B. Gordon, 2713 Hampshire #7, Cleveland Heights, Ohio 44106; David V. Neff, 3141 E. Derbyshire Rd., Cleveland Heights, Ohio 44118; Paul V. Cooper, 2240 Belvoir Blvd., Cleveland, Ohio 44121, and Ronald E. Gilbert, 10999 Bridle Trail, Chardon, Ohio 44024**

**Continuation of Ser. No. 781,538, Sep. 26, 1985, abandoned. This application Jun. 10, 1987, Ser. No. 61,025**

**Int. Cl.⁴ F27B** *14/10*

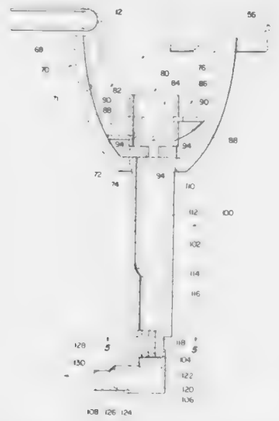
**U.S. Cl. 266—235** **13 Claims**

1. A crucible for melting metal particles in molten metal flowing in the crucible, comprising:

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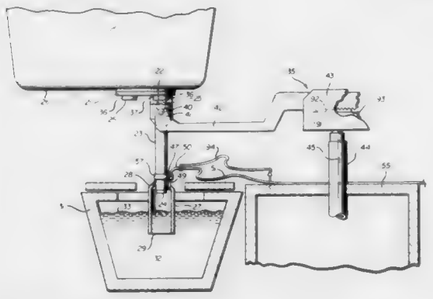
an annular side wall;
a bottom wall having an unobstructed opening therein; and
mixing means for submerging metal particles within molten metal flowing in the crucible, the mixing means being



disposed adjacent the bottom wall and being maintained stationary relative to the bottom wall and the side wall, the mixing means including a blade having a leading edge and a trailing edge, the leading edge being disposed at a higher vertical location than the trailing edge.

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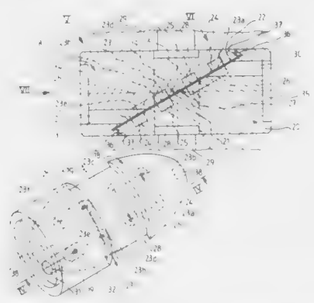
**4,747,584**
**APPARATUS FOR INJECTING ALLOYING INGREDIENT INTO MOLTEN METAL STREAM**
**Daniel Rellis, Jr., Lansing, Ill., and Roger J. Glennon, Munster, Ind., assignors to Inland Steel Company, Chicago, Ill.**
**Filed May 19, 1987, Ser. No. 51,943**
**Int. Cl.[4] C21C** *7/00*
**U.S. Cl. 266—287** **17 Claims**



1. In combination:
a vertically disposed conduit having a vertically disposed center line and upper and lower open ends;
a vertically disposed, tubular shroud enclosing the lower portion of said conduit and having an open lower end;
means mounting said shroud to said conduit for movement of the shroud and the conduit together;
means mounting said conduit for rotational movement with said shroud, about a vertical first axis spaced from the vertical center line of said conduit;
a rigid injector nozzle having a straight portion extending through said shroud;
a flexible feed line extending away from said conduit;
said nozzle having a downstream open end communicating with the interior of said shroud and an upstream open end for connection to said flexible feed line;
said straight portion of the nozzle terminating at said downstream nozzle end and having a center line extending in a direction having a vertical component;
collar means having an axis and surrounding said straight nozzle portion;
said collar axis being co-linear with said center line of said straight nozzle portion;
first means mounting said collar means for rotational movement about its axis, relative to said nozzle;
and means connecting said collar means to said conduit;
said first mounting means for the collar means and said connecting means for the collar means comprising means cooperating to facilitate rotation of the nozzle about said center line of the nozzle's straight portion during said rotational movement of the conduit.

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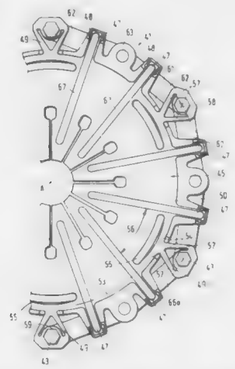
**4,747,585**
**DAMPING DEVICE AND VEHICLE HEIGHT CORRECTOR USING SUCH A DEVICE**
**Irénée Buvat, Paris, France, assignor to Automobiles Peugeot and Automobiles Citroen, both of, France**
**Filed Jul. 2, 1986, Ser. No. 881,267**
**Claims priority, application France, Jul. 3, 1985, 85 10187**
**Int. Cl.[4] F16M** *1/00*
**U.S. Cl. 267—140.1** **5 Claims**



1. A damping device for use in a hydraulic circuit adapted to connect a tank of hydraulic fluid to two chambers and allowing free circulation of this fluid in both directions between one or the other chamber to the tank, said device comprising in combination:
two cylindrical elements (**18**, **20**) which are obliquely truncated to thus define two elliptic surfaces (**19**, **21**) which are adapted to mate with each other while defining an oblique junction plane;
a thin wall (**22**) provided with a plurality of through holes (**23***a*–**23***h*) and located in said plane in fluid-tight relationship between said two elliptic surfaces; and
each of said elliptic surfaces being provided with a plurality of slots (**24**, **25**, **26**, **27**) which are identically arranged on both surfaces as is deduced from the position of the respective slots when one element is rotated by 180° with respect tothe other element, and which define together with said through holes of the thin wall, tortuous passages which interfere with the flow of the hydraulic fluid flowing in both directions between said tank and one or the other of said two chambers.



**4,747,586**
**FRICTION CLUTCH AND DIAPHRAGM SPRING THEREFOR**
**Wolfgang Reik, Bühl, Fed. Rep. of Germany, assignor to LuK Lamellen und Kupplungsbau GmbH, Bühl, Fed. Rep. of Germany**
**Continuation of Ser. No. 531,930, Sep. 13, 1983, abandoned. This application May 12, 1987, Ser. No. 54,148**
**Claims priority, application Fed. Rep. of Germany, Sep. 15, 1982, 3234212; Sep. 15, 1982, 3234156**
**Int. Cl.[4] F16F** *1/34*
**U.S. Cl. 267—161** **33 Claims**

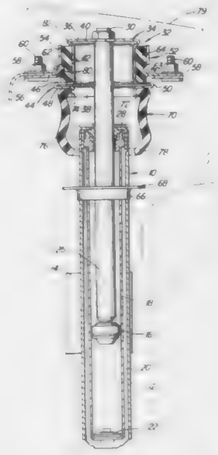


1. A diaphragm spring having radially innermost and outermost edge faces and comprising an annular main section having an innermost and an outermost part; a first and a second group of prongs extending outwardly from said outermost part, m prongs of said first group alternating with n prongs of said second group, as considered in the circumferential direction of said main section, m and n being whole numbers including one; and reinforcing elements provided on at least some of said prongs and extending into said main section across at least one of said parts but terminating short of at least one of said edge faces.

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**4,747,587**
**LOW PROFILE SUSPENSION STRUT**
**Terry J. Ferrel, Rochester Hills, Mich., assignor to Chrysler Motors Corporation, Highland Park, Mich.**
**Filed Jan. 15, 1987, Ser. No. 4,392**
**Int. Cl.[4] B60G** *15/00*
**U.S. Cl. 267—220** **2 Claims**

1. A telescoping shock absorbing suspension strut operatively connected between sprung and unsprung masses of a vehicle having an outer support casing operatively connected to said unsprung mass of said vehicle and an inner cylinder tube fixed in said support casing having a hydraulic dampening fluid therein, a valved piston mounted for sliding reciprocal movement in said inner cylinder tube, a piston rod operatively connected to said piston with its upper end extending through one upper end of said cylinder tube and said support casing, a mounting assembly for said strut adapted for attachment to a horizontally disposed strut receiving said sprung mass, said mounting assembly comprising; a collar member including an annular upstanding cylindrical-shaped collar portion having a free upper end and a lower end formed end with an integral, radially outwardly extending horizontally disposed mounting flange portion underlying said vehicle sprung mass panel and secured thereto, an inverted cup having a right cylindrical body portion formed with an upper closed end portion and a lower open end neck portion, said cup body portion positioned in a concentrically spaced manner within said collar member defining a uniform annular space therebetween such that said cup upper closed end portion is located above said collar member upper end, said cup body and neck portions joined by a radially outwardly extending annular stop flange formed a predetermined axial distance above said neck portion open end, said cup stop flange spaced a predetermined axial distance below the plane of said collar mounting flange portion, said stop flange having a predetermined radial extent so as to be vertically aligned for flush abutting contact with said collar mounting flange portion when said strut undergoes maximum jounce, a right cylindrical-shaped elastomeric isolator fitted in said annular space and bonded to both said outer collar portion and said inner cup body portion, said isolator having a uniform thickness and extending vertically below said space such that its lower end contacts the upper surface of said stop flange, a sleeve-shaped elastomeric shield having one or more convoluted portions formed intermediate its upper and lower ends, said shield encircling the upper end portion of said support casing, said shield having on its upper end bonded to the exterior surface said neck portion, a radially outwardly extending



contact flange positioned on said support casing a predetermined axial distance below its upper end, said piston rod extending upwardly into said cup in a co-axial manner with its upper end fixed to said cup closed end, said cup having a predetermined internal diameter whereby upon movement of said sprung and unsprung masses toward one another said support casing upper end adapted to be telescopically received in said cup body portion, wherein said cup stop flange adapted for flush abutting contact with said collar mounting flange portion upon said strut undergoing maximum jounce travel without causing excessive stress on said elastomeric isolator, and such that said shield one or more convolute portions being initially progressively buckled and compressed between said cup stop flange and said casing contact flange, and whereby during said maximum jounce travel said support casing upper end is adapted to contact said cup closed end obviating excessive deformation of said elastomeric shield.

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**4,747,588**
**UNIVERSAL CLAMPING TOOL**
**George A. Dillhoff, 1301 Furnas Rd., Vandalia, Ohio 45377**
**Filed Aug. 15, 1986, Ser. No. 896,898**
**Int. Cl.[4] B25B** *1/00*
**U.S. Cl. 269—6** **2 Claims**

1. A clamping tool for use as a fixture for clamping and supporting a wide variety of elongated pieces for welding or the like, in which a pair of generally C-shaped arms, each having first and second ends, said arms being pivotally connected at said first ends, means for locking said arms whereby said arms may be moved between opened and clamped positions and locked in a clamped position, and in which the arms

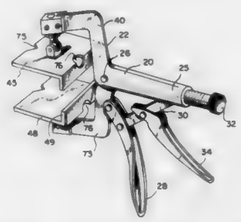
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carry workpiece engaging elements thereon, the improvement comprising:

a pair of opposed gnerally L-shaped clamping members, one for each arm, each such clamping member having a long leg and a short leg extending generally perpendicular to the long leg and in a direction therefrom toward the opposite said clamping member,

a support attached to each of said clamping members to an adjacent surface of said long leg with said short leg extending away from said support, and



means for mounting each of said supports on said second end of one of said arms to provide for unrestricted rotational movement of said support about a first axis intersecting said long leg of said clamping member and for simultaneous pivotal movement of said support about a second axis generally parallel to said long leg, including a pair of swivel pins, each of said pins being connected to said second end of one of said arms for rotational movement about said first axis, each of said pins further being pivotally conencted to one of said supports providing for movement of said one support about said second axis.

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**4,747,589**

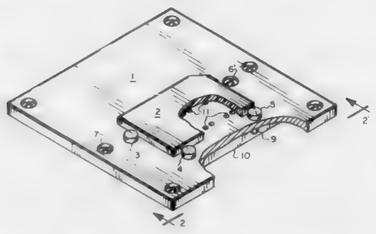
**UNIVERSAL PNEUMATIC PARTS LOCATING SYSTEM**

**Donald R. Watson, Kingston; Kevin L. Woolbright, Rochelle, and Russell L. Schreiner, Norridge, all of Ill., assignors to GTE Communication Systems Corporation, Phoenix, Ariz.**

**Filed May 15, 1987, Ser. No. 50,120**

**Int. Cl.[4] B25B** *11/00*

**U.S. Cl. 269—21** **10 Claims**



1. A printer table for use in thick film printing of circuits on alumina substrates, said table comprising:

a first planar section, including a top surface, a bottom surface, a first plurality of holes, each extending from said bottom surface to said top surface, a second plurality of holes, each extending from said bottom surface to said top surface;

a plurality of sockets included in said top surface, each adapted to receive a locator pin;

a second planar section, including a top surface, a bottom surface, first and second multielement channels located in said second planar section top surface;

first connecting means included in said second planar section connected to said first channel, adapted to facilitate connection to a source of compressed air;

second connecting means included in said second planar section connected to said second channel, adapted to facilitate connection to a vacuum source; and

a plurality of fastening means adapted to connect said first section to said second section with said first section bottom surface abutting said second section top surface;

said first channel providing a first airway between said first connecting means and said first plurality of holes and said second channel providing a second airway between said second connecting means and said second plurality of holes;

whereby response to the connection of said first connecting means to a source of compressed air and said second connecting means to a vacuum source, the combined use compressed air directed through said first plurality of holes and said vacuum through said second plurality of holes permits said substrates to float on air in close proximity to said first planar section top surface while not overriding said locator pins in said sockets included in said top surface.

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**4,747,590**

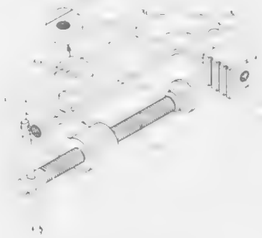
**INTERCONNECTED C-CLAMPS AND TENSIONING MEANS THEREFOR**

**Tai-Her Yang, 5-1 Taipin Street, Si-Hu Town, Dzan-Hwa, Taiwan**

**Filed Oct. 27, 1986, Ser. No. 923,017**

**Int. Cl.[4] B25B** *1/00*

**U.S. Cl. 269—45** **5 Claims**



1. A C-clamp adapted for interconnection to other like C-clamps and to other tensioning devices by means of at least one threaded adapter and comprising, in combination a main body portion including a first leg having a boss provided with a threaded recess therein, a threaded clamping rod received in the threaded recess, the threaded clamping rod having a pair of ends, one of which ends is provided with a handle, and the other of which ends is provided with a clamping member, the main body portion further including a second leg substantially perpendicular to the first leg and integral therewith, the second leg being disposed substantially parallel to the threaded clamping rod, the main body portion further including a third leg substantially perpendicular to the second leg and substantially parallel to the first leg and spaced therefrom, the third leg having a free end portion provided with an enlarged boss directed towards the threaded clamping rod, whereby an object may be clamped between the enlarged boss and the clamping member on the threaded clamping rod, the main body portion further includes a fourth leg integrally joining the first and second legs and disposed thereto at an angle of substantially 45 degrees, and wherein the main body portion further includes a fifth leg integrally joining the second and third legs and disposed thereto at an angle of substantially 45 degrees, wherein the fourth and fifth legs each has one of said blind bores formed therein, the main body portion having a first plurality of respective blind bores formed therein in the plane thereof and opening externally of the main body portion of the C-clamp, the main body portion further having a second plurality of through bores formed therein substantially perpendicular to the plane of the main body portion and interspersed with the first plurality of blind bores, respectively, and each of the respective bores in the first and second plurality of bores being threaded to receive, selectively, at least one threaded adapter for interconnection to the other C-clamps or tensioning devices.



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**4,747,591**

**APPARATUS FOR SEPARATING FOLDED PERFORATED REEL PAPERS**

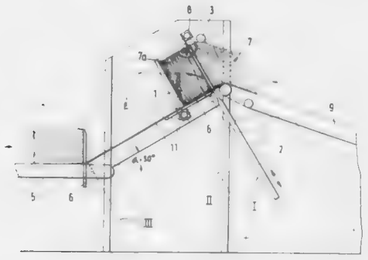
**Jörg-Detlef Beyer, Ortsteil Eichede, Fed. Rep. of Germany, assignor to Riensch & Held (GmbH & Co.), Hamburg, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 863,108, May 14, 1986, abandoned. This application Oct. 7, 1987, Ser. No. 106,235**

**Claims priority, application Fed. Rep. of Germany, May 22, 1985, 3518386**

**Int. Cl.[4] B61H** *41/00*; **B26F** *3/00*

**U.S. Cl. 270—52.5** **38 Claims**



1. Apparatus for providing a separated stack from a main stack of folded and perforated reel papers comprising a conveying means on which the reel papers are conveyed standing on their folded edge to a further processing means in the vicinity of the conveying means, a separating sword, means for moving the separating sword between the reel papers of the stack to thereby form a cavity, a blade mounted over the stack, means for moving the blade into the cavity at right angles to the direction of the perforations, and means for retaining the separating sword to support the following stack until the separated stack has been conveyed away.

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**4,747,592**

**FEEDING MACHINE FOR SIGNATURES APPLICABLE TO MACHINES FOR FEEDING SHEETS FOR USE IN BINDING MACHINES, INC.**

**Giorgio Pessina, and Aldo Perobelli, both of Via Timavo, 32 20037, Paderno Dugnano, Italy**

**Filed Apr. 25, 1986, Ser. No. 856,592**

**Claims priority, application Italy, May 5, 1985, 20566 A/85**

**Int. Cl.[4] B65H** *5/02*

**U.S. Cl. 271—13** **3 Claims**

1. A machine for feeding signatures to a sheet feeder machine for book binding, comprising means defining a loading plane for the support and conveyance of stacks of adjacently disposed signatures,

an inclined signature elevator,

means defining a delivery plane for the delivery of individual signatures to a sheet feeder,

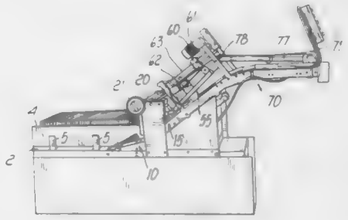
an intermediate conveyor connector disposed between said loading plane means and said inclined signature elevator, said intermediate conveyor connector being pivotally mounted at the end thereof nearest said loading plane means,

inclination adjustment means on said intermediate conveyor connector for adjustment of the inclination thereof including micrometer screws supported on said intermediate conveyor connector and engageable on the frame of said feeder machine,

said intermediate conveyor connector including drive belts against which said signatures on said loading plane means engage, said drive belts operating to reduce the pressure of the stack of signatures positioned upstream thereof on said loading plane means, wherein said machine further comprises signature stack pressure adjustment means located downstream of said loading plane means and including:

convergingly inclined vertical side walls,

a first counter-threaded rod threadedly engaging said convergingly inclined vertical side walls,



first means for rotating said first counter-threaded rod whereby to effect symmetrical adjustment of the lateral separation of said convergingly inclined vertical side walls,

downstream of said convergingly inclined lateral side walls there being respective groups of rollers, one on each side, said rollers having inclined axes and being supported by support means threadedly engaged by a second counter-threaded rod, turnable by second rotating means, whereby to adjust separation of said groups of rollers, and

wherein a feeler device is located between said groups of rollers for detecting the presence of an excess number of signatures on said loading plane means and operating to limit the advancement of the signatures on said loading plane means in dependence of said feeler device.

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**4,747,593**

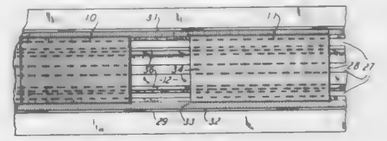
**SUPPORT FOR EDGE-STANDING SHEETS**

**Walter J. Stobb, Pittstown, N.J., assignor to Stobb Inc., Clinton, N.J.**

**Filed Jul. 17, 1986, Ser. No. 886,374**

**Int. Cl.[4] B65H** *35/04*

**U.S. Cl. 271—213** **4 Claims**



1. A support for unbound sheets standing on their edges in a bundle thereof, comprising a horizontal floor, a conveyor disposed on said floor for receiving and upwardly supporting the bundle of sheets in their edge-standing positions, two conveyor belts extending parallel to said floor and thereabove and spaced apart and each having flexible bristles extending toward the other of said conveyor belts and at the respective opposite sides of the bundle and with said bristles being adapted and spaced apart a distance sufficient to have said bristles in flexed contact with the sheets to maintain the sheets in their edge-standing positions on said floor and in an upright flat orienta-

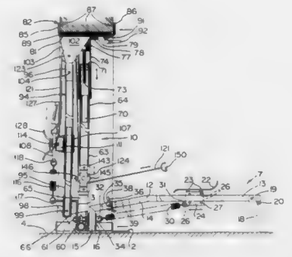
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tion on said conveyor, and said conveyor and said two conveyor belts all being movable in the same direction and at the identical speed for moving the bundle of sheets along said floor at said speed.

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**4,747,594**
**PORTABLE EXERCISE DEVICE FOR USE IN A DOORWAY**
**Roger Houde, #2, 10031-153 St., Edmonton, Alberta, Canada (T5P 2B1)**
**Filed Mar. 24, 1986, Ser. No. 842,977**
**Claims priority, application Canada, Feb. 18, 1986, 502136**
**Int. Cl.[4] A63B *27/00***
**U.S. Cl. 272—72** **12 Claims**

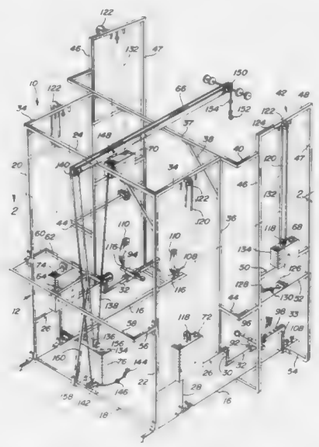


1. A portable exercise device for use in a doorway or similar opening having a top and sides comprising base means for mounting in said opening; adjustable post means for detachable connection to said base means and to the top of said opening; adjustable arm means extending laterally from said post means for engaging the sides of the opening into engagement with the sides of the opening; hinge means pivotally connecting said arm means to said post means whereby said arm means can be rotated between a vertical storage position and a horizontal use position; seat means for detachable connection to said post means, so that the seat means is perpendicular to a plane containing said post means and said arm means; pulley means for mounting on said post means; load means for connection to said post means; and cable means for extending around said pulley means to said load means, whereby the user of the device can sit on said seat means and pull said cable means against the force of said load means.

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**4,747,595**
**EXERCISER FOR WHEELCHAIR OCCUPANTS**
**George D. Mabry, 3257 Beatrice Dr., Jackson, Miss. 39212, and Paul H. Pettie, 236 McDowell Park Cir., Jackson, Miss. 39204**
**Filed Jan. 12, 1987, Ser. No. 2,244**
**Int. Cl.[4] A63B *21/06***
**U.S. Cl. 272—118** **11 Claims**

1. An exercise device for use by wheelchair occupants comprising a framework including side components and end components at only one end of the side components with the other end of the side components being permanently open to enable a wheelchair to be rolled into and out of the area between the side components in forwardly or rearwardly facing direction in relation to the end components without removal and replacement of any components, adjustable means on the side components of the framework engaging the wheels on the wheelchair to limit the inward movement of the wheelchair into the framework, means connected with the side components of the framework for detachable and adjustable connection with the wheelchair to preclude outward and lateral movement of the wheelchair in relation to the framework and means connected with the side components of the framework to form a seatbelt engageable with the occupant of the wheelchair to stabilize the occupant in the wheelchair, said framework including vertically movable weight means and a cable and pulley system connected thereto and to the framework for attachment of user



engaging means by which various exercises can be practiced by moving the weight means vertically.

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**4,747,596**
**SCORER'S TABLE**
**Grant Harrison, Salt Lake City, Utah, assignor to Specta-View, Inc., Del Ran, N.J.**
**Filed Jun. 6, 1986, Ser. No. 871,493**
**Int. Cl.[4] A63B *71/06***
**U.S. Cl. 273—1 ES** **4 Claims**



1. A scorer's table for sporting events having a front side and a rear side, comprising:
a table top adapted to be supported in a horizontal position by legs;
a center panel having a top, bottom and opposed sides, said top of said center panel being mounted at the center of said table top and said center panel extending vertically downwardly therefrom on said front side of said table, said center panel displaying a permanent message;
a pair of end panels each having a top, bottom and opposed sides, said top of each said end panels being mounted to said table top and said end panels extending vertically downwardly therefrom on said front side of said table on either of said sides of said center panel, each of said end panels having a display screen for displaying a message, the message appearing on each of said display screens being controlled by signals from an electronic controller communicating with said display screens.

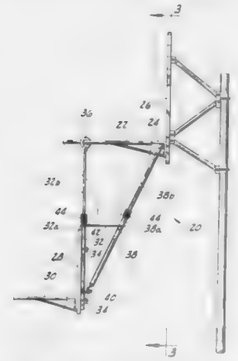
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**4,747,597**
**AUXILIARY BASKETBALL BACKBOARD AND HOOP**
**Raymond M. Kluczny, 1112 Sycamore, Rolla, Mo. 65401**
**Filed Aug. 20, 1987, Ser. No. 87,304**
**Int. Cl.[4] A63B *63/08***
**U.S. Cl. 273—1.5 R** **20 Claims**

8. An auxiliary basketball backboard and hoop unit for installation on a standard basketball hoop mounted by a horizontal plate to a standard backboard to provide a lower and



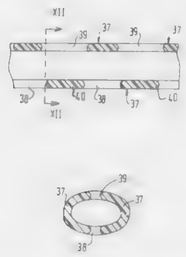
smaller backboard and hoop for juvenile use, the unit comprising:
an auxiliary backboard;
an auxiliary hoop mounted on the front of the auxiliary backboard;
a pair of telescoping elongate supports extending upwardly from the auxiliary backboard, each elongate support having a hook at its upper end, the hooks being adapted to, and spaced from each other sufficiently to, engage the



forward portion of the standard hoop on generally opposite sides thereof;
a telescoping brace having upper and lower portions, the lower portion pivotally connected to the back of the auxiliary backboard to pivot about a horizontal axis, and the upper portion adapted to engage the corner formed between the standard backboard and the plate mounting the standard hoop; and
means for resiliently biasing the brace toward the supports.

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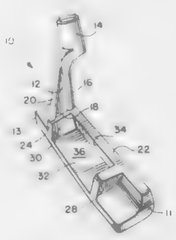
**4,747,598**
**RACKET FRAME HAVING INTERIORLY LOCATED STRINGING LUGS**
**Michael E. Curtis, Wakefield, England, assignor to Dunlop Limited a British Company, United Kingdom**
**Filed Jun. 26, 1985, Ser. No. 748,910**
**Claims priority, application United Kingdom, Jul. 17, 1984, 8418191**
**Int. Cl.[4] A63B *49/10***
**U.S. Cl. 273—73 C** **6 Claims**



1. A games racket frame comprising a head and a shaft at least the head of which is a hollow injection-moulding of thermoplastics material reinforced with short filament reinforcing material, at least the head being of generally C–shaped cross section with the open end of the C-shape defining an inner periphery of the head, said head having an outer periphery opposite said inner periphery, said outer periphery being provided with a series of apertures giving access to the inside of the hollow head, said head provided with stringing means adjacent the inner periphery for holding a racket string, said stringing means being unitary with and bridging the open end of the generally C-shaped cross section, wherein the spaces between adjacent stringing means define stringing holes in the head and at least one racket string strung on the head through the stringing holes and about the stringing means such that the string does not pass through the hollow frame to the outer periphery of the head, in which the stringing means defining the stringing holes are formed of one piece with the moulding in the form of a series of discrete lugs.

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**4,747,599**
**GOLF CLUB PUTTER**
**Anthony J. Antonious, 205 E. Joppa Rd., Towson, Md. 21204**
**Filed Apr. 17, 1986, Ser. No. 853,123**
**Int. Cl.[4] A63B *53/02, 53/04***
**U.S. Cl. 273—167 G** **6 Claims**



1. A putter-type golf club head comprising:
a shaft socket structured to receive a golf club shaft;
a club head body including a heel end, toe end, ball striking face, a rear wall behind said ball striking face, a rearwardly extending lower flange having an upper surface thereon, a pair of upright boss members located on said upper surface of said rearwardly extending lower flange and connected to said rear wall behind said ball striking face, one of said boss members being located inward of but adjacent said heel end and a second of said boss members being located inward of but adjacent said toe end;
a cavity defined by said read wall, said upper surface of said rearwardly extending lower flange and said upright boss members;
a hosel member defined by a triangular shape including an upright side adjacent to and extending above said ball striking face to said shaft socket, a base 90 degrees to said upright side, said base extending from adjacent said ball striking face rearwardly to adjacent said rear edge, and being located on said boss member adjacent said heel end, said hosel member having a hypotenuse side connecting said upright side and said base, said hypotenuse side extending above said ball striking face from adjacent said shaft socket to adjacent said rear edge;
said hosel member being located in a plane perpendicular to said ball striking face and forming a one-piece, in-line connection between said shaft socket and said rearwardly extending lower flange.

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**4,747,600**
**ELECTRONIC GAMING BOARD FOR BINGO**
**John Richardson, San Diego, Calif., assignor to Selectro-Vision, Ltd., San Diego, Calif.**
**Filed Jan. 17, 1986, Ser. No. 820,448**
**Int. Cl.[4] A63F *3/06***
**U.S. Cl. 273—269** **23 Claims**

1. A chance based gaming board comprising:
display means including means for visually displaying a plurality of symbols in a predetermined array of symbol display locations;

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computer means including a control program, processor means controlled by said control program, data storage means including a plurality of symbol storage locations, and means for generating control signals;

input switch means for entering into said data storage means a plurality of symbols including data and function commands;

means for selecting a first load mode for the gaming board;

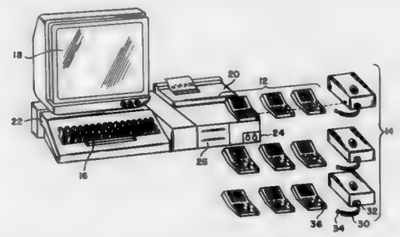
said processor means, in response to said load mode, generating control signals causing the present state of said input switch means to be periodically sensed, causing said data storage means to store entered symbols in a selected sequence in said symbol storage locations, and causing said display means to display said entered symbols in said predetermined array;

means for selecting a second play mode for the gaming board;

said processor means, in response to said play mode, generating control signals causing the contents of each symbol storage location to be compared with said entered symbols, causing a symbol storage location to be marked if said comparison locates an indentical match; causing said display means to visually display marked symbol storage locations differently from the display of unmarked symbol storage locations; and further causing the pattern of said marked symbol storage locations to be compared with a predetermined pattern forming a plurality of locations of said symbol array, and causing an annunciation if said pattern comparison locates an indentical match;

means for selecting a third communications mode for the gaming board adapted to upload or download information with an external device; and

said processor means generating control signals to store a gaming schedule comprising a plurality of win patterns in said data storage means during said communications mode and generating control signals during said play mode to execute said gaming schedule.



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**4,747,601**

**DISCONNECTABLE SEALING DEVICE FOR LINKING TWO CLOSED VOLUMES WITHOUT BREAKING THE CONFINEMENT**

**Charles Giachet, Vendome, France, assignor to Societe Nouvelle d'exploitation de la Calhene, Velizy Villacoublay, France**

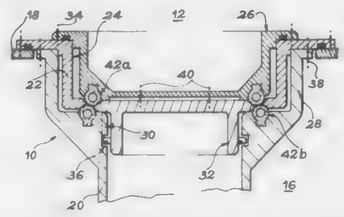
**Filed May 14, 1987, Ser. No. 49,525**

**Claims priority, application France, May 15, 1986, 86 06984**

**Int. Cl.⁴ F16J** *15/10*

**U.S. Cl. 277—12** **7 Claims**

1. A disconnectable device for linking two closed volumes without breaking the confinement thereof with respect to the external atmosphere, each of these closed volumes having at least one circular opening with a given axis, defined by a flange and normally sealed by a door, said device incorporating means for the disconnectable fixing of the doors to the flanges, means for the disconnectable fixing of the flanges to one another, means for the disconnectable fixing of the doors to one another and sealing means for permanently ensuring a confinement of said closed volumes with respect to the external atmosphere, wherein the sealing means comprise two annular gaskets, each having in section an approximately circular part and at least one projecting part forming a fixing member, the member of a first of said gaskets being sealingly located in a groove formed in the door of a first of the closed volumes, the approximately circular part of said gasket being in tight contact with two surfaces inclined with respect to the axes of the openings and formed respectively on the flange of the first closed volume and on the door of the second closed volume when all the



fixing means are connected, the member of the second gasket being sealingly located in a groove formed in the flange of the second closed volume, the approximately circular part of said second gasket being in tight contact with two other surfaces inclined with respect to the axes of the openings and respectively formed on the door of the second closed volume and on the flange of the first closed volume, as well as with the approximately circular part of the first gasket when all the fixing means are connected.

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**4,747,602**

**SYNTHETIC RESIN SEALING RING ASSEMBLY WITH METAL FILM LAYER**

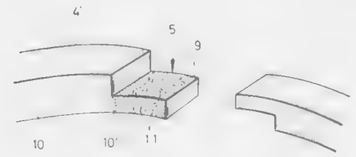
**Daisaku Kobayashi; Tunesaku Itara; Koichiro Kasahara, all of Kashiwazaki; Yutaka Momose, Anjyo, and Tomokimi Mizuno, Chiryu, all of Japan, assignors to Kabushiki Kaisha Riken, Tokyo and Aisin Seiki Kabushiki Kaisha, Aichi, both of, Japan**

**Filed Jun. 10, 1987, Ser. No. 60,352**

**Claims priority, application Japan, Jun. 21, 1986, 61-94013[U]**

**Int. Cl.⁴ F16J** *9/14, 9/28*

**U.S. Cl. 277—216** **5 Claims**



1. In a sealing ring assembly including a synthetic resin sealing ring body having an inner circumferential surface and two opposing stepped cut surface portions each of which includes a planar portion, a synthetic resin gas sealing ring in contact with the inner circumferential surface of said sealing ring body and having an inner circumferential surface, and a metal ring in contact with the inner circumferential surface of said gas sealing ring, an improvement comprising a metal film layer provided on the planar portion of one of the stepped cut surface portions and on the inner circumferential surface of at least the inner circumferential surface of this stepped cut surface portion.



**4,747,603**

**OIL SEAL COMPRISING LIP SEAL WITH THERMAL EXPANSION CONTROLLED REINFORCING RING**

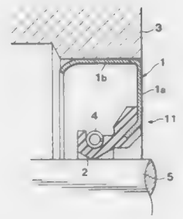
**Eiichi Sugino; Eigoro Tsukagoshi, and Yoshio Arai, all of Tokyo, Japan, assignors to Arai Seisakusho Co., Ltd., Tokyo, Japan**

**Filed Nov. 18, 1986, Ser. No. 932,441**

**Claims priority, application Japan, Dec. 26, 1985, 60-297176**

**Int. Cl.⁴ F16J** *15/32*

**U.S. Cl. 277—26** **3 Claims**



1. An oil seal of the type having a metallic reinforcement ring whose outer peripheral portion is oil-tightly fitted into a housing, characterized in that after the formation or fabrication of said metallic reinforcement ring, the latter is subjected to a hardening process so that its durability is increased beyond an inherent durability of a raw material of said metallic reinforcement ring; and a seal lip is formed over the inner peripheral edge portion of an annular flange portion of said metallic reinforcement ring.

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**4,747,604**

**ROTARY SHAFT SEAL FOR DRILL BIT CUTTERS**

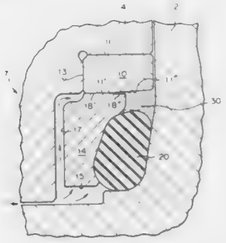
**Osamu Nakamura, Tokyo, Japan, assignor to Tsukamoto Seiki Co., Ltd., Tokyo, Japan**

**Filed Sep. 18, 1986, Ser. No. 909,113**

**Claims priority, application Japan, Jun. 13, 1986, 61-137888**

**Int. Cl.⁴ F16J** *15/34*

**U.S. Cl. 277—83** **5 Claims**



1. A rotary shaft seal for a cutter of a drill bit having a bit body formed to include a bearing portion on which the cutter is rotatably journalled, comprising:

a fixed seal ring fitted securely in the cutter and having an end face which includes a first tapered surface;

a floating seal ring having an end face which includes a second tapered surface opposing said first tapered surface, and a curved inner circumferential surface; and

a resilient O-ring compressed between the curved inner circumferential surface of said floating ring and said bearing portion.

**4,747,605**

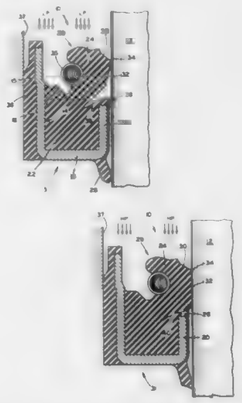
**FLUID PRESSURE SEAL WITH PRESSURE DISTORTION BARRIER**

**Joseph Antonini, Chicago, Ill., assignor to Dana Corporation, Toledo, Ohio**

**Filed May 30, 1986, Ser. No. 868,458**

**Int. Cl.⁴ F16J** *15/32*

**U.S. Cl. 277—153** **8 Claims**



1. In a fluid pressure seal assembly including a primary shaft sealing annulus having a radially inwardly extending circumferential sealing lip defined by a pair of axially oriented outer and inner converging frustoconical walls, means for biasing said shaft sealing annulus radially inwardly for establishing sealing contact with an operatively moveable shaft, said assembly further having a pressure side on said annulus,and including means for limiting axial movement of said sealing annulus; an improvement comprising said means for limiting axial movement of said sealing annulus comprising a rigid axially extending support component disposed for limiting axial movement of said sealing annulus in a direction away from said pressure side of said annulus, wherein said support and said annulus comprise a unitary composite, wherein said means for limiting axial movement of said sealing annulus further comprises an elastomeric material bonded to said axially extending support component to define a rigid axial barrier, wherein said elastomeric material is integral with said sealing annulus.

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**4,747,606**

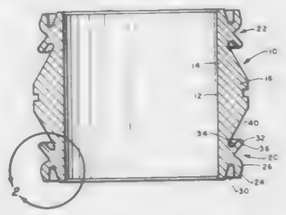
**BI-DIRECTIONAL METAL-TO-METAL SEAL**

**Charles E. Jennings, Agoura Hills, Calif., assignor to Vetco Gray Inc., Houston, Tex.**

**Continuation of Ser. No. 778,813, Sep. 23, 1985, abandoned. This application Mar. 27, 1987, Ser. No. 32,939**

**Int. Cl.⁴ F16J** *15/02;* **F16L** *17/02, 39/00*

**U.S. Cl. 277—182** **7 Claims**



1. A metal-to-metal seal comprising a cylindrical ring having a bore therein and having bi-directional sealing elements on the outer periphery of said cylindrical ring,

each bi-directional sealing element comprising,

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a first sealing element of flexible, springy metal, engageable in a cylindrical bore in interference fit relationship and, thus energized thereby, said first sealing element being of non-uniform thickness and having a curved outer surface and defining with said cylindrical ring a first cavity open toward a first flow path of fluid pressure so that said first sealing element is pressure assisted by said fluid pressure in said first cavity,

said first sealing element having a maximum thickness in the area of said curved outer surface and having a lesser thickness in the area adjacent the end of said first sealing element where said cavity is formed,

a second sealing element of flexible, springy metal also engaging said cylindrical bore in interference fit relationship and energized thereby, said second sealing element being of uniform thickness and adjacent said first sealing element and having a surface facing away from said first flow path of pressure fluid and defining with said cylindrical ring a second cavity energizable by fluid from a second direction in said second cavity to seal said flow path in two directions.

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**4,747,607**

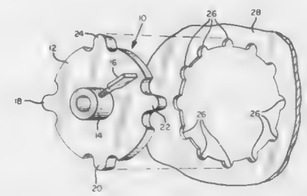
**LOBED CHUCK FOR SAW REGRINDING**

**James Emter, 23429 NE. 29th Ave., Ridgefield, Wash. 98642**

**Filed Mar. 30, 1987, Ser. No. 31,772**

**Int. Cl.[4] B23D** *63/08*

**U.S. Cl. 279—1 L** **3 Claims**



1. A chuck for holding a saw blade during a regrinding operation wherein said saw blade includes a plurality of teeth and an aperture having an inner diameter and a plurality of substantially semicircular scallops forming an outer diameter for mounting said saw blade on a splined arbor, said chuck comprising a frusto-conical member having at least three semi-spherical tapered lobes for snugly engaging said saw blade through said aperture along said outer diameter by fitting tightly into at least three scallops of said aperture when said saw blade is pressed onto said chuck whereby the distance between the tip of each tooth of said blade and said outer diameter is evenly maintained during said regrinding operation to provide a substantially uniform chip load.

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**4,747,608**

**WAFER CHUCK**

**Mitsuya Sato, Yokohama; Nobuyoshi Deguchi, Yamatoshi, and Shunzo Imai, Yamato, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 29, 1985, Ser. No. 792,584**

**Claims priority, application Japan, Oct. 30, 1984, 59-228380; Jul. 12, 1985, 60-152373; Jul. 12, 1985, 60-152374**

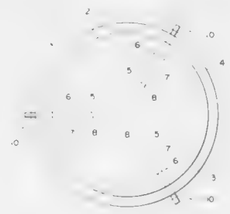
**Int. Cl.[4] B23B** *31/00*

**U.S. Cl. 279—1 E** **8 Claims**

1. A wafer chuck for releasably holding a wafer, comprising:

a base member having an upper surface for carrying and holding thereon the wafer;

a lift mechanism operative on the wafer when it rests on said base member to move the wafer relative to said base member in a direction away from said base member, said lift mechanism having a plurality of operative members, each extending substantially from a radially outward position to a radially inward position of said base member, said plurality of operative members being disposed along lines that substantially evenly divide said base member into a plurality of portions corresponding in number to said plurality of operative members, each of said operative members having an end portion movable, relative to said base member, between a first position at which it is retracted from the upper surface of said base member and a second position at which it protrudes from the upper surface of said base member so as to engage the wafer to



move the same relative to said base member, wherein said operative members have other end portions which are collectively disposed adjacent to a predetermined portion; and

driving means for moving, relative to said base member, the end portion of each of said operative members between said first and second positions, wherein said driving means is disposed so as to be operationally associated with the collectively disposed end portions of said operative members.

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**4,747,609**

**CHUCK WITH TWO OPPOSITELY DISPOSED CLAMPING JAWS**

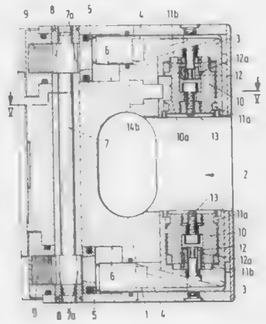
**Hans Scharfen, Meerbusch, Fed. Rep. of Germany, assignor to Paul Forkardt GmbH & Co. KG, Düsseldorf, Fed. Rep. of Germany**

**Filed Jun. 5, 1987, Ser. No. 58,559**

**Claims priority, application Fed. Rep. of Germany, Jun. 6, 1986, 3619145**

**Int. Cl.[4] B23B** *31/18*

**U.S. Cl. 279—4** **2 Claims**



1. A chuck with two oppositely disposed clamping jaws that operate along a clamping axis, each of said clamping jaws comprising a base jaw and a top jaw, with said base jaws being guided in an annular chuck body, which has a central clamping space, in such a way as to be movable in a radial direction, and with each of said base jaws being driven by a wedge-type member that is mounted in said chuck body in such a way as to be essentially axially movable, said chuck further comprising:

for each of said wedge-type members, a pressure-medium cylinder having a piston for driving that wedge-type member, whereby each of the two pistons carries out a stroke movement; and

a mechanical coupling element that is disposed in said chuck body parallel to said clamping axis of said two clamping jaws, with said coupling element automatically synchronizing said stroke movements of the two pistons;

each of said pistons being provided with a piston rod on which a toothed rack is formed; and in which said coupling element is in the form of a coupling shaft that has two ends, in the vicinity of each of which respective teeth are provided that mesh with a given one of said toothed racks to effect said synchronization.

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**4,747,610**

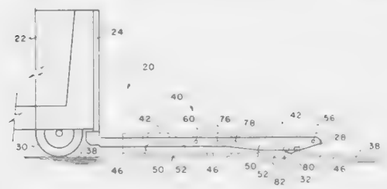
**PALLET SENSOR FOR LIFT TRUCK**

**Bruce A. Yingling, Sleepy Hollow, and Richard A. Peck, McHenry, both of Ill., assignors to Barrett Industrial Trucks, Inc., Marengo, Ill.**

**Filed Aug. 20, 1987, Ser. No. 87,347**

**Int. Cl.[4] B66F** *9/00*

**U.S. Cl. 280—43.12** **20 Claims**



1. A system for staging a fork lift with a pallet, wherein the fork lift has load wheels carried by forks and a lift system for extending the wheels away from and retracting the wheels toward bottoms of the forks to raise and lower the forks, the pallet has top and bottom decks defining passages therebetween and the bottom deck has at least one opening therethrough in communication with the passages, and the forks and load wheels are extendible into the pallet passages to lift the pallet upon extension of the wheels away from the bottoms of the forks, said system comprising sensor means carried on at least one of the forks for detecting the positions of the load wheels with respect to the at least one pallet bottom deck opening when the forks are extended into the pallet passages; and means responsive to said sensor means for generating a signal when the wheels are positioned to be extended away from the forks and through the at least one bottom deck opening to raise the forks and lift the pallet without contacting any portion of the bottom deck.

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**4,747,611**

**CURB ASCENDING AND DESCENDING WHEELCHAIR**

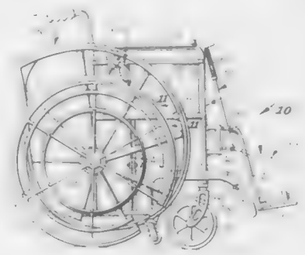
**Harry K. Daugherty, Jr., 1424 Peacock La., St. Louis, Mo. 63144**

**Filed Jul. 31, 1987, Ser. No. 80,080**

**Int. Cl.[4] B62B** *5/02*

**U.S. Cl. 280—242 WC** **18 Claims**

1. A wheelchair adapted to traverse an obstruction such as a curb, said wheelchair including an occupant supporting seat, a frame supporting said seat, pairs of front and rear surface engaging wheels rotatably supported on said frame and supporting said seat for movement along a surface, one of said pairs of wheels being considerably larger than the other pair, normally inactive spiral cam means operatively associated with said larger wheels and rotatable about a common axis with said larger wheels for progressively raising said wheelchair up to the level of the obstruction in response to rotational movement of said larger wheels in one direction and for progressively lowering said wheelchair down from the obstruction in response to rotational movement of said larger wheels in the other direction, and control means operable by the occupant



for selectively activating said normally inactive spiral cam means.

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**4,747,612**

**QUICK ATTACH COUPLING**

**John B. Kuhn, Mayville, Wis., assignor to Deere & Company, Moline, Ill.**

**Filed Mar. 26, 1986, Ser. No. 844,047**

**Int. Cl.[4] A01B** *59/00*

**U.S. Cl. 280—460 A** **11 Claims**



1. A coupler, operatively connected to a vehicle, for operatively connecting an implement, having a stud, to said vehicle, said coupler comprising:

a pair of fixed jaws, operatively connected to said vehicle, defining an inwardly converging notch for receiving said stud;

a latch plate pivotally mounted on said pairs along side said notch and being capable of relatively unrestrained pivotal movement with respect to said jaws, said plate having a cam surface upon which said stud acts when urged into the notch and a prong projecting therefrom, action of said stud against the cam surface pivoting said plate to a closed positon wherein the prong traps said stud in the notch;

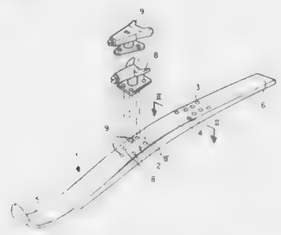
a resilient lock means mounted on said latch plate and slidably supported with respect to said jaws and said plate, for frictionally resisting relative rotation between said plate and said jaws and for automatically engaging a stop means, said stop means being formed in said jaws proximate said notch for preventing rotation of said plate out of said closed position; and

means for holding said lock means out of engagement with said stop means and preventing said lock means from frictionally inducing resistance to rotation of said plate relative to said jaws.

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**4,747,613**
**SKI MANUFACTURED TO HAVE PRE-BORED SCREW HOLES FOR THE MOUNTING OF BINDINGS**
**Jean-Claude Brichoud, Seynod, and Pierre Rullier, Annecy, both of France, assignors to Salomon S.A., Annecy, France**
**Filed Jan. 28, 1987, Ser. No. 7,633**
**Claims priority, application France, Mar. 14, 1986, 86 04127**
**Int. Cl.[4] A63C** *9/00*
**U.S. Cl. 280—611** **33 Claims**



1. A ski manufactured to have a binding mounting zone comprising a number of bores corresponding at least in number and in position to a mounting screw arrangement of a binding apparatus for binding a shoe or boot to a ski and a protection element composed of a material selected from the group of translucent material, transparent material, and opaque material, covering said bores.

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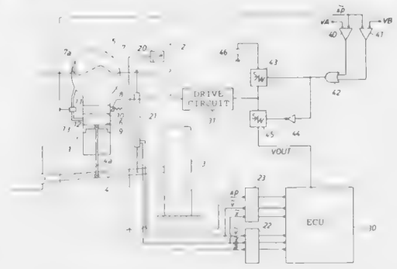
**4,747,614**
**HYDRAULIC CYLINDER MECHANISM**
**Masatoshi Kuroyanagi, Kariya; Kazuma Matsui, Toyohashi; Youzou Majima, and Fumiaki Murakami, both of Kariya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan**
**Filed Mar. 12, 1987, Ser. No. 25,275**
**Claims priority, application Japan, Mar. 12, 1986, 61-53915**
**Int. Cl.[4] B62D** *17/00;* **B60G** *25/00, 17/00*
**U.S. Cl. 280—661** **5 Claims**



1. A hydraulic cylinder mechanism for controlling the displacement of swing means which swingably supports an automotive wheel to an automotive body in order to control wheel alignment comprising:
- a cylinder member connected to one of said body and said wheel;
- a main piston arranged slidably in said cylinder member and connected to another one of said body and said wheel;
- a piston portion formed in said main piston and made movable together with said main piston;
- two cylindrical sub-pistons surrounding said main piston and clamping said piston portion from both sides of said piston portion in said cylinder member;
- control pressure chambers formed between said sub-pistons and said piston portion so that said piston portion is driven in accordance with the pressure in said control pressure chambers; and
- holding pressure chambers formed at back of said sub-pistons so that said piston portion is held in a predetermined position by the pressure in said holding pressure chambers.

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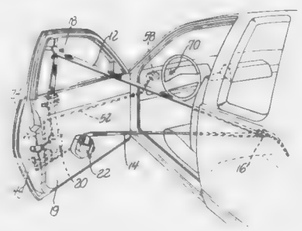
**4,747,615**
**SUSPENSION CONTROL METHOD**
**Yukio Yamamoto, Suzono, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Japan**
**Filed Mar. 3, 1987, Ser. No. 21,260**
**Claims priority, application Japan, Mar. 6, 1986, 61-50045**
**Int. Cl.[4] B60G** *17/00*
**U.S. Cl. 280—707** **6 Claims**




1. A method for controlling a suspension of a vehicle equipped with a variable damping force shock absorber, said method comprising the steps of:
- predetermining a plurality of movement patterns, said movement patterns each depicting an ideal movement patterns of a sprung mass of the vehicle from a time point when the sprung mass attains one of various local highest and local lowest positions with respect to a neutral position, to a time point when the sprung mass reaches said neutral position;
- sequentially generating a control signal for altering the damping force of the shock absorber so that the spring mass traces one of said predetermined movement patterns after the sprung mass has attained substantially said one of various local highest and local lowest positions; and
- controlling thereby the shock absorber responsive to said control signal.

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**4,747,616**
**STATUS INDICATOR FOR PASSIVE BELT SYSTEM**
**Darryl L. Burris, Holt, Mich., assignor to General Motors Corporation, Detroit, Mich.**
**Filed Jun. 25, 1987, Ser. No. 66,656**
**Int. Cl.[4] B60R** *22/34*
**U.S. Cl. 280—807** **2 Claims**

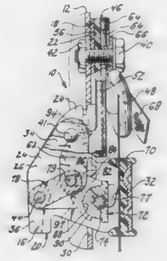


1. In a vehicle having a seat belt system including a seat belt retractor mounted on the vehicle door and having an associated electrical device operative upon energization to effect an operating mode of the retractor, a switch mounted on the vehicle door for energizing the associated electrical device, and an electrical circuit extending from a battery located on the vehicle body remotely from the vehicle door, a remote sensing signal device for indicating closure of the switch and energization of the associated electrical device, comprising:
- an electrical indicator mounted on the instrument panel of the vehicle body remote from the door mounted retractor and the switch,
- a relay having a coil situated in the circuit remote from the electrical device associated with the retractor and a set of normally open contacts in series with the electrical indicator so that energization of the coil closes the contacts and energizes the electrical indicator to indicate that the switch is closed and the device associated with the retractor energized to control the operating mode of the retractor;
- said relay coil being sensitive to an electrical current flow threshold therethrough of a level less than the current draw of the electrical device associated with the retractor so that the coil and the electrical indicator are energized whenever the switch is closed whereby the electrical energization of the electrical device associated with the retractor is remotely sensed and indicated to the vehicle operator.



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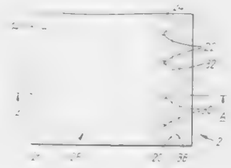
**4,747,617**
**BELT CLAMPING GUIDE LOOP**
**Joseph J. Magyar, Rochester, and Wendy M. Schoof, Mt. Clemens, both of Mich., assignors to General Motors Corporation, Detroit, Mich.**
**Filed May 27, 1987, Ser. No. 54,790**
**Int. Cl.[4] B60R** *22/00*
**U.S. Cl. 280—808** **3 Claims**



1. A restraint belt guide loop assembly adapted to be mounted on a vehicle body and slidably receive the belt from a retractor and deflect the belt across the occupant comprising:
- a frame mounted on the body;
- a bracket mounted for limited movement relative the frame and having a belt deflecting loop carried thereby so that imposition of an occupant restraint load upon the deflecting loop by the belt induces movement of the bracket relative to the frame;
- a first clamping jaw fixedly mounted on the frame and a second clamping jaw mounted for movement relative to the frame to define therebetween a belt passage through which the belt slides;
- a toggle linkage acting between the bracket and the second clamping jaw to forcibly move the second clamping jaw into belt clamping proximity with the first clamping jaw upon occurrence of movement of the bracket induced by the imposition of occupant restraint load on the deflecting loop;
- and means adapted to provide a defined path of angularly convergent movement of the second clamping jaw toward the first clamping jaw so that subsequent to the initial belt clamping provided by the toggle linkage the second clamping jaw is self energized into clamping action with the belt independently of the action of the toggle linkage by the occupant restraint load on the belt inducing said angularly convergent movement of the second clamping jaw toward the first clamping jaw.

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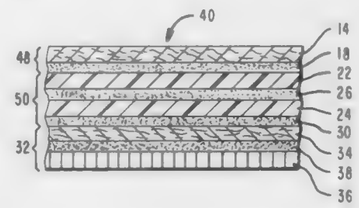
**4,747,618**
**LABELS AND MANUFACTURE THEREOF**
**David J. Instance, Guinea Hall, Sellindge, Kent, United Kingdom**
**Division of Ser. No. 829,909, Feb. 18, 1986, Pat. No. 4,711,686.**
**This application Sep. 4, 1987, Ser. No. 93,235**
**Claims priority, application United Kingdom, Feb. 18, 1985, 8504114**
**Int. Cl.[4] B42D** *15/00*
**U.S. Cl. 281—5** **5 Claims**



1. A label for affixing to a container comprising a longitudinal strip divided into two or more panels by one or more transverse fold lines, an end panel of the strip forming a front cover for the remaining panel or panels when the remaining panel or panels is or are folded behind the front cover panel, the front cover panel having a folded edge defined by the fold line between the front cover panel and the adjacent panel and a free outer edge which is opposite the folded edge and extends beyond the remaining panel or panels of the strip when folded, the extending part of the front cover panel having one or more holes, a support web for the longitudinal strip and a layer of pressure sensitive self-adhesive material which is adhered by the self-adhesive surface thereof over the front cover panel, the self-adhesive material extending beyond the folded edge thereby to adhere the front cover panel to the support web and covering the hole or holes in the front cover panel thereby to form one or more exposed portions of the self-adhesive material each of which is in registry with a respective hole and can be adhered to the support web to secure the front cover panel in a folded condition over the remaining panel or panels and can be pulled away from the support web to unfold the front cover panel and give access to the remaining panel or panels.

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**4,747,619**
**PRESSURE-SENSITIVE LABEL**
**Frank D. Sager, Centerville, Ohio, assignor to NCR Corporation, Dayton, Ohio**
**Filed Apr. 6, 1987, Ser. No. 34,375**
**Int. Cl.[4] B41L** *1/20;* **B42D** *15/00;* **B32B** *31/00;* **A61F** *13/02*
**U.S. Cl. 282—9 R** **10 Claims**




1. A pressure-sensitive label suitable for imprinting images thereon comprising a
plurality of layers of record media, at least one of the layers

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being fiber stock and a pair of other layers being synthetic stock, said at least one layer of fiber stock and at least one of the pair of other layers of synthetic stock having preprinted images on one surface thereof, the preprinted images on said one surface being protected by the other one of the pair of layers of synthetic stock; a

layer of pressure-sensitive adhesive for causing adherence of said at least one fiber stock layer with one of the pair of synthetic stock layers; a

layer of non-tacky adhesive positioned in contact with the synthetic stock layers for allowing separation of one synthetic stock layer from the other synthetic stock layer; and a

carbonless fiber layer adhered to the other of said synthetic stock layers for receiving impringting images on said carbonless fiber layer after laminating the layer of fiber stock, the layers of synthetic stock and the carbonless fiber layer, and a layer of pressure-sensitive adhesive for securing said carbonless fiber layer to a fixed surface, the separation of said one synthetic layer from the other synthetic layer providing a non-adheasive label portion removable from said other synthetic stock layer and the carbonless fiber layer.

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**4,747,620**

## SECURITY CARD AND SECURITY CARD BLANK

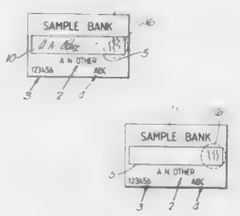
**Ralph Kay, Berkshire, and Martin C. Gomme, Hertsfordshire, both of England, assignors to The De La Rue Company PLC, England**

**Filed Aug. 13, 1986, Ser. No. 895,927**

**Claims priority, application United Kingdom, Aug. 28, 1985, 8521363**

**Int. Cl.⁴ B42D** *15/00*

**U.S. Cl. 283—86** **32 Claims**




1. A security card blank comprising a plurality of superposed layers including a metallic layer selected from the group of radiation absorbent metals, metalloids and their alloys and derivatives, said metallic layer being positioned within the card blank, said metallic layer being imageable under the influence of high intensity radiation to produce a security card, said metallic layer having a melting point in the range 1500°–2000° C., whereby, after imaging, at least part of said imaged metallic layer is detectable from outside said card.

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**4,747,621**

## AQUATIC VACUUM HOSE SWIVEL CUFF

**Leo Gans, Teaneck, and Ronald Presinzano, Andover, both of N.J., assignors to Action Technology, Rockaway, N.J.**

**Filed Nov. 19, 1986, Ser. No. 932,726**

**Int. Cl.⁴ F16L** *21/00*

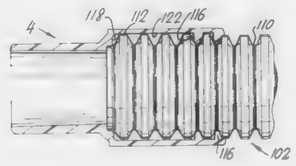
**U.S. Cl. 285—7** **3 Claims**

1. A hose and swivel cuff, comprising, in combination:

a flexible blow-molded hose having substantially uniform circumferential grooves and convolutions throughout the length thereof;

a one-piece molded cuff which has a seating portion for receiving and adapted to coupled with an end portion of said hose, regardless of the point at which the hose is cut, and at least one rigid annular ring adapted to fit within one of said circumferentail grooves of said hose, said at least one annular ring being provided about the hose entrance to said seating portion of said cuff;

wherein the inner diameter of said at least one annular ring is lees than the outer diameter of said circumferential convolutions of said hose, the end portion of said hose is




maintained within said seating portion by said at least one annular ring being engaged within one of said circumferential grooves such that said hose end is locked in the longitudinal direction within said cuff, and said hose portion is swivelably rotatable within said cuff, and water may seep around the outer circumference of said end portion and into said cuff.

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**4,747,622**

## PIPE CONNECTION

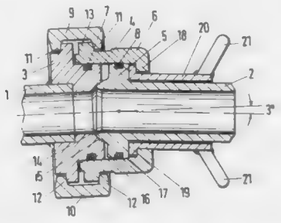
**Karl Weinhold, im Jagdfeld 43, 4040 Neuss, Fed. Rep. of Germany**

**Filed Jan. 21, 1987, Ser. No. 5,826**

**Claims priority, application Fed. Rep. of Germany, Jan. 23, 1986, 3601895**

**Int. Cl.⁴ F16L** *37/00*

**U.S. Cl. 285—38** **4 Claims**




1. A pipe Connection for connecting two pipe ends, collars fixed at each pipe end, a plug part joined to one end of one of the collars, a socket part surrounding the collar and the plug part, ring gaskets between and sealingly engaging the socket part and one collar and the socket part and the plug part, an inwardly directed shoulder at one end of the socket part and on outwardly directed shoulder at the other end of the socket part, a pair of pivotally connected shell sections which when closed engage at one end said collar at one pipe end and the outwardly directed shoulder on the socket part at the other end thereby functioning to keep the pipe connection together, a pipe piece having attached at one end a ring part, said ring part having a wedge-shaped tapered face, a complementary wedge-shaped taper on the face of the inwardly directed shoulder of the socket part, said pipe piece and ring part fitted under the socket part axial outwardly of the pipe collar at that end of the pipe, handles provided on the pipe piece at the opposite end from the ring part, whereby upon turning the pipe piece on the pipe the cooperating wedge-shaped tapers on the ring part and the inwardly directed shoulder permit off angle connection of the pipe ends.



**4,747,623**

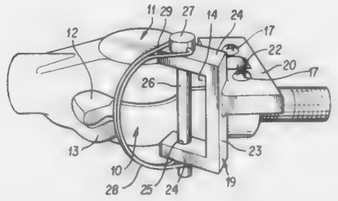
## ANTI-DISCONNECT ATTACHMENT FOR AIR LINE COUPLINGS

**Bruce D. Newcomb; Bruce D. Newcomb, both of 834 Ellen St., Staunton, Va. 24401, and Wayne H. Gosnell, Rt. 1, Box 227, Mt. Sidney, Va. 24467**

**Filed Oct. 14, 1986, Ser. No. 918,106**

**Int. Cl.⁴ F16L** *55/00*

**U.S. Cl. 285—69** **8 Claims**




1. An anti-disconnect attachment for an air line coupling of the type having two interfaced swiveled coupling parts including interengaging flanges which prevent separation of the coupling parts along their axis of rotation, said attachment comprising a rigid body fixed removably on one coupling part and having a yoke portion which is apertured, and a rigid blocking pin mounted releasably in the apertures of the yoke portion and extending parallel to the axis of rotation of said coupling parts and extending across and engageable with a flange of the other coupling part thereby blocking rotation of said coupling parts in a direction which could result in undesired separation thereof while in use, a lip attachment secured to said one coupling part for engaging the forward portion of the other coupling part, and means securing said lip attachment to said one coupling part, said rigid body being further fixed on said one coupling part by said means securing said lip attachment to said one coupling part.

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**4,747,624**

## CONNECTION ARRANGEMENT FOR TWO PIPES CARRYING HOT FLUIDS, FOR EXAMPLE INTERNAL COMBUSTION ENGINE EXHAUST GASES

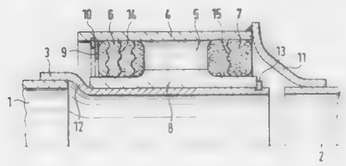
**Bernd Faber, Pforzheim, and Reinhard Gropp, Neuenbürg-Arnbach, both of Fed. Rep. of Germany, assignors to Witzenmann GmbH Metallschlauch-Fabrik Pforzheim, Pforzheim, Fed. Rep. of Germany**

**Filed Nov. 12, 1986, Ser. No. 930,280**

**Claims priority, application European Pat. Off., Jul. 25, 1986, 86110255-6**

**Int. Cl.⁴ F16L** *55/00*

**U.S. Cl. 285—187** **19 Claims**




1. A connection arrangement to connect two pipes (3, 4; 24, 25), particularly for conveying hot fluids, especially exhaust gases from an internal combustion engine.

in which one of the pipes has an end portion facing the end portion of the other pipe, said connection arrangement permitting relative movement of the two pipes with respect to each other in axial, lateral and angular direction, while maintaining a sealed connection preventing escape of fluid to ambient space,

comprising

means for defining a ring chamber or space (5, 26) surrounding the end portions of the pipes (3, 4; 24, 25);

at least one sealing pillow (6, 7; 16, 17; 27, 28) located in said ring chamber or space,

the material of said sealing pillow having damped springy characteristics,

said at least one resilient springy sealing pillow being retained in said chamber or space in a predetermined axial and radial position;

the facing ends of the pipes being radially supported and located in position in at least approximate alignment with respect to each other by said at least one resilient or springy sealing pillow retained in said ring chamber (5, 26), and

a sealing foil (14, 15; 19, 20) embedded within the material of the pillow and extending over the entire radial region of said space or chamber (5).

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**4,747,625**

## BRANCH PIPE MOUNTING ASSEMBLY

**Vincent Mignet, and Pierre Vigneron, both of Pont-A-Mousson, France, assignors to Pont-a-Mousson S.A., Nancy, France**

**Filed Sep. 16, 1987, Ser. No. 97,013**

**Claims priority, application France, Sep. 19, 1986, 86 13162**

**Int. Cl.⁴ F16L** *41/00*

**U.S. Cl. 285—197** **9 Claims**



1. A mounting assembly for securing a take-off branch to a primary pipe (1) having an aperture (2) in a wall thereof, said assembly comprising:

(a) a hollow connection member (3) having a base portion (3*b*) extending outwardly through the pipe wall aperture, and two clamping tongues (3*c*, 3*d*) extending laterally outwardly from opposite lower edges of the base portion and engaging an inner surface of the pipe under opposite edges of the aperture,

(b) a deformable gasket (4) surrounding and seated against a lower region of the base portion, and overlying and seated against an outer surface of the pipe surrounding the aperture in the manner of a collar,

(c) a rigid saddle (5) disposed surrounding said lower region of the base portion of the connection member and overlying the gasket, and

(d) a plurality of circumferentially spaced, axially extendible, adjustable tighteners (7, 8) disposed between the saddle and associated abutment supports (3*e*) on the connection member base portion for selectively urging the saddle axially of the connection member and towards the pipe and attendantly pulling the connection member clamping tongues tightly against the inner pipe surface, thereby compressing the gasket into sealing engagement with the lower region of the base portion and with the outer pipe surface surrounding the aperture.

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4,747,626

## TUBING JOINT

Tomio Hama, and Kiyoyasu Yamazaki, both of Okaya, Japan, assignors to Kabushiki Kaisha Nihon Pisco, Nagano, Japan

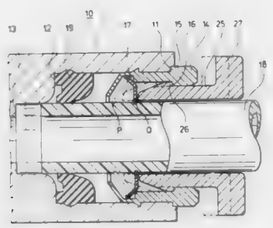
Continuation of Ser. No. 628,400, Jul. 6, 1984. This application Mar. 17, 1986, Ser. No. 840,452

Claims priority, application Japan, Aug. 23, 1983, 58-153701; Aug. 23, 1983, 58-153702; Aug. 30, 1984, 59-88174

The portion of the term of this patent subsequent to Jun. 10, 2003, has been disclaimed.

Int. Cl.[4] F16L *37/00*

U.S. Cl. 285—308 7 Claims



1. In a releasable tubing connector comprising:

a joint having at least an opening which is bored on an end face thereof:

a guide-ring having an inner wall and fixed in said opening of said joint;

a deformable ring plate, which is shaped zigzag by a plurality of notches formed alternately in inner and outer peripheral portions, disposed within a groove located on said guide-ring, said inner peripheral portion of said deformable ring plate having a smaller diameter than an outer diameter of a tube inserted into said opening of said joint, and the portions of said ring plate between said notches providing claws to bite into an outer wall of the tube to prevent the inserted tube from moving;

a release-ring disposed within said guide-ring and movable by a prescribed distance at least in the longitudinal direction so as to release the bite of said claws by pushing said claws and displacing them from the outer wall of said inserted tube;

stop means provided between an inner wall of said guide-ring and an outer wall of said release-ring for limiting the outward movement of said release-ring from said guide-ring;

wherein said inserted tube, with said claws biting said outer surface thereof, can be pulled slightly backward in a tube-detaching direction, thereby causing said claws to make an arcuate rotation about the outer periphery of said deformable ring plate acting as a rotational fulcrum until said claws are brought to a position slightly over a position of maximum bite at which said claws are approximately normal to the surface of the inserted tube; and

the front end of said release-ring, when in its outward position, provides a stopper to prevent further deformation of said claws of said deformable ring plate and maintain said claws at a position of slightly over maximum bite upon pulling on the inserted tube in a tube detaching direction.

4,747,627

## APPARATUS FOR IMPROVING ADHESION OF A RAILWAY VEHICLE

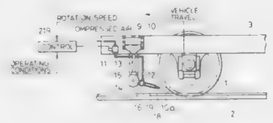
Junichi Shigeura; Nobuyoshi Takahashi, and Noriyuki Isoda, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 30, 1986, Ser. No. 913,280

Claims priority, application Japan, Sep. 30, 1985, 60-219400; Apr. 14, 1986, 61-85787; May 21, 1986, 61-116700; May 21, 1986, 61-116701

Int. Cl.[4] B61C *15/10*

U.S. Cl. 291—3 12 Claims





1. An apparatus for supplying adhesion intensifying particles to contacting faces of a wheel and rail, comprising:

a supply of adhesion intensifying particles, said particles comprising a material selected from the group consisting of silica sand, quartz and a mixture of silica sand and quartz, a diameter of at least 50% of said particles being within a range of 100 to 300 micrometers;

a U-shaped storage chamber having an upper end of one leg of the U coupled to said supply of particles;

a nozzle, said nozzle comprising an inner particle supply pipe surrounded by an outer compressed air supply pipe, said particle supply pipe having one end coupled to an upper end of the other leg of the U of said storage chamber, one end of said compressed air supply pipe projecting beyond the other end of said particle supply pipe by a distance within a range of 3 to 8 times an inner diameter of said particle supply pipe, a gap between said particle supply pipe and said air supply pipe being in a range of 0.5 to 1.5 mm; and

a source of compressed air coupled to the other end of said air supply pipe, a pressure of said compressed air being such that a velocity of particles jetted by said nozzle is in a range of 200 to 300 m/sec.

4,747,628

## SAFE LOCKING SYSTEM ELEMENTS STRUCTURE

Ilan Goldman, Kfar Shmaryahu, Israel, assignor to Toot (Engineering) Ltd., Israel

Filed Jun. 15, 1987, Ser. No. 62,511

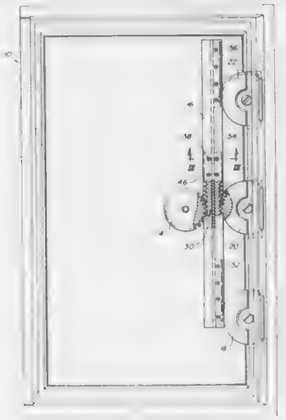
Claims priority, application Israel, Jun. 19, 1986, 79162

Int. Cl.[4] E05C *3/10*

U.S. Cl. 292—51 8 Claims

1. A safe door locking system comprising a safe door having an inside and an outside, a pinion rotatably mounted on the inside of the door, a door operating handle wheel at the outside of the door and drivingly coupled to the pinion, a rack bar, a gear mesh coupling the rack bar to the pinion, and a plurality of in-unison rotatable, disc-like lock bolts coupled to the rack bar, the rack bar comprising a double-T profiled, non-ferrous metal extruded bar wherein the profile of the bar defines elongated cavities; inside one of the elongated cavities of the bar, at appropriate intervals as determined by the location of the lock bolts, there are fastened a respective number of gear-toothed inserts meshed with the said lock bolts, the gear mesh comprising an additional gear-toothed insert fastened inside the other of the elongated cavities and meshing with the pinion.





4,747,629

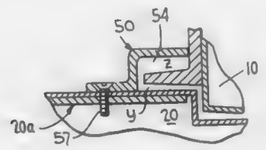
## EMERGENCY EXIT LOCK DEVICE

Theodore H. Miller, New Britain, Conn., assignor to Emhart Industries, Inc., Farmington, Conn.

Continuation of Ser. No. 729,198, May 1, 1985, abandoned. This application Dec. 12, 1986, Ser. No. 940,198

Int. Cl.[4] E05C *21/00*

U.S. Cl. 292—92 16 Claims




1. A lock mechanism comprising a latch-bolt assembly and a mated strike assembly mounted on a closure frame member, said latch-bolt assembly comprising a base plate and a latch-bolt mechanism mounted on said base plate and including a latch, said base plate having means for securing said base plate to a closure such as a door and two upstanding projections, one of said upstanding projections being spaced vertically on either side of said latch of said latch-bolt mechanism and extending from the base plate in the direction of movement of said closure towards a closure frame member; said strike assembly comprising a front plate, means for securing said front plate to said closure frame member; said strike assembly having a first recess for receiving said latch and corresponding recesses for receiving said projections when the closure is closed, said corresponding recesses being spaced vertically at opposite sides of said first recess, and in generally vertical alignment therewith, the width of said corresponding recesses being substantially greater than the width of said projections to permit controlled limited vertical growth of said strike assembly and closure frame member relative to said latch, said corresponding recesses when engaged by said projections limiting further movement of said closure towards said closure frame member and said first recess when engaged by said latch limiting movement of said closure member away from said closure frame member.

4,747,630

## TOGGLE LINKAGE FOR A VEHICLE ROOF

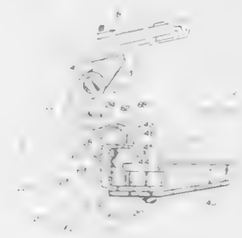
Hideaki Isomine, Tochigi, and Yasuo Fujita, Tokyo, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 28, 1986, Ser. No. 834,908

Claims priority, application Japan, Feb. 28, 1985, 60-39697

Int. Cl.[4] E05C *17/32*

U.S. Cl. 292—263 3 Claims



1. A toggle linkage for moving a closure panel between a ventilating position and a closed position, said closure panel being detachably arranged in an opening formed in a vehicle roof, comprising:

a handle pivotably connected to the lower surface of said closure panel and having bearing lugs;

a bearing component fixed on the lower surface of said vehicle roof and having a base;

a link mechanism for connecting said handle with said bearing component; and

means for limiting rotation of said handle to a predetermined position whereby said closure panel is maintained in said ventilating position;

said means comprises a first engaging means provided at said bearing lugs, and a second engaging means provided at said bearing component, said first engaging means being brought into engagement with said second engaging means when said closure panel is tilted upwardly to said ventilating position;

said first engaging means includes first projections and said second engaging means includes a plate secured to said base of said bearing component;

said plate includes second projections for engagement with said first projections; and

said second engaging means further includes resilient members adapted to cover said second projections.

4,747,631

## CABLE LOCKING AND SEALING DEVICE

Leslie M. Loynes; Jack E. Bledsoe, both of Fremont; Clarence A. Penick, Jr., Hudson; Jerry A. Bystry, Orland; Richard C. Horr, Pleasant Lake; James A. Haddix, and Roger J. Green, both of Angola, all of Ind., assignors to Brammall, Inc., Angola, Ind.

Continuation of Ser. No. 813,478, Dec. 26, 1985, abandoned. This application Jan. 9, 1987, Ser. No. 5,392

Int. Cl.[4] G09F *3/00*; F16G *11/04*

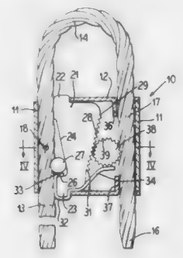
U.S. Cl. 292—307 R 3 Claims

1. A cable lock and seal device comprising a body member formed with first and second openings, a cable with a first end fixedly mounted in said first opening, a wedging member mounted in said body member adjacent said second opening, an inclined ramp formed on said wedging member on the side facing said second opening and a plurality of gear teeth formed in said inclined ramp, and said gear teeth having heights of 0.015 inches and adjacent teeth formed with 60 degree angles therebetween, a disc-shaped gear mounted between said wedging member with the teeth of said disc-shaped gear having radial lengths of 0.20 inches and said second opening in said

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body member and the teeth of said gear in mesh with the gear teeth on said inclined ramp such that the second end of said cable can be inserted into said second opening of said body member in a first direction so as to rotate said gear so that it moves along said ramp to make the second opening larger and



such that when said second end of said cable is moved in a direction opposite to said first direction said gear moves along said ramp to make said second opening smaller to lock said cable to said body member and wherein said gear cannot slide on said ramp.

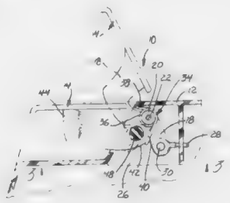
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**4,747,632**

**AUDIBLE/TACTILE ENHANCER FOR REMOTE OPERATING HANDLE**

**Richard S. Joy, Royal Oak, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Jul. 2, 1987, Ser. No. 70,200**
**Int. Cl.[4] E05C *21/00***
**U.S. Cl. 292—347** **3 Claims**



1. An improved operating handle mechanism including a handle pivotally mounted on a housing for remotely actuating a closure latch in a vehicle body via an actuating means extending between the handle and the latch, comprising:

spring means having a first end seated on the housing and a second end seated on the handle and acting to bias the handle to an unactuated position, and

means projecting from the housing into the path of movement of the second end of the spring during actuating movement of the handle so that the second end of the spring and the means projecting from the housing are temporarily and yieldably engaged with one another during further movement of the handle to the actuating position, thereby providing a perceptible audible and tactile signal to the operator confirming actuation of the handle and the remote latch actuated thereby.

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**4,747,633**

**DISPOSABLE SCOOP AND CONTAINER**

**Thomas M. Stacy, 10150 Boone Cir., Bloomington, Minn. 55438**

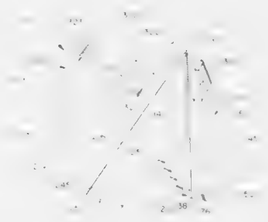
**Filed Jun. 3, 1987, Ser. No. 57,042**
**Int. Cl.[4] A01K *29/00***
**U.S. Cl. 294—1.3** **12 Claims**

1. An integral, one-piece disposable scoop that is erectable from a collapsed, compact form to an expanded, operational form, for collecting and disposing of animal waste and the like comprising:

(a) a first jaw having a first scoop opening, said first scoop opening being formed within three upstanding sidewalls foldably erectable from a first jaw panel, including two triangular sidewalls and an end wall bridging said triangular sidewalls, said triangular sidewalls each having a locking tab projecting beyond said bridging end wall;

(b) a second jaw hingedly connected to said first jaw and having a second scoop opening, said second scoop opening being formed within three upstanding sidewalls foldably erectably from a second jaw panel, including two triangular sidewalls and an end wall bridging said triangular sidewalls, said bridging end wall having an opening sized and positioned to accept each of said locking tabs; and

(c) means for hingedly connecting said first jaw panel to said second jaw panel, said first jaw being hingedly recessible into said second jaw, to simultaneously engage said locking tabs into said openings for locking closure of said jaws.



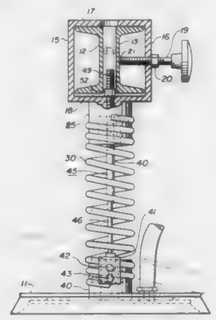
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**4,747,634**

**APPARATUS FOR SUSPENDING A LIFTING PAD**

**Thomas A. Hoke, R.D. #2, Red Lion, Pa. 17356**

**Filed Dec. 18, 1986, Ser. No. 943,102**
**Int. Cl.[4] B66C *1/02***
**U.S. Cl. 294—64.1** **3 Claims**



1. An arrangement for lifting flat articles of the type in which a lifting pad is suspended below a generally horizontal beam, the beam in turn being suspended from a crane or other source of lifting power, the pad adhering to the flat article during the lifting operation, wherein the improvement comprises apparatus for suspending the lifting pad from the horizontal beam, comprising:

(a) a single coil spring oriented with its longitudinal axis generally vertical and having predetermined tensile load versus extension characteristics, the coil spring having lower and upper end portions secured respectively to the lifting pad and the beam by securing means adapted to retain the end portions in place when the coil spring is under tensile load, the length of the coil spring being such as to allow from five to ten unrestrained turns or coils thereof between the end portions which are secured by the securing means; and

(b) overload support means operative at tensile loads above a predetermined design load to support the portion of said loads in excess of the design load and to prevent extension of the coil spring beyond a predetermined length corresponding to the design load, said means being so constructed and arranged that at loads equal to or less than the design load they do not restrain movement of the coil spring.

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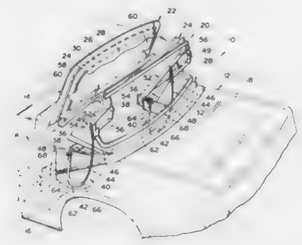


**4,747,635**

**VEHICLE CONVERTIBLE TOP HAVING SAIL FLAP TENSIONER**

**John J. Wagner, Howell, Mich., assignor to Cars & Concepts, Inc., Brighton, Mich.**

**Filed Mar. 2, 1987, Ser. No. 20,368**
**Int. Cl.[4] B60J *7/12***
**U.S. Cl. 296—107** **10 Claims**



1. In a vehicle body having an open occupant compartment, a convertible top comprising: a foldable frame mounted on the vehicle body for movement between an unfolded raised position extending over the occupant compartment and a folded storage position at the rear of the occupant compartment; a soft top having a front edge secured to the foldable frame, a rear edge secured to the vehicle body, and a pair of sail flaps each of which has a front lower portion that is free for movement with respect to the vehicle body and the foldable frame; a pair of tensioners respectively associated with the pair of sail flaps; each tensioner including a guide mounted on the vehicle body adjacent the associated sail flap; and each tensioner also including a flexible elongated member that is received by the guide and has a first end connected to the foldable frame and a second end connected to the front lower portion of the associated sail flap, and each flexible elongated member being pulled by the foldable frame over its associated guide to tension the front lower portion of the sail flap connected thereto with the foldable frame in the unfolded raised position.

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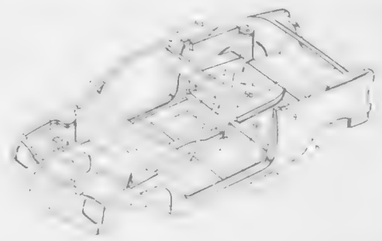
**4,747,636**

**ARRANGEMENT FOR FORMING VEHICLE BODIES**

**Hayatsugu Harasaki; Tsuginobu Tomita, both of Hiroshima; Mitsunori Katsyama, Higashihiroshima; Tamiko Aonuma, and Masahiro Hirao, both of Hiroshima, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan**

**Filed Oct. 23, 1986, Ser. No. 922,264**
**Claims priority, application Japan, Oct. 26, 1985, 60-240247; Oct. 30, 1985, 60-243418; Oct. 30, 1985, 60-243423; Oct. 30, 1985, 60-243425**
**Int. Cl.[4] B62D *25/00;* B60R *21/13***
**U.S. Cl. 296—186** **27 Claims**

18. An arrangement for forming partially a vehicle body of the open-top type, the arrangement comprising a front header member provided at an upper end portion of a front windshield for interconnecting therethrough right and left front pillars, and a center frame member including a lateral part elongating in a direction of the length of the body with its front end portion connected to a central portion of said front header member and a vertical part elongating in a direction of the height of the body with its upper end portion connected to a rear end portion of said lateral part and its lower end portion connected to a floor panel member, wherein said floor panel member comprises a front panel component and a rear panel



component disposed behind and above said front panel component, and the lower end portion of said vertical part of the center frame member is fixedly connected to a floor tunnel portion which is formed on said floor panel member and elongates in the direction of the length of the body so that said vertical part of the center frame member stands upright on the floor panel member and spans said front and rear panel components.

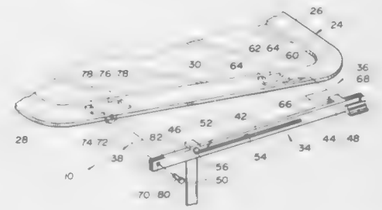
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**4,747,637**

**EXTERNALLY RETRACTABLE SUNROOF**

**John R. Lenoir, Fenton, and Randy S. Williams, Livonia, both of Mich., assignors to Cars & Concepts, Inc., Brighton, Mich.**

**Filed Dec. 8, 1986, Ser. No. 938,817**
**Int. Cl.[4] B60J *7/047, 7/19***
**U.S. Cl. 296—218** **10 Claims**



1. A sunroof for a vehicle roof, the sunroof comprising:

a peripheral frame that is mountable within an opening in the vehicle roof, the frame having front and rear portions, and the frame also having side portions extending between the front and rear portions;

a sunroof panel for opening and closing the roof opening in which the frame is received, the panel having front and rear edge portions respectively positionable adjacent the front and rear portions of the frame, and the panel having laterally spaced side edge portions extending between its front and rear edge portions and positionable adjacent the side portions of the frame;

a track mechanism having a pair of track assemblies respectively mounted for movement on the side portions of the frame, each track assembly including front and rear detachable connections for detachably securing one side edge portion of the sunroof panel and for releasing the panel to permit full exposure of the roof opening, one of said detachable connections of each track assembly including an elongated pin connector and a hole connector,

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one of said connectors being fixedly located on the associated track assembly and the other connector being fixedly located at the associated side edge portion of the sunroof panel such that the hole connector receives the elongated pin connector to secure the sunroof panel with the elongated pin connector extending parallel to the adjacent side edge portion of the sunroof panel and with the hole connector opening in a longitudinal direction with respect to the vehicle to receive the elongated pin connector, the other detachable connection of each track assembly including a laterally extending hole in the track assembly and structure defining a laterally extending hole at the associated side edge portion of the sunroof panel as well as including a detachable pin that is inserted laterally through said laterally extending holes to cooperate with said one detachable connection in securing the sunroof panel; and

the track assemblies of the track mechanism being driven by a power actuator for movement between: (a) a closed position where the attached panel closes the roof opening, (b) a vented position where the front edge portion of the attached panel is located just rearwardly of the front frame portion with the panel inclined upwardly toward its rear edge portion which is raised above the roof, and (c) an externally retracted storage position where the inclined panel is positioned rearwardly from the vented position over the roof to the rear of the rear frame portion.

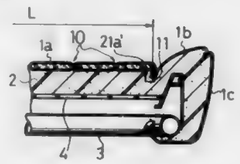
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**4,747,638**

## VEHICLE SEAT

**Tetsuo Saito, c/o Tachi-S Co., Ltd., 2-12, Matsubaracho 3-chome, Akishima-shi, Tokyo, Japan**

**Filed Jan. 16, 1987, Ser. No. 4,033**
**Int. Cl.[4] A47C *7/18, 31/02***
**U.S. Cl. 297—218** **6 Claims**




1. A seat for use in a vehicle, comprising: a trim cover assembly including a center portion having a fixed width, two side bolster portions respectively sewn to the two sides of said center portion, and margins produced when said two side bolster portions are sewn to said center portion and extending projectingly in and from the back side of said trim cover assembly; and

a pad member formed of foam material, covered by said trim cover assembly, and including on the surface thereof two sets of recessed grooves disposed respectively in the right and left portions of said surface, extending longitudinally of said surface, and spaced from each other at a distance equal to said fixed width of said center portion of said trim cover assembly,

in which each of said recessed grooves has one side of said groove being perpendicular to the bottom of the groove and a second side of said groove being oblique relative thereto, said oblique sides allowing the margins to be easily inserted into said recessed groove in said pad member.

**4,747,639**

## COVER FOR MOTOR VEHICLE SEATS

**Dieter Pfau, Fürth, Fed. Rep. of Germany, assignor to Emil Bayer & Co. KG, Fürth, Fed. Rep. of Germany**

**Filed Dec. 8, 1986, Ser. No. 939,394**
**Claims priority, application Fed. Rep. of Germany, Dec. 6, 1985, 3543138**
**Int. Cl.[4] A47C *31/10***
**U.S. Cl. 297—219** **4 Claims**



1. A cover for the seat of a motor vehicle comprising

a seat element;

a seat wedge pivotable about a transverse pivot axis and having a narrow edge of said widge pivotally attached at said transverse pivot axis transverse to said seat element;

said transverse pivot axis transverse to said seat element at a location within the front half of said seat element;

said seat wedge when extended in a forward direction from said transverse pivot axis extending beyond a front edge of said seat element wherein an elevation and extension of the surface of the seat provides thigh support;

said seat wedge when extended in a backward direction from said transverse pivot axis extends to the back edge of the said seat element and provides an elevation of the surface of the seat whereby the occupant of the seat is seated in a raised position.

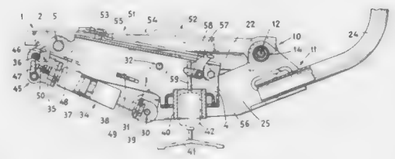
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**4,747,640**

## CHAIR SUPPORT

**Hermann Locher, Dornach, Switzerland, assignor to Giroflex Entwicklungs AG, Koblenz, Switzerland**

**Filed Sep. 14, 1987, Ser. No. 96,333**
**Claims priority, application Switzerland, Sep. 24, 1986, 3842/86**
**Int. Cl.[4] A47C *3/00***
**U.S. Cl. 297—301** **10 Claims**



1. A chair support, comprising:

a seat holder having a front end and a backrest end;

a backrest holder;

a first swivel joint possessing a substantial horizontal axis of rotation;

a supporting structure inclinably connected with the front end of said seat holder by means of said first swivel joint;

a second swivel joint possessing a substantially horizontal axis of rotation inclinably connecting the backrest end of said seat holder with said backrest holder;

said backrest holder possessing arm means having a free end;

said arm means extending from said second swivel joint towards the supporting structure;

a third swivel joint possessing a substantially horizontal axis of rotation for pivotably connecting said arm means at said supporting structure;

a first spring element supported at said supporting structure acting at said backrest holder;

a foot support;

a second spring element for supporting said supporting structure at said foot support;

said first spring element being positioned between the free end of said arm means of said backrest holder and the front end of said support structure;

said seat holder comprising two partial seat holders arranged adjacent and in spaced relationship from one another;

said supporting structure being disposed between said partial seat holders; and

said second swivel joint being constructed as a torsion spring and connecting said seat holder to said backrest holder.



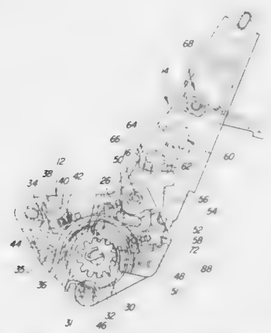
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**4,747,641**

## SEAT RECLINER MECHANISM

**Robert L. Bell, Rochester Hills, Mich., assignor to Fisher Dynamics Corporation, St. Clair Shores, Mich.**

**Filed Aug. 26, 1987, Ser. No. 89,722**
**Int. Cl.[4] B60N *1/02***
**U.S. Cl. 297—379** **10 Claims**



1. A seat recliner mechanism of the type enabling the reclined angle between a seat back and seat bottom to be adjusted and further enabling the seat back to be folded forwardly without changing the reclined angle comprising:

an upper recliner structure for supporting the seat back;

a lower recliner structure for supporting the seat bottom;

a pivot connecting said upper and lower recliner structures enabling said recliner structures to be rotated with respect to each other;

a quadrant having engaging means for establishing the reclined position of the seat back;

recliner actuation means acting on the quadrant and movable from a released position disengaged from said quadrant for enabling the reclined angle to be varied, to a normal position engaged with said quadrant fixing the reclined angle;

seat folding means for enabling said upper recliner structure to be folded forwardly through a predetermined range without requiring said quadrant to be moved;

a pawl movable between a first and second position;

means for sensing the folded position of said upper recliner structure wherein said pawl is urged to said first position when said upper recliner structure is folded forwardly and moved to said second position when said upper recliner structure is folded rearwardly; and

an arresting rack engagable with said pawl when said pawl is in said first position whereby when said upper recliner structure is folded forwardly, rotation of said quadrant will be inhibited in the event that said recliner actuation means is moved to said released position.

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**4,747,642**

## CONTROL OF SUBSIDENCE DURING UNDERGROUND GASIFICATION OF COAL

**Bruce W. Gash, and Thomas S. Buxton, both of Tulsa, Okla., assignors to Amoco Corporation, Chicago, Ill.**

**Continuation of Ser. No. 701,481, Feb. 14, 1985, abandoned. This application Dec. 10, 1986, Ser. No. 939,991**
**Int. Cl.[4] E21C *41/00***
**U.S. Cl. 299—11** **7 Claims**

1. A method of modifying an underground coal seam located between a lower noncoal layer and an overbuden layer to control subsidence resulting from gasification of coal in the underground coal seam, comprising:

(a) drilling a plurality of holes through the overburden layer and the underground coal seam and into the lower noncoal layer,

(b) gasifying a portion of the coal adjacent each hole, thereby producing a plurality of cavities of a predetermined shape,

(c) placing fluid transportation devices within each cavity;

(d) filling, through the holes, each cavity with a heat resistant material adapted to support the overburden upon gasification of the coal;

(e) introducing a cooling fluid into the transportation devices; and

(f) gasifying the coal.

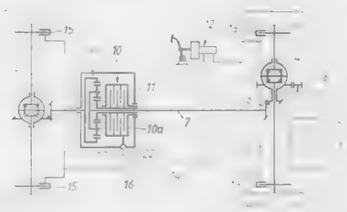
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**4,747,643**

## MOTOR VEHICLE HAVING TWO DRIVEN AXLES AND BRAKE SYSTEM

**Heribert Lanzer, Gössendorf, Austria, assignor to Steyr-Daimler-Puch Aktiengesellschaft, Vienna, Austria**

**Filed Apr. 24, 1987, Ser. No. 42,355**
**Claims priority, application Austria, Apr. 29, 1986, A1140/86**
**Int. Cl.[4] B60K *17/34*; B60T *8/32***
**U.S. Cl. 303—2** **7 Claims**



1. In a motor vehicle comprising

a driven front axle having front wheels,

a driven rear axle having rear wheels,

an interaxle power train interconnecting said front and rear axles and comprising a speed-changing transmission and in series with said transmission a liquid friction coupling having two coupling members and adapted to transmit torque only when said two coupling members rotate at different speeds, and

a brake system for applying pressure to brake said front and rear wheels, which brake system comprises a brake pressure regulator for controlling the pressure applied to brake said rear wheels,

the improvement residing in that

a pressure-setting controller is provided, which is responsive

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to a reversal of the direction of torque transmission between said interaxle coupling and said rear axle and to the value of torque transmitted from the rear axle to said interaxle coupling and is adapted to operate said brake pressure regulator in dependence on said value of torque said brake pressure regulator so as to effect a substantial reduction of the pressure applied to brake said rear wheels relative to the pressure applied to brake said front wheels only during a transmission of torque from said rear wheels to said interaxle coupling.

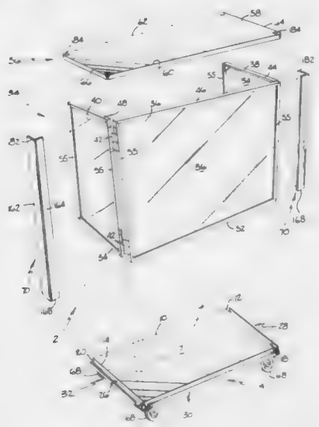
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**4,747,644**

## PORTABLE DISPLAY STAND

**Stanley A. Gallery, 11745 W. 66th Pl. Unit D, Arvada, Colo. 80003; Daniel J. Gallery, 11600 Shoshone, Westminster, Colo. 80234, and Deborah A. Gallery, 241 Grant, Denver, Colo. 80204**

**Filed Apr. 1, 1987, Ser. No. 33,413**
**Int. Cl.[4] A47B *43/00***
**U.S. Cl. 312—140** **16 Claims**



1. A portable display stand comprising separate sections which, in a disassembled relationship, may be combined into a storable and transportable package and which may be readily assembled without requiring tools for use as a sturdy, movable display stand where desired comprising:
at least base member means, sidewall member means and top member means;
said base member means comprising:
a base member plate having a length, a width and a thickness and upper and lower surfaces;
said base member plate having opposed parallel front and rear edge portions and opposed parallel left and right edge portions;
depending flange portions depending substantially perpendicularly from at least said front, left and right edge portions and having an outer surface;
fixedly located channel forming means for forming upwardly facing, external U-shaped support channel means including as a portion thereof said depending flange portions from each of said front, left and right edge portions;
each of said U-shaped support channel means having one leg spaced from said depending flange portion and having an inner surface with said inner surface thereof being spaced a desired distance from said outer surface of said depending flange portion;
each of said U-shaped support channel means having an upwardly facing support surface;
said sidewall member means comprising:
a plurality of sidewall panels comprising front, left and right sidewall panels which are hingedly connected together so that they may be moved relative to each other between a storage position and a use position;
each of said sidewall panels having a length, a width and a thickness;
each of said sidewall panels having opposed parallel top and bottom edge portions and opposed parallel side edge portions, each having substantially the same desired thickness;
said thickness of said bottom edge portion being slightly smaller than the distance between each of the legs and flanges of said U-shaped support channel means;
said top member means comprising:
a top member plate having a length, a width and a thickness;
said top member plate having opposed parallel front and rear edge portions and opposed parallel left and right edge portions;
depending flange portions depending substantially perpendicularly from at least said front, left and right edge portions;
fixedly located channel forming means for forming downwardly facing, internal U-shaped channels including as a portion thereof said depending flanges from at least said front, left and right edge portions and having a downwardly facing surface;
each of said U-shaped channels having one leg spaced a desired distance from an opposed depending flange portion;
said thickness of said top edge portions of said sidewall panels being slightly smaller than said desired thickness between said one leg and said depending flange of said top member plate; and
said base member means, said sidewall member means and said top member means are assembled in a relationship in which:
said bottom edge portions of said front, left and right sidewall panels are positioned in contact with said upwardly facing support surface of said U-shaped support channel means to be supported thereby;
said top edge portions of said front, left and right sidewall panels are positioned in contact with said downwardly facing surfaces of said U-shaped channels to support said top member plate; and
movement permitting means mounted on said lower surface of said base member plate.

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**4,747,645**

## ILLUMINATION SYSTEM FOR MATERIAL TESTING APPARATUS

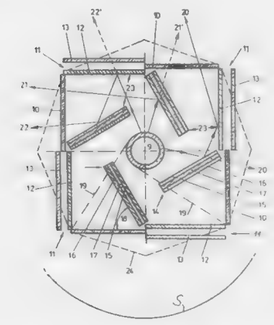
**Thore Rudzki, Hanau, Fed. Rep. of Germany, assignor to W. C. Heraeus GmbH, Hanau, Fed. Rep. of Germany**

**Filed Feb. 12, 1986, Ser. No. 828,830**
**Claims priority, application Fed. Rep. of Germany, Feb. 13, 1985, 3504793**
**Int. Cl.[4] G21K *5/00;* G02B *5/10***
**U.S. Cl. 350—1.1** **17 Claims**

1. Illumination system for material testing apparatus to test the resistance of a sample (S) to fading, weathering, aging and the like, by irradiation with light of controlled spectral distribution, having
a central light source (9) emitting radiation in the ultraviolet (UV), visible, and infrared (IR) spectral ranges,
the sample (S) being positioned spaced from the central light source in the path of light therefrom and for irradiation thereby; and
means for accurately controlling the radiation spectrum received by the sample, located between the light source (9) and the sample (S), said means including a structure defining a plurality of adjacent sections, the light source being located within said structure,
said means comprising, in accordance with the invention
a UV filter (10, 310, 410, 510, 610) located in a first section and forming a first outer filter;



a first mirror-filter combination (11,311,411,511,611) located in a second section, and including a first UV mirror (12,312,412,512,612) having its mirror surface directed toward the light source (9) and a first IR filter (13,313,413,513,613), essentially congruent with the first UV mirror, said first IR filter of the first mirror-filter combination forming a second outer filter; and
a second mirror-filter combination (14,314,414,514,614) including, in essentially congruent sandwich form, an inner UV mirror (15) having its mirror surface directed towards the light source (9), an outer UV mirror (16) having its mirror surface directed towards the outer filters and an intermediate IR filter (17) located between said inner and outer UV mirrors (15,16),



the UV filter (10,310,410,510,610) being positioned entirely within the optical shadow of the second mirror-filter combination (14,314,414,514,614);
and wherein the second mirror-filter combination (14,314,414, 514,614) is located spaced from the first mirror-filter combination (11,311,411,511,611) and positioned in the region of an end zone between the light source (9) and the first mirror-filter combination, and having an end zone positioned to direct UV radiation to the first UV filter (10,310,510,610) of the first section,
the first UV filter of the first section thereby forming a radiation window for the UV radiation reflected within the radiation spectrum control means from the source (9) while separating UV radiation from the IR filters, and thereby preventing aging effects of the IR filters when subjected to UV radiation.

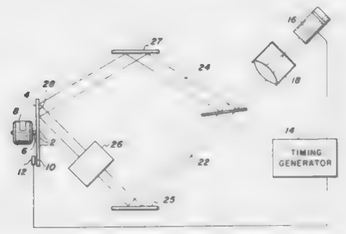
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**4,747,646**

## OPTICAL HOLOGRAPHIC SCANNER

**John R. Andrews, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Mar. 20, 1987, Ser. No. 28,372**
**Int. Cl.[4] G02B *5/32, 26/10;* G03H *1/04***
**U.S. Cl. 350—3.71** **4 Claims**




1. An improved method of making a holographic disc comprising the steps of: disposing a photosensitive medium on at least one portion of the disc; rotating the disc about its center axis until gyroscopic stabilization is achieved; identifying the positions on the disc at which optical diffraction gratings are to be formed on said photosensitive medium; firing a laser source to produce a short output pulse following each sid position identification; splitting the output pulse into a first object beam and a second reference beam; passing the object beam through an optical device to change the object beam into a non-planar waveform; and recombining the first and second beam at said identified positions thereby forming optical diffraction gratings identically spaced from the center axis and having optical power incorporated therein.

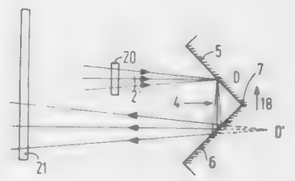
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**4,747,647**

## OPTICAL SCANNING DEVICE

**Peter de Zoeten, and Albert Smid, both of Eindhoven, Netherlands, assignors to U.S. Philips Corp., New York, N.Y.**

**Filed Jun. 17, 1986, Ser. No. 875,418**
**Claims priority, application Netherlands, Jun. 24, 1985, 8501805**
**Int. Cl.[4] G02B *26/10;* H01J *3/14***
**U.S. Cl. 350—6.8** **13 Claims**



1. An optical scanning device comprising an objective system, a rotationally symmetrical rotating reflector body comprising a plurality of reflector elements each comprising two plane reflector faces which are disposed at an angle of substantially 90° to one another and which intersect each other along a line transverse to the direction of rotation of the reflector body, a radiation-sensitive detection system arranged in the path of the radiation reflected by the reflector body, and an image system arranged between the detection system and the reflector body for imaging a point of the detection system and a fixed point in the proximity of the reflector body onto one another, characterized in that a first astigmatic element is aranged in a radiation path between the detection system and the reflector body and a second astigmatic element is arranged in a radiation path between the reflector body and the objective system to correct for the astigmatism of the first astigmatic element.

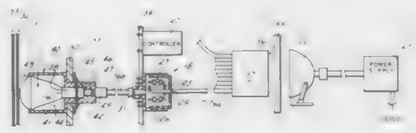
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**4,747,648**

## OPTICAL FIBER DISPLAY AND OPTICAL TRAIN FOR SAME

**B. David Gilliland, III, Memphis, Tenn., assignor to DRD Ltd., Memphis, Tenn.**

**Filed Jan. 24, 1985, Ser. No. 694,335**
**Int. Cl.[4] G02B *6/00;* F21V *7/04;* H01J *5/16;* G09F *21/04***
**U.S. Cl. 350—96.10** **5 Claims**



1. An optical fiber display device comprising:
a display surface,
a plurality of pixels formed on said display surface,

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a plurality of light conductors, each light conductor having a light input end and a light output end, said light input ends being grouped together, each said light output end terminating in said display surface in a pixel,
a source of light for illuminating said grouped output ends to thereby illuminate said pixels,
a plurality of shutter means for controlling light flow through said light conductors, each shutter means being associated with a respective light conductor for individual control of the illumination of each said pixel,
each of said light conductors being comprised of a first optical fiber having two ends, one end of said first optical fiber forming said light input end, the other end of said first optical fiber terminating in a respective shutter means, a second optical fiber having two ends, one end of said second optical fiber having two ends, one end of said second optical fiber terminating at said display surface in a pixel, the other end of said second optical fiber terminating in said respective shutter means, said ends of said first and second optical fibers terminating in said respective shutter means being aligned in spaced apart relationship to conduct light from said first optical fiber to said second optical fiber,
said shutter means including a casing surrounding said spaced apart ends of respective first and second optical fibers terminating therein, said casing separating and optically isolating said surrounding optical fiber ends from adjacent shutter means.

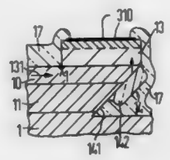
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**4,747,649**

## MONOLITHICALLY INTEGRATED WDM DEMULTIPLEX MODULE AND METHOD OF MANUFACTURE OF SUCH MODULE

**Jochen Heinen, Haar; Hans F. Mahlein, Unterhaching; Reinhard März; Manfred Plihal, both of Munich; Heinrich Schlötterer; Gerhard Winzer, both of Putzbrunn, and Ulrich Wolff, Munich, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany**

**Filed Dec. 27, 1985, Ser. No. 813,954**
**Claims priority, application Fed. Rep. of Germany, Jul. 7, 1985, 3500206**
**Int. Cl.[4] G02B** *6/10*
**U.S. Cl. 350—96.12** **18 Claims**




1. A monolithically integrated wavelength demultiplexing module, comprising:
a film wave guide for guiding a light beam containing a plurality of wavelengths;
a wavelength selecting element in said waveguide for splitting the light beam into the respective wavelength components and directing the components in different directions through the film waveguide;
a plurality of photodetectors optically coupled to said film wave guide and respectively positioned to receive respective ones of said components;
a common substrate carrying said wave guide, said wavelength selection element and said photodetectors, said substrate comprising InP;
said film wave guide comprising a quaternary layer; and
a reflective element extending transversely relative to said film wave guide and obliquely to the propagation direction of a radiation component to be received by a photodetector, said reflective element reflecting the radiation passing said photodetector in the direction toward said photo detector;

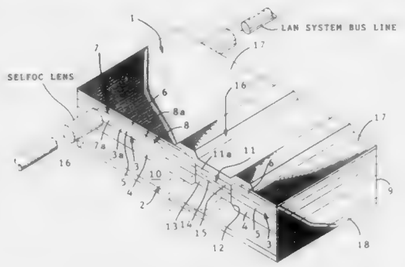
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**4,747,650**

## SEMICONDUCTOR OPTICAL AMPLIFIER

**Kyohei Sakuda, Nagaoka, Japan, assignor to AMP Incorporated, Harrisburg, Pa.**

**Filed Jan. 20, 1987, Ser. No. 4,530**
**Claims priority, application Japan, Feb. 20, 1986, 61-036248**
**Int. Cl.[4] G02B** *6/10*
**U.S. Cl. 350—96.14** **4 Claims**




1. A semiconductor amplifying device comprising,
a substrate,
a first optical waveguide on the substrate for transmitting an optical signal,
a second optical waveguide on the substrate,
a third optical waveguide on the substrate forming an optical coupling with the first optical waveguide along an interaction length and constructed as a semiconductor optical amplifier that receives an amplifies at least a portion of the optical signal and couples at least a portion of the amplified optical signal to the first waveguide, and antireflective means covering light emitting edges at corresponding ends of the respective waveguides,
the second optical wavelength being interposed between the first optical waveguide and the second optical waveguide, and forming a second optical coupling with the first waveguide along a second interaction length,
the second optical coupling having a phase mismatch selected for a wavelength of the optical signal to adjust a power gain in the first optical waveguide attributed to an amplified portion of the same wavelength of the optical signal received from the amplifier.

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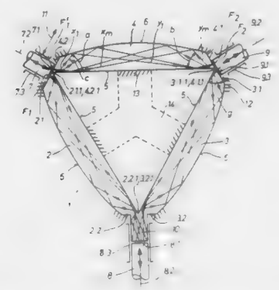
**4,747,651**

## THREE-WAY START SPLITTER FOR OPTICAL WAVE GUIDES

**Albert Wiesmeier, Merlingen, Fed. Rep. of Germany, assignor to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany**

**Filed Mar. 14, 1986, Ser. No. 839,601**
**Claims priority, application Fed. Rep. of Germany, Mar. 14, 1985, 3509053**
**Int. Cl.[4] G02B** *6/26*
**U.S. Cl. 350—96.15** **26 Claims**

1. Bidirectional three-way splitter arrangement for a plurality of optical wave guide means, each of said wave guide means having an optical axis and a front-end face, said splitter arrangement comprising;
plural coupling element means each optically coupled between two of the plurality of optical wave guide means and each having a longitudinal inside surface and a longitudinal outside surface, said longitudinal inside and outside surfaces of each coupling element being joined at both ends by a planar coupling surface, said planer coupling surface extending parallel to the front-end face of the respectively adjoining wave guide means and forming an enclosed acute angle with the respective adjoining



longitudinal inside surface, and wherein each said longitudinally inside surface includes a plane reflector means and each said longitudinal outside includes an elliptical reflector means.

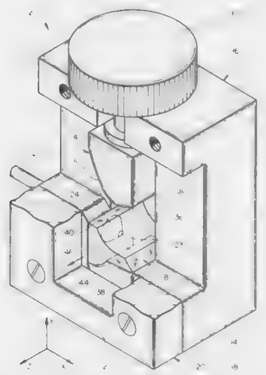
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**4,747,652**

## OPTICAL FIBER COUPLER

**Bruce D. Campbell, Portola Valley; James T. Triplett, Livermore, and Richard E. Tylor, Fremont, all of Calif., assignors to Raychem Corporation, Menlo Park, Calif.**

**Continuation-in-part of Ser. No. 437,053, Oct. 27, 1982, which is a continuation-in-part of Ser. No. 370,321, Apr. 21, 1982, abandoned, which is a continuation-in-part of Ser. No. 258,079, Apr. 27, 1981, abandoned. This application May 25, 1984, Ser. No. 614,884**
**Int. Cl.[4] G02B** *6/26*
**U.S. Cl. 350—96.15** **24 Claims**



1. An optical coupler for coupling light between an optical fiber and a light element through an outer moisture barrier layer of an intermediate portion of an optical fiber without damaging said fiber, said fiber comprising a light guiding region and said outer moisture barrier layer which provides mechanical strength for said light guiding region and keeps moisture therefrom, comprising:
a solid material for facilitating optical coupling with said moisture barrier layer;
a member disposed opposite said solid material, said fiber being disposed between said member and said material;
means for exerting pressure between said member and said solid material so as to bend said intermediate portion of said fiber therebetween;
said member having a curved surface confronting a first moisture barrier layer surface of said intermediate portion of said fiber such that said intermediate portion of said fiber is bent by said member and said solid material when pressure is exerted therebetween by said pressure exerting means; and
a light element having an end surface completely embedded within said deformable material, said light element comprising a waveguide having an end surface completely embedded within said solid material, said waveguide extending out of a casing of said optical coupler, said waveguide being capable of injecting light into or tapping light from said intermediate portion of said optical fiber having said moisture barrier layer thereon.

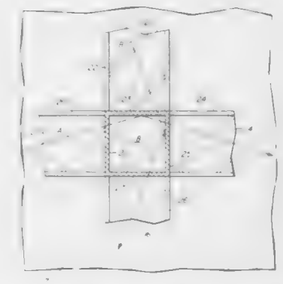
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**4,747,653**

## CROSSOVER ARRANGEMENT FOR OPTICAL CONDUCTORS

**David A. Kahn, Nepean, Canada, assignor to Northern Telecom Limited**

**Filed Mar. 14, 1986, Ser. No. 839,654**
**Int. Cl.[4] G02B** *6/26*
**U.S. Cl. 350—96.15** **12 Claims**



1. Apparatus comprising an assemblage of optical conductors, each comprising a rod of light-transmissive material with a cladding of a material having a lower refractive index than that of said rod, and a multifaceted member of light-transmissive material having at least two pairs of mutually parallel opposite facets, each facet of each pair having abutted thereto an end face of a respective one of said plurality of optical conductors, and a coating being provided on each said facet abutted by an optical conductor, said coating having a refractive index less than the refractive index of the associated facet, such that light passing across the multifaceted member from one of a pair of facets to the other facet of said pair is constrained from emerging from said member through either facet of the other of said pairs of facets.

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**4,747,654**

## OPTICAL MONOMODE GUIDANCE STRUCTURE INCLUDING LOW RESOLUTION GRATING

**Alfredo Yi-Yan, 19 rue de la Tombe Issoire, 75014 Paris, France**

**Continuation of Ser. No. 612,316, May 21, 1984, abandoned. This application May 4, 1987, Ser. No. 45,162**
**Claims priority, application France, May 19, 1983, 8308298**
**Int. Cl.[4] G02B** *6/34, 5/18*
**U.S. Cl. 350—96.19** **11 Claims**

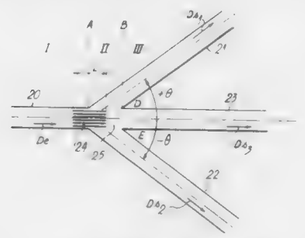
1. An optical guidance structure comprising:
(a) a monomode input guide having a particular direction (De);
(b) two monomode output guides having directions ($Ds_1$, $Ds_2$) symmetrically inclined with respect to the direction (De) of said monomode input guide;

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(c) a widened junction zone between said monomode input guide and said two monomode output guides; and

(d) a low resolution diffraction grating located partly in said monomode input guide and partly in said widened junction zone, said low resolution diffraction grating having lines extending along the direction (De) of said monomode input guide, said lines having a length and a spacing which defines only two diffraction directions of orders differing from zero by, respectively, +1 and −1, said spacing being chosen so that said two diffraction directions coincide with the directions ($Ds_1$, $Ds_2$) of said two monomode output guides.



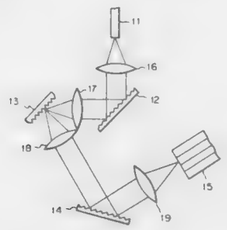
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**4,747,655**

## OPTICAL WAVELENGTH COMPOUNDING/DIVIDING DEVICE

**Masataka Shirasaki, Tokyo, Japan, assignor to Fujitsu Limited, Kawasaki, Japan**

**Filed Jan. 29, 1987, Ser. No. 8,346**
**Claims priority, application Japan, Jan. 30, 1986, 61-018627; Jan. 30, 1986, 61-018633**
**Int. Cl.[4] G02B *6/34***
**U.S. Cl. 350—96.19** **8 Claims**



1. An optical device for compounding/dividing a light beam depending on an optical wavelength thereof, comprising:

optical input and optical output means, one of said means including a single optical fiber and the other of said means including an optical fiber array having a plurality of optical fibers, said optical input and optical output means defining therebetween an optical path;

first and second spectroscopic gratings disposed on said optical path;

a dispersion-dividing element disposed on said optical path and between said first and second spectroscopic grating, said dispersion-dividing element having a face comprised of a plurality step-like V-shaped grooves each having an apex with a predetermined angle and first and second inclined surfaces, so that the light beam, the position of which is shifted depending on the wavelength thereof, moves from groove to groove, and within a region of one groove, the light beam is reflected first at one of the inclined surfaces and then reflected at the other surface so as to change the direction of the light beam.

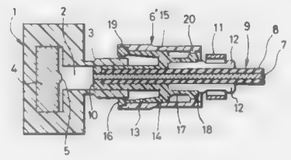
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**4,747,656**

## OPTICAL FIBER CONNECTOR WITH LOCKING MECHANISM

**Yoshinori Miyahara, and Kazuo Hasegawa, both of Furukawa, Japan, assignors to Alps Electric Co., Ltd., Japan**

**Filed May 9, 1986, Ser. No. 861,544**
**Claims priority, application Japan, May 9, 1985, 60-68339[U]**
**Int. Cl.[4] G02B *6/36***
**U.S. Cl. 350—96.20** **4 Claims**



1. An optical connector comprising:

a plug lock member for receiving an optical fiber end inserted along a center axis therein and having at least one engaging portion formed at a first angular position radially outwardly from said center axis;

a plug which is concentrically attachable to and detachable from said plug lock member, said plug including a cylindrical outer push member having one end facing toward said plug lock member and another end opposite therefrom, said one end having at least one push portion formed concentrically and radially outwardly from said center axis, and said other end having at least one click cam formed concentrically and radially outwardly from said center axis; and

a holding member having an inner holding portion for holding an optical fiber end along said central axis therein, at least one engagement portion formed at said first angular position radially outwardly from said center axis at one part of said holding member, and at least one cam portion formed at a second angular position radially outwardly from said center axis at another part of said holding member,

wherein said engaging portion of said plug lock member and said engagement portion of said one part of said holding member, which are located at said first angular position relative to said central axis, become mated in axial locking relationship when said holding member holding said optical fiber end is inserted in said plug lock member, and

wherein said plug is axially attachable on said plug lock member and said holding member inserted therein, and said push member thereof is angularly rotatable so as to rotate said push portion to said first angular position, wherein it presses said engaging portion of said plug lock member and said engagement portion of said holding member tightly in said locking relationship, and simultaneously with said angular rotation of said push member said click cam on the other end thereof is rotated to said second angular position so as to engage said cam portion on said other part of said holding member with a click locking action.



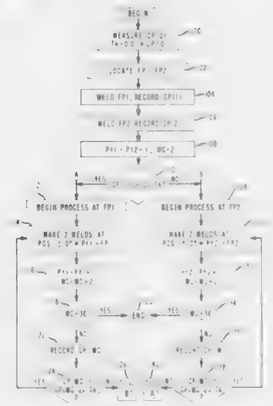
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**4,747,657**

## ACHIEVING IMPROVED RADIAL ALIGNMENT IN AN OPTICAL PACKAGE

**Ghazi M. Chaoui; Charles R. Fegley, both of Muhlenberg Township, Berks County; Jan Lipson, Upper Macungie Township, Lehigh County; Ralph S. Moyer, Cumru Township, Berks County, and Thomas S. Stakelon, South Whitehall Township, Lehigh County, all of Pa., assignors to American Telephone and Telegraph Company, Murray Hill and AT&T Technologies, Inc., Berkeley Heights, both of, N.J.**

**Filed Jun. 15, 1987, Ser. No. 61,629**
**Int. Cl.[4] G02B *6/42***
**U.S. Cl. 350—96.20** **11 Claims**



1. A method of achieving radial alignment and attachement between an optical device subassembly and an optical fiber subassembly, both subassemblies comprising essentially identical outer diameters, the method comprising the steps of:

(a) determining the total number of attachments (WC) desired and dividing said total into 360 to determine the position increments to be used for locating each site;

(b) measuring and recording the initial throughput efficiency (CP(0)) between said optical device subassembly and said optical fiber subassembly and defining a certain percentage of said initial throughput efficiency as a threshold value (Th);

(c) locating a pair of flush point (FP1,FP2) where the edges of said subassemblies coincide;

(d) attaching said subassemblies at said pair of flush points;

(e) measuring and recording the throughput efficiency (CP(1), CP(2)) after each attachment performed in step (d);

(f) comparing the value of CP(1) to the quantity CP(2)-Th and proceeding to step (g) as long as CP(1) is at least equal to the quantity CP(2)-Th, otherwise, proceeding to step(j);

(g) attaching said subassemblies at a pair of symmetric attachment sites on either side of a first flush point (FP1) of said pair of flush points at loations determined by the position increment defined in step (a);

(h) measuring and recording the current throughput efficiency (CP(WC)) between said subassemblies;

(i) comparing the current throughput efficiency measured in step (h) with the last recorded throughput efficiency (CP(WC-2)) and returning to step (g) as long as said current efficiency CP(WC) is at least equal to said last recorded efficiency minus said threshold value (CP(WC-2)-Th), otherwise proceeding to step (j) as long as the total number of attachments (WC) as defined in step (a) have not been made, the alignment and attachment process being completed if the total number of attachments has been reached;

(j) attaching said subassemblies at a pair of symmetric locations on either side of a second flush point (FP2) of said pair of flush points, at locations determined by the position increment defined in step (a);

(k) measuring and recording the current throughput efficiency (CP(WC)) between said subassemblies;

(l) comparing the current throughput efficiency measured in step (k) with the last recorded throughput efficiency (CP(WC-2)) and returning to step (j) as long as said current throughput efficiency (CP(WC)) is at least equal to said last recorded efficiency minus said threshold value (CP(WC-2)-Th), otherwise returning to step (g) as long as the total number or attachments as defined in step (a) has not been made, the alignment and attachment process being completed if the total number of attachments has been reached.

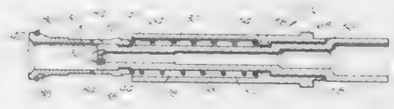
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**4,747,658**

## FIBER OPTIC CONTACT

**Leslie M. Borsuk, Los Alamitos, and Patrick G. Corrales, Garden Grove, both of Calif., assignors to International Telephone and Telegraph Corporation, New York, N.Y.**

**Filed Mar. 14, 1983, Ser. No. 474,755**
**Int. Cl.[4] G02B *6/36***
**U.S. Cl. 350—96.20** **17 Claims**



1. A fiber optic contact comprising:

a fiber optic ferrule having a forward mating end face;

an alignment sleeve mounted over the forward end of said ferrule, said sleeve having front and rear ends and a substantially constant diameter bore extending between said ends;

said mating end face of said ferrule being positioned in said bore between said front and rear ends of said sleeve; and

means including interengaging oppositely facing shoulders on said sleeve and said ferrule providing a releasable positive interlock between said sleeve and said ferrule.

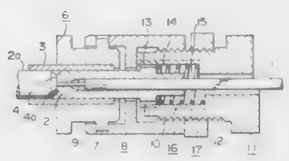
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**4,747,659**

## OPTICAL FIBER CONNECTOR

**Mitsuo Takahashi, Matsudo, Japan, assignor to Seikoh Giken Co., Ltd., Matsudo, Japan**

**Filed Mar. 26, 1986, Ser. No. 844,317**
**Claims priority, application Japan, Apr. 2, 1985, 60-69495**
**Int. Cl.[4] G02B *6/38***
**U.S. Cl. 350—96.21** **18 Claims**



1. An optical fiber connector of the type in which optical fibers are inserted into a pair of ferrules and the ferrules are inserted into a sleeve, the ferrules holding the ends of the optical fibers together, comprising:

a sleeve holding member which holds the sleeve;

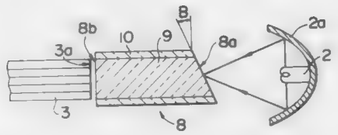
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a detachable member detachably mounted to the sleeve holding member;
a ferrule supporting member rotatably mounted with respect to the detachable member, one of the ferrules rotating integrally with the ferrule supporting member and being movable with respect to the ferrule supporting member only in its axial direction;
an urging member which urges said one of the ferrules in a direction so that the end surface of said one of the ferrules contacts the end surface of the other ferrule; and
a locking member which locks the ferrule supporting member in a position on the detachable member,
so that after mounting the detachable member on the sleeve holding member, the ferrule supporting member may be rotated, thus enabling a continuous adjustment to reduce misalignment between the optical axes of the optical fibers, the adjusted position then being locked with the locking member.

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**4,747,660**
**LIGHT TRANSMITTER**
**Kimihiko Nishioka, and Tsutomu Yamamoto, both of Hachioji, Japan, assignors to Olympus Optical Co., Ltd., Japan**
**Continuation of Ser. No. 656,862, Oct. 2, 1984, abandoned. This application Jan. 29, 1987, Ser. No. 14,132**
**Claims priority, application Japan, Aug. 12, 1983, 58-232125**
**Int. Cl.[4] G02B *6/06***
**U.S. Cl. 350—96.25** **8 Claims**

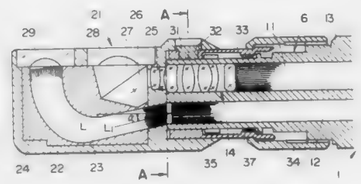



1. A light transmitter, comprising;
a light source;
image focusing means for focusing light from said light source into a bright spot image at a point in front of both said light source and said image focusing means;
a light guide comprising an optical fiber bundle having first and second planar ends, said optical fiber bundle transmitting light incident upon said first end to said second end, the latter being located in front of said first end; and
an optical system interposed between said image focusing means and said first planar end of said light guide;
said optical system including a light exit end face confronting said first end, and a light incident end face disposed to the rear of said exit end face and in the vicinity of said bright spot image;
said optical system being provided with a refracting plane and a cylindrical reflecting plane which cooperate to normalize light that impinges upon said first end.

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**4,747,661**
**ENDOSCOPE TIP ADAPTOR**
**Hideki Ohkuwa, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan**
**Filed May 8, 1987, Ser. No. 47,390**
**Claims priority, application Japan, May 15, 1986, 61-73387[U]**
**Int. Cl.[4] G02B *23/26***
**U.S. Cl. 350—96.26** **7 Claims**

1. An endoscope tip adaptor removably fitted to an elongate flexible tube of an endoscope, said elongated flexible tube including an image guide and a first light guide therein, said endoscope tip adaptor and said elongated flexible tube having a substantially same diameter and being coaxial, said endoscope tip adaptor, comprising:
a lens means for transmitting an image, said lens means being adapted to fit to said image guide; and




a second light guide being adapted to fit to said first light guide, wherein the axis of said second light guide is inclined from an axis of said first light guide away from said lens means in order to provide more room in said tip adaptor for said lens means.

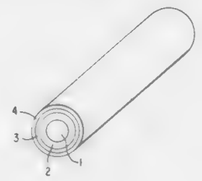
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**4,747,662**
**FIBER OPTICS HAVING A LIQUID CORE AND A FLUOROPLASTIC CLADDING**
**Herbert Fitz, Burgkirchen, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**
**Filed May 19, 1987, Ser. No. 52,051**
**Claims priority, application Fed. Rep. of Germany, May 21, 1986, 3617005**
**Int. Cl.[4] G02B *6/20***
**U.S. Cl. 350—96.32** **9 Claims**

1. A fiber optic having a liquid core, which comprises a liquid of high radiation transmission, and a sheath made from a fluorine-containing polymer material, wherein this fluorine-containing polymer material is a copolymer which comprises at least 20% by weight and at most 75% by weight of copolymerized units of vinylidene fluoride and copolymerized units of at least one further fluorine-containing monomer.

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**4,747,663**
**MONOMODE QUARTZ GLASS LIGHT WAVEGUIDE AND METHOD FOR PRODUCING IT**
**Hans-Peter Huber, New Ulm, Fed. Rep. of Germany, assignor to Licentia Patent-Verwaltungs-GmbH, Frankfurt am Main, Fed. Rep. of Germany**
**Filed Mar. 20, 1986, Ser. No. 841,804**
**Claims priority, application Fed. Rep. of Germany, Mar. 20, 1985, 3510023**
**Int. Cl.[4] G02B *6/22***
**U.S. Cl. 350—96.33** **6 Claims**

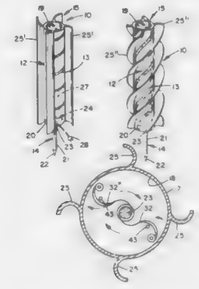



1. A monomode light waveguide of quartz glass, comprising a light carrying core means, an inner cladding means surrounding said core means, an intermediate layer surrounding said inner cladding means, and an outer cladding means surrounding said intermediate layer, the index of refraction of the core means being greater than that of both cladding means and the indices of refraction of the inner and outer cladding means being essentially equal, the ratio of the outer diameter of the inner cladding means to the outer diameter of the core means being in a range between about 1.8 and about 3.5, and said intermediate layer preventing diffusion of $OH^-$ ions from the outer cladding means into the inner cladding means.



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**4,747,664**
**ROTARY REFLECTIVE MARKER**
**Harold W. Slaughter, P.O. Box 461, West Fargo, N. Dak. 58078**
**Continuation-in-part of Ser. No. 728,238, Apr. 29, 1985, abandoned, which is a continuation-in-part of Ser. No. 553,964, Nov. 21, 1983, abandoned. This application Dec. 17, 1985, Ser. No. 810,659**
**Int. Cl.[4] G02B *5/12***
**U.S. Cl. 350—99** **10 Claims**




1. A reflective marker suitable for attracting an observer's attention; said marker comprising:
(a) a rotatable member having an outer wall and an inner cylindrical wall defining an internal longitudinal bore having an axis;
(b) a bushing and bearing arrangement including means mounting said rotatable member for rotation about said longitudinal bore axis;
(c) a non-rotatable internal shaft member mounted to extend along and inside said rotatable member longitudinal bore;
(d) a brake mechanism mounted on said rotatable member;
(i) said brake mechanism including a plurality of cams, each cam being pivotally mounted within said rotatable member longitudinal bore to pivot and extend inwardly toward said non-rotatable internal shaft member as said rotatable member rotates;
(ii) each of said cams including a friction portion thereon constructed and arranged to engage said non-rotatable internal shaft and selectively brake said rotatable member;
(e) means mounted in association with said rotatable member to selectively rotate same; and
(f) reflective means applied to said rotatable member outer wall, for reflecting light rays from a light source to an observer.

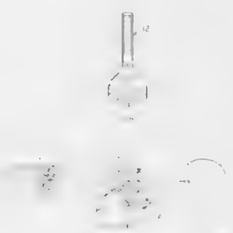
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**4,747,665**
**METHOD FOR DISPLAYING THREE-DIMENSIONAL IMAGES USING COMPOSITE DRIVING WAVEFORMS**
**Thomas P. O'Brien, Painesville, Ohio, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan**
**Filed Apr. 9, 1987, Ser. No. 36,546**
**Int. Cl.[4] G02B *27/22, 5/10***
**U.S. Cl. 350—144** **2 Claims**

1. A method for displaying a three-dimensional image in a system including a flexible membrane mirror, a cathode ray tube (CRT) screen, and a loudspeaker for driving the mirror and thereby moving an apparent image plane toward and away from a viewer, comprising the steps of:
(a) driving the mirror with a composite waveform h(t) having the following characteristics:

| | |
|---|---|
| $h(t) = A \cdot t$ | for $t = 0$ to $t^*$ |
| $h(t) = B \cdot \sin(w_B \cdot t) + X$ | for $t = t^*$ to $(T/2 - t^*)$ |
| $h(t) = (A \cdot T/2) - (A \cdot t)$ | for $t = (T/2 - t^*)$ to $(T/2 + t^*)$ |
| $h(t) = B \cdot \sin(w_B \cdot t) - X$ | for $t = (T/2 + t^*)$ to $(T - t^*)$ |
| $h(t) = (A \cdot t) - (A \cdot T)$ | for $t = (T - t^*)$ to $T$ |

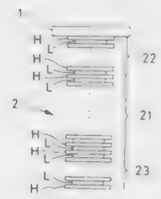
wherein "h(t)" is a displacement "h" of the mirror as a function of time, "A" is a slope, having a value greater than zero, of a triangle portion of the waveform h(t), "t" is time, "B" is an amplitude, having an absolute value greater than zero, of a sinusoidal portion of the waveform h(t), "$t^*$" is the time when the triangle portion and sinusoidal portion of the waveform h(t) have equal values and



equal slopes, "$w_B$" is a frequency, having a value which is an odd harmonic of a fundamental frequency, of the sinusoidal portion of the waveform h(t), "X" is an offset of the sinusoidal portion of the waveform h(t), and "T" is a fundamental period of the waveform h(t); and
(b) displaying a sequence of two-dimensional images synchronized to the displacement of the mirror so that a viewer perceives a three-dimensional image.

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**4,747,666**
**MULTI-LAYER INTERFERENCE FILTER**
**Masahiko Ishida, Kyoto, Japan, assignor to Horiba, Ltd., Kyoto, Japan**
**Filed Jun. 18, 1986, Ser. No. 875,873**
**Claims priority, application Japan, Jun. 25, 1985, 60-140063**
**Int. Cl.[4] G02B *1/10***
**U.S. Cl. 350—164** **2 Claims**




1. A multi-layer interference filter, comprising a substrate, a first stack, a second stack and a third stack, said stacks composed of high refractive index layers and low refractive index layers, which are alternately arranged, the first stack of said three stacks being a central stack having a number of layers about half of the number of all layers and which layers are set to a desired optical quarter-wave thickness, and wherein the second stack and the third stack are each arranged on opposite sides of said first stack and have a number of layers of about ¼ times the number of all layers and which layers are set so that the individual layers of both the second and third stacks each have an optical thickness which is different from each other

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and is different from said desired quarter-wave optical thickness of the layers of the first stack.

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4,747,667

## PLASTIC LENS ARRAY

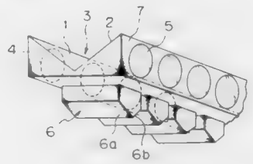
Akira Tanaka, Kawasaki; Eietsu Takahashi, Machida; Masao Tanaka, Kawasaki; Minoru Terashima, Suzaka, and Toshito Hara, Sagamihara, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed May 7, 1986, Ser. No. 860,483

Claims priority, application Japan, May 9, 1985, 60-098551; Jun. 28, 1985, 60-141623; Apr. 25, 1986, 61-094840

Int. Cl.[4] G02B *13/26, 5/04*

U.S. Cl. 350—167 11 Claims




1. A plastic lens array including the following members which are formed integrally as one block by a plastic material, comprising:

(a) a lens array body member;

(b) a plurality of object convex lenses into which a light from an object is made incident, said plurality of object convex lenses being arranged side by side in one row along one side of said lens array body member;

(c) a plurality of image convex lenses corresponding to said plurality of object convex lenses, and being arranged side by side in a row along an opposite side of said lens array body member;

(d) a plurality of image inverting portions corresponding to said object convex lenses, each of said plurality of image inverting portions having a pair of first and second roof surfaces which are substantially normal to each other to invert an image of the object;

(e) a first reflecting surface arranged at the backs of said plurality of object convex lenses, for totally reflecting said incident light of the object through said plurality of object convex lenses with an angle exceeding a critical angle and for guiding said reflected light of the object to the first roof surface in each pair of said first and second roof surfaces; and

(f) a second reflecting surface arranged at the backs of said plurality of image convex lenses, for totally reflecting said inverted light of the object from the first roof surface in each pair of said first and second roof surfaces with an angle exceeding the critical angle and for guiding said reflected light of the object to said plurality of image convex lenses.

4,747,668

## OPTICAL SCANNING UNIT

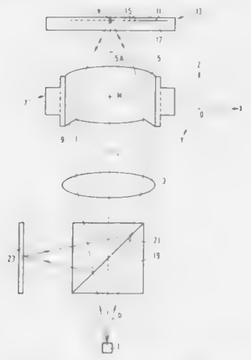
Karl-Hanns Meyer, Aachen, Fed. Rep. of Germany; Wilhelmus A. H. Gijzen, Eindhoven, Netherlands; Willy J. J. Aerts, Eindhoven, Netherlands; Gerard E. Van Rosmalen, Eindhoven, Netherlands, and Leonhard Honds, Aachen, Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jul. 24, 1986, Ser. No. 889,020

Claims priority, application Fed. Rep. of Germany, Aug. 14, 1985, 3529090; Aug. 14, 1985, 3529091; Netherlands, Nov. 25, 1985, 8503238

Int. Cl.[4] G02B *7/11;* H02K *1/00, 3/00*

U.S. Cl. 350—247 16 Claims



1. An optical scanning unit for controlling the position of a radiation beam with respect to tracks on the surface of an information carrier, wherein the scanning unit comprises an objective having an optical axis and a lens for focussing the beam into a scanning spot on said surface, an electromagnetic drive for continuous correction of the position of the objective with respect to the information carrier, the drive comprising a mount for the objective, said objective mount having a movable ring-shaped magnetic body of permanent-magnetic material arranged coaxially with the optical axis, said magnetic body being axially magnetized with magnetic poles at the axial ends thereof, the drive further comprising at least three fixed coil sets which interact magnetically with said magnetic body through an air gap, wherein said sets are arranged uniformally about the periphery of the magnetic body, each coil set having a first segmental coil which has two active parts axially spaced from each other, said active coil parts being spaced by equal distances from the magnetic body and extending along the periphery thereof, wherein each active coil part is located in the vicinity of one of the axial ends of the centrally positioned magnetic body, the two active coil parts being joined together by axially extending further coil parts, and including at least one second coil which is positioned at least partially between said two active coil parts.

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4,747,669

## LENS DRIVING MEANS IN A CAMERA

Minoru Yamada; Eiji Ito; Kenji Miyama, and Masataka Sawamura, all of Hachioji, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed Nov. 7, 1985, Ser. No. 796,001

Claims priority, application Japan, Nov. 8, 1984, 59-236039; Feb. 6, 1985, 60-21436; Feb. 6, 1985, 60-21437

Int. Cl.[4] G02B *7/10;* G03B *13/18*

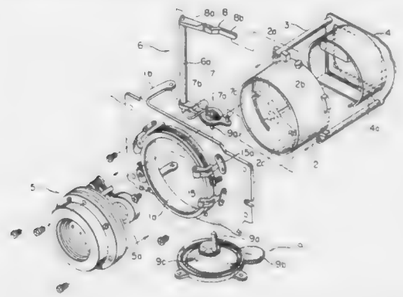
U.S. Cl. 350—255 18 Claims

1. A camera comprising:

a lens unit which is slidable through a lens stroke defined by stoppers along an optical axis for varying a focal length thereof, said stoppers comprising a frame and a cylindrical lens mount attached to a front plate, said frame and said front plate constituting a housing;

a driving mechanism having a predetermined driving stroke to slide said lens unit; and

a driving member having at least two parts which are connected to circumferential parts of said lens unit, said driving member being mounted on a camera body and adapted to transmit a driving force to said parts, said driving member comprising a stroke absorber for absorbing an overrunning stroke of said driving mechanism after said lens unit abuts against one of said stoppers.





vide a constant pressure between said distended area part of said conducting variable electrode face and said metal terminal.

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4,747,671

## FERROELECTRIC OPTICAL MODULATION DEVICE AND DRIVING METHOD THEREFOR WHEREIN ELECTRODE HAS DELAYING FUNCTION

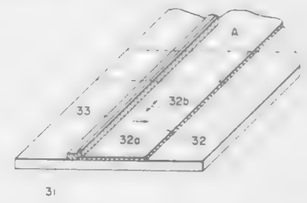
Tohru Takahashi, Tokyo; Hiroshi Inoue, Yokohama; Yoshiyuki Osada, Atsugi; Yutaka Inabe, Kawaguchi, and Junichiro Kanbe, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 17, 1986, Ser. No. 931,082

Claims priority, application Japan, Nov. 19, 1985, 60-260594

Int. Cl.[4] G02F *1/13*

U.S. Cl. 350—336 38 Claims




1. An optical modulation device, comprising:

a first substrate having thereon a signal transmission electrode connected to a signal source and a first electrode having a delay function connected to the transmission electrode,

a second substrate having thereon a second electrode disposed opposite to said first electrode, and

an optical modulation material disposed between the first and second electrodes.

27. A driving method for an optical modulation device of the type comprising: a first substrate having thereon a signal transmission electrode connected to a signal source and a first electrode having a delay function connected to the transmission electrode, a second substrate having thereon a second electrode disposed opposite to said first electrode, and an optical modulation material disposed between the first and second electrodes;

said driving method comprising applying an information signal to the signal transmission electrode.

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4,747,670

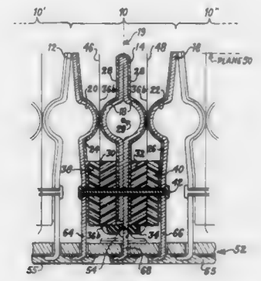
## ELECTROSTATIC DEVICE AND TERMINAL THEREFOR

John L. Devio, Adams, and Charles G. Kalt, Williamstown, both of Mass., assignors to Display Science, Inc., North Adams, Mass.

Filed Mar. 17, 1986, Ser. No. 840,138

Int. Cl.[4] G02B *26/02;* G09G *3/16*

U.S. Cl. 350—269 10 Claims




1. An electrostatic device of the kind including a fixed electrode, a variable electrode of a resilient sheet material having at least one conductive face, an insulation layer positioned between said fixed and variable electrodes, said variable electrode having at least one free end normally standing apart from said fixed electrode and having a portion mounted to said fixed electrode, and two electrical contacts respectively at said fixed electrode and at an area of said variable electrode near said mounted portion by which a voltage may be applied between said variable and fixed electrodes for causing said resilient variable electrode to become attracted to said fixed electrode, wherein the improvement comprises:

said variable-electrode contact comprised of an elastomeric pad mounted between said rigid fixed electrode and one face of said contact area of said resilient variable electrode; a fixedly mounted metal terminal having a convex surface making pressure contact with said conducting and opposite face of said contact area so that a central part of said resilient variable electrode area is distended toward and is pressed partially into said elastomeric pad to provide a constant pressure between said distended area part of said conducting variable electrode face and said metal terminal.

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4,747,672

## LIGHT COMPENSATING LIQUID CRYSTAL DISPLAY

Isao Yasuhara, and Shunichi Kusumi, both of Nagaoka, Japan, assignors to Nippon Seiki Co., Ltd., Niigata, Japan

Filed Apr. 8, 1986, Ser. No. 849,429

Claims priority, application Japan, Apr. 26, 1985, 60-91973; May 27, 1985, 60-79547[U]; Jul. 31, 1985, 60-117855[U]

Int. Cl.[4] G02F *1/13*

U.S. Cl. 350—345 9 Claims

1. A liquid crystal display device to reflect light which has passed through said liquid crystal display device comprising:

a liquid crystal display element;

a reflecting plate disposed below said liquid crystal display element and inclined relative to said element by a predetermined angle;

first and second arm pieces having a base portion, free ends of said arm pieces extending at an angle $\theta$ from said base portion, said first and second arm pieces and said base portion together forming a frame;

said liquid crystal display element fixed on said first arm piece and said reflecting plate fixed on said second arm piece;

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said liquid crystal display device further comprising:

a printed circuit board carrying thereon a liquid crystal display element driving circuit; and




said printed circuit board fixed on a rear surface of said reflecting plate.

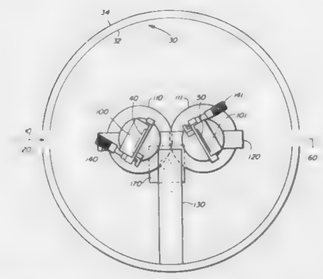
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**4,747,673**

**HIGH POWER OPTICAL ATTENUATOR**

C. Denton Marrs, and William N. Faith, both of Ridgecrest, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jun. 1, 1987, Ser. No. 55,963
Int. Cl.[4] G02F *1/21*; G02B *5/28*
U.S. Cl. 350—372 6 Claims



1. An optical attenuator comprising:

an annular beam dump defining, for a beam to be attenuated, an inlet port and a diametrically opposite outlet port, said ports defining a beam path therebetween;

a first transmissive and reflective element and a substantially identical second transmissive and reflective element disposed across said path with said second element between said first element and the outlet port, each of said elements having an incident side from which a first portion of said beam is reflected with a second portion thereof being transmitted through the element and offset by refraction in a direction transversely of said path; and

means mounting said elements for selective and simultaneous pivotal movement through a predetermined angular range with said elements pivoting in opposite directions so that at each element such a first portion is reflected toward the beam dump for absorption thereat and such a second portion is offset by refraction oppositely and equally at said second element from a corresponding such offset at the first element so that at the second element such a second portion leaves along said path and through the outlet port at every position of said elements in said angular range.

**4,747,674**

**CONTRAST ENHANCEMENT FILTER**

William F. Butterfield, Winchester; Kuang-Chou Chang, Lexington; Edmund J. McLelland, Plymouth, and Leonard Polizzotto, Stow, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Continuation-in-part of Ser. No. 853,467, Apr. 18, 1986, abandoned. This application Mar. 30, 1987, Ser. No. 32,479
Int. Cl.[4] G02B *5/30, 27/28*; H05F *1/02*
U.S. Cl. 350—399 20 Claims




1. A contrast enhancement filter having antistatic and antireflection properties, said filter comprising a transparent plastic sheet carrying on one side thereof, a layer of indium tin oxide, and superposed upon said indium tin oxide layer, an antireflection layer, said filter having affixed to the opposed side of said plastic sheet, a light-polarizing element.

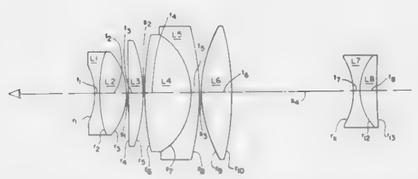
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**4,747,675**

**ULTRA WIDE-ANGLE EYEPIECE**

Albert Nagler, 15 Green Hill La., Spring Valley, N.Y. 10977

Filed Jun. 1, 1987, Ser. No. 56,060
Int. Cl.[4] G02B *25/04, 9/60, 9/62*
U.S. Cl. 350—410 4 Claims



1. An ultra wide-angle eyepiece having six lens elements in the positive power group arranged in a 2-1-2-1 format and two lens elements in the negative power group with the internal focal plane of the eyepiece lying between the two groups in which the lens surface of the positive group closest to the internal focal plane is convex or plano, said lens elements for a 10 mm. focal length eyepiece having parameters substantially as set forth in the following table wherein lens curvatures, lens thicknesses, and lens separations are given in millimeters, and N is the refractive index and V is the Abbe number of the glass used for a lens element:

| Lens | Radius | Thickness | Aperture | Glass | N | V |
|---|---|---|---|---|---|---|
| | r1=−18.56 | | | | | |
| L1 | | t1=1.65 | 8.24 | SF5 | 1.6727 | 32.2 |
| | r2=+44.30 | | | | | |
| L2 | | t2=7.83 | 12.36 | SK16 | 1.6204 | 60.3 |
| | r3=−18.56 | | | | | |
| | | s1=0.41 | | | | |
| | r4=plano | | | | | |
| L3 | | t3=4.53 | 15.66 | SK16 | 1.6204 | 60.3 |
| | r5=−44.30 | | | | | |
| | | s2=0.41 | | | | |
| | r6=+82.40 | | | | | |
| L4 | | t4=14.01 | 17.30 | SK16 | 1.6204 | 60.3 |
| | r7=−20.59 | | | | | |
| L5 | | t5=2.47 | 19.77 | SF1 | 1.7174 | 29.5 |
| | r8=−82.40 | | | | | |



-continued

| Lens | Radius | Thickness | Aperture | Glass | N | V |
|---|---|---|---|---|---|---|
| | | s3=0.41 | | | | |
| | r9=+40.14 | | | | | |
| L6 | | t6=9.06 | 19.77 | SK16 | 1.6204 | 60.3 |
| | r10=−82.40 | | | | | |
| | | s4=36.26 | | | | |
| | r11=−20.59 | | | | | |
| L7 | | t7=2.06 | [illegible] | LAK8 | 1.7130 | 53.8 |
| | r12=+15.57 | | | | | |
| [illegible] | | t8=4.94 | 10.71 | SF1 | 1.7174 | 29.5 |
| | r13=+168.59 | | | | | |

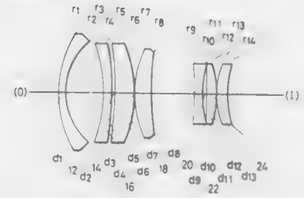
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**4,747,676**

**WIDE-ANGLE SEVEN-ELEMENT LENS SYSTEM**

Jun Hirakawa, Tokyo, Japan, assignor to Asashi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 4, 1987, Ser. No. 45,990
Claims priority, application Japan, May 2, 1986, 51-102779
Int. Cl.[4] G02B *13/04, 9/64*
U.S. Cl. 350—460 9 Claims



1. A wide-angle lens system of the seven-unit-seven-element configuration which comprises, in order from the object side, a first lens element which is a negative meniscus lens having a convex surface directed toward an object, a second lens element which is a negative meniscus lens having a convex surface directed toward an image, a third lens element which is a positive lens having a convex surface directed toward the image, a fourth lens element which is a positive lens having a convex surface directed toward the object, a fifth lens element which is a negative lens, a sixth lens element which has a convex surface directed toward the image, and a seventh lens element which is a meniscus lens having a convex surface directed toward the object, said lens system satisfying the following conditions:

(1) $-1.6<f_1/f<-1.2$
(2) $-1.1<r_3/f<-0.65$
(3) $\nu_1>40$
(4) $\nu_2>40$
(5) $n_3, n_4>1.65$

where f is the focal length of the overall lens system; $f_1$ is the focal length of the first lens element; $r_3$ is a radius of curvature of a surface of the second lens element which is the side of the object; $\nu_1$ and $\nu_2$ denote Abbe numbers of the first and second lens elements, respectively; and $n_3$ and $n_4$ denote refractive indices, of the third and fourth lens elements, respectively.

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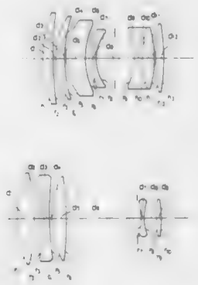
**4,747,677**

**LENS SYSTEM HAVING ABERRATIONS CORRECTED AT NEAR DISTANCE FOCUSING**

Yoshiaki Horikawa; Toshihiro Imai, and Yasuzi Ogata, all of Hachiouji, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Dec. 23, 1981, Ser. No. 333,698
Claims priority, application Japan, Dec. 27, 1980, 55-188793
Int. Cl.[4] G02B *9/62, 9/60*
U.S. Cl. 350—464 4 Claims

1. A lens system comprising a first lens unit having a positive refracting power as a whole, an aperture stop provided on the exit side of first lens unit and at least two units disposed on the exit side of said aperture stop comprising a second lens unit and a third lens unit, said lens system being movable along an optical axis as a whole for focusing and causing said second and third lens units to be further moved with the movement of the entire lens system so that airspace between said second lens



unit and said aperture stop and between said second lens unit and said third lens unit are varied independently of each other and non-linearly to thereby prevent aberration from being deteriorated when said lens system is focused on a near distance object.

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**4,747,678**

**OPTICAL RELAY SYSTEM WITH MAGNIFICATION**

David R. Shafer, Fairfield; Abe Offner, Darien, and Rama Singh, Bethel, all of Conn., assignors to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed Dec. 17, 1986, Ser. No. 942,899
Int. Cl.[4] G02B *17/06*
U.S. Cl. 350—505 20 Claims



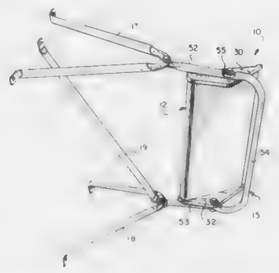
1. An optical system for forming a magnified image of an object within an annular ring field concentric with the optical axis of the system, comprising:

first, second, and third concave spherical mirrors, a convex spherical mirror providing substantially all of the magnification in the system, each of said mirrors having its center of curvature on the optical axis of the system, said first concave mirror being disposed to receive light from an object area, said convex mirror being disposed to receive light from said first concave mirror, said second concave mirror being disposed to receive light from said convex mirror, and said third concave mirror being disposed to receive light from said second concave mirror and focus it at a final image area, said second concave mirror focusing light at an intermediate image area between said second and third concave mirrors.

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**4,747,679**
**MIRROR HEAD ASSEMBLY FOR TRUCKS**
**Theodore L. Beach, Jr., Donnelsville, Ohio, assignor to Beach Manufacturing Company, Donnelsville, Ohio**
**Filed Jun. 5, 1987, Ser. No. 58,413**
**Int. Cl.[4] B60R** *1/06;* **G02B** *7/18*
**U.S. Cl. 350—632** **2 Claims**



1. An improved side mounted rear view mirror head assembly for trucks in which a mirror and an enclosing back cover define an internal space therebetween and are mounted and retained between a pair of end caps, the improvement comprising:
integral means in each of said end caps defining generally transversely extending mirror head adjusting slots, said slots being positioned adjacent said back cover and on the side of said caps remote from said mirror,
a generally U-shaped tubular metal mirror head support arm, including generally horizontal top and bottom mirror head mounting sections joined at a common generally vertical connection section, means in each of said mounting sections defining a transversely flattened mounting region, said mounting regions being generally in vertical alignment to each other,
bolt means joined to said arm at one of said regions and extending through an associated one of said slots in said end caps providing for pivotal and lateral adjustment of said head with respect to said arm,
tie bar means in said space between said mirror and said cover, said tie bar means formed as a square, and
socket means formed in each of said caps for receiving an end of said shaft for coupling said shaft to said caps and transmitting twisting torques to said shaft.

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**4,747,680**
**SPECTACLE FRAME**
**Tatsuro Hatano, Fujisawa, and Kazuyuki Sakamoto, Kawasaki, both of Japan, assignors to Nippon Kogaku K. K., Tokyo, Japan**
**Filed Jun. 3, 1985, Ser. No. 740,529**
**Claims priority, application Japan, Jun. 13, 1984, 59-87700**
**Int. Cl.[4] G02C** *1/08, 5/22*
**U.S. Cl. 351—90** **8 Claims**

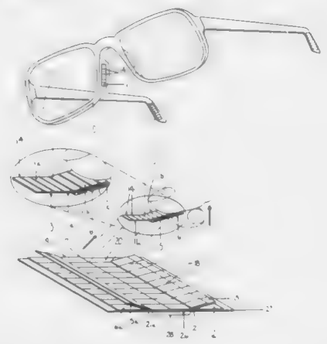
1. A spectacle frame comprising:
a pair of molded plastic rim members suitable for containing individual lenses therein and having an open ring-like shape, each of said rim members having at the ends of the open ring thereof a pair of coupling portions, respectively, one coupling portion of each pair of coupling portions having a depression into which the other coupling portion of each pair of coupling portions is fitted, each of said rim members being closed by the coupling of the respective coupling portions to each other;
a pair of temple members each having a body portion and having a hinge piece at an end of said body portion; and
fastening means for fastening the coupling portions of each pair of coupling portions to each other and for connecting said one coupling portion to the body portion of one of said temple members;
said fastening means including a metal member having one end provided with an internal thread and another end provided with a hinge piece adapted to be coupled to the hinge piece of said one temple member, and a screw member threadably engaged with said internal thread through said other coupling portion;



said one end of said metal member being integrally molded into said one coupling portion so as to be fixedly embedded therein, and said other end of said metal member projecting from said one coupling portion;
said one end of said metal member having a surface which is exposed at a bottom of said depression and which includes an entrance to said internal thread.

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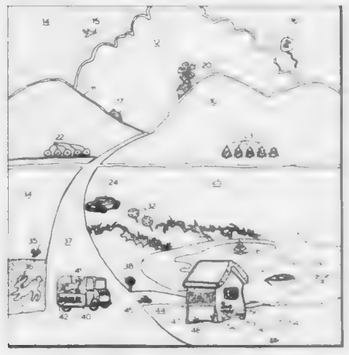
**4,747,681**
**TRACTION STRIP FOR EYEWEAR**
**Arthur B. Brower, P.O. Box 480145, Los Angeles, Calif. 90048**
**Filed May 20, 1985, Ser. No. 735,488**
**Int. Cl.[4] G01C** *5/02*
**U.S. Cl. 351—139** **7 Claims**



1. A traction strip for eyeglasses for application to the skin engaging surfaces thereof in order to minimize slippage when worn, which comprises a porous fibrous member and a coating of a pressure sensitive adhesive on one surface only thereof for adhesion of said strip to said skin engaging surfaces, said porous member comprising a mat of non-woven fibers loosely bonded together and having a plurality of spaced parallel filaments mounted upon or embedded adjacent to the uncoated surface of said strip extending transversely or angularly with respect to the longitudinal axis thereof in order to increase resistance to slippage, said porous member permitting frictional engagement between the eye-glasses and skin and allowing said pressure sensitive adhesive to penetrate to the exposed outer surface of said strip under the influence of body heat when worn to provide a tacky surface in contact with the skin and thereby additionally minimize slippage.



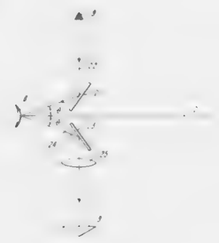
**4,747,682**
**METHOD AND GRAPHIC TO ACHIEVE OPTIMAL LENS CORRECTION FOR SUBNORMAL VISION DUE TO IMPAIRED RETINAS AND UNDEVELOPED DEFECTIVE FOCUSING ABILITIES**
**Ronald E. Reese, Simonton St., Key West, Fla. 33040**
**Filed Dec. 5, 1983, Ser. No. 558,047**
**Int. Cl.[4] A61B** *3/02*
**U.S. Cl. 351—203** **4 Claims**



1. A method for use in testing for visual acuity in a human subject suffering from subnormal vision including severe myopia to determine a prescription for soft contact lens for a training program to improve the subject's vision, the method comprising obtaining subject's correction for distance vision by traditional testing methods, the subject then successively observing through selected minus diopter lenses colored shapes on contrasting colored backgrounds well-illuminated by daylight or simulated daylight conditions and being situated so that the distance between the subject and the colored shapes on contrasting colored background can be selectively reduced as required to determine the subject's best lens correction based on the subject's perception of clarity of the extended environment, said correction comprising an estimate of the subject's optimal correction, and determining on the basis thereof a suitable correction for a training lens, said suitable correction being not greater than said estimated optimal correction and more than the correction corresponding to that obtained by traditional testing methods.

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**4,747,683**
**METHOD AND DEVICE FOR IN VIVO WETTING DETERMINATIONS**
**Marshall G. Doane, Cambridge, Mass., assignor to Eye Research Institute of Retina Foundation, Boston, Mass.**
**Filed Jan. 17, 1986, Ser. No. 820,526**
**Int. Cl.[4] G02C** *7/04;* **A61B** *3/00, 3/10, 3/14*
**U.S. Cl. 351—206** **16 Claims**



8. Apparatus for the evaluation of an ophthalmic wetting characteristic, such wetting characteristic being a function of tear film thickness, wherein the apparatus comprises
light means for directing incident light at a tear film on a subject's eye when the subject's head is supported in an observation position, and
light collection means for collecting incident light which has been specularly reflected from, and for focusing an image of a surface region of, the tear film, for
providing an image of the tear film, such image including a pattern of interference bands localized in said tear film surface region and formed by interference between incident light reflected from front and rear surfaces of said tear film so as to be indicative of tear film thickness, such light means and light collection means being arranged such that the light from the tear film collected and focused by the collection means consists substantially of light specularly reflected from the tear film whereby the interference bands are clearly defined throughout the region, thus enabling the wetting characteristic to be evaluated by determining the thickness over time.

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**4,747,684**
**METHOD OF AND APPARATUS FOR REAL-TIME CRYSTALLOGRAPHIC AXIS ORIENTATION DETERMINATION**
**Sidney Weiser, Silver Spring, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**
**Continuation-in-part of Ser. No. 913,437, Sep. 30, 1986. This application Aug. 27, 1987, Ser. No. 89,893**
**Int. Cl.[4] G01N** *21/01, 21/47*
**U.S. Cl. 356—31** **5 Claims**



1. A device for determining, in real time, crystallographic orientation of an essentially planar crystal sample including:
means for providing a focussed beam of coherent and essentially monochromatic electromagnetic radiation:
means for directing said beam as a spot onto a specific plane on said sample in a scanned pattern such that the intersection of said beam with a plane above and parallel to said surface is substantially spiral, wherein said post is small with respect to the area of said sample;
means for detecting that portion of said beam reflected in a particular direction form said material, whereby the beam is reflected different amounts for different incident directions in accordance with the crystallographic orientation of the crystal material to yield a particular reflectance pattern;
and means for determining said orientation in accordance with said reflectance pattern.

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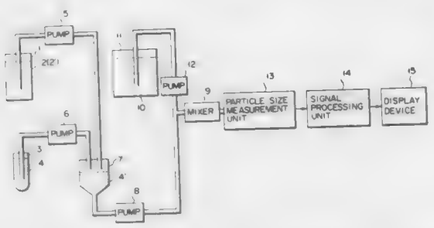


**4,747,685**

## BIOLOGICAL MICROPARTICLE INSPECTION APPARATUS

**Yoshinori Suzuki, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Mar. 20, 1986, Ser. No. 841,817**
**Claims priority, application Japan, Mar. 29, 1985, 60-66049**
**Int. Cl.⁴ G01N** *1/10, 33/487, 15/12, 15/14*
**U.S. Cl. 356—36** **10 Claims**




1. A biological microparticle inspection apparatus comprising:

first means for mixing coupling bodies capable of coupling specifically with specified biological microparticles and labeled with particles having substantially the same size, together with a sample containing biological microparticles including said specified biological microparticles, thereby coupling said labeled coupling body with said specified biological microparticles to form complexes; and

second means for selectively counting the number of said complexes, said second means comprising a particle size measurement unit for detecting the size of said complexes, and a signal processing unit for processing a signal from said particle size measurement unit and for counting the number of said complexes having a size falling within a predetermined size range.

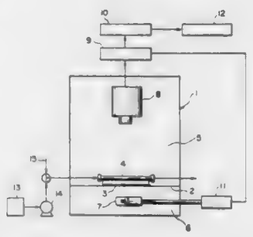
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**4,747,686**

## METHOD AND APPARATUS FOR PERFORMING NOVEL HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY

**Haruo Sato, Chiba, Japan, assignor to SATO Pharmaceutical Research Institute Ltd., Tokyo, Japan**

**Filed Jul. 25, 1986, Ser. No. 889,194**
**Claims priority, application Japan, Aug. 9, 1985, 60-175288**
**Int. Cl.⁴ G01N** *21/85, 30/74*
**U.S. Cl. 356—72** **10 Claims**



1. A high performance liquid chromatograph comprising an apparatus for detecting separating conditions and separation patterns, comprising:

a light-shielding chamber;

a light source located within said chamber;

a line sensor located in said chamber for detecting light and producing a sensed light signal;

a transparent separation column extending parallel with said line sensor and positioned between said light source and said line sensor;

means for pumping a sample through said column; and

means for processing said sensed light signal from said line sensor.

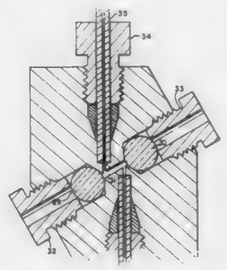
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**4,747,687**

## BALL CELL WINDOWS FOR SPECTROPHOTOMETERS

**Thomas Hoppe, and Miner Munk, both of Palm Beach, Fla., assignors to Milton Roy Company, St. Petersburg, Fla.**

**Continuation of Ser. No. 618,560, Jun. 8, 1984, abandoned. This application Aug. 14, 1986, Ser. No. 898,730**
**Int. Cl.⁴ G01N** *21/05, 21/85*
**U.S. Cl. 356—246** **7 Claims**



1. A detector cell assembly for use in spectrophotometry wherein a source of radiation is spaced from a photodetector with said cell assembly being positioned between the radiation source and the photodetector, said detector cell assembly comprising:

a body having a sealed cell therein for holding a sample on which spectrophotometric measurements are to be made;

a first radiation transparent spherical ball closing a first opening in said cell at which radiation enters said cell, said first spherical ball being in a first direct seal with said cell, said first direct seal being capable of withstanding high pressure;

a second radiation transparent spherical ball closing a second opening in said cell at which radiation exits said cell, said second spherical ball being in a second direct seal with said cell, said second direct seal being capable of withstanding high pressure; and

wherein said first spherical ball focuses said radiation so that said radiation has a crossed ray pattern within said cell and said second spherical ball directs said radiation to said photodetector for detection.

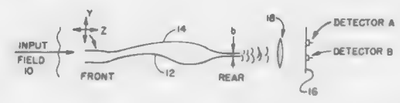
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**4,747,688**

## FIBER OPTIC COHERENCE METER

**Joseph M. Geary, Jupiter, Fla., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Sep. 26, 1986, Ser. No. 911,935**
**Int. Cl.⁴ G01B** *9/02*
**U.S. Cl. 356—345** **12 Claims**




1. A fiber optic coherence meter comprising in combination:

an input light field,

first and second fiber optic conductors having identical length, said first and second fiber optic conductors respectively have front and rear faces, said front faces of said first and second fiber optic conductors receiving said input light field, said front faces of said first and second fiber optic conductors being arranged to form a first common plane, said first fiber optic conductor being held stationary with respect to said second fiber optic conductor which can be moved either laterally in said first common plane or or longitudinally into and out of said first common plane, said rear faces of said first and second conductors being arranged to form a second common plane and having a lateral separation b, said rear faces being fixed with respect to each other to maintain said lateral separation b once it has been established,

an observation plane parallel to said second common plane, said observation plane having positioned therein a first and second light detector, said input light field traveling through said first and second fiber optic conductors to form a first and second light field which emerges from said rear faces thereof, said first and second light fields interacting in said observation plane to form an interference pattern, said first and second light detectors detecting said interference pattern to determine the degree of coherence in said input light field.



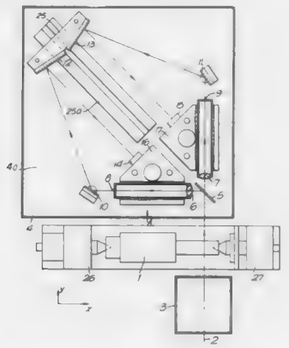
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**4,747,689**

## OPTICAL MEASUREMENT APPARATUS

**Philip J. E. Aldred, Shrewsbury, England, assignor to Tesa Metrology Limited, Telford, England**

**Filed Sep. 12, 1986, Ser. No. 906,812**
**Claims priority, application United Kingdom, Sep. 13, 1985, 8522780**
**Int. Cl.⁴ G01B** *11/04*
**U.S. Cl. 356—385** **8 Claims**



1. Optical measurement apparatus for determining a plurality of dimensions of an object at linearly spaced locations on the object, comprising a measurement station for measurement of a linear dimension of the object, means to move the object through the measurement station to present the locations to be measured one by one, a light source on one side of the measurement station to direct a beam of light at the location of the object in the measuring station transversely to the required line of measurement and to the path of movement of the object through the station, elongate photo-electric array means disposed on the opposite side of the measurement station to the light source, lens means to focus an image of the part of the object to be measured on the photo-electric array means to form an image thereon of said part of the object and means to determine the dimension of the object from the image received on the array means, wherein an elongate measurement graticule is provided on which a scale is delineated, means are provided for directing collimated light through the graticule and thence into the lens system to be focussed on to the photo-electric array means whether or not an object is present in the apparatus for calibration of the array means prior to or during a cycle of measurement of an object.

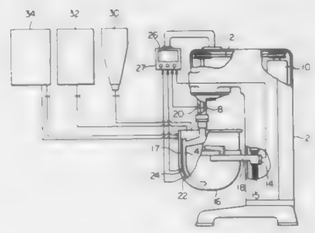
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**4,747,690**

## KNEADING APPARATUS FOR BREAD DOUGH AND THE LIKE AND A METHOD OF CONTROLLING THE QUALITY THEREOF DURING KNEADING

**Toshiko Hayashi, Utsunomiya, Japan, assignor to Rheon Automatic Machinery Co., Ltd., Utsunomiya, Japan**

**Filed Oct. 27, 1986, Ser. No. 923,642**
**Claims priority, application Japan, Oct. 29, 1985, 60-242292**
**Int. Cl.⁴ B01F** *15/00*
**U.S. Cl. 366—98** **2 Claims**



1. A kneading apparatus for controlling the quality of bread dough and the like during kneading, comprising a kneading vessel, an agitator, measuring instruments consisting of a strain gauge mounted on said agitator, a thermometer and a pH meter mounted on the inner surface of said kneading vessel, and a weighing device mounted relative to said kneading vessel, said measuring instruments being adapted to begin their measurement as soon as the kneading begins, and means for displaying the individual chronologically measured values.

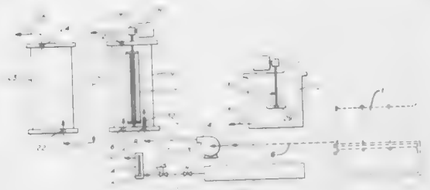
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**4,747,691**

## METHOD AND APPARATUS FOR DILUTING AND ACTIVATING POLYMER

**Robert O. Hoffland, 303 Silver Spring Rd., Conroe, Tex. 77303**

**Filed Sep. 29, 1986, Ser. No. 912,254**
**Int. Cl.⁴ B01F** *15/04*
**U.S. Cl. 366—160** **8 Claims**



1. An apparatus for continuously diluting and activating a concentrated polymer/carrier in water comprising:

(a) a storage tank for containing the polymer/carrier;

(b) an agitated mixing tank for mixing and diluting said polymer/carrier with water to be utilized in treatment of waste water, said mixing tank having a polymer inlet means, a water inlet means, and a mixing tank outlet means;

(c) a polymer delivery means for continuously delivering said polymer/carrier from said storage tank to said polymer inlet means at precise delivery rates;

(d) a water delivery means for continuously providing water to said water inlet means at desired flow rates;

(e) an aging tank for activating said polymer after dilution in the water; and

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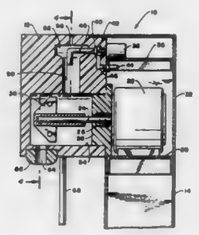
(f) a means for continuously delivering the diluted polymer to said aging tank.

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**4,747,692**
**BEVERAGE DISPENSER**

Roger D. Harrison, 55 W. Gainsborough Rd., Thousand Oaks, Calif. 91360

Continuation-in-part of Ser. No. 698,027, Feb. 4, 1986, abandoned. This application Sep. 30, 1986, Ser. No. 913,526
Int. Cl.[4] B01F *15/02*
U.S. Cl. 366—164 22 Claims



1. A beverage dispenser comprising:
a housing formed of a rigid block of material, said housing being transparent;
a mixing chamber formed within said housing, conduit means connecting with said mixing chamber, said conduit means being adapted to conduct a plurality of different liquids to be then dispensed within said mixing chamber;
an air vent passage formed within said housing, said air vent passage connecting with said mixing chamber;
control means connected to said conduit means, said control means for causing conducting of the liquids into said mixing chamber;
a whipping chamber formed within said housing a connecting conduit connecting said mixing chamber with said whipping chamber, whipping means mounted on said housing and extending within said whipping chamber, said whipping means being activatable for whipping of the liquids that have been conducted from said connecting conduit into said whipping chamber; and
an outlet conduit mounted on said housing, said outlet conduit for dispensing of the whipped liquids from said whipping chamber into the ambient.

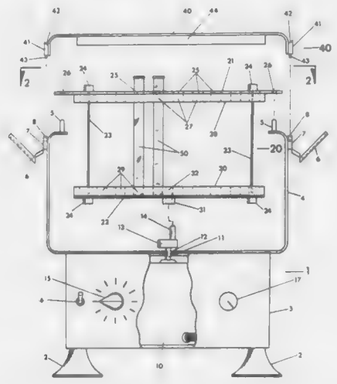
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**4,747,693**
**LABORATORY MIXER**

Murray Kahl, 12083 Regal Ct. W., West Palm Beach, Fla. 33414

Filed Nov. 20, 1986, Ser. No. 936,647
Int. Cl.[4] B01F *11/00;* A47B *73/00;* B01L *3/00*
U.S. Cl. 366—208 15 Claims

1. A holder for uniformly mixing fluent material contained within a plurality of vessels, the holder comprising:
restraining means including a restraining plate arranged for restraining a plurality of vessels at a first location thereof against movement;
vessel engaging means including a vessel engaging plate arranged to engage the plurality of vessels at a second location thereof and spaced away from and rotatably movable relative to said restraining means for shaking all the vessels over a uniform path when the vessels are thereby engaged and restrained by said vessel engaging plate and said restraining plate respectively; and
means for flexibly connecting said engaging and restraining plates together so as to allow movement of said engaging plate relative to said restraining plate, said flexibly connecting means including at least one flexible connecting



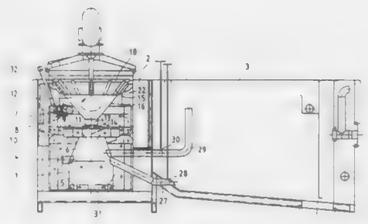
rod connected at one end thereof with said engaging plate and at another end thereof with said restraining plate.

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**4,747,694**
**METHOD FOR DISPERSING TWO PHASES IN A SOLVENT EXTRACTION PROCESS AND A PUMP MIXER FOR REALIZING THE METHOD**

Bror G. Nyman, Ulvila; Stig-Erik Hultholm, Pori; Launo L. Lilja, Pori, and Valto J. Mäkitalo, Pori, all of Finland, assignors to Outokumpu Oy, Helsinki, Finland

Filed Nov. 13, 1986, Ser. No. 930,727
Claims priority, application Finland, Nov. 28, 1985, 854725
Int. Cl.[4] B01F *3/08*
U.S. Cl. 366—265 12 Claims



6. Apparatus for dispersing two liquid phases in a solvent extraction process, for providing that a selected one of said liquid phases is a continuous phase, and for conducting a dispersion to a next stage of the extraction process, comprising: a mixer; a circulation cylinder at the bottom of said mixer; a turbine pump located above said circulation cylinder; a division ring; a presettler surrounding said mixer; and a settler; a heavy phase return conduit and a light phase return conduit for conducting liquid from the settler to a top part of the circulation cylinder for controlling which phase is continuous and for creating a double-loop circulation; a dispersion pump mounted coaxially with and above said turbine pump; said dispersion pump comprising a suction cylinder which suction cylinder is closed at the suction cylinder top, and which suction cylinder has a suction inlet located above the middle of the turbine pump; at least two rising pipes seated in said suction cylinder and extending upwardly and outwardly; cone plates around said rising pipes, bottom ends of said cone plates extending below a surface level of liquid in the mixer; said rising pipes terminating in an interconnecting circular pipe; and means for conducting dispersion from said circular pipe to a next extraction stage via a collecting trough positioned above said surface level of liquid in the mixer.

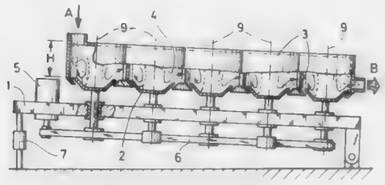


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**4,747,695**
**CENTRIFUGAL STIRRING APPARATUS**

Paul Schmidt, Essen, Fed. Rep. of Germany, assignor to Dr. - ING. Manfrid Dreher GmbH & Co. KG, Fed. Rep. of Germany

Continuation of Ser. No. 757,357, Jul. 22, 1985, abandoned. This application Mar. 16, 1987, Ser. No. 26,175
Claims priority, application Fed. Rep. of Germany, Jul. 26, 1984, 3427568
Int. Cl.[4] B01F *7/26;* B24B *19/00*
U.S. Cl. 366—291 16 Claims



1. A centrifugal stirring apparatus for altering the shape, surface and/or size of loose particles or workpieces, the centrifugal stirring apparatus comprising a plurality of work vessels including at least two generally cylindrical work vessels connected to each other having a common overflow opening between them wherein each work vessel has a height, diameter and a bottom end, the opening has a crosssectional surface, and the cross-sectional surface of the opening is narrowed in relation to the height and diameter of the work vessels, means for adjusting the cross-sectional surface of the overflow opening, and a rotatably driven stirring disk mounted on said bottom end of each work vessel for rotation about an axis of rotation whereby the particles and workpieces circulate in the work vessels, and the treated particles or workpieces pass directly from one work vessel into another through the opening, the work vessels being arranged one behind the other in a continuous row and the loose particles or workpeices being introduced into the first work vessel of the row, travelling continuously through all the vessels of the row and being removed from the last vessel of the row.

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**4,747,696**
**MIXING AND BLENDING APPARATUS**

Carl E. McCrory, West Covina, and Herbert G. Hall, Calabasas, both of Calif., assignors to Carl McCrory Enterprises Inc., West Covina, Calif.

Continuation-in-part of Ser. No. 608,641, May 9, 1984, abandoned. This application May 28, 1985, Ser. No. 738,177
Int. Cl.[4] B01F *7/16*
U.S. Cl. 366—307 3 Claims

1. A mixer for liquids comprising:
(a) a container having inner and outer wall surfaces;
(b) an axial impeller mounted in said container rotatable impeller blade means adapted to rotate in a fixer plane for imparting rotational motion with respect to the axis of said impeller to a mixable material in contact therewith;
(c) a removable stationary baffle means to impede the rotational motion of said mixable material comprising a single piece and including at least one inwardly extending baffle having an outer edge continuously contacting the inner wall surface of said container and an inner edge and an integral wall attachment portion adapted to overlie the inner wall surface of said container said integral wall attachment portion of said removable stationary baffle means being formed as a semi-circular section and said baffle means being held in position in said container by means of a threaded fastener and wing nut, said fastener passing through said wall attachment portion and said container; and,
(d) at least two axially spaced aperture means located intermediate the inner and outer edges of said baffle means at a location in said upwardly extended portion of said baffle means to permit a portion of said mixable material to



which rotational motion has been imparted by said impeller blade means to flow through said baffle means, a first one of said aperture means being located at a position approximately level with the upper level of said mixable material when said mixer is in use, and a second one of said apertures being located at least about 40% of the axial distance from the plane of said impeller to said first aperture.

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**4,747,697**
**FLUID MIXER**

Hisao Kojima, 3-53-21, Shioiri-Cho, Tsurumi-Ku, Yokohama-Shi, Kanagawa-Ken, Japan

Filed Dec. 22, 1986, Ser. No. 946,184
Claims priority, application Japan, Dec. 20, 1985, 60-285650
Int. Cl.[4] B01F *5/06*
U.S. Cl. 366—339 12 Claims



1. A fluid mixer for mixing at least two kinds of fluids, said mixer comprising:
an elongated tubular casing;
a plurality of mixing elements within said casing, each of said mixing elements comprising a tubular pipe through which the fluids flow and a helical blade member disposed within the pipe for dividing the interior of the pipe into a plurality of fluid passages;
a tubular spacer disposed between respective pairs of said mixing elements,
each of the tubular spacers comprising a cylindrical member in which a circular fluid passage is defined, and two spacer blade members extending radially inward from the inner peripheral surface of said cylindrical member, said spacer blade members spaced from one another so as to define an opening extending therebetween, said spacer blade members extending helically in one of a righthand direction

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over an angle of 90 degrees and a lefthand direction over an angle of 90 degrees.

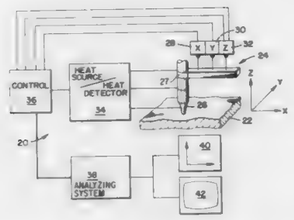
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**4,747,698**

## SCANNING THERMAL PROFILER

**Hermantha K. Wickramasinghe, Chappaqua, and Clayton C. Williams, Peekskill, both of N.Y., assignors to International Business Machines Corp., Armonk, N.Y.**

**Filed Apr. 30, 1986, Ser. No. 858,320**
**Int. Cl.[4] G01N *25/00***
**U.S. Cl. 374—6** **21 Claims**




1. Apparatus for investigating surface structures present on the surface of a sample to be investigated irrespective of the materials involved comprising:

probe means including a fine scanning tip;

means for relatively positioning said scanning tip and the surface to be investigated;

a heat source for heating said scanning tip to a controlled temperature when said scanning tip is remote from the sample surface; temperature sensing means at said scanning tip for detecting variations in the tip temperature when said scanning tip is moved to a separation distance in close proximity with the sample surface;

means for scanning said scanning tip across the sample surface in close proximity therewith;

means for automatically controlling the separation distance between said scanning tip and the sample surface in response to the temperature variations such that the temperature variations remain substantially constant during scanning; and

means for graphically displaying the spatial coordinates of said scanning tip to produce a topographical map of the surface.

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**4,747,699**

## THERMAL-ENVIRONMENT SENSOR WITH MEANS TO SIMULATE EMISSIVITY OF HUMAN BODY

**Masshiro Kobayashi; Noboru Kobayashi; Kunikazu Torikoshi, and Shigehiro Uemura, all of Sakai, Japan, assignors to Daikin Industries, Ltd., Osaka, Japan**

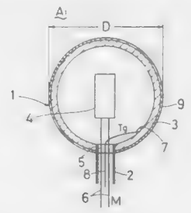
**PCT No. PCT/JP86/00048, § 371 Date Oct. 4, 1986, § 102(e) Date Oct. 4, 1986, PCT Pub. No. WO86/04674, PCT Pub. Date Aug. 14, 1986**
**PCT Filed Feb. 6, 1986, Ser. No. 917,943**
**Claims priority, application Japan, Feb. 6, 1985, 60-22327; Feb. 6, 1985, 60-22328; Nov. 26, 1985, 60-265324; Nov. 26, 1985, 60-265325; Nov. 26, 1985, 60-265326; Nov. 26, 1985, 60-265327; Nov. 26, 1985, 60-181869[U]; Nov. 26, 1985, 60-181870[U]; Nov. 26, 1985, 60-181871[U]**
**Int. Cl.[4] G01J *5/02*; G01K *3/00***
**U.S. Cl. 374—109** **21 Claims**

1. A thermal-environment sensor for detecting the thermal environment in a room, which comprises:

a heating element adapted for placement in said room and for being heated with a thermal quantity (M);

a temperature detector adapted to detect the surface temperature (Tg) of said heating element; and

a layer of radiant materials covering the outer surface of said heating element, having a spectral emissivity closely conforming to that of the surface of the human skin or clothes




thereon, said layer of radiant materials comprising a metallic oxide pigment and a resin binder.

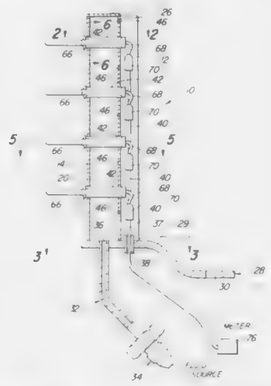
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**4,747,700**

## THERMOCOUPLE RAKE

**Herman N. Lenz, Lambertville, Mich., and John M. Kasper, Toledo, Ohio, assignors to Teledyne Industries, Inc., Los Angeles, Calif.**

**Filed Jun. 19, 1987, Ser. No. 64,109**
**Int. Cl.[4] G01K *1/16, 13/02***
**U.S. Cl. 374—135** **13 Claims**




1. A device for sensing and measuring physical properties of a fluid at a plurality of predetermined locations within a flow of fluid, said device comprising:

a source of coolant fluid;

a rake body defining a fluid tight interior chamber, said rake body having means for communicating said coolant fluid from said source of coolant fluid to said chamber, and means for expelling said coolant fluid from said chamber such that said coolant fluid flows through said chamber;

a plurality of spaced apart mounting members mounted to said rake body, each of said plurality of mounting members mounted in a spaced apart relationship extending through said chamber for cooling by the flow of coolant fluid through said chamber;

a plurality of probe assemblies, each of said plurality of probe assemblies having a tip portion with a sensor therein generating a signal and a mounting portion, each of said plurality of probe assemblies demountably positioned in a respective one of said plurality of mounting members with said tip portion extending into said flow of measured fluid and said mounting portion being received within said respective one of said mounting members for cooling, each of said probe assemblies further having means for communicating said signal; means for converting said signal from each said probe to a measurement of said physical properties; and

means for selectively locking each of said plurality of probe assemblies in a respective one of said plurality of mounting members.



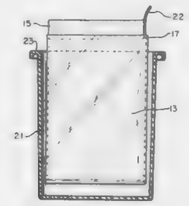
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**4,747,701**

## PLASTIC LINER BAG WITH ELASTIC TOP AND METHOD OF MAKING

**Stephen Perkins, 525 Justina, Hinsdale, Ill. 60521**

**Filed Dec. 3, 1986, Ser. No. 937,353**
**Int. Cl.[4] B65D *33/00***
**U.S. Cl. 383—33** **28 Claims**




1. A generally rectangular plastic liner bag for a receptacle which comprises a generally rectangular plastic bag having an open top with a circumference; and an elastic head having an edge attaced to the platic bag and an edge which is not attached to the plastic bag, said attached edge having a circumference when in a relaxed state which is substantially equal to the circumference of said open top whereby the circumference of the open top is not reduced by the elastic band in a relaxed state, and whereby said plastic bag with said elastic band will lay substantially flat when placed on a flat surface.

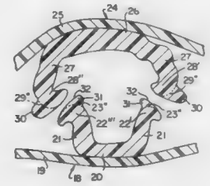
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**4,747,702**

## INTERLOCKING CLOSURE DEVICE HAVING CONTROLLED SEPARATION AND IMPROVED EASE OF OCCLUSION

**Gerald H. Scheibner, Liberty Lake, Wash., assignor to First Brands Corporation, Danbury, Conn.**

**Continuation-in-part of Ser. No. 690,207, Jan. 10, 1985, abandoned, which is a continuation-in-part of Ser. No. 509,709, Jun. 30, 1983, abandoned. This application Mar. 17, 1987, Ser. No. 27,081**
**Int. Cl.[4] B65D *33/24***
**U.S. Cl. 383—63** **44 Claims**




1. An interlocking closure fastening device comprising a male closure element and a female closure element formed such that said male closure element and said female closure element engage in interlocking relationship; said male closure element comprising a substantially linear U-shaped channel element including a profile portion comprising a base portion having a pair of spaced-apart, parallelly disposed webs extending from said base portion, said webs terminating in hooks facing away from each other; said female closure element comprising a substantially linear U-shaped channel element including a profile portion comprising a base portion having a pair of spaced-apart, parallelly disposed webs extending from said base portion, said webs terminating in hooks extending nonlinearly from said webs and facing toward each other, said hooks each including a projection extending nonlinearly in a direction outwardly and downwardly with respect to said base portion and facing away from each other, each of said projections providing guidance for occlusion of said female closure element with said male closure element; and wherein said female closure element further provides controlled separation characteristics to said interlocking closure fastening device when said interlocking closure fastening device is partially deoccluded.

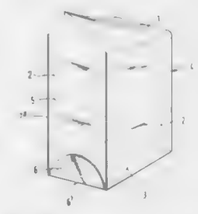
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**4,747,703**

## BAG MADE OF FLEXIBLE SYNTHETIC MATERIAL AND POSSESSING A STIFFENING AND STABILIZING MEANS

**Michel Cazes, Vittel, France, assignor to Societe Generale des Eaux Minerales de Vittel, Vittel, France**

**Filed Oct. 28, 1988, Ser. No. 923,889**
**Int. Cl.[4] B65D *33/02***
**U.S. Cl. 383—119** **22 Claims**




1. In a bag made of flexible synthetic material and of the type obtained from at least one strip of synthetic film shaped to define, by means of welds, a bottom on which the bag rests, two side walls, a stiffening and gripping zone connecting the two side walls, and a front face connecting the two side walls, said front face corresponding to the side from which the content of the bag is poured after the bag has been opened, the improvement wherein the front face is provided with a means of stiffening and stabilizing the bag.

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**4,747,704**

## SIMPLIFIED UNIVERSAL DRAWER GUIDING SYSTEM

**Gary W. Nelson, 222933 Hatteras St., Woodland Hills, Calif. 91367**

**Continuation-in-part of Ser. No. 843,197, Nov. 28, 1986, Pat. No. 4,645,359, which is a continuation-in-part of Ser. No. 642,420, Aug. 20, 1984, Pat. No. 4,580,851. This application Feb. 24, 1987, Ser. No. 17,717**
**The portion of the term of this patent subsequent to Apr. 8, 2003, has been disclaimed.**
**Int. Cl.[4] A47B *88/04*; F16C *29/04***
**U.S. Cl. 384—19** **11 Claims**

1. A simplified, universal drawer quide system in combination with a drawer and a cabinet comprising:

a pair of rollers of relatively small vertical extents, each having a vertical extent of ¾ inch or less;

means for mounting said rollers near the front face of and within the cabinet in cantilevered and sidewardly projecting offset relation to the cabinet sides to engage and support the lower edges of the drawer sides as the drawer is opened and closed; said rollers attached only to the cabinet sides;

a pair of metal tracks, one mounted rigidly to the cabinet one each side of the drawer and extending for the length of the drawer;

third and fourth rollers freely projecting at left and right side corner portions of said drawer at the rear thereof for engagement by and into the respective associated tracks; and

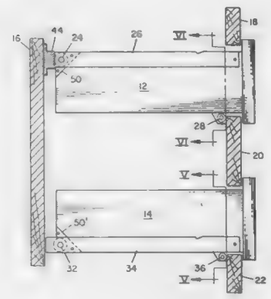
left and right fittings carrying the respective third and fourth

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rollers, the fittings engaging the drawer left and right side corner portions, each fitting positioned near the rear extent of the drawer and attached thereto, each of the third and fourth rollers freely and openly projecting sidewardly from its corresponding fitting and outwardly from the drawer side,

said mounting means including a pair of fixed identical



brackets secured directly to said cabinet sides for mounting the small rollers onto said cabinet sides for supporting the drawer under its right and under its left-hand sides just inside the front of the cabinet, each of said small rollers being substantially sidewardly offset from a downward continuation of the space between the drawer and cabinet, each of said left and right fittings being entirely confined at rearwardmost extent of the drawer.

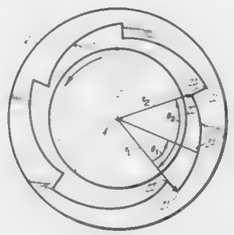
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**4,747,705**

## POWER SHAPED MULTIPAD HYDRODYNAMIC JOURNAL BEARING

**Giridhari L. Agrawal, Simsbury, Conn., assignor to United Technologies Corporation, Hartford, Conn.**

**Filed Jun. 26, 1987, Ser. No. 67,564**
**Int. Cl.[4] F16C *17/02***
**U.S. Cl. 384—118** **4 Claims**



1. A hydrodynamic fixed shape journal bearing disposed about an axis characterized by:

an outer surface, and

an inner surface having a plurality of pads, each pad having a peak, a trough and a curved surface connecting said peak and trough, the points of the curved surface being defined by the equation:

$$h = r + s\,(1-\theta_1/\theta_2)^{\alpha}$$

where

h=distance of a point on the curve from the axis of the bearing

r=length of a radius $r_1$ emanating from the axis of the bearing and intersecting a peak of a pad

s=difference between the length of the radius $r_1$ and the length of a radius $r_2$ emanating from the axis and intersecting a trough of the pad

$\theta_1$=angular distance from the first radius to the point of the curve

$\theta_2$=angular distance from the first radius to the second radius

$\alpha$=power of the curve.

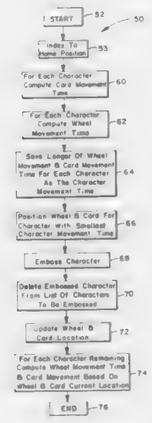
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**4,747,706**

## EMBOSSING METHOD AND APPARATUS

**Duane Duea, Apple Valley, Minn., assignor to DataCard Corporation, Minneapolis, Minn.**

**Filed Aug. 17, 1987, Ser. No. 86,067**
**Int. Cl.[4] B41J *3/38***
**U.S. Cl. 400—70** **7 Claims**




1. An embossing system for embossing a card at a plurality of character locations with characters in accordance with particular character data to be embossed on the card by use of a rotatable embossing wheel assembly including a set of character embossing elements disposed at predetermined spaced locations about the periphery of the embossing wheel assembly and card transportation means for moving the card so as to individually place each of the character locations to be embossed into embossing position relative to the embossing wheel assembly; the embossing system comprising:

(a) character data memory means for storing in a predetermined data format, character data to be embossed on the card, the character data including for each character, its character location on the card relative to an index position and an identifier associating each of the characters with one of the character embossing elements of the embossing wheel assembly;

(b) embossing wheel memory means for storing the location of each of the character embossing elements on the embossing wheel assembly relative to a home position; and

(c) data processing means including:

(i) means for computing for each character to be embossed on the card, a first time required to move its associated character location into embossing position;

(ii) means for computing for each character to be embossed on the card a second time required to rotate its associated character embossing element into embossing position;

(iii) means for comparing the first and second times for each character to be embossed and saving the longer of the two times as a character movement time;

(iv) means for comparing the character movement time of each of the characters to be embossed and selecting the character having the smallest of the character movement times;

(v) means for causing movement of the card and the embossing wheel assembly into embossing position for embossing the character having the smallest of the character movement times;

(vi) means for discarding the embossed character from the characters in the character data memory means which are yet to be embossed; and

(vii) means for iteratively selecting the character from the character data memory means having the smallest character movement time and embossing the same until all of the characters have been embossed.



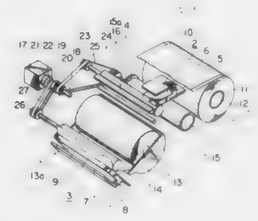
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**4,747,707**

## LABEL PRINTER

**Yasuo Komori, Shizuoka, Japan, assignor to Tokyo Electric Co., Ltd., Tokyo, Japan**

**Filed Dec. 19, 1986, Ser. No. 943,729**
**Claims priority, application Japan, Dec. 27, 1985, 60-202277[U]**
**Int. Cl.[4] B41J *3/54, 3/56***
**U.S. Cl. 400—82** **10 Claims**



1. A label printer comprising:

(a) a first print device comprising:

(i) a first platen rotatable about a first axis and

(ii) a first printing head mounted for pivotal movement between a first position in which it is in close proximity to said first platen on the side of said first platen that is upward during normal use of said label printer and a second position in which it is spaced from said first platen;

(b) a second printing device comprising:

(i) a second platen rotatable about a second axis, said second axis being parallel to said first axis and said first and second platens being located in the same vertical volume defined by planes vertical to the ends of said first platen, and

(ii) a second print head mounted for pivotal movement between a first position in which it is in close proximity to said second platen on the side of said second platen that is downward during normal use of said label printer and a second position in which it is spaced from said second platen;

(c) a supply shaft rotatable about a third axis, said third axis being parallel to said first axis and said supply shaft being located in the same vertical volume as is said second platen, a roll of backing sheet on which a large number of labels are attached being mounted on said supply shaft during normal use of said label printer;

(d) a take-up shaft rotatable about a fourth axis, said fourth axis being parallel to said first axis and said take-up shaft being located in the same vertical volume as is said second platen, said take-up shaft serving to take up the backing sheet after removal of the labels during normal use of said label printer;

(e) a label exfoliating member located downstream of said first printing device and upstream of said take-up shaft;

(f) first means for holding a roll of an elongated record medium having a fifth axis such that said fifth axis is parallel to said first axis and the roll of elongated record medium is located in the same vertical volume as is said second platen;

(g) a bidirectional motor having an output shaft that is rotatable about a sixth axis, said sixth axis being parallel to said first axis;

(h) second means for transmitting the rotation of said output shaft in one direction to said first platen and said take-up shaft while not rotating said second platen, thereby issuing printed labels; and

(i) third means for transmitting the rotation of said output shaft to said second platen while not rotating said first platen and said take-up shaft, thereby advancing the elongated record medium.

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**4,747,708**

## SELECTOR DEVICE FOR A CHARACTER-CARRYING ELEMENT ON PRINTING MACHINE

**Pietro Musso, Ivrea, Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy**

**Filed May 23, 1986, Ser. No. 866,254**
**Claims priority, application Italy, May 29, 1985, 67491 A/85**
**Int. Cl.[4] B41J *1/06, 1/26***
**U.S. Cl. 400—144.2** **7 Claims**



1. A selector device for a rotary character-carrying element of a printing machine, comprising spring means; a selector motor for rotating the character-carrying element in both rotational directions; a pinion-gear coupling arrangement disposed between the selector motor and the character-carrying element comprising a pinion and a gear; a fixed support having two spherical bushes and a thrust bearing ball rotatable in the fixed support; a shaft rotatably supported by said two spherical bushes in the fixed support and comprising a flange; wherein the character-carrying element is urged by said spring means against said flange and wherein said shaft cooperates with the thrust bearing ball to absorb the axial thrust of said spring means; wherein said gear is mounted fixedly and coaxially on said shaft which is fixed in respect of rotary movement to said flange and said gear; wherein said fixed support further comprises two pins and said selector motor and a motor shaft on which is fixed said pinion; wherein said selector motor can swing on the fixed support by means of said two pins; wherein the pinion and the gear have teeth which have a reduced addendum with respect to the standard value of the modulus of the teeth and further providing a device for taking up the radial play between the pinion and the gear; wherein said device for taking up the radial play causes the selector motor to tilt in an engagement direction, wherein said device holds the pinion always in engagement and in mesh with the gear, without radial play between the teeth of the pinion and the gear even in the event of wear on the teeth themselves.

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**4,747,709**

## PRINTING APPARATUS WITH VARIABLE IMPACT PRESSURE

**Hiroyuki Ueda, Yokohama, and Mitsuaki Seki, Machida, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 642,738, Aug. 20, 1984, abandoned, which is a continuation of Ser. No. 407,474, Aug. 12, 1982, abandoned. This application Apr. 23, 1986, Ser. No. 858,528**
**Claims priority, application Japan, Oct. 15, 1981, 56-163499**
**Int. Cl.⁴ B41J** *9/00*
**U.S. Cl. 400—157.3** **36 Claims**



1. A printing apparatus comprising:
a typefont structure having a plurality of type members thereon;
a hammer for striking said type members to effect printing;
hammer drive means for driving said hammer and energizable for different durations to control printing impression;
a programmable timer coupled to said hammer drive means for controlling said durations;
input means for inputting desired character information indicating a type member to be selected for printing;
a time table storing a plurality of numbers having values equal to said durations;
retrieving means responsive to information, including the character information, for retrieving desired durations from said time table and for supplying said retrieved desired durations to said programmable timer, said retrieving means including arithmetic means for performing a calculation to generate information for accessing said time table for retrieving the durations;
selection information providing means responsive to desired character information from said input means for providing selection information for the selection of a desired one of said plurality of type members; and
selecting means for performing the selection of said type member in response to the selection information;
said retrieving means being operative, after the selection of said type member by said selecting means and lapse of a predetermined period of time, to access said time table in response to the information from said arithmetic means to retrieve the desired durations therefrom and to supply said retrieved desired durations to said programmable timer; said arithmetic means conducting said calculation to access said time table that stores the plurality of numbers, which have no direct relation to the character information corresponding thereto.

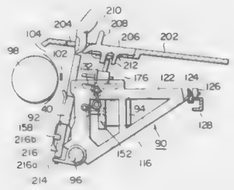
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**4,747,710**

## APPARATUS FOR RECEIVING A TYPE WHEEL CASSETTE IN A PRINTING APPARATUS

**Nobuo Iwata, Sagamihara, and Hiromi Takada, Yokohama, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan**

**Continuation of Ser. No. 708,564, Mar. 6, 1985, abandoned. This application Dec. 19, 1986, Ser. No. 943,719**
**Claims priority, application Japan, Mar. 9, 1984, 59-45078; Jun. 14, 1984, 59-120716**
**Int. Cl.⁴ B41J** *1/30*
**U.S. Cl. 400—175** **6 Claims**



1. A type wheel cassette loading mechanism in a printing apparatus having a platen, a carriage including cassette holding means movable toward and away from said platen, and a top cover pivotable between a closed position covering said platen and said carriage and an open position allowing access to said platen and said carriage, said type wheel loading mechanism comprising:
an opening in said top cover, said opening having a size sufficient to pass a cassette therethrough and being positioned on said cover such that the cassette passing therethrough may only be introduced into said cassette holding means when said cassette holding means is moved away from said platen;
a lid for selectively closing said opening; and
engaging means on said lid and said cassette holding means responsive to the opening of said lid for permitting the cassette to be moved away from said platen and for permitting insertion of said cassette into said cassette holding means.

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**4,747,711**

## CARTRIDGE FOR AN INKED RIBBON WITH A RE-INKING DEVICE

**Carlo Motta, Borgofranco; Aldo Ricca, Rivarolo; Walter Trimboli, and Bruno Fausto, both of Turin, all of Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy**

**Filed Feb. 9, 1987, Ser. No. 12,140**
**Claims priority, application Italy, Feb. 28, 1986, 67166 A/86**
**Int. Cl.⁴ B41J** *32/02, 27/12*
**U.S. Cl. 400—196.1** **6 Claims**

3. A cartridge for an inked ribbon with a re-inking device, comprising a casing having an inked ribbon, a magazine for housing the inked ribbon which is of the closed loop type and is disposed in randomly distributed turns, and a pair of rollers, and in which the re-inking device comprises an ink reservoir, an ink metering means, and an ink housed in the ink reservoir and accommodating means in said casing for accommodating said ink reservoir;
wherein the ink reservoir comprises a parallelepipedic body having an axial recess filled with fibers in which said ink is housed and wherein said body has an open end positioned in correspondence with said pair of rollers and allowing direct access to the fibers filling said body;
wherein the ink metering means has a substantially cylindrical shape and its longitudinal uniform cross-sectional configuration formed with a relatively rigid bunch of capillary filaments of elastic fibers, which are slightly impregnated with a resin, which leaves capillary spaces between the filaments such as to provide for capillary flow of the ink therethrough, wherein said bunch of capillary filaments comprises a first and a second end delimited by a bevelled surface, wherein the first end of the ink metering means is inserted among the fibers of said ink reservoir through the open end and the second end of the ink metering means projects from the first aperture of said parallelepipedic body toward one roller of said pair of rollers, and
wherein the re-inking device further comprises resilient means operative on a lateral portion of the second end of said ink metering means for holding an end of the capillary filaments of said second end to be always engaged and in contact with said one roller for capillary flow of the ink from the ink reservoir to said one roller through said fibers, and said first and second ends of said ink bunch of capillary filaments.



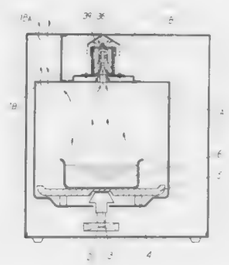
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**4,747,712**

## DEVICE FOR ROTATING AND SUPPORTING A TEMPERATURE PROBE

**Akira Gonoh, and Toshio Masubuchi, both of Nara, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Continuation of Ser. No. 758,230, filed as PCT JP84/00551, Nov. 16, 1984, published as WO85/02456, Jun. 6, 1985, abandoned. This application Apr. 10, 1987, Ser. No. 38,454**
**Claims priority, application Japan, Nov. 22, 1983, 58-219816; Jun. 4, 1984, 59-114971; Jun. 7, 1984, 59-116964; Jun. 7, 1984, 59-116963**
**Int. Cl.⁴ G01K** *13/08;* **H05B** *6/64;* **A47J** *37/04*
**U.S. Cl. 374—149** **8 Claims**



1. A device for rotatably supporting a temperature probe disposed in an oven chamber of an oven for heating materials, said temperature probe having a plug at one end thereof and having another end for insertion into a material to be heated for detecting the temperature thereof, said oven chamber having wall surfaces, comprising
a socket section having a body with means for securing said socket section to one of the wall surfaces of the oven chamber, said body having a top part with a vapor hole formed therein, said socket section further including contact means nonrotatably supported by said body and arranged for rotatably and disengageably supporting said plug, said contact means receiving signals from said temperature probe through said plug; and
preventing means arranged on a portion of a top plate of said oven directly above said vapor hole for preventing waterdrops formed by condensation of vapor ascending through said vapor hole, from falling back through said vapor hole, said preventing means having an inner conical surface with an edge radially extending beyond an area occupied by said socket section arranged therebelow so that water droplets formed by condensation on said inner conical surface run down said inner conical surface and fall outside said area occupied by said socket section.

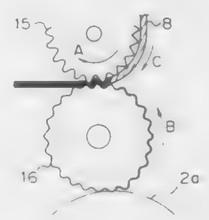
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**4,747,713**

## INK RIBBON CASSETTE INCLUDING GEAR TEETH CONFIGURED TO RE-INK THE RIBBON

**Hiroshi Kikuchi; Takashi Itaya, both of Tokyo, and Masakuni Anada, Fukushima, all of Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan**

**Filed Jun. 24, 1986, Ser. No. 877,965**
**Claims priority, application Japan, Jun. 27, 1985, 60-96748**[U]
**Int. Cl.⁴ B41J** *27/12*
**U.S. Cl. 400—202.4** **9 Claims**



1. In an ink ribbon cassette including a cassette body, an endless ink ribbon, gear means in said cassette body for moving said ink ribbon through said cassette body, said gear means comprising a drive gear and an idle gear having meshing teeth nipping therebetween said ink ribbon, said teeth of said idle gear having tips and bottoms meshing with respective bottoms and tips of said teeth of said drive gear, and ink supply means in said cassette body and in contact with said idle gear for feeding ink to said teeth thereof, whereby said ink then is applied to said ink ribbon during nipping thereof between said idle and drive gears, the improvement of means for ensuring the uniform application of said ink from said teeth of said idle gear to said ink ribbon, said ensuring means comprising:
said tip of each said tooth of said idle gear being pointed; and
said bottom of each said tooth of said idle gear being a portion of a circular arc centered about said tip of the respective meshing tooth of said drive gear, said circular arc having a radius slightly less than the thickness of said ink ribbon.

VOL 1090 ISS 5 MY 31 1988 UMI



4,747,714

## MECHANISMS FOR SELECTIVELY RAISING AND TRANSPORTING PRINT RIBBONS AND CORRECTION TAPES

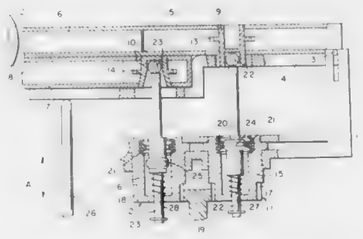
Manfred Moritz, Nuremberg, and Wilfried Rettke, Altodorf, both of Fed. Rep. of Germany, assignors to Ta Triumph-Adler Aktiengesellschaft, Nuremberg, Fed. Rep. of Germany

Filed Oct. 31, 1986, Ser. No. 925,231

Claims priority, application Fed. Rep. of Germany, Nov. 11, 1985, 3539443

Int. Cl.[4] B41J *35/22*

U.S. Cl. 400—214 5 Claims



1. A device for raising and transporting a print ribbon and a correction tape in a typewriter or the like, comprising

a carriage adapted to be moved in print and return directions along a print line,

a platform pivotally mounted on said carriage and mounting a print ribbon cartridge for said print ribbon and a correction tape cartridge for said correction tape, for movement from a rest position to first and second elevated positions to present said print ribbon and correction tape, respectively, at a printing line,

a respective transport means for each of said cartridges to effect feed movement of the associated ribbon or tape,

a first and a second freewheel clutch, each having a respective drive part,

means for driving said drive parts of said first and second freewheel clutches incident to the movement of said carriage in said print direction,

said first and second freewheel clutches each having a respective output part which in the rest position of said platform is normally decoupled from the associated one of said drive parts,

means on each of said output parts for being activated to couple to and to selectively drive the respective transport means in said print ribbon and correction tape cartridges when each said associated output part is respectively driven,

and means for moving said platform from said rest position to each of said elevated positions according to commanded functions,

wherein movement to said first elevated position enables drive transmitting engagement of said output part of said first freewheel clutch with its associated drive part, whereby driving movement thereafter of said drive part of said first freewheel clutch in said print direction causes its associated output part to be driven thereby to transport said print ribbon and,

wherein movement to said second elevated position of said platform disables the drive transmitting engagement of said drive and output parts of said first freewheel clutch and enables the drive transmitting engagement of said drive and output parts of said second freewheel clutch, whereby movement thereafter of said carriage in said print direction causes said drive part of said second clutch to transport said correction tape.

4,747,715

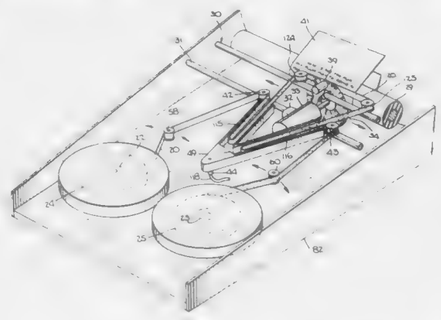
## VACUUM BUFFERED RIBBON TRANSPORT SYSTEM

Roy J. Lahr, Los Angeles, Calif., assignor to Creative Associates, Los Angeles, Calif.

Continuation of Ser. No. 794,961, Nov. 4, 1985, abandoned, which is a continuation of Ser. No. 570,913, Jan. 16, 1984, abandoned. This application Jan. 8, 1987, Ser. No. 4,748

Int. Cl.[4] B41J *35/08, 33/34*

U.S. Cl. 400—248.3 6 Claims



1. In a printer comprising a chassis, a paper support platen mounted on said chassis, a printing carriage for mounting impact printer means, means mounting said printing carriage for translation with respect to said chassis and said paper support platen, ribbon transport system means having a ribbon supply means for a print ribbon and a ribbon take-up means, said ribbon transport system means defining a predetermined ribbon utilization path parallel to the translation of said print carriage with respect to said paper support platen, with said ribbon utilization path being located between said ribbon supply means and said ribbon take-up means and being for use by the impact printer means, the improvement comprising:

vacuum storage chamber means for storing said print ribbon between said ribbon supply means and said ribbon utilization path and between said ribbon utilization path and said ribbon take-up means; and

means for mounting at least a portion of said vacuum storage chamber means for angular displacement with respect to said chassis responsive to translation of said printing carriage with respect to said chassis.

4,747,716

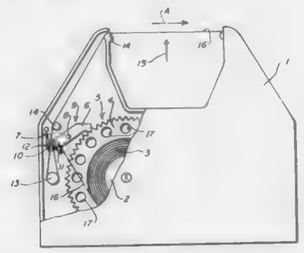
## RIBBON CASSETTE

Jan van der Eikel, Adelsdorf, Fed. Rep. of Germany, assignor to Ta Triumph-Adler Aktiengesellschaft, Nuremberg, Fed. Rep. of Germany

Filed Jan. 12, 1987, Ser. No. 2,745

Int. Cl.[4] B41J *35/36*

U.S. Cl. 400—249 7 Claims



1. In combination with a typewriter having a programmed control unit for generating signals to effect incremental feed of a ribbon and a support for mounting a ribbon cassette;

a sensor mounted on said support;

said ribbon cassette having a rotatably mounted ribbon supply spool supported in a cassette housing between top and bottom walls of said cassette housing;

said ribbon on said supply spool being adapted to be incrementally drawn off for passage past a printing point in response to feed signals from said control unit;

a marking element co-rotating with said supply spool having a plurality of coded markings disposed over a circular path around the rotation of said supply spool and grouped together into code groups and adapted to be sensed in turn by said sensor incident to rotation of said marking element as ribbon is drawn off said supply spool;

said coded markings being angularly spaced from one another by a predetermined angle;

said sensor located for scanning said coded markings and spacing between said coded markings;

said programmed control unit connected to said sensor to determine from said scanning, the type of said ribbon, the end of said ribbon, the amount of said ribbon remaining on said ribbon supply spool, and ribbon feed malfunctions.



4,747,717

## GUIDE MEANS

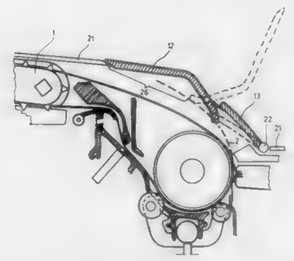
Leif H. Andersson, Åtvidaberg, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Continuation of Ser. No. 839,561, Mar. 14, 1986, abandoned. This application Sep. 15, 1987, Ser. No. 97,420

Claims priority, application Sweden, Mar. 20, 1985, 8501355

Int. Cl.[4] B41J *11/30, 29/10*

U.S. Cl. 400—616.2 3 Claims



1. In a printer of the type having a casing and a tractor feed mechanism for advancing a printing medium to a position on a platen where printing takes place, and operable in a first mode in which the printing medium is directly discharged from the printer, through an opening in said casing, after printing takes place, and a second mode in which the printing medium is brought back into engagement with the tractor feed mechanism after printing for subsequent discharge from the printer, apparatus for automatically guiding the printing medium to one of two positions respectively related to the mode of operation of the printer, comprising:

a first plate disposed in said opening and movable between a first position in which said plate closes at least a portion of said opening to inhibit access to said tractor feed mechanism, and a second position which provides access to said mechanism through said portion of said opening; and

a second plate disposed in said opening and movable between a first position in which said second plate cooperates with said first plate in its first position to form a tapering gap into which the printing medium is automatically advanced after printing and through which the printing medium is directly discharged from the printer, and a second position in which said second plate cooperates with said first plate in its second position to automatically guide said printing medium to said portion of said opening for access thereto.

4,747,718

## AUTOMATIC CUT-SHEET FEEDER FOR PRINTERS

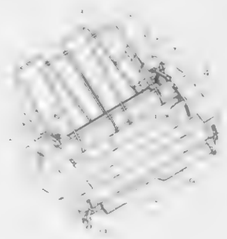
Makoto Shimizu, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 719,142, Apr. 2, 1985, abandoned. This application Jan. 9, 1987, Ser. No. 6,541

Claims priority, application Japan, Apr. 5, 1984, 59-66669

Int. Cl.[4] B41J *11/58*

U.S. Cl. 400—625 8 Claims



1. An automatic cut-sheet feeder used with a printer, comprising:

(a) a hopper for supporting a stack of cut sheets to be printed;

(b) a stacker for supporting a stack of printed cut sheets;

(c) a platen extending in a longitudinal direction and providing a printing surface against which a cut sheet is fed by feeding the cut sheet from said hopper under and around said platen, said printing surface of said platen having a left platen surface edge and a right platen surface edge opposite said left platen surface edge;

(d) a feed path extending from said hopper to said platen for feeding the cut sheets therethrough;

(e) a sensor disposed along said feed path for detecting the cut sheet fed from said hopper;

(f) a print head mounted on a carriage movable in said longitudinal direction, the carriage having means for replaceably mounting an ink ribbon cartridge thereon, said print head being disposed in confronting relation to said printing surface so as to be reciprocally movable leftward toward said left platen surface edge and rightward toward said right platen surface edge when viewed in a direction from said print head toward said platen surface, for printing on the cut sheet disposed around said platen;

(g) an upper sheet guide disposed in close proximity to an upper portion of said platen for delivering the printed cut sheet into said stacker, said upper sheet guide having a width in said longitudinal direction, an ink ribbon cartridge replacement recess being provided in said upper sheet guide, said recess being sized to allow replacement of an ink ribbon cartridge on said carriage and said recess having a left recess edge and right recess edge when viewed in a direction from said print head toward said platen surface, said recess in said upper sheet guide being positioned in said longitudinal direction to the left of the center of said platen such that said right recess edge is closer to said center of said platen than said left recess edge and said left recess edge is positioned to the right of said left platen surface edge;

(h) a front sheet guide mounted on said carriage, said front sheet guide having a width in said longitudinal direction which is less than said width of said upper sheet guide and positioned facing said platen, the front sheet guide being movable together with said print head for preventing a leading end of the cut sheet fed around said platen from being separated from said platen; and

(i) control means for receiving a signal from said sensor

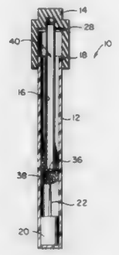
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detecting a cut sheet fed from said hopper and for moving said print head to a position which confronts said ink ribbon replacement recess in said upper sheet guide so that the cut sheet fed from said hopper is fed between said platen and said upper sheet guide without being caught in said recess.

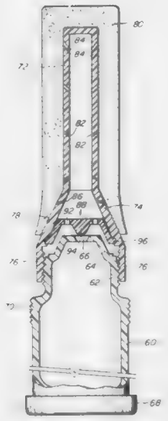
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**4,747,719**
**SWAB APPLICATOR**
**Cole Parkin, 1727 Saint Ann St., Jackson, Miss. 39202**
**Filed Jul. 28, 1986, Ser. No. 889,634**
**Int. Cl.[4] A61M** *35/00;* **A47L** *13/17*
**U.S. Cl. 401—132** **7 Claims**



1. A disposable, individually packaged, self contained swab applicator which comprises: a first elongated tubular member having an absorbent material attached at one end thereof, said first tubular member having a sealed end portion at the end to which said absorbent material is attached, a cap member formed of a resilient material and releasably secured to the other end of said first tubular member, said cap member acting to initially seal said other end of said first tubular member; a second elongated tubular member substantially enclosing said first tubular member, said second tubular member having a closed end portion and an open end portion, said closed end portion being located at the end of said applicator opposite the end at which said cap member is located and having a fixed lance secured thereto and extending inwardly of the second tubular member along the longitudinal axis thereof for use in rupturing the sealed end portion of said first tubular member, said open end portion of said second tubular member being releasably secured within said cap member and movable between first and second axial positions within the interior of said cap member upon the application of force in a direction parallel to the longitudinal axes of said first and second tubular members, whereby said lance is moved to rupture the sealed end portion of said first tubular member, said cap member having a main interior bore or channel in which said second tubular member is releasably secured and with a second interior bore of reduced diameter relative to said main bore in which said first tubular member is releasably secured, said second interior bore extending axially outwardly of said main interior bore and with said other end of said first tubular member extending axially outwardly of said main interior bore and within said second interior bore, so that a seal is provided between said other end of said first tubular member and said cap member even after removal of said second tubular member from said cap member and whereby said cap member can be removed from said first tubular member for use of said applicator.

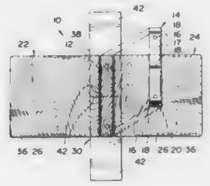
**4,747,720**
**SPONGE APPLICATOR AND VALVE**
**Deanis W. Belichumeur, 2765 Bouffard Rd., Windsor, Ontario, Canada N9H-1W3, and Gary E. Schultz, 16205 Stricker East, Detroit, Mich. 48021**
**Continuation-in-part of Ser. No. 544,628, Oct. 24, 1983. This application Sep. 13, 1985, Ser. No. 775,765**
**Claims priority, application Canada, Oct. 27, 1982, 414298**
**Int. Cl.[4] A45D** *34/00;* **B05C** *17/00;* **A47L** *13/16*
**U.S. Cl. 401—205** **8 Claims**



1. An applicator for applying liquid to a person's body, comprising:
a storage container for the liquid to be applied, said storage container having an aperture defined in an upper end thereof and a neck portion with a threaded outer surface;
an elongated, fluid transmission tube including walls extending axially upwardly from said upper end of said container said tube having a lower end with a threaded inner periphery for engaging the threaded outer surface of the neck portion of said storage container and a plurality of apertures defined in the walls thereof for passage there through of liquid from the interior of said tube;
sponge means for receiving liquid from said tube and including a liquid permeable sleeve coaxially mounted on and supported by said elongated tube, said sponge means enveloping substantially the full length of said tube; and
valve means for controlling flow of liquid from said container to said tube and including a disc detachably coupled to the lower end of said tube and having a plurality of openings defined therein and a stem portion depending from said disc for cooperation with said aperture in the upper end of said storage container so that rotation of the lower end of said tube on its threaded connection with said container neck, raises or lowers said stem portion into or out of engagement with said aperture and wherein said lower end of said tube further includes a frusto-conical section intermediate the threaded portion thereof and the portion supporting said sponge means and a peripheral channel formed in said frusto-conical section and wherein said disc further includes a frusto-conical wall portion in surface contact with said frusto-conical section of said tube and a peripheral rim snap-fitted into said channel whereby said valve means is quickly detachable for cleaning.



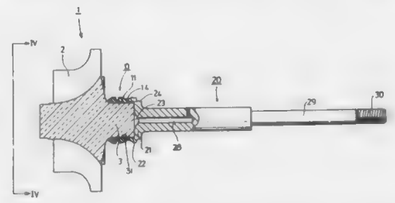
**4,747,721**
**OPENABLE RING TYPE LOOSE-LEAF NOTEBOOK**
**Richard C. Horian, 889 Cutler Rd., Longwood, Fla. 32779**
**Filed Jan. 27, 1987, Ser. No. 7,103**
**Int. Cl.[4] B42F** *13/00;* **B42D** *3/00;* **B42C** *7/00*
**U.S. Cl. 402—73** **8 Claims**



1. A loose-leaf notebook comprising: an elongated spine having top and bottom edges that define a length of the spine, the spine having a pair of side edges that extend between the top and bottom edges thereof to define a generally uniform width, the spine having inner and outer surfaces that each extend between the top, bottom, and side edges; front and back cover flaps each of which has top and bottom edges that are spaced from each other substantially the same distance as the length of the spine, each cover flap having an inner edge located adjacent one side edge of the spine and also having an outer edge, each cover flap being made from plywood of a uniform thickness to provide a lightweight, high strength, rigid construction, each cover flap having an inner surface and also having an outer surface of exposed wood to facilitate writing on the outer surface and to provide the exterior of the closed notebook with an aesthetically appealing appearance; a hinge including an elongated strip having adhesive on one side, said hinge strip having a length and width greater than the length and width of the spine, said hinge strip being adhered to the outer surface of the spine and extending beyond the top, bottom, and side edges of the spine, the hinge strip being adhered to the cover flaps adjacent the inner edges thereof, the hinge strip being folded over the top and bottom edges of the spine and cover flaps and being adhered to the inner surface of the spine and the inner surfaces of the cover flaps adjacent the inner edges thereof; and an alongated ring assembly secured to the inner surface of the spine with the hinge strip located therebetween, and said ring assembly including a plurality of openable rings for detachably securing loose-leaf pages in the notebook.

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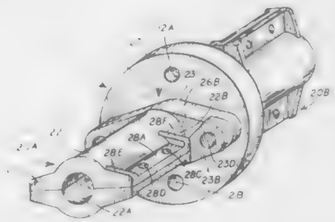
**4,747,722**
**METAL-CERAMIC FITTING ASSEMBLY**
**Yasunobu Kawaguchi, Tokyo; Toshiaki Muto, and Tatsuo Ichinokawa, both of Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**
**Filed Dec. 19, 1985, Ser. No. 811,160**
**Claims priority, application Japan, Dec. 19, 1984, 59-191479[U]; Dec. 22, 1984, 59-194618[U]**
**Int. Cl.[4] F16B** *9/00;* **F01D** *5/28*
**U.S. Cl. 403—30** **6 Claims**



1. A metal-ceramic composite body including a member formed of ceramic material having a generally cylindrical boss extending from the surface of said member to a free leading end and a shaft formed of a metal material whose coefficient of thermal expansion is greater than that of said ceramic material, and means for connecting said shaft to said boss, comprising:
a cup-shaped end on said shaft defined by a recess on said shaft receiving the leading end of said boss and a sleeve affixed to said shaft end, said sleeve having a through-opening coaxially aligned with said recess in said shaft to enclose said boss and being formed of a metal whose coefficient of thermal expansion corresponds substantially with that of said ceramic material, and bearing means interposed between facing surfaces of said connecting means and said boss for imposing a compressive force about the surface of said boss that increases in magnitude axially along said boss toward the leading end thereof upon heating said composite body and subsequent cooling thereof.

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**4,747,723**
**UNIVERSAL JOINT COUPLING**
**George E. Hasley, P.O. Box 2062, Hastings, Nebr. 68901**
**Filed Feb. 6, 1987, Ser. No. 11,883**
**Int. Cl.[4] F16B** *2/02, 7/04*
**U.S. Cl. 403—337** **6 Claims**



1. A universal joint, comprising:
means of flexible material for transmitting torque, having first and second planar opposing faces;
a first base means of rigid material having a planar underside and a planar upper side, parallel to each other, wherein said first base means is comprised of two equal half sections which are divided by a first longitudinal plane, said first longitudinal plane being perpendicular to said planar underside, including:
a lower wing means affixed to one side of each half-section of said first base means, said lower wing means having a planar underside coplanar with the underside of said half-section of said first base means and a planar upper side which is within a second imaginary plane which is perpendicular to said first longitudinal plane, said lower wings means extending on either side of said first longitudinal plane approximately the same distance;
an upper wing means affixed to the side of each half-section of said first base means which is opposite said lower wing means, said upper wing means having a planar underside which is adjacent to said second imaginary plane extending on either side of said first longitudinal plane the same distance as said lower wing means extends; and
means for removably affixing said upper wing means and said lower wing means of one said half-section of said first base means to the lower wing means and the upper wing means, respectively, of the other said half-section of said first base means;
means for removably affixing said first base means to the first planar face of said torque transmitting means;
means for removably affixing to said upper side of said first base means a free end of a first shaft, such that the axis of said first shaft lies in said first longitudinal plane and is

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centered between said upper and lower wings of each said half-section of said base means when said respective upper and lower wing means are affixed to each other;

a second base means identical to said first base means;

means for removably affixing said second base means to the second planar face of said torque transmitting means such that its pairs of upper and lower wings will be oriented at 90 degrees to those of said first base means; and

means for removably affixing to the upper side of said second base means a free end of a second shaft, such that the axis of said second shaft extends coaxially with the axis of said first shaft.

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**4,747,724**

**LINK CONNECTING STRUCTURE**

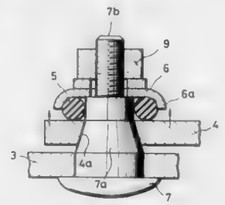
**Masami Nishikawa, Toyoake; Masanobu Ishikawa, Nagoya; Hakumi Ishii, and Sumio Takizawa, both of Toyota, all of Japan, assignors to Aishin Seiki Kabushiki Kaisha and Toyota Jidosha Kabushiki Kaisha, both of Aichi, Japan**

**Filed Mar. 27, 1986, Ser. No. 844,566**

**Claims priority, application Japan, Mar. 30, 1985, 60-67506**

**Int. Cl.⁴ B25G** *3/00*

**U.S. Cl. 403—388** **16 Claims**




1. A link connecting structure comprising

a first link member;

a second link member operatively connected to said first link member;

a connecting pin means disposed between said first and second link members and having a tapered outer peripheral surface disposed in a complementary tapered hole provided in said second link member;

a resilient means disposed on said second link member for always urging said second link member in the direction of said first link member; and

a cover member provided on said resilient means for enclosing said resilient means and for holding said resilient means in place on said second link member;

wherein said connecting pin means includes a shoulder for receiving the cover member and for restricting axial movement of the cover member in one direction toward the tapered surface of the connecting pin means.

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**4,747,725**

**DEVICE FOR POLE-SHAPED ELEMENTS**

**Sven R. V. Gebelius, Box 15008, Bromma, Sweden (S-161 15)**

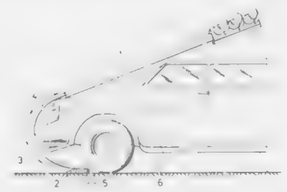
**Continuation of Ser. No. 764,255, filed as PCT SE84/00424, Dec. 12, 1984, published as WO85/02636, Jun. 20, 1985, abandoned. This application Jan. 15, 1987, Ser. No. 5,340**

**Claims priority, application Sweden, Dec. 13, 1983, 8306871**

**Int. Cl.⁴ E01F** *9/01*

**U.S. Cl. 404—10** **10 Claims**

1. A vehicle-arresting pole structure for arresting a vehicle of predetermined height in response to a collision of the vehicle with the structure comprising a base assembly, an upright mounted on the base assembly for separation therefrom in response to a collision from the vehicle, the upright being of sufficient height related to the height of the vehicle for falling toward the vehicle responsive to the collision, and at least one elongate, flexible, strap element having one end fixedly attached within the upright and another end fixedly attached within the base assembly, the strap element being compacted lengthwise on itself within the structure for non-retractable lengthwise extension thereof responsive to the collision accompanied by increasing separation of the upright from the base assembly, the strap member having a fully extended length




sufficient to provide a length of strap between the upright and the base member forming a vehicle engaging and arresting loop.

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**4,747,726**

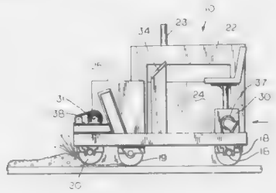
**CONCRETE SCREEDING MACHINE**

**James D. Garner, 126 Kings Chapel Rd., and John M. Hinnant, 3973 Belair Rd., both of Augusta, Ga. 30907**

**Filed Dec. 29, 1986, Ser. No. 947,513**

**Int. Cl.⁴ E01C** *19/29*

**U.S. Cl. 404—123** **3 Claims**




1. A concrete screeding machine comprising a frame; a pair of rollers mounted to said frame for rotation in one rotary direction about parallel axes passing to a reference support plane tangential to said rollers, motor means supported on said frame for driving at least one of said rollers in said one rotary direction; means for selectively lifting opposite ends of said one roller momentarily above said reference support plane in steering the machine that comprises a pair of hydraulic cylinders mounted to opposite sides of said frame and a pair of hinge plates each pivotably mounted at one point to said frame for pivotable movement about a common axis oriented substantially parallel to said one drive roller to each of which plates one of said hydraulic cylinders is operatively connected and to which plates opposite ends of said one roller are journalled; a screed roller mounted to a forward portion of said frame for rotation passing above said reference support plane; and means for driving said screed roller in a rotary direction opposite to said one rotary direction.

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**4,747,727**

**ANCHOR ROD ASSEMBLY SECURED BY HARDENABLE MASS**

**Oliver Berchtold, Grabs, and Alfred Tobler, Ruggell, both of Switzerland, assignors to Hilti Aktiengesellschaft**

**Filed Jun. 23, 1987, Ser. No. 65,365**

**Claims priority, application Fed. Rep. of Germany, Jun. 23, 1986, 3620972**

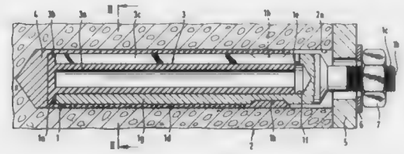
**Int. Cl.⁴ E21D** *20/02*

**U.S. Cl. 405—260** **11 Claims**

1. Anchor rod assembly, including an axially elongated anchor rod having an outer axially extending circumferential surface and arranged to be secured in a borehole formed in a receiving material by introducing a hardenable mass into the borehole around the anchor rod, said anchor rod having a



leading end inserted first into the borehole and a trailing end arranged to be positioned outwardly from the borehole, means adjacent the trailing end of said anchor rod for attaching a load on the trailing end, said anchor rod including an axially extending attachment region extending from the leading end toward the trailing end and arranged to be located within the borehole, said attachment region comprising a plurality of axially extending segments, wherein the improvement comprises that said segments are spaced apart in the circumferential direction of said anchor rod forming slots between adjacent said segments with said slots extending radially inwardly from said outer circumferential surface, and means located in said slots between adjacent said segments for forming a closure of said slots at the outer circumferential surface.



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**4,747,728**

**METHOD FOR DISTRIBUTING AN AQUEOUS SOLUTION CONTAINING A PEROXYGEN IN CLAY**

**Robert D. Norris, East Windsor; Richard A. Brown, Lawrenceville, and Joseph C. Richards, Robbinsville, all of N.J., assignors to International Technology Corporation, Torrence, Calif.**

**Filed Aug. 25, 1986, Ser. No. 900,048**

**Int. Cl.⁴ E02D** *3/12*

**U.S. Cl. 405—263** **17 Claims**

1. A process for distributing a peroxygen through particulate matter containing clay without swelling the clay comprising incorporating a compound selected from the group consisting of a salt of a perborate or a persulfate anion into water to form an aqueous solution absent a colloidal agent to impart a high viscosity, and introducing the aqueous solution into the particulate matter containing clay.

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**4,747,729**

**MOVABLE TRESTLE**

**Ernst Urschitz, Amstetten, Austria, assignor to Voest-Alpine Aktiengesellschaft, Linz, Austria**

**Filed Jan. 12, 1987, Ser. No. 2,248**

**Claims priority, application Austria, Jan. 22, 1986, 145/86**

**Int. Cl.⁴ E21D** *23/00*

**U.S. Cl. 405—296** **8 Claims**



1. Movable trestle of approximately rectangular horizontal projection for supporting the roof in underground cavities, in particular for securing the excavation edge when recovering pillers in coal mining, comprising:

a cap supported against a base frame by hydraulically extensible props extending approximately in vertical direction to stratification;

shielding means for preventing ingress of rubble into the interior of the trestle at the rear side of the trestle and at both sides of the trestle adjoining its rear side;

fixedly arranged shielding means for covering the lower portion of the trestle;

movable shielding means proximate to the extensible portion of the trestle, the movable shielding means formed of a plurality of horizontal protective plates, each plate having an outer side and each plate being guided for being slidably movable in height direction by means of a plurality of sliding plates arranged at that side of the protective plates which is facing the interior of the trestle, said protective plates moving so that a respective upper plate overlaps an associated lower protective plate at its outer side.

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**4,747,730**

**TRESTLE BEING DISPLACEABLE ON CATERPILLAR**

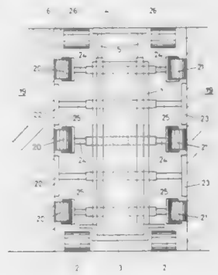
**Ernst Urschitz, Amstetten, Austria, assignor to Voest-Alpine Aktiengesellschaft, Linz, Austria**

**Filed Jan. 8, 1987, Ser. No. 1,466**

**Claims priority, application Austria, Jan. 22, 1986, 146/86**

**Int. Cl.⁴ E21D** *23/08*

**U.S. Cl. 405—298** **6 Claims**



1. A trestle being movable on a floor chassis comprising driveable caterpillars and having an approximately rectangular horizontal projection and serving the purpose of supporting the roof in underground cavities, in particular serving the purpose of securing the excavating edge when recovering pillars in coal mining, said trestle comprising a roof cap being supported against the base frame by hydraulically expandable props extending approximately vertically relative to stratification, characterized in that the trestle has, referred to the travelling direction of its floor chassis (2), at its both sides supporting plates (7, 8; 10, 11; 16, 17; 22, 23) and/or horizontal driveable caterpillar chassis (13, 14; 20, 21) being supported against the frame (1) of the trestle and being adjustable in outward direction.

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**4,747,731**

**AUTOMATIC POWDER FEEDING APPARATUS**

**Hideo Nagasaka, 2-21-33, Minamikohya-cho, Hitachi-shi, Ibaraki-ken; Tsutomu Itoh, Tokyo; Tadao Morita, Chiba, and Masahiro Yamamoto, Sakura, all of Japan, assignors to Hideo Nagasaka, Ibaraki and Onoda Cement Co., Ltd., Yamaguchi, both of, Japan**

**Filed Mar. 17, 1987, Ser. No. 27,187**

**Claims priority, application Japan, Mar. 25, 1986, 61-66644**

**Int. Cl.⁴ B65G** *53/66*

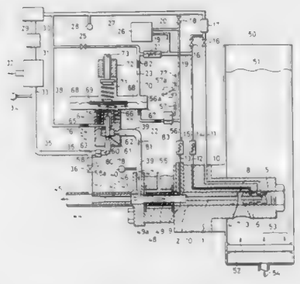
**U.S. Cl. 406—14** **12 Claims**

1. An automatic powder feeding apparatus including a sensor nozzle for blowing a carrier fluid into an inlet of a detector tubular passageway having an inlet and an outlet, means for introducing powder to said tubular passageway, means for detecting a pressure difference between an inlet side pressure

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detecting port provided upstream of the outlet of said sensor nozzle and an outlet side pressure detecting port provided at the outlet of said detector tubular passageway, means for shunting a part of said carrier fluid to said inlet side pressure detecting port and regulating the pressure at the outlet of the detector tubular passageway, means for regulating the pressure at the inlet of the detector tubular passageway, said means for regulating the pressure at the outlet of the detecting tubular passageway being an injector connected by way of a valve to said outlet of the detector tubular passageway, and an auto-



matic control valve having said pressure difference applied as its input and a flow rate of a driving fluid of said injector issued as its control output and including means for presetting a set value corresponding to said pressure differcnce; characterized in that said automatic control valve and said output said pressure detecting port are connected to each other by a three-way valve, having three connecting ports with the automatic control valve connected to a first one of said ports of the three-way valve and the output side pressure detecting port connected to a second one of said ports of the three-way valve.

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**4,747,732**

**CLOSED APPARATUS WITH POTENTIAL FLUIDIZATION FOR HORIZONTALLY CONVEYING POWDER MATERIAL IN A DENSE BED**

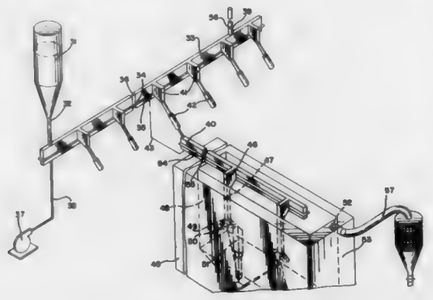
**Jean-Pascal Hanrot, Aix En Provence, and Jacky Volpeliere, Gardanne, both of France, assignors to Pechiney, France**

**Continuation of Ser. No. 816,123, filed as PCT FR84/00112, Apr. 20, 1984, published as WO85/04676, Oct. 24, 1985, abandoned. This application Jun. 3, 1987, Ser. No. 59,159**

**Claims priority, application France, Apr. 12, 1984, 84 06017**

**Int. Cl.[4] B65G** *53/22*

**U.S. Cl. 406—89** **4 Claims**



1. In a closed apparatus system of potential-fluidization type for conveying powder materials, comprising a storage region, a supply region, said supply region including a reserve container for receiving powder materials, at least one horizontal conveyor located between said regions, said conveyor being formed by a duct having a lower gas receiving portions, an upper portion for permitting flow of the powder materials and a porous, gas permeable wall disposed between said duct portions, at least one pipe for supplying the lower duct portion with gas to establish a fluidization gas pressure in a conveyor and at least one balancing column having a cross-sectional area which is determined as a proportion of the total area of said porous, gas permeable wall and is filled with said powder material to a height sufficient to counterbalance the fluidization gas pressure, the improvement which comprises at least one lateral opening disposed in said reserve container and positioned above the level for filling said reserve container with powder thereby to establish a pressure equilibrium between the inside and outside of said container.

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**4,747,733**

**ELECTRIC DRILL'S CHUCK KEY HOLDING DEVICE**

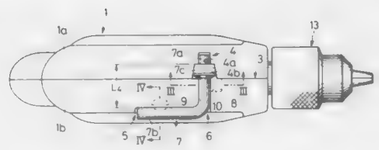
**Shumi Akazawa, Hiroshima, Japan, assignor to Ryobi Ltd., Hiroshima, Japan**

**Filed Feb. 3, 1987, Ser. No. 10,599**

**Claims priority, application Japan, Feb. 3, 1986, 61-14691[U]**

**Int. Cl.[4] B23B** *45/00*

**U.S. Cl. 408—241 R** **6 Claims**



1. A chuck key holding device in a rotary tool, for holding an L-shaped chuck key including an L-shaped rod forming one leg having thereon a radially enlarged gear part, and a second leg forming a grip part of said chuck key, said tool comprising:

two half housings joined together along a junction plane to form a tool body having a top and laterally opposite sides; said chuck key holding device comprising:

a first recess or receiving a gear part of a chuck key, said first recess being formed in said two half housings perpendicular to and crossing said junction plane; said first recess being in the form of transverse groove opening upwardly to the periphery of the tool body and having a radially enlarged portion intermediate of the ends thereof for receiving said gear part of said chuck key;

a second recess for receiving said grip part of said chuck key, said second recess being formed in one of said half housings extending longitudinally along said tool body intersecting said first recess and being substantially perpendicular to said first recess; said second recess consisting of a longitudinal groove opening upwardly in the same direction as said transverse groove and intersecting at one end, said transverse groove at one of said sides of said tool body;

a first elastic member protruding into said second recess for elastically holding said grip part against a surface of said second recess, and a second elastic member protruding into said first recess from a wall of said first recess in the opposite direction to which said second recess extends whereby, said one leg and said gear part of said chuck key is resiliently secured in said first recess by inserting said one leg into said recess past said second elastic member and said chuck key is rotated about the axis of said one leg until said second leg moves into said second recess past said first elastic member.



**4,747,734**

**PROFILING APPARATUS**

**Kensuke Ide, and Hiroshi Yamaji, both of Hiroshima, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Nov. 22, 1985, Ser. No. 801,067**

**Int. Cl.[4] B23Q** *35/04;* **G05B** *19/18*

**U.S. Cl. 409—99** **2 Claims**

1. A profiling apparatus for machining purposes by tracing a profiling surface on a model by means of a tracer head and driving electric motors provided on X-Y feed shafts of a machine tool which comprises:

(a) a first arithmetic means for calculating a vector component of said profiling surface projected on an X-Y plane in accordance with a signal from said tracer head,

(b) a second arithmetic means for calculating, on the basis of an output signal from said first arithmetic means, a profiling direction, a circumferential direction, as a pick feed direction, of a circle of curvature formed of a curve projected on the X-Y plane thus profiled and such a pick-feed quantity so as to assume a given pick-feed quantity on said curve,

(c) means for distributing an output from said second arithmetic means in components of directions of said X-Y shafts, and

(d) means for amplifying an output of each of direction components of said X-Y shafts so as to drive each of said electric motors.

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**4,747,735**

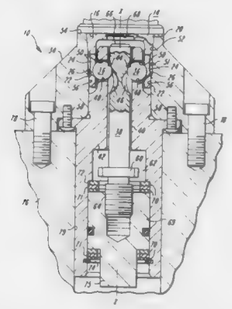
**TOOLHOLDER AND METHOD OF RELEASABLY MOUNTING**

**Robert A. Erickson, Raleigh, N.C.; Rainer von Haas, Geesthact, Fed. Rep. of Germany; Norbert Reiter, Mettmann; Hans W. Tack, Velbert, both of Fed. Rep. of Germany, and James W. Heaton, Raleigh, N.C., assignors to Kennametal Inc., Latrobe, Pa. and Krupp Widia GmbH, Essen, Fed. Rep. of Germany**

**Filed Jan. 27, 1987, Ser. No. 7,070**

**Int. Cl.[4] B23C** *5/26;* **B23B** *29/12*

**U.S. Cl. 409—234** **14 Claims**



1. A toolholder for mounting on a tool support member having a bore extending rearwardly therein and a forwardly facing surface thereon, said toolholder comprising:

a forward end for receiving a tool;

a shank receivable in said bore and extending rearwardly from said forward end;

a rearwardly facing face on said toolholder for abutment with said forwardly facing surface;

said shank having a first section dimensioned to provide a resilient interference fit of at least 0.0005 inches with said bore when said rearwardly facing face is in abutment with said forwardly facing surface;

said shank having a second section resiliently expansible for abutment with said bore rearwardly of said first section.

**4,747,736**

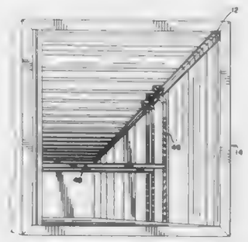
**DECK HANGER FOR AN INTERMODAL CONTAINER**

**George D. Krieps, Wauconda, Ill., assignor to White Welding and Mfg., Inc., Kenosha, Wis.**

**Filed Dec. 22, 1986, Ser. No. 944,041**

**Int. Cl.[4] B63B** *25/24*

**U.S. Cl. 410—54** **10 Claims**



1. A vertically suspended hanger means which provides for placement of at least one temporary deck in the normally open cargo area of an intermodal container means that includes wall and top rail means, comprising:

a hook end means which fits over and engages the top rail means;

a link means pivotally secured to said hook end means whereby said link means releaseably engages said top rail means at a point opposite that engaged by said hook end means; and

hanger strap means pivotally secured to said link means and extending downwardly coextensively with the surface of said wall means of said intermodal container means, such that as load is placed upon said hanger strap means, the gripping force of said hook end means and said link means on said top rail means increases.

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**4,747,737**

**FIXING DEVICE FOR MOUNTING OBJECTS ON SUPPORTS**

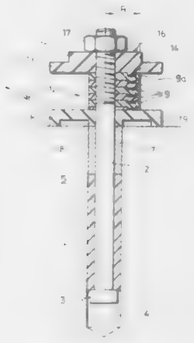
**Franciscus Roffelsen, Helmond, Netherlands, assignor to Spiro Research B.V., Helmond, Netherlands**

**Continuation of Ser. No. 667,014, Nov. 1, 1984, abandoned. This application Dec. 22, 1986, Ser. No. 945,192**

**Claims priority, application Fed. Rep. of Germany, Nov. 3, 1983, 3339765**

**Int. Cl.[4] F16B** *13/04;* **F16L** *3/08*

**U.S. Cl. 411—34** **11 Claims**



1. In a fixing device for mounting an object on a support, such as for mounting heating elements or convectors, comrpising a fastening element including an adjsutment mounting flange and an adjusting eccentric, said fastening element ar-

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ranged to be installed into a bore in the support on which the object is to be mounted, the object to be mounted has a bore therethrough arranged to be in general alignment with the bore in the support, wherein the improvement comprises that said fastening element comprises an axially elongated bolt having a first axially extending section arranged to extend into the bore in the support and a second axially extending section arranged to extend out of the bore in the support and through the bore in the object, said adjustment mounting flange (13) is positioned on the second axially extending section so that it is spaced outwardly from the support, an inner flange (8) located on the second axially extending section between said mounting flange (13) and the support, said inner flange (8) spaced axially from said mounting flange, said adjusting eccentric (12) is mounted on said bolt between said inner flange and said mounting flange, said adjusting eccentric (12) being eccentric to said bolt and said inner and outer mounting flanges, said inner flange having a pair of opposite surfaces extending transversely of the axial direction of said bolt with one surface arranged to bear against the support surface and the other surface arranged to bear against said adjusting eccentric, said adjusting eccentric (12) being rotably mounted on said bolt (2) and arranged to extend through and contact the surface of the bore in the object to allow for any inaccuracy in the relative positions of said bolt and the bore in the object, and said eccentric includes a plurality of discs arranged face to face, means rotatably mounting said discs on said bolt and means keying said discs together for simultaneous rotation on said bolt.

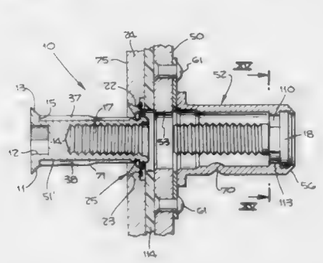
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**4,747,738**

## CAPTIVE PANEL FASTENER ASSEMBLY

**John A. Duran, Glendora, Calif., assignor to Avilbank Mfg., Inc., Burbank, Calif.**

**Filed Oct. 3, 1986, Ser. No. 914,884**
**Int. Cl.[4] F16B *21/18***
**U.S. Cl. 411—353** **29 Claims**



1. In a captive panel fastener assembly comprising a threaded shank portion, an enlarged head at one end of the shank portion, a retaining member including a grommet assembly trapping a generally C-shaped spring ring therein, said ring adapted to rotate together with said shank portion and having a main arcuate body portion terminating in inwardly extending ends, said shank portion having at least a pair of longitudinally extending slots receiving therein the ends of said ring therein whereby, when said ring is at the terminal end of said shank portion, the remainder of said shank portion and said head extend away from said ring, and when the ends of said ring are moved axially along said shank portion in said slots, said ring abuts against said head with the remaining portion of said shank portion extending away from said ring, said bolt being adapted to engage a receptacle assembly mounted in an adjacent subpanel, the improvement which comprises:

said slots extending from the head of said fastener to the terminal end thereof, and an enlargement along each of said pair of slots adjacent the terminal end of said shank portion but spaced therefrom, the outer diameter of said shank portion through the portion of said slots between said enlargement and the terminal end of said shank portion being substantially the same as the outer diameter of said shank portion through the portion of said slots between said enlargement and the head of said fastener, the outer diameter of said shank portion at said enlargement being substantially greater than the outer diameter of the remaining portions of said shank portion whereby said ring is adapted to grab down within the area of said slots between said enlargement and the terminal end of said shank portion to maintain said shank grommet assembly, said grommet assembly being comprised of a retainer portion and a grommet portion, said retainer portion and said grommet portion forming an annular member trapping said ring therebetween, said grommet portion having an internal shoulder receiving said ring thereagainst with said retainer portion abutting against said ring, said grommet portion further including at least a pair of bendable fingers extending from said shoulder, one of said fingers being adapted to overlie and bear against said retainer portion to sandwich said ring between said grommet portion and said retainer portion, the other of said fingers being adapted to overlie and bear against a panel in which said fastener may be assembled.

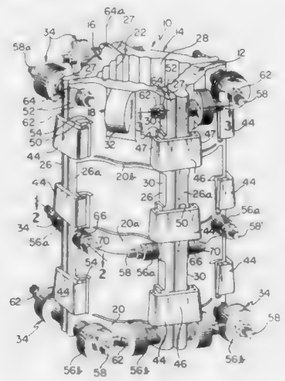
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**4,747,739**

## INGOT MOLD AND METHOD

**Harold M. Bowman, 18867 N. Valley Dr., Fairview Park, Ohio 44126, and Thomas P. Kicher, 1083 Hillrock Dr., South Euclid, Ohio 44121**

**Continuation of Ser. No. 520,135, Aug. 3, 1983, abandoned, which is a division of Ser. No. 266,382, May 22, 1981, Pat. No. 4,416,440, which is a continuation-in-part of Ser. No. 78,447, Sep. 24, 1979, Pat. No. 4,358,084, which is a continuation-in-part of Ser. No. 3,093, Jan. 15, 1979, Pat. No. 4,269,385, which is a continuation-in-part of Ser. No. 669,650, Jun. 24, 1976, abandoned, which is a continuation-in-part of Ser. No. 600,060, Jul. 29, 1975, abandoned. This application Oct. 14, 1986, Ser. No. 918,571**
**Int. Cl.[4] F16B *33/00***
**U.S. Cl. 411—368** **6 Claims**



1. A pair of disc-type fastener assemblies adapted for assembly in vertically spaced relation and with ingot mold wall sections for clamping the wall sections together along generally vertically extending juncture surfaces, said assemblies being capable of applying to the juncture surfaces of the mold wall sections a predetermined amount of force generally adjacent the upper and lower ends of the ingot mold, each said assembly comprising an elongated longitudinally extending tie member having means adjacent at least one end thereof for adjusting the effective length of said tie member, and a plurality of sets of centrally apertured Belleville disc springs mounted on said tie member, with the latter extending through the respective aperture in each disc spring, each said assembly



when installed on adjacent mold wall sections being adapted for preloading by adjustment of said means on the end of said member for maintaining engagement between the confronting surfaces of said sets and for maintaining the juncture surfaces of the adjacent ingot mold wall sections in generally engaged abutting condition until the completion of filling of the mold cavity with molten metal and the formation of an ingot skin on the produced ingot having sufficient structural integrity to support the molten interior of the ingot, after which said disc springs will compress further to permit separation of the mold wall sections juncture surfaces, thus limiting the stresses applied to the mold wall sections during pouring of the ingot in the mold and solidification of the ingot, said predetermined preloading amount of force being determined by combining the total force of fluid static loading with the total forces for restricting free thermal deformation of the mold wall sections occurring during the pouring of molten metal into the mold in order to prevent leakage of molten metal from between the mold wall sections, said predetermined preloading being determined by the formula

$$P = \frac{-3M_T w (x^2 + y^2)}{2.828\ l^3}$$

where P represents the approximate predetermined preloading force for the fastener assembly to restrict the free thermal deformation of the mold wall sections, $M_T$ is the thermal moment at the time generally coinciding with the filling of the mold cavity to a predetermined extent with molten metal and the formation of an ingot skin on a poured ingot, w is the width of the associated mold wall section, x and y are the coordinates of the outermost corner of the mold wall section, and l is the vertical distance between the uppermost and lowermost spring fastener assemblies on the mold, said free thermal deformation being determined by the formula

$$W = \frac{-3M_T}{4Eh^3} (x^2 + y^2)$$

where W represents the thermal bending deformation of the associated mold wall section, $M_T$ is the thermal moment at the time generally coinciding with the filling of the mold cavity to a predetermined extent with molten metal and the formation of an ingot skin on a poured ingot having sufficient structural integrity to support the molten interior of the ingot, x and y are respectively the x and the y coordinates of the outermost corner of the mold wall section, E is the modulus of elasticity of the mold wall section, and h is the thickness of the mold wall section, said spring fastener assembly being adapted to provide an extent of yielding movement in response to loading beyond the preloaded condition due at least in part to increased thermal moment in the mold wall sections after formation of the ingot skin, that accommodates the thermal bending deformation of the mold wall sections as determined by the latter mentioned formula and where $M_T$ is now the increased thermal moment of the mold wall sections.

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**4,747,740**

## SYSTEM FOR SETTING THE VERTICAL POSITION OF THE ROUNDING BAR IN A BOOK BLOCK ROUNDING AND BACKING MACHINE

**Karl-Ludwig Rabe, Preussisch Oldendorf, Fed. Rep. of Germany, assignor to Kolbus GmbH & Co. KG, Rahden, Fed. Rep. of Germany**

**Filed Apr. 24, 1987, Ser. No. 42,308**
**Claims priority, application Fed. Rep. of Germany, Apr. 26, 1986, 3614168**
**Int. Cl.[4] B42C *13/04***
**U.S. Cl. 412—11** **20 Claims**

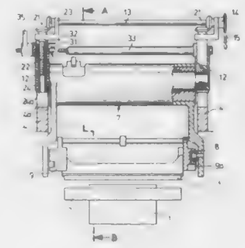
1. A book block rounding and backing machine comprising:

a frame;

an intermediate support member connected to the frame and having a stop surface thereon;

a support-bearing unit, said unit including means for mounting the unit to the intermediate support member and for permitting free relative vertical movement of the unit within the frame, the downward position of the unit relative to the frame being limited by said stop surface, said unit further including a rounding bar mounted for reciprocating motion while bearing upon the spine of a book block to be positioned beneath the bar;

means for adjusting the vertical position of the intermediate support member relative to the frame, whereby the unit



can be lowered toward the spine of a book block, while the dead weight of the unit is supported by said stop surface;

means for detecting a predetermined vertical displacement of the unit relative to the frame, indicative of the transfer of the dead weight of the unit from said stop surface to the spine of the book block; and

clamping means responsive to the means for detecting, for immobilizing the unit relative to the frame upon the occurrence of said predetermined vertical displacement, whereupon the reciprocating motion of the rounding bar on the spine of the book can be initiated.

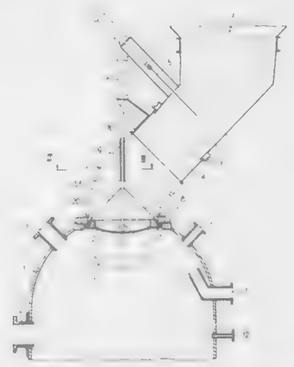
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**4,747,741**

## DEVICE FOR CLOSING THE CHARGING OPENING FOR PRESSURE RESISTANT CONTAINERS

**Johann Stadler, Hellmonsödt, Austria, assignor to Voest-Alpine Aktiengesellschaft, Vienna, Austria**

**Filed Dec. 20, 1982, Ser. No. 451,051**
**Int. Cl.[4] C10B *31/04***
**U.S. Cl. 414—202** **10 Claims**



1. A closure device for the charging opening of a pressure resistant autoclave, the charging opening having an inwardly extending annular rim forming a sealing surface with a closure member, an annular sealing element situated on the annular rim, the annular rim further provided with at least one outlet

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for blowing pressurized air onto the sealing surface of the annular rim and a sealing surface of the closure member thereby removing adhering debris, the closure device further provided with a drive means supported outside of the autoclave for opening and closing the closure member, the closure being lowered into the interior of the autoclave during the opening stage.

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**4,747,742**

## UNLOADING FLAP FOR POURABLE PARTICULATE MATERIAL

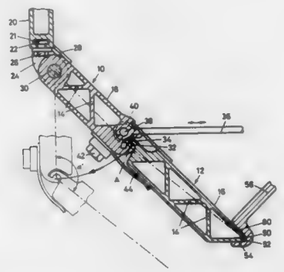
**Jürg Zehnder, Uitikon, Switzerland, assignor to Swiss Aluminium Ltd., Neuhausen, Switzerland**

**Filed Sep. 3, 1987, Ser. No. 92,560**

**Claims priority, application Switzerland, Sep. 22, 1986, 3782/86**

**Int. Cl.⁴ B65G *1/00***

**U.S. Cl. 414—299** **18 Claims**



1. Unloading flap of a stationary or mobile silo for pourable particulate having at least one outlet opening, said unloading flap comprising:

a first and second silo wall spaced from each other, wherein said second silo wall has a lower region;

an upper part secured to the first silo wall;

a lower part having a lower edge, wherein said lower part hinges on the upper part and can be tilted into the open and closed position;

actuating means operative to tilt said upper part into the open and closed position;

a longitudinal groove in the lower region of the second silo wall;

wherein, the lower edge of the lower part is in the form of a projecting support which in the closed position rests in said longitudinal groove; and

means attached to one of said upper and lower parts operative to exercise a moment of rotation on the other part, such that the angle ($\alpha$) between the upper and lower parts is reduced to an angle ($\alpha'$) in the open position to such an extent that during the closing operation the projecting support can be introduced into the longitudinal groove by the actuating means acting exclusively on the upper part.

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**4,747,743**

## CONVEYING APPARATUS FOR ROD-LIKE ARTICLES

**John G. Dowding, Dallington Northampton; David M. Hawkins, and Robert J. C. Southwood, both of High Wycombe, all of England, assignors to Molins PLC, United Kingdom**

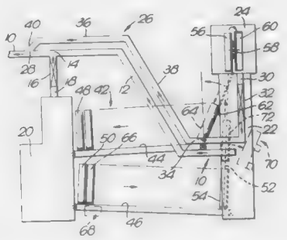
**Filed Mar. 6, 1986, Ser. No. 836,556**

**Claims priority, application United Kingdom, Mar. 6, 1985, 8505804**

**Int. Cl.⁴ A24C *5/35***

**U.S. Cl. 414—403** **13 Claims**

1. Apparatus for conveying rod-like articles, comprising an article delivery device an article receiving device; conveyor means for conveying articles away from the delivery device and for conveying articles towards the receiving device, said conveyor means being arranged to convey articles in multi-layer stack formation; a container loading position; a container unloading position; a first subsidiary conveyor linking the container loading position with said conveyor means; a second subsidiary conveyor linking the container unloading position with said conveyor means; and a container handling system including container conveying means for conveying a container between said loading and unloading positions, said container conveying means including means for elevating a container and means for transferring containers to or from said container conveying means in a lateral direction, said transferring means including first means for moving a container in a lateral direction into a transfer position at least partly in the path of said container conveying means and second means for arresting a container on said container conveying means adjacent and upstream of said transfer position so that said moving means may introduce a container onto said container conveying means between containers already on said container conveying means, said lateral direction and said path being substantially horizontal and relatively transverse and intersecting at said transfer positions.



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**4,747,744**

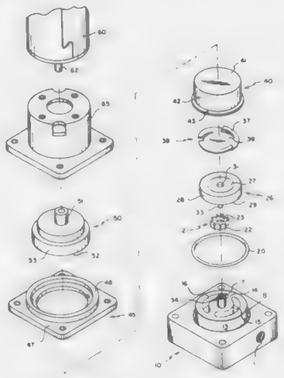
## MAGNETIC DRIVE GEROTOR PUMP

**Alexander L. Dominique, Cincinnati, and David H. Voisard, Troy, both of Ohio, assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Jan. 9, 1987, Ser. No. 1,774**

**Int. Cl.⁴ F04B *35/00***

**U.S. Cl. 417—420** **12 Claims**



1. A magnetic drive, gerotor pump apparatus comprising:

(a) a pump housing including (i) a gerotor bearing surface, (ii) inlet and outlet passages extending from housing inlet and outlets to spaced openings in said bearing surface and (iii) a hub portion extending normally to said bearing surface;

(b) a male gerotor gear member having a central bore by which said gear member is located for rotation around said hub portion;

(c) a female gerotor gear member mounted on said bearing surface in operative engagement with said male gerotor gear member, said female gear member comprising top and side wall portions which, together with said bearing surface, enclose said male gerotor gear member and which include first magnetic means for producing a magnetic field external thereof;

(d) a non-magnetic cap member covering said gerotor members; and

(e) a magnetic driving member mounted for rotation proximate said cap member and comprising second magnetic means for producing a magnetic field that extends through said cap member to said first magnetic means of said female gerotor gear member.

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**4,747,745**

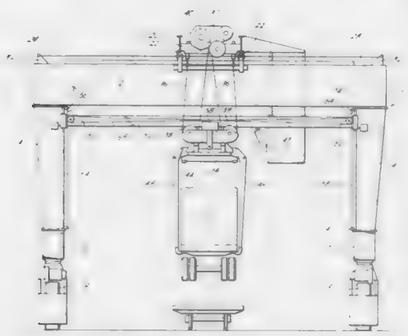
## SELECTIVE BEAM GANTRY CRANE

**Harvey J. Pippen, Longview, Tex., and Donald W. Schaper, Alliance, Ohio, assignors to Marathon LeTourneau Company, Longview, Tex.**

**Continuation-in-part of Ser. No. 800,273, Nov. 21, 1985, abandoned. This application Apr. 9, 1987, Ser. No. 36,346**

**Int. Cl.⁴ B66C *13/06***

**U.S. Cl. 414—460** **19 Claims**



1. A hoisting apparatus comprising

a supporting structure having at least one substantially horizontal transverse beam and plural vertical leg means with wheel means for supporting said beam in such horizontal position;

a lifting frame suspended from said beam by flexible suspension means and moveable longitudinally of said transverse beam;

load engaging means on said lifting frame for releaseably engaging loads to be hoisted by said hoisting apparatus;

means associated with one of said supporting structure and said lifting frame for selectively shortening and lengthening said flexible suspension means to selectively raise and lower said lifting frame throughout a range of vertical movement;

stabilizing means vertically moveable and guided on said leg means and selectively engageable with said lifting frame for selectively stabilizing said lifting frame against movement in a direction transverse to said substantially horizontal beam throughout said range of vertical movement of said lifting frame; and

means for selectively retaining said stabilizing means in an inoperative position,

whereby said hoisting apparatus is adapted to operate in a first mode, with said stabilizing means operatively engaged with said lifting frame, in which first mode said lifting frame and any load carried thereby are stabilized against movement in a direction transverse to said substantially horizontal beam throughout said range of vertical movement of said lifting frame, and to operate in a second mode, without said stabilizing means operatively engaged with said lifting frame, in which second mode said lifting frame and any load carried thereby are not stabilized against movement by said stabilizing means throughout at least the majority of said range of vertical movement of said lifting frame.

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**4,747,746**

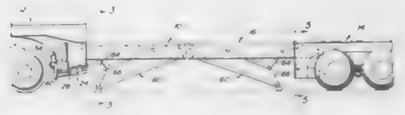
## SINGLE DROP TRAILER WITH VERTICALLY ADJUSTABLE CENTER SECTION

**Donald E. Wise, 5370 NW. 273rd St., Hillsboro, Oreg. 97124**

**Filed Dec. 12, 1986, Ser. No. 940,808**

**Int. Cl.⁴ B60P *1/02***

**U.S. Cl. 414—481** **14 Claims**



1. A single drop semi-trailer including a front fifth wheel connectable gooseneck section, a rear wheeled section and a center intermediate deck section extending between said front and rear sections, said front, center and rear sections each defining an upwardly facing deck surface, said front section deck surface being disposed at an elevation spaced above the elevation of said rear section deck surface, said front, center and rear sections including coacting anchor means operative to selectively removably anchor said center section between said front and rear section in high and low positions relative to said front and rear sections and wherein said center section deck surface is substantially horizontally aligned with said rear section deck surface when in said high position, said gooseneck section including coupling means for releaseable coupling to a fifth wheel equipped motorized tractor vehicle, said center section including opposite end pairs of opposite side downwardly extendable and upwardly retractable support leg means for support of said center section directly from the ground and height adjustment of said center section relative to the ground.

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**4,747,747**

## CONVEYOR FOR LOADING AND UNLOADING VEHICLES AND STORAGE FACILITIES

**Salvatore M. Fusco, 5128 E. Thomas, Phoenix, Ariz. 85018, and Lloyd Fogel, 6150 N. 29th St., Phoenix, Ariz. 85016**

**Filed May 5, 1986, Ser. No. 859,906**

**Int. Cl.⁴ B60P *1/38***

**U.S. Cl. 414—528** **3 Claims**

1. A conveyor for loading and unloading vehicles and other storage facilities comprising:

an elongated substantially rectangular frame formed of a plurality of spaced elongated members interconnected by a plurality of spaced cross members, and said frame having a length, width and predetermined thickness,

a pair of roller means, one journaled at each end of said frame,

said roller means, each comprising a pair of similar shaft mounted cog wheels, one wheel of each roller means being positioned at each side of said frame and at each end thereof,

said cog wheels, each having a plurality of teeth spacedly arranged around the periphery of said wheels,

an endless conveyor belt having a width substantially equal to the width of said frame, top and bottom surfaces and being longitudinally mounted around said frame,

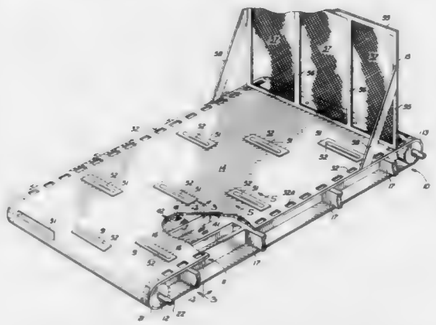
said belt having a plurality of perforations spacedly arranged along each edge thereof and positioned for penetration of the teeth of said wheels upon rotation thereof,

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said cog wheels having a diameter larger than the thickness of said frame for holding said belt away from the top and bottom surfaces of said frame upon movement of said belt over said frame,

a plurality of rollers rotatively mounted on said frame at positions along its length for engaging the bottom surface of said belt upon rotation thereof for supporting its load, each of said rolelrs comprising a pair of wheels spacedly



mounted on a common shaft with each wheel of a given pair being mounted on different sides of an associated elongated member of said frame,

a plurality of stiffeners mounted on the top surface of said belt and positioned to extend laterally across said belt, and

motor means operatively connected with one of said roller means for driving said conveyor belt to advance a load along said belt in one direction and sequentially in the reverse direction thereof.

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**4,747,748**

## AIR TURBINE FOR PREVENTING FORMATION OF ICE ON AIR EXPOSED TURBINE PARTS

**Per-Holger Sahlberg, Helsinki, Finland, assignor to Imatran Voima Oy, Helsinki, Finland**

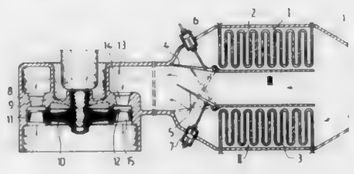
**PCT No. PCT/FI86/00061, § 371 Date Feb. 6, 1987, § 102(e) Date Feb. 6, 1987, PCT Pub. No. WO86/07411, PCT Pub. Date Dec. 18, 1986**

**PCT Filed Jun. 5, 1986, Ser. No. 30,837**

**Claims priority, application Finland, Jun. 7, 1985, 852282**

**Int. Cl.[4] F01B** *25/00*

**U.S. Cl. 415—47** **5 Claims**



1. An air turbine comprising:

a stator provided with a guide wheel for moist air and with guide passages placed between guide blades;

a rotor provided with a runner and runner blade passages placed between runner blades;

an annular intermediate space between the guide blades of the stator and the runner blades of the rotor; and

a control unit for controlling the temperature of the air to be supplied to the guide wheel;

said control unit being arranged so as to adjust the temperature of the air flowing to the turbine to a temperature of 2° to 10° C., whereat the absolute pressure after the guide wheel is 0.8 to 0.4 times the absolute pressure before the guide wheel;

an axial dimension of the intermediate space being at least 30% of the axial dimension of the runner blades, and the intermediate space being widened in the radial direction beyond the radial dimension of the passages between the runner blades so as to produce whirling that prevents freezing at the inner and outer edges of the intermediate space.

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**4,747,749**

## MACHINE FOR COMPRESSING A FLUID, HAVING A PLURALITY OF COMPRESSION STAGES IN SERIES

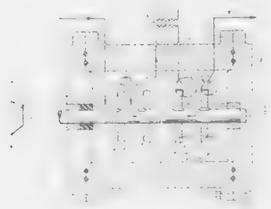
**Pierre F. J. Sagnes, Rambouillet, France, assignor to Bertin & Cie., Plaisir, France**

**Continuation of Ser. No. 659,970, Oct. 11, 1984, abandoned. This application Apr. 17, 1987, Ser. No. 39,280**

**Claims priority, application France, Oct. 25, 1983, 83 17000**

**Int. Cl.[4] F01D** *13/00*

**U.S. Cl. 415—143** **16 Claims**



1. In a system for compressing a gas, for delivering a gas flow rate of a few hundred to several tens of thousands of $m^3$ per hour at a pressure lying in the range of about 150 bars to about 300 bars, and comprising a source of gas, a plurality of different types of compressor stages in series, and a connection between said source of gas and the first of said series of compressor stages, the improvement wherein at least one centrifugal compressor constituting an inlet stage to the series is associated with at least one peripheral compressor constituting an outlet stage from the series, said peripheral compressor including at least one rotor with an inlet and outlet at the periphery thereof, whereby a reduction in the flow rate of the gas does not result in vibrations capable of destroying the compressor stages.

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**4,747,750**

## TRANSITION DUCT SEAL

**Wieslaw A. Chlus, Wethersfield; Stephen E. Potz, East Hartford, and Arthur W. Lucas, Jr., West Hartford, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.**

**Filed Jan. 17, 1986, Ser. No. 819,943**

**Int. Cl.[4] F04D** *29/08*

**U.S. Cl. 415—172 A** **4 Claims**

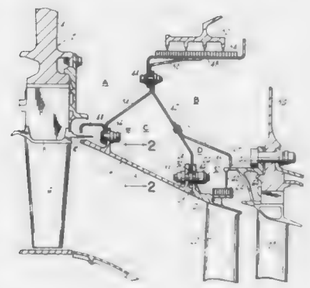
1. In combination with high and low pressure turbines, a transition duct including a seal structure for positioning between high and low pressure turbine rotors in a multirotor engine, the low pressure turbine rotors having low pressure turbine vanes arranged in clusters downstream of the high pressure turbine, and each cluster being attached to an inner shroud, the seal structure comprising:

a plurality of segments arranged in a ring and forming an inner wall of the transition duct between the high and low pressure turbines, and each segment being bolted to one of the shrouds,

a forward cone secured to and extending inwardly from adjacent the forward portions of the segments,

a rearward cone secured to the forward cone at its inner edge and having a connection at its outer edge to the segments near the shrouds, and

a seal element secured to the inner edges of said cones and wherein the segments and shrouds have flanges by which they are connected together and these flanges are spaced



apart forming a slot to receive between them the outer end of the rearward cone and wherein the slot is wider than the thickness of the rearward cone, and wherein the connection between the rearward cone and the segments leaves a freedom of movement in both axial and radial directions.

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**4,747,751**

## ELECTRONIC DEVICE FOR THE CONTROL OF A SUBMERSIBLE PUMP

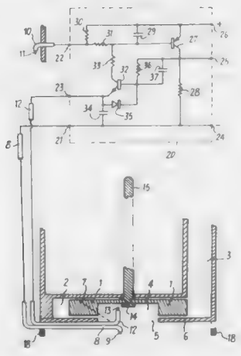
**Gilbert Guillemot, 7 rue de la Libération, 95650 Courcelles-sur-Viosne, France**

**Filed May 16, 1986, Ser. No. 863,839**

**Claims priority, application France, May 24, 1985, 85 07869**

**Int. Cl.[4] F04B** *49/06*

**U.S. Cl. 417—36** **5 Claims**



1. A device for the control of a submersible pump, the pump having a wheel fitted with blades and carried by a shaft rotatable by a motor, the wheel being situated in a chamber closed at the bottom by a lower partition provided with a suction hole, the blades being shaped and arranged to define by their inner vertical edges a cylindrical central space, the device comprising a first electrode, which is a constantly submersible common electrode, a second electrode, which is a high-level electrode for starting the motor, and a third electrode which is a low level electrode for stopping the motor, wherein the third electrode is insulated over nearly the whole of its length, passes under the lower partition and enters through the suction hole into the cylindrical central spacing, the third electrode having a first end which is bared and is situated in the vicinity of the center of the central space where the air that has entered the chamber can accumulate, and a second end connected to the one terminal of an electronic circuit comprising a transistor having an emitter connected to said one terminal and a collector and a base connected to an active circuit for activating said motor during a pumping phase.

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**4,747,752**

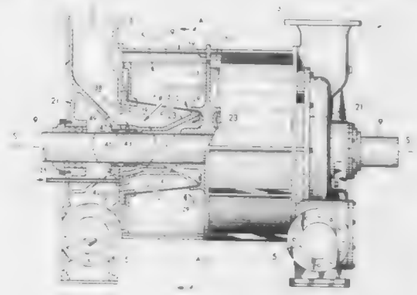
## SEALING AND DYNAMIC OPERATION OF A LIQUID RING PUMP

**John Somarakis, Vancouver, Wash., assignor to Somarakis, Inc., Vancouver, Wash.**

**Filed Apr. 20, 1987, Ser. No. 40,561**

**Int. Cl.[4] F04C** *19/00*

**U.S. Cl. 417—68** **27 Claims**



1. A liquid ring pump having:

an annular housing extending along a longitudinal axis,

a shaft extending along a longitudinal axis and means for mounting said shaft for rotation about the longitudinal axis thereof with the longitudinal axis of said shaft substantially parallel to and spaced from the longitudinal axis of said housing wherein said shaft is eccentrically positioned within said housing,

a rotor fixedly mounted on said shaft and having a plurality of blades, each of blades extending along and substantially radially outwardly of the shaft relative to the longitudinal axis of said shaft, said blades being spaced from one another about said shaft relative to the longitudinal axis of said shaft,

means for introducing liquid into said housing wherein said rotating shaft and rotor create an annular ring of liquid extending substantially symmetrically about the longitudinal axis of said housing and eccentrically about the longitudinal axis of said shaft, said liquid introducing means including a portion fixedly mounted relative to said housing, said portion extending about and along said shaft and radially spaced from said shaft to define a chamber between said portion and said shaft, said chamber extending longitudinally along said shaft from a first location to at least a second location, said second location being longitudinally spaced from said first location along said shaft, said liquid introducing means further including means for admitting liquid into said chamber and further including means for admitting liquid from said chamber into said housing through at least one make-up passage located substantially closer to said second location than to said first location,

port means fixedly mounted relative to said housing, said port means having an inlet passage for admitting gas into said rotor and an outlet passage for discharging gas from said rotor, said liquid ring pump drawing gas into said rotor through said inlet passage at a first pressure and discharging said gas from said rotor through said outlet passage at a second, higher pressure,

sealing means extending between said portion of said liquid introducing means and said shaft at said first location of said chamber for sealingly engaging said shaft and said

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portion of said liquid introducing means radially about the longitudinal axis of said shaft to prevent fluid and fluid pressures generated in said pump from passing between said fixed portion of said liquid introducing means and said rotating shaft, said sealing means defining and separating an inboard side including said chamber subjected to the pressures generated by said pump and an outboard side isolated and sealed from the chamber and the pressures generated by said pump, said chamber and said inboard side of said sealing means being subjected substantially to the full, second pressure generated by said pump, and

means located substantially closer to said first location of said chamber than to said second location for aspirating fluid at said second, higher pressure from next to said shaft in said chamber on the inboard side of said sealing means substantially adjacent said first location, said aspirating means including at least one passage extending between and in fluid communication with the fluid in said chamber adjacent said shaft at said second, higher pressure and the inlet passage of said port means and said gas at said higher pressure wherein said fluid at said second, higher pressure next to said shaft on the inboard side of said sealing means substantially adjacent said first location is aspirated into the gas being drawn into the rotor through the inlet passage of said port means.

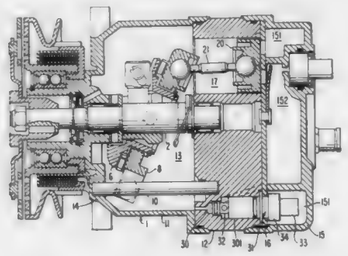
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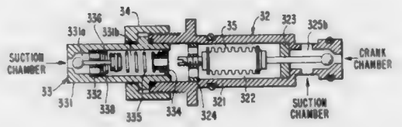
**4,747,753**

## SLANT PLATE TYPE COMPRESSOR WITH VARIABLE DISPLACEMENT MECHANISM

**Yukihiko Taguchi, Maebashi, Japan, assignor to Sanden Corporation, Gunman, Japan**

**Filed Aug. 10, 1987, Ser. No. 83,255**
**Claims priority, application Japan, Aug. 8, 1986, 61-185322**
**Int. Cl.[4] F04B** *1/26*
**U.S. Cl. 417—222** **12 Claims**






1. In a slant plate type refrigerant compressor for use in a refrigeration circuit, said compressor including a compressor housing having a central portion, a front end plate at one end and a rear end plate at its other end, said housing having a cylinder block provided with a plurality of cylinders and a crank chamber adjacent said cylinder block, a piston slidably fitted within each of said cylinders, a drive mechanism coupled to said pistons to reciprocate said pistons within said cylinders, said drive mechanism including a drive shaft rotatably supported in said housing, a rotor coupled to said drive shaft and rotatable therewith, and coupling means for drivingly coupling said rotor to said pistons such that the rotary motion of said rotor is converted into reciprocating motion of said pistons, said coupling means including a member having a surface disposed at an incline angle relative to said drive shaft, said incline angle of said member being adjustable in response to changes in the crank chamber pressure to vary the stroke length of said pistons and the capacity of the compressor, said rear end plate having a suction chamber and a discharge chamber, a passageway connected between said crank chamber and said suction chamber, and a variable displacement mechanism for controlling the closing and opening of said passageway to control communication between said suction and said crank chambers to vary the capacity of said compressor by adjusting the incline angle, said variable displacement mechanism including a valve control mechanism to directly open and close said passageway, the improvement comprising:

said valve control mechanism comprising a first valve control device, said first valve control device comprising a first valve element for controlling the opening and closing of said passageway, and an isolated pressure sensitive chamber within which said first valve element is partially disposed and which controls said first valve element; and

a second valve control device to control the communication between said suction chamber and said isolated pressure sensitive chamber in accordance with changes in operating conditions of said compressor.

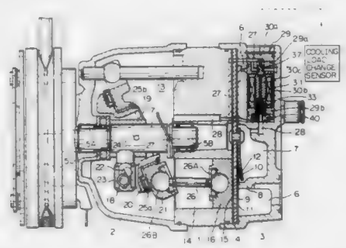
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**4,747,754**

## VARIABLE DISPLACEMENT WOBBLE PLATE TYPE COMPRESSOR WITH SOLENOID-OPERATED WOBBLE ANGLE CONTROL UNIT

**Toshiro Fujii; Akira Nakamoto, and Shinichi Suzuki, all of Kariya, Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Aichi, Japan**

**Filed Sep. 4, 1987, Ser. No. 93,797**
**Claims priority, application Japan, Sep. 5, 1986, 61-210404**
**Int. Cl.[4] F04B** *1/06, 1/28*
**U.S. Cl. 417—222** **6 Claims**




1. A variable displacement wobble plate type compressor for an air-conditioning system including a housing element having therein a suction chamber for a refrigerant to be compressed and a discharge chamber for a compressed refrigerant, a cylinder block defining therein a plurality of cylinder bores in which associated reciprocatory pistons are disposed so as to draw the refrigerant from the suction chamber and then to discharge the refrigerant after compression to the discharge chamber, a closed crankcase defining therein a chamber for an assembly of wobble and drive plates to drive the reciprocatory pistons, and a control means for changing an angle of wobble of the wobble plate in association with a change in a cooling load of the air-conditioning system, thereby changing a compressor displacement, wherein said control means comprises:

first passageway means for fluidly communicating said chamber of said crankcase with said discharge chamber of said housing element;

solenoid valve means arranged in said first passageway means for controlling the communication between said crankcase chamber and said discharge chamber in response to the change in the cooling load, said solenoid valve means including a solenoid element capable of being energized and de-energized in response to a signal indicating the change in the cooling load and a movable plunger element magnetically moved by said solenoid between a first position thereof opening said first passageway means and a second position thereof closing said first passageway means;

second passageway means for fluidly communicating said chamber of said crankcase with said suction chamber of said housing element;

spring-biased spool valve means arranged in said second passageway means for controlling the communication between said crankcase chamber and said suction chamber, said spring-biased spool valve means including a valve body element defining therein a part of said second passageway means and a spool chamber, a spool element slidably received in said spool chamber and movable between a first position thereof opening said part of said second passageway means and a second position thereof closing said part of said second passageway means, and a first spring element received in one end portion of said spool chamber, for biasing said spool element toward said first position; and

means for associating movement of said spool element of said spring-biased spool valve means with movement of said plunger element of said solenoid valve means.



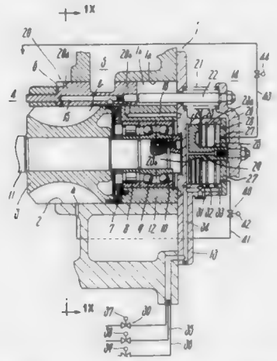
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**4,747,755**

## CAPACITY CONTROL DEVICE FOR A SCREW COMPRESSOR

**Akira Ohtsuki; Kaname Otsuka, and Osamu Hikita, all of Settu, Japan, assignors to Daikin Industries, Ltd., Osaka, Japan**

**Filed Oct. 15, 1985, Ser. No. 787,089**
**Claims priority, application Japan, Oct. 12, 1984, 59-214667**
**Int. Cl.[4] F04B** *49/02, 49/08;* **F04C** *29/08*
**U.S. Cl. 417—282** **5 Claims**



1. A capacity control device for a screw compressor comprising:

(a) a capacity control passage for making a capacity control by bypassing a gaseous fluid in process of compression in said screw compressor, which as a suction chamber and a discharge chamber, to said suction chamber,

(b) a slide valve which adjusts opening of said capacity control passage and comprises a high-pressure-side pressure bearing surface in communication with said discharge chamber and a low-pressure-side pressure bearing surface in communication with said suction chamber, so that said slide valve is moved in the closing direction due to a pressure difference between the high pressure and low pressure each acting on said pressure bearing surfaces respectively,

(c) a spring which urges said slide valve in the opening direction,

(d) an operating means for controlling positions of said slide valve in the opening direction which slide valve being moved to the closing position due to the pressure difference between the high pressure and low pressure, said operating means comprising an actuation chamber, a piston within the actuation chamber to define a first actuation chamber and a second actuation chamber, an escape passage which opens to the first chamber and communicates the first chamber with the suction chamber, an opening and closing means for opening and closing the escape passage, a communicating means communicating the second chamber with the discharge chamber, and a transmitting means for transmitting the movement of the piston to the slide valve, so that the slide valve is moved through the piston and the transmitting means by use of the pressure difference between pressures each acting to the first and second actuation chambers respectively,

(e) a control means which, when the pressure difference between the high pressure and low pressure is low causes said slide valve to be open due to function of said spring, moves said slide valve in the closing direction against said spring to thereby control a transition from no load condition to a loaded condition, said control means is provided with a connection passage by which the first actuation chamber is communicated, at a position in the compressor which position is different from a position of the discharge port, with a point in the compression processing part at which point an in-process pressure higher than discharge pressure can be obtained, so that the in-process pressure in the compression processing part is applied to the first chamber so as to move the slide valve in closing direction through the piston and transmitting means by use of the pressure difference between the in-process pressure applied to the first chamber and discharge pressure applied to the second chamber, the connection passage has an opening-closing valve which opens when pressure difference between high pressure and low pressure is low.

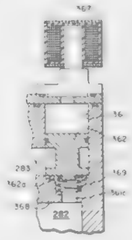
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**4,747,756**

## SCROLL COMPRESSOR WITH CONTROL DEVICE FOR VARIABLE DISPLACEMENT MECHANISM

**Tadashi Sato; Atsushi Mabe, and Kiyoshi Terauchi, all of Gunma, Japan, assignors to Sanden Corporation, Gunma, Japan**

**Division of Ser. No. 895,494, Aug. 11, 1986, Pat. No. 4,717,314.**
**This application Sep. 30, 1987, Ser. No. 102,847**
**Claims priority, application Japan, Aug. 10, 1985, 60-174968; Sep. 4, 1985, 60-134406**
**Int. Cl.[4] F04B** *49/00*
**U.S. Cl. 417—307** **2 Claims**



1. In a scroll type compressor including a housing having an inlet port and an outlet port, a fixed scroll fixedly disposed within said housing and having a circular end plate from which a first spiral element extends into the interior of said housing, an orbiting scroll having a circular end plate from which a second spiral element extends, said first and second spiral elements interfitting at an angular and radial offset to make a plurality of line contacts to define at least one pair of fluid pockets within the interior of said housing, a driving mechanism operatively connected to said orbiting scroll to effect the

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orbital motion of said orbiting scroll, a rotation preventing mechanism for preventing the rotation of said orbiting scroll during the orbital motion to thereby change the volume of the fluid pockets, said circular end plate of said fixed scroll dividing the interior of said housing into front chamber and rear chamber, said front chamber including a suction chamber communicating with said inlet port, and said rear chamber being divided into a discharge chamber which communicates between said outlet port and a central fluid pocket formed by both said scrolls and an intermediate pressure chamber, at least one pair of holes formed through said circular end plate of said fixed scroll to form a fluid channel between the fluid pockets and said intermediate pressure chamber, a cylinder connected for selective fluid communication with said intermediate pressure chamber, said suction chamber and said discharge chamber, means for selectively passing fluid from said discharge chamber to said cylinder and a control device disposed on a portion of said intermediate pressure chamber to control communication between said intermediate pressure chamber and said suction chamber, said control device including a piston slidably disposed within said cylinder and a shock absorbing element, said piston sliding in accordance with a pressure difference between the pressure in said cylinder and the pressure in said intermediate pressure chamber, and said shock absorbing element disposed on a bottom surface of either end of said cylinder, and said piston for absorbing the impact force between an inner wall surface of said cylinder and said piston and for securing sealing between said piston and said inner wall surface of said cylinder.

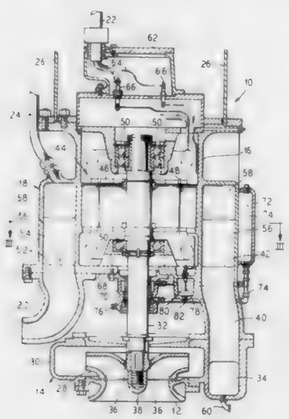
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**4,747,757**

## SUBMERSIBLE MIXING PUMP

**Walter D. Haentjens, R.D. #1 - Box 121, Sugarloaf, Pa. 18249**

**Filed Nov. 26, 1986, Ser. No. 935,004**
**Int. Cl.[4] F04B** *35/04, 39/12;* **B01F** *5/12*
**U.S. Cl. 417—366** **12 Claims**



1. A submersible pump for operation as a mixer in a tank or liquid reservoir containing liquids or mixtures of liquids and solids, comprising:

a motor encased within a motor housing, said motor having an output shaft;

a pump mechanism mounted below said motor and connected for operation to said output shaft of said motor, said pump mechanism having an inlet below said motor housing for drawing in liquids and at least one outlet for expelling liquids drawn in through said inlet;

an annular chamber encircling said motor housing, said chamber being in thermal communication with said motor within said motor housing and having at least one chamber inlet opening and at least one chamber outlet each in a lower wall of said annular chamber;

a first passageway connected to provide communication between said at least one outlet of said pump mechanism and said at least one chamber inlet opening of said chamber; and

first and second discharge nozzles connected to said at least one chamber outlet to expel liquid from said annular chamber into the liquid reservoir in substantially opposite directions.

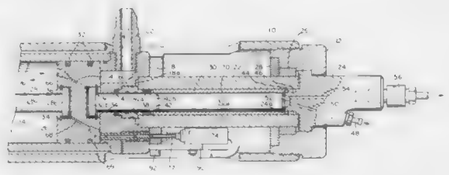
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**4,747,758**

## FLUID PRESSURE-INTENSIFIER

**Albert C. Saurwein, 5 F St. SE., Auburn, Wash. 98002**

**Filed Apr. 17, 1986, Ser. No. 846,039**
**Int. Cl.[4] F04B** *35/00*
**U.S. Cl. 417—397** **12 Claims**



2. A fluid pressure-intensifying apparatus which comprises a low pressure—high pressure cylinder means providing a cylindrical low pressure chamber and a pair of elongated cylindrical high pressure chambers, the high pressure chambers extending from opposite ends of said low pressure chamber; low pressure—high pressure piston means having a double acting low pressure piston section mounted for reciprocal movement in said low pressure chamber, and having a pair of elongated high pressure piston sections connected to opposite sides of said low pressure piston section and extending from said low pressure chamber into an adjacent high pressure chamber for reciprocal movement therein; cylindrical housing means enclosing and constraining said low pressure—high pressure cylinder means to position and maintain said pressure chambers in alignment; and fluid inlet-outlet means mounted by said housing means in fluid communication with said high pressure chambers to simultaneously introduce fluid to be pressurized to one high pressure chamber and withdraw pressurized fluid from the other high pressure chamber; and working fluid inlet-outlet means mounted in fluid communication with said low pressure chamber such that working fluid may alternately work against one side or the other of said low pressure piston section to cause said low pressure—high pressure piston means to reciprocate.

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**4,747,759**

## TURBOCHARGER HOUSING

**Michael E. Ryan, Fairhope; J. Albert McEachern, Jr., Mobile, and J. William Brogdon, Daphne, all of Ala., assignors to Teledyne Industries, Inc., Los Angeles, Calif.**

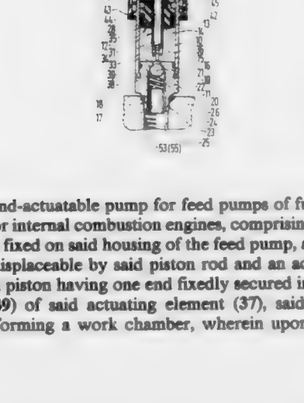
**Continuation of Ser. No. 890,785, Jul. 23, 1986, abandoned, which is a continuation of Ser. No. 739,423, May 30, 1985, abandoned. This application Mar. 6, 1987, Ser. No. 22,530**
**Int. Cl.[4] F04B** *17/00*
**U.S. Cl. 417—407** **2 Claims**

1. A housing for a turbocharger having a turbine rotor and a compressor rotor secured to a rotatable shaft, comprising:

a central housing having means for rotatably supporting said shaft, said central housing having a pair of axial end portions, each axial end portion having at least one annular and outwardly facing end surface;

two end housings, each of said end housings having a peripheral housing portion which sealingly engages one of said outwardly facing end surfaces so that one end housing encloses said turbine rotor and so that the other end housing encloses said compressor rotor, each of said end housing including a plurality of spaced apart vanes, each of said vanes having an end which abuts against one said annular end surfaces of said central housing;

wherein each end housing with its associated vanes are of a one piece construction; and



means for detachably securing each of said end housings to said central housing, said securing means comprising a plurality of threaded fasteners each of which extends through the axial end portions and threadably engages a threaded bore in one of said vanes.



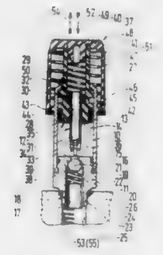
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**4,747,760**

## HAND-ACTUATABLE PUMP FOR FEED PUMPS OF FUEL INJECTION SYSTEMS FOR INTERNAL COMBUSTION ENGINES

**Leonhard Eberl, deceased, late of Unterschleissheim, Fed. Rep. of Germany by Anna Eberl, Robert L. F. Eberl, heirs; Karl Mielich, Baldham, Fed. Rep. of Germany; Miklos Mozes, Munich, Fed. Rep. of Germany; Walter Schmid, Munich, Fed. Rep. of Germany, and Klaus Stieninger, Munich, Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Aug. 5, 1986, Ser. No. 893,140**
**Claims priority, application Fed. Rep. of Germany, Sep. 27, 1985, 3534485**
**Int. Cl.[4] F04B** *21/02*
**U.S. Cl. 417—443** **14 Claims**



1. A hand-actuatable pump for feed pumps of fuel injection systems for internal combustion engines, comprising a housing, a cylinder fixed on said housing of the feed pump, a piston rod, a piston displaceable by said piston rod and an actuating element, said piston having one end fixedly secured in an annular groove (49) of said actuating element (37), said piston and cylinder forming a work chamber, wherein upon a working stroke of said piston departing from its position of repose, a fluid medium (fuel or a fuel-air mixture) is positively displaced from said work chamber into a fuel feeding system of the feed pump and upon a return stroke of said piston said fluid medium is aspirated out of said fuel feeding system of said feed pump into said work chamber, a restoring spring (47) for the piston (12) disposed between said actuating element (37) and said cylinder (10), and a blocking element including a blocking part (19) and a valve seat (16) between said work chamber (29/35/36) and said fuel feed system (53, 55) of said feed pump (26), said blocking part (19) is pushed open at least indirectly by said piston (12), during substantially a whole movement said working stroke (arrow 52) closes automatically shortly before the piston (12) reaches the end of the return stroke (arrow 54).

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**4,747,761**

## SILENCER-CARRYING ROTARY VANE PUMP

**Shigeru Yumiyama, and Takaki Kamiyama, both of Katsuta, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jun. 11, 1986, Ser. No. 872,906**
**Claims priority, application Japan, Jun. 17, 1985, 60-129845**
**Int. Cl.[4] F04C** *18/344, 29/06;* **F01N** *1/10*
**U.S. Cl. 418—46** **2 Claims**



1. A rotary vane pump, comprising:

a cylindrical center case,

a rotor supported at both ends of said cylindrical center case on bearing means and adapted to be rotated in said center case,

vane means displaceably mounted in said rotor,

side covers fixed to both end surfaces of said center case so as to form compression spaces being rotated to carry out a pumping operation due to different volumes of different portions of said spaces defined by said cylindrical center case, said rotor, and said vane means and said side covers,

a suction port formed in said cylindrical center case for communicating one of said compression spaces with the outside,

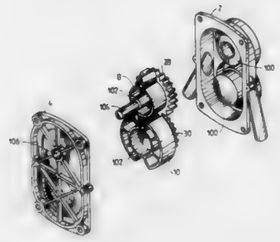
moat-like groove means formed within said cylindrical center case and defining inner and outer circumferential walls so as to form a sealed chamber between said covers, and

a discharge port means for communicating a pump chamber with the sealed chamber whereby a medium is discharged from the pump chamber through said discharge port means into said sealed chamber and then to the outside of said pump, wherein a plurality of partitions are provided in a portion of said sealed chamber to divide said sealed chamber into a plurality of sealed compartments, a passage means of a small cross-sectional area is provided for communicating adjacent compartment, soundproof members are provided in said sealed compartments, said soundproof members being sealed in second to last sealed compartments except for a first sealed compartment having said discharge port means in communication with the pump chamber.

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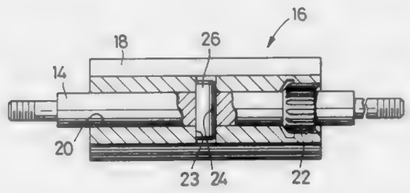


4,747,762
**FLUID MACHINE**
George A. Fairbairn, Victoria, Australia, assignor to Fairbairn International PTY. Ltd., Melbourne, Australia
Continuation-in-part of Ser. No. 569,708, Jan. 10, 1984, abandoned. This application Feb. 20, 1986, Ser. No. 832,509
Claims priority, application Australia, Jan. 10, 1983, PF7548
Int. Cl.[4] F04C *18/00, 29/00*
U.S. Cl. 418—191 1 Claim



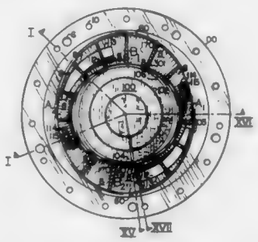
1. In a fluid pump comprising a casing having a working chamber therein, first and second rotors mounted in the chamber for rotation about respective parallel axes, means for synchronising rotation of the two rotors, the first rotor having a surface of rotation with at least one projection extending radially outwardly of said surface, and the second rotor having a surface of rotation with at least one recess shaped to receive the projection during rotation of the two rotors, an inlet for directing fluid into the working chamber, and an outlet for discharging fluid from the working chamber, the first rotor haivng two of said projections disposed 180° apart around the periphery of the first rotor, the second rotor having two of said recesses disposed 180° apart around the periphery of the second rotor, each said projection engaging within a respective one of the recesses during rotation of the two rotors with the projection and corresponding recess having complementary profiles to avoid trapping of fluid within the recess by the projection, the surfaces of rotation of the first and second rotors cooperating over a substantial arc of rotation of the two rotors to define a fluid barrier therebetween to separate the working chamber into an inlet chamber and an outlet chamber, said inlet being positioned to direct said fluid into said inlet chamber generally in the direction that the fluid moves around the surface of the first rotor away from said inlet chamber and said outlet being oriented to face the direction in which the fluid moves around the surface of the first rotor into said outlet chamber, wherein said means for synchronizing rotation of the rotors comprises first and second intermeshing gears within the casing, the first rotor and the first gear comprising an integrally molded plastics unit having a hollow cylindrical center portion and the second rotor and the second gear comprising an integrally molded plastics unit having a hollow cylindrical center portion and wherein said casing is comprised of two casing halves of plastics material having parallel cylindrical hub portions integral with said casing halves and disposed in the respective hollow cylinders central portions of said units with at least one of said casing halves having an aperture extending through the hub disposed in one of said units and a shaft secured to said one of said units and extending outwardly of the casing through said aperture.

4,747,763
**ROTOR ASSEMBLY OF ROOTS PUMP**
Takuo Sibata, Okazaki; Hisao Shirai, Aichi; Yoshio Kuroiwa, Toyota; Katsuro Harada, Tajimi; Kichiro Kato, Toyota, and Naofumi Masuda, Nagoya, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan
Filed Jun. 4, 1986, Ser. No. 870,746
Claims priority, application Japan, Jun. 7, 1985, 60-86454
Int. Cl.[4] F04C *18/00*; F16D *1/00*
U.S. Cl. 418—206 9 Claims




1. A Roots pump having a plurality of rotor assemblies each of which includes a rotor made of light alloy having an axial bore formed therethrough, a support shaft made of steel which has a timing gear fixed to one of opposite axial ends thereof and which has a press-fitted portion press-fitted in the axial bore to support the rotor, and a lock pin which is inserted through the rotor and the support shaft in a direction intersecting an axis of rotation of the rotor assembly, to prevent removal of the support shaft from the rotor, wherein the improvement comprises:
said lock pin being located substantially at an axial center of said press-fitted portion of said support shaft which is press-fitted in said axial bore;
said axial bore comprising a first hole and a second hole; and
said press-fitted portion of said support shaft having a plurality of engagement teeth formed at one of opposite ends thereof which is nearer to said timing gear than the other end, said engagement teeth being at least partially embedded in an inner surface defining said first hole of said axial bore of the rotor, to thereby prevent a rotation movement of said support shaft relative to said rotor, said press-fitted portion further having a part which extends through said second hole of said axial bore of the rotor and through which said lock pin is inserted.

4,747,764
**ROTARY FLUID PUMP**
Joseph F. Frasca, 5801 Yorktown Rd., Lorain, Ohio 44053
Continuation-in-part of Ser. No. 690,888, Jan. 14, 1985, Pat. No. 4,653,446. This application Jul. 9, 1986, Ser. No. 883,778
Int. Cl.[4] F02B *53/00*
U.S. Cl. 418—231 38 Claims

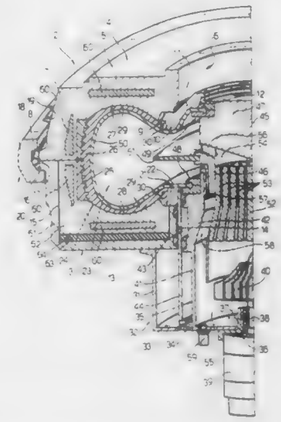



1. A rotary fluid pump additionally used as a fluid motor having:
a casing;



a rotor mounted for rotation in the casing;
a power transfer means to outside the device;
a power take-off means to supply mechanical power to outside the pump;
the rotor driven in rotation in the casing by the power transfer means;
an annular cavity formed between the casing and the rotor about the rotor axis;
a wave surface on the rotor about the rotor axis which is a boundary surface of the annular cavity and the circumferential extent of the rotor wave surface comprised of at least one rotor wave surface undulation;
a face surface on the casing about the rotor axis which is a boundary surface of the annular cavity and across the annular cavity from the rotor wave surface and facing it;
at least the rotor wave surface and the casing face surface as the boundary surfaces of the annular cavity;
a cavity undulation formed at each rotor wave surface undulation at the annular cavity with said rotor wave surface undulation the rotor wave surface's annular cavity boundary surface of said cavity undulation;
the casing with a plurality of slots which are axially oriented and circumferential spaced about the rotor axis and open to the annular cavity at the face surface;
a partition mounted in each of the casing slots for pivotal, axially directed motion therein and extension therefrom into the annular cavity;
a cam means on the rotor which is circumferential to the rotor axis and outside of the annular cavity;
the rotor cam means operatively engage a portion of each partition and thereby pivotally position it in its slot and in extension therefrom into the annular cavity;
a plurality of circumferential spaced volume varying chambers formed in the annular cavity by the partitions with a volume varying chamber formed between consecutive partitions in the annular cavity;
a cyclic volume variation between minimum and maximum volume in each volume varying chamber with rotation of the rotor in the casing and the consequent traverse of each cavity undulation of the annular cavity by the volume varying chambers;
an intake region in each cavity undulation;
intake means for the transfer of fluid from outside the rotary fluid pump to the volume varying chambers in the intake region of each cavity undulation;
an exhaust region in each cavity undulation;
exhaust means for the transfer of fluid contents of the volume varying chambers in the exhaust region of each cavity undulation to outside the rotary fluid pump;
a fluid sump region in the annular cavity where the ends of neighboring cavity undulations join and each said fluid sump region extends between the exhaust region in one said neighboring cavity undulation and the intake region in the other said neighboring cavity undulation;
a fluid transfer region in each cavity undulation between the intake region and the exhaust region of the cavity undulation;
the partitions' edge surfaces in the annular cavity extended towards the annular cavity surfaces without abutting the annular cavity surfaces towards which they extend;
the edge surfaces of the partitions in each cavity undulation fluid transfer region and each annular cavity sump region maintained in close proximity to the annular cavity surfaces towards which the extend;
the rotor rotation effected volume varying chambers' traverse of each cavity undulation convey fluid from the intake means in the cavity undulation's intake region across the cavity undulation's fluid transfer region to the exhaust means in the cavity undulation's exhaust region;
the fluid conveyed from the intake means to the exhaust means in each cavity undulation as said power transfer means;
the pressure of the fluid in the volume varying chambers increasing in volume while traversing a cavity undulation act on the rotor wave surface segments which are boundaries of said volume varying chambers and thereby impart a moment to the rotor about its axis which propels the rotor in rotation;
said rotor rotation effecting said conveyance of fluid and the supply of mechanical power to outside the pump by the power take-off means.

4,747,765
**MOBILE TIRE CURING UNIT**
Karl J. Siegenthaler, Rome, Italy, and Robert Schlemmer, Riehem, Switzerland, assignors to The Firestone Tire & Rubber Company, Akron, Ohio
Filed May 18, 1987, Ser. No. 50,660
Claims priority, application Italy, May 20, 1986, 067417 A/86
Int. Cl.[4] B29C *33/04, 35/02*
U.S. Cl. 425—42 5 Claims



1. A mobile tire curing unit comprising a mold, in turn comprising a top mold half, a bottom mold half and means for interconnecting the said two molds halves in a releasable manner; the said two mold halves combining to define an annular chamber for receiving a green tire; the tire curing unit further comprising means defining a closed circuit for a given supply of fluid curing medium under pressure, the said circuit means being carried on a first one of the said mold halves and comprising a deformable curing bladder, designed to expand inside the said annular chamber, a casing, and supply and return duct means for the said curing medium, said duct means interconnecting the said curing bladder and the said casing; power ventilating means being housed inside the said casing, for force circulating the said curing medium inside the said closed circuit; an inlet valve for the said curing medium supply being provided on the said closed circuit means; and heating means being connected to at least part of the said closed circuit means, for heating the said curing medium supply.

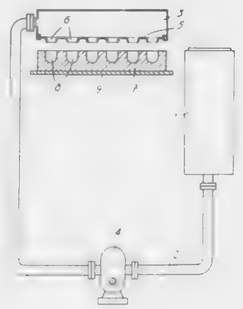
4,747,766
**DEVICE FOR FILLING A MOLD TRAY WITH A THICK FLUID SUBSTANCE SUCH AS CHOCOLATE**
Pierre Van Meulenbeke, Karel Soetelaan,, 25-2210 Borsbeek, Belgium
Filed Nov. 25, 1986, Ser. No. 936,688
Claims priority, application Belgium, Nov. 28, 1986, 2/60854
Int. Cl.[4] A23G *1/20, 1/26*
U.S. Cl. 425—159 8 Claims

1. Device for the filling of mold trays with a thick fluid substance, such as chocolate, creme, fondant and the like, comprising, in combination, a tank for a thick fluid substance;

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a distribution vessel with filler openings which serves to collect the substance flowing out of the tank and to distribute the substance flowing out; a transport pipe between the tank and the distribution vessel for the transportation of the substance to the distribution vessel; a constant-flow pump connected to the transport pipe for pumping the substance from the tank to the distribution vessel and forcing the substance out of the filler openings; at least one mold tray located under the distribution vessel with the filler openings and which is filled with the



substance; driving means for driving the pump in one direction for pumping the substance from the tank to the distribution vessel; means for switching the driving means on and switching off this means when the mold tray is filled by the pump; driving means for driving the pump in the opposite direction; and means for switching the second driving means on and off for withdrawing and retaining by means of the pump the substance in the filler openings of the distribution vessel, after the mold tray has been filled.

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**4,747,767**

**APPARATUS FOR CUTTING COMESTIBLE SUBSTANCES IN DISCRETE METERED PORTIONS**

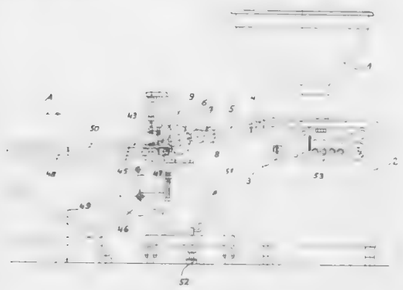
**Karl Schnell, Winterbach, Fed. Rep. of Germany, assignor to Karl Schnell Maschinenfabrik, Winterbach, Fed. Rep. of Germany**

**Filed Dec. 19, 1986, Ser. No. 944,666**

**Claims priority, application Fed. Rep. of Germany, Dec. 21, 1985, 3545673**

**Int. Cl.[4] A23P** *1/12*

**U.S. Cl. 425—311** **17 Claims**



1. Apportioning apparatus particularly for dispensing comestible material in discrete doses comprising a charging pump having outlet nozzle means comprising at least one outlet nozzle connected therewith through which said material is dispensed, said outlet nozzle means defining outlet surface means at which said at least one outlet nozzle terminates, a cutter advanceable and retractable alongside said outlet surface means of said outlet nozzle means in a cutting direction for cutting the material, a displacement link mounted for movement substantially parallel to the cutting direction, said cutter being mounted to swivel on an axis to said displacement link, said axis extending perpendicularly to the cutting direction, and a swivel drive connected to said cutter at a lug on said cutter which is spaced away from said axis, said swivel drive comprising a working cylinder having a working piston for movement approximately parallel to the cutting direction and a rotary joint connected between said working piston and said lug, wherein said cutter can be lifted off into an advanced end position from said nozzle means and can be returned against said nozzle means prior to the start of each cutting process.

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**4,747,768**

**APPARATUS FOR MANUFACTURING SHAPED ARTICLES OF PLASTICS MATERIAL, PARTICULARLY FILLING PIPES FOR FUEL TANKS OF MOTOR VEHICLES**

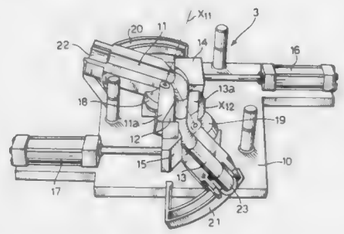
**Giuseppe Crupi, Rosta, Italy, assignor to 501 C-Plast di Crupi D. & C. S.N.C., Turin, Italy**

**Filed Nov. 17, 1986, Ser. No. 932,188**

**Claims priority, application Italy, Nov. 22, 1985, 67986 A/85**

**Int. Cl.[4] B29C** *53/08*

**U.S. Cl. 425—392** **7 Claims**



1. An apparatus for forming a curve in a semi-finished tube of softened plastic material comprising: two complementary half-moulds operable to mate together to define a tubular mould cavity, at least one of said half-moulds having two mould sections defining a portion of said mould cavity, one of said mould sections being angularly rotatable relative to the other about a predetermined axis between a first position wherein said mould cavity is substantially straight and a second position wherein said mould cavity has a shape reproducing the curve to be formed in said tube of softened plastic material, and means for moving said one mould section from said first position to said second position.

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**4,747,769**

**INJECTION STRETCHING BLOW MOLDING MACHINE**

**Yoshinori Nakamura, and Kouhei Koga, both of Nagano, Japan, assignors to Nissei ASB Machine Co., Ltd., Japan**

**Filed Jun. 11, 1986, Ser. No. 872,860**

**Claims priority, application Japan, Jun. 14, 1985, 60-129372**

**Int. Cl.[4] B29C** *49/06*

**U.S. Cl. 425—529** **14 Claims**

1. A molding machine comprising:

a machine bed having a substantially horizontal surface for supporting thereon operating stages associated with the molding machine;

a base plate disposed generally parallel to and above the machine bed plate, the base plate having an undersurface facing the machine bed;

a plurality of supporting members, extending between the machine bed and the base plate, for supporting the bed plate above the machine bed;

a rotatable disk rotatably supported at the undersurface of the base plate, the rotatable disk being annularly shaped and defining opening means along a center region thereof, the plurality of supporting members including outer support member means disposed externally to the rotatable disk and inner support member means, passing through the opening means at the center region of the rotatable disk; and

means for intermittently driving the rotatable disk through a plurality of operational positions.

14. A molding machine comprising:

a machine bed having a substantially horizontal surface for supporting thereon operating stages associated with the mold machine;

a base plate disposed generally parallel to and above the machine bed, the base plate having an undersurface facing the machine bed;

a plurality of supporting members, extending between the machine bed and the base plate, for supporting the base plate above the machine bed;

a rotatable disk rotatably supported at the undersurface of the base plate, the rotatable disk being annularly shaped and defining opening means along a center region thereof, the plurality of supporting members including outer support member means disposed externally to the rotatable disk and inner support member means, passing through the opening means at the center region of the rotatable disk;

means for intermittently driving the rotatable disk through a plurality of operational positions;

neck molds mounted on the rotary disk and stopping means on the neck molds, instrumental for stopping the rotary disk at the plurality of operational positions;

the operating stages of the molding machine including an injection stretching blow molding stage;

molds arranged between the machine bed and the base plate;

an annular rack disposed on the periphery of the rotatable disk and gear means for coupling the annular rack to a driving device; and

shock absorber means disposed between the bed plate and the rotatable disk, the shock absorber means comprising a first cylinder having a rear end rotatably mounted on the base plate, a swinging air cylinder connected externally of an extreme end of the first cylinder, and a stop plate projecting from a lower side of the rotary disk so as to provide contact with a pressure receiving pin at the end of the swinging air cylinder.



**4,747,770**

**FLUID COOLED HYDRAULIC ACTUATING MECHANISM FOR INJECTION MOLDING**

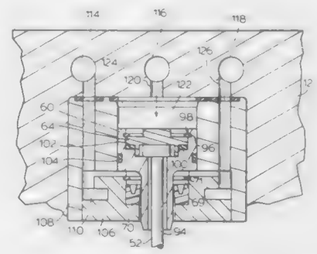
**Harald H. Schmidt, Georgetown, Canada, assignor to Mold-Masters Limited, Georgetown, Canada**

**Filed Nov. 4, 1986, Ser. No. 926,586**

**Claims priority, application Canada, Oct. 17, 1986, 520804**

**Int. Cl.[4] B29C** *45/23*

**U.S. Cl. 425—549** **5 Claims**



1. In a multi-cavity valve gated injection molding system comprising a manifold extending between a mold back plate and a plurality of spaced heated nozzles, each nozzle being seated in a cavity plate with a central bore in alignment with a gate leading to a cavity, an elongated valve pin having a driven end and a tip end mounted in the central bore of each nozzle, the driven end of each valve pin being operatively connected to hydraulic valve pin actuating mechanism mounted on the mold back plate whereby the valve pin is reciprocated between a retracted open position and a closed position wherein the tip end of the valve pin is seated in the gate and a melt passage branching from a common inlet in the manifold to longitudinal bores extending in the manifold to convey melt around the valve pin through the central bore of each nozzle to the respective gate, the improvement wherein;

the valve pin actuating mechanism comprising a piston which is seated in a cylinder and connected to the driven end of the valve pin, at least three hydraulic fluid lines extending through the mold back plate, each line having ducts which branch off to connect to each cylinder to apply hydraulic pressure to one side of each piston to reciprocate the pistons according to a predetermined cycle, two of said lines extending through the mold back plate being a high pressure line and a low pressure line which are connected through respective high and low pressure ducts directly to the cylinder on the same side of each piston, a predetermined minimum pressure differential being maintained between the high and low pressure lines whereby a flow of hydraulic fluid is maintained through the cylinder on said one side of each piston to provide cooling.

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**4,747,771**

**OPERATION OF A PULSE-FIRED BURNER**

**James H. Goodfellow, Dewsbury, and Trevor Ward, Kirby Moreside, both of United Kingdom, assignors to British Gas PLC, London and Hotwork Developments Ltd., West Yorkshire, both of, England**

**Filed Nov. 10, 1986, Ser. No. 928,401**

**Claims priority, application United Kingdom, Nov. 12, 1985, 8527694**

**Int. Cl.[4] F23C** *11/04;* **F23N** *5/00*

**U.S. Cl. 431—1** **17 Claims**

1. A method of operating a pulse-fired burner of the type comprising:

(a) a combustion chamber having an inlet to receive air during a firing phase of the burner for the combustion of fuel;

(b) an outlet for discharging the combusted fuel; and

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(c) a fuel injector having an outlet arranged to inject fuel into the combustion chamber,

said method comprising the steps of:

(d) supplying fuel to the injector;

(e) modulating the rate at which the fuel is supplied to the injector between a first lower rate during a non-firing phase of the burner and a second higher rate during a firing phase of the burner;

(f) supplying air for premix with the fuel before ignition at a rate which is sufficient only to support combustion of the fuel at the lower rate of supply;

(g) premixing the air with the fuel before ignition;

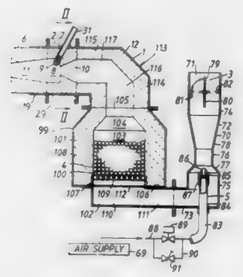
(h) igniting the fuel during a non-firing phase;

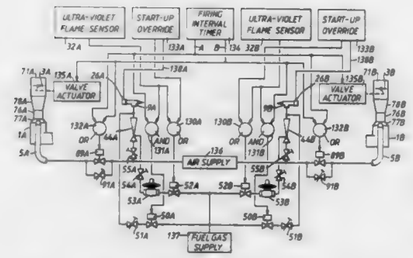
(i) sensing the presence of a flame at the injector outlet; and

(j) terminating the supply fuel to the injector if no flame is sensed.

11. A pulse-fired burner comprising:

(a) a combustion chamber having an inlet to receive air during a firing phase of the burner for combustion of fuel;






(b) an outlet for discharging the combusted fuel;

(c) a fuel injector having an outlet arranged to inject fuel into said combustion chamber;

(d) first means for supplying fuel to said fuel injector;

(e) second means for modulating the rate at which the fuel is supplied to said fuel injector between a first lower rate during a non-firing phase of the burner and a second higher rate during a firing phase of the burner;

(f) third means for supplying air for premix with the fuel before ignition at a rate which is sufficient only to support combustion of the fuel at the lower rate of supply;

(g) fourth means for premixing the air with the fuel before ignition;

(h) fifth means for igniting the fuel during a non-firing phase;

(i) sixth means for sensing the presence of a flame at said outlet of said fuel injector; and

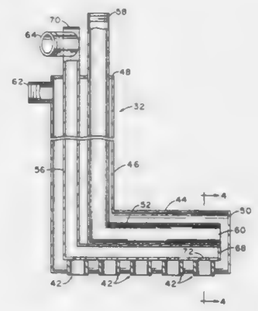
(j) seventh means for terminating the supply of fuel to said injector if no flame is sensed.

**4,747,772**

## BURNER DESIGN FOR MELTING GLASS BATCH AND THE LIKE

Yih-Wan Tsai, Pittsburgh, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 830,783, Feb. 19, 1986, Pat. No. 4,671,765.
This application Feb. 18, 1987, Ser. No. 16,152
Int. Cl.[4] F23D *14/62*
U.S. Cl. 431—354 16 Claims



1. A burner comprising:

a fuel conduit positioned along a first longitudinally extending axis, said fuel conduit having a plurality of first openings spaced along said fuel conduit;

a combustion gas conduit positioned along a second longitudinally extending axis generally paralleling said first axis wherein each of said conduits are mutually exterior to the other of said conduits, said second conduit having a plurality of second openings spaced along said combustion gas conduit such that each of said second openings is paired with a corresponding first oepning; and

means forming mixing chambers spaced along said conduits at each of said pairs of openings to combine said fuel and gas.

**4,747,773**

## SHAFT KILN UTILIZED FOR LIME PRODUCTION

Lucian A. Predescu, and Lucian D. Predescu, both of 3931 Somerset Pl., Tuscaloosa, Ala. 35405

Continuation of Ser. No. 842,234, Mar. 21, 1986. This application Jun. 8, 1987, Ser. No. 59,332
Int. Cl.[4] F27B *15/00;* F27D *1/08*
U.S. Cl. 432—14 2 Claims

1. Apparatus for calcining materials comprising:

(a) an upstanding hollow shaft kiln, through which the material to be calcined passes downwardly by the force of gravity, defining a plurality of zones including an upper preheating zone, a first calcining zone having a defined length, a second calcining zone having a defined length relative to the length of said first calcining zone with said defined length being approximately twice the length of said first calcining zone, and a material cooling zone;

(b) air tight charging means at the top of said kiln communicating with supply means for charging said kiln with said material to be calcined;

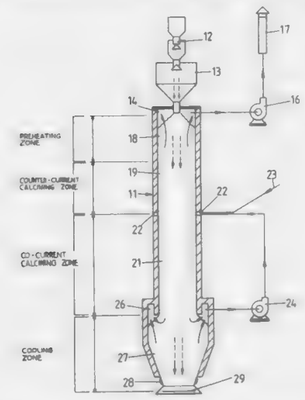
(c) means for selectively introducing combustion air into a lower portion of said cooling zone from outside said kiln comprising a plurality of adjustable ducts located at the bottom of said material cooling zone;

(d) a collector channel adjacent the upper portion of said cooling zone and the lower portion of said second calcining zone;

(e) a plurality of burners located intermediate said first calcining zone and said second calcining zone in position to inject burnt gases therefrom into said kiln;



(f) first flow means communicating said collector channel with said burner and including gas conveying means for conveying gases from said collector channel to said burners and creating a negative pressure within said collector channel to convey a minor portion of said burnt gases injected into said kiln downwardly through said second calcining zone in co-current flow with said material to said collector channel for intermingling with said combustion air and recycling to said burners, said minor portion




comprising about 20 to 25% of the burnt gases injected to the kiln from said burner; and

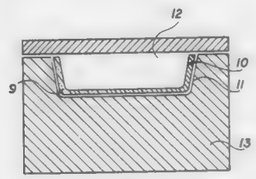
(g) second flow means communicating with an upper portion of said preheating zone for exhausting burnt gases therefrom and creating a negative pressure within said upper portion of said preheating zone to convey a major portion of said burnt gases injected into said kiln upwardly through said first calcining zone and said preheating zone in counter current flow to said material.

**4,747,774**

## CONFORMING CRUCIBLE/SUSCEPTOR SYSTEM FOR SILICON CRYSTAL GROWTH

Paul A. Piotrowski, Monroeville; Edgar L. Kochka, Greentree, and Charles S. Duncan, Penn Hills, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 9, 1987, Ser. No. 12,779
Int. Cl.[4] F27B *14/00*
U.S. Cl. 432—156 3 Claims



1. An apparatus for silicon dendritic web crystal growth, said apparatus capable of melting silicon to produce a silicon melt comprising:

a. a susceptor having a cavity with continuously sloped side walls, said side walls having a substantially flat configuration and being sloped outwardly at an angle of 10° to 30° from the vertical such that the combined gravitational forces on the side walls and the hydrostatic forces of molten silicon in the cavity at the side walls exceeds the surface tension forces on such molten silicon;

b. a heating means for melting said silicon;

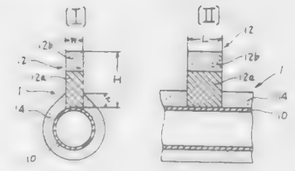
c. a thin-walled quartz crucible positioned in the cavity of the susceptor having continuously sloped side walls for preventing side wall collapse due to silicon surface tension, said side walls having a substantially flat configuration and sloped outwardly at an angle of 10° to 30° from the vertical such that the combined gravitational forces on the side walls and the hydrostatic forces of molten silicon in the cavity at the side walls exceeds the surface tension forces of the molten silicon, said side walls of said crucible conforming to and remaining substantially in contact with the side walls of the cavity of the susceptor upon softening of the crucible side walls at operating temperatures, said susceptor side walls supporting said crucible side walls when said side walls become soft.

**4,747,775**

## SKID BEAM FOR HEATING FURNACES OF WALKING BEAM TYPE

Kiyoshi Takagi, Okayama; Tadashi Naito, Kurashiki; Osamu Nakatani, Kurashiki; Toshio Inoue, Kurashiki; Masamitsu Obashi, Kurashiki; Hisashi Hiraishi, Kyoto; Akira Shinosaki, Hirakata, and Tohru Kawai, Toyonaka, all of Japan, assignors to Kawasaki Steel Corporation, Hyogo and Kubota Ltd., Osaka, both of, Japan

Filed Jun. 9, 1987, Ser. No. 59,971
Claims priority, application Japan, Jun. 10, 1986, 61-134660; Aug. 18, 1986, 61-193194; Aug. 18, 1986, 61-193195
Int. Cl.[4] F27D *3/02*
U.S. Cl. 432—234 8 Claims




1. A skid beam adapted for use in a walking beam type heating furnace of which operating temperature exceeds 1000° C., the skid beam comprising a hollow skid pipe of heat-resistant alloy, skid buttons provided upright on the top of the pipe and arranged axially thereof at a predetermined spacing, each skid button having a base portion, and a refractory lining covering the outer peripheral surface of the skid pipe and each of the skid buttons over the base portion thereof toward its upper portion, each of the skid buttons comprising a first member attached to the skid pipe and a second member to be brought into contact with the material to be heated, the first member being made of a heat-resistant alloy, the second member being made of a composite material having a matrix of a heat-resistant alloy and ceramic particles dispersed therein in an amount of 30 to 70% by weight based on the composite material, the skid button having a height exceeding 120 mm.

**4,747,776**

## ARTIFICIAL TEETH AND CARDING SYSTEM AND METHOD

Franklin T. Sudderth, 110 Ridgeland Dr., Greenville, S.C. 29601

Filed Sep. 24, 1986, Ser. No. 911,164
Int. Cl.[4] A61C *19/10*
U.S. Cl. 433—26 26 Claims

1. A method for carding artificial teeth comprising:

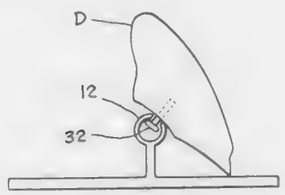
providing an elongated tooth carding strip having a vertical flange and a retainer tube carried on said vertical flange for retaining a series of said tooth on said card;

providing said retainer tube in the form of a split retainer tube having a narrow longitudinal slit formed along the length thereof;

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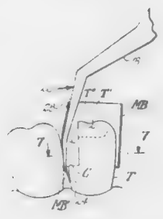
providing artificial teeth having retainer means carried on tooth back thereof; and




arranging said teeth on said tooth card such that said retainer means of said teeth is engaged by said retainer tube for retention on said tooth card.

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**4,747,777**
**DENTAL INSTRUMENT**
Ridley C. Ward, 2392 Fiesta Dr., Sarasota, Fla. 33581
Filed Apr. 23, 1987, Ser. No. 41,462
Int. Cl.[4] A61C 3/00
U.S. Cl. 433—141 8 Claims




1. A dental instrument for assisting in the temporary placement of a dental matrix band around a tooth to be repaired comprising:

an elongated slender handle having a first and second end and adapted to be grasped and manipulated by a user's hand;

a thin matrix band guide blade disposed from said handle first end;

said guide blade having an upper portion adjacent said handle first end and a wider mid-portion tapering to a generally pointed distal end;

said guide blade having a generally curved transverse cross section whose generally concave surface is adapted to mate against a side of the tooth;

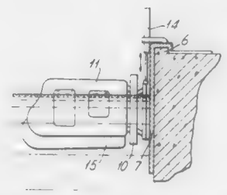
said guide blade also having a first transverse bend across said mid-portion and a bracket extending outwardly from the convex surface of said mid-portion, said bracket adapted to engage the upper margin of the matrix band and retain the matrix band against said guide blade generally convex surface during positioning of the matrix band around the tooth to be repaired and its associated gingival margin shoulder;

said first bend disposing said mid-portion therebelow in the direction of said concave surface;

said guide blade also having a second transverse bend below said first bend and said bracket and adjacent said distal end, said second bend in the same direction as said first bend;

the distance between said guide blade distal end and said bracket slightly greater than the width of the matrix band.

**4,747,778**
**DEVICE IN CONNECTION WITH A SIMULATOR FOR DRILLING RESCUE PROCEDURES**
Kjell Haltbrekken, Ingebjorgs vei 7, N-7140 Opphaug, Norway
Filed Feb. 9, 1987, Ser. No. 12,480
Claims priority, application Norway, Feb. 18, 1986, 860604
Int. Cl.[4] G09B 9/02
U.S. Cl. 434—29 6 Claims




1. A training device for use in providing rescue procedure drills for the occupants of a land, air or sea means of conveyance that may accidentally become submerged in a body of water, comprising a vertically oriented track mounted adjacent a body of water with a lower portion of said vertical track extending below the surface of said body of water, a carriage mounted for movement in a vertical direction along said track between positions above and below said water surface, a rotatable support mounted on said carriage for rotation through at least 180° about a horizontal axis extending outwardly of said carriage in a direction parallel to said water surface, a cabin attached to said rotatable support for occupancy by persons being trained in said rescue procedures, means for moving said carriage and cabin in a vertical direction along said track, and means for rotating said support and cabin about said horizontal axis, whereby said carriage and cabin can be lowered vertically along said track to a position wherein it is at least partially submerged in said body of water and said cabin can be turned about said horizontal axis to an upside-down position during a rescue procedure drill.

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**4,747,779**
**FORM-KEEPING DEVICE FOR GYMNASTS AND SPRING BOARD DIVERS**
Seigfried Gerstung, Baltimore, Md., assignor to Gym-Thing, Inc., Baltimore, Md.
Filed Oct. 20, 1986, Ser. No. 920,612
Int. Cl.[4] A63B 69/00
U.S. Cl. 434—247 1 Claim



1. A form-keeping device to be worn on extremities of a person comprising:

a first part having a first block with a first flat surface and a first oppositely-facing concave surface for conforming to a part of a first limb of the person, a first front face provided on the first flat surface and covered with pile, a strap attached to the first block and extending in one perimetrically outward direction from the first block and having an outer end provided with a first fastener, a second fastener attached to the first block and extending in an opposite perimetrically outward direction from the first block; and

a second part having a second block with a second flat surface and a second oppositely-facing concave surface for conforming to a corresponding part of a second limb the person, a second front face provided on the second flat surface and covered with hook-like projections for disengageably engaging the pile covering the first front face, a strap attached to the second block and extending in one perimetrically outward direction from the second block and having an outer end provided with a first fastener, a second fastener attached to the second block and extending in an opposite perimetrically outward direction from the second block;

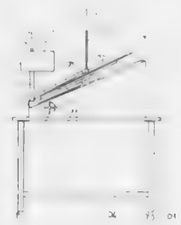
the first and second fasteners of said first part being removably securable together around said first limb and the first and second fasteners of said second part being removably securable together around said second limb, with said strap of said second part at least partially encircling said second limb of the person, so as to dispose said hook-like projections on said part of said second limb so that said hook-like projections face in substantially the same direction as is faced by said part of said second limb;

whereby disengageable engagement of the pile on the first front face with the hook-like projections on the second front face will cause said first and second limbs of the person to be disengageably held together at said first and second parts of the device, with a fixed distance between the first and second limbs, which fixed distance is determined by thicknesses of said first and second blocks, said pile and said hook-like projections; and said pile and hook-like projections being adapted to produce an audible ripping-like sound upon reengageable disengagement, if disengaged from an engaged relationship while the person is performing a physical act involving movement of said first and second limbs, for indicating that the person has moved said first and second limbs apart at said parts, by a distance which is greater than said fixed distance.



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**4,747,780**
**MULTI-FUNCTION GLOBE WITH ITS RELATED PLANETS**
Shui-Tan Tzeng, 11-1 F 80, sec. 2, Chang An E. Rd., Taipei, Taiwan
Filed Oct. 14, 1986, Ser. No. 918,790
Int. Cl.[4] G09B 27/02
U.S. Cl. 434—293 4 Claims



1. A multi-function device globe, comprising:

a horizontally extending board (01);

a transmission gear train (115) on said board having a driven gear (114); a motor (116) connected to said gear train for driving said gear train to rotate said driven gear;

a rotary shaft (111) rotatably mounted to said board and being movable along its own axis to engage said driven gear for rotation of said rotary shaft with rotation of said driven gear, and being movable along its axis for disengagement from said driven gear, said rotary shaft having a shaft gear (112);

a rotary disc (14) mounted for rotation about a vertical axis to, said board, said rotary disc having a gear plate (141) meshed with said shaft gear for rotation of said rotary disc with rotation of said rotary shaft;

a hand wheel (11) connected to said rotary shaft for pulling said rotary shaft along its axis to disengage said rotary shaft from said driven gear and for manual rotation of said rotary shaft for rotation of said rotary disc;

an orbit base (3) connected to said board and defining an earth orbit recess (33) lying in an orbit plane extending at an acute angle to said board;

an earth supporting rod (63) having a lower end engaged in said orbit recess for movement along said orbit recess; a driven frame (2) mounted to said earth rod for rotation of said earth rod relative to said driven frame;

an earth structure (6) connected to said earth rod for rotation with said earth rod to simulate rotation of the earth once each day, said earth rod extending vertically with respect to said board, said earth structure having an earth axis axially aligned with said earth rod, said earth rod being at an angle of 66½° to said orbit plane of said orbit recess;

a ring gear (24) connected to said orbit base and extending adjacent to said orbit recess;

an earth rotation shaft (26) having gears meshed with said ring gear and with said earth rod for rotation of said earth rod with movement of said driven frame along said orbit recess;

a sun supporting rod (51) rotatably mounted to said board and extending vertically from said board;

a first linking rod (12) pivotally connected between said rotary disc and said driven frame for movement of said driven frame along said earth orbit recess with rotation of said rotary disc;

a second linking rod (71) pivotally connected between said driven frame and said sun rod for rotating said sun rod with movement of said drive frame along said orbit recess;

a sun structure (5) connected to said sun rod for rotation with said sun rod, said sun structure having a semispherical metal portion (52) and a semispherical transparent portion (506) connected to said semispherical metal portion, said second linking rod holding said sun rod so that said semispherical transparent portion always faces said earth structure;

a light source (503) in said sun structure for casting light on said earth structure through said semispherical transparent portion, said semispherical metal portion having at least two holes (504) therein for dissipating heat generated by said light source;

a gear box supporting cylinder (42) connected to said driven frame and rotatably receiving said earth rod therein;

a gear box (4) connected to said gear box supporting cylinder for rotation around said earth rod;

a gear assembly operatively connected between said supporting cylinder, said gear box and said earth rod for rotating said gear box around said earth rod to simulate the revolution of the moon around the earth;

a moon structure (41) fixed to said gear box for making revolutions around said earth structure; said earth structure comprising a ball-shaped body marked with longitudes and latitudes and being connected to a top of said earth rod;

a slender rod (62) extending axially with said earth rod and through said earth structure and said earth rod to said orbit recess;

a block (64) in said orbit recess for non-rotating sliding movement along said earth orbit recess, said slender rod having a lower end fixed to said block;

a time disc (61) fixed to a top end of said slender rod above said earth structure and carrying markings for indicating a time of day for said earth structure as said earth structure rotates on its axis and with said earth rod;

a calendar disc (7) being marked with months, days and

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weekdays and fixed with respect to said orbit base and lying in a plane parallel to said orbit plane;

said second linking rod having a window therein alignable with said markings of said calendar disc to indicate the month, day and weekday of a position of said earth structure on said orbit recess around said sun structure; and electric power means connected to said light source and said motor for powering said light source and said motor.

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**4,747,781**

**COMBUSTION SYSTEM**

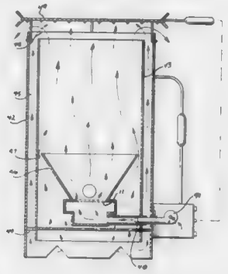
**Jean-Pierre Patenaude, 104 Guigues St., Ottawa, Ontario, Canada K1N 5H7**

**Continuation of Ser. No. 757,227, Jul. 22, 1985, abandoned. This application Nov. 19, 1986, Ser. No. 933,350**

**Claims priority, application Canada, Mar. 27, 1985, 477685**

**Int. Cl.[4] F23D** *15/12*

**U.S. Cl. 431—326** **17 Claims**



1. A system for promoting combustion of a fuel comprising:

a diffusion manifold including a diffuser plate having a pattern of spaced-apart openings therethrough, a source of air under pressure connected to said diffuser manifold for pushing air through said openings, shielding means about said diffuser plate about an upper diffuser surface thereof, said openings having a predetermined cross-sectional area and distance between each other dependent on the type of fuel to be burned, the velocity of air pushed through each of said openings by said source of air under pressure creating a turbulence zone on said upper diffuser surface of said plate about each of said openings, said openings being spaced apart such that said turbulence zones of adjacent openings are closely spaced to achieve a combustion zone in the vicinity of said diffuser surface and having a proper amount of air/fuel mixture wherein the air in said zone is determined by the size of said openings and the distance between each said opening so that a desired combustion is obtained, said air under pressure creating a negative pressure in said combustion zone to cause unburned combustible products of said fuel to be recirculated to thereby achieve substantially clean combustion, said shielding means shielding ambient air from said zone so that only said metered air is used to achieve controlled combustion.

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**4,747,782**

**COSMETIC SAMPLER**

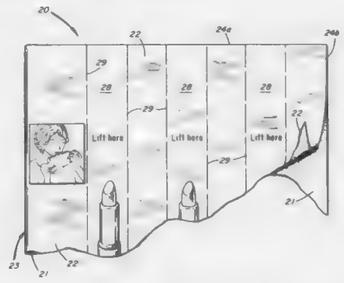
**Gaines P. Campbell, Jr., Lookout Mountain, Tenn., assignor to Arcade Inc., Chattanooga, Tenn.**

**Filed Nov. 13, 1986, Ser. No. 929,812**

**Int. Cl.[4] G09B** *250/00*

**U.S. Cl. 434—377** **32 Claims**

1. A cosmetic sampler, comprising a folded flexible sheet, penetrable by an oleaginous substance, comprising a bottom fold and a top fold, said bottom fold and said top fold having at least portions of opposing inner faces adhering to one another, each inner face having disposed thereon on an oleaginous barrier, said barrier on said bottom fold having disposed thereon an oleaginous-based cosmetic containing at least 30% of oils, fats and/or waves opposing the barrier of said top fold




and said top fold having perforations for exposing said cosmetic on either side of said oleaginous barrier.

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**4,747,783**

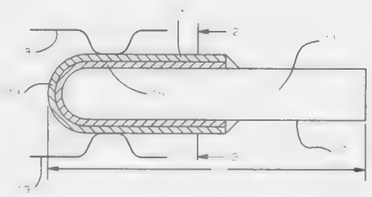
**RESISTIVE PIN FOR PRINTED CIRCUIT CARD CONNECTOR**

**Paul D. Bellamy, Poughkeepsie; Richard A. Fritz, Red Hook; Wayne V. Myers, Saugerties; Gary J. Robinson, Poughkeepsie; Raymond L. Simonetty, West Hurley, and Jordan M. Taylor, Poughkeepsie, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Oct. 28, 1986, Ser. No. 923,940**

**Int. Cl.[4] H01R** *9/09*

**U.S. Cl. 439—59** **8 Claims**



1. A connector system for connecting or disconnecting a connector plug assembly while maintaining continuous operation of load devices associated with said connector system comprising, in combination,

a socket,

a plug having pins associated with the voltage and/or ground connections of a said load device and adapted for insertion or withdrawal into or from said socket,

said pins of said plug being metallic and at least one of said pins having a resistive coating covering a portion thereof,

the low resistance of said resistive coating preventing surge currents resulting from insertion or removal of said plug into or from said socket during operation of said system,

whereby, upon plug insertion, said socket initially engages the resistive coating of said plug permitting limited current flow through said resistive coating to gradually charge components of the system and upon full insertion of said plug said socket extends past said resistive coating to engage a zone of said plug having a lower or nominal zero resistance.



**4,747,784**

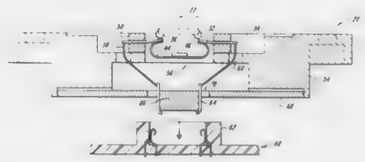
**CONTACTOR FOR INTEGRATED CIRCUITS**

**Nicholas J. Cedrone, Wellesley Hills, Mass., assignor to Daymarc Corporation, Waltham, Mass.**

**Filed May 16, 1986, Ser. No. 864,293**

**Int. Cl.[4] H01R** *23/72*

**U.S. Cl. 439—71** **2 Claims**



1. A contactor assembly for establishing an electrical connection between a test circuit of a high speed automatic test handler and a succession of integrated circuits (IC'S) each having a generally planar body and a plurality of leads extending from at least one side of said body comprising:

an insulating base have a central recess dimensioned to receive the IC under test at a seating plane within the recess without physical contact between the IC and the contactor assembly to avoid damage to the leads, the base extending generally along a first plane but having a thickness in a direction Z perpendicular to said first plane measured between the seating plane and the test circuit which places said IC in sufficient physical proximity to said circuit to closely simulate the electro-magnetic environment of said IC in said circuit,

a plurality of contacts each mounted at a fixed end to said base with a free end projecting into said recess and positioned to make electrical connection at the seating plane with an associated lead of the IC, said contacts being directed along said Z direction sufficiently that when the IC under test is positioned at the seating plane for testing said contacts deflect to a position where they exert substantially no force on the leads in a direction lying in said first plane,

a substantially characteristic impedance path connecting at least one of said contacts with said test circuit, and

electrical decoupling means closely spaced from said IC under test, said decoupling means including at least one conductor plate having at least two arms connected to the free ends of selected ones of said contacts and including at least one capacitor electrically connected by said at least one plate between said selected contacts.

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**4,747,785**

**SHIELDING FOR CONNECTOR HOOD**

**Arthur Roberts, Westbury, and Richard Leeds, Lawrence, both of N.Y., assignors to Global Equipment Company, Div. of Continental Dynamics**

**Filed Mar. 17, 1987, Ser. No. 944,655**

**Int. Cl.[4] H01R** *13/658*

**U.S. Cl. 439—88** **9 Claims**

1. Apparatus for providing electrical continuity between a connector hood and a shield on a cable attachable to a connector associated with said connector hook, said connector hood including at least one conductive surface thereon, comprising:

a connector hood;

said connector hood including first and second half hoods;

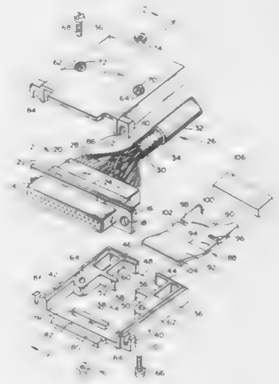
each of said first and second half hoods including cooperating means together forming an opening for the entry of said cable and said shield into said connector hood;

first and second masses of a resilient conductive material;

each of said first and second half hoods including means for positioning said first and second masses respectively facing each other within said conector hood adjacent said opening;

said shield, when said cable is installed in said hood, being exposed over at least a portion thereof passing between said first and second masses;

a dimension and a resilience of said first and second masses being effective for urging facing surfaces thereof into contact with said shield and further being effective for urging said facing surfaces into contact with each other



over substantially all portions thereof not contacting said shield; and

said first and second masses of a resilient conductive material contacting said at least one conductive surface, whereby electrical continuity between said shield and said at least one conductive surface is achieved.

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**4,747,786**

**COAXIAL CABLE CONNECTOR**

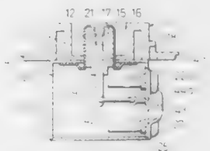
**Hideo Hayashi, and Yasushi Nishioka, both of Tsu, Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan**

**Continuation of Ser. No. 789,097, Oct. 18, 1985, abandoned. This application Apr. 3, 1987, Ser. No. 33,899**

**Claims priority, application Japan, Oct. 25, 1984, 59-224531**

**Int. Cl.[4] H01R** *4/66*

**U.S. Cl. 439—95** **8 Claims**




1. A coaxial cable connector in combination with a wiring-module mounting frame of the type to be mounted in a recess of an interior wall of a building, whereby said connector will be exposed to receive a coaxial cable, said wiring-module mounting frame including an opening extending completely therethrough and bordered by a pair of opposing edges, and first engaging means situated on each of said edges, said connector comprising a generally flat plastic body fitted within said opening and having a generally flat front surface and a rear surface, said front surface formed on a base part of said body, a receptacle formed in said front surface and including a forwardly open front end, said receptacle including first and second electrically insulated terminal members adapted to be electrically connected to an end plug of a coaxial cable, a casing mounted to said body and extending from said rear

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surface of said body and disposed within said opening of said wiring-module mounting frame, said casing comprising a side wall which includes a surface facing laterally away from a longitudinal axis defined by said receptacle, first and second connecting means electrically insulated from one another and secured to said surface and adapted to be connected, respectively, to a pair of conductors of another coaxial cable, said first and second connecting means being electrically connected, respectively, to said first and second terminal members, said casing comprising an electrically conductive material which electrically interconnects one of said connecting means to one of said terminal members, second engaging means formed on mutually opposite sides of one of said body and casing and operably connected to said first engaging means on said opposing edges of said wiring-module mounting frame, said first and second engaging means defining a projection and slot connection, the projection of which extends laterally relative to said longitudinal axis, the placement of said connector in said frame being such that said connector is situated in and behind said opening except for said base part which projects slightly forwardly beyond said opening so that said front surface and said front end of said receptacle are disposed forwardly of said opening.

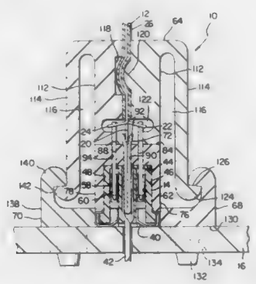
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**4,747,787**

## RIBBON CABLE CONNECTOR

**Paul P. Siwinski, Seminole, Fla., assignor to AMP Incorporated, Harrisburg, Pa.**

**Filed Mar. 9, 1987, Ser. No. 23,760**
**Int. Cl.[4] H01R** *13/652*
**U.S. Cl. 439—108** **14 Claims**



1. For coupling wires of a ribbon cable with an electrical connector, the combination comprising:

signal contacts within the connector, each signal contact having a downwardly extending U-shaped slot, the bights of said slots having semicircular cross-sectional configurations about parallel horizontal axes with a common first diameter;

signal wires extending parallel with each other in the plane of a ribbon cable, said signal wires having circular cross-sectional configurations with a common second diameter less than the first diameter, said signal wires having stripped free ends with a bend in each said signal wire adjacent to its free end of less than 90 degrees from an original vertical orientation whereby the bent portion of each said signal wire may contact the bight of one said signal contact adjacent to its end remote from the plane of the ribbon cable; and

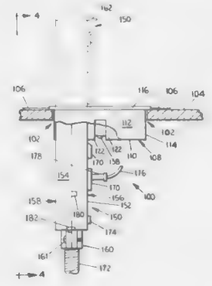
material coupling each said signal wire and its associated said signal contact.

**4,747,788**

## MANUALLY OPERABLE RETRACTABLE POWER CENTER

**Norman R. Byrne, 2736 Honey Creek, NE., Ada, Mich. 49301**

**Filed Jan. 28, 1987, Ser. No. 7,622**
**Int. Cl.[4] H01R** *13/44, 13/60*
**U.S. Cl. 489—131** **3 Claims**



1. A manually-operable power center adapted to be mounted in a desk or other furniture item having a work surface, and comprising a slot formed in the work surface, the power center comprising:

stationary housing means mounted within said slot;

electrical receptacle means for supplying electrical power from an interconnected common power source to selectively interconnected electrical devices;

carriage means received within said housing means for mounting said electrical receptacle means so as to be vertically moveable with respect to said housing means between a closed, retracted position and an extended, open position, said carriage means comprising opposing lateral sides;

first support means extending outwardly from said opposing lateral sides of said carriage means for supporting said carriage means in said extended, open position, said first support means abutting a top portion of the said housing means when said carriage means is in said extended, open position;

clamping means coupled to said housing means and rigidly securing said housing means to said work surface, wherein said clamping means comprises:

a pair of inwardly-directed flanges mounted to inner surfaces of said housing means, and comprising a central flange portion extending from a top portion of said housing means to a positon below a vertical midpoint of said housing means, side flange portions integral with said central flange portion and extending downwardly to a bottom portion of said housing means, and opposing guide slots formed in said side flange portions and extending in a vertical direction;

L-shaped locking members associated with each of said inwardly-directed flanges, and each comprising a vertical upright extending upwardly in a manner so as to be adjacent outer vertical surfaces of said housing means, a horizontally-disposed base portion integral with an associated vertical upright, and vertically-disposed tabs integral with said horizontally-disposed base portion and sized so as to be slidable within said guide slots;

clearance holes extending in a vertical direction in each of said central portion and in each of said horizontally-disposed base portions; and

threaded means rotatably secured within said clearance holes, whereby rotation of said threaded means causes upward or downward movement of said L-shaped locking members relative to said housing means as a result of said vertical tabs being maintained within said guide slots, and wherein said housing means is rigidly secured to said work surface by the vertical uprights being abutted against a lower portion of said work surface.



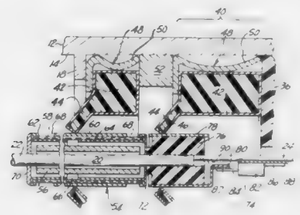
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**4,747,789**

## FILTER ELECTRICAL CONNECTOR WITH TRANSIENT SUPPRESSION

**Edward R. Gliha, Bainbridge, N.Y., assignor to Amphenol Corporation, Wallingford, Conn.**

**Filed Nov. 3, 1986, Ser. No. 926,478**
**Int. Cl.[4] H01R** *13/66*
**U.S. Cl. 439—620** **6 Claims**



1. An electrical filter connector assembly comprising:

a metallic shell defining an electrical ground,

an elongated generally cylindrical electrically conductive contact element mounted in the shell, said contact having a forward and rearward end portion each portion being adapted to be electrically connected to the shell ground,

first and second electrically conductive spring members each defining a central aperture and the apertures being coaxially aligned for receiving the contact element inserted therethrough, one said spring member completing a circuit path with said forward end portion and said shell and the other said spring member completing a circuit path with the rearward end portion and said shell,

circuit protection means for protecting a signal received by said contact element, said protection means comprising a capacitor element on said forward end portion and a diode element on said rearward end portion, the circuit protection means being in electrical circuit relation with the contact element and with the shell by way of said members.

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**4,747,790**

## CONNECTOR FOR PRINTED CIRCUIT BOARD

**Toru Masuda, Osaka, and Norio Ichitsubo, Yao, both of Japan, assignors to Hoiden Electronics Co., Ltd., Osaka, Japan**

**Filed Jun. 12, 1986, Ser. No. 873,663**
**Claims priority, application Japan, Jul. 18, 1985, 60-110147[U]; Oct. 16, 1985, 60–158005[U]**
**Int. Cl.[4] H01R** *9/09*
**U.S. Cl. 439—631** **5 Claims**

1. A connector for printed circuit boards, comprising:

a body for receiving contact pieces and printed circuit boards;

a locking piece situated within said body;

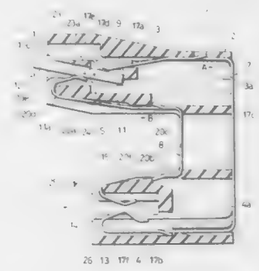
a first contact piece having a spring contactor defining a contact point; and

a second contact piece having a spring contactor defining a contact point, wherein:

said first and second contact pieces being mounted to said body for receiving a printed circuit board obliquely into said body, said contact points being displaced relative to each other in said body, with respect to the direction of insertion of the printed circuit board, so that the printed circuit board is in tight contact with the contact points when the obliquely inserted printed circuit board is situated substantially horizontally;

said body having an upper wall and a lower wall partly defining a space within which the printed circuit board is received for contact with said spring contactors and within which said locking piece is situated; and

the spring contactor of said first contact piece being situated near one of said walls and in contact with said locking piece and having a V-shaped portion defining the contact point of said first contact piece, and the spring contactor of said second contact piece being in contact with the outside surface of the other of said walls and having a laterally U-shaped front end with a V-shaped portion extending into said space and defining the contact point of said second contact piece.



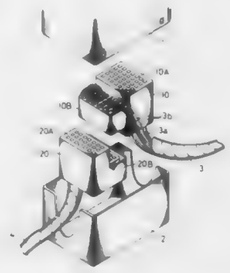
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**4,747,791**

## ELECTRICAL JUNCTION BOX

**Yukio Nishio, Shizuoka, Japan, assignor to Yazaki Corporation, Japan**

**Filed Feb. 17, 1987, Ser. No. 15,144**
**Claims priority, application Japan, Feb. 17, 1986, 61-20114[U]**
**Int. Cl.[4] H01R** *25/12*
**U.S. Cl. 439—638** **11 Claims**



1. An electrical junction box having a junction box body and at least two box connectors connectable to the junction box body in fitting engagement therewith to separately connect at least two cables to the junction box body, wherein each of said at least two box connectors comprises at least one cable connector for directly connecting the remaining wires of the two cables which are not connected to the junction box within the junction box, and the cable connectors are connected to each other when said box connectors are engaged with the junction box body.

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**4,747,792**

## MULTI-POLE PLUG CONNECTOR WITH CODING SYSTEM

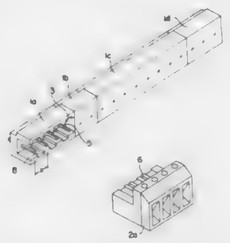
**Klaus Strate, Detmold, Fed. Rep. of Germany, assignor to C.A. Weidmüller GmbH & Co, Detmold, Fed. Rep. of Germany**

**Filed Mar. 4, 1987, Ser. No. 21,414**

**Claims priority, application European Pat. Off., Mar. 5, 1986, 86102927.0**

**Int. Cl.⁴ H01R** *13/645*

**U.S. Cl. 439—681** **7 Claims**



1. A multi-plug connector, comprising in combination

a strip including a plurality of plug parts or socket parts provided with different respective numbers of poles and arranged in a side by side assembly;

a plurality of corresponding socket parts or plug parts each having a different number of poles and each one individually and apart from the other ones, being insertaable into said strip to mate with a socket or plung part at a location along said strip having the same number of poles;

a plurality of insertion recesses provided in mating ones of said plug parts and said socket parts for inserting coding elements therein, and

contours provided on said plug parts and said socket parts which cooperate with one another in other than edge regions thereof, when said plug parts are plugged into said socket parts, said contours including projections and recess which are arranged in correspondence with a regular pattern having a predetermined pattern spacing and interfitting when an insertable plug or socket part is mated with an appropriate plug or socket part of said assembly of said strip;

said contours including corner edges deviating from said contours of said regular pattern so as to be purposely mismatched and non-fittingly collidable with the latter to prevent incorrect matching of an insertable plug or socket part with a plug or socket part of said assembly of said strip having a different number of poles.

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**4,747,793**

## BATTERY TERMINAL CONNECTOR

**Kiyohito Fukuda, and Takao Murakami, both of Shizuoka, Japan, assignors to Yazaki Corporation, Japan**

**Filed Nov. 17, 1986, Ser. No. 931,050**

**Claims priority, application Japan, Nov. 15, 1985, 60-174889[U]**

**Int. Cl.⁴ H01R** *4/38*

**U.S. Cl. 439—766** **4 Claims**

1. A battery terminal connector formed of a metal sheet material, which is punched and pressed from a single metal piece comprising:

a metal body, which is formed by folding the metal sheet material, having a post fixing portion, a stud bold fixing portion and a cylindrical portion;

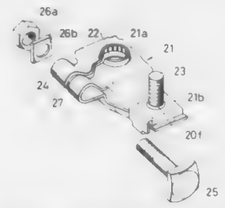
a fixing hole having a variable diameter for receiving a terminal post therein provided in the post fixing portion;

a stud bolt, which has a square head, provided in the stud bolt fixing portion;

a fastening bolt passing through the cylindrical portion for compressing of the diameter of the fixing hole;

said stud bolt fixing portion comprising an upper plate portion having a stud bolt hole formed therein and a lower plate portion of the metal sheet material further comprising;

a pair of wing portions adapted to be bent at a right angle to the plane of the sheet metal material provided in the lower plate portion to sandwich the square head of the stud bolt from the opposite sides thereof and support the square head upwardly; and




a pair of wing portions provided in the upper plate portion to embrace said wing portions provided in the lower plate portion which sandwiches the square head of the stud bolt, and the threaded portion of the stud bolt being projected through said stud bolt hole in the upper plate portion;

wherein said lower plate portion provided with a pair of wing portions is made of a single metal piece, whereby the strength of said wing portions of said lower plate portion is increased.

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**4,747,794**

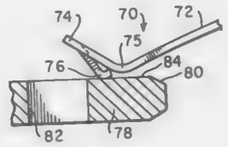
## ELECTRICAL CONNECTOR

**Jack Seidler, Flushing, N.Y., assignor to North American Specialties Corp., College Point, N.Y.**

**Filed Sep. 28, 1984, Ser. No. 656,137**

**Int. Cl.⁴ H01R** *13/05*

**U.S. Cl. 439—857** **12 Claims**




1. An electrical connector which comprises:

a pair of pin-and-socket type mating connector assemblies, each of which is adapted for sliding engagement with the other, to form an electrically conductive path from one assembly to the other;

one of said assemblies comprising a substantially rigid member, and the other of said assemblies comprising a resilient leaf member, each of the substantially rigid member and resilient leaf member having a free-standing end and each of the substantially rigid member and resilient leaf member being electrically conductive;

said substantially rigid member and resilient leaf member being positioned in their respective connector assemblies to have their free-standing ends contact each other upon the coupling of said connector assemblies thereby providing an electrically conductive path through the connector;

the resilient leaf member being biased toward the substantially rigid member so as to be adapted to slidably engage the substantially rigid member during the coupling and uncoupling of said connector assemblies;

said leaf member including a central bearing surface adjacent one end thereof which slides upon the other member during the coupling and uncoupling of the connector assemblies, and also including an electrical contacting surface area longitudinally spaced from said bearing surface;

said rigid member including an end having a central bearing surface and an electrical contacting surface area laterally displaced therefrom and adapted to cooperate with said leaf member contacting surface area;

the bearing surface of said leaf member being in the form of a protrusion adapted to cooperate with the bearing surface of said rigid member to maintain said electrical contacting surface areas separated during the coupling and uncoupling of the connector assemblies;

said rigid member including a reduced thickness portion dimensioned to receive said protrusion upon the substantially complete coupling of said connector assemblies to cause said electrical contacting surface areas of said members to engage each other to provide an electrically conductive path through the connector.



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**4,747,795**

## OUTBOARD ENGINE CONSTRUCTION ADAPTED FOR USE WITH DEEP DRAFT AND SHALLOW DRAFT VESSELS

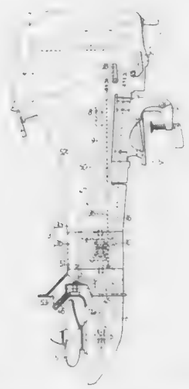
**Hiroshi Kawamura; Nobuo Haga, and Sukehiro Yamaguchi, all of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Feb. 17, 1987, Ser. No. 15,216**

**Claims priority, application Japan, Feb. 17, 1986, 61-32637**

**Int. Cl.⁴ B63H** *21/26*

**U.S. Cl. 440—75** **25 Claims**



1. An outboard engine construction comprising an extension case including means for attachment to a vessel, an engine, a gear case connected to said extension case, a propeller rotatably supported by said gear case, a drive shaft coupled to said engine and extending in said extension case, a gear assembly in said gear case drivingly coupled to said drive shaft and to said propeller for transmitting drive from the drive shaft to the propeller, said extension case comprising a primary upper case portion and an auxiliary lower case portion, said auxiliary lower case portion being detachably connectable to said upper case portion and said gear case in a first configuration of the engine construction in which the extension case is of maximum length, said upper case portion being detachably connectable directly to said gear case with said lower case portion removed in a second configuration of the engine construction in which the extension case is of minimum length, and a transmission supported in said lower case portion and including means for detachable connection with said drive shaft and said gear assembly when said lower case portion is connected between the upper case portion and the gear case, said construction in said first configuration providing a first transmission path between the drive shaft and the gear assembly including said transmission whereas in said second configuration a second transmission path is provided directly between the drive shaft and the gear assembly without said transmission whereby in said first configuration the length of said extension case and the gear ratio of said first transmission path is adapted to a vessel of deep draft and in said second configuration the length of said extension case and the gear ratio of said second transmission path is adapted to a vessel of shallow draft said gear ratio of said first transmission path being different than said gear ratio of said second transmission path.

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**4,747,796**

## SMOOTHING DEVICE FOR ROTATION OF PROPELLER OF BOAT PROPULSION MACHINE

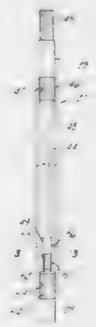
**Tomio Iwai, Hamamatsu, and Minoru Kawamura, Iwata, both of Japan, assignors to Sanshin Kogyo Kabushiki Kaisha, Japan**

**Continuation of Ser. No. 722,227, Apr. 11, 1985, abandoned. This application Oct. 14, 1986, Ser. No. 919,604**

**Claims priority, application Japan, Apr. 12, 1984, 59-71846**

**Int. Cl.⁴ B63H** *21/28*

**U.S. Cl. 440—83** **6 Claims**



1. In a marine drive having an output shaft driven by an engine having firing impulses, a drive shaft housing rotatably journaling a drive shaft, a lower unit fixed to said drive shaft housing and journaling a propeller shaft for powering an associated watercraft and coupling means for drivingly coupling said output shaft and said drive shaft, the improvement comprising said coupling means including an elongated torsion bar fixed at one end for rotation with said output shaft, a first element fixed to the other end of said torsion bar and said drive shaft, a tubular element fixed at one end to said torsion bar and encircling said torsion bar and terminating contiguous to the other end thereof, a lost motion connection between said first and said tubular elements defined by a first pair of spaced apart lugs permitting a predetermined degree of relative rotation therebetween corresponding to the low speed firing impulses of said engine, said torsion bar providing a first relatively low torsional resistance to absorb low load vibrations during said predetermined degree of relative rotation, resilient stop means surrounding one of said lugs for providing a resilient transmission of high loads after said first and tubular elements have undergone said predetermined degree of relative rotation, and a second pair of spaced apart lug means on said first and said tubular elements providing positive stop means for limiting the deflection of said resilient stop means.

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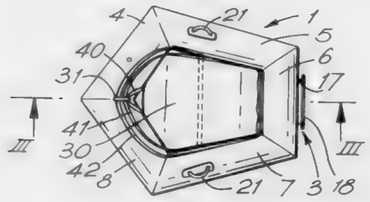


4,747,797

## MAN OVERBOARD RETRIEVAL APPARATUS

John D. Hindle, 57 Beech Grove, Guilford, Surrey, England

PCT No. PCT/GB86/00036, § 371 Date Oct. 8, 1986, § 102(e) Date Oct. 8, 1986, PCT Pub. No. WO86/04312, PCT Pub. Date Jul. 31, 1986
PCT Filed Jan. 20, 1986, Ser. No. 912,336
Claims priority, application United Kingdom, Jan. 22, 1985, 8501540; Dec. 23, 1985, 8531577
Int. Cl.[4] B63C 9/04
U.S. Cl. 441—38 18 Claims




1. Man overboard retrieval apparatus comprising:
an inflatable life buoy (1,101) with a configuration having an upper part (4,5,6,7,8,10; 109,110) which is downwardly concave—when floating in a use position—and is of a size to at least partially accommodate the torso of a man; and
a sling (30; 115) for lifting the man arranged at the upper part of the life buoy, the sling (30; 115) having one or more man supporting members (40,41,42) and a lifting eye (31) to which the supporting member(s) (40,41,42) is/are secured, said sling being completely detachable from said life buoy for lifting the man from said life raft;
the eye (31) being so carried by the life buoy (1; 101) as to be easily detached therefrom for lifting of the man with the supporting member(s) extending down from the eye to liftingly support the man whereby, in a rescue operation, said sling separates from said life buoy so the man is lifted in said sling to the rescue craft while said life buoy remains in the water.

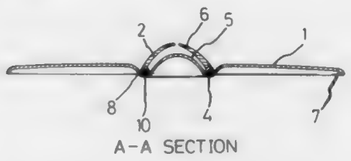
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4,747,798

## FLYING DISH

Te-Cheng Wang, No. 2-1, Alley 3, Lane 53, Nanking E. Rd., Sec. 4; Wen-Tang Liu, No. 2, Alley 8, Lane 62, Hsi-Tsang Rd., both of Taipei, and Ke-Chang Lu, 9F.-3, No. 154, Kuan-Chien W. Rd., Pan-Chiao City, Taipei, all of Taiwan

Filed Feb. 25, 1987, Ser. No. 18,540
Int. Cl.[4] A63H 27/00
U.S. Cl. 446—47 11 Claims




1. A flying dish adapted to fly through the air, said dish having:
a center; an annular area surrounding said center located on one surface of said dish;
a plurality of petals pivotally mounted to said dish at said annular area; each said petal being pivotable between lying down over said dish surface at said center of said dish and being upraised off said center of said dish.

4,747,799

## ROTATION COUPLING DEVICE WITH MEANS FOR SUPPRESSING STATIONARY WAVE VIBRATIONS

Kiyomitsu Kato, Shimada, Japan, assignor to Yazaki Corporation, Tokyo, Japan

Continuation of Ser. No. 678,047, Dec. 4, 1984, abandoned. This application Jan. 14, 1987, Ser. No. 6,352
Claims priority, application Japan, Dec. 6, 1983, 58-187502[U]
Int. Cl.[4] F16C 1/06, 1/28
U.S. Cl. 464—52 6 Claims




1. A rotation coupling device for use between a drive member and a driven member for suppressing stationary wave vibrations, said device comprising:
a tubular sheath;
a flexible rotating shaft inserted through said tubular sheath; and
a plurality of longitudinally spaced means for suppressing stationary wave vibrations occurring along said flexible rotating shaft during rotation thereof, each said means comprising a tubular sheath joint mounted on said tubular sheath, and each said means being disposed at an antinodal point of the stationary wave vibration; and
wherein said tubular sheath comprises a plurality of tubular portions, and said tubular sheath joint comprises a cylindrical body having an inner diameter substantially corresponding to the outer diameter of said tubular sheath portions, said tubular sheath joint further comprising a radially inwardly protruding annular member formed on the inner surface of said cylindrical body having an inner diameter slightly larger than the outer diameter of the rotating shaft; said tubular portions of said sheath being joined by inserting their respective ends into said cylindrical body.

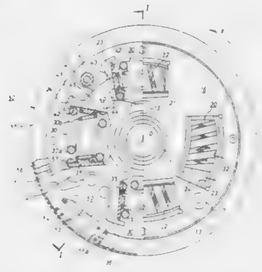
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4,747,800

## DAMPER DISC WITH SERIAL TORSION SPRINGS

Hiroshi Takeuchi, Osaka, Japan, assignor to Kabushiki Kaisha Daikin Seisakusho, Osaka, Japan

Continuation of Ser. No. 758,997, Jul. 25, 1985, abandoned. This application Dec. 22, 1986, Ser. No. 943,852
Claims priority, application Japan, Jul. 31, 1984, 59-162340
Int. Cl.[4] F16D 3/14
U.S. Cl. 464—64 5 Claims



1. A damper disc with serial torsion springs, in which a pair of projecting hub-side flanges protruding radially outwardly are provided on a central hub, a pair of side plates fitting rotatably onto the hub and having holes extending in a disc circumferential direction are disposed on both sides of said pair of hub-side flanges, a pair of retainers having respectively a pair of retainer-side flanges fitting rotatably onto the hub and protruding in a disc radial direction are disposed inbetween the hub-side flanges and the side plates, a coil spring assembly extending approximately in the disc circumferential direction is interposed between each of said retainer-side flanges and each of said holes of the side plates and the hub-side flange to resiliently couple the hub and the side plates in the disc circumferential direction; characterized by that said retainer-side flanges of said retainers are circumferentially aligned with one another and are relatively rotatable in circumferentially opposite directions and each said coil spring assembly is composed of a high-rigidity large-diameter outer main spring and a low-rigidity smalldiameter inner sub spring fitted coaxially in said outer spring, one side surface of each of said pair of retainer-side flanges of one of said pair of retainers has a projection protruding from said one side surface into one end of an outer main spring of a respective coil spring assembly and into contact with one end of the sub spring in said outer main spring of said respective spring assembly for compressing said sub spring in said outer main spring before compression is commenced in said outer spring, the opposite side surface of the other of said retainer-side flanges of said other of said pair of retainers has a projection protruding from its side surface into one end of an outer main spring of another of said coil sring assemblies, and into contact with one end of the sub spring in the outer main spring of said another spring assembly for compressing said contacted sub spring in said main spring before compression is commenced in said outer spring of said another assembly, said sub spring compression of said inner sub springs before compression in said outer springs commences taking place during the initial stage of twisting of the disc in said circumferentially opposite directions.



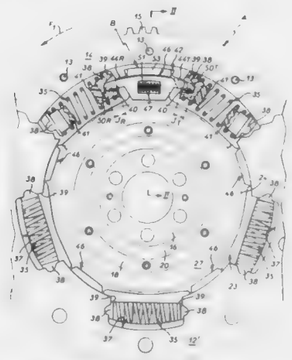
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4,747,801

## DAMPER-TYPE FLYWHEEL SUITABLE FOR AUTOMOBILE TRANSMISSIONS

Gustave Chasseguet, Taverny, and Jacques Paquin, Villeneuve-la-Gareane, both of France, assignors to Valeo, Paris, France

Filed Jan. 22, 1987, Ser. No. 6,167
Claims priority, application France, Jan. 22, 1986, 86 00854
Int. Cl.[4] F16D 3/14; F16F 15/12
U.S. Cl. 464—66 14 Claims



1. Damper-type multi-part flywheel comprising a first flywheel part, two spaced annular flanges on said first flywheel part, a second flywheel part coaxial with said first flywheel part, said first and second flywheel parts being rotatable relative to each other, at least one annular flange on said second flywheel part disposed between said annular flanges on said first flywheel part, friction means operative between said first and second flywheel parts for relatively small amounts of relative displacement between them, at least two circumferentially acting spring members operative between said first and second flywheel parts in conjunction with said friction means for relatively large amounts of relative displacement between them, openings in said annular flanges of said first flywheel part accommodating said spring members, arms on said at least one flange of said second flywheel part cooperating with said spring members, resilient centering means between said first and second flywheel parts so as to provide clearance in each circumferential direction between said spring members and said arms in an inoperative configuration of the flywheel, and at least one circumferential spacer disposed circumferentially between two of said spring members and bearing circumferentially on said two spring members, said resilient centering means being operatively disposed between said at least one flange and said spacer.

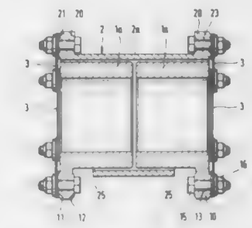
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4,747,802

## RESILIENT LINK SHAFT COUPLING

Friedrich Hille, Schwerte, Fed. Rep. of Germany, assignor to Firma Heinrich Deach KG, Arnsberg, Fed. Rep. of Germany

Filed Nov. 19, 1986, Ser. No. 932,743
Claims priority, application Fed. Rep. of Germany, May 24, 1986, 3617578
Int. Cl.[4] F16D 3/62, 3/79
U.S. Cl. 464—69 3 Claims



1. An elastic shaft coupling consisting essentially of two identical flanged hubs and a flanged hollow shaft adapted to receive cylindrical parts of said identical hubs with predetermined play, one end of each of the two hubs being linked to the hollow shaft by means of a respective resilient ring element bolted alternatingly to the flange of the hub and the flange of the hollow shaft with bolts parallel to the axis of said shaft, the ring elements comprising individual polygonally arranged resilient links, the flanges having radial stops formed thereon, the hub flanges and hollow shaft flanges projecting radially outwardly in the same transverse plane radially outside the hollow shaft, the hollow shaft being provided with axially extending recesses through which the hub flanges extend, the recesses having axial lengths greater than the axial lengths of the flanges, the hollow shaft being more than twice a hub length, and the elastic ring element bolts being bolted frontally to the coupling.

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4,747,803

## TRIPOD HOMOKINETIC UNIVERSAL JOINT WITH CYLINDRICAL ROLLERS AND A FLAT ROLLER GUIDE

Kei Kimata, Ama; Masahiro Kato; Fumio Hoshikawa, both of Iwata, and Hisashi Takahashi, Takarazuka, all of Japan, assignors to NTN Toyo Bearing Co., Ltd., Osaka, Japan

Filed Sep. 16, 1986, Ser. No. 907,912
Claims priority, application Japan, Sep. 17, 1985, 60-141669[U]
Int. Cl.[4] F16D 3/20
U.S. Cl. 464—111 6 Claims

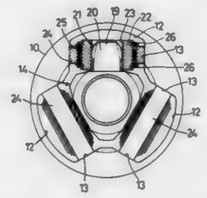
1. A homokinetic universal joint comprising:
a tripod member having three trunnions projecting radially and equally angularly spaced about its axis, each of said trunnions having an opposed pair of flat surfaces parallel to a plane perpendicular to the axis of said tripod member,

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said trunnions also having an opposed pair of cylindrical surfaces with an axis parallel to the axis of said tripod member;

an outer member formed with an inner surface having three track grooves, said track grooves extending axially and equally angularly spaced around an axis of said outer member, said tripod member being mounted in said outer member with said trunnions being received in respective track grooves in said outer member, said track grooves being formed with a pair of roller guide surfaces, said roller guide surfaces being flat and parallel to a plane



including the axis of said outer member and a center of said track groove;

a cylindrical roller member mounted on each of said trunnions, said cylindrical roller being guided on said roller guide surfaces; and

a ring interposed between said each cylindrical roller and said each trunnion, said ring being supported to be turnable around an axis which is perpendicular to the axis of said trunnion and parallel to the axis of said tripod member, said ring being formed with a square hole, wherein a rotation is transmitted between said outer member and said tripod member through said cylindrical roller.

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**4,747,804**

## PROTECTOR FOR UNIVERSAL JOINTS

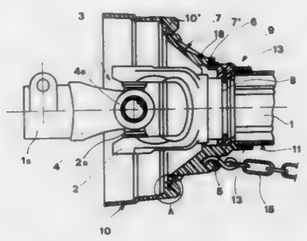
**Rolando Benzi, Cassano d'Adda, Italy, assignor to Benzi & Di Terlizzi s.n.c., Cassano d'Adda, Italy**

**Continuation of Ser. No. 705,555, Feb. 26, 1985, abandoned. This application Jul. 8, 1986, Ser. No. 883,134**

**Claims priority, application Italy, Mar. 1, 1984, 19873 A/84**

**Int. Cl.⁴ F16P *1/00***

**U.S. Cl. 464—170** **8 Claims**



1. A protector for use around a universal joint, such as the joint in the power take-off of a motor vehicle, comprising a one-piece first component including a rigid first substantially tubular section having a first end and a second end, a substantially frustoconical section less rigid than said first section and having a smaller-diameter end portion integral with one end of said tubular section and larger-diameter end portion, and a flexible second substantially tubular section less rigid than said frustoconical section and having two ends one of which is integral with said larger-diameter end portion; and an annular second component having internal first coupling means for rotatably securing the second component to a part of the joint and second coupling means for securing the second component to said first component.

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**4,747,805**

## PROTECTIVE BOOT ASSEMBLY FOR CONSTANT VELOCITY UNIVERSAL JOINT

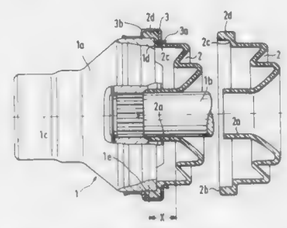
**Hans-Heinrich Welschof, Rodenbach, and Rudolf Beier, Offenbach am Main, both of Fed. Rep. of Germany, assignors to Löhr & Bromkamp GmbH**

**Filed Feb. 3, 1987, Ser. No. 10,398**

**Claims priority, application Fed. Rep. of Germany, Feb. 5, 1986, 3603389**

**Int. Cl.⁴ F16C *1/26***

**U.S. Cl. 464—175** **4 Claims**



1. In a protective boot assembly particularly for a constant velocity universal joint having a driving shaft, an inner joint member, an outer joint member, rolling members which are guidable at half an angle of said joint through which torque is transmitted and a cage holding said rolling members, said protective boot assembly including a boot made of plastic material suitable for being injection molded bridging and sealing a free space between said driving shaft and driven parts of said joint, wherein rotation-symmetrical fixing and securing means embracing said boot are provided, the improvement comprising that said boot is formed with folds which are axially undercut-free arranged in a sawtooth-like cross-sectional configuration with said boot having an inner smaller diameter part inwardly turned facing toward said outer joint member and extending in sealing engagement against said driving shaft at least approximately parallel with a central axis of said universal joint over a defined distance, that said boot includes a larger diameter outer end provided with an axial portion and a radial portion defining a radial shoulder resting in sealing engagement against a correspondingly shaped end face formed on said outer joint member, with said axial portion of said larger diameter outer end of said boot adjoining said radial shoulder being supported in sealed engagement on an outer circumference of said outer joint member, and that said larger diameter outer end of said boot is arranged in secured engagement and surrounded by a rotation-symmetrical relatively thin cap making use of its own resilience, wherein said cap has an inner diameter which is samller than a tensioned diameter of said outer joint member, said inner smaller diameter part of said boot being designed without any fixing means in such a manner that it abuts said inner joint member by one of direct abutment and engaged thru a sleeve means provided between the end of said inner smaller diameter part and the axial limit of said joint member.



**4,747,806**

## DETACHABLE FLANGE CONNECTION FOR TORQUE TRANSMITTING DRIVE SHAFT PARTICULARLY FOR CONNECTING TWO PARTS OF A CARDAN DRIVE SHAFT FOR MOTOR VEHICLES

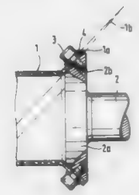
**Werner Krude, and Werner Hoffmann, both of Siegburg, Fed. Rep. of Germany, assignors to Uni-Cardan Aktiengesellschaft, Siegburg, Fed. Rep. of Germany**

**Continuation of Ser. No. 816,382, Jan. 6, 1986, abandoned. This application Aug. 13, 1987, Ser. No. 86,213**

**Claims priority, application Fed. Rep. of Germany, Jan. 31, 1985, 3503194**

**Int. Cl.⁴ F16D *1/02*; B60K *17/22***

**U.S. Cl. 464—182** **5 Claims**



1. A detachable flange connection assembly for joining together at their ends a pair of longitudinal members made of different materials for transmission of torque, comprising:

a first longitudinal tubular member made of fiber-reinforced plastic and consisting essentially of fibers wound at a fiber angle $\alpha$ taken relative to a longitudinal axis of said first member;

a first flange at an end of said first member formed integrally therewith shaped as a uniformly outwardly tapering frustum extending at a flange angle $\beta$ relative to said longitudinal axis;

said flange angle $\beta$ and said fiber angle $\alpha$ being at least approximately equal to each other to ensure that fibers of the tubular member are wound on shortest possible geodetic lines, thereby becoming nonslip;

a second member made of metal having a second flange thereon formed integrally therewith, said second flange being formed with a frustoconical surface having an angle of inclination which corresponds to said flange angle $\beta$ and being in abutment with said first flange; and

connecting means extending through said first and second flanges detachably and nondestructively joining said first and second members together.

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**4,747,807**

## CONTROL SYSTEM FOR AN INFINITELY VARIABLE TRANSMISSION

**Hiroyuki Nakamura, Higashiyamato, and Yoshihiko Morimoto, Mitaka, both of Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 25, 1986, Ser. No. 843,963**

**Claims priority, application Japan, Jun. 29, 1985, 60-143462**

**Int. Cl.⁴ B60K *41/16***

**U.S. Cl. 474—28** **11 Claims**

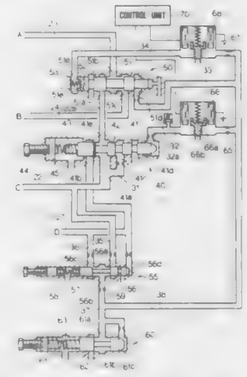
1. In a control system for an infinitely variable transmission for transmitting power of an internal combustion engine, the transmission comprising a drive pulley having a hydraulically shiftable disc and the system including a hydraulic cylinder for shifting the disc, the transmission comprising a driven pulley having a hydraulically shiftable disc and the system including a hydraulic cylinder for shifting the disc of the driven pulley, the transmission comprising a belt engaged with both pulleys, the system including a first hydraulic circuit having a pump for supplying oil to both of the hydraulic cylinders, and a transmission ratio control valve having a shiftable spool for controlling the oil supplied to the cylinder of the drive pulley to change the transmission ratio, the improvement in the system wherein:

the transmission ratio control valve having chambers at both ends of the spool respectively;

a second hydraulic circuit for supplying oil therein to the chambers;

control valve means provided in the second hydraulic circuit for controlling flow rate of the oil supplied to at least one of the chambers of the transmission ratio control valve for shifting the spool;

sensing means for sensing load on the engine and conditions of the transmission and for producing operating condition signals dependent on the load and conditions;



means for detecting rate of change of the load on the engine and for producing a load changing rate signal; and

means comprising a control unit responsive to the operating condition signals from the sensing means and to the load changing rate signal for producing an output signal for controlling operation of the control valve means so that shifting speed of the spool is variably controlled by the control valve means to variably control the transmission ratio changing speed.

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**4,747,808**

## SYSTEM FOR ACTUATING THE DISPLACEABLE PULLEY IN A CONTINUALLY VARIABLE TRANSMISSION

**Richard D. Moan, Livonia, Mich., assignor to Ford Motor Company, Dearborn, Mich.**

**Filed Jan. 8, 1987, Ser. No. 1,592**

**Int. Cl.⁴ F16H *11/02***

**U.S. Cl. 474—28** **7 Claims**

1. A system for hydraulically actuating a displaceable sheave of a continually variable transmission comprising:

a source of pressurized hydraulic fluid;

a pressurizable cylinder having its volume hydraulically connected to the sheave;

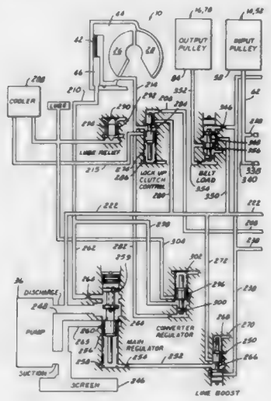
control valve means for hydraulically connecting the source of pressurized fluid and the cylinder;

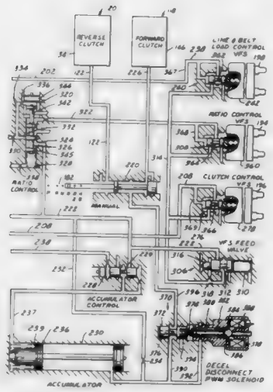
a metering orifice located in a hydraulic circuit between the control valve and the cylinder; and

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feedback means for opening and closing said control valve means between the source of pressurized fluid and the

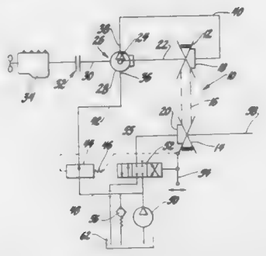




cylinder in accordance with a pressure drop across the metering orifice.

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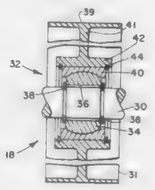
**4,747,809**
**HYDRAULIC CONTROL FOR A CONTINUOUSLY VARIABLE TRANSMISSION**
**Hamid Vahabzadeh, Rochester Hills, Mich., assignor to General Motors Corporation, Detroit, Mich.**
**Filed Jun. 15, 1987, Ser. No. 61,955**
**Int. Cl.[4] F16H *11/02***
**U.S. Cl. 474—28** **1 Claim**



1. A torque sensitive squeeze control system for a variable ratio pulley drive mechanism comprising: input drive shaft means for transmitting input torque; input pulley means having a movable sheave and control means for controlling the movement thereof; output pulley means having a movable sheave; belt means for frictionally transmitting torque between said pulleys as determined by the squeeze force imposed thereon by said movable sheave of said input pulley means and being operable at a plurality of pitch diameters on said pulleys as determined by the position of said movable sheave on said output pulley means; and hydraulic fluid translating means having two fluid pump members with one fluid pump member drivingly connected with said input drive shaft means, the other fluid pump member drivingly connected with said input pulley means for transmitting torque to said input pulley means, fluid conduit means connected between said fluid translating means and said control means for directing fluid pressure to said control means at a pressure level proportioned to the torque transmitting by said input drive means when said fluid pump members are rotating at the same speed to control the squeeze force on the belt means at a value proportional to the torque transmitted, said fluid translating means being effective to increase the squeeze force at said input pulley means when said one fluid pump member is rotating faster than said other fluid pump member.

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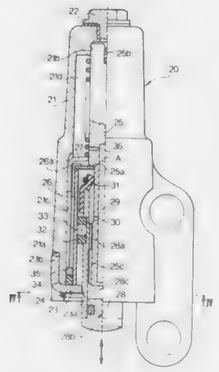
**4,747,810**
**BELT DRIVE WITH SELF-ALIGNING IDLER**
**Laurel A. Shepley, Wapello, Iowa, and Rodney G. Koertner, Auburn, Wash., assignors to Deere & Company, Moline, Ill.**
**Continuation of Ser. No. 56,376, Jul. 10, 1979, abandoned. This application Oct. 14, 1981, Ser. No. 311,374**
**Int. Cl.[4] F16H *7/12***
**U.S. Cl. 474—135** **8 Claims**



1. In a belt drive including drive and driven sheaves respectively supported for rotation about a pair of fixed, parallel shafts, a belt trained about the sheaves, a fixed pivot located adjacent a run of the belt, and extending parallel to said shafts, an idler means carrier, an idler shaft extending parallel to said pivot, an idler pulley means being rotatably mounted on the idler shaft and including rim means having axially spaced opposite ends, said carrier being mounted to the pivot for movement toward and away from the run of the belt with the rim means being located for engaging and tensioning said belt and biasing means coupled to the carrier for urging the latter toward the belt for maintaining the idler means in engagement therewith, the improvement comprising: said idler shaft forming a part of one of said idler pulley means and idler means carrier; a self-aligning bearing means universally pivotally connecting said carrier to one of said idler pulley means and pivot for relative universal movement, about a point located equidistant from said opposite ends of the rim means of the pulley means, in response to unbalanced belt forces.



**4,747,811**
**AUTOMATIC BELT TENSIONER**
**Shuji Sawafuji, Higashimurayama; Masahiro Ozawa, Akikawa, and Hiroshi Yoshikawa, Mitaka, all of Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan**
**Filed Jan. 21, 1987, Ser. No. 6,503**
**Claims priority, application Japan, Jan. 25, 1986, 61-14424**
**Int. Cl.[4] F16H *7/12***
**U.S. Cl. 474—135** **2 Claims**

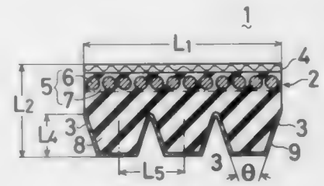


1. An automatic belt tensioner comprising:
a substantially vertically disposed cylindrical body having an axial chamber;
a shaft having an oil reservoir in a lower portion thereof and having an external thread and rotatably mounted in the chamber of the body;
a torsion spring provided between the body and the shaft so as to urge the shaft in a rotational direction;
a cylindrical rod having an axial bore and an internal thread provided at an intermediate portion with respect to axial length of the bore and engaged with the external thread of the shaft;
the rod having a lower end being projected from the body so as to be operatively connected to a tension pulley for tensioning a belt;
holding means for holding the rod so as to permit axial movement of the rod;
means for circulating oil between the oil reservoir in the shaft and the bore below the internal thread of the rod;
sealing means for preventing the oil from leaking out of the rod;
the torsion spring and both the threads being arranged to project the rod by the rotation of the shaft urged by the torsion spring.

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**4,747,812**
**V-RIBBED BELT AND THE METHOD OF MANUFACTURING THE SAME**
**Hiroshi Matsuoka, and Masaki Ochiai, both of Osaka, Japan, assignors to Bando Chemical Industries, Ltd., Hyogo, Japan**
**Filed Apr. 25, 1986, Ser. No. 855,978**
**Int. Cl.[4] F16G *5/06***
**U.S. Cl. 474—252** **3 Claims**

1. A method of manufacturing a V-ribbed belt characterized in that it is the method of manufacturing a belt having a plurality of ribs on a belt base along the lengthwise direction of belt, whereby a canvas, an unvulcanized rubber sheet, a load carrier, another unvulcanized rubber sheet and a non-woven fabric are wound in the order given on the outer circumferential surface of a rubber sleeve fitted on a forming metal mold so as to form a cylindrical unvulcanized body, said unvulcanized body is detached from said forming metal mold and from said rubber sleeve and then a vulcanization forming process is carried out with said non-woven fabric of said unvulcanized

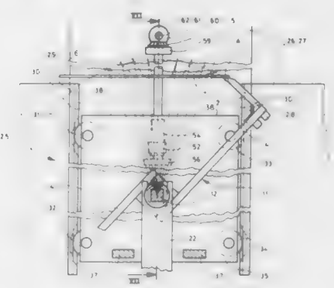




body applied to rib grooves of a vulcanizing mold and molded therewith and molded thereon.

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**4,747,813**
**DEVICE FOR FOLDING A REAR FLAP OF A BOX BLANK**
**Jean-Marc Genood, Bussigny, and Ivan Vaclavik, Cugy, both of Switzerland, assignors to Bobst SA, Switzerland**
**Filed Apr. 13, 1987, Ser. No. 37,874**
**Claims priority, application Switzerland, Apr. 15, 1986, 1483/86**
**Int. Cl.[4] B31B *1/26, 3/54***
**U.S. Cl. 493—10** **9 Claims**

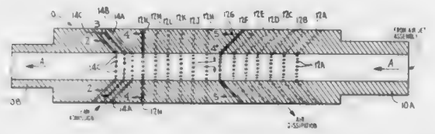


1. In a device for folding a flap on a back edge of a box blank, said device including a frame means for conveying the blank along a path over the frame a rotatable shaft having two folding hook members facing in the same direction of rotation for engaging the rear flap and folding the flap over onto the blank as the blank moves along the path, the improvements comprising said hook member being axially adjustable on said shaft, said device including a cradle having two side plates being mounted in the frame for a sliding movement in a slide path extending perpendicular to the path of the blank, a drive motor being connected by a speed reducer to said rotatable shaft, said drive motor speed reducer and shaft being mounted in said cradle for movement therewith, and means for shifting the cradle on said slide path.

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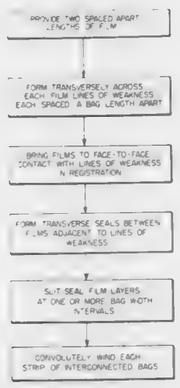
**4,747,814**
**FIBER SEPARATOR**
**Richard M. Berger, Midlothian, Va., assignor to American Filtrona Corporation, Richmond, Va.**
**Filed Jul. 23, 1986, Ser. No. 888,211**
**Int. Cl.[4] A24D** *3/02*; **B65G** *53/52*; **B65H** *51/16*
**U.S. Cl. 493—44** **4 Claims**



1. In an apparatus for the manufacture of filter rod material from a fibrous tow including a conduit means through which the tow is to be conveyed pneumatically to a steam injection station, gas injection means for delivering conveying gas to the conduit means for conveying the tow therethrough in one direction of travel, and a gas dissipation means for discharging the gas from the conduit means downstream from the injection means, the improvement wherein the gas dissipation means includes at least one ring of circumferentially spaced gas dissipation ports in the conduit means adapted for reducing the tendency of tow fibers to hang on said ports and increasing the tendency of the fibers to become bent back at their edges, said ports being inclined rearwardly for outflow of gas from the conduit means in a second direction which is counter-current to the direction of travel of the tow through the conduit means.

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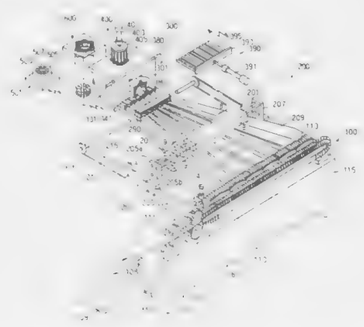
**4,747,815**
**COLLECTION OF BAGS AND METHOD OF PREPARING THE SAME**
**Gordon L. Benoit, Macedon; James R. Gavin, Pittsford; Ned R. Pendleton, Macedon, and William Randolph, Marion, all of N.Y., assignors to Mobil Oil Corporation, New York, N.Y.**
**Continuation of Ser. No. 729,832, May 2, 1985, abandoned. This application Nov. 17, 1986, Ser. No. 931,885**
**Int. Cl.[4] B65B** *1/14*; **B65D** *30/02*
**U.S. Cl. 493—194** **5 Claims**




1. A method of preparing a collection of thin thermoplastic interconnected bags comprising:
(a) providing two separated thermoplastic films, each film being less than 0.75 mils and of at least approximately the same width and of a length suitable for the formation of one or more lengths of interconnected bags;
(b) forming, transversely across each film, lines of weakness extending from one edge of each film to the other, with each line spaced from the next a bag length distance apart;
(c) bringing said films together in face-to-face relationship with the lines of weakness across one film in registration with those of the other film;
(d) sealing the films transversely along lines parallel with and immediately adjacent to the lines of weakness;
(e) slit-sealing the film layers at one or more bag width intervals to complete individual but interconnected bag structures; and
(d) collecting each strip of interconnected bags into a volumetrically efficient form.

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**4,747,816**
**APPARATUS FOR MAKING A FILTER FROM A MATERIAL FOR A FILTER ELEMENT**
**Harukaza Matsuyama, Takahama; Tetsuo Kato, Toyota; Yasuo Hibi, Oobu; Satoshi Inukai; Masanori Suzuki, both of Kariya, and Yoshimitsu Yamaguchi, Anjo, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan**
**Filed Apr. 21, 1987, Ser. No. 41,005**
**Claims priority, application Japan, Apr. 28, 1986, 61-99236; May 2, 1986, 61-102745; May 2, 1986, 61-102746**
**Int. Cl.[4] B31F** *1/34*
**U.S. Cl. 493—407** **4 Claims**

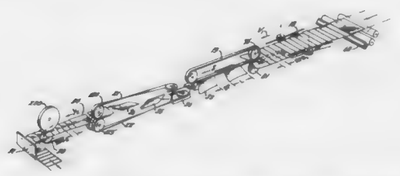


4. An apparatus for making a filter from a material for a filter element, comprising:
a contracting apparatus for contacting a continuously corrugated strip of material for a filter element so that a distance between adjacent ridges of said corrugated strip is reduced, said contracting apparatus including:
a guide plate on which said strip slides in a direction perpendicular to a direction in which said strip is contracted;
said guide plate including a plurality of guide grooves extending in a direction substantially perpendicular to said direction in which said strip is contracted, said grooves being spaced apart from one another by a distance which decreases from one end of said guide plate to the other;
a plurality of lower guide members mounted for moving together along said guide grooves, while supporting said strip thereon in such a manner that each of said lower guide members engages in a respective valley formed in a lower surface of said strip; and
a plurality of upper guide members each located between a pair of adjacent lower guide members and spaced apart from one another by a distance which decreases with the movement of said upper guide members from said one end of said guide plate to said other end thereof, said upper guide members supporting said strip in such a manner that each of said upper guide member engages in a respective valley formed in an upper surface of said strip,
a rounding apparatus for rounding the continuously corrugated strip of the material for the filter element so that both ends of said strip are connected to each other, said rounding apparatus including:
a back plate having a flat surface;
a plurality of holding blocks connected to each other and provided on said flat surface of said back plate, said holding block having a holding space in which said corrugated strip of material for a filter element is held;
block connecting means rotatably connecting adjacent pairs of said holding blocks on said flat surface of said back plate;
block pivoting means for pivoting two of said plurality of holding blocks on said back plate;
block moving means connected to both ends of said plurality of holding blocks for moving said plurality of holding blocks in such a manner that said plurality of holding blocks form a circle with both ends of said holding blocks abutting each other; and
attaching means for detachably attaching both ends of said holding blocks to each other, and
a shaping apparatus for shaping the continuously corrugated strip of material for the filter element both ends of which are connected to each other so that the continuously corrugated strip forms a circle, said shaping apparatus including:
a shaping block having a bore defined therethrough and a core member mounted within said bore, the sectional shape between an inner wall of said shaping block which defines said bore and an outer wall of said core member at one end of said shaping block being the same shape as the continuously corrugated strip of material so that the continuously corrugated strip of material can be inserted between said inner wall and said core member, the sectional shape between the inner wall of said shaping block and the outer wall of said core member at the other end of said shaping block being a predetermined shape of the filter element and an area of the sectional shape between the inner wall of said shaping block and the outer wall of said core member between said one end and said other end of said shaping block being continuously reduced from said one end to said other end of said shaping block; and
pushing means for pushing the continuously corrugated strip of material within said bore from said one end of said shaping block toward said other end of said shaping block.



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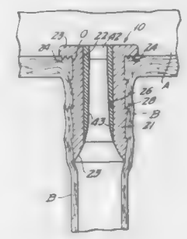
**4,747,817**
**HIGH SPEED SIGNATURE MANIPULATING APPARATUS**
**John R. Newsome, R.R. #1, Box 58A, Shumway, Ill. 62461**
**Filed Jul. 3, 1986, Ser. No. 882,073**
**Int. Cl.[4] B65H** *45/22*
**U.S. Cl. 493—438** **17 Claims**



17. Apparatus for making quarter folded signatures from half folded signatures, comprising in combination
(a) means for feeding in half folded signatures as a first shingle running in a given plane downstream along a path,
(b) conveyor means for receiving signatures from said means (a) and individually accelerating each one so that they travel along said path seriatim and in spaced-apart relation at a given speed S,
(c) means associated with said conveyor means for folding each signature essentially about its centerline which is parallel to said path, thereby to create a quarter folded signature disposed in a plane lying transverse to said given plane,
(d) means downstream of said means (c) for decelerating the quarter folded signatures and forming them into a second running shingle,
(d1) said means (d) including a moving barrier surface for affirmatively intercepting the successive leading edges of successive signatures arriving seriatium to slow and guide them to a moving conveyor surface traveling at a velocity slower than said speed S, said conveyor surface being oppositely disposed from said barrier surface to create a moving V-shaped throat.

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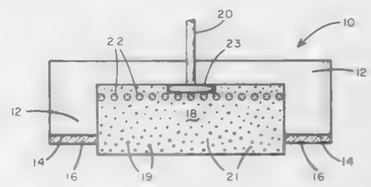
**4,747,818**
**STABILIZING DISTURBED ARTERIAL BLOOD FLOW BY ALTERATION OF INFLOW ADMITTANCE**
**Donald Edelschick, 9 Trap Rock Clr., New City, N.Y. 10956**
**Continuation of Ser. No. 640,934, Aug. 15, 1984, abandoned. This application Jan. 13, 1987, Ser. No. 5,341**
**Int. Cl.[4] A61M** *5/00*
**U.S. Cl. 604—8** **6 Claims**



1. A device for altering blood flow to be positioned at an opening between a first artery and a larger second artery through which blood flows into said first named artery from said second, larger artery,
said first artery having an input impedance,
said second, larger artery having an admittance phasor,
and said device comprising:
a plug having a central passageway therethrough adapted to receive an insert, and
said insert having an interior passageway therethrough which when said insert is positioned in said central passageway alters the admittance phasor to match the input impedance.

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**4,747,819**
**IONTOPHORETIC DRUG DELIVERY**
**Joseph B. Phipps, Plymouth, and Darrel F. Untereker, Cedar, both of Minn., assignors to Medtronic, Inc., Minneapolis, Minn.**
**Filed Oct. 29, 1984, Ser. No. 665,699**
**Int. Cl.[4] A61N** *1/00*, *1/30*
**U.S. Cl. 604—20** **6 Claims**



1. An improved method of iontophoretic drug delivery wherein an electrochemically active component of either the anode or the cathode of the iontophoresis device is intentionally comprised of a material that effets oxidation/reduction

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without being consumed to produce a species which interacts with an intentionally selected drug in which a corresponding weak acid/weak base form is selected to be delivered, so that water hydrolysis products are minimized.

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**4,747,820**

## IRRIGATION/ASPIRATION MANIFOLD AND FITTINGS FOR ULTRASONIC SURGICAL ASPIRATION SYSTEM

**Robert W. Hornlein, Stamford; Joseph N. Logan, Trumbull, both of Conn.; Alan Broadwin, Brooklyn, N.Y., and Vaclav O. Podany, New Fairfield, Conn., assignors to Cooper LaserSonics, Inc., Stamford, Conn.**

**Filed Apr. 9, 1986, Ser. No. 849,830**
**Int. Cl.[4] A61B *17/38***
**U.S. Cl. 604—22** **36 Claims**



1. In an ultrasonic surgical system of the type which comprises a handpiece which includes the combination of an ultrasonically-vibrating tip, a handle, a nosecone secured to said handle about said tip, and a vibrating means for vibrating said tip, the improvement comprising:

a nosecone extension means comprising a nosecone extension body having a first end and a second end, a rotation joint means at said first end for connection of said body to an outward side of said nosecone, and an articulating joint means at said second end for connection of said body to a flue enveloping said tip.

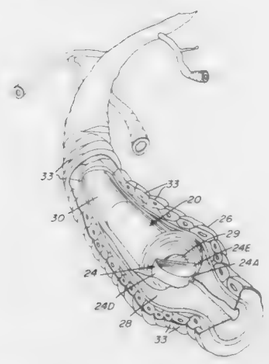
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**4,747,821**

## CATHETER WITH HIGH SPEED MOVING WORKING HEAD

**Kenneth Keusey, Hinsdale, Ill., and John Nash, Downingtown, Pa., assignors to Intravascular Surgical Instruments, Inc., Frazer, Pa.**

**Filed Oct. 22, 1986, Ser. No. 921,973**
**Int. Cl.[4] A61B *17/00***
**U.S. Cl. 604—22** **24 Claims**



1. A catheter for introduction into a lumen in a living being to open a restriction formed of an undesirable material in a remote portion of said lumen, said catheter comprising an elongated member having a longitudinal axis, a working head located adjacent the distal end thereof, and drive means for effecting the rotation of said working head about said axis, said working head comprising at least one, non-sharp, arcuate impacting surface repeatedly impacting said material as said working head is rotated about said axis and producing a wave in the tissue of said lumen adjacent said impacting surface, said impacting surface defining at least one curve in a plane perpendicular to said axis, with the radius of curvature of said curve in said plane being substantially equal or greater than said tissue wave, whereupon the repeated impaction of said impacting surface on said undesirable material opens said restriction and reduces in size any portion of said undesirable material broken away by the impacting action of said impacting surface to enable said portion to flow distally without significant deleterious effects to distally located tissue.

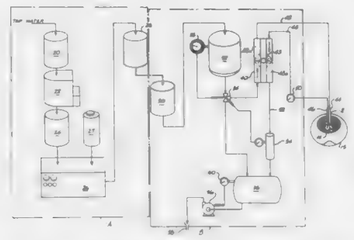
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**4,747,822**

## CONTINUOUS FLOW PERITONEAL DIALYSIS SYSTEM AND METHOD

**Alan M. Peabody, 102 Meadow Creek Ct., Greer, S.C. 29651**

**Continuation-in-part of Ser. No. 840,142, Mar. 17, 1986, Pat. No. 4,718,890, which is a continuation-in-part of Ser. No. 629,130, Jul. 9, 1984, Pat. No. 4,586,920. This application May 2, 1986, Ser. No. 858,645**
**The portion of the term of this patent subsequent to May 6, 2003, has been disclaimed.**
**Int. Cl.[4] A61M *5/00, 1/00***
**U.S. Cl. 604—29** **25 Claims**



1. A continuous flow peritoneal dialysis process comprising:

providing a source of sterilized dialysis fluid;

providing an inflow line for connection to a catheter adapted for implantation into the peritoneal cavity of a patient;

providing an outflow line for connection to said catheter;

delivering a flow of sterilized dialysis fluid from said course to said inflow line;

monitoring a function of the volume of said sterile dialysis fluid in said peritoneal cavity and controlling the inflow and outflow of said sterilized dialysis fluid so that a desired volume exists in said cavity in a manner that proper amount of fluid is maintained during dialysis; and

delivering said outflow of sterilized dialysis fluid to a disposal means so that a single flow of dialysis fluid is provided through the peritoneal cavity of said patient.

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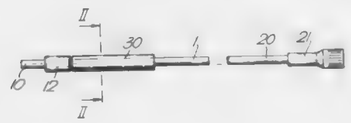
**4,747,823**

## CANNULAE

**John M. Buchanan, Rowan House, Whitmore Heath, Near Newcastle, Staffordshire, England**

**Filed Jun. 18, 1986, Ser. No. 875,795**
**Claims priority, application United Kingdom, Jul. 30, 1985, 8519173**
**Int. Cl.[4] A61M *25/00***
**U.S. Cl. 604—49** **9 Claims**

1. A cholangiogram cannula comprising: a flexible, tubular member having a forward, patient end shaped for insertion into the cystic duct, and a rear, machine end, said tubular member being open in the region of said patient end and said tubular member having a portion of enlarged circular cross section fixed on said tubular member towards said patient end, said enlarged portion being shaped to prevent withdrawal of the cannula from the cystic duct when the cystic duct is secured to the cannula to the rear of said enlarged portion; and a sleeve mounted on the tubular member to the rear of said enlarged portion, said sleeve being of substantially cylindrical shape and circular cross section, shorter than the tubular member, being of substantially the same external diameter as that of said enlarged portion along at least the forward end of the sleeve, and being slidable along said tubular member as far as the rear of



said enlarged portion to form a continuation of the surface of the enlarged portion such that the cannula can be gripped on the sleeve when it abuts said enlarged portion thereby to enable the cannula to be manipulated into the cystic duct and the enlarged portion to be pushed fully by said sleeve into the cystic duct.

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**4,747,824**

## HYPODERMIC ANESTHETIC INJECTION METHOD

**Ronald P. Spinello, 523 Post Ave., Westbury, N.Y. 11590**

**Filed May 30, 1986, Ser. No. 868,745**
**Int. Cl.[4] A61M *31/00***
**U.S. Cl. 604—51** **4 Claims**



1. A method for anesthetizing body tissue by means of local anesthetic using a hollow hypodermic needle, the steps of

establishing a uniform flow of anesthetic at a flow rate less than 1.0 cc. per minute through the needle no later than the instant of entry into the tissue

maintaining said uniform flow while moving the needle into the tissue, whereby said flow rate is sufficient to establish and maintain a sheath of liquid anesthetic around the forward portion of the moving needle thereby to anesthetize the path of travel of the needle.

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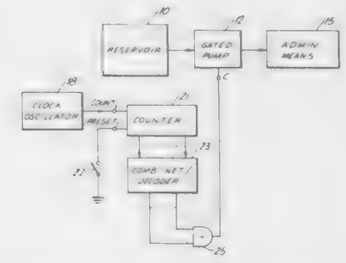
**4,747,825**

## APPARATUS AND METHODOLOGY FOR PULSED ADMINISTRATION OF GROWTH PROMOTING AGENTS

**Daniel M. Linkie, Suffern, N.Y., and Michael O. Thorner, Charlottesville, Va., assignors to Ferring Laboratories, Inc., Suffern, N.Y.**

**Filed Jun. 29, 1984, Ser. No. 626,400**
**Int. Cl.[4] A61M *31/00***
**U.S. Cl. 604—51** **30 Claims**

1. A method of therapeutically effective treatment of a living animal comprising administering to the animal a dynamic dosage of growth hormone releasing factor, analogs, biologically active fragments and derivatives thereof (collectively GRF) said dynamic dosage comprising administration of GRF



to be interrupted by periods of non-administration of GFR of from at least about 2 times the half-life of GRF in the blood.

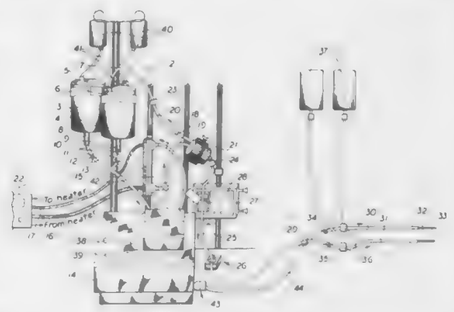
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**4,747,826**

## RAPID VENOUS INFUSION SYSTEM

**John J. Sassano, Pittsburgh, Pa., assignor to University of Pittsburgh, Pittsburgh, Pa.**

**Continuation of Ser. No. 502,309, Jun. 8, 1983, abandoned. This application Jan. 6, 1986, Ser. No. 817,758**
**Int. Cl.[4] A61M *31/00***
**U.S. Cl. 604—52** **7 Claims**



7. A system for venous infusion of a physiologic fluid, such as blood, into a patient at a flow rate of at least one liter per minute consisting essentially of:

a. a reservoir for the physiologic fluid having an input port for receiving the physiologic fluid and an outlet port for dispensing the physiologic fluid;

b. a rollerhead occlusive pump or a centrifugal pump for propelling the physiologic fluid through the system at a flow rate of at least about one liter per minute;

c. a heat exchanger with an interrelated heating/cooling unit;

d. a micropore filter having a pore size of 40 microns or less;

e. a pressure sensor;

f. an air bubble sensor with an associated cut-off mechanism;

g. one or more intravenous cannula of a relatively large diameter;

h. flexible conduit means connecting the reservoir to the infusion pump, the infusion pump to the heat exchanger, the heat exchanger to the micropore filter, the micropore filter to the reservoir and the micropore filter to the air bubble sensor and associated cut-off mechanism, and terminating at the intravenous cannula;

i. means in said system for sensing the temperature, flow rate, and total volume of the physiologic fluid to be infused; and

j. means in said system for controlling the temperature, flow

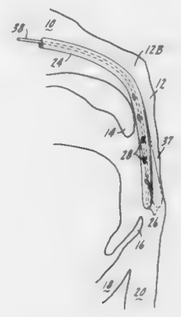
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rate, pressure, and total volume of the physiologic fluid to be infused.

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**4,747,827**
**NASOGASTRIC INTUBATION PROCESS**
**Frank C. Micek, 343 Ridge Rd., Barrington Hills, Ill. 60010**
**Filed Sep. 25, 1986, Ser. No. 911,429**
**Int. Cl.[4] A61M *31/00***
**U.S. Cl. 604—54** **1 Claim**

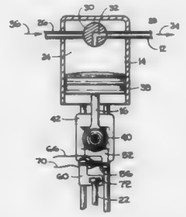


1. Method of performing nasal-gastric intubation incidental to extending to the stomach a hollow flexible, nasal-gastric tube employed for intubation, the tube having a closed distal end and a series of perforations distally thereof to communicate negative pressure to the stomach or to pass fluids to the stomach, and the tube when flexed tending to return to its original unflexed attitude, said method comprising:
inserting into the perforated portion of the tube a stylet having a shaft of malleable material, which holds its shape when bent, until the inserted end of the stylet reaches the distal end of said tube, and then bending the stylet to cause the tube to assume an arch profile which approximates the arch-like passage from the inferior concha past (trans) the pharyngeal recess and well into the posterior pharynx;
inserting the arched tube containing the bent stylet trans-pharyngeal recess and trans-soft palate until the distal end of the tube is positioned adjacent the epiglottis;
holding the tube in said adjacent position and withdrawing the stylet to allow the distal end of the tube to flex toward the posterior wall of the esophagus away from the trachea thereby biasing the tube for sure entry into the esophagus; and
advancing the tube down the esophagus into the stomach.

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**4,747,828**
**IV FLUID LINE OCCLUSION DETECTOR**
**Gus G. Tseo, San Diego, Calif., assignor to Fisher Scientific Group, San Diego, Calif.**
**Filed Dec. 9, 1986, Ser. No. 939,549**
**Int. Cl.[4] A61M *31/00***
**U.S. Cl. 604—67** **19 Claims**

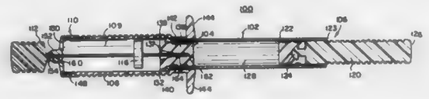
1. An occlusion detector in combination with a fluid line for use with an IV administration system which comprises:
means associated with said fluid line for pumping fluid therethrough;
an actuator for driving said pumping means;
a beam operatively connecting said actuator to said pumping menas, said beam being positioned to flex in proportion to the resistive force transmitted by the fluid against said pumping means;
means mounted on said beam for measuring the flexure of said beam; and



means connected with said measuring means for stopping said pumping means when the flexure of said beam indicates a resistive force of predetermined value.

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**4,747,829**
**PRE-FILLED SYRINGE**
**Jean-Louis Jacob; Gaetan Sanschagrin; Jean Thibodeau, and France Guay, all of Quebec, Canada, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.**
**Filed Jan. 21, 1987, Ser. No. 5,717**
**Int. Cl.[4] A61M *5/32***
**U.S. Cl. 604—110** **30 Claims**

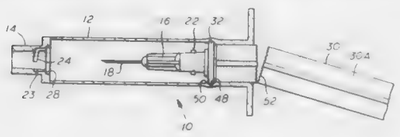


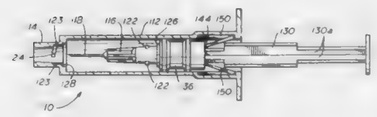
1. An apparatus for a one time injection of a liquid injectant comprising:
a hollow cylindrical casing having a first open end and a second opposite end;
a barrel for holding said injectant, said barrel disposed at a first end to slide through said first open end of said casing from a remote pre-injection position to a forward injection position and back again;
means coupled to said barrel for ejecting said injectant;
a hollow needle disposed within said casing and having an opening at each end thereof;
means for extending said needle through said casing second end and placing said needle in fluid communication with said injectant when said barrel moves from said remote pre-injection position to said forward injection position and for retracting said needle through said casing second end into said casing when said barrel moves back again to said pre-injection position; and
means for blocking automatically said needle from extending through said casing second end after said needle has been retracted.

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**4,747,830**
**ANTI-STICK CONTAGION FREE DISPOSABLE HYPODERMIC SAFETY SYRINGE**
**Walter W. Gloyer, 1010 W. Main St., Tomball, Tex. 77375, and Frederick G. Bright, 27311 Springwood Dr., Magnolia, Tex. 77355**
**Continuation-in-part of Ser. No. 856,199, Apr. 28, 1986, abandoned. This application Jan. 12, 1987, Ser. No. 2,510**
**Int. Cl.[4] A61M *5/32***
**U.S. Cl. 604—110** **20 Claims**

14. A disposable safe hypodermic syringe comprising in combination:
(a) a hollow barrel formed with a support collar at one end to releasably latch and support a flanged needle support member, said support collar provided with an interior counter bore for sealing said support member;
(b) said flange needle support member carrying a hypodermic needle within said support collar, said needle support member an said hypodermic needle forming a single piece;
(c) a resilient injection piston received within said barrel from its second end and carried by a plunger head of a plunger member;
(d) said plunger head and said needle support member having means cooperating to form a first latch means for latching said support member to said plunger head, releasing said support member from within said collar, and withdrawing said plunger head, said support member and said needle together as an integral unit to a selected position within the barrel; and



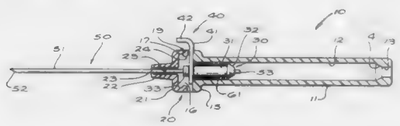


(e) a second latch means carried by said injection piston and by said second end of the barrel to finally latch said injection piston, said plunger head, said support member and said needle together as integral unit into said protective position within said barrel.



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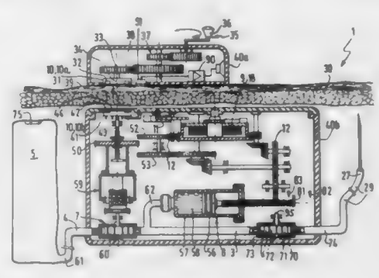
**4,747,831**
**CANNULA INSERTION SET WITH SAFETY RETRACTING NEEDLE**
**John C. Kulli, South Pasadena, Calif., assignor to Phase Medical, Inc., Los Angeles, Calif.**
**Filed Apr. 29, 1987, Ser. No. 43,691**
**Int. Cl.[4] A61M *5/24***
**U.S. Cl. 604—110** **20 Claims**



1. A safety device for use in inserting a cannula into a patient and for thereafter protecting people from contact with portions of the device that have been within the patient; said device comprising:
a needle for piercing such patient and for guiding and carrying such a cannula into place within such patient, said needle having a shaft with at least one sharp end;
a hollow handle adapted to enclose at least the sharp end of the needle beyond reach of such people's fingers;
means for securing the shaft to the handle, with the sharp end projecting from the handle; and
means for releasing the securing means and for substantially permanently retracting the sharp end of the needle into the handle and beyond reach of such people's fingers;
said releasing and retracting means being manually actuable by a simple unitary motion, of amplitude that is substantially shorter than the shaft of the needle.

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**4,747,832**
**DEVICE FOR THE INJECTION OF FLUID, SUITABLE FOR IMPLANTATION**
**Jacques Buffet, 28 Avenue Thiers, 93340 LeRaincy, France**
**Continuation-in-part of Ser. No. 641,444, Aug. 16, 1984, abandoned. This application May 16, 1986, Ser. No. 864,173**
**Claims priority, application France, Sep. 2, 1983, 83 14080**
**Int. Cl.[4] A61M *5/20***
**U.S. Cl. 604—135** **15 Claims**



1. A fluid injection device comprising:
an implantable fluid reservoir;
an implantable catheter for injecting fluid contained in said reservoir into a patient, said catheter being connected to said reservoir;
an implantable pumping means for pumping fluid from said reservoir to said implantable catheter;
an implantable elastic means for actuating said pumping means;
an implantable mechanical flow regulating means for regulating said elastic means to cause said pumping means to deliver a continuous dose of fluid to said catheter;
a magnetic drive means for selectively tensioning said elastic means and for selectively driving said pumping means to deliver an instantaneous dose of fluid to said catheter, said magnetic drive means including a first implantable part and a second non-implantable part cooperating with each other through the skin of the patient via a magnetic field;
an implantable gear transmission means for transmitting the motion of said first implantable part of said drive means selectively to said pumping means and selectively to said elastic means, said transmission means being capable of tensioning said elastic means thereby rendering said elastic means active, said transmission means being further capable of cooperating with said pumping means to fill said pumping means with fluid from said reservoir and to selectively manually deliver an instantaneous dose of fluid to said catheter independently of said elastic means; and
an implantable flow-adjustment means for continuous adjustment of the rate of fluid flow to said catheter from said pumping means, said first implantable part of said drive means cooperating with said flow adjustment means when said pumping means is activated by said elastic means and when said first implantable part does not cooperate with said elastic means or said pumping means.

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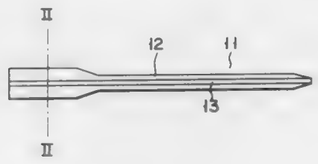


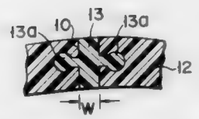
**4,747,833**

## MEDICAL INSTRUMENT-GUIDING TUBE AND ASSEMBLY COMPRISING THE SAME

**Tadashi Kousai, and Yousuke Moriuchi, both of Fujinomiya, Japan, assignors to Terumo Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 22, 1986, Ser. No. 921,379**
**Claims priority, application Japan, Oct. 28, 1985, 60-240984**
**Int. Cl.⁴ A61M 5/00**
**U.S. Cl. 604—164** **6 Claims**




1. A medical instrument-guiding tube for guiding a rod-like medical instrument, comprising a hollow tube body having a cutaway section extending in the longitudinal direction of the tube body and at least one linear body extending in the longitudinal direction of the tube body in such a manner as to fill the cutaway section and integrally and water-tightly joined to the tube body, the tube body and the linear body are formed of synthetic resins poorly compatible with each other, having a complementary concave-convex engaging portion for the water-tight engagement between the tube body and the linear body, the upper or lower surface of the linear body being covered with a thin film of the thermoplastic resin forming the tube body, wherein the linear body is capable of peeling from the engaging portion with the use of reasonable force.

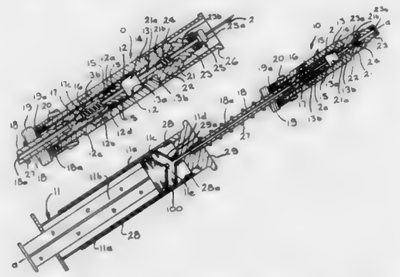
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**4,747,834**

## BACK-FILL SYRINGE

**Gordon E. Prindle, Schaumburg, Ill., assignor to Ideal Instruments, Inc., Chicago, Ill.**

**Continuation-in-part of Ser. No. 909,481, Sep. 19, 1986, Pat. No. 4,715,853. This application Sep. 28, 1987, Ser. No. 101,431**
**Int. Cl.⁴ A61M 5/18**
**U.S. Cl. 604—184** **19 Claims**



1. A reusable syringe assembly for connection to a supply means which reloads a liquid to be dispensed by the syringe assembly after injecting a dose of the liquid which comprises:
(a) a piston means movable along a longitudinal axis for dispensing the liquid from the syringe assembly and which has an opening along the axis;
(b) a sleeve means confining the piston means for movement along the longitudinal axis and defining a chamber with the piston means for holding a liquid prior to dispensing, the sleeve means having a dispensing end with an opening for discharging the liquid and a charging end for receiving the liquid;
(c) tubular means connected at one end to the piston means along the longitudinal axis and extending from the charging end of the sleeve means to provide movement of the piston means in the sleeve means and to provide a fluid connection to the opening in the piston means, wherein the tubular means is to be connected to the supply means for the liquid;
(d) handle means grippable by one hand mounted on the tubular means away from the charging end of the sleeve means such that the tubular means can be moved to push the piston means in the sleeve means along the longitudinal axis by the hand on the handle means, wherein the handle means includes an elongate cylindrical opening inside the handle means with a conduit leading into the tubular means, wherein the cylindrical opening is adapted to receive a disposable syringe assembly with a plunger as the supply means and a nozzle projecting into the conduit leading to the tubular means so as to provide the liquid in the reusable syringe assembly as the liquid is dispensed; and
(e) one-way valve means in the dispensing end of the sleeve means and the opening in the piston means or in the tubular means, whereby liquid can be dispensed from the chamber through the dispensing end of the sleeve means by the piston means with the valve means in the dispensing end open and with the valve means in the piston means or tubular means closed and whereby the chamber is refilled from the supply means by closing of the valve means in the dispensing end and by opening of the valve means in the piston means or tubular means.

17. A method for dispensing a liquid from a reusable syringe assembly which reloads a liquid to be dispensed by the reusable syringe assembly after injecting a dose of the liquid into an animal which comprises:
(a) a piston means movable along a longitudinal axis for dispensing the liquid from the syringe assembly and which has an opening along the axis;
a sleeve means confining the piston means for movement along the longitudinal axis and defining a chamber with the piston means for holding the liquid prior to dispensing, the sleeve means having a dispensing end with an opening for discharging the liquid through an needle means to be mounted on the dispensing end and a charging end for receiving the liquid;
tubular means connected at one end to the piston means along the longitudinal axis and extending from the charging end of the sleeve means to provide movement of the piston means in the sleeve means and to provide a fluid connection to the opening in the piston means wherein the tubular means is to be connected to a supply means for the liquid;
handle means grippable by one hand mounted on the tubular means away from the charging end of the sleeve means such that the tubular means can be moved to push the piston means in the sleeve means along the longitudinal axis by the hand on the handle means wherein the handle means includes an elongate cylindrical opening inside the handle means with a conduit leading into the tubular means wherein the cylindrical opening is adapted to receive a disposable syringe assembly with a plunger as the supply means and with a nozzle projecting into the conduit leading to the tubular means wherein the disposable syringe is adapted to contain a fluid to be dispensed so as to provide the liquid in the reusable syringe as the liquid is dispensed; and
one-way valve means in the dispensing end of the sleeve means and the opening in the piston means or in the tubular means, whereby the liquid can be dispensed from the chamber through the dispensing end of the sleeve means by the piston means with the valve means in the dispensing end open and with the valve means in the tubular means or piston means closed when the needle means is inserted into the animal and the liquid injected by pushing the handle means along the longitudinal axis and whereby the chamber is refilled from the disposable syringe assembly means by closing of the valve means in the dispensing end and by opening of the valve means in the piston means;
(b) dispensing the liquid by pushing the syringe assembly against the animal; and
(c) returning the piston means in the sleeve means to refill the chamber from the disposable syringe assembly, wherein the plunger in the disposable syringe assembly moves into the disposable syringe assembly as the fluid is dispensed.



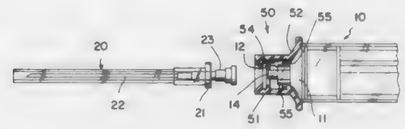
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**4,747,835**

## SAFETY DEVICE FOR HYPODERMIC NEEDLES

**Jeffrey Sandhaus, Box 253, Snedens Landing, Palisades, N.Y. 10964**

**Filed Feb. 19, 1987, Ser. No. 16,543**
**Int. Cl.⁴ A61M 5/32**
**U.S. Cl. 604—192** **11 Claims**




1. A safety device for use with a needle including a distal end and a proximal end terminating in a needle rim, said safety device comprising a tubular body portion including a first end and a second end, an enlarged annular shield projecting outwardly from said tubular body portion so as to provide a protective guard during insertion of said needle through said safety device, and occluding means for partially occluding the interior of said tubular body portion proximally of said proximal end of said needle when said needle is disposed within said safety device, said occluding means comprising an inwardly projecting flange capable of cooperatively engaging said needle rim at said proximal end of said needle, said occluding means being located adjacent to said first end of said tubular body portion and having sufficient size and flexibility to be capable of permitting insertion of said needle into said tubular body portion from said first end and at the same time of cooperatively engaging the outer surface of said needle rim at said proximal end of said needle so as to block removal of said needle from said tubular body portion through said first end.

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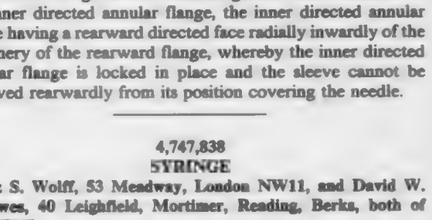
**4,747,836**

## NEEDLE GUARD, AND ASSEMBLY

**Ronald B. Luther, Newport Beach, Calif., assignor to Luther Medical Products, Inc., Santa Ana, Calif.**

**Filed Jul. 17, 1987, Ser. No. 74,693**
**Int. Cl.⁴ A61M 5/32**
**U.S. Cl. 604—198** **6 Claims**

1. An assembly of a needle guard for a hub and attached needle, comprising:
an elongate guard member mounted on the hub for rotatable movement thereon, the guard member including an elongate, longitudinal slit adapted to interfit with the needle prior to use, the guard member defining engaging means for a rotatable locking member; and,
a locking member mounted on the guard member, and adapted for forward movement therealong, the locking member providing an elongate slit coinciding with the slit of the guard member; whereby: i. prior to use the needle is adapted to interfit into the slit of the guard member; ii. during use, the guard member and attached locking member are adapted to rotate away from the needle; iii. following use, the guard member and attached locking member are adapted to rotate back to interfit with the used needle;




and, iv. the locking member is adapted to be advanced along the needle guard and rotatably locked along the engaging means while moving the locking slit out of alignment with, and to occlude the needle, thereby protecting against accidental needle stick injuries.

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**4,747,837**

## SYRINGE NEEDLE RECAPPING PROTECTIVE DEVICE

**Martin W. Hauck, 45 S. Lake Dr., Hillsboro, Mo. 63050**

**Filed May 1, 1987, Ser. No. 44,576**
**Int. Cl.⁴ A61M 5/32**
**U.S. Cl. 604—198** **5 Claims**

1. A syringe needle recapping protective device, comprising, a sleeve, for being drawn over and covering a hypodermic needle, a syringe received in a said sleeve having a barrel with a forward end retaining said hypodermic needle and a rearward end supporting a plunger, and locking means secured to said sleeve and said barrel of said syringe, wherein said sleeve includes a rear opening and a front opening and is freely slideable on said barrel of said syringe until locked in extended position covering said needle, and said locking means limits further travel of said sleeve after said sleeve covers said needle, and comprises an inner directed annular flange integrally attached to said sleeve and a pair of spaced outer directed flanges integrally attached to said barrel, and wherein a forward one of said pair of spaced outer directed flanges of said barrel is chamfered to engage and cam against a similarly chamfered peripheral edge of said inner directed annular flange of said sleeve, causing said inner directed annular flange of said sleeve to lodge between said spaced outer directed flanges and lock said sleeve in the extended position covering said needle, a rearward one of said pair of spaced outer directed flanges of said barrel having an outer diameter greater than a diameter of the inner directed annular flange, the inner directed annular flange having a rearward directed face radially inwardly of the periphery of the rearward flange, whereby the inner directed annular flange is locked in place and the sleeve cannot be removed rearwardly from its position covering the needle.

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**4,747,838**

## SYRINGE

**Heinz S. Wolff, 53 Meadway, London NW11, and David W. Hawes, 40 Leighfield, Mortimer, Reading, Berks, both of England**

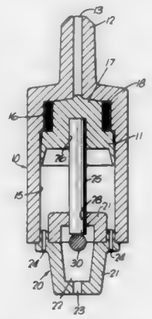
**Filed Jan. 28, 1987, Ser. No. 7,730**
**Claims priority, application United Kingdom, Feb. 4, 1986, 8602733**
**Int. Cl.⁴ A61M 5/315**
**U.S. Cl. 604—218** **20 Claims**

1. A syringe comprising a housing defining chamber having an opening, a piston movably mounted within and at one end of the chamber, means for biasing said piston towards the other end of said chamber, a fuse stop fixedly mounted relative to said housing, a heater disposed proximate said fuse stop, a fusible element of low-melting point material extending be-

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tween said piston and said fuse stop for holding said piston at said one end of the chamber against the urging of the biasing means, said heater being located relative to said fusible element for melting the end thereof adjacent said fuse stop to allow



movement of the piston under the urging of said biasing means to the extent of melting of said last mentioned end of said fusible element, movement of said piston transferring liquid between the chamber and the exterior of said syringe through said chamber opening.

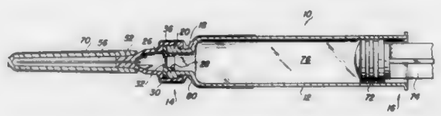
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**4,747,839**

## DISPOSABLE HYPODERMIC SYRINGE WITH PLASTIC SNAP-ON NEEDLE HUB AND HEAT SHRINK SEAL THEREFOR

**William R. Tarello, Bethesda, and Claudio Lopez, Darnestown, both of Md., assignors to Survival Technology, Inc., Bethesda, Md.**

**Filed Dec. 17, 1986, Ser. No. 942,727**
**Int. Cl.[4] A61M *5/325***
**U.S. Cl. 604—240** **4 Claims**



**1. A disposable hypodermic syringe comprising a cylindrical barrel open at both its forward and rearward ends, the forward tooled end having a necked down portion terminating in an annular flange having an outer diameter greater than that of the necked down portion and less than that of the cylindrical barrel, a stopper positioned in the necked down portion of the cylindrical barrel to seal off the forward end of the said barrel, a unitary resilient plastic needle hub assembly fitted on the forward end of the cylindrical barrel, said hub assembly comprising a cylindrical body having both a forward and a rearward end, a nose portion extending forwardly from the forward end of the cylindrical body, a needle affixed to the nose portion away from the forward end of the cylindrical body, said cylindrical body being sized whereby it will resiliently fit over and engage the annular flange of the necked down portion of the cylindrical barrel to operatively retain the needle hub assembly on the cylindrical barrel, said hub body being provided with internal locking means engaging behind the annular flange to assist in retaining the hub assembly on the cylindrical barrel, a sleeve of heat shrinkable plastic fitted over a portion of the hub assembly and contiguous cylindrical barrel whereby when heat is applied the sleeve will shrink to firmly engage the aforedescribed syringe portions and thereby provide an air tight seal between the hub body and the cylindrical barrel and in addition whereby the shrink tension will cause the hub body to more firmly engage the annular flange.**

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**4,747,840**

## SELECTIVE PULMONARY ARTERIOGRAPH CATHETER

**Joseph E. Ladika, 2005 20th St., Ct. West, Bradenton, Fla. 33505, and David L. Tempkin, 647 Key Royal Dr., Holmes Beach, Fla. 33510**

**Filed Sep. 17, 1986, Ser. No. 908,327**
**Int. Cl.[4] A61M *25/00***
**U.S. Cl. 604—281** **18 Claims**



**1. A cardio-pulmonary arteriography catheter for facilitating an antecubital approach to the pulmonary artery through an enlarged right atrium of the heart and the tricuspid valve comprising:**
- **a length of relatively thin-walled, flexible and pliable tubing having a connector at one end and a distal end;**
- **said tubing having a pigtail contour adjacent said distal end and a first, second and third curved portion arranged seriatim along said tubing from said pigtail contour;**
- **said pigtail contour and said first, second and third curved portions generally curving in a similar direction;**
- **said tubing having a plurality of apertures disposed through said tubing in a spaced array;**
- **said first curved portion spaced from said pigtail contour by a first relatively straight portion of said tubing;**
- **said first and second curved portions spaced apart by a second relatively straight portion of said tubing;**
- **said first relatively straight portion being shorter than said second relatively straight portion;**
- **said first relatively straight portion and second relatively straight portion of said tubing extending distances permitting said pigtail contour, said first curved portion and said second curved portion to be simultaneously positioned within an enlarged right atrium of the heart and being preformed so as to predispose said pigtail contour to pass through the tricuspid valve in response to the application of force at said connector end;**
- **said second portion generally merging into said third curved portion;**
- **said third curved portion spaced from said connector by a third relatively straight portion of said tubing;**
- **said first relatively straight portion and said second relatively straight portion disposed in the range of about 120 degrees one to another;**
- **said second relatively straight portion and said third relatively straight portion being disposed in the range of about 130 degress one to another;**
- **said third curved portion generally more gradual and elongated than said first and second curved portions;**



- **said pigtail contour relatively tightly structured to pass into a patient's pulmonary artery through the right atrium and the tricuspid valve of the heart;**
- **said connector adapted for connection to a fluid source.**

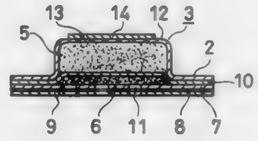
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**4,747,841**

## METHODS AND INSTRUMENTS OF MOXIBUSTION

**Yasuro Kuratomi, 8-2, 3-chome, Kita-Shinjuku, Shinjuku-ku, Tokyo, and Keiko Miyauchi, 3-2-205-3, Takane-Dai Funabashi-shi, Chiba-ken, both of Japan**

**Continuation of Ser. No. 713,489, Mar. 19, 1985, abandoned. This application Oct. 15, 1986, Ser. No. 919,549**
**Int. Cl.[4] A61F *7/00***
**U.S. Cl. 604—291** **7 Claims**



**4. An apparatus for moxibustion comprising a package body having means for contacting a skin surface;**
- **means for supporting a herb material in contact with a first surface of said means for contacting a skin surface;**
- **a herb material comprising moxa contained in said means for supporting a herb material;**
- **means for supporting a pyrogen comprising iron oxide, carbon, cellulose, sodium chloride and water, in contact with a second surface of said means for supporting a herb material;**
- **said pyrogen contained in said means for supporting said pyrogen and means for introducing air into said pyrogen, such that air may enter the package body and oxidize the said pyrogen, causing the herb material comprising moxa to heat up and vaporize to release compounds comprising at least adenine, choline and thymol and act on the surface of the skin.**

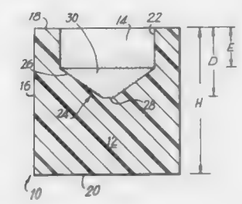
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**4,747,842**

## ARTICLE FOR APPLYING STYPTIC TO A DOG'S BLEEDING NAIL

**David Dietz, 2084 Flatbush Ave., Brooklyn, N.Y. 11234**

**Filed Jan. 22, 1987, Ser. No. 65,267**
**Int. Cl.[4] A61M *35/00***
**U.S. Cl. 604—309** **3 Claims**



**1. An article for facilitating the cessation of bleeding from the nails of dogs during the manicuring of a dog's nails, comprising:**
- **a receptacle of a predetermined height and having therein defined a cavity extending substantially vertically from a wall of said receptacle into the interior thereof to a cavity bottom;**
- **said cavity having at least a portion of predetermined depth less than said predetermined height and no less than the minimum extension of said cavity from said wall top of the receptacle to said cavity bottom;**
- **said predetermined depth substantially corresponding to the length of a dog's manicured nail; and**
- **a quantity of styptic powder disposed in said cavity in an amount such that, when the end of a dog's nail which has begun to bleed in the course of a manicure is placed into said cavity to the predetermined depth of said cavity portion, the nail end is sufficiently immersed is said styptic powder so as to properly coat the nail end with said powder and thereby facilitate the cessation of bleeding from the nail end, and said predetermined depth of the cavity portion being such as to enable the ready application of styptic powder to the nail while avoiding soiling of the paws and coat and other body portions of the dog with said styptic powder while controlling bleeding from the nail end.**

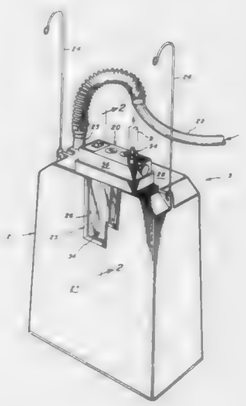
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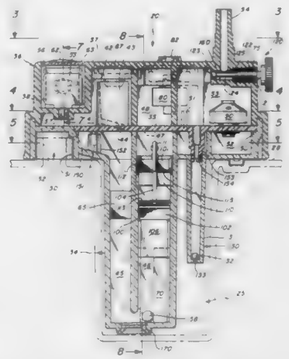
**4,747,843**

## CONTROL MODULE FOR THORACIC DRAINAGE APPARATUS

**Augustus Felix, Providence, and John Uhoch, Warwick, both of R.I., assignors to C.R. Bard, Inc., Murray Hill, N.J.**

**Filed May 15, 1986, Ser. No. 863,925**
**Int. Cl.[4] A61M *1/00***
**U.S. Cl. 604—318** **12 Claims**





**1. A control module for regulating the flow of gases in a suction drainage apparatus of the type having a collection container in communication with a body cavity to receive body fluids (including liquids and gases) from the body cavity and a suction source for creating a negative pressure within the**

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collection container and removing the gases of the body fluids, said control module comprising:

an entrance port connectable in airtight relationship to the collection container to permit the gases of the body fluids to enter said control module from said collection container;

an exit port connectable in airtight relationship to the suction means to permit the gases to exit said a control module to said suction means; and

all of the control means for the suction drainage apparatus being carried by said module and none by the container whereby the module may be used with different configurations of containers, said control means comprising:

gas-preventing return means disposed between said entrance port and said exit port to prevent the return of gases to said collection container after being removed therefrom by said suction means;

air leak indicator means disposed between said entrance port and said gas-preventing return means adapted to receive an indicator liquid for observing the gases flowing from said collection container to said suction means;

baffle means disposed on both sides of said air leak indicator means to prevent the indicator liquid from leaving said air leak indicator means if the drainage apparatus is tipped up to 90° in any direction; and

suction control means disposed between said gas-preventing return means and said exit port to regulate the amount of negative pressure applied to said collection container by said suction means.

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**4,747,844**

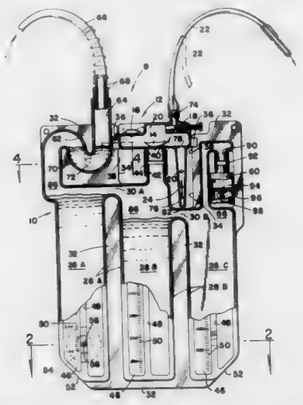
## CHEST DRAINAGE APPARATUS

**Donald P. Elliott, Denver, Colo., assignor to C. R. Bard, Inc., Murray Hill, N.J.**

**Continuation of Ser. No. 553,992, Nov. 21, 1983, abandoned, and a continuation of Ser. No. 156,920, Jun. 6, 1980, abandoned, and a continuation of Ser. No. 341,877, Jan. 22, 1982, abandoned, said Ser. No. 341,877, is a division of Ser. No. 156,920,. This application Sep. 19, 1986, Ser. No. 909,779**

**Int. Cl.⁴ A61M *1/00***

**U.S. Cl. 604—319** **25 Claims**



1. A non-waterseal thoracic drainage apparatus comprising:

means defining a fluid collection chamber with an air space thereabove;

means defining an air chamber connected to receive air from the air space above the fluid collection chamber;

means comprising a one-way waterless valve means interposed between said air space and air chamber, said waterless valve means being operative to admit air to said air chamber while preventing reverse flow back into the collection chamber;

said one-way waterless valve means being operative to prevent said reverse flow unaided by underwater seals and comprising the sole means therefor;

an inlet tube in communication with the fluid collection chamber and being connectable to receive fluids and air from a patient's chest cavity to be drained and to deliver same to the fluid collection chamber;

means defining a flow path between the inlet tube and said one-way waterless valve, a portion of said fluid flow path defining a U-shaped path;

said portion of the U-shaped fluid path being constructed and so as to be transparent, said U-shaped portion of flow path being adapted to retain a measure of fluid so as to cooperate to provide a visual indication of any air passing therethrough and of oscillations in the patient's breathing.

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**4,747,845**

## SYNTHETIC RESIN MATRIX SYSTEM FOR THE EXTENDED DELIVERY OF DRUGS

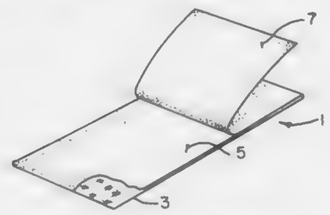
**Bernard Korol, St. Louis, Mo., assignor to Enquay Pharmaceutical Associates, Boca Rotan, Fla.**

**Continuation-in-part of Ser. No. 542,754, Oct. 17, 1983, Pat. No. 4,563,184. This application Jan. 3, 1986, Ser. No. 815,874**

**The portion of the term of this patent subsequent to Jan. 7, 2003, has been disclaimed.**

**Int. Cl.⁴ C08K *5/41, 5/34, 5/15, 5/10*; A61L *15/01, 15/06, 15/03***

**U.S. Cl. 604—368** **7 Claims**



1. A synthetic resin matrix system for drug storage and extended duration drug release comprising a particulate, hydrophilic, water swellable polymer, an inert, non-toxic water miscible organic solvent, and a hydrogen bonding plasticizer, said polymer selected from the group consisting of hydroxy($C_2$–$C_4$-alkyl) methacrylate, hydroxy($C_2$–$C_4$alkyl) acrylate, hydroxy($C_2$–$C_4$alkoxy$C_2$–$C_4$alkyl) methacrylate, hydroxy($C_2$–$C_4$alkoxy$C_2$–$C_4$alkyl) acrylate, alkoxy($C_2$–$C_4$alkoxy$C_2$–$C_4$alkyl) methacrylate, alkoxy($C_2$–$C_4$alkoxy$C_2$–$C_4$alkyl) acrylate, N-($C_1$–$C_4$alkyl) acrylamide, N-($C_1$–$C_4$alkyl) methacrylamide, N,N-di($C_1$–$C_4$alkyl) acrylamide, N,N-di($C_1$–$C_4$alkyl) methacrylamide, vicinal-epoxy($C_1$–$C_4$alkyl) methacrylate, or vicinal-epoxy($C_1$–$C_4$alkyl) acrylate, said solvent selected from the group consisting of polyethylene glycol or polypropolene glycol having a molecular weight averaging between about 200–2000 gram molecules weight units, and wherein said plasticizer being selected from the group consisting of dimethylsulfoxide, dimethylphthalate, 2,3-butylene carbonate, dimethylformamide, dimethyltetramethylene sulfone, diethylsulfone, methylene glycolate, methylpropyl sulfone, or butyrolactone, with said polymer ranging between about 15%–50% by weight of said matrix system, with said solvent ranging between about 30%–65% by weight of said matrix system, and with said plasticizer ranging up to about 20% by weight of said matrix system.



**4,747,846**

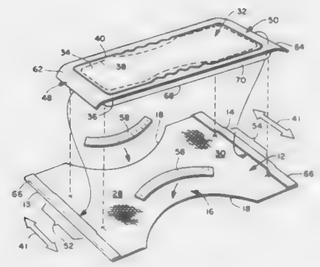
## STRETCHABLE DISPOSABLE ABSORBENT UNDERGARMENT

**Leona G. Boland, Neenah; Georgia L. Zehner, Larsen, and Robert A. Stevens, Appleton, all of Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.**

**Filed Apr. 3, 1987, Ser. No. 34,818**

**Int. Cl.⁴ A61F *13/16***

**U.S. Cl. 604—385** **11 Claims**



1. An anatomically form-fitting, generally self-adjusting three dimensional disposable absorbent undergarment comprising:

a breathable elastomeric nonwoven outer cover wherein an elastic nonwoven web is joined to one or more gatherable nonwoven webs, defining a waist opening, leg openings, a central crotch section, front and rear panels separate by said crotch section, and a pair of side panels extending between and interconnecting said leg and waist openings and said front and rear panels, respectively;

an absorbent insert structure substantially superposable upon said front and rear panels and said crotch section, including a liquid permeable bodyside liner, a liquid impermeable barrier and an absorbent composite disposed therebetween;

attachment means for attaching and integrating said absorbent structure into said elastomeric outer cover while allowing substantially unrestricted functional stretchability thereof; and

nonrefastenable side seams extending between and interconnecting said leg and waist openings of each of said side panels, including manually tearable stress release means for opening and separating said side seams and removing said garment from a wearer when the same becomes soiled.

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**4,747,847**

## SYSTEM FOR DELIVERING POTASSIUM CHLORIDE WITH ENHANCED BIOACCEPTABILITY

**Paul R. Magruder, Palo Alto; Patrick S. L. Wong, Hayward; Felix Theeuwes, Los Altos, and George V. Guittard, Cupertino, all of Calif., assignors to ALZA Corporation, Palo Alto, Calif.**

**Continuation of Ser. No. 827,027, Feb. 7, 1986, Pat. No. 4,723,957. This application Jul. 9, 1987, Ser. No. 71,699**

**Int. Cl.⁴ A61M *31/00***

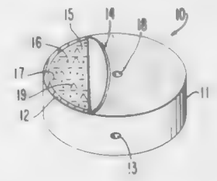
**U.S. Cl. 604—892.1** **5 Claims**

1. A dosage form for delivering a beneficial drug to a fluid biological environment for use, the dosage form comprising:

(a) a wall comprising in at least a part a semipermeable composition permeable to the passage of fluid and substantially impermeable to the passage of drug, which wall surrounds and forms;

(b) a compartment housing a composition comprising (1) a therapeutically effective dose of the beneficial drug potassium chloride blended with (2) means for aiding in delivering the potassium chloride from the compartment and for lessening the incidence of unwanted side effects of potassium chloride on the bioloical environment of use, said means comprising a first hydrogel and a different second hydrogel;

(c) at least one passageway in the wall communicating with the compartment and the exterior of the dosage form for



delivering the composition comprising the potassium chloride and the means from the dosage form over a prolonged period of time; and,

(d) wherein, when the dosage form is in operation in the environment of use, the dosage form delivers the composition comprising the potassium chloride and the means comprising the first and second hydrogels for the potassium chloride therapeutic effects and for simultaneously lessening the incidence of unwatned side effects on the environment of use.

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**4,747,848**

## VASCULAR GRAFTS

**Roshan Maini, Bridge of Weir, Scotland, assignor to Vascutek Limited, Ayr, Scotland**

**Filed Oct. 17, 1985, Ser. No. 788,718**

**Claims priority, application United Kingdom, Nov. 30, 1984, 8430265**

**Int. Cl.⁴ A61F *2/06***

**U.S. Cl. 623—1** **7 Claims**

1. A method of producing a vascular graft which after implantation becomes permeable at a predictable rate comprising ascertaining the proportion of amino groups present in a particular sample of untreated gelatin, treating a first quantity of gelatin taken from said sample to cause a predetermined proportion of the amino groups in said first quantity of gelatin to be converted to other groups whereby to cause the proportion of amino groups present in said first quantity of gelatin to be reduced to a predetermined proportion, mixing a further quantity of untreated gelatin taken from said sample and a quantity of said treated gelatin in a predetermined proportion to produce a gelatinous mixture having a predetermined proportion

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of amino groups, impregnating a tube of flexible porous material with said gelatinous mixture, and treating the impregnated tube to cause the amino groups present in the gelatinous mixture to form cross links with one another.

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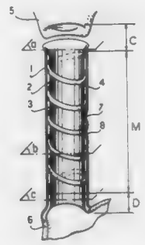
**4,747,849**

## OESOPHAGUS PROSTHESIS

**Claude Galtier, 13, Avenue Maillol, 95370 Montigny Les Cormeilles, France**

**Filed Jan. 13, 1987, Ser. No. 2,859**
**Claims priority, application France, Jan. 13, 1986, 86 00464**
**Int. Cl.⁴ A61F *2/04***
**U.S. Cl. 623—12** **4 Claims**

1. Implantable prosthesis fulfilling the natural functions of the oesophagus, characterized in that it consists of a double-walled tube of circular cross-section in its midportion and of elliptical cross-section towards its extremities, comprising an exterior wall made of a relatively rigid hemocompatible synthetic material and an interior wall made of a flexible hemocompatible synthetic material providing of perfectly smooth




internal surface, a helicoidal band of relatively elastic material being inserted between the two walls in the midportion of said tube.



**4,747,850**

## MODIFIED SUCCINIMIDES IN FUEL COMPOSITION

**Robert H. Wollenberg, San Rafael, and Frank Plavac, Novato, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.**

**Division of Ser. No. 897,190, Aug. 15, 1986, which is a continuation-in-part of Ser. No. 722,939, Apr. 12, 1985, Pat. No. 4,612,132, which is a continuation-in-part of Ser. No. 632,777, Jul. 20, 1984, abandoned. This application Sep. 11, 1987, Ser. No. 96,426**
**Int. Cl.⁴ C10L *1/22***
**U.S. Cl. 44—63** **44 Claims**

1. A fuel composition comprising a hydrocarbon boiling in the gasoline or diesel range and from 10 to 10,000 parts per million of a multiply adducted alkenyl or alkyl succinimide wherein one or more of the nitrogens of the multiply adducted alkenyl or alkyl succinimide is substituted with a hydroxyhydrocarbyl oxycarbonyl wherein the hydroxyhydrocarbyl group of said hydroxyhydrocarbyl oxycarbonyl contains from 2 to 20 carbon atoms and 1 to 6 hydroxy groups with the proviso that there is no hydroxy substitution on the hydrocarbyl carbon atom attaching the hydroxyhydrocarbyl group to the oxy atom of the oxycarbonyl group and with the further proviso that when more than one hydroxy group is contained in the hydroxyhyrocarbyl group, no more than one hydroxy group is attached to the same carbon atom and the number of carbon atoms in the hydroxyhydrocarbyl group is minimally one greater than the number of hydroxy groups and wherein said multiply adducted alkenyl or alkyl succinimide is derived from a multiply adducted alkenyl or alkyl succinic anhydride characterized by the presence within its structure of an average of greater than 1 succinic group for each equivalent of alkenyl or alkyl group.

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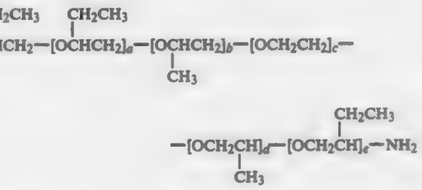
**4,747,851**

## NOVEL POLYOXYALKYLENE DIAMINE COMPOUND AND ORI-INHIBITED MOTOR FUEL COMPOSITION

**Rodney L. Sung; Milton D. Behrens, both of Fishkill; Michael A. Caggiano, Chelsea, all of N.Y.; John F. Knifton, Austin, Tex.; John M. Larkin, Austin, Tex., and Robert L. Zimmerman, Austin, Tex., assignors to Texaco Inc., White Plains, N.Y.**

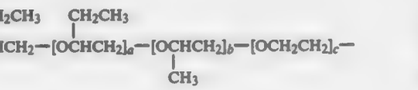
**Filed Jan. 2, 1987, Ser. No. 253**
**Int. Cl.⁴ C10L *1/18, 1/22***
**U.S. Cl. 44—72** **20 Claims**

1. A polyoxyalkylene diamine compound of the formula:

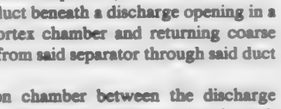


where c has a value from about 5–150, b+d has a value from about 5–150, and a+e has a value from about 2–12.

6. A motor fuel composition comprising a mixture of hydrocarbons boiling in the range from about 90° F.–450° F. and from 0.0005–5.0 weight percent of a polyoxyalkylene diamine of the formula:



-continued



where c has a value from about 5–150, b+d has a value from about 5–150, and a+e has a value from about 2–12.

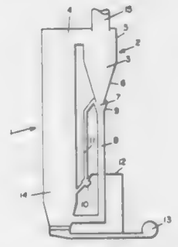
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**4,747,852**

## METHOD AND APPARATUS FOR SEPARATING SOLID PARTICLES FROM FLUE GASES IN A CIRCULATING FLUIDIZED BED REACTOR

**Folke Engström, San Diego, Calif., assignor to A. Ahlstrom Corporation, Karhula, Finland**

**PCT No. PCT/FI86/00002, § 371 Date Aug. 25, 1986, § 102(e) Date Aug. 25, 1986, PCT Pub. No. WO86/03986, PCT Pub. Date Jul. 17, 1986**
**PCT Filed Jan. 9, 1986, Ser. No. 902,407**
**Claims priority, application Finland, Jan. 11, 1985, 850134**
**Int. Cl.⁴ B01D *45/12;* B04C *9/00;* F27B *15/12***
**U.S. Cl. 55—1** **11 Claims**



1. A method of separating coarse and fine solid particles from flue gases in a circulating fluidized bed reactor comprising the steps of:

(a) leading flue gases containing coarse and fine solid particles from an upper part of the reactor to a vortex chamber disposed within a cyclone separator;

(b) providing a return duct beneath a discharge opening in a lower part of the vortex chamber and returning coarse particles discharged from said separator through said duct to the reactor;

(c) providing a suction chamber between the discharge opening and the return duct and applying suction through a suction pipe opening into said suction chamber to remove fine particles discharged from said separator; and

(d) returning said fine particles to the reactor through the suction pipe.

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**4,747,853**

## PRESSURE CONTROL

**Andrew M. Haslett, and John B. Johnson, both of Stockton-on-Tees Cleveland, England, assignor to Imperial Chemical Industries PLC, London, England**

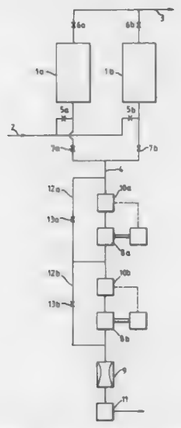
**Filed Jun. 22, 1987, Ser. No. 64,568**
**Claims priority, application United Kingdom, Jul. 2, 1986, 8616185**
**Int. Cl.⁴ B01D *53/04***
**U.S. Cl. 55—21** **9 Claims**

8. A pressure swing adsorption system wherein an inlet gas stream is separated by adsorption into a first gas stream at a first pressure and a second gas stream at a second pressure that is lower than said first pressure, and the fluid line for said second gas stream is provided with a pressure control arrangement comprising:

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(a) valve means disposed in said fluid line, said valve means being in the open state during normal operation;
(b) flow restricting means disposed in said fluid line,
that portion of the fluid line upstream of said flow restricting means being constructed to have a maximum design pressure at least equal to the first pressure; and



(c) pressure sensing means disposed upstream of the flow restricting means and arranged to sense the pressure in said line and to actuate said valve means to close said line in the event of the sensed pressure exceeding a predetermined limit,
said predetermined limit being above the normal operating pressure range of the fluid line but below said first pressure.

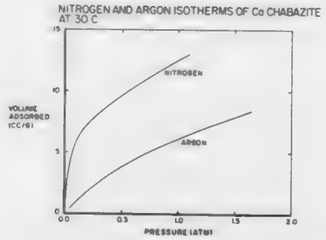
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**4,747,854**

## SELECTIVE CHROMATOGRAPHIC PROCESS USING AN ION-EXCHANGED, DEHYDRATED CHABAZITE ADSORBENT

**Peter J. Maroulis, Allentown; Charles G. Coe, Macungie; Steven M. Kuznicki, Easton, and David A. Roberts, Allentown, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.**

**Continuation of Ser. No. 866,544, May 22, 1986, abandoned. This application Jun. 25, 1987, Ser. No. 66,789**
**Int. Cl.[4] B01D** *53/04*
**U.S. Cl. 55—66** **6 Claims**




1. In a process for the selective adsorption and separation of one or more constituents from a gas stream, wherein the gas stream is contacted with a zeolitic adsorbent contained within a column maintained within a gas chromatograph while having an inert carrier gas continually flowing through the column, the improvement for the selective adsorption and separation of the constituents comprises utilizing a dehydrated chabazite adsorbent having a residual water content of less than 1.5 wt% as the zeolite adsorbent, wherein the dehydrated chabazite has at least 50% of any exchangeable ion capacity exchanged with a polyvalent metal cation.

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**4,747,855**

## SOLID ABSORBENT FOR UNSATURATED HYDROCARBON AND PROCESS FOR SEPARATION OF UNSATURATED HYDROCARBON FROM GAS MIXTURE

**Hidefumi Hirai, 14-10, Yutenji 1-chome, Meguro-ku, Tokyo, Japan; Makoto Komiyama, Tokyo, and Keiichiro Wada, Kiyose, both of Japan, assignors to Hidefumi Hirai, Tokyo, Japan**

**Continuation of Ser. No. 829,867, Feb. 18, 1986, abandoned, which is a continuation of Ser. No. 602,743, Apr. 23, 1984, abandoned. This application Jan. 21, 1987, Ser. No. 6,343**
**Claims priority, application Japan, Jul. 20, 1983, 58-132360; Jan. 7, 1984, 59-001164**
**Int. Cl.[4] B01D** *53/04*
**U.S. Cl. 55—74** **7 Claims**

1. A process for recovering an unsaturated hydrocarbon from a gas mixture containing the same comprising the steps of:
(1) contacting the gas mixture with solid adsorbent, said solid adsorbent comprising:
(a) a cooper (I) halide or oxide and
(b) activated carbon or graphite,
and being prepared by dissolving or suspending a component (a) in an aqueous hydrochloric acid and adding the activated carbon or graphite to a resultant solution or suspension, followed by evaporating a solvent from a mixture; and then
(2)
(i) heating the solid adsorbent
(ii) evacuating a system containing the solid adsorbent, or
(iii) decreasing a partial pressure of an unsaturated hydrocarbon in the system containing the solid adsorbent whereby the adsorbed unsaturated hydrocarbon is released.

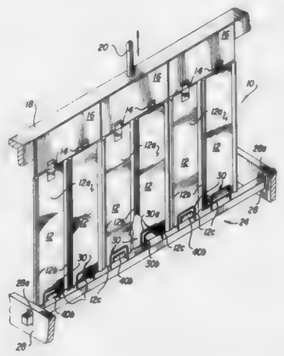
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**4,747,856**

## LOWER END ALIGNMENT DEVICE FOR ELECTROSTATIC PRECIPITATOR COLLECTOR ELECTRODES

**Ricky D. Hicks, and Anthony J. DiBiasi, both of Lebanon, Pa., assignors to General Electric Environmental Services, Inc., Lebanon, Pa.**

**Filed Aug. 21, 1987, Ser. No. 87,840**
**Int. Cl.[4] B03C** *3/45*
**U.S. Cl. 55—143** **7 Claims**



1. In an electrostatic precipitator having at least one collector electrode in the form of a plurality of electrode panels vertically suspended at their upper ends in closely spaced, essentially coplanar relation, a device for maintaining the lower ends of the electrode panels in aligned relation comprising, in combination:
A. an elongated bar mounted by a precipitator frame in a position underlying the lower ends of the electrode panels; and
B. plural pairs of laterally opposed first and second channel-shaped elements each having free ends affixed to said bar so as to extend upwardly therefrom in wicket-like fashion, said element pairs being distributed along the length of said bar with said first and second elements of each said pair respectively disposed in flanking relation with the lower end portion of each of the electrode panels.



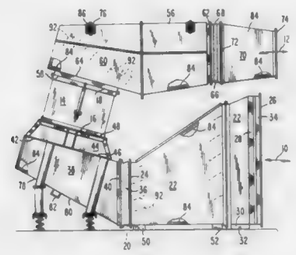
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**4,747,857**

## U-LOOP AIR HANDLING APPARATUS

**John S. Andrews, Barry South Glamorgan, Wales, assignor to Strobic Air Corporation, Bensalem, Pa.**

**Filed Jul. 29, 1987, Ser. No. 79,077**
**Int. Cl.[4] B01D** *53/00*
**U.S. Cl. 55—269** **23 Claims**



1. A U-loop air handling apparatus, for handling and conditioning air from an environment to be treated, comprising:
(a) a fan means including a fan inlet opening and a fan outlet opening, said fan means being operable to receive air through said fan inlet opening for exhausting thereof through said fan outlet opening;
(b) an intake section adapted to receive air for supplying thereof to said fan inlet opening of said fan means, said intake section comprising:
(1) a reducing section comprising:
(a) a reducing section output means for expelling air from said reducing section;
(b) a reducing section input means for receiving low velocity air from the treated environment, said reducing section output means being of smaller cross-sectional area than said reducing section input means;
(c) a cooling means positioned within said reducing section to lower the temperature of air moving therethrough;
(d) a filter means positioned within said reducing section to remove contaminants from the air moving therethrough;
(2) a first flexible connecting means of flexibly resilient material secured with respect to said reducing section output means;
(3) a fan box means including a box inlet means and a box outlet means, said box outlet being secured with respect to said fan inlet opening, said box inlet means being secured with respect to said first flexible connecting means to acoustically and vibrationally isolate said reducing section from said fan box means;
(4) a bell means including a bell inlet means and a bell outlet means, said bell outlet means being of a smaller cross-sectional area than said bell inlet means to facilitate flow of air, said bell inlet means being attached with respect to said box outlet means to receive air flow therefrom, said bell outlet means being secured with respect to said fan inlet opening to supply air flow thereto;
(5) an intake section mounting means secured with respect to said intake section and adapted to resiliently secure said intake section with respect to the surrounding environmental structure;
(c) an output section adapted to receive conditioned air from said fan outlet opening for expelling same from the U-loop handling apparatus into the treated environment, said outlet section comprising:
(1) a second flexible connector means attached with respect to said fan outlet opening;
(2) an acoustical box means including an acoustical box inlet means and an acoustical box outlet means, said acoustical box inlet means being attached with respect to said second flexible connector means to acoustically and vibrationally isolate said fan means therefrom;
(3) an output transition box including a transition inlet means and a transition outlet means, said transition inlet means being attached with respect to said acoustical box outlet means to receive conditioned air therefrom, said transition outlet means being adapted to supply conditioned air directly to the treated environment;
(4) an output section mounting means secured with respect to said output section and adapted to resiliently secure said output section with respect to the surrounding environmental structure; and
(5) a damper box positioned within said output section and extending across the path of air flow therethrough to prevent backflow of air therein.

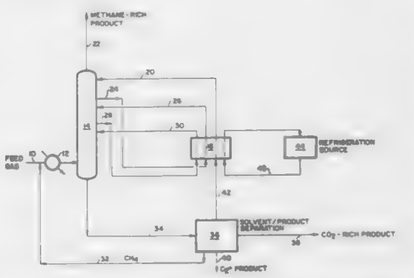
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**4,747,858**

## PROCESS FOR REMOVAL OF CARBON DIOXIDE FROM MIXTURES CONTAINING CARBON DIOXIDE AND METHANE

**Gerry N. Gottier, Emmaus, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.**

**Filed Sep. 18, 1987, Ser. No. 98,262**
**Int. Cl.[4] F25J** *3/00*
**U.S. Cl. 62—17** **17 Claims**




1. A process for the physical solvent absorptive distillation of a feed gas stream containing carbon dioxide, methane and heavier hydrocarbons to produce a methane-rich overhead product and a $CO_2$-rich bottom product comprising the steps of:
(a) introducing a feed gas stream comprising carbon dioxide, methane and heavier hydrocarbons into an absorptive distillation zone at elevated pressure;
(b) introducing a physical solvent in the amount of approximately 0.5–5 moles of solvent per mole of feed into the upper zone of the distillation zone to absorb $CO_2$ and heavier hydrocarbons from such feed gas stream;
(c) withdrawing a methane-rich overhead stream from said distillation zone as a product without subjecting it to any overhead condenser-reflux duty;
(d) removing heat from said distillation zone in at least one intermediate stage of the distillation zone between the

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point of entry of the physical solvent and the feed location;

(e) removing and heating the $CO_2$ and heavier hydrocarbon-containing physical solvent at approximately the elevated pressure of the feed gas stream to separately recover at least a regenerated physical solvent for recycle to step (b) and a $CO_2$-rich bottom product.

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**4,747,859**

## AIR SEPARATION

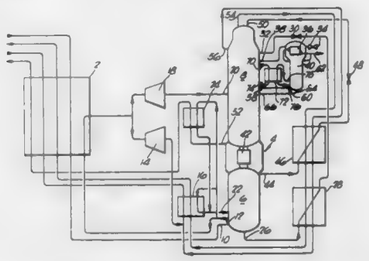
David C. F. Gladman, Toddington, and John D. Oakey, London, both of England, assignors to The BOC Group plc, Windlesham, England

Filed Sep. 10, 1987, Ser. No. 95,287

Claims priority, application United Kingdom, Sep. 12, 1986, 8622055

Int. Cl.[4] F25J *3/04*

U.S. Cl. 62—22 12 Claims



1. A process of separating air, comprising fractionating air in a first distillation column, providing reboil at a bottom region and reflux at a top region of the first distillation column, withdrawing a product oxygen stream from a bottom region of the column, withdrawing a product nitrogen stream from a top region of the column, withdrawing a stream enriched in argon from an intermediate level in the column, and separating it in a second distillation column to form a product argon stream, wherein at least one liquid stream comprising oxygen and nitrogen is taken from the first column, at least partially boiled by heat exchange with fluid taken from the second distillation column, and returned to the first distillation column, said fluid being returned to the second distillation column.

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**4,747,860**

## AIR SEPARATION

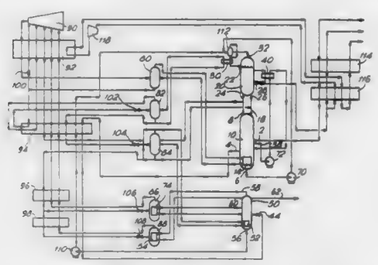
Timothy D. Atkinson, London, England, assignor to The BOC Group plc, Windlesham, England

Filed Aug. 25, 1987, Ser. No. 89,272

Claims priority, application United Kingdom, Aug. 28, 1986, 8620754

Int. Cl.[4] F25J *3/04*

U.S. Cl. 62—22 14 Claims



1. In a process for the separation of argon from air comprising introducing a stream of air into a first distillation column, withdrawing therefrom a stream of argon-containing fluid having an argon concentration greater than said stream of air and separating an argon product from said fluid in a second distillation column, wherein oxygen-rich liquid is withdrawn from said first distillation column and introduced into one end of a mixing zone, a nitrogen-rich vapor is withdrawn from said first distillation column and introduced into the opposite end of the mixing zone, a liquid flow and an opposed vapor flow are established through said mixing zone which become progressively richer in nitrogen and oxygen, respectively, a mixed stream comprising oxygen and nitrogen is withdrawn from an intermediate point in said mixing zone and said oxygen-rich vapor is condensed and returned to the mixing zone, the improvement wherein liquid nitrogen is passed from the mixing zone to the first distillation column, and a vapor stream is withdrawn from the mixing zone at a point intermediate in the direction of a vapor flow between the point of withdrawal of said mixed stream and the end of the zone, said vapor stream is condensed in heat exchange with a stream of boiling liquid from one of said distillation columns, said condensed stream is returned to the mixing zone and said boiled liquid is returned to said distillation column.

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**4,747,861**

## METHOD FOR THE MANUFACTURE OF GLASS BY MEANS OF DEPOSITION FROM THE VAPOR PHASE

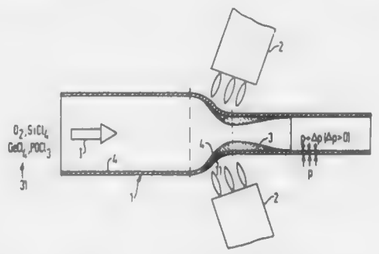
Hartmut Schneider, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Mar. 14, 1984, Ser. No. 589,593

Claims priority, application Fed. Rep. of Germany, Jul. 7, 1983, 3324539

Int. Cl.[4] C03C *25/02;* C03B *19/09*

U.S. Cl. 65—3.12 4 Claims



1. A method for depositing glass by decomposition of glass forming compounds in the vapor phase which comprises:

providing a heat-softenable refractory tube,

introducing a gaseous mixture of said glass forming compounds into one end of said tube,

applying a source of heat to said tube while rotating the tube, and

moving said source of heat parallel to the axis of said tube to provide a moving hot zone therealong,

heating said tube to at least the softening point of the tube to expand and cause the formation of a conical section of decreasing diameter which moves with the movement of said hot zone,

maintaining the interior of said tube at a pressure in excess of the exterior pressure on said tube during such heating to thereby cause a softened portion of the tube to expand and form said conical portion, and

forming a glass layer in said tube by deposition of decomposed glass forming compounds.



**4,747,862**

## METHOD OF MANUFACTURING A DEVICE FOR CONDUCTING QUANTIZED PARTICLES

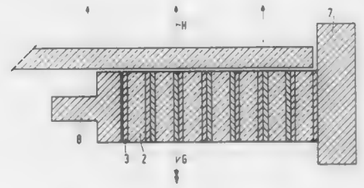
Jan Haisma, and Eltjo Scholtens, both of Eindhoven, Netherlands, assignors to U.S. Philips Corp., New York, N.Y.

Filed Sep. 22, 1986, Ser. No. 909,805

Claims priority, application Netherlands, Oct. 23, 1985, 8502889

Int. Cl.[4] C03B *37/027*

U.S. Cl. 65—4.1 28 Claims



1. A method of manufacturing a device for conducting quantized particles in which a plurality of separate elongated conductor pieces which are substantially parallel is bundled, characterized in that the method comprises the following steps:

providing a layer of magnetizable material throughout the length of a conductor;

dividing the conductor into conductor pieces having a predetermined length;

aligning the conductor pieces by means of a magnetic field and a gravitational field in such a manner that their ends are positioned against an abutment face that extends substantially normal to the direction of the gravitational field, the attraction caused by the magnetic field being greater than and opposed to the force of gravity caused by the gravitational field;

bundling the conductor pieces into dense packing; and

joining the bundled conductor pieces into a single unit.

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**4,747,863**

## METHOD OF MANUFACTURING GLASS BODIES

Rolf Clasen, and Joachim F. A. Opitz, both of Aachen, Fed. Rep. of Germany, assignors to U. S. Philips Corp., New York, N.Y.

Filed May 19, 1986, Ser. No. 864,988

Claims priority, application Fed. Rep. of Germany, Jun. 21, 1985, 3522194

Int. Cl.[4] C03B *37/016*

U.S. Cl. 65—17 10 Claims

1. A method of manufacturing glass bodies, in which the starting material for the glass body, being microporous monodispersed suspensions of $SiO_2$ particles is used to form an open-pore green body which is subjected to a purification process in which the impurities present in the green body react with purifying gas which is heated to a temperature in the range from 600° to 900° C., after which the green body is sintered, characterized by a two-stage heating-purification step in which in the first stage the $SiO_2$ particles are heated until they are dense-sintered whereby they are substantially free of micropores, in which said particles have an average diameter of 0.08–0.9 μm, a standard deviation of about 0.04–0.1 μm and a specific surface of about 3 to 30 m2/g and in the second stage the open-pore green body formed from the dense-sintered $SiO_2$ particles is purified in a a gaseous purification atmosphere and subsequently sintered.

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**4,747,864**

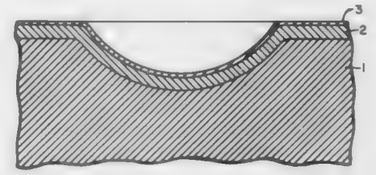
## PROCESS FOR THE PRECISION MOLDING OF GLASS ARTICLES

Robert J. Hagerty, Painted Post; Paul I. Kingsbury, Elmira, and Harold G. Shafer, Jr., Rock Stream, all of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Jun. 19, 1986, Ser. No. 875,946

Int. Cl.[4] C03B *23/00*

U.S. Cl. 65—102 4 Claims



1. In a method for molding a glass optical element having at least one curved optical surface exhibiting a precise surface figure and low light scattering, which method comprises the steps of providing a glass forming mold having a pressing surface provided with a TiN surface coating and corresponding to the optical surface, preheating the mold and a glass preform for the glass optical element to a temperature at which the glass has a viscosity in the range of $10^8$–$10^{12}$ poises, and pressing the mold against the preheated glass preform with pressure sufficient to conform a surface of the preform to the pressing surface of the mold, the improvement wherein:

(a) the mold comprises a base member formed of an oxidation resistant metal;

(b) a surface of the base member corresponding to the pressing surface of the mold is provided with a machinable nickel base coating;

(c) the nickel base coating is provided with a TiN glass contact coating;

(d) the glass preform consists of an alkali fluoroaluminophosphate glass; and

(e) the step of pressing the mold against the preheated glass preform is carried out in air.

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**4,747,865**

## SUBSTITUTED PHENOXYALKANECARBOXYLIC ACID ESTERS

Kozo Shiokawa, Kawasaki; Koichi Moriya, Hachioji; Toshio Goto, Sagamihara; Atsumi Kamochi, Hino; Seishi Ito, Hachioji, and Mitsugu Horita, Hino, all of Japan, assignors to Nihon Tokushu Noyaku Seizo K.K., Tokyo, Japan

Division of Ser. No. 661,622, Oct. 17, 1984, Pat. No. 4,666,503. This application Nov. 25, 1986, Ser. No. 934,774

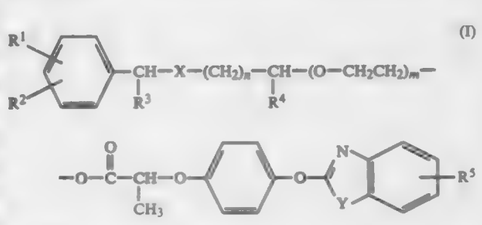
Claims priority, application Japan, Oct. 25, 1983, 58-198235

The portion of the term of this patent subsequent to May 19, 2004, has been disclaimed.

Int. Cl.[4] C07D *277/86, 263/58;* A01N *43/76, 43/78*

U.S. Cl. 71—90 19 Claims

1. Substituted phenoxyalkanecarboxylic acid esters of the formula



(I)

in which

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$R^1$ and $R^2$, independently of one another, represent a hydrogen atom, a halogen atom, a lower alkyl group or a nitro group, or

$R^1$ and $R^2$, together with the benzene ring to which they are bonded, represent a naphthalene ring,

$R^3$ and $R^4$, independently of one another, represent a hydrogen atom or a methyl group,

n represents 1 or 2,

m represents 0 or 1,

X represents an oxygen atom, a sulfur atom, a sulfonyl group of a group of the formula



in which

$R^6$ represents a lower alkyl group,

$R^5$ represents a hydrogen atom or a halogen atom, and

Y represents an oxygen atom or a sulfur atom.

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**4,747,866**

**PYRIMIDINYLOXYALKANAMIDE DERIVATIVES AND HERBICIDE COMPOSITION CONTAINING THE SAME**

**Tetsuo Takematsu; Yasutomo Takeuchi, both of Utsunomiya; Mitsuaki Takenaka, Ube; Seiji Takamura, Ube, and Hiroshi Hase, Ube, all of Japan, assignors to Ube Industries, Ltd., Ube, Japan**

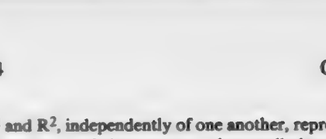
**Filed Aug. 15, 1986, Ser. No. 897,306**

**Claims priority, application Japan, Aug. 20, 1985, 60-180987**

**Int. Cl.[4] A61K** *31/34, 31/505*

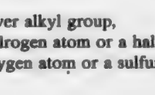
**U.S. Cl. 71—92** **13 Claims**

1. A pyrimidinyloxyalkanamide derivative of Formula 1:



(1)

wherein $R_1$ represents a hydrogen atom, a halogen atom, a lower alkyl group, a lower alkylthio group, a lower alkenylthio group, a lower alkynylthio group, a halogenated lower alkenylthio group, a cycloalkylthio group, a phenoxyalkylthio group, a lower alkoxyl group, an amino group, a methanesulfonyl group, a trifluoromethyl group, an anilino group which may be substituted with a halogen atom or a benzylthio group which may be substituted with a halogen atom; $R_2$ represents a hydrogen atom, a halogen atom, a lower alkyl group, a trifluoromethyl group, a lower alkoxyl group or a lower alkylthio group; $R_3$ represents an ethyl group or an n-propyl group; and $R_4$ represents a cyclohexyl group, a thienyl group, a pyridyl group, a furyl group or a



group wherein X and Y may be the same or different and each represent a hydrogen atom, a lower alkyl group, a trifluoromethyl group, a lower alkoxyl group or a halogen atom,

said active ingredient being in an amount of from 1 to 80% by weight based on the total weight of the herbicidal composition with the remainder of said herbicidal composition being at least one auxiliary component.

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**4,747,867**

**1-ARYL-4-CYANO-5-HALOGENOPYRAZOLES, COMPOSITION CONTAINING THEM, AND HERBICIDAL METHOD OF USING THEM**

**Reinhold Gehring, Wuppertal; Uta Jensen-Korte, Düsseldorf; Otto Schallner, Monheim; Jörg Stetter, Wuppertal; Hans-Joachim Santel, Leverkusen, and Robert R. Schmidt, Bergisch Gladbach, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

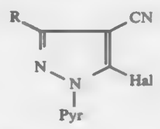
**Filed May 22, 1986, Ser. No. 866,050**

**Claims priority, application Fed. Rep. of Germany, Jun. 7, 1985, 3520329**

**Int. Cl.[4] A01N** *43/56;* **C07D** *231/16, 401/04*

**U.S. Cl. 71—92** **7 Claims**

1. A 1-pyridyl-4-cyano-5-halogenopyrazole of the formula



in which

R is hydrogen or alkyl having 1 to 4 carbon atoms,

Hal is halogen, and

Pyr is pyridyl which is polysubstituted, the pyridyl substituents being independently selected from the group consisting of cyano, halogen, alkyl, alkoxy or alkoxycarbonyl each of which has up to 4 carbon atoms, halogenoalkyl or halogenoalkoxy each of which has up to 4 carbon atoms and up to 9 halogen atoms, or the radical $—S(O)_n—R^1$, wherein

$R^1$ is amino, alkyl, alkylamino, dialkylamino or halogenoalkyl each of which has up to 4 carbon atoms in the individual alkyl moieties and, in the case of halogenoalkyl, up to 9 halogen atoms, and

n is 0, 1 or 2.

6. A method of combating unwanted vegetation which comprises applying to such vegetation or to a locus from which it is desired to exclude such vegetation a herbicidally effective amount of a compound according to claim 1.

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**4,747,868**

**GROWTH-REGULATING, FUNGICIDAL, AND HERBICIDAL CYCLOHEXYLIMIDAZOLE AND CYCLOHEXENYLIMIDAZOLE DERIVATIVES, COMPOSITIONS, AND METHODS OF USE THEREFOR**

**Roland Schmierer, Todtenweis; Hilmar Mildenberger, Kelkheim; Reinhard Handte, Gablingen; Helmut Börstell, Frankfurt am Main; Burkhard Sachse, Kelkheim; Klaus Bauer, Rodgau, and Hermann Bieringer, Eppstein/Taunus, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

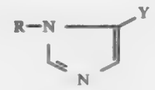
**Filed Apr. 17, 1986, Ser. No. 853,018**

**Claims priority, application Fed. Rep. of Germany, Apr. 19, 1985, 3514116**

**Int. Cl.[4] A01N** *43/50;* **A61K** *31/415;* **C07D** *231/12*

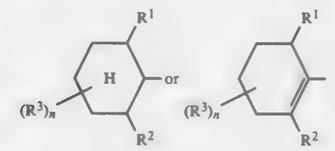
**U.S. Cl. 71—92** **4 Claims**

1. A compound of the formula I



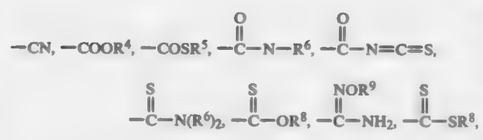
in which

R is a radical of the formulae



n is 0 to 6,

Y is



m is 1 to 4,

$R^1$ and $R^2$ independently of one another are $(C_1–C_4)$-alkyl or hydrogen, $(C_1–C_4)$-alkoxy-$(C_1–C_4)$-alkyl or halogen,

$R^4$ is hydrogen, $(C_1–C_{12})$-alkyl, $(C_1–C_{12})$-alkyl which is monosubstituted to trisubstituted by hydroxyl, halogen, $(C_1–C_6)$-alkoxy, $(C_1–C_4)$-alkoxy-$(C_1–C_4)$-alkoxy, $(C_1–C_4)$-alkylthio, $(C_1–C_4)$-alkylsulfinyl, $(C_1–C_4)$-alkylsulfonyl, mono-$(C_1–C_4$-alkyl)-amino, di-$(C_1–C_4$-alkyl)-amino, cyano, aminocarbonyl, $(C_1–C_4)$-alkanoyl, $(C_1–C_4$-alkoxy)-carbonyl, cyclo-$(C_3–C_7)$-alkyl, tri-$(C_1–C_4$-alkyl)-silyl, benzyloxy, benzyloxyethoxy, phenyl or phenyl which is mono substituted or polysubstituted by halogen or $(C_1–C_4)$-alkyl, by phenoxy or phenylthio both of which can be monosubstituted or polysubstituted by halogen or $(C_1–C_4)$-alkyl, carboxyl, carboxylate containing a cation which can be employed in agriculture or by the radical $—O—N=C(CH_3)_2$; or $R^4$ denotes $(C_3–C_6)$-alkenyl, halogenated $(C_3–C_6)$-alkenyl, cyclo-$(C_3–C_7)$-alkyl which is unsubstituted or substituted by halogen or $(C_1–C_4)$-alkyl, cyclo-$(C_5–C_7)$-alkenyl, $(C_3–C_7)$alkynyl, 1,2-epoxy-prop-3-yl, phenyl which is unsubstituted or monosubstituted or disubstituted by halogen, nitro, cyano, $(C_1–C_4)$-alkyl, $(C_1–C_4$-alkoxy)-carbonyl or $(C_1–C_4)$-alkoxy; $(C_1–C_4$-alkyl)-carbonyl, phenylcarbonyl in which the phenyl ring can be substituted by halogen, nitro, cyano or $(C_1–C_4)$-alkyl, or a radical of the formulae $—N=CR^{14}R^{15}$, $—NR^6R^{16}$,

$R^5$ is $(C_1–C_{12})$-alkyl or $(C_1–C_{12})$-alkyl which is not more than disubstituted by $(C_1–C_4)$-alkoxy-ethoxy, cyclo-$(C_3–C_6)$-alkyl, benzyloxy, phenyl, phenoxy, $(C_1–C_4)$-alkylthio, $(C_1–C_4$-alkoxy)-carbonyl, carboxyl or carboxylate containing a cation which can be employed in agriculture,

the $R^6$s independently of one another each are hydrogen, $(C_1–C_6)$-alkyl, phenyl or $(C_3–C_6)$-alkenyl,

$R^7$ is hydrogen, $(C_1–C_{12})$-alkyl or $(C_1–C_{12})$-alkyl which is not more than disubstituted by $(C_1–C_6)$alkoxy, $(C_1–C_4)$-alkoxyethoxy, hydroxyl, halogen cyclo-$(C_3–C_6)$-alkyl, benzyloxy, cyano, aminocarbonyl, carboxyl, $(C_1–C_4$-alkoxy)-carbonyl, formyl, phenyl or phenoxy; phenyl or phenyl which is not more than disubstituted by halogen, nitro, cyano, $(C_1–C_4)$-alkyl or $(C_1–C_4)$-alkoxy; $(C_3–C_6$-)alkenyl, $(C_3–C_6)$-cycloalkyl or a radical of the formulae $—NR^6R^{17}$, $—OR^9$, $—NH—CO—NH_2$, $—NH—C(=S)—NH_2$ or $—SO_2R^{18}$, or

$R^8$ is H, $(C_1–C_6)$-alkyl or phenyl or, in the event that R=—CS—$OR^9$, is a cation which can be employed in agriculture,

the $R^9$s independently of one another each are H, $(C_1–C_4)$-alkyl or benzyl,

the $R^{14}$s and $R^{15}$s independently of one another are H or $(C_1–C_6$-alkyl which is unsubstituted or substituted by $(C_1–C_4)$-alkoxy; cyclo-$(C_3–C_6)$-alkyl, $(C_3–C_6)$-alkenyl, phenyl or benzyl or

$R^{14}$ and $R^{15}$, together with the carbon atom to which they are attached, are cyclo-$(C_5–C_7)$-alkyl which is unsubstituted or substituted by methyl or halogen,

$R^{16}$ is $(C_1–C_4)$-alkyl, phenyl, $(C_1–C_6$-alkyl)-carbonyl, benzyl, benzoyl, halogenobenzyl, halogenobenzoyl or methylbenzoyl,

$R^{17}$ is H, $(C_1–C_4)$-alkyl, formyl, $(C_1–C_6$-alkyl)-carbonyl, benzoyl, halogenobenzoyl, methylbenzoyl or trihalogenoacetyl and

$R^{18}$ is $(C_1–C_4)$-alkyl, phenyl or methylphenyl,

and to salts and quaternization products thereof which are compatible for agricultural purposes.

3. A herbicidal having an effective content of a compound of the formula (I) of claim 1 and an agriculturally acceptable carrier.

4. A process for regulating the growth of plants and for combating weeds and harmful fungi, which comprises applying an effective amount of a compound of the formula (I) of claim 1 to the plants or to the cultivated area.

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**4,747,869**

**SUBSTITUTED AZOLYL-KETONES AND -ALCOHOLS**

**Wolfgang Krämer, Wuppertal; Karl H. Büchel, Burscheid; Klaus Ditgens; Hans-Ludwig Elbe, both of Wuppertal; Gerhard Jäger, Leverkusen; Manfred Jautelat, Burscheid; Klaus Lürssen, Bergisch-Gladbach, and Paul Reinecke, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Continuation of Ser. No. 503,220, Jun. 10, 1983, abandoned. This application Apr. 18, 1985, Ser. No. 724,375**

**Claims priority, application Fed. Rep. of Germany, Jun. 29, 1982, 3224129**

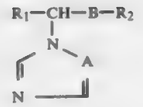
**Int. Cl.[4] C07D** *249/08;* **A01N** *43/653;* **A61K** *31/41*

**U.S. Cl. 71—92** **8 Claims**

1. A substituted azolyl ketone or -alcohol of the formula

VOL 1090 ISS 5 MY 31 1988 UMI





in which
B is CO or CH (OH),
$R_1$ is benzyl optionally mono- or di- substituted by chlorine,
$R_2$ is cycloalkyl with 3–7 carbon atoms which is mono-, di- or trisubstituted with alkyl radicals with 1–4 carbon atoms, or an addition product thereof with an acid or metal salt.

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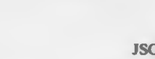
**4,747,870**

## HERBICIDAL PYRAZOLE SULFONAMIDES

**Barry A. Wexler, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

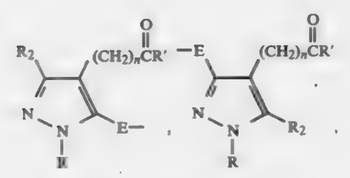
**Continuation-in-part of Ser. No. 859,275, May 2, 1986, abandoned. This application Mar. 13, 1987, Ser. No. 22,365**
**Int. Cl.[4] C07D *239/69, 403/12, 403/14*; A01N *43/54***
**U.S. Cl. 71—92** **36 Claims**

1. A compound of the formula



I

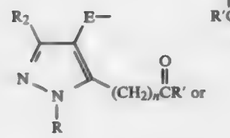
wherein
J is



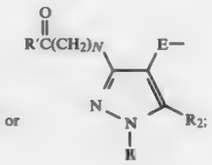
J-1



J-2

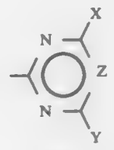


J-3



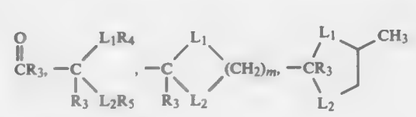
J-4

R is H, $C_1$–$C_3$ alkyl, phenyl, $SO_2NR_aR_b$, $C_1$–$C_2$ haloalkyl, $C_2$–$C_4$ alkoxyalkyl, $C_2$–$C_3$ cyanoalkyl, $C_2$–$C_4$ alkylthioalkyl, $C_2$–$C_4$ alkylsulfinylalkyl, $C_2$–$C_4$ alkylsulfonylalkyl, $CO_2C_1$–$C_2$ alkyl, $C_1$–$C_4$ alkylcarbonyl, $C_1$–$C_2$ alkylsulfonyl, $C_3$–$C_4$ alkenyl, $C_3$–$C_4$ alkynyl or $C_1$–$C_2$ alkyl substituted with $CO_2C_1$–$C_2$ alkyl;
$R_1$ is H or $CH_3$;
$R_2$ is H, $C_1$–$C_3$ alkyl, $C_1$–$C_3$ haloalkyl, halogen, nitro, $C_1$–$C_3$ alkoxy, $SO_2NR_cR_d$, $C_1$–$C_3$ alkylthio, $C_1$–$C_3$ alkylsulfinyl, $C_1$–$C_3$ alkylsulfonyl, CN, $CO_2R_e$, $C_1$–$C_3$ haloalkoxy, $C_1$–$C_3$ haloalkylthio, amino, $C_1$–$C_2$ alkylamino, di($C_1$–$C_3$ alkyl)amino or $C_1$–$C_2$ alkyl substituted with $C_1$–$C_2$ alkoxy, $C_1$–$C_2$ haloalkoxy, $C_1$–$C_2$ alkylthio, $C_1$–$C_2$ haloalkylthio, CN, OH or SH;
$R_a$ and $R_b$ are independently $C_1$–$C_2$ alkyl;
$R_c$ is H, $C_1$–$C_4$ alkyl, $C_2$–$C_3$ cyanoalkyl, methoxy or ethoxy;
$R_d$ is H, $C_1$–$C_4$ alkyl or $C_3$–$C_4$ alkenyl; or
$R_c$ and $R_d$ may be taken together as $—(CH_2)_3—$, $—(CH_2)_4—$, $—(CH_2)_5—$ or $—CH_2CH_2OCH_2CH_2—$;
$R_e$ is $C_1$–$C_4$ alkyl, $C_3$–$C_4$ alkenyl, $C_3$–$C_4$ alkynyl, $C_2$–$C_4$ haloalkyl, $C_2$–$C_3$ cyanoalkyl, $C_5$–$C_6$ cycloalkyl, $C_4$–$C_7$ cycloalkylalkyl or $C_2$–$C_4$ alkoxyalkyl;
R′ is $C_3$–$C_5$ cycloalkyl;
E is a single bond or $CH_2$;
W is O or S;
n is 0 or 1;
A is



A-1

X is H, $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkoxy, $C_1$–$C_4$ haloalkoxy, $C_1$–$C_4$ haloalkyl, $C_1$–$C_4$ haloalkylthio, $C_1$–$C_4$ alkylthio, halogen, $C_2$–$C_5$ alkoxyalkyl, $C_2$–$C_5$ alkoxyalkoxy, amino, $C_1$–$C_3$ alkylamino, di($C_1$–$C_3$ alkyl)amino or $C_3$–$C_5$ cycloalkyl;
Y is H, $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkoxy, $C_1$–$C_4$ haloalkoxy, $C_1$–$C_4$ haloalkylthio, $C_1$–$C_4$ alkylthio, $C_2$–$C_5$ alkoxyalkyl, $C_2$–$C_5$ alkoxyalkoxy, amino, $C_1$–$C_3$ alkylamino, di($C_1$–$C_3$ alkyl)amino, $C_3$–$C_4$ alkenyloxy, $C_3$–$C_4$ alkynyloxy, $C_2$–$C_5$ alkylthioalkyl, $C_1$–$C_4$ haloalkyl, $C_2$–$C_4$ alkynyl, azido, cyano, $C_2$–$C_5$ alkylsulfinylalkyl, $C_2$–$C_5$ alkylsulfonylalkyl,



or $N(OCH_3)CH_3$;
m is 2 or 3;
$L_1$ and $L_2$ are independently O or S;
$R_3$ is H or $C_1$–$C_3$ alkyl;
$R_4$ and $R_5$ are independently $C_1$–$C_3$ alkyl;
Z is CH;
and their agriculturally suitable salts; provided that
(a) when X is Cl, F, Br or I, then Y is $OCH_3$, $OC_2H_5$, $N(OCH_3)CH_3$, $NHCH_3$, $N(CH_3)_2$ or $OCF_2H$;
(b) when W is S, then $R_1$ is H and Y is $CH_3$, $OCH_3$, $OC_2H_5$, $CH_2OCH_3$, $C_2H_5$, $CF_3$, $SCH_3$, $OCH_2CH{=}CH_2$, $OCH_2C{\equiv}CH$, $OCH_2CH_2OCH_3$, $CH(OCH_3)_2$ or 1,3-dioxolan-2-yl;
(c) when the total number of carbons of X and Y is greater than four, then the number of carbons of R must be less than or equal to two.

25. A method for controlling the growth of desired vegetation which comprises applying to the locus to be protected an effective amount of a compound of claim 1.

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**4,747,871**

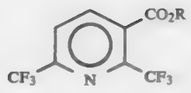
## 2,6-BIS(TRIFLUOROMETHYL)-3-HYDROXYCARBONYL PYRIDINE, SALTS AND GAMETOCIDES

**Peter G. Ruminski, Fenton, and Om P. Dhingra, Chesterfield, both of Mo., assignors to Monsanto Company, St. Louis, Mo.**

**Filed Jan. 7, 1987, Ser. No. 930**
**Int. Cl.[4] A01N *43/40*; C07D *213/80***
**U.S. Cl. 71—94** **8 Claims**

1. A compound of the formula





wherein R is selected from the group consisting of hydrogen and agriculturally acceptable cations.

2. A process for selectively sterilizing the male gametes of a plant which comprises applying to a plant locus a compound selected from the group consisting of 2,6-bis(trifluoromethyl)-3-hydroxycarbonyl pyridine and agronomically acceptable salts thereof.

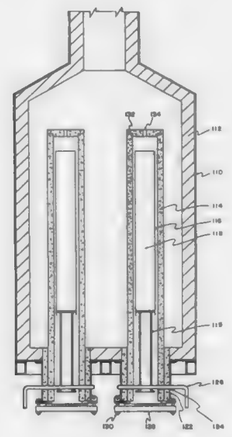
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**4,747,872**

## PROCESS AND APPARATUS FOR PRODUCING HIGH PURITY IRON

**Ricardo Viramontes-Brown, Garza Garcia, and Jorge D. Berrun-Castanon, San Nicolas de los Garza, both of Mexico, assignors to Hylsa, S.A., Neuvo Leon, Mexico**

**Filed Mar. 14, 1985, Ser. No. 711,852**
**Claims priority, application Mexico, Mar. 15, 1984, 200.682**
**Int. Cl.[4] C21B *13/04*; F27D *5/00***
**U.S. Cl. 75—37** **17 Claims**



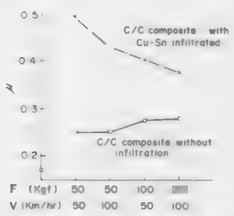
1. A process for producing metallic iron having a sponge-like structure from iron oxides comprising mixing particles of a carbon-containing solid reductant with particles of iron oxide, charging the mixture of said solid reductant and iron oxide to a container formed of a non-porous sheet material resistant to high temperatures, promptly placing and enclosing said charged container within a vented vessel that is made of a refractory material and which vessel is permanently mounted in a furnace, continuously externally heating said refractory vessel in said furnace to heat said mixture to a temperature above 700° C. to reduce said particles of iron oxide to metallic iron, said container operating to prevent said mixture from sticking to said refractory vessel during the heating step of the process, and thereafter removing said container and metallic iron from said furnace.

**4,747,873**

## FRICTIONAL MATERIAL

**Nobuo Kamioka, Kasukabe, Japan, assignor to Akebono Brake Industry Co., Ltd., Tokyo and Akebono Research & Development Centre Ltd., Hanyu, both of, Japan**

**Filed Sep. 11, 1987, Ser. No. 95,450**
**Int. Cl.[4] B22F *1/00***
**U.S. Cl. 75—229** **6 Claims**




1. A frictional material characterized in that, with the metal-containing composite material infiltrated with metal into the pore portions of composite comprising carbon material reinforced with carbon fibers, the porosity of said composite is adjusted to 5 to 15 vol. % and a metal or an alloy with a melting point of 125° to 1100° C. is infiltrated in amounts of 3 to 10 vol. %.

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**4,747,874**

## RARE EARTH-IRON-BORON PERMANENT MAGNETS WITH ENHANCED COERCIVITY

**Mohammad H. Ghandehari, Brea, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.**

**Filed May 30, 1986, Ser. No. 869,045**
**Int. Cl.[4] B22F *1/00***
**U.S. Cl. 75—255** **15 Claims**

1. A composition for preparing a permanent magnet comprising:
(a) a particulate alloy containing at least one rare earth metal, iron, and boron; and
(b) particulate aluminum.

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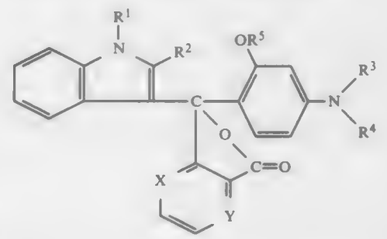
**4,747,875**

## CHROMOGENIC AZAPHTHALIDE COMPOUND AND A COLOUR-FORMING RECORDING COMPOSITION CONTAINING THE SAME

**Hajime Kawai, Tsuzuki; Toshiyuki Nakai, and Katsuhiko Tsunemitsu, both of Kyoto, all of Japan, assignors to Yamada Chemical Co., Ltd., Kyoto, Japan**

**Continuation of Ser. No. 658,997, Oct. 9, 1984, abandoned. This application Jun. 26, 1987, Ser. No. 67,395**
**Claims priority, application Japan, Oct. 18, 1983, 58-195448**
**Int. Cl.[4] C09D *11/00***
**U.S. Cl. 106—21** **17 Claims**

1. A chromogenic compound of the formula



wherein $R^1$, $R^2$, $R^3$ and $R^4$ respectively represent an alkyl group having 1 to 4 carbon atoms; $R^5$ represents an alkyl group

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having 5 to 8 carbon atoms or a cycloalkyl group having 5 to 7 carbon atoms; one of X and Y represents a nitrogen atom and the other of X and Y represents a carbon atom.

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**4,747,876**

## DENTAL CROWN MATERIAL

**Yasuharu Hakamatsuka, and Kazuhiro Watanabe, both of Hachioji, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed Sep. 15, 1986, Ser. No. 907,587**
**Claims priority, application Japan, Sep. 21, 1985, 60-209590**
**Int. Cl.[4] C03C *10/16*; C09K *3/00***
**U.S. Cl. 106—35** **11 Claims**

1. A dental crown formed of a dental crown material comprising crystallized glass containing 40 to 45% by weight of $SiO_2$, 11 to 15% by weight of $Al_2O_3$, 16 to 23% by weight of MgO, 6.5 to 8% by weight of F, 4.0 to 7.0% by weight of $Na_2O$, 5 to 9% by weight of $Li_2O$, not more than 1% by weight of $TiO_2$, 2 to 4% by weight of $ZrO_2$, and at least one oxide selected from the group consisting of $Fe_2O_3$, MnO, $CeO_2$ and NiO, and having a bending strength of at least 2000 $Kg/cm^2$.

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**4,747,877**

## CHLORIDE-FREE HARDENING ACCELERANT FOR PORTLAND CEMENT AND PROCESS THEREOF

**Hans-Ruediger Braun, Palling, Fed. Rep. of Germany, assignor to SKW Trostberg AG, Trostberg, Fed. Rep. of Germany**

**Filed Dec. 11, 1986, Ser. No. 940,425**
**Claims priority, application Fed. Rep. of Germany, Dec. 12, 1985, 3543874**
**Int. Cl.[4] C04B *24/12***
**U.S. Cl. 106—90** **16 Claims**

1. A chloride-free hardening accelerant for Portland cement and Portland cement mortar, based on nitrates and an amine and containing calcium nitrate, sodium nitrate, hexamethylenetetramine and sodium hydroxide.

4. A process for preparing a hardening accelerant as claimed in claim 1, 2 or 3, which comprises adding at room temperature to 55° C. to commercially available calcium ammonium nitrate an amount of formaldehyde which corresponds to that needed for binding the ammonium ion adding sufficient sodium hydroxide solution so as to obtain a pH value of 8 to 12, and stirring the reaction mixture for 1 hour without further heat supply.

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**4,747,878**

## COMPOSITIONS AND METHODS OF MAKING NO MIX CEMENTS

**H. Nash Babcock, Old Greenwich, and Edward P. Holub, Bethel, both of Conn., assignors to Nomix Corporation, Fairfield, Conn.**

**Division of Ser. No. 843,316, Mar. 24, 1986. This application May 15, 1987, Ser. No. 49,906**
**Int. Cl.[4] C04B *14/02***
**U.S. Cl. 106—97** **20 Claims**

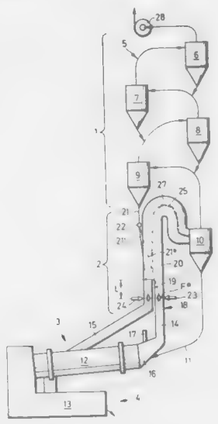
10. A dry cementitious composition in the form of finely divided particles comprising at least one cement binder, a filler component, and at least one accelerator, water reducing compound, pumping aid, water absorbing compound, or a wet or drying shrinkage inhibitor to impart a specific property to the composition, the major portion of the particles having approximately the same drop rate so that the composition is capable of setting and curing to a solid mass when poured into an amount of water which is present in excess of that needed to completely hydrate the composition without any type of physical mixing of the cementitious composition and water other than that which occurs when the composition is poured into the water; the cement binder present in an amount of about 35 weight percent of the composition.

**4,747,879**

## METHOD AND APPARATUS FOR THE THERMAL TREATMENT OF MEAL-LIKE RAW MATERIALS

**Albrecht Wolter, Cologne, and Horst Herchenbach, St. Johann, both of Fed. Rep. of Germany, assignors to Klöckner-Humboldt-Deutz Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Oct. 31, 1986, Ser. No. 925,273**
**Claims priority, application Fed. Rep. of Germany, Oct. 31, 1985, 3538707**
**Int. Cl.[4] C04B *7/43***
**U.S. Cl. 106—100** **20 Claims**



1. A method for the thermal treatment of pulverulent raw material in the manufacture of cement clinker wherein the material is preheated, calcined, sintered and cooled, comprising the steps:

passing the gas stream from the sintering stage and the air-stream from the cooling stage into a common reaction zone for calcination of the raw material;

introducing a preheated raw material into at least one of the streams;

and bringing said streams together in a substantial flow retaining the cross-section of the streams and flowing said streams at substantially the same velocity so that a partial mixing of the two streams occurs only at the boundary layer between the streams.

8. An apparatus for the thermal treatment of pulverulent raw material for the manufacture of cement clinker wherein the material is preheated, calcined, sintered and cooled, comprising in combination:

a preheating stage including a sequence of cyclones following one another;

means for introducing raw material into said preheating stage;

a calcination stage connected to receive the material from the preheating stage and including a reaction stack;

a sintering kiln connected to receive the material from the calcination stage;

a clinker cooler connected to receive the material from the sintering kiln;

an exhaust air conduit leading from the clinker cooler and carrying heated air from the clinker cooler;

an exhaust gas conduit leading from the kiln; and

said conduits having portions extending substantially parallel to each other and connected to discharge to the reaction stack whereby the conduits discharge into the reaction stack with the streams flowing therethrough flowing parallel into the reaction stack and mixing at the boundary layer of the streams.



**4,747,880**

## DRY, GRANULAR MAINTENANCE PRODUCT RECONSTITUTABLE TO AN AQUEOUS CLEAN AND SHINE PRODUCT

**Colin Berrido, Surrey, United Kingdom, and Alfred E. Kilsdonk, Racine, Wis., assignors to S. C. Johnson & Son, Inc., Racine, Wis.**

**Continuation of Ser. No. 680,709, Dec. 12, 1984, abandoned. This application May 1, 1987, Ser. No. 45,903**
**Int. Cl.[4] C08L *5/00*; C11D *3/06***
**U.S. Cl. 106—207** **7 Claims**

1. A dry, granular clean and shine product primarily for floor maintenance having uniformly contained in dry granules from about 15 to 60 percent by weight of an alkaline builder, 15 to 80 percent by weight of a film-former selected from the group consisting of an alkali-soluble polymer, an alkali-soluble resin, a film-forming wax, and mixtures thereof, 0 to 30 percent by weight of a water-softening agent, and 5 to 40 percent by weight of a water-soluble binder selected from the group consisting of natural water-soluble gums, protein materials, an emulsion polymer, water-soluble polymers, alkaline solutions of alkali-soluble resins, solvent-soluble binders that are soluble in water, and mixtures thereof; said granules having an unpacked bulk density of about 0.3 to about 0.8 $g/cm^3$, wherein said product is readily reconstituted as an aqueous floor maintenance composition in water at ambient temperatures without addition of a solubilizing agent, and wherein said water-soluble binder is polyvinylalcohol.

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**4,747,881**

## INGESTIBLE AGGREGATE AND DELIVERY SYSTEM PREPARED THEREFROM

**James J. Shaw, Morristown, and Shri C. Sharma, Mendham, both of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.**

**Filed Feb. 5, 1985, Ser. No. 698,511**
**Int. Cl.[4] A23C *1/29***
**U.S. Cl. 106—209** **8 Claims**



1. An ingestible substantially anhydrous aggregate comprising a pre-swelled hydrocolloid and a solid substrate, wherein the hydrocolloid at least partially entraps and binds the substrate, the substrate comprising soluble dietary fiber and wherein the substrate and the hydrocolloid are not the identical material.

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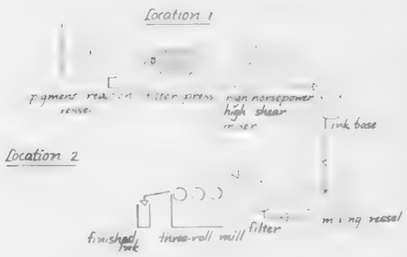
**4,747,882**

## PROCESS FOR THE DIRECT PRODUCTION OF PRINTING INKS

**Russell J. Schwartz, Cincinnati, Ohio, and James Keightley, Mundelein, Ill., assignors to Sun Chemical Corporation**

**Continuation of Ser. No. 711,197, Mar. 13, 1985, abandoned, which is a continuation-in-part of Ser. No. 461,379, Jan. 27, 1983, abandoned. This application Apr. 9, 1987, Ser. No. 36,187**
**Int. Cl.[4] C09D *17/00***
**U.S. Cl. 106—309** **17 Claims**

1. A direct process for the production of a printing ink that is carried out in a single vessel and consists essentially of the steps of (1) mixing under agitation a pigment slurry which contains about 0.5 to 15 percent of pigment with a non-aqueous hydrophobic ink vehicle in a mixer equipped with concentrically arranged mixing elements and high-speed impeller blades and heating to transfer the pigment from the aqueous phase to




the non-aqueous phase, (2) removing the aqueous phase from the mixer, and (3) adding additional ink-making ingredients to the mixer to produce a press-ready printing ink.

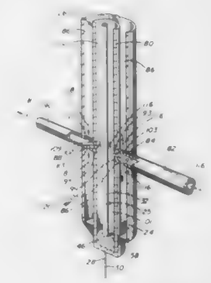
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**4,747,883**

## CONTINUOUSLY FLUSHED THERMOCOUPLE ASSEMBLY

**John F. Krumwiede, Cresattown, Md., and Roy M. Sims, Lower Burrell, Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.**

**Filed Apr. 14, 1986, Ser. No. 851,986**
**Int. Cl.[4] H01L *35/02***
**U.S. Cl. 136—233** **16 Claims**



1. A thermocouple assembly in combination with a melting furnace for containing a body of molten glass, said melting furnace having refractory side and bottom walls, at least one of the walls having a hole therein in which the thermocouple assembly may be mounted, said thermocouple assembly comprising:

a thermocouple element having a junction;

a first sleeve having a closed first end and an opposite second end with said closed first end disposed in surrounding relation to a selected portion of said thermocouple element which portion includes said junction of said thermocouple element to form a sealed first annular space between outer surface of said selected portion of said thermocouple assembly and inner surface of said first sleeve;

a second sleeve having a first end and an opposite second end disposed in surrounding relation to a selected portion of said first sleeve with said first end of said second sleeve between said closed first end and said second end of said first sleeve and said second end of said second sleeve adjacent to and closer to said second end of said first sleeve than said closed first end of said first sleeve;

means for sealing said second end of said second sleeve to the first sleeve to provide a second annular space having a closed end adjacent said second end of said second sleeve

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and an open portion at said first end of said second sleeve to provide the thermocouple assembly;

means for securing the thermocouple assembly in the hole with said closed first end of said first sleeve extending into the molten glass and said second end of said second sleeve at or extending beyond outer surface of the wall having the hole;

means for sealing said first end of said second sleeve and space between said first end of said second sleeve and adjacent wall portion of the hole to provide a sealed second annular space; and

means for moving a corrosion-inhibiting gas into, through, and out of at least one of said annular spaces to flush said at least one of said annular spaces.

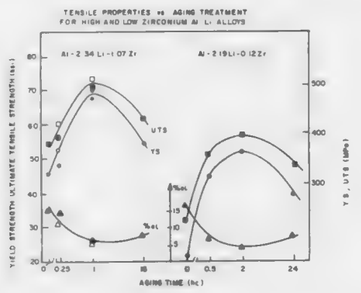
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**4,747,884**

## HIGH STRENGTH ALUMINUM-BASE ALLOY CONTAINING LITHIUM AND ZIRCONIUM AND METHODS OF PREPARATION

**Frank W. Gayle, Cambridge, and John B. Vander Sande, Newbury, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.**

**Filed Apr. 3, 1985, Ser. No. 719,446**
**Int. Cl.⁴ C22F *1/04***
**U.S. Cl. 148—2** **24 Claims**




17. A method of forming an Al—Li—Zr alloy which comprises:

(a) mixing Al metal with Li alloy and Zr,

(b) heating the mixture in an inert gas atmosphere to a temperature sufficient to dissolve the Zr and Li in the molten Al:

(c) rapidly cooling the mixture and creating a solidified mass; and heat-treating the solidified mass at a temperature below about 550° C. in order to form a precipitate of the formula $Al_3(Li_xZr_{1-x})$ wherein $0.8.>x>0.1$.

18. The method of claim 17 which further comprises compacting the solidified mass into a billet.

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**4,747,885**

## SOLUTION AND PROCESS FOR COATING METALS

**Zigmund Zoltowski, Kingston-upon-Thames, England, assignor to Pyrene Chemical Services Limited, Buckinghamshire, England**

**Filed Aug. 28, 1986, Ser. No. 901,664**
**Claims priority, application United Kingdom, Sep. 24, 1985, 8523572**
**Int. Cl.⁴ C23C *22/10***
**U.S. Cl. 148—6.15 R** **6 Claims**

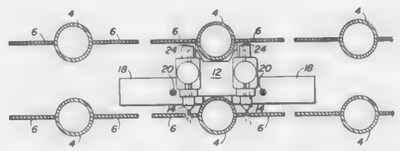
1. An aqueous conversion coating solution comprising about 1.0 to 30 g/l phosphate, 0.01 to 5 g/l stannous ions and 0.2 to 5 g/l of a water-soluble aromatic nitro compound, which has a pH in the range 1.5 to 3.5.

**4,747,886**

## TUBE FIN REMOVAL ROBOT

**Richard A. Dankovic; Allyn E. Haase, and Ralph E. Spada, all of Canal Fulton, Ohio, assignors to The Babcock & Wilcox Company, New Orleans, La.**

**Filed Jun. 12, 1987, Ser. No. 61,857**
**Int. Cl.⁴ B23K *7/10***
**U.S. Cl. 148—9 R** **11 Claims**



1. A method for cutting fins from the pipes carrying fins, each with its fins forming a structure lying in a plurality of spaced apart rows of such structures, each of the structures extending in a longitudinal direction which is substantially transverse to the spacing between the rows of structures, the method comprising the steps of:

rolling a guide roller, mounted to a carriage, against a first one of the structures in a first one of the rows;

rolling at least one pressure wheel mounted to the carriage, against a second one of the structures in an adjacent second one of the rows which is spaced from the first one of the rows;

supporting the carriage between the first and second rows;

pressing the guide wheel against the first structure when the carriage is between the first and second rows of structures;

rotating at least one guide roller and the pressure wheel and moving the carriage in the longitudinal direction between the first and second rows;

cutting one of the fins of one of the first and second structures with a cutting head while moving the carriage in the longitudinal direction.

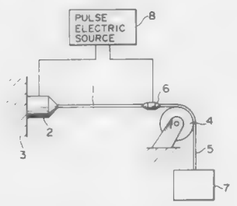
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**4,747,887**

## METHOD AND DEVICE FOR ACTUATING SHAPE MEMORY ALLOY MEMBER

**Dai Honma, Tanashi, Japan, assignor to Naomitsu Tokieda, Tokyo, Japan**

**Continuation of Ser. No. 763,402, Aug. 7, 1985, abandoned. This application Apr. 13, 1987, Ser. No. 38,462**
**Claims priority, application Japan, Dec. 6, 1984, 59-256547**
**Int. Cl.⁴ C22C *19/00*; C22F *1/00***
**U.S. Cl. 148—131** **4 Claims**




1. A method for actuating a member made of shape memory alloy, which comprises the steps of:

(a) stressing said shape member alloy member so that its Ms point becomes positioned between its As point and its Af point; and

(b) applying a successively pulsed supply of electricity with a substantially rectangular wave form to said shape memory alloy member so that the voltage and the duty factor "d" of said pulsed supply of electricity ensure that the relations $\theta$ha greater than $-\theta$ca and "d" less than or equal to $\theta cc/(\theta cc-\theta hb)$ are satisfied, and the frequency of said pulsed supply of electricity is of a frequency which generates sound waves audible to the human ear from said member, where $\theta$ha is the heating speed of said shape memory alloy member in the region below its As point, $\theta$hb is the heating speed of said shape memory alloy member in the region between its As point and its Af point, $\theta$cc is the cooling speed of said shape memory alloy member in the region above its Ms point, and $\theta$ca is the cooling speed of said shape memory alloy member in the region below its Mf point.



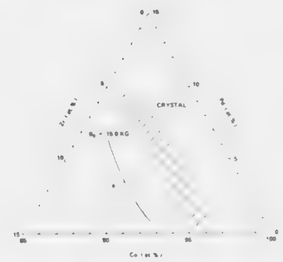
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**4,747,888**

## AMORPHOUS SOFT MAGNETIC THIN FILM

**Hiroshi Takino; Kiyonori Hayakawa; Kazuko Kawabata, and Makoto Tsuruoka, all of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan**

**Filed Feb. 14, 1986, Ser. No. 829,162**
**Claims priority, application Japan, Feb. 16, 1985, 60-28743**
**Int. Cl.⁴ H01F *1/04***
**U.S. Cl. 148—304** **4 Claims**




1. An amorphous soft magnetic thin film composed of an alloy composition having the compositional formula $Co_xZ-r_yPd_z$ wherein

$0.85 \leqq x \leqq 0.94$

$0.04 \leqq y \leqq 0.07$

$0.01 \leqq z \leqq 0.10$.

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**4,747,889**

## INTERCONNECTING WIRE FOR SEMICONDUCTOR DEVICES

**Masanobu Nishio; Kazuo Sawada; Minoru Yokota, and Hitoshi Kishida, all of Osaka, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan**

**Filed May 22, 1986, Ser. No. 865,696**
**Claims priority, application Japan, May 22, 1985, 60-111118; Jun. 21, 1985, 60-136297; Oct. 18, 1985, 60-234358**
**Int. Cl.⁴ C22C *21/00***
**U.S. Cl. 148—437** **4 Claims**

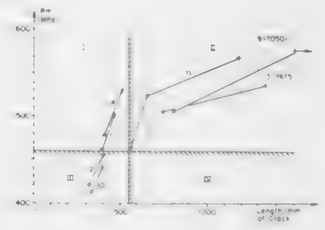
1. An interconnecting wire for semiconductor devices consisting essentially of about 0.1 to about 45 wt% of an element having a melting point lower than about 450° C. selected from the group consisting essentially of lead, tin, cadmium, zinc and indium, with the balance being substantially aluminum, said wire having a diameter of from 40 to 350 $\mu$m.

**4,747,890**

## AL-BASE ALLOY HOLLOW BODIES UNDER PRESSURE

**Philippe Meyer, Voiron, France, assignor to Societe Metallurgieque de Gerzat, Paris, France**

**Filed Sep. 24, 1986, Ser. No. 911,067**
**Claims priority, application France, Jul. 24, 1986, 86 10930**
**Int. Cl.⁴ C22C *21/10***
**U.S. Cl. 148—439** **4 Claims**



1. Wrought hollow body for gas under pressure which is manufactured from an aluminum alloy consisting essentially of (in % by weight):

| | |
|---|---|
| $6.25 \leqq Zn \leqq 8.0$ | $Mn \leqq 0.20$ |
| $1.2 \leqq Mg \leqq 1.95$ | $Zr \leqq 0.05$ |
| $1.7 \leqq Cu \leqq 2.8$ | $Ti \leqq 0.05$ |
| $0.15 \leqq Cr \leqq 0.28$ | Others each $\leqq 0.05$ |
| $Fe \leqq 0.20$ | Others total $\leqq 0.15$ |
| $Si + Fe \leqq 0.40$ | Balance Al. |

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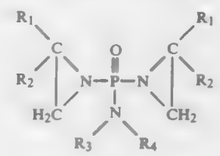
**4,747,891**

## SOLID PROPELLANT CONTAINING AN AZIRIDINYL BONDING AGENT

**Bernard Finck, Corbeil Essonnes; Gérard Doriath, Itteville, and Jean-Pierre Martenot, Bergerac, all of France, assignors to Societe Nationale des Poudres et Explosifs, Paris, France**

**Filed Sep. 15, 1986, Ser. No. 907,624**
**Claims priority, application France, Sep. 19, 1985, 85 13871**
**Int. Cl.⁴ C06B *45/10***
**U.S. Cl. 149—19.4** **7 Claims**

1. A propellant composition which contains in addition to a polyurethane binder, energetic material, an oxidizing agent and a reducing agent and at least an adhesive of formula I:



wherein $R_1$, $R_2$, $R_3$ and $R_4$ are the same or different and are hydrogen, methyl or ethyl.

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**4,747,892**

## MELT-CASTABLE EXPLOSIVE COMPOSITION

**Arthur F. Spencer, Niceville, Fla., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed May 22, 1987, Ser. No. 56,864**
**Int. Cl.⁴ C06B *45/08***
**U.S. Cl. 149—20** **6 Claims**

1. A melt castable explosive composition consisting essentially of about 10 to 20 weight percent of a matrix material having a melting temperature of about 60° to 100° C., up to

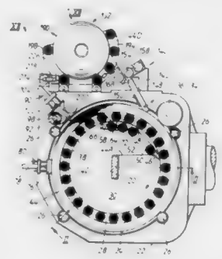
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about 0.5 weight percent of an emulsifying agent, up to about 20 weight percent aluminum powder, balance high explosive.

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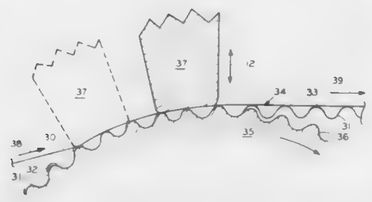
**4,747,893**
**TAPING DEVICE**
**Katsusaburo Nakayama, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**
**Filed Jun. 9, 1987, Ser. No. 60,008**
**Claims priority, application Japan, Jun. 13, 1986, 61-137892**
**Int. Cl.[4] B65H *81/00***
**U.S. Cl. 156—64** **10 Claims**



1. A taping device comprising:
a supporting frame which is adapted to be driven along an object to be wound with an insulation tape;
a revolving ring revolvably arranged on the supporting frame, wherein the revolving ring has a layer of insulation tape around it;
means for rotating the ring around the object to wind the insulation tape under tension around the object;
means for detecting a thickness of the layer of the insulation tape on the revolving ring;
an adhesive feeder for feeding an amount of adhesive onto the outside surface of the insulation tape on the revolving ring when the thickness of the layer of the insulation tape on the revolving ring is less than a predetermined value;
a tape feeder for feeding an auxiliary insulation tape to the layer of the insulation tape around the revolving ring after the adhesive is fed onto the insulation tape on the revolving ring; and
a tape holder arranged on the supporting frame for holding a plurality of reeled auxiliary insulation tapes and including means for supplying the auxiliary insulation tapes to the tape feeder one after another.

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**4,747,894**
**STARCH ADHESIVE BONDING**
**Herbert N. Johnston; Donald F. Hiscock, and Ralph E. Beard, all of Columbus, Ohio, assignors to Battelle Memorial Institute, Columbus, Ohio**
**Filed May 21, 1985, Ser. No. 736,623**
**Int. Cl.[4] B29C *65/08*; B31F *1/28*; C09J *3/06***
**U.S. Cl. 156—73.1** **9 Claims**




1. A method of adhering substrates of paper, paperboard, and like cellulosic-fiber materials to each other by means of adhesive composition therebetween, which method comprises the steps of
(a) applying a coating of an adhesive composition, which comprises starch and water, to a surface area of a first substrate, which substrate is a fluted or corrugated medium in the form of sheet or web like lengths; whereby the coating of the adhesive composition is applied to tips of flutes of the fluted or corrugated medium;
(b) positioning an uncoated surface area of another substrate in contact with the applied coating, which substrate is a liner in the form of sheet or web like lengths;
(c) contacting an output horn of an ultrasonic energy generating means with one or the other or both of the first or another positioned substrates at a moving exterior surface area thereof juxtapositional to the applied coating between the positioned substrates;
(d) carrying adhesive-uncoated reverse surfaces of the flutes of the fluted corrugating medium on metal flutes located on a rotating metal roll so as the roll functions as an anvil for the output horn and in conjunction with the output horn provides a nip spacing between the roll and the output horn of less than the combined thickness of the fluted corrugating medium, the adhesive coating, and the liner; and
(e) generating ultrasonic energy with the ultrasonic energy generating means so as to transmit from the output horn into the coating the ultrasonic energy of a frequency and for a time duration so as to increase adhesiveness of the coating to the positioned substrates;
whereby the product of the method is corrugated board.

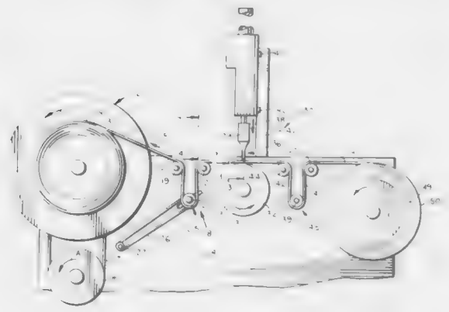
6. An apparatus for adhering substrates of paper, paperboard, and like cellulosic-fiber materials to each other by means of an adhesive composition therebetween, which apparatus comprises the following components:
(a) means for applying a coating of an adhesive composition, which comprises starch and water, to a surface area of a first substrate;
(b) means for positioning an uncoated surface area of another substrate in juxtapositional contact with the applied coating;
(c) means for applying ultrasonic energy to one or the other or both of the first or the another positioned substrates at an exterior surface area thereof juxtapositional to the applied coating between the positioned substrates;
(d) one or more means for preheating either or both of the first and the other substrates to a temperature less than the gelatinization temperature of the adhesive composition prior to applying of the coating to the first substrate and prior to contact of the another substrate with the applied coating; and
(e) one or more roll means provided with flutes thereon for forming of a fluted corrugating medium to function as the first substrate, and with the (c) means for applying ultrasonic energy positioned in relation to other components so as to provide, between an output horn of the means for applying ultrasonic energy and a flute on a roll means, a nip space less than the combined thickness of the first substrate, the coating and the other substrate.

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**4,747,895**
**CONTINUOUS ULTRASONIC PERFORATING SYSTEM AND METHOD**
**Lawrence B. Wallerstein, and Youn Mobasser, both of New Rochelle, N.Y., assignors to American White Cross Laboratories, Inc., New Rochelle, N.Y.**
**Filed Aug. 20, 1986, Ser. No. 898,210**
**Int. Cl.[4] B32B *31/18***
**U.S. Cl. 156—73.3** **12 Claims**

1. A continuous system for rapidly ultrasonically perforating a continuous adhesive backed plastic strip to provide a breathable matrix pattern of holes therein, said continuous adhesive backed strip being mounted on a continuous strip of release material, said system including means defining a feed path for the transport of said mounted continuous adhesive backed plastic strip; a first station disposed in said feed path; said feed path starting at a source of said mounted continuous adhesive backed plastic strip; said first station comprising tensioning means adapted to provide tension to said mounted continuous adhesive backed plastic strip as it is fed in said feed path; a second station disposed in said feed path; said second station comprising ultrasonic perforating means including a knurled roller; said knurled roller being rotatively adjacent said mounted continuous adhesive backed plastic strip and disposed on one side thereof; an ultrasonic horn adjacent said knurled roller disposed on an opposite side of said mounted continuous adhesive backed plastic strip; said knurled roller and said ultrasonic horn adapted to cause a matrix pattern of holes to be continuously formed; a third station disposed in said feed path; said third station comprising tensioning means adapted to provide tension to said mounted continuous adhesive backed plastic strip as it is fed in said feed path; said third station tensioning means including a floatable pulley; and at least means defining a feed path for the transport of said continuous adhesive backed plastic strip from said third station.

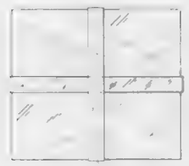
7. A method of for rapidly ultrasonically perforating a continuous adhesive backed plastic strip to provide a breathable matrix pattern of holes therein, comprising the steps of mounting said continuous adhesive backed plastic strip on a continuous strip of release material, feeding said mounted continuous



adhesive backed plastic strip in a feed path to a first station, said first station being disposed in said feed path, said feed path starting at a source of said mounted continuous adhesive backed plastic strip, providing said first station with tensioning means adapted to tension said mounted continuous adhesive backed plastic strip, feeding said mounted continuous adhesive backed plastic strip in said feed path to a second station, providing said second station with ultrasonic perforating means, said ultrasonic perforating means including a knurled roller, said knurled roller being rotatively adjacent said mounted continuous adhesive backed plastic strip and disposed on one side thereof, providing an ultrasonic horn adjacent said knurled roller disposed on an opposite side of said mounted continuous adhesive backed plastic strip, said knurled roller and said ultrasonic horn adapted to perforate said mounted continuous adhesive backed plastic strip, perforating said mounted continuous adhesive backed plastic strip causing a matrix pattern of holes to be continuously formed at said second station, feeding said perforated mounted continuous adhesive backed plastic strip to a third station disposed in said feed path, providing said third station with tensioning means adapted to provide tension to said mounted continuous adhesive backed plastic strip as it is fed along said feed path, said third station tensioning means including a floatable pulley, and providing at least a feed path for the transport of said continuous adhesive backed plastic strip from said third station.



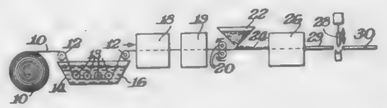
**4,747,896**
**PROTECTIVE COMPOSITE GLASS AND METHOD OF MANUFACTURING THEREOF**
**Maurice G. E. Anastasie, 4, rue Changarnier, 75012 Paris, France**
**Division of Ser. No. 574,864, Jan. 30, 1984, abandoned. This application Feb. 26, 1986, Ser. No. 834,124**
**Claims priority, application France, Feb. 4, 1983, 83 01751; Sep. 21, 1983, 83 14988**
**Int. Cl.[4] B32B *31/00***
**U.S. Cl. 156—85** **21 Claims**



1. A process for making a protective superposed layer composite glass structure comprising:
(a) providing a superposed layer assembly including a first glass plate, a first polyurethane film superposed with said first glass plate, a first polyvinyl butyral sheet disposed between said first glass plate and said first polyurethane film for attaching said first polyurethane sheet to said first glass plate;
(b) providing a polycarbonate plate superposed on one end of said superposed layer assembly adjacent said first polyurethane film;
(c) pressing a rigid plate formed of a material through which infrared radiation can pass against the exterior surface of said polycarbonate plate;
(d) surrounding said superposed layer assembly, said polycarbonate plate, and said rigid plate with at least two bands formed of a thermo-retractable material;
(e) subjecting said superposed layer assembly, said polycarbonate plate, and said rigid plate surrounded by said bands to a calendering operation;
(f) subjecting said superposed layer assembly, said polycarbonate plate, and said rigid plate surrounded by said bands to the action of an autoclave; and
(g) removing said bands from around said superposed layer assembly, said polycarbonate plate and said rigid plate and separating said rigid plate from said polycarbonate plate and said superposed layer assembly subsequent to autoclaving.

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**4,747,897**
**DIELECTRIC MATERIALS**
**Daniel D. Johnson, Yorklyn, Del., assignor to W. L. Gore & Associates, Inc., Newark, Del.**
**Division of Ser. No. 705,538, Mar. 26, 1985, Pat. No. 4,680,220. This application Apr. 2, 1987, Ser. No. 34,285**
**Int. Cl.[4] B65H *81/00***
**U.S. Cl. 156—148** **18 Claims**




1. A process for making a dielectric material comprising:
(a) treating fluorocarbon fibers to render them wettable by an uncured thermosetting resin, the fibers being held under longitudinal tension during such treatment, thereby

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preventing longitudinal shrinkage of said fibers during treatment to produce treated fluorocarbon fibers,
(b) weaving a fabric containing at least a portion of said treated fluorocarbon fibers,
(c) impregnating said fabric with an uncured thermosetting resin, and
(d) heating and drying said resin-impregnated-fabric to cure said resin to at least the semi-cured, B-stage state.

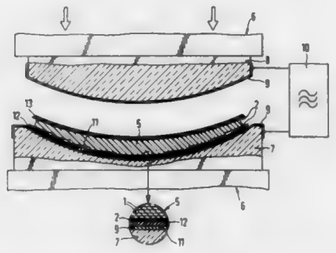
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**4,747,898**

## METHOD OF MAKING A PLASTIC LEAF SPRING

**Herbert Woltron, Eisenstadt, Austria, assignor to Isovolta Osterreichische Isolierstoffwerke Aktiengesellschaft, Wiener Neudorf, Austria**

**Division of Ser. No. 537,270, Sep. 29, 1983, Pat. No. 4,688,778. This application Jun. 2, 1987, Ser. No. 57,341**
**Claims priority, application Austria, Oct. 1, 1982, 3633/82; Apr. 14, 1983, 1327/83**
**Int. Cl.⁴ B32B** *31/12, 31/20*
**U.S. Cl. 156—153** **5 Claims**



5. A method for the production of a plastic leaf spring comprising forming several fiber-reinforced plastic resilient elements or regions from a plurality of cured strips of duromeric plastic reinforced with high strength fibers aligned substantially in the direction of maximum elongation and compression of the fibers under spring load wherein at least a portion of the strips forming the elements have decreasing lengths to form a step profile, machining the step profile to form an arcuate smooth surface and bonding at said surface at least two of said resilient elements or regions together with a bonding agent to form a plastic leaf spring or leaf spring profile body.

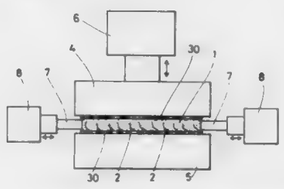
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**4,747,899**

## METHOD FOR IMPROVING THE MECHANICAL STRENGTH OF VENEER SHEETS HAVING LATHE CHECKS

**Katsuji Hasegawa, Ohbushi, Japan, assignor to Meinan Machinery Works, Inc., Aichi, Japan**

**Filed Jan. 12, 1987, Ser. No. 2,108**
**Claims priority, application Japan, Jan. 31, 1986, 61-20320; Feb. 6, 1986, 61-24655; Feb. 10, 1986, 61-27544**
**Int. Cl.⁴ B32B** *31/20*
**U.S. Cl. 156—160** **18 Claims**



1. A method for improving the mechanical strength of a veneer sheet with a loose side having lathe checks and with an opposite tight side having no lathe checks, which comprises bonding a second sheet to at least one of said tight and loose sides of the veneer sheet with glue while pressing the veneer sheet in at least one of two opposite directions in the same plane as the veneer sheet itself and substantially perpendicular to the directions of its fibers.

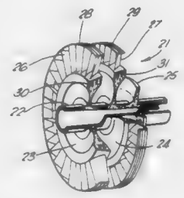
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**4,747,900**

## METHOD OF MANUFACTURE OF COMPRESSOR ROTOR ASSEMBLY

**James P. Angus, Penrith, England, assignor to Rolls-Royce plc, London, England**

**Filed Jun. 5, 1985, Ser. No. 741,587**
**Claims priority, application United Kingdom, Jul. 7, 1984, 8417417**
**Int. Cl.⁴ B65H** *81/00;* **B29C** *45/14;* **B64C** *27/46*
**U.S. Cl. 156—172** **15 Claims**



1. A method of manufacturing a compressor rotor assembly comprising a shaft and at least one disc having integral radially extend aerofoil blades which disc is coaxially mounted on said shaft and is coaxial therewith, comprising injecting a mixture of short fibres and a matrix material into a dividable die so configured as to define the form of said compressor rotor assembly, said mixture being injected into said die at such a location that the majority of said fibres in said mixture which enter that portion of said die defining said shaft are generally axially aligned and the majority of said fibres in said mixture which enter the portions of said die which define said aerofoil blades are generally radially aligned, said portion of said die defining said at least one bladed disc containing at least one support ring which is so positioned within said die as to be integral with said bladed disc after said injection moulding step and additionally provide radial support for the thus moulded aerofoil blades and subsequently opening said die to release the thus moulded compressor rotor assembly.

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**4,747,901**

## PROCESS FOR MAKING A STRESS-FREE EMBOSSED AND ORNAMENT SURFACE COVERING

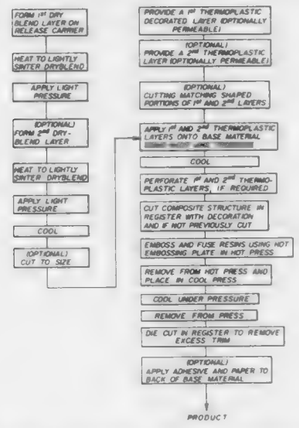
**Stephen E. Becker, Marietta; John S. Forry, Lancaster; Walter J. Lewicki, Jr., Lancaster, and Richard M. Ringer, Lancaster, all of Pa., assignors to Armstrong World Industries, Inc., Lancaster, Pa.**

**Filed Dec. 10, 1985, Ser. No. 806,829**
**Int. Cl.⁴ B31F** *1/00;* **B29C** *59/00;* **B28B** *11/08;* **B32B** *3/00*
**U.S. Cl. 156—220** **3 Claims**

1. A process for making a stress-free embossed and ornamented surface covering comprising:
(a) providing a rigid resinous thermoplastic vinyl film having a 3 to 5% plasticizer level on a release carrier, said film being permeable prior to embossing due to having a plurality of openings extending therethrough, said film having design portions on the surface thereof facing away from the release carrier, said resinous thermoplastic film being rigidly supported;
(b) providing a low-density, porous, thermoplastic resinous base material having top and bottom surfaces;
(c) interfacing the design bearing film surface with the top surface of the base material;
(d) separating the release carrier from said film; and



(e) embossing deeply with an embossing plate the film and base material while applying heat and pressure thereto to fuse the resinous material and to seal the film openings to render the film impermeable due to melting and flowing of the film, said embossing being carried out in a two-stage operation where the film and base material is first embossed in a hot embossing operation with the face of said embossing plate being raised to the temperature of approximately 320° F. wherein the rigid vinyl is raised above its




glass transition temperature to stress relieve the vinyl and to provide the vinyl with appropriate embossed configuration, and then immediately removing said film in contact with the embossing plate and base material from said hot press and placing it in a cold press wherein said embossing plate cools to a temperature of approximately 100° F. to bring the temperature of the rigid vinyl down below its glass transition temperature so that the product will cool in its embossed shape and no stresses will be developed therein.

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**4,747,902**

## METHOD FOR PRODUCING LAMINATED MATERIAL

**Hachiro Saitoh, Yokosuka, Japan, assignor to Nippon Petrochemicals Company, Limited, Tokyo, Japan**

**Filed Sep. 17, 1986, Ser. No. 908,374**
**Claims priority, application Japan, Sep. 24, 1985, 60-210435**
**Int. Cl.⁴ B32B** *31/30*
**U.S. Cl. 156—244.11** **15 Claims**

1. A method for producing a substrate sheet-polyolefin film laminate comprising laminating a molten web of a composition of (a) low density polyethylene characterized by a melt index of at least 30 g/10 min and (b) a carboxyl group-containing ethylene copolymer, said copolymer containing at least one active agent, to a substrate sheet, said sheet previously laminated with a polyolefin layer, said molten web laminated to the polyolefin surface of said subtrate sheet under pressure at a temperature in the range of between the melting or softening point of said low density polyethylene and a temperature 100° C. higher than said melting or softening point of said low density polyethylene.

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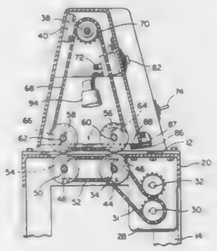
**4,747,903**

## GAS FIRED PLASTIC FILM SEAMING APPARATUS

**Alvin L. Miller, 14949 Stanwood St. SW., Dalton, Ohio 44618**

**Filed Sep. 9, 1986, Ser. No. 905,301**
**Int. Cl.⁴ B32B** *31/26*
**U.S. Cl. 156—366** **6 Claims**

1. A gas fired plastic film seaming apparatus for sealingly connecting overlapped edges of plastic film comprising a supporting structure including a supporting surface, a rotatably driven lower pressure roller mounted with its upper periphery generally in alignment with the supporting surface, a driven upper pressure roller supported above the surface in opposed relation to the lower roller for receiving overlapping plastic film therebetween, a gas burner directing a gas flame toward adjacent peripheral portions of the pressure rollers on the approach side of the rollers for heating plastic film, means supplying a combustible mixture of gas and air to said burner thereby eliminating dependency on ambient air surrounding the burner to support combustion and providing a stable and controllable flame, and driven lower and upper rollers spaced laterally of the pressure rollers and receiving the joined overlapping edges of the plastic film to move the plastic film away



from the pressure rollers with all of the rollers being driven at the same rotational speed, all of said rollers being powered from an electric drive motor, a foot switch for operating said electric motor, said means supplying a combustible mixture of gas and air including a gas valve in a supply line controlled by the foot switch for supplying a combustible mixture to the gas burner, a gas igniter associated with said burner, said gas igniter also being actuated by said foot switch, a delay device associated with the foot switch and electric drive motor to delay operation of the motor until the gas igniter and gas valve have been actuated to initiate a gas flame thereby assuring that the film will be sealingly connected from the starting point of the motor.

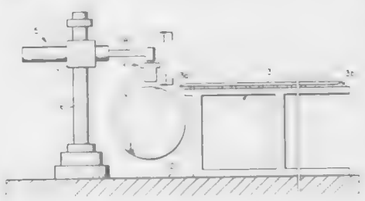
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**4,747,904**

## CYLINDRICAL TIRE FORMING MEMBER MANUFACTURING APPARATUS

**Kouji Okuyama; Makoto Yamamoto; Hidetoshi Kimura, and Taizo Ito, all of Tokyo, Japan, assignors to Bridgestone Corporation, Tokyo, Japan**

**Filed Apr. 7, 1987, Ser. No. 35,535**
**Claims priority, application Japan, Apr. 7, 1986, 61-79863**
**Int. Cl.⁴ B29D** *30/18*
**U.S. Cl. 156—403** **8 Claims**



1. An apparatus for building a cylindrical tire forming member, comprising:
a building drum;
a robot positioned in juxtaposition to said building drum and having a hand which is movable at least in a plane perpendicular to an axis of rotation of said building drum;
a pair of lower pawls coupled to said robot hand body so

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that said lower pawls are movable towards and away from each other;

a pair of upper pawls coupled to said robot hand body so that said upper pawls are paired with said lower pawls, respectively, said upper pawls being movable towards and away from the lower pawls to clamp together with the upper pawls opposite edge portions in a widthwise direction of a belt-shaped material;

rocking means for rocking said upper and lower pawls paired as units in said plane; and

a depressing member operatively coupled to said robot hand body, positioned between said pair of upper pawls and being movable in the direction of the thickness of said belt-shaped material to forceably apply the belt-shaped material interiorly of said edge portions against the periphery of said drum.

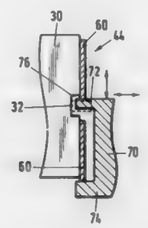
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**4,747,905**

**LABELLING APPARATUS**

Heino Ilsemann, Am Wehkamp 3, 2800 Bremen 1, Fed. Rep. of Germany

Filed Sep. 17, 1986, Ser. No. 908,194
Claims priority, application Fed. Rep. of Germany, Sep. 17, 1985, 3533059
Int. Cl.[4] B44C *1/00*; B65C *9/00, 9/08*
U.S. Cl. 156—542 16 Claims




1. In an apparatus for labelling tape cassettes, said apparatus including a supply magazine for the tape cassettes, a conveyor means for conveying the tape cassettes upright along an essentially horizontal straight line direction from the supply magazine, label applying devices being arranged on opposite sides of the conveyor means, each of said label applying devices including a radially movable label holder having vertical suction faces being mounted on a turret head rotating around a vertical axis to present the holder in succession to a label feeding station, a preparation station, and a labelling station, the improvements comprising for applying self-adhesive strip labels, each label applying device including at least one strip label feeder station, said strip label feeder station having means for conveying a carrier tape with the strip label attached to the tape to extend at a right angle relative to a direction of feed of the tape, and means for transfering the labels from the tape onto a suction face of the label holder in a position which is vertically offset slightly relative to the intended application height for the strip label; and the preparation station including an alignment station having means for engaging an edge of the strip labels and moving the strip label from the vertically offset position to the exact application height position on the suction face of the label holder.

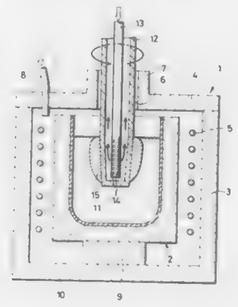
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**4,747,906**

**PROCESS AND APPARATUS FOR PURIFYING SILICON**

Hideo Shingu, Kyoto; Ryotatsu Otsuka, Sakai; Shigemi Tanimoto, Sakai, and Kazuo Toyoda, Sakai, all of Japan, assignors to Showa Aluminum Corporation, Sakai, Japan

Filed Jul. 27, 1987, Ser. No. 77,921
Claims priority, application Japan, Aug. 7, 1986, 61-186646
Int. Cl.[4] C30B *19/00*
U.S. Cl. 156—624 4 Claims




1. A process for purifying crude silicon comprising melting the crude silicon, maintaining the molten silicon above the solidification temperature thereof in an inert gas atmosphere, and providing a hollow rotary cooling member immersed in the molten silicon, rotating and introducing a cooling fluid into the cooling member to cause high-purity silicon to crystallize on the outer surface of the cooling member.

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**4,747,907**

**METAL ETCHING PROCESS WITH ETCH RATE ENHANCEMENT**

John Acocella, Hopewell Junction, and Lawrence D. David, Wappingers Falls, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 29, 1986, Ser. No. 924,702
Int. Cl.[4] C23F *1/00*
U.S. Cl. 156—642 15 Claims

1. An etching process in which a metal is dissolved as cations from a surface of a body by contact with an etching solution comprising,

contacting said metal, selected from the group consisting of Ni, Sn, Cu, Cr, and alloys of steel, stainless steel, with an etching solution, said etching solution having an active etching ingredient selected from the group consisting of ferric ions, ferricyanide ions, chromate ions, and dichromate ions,

simultaneously introducing ozone into said etching solution to rejuvenate said solution, and to materially increase the etching rate of the metal.

14. An etching process in which a metal is dissolved as cations from a surface of a body by contact with an etching solution containing an active oxidizing agent comprising,

contacting molybdenum with a solution containing an active agent consisting of a reduction-oxidation couple to be reversed with an electromotive force of less than 2.07 V in an acid solution, and an oxidation-reduction couple to be reversed with an electromotive force of less than 1.24 V in basic solution, introducing ozone into said etching solution to rejuvenate said solution and increase the etching rate.



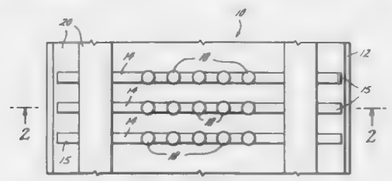
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**4,747,908**

**METHOD OF MAKING A HERMETICALLY SEALED MULTILAYER ELECTRICAL FEEDTHRU**

Curtis N. Potter, Austin, Tex., assignor to Microelectronics and Computer Technologogy Corporation, Austin, Tex.

Filed Apr. 9, 1987, Ser. No. 36,404
Int. Cl.[4] B44C *1/22*; C23F *1/02*; C03C *15/00, 25/06*
U.S. Cl. 156—652 2 Claims




1. A method of making a hermetically sealed multilayered electrical feedthru connector comprising,

coating a substrate with a layer of molybdenum,

coating the molybdenum with a layer of aluminum,

anodizing the aluminum,

depositing a second layer of molybdenum over the anodized aluminum,

masking and etching the individual feedthrus of molybdenum,

coating a second layer of aluminum over the second layer of molybdenum,

anodizing the second layer of aluminum,

applying an etch mask to the top of the second layer of anodized aluminum over areas where it is desired to provide supports leaving the other areas bare,

etching out the anodized aluminum in the bare areas,

cleaning and oxidizing the exposed molybdenum, and

depositing a glass solution to the exposed molybdenum and heat to provide a hermetic glass-to-metal seal.

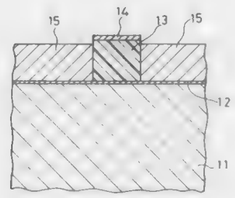
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**4,747,909**

**METHOD FOR MANUFACTURING A PERPENDICULAR SIDEWALLED METAL LAYER ON A SUBSTRATE**

Kunihiko Kanazawa, Toyonaka, and Masaru Kazumura, Takatsuki, both of Japan, assignors to Matsushita Electronics Corporation, Kadoma, Japan

Filed Apr. 18, 1986, Ser. No. 853,762
Claims priority, application Japan, Apr. 19, 1985, 60-84913
Int. Cl.[4] H01L *21/312*; C25D *5/02*
U.S. Cl. 156—653 8 Claims




1. A method for manufacturing a perpendicular sidewalled metal layer on a substrate, comprising:

(a) forming an electrically conductive layer on a substrate;

(b) forming a first photoresist layer made of an organic material on said electrically conductive layer;

(c) forming an inorganic film on said photoresist layer;

(d) forming a second photoresist layer which is thinner than said first photoresist layer on a first region of said inorganic film, while leaving an adjoining second region of said inorganic film uncovered by said thinner second photoresist layer;

(e) selectively etching away said inorganic film in said adjoining second region by one of wet-etching and dry-etching sufficiently to thereby expose said first photoresist layer in a pattern matching that of said adjoining second region;

(f) selectively dry-etching away said first photoresist layer in said pattern, using said inorganic film remaining in place in the first region as a mask, to thereby expose said conductive film in said pattern and create, from said first photoresist layer remaining in place in said first region, a second mask having sidewalls which are substantially perpendicular to said conductive film;

(g) electrolytically plating a metal layer onto said conductive layer using said conductive layer as an electrode, thereby building said metal layer on said conductive layer in said pattern with said sidewalls of the second mask defining sidewalls of said metal layer, said metal layer being less thick at said sidewalls thereof than is said first photoresist layer at said sidewalls thereof wherein the height of said metal layer on said conductive layer determines the thickness of said metal layer and said metal layer is not plated onto said first photoresist layer; and

(h) removing said first photoresist layer and said electrically conductive layer from said substrate in said first region.

8. A method for making a patterned metal layer comprising the steps of:

forming a conductive film on a substrate,

forming a resist layer made of an organic material on said conductive film,

forming an inorganic film on said resist layer,

selectively removing said inorganic film by using a thin photoresist layer thereby retaining a predetermined pattern,

selectively dry-etching said resist layer by using said inorganic film of said predetermined pattern as a first mask, thereby to make a second mask having perpendicular side walls, and

forming a metal layer on said conductive layer using said second mask of said patterned resist layer by an electrolytic plating method in which said conductive film is used as one electrode, thereby building said metal layer on said conductive layer in said pattern with said sidewalls of the second mask defining sidewalls of said metal layer, said metal layer being less thick at said sidewalls thereof than is said resist layer at said sidewalls thereof, wherein the height of said metal layer on said conductive layer determines the thickness of said metal layer and said metal layer is not plated onto said resist layer.

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**4,747,910**

**STORAGE STABLE PAPER SIZE COMPOSITION CONTAINING ETHOXYLATED LANOLIN**

Emil D. Mazzarella, Mountainside; Walter Maliczyszyn, Somerville, and Jeffrey Atkinson, Neshanic Station, all of N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.

Division of Ser. No. 049,033, Apr. 27, 1987, Pat. No. 4,711,671, which is a continuation of Ser. No. 783,904, Oct. 3, 1985, abandoned. This application Sep. 18, 1987, Ser. No. 98,118
Int. Cl.[4] D21H *3/08*
U.S. Cl. 162—158 13 Claims

1. A method for sizing paper products comprising the steps of

(a) providing a paper stock system;

(b) forming, in the absence of high shearing forces and under normal pressures, a sizing emulsion comprising from 80 to 99 parts of a substituted cyclic dicarboxylic acid anhydride containing hydrophobic substitution; from 1 to 20 parts of an ethoxylated lanolin containing at least 15 moles ethylene oxide per mole lanolin; and water;

(c) forming a web from the paper stock system;

(d) dispersing said emulsion within the paper stock either before or after formation of said web but prior to passing

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said web through the drying stage of the paper making operation in an amount sufficient to provide a concentration of the substituted cyclic dicarboxylic acid anhydride of from 0.01 to 2.0%, based on dry fiber weight.

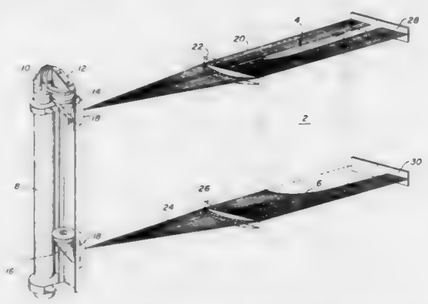
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**4,747,911**

## APPARATUS FOR MEASURING DIAGONAL AND SIMPLEX PAPER CURL

**Alvin K. Polson, Richland, Wash., assignor to Boise Cascade Corporation, Boise, Id.**

**Filed Oct. 23, 1986, Ser. No. 922,394**
**Int. Cl.[4] G01B *11/24***
**U.S. Cl. 162—263** **4 Claims**



1. Apparatus for measuring the simplex and diagonal curl in a sheet of paper, comprising

(a) a laser generator for producing a laser beam;

(b) a line splitter connected with said laser generator for splitting said laser beam into a pair of beams of equal intensity;

(c) reflector means connected with said line splitter for reflecting said beams in a vertically spaced parallel configuration;

(d) means for vertically suspending a sheet of paper from its upper edge;

(e) a pair of collimator lenses, one of said lenses being arranged in the path of each of said reflected laser beams, respectively, for producing laser beams having a given width and for directing said laser beams against both vertically spaced side edge portions of the sheet of paper in directions parallel with the planar surface of the sheet, wherein the sheet interrupts at least a portion of each of said laser beams to cast a shadow image from each beam; and

(f) at least two detector means arranged adjacent the sheet for receiving and comparing said laser beams, respectively, the difference between said received laser beams corresponding with the diagonal curl of the sheet of paper.

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**4,747,912**

## CRACKING FURNACE CONTROL

**Gary L. Funk; William S. Stewart, and Guy S. Pennington, Jr., all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Division of Ser. No. 863,894, May 16, 1986, which is a division of Ser. No. 605,024, Apr. 27, 1984, Pat. No. 4,655,277. This application Aug. 24, 1987, Ser. No. 88,746**
**Int. Cl.[4] C10G *7/58*; C06F *15/18***
**U.S. Cl. 196—132** **6 Claims**

1. Apparatus comprising:

a cracking furnace means having a plurality of cracking tubes;

means for supplying a feed fluid to each of said plurality of cracking tubes;

means for supplying a diluent fluid to each of said plurality of cracking tubes;

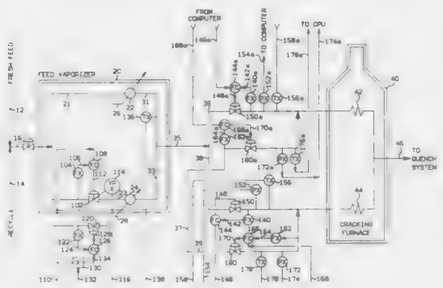
means associated with each of a plurality of said cracking tubes for establishing a first signal representative of the temperature of feed fluid supplied to the associated cracking tube;

means associated with each of said plurality of said cracking tubes for establishing a second signal representative of the pressure of feed fluid supplied to the associated cracking tube;

means associated with each of said plurality of said cracking tubes for establishing a third signal representative of the temperature of diluent fluid supplied to the associated cracking tube;

means associated with each of said plurality of said cracking tubes for establishing a fault signal representative of the pressure of diluent fluid supplied to the associated cracking tube;

means associated with each of said plurality of said cracking tubes for establishing a fifth signal representative of a desired mass flow of feed fluid to the associated cracking tube;



means associated with each of said plurality of said cracking tubes for establishing a sixth signal representative of a desired ratio of feed fluid mass flow to diluent fluid mass flow for the associated cracking tube;

first flow control means associated with each of said plurality of said cracking tubes for controlling the flow of feed fluid to the associated cracking tube in response to said first signal, said second signal and said fifth signal for said associated cracking tube;

set point generating means associated with each of said plurality of said cracking tubes for establishing a diluent flow set point signal representative of the desired flow of diluent fluid to the associated cracking tube in response to said third signal, said fourth signal, said fifth signal and said sixth signal for said associated cracking tube; and

second flow control means associated with each of said plurality of said cracking tubes for controlling the flow of diluent fluid to the associated cracking tube in response to the diluent flow set point signal for said associated cracking tube.

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**4,747,913**

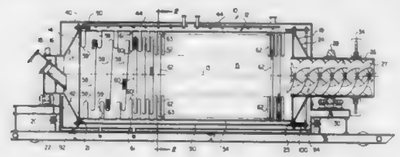
## COOLING APPARATUS FOR GRANULAR COKE MATERIAL

**Ralph Gerstenkorn; Dale D. Erickson, both of Huntington Beach, Calif.; Heyward G. Christmas, Bellingham, Wash.; Ronald E. Kelley, Lynden, Wash., and Charles A. Taul, Bellingham, Wash., assignors to Atlantic Richfield Company, Los Angeles, Calif.**

**Filed Oct. 31, 1986, Ser. No. 926,029**
**Int. Cl.[4] C10B *39/10***
**U.S. Cl. 202—227** **7 Claims**

1. A coke cooling apparatus comprising an elongated generally cylindrical drum disposed in a housing having a lower portion including means forming a trough adapted to be at least partially filled with a cooling liquid, means for supporting said drum for rotation in said housing about a generally horizontal longitudinal central axis of said drum, said drum including an outer circumferential shell wall and opposed head members including respective end wall means of said drum and forming a substantially enclosed space for receiving and discharging a quantity of granular coke material to be cooled,

a plurality of axially and circumferentially spaced apart cooling liquid conduits intersecting and extending radially inwardly from said shell wall with respect to said axis, said conduits being adapted to receive cooling liquid from and discharge cooling liquid into said trough upon rotation of said drum, said conduits causing said shell wall to be deflected radially with respect to said axis during rotation



of said drum due to the weight of said drum and granular coke material in said enclosed space, and stress distributing means for minimizing the deflection of said shell wall during rotation of said drum, said stress distributing means comprising a plurality of elongated rods extending from one end of said drum to the other and being uniformly spaced apart circumferentially with respect to said axis, each of said rods being secured at one end to support means engaged with end wall means at one end of said drum, and each of said rods being secured at its opposite end to a support plate, and resilient spring means interposed between said support plate and end wall means at said other end of said drum for transferring axially directed compressive forces against said shell wall substantially uniformly around the circumference of said drum to minimize deflection of said shell wall during rotation of said drum.

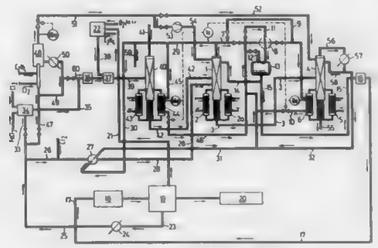
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**4,747,914**

## PROCESS FOR THE PURIFICATION OF 1,2-DICHLOROETHANE

**Peter Schwarzmaier, Kastl; Walter Fröhlich, Burgkirchen; Wenzel Kühn, Burgkirchen; Josef Riedl, Burgkirchen; Iwo Schaffelhofer, Burghausen; Erich Mittermaier, Tüssling, and Reinhard Krumböck, Burgkirchen, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

**Filed May 27, 1986, Ser. No. 867,809**
**Claims priority, application Fed. Rep. of Germany, May 29, 1985, 3519161**
**Int. Cl.[4] B01D *3/14*; C07C *17/38***
**U.S. Cl. 203—22** **5 Claims**



1. A process for the purificaition of 1,2-dichloroethane containing less than 3% by weight of substances having a boiling point at atmospheric pressure higher than 1,2-dichloroethane, which comprises distilling 1,2-dichloroethane in a first column which is continuously fed with impure 1,2-dichloroethane; discharging a bottom product of the first column and feeding said bottom product of the first column to a second column which operates at lower pressure than the first column; regulating said bottom product of the first column to a content of not more than 7% by weight of substances boiling above 1,2-dichloroethane; discharging a bottom product of the second column containing essentially the substances having a boiling point at atmospheric pressure higher than 1,2-dichloroethane; distilling a head product of the first column and a head product of the second column containing essentially vaporous 1,2-dichloroethane; operating the first column at a head temperature of 125° to 180° C.; cooling the vaporous 1,2-dichloroethane which is distilled as the head product of the first column in at least one heat exchanger to heat a 1,2-dichloroethane containing product and to provide a condensate of the vaporous 1,2-dichloroethane; and feeding a portion of said condensate from said heat exchanger to the first column and feeding the remaining portion to a thermal cracking.

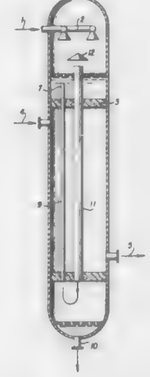
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**4,747,915**

## FALLING-FILM PROCESS FOR THE COCURRENT EVAPORATION OF A SOLUTION

**Giorgio Pagani, Milan, Italy, assignor to Montedison S.p.A., Milan, Italy**

**Continuation of Ser. No. 629,422, Jul. 10, 1984, abandoned. This application Mar. 6, 1986, Ser. No. 837,656**
**Claims priority, application Italy, Jul. 18, 1983, 22103 A/83**
**Int. Cl.[4] B01D *1/22, 3/00***
**U.S. Cl. 203—89** **9 Claims**



1. In a method of stripping, at high pressures, a urea solution effluent of a high pressure reactor, said stripping being performed within a stripper apparatus comprising a vertical tube-bundle heat exchanger including a shell, an uppermost tube-sheet and a lower tube-sheet mounted within said shell so as to define a space between said uppermost and lower tube-sheets into which a heat exchange fluid is introduced, said tube-bundle including a plurality of pipes extending through said space and above said uppermost tube-sheet and opening below said lower tube-sheet, and a feed distribution means to form a liquid heel on said uppermost tube-sheet, the improvement consisting of closing the uppermost end of said pipes and providing said pipes with apertures in those portions of said pipes which extend above said uppermost tube-sheet, maintaining said liquid heel at a level higher than the highest of said apertures, introducing liquid from said liquid heel through said apertures

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into the interior of said pipes so as to cause co-current downward flow of both said liquid and any vapor released therefrom through said pipes to below said lower tube-sheet, and recycling said vapor from below said lower tube-sheet to above said liquid heel through conduit means distinct from said pipes.

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**4,747,916**

## PLATING BATH FOR ELECTRODEPOSITION OF ALUMINUM AND PROCESS FOR THE SAME

**Yoshio Kato, Nishinomiya, and Setsuko Takahashi, Misato, both of Japan, assignors to Nisshin Steel Co., Ltd., Tokyo, Japan**

**Filed Sep. 3, 1987, Ser. No. 92,517**
**Int. Cl.[4] C25D *3/44***
**U.S. Cl. 204—58.5** **6 Claims**

1. A plating bath for electrodeposition of aluminum, comprising a mixture of about 40 to 80 mol % of an aluminum halide ($AlX_3$, wherein X represents Cl, Br of I) and about 20 to 60 mol % of butyl pyridinium halide ($C_2H_5N$-($C_4H_9$)X, wherein X represents a halogen atom).

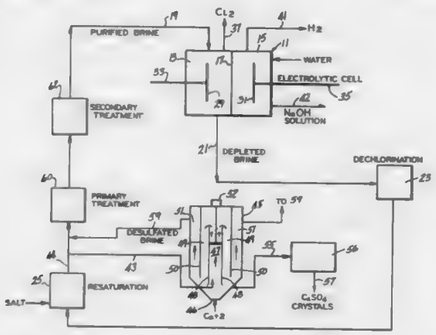
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**4,747,917**

## SCALE-FREE PROCESS FOR PURIFYING CONCENTRATED ALKALI METAL HALIDE BRINES CONTAINING SULFATE IONS AS AN IMPURITY

**Don E. Reynolds, Mt. Verd; Paul W. Breaux, deceased, late of Cleveland, Tenn. (by Vashti C. Breaux, executor), and Emily J. Reed, Englewood, all of Tenn., assignors to Olin Corporation, Cheshire, Conn.**

**Filed Mar. 2, 1987, Ser. No. 20,612**
**Int. Cl.[4] C25B *1/14***
**U.S. Cl. 204—98** **14 Claims**




10. A process for the purification of an alkali metal chloride brine containing sulfate ion for electrolytic cells which comprises:

(a) electrolyzing said alkali metal chloride brine containing sulfate ion in an electrolytic cell to produce chlorine and a depleted brine containing dissolved chlorine and sulfate ion,

(b) removing a portion of said depleted brine from said electrolytic cell,

(c) removing dissolved chlorine from said depleted brine to produce a depleted brine containing sulfate ion,

(d) admixing alkali metal chloride with said depleted brine to produce a concentrated brine containing sulfate ion,

(e) reacting a portion of said concentrated brine containing sulfate ion with calcium chloride in a reaction zone containing at least 5 weight percent of gypsum crystals, to produce additional gypsum crystals,

(f) agitating said reaction zone at a pumping velocity of at least 0.5 meters per second to release solution supersaturation,

(g) passing a desulfated concentrated brine to a settling zone, the residence time in the reaction zone being at least 30 minutes and settling zone residence time based on rise rate to prevent crystal carryover being at least 10 feet per hour, and

(h) removing said desulfated concentrated brine from said settling zone,

(i) admixing said desulfated concentrated brine with any untreated portion of said concentrated brine containing sulfate ion to form a concentrated brine having a reduced sulfate ion concentration, and

(j) feeding said concentrated brine having a reduced sulfate ion concentration to said electrolytic cell.

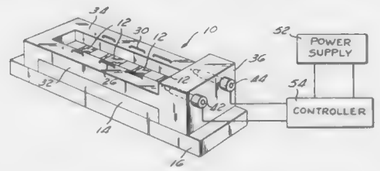
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**4,747,918**

## ELECTROELUTION APPARATUS AND METHOD OF USING SAME

**Donald R. Wassenberg, II, San Diego, Calif., assignor to William Bellomy, San Diego, Calif.**

**Filed Jun. 18, 1986, Ser. No. 875,617**
**Int. Cl.[4] G01N *27/28, 27/30***
**U.S. Cl. 204—182.8** **13 Claims**




1. A method for electrophoretic elution of a charged biological molecule from a gel, comprising the steps of:

(a) providing a container for a liquid, said container having a first side and a second side, with a first electrode on said first side of said container and a second electrode on said second side of said container;

(b) freely placing said gel in said container between said electrodes so that said gel is sitting unrestrained in said container and substantially immersing at least the portion of said gel containing said biological molecule in a single liquid in said container while permitting free movement of liquid around said gel during elution, wherein the total volume of liquid in said container and in fluid communication with said gel is less than 10 ml;

(c) applying a voltage to said electrodes for a period of time sufficient to elute said biological molecule from said gel into said liquid; and

(d) removing said liquid containing said molecule from said container.

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**4,747,919**

## APPARATUS AND METHOD FOR ELECTROPHORESIS IN TUBES

**Norman L. Anderson, Washington, D.C., assignor to Large Scale Biology Corporation, Rockville, Md.**

**Filed Jan. 16, 1987, Ser. No. 4,041**
**Int. Cl.[4] G01N *27/28, 27/26***
**U.S. Cl. 204—182.8** **13 Claims**

1. A method of electrophoresis of macromolecules through a gel medium comprising:

casting the gel medium in a vertically oriented, rigid tube having a hydrophilic inner surface and a top end having a hydrophobic outer surface, the volume of said gel medium being less than the volume of the tube, to form an upper gel surface below the top end of said tube;

loading the macromolecules onto the upper gel surface;

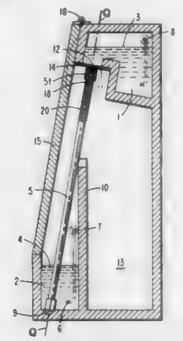
overlaying the upper gel surface with an electrode buffer to fill the tube completely and to form convex meniscus at the top end of said tube;

placing the tube in a first reservoir containing an electrode buffer such that the buffer is in direct contact with a lower gel surface;



filling a second reservoir with an electrode buffer;

establishing contact between the convex meniscus and said electrode buffer in the second reservoir to form a liquid bridge between said second reservoir and said gel medium by surface tension;



generating an electric field between the first and second reservoirs to cause the macromolecules to migrate through the gel medium.

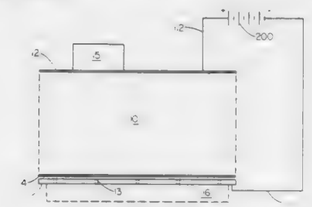
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**4,747,920**

## SOLID-LIQUID SEPARATION PROCESS FOR FINE PARTICLE SUSPENSIONS BY AN ELECTRIC AND ULTRASONIC FIELD

**Harapanahalli S. Muralidhara, Dublin, Ohio; Bhupendra K. Parekh, Lexington, Ky., and Nagabhusan Senapati, Dublin, Ohio, assignors to Battelle Memorial Institute, Columbus, Ohio**

**Continuation-in-part of Ser. No. 622,422, Jun. 20, 1984, Pat. No. 4,561,953, which is a continuation-in-part of Ser. No. 504,780, Jun. 16, 1983, abandoned. This application Nov. 19, 1985, Ser. No. 799,529**
**The portion of the term of this patent subsequent to Dec. 31, 2002, has been disclaimed.**
**Int. Cl.[4] B01D *13/02***
**U.S. Cl. 204—182.3** **35 Claims**



1. A method of separating a solid-liquid suspension comprising:

a. subjecting the suspension to an acoustical field at a frequency and amplitude adapted to cause separation in liquid bound to particles in the suspension;

b. concurrently subjecting the suspension to an electrical field adapted to cause a migration of liquid and of particles resulting in a portion of the suspension having an increased concentration of particles and another portion having an increased concentration of liquid; and

c. removing liquid from the portion of the suspension having an increased concentration of liquid.

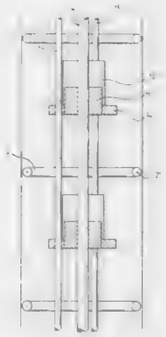
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**4,747,921**

## LIQUID-LIQUID CONTACTING

**Philip J. Bailes, Baildon, and Edmund H. Stitt, Hebden Bridge, both of England, assignors to University of Bradford, Bradford, England**

**PCT No. PCT/GB86/00133, § 371 Date Jan. 6, 1987, § 102(e) Date Jan. 6, 1987, PCT Pub. No. WO86/05115, PCT Pub. Date Sep. 12, 1986**
**PCT Filed Mar. 10, 1986, Ser. No. 17,255**
**Claims priority, application United Kingdom, Mar. 9, 1985, 8506161; Apr. 4, 1985, 8508889**
**Int. Cl.[4] B01D *11/04***
**U.S. Cl. 204—186** **13 Claims**



1. A method for effecting contact between two immiscible liquids having diffrent electrical conductivities, the method comprising mixing the two liquids so that the relatively more conductive liquid is dispersed within the less conductive liquid, and subjecting the dippersed mixture to mechanical agitation in a primary zone which reduces the droplet size of the dispersed phase and to the application of an electrostatic field to the reduced droplets in a secondary zone so as to cause coalescence of the droplets:

characterized in that the primary and secondary zones are located closely adjacent to each other;

and in that the primary zone is shrouded from the secondary zone so as to shroud the dispersed phase from the effect of the electrostatic field while the dispersed phase is being subjected to intense mechanical agitation in the primary zone.

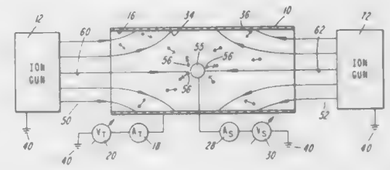
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**4,747,922**

## CONFINED ION BEAM SPUTTERING DEVICE AND METHOD

**Donald J. Sharp, Albuquerque, N. Mex., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Mar. 25, 1986, Ser. No. 844,035**
**Int. Cl.[4] C23C *14/46***
**U.S. Cl. 204—192.11** **11 Claims**




1. A confined ion beam sputtering device comprising:

a hollow cylindrical target having at least an inner wall surface of material selected for ion sputtering;

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a substrate supported within and electrically insulated from said cylindrical target;

a first ion beam source means at one end of the cylindrical target for generating a first ion beam and directing the beam axially into the hollow cylindrical target toward said substrate;

first biasing means for electrically biasing said substrate; and

second biasing means for electrically biasing said cylindrical target independent of the first biasing means;

whereby ions entering the cylindrical target may be electrically deflected circumferentially to impinge on the inner wall surface of the target at acute angles for efficiently sputtering material therefrom for deposit on the substrate.

5. A method of sputter deposition of a substrate comprising the steps of:

positioning the substrate within a hollow cylindrical target lined with material to be sputtered;

directing an ion beam axially into the hollow cylindrical target toward said substrate; and

electrically biasing the target and the substrate with respect to each other and the charge of the ion beam to divert the ion beam into impingement with the lined material of the target at acute angles for efficiently sputtering material therefrom for deposit on the subtrate.

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**4,747,923**

**DEVICE FOR PERFORMING CONTINUOUS ELECTROLYTIC TREATMENT ON A METAL WEB**

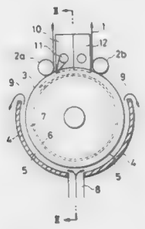
**Kazutaka Oda, Shizuoka, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Dec. 9, 1986, Ser. No. 939,839**

**Claims priority, application Japan, Dec. 9, 1985, 60-275027**

**Int. Cl.⁴ C25D** *17/00*

**U.S. Cl. 204—206** **3 Claims**



1. A device for performing continuous electrolytic treatment on a metal web, said device comprising:

(a) a treatment vessel containing a first electrolyte and serving as one electrode;

(b) a cylindrical rotary body mounted for rotation within the treatment vessel and having enlarged diameter portions at opposite axial ends thereof;

(c) at least the peripheral surfaces of said enlarged diameter portions being made of elastic, electrically insulative shoulder portions, said cylindrical rotary body having a central smaller diameter portion intermediate said enlarged diameter shoulder portions, said smaller diameter portion being formed of metal and constituting a second electrode;

(d) means for rotatably supporting a travelling metal web at edges of one side thereof using said electrically insulative elastic shoulders, a second electrolyte enclosed between said second electrode and said metal web and being sealed within said enclosure via the contact between said metal web and said elastic insulating shoulders, and means for applying an electrical potential across said treatment vessel and said second electrode, so as to perform continuous electrolytic treatment on a second side of said metal web as it passes through contact with said first and second electrolytes.

**4,747,924**

**APPARATUS FOR PRODUCING NEODYMIUM-IRON ALLOY**

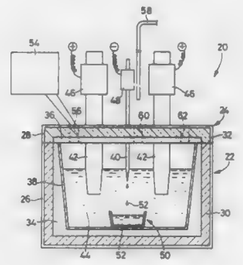
**Katsuhisa Itoh; Yoshiaki Watanabe, both of Nagoya; Eiji Nakamura, Aichi, and Masayasu Toyoshima, Nagoya, all of Japan, assignors to Sumitomo Light Metal Industries, Ltd., Tokyo, Japan**

**Division of Ser. No. 776,800, Sep. 17, 1985, Pat. No. 4,684,448. This application Apr. 8, 1987, Ser. No. 36,102**

**Claims priority, application Japan, Oct. 3, 1984, 59-20733; Nov. 22, 1984, 59-247546**

**Int. Cl.⁴ C25D** *17/00*; **C25C** *3/36, 7/00*

**U.S. Cl. 204—225** **8 Claims**



1. An apparatus for producing a neodymium-iron alloy by electrolytic reduction of a neodymium compound, comprising:

an electrowinning cell formed of refractory materials for accomodating a bath of electrolyte consisting essentially of at least one material selected from the group consisting of neodymium fluoride, lithium fluoride, barium fluoride and calcium fluoride;

raw material-supply means for adding neodymium fluoride to said bath of electrolyte;

a lining applied to the inner surface of said electrowinning cell and in contact with said bath of electrolyte, said lining comprising a ferrous material;

at least one elongate carbon anode having a substantially constant transverse cross sectional shape over its length, said at least one elongate carbon anode projecting into said electrowinning cell such that a lower free end portion of said at least one elongate carbon anode is immersed in said bath of electrolyte;

at least one elongate iron cathode having a substantially constant transverse cross sectional shape over its length, said at least one elongate iron cathode projecting into said electrowinning cell such that a lower free end portion of said at least one elongate iron cathode is immersed in said bath of electrolyte, said at least one iron cathode being consumable;

a receiver having a mouth which is open upward in a lower portion of said electrowinning cell below said lower free end portion of said at least one elongate iron cathode, said receiver collecting a molten pool of a neodymium-iron alloy which is produced on said at least one elongate iron cathode by means of electrolytic reduction of neodymium fluoride with a direct current applied between said at least one elongate carbon anode and said at least one iron cathode, the produced neodymium-iron alloy dripping off of said at least one elongate iron cathode into said receiver;

siphoning means for withdrawing said molten pool of neodymium-iron alloy from said receiver out of said electrowinning cell; and

feeding means for feeding said at least one iron cathode into said bath of electrolyte so as to apply direct current to said at least one iron cathode with a predetermined current density, for compensating for consumption of said at least one elongate iron cathode during production of said neodymium-iron alloy.



6. An apparatus according to claim 1, further comprising ascent-and-descent means for positioning said at least one elongate carbon anode into said bath of electrolyte so as to apply the direct current to said at least one elongate carbon anode with a predetermined current density, thereby compensating for consumption of said at least one elongate carbon anode during production of said neodymium-iron alloy.

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**4,747,925**

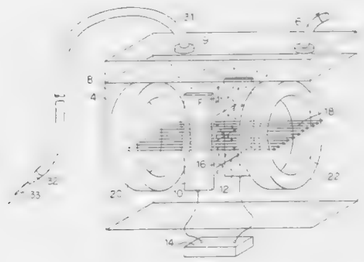
**APPARATUS FOR SIMULTANEOUS GENERATION OF OXYGEN AND HYDROGEN GASES**

**Shigeta Hasebe, Tokyo; Takeo Miyazawa, Yamato, and Susumu Daidoji, Tokyo, all of Japan, assignors to Kabushiki Kaisha Miyazawa Seisakusho, Yamato, Japan**

**Filed Jun. 24, 1986, Ser. No. 878,062**

**Int. Cl.⁴ C25B** *1/06, 9/00*

**U.S. Cl. 204—270** **2 Claims**



1. Apparatus for simultaneous generation of oxygen and hydrogen gases, which comprises

a tank for containing an aqueous electrolyte solution;

a plurality of positive and negative electrodes alternately arranged in an opposing alignment on a same vertical level in the tank; and

a pair of magnets having the polarities thereof fixed in the same direction and which are disposed along the direction horizontally orthogonal to the arrangement of the electrodes on said vertical level, so that the magnetic field generated by said magnets is orthogonally superimposed upon the electric field generated by said plurality of electrodes, in order to impose upwardly directed force perpendicular to both the electric field and the magnetic field generated by the electrodes and the magnets, in accordance with Fleming's left-hand rule.

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**4,747,926**

**CONICAL-FRUSTUM SPUTTERING TARGET AND MAGNETRON SPUTTERING APPARATUS**

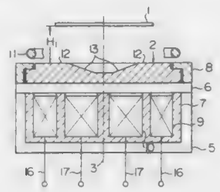
**Tamotsu Shimizu, Yokohama; Hikaru Nishijima; Takeshi Oyamada, both of Takasaki, and Shigeru Kobayashi, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Feb. 4, 1986, Ser. No. 825,940**

**Claims priority, application Japan, Feb. 8, 1985, 60-21642**

**Int. Cl.⁴ C23C** *14/34*

**U.S. Cl. 204—298** **14 Claims**



1. A conical-frustum-sputtering target for use in a magnetron sputtering apparatus for forming a film on a planar substrate comprising:

a target member being constituted in one body and having a size for enabling formation of erosion areas corresponding to the entirety of said planar substrate, said target member having at least a conical-frustum-shaped surface including a first surface portion parallel to a center portion of said planar substrate and being spaced a first distance therefrom, a second surface portion parallel to at least to an extension of a peripheral portion of said planar substrate so as to extend beyond a diameter of the peripheral portion of the planar substrate and being spaced a second distance therefrom, said second distance being less than said first distance, and at least one third surface portion inclined with respect to said planar substrate for interconnecting said first surface portion and said second surface portion, said second surface portion including a first target surface for forming a plasma having a diameter larger than the diameter of said planar substrate so as to enable a primary sputtering component of the plasma to be directed onto the peripheral portion of said planar substrate, said at least one third surface portion including a second target surface inclined with respect to said planar surface and disposed at a distance from said planar substrate greater than the distance of said first target surface from said planar substrate, said second target surface forming a plasma having a diameter smaller than the diameter of said planar substrate so as to enable a primary sputtering component of the plasma to be directed to the center of said planar substrate;

a backing plate for supporting said target member;

at least two magnetic-field-generating means for generating a magnetic field for at least enabling the plasma having the diameter larger than the diameter of said planar substrate to be formed on said first target surface so that the primary sputtering component of the plasma is directed onto the peripheral portion of said planar substrate, said at least two magnetic-field-generating means having solenoidal shapes and arranged to have a common central axis; and

magnetic circuit means for converging a magnetic flux generating by said two magnetic-field-generating means on said surface of said target member, said magnetic circuit means being disposed adjacent to said backing plate.

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**4,747,927**

**TARGET PLATE FOR CATHODE DISINTEGRATION**

**Eduard Rille, Dornbirn, Austria; Bernhard Bracher, Balzers, Liechtenstein, and Robert Polacek, Buchs, Switzerland, assignors to Balzers Aktiengesellschaft, Liechtenstein**

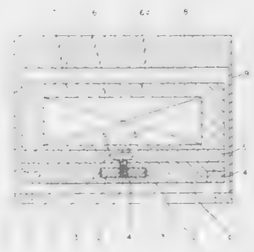
**Filed Jul. 9, 1986, Ser. No. 883,542**

**Claims priority, application Switzerland, Jul. 10, 1985, 02986/85**

**The portion of the term of this patent subsequent to May 26, 2004, has been disclaimed.**

**Int. Cl.⁴ C23C** *14/34*

**U.S. Cl. 204—298** **5 Claims**



1. A target plate assembly for cathode disintegration, com-

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prising at least two target plate parts oriented adjacent each other at a joint, said parts together forming a target plate having a front surface to be sputtered and a rear surface for engagement against a support plate, each of said parts having a cutout portion communicating with said joint and with each other, an auxiliary element substantially filling the said cutouts and spanning said joint, and means for holding said element to said support plate for anchoring said parts against said support plate, said cutouts being spaced away from said front surface and at least one of said cutouts extending through rear surface for passage of said means for holding said element to said support plate.

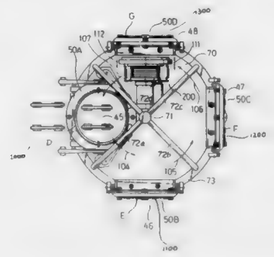
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**4,747,928**

## SUBSTRATE PROCESSING APPARATUS INCLUDING WAFER TRANSPORTING AND SUBSTRATE COOLING MECHANISMS

Nobuyuki Takahashi; Ryuji Sugimoto, and Yasuyuki Shirai, all of Fuchu, Japan, assignors to Anelva Corporation, Tokyo, Japan

Filed Aug. 7, 1986, Ser. No. 894,146
Claims priority, application Japan, Aug. 8, 1985, 60-174895
The portion of the term of this patent subsequent to Jun. 23, 2004, has been disclaimed.
Int. Cl.[4] C23C *14/34;* B65G *29/00*
U.S. Cl. 204—298 6 Claims



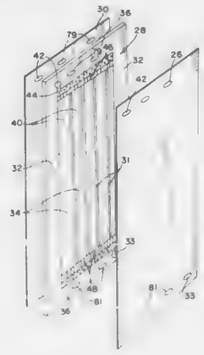
1. A substrate processing apparatus for forming at least one thin film on a surface of a substrate, comprising:
- means for transporting the substrate in a horizontal position to a processing chamber;
- means for guiding the substrate to an appropriate place in the chamber;
- attitude controlling means for orienting the substrate orthogonal to the horizontal position;
- means for holding the substrate in an orthogonal position while the substrate is being processed at a first optimum temperature;
- cooling means positioned in the chamber;
- means for revolving the orthogonally positioned substrate until the rear surface of the substrate is positioned adjacent to the cooling means;
- wherein the substrate is processed at a different optimum temperature than the first optimum temperature and wherein different thin films are formed on the substrate at the different optimum temperatures.

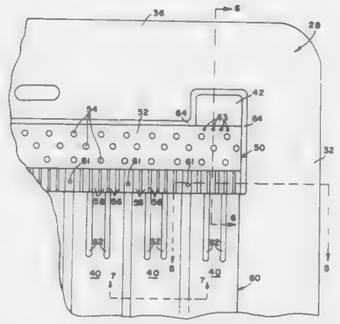
**4,747,929**

## DEPLETION COMPARTMENT AND SPACER CONSTRUCTION FOR ELECTRODEIONIZATION APPARATUS

Kitty K. Siu, Dracut; Anil D. Jha, and Gary C. Ganzi, both of Lexington, all of Mass., assignors to Millipore Corporation, Bedford, Mass.

Filed Oct. 1, 1986, Ser. No. 913,897
Int. Cl.[4] B01D *13/02*
U.S. Cl. 204—301 5 Claims





1. A spacer for use in an electrodeionization apparatus which comprises:
- a shaped element having a solid periphery comprising two width sections connected to two longitudinal sections,
- a first liquid inlet in one of said width sections,
- a liquid outlet in a second of said width sections,
- said width sections and said longitudinal sections defining a central open section positioned between said longitudinal sections, said central section comprising an open area extending through the thickness of said element,
- a plurality of ribs extending the length of said central section to form subcompartments having a width defined by the distance between two adjacent ribs or the distance between a rib and an adjacent longitudinal section,
- a second inlet means comprising (a) a manifold having a base surface and spaced apart projections extending from said base surface and (b) a plurality of generally rectangular channels, said manifold being in direct fluid communication with and being positioned between said first inlet and said central secion,
- and fingers extending from said manifold into said subcompartments.

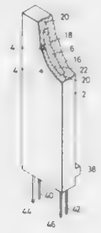


**4,747,930**

## AIR/FUEL RATIO SENSOR

Takao Kojima; Hiroyuki Ishiguro, and Yoshihide Kami, all of Aichi, Japan, assignors to NGK Spark Plug Co., Ltd., Japan

Filed Jul. 1, 1987, Ser. No. 68,293
Claims priority, application Japan, Jul. 1, 1986, 61-155788
Int. Cl.[4] G01N *27/12, 27/58*
U.S. Cl. 204—412 6 Claims



1. An air/fuel ratio sensor comprising:
- a box member having a wall made of an oxygen ion-conductive electrolyte having a pair of porous electrodes on opposite sides thereof, said box member also having a diffusion-limiting portion establishing communication between an inside and an outside of said box member; and
- an oxygen gas sensing element formed within said box member by injection of a material forming said oxygen gas sensing element into said box member and subsequent firing of said material, said oxygen gas sensing element having a resistance which varies in accordance with an oxygen partial pressure of an atmosphere in which said sensor is immersed.

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**4,747,931**

## COMPOSITION AND METHOD FOR COKE RETARDANT DURING PYROLYTIC HYDROCARBON PROCESSING

David R. Forester, The Woodlands, and Dwight K. Reid, Houston, both of Tex., assignors to Betz Laboratories, Inc., Trevose, Pa.

Division of Ser. No. 773,402, Sep. 6, 1985, Pat. No. 4,680,421.
This application May 8, 1987, Ser. No. 47,740
Int. Cl.[4] C10L *1/10*
U.S. Cl. 208—14 6 Claims

1. A hydrocarbon which is to be subjected to thermal cracking to whch hydrocarbon has been added a composition comprising an ammonium borate contained in a water, glycolic or water-glycolic carrier.

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**4,747,932**

## THREE-STEP CATALYTIC DEWAXING AND HYDROFINISHING

Stephen J. Miller, San Francisco, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Apr. 10, 1986, Ser. No. 850,316
Int. Cl.[4] C10G *65/12*
U.S. Cl. 208—61 16 Claims

1. A process for preparing a dewaxed, stabilized lubricating oil base stock from a hydrocracked bright stock, comprising:
(a) contacting said hydrocracked bright stock with hydrogen in the presence of a catalyst having hydrodenitrification activity under conditions effective to reduce nitrogen content of said stock to below about 50 ppm by weight and to minimize hydrocracking to produce a substantially nitrogen-free product;
(b) contacting said substantially nitrogen-free product with a catalyst having a dewaxing activity to produce a dewaxed oil; and
(c) contacting said substantially nitrogen-free, dewaxed product with hydrogen in the presence of a catalyst having hydrogenation activity under mild conditions to produce a dewaxed and stabilized lubricating oil base stock having improved oxidation stability.

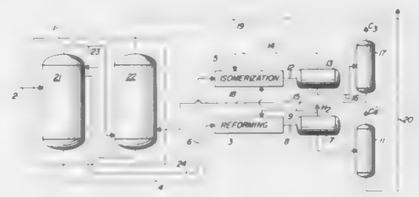
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**4,747,933**

## ISOMERIZATION UNIT WITH INTEGRATED FEED AND PRODUCT SEPARATION FACILITIES

Frederick M. Hibbs, West Wickham, England, assignor to UOP Inc., Des Plaines, Ill.

Filed Mar. 27, 1987, Ser. No. 30,806
Int. Cl.[4] C10G *51/06*
U.S. Cl. 208—79 16 Claims




1. A process for upgrading $C_5$ and $C_6$ components of a $C_5$ and higher boiling feed stream into higher octane components, said process comprising:
(a) passing said feed stream into a fractionation zone and separating said feed stream into higher and lower boiling components;
(b) withdrawing a relatively heavy stream comprising $C_7$-plus hydrocarbons from said fractionation zone;
(c) withdrawing an intermediate stream, rich in normal hexane and lower boiling range hydrocarbons from said fractionation zone, and contacting said intermediate stream, in an isomerization zone, with an isomerization catalyst at isomerization conditions;
(d) returning a recycle stream comprising at least a portion of the effluent stream from said isomerization zone to said fractionation zone; and
(e) withdrawing a relatively light stream from said fractionation zone, said relatively light stream comprising $C_6$ isoparaffins and lower boiling hydrocarbons.

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**4,747,934**

Patent Not Issued For This Number

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**4,747,935**

## PROCESS FOR THE CATALYTIC CRACKING OF FEEDSTOCKS CONTAINING NITROGEN

**Julius Scherzer, Anaheim, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.**

**Filed Mar. 26, 1986, Ser. No. 844,463**
**Int. Cl.[4] C10G** *11/18, 17/095*
**U.S. Cl. 208—120** **33 Claims**

1. A process for the catalytic cracking of a nitrogen-containing hydrocarbon feedstock which comprises contacting said feedstock in the vapor phase, without first treating said feedstock to remove at least a portion of said nitrogen compounds, with a mixture of a regenerated cracking catalyst and separate particles of a nitrogen scavenger under cracking conditions in the substantial absence of added molecular hydrogen in a cracking zone to convert components of said feedstock into lower molecular weight constituents, wherein said regenerated cracking catalyst comprises a molecular sieve having cracking activity dispersed in a matrix and said separate particles of said nitrogen scavenger comprise a mineral acid or a mineral acid precursor supported on an inorganic refractory oxide component.

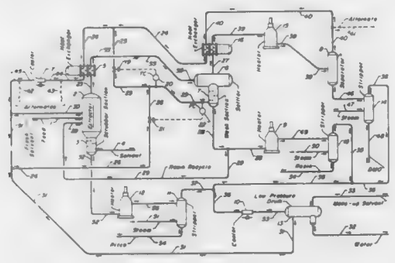
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**4,747,936**

## DEASPHALTING AND DEMETALLIZING HEAVY OILS

**Richard T. Penning, Chicago, Ill., assignor to UOP Inc., Des Plaines, Ill.**

**Filed Dec. 29, 1986, Ser. No. 947,115**
**Int. Cl.[4] C10G** *21/02, 21/00*
**U.S. Cl. 208—251 R** **10 Claims**



1. A deasphalting and demetallization process for heavy fractions of crude oil comprising:
(a) supplying a hydrocarbon feed stream comprising a heavy oil to an extraction zone;
(b) supplying a fresh solvent stream to said extraction zone;
(c) contacting said hydrocarbon feed stream with said fresh solvent stream in said extraction zone and recovering therefrom a first light phase stream and a first heavy phase stream;
(d) heating said first light phase stream and supplying said first light phase stream to a settling zone, wherein a second light phase stream comprising solvent and deasphalted and demetallized oil is separated from a second heavy phase stream comprising resins, oil, and solvent;
(e) countercurrently contacting said second heavy phase stream with a fresh wash solvent stream in a resin wash zone in order to displace deasphalted and demetallized oil and thereby to obtain a third light phase stream comprising solvent and deasphalted and demetallized oil and a third heavy phase stream comprising resins and solvent;
(f) combining said second light phase stream with said third light phase stream, heating the combined stream, and supplying the combined stream to a separation zone;
(g) recovering from said separation zone a fourth light phase stream comprised of solvent and a fourth heavy phase stream comprised of solvent and deasphalted and demetallized oil; and,
(h) passing at least a portion of said fourth heavy phase stream into a first steam stripping zone and recovering therefrom a stream comprising solvent and water and a stream comprising deasphalted and demetallized oil.

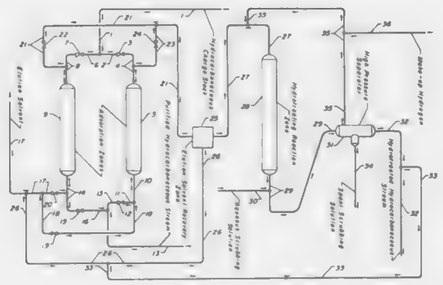
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**4,747,937**

## PROCESS FOR THE REMOVAL OF HYDROGENATABLE HYDROCARBONACEOUS COMPOUNDS FROM A HYDROCARBONACEOUS STREAM AND HYDROGENATING THESE COMPOUNDS

**Lee Hilfman, Mount Prospect, and Russell W. Johnson, Elmhurst, both of Ill., assignors to UOP Inc., Des Plaines, Ill.**

**Filed Nov. 24, 1986, Ser. No. 934,368**
**Int. Cl.[4] C10G** *25/00, 17/00*
**U.S. Cl. 208—251 R** **32 Claims**



1. A process for the removal of hydrogenatable hydrocarbonaceous compounds comprising a component selected from the group consisting of halogen, metal, sulfur oxygen, and nitrogen from a hydrocarbonaceous stream which comprises the steps of:
(a) contacting said hydrocarbonaceous stream with an adsorbent to remove at least a portion of said hydrogenatable hydrocarbonaceous compounds from said hydrocarbonaceous stream to provide a hydrocarbonaceous stream having a reduced concentration of hydrogenatable hydrocarbonaceous compounds;
(b) contacting spent adsorbent which has accumulated said hydrogenatable hydrocarbonaceous compounds from said hydrocarbonaceous stream with an elution solvent to remove said hydrogenatable hydrocarbonaceous compounds from said spent adsorbent thereby regenerating said adsorbent;
(c) covering at least a poriton of said elution solvent from a resulting admixture of elution solvent and hydrogenatable hydrocarbonaceous compounds recovered from step (b) in an elution solvent recovery zone;
(d) contacting said hydrogenatable hydrocarbonaceous compounds which were recovered from step (c) in the presence of hydrogen with a hydrogenation catalyst in a hydrotreating reaction zone;
(e) contacting the hydrotreating reaction zone effluent with an aqueous scrubbing solution; and
(f) introducing a resulting admixture of said reaction zone effluent and said aqueous scrubbing solution into a separation zone to provide a hydrotreated hydrocarbonaceous stream and a spent aqueous stream.



**4,747,938**

## LOW TEMPERATURE PYROLYSIS OF COAL OR OIL SHALE IN THE PRESENCE OF CALCIUM COMPOUNDS

**M. Rashid Khan, Morgantown, W. Va., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Apr. 17, 1986, Ser. No. 853,117**
**Int. Cl.[4] C10G** *1/04*
**U.S. Cl. 208—419** **4 Claims**

1. A gasification method for the production of liquid and gaseous products from carbonaceous materials, consisting of the steps of heating at a rate in the range of about 5° to 50° C. per minute a particulate mixture consisting essentially of carbonaceous material selected from coal or oil shale in an average particle size range of about 8 to 100 mesh and about 5 to 25 wt. % of a calcium compound of an average particle size of less than about 325 mesh to a pryolysis temperature in the range of about 450° to 700° C., maintaining the mixture at a temperature within said range for a duration of about 10 to 60 minutes, and removing liquid and gaseous products generated during the pyrolysis of the carbonaceous material.

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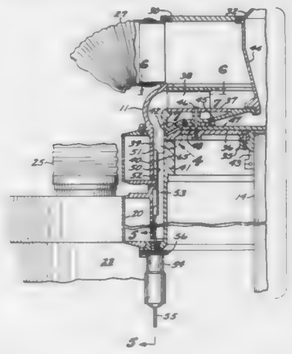
**4,747,939**

## PARTICLE CLASSIFIER

**Johannes F. E. Kampe, 4105 W. 234th St., Torrance, Calif. 90505**

**Filed Nov. 22, 1985, Ser. No. 800,958**
**Int. Cl.[4] B07B** *9/00*
**U.S. Cl. 209—20** **16 Claims**

1. A system for classifying particulate matter into a plurality of fractions in accordance with the particle size and density thereof, comprising:
(a) an annular, cylindrically shaped classification zone having concentric inner and outer boundaries;
(b) rotor means having rotating table to receive particulate matter on the upper surface thereof and to project the received particulate matter into a spiraling fluid stream within the annular classification zone from the inner boundary thereof in a substantially tangential direction whereby the particles pass radially through the spiraling fluid stream in accordance with the particle size or density thereof;
(c) table cover means above the rotating table supporting on the upper surface thereof fluid accelerating blades which generate the spiraling fluid stream within the annular classification zone;
(d) means to separate the spiraling fluid stream in the annular classification zone having the particulate matter distributed therein into a plurality of annular fluid streams whereby each of said separated streams contain a distinct size range of particles therein; and



(e) means to remove the particulate matter in at least one of the separate fluid streams.

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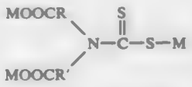
**4,747,940**

## ORE FLOTATION AND TRI-ALKALI METAL-DI(CARBOXYALKYL) DITHIOCARBAMATE AND TRIAMMONIUM-DI(CARBOXYALKYL) DITHIOCARBAMATE FLOTATION AGENTS FOR USE THEREIN

**Kenneth B. Kimble; Clarence R. Bresson, and Harold W. Mark, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Continuation of Ser. No. 809,468, Dec. 16, 1985, abandoned, which is a division of Ser. No. 708,130, Mar. 4, 1985, Pat. No. 4,595,538. This application Mar. 30, 1987, Ser. No. 31,647**
**Int. Cl.[4] B03D** *1/14*
**U.S. Cl. 209—167** **10 Claims**

1. A process for recovering minerals comprising:
(a) mixing solids containing said minerals, water, and a dithiocarbamate having the formula



wherein R and R′ can be the same or different and are each selected from the group consisting of alkylene radicals each having from 1 to 12 carbon atoms, and wherein M is selected from the group consisting of alkali metal atoms and ammonium, to establish a pulp;
(b) aerating said thus established pulp to produce a froth containing minerals while allowing gangue materials to be depressed in said pulp; and
(c) recovering said minerals from said thus produced froth.

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**4,747,941**

## INCREASED REDUCTION OF MAGNESIUM CONTENT BY USE OF INORGANIC PROMOTERS DURING BENEFICIATION OF PHOSPHATE ORES BY FLOTATION

**Samuel M. Polinsky; Laurence W. Bierman, both of Pocatello, Id., and David A. Hempel, Webster, S. Dak., assignors to J. R. Simplot Company, Pocatello, Id.**

**Continuation-in-part of Ser. No. 707,168, Feb. 28, 1985, Pat. No. 4,642,181, which is a continuation of Ser. No. 440,454, Nov. 10, 1982, abandoned. This application Dec. 10, 1986, Ser. No. 940,528**

**The portion of the term of this patent subsequent to Feb. 10, 2004, has been disclaimed.**

**Int. Cl.⁴ B03B** *1/02*

**U.S. Cl. 209—167** **8 Claims**

1. A process for beneficiating a water slurry of a phosphate-containing ore having magnesium and carbonate impurities by separating the fraction of the ore containing those impurities from the fraction of the ore containing the phosphates, the ore having previously been comminuted and sized, comprising the steps of:

adding two promoters to the slurry, to reduce inhibition of phosphate depression and to condition the slurry, the first promoter being selected from the group consisting of ammonia, a soluble hydroxide, a soluble ammonium salt, and lime, and the second promoter being selected from the group consisting of a soluble carbonate and carbon dioxide gas;

adding a fatty acid collection reagent and a phosphate depressant to the slurry, the fatty acid rendering hydrophobic the fraction of the ore containing the magnesium and the carbonates, and the depressant rendering hydrophilic the fraction of the ore containing the phosphates, the addition of collection reagent and depressant to occur shortly after the addition of the two promoters; and

separating the fraction of the ore containing the magnesium and the carbonates from the fraction of the ore containing the phosphates by bubbling a gas through the slurry, whereupon the fraction of the ore containing the magnesium and the carbonates floats to the surface in a froth and the fraction containing the phosphates remains in the slurry.

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**4,747,942**

## PULSE GENERATOR FOR AN AIR PULSED JIGGING MACHINE

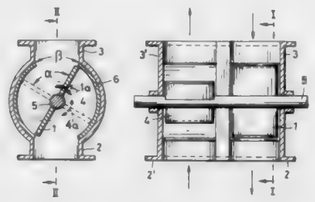
**Werner Strauss, Bochum, Fed. Rep. of Germany, assignor to Klöckner-Humboldt-Deutz Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Jul. 14, 1986, Ser. No. 885,021**

**Claims priority, application Fed. Rep. of Germany, Jul. 12, 1985, 3524958**

**Int. Cl.⁴ B03B** *4/00, 5/20*

**U.S. Cl. 209—455** **8 Claims**



1. A wet jig mechanism for handling coal or other minerals wherein a pulsed motion of a liquid mixture in a container is generated by pulsed compressed air delivered beneath the liquid, comprising in combination:

a rotary pulsing valve for alternately connecting said liquid container to compressed air or to atmosphere;

a housing for said valve having chambers with a first chamber having a first port for connecting to the liquid container and a second port for connecting to a source of compressed air;

said housing having a second chamber with a first port for connecting to the liquid container and a second port for connecting to atmosphere;

a butterfly valve plate in each of the chambers;

a common rotary shaft connecting said plates adapted to be driven in unidirectional rotation with said plates rotating with said shaft; and

said plates being disposed on said shaft at a relative angle to respectively block communication between said first and second ports of each chamber during respective predetermined angular ranges of unidirectional rotational movement of the shaft and plates.

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**4,747,943**

## SPLITTER ASSEMBLY

**Phillip J. Giffard, Nerang, Australia, assignor to Mineral Deposits Limited, Australia**

**PCT No. PCT/AU85/00295, § 371 Date Jul. 30, 1986, § 102(e) Date Jul. 30, 1986, PCT Pub. No. WO86/03140, PCT Pub. Date Jun. 5, 1986**

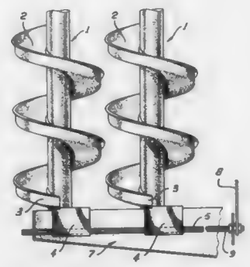
**PCT Filed Nov. 29, 1985, Ser. No. 902,441**

**Claims priority, application Australia, Nov. 30, 1984, PG8371**

**Int. Cl.⁴ B03B** *5/52*

**U.S. Cl. 209—459** **10 Claims**





1. A plurality of spiral separators for separation of particulate material and disposed in a linear array comprising:

a plurality of volute-shaped chutes each having a discharge section at its lower end;

a splitter blade mounted vertically below each said discharge section of the chute with each said splitter blade being in the flow of material leaving its respective chute, said splitter blade being mounted for selected rotation about a substantially horizontal axis extending generally parallel to the direction of flow of particulate material in the chute, splitting being adjusted by the rotation of each said splitter blade about said axis so that splitting occurs after the slurry has left the discharge section of said chute;



a shaft connected to a plurality of said splitter blades and extending along said linear array so that rotation of said shaft effects rotation of a plurality of splitter blades.

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**4,747,944**

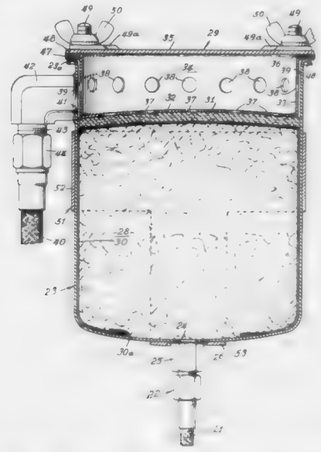
## RECIRCULATING FILTER SYSTEM

**Harry George, Naperville, Ill., assignor to Midwest Conservation Specialties, Inc., St. Louis, Mo.**

**Filed Apr. 29, 1986, Ser. No. 857,727**

**Int. Cl.⁴ B01D** *29/08, 36/00*

**U.S. Cl. 210—167** **23 Claims**



18. A filter canister assembly for use in a pressurized filtering system for liquid, said filter canister assembly comprising:

a stainless steel canister shell having an open top, a side wall with an internal diameter, and a bottom wall having means defining a central inlet orifice therethrough for coupling with an inlet line;

a hollow unitary lid assembly defined by a solid upper wall, a perforated side wall integrally joined with the upper wall and extending downwardly therefrom, said perforated side wall being concentric with said canister shell side wall, and a perforated concave bottom wall spaced from said upper wall and integrally joined to the entire bottom edge of the perforated side wall, said walls defining a hollow baffle chamber;

said shell containing a fibrous filter material substantially filling the shell below said lid assembly;

a retainer pad means disposed between the perforated concave bottom wall and the fibrous material;

said perforated side wall of the lid assembly having a diameter slightly less than the internal diameter of the canister shell side wall whereby to form an annular passageway bounded annularly by the shell side wall and the perforated side wall and bounded around the top by the solid upper wall and around the bottom by the retainer pad means;

means forming an outlet orifice through the shell side wall communicating fluidly with said annular passageway for egress of liquid from the shell and,

lock means fastening the upper solid wall to the shell over the open top of said shell whereby said filter canister assembly is capable of accommodating liquid under pressure.

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**4,747,945**

## LIGHTWEIGHT MEDIA DEPTH FILTER

**Edward G. Kreusch, Arlington Heights, and John M. Scanlan, Glenview, both of Ill., assignors to Culligan International Company, Northbrook, Ill.**

**Filed Jul. 14, 1987, Ser. No. 72,915**

**Int. Cl.⁴ B01D** *23/10*

**U.S. Cl. 210—290** **18 Claims**



1. In a depth filter which comprises a filter column having an opposed inlet and outlet, said filter column containing particulate material, the improvement comprising, in combination:

said particulate material being present in said filter column in the following types and proportions:

(a) adjacent the inlet end, from 0 to 12 volume percent of a particulate material having an effective particle size of 5 to 8 mm., a density of 30 to 50 pounds per cubic foot, and an $^{ES}/_{D}$ of 0.1 to 0.2;

(b) adjacent the material of (a) above, from 30 to 70 volume percent of a particulate material having an effective particle size of 1 to 2 mm., a density of 25 to 50 pounds per cubic foot, and an $^{ES}/_{D}$ of 0.04 to 0.07;

(c) adjacent the material of (b) above and generally spaced from said inlet, from 15 to 30 volume percent of a particulate material having an effective particle size of 0.4 to 0.8 mm., a density of 40 to 55 pounds per cubic foot, and an $^{ES}/_{D}$ of 0.01 to 0.02;

(d) adjacent the material of (c) above and generally spaced from the material of (b) above, from 5 to 15 volume percent of a particulate material having an effective particle size of 0.35 to 0.5 mm., and smaller than the particle size of (c) above, a density of 80 to 110 pounds per cubic foot, and an $^{ES}/_{D}$ of 0.001 to 0.01; and

(e) adjacent the material of (d) above and adjacent said outlet, from 5 to 15 volume percent of a particulate material having an effective particle size of 1.5 to 5 mm. one dimension of the individual particles of this region (e) being an average of ½ to ¾ less than the other two dimensions of said particles, whereby the particles of this region (e) lie together in generally laminar manner to support the other particulate material in said filter column, whereby liquid passing from the inlet to the outlet passes through a series of particles of generally decreasing size after region (a) above and prior to region (e) above, for depth filtration, all percentages being based on the total volume of said particulate material present.

VOL 1090 ISS 5 MY 31 1988 UMI



4,747,946

## TUBULAR MEMBRANE ULTRAFILTRATION MODULE

Norio Ikeyama; Noriaki Yoshioka; Shusaku Tamaru, and Hisashi Ichinose, all of Osaka, Japan, assignors to Nitto Electric Industrial Co., Ltd., Japan

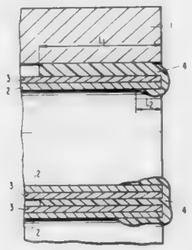
Continuation of Ser. No. 468,746, Feb. 22, 1983, Pat. No. 4,707,261, which is a continuation of Ser. No. 237,050, Feb. 23, 1981, abandoned, which is a continuation of Ser. No. 065,018, Aug. 9, 1979, abandoned. This application Jul. 2, 1987, Ser. No. 69,080

Claims priority, application Japan, Aug. 9, 1978, 53-97734

The portion of the term of this patent subsequent to Nov. 17, 2004, has been disclaimed.

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—321.8 8 Claims



1. A parallel-flow tubular membrane ultrafiltration module comprising: an outer cylinder of a given length, a plurality of water permeable non-woven fabric pipes each having a permeable membrane formed on the inside thereof and having substantially the same length as the given length of the outer cylinder, said cylinder having a common take-off port from said non-woven fabric pipes, said non-woven fabric pipes each being inserted into the outer cylinder in a closely bundled state with each other, spaces between the outer cylinder and the non-woven fabric pipes at both end portions of the outer cylinder being filled solely with a first hardened synthetic resin bonding the pipes to each other and fixing them to the outer cylinder to provide sealing, the ends of each of the non-woven fabric pipes and the ends of the permeable membranes neighboring the ends of the non-woven fabric pipes being coated solely with a second synthetic resin which may be the same as or different from the first synthetic resin filling any spaces between the outer cylinder and the non-woven fabric pipes, wherein only said first and second resins are utilized for sealing and retaining said non-woven fabric pipes at said ends of said outer cylinder, the permeable membrane in each pipe having an inner diameter of about 4 to 25 mm.

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4,747,947

## SEPARATOR SKIMMER FOR SURGE VESSELS

Robert P. Bannon, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Continuation of Ser. No. 848,193, Apr. 4, 1986, abandoned. This application Jun. 11, 1987, Ser. No. 59,187

Int. Cl.[4] B01D *21/02*

U.S. Cl. 210—522 29 Claims

1. An apparatus for separating a lighter liquid phase from a heavier liquid phase in a vertically surging body of liquid comprising:

means for collecting a lighter immiscible fluid phase from a two-phase fluid while the level of a body of fluid within a surge vessel is changing; including,

first containing means;

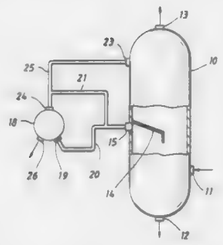
first inlet opening means located in the side wall of said first containing means by which the two-phase liquid enters said first containing means;

first outlet opening means located at the lower end of said first containing means for discharging a heavier liquid phase;

second outlet opening means located at the upper end of said first containing means;

collecting means mounted on the interior wall of said first containing means above a maximum liquid level for collecting at least a portion of said lighter fluid phase thereunder from time to time during normal surge operations, said collecting means operatively driven by changes in vertical displacement of the liquid body within the first containing means;

third outlet opening means located through the side wall of said first containing means and below said collecting means;



second containing means located outside of said first containing means, said second containing means having upper and lower portions;

second inlet opening means located through the wall of said second containing means; and

a first conduit connecting said third outlet opening means to said second inlet opening means of said second containing means for transporting said liquid from said first containing means to said second containing means, an upper portion of said first conduit positioned at an elevation between the upper and lower portions of said second containing means.

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4,747,948

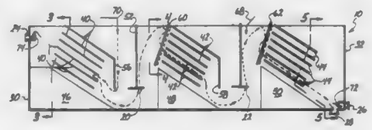
## PARALLEL PLATE EXTRACTOR SYSTEM AND METHOD FOR USING SAME

Darryl L. North, 10 Shafto St., Farmingdale, N.J. 07727

Continuation-in-part of Ser. No. 714,122, Mar. 20, 1985, abandoned. This application Dec. 17, 1986, Ser. No. 942,671

Int. Cl.[4] B01D *11/00, 21/02*

U.S. Cl. 210—633 17 Claims



14. A method of conducting extraction between a relatively light first material and a relatively heavy second material, provided that at least one of said first and second materials is liquid, comprising:

passing said first material into an elongated vessel through a first inlet located at or near the first end of said vessel;

passing said second material into said vessel through a second inlet located at or near the second end of said vessel;

causing at least a portion of said first and second materials to contact each other while flowing through a first, at least one intermediate, and a second parallel plate assembly located in said vessel, each said parallel plate assembly comprising a plurality of parallel paths available for material flow, provided that material flow beneath and around said intermediate assembly is substantially eliminated and said first and second materials are substantially continuously contacted;

agitating said first and second materials in each space between said assemblies to facilitate contact between said first and second material in said space; and

recovering a relatively light product at or near said first end of said vessel, and a relatively heavy product at or near said second end of said vessel.

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4,747,949

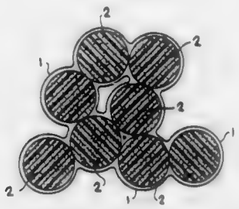
## LIQUID MEMBRANE COATED ION-EXCHANGE COLUMN SOLIDS

Dale P. Barkey, Berkeley, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Oct. 23, 1986, Ser. No. 922,426

Int. Cl.[4] B01D *13/00, 15/04*

U.S. Cl. 210—638 3 Claims



1. A process for separating metal ions from an aqueous solution comprising the steps of:

providing confined cation exchange beads coated with a substantially hydrophobic, removable liquid membrane, the liquid membrane including a carrier compound effective to complex with the cations and to permit the transport of the cations through the membrane and onto the beads;

contacting the confined beads with an aqueous solution having cations therein, the cations selected from the group consisting of copper, chromium, zinc, lead, nickel, cobalt, tungsten, palladium and mercury, for a sufficient time to permit the cations to permeate the membrane and be bound by the beads; and,

separating the aqueous solution from the beads and thereafter extracting the cations from the beads.

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4,747,950

## METHOD AND APPARATUS FOR CONTROLLED ULTRAFILTRATION DURING HEMODIALYSIS

Perry W. Guinn, Gladstone, Oreg., assignor to CD Medical, Inc., Miami Lakes, Fla.

Continuation of Ser. No. 562,328, Dec. 16, 1983, abandoned. This application Jun. 6, 1986, Ser. No. 873,264

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—646 21 Claims

1. A method for controlling ultrafiltration during hemodialysis comprising:

supplying blood to and removing blood from a hemodialyzer;

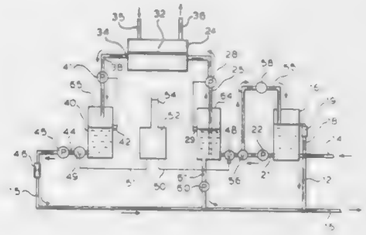
supplying fresh dialysate to a dialysate flow path which includes said hemodialyzer, a dialysate reservoir, a first receptacle and a second receptacle, with fresh dialysate being first supplied to said reservoir;

withdrawing fresh dialysate from said reservoir and delivering same to said first receptacle and then to said hemodialyzer at a controlled flow rate;

sensing the volume of fresh dialysate in the first receptacle and maintaining same at a relatively constant, pre-determined level;

withdrawing spent dialysate, including any ultrafiltrate, from said hemodialyzer and delivering same to said second receptacle and then removing same from said second receptacle and out of said dialysate flow path at said controlled flow rate;

sensing the volume of spent dialysate in the second receptacle and maintaining same at a relatively constant, predetermined level;



withdrawing a controlled amount of dialysate from either of said receptacles causing a system response to thereby exert a negative pressure in the dialysate section of said hemodialyzer to effect a withdrawal of ultrafiltrate from the patient's blood into said flow path to substantially balance the amount of dialysate withdrawn therefrom.

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4,747,951

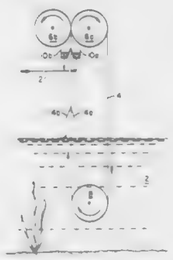
## METHOD FOR RECOVERING WATER OF REDUCED SALINITY FROM HIGH SALINITY WATER

John R. B. Ellis, Kentfield, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Continuation of Ser. No. 399,603, Jul. 19, 1982, abandoned. This application Sep. 19, 1983, Ser. No. 525,930

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—649 8 Claims



1. A process for recovering water of reduced salinity which comprises:

(a) contacting a high salinity water with a composite sheet consisting essentially of contiguous layers of two different materials, said contiguous layers consisting of two outer layers and an inner layer, said outer layers forming a semipermeable barrier capable of allowing the passage of water while restricting the passage of ions and said inner layer forming a hydrophilic layer, whereby said sheet selectively sorbs relatively ion-free water into said inner layer through said outer layers;

(b) withdrawing the composite sheet and the sorbed relatively ion-free water from contact with the high salinity water;

(c) placing the sheet under sufficient physical pressure to force at least part of the sorbed relatively ion-free water out of the sheet; and

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(d) recovering a lower salinity water from the relatively ion-free water leaving the sheet.

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**4,747,952**

## METHOD AND APPARATUS FOR PLASMA TREATMENT

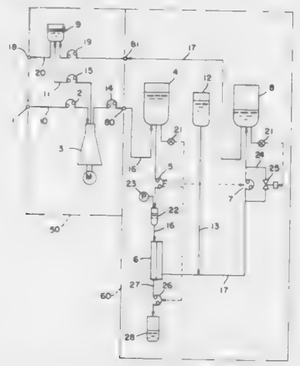
**Akiyoshi Nakano; Yoshimichi Harada, both of Okayama; Yasuzo Kirita, Toyonaka; Tadashi Miyahara, Kurashiki; Yoshio Yagiri, Kurashiki; Michiko Ueda, Kurashiki, and Yasunori Ueda, Kurashiki, all of Japan, assignors to Kuraray Co., Ltd., Japan**

**Continuation of Ser. No. 704,765, Feb. 21, 1985, abandoned. This application Sep. 2, 1986, Ser. No. 902,127**

**Claims priority, application Japan, Feb. 24, 1984, 59-34813; Jun. 1, 1984, 59-113495**

**Int. Cl.[4] B01D** *13/00, 17/038*

**U.S. Cl. 210—650** **6 Claims**



1. The method of treating plasma separated from the corpuscular fraction of blood in a continuous operation type centrifugal separator and for returning to a patient corpuscular fraction and purified plasma freed of high molecular weight substances, said method comprising the steps of:

providing a centrifugal separator;

delivering blood to said centrifugal separator;

separating the blood into a plasma fraction and a corpuscular fraction;

separating the plasma into a high molecular weight fraction and a low molecular weight fraction with a filtration membrane module;

providing a plasma feeding circuit connecting the centrifugal separator with the filtration membrane module;

disposing a plasma reservoir bag in said plasma feeding circuit between said centrifugal separator and said filtration membrane module;

continuously pumping the plasma fraction from the centrifugal separator to a plasma reservoir bag through the plasma feeding circuit at a first flow rate;

sensing the level of fluid in the plasma reservoir bag;

selectively pumping the plasma from the plasma reservoir bag at a second flow rate, higher than the first flow rate in response to the fluid level in the plasma reservoir bag being within a predetermined range;

returning the purified plasma from the filtration membrane module to the patient;

said step of returning the purified plasma, including pumping purified plasma to a purified plasma reservoir vessel;

maintaining the fluid flow rate between the plasma introduced into the filtration membrane module and the purified plasma delivered from the filtration membrane module at a predetermined, controlled value;

providing a bypass circuit around the purified plasma delivery pump;

providing a supplementary fluid reservoir supply bag to supply a supplementary fluid to the plasma return circuit at a point upstream of the purified plasma delivery pump;

discharging the high molecular weight fraction from the filtration membrane module.

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**4,747,953**

## COMPOSITE MEMBRANES BASED ON INTERPENETRATING POLYMER NETWORKS

**Joseph J. Zupancic, Bensenville, and Raymond J. Swedo, Mt. Prospect, both of Ill., assignors to Allied Corporation, Morristown, N.J.**

**Filed Feb. 21, 1986, Ser. No. 831,672**

**The portion of the term of this patent subsequent to Sep. 23, 2003, has been disclaimed.**

**Int. Cl.[4] B01D** *13/00*

**U.S. Cl. 210—651** **27 Claims**

19. A process for the separation of a saccharide from a mixture of mono- and polysaccharides which comprises passing said mixture across a composite membrane comprising an interpenetrating polymer network at separation conditions to form a retentate and a permeate, and recovering said permeate consisting mainly of a monosaccharide, said interpenetrating polymer network being comprised of:

() an isocyanate-capped polymer which is obtained by reacting a polyether with a diisocyanate, said isocyanate-capped polyether being physically entwined with

(2) a copolymer of at least two saturated or unsaturated heterocyclic nitrogen-containing compounds, said composite membrane being supported on a porous backing support material; and

(3) said component (1) being physically entwined with component (2) by means of a generated polyurethane, said polyurethane being formed by the curing of said membrane at a temperature in the range of from about ambient to about 100° C. in an atmosphere which possesses a relative humidity in the range of from about 20% to about 100% for a period of time sufficient to generate an amine-capped polymer by the hydrolysis of a portion of said isocyanate-capped polyether, with said amine-capped polymer subsequently reacting with a portion of the isocyanate groups present in said membrane to form a polyurethane which serves to physically entwine said component (2) in said membrane.

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**4,747,954**

## REMOVAL OF METALS FROM SOLUTIONS

**Walter L. Vaughn, and Rafael E. Guerra, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Sep. 16, 1985, Ser. No. 776,347**

**Int. Cl.[4] B01D** *15/00;* **C02F** *1/28*

**U.S. Cl. 210—670** **23 Claims**

1. A method of removing metal contaminants from solution in an aqueous liquid, an organic liquid, or a liquid which is aqueous and organic, said method comprising

contacting the said liquid with an ethylene polymer having pendent carboxylic acid groups or pendent carboxylic acid groups in the salt form, said polymer being in microporous, particulate form, and having a surface area/-weight ratio of at least about 0.5 $m^2$/gm, for a time sufficient to cause the metal values to affix to the polymer, and

separating the liquid from the polymer,

wherein the ethylene polymer comprises ethylene interpolymerized with about 10% to about 40% by weight of an olefinically unsaturated carboxylic acid of the group consisting of acrylic acid, methacrylic acid, crotonic acid, fumaric acid, maleic acid, and butenoic acid.



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**4,747,955**

## PURIFICATION OF LIQUIDS WITH TREATED POLYESTER FIBERS

**Robert Kunin, Yardley, Pa., assignor to The Graver Company, Union, N.J.**

**Filed Apr. 13, 1987, Ser. No. 37,949**

**Int. Cl.[4] B01D** *37/02*

**U.S. Cl. 210—679** **30 Claims**

1. A method for removing impurities from a liquid comprising: passing said liquid through a filter bed comprising a mixture of oppositely charged polyester fibers, wherein said polyester fibers have been treated with a caustic solution to increase the hydrophilicity of said polyester fibers.

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**4,747,956**

## METHOD OF ADSORBING SUBTANCES

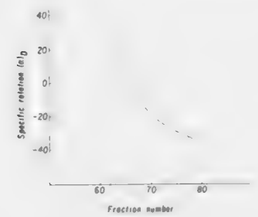
**Hideaki Kiniwa, Yokohama, Japan, assignor to Research Development Corporation, Tokyo, Japan**

**Division of Ser. No. 708,935, Mar. 6, 1985, Pat. No. 4,694,044. This application Mar. 17, 1987, Ser. No. 26,970**

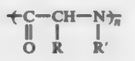
**Claims priority, application Japan, Mar. 9, 1984, 59-44065; Jul. 13, 1984, 59-144372**

**Int. Cl.[4] B01D** *15/00*

**U.S. Cl. 210—679** **6 Claims**




1. A method of adsorbing a substance selected from the group consisting of optically active substances, peptides and proteins, which comprises contacting a solution of the substance in a solvent with an adsorbent consisting of a cross-linked polymer comprising an optically active, synthetic poly(amino acid) represented by the general formula (I):



(I)

wherein R stands for an organic group, R′ stands for hydrogen or an alkyl group and n is an integer of at least 5, and a carrier polymer supporting said synthetic poly(amino acid) thereon, said carrier polymer having an affinity for said solvent.

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**4,747,957**

## BRINE TREATMENT USING ETHYLENE CARBOXYLIC ACID POLYMERS

**Walter L. Vaughn, Lake Jackson; Harry S. Burney, Clute; Robert D. Spradling, Lake Jackson, all of Tex., and Robert R. Frable, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Sep. 16, 1985, Ser. No. 776,346**

**Int. Cl.[4] C02F** *1/42*

**U.S. Cl. 210—687** **18 Claims**

1. A method for removing alkaline earth metal values from an alkali metal salt brine, said method comprising

intimately contacting said brine with microporous ethylene acrylic acid interpolymer fibers having a surface area of least about 2$m^2$/gm, said acrylic acid moiety comprising at least about 1 meq., but not more than 5 meq., per gram of said copolymer, and

separating said copolymer from said brine, thereby substantially removing alkaline earth metal values from said brine.

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**4,747,958**

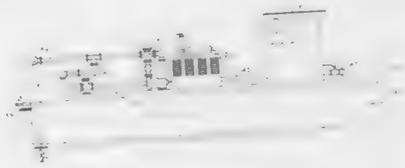
## METHOD AND APPARATUS FOR TREATING BODIES OF WATER

**Thomas E. Eberhardt, 220 Blenheim Dr., Easton, Pa. 18042**

**Filed Jul. 20, 1987, Ser. No. 75,114**

**Int. Cl.[4] C02F** *1/68*

**U.S. Cl. 210—749** **22 Claims**



1. A method of comprising: providing precise chemical treatment of a body of water having a predetermined chemical imbalance, by,

(a) directing a floating means incorporating transversely extended spray means across the surface of a body of water,

(b) determining the velocity of movement of such floating means,

(c) substantially continuously determining the depth of water under the floating means by on-board depth detection means,

(d) substantially continuously processing the velocity and depth data to determine the volume of water over which the spray means passes,

(e) adjusting the spray means to spray a predetermined amount of at least one chemical treatment agent onto the surface of said body of water proportionally related to the volume of water over which the spray means passes to correct said imbalance.

6. Apparatus comprising: means for providing precise chemical treatment to a body of water having a predetermined chemical imbalance, including,

(a) a directable floating means adapted for flotation in said body of water,

(b) spray means mounted upon said floating means for dispensing a chemical treatment agent into said body of water,

(c) means to propel said floating means over said water,

(d) means to determine:

(i) the velocity of said floating means across the body of water,

(ii) the depth of said body of water under said floating body,

(e) means to control discharge of chemical agent from said spray means proportionally related to:

(i) the velocity of said floating means, and

(ii) the depth of said body of water under the floating means for correcting said imbalance.

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**4,747,959**

## ANALYTICAL METHOD AND APPARATUS FOR CHARACTERIZING LATEXES

**Susanna M. Ho, and Valentino G. Xanthopoulo, both of Sarnia, Canada, assignors to Polysar Limited, Sarnia, Canada**

**Filed Apr. 13, 1987, Ser. No. 37,439**

**Int. Cl.[4] E01D** *29/00*

**U.S. Cl. 210—768** **11 Claims**

1. A process comprising: enabling the selection of one or

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more segments from an aqueous emulsion or dispersion containing as a discontinuous phase one or more members selected from the group consisting of immiscible liquids and a polymer having a molecular weight greater than 9000, said segment comprising both the continuous phase and a portion of the discontinuous phase having a particle size distribution less than 2500 Å by, passing a sample of said emulsion or dispersion through one or a plurality of filters having a pore size 2500 Å or less and retaining the filtrate segment or segments with the desired particle size distribution.

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**4,747,960**

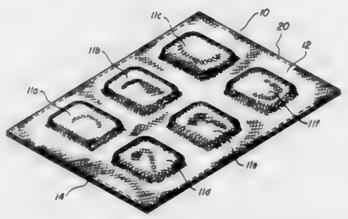
**WATER ABSORBENT PACKET**

**Clarence S. Freeman, and Katherine M. Freeman, both of 16242 Katherin La., Channelview, Tex. 77530**

**Filed May 17, 1985, Ser. No. 735,792**

**Int. Cl.⁴ B01D *15/00***

**U.S. Cl. 210—689** **3 Claims**



1. A method for detection and removal of water from dielectric oil in an underwater seismic cable system, cable connector booted section, and solid body cable connectors, or atmospheric mositure from containers of seismic equipment in humid environments comprising

inserting at least one packet with an upper and lower sheet of material which allows penetration of fluid and is bonded to form at least ont totally enclosed compartment which contains a water absorbent material contained in said compartment which absorbs water in anotehr liquid and water from the atmosphere, said packet selectively sized to fits within the system part or container in which it is placed and each compartment of absorbent capable of absorbing water, in the system part or container to be protected from water or atmospheric moisture;

placing into service the underwater seismic cable system or the containers of seismic equipment in the humid environment with the packet inserted into the system for water detection and removal;

observing said packet for swelling indicating water absorption; and

retaining said packet in said section of seismic cable until said water absorbent material is saturated with water.

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**4,747,961**

**METHOD AND SYSTEM FOR TREATING DRILL CUTTING SLURRIES AND THE LIKE**

**Gary L. Beer, and Ying H. Li, both of Plano, Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.**

**Filed Dec. 19, 1986, Ser. No. 944,644**

**Int. Cl.⁴ B01D *33/16*; F26B *3/18***

**U.S. Cl. 210—770** **18 Claims**

1. A method for treating a mixture which includes liquid oil and solids comprising the steps of:

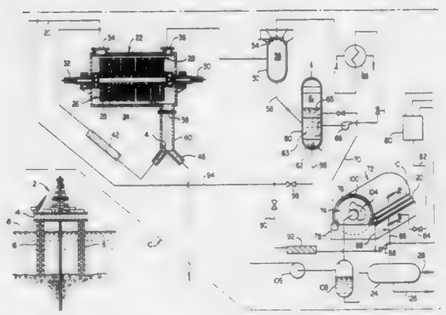
providing dryer means for receiving said mixture, said dryer means being operable to form vapor of said oil and dry said solids;

conducting said mixture through said dryer means to vaporize liquid oil and produce solids fines and dry solids;

conducting said vapor and solids fines entrained with said vapor from said dryer means and condensing said vapor to produce a mixture of liquid and entrained solids fines;

providing filter means including a filter media comprising a quantity of solid particles;

passing a mixture of said liquid and entrained solids fines through said filter means to entrap said solids fines in said filter media;



removing a mixture of said filter media and solids fines from said filter means;

conveying said mixture of filter media and solids fines to said dryer means; and

drying the mixture of filter media and said solids fines and discharging said filter media and said solids fines with solids from said dryer means.

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**4,747,962**

**SEPARATION OF COMPONENTS OF A FLUID MIXTUHE**

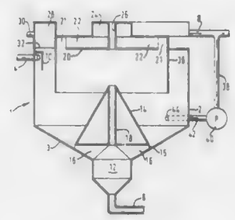
**Bernard Smisson, Bristol, England, assignor to Hydro International Limited, England**

**Filed May 14, 1985, Ser. No. 733,863**

**Claims priority, application United Kingdom, May 14, 1984, 8412228**

**Int. Cl.⁴ C02F *1/38*; B01D *21/26***

**U.S. Cl. 210—788** **6 Claims**



1. A method of separating the solid components out of a liquid mixture, the method comprising:

introducing a liquid mixture tangentially into a vessel having cylindrical outer walls and oppositely disposed end walls, via a first tangential inlet, said liquid mixture containing the solid components to be separated, said liquid mixture being introduced at a relatively low pressure head, and said liquid moving rotationally about the cylindrical vessel, such that separation of the solids occurs primarily by gravity,

collecting a portion of the liquid associated with the vessel, including at least one of (1) liquid being introduced into the vessel, (2) liquid being removed from the vessel or (3) liquid within the vessel itself and imparting energy to that collected liquid by means including a pump;

introducing into the vessel, via a second tangential inlet, the energized collected liquid to create or enhance rotational movement of the liquid within the region of the base of the vessel, said rotational movement being sufficient to cause or enhance an inward sweeping effect toward a first outlet on solids accumulated at the base of the vessel, while being of sufficiently low energy that separation of the solids components in the liquid is brought about primarily by gravity;

causing a portion of the liquid mixture with the separated settled solids to pass through an annular opening defined between a body in the vessel and one end wall of the vessel;

and removing the settled solids from the liquid mixture from the vessel via the first outlet disposed in the one end wall of the vessel.



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**4,747,963**

**LUBRICATING OIL COMPOSITIONS CONTAINING MODIFIED SUCCINIMIDES (VII)**

**Robert H. Wollenberg, San Rafael, Calif., assignor to Chevron Research Company, San Francisco, Calif.**

**Continuation of Ser. No. 840,625, Mar. 17, 1986, Pat. No. 4,663,062, which is a continuation-in-part of Ser. No. 722,909, Apr. 12, 1985, abandoned. This application May 5, 1987, Ser. No. 47,083**

**Int. Cl.⁴ C10M *133/48***

**U.S. Cl. 252—47.5** **23 Claims**

1. A product prepared by the process which comprises contacting at a temperature sufficient to cause reactor:

(a) a compound selected from the group consisting of boric acid, boron oxides, boron halides, and esters of boric acid; and

(b) a product produced by the process which comprises contacting at a temperature sufficient to cause reaction a polyamino alkenyl or alkyl succinimide containing at least one primary or secondary amine and a compound of the Formula I:



I

wherein W is oxygen or sulfur; X is oxygen or sulfur; $R_4$ is an alkylene group of from 2 to 3 carbon atoms or an alkylene group of from 2 to 3 carbon atoms substituted with from 1 to 3 alkyl groups of from 2 to 3 carbon atoms each; and $R_5$ is hydrogen or alkyl of from 1 to 20 carbon atoms; wherein from about 0.1 equivalents to about 10 equivalents of (a) are employed per equivalent of (b).

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**4,747,964**

**DISPERSING ADDITIVE COMPOSITIONS FOR LUBRICATING OILS AND THEIR MANUFACTURE**

**Jean-Pierre Durand, Chatou; Daniel Binet, and Guy Parc, both of Rueil-Malmaison, all of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France**

**Filed Aug. 14, 1986, Ser. No. 896,372**

**Claims priority, application France, Aug. 14, 1985, 85 12482**

**Int. Cl.⁴ C10M *133/44***

**U.S. Cl. 252—51.5 A** **21 Claims**

1. An additive composition of improved dispersing effect in lubricating oils, consisting essentially of:

(1) the product resulting from the reaction (a) in a solvent, of at least one alkenylsuccinimide with at least one dianhydride of an aromatic polycarboxylic acid in a molar ratio from 0.25/1 to 20/1, at a temperature from 20° to 200° C.; or

(2) the product resulting from the reaction (a) in a solvent, of at least one alkenylsuccinimide with at least one anhydride or dianhydride of a mono- or polycarboxylic, aliphatic, alicyclic or aromatic acid of low molecular weight, in a molar ratio from 0.25/1 to 20/1, at a temperature from 20° to 200° C. followed by the reaction (b) in a solvent of the resultant product with at least one organic compound having several hydroxy groups, amine groups or both, in a molar ratio of said organic compound to said anhydride or dianhydride from 0.25/1 to 4/1, at a temperature from 100° to 200° C.

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**4,747,965**

**MODIFIED SUCCINIMIDES**

**Robert H. Wollenberg, San Rafael, and Frank Plavac, Novato, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.**

**Continuation-in-part of Ser. No. 722,939, Apr. 12, 1985, Pat. No. 4,612,132, which is a continuation-in-part of Ser. No. 632,777, Jul. 20, 1984, abandoned. This application Aug. 15, 1986, Ser. No. 897,190**

**The portion of the term of this patent subsequent to Sep. 16, 2003, has been disclaimed.**

**Int. Cl.⁴ C10M *133/44***

**U.S. Cl. 252—51.5 A** **22 Claims**

1. A multiply adducted alkenyl or alkyl succinimide wherein one or more of the nitrogens of the multiply adducted alkenyl or alkyl succinimide is substituted with a hydroxyhydrocarbyl oxycarbonyl wherein the hydroxyhydrocarbyl group of said hydroxyhydrocarbyl oxycarbonyl contains from 2 to 20 carbon atoms and 1 to 6 hydroxy groups with the proviso that there is no hydroxy substitution on the hydrocarbyl carbon atom attaching the hydroxyhydrocarbyl group to the oxy atom of the oxycarbonyl group and with the further proviso that when more than one hydroxy group is contained in the hydroxyhydrocarbyl group, no more than one hydroxy group is attached to the same carbon atom and the number of carbon atoms in the hydroxyhydrocarbyl group is minimally one greater than the number of hydroxy groups and wherein said multiply adducted alkenyl or alkyl succinimide is derived from a multiply adducted alkenyl or alkyl succinic anhydride characterized by the presence within its structure of an average of greater than 1 succinic group for each equivalent of alkenyl or alkyl group.

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**4,747,966**

**ELECTRICALLY CONDUCTIVE THERMOPLASTIC RESIN AND COATING COMPOSITIONS**

**Seiji Maeno, Tokyo; Hidetaka Ozaki, Yachiyo; Hisashi Yamada, Chiba, and Osamu Ito, Matsudo, all of Japan, assignors to Lion Corporation, Tokyo, Japan**

**Continuation-in-part of Ser. No. 837,980, Mar. 10, 1986, abandoned, which is a continuation-in-part of Ser. No. 712,826, Mar. 18, 1985, abandoned. This application Sep. 30, 1986, Ser. No. 913,195**

**Claims priority, application Japan, Mar. 30, 1984, 59-64270; Oct. 1, 1985, 60-218922**

**Int. Cl.⁴ H01B *1/04, 1/06***

**U.S. Cl. 252—512** **15 Claims**

1. An electrically conductive thermoplastic resin composition comprising:

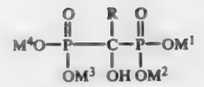
(i) at least one thermoplastic resin selected from the group consisting of low-density polyethylene, high-density polyethylene, linear low-density polyethylene, polypropylene, polystyrene, ethylene-vinyl acetate copolymer, ABS resin, MMA resin, ethylene-acrylate copolymer, polyamide resin, and polyester resin;

(ii) at least one metallic powder selected from the group consisting of nickel, copper, iron, and aluminum, and the alloys thereof; and

(iii) 0.5 to 9 parts by weight, based on 100 parts by weight of the metallic powder, of diphosphonic acid having the general formula:

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(I)

wherein R represents an alkyl group having 1 to 18 carbon atoms, a phenyl group, or an alkylphenyl group having an alkyl group with 1 to 8 carbon atoms and $M^1$ to $M^4$ independently represent hydrogen or a cation;

the weight ratio of the component (i) to the component (ii) (i.e., (i)/(ii)) being 40/60 to 6/94.

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**4,747,967**

**USE OF AMINE OXIDE IN THE $H_2O_2$ OXIDATION OF ALIPHATIC MERCAPTAN TO SULFONIC ACID**

**Kim R. Smith; Joe D. Sauer, and James E. Borland, all of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.**

**Filed May 24, 1985, Ser. No. 737,559**

**Int. Cl.⁴ C07C *143/02***

**U.S. Cl. 260—513 R** **13 Claims**

1. A process for oxidizing a hydrocarbyl mercaptan to the corresponding sulfonic acid salt, said process comprising reacting said hydrocarbyl mercaptan with aqueous hydrogen peroxide in the presence of a base and a tert-amine oxide catalyst, said process being characterized by having high selectivity to sulfonic acid salt and reduced free-oil by-product.

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**4,747,968**

**LOW TEMPERATURE CURE HAVING SINGLE COMPONENT CONDUCTIVE ADHESIVE**

**Kenneth B. Gilleo, Northfield, Minn., assignor to Sheldahl, Inc., Northfield, Minn.**

**Continuation of Ser. No. 731,867, May 8, 1985, abandoned, which is a continuation of Ser. No. 591,163, Mar. 19, 1984, abandoned. This application Jan. 28, 1987, Ser. No. 9,146**

**Int. Cl.⁴ A01B *1/04***

**U.S. Cl. 252—514** **4 Claims**

1. An electrically conductive adherent film forming adhesive which is rapidly curable thermally from a flowable liquid form to an adherent and coherent solid at temperatures below about 120° C. and with a specific resistivity of less than about 0.001 ohm-cm. and comprising a uniform mixture with the following formulation:

| Component | Percent Range by Weight |
|---|---|
| (a) A liquid base epoxy resin selected from the group consisting of bisphenol A—diglycidyl ether diepoxide, gycloaliphatic diepoxide and epoxy novalacs, | 24.9% to 14.9% by weight total; |
| (b) A sole hardening component for said liquid epoxy base resin, said hardening component consisting essentially of the tertiary amine salt of trifluoromethane sulfonic acid having the structural formula $B.CF_3SO_3H$ wherein "B" represents the radical $NR'R''R'''H$, and wherein "R'R", and R'"" each represent lower alkyl groups having up to six carbon atoms and being free of other hardening components | 1.0% to 4.0% by weight of epoxy resin; |
| (c) Metallic silver having a size of from between about 1 micron and 20 microns | 75–85% by weight. |

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**4,747,969**

**PROCESS FOR THE PRODUCTION OF FATTY ACID MIXTURES CONTAINING A HIGH PROPORTION OF $C_6$–$C_{10}$-FATTY ACIDS**

**Wolfgang Rupilius, and Karl Hentschel, both of Düsseldorf, Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany**

**Continuation of Ser. No. 694,902, Jan. 25, 1985, abandoned. This application Jan. 29, 1987, Ser. No. 14,098**

**Claims priority, application Fed. Rep. of Germany, Jan. 28, 1984, 3403021**

**Int. Cl.⁴ C11C *3/02, 1/04***

**U.S. Cl. 260—415** **3 Claims**

1. A process for the production of fatty acid mixtures containing a high proportion of $C_6$–$C_{10}$-fatty acids consisting essentially of (1) transesterifying mixtures consisting essentially of $C_6$-$C_{10}$-fatty acid alkyl esters with from 1 to 4 carbon atoms in the alkyl with glycerine, wherein the molar ratio of $C_6$–$C_{10}$-fatty acid alkyl esters to glycerine is from 2:1 to 3:1, at 160° to 250° C. in the presence of an alkaline transesterification catalyst with removal of the $C_1$–$C_4$-alkanol formed, (2) adding the resulting C6-C10-fatty acid glycerides to a naturally occurring glyceride selected from the group consisting of coconut oil, palm kernel oil and mixtures thereof, in a weight ratio of $C_6$–$C_{10}$-fatty acid glyceride to naturally occurring glyceride of from 1:19 to 1:3, (3) subjecting the mixture of glycerides to lipolysis in the presence of an excess of water at 200° to 250° C. at the autogenous pressure in the absence of a catalyst until splitting equilibrium is achieved and (4) recovering a fatty acid mixture containing a high proportion of $C_6$–$C_{10}$-fatty acids.

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**4,747,970**

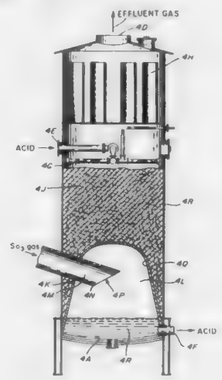
**ABSORPTION AND DRYING TOWERS**

**John McFarland, Pickering, Canada, assignor to C-I-L Inc., Mississauga, Canada**

**Filed Oct. 14, 1987, Ser. No. 108,366**

**Int. Cl.⁴ B01F *3/04***

**U.S. Cl. 261—96** **6 Claims**




1. An improved concentrated sulphuric acid-gas contacting tower for treating gas with concentrated sulphuric acid in countercurrent flow of the type comprising: a shell; a base having an inner surface; a perforated packing support having a lower, inner surface within said shell and adapted to retain packing to provide a packed absorption zone; means for feeding a concentrated sulphuric acid stream to said packed absorption zone; a lower chamber below said packing support within said shell; and meams for feeding a stream of said gas to said lower chamber; wherein the improvement comprises;

said base inner surface and said packing support lower, inner surface substantially alone define said lower chamber; interposed between said shell and said packing support is said packing;



said packing support being so perforated as to permit substantially complete wetting of said packing support lower surface by said acid; and

said means for feeding said gas to said lower chamber comprises a downwardly angled gas delivery duct protruding through said packing support into said lower chamber, said duct having a gas contacting inner surface and a portion defining an aperture within said lower chamber through which said gas enters said lower chamber; said duct being so shaped as to prevent said acid from entering said aperture and contacting said inner surface.

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**4,747,971**

**HYDROCARBON SOLUBLE NITROGEN CONTAINING DISPERSANT - FLUOROPHOSPHORIC ACID ADDUCTS**

**Timothy R. Erdman, San Rafael, Calif., assignor to Chevron Research Company, San Francisco, Calif.**

**Division of Ser. No. 856,524, Apr. 25, 1986, Pat. No. 4,648,980, which is a division of Ser. No. 745,566, Jun. 17, 1985, Pat. No. 4,615,826, which is a continuation-in-part of Ser. No. 534,858, Sep. 22, 1983, abandoned. This application Mar. 6, 1987, Ser. No. 23,062**

**Int. Cl.⁴ C10M *149/00, 153/00***

**U.S. Cl. 252—32.5** **4 Claims**

1. A hydrocarbon-soluble fluorophosphoric acid adduct which comprises the reaction product of:

(a) a basic nitrogen compound selected from the group consisting of a functionalized polymeric hydrocarbon dispersant viscosity index improvers having at least one nitrogen containing functional group; and mixtures thereof; and

(b) a fluorophosphoric acid or ammonium salt thereof wherein the amount of said fluorophosphoric acid or salt thereof is from about 0.1 to 1 equivalent per equivalent of basic nitrogen atom.

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**4,747,972**

**SULFONIC ACID COMPOSITIONS HAVING REDUCED SULFUR-CONTAINING CONTAMINANTS**

**Thomas F. Holden, Mentor, and Albert F. Baumann, Highland Heights, both of Ohio, assignors to The Lubrizol Corporation, Wickliffe, Ohio**

**Division of Ser. No. 622,921, Jun. 21, 1984, Pat. No. 4,677,074. This application Apr. 15, 1987, Ser. No. 38,390**

**Int. Cl.⁴ C10M *105/72;* C07B *45/02***

**U.S. Cl. 252—33.2** **12 Claims**

10. An additive concentrate for lubricating oils and normally liquid fuels comprising a substantially inert, normally liquid organic diluent and a sulfonic acid composition prepared by the steps comprising:

reacting a sulfonatable organic compound with a sulfonating agent to form an acid mass comprising organic sulfonic acid and inorganic sulfonic acid;

allowing the acid mass to separate into an upper organic sulfonic acid layer and a lower acid sludge layer;

isolating the upper organic sulfonic acid layer;

treating the upper organic sulfonic acid layer with ammonia in the presence of water and an oleophilic alcohol selected from the group consisting of amyl alcohols and hexanols to neutralize the acids and to form a mixture containing ammonium salts of the acids;

allowing separation of the mixture to provide a first lower aqueous phase containing water-soluble ammonium salts and a first upper phase comprising the oleophilic alcohols and ammonium salts of the organic sulfonic acids; and

recovering the first upper phase of oleophilic alcohols and ammonium salts.

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**4,747,973**

**RARE-EARTH-DOPED YTTRIA-GADOLINA CERAMIC SCINTILLATORS**

**Dominic A. Cusano; Charles D. Greskovich, both of Schenectady, N.Y., and Frank A. DiBianca, Chapel Hill, N.C., assignors to General Electric Company, Schenectady, N.Y.**

**Continuation of Ser. No. 629,027, Jul. 9, 1984, abandoned, which is a continuation of Ser. No. 389,812, Jun. 18, 1982, abandoned. This application Jul. 11, 1986, Ser. No. 885,374**

**Int. Cl.⁴ C09K *11/477***

**U.S. Cl. 252—301.4 R** **24 Claims**

1. A high density polycrystalline ceramic scintillator of cubic crystal structure consisting essentially of between 5 mole percent and 50 mole percent $Gd_2O_3$, and between about 0.02 and 12 mole pecent of at least one rare-earth activator oxide selected from the group consisting of $Eu_2O_3$, $Nd_2O_3$, $Yb_2O_3$, $Dy_2O_3$, $Tb_2O_3$, and $Pr_2O_3$; the remainder being $Y_2O_3$, said scintillator having an optical attenuation coefficient of less than 100 $cm^{-1}$.

14. A high density polycrystalline ceramic scintillator consisting essentially of between 5 to 50 mole percent of $Gd_2O_3$, between about 0.02 and 12 mole percent of at least one rare-earth activator selected from the group consisting of $Eu_2O_3$, $Nd_2O_3$, $Yb_2O_3$, $Dy_2O_3$, $Dy_2O_3$, $Tb_2O_3$, and $Pr_2O_3$, and between about 0.1 and 2 mole percent of each of at least one afterglow reducer selected from the group consisting of CaO and SrO, the remainder being $Y_2O_3$, said scintillator having an optical attenuation coefficient of less than 100 $cm^{-1}$.

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**4,747,974**

**MIXED $CR_2O_3$ PASTE FOR $CRO_2$ SYNTHESIS**

**Terry G. Crandall, Wilmington, Del., assignor to E. I. DuPont de Nemours and Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 845,734, Mar. 28, 1986, abandoned. This application Jan. 28, 1987, Ser. No. 3,401**

**Int. Cl.⁴ C01G *37/027***

**U.S. Cl. 252—62.51** **7 Claims**

1. A process for producing ferromagnetic chromium dioxide consisting essentially of:

(a) Dissolving in water $CrO_3$ and coarse grained $Cr_2O_3$ having a specific surface area below approximately 10 $m^2/g$;

(b) Adding fine grained $Cr_2O_3$ having a specific surface area of at least approximately 30 $m^2/g$ to the solution to prepare a paste with undissolved fine grained $Cr_2O_3$; and

(c) Reacting the paste at about 300° C. to 400° C. and 300 to 400 atmospheres to form chromium dioxide;

with the proviso that approximately 20 to 80% by weight of the $Cr_2O_3$ is added as coarse grained $Cr_2O_3$ in step (a) and the remainder is added as fine grained $Cr_2O_3$ in step (b).

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**4,747,975**

**METHOD OF DISSOLVING, AND SOLVENTS FOR, DIFFICULT TO DISSOLVE CARBONATES**

**Gunter Ritter, Bunde, Fed. Rep. of Germany, assignor to U H T Umwelt und Hygienetechnik GmbH, Bielefeld, Fed. Rep. of Germany**

**Filed Jun. 26, 1986, Ser. No. 891,839**

**Claims priority, application Fed. Rep. of Germany, Oct. 26, 1984, 3439263**

**Int. Cl.⁴ C23G *1/02***

**U.S. Cl. 252—87** **8 Claims**

1. A method of dissolving either a precipitate or deposit that contains calcium carbonate, the method consisting essentially of contacting the precipitate or deposit with a mixture comprising a first acid, said first acid being a Lewis acid in a concentration of 10 to 1000 mmoles/1, and a second acid, said second acid being a medium-strength to weak protonic acid or a partly deprotonated acid that yields at least one proton, said partly deprotonated acid being selected from the group consisting of polyphosphoric acid and its partly deprotonated anions, $H_2PO_3^-$, boric acid and its partly deprotonated stages,

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formic acid, acetic acid, propionic acid, glycolic acid, glyoxylic acid, lactic acid, malonic acid, maleic acid, succinic acid, polyacrylic acid, citric acid, malic acid, racemic acid, the mono- and dicarboxylic acids of triose, tetrose, pentose, hexose, and heptose and their biopolymeric forms, polyhydroxy and polyaldehyde carboxylic acids, alpha-amino acids, carbohydrates with vicinal dihydroxy groups, nitrilo-triacetic acid, partly deprotonated EDTA stages, partly deprotonated DTPA stages, nitrilo-tris(methylene-phosphonic acid), ethylene diamine-tetra-(methylene-phosphonic acid), diethylene triamine-penta-(methylene-phosphonic acid), hexamethylene diamine-tetra-(methylenephosphonic acid), n-(phosphonomethyl)glycine and n-(phosphonomethyl)iminodiacetic acid, with the molar ratio of the second acid to the Lewis acid being between 1:1 and 6:1, the Lewis acid being a solution of at least one salt of a strong acid with cations selected from the group consisting of cations of a 3-valence main-group element, cations of a 3-valence transition element, cations of a 3-valence lanthanide, cations of a 3-valence actinide, cations of a 4-valence main-group element, cations of a 4-valence transition element, cations of a 4-valence lanthanide and cations of a 4-valence actinide.

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**4,747,976**

## PVA FILMS WITH NONHYDROLYZABLE ANIONIC COMONOMERS FOR PACKAGING DETERGENTS

**Chihae Yang, Pleasanton, and Edward J. Kaufmann, San Ramon, both of Calif., assignors to The Clorox Company, Oakland, Calif.**

**Filed May 14, 1987, Ser. No. 50,260**
**Int. Cl.[4] C11D *17/04*; C08F *20/04*; C08J *5/18*; C08L *29/04***
**U.S. Cl. 252—90** **19 Claims**

1. A water-soluble polymeric film and detergent composition combination comprising

(a) a water-soluble film about 1–5 mils thick, formed from a copolymer resin of vinyl alcohol having about 0–10 mole percent residual acetate groups and about 1–5 mole percent of a nonhydrolyzable anionic comonomer selected from the group consisting of methyl acrylate, methyl methacrylate, maleic anhydride, itaconic acid, acrylamide, unsaturated sulfonates, and mixtures thereof, the resin being polymerized to an extent to result in a resin viscosity, when dissolved in 25° C. water to a level of about 4% of between about 4–35 cPs, the film including a plasticizing-effect amount of a plasticizer, and;

(b) an alkaline or borate-containing detergent composition, at least partially enclosed by the film wherein the film will dissolve when placed in an aqueous medium, freeing the detergent.

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**4,747,977**

## ETHANOL-FREE LIQUID LAUNDRY DETERGENT COMPOSITIONS

**William A. Whitehead, Fort Mitchell, Ky., and Raymond D. Young, Fairfield, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio**

**Filed Nov. 9, 1984, Ser. No. 670,426**
**Int. Cl.[4] C11D *9/30, 15/04***
**U.S. Cl. 252—111** **6 Claims**

1. A homogeneous liquid laundry detergent composition, substantially free from $C_1$–$C_6$ monohydric alcohols, which comprises by weight of the composition:

(A) non-soap anionic surfactant in an amount from about 8% to about 33% on a surfactant acid basis;

(B) $C_{10}$–$C_{14}$ fatty acid soap in an amount from about 4% to about 20% on a fatty acid basis;

(C) ethoxylated nonionic surfactant in an amount from about 1% to about 15%;

(D) water-soluble polycarboxylate builder in an amount from about 1% to about 8% on a builder acid basis;

(E) neutralizing agent, selected from the group consisting of alkali metal hydroxides and at least about 2% alkanolamines, in a total amount sufficient to produce a pH for the composition of from about 7 to about 9 when measured as a 10 wt. % solution at 20° C.;

(F) enzyme selected from the group consisting of protease and amylase in an amount from about 0.05% to about 2%;

(G) aliphatic polyol having from 2 to 6 carbon atoms and from 2 to 4 hydroxyl groups in an amount from about 4% to about 25%;

(H) water in an amount from about 20% to about 70%; and

wherein the sum of components (A), (B) and (C) is not greater than about 55%.

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**4,747,978**

## CALCIUM HYPOCHLORITE COMPOSITIONS

**Clifford E. Loehr, Norton; Leo J. Paridon, Doylestown, and Robert B. Simmons, Norton, all of Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.**

**Filed Aug. 7, 1986, Ser. No. 894,167**
**Int. Cl.[4] A01N *59/06*; C02F *1/50***
**U.S. Cl. 252—175** **4 Claims**

1. A composition consisting essentially of granular calcium hypochlorite and from 0.1 to about 3 percent by weight water-soluble aluminum-coating inorganic salt, basis the total weight of the composition, said aluminum containing inorganic salt being selected from the group consisting of aluminum sulfate, aluminum sulfate hydrates, aluminum sodium sulfate, aluminum sodium sulfate hydrates, aluminum potassium sulfate and aluminum potassium sulfate hydrates.

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**4,747,979**

## REMOVAL OF TOXINS FROM COTTONSEED

**Gerald A. Gimber, and Elliot M. Haschke, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.**

**Continuation-in-part of Ser. No. 627,014, Jul. 2, 1984, abandoned. This application Feb. 14, 1985, Ser. No. 701,846**
**Int. Cl.[4] C11B *1/00***
**U.S. Cl. 260—412.4** **12 Claims**

1. A method for simultaneous toxin (gossypol and aflatoxin) and oil removal from cottonseed meal which comprises

contacting the cottonseed with a solvent mixture of from 80 to 99.5 percent by weight of a chlorinated hydrocarbon solvent having one to two carbon atoms and at least one chlorine atom and from about 20 to about 0.5 percent by weight of at least one other solvent selected from the group consisting of a $C_1$ to $C_4$ alcohols, acetone, ethyl ether, dimethyl formamide, dimethyl sulfoxide, which other solvent may be saturated with water,

at a temperature from room temperature to the boiling point of the solvents.

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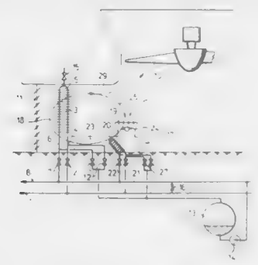
**4,747,980**

## COOLING APPARATUS

**Árpád Bakay; György Bergmann; János Bódás; István Papp, and Zoltán Szabó, all of Budapest, Hungary, assignors to Transelektro Magyar Villamossagi Kulkereskedelmi Vallalat, Budapest, Hungary**

**Filed Oct. 17, 1986, Ser. No. 920,708**
**Claims priority, application Hungary, Oct. 24, 1985, 4101/85**
**Int. Cl.[4] F28B *7/00***
**U.S. Cl. 261—129** **10 Claims**

1. Cooling apparatus operated by ambient air and an agent to be cooled which can have solid state at cold atmospherical temperatures, comprising a cooling tower housing with air inlets and air closure means at the air inlet and large surface heat exchangers arranged within the cooling tower at the air inlets and divided into groups or sectors in parallel connection and with which the agent is cooled by air streaming through the large surface heat exchangers, at least one pre-heating heat exchanger of smaller size (20) arranged in the air space (29) of each sector, the pre-heating heat exchangers (20) being in parallel connection with the large surface heat exchangers (3)



of the sector, and means to recirculate air from the pre-heating heat exchangers to the large surface heat exchangers.

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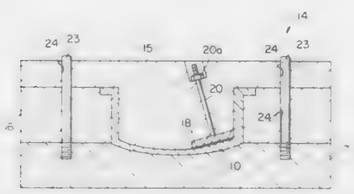


**4,747,981**

## METHOD OF MOLDING A URETHANE REFLECTOR

**Jesse L. Robinson, 5481 S. Shingle Rd., Shingle Springs, Calif. 95682**

**Filed Oct. 7, 1985, Ser. No. 785,008**
**Int. Cl.[4] B29D *11/00***
**U.S. Cl. 264—1.9** **5 Claims**



1. A method for molding a flexible reflective body of light-transmissive urethane, with a multiplicity of precision shaped angled facets formed in the back surface of the body necessary for reflecting back light passing into the body from the front, comprising:

providing a mold having a mold cavity generally in the shape of the body to be molded;

providing in association with the mold a portion precision shaped to form said multiplicity of angled facets;

prior to filling the mold, applying to said portion temporarily a transfer coating of a material which will maintain said angled facets reflective on a urethane marker and which will not cause scatter or diffusion of light from said angled facets as the light is reflected off the angled facets back through the urethane body toward the front, said transfer coating being sufficiently thin as to substantially reproduce said precision shaped angled facets on the side of the coating opposite said mold portion;

applying a releasing agent to the remainder of the mold other than said portion, said releasing agent being of the type which would be likely cause deformation or clouding of said angled facets on the urethane body if applied to the facets;

filling the mold with urethane material, and allowing the urethane to set with the mold closed; and

opening the mold and removing the resulting molded flexible urethane body from the mold, including stripping the urethane off said portion of the mold, leaving the transfer coating, which acts as a release coating, adhered to said angled facets formed in the back surface of the molded body.

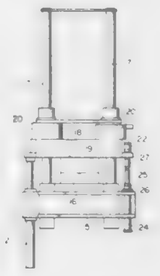
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**4,747,982**

## METHOD FOR ADJUSTING COMPRESSION STROKE ALLOWANCE OF VERTICAL INJECTION-COMPRESSION MOLDING MACHINE

**Susumu Nakatsukasa, Kobe; Yoshifumi Mukai, Nishinomiya; Hiroaki Kondo, Kobe; Naoki Takeuchi, Kobe; Masanobu Kurumaji, Kobe; Hiroshi Ueda, Kobe, and Tsutomu Sano, Kobe, all of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan**

**Filed Jan. 20, 1987, Ser. No. 4,488**
**Claims priority, application Japan, Mar. 3, 1986, 61-46957**
**Int. Cl.[4] B29C *43/04, 45/04, 45/67***
**U.S. Cl. 264—40.5** **1 Claim**



1. A method for adjusting the compression stroke allowance of a vertical injection-compression molding machine having a slide plate mounting thereon a mold clamp cylinder and an upper mold vertically in opposition to a lower mold on a bed, a lift cylinder for moving the slide plate up and down along a plurality of tie bars, a hydraulic cylinder connected to said slide plate and having a piston rod and an air cylinder connected to said bed and having a piston rod, wherein said method comprises the steps of:

positioning a micrometer at an upper end of said piston rod of said air cylinder

supplying hydraulic fluid to said hydraulic cylinder so as to downwardly extend said piston rod of said hydraulic cylinder to a stroke end thereof;

moving said upper and lower molds into contact with each other;

supplying air pressure to said air cylinder so as to upwardly extend said piston rod of said air cylinder until said micrometer abuts a lower end of said piston rod of said hydraulic cylinder;

fixing said piston rod of said air cylinder in position;

retracting said piston rod of said hydraulic cylinder and setting said micrometer at a desired compression stroke allowance; and

returning said piston rod of said hydraulic cylinder to said stroke end thereof; and thereby lifting up said slide plate so as to allow for injection-compression molding operation.

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**4,747,983**

## PROCESS AND APPARATUS FOR MANUFACTURING FOAMED STRUCTURES WITH INTEGRAL SKIN

**Edward A. Colombo, Fairport, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.**

**Filed Dec. 30, 1985, Ser. No. 814,717**
**Int. Cl.[4] C08J *9/34*; B29C *67/22, 47/14, 47/20***
**U.S. Cl. 264—45.5** **17 Claims**

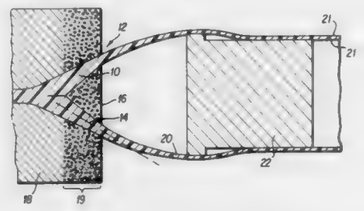
1. In a method of producing a thermoplastic article from a mixture of a plastified thermoplastic resin containing a blowing agent, the method comprising passing the mixture through an extruder means equipped with a die means,

the improvement comprising removing in the die means at least a portion of the blowing agent, thereby forming a skin layer on the surface of the article, the die means

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containing no dividing means within the cross-section of its flow channel, thereby producing the article with the



skin layer integrated into the surface of the article substantially upon the commencement of the formation of the skin layer.

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**4,747,984**

## PRODUCTION OF SILICON NITRIDE SINTERED BODY

**Takao Soma, Nagoya, and Tomonori Takahashi, Chita, both of Japan, assignors to NGK Insulators, Ltd., Japan**

**Filed Nov. 18, 1986, Ser. No. 932,204**
**Claims priority, application Japan, Nov. 18, 1985, 60-256805**
**Int. Cl.[4] C04B *35/64***
**U.S. Cl. 264—65** **4 Claims**

1. A process for manufacturing a silicon nitride sintered body comprising:

forming a mold comprising a mixture of a silicon nitride starting material powder and a sintering aid; and

firing said mold in at least one atmosphere selected from the group consisting of $N_2$ to which at least 0.001% of $CO_2$ is added, a mixture of $N_2$ and an inert gas to which at least 0.001% of $CO_2$ is added, and a mixture of $N_2$ and an inert gas to which a mixed gas of at least 0.001% of $CO_2$ and CO are added, wherein said at least one atmosphere contains a sufficient oxygen partial pressure to restrain the evaporation and nitriding of $SiO_2$ within said mold during firing.

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**4,747,985**

## METHOD FOR THE MANUFACTURE OF A MAGNESIA-CARBON BRICK

**Jaap H. Addink, Heemskerk; Christian M. J. M. Beelen, Alkmaar; Adam Steen, Heemskerk; Hendrik M. Verhoog, Bennebroek, and Jurrie de Boer, Castricum, all of Netherlands, assignors to Hoogovens Groep B.V., Ijmuiden, Netherlands**

**Continuation of Ser. No. 640,801, Aug. 14, 1984, abandoned. This application Sep. 11, 1986, Ser. No. 906,685**
**Claims priority, application Netherlands, Aug. 24, 1983, 8302955**
**Int. Cl.[4] C04B *35/04***
**U.S. Cl. 264—102** **6 Claims**

1. A method for reducing crack formation and increasing wearability of a magnesia-carbon brick consisting of preparing a mixture at a temperature of from 45° to 100° C. comprising:

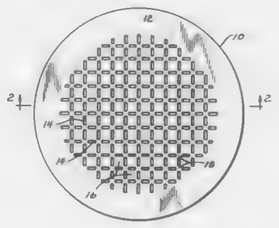
1. burned magnesite
2. carbon
3. binder solution comprising
   (a) precondensed novolak resin
   (b) solvent for the novolak resin and
4. a hardener for the resin and pressing a brick from said mixture directly after preparation of said mixture at a temperature of from 30° to 100° C., said solvent for the novolak resin being present in said binder solution in a range of 5 to 20% based on the weight of said novolak resin and solvent together.

**4,747,986**

## DIE AND METHOD FOR FORMING HONEYCOMB STRUCTURES

**Tai-Hsiang Chao, Mt. Prospect, Ill., assignor to Allied-Signal Inc., Morristown, N.J.**

**Filed Dec. 24, 1986, Ser. No. 946,234**
**Int. Cl.[4] B29C *47/12***
**U.S. Cl. 264—177.11** **6 Claims**



1. An extrusion die for producing multichanneled honeycomb structures from an extrudable material, said die comprising:

(a) a die body having a plurality of polygonally shaped pins in a spaced apart arrangement wherein all of said pins extend over the length of the die and have mutually perpendicular major axes and parallel surfaces between adjacent pins;

(b) at least two intersecting slots defined by first ends of said pins;

(c) a web section interconnecting second ends of said pins about each nontransverse corner of each pin; and

(d) feed passage between every two adjacent web sections, defined by the second ends of said pins and said web sections, all of said passages only communicating directly with, and together having a configuration that substantially matches the configuration of, the nonintersecting portion of said slots.

4. A method of forming a multichanneled honeycomb structure from an extrudable material, said method comprising:

(a) pressing said extrudable material through a plurality of feed passageways;

(b) feeding said extrudable material from said feed passages into a discharge zone having a plurality of parallel pins for defining at least two sets of intersecting discharge slots and the shape of the channels in said multichanneled honeycomb wherein, said extrudable material first enters said discharge zone at every nonintersecting portion of said discharge slots;

(c) impeding the flow of said mixture through said discharge zone in a direction parallel to said pins such that said material fills the entire discharge zone; and

(d) discharging said multichanneled honeycomb structure from said discharge zone.

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**4,747,987**

## PROCESS FOR THE PRODUCTION OF FILLER-CONTAINING ACRYLIC AND MODACRYLIC FIBERS

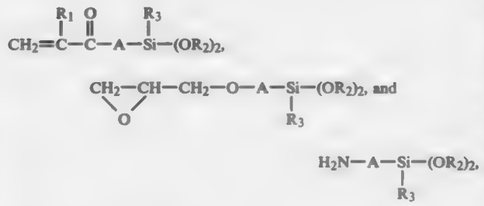
**Wolfgang Bräuer, Cologne; Bernd Willenberg, Bergisch-Gladbach; Siegfried Korte, Leverkusen, and Carlhans Süling, Odenthal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Division of Ser. No. 797,100, Nov. 12, 1985, Pat. No. 4,643,946. This application Sep. 3, 1986, Ser. No. 903,329**
**Claims priority, application Fed. Rep. of Germany, Nov. 30, 1984, 3443680**
**Int. Cl.[4] D01F *6/18***
**U.S. Cl. 264—182** **8 Claims**

1. In a process for the production of silica-containing acrylic and modacrylic fibers, without spinning defects from a solution



of a thread-forming acrylonitrile polymer in a polar organic solvent, which additionally contains finely divided silica particles by said solution into threads spinning by a dry or wet spinning process and subsequently after-treating said threads, the improvement comprising reacting an aqueous silica sol of an amorphous silica, which does not tend to aggregate and has a particulate diameter distribution of from 10 to 50 nm, in any sequence, with from 0.1 to 10% by weight, based on silica sol solid, of a silane, said silane selected from the group consisting of



wherein

$R^1$ represents H or $CH_3$,

$R^2$ represents a straight-chained or branched $C_1$–$C_4$ alkyl or phenyl,

$R^3$ represents $OR_2$ or $R_2$, and

A represents a straight-chained or branched $C_1$–$C_6$-alkylene, and with a one to five-fold quantity, based on silica sol, of the polar organic solvent, distilling off water under vacuum at a temperature of at most 60° C., adding the thread-forming polymer in a quantity which is sufficient to form a spinnable solution, spinning the solution into threads and drawing said threads in a ratio of 1:6 to 1:12 in the course of the after treatment.

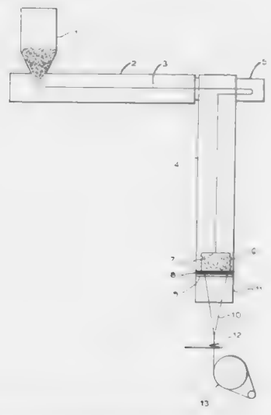
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**4,747,988**

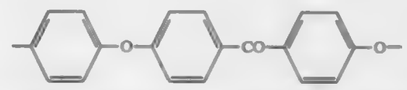
## PROCESS OF MAKING AN AROMATIC POLYETHERKETONE FIBER PRODUCT

**Martin H. G. Deeg, Maplewood, N.J., assignor to Hoechst Celanese Corporation, Somerville, N.J.**

**Continuation-in-part of Ser. No. 732,537, May 10, 1985. This application Jun. 14, 1985, Ser. No. 744,858**
**Int. Cl.[4] D01F *6/00***
**U.S. Cl. 264—211.17** **7 Claims**



1. A process for producing filaments each having a denier of about 2.8 to 15 and superior heat and solvent resistance, excellent electrical properties, and satisfactory mechanical properties in the as spun state, from a polymer having an inherent viscosity of at least 0.7 measured in concentrated sulfuric acid and containing in the polymer chain at least 50 percent of the repeating units:



said polymer having properties which cause it to be difficult to spin into filaments which comprises melting the polymer and heating the melt to a temperature in the range of from about 20° C. above to about 80° C. above its melting point, said heat melt having a high melt viscosity, passing the melt through a filter pack having a filtering area of at least about 8 $in^2$ and a total filter volume of at least about 1.2 $in^3$ per pound of polymer extruded per hour, said filter pack containing inert irregularly shaped particles having a mesh size of about 25 to 140 to provide a pressure drop of at least about 800 psig, extruding the melt through spinning openings of desired shape and a diameter of about 0.009 to 0.013 inch to form said filaments, passing said filaments immediately upon extrusion through a heating zone maintained at a temperature of about 200° to 320° C. and having a length of about 3 to 12 inches and taking up said filaments at a speed of at least 325 mpm.

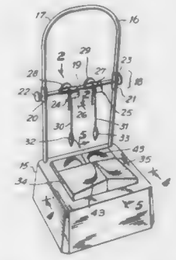
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**4,747,989**

## METHOD AND APPARATUS FOR MAKING CORRECTED CUSTOM FOOT MOLDS

**William Peterson, Lake Placid, N.Y., assignor to Peterson Laboratories, Lake Placid, N.Y.**

**Continuation of Ser. No. 449,978, Dec. 15, 1982, Pat. No. 4,522,777. This application May 6, 1985, Ser. No. 731,231**
**The portion of the term of this patent subsequent to Jun. 11, 2002, has been disclaimed.**
**Int. Cl.[4] B29D *31/00***
**U.S. Cl. 264—223** **27 Claims**



1. Apparatus for producing a corrected mold for a foot from a molding material, said foot having a forefoot portion and a rear portion, said apparatus comprising:

resilient cushion means for supporting said foot with said molding material being positioned between said resilient cushion means and said foot, said resilient cushion means having a rear section with a first thickness and a front section with a second, smaller thickness for supporting said foot such that said foot is positioned on said resilient cushion means with said forefoot portion being positioned lower than said rear portion thereof and being relatively immobile with respect to said rear portion thereof and so as to provide a floating action for the rear portion of said foot when said foot is supporting its respective portion of full body weight, said rear section being deformable throughout the entire first thickness thereof to provide the floating action;

alignment means for positioning a knee corresponding to said foot such that said knee is positioned in accurate alignment with the foot when said foot is positioned on

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said resilient cushion means and such that said foot is in a substantially neutral position; and

means for associating said alignment means with said foot to ensure a substantially ideal weight bearing position of said knee with respect to said foot.

12. A method for producing a corrected mold for a foot from a molding material, said foot having a forefoot portion and a rear portion, said method comprising the steps of:

supporting the foot on resilient cushion means having a rear section with a first thickness for supporting said rear portion and a front section with a second, smaller thickness for supporting said forefoot portion such that said foot is positioned on said resilient cushion means with said forefoot portion being positioned lower than said rear portion thereof and being relatively immobile with respect to said rear portion thereof and such that said rear portion supports its respective portion of full body weight in a floating manner;

supporting the rear portion of the foot on said rear section in a floating manner, with said rear section being deformable throughout the entire first thickness thereof to provide the support in said floating manner;

adjusting the position of the rear portion of the foot on said resilient cushion means so that said foot is in a substantially neutral position;

accurately aligning a knee with respect to said foot when the foot is positioned on said cushion means by means of alignment means; and

associating said alignment means with said foot to ensure a substantially ideal weight bearing position of said knee with respect to the foot; and

making a mold of said adjusted foot from said molding material positioned between said foot and said resilient cushion means.

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**4,747,990**

## PROCESS OF MAKING A HIGH MOLECULAR WEIGHT POLYOLEFIN PART

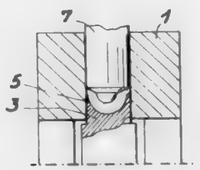
**Gilbert Ganssens, Meudon; Jean M. Handin, and Bernard Monasse, both of Antibes, all of France, assignors to CIE Oris Industrie S.A. and Association pour la Recherche et le Developpement des Methodes et Processus Industriels (A.R.M.I.N.-E.S.), both of Paris, France**

**Filed Mar. 6, 1986, Ser. No. 836,976**

**Claims priority, application France, Mar. 12, 1985, 85 03591**

**Int. Cl.[4] B29C** *43/16, 43/52*

**U.S. Cl. 264—322** **10 Claims**




1. A forging process for making a polyolefin part including an arcuate friction surface having improved creep and wear resistances comprising the steps of:

(a) raising to the forging temperature a blank of high molecular weight polyolefin in which the blanks length/transverse dimension ratio is between approximately 0.6 and approximately 1.7, the forging temperature being in the temperature range from approximately 20° C. below the melting point Tf of said polyolefin and approximately 10° C. above said melting point Tf;

(b) placing the blanks raised to the forging temperature in a forging mould which can be closed by a punch displaceable in translation in said mould in the lengthwise direction of the blank;

(c) applying to the punch a pressure exceeding the yield stress of said polyolefin at said forging temperature and moving said punch to a final position for forging the blank in the mould with a reduction rate of 0.4 to 0.8 to provide a polyolefin part having an arcuate friction surface;

(d) maintaining the punch in the final position for a period between approximately 90 and approximately 150 seconds; and

(e) extracting the forged part from said mould.

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**4,747,991**

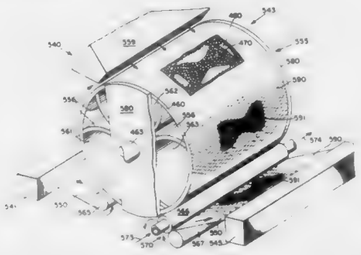
## METHOD FOR DEBOSSING AND SELECTIVELY APERTURING A RESILIENT PLASTIC WEB

**Delmar J. Bishop, Hamilton, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio**

**Division of Ser. No. 230,919, Feb. 2, 1981, Pat. No. 4,395,215. This application Apr. 20, 1983, Ser. No. 486,626**

**Int. Cl.[4] B29C** *51/02, 51/10, 59/06*

**U.S. Cl. 264—504** **8 Claims**



1. A continuous method of forming a plastic web exhibiting a substantially continuous three-dimensional pattern of debossments, a predetermined portion of said debossments being apertured at preselected points along the surface of said plastic web, said method comprising the steps of:

(a) continuously bringing said plastic web in contact relation with a tubular-shaped laminate forming structure exhibiting a substantially continuous first pattern of apertures corresponding to said debossments and extending from the outermost to the innermost surface of said tubular-shaped structure, those apertures corresponding to the non-apertured debossments in said web having a perforate support member exhibiting a second pattern of apertures smaler in size than the apertures in said first pattern located interiorly of the outermost surface of said laminate structure, each of the apertures in said second pattern being sufficiently small in size to substantially prevent rupture of said web in those areas coinciding with said apetures in said second pattern when said web is subjected to a fluid pressure differential sufficient to aperture those debossments which do not coincide with said perforate support member;

(b) heating the portion of said web in contact with said forming structure above its softening temperature;

(c) applying a substantially uniform fluid pressure differential to said heated plastic web in those areas to be debossed but not apertured and in those areas to be debossed and apertured and said first and second patterns of apertures in said tubular-shaped forming structure while said web is in contact with said forming structure, whereby said web is debossed in the image of said laminate forming structure yet substantially prevented from being apertured where said perforate support member contact said web due to the support afforded said web by said perforate support member and debossed and apertured in those portions of said forming structure where said perforate support member does not contact said web;

(d) cooling said debossed and selectively apertured web below its softening temperature; and



(e) removing said debossed and selectively apertured web from said forming structure.

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**4,747,992**

## PROCESS FOR FABRICATING A BELT

**Donald S. Sypula, 15 Burnley Rise, Pittsford, N.Y. 14534; Merlin E. Scharfe, 273 Valley Green Dr., Penfield, N.Y. 14526; Dennis A. Abramsohn, 23 Crestview Dr., Pittsford, N.Y. 14534; Paul J. Brach, 203 Nichols St., Rochester, N.Y. 14609; Clifford H. Griffiths, 230 Tobey Rd., Pittsford, N.Y. 14534; Deborah J. Nichol-Landry, 83 W. Parkway, Rochester, N.Y. 14616; Andrew R. Melnyk, 140 Windemere Rd., Rochester, N.Y. 14610; John W. Spiewak, 773 Saffron La., Webster, N.Y. 14580; Joseph Mammino, 59 Bella Dr., Penfield, N.Y. 14526; Edward C. Williams, 126 Canandagua Rd., Palmyra, N.Y. 14522; Lieng-Huang Lee, 796 John Glean Blvd., Webster, N.Y. 14580, and Christine J. Tarnawskyj, 75 Ridgeport Cir., Rochester, N.Y. 14617**

**Filed Mar. 24, 1986, Ser. No. 842,953**

**Int. Cl.[4] B29C** *33/58, 41/04, 41/08, 41/42*

**U.S. Cl. 264—130** **17 Claims**

1. A process for fabricating a thin, flexible, seamless belt comprising forming at least one thin substantially uniform fluid coating comprising film forming polymer material on a cylindrical mandrel having a cylindrical molding surface parallel to the axis of said cylinder, said mandrel having a larger mass, lower thermal conductivity, or larger mass and lower thermal conductivity than said film forming polymer material and a critical surface tension greater than the surface tension of said fluid coating, solidifying said fluid coating to form at least one thin substantially uniform solid coating comprising said film forming polymer material on said cylindrical mandrel, heating both said uniform solid coating and said mandrel to a temperature at least above the apparent $T_g$ of said solid coating to expand said coating and said mandrel while maintaining contact between said coating and said mandrel, cooling said coating to a temperature below the apparent $T_g$ of said solid coating prior to substantial cooling of said mandrel, and cooling said mandrel whereby said mandrel contracts at a greater rate than said solid coating until separation occurs between said mandrel and said solid coating, and removing said solid coating from said mandrel.

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**4,747,993**

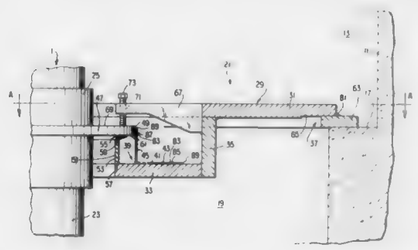
## PERMANENT SEAL RING FOR A NUCLEAR REACTOR CAVITY

**Michael F. Hankinson, Monroeville Boro, and James R. Marshall, Penn Hills Township, Allegheny County, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Continuation-in-part of Ser. No. 758,907, Jul. 25, 1985, abandoned. This application Jan. 27, 1987, Ser. No. 9,035**

**Int. Cl.[4] G21C** *13/00*

**U.S. Cl. 376—205** **24 Claims**



1. A nuclear reactor containment arrangement including:

a. a reactor vessel which thermally expands and contracts during cyclic operation of the reactor and which has a peripheral wall;

b. a containment wall spaced apart from and surrounding the peripheral wall of the reactor vessel and defining an annular thermal expansion gap therebetween for accommodating thermal expansion; and

c. an annular ring seal which sealingly engages and is affixed to and extends between the peripheral wall of the reactor vessel and the containment wall, and comprises:

i. an annular ring plate having an outer peripheral surface which sealingly engages and is affixed to the containment wall, an inner peripheral surface which is positioned proximate the reactor vessel, a step-shaped cross-section, and a first annular portion, a second annular portion, and a cylindrical portion which interconnects the first and second annular portions to form the step-shaped cross-section, the first annular portion surrounding the second annular portion and including the outer peripheral surface which sealingly engages and is affixed to the containment wall, the second annular portion including the inner peripheral surface which is positioned proximate the reactor vessel; and

ii. a flexure member having an annular base plate affixed to the second annular portion of the annular ring plate near the inner peripheral surface thereof, and having a leg which is joined to and extends upwardly from the annular base plate and sealingly engages and is affixed to the peripheral wall of the reactor vessel to thereby seal the annular thermal expansion gap.

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**4,747,994**

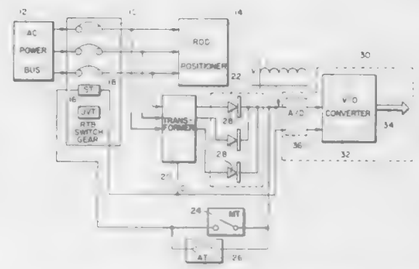
## REACTOR TRIP CONTROL WITH VOLTAGE SENSING

**Robert E. Hager, Penn Hills, and Jerzy Gutman, Plum Borough, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Continuation of Ser. No. 789,252, Oct. 18, 1985. This application Apr. 20, 1987, Ser. No. 40,696**

**Int. Cl.[4] G21C** *7/36*

**U.S. Cl. 376—215** **14 Claims**




10. A control system for a trip coil in switchgear, the switchgear receiving alternating current power at a first voltage level from a power source and supplying the alternating current power at the first voltage level to a rod positioner for control rods in a pressurized light water nuclear reactor, said control system comprising:

a potential transformer, operatively connected to the switchgear to receive the alternating current power at the first voltage level, for reducing the first voltage level to a second voltage level;

rectifier means, operatively connected to said potential transformer, for converting the alternating current power at the second voltage level to a first direct current voltage;

trip means, operatively connected to said rectifier means and the trip coil in the switchgear, for supplying the first direct current voltage to the trip coil of the switchgear only when interruption of the alternating current power supplied to the rod positioner is desired, said rectifier means ending the supplying of the first direct current

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voltage when the alternating current supplied to the rod positioner is interrupted;

voltage/optical converter means, operatively connected to said rectifier means, for converting the first direct current voltage into a light signal indicating the second voltage level; and

optical transmission means, operatively connected to said voltage/optical converter means, for transmitting the light signal.

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**4,747,995**

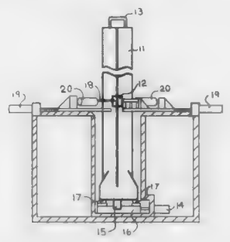
## VELOCITY LIMITER SHEAR FOR BWR CONTROL RODS

**Alan Bednarik, Trumbull, and Boanie Whalen, Naugatuck, both of Conn., assignors to Widder Corporation, Naugatuck, Conn.**

**Continuation of Ser. No. 742,980, Jun. 10, 1985, abandoned. This application Dec. 29, 1986, Ser. No. 943,824**

**Int. Cl.[4] G21C *19/00***

**U.S. Cl. 376—260** **4 Claims**



1. With a cruciform shaped radioactive control rod of the type having four substantially equidistantly spaced plate-like sheaths extending from and along a large portion thereof so as to provide a first set of opposed sheaths and a second set of opposed sheaths, each sheath containing at least one radioactive rod, and a velocity limiter at one end thereof, apparatus for separating said velocity limiter from the remainder of said control rod, said apparatus comprising:

shearing means for simultaneously shearing each set of two opposed sheaths adjacent the velocity limiter, said shearing means including a first shearing head operative from a first direction to shear one of the sheaths of a respective set and a second shearing head operative from a second direction substantially opposite to said first direction to shear the other of the sheaths of the respective set;

rotating means for providing relative rotation of the sheaths with respect to said shearing means such that said shearing means can simultaneously shear the other set of two opposed sheaths, to thereby separate the velocity limiter from the remainder of the control rod.

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**4,747,996**

## APPARATUS AND METHOD FOR ADJUSTING THE ELEVATION OF FUEL RODS IN A NUCLEAR REACTOR FUEL ASSEMHLY

**David L. Hale, Lexington, and Thomas F. Culbreth, Columbia, both of S.C., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

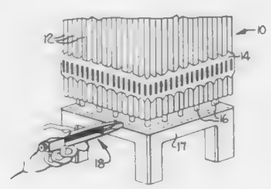
**Division of Ser. No. 844,421, Mar. 26, 1986. This application Mar. 9, 1987, Ser. No. 23,496**

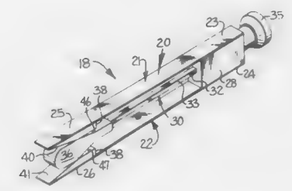
**Int. Cl.[4] G21C *19/00***

**U.S. Cl. 376—261** **4 Claims**

1. The method of adjusting the level of a nuclear fuel rod in a fuel assembly which comprises a plurality of fuel rods mounted in a parallel, laterally spaced apart relationship, and top and bottom nozzles fixedly mounted to each other adjacent respective opposite ends of the fuel rods, and such that the level of each rod may be accurately aligned with respect to the top and bottom nozzles and also with the other rods of the fuel assembly, said method comprising the steps of

providing a tool which includes an expander comprising two elongate generally parallel and laterally spaced apart arms extending in a longitudinal direction, with the two arms including first laterally aligned ends which are fixedly interconnected to each other and opposite laterally aligned free ends, and at least one of said arms being flexible so as to permit lateral movement of the free ends toward and away from each other, an actuator operatively mounted to said expander so as to be disposed between said two arms and being movable with respect thereto, and cooperating surface means mounted to said arms and said actuator for laterally separating said free ends of said arms from an initial position wherein said free ends are relatively closely spaced to an expanded position wherein





said free ends are separated a predetermined maximum distance upon movement of said actuator with respect to said arms,

positioning said tool between a nozzle of the fuel assembly and the end of a misaligned fuel rod located at an incorrect level which is unduly close to such nozzle, and with said free ends of said arms disposed in said relatively closely spaced initial position and located directly between the nozzle and the end of such fuel rod, then

moving said actuator with respect to said arms so as to laterally separate said free ends of said arms to said expanded position and such that the free ends are separated said predetermined maximum distance, and such that the free end of one of said arms engages the misaligned fuel rod and longitudinally moves the fuel rod to its proper level with respect to the adjacent nozzle.

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**4,747,997**

## NUCLEAR FUEL ROD LOADER FOR PULLING FUEL RODS INTO A FUEL ASSEMBLY SKELETON

**David A. Boatwright, Columbia, S.C., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Mar. 30, 1987, Ser. No. 31,953**

**Int. Cl.[4] G21C *19/00***

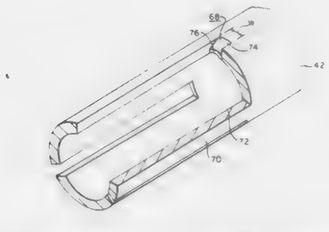
**U.S. Cl. 376—261** **12 Claims**

1. In a nuclear fuel rod loader for pulling a nuclear fuel rod from a fuel rod magazine into spacer grids of a nuclear reactor fuel assembly skeleton, a nuclear fuel rod gripper for releasably engaging an internal circumferential groove of a nuclear fuel rod end plug cavity, said gripper comprising:

(a) an outer tube having an end portion, said end portion having a plurality of longitudinal slots each having a closed slot end and an open slot end, said slots defining fingers therebetween, said fingers each having inwardly-biased finger ends, said inwardly-biased finger ends each having a generally outwardly-projecting rim portion, said rim portions together defining a generally circular and circumferential rim, said rim longitudinally insertable into said nuclear fuel rod end plug cavity; and

(b) an inner shaft insertable in said outer tube, said inner shaft having a terminus portion, said terminus portion longitudinally engagable with said inwardly-biased finger ends to spread them apart to open said rim for said rim portions to releasably engage said internal circumferential groove of said nuclear fuel rod end plug cavity; and





wherein the outer surface of said outer tube is connected to the inner surface of said outer tube at said closed slot end of each said slot by a transition surface, each said transition surface including a generally outwardly-facing, longitudinally-running, chamfer surface and a generally open-slot-end-facing stress relief surface, with said chamfer surface coextensive with said outer surface of said outer tube and said stress relief surface coextensive with said inner surface of said outer tube, wherein said chamfer surface has a radially-transverse depth and a longitudinal length, with said radially-transverse depth smaller than said longitudinal length, and wherein said stress relief surface has a stress relief radius.

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**4,747,998**

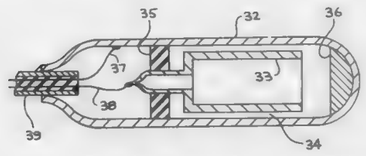
## THERMALLY ACTUATED THERMIONIC SWITCH

**Donald M. Barrus, and Charles D. Shires, both of San Jose, Calif., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Continuation of Ser. No. 430,579, Sep. 30, 1982, abandoned. This application Feb. 21, 1986, Ser. No. 831,122**

**Int. Cl.[4] G21C *7/12***

**U.S. Cl. 376—336** **11 Claims**



1. A thermally actuated thermionic switch which responds electrically to an increase in temperature of thermionic material therein by changing from a high impedance to a low impedance at a predetermined temperature set point, comprising:

an emitter constituting an outer casing of said switch and adapted to be in contact with an associated medium which may undergo a change in temperature, said outer casing having a closed end and an open end,

a collector positioned totally within said emitter and separated therefrom by a gap, said collector including a hollow longitudinally extending annular section and a hollow reduced diameter section, said collector being electrically isolated from said emitter and retained within said emitter by an insulator member positioned within said emitter, said insulator member being located intermediate said reduced diameter section of said collector and an inner surface of said emitter,

means for closing said open end of said outer casing formed by said emitter for defining a closed volume within said emitter,

electrical lead means connected to said inner surface of said emitter and to said reduced diameter section of said collector and extending through said means for closing said outer casing for connection to an associated power supply and to an associated point of use, and

a quantity of thermionic material held in a matrix in a graphite block reservoir, and which is located within said emitter, said thermionic material consisting of metal which ionizes when heated to a temperature above said set point, for electrically connecting said emitter and collector when said thermionic material is ionized,

whereby upon said thermionic material ionizing, said switch changes from high impedance to low impedance allowing the conduction of large electrical currents therethrough.

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**4,747,999**

## POWDER METALLURGICAL METHOD

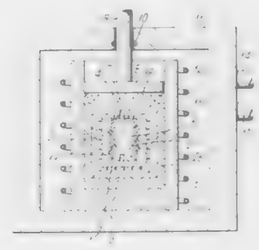
**Per Hasselström, Norrtälje, Sweden, assignor to Uddeholm Tooling Aktiebolag, Hagfors, Sweden**

**Filed Mar. 20, 1987, Ser. No. 28,664**

**Claims priority, application Sweden, Mar. 21, 1986, 8601324**

**Int. Cl.[4] B22F *1/00***

**U.S. Cl. 419—49** **6 Claims**



1. A method of powder metallurgically manufacturing an article with near net shape, said method comprising:

providing an open ceramic mould having an exterior, an internal cavity and an opening in communication with said internal cavity, said internal cavity having inside walls which are precision copying cast surfaces;

filling said internal cavity of said open ceramic mould with fine particulate metal powder through said opening to give a metal powder-containing open ceramic mould;

placing said metal powder-containing open ceramic mould in an outer mould;

covering said metal powder-containing open ceramic mould in said outer mould with a bed of finely distributed particulate pressure medium;

heating said bed of particulate pressure medium and said metal powder-containing open ceramic mould and subjecting said particulate pressure medium to pressure by at least one surface acting against said opening of said metal powder-containing open ceramic mould in an axial direction towards said open ceramic mould, whereby pressure

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is transferred by said particulate pressure medium to said metal powder in said open ceramic mould to consolidate said metal powder and form a completely dense body with surfaces shaped by said precision cast surfaces of said internal cavity.

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**4,748,000**

## SOFT MAGNETIC THIN FILM

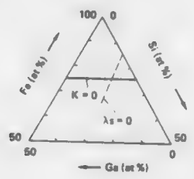
**Kazuhiko Hayashi; Masatoshi Hayakawa; Yoshitaka Ochiai; Hideki Matsuda; Wataru Ishikawa; You Iwasaki, and Kouichi Aso, all of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan**

**Filed Apr. 10, 1986, Ser. No. 850,108**

**Claims priority, application Japan, Apr. 11, 1985, 60-77338; Oct. 1, 1985, 60-218737; Oct. 31, 1985, 60-244624**

**Int. Cl.⁴ C22C *38/00***

**U.S. Cl. 420—82** **6 Claims**




1. A soft magnetic thin film having a composition represented by the formula:

$$Fe_aGa_bSi_cCo_dRu_eCr_f$$

wherein a, b, c, d, e, and f represent atomic percents and the following relationships apply:

$$68 \leqq a \leqq 84$$
$$2.4 \leqq b \leqq 23$$
$$9 \leqq c \leqq 31$$
$$0 \leqq d \leqq 15$$
$$0 \leqq e \leqq 10$$
$$0 \leqq f \leqq 7$$
$$a+b+c+d+e+f=100.$$

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**4,748,001**

## PRODUCING TITANIUM CARBIDE PARTICLES IN METAL MATRIX AND METHOD OF USING RESULTING PRODUCT TO GRAIN REFINE

**Abinash Banerji, and Winfried Reif, both of Berlin, Fed. Rep. of Germany, assignors to London & Scandinavian Metallurgical Co Limited, London, England**

**Filed Mar. 3, 1986, Ser. No. 835,747**

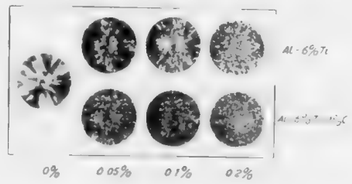
**Claims priority, application United Kingdom, Mar. 1, 1985, 8505904; Aug. 2, 1985, 8519447**

**Int. Cl.⁴ C22C *21/00***

**U.S. Cl. 420—528** **29 Claims**

1. A method of producing an alloy containing titanium carbide particles, the method comprising thoroughly dispersing preheated finely divided carbon powder particles into a metal melt in the presence of titanium, the said carbon powder particles being substantially above ambient temperature when introduced into the metal melt, causing the dispersed carbon particles to react with titanium within the metal melt so as to produce a dispersion of fine particles comprising titanium carbide within the metal melt, and thereafter solidifying the metal melt.

26. A method of grain refining an aluminium-based metal, by treating a melt of the metal with an alloy produced by a method in accordance with claim 1, and allowing the treated




melt to solidify so that carbide particles from the alloy cause refinement of the structure of the thus-treated metal.

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**4,748,002**

## SEMI-AUTOMATIC, SOLID-PHASE PEPTIDE MULTI-SYNTHESIZER AND PROCESS FOR THE PRODUCTION OF SYNTHETIC PEPTIDES BY THE USE OF THE MULTI-SYNTHESIZER

**Jean Neimark, and Jean-Paul Briand, both of Strasbourg, France, assignors to Centre National de la Recherche Scientifique (CNRS), Paris, France**

**Filed May 27, 1986, Ser. No. 866,956**

**Claims priority, application France, Jun. 3, 1985, 85 08438**

**Int. Cl.⁴ C07K *1/04, 1/06, 1/10;* B01J *8/02***

**U.S. Cl. 422—115** **9 Claims**

1. In a semi-automatic, solid phase peptide multi-synthesizer of the type comprising a hydraulic circuit having: a plurality of chemical reactors; a corresponding plurality of volumetric solvent proportioners, each of said plurality of chemical reactors being disposed downstream of a corresponding said volumetric solvent proportioner; a plurality of solvent containers disposed upstream of said plurality of volumetric solvent proportioners; distribution means disposed intermediate said solvent containers and said solvent proportioners, for directing a desired solvent from its corresponding said solvent container to any selected one of said plurality of volumetric solvent proportioners; and a programmable microcomputer implementing a predetermined sequence in which fluids are supplied to and evacuated from said plurality of chemical reactors and said corresponding plurality of volumetric solvent proportioners; the improvement in which said distribution means comprises a first cylindrical element traversed by an axial opening forming a distribution channel having inlet and outlet ends, a plurality of radial openings communicating with said distribution channel and offset axially of said cylindrical element, said cylindrical element being disposed substantially vertically within said multi-synthesizer such that said inlet end underlies said outlet end, each said radial opening being connected to a said volumetric solvent proportioner and said inlet end of said distribution channel receiving solvents from said solvent containers.

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**4,748,003**

## CONTAINER FOR FLASH STERILIZATION

**Edward D. Riley, Ipswich, Mass., assignor to Riley Medical Incorporated, Newburyport, Mass.**

**Continuation-in-part of Ser. No. 838,638, Mar. 11, 1986, abandoned. This application Aug. 25, 1986, Ser. No. 899,811**

**Int. Cl.⁴ A61L *2/24;* G05D *16/00***

**U.S. Cl. 422—112** **7 Claims**

1. A container for sterilization of articles contained therein shaped for insertion into a sterilization unit, said container comprising:

A. A base unit forming a bottom of said container,

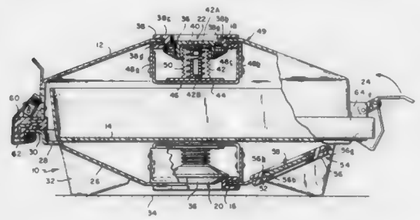
B. A cover unit forming a top of said container,

C. Means for releasably securing said cover unit to said base unit thereby forming said container,



D. Means forming apertures at the top and bottom of said container, and

E. Pressure actuated valves which close to seal said apertures when the pressure external to said container is at about atmospheric and which fully open to provide negligible impedance to gas flow through said apertures when said pressure is at or above a predetermined level above atmospheric said apertures located such that gas flows freely into, through, and out of said container via said valves.



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**4,748,004**

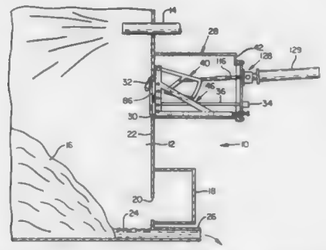
## APPARATUS FOR CLEANING AIR PORTS OF A CHEMICAL RECOVERY FURNACE

**Byron L. Goodspeed, 1111 Holcomb Rd., Kelso, Wash. 98626**

**Filed Feb. 13, 1986, Ser. No. 829,712**

**Int. Cl.⁴ D21C *7/14***

**U.S. Cl. 422—185** **18 Claims**



1. Apparatus for cleaning an opening in a firebox, said apparatus comprising:

a cleaning element having a first hook-shaped member;

means for mounting said cleaning element adjacent to an opening in a firebox, said first hook-shaped member having first and second ends, said cleaning element being pivotally mounted toward the first end of said hook-shaped member to said mounting means, said cleaning element being adapted for movement of the second end between a first, retracted, position and a second, extended position, whereby the second end defines a locus sweeping inside the firebox and upwardly with respect to the opening substantially beyond an upper edge of the opening; and

actuating means affixed to said mounting means for providing the movement of said cleaning element, whereby the extension of said second end dislodges excrescent material inside the upper edge of the opening.

6. In an apparatus for cleaning a port introducing air into a furnace, said furnace being provided with a wind box for supplying air under pressure to said port, said furnace being subject to a buildup of excrescent material along an upper edge of said port inside said furnace, wherein the improvement comprises:

a cleaning head insertable through said port;

means mounted in said wind box for pivotally mounting said cleaning head adjacent said port;

means mounted to said wind box and coupled to said cleaning head for rotatably moving said cleaning head so as to insert a portion of said cleaning head into said port and inside said firebox vertically beyond said upper edge of said port, thereby contacting and dislodging excrescent material inside said upper edge, and for subsequently retracting said portion of said cleaning head from said port.

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**4,748,005**

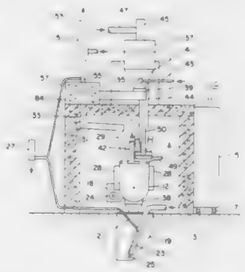
## APPARATUS AND METHOD FOR RADIATION PROCESSING OF MATERIALS

**William B. Neuberg, Perrineville, N.J., and Robert Laniewski, Smithtown, N.Y., assignors to Shamrock Chemicals Corporation, Newark, N.J.**

**Filed May 3, 1982, Ser. No. 374,015**

**Int. Cl.⁴ B01J *2/00;* B29B *9/00***

**U.S. Cl. 422—186** **17 Claims**



1. Apparatus for batch radiation processing of a high molecular weight, flowable solid polytetrafluoroethylene material to degrade said material to lower its molecular weight and render it grindable into a powder, comprising a processing vessel for holding a batch of said material during processing, a source of particle radiation for supplying radiation to a selected region of said processing vessel, mechanical stirring means for agitating said material in said processing vessel during said processing thereby to repeatedly move said material into and out of said selected region whereby said material is uniformly irradiated, and water cooling means for maintaining said vessel and said material below a selected temperature during said processing.

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**4,748,006**

## EXTRACTOR APPARATUS

**Robert J. Flocco, Summit, N.J., assignor to Exxon Research and Engineering Company, Florham Park, N.J.**

**Filed Jan. 6, 1986, Ser. No. 816,274**

**Int. Cl.⁴ B01D *11/04***

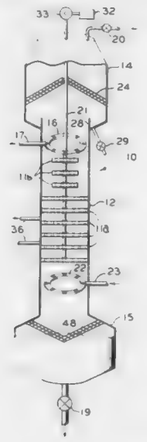
**U.S. Cl. 422—256** **9 Claims**

1. In a vertical wall liquid-liquid extractor of the type having a mixing zone wherein means are provided for dispersing a first fluid in a second fluid, said mixing zone having a first end and a second end, at least one settling zone located at said first end of said mixing zone wherein a dispersed first fluid from said mixing zone is separated from said second fluid for removal of said second fluid, said extractor having inlet means located between said first end of said mixing zone and said settling zone for introduction of a first fluid for dispersed flow through said extractor and outlet means at said second end of said mixing zone for removal thereof, and said extractor having inlet means at said second end of said mixing zone for the introduction of a second fluid for flow through said extractor and outlet means in said settling zone for removal of said second fluid, the improvement comprising: coalescence media located in said settling zone between said inlet means for said first fluid and

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said outlet means for said second fluid, said coalescence media being disposed across the flow path of said second fluid and arranged at an angle so that it slopes from the vertical axis of the extractor in the direction of the mixing zone and extends



substantially to the wall of said settling zone, whereby emulsified fluid passing therethrough will be coalesced and said coalesced fluid will drain toward the wall of the extractor and thence to said mixing zone.

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**4,748,007**

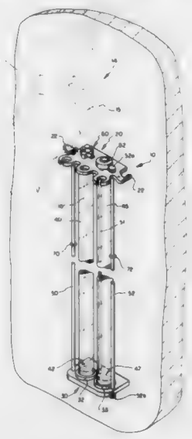
**ENDOSCOPE DISINFECTING AND STORING DEVICE**

**John R. Gandion, Columbus; Phillip L. Gerwig, Ashland, and Jeffrey J. Sopko, Brecksville, all of Ohio, assignors to Vetrodyne, Inc., Cleveland, Ohio**

**Filed Nov. 27, 1985, Ser. No. 802,593**

**Int. Cl.[4] A61L** *2/18;* **B08B** *9/00, 11/02*

**U.S. Cl. 422—300** **8 Claims**



1. A device for disinfecting and storing elongated medical instruments such as endoscopes and the like comprising:

at least one elongated vertically extending tube means for holding disinfecting liquid, the tube means constructed so as to receive at its top end an elongated portion of a medical instrument for immersion in disinfecting liquid;

means for closing the bottom end of the at least one tube means to preclude leakage of disinfecting liquid therefrom, said means for closing comprising a portion held in compression against the bottom end of the at least one tube means to establish a fluid tight compression seal therewith; and

means for supporting a medical instrument so that it extends through said top end and for mounting said at least one tube means to a wall-like support surface which lies in a generally vertical plane.

6. A device for disinfecting and storing elongated medical instruments such as endoscopes and the like comprising:

a pair of vertically spaced, wall-mounted brackets,

a plurality of elongated members interconnecting said brackets, said interconnecting members supporting and maintaining the brackets in fixed spaced apart positions relative to each other;

at least one elongated, linear tube for containing disinfecting liquid into which an elongated portion of a medical instrument can be inserted and immersed, the at least one tube extending vertically between the brackets;

means for removably connecting at least one of said plurality of elongated members between said brackets so as to use said at least one of said plurality of elongated members as to cleaning rod for swabbing out said at least one tube to clean its interior wall;

means for closing the bottom end of the at least one tube to preclude leakage of disinfecting liquid therefrom; and

means for locking the at least one tube in position between said brackets, said locking means being releasable to permit removal of said at least one tube from its position between said brackets for cleaning of said at least one tube at a remote location.

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**4,748,065**

**PROCESS FOR SEPARATING URANIUM ISOTOPES BY OXIDATION-REDUCTION CHROMATOGRAPHY**

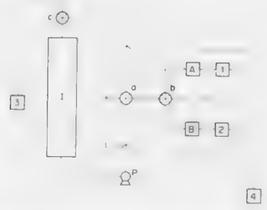
**Kunihiko Takeda, Yokohama, and Heiichiro Obanawa, Kamakura, both of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan**

**Filed Jan. 3, 1986, Ser. No. 816,056**

**Claims priority, application Japan, Jan. 9, 1985, 60-895**

**Int. Cl.[4] B01D** *59/30;* **C01G** *43/00;* **C22B** *60/02*

**U.S. Cl. 423—6** **10 Claims**



1. In a process for continuously separating uranium isotopes, $^{235}U$ and $^{238}U$, by passing an acidic solution of a mixture of uranium isotopes in a solvent through a column of an anion exchanger, thereby forming in said column a boundary (A) between a uranium adsorption zone and an adjacent reducing agent zone and a boundary (B) between said uranium adsorption zone and an adjacent oxidizing agent zone; advancing said uranium adsorption zone through said column while effecting reduction at said boundary (A) and effecting oxidation at said boundary (B), thereby to effect enrichment of $^{235}U$ and $^{238}U$ at said boundary (A) and said boundary (B), respectively; and separately collecting fractions enriched in said isotopes, respectively, the improvement which comprises:

returning to and passing through said column having said uranium adsorption zone an eluate, said eluate containing a deactivated oxidizing agent and a deactivated reducing agent, so as to regenerate said deactivated oxidizing agent and said deactivated reducing agent and so as to form an oxidizing agent zone; and

returning to and passing through said column said regenerated reducing agent for the reduction of uranium,

thereby simultaneously effecting in a single column of an anion exchanger the separation of $^{235}U$ and $^{238}U$ and the regeneration of the deactivated oxidizing agent and deactivated reducing agent.

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**4,748,009**

**METHOD OF RECOVERING VANADIUM FROM VANADIUM-CONTAINING MATERIALS WITH AT LEAST 6 WT % OXIDIC VANADIUM COMPOUNDS**

**Reinhard Hähn, Schwabach-Limbach; Siegfried Sattelberger; Rudolf Fichte, both of Nuremberg, and Hans-Joachim Retelsdorf, Zirndorf, all of Fed. Rep. of Germany, assignors to GfE Gesellschaft fur Elektrometallurgie mbH, Dusseldorf, Fed. Rep. of Germany**

**Filed Oct. 2, 1986, Ser. No. 914,632**

**Claims priority, application Fed. Rep. of Germany, Oct. 5, 1985, 3535698**

**Int. Cl.[4] C01G** *31/00*

**U.S. Cl. 423—68** **6 Claims**

1. A process for the recovery of vanadium values from a source material containing at least 6% by weight oxidic vanadium compounds, said process comprising the steps of:

roasting the source material containing at least 6% by weight of oxidic vanadium compounds in an oxidizing atmosphere at a temperature in excess of 800° C. in a first roasting step without addition of alkali metal compounds for preparation of a product containing soluble vanadium values;

leaching the product containing soluble vanadium values in a first leaching step with an aqueous leach solution containing sodium carbonate to recover soluble vanadium values in the leach solution and to provide a residue containing vanadium values;

roasting said residue containing vanadium values in a second roasting step in admixture with an alkali metal compound selected from the group consisting of carbonates, chlorides, sulfates and nitrates of alkali metals and mixtures thereof, and at a temperature in the range of aobut 750° C. to about 850° C. for preparation of a roasted product containing soluble vanadium values; and

leaching with water the roasted product containing soluble vanadium values from said second roasting step to recover the balance of the vanadium content of the source material.

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**4,748,010**

**ENERGY CONSERVING LIMESTONE CALCINING SYSTEM**

**Daniel D. Walker, Henderson, Nev., assignor to Chemstar, Inc., Fort Worth, Tex.**

**Filed Mar. 11, 1985, Ser. No. 710,157**

**Int. Cl.[4] C01F** *11/06*

**U.S. Cl. 423—176** **22 Claims**

21. Carbonate rock calcining process of first and second separate successive steps which comprises:

in the first step, heating metallic carbonate rock sufficiently to achieve sufficient partial conversion thereof to metallic oxide and carbon dioxide to form in the first step a partially calcined hot mass which itself contains sufficient retained heat for subsequently independently substantially completing the conversion of the remaining unconverted metallic carbonate therein in the second step substantially in the absence of supplying further heat thereto in the second step, and thereafter

in the second step, independently substantially completing the conversion of the metallic carbonate in the hot mass from the first step to metallic oxide and carbon dioxide by such retained heat and substantially in the absence of supplying further heat thereto in the second step while subjecting the partially calcined hot mass from the first step to a vacuum in the second step sufficiently to remove substantially completely the resultant carbon dioxide and for a duration sufficient to achieve in the second step such substantially complete conversion of the metallic carbonate independently by such retained heat and substantially in the absence of supplying further heat thereto and thereby provide a substantially completely calcined hot mass.

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**4,748,011**

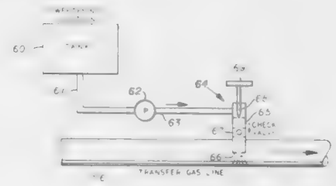
**METHOD AND APPARATUS FOR SWEETENING NATURAL GAS**

**Thomas H. Baize, P.O. Box 1007, Missouri City, Tex. 77459**

**Continuation-in-part of Ser. No. 513,319, Jul. 13, 1983. This application Jun. 2, 1987, Ser. No. 57,031**

**Int. Cl.[4] B01D** *53/14*

**U.S. Cl. 423—228** **7 Claims**



1. In a method of collection and separation of natural gas wherein a sour natural gas from a well head is passed through a knock out separator to remove free liquids, the treated gas is expanded through a choke into a low temperature separator to cool the gas sufficiently to condense water or hydrocarbon condensate, or water and hydrocarbon condensate therein and to collect dry natural gas overhead therein, the steps which comprise

removing dry gas continuously from said low temperature separator through a transfer line to a sales gas flow line,

providing an injector-valve sealed in the wall of one of the flow lines in the system comprising a valve body with an atomizer nozzle extending into the stream of flowing dry natural gas, a check valve preventing back flow from the flow line, a shut off valve, and an inlet,

providing a pump having an inlet and having an outlet connected to said valve inlet,

providing a storage tank connected to said pump inlet,

providing a sweetening solution in said tank consisting essentially of 10–50 % wt. a low molecular weight aldehyde, or a low molecular weight ketone; 20–80% water; 10–50% methanol; 1–25% amine inhibitor; 0–5% sodium hydroxide or potassium hydroxide and 2–5% isopropanol, where the percentages total one hundred, and the pH is 6.0–14 and

operating said pump to supply said sweetening solution continuously at a rate sufficient to react continuously with hydrogen sulfide to sweeten the natural gas.

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**4,748,012**

## PROCESS FOR THE REDUCTION OF NITROGEN OXIDES

Horst Weber, Leverkusen; Manfred Mengel, Odenthal, and Gerhard Beyer, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation of Ser. No. 847,080, Apr. 1, 1986, abandoned. This application Apr. 22, 1987, Ser. No. 41,031

Claims priority, application Fed. Rep. of Germany, Apr. 16, 1985, 3513567

Int. Cl.[4] B01J *8/00;* L01B *21/00*

U.S. Cl. 423—239 5 Claims

1. A process for reducing the nitrogen oxide content in a waste gas of a combustion installation by catalytic reductions with ammonia and in the presence of an aluminosilicate, the improvement comprising conducting the nitrogen oxide-containing waste gas past temperature-resistant surface structures which are coated to a thickness of 0.1 to 2 mm with a mixture of one or more crystalling aluminosilicate zeolites of the faujasite group, silica sol and/or silicates as binder and a copper compound and the catalytic reduction is carried out in the temperature range of from about 100 to about 250° C.

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**4,748,013**

## ADSORBENT FOR RECOVERY OF BROMINE AND BROMINE-RECOVERING PROCESS USING SAME

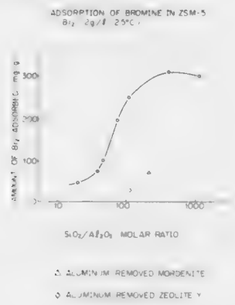
Hiroyuki Saito, Tokuyama, and Kazushige Igawa, Shinnanyo, both of Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Shinnanyo, Japan

Filed Apr. 15, 1986, Ser. No. 852,114

Claims priority, application Japan, Apr. 17, 1985, 60-80255

Int. Cl.[4] C01B *7/00*

U.S. Cl. 423—241 6 Claims




1. A process for the recovery of bromine, which comprises placing a bromine-containing fluid selected from the group consisting of free bromine-containing aqueous solutions and gases in contact with an adsorbent comprising a ZSM-5 zeolite having an $SiO_2/Al_2O_3$ molar ratio of at least 70 at a temperature not higher than 40° C. whereby bromine is adsorbed by the adsorbent, heating the adsorbent at a temperature of at least 60° C. to desorb gaseous bromine from the adsorbent, and cooling the desorbed gaseous bromine to condense the gaseous bromine whereby the bromine is recovered in the liquid form.

**4,748,014**

## PROCESS AND APPARATUS FOR OBTAINING SILICON FROM FLUOSILICIC ACID

Leonard Nanis, Palo Alto, and Angel Sanjurjo, San Jose, both of Calif., assignors to SRI International, Menlo Park, Calif.

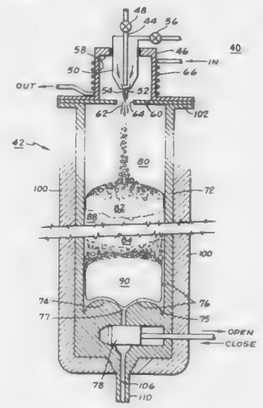
Division of Ser. No. 453,337, Dec. 27, 1982, Pat. No. 4,584,181.

This application Nov. 26, 1985, Ser. No. 802,634

The portion of the term of this patent subsequent to Apr. 10, 2001, has been disclaimed.

Int. Cl.[4] C01B *33/02*

U.S. Cl. 423—350 3 Claims




1. A process for producing solar grade silicon by reaction of gaseous silicon tetrafluoride with sodium in substantially stoichiometric quantities to produce a reaction product from which silicon is recovered by melt separation and wherein said fluoride gas used in the reaction is obtained by thermal decomposition of sodium fluosilicate which is precipitated from aqueous fluosilicic acid generated from phosphate rock conversion to fertilizer, said process comprising: carrying out said reaction inside a graphite reaction chamber formed with at least one bottom drainage port therethrough, said port being of sufficient size so that essentially all reaction product other than silicon freely flow through and silicon is preferentially contained, said flow being due to the low surface tension of said other reaction products as compared to that of silicon.

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**4,748,015**

## METHOD OF COMPLEX PRODUCTION OF SODIUM BIFLUORIDE, ACTIVE SODIUM FLUORIDE, HYDROGEN FLUORIDE AND POTASSIUM NITRATE

Wladyslaw Augustyn, 90 LaSalle Rd., New Britain, Conn. 06051

Filed Oct. 10, 1986, Ser. No. 917,796

Int. Cl.[4] C01D *3/02*

U.S. Cl. 423—472 14 Claims

1. A method of production of sodium bifluoride from an ammonium fluoride solution, which comprises:

mixing a concentrated solution of ammonium fluoride with a concentrated solution containing sodium nitrate, hydrofluoric acid and nitric acid, wherein said solutions are introduced into an intensively stirred mother solution which contains sodium bifluoride crystals, such that an agitated reacting system is formed;



precipitating sodium bifluoride crystals from said mother solution; and

separating said precipitated sodium bifluoride crystals from said reacting system.

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**4,748,016**

## PROCESS OF MAKING FINELY DIVIDED POWDERS OF ALKALINE EARTH METAL TITANATES

Jean-Philippe Browaeys, Paris; Jean-Francois Colombet, Rueil Malmaison; Patrick Dougier, Andresy; Claude Magnier, Paris, and Regis Poisson, Asnieres, all of France, assignors to Rhone-Poulenc Specialites Chimiques, Courbevoie, France

Filed Sep. 14, 1984, Ser. No. 650,710

Claims priority, application France, Sep. 14, 1983, 8314618

Int. Cl.[4] C01G *23/08;* C04B *35/46*

U.S. Cl. 423—598 10 Claims

1. A process for the preparation of finely divided alkaline earth metal titanate powder, comprising (i) admixing a solution of an alkaline earth metal nitrate with a titanium sol having a pH ranging from 0.8 to 2.5 and which comprises elementary crystallites of $TiO_2$ having particle sizes ranging from 10 to 100 Å, agglomerated into submicronic masses having particle sizes ranging from 200 to 1000 Å, to form a suspension, (ii) establishing a helical flow of gas in a reactor at a temperature ranging from 400° to 700° C. and allowing the gas to flow into a vortex well, (iii) injecting the suspension along the axis of symmetry of the helical flow of gases into the vortex well assuring drying of the suspension, the retention time of the suspension in the reactor being less than 1/10 of a second with the temperature of the exiting dried solids ranging from 120° to 160° C., (iv) calcining said dried suspension at a temperature ranging from 700° to 1300° C. for from 30 minutes to 24 hours, under a $NO_x$ partial pressure decreasing from 1 to 0, and thence optionally grinding the powder resulting from said step (iv).

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**4,748,017**

## METHOD FOR MANUFACTURING LEPIDOCROCITE

Yasushi Matsui; Toshinori Kamisaka; Takahiko Goto, all of Yokohama; Kenichi Okazaki, Kawasaki, and Norio Koike, Tokyo, all of Japan, assignors to Showa Denko Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 20, 1987, Ser. No. 4,942

Claims priority, application Japan, Jan. 17, 1986, 61-7310

Int. Cl.[4] C01G *49/06*

U.S. Cl. 423—634 10 Claims

1. A method for producing lepidocrocite, comprising preparing an aqueous suspension of ferrous hydroxide by mixing a ferrous salt and an alkali in an amount of 0.3 to 0.7 times the theoretical amount necessary for converting all of the ferrous salt to ferrous hydroxide in a reactor, blowing an oxygen-containing gas into the suspension to form a seed crystal of lepidocrocite, and completing a growth reaction of lepidocrocite by blowing an oxygen-containing gas into the suspension with adding an alkali into the suspension, in which:

the entire oxidation reaction of the ferrous hydroxide conducted by blowing the oxygen-containing gas in said method is divided into three steps, comprising a first step of carrying out a green rust-forming reaction, a second step of carrying out a lepidocrocite seed crystal-forming reaction, and a third step of carrying out a lepidocrocite-generation reaction, and control of the blowing of the oxygen-containing gas in each of said three steps is based on the following average oxygen absorption rates V and V' (Nl/min.mol), said first and second step being based on the average oxygen absorption rate V, said third step being based on the average oxygen absorption rate V':

$$V = \frac{(A - B)C/100}{D\left(\frac{E}{2D}\right)}$$

$$V' = \frac{(A - B)C/100}{D\left(1 - \frac{E}{2D}\right)}$$

wherein

A is the concentration of oxygen in the blowing oxygen-containing gas (vol %),

B is the concentration of oxygen in the gas in the reactor above the suspension (vol %),

C is the feed rate of the blowing oxygen-containing gas (Nl/min),

D is the molar amount of ferrous ion contained in the ferrous salt (mol), and

E is the molar amount of alkali consumed in each step of the oxidation reaction (mol).

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**4,748,018**

## METHOD OF PASSIVE IMMUNIZATION OF MAMMALS USING AVIAN ANTIBODY

Ralph J. Stolle, Oregonia, Ohio, and Lee R. Beck, Birmingham, Ala., assignors to Stolle Research & Development Corp., Lebanon, Ohio

Continuation-in-part of Ser. No. 577,804, Feb. 7, 1984, abandoned. This application Jun. 19, 1984, Ser. No. 622,130

Int. Cl.[4] A61K *39/40, 39/395*

U.S. Cl. 424—87 25 Claims

1. A method of passive immunization of a mammal against a condition caused by an antigen, which comprises:

(a) feeding said mammal a material, said material comprising heterologous protein antibody, having an enhanced antibody titer against said antigen obtained from the egg of a domesticated fowl immunized against said antigen, until said mammal develops substantial tolerance to said antibody; and

(b) administering to said mammal an immunologically effective amount of an antibody obtained from a domesticated fowl immunized against said antigen.

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**4,748,019**

## VACCINE FOR SWINE DYSENTERY

Richard J. Lysons, Reading, England, assignor to National Research Development Corporation, London, England

PCT No. PCT/GB85/00087, § 371 Date Oct. 9, 1985, § 102(e) Date Oct. 9, 1985, PCT Pub. No. WO85/03875, PCT Pub. Date Sep. 12, 1985

PCT Filed Mar. 4, 1985, Ser. No. 789,960

Claims priority, application United Kingdom, Mar. 2, 1984, [illegible]405530

Int. Cl.[4] A61K *39/02;* C12N *1/20*

U.S. Cl. 424—92 12 Claims

1. A kit for use in a regime of vaccination in which there is administered parenterally to a pig at least one priming dose of a killed pathogenic *T. hyodysenteriae* effective to stimulate the immune response of the pig to a subsequent dose of a live

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non-pathogenic strain of *T. hyodysenteriae* and at about the same time or thereafter there is administered orally to the pig at least one said dose of the live strain effective to immunise the pig against swine dysentery, said kit comprising separately a killed pathogenic strain of *T. hyodysenteriae* and a live non-pathogenic strain of *T. hyodysenteriae.*

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**4,748,020**

## VACCINE FOR DISEASES OF STAPHYLOCOCCUS AUREUS AND METHODS OF PREPARATION

**Egbert F. von Malsen-Ponickau, P.O. Box/Apartado 428, Puerto de la Cruz Teneriffa, Spain**

**PCT No. PCT/EP84/00414, § 371 Date Aug. 12, 1985, § 102(e) Date Aug. 12, 1985, PCT Pub. No. WO85/02771, PCT Pub. Date Jul. 4, 1985**

**PCT Filed Dec. 19, 1984, Ser. No. 768,116**

**Claims priority, application Fed. Rep. of Germany, Dec. 19, 1983, 3345864**

**Int. Cl.[4] A61K** *39/083;* **C12N** *1/38, 1/20*

**U.S. Cl. 424—92** **7 Claims**

1. A vaccine for diseases caused by Staphylococci aureus in humans and warm-blooded animals containing in a carrier an effective amount of live organisms prepared by (a) growing Staphylococci aureus which cause the disease against which the vaccine is intended to be effective; (b) inocculating the said organisms on a culture medium of protein of non-warm-blooded animals and culturing on this medium until a colony capable of living on this medium is obtained and (c) incorporating live organisms from this colony into the vaccine.

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**4,748,021**

## ANTIFUNGAL COMPOSITIONS CONTAINING TRICHODERMA ACTIVE AGAINST FUSARIUM

**Ilan Chet, and Alex Sivan, both of Ness Ziona, Israel, assignors to Yissum Research and Development Company of the Hebrew University of Jerusalem, Jerusalem, Israel**

**Filed Jul. 27, 1984, Ser. No. 634,883**

**Claims priority, application Israel, Jul. 28, 1983, 69368**

**Int. Cl.[4] C12N** *5/00;* **A61K** *37/00*

**U.S. Cl. 424—93** **16 Claims**

1. A biologically pure, stable culture of an *Trichoderma harzianum* T-35 (ATCC No. 20691) useful as a biological control agent and having anti-fungal activity against pathogenic fungi of the genus Fusarium or mutants thereof.

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**4,748,022**

## TOPICAL COMPOSITION

**John A. Busciglio, 515 Corner Dr., Brandon, Fla. 33511**

**Continuation of Ser. No. 715,461, Mar. 25, 1985, abandoned. This application Dec. 9, 1986, Ser. No. 939,475**

**Int. Cl.[4] A61K** *35/78, 31/13, 31/075*

**U.S. Cl. 424—195.1** **10 Claims**

1. A composition for the treatment of pain and inflammation associated with lesions of skin or mucous membrane comprising:

lidocaine HCl: about 0.5 to 0.7 percent by weight;

diphenhydramine HCl: about 0.06 to 0.09 percent by weight;

aloe vera gel (100% pure): about 20 to 35 percent by weight;

propolis 1–2 percent by weight and sufficient base to raise the pH of the final composition to 8–9 plus a suitable pharmaceutical excipient(s).

**4,748,023**

## PROCESS FOR THE PREPARATION OF SUSTAINED RELEASE PHARMACEUTICAL COMPOSITIONS HAVING A HIGH ACTIVE INGREDIENT CONTENT

**Éva Tamás, Gödöllo; Pál Fekete, Budapest; Tibor Kovács, Szentendre; Dénes Bezzegh, Budapest; Ilona Bór née Baumgartner, Budapest; Zoltán Tóth, Budapest, and Katalin Zukovics née Sümeg, Budapest, all of Hungary, assignors to EGYT Gyógyszervegyészeti Gyár, Budapest, Hungary**

**PCT No. PCT/HU84/00006, § 371 Date Aug. 27, 1984, § 102(e) Date Aug. 27, 1984, PCT Pub. No. WO84/02843, PCT Pub. Date Aug. 2, 1984**

**PCT Filed Jan. 25, 1984, Ser. No. 644,835**

**Claims priority, application Hungary, Jan. 26, 1983, 245/83**

**Int. Cl.[4] A61K** *9/50, 9/52, 9/22, 9/26*

**U.S. Cl. 424—465** **7 Claims**

1. A compressed relatively large single sustained release and dosage unit tablet which consists essentially of:

(a) at least 80% by weight of 100 to 500 mg. of at least one pharmacologically active ingredient, encapsulated in

(b) an effective amount of a pharmaceutically acceptable water insoluble polymer for microencapsulating said active ingredient and for retarding the dissolution of the active ingredient within the human body for a predetermined period of time, said effective amount being from about 2% to about 18% by weight of said tablet, and admixed therewith

(c) an effective amount of from about 0.9% to about 25% by weight of the tablet of a pharmaceutically acceptable, water swellable disintegrating agent for loosening the structure of the compressed tablet in water or like body fluid without disintegration of the tablet into discrete particles for a period of at least 4 hours,

said tablet having been compressed at a predetermined force effective cooperatively with said polymer and said disintegrating agent to form a cross-linked matrix structure from the walls of the microcapsules during pressing a matrix structure which loosens upon aqueous swelling, to regulate the release at a predetermined rate of said active ingredient from said tablet.

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**4,748,024**

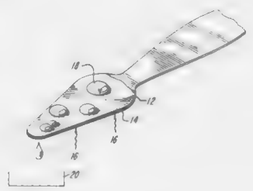
## FLASH FLOW FUSED MEDICINAL IMPLANTS

**Robert J. Leonard, Lyanfield, Mass., assignor to Endocon, Inc., Boston, Mass.**

**Filed Apr. 6, 1987, Ser. No. 35,379**

**Int. Cl.[4] A61K** *31/56*

**U.S. Cl. 424—489** **20 Claims**



1. A process for preparing a fused pellet from pelleting material comprising,

forming a thin layer of said material on a surface of a heat conductive base,

orienting said thin layer and said base at an inclined angle,

applying heat to the opposite surface of said base sufficient to cause said material to melt uniformly,

collecting said melted material as it beads upon and runs from said inclined surface, and

allowing said collected material to cool into a fused pellet.



**4,748,025**

## NOVEL CULTURED BUTTERMILK COMPOSITIONS AND METHOD OF PREPARATION

**Marc R. Bachmann, Winterthur, Switzerland, and Endel Karmas, Kendall Park, N.J., assignors to Rutgers, The State University of New Jersey, New Brunswick, N.J.**

**Filed Feb. 24, 1986, Ser. No. 832,074**

**Int. Cl.[4] A23C** *9/12, 17/02*

**U.S. Cl. 426—43** **17 Claims**

1. A cultured buttermilk composition comprising a fermented, pasteurized mixture of about 30 to about 85 percent soymilk, about 15 to about 70 percent fresh milk and a buttermilk producing culture, said cultured buttermilk having a firm curd consistency, which can be broken to render said cultured buttermilk pourable and drinkable, and a flavor like or substantially indistinguishable from a cultured buttermilk made by a fermentation using 100 percent pasteurized fresh milk.

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**4,748,026**

## PROCESS FOR PRODUCTION OF A NO-STARCH SHELF STABLE YOGURT PRODUCT

**Dorothy K. Keefer, Walnut Creek, and Mark E. Murray, Antioch, both of Calif., assignors to Nabisco Brands, Inc., Parsippany, N.J.**

**Filed Aug. 15, 1986, Ser. No. 897,755**

**Int. Cl.[4] A23C** *9/137*

**U.S. Cl. 426—43** **30 Claims**

1. A method of producing an improved starch free shelf stable yogurt characterized by its smooth texture and an absence of starch:

(a) pasteurizing a fluid homogenized dairy base by heating at a temperature between about 170° F. and about 210° F.;

(b) fermenting said dairy base at a temperature of about 95° to 110° F. for a period of time sufficient to produce a yogurt base of pH about 3.5 to 5;

(c) adding a starch free mixture of food additives comprising at least one calcium binding gum selected from the group consisting of algin, carrageenan and pectin in quantities sufficient to prevent the formation of appreciable syneresis at temperatures as high as 210° F. is mixed with said fermented yogurt base;

(d) preconditioning said mixed yogurt base (step C) by continuously adjusting the temperature of said mixed yogurt base over a period of no greater than about 10 minutes to a temperature of 150° F.;

(e) homogenizing the preconditioned yogurt base from step d to form a uniform mixture; and

(f) pasteurizing said homogenized yogurt at a temperature of between about 170° F. and 210° F.

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**4,748,027**

## POWDER PRODUCT AND A METHOD FOR ITS PREPARATION

**Herbert Schou, Juelsminde, and Jack A. Dreyer, Horsens, both of Denmark, assignors to Nexus ApS, Juelsminde, Denmark**

**PCT No. PCT/DK85/00018, § 371 Date Oct. 28, 1985, § 102(e) Date Oct. 28, 1985, PCT Pub. No. WO85/03846, PCT Pub. Date Sep. 12, 1985**

**PCT Filed Feb. 27, 1985, Ser. No. 797,678**

**Claims priority, application Denmark, Feb. 29, 1984, 1487/84**

**Int. Cl.[4] A23L** *1/035*

**U.S. Cl. 426—96** **14 Claims**

1. A method for preparing a substantially free-flowing powder product which comprises mixing a surface-active substance of lipid character with a particulate carrier which is capable of sorbing the surface-active substance to form a mixture, the amount of surface-active substance being 10–60% by weight calculated on the total weight of the surface-active substance and the carrier, and extruding the mixture at a temperature of 100°–180° C. through one or several orifices to obtain, as an immediate result of the extrusion, a powder product comprising the surface-active substance applied on the particulate carrier.

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**4,748,028**

## ASEPTIC FLUID COFFEE WHITENER AND PROCESS FOR PREPARING SAME

**Ronald J. McKenna, Marcellus; David J. Keller, Syracuse, and Paul J. Streiff, Camillus, all of N.Y., assignors to Borden, Inc., Columbus, Ohio**

**Filed Feb. 18, 1987, Ser. No. 16,131**

**Int. Cl.[4] A23C** *11/02;* **A23L** *1/19*

**U.S. Cl. 426—130** **27 Claims**

1. An aseptically packaged, liquid non-dairy coffee whitener which is shelf-stable at room temperature for several months, comprising:

about 75% to about 91% by weight of water;

about 5% to about 15% by weight of vegetable fat;

about 0.07% to about 0.30% by weight of an edible emulsifier system; and

about 0.2% to about 2.6% of weight of a milk protein, said whitener being substantially free of reducing sugar.

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**4,748,029**

## METHOD FOR CONTROLLING THE FLOW OF A PRODUCT ONTO A CONVEYOR BELT

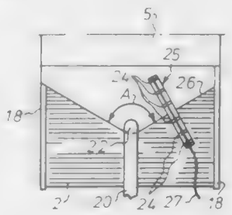
**Per A. Alfred, and Karl C. Dahlberg, both of Helsingborg, Sweden, assignors to Frigoscandia Contracting AB, Helsingborg, Sweden**

**Filed Jun. 19, 1986, Ser. No. 876,702**

**Claims priority, application Sweden, Jun. 26, 1985, 8503158**

**Int. Cl.[4] F25D** *25/04*

**U.S. Cl. 426—231** **3 Claims**




3. A method of controlling the flow of a pumpable food product onto a moving conveyor belt whereupon said food product is frozen into solid form, comprising:

discharging said pumpable food product onto the belt at approximately the center thereof while simultaneously moving said belt relative to the location of such discharging;

permitting said pumpable food product to spread across the entire width of said moving belt;

sensing the position of a spreading front of the pumpable food product as it spreads across the width of said belt and as said belt moves away from the location of said discharging; and

controlling the rate of discharging based on the sensed location of the spreading front of the pumpable food product on the moving belt.

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**4,748,030**

## PROCESS FOR TREATING ROASTED COFFEE

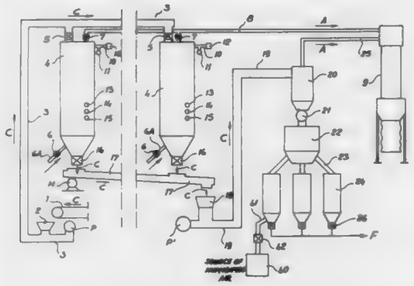
**Ernesto Illy, Via Flavia, 110, I-34147 Trieste, Italy**

**Continuation-in-part of Ser. No. 844,233, Mar. 24, 1986, abandoned, which is a continuation-in-part of Ser. No. 479,956, Mar. 29, 1983, abandoned. This application Nov. 26, 1986, Ser. No. 935,395**

**Claims priority, application Italy, Apr. 27, 1982, 20950 A/82; European Pat. Off., Aug. 4, 1986, 86830227.4**

**Int. Cl.[4] A23F** *5/10, 5/02;* **A01J** *11/00*

**U.S. Cl. 426—233** **23 Claims**



1. A process for treating roasted coffee, comprising the steps of admitting roasted coffee beans into at least one aging chamber; establishing an $O_2$ concentration of between about 0.2 and about 2% in said chamber; and thereafter aging the coffee beans in said chamber at a temperature of about 20°–50° C. for a period of about 4 days to about 4 months, the aging step including establishing and at least substantially continuously maintaining in said chamber a pressure of less than about 1.8 atmospheres throughout at least a major part of said period, measuring and continuously maintaining the $O_2$ concentration in said chamber between about 0.2 and about 2% throughout at least a major part of said period and adjusting the $O_2$ concentration when the $O_2$ concentration lies outside the range of about 0.2 to about 2%.

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**4,748,031**

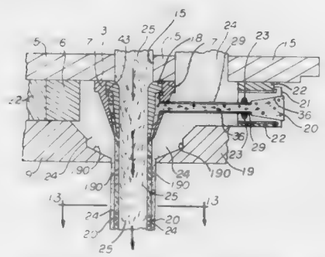
## METHOD OF TRIPLE CO-EXTRUDING BAKEABLE PRODUCTS

**Daniel A. Koppa, Bloomfield, N.J., assignor to Nabisco Brands, Inc., Parsippany, N.J.**

**Division of Ser. No. 724,206, Apr. 17, 1985, abandoned. This application Apr. 29, 1987, Ser. No. 43,759**

**Int. Cl.[4] A23P** *1/12*

**U.S. Cl. 426—283** **6 Claims**



1. A method for preparing a multi-textured bakeable product, comprising continuously and simultaneously co-extruding at least two dissimilar materials to form an extrudate rope having a core portion of a first material, an intermediate layer of a second material enrobing said core portion, and an outermost layer of a dough material enrobing said intermediate layer, wherein, said co-extruding is through an extrusion die for co-extruding three streams simultaneously and having three generally concentric flow passages defined by said die, said die containing: three plates in face abutting relationship, a first of said plates being a block attached to means for extruding two materials, said block defining two side-by-side apertures, each being in communication with said means for extruding, an extrusion nozzle defining a generally cylindrical internal axial passage and a second annular orifice concentric with said passage, said nozzle having an internal sleeve member inserted within and radially spaced from a conical member to form both the internal passage and said annular passage with said conical member having a conduit fixed thereto and radially extending from the exterior of said conical member and in communication with said annular passage, a second plate abutting with said first of said plates, said conical member abutting said first of said plates such that a flow passage is defined by said internal axial passage communicating with a first of said apertures, a second of said apertures communicating with an aperture defined by said second plate and surrounding said nozzle, a third of said plates defining an extrusion orifice for the three streams, the second of said plates defining an opening extending generally parallel to a face of said plates through which said radially extending conduit projects for communication with a third extrusion means, whereby said product is prepared.

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**4,748,032**

## METHOD FOR PREVENTING DETERIORATION OF STARCH-CONTAINING FOODS

**Toshiaki Kono; Takahisa Tokunaga; Goichi Yamaguchi, all of Kanagawa; Hironoshin Kitagawa, Tokyo, and Tetsuo Hiraga, Kyoto, all of Japan, assignors to The Japanese Research and Development Association for Bioreactor System, Tokyo, Japan**

**Filed Mar. 13, 1987, Ser. No. 25,695**

**Claims priority, application Japan, Mar. 13, 1986, 61-53643**

**Int. Cl.[4] A21D** *2/08*

**U.S. Cl. 426—321** **4 Claims**

1. A method for preventing deterioration of a starch-containing food due to retrogradation of the starch, comprising adding to the starch-containing food an anit-food deterioration effective amount of an oligosaccharide obtained from hydrolysis of agar, carrageenan or combinations thereof, wherein said oligosaccharide obtained from hydrolysis of agar is an oligo saccharide which consists of units of agarobiose, neoagarobiose and neoagarotetraose and wherein said oligosaccharide obtained from hydrolysis of carrageenan is an oligosaccharide which consists of units of carrabiose, neocarrabiose and neocarratetraose.

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**4,748,033**

## TEA CONCENTRATE HAVING FREEZE THAW STABILITY AND ENHANCED COLD WATER SOLUBILITY

**Scott W. Syfert, Cincinnati, Ohio; Lora L. Spangler, Myerstown, Pa., and Lowen R. Morrison, Jr., Hamilton, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio**

**Continuation of Ser. No. 860,601, May 7, 1986, abandoned. This application Jun. 18, 1987, Ser. No. 65,086**

**Int. Cl.[4] A23F** *3/16*

**U.S. Cl. 426—330.3** **18 Claims**

1. A frozen tea concentrate having a pH of about 4.6 or less at 20° C. and which comprises:

a. from about 0.4 to about 8% by weight decreamed tea solids;

b. an edible gum selected from the group consisting of xanthan gum in an amount of from about 5 to about 12% by weight of said tea solids; natural and modified gums selected from the group consisting of cellulose gums, locust bean gum, guar gum and mixtures thereof in an amount of from about 15 to about 50% by weight of said tea solids; and mixtures of from about 2 to about 5% by weight of said tea solids of said xanthan gum and from about 5 to about 25% by weight of said tea solids of said natural and modified gums;

c. the balance water.



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**4,748,034**

## PREPARING A HEAT STABLE AQUEOUS SOLUTION OF WHEY PROTEINS

**Olivier de Rham, La Tour-de-Peilz, Switzerland, assignor to Nestec S.A., Vevey, Switzerland**

**Continuation of Ser. No. 601,164, Apr. 17, 1984, abandoned. This application Apr. 18, 1986, Ser. No. 854,057**

**Claims priority, application Switzerland, May 13, 1983, 2615/83**

**Int. Cl.[4] A23C** *21/00, 21/08, 21/10*

**U.S. Cl. 426—330.2** **16 Claims**

1. A process for preparing a heat stable aqueous solution of whey proteins having a pH in the range of from 6.2 to less than 7.2 wherein at least 80% of the whey proteins remain soluble when heat treated which comprises preparing an aqueous solution containing a solute which consists essentially of dry matter of soluble whey proteins and adjusting the concentration of Ca+Mg−citrate such that the concentration of Ca+Mg−citrate is less than 4 mM.

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**4,748,035**

## METHOD FOR HEATING A FOOD CONTAINED IN A CAN

**Ramon Apellaniz, Lasne, Belgium, assignor to Tarahelm Limited, London, England**

**PCT No. PCT/BE86/00009, § 371 Date Jan. 28, 1987, § 102(e) Date Jan. 28, 1987, PCT Pub. No. WO86/05671, PCT Pub. Date Oct. 9, 1986**

**PCT Filed Mar. 25, 1986, Ser. No. 945,102**

**Claims priority, application Luxembourg, Apr. 1, 1985, 85831**

**Int. Cl.[4] A23L** *3/10;* **F24J** *1/00*

**U.S. Cl. 426—407** **5 Claims**

1. In a process for heating a food contained in a can adjacent to an envelope containing quicklime and water separated by a wall which can be easily pierced or ruptured, said process comprising the step of piercing or rupturing said wall so as to enable a contact between the water and the quicklime, the improvement comprising reacting, after piercing or rupturing said wall, the water with two types of quicklime comprising (1) quicklime having a high or medium reactivity and (2) overburned quicklime to produce heat for heating the food contained in the can, the proportion of quicklime having a high or medium reactivity being comprised between about 6 and 75% by weight of the total weight of the two types of quicklime.

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**4,748,036**

## METHOD OF FILLING FLAT STOCK FIBROUS CELLULOSIC FOOD CASINGS CONTAINING A LOW LEVEL OF TOTAL PLASTICIZER

**James R. Hansen, Tinley Park, and Jerome J. M. Rasmussen, Burbank, both of Ill., assignors to Viskase Corporation, Chicago, Ill.**

**Division of Ser. No. 822,864, Jan. 27, 1986. This application Sep. 30, 1987, Ser. No. 102,686**

**Int. Cl.[4] A22C** *11/00, 13/00*

**U.S. Cl. 426—413** **4 Claims**

1. A method of manufacturing a food product in a flat stock fibrous casing which comprises the steps of:

a. providing a flat stock fibrous casing having a total plasticizer content of between about 10 wt. % and about 17 wt. %. including at least about 9 wt. % polyol, and at least about 8 wt. % water, all based upon the weight of bone dry cellulose in the casing.

b. mounting one end of said casing on a stuffing machine and filling said casing with edible material, and

c. processing the edible materialfilled casing to convert said edible material to a finished food product.

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**4,748,037**

## PROCESS FOR PRODUCING A BEAN CAKE

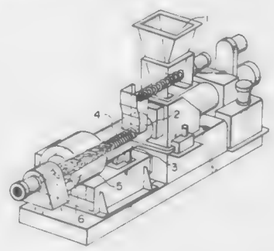
**Yukio Matsumoto, and Gyota Taguchi, both of Kanagawa, Japan, assignors to The Nisshin Oil Mills, Ltd., Tokyo, Japan**

**Continuation of Ser. No. 766,925, Aug. 19, 1985, abandoned. This application Feb. 3, 1987, Ser. No. 14,103**

**Claims priority, application Japan, Aug. 29, 1984, 59-178407**

**Int. Cl.[4] A23L** *1/18, 1/20*

**U.S. Cl. 426—448** **6 Claims**



1. A process for producing a bean cake which comprises feeding whole or hulled grains of beans containing, in dry base, less than 6 weight percent lipid, 20 to 30 weight percent protein and 50 to 60 weight percent carbohydrate comprising at starch component to a twin-screw extruder, extruding the beans through the twin-screw extruder at a temperature in the range of 90° to 250° C. to form a cake, and while extruding, adjusting the moisture content of the beans to be treated to the range of 8 to 50 weight percent and swelling the starch component while texturizing the protein component.

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**4,748,038**

## PROCESS FOR PREPARING SOYBEAN PRODUCTS

**Victor M. Lewis, and David A. Lewis, both of 19A Boundary Street, Rushcutters Bay N.S.W. 2011, Australia**

**Continuation of Ser. No. 601,775, Apr. 4, 1985, abandoned. This application May 8, 1986, Ser. No. 860,991**

**Int. Cl.[4] A23L** *1/20*

**U.S. Cl. 426—456** **7 Claims**

1. The method of processing soybeans which comprises the steps of

(a) treating dehulled soybeans (1) with live steam or water under atmospheric pressure, the soybeans being held at temperatures from 80° to 100° C. for 2½ to 20 minutes; or (2) with live steam under pressure in excess of atmospheric pressure or hot water under steam pressure in excess of atmospheric pressure, the treatment time in each case being sufficient to avoid green, painty or raw flavors developing in the soybean product on storage but short enough such that beany or bitter flavors do not develop in said product;

(b) compressing the beans as they exit from step (a) to flatten them and form a plurality of cracks or fissures throughout the beans, the beans cooling during the compression step; and

(c) dehydrating the flattened beans while keeping their temperature below 80° C. for a period of time to reduce the moisture content to the desired level.

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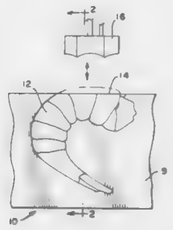


**4,748,039**

## METHOD FOR PRODUCING SHRIMP-SHAPED FOOD PRODUCTS

Hiroji Ikeuchi, and Kiyoaki Ikeuchi, both of Akashi, Japan, assignors to Kabushiki Kaisha Ikeuchi Tekkosho, Akashi, Japan

Filed Jul. 20, 1987, Ser. No. 75,575
Claims priority, application Japan, Jan. 22, 1987, 62-13104
Int. Cl.[4] A23L *1/325;* A23P *1/00*
U.S. Cl. 426—513 3 Claims



1. A method for producing shrimp-shaped products from minced fish meat material using a split mold having a shrimp-shaped mold cavity therein, the cavity having an injection opening for receiving the material and the opening being oriented along the backside of the shrimp, comprising the steps of injecting minced fish meat material into the cavity of the split mold and filling the injection opening, forming a V-shaped groove in the portion of the material which appears at said injection opening, and then heating the mold to produce a shrimp-shaped food product.

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**4,748,040**

## PROCESS FOR THE MANUFACTURE OF A FROTHY DRINK COMPOSITION

Theo W. Kuypers, Richigen, Switzerland, assignor to Nestec S.A., Vevey, Switzerland

Division of Ser. No. 700,198, Feb. 11, 1985, abandoned. This application Aug. 21, 1986, Ser. No. 899,252
Claims priority, application Switzerland, Feb. 20, 1984, 806/84
Int. Cl.[4] A23C *1/04;* A23G *1/00;* A23L *2/40;* A23F *5/40*
U.S. Cl. 426—569 11 Claims

1. A process for preparing a powder-form composition for a beverage which is frothy at its surface comprising:
- combining lactic proteins, lactose, fats, carbohydrates other than lactose and stabilizing salt in an aqueous solution and suspension, such that the ratio by weight of lactic proteins to lactose is from 1:3.5 to 1:5;
- preheating and then heating the aqueous solution and suspension;
- evaporating the heated aqueous solution and suspension of constituents to form a concentrate having a solids content of from 46% to 60% by weight;
- injecting an inert gas into the concentrate, mixing the gas and concentrate, and then increasing the pressure of the gasified concentrate to a pressure of from 40 to 80 bars and delivering the pressurized gasified concentrate to a spray nozzle in a drying tower for spraying via the nozzle;
- spray-drying the pressurized gasified concentrate spray from the nozzle by deflecting the stream of drying air into a plurality of turbulent component streams to decrease the air pressure of the drying air at the spray nozzle; and
- post-drying the spray-dried concentrate.

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**4,748,041**

## SHELF STABLE NON-AQUEOUS SQUEEZABLE COMPOSITION

Kenneth W. Player, Olmsted Falls, and Carey R. Mohnasky, Middleburg Heights, both of Ohio, assignors to Durkee Industrial Foods Corp., Cleveland, Ohio

Filed Mar. 6, 1986, Ser. No. 836,913
Int. Cl.[4] H23C *20/00*
U.S. Cl. 426—601 6 Claims

1. A shelf-stable, anhydrous, squeezeable, lipid-based, filled, savory or cheese-flavored composition having stand-up at room temperature suitable for hand dispensing at a temperature as low as 50° F. from a hand deformable plastic container through an orifice as small as two millimeters in diameter, consisting essentially of, based on the composition weight,
- (a) about 25% to about 70% lipid; and
- (b) about 75% to about 30% edible bulking ingredient;
- said lipid consisting essentially of a vegetable oil carrier, lecithin and lipophilic ester emulsifier having a Capillary Melting Point above about 110° F. and an HLB less than about 8, with the lecithin being about 0.3–0.6% of the lipid weight and the lipophilic ester emulsifier being about 0.5% to about 2% of the lipid weight;
- said vegetable oil carrier being selected from the group consisting of
  - (1) a vegetable oil blend consisting essentially of (a) about 30% to about 70% of a hydrogenated non-lauric vegetable oil having a Wiley Melting Point of about 50° F. to about 85° F., an AOM stability of at least about 75 hours, and an SFI Index at 50° F. of less than about 20;
  - (b) about 70% to about 30% of a lauric fat having a Wiley Melting Point less than about 96° F.; said blend having an SFI Index at 50° F. of less than about 5;
  - (2) the vegetable oil of 1 (a) which is winterized at a temperature less than about 60° F. further comprising an emulsifier effective to remove cloud at 50° F.
  - (3) an olein fraction of a fractionated coconut oil;
- said composition having a Brookfield viscosity of about 10 to about 60 at 120° F.

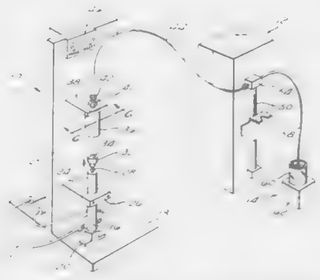
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**4,748,042**

## METHOD AND APPARATUS FOR IMPRINTING MEMBRANES WITH PATTERNS OF ANTIBODY

Carl Linnecke, Arcadia; Ailene Herranen, Woodland Hills, and Alan S. Fraser, Whittier, all of Calif., assignors to V-Tech, Inc., Pomona, Calif.

Filed Mar. 31, 1987, Ser. No. 32,460
Int. Cl.[4] A01N *1/02;* G01N *31/22, 33/543, 33/544*
U.S. Cl. 427—2 16 Claims



10. A method for impregnating a protein binding membrane with a predetermined pattern of antibody comprising:
- forming a transferable pattern of a first antibody solution;
- presenting a protein binding membrane to the formed pattern of antibody solution; and
- removing said membrane from contact with said pattern.

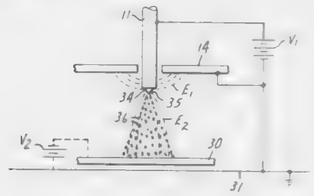


**4,748,043**

## ELECTROSPRAY COATING PROCESS

Albert E. Seaver, and Carey J. Eckhardt, both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed Aug. 29, 1986, Ser. No. 902,218
Int. Cl.[4] B05D *1/04;* B05B *5/02*
U.S. Cl. 427—30 17 Claims



7. A process for coating a substrate having sufficient surface energy to allow a wetting of its surface by droplets of a coating material to form a very thin uniform coating thereon, said process comprising the steps of
- pumping the coating material to at least two rows of capillary needles having the tips arranged in the same plane and having an electrically insulative coating,
- creating an electrostatic force between each needle and a surrounding extractor plate to generate a spray of droplets,
- advancing a said substrate past said rows of needles and spaced from said plane of the tips by between 5 and 15 cm, said substrate having sufficient surface energy to be wet by said coating material,
- creating a second electrical potential between said needles and said substrate surface to attract charged droplets of material to said surface, and
- discharging said surface of said substrate.

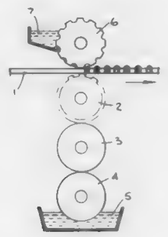
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**4,748,044**

## METHOD FOR THE SIMULTANEOUS, CONTINUOUS BINDING AND COATING OF A NONWOVEN FABRIC

Walter Fottinger, Weinheim; Sepp Wagner, Gorrheimertal; Bohuslav Tecl, Weinheim, and Werner Enders, Waldmichelbach, all of Fed. Rep. of Germany, assignors to Rms Carl Freudenberg, Heim/Bergstrasse, Fed. Rep. of Germany

Filed Dec. 15, 1981, Ser. No. 330,795
Claims priority, application Fed. Rep. of Germany, Dec. 24, 1980, 3049036; Dec. 24, 1980, 3049037
Int. Cl.[4] B05D *3/06, 5/00*
U.S. Cl. 427—44 31 Claims



1. A method for the continuous, synchronous binding and coating of a non-woven fabric, respectively with a radiation cross-linkable binding agent and with a thermoplastic adhesive composition, which comprises:
- applying the agent as a fluid to the fabric lower side and distributing the agent throughout the fabric;
- applying synchronously with the agent application, the composition as a solid coating on the surface of the fabric upper side, the agent and composition applications being made as overlapping patterns;
- irradiating the fabric impregnated with agent and coated with composition to cause agent cross-linking, wherein the irradiation source used also produces thermal radiation of an amount sufficient to render the composition tacky and fabric adherent, and
- heating the composition with the thermal radiation to cause the composition to become tacky and fabric adherent but substantially prevent it from attaining a fluid state on the fabric which would affect substantial penetration of the composition into the fabric, thereby producing the bonded, coated non-woven fabric.

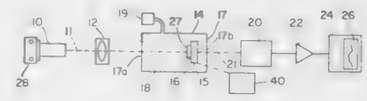
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**4,748,045**

## METHOD AND APPARATUS FOR PHOTODEPOSITION OF FILMS ON SURFACES

Daniel J. Ehrlich, Lexington, and Mordecai Rothschild, Newton, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Continuation-in-part of Ser. No. 849,710, Apr. 9, 1986, Pat. No. 4,668,528. This application Mar. 16, 1987, Ser. No. 26,062
Int. Cl.[4] B05D *3/06*
U.S. Cl. 427—53.1 21 Claims



1. A method for deposition of metal containing films on a surface of a substrate disposed in a reaction chamber comprising the steps of:
- (a) introducing a visible absorbing gaseous polymetal carbonyl vapor precursor into said chamber;
- (b) generating a beam of visible light directed at or near the surface upon which deposition is desired;
- (c) initiating deposition with said beam of visible light via a substantially photolytic dissociation of said precursor resulting in formation of metal containing material on said substrate surface.

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**4,748,046**

## METHOD OF MAKING KEYS OF A KEYBOARD

Yoshitomo Kuboki; Mitsuhiro Okada, and Hiroo Ookoshi, all of Iwaki, Japan, assignors to Alps Electric Co., Ltd., Japan

Filed Feb. 24, 1987, Ser. No. 17,989
Claims priority, application Japan, Jun. 24, 1986, 61-146243
Int. Cl.[4] B05D *3/06*
U.S. Cl. 427—54.1 4 Claims



1. A method of making a key of a keyboard having a top surface on which a symbol for the key is displayed, comprising:
- applying a first pad having a selected shape and displaying the symbol on the top surface of the key;
- forming a second pad of ultraviolet-curable resin corresponding to the selected shape of the first pad, and applying the second pad as a protective layer on the first pad; and

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curing the protective layer of the second pad on the first pad by ultraviolet radiation.

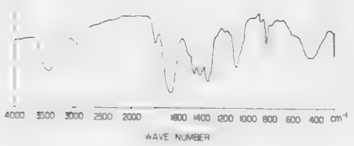
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**4,748,047**

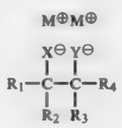
## POLYACETYLENE COMPOSITE, PROCESS FOR PRODUCTION THEREOF, AND METHOD FOR USE THEREOF

**Akira Yoshino, Fujisawa, and Kenichi Sanechika, Kawasaki, both of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan**

**Division of Ser. No. 896,633, Aug. 15, 1986, Pat. No. 4,686,160, which is a division of Ser. No. 679,399, Dec. 7, 1984, Pat. No. 4,634,636. This application Apr. 20, 1987, Ser. No. 39,728**
**Claims priority, application Japan, Dec. 13, 1983, 58-233648; Dec. 13, 1983, 58-233649**
**Int. Cl.[4] B32B *27/00***
**U.S. Cl. 427—58** **1 Claim**

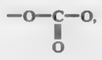



1. A process for the production of a polyacetylene composite, comprising applying to a polyacetylene polymer a solution containing at least one ionic organic compound represented by the general formula (I):




(I)

the same or different and represent -O or




$R_1$, $R_2$, $R_3$, and $R_4$ each are at least one member selected from the group consisting of hydrogen substituted or unsubstituted alkyl groups of 1 to 5 carbon atoms, and substituted or unsubstituted alkoxy groups of 1 to 5 carbon atoms, or $R_1$ and $R_2$ or $R_3$ and $R_4$ in combination form a cyclic structure, and drying the coated polyacetylene polymer.

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**4,748,048**

## METHOD OF INSULATING ELECTRICAL CONDUCTORS BY IMPREGNATION

**Alain Anton, Chaponnay, and Alain Dubuisson, Meyzieu, both of France, assignors to Alsthom, S.A., Paris, France**

**Filed Oct. 20, 1986, Ser. No. 922,082**
**Claims priority, application France, Oct. 22, 1985, 85 15667**
**Int. Cl.[4] B05D *5/12***
**U.S. Cl. 427—116** **9 Claims**

1. A method of insulating electrical conductors including winding a tape of porous mica paper and a backing layer selected from the group consisting of glass felt, glass cloth, and plastic material film around the conductors, impregnating the tape with a varnish comprising a polymerizable liquid resin, and polymerizing the impregnated tape by heat treatment, wherein the improvement comprises adding an adhesive material to the tape to provide adhesion between the porous mica paper and the backing layer, said adhesive material comprising a polymer having chains of oxazolidone groups containing groups with epoxy terminations, and wherein the polymerizable liquid resin of the varnish contains isocyanate groups which are transformed into isocyanurate groups during polymerization.

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**4,748,049**

## CLEAR PAINT BOOTH COATING COMPOSITION AND METHOD

**Harry R. Charles, and Cathy D. Stewart, both of Sterling Heights, Mich., assignors to Chemfil Corporation, Troy, Mich.**

**Filed Mar. 27, 1986, Ser. No. 845,107**
**Int. Cl.[4] B05D *5/08***
**U.S. Cl. 427—156** **10 Claims**

1. An aqueous solution for forming crystal clear coating on paint booth surfaces and equipment located in paint spray booths, said coating being removable with water or peelable from a substrate as a film comprising the following constituents:

from about 5 to 20% by weight of polyvinyl alcohol;
from about 1 to 5% by weight of a foam depressor;
from about 0.07 to 0.7% by weight of a wetting agent;
and an amine neutralizer and corrosion inhibitor in an amount of up to 1% by weight.

10. A method of providing a barrier coating on a paint spray booth and equipment located in a paint spray booth comprising applying to surfaces of the paint spray booth or the equipment located in said spray booth, the aqueous solution of claim 1.

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**4,748,050**

## PROCESS FOR PREPARING THIN FILM HAVING HIGH LIGHT TRANSMITTANCE

**Shigeyuki Takahashi; Kaoru Yamaki, and Takayuki Kuroda, all of Himeji, Japan, assignors to Daicel Chemical Industries, Ltd., Sakai, Japan**

**Filed Dec. 6, 1985, Ser. No. 806,145**
**Claims priority, application Japan, Aug. 9, 1985, 60-175249**
**Int. Cl.[4] B05D *5/06***
**U.S. Cl. 427—164** **13 Claims**

1. A process for preparing a thin coated film, which comprises coating, by vacuum vapor deposition, a thin film of a transparent resin selected from the group consisting of cellulose nitrate, cellulose acetate propionate, cellulose acetate butyrate, cellulose acetate, cellulose propionate and cyanoethyl cellulose and having a uniform thickness of 0.5 to 10 μm, with a colorless metal fluoride or oxide to a thickness of about 100 nm or one or both surfaces of said thin film while holding said thin film in a uniformly tensioned state.

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**4,748,051**

## REDUCING EXPOSURE TO HAZARDOUS PARTICLES

**Paul E. Songer, Rossville, Ga., and Warren D. Stidham, Hixson, Tenn., assignors to Polysar Financial Services S.A., Fribourg, Switzerland**

**Continuation-in-part of Ser. No. 718,371, Apr. 1, 1985, abandoned. This application Jul. 25, 1986, Ser. No. 889,258**
**Int. Cl.[4] B05D *7/00***
**U.S. Cl. 427—212** **11 Claims**

1. A process for reducing the health hazzard from residual hazardous particulate material following the bulk removal of said material from a substrate which comprises applying to the substrate, adjacent surfaces, or both an unfilled coating composition which does not contain any water soluble alkali metal silicate, which has on drying a tack of at least 300 g when determined by the Polyken Probe Tack Test according to ASTM D-2979 on a sample having a thickness of 0.003 inches said compound being applied at a rate to provide a dry coat weight of at least 0.1 oz. per square foot and consisting essentially of a latex and tackifier in a dry weight ratio from 100:0 to 100:40 wherein said latex is an aqueous polymeric dispersion containing at least 35 weight percent of a solid synthetic random polymer having a Tg from −40° to 10° C. consisting essentially of:

(i) from 60 to 75 weight percent of butadiene or isoprene;
(ii) from 20 to 40 weight percent of styrene;
(iii) from 0.5 to 5 weight percent of a $C_{3-6}$ ethylenically unsaturated carboxylic acid; and
(iv) from 0.5 to 5 weight percent of an amide of a $C_{3-6}$ ethylenically unsaturated carboxylic acid, said amide being unsubstituted or substituted at the nitrogen atom by a $C_{1-4}$ alkyl or alkanol radical;

said polymer having a molecular weight distribution such that from 20 to 75 weight percent of the polymer has a moelcular weight greater than 320,000;
and said tackifier is selected from the group consisting of rosin, hydrogenated rosin, mono, di and tri ethylene glycol esters of rosin, and synthetic tackifiers manufactured from a cut of a $C_9$ aromatic hydrocarbon stream or a cut from a $C_5$ aliphatic or cycloaliphatic hydrocarbon stream.



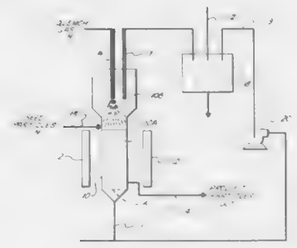
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**4,748,052**

## FLUID BED REACTOR AND PROCESS

**Robert H. Allen, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.**

**Filed Aug. 21, 1987, Ser. No. 88,145**
**Int. Cl.[4] B05C *19/02*; B05D *1/22***
**U.S. Cl. 427—213** **7 Claims**



1. A method for reducing the amount of undesirable conversion of silane or other gaseous or vaporous silicon source in the freeboard above a fluidized bed of silicon particles utilized in a fluidized bed process for producing polysilicon, in which said silicon source is thermally decomposed to deposit silicon metal on said silicon particles in said fluidized bed,

said method comprising introducing, into the freeboard above said fluidized bed in a fluidized bed reactor, quench gas at a temperature below the decomposition temperature of said silicon source, the amount of said quench gas being sufficient to significantly reduce both the temperature of gas and the concentration of said silicon source in said freeboard, and thereby reduce the amount of thermal decomposition of said silicon source in said freeboard.

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**4,748,053**

## METHOD OF FORMING A UNIFORM RESIST FILM BY SELECTING A DURATION OF ROTATION

**Masato Okada, Tokyo, Japan, assignor to Hoya Corporation, Tokyo, Japan**

**Filed Dec. 7, 1984, Ser. No. 679,317**
**Claims priority, application Japan, Dec. 8, 1983, 58-231933**
**Int. Cl.[4] B05D *3/12***
**U.S. Cl. 427—240** **8 Claims**

1. A method of forming a resist film on a thin film of a substrate, said method comprising the steps of:

dropping a predetermined resist onto a thin film;
spreading the resist dropped on said thin film into a spread resist to make said spread resist substantially uniform in thickness by rotating said substrate at a first speed of rotation for a first duration of time, said first speed being between 100 (rpm) and 6000 (rpm), both inclusive, and said duration of time being less than 20 (sec), such that a product obtained by multiplying the value of said first speed and said first duration of time is less than 24,000 (rpm. sec); and
drying the spread resist to form the resist film of said predetermined thickness, while the thickness of the spread resist is kept substantially unchanged by rotating the substate for a second duration of time at a second speed which is lower than said first speed.

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**4,748,054**

## METHOD OF PROVIDING COLOR ON GLASS

**Penelope J. Wurr, 15 Morshead Mansions, Morshead Road, London W9, England**

**Filed Jan. 13, 1987, Ser. No. 3,037**
**Int. Cl.[4] B05D *3/10, 3/12, 5/06, 1/32***
**U.S. Cl. 427—259** **5 Claims**

1. A method of providing different coloured layers of paint on glass, which method comprises roughening a surface of the glass, applying a first lot of soluble resist to predetermined areas of the roughened glass, then applying a first colour paint to the glass, drying the paint, washing off the first lot of soluble resist to expose unpainted roughened glass, drying the glass, applying a second lot of soluble resist on top of some of the first coloured paint and on top of some of the exposed unpainted roughened glass, applying a second colour paint to the glass, and washing off the second lot of soluble resist to leave the glass with at least one area where the first and the second colours are overlaid, at least one area where the roughened glass only has the first colour, and at least one area where the roughened glass only has the second colour.

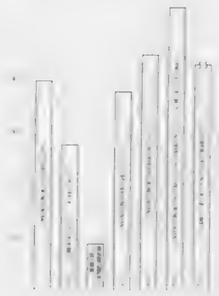
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**4,748,055**

## METHOD FOR FORMING A SELF-HEALING CORROSION PREVENTATIVE FILM

**Perry E. Landers, Russell, Ky.; George F. Felton, Bel Air, Md., and Richard L. Williams, Lexington, Ky., assignors to Ashland Oil, Inc., Ashland, Ky.**

**Division of Ser. No. 818,437, Jan. 13, 1986, abandoned. This application Oct. 22, 1986, Ser. No. 921,998**
**Int. Cl.[4] B05D *3/12, 3/02***
**U.S. Cl. 427—292** **13 Claims**



1. A method for coating metal parts comprising contacting said parts with an oil-in-water emulsion capable of application and flow onto said parts, and capable of curing to form a self-healing polymeric coating having improved salt spray resistance, wherein said concentrate comprises in combination:

A. about 20 to 95 wt. % of aliphatic or naphthenic oil having a viscosity of about 50 to 500 second (SSU @37° C., 100° F.);

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B. about 0.1 to 15 wt. % of stabilizing agent comprising glycol or glycol ethers or derivatives thereof;
C. about 5 to 50 wt. % of emulsifying agent comprising a sulfonate salt of alkaline earth metals;
D. about 0.5 to 10 wt. % of curable siloxane resin comprising polyalkylsiloxane or alkylpolysiloxane or derivatives thereof;
E. about 0.1 or more wt. % of water.

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**4,748,056**
**PROCESS AND COMPOSITION FOR SENSITIZING ARTICLES FOR METALLIZATION**

**Francis J. Nuzzi, Lynbrook; Edward J. Leech, Oyster Bay; Richard W. Charm, Glen Cove, and Joseph Polichette, South Farmingdale, all of N.Y., assignors to Kollmorgen Corporation, Simsbury, Conn.**

**Continuation of Ser. No. 751,330, Dec. 16, 1976, abandoned, which is a continuation of Ser. No. 407,555, Oct. 18, 1973, abandoned, which is a continuation-in-part of Ser. No. 270,861, Jul. 11, 1972, abandoned. This application Feb. 21, 1978, Ser. No. 879,774**
**Int. Cl.⁴ C23C *18/28***
**U.S. Cl. 427—304** **14 Claims**

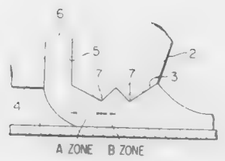
1. In a process for the adherent electroless metallization of the surface of a non-metallic article, the improvement comprising sensitizing said surface to the electroless deposition of metal by a process consisting essentially of the steps:
(a) contacting the surface or selected areas of the surface of said article with a first liquid medium, said medium being the product of forming a mixture of a soluble metal compound of copper, a source of ammonium ions and water, thereby adsorbing at least said copper compound on said surface;
(b) next rinsing said article with at least a second medium to remove the excess of said medium and unadsorbed metal while, at the same time, with said rinsing water decreasing the solubility of the compound adsorbed in said surface; and subsequently,
(c) treating said article with at least one reducing agent to render said adsorbed copper compound catalytically active to the deposition of electroless metal, thereby reducing said surface sensitized to adherent metallization in electroless metal deposition baths.

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**4,748,057**
**COATING METHOD**

**Takashi Kageyama, and Makoto Yoshida, both of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 492,456, May 5, 1983, abandoned. This application Dec. 3, 1985, Ser. No. 804,321**
**Claims priority, application Japan, May 19, 1982, 57-83221**
**Int. Cl.⁴ B05D *1/26*; B05C *5/02***
**U.S. Cl. 427—356** **8 Claims**



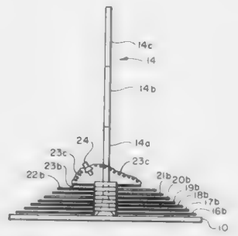

1. A method of coating a web traveling in a predetermined downstream direction comprising passing a stream of coating material through an opening to form a layer on said web, thereafter passing said material through a first convergent pressure zone and then through a second divergent pressure zone, and supporting said web by a back-up roll in said zones, and wherein said material fills said first and second zones.

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**4,748,058**
**ARTIFICIAL TREE**

**Chester L. Craig, Jr., Rt. 1, Box 303, Somerton, Ariz. 85350**

**Filed Feb. 10, 1987, Ser. No. 13,056**
**Int. Cl.⁴ A47G *33/06***
**U.S. Cl. 428—9** **20 Claims**




1. An artificial tree assembly comprising:
a collapsible pole;
a base member formed by the bottom of a box for storing the tree assembly and including a pole support member secured thereto for supporting the pole;
a plurality of limb sections, each said limb section comprising a central ring portion and a plurality of limb members extending radially outwardly from said central ring portion, the ring portions of the limb sections being stacked, when not in use, on said pole support member and being disposed, in use, along the length of the pole in spaced relationship therealong and;
a plurality of garlands interconnecting said limb portions so that as the ring portions are lifted from the top from the stacked position thereof on the pole support member and slid along the pole, the garlands between adjacent limb section are tensioned in turn and thereby serve to lift the next adjacent limb section in sequence until all of the rings assume said spaced relationship along the pole, whereby the tree is erected.

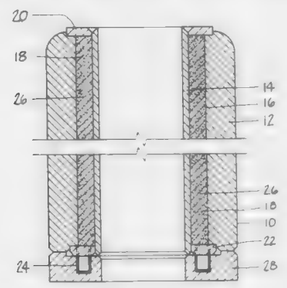
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**4,748,059**
**ASSEMBLY FOR PRODUCING EXTRUSION-CLAD TUBULAR PRODUCT**

**Karl S. Brosius, Burgettstown; Scott B. Justus, Wexford, and David A. Salvatora, Gibsonia, all of Pa., assignors to Crucible Materials Corporation, Pittsburgh, Pa.**

**Division of Ser. No. 788,416, Oct. 17, 1985, Pat. No. 4,640,815. This application Nov. 3, 1986, Ser. No. 925,988**
**Int. Cl.⁴ B27N *5/02***
**U.S. Cl. 428—35** **6 Claims**

1. An assembly for use in producing metal tubing having an internal surface clad with a material of a metallurgical composition different from said internal surface, said assembly comprising a metal tubing having an internal surface to be clad, a hollow tubular metal insert mounted generally axially within said tubing in spaced-apart relation to said internal surface thereof to provide a generally annular cavity between said internal surface and said hollow tubular metal insert, means for filling said cavity with metal particles of a metallurgical composition different than said internal tubing surface and means for sealing said cavity, whereby said assembly is adapted for heating and extrusion to densify and metallurgically bond




metal particles within said cavity to said internal surface of said tubing to clad the surface.

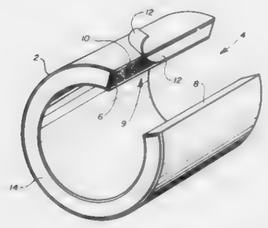
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**4,748,060**
**FLEXIBLE PIPE COVERING SEAM SEALING**

**William F. Fry, Columbia; Joseph L. Giandalia, Lancaster, and Rickie L. Sitler, Wrightsville, all of Pa., assignors to Armstrong World Industries, Inc., Lancaster, Pa.**

**Filed Dec. 29, 1986, Ser. No. 946,768**
**Int. Cl.⁴ B29D *23/22***
**U.S. Cl. 428—36** **2 Claims**




1. An article having a long tubular flexible shape with an elongated axis and a split or seam in the wall of the tubular cross-section on only one side parallel to the axis, said split extending all the way through the wall of the tubular shape and extending the full length of the tubular shape, the wall either side of the split having flat surfaces that abut together when the split is forced into a closed position, comprising:
(a) a pressure sensitive adhesive transfer tape having an adhesive coating being positioned on at least one flat surface at the split and a protective sheet overlying the adhesive and preventing the adhesive from bonding to the other flat surface of the split, said adhesive coating being the only means to fasten the two flat surfaces together to force the split into a closed position, and
(b) a pressure sensitive adhesive transfer tape having an adhesive coating being positioned on the flat surface at the end of the tubular shape and a protective sheet overlying the adhesive and preventing the adhesive from bonding to a similar flat surface on a second long tubular shape article or any other surface.

**4,748,061**
**CAMOUFLAGED COMPOSITE PRESSURE-SENSITIVE ADHESIVE TAPE**

**George F. Vesley, Hudson, Wis., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Jan. 2, 1987, Ser. No. 242**
**Int. Cl.⁴ C08F *2/48***
**U.S. Cl. 428—40** **13 Claims**

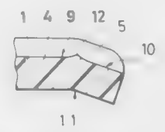
1. Composite pressure-sensitive adhesive tape comprising a pigmented microbubble-filled or cellular pressure-sensitive adhesive core layer to which is adhered a relatively thin, dense surface layer of pigmented pressure-sensitive adhesive that is substantially free of microbubbles wherein the surface layer of the composite tape appears more intense in color than does the face of either layer alone.

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**4,748,062**
**DECORATIVE MEMBER HAVING TRANSPARENT LAYER WITH LENS EFFECT**

**Yoshihiro Menjo; Seiji Kobayashi; Takuji Nagata; Hiroshi Ohashi, and Yoshiharu Kanamori, all of Aichi, Japan, assignors to Toyoda Gosei Co., Ltd., Nishikasugai and Toyota Jidosha Kabushiki Kaisha, Toyota, both of, Japan**

**Filed Oct. 29, 1986, Ser. No. 924,339**
**Claims priority, application Japan, Oct. 31, 1985, 60-168950[U]**
**Int. Cl.⁴ A44C *25/00*; B44F *1/00*; B60R *13/04***
**U.S. Cl. 428—46** **4 Claims**



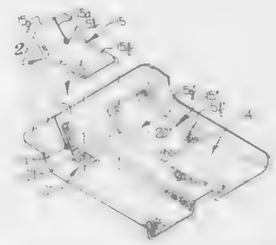

1. A decorative member comprising
a base means having a decorative face on a surface thereof, said decorative face having more than one face section;
a layer of transparent material formed over the decorative face of said base means; and
at least one chevron shaped projection extending from the decorative face of said base means to form a boundary between two of said face sections, whereby the optical effect provided by the transparent material highlights the definition of said boundary.

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**4,748,063**
**AUTOMOTIVE FLOOR COVERING WITH PAD ATTACHMENT MEANS**

**Harold Reuben, Akron, Ohio, assignor to The Akro Corporation, Canton, Ohio**

**Filed Sep. 21, 1987, Ser. No. 99,069**
**Int. Cl.⁴ B32B *3/06*; B60J *9/00***
**U.S. Cl. 428—78** **9 Claims**



1. A floor covering for an automobile comprising an auto-

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mobile carpet of a predetermined size and configuration, at least one carpet pad overlying a predetermined area of said carpet, and carpet pad attaching means connected to the face of said carpet in at least one localized area of the carpet and comprising a unitary group of upstanding integrally formed spaced apart projections extending upwardly from the face of the carpet, said carpet pad having a plurality of downwardly extending integrally formed spaced apart projections connected thereto and depending from the backside thereof and adapted to penetrate into said underlying carpet for preventing shifitng of the pad, some of said projections depending from said pad being in intermeshing relationship with said unitary group of upstanding projections and serving to ensure maintence of the carpet pad in its desired placed relationship overlying the automobile carpet.

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**4,748,064**

## BALLISTIC-RESISTANT COMPOSITE ARTICLE

**Gary A. Harpell, Morristown; Igor Palley, Madison; Sheldon Kavesh, Whippany, and Dusan C. Prevorsek, Morristown, all of N.J., assignors to Allied Corporation, Morris Township, Morris County, N.J.**

**Continuation-in-part of Ser. No. 691,048, Jan. 14, 1985, Pat. No. 4,623,574. This application Dec. 9, 1985, Ser. No. 825,039**

**The portion of the term of this patent subsequent to Nov. 18, 2003, has been disclaimed.**

**Int. Cl.⁴ B32B** *5/12*

**U.S. Cl. 428—113** **30 Claims**

1. A composite article of manufacture comprising a network of fibers having a tensile modulus of at least about 500 g/denier and an energy-to-break of at least about 22 J/g in a matrix of an elastomeric material which has a tensile modulus (measured at 25° C.) of less than about 6,000 psi (41,300 kPa).

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**4,748,065**

## SPUNLACED NONWOVEN PROTECTIVE FABRIC

**Murty S. S. R. Tanikella, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Aug. 13, 1986, Ser. No. 896,531**

**Int. Cl.⁴ B41M** *3/12*

**U.S. Cl. 428—152** **6 Claims**

1. A flame resistant and noxious chemical adsorbent, flexible, creped fabric comprising:

(a) a spunlaced fabric substrate comprising at least 90% by weight aramid staple fibers having a length between 0.75 and 10 cm, said fabric having a weight in the range of 35 to 70 g/m$^2$ and a thickness of 300 to 800 μm;

(b) said fabric being impregnated with adsorbent carbonized particles having a particle size less than 100 μm, said particles being approximately uniformly distributed over the entire fabric, and dispensed throughout the cross section of the fabric, said particles being present in an amount of 20 to 120 g/m$^2$ of fabric;

(c) said adsorbent particles being held in place in the fabric by a synthetic copolymeric latex organic binder, said binder being present in the amount of 10 to 50% by weight of the adsorbent particles.

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**4,748,066**

## FIRE RESISTANT MATERIALS

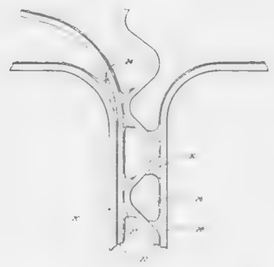
**Richard A. Kelly, Framingham, Mass., and Archibald L. Walker, Woodstock, Conn., assignors to Digital Equipment Corporation, Maynard, Mass.**

**Continuation of Ser. No. 666,787, Oct. 31, 1984, abandoned. This application Feb. 3, 1987, Ser. No. 11,418**

**Int. Cl.⁴ B32B** *3/28*

**U.S. Cl. 428—182** **42 Claims**

1. In a corrugated laminated cellulose product comprising at least two sheets of cellulose material including at least one liner board and at least one fluted medium sheet affixed to one another by a sodium silicate adhesive, the improvement wherein said sodium silicate is dried-in-place from an aqueous solution, substantially under ambient drying conditions, whereby bound water molecules contained in the sodium silicate are retained, said dried-in-place sodium silicate being present in an amount (dry weight) of at least about three pounds per thousand square feet of laminated product, said



dried-in-place sodium silicate being heat-foamable to produce an element capable of retarding the passage of heat or fire therethrough in the event said product is exposed to fire or heat.

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**4,748,067**

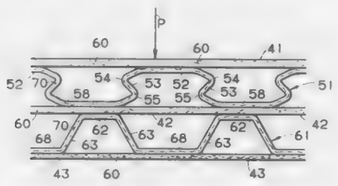
## PADDED BOOK PANEL CONSTRUCTION

**Thomas L. Cline, Hanover, Pa., assignor to Corra-Board Products Co., Inc., Hanover, Pa.**

**Filed Oct. 19, 1987, Ser. No. 110,355**

**Int. Cl.⁴ B32B** *3/12*

**U.S. Cl. 428—186** **10 Claims**




1. In combination with a hardcover book structure (10) having a solid front panel (20), a solid rear panel (21) and a flexible middle binding section (25),

a book panel structure having a first upper flat chipboard layer (41),

said book panel structure having a second middle flat chipboard layer (42),

said book panel structure having a third lower flat chipboard layer (43),

a first undulating layer (51) positioned between said first chipboard layer (41) and said second chipboard layer (42),

said first undulating layer (51) having a plurality of upper flat zone means (52) for adhesive securing to said first chipboard layer (41),

said first undulating layer (51) having a plurality of lower flat zone means (58) for adhesive securing to said second chipboard layer (42),

said first undulating layer (51) having a plurality of arm means (53) extending between said upper flat zone means (52) and said lower flat zone means (58),

and wherein each of said arm means (53) has a first upper bend (54) formed therein and a second lower bend (55) formed therein to provide means whereby a padded effect is created upon depression of the first upper chipboard layer (41),

a second undulating layer (61) positioned between said second chipobard layer (42) and said third chipboard layer (43),

said second undulating layer (61) having a plurality of upper flat zone means (62) for adhesive securing to said second chipboard layer (42),

said second undulating layer (61) having a plurality of lower flat zone means (68) for adhesive securing to said third chipboard layer (43),

said second undulating layer (61) having a plurality of unbent arm means (63) extending between said upper flat zone means (62) and said lower flat zone means (68).

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**4,748,068**

## SYNTHETIC RESIN UNIT

**Karsten Fahner, Winnenden, and Hans W. Depcik, Duesseldorf, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Fed. Rep. of Germany**

**Filed May 15, 1986, Ser. No. 863,349**

**Claims priority, application Fed. Rep. of Germany, May 25, 1985, 3518975**

**Int. Cl.⁴ B32B** *3/00, 27/36;* **H05K** *1/00;* **C04B** *35/00*

**U.S. Cl. 428—201** **7 Claims**




1. A synthetic resin unit with electric current paths, in particular a printed circuit board, consisting of insulating and conductive materials, comprising a moulded unit of insulating synthetic resin having

recesses and/or perforations in the region of at least some of which is arranged a conductive synthetic resin as a current path and wherein the conductivity of the conductive synthetic resin is greater than 0.01 S/cm.

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**4,748,069**

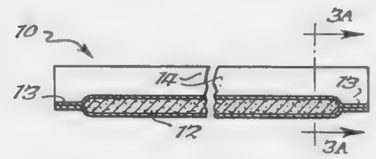
## LIQUID ABSORBING AND IMMOBILIZING PACKET AND PAPER THEREFOR

**John S. Cullen, Buffalo, N.Y., assignor to Multiform Desiccants, Inc., Buffalo, N.Y.**

**Filed Jun. 20, 1986, Ser. No. 877,095**

**Int. Cl.⁴ B05D** *3/02, 1/14;* **B65D** *81/26, 85/14*

**U.S. Cl. 428—195** **22 Claims**




1. A packet for absorbing and immobilizing a liquid comprising an envelope which is degradable in said liquid, and a liquid absorbing and immobilizing material in said envelope, said envelope including a layer of material which is degradable in said liquid, and a patterned coating of sealing material in said layer of material with uncoated portions of said layer of material within said patterned coating which can remain exposed to be contacted directly by and degraded by said liquid, said patterned coating of sealing material including portions which are sufficiently closely spaced to permit said layer of material to be sealed in the form of said envelope.

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**4,748,070**

## FILM/FIBER LAMINATES

**David C. Beehler, Landenburg, Pa., assignor to Hercules Incorporated, Wilmington, Del.**

**Filed Mar. 24, 1986, Ser. No. 842,971**

**Int. Cl.⁴ B37B** *27/14*

**U.S. Cl. 428—198** **4 Claims**

1. A high tear strength film comprised of a base film of biaxially oriented polypropylene having on one of its surfaces a layer of a lower melting polymer and, thermally bonded to said lower melting polymer layer, and coextensive with the biaxially oriented film, a fibrous polypropylene web, said web being bonded to the lower melting polymer layer in about 10 to 50% of the total surface area of the web.

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**4,748,071**

## DECAL FOR DECORATION WITH BRIGHT NOBLE METAL

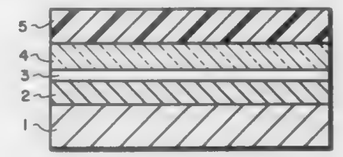
**Wolfgang Wild, and Günter Landgraf, both of Hanau, Fed. Rep. of Germany, assignors to W. C. Heraeus GmbH, Hanau, Fed. Rep. of Germany**

**Filed Apr. 6, 1987, Ser. No. 34,682**

**Claims priority, application Fed. Rep. of Germany, May 16, 1986, 3616547**

**Int. Cl.⁴ C04B** *23/01*

**U.S. Cl. 428—210** **17 Claims**




1. In a ceramic decal for bright noble metal decoration, comprising a backing sheet, a design layer comprising a bright noble metal, and a cover-coat on an acrylate resin basis, the improvement wherein said design layer comprises a composition comprising a bright noble metal and a thermoplastic resin, and between the design layer and cover-coat there is disposed a layer which contains a colorless, transparent, lead borosilicate glaze frit.

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**4,748,072**

## RIGID SHAPED BODY COMPRISING A PLURALITY OF SUPERPOSED AND/OR ADJACENTLY LAMINATED AND COMMONLY PRESSED ORIENTED THERMOPLASTIC CARRIERS AND A METHOD FOR PRODUCING THE SAME

**Harald Schobermayr, 9/4 Heipelweg, A8706 Leoben, Austria**

**Filed Jan. 17, 1986, Ser. No. 820,712**

**Claims priority, application Austria, Jan. 25, 1985, 201/85**

**Int. Cl.⁴ B32B** *7/02*

**U.S. Cl. 428—212** **9 Claims**

1. A rigid shaped body obtained by uniting highly biaxially oriented polypropylene carriers having ethylene/propylene copolymer coatings on their contacting surfaces under the influence of heat and pressure, which comprises:

a plurality of zones of high molecular orientation comprising said propylene carriers, alternating with zones without molecular orientation comprising said ethylene/propylene copolymer coatings;

said propylene carriers having a crystallite melting temperature on the order of about 160° to 180° C. and the ethylene/propylene copolymer coatings having a crystallite melting temperature on the order of about 110° to 140° C.; and,

said zones without molecular orientation having a volume of up to 20 percent of the volume of the rigid shaped body,

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with the tensile strength and the modulus of elasticity of the rigid shaped body being less than 10 percent lower than that of a highly biaxially oriented polypropylene carrier and the impact energy of the rigid shaped body being at least 20 times as high as that of an isotropic material of the same thickness.

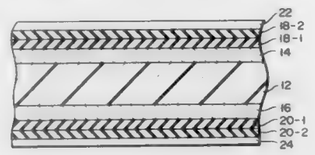
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**4,748,073**

## PERPENDICULAR MAGNETIC RECORDING MEDIUM WITH MULTILAYERED PROTECTIVE LAYER

**Masayuki Sagoi, and Yoichiro Tanaka, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Jun. 26, 1986, Ser. No. 878,795**
**Claims priority, application Japan, Jun. 29, 1985, 60-143702**
**Int. Cl.⁴ G11B** *5/72*
**U.S. Cl. 428—213** **8 Claims**




1. A perpendicular magnetic recording medium comprising:
(a) a substrate;
(b) a recording layer comprising a ferro-magnetic metallic layer which is formed on said substrate end has an axis of easy magnetization in a direction perpendicular to its surface, said recording layer storing in a track definad thereon a data signal magnetically recorded by a magnetic head; and
(c) a multilayered protective layer structure which is provided on said recording layer to protect both said recording layer and the magnetic head from wear, said protective layer structure comprising,
a first non-magnetic protective layer comprising a silicon-nitride-oxide thin-film layer formed directly on said recording layer and having a first hardness, and
a second non-magnetic protective layer comprising a silicon exide thin-film layer stacked on said first protective layer and having a second hardness which is less than that of the magnetic head so as to prevent wear of the magnetic head, said first hardness being greater than said second hardness so as to protect said recording layer from wear, said first and second protective layers having their total thickness ranging from 5 to 40 nanometers, which is small enough to maximize an efficiency in perpendicular magnetic recording of the data signal wherein said second protective layer has a thickness which is in the range of 5 to 70 percent of the total thickness of said first and second protective layers.

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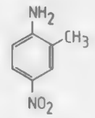
**4,748,074**

## COMPOSITIONS HAVING NON-LINEAR OPTICAL PROPERTIES

**Philippos Pantelis, Ipswich, and Graham J. Davies, Woodbridge, both of England, assignors to British Telecommunications Public Limited Company, London, England**

**Filed Dec. 16, 1985, Ser. No. 808,995**
**Claims priority, application United Kingdom, Dec. 14, 1984, 8431682**
**Int. Cl.⁴ C08K** *5/34;* **C08L** *27/16*
**U.S. Cl. 428—220** **20 Claims**

1. A composition for use in optical devices which consists essentially of:
(A) 10% to 99.9% of a vinylidene fluoride polymer;
(B) 0.1% to 50% of an additive that is an organic compound having non-linear optical properties; and
(C) 0% to 60% of a polymeric auxiliary component material




MNA
2 – methyl – 4 – nitroaniline

for enhancing the compatibility of components (A) and (B);
wherein all percentages are by weight based on the total composition.

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**4,748,075**

## FLAT SEALING MATERIAL MADE OF A SOFT SUBSTANCE, PARTICULARLY FOR THE PRODUCTION OF GASKETS THAT ARE TO BE SUBJECTED TO HIGH STRESSES

**Horst Beyer; Hans-Rainer Zerfass, both of Burscheid; Heribert Bechen, Cologne; Hans Haack, Bad Berneck, and Franz Kutnar, Bayreuth, all of Fed. Rep. of Germany, assignors to Goetze AG, Burscheid and Frenzelit Asbestwerke GmbH & Co. KG, Bad Berneck, both of, Fed. Rep. of Germany**

**Filed Aug. 30, 1983, Ser. No. 527,948**
**Claims priority, application Fed. Rep. of Germany, Aug. 30, 1982, 3232255**
**Int. Cl.⁴ B65D** *53/00*
**U.S. Cl. 428—221** **14 Claims**

1. In an internal combustion cylinder head gasket the improvement comprising an asbestos-free soft gasket material having the characteristics of strength, heat resistance, and elasticity required for use as an internal combustion engine cylinder head gasket and containing fibers and an organic binder, comprising a fiber sheet consisting essentially of at least three different intermixed types of fibers, namely
(a) natural organic fibers,
(b) synthetic organic fibers, and
(c) at least one type of fiber selected from mineral fibers and metal fibers, and
containing at least one inorganic filler selected from the group of powders consisting of kaolin, porcelain earth, heavy spar, talcum, gypsum, chalk, titanium dioxide, silicon dioxide, calcium silicate, powdered metal, ground slag, diatomaceous earth and ground mineral fibers, the ground mineral fibers being at least one ground fiber of rock wool, glass wool, slag wool or aluminum silicate or fine fibers having lengths of less than 0.4 mm and
containing at least one organic binder.

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**4,748,076**

## WATER ABSORBENT FIBROUS PRODUCT AND A METHOD OF PRODUCING THE SAME

**Kazuo Saotome, Tokyo, Japan, assignor to Hayashikane Shipbuilding & Engineering Co., Ltd., Japan**

**Filed Feb. 13, 1986, Ser. No. 829,668**
**Claims priority, application Japan, Feb. 16, 1985, 60-27570; Jun. 22, 1985, 60-136654; Dec. 4, 1985, 60-273896**
**Int. Cl.⁴ A61F** *13/18;* **A61L** *15/00, 15/01;* **D06M** *15/263*
**U.S. Cl. 428—224** **18 Claims**

1. A water absorbent fibrous product produced by a method comprising the steps of:
(1) providing an aqueous solsution comprised of water, a monomeric component comprising a water-soluble cross-linkable polyfunctional monomer, acrylic acid, 60 to 90%



of th e carboxyl groups of said acrylic acid being in the form of an alkali metal salt, and a radical initiator;
(2) diffusing the aqueous solution in a fibrous cellulosic material in such proportions that the amount ratio of said monomeric component to said cellulosic material is in the range of from 5/95 to 50/50 to obtain an aqueous mixture;
(3) heating the aqueous mixture at a temperature of 60° C. or more to effect radical polymerization of said monomeric component to form a crosslinked acrylic polymer, thereby obtaining a polymerization product containing the fibrous cellulosic material impregnated with said polymer, followed by bringing to pieces; and
(4) blending the polymerization product with a fibrous material.

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**4,748,077**

## NOVEL MONOFILAMENTS, FABRICS THEREOF AND RELATED PROCESS

**David B. Skinner, Irmo, and Larry Ballard, Columbia, both of S.C., assignors to Shakespeare Company, Columbia, S.C.**

**Filed May 19, 1987, Ser. No. 51,868**
**Int. Cl.⁴ B05D** *3/08;* **C08L** *81/00;* **D02G** *3/00*
**U.S. Cl. 428—224** **10 Claims**

1. A monofilament formed by a blend of two resins comprising:
from about 50 to 99 parts by weight of a linear polyphenylene sulfide; and
from about 1 to 50 parts by weight of a melt extrudable polymer selected from the group consisting of non-halogenated olefin polymers.

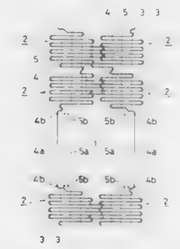
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**4,748,078**

## WARP KNITTED LACE FABRICS

**Ichiro Doi, Nishinomiya, and Katsuhiko Ichii, Takarazuka, both of Japan, assignors to Sakae Lace Co., Ltd., Takarazuka, Japan**

**Filed Dec. 5, 1986, Ser. No. 938,291**
**Claims priority, application Japan, Dec. 5, 1985, 60-274805; Apr. 2, 1986, 61-077172; Jul. 2, 1986, 61-157052**
**Int. Cl.⁴ D03D** *15/00;* **D04B** *1/08*
**U.S. Cl. 428—245** **9 Claims**




1. A warp knitted lace fabric comprising a plurality of chain stitches and a ground insertion yarn, pattern yarn and/or other yarn interconnecting said stitches, each of said plurality of stitches being made by at least one heat bonding yarn throughout the fabric, said heat bonding yarn being composed of a core of a lace knitting yarn made of a synthetic fiber fully surrounded by a thermoplastic synthetic resin covering layer having a melting point lower than the melting point of said core yarn, said heat bonding yarn being thermally joined to itself and to other component yarns at intersections.

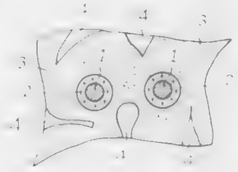
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**4,748,079**

## COMPOSITE MATERIALS CONSTITUTED BY A MATRIX IN RESIN COKE CARBON, REINFORCED WITH PYROLYTIC CARBON-COATED REFRACTORY FIBERS

**Jacques Thebault, Bordeaux, France, assignor to Societe Europeenne de Propulsion, Puteaux, France**

**Continuation of Ser. No. 599,259, Apr. 11, 1984, abandoned. This application Oct. 16, 1985, Ser. No. 788,105**
**Claims priority, application France, Apr. 19, 1983, 83 06369**
**Int. Cl.⁴ B32B** *9/00;* **D04H** *1/58*
**U.S. Cl. 428—288** **4 Claims**



1. A composite material comprising a coke matrix and a plurality of refractory reinforcement fibers disposed therein, each fiber being individually coated with a pyrolytic carbon layer by a chemical vapor deposition process, said matrix making a bond with and being disposed around each individual coated fiber, said coating layer having such properties as to reduce the bonding forces between the coated fibers and the matrix.

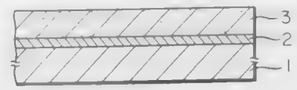
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**4,748,080**

## MAGNETIC RECORDING MEDIUM CONTAINING IRON CARBIDE

**Kenji Itozawa, Hino, Japan, assignor to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan**

**Filed Oct. 1, 1986, Ser. No. 913,954**
**Claims priority, application Japan, Oct. 8, 1985, 60-225647; Mar. 17, 1986, 61-61197; Mar. 17, 1986, 61-61198; Mar. 17, 1986, 61-61199**
**Int. Cl.⁴ G11B** *5/714*
**U.S. Cl. 428—328** **4 Claims**




1. A magnetic recording medium comprising a support having a magnetic layer thereon,
said layer containing a binder and particles of a magnetic iron oxide and further containing iron carbide particles from 1.5 to 15% in volume to said layer,
said iron carbide particles comprising an iron carbide represented by the formula $Fe_nC$ wherein n is not less than 2 and,
wherein a surface area in BET value, saturation magnetization, and average particle size measured along a long axis of said iron carbide particles are not less than 35 $m^2/g$, from 75 to 125 emu/g, and from 0.005 to 0.3 $\mu m$, respectively.

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**4,748,081**

## MAGNETIC RECORDING MEDIUM HAVING AN IMPROVED MAGNETIC LAYER USING PARTICULATE ALPHA-$Fe_2O_3$ AND CARBON BLACK

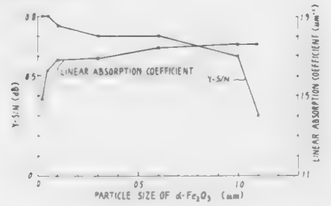
**Osamu Kobayashi; Yukio Matsumoto; Hitoshi Takita; Mutsumu Kurihara, and Tsunehide Naruse, all of Mito, Japan, assignors to Victor Company of Japan, Ltd., Japan**

**Filed Feb. 21, 1986, Ser. No. 831,796**

**Claims priority, application Japan, Feb. 23, 1985, 60-33662; Feb. 23, 1985, 60-33663**

**Int. Cl.⁴ G11B** *5/702*

**U.S. Cl. 428—329** **7 Claims**




1. A magnetic recording medium comprising a non-magnetic substrate and a magnetic recording layer formed on at least one side of said substrate, said magnetic recording layer being made of a composition which comprises a vinyl chloride-vinyl alcohol copolymer binder uniformly dispersing therein a magnetic powder, from 10 to 15 wt% of particulate alpha-$Fe_2O_3$ having an average size of from 0.05 to 1 micrometer and from 2 to 12 wt% of carbon black, each based on the magnetic powder.

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**4,748,082**

## ZEOLITE CASTINGS

**Jürgen Dörr, Kriftel; Peter Kleinschmit, Hanau; Reinhard Klingel, Alzenau, and Reinhard Manner, Maintal, all of Fed. Rep. of Germany, assignors to Degussa AG, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Jan. 6, 1987, Ser. No. 741**

**Int. Cl.⁴ F28F** *1/00;* **B01J** *29/04;* **B32B** *5/16, 13/00*

**U.S. Cl. 428—331** **6 Claims**

1. A zeolite molded article comprising (1) per 100 parts by weight of zeolite, (2) 7–29.5 parts by weight of at least one silicate selected from the group consisting of sodium silicate, potassium silicate, calcium silicate and magnesium silicate and (3) 0.2 to 28 parts by weight of at least one fibrous filler of the group consisting of mineral fibers and carbon fibers.

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**4,748,083**

## MOISTURE CURABLE COMPOSITION

**Jürg Widmer, Zürich; Gerhard Leu, Neuhausen a. Rheinfall, and Ueli Sulser, Oberengstringen, all of Switzerland, assignors to Sika AG, Vorm. Kaspar Winkler & Co., Zurich, Switzerland**

**Filed Jan. 15, 1987, Ser. No. 3,617**

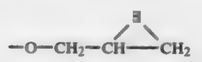
**Claims priority, application Switzerland, Jan. 29, 1986, 341/86**

**Int. Cl.⁴ C08G** *75/08, 75/00*

**U.S. Cl. 428—419** **17 Claims**

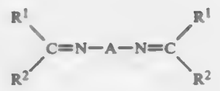
1. A moisture hardenable composition containing

(a) one or more episulfide compounds having on the average more than one 1,2-epithiopropyl ether group of the formula I


(I)

per molecule, and

(b) one or more aliphatic N,N'-dialkyl-substituted diketimines of the general formula II


(II)

wherein

A is a divalent aliphatic, cycloaliphatic or arylaliphatic group, and

$R^1$ and $R^2$ are each an alkyl group, or form together with the C-atom, to which they are bonded, a cycloalkyl group or cycloalkenyl group, and

(c) at least one component, selected from the group of the setting accelerators as well as commercially available solvents, reactive diluents, plasticizers, thixotropic aids, fillers and pigments.

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**4,748,084**

## MAGNETIC RECORDING MEDIUM

**Kotaro Hata, and Eitaro Nakamura, both of Kawasaki, Japan, assignors to Nippon Zeon Co., Ltd., Tokyo, Japan**

**Filed Oct. 31, 1986, Ser. No. 925,292**

**Claims priority, application Japan, Nov. 11, 1985, 60-252286; Nov. 11, 1985, 60-252287; Nov. 11, 1985, 60-252288**

**Int. Cl.⁴ G11B** *5/702*

**U.S. Cl. 428—425.9** **9 Claims**

1. A magnetic recording medium comprising a substrate and a magnetic layer formed thereon, said magnetic layer comprising a magnetic powder, a vinyl chloride resin selected from the group consisting of a homopolymer of vinyl chloride and a copolymer composed of 50 to 90% by weight of vinyl chloride and 50 to 5% by weight of another monomer, said vinyl chloride resin having an average degree of polymerization of from 100 to 1,000, from 5 to 70% by weight, based on the total weight of the vinyl chloride resin and the below-defined epoxy group-containing resin, of a resin containing an epoxy group which is selected from the group consisting of epoxy-modified polyurethane resins, epoxy-modified polyester resins and epoxy- modified acrylonitrile/butadiene copolymer resin, and from 0.1 to 20 parts by weight, per 100 parts by weight of the magnetic powder, of at least one additive selected from the group consisting of (1) a phosphoric acid ester, (2) a carboxylic acid compound having a pKa of not more than 4, (3) a monosulfate compound and (4) a sulfonic acid compound; the total amount of said vinyl chloride resin and said epoxy group-containing resin being 5 to 50 parts by weight, per 100 parts by weight of said magnetic powder.

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**4,748,085**

## MULTILAYER CERAMIC CIRCUIT BOARD FIRED AT A LOW TEMPERATURE

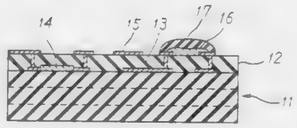
**Junzo Fukuda, Nagoya; Masashi Fukaya, Kuwana; Hiroshi Kawabe, and Susumu Nishigaki, both of Nagoya, all of Japan, assignors to Narumi China Corporation, Nagoya, Japan**

**Filed Nov. 14, 1986, Ser. No. 931,697**

**Claims priority, application Japan, Nov. 16, 1985, 60-255845; Mar. 20, 1986, 61-62796**

**Int. Cl.⁴ B32B** *15/00;* **C03C** *8/24, 8/14*

**U.S. Cl. 428—432** **2 Claims**




1. In a multilayer ceramic circuit board comprising a substrate, an insulating layer on said substrate, and a conductive pattern on said insulating layer, the improvement wherein said insulating layer is produced by firing at a low temperature and comprises:

a first mixture comprising by weight 10%–90% of a first glass component and 90%–10% of a first alumina component, said first glass component comprising by weight 45% –70% of $SiO_2$, 0%–30% of $Al_2O_3$, 0% –30% of $B_2O_3$, and 10%–55% of at least one of CaO and MgO, said first mixture providing a first total amount of alumina determined by said first alumina component and $Al_2O_3$ included in said first glass component;

said substrate comprising a second alumina component and a second glass component of $SiO_2$, $Al_2O_3$, $B_2O_3$, and at least one of CaO and MgO and thereby providing a second total amount of alumina determined by said second alumina component and $Al_2O_3$ included in said second glass component; and

said first total amount of alumina being greater than said second total amount of alumina and the difference between said first and said second total amounts of alumina falling within the range between 0%–30% by weight (0% exclusive), said insulating layer comprising an additive which is selected from a group consisting of $MnO_2$ and $Cr_2O_3$ and which is added by 0.1% –10% by weight relative to said first mixture.



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**4,748,086**

## FORMATION OF COPPER ELECTRODE ON CERAMIC OXIDE

**Tetsuo Akoh, Chiba, Japan, assignor to TDK Corporation, Tokyo, Japan**

**Filed Mar. 17, 1986, Ser. No. 840,204**

**Claims priority, application Japan, Mar. 18, 1985, 60-54014**

**Int. Cl.⁴ C25D** *5/50, 5/54*

**U.S. Cl. 428—433** **11 Claims**

1. A method for forming a copper electrode on a ceramic oxide body, comprising:

(a) forming a first copper film on a ceramic oxide body by electroless plating or vapor phase plating,

(b) forming a second copper film on the first copper film by electrolytic plating, and

(c) heat treating the resulting copper layer on the body at a temperature of 750° to 1065° C. in an inert gas atmosphere having an oxygen concentration of about 2 to 25 ppm.

5. An article of manufacture, comprising a ceramic oxide body and a copper electrode formed thereon, said article being prepared by a method comprising:

(a) forming a first copper film on a ceramic oxide body by electroless plating or vapor phase plating,

(b) forming a second copper film on the first copper film by electrolytic plating, and

(c) heat treating the resulting copper layer on the body at a temperature of 750° to 1065° C. in an inert gas atmosphere having an oxygen concentration of about 2 to 25 ppm.

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**4,748,087**

## PLASTIC LAMINATE OF FURNITURE FOIL AND METHOD OF MAKING

**Robert S. Davidson, Leicester, and Richard J. Ellis, Milton Keynes, both of England, assignors to The Wiggins Teape Group Limited, Hampshire, England**

**Continuation of Ser. No. 946,140, Dec. 24, 1986, abandoned, which is a continuation of Ser. No. 770,193, Aug. 28, 1985, abandoned. This application Sep. 25, 1987, Ser. No. 102,266**

**Claims priority, application United Kingdom, Jun. 8, 1984, 8414705**

**Int. Cl.⁴ B32B** *15/08;* **B05D** *3/06*

**U.S. Cl. 428—463** **12 Claims**

10. A method of making a substrate having on at least one surface thereof a cured polymeric coating, which method comprises providing on the substrate a layer of a curable coating composition including at least one compound of the formula:

$$R^1{}_mMR^2{}_n \quad \text{(I)}$$

where

each $R^1$ is independently an alkyl group, optionally substituted with one or more alkoxy or polyoxyalkylene groups; an alkenyl group; a cycloalkyl group; an aralkyl group; or an aryl group which is optionally substituted with one or more alkyl or alkoxy groups or halogen atoms;

each $R^2$ is independently a group of the formula:

$$—O—X—CO—CH=CHR^3$$

where

X is selected from the group consisting of a direct bond; a group of the formula: $—(CH_2CHR^4O)_p—$, wherein $R^4$ is a hydrogen atom or a $C_1$ to $C_4$ alkyl group, and p is an integer from 1 to 3; a $C_2$ to $C_{16}$ alkylene group; and a group of the formula:

$$—[(CH_2)_rCO_2]_s—(CH_2CHR^4O)_p—,$$

where $R^4$ and p are as defined above, r is an integer from 3 to 8, and s is an integer from 1 to 3;

$R^3$ is a hydrogen atom or a methyl group;

n is an integer from 1 to 4;

m is (4−n); and

M is a tin or silicon atom; and

curing the coating by exposing it to electron beam radiation.

12. A plastics laminate or furniture foil made by the method claimed in claim 10.

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**4,748,088**

## TOOL DIE BLANK AND MANUFACTURING METHOD THEREOF

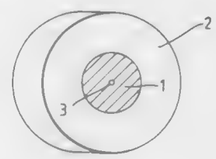
**Per Billgren, Söderfors, Sweden, assignor to Kloster Speedsteel Aktiebolag, Söderfors, Sweden**

**Filed Jun. 19, 1985, Ser. No. 746,261**

**Claims priority, application Sweden, Jun. 19, 1984, 8403261**

**Int. Cl.⁴ B22F** *7/04*

**U.S. Cl. 428—558** **16 Claims**




1. A method for manufacturing blanks for tool dies, having a prestressed core, comprising:

providing a pipe-like member of predetermined outside diameter having a hollow core of predetermined diameter, said pipe-like member formed of a steel having a first predetermined degree of residual austenite transformation into martensite during a tempering after a hardening;

providing a high speed steel powder, said high speed steel having a second predetermined degree of residual austenite transformation into martensite during said tempering after said hardening;

filling said hollow core of said pipe-like member with said high speed steel powder;

sealing said high speed steel powder in said hollow core of said pipe-like member;

subjecting said sealed pipe-like member to hot isostatic compaction causing the powder to become compacted to full density and forming a compact core within said pipe-like member, a compound material thus being created;

subjecting said compound material to said hardening and

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then said tempering, said first predetermined degree of residual austenite transformation into martensite being substantially less than said second predetermined degree of residual austenite transformation into martensite whereby a compression stress is induced in said core due to the larger volume of the martensite phase as compared to the austenite phase.

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**4,748,089**

## MULTILAYERED FERROMAGNETIC AMORPHOUS ALLOY FILM AND MAGNETIC HEAD EMPLOYING THE SAME

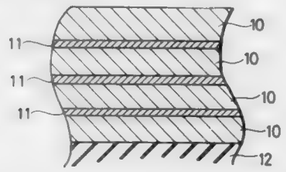
**Noriyuki Kumasaka, Ome; Kazuo Shiiki, Tsukui; Shigekazu Otomo, Sayama; Yoshihiro Shiroishi, Hachioji; Takeo Yamashita, Hachioji; Noritoshi Saito, Hachioji; Kiminari Shinagawa, Chiba, and Mitsuhiro Kudo, Nishitoma, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Dec. 13, 1984, Ser. No. 681,261**

**Claims priority, application Japan, Dec. 16, 1983, 58-236172**

**Int. Cl.[4] G11B** *5/31;* **H01F** *10/08*

**U.S. Cl. 428—635** **17 Claims**




1. A multilayered ferromagnetic amorphous alloy film comprising: a plurality of main ferromagnetic material films of a ferromagnetic amorphous alloy laminated one upon another with a spacer ferromagnetic material layer interposed therebetween, said spacer ferromagnetic material layer being a ferromagnetic material different from said ferromagnetic alloy, wherein the thickness of each of the layers constituted by said main ferromagnetic material films is 0.05 to 2 μm and the thickness of each layer constituted by said spacer ferromagnetic material layer is 10 to 200 Å.

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**4,748,090**

## MAGNETIC RECORDING MEDIA

**Nobuyuki Yamamoto; Katsumi Ryoke; Nobuo Tsuji, all of Kanagawa; Yuzo Higaki, and Toshihisa Okamura, both of Tokyo, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Aug. 2, 1983, Ser. No. 519,646**

**Claims priority, application Japan, Aug. 2, 1982, 57-133804**

**Int. Cl.[4] G11B** *5/70, 5/71*

**U.S. Cl. 428—694** **17 Claims**

1. A magnetic recording medium, comprising a non-magnetic support base having positioned thereon a magnetic layer containing a ferromagnetic powder, wherein the magnetic layer contains an oxystearic acid ester.

2. A magnetic recording medium comprising a non-magnetic support base having positioned thereon a magnetic layer containing a ferromagnetic powder and a non-magnetic layer, wherein the non-magnetic layer contains an oxystearic acid ester.

**4,748,091**

## BIPOLAR PLATING OF METAL CONTACTS ONTO OXIDE INTERCONNECTION FOR SOLID OXIDE ELECTROCHEMICAL CELL

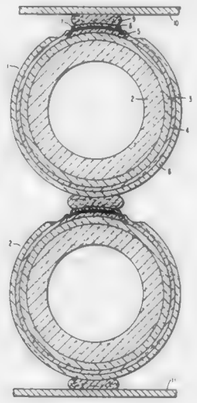
**Arnold O. Isenberg, Forest Hills Boro, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Division of Ser. No. 714,650, Mar. 21, 1985, Pat. No. 4,648,945.**

**This application Dec. 9, 1986, Ser. No. 939,835**

**Int. Cl.[4] H01M** *8/12*

**U.S. Cl. 429—31** **14 Claims**



1. A multi-layered solid oxide fuel cell tube comprising:
(1) an inner porous ceramic support tube;
(2) a porous air electrode covering said support tube;
(3) a non-porous ceramic electrolyte covering a portion of said air electrode;
(4) a non-porous electronically conducting ceramic interconnection covering another portion of said air electrode;
(5) a metal deposit on said interconnection; and
(6) a metal fuel electrode covering said electrolyte

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**4,748,092**

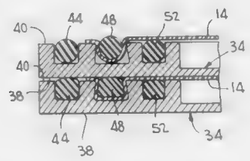
## FRAME FOR A CELL CONSTRUCTION

**Ihab M. Hekal, Stamford, Conn., assignor to Continental Can Company, Inc., Norwalk, Conn.**

**Filed Jan. 2, 1987, Ser. No. 78**

**Int. Cl.[4] H01M** *8/02*

**U.S. Cl. 429—35** **14 Claims**




1. A frame for a cell construction wherein a membrane is clamped between adjacent frames and a seal is effected between the membrane and two adjacent frames, said frame having at least one peripheral face for receiving in contacting relation an outer peripheral portion of a membrane, said peripheral face having peripheral anchoring means for anchoring a membrane relative to said peripheral face, and pheripheral sealing means carried by said peripheral face within the periphery of said peripheral anchoring means.



**4,748,093**

## ELECTROCHEMICAL CELL COMPRISING ELECTRO-OSMOSIS-PROMOTER

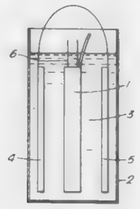
**Andrew D. Turner, Abingdon, England, assignor to United Kingdom Atomic Energy Authority, London, England**

**Filed Dec. 31, 1986, Ser. No. 947,907**

**Claims priority, application United Kingdom, Jan. 15, 1986, 8600994**

**Int. Cl.[4] H01M** *2/38*

**U.S. Cl. 429—81** **12 Claims**




1. An electrochemical cell comprising a positive electrode, a negative electrode, and an aqeuous cell electrolyte, at least one of the electrodes being porous and including a promoter in the form of a solid material other than graphite having, under operating conditions of the cell, a zeta potential of such magnitude and polarity as to be capable of inducing electro-osmotic flow of electrolyte through said at least one of the electrodes when a current is flowing through electrolyte containing pores thereof.

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**4,748,094**

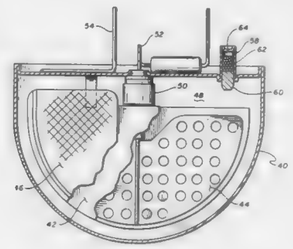
## BATTERY FILL-PORT SEAL ARRANGEMENT FOR HERMETICITY LEAKAGE TESTING

**William G. Howard, St. Paul, and David R. Berberick, Maple Grove, both of Minn., assignors to Medtronic, Inc., Minneapolis, Minn.**

**Division of Ser. No. 537,256, Sep. 28, 1983, abandoned. This application Feb. 24, 1986, Ser. No. 832,063**

**Int. Cl.[4] H01M** *10/48*

**U.S. Cl. 429—90** **3 Claims**




1. A seal arrangement for facilitating the leak testing of a hermetically sealed battery container having an opening in the battery container for receiving the seal arrangement, the seal arrangement comprising a mass of glass bubbles associated with the hermetic seal for functioning as a test gas holding means, and including an outer hermetic seal closing the battery container opening.

**4,748,095**

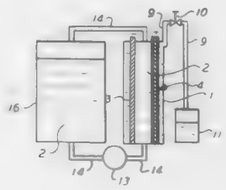
## HALOGEN CELL

**Nagakazu Furuya, No. 4-3-31, Ohte 2-chome, and Satoshi Motoo, No. 5-24, Takeda 3-chome, both of Kofu-shi, Yamanashi, Japan, assignors to Nagakazu Furuya; Satoshi Motoo and Tanaka Kikinzoku Kogyo K.K., all of, Japan**

**Filed Mar. 6, 1987, Ser. No. 22,866**

**Int. Cl.[4] H01M** *4/86*

**U.S. Cl. 429—101** **4 Claims**




1. A halogen cell comprising at least one gas-permeable electrode, wherein the gas permeable electrode comprises a hydrophilic layer and a gas permeable layer attached to each other.

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**4,748,096**

## FIBER STRUCTURE-ELECTRODE FRAMEWORK OF METALLIZED PLASTIC FIBERS WITH WELDED-ON CURRENT-CONDUCTING LUG

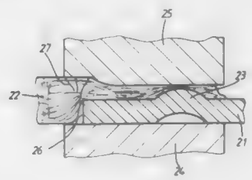
**Otwin Imhof, Nuertingen, Fed. Rep. of Germany, assignor to Deutsche Automobilgesellschaft mbH, Hanover, Fed. Rep. of Germany**

**Filed Sep. 23, 1987, Ser. No. 100,351**

**Claims priority, application Fed. Rep. of Germany, Sep. 24, 1986, 3632352**

**Int. Cl.[4] H01M** *2/26*

**U.S. Cl. 429—211** **2 Claims**




1. A fiber structure-electrode framework of metallized plastic fibers with a reinforced edge and a welded-on current-conducting lug, the current-conducting lug being provided on the side abutting at the fiber framework with an essentially steplessly terminating chamfer that forms an angle of about 10° to about 50° with the lug, the welded connection of the fiber framework being located essentially on the non-chamfered part of the current-conducting lug up to about 5 mm. above the beginning of the chamfer, and the fiber framework being compressed within the area of the welding seam and starting from the welding seam tapering on both sides thereof approximately continuously to the full thickness thereof.

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4,748,097

## METHOD OF PREPARING A HOLOGRAM

John A. Clark, Altrincham; Alan Adshead, New Mills, and David W. Butcher, Goostrey, all of England, assignors to Ciba-Geigy AG, Basel, Switzerland

Filed Jun. 24, 1986, Ser. No. 877,954

Claims priority, application United Kingdom, Jun. 25, 1985, 8516054

Int. Cl.[4] G03H *1/04;* G03C *5/38, 5/42, 5/44*

U.S. Cl. 430—1 6 Claims

1. A method of preparing a hologram which comprises subjecting holographic material to a holographic exposure, the holographic material comprising silver halide emulsion of which at least 80% by weight of the halide is bromide, developing the exposed material in a silver halide developing solution to yield developed silver, converting the developed silver to silver chloride using a bleaching agent selected from ferric ions from ferric salts of acids, persulphate ions, chlorate ions, peroxides and water-soluble quinones, in the presence of chloride ions and then fixing out the silver chloride using a silver halide fixing agent which dissolves silver chloride but not silver bromide or silver iodobromide under the conditions of use.

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4,748,098

## EMULSION FOR POST-TREATING PLANOGRAPHIC PRINTING PLATES PREPARED BY ELECTROPHOTOGRAPHIC MEANS AND PROCESS FOR PRODUCING THE PRINTING PLATES

Loni Schell, Hofheim, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Filed May 21, 1987, Ser. No. 52,416

Claims priority, application Fed. Rep. of Germany, May 21, 1986, 3617077

Int. Cl.[4] G03G *13/28;* B01J *13/00*

U.S. Cl. 430—49 12 Claims

1. An emulsion for post-treating planographic printing plates prepared by electrophotographic means, comprising (A) between about 25% to 60% by weight of an aqueous phase comprised of a phosphonic acid compound and a water-soluble, hydrophilizing polymer and (B) between about 40% and 75% by weight of an organic solvent phase comprised of a hydrocarbon mixture containing at least 20% by weight of aromatic components.

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4,748,099

## PROCESS FOR FORMING PRINTING PLATE USING AN ELECTROPHOTOGRAPHIC MATERIAL FOR OBTAINING TONER IMAGE

Fumio Shimada; Masafumi Uehara, and Masatoshi Matsuzaki, all of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

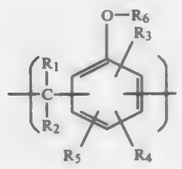
Continuation of Ser. No. 907,630, Sep. 15, 1986, abandoned, which is a continuation of Ser. No. 530,972, Sep. 9, 1983, abandoned, which is a continuation of Ser. No. 424,215, Sep. 27, 1982, abandoned, which is a continuation of Ser. No. 230,503, Feb. 2, 1981, abandoned, which is a continuation of Ser. No. 8,407, Feb. 1, 1979, abandoned. This application Jun. 30, 1987, Ser. No. 68,737

Claims priority, application Japan, Feb. 7, 1978, 53-12686; Apr. 11, 1978, 53-42381

Int. Cl.[4] G03G *13/32*

U.S. Cl. 430—49 15 Claims

1. A process for forming a printing plate, comprising the steps of forming a toner image by liquid development on an original plate for printing which had been exposed imagewise to light, said plate having a support and a photosensitive layer for obtaining an electrostatic latent image coated thereon, and then dissolving the no toner image area of the layer with an alkaline solution to remove the same, wherein said layer comprises as a main component a phenol resin having a photoconductive phthalocyanine pigment dispersed therein, said phenol resin having a repeating unit represented by the formula (1):



(1)

wherein $R_1$ and $R_2$ each represent hydrogen, a lower-alkyl group, an aryl group or a furfuryl group, provided that when one of $R_1$ and $R_2$ represents an aryl group or a furfuryl group, the other represent hydrogen; $R_3$, $R_4$ and $R_5$ each represent hydrogen, or an unsubstituted or substituted, saturated or unsaturated hydrocarbon group having 1 to 3 carbon atoms; $R_6$ represents hydrogen or a glycidyl group.

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4,748,100

## MULTILAYER SILVER HALIDE COLOR PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL CONTAINING A NOVEL COMBINATION OF COUPLERS

Makoto Umemoto, and Kozo Aoki, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

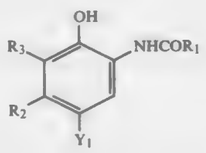
Continuation of Ser. No. 729,841, May 2, 1985, abandoned. This application Sep. 11, 1987, Ser. No. 97,336

Claims priority, application Japan, May 2, 1984, 59-89720

Int. Cl.[4] G03C *1/46, 1/08, 7/26, 7/32*

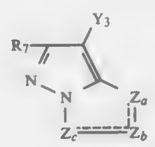
U.S. Cl. 430—505 29 Claims

1. A silver halide color photographic light-sensitive material comprising a support having provided thereon at least one red-sensitive emulsion layer, at least one green-sensitive emulsion layer and at least one blue-sensitive emulsion layer, wherein a coupler represented by the formula (I), a coupler represented by the formula (III), and a coupler represented by the formula (IV) are present in light-sensitive emulsion layers having sensitivities to different colors:



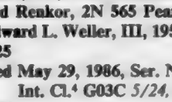
(I)

wherein $R_1$ represents a substituted or unsubstituted aliphatic group, a substituted or unsubstituted aryl group, or a substituted or unsubstituted heterocyclic group; $R_2$ represents an alkyl group having 2 or more carbon atoms or an alkyl group substituted with an aryl group, an alkoxy group, an aryloxy group, an acylamino group, an alkylthio group, an arylthio group, an alkylsulfonyl group, an arylsulfonyl group, or an arylseleno group; $R_3$ represents a hydrogen atom, a halogen atom, or a substituted or unsubstituted alkyl, aryl, alkoxy, or acylamino group; $Y_1$ represents a hydrogen atom or a group releasable upon coupling with an oxidized product of a developing agent; $R_2$, $R_3$ or $Y_1$ may form a dimer or a higher polymer;



(III)

wherein $R_7$ represents a hydrogen atom or an organic residual group bonded by carbon, oxygen, sulfur, nitrogen, phosphorus or silicon; $Y_3$ represents a hydrogen atom or a group releasable upon coupling with an oxidized product of a developing agent; $Z_a$, $Z_b$ and $Z_c$ each represents a methine group, a substituted methine group, =N—, or —NH—; and $R_7$, $Y_3$ or the methine group as represented by $Z_a$, $Z_b$ or $Z_c$ may form a dimer or a higher polymer;



(IV)

wherein $R_8$ represents a substituted or unsubstituted N-phenylcarbamoyl group; $Y_4$ represents a hydrogen atom or a group releasable upon coupling with an oxidized product of a developing agent; and $R_8$ or $Y_4$ may form a dimer or a higher polymer, wherein the coupler represented by the formula (I) is present in a red-sensitive emulsion layer, the coupler represented by the formula (III) is present in a green-sensitive emulsion layer, and the coupler represented by the formula (IV) is present in a blue-sensitive emulsion layer.

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4,748,101

## OVERLAY PROOFING FILM

O. Alfred Barton, Florham Park, N.J., assignor to Hoechst Celanese Corporation, Somerville, N.J.

Continuation of Ser. No. 691,313, Jan. 14, 1985, abandoned. This application Nov. 4, 1986, Ser. No. 927,191

Int. Cl.[4] G03C *1/80*

U.S. Cl. 430—160 15 Claims

1. An overlay proofing film comprising a substantially transparent polyester base film which is first coated on one or both sides with a substantially transparent non-light-sensitive composition having a refractive index of less than about 1.6, said non-light-sensitive composition consisting essentially of a copolymer of polymethyl methacrylate and methacrylic acid and a polyfunctional aziridine in admixture with said copolymer, wherein said copolymer comprises at least about 50% by weight, based on the weight of said copolymer, polymethyl methacrylate; said coated polyester base film having a second coating on either side thereof, said second coating comprising, in admixture, in amounts effective to produce a light-sensitive composition capable of functioning in an overlay proofing film: a resinous binder, a colorant and a light-sensitive material; wherein said aziridine is present in sufficient amount to cure said copolymer; and wherein said light sensitive, composition is capable of forming a colored image upon imagewise light exposure and subsequent development with an aqueous developer which removes either the light exposed or the light unexposed areas of the second coating to form the colored image.

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4,748,102

## PHOTOIMAGING PROCESS USING WATER REMOVABLE COATINGS

Edward L. Weller, Jr., 1959 Robincrest La., Glenview, Ill. 60025; Edward Renkor, 2N 565 Pearl Ave., Glen Ellyn, Ill. 60137, and Edward L. Weller, III, 1959 Robincrest La., Glenview, Ill. 60025

Filed May 29, 1986, Ser. No. 867,956

Int. Cl.[4] G03C *5/24, 5/00*

U.S. Cl. 430—258 10 Claims

1. A method of photographically producing a colored image on a backing using a water-basd system, which comprises:

applying a sealant coat containing a nitrocellulose solution onto said backing with a coating rod;

drying said sealer coat;

applying a uniform layer of a water-based varnish with a coating rod onto said backing over the sealer coat, said water-based varish consisting essentially of a color pigment dispersion, sufficient dispersed organic resin in the range of from about 5 to about 20 percent by weight, said resin being capable of forming cross-links in the presence of ultraviolet radiation and selected from the group consisting of casein, polyvinyl alcohol, polyvinyl acetate, acrylic polymers, silicone acrylics and urethanes, and an alkali dichromate salt in the range of about 0.1 to aboout 1.0 percent by weight, said resin being present in said varnish 25 to 75 times greater by weight than said dry dichromate salt;

drying said uniform layer;

pressing said uniform layer against a transparent negative image of the desired image;

exposing said uniform layer to actinic radiation which passes through transparent areas of said negative image to cause cross-linking said organic resin and dichromate salt, rendering these areas insoluble;

developing said image bywashing said uniform layer with water to remove noncross-linked portions thereof; and

drying said developed image on said backing.

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4,748,103

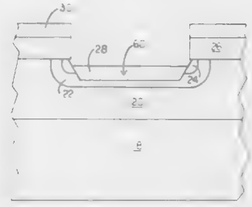
## MASK-SURROGATE SEMICONDUCTOR PROCESS EMPLOYING DOPANT PROTECTIVE REGION

Theodore G. Hollinger, Bend, Oreg., assignor to Advanced Power Technology, Bend, Oreg.

Filed Mar. 21, 1986, Ser. No. 842,771

Int. Cl.[4] G03C *5/00*

U.S. Cl. 430—314 11 Claims



1. A method employing no more than one independent mask of producing a plural-functional-region MOS semiconductor device in a substrate structure including an outer, MOS oxide layer, and wherein at least one doping step is involved, said method comprising

forming over the oxide layer a dopant protective layer,

creating a first and only mask-surrogate pattern-definer having a defined outline characteristic in such protective layer, and

thereafter, employing the unaltered perimetral outline characteristic per se of such only-created pattern-definer for control and self-alignment masking to effect the making of the desired, final functional regions in the device, including a conductive-material deposition step.

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4,748,104

## SELECTIVE METALLIZATION PROCESS AND ADDITIVE METHOD FOR MANUFACTURED PRINTED CIRCUIT BOARDS

Donald R. Ferrier, Thomaston, and Gary B. Larson, Cheshire, both of Conn., assignors to MacDermid, Incorporated, Waterbury, Conn.

Filed Nov. 10, 1986, Ser. No. 929,595

Int. Cl.[4] G03C *5/00*

U.S. Cl. 430—315 18 Claims

1. A process for metallizing a substrate in a pre-selected pattern, comprising the steps of:

(a) applying a resist to the substrate surface in a predetermined pattern such that the exposed substrate areas not covered by the resist define the desired substrate pattern to be metallized;

(b) thereafter treating the resist-patterned substrate with a

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conditioning agent effective to increase adsorption of subsequently-applied catalytic species to exposed substrate areas;

(c) treating the resist-patterned substrate with an adjuvant material effective to decrease the receptivity of resist surfaces to subsequently-applied catalytic species and flash metal deposit;

(d) thereafter treating the resist-patterned substrate with a deactivating agent comprising a solvent for said resist, the conditions of said treatment being such as to decrease the receptivity of resist surfaces to subsequently-applied catalytic species and flash metal deposit without effecting any substantial dissolution of said resist;

(e) thereafter providing on the resist-patterned substrate species catalytic to electroless flash deposition of metal;

(f) thereafter immersing the resist-patterned substrate in an electroless metal depositing bath to provide on the exposed, catalyzed areas of said substrate a thin flash metal deposit;

(g) thereafter stripping the resist from the substrate, leaving a flash metal deposit on the substrate in the preselected desired pattern; and

(h) thereafter providing additional metal on the pattern of flash metal deposit.

2. The process according to claim 1 wherein said application of resist in a predetermined pattern comprises the steps of (i) uniformly coating the substrate surface with a photoresist composition which is developable in aqueous alkaline medium and, after development, strippable in aqueous alkaline medium, (ii) imaging said photoresist composition by exposing it to light through a suitably patterned mask; and (iii) developing said imaged photoresist utilizing aqueous alkaline developing medium so as to remove undesired resist from predetermined areas on said substrate surface and leave behind on said surface a desired predetermined pattern of resist.

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**4,748,105**

**RAPID BLEACH FIXING OF A SILVER HALIDE COLOR PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL USING AN ORGANIC ACID FERRIC COMPLEX**

**Shinzi Kadota, Hino; Shigeharu Koboshi, Sagamihara, and Moeko Higuchi, Houya, all of Japan, assignors to Konisiroku Photo Industry Company, Ltd., Tokyo, Japan**

**Filed Sep. 24, 1986, Ser. No. 911,068**

**Claims priority, application Japan, Sep. 25, 1985, 60-213904; Nov. 13, 1985, 60-256382; Nov. 13, 1985, 60-256383**

**Int. Cl.[4] G03C** *1/02, 1/08, 1/30, 7/16*

**U.S. Cl. 430—393** **12 Claims**

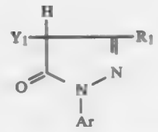
1. A method of processing a silver halide color photographic light sensitive material comprising the steps of:

(a) developing an imagewise exposed silver halide color photographic material comprising a support and photographic component layers including a blue-sensitive silver halide photographic emulsion layer, a green-sensitive silver halide photographic emulsion layer and a red-sensitive silver halide photographic emulsion layer provided on one side of said support, at least one of said silver halide photographic emulsion layers comprising a silver iodobromide containing from 0.5 to 25 mol% of silver iodide, and at least one of said silver halide emulsion layers comprising at least one coupler selected from the group consisting of the couplers represented by the Formula C I, the couplers represented by the Formula C II and polymerized couplers,

(b) maintaining the total dry-thickness of said photographic component layers within the range of 8 to 25 μm and the swelling rate $T\frac{1}{2}$ of said photographic component layers at not more than 25 sec., and

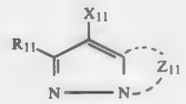
(c) bleach-fixing said developed photographic material with a bleach-fixing solution containing an organic acid ferric complex, wherein Formula C I and Formula C II compounds are as follows:

Formula C I



wherein Ar is a phenyl group which may be substituted, $Y_1$ is a group being capable of releasing upon the coupling reaction with an oxidized product of a color developing agent of an aromatic primary amine and $R_1$ is selected from the group consisting of an anilino, an ureido and an acylamino, the $R_1$ group may be substituted;

Formula C II



wherein $Z_{11}$ is a group of non-metallic atoms necessary to complete a nitrogen-containing heterocyclic ring which may be substituted, $X_{11}$ is a group being capable of releasing upon the coupling reaction with an oxidized product of a color developing agent of an aromatic primary amine and $R_{11}$ is a hydrogen atom or a substituent.

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**4,748,106**

**COLOR PHOTOGRAPHIC LIGHT-SENSITIVE MATERIALS CONTAINING SPECIFIED TABULAR GRAINS**

**Yasuhiro Hayashi, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Jul. 17, 1986, Ser. No. 886,466**

**Claims priority, application Japan, Jul. 18, 1985, 60-158894**

**Int. Cl.[4] G03C** *1/02*

**U.S. Cl. 430—503** **4 Claims**

1. A color photographic light-sensitive material comprising a support having thereon at least one layer each of a red-sensitive emulsion, a green-sensitive emulsion and a blue-sensitive emulsion, wherein at least 50% of the total projected area of silver halide grains in at least one of said emulsion layer is tabular grains of silver bromide or silver iodobromide which have a thickness of less than 0.12 micron and a diameter of less than 0.6 micron said tabular grains of silver bromide or silver iodobromide having a mean aspect ratio of at least 5.

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**4,748,107**

**MULTILAYER SILVER HALIDE COLOR PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL CONTAINING A NOVEL COMBINATION OF COUPLERS**

**Makoto Umemoto, and Kozo Aoki, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Continuation-in-part of Ser. No. 729,841, May 2, 1985. This application Sep. 5, 1986, Ser. No. 904,068**

**Claims priority, application Japan, May 2, 1984, 59-89720**

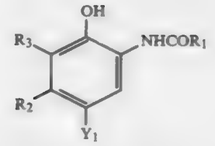
**Int. Cl.[4] G03C** *1/46, 1/08, 7/26, 7/32*

**U.S. Cl. 430—505** **34 Claims**

1. A silver halide color photographic light-sensitive material comprising a support having provided thereon at least one red-sensitive emulsion layer, at least one green-sensitive emulsion layer and at least one blue-sensitive emulsion layer, wherein a coupler represented by the formula (I), a coupler represented by the formula (II), and a coupler represented by the formula (III) are present in light-sensitive layers having sensitivities to different colors:

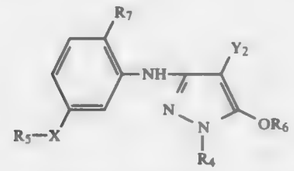


(I)



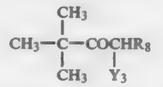
wherein $R_1$ represents a substituted or unsubstituted aliphatic group, a substituted or unsubstituted aryl group, or a substituted or unsubstituted heterocyclic group; $R_2$ represents an alkyl group having 2 or more carbon atoms or an alkyl group substituted with an aryl group, an alkoxy group, an aryloxy group, an acylamino group, an alkylthio group, an arylthio group, an alkylsulfonyl group, an arylsulfonyl group, or an arylseleno group; $R_3$ represents a hydrogen atom, a halogen atom, or a substituted or unsubstituted alkyl, aryl, alkoxy, or acylamino group; $Y_1$ represents a hydrogen atom or a group releasable upon coupling with an oxidized product of a developing agent; $R_2$, $R_3$ or $Y_1$ may form a dimer or a higher polymer;

(II)



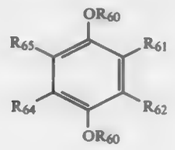
wherein $R_4$ represents a substituted or unsubstituted phenyl group; $R_5$ represents a substituted or unsubstituted aryl group, a substituted or unsubstituted alkyl group or an aryloxyalkyl group having an aryl moiety substituted with an alkyl group, a halogen atom, an alkoxy group, an aryloxy group, an acylamino group, a sulfonamido group, an amino group, an aryl group, an aliphatic or aromatic sulfonyl group, a cyano group, or a nitro group; $R_6$ represents a hydrogen atom, an acyl group or an aliphatic or aromatic sulfonyl group; $R_7$ represents a halogen atom or an alkoxy group; X represents a divalent linking group or atom; $Y_2$ represents a hydrogen atom or a group releasable upon coupling with an oxidized product of a developing agent; and $R_4$, $R_5$, or $Y_2$ may form a dimer or a higher polymer;

(III)



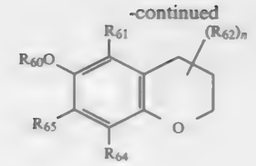
wherein $R_8$ represents a substituted or unsubstituted N-phenylcarbamoyl group; $Y_3$ represents a hydrogen atom or a group releasable upon coupling with an oxidized product of a developing agent; and $R_8$ or $Y_3$ may form a dimer or a higher polymer, and wherein the couplers represented by formula (I), (II) and (III) are used in combination with a discoloration inhibitor selected from compounds represented by the formulae (XIV), (XV), (XVI), (XVII), (XVIII), and (XIX):

(XIV)

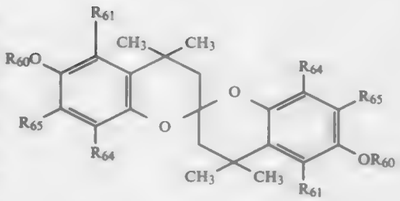


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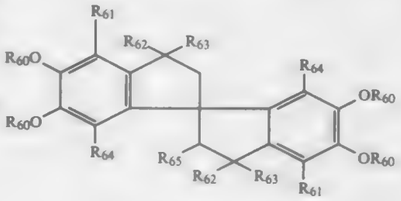
(XV)



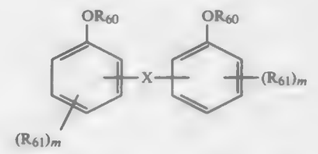
(XVI)



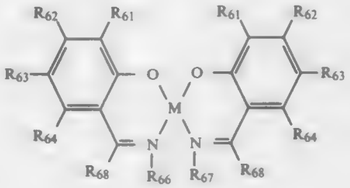
(XVII)



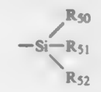
(XVIII)



(XIX)



wherein $R_{60}$ represents a hydrogen atom, an aliphatic group, an aromatic group, a heterocyclic group, or a substituted silyl group represented by the formula:



wherein $R_{50}$, $R_{51}$ and $R_{52}$ each represents a substituted or unsubstituted aliphatic group, a substituted or unsubstituted aromatic group, a substituted or unsubstituted aliphatic oxy group, or a substituted or unsubstituted aromatic oxy group;

$R_{61}$, $R_{62}$, $R_{63}$, $R_{64}$, and $R_{65}$ each represents a hydrogen atom, a substituted or unsubstituted aliphatic group, a substituted or unsubstituted aromatic group, an acylamino group, a mono- or dialkylamino group, an aliphatic or aromatic thio group, an aliphatic or aromatic oxycarbonyl group or —$OR_{60}$; $R_{60}$ and $R_{61}$ together can form a 5- or 6-membered ring; $R_{61}$ and $R_{62}$ together can form a 5- or 6-membered ring; X represents a divalent linking group; $R_{66}$ and $R_{67}$ each represents a hydrogen atom, a substituted or unsubstituted aliphatic group, a substituted or

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unsubstituted aromatic ring or a hydroxyl group; $R_{68}$ represents a hydrogen, a substituted or unsubstituted aliphatic group or a substituted or unsubstituted aromatic ring; $R_{66}$ and $R_{67}$ together can form a 5- or 6-membered ring; M represents Cu, Co, Ni, Pd, or Pt; n represents 0 or an integer of from 1 to 6; m represents 0 or an integer of from 1 to 4; and when m or n is 2 or more, the substituted groups $R_{62}$ or $R_{61}$ may be the same or different; with the proviso that, in the discoloration inhibitor represented by the formula (XIV), when one of $R_{60}$ represents a hydrogen atom and the other $R_{60}$ represents a group other than the hydrogen atom, $R_{61}$ and $R_{64}$ both represent the groups other than a hydrogen atom.

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**4,748,108**

## YELLOW DYE-RELEASING AZO COMPOUNDS FOR USE IN THE PRODUCTION OF DIFFUSION TRANSFER COLOR IMAGES

**Christian C. Van de Sande, Beisele, and Piet Kok, Ghent, both of Belgium, assignors to AGFA-Gevaert, N.V., Mortsel, Belgium**

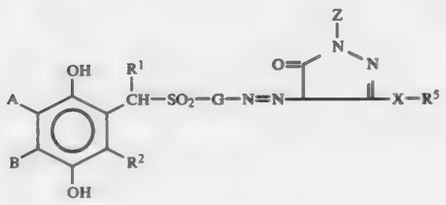
**Filed Jul. 8, 1986, Ser. No. 883,117**

**Claims priority, application European Pat. Off., Jul. 9, 1985, 85201126.1**

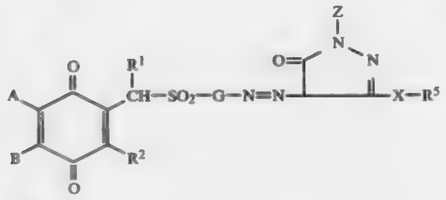
**Int. Cl.[4] G03C** *5/54, 7/26*

**U.S. Cl. 430—562** **6 Claims**

1. Photosensitive element incorporating in operative association with at least one alkali-permeable silver halide hydrophilic colloid emulsion layer at least one hydroquinone-type or quinone-type redox-controlled dye-releasing compound in ballasted non-diffusing state that can split off image-wise a diffusible yellow azo-pyrazolone dye as a function of development of said silver halide emulsion layer and of a redox reaction, wherein said dye-releasing compound corresponds to one of the following general formulae I and II:



(I)



(II)

wherein:

each of A and B represents:

a monoatomic group or a polyatomic group,

or A and B together represent the atoms needed to complete a carbocyclic ring, which may be saturated or unsaturated,

each of $R^1$ and $R^2$ (the same or different) is a member selected from the group consisting of hydrogen, an alkyl group and an aromatic group, at least one of the substituents $R^1$ and $R^2$ representing or including a ballasting group of sufficient size to render said dye-releasing compound non-diffusing in an alkali-permeable hydrophilic colloid layer under wet alkaline conditions,

G represents a bivalent organic group (unsubstituted or substituted) containing at least one homocyclic or heterocyclic aromatic nucleus,

Z represents a member selected from the group consisting of an alkyl group, an aryl group, an aralkyl group, a hetaryl group, and a heterocyclyl group, which may be saturated or unsaturated,

$R^5$ represents a member selected from the group consisting of an alkyl group, an aryl group, hetaryl group, an acyl group, an alkylsulphonyl group, an unsubstituted benzenesulphonyl group, a p-acetamidobenzenesulphonyl group, $R^7R^8NCO$—, $R^7R^8NSO_2$—, $R^7OCO$—, and $R^7OSO_2$—, $R^7$ and $R^8$ being identical or different and each of them being a member selected from the group consisting of hydrogen, an alkyl group, an aryl group, a hetaryl group, or $R^7$ and $R^8$ together constituting the ring members completing a heterocyclic nucleus,

X is a bivalent mono- or polyatomic group, the atom of which that links said group with the pyrazolone nucleus having at least one free electron pair.

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**4,748,109**

## ASSAY METHOD AND REAGENT TO DETERMINE ANTIBODIES TO PAPILLOMAVIRUS VIRIONS

**Phillip J. Baird, 2 Torrens Place, Cherrybrook, New South Wales 2120, Australia**

**Filed Jul. 2, 1984, Ser. No. 626,777**

**Claims priority, application Australia, Jul. 1, 1983, PG0083**

**Int. Cl.[4] G01N** *33/543, 33/544, 33/569, 33/574*

**U.S. Cl. 435—5** **21 Claims**

1. A reagent useful in the detection of anogenital warts, cervical intraepithelial neoplasia and cervical squamous carcinoma, said reagent comprising a solid or particulate support coated with proteins of disrupted Papillomavirus virions, or antigen extract thereof.

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**4,748,110**

## IMMUNOASSAY FOR HTLV-III ANTIGENS

**Deborah A. Paul, Gurnee, Ill., assignor to Abbott Laboratories, North Chicago, Ill.**

**Filed Sep. 25, 1985, Ser. No. 779,892**

**Int. Cl.[4] C12Q** *1/70;* **G01N** *33/53*

**U.S. Cl. 435—5** **6 Claims**

1. An immunoassay for the detection of viral antigens in a biological sample comprising:

(a) coating a solid support with antibody to HTLV-III from a first animal species;

(b) contacting the coated solid support with the biological sample so as to form a conjugate;

(c) contacting the conjugate with antibody to HTLV-III from a second animal species;

(d) contacting the conjugate with a labeled antibody of said specific for the antibody second animal species; and

(e) detecting the label as a measure of the presence of HTLV-III viral antigen in the sample.

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**4,748,111**

## NUCLEIC ACID-PROTEIN CONJUGATE USED IN IMMUNOASSAY

**Nanibhushan Dattagupta, New Haven; William J. Knowles, Hamden; Vincent T. Marchesi, Guilford, and Donald M. Crothers, Northford, all of Conn., assignors to Molecular Diagnostics, Inc., West Haven, Conn.**

**Filed Mar. 12, 1984, Ser. No. 588,858**

**Int. Cl.[4] G01N** *53/00, 33/53, 33/543;* **C12Q** *1/68*

**U.S. Cl. 435—7** **3 Claims**

1. An assay for detecting an antigen comprising:

combining a sample suspected of containing an antigen with an antibody specific to said antigen and a protein selected from the group consisting of Protein A and an antibody, said protein coupled to a 3' terminal end of a nucleic acid wherein the nucleic acid carries one or more label molecules;

allowing complexation of said antigen, if contained in the sample, antibody and protein;



incubating the resultant complex, and

assaying for the label which is indicative of the amount of antigen in the sample.

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**4,748,112**

## METHODS AND COMPOSITIONS RELATING TO REGRESSION-ASSOCIATED ANTIGENS

**George C. Fareed, and Arup Sen, both of Los Angeles, Calif., assignors to International Genetic Engineering, Inc., Santa Monica, Calif.**

**Filed Mar. 7, 1986, Ser. No. 837,494**

**Int. Cl.[4] C07K** *3/00, 15/00;* **G01N** *33/53, 33/574*

**U.S. Cl. 435—7** **11 Claims**

1. A method for detecting the presence of regression-associated antibodies comprising the steps of:

obtaining a first sample of serum from a patient diagnosed as not being in a state of regression and obtaining a second sample from the patient after diagnosis as being in a state of regression;

separately exposing a component of a neoplastic cell to the first and second samples;

detecting the absence of immune complex formation between the component of a neoplastic cell and antibodies in the first serum sample; and

detecting the presence of an immune complex between an antibody in the second sample and the component of a neoplastic cell and thereby detecting a regression-associated antibody in the second sample.

2. A method for monitoring the response of a patient to immunotherapy for symptoms associated with a neoplasm comprising the steps of:

establishing a first level of regression-associated antibodies indicative of a state of regression;

determining a second level of regression-associated antibodies in a patient undergoing immunotherapy; and

comparing the first level with the second level to determine whether the first level is indicative of a state of regression.

5. A purified and isolated antigen selected form the group consisting of human regression associated antigens having a molecular weight as determined by reducing SDS polyacrylamide gel electrophoresis within the range of:

about 19,000 to about 23,000 daltons;

about 41,000 to about 45,000 daltons; and

about 65,000 to about 71,000;

said regression-associated antigens being characterized by formation of an immune complex with an antibody present in a serum sample from a pateitn after the patient is diagnosed as being in a state of regression and being further characterized by the absence of an immune complex with an anitbody present in a serum sample from a patient before diagnosis as being in a state of regression.

7. A method for monitoring the metastasis of a tumor in a patient comprising the steps of:

determining the level of a regression-associated antigen in a sample of a bodily fluid;

comparing the level of the regression-associated antigen in the sample with a criterion for metastasis and thereby monitoring metatasis of a tumor in the patient.

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**4,748,113**

## COMPOSITIONS AND METHODS FOR THE DIAGNOSIS OF GASTROINTESTINAL DISORDERS INVOLVING UREASE

**Barry J. Marshall, 25 Bondi Street, Mount Hawthorn, 6016 Perth, Australia**

**Filed Jun. 13, 1985, Ser. No. 744,840**

**Int. Cl.[4] C12Q** *1/58*

**U.S. Cl. 435—12** **10 Claims**

1. A composition for the diagnosis of gastrointestinal disorders in a human or lower animal subject by detection of urease in gastric material of the subject, comprising:

(a) urea, at a concentration of from about 10 to about 40 grams per liter;

(b) a bactericide which substantially inhibits the growth of urease-producing organisms, at a concentration of from about 1 to about 5 grams per liter;

(c) an indicator having a $pK_a$ of from about 6.5 to about 8.5, at an effective concentration; and

(d) water;

wherein said composition has a pH of from about 5.0 to about 6.5, and the pH of said composition is at least about one pH unit lower than the $pK_a$ of said indicator.

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**4,748,114**

## TEST STRIP FOR COLLECTING OF BLOOD SUGAR DAILY PROFILES AND PROCESS FOR ITS PREPARATION

**Karl-Heinz Kallies, Sebnitz; Dieter Plaschnick, Wolfen; Peter Mohr, Hohen-Neuendorf; Hans-Jürgen Thiele, Dresden; Conrad J. Pahlitzsch, Seibnitz; Lothar Kretschmer, Langburkersdorf, and Gert Kallies, Seibnitz, all of German Democratic Rep., assignors to VEB Arzneimittelwrk Dresden, Radebeul, German Democratic Rep.**

**Filed Feb. 19, 1985, Ser. No. 703,234**

**Claims priority, application German Democratic Rep., Apr. 9, 1984, 261762**

**Int. Cl.[4] C12Q** *1/54, 1/26;* **C12N** *11/02, 9/96*

**U.S. Cl. 435—14** **23 Claims**

1. A test strip for receiving blood sugar daily profiles, comprising a carrier, a film forming membrane, and an enzyme indicator reaction layer disposed on said membrane, said reaction layer containing glucose oxidase, peroxidase, and o-tolidine, said reaction layer being treated with from about 0.01 to about 0.1 mole of a chelating agent and with from about 0.01 to about 1 mole of choline, amino-trihydroxymethylmethane, collidine, quinoline or quinoazine.

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**4,748,115**

## SUBSTRATE FORMULATION IN 2-AMINO-2-METHYL-1-PROPANOL BUFFER FOR ALKALINE PHOSPHATASE ASSAYS

**Jeffrey W. Steaffens, Gurnee, Ill., assignor to Abbott Laboratories, North Chicago, Ill.**

**Filed Jan. 8, 1986, Ser. No. 817,090**

**Int. Cl.[4] C12Q** *1/42;* **G01N** *33/535*

**U.S. Cl. 435—21** **10 Claims**

1. A substrate formulation for an alkaline phosphatase assay comprising:

a phosphated indigo cogener;

a tetrazolium salt at a concentration effective to produce a detectable signal upon reaction with said phosphated indigo cogener; and

2-amino-2-methyl-1-propanol at a concentration effective to buffer a reaction between said phosphated indigo cogener and said tetrazolium salt in aqueous solution within a range of pH which allows the reaction to proceed.

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**4,748,116**

## PEPTIDE SUBSTRATES FOR DETERMINATION OF PROTEASE ACTIVITY

**Leif R. Simonsson, Hisings Backa; Salo Arielly, Kungsbacka; Leif E. Aurell, Särö , and Karl G. Claeson, Lindingö, all of Sweden, assignors to KabiVitrum AB, Stockholm, Sweden**

**Continuation of Ser. No. 294,127, Aug. 19, 1981, abandoned. This application May 21, 1987, Ser. No. 53,569**

**Claims priority, application Sweden, Aug. 25, 1980, 8005940**

**Int. Cl.[4] C12Q** *1/38;* **C07K** *5/06, 5/08, 5/10*

**U.S. Cl. 435—23** **29 Claims**

1. Peptide derivatives being acyl derivatives of luminol(5-amino-2,3-dihydro-1,4-phthalazinedione) or isoluminol (6-amino-2,3-dihydro-1,4-phthalazinedione) wherein the acyl residue is an amino acid, or amino acid sequence, with 2 to 4

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amino acid residues, coupled with an amide bond, and wherein the α-amino group is either free or acylated.

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**4,748,117**

## METHOD FOR FORMING AMPHOTERICIN B CRYSTALS IN FERMENTATION BROTH

**Raphael Y. Ko, Princeton, and Laszlo J. Szarka, East Brunswick, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.**

**Continuation-in-part of Ser. No. 528,384, Sep. 1, 1983, abandoned. This application Apr. 16, 1986, Ser. No. 852,591**

**Int. Cl.⁴ C12P *19/62;* C12R *1/465***

**U.S. Cl. 435—76** **13 Claims**

1. A method for producing crystals of amphotericin B directly in a fermentation medium, which consists essentially of cultivating a strain of *Streptomyces nodosus* in a fermentation medium which is free of organic solvent for amphotericin B until substantial antifungal activity is imparted to said medium, heating the medium to a temperature of from about 70° to about 130° C. for at least 10 minutes to form crystals of amphotericin B, and recovering substantial amounts of said crystals of amphotericin B from said medium.

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**4,748,118**

## CONSTRUCTION OF ARSENIC RESISTANCE VECTORS FOR *THIOBACILLUS FERROOXIDANS*

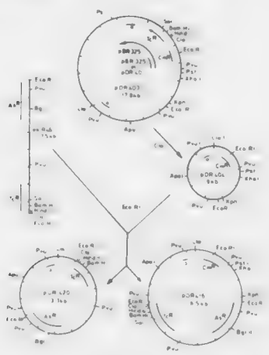
**Douglas E. Rawlings, and David R. Woods, both of Rondebosch, South Africa, assignors to General Mining Union Corporation Limited, Johannesburg, South Africa**

**Filed Nov. 1, 1984, Ser. No. 667,259**

**The portion of the term of this patent subsequent to Dec. 8, 2004, has been disclaimed.**

**Int. Cl.⁴ C12N *15/00, 1/20, 7/00***

**U.S. Cl. 435—172.3** **14 Claims**



1. A method of constructing arsenic resistance vectors for *Thiobacillus ferrooxidans* which includes the steps of;

(a) cleaving a cryptic DNA plasmid from a *T. ferrooxidans* strain with a first restriction enzyme, cleaving a second plasmid containing an *E. coli* origin of replication with the same first restriction enzyme and ligating the plasmids to form a recombinant plasmid,

(b) transforming *E. coli* cells with said recombinant plasmid and selecting for transformants,

(c) removing the *E. coli* origin of replication from said recombinant plasmid to form a deleted recombinant plasmid,

(d) removing at least one arsenic resistance gene from a third plasmid by cleaving said third plasmid with a second restriction enzyme, cleaving the deleted recombinant plasmid with the same second restriction enzyme and ligating said arsenic resistance gene to said deleted recombinant plasmid plasmid to generate an arsenic resistance recombinant plasmid;

(e) transforming *T. ferrooxidans* cells with the arsenic resistance recombinant plasmid and selecting for transformants, and,

(f) isolating said arsenic resistance recombinant plasmid.

2. A method of constructing arsenic resistance vectors for *Thiobacillus ferrooxidans* including the steps of cleaving with the same restriction enzyme a cryptic, wild type DNA plasmid from a *T. ferrooxidans* strain and a second plasmid containing an *E. coli* origin of replication and antibiotic-resistance genes; ligating the plasmids to form a recombinant plasmid; removing from said recombinant plasmid the *E. coli* origin of replication and one of the antibiotic resistance genes by deletion; cleaving with restriction enzyme the resultant deleted plasmid and a third plasmid containing an arsenic resistance gene, and ligating said arsenic-resistance gene from the third plasmid to the deleted plasmid or to a portion thereof containing the *T. ferrooxidans* origin of replication.

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**4,748,119**

## PROCESS FOR ALTERING AND REGULATING GENE EXPRESSION

**Alexander Rich, 2 Walnut Ave., Cambridge, Mass. 02140, and Alfred E. Nordheim, 70 Revere St., Boston, Mass. 02114**

**Continuation of Ser. No. 533,778, Sep. 19, 1983, abandoned. This application Jan. 15, 1987, Ser. No. 5,399**

**Int. Cl.⁴ C12N *15/00;* C12P *19/34;* C07H *15/12***

**U.S. Cl. 435—172.3** **13 Claims**

1. A process for enhancing the potential for Z-DNA formation in a nucleotide sequence which comprises altering said nucleotide sequence to have alternations of purine and pyrimidine residues.

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**4,748,120**

## PHOTOCHEMICAL DECONTAMINATION TREATMENT OF WHOLE BLOOD OR BLOOD COMPONENTS

**Gary P. Wiesehahn, Alameda, Calif., assignor to Diamond Scientific Co., Des Moines, Iowa**

**Continuation of Ser. No. 490,681, May 2, 1983, abandoned. This application Oct. 20, 1986, Ser. No. 928,841**

**The portion of the term of this patent subsequent to Feb. 23, 2005, has been disclaimed.**

**Int. Cl.⁴ C12N *13/00;* A61K *39/00, 35/14, 35/48***

**U.S. Cl. 435—173** **32 Claims**

1. A method for decontaminating blood components suspected of containing viruses, said blood components being selected from the group consisting of red blood cells, platelets, blood clotting factors, plasma and immunoglobulins, without substantial impairment of the physiological activities of the treated blood components, said method comprising:

(a) adding to a blood component selected from the group consisting of red blood cells, platelets, blood clotting factors, plasma and immunoglobulins at least one psoralen compound in an amount sufficient to inactivate substantially all contaminating viruses prevent; and thereafter

(b) irradiating said psoralen treated blood component with long wavelength ultraviolet light under operating conditions which maintain the concentrations of reactive oxygen species at levels which do not substantially impair the physiological activity of the treated blood component, and wherein said irradiation is conducted for a time sufficient to inactivate substantially all contaminating viruses present.



**4,748,121**

## POROUS GLASS FIBERS WITH IMMOBILIZED BIOCHEMICALLY ACTIVE MATERIAL

**Richard P. Beaver, Library; Ronald E. Betts, Turtle Creek; Lin-Chang Chiang, Export, and George V. Sanzero, New Kensington, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.**

**Filed Nov. 30, 1984, Ser. No. 677,108**

**Int. Cl.⁴ C12N *11/00, 11/14;* G01N *33/552;* C07K *17/14***

**U.S. Cl. 435—176** **9 Claims**

1. Method of producing glass fibers with a discrete length having nonliving immobilized biochemically active material, comprising:

a. forming sized glass fibers having a filament diameter from about 3 to about 150 microns and having a composition comprising greater than 35 up to about 60 weight percent $B_2O_3$, about 1 to about 10 weight percent alkali metal oxides, about 30 to about 65 weight percent $SiO_2$, up to about 5 weight percent $ZrO_2$, and up to about 4 weight percent $Al_2O_3$,

b. gathering the sized fibers into one or more strands,

c. collecting the one or more strands on a winder into a multilayered package,

d. removing the one or more glass fiber strands from the multilayered cylindrical package,

e. heat treating the glass fibers at a temperature in the range of about 400° to about 600° C. for a period of time of about 10 minutes to about 64 hours to phase separate glass into a boron-rich phase and a silica-rich phase,

f. water leaching the glass fibers at an elevated temperature,

g. acid leaching the glass fibers at elevated temperatures with dilute inorganic or organic acid solutions to produce porous silica-rich fibers having a pore volume of about 0.5 to 1.5 cc/gm,

h. contacting the porous fibers with one or more nonliving biochemically active materials to immobilize the material in the internal surface area and on the external surface area of the glass fibers,

i. maintaining the activity of the nonliving biochemically active material on and in the glass fibers.

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**4,748,122**

## 2,5-DIKETO-D-GLUCONIC ACID REDUCTASE

**Takayasu Sonoyama; Bunji Kageyama; Kobee Kobayashi, all of Osaka, and Masahiro Tanimoto, Hyogo, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan**

**Filed Oct. 29, 1984, Ser. No. 665,965**

**Claims priority, application Japan, Nov. 17, 1983, 58-217176**

**Int. Cl.⁴ C12N *9/02;* C12P *19/02, 7/60;* C12R *1/15***

**U.S. Cl. 435—189** **23 Claims**

1. Substantially pure 2,5-Diketo-D-gluconic acid reductase having the following physio-chemical properties:

(a) enzyme action: catalyzes, in the presence of NADPH as a coenzyme,

(i) reduction of 2,5-diketo-D-gluconic acid or its salts to 2-keto-L-gulonic acid or the corresponding salts thereof, and

(ii) reduction of 5-keto-D-fructose to L-sorbose;

(b) substrate specificity to: 2,5-diketo-D-gluconic acid and 5-keto-D-fructose;

(c) optimum pH: pH 6–7;

(d) pH stability: pH 5–7;

(e) molecular weight: 29,000±2,000; and

(f) isoelectric point: pH 4.4±0.3.

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**4,748,123**

## CONTINUOUS FERMENTATION DEVICE

**John R. Birch, High Wycombe, and Robert C. Boraston, Reading, both of England, assignors to Celltech Limited, Slough, England**

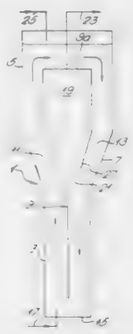
**PCT No. PCT/GB86/00360, § 371 Date Feb. 19, 1987, § 102(e) Date Feb. 19, 1987, PCT Pub. No. WO86/07604, PCT Pub. Date Dec. 31, 1986**

**PCT Filed Jun. 20, 1986, Ser. No. 26,906**

**Claims priority, application United Kingdom, Jun. 20, 1985, 8515636**

**Int. Cl.⁴ C12N *1/02***

**U.S. Cl. 435—261** **10 Claims**



1. A continuous fermentation device for receiving a suspension culture of cells, the device comprising:

a fermentation vessel having inlet means to deliver suspension culture medium;

baffle means defining, in combination with interior walls of said vessel, a downcomer and a riser;

pump means for forcing a suspension culture to circulate in the riser and downcomer;

a portion of said baffle means further defining a static settling zone disposed within said vessel, wherein said zone is surrounded by at least one of said riser and said downcomer, said zone having a bottom opening communicating with at least one of said riser and downcomer, and a top opening connected to outlet means to draw off culture supernatant, and wherein said zone provides for cells to settle out in its bottom so as to result in a cell concentration lower in the supernatant than in the suspension.

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**4,748,124**

## COMPARTMENTALIZED CELL-CULTURE DEVICE AND METHOD

**Erwin A. Vogler, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Oct. 30, 1984, Ser. No. 666,617**

**Int. Cl.⁴ C12N *5/00;* C12M *3/00***

**U.S. Cl. 435—240.241** **9 Claims**

1. A method of culturing cells comprising the steps:

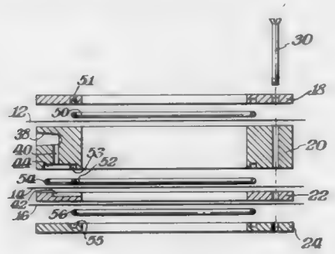
placing the cells in a first compartment with a culture medium, said first compartment composed of an upper dialysis membrane and a lower gas-permeable, liquid-impermeable sheet;

injecting a culture medium in a second compartment above said dialysis membrane;

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permitting waste products from said cells to flow upwardly through said dialysis membrane; and




exchanging incubator gases through said gas-permeable sheet whereby said cells grow continuously without clogging said dialysis membrane.

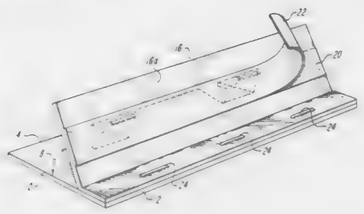
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**4,748,125**

## DISPOSABLE ADHESIVE TEST TUBE RACK

**John M. Pizzolante, 4 Todd Rd., Woburn, Mass. 01801**

**Filed Sep. 25, 1986, Ser. No. 911,373**
**Int. Cl.[4] C12M *1/00***
**U.S. Cl. 435—287** **5 Claims**




1. A collapsible test tube rack having open and closed conditions, said rack comprising:

a base having a front edge, a rear edge, and at least one orientable tab;

a test tube-supporting member having an outwardly-facing surface, a rear surface, and at least one slot, and having a length greater than its width, said member being pivotably connected along its length to said base along a line set back from the front edge of said base, said at least one slot and said at least one tab being mutually disposed such that in the open condition of said test tube rack said at least one tab connects with said at least one slot to prop said test tube-supporting member and in the closed condition of said test tube rack said at least one tab disconnects from said at least one slot and folds into said base, allowing said test tube-supporting member to fold down flat on said base; and

at least one double-sided adhesive strip mounted on said outwardly-facing surface of said test tube-supporting member over said at least one slot, the side of said double-sided adhesive strip facing said test tube-supporting member serving to hold said strip on said test tube-supporting member and to hold said at least one tab in said at least one slot in the open condition of said test tube rack.

**4,748,126**

## PYRIDINE-FREE KARL-FISCHER REAGENT AND A PROCESS FOR THE DETERMINATION OF WATER THEREWITH

**Wolfgang Fischer, Darmstadt, and Karl-Dieter Krenn, Pfungstadt, both of Fed. Rep. of Germany, assignors to Riedel-de Haen AG, Seelze, Fed. Rep. of Germany**

**Filed Mar. 19, 1981, Ser. No. 245,405**
**Claims priority, application Fed. Rep. of Germany, Mar. 19, 1980, 3010436**
**The portion of the term of this patent subsequent to Apr. 5, 2000, has been disclaimed.**
**Int. Cl.[4] G01N *33/18***
**U.S. Cl. 436—42** **14 Claims**

1. A solvent solution for use in a Karl-Fischer reagent comprising sulfur dioxide and an amine in a Karl-Fischer reagent solvent, the amine being functionally equivalent to pyridine in a Karl-Fischer reagent, wherein the molar ratio of amine to sulfur dioxide is about 2:1 to 1:1 and the solution is essentially free of pyridine.

2. An essentially pyridine-free Karl-Fischer reagent system for the determination of water comprising (a) a solvent solution containing sulfur dioxide and an amine in a Karl-Fischer reagent solvent, the amine being functionally equivalent to pyridine in a Karl-Fischer reagent, and (b) a titrating agent containing iodine in a Karl-Fischer solvent; the molar ratio of amine to sulfur dioxide being about 2:1 to about 1:1 and the reagent system being essentially free of pyridine.

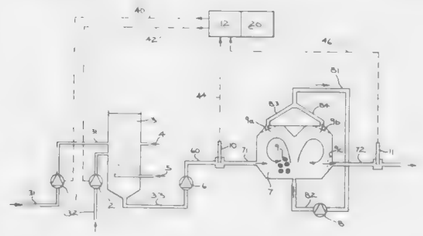
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**4,748,127**

## PROCESS FOR THE DETECTION OF BIODEGRADABLE AND TOXIC SUBSTANCES IN AQUEOUS SOLUTIONS

**Friedrich Siepmann, Frankfurter Str. 10, D-6100 Darmstadt, and Michael Teutscher, Heinrichstr. 5, D-6111 Otzberg 4, both of Fed. Rep. of Germany**

**Continuation of Ser. No. 387,873, Jun. 10, 1982, abandoned. This application Jan. 23, 1985, Ser. No. 693,836**
**Claims priority, application Fed. Rep. of Germany, Oct. 10, 1980, 3038305**
**Int. Cl.[4] C12Q *1/02, 1/18, 3/00***
**U.S. Cl. 436—50** **16 Claims**




1. A process for measuring the degree of pollution of an aqueous liquid resulting from biodegradable components contained in the aqueous liquid, said process comprising the steps of:

withdrawing a sample stream from the aqueous liquid;

diluting the sample stream with biologically neutral water;

obtaining oxygenation of the diluted sample stream;

flowing a constant volume of diluted sample stream continuously through a biological bath having an essentially constant microbiological living mass for which the biodegradable components of the aqueous liquid act as nutrients and in which oxygen is consumed in biodegrading the biodegradable components;

determining the oxygen content of the diluted sample stream upstream of the bath;

measuring the oxygen content of the sample stream downstream of the bath; and

regulating the amount of dilution of the sample stream in accordance with the oxygen content measurement to maintain an essentially constant difference between the upstream and downstream oxygen content of the sample stream so that the amount of dilution indicates the degree of pollution of the aqueous liquid.

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**4,748,128**

## METHOD FOR DETERMINING LIPID BOUND SIALIC ACID IN PLASMA

**Nonda Katopodis, Stamford, Conn., assignor to Dianon Systems, Inc., Stratford, Conn.**

**Continuation-in-part of Ser. No. 595,310, Mar. 30, 1984, abandoned. This application Mar. 18, 1985, Ser. No. 711,591**
**Int. Cl.[4] G01N *33/00, 33/48, 31/22, 1/18***
**U.S. Cl. 436—93** **35 Claims**

1. A method for extracting lipid bound sialic acid from human blood plasma or serum and determining the amount of lipid bound sialic acid in a sample of human blood plasma or serum which comprises the following steps:

(a) diluting a predetermined volume of a blood plasma or serum sample with distilled water to a volume about four times that of the predetermined volume of the sample;

(b) mixing the diluted sample for a suitable period of time to obtain a substantially homogenous sample;

(c) cooling the mixed, diluted sample to about 0°–5° C.;

(d) adding to the cooled sample a mixture of a chlorinated lower alkyl hydrocarbon and a lower alkyl alcohol, the volume of the mixture added being about sixty times the predetermined volume of the blood plasma or serum sample, and the volume ratio of chlorinated hydrocarbon to alcohol in the mixture being about 2:1 and its temperature about 0°–5° C.;

(e) mixing the resulting admixture for a suitable period of time to dissolve lipid-bound or unbound sialic acid containing matter present in the sample in the chlorinated hydrocarbon/alcohol mixture;

(f) diluting the admixture with deionized distilled water at a temperature from about 0°–5° C., the volume of water added being about ten times the predetermined volume of the blood plasma or serum sample;

(g) mixing the diluted admixture for a suitable period of time to obtain a substantially homogeneous admixture and centrifuging the mixture to form a substantially clear upper phase;

(h) separately recovering from the clear upper phase so formed a predetermined volume of the upper phase;

(i) adding to the predetermined volume of the upper phase an amount of a mixture of a protein-precipitating agent and an adsorbing material, the amount of mixture being effective to cause precipitation of the lipid bound sialic acid and to absorb the precipitated lipid bound sialic acid;

(j) mixing the resulting admixture;

(k) separately recovering the resulting absorbed precipitate;

(l) suspending the precipitate in a volume of distilled water; and

(m) determining the amount of lipid bound sialic acid present in the suspended precipitate and thereby the amount present in the blood plasma or serum sample.

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**4,748,129**

## ASSAY METHOD EMPLOYING FLUORESCENT CELL INCORPORATIVE DYE

**Chiu C. Chang, Sunnyvale; Vartan Ghazarossian, Palo Alto, and Edwin F. Ullman, Atherton, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.**

**Filed Aug. 28, 1984, Ser. No. 645,458**
**Int. Cl.[4] G01N *33/554, 33/555***
**U.S. Cl. 436—519** **34 Claims**

1. A method for determining in a sample the presence of a member of a specific binding pair ("sbp member") consisting of ligand and its homologous receptor, which method comprises:

(a) combining in an aqueous medium (1) a sample, (2) a complementary sbp member wherein at least one of said sbp member or said complementary sbp member is bound to the surface of a cell and (3) a fluorescent dye capable of being incorporated into said cell and

(b) without separating said cells from said aqueous medium determining a change in fluorescence as a result of agglutination of said cells, said change being an indication of the presence of said sbp member.

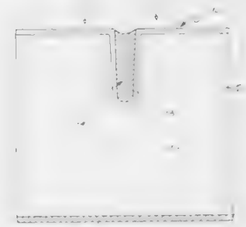
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**4,748,130**

## METHOD OF MAKING BURIED CONTACT SOLAR CELL

**Stuart R. Wenham, Bexley North, and Martin A. Green, Waverley, both of Australia, assignors to Unisearch Limited, Kensington, Australia**

**Division of Ser. No. 716,115, Mar. 26, 1985, abandoned. This application Mar. 16, 1987, Ser. No. 26,480**
**Claims priority, application Australia, Mar. 26, 1984, PG4244**
**Int. Cl.[4] H01L *31/18, 21/28***
**U.S. Cl. 437—2** **12 Claims**



1. A method for forming an electrical contact in a solar cell comprising forming at least one groove in the surface of the cell to a depth substantially greater than the average width of each respective groove, and applying an electrically conducting material so that said conducting material is in intimate contact with the walls of each groove and substantially fills each said groove, including applying the electrically conducting material as a paste material applied to the surface of cell by a sweeping stroke of a squeegee or scraper.

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**4,748,131**

## METHOD FOR INCREASING RADIATION HARDNESS OF MOS GATE OXIDES

**Thomas C. Zietlow, Pasadena, Calif., assignor to The Aerospace Corporation, El Segundo, Calif.**

**Filed Feb. 6, 1987, Ser. No. 11,563**
**Int. Cl.[4] H01L *21/425***
**U.S. Cl. 437—24** **5 Claims**

1. A method for improving the radiation damage resistance of silicon metal-oxide-semiconductor (MOS) devices by implanting fluorine atoms into a polysilicon layer above the oxide followed by a high temperature anneal thereby allowing the fluorine to migrate into the oxide.

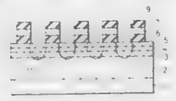
VOL 1090 ISS 5 MY 31 1988 UMI



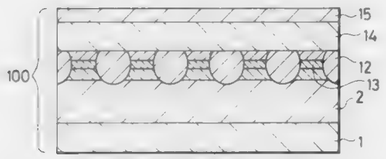
**4,748,132**
**MICRO FABRICATION PROCESS FOR SEMICONDUCTOR STRUCTURE USING COHERENT ELECTRON BEAMS**

**Tadashi Fukuzawa, Tokyo; Akira Tonomura, Koganei, and Naoki Chinone, Chofu, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Dec. 15, 1986, Ser. No. 941,841**
**Claims priority, application Japan, Dec. 16, 1985, 60-280934**
**Int. Cl.⁴ G03C** *5/00;* **H01L** *21/203*
**U.S. Cl. 437—25** **26 Claims**







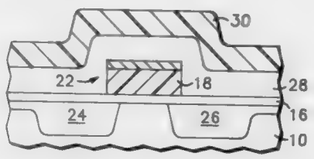

1. A micro fabrication process for a semiconductor structure, comprising at least:
(a) the film formation step of forming necessary ones of various semiconductor films and mask layers on a semiconductor substrate,
(b) the resist film formation step of forming an electron beam-resist film on any of the film and the layer,
(c) the irradiation step of irradiating said electron beam-resist film with a pattern based on coherent electron beams,
(d) the resist pattern formation step of forming the pattern in said resist film, and
(e) the transfer step of transferring the resist pattern to any of the films and the layer.

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**4,748,133**
**DEPOSITION OF AMORPHOUS SILICON FOR THE FORMATION OF INTERLEVEL DIELECTRICS IN SEMICONDUCTOR MEMORY DEVICES**

**Mark D. Griswold, Chandler, Ariz., assignor to Motorola Inc., Schaumburg, Ill.**

**Filed Jun. 26, 1987, Ser. No. 66,672**
**Int. Cl.⁴ H01L** *29/04*
**U.S. Cl. 437—43** **13 Claims**



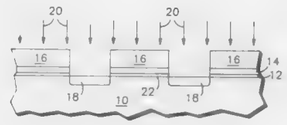

13. A method of making a semiconductor memory device having an interlevel dielectric wherein a first oxide layer is grown on a silicon wafer, a polysilicon layer is formed on said first oxide layer, an amorphous silicon layer is formed on said first polysilicon layer and a second oxide layer is grown on said amorphous silicon layer, said second oxide layer providing said interlevel dielectric.

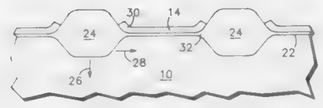
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**4,748,134**
**ISOLATION PROCESS FOR SEMICONDUCTOR DEVICES**

**Orin W. Holland, Oak Ridge, Tenn., and John R. Alvis, Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed May 26, 1987, Ser. No. 53,919**
**Int. Cl.⁴ H01L** *21/265, 17/00*
**U.S. Cl. 437—062** **13 Claims**




1. An improved process for selectively anisotropically oxidizing a silicon substrate to provide localized oxide isolation of reduced width wherein the improvement comprises the step of:
before heating in an oxidizing ambient, selectively implanting chlorine atoms into localized regions of said substrate comprising less than the whole of said substrate where said oxide isolation is desired, to increase growth rate of said oxide in a vertical direction relative to growth rate in a lateral direction.

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**4,748,135**
**METHOD OF MANUFACTURING A SEMICONDUCTOR DEVICE BY VAPOR PHASE DEPOSITION USING MULTIPLE INLET FLOW CONTROL**

**Peter M. Frijlink, Crosne, France, assignor to U.S. Philips Corp., New York, N.Y.**

**Filed May 27, 1987, Ser. No. 54,543**
**Claims priority, application France, May 27, 1986, 8607538**
**Int. Cl.⁴ H01L** *7/34, 21/20*
**U.S. Cl. 437—102** **3 Claims**

1. A method of manufacturing a semiconductor device including the step of depositing from the vapour phase layers on a substrate in a chamber of a reactor in which a vector gas and a reactant gas are introduced, said chamber being provided with a hot zone, characterized in that the vector gas and the reactant gas are introduced into the chamber of the reactor by means of a system of three coaxial tubes, the first of which (the inner tube) has a diameter smaller than that of the second tube (the intermediate tube), which in turn has a diameter smaller than that of the third tube (the outer tube), each of said tubes having a first end and a second end the first ends of said tubes being independent, but the second ends thereof being situated in the proximity of each other and cooperating with each other so as to form a valve controlling the introduction of a mixture of the reactant gas and the vector gas into the hot zone of the chamber of the reactor, these tubes being disposed in such a manner that:
the said second end of the inner tube merges into the intermediate tube,
the said second end of the intermediate tube, which is provided with a restriction, merges into the outer tube,
the said second end of the outer tube, which is provided with a restriction, merges into the chamber of the reactor in the proximity of the hot zone,
the said first end of the intermediate tube is provided with a valve V,
in that the reactant gas is introduced through the first end of the inner tube and circulates in the direction of the second end of the intermediate tube,
in that the vector gas is introduced through the first end of the outer end of the outer tube and circulates in the direction of the second end of the chamber of the reactor,
in that the flow rate of the vector gas is much higher than the flow rate of the reaction gas,
in that, the flow rate of the vector gas being chosen to be much higher than the flow rate of the reactant gas, the tube system behaves like a commutation valve, which directs the whole quantity of reactant gas to the chamber of the reactor when the valve V is closed,
and which directs the whole quantity of reactant gas to the first end of the intermediate tube when the valve V is opened.



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**4,748,136**
**CERAMIC-GLASS-METAL COMPOSITE**

**Deepak Mahulikar, Meriden, and Narendra N. SinghDeo, New Haven, both of Conn., assignors to Olin Corporation, New Haven, Conn.**

**Filed Oct. 30, 1986, Ser. No. 924,968**
**Int. Cl.⁴ C03C** *14/00*
**U.S. Cl. 501—32** **34 Claims**

1. A ceramic-glass metal composite, comprising:
from about 5 to about 45 volume % of metallic particles for enhancing the flow characteristics of said composite;
from about 15 to about 50 volume % of a glass for adhering said composite together;
the balance essentially ceramic particles;
said metallic particles substantially smaller than said glass or ceramic particles; and
said composite having a structure comprising substantially a matrix of said glass with said ceramic and metallic particles dispersed therein.

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**4,748,137**
**LOW TEMPERATURE MELTING FRITS**

**Jaroslava M. Nigrin, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.**

**Filed May 20, 1987, Ser. No. 51,840**
**Int. Cl.⁴ C03C** *3/21, 8/08, 8/04, 3/19*
**U.S. Cl. 501—46** **3 Claims**

1. An essentially lead-free glass composition consisting essentially, expressed in terms of weight percent on the oxide basis, of

| | | | |
|---|---|---|---|
| $Li_2O$ | 1–4 | $Na_2O + K_2O$ | 0–12 |
| ZnO | 20–30 | CaO | 0–7 |
| $B_2O_3$ | 32–42 | SrO | 0–10 |
| $Al_2O_3$ | 2–5 | BaO | 0–15 |
| $ZrO_2$ | 2–6 | CaO + SrO + BaO | 0–15 |
| $P_2O_5$ | 6–10 | $V_2O_5$ | 0–22 |
| $Na_2O$ | 0–8 | $Bi_2O_3$ | 0–16 |
| $K_2O$ | 0–8.40 | $V_2O_5 + Bi_2O_3$ | 5–25 |

wherein a minimum of 5% $V_2O_5+Bi_2O_3$ is required in the presence of at least 2% $Na_2O$ or 5% $K_2O$, and a minimum of 9% $V_2O_5$ and/or $Bi_2O_3$ is required in the essential absence of $Na_2O$ or $K_2O$, but in the presence of at least 3% CaO or 6% SrO or 9% BaO, said glass exhibiting a softening point below 500° C., a maturing temperature no higher than 560° C., and a coefficient of thermal expansion (0°–300° C.) below about $88\times10^{-7}$/°C. but not less than about $80\times10^{-7}$/°C.

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**4,748,138**
**HIGHLY TOUGHENED, SINTERED MASS OF ZIRCONIA**

**Masakazu Watanabe, Nagoya; Satoshi Iio, Komaki, and Yasushi Matsuo, Nagoya, all of Japan, assignors to NGK Spark Plug Co., Ltd., Nagoya, Japan**

**Continuation-in-part of Ser. No. 454,260, Dec. 29, 1982, abandoned. This application Jul. 16, 1984, Ser. No. 630,358**
**Claims priority, application Japan, Jan. 9, 1982, 57-1966**
**The portion of the term of this patent subsequent to Dec. 2, 2003, has been disclaimed.**
**Int. Cl.⁴ C04B** *35/48, 35/56, 35/58*
**U.S. Cl. 501—87** **32 Claims**

1. A ceramic press-sintered mass of high toughness consisting essentially of 30–99.5% by weight of a component A as defined below and the balance being a component B as defined below, and having a mean grain size of no more than 3 microns as a whole:
Component A:
zirconia having a tetragonal and/or cubic system content of no less than 90% by weight, with the proviso that the tetragonal/cubic system ratio by weight is no less than 0.25, said zirconia including a stabilizer consisting of one or more selected from the group consisting of $Y_2O_3$, CaO, MgO, $Yb_2O_3$ and CeO; and
Component B:
one, or a mixture of two or more substances selected from the group consisting of borides, carbides and nitrides of Al, Si and an element in the groups 4a, 5a and 6a of the periodic table.

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**4,748,139**
**PREPARATION OF PRECURSOR MATERIALS CONVERTIBLE INTO BI- AND POLY-METAL SPINELS**

**John L. Burba, III, Angleton, Tex., assignor to The Dow Chemical Company, Midland, Mich.**

**Filed Jun. 2, 1986, Ser. No. 869,521**
**Int. Cl.⁴ C04B** *35/04;* **C01F** *35/16*
**U.S. Cl. 501—120** **11 Claims**

1. In a method of producing a substantially chlorine free bi- or multi-metal hydroxide precipitate as a layered structure in which the ratio of metals is at least 1 to 1 and when the ratio is greater than 1 to 1 such excess is a segregated phase of the hydroxide form of the metal(s) in the layered phase, consisting of mixing a first divalent metal or group of divalent metals as their insoluble hydroxide, oxyhydroxide or carbonate with a second metal or group of metals as their hydroxide or alkali metal oxide in a proportion and under aqueous alkaline pH conditions to form at least a layered structure after chemical digestion and precipitation of said metals as their hydroxides, said excess of metals over a 1 to 1 ratio forming a segregated

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phase of the hydroxide form of said metal or metals in excess, the concentration of the metals in the aqueous phase being from 1% by weight to about the saturation point of the least soluble of the metal starting compound such that the desired ratio is obtained based upon the amount of segregated phase desired, maintaining said mixture in suspension for from 10 minutes to about 48 hours at a temperature of above about 40° C., cooling said mixture to below about 40° C. and recovering the resultant precipitate, the resulting aqueous mother liquor being substantially free of precipitate and in which latter form is a suitable mother liquor, when by addition of alkali the pH is adjusted to that capable of providing an aqueous environment for precipitation of additional bi- or multi-metal layered structure compositions.

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**4,748,140**

## IN SITU ACTIVATION PROCESS FOR FLUID BED OXIDATION CATALYSTS

**Patricia R. Blum, Macedonia; Ernest C. Milberger, Solon; Mark L. Nicholas, Cleveland, and Patricia A. Zock, Maple Hts., all of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio**

**Continuation of Ser. No. 550,276, Nov. 9, 1983, abandoned, which is a continuation of Ser. No. 334,693, Dec. 28, 1981, abandoned. This application Dec. 24, 1984, Ser. No. 685,437**

**Int. Cl.⁴ B01J** *27/198*

**U.S. Cl. 502—209** **9 Claims**

1. A process for activating a fluid bed catalyst by contacting a fluidized catalyst containing the mixed oxides of vanadium and phosphorus with oxygen and a reducing gas at least partially combustible with oxygen, the contacting conducted at an elevated temperature sufficient to cause combustion of the reducing gas, wherein the molar ratio of reducing gas to oxygen is greater than the stoichiometric ratio required for complete combustion of the reducing gas.

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**4,748,141**

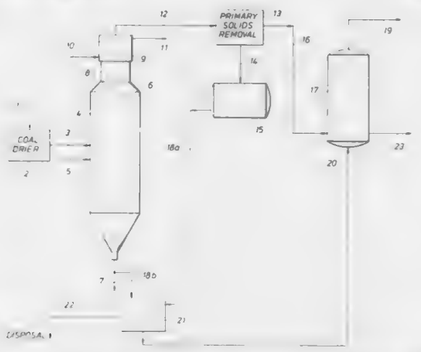
## METAL SULFIDE CATALYST PREPARATION

**Daniel C. Baker, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.**

**Filed Apr. 29, 1987, Ser. No. 43,737**

**Int. Cl.⁴ B01J** *27/047, 27/04;* **C01B** *17/027*

**U.S. Cl. 502—216** **2 Claims**




1. A process for the preparation of a metal sulfide catalyst which comprises (a) treating coal, shale, tar sands or mineral ore with oxygen at 800°–2000° C. and 1–200 bar pressure to produce a synthesis gas stream containing inorganic metal sulfide selected from the group consisting of CuS, PbS, ZnS, CdS, MgS, CrS, TiS, FeS and mixtures thereof; (b) recovering slag particles from the treatment of coal in step (a) suitable for use as a catalyst carrier; and (c) treating the slag particles from step (b) at 150°–400° C. and 20–30 atmospheres with the synthesis gas stream to deposit a catalytic amount of said inorganic metal sulfide or said mixtures of organic metal sulfides from (a) on the surface thereof.

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**4,748,142**

## SUPPORTED CHROMIUM-MOLYBDENUM AND TUNGSTEN SULFIDE CATALYSTS

**Russell R. Chianelli, Somerville; Teh C. Ho, Bridgewater; Allan J. Jacobson, Princeton, and Archie R. Young, Montclair, all of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.**

**Division of Ser. No. 656,090, Sep. 28, 1984, Pat. No. 4,626,339. This application Sep. 19, 1986, Ser. No. 909,188**

**The portion of the term of this patent subsequent to Dec. 29, 2004, has been disclaimed.**

**Int. Cl.⁴ B01J** *27/051, 27/049, 27/047, 31/18*

**U.S. Cl. 502—220** **17 Claims**

1. As a composition of matter, a supported hydroprocessing catalyst obtained by compositing a quantity of a particulate, porous catalyst support material comprising one or more refractory oxides with one or more catalyst precursor salts and heating said composite at an elevated temperature of at least about 200° C. up to about 600° C., in the presence of a sulfur-bearing compound in an amount such that, based on the sulfur in said sulfur-bearing compound, sulfur is present in excess of that contained in the catalyst precursor and under oxygen-free conditions for a time sufficient to form said catalyst, wherein said catalyst precursor salt contains a tetrathiometallate anion of Mo, W or mixture thereof and a cation comprising trivalent chromium or mixture of trivalent chromium with one or more divalent promoter metals selected from the group consisting of Fe, Ni, Co, Mn, Zn, Cu and mixture thereof wherein said trivalent chromium and divalent promoter metals are chelated by at least one neutral, nitrogen-containing polydentate ligand, L, and wherein said trivalent chromium and divalent promoter metal are in the same or different cations.

7. A process for preparing a supported hydroprocessing catalyst, said process comprising compositing a quantity of a particulate, porous catalyst support material comprising one or more refractory oxides with one or more catalyst precursor salts and heating said composite at elevated temperature of at least about 200° C. up to about 600°, in the presence of a sulfur-bearing compound in an amount whereby sulfur in the form of said sulfur-bearing compound is present in excess of that contained in the catalyst precursor and under oxygen-free conditions for a time sufficient to form said catalyst, wherein said catalyst precursor salt contains a tetrathiometallate anion of Mo, W or mixture thereof and a cation comprising trivalent chromium or a mixture of trivalent chromium with one or more divalent promoter metals selected from the group consisting of Fe, Ni, Co, Mn, Zn, Cu and mixture thereof wherein said trivalent chromium and divalent promoter metals are chelated by at least one neutral, nitrogen-containing polydentate ligand, L.

13. As a composition of matter, a supported hydroprocessing catalyst obtained by compositing a quantity of inorganic refractory oxide support material with one or more catalyst precursor salts and heating said composite at an elevated temperature of at least about 200° C. up to about 600° C. in the presence of a sulfur-bearing compound in an amount such that the sulfur in the form of said sulfur-bearing compound is present in excess of that present in said precursor and under oxygen-free conditions for a time sufficient to form said catalyst, wherein said presursor salt is selected from the group consisting of $(Cr_{1-z}M_zLX_y)\ (MoS_4)_n$, $(Cr_{1-z}M_zLX_y)\ (WS_4)_n$ and mixture thereof, wherein the chromium is in the trivalent state, wherein $n=(3-z-y)/2$, wherein M is one or more divalent promoter metals selected from the group consisting of Mn, Fe, Co, Ni, Cu, Zn and mixtures thereof, wherein $1 \geqq z \geqq 0$ and $1-z \geqq y \geqq 0$, wherein ligand L is one or more neutral, nitrogen-containing ligands, at least one of which is a chelating polydentate ligand, and wherein X is a single charged anionic ligand.



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**4,748,143**

## PEROVSKITE-TYPE OXIDATION CATALYSTS AND METHOD FOR PREPARING THE CATALYSTS

**Kenji Tabata, and Ikuo Matsumoto, both of Ikoma, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan**

**Filed Jun. 6, 1986, Ser. No. 871,551**

**Claims priority, application Japan, Jun. 7, 1985, 60-124473**

**Int. Cl.⁴ B01J** *23/02, 23/10*

**U.S. Cl. 502—304** **14 Claims**

1. An oxidation catalyst of a perovskite-type compound oxide of the general formula, $AA'BO_3$, in which A represents a mixture of rare earth elements originally in the form of oxides collected from an ore containing the rare earth elements, A' represents at least one element which is selected from the group consisting of alkali metals, alkaline earth metals and rare earth elements and which have a tolerance factor, $t=(r_A+r_O)/\sqrt{2}(r_B+r_O)$, in which $r_A>0.90$ angstroms, $r_B>0.51$ angstroms, and $r_O$ is a radius of oxygen ion, in the range of $0.75 \leqq t \leqq 1.0$, and has a valence and ionic radius different from the rare earth elements from the ore, and B represents a transition metal, said transition metal being added at an atomic ratio to the mixture of the rare earth elements of 0.9:1 to 1.1:1, said at least one element being added in such an amount that a surface atomic ratio of the transition metal and the rare earth elements of the A site is in the range of from 1.0:1.0 to 1.1.:1.0.

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**4,748,144**

## DELAFOSSITE MIXED METAL OXIDE CATALYSTS AND METHOD FOR THEIR PREPARATION

**John R. Monnier, Fairport; Gustav R. Apai, II, and Michael J. Hanrahan, both of Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Aug. 13, 1986, Ser. No. 896,044**

**Int. Cl.⁴ B01J** *21/04, 23/72, 23/86*

**U.S. Cl. 502—316** **4 Claims**

1. A mixed oxide of the formula:

$$Cu_xM_aFe_bO_{2x}$$

wherein M is either chromium or aluminum and a+b is equal to or almost equal to x; wherein said mixed oxide has a delafossite type of crystal lattice structure; and wherein said mixed oxide has an onset of reduction at a temperature less than 350° C. and a maximum rate of reduction at a temperature greater than 350° C. when heated at 5° C. per minute in the presence of hydrogen at atmospheric pressure.

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**4,748,145**

## CATALYSTS HAVING ALKOXIDE-MODIFIED SUPPORTS AND METHOD OF INCREASING THE CATALYTIC ACTIVITY OF A CATALYTIC METAL

**Clayton D. Wood, Framingham, Mass.; Philip E. Garrou, Charlotte, N.C.; Edward F. Gleason, III, Danvers, Mass., and Iwao Kohatsu, Lexington, Mass., assignors to The Dow Chemical Company, Midland, Mich.**

**Division of Ser. No. 809,544, Dec. 16, 1985, which is a continuation-in-part of Ser. No. 655,991, Sep. 28, 1984, Pat. No. 4,559,364, which is a division of Ser. No. 567,112, Dec. 30, 1983, abandoned. This application Feb. 9, 1987, Ser. No. 12,924**

**The portion of the term of this patent subsequent to Feb. 10, 2004, has been disclaimed.**

**Int. Cl.⁴ B01J** *21/04, 21/06, 21/08, 23/64*

**U.S. Cl. 502—332** **16 Claims**

1. A catalyst composition comprising a catalytic metal and an alkoxide-modified support, which support comprises a core support material having (a) a surface area which is greater than about 5 $m^2/g$; and having (b) on the outer surface thereof a metal oxide produced from a precursor metal alkoxide.

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**4,748,146**

## PROCESS FOR ENCAPSULATING DISSOLVED REACTANTS OF COLOR REACTION SYSTEMS, THE CAPSULES OBTAINED AS A RESULT THEREOF AND THEIR USE IN NON-CARBON PAPERS

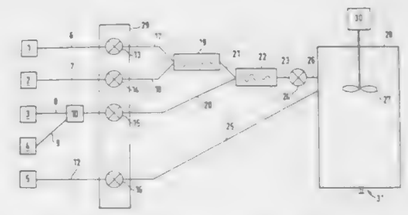
**Gunther Pietsch, Isernhagen, and Claus Hartmann, Hanover, both of Fed. Rep. of Germany, assignors to Papierfabrik August Koehler AG, Fed. Rep. of Germany**

**Division of Ser. No. 708,284, Mar. 5, 1985, Pat. No. 4,684,574. This application May 15, 1987, Ser. No. 50,913**

**Claims priority, application Fed. Rep. of Germany, Mar. 9, 1984, 3408745; Nov. 19, 1984, 3442268**

**Int. Cl.⁴ B41M** *5/00*

**U.S. Cl. 503—201** **35 Claims**



1. A method for coloring a non-carbon paper substrate comprising:

providing an encapsulated preparation manufactured by a process comprising the steps of:

dissolving an effective amount for use in a color reaction system of one component selected from the group consisting of (i) basic color formers for the color reaction system and (ii) acid reactants in a solvent in which said amount of said component is soluble, to form a component-solvent solution;

admixing in said solution, in an amount sufficient to form a super-saturated solution with respect to said component, a non-solvent fluid in which said component is essentially insoluble; and

emulsifying and encapsulating said super-saturated solution;

applying said encapsulated solution to said paper substrate;

breaking selected capsules of said encapsulated solution so as to permit escape of encapsulated solution therefrom; and

reacting said preparation with the other component of said group, thereby causing color to form on said substrate.

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**4,748,147**

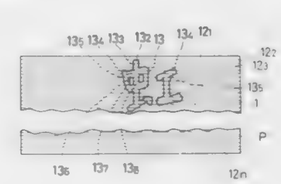
## WRITING SET

**Masa-aki Sumi-i, Osaka, and Hikoshiro Nushimura, Hyogo, both of Japan, assignors to Sakura Color Products Corp., Higashinari, Japan**

**Filed Nov. 29, 1985, Ser. No. 802,821**

**Int. Cl.⁴ B41M** *5/12, 5/16*

**U.S. Cl. 503—204** **7 Claims**



1. A combination writing device comprising a sheet substrate having printed thereon a plurality of proximate areas of different color leuco dyes in an undeveloped colorless state and a writing instrument containing a dye developing composition including and acid solution whereby when said writing

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instrument is drawn over said substrate along any desired path said dyes are developed along said path in accordance with the traversed dye areas to produce correspondingly colored image of said path.

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**4,748,148**

## RECORDING SYSTEM UTILIZING PHTHALIDE DERIVATIVES AS COLORLESS CHROMOGENIC MATERIAL

**Mitsuru Kondo, Kawabegun; Tomoyuki Okimoto, Amagasaki, and Nobuo Kanda, all of c/o Kanzaki Paper Manufacturing Co., Ltd. 1-11 Motomachi, Jyokoji, Amagasaki, Hyogo, Japan**

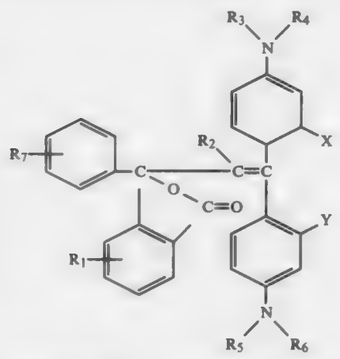
**Division of Ser. No. 667,805, Nov. 2, 1984, Pat. No. 4,641,160, which is a continuation of Ser. No. 366,338, Apr. 7, 1982, abandoned. This application Nov. 13, 1986, Ser. No. 929,786**

**Claims priority, application Japan, Apr. 8, 1981, 56-53678**

**Int. Cl.⁴ B41M** *5/16, 5/18, 5/22*

**U.S. Cl. 503—220** **7 Claims**

1. A recording system which utilizes the color forming reaction between a colorless chromogenic material and an electron accepting acidic reactant material, characterized in that said colorless chromogenic material comprises at least one phthalide derivative having the formula:



wherein $R_1$ is hydrogen or at least one substituent selected from the group consisting of halogen, $C_1 \sim C_4$ alkyl, $C_1 \sim C_4$ alkoxyl, nitro, and amino having the formula



$R_2$ is hydrogen or $C_1 \sim C_4$ alkyl; each $R_3$, $R_4$, $R_5$, $R_6$, $R_8$, and $R_9$ is hydrogen, $C_1 \sim C_4$ alkyl, benzyl, halogen substituted benzyl, phenyl, or $C_1 \sim C_4$ alkyl or $C_1 \sim C_2$ alkoxyl subtituted phenyl, or both of $R_3$ and $R_4$, $R_5$ and $R_6$ or $R_8$ and $R_9$ together with the adjacent nitrogen form an alicyclic amino having the formula



c is an integer of 4 to 6; $R_7$ is hydrogen or one to two substituents selected from the group consisting of halogen, $C_1 \sim C_4$ alkyl, $C_1 \sim C_4$ alkoxyl, nitro and alicyclic amino having the formula



c is an integer of 4 to 6; and each X and Y is hydrogen, $C_1 \sim C_4$ alkyl or $C_1 \sim C_4$ alkoxyl.

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**4,748,149**

## THERMAL PRINT ELEMENT COMPRISING A YELLOW MEROCYANINE DYE STABILIZED WITH A CYAN INDOANILINE DYE

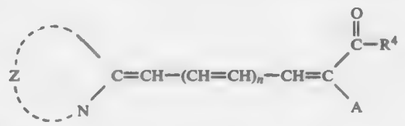
**Gary W. Byers, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Continuation-in-part of Ser. No. 14,565, Feb. 13, 1987, Pat. No. 4,695,632. This application Jul. 24, 1987, Ser. No. 77,364**

**Int. Cl.⁴ B41M** *5/26*

**U.S. Cl. 503—227** **12 Claims**

1. A thermal print element comprising a support having thereon a layer containing a thermally-transferred dye image, said dye image comprising a yellow merocyanine dye having the formula:



wherein:

A represents —COR, —COOR, —CONHR, —CN, $—SO_2R$ or $—SO_2NR_2$; or A may be combined together with $R^4$ to form a heterocyclic or carbocyclic ring system;

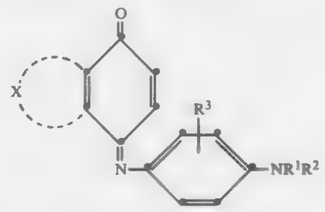
$R^4$ represents —NHR, $—NR_2$, —OR, —SR, or —R;

n represents 0 or 1;

Z represents the atoms necessary to complete a 5- or 6-membered substituted or unsubstituted heterocyclic ring; and

each R independently represents a substituted or unsubstituted alkyl group of from 1 to about 6 carbon atoms or a substituted or unsubstituted aryl group of from about 6 to about 10 carbon atoms;

said dye image also comprising a cyan indoaniline dye in the same areas as said yellow merocyanine dye to provide improved stability to light for said yellow merocyanine dyes, said cyan indoaniline dye having the formula:



wherein:

$R^1$ and $R^2$ are each independently hydrogen; a substituted or unsubstituted alkyl group of from 1 to about 6 carbon atoms; a substituted or unsubstituted cycloalkyl group of from about 5 to about 7 carbon atoms; or a substituted or unsubstituted aryl group of from about 5 to about 10 carbon atoms;

$R^3$ is hydrogen; a substituted or unsubstituted alkyl group of from 1 to about 6 carbon atoms; halogen; $—NHCOR^1$ or $—NHSO_2R^1$; and

X represents hydrogen or the atoms necessary to complete a 5- or 6-membered, substituted or unsubstituted, carbocyclic or heterocyclic ring system.



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**4,748,150**

## SUBBING LAYER FOR DYE IMAGE-RECEIVING LAYER USED IN THERMAL DYE TRANSFER

**Noel R. Vanier, Rochester, and Kin K. Lum, Webster, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Sep. 15, 1987, Ser. No. 97,228**

**Int. Cl.⁴ B41M** *5/26*

**U.S. Cl. 503—227** **20 Claims**

9. In a process of forming a dye transfer image comprising imagewise-heating a dye-donor element comprising a support having thereon a dye layer and transferring a dye image to a dye-receiving element to form said dye transfer image, said dye-receiving element comprising a support having thereon a polymeric dye image-receiving layer, the improvement wherein said support of said dye-receiving element is coated with a subbing layer comprising a vinylidene chloride copolymer.

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**4,748,151**

## HEAT TRANSFER RECORDING SHEET

**Yukichi Murata, Saganihara; Takao Hirota, Machida, and Hiroshi Urabe, Kawasaki, all of Japan, assignors to Mitsubishi Chemical Industries Limited, Japan**

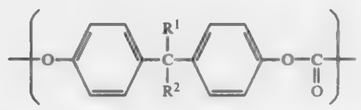
**Filed Aug. 5, 1986, Ser. No. 893,489**

**Claims priority, application Japan, Aug. 6, 1985, 60-172645; Oct. 14, 1985, 60-228394**

**Int. Cl.⁴ B41M** *5/26*

**U.S. Cl. 503—227** **14 Claims**

1. A heat transfer recording sheet comprising a base film having provided on one side thereof a coloring material layer containing at least a subliming dye and a binder, wherein said binder is a polycarbonate resin having a repeating unit represented by the formula (I):



(I)

wherein $R^1$ represents an aryl group; and $R^2$ represents a hydrogen atom, an alkyl group or an aryl group.

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**4,748,152**

## SUCCINYLATED ATELOCOLLAGEN SOLUTION FOR USE IN VISCOSURGERY AND AS A VITREOUS SUBSTITUTE

**Teruo Miyata, Tokyo, Japan, and Michael W. Dunn, New Rochelle, N.Y., assignors to Opticol Corp., Stanford, Conn. and Koken Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 693,084, Jan. 22, 1985, abandoned. This application Jul. 16, 1986, Ser. No. 888,084**

**Int. Cl.⁴ A61K** *37/12;* **C07K** *15/20*

**U.S. Cl. 514—2** **5 Claims**

1. A solution of succinylated atelocollagen suitable for use in ophthalmic viscosurgery and vitreous replacement comprising atelocollagen succinylated to between about 10% to 50% of the total lysine residue and dissolved in a buffered solution to a concentration of between 0.5% and 5% by weight.

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**4,748,153**

## COMPOUNDS HAVING SOMATOSTATIN-LIKE ACTIVITY USEFUL AS LOCAL ANTI-INFLAMMATORY AGENTS

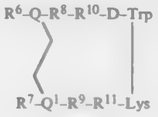
**Evan R. Morgan, Bridgewater, N.J.; Daniel F. Veber, Ambler, Pa., and Sanford L. Steelman, Watchung, N.J., assignors to Merck & Co., Inc., Rahway, N.J.**

**Continuation of Ser. No. 847,349, Apr. 2, 1986, abandoned, which is a continuation-in-part of Ser. No. 728,019, Apr. 29, 1985, Pat. No. 4,585,755. This application Sep. 2, 1987, Ser. No. 92,352**

**Int. Cl.⁴ A61K** *37/02*

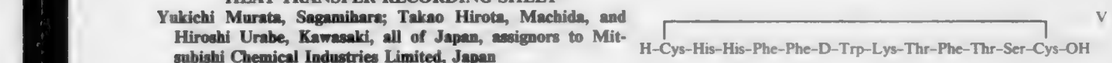
**U.S. Cl. 514—10** **4 Claims**

1. A method of locally treating inflammatory and allergic conditions comprising applying to the area to be treated an anti-inflammatory and anti-allergically effective amount of a compound having the Formulae:



IV

and,



V

wherein in the compound of Formula IV:

$R^6$ is D-Phe; $CH_3(CH_2)_8CO$-D-Phe; or is absent;

$R^7$ is Thr or is absent;

$R^8$ and $R^9$ can each independently be Phe or be absent;

$R^{10}$ is Phe or Tyr;

$R^{11}$ is Val or Thr;

Q is Cys or Asn; and,

$Q^1$ is Cys or, when Q, $R^6$ and $R^7$ are absent, Gaba.

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**4,748,154**

## PEPTIDE DERIVATIVES, THEIR PRODUCTION AND USE

**Giichi Goto, Toyono; Akinobu Nagaoka, Kawanishi, and Mitsuhiro Wakimasu, Suita, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan**

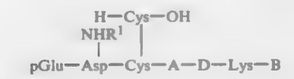
**Filed Dec. 8, 1986, Ser. No. 939,103**

**Claims priority, application Japan, Dec. 24, 1985, 60-291474**

**Int. Cl.⁴ A61K** *37/02;* **C07K** *7/06*

**U.S. Cl. 514—16** **12 Claims**

1. A peptide derivative of the general formula



wherein

$R^1$ is a hydrogen atom, a $C_{1-18}$ alkyl group or an unsubstituted phenyl $C_{1-3}$ alkyl group or a phenyl $C_{1-3}$ alkyl group in which the phenyl is substituted by nitro, halogen or alkoxy;

A is an amino or N-$C_{1-6}$ alkylamino acid residue;

B is a hydroxyl group, an amino group or an amino group substituted by alkyl, or an amino acid or an amide thereof, or a physiologically acceptable salt thereof.

VOL 1090 ISS 5 MY 31 1988 UMI



**4,748,155**

## PHARMACOLOGICALLY ACTIVE TRIPEPTIDES AND PROCESS FOR THEIR SYNTHESIS

**Alessandro Sisto, Rome; Antonio S. Verdini, Monterotondo; Antonio Virdis, Rome; Giovanna De Luca, Rome; Giovanni Di Stazio, Rome, and Vincenzo Politi, Rome, all of Italy, assignors to Eniricerche S.p.A., Milan and Polifarma S.p.A., Rome, both of, Italy**

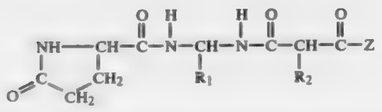
**Filed Mar. 10, 1986, Ser. No. 838,120**

**Claims priority, application Italy, Mar. 19, 1985, 19961 A/85**

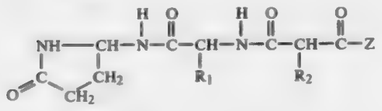
**Int. Cl.[4] A61K** *37/43;* **C07K** *5/08*

**U.S. Cl. 514—18** **8 Claims**

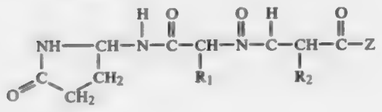
1. Tripeptides having the formulae:



Ia

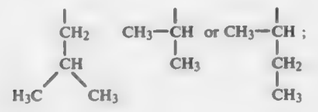


Ib

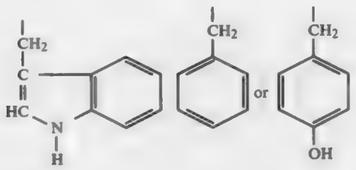


Ic

wherein $R_1$ is



$R_2$ represents



group; and

Z represents an OH, $OR_3$, $NH_2$, $NHR_3$ group, wherein $R_3$ represents an alkyl group having 1 to 10 carbon atoms.

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**4,748,156**

## THROMBIN-BINDING SUBSTANCE AND PROCESS FOR PREPARING THE SAME

**Nobuo Aoki, Tokyo; Masami Shiratsuchi, Musashimurayama, and Shigeru Kimura, Higashiyamato, all of Japan, assignors to Kowa Co., Ltd., Nagoya, Japan**

**Filed Jan. 15, 1987, Ser. No. 3,465**

**Claims priority, application Japan, Jan. 21, 1986, 61-10620**

**Int. Cl.[4] C07K** *3/20, 3/28*

**U.S. Cl. 514—21** **6 Claims**

1. A thrombin-binding substance derived from human tissue obtained by (1) extracting human tissue with a buffer containing a non-ionic surfactant, (2) isolating said thrombin-binding substance in pure form from the resulting extract by diisopropylphosphorothrombin affinity chromatography, (3) subjecting isolate to SDS-polyacrylamide electrophoresis and (4) elution of said thrombin-binding substance having the following characteristics:

(a) molecular weight:
47,000±6,000 in reduced condition
38,000±6,000 in unreduced condition

(b) isoelectric point: pH 4.9–5.7

(c) affinity: strong affinity to thrombin

(d) activity:
(1) capable of promoting the thrombin catalyzed activation of protein C
(2) prolongs clotting time; and

(e) stability: stable to denaturing agents, urea and sodium dodecylsulfate.

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**4,748,157**

## COMPOSITION FOR GASTROINTESTINAL ULCERS

**Masakazu Iwai, Fujiidera; Kazumasa Yokoyama, Toyonaka, and Tsunekazu Fukushima, Kobe, all of Japan, assignors to The Green Cross Corporation, Osaka, Japan**

**Continuation of Ser. No. 626,421, Jun. 29, 1984, abandoned. This application Feb. 4, 1986, Ser. No. 827,209**

**Claims priority, application Japan, Jul. 4, 1983, 58-121756; Jul. 4, 1983, 58-121757**

**Int. Cl.[4] A61K** *37/00;* **C07G** *7/00*

**U.S. Cl. 514—2** **6 Claims**

1. A composition for the treatment of gastrointestinal ulcers comprising an anti-ulcer effective amount of a carbamoyl-$C_1$–$C_3$ alkylated Fc fragment of human IgG together with a pharmaceutically acceptable diluent.

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**4,748,158**

## ALKYL GLYCOSIDES AS POTENTIATING AGENTS IN ANTISEPTIC, DISINFECTING AND CLEANING PREPARATIONS TO INCREASE MICROBICIDAL ACTIVITY

**Manfred Biermann, Muelheim; Rudolf Lehmann; Harald Schnegelberger, both of Leichlingen; Walter Ploeger, Hilden; Hans-Juergen Klueppel, Duesseldorf, and Karl-Heinz Schmid, Mettmann, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany**

**Filed Dec. 6, 1985, Ser. No. 806,059**

**Claims priority, application Fed. Rep. of Germany, Dec. 10, 1984, 3444958**

**Int. Cl.[4] A61K** *31/70, 7/16*

**U.S. Cl. 514—25** **28 Claims**

1. A microbiocidal composition comprising a microbiocidally-active combination of a biguanide compound microbiocidally active against bacteria and from about 10 to about 10,000 ppm of a $C_6$- $C_{18}$-alkyl glycoside in a non-microbiocidally-active amount which is sufficient to potentiate the microbiocidal activity of said biguanide.

13. A hygienic composition for the care of the oral cavity comprising a physiologically-compatible carrier and the microbiocidal composition of claim 1 in a microbiocidally-active amount.

23. A method for improving the hygiene of the oral cavity comprising contacting the cavity with a hygienic composition according to claim 13.



**4,748,159**

## METHOD FOR THE TREATMENT OF TUMORS

**Chikao Yoshikumi, Tokyo; Yoshio Ohmura, Chiba; Fumio Hirose, Tokyo; Masanori Ikuzawa, Tokyo; Kenichi Matsunaga, Tokyo; Takayoshi Fujii, Tokyo; Minoru Ohhara, Tokyo, and Takao Ando, Tokyo, all of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Japan**

**Continuation of Ser. No. 686,737, Dec. 27, 1984, abandoned, which is a division of Ser. No. 584,629, Feb. 29, 1984, Pat. No. 4,555,505, which is a continuation-in-part of Ser. No. 484,592, Apr. 13, 1983, Pat. No. 4,559,327, which is a continuation-in-part of Ser. No. 289,226, Aug. 3, 1981, abandoned, which is a division of Ser. No. 102,535, Dec. 11, 1979, Pat. No. 4,313,939, which is a continuation-in-part of Ser. No. 039,218, May 15, 1979, abandoned. This application Nov. 24, 1986, Ser. No. 931,974**

**Claims priority, application Japan, May 26, 1978, 53-63146; Dec. 29, 1978, 53-161386; Dec. 29, 1979, 53-161385**

**Int. Cl.[4] A61K** *31/70;* **C07H** *1/00*

**U.S. Cl. 514—42** **14 Claims**

1. A method of inhibiting tumor growth in a patient suffering therefrom, which comprises administering to said patient a pharmaceutically effective amount of p-aminobenzoate-N-L-rhamnoside or a pharmaceutically acceptable salt thereof.

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**4,748,160**

## ANGIOTENSIN CONVERTING ENZYME INHIBITORS AND THEIR FORMULATION AND USE AS PHARMACEUTICALS

**Colin Beanion, Loughborough; David P. Marriott, Radcliffe-on-Trent; Anthony R. Cook, Nottingham, and David H. Robinson, Shepshed, all of United Kingdom, assignors to Fisons plc, Ipswich, England**

**Filed Nov. 14, 1985, Ser. No. 797,934**

**Claims priority, application United Kingdom, Nov. 30, 1984, 8430295; Mar. 6, 1985, 8505798; May 21, 1985, 8512875**

**Int. Cl.[4] A61K** *31/55;* **C07D** *285/36*

**U.S. Cl. 514—82** **11 Claims**

1. A compound of formula I,

$$ZCHRCON(—N{=}CR_4R_5)CHR_6(CH_2)_nCOY$$

in which

Z is $R_2CH(COOH)NH—$, $R_1SCH_2—$ or $Ph(CH_2)_pPO(OH)—$,

Ph is phenyl,

p is an integer from 1 to 6,

$R_1$ is hydrogen or $R_8CO—$,

$R_8$ is alkyl C1 to 10 or phenyl,

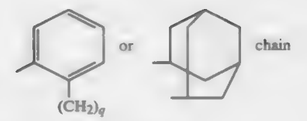
R is hydrogen or alkyl C1 to 10,

$R_2$ is alkyl C1 to 10 or phenylalkyl C7 to 12,

$R_4$ and $R_5$, which may be the same or different, are each hydrogen, phenyl, naphthyl; a heterocyclic group selected from thiophenyl, furyl, pyrrolyl, imidazol, oxazolyl, thiazolyl, pyrimidinyl and pyridyl, each of which is optionally fused to a benzene ring; a 5 or 6 membered alicyclic ring fused to a benzene ring; cycloalkyl containing 3 to 7 carbon atoms, or alkyl C1 to 10 optionally substituted by phenyl, naphthyl or a heterocyclic group selected from thiophenyl, furyl, pyrrolyl, imidazolyl, oxazolyl, thiazolyl, pyrimidinyl and pyridyl, each of which is optionally fused to a benzene ring,

when $R_4$ or $R_5$ are phenyl, naphthyl, a 5 or 6 membered alicyclic ring or a heterocyclic group as defined above, said phenyl, naphthyl, alicyclic ring or heterocyclic group can be optionally substituted by one or more alkyl C1 to 10 alkoxy C1 to 10, halogen, phenylalkyl C7 to 12, phenylalkoxy C7 to 12, phenyl, hydroxy, =O, fluoroalkyl C1 to 10, cyano, nitro, phenylsulphonamido, dialkyl (C1 to 10)-amino-alkoxy (C1 to 10), alkylthio C1 to 10, or dialkyl (C1 to 10)-amino,

or $R_4$ and $R_5$ together form a $—(CH_2)_4—$, $—(CH_2)_5—$,



or



chain

$R_6$ is hydrogen or alkyl C1 to 10,

q is 2 or 3,

n is 0 or 1,

Y is hydroxy or $—NHSO_2R_9$, and

$R_9$ is alkyl C1 to 10,

and pharaceutically acceptable salts, alkyl C1 to 6 and benzyl esters thereof.

11. A method of treatment of hypertension, which comprises administering an effective amount of a compound according to claim 1 to a patient suffering from hypertension.

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**4,748,161**

## TRITERPENYL ESTERS OF ORGANIC ACIDS AND HYPOLIPIDEMIC AGENTS COMPOSED OF THEM

**Goro Kimura, Kamakura; Yoshihiko Hirose, Ohgaki; Kumi Yoshida, Sayamachi; Fumio Kuzuya, Nagoya, and Katsunari Fujita, Aichi, all of Japan, assignors to Amano Pharmaceutical Co., Ltd., Nagoya, Japan**

**Filed May 30, 1985, Ser. No. 739,183**

**Claims priority, application Japan, Jun. 4, 1984, 59-115306; Jun. 4, 1984, 59-115307; Apr. 19, 1985, 60-85254; Apr. 19, 1985, 60-85255**

**Int. Cl.[4] F61K** *31/56;* **C07J** *9/00*

**U.S. Cl. 514—182** **21 Claims**

1. A triterpenyl ester derived from triterpenyl alcohol and organic acid other than ferulic acid and monobasic and dibasic saturated fatty acids, wherein

(a) the triterpenyl alcohol is selected from the group consisting of cycloartenol, cyclobranol, 24-methylenecycloartanol, lanosterol, lanostenol, agnosterol, cyclosadol, dihydroagnosterol, cyclolaudenol, cycloartanol, cycloeucalenol, euphol, butyrospermol, tirucallol, euphorbol and dammerdienol and

(b) the organic acid is nicotinic acid, linoleic acid, or an organic acid of the formula

$$Ar(CH{=}CR)_n—COOH$$

wherein R is hydrogen or a $C_{1-4}$-alkyl group and Ar is aminophenyl, nitrophenyl, hydroxyphenyl, a $C_{1-4}$-alkoxyphenyl, $C_{1-4}$-alkyl-CONH-phenyl, ($C_{1-5}$-alkyl)COO-phenyl, $C_{1-4}$-alkoxyhydroxyphenyl, hydroxy-($C_{1-5}$-akyl)-COO-phenyl, $C_{1-4}$-alkoxy-($C_{1-5}$-alkyl)COO-phenyl, $C_{1-4}$-alkoxynitrophenyl, $C_{1-4}$-alkoxyaminophenyl, $C_{1-4}$-alkyl-CONH-$C_{1-4}$-alkxyphenyl, di-($C_{1-4}$-alkoxyphenyl), di-($C_{1-5}$-alkyl-COO)phenyl and dihydroxyphenyl and n is 0 or 1.

21. A method of treating hyperlipidemia comprising administrating to a patient in need of such treatment, a therapeutically effective amount of cyclobranol, or of a triterpenyl ester of organic acid other than dibasic saturated fatty acid.

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**4,748,162**

## 6-SUBSTITUTED-2-CARBAMINIDOYL-PEN-2-EM-3-CARBOXYLIC ACIDS

**William J. Leanza, Berkeley Heights; Burton G. Christensen, Cliffside Park; Frank P. DiNinno, Old Bridge, and Ronald W. Ratcliffe, Matawan, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.**

**Continuation of Ser. No. 353,453, Mar. 1, 1982, abandoned. This application Apr. 30, 1984, Ser. No. 605,338**

**The portion of the term of this patent subsequent to Mar. 17, 2004, has been disclaimed.**

**Int. Cl.[4] C07D** *499/00;* **A61K** *31/425*

**U.S. Cl. 514—192** **25 Claims**

1. A compound having the structural formula:

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**4,748,163**

## NOVEL β-LACTAM ANTIBIOTICS

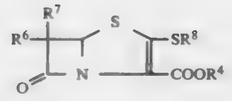
**Gunter Schmidt, Wuppertal; Hans-Joachim Zeiler, Velbert, and Karl G. Metzger, Wuppertal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Feb. 21, 1986, Ser. No. 832,483**

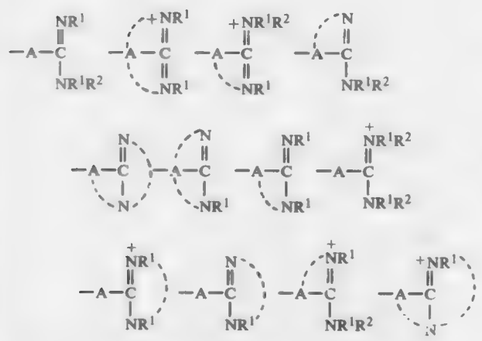
**Claims priority, application Fed. Rep. of Germany, Mar. 8, 1985, 3508258**

**Int. Cl.[4] A61K** *31/43, 31/545;* **C07D** *501/22, 499/70*

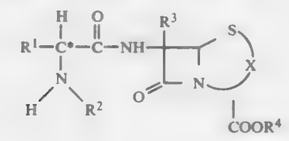
**U.S. Cl. 514—194** **23 Claims**



wherein $R^4$ is H, a carboxylate salt cation, removable protecting group, or a pharmaceutically acceptable salt, ester or amide moiety; wherein: $R^6$ and $R^7$, are independently selected from the group consisting of substituted and unsubstituted: hydrogen, alkyl, alkenyl, alkoxyl, and alkynyl having 1–10 carbon atoms; halo; hydroxyl; carboxyl; cyano; cycloalkyl, cycloalkylalkyl, and alkylcycloalkyl having 3–6 carbon atoms in the cycloalkyl ring and 1–6 carbon atoms in the alkyl moiety; aryl, aralkyl, aralkenyl, and aralkynyl wherein the aryl moiety is phenyl and aliphatic portion has 1–6 carbon atoms; heteroaryl, heteroaralkyl, heterocyclyl, and heterocyclylalkyl, wherein the alkyl moiety has 1–6 carbon atoms and the heteroatoms are selected from ON, N and S; $R^6$ and $R^7$ may be joined to form a cyclicalkyl having, together with the carbon atom to which they are attached, 3–6 carbon atoms; wherein the substituent or substituents on $R^6$, and $R^7$ are independently selected from chloro, fluoro, hydroxy, bromo, alkoxyl having 1–6 carbon atoms, mercapto, carboxyl, cyano, azido, amino, mono- and dialkylamino (each alkyl having 1–6 carbon atoms), ureido, alkylthio having 1–6 carbon atoms; and $R^8$ is a carbamimidoyl selected from the group consisting of:

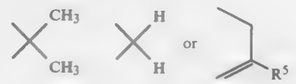


wherein: A is a single, direct bond, or A, the cyclic or acyclic connector, is selected from the group consisting of alkyl, alkenyl, and alkynyl having 1–10 carbon atoms which may be interrupted by a hetero atoms selected from O, S or N, or by a ring such as phenyl, cycloalkyl, cycloalkenyl, heterocyclyl or heteroaryl wherein such cyclic interruptions comprise 3–6 ring atoms selected from C, O, S and N; cycloalkyl, cycloalkenyl having 3–6 carbon atoms; heterocyclyl; heteroaryl; and phenyl; $R^1$ and $R^2$ are independently selected from: hydrogen, $N(R^a)_2$, $OR^a$, ($R^a$ is $C_{1-6}$alkyl), CN, $SO_2NH_2$ and the previously defined, but monovalent, values for the group A; and wherein the dotted lines indicate provision for cyclic structures formed by the joinder of the indicated nitrogen atom and the connector group A and by the joinder of the indicated nitrogen atoms; when $R^6/R^7$ is $CH_3CH(OH)$—, $R^7/R^6$ is not hydrogen.



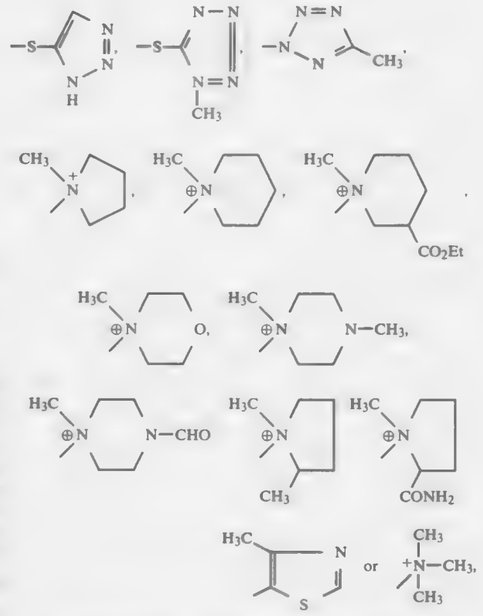
in which

X represents a radical of the formula



in which

$R^5$ represents hydrogen, represents halogen, azido or represents straight-chain, branched or cyclic, alkyl which has up to 7 C atoms and which is optionally substituted by halogen, $C_1$–$C_5$-alkoxy, $C_{1-C5}$-alkylthio, —$OCONH_2$, $C_2$–$C_{10}$-acyloxy, by a pyridinium radical, or by a radical of the formula



or represents alkoxy which has up to 5 C atoms or alkylthio which has up to 5 C atoms,

$R^1$ represents the radical



**4,748,164**

## BICYCLIC BENZONOID ALKYLENE AMINO THIENO [3,4-D] ISOTHIAZOLE ETHERS AND THIOETHETHERS, PHARMACEUTICAL COMPOSITIONS AND USE

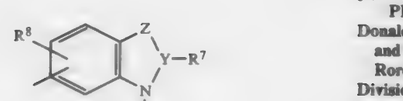
**Donald E. Kuhla, Doylestown; Henry F. Campbell, Lansdale, and William L. Studt, Harleysville, all of Pa., assignors to Rorer Pharmaceutical Corporation, Fort Washington, Pa.**

**Division of Ser. No. 878,284, Oct. 22, 1985, Pat. No. 4,699,906, which is a continuation-in-part of Ser. No. 664,222, Oct. 24, 1984, Pat. No. 4,588,719, which is a continuation-in-part of Ser. No. 604,813, Apr. 27, 1984, Pat. No. 4,638,001, which is a continuation-in-part of Ser. No. 489,702, Apr. 29, 1983, Pat. No. 4,529,723. This application Oct. 5, 1987, Ser. No. 104,849**

**Int. Cl.[4] A61K** *31/425, 31/535;* **C07D** *513/04*

**U.S. Cl. 514—212** **9 Claims**

1. A compound of the formula:



wherein:

a is 0, 1 or 2;

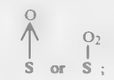
b is 0 or 1;

c is 0, 1-b, 2-b or 3-b;

d is 0 or 1;

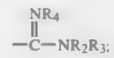
e is 2, 3 or 4;

X is oxygen, sulfur,



R, R′ and R″ are each independently H, alkyl, or aryl-alkyl wherein aryl is phenyl or substituted phenyl

$R_1$ is



$R_2$ and $R_3$ are each independently H or alkyl, or both together with the nitrogen to which they are attached form a 5, 6 or 7-membered ring which may include one to three additional hetero atoms of N, O or S; and

$R_4$ is H or lower alkyl or $R_4$ and $R_2$ together are ethylene or propylene and form a 5- or 6-membered ring together with the nitrogens to which they are attached; or a pharmaceutically acceptable salt thereof.

7. A method for decreasing acid secretion in the gastrointestinal tract of mammals by administering thereto an anti-secretory effective amount of a compound according to claim 1.

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**4,748,165**

## AMIDINE DERIVATIVES

**Derrick F. Jones, Macclesfield, and Keith Oldham, Cheadle, both of United Kingdom, assignors to Imperial Chemical Industries PLC, London, England**

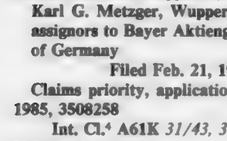
**Filed May 11, 1982, Ser. No. 377,137**

**Claims priority, application United Kingdom, May 18, 1981, 8115156**

**Int. Cl.[4] A61K** *31/505;* **C07D** *239/42*

**U.S. Cl. 514—256** **17 Claims**

1. A guanidine derivative of the formula I:



$R^8$ representing hydrogen, representing hydroxyl or amino, or representing straight-chain, branched or cyclic, alkyl which has up to 10 C atoms and is optionally substituted by halogen, hydroxyl, cyano or $C_6$–$C_{10}$-aryl,

$R^7$ representing hydrogen, representing straight-chain, branched or cyclic, alkyl which has up to 10 C atoms and which is optionally substituted by halogen, hydroxyl, alkoxy or alkoxycarbonyl, each having 1 to 6 C atoms, cyano, carboxyl, aryl, $SO_3H$ or by an amino group, or representing aryl, or

$R^6$ and $R^7$ together completing a double bond,

$R^8$ representing hydrogen, representing alkyl, alkoxy, alkylthio, each having 1 to 8 C atoms, representing trifluoromethyl or trifluoromethoxy, representing hydroxyl, mercapto, nitro or cyano, representing halogen, or representing an amino group,

$R^9$ having the same meaning as $R^7$ and, additionally, representing halogen, representing $C_1$–$C_8$-alkoxy or $C_1$–$C_8$-alkylthio, representing an amino group, representing $SO_2$—$C_1$–$C_8$-alkyl or —$PO(OH)_2$, representing $SO_3H$ or $SO_2NH_2$, representing SH, OH, S-phenyl or O-phenyl, representing guanidino, amidino, —$NHNH_2$ or NHOH, representing pyrrolyl, pyrrolidinyl, pyrazolyl, imidazolyl, pyridyl, pyridazinyl, pyrimidyl, pyrazinyl, quinolyl, isoquinolyl, indolyl, quinoxalyl, quinazolyl, piperidinyl, morpholinyl, piperazinyl, thiomorpholinyl, furyl, thienyl, oxazolyl, thiazolyl, isoxazolyl, thiadiazolyl, triazolyl, S-pyridyl or O-pyridyl,

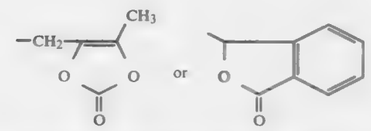
$R^{10}$ having the same meaning as $R^6$ but not completing a double bond with $R^7$, or

$R^9$ and $R^{10}$ together representing a $C_2$–$C_4$-methylene chain which is optionally interrupted by oxygen or sulphur,

$R^2$ represents hydrogen or represents an amino-protective group,

$R^3$ represents hydrogen, represents alkoxy or alkylthio, each having up to 5 C atoms, represents an amino group, or represents NHCHO, and

$R^4$ represents hydrogen, represents a carboxyl protective group, represents —$CH_2$—O—CO—$C(CH_3)_3$, represents —$CH_2$—O—CO—$CH_3$ or —$CH(CH_3)$—O—CO—O—$C_2H_5$, represents the radical of the formula

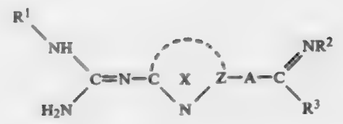


or represents alkali metal or ammonium ions.

17. An antibacterial composition comprising an antibacterially effective amount of a β-lactam compound according to claim 1 in admixture with a pharmaceutically acceptable diluent.

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in which $R^1$ is hydrogen, 1–10C alkyl, 3–8C cycloalkyl, 4–14C cycloalkylalkiyl, 3–6C alkenyl, 3–6C alkynyl, 1–6C alkanoyl, phenyl, 7–11C phenylalkyl or benzoyl, the phenyl, phenylalkyl and benzoyl being optionally substituted on the phenyl ring by one or two substituents selected from halogen, 1–6C alkyl, 1–6C alkoxy, 1–6C alkylthio, trifluoromethyl, hydroxy and amino;

in ring X the dotted line is a double bond on one side of the nitrogen and Z is carbon or nitrogen such that ring X is pyrazine, pyridine, pyrimidine or 1,3,5-triazine, which ring may, where possible, carry one or two optional substituents, the optional substituents on ring X being selected from fluorine, chlorine, bromine, 1–6C alkyl, 1–6C alkoxy, trifluoromethyl, hydroxy and amino;

—A— is phenylene, 5–7C cycloalkylene, or a 1–8C alkylene chain which is optionally substituted by one or two 1–3C alkyls and into which is optionally inserted, as part of the backbone of the chain, one or two groups selected from oxygen, sulphur, NH, 1–6C N-alkyl, cis and trans vinylene, ethynylene, phenylene and 5–7C cycloalkylene, provided that the shortest link between ring X and $C(R^3)=NR^2$ is of at least 3 atoms, provided that when an optional insertion is made in chain A which results in the inserted group being directly attached to $C(R^3)=NR^2$ the inserted group is other than NH or N-alkyl, and provided that no two insertions selected from oxygen, sulphur, NH and N-alkyl are directly attached one to the other;

$R^2$ is hydrogen, 1–6C alkyl, 3–8C cycloalkyl, 4–14C cycloalkylalkyl, 1–6C haloalkyl, 1–6C hydroxyalkyl, 1–6C aminoalkyl, 2–10C alkylaminoalkyl, 3–14C dialkylaminoalkyl, 2–6C carboxyalkyl, 1–6C alkanoyl, benzoyl, phenyl, 7–11C phenylalkyl, 2–6C alkenyl, 2–6C alkynyl, 2–6C haloalkanoyl, 1–6C thioalkanoyl, thiobenzoyl, cyano, carbamoyl, thiocarbamoyl, 2–6C alkylcarbamoyl, 3–10C dialkylcarbamoyl, 2–6C alkylthiocarbamoyl, 3–10C dialkylthiocarbamoyl, carboxyl, 2–6C alkoxycarbonyl, 2–6C alkoxythiocarbonyl oxamoyl, sulphamoyl, 1–6C alkylsulphamoyl, 2–10C dialkylsulphamoyl, phenylsulphamoyl, 7–11C phenylalkylsulphamoyl, 1–6C alkanesulphonyl, benzenesulphonyl, hydroxy, 1–6C alkoxy, amino, 1–6C alkylamino, 2–10C dialkylamino, phenylamino, 2–6C alkoxycarbonylamino, phenylcarbonylamino, 1–6C alkanoylamino, benzoylamino, 1–6C thioalkanoylamino, thiobenzoylamino, heteroarylcarbonylam heteroaryl-(1–6C)alkylcarbonylamino, 1–6C alkanesulphonylamino, benzenesulphonylamino, ureido, thioureido, oxamoylamino, heteroaryl or heteroaryl-(1–6C)alkyl;

$R^3$ is of the formula $HNR^4$ in which $R^4$ is hydrogen, 1–6C alkyl, 2–6C alkenyl, 2–6C alkynyl, cyano, 1–6C alkanoyl, carbamoyl, 2–6C alkylcarbamoyl or 1–6C alkanoylamino;

or $R^2$ is a hydrogen, 1–6C alkyl, 2–6C alkenyl or 2–6C alkynyl and $R^3$ is carboxy;

and wherein when $R^2$ is or contains heteroaryl that heteroaryl is pyridyl or pyrimidyl each of which is optionally substituted by one or two substituents selected from methyl and amino;

and the pharmaceutically-acceptable acid-addition salts thereof.

**16.** A method of inhibiting gastric acid secretion in a warm-blooded animal comprising administering to the animal an effective amount of a compound of claim **1**.

**4,748,166**

## RTV STORAGE STABLE, WATER-FREE ORGANOPOLYSILOXANES

**Alain Gautier, Lyons; Bernard Laisney, and Michel Letoffe, both of Ste Foy-Lès-Lyon, all of France, assignors to Rhone-Poulenc Industries, Paris, France**

**Continuation of Ser. No. 767,258, Aug. 21, 1985, abandoned, which is a continuation of Ser. No. 676,216, Nov. 29, 1984, abandoned, which is a continuation of Ser. No. 517,414, Jul. 26, 1983, abandoned, which is a continuation of Ser. No. 377,156, May 11, 1982, abandoned, which is a continuation of Ser. No. 157,855, Jun. 9, 1980, abandoned. This application May 28, 1986, Ser. No. 869,859**

**Claims priority, application France, Jun. 8, 1979, 79 14675**

**Int. Cl.[4] C08K** *11/00*

**U.S. Cl. 524—13** **15 Claims**

**1**. A curable, pasty, one-component storage stable organopolysiloxane composition of matter consisting essentially of an intimate, water-free admixture of:

(i) 100 parts by weight of $\alpha\omega$-dihydroxydiorganopolysiloxane polymer having a viscosity of at least 500 mPa.s at 25° C. and essentially consisting of diorganosiloxy units of he formula $R_2SiO$, in which the symbols R, which are identical or different, represent alkyl and haloalkyl radicals having from 1 to 8 carbon atoms, alkenyl radicals having from 2 to 4 carbon atoms, aryl and haloaryl radicals having from 6 to 8 carbon atoms or cyanoalkyl radcials having fro 3 to 4 carbon atoms, at least 50% of the total of such radicals being methyl radicals;

(ii) 5 to 200 parts by weight of filler;

(iii) 2 to 20 parts by weight of a polyalkoxylated organosilane having the structural formula:

$$R'_xSi(OCH_2CH_2)_pOCH_3]_{4-x}$$

wherein R', is methyl, vinyl, allyl, methallyl or phenyl, and p and x are each zero or one;

(iv) 0.5 to 115 parts by weight of an amine selected from the group consisting of primary and secondary organic amines having a PKb of less than 5 in an aqueous medium and having a boiling point of at least 60° C. at at atmospheric pressure, and the aminoorganosilanes having the structural formula:

$$Y'NH(G'X)_yGSi[(OCH_2CH_2)_pOR'']_{3-m}Y''_M$$

in which the symbol R'' represents a methyl or ethyl radical, the symbol G represents an alkylene radical having from 1 to 5 carbon atoms, the symbol X represents an oxygen or sulfur atom, the symbol G', represents an alkylene radical having from 2 to 5 carbon atoms, the symbol Y', represents a radical of the formula $(G''NH)_kR'''$, in which the symbol G'' represents an alkylene radical having from 2 to 6 carbon atoms, the symbol R''' represents a hydrogen atom or an alkyl radicla having from 1 to 4 carbon atoms and the symbol k represents zero, one, two or three, the symbol Y'' represents a methyl vinyl or phenyl radical, the symbols p and y represent zero or one, with the proviso that, if p is one, R'' can only be methyl, and the symbol m represents zero, on, two or three; and

(v) 0.005 to 3 parts by weight of a curing catalyst selected from the group consisting of tin salts of carboxylic acids and organotin salts of carboxylic acids.



**4,748,167**

## WATER-BASED COATING COMPOSITIONS COMPRISING EPOXY-CONTAINING ACRYLIC POLYMERS AN POLYFUNCTIONAL WATER-SOLUBLE AMINES

**Suryya K. Das, Pittsburgh; Kurt G. Olson, Gibsonia, and James A. Claar, Export, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.**

**Filed Aug. 1, 1984, Ser. No. 636,754**

**Int. Cl.[4] C08L** *63/10*

**U.S. Cl. 524—410** **8 Claims**

**1**. A water-based curable composition comprising:

(i) water-borne epoxy-containing vinyl polymer which is derived from copolymerizing from about 1 to 80 percent by weight of an ethylenically unsaturated epoxy-containing monomer with other ethylenically unsaturated monomers based on the total monomer content, and

(ii) an oxygen-containing amine having at least two reactive amino hydrogens per molecule and also having a molecular weight less than 5000; said oxygen-containing amine is present in an amount sufficient to produce an effective cure of the composition without imparting undue water sensitivity thereto.

**4,748,168**

## RUBBER COMPOSITIONS FOR TIRE TREADS

**Shinji Kawakami; Makoto Misawa; Takekazu Inoue; Yasuhiro Ishikawa, all of Hiratsuka, and Hiroshi Hirakawa, Isehara, all of Japan, assignors to The Yokohama Rubber Co., Ltd., Tokyo, Japan**

**Filed Apr. 30, 1987, Ser. No. 44,323**

**Int. Cl.[4] C08K** *3/04, 5/01;* **C08L** *9/06*

**U.S. Cl. 524—474** **5 Claims**

**1**. A rubber composition for use in tire treads which comprises:

(a) a starting rubber consisting essentially of one or more of a first styrene-butadiene copolymer rubber having a glass-transition temperature between −20° C. and −45° C., said first copolymer rubber being in an amount of 90–40 parts by weight, and one or more of a second styrene-butadiene copolymer rubber having a glass-transition temperature lower than 45° C., said second copolymer rubber being in an amount of 10–60 parts by weight;

(b) 80–130 parts by weight of a carbon black having a specific surface area greater than 120 $m^2/g$ as determined by nitrogen adsorption, the amount being based on 100 parts by weight of said starting rubber; and

(c) 20–90 parts by weight of a softener of a petroleum type having a viscosity-gravity constant between 0.90 and 0.98, the amount being based on 100 parts by weight of said starting rubber, whereby the composition is provided with a storage shear modulus smaller than 500 MPa at −30° C.

**4,748,169**

## POLYARYLENE SULFIDE RESIN COMPOSITION

**Hitoshi Izutsu, Osaka, and Toshihide Yamaguchi, Izumi-ohtsu, both of Japan, assignors to Dainippon Ink and Chemicals, Inc., Tokyo, Japan**

**Filed Jan. 15, 1986, Ser. No. 819,036**

**Claims priority, application Japan, Jan. 16, 1985, 60-4039; Feb. 28, 1985, 60-40138**

**Int. Cl.[4] C08L** *81/00*

**U.S. Cl. 524—500** **7 Claims**

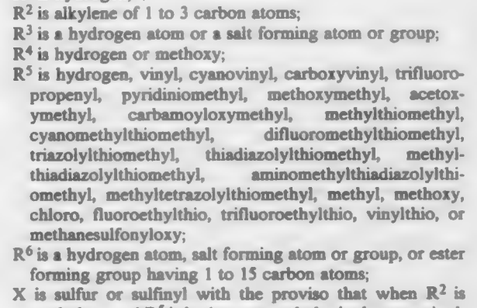
**1**. A polyarylene sulfide resin composition useful for encapsulating electronic components by injection-molding, as a coating composition, or for molding into printed circuit boards, said composition comprising:

(A) 100 parts by weight of polyarylene sulfide resin,

(B) 0.01 to 30 parts by weight of a polymer containing a fluoroaliphatic group and having affinity for the resin (A), said polymer (B) being a random, block or graft copolymer of an unsaturated monomer containing a fluoroaliphatic group represented by the general formula

$$(Rf)_nX—A \quad I$$

wherein Rf represents a fluoroaliphatic group having 3 to 20 carbon atoms, X is



R represents H or a hydrocarbon group having 1 to 10 carbon atoms, l is 1 to 10 and n is 1 or 2, and an unsaturated monomer containing an organic group having affinity for the resin (A), and

(C) 0 to 600 parts by weight of a filler.

**4,748,170**

## CARBOXYALKENAMIDOCEPHALOSPORINS

**Yoshio Hamashima, Kyoto, Japan, assignor to Shionogi & Co., Ltd., Osaka, Japan**

**Division of Ser. No. 711,017, Mar. 12, 1985, Pat. No. 4,634,697, which is a continuation-in-part of Ser. No. 656,731, Oct. 1, 1984, abandoned. This application Feb. 20, 1986, Ser. No. 831,435**

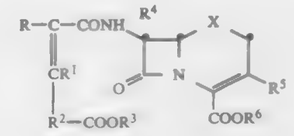
**Claims priority, application Japan, Oct. 4, 1983, 58-186601; Feb. 3, 1984, 59-18563; May 18, 1984, 59-100890**

**The portion of the term of this patent subsequent to Jan. 6, 2004, has been disclaimed.**

**Int. Cl.[4] A61K** *31/545;* **C07D** *501/20*

**U.S. Cl. 514—201** **9 Claims**

**1**. A 7beta-(carboxyalkenoylamino)-3-cephem-4-carboxylic acid compound represented by the following formula



wherein R is 2-aminothiazol-4-yl or 5-amino-1,2,4-thiadiazol-3-yl;

$R^1$ is hydrogen; .

$R^2$ is alkylene of 1 to 3 carbon atoms;

$R^3$ is a hydrogen atom or a salt forming atom or group;

$R^4$ is hydrogen or methoxy;

$R^5$ is hydrogen, vinyl, cyanovinyl, carboxyvinyl, trifluoropropenyl, pyridiniomethyl, methoxymethyl, acetoxymethyl, carbamoyloxymethyl, methylthiomethyl, cyanomethylthiomethyl, difluoromethylthiomethyl, triazolylthiomethyl, thiadiazolylthiomethyl, methylthiadiazolylthiomethyl, aminomethylthiadiazolylthiomethyl, methyltetrazolylthiomethyl, methyl, methoxy, chloro, fluoroethylthio, trifluoroethylthio, vinylthio, or methanesulfonyloxy;

$R^6$ is a hydrogen atom, salt forming atom or group, or ester forming group having 1 to 15 carbon atoms;

X is sulfur or sulfinyl with the proviso that when $R^2$ is methylene and $R^5$ is hydrogen, methyl, vinyl, cyanovinyl, trifluoropropenyl, methoxymethyl, carbamoyloxymethyl,

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methylthiomethyl, cyanomethylthiomethyl, thiadiazolylthiomethyl, triazolylthiomethyl, aminomethylthiadiazolylthiomethyl, methoxy, fluoroethylthio, trifluoroethylthio, or chloro, R is not protected or unprotected 2-aminothiazol-4-yl.

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**4,748,171**

## CEPHEM COMPOUNDS HAVING AT THE 3-POSITION A (1,4-METHYLENE-1-PIPERIDINIO)METHYL GROUP OR A (1-QUINUCLIDINIO)METHYL GROUP

**Hiroshi Yamauchi; Isao Sugiyama; Isao Saito; Seiichiro Nomoto; Takashi Kamiya; Yoshimasa Machida, and Shigeto Negi, all of Ibaraki, Japan, assignors to Eisai Co., Ltd., Tokyo, Japan**

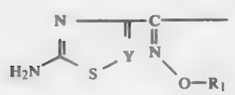
**Filed Jan. 14, 1986, Ser. No. 818,824**

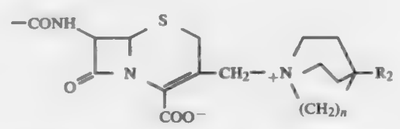
**Claims priority, application Japan, Jan. 14, 1985, 60-3181; Apr. 11, 1985, 60-75333; Sep. 9, 1985, 60-174326**

**Int. Cl.[4] A61K** *31/54;* **C07D** *501/46*

**U.S. Cl. 514—202** **9 Claims**

9. An antibacterial composition comprising a compound represented by the formula:





wherein n represents 1 or 2, Y represents a nitrogen atom, $R_1$ represents lower alkyl, lower alkenyl, lower alkynyl, carboxyl-substituted lower alkyl, or carbamoyl-substituted lower alkyl, and $R_2$ represents hydroxyl, hydroxy-substituted lower alkyl, or carbamoyl, or a pharmaceutically acceptable salt thereof, and a pharmaceutically acceptable carrier therefor.

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**4,748,172**

## 3-BICYCLICPYRIDINIUM-METHYL CEPHALOSPORINS

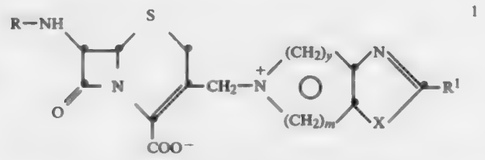
**Allen S. Katner, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.**

**Continuation of Ser. No. 740,153, Jun. 3, 1985, abandoned, which is a division of Ser. No. 679,717, Dec. 10, 1984, which is a continuation-in-part of Ser. No. 542,619, Oct. 17, 1983, abandoned. This application Jan. 12, 1987, Ser. No. 2,091**

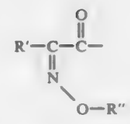
**Int. Cl.[4] C07D** *501/38;* **A61K** *31/545*

**U.S. Cl. 514—206** **28 Claims**

1. A compound of the formula

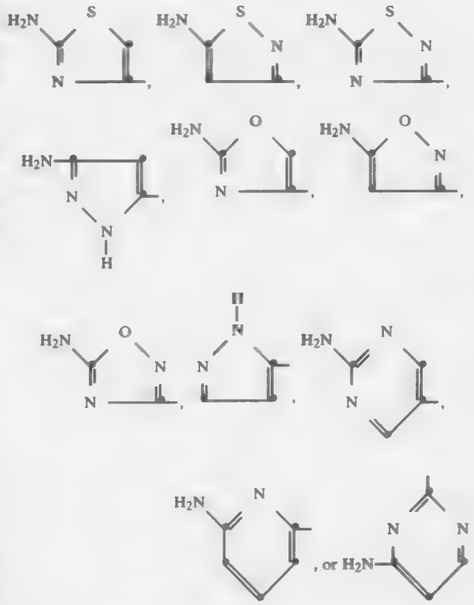


wherein R is hydrogen, formyl, α-aminoadipoyl, protected α-aminoadipoyl, or an acyl group of the formula

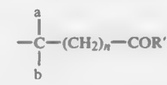


wherein

R′ is a 5- or 6-membered heterocyclic ring of the formulas



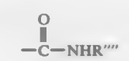
R″ is hydrogen, $C_1$–$C_4$ alkyl, a carboxy-substituted alkyl or carboxy-substituted cycloalkyl group of the formula



wherein

n is 0–3; a and b when taken separately are independently hydrogen or $C_1$–$C_3$ alkyl, and when taken together with the carbon to which they are bonded form a $C_3$–$C_7$ carbocyclic ring; R‴ is hydroxy, $C_1$–$C_4$ alkoxy, amino, or OR*, wherein R* is indanyl, phthalidyl, or an acyloxymethyl group of the formula —$CH_2$—O—C(O)—$R_2$ wherein $R_2$ is $C_1$–$C_4$ alkyl or phenyl; or R* is a carboxy-protecting group; or

R″ is an N-substituted carbamoyl group of the formula



wherein R‴′ is $C_1$–$C_4$ alkyl, phenyl or $C_1$–$C_3$ alkyl substituted by phenyl;

y and m independently are integers equal to 0, 1, 2 or 3, provided that y plus m equals 3;

$R^1$ is hydrogen, $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkoxy, $C_1$–$C_4$ alkylthio, thienyl, amino, $C_1$–$C_4$ alkanoylamino, $C_1$–$C_4$ alkylamino, di-$C_1$–$C_4$ alkylamino, hydroxycarbonyl, $C_1$–$C_4$ alkoxycarbonyl, or phenyl or phenylcarbonyl in which the phenyl groups may be substituted by one or two groups selected from $C_1$–$C_4$ alkoxy, $C_1$–$C_4$ alkyl or $C_1$–$C_4$ alkylthio;

X is N—$R^2$, where $R^2$ is hydrogen or $C_1$–$C_4$ alkyl; and the pharmaceutically acceptable salts and biologically labile esters thereof.



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**4,748,173**

## HETEROCYCLIC AMINOALKYL ESTERS OF MYCOPHENOLIC ACID AND DERIVATIVES THEREOF AND PHARMACEUTICAL COMPOSITIONS

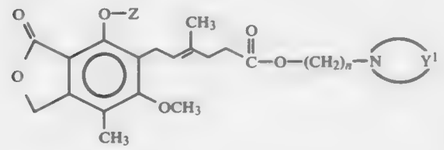
**Peter H. Nelson, Los Altos; Chee-Liang L. Gu, Sunnyvale; Anthony C. Allison; Elsie M. Eugui, both of Belmont, and William A. Lee, Menlo Park, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.**

**Division of Ser. No. 8,909, Jan. 30, 1987. This application Sep. 23, 1987, Ser. No. 99,950**

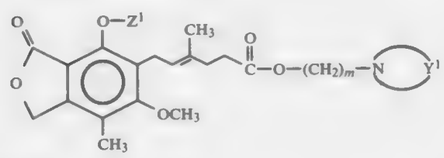
**Int. Cl.[4] A61K** *31/535, 31/55;* **C07D** *405/12, 413/12*

**U.S. Cl. 514—211** **8 Claims**

1. A compound represented by the formula:



or represented by the formula:



wherein:

m is an integer from two to four;

n is an integer from two to four;

Z is —C(O)$R^1$ in which $R^1$ is hydrogen, or alkyl having seven or more carbon atoms;

$Z^1$ is hydrogen or —C(O)$R^9$, where $R^9$ is lower alkyl or aryl; and

$Y^1$ is lower alkylene of four to six carbon atoms, or lower alkylene of three to five carbon atoms plus one member that is —O—, —S—, or >N—$R^{10}$,

where $R^{10}$ is hydrogen or alkyl of one to five carbon atoms; or a pharmaceutically acceptable salt thereof;

provided that that when when m is two, $Y^1$ is not —$(CH_2)_2$—O—$(CH_2)_2$—.

7. A pharmaceutical composition comprising a pharmaceutically acceptable non-toxic excipient and a therapeutically effective amount of a compound of claim 1.

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**4,748,174**

## WATER SOLUBLE SALTS OF AN NSAID WITH MEGLUMINE/GLUCAMINE

**Paolo A. Veronesi, Milan, Italy, assignor to Therapicon s.r.l., Milan, Italy**

**Filed Jan. 5, 1987, Ser. No. 363**

**Claims priority, application Italy, Jan. 3, 1986, 19004 A/86**

**Int. Cl.[4] C07D** *279/02, 231/56, 333/22, 207/323;* **A61K** *31/54, 31/44, 31/415, 31/615*

**U.S. Cl. 514—226.5** **34 Claims**

1. A water soluble acid addition salt of meglumine or glucamine and one of the NSAIDs, acetylsalicylic acid, bucloxic acid, flufenamic acid, mefanamic acid, niflumic acid, tiaprofenic acid, tolfenamic acid, bendazac, carprofen, ketoprofen, diclofenac, diflunisal, etodolac, fenbufen, fenoprofen, fentiazac, flurbiprofen, isoxicam, naproxen, pirfrofen, piroxicam, sulindac, suprofen, tenoxicam, tolmetin, or zomepirac.

33. A method for eliciting an anti-inflammatory or analgesic response in a mammalian organism in need of such treatment, comprising administering to such organism an anti-inflammatory or analgesically effective amount of the acid addition salt as defined by claim 1.

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**4,748,175**

## PYRIMIDO[5,4-B][1,4]OXAZINE DERIVATIVES AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

**Endre Kasztreiner; György Rabloczky; Nándor Makk; György Csch; Mária Kubár née Kürthy; Eszter Diesler; László Jaszlits; László Sebestyén; János Wellmann; Anikó Tegdes; Judit Sárossy née Kincsesy; Péter Mátyus; András Varró; László Szám, all of Budapest, and Sarolta Végvári née Gyürki, Verocemaros, all of Hungary, assignors to Chinoin Gyogyszer Es Vegyeszeti Termekek Gyara Rt, Budapest, Hungary**

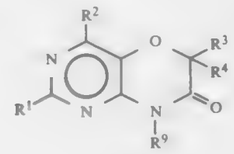
**Filed Dec. 30, 1986, Ser. No. 947,700**

**Claims priority, application Hungary, Dec. 30, 1985, 5042/85**

**Int. Cl.[4] A61K** *31/535;* **C07D** *498/04*

**U.S. Cl. 514—230.5** **10 Claims**

1. A compound of the Formula (I),



(I)

wherein

$R^1$ stands for a $C_{1-4}$ alkyl group;

$R^2$ stands for halogen or an —$NR^5R^6$ group, wherein

$R^5$ represents hydrogen or a benzyl group

$R^6$ stands for hydrogen, a straight or branched-chain $C_{1-4}$ alkyl group optionally substituted by a hydroxyl, di($C_{1-4}$ alkyl)amino group or by a 6-membered, saturated nitrogen-containing heterocycle optionally containing an additional nitrogen or oxygen atom and optionally substituted by a methyl or benzyl group; further

$NR^5R^6$ may also represent a 6-membered, saturated nitrogen-containing heterocycle optionally containing an additional nitrogen or oxygen atom and optionally substituted by a $C_{2-4}$ alkoxycarbonyl or $C_{1-4}$ hydroxyalkyl group;

$R^3$ and $R^4$ are the same or different and stand for hydrogen or a methyl group;

$R^9$ stands for hydrogen or a $C_{1-3}$ alkyl group unsubstituted or monosubstituted by an oxo, cyano, $C_{2-5}$ alkoxycarbonyl, morpholinocarbonyl, or phenyl group or mono- or polysubstituted by a OH group, with the proviso that $R^2$ is different from a chlorine, 4-morpholinyl or piperidyl group when $R^9$ stands for hydrogen; or $R^2$ is different from a chlorine or 4-morpholinyl group when $R^9$ stands for a methyl or benzyl group, or a tautomer, tautomeric mixture or pharmaceutically acceptable acid addition salt thereof.

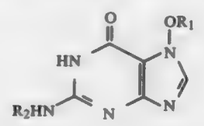
3. The compound of the Formula (I) defined in claim 1 wherein $R^2$ is —$NR^5R^6$ and —$NR^5R^6$ is 4-morpholinyl, or a tautomeric, tautomeric mixture or pharmaceutically acceptable acid addition salt thereof.

VOL 1090 ISS 5 MY 31 1988 UMI



**4,748,176**
**7-HYDROXYGUANINE COMPOUNDS**
**Kiyoto Ishii, Akashi; Hajime Kawaharada, Kakogawa, and Kiyoshi Watanabe, Akashi, all of Japan, assignors to Kanegafuchi Chemical Industry Co., Ltd., Osaka, Japan**
**Filed May 27, 1986, Ser. No. 867,032**
**Claims priority, application Japan, May 27, 1985, 60-113874**
**Int. Cl.⁴ C07D *473/18;* A61K *31/52***
**U.S. Cl. 514—262** **4 Claims**

1. A 7-hydroxyguanine compound of the formula:



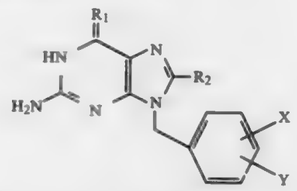
(I)

wherein $R_1$ is hydrogen atom, tetrahydropyranyl group or tetrahydrofuryl group, $R_2$ is hydrogen atom, tetrahydropyranyl group or tetrahydrofuryl group, provided that when $R_1$ is hydrogen atom, $R_2$ is tetrahydropyranyl group or tetrahydrofuryl group, or a pharmaceutically acceptable salt thereof.

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**4,748,177**
**GUANINE DERIVATIVES**
**Jagadish C. Sircar; Catherine R. Brungardt, both of Ann Arbor, Mich., and Charles F. Schwender, Gladstone, N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.**
**Continuation-in-part of Ser. No. 593,063, Mar. 26, 1984, abandoned. This application Feb. 11, 1985, Ser. No. 698,805**
**Int. Cl.⁴ C07D *473/18;* A61K *31/52***
**U.S. Cl. 514—262** **18 Claims**

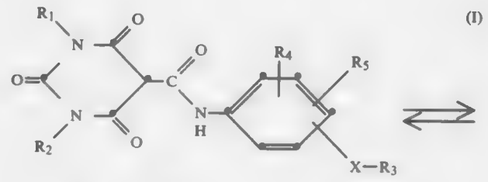
1. A compound of the formula



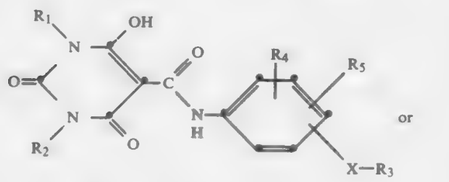
wherein $R_1$ is O or S; $R_2$ is bromine or NHR where R is hydrogen or $COR_5$ where $R_5$ is alkyl of one to four carbon atoms, aryl where aryl is phenyl unsubstituted or substituted by halogen, alkyl of one to four carbon atoms, alkxoy of one to four carbon atoms or trifluoromethyl, or arylalkyl where aryl is as defined above and alkyl is a carbon chain of up to four carbon atoms; Y is hydrogen and X and Y are each independently halogen, alkoxy of one to four carbon atoms, trifluoromethyl, hydroxy, CN, $SO_nR_3$, $COOR_3$, $NR_3R_4$ in which $R_3$ and $R_4$ are each independently hydrogen or alkyl of one to four carbon atoms and n is zero, one, two or three, or a pharmaceutically acceptable acid addition or base salt thereof.

**4,748,178**
**5-(PYRIDYLOXY- OR PYRIDYLTHIO-PHENYL)CARBAMOYL BARBITURIC ACID DERIVATIVES**
**Urs Burckhardt, Basel; Jean J. Gallay, Magden, and Manfred Kühne, Pfeffingen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**
**Continuation-in-part of Ser. No. 788,087, Oct. 15, 1985, abandoned, which is a continuation of Ser. No. 641,092, Aug. 15, 1984, abandoned. This application Feb. 13, 1986, Ser. No. 829,589**
**Claims priority, application Switzerland, Aug. 19, 1983, 4535/83; Jul. 20, 1984, 3526/84**
**Int. Cl.⁴ A61K *31/495;* C07D *401/10***
**U.S. Cl. 514—270** **19 Claims**

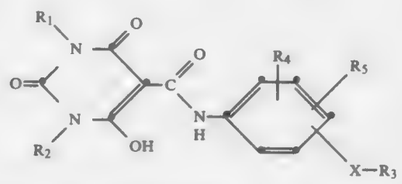
1. A 5-phenylcarbamoylbarbituric acid compound of the formula I



(I)



or



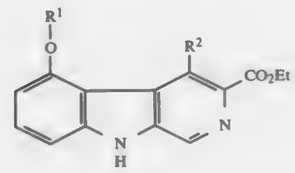
and tautomeric forms and salts thereof in which $R_1$ and $R_2$ independently of one another are $C_1$–$C_5$-alkyl, $C_1$–$C_3$-alkoxy, $C_3$–$C_6$-cycloalkyl, allyl or phenyl; $R_3$ is pyridyl which is unsubstituted or monosubstituted to trisubstituted by substituents selected from the group consisting of halogen, cyano, thiocyano, isothiocyano, $C_1$–$C_5$-alkanoyl, $C_1$–$C_5$-alkyl, $C_1$–$C_5$-halogenoalkyl, $C_1$–$C_5$-halogenoalkoxy, $C_1$–$C_5$-alkoxy or benzyl; $R_4$ and $R_5$ independently of one another are hydrogen, halogen, $C_1$–$C_5$-halogenoalkyl, $C_1$–$C_5$-alkyl, $C_1$–$C_5$-alkoxy or $C_1$–$C_5$-alkylthio; and X is oxygen or sulfur.

19. A process for controlling parasitic helminths, which comprises administering an anthelmintically effective amount of a compound of the formula I according to claim 1 to an animal.



**4,748,179**
**β-CARBOLIN-3-CARBOXYLIC ACID DERIVATIVES AND THEIR USE AS BENZODIAZEPINE ANTAGONISTS**
**Claus T. Braestrup; Erling Petersen, both of Glostrup; Tage Honore, Maaloev; Leif H. Jensen, Hellerup, all of Denmark, and Dieter Seidelmann, Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany**
**Continuation of Ser. No. 614,504, May 29, 1984, abandoned. This application Jun. 20, 1985, Ser. No. 746,811**
**Claims priority, application Denmark, May 27, 1983, 2402/83**
**Int. Cl.⁴ A61K *31/395, 31/40;* C07D *471/04***
**U.S. Cl. 514—292** **10 Claims**

1. A β-carbolin-3-carboxylic acid of the formula



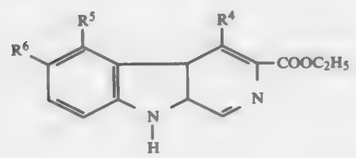
wherein
$R^1$ is methyl, ethyl, n-propyl or iso-propyl, and wherein
$R^2$ is hydrogen, methyl, ethyl, n-propyl or iso-propyl, provided that $R^1$ is not methyl, when $R^2$ is hydrogen.

6. A method of producing a benzodiazepine antagonistic effect in a patient an in need of such treatment comprising administering to the patient an amount of a compound of claim 1 effective for producing said benzodiazepine antagonistic effect.

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**4,748,180**
**β-CARBOLINE-3-CARBOXYLIC ACID DERIVATIVES, AND THEIR USE AS PSYCHOTROPIC AND ANTI-EPILEPTIC AGENTS**
**Erling N. Petersen, Glostrup; Leif H. Jensen, Hellerup; Frank Watjen, Bajsvaerd, all of Denmark, and Dieter Seidelmann, Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany**
**Division of Ser. No. 734,222, May 15, 1985, Pat. No. 4,631,285. This application Oct. 9, 1986, Ser. No. 917,333**
**Claims priority, application Denmark, May 15, 1984, 2401/84**
**Int. Cl.⁴ A61K *31/395, 31/40;* C07D *471/04***
**U.S. Cl. 514—292** **19 Claims**

1. A β-carboline-3-carboxylic acid of the formula



(1)

wherein
$R^4$ is methyl, ethyl or methoxymethyl,
$R^5$ is —$OR^8$,
$R^8$ is $C_{2-4}$—alkyl,
$R^6$ is hydrogen, —$OR^{10}$, or —$CH_2$—$OR^9$,
$R^9$ is $C_{1-4}$—alkyl, and
$R^{10}$ is $C_{3-4}$—alkyl,
with the proviso that,
$R^5$ is not isopropoxy when $R^4$ is methyl.

8. A psychotropic composition comprising a psychotropically effective amount of a compound of claim 1 and a pharmaceutically acceptable carrier.

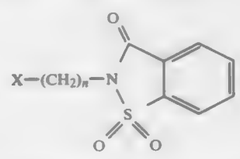
**4,748,181**
**METHOD FOR TREATING HYPERTENSION WITH NICOTINE**
**Ronald R. Hutchinson, and Grace S. Emley, both of Augusta, Mich., assignors to Foundation for Behavioral Research, Augusta, Mich.**
**Continuation of Ser. No. 70,367, Aug. 28, 1979, abandoned. This application May 15, 1985, Ser. No. 734,764**
**Int. Cl.⁴ A61K *31/44***
**U.S. Cl. 514—343** **5 Claims**

1. A method of treating essential hypertension which comprises administering to a hypertensive primate subject afflicted with essential hypertension and requiring such treatment, over a period of at least several weeks, a therapeutically effective amount, for chronic treatment to obtain an antihypertensive effect, of nicotine or pharmacologically acceptable acid addition salt of nicotine, in combination with a pharmacologically acceptable carrier, diluent or vehicle.

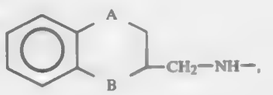
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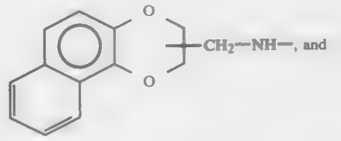
**4,748,182**
**AROMATIC 2-AMINOALKYL-1,2-BENZOISOTHIAZOL-3(2H)ONE-1,1-DIOXIDE DERIVATIVES AND THEIR USE AS ANTI-HYPERTENSIVE AND ANXIOLYTIC AGENTS**
**Marcel Hibert, Strasbourg, and Maurice W. Gittos, Plobsheim, both of France, assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio**
**Filed Mar. 5, 1986, Ser. No. 836,276**
**Int. Cl.⁴ A61K *31/34, 31/35;* C07D *275/06***
**U.S. Cl. 514—367** **10 Claims**

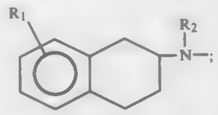
1. An aromatic 2-aminoalkyl-1,2-benzoisothiazol-3(2H)one-1,1-dioxide derivative having the formula



wherein n is an integer of from 2 to 5; X is selected from the group consisting of







A and B are each oxygen or sulfur; $R_1$ is hydrogen, hydroxy or methoxy; $R_2$ is hydrogen or methyl; and the pharmaceutically acceptable acid addition salts thereof.

10. An antihypertensive composition comprising an antihypertensive effective amount of a compound according to claim 1, or a pharmaceutically acceptable acid salt thereof, in combination with a pharmaceutically acceptable carrier or diluent.

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**4,748,183**

## N-1H-TETRAZOL-5-YL-2-THIOPHENE CARBOXAMIDES, N-1H-TETRAZOL-5-YL-2-PYRROLE CARBOXAMIDES, N-1H-TETRAZOL-5-YL-2-FURAN CARBOXAMIDES, AND ANTI-ALLERGIC AND ANTI-INFLAMMATORY USE THEREOF

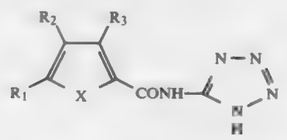
**Wiaczeslaw A. Cetenko; David T. Connor, both of Ann Arbor; Michael D. Mullican, Ypsilanti, and Roderick J. Sorenson, Ann Arbor, all of Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.**

**Continuation-in-part of Ser. No. 874,309, Jun. 13, 1986. This application Mar. 18, 1987, Ser. No. 27,453**

**Int. Cl.**[4] **C07D** *405/12, 409/12, 403/12;* **A61K** *31/41*

**U.S. Cl. 514—381** **52 Claims**

**1**. A compound having the formula (I)



I

and pharmaceutically acceptable salts thereof, wherein $R_1$, $R_2$, and $R_3$ may be the same or different and are (i) hydrogen; (ii) lower alkyl; (iii) lower alkoxy; (iv) phenyl unsubstituted or substituted with of from one to five, substituents comprising one or more of each of halogen, trifluoromethyl, lower alkyl, hydroxy, lower alkoxy, nitro, amino, mono lower alkylamino, dilower alkylamino; (v) halogen; (vi) trifluoromethyl; (vii) hydroxy; (viii) amino; (ix) mono lower alkylamino; (x) di lower alkylamino; (xi) nitro; (xii) mercapto; (xiii) lower alkylthio; (xiv) lower alkylsulfinyl; (xv) lower alkylsulfonyl; (xvi) benzyloxy; (xvii) methylphenyloxy; or (xviii) 4-methoxyphenylthio;

X is O, $S(O)_{0-2}$ or $NR_4$ whereibn $R_4$ is hydrogen; lower alkyl; phenyl unsubstituted or substituted by of from one to five, preferably, from one to three, substituents comprising one or more of each of halogen, trifluoromethyl, lower alkyl, hydroxy, lower alkoxy, nitro, amino, mono lower alkylamino, or dilower alkylamino; or aralkyl.

**52**. A method for treating allergy or inflammation in a mammal suffering therefrom which comprises administering to such mammal the compound of formula I of claim **1** in a unit dosage form.

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**4,748,184**

## ARYL SUBSTITUTED AMINOMETHYL BENZENE DERIVATIVES HAVING ANTIARRHYTHMIC UTILITY

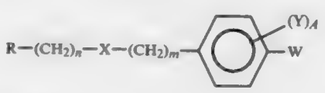
**David M. Stout; William L. Matier, both of Libertyville, and Lawrence A. Black, Vernon Hills, all of Ill., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 401,751, Jul. 26, 1982, Pat. No. 4,562,201. This application Dec. 27, 1985, Ser. No. 813,734**

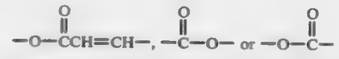
**Int. Cl.**[4] **A61K** *31/40, 31/455;* **C07D** *403/10, 401/10*

**U.S. Cl. 514—422** **19 Claims**

**1**. A compound of the formula



wherein X is



wherein W is hydrogen or hydroxy; $(Y)_A$ is positioned ortho to W and is an aminoloweralkyl having the formula $—CH_2NR_2R_3$ where $R_2$ and $R_3$ may together with N form a pyrrolidine, piperidine or azepine ring, and A is 2; n and m are independently from 0 to 5; and R is straight or branched $C_1$–$C_{10}$ alkyl, straight or branched $C_3$–$C_{10}$ cycloalkyl, straight or branched $C_2$–$C_4$ alkenyl, or straight or branched $C_2$–$C_4$ alkynyl, or a pharmaceutically acceptable salt thereof.

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**4,748,185**

## 4-HYDROXYCOUMARIN DERIVATIVES

**Ian D. Entwistle, Sittingbourne, and Peter Boehm, Maidstone, both of England, assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

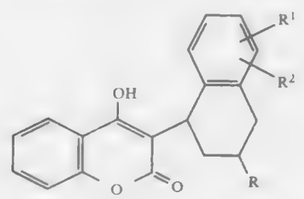
**Filed Dec. 16, 1986, Ser. No. 944,942**

**Claims priority, application United Kingdom, Dec. 20, 1985, 8531388**

**Int. Cl.**[4] **C07D** *311/12;* **A61K** *31/35*

**U.S. Cl. 514—457** **8 Claims**

**1**. A 4-hydroxycoumarin compound of formula



(I)

wherein $R^1$ and $R^2$ are independently selected from hydrogen and halogen atoms and R represents a group of formula



wherein one of n and n′ is 0, the other being 0 or 1, D represents a moiety —O—, $—(CH_2)_m—$ or $—O(CH_2)_m—$ where m is 1 or 2 and X represents a substituent selected from hydrogen, halogen, CN, $CF_3$, $OCF_3$, $C_{1-6}$ alkyl and $C_{1-6}$ alkoxy moieties, provided that when n is 1 and D is $—OCH_2—$, X may additionally represent a phenyl group, optionally substituted in the 4-position by a substituent selected from halogen, CN, $CF_3$, $OCF_3$, $C_{1-6}$alkyl and $C_{1-6}$ alkoxy moieties.

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**4,748,186**

## S-TRIFLUOROBUTENYL DERIVATIVES AND PESTICIDAL USES THEREOF

**Thomas G. Cullen, Milltown; Anthony J. Martinez, Hamilton Square, and Jacob J. Vukich, Mount Holly, all of N.J., assignors to FMC Corporation, Philadelphia, Pa.**

**Filed Jun. 30, 1986, Ser. No. 880,421**

**Int. Cl.**[4] **C07C** *119/18, 155/08;* **A01N** *37/00, 47/10*

**U.S. Cl. 514—478** **22 Claims**

**1**. S-trifluorobutenyl compounds of the formula



and salts thereof,

wherein X is $R^1N$ or S and Y is RS or $R^3R^2N$;

wherein R is a metal or a radical selected from alkyl, cycloalkylalkyl, halocycloalkylalkyl, alkenyl, haloalkyl, haloalkenyl, alkynyl, alkoxyalkyl, alkylthioalkyl, alkoxycarbonylalkyl, halophenoxyalkyl, phenylalkyl, halophenylalkyl, nitrophenylalkyl, haloalkylphenylalkyl, [2-methyl-(1,1′-biphenyl)-3-yl]methyl, 3-phenoxybenzyl, phenylthioalkyl and halophenylthioalkyl;



wherein $R^1$ is alkyl, cycloalkyl, cyano, halophenyl, halophenylalkyl or haloalkoxyphenyl;

wherein $R^2$ is hydrogen or alkyl; and

wherein $R^3$ is cycloalkylalkyl, dialkylaminoalkyl, halophenyl, halophenylkalkyl or haloalkoxyphenyl;

said alkyl and alkoxy groups having 1–12 carbon atoms; said cycloalkyl groups having 3–8 carbon atoms; and said alkenyl and alkynyl groups having 2–12 carbon atoms;

provided that:

when X is S, Y is $R^3R^2N$,

when X is $R^1N$, Y is RS,

$R^1$ is other than alkyl and

R is other than haloalkenyl; and

when X is $R^1N$ where $R^1$ is CN and Y is RS,

R is other than alkali metal.

**12**. A method of controlling nematodes which comprises applying to the locus where control is desired a nematicidally effective amount of a compound of claim **1**.

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**4,748,187**

## OPIOID PEPTIDE-DEGRADING ENZYME INHIBITOR WITH A GERMANIUM COMPOUND

**Norihiro Kakimoto; Takashi Katayama, both of Tokyo; Tadahiko Hazato, Saitama, and Tsutomu Ohnishi, Tokyo, all of Japan, assignors to Asai Germanium Research Institute, Tokyo, Japan**

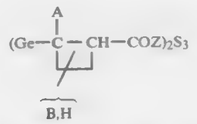
**Division of Ser. No. 626,787, Jul. 2, 1984, Pat. No. 4,681,960. This application Nov. 14, 1986, Ser. No. 930,561**

**Claims priority, application Japan, Jul. 1, 1983, 58-119856; Jul. 11, 1983, 58-125725**

**Int. Cl.**[4] **A61K** *31/28*

**U.S. Cl. 514—492** **11 Claims**

**1**. A method of inhibiting the action of an opioid peptide-degrading enzyme comprising administering to an organism in need of such treatment an effective opioid peptide-degrading enzyme amount of a compound having the formula:



wherein A represents a hydrogen atom, a lower alkyl group or a phenyl group, B represents a hydrogen atom or a lower alkyl group and Z represents a hydroxyl or amino group; wherein said lower alkyl group is selected from the group consisting of methyl, ethyl and propyl.

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**4,748,188**

## PROCESS FOR TREATING WOOD PRODUCTS WITH AN ANTIFOULING/PRESERVATIVE COMPOSITION

**Richard J. Guglielmo, Sr., Lambe La., Cresskill, N.J. 07626**

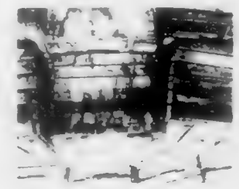
**Division of Ser. No. 508,521, Jun. 27, 1983, Pat. No. 4,555,356, which is a continuation-in-part of Ser. No. 888,373, Mar. 20, 1978, Pat. No. 4,393,102, and a continuation-in-part of Ser. No. 341,275, Jan. 21, 1982, abandoned. This application Jul. 29, 1985, Ser. No. 760,280**

**The portion of the term of this patent subsequent to Nov. 26, 2002, has been disclaimed.**

**Int. Cl.**[4] **C09D** *5/14*

**U.S. Cl. 514—493** **3 Claims**

**1**. A process for treating a wood product to impart antifouling and preservative properties thereto which comprises contacting said wood product with an antifouling/preservative composition comprised of tri-n-butyl tin linoleate in an amount of from 8 to 12 percent by weight in a solvent system to form



a treated wood product of controlled leach out rate of said tri-n-butyl tin linoleate in a water environment.

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**4,748,189**

## OPHTHALMIC SOLUTIONS AND METHODS FOR IMPROVING THE COMFORT AND SAFETY OF CONTACT LENSES

**Kai C. Su, Alpharetta, and Lynn Winterton, Roswell, both of Ga., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Continuation-in-part of Ser. No. 726,065, Apr. 15, 1985, abandoned. This application Feb. 27, 1986, Ser. No. 834,998**

**Int. Cl.**[4] **A61K** *9/12, 47/00, 9/08, 9/10*

**U.S. Cl. 514—781** **46 Claims**

**1**. An ophthalmic comfort drop solution for intra ocular use with a daily wear hydrogel contact lens so as to improve the exchange of

(I) ocular fluid trapped between said lens and an eye to which said lens has been applied for

(II) ocularly compatable fluid not so trapped, said solution consisting essentially of:

(a) 0.1 to 0.5% by weight of a lens flattening agent selected from urea, glycerin, sorbitol, aminoethanol and mixtures thereof;

(b) an ocularly acceptable ionic salt in an amount sufficient to give the entire comfort drop solution a tonicity in the range of 270–330 milliosmoles per kilogram of said comfort drop solution;

(c) an ocularly acceptable viscosity enhancing agent in an amount sufficient to give said comfort drop solution a Brookfield relative viscosity in the range of 3 to 50 cps;

(d) an ocularly acceptable buffer in an amount of 0% or an effective buffering amount to result in said comfort drop solution having a pH of about 6.5 to about 8;

(e) 0% to 0.5% of an ocularly acceptable preservative;

(f) 0% to 2% of an ocularly acceptable lubricant;

(g) 0% to an ocularly vasoconstricting effective amount of an ocular decongestant;

(h) 0% to 0.5% of a non-ionic ocularly acceptable surfactant; and

(i) water.

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**4,748,190**

## PROCESS FOR FORMING A SHAPED POROUS FLUORINATED POLYMER CATALYST AND THE RESULTANT PRODUCT

**William P. Carl, Angleton, Tex., assignor to The Dow Chemical Company, Midland, Mich.**

**Filed Dec. 24, 1985, Ser. No. 813,130**

**Int. Cl.**[4] **C08J** *9/06, 9/12;* **B29C** *67/22*

**U.S. Cl. 521—38** **22 Claims**

**1**. A process for making a high surface area, self-supporting catalyst suitable for use as an acid catalyst comprising:

(a) at least partially polymerizing a perfluorinated monomer containing ion exchange groups convertible to an acid or salt form in a medium containing a gas forming ingredient(s) which is present during polymerization and serves a polymerization enhancement purpose during polymerization wherein the said gas-forming ingredient(s)

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is a material that will convert into a gasous state and expand when heated; and

(b) heating the polymer to a temperature sufficient to soften the polymer and sufficient to convert at least a portion of the gas-forming ingredient(s) into a gaseous state while the polymer is still in contact with at least a portion of the gas-forming ingredient(s), thereby converting the gas-forming ingredient(s) into a gas which expands the polymer and causes the formation of open and closed pores within the polymer;

wherein the gas-forming ingredient is selected from the group consisting of: potassium persulfate, potassium bisulfite, ammonium persulfate, sodium persulfate, sodium bisulfite, organic fluorocarbon peroxides, azodifluodiazide, azo-bisisobutyronitrilealkyl sulfates, fluorinated alkyl carboxylates, fatty acid salts, and water.

2. The process of claim 1 wherein the perfluorinated monomer is represented by the general formula:

$$Y-(CF_2)_a-(CFR_f)_b-(CFR'_f)_c-O-[CF(CF_2X)-CF_2-O]_n-CF=CF_2 \quad (1)$$

where:

Y is selected from the group consisting of $-SO_2Z$, —CN, —COZ, $-COOCH_3$ and $-C(R^3_{hd\,f})(R^4_f)OH$;

Z is selected from the group consisting of —I, —Br, —Cl, —F, —OR, and $-NR_1R_2$;

R is a branched or linear alkyl radical having from 1 to about 10 carbon atoms or an aryl radical;

$R_f$ and $R'_f$ are independently selected from the group consisting of —F, —Cl, perfluoroalkyl radicals having from 1 to about 10 carbon atoms and fluorochloroalkyl having from 1 to about 10 carbon atoms;

$R_1$ and $R_2$ are independently selected from the group consisting of —H, a branched or linear alkyl radical having from 1 to about 10 carbon atoms, and aryl radicals;

$R^3_f$ and $R^4_f$ are independently selected from the group consisting of perfluoroalkyl radicals having from 1 to about 10 carbon atoms;

X is —Cl, —Br, —F, or mixtures thereof when n>1;

a is 0–6;

b is 0–6; and

c is 0 or 1;

provided a+b+c is not equal to 0.

3. The method of claim 2 wherein a second type of monomer is present which is represented by the general formula:

$$CF_2=CZZ' \quad (2)$$

where Z and Z' are independently selected from the group consisting of —H, —Cl, —F, and $-CF_3$.

16. The product produced by the method of claim 3.

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**4,748,191**

**PROCESS FOR PREPARING PRE-EXPANDED PARTICLES OF THERMOPLASTIC RESIN**

**Kyoichi Nakamura, Ibaraki, Japan, assignor to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan**

**Filed Jan. 30, 1987, Ser. No. 8,885**

**Claims priority, application Japan, Jan. 30, 1986, 61-18928**

**Int. Cl.⁴ C08J** *9/22*

**U.S. Cl. 521—58** **6 Claims**




1. In a process for preparing pre-expanded particles of a thermoplastic resin which comprises releasing into a low pressure zone an aqueous dispersion of thermoplastic resin particles containing a volatile blowing agent, said dispersion being maintained at an elevated temperature under pressure in a pressure vessel, the improvement which comprises releasing said dispersion through an orifice member with a through-hole having a ratio of the length to the average diameter of 4 to 100.

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**4,748,192**

**ALIPHATIC POLYURETHANE SPRAYABLE COATING COMPOSITIONS AND METHOD OF PREPARATION**

**Stuart B. Smith, Conyers, Ga., assignor to Urylon Development, Inc., Conyers, Ga.**

**Filed Mar. 24, 1986, Ser. No. 843,033**

**Int. Cl.⁴ C08G** *18/30*

**U.S. Cl. 521—107** **31 Claims**

1. A process for preparing a fast-curing urethane polymer, which process consists essentially of reacting about 100 parts by weight of an aliphatic polyisocyanate with from about 5 to 50 parts by weight of a caprolactone polyol in the presence of a catalytic amount of a metallo catalyst and in the presence of a curing amount of a polyalkanol amine sufficient to provide a reaction time of about 30 seconds or less and to provide a fast-reacting, color stable aliphatic urethane polymer.

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**4,748,193**

**FRICTION MATERIAL**

**William D. Hays, Jr., Ballston Spa, N.Y., assignor to Allied Corporation, Morristown, N.J.**

**Filed Sep. 29, 1986, Ser. No. 912,432**

**Int. Cl.⁴ C08K** *3/08, 7/02;* **C08L** *21/00, 61/06*

**U.S. Cl. 523—156** **7 Claims**

FORMULA WEIGHT %

| | X | II | III | II | II | E | II |
|---|---|---|---|---|---|---|---|
| [a] METALLIC POWDERS | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| SPONGE IRON | II | 31 | 44 | 41 | 33 | 31 | 35 |
| STEEL FIBER | 20 | 16 | 15 | 14 | 15 | III | 19 |
| [b] INORGANIC FILLER | 7 | 5 | 7 | 6 | 7 | 5 | II |
| [c] ORGANIC FILLER | 4 | 4 | 3 | 2 | 3 | II | 4 |
| [d] FRICTION MODIFIERS | 20 | 16 | 15 | 15 | 17 | 16 | III |
| PHENOLIC RESIN | 10 | 8 | 7 | 7 | 9 | 8 | II |
| ZINC POWDER | | | II | 14 | III | 19 | |
| ALUMINUM POWDER | | | | | | | II |
| TIN POWDER | | III | | | | | |

[a] IRON, COPPER
[b] BARYTES, WHITING, TALC, ROTTENSTONE, ETC
[c] ELASTOMERIC MATERIALS, NATURAL & SYNTHETIC RUBBER, LATEX, ETC
[d] SILICA, MAGNESIUM OXIDE, ZIRCON, MULLITE, ALUMINA, BARIUM SULFIDE, IRON OXIDE, ETC.

1. A composition of matter for use as a friction material in a light weight caliper brake comprising a mixture of sponge iron, iron and copper powder, steel fiber, inorganic fillers and an elastomeric material held in a phenolic matrix, said friction material engaging another member to effect a brake applications, said friction material and other member under certain circumstances generating low frequency vibration, the improvement comprising:

an additional ingredient selected from a group consisting of aluminum, tin and zinc powders, said additional ingredient making up from 8–19% by weight of the friction material, said additional ingredient attenuating said low frequency vibrations to prevent the development of undesirable noise.

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**4,748,194**

**PROTECTIVE COATINGS FOR GAS TANK CONTAINERS**

**Thurlow Geeck, 20951 Laurelwood, Farmington, Mich. 48024**

**Continuation of Ser. No. 797,857, Nov. 14, 1985, abandoned. This application Jul. 24, 1987, Ser. No. 81,626**

**Int. Cl.⁴ C08L** *63/00*

**U.S. Cl. 523—427** **22 Claims**

1. A corrosion resistant coating for application to a metal substrate, said coating consisting essentially of: 13 to 52 parts per hundred of a powdered metal selected from the group consisting essentially of zinc, cadmium, stainless steel, aluminum, and alloys and blends thereof; 17.4 to 56.9 parts per hundred of a linear epoxy or phenoxy resin having an average molecular weight of less than 15,000 as determined by calculation from epoxy equivalent weight and essentially no highly reactive terminal epoxy groups; and 0.4 to 3.0 parts per hundred of a cross-linking urethane resin; the balance of said coating consisting essentially of an active organic solvent selected from the groups consisting essentially of acetone, methyl ethyl ketone, methyl isobutyl ketone, dimethylformamide, and blends thereof; and an inactive organic solvent selected from the groups consisting essentially of aromatic hydrocarbons, alcohols, and blends thereof.



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**4,748,195**

**FLAME-RESISTANT, THERMOPLASTIC POLYURETHANE ELASTOMERS, PROCESS FOR THEIR PREPARATION, AND THEIR USE**

**Christa Hackl, Bad Essen; Dietrich Wagner, Osnabrueck, and Hans M. Rombrecht, Quernheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 819,925, Jan. 17, 1986, abandoned. This application Dec. 8, 1986, Ser. No. 939,355**

**Claims priority, application Fed. Rep. of Germany, Jan. 21, 1985, 3501762**

**Int. Cl.⁴ C08K** *3/38, 3/22*

**U.S. Cl. 523—445** **12 Claims**

1. A flame-resistant, thermoplastic polyurethane elastomer comprising per 100 parts by weight of thermoplastic polyurethane elastomer, a flame-retardant additive package consisting of

(a) from 2 to 10 parts by weight of a compound selected from the group consisting of antimony trioxide, zinc borate and mixtures thereof,

(b) from 5 to 10 parts by weight of a chlorinated polyethylene, and

(c) from 5 to 10 parts by weight of a brominated aromatic compound having a moelcular weight of at least about 1700.

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**4,748,196**

**WATER REPELLENT COMPOSITION**

**Katsuhiko Kuroda; Toru Tagawa, both of Yokohama; Kiyoharu Yoshimi, Tokyo, and Yasoji Ozawa, Machida, all of Japan, assignors to Mitsubishi Chemical Industries, Ltd. and Yoshino Gypsum Company, Ltd., both of Tokyo, Japan**

**Filed Sep. 18, 1986, Ser. No. 908,795**

**Claims priority, application Japan, Sep. 25, 1985, 60-211293; Oct. 3, 1985, 60-220909; Oct. 3, 1985, 60-220910; Oct. 4, 1985, 60-221163; Apr. 21, 1986, 61-91666**

**Int. Cl.⁴ C08L** *1/26*

**U.S. Cl. 524—43** **10 Claims**

1. A water repellent composition comrpising an emulsion prepared by emulsifying in water (A) a wax having a melting point offrom 40° to 90° C. and (B) at least one member selected fromthe group consisting of an adduct or copolymer of an α-olefin having from 4 to 60 carbon atoms with maleic anhydride, and a partially esterified product thereof, with the weight ration of (A) to (B) being from 1:0.001 to 1:0.7, in the presence of (C) a water-soluble alkaline compound.

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**4,748,197**

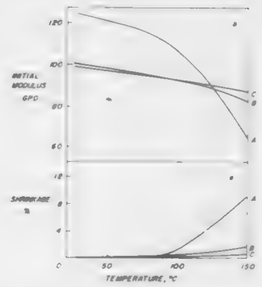
**FIBER FOR REINFORCING PLASTIC COMPOSITES AND REINFORCED PLASTIC COMPOSITES THEREFROM**

**David S. Cordova; David R. Coffin, both of Richmond; Stanley D. Lazarus, Petersburg, all of Va.; Hugh H. Rowan, Chapel Hill, N.C., and Robert M. Marshall, Chester, Va., assignors to Allied Corporation, Morris Township, Morris County, N.J.**

**Filed Jun. 27, 1984, Ser. No. 624,897**

**Int. Cl.⁴ C08L** *77/00;* **D01F** *6/62;* **D06M** *13/00, 13/50*

**U.S. Cl. 524—114** **31 Claims**




1. A fiber reinforced plastic composite comprising:

a. a resin matrix; and

b. a high tenacity reinforcing fiber selected from the group consisting of polyester, aliphatic polyamide, and combinations thereof, and treated with a composition consisting essentially of

(i) an organofunctional silane in an amount sufficient to achieve 0.02 to 1.0 weight percent of the silane on the fiber, and

(ii) a diluent which provides for the hydrolysis of the silane to a silanol;

to enhance compatibility of the fiber and the resin matrix.

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**4,748,198**

**COATING MATERIALS FOR PROTECTING THE SURFACES OF TEETH**

**Masayuki Takahashi, Tokyo, and Ryoji Nakazato, Tokorozawa, both of Japan, assignors to G-C Dental Industrial Corp., Tokyo, Japan**

**Filed Apr. 17, 1987, Ser. No. 39,279**

**Claims priority, application Japan, May 26, 1986, 61-119156**

**Int. Cl.⁴ C08J** *23/00;* **C08L** *23/00;* **A61K** *6/00*

**U.S. Cl. 524—273** **10 Claims**

1. A coating material for protecting the surfaces of teeth, wherein a resinous composition comprising 100 weight parts of a polystyrene resin or a high-impact polystyrene resin and 1 to 60 weight parts of rosin or a rosin derivative selected from the group consisting of polymerized rosin, rosin-modified maleic acid resin, rosin-modified glycerin ester and rosin-modified pentaerythritol ester, and 1 to 100 weight parts of a chlorinated polymer added thereto is dissolved in an organic solvent.

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4,748,199

## LOW FUEL CONSUMPTION TIRE WITH ALL WEATHER PERFORMANCES

Eiji Takiguchi; Kazuaki Yuto, both of Higashimurayama, and Toru Oniki, Higashikurume, all of Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Filed Apr. 10, 1985, Ser. No. 721,741
Claims priority, application Japan, Apr. 10, 1984, 59-69912
The portion of the term of this patent subsequent to Feb. 3, 2004, has been disclaimed.
Int. Cl.[4] B60C *1/00*
U.S. Cl. 524—318 8 Claims

1. A low fuel consumption pneumatic tire with all weather running performances, which tire uses as a tread a vulcanizable rubber composition obtained by adding 30 to 80% by weight of carbon black having an iodine adsorption value of not less than 70 mg/g and a dibutylphthalate (DBP) absorption of not less than 90 ml/100 g, and a low temperature plasticizing ester selected from the group consisting of butyl oleate and octyl oleate in an amount of 2 to 50% by weight relative to said carbon black into 100 parts by weight of rubber component composed of 100 to 25 parts by weight of at least one kind of a first diene rubber containing 0 to 30% of styrene and 25 to 95% of vinyl bonds in the butadiene unit and 0 to 75 parts by weight of at least one kind of a second diene rubber which is different in kind from the above first diene rubber, wherein said rubber composition has a dynamic storage modulus (E') at −20° C. of not more than 260 kg/cm$^2$, a loss tangent (tan δ) at 0° C. of not less than 0.30, and a loss tangent (tan δ) at 60° C. of not more than 0.22.

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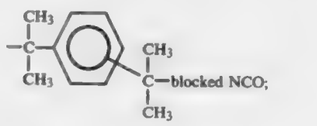
4,748,200

## THERMOSETTING RESINS AND ELECTRODEPOSITION COATING COMPOSITIONS CONTAINING THE SAME

Kohji Nasu, Nishinomiya, Japan, assignor to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Mar. 9, 1987, Ser. No. 23,702
Claims priority, application Japan, Mar. 18, 1986, 61-61683
Int. Cl.[4] C08G *18/80*
U.S. Cl. 524—591 5 Claims

1. A thermosetting resin which contains therein:
(a) groups represented by the formula of




(b) hydroxyl groups; and
(c) quaternary ammonium salt groups which solubilize the resin in water;
the blocked NCO groups being stable in the presence of water, but reactive with the hydroxyl groups at elevated temperatures.

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4,748,201

## SPRAYABLE POLYURETHANE COMPOSITION AND METHOD OF PREPARATION

Stuart B. Smith, Conyers, Ga., assignor to Urylon Development, Inc., Conyers, Ga.

Filed Mar. 28, 1986, Ser. No. 845,453
Int. Cl.[4] C08G *18/30*
U.S. Cl. 524—712 24 Claims

1. In a process for preparing a fast-reacting polyurethane which process consists essentially of reacting about 50 to 200 parts by weight of MDI with a caprolactone polyol in the presence of a catalytic amount of a metal catalyst and an amine curing agent, to provide a reaction composition to produce a fast-reacting polyurethane polymer, the improvement which comprises
employing as the curing agent a polyalkanol amine curing agent in a curing amount sufficient to provide a reaction time of about 15 seconds or less.

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4,748,202

## NOVEL AQUEOUS DISPERSIONS

Peter Ball, Emmerting; Richard Goetze, Mehring-Öd; Klaus Marquardt, and Manfred Selig, both of Burghausen, all of Fed. Rep. of Germany, assignors to Wacker-Chemie GmbH, Fed. Rep. of Germany

Filed Sep. 12, 1986, Ser. No. 907,036
Claims priority, application Fed. Rep. of Germany, Oct. 3, 1985, 3535389
Int. Cl.[4] C08L *33/00, 35/00*
U.S. Cl. 524—823 8 Claims

1. A batch process for the production of an emulsion polymerization aqueous copolymer dispersion with a solids contents of 45–55% by weight consisting essentially of
(a) 75 to 95 parts by weight of acrylic acid and/or methacrylic acid alkyl esters of 1 to 10 carbon atoms of which 20 to 80% by weight have a water solubility of at most 2 g/l and 20 to 80% by weight a water solubility of at least 10 g/l.
(b) 5 to 25 parts by weight of a mixture of ethylenically-unsaturated, functional and water-soluble monomers, 25 to 100% by weight thereof consisting of unsaturated carboxylic acids.
(c) 500 to 1700 parts by weight of a mixture of 70 to 100% by weight of vinyl chloride, 0 to 30% by weight of at least one vinyl ester of saturated carboxylic acids of 2 to 18 carbon atoms and 0 to 1.5% by weight of a polyunsaturated monomer which possesses a water solubility of at most 5 g/l, and
(d) ethylene with radical initiators in the presence of emulsifiers and other common additives, characterized in that (1) the components (a) and (b) together with 500 to 1000 parts by weight of water and 0.5 to 10 parts by weight of emulsifier are charged at a pH value of 2 to 4 in an autoclave, and the polymerization is begun at a temperature of 50° to 80° C. by addition of an initiator, (2) the component (c) is metered in in the form of an aqueous emulsion as soon as components (a) and (b) are reacted at least 50% and at most 99%, (3) during the metering phase a pH value of 4.5 to 6.5 is maintained, (4) an ethylene pressure of 40 to 80 bars is built up at the time indicated in (2) and (5) before start of polymerization or at the latest at the time indicated in (2) 10 to 50 parts of an inert organic substance having a water solubility of $10^{-3}$ to 200 g/l and a molecular weight of at most 1000 are added.

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4,748,203

## POLYMER MIXTURE WITH PC AND HIPS

Petrus C. A. M. van Abeelen, Bergen op Zoom, and Johannes W. J. de Munck, Huybergen, both of Netherlands, assignors to General Electric Company, Mt. Vernon, Ind.

Filed Mar. 6, 1987, Ser. No. 23,053
Claims priority, application Netherlands, Mar. 17, 1986, 8600671
Int. Cl.[4] C08L *69/00*
U.S. Cl. 525—67 19 Claims

1. A polymer mixture which comprises an aromatic polycarbonate and rubber-modified polystyrene, characterized in that the polymer mixture comprises a rubber-modified polystyrene built up from a polystyrene matrix having uniformly distributed therein rubber-like particles of (co)polymerisates built up substantially from 1,3-dienes with a capsule particle morphology in whihc the particles have an average particle size ($d_{50}$-value of the cumulative mass distribution) from 0.2 to 0.6 micrometres, said polystyrene essentially free of acrylonitrile.



4,748,204

## FLEXIBLE AND MELT PROCESSABLE FLUORORESIN

Chikashi Kawashima, Kamifukuoka; Seiiti Minegishi, Saitama; Shinji Ogasawara, Kamifukuoka, and Takashi Mukaino, Kawagoe, all of Japan, assignors to Central Glass Company, Limited, Ube, Japan

Filed Sep. 12, 1986, Ser. No. 906,825
Claims priority, application Japan, Sep. 19, 1985, 60-205413
Int. Cl.[4] C08L *27/16, 51/00*
U.S. Cl. 525—72 8 Claims

1. A flexible and melt-processable fluororesin, comprising a blend of 100 parts by weight of a first polymer, which is obtained by graft copolymerization of vinylidene fluoride with an elastomeric copolymer of vinylidene fluoride, chlorotrifluoroethylene and another monomer which has both a double bond and a peroxy bond, and 5–80 parts by weight of a crystalline second polymer which is a vinylidene fluoride base polymer, said fluororesin being not higher than 70 in Shore D hardness at room temperature.

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4,748,205

## THERMOPLASTIC RESIN COMPOSITION

Takayuki Katto; Yasumasa Komatsu, and Zenya Shiiki, all of Fukushima, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 834,122, Feb. 26, 1986, Pat. No. 4,701,495, which is a continuation of Ser. No. 618,663, Jun. 8, 1984, abandoned. This application Jun. 16, 1987, Ser. No. 62,694
Claims priority, application Japan, Jun. 10, 1983, 58-103919
Int. Cl.[4] C08L *33/04, 51/00*
U.S. Cl. 525—75 10 Claims

1. A thermoplastic resin composition exhibiting improved heat resistance and high impact resistance, comprising:
50% to 90% by weight of a copolymer (A) prepared by copolymerizing of 10 to 35% by weight of acrylonitrile, 60 to 85% by weight of a monomer mixture consisting of 2-Isopropenylnaphthalene and α-methylstyrene, the proportion of 2-isopropenylnaphthalene being 5% to 70% by weight based on the total of 2-isoprophenyl- naphthalene and α-methylstyrene, and 0 to less than 10% by weight of a vinyl monomer copolymerizable with the foregoing monomers; and
10 to 50% by weight of a graft copolymer (B) prepared by adding 15 to 50 parts by weight of at least one monomer selected from the group consisting of aromatic vinyl compounds, vinyl cyanides, methacrylic acid alkyl esters, and acrylic acid alkyl esters to 50 to 85 parts by weight of an alkyl acrylate-containing rubber, the sum of the rubber component and the graft component being 100 parts by weight, and polymerizing the graft copolymer in the presence of the rubber component.

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4,748,206

## POLYOLEFIN COMPOSITION AND THE SAME USED FOR VEHICLE EXTERIOR MEMBERS

Motomi Nogiwa, Zushi; Sachio Aksi, Fujisawa; Hiroshi Furuhashi, Kawasaki; Kenji Tanaka, Sagamihara; Toshimasa Takakusaki, Kawasaki; Yoichi Kawai, Yokohama; Masaru Abe, Yokohama, and Katsumi Sekiguchi, Yokohama, all of Japan, assignors to Nippon Petrochemicals Company, Limited, Tokyo, Japan

Filed Nov. 7, 1986, Ser. No. 929,071
Claims priority, application Japan, Nov. 11, 1985, 60-252525
Int. Cl.[4] C08L *23/18, 23/12, 23/16, 53/00*
U.S. Cl. 525—88 13 Claims

1. A polyolefin composition which comprises 20 to 70% by weight of a crystalline propylene polymer (a); 10 to 50% by weight of a substantially amorphous alpha-olefin copolymer (b) comprising two or more α-olefins each having 2 to 8 carbon atoms, having a density no greater than about 0.89 g/cm$^3$, said copolymer (b) containing no more than 10% by weight of boiling n-hexane insoluble matter and having a maximum peak temperature $T_m$ of below 100° C. as measured by differential scanning calorimetry (DSC); 5 to 50% by weight of an ethylene-alpha-olefin copolymer (c), said copolymer (c) having a density of 0.860 to less than 0.910 g/cm$^3$, 10% by weight or more of boiling n-hexane insoluble matter and a maximum peak temperature $T_m$ of 100° C. or higher as measured by differential scanning calorimetry (DSC); and 5 to 30% by weight of an ethylene polymer (d) having a density of 0.910 to 0.965 g/cm$^3$, wherein the total of said components (a), (b), (c) and (d) represents 100% by weight of said composition.

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4,748,207

## POLYPROPYLENE SHEET

Masahiro Kakugo; Yoshiharu Fukui; Kizuku Wakatsuki, and Hideaki Nishio, all of Chiba, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Jul. 9, 1985, Ser. No. 753,082
Claims priority, application Japan, Jul. 9, 1984, 59-141870
The portion of the term of this patent subsequent to Nov. 5, 2002, has been disclaimed.
Int. Cl.[4] C08L *23/12, 23/14, 53/00;* C08J *5/18*
U.S. Cl. 525—88 4 Claims

1. A crystalline polypropylene extrusion molded sheet obtained from a crystalline polypropylene composition containing a polymer of a vinylcycloalkane having at least 6 carbon atoms in an amount of 0.05 wt ppm to 1 wt% calculated as a vinylcycloalkane unit, wherein said composition is prepared by one of the following methods:
(1) a vinylcycloalkane having at least 6 carbon atoms is polymerized in the presence of a Ziegler-Natta catalyst, and subsequently propylene is homopolymerized or copolymerized with other α-olefin; or
(2) the polymer as obtained in (1) is mixed with a propylene homopolymer or a propylene/α-olefin copolymer; or
(3) a polymer of a vinylcycloalkane having at least 6 carbon atoms as mixed with a propylene homopolymer or a propylene/α-olefin copolymer.

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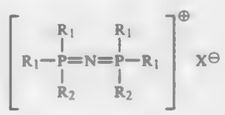
4,748,208

## CURABLE ELASTOMER COMPOSITION

Michio Kasahara, Kawasaki, and Hideaki Kodera, Fuji, both of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 791,123, Oct. 24, 1985, abandoned. This application Jun. 5, 1987, Ser. No. 60,995
Claims priority, application Japan, Nov. 22, 1984, 59-247578; Feb. 25, 1985, 60-34483
Int. Cl.[4] C08F *8/40*
U.S. Cl. 525—151 13 Claims

1. A curable fluoroelastomer composition comprising:
(a) a fluoroelastomeric copolymer of vinylidene fluoride and at least one other fluorinated monomer,
(b) as a curing accelerator, an iminum compound represented by the formula (1)




(1)

wherein $R_1$ is a phenyl group,
$R_2$ is a methyl group or a benzyl group,
X is chlorine;
(c) a polyhydroxy compound as a cross-linking agent; and
(d) a metal compound selected from a divalent metal hydroxide, a divalent metal oxide or a mixture thereof.

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4,748,209

## METHOD FOR IMPROVING IMPULSE DESTRUCTIVE STRENGTH OF ELECTRICAL INSULATING MATERIALS

Yuichi Orikasa; Shinji Kojima; Takashi Inoue, all of Yokohama; Kaoru Yamamoto; Atsushi Sato, both of Tokyo, and Shigenobu Kawakami, Ichikawa, all of Japan, assignors to Nippon Petrochemicals Co., Ltd., Japan

Continuation-in-part of Ser. No. 785,282, Oct. 7, 1985, abandoned. This application Jun. 8, 1987, Ser. No. 59,420
Claims priority, application Japan, Oct. 9, 1987, 59-212268
Int. Cl.[4] C08F *212/08*
U.S. Cl. 525—240 10 Claims

1. A method for improving impulse destructive strength of an electrical insulating material which is characterized by employing, as said electrical insulating material, a random copolymer of a styrene series monomer and ethylene or a combination of ethylene and another ethylenically unsaturated monomer, or a composition in which said copolymer is blended with a polymer of ethylene, said copolymer being prepared by introducing, into a reaction system, said styrene series monomer selected from the group of styrene and single-ring substituted styrenes, ethylene or said combination of ethylene and said ethylenically unsaturated monomer and a polymerization initiator, the initiator being introduced thereinto separately from at least said styrene series monomer, and subjecting these monomers to a high-pressure radical copolymerization under a polymerization pressure of 500 to 4,000 kg/cm$^2$ at a polymerization temperature of 50° to 400° C., said polymer or said composition satisfying the following (a) and (b):

(a) a content of said styrene series monomer in said copolymer or said composition being within the range of 0.01 to 1 mol %; and

(b) a crystallinity of said copolymer or said composition being 30% or more in accordance with X-ray diffraction.

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4,748,210

## VINYL CHLORIDE-GRAFTED ETHYLENE COPOLYMER AND PROCESS FOR PRODUCING SAME

Masahisa Okawa, Ehime; Tomoyuki Emura, Kanagawa; Yoshitaka Owatari, Saitama; Kentaro Mashita, Chiba, and Toshio Kawakita, Osaka, all of Japan, assignors to Sumitomo Chemical Co., Ltd., Osaka, Japan

Filed Jun. 19, 1987, Ser. No. 63,992
Claims priority, application Japan, Jun. 25, 1986, 61-150563
Int. Cl.[4] C08F *255/02, 265/02, 265/04*
U.S. Cl. 525—260 11 Claims

1. Vinyl chloride-grafted ethylene copolymer which comprises, as the backbone polymer, a copolymer comprising ethylene, an ester of a monohydric alcohol of 1–8 carbon atoms with acrylic acid or methacrylic acid and maleic anhydride and, as the pendant polymer, a vinyl chloride polymer.

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4,748,211

## HYDROXYL FUNCTIONAL GRAFT COPOLYMERS

Suryya K. Das, Pittsburgh; Rostyslaw Dowbenko, Gibsonia, and Samuel Porter, Natrona Heights, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jul. 21, 1986, Ser. No. 887,501
Int. Cl.[4] C08G *59/16;* C08F *269/00*
U.S. Cl. 525—286 8 Claims

1. An ungelled hydroxyl functional graft copolymer prepared by the vinyl addition polymerization, in an inert organic solvent, of a vinyl monomer component comprising at least a portion of carboxyl functional vinyl monomer in the presence of a glycidyl ester containing acrylic polymer, the grafting occurring by the condensation reaction between the carboxyl groups of the vinyl monomer component and the epoxy groups of the glycidyl ester containing acrylic polymer.

4,748,212

## ADHESIVE COMPOSITION

Tatsuya Murachi, and Masakazu Nakane, both of Aichi, Japan, assignors to Toyoda Gosei Co., Ltd., Aichi, Japan

Continuation of Ser. No. 784,632, Oct. 4, 1985, abandoned. This application Jun. 4, 1987, Ser. No. 58,624
Claims priority, application Japan, Oct. 4, 1984, 59-208689; Dec. 8, 1984, 59-259726; Dec. 10, 1984, 59-261567; Dec. 11, 1984, 59-261262; Dec. 17, 1984, 59-265543; Jan. 30, 1985, 60-15693; Jan. 30, 1985, 60-15694; Mar. 22, 1985, 60-58751; Apr. 4, 1985, 60-71739; Apr. 10, 1985, 60-75968; Apr. 13, 1985, 60-78674; May 16, 1985, 60-104586; May 16, 1985, 60-104587
Int. Cl.[4] C08F *8/20*
U.S. Cl. 525—359.2 3 Claims

1. An adhesive composition which comprises:

(a) a hydrocarbon polymer having an average molecular weight of 500 to 10,000, said hydrocarbon polymer having a main chain with a degree of saturation greater than 90% and terminating at both ends of the chain with a hydroxyl or a carboxyl group; and

(b) a halogenating agent to be incorporated in said hydrocarbon polymer, said agent being selected from the group consisting of alkyl hypohalide, a halogenated succinimide, and an isocyanuric acid halide.

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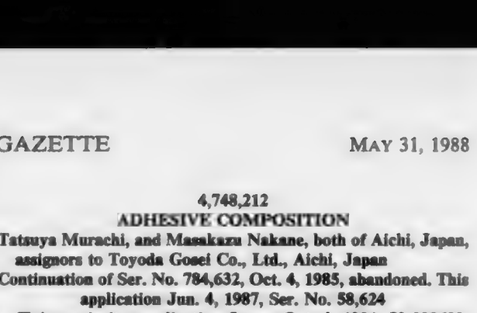
4,748,213

## ALL-AROMATIC POLYESTER RESIN COMPOSITION

Masao Yoshikawa, Gifu, Japan, assignor to NTN-Rulon Industries Co., Ltd., Tokyo, Japan

Filed Jun. 12, 1987, Ser. No. 60,886
Claims priority, application Japan, Jun. 14, 1986, 61-138941
Int. Cl.[4] C08G *65/48;* C08L *67/00, 71/04, 77/00*
U.S. Cl. 525—397 1 Claim

1. All-aromatic polyester resin compositions comprising an all-aromatic polyester resin having three repeated elements of the following formulas as the main structural units:




and a polyether oil.

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4,748,214

## MICROSPHERICAL CURED PHENOLIC RESIN PARTICLES AND PROCESS FOR PRODUCTION THEREOF USING EMULSION STABILIZERS

Keiichi Asami; Yoshiaki Echigo; Mutsunori Yamao; Yoshiyuki Suematu; Tadashi Ishikura, and Ritsuko Shidei, all of Kyoto, Japan, assignors to Unitika Ltd., Hyogo, Japan

Filed May 13, 1986, Ser. No. 862,728
Claims priority, application Japan, May 13, 1985, 60-103148
Int. Cl.[4] C08G *8/28*
U.S. Cl. 525—503 18 Claims

1. A process for producing microspherical cured phenolic resin particles having a particle diameter of not more than about 100 μm, which comprises reacting a novolak resin, a phenol, and an aldehyde in an aqueous medium in the presence of a basic catalyst and an emulsion stabilizer, at a temperature of from about 75° to about 98° C.

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4,748,215

## DIORGANOSILOXANE POLYMER POWDER

Christian Lindner; Wolfgang Grape, both of Cologne, and Hans-Jürgen Kress, Krefeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Sep. 22, 1986, Ser. No. 910,030
Claims priority, application Fed. Rep. of Germany, Oct. 2, 1985, 3535136
Int. Cl.[4] C08F *283/00*
U.S. Cl. 525—479 3 Claims

1. Process for the preparation of diorganosiloxane polymers in powder form having particles with an average diameter of 0.01–10 mm, wherein an emulsion of a diorganosiloxane polymer is completely broken to form a suspension of diorganosiloxane polymer particles, 2–20% by weight, based on the siloxane polymer, of vinyl monomers which form polymers with glass transition temperatures above 25° C. are then introduced into the suspension and are then polymerized onto the siloxane polymer particles, optionally after addition of catalysts which form free radicals.

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4,748,216

## PURIFIED CYCLOOLEFIN POLYMERIZATION COMPOSITION

Glenn M. Tom, Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Continuation of Ser. No. 828,419, Feb. 11, 1986, abandoned, which is a division of Ser. No. 672,424, Nov. 16, 1984, Pat. No. 4,584,425, which is a continuation-in-part of Ser. No. 497,918, May 25, 1983, Pat. No. 4,507,453, which is a continuation-in-part of Ser. No. 342,455, Jan. 25, 1983, abandoned. This application Mar. 12, 1987, Ser. No. 24,876
The portion of the term of this patent subsequent to Mar. 26, 2002, has been disclaimed.
Int. Cl.[4] C08F *2/02, 36/04, 32/06;* C07C *7/12*
U.S. Cl. 526—77 6 Claims

1. A method of making a molded product comprising a substantially crosslinked polymeric composition of crosslinked polymerized units of cycloolefin, said method comprising: providing a metathesis catalyst and an absorption purified cycloolefin composition, said cycloolefin composition comprising at least 50% by weight dicyclopentadiene liquid, said absorption purified cycloolefin composition being sufficiently reactive to polymerize to form said crosslinked polymer in about one minute or less in the presence of a metathesis catalyst, combining said catalyst and said cycloolefin composition in contact with a mold means to form a reaction composition whereby said reaction composition forms said molded product comprising substantially crosslinked polymeric composition in about one minute or less.

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4,748,217

## PREPARATION OF TETRAFLUOROETHYLENE FINE POWDER

Satish C. Malhotra, Parkersburg, W. Va., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 27, 1986, Ser. No. 823,065
The portion of the term of this patent subsequent to Mar. 31, 2004, has been disclaimed.
Int. Cl.[4] C08F *2/18, 14/18, 14/26*
U.S. Cl. 526—81 2 Claims

1. A process for preparing tetrafluoroethylene resins by polymerizing tetrafluoroethylene in an aqueous medium in the presence of a substantially non-telogenic anionic surfactant present in an amount which maintains colloidal particles of polymerization product in dispersed form, said process being carried out at 65–100° C. by contacting tetrafluoroethylene in the presence of at least one polymerization initiator consisting of a redox couple of $xBrO_3/yHSO_3$ wherein x and y are each independently selected from hydrogen, ammonium, alkali or alkaline earth metal ions, where either the bromate or the bisulfite is added as precharge and the other added intermittently or continuously during the polymerization and where the last addition occurs before the end point so that the reaction slows down and the total reaction time is at least 40% longer in comparison with a reaction which does not slow down.

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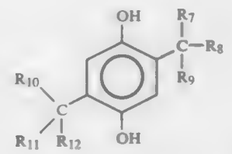
4,748,218

## SHORTSTOPPING FREE RADICAL POLYMERIZATION OF OLEFINIC MONOMERS

Zaev Sharaby, Cleveland Heights, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Apr. 29, 1985, Ser. No. 728,549
Int. Cl.[4] C08F *2/38, 114/06, 2/02, 2/18*
U.S. Cl. 526—84 19 Claims

1. A process for controlling the aqueous suspension homopolymerization of vinyl chloride and the aqueous suspension copolymerization of vinyl chloride with one or more copolymerizable olefinic monomers having a terminal $CH_2{=}C<$ grouping in the presence of a free radical yielding catalyst(s) and from about 0.01% to about 1.0% by weight, based on the total weight of monomer, of dispersant, comprising adding to the polymerization mixture containing vinyl chloride and said catalyst(s) from about 0.0005 part by weight to about 0.0600 part by weight per 100 parts by weight of monomer of a 2,5 substituted hydroquinone shortstop agent having the formula:




wherein $R_7$, $R_8$, $R_{10}$ and $R_{11}$ are identical or different and are either H, methyl, or ethyl; $R_9$ and $R_{12}$ are identical or different and are either H, or an alkyl having from 1 to about 12 carbon atoms.

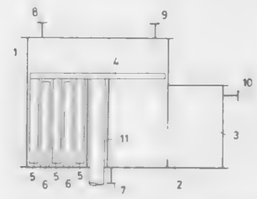
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4,748,219

## REACTOR FOR POLYMERIZATION IN CONCENTRATED SYSTEMS

Silvano Gordini, San Donato Milanese, Italy, assignor to Enichem Elastomeri S.p.A., Palermo, Italy

Filed Jun. 3, 1986, Ser. No. 870,162
Claims priority, application Italy, Jun. 5, 1985, 21040 A/85
Int. Cl.[4] C08F *2/02, 136/06;* B01F *7/16;* B01J *14/00*
U.S. Cl. 526—88 2 Claims




1. A process for bulk-polymerization of butadiene to polybutadiene in the presence of a polymerization catalyst, comprising:

feeding monomeric butadiene into the top of a cylindrical-bodied and vertical axis reactor having a bottom, fixed vertical veins extending from said bottom toward said top,

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and a vertical-axis stirrer including a rotable shaft and downwardly extending tapered veins rotated by said shaft and insertable between said fixed veins;

feeding the polymeric catalyst into the bottom of said reactor in the vicinity of the stirrer shaft;

polymerizing monomeric butadiene within the reactor body;

discharging vaporized butadiene monomer through the top of said reactor; and

discharging polybutadiene into the extruding chamber of a vertical-axis extruder integral, and communicating with, the bottom section of the reactor body, the discharge taking place through the combined actions of the fixed veins and the moveable veins within the reactor body.

2. An apparatus for the bulk-polymerization of butadiene to polybutadiene in the presence of a polymerization catalyst, comprising:

a cylindrical-bodied and vertical axis reactor having a top and a bottom, fixed vertical vanes within said reactor extending from said bottom toward said top, and a vertical-axis stirrer within said reactor including a rotatable shaft and downwardly extending tapered vanes rotated by said shaft and insertable between said fixed vanes;

a vertical-axis extruder integral with said reactor and having an extruding chamber communicating with the bottom of said reactor;

means for feeding butadiene monomer into the top of said reactor at a point spaced from said extruder;

means for feeding the polymeric catalyst into the bottom of said reactor in the vicinity of the stirrer shaft;

means for discharging vaporized butadiene monomer through the top of said reactor; and

means for discharging polybutadiene polymerized within said reactor into said extruding chamber of said vertical-axis extruder through the combined actions of said fixed vanes and said moveable vanes within the reactor.

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**4,748,220**

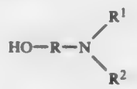
## PREPARATION OF FINELY DIVIDED PULVERULENT CROSSLINKED COPOLYMERS

**Heinrich Hartmann, Limburgerhof, and Walter Denzinger, Speyer, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Filed Mar. 20, 1987, Ser. No. 28,307**
**Int. Cl.⁴ C08F** *2/00, 26/00*
**U.S. Cl. 526—89** **6 Claims**

1. A process for the preparation of a pulverulent crosslinked copolymer, comprising polymerizing a monomer mixture consisting of

(a) from 70 to 99.999% by weight of monoethylenically unsaturated carboxylic acids, amides of such carboxylic acids and/or esters of such carboxylic acids and amino alcohols of the formula



where R is $C_2$–$C_6$-alkylene and $R^1$ and $R^2$ are each H, $CH_3$, $C_2H_5$ or $C_3H_7$,

(b) from 0.001 to 10% by weight of a diethylenically or polyethylenically unsaturated monomer and

(c) from 0 to 20% by weight of other monoethylenically unsaturated monomers

in supercritical carbon dioxide at up to 150° C. and under pressures above 73 bar in the presence of a free radical initiator, from 100 to 1,500 parts by weight of carbon dioxide being used per 100 parts by weight of the monomers employed in the polymerization, and removing the carbon dioxide after the polymerization resulting in a fine polymer powder consisting of primary particles of 0.5 μm to 3 μm in diameter.

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**4,748,221**

## POLYMERIZATION OF OLEFINS USING A ZIEGLER-NATTA CATALYST AND TWO ORGANOMETALLIC COMPOUNDS

**Joelle Collomb, Marseille, France; Daniel C. Durand, London, England; Lazalo Havas, Martigues, and Frederic R. M. M. Morterol, Sausset-les-Pins, both of France, assignors to BP Chemicals Limited, London, England**

**Filed Aug. 5, 1986, Ser. No. 893,403**
**Claims priority, application France, Aug. 6, 1985, 8511999**
**Int. Cl.⁴ C08F** *2/34, 10/02*
**U.S. Cl. 526—153** **7 Claims**

1. A process for the polymerization or copolymerization of ethylene comprising the steps (A) preparing a prepolymer-based catalyst system of the Ziegler-Natta type consisting of a catalyst comprising basically atoms of halogen, magnesium and a transition metal belonging to Groups IV, V or VI of the Periodic Table of Elements, and of a cocatalyst based on one or more organometallic compounds of a metal belonging to Groups II or III of this Table, and (B) contacting the prepolymer-based catalyst under gas phase fludized bed polymerization conditions with ethylene or ethylene and one or more alpha-olefins in the presence of organometallic cocatalyst the process being characterised in that:

(1) the cocatalyst employed in step (A) is at least one low volatility organometallic compound (a) having a vapour pressure at 80° C. of less than 65 Pa, in a quantity such that the atomic ratio of the quantity of metal in the organometallic compound (a) to the quantity of transition metal in the catalyst is at least 0.5 and at most 2.5,

and wherein said organometallic compound (a) is an organo-aluminium compound of the general formula $AlR_nX_{3-n}$ in which R represents an alkyl group comprising from 4 to 20 carbon atoms, X is a hydrogen or halogen atom, or an alcoholate group, and n is an integer or fraction which may have any value from 1 to 3, and

(2) the cocatalyst employed in step (B) is at least one volatile organometallic compound (b), having a vapour pressure at 80° C. equal to or greater than 65 Pa in a quantity such that the atomic ratio of the quantity of metal in the organometallic compound (b) to the quantity of transition metal in the prepolymer-based catalyst is at least 0.5, and that the atomic ratio of the total quantity of metal in the organometallic compound (a) and (b) to the quantity of transition metal in the catalyst is at least 2.5 and at most 9, the organometallic compound (b) being introduced into the polymerisation medium separately from the prepolymer-based catalyst, and wherein the organometallic compound (b) is an organo-aluminium compound of the general formula $Al\,R'_nX_{3-n}$ in which R' represents an alkyl group comprising from 1 to 3 carbon atoms, X is a hydrogen or halogen atom or an alcoholate group and n is an integer or fraction which may have any value from 1 to 3.

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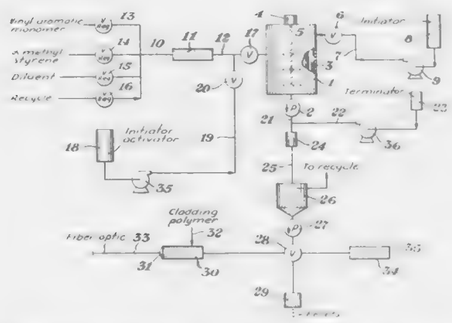
**4,748,222**

## PREPARATION OF HIGHLY PURE ALPHA-METHYLSTYRENE POLYMER

**Michael T. Malanga, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.**

**Filed Mar. 31, 1986, Ser. No. 846,539**
**Int. Cl.⁴ C08F** *2/06, 4/48*
**U.S. Cl. 526—174** **10 Claims**

1. A process for preparing an alpha-methylstyrene polymer comprising contacting a monomer mixture consisting essentially of alpha-methyl-styrene and at least one copolymerizable vinyl aromatic comonomer with an effective amount to cause anionic polymerization of an organolithium initiator and an initiator activator which is a sodium-, potassium-, rubidium-, or cessium-derivative of an oxygen-, sulfur-, or nitrogen-containing organic compound at a temperature above about 61° C., and recovering the alpha-methylstyrene polymer.




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**4,748,223**

## PROCESS FOR PRODUCING PEROXIDE-VULCANIZABLE, FLUORINE-CONTAINING ELASTOMER

**Tatsu Haruyoshi, Hitachi; Okabe Jun, Kitaibaraki; Naraki Akihiro, Kitaibaraki; Abe Masatoshi, Kitaibaraki, and Ebina Yoshiaki, Kitaibaraki, all of Japan, assignors to Nippon Mektron Limited, Tokyo, Japan**

**Filed Mar. 12, 1987, Ser. No. 25,191**
**Claims priority, application Japan, Apr. 1, 1986, 61-74483; Jan. 3, 1987, 62-21591**
**Int. Cl.⁴ C08F** *2/00, 8/18*
**U.S. Cl. 526—206** **13 Claims**

1. A process for producing a peroxide-vulcanizable, fluorine-containing elastomer, which comprises homopolymerizing or copolymerizing a fluorine-containing olefin having 2 to 8 carbon atoms in the presence of a radical polymerization iniator and an iodine and bromine-containing compound represented by the general formula:

$$RBr_nI_m$$

where R is a fluorohydrocarbon group, a chlorofluoro-hydrocarbon group, a chlorohydrocarbon group or a hydrocarbon group, and n and m are integers of 1 and 2.

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**4,748,224**

## SILICONE-SULFONE AND SILICONE-FLUOROCARBON-SULFONE GAS PERMEABLE CONTACT LENSES AND COMPOSITIONS THEREOF

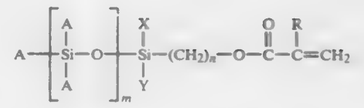
**Nick N. Novicky, Calgary, Canada, assignor to Maureen J. DeVou, Alberta, Canada**

**Filed Jun. 6, 1986, Ser. No. 871,259**
**Claims priority, application Canada, Feb. 6, 1986, 501311**
**Int. Cl.⁴ C08F** *30/08*
**U.S. Cl. 526—242** **27 Claims**

1. An ophthalmic device formed of a copolymer plastic material which comprises:

[A] at least one organosilicone selected from the group consisting of

(1) an organosiloxanylalkyl ester monomer of acrylic or methacrylic acid which has the structural formula:

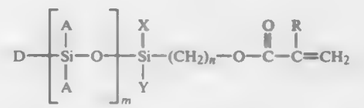


wherein X and Y are $C_1$ to $C_6$ alkyl, cycloalkyl or phenyl groups; or groups of the following structure:



m being an integer from 1 to 6, n being an integer from 1 to 3, A is selected from $C_1$ to $C_6$ alkyl or phenyl groups, and R is methyl group or hydrogen;

(2) an organosiloxanylalkyl ester monomer of acrylic or methacrylic acid having the structural formula:

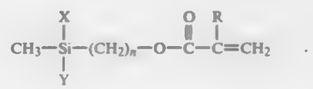


wherein X and Y are $C_1$ to $C_6$ alkyl, cyclohexyl or phenyl groups; or groups of the following structure:



m being an integer from 1 to 6, n being an integer from 1 to 3, wherein A is selected from $C_1$ to $C_6$ alkyl or phenyl groups, R is a methyl group or hydrogen, and D is hydrogen or a hydroxy group;

(3) an organosiloxanylalkyl ester monomer of acrylic or methacrylic acid having the following structural formula:



wherein X and Y are groups of the following structure:

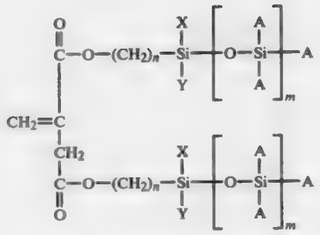


m being an integer from 1 to 5, n is an integer from 1 to 3, wherein A is selected from $C_1$ to $C_6$ alkyl, cyclohexyl or phenyl groups, and R is a methyl group or hydrogen;

(4) an organosiloxanylalkyl ester monomer of itaconic acid having the following formula:

VOL 1090 ISS 5 MY 31 1988 UMI





wherein X and Y are $C_1$ to $C_6$ alkyl, cyclohexyl or phenyl groups; or groups of the following structure:

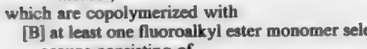


m being an integer from 1 to 5, n being an integer from 1 to 3, A is selected from $C_1$ to $C_6$ alkyl, cyclohexyl or phenyl groups, and B is a member selected from the group consisting of methyl, hydrogen, and mixtures thereof;

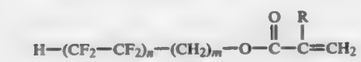
which are copolymerized with

[B] at least one fluoroalkyl ester monomer selected from the groups consisting of

(1) perfluoroalkyl ester monomers of acrylic or methacrylic acid having the following formula:

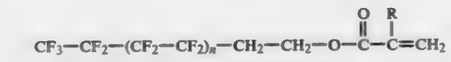


(2) fluorocarbon telomer alcoholmethacrylates or acrylates of the following formula:



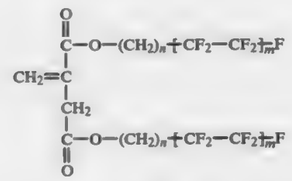
wherein n is an integer from 1 to 18, m is an integer from 1 to 5, and R is a methyl group or hydrogen;

(3) perfluoroalkyl ethyl acrylates and methacrylates of the following formula:



wherein n is an integer from 1 to 10, and R is a methyl group or hydrogen;

(4) perfluoroalkyl ester monomers of itaconic acid having the general formula:

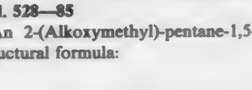


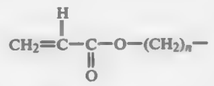
wherein n is an integer from 1 to 4 and m is an integer from 1 to 10; said copolymer plastic material including

[C] at least one organosulfone monomer selected from the group consisting of a polymerizable ethylenically unsaturated organosulfone monomer having the general structural formula:



wherein A is selected from one or more of the following:





n being an integer from 1 to 5, wherein B is at least one member selected from the group consisting of phenyoxyethyl, $C_1$ to $C_6$ alkyl, cycloalkyl and phenyl group.

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4,748,225

## SYNTHETIC RESIN MODIFIER

Hiroshi Yoshioka, and Ichiro Ono, both of Annaka, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

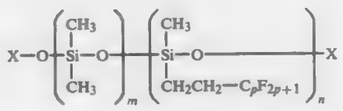
Filed May 21, 1987, Ser. No. 52,402

Claims priority, application Japan, May 23, 1986, 61-119910

Int. Cl.[4] C08G *77/04*

U.S. Cl. 528—26 4 Claims

1. A synthetic resin modifier comprising an organopolysiloxane represented by General Formula (I):



(I)

wherein the two types of diorganosiloxy units are arranged at random; the group represented by X consists of 2 to 40% by weight of a group represented by $R^1CO$-, wherein $R^1$ represents a saturated or unsaturated monovalent hydrocarbon group having 7 to 21 carbon atoms, and 60 to 98% by weight of a group represented by $R^2$—O-$C_qH_{2q})_l$, wherein $R^2$ represents a saturated or unsaturated monovalent hydrocarbon group having 7 to 21 carbon atoms, l represents an integer of 1 to 50, and q is a number of 2 to 4 on the average; m represents an integer of 1 to 50; n represents an integer of 1 to 20; and p represents an integer of 1 to 8.



4,748,226

## METHOD OF PREPARATION OF NOVEL 2-(ALKOXYMETHYL)-PENTANE-1,5-DIISOCYANATES, 2-(ALKOXYMETHYL)-PENTANE-1,5-DIURETHANES, AND 2-(ALKOXYMETHYL)-PENTANE-1,5-DICARBAMIC ACID CHLORIDES AND THEIR USES

Franz Merger, Frankenthal, and Wolfgang Schwarz, Pfiaztal, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

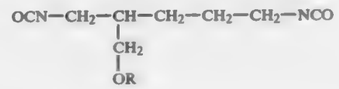
Filed Sep. 16, 1987, Ser. No. 97,505

Claims priority, application Fed. Rep. of Germany, Sep. 20, 1986, 3632010

Int. Cl.[4] C08G *18/77*

U.S. Cl. 528—85 14 Claims

1. An 2-(Alkoxymethyl)-pentane-1,5-diisocyanate, having the structural formula:



wherein

R is either

a straight chain or branched $C_1$–$C_{20}$ alkyl radical,

a straight chain or branched $C_2$–$C_{20}$ alkenyl radical,

a straight chain or branched $C_3$–$C_{20}$ oxaalkyl radical,

an optionally substituted $C_5$–$C_{12}$ cycloalkyl radical, or

an optionally substituted $C_7$–$C_{20}$ aralkyl radical.

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4,748,227

## PROCESS FOR PREPARING POLY(ARYL ETHER)KETONES USING A SODIUM CARBONATE/ORGANIC ACID SALT CATALYST

Markus Matzner, Edison, and Paul A. Winslow, West Millington, both of N.J., assignors to Amoco Corporation, Chicago, Ill.

Filed Apr. 25, 1986, Ser. No. 855,596

Int. Cl.[4] C08G *8/02*

U.S. Cl. 528—126 22 Claims

1. An improved process for preparing poly(aryl ether ketone)s by the reaction of a mixture of at least one bisphenol and at least one dihalobenzenoid compound, and/or a halophenol, wherein the improvement comprises providing to the reaction a base which is a combination of sodium carbonate and/or bicarbonate and a potassium, rubidium, or cesium salt of an organic acid or combinations of various organic salts thereof.

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4,748,228

## PROCESS FOR PRODUCING ORGANIC SILICON-TERMINATED POLYIMIDE PRECURSOR AND POLYIMIDE

Fusaji Shoji, Yokohama; Haruhiko Matsuyama, Hiratsuka; Akio Fujiwara, Fujisawa; Fumio Kataoka, Yokohama, and Teruji Aizawa, Shimodate, all of Japan, assignors to Hitachi, Ltd. and Hitchi Chemical Co., both of Tokyo, Japan

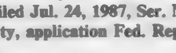
Filed May 14, 1986, Ser. No. 863,241

Claims priority, application Japan, Sep. 25, 1985, 60-210063

Int. Cl.[4] C08G *77/00*

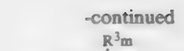
U.S. Cl. 528—182 12 Claims

1. A process for producing an organic silicon-terminated polyimide precursor, which comprises polycondensing 100 parts by weight of a mixture composed of 90 to 99.5% by mole of an organic diamine represented by the following general formula (I) and 10 to 0.5% by mole of an organic silyl represented by the following general formula (II):



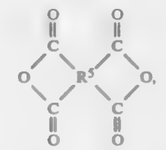
(I)

-continued



(II)

wherein $R^1$ and $R^2$ are divalent organic groups; $R^3$ and $R^4$ are monovalent organic groups; m is 0, 1, 2 or 3, with an organic tetracarboxylic acid dianhydride represented by the following general formula (III) in a molar amount corresponding to the 100 parts by weight of the mixture of the organic diamine and the organic silyl represented by the said general formulae (I) and (II), respectively, in an organic polar solvent at 0° to 40° C., thereby obtaining a solution of organic silicon-terminated polyimide precursor, and heating the solution of organic silicon-terminated polyimide precursor at 50° to 80° C.:



(III)

wherein $R^5$ is a tetravalent organic group.

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4,748,229

## FULLY AROMATIC THERMOTROPIC POLYESTERS

Bernd Hisgen, Limburgerhof; Hans-Jakob Kock, Ludwigshafen; Michael Portugall, Wachenheim; Erhard Seiler, Ludwigshafen, and Gerd Blinne, Bobenheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jul. 24, 1987, Ser. No. 77,281

Claims priority, application Fed. Rep. of Germany, Aug. 28, 1986, 3629210

Int. Cl.[4] C08G *63/54, 63/60, 69/44*

U.S. Cl. 528—183 10 Claims

1. A fully aromatic thermotropic polyester based on

(A) from 30 to 60 mol % of 4-hydroxybenzoic acid,

(B) from 20 to 35 mol % of a mixture of

($B_1$) terephthalic acid and

($B_2$) isophthalic acid,

the molar ratio of $B_1$ to $B_2$ being from 1.04:1 to 19:1, and

(C) from 20 to 35 mol % of a mixture of

($C_1$) hydroquinone,

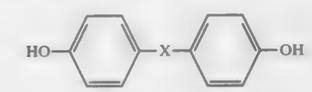
($C_2$) 4,4'-dihydroxydiphenyl and

($C_3$) from 0.5 to 5 mol % of one or more compounds from the group consisting of

($C_{31}$) 2,7-dihydroxynaphthalene,

($C_{32}$) 1,3-dihydroxybenzene,

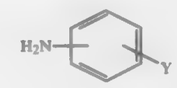
($C_{33}$) aromatic dihydroxy compounds of the formula I



(I)

where X is —$CH_2$—, —$C(CH_3)_2$—, —S—, —$SO_2$—, —O— or —CO—, or their chlorine, bromine, aryl or $C_1$–$C_8$-alkyl or alkoxy derivatives which are substituted in the nucleus, and

($C_{34}$) compounds of the formula II



(II)

where X is —$NH_2$ or —OH and the substituents are

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meta or para to one another, or their chlorine, bromine, aryl or $C_1$–$C_8$-alkyl or alkoxy derivatives which are substituted in the nucleus,

the molar ratio of $C_1$ to $C_2$ being from 0.1:1 to 2.67:1 and the molar ratio of B to C being from 0.9:1 to 1.1:1.

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**4,748,230**

## PREPARATION OF RESIN FROM PHENOLIC AND OXAZOLINE USING PHOSPHINE CATALYST

**Omar Tiba, Dublin; Billy M. Culbertson, Worthington; Marvin L. Deviney, Worthington, and Anil B. Goel, Worthington, all of Ohio, assignors to Ashland Oil, Inc., Ashland, Ky.**

**Filed Mar. 27, 1987, Ser. No. 30,799**

**Int. Cl.[4] C08G *69/00***

**U.S. Cl. 528—211** **8 Claims**

1. The process for the preparation of a polymeric composition comprising copolymerizing a mixture of a polyoxazoline and a polyphenolic compound in the presence of from about 0.5 to 5% by weight of a phosphine catalyst having the formula $R_3P$ wherein R independently represents an alkyl group having from 1 to 30 carbon atoms or an aryl group having from 6 to 14 carbon atoms or said R groups are independently substituted with at least one member selected from the group consisting of halogen, cyano, nitro, ester, hydroxyl, and phenolic groups at a temperature in the range of from about 140° C. to about 230° C.

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**4,748,231**

## REPRECIPITATION OF POLY(ARYLENE SULFIDE) TO INCREASE MOLECULAR WEIGHT THEREOF

**Afif M. Neaheiwat, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Nov. 21, 1986, Ser. No. 934,233**

**Int. Cl.[4] C08G *75/14***

**U.S. Cl. 528—486** **47 Claims**

1. A method for increasing the molecular weight of linear poly(arylene sulfide) comprising:

(a) heating a mixture comprising linear poly(arylene sulfide), polar organic solvent, and alkali metal carboxylate, with or without water, to at least the dispersion temperature of said linear poly(arylene sulfide) in said polar organic solvent;

(b) maintaining said mixture at about said dispersion temperature for a sufficient length of time for said linear poly(arylene sulfide) to disperse in the balance of the mixture;

(c) adding sufficient water while maintaining said mixture at about said dispersion temperature to cause a phase separation;

(d) slowly cooling said mixture and water to at least about 200° C.; and

(e) recovering a linear poly(arylene sulfide) of increased molecular weight from said mixture.

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**4,748,232**

## PEPTIDE PRODUCTION AND USE THEREOF

**Hisayuki Matsuo, 6653, Ooaza-kihara, Kiyotake-cho, Miyazaki-gun, Miyazaki-ken, and Kenji Kangawa, Miyazaki, both of Japan, assignors to Suntory Limited, Osaka and Hisayuki Matsuo, both of, Japan**

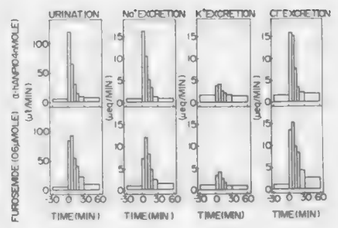
**Division of Ser. No. 685,151, Dec. 21, 1984. This application Sep. 11, 1986, Ser. No. 905,968**

**Claims priority, application Japan, Dec. 26, 1983, 58-243675**

**Int. Cl.[4] C07K *7/10***

**U.S. Cl. 530—324** **3 Claims**

1. A process for production of a peptide α-hANP having the following formula:




5 10
H-Ser-Leu-Arg-Arg-Ser-Ser-Cys-Phe-Gly-Gly-Arg-Met-Asp-Arg-1
S-S
15 20 25
2-Ile-Gly-Ala-Gln-Ser-Gly-Leu-Gly-Cys-Asn-Ser-Phe-Arg-Tyr-OH

and an acid addition salt thereof which comprises the following steps:

(1) human atrium is boiled in an acidic solution and homogenized therein;

(2) the homogenate is centrifuged to obtain a supernatant containing the α-haNP; and

(3) the α-haNP is seperated from impurities to obtain the α-hANP in a substantially purified form, and optionally, the α-haNP is converted into acid addition salt thereof or acid addition salt into free α-haNP.

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**4,748,233**

## ALPHA-INTERFERON GX-1

**Alan Sloma, Silver Spring, Md., assignor to Bristol-Myers Company, Syracuse, N.Y.**

**Division of Ser. No. 602,275, Apr. 24, 1984, Pat. No. 4,695,543, which is a continuation of Ser. No. 361,364, Mar. 23, 1982, abandoned. This application May 28, 1987, Ser. No. 55,044**

**Int. Cl.[4] C07K *15/26, 13/00;* C12P *21/02, 21/04;* C12N *15/00;* C07H *21/04;* A61K *45/02***

**U.S. Cl. 530—351** **2 Claims**

1. Alpha-interferon Gx-1, comprising the following amino acid sequence, beginning with the amino terminus: CYS ASN LEU SER GLN THR HIS SER LEU ASN ASN ARG ARG THR LEU MET ILE MET ALA GLN MET GLY ARG ILE SER PRO PHE SER CYS LEU LYS ASP ARG HIS ASP PHE GLY PHE PRO GLN GLU GLU PHE ASP GLY ASN GLN PHE GLN LYS ALA GLN ALA ILE SER VAL LEU HIS GLU MET ILE GLN GLN THR PHE ASN LEU PHE SER THR LYS ASP SER SER ALA THR TRP ASP GLU THR LEU LEU ASP LYS PHE TYR THR GLU LEU TYR GLN GLN LEU ASN ASP LEU GLU ALA CYS MET MET GLN GLU VAL GLY VAL GLU ASP THR PRO LEU MET ASN VAL ASP SER ILE LEU THR VAL ARG LYS TYR PHE GLN ARG ILE THR LEU TYR LEU THR GLU LYS LYS TYR SER PRO CYS ALA TRP GLU VAL VAL ARG ALA GLU ILE MET ARG SER PHE SER LEU SER ALA ASN LEU GLN GLU ARG LEU ARG ARG LYS GLU wherein

GLY is glycine
ALA is alanine
VAL is valine
LEU is leucine
ILE is isoleucine
SER is serine
THR is threonine
PHE is phenylalanine
TYR is tyrosine
TRP is tryptophan
CYS is cysteine
MET is methionine
ASP is aspartic acid
GLU is glutamic acid
LYS is lysine
ARG is arginine
HIS is histidine
PRO is proline
GLN is glutamine
ASN is asparagine.

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**4,748,234**

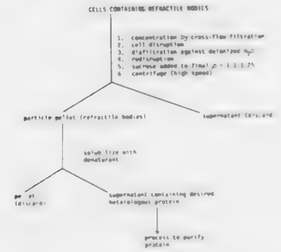
## PROCESS FOR RECOVERING REFRACTILE BODIES CONTAINING HETEROLOGOUS PROTEINS FROM MICROBIAL HOSTS

**Glenn Dorin, San Rafael, Calif.; Wolfgang H. Hanisch, Balmoral Heights, Australia, and Leo S. Lin, Walnut Creek, Calif., assignors to Cetus Corporation, Emeryville, Calif.**

**Continuation-in-part of Ser. No. 749,951, Jun. 26, 1985, abandoned. This application Mar. 25, 1986, Ser. No. 843,997**

**Int. Cl.[4] C07K *3/12, 3/28;* A61K *45/02***

**U.S. Cl. 530—412** **46 Claims**




1. A process for recovering a refractile material containing a heterologous protein from a host microorganism cell culture transformed to produce said protein, said process comprising:

(a) disrupting the cell wall and cell membrane of the microorganism;

(b) removing greater than 99% by weight of the salts from said disruptate;

(c) redisrupting the desalted disruptate;

(d) adding a material to the disruptate to increase the density or viscosity of, or to create a density or viscosity gradient in, the liquid within the disruptate; and

(e) separating the refractile material from the cellular debris by high-speed centrifugation.

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**4,748,235**

## METHOD OF PRODUCING IMPROVED AMINE SALTS OF LIGNOSULFONATES

**Peter Dilling, Isle of Palms, and Susan L. Schlegel, Goose Creek, both of S.C., assignors to Westvaco Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 859,384, May 5, 1986, Pat. No. 4,715,864. This application Apr. 16, 1987, Ser. No. 38,955**

**Int. Cl.[4] C07G *1/00***

**U.S. Cl. 530—501** **6 Claims**

1. A method of producing an amine-containing salt of a lignosulfonate compound which may be effectively spray-dried for use in dry form comprising the steps of

(a) methylolating a lignin compound at an alkaline pH;

(b) lowering the pH of the methylolated lignin to precipitate the lignin;

(c) washing the precipitated lignin at an acid pH to remove impurities;

(d) sulfonating the methylolated lignin in the presence of a sulfur-oxygen-containing compound, an amine compound, and an ammonium-containing compound to produce an amine salt thereof; and

(e) heating and spray-drying the sulfonated lignin amine salt while evaporating ammonia therefrom to produce a sulfonated lignin amine salt in dry form.

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**4,748,236**

## AZO DYESTUFFS HAVING SULPHO ORTHO TO AZO BRIDGE AND CONTAINING TWO TRIAZINE REACTIVE GROUPS

**Horst Jäger, and Richard Schwaebel, both of Leverkusen, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

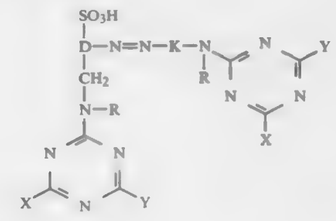
**Continuation of Ser. No. 177,559, Aug. 13, 1980, abandoned, which is a division of Ser. No. 40,853, May 21, 1979, abandoned. This application Nov. 9, 1984, Ser. No. 670,434**

**Claims priority, application Fed. Rep. of Germany, Jun. 10, 1978, 2825594**

**Int. Cl.[4] C09B *62/08, 62/085, 62/09, 62/095***

**U.S. Cl. 534—634** **17 Claims**

1. A dyestuff of the formula



wherein

D is a radical of a benzene or naphthalene coupling component, having a sulpho group in the o-position to the azo bridge,

K is a radical of a hydroxy-naphthalene or pyrazolone coupling component,

R is hydrogen or $C_1$–$C_4$-alkyl,

Y is $OR_1$ or $SR_1$, wherein $R_1$ represents unsubstituted $C_1$–$C_4$-alkyl; $C_1$–$C_4$-alkyl substituted by methoxy or ethoxy; unsubstituted aryl; aryl substituted by chlorine or methoxy; unsubstituted heteroaryl; heteroaryl substituted by chlorine or methoxy; or

Y is $NR_2R_3$, wherein $R_2$ represents hydrogen; unsubstituted alkyl; alkyl substituted by OH, $OCH_3$, COOH or $SO_3H$; $R_3$ represents hydrogen; unsubstituted alkyl; alkyl substituted by OH or $OCH_3$, unsubstituted aryl; aryl substituted by chlorine, methoxy, methyl, $SO_3H$ or COOH; or

$R_2$ and $R_3$ form a ring without or with inclusion of a hetero atom;

X is fluorine.

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**4,748,237**

## INCREASING CYCLODEXTRIN YIELDS BY THE ADDITION OF VARIOUS SOLUTES TO STARCH FEEDSTOCKS

**Ronald P. Rohrbach, Forest Lake, and Dale S. Scherl, Mt. Prospect, both of Ill., assignors to UOP Inc., Des Plaines, Ill.**

**Filed Apr. 10, 1987, Ser. No. 36,725**

**Int. Cl.[4] C08B *37/16***

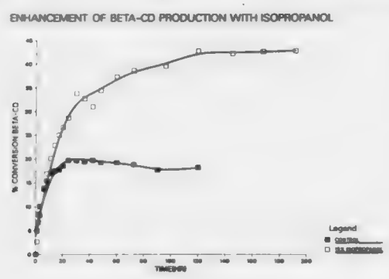
**U.S. Cl. 536—103** **11 Claims**

1. In the method of making cyclodextrins by hydrolyzing a feedstock of starch in the presence of a cyclodextrin glycosyltransferase, the improvement comprising performing the hydrolysis in the presence of an effective amount of a cyclodextrin-enhancing water-soluble solute selected from the group consisting of: organic solutes at a concentration from about 5

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to about 40%; salts of oxoanions, said oxoanion being selected from the group consisting of halide, perchlorate, thiocyanate,




and oxoanions of pentavalent phosphorus, at a concentration from 0.1 to about 2 molar; and combinations thereof.

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**4,748,238**

**CRYSTALLINE 1R,5S,6S,8R-1-METHYL-2-(N,N-DIMETHYLCARBAMIMIDOYLMETHYLTHIO)-6-(1-HYDROXYETHYL)-1-CARBAPEN-2-EM-3-CARBOXYLIC ACID**

**David H. Shih, Manalapan, N.J., assignor to Merck & Co., Inc., Rahway, N.J.**

**Continuation of Ser. No. 589,369, Mar. 14, 1984, abandoned, which is a continuation of Ser. No. 365,066, Apr. 2, 1982, abandoned. This application Jun. 6, 1986, Ser. No. 873,262**

**The portion of the term of this patent subsequent to Dec. 15, 2004, has been disclaimed.**

**Int. Cl.**[4] **C07D** *487/04;* **A61K** *30/40*

**U.S. Cl. 540—350** **1 Claim**

1. Crystalline 5R,6S,8R,1$\beta$-methyl-2-(N,N-dimethyl carbamimidoylmethylthio)-6-(1-hydroxyethyl)-1-carbapen-2-em-3-carboxylic acid, having the following X-ray powder diffraction parameters:

| Peak Position 2θ (CuKα) | d-Spacing (Å) | Intensity I/I° | Peak Position 2θ (CuKα) | d-Spacing (Å) | Intensity I/I° |
|---|---|---|---|---|---|
| 10.1 | 8.75 | 52 | 28.9 | 3.09 | 10 |
| 11.15 | 7.93 | 15 | 30.1 | 2.97 | 13 |
| 12.0 | 7.37 | 25 | 30.7 | 2.91 | 8 |
| 13.5 | 6.55 | 14 | 31.0 | 2.88 | 13 |
| 15.0 | 5.90 | 100 | 31.5 | 2.84 | 20 |
| 15.4 | 5.75 | 16 | 32.9 | 2.72 | 10 |
| 16.7 | 5.31 | 13 | 33.2 | 2.69 | 18 |
| 17.5 | 5.06 | 69 | 33.8 | 2.65 | 5 |
| 18.1 | 4.89 | 38 | 34.8 | 2.58 | 10 |
| 19.0 | 4.66 | 26 | 35.4 | 2.53 | 7 |
| 20.1 | 4.41 | 28 | 36.0 | 2.49 | 10 |
| 20.7 | 4.29 | 86 | 37.1 | 2.42 | 20 |
| 21.3 | 4.17 | 22 | 37.9 | 2.37 | 10 |
| 22.2 | 4.00 | 7 | 38.2 | 2.35 | 8 |
| 23.5 | 3.78 | 63 | 39.4 | 2.28 | 5 |
| 24.0 | 3.71 | 7 | 40.1 | 2.25 | 7 |
| 24.7 | 3.60 | 19 | 40.5 | 2.23 | 7 |
| 25.7 | 3.46 | 66 | 41.1 | 2.20 | 13 |
| 26.4 | 3.37 | 18 | 41.6 | 2.17 | 7 |
| 26.9 | 3.31 | 9 | 42.2 | 2.14 | 5 |
| 27.6 | 3.23 | 11 | 43.1 | 2.09 | 10 |
| 28.0 | 3.18 | 30 | | | |

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**4,748,239**

**BENZAZEPINE DERIVATIVES**

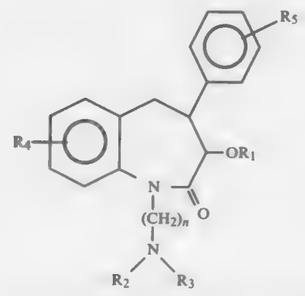
**David Floyd, Pennington, and John Krapcho, Somerset, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.**

**Continuation-in-part of Ser. No. 935,995, Nov. 28, 1986, abandoned, which is a continuation-in-part of Ser. No. 800,936, Nov. 22, 1985, abandoned, which is a continuation-in-part of Ser. No. 743,841, Jun. 12, 1985, abandoned. This application Apr. 24, 1987, Ser. No. 42,187**

**Int. Cl.**[4] **C07D** *223/16;* **A61K** *31/55*

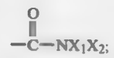
**U.S. Cl. 540—523** **30 Claims**

1. A compound having the formula



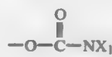
or a pharmaceutically acceptable salt thereof wherein

$R_1$ is hydrogen, alkyl, alkanoyl, alkenyl, arylcarbonyl, heteroarylcarbonyl or

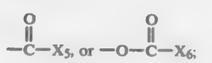


$R_2$ and $R_3$ are each independently hydrogen, alkyl, cycloalkyl or arylalkyl or $R_2$ and $R_3$ together with the nitrogen atom to which they are attached are pyrrolidinyl, piperidinyl, or morpholinyl;

$R_4$ and $R_5$ are each independently hydrogen, halogen, alkyl, alkoxy, aryloxy, arylalkoxy, diarylalkoxy, arylalkyl, cyano, hydroxy, alkanoyloxy,



fluoro substituted alkoxy, fluoro substituted alkyl, (cycloalkyl)alkoxy, $-NO_2$, $-NX_3X_4$, $-S(O)_m$alkyl, $-S(O)_m$aryl,

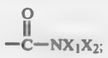


n is 2 or 3;

m is 0, 1 or 2;

$X_1$ and $X_2$ are each independently hydrogen, alkyl, aryl or heteroaryl, or $X_1$ and $X_2$ together with the nitrogen atom to which they are attached are pyrrolidinyl, piperidinyl or morpholinyl;

$X_3$ and $X_4$ are each independently hydrogen, alkyl, alkanoyl, arylcarbonyl, heteroacrylcarbonyl, or



$X_5$ is hydroxy, alkoxy, aryloxy, amino, alkylamino or dialkylamino; and



$X_6$ is alkyl, alkoxy or aryloxy; with the proviso that if R4 is a 7-alkyl group, it must have a tertiary carbon atom bonded to the ring;

wherein the term "aryl" refers to phenyl and phenyl substituted with 1, 2 or 3 amino, alkylamino, dialkylamino, nitro, halogen, hydroxyl, trifluoromethyl, alkyl or 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, alkanoyloxy, carbamoyl, or carboxyl groups;

the term "heteroaryl" refers to pyridinyl, pyrrolyl, imidazolyl, furyl, thienyl, or thiazolyl;

the terms "alkyl" and "alkoxy" refers to groups having 1 to 10 carbon atoms;

the term "alkenyl" refers to groups having 2 to 10 carbon atoms;

the term "alkanoyl" refers to groups having 2 to 11 carbon atoms; and

the term "cycloalkyl" refers to groups having 3, 4, 5, 6 or 7 carbon atoms.

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**4,748,240**

**PSYCHOTROPIC BICYCLIC IMIDES**

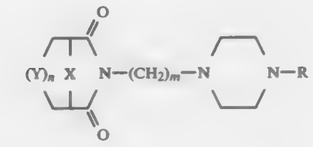
**Gary P. Stack, Merion, Pa.; Magid A. Abou-Gharbia, Wilmington, Del., and Edward J. Podlesny, New Tripoli, Pa., assignors to American Home Products Corporation, New York, N.Y.**

**Filed Apr. 3, 1987, Ser. No. 34,525**

**Int. Cl.**[4] **C07D** *401/06, 401/14, 405/14, 409/14*

**U.S. Cl. 544—47** **18 Claims**

1. A compound of the formula:



in which

X is —O—, —S—, —SO—, —$SO_2$—, —$CR_3R_4$— where $R_3$ and $R_4$, independently, are hydrogen, alkyl of 1 to 4 carbon atoms or, taken together with the carbon atom to which they are attached, $R_3$ and $R_4$ form a cycloalkyl group of 3 to 5 carbon atoms;

Y is alkylene of 1 to 3 carbon atoms or alkenylene of 2 to 3 carbon atoms;

m is one of the integers, 2, 3, 4, or 5;

n is one of the integers 0 or 1; and

R is 2-pyrimidinyl, halopyrimidin-2-yl, 2-pyrazinyl, halopyrazin-2-yl, 2-pyridinyl, cyanopyridin-2-yl, halopyridin-2-yl, quinolyl, or haloquinolyl;

or a pharmaceutically acceptable salt thereof.

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**4,748,241**

**PROCESS FOR PRODUCING AQUEOUS N-METHYLMORPHOLINE-N-OXIDE SOLUTIONS**

**Heinz Scholten, Haltern, and Klaus Rindtorff, Recklinghausen, both of Fed. Rep. of Germany, assignors to Hüls Aktiengesellschaft, Marl, Fed. Rep. of Germany**

**Filed Feb. 6, 1987, Ser. No. 11,526**

**Claims priority, application Fed. Rep. of Germany, May 31, 1986, 3618352**

**Int. Cl.**[4] **C07D** *295/22*

**U.S. Cl. 544—173** **6 Claims**

1. In a process for producing an aqueous, pure solution of N-methylmorpholine-N-oxide by reacting methylmorpholine with an aqueous solution of hydrogen peroxide, the improvement comprising:

preparing mixtures of methylmorpholine and water, distilling said mixtures of methylmorpholine and water to form an azeotrope of methylmorpholine/water, reacting said azeotrope with an aqueous solution of hydrogen peroxide at temperatures between 60° and 100° C. to form a reaction product and subsequently concentrating said reaction solution to a given content in N-methylmorpholine-N-oxide.

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**4,748,242**

**TERTIARY POLYISOCYANATE DERIVATIVES**

**Reinhard Halpaap; Josef Pedain, both of Cologne; Hans-Joachim Kreuder, Krefeld; Gerhard Klein, Monheim, and Dieter Arlt, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Bayerwerk, Fed. Rep. of Germany**

**Filed Nov. 12, 1986, Ser. No. 930,584**

**Claims priority, application Fed. Rep. of Germany, Nov. 27, 1985, 3541859**

**Int. Cl.**[4] **C07D** *251/30, 251/32*

**U.S. Cl. 544—222** **7 Claims**

1. A polyisocyanate containing at least one isocyanurate group and prepared by catalytically trimerizing a portion of the isocyanate groups of an organic diisocyanate mixture comprising

(a) an aliphatic-cycloaliphatic diisocyanate having an NCO content of about 20 to 50% by weight, and also having a sterically unhindered isocyanate group bound to a primary aliphatic carbon atom and a sterically hindered isocyanate group bound to a tertiary carbon atom which forms part of a cycloaliphatic ring system and

(b) 1,6-diisocyanatohexane in a positive quantity of up to about 50 mol % of HDI, based on the total quantity of components (a) and (b)

and optionally terminating the trimerization reaction at the desired degree of trimerization by adding a catalyst poison and/or by thermally deactivating the catalyst.

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**4,748,243**

**PREPARATION OF 2-CHLORO-5-CHLOROMETHYLTHIAZOLE**

**Gunther Beck, and Helmut Heitzer, both of Leverkusen, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

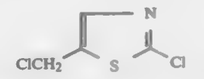
**Filed Aug. 31, 1987, Ser. No. 91,577**

**Claims priority, application Fed. Rep. of Germany, Sep. 17, 1986, 3631538**

**Int. Cl.**[4] **C07D** *277/32*

**U.S. Cl. 548—202** **7 Claims**

1. A process for the preparation of 2-chloro-5-chloromethylthiazole of the formula



comprising reacting allyl isothiocyanate of the formula

$$CH_2{=}CH{-}CH_2{-}NCS$$

with about 2 to 20 times its molar amount of chlorine at a temperature from above 0° to 150° C.

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**4,748,244**

## PROCESS FOR THE PREPARATION OF PYRIDINE-2-3-DICARBOXYLIC ACID DERIVATIVES, AND NOVEL 1-AMINO-1,4-DIHYDROPYRIDINE-2-3-DIARBOXYLIC ACID DERIVATIVES

**Adrian Waldner, Allschwil; Achim Roloff, Rheinfelden, and Daniel Bellus, Riehen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

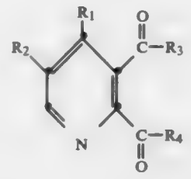
**Filed May 3, 1985, Ser. No. 730,026**

**Claims priority, application Switzerland, May 11, 1984, 2337/84**

**Int. Cl.**[4] **C07D** *213/803, 213/82, 471/04, 491/048*

**U.S. Cl. 544—313** **14 Claims**

**1**. A process for the preparation of a pyridine-2,3-dicarboxylic acid derivative of formula I



(I)

wherein

$R_1$ is hydrogen or $C_1$–$C_6$alkyl, $C_1$–$C_6$alkylthio or $C_1$–$C_6$alkoxy which are unsubstituted or substituted by hydroxy, halogen, $C_1$–$C_4$alkoxy, phenyl, phenoxy, cyano, carboxyl or $C_1$–$C_4$alkoxycarbonyl; or phenyl or phenoxy, unsubstituted or substituted by halogen, cyano, $C_1$–$C_4$alkyl, $C_1$–$C_4$alkoxy, $C_1$–$C_4$haloalkyl or $C_1$–$C_4$cyanoalkyl,

$R_2$ has the meaning as $R_1$ and is additionally fluorine, chlorine or bromine, each of

$R_3$ and $R_4$ independently of the other is —OH, —$NH_2$, —$NHR_5$, —$NR_5R_6$ or —$OR_7$, wherein

$R_5$ and $R_6$ are $C_1$–$C_6$alkyl, $C_5$–$C_6$cycloalkyl, allyl, methallyl, propargyl, unsubstituted $C_6$–$C_{16}$aryl or $C_7$–$C_{16}$aralkyl or $C_6$–$C_{16}$aryl or $C_7$–$C_{16}$aralkyl which are substituted by halogen, cyano, $C_1$–$C_4$alkyl, $C_1$–$C_4$alkoxy, $C_1$–$C_4$haloalkyl or $C_1$–$C_4$cyanoalkyl, or $R_5$ and $R_6$ together are $C_4$–$C_5$alkylene or 3-oxapentalene, and

$R_7$ is unsubstituted $C_1$–$C_6$alkyl or $C_1$–$C_6$alkyl substituted by —OH, —$OR_{11}$ or —$SR_{11}$, —$NR_9R_{10}$, —COOH, —$COOR_7$, —$OCOR_{11}$, —$CONH_2$, —$CONHR_5$, —$CONR_5R_6$, halogen or cyano; or is $C_5$–$C_6$cycloalkyl, allyl, methallyl, propargyl unsubstituted phenyl or benzyl or phenyl or benzyl which is substituted by $C_1$–$C_4$alkyl, $C_1$–$C_4$alkoxy or halogen, wherein each of

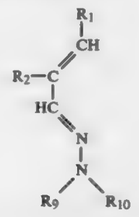
$R_9$ and $R_{10}$ individually is $C_1$–$C_6$alkyl, $C_5$–$C_6$cycloalkyl, phenyl or benzyl, or $R_9$ and $R_{10}$ together are $C_4$–$C_5$alkylene or 3-oxypentalene and

$R_{11}$ is $C_1$–$C_6$alkyl, cyclohexyl or phenyl; or

$R_3$ and $R_4$ taken together are —O— or —$NR_8$— wherein

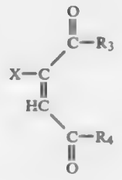
$R_8$ is hydrogen or $R_7$,

which process comprises reacting a hydrazone of formula II



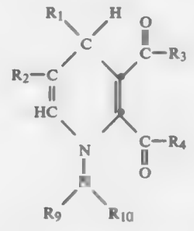
(II)

wherein $R_1$, $R_2$, $R_9$ and $R_{10}$ are as previously defined, with a maleic acid derivative of formula III



(III)

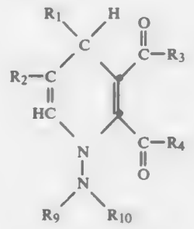
wherein $R_3$ and $R_4$ are as previously defined and X is chlorine or bromine, in the presence of an inert solvent, to give a 1-amino-3,4-dihydropyridine-2,3-dicarboxylic acid derivative of formula IV



(IV)

wherein $R_1$, $R_2$, $R_3$, $R_4$, $R_9$ and $R_{10}$ are as defined above, and subsequently removing H—$NR_9R_{10}$ from said compound of formula IV by treatment with an acid or by heat treatment at a temperature of at least 20° C. in neutral medium to give a pyridine-2,3-dicarboxylic acid derivative of formula I.

**12**. A 1-amino-1,4-dihydropyridine-2,3-dicarboxylic acid derivative of formula IV



(IV)

wherein

$R_1$ is hydrogen or $C_1$–$C_6$alkyl, $C_1$–$C_6$alkylthio or $C_1$–$C_6$alkoxy which are unsubstituted or substituted by hydroxy, halogen, $C_1$–$C_4$alkoxy, phenyl, phenoxy, cyano, carboxyl or $C_1$–$C_4$alkoxycarbonyl; or phenyl or phenoxy, unsubstituted or substituted by halogen, cyano, $C_1$–$C_4$alkyl, $C_1$–$C_4$alkoxy, $C_1$–$C_4$haloalkyl or $C_1$–$C_4$cyanoalkyl,

$R_2$ has the meaning as $R_1$ and is additionally fluorine, chlorine or bromine, each of

$R_3$ and $R_4$ independently of the other is —OH, —$NH_2$, —$NHR_5$, —$NR_5R_6$ or —$OR_7$, wherein

$R_5$ and $R_6$ are $C_1$–$C_6$alkyl, $C_5$–$C_6$cycloalkyl, allyl, methallyl, propargyl, unsubstituted $C_6$–$C_{16}$aryl or $C_7$–$C_{16}$aralkyl or $C_6$–$C_{16}$aryl or $C_7$–$C_{16}$aralkyl which are substituted by halogen, cyano, $C_1$–$C_4$alkyl, $C_1$–$C_4$alkoxy, $C_1$–$C_4$haloalkyl or $C_1$–$C_4$cyanoalkyl, or $R_5$ and $R_6$ together are $C_4$–$C_5$alkylene or 3-oxapentalene, and

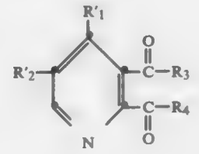
$R_7$ is unsubstituted $C_1$–$C_6$alkyl or $C_1$–$C_6$alkyl substituted by —Oh, —$OR_{11}$ or —$SR_{11}$, —$NR_9R_{10}$, —COOH, —$COOR_7$, —$OCOR_{11}$, —$CONH_2$, —$CONHR_5$, —$CONR_5R_6$, halogen or cyano; is is $C_5$–$C_6$cycloalkyl, allyl, methallyl, propargyl unsubstituted phenyl or benzyl or phenyl or benzyl which is substituted by $C_1$–$C_4$alkyl, $C_1$–$C_4$alkoxy or halogen, wherein each of $R_9$ and $R_{10}$ individually is $C_1$–$C_6$alkyl, $C_5$–$C_6$cycloalkyl, phenyl or benzyl, or $R_9$ and $R_{10}$ together are $C_4$–$C_5$alkylene or 3-oxypentalene and

$R_{11}$ is $C_1$–$C_6$alkyl, cyclohexyl or phenyl; or

$R_3$ and $R_4$ taken together are —O— or —$NR_8$— wherein

$R_8$ is hydrogen or $R_7$.

**14**. A pyridine-2,3-dicarboxylic acid derivative of the formula Ia



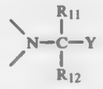
(Ia)

wherein

$R_1'$ is hydrogen,

$R_2'$ is $C_1$–$C_4$alkyl and

$R_3$ and $R_4$ together are a group of the formula



wherein

$R_{11}$ and $R_{12}$ are hydrogen or $C_1$–$C_6$alkyl and

Y is a cyano or a carbamoyl group.

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**4,748,245**

## PROCESS FOR MAKING PHENYLTHIOPYRIMIDINES

**Donald R. James, El Sobrante, Calif., assignor to Stauffer Chemical Company, Westport, Conn.**

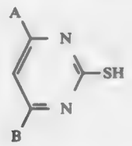
**Filed Mar. 20, 1986, Ser. No. 841,964**

**Int. Cl.**[4] **C07D** *239/38, 239/56, 403/12*

**U.S. Cl. 544—316** **9 Claims**

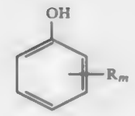
**1**. A process for the preparation of phenylthiopyrimidines which comprises

(a) reacting a thiopyrimidine of the formula

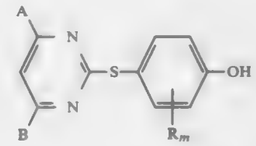


wherein A and B are the same or different and are selected from the group consisting of hydrogen, straight or branched chain alkyl groups having from 1 to about 5 carbon atoms, alkoxy wherein the alkyl group has from 1 to about 5 carbon atoms, mono- or di-alkyl substituted amine wherein the alkyl group has from 1 to about 5 carbon atoms, cyano, COO-alkyl wherein the alkyl group has from 1 to about 5 carbon atoms, trifluoromethyl, chlorine or fluorine; with a sulfuryl chloride chlorinating agent in the presence of a halocarbon solvent to form the sulfenyl chloride of said thiopyrimidine;

(b) reacting said sulfenyl chloride of said thiopyrimidine with phenol or an substituted phenol of the formula

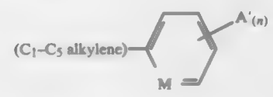


wherein R is hydrogen, alkyl having from 1 to about 5 carbon atoms, halogen, phenyl, cyano, COO-alkyl wherein the alkyl group has from 1 to about 5 carbon atoms, trifluoromethyl or alkoxy wherein the alkyl group has from 1 to about 5 carbon atoms; and m is an integer of from 1 to 4; optionally in the presence of a Friedal-Crafts catalyst, to form a thiopyrimidinylphenol of the formula

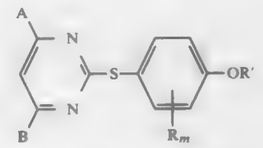


wherein A, B and $R_m$ are as defined above; and

(c) reacting said thiopyrimidinylphenol formed in step (b) with base and an alkylating agent of the formula R'-$X_a$ wherein R' is a straight or branched chain alkyl group having from 1 to about 5 carbon atoms, an arylalkyl moiety of the formula



wherein the alkylene group is straight or branched chain; A' is selected from the group consisting of hydrogen, halogen, straight or branched chain alkyl having from 1 to about 5 carbon atoms, nitro, cyano, methoxy, and halogenated alkyl having from 1 to about 5 carbon atoms wherein n is an integer from 1 to 5; M is CH or nitrogen; and $X_a$ is chlorine, bromine or iodine, to form



wherein A, B, $R_m$ and R' are as defined above.

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**4,748,246**

## PYRAZOLO(4,3-C)QUINOLINES

**Jerauld S. Skotnicki, Chadds Ford; Steven C. Gilman, Newtown Square; Bruce A. Steinbaugh, King of Prussia, and John H. Musser, Malvern, all of Pa., assignors to American Home Products Corporation, New York, N.Y.**

**Filed May 7, 1987, Ser. No. 47,969**

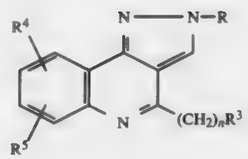
**Int. Cl.**[4] **C07D** *471/04*

**U.S. Cl. 544—331** **14 Claims**

**1**. A compound having the formula

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wherein
R is, phenyl, naphthyl, pyrid(-2-, 3- or 4-)yl, quinolin(-2-, -3- or -4-)yl or phenyl, naphthyl, pyrid(-2-, -3- or -4-)yl or quinolin(-2-, -3- or -4-)yl substituted by halo, lower alkyl, lower alkoxy, nitro, cyano, amino, monolower alkyl amino, dilower alkyl amino, carboxy, lower alkoxycarbonyl or hydroxy;
$R^1$ is phenyl, phenyl lower alkyl, naphthyl, pyrid(-2-, -3- or -4-)yl, quinolin(-2-, -3-, -4-)yl, pyrazin(-2- or -3-)yl, pyrimidin(-2-, -4- or -5-)yl, pyridazin(-3, -4- or -5-)yl, quinoxalin(-2- or -3-)yl or quinazolin(-2- or -4-)yl or any of the foregoing substituted with halo, lower alkyl, carboxy, cyano, nitro, lower alkylsulfonyl, lower alkoxy carbonyl or lower alkyl substituted by fluoro, carboxy, cyano, nitro or lower alkoxy carbonyl;
$R^2$ is hydrogen, lower alkyl, phenyl or benzyl;
$R^3$ is $NR^2R^1$ or $NR^6R^1$;
$R^4$ and $R^5$ are each independently, hydrogen, halo, lower alkoxy, lower alkyl, trifluoromethyl, cyano, nitro, carboxy or lower alkoxycarbonyl;
$R^6$ is carbamoyl, phenylcarbamoyl, or halophenylcarbamoyl; and
n is 1—5.

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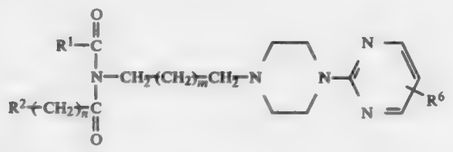
**4,748,247**

**2-[4-[4-(2-PYRIMIDINYL)-1-PIPERAZINYL]ALKYL]ALKYL]PYRIDO- AND PYRAZINO-INDOLE-1,3-DIONE DERIVATIVES AS HISTAMINE $H_1$ ANTAGONISTS**

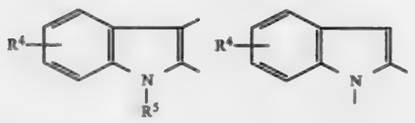
**Magid A. Abou-Gharbia, Wilmington, Del., assignor to American Home Products Corporation, New York, N.Y.**

**Filed Oct. 21, 1986, Ser. No. 921,642**
**Int. Cl.[4] C07D *403/14;* A61K *31/495***
**U.S. Cl. 544—357** **5 Claims**

1. A compound of the formula:



in which
$R^1$ and $R^2$, taken together, represent an ortho-fused 1,2-indolo or 2,3-indolo moiety of the formulas:



where
$R^4$ is hydrogen, alkyl of 1 to 6 carbon atoms, alkoxy of 1 to 6 carbon atoms or halo;
$R^5$ is hydrogen, alkyl of 1 to 6 carbon atoms, benzyl, phenyl or substituted phenyl or benzyl where the substituent is taken from the group alkyl of 1 to 6 carbon atoms, alkoxy of 1 to 6 carbon atoms, halo or trifluoromethyl;
$R^6$ is alkyl of 1 to 6 carbon atoms, alkoxy of 1 to 6 carbon atoms or halo;
n is one of the integers 0 or 1; and
m is one of the integers 0, 1, 2 or 3;
or a phamaceutically acceptable salt thereof.

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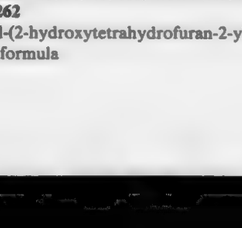
**4,748,248**

**PROCESS FOR THE PREPARATION OF ERGOLINE DERIVATIVES**

**Gerhard Sauer, and Gregor Haffer, both of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany**

**Continuation of Ser. No. 576,504, Feb. 2, 1984, abandoned, which is a continuation of Ser. No. 415,612, Sep. 3, 1982, abandoned. This application Dec. 13, 1985, Ser. No. 808,804**
**Claims priority, application Fed. Rep. of Germany, Sep. 3, 1981, 3135305**
**Int. Cl.[4] C07D *457/12***
**U.S. Cl. 546—68** **13 Claims**

1. A process for preparing an ergoline of high configurational purity of the formula



wherein
$NR^1$ can be in the $\alpha$- or $\beta$-position,
$C_9$- - - -$C_{10}$ is a CC single or double bond,
$R^1$ is hydrogen or $CONR_2$,
R is hydrogen, methyl, or ethyl,
$R^2$ is lower alkyl of up to 3 carbon atoms, or a physiologically compatible salt thereof,
comprising,
treating the corresponding ergolinyl 8-carboxylic acid amide with lead (IV) acetate in a reaction compatible, aprotic polar solvent at a temperature less than about room temperature,
reacting the intermediarily formed corresponding 8-isocyanate with water or with a mono- or dialkylamine of up to 4 carbon atoms; and,
optionally, converting the resultant ergoline into a physiologically compatible salt thereof by reacting it with a corresponding acid.

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**4,748,249**

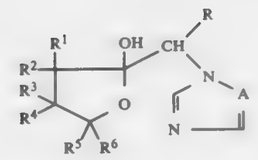
**COMBATING FUNGI WITH NOVEL AZOLYL-TETRAHYDROFURAN-2-YLIDENE-METHANES**

**Hans-Ludwig Elbe, Wuppertal; Manfred Jautelat; Karl H. Büchel, both of Burscheid; Wilhelm Brandes, Leichlingen; Gerd Hänssler, and Paul Reinecke, both of Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Division of Ser. No. 658,941, Oct. 9, 1984, Pat. No. 4,619,940. This application Jun. 27, 1986, Ser. No. 879,661**
**Claims priority, application Fed. Rep. of Germany, Oct. 11, 1983, 3336861**
**Int. Cl.[4] A01N *43/50, 43/653;* C07D *249/08, 405/06***
**U.S. Cl. 548—262** **14 Claims**

1. An azolyl-(2-hydroxytetrahydrofuran-2-yl)-methane derivative of the formula





in which
A represents a nitrogen atom or the CH group,
R represents straight-chain or branched alkyl with 1 to 12 carbon atoms, or represents straight-chain or branched alkenyl or alkynyl with in each case 2 to 12 carbon atoms, or represents straight-chain or branched alkoxyalkyl or alkylthioalkyl with in each case 1 to 6 carbon atoms in each alkyl part, or represents halogenoalkyl, halogenoalkoxyalkyl or halogenoalkylthioalkyl with in each case 1 to 6 carbon atoms in each alkyl part and with in each case 1 to 6 identical or different halogen atoms or represents halogenoalkyl with 2 to 6 carbon atoms and 1 to 5 identical or different halogen atoms, or represents phenylalkyl, phenoxyalkyl or phenylthioalkyl with in each case 1 to 4 carbon atoms in the alkyl part and in each case optionally monosubstituted or polysubstituted in the phenyl part by identical or different substituents selected from the group consisting of halogen, alkyl, alkoxy and alkylthio with in each case 1 to 4 carbon atoms; halogenoalkyl, halogenoalkoxy and halogenoalkylthio with in each case 1 to 4 carbon atoms and 1 to 5 identical or different halogen atoms; nitro; cyano; and optionally halogen-substituted phenyl and phenoxy; or represents cycloalkyl or cycloalkylalkyl with in each case 3 to 7 carbon atoms in the cycloalkyl part and 1 to 4 carbon atoms in the alkyl part and in each case optionally monosubstituted or polysubstituted by alkyl with 1 to 4 carbon atoms;
$R^1$ to $R^6$, which can be identical or different, represent hydrogen, straight-chain or branched alkyl with 1 to 4 carbon atoms, or represent halogenoalkyl with 1 or 2 carbon atoms and 1 to 5 identical or different halogen atoms, up to a maximum of 3 substituents representing halogenoalkyl,
$R^3$ to $R^6$, which can be identical or different, also represent halogen, up to a maximum of 3 substituents having this meaning; or
$R^1$ and $R^2$, together with the carbon atom to which they are bonded, represent cycloalkyl which has 4 to 7 carbon atoms and is optionally substituted by alkyl with 1 or 2 carbon atoms; or
$R^2$ and $R^3$, together with the carbon atoms to which they are bonded, represent cycloalkyl which has 4 to 7 carbon atoms and is optionally substituted by alkyl with 1 or 2 carbon atoms.

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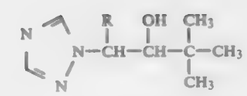
**4,748,250**

**DIASTEREOSELECTIVE REDUCTION OF ALPHA-TRIAZOLYLKETONES TO BETATRIAZOLYLCARBINOLS**

**Peter C. Thieme, Wachenheim; Hubert Sauter, Mannheim, and Gernot Reissenweber, Boehl-Iggelheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Filed May 2, 1985, Ser. No. 729,951**
**Claims priority, application Fed. Rep. of Germany, May 4, 1984, 3416444; Nov. 23, 1984, 3442657**
**Int. Cl.[4] C07D *249/08***
**U.S. Cl. 548—262** **4 Claims**

1. A process for the preparation of a sterically pure $\beta$-triazolylcarbinol



(I)

where R is
(a) phenoxy which is unsubstituted or contains up to three substituents of halogen, $CF_3$, methyl, methoxy, phenyl or phenoxy, or
$C_1$-$C_{10}$-alkyl which is unsubstituted or monosubstituted or di- or trisubstituted by identical or different radicals from the group consisting of $C_1$-$C_4$-alkyl, methoxy, ethoxy, phenyl and phenoxy, which in turn can be substituted by halogen, $CF_3$, alkyl or alkoxy,
by diastereoselective reduction of the corresponding $\alpha$-triazolylketone (II) with a complex hydride which reduces ketones to alcohols, wherein the reaction is carried out in the presence of a Lewis acid in a non-polar solvent.

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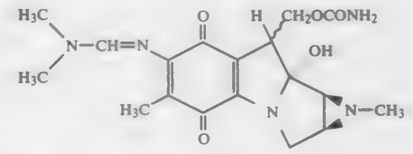
**4,748,251**

**7-N-AMINOMETHYLENEMITOMYCIN DERIVATIVE**

**Kunikatsu Shirahata, Komae; Motomichi Kono, Machida; Masaji Kasai, Fujisawa; Makoto Morimoto, Shizuoka, and Tadashi Ashizawa, Numazu, all of Japan, assignors to Kyowa Hakko Kogyo Co., Ltd., Tokyo, Japan**

**Filed Jan. 30, 1986, Ser. No. 824,227**
**Claims priority, application Japan, Jan. 31, 1985, 60-17532**
**Int. Cl.[4] C07D *487/14;* A61K *31/40***
**U.S. Cl. 548—422** **1 Claim**

1. A mitomycin compound represented by the formula:



wherein ~~~~ represents $\alpha$-bond.

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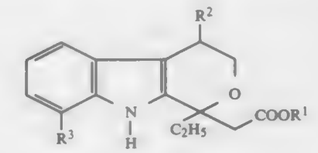
**4,748,252**

**SUBSTITUTED 1,3,4,9-TETRAHYDROPYRANO[3,4-B]INDOLE-1-ACETIC ACIDS**

**Eckhardt S. Ferdinandi, Princeton; Dominick Mobilio, Plainsboro; Joseph P. Sabatucci, Plainsboro, and Leslie G. Humber, North Brunswick, all of N.J., assignors to American Home Products Corporation, New York, N.Y.**

**Division of Ser. No. 896,998, Aug. 15, 1986, Pat. No. 4,686,213. This application Jan. 28, 1987, Ser. No. 7,876**
**Int. Cl.[4] C07D *493/04***
**U.S. Cl. 548—432** **3 Claims**

1. A process for producing the compounds of formula (I)

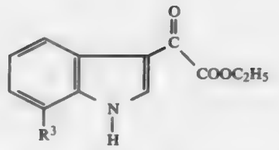


(I)

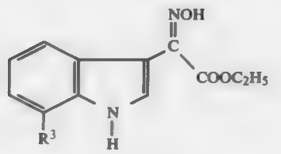
wherein $R^1$ is lower alkyl; $R^2$ is $—NH_2$; and $R^3$ is —H or lower alkyl which comprises the steps
(a) reacting the compound of formula

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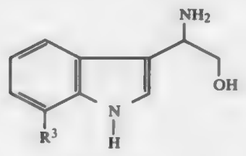


wherein $R^3$ is as defined above with hydroxylamine hydrochloride to produce the oxime of formula



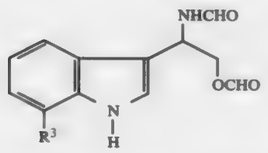
wherein $R^3$ is a defined above

(b) successively reducing the oxime group and the ethoxycarbonyl group with hydrogen and palladium on carbon catalyst and with lithium aluminium hydride respectively to produce the aminotyptophol compound of formula



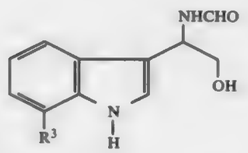
wherein $R^3$ is as defined above

(c) formylating said aminotryptophol with formic-acetic anhydride to produce the diformyl compound of formula



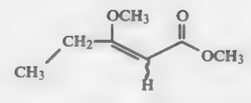
wherein $R^3$ is as defined above

(d) selectively deformylating said diformyl compound to produce the monoformyl compound of formula

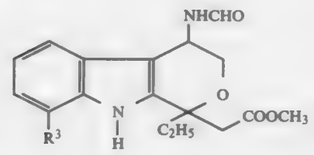


wherein $R^3$ is as defined above

(e) reacting said monoformyl compound with the enol methyl ether of methyl propionyl acetate having the structure



in the presence of boron trifluoride etherate to produce the 4-formamidopyrano[3,4-b]indole acetic acid methyl ester of formula



wherein $R^3$ is as defined above and

(f) deformylating said 4-formamido compound to produce the desired compound of formula (I).

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**4,748,253**

**PROCESS FOR PREPARING ESTERS OF ALKANOIC ACIDS VIA REARRANGEMENT OF ALPHA-HALOKETALS**

**Claudio Giordano, Monza; Aldo Belli, Novara; Fulvio Uggeri, Codogno, and Giovanni Villa, Monticello Brianza, all of Italy, assignors to Biosinachim S.p.A., Milan, Italy**

**Division of Ser. No. 236,524, Feb. 20, 1981, abandoned. This application Dec. 10, 1981, Ser. No. 329,333**

**Claims priority, application Italy, Feb. 26, 1980, 20187 A/80; Aug. 7, 1980, 24045 A/80**

**The portion of the term of this patent subsequent to Nov. 8, 2000, has been disclaimed.**

**Int. Cl.⁴ C07D *333/24*; C07C *69/76***

**U.S. Cl. 549—79** **2 Claims**

1. Process for preparing compounds having the general formula:



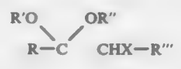
wherein

R is selected from the group consisting of a phenyl, a substituted phenyl, a fused heterocyclic aryl, an heterocyclic, a substituted heterocyclic, and a fused aryl-heterocyclic radical;

R‴ is selected from the group consisting of a hydrogen atom and an alkyl radical having from 1 to 6 carbon atoms;

Y is selected from the group consisting of an alkyl radical having from 1 to 6 carbon atoms, a haloalkyl radical having from 2 to 6 carbon atoms, and a benzyl radical;

which comprises the rearrangement of compounds having the general formula:



wherein

R and R‴ have the above mentioned meanings, and

R′ is selected from the group consisting of an alkyl radical having from 1 to 6 carbon atoms and a benzyl radical;

R″ is selected from the group consisting of an alkyl radical having from 1 to 6 carbon atoms and a benzyl radical; or

R′ and R″, together, are an alkylene radical having from 2 to 6 carbon atoms which, together with the —O—C—O— group, forms an heterocyclic ring; and

X is a halogen atom;



in the presence of a Lewis acid in such an amount and under such conditions that said Lewis acid does not act toward the starting halo-ketal as either an oxidizing agent or a reducing agent.

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**4,748,254**

**MIXED CARBOXYLATO PLATINUM (II) COMPLEXES**

**Petr A. Cheltsov-Bebutov; Alexandr N. Kravchenko; Robert N. Schelokov; Alexandra L. Konovalova; Mikhail A. Presnov, and Viktor B. Ivanov, all of Moscow, U.S.S.R., assignors to Institut Obschei I Neorganicheskoi Khimii Imeni N.S. Kurnakova Akademii Nauk SSR and Vsesojuzny Onkologichesky Nauchny Tsentr Akademii Meditsinskikh, both of Moscow, U.S.S.R.**

**PCT No. PCT/SU84/00001, § 371 Date Sep. 4, 1985, § 102(e) Date Sep. 4, 1985, PCT Pub. No. WO85/03296, PCT Pub. Date Aug. 1, 1985**

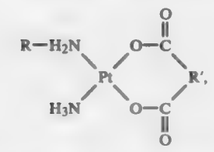
**PCT Filed Jan. 23, 1984, Ser. No. 779,779**

**Claims priority, application PCT Int'l Appl., Jan. 23, 1984, PCT/SU84/00001**

**Int. Cl.⁴ C07F *15/00***

**U.S. Cl. 549—206** **4 Claims**

1. Platinum(II) carboxylatocomplexes of the formula:



wherein R is tetrahydrofurfuryl or a cyclo-$C_nR''_{2n-1}$, each R'' is independently H, an alkyl, or hydroxyl, n=3–6, R′ is —$CH_2$—, —$CH_2$—$CH_2$—, CH(OH)—, —CH(OH)—$CH_2$—, or —CH(OH)—CH(OH)—.

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**4,748,255**

**THERMALLY ADAPTIVE POLYMERS AND PREPOLYMERS AND METHODS OF MAKING THEM**

**John A. Parker, Los Altos, Calif.; Rubin Feldman, Ladue, and Robert L. Bryant, Webster Groves, both of Mo., assignors to Thermal Science, Inc., Fenton, Mo.**

**Division of Ser. No. 769,863, Aug. 27, 1985, Pat. No. 4,687,785. This application Jul. 27, 1987, Ser. No. 78,078**

**Int. Cl.⁴ C07D *307/77***

**U.S. Cl. 549—243** **35 Claims**

1. A solid oligomer including reactive terminal groups and two amic acid groups, each of said amic acid groups consisting of a carboxyl group and a singly substituted amide linkage attached to adjacent carbon atoms.

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**4,748,256**

**PROCESS FOR THE PREPARATION OF (6-METHOXY-2-NAPHTHYL)-(1-BROMOETHYL)-KETONE AND ITS DERIVATIVES**

**Daniele Donati, Soave; Claudio Giordano, Vicenza, and Graziano Castaldi, Briona, all of Italy, assignors to Zambon SpA, Vicenza, Italy**

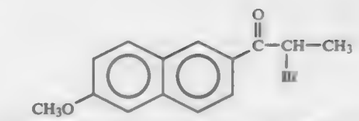
**Filed May 29, 1986, Ser. No. 867,954**

**Claims priority, application Italy, May 30, 1985, 20971 A/85**

**Int. Cl.⁴ C07D *317/16*; C07C *45/00***

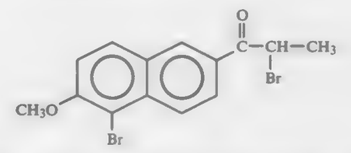
**U.S. Cl. 549—453** **6 Claims**

1. Process for the preparation of (6-methoxy-2-naphthyl)-(1-bromo-ethyl)-ketone of formula



(I)

and ketals thereof, wherein (5-bromo-6-methoxy-2-naphthyl)-(1-bromo-ethyl)-ketone of the formula



(III)

or ketal thereof are selectively debrominated by eliminating the bromine atom in the 5-position on the aromatic nucleus by means of a bromine acceptor selected from the group consisting of phenols, phenol ethers, aryl ketones, aryl-alkyl ketones and ketals of aryl-alkyl ketones and of an acid selected from the group consisting of halogenidric acids, $HSO_3F$, $CF_3SO_3H$ and systems consisting of halogenidric acids and Lewis acids, in an inert organic solvent.

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**4,748,257**

**4-FLUORO-3-PHENOXY-BENZALDEHYDE ACETALS**

**Rainer Fuchs; Fritz Maurer, both of Wuppertal; Uwe Priesnitz, Unna-Massen; Hans-Jochem Riebel, Wuppertal, and Erich Klauke, Odenthal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

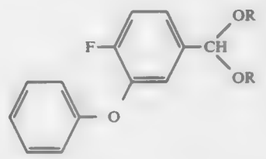
**Division of Ser. No. 303,657, Sep. 18, 1981, Pat. No. 4,626,601, which is a continuation of Ser. No. 174,762, Aug. 4, 1980, abandoned. This application Jul. 21, 1986, Ser. No. 887,471**

**Claims priority, application Fed. Rep. of Germany, Aug. 22, 1979, 2933979**

**Int. Cl.⁴ C07D *317/16*; C07C *43/303***

**U.S. Cl. 549—453** **2 Claims**

1. A 4-fluoro-3-phenoxy-benzaldehyde acetal of the formula



in which

the two radicals R each independently is $C_1$–$C_4$-alkyl or together are $C_2$–$C_5$-alkanediyl.

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**4,748,258**

**PREPARATION OF A MIXTURE OF CAFESTOL AND KAHWEOL**

**Raymond Bertholet, Bionay, Switzerland, assignor to Nestec S.A., Vevey, Switzerland**

**Division of Ser. No. 847,488, Apr. 3, 1986, Pat. No. 4,692,534. This application Apr. 23, 1987, Ser. No. 41,693**

**Int. Cl.⁴ C07D *307/77***

**U.S. Cl. 549—456** **13 Claims**

1. A process for obtaining a mixture of cafestol and kahweol from coffee oil comprising reacting coffee oil with anhydrous methanol in the presence of a basic catalyst to form a reaction medium including fatty acid methyl esters, diluting the reaction medium with a substantially water-insoluble solvent to dissolve the methyl esters, extracting the diluted reaction me-

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dium with aqueous methanol to form a water-insoluble solvent phase and an aqueous methanol phase, separating the methanol phase from the solvent phase, extracting a mixture of cafestol and kahweol from the methanol phase with a low boiling chlorinated hydrocarbon and evaporating the chlorinated hydrocarbon from the mixture of cafestol and kahweol.

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**4,748,259**

## PROCESS FOR THE PREPARATION OF MIXTURES OF METAL SALTS OF RING-SUBSTITUTED SALICYLIC ACID COMPOUNDS

**Hermann Nachbur, Reinach, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Filed Sep. 26, 1986, Ser. No. 912,895**

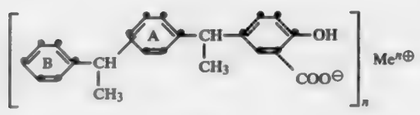
**Claims priority, application Switzerland, Oct. 3, 1985, 4286/85**

**Int. Cl.⁴ C07F 3/06, 7/22, 5/06, 9/00**

**U.S. Cl. 556—132** **8 Claims**

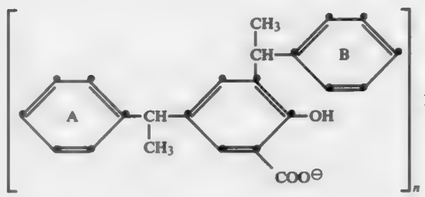
1. A process for the preparation of a mixture of a metal salt of formula

(1)



and a metal salt of formula

(2)



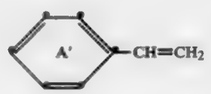
in which formulae (1) and (2)

Me is a metal ion of valency n, selected from the group consisting of aluminium, zirconium, vanadium, tin and zinc,

n is 2, 3 or 4, and

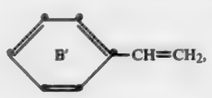
each of the rings A and B independently of the other is unsubstituted or substituted by halogen, lower alkyl, lower alkoxy or an alpha-methylbenzyl radical, which process comprises treating 2 moles of salicylic acid with at least 2 moles of a styrene compound of formula

(3)



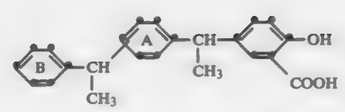
and at least 2 moles of a styrene compound of formula

(4)



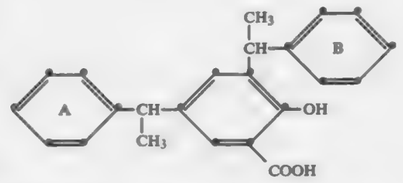
in which formulae (3) and (4) the benzene rings A′ and B′ are unsubstituted or substituted by halogen, lower alkyl or lower alkoxy, at a temperature in the range of 80° to 170° C., in the presence of an aromatic sulfonic acid, and, in a further step, reacting 2n moles of the resultant mixture of the salicylic acid compound of formula

(5)



and the salicylic acid compound of formula

(6)



in which formulae (5) and (6) A and B are as defined for formulae (1) and (2), with 2 moles of the salt of an n-valent metal of an inorganic acid or of a lower aliphatic carboxylic acid, where n has the given meaning.

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**4,748,260**

## PREPARATION OF AMINE ALANES

**Everett M. Marlett, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.**

**Filed Dec. 22, 1986, Ser. No. 945,286**

**Int. Cl.⁴ C08F 5/06**

**U.S. Cl. 556—176** **10 Claims**

1. Process for the preparation of a tertiary amine alane, said process comprising reacting about equimolar amounts of:

(a) an alkali metal aluminum tetrahydride having the formula $MAlH_4$, wherein M is an alkali metal selected from the class consisting of lithium, sodium and potassium,

(b) a hydrogen halide, and

(c) a complexing tertiary amine.

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**4,748,261**

## BIS-PHOSPHITE COMPOUNDS

**Ernst Billig; Anthony G. Abatjoglou, both of Charleston, and David R. Bryant, South Charleston, all of W. Va., assignors to Union Carbide Corporation, Danbury, Conn.**

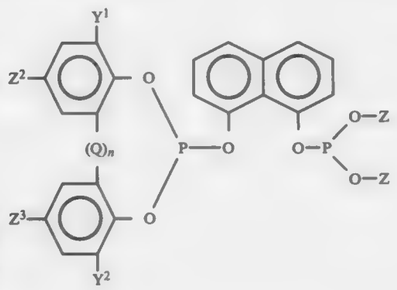
**Filed Sep. 5, 1985, Ser. No. 772,891**

**Int. Cl.⁴ C07F 9/02, 9/141**

**U.S. Cl. 556—404** **4 Claims**

1. A bis-phosphite ligand selected from the class consisting of the formulas

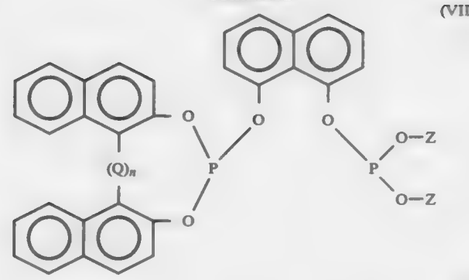
(VII)

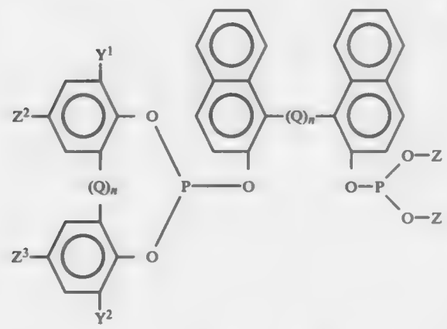




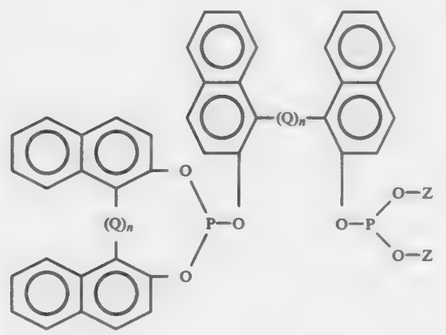
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(VIII)

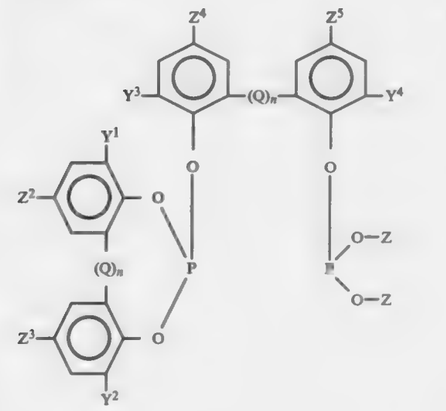




(X)

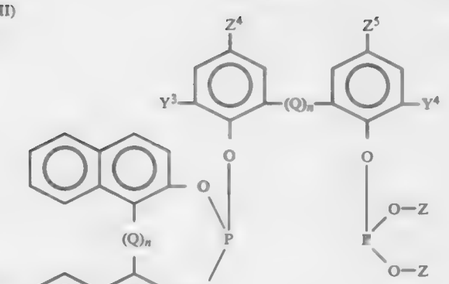


(XI)



-continued

(XII)



(IX)

wherein in Formulas VII, VIII, IX, X, XI, and XII, Q is $—CR^1R^2$ wherein each $R^1$ and $R^2$ radical individually represents a radical selected from the group consisting of hydrogen, alkyl of 1 to 12 carbon atoms, phenyl, tolyl and anisyl; wherein each $Y^1$, $Y^2$, $Y^3$, $Y^4$, $Z^2$, $Z^3$, $Z^4$ and $Z^5$ group individually represents a radical selected from the group consisting of hydrogen, an alkyl radical having from 1 to 18 carbon atoms, phenyl, benzyl, cyclohexyl, 1-methylcyclohexyl, cyano, halogen, nitro, trifluoromethyl, hydroxy, carbonyloxy, amino, acyl, phosphonyl, oxycarbonyl, amido sulfinyl, sulfonyl, silyl, alkoxy and thionyl radicals; wherein each Z group individually represents an identical or different radical selected from the group consisting of unsubstituted monovalent hydrocarbon alkyl, aryl, aralkyl, alkaryl and alicyclic radicals and a substituted phenyl radical containing a substituent radical selected from the group consisting of unsubstituted monovalent hydrocarbon alkyl, aralkyl, alkaryl and alicyclic radicals, as well as cyano, halogen, nitro, trifluoromethyl, hydroxy, amino, acyl, carbonyloxy, oxycarbonyl, amido, sulfonyl, sulfinyl, silyl, alkoxy, phosphonyl and thionyl radicals; and wherein n has a value of 0 or 1.

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**4,748,262**

## (PHENYL DIMETHYL CARBINYL) SILANE COMPOUND AND A METHOD FOR THE PREPARATION THEREOF

**Toshinobu Ishihara; Minoru Takamizawa; Mikio Endo, and Toru Kubota, all of Joetsu, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan**

**Filed Sep. 1, 1987, Ser. No. 91,885**

**Claims priority, application Japan, Sep. 4, 1986, 61-208337**

**Int. Cl.⁴ C07F 7/08, 7/18**

**U.S. Cl. 556—480** **11 Claims**

1. A (phenyl dimethyl carbinyl)silane compound represented by the general formula

$$(PhMe_2C)_pR_qX_rSi,$$

in which Ph is a phenyl group, Me is a methyl group, R is a monovalent hydrocarbon group selected from the class consisting of alkyl groups, alkenyl groups and aryl groups, X is a halogen atom or an alkoxy group, p is 1 or 2, q is zero, 1 or 2 and r is zero, 1, 2 or 3 with the proviso that $p+q+r=4$.

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**4,748,263**

## AROMATIC CYCLOTRIPHOSPHAZENES

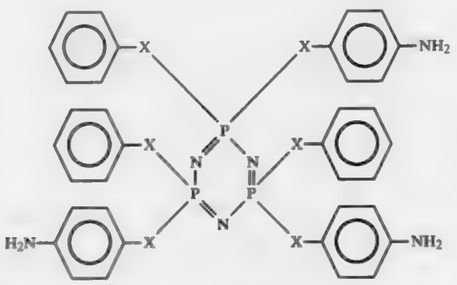
**Devendra Kumar, Shakarpur Extension, India; George M. Fohlen, Millbrae, and John A. Parker, Los Altos, both of Calif., assignors to The United States of America as represented by the administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Division of Ser. No. 760,374, Jul. 30, 1985, Pat. No. 4,634,759, which is a division of Ser. No. 599,126, Apr. 11, 1984, Pat. No. 4,550,177. This application Oct. 29, 1986, Ser. No. 924,467**

**Int. Cl.[4] C07F *9/00***

**U.S. Cl. 558—80** **3 Claims**

1. A cyclotriphosphazene having the structure:



wherein X is oxygen (—O—) or secondary amino (—NH—).

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**4,748,264**

## SUBSTITUTED ALPHA-[2'-TRICYCLO[3.3.1.1$^{3,7}$]-DECYLIDENE]BENZENEACETONITRILE DERIVATIVES

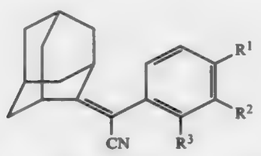
**Vassil S. Georgiev, Rochester, and George B. Mullen, Avon, both of N.Y., assignors to Pennwalt Corporation, Philadelphia, Pa.**

**Filed May 27, 1986, Ser. No. 867,182**

**Int. Cl.[4] C07C *121/68***

**U.S. Cl. 558—388** **8 Claims**

1. A compound of the formula:



where the $R^1$, $R^2$ and $R^3$ substituents are independently selected from hydrogen, lower alkyl, lower alkoxy, halogen, and trifluoromethane provided that at least one of such substituents is hydrogen.

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**4,748,265**

## PROCESS FOR THE PREPARATION OF HERBICIDALLY ACTIVE PHENYL CARBAMATES

**Arne Oxbol, Copenhagen, and Ole Jensen, Koge, both of Denmark, assignors to Kemisk Vaerk Koge A/S, Koge, Denmark**

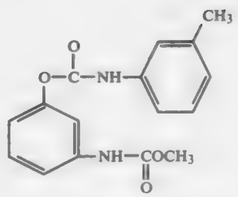
**Filed Sep. 20, 1984, Ser. No. 652,610**

**Claims priority, application Deamark, Sep. 20, 1983, 4294/83; Feb. 29, 1984, 1486/84; Jun. 18, 1984, 2978/84**

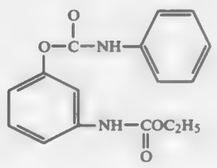
**Int. Cl.[4] C07C *125/073, 125/075;* A01N *33/00***

**U.S. Cl. 560—25** **10 Claims**

1. A process for the preparation of compounds of the formulae Ia or Ib:

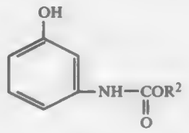


Ia



Ib

which comprises reacting N-hydroxyphenyl carbamates of the formula II



II

wherein $R^2$ is a methyl group or an ethyl group, with isocyanates of the formula IV

$$R^1—N=C=O \qquad \text{(IV)}$$

wherein $R^1$ is 3-tolyl or phenyl and wherein the reaction is performed with a minimum loss of isocyanate, according to the following steps: (a) taking the N-hydroxyphenyl carbamate up in an aqueous medium comprising at least 90% of water at a pH of about 9 and a temperature of 10°–30° C., the N-hydroxyphenyl carbamate being present in an amount of between 0.1 and 0.66 mol/liter; (b) adding seed crystals of the desired end product; (c) adding the isocyanate (IV) during vigorous stirring or agitation of the aqueous phase comprising the N-hydroxyphenyl carbamate, at a rate at which it reacts with the N-hydroxyphenyl carbamate, the total amount of isocyanate (IV) added not exceeding the stoichiometric amount; and

(d) isolating the final product.

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**4,748,266**

## SUBSTITUTED 2-OXOCYCLOHEXANEACETIC ACID ESTERS

**Philip F. Hughes, Hopewell; Dominick Mobilio, Plainsboro, and Leslie G. Humber, North Brunswick, all of N.J., assignors to American Home Products Corporation, New York, N.Y.**

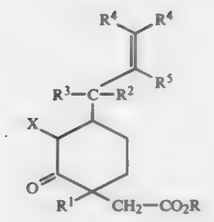
**Continuation-in-part of Ser. No. 868,230, May 28, 1986, abandoned. This application Mar. 2, 1987, Ser. No. 20,426**

**Int. Cl.[4] C07C *69/74, 69/76***

**U.S. Cl. 560—51** **3 Claims**

1. A compound of formula (IV)



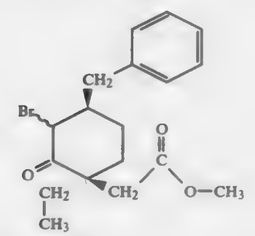


(IV)

wherein R and $R^1$ are lower alkyl; $R^2$, $R^3$, and $R^5$ are hydrogen, or lower alkyl wherein lower alkyl contains 1 to 6 carbon atoms; each $R^4$ is independently selected from the group consisting of hydrogen, or lower alkyl wherein lower alkyl contains 1 to 6 carbon atoms, or $R^3$ is joined to the $R^4$ which is cis to the carbon bearing $R^3$ to form $—CH_2)_m$ wherein m is 2 to 3, or $R^5$ is joined to the $R^4$ which is cis to $R^5$ to form —CH=CH—CH=CH—; and X is chlorine, or bromine.

3. The compound of formula (IVb-(±)cis)

(IVb-(±)cis)



according to claim 1.

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**4,748,267**

## FLUOROCHEMICAL BIURET COMPOUNDS AND FIBROUS SUBSTRATES TREATED THEREWITH

**John C. Chang, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Division of Ser. No. 595,901, Apr. 2, 1984, Pat. No. 4,668,406. This application Feb. 18, 1987, Ser. No. 16,138**

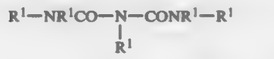
**Int. Cl.[4] D02G *3/00;* D06M *1/00***

**U.S. Cl. 560—158** **15 Claims**

1. Fluorochemical biuret compounds each biuret compound comprising one or more monovalent fluoroaliphatic radicals having at least three fully fluorinated terminal carbon atoms and one or more biuret moieties,



said radicals bonded to the biuret moieties by hetero atom-containing or organic linking groups, which linking groups are free of active hydrogen atoms, and wherein said fluorochemical biuret compounds are represented by the general formula



where each $R^1$ is the same or different, and is selected from hydrogen and terminal monovalent organic radicals, selected from alkyl, cycloalkyl, and aryl radicals and combinations thereof, with the proviso that at least one of $R^1$ is said organic radical and contains at least one fluoroaliphatic radical ($R_f$) and the proviso that at least one $R^1$ contains one or more organic radicals having at least one acid or amino moiety or is a salt formed from the compounds containing said acid or aminomoiety or that said fluorochemical biuret compound contains at least three biuret moieties.

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**4,748,268**

## CONTINUOUS PROCESS FOR PRODUCTION OF METHACRYLIC ACID ESTER OF $C_1$ TO $C_4$ ALIPHATIC ALCOHOL

**Stephen J. Pietsch, Oak Park, and Houssam M. Naim, Naperville, both of Ill., assignors to Amoco Corporation, Chicago, Ill.**

**Filed Jul. 31, 1986, Ser. No. 891,760**

**Int. Cl.[4] C07C *67/08***

**U.S. Cl. 560—205** **8 Claims**

1. A continuous process for production of methacrylic acid ester of a $C_1$ to $C_4$ saturated aliphatic alcohol in the presence of an esterification catalyst, which process comprises the steps of:

continuously introducing into a plug-flow reactor a feed stream containing methacrylic acid, a $C_1$ to $C_4$ saturated aliphatic alcohol in stoichiometric excess relative to the methacrylic acid present, a sulfuric acid esterification catalyst, and relatively high boiling liquid organic substances which include at least one member from the group consisting of 2,5-dimethylcyclopentenone and 3,5,5-trimethylbutyrolactone having a volatility no greater than that of methacrylic acid, such that said liquid organic substances constitute between about 55 and about 75 percent by weight of the contents of said reactor;

maintaining the introduced feed stream in the plugflow reactor at substantially atmospheric pressure and at an esterification temperature for a time period sufficient to product a relatively high conversion esterification and to produce a reactant and reaction product admixture;

continuously fractionating the produced admixture at a subatmospheric pressure into a distillate stream having a relatively greater methacrylic acid ester content and a bottoms stream having a relatively lesser methacrylic acid ester content and containing said liquid organic substances and said sulfuric acid; and

returning at least about 98 wt. % to about 99.9 wt. % of said bottoms stream to the plug-flow reactor.

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**4,748,269**

## PROCESS FOR THE PREPARATION OF (METH)ACRYLIC ACID ESTERS AND THEIR USE

**Jürgen Meixner, Krefeld; Josef Pedain, Cologne; Peter Höhlein, Kempen, and Dieter Margotte, Krefeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Apr. 14, 1986, Ser. No. 851,742**

**Claims priority, application Fed. Rep. of Germany, Apr. 20, 1985, 3514402**

**Int. Cl.[4] C07C *69/52***

**U.S. Cl. 560—205** **10 Claims**

1. A process for reducing the acid number of an ester of (meth)acrylic acid wherein said meth(acrylic) acid ester is prepared by the acid-catalyzed esterification of (meth)acrylic acid with an alcohol in a water-immiscible solvent said process comprising (1) washing the esterification reaction mixture obtained from the reaction of (meth)acrylic acid with an alcohol with an aqueous alkaline solution; (2) washing the aqueous alkaline solution washed esterification reaction mixture with water until neutral to obtain a neutral esterification reaction mixture; and (3) reacting said neutral esterification reaction mixture at an elevated temperature with a carbodiimide.

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**4,748,270**

## PREPARATION OF AROMATIC CYANATES

**Daniel J. Murray, Saginaw, and Edmund P. Woo, Midland, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Nov. 16, 1983, Ser. No. 552,515**
**Int. Cl.⁴ C07C *69/00***
**U.S. Cl. 560—301** **9 Claims**

1. A process for the preparation of an aromatic cyanate which comprises

(a) preparing in situ a cyanogen chloride by contacting a solution of chlorine in a chlorinated hydrocarbon with an aqueous solution of an alkali metal cyanide at a temperature of 0° C. or below under conditions such that a cyanogen chloride is prepared;

(b) physically separating the chlorinated hydrocarbon in which the cyanogen chloride is dissolved from the aqueous layer in which an alkali metal chloride salt is dissolved; and

(c) contacting the cyanogen chloride dissolved in the chlorinated hydrocarbon with an aromatic phenol dissolved in a chlorinated hydrocarbon, a secondary alcohol or a tertiary alcohol, in the presence of a tertiary amine at a temperature of about 0° C. or less under conditions such that a aromatic cyanate is prepared.

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**4,748,271**

## PROCESS FOR THE PREPARATION OF CIS-5-FLUORO-2-METHYL-1-(4-METHYL-THIOBENZYLIDENE)-INDENE-3-ACETIC ACID

**Mariano Meneghin, Treviso, Italy, assignor to Zambon S.p.A., Milan, Italy**

**Filed Jun. 17, 1986, Ser. No. 875,405**
**Claims priority, application Italy, Jun. 19, 1985, 21215 A/85**
**Int. Cl.⁴ C07C *147/107, 147/11***
**U.S. Cl. 562—428** **9 Claims**

1. A process for the preparation of cis-5-fluoro-2-methyl-1-(4-methylthiobenzylidene)-indene-3-acetic acid consisting of reacting a lower alkyl ester of 5-fluoro-2-methyl-indene-3-acetic acid with a substantially equimolecular amount of 4-methylthiobenzaldehyde in a solid-liquid two-phase system in which the solid phase is a potassium alcoholate or hydroxide in a molar ratio comprised between 2:1 and 3:1 with respect to the lower alkyl ester of 5-fluoro-2-methyl-indene-3-acetic acid and the liquid phase is a solution of the reagents in an organic solvent inert under the reaction conditions, in the presence of a phase transfer catalyst which promotes the selective formation of the cis-isomer and at a temperature comprised between −20° and +20° C.

9. A process according to claim 1 in which methyl ester of 5-fluoro-2-methyl-indene-3-acetic acid reacts with a substantially equimolecular amount of 4-methylthio-benzaldehyde in a solid-liquid two-phase system in which the solid phase is KOH in scales and the liquid phase is a solution of the reagents in toluene, in the presence of tricaprylyl-methyl-ammonium chloride as phase transfer catalyst and at a temperature between −15° and 15° C.

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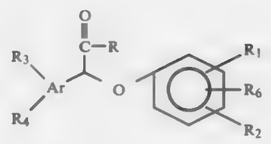
**4,748,272**

## PHENOXYPHENYLACETATES FOR USE AS POTENTIAL MODULATORS OF ARICHIDONIC ACID PATHWAYS

**Raymond D. Youssefyeh, Tarrytown, N.Y., assignor to Rorer Pharmaceutical Corp., Fort Washington, Pa.**

**Filed Aug. 1, 1986, Ser. No. 891,846**
**Int. Cl.⁴ A61K *31/19, 31/22***
**U.S. Cl. 562—471** **11 Claims**

1. A compound of the formula:



wherein Ar is phenyl or naphthyl;
R is hydroxy or lower alkoxy;
$R_1$ is lower alkyl or hydrogen;
$R_2$ is lower alkanoyl or hydrogen;
$R_3$ is halogen or hydrogen;
$R_4$ is halogen or lower alkoxy; and
$R_6$ is hydroxy or hydroxy substituted lower alkyl.

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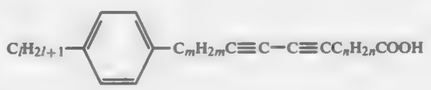
**4,748,273**

## AMPHIPHILIC DIACETYLENE COMPOUND CONTAINING BENZENE RING AND FILM PREPARED THEREFROM

**Kiyoshige Fukuda, Tokyo; Yasunori Yoshioka, Ashiya, and Masakazu Uekita, Kobe, all of Japan, assignors to Kanegafushi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan**

**Filed Dec. 2, 1985, Ser. No. 803,700**
**Claims priority, application Japan, Dec. 5, 1984, 59-257118**
**Int. Cl.⁴ C07C *63/64***
**U.S. Cl. 562—495** **2 Claims**

1. An amphiphilic diacetylene compound having benzene ring of the formula (I):



(I)

wherein "1", "m" and "n"≧0, 8≦1+m+n≧25.

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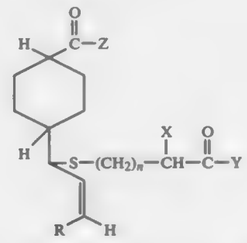
**4,748,274**

## 4-HYDROXY-4-(SUBSTITUTED ALKENYL)CYCLOHEXANECARBOXYLIC ACIDS

**Robert J. Cregge, Zionsville, and Nelsen L. Lentz, Indianapolis, both of Ind., assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio**

**Filed Nov. 7, 1986, Ser. No. 928,759**
**Int. Cl.⁴ C07C *149/26, 149/273;* A61K *31/215, 31/19***
**U.S. Cl. 562—507** **7 Claims**

1. A compound of the formula:



wherein n is an integer from 0 to 2; R is straight-chain alkyl containing from 6 to 15 carbon atoms; X is hydrogen or, when n is 1 or 2, X can be $—NH_2$; Y is hydroxy, —O—(lower alkyl), $—NH_2$, —NH(lower alkyl), —N—(lower alkyl)$_2$ or





wherein R' is hydrogen, alkyl of 1 to 4 carbon atoms, or benzyl; and Z is hydroxy, —O—(lower alkyl), $—NH_2$, —NH—(lower alkyl), or —N—(lower alkyl)$_2$.

4. A compound according to claim 1 which is [4(R)-[1α,4β,4(Z)]]-4-[1-[(carboxymethyl)thio]-2-hexadecenyl]-4-hydroxycyclohexanecarboxylic acid.

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**4,748,275**

## NON-HYGROSCOPIC TRIALKYLAMINE OXIDES

**Kim R. Smith, and James E. Borland, both of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.**

**Filed Sep. 8, 1986, Ser. No. 904,289**
**Int. Cl.⁴ C07C *135/02***
**U.S. Cl. 564—298** **8 Claims**

1. A process for making a solid non-hygroscopic flakeable di-$C_{14-24}$ alkyl $C_{1-2}$ alkylamine oxide, said process comprising reacting a di-$C_{14-24}$ alkyl $c_{1-2}$ alkylamine with at least a stoichiometric amount of aqueous hydrogen peroxide containing initially at least 40 weight percent $H_2O_2$ in the absence of a solvent or added water which when combined with aid aqueous hydrogen peroxide would lower the hydrogen peroxide concentration below 40 weight percent to form a reaction product which on cooling is said solid non-hygroscopic flakeable di-$C_{14-24}$ alkyl $C_{1-2}$ alkylamineoxide.

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**4,748,276**

## PROCESS FOR PREPARING N,N-BIS(2-HYDROXYETHYL)BENZYLAMINE AND N,N-BIS(2-CHLOROETHYL)BENZYLAMINE

**John R. Handley, Schodack, and Allen F. Dow, Kinderhook, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.**

**Division of Ser. No. 545,809, Oct. 26, 1983, abandoned. This application Mar. 6, 1985, Ser. No. 708,633**
**Int. Cl.⁴ C07C *85/20***
**U.S. Cl. 564—386** **6 Claims**

1. In the process for preparing N,N-bis(2-chloroethyl)benzylamine by first reacting benzyl chloride with N,N-bis(2-hydroxyethyl)amine to produce N,N-bis(2-hydroxyethyl)benzylamine and then reacting N,N-bis(2-hydroxyethyl)benzylamine with thionyl chloride to produce N,N-bis(2-chloroethyl)-benzylamine, the improvements which comprise adding about one molar equivalent of benzyl chloride to a warmed mixture containing about one molar equivalent of N,N-bis(2-hydroxyethyl)amine and about one molar equivalent of sodium carbonate, the addition rate of benzyl chloride being so as to maintain the exothermic reaction temperature at about 70° to 100° C.; maintaining the reaction temperature at about 70° to 100° C. for a short period; adding toluene to the reaction mixture; separating and drying the toluene solution containing N,N-bis(2-hydroxyethyl)benzylamine; adding said dry toluene solution to more than two molar equivalents of thionyl chloride heated to about 65°–75° C., the rate of addition being so as to maintain the reaction temperature at about 65°–75° C.; treating the reaction mixture with aqueous alkali; and, separating the toluene solution containing a substantially quantitative yield of the N,N-bis(2-chloroethyl)benzylamine.

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**4,748,277**

## PROCESS FOR THE PREPARATION OF TRIFLUOROMETHYLANILINES

**Michel Debois, Rillieux, France, assignor to Rhone-Poulenc Specialites Chimiques, Courbevoie, France**

**Continuation of Ser. No. 692,723, Jan. 18, 1985, abandoned. This application Sep. 25, 1986, Ser. No. 912,206**
**Claims priority, application France, Jan. 20, 1984, 84 00848**
**Int. Cl.⁴ C07C *85/20***
**U.S. Cl. 564—414** **14 Claims**

1. A process for the preparation of a para-trifluoromethylaniline which comprises the step of simultaneously performing, in liquid hydrofluoric acid in a closed reactor, hydrolysis with water and exchange fluorination of a para-trihalomethyl benzene isocyanate compound, wherein, of the three halogen atoms in the trihalomethyl radical, at least one is not fluorine, and wherein said compound may contain at least one substituent other than said isocyanate and said trihalomethyl group, said hydrolysis with water and exchange fluorination being conducted for a time sufficient to obtain said para-trifluoromethylaniline.

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**4,748,278**

## PROCESS FOR THE ISOLATION OF P-HYDROXYBENZALDEHYDE

**Freimund Röhrscheid, Kelkheim, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Jul. 17, 1986, Ser. No. 886,973**
**Claims priority, application Fed. Rep. of Germany, Jul. 19, 1985, 3525846**
**Int. Cl.⁴ C07C *45/78, 45/81***
**U.S. Cl. 568—438** **2 Claims**

1. A process for the isolation of p-hydroxybenzaldehyde from the reaction mixture obtained by oxidizing p-cresol with oxygen or oxygen-containing gases in methanol in the presence of Na or K hydroxide and an Mn, Ni, Cr or Co salt, which comprises adding 2 to 6 parts by weight of water per part by weight of p-cresol to the reaction mixture, heating the resulting solution to 50°–90° C. and filtering off the precipitated Mn, Ni, Cr or Co oxide-hydrate, removing the methanol from the filtrate by distillation, cooling the residual aqueous solution and thus allowing the p-hydroxybenzaldehyde to crystallize out in the form of the Na or K salt.

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**4,748,279**

## LIQUID STERILIZING COMPOSITION

**Reginald K. Whiteley, 18 Glenside Street, Balgowlah Heights, N.S.W., Australia**

**Filed Jun. 23, 1987, Ser. No. 65,518**
**Claims priority, application Australia, Jun. 27, 1986, PH6624**
**Int. Cl.⁴ C07C *47/12***
**U.S. Cl. 568—494** **10 Claims**

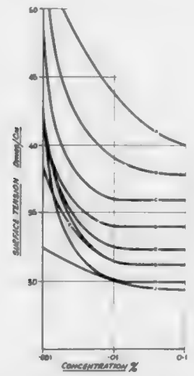
1. A compound for liquid sterilizing compositions comprising the product made by simultaneously reacting

(a) a nonionic surfactant containing from 4 to 12 moles of ethylene oxide per nonionic molecule with

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(b) glutaraldehyde and triethylene glycol in a mole ratio of from 2.0 to 0.5 to 1.0 to 1.75 respectively for a period of




from 20 to 30 minutes at ambient temperature and at a pH of from 4.0 to 5.5.

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**4,748,280**

**CERTAIN CHLORINATION PROCESS FOR PREPARING 2-CHLORO-1,1,1-($C_1$-$C_6$)-ALKOXYETHANES**

**Basavara L. Mylari, Waterford, and William J. Zembrowski, Oakdale, both of Conn., assignors to Pfizer Inc., New York, N.Y.**

**Division of Ser. No. 796,359, Nov. 7, 1985, Pat. No. 4,723,010. This application Jul. 31, 1987, Ser. No. 79,869**

**Int. Cl.[4] C07C *43/32, 43/12***

**U.S. Cl. 568—595** **1 Claim**

1. A process for preparing a 2-chloro-1,1,1-tri($C_1$–$C_6$)alkoxyethane by reacting a corresponding tri ($C_1$–$C_6$)alkoxyethane with N-chlorosuccinimide or with chlorine in pyridine and a chlorohydrocarbon solvent.

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**4,748,281**

**RECOVERY OF METHANOL IN AN MTBE PROCESS**

**David E. Whisenhunt; Gregg L. Byers, and Uday S. Hattiangadi, all of Ponca City, Okla., assignors to Conoco Inc., Ponca City, Okla.**

**Filed Oct. 16, 1986, Ser. No. 919,526**

**Int. Cl.[4] C07C *41/06, 41/36***

**U.S. Cl. 568—697** **12 Claims**

1. In a process for the manufacture of methyltertiarybutylether (MTBE) in which methanol and a mixture of $C_4$ hydrocarbons containing isobutylene are contacted in a reaction zone containing an ion-exchange resin catalyst under suitable conditions to effect the reaction of methanol and isobutylene to produce a reaction product containing MTBE, unreacted methanol, unreacted isobutylene and other $C_4$ hydrocarbons; the reaction product is introduced to a fractionation zone wherein it is separated into a bottoms product comprising essentially MTBE and an overhead product containing unreacted methanol, unreacted isobutylene and other $C_4$ hydrocarbons; and the overhead product is introduced to an adsorption zone wherein the methanol is adsorbed; the improvement which comprises utilizing silica gel as adsorbent and regenerating the silica gel adsorbent in a closed loop by contacting the silica gel adsorbent with a desorption gas stream at an elevated temperature for a sufficient period of time to remove adsorbed methanol, cooling the effluent from the adsorption zone to condense desorbed methanol, removing desorbed methanol from the system and recycling the desorption gas to the adsorption zone.

**4,748,282**

**PROCESS FOR THE SYNTHESIS OF MONO-DI-HYDROXYFLUORO-ALKANES**

**Gianangelo Bargigia; Claudio Tonelli, and Vito Tortelli, all of Milan, Italy, assignors to Ausimont S.p.A., Milan, Italy**

**Filed May 28, 1987, Ser. No. 55,061**

**Claims priority, application Italy, May 30, 1987, 20655 A/86**

**Int. Cl.[4] C07C *31/38***

**U.S. Cl. 568—842** **5 Claims**

1. A process for preparing hydroxyfluoroalkanes of general formula:

$$X\text{-}R_f\text{-}Y \qquad (I)$$

wherein X and Y, equal or different from each other, are —F or —$CH_2CH(A)OH$ (A is H or an alkyl with 1 to 3 carbon atoms) X being different from F when Y is F, and viceversa, $R_f$ is a straight or branched perfluoroalkylene chain containing 2 to 18 carbon atoms, said process comprising reacting in a homogeneous phase compounds of formula:

$$W\text{-}R_f\text{-}T \qquad (II)$$

where $R_f$ is the same as defined hereinabove and W and T, equal or different from each other, are —F, —$CH_2CH(A)I$ (A is H or an alkyl having 1 to 3 carbon atoms), W being different from F when T is F, and vice-versa, with water —in an organic solvent, which is fully miscible with water or in which water is soluble for at least 1.7% by weight at 20° C., in the presence of catalysts comprising one or more transition metal ions having an atomic number ranging from 24 to 29, from 44 to 47, from 74 to 79, and the ones with atomic number 42 and 58.

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**4,748,283**

**HYDROCARBON AND CHLORINATED HYDROCARBON-SOLUBLE MAGNESIUM DIALKOXIDES**

**Conrad W. Kamienski, Gastonia, N.C., assignor to Lithium Corporation of America, Bessemer City, N.C.**

**Filed Feb. 17, 1987, Ser. No. 15,388**

**Int. Cl.[4] C07C *31/30;* C07F *05/05***

**U.S. Cl. 568—851** **17 Claims**

1. In a process for the preparation of hydrocarbon or chlorinated hydrocarbon-solvent solutions of magnesium dialkoxides, the steps which comprise reacting a suspension of magnesium metal or magnesium amide, or a solution of a dialkylmagnesium compound, in a volatile hydrocarbon or chlorinated hydrocarbon solvent with an alcohol selected from the group of (a) aliphatic, cycloaliphatic and acyclic $C_5$–$C_{18}$ beta- and gamma-alkyl-substituted secondary and tertiary monohydric alcohols; or (b) mixtures of said (a) alcohols with $C_3$–$C_{18}$ aliphatic or cycloaliphatic beta- and gamma-alkyl-unsubstituted secondary or tertiary alcohols; or (c) mixtures of said (a) alcohols with $C_1$–$C_{18}$ aliphatic primary unsubstituted and 2-alkyl-substituted alcohols; the mole ratios of said (a) to said (b), and said (a) to said (c), alcohols being 1 of said (a) alcohols to 0.1 to 2 of said (b) and/or said (c) alcohols.

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**4,748,284**

**PROCESS FOR PREPARING 1,1-DIHALO-1,2,2,2-TETRAFLUOROETHANES**

**Franco Gozzo, San Donato Milanese; Nicola Troiani, and Paolo Piccardi, both of Milan, all of Italy, assignors to Montedison S.p.A., Milan, Italy**

**Continuation of Ser. No. 700,500, Feb. 11, 1985, abandoned, which is a continuation of Ser. No. 435,365, Oct. 20, 1982, abandoned. This application Dec. 19, 1986, Ser. No. 943,898**

**Claims priority, application Italy, Oct. 21, 1981, 24602 A/81**

**Int. Cl.[4] C07C *17/20, 17/00, 19/08***

**U.S. Cl. 570—151** **1 Claim**

1. A process for isomerizing a 1,2-dihalotetrafluoroethane selected from the group consisting of 1,2-dichloro- and 1,2-dibromo-tetrafluoroethane to 1,1-dichloro- or 1,1-dibromo-1,2,2,2-tetrafluoroethane, said process being characterized in that the isomerization is catalyzed by an activated complex formed in situ, and obtained by reacting an anhydrous aluminum halide selected from the group consisting of aluminum chloride and aluminum bromide with preformed 1,1dichloro- or 1,1-dibromo-1,2,2,2-tetrafluoroethane, in an amount equal to at least 1 mole per mole of aluminum halide, in a medium consisting essentially of 1,2-dichloro- or 1,2-dibromo-tetrafluoroethane, in an amount equal to 10 to 500 parts by weight with respect to the aluminum halide, the isomerization being carried out at the reflux temperature of the 1,2-dichloro- or 1,2-dibromo-tetrafluoroethane to be isomerized.



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**4,748,285**

**CATALYSTS AND PROCESS FOR GASEOUS PHASE FLUORINATION OF ALIPHATIC CHLORINATED DERIVATIVES**

**Louis Foulletier, Oullins, France, assignor to Produits Chimiques Ugine Kuhlmann, Courbevoie, France**

**Continuation of Ser. No. 429,080, Sep. 30, 1982, abandoned, which is a division of Ser. No. 324,437, Nov. 24, 1981, Pat. No. 4,439,534. This application Nov. 25, 1986, Ser. No. 935,144**

**Claims priority, application France, Dec. 29, 1980, 80 27659**

**Int. Cl.[4] C07C *17/20, 45/00***

**U.S. Cl. 570—169** **24 Claims**

1. A gaseous phase fluorination process which comprises: preparing catalysts having a chromium oxide base consisting essentially of unsupported amorphous chromium (II±) oxide having a diameter of between about 100 to 3,000 μm:
(a) forming a sol or semi-colloidal suspension of hydroxide of chromium from a mixture comprising an aqueous solution of a chromium salt, ammonia, and hexamethylenetetramine;
(b) gelling the sol in the form of microspheres, at an elevated temperature, in an organic solvent that is non-miscible or partially miscible in water;
(c) washing the microspheres in ammonia and water;
(d) drying the microspheres; and
(e) thermally activating the microspheres at a temperature between about 200° and 500° C.; and
contacting chlorinated aliphatic hydrocarbons with hydrofluoric acid in the presence of said catalyst in a fluidized bed reactor for a sufficient time to produce fluorinated or fluorochlorinated aliphatic hydrocarbons.

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**4,748,286**

**PRODUCTION OF CRYSTALLINE TRIBROMOSTYRENE**

**Stephen L. J. Daren, Ness Ziona; David Vofsi, Haifa, and Aurelia Finkels, Rehovot, all of Israel, assignors to Yeda Research & Development Co. Ltd., Rehovot, Israel**

**Filed Jul. 21, 1987, Ser. No. 78,004**

**Claims priority, application Israel, Jul. 23, 1986, 79499**

**Int. Cl.[4] C07C *17/34, 17/38, 17/24***

**U.S. Cl. 570—200** **6 Claims**

1. A process for the production of crystalline tribromostyrene which comprises effecting an elimination of hydrogen bromide in a two-phase system by phase transfer catalysis, said phases comprising an aqueous phase of an alkali metal hydroxide and a second phase comprising the β-bromoethyltribromobenzene substrate in a solvent selected from $C_1$- to $C_3$- alcohols.

**4,748,287**

**PROCESS FOR THE REMOVAL OF M-DICHLOROBENZENE FROM DICHLOROBENZENE MIXTURES**

**Kai Röhlk, Bergisch Gladbach, and Sigurd Hartung, Cologne, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Oct. 16, 1986, Ser. No. 920,102**

**Claims priority, application Fed. Rep. of Germany, Oct. 30, 1985, 3538565**

**Int. Cl.[4] C07C *17/38, 17/12***

**U.S. Cl. 570—209** **12 Claims**

1. In a process for the removal of m-dichlorobenzene from dichlorobenzene mixtures with a m-dichlorobenzene content of up to 35% by weight, relative to the total amount of dichlorobenzene in the mixture, by chlorination in the liquid phase at elevated temperature in the presence of a chlorine-containing Friedel-Crafts catalyst selected from the group consisting of iron(III) chloride, aluminum chloride, zinc chloride, tin chloride and mixtures thereof, the improvement comprising conducting the chlorination in the presence of an element or a compound selected from the group consisting of iodine, iodine compounds and mixtures thereof, said iodine compounds selected from the group consisting of alkyl iodides and aromatic iodides.

6. In a process for the removal of m-dichlorobenzene from dichlorobenzene mixtures with a m-dichlorobenzene content of up to 35% by weight, relative to the total amount of dichlorobenzene in the mixture, by chlorination in the liquid phase at elevated temperature in the presence of a chlorine-containing Friedel-Crafts catalyst selected from the group consisting of iron(III) chloride, aluminum chloride, zinc chloride, tin chloride and mixtures thereof, the improvement comprising conducting the chlorination in the presence of an element or a compound selected from the group consisting of sulphur, sulphur compounds and a mixture thereof, said sulfur compounds selected from the group consisting of sulphur chlorides, iron(II) sulphide, mercaptans and thioethers.

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**4,748,288**

**PROCESS FOR THE SEPARATION OF SOLVENTS FROM HYDROCARBONS DISSOLVED IN THE SOLVENTS**

**Johan G. A. Bitter; Johannes P. Haan, and Hendrik C. Rijkens, all of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.**

**Filed Jun. 23, 1986, Ser. No. 877,050**

**Claims priority, application United Kingdom, Aug. 30, 1985, 8521607**

**Int. Cl.[4] C10G *73/08***

**U.S. Cl. 585—818** **19 Claims**

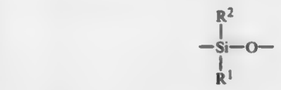


1. A process for the recovery of a solvent mixture of an aromatic solvent and a polar aliphatic solvent from hydrocarbons dissolved in the solvent mixture which process comprises contacting at elevated pressure a feed solution comprising hydrocarbons dissolved in the solvent mixture with one side of a dense membrane which is substantially impermeable to the

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hydrocarbons and which membrane comprises a layer of a halogen-substituted silicon compound having a thickness from about 0.1 to about 100 μm and comprising units according to the general formula:



wherein $R^1$ is selected from the group consisting of halogen, halogensubstituted alkyl, halogen-substituted aryl, and halogen-substituted arylalkyl moieties, $R^2$ is selected from the group consisting of hydrogen, halogen, alkyl, aryl, arylalkyl, halogen-substituted alkyl, halogen-substituted aryl, and halogen-substituted arylalkyl moieties, passing the solvent mixture through the membrane, and recovering the solvent mixture substantially free of the hydrocarbons on the other side of the membrane.

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**4,748,289**

**METHOD AND APPARATUS FOR CATALYTIC PROCESSING OF LIGHT HYDROCARBONS AND CATALYSTS FOR USE THEREIN**

**Allan S. Douglas, Sea Cliff, N.Y., assignor to Hydratron Systems, Inc., Farmingdale, N.Y. and StarMark Energy Systems, Inc., Memphis, Tenn.**

**Continuation of Ser. No. 797,908, Nov. 14, 1985, abandoned. This application Jan. 15, 1987, Ser. No. 3,538**

**Int. Cl.[4] C10L** *1/16, 1/04*

**U.S. Cl. 585—14** **9 Claims**

1. A process for converting light hydrocarbon to a stable liquid fuel having a higher flash point than said light hydrocarbon comprising the steps of:

(a) mixing controlled proportions of light hydrocarbon having an API gravity of at least 60°, a viscosity of not more than 200 SU at 100° F., and a flash point below 140° F. and heavy oil having an API gravity of not more than 45°, a viscosity of at least 140 FU at 122° F., and a flash point of at least 140° F.;

(b) forcing the resulting mixture consisting essentially of said light hydrocarbon and said heavy oil under a pressure of at least about 500 psi through a porous substrate having an amount of a catalytically active oxide of hexavalent group 6b metal thereon effective to catalytically effect molecular rearrangements in at least one constituent of said mixture and produce a stable fuel which does not separate upon standing, and

(c) collecting the resulting fuel.

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**4,748,290**

**HYDROGENATION CATALYSTS AND PROCESS**

**Ted H. Cymbaluk, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Division of Ser. No. 826,455, Feb. 5, 1986, which is a division of Ser. No. 682,466, Dec. 17, 1984, Pat. No. 4,659,687. This application Oct. 5, 1987, Ser. No. 104,612**

**Int. Cl.[4] C07C** *5/05*

**U.S. Cl. 585—271** **8 Claims**

1. A process for preparing a monoolefinic compound from a diolefinic compound comprising contacting a diolefinic compound with hydrogen under hydrogenation conditions in the presence of a catalyst prepared by contacting an alumina supported nickel arsenate with at least one borohydride compound; wherein said at least one borohydride compound conforms to the following formula:

$$M(BH_4)_n$$

wherein M is a monovalent or divalent cation selected from the group consisting of:

$NR'_4$; wherein each R' is independently $C_1$ through $C_{10}$ alkyl, cycloalkyl, aryl, aralkyl and alkaryl,

alkali metals, and

alkaline earth metals;

wherein n=1 if M is a monovalent cation and n=2 if M is a divalent cation.

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**4,748,291**

**CATALYTIC TREATMENT PROCESS**

**Guy L. G. Debras, Belgrade; Raymond M. Cahen, Bruxelles, and Georges E. M. J. De Clippeleir, Sint-Pieters-Leeuw, all of Belgium, assignors to Labofina, S.A., Brussels, Belgium**

**Filed Jan. 29, 1987, Ser. No. 8,877**

**Claims priority, application Luxembourg, Jan. 29, 1986, 87277**

**Int. Cl.[4] C07C** *2/52*

**U.S. Cl. 585—418** **23 Claims**

1. A process for the catalytic conversion of hydrocarbons which comprises contacting a hydrocarbon feedstream under conversion conditions, including a pressure greater than atmospheric with a molecular sieve catalyst in the presence of water, said catalyst comprising silicalite or TEA-silicate which has previously been stabilized by the process comprising halogenating silicalite or TEA-silicate by contacting said silicalite or TEA-silicate with a halogenating agent having a vapor pressure of at least 13 kPa at a temperature within the range of 200°–230° C., said halogenating agent selected from the group consisting of organic saturated aliphatic chlorinated compounds, organic saturated aliphatic brominated compounds, and organic saturated aliphatic fluorinated compounds and mixtures thereof, and contacting said silicalite or TEA-silicate at a temperature within the range of 200°–500° C. for a period of time sufficient to impart a halogen concentration to said silicalite or TEA-silicate within the range of 0.1–5.0 wt. %.

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**4,748,292**

**METHOD FOR REMOVING POLYHALOGENATED HYDROCARBONS FROM NON-POLAR ORGANIC SOLVENT SOLUTIONS**

**Ashok K. Mendiratta, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Continuation of Ser. No. 816,188, Jan. 6, 1986, abandoned. This application Apr. 6, 1987, Ser. No. 36,161**

**Int. Cl.[4] C07C** *33/34*

**U.S. Cl. 585—469** **3 Claims**

1. In a method for reducing the concentration of polyhalogenated aromatic hydrocarbons present in a non-polar inert organic solvent solution comprising reacting in a reactor the polyhalogenated aromatic hydrocarbon with a reagent comprising an alkali metal hydroxide and a glycol selected from the group consisting of polyalkylene glycol and monocapped polyalkylene glycol ether, the improvement comprising maintaining the reaction mixture under substantially water-free conditions until the concentration of polyhalogentated aromatic hydrocarbons has been reduced below about 2 ppm, and then adding to the reaction mixture at least about 0.25% by weight water, whereby sticky viscous solids are removed from the reactor.



**4,748,293**

**FLEXIBLE CABLE AND METHOD OF MANUFACTURING THEREOF**

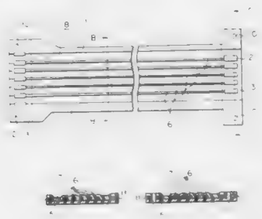
**Hiroshi Kikuchi; Jiro Tanuma, and Naoji Akutsu, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan**

**Filed Feb. 25, 1986, Ser. No. 832,753**

**Claims priority, application Japan, Feb. 25, 1985, 60-34503**

**Int. Cl.[4] H01B** *7/08*

**U.S. Cl. 174—117 PC** **6 Claims**



1. A longitudinally extending flexible cable having opposite lateral edges, said flexible cable comprising:

a longitudinally extending base of insulating material;

a plurality of longitudinally extending conductors spaced laterally from each other in the width direction of said base;

a longitudinally extending cover layer of insulating material covering said conductors;

said base and said cover layer forming insulation enclosing said conductors and insulating said conductors from each other;

means for protecting said insulation from dielectric breakdown resulting from subjecting said cable to an exterior source of high voltage static electricity, said protecting means comprising at least one additional conductor extending longitudinally at a position spaced laterally from said conductors, said insulation insulating said conductors from said additional conductor, and said additional conductor being exposed over the entire length thereof to the exterior of said cable.

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**4,748,294**

**HOUSING FOR AN ELECTROMECHANICAL DEVICE**

**Wieland A. Bartel, Eckental-Ebach; Hans P. Meyer, Nuremberg, and Bernhard F. Nitschke, Herzogenaurach, all of Fed. Rep. of Germany, assignors to Alcatel N.V., Amsterdam, Netherlands**

**Continuation of Ser. No. 648,103, Sep. 7, 1984, abandoned. This application Dec. 12, 1986, Ser. No. 941,516**

**Claims priority, application Fed. Rep. of Germany, Sep. 17, 1983, 3333684**

**Int. Cl.[4] H05K** *5/06*

**U.S. Cl. 174—52 S** **4 Claims**

1. In a housing for an electromechanical device which is tightly sealed by a sealing compound, said housing comprising a rectangular plate which has a top face, and which is inserted in a step-shaped recess of the rim of a housing member, the rim portion of the plate having a reduced thickness forming between the plate and the housing rim; a rim channel which is in communication with fill-in cavities in the plate through which the rim channel is filled with a self-hardening or curable material; and an edge gap between the step shaped recess and the rim portion of the plate, the improvement comprising:

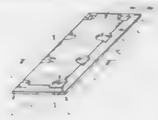
said fill-in cavities being formed as flat recesses each generally the shape of a sector of a circle having a radius adjoining said rim channel;

said fill-in cavities being connected to each other only by said rim channel;

said fill-in cavities having relatively wide openings merging with the bottom of said rim channel;

at least a first four of said fill-in cavities being of semicircular configuration and being symmetrically distributed along two opposing sides of said plate;

a second four of said fill-in cavities being of quarter-circular





configuration and being located at the four corners of said plate; and

said rim portion of said plate being bevelled, so when the outer face of said plate lies in a horizontal plane facing upwards, the bottom of said rim channel extends downwardly from said openings of said fill-in cavities to said edge gap.

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**4,748,295**

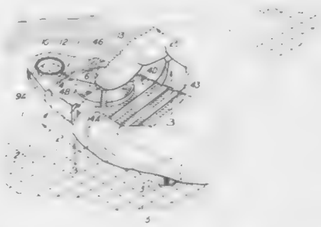
**FOUR BUTTON CURSOR AND METHOD FOR DIGITIZING TABLET**

**James L. Rogers, Mesa, Ariz., assignor to Kurta Corporation, Phoenix, Ariz.**

**Continuation-in-part of Ser. No. 719,351, Apr. 3, 1985, Pat. No. 4,672,154. This application Jan. 23, 1987, Ser. No. 6,664**

**Int. Cl.[4] G08C** *21/00*

**U.S. Cl. 178—19** **25 Claims**



1. A cursor for use in digitizing points along a digitizing surface of a digitizer, the cursor comprising in combination:

(a) bottom surface means for sliding the cursor smoothly along the digitizing surface;

(b) housing means attached to the bottom surface means and grippable by a hand of an operator for enabling the operator to hold and operate the cursor;

(c) alignment indicia means attached in fixed relationship to the housing means for enabling the operator to visually align the cursor with the points to be digitized;

(d) non-directional antenna means attached in fixed relationship to the alignment indicia means for transmitting an antenna signal to the digitizing surface substantially independently of the rotational orientation of the cursor about an axis perpendicular to the plane of the digitizing surface when the bottom surface means rests on the digitizing surface; and

(e) means for producing the antenna signal on the antenna

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means in response to pressure applied to the cursor by the hand of the operator, wherein the antenna signal producing means include

i. circuit means for producing a plurality of different frequency signals,

ii. means responsive to the signals produced by the circuit means for producing the antenna signal,

iii. a plurality of switch buttons arranged around a post,

iv. a plurality of control switches corresponding to the switch buttons, respectively, connected to the circuit means for causing the circuit means for produce a signal having a frequency determined by the states of the control switches.

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**4,748,296**

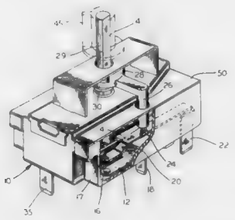
**PUSH-TO-START CONTROL SWITCH**

**Leon H. Cutler, Stratford, Conn., and Warren B. Bigelow, Jr., Shelby, N.C., assignors to General Electric Company, Bridgeport, Conn.**

**Filed Dec. 3, 1986, Ser. No. 937,328**

**Int. Cl.[4] H01H** *19/14*

**U.S. Cl. 200—6 B** **5 Claims**



1. A combination electrical selector push-to-start switch, comprising:

a housing, a covering for said housing, a rotatable non-conductive cam positioned within said housing having a set of annular cam tracks thereon for controlling an applicance;

a rotatable shaft attached to said rotatable cam for rotation thereby;

a plurality of electrical switch contacts positioned within said housing in close proximity to said cam for completing an electrical circuit according to the position of said set of annular cam tracks relative to said switch contacts;

a push-to-start switch means mounted within said housing, including a fixed conductive strip and a spring conductive strip positioned relative to said fixed conductive strip in a normally open position, each of said conductive strips of said push-to-start switch means including opposing contacts thereon which are forced together to close said electrical circuit to a starting winding of a motor; and

means for temporarily forcing said spring conductive strip into electrical contact with said fixed conductive strip to close an electrical circuit to a starting winding of an electrically operated motor of an appliance, said means for temporarily forcing said spring conductive strip into electrical contact with said contact on said fixed conductive strip being a control arm of insulating material supported by said rotatable shaft which contacts said spring conductive strip.

**4,748,297**

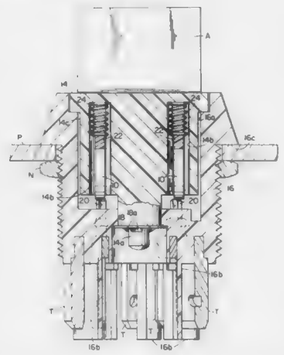
**ROTARY SWITCH**

**Richard W. Sorenson, Avon, and Milton N. Ives, Wolcott, both of Conn., assignors to Carlingswitch, Inc., West Hartford, Conn.**

**Continuation-in-part of Ser. No. 884,545, Jul. 11, 1986, abandoned. This application Dec. 22, 1986, Ser. No. 945,880**

**Int. Cl.[4] H01H** *19/58*

**U.S. Cl. 200—11 J** **39 Claims**



1. A rotary switch comprising a generally cylindrical dielectric body portion defining an upwardly open cavity of generally cylindrical shape, said cavity having a longitudinal axis, said body portion having a bottom wall defining a plurality of circumaxially spaced openings, fixed contacts provided in at least some of said openings such that upper ends thereof are spaced radially between said cavity axis and the cylindrical cavity wall, said fixed contact upper ends spaced above said bottom wall, a generally cylindrical dielectric control member rotatably received in said cylindrical cavity, means for restraining said control member from movement axially in said cavity, said control member having at least one downwardly open generally rectangularly shaped recess, said recess spaced radially from said axis a distance corresponding to the radial spacing of said fixed contact upper ends, a disc shaped movable contact so provided in said recess that said disc contact is free to rotate on its own central axis to provide a first peripheral portion of said disc contact in abutting relationship to adjacent fixed contact upper ends, and means located in said recess for biasing said disc contact downwardly toward said fixed contact upper ends, said disc contact being movable upwardly in said recess against the force of said biasing means as said control member is rotated out of contact with one of said adjacent fixed contact upper ends and said disc contact caused to rotate over the upper end of the other adjacent fixed contact upper end.

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**4,748,298**

**BISTABLE SWITCH, IN PARTICULAR FOR USE AS A HEADLAMP DIPSWITCH ON A MOTOR VEHICLE**

**Louis J. Chretien, Eragny S/Oise, France, assignor to Jaeger, Levallois-Perret, France**

**Filed Apr. 16, 1987, Ser. No. 39,093**

**Claims priority, application France, Apr. 18, 1986, 86 05604; Jun. 3, 1986, 86 07963; Dec. 3, 1986, 86 16924; Dec. 3, 1986, 86 16925**

**Int. Cl.[4] H01H** *3/16, 83/00*

**U.S. Cl. 200—12** **35 Claims**

1. A bistable switch, in particular a dipswitch for switching between a dipped and a main beam position for vehicle headlamps, the bistable switch comprising:

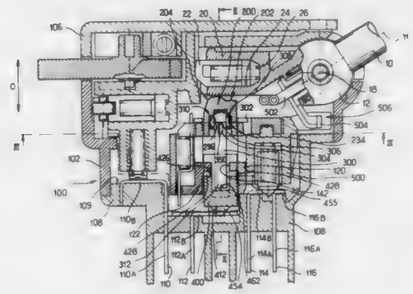
a housing containing:

a control crosshead guided in translation between a rest position and a working position;



a toggle bar extending in the direction of control crosshead displacement, and pivotally mounted on the control crosshead about an axis extending transversely to the direction of control crosshead translation, the toggle bar having a free end distant from the control crosshead;

a contact carriage guided in translation opposite said free end of the toggle bar, between a first position and a second position, in a direction generally perpendicular to the direction of control crosshead displacement and to the pivot axis of the toggle bar, said contact carriage including:



at least one contact stud; and

two sloping cam surfaces provided on a common face of the contact carriage facing the free end of the toggle bar, said cam surfaces alternately occupying a position facing said toggle bar depending on the position of the contact carriage in the housing so that when said control crosshead is displaced in the working position, the free end of the toggle bar contacts one or the other of the two sloping cam surfaces;

resilient means urging said contact carriage in the first position; and

means for selectively locking said contact carriage in the second position.

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**4,748,299**

**LEVEL SENSING SYSTEM WITH LATCHING DEVICE**

**Craig S. Caster, Pompano Beach, Fla., assignor to CTE Chem Tech Equipment Corp., Deerfield Beach, Fla.**

**Filed Jul. 24, 1987, Ser. No. 77,453**

**Int. Cl.[4] H01H** *35/18*

**U.S. Cl. 200—84 C** **1 Claim**

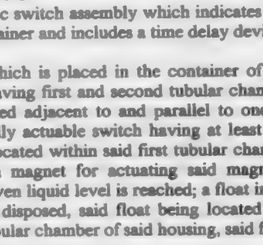
1. A liquid level sensing system, comprising:

(a) a tank or the like adapted to hold a liquid which is partially withdrawn or replenished from time to time;

(b) a plurality of level sensing pole magnets secured in uniform relative vertical positions within said tank, each of said pole magnets having magnetic axes of like directional polarity;

(c) within said tank, an elongate reed switch having a buoyant envelope thereabout and having a top and a bottom, said reed switch comprising an upper reed element, axially rigidly secured within said envelope from the top thereof, and a lower reed element axially secured by a radial spring of constant value from the bottom of said envelope, wherein opposite ends of said reed elements are unsecured, free ends defining an axial segment of radially-displaced, overlap, said radial displacement being smaller in dimension than said segment of axial overlap;

(d) a compensating magnet secured in magnetic proximity to said upper reed element, said compensation magnet having a magnetic axis co-parallel and co-directional with the magnetic axis of said level sensing magnest, said compensating magnet inducing in said upper reed element a magnetic axis and polarity opposite that of said compensating magnet and of said upper reed element, thereby inducing into said lower reed element a magnetic axis and polarity opposite to that of said upper reed element and thereby the same as the polarity of said compensating magnet and of said level sensing magnets, whereby, when said envelope of said reed switch is beyond the magnetic proximity of any of said level sensing magnets, the radial component of said spring constant value, securing said lower reed



element at its fixed end, will overcome the normal magnetic attraction between said free ends of said upper and lower reed elements to thereby maintain said reed elements in an open state and, further whereby, movement of said envelope into the proximity of one of said level sensing magnets will cause the mutual contacting of said free ends of said reed elements when said ends become magnetically proximal to that pole of the proximal level sensing magnet that is like in polarity to the free end of said upper reed element, and, conversely, will cause the opening of said free ends of said reed elements when said free ends are magnetically proximal to the pole of said proximal level sensing magnet that is opposite to polarity of the free end of said upper reed element, wherein the event, direction and velocity of said reed switch passing a particular level sensing magnet can be monitored from changes in the magnetic field geometry within the reed switch as well as from direct current flow monitoring within the elements of the reed switch.

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**4,748,300**

**LIQUID LEVEL INDICATOR SWITCH**

**Donald D. Anderson, 4145 Southwind, Las Cruces, N. Mex. 88005**

**Filed Jan. 30, 1985, Ser. No. 696,603**

**Int. Cl.[4] H01H** *35/18, 9/00*

**U.S. Cl. 200—84 C** **3 Claims**

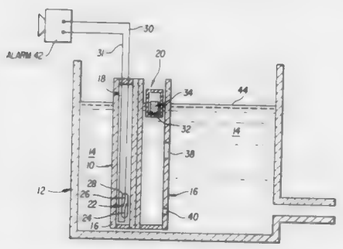
1. A magnetic switch assembly which indicates the level of liquid in a container and includes a time delay device comprising:

a housing which is placed in the container of liquid, said housing having first and second tubular chambers which are mounted adjacent to and parallel to one another; a magnetically actuable switch having at least one pair of contacts located within said first tubular chamber of said housing; a magnet for actuating said magnetic switch when a given liquid level is reached; a float in which said magnet is disposed, said float being located within said second tubular chamber of said housing, said float varying

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in position with the level of liquid in said second chamber; wherein said time delay device includes a means for delaying the actuation of said magnetically actuable switch to prevent a premature indication that the given liquid level has been reached; and wherein said second tubular chamber of said housing includes a large orifice and a small orifice, said large orifice being located above said small orifice, wherein said orifices allow said container to fill



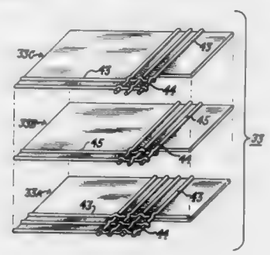

and drain the liquid being monitored, wherein said small orifice allows the liquid in the second tubular chamber to drain at a slower flow rate than the liquid draining from said container, and said large orifice is utilized to refill said second tubular chamber quickly when the liquid level in said container rises, and said second tubular chamber is not in fluid communication with said first tubular chamber.

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**4,748,301**
**ELECTRIC CIRCUIT BREAKER ARC CHUTE COMPOSITION**

**Ira B. Goldman, Waterbury, and Karen B. Lausier, Plymouth, both of Conn., assignors to General Electric Company, New York, N.Y.**

**Filed Jun. 1, 1987, Ser. No. 56,187**
**Int. Cl.⁴ H01H *33/02***
**U.S. Cl. 200—144 C** **20 Claims**

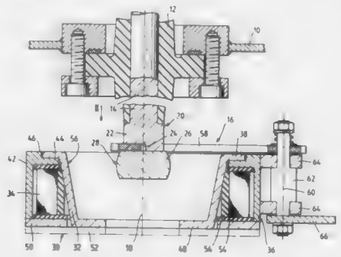



1. A molded case circuit breaker comprising:
a molded plastic case and cover;
a pair of separable contacts within said case;
an operating mechanism moving said contacts between open and closed positions; and
an arc chute facing said contacts and extinguishing an arc which occurs when said contacts become separated during overcurrent conditions, said arc chute including a plurality of spaced metal plates supported between a pair of side supports and an apertured back support, said side supports each comprising an arrangement of a layer of resin-impregnated glass fibers sandwiched between a pair of outer layers of resin-impregnated cloth fibers.

**4,748,302**
**ARC INTERRUPTER**

**James Spooner, Sunderland, England, assignor to Northern Engineering Industries Plc, New Castle upon Tyne, England**

**Filed Feb. 27, 1987, Ser. No. 19,944**
**Claims priority, application United Kingdom, Mar. 25, 1986, 8607399**
**Int. Cl.⁴ H01H *33/18***
**U.S. Cl. 200—147 R** **9 Claims**




1. An arc interrupter comprising fixed and movable contacts, a fixed electrode, an annular flange extending radially outwardly from said electrode and terminating at an outer periphery, said flange being divided by slots extending radially thereof from said outer periphery through at least a substantial part of the width of said flange, first and second annular arcing surfaces provided, respectively, by one of said contacts and said electrode, said surfaces being coaxial with one another on a common axis and being separated from one another by an annular gap, said first arcing surface being closer to said common axis than said second arcing surface, and an arc-driving coil surrounding said electrode, said coil being coaxial with said surfaces and being electrically connected at one end to said electrode whereby said coil is included in series with said arcing surfaces in an arc current path at least during a later part of the opening of a main current path formed by said contacts in a make position.

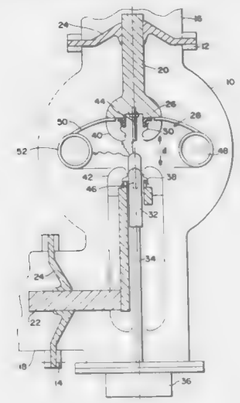
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**4,748,303**
**ISOLATING SWITCH OF A HIGH VOLTAGE METALCLAD INSTALLATION**

**Jean Kieffer, Crolles, France, assignor to Merlin Gerin, Grenoble Cedex, France**

**Filed Dec. 10, 1986, Ser. No. 940,109**
**Claims priority, application France, Dec. 20, 1985, 85 19216**
**Int. Cl.⁴ H01H *33/60***
**U.S. Cl. 200—148 B** **6 Claims**

1. An isolating switch of a metalclad installation with an annular earthed metal enclosure filled with a high dielectric strength gas, comprising:
a movable contact in the form of a sliding pin capable of moving to a closed position engaged with an aligned stationary contact, and to an open position separated from said stationary contact by an isolation gap,
a field distribution shield in the form of a fixed cover covering the end of the stationary contact to which it is electrically connected and having a central opening for the movable contact pin to pass through in the closed position of the isolating switch,
a field distribution shield in the form of a cover associated with the movable contact and arranged to cover the end of the movable contact in the open position, and electrically connected to the movable contact,
and an annular electrode in the shape of a ring having its axis aligned with said movable and stationary contacts, said annular electrode being disposed coaxially around said isolation gap between said movable and stationary contacts, and fitted between the isolation gap and the earthed metal enclosure to pick up an arc liable to migrate from said gap to said enclosure, said annular electrode being electrically connected to the stationary contact and having an axial length equivalent to that of said gap so as to surround said gap over its entire axial length, said



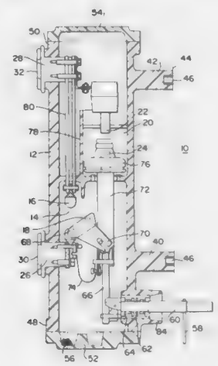

enclosure having an enlarged cross-section at the level of said annular electrode to ensure a sufficient dielectric withstand between the enclosure and the annular electrode.

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**4,748,304**
**ELECTRICAL CIRCUIT BREAKER WITH IMPROVED DIELECTRIC WITHSTAND**

**Raymond Soboul, Autrans, France, assignor to Merlin Gerin, Grenoble Cedex, France**

**Filed Mar. 16, 1987, Ser. No. 26,390**
**Claims priority, application France, Mar. 26, 1986, 86 04493**
**Int. Cl.⁴ H01H *33/00***
**U.S. Cl. 200—148 R** **9 Claims**




1. An electrical circuit breaker having a sealed casing made of molded insulating material, filled with an insulating gas with high dielectric strength, notably sulphur hexaflouride, and comprising:
an operating mechanism for actuating a system of separable contacts between closed and open positions,
a pair of connection terminals in electrical connection with said contacts via bushings of conducting material, said terminals passing through the wall of the lateral surface of the casing and extending perpendicular to the longitudinal axis,



fixing means for mounting the insulating casing to a metal support electrically connected to the ground or earth,
a plurality of flanges provided on the external lateral surface of the casing to increase the creepage distance between the terminals and the support, the value of the creepage distance being greater than the distance in the air between the same parts,
said casing having a smooth internal lateral surface in contact with the insulating gas and extending on an opposite side of the external flanges.

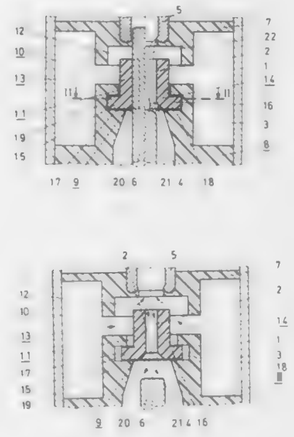
7. An electrical circuit breaker according to claim 1, wherein the system of separable contacts comprises:
a main circuit for the noted current to flow through having a pair of fixed and movable main contacts,
an auxiliary shunting circuit having a pair of fixed and movable arcing contacts, the fixed main contact and the fixed arcing contact being electrically connected to one of the connection terminals, whereas the movable main contact and the movable arcing contact are connected to the other connection terminal of the pole,
a connection system between the fixed main contact and the associated connection terminal, having at least two conducting bars extending parallel to the longitudinal axis of the casing, each bar presenting a rectangular cross-section with rounded edges,
the fixed main contact being provided with a tailpart acting as a spacer between the two offset bars.

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**4,748,305**
**GAS-BLAST SWITCH**

**Charles Luginbühl, Neuenhof, Switzerland, assignor to BBC Brown Boveri, AG, Switzerland**

**Filed Mar. 19, 1987, Ser. No. 27,637**
**Claims priority, application Switzerland, Mar. 26, 1986, 1213/86**
**Int. Cl.⁴ H01H *33/60***
**U.S. Cl. 200—148 R** **12 Claims**




1. A gas-blast switch, comprising:
a housing;
an arcing chamber, an accumulator space, and an expansion space, all defined within said housing;
first and second contact members which are movable relative to one another, said first contact member being mounted to be movable through said arcing chamber toward and away from said second contact member; and
said arcing chamber being defined, at least partially, by a nozzle having a variably sized discharge cross-section, said nozzle being comprised of and defined by movable nozzle parts, the relative position of said nozzle parts

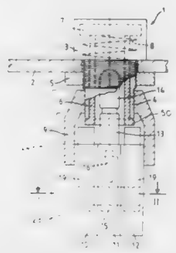
VOL 1090 ISS 5 MY 31 1988 UMI



determining the size of said discharge cross-section, said movable nozzle parts being disposed at least partially in a path which leads from said arcing chamber to said accumulator space and said movable nozzle parts being freely mounted in said housing such that the size of a spacing between said movable nozzle parts is controlled by gas pressure which is exerted on said nozzle parts in response to an arc that develops in said housing.

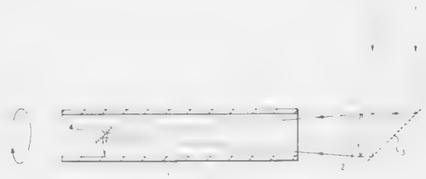
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**4,748,306**
**CONTROL BUTTON UNIT HAVING BLOCK ELEMENTS WITH COUPLED MOVABLE MEMBERS**
**Eberhard Schlegel, Duermentingen, Fed. Rep. of Germany, assignor to Firma Georg Schlegel, Duermentingen, Fed. Rep. of Germany**
**Filed Oct. 14, 1986, Ser. No. 918,045**
**Claims priority, application Fed. Rep. of Germany, Nov. 5, 1985, 3539178**
**Int. Cl.[4] H01H *9/02***
**U.S. Cl. 200—307** **17 Claims**



1. A control button unit, comprising:
an actuating member which includes a housing for installation in a supporting wall, a plunger mounted on the housing for linear movement along a line, and spring means for urging the plunger in a predetermined direction along the line;
a first block element having a broadside with an opening, the first block element additionally having a movable member with a projection which extends through the opening and perpendicular to the broadside of the first block element;
a second block element having a broadside with an opening, the second block element additionally having a movable member with a recess; and
a coupling member connected to the actuating member and having a plurality of receiving locations for selectively receiving block elements in parallel juxtaposition, the receiving locations being disposed so that the broadside of a block element in any receiving location is parallel to the line along which the plunger moves and so that the movable member thereof is displaceable in a direction parallel to the line along which the plunger moves, the first and second block elements being mounted on the coupling member at adjacent receiving locations, with the movable member of one of the first and second block elements projecting to a position for actuation by the plunger,
wherein the projection on the movable member of the first block element extends through the opening in the broadside of the second block element and into the recess in the movable member of the second block element to couple the movable members of the first and second block elements together.

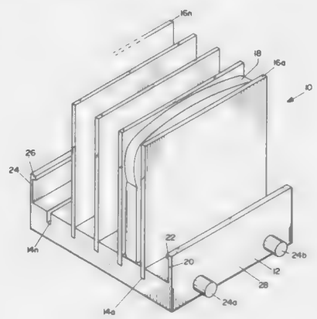
**4,748,307**
**TUBE FURNACE**
**John G. Lamb, Harlow, England, assignor to STC PLC, London, England**
**Filed May 1, 1986, Ser. No. 858,617**
**Claims priority, application United Kingdom, May 4, 1985, 8511422**
**Int. Cl.[4] H05B *6/30***
**U.S. Cl. 219—10.49 R** **1 Claim**



1. A tubular susceptor composed of particles of zirconia partially sintered together, in which over at least a portion of the axial length of the tube a region confined to an inner surface layer of the tube has been rendered glassy by laser beam induced fusion of the zironia particles, said inner surface being backed by material that remains in the form of particles of zirconia partially sintered together.

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**4,748,308**
**MICROWAVE OVEN TOASTER**
**Robert C. Drews, 211 N. Meramac Ave., Clayton, Mo. 63105**
**Filed Jan. 12, 1987, Ser. No. 2,382**
**Int. Cl.[4] H05B *6/80*; A47J *37/08***
**U.S. Cl. 219—10.55 E** **1 Claim**

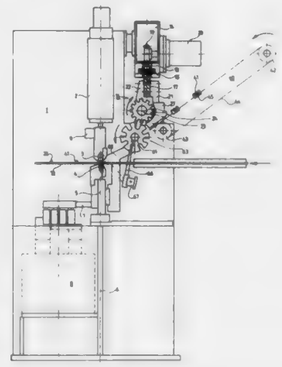


1. In combination, a microwave oven toaster and pieces of bread comprising of:
a. a rectangular block of microwave transparent material including a plurality of parallel aligned slots, and at least two cards which are of microwave material for converting microwave energy into thermal energy inserted into said slots; and,
b. a piece of bread inserted on the top portion of said block material between said cards which are aligned into said slots whereby said cards convert microwave energy in the card material into radiant thermal energy thereby heating and toasting outer surfaces of said bread while microwave energy heats said bread thereby converting said bread into a piece of toast.

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**4,748,309**
**MULTI-SPOT RESISTANCE-WELDING MACHINE**
**Josef Ritter; Gerhard Ritter; Klaus Ritter, and Rudolf Scherr, all of Graz, Austria, assignors to EVG Entwicklungs-U. Verwertungs-Gesellschaft m.b.H., Graz, Austria**
**Filed Mar. 3, 1987, Ser. No. 21,197**
**Claims priority, application Austria, Apr. 2, 1986, 859/86**
**Int. Cl.[4] B23K *11/02, 11/32***
**U.S. Cl. 219—56** **7 Claims**

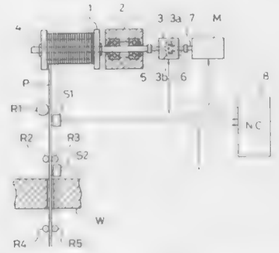


1. A multi-spot resistance-welding machine for manufacturing grids in which longitudinal and crosswires cross one another at right-angles and are welded to one another at points of intersection, said machine comprising two feed devices for said crosswires, two welding electrodes defining a welding area therebetween, a delivery device operable to take said crosswires from said feed devices and transfer them into said welding area, and a guide for at least one feed device, said one feed device being operable to be displaced and positioned in said guide transversely to a feed path of said longitudinal wires and relative to said delivery device transferring said crosswires into said welding area.

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**4,748,310**
**WIRE FEED MECHANISM OF WIRE ELECTRIC DISCHARGE MACHINE**
**Toshiyuki Aso, Hino, and Tamotsu Ishibashi, Hachioji, both of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan**
**PCT No. PCT/JP86/00414, § 371 Date Apr. 8, 1987, § 102(e) Date Apr. 8, 1987, PCT Pub. No. WO87/01064, PCT Pub. Date Feb. 26, 1987**
**PCT Filed Aug. 13, 1986, Ser. No. 46,920**
**Claims priority, application Japan, Aug. 13, 1985, 60-176883**
**Int. Cl.[4] B23H *7/10*; B65H *59/00***
**U.S. Cl. 219—69 W** **5 Claims**

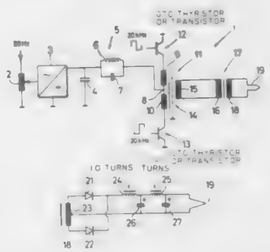
1. A wire feed mechanism having a wire electrode feed reel for use in a wire electric discharge machine, comprising:
a clutch having a plurality of clutch elements, a first one of which is coupled to said wire electrode feed reel to be integrally rotatable therewith and arranged to create a coupling torque between said plurality of clutch elements that changes in accordance with a feed voltage;
a geared motor coupled to a second one of the plurality of clutch elements of said clutch, for rewinding said wire electrode;
detecting means for detecting a breakage of said wire electrode and for outputting a breadkage detection signal; and
control means responsive to the breakage detection signal for supplying a first predetermined voltage to the clutch to firmly engage said clutch, so as to couple said wire electrode feed reel to said geared motor when the reel is



rotating and said geared motor is kept stopped, thereby stopping idle rotation of said wire electrode feed reel upon breakage of said wire electrode, and for supplying a second predetermined voltage to the clutch to loosely engage said clutch so that a predetermined tension is applied to said wire electrode during machining.

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**4,748,311**
**INVERTER WITH POWER SUPPLY TO CHOPPER THROUGH PARALLEL RESONANT CIRCUIT TUNED TO TWICE THE CHOPPER FREQUENCY**
**Friedrich-Werner Thomas, Geinhausen, and Johann Stürmer, Freigericht, both of Fed. Rep. of Germany, assignors to Leybold Aktiengesellschaft, Fed. Rep. of Germany**
**Filed Feb. 27, 1987, Ser. No. 19,694**
**Claims priority, application Fed. Rep. of Germany, Feb. 28, 1987, 3606463**
**Int. Cl.[4] H01J *37/315*; H02M *7/519, 7/538***
**U.S. Cl. 219—121 EA** **11 Claims**



1. An inverter comprising: a direct-voltage source (3) and a chopper section (9, 10, 12, 13) which has switching means (12, 13) which operate in push-pull and which are switched at a frequency $f_O$, a parallel tuned circuit (5) being provided between the chopper section (9, 10, 12, 13) and the direct-voltage source (3), wherein the parallel tuned circuit (5) has a resonant frequency set to $2f_O$.

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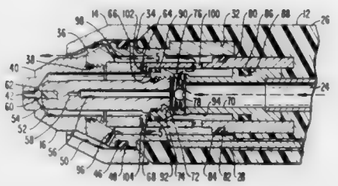


**4,748,312**

## PLASMA-ARC TORCH WITH GAS COOLED BLOW-OUT ELECTRODE

**Bruce O. Hatch, Lebanon, and Richard A. Spaulding, Hanover, both of N.H., assignors to Thermal Dynamics Corporation, West Lebanon, N.H.**

**Filed Apr. 10, 1986, Ser. No. 850,504**
**Int. Cl.⁴ B23K *9/00***
**U.S. Cl. 219—121 PR** **8 Claims**



1. A plasma-arc cutting torch comprising:
a torch housing defining a chamber having an outlet at the end of said chamber;
gas supply means for supplying a gas to said chamber, said gas being suitable for generating plasma and for a secondary gas flow which will cool the torch and a workpiece;
an electrode in the chamber adjacent to the outlet,
said electrode being generally elongated and defining a central axis and having first and second opposite ends.
attachment means on said first end of said electrode for removably mounting said electrode within said chamber in said torch housing,
an insert bore in said second end extending into said electrode,
an insert fitted within and closing off said insert bore,
gas separation means in said chamber for separating said gas into a primary gas flow adjacent to said electrode for generating a plasma and a secondary gas flow away from said electrode for cooling the torch and the workpiece, wherein said gas separation means comprises,
a generally cylindrical, electrical insulator at least partially surrounding said electrode, said insulator defining an outer chamber with said body and further including passage means for directing gas from said gas supply means to said outer chamber,
a cup-shaped torch tip around the end of said electrode and closing off said outlet except for an opening in said tip, said tip and said insulator defining, with said insulator, an inner chamber around said electrode,
passage means in said insulator for directing primary gas flow from said gas supply means to said outer chamber, and thence to said inner chamber, and wherein said passage means comprises tangentially directed passages in said insulator so that primary gas from said gas supply means will generate a vortex around said electrode.

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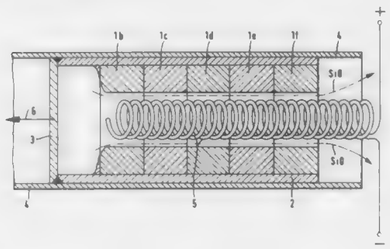
**4,748,313**

## APPARATUS BY THE CONTINUOUS VAPORIZATION OF INORGANIC COMPOSITIONS BY MEANS OF A PHOTON-GENERATING THERMAL SOURCE OF RADIATION HEAT

**Andre de Rudnay, Lausanne, Switzerland, assignor to Elektroschmelzwerk Kempten GmbH, Munich, Fed. Rep. of Germany**

**Filed Aug. 15, 1986, Ser. No. 897,549**
**Claims priority, application Fed. Rep. of Germany, Aug. 23, 1985, 3530106**
**Int. Cl.⁴ H05B *3/00***
**U.S. Cl. 219—271** **8 Claims**

1. An apparatus for the vaporization of high-melting point inorganic compositions by means of a photon-generating thermal source of radiation heat in a continuously operated vacuum vaporization apparatus which comprises: compacted vaporizable material in the form of a shaped body having an interior portion prepared from at least one pulverulent inorganic composition having a melting point greater than 1000° C. or a mixture of at least one pulverulent inorganic composition having a melting point greater than 1000° C. and at least one pulverulent element having a melting point greater than 1000° C.; a thermal source of radiation heat, coupled without contact, to said interior portion of said compacted shaped body of vaporizable material; and means to move at least one of said shaped body and said thermal source of radiation heat in relation to each other while the body is being heated.



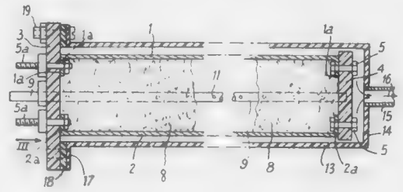
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**4,748,314**

## DEVICE FOR THE RAPID VAPORIZATION OF A LIQUID

**Robert Desage, Verneuil, France, assignor to A.R.M.I.N.E.S., Paris, France**

**Filed Mar. 2, 1987, Ser. No. 20,871**
**Claims priority, application France, Mar. 3, 1986, 86 02934**
**Int. Cl.⁴ H05B *3/60***
**U.S. Cl. 219—274** **20 Claims**



1. A device for the high speed liquid vaporization of a liquid including in a closed housing, a porous body impregnated with liquid to be vaporized which is placed wholly or partially between and in contact with two longitudinal current lead-in plate electrodes made from an electrically conducting material and which may be connected respectively to the two poles of an electric current source, and said lead-in electrodes acting as heating electrodes for heating the liquid contained in the porous body and causing therein high speed liquid vaporization of the liquid which continually migrates through the porous body under the effect of its pumping and suction capacity, means for introducing and storing a liquid mass to be vaporized solely in impregnated form directly in this porous body, without formation of a permanent liquid layer in the housing, density of the porous body being chosen according to a rate of decrease of the vapor flow rate depending on the density of the porous body.

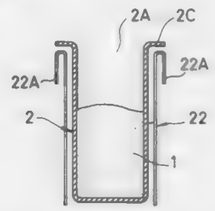


**4,748,315**

## MOLECULAR BEAM SOURCE

**Kunihiro Takahashi; Kazumasa Fujioka, both of Ibaraki, and Naoyuki Tamura, Kudamatsu, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jan. 21, 1987, Ser. No. 5,846**
**Claims priority, application Japan, Jan. 21, 1986, 61-10516**
**Int. Cl.⁴ C23C *14/26***
**U.S. Cl. 219—275** **6 Claims**



1. In a vaporization source for vacuum evaporation wherein a heater is disposed around a crucible which contains vaporization metal, said heater being formed of straight parts and U-shaped end parts which are continuously repeated at equal intervals, said straight parts being arranged so as to extend in a vertical direction of said crucible, and the U-shaped end parts being bent outwards at outer-peripheral positions of an opening of said crucible.

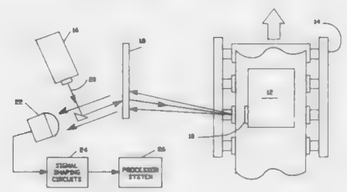
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**4,748,316**

## OPTICAL SCANNER FOR READING BAR CODES DETECTED WITHIN A LARGE DEPTH OF FIELD

**LeRoy D. Dickson, Raleigh, N.C., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Jun. 13, 1986, Ser. No. 873,934**
**Int. Cl.⁴ G06K *7/10, 7/14***
**U.S. Cl. 235—454** **6 Claims**



1. An optical scanner for reading bar code labels at different distances from the scanner, said scanner including a coherent light beam source and a beam deflector capable of deflecting and focussing the light beam to produce a set of scan lines, each of the scan lines having a focal zone which overlaps the focal point of at least one other of said scan lines, said beam deflector producing a scan spot in the focal zone closest to the deflector which is relatively small in comparison to irregularities of the surface on which the bar code label appears.

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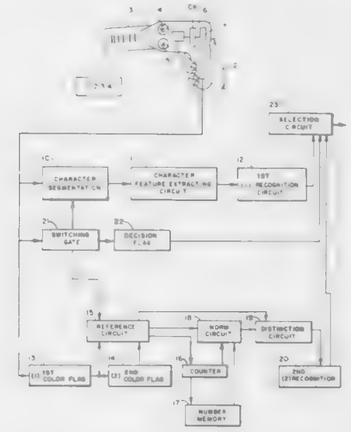
**4,748,317**

## OPTICAL READER

**Koji Satoh, Osaka, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan**

**Filed Nov. 26, 1984, Ser. No. 674,757**
**Claims priority, application Japan, Nov. 25, 1983, 58-220550**
**Int. Cl.⁴ G06K *7/10***
**U.S. Cl. 235—462** **4 Claims**

1. An optical reader for scanning and recognizing an object information field consisting of alphanumeric characters and bar codes, including:
an image sensor having a two-dimensional array of photoelectric elements each of which provides an output signal and which represents a binary matrix of column and line segments;
focusing means for transmitting and focusing the object field on the image sensor;
digitalizing means for providing a binary signal pattern representing the object field by digitalizing the output signals of each of the photoelectric elements in the sensor array;
calculating means for calculating the logical sum of black area in either of the line or column segments of the binary matrix to detect whether a selected number of consecutive lines or columns has at least one photoelectric element which detects the presence of a character or a bar code;
object determination means for determining whether the object field is a character or a bar code, by detecting and



calculating the number of consecutive lines or columns having at least one photoelectric element which detects the presence of a character or a bar code in either the line or column segments; with the object determination means detecting line segments if the calculating means detects column segments and the object determination means detecting column segments if the calculating means detects line segments;
first recognition circuit means for recognizing a character according to a binary pattern; and
second recognition circuit means for recognizing a width of a bar code;
switching gate means for operating either of the first or second circuit recognition means, but not both concurrently, according to the results from the object determination means.

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**4,748,318**

## WAND FOR A HAND-HELD COMBINED LIGHT PEN AND BAR CODE READER

**James D. Bearden, 22483 Rio Aliso Dr., El Toro, Calif. 92630, and William Floyd, 5531 Glenstone Dr., Huntington Beach, Calif. 92649**

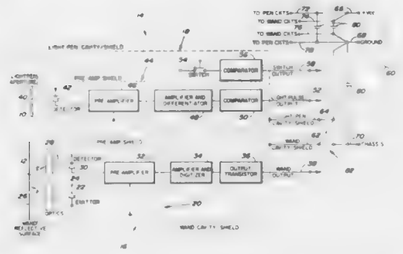
**Filed Oct. 22, 1986, Ser. No. 922,050**
**Int. Cl.⁴ G06K *7/10***
**U.S. Cl. 235—472** **18 Claims**

1. An optical input device comprising:
a first optical transducer means for generating a corresponding first electrical input signal;
a second optical transducer means for generating a corresponding second electrical input signal;

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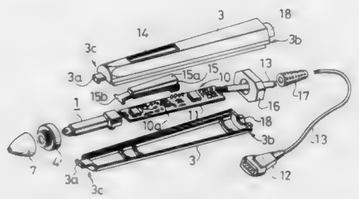
a first electrical shielding arranged and configured in operative configuration with said first optical transducer means;
a second separate electrical shielding arranged and configured in operative configuration with said second optical transducer means;
optical shielding means for optically isolating said first and second optical transducer means one from the other; and



a hand-held housing enclosing said first and second optical transducer means, said first and second electrical shielding and said optical shielding,
whereby two separate and independent optical transducers are included within a single hand-held optical input device.

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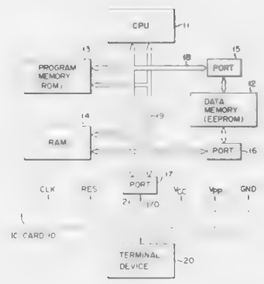
**4,748,319**
**BAR CODE SCANNER**
**Hiroaki Sasaki, and Koji Nakase, both of Furukawa, Japan, assignors to Alps Electric Co., Ltd., Japan**
**Filed Oct. 6, 1986, Ser. No. 915,750**
**Claims priority, application Japan, Oct. 8, 1985, 60-153106[U]**
**Int. Cl.⁴ G06K *7/10***
**U.S. Cl. 235—472** **3 Claims**



1. In a bar code scanner having a light-emitting element, a light-receiving element, an optical means for applying a light beam from said light-emitting element to a bar code area and for leading the light reflected from said bar code area to said light-receiving element, an electrical processing circuit, a sensor body for accommodating said light-emitting element, said light-receiving element and said optical means, a pair of split casing members for retaining said sensor body, an intermediate cap for connecting together said pair of split casing members, and a distal end cap adapted to be detachably retained by said intermediate cap in such a manner that a light incident and emergent portion of said sensor body alone is exposed,
the improvement which comprises:
a projection formed on an extending portion provided at one end of each of said split casing members and adapted to contact a side portion of said sensor body with flexibility so that said sensor body is movable;
a retaining portion formed on the inner surface of said intermediate cap; and
an engaging portion formed on the outer surface of each of said split casing members and adapted to engage with said retaining portion, whereby said retaining portion and said engaging portion are fitted to each other in such a manner that said extending portion deflects about said projection.

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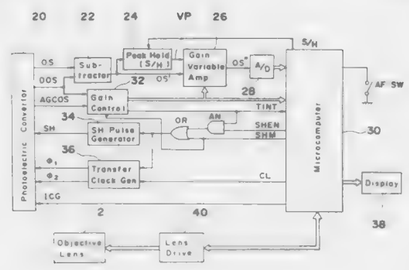
**4,748,320**
**IC CARD**
**Yoshikazu Yorimoto, Matsudo, and Masashi Takahashi, Tokyo, both of Japan, assignors to Toppan Printing Co., Ltd., Tokyo, Japan**
**Filed Oct. 27, 1986, Ser. No. 923,216**
**Claims priority, application Japan, Oct. 29, 1985, 60-242429**
**Int. Cl.⁴ G06K *19/06***
**U.S. Cl. 235—492** **11 Claims**



1. An IC (integrated circuit) card comprising:
rewritable memory means with a plurality of sectors; and
memory control means for writing into said memory means, data file supplied to the IC card from a processing device outside the IC card, said memory control means including means for chaining a plurality of sectors according to the length of the data file, means for writing chain data of each sector into a predetermined portion of the sector, and means for writing for each data file data relating to the sectors constituting the data file into a predetermined sector.

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**4,748,321**
**FOCUS DETECTION DEVICE WITH WAVEFRONT ABERRATION CORRECTION**
**Tokuji Ishida, Daito, and Masataka Hamada, Osaka, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**
**Filed Aug. 4, 1986, Ser. No. 893,101**
**Claims priority, application Japan, Aug. 5, 1985, 60-172889**
**Int. Cl.⁴ G01J *1/20***
**U.S. Cl. 250—201** **4 Claims**

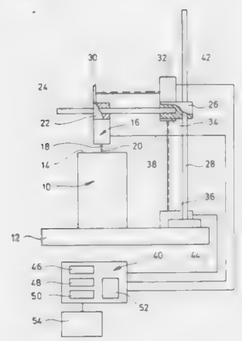


1. A focus detection device comprising:
a focus adjustable objective lens for forming an image of an object;
first and second image forming lenses arranged symmetrically with one another with respect to the optical axis of said objective lens for forming first and second images of said image of the object in such a manner that the distance between the first and second images in the direction perpendicular to the optical axis of said objective lens varies with the focus condition of said objective lens, said first and second images being subjected to wave front aberration;
first and second image sensors for sensing said first and second images to generate first and second signals representative of the light intensity distributions of said first and second images, respectively;
first calculating means for calculating the distance between said first and second images sensed by said first and second image sensors in accordance with said first and second signals;
second calculating means for calculating the amount of deviation of said image relative to a predetermined focal plane of said objective lens in accordance with the distance calculated by said first calculating means;
main portion determining means for determining the location of a main portion of at least said first image in accordance with said first signal; and
correction means for correcting one of the calculation results obtained by said first and second calculating means so as to lessen an error involved therein owing to said wave front aberration when the determination by said main portion determining means indicates that said first image has a main portion outside its central region.



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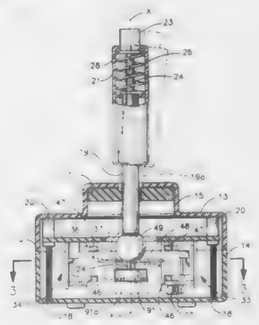
**4,748,322**
**APPARATUS FOR DETERMINING THE DISTANCE BETWEEN A MEASURING SURFACE AND A REFERENCE SURFACE**
**Ulrich O. Breitmeier, Nobelstr. 15, D-7000 Stuttgart 80, Fed. Rep. of Germany**
**Filed Sep. 29, 1986, Ser. No. 912,097**
**Claims priority, application Fed. Rep. of Germany, Oct. 15, 1985, 3536700**
**Int. Cl.⁴ G01J *1/20***
**U.S. Cl. 250—201** **23 Claims**



1. Apparatus for determining the local distance of a measuring surface from a reference surface comprising in combination:
(a) a light source having a small diameter,
(b) a photoelectric arrangement that includes at least two transducers (116, 118),
(c) a lens (68) for focussing said light source on a local region of the measuring surface and for focussing the light not produced there by the light source on said photoelectric transducer arrangement,
(d) a deflection device for the spatial separation of the light reflected by the measuring surface from the incident light thereon, said device being located on the optical axis of the apparatus between the lens and the light source,
(e) a beam divider that is located in the path of light behind the deflection device, said beam divider dividing the reflected light into two partial beams, one of which impinges on an associated transducer or said transducer arrangement, and
(f) a differential amplifier which receives the output signals of the two transducers characterized in that
(1) the lens (68) is pre-tensioned in an axial position and can be displaced axially against the pre-tensioning force by an electro-magnet (74, 140);
(2) a supply circuit increases or reduces the supply current to the electromagnet (74, 140) depending on the sign of the output signal of the differential amplifier (120); and
(3) a signal associated with the supply current is made available as the measuring signal associated with the distance to be measured.

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**4,748,323**
**JOYSTICK DEVICE WITH PHOTOELECTRIC TILT AND PUSH BUTTON DETECTION**
**Morton J. Holiday, 7686 Sherman Pl., Denver, Colo. 80221**
**Filed Mar. 23, 1987, Ser. No. 29,201**
**Int. Cl.⁴ G01V *9/04***
**U.S. Cl. 250—221** **20 Claims**



1. A joystick device comprising:
a casing supporting a control shaft disposed upright in a neutral position and movable to different tilt positions;
shaft position sensing means responsive to the tilt of said control shaft to one of a plurality of selected tilt positions, said sensing means including
a light emitter-detector device at each preselected shaft position to be sensed, each said device having a light emitter and a light detector spaced from one another along a line substantially parallel to said shaft in said neutral position and arranged so that light from each emitter is normally received by an associated detector,
a first light blocking member mounted on said shaft extending transverse thereto which in response to the tilt of said shaft to a selected tilt position will interrupt the light passing from an emitter and to an associated detector at that selected tilt position,
a signal processing first circuit operatively associated with each detector, each said first circuit providing a shaft position output terminal at which there is produced a change in electrical state when the light to the associated detector is interrupted by said first blocking member, and
button position sensing means responsive to the actuation of a button on the end of said control shaft which axially moves an inner shaft disposed in said control shaft, said button position sensing means including
a button light emitter and button light detector located at position opposite from one another along a line substan-

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tially perpendicular to the longitudinal axis of and below the lower end of said control shaft so that light from said button light emitter is normally received by said button light detector,

a second blocking member mounted on said inner shaft which in response to actuation of said button interrupts the light passing from said button light emitter to said button light detector, and

a signal processing second circuit associated with said button light detector, said second circuit providing a button position output terminal at which there is produced a change in electrical state when the light to the button light detector is interrupted by said second blocking member.

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**4,748,324**

**ELECTROSTATIC OPPOSING FIELD SPECTROMETER FOR ELECTRON BEAM TEST METHODS**

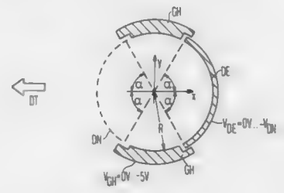
**Erich Plies, Munich, and Wilhelm Argyo, Osterwarngau, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed May 1, 1986, Ser. No. 857,965**

**Claims priority, application Fed. Rep. of Germany, May 31, 1985, 3519585**

**Int. Cl.[4] H01J** *40/00*

**U.S. Cl. 250—305** **11 Claims**




1. An electrostatic opposing field spectrometer for measuring a shift in the energy-distribution of secondary electrons triggered on a specimen by primary particles comprising:

a first electrode system arranged immediately above the specimen for accelerating the secondary electrons triggered at the specimen by a beam of the primary particles proceeding along a beam axis;

a second electrode system toward which said first electrode system accelerates the secondary electrons, said second electrode system being charged with voltages that establish an electrical field for decelerating the secondary electrons;

a deflection unit disposed above said second electrode system for deflecting the secondary electrons;

said deflection unit including a third electrode charged with a first voltage and a fourth electrode disposed opposite said third electrode and charged with a second voltage, said third and fourth electrodes being fashioned to form parts of a generated surface of a hollow cylinder having an axis of symmetry coincident with the beam axis; and

a detector toward which said deflection unit deflects the secondary electrons.

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**4,748,325**

**METHOD AND DEVICE TO DISCHARGE SAMPLES OF INSULATING MATERIAL DURING ION ANALYSIS**

**Georges Slodzian, Sceaux, France, assignor to Cameca, Courbevoie, France**

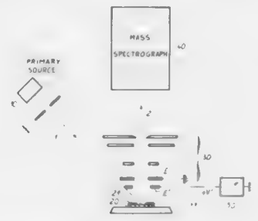
**Filed Jul. 14, 1987, Ser. No. 72,867**

**Claims priority, application France, Jul. 23, 1986, 86 10681**

**Int. Cl.[4] G01N** *23/22*

**U.S. Cl. 250—309** **7 Claims**

1. A method for the ion analysis of samples of an insulating material where positive ions are emitted under the impact of a primary bombardment beam of positive ions, these positive emitter ions being accelerated by an electrostatic field created in an acceleration space between an accelerating electrode and the sample taken to a very positive potential as compared to this electrode, method wherein the positive charge created in




the imaged field of the sample is compensated for by secondary electrons emitted by the accelerating electrode under the impact of particles emitted by the sample, focusing means placed in the acceleration space being used to send back to the imaged field the exact quantity of secondary electrons needed for charge neutralization.

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**4,748,326**

**RADIATION IMAGE READ-OUT APPARATUS**

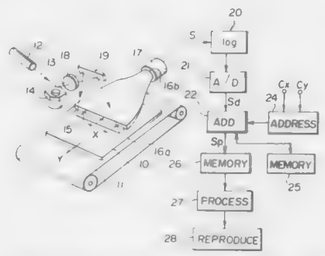
**Nobufumi Mori; Shigeru Saotome; Hideo Watanabe, and Kazuo Shimura, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Dec. 29, 1986, Ser. No. 947,220**

**Claims priority, application Japan, Dec. 27, 1985, 60-299848**

**Int. Cl.[4] G03C** *5/16*

**U.S. Cl. 250—327.2** **6 Claims**




1. A radiation image read-out apparatus for scanning a stimulable phosphor sheet carrying a radiation image stored thereon with a beam of stimulating rays which cause the stimulable phosphor sheet to emit light in proportion to the stored radiation energy, and photoelectrically detecting the light emitted by a stimulable phosphor sheet portion scanned with the beam of stimulating rays by use of a photodetector to obtain an image signal,

wherein the improvement comprises:

(i) means for adjusting the beam diameter of said beam of stimulating rays such that the beam diameter is smaller than a picture element size, and means for scanning each of the picture elements by a plurality of scanning passes with said beam of stimulating rays, and

(ii) an addition means for adding a plurality of image signals per picture element obtained by said plurality of scanning passes.



**4,748,327**

**METHOD OF INSPECTING MASKS AND APPARATUS THEREOF**

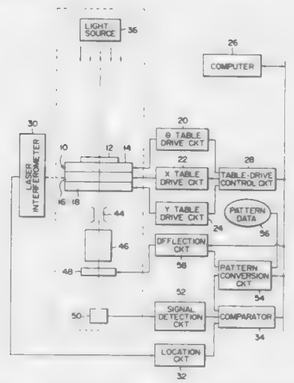
**Toshiaki Shinozaki, and Sadao Sasaki, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Jun. 9, 1986, Ser. No. 871,792**

**Claims priority, application Japan, Jun. 13, 1985, 60-128766**

**Int. Cl.[4] G01F** *23/00;* **H01J** *37/30*

**U.S. Cl. 250—358.1** **15 Claims**




1. A method of inspecting a mask which has a lithographic pattern thereon, comprising the steps of:

depositing an electron-emissive layer on a front surface of said mask on which said pattern is formed, said electron-emissive layer emitting electron beams when a rear surface of said mask is irradiated with energy beams;

applying said energy beams to said electron-emissive layer through said rear surface of said mask to cause said electron beams to emit from said electron-emissive layer;

guiding said electron beams emitted from said electron-emissive layer to an electron optical system, thereby forming an electron beam image of said pattern on a detector means;

detecting said electron beam image by said detector means to generate detection signals; and

comparing said detection signals corresponding to said pattern with reference signals representing a desirable shape and size of said pattern, thereby to inspect said mask.

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**4,748,328**

**SINGLE PHOTON EMISSION COMPUTED TOMOGRAPH USING FOCUSED MODULAR COLLIMATORS**

**Wei Chang; Peter Kirchner, and Karim Rezai, all of Iowa City, Iowa, assignors to The University of Iowa Research Foundation, Iowa City, Iowa**

**Filed Jul. 10, 1986, Ser. No. 884,080**

**Int. Cl.[4] G01T** *1/166;* **G21K** *1/02*

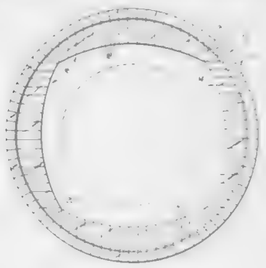
**U.S. Cl. 250—363 R** **4 Claims**

1. A single photon emission computed tomograph comprising:

(a) a detector ring and

(b) a rotatable collimator assembly disposed within said detector ring, said rotatable collimator assembly comprising four collimator quadrants, each of said four collimator quadrants comprising a plurality of collimator modules with their axes assembled in parallel, each of said modules containing a plurality of inwardly directed channels focused to a single point on its own axis, the focal length of each of said collimator modules being individually chosen to suit a particular imaging task,

(c) wherein each of said four collimator quardants is installed in said rotatable collimator assembly at a slightly different first angular offset to achieve fine data sampling, the first angular offsets being in the range of just greater



than 0° to the angle subtended by each discrete crystal in said detector ring.

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**4,748,329**

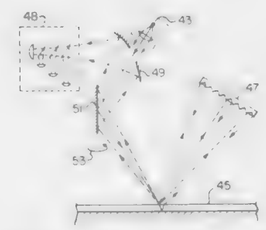
**METHOD FOR ON-LINE THICKNESS MONITORING OF A TRANSPARENT FILM**

**Paolo Cielo, Montreal; Kenneth C. Cole, St. Hubert, and Mario Lamontagne, Longueuil, all of Canada, assignors to Canadian Patents and Development Ltd., Ottawa, Canada**

**Filed Feb. 17, 1987, Ser. No. 15,704**

**Int. Cl.[4] G01N** *21/86*

**U.S. Cl. 250—560** **18 Claims**




1. An optical film thickness measuring method for measuring the thickness of a thin sheet, comprising steps of:

(a) projecting an incident beam of polychromatic light onto a surface of the thin sheet,

(b) detecting the light transmitted through the sheet at, at least three different wavelengths $\lambda_1$, $\lambda_2$ and $\lambda_3$, the first wavelength $\lambda_1$ corresponding to an absorption band of a material of the sheet and the second and the third wavelengths $\lambda_2$ and $\lambda_3$ being outside the absorption band and being substantially free from absorption by the material,

(c) producing three electric signals $T(\lambda_1)$, $T(\lambda_2)$ and $T(\lambda_3)$ representative of the light detected at the three different wavelengths $\lambda_1$, $\lambda_2$ and $\lambda_3$,

(d) establishing a reference signal $T_o$ from the electric signals $T(\lambda_2)$ and $T(\lambda_3)$ by using a pre-established non linear relationship among $T_o$, $T(\lambda_2)$ and $T(\lambda_3)$, and

(e) comparing the reference signal $T_o$ to the electric signal $T(\lambda_1)$ to determine the thickness of the thin sheet.

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**4,748,330**

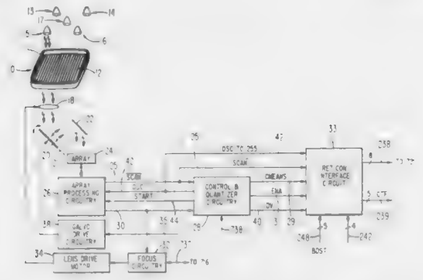
## METHOD AND APPARATUS FOR MEASURING PERIODIC MATRIX SPACES

**Frank S. Krufka, Mount Joy, Pa., assignor to RCA Licensing Corporation, Princeton, N.J.**

**Filed Dec. 22, 1986, Ser. No. 944,525**

**Int. Cl.[4] G01N *21/86*; G01V *9/04*; H04N *7/18***

**U.S. Cl. 250—560** **18 Claims**



1. A method for measuring spaces in a periodic matrix having a period including a plurality of spaces and areas therebetween comprising:

placing said matrix between an energy source and an array of pixels for receiving the energy from said matrix and irradiating said matrix with said energy;

scanning a plurality of image lines from said matrix across said array and producing signals representative of said spaces and areas therebetween;

converting said signals into data values and transmitting said data values to means for storing said data values for each of said scan lines as a row and for successive scan lines as columns;

adding selected data values in predetermined groups of columns representing corresponding nonadjacent spaces of said periodic matrix to obtain a total for each group;

dividing said total for each group by the number of selected data values in that group to obtain an average data value for each group; and

multiplying said average data value for each group by a linear value representing the length of each pixel to obtain the average space length for each group.

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**4,748,331**

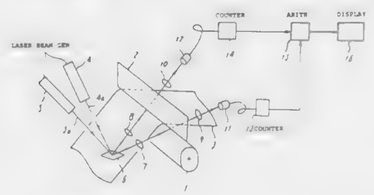
## FILM THICKNESS MEASURING DEVICE WITH SIGNAL AVERAGING TO COMPENSATE FOR ROLLER ECCENTRICITY

**Toshishige Nagao; Masayuki Ariki, and Yoshiaki Ida, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 29, 1987, Ser. No. 43,711**

**Int. Cl.[4] G01N *21/86***

**U.S. Cl. 250—560** **7 Claims**




1. A film thickness measuring device for measuring the thickness t of a film formed on a sheet member which is conveyed with the rotation of a rotary shaft while being kept in close contact with said rotary shaft, comprising:

a light shielding member disposed in parallel with said rotary shaft with a predetermined distance therebetween;

means for scanning a first space between said light shielding member and the surface of said rotary shaft with a first laser beam and a second space between said light shielding member and the surface of said film with a second laser beam;

means for receiving said first and second laser beams after scanning operation to produce first and second electric signals representing the widths of said first and second spaces, respectively;

means for carrying out an arithmetic operation to obtain the thickness t of said film based on said first and second electric signals; and

means for detecting the rotation speed of said rotary shaft, which is coupled to said arithmetic means,

said means for receiving operating to produce a plurality of said first and second electric signals for a period of time defined by the output of said detecting means, and said arithmetic means operating to average said first and second electric signals produced for the period of time so as to obtain the thickness of said film based on said first and second electric signals averaged.

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**4,748,332**

## APPARATUS FOR DETECTING THE LONGITUDINAL EDGES OF A ROD-SHAPED OBJECT

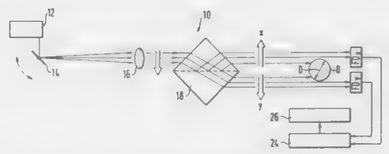
**Manfred Kühne, Furtwangen, and Reinhard Ulrich, Buchholz, both of Fed. Rep. of Germany, assignors to B.A.T. Cigarettenfabriken GmbH, Hamburg, Fed. Rep. of Germany**

**Filed Mar. 5, 1987, Ser. No. 22,319**

**Claims priority, application Fed. Rep. of Germany, Mar. 5, 1986, 3607244**

**Int. Cl.[4] G01N *21/86***

**U.S. Cl. 250—560** **12 Claims**



1. Apparatus for detecting the longitudinal edges of a rod-shaped object moved in its longitudinal direction, in particular a tobacco or filter rod comprising

(a) a light source for generating a light beam,

(b) at least one beam divider dividing the beam coming from the light source into at least two light beams sweeping over the edge regions of the object,

(c) an optical deflection system for sweeping the two light beams over the object,

(d) at least two photodetectors disposed behind the object in the beam direction, and

(e) an evaluating means for determining the position of the longitudinal edges from the instants of the bright/dark transitions at the two photodetectors on the one hand and the instantaneous position of the light beams on the other, wherein

(f) the or each beam divider generates two light beams which are parallel to each other and which move in opposite directions over the object.



**4,748,333**

## SURFACE DISPLACEMENT SENSOR WITH OPENING ANGLE CONTROL

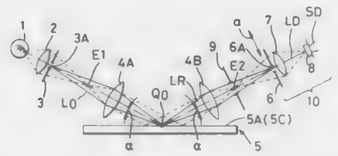
**Hideo Mizutani, Tokyo; Shoji Ishizaka, Kawasaki, and Takeshi Suto, Funabashi, all of Japan, assignors to Nippon Kogaku K. K., Tokyo, Japan**

**Filed Mar. 25, 1987, Ser. No. 30,076**

**Claims priority, application Japan, Mar. 31, 1986, 61-74020; Jun. 19, 1986, 61-144340**

**Int. Cl.[4] G01V *9/04***

**U.S. Cl. 250—561** **6 Claims**



1. A surface displacement sensor of the type in which a light image having a predetermined pattern is projected on a surface to be detected having an optically transparent thin film and a deviation of the position of the light image re-focused by the reflected light beam from said surface to be detected is opto-electrically detected, thereby detecting the displacement of said surface to be detected, comprising:

a radiation source capable of generating radiation rays;

a member which has a predetermined-shaped opening and which is illuminated by the radiation beam from said radiation source;

a radiation projection system which projects the radiation beam emitted from said radiation source and passed through said opening on said surface to be detected, thereby forming a first radiation image similar to said opening on said surface to be detected;

a radiation receiving system for causing the reflected radiation beam reflected from said surface to be detected to re-focus a second radiation image;

detection means for optoelectrically detecting the center of gravity of the amount of said second radiation image re-focused by said radiation receiving system; and

means for controlling the angle of opening which is inserted in the path of said detection radiation beam so as to control the angle of opening of at least one radiation beam focusing said radiation image in a plane of incidence including a normal line perpendicular to said surface to be detected.

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**4,748,334**

## METHOD AND APPARATUS FOR DETECTING FLAWS IN KNITTED FABRIC

**Akira Kobayashi, Kanagawa; Tomio Yamaura; Mizuo Nakayama, both of Tokyo, and Hisao Itaya, Aono, all of Japan, assignors to Gunze Limited, Kyoto, Japan**

**Filed Apr. 8, 1987, Ser. No. 35,811**

**Claims priority, application Japan, Apr. 25, 1986, 61-97324**

**Int. Cl.[4] G01N *21/88***

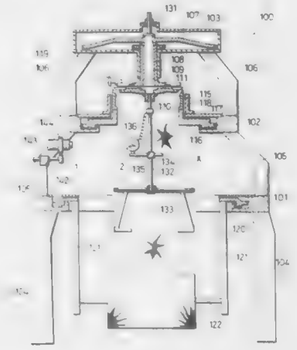
**U.S. Cl. 250—563** **9 Claims**

1. A flaw detecting method for detecting flaws not defining normal stitches in a knitted fabric, comprising the steps of;

deriving fabric detection signals from three detectors arranged to correspond to intervals between lines of thread defining stitches,

adding predetermined weights to the fabric detection signals derived from the detectors,

operating the signals thus weighted by adding and/or subtracting the signals, and



judging presence and absence of flaw based on results of the operation.

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**4,748,335**

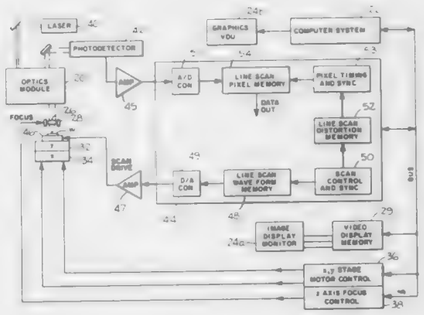
## METHOD AND APPARATUS FOR DETERMINING SURFACE PROFILES

**James T. Lindow, Saratoga; Simon D. Bennett, and Ian R. Smith, both of Los Gatos, all of Calif., assignors to SiScan Systems, Inc., Campbell, Calif.**

**Continuation-in-part of Ser. No. 725,082, Apr. 19, 1985. This application Jul. 3, 1985, Ser. No. 752,160**

**Int. Cl.[4] G01N *21/88***

**U.S. Cl. 250—572** **42 Claims**




1. A method of obtaining a representation of the surface profile of a portion of a specimen such as a semiconductor wafer comprising the steps of projecting a sharply defined beam through a confocal optical imaging system having a very narrow depth of field to focus it into a small spot upon the wafer surface and detecting a measurable characteristic of the beam reflected from said spot, relatively moving the projected beam and the wafer so that the spot scans a line on a portion of said wafer, recording and storing a signal with respect to said measurable characteristic at a plurality of closely spaced positions along said line, successively changing the relative spacing between the imaging system and the wafer by a small incremental distance after each scan of said line such that the focus level of the system with respect to the wafer surface is successively changed by said incremental distances in a given direction perpendicular to said scan line, and separately determining the relative spacing level for each of said points along said line at which a signal most characteristic of a surface indication

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was obtained to provide a cross-sectional representation of the surface of the wafer along said line.

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**4,748,336**

## OPTICAL DUST DETECTOR ASSEMBLY FOR USE IN AN AUTOMOTIVE VEHICLE

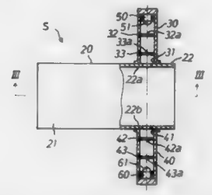
**Fumiaki Fujie, Oobu; Tetsuro Adachi, Okazaki; Tomonori Fukui, Kariya; Noboru Oyama, Okazaki, and Yukiyasu Ueno, Kariya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan**

**Filed May 1, 1986, Ser. No. 858,168**

**Claims priority, application Japan, May 1, 1985, 60-94765; Sep. 2, 1985, 60-193324**

**Int. Cl.⁴ G01N** *15/06, 21/00*

**U.S. Cl. 250—573** **4 Claims**



1. An optical dust detector assembly adapted for use in an automotive vehicle for detecting the concentration of dust, smoke or the like contained in a flow of air passing therethrough, the detector assembly comprising:

air duct means arranged parallel to said air flow and having an introductory portion with an inlet opening, a base portion with an outlet opening, and a pair of radial holes formed in a base portion in peripheral wall and opposed to each other;

a pair of casings disposed at said base portion peripheral wall on both sides thereof and having respective openings ends communicating with the interior of said base portion through the respective radial holes thereof;

a light emission element arranged within one of said casings to emit a light beam therefrom and pass it through the radial holes of said base portion toward the other casing; and

a light receiving element arranged within the other casing to receive the light beam emitted from said light emission element and passed through the radial holes of said base portion;

wherein said air duct member is bent in such a manner as to provide therein an inclined internal surface for deflecting upwardly the flow of air introduced through the introductory portion thereof, and wherein the radial holes are formed in the peripheral wall of the base portion of said duct member to face the flow of air after deflection by the inclined internal surface.

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**4,748,337**

## PRIME MOVER STARTING SYSTEM AND METHOD

**Bernard A. Raad; Jeffrey D. Baldwin, and Clarence F. Dolan, all of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.**

**Filed Jun. 17, 1987, Ser. No. 63,296**

**Int. Cl.⁴ F02N** *11/04*

**U.S. Cl. 290—31** **10 Claims**

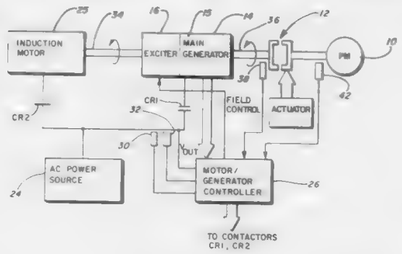
1. A starting system for starting a prime mover connected to a generator having armature and field windings and a rotor, comprising:

a torque link disposed between the generator rotor and the prime mover wherein the torque link is actuated or deactuated to drivingly engage or disengage, respectively, the generator rotor and the prime mover;

an induction motor having a torque rating substantially equal to the minimum torque required to rotate the generator rotor from rest to a particular speed within a predetermined time period while the torque link is deactuated;

a source of electrical power;

first means for connecting the source of electrical power to the induction motor when the torque link is deactuated to accelerate the generator rotor to the particular speed; and




second means for connecting the source of electrical power to the generator armature and field windings once the generator rotor has reached the particular speed to cause the generator to operate as a synchronous motor;

whereby the torque link is actuated once the generator is operating as a synchonrous motor to bring the prime mover up to starting speed.

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**4,748,338**

## OCEAN WAVE ENERGY EXTRACTING EROSION REVERSAL AND POWER GENERATION SYSTEM

**Peter F. Boyce, Delsea Dr., Delmont, N.J. 08314**

**Continuation-in-part of Ser. No. 903,582, Sep. 4, 1986. This application May 6, 1987, Ser. No. 46,548**

**Int. Cl.⁴ F03B** *13/10;* **E02B** *3/06*

**U.S. Cl. 290—42** **8 Claims**



1. In an apparatus for extracting energy from the waves on a body of water thereby reversing coastal erosion including an assembly having a bouyancy sufficient for maintaining said assembly afloat in the water, the improvements comprising

(a) a series of structures mounted on the assembly having generally upwardly oriented beams having upper ends connected at least indirectly to one another

(b) a pendulum driveshaft suspended by cable from the upper ends of said beams

(c) each structure having a pulley at the upper ends of said beams through which a continuous loop of said cable passes for suspending said pendulum driveshaft and permitting said pendulum drive shaft to rotate

(d) a racheted pulley mounted at the lower end of each of said beams through which a second continuous loop of cable passes said second continuous loop of cable also loops around said pendulum driveshaft causing said pendulum driveshaft to rotate as it swings by rolling within the loop of said second cable which is anchored by the ratcheted pulley, said second cable being prevented from turning by said rachet during the pendulum's forward swing said rachet however enabling said pulley to turn during the return swing of the pendulum thereby permitting the pendulum to continue the same direction of rotation during both the forward and return swings.



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**4,748,339**

## WIND TURBINE OPERATED ELECTRICAL GENERATOR SYSTEM

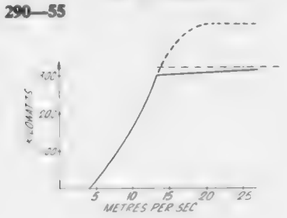
**Peter M. Jamieson, Stirling, Scotland, assignor to James Howden & Company Limited, Glasgow, Scotland**

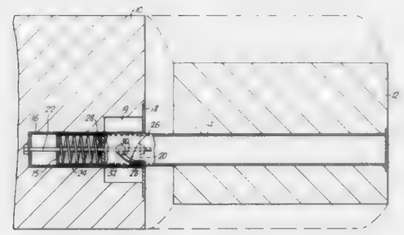
**Continuation of Ser. No. 713,426, Mar. 19, 1985, abandoned. This application Apr. 27, 1987, Ser. No. 45,803**

**Claims priority, application United Kingdom, Mar. 21, 1984, 8407332**

**Int. Cl.⁴ F03D** *7/04*

**U.S. Cl. 290—55** **6 Claims**



1. In a wind turbine operated electrical generator system, said system comprising a wind turbine of the axial flow type, blades of the turbine, tip portions of said blades each pivoted with respect to the remainder of the blade, a generator driven by the wind turbine and designed to operate within a given rotational speed range, said speed range being below the speed at which the wind turbine can develop its maximum power, a pin and socket connection on the outer end of at least some of said blades, for connecting the tip portion thereto, a cam track on the pin or socket, a cam follower on the socket or pin, respectively, and engaging in said cam track, the cam track being shaped to cause the tip to pivot under centrifugal movement of the tip, and resilient means to restore the position of said at least one tip against centrifugal action, the improvement consisting in that the characteristics of the resilient means and the cam track shape are designed to operate entirely within the upper portion of said speed range, to cause said system to operate always below the speed at which the turbine can produce its maximum power, to ensure that a change in the torque produced by pivoting of the tip, caused by centrifugal movement thereof causes a continuous fluctuation in the speed which is within said upper portion of the given range, thereby positively to control the power output of the system and in that means associated with said generator for accommodating said speed fluctuation.

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**4,748,340**

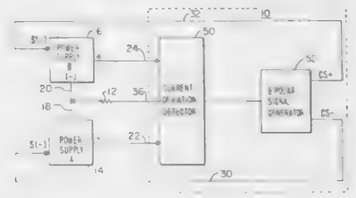
## LOAD SHARE SYSTEM

**Robert J. Schmidt, Bolton, Mass., assignor to Liberty Engineering, Inc., Waltham, Mass.**

**Filed Nov. 17, 1986, Ser. No. 931,253**

**Int. Cl.⁴ H02J** *1/04, 1/10*

**U.S. Cl. 307—53** **27 Claims**




1. A load share system, comprising:

means, connectable to the power outputs of two power supplies, for determining any deviation of the output currents relative to each other;

means for providing a correction signal representative of said deviation; and

means, responsive to said correction signal, for generating two balance signals of similar magnitude and opposite polarity and for delivering one of said balance signals to a sense input of one power supply and the other balance signal to a sense input of the other power supply to balance the power outputs.

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**4,748,341**

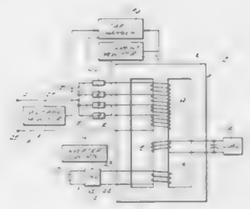
## UNINTERRUPTIBLE POWER SUPPLY

**Suresh Gupta, Los Alamitos, Calif., assignor to RTE Deltec Corporation, San Diego, Calif.**

**Filed Mar. 24, 1987, Ser. No. 29,575**

**Int. Cl.⁴ H02J** *7/00*

**U.S. Cl. 307—64** **7 Claims**



1. An uninterrruptible power supply comprising:

a regulating transformer,

output means for connecting said transformer to a load,

first input means for connecting a reserve source of AC power to said transformer, and

second input means for connecting a primary source of AC power to said transfomer, said second input means comprising:

a plurality of winding taps, each providing a different winding ratio between the primary source and the load,

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a plurality of tap switches, each coupling the primary source to said transformer through one of said winding taps, and

voltage control means for monitoring the voltage of the primary source and, if the voltage is outside a predetermined maximum allowable range, opening all of said tap switches to isolate the primary source from said transformer, and, if said voltage is within said predetermined maximum allowable range, selectively closing one of said tap switches to coarsely compensate so that the voltage at the load is held within a predetermined range, and,

wherein said first input means includes means for supplying power from the reserve source through said transformer to the load when said voltage control means has isolated the primary source, and means, operative when the primary source is coupled to the load through one of said taps, for augmenting the power supplied to the load from the primary source by providing an added voltage differential through said transformer to the load and finely regulating the load voltage so that the load voltage remains essentially constant.

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**4,748,342**

## POWER SUPPLY CIRCUIT

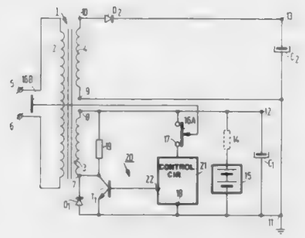
**Else C. Dijkmans, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, Tarrytown, N.Y.**

**Filed Dec. 3, 1986, Ser. No. 937,592**

**Claims priority, application Netherlands, Dec. 18, 1985, 8503480**

**Int. Cl.⁴ H02J** *9/06*

**U.S. Cl. 307—66** **15 Claims**



11. A power supply circuit for producing first and second DC supply voltages comprising:

a transformer comprising a primary winding having first and second terminals for connection to a source of AC voltage and a secondary winding and a tertiary winding,

third and fourth terminals for supplying said first DC supply voltage and fifth and sixth terminals for supplying said second DC supply voltage,

first and second rectifier means coupling said third and fourth terminals and said fourth and fifth terminals, respectively, to said secondary and tertiary windings, respectively,

means for coupling a battery to said third and fourth terminals, and

an inverter circuit energized by said battery, said inverter circuit including switching means for coupling the battery voltage to a part of the secondary winding during first time periods so as to generate in the tertiary winding a first voltage of one polarity and, during second timer periods alternating with the first time periods, generating in the tertiary winding a second equal voltage but of opposite polarity to the first voltage.

**4,748,343**

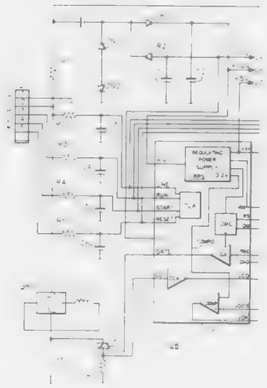
## ELECTROMAGNETIC CONTACTOR WITH UNIVERSAL CONTROL

**Joseph C. Engel, Monroeville Boro, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Feb. 19, 1987, Ser. No. 16,424**

**Int. Cl.⁴ H02J** *15/00*

**U.S. Cl. 307—135** **8 Claims**



1. Apparatus for detecting the presence of an AC voltage signal, comprising:

microprocessor means for receiving said AC voltage signal, said microprocessor means having input terminal means, across which the allowable instantaneous voltage amplitude is variable between voltage values Vx and Vy, said microprocessor means sampling said input terminal means and providing an output signal indicative of the presence of said AC voltage signal when said AC voltage signal is present;

voltage regulator means interconnected to said input terminal means of said microprocessor means for regulating said AC voltage signal, said voltage regulator means including impedance means; and

filter means interconnected with said voltage regulator means for filtering said AC voltage signal, said filter means including a capacitor means, the impedance of said filter means and said impedance means of said voltage regulator means being sufficiently high that said capacitor means unless otherwise discharged will remain charged to a voltage value after said AC voltage signal has been removed from said input of said voltage regulator means sufficient to give said microprocessor means a false indication of the presence of said AC voltage signal, said input terminal means of said microprocessor means periodically having internally disposed thereon a digital current sinking value for discharging said capacitor means if necessary before said terminal means is sampled by said microprocessor means to eliminate said false indication.

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**4,748,344**

## PORTABLE POWER SUPPLY CARRIER

**Peter Sing, 43 Donny Brook Rd., Scarsdale, N.Y. 10583**

**Filed Mar. 23, 1987, Ser. No. 29,525**

**Int. Cl.⁴ H02J** *7/00*

**U.S. Cl. 307—150** **19 Claims**

1. Portable power supply carrier for use in energizing electrically operated appliances and instruments, which comprises:

a belt to be worn around a user's waist, said belt having electrical conduit means incorporated therein, said electrical conduit means being insulated by said belt;

securing means attached to and for maintaining said belt removably in place on the user;

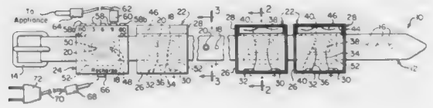


a plurality of electrical connector-fasteners externally mounted in pairs at spaced intervals along the length of said belt, said connector-fasteners being electrically connected to said electrical conduit means;

a plurality of electrical batteries for providing power to the portable power supply carrier;

a plurality of battery holders to be mounted removably on said belt for carrying said electrical batteries and connecting said batteries electrically to said electrical conduit means;

complementary mating fastening means externally mounted in pairs on said battery holders, said fastening means being electrically connected to said batteries held in said battery



holders, said fastening means being capable of mechanical and electrical attachment each to a corresponding mating one of said electrical connector-fasteners on said belt; and

output terminal means mounted on said belt for operative power-transferring attachment to the electrically operated appliance to be energized and operated, said output terminal means being electrically connected to said electrical conduit means whereby said electrical connector-fasteners are electrically interconnected with said output terminal means so that current from said electrical batteries held in said battery holders is transmitted through said electrical conduit means and carried to said output terminal means for energizing the electrical appliance attached thereto.

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**4,748,345**

## PULSE CONDITIONING CIRCUIT FOR CONTROLLING ELECTRICALLY CONTROLLABLE VALVES IN A HYDRAULIC CONTROL APPARATUS

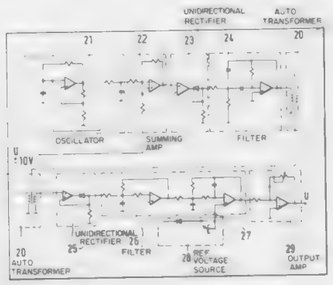
**Matthias Landgraf, Freiamt-Musbach, Fed. Rep. of Germany, assignor to Klöckner Ferromatik Desma GmbH, Malterdingen, Fed. Rep. of Germany**

**Filed Apr. 8, 1987, Ser. No. 35,874**

**Claims priority, application Fed. Rep. of Germany, Apr. 16, 1986, 3612713**

**Int. Cl.⁴ H03K** *5/08*

**U.S. Cl. 307—268** **27 Claims**




1. Pulse conditioning device for electrically controllable valves in hydraulic control apparatus whereby a regulating signal is transmitted to the actuator of the respective electrically controllable valve, comprising:

an isolating transformer and a filter connected to the input side thereof and further comprising a unidirectional rectifier serially connected to an input side of said isolating transformer through said filter;

an oscillator for generating a sinusoidal output signal;

a summing amplifier receiving said regulating signal and said sinusoidal output signal and providing an output signal which is input to said unidirectional rectifier;

said pulse conditioning device further comprising a second unidirectional rectifier serially connected to a second filter and connected to the output side of said isolating transformer;

said second filter executing a zero offset compensation; and

an amplifier connected to the output of said second filter for producing an output signal which is said regulating signal for the actuator of the electrically controllable valve.

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**4,748,346**

## DRIVER FOR DIFFERENTIAL SIGNAL TRANSMISSION

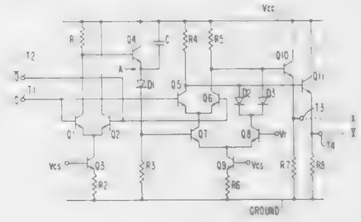
**Shinji Emori, Urawa, Japan, assignor to Fujitsu Limited, Kawasaki, Japan**

**Filed Dec. 19, 1984, Ser. No. 683,495**

**Claims priority, application Japan, Dec. 23, 1983, 58-243474**

**Int. Cl.⁴ H03K** *3/01, 17/16, 19/086;* **G06G** *7/12*

**U.S. Cl. 307—270** **7 Claims**




1. A driver, having an input transmission line and an output transmission line, for transmitting a digital differential signal having two phases, said driver comprising:

first and second input terminals coupled to the input transmission line for receiving an input signal;

first and second output terminals coupled to the output transmission line;

a power supply;

a driving circuit for transmitting the digital differential signal from said first and second output terminals as first and second voltage values, said driving circuit including a first pair of emitter coupled transistors each having an emitter, a base and a collector, the base of one transistor in the first pair of emitter coupled transistors coupled to said first input terminal and receiving one phase of the differential signal and the base of the other transistor in the first pair of emitter coupled transistors coupled to said second input terminal and receiving the opposite phase, the emitters coupled together, and the collectors coupled to said power supply via a resistor;

mean value voltage means, operatively connected to said first and second output terminals, for producing at both the first and second output terminals a voltage value midway between the first and second voltage values when the digital difference signal is not being transmitted, said mean value voltage means comprising:

a switching controller including a second pair of emitter coupled transistors operatively connected to the coupled emitters of said first pair of emitter coupled transistors; and

voltage equalization means, operatively connected to the switching controller and the collectors of said first pair of emitter coupled transistors, for providing an equal voltage value at each collector of said first pair of emitter coupled transistors when the digital differential signal is not being transmitted; and

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packet time detecting means, operatively coupled to said first and second inputs, for supplying a first current to the driving circuit by turning on one of the transistors of said second pair of emitter coupled transistors when the level of the input signal received at said first and second input terminals is variable and supplying a second current to said voltage equalization means by turning on the other of the transistors of said second pair of emitter coupled transistors when the input signal is not variable.

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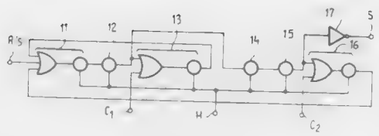
**4,748,347**

## LOGIC COINCIDENCE GATE, TRIPLET OF LOGIC GATES AND SEQUENTIAL LOGIC CIRCUIT USING THIS LOGIC GATE

**Pham N. Tung, Paris, France, assignor to Thomson-CSF, Paris, France**

**Filed Oct. 15, 1986, Ser. No. 918,877**
**Claims priority, application France, Oct. 18, 1985, 85 15506**
**Int. Cl.[4] H03K** *19/094, 19/096, 21/17, 27/00*
**U.S. Cl. 307—450** **10 Claims**



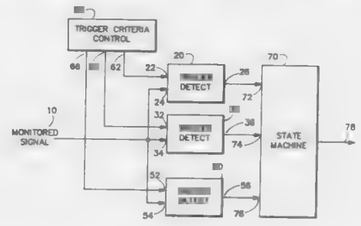

1. A coincidence logic gate comprising:
two parallel-mounted inverters wherein each inverter comprises,
a transistor having its source grounded;
a saturable resistor coupled to the drain of said transistor;
a means for supplying—a voltage to said transistor's drain through said saturable resistor;
means for inputting a signal to a gate electrode of the transistor in said first inverter;
means for inputting a clock signal to a gate electrode of the transistor in said second inverter;
a third transistor having its source connected to the saturable resistor associated with said second transistor, in said second inverter, and wherein the drain and gate electrode of said third transistor are connected between the saturable resistor of the first inverter and the transistor of the first inverter; and
wherein the first inverter has at least one signal input and the output of said entire logic gate is taken at a common point between said saturable resistor associated with said second inverter and said third transistor.

**4,748,348**

## MULTI-LEVEL PATTERN DETECTOR FOR A SINGLE SIGNAL

**Tran Thong, Beaverton, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.**

**Filed Dec. 29, 1986, Ser. No. 947,156**
**Int. Cl.[4] H03K** *5/24, 5/26*
**U.S. Cl. 307—517** **22 Claims**




1. Apparatus for detecting the occurrence of a plurality of selected sequential events in a single monitored signal, and producing a trigger signal responsive to the occurrence thereof, comprising:
trigger criteria means for defining a plurality of selected events in the monitored signal;
a plurality of event detection means, each coupled to said trigger criteria means and to receive the monitored signal, for producing an indication for a selected period of time thereafter in response to detection of a selected event in the monitored signal; and
trigger generation means, coupled to the plurality of event detection means, for delaying each of the indications by selected differing periods, and serially combining the first through the last of the delayed indications to produce the trigger signal.

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**4,748,349**

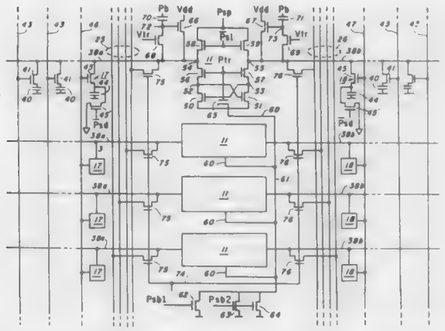
## HIGH PERFORMANCE DYNAMIC SENSE AMPLIFIER WITH VOLTAGE BOOST FOR ROW ADDRESS LINES

**Joseph C. McAlexander, III, Sugar Land; Lionel S. White, Jr., and G. R. Mohan Rao, both of Houston, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Continuation of Ser. No. 884,126, Jul. 10, 1986, abandoned, which is a continuation of Ser. No. 779,183, Sep. 23, 1985, abandoned, which is a continuation of Ser. No. 199,773, Oct. 22, 1980, Pat. No. 4,543,500, which is a division of Ser. No. 944,822, Sep. 22, 1978, Pat. No. 4,239,993. This application Oct. 27, 1987, Ser. No. 117,344**
**The portion of the term of this patent subsequent to Dec. 16, 1997, has been disclaimed.**
**Int. Cl.[4] H03K** *5/24;* **G11C** *7/06, 8/00*
**U.S. Cl. 307—530** **10 Claims**

1. A dynamic semiconductor memory device of the type having an array of rows and columns of one-transistor memory cells at a face of a semiconductor body with each column of cells connected to a column line and sense amplifiers connected to sense nodes for column lines, each memory cell having an access transistor and a storage capacitor for storing a zero-level or a one-level, said one-level having a maximum voltage about that of a supply voltage connected to said device, said device comprising:
a pair of cross-coupled transistors for each sense amplifier, each of the cross-coupled transistors having a current path and a control electrode, the current path of each one of the cross-coupled transistors being separately connected between one of the sense nodes and a grounding node,
grounding means for coupling the grounding node to a reference potential,
means for applying an address voltage to a row line for a selected row of the memory cells in the array at a given time in an operating cycle, said address voltage having a magnitude substantially higher than said supply voltage during at least part of said operating cycle to thereby increase the level of the voltage stored in the storage capacitors of the selected row where a one-level is stored,






means for applying a clock voltage to activate said grounding means at a first time subsequent to said given time in said operating cycle, and
pull-up means coupled to the column lines to cause the voltage of a column line for which a one-level was stored to be pulled up to about said supply voltage level.

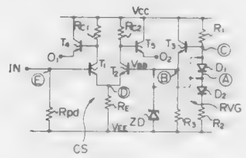
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**4,748,350**

## EMITTER-COUPLED LOGIC CIRCUIT

**Shinji Emori, Urawa, Japan, assignor to Fujitsu Limited, Kawasaki, Japan**

**Continuation of Ser. No. 825,685, Jan. 31, 1986, abandoned, which is a continuation of Ser. No. 738,890, May 29, 1985, abandoned, which is a continuation of Ser. No. 331,288, Dec. 16, 1981, abandoned. This application Oct. 2, 1987, Ser. No. 105,443**
**Claims priority, application Japan, Dec. 20, 1980, 55-180832**
**Int. Cl.[4] H03K** *19/086, 19/20*
**U.S. Cl. 307—566** **2 Claims**




1. An emitter-coupled semiconductor integrated logic circuit, comprising:
power source means for providing a normal operating voltage, a high voltage power at a voltage of $V_{CC}$ and low voltage power at a voltage of $V_{EE}$;
reference voltage generator means driven by said power source means for generating a reference voltage $V_{BB}$ and including a voltage dividing resistor circuit having an output node;
a current switching including:
a first transistor and a second transistor, said first transistor receiving input data at its base and having an emitter-base breakdown voltage $V_{EB0}$, the base of said first transistor being connected, via a pull-down resistor, to the low voltage $V_{EE}$ of said power source means, said second transistor receiving the reference $V_{BB}$ at its base, said first and second transistors being commonly connected at their respective emitters and operatively connected to $V_{EE}$;
a third transistor having an emitter connected to the base of said second transistor, a collector operatively connected to the high voltage $V_{CC}$, and a base connected to the output node of said voltage dividing resistor circuit; and
protecting means, operatively connected to the low voltage and to the base of said third transistor, for controlling an emitter voltage of said first transistor such that the emitter-base voltage of said first transistor is maintained below said $V_{EB0}$, and including a zener diode connected between the low voltage $V_{EE}$ and one of the emitter of said third transistor, the output node of said voltage driving resistor circuit, and a portion between the low voltage $V_{EE}$ and the output node of said voltage dividing resistor circuit, a zener voltage ZD being higher than the voltage across said zener diode and lower than $V_{EB0}$ when the normal operating voltage is applied, said protecting means having a breakdown voltage $ZD \leqq V_{EB0}$, and being operated when a predetermined voltage is impressed across said protection means, said zener diode clamping the reference voltage only when the low voltage $V_{EE}$ falls below the normal operating voltage.

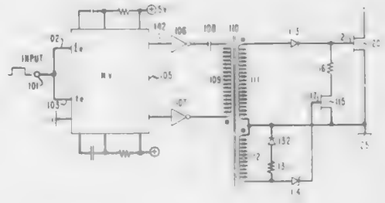
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**4,748,351**

## POWER MOSFET GATE DRIVER CIRCUIT

**Farhad Barzegar, Hillsborough Township, Somerset County, N.J., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Aug. 26, 1986, Ser. No. 900,578**
**Int. Cl.[4] H03K** *17/687, 3/33*
**U.S. Cl. 307—571** **3 Claims**




1. In combination:
a MOSFET power switch including a gate electrode and a main conduction path coupled to first and second main conduction path electrodes,
a drive circuit for controlling a conductive state of the MOSFET power switch, comprising
an input means to accept a drive pulse having a leading edge and a trailing edge,
a transformer including a primary winding having first and second primary terminals and a first and second secondary winding connected in series and directionally wound to generate opposite polarity signals at first and second polarity end terminals of the first and second secondary windings respectively,
a triggerable circuit coupled to the input means and responsive to the leading and trailing edges of the drive pulse respectively to produce a turn-on pulse applied to the first primary terminal and a turn-off pulse applied to the second primary terminal in response thereto respectively,
a diode coupling the first polarity end terminal of the first secondary winding to the gate electrode of the MOSFET power switch, and applying the turn-on pulse thereto.
a control MOSFET device having a gate electrode and a main conduction path and having its main conduction path connected to shunt the gate and the first main conduction path electrode of the MOSFET power switch and operative when conducting to drain charge from the gate electrode of the MOSFET power switch, and
a breakdown diode coupling the second polarity end terminal of the second secondary winding to the gate electrode

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of the control MOSFET device and applying the turnoff pulse thereto and the breakdown diode being poled to breakdown at termination of the turnoff pulse and maintain a breakdown voltage to prevent draining charge from the gate electrode of the control MOSFET device and keep the control MOSFET device biased conducting until the drive circuit generates a turn-on signal to turn on the MOSFET power switch.

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**4,748,352**

## POWER SOURCE RESET CIRCUIT FOR CONTACTLESS SWITCH

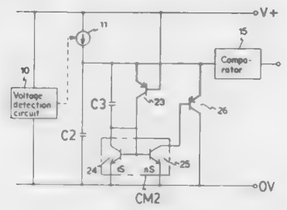
**Fumio Kamiya, Nagaokakyo; Hisatoshi Noders, Kusatsu; Kenji Ueda, Otsu; Keinosuke Imazu, Takatsuki, and Hidehiro Tomioka, Kyoto, all of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan**

**Filed Jul. 29, 1985, Ser. No. 759,989**

**Claims priority, application Japan, Jul. 27, 1984, 59-157917; Jul. 27, 1984, 59-157918**

**Int. Cl.⁴ H03K** *5/159, 3/01*

**U.S. Cl. 307—592** **7 Claims**




1. A power source reset circuit for use in a contactless switch, comprising:

a capacitor for integration;

a current source which starts charging the capacitor for integration when a voltage of the power source has reached a first certain level;

a Miller circuit which forms a current amplifier from a current mirror circuit with a pair of transistors having different emitter areas and wherein the capacitor for integration is connected across the Miller integration circuit for charging the capacitor for integration with the current amplifier, and wherein the Miller circuit suspends an output from the contactless switch for a certain time interval after the power source is turned on;

a comparison means for comparing a voltage of the capacitor for integration with a second certain level and for producing an output when the charge voltage has reached the certain level; and

a switch means for discharging the capacitor for integration each time the power source is disconnected.

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**4,748,353**

## HAND TOOL FOR CLOCKWISE AND COUNTERCLOCKWISE ROTATIONS

**Klaus Klingenstein, Leinfelden-Echterdingen; Werner Rieker, Waldenbuch, and Günter Schaal, Stuttgart, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

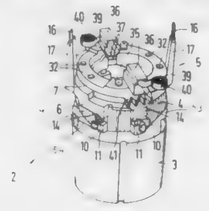
**Filed Mar. 17, 1986, Ser. No. 840,647**

**Claims priority, application Fed. Rep. of Germany, Jul. 10, 1985, 3524614**

**Int. Cl.⁴ H02K** *7/14*

**U.S. Cl. 310—50** **10 Claims**

1. In a hand machine tool capable of rotation in two opposite directions, comprising a universal electric motor having a stator and provided with a device for displacing carbon brushes which wipe on a collector of the motor, the improvement comprising said device being a changeover switch (5) including two holding elements of insulating material, one of said holding elements carrying carbon brush holders (36) for holding said carbon brushes and another of said holding elements being connectable with the stator of said motor, said stator having four pole shoe connection contacts (11), said holding elements (6, 7) being connectable to each other and rotatable relative to each other within certain limits, said holding elements (6, 7) carrying at sides of the connection thereof respective contacts (18, 30) which come into contact with each other upon rotation of said holding elements one against the other, one of said holding elements being a contact holder carrying connection contacts (16) and contact elements (10) engageable into the four pole shoe connection contacts (11) of said stator, and the other of said holding elements being a contact plate (7) which carries said carbon brush holders (36);




housing means (1, 43) accommodating said motor with said switch, said housing means having an open connection flange (52), said connection contacts (16) being sufficiently long so that they extend through said open connection flange and are accessible through said flange when said motor and said switch are inserted into the housing means, said contact plate (7) having at a periphery thereof near said brush holders (36) a plurality of teeth (41), said housing means having an opening (42) providing an access to said brush holders, said housing means having a slot (46); and an adjustment member (44) supported in said housing means and having teeth adapted to engage with the teeth of said contact plate, said adjustment member being held in said slot (46) and having a grip portion extended outwardly from said housing means.

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**4,748,354**

## ROTOR FOR SALIENT-POLE MACHINE

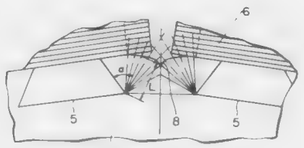
**Hisashi Toshima, Hitachi, Japan, assignor to Hitachi, Ltd., Tokyo, Japan**

**Continuation of Ser. No. 829,025, Feb. 13, 1986, abandoned. This application Oct. 7, 1987, Ser. No. 106,008**

**Claims priority, application Japan, Feb. 15, 1985, 60-26274**

**Int. Cl.⁴ H02K** *9/00*

**U.S. Cl. 310—60 A** **2 Claims**




1. A rotor for a salient-pole machine, the rotor comprising a rotor rim rotatable with a rotary shaft and magnetic poles fixedly connected to an outer periphery of the rotor rim at predetermined intervals, the rotor rim comprising a material having an allowable stress value, ventilation grooves formed on an outer peripheral surface of the rotor rim, said ventilation grooves extending in an axial direction of the rotary shaft and being disposed between respective adjacent magnetic poles dovetail joint means for connecting said rotor rim and said magnetic poles to each other, said dovetail joint means comprising dovetail grooves provided on the rotor rim and dovetail tenons provided on a bottom portion of the magnetic poles, and wherein each of said ventilation gooves has a cross-sectional profile, as viewed in a direction perpendicular to the rotary shaft, said cross-sectional profile being defined by connecting terminal points of two groups of lines originating respectively from respective adjacent corners of two adjacent dovetail groups at different angles, the length of each line from the origination at a corner of the dovetail groove to the terminal point thereof being determined in accordance with an angle of extension from the corner of the dovetail groove and the allowable stress value of the material of the rotor rim.



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**4,748,355**

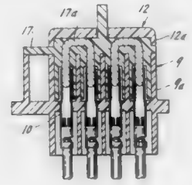
## ELECTRICAL CONNECTOR WITH A RELEASABLE LOAD-CONTROL ELEMENT FOR MULTI-CONNECTABLE LOADS

**Wesley K. Anderson, Schofield, and Daniel J. Edminster, Grafton, both of Wis., assignors to Marathon Electric Manufacturing Corp., Wausau, Wis.**

**Filed Dec. 3, 1985, Ser. No. 804,154**

**Int. Cl.⁴ H02K** *11/00;* **H01K** *29/00*

**U.S. Cl. 310—71** **20 Claims**




1. A universal releasable motor connector apparatus for interconnecting of a multiple winding motor to incoming supply lines and adapted for connecting of different motor circuits, comprising a support means, a first fixed connector part having a 3×5 matrix of available contact locations, said fixed connector part having a single piece body unit and fixed contact means at selected of said available contact locations, separate line terminals separate from said 3×5 matrix of contact locations for connection to incoming power supply lines, mounting means for mounting said motor mounted part to said support means, said fixed contact means having means for termination to the windings of the motor and to said line terminals to establish different motor operating states, a movable shorting part having a single piece body unit and a 3×5 matrix of available contact locations, a plurality of shorting contact means in said available contact locations of said movable shorting part, each said shorting contact means spanning two of said fixed contact means for providing a shorted interconnection of said fixed contact means, said movable shorting part adapted to be coupled to said motor mounted part in a plurality of different orientations and each orientation establishing interconnection of different fixed contact means and thereby changing the interconnection of the motor windings for selective different motor operations.

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**4,748,356**

## ELECTRIC FUEL PUMP

**Tetsuo Okashiro; Shingo Iwai, and Ryozo Suzuki, all of Hiroshima, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

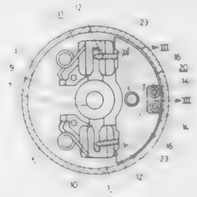
**Filed Jan. 29, 1987, Ser. No. 11,433**

**Claims priority, application Japan, Jan. 30, 1986, 61-13440[U]**

**Int. Cl.⁴ H02K** *13/00*

**U.S. Cl. 310—72** **9 Claims**

1. An electric fuel pump comprising a motor housing of conductive material; a motor in the housing; a bracket of insulating material; and a pump cover defining a pump chamber in the housing, said pump cover including a fuel suction port and said motor housing having a fuel outlet port; an impeller mounted on a motor shaft of the motor; a commutator and brush means thereon mounted on the motor shaft; a choke coil; pigtail means connecting the brushes to one end of the choke coil; lead wire means extending into the housing for connection to the other end of the choke coil; and a holding part formed of insulating material mounted to the bracket and including a first cavity receiving the choke coil, a second



cavity and a third cavity respectively communicating with opposite ends of the first cavity, end portions of the pigtail means and lead wire means respectively extending into the second and third cavities for attachment therein to opposite ends of the choke coil, said first and second and third cavities facing away from the conductive motor housing and brushes such that said holding part provides insulative shielding between the choke coil and the conductive motor housing.

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**4,748,357**

## ELECTROMECHANICAL APPARATUS FOR PRODUCING AN AXIAL FORCE FOR ACTUATING CLAMPING DEVICES

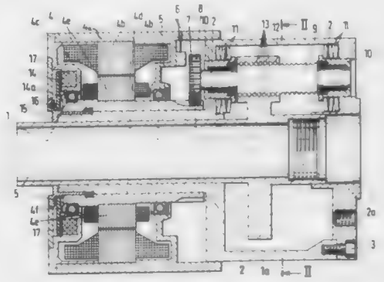
**Rainer Kempken, Erkrath, Fed. Rep. of Germany, assignor to Paul Forkardt GmbH & Co. KG, Düsseldorf, Fed. Rep. of Germany**

**Filed Aug. 27, 1987, Ser. No. 90,168**

**Claims priority, application Fed. Rep. of Germany, Aug. 29, 1986, 3629453**

**Int. Cl.⁴ H02K** *7/06;* **B23B** *31/28*

**U.S. Cl. 310—80** **6 Claims**




1. In an electromechanical apparatus for producing an axial force for the actuation of a clamping device, the apparatus including an electric motor that has a stator and a rotor, with the relative movement between the rotor and stator being transferable, via a gear system and a shaft drive, as an axial movement, to a tie rod, the improvement comprising:

a housing;

a gear wheel connected with said rotor;

at least one shaft, with each shaft being mounted in said housing in such a way that it essentially cannot shift axially;

secured to each shaft, a respective pinion, each of which meshes with said gear wheel; and

disposed on each shaft, a respective nut that in turn is con-

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nected to said tie rod, which is axially movably mounted in said housing.

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**4,748,358**

## ELECTRIC STARTER MOTOR WITH HOLDER FOR PERMANENT MAGNETS

**Walter Rühle, Korntal; Peter Kleindieck, Grossbottwar; Kurt Zimmermann, Bietigheim, and Manfred Kropp, Diekholzen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

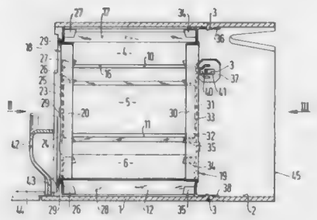
**PCT No. PCT/DE86/00386, § 371 Date Jul. 1, 1987, § 102(e) Date Jul. 1, 1987, PCT Pub. No. WO87/03148, PCT Pub. Date May 21, 1987**

**PCT Filed Sep. 23, 1986, Ser. No. 86,698**

**Claims priority, application Fed. Rep. of Germany, Nov. 9, 1985, 3539851**

**Int. Cl.⁴ H02K *21/26***

**U.S. Cl. 310—154** **5 Claims**



1. In an electric machine, of the type having a cylindrical housing and within the housing, a plurality of arcuate permanent magnets each having a convex side contact with the inner wall of the housing, an opposite concave side, two opposite longitudinal sides and front sides, and a plurality of magnetic flux conducting pieces arranged, respectively, in contact with a longitudinal side of assigned permanent magnets, the improvement comprising resilient retaining means for fastening said permanent magnets and conducting pieces in fixed circumferential and longitudinal positions in the housing, said retaining means consisting of two facing rings each having a flange-like edge part matching the inner diameter of said housing and engaging assigned front sides of said permanent magnets and conducting pieces, a cylindrical part projecting at right angles from said edge part to contact assigned end portions of the concave sides of the permanent magnets and the conducting pieces, said edge parts including retaining projections for engaging end portions of free longitudinal sides of respective permanent magnets and conducting pieces and the edge part of at least one of said rings being provided with axially directed projections for detacheably fastening said one ring to the inner wall of the housing.

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**4,748,359**

## PERMANENT MAGNET ROTOR WITH SINUSOIDAL FLUX PATTERN

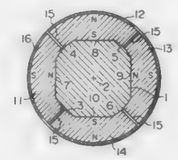
**Masataka Yahara; Goro Urayama, both of Chibe; Yoshiomi Joujima, Funabashi, and Hiroshi Sugai, Sakura, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jun. 5, 1986, Ser. No. 870,945**

**Int. Cl.⁴ H02K *91/14***

**U.S. Cl. 310—156** **6 Claims**

1. A permanent magnet rotor including a rotary shaft means having an orthogonal cross-sectional shape in a longitudinal direction thereof comprising a plurality of circular-arc portions centered around an axis of rotation of said rotary shaft means, rectilinear portions for connecting adjacent circular-arc portions with straight lines having no curved portion, permanent magnets equal in number to said circular-arc portions fixed so as to extend over said circular-arc portions and said rectilinear portions in close contact therewith or at uniform intervals therefrom, an outer surface of each of said permanent magnets remote from said rotary shaft means having a cylindrical shape in a longitudinal direction of the rotary shaft means an inner surface of said permanent magnets adjacent to said rotary shaft means having a rectilinear portion and two circular-arc portions extending from a rectilinear portion, and wherein each of said permanent magnets is fixed to two of said circular-arc portions and one of said rectilinear portions located between the two circular-arc portions.



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**4,748,360**

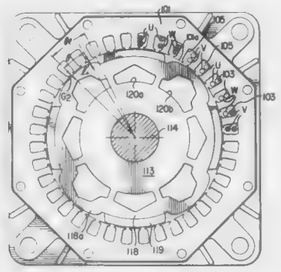
## ROTOR FOR A SYNCHRONOUS MOTOR

**Shigeki Kawada; Yoichi Amemiya; Masatoyo Sogabe, all of Hachioji, and Noboru Iwamatsu, Hino, all of Japan, assignors to Fanuc, Ltd., Yamanashi, Japan**

**Continuation-in-part of Ser. No. 767,586, Jul. 30, 1985, Pat. No. 4,661,736. This application Apr. 24, 1987, Ser. No. 41,944**

**Int. Cl.⁴ H02K *21/12***

**U.S. Cl. 310—156** **4 Claims**



1. A rotor for a synchronous motor, rotatably supported inside the cylindrical bore of a stator provided in the wall of said bore with armature coils having a plurality of phases, comprising: a motor shaft; yoke means fixed to said motor shaft; a plurality of first magnetic poles formed by a plurality of permanent magnets fixedly disposed on a circumference of said yoke means at substantially equal circumferential intervals; and a plurality of second magnetic poles each projecting radially from said yoke means and disposed between adjacent said first magnetic poles; the pole faces of the poles of said first magnetic poles being in a circular arc having a uniform first gap between the face of said first magnetic pole and said bore of said stator in a plane perpendicular to the axis of said motor shaft and the pole faces of each of the poles of said second magnetic poles in said plane perpendicular to said axis of said motor shaft having a second gap between the face of said second magnetic pole and said bore of said stator, said second gap increasing along said face of said second magnetic pole from the center of said face in said perpendicular plane to the right and left of said center in accordance with the following equation:



$$L_i = \frac{\cdot Ga}{\cos\left(\frac{P\theta}{2}\right) \times \left(1 - \frac{\theta}{\theta_e}(1 - C)\right)}$$

where:

$L_i$ is the gap along the radial line of the rotor through the point on the second magnetic pole face where the gap is to be determined;

Ga is the minimum gap along the radial line of the rotor at the point at the center of the second magnetic pole face;

P is the number of rotor poles

$\theta$ is the angle, in degrees, between the radial line of the rotor through the center of the second magnetic poles and the radial line of the rotor through the point on the second magnetic pole where the gap is to be determined;

$\theta_e$ is the angle, in degrees, between the is the angle, in degrees, between the radial line of the rotor through the center of the second magnetic pole and the radial line of the rotor through the end of the second magnetic pole; and

C is a constant selected to determine the convexity of the second magnetic pole.

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**4,748,361**

## PERMANENT MAGNET ELECTRIC MOTOR

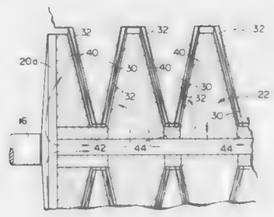
**Koubei Ohnishi, Yokohama, and Akira Mochizuki, Yono, both of Japan, assignors to Mitsubishi Kinzoku Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 4, 1986, Ser. No. 937,713**

**Claims priority, application Japan, Dec. 5, 1985, 60-274241**

**Int. Cl.⁴ H02K *19/26***

**U.S. Cl. 310—156** **6 Claims**



1. An electric motor comprising:

a housing including a cylindrical portion of a non-magnetic material;

a rotor including a rotor shaft of a magnetic material having a longitudinal axis of rotation and being rotatably supported on said housing, and a plurality of disk portions disposed on said rotor shaft coaxially therewith and being spaced from each other axially of said rotor shaft, each of said disk portions having a radially outwardly gradually decreasing thickness;

a stator including a plurality of annular portions of a non-magnetic material disposed on an inner periphery of said cylindrical portion of said housing coaxially with said rotor shaft and being spaced from each othr axially of said rotor shaft, each of said annular portions having a gradually decreasing thickness, said annular portions and said disk portions being loosely fitted with each other to provide a gap therebetween, opposed side surfaces of said annular portion and disk portion being conical, each of said annular portions having coil means disposed in each conical side face thereof, each of said disk portions having permanent magnet means disposed at least in each conical side surface thereof; and

a pair of end members of a magnetic material being spaced from each other axially of said rotor shaft and having said annular portions and said disk portions interposed therebetween, each end member being connected to said rotor shaft to cause a magnetic flux to flow between each other.

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**4,748,362**

## D. C. MOTOR WITH MULTI-TOOTH POLES

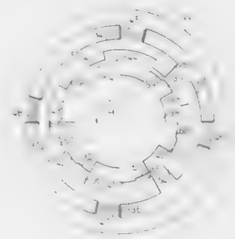
**Gunnar Hedlund, Stockholm, Sweden, assignor to EMS Electronic Motor Systems AB, Stockholm, Sweden**

**Continuation-in-part of Ser. No. 776,055, filed as PCT SE84/00438, Dec. 20, 1984, published as WO85/02951, Jul. 4, 1985, abandoned. This application Jul. 11, 1986, Ser. No. 884,584**

**Claims priority, application Sweden, Dec. 21, 1983, 8307088-8**

**Int. Cl.⁴ H02K *1/14, 17/12***

**U.S. Cl. 310—168** **7 Claims**



1. A variable reluctance motor fed by D.C. pulses, said motor having at least two phases comprising:

a stator and a rotor, the stator being a continuous magnetic circuit having stator poles for different phases arranged in sequence along the periphery of the rotor connected together in a continuous magnetic circuit so that each pole adjoins poles pertaining to another phase, diametrically opposed poles pertaining to the same phase, each stator pole having at least two teeth per stator pole, and the rotor being provided with teeth which cooperate with the stator teeth, adjacent stator poles being spaced at a distance smaller than the spaces between the teeth for any one stator pole.

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**4,748,363**

## CURRENT-COLLECTING BRUSH APPARATUS

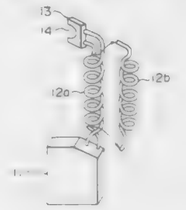
**Takashi Watanabe, Hitachi; Masao Ohi, Mito; Koji Tanaka, Hatachi; Yoshio Takikawa, Hitachi; Yasuto Kondoh, Hitachi, and Satoshi Oouchi, Hitachi, all of Japan, assignors to Hitachi, Ltd. and Hitachi Service Eng., Co. Ltd., both of Tokyo, Japan**

**Filed Feb. 24, 1987, Ser. No. 17,534**

**Claims priority, application Japan, Feb. 21, 1986, 61-35304**

**Int. Cl.⁴ H02K *13/00***

**U.S. Cl. 310—249** **6 Claims**



1. A current-collecting brush apparatus comprising a plurality of brushes pressed against a rotor, a brush holder for slidably holding each of said brushes, a brush-pressing spring for pressuring each of said brushes into contact with said rotor, a plurality of pigtails connected to each of said brushes for applying current to and receiving current from each of said brushes, and a bus ring for applying current to and receiving

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current from the pigtails, wherein said pigtails include at least a pair of spiral conductors connected in parallel and arranged coiled in opposite directions in a manner to offset the magnetic fluxes generated therein.

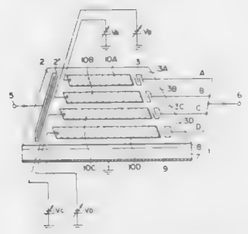
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**4,748,364**

## SURFACE ACOUSTIC WAVE DEVICE

**Syuichi Mitsutsuka, Tokyo, Japan, assignor to Clarion Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 785,938, Oct. 9, 1985, Pat. No. 4,697,115. This application Mar. 20, 1987, Ser. No. 28,284**
**Int. Cl.[4] H01L *41/08***
**U.S. Cl. 310—313 D** **10 Claims**



1. A surface acoustic wave device comprising:
a semiconductor substrate;
A piezoelectric film provided on said semiconductor substrate;
an input transducer and an output transducer provided at spaced locations on said piezoelectric film, wherein a surface acoustic wave travelling through said piezoelectric film from said input transducer to said output transducer has respective portions which travel along respective paths of travel;
a plurality of elongate metal electrodes provided on said piezoelectric film between said input transducer and said output transducer, each said metal electrode being positioned along a respective said surface acoustic wave path of travel so as to extend parallel to a direction in which surface acoustic waves travel along the path;
bias voltage applying means for applying to each of said metal electrodes a respective bias voltage; and
bias voltage regulating means for independently regulating said bias voltages so as to control the respective propagation losses of surface acoustic waves traveling past each said metal electrode along a respective said path of travel.

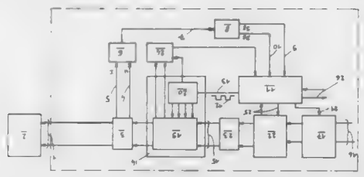
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**4,748,365**

## METHOD AND APPARATUS FOR SUPPLYING ELECTRIC POWER TO A VIBRATION GENERATOR TRANSDUCER

**Jean-Pierre Poupaert, Armentieres, and Bernard Thirion, Marquette, both of France, assignors to Institut Superieur d'Electronique du Nord (ISEN), Lille, France**

**Filed Aug. 27, 1986, Ser. No. 901,050**
**Claims priority, application France, Aug. 27, 1985, 85 13032**
**Int. Cl.[4] H01L *41/08***
**U.S. Cl. 310—316** **15 Claims**



1. A method for supplying electric power to a transducer for generating sonic or ultrasonic vibrations by means of an apparatus, said apparatus having
an adapter for adapting the frequency of the electric supply of the vibration transducer,
continuous sampling means which sample signals representative of the current and voltage of the power supply to the vibration transducer, analyzing means for analyzing the signals and for providing analyzed data pertaining to the voltage signal and the current signal, and in particular on their phase displacement ($D_f$) and on the direction ($S_f$) of the phase displacement to a frequency adapter, the method comprising:
(a) continuously sampling the signals representative of the current and voltage of the power supply to the vibration transducer;
(b) analyzing said sampled signals to obtain data indicative of the phase displacement $D_f$ and the direction of the phase displacement $S_f$;
(c) providing said data indicative of said phase displacement $D_f$ and said direction of said displacement $S_f$ to a control circuit device;
(d) processing said data to obtain a value of a desired supply power frequency and providing said processed data to an adapter;
(e) searching for a tuning frequency of the adapter by means of a control input connected via a line to a control circuit device which progressively modifies the output frequency of the adapter by determining a different value of the output frequency of the adapter and commanding a first frequency modification sweep until the phase displacement $D_f$ is nullified
so as to cause said adapter to function at a natural resonant frequency of the vibration transducer determined with reference to the tuning frequency previously searched for,
whereby said control circuit device is kept within a command and control loop formed by said analyzing means, said control circuit device and said adapter
and whereby said progressive modification of the frequency is commanded in the direction dictated by the direction of the phase displacement $S_f$.

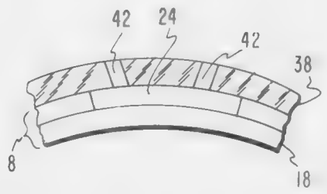
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**4,748,366**

## NOVEL USES OF PIEZOELECTRIC MATERIALS FOR CREATING OPTICAL EFFECTS

**George W. Taylor, 305 Dodds La., Princeton, N.J. 08540**

**Filed Sep. 2, 1986, Ser. No. 904,019**
**Int. Cl.[4] H01L *41/08***
**U.S. Cl. 310—328** **5 Claims**




1. In combination, an article of manufacture the use of which involves movement thereof, and a transducer mounted on said article for generating an optical effect in response to such movements, said transducer comprising a laminate structure including an electroded layer of piezoelectric material and an electroded layer of an optical effect device, each of two electrodes of said piezoelectric layer being electrically connected to a different one of two electrodes of said device, said article being a ball, the wall thereof comprising said laminate.

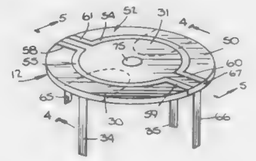


**4,748,367**

## CONTACT HEATER FOR PIEZOELECTRIC EFFECT RESONATOR CRYSTAL

**Martin B. Bloch, Mitchel Field, and Bruce Goldfrank, Glen Cove, both of N.Y., assignors to Frequency Electronics, Inc., Mitchel Field, N.Y.**

**Continuation-in-part of Ser. No. 738,697, May 28, 1985. This application Nov. 25, 1985, Ser. No. 801,485**
**The portion of the term of this patent subsequent to Oct. 20, 2004, has been disclaimed.**
**Int. Cl.[4] H01L *41/08***
**U.S. Cl. 310—343** **8 Claims**



1. A piezoelectric effect resonator comprising a housing defining an evacuated interior chamber, a generally plate-like crystal element of piezoelectric material having opposed sides mounted in the chamber, electrodes coupled to only a first of the opposed sides of the crystal element for generating an electric field therein, means for coupling electrical signals to the electrodes from the exterior of the housing, an electric heater comprising a thin film layer of resistive material coupled to only a second of the opposed sides of the crystal element, and a pair of leads of a material of good electrical conductivity and a thermal conductivity of less than 173 BTU/hr per sq. ft. per °F./in. coupled to the layer of resistive material and to the exterior of the housing for coupling electrical power to the layer of resistive material.

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**4,748,368**

## THREE WAY GAS DISCHARGE LAMP

**William E. Wilson, Clifton; Edward W. Morton, Teaneck, and Daniel W. O'Mullan, Bloomfield, all of N.J., assignors to North American Philips Lighting Corporation, New York, N.Y.**

**Filed Dec. 27, 1984, Ser. No. 686,871**
**Int. Cl.[4] H01J *61/34, 61/92*; H05B *31/04, 41/18***
**U.S. Cl. 313—1** **4 Claims**



1. A three-way lamp comprising a housing having first, second and third terminals arranged thereon as provided on a three-way incandescent lamp, said lamp including a light-transmitting bulb, and two gas discharge light tubes in said bulb, each tube having two electrodes, one tube having its electrodes separately connected to said first and third terminals, the other tube having its electrodes separately connected to said second and third terminals.

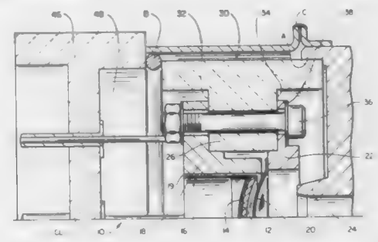
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**4,748,369**

## ELECTRON GUN ASSEMBLY USEFUL WITH TRAVELING WAVE TUBES

**Robert M. Phillips, Redwood City, and Robert J. Espinosa, Los Gatos, both of Calif., assignors to Star Microwave, Campbell, Calif.**

**Filed Apr. 10, 1986, Ser. No. 850,156**
**Int. Cl.[4] H01J *25/02, 25/34***
**U.S. Cl. 313—250** **11 Claims**



1. An electron gun assembly for coaction with an anode electrode in a vacuum tube comprising:
a cathode subassembly for providing an electron beam;
a grid electrode for controlling said electron beam; and
a ceramic mounting element for supporting said cathode subassembly and said grid electrode, said element having a step for positioning said cathode subassembly and a shoulder spaced from said step for positioning said grid electrode so that said cathode subassembly and grid electrode are precisely located whereby a desired cathode-to-grid spacing is enabled.

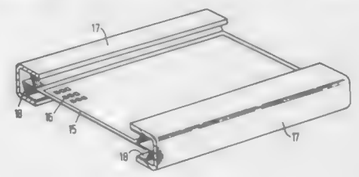
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**4,748,370**

## COLOR DISPLAY TUBE HAVING TENSIONED COLOR SELECTION ELECTRODE AND MOUNTING ARRANGEMENT

**Adrianus van den Broek, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Nov. 28, 1986, Ser. No. 936,062**
**Claims priority, application Netherlands, Dec. 2, 1985, 8503328**
**Int. Cl.[4] H01J *29/07, 29/82***
**U.S. Cl. 313—404** **10 Claims**

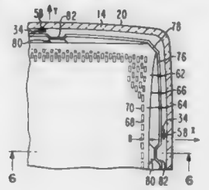


1. A color display tube comprising in an evacuated envelope: means to generate a number of electron beams; an at least substantially flat display screen having areas luminescing in different colors; and a color selection electrode having apertures for passing the electron beams and for associating each electron beam with luminescent areas of one color, said color selection electrode being tensioned on a supporting frame on at least one set of oppositely located sides of the color selection electrode connected to the supporting frame by means of a spring construction, the spring construction only permitting a maximum tension at the color selection electrode which is smaller than the elastic proof stress of the color selection electrode.

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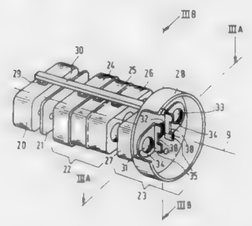
**4,748,371**
**CATHODE-RAY TUBE SHADOW MASK FOR LOW OVERSCAN**
Richard C. Bauder, Millersville, Pa., assignor to RCA Licensing Corporation, Princeton, N.J.
Filed Feb. 10, 1987, Ser. No. 13,090
Int. Cl.[4] H01J *29/07*
U.S. Cl. 313—407 5 Claims



1. In a cathode-ray tube including a shadow mask having an array of apertures mounted adjacent a substantially rectangular faceplate panel with curvature along major and minor axes orthogonal to each other and to a central longitudinal axis passing through the center of said faceplate panel, said shadow mask having a border of varying width disposed between the perimeter of said apertured array and a bend line adjoining a peripheral mask skirt, said skirt substantially paralleling said central axis and supported by a shadow-mask frame oriented orthogonally to said central axis, the improvement comprising:
the width of said border being narrowest at said major axis.

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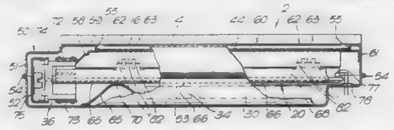
**4,748,372**
**COLOR DISPLAY TUBE**
Leendert J. Noordermeer, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Continuation of Ser. No. 659,067, Oct. 9, 1984, abandoned. This application Dec. 8, 1986, Ser. No. 940,214
Claims priority, application Netherlands, Jul. 20, 1984, 8402303
Int. Cl.[4] B65B *21/02*
U.S. Cl. 313—413 8 Claims



1. A color display tube comprising an envelope containing a display screen and an electron gun system for producing a central electron beam and first and second outer electron beams having respective axes which lie in a single plane and converge toward a point on the screen, the electron gun system including a plate at an end thereof including a central aperture and first and second outer apertures from which the respective electron beams exit into a deflection field region of the envelope;
characterized in that said plate includes coma-correcting field shapers disposed on a surface of the plate facing the screen for correcting line and field coma, said field shapers including first and second elements of high magnetic permeability material disposed adjacent the first and second outer apertures, respectively, each of said field shapers comprising:
(a) a plate-shaped portion surrounding the respective aperture and lying flat on said surface of the plate; and
(b) an upstanding elongate portion disposed between the respective aperture and the central aperture, said respective elongate portion;
(1) extending transversely of the plane containing the electron beam axes and terminating in end portions on opposite sides of said plane which extend substantially beyond the central aperture;
(2) being positioned closer to the central aperture then to the respective outer aperture, at least where the upstanding elongate portion joins the plate-shaped portion of the respective field shaper; and
(3) including a reduced area portion having a height, in the direction of said axes, which is reduced over a predetermined length of the upstanding elongate portion where it extends alongside the central aperture;
the overall length and height of said upstanding elongate portion determining line coma correction substantially independently of field coma correction;
the shape, length and height of the reduced area portion, together with the plate-shaped portion, determining field coma correction substantially independently of line coma correction.

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**4,748,373**
**FLAT CATHODE RAY DISPLAY TUBE WITH BEAM GENERATOR SUBASSEMBLY**
Adrian Caple, Purley, England, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Sep. 8, 1986, Ser. No. 904,439
Claims priority, application United Kingdom, Sep. 11, 1985, 8522543
Int. Cl.[4] H01J *29/86*
U.S. Cl. 313—422 10 Claims



1. A flat cathode ray tube comprising: an envelope including a faceplate on which a screen is provided; a partition comprising a glass plate within the envelope and arranged substantially parallel to, and spaced from, the faceplate, the partition dividing the envelope into a front portion adjoining the faceplate and a rear portion which communicates with the front portion at one end of the envelope; a channel plate electron multiplier arranged in the front portion substantially parallel to, and spaced from, both the faceplate and the partition, the electron mulitplier having an input side facing the partition and an output side facing the faceplate; means in the rear portion for producing an electron beam which is directed towards said one end; means in the rear portion for deflecting the electron beam in one dimension; a reversing lens at said one end for deflecting the electron beam into the front portion; and a deflection electrode arrangement carried by the partition and facing the electron multiplier for deflecting the electron beam in the front portion toward the screen;
characterized in that the partition futher includes a rectangular metal plate secured to the glassplate and extending substantially over its surface facing the rear portion of the envelope, and having upstanding side portions extending along at least two opposite edges which bear at least in part against respective sidewall portions of the envelope,
and further characterized in that the means for producing the electron beam and the means for deflecting the electron beam in one dimension in the rear portion are mounted on the metal plate so as to form together with the glass plate and the deflection electrode arrangement carried thereby a subassembly, said subassembly being mounted within the envelope in a predetermined position with respect to the faceplate.

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**4,748,374**
**LUMINESCENT RARE EARTH METAL PHOSPHATE, LUMINESCENT SCREEN PROVIDED WITH SUCH A PHOSPHATE AND LOW-PRESSURE MERCURY VAPOR DISCHARGE LAMP PROVIDED WITH SUCH A SCREEN**
Peter C. Van Loosdregt, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Oct. 16, 1987, Ser. No. 109,793
Claims priority, application Netherlands, Oct. 20, 1986, 8602627
Int. Cl.[4] C09K *11/475*
U.S. Cl. 313—486 7 Claims

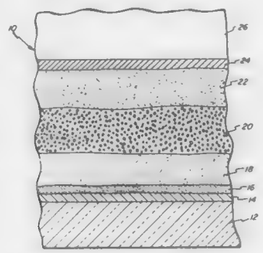
1. A luminescent rear earth metal phosphate which is activated by $Tb^{3+}$ and exhibits a high quantum efficiency when excited by 254 nm radiation, characterized in that the phosphate is an oxyphosphate and is defined by the formula

$$Ln_{14-p-x}Tb_pMe_xP_{6-y}Al_yO_{36-\frac{1}{2}x-y}$$

wherein Ln is yttrium which is replaceable by up to 50 mol% by Gd and/or La, wherein Me is at least one of the elements Ca, Sr and Ba and wherein $0 \leqq x \leqq 3$, $0 \leqq y \leqq 1.5$ and $0.1 \leqq p \leqq 4$.

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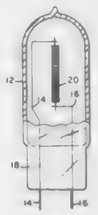
**4,748,375**
**STABLE OPTICALLY TRANSMISSIVE CONDUCTORS, INCLUDING ELECTRODES FOR ELECTROLUMINESCENT DEVICES, AND METHODS FOR MAKING**
Joseph Lindmayer, Rockville, Md., assignor to Quantex Corporation, Rockville, Md.
Filed Dec. 27, 1985, Ser. No. 813,929
Int. Cl.[4] H05B *33/22, 33/24*
U.S. Cl. 313—509 9 Claims



1. An electroluminescent device, comprising:
an electroluminescent layer sandwiched between a pair of electrodes and separated from said electrodes by respective dielectric layers;
at least one of said electrodes being optically transmissive and comprising a layer of indium tin oxide on an optically transmissive substrate; and
a stabilizing layer comprising a metal oxide selected from a group consisting of palladium oxide and nickel oxide over said layer of indium tin oxide.

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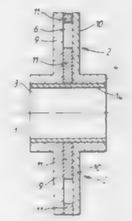
**4,748,376**
**HALOGEN LAMP FILL MIXTURE WHICH REDUCES LOWER OPERATING TEMPERATURE OF HALOGEN CYCLE**
Thomas G. Weld, Chicago, Ill., and Mark D. Beschle, Danvers, Mass., assignors to GTE Products Corporation, Danvers, Mass.
Continuation of Ser. No. 749,355, Jun. 27, 1985, abandoned. This application Feb. 3, 1987, Ser. No. 14,129
Int. Cl.[4] H01K *1/50*
U.S. Cl. 313—579 1 Claim



1. A tungsten-halogen lamp having commercially feasible maintenance comprising:
(a) a light-transmitting hermetically sealed envelope enclosing an interior, said envelope being manufactured from a material selected from the group consisting of borosilicate and aluminosilicate glass, said envelope having an interior wall surface, the temperature of said interior wall surface during continuous operation of said lamp being less than two hundred degrees centigrade:
(b) a tungsten filament mounted within said envelope;
(c) a fill within said envelope, said fill including bromine, phosphorus, carbon, and an inert gas, wherein the phosphorus to carbon mass ratio is in the range of approximately 10:1 to 1:1, and
(d) means for structurally and electrically completing said lamp.

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**4,748,377**
**TRAVELLING WAVE TUBES**
Robin C. M. King, Ongar, England, assignor to English Electric Valve Company Limited, Chelmsford, England
Filed Apr. 16, 1986, Ser. No. 852,745
Claims priority, application United Kingdom, Apr. 24, 1985, 8510444; Mar. 11, 1986, 8605950
Int. Cl.[4] H01J *25/34*
U.S. Cl. 315—3.5 20 Claims



1. A coupled cavity travelling wave tube in which a coupling plate defining the end of a cavity acts also as a magnetic pole piece, said coupling plate/magnetic pole piece being of sandwich construction with outer constituent members of ferro-magnetic material and an inner member of a material resistant to coolant-induced corrosion and having a heat conductivity greater than that of said ferro-magnetic material, said

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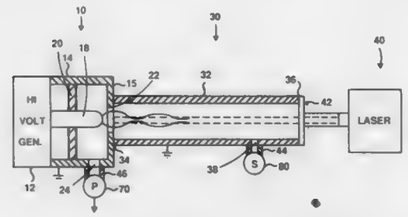
inner member defining, at least in part, the walls of a coolant channel within said coupling wall/pole piece.

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**4,748,378**
**IONIZED CHANNEL GENERATION OF AN INTENSE-RELATIVISTIC ELECTRON BEAM**

**Charles A. Frost; Gordon T. Leifeste, and Steven L. Shope, all of Albuquerque, N. Mex., assignors to The United States of America as represented by the Department of Energy, Washington, D.C.**

**Filed Mar. 31, 1986, Ser. No. 846,530**
**Int. Cl.[4] H01J** *7/46, 19/80*
**U.S. Cl. 315—39** **10 Claims**




1. A method for generating an intense relativistic electron beam consisting of:

forming a strongly ionized channel containing positive ions and electrons, said channel having radius $r_c$ and extending from adjacent a cathode to a remote location; and

generating a pulse of high energy electrons from said cathode to said remote location along said channel, said electrons having a radius $r_b >= r_c$,

whereby low energy electrons in the ionized channel are expelled by the high energy electrons leaving a positive core of ions which attract and guide the high energy electrons by partially neutralizing the space charge of the IREB, resulting in a focusing magnetic field.

2. A foilless diode for generating an intense relativistic electron beam without a strong external magnetic field consisting of:

high voltage pulse generating means for generating a very high voltage pulse;

cathode means, connected to said pulse generating means, for generating a pulse of high energy electrons having a radius $r_b$;

anode means, connected to said pulse generating means and spaced from said cathode means, for attracting said high energy electrons from said cathode;

an ionizable gas extending from adjacent said cathode to a remote location;

means for generating an ionized channel of radius $r_c <= r_b$ through said ionizable gas from adjacent said cathode to said remote location, said channel not intersecting said anode and satisfying the following relationship:

$$1 > f_e > \gamma^{-2}$$

wherein $f_e = n_c r_c^2 / n_b r_b^2$ and $n_c$ is the ion density, $n_b$ is the beam density, and $\gamma$ = the Lorenz factor.

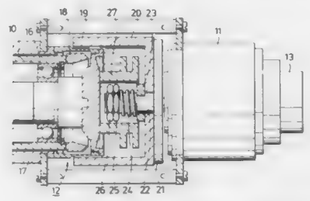
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**4,748,379**
**ARRANGEMENT IN A TUNABLE MAGNETRON**

**Andras Agoston, Täby, Sweden, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Mar. 12, 1986, Ser. No. 839,018**
**Claims priority, application Sweden, Mar. 21, 1985, 8501399**
**Int. Cl.[4] H01J** *25/50*
**U.S. Cl. 315—39.55** **10 Claims**

1. An arrangement in a tunable magnetron comprising coaxial cathode and anode systems defining between themselves a ring shaped, in operation evacuated, interaction space and a rotatable tuning element comprising an active part influencing the tuning of the magnetron , which element is situated within an evacuated space enclosed by a vacuum-tight envelope and is driven by an electric motor situated outside the vacuum-tight envelope via a coupling having two active parts situated one



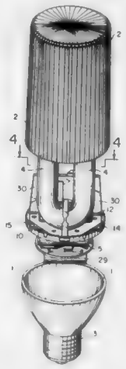

on each side of the vacuum-tight envelope, and furthermore comprising a brake or stop device acting on the motor shaft, characterized in that it has means for limiting the torque transferred to that part of the coupling which is situated outside the vacuum-tight envelope from the motor to a value which is just below the maximum torque which can be transferred by the coupling.

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**4,748,380**
**COMPACT FLUORESCENT LAMP ASSEMBLY HAVING IMPROVED THERMAL DISSIPATION AND RFI SUPPRESSION**

**Wallace T. MacDonald, Tewksbury, and Frank M. Latassa, Magnolia, both of Mass., assignors to North American Philips Corporation, New York, N.Y.**

**Filed Sep. 27, 1983, Ser. No. 536,403**
**Int. Cl.[4] H01J** *7/44, 17/34, 23/16, 29/96*
**U.S. Cl. 315—57** **7 Claims**



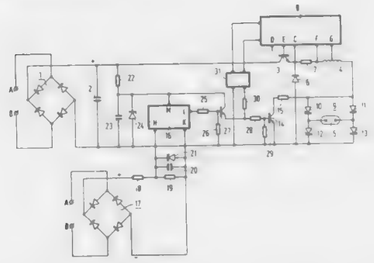

1. In a lamp assembly having a fluorescent lamp and a high frequency electronic ballast circuit having a transformer for driving said fluorescent lamp, the improvement comprising: a metallic mounting plate having first and second opposite major surfaces and a recess in the first of said major surfaces shaped complementary to the shape of said transformer; lamp mounting means for mounting said fluorescent lamp on the second major surface of said mounting plate; and ballast circuit mounting means for mounting said ballast circuit on the first of said major surfaces with said transformer positioned within said recess to effectuate conducted radio frequency interference shielding of said ballast circuit transformer by said mounting plate and dissipation of heat from said ballast circuit transformer by said mounting plate.



**4,748,381**
**CIRCUIT ARRANGEMENT FOR A.C. OPERATION OF GAS DISCHARGE LAMPS**

**Hans-Günther Ganser, Stolberg; Ralf Schäfer, Aachen, and Hans-Peter Stormberg, Stolberg, all of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Nov. 7, 1986, Ser. No. 928,146**
**Claims priority, application Fed. Rep. of Germany, Nov. 19, 1985, 3540985**
**Int. Cl.[4] H05B** *41/16, 41/24*
**U.S. Cl. 315—200 R** **17 Claims**



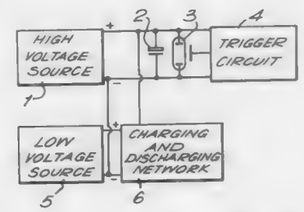
1. A circuit arrangement for A.C. operation of at least one gas discharge lamp comprising: a full-wave rectifier for connection to an A.C. voltage source and having output terminals connected to a combinatorial circuit part including a direct voltage converter connected in turn to a bridge circuit which comprises at least two thyristors and in whose transverse branch the lamp is included, characterized in that a smoothing capacitor is connected to the output terminals of the full-wave rectifier and parallel to the direct voltage converter, an electronic switching element connected parallel to the bridge circuit, and means for switching the electronic switching element to the conducting state in the vicinity of the zero passages of the A.C. voltage source so as to effectively short circuit said bridge circuit.

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**4,748,382**
**ELECTRIC CIRCUIT ARRANGEMENT**

**Michael J. Walker, Halesowen, England, assignor to Lullas Industries Public Limited Company, Birmingham, England**

**Filed Sep. 25, 1986, Ser. No. 911,321**
**Claims priority, application United Kingdom, Oct. 8, 1985, 8524735**
**Int. Cl.[4] H05B** *41/32*
**U.S. Cl. 315—241 P** **4 Claims**



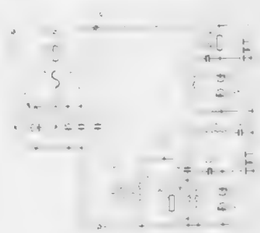

1. A warning beacon comprising: a flash tube arranged to provide a series of pairs of flashes, one flash of each pair being of relatively longer duration and larger energy content, the other being of relatively shorter duration and lower energy content, both flashes having the same peak intensity; an electric circuit arrangement connected to the flash tube comprising a trigger circuit arranged to supply a voltage to a trigger electrode of the tube sufficient to cause the tube to strike; a first capacitor connected directly across the tube and a second capacitor connected across the tube in series with a switchable network comprising a parallel arrangement of a diode and controlled rectifier, the controlled rectifier being switched by a transistor, the emitter collector paths of the transistor being connected across a low voltage supply via a series resistor, the collector of the transistor being connected to the controlled rectifier, and the base of the transistor being connected to the junction between a diode and a resistor, which junction is also connected to the junction between the second capacitor and the switchable network by way of a series arrangement of a third capacitor and a resistor; a charging and discharging network connected to the first and second capacitors and operative to effect charging of both the first and second capacitors and discharging of only the first capacitor and then both the first and second capacitors together, alternately into the tube when triggered, thereby to cause a series of said pairs of flashes, the time interval between the flashes being varied by varying the relative values of the capacitors.

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**4,748,383**
**DC-AC CONVERTER FOR IGNITING AND SUPPLYING A DISCHARGE LAMP**

**Henk Houkes, Oss, Netherlands, assignor to U. S. Philips Corporation, New York, N.Y.**

**Filed Oct. 27, 1986, Ser. No. 923,259**
**Claims priority, application Netherlands, Nov. 4, 1985, 8503008**
**Int. Cl.[4] H05B** *41/24*
**U.S. Cl. 315—248** **11 Claims**



1. A DC-AC converter for igniting and operating an electrodeless low-pressure discharge lamp having a lamp coil comprising:

first and second input terminals for connection to a source of DC voltage,

a transformer having a primary winding and a secondary winding,

a controlled semiconductor switching element having first and second main electrodes and a control electrode,

first means for connecting said lamp coil and the transformer primary winding in a parallel circuit,

second means for connecting the semiconductor switching element, a first coil and the parallel circuit in a series circuit across said first and second input terminals,

a starter circuit including a resistor and a capacitor,

third means connecting said transformer secondary winding and said capacitor in series between the control electrode and the first main electrode of the controlled semiconductor switching element, and

fourth means connecting the resistor between the second main electrode and the control electrode of the semiconductor switching element.

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**4,748,384**

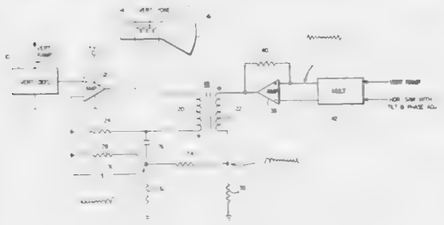
## ERROR SIGNAL CANCELLATION FOR TOP/BOTTOM PINCUSHION CORRECTION CIRCUIT

**Kirk Oliver, Forest Park, Ill., assignor to Zenith Electronics Corporation, Glenview, Ill.**

**Filed Jan. 6, 1987, Ser. No. 1,060**

**Int. Cl.[4] H01J** *29/56, 29/70, 29/72*

**U.S. Cl. 315—371** **1 Claim**



1. A vertical deflection circuit comprising:

a vertical amplifier having an inverting input terminal and a non-inverting input terminal;

a vertical deflection yoke having one terminal coupled to the output of said vertical amplifier;

feedback means including a voltage sensing resistor for developing a voltage representative of the current flowing in said yoke and for applying it to said inverting terminal of said vertical amplifier;

a top/bottom pincushion correction circuit including a pincushion transformer having a primary winding and a secondary winding;

a current limiting resistor connected in series with said primary winding and developing a voltage corresponding to said correction current;

said secondary winding having one terminal connected to the other terminal of said yoke and another terminal coupled to said feedback means; and

a bridging resistor connected between said voltage sensing resistor and said current limiting resistor, said primary and secondary windings being poled such that the voltage developed across said voltage sensing resistor as a result of said top/bottom correction current in said yoke is opposite in phase to, and therefore offset by, the voltage developed across said current limiting resistor.

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**4,748,385**

## BRUSHLESS D.C. MOTOR AND SWITCHING DEVICE FOR USE IN SUCH A D.C. MOTOR

**Henricus M. Van Hout, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

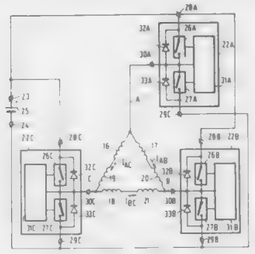
**Filed Apr. 3, 1987, Ser. No. 33,713**

**Claims priority, application Netherlands, Nov. 12, 1986, 8602862**

**Int. Cl.[4] H02K** *29/08*

**U.S. Cl. 318—254** **8 Claims**

1. A brushless d.c. motor comprising: a permanent-magnetic rotor, a stator provided with stator coils coupled between at least three power supply lines, and a commutation circuit for cyclic connection and disconnection of the power supply lines to a d.c. power source by means of switching devices controlled by the rotor magnet field, each switching device comprising a series arrangement of a first electronic switch and a second electronic switch, the series arrangement being connectable between a positive terminal and a negative terminal of the d.c. power source, a plurality of magneto-sensitive elements for detecting the rotor magnet field, and each switching device includes a control circuit for opening its first and second electronic switches depending on the rotor magnetic field detected by an associated magneto-sensitive element, each of the power supply lines being connected to a respective junction point between the first and second electronic switches, characterized in that the control circuit of each switching device comprises means for closing the first electronic switch or the second electronic switch in response to a voltage change at the junction point between the first electronic switch and the



second electronic switch produced by an induced voltage pulse in a stator coil and caused by opening one of said first and second electronic switches of another one of the switching devices.

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**4,748,386**

## CONTROLLER OF BRUSHLESS DC MOTOR

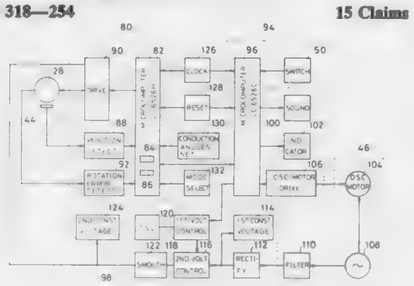
**Yuji Nakanishi, and Hajime Kanki, both of Hyogo, Japan, assignors to Sanyo Electric Co., Ltd., Japan**

**Filed Sep. 10, 1986, Ser. No. 907,737**

**Claims priority, application Japan, Sep. 20, 1985, 60-209693; Sep. 20, 1985, 60-209696**

**Int. Cl.[4] H02P** *5/16, 6/02*

**U.S. Cl. 318—254** **15 Claims**



1. A controller of a DC brushless motor comprising:

position detecting means provided in association with the DC brushless motor and for detecting the position of a rotor,

data evaluating means for evaluating data of rotating number of the rotor on the basis of a position detecting signal outputted from said position detecting means, said data evaluating means including time counting means for counting time of the rotation of the rotor,

comparing means for comparing the data of rotating number of the rotor evaluated by said data evaluating means and a predetermined value,

electric power control means for (1) controlling the application of power to said motor in response to a result of the comparison by said comparing means, and (2) for stopping said motor by cutting off said power thereto when the rotating number of the rotor is reduced a predetermined amount irrespective of the electric power being supplied, and

data setting means for setting comparison data to be compared by said comparing means.



**4,748,387**

## DC BRUSHLESS MOTOR DRIVING METHOD AND APPARATUS FOR ACCURATELY CONTROLLING STARTING POSITION OF ROTOR

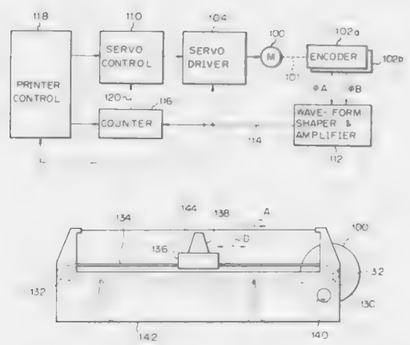
**Jiro Tazuma, and Takao Uchida, both of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan**

**Filed Jul. 17, 1987, Ser. No. 75,034**

**Claims priority, application Japan, Jul. 25, 1986, 61-173926**

**Int. Cl.[4] H02K** *29/14;* **H02P** *9/00*

**U.S. Cl. 318—254** **8 Claims**



1. A driving method for controlling a brushless DC motor by applying currents to a plurality of armature coils in a predetermined sequence to rotate a rotatable rotor, said brushless motor having:

a stator having the armature coils which are provided on a generally circular stator yoke;

said rotor in which a disk-like magnet having N and S poles arranged alternately in a circumferential direction is provided on a generally circular rotor yoke to face the armature coils; and

a speed sensing means for producing pulses responsive to a rotation speed of said rotor;

said method comprising the steps of:

at a start-up of said brushless motor, switching the current applied to the armature coils to excite said armature coils in several different phases, thereby locating said rotor at a starting angular position;

in the event when said rotor is located at the starting angular position, cancelling a load acting on said rotor, at least before a last one of the phases is excited; and

subsequently, controlling a rotational drive by counting output pulses of said speed sensing means to sense an angular position of said rotor;

a rotation direction of said rotor being controlled on the basis of output pulses of said speed sensing means and on a resulting count of the output pulses.

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**4,748,388**

## BRUSHLESS D.C. MOTOR HAVING RC TIME-DELAY STAGE(S) AND DRIVER TRANSISTORS WHICH PREVENT SIMULTANEOUS CONDUCTION BY THE POWER TRANSISTORS OF THE WOUND CONDUCTOR PAIR(S) OF THE MOTOR WINDING

**Rolf Müller, St. Georgen, Fed. Rep. of Germany, assignor to Papst-Motoren GmbH & Co KG, St. Georgen/Black Forest, Fed. Rep. of Germany**

**Filed Jul. 22, 1985, Ser. No. 757,647**

**Claims priority, application Fed. Rep. of Germany, Jul. 20, 1984, 3426780**

**Int. Cl.[4] H02K** *29/08*

**U.S. Cl. 318—254** **16 Claims**

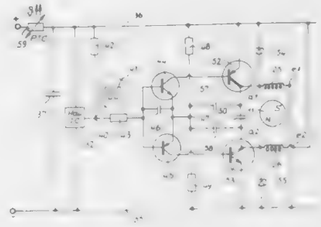
1. A brushless d.c. motor (10) provided with a winding having at least one conductor pair, the conductor pair carrying two current pulses per 360°-el. of rotor rotation, and furthermore provided with rotor-position-dependent sensor means (32), the sensor means (32) controlling semiconductor control means (52, 53) associated with the conductor pair in order to control the current in the two conductors (25, 26) of the conductor pair

(a1) one of the conductor pair's conductors (26) at one of its ends (a2) being connected via semiconductor control means of one conductivity type (e.g. npn transistor 53) to one terminal (e.g. negative terminal) of a d.c. current source and

(a2) the conductor pair's other conductor (25) at one of its ends (a1) being connected via semiconductor control means of the opposite conductivity type (e.g. pnp transistor 52) to the other terminal (e.g. positive terminal) of the d.c. current source,

(a3) establishment of the connection recited at paragraph (a1) above alternating with establishment of the connection recited at paragraph (a2) above, under the control of the sensor means (32),

(b) the conductor pair's one conductor (26) furthermore being connected at its other end (e2) to the other terminal (e.g. positive terminal), and the conductor pair's other conductor (25) being connected at its other end (e1) to said one terminal (e.g. negative terminal) of the d.c. current source, and



(c) at least those ends (a1, a2) of the conductor pair's two conductors that are connected to the semiconductor control means (52, 53) exhibiting a.c.-voltage coupling, wherein in accordance with the invention:

(d) each semiconductor control means (52, 53) has connected with it a respective driver transistor (44, 45; 74, 75) which is of a conductivity type opposite to that of the associated semiconductor control means (52, 53), the driver transistors (44, 45) accordingly being of conductivity types opposite to each other,

(e) and resistor-capacitor time-delay means, comprising at least one RC-stage (43, 46; 43', 46', 43'', 46''; 43, 77), connected to the driver transistors (44, 45), operative for

introducing a predetermined time delay between disestablishment of the connection recited at paragraph (a1) above the establishment of the connection recited at paragraph (a2) above, as a result of which neither of the connections recited at paragraphs (a1) and (a2) above exists during this time delay, and

conversely, introducing a predetermined time delay between disestablishment of the connection recited at paragraph (a2) above and establishment of the connection recited at paragraph (a1) above, as a result of which neither of the connections recited at paragraphs (a1) and (a2) above exists during this time delay.

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**4,748,389**

## MOTOR SPEED CONTROL APPARATUS

**Junichi Nakakuki, Osaka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

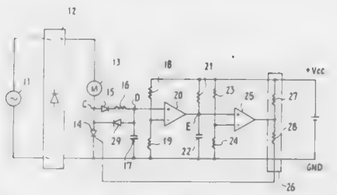
**PCT No. PCT/JP86/00063, § 371 Date Oct. 17, 1986, § 102(e) Date Oct. 17, 1986, PCT Pub. No. WO86/05042, PCT Pub. Date Aug. 28, 1986**

**PCT Filed Feb. 13, 1986, Ser. No. 928,275**

**Claims priority, application Japan, Feb. 18, 1985, 60-29617; Feb. 18, 1985, 60-29618; Feb. 18, 1985, 60-29619**

**Int. Cl.[4] H02P *5/00***

**U.S. Cl. 318—345 D** **9 Claims**



1. A motor speed control apparatus comprising a full-wave rectifier connected across terminals of an AC supply to convert the AC supply voltage to a DC voltage, a motor and a thyristor coupled in a series circuit to the DC output of the full-wave rectifier, a first capacitor arranged to be charged with a voltage applied to the terminals of the thyristor, a first comparator for comparing the voltage developed in the first capacitor with a first predetermined voltage, a second capacitor charged with an output of the first comparator, a second comparator which compares the voltage developed in the second capacitor with a second predetermined voltage, and a trigger circuit connected to the output of the second comparator triggering the gate of the thyristor.

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**4,748,390**

## CAPACITIVE-TYPE DETECTION DEVICE

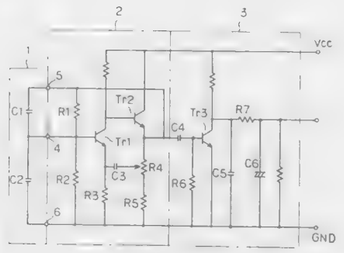
**Akihiro Okushima, and Shinichi Shoji, both of Nagoya, Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan**

**Filed Sep. 18, 1985, Ser. No. 777,432**

**Claims priority, application Japan, Sep. 19, 1984, 59-196142; Sep. 21, 1984, 59-199061; Sep. 21, 1984, 59-143822[U]**

**Int. Cl.[4] B60S *1/08***

**U.S. Cl. 318—483** **8 Claims**



1. A detection device mounted on a windshield to detect water adhering to an external surface of the windshield to be wiped by a windshield wiping system, comprising:

detection electrode means including a detection electrode and a ground electrode which are mounted adjacent said windshield,

oscillation circuit means including a resonance circuit associated with a capacitance between said detection electrode and said ground electrode, said oscillation circuit means changing its oscillation frequency in response to change in said capacitance caused by a presence of water on said external surface of the windshield adjacent said detection electrode means, said water causing said capacitance to vary in accordance with whether it is in the form of drops of water or a film of water, said oscillation circuit means including means for changing the oscillation frequency thereof by a larger amount in response to the presence of drops of water adjacent said detection electrode means and by a lesser amount in response to the presence of a film of water adjacent said detection electrode means, and

detection circuit means for detecting a change of oscillation frequency of said oscillation circuit means and determining whether said change of oscillation frequency in said larger amount indicating the presence of drops of water adjacent said detection electrode means or said lesser amount indicating the presence of a film of water adjacent said detection electrode means, whereby said detection device drives said windshield wiping system in a first mode if said detection circuit means detects said larger amount of change in oscillation frequency and in a second mode if said detection circuit means detects said lesser amount of change in oscillation frequency.

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**4,748,391**

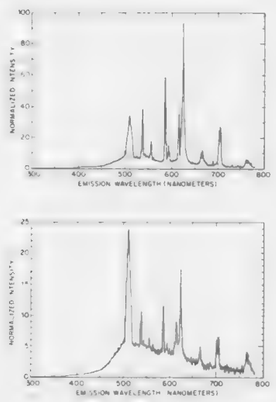
## YELLOW GREEN BARIUM LANTHANUM SILICATE OXYAPATITE PHOSPHOR, A FLUORESCENT LAMP CONTAINING THE SAME, AND A METHOD THEREOF

**A. Gary Sigai, and Michael N. Alexander, both of Lexington, Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.**

**Filed Dec. 18, 1986, Ser. No. 943,109**

**Int. Cl.[4] C09K *11/477***

**U.S. Cl. 313—486** **18 Claims**



15. A yellow green emitting phosphor exhibiting characteristic emission wavelengths essentially as depicted in FIG. 1 when excited by 254 nm excitation, said phosphor having a composition defined by the general formula: $Ba_2La_8(SiO_2)_6O_2$:Eu in which Eu is in the divalent state.

17. A yellow green emitting phosphor exhibiting characteristic emission wavelengths essentially as depicted in FIG. 2 when excited by 254 nm excitation, said phosphor having a composition defined by the general formula: $Ba_2La_8(SiO_2)_6O_2$:Mn, Eu in which Mn and Eu are in the divalent state.



**4,748,392**

## SERVO-CONTROL SYSTEM FOR THE STEERABLE FRONT WHEELS OF A VEHICLE

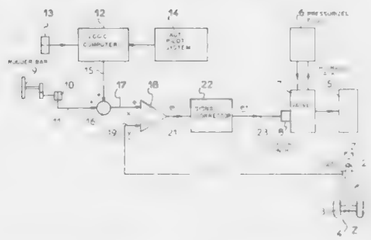
**José-Raymond Goïcoechea, Blagnac, France, assignor to Aerospatiale Societe Nationale Industrielle, Paris, France**

**Filed May 5, 1987, Ser. No. 46,183**

**Claims priority, application France, May 5, 1986, 86 06472**

**Int. Cl.[4] G05B *5/01***

**U.S. Cl. 318—611** **4 Claims**



1. In a servo-control system for the steerable front wheels or nose gear of a vehicle, at least a lower part of which having at least one wheel that may rotate about its longitudinal axis comprising:

means for generating an electric command representative of a desired orientation for said lower part of said nose gear;

actuation means for causing rotation of said lower part of said nose gear;

control means for controlling said actuation means;

means for detecting the real orientation of said lower part of said nose gear and for generating an electric signal representative of said real orientation; and

means for subtracting said electric signal from said command and applying the difference obtained to said control means;

said control means having a high pass filter which receives an input signal containing information of the oscillations to which said lower part of said nose gear is subjected and whose output is connected to a device for subtracting the output signal of said high pass filter from the difference between said command and said signal representative of the real orientation; and

the pass band of said high pass filter covering the natural oscillation frequency of said lower part of the gear about its longitudinal axis;

whereby the steerable front wheels or nose gear is rotated about its longitudinal axis.

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**4,748,393**

## POSITIVE FEEDBACK POSITION SERVO

**Jeffrey L. Fincher, San Bruno; Lauren V. Merritt, Sunnyvale, and Gordon D. Svendsen, Belmont, all of Calif., assignors to Ampex Corporation, Redwood City, Calif.**

**Filed Feb. 4, 1987, Ser. No. 10,652**

**Int. Cl.[4] G05B *1/06***

**U.S. Cl. 318—638** **28 Claims**

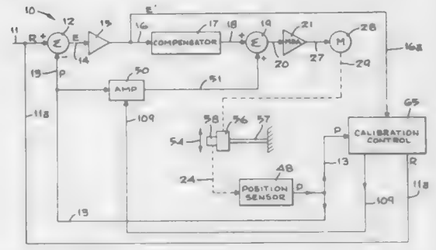
1. A position servo system for positioning a member by means of a position actuator, said member being attached to a spring means, said spring means providing a force opposing a motion of said member from an initial position, comprising:

sensor means for detecting an actual position of said member and providing a corresponding position feedback signal;

summing means coupled to receive a position request signal and said position feedback signal, and to provide an error signal as a difference of said received signals;

said position actuator coupled to receive said error signal and to apply a force necessary to overcome said force provided by said spring means and to move said member to a desired position;

means coupled to apply a portion of said position feedback signal as a positive feedback signal to said position actuator to compensate for said force provided by said spring means; and



programmable digital control means coupled to vary a magnitude of said positive feedback signal to obtain a substantially zero steady state error.

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**4,748,394**

## CONTROL APPARATUS FOR ESCALATOR

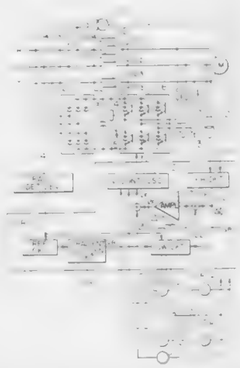
**Eiki Watanabe, Inazawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan**

**Filed Jun. 17, 1986, Ser. No. 875,212**

**Claims priority, application Japan, Jun. 18, 1985, 60-132451**

**Int. Cl.[4] H02P *5/40***

**U.S. Cl. 318—807** **7 Claims**



1. A control apparatus for an escalator comprising an induction motor for driving the escalator, a passenger detection device for detecting the presence of passengers at the escalator, conversion means for converting an alternating current from a three-phase A-C power source into a three-phase alternating current of variable frequency, control means for controlling said conversion means by providing a controllable frequency signal thereto so that a generated alternating current of a frequency substantially lower than and of a phase different from that of the three-phase A-C power source is generated by said conversion means in response to the absence of the passengers at the escalator, said control means including phase detection means for detecting the different in phase between the generated alternating current and the source alternating current and for controlling the frequency signal in response to the presence of passengers at the escalator and in response to the detected different in phase, (1) gradually increasing the frequency of the generated alternating current until it surpasses the frequency of said source alternating current, and (2) subsequently decreasing the frequency of said generated alternating current so as to approach the frequency of said source alternating current, and switching means for connecting said induction

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motor to said conversion means in response to the absence of passengers so as to perform a low speed operation, and for connecting said induction motor to the three-phase A-C power source in response to the presence of passengers so as to perform a high speed operation when the frequency and phase of the generated alternating current are substantially equal to the frequency and phase of the A-C power source.

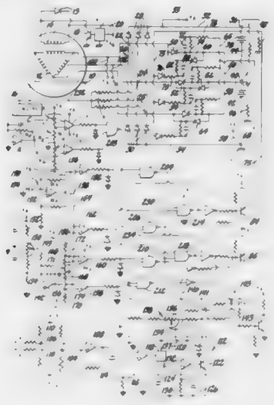
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**4,748,395**

## DUAL VOLTAGE ELECTRICAL SYSTEM

**Michael G. Reynolds, Utica, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Aug. 7, 1987, Ser. No. 82,492**
**Int. Cl.[4] H02J *7/14*; H02M *5/30*; H02P *9/00***
**U.S. Cl. 320—17** **5 Claims**



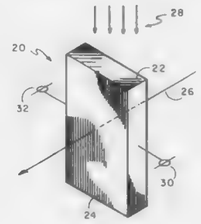
1. A dual voltage motor vehicle electrical system comprising, an alternating current generator having a polyphase output winding, a polyphase full-wave bridge rectifier comprised of groups of positive and negative diodes, said bridge rectifier having AC input terminals connected to said output winding and having positive and negative direct voltage output terminals, first and second storage batteries connected in series and across said direct voltage output terminals of said bridge rectifier, the negative terminal of one battery and the positive terminal of the other battery being connected to a common junction, a first switchable rectifying circuit connected between said junction and said AC input terminals, said first switchable rectifying circuit when biased conductive and one of said groups of diodes supplying charging current to one of said batteries, a second switchable rectifying circuit connected between said junction and said AC input terminals, said second switchable rectifying circuit when biased conductive and the other group of said diodes supplying charging current to the other battery, means for causing said switchable rectifying circuits to be biased alternately conductive, means for sensing the relative magnitudes of the voltages across said batteries, means responsive to the difference in the voltages across the batteries for controlling the time periods that said switchable rectifying circuits are biased conductive, said last-named means operative to cause the switchable rectifying circuit that supplies current to the battery that has the lower voltage to be biased conductive for a time period that is longer than the time period of conduction of the other switchable rectifying circuit means for summing the phase voltages developed by said polyphase output winding to provide a control signal that is a function of the summed phase voltages, and means responsive to said control signal for preventing simultaneous conduction of said switchable rectifying circuits.

**4,748,396**

## ELECTRIC CELL AND METHOD OF PRODUCING ELECTRICITY

**Valentin Pechorin, 13 Strawberry Bank Rd., Nashua, N.H. 03062**

**Filed Nov. 25, 1986, Ser. No. 934,941**
**Int. Cl.[4] H02N *3/00***
**U.S. Cl. 322—2 R** **1 Claim**




1. A method for producing electricity, comprising
providing a membrane of fast ion-conducting materials having a first side and a second side, said first side having a higher ion concentration than said second side, such difference in ion concentration creating a diffusion of ions and resulting ion movement from said first side to said second side of said membrane;
placing said membrane in a magnetic field situated at an angle other than 0° to the direction of the ion movement; and
providing means to receive current from said cell that is produced at the sides of said membrane perpendicular to the direction of the magnetic field and direction of ion movement.

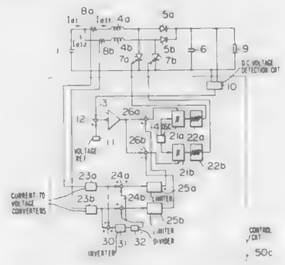
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**4,748,397**

## CONTROL DEVICE FOR CHOPPERS PARALLEL BETWEEN A DC POWER SOURCE AND A LOAD FOR PRODUCING BALANCED CHOPPER CURRENTS

**Kiyoshi Ogawa, Fuchu, and Yoshizo Akao, Hino, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Continuation of Ser. No. 809,309, Dec. 16, 1985, abandoned.**
**This application May 18, 1987, Ser. No. 51,186**
**Claims priority, application Japan, Dec. 17, 1984, 59-264411; Sep. 6, 1985, 60-195743**
**Int. Cl.[4] H02M *3/142***
**U.S. Cl. 323—222** **3 Claims**



1. A control device for an apparatus having a plurality of choppers connected in parallel between a DC power source and a load, said apparatus supplying a voltage to said load, each of said choppers including a semiconductor switch, said control device comprising:
a plurality of DC current detection circuits, each connected to one of said plurality of choppers for detecting a chopper current of one of said plurality of choppers, respectively;
a first circuit connected to said plurality of DC current detection circuits for generating an average value of said plurality of chopper currents;
a plurality of second circuits, each connected to one of said DC current detection circuits and to said first circuit for comparing one of said chopper current detected by one of said DC current detection circuits with said average value to derive deviation values, respectively;
a third circuit for detecting an output voltage of said apparatus;
a fourth circuit connected to said third circuit for comparing said output voltage of said apparatus with a predetermined voltage reference and for generating a voltage control signal based on a comparison result so that said output voltage is controlled to be equal to said predetermined voltage reference;
a plurality of fifth circuits, each connected to said fourth circuit and one of said second circuits for adding a value of said voltage control signal and one of said deviation values to produce a modified voltage control signal, respectively, so that the values of said plurality of chopper currents are substantially equal to each other;
an oscillator circuit for generating a pulse signal;
a plurality of phase shifters, each connected to said oscillator circuit and one of said plurality of fifth circuits for shifting a phase of said pulse signal based on said modified voltage control signal, respectively;
a plurality of pulse amplifier circuits, each connected to one of said plurality of phase shifters and one of said choppers, for isolating and supplying an output signal of one of said plurality of phase shifters to one of said semiconductor switches of one of said choppers, respectively, each of said semiconductor switches being controlled to be switched ON and OFF based on one of said output signals of said plurality of pulse amplifier circuits, respectively; and
a plurality of limiter circuits, each connected to one of said second circuits for limiting said deviation value and for supplying said limited deviation value to one of said fifth circuits as said deviation value, respectively.

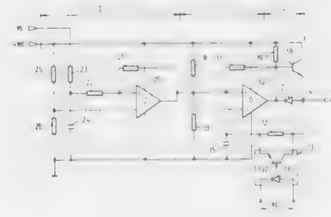
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**4,748,398**

## CIRCUIT FOR CONTROLLING A SERIES SWITCHING ELEMENT IN A CLOCKED POWER SUPPLY

**Hans-Bodo Laue, Altenbeken, Fed. Rep. of Germany, assignor to Nixdorf Computer AG, Paderborn, Fed. Rep. of Germany**

**Filed Feb. 12, 1987, Ser. No. 13,834**
**Claims priority, application Fed. Rep. of Germany, Feb. 14, 1986, 3604716**
**Int. Cl.[4] G05F *1/44***
**U.S. Cl. 323—285** **18 Claims**



1. An improved circuit for controlling a series switching element of a clocked power supply unit by producing a pulse signal whose pulse-interval ratio can be varied as a function of a regulating signal derived from the output side of said power supply unit and conducted over an optoisolator having a phototransistor, said circuit being of the type including a feedback oscillator circuit having a first feedback branch provided with a capacitance and with a variable resistance comprised of a parallel connection of the phototransistor and a resistor, the improvement comprising in combination:
said oscillator circuit having an operational amplifier provided with an output and said first feedback branch and a second feedback branch, an amplifying transistor provided with an emitter, and a diode;
said amplifying transistor being connected to the output of said operational amplifier and being arranged to operate in an emitter-follower mode;
said diode being poled in the reverse direction relative to the output of said operational amplifier;
said first feedback branch being connected to the emitter of the amplifying transistor; and
said second feedback branch being connected to the output of the operational amplifier.

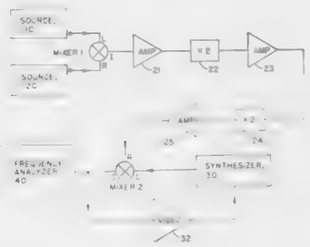
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**4,748,399**

## MULTICHANNEL PHASE NOISE MEASUREMENT SYSTEM

**Stephen P. Caldwell, Linthicum; James T. Haynes, Pasadena, and Michael S. Buchalter, Columbia, all of Md., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Apr. 21, 1986, Ser. No. 853,827**
**Int. Cl.[4] G01R *27/00***
**U.S. Cl. 324—57 N** **1 Claim**




1. In combination with a first and second signal source which respectively produce first and second output signals which have phase noise, a multichannel phase noise measuring system comprising:
a first mixer which receives and mixes said first and second output signals from said first and second signal sources to produce a difference frequency signal;
a first amplifier which produces a first amplified difference signal by receiving and amplifying the difference signal produced by the first mixer;
a first frequency multiplier which produces an output signal by receiving and frequency multiplying the first amplified difference signal from the first amplifier;
a second amplifier which produces a second amplified difference signal by receiving and amplifying the output signal of the first frequency multiplier;
a second frequency multiplier which produces an output signal by receiving and frequency multiplying the second amplified difference signal from the second amplifier;
an output amplifier which produces a multiplied frequency signal by receiving and amplifying the output signal of the second frequency multiplier, said multiplied frequency signal including the phase noise of the first and second output signals with a positive gain applied to it, said positive gain thereby allowing commercial frequency synthesizers with phase noise characteristics inferior to said first and second signal sources to be used to help measure said phase noise;
a frequency synthesizer which produces a reference frequency signal wherein said frequency synthesizer has

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inferior phase noise characteristics to the first and second signal source;

a second mixer which produces an output signal by receiving and mixing the multiplied frequency signal from the output amplifier and the reference frequency signal from the frequency synthesizer;

a video amplifier which receives the output signal from the second mixer and provides a tuning signal to the frequency sythesizer to phase lock it with the multiplied frequency signal received by the second mixer, said video amplifier and said second mixer thereby causing said frequency synthesizer to be phase locked with said multiplied frequency signal by producing said output signal of said second mixer which includes the phase noise of the first and second output signals with the positive gain applied to it; and

a means of measuring phase noise which receives the output signal of the second mixer and produces a measurement which indicates the amount of phase noise present in the first and second output signals.

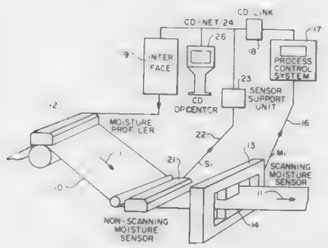
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**4,748,400**

## METHOD FOR CONTROLLING THE AMOUNT OF MOISTURE ASSOCIATED WITH A WEB OF MOVING MATERIAL

**Pekka M. Typpo, Cupertino, Calif., assignor to Impact Systems, Inc., San Jose, Calif.**

**Filed Jan. 20, 1987, Ser. No. 4,989**
**Int. Cl.[4] G01R** *27/26*
**U.S. Cl. 324—61 R** **5 Claims**




1. A method using a fixed moisture sensor for controlling the amount of moisture that is associated with a web of moving material where a scanning moisture sensor scans across zones or slices of said web in a cross direction (CD) perpendicular to the machine direction of movement of said web to provide, sequentially, moisture values for each of said zones and also including a moisture profiler for controlling said amounts of moisture in said zones and having a response time much faster than the time required for a single cross direction scan by said scanning moisture sensor, said method comprising the following steps:

measuring the amount of moisture in each of said zones substantially continuously by use of a said fixed moisture sensor located at each zone;

calibrating said measured moisture by said fixed sensor by comparing with a said moisture value from said scanning moisture sensor to provide a calibration constant;

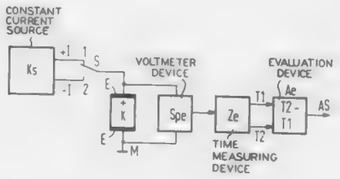
and utilizing said calibration constant by correcting said measured moisture from said fixed sensor to control said moisture profiler.

**4,748,401**

## METHOD AND APPARATUS FOR RECOGNIZING THE POLARITY OF POLARIZED CAPACITORS

**Ulrich Aldinger, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Jan. 27, 1987, Ser. No. 6,904**
**Claims priority, application Fed. Rep. of Germany, Aug. 1, 1986, 3626036**
**Int. Cl.[4] G01R** *27/26, 27/00*
**U.S. Cl. 324—61 R** **6 Claims**




3. Apparatus for recognizing the polarity of an electrolytic capacitor, comprising:

a current generator including a first output and a second output and operable to provide a first constant direct current of a first direction at said first output and a second constant direct current of equal magnitude as the first constant direct current and of the opposite direction at said second output;

a switch connected to said capacitor and selectively operable to connect said capacitor to said first and second outputs of said current generator;

sensing means connected to said capacitor for sensing the charging of the capacitor to a first predetermined voltage when said switch is connected to said first output and to an equal and opposite second predetermined voltage when said switch is connected to said second output;

timing means connected to said sensing means and operable to measure the charging times of said capacitor to said first and second predetermined voltages; and

means for comparing the charging times to determine the polarity of the capacitor.

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**4,748,402**

## CIRCUIT IDENTIFIER TESTER FOR TELECOMMUNICATION PAIRS

**Valentine Sellati, 8880 N.W. 24 Terrace, Miami, Fla. 33172**

**Filed May 1, 1986, Ser. No. 857,879**
**Int. Cl.[4] G01R** *31/02*
**U.S. Cl. 324—66** **3 Claims**



1. A transmitter and receiver combination device for identifying a particular telecommunication circuit pair in a plurality of circuit pairs having each receiving and transmitting ends, comprising:



A. counting means for sequentially and continuously generating a predetermined parallel coded output signal;

B. means for selecting said circuit pairs connected to said means for counting so that each one of said pairs is selected sequentially and continuously according to the output of said counting means;

C. means for converting said parallel coded output of said counting means to a serial coded output and adapted to send said serial output to said transmitting end of the circuit pair being selected during the time of selection through said means for selecting and said means for converting further including a universal asynchronous receiving and transmitting device having a parallel input port and a serial output port;

D. means for removably connecting to each one of said receiving ends of said circuit pairs and including means for detecting the output of said counting means being continuously sent;

E. means for decoding and displaying said detected output so that a particular circuit pair is identified according to said predetermined coded output signal;

F. means for generating a second parallel coded output and multiplexer means for alternating said first and second parallel coded outputs and connected to said universal asynchronous receiving and transmitting device.

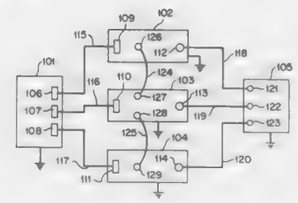
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**4,748,403**

## APPARATUS FOR MEASURING CIRCUIT ELEMENT CHARACTERISTICS WITH VHF SIGNAL

**Toshio Tamamura, Hachioji, Japan, assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Feb. 5, 1986, Ser. No. 826,473**
**Int. Cl.[4] G01R** *1/30*
**U.S. Cl. 324—73 R** **1 Claim**




1. Apparatus for measuring circuit characteristics of a device under test comprising:

signal generating means, connected to ground, for providing an input signal to the device under test;

signal measuring means, connected to ground, for measuring an output signal from the device under test in response to the input signal;

first connecting means for connecting the signal generating means to the signal measuring means, having a high common mode rejection and capable of transmitting wide band high frequency signals with substantially no net current flow, said first connecting means comprising a shielded twisted pair cable, a balanced ECL receiver in the signal measuring means, and high impedence transistors connected between the twisted pair cable and the receiver for terminating the twisted pair cable and generating an input signal for the receiver;

second connecting means for connecting the signal generating means and the signal measuring means to the device under test, having a wide band signal path a common grounding paths;

wherein the shield for the twisted pair cable is connected at only one of the signal generating means or the signal measuring means so that there is no ground loop connecting the signal generating means, the signal measuring means and the device under test, and reference potential fluctuations are not propagated betwen the signal generating means and the signal measuring means.

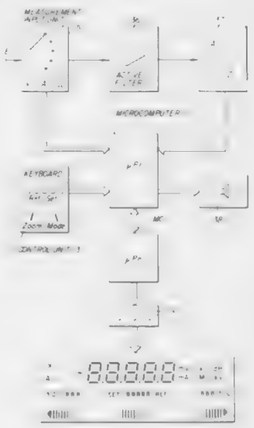
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**4,748,404**

## DIGITAL MEASURING DEVICE FOR THE QUASI-ANALOG INDICATION OF MEASUREMENT VALUES

**Siegfried Heinze, Nuremberg; Werner Haüssel, Feucht; Reinhold Kern, Neumarkt, and Günter Roppelt, Nuremberg, all of Fed. Rep. of Germany, assignors to Brown, Boveri & Cie. AG, Mannheim-Käfertal, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 708,346, Mar. 5, 1985, abandoned. This application Feb. 14, 1986, Ser. No. 830,067**
**Claims priority, application Fed. Rep. of Germany, Mar. 5, 1984, 3408026**
**Int. Cl.[4] G01R** *1/00, 19/00, 15/08*
**U.S. Cl. 324—114** **22 Claims**



1. Digital measuring device for measuring and displaying a measurement value, comprising:

a numerical measurement value display;

a predetermined overall measuring range;

a quasi-analog measurement value scale disposed forming a spread measuring range within said predetermined overall measuring range;

a plurality of addressable planar segments disposed in parallel with said quasi-analog measurement value scale, having a alphanumeric lettering to indicate said spread measuring range section on said measurement value scale;

indicating means for said measurement value scale for indicating a value thereon;

automatic control means for automatically changing said spread measuring range by a given spreading factor until the measurement value is disposed between the limits of said spread measuring range and wherein said overall measuring range remains constant.

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**4,748,405**

## CURRENT SENSOR ARRANGEMENT

**Paul E. Brodzik, Deerfield, and Arthur J. Lostumo, Franklin Park, both of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.**

**Filed Jun. 12, 1986, Ser. No. 873,670**
**Int. Cl.[4] G01R** *1/20*
**U.S. Cl. 324—127** **13 Claims**

1. A current sensing arrangement mounted on a PC board comprising:

a toroidal-shape ferrite core having an aperture therein;

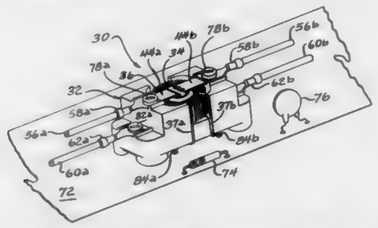
a pick-up coil cound around said ferrite core and disposed about the aperture therein;

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a unitary housing having a curvilinear recessed upper portion comprised of a pair of generally semicircular, spaced, facing notches in an upper portion of said housing defining an upraised portion of said housing therebetween and adapted to receive and engage said ferrite core and said pick-up coil disposed thereon;

a slot extending through said housing from top to bottom and positioned within the upraised portion thereof;



a current carrying conductor positioned within the slot in said housing and disposed within said ferrite core and said pick-up coil; and

first and second coupling means for securely connecting respective ends of said conductor to respective electrical leads and for securely mounting the thus connected ends of said conductor and electrical leads to said housing.

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**4,748,406**

**CIRCUIT ARRANGEMENT FOR CONTROLLING A ROTARY-MAGNET MEASURING INSTRUMENT**

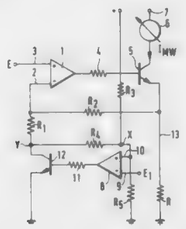
**Axel Schäfer, Bad Soden, Fed. Rep. of Germany, assignor to VDO Aloft Schindling AG, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Sep. 16, 1986, Ser. No. 907,875**

**Claims priority, application Fed. Rep. of Germany, Oct. 3, 1985, 3535252**

**Int. Cl.[4] G01R** *15/10*

**U.S. Cl. 324—132** **7 Claims**



1. In a circuit for controlling a rotary-magnet measuring instrument by an input voltage operative via a controlled source of current, the circuit comprising a first amplifier with a first negative-feedback resistor and a first input resistor, an improvement providing

for the linearizing of an approximately S-shaped characteristic curve of the rotary-magnet measuring instrument by use of a characteristic curve of the controlled source of current, wherein the characteristic curve of the controlled source of current is established by three straight line segments of differing slope with a shape approximating the S-shaped characteristic curve; the improvement comprising:

a second amplifier constructed as a differential amplifier with a first input and a second input, said first input receiving a second input voltage corresponding to said first-mentioned input voltage;

a semiconductor path including a transistor driven by said second amplifier, said transistor being connected in series with said first input resistor, said first input resistor being connected between said transistor and a junction of the first feedback resistor with an input terminal of the first amplifier;

a voltage divider outputting a divider voltage, and a second negative feedback resistor, said second input of said second amplifier being connected to said voltage divider for receiving said divider voltage and being further connected via said second feedback resistor to said semiconductor path at a junction between said transistor and said first input resistor; and wherein

the resistances of said second negative feedback resistor and of said voltage divider are small as compared with that of said first input resistor, said transistor is in a state of conduction producing essentially a grounding of said first input resistor when said input voltage is less than said divider voltage, a break point between two of said line segments occurring when said input voltage approaches said divider voltage, said transistor operates as an amplifier in concert with said second amplifier when said input voltage approximates said divider voltage to produce a middle one of said three line segments, and said transistor operates with a fixed voltage drop when said input voltage rises above said divider voltage to produce a third one of said three line segments.

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**4,748,407**

**METHOD AND APPARATUS FOR MEASURING TIME DEPENDENT SIGNALS WITH A PARTICLE PROBE**

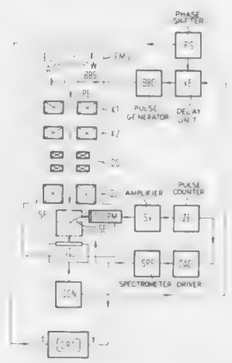
**Matthias Brunner, Kirchheim; Reinhold Schmitt, and Dieter Winkler, both of Munich, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Jan. 28, 1987, Ser. No. 16,696**

**Claims priority, application Fed. Rep. of Germany, Feb. 6, 1986, 3603724**

**Int. Cl.[4] G01N** *23/225;* **G01R** *31/28*

**U.S. Cl. 324—158 R** **9 Claims**



6. An apparatus for measuring time dependent signals at a measuring point by a particle probe, comprising:

a primary beam generator for producing a primary particle beam of the particle probe;

a beam blanking system for gating the primary particle beam synchronously with a signal prior to impinging a measuring point;

an energy analyzer to analyze a shift in energy distribution of secondary particles triggered by the particle probe at a measuring point where the shift is dependent on the potential of a measuring point;

a feedback circuit connected to control said energy analyzer to hold a signal measured at an output of the energy analyzer constant, said feedback circuit including:

a pulse counter connected to an output of said energy analyzer to count current pulses triggered by secondary particles registered in said energy analyzer; and

a digital-to-analog converter connected at an output of said pulse counter and having an output connected to said energy analyzer.



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**4,748,408**

**METHOD AND APPARATUS FOR PROVIDING DIRECTION-INDICATIVE OUTPUT SIGNALS TO THE INTEGRATING AMPLIFIER OF A DEVICE FOR DETECTING MAGNETIC DIRECTION**

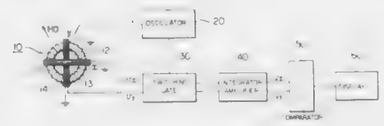
**Toshio Itakura, Saitama, Japan, assignor to Hitachi Metals, Ltd., Tokyo, Japan**

**Filed Oct. 1, 1985, Ser. No. 782,419**

**Claims priority, application Japan, Oct. 1, 1984, 59-205955**

**Int. Cl.[4] G01R** *33/04*

**U.S. Cl. 324—255** **8 Claims**



4. Apparatus used in a magnetic field direction detecting device, for providing output signals indicative of a direction of a magnetic field to an integrating amplifier of the magnetic field direction detecting device, the apparatus for providing the output signals comprising:

(a) a magnetic sensor head comprising a looped magnetic core, an excitation coil wound around said looped magnetic core and carrying an input current operative to magnetically excite said looped magnetic core, and a plurality of detection coils diametrically wound around said looped magnetic core in such a manner that said detection coils cross each other at a predetermined angle;

(b) an oscillator for supplying said input current in the form of a rectangular wave of a single polarity, comprising pulses each having a leading edge and a trailing edge, to said excitation coil of said magnetic sensor head to magnetically excite said looped magnetic core and to thereby generate output signals having peaks in said detection coils, said output signals having peaks of negative and positive polarity corresponding to said leading edge and said trailing edge of each of said pulses of said rectangular wave, respectively; and

(c) a switching gate, connected to said detection coils, said oscillator and said integrating amplifier, for synchronously transferring output signal peaks of a single predetermined polarity from said detection coils to said integrating amplifier when said switching gate is opened, said switching gate being opened in response to a selected edge of said pulses of said rectangular wave to transfer said single polarity peaks of said output signals.

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**4,748,409**

**IMAGING MAGNETIC SPIN RESONANCE METHOD AND APPARATUS**

**Jens Frahm; Axel Haase; Wolfgang Haenicke; Klaus-Dietmar Merboldt, and Dieter Matthael, all of Goettingen, Fed. Rep. of Germany, assignors to Max-Planck-Gesellschaft zur Foerderung der Wissenschaften E.V., Goettingen, Fed. Rep. of Germany**

**Filed Dec. 9, 1985, Ser. No. 806,780**

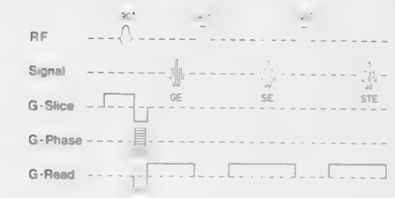
**Claims priority, application Fed. Rep. of Germany, Dec. 14, 1984, 3445689**

**Int. Cl.[4] G01R** *33/20*

**U.S. Cl. 324—309** **39 Claims**

1. A method for locally resolved investigation of a specimen, in which the specimen is exposed to a constant magnetic field and a variable combinatio of three gradient magnetic fields directed substantially perpendicularly to each other and the specimen is subjected to a sequence of high-frequency pulses which sequence contains three successive pulses with flip angles differeing from 180 degrees and multiples thereof, and in which signals corresponding to a magnetic resonance of spin moments, in particular of nuclear spin moments, are measured, characterized in that

the interval (tau) between the first and the second of said three pulses is greater than $T_{2eff}$ and smaller than $5T_2$, and that the interval (T-tau) between the second and the third pulses is greater than $T_{2eff}$ and smaller than $5T_1$, wherein $T_1$ is the spin-lattice relaxation time,




$T_2$ is the spin-spin relaxation time, and

$T_{2eff}$ is the effective spin-spin relaxation time of the spinds to be determined in the specimen,

that at least one of the gradient fields is switched over during at least one of the following periods of time:

(a) between the first and the second pulses,

(b) between the second and the third pulses,

(c) after the third pulse,

that at least one of the pulses is a frequency-selective pulse and that at least one echo signal stimulated by the third pulse is detected and evaluated.

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**4,748,410**

**RAPID NMR IMAGING SYSTEM**

**Albert Macovski, Menlo Park, Calif., assignor to Stanford University, Stanford, Calif.**

**Filed Aug. 6, 1986, Ser. No. 893,793**

**Int. Cl.[4] G01R** *33/20*

**U.S. Cl. 324—309** **25 Claims**



1. In a method for providing a magnetic resonance image of a region in a volume in the presence of a constant magnetic field the steps of;

exciting the region with a radio frequency burst;

applying magnetic gradient waveforms to two orthogonal axes normal to the constant magnetic field where the magnitudes of the two gradients are substantially constant and the integral of the gradient waveforms, representing the spatial frequencies of the image, form an array of loops of increasing distance from the origin;

applying magnetic gradient waveforms which cause the integral of the gradient waveforms to return to the origin along substantially the same array of loops;

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receiving magnetic resonant signals while the gradient waveforms are applied; and

processing the magnetic resonant signals to produce an image of the region.

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**4,748,411**

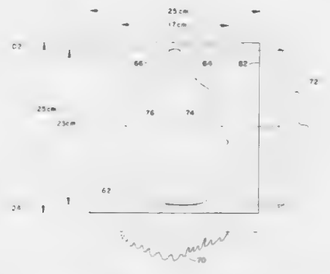
## PHASE ENCODING TECHNIQUE FOR MORE RAPID MAGNETIC RESONANCE IMAGING

**G. Neil Holland, Chagrin Falls, Ohio, assignor to Picker International, Inc., Highland Hts., Ohio**

**Filed Feb. 19, 1987, Ser. No. 16,544**

**Int. Cl.[4] G01R *33/20***

**U.S. Cl. 324—309** **19 Claims**



17. An apparatus for magnetic resonance imaging, the apparatus comprising:

a main magnetic field means for generating a generally uniform magnetic field longitudinally through an image region:

a magnetic resonance excitation means for applying a magnetic resonance excitation pulse with a selected center frequency to excite magnetic resonance of dipoles in the image region;

a phase encode means for applying phase encode gradients to phase encode the image region along a phase encode axis;

a frequency encode gradient means for frequency encoding the image region along a frequency encode axis;

an axis rotating means for selectively adjusting an orientation of the phase encode and frequency encode axes;

a radio frequency receiver for receiving radio frequency resonance signals emanating from the image region;

a filter means for filtering received resonance signals outside of a selected frequency range;

an image reconstructing means for reconstructing a plurality of views from the filtered resonance signals into an image representation, each view being generated with a different phase encode gradient, which phase encode gradients vary by a multiple of a selected phase angle;

an image memory for storing the reconstructed image representation;

projection measuring means for measuring projections of a subject in the image region at least along first and second axes;

a projection comparing means for comparing widths of the measured projections, the projection comparing means being operatively connected with the axis direction control means for selectively adjusting the phase and frequency encode axes such that the phase encode axis aligns with the axis with the smaller projection width.

**4,748,412**

## HIGH-FREQUENCY COIL FOR NUCLEAR MAGNETIC RESONATOR

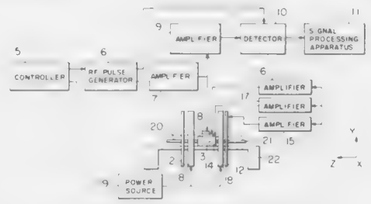
**Etsuji Yamamoto, Akishima; Takashi Onodera, Koganei, and Hideki Kohno, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Feb. 19, 1987, Ser. No. 16,401**

**Claims priority, application Japan, Mar. 7, 1986, 61-48311**

**Int. Cl.[4] G01R *33/20***

**U.S. Cl. 324—318** **7 Claims**




1. A high-frequency coil for a nuclear magnetic resonance apparatus, comprising:

first and second outer conductors formed at opposite positions in a cylindrical plane, each having a central band portion, extended parallel to a center axis of said cylindrical plane and four wing portions extended from both ends of said band portion, a selected one end of said band portion of said first and second conductors being used as a first current supply position, wherein both of said first and second outer conductors are respectively split into two pieces by lines parallel to center lines at said first current supply position and at a position symmetrical to said first current supply position, and means for respectively coupling each of the ends of said wing portions to the end of an adjacent wing portion;

first and second ring-shaped inner conductors each positioned inwardly of said wing portions, a position adjacent to the selected one end of said center band of said first and second inner conductors being used as a second current supply position;

dielectric means for insulatively separating each of said first and second inner conductors from said first and second outer conductors;

a first lead wire connected to both pieces forming one of said first and second outer conductors at said first current supply position;

a second lead wire connected to one of said first and second inner conductors at said second current supply position.

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**4,748,413**

## STRUCTURE FOR HOMOGENIZING THE FUNDAMENTAL FIELD IN A NUCLEAR MAGNETIC RESONANCE EXAMINATION APPARATUS

**Georg Frese, and Karl-Georg Ladwein, both of Erlangen, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Nov. 3, 1986, Ser. No. 926,226**

**Claims priority, application Fed. Rep. of Germany, Nov. 12, 1985, 3540080**

**Int. Cl.[4] G01R *33/20***

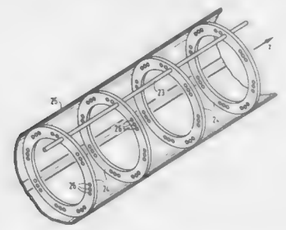
**U.S. Cl. 324—318** **17 Claims**

1. In a nuclear magnetic resonance apparatus for examining a subject having means for generating a fundamental magnetic field in which said subject is disposed, means for generating a plurality of gradient fields in which said subject is also disposed, and means for generating and measuring nuclear magnetic resonance signals in said subject, the improvement comprising:

a plurality of rods at least partially consisting of ferromagnetic material; and



means for supporting said rods in said fundamental magnetic field at respective locations selected in combination with



the cross-section, shape, length and number of said rods for homogenizing said fundamental magnetic field.

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**4,748,414**

## NUCLEAR SPIN TOMOGRAPH

**Bertold Knüttel, Rheinstetten, and Günther R. Laukien, Rheinstetten-Forchheim, both of Fed. Rep. of Germany, assignors to Bruker Medizintechnik GmbH, Fed. Rep. of Germany**

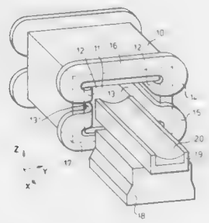
**PCT No. PCT/DE85/00164, § 371 Date Jan. 17, 1986, § 102(e) Date Jan. 17, 1986, PCT Pub. No. WO85/05448, PCT Pub. Date Dec. 5, 1985**

**PCT Filed May 15, 1985, Ser. No. 835,865**

**Claims priority, application Fed. Rep. of Germany, May 19, 1984, 3418812**

**Int. Cl.[4] G01R *33/20***

**U.S. Cl. 324—318** **14 Claims**



1. In a nuclear spin tomograph comprising:

(a) a magnet system including main-field magnet-coil means for generating a substantially homogeneous magnetic field in a volume positioned with respect to the magnet coil means defining a tomographic-imaging volume;

(b) a holder for a test object adapted to translatably position test portions of the test object in the tomographic-imaging volume;

(c) gradient-field coil system means shaped and positioned relative to the main-field magnet-coil means for generating magnetic-gradient fields in the tomographic-imaging volume; and

(d) radio-frequency irradiator/receiver means shaped and positioned relative to the main-field magnet-coil means for irradiating a radio-frequency field in the tomographic-imaging volume and receiving measuring signals from the tomographic-imaging volume, the improvement comprising a magnet system which includes:

(a.1) a ferromagnetic yoke body surrounding an interior volume defining a test-object cavity, the test-object cavity extending in a direction to define a longitudinal direction and being dimensioned to receive the test object, the test-object cavity having openings at each of two substantially longitudinally opposing ends to define a cavity-access end openings in the yoke body, the cavity-access end openings including a test-object opening at one end dimensioned to receive the test object; and

(a.2) main-field magnet-coil means shaped and positioned for generating a substantially homogeneous magnetic field in a tomographic-imaging volume positioned generally centrally within the test-object cavity of the yoke body, the main-field magnet-coil means including at least two cavity-interior longitudinal-coil sections and at least one cavity-exterior transverse-closure section, each cavity-interior longitudinal-coil section of the main-field magnet-coil means extending substantially in the longitudinal direction through the test-object cavity of the yoke body from a first cavity-access end opening at a first end of the test-object cavity to a second cavity-access end opening at a second end of the test-object cavity opposing the first end of the test-object cavity, each cavity-exterior transverse-closure section of the main-field magnet-coil menas extending substantially externally of the test-object cavity in the yoke body generally transversely to the longitudinal direction and interconnecting ends of two cavity-interior longitudinal-coil sections located at one end of the test-object cavity.

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**4,748,415**

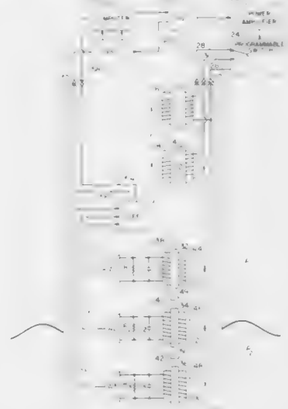
## METHODS AND APPARATUS FOR INDUCTION LOGGING IN CASED BOREHOLES

**William B. Vail, III, Bothell, Wash., assignor to ParaMagnetic Logging, Inc., Bothell, Wash.**

**Filed Apr. 29, 1986, Ser. No. 857,160**

**Int. Cl.[4] G01V *3/28, 3/24***

**U.S. Cl. 324—339** **23 Claims**



6. An apparatus for measurement of geological formation properties through conductive and magnetic steel borehole casing comprising at least one primary source of exciting A.C. magnetic fields on the surface of the earth, the frequency of the exciting A.C. fields being chosen to subject the subterranean formation to the exciting A.C. magnetic fields thereby resulting in the production of eddy currents in the formation which subsequently produce secondary A.C. magnetic fields characteristic of the formation whereby the longitudinal and azimuthal components of said secondary A.C. magnetic fields penetrate the wall of the casing to the interior of the borehole casing, in combination with at least one magnetic field sensing means positioned inside the borehole casing responsive to the longitudinal components of said primary and secondary A.C. magnetic fields, the frequency of the source of A.C. magnetic fields on the surface of the earth being between 0.001 Hz and 20 Hz thereby allowing said A.C. magnetic fields to penetrate the earth to great depths which causes eddy currents to flow in

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the geological formation which causes the subsequent generation of secondary A.C. magnetic fields at the same frequency which therefore penetrate the walls of the conductive and magnetic borehole casing whereby the longitudinal components of said primary and secondary A.C. magnetic fields are measured thereby providing characteristic formation properties including the resistivity of the geological formation.

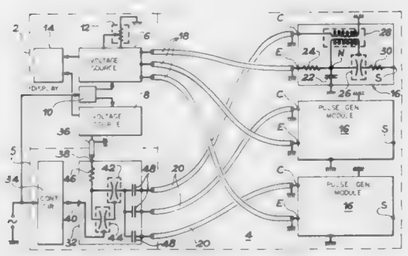
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**4,748,416**

## GENERATOR OF STRONG SYNCHRONOUS CURRENT PULSES ON PARALLEL OUTPUTS

**Jean-Pierre Climent, Saint Germain Les Corbeil; Jean-Claude Tronel, Bretigny-sur-Orge, and Adolphe Yastroubinski, Pessac, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France**

**Filed Dec. 26, 1985, Ser. No. 813,609**
**Claims priority, application France, Dec. 26, 1984, 8419807**
**Int. Cl.⁴ H03K** *3/537*
**U.S. Cl. 328—62** **1 Claim**



1. A current pulse generator for generating strong synchronous current pulses on parallel outputs comprising:

a high voltage stage having a power supply unit, a first high voltage source and a second high voltage source,

a group of N identical modules, in which N is an integer, each module being provided with an input terminal, a control terminal and an output terminal, each module comprising a load resistor and a spark gap connected in series between the intput terminal and the output terminal, a storage capacitor having an input connected to the common point between said load resistor and said spark gap, and a transformer connected to the control terminal and controlling said spark gap,

coaxial connections for connecting outputs of said first high voltage source to the input terminals of said modules,

triggering control means having a triggering device and a control circuit, said triggering device having an input terminal connected to said second high voltage source, N parallel output terminals and a control input, and comprising two spark gaps in cascade connected between the input terminal and the N parallel output terminals, said control circuit being connected to the control input of said triggering device, and

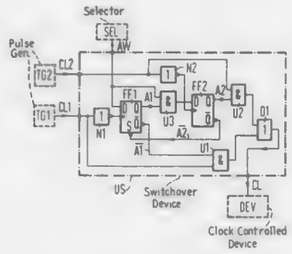
coaxial connections for connecting the output terminals of said triggering device to the input terminals of different ones of said modules.

**4,748,417**

## METHOD AND CIRCUIT ARRANGEMENT FOR SWITCHING A CLOCK-CONTROLLED DEVICE HAVING A PLURALITY OF OPERATING STATUSES

**Werner Spengler, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Dec. 16, 1985, Ser. No. 809,035**
**Claims priority, application Fed. Rep. of Germany, Feb. 5, 1985, 3503832**
**Int. Cl.⁴ H03K** *5/26;* **H03L** *7/00*
**U.S. Cl. 328—72** **9 Claims**




1. A method for switching a clock-controlled device having at least first and second operating statuses during which the clock-controlled device is controlled by respective first or second individual clock signal sequences which may differ in phase and frequency, comprising the steps of:

providing a status change selection signal for indicating a change from the first clock signal sequence to the second clock signal sequence at any time point of the first clock signal sequence;

feeding the first clock signal sequence to the clock control device;

on receiving the status change selection signal indicating a change from the first to the second clock signal sequence, sensing for the next occurring pulse edge of the first clock signal sequence in a predetermined direction, and after occurrence of said pulse edge in the predetermined direction checking for a next pulse edge in said predetermined direction of the second clock signal sequence; and

upon occurrence of said next pulse edge in said predetermined direction in said second clock signal sequence, always switching the feed to the clock-controlled device from the first clock signal sequence to the second clock signal sequence regardless of the first and second clock pulse sequence phase or frequency.

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**4,748,418**

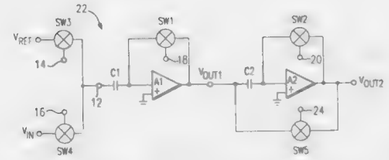
## QUASI AUTO-ZERO CIRCUIT FOR SAMPLING AMPLIFIERS

**Donald A. Kerth, Austin, Tex., assignor to Crystal Semiconductor Corporation, Austin, Tex.**

**Filed Nov. 12, 1986, Ser. No. 929,984**
**Int. Cl.⁴ H03F** *1/00;* **H03K** *5/22*
**U.S. Cl. 330—9** **3 Claims**

3. In a sampling amplifier which is reset between each sampling operation and which comprises a series combination of a signal input terminal, a first series capacitor, a first amplifier having a first switching means coupled between its output terminal and its input terminal, a second series capacitor, and a second amplifier having a second switching means coupled between its output terminal and its input terminal; the improvement comprising placing said first and second switching means in a first state to provide a low impedance between said output terminals and said input terminals of said first and second amplifiers respectively at a time between two successive sampling periods, and placing said first and second switching means in a second state to provide a high impedance between said output terminals and said input terminals of said first and second amplifiers respectively continuously during the time






interval encompassing a plurality of successive sampling periods.

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**4,748,419**

## ISOLATION AMPLIFIER WITH PRECISE TIMING OF SIGNALS COUPLED ACROSS ISOLATION BARRIER

**Thomas A. Somerville, Tucson, Ariz., assignor to Burr-Brown Corporation, Tucson, Ariz.**

**Filed Apr. 28, 1986, Ser. No. 856,763**
**Int. Cl.⁴ H03F** *3/38*
**U.S. Cl. 330—10** **18 Claims**




16. A method of operating an isolation amplifier comprising the steps of:

(a) encoding an analog input signal to produce a first pulse signal, the time of occurrence of certain edges of the first pulse signal being precisely representative of the level of the analog input signal, and producing a second pulse signal that is the logical complement of the first pulse signal;

(b) coupling a portion of each of the first and second pulse signals across an isolation barrier;

(c) differentiating the first and second pulse signals as they are coupled across the isolation barrier to produce differentiated third and fourth pulse signals each having certain edges corresponding precisely to the times of occurrence of the certain edges of the first pulse signal;

(d) amplifying the third and fourth pulse signals to produce a differential signal; and

(e) applying the differential signal to inputs of first and second comparators that sense relative positive and negative excursions of the differential signal, causing the first and second comparators to switch at times precisely corresponding to the leading and trailing edges of the first pulse signal.

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**4,748,420**

## QUADCOMP AMPLIFIER

**Arthur J. Metz, Gervais, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.**

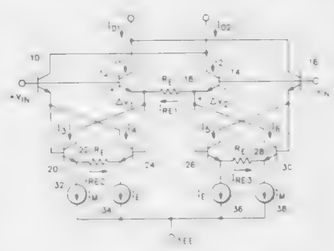
**Filed Oct. 19, 1987, Ser. No. 109,872**
**Int. Cl.⁴ H03F** *1/26, 3/45*
**U.S. Cl. 330—149** **7 Claims**

1. A differential transconductance amplifier for converting an input differential voltage into an output differential current comprising:

a. a main differential amplifier having first and second inputs for receiving the input differential voltage, first and second outputs, and first and second emitter terminals;

b. first and second reference devices each having an input, a positive output and a negative output, each input being respectively coupled to said first and second main differential amplifier inputs, and the positive outputs of said first and second reference devices being respectively cross coupled to said first and second main differential amplifier outputs for providing said output differential current; and

c. first and second error correction amplifiers each having a pair of inputs and a pair of outputs, the inputs of said first error correction amplifier being coupled between the negative output of said first reference device and said first emitter terminal, the outputs of said first error correction amplifier being crosscoupled thereto, the inputs of said second error correction amplifier being coupled between said second emitter terminal and the negative output of said second reference device, the outputs of said second error correction amplifier being crosscoupled thereto.



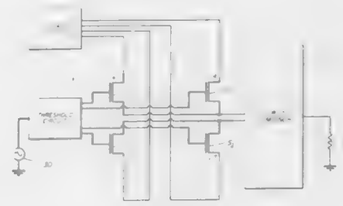
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**4,748,421**

## ENHANCED CLASS SM POWER AMPLIFIER

**Donald L. Schilling, Sands Point; David Manela, Kew Garden, and Tuvia Apelewicz, Queens, all of N.Y., assignors to SCS Telecom, Inc., Port Washington, N.Y.**

**Filed Apr. 8, 1987, Ser. No. 35,917**
**Int. Cl.⁴ H03F** *3/217*
**U.S. Cl. 330—251** **11 Claims**



1. A class SM amplifier comprising:

a load;

a power combiner coupled to said load, having first, second, third and fourth inputs;

an input source having an input signal with a bandwidth B and a center frequency $f_o$;

threshold means having first, second, third and fourth threshold levels, coupled to said input source and responsive to the voltage amplitude of the input signal crossing first, second, third and fourth threshold levels, for generating first, second, third, and fourth threshold signals, respectively;

voltage means for supplying a first voltage level, V1, a second voltage level, V2, a third voltage level, V3, and a fourth voltage level V4, wherein first voltage level is adjusted to approximate the voltage amplitude of the input signal when the voltage amplitude of the input signal crosses the first threshold level, first voltage level plus second voltage level are adjusted to approximate the voltage amplitude of the input signal when the voltage

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amplitude of the input signal crosses the second threshold level, third voltage level is adjusted to approximate the voltage amplitude of the input signal when the voltage amplitude of the input signal crosses the third threshold level, and third voltage level plus fourth voltage level are adjusted to approximate the voltage amplitude of the input signal when the voltage amplitude of the input signal crosses the fourth threshold level;

first switching means coupled to said power combiner, said threshold means and the first voltage level of said voltage means, and responsive to the first threshold signal from said threshold means for switching the first voltage level across said power combiner;

second switching means coupled to said power combiner, said threshold means and the second voltage level of said voltage means, and responsive to the second threshold signal from said threshold means for switching the second voltage level across said power combiner;

third switching means coupled to said power combiner, said threshold means and the third voltage level of said voltage means, and responsive to the third threshold signal from said threshold means for switching the third voltage level across said power combiner;

fourth switching means coupled to said power combiner, said threshold means and the fourth voltage level of said voltage means, and responsive to the fourth threshold signal from said threshold means for switching the fourth voltage level across said power combiner; and

wherein said power combiner is responsive to only the second voltage level being present at the second input for outputting the second voltage level across said load, is responsive to only the third voltage level being present at the third input for outputting the third voltage level across said load, is responsive to the first and second voltage levels being present simultaneously at the first and second inputs for outputting the combination of the first and second voltage levels across said load, and is responsive to the third and fourth voltage levels being present simultaneously at the third and fourth inputs for outputting the combination of the third and fourth voltage levels across said load.

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**4,748,422**

## AMPLIFIER CIRCUIT SUITABLE FOR USE AS AN ACTIVE FILTER CIRCUIT

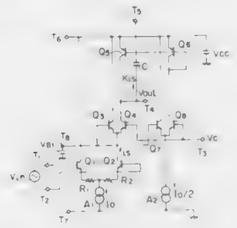
**Shuzo Matsumoto, Fujisawa; Tomomitsu Kuroyanagi, Yokohama; Yukinari Ueki, Yokohama, and Masanori Kamiya, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jan. 6, 1987, Ser. No. 770**

**Claims priority, application Japan, Jan. 10, 1986, 61-2016; Jan. 10, 1986, 61-2044; Apr. 25, 1986, 61-94491; May 21, 1986, 61-114541**

**Int. Cl.⁴ H03F** *3/45*

**U.S. Cl. 330—252** **7 Claims**



1. An amplifier comprising:

a first differential amplifier circuit including first and second transistors, a first resistor connected to an emitter of said first transistor, a second resistor connected to an emitter of said second transistor, a first input terminal connected to a base of said first transistor, a second input terminal connected to a base of said second transistor, and a first current source connected to said first and second resistors to pass a current ($I_0$) therethrough;

a second differential amplifier circuit including third and fourth transistors to divide a current flowing through said second transistor, said third and fourth transistors having their respective emitters connected to the collector of said second transistor;

a capacitor having one end connected to the collector of said fourth transistor and another end connected to a third input terminal;

a control voltage input terminal connected to said second differential amplifier to receive a control voltage $V_c$ for determining a current division ratio K for the currents flowing through said third and fourth transistors;

a current mirror circuit including fifth and sixth transistors which are interconnected in parallel both at their emitters and at their bases, said fifth transistor connected at its collector to the collector of said fourth transistor; and

a third differential amplifier including seventh and eighth transistors, a second current source connected to emitters of said seventh and eighth transistors for providing a current (approximately ($I_0$/2), wherein the collectors of said eighth and sixth transistors are interconnected, the bases of said seventh and third transistors are interconnected, and the bases of said eighth and fourth transistors are interconnected.

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**4,748,423**

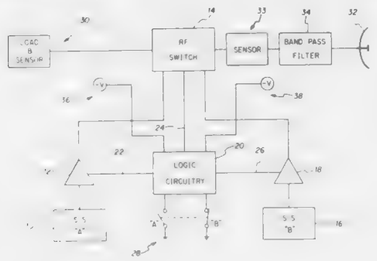
## HOT STANDBY AMPLIFIER APPARATUS

**Leon Jinich, Plano, Tex., assignor to Rockwell International Corporation, El Segundo, Calif.**

**Filed Jan. 28, 1987, Ser. No. 7,853**

**Int. Cl.⁴ H03F** *3/68*

**U.S. Cl. 330—295** **5 Claims**




1. The method of conserving power in the operation of a standby amplifier circuit of main and standby amplifier apparatus comprising, the steps of:

changing the bias level, of at least one power output stage, of whichever one of main and standby amplifiers that is presently in a standby use condition, to a value that is lower than the value of a comparable stage in the amplifier which is presently in a main use condition while leaving the standby use amplifier in an "ON" but distorted output signal condition; and

altering the bias levels, of said at least one power output stage, of each of the main and standby amplifiers when a switch is required from an old main amplifier to new main amplifier (old standby) which was previously in a standby use condition, to a value that is lower than the value of a comparable stage in the amplifier which is presently in a main use condition.



**4,748,424**

## MAGNETRON WITH FREQUENCY CONTROL MEANS

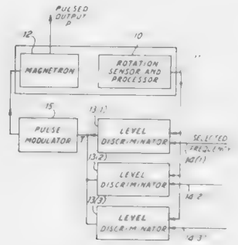
**Melvin G. England, Ashford Common, England, assignor to Thorn EMI Varian Limited, Hayes, England**

**Filed Mar. 13, 1987, Ser. No. 25,667**

**Claims priority, application United Kingdom, Mar. 15, 1986, 8606459**

**Int. Cl.⁴ H03B** *9/10*

**U.S. Cl. 331—87** **3 Claims**




1. A magnetron for producing radiation at a continuously varying frequency, the magnetron including a rotatable tuning member, means responsive to rotation of the tuning member for generating an indication signal representing the instantaneous magnetron frequency and control means for generating a trigger signal, effective to initiate transmission of a pulse of radiation produced by the magnetron, whenever the instantaneous magnetron frequency, as represented by the indication signal, has any one of a number of different predetermined values.

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**4,748,425**

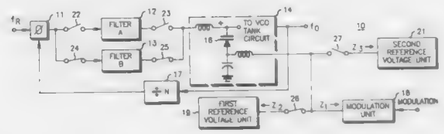
## VCO RANGE SHIFT AND MODULATION DEVICE

**Joseph P. Heck, Fort Worth, Tex., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Feb. 18, 1987, Ser. No. 16,024**

**Int. Cl.⁴ H03C** *3/22*

**U.S. Cl. 332—19** **6 Claims**




6. In a frequency synthesizer having a phase locked loop, which phase locked loop includes a voltage controlled oscillator having:

a tuning range; and

a tuning varactor having a first side and a second side, an improvement wherein:

(A) said first side of said tuning varactor connects to said phase locked loop; and further including

(B) modulation means for providing a modulation signal to said second side of said varactor; and

(C) steering line control means for selectively varying varactor bias voltage to thereby allow said tuning range of said voltage controlled oscillator to be selectively range shifted.

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**4,748,426**

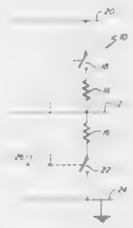
## ACTIVE TERMINATION CIRCUIT FOR COMPUTER INTERFACE USE

**Alexander Stewart, Boca Raton, Fla., assignor to Rodime PLC, Glenrothes, Scotland**

**Filed Nov. 7, 1986, Ser. No. 927,989**

**Int. Cl.⁴ H03H** *11/28*

**U.S. Cl. 333—22 R** **6 Claims**



1. In a system in which a logic generator transmits a data to a plurality of peripheral devices through a connecting cable, an active termination circuit to minimize line reflection of the transmitted signal, comprising:

means for providing a voltage;

means connected between said voltage providing means and said cable and a logic ground potential for minimizing line reflection;

means for selectively connecting and disconnecting said minimizing means to the cable;

said minimizing means comprising first and second resistor means commonly connected at one end to said cable, said first resistor means being connected at its other end to the voltage providing means and said second resistor means being connected at its other end to a logic ground potential; and

the connecting and disconnecting means comprises switch means disposed between the common connection of said first and second resistor means and the connecting cable and means to control said switch means disposed remotely from said switch means.

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**4,748,427**

## MICROWAVE RESONATING CAVITY WITH METALLIZED DIELECTRIC

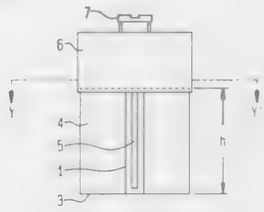
**Carlo Buoli, Mirandola, Italy, assignor to GTE Telecommunicazioni, S.p.A., Milan, Italy**

**Filed Nov. 6, 1986, Ser. No. 927,461**

**Claims priority, application Italy, Nov. 20, 1985, 23904/85[U]**

**Int. Cl.⁴ H01P** *7/06*

**U.S. Cl. 333—227** **4 Claims**




1. A microwave resonating cavity including a hollow cylindrical body shaped in the form of a parallelepiped and consisting of a dielectric material coated by a metallic layer, said dielectric material having a high dielectric constant having a value greater than 30, and wherein said hollow body includes an upper base, a lower base, an external surface and an internal

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surface, and further includes a non-metallized area defining a metallized coupling line onto the external surface of the said hollow cylinder and wherein said hollow cylinder has an inner diameter ranging between 3 and 5 mm, an outer diameter ranging between 6 and 15 mm and a height ranging between 5 and 10 mm, and further including a metallic cap welded to the upper base of said hollow body, and further including an adjusting screw for fine adjustment of the resonating frequency.

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**4,748,428**

**MULTI-POLE CIRCUIT INTERRUPTER**

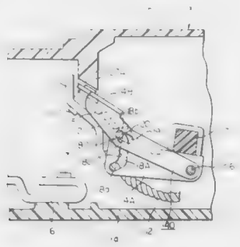
**Haruhisa Toda; Toshiyuki Tanibe, and Hiroaki Fugihisa, all of Fukuyama, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan**

**Filed Jul. 30, 1987, Ser. No. 79,700**

**Claims priority, application Japan, Aug. 4, 1986, 61-120177[U]**

**Int. Cl.[4] H01H** *75/02*

**U.S. Cl. 335—10** **3 Claims**



1. A multi-pole circuit interrupter having a first pole unit provided with an operating mechanism and a second pole unit provided with no operating mechanism, said circuit interrupter interrupting current flowing therethrough by separating a movable contact from a stationary contact as a result of an electromagnetic repulsive force generated upon the occurrence of a large overcurrent irrespective of an automatic trip operation of the operating mechanism, each of said first and second pole units comprising:

a movable contact and a stationary contact;

a contact arm assembly for supporting the movable contact of the respective pole unit including a first contact arm and a second contact arm pivotally supported by a common pivot pin;

said first contact arm of said contact arm assembly in said first pole unit having an elongated guide hole extending in a direction of movement of the movable contact of said contact arm assembly and being directly connected to the operating mechanism of said first pole unit;

said first contact arm of said contact arm assembly in said second pole unit being connected to the operating mechanism of said first pole unit through a cross bar;

said second contact arm of said contact arm assembly in both said first and second pole units extending longitudinally and having an elongated hole extending substantially in the longitudinal direction of said second contact arm;

a spring-biased sliding pin extending through the elongated hole and the guide hole of said first and second contact arms of said contact arm assembly;

the guide hole having a pin sliding surface on which said sliding pin slidably moves, and a pin braking surface disposed at an end portion thereof for preventing said sliding pin from being bounced from said end portion of the guide hole upon the electromagnetic repulsive force being exerted on the contact arm assembly; and

time delaying means associated with the guide hole of said first contact arm for providing a time delay between a resetting movement of said sliding pin along said pin braking surface of the guide hole in said second pole unit compared with a resetting movement of said sliding pin along said pin braking surface of the guide hole in said first pole unit.

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**4,748,429**

**SOLENOIDAL MAGNET WITH HOMOGENEOUS MAGNETIC FIELD**

**Guy Aubert, Grenoble, France, assignor to Thomson-CGR, Paris, France**

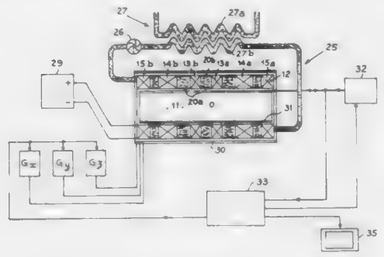
**PCT No. PCT/FR85/00341, § 371 Date Aug. 13, 1986, § 102(e) Date Aug. 13, 1986, PCT Pub. No. WO86/03882, PCT Pub. Date Jul. 3, 1986**

**PCT Filed Nov. 29, 1985, Ser. No. 905,316**

**Claims priority, application France, Dec. 14, 1984, 8419191**

**Int. Cl.[4] H01F** *5/00*

**U.S. Cl. 335—299** **3 Claims**



1. A solenoidal magnet, particularly for NMR applications, of the type including an assembly of Bitter type coils disposed along a common longitudinal axis and symmetrically with respect to a median transverse plane of a zone of interest where the magnetic field reigns, wherein all the coils have substantially the same inner and outer diameter and are connected so as to have the same current flowing therethrough and the lengths of the coils, the distances which separate them axially and their outer diameter are determined so as to give to said field a prescribed homogeneity in said zone of interest with an optimized Power-Mass product.

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**4,748,430**

**AIR-COOLED HIGH-FREQUENCY CURRENT TRANSFORMER**

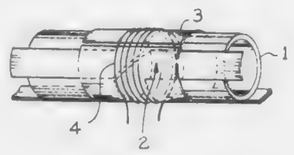
**Noël Guais, Cholet, France, assignor to Thomson-CGR, Paris, France**

**Filed Nov. 17, 1986, Ser. No. 931,087**

**Claims priority, application France, Nov. 19, 1985, 85 17084**

**Int. Cl.[4] H01F** *15/04, 27/28*

**U.S. Cl. 336—84 C** **5 Claims**



1. Air-cooled, high-frequency current transformer comprising, a primary coil made up of a conductive strip wound around an insulating coil base comprising a rectangular central part, the bigger sides of which extend along an initial direction and two parts located at the ends of the central part, with a roughly rectangular shape, the bigger sides of which extend along a second and a third direction which are mutually opposed, the length of the central part measured in the initial direction being determined so that the directions of their bigger sides are colinear in pairs when the central part, taken along the initial direction, is wound around the coil base, wherein the two angles formed at the points where the edges of the parts located at the ends intersect the parts adjacent to the bigger sides of the central part are truncated to prevent the overlapping of the two ends when the central part is wound around the coil base and, a secondary winding with N contiguous turns made of enamelled wire wound on top of the conductive strip.



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**4,748,431**

**ELECTRICAL SWITCHES**

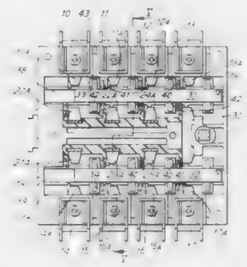
**Arthur J. Saunders, Bucks, and Raymond D. Rochester, Bedford, both of England, assignors to Harvey Hubbell, Ltd., United Kingdom**

**Filed Jul. 13, 1987, Ser. No. 72,393**

**Claims priority, application United Kingdom, Apr. 10, 1987, 8709637**

**Int. Cl.[4] H01H** *85/00*

**U.S. Cl. 337—10** **10 Claims**



1. An electric switch comprising:

a switch housing assembly having a plurality of pairs of fixed contacts;

at least one moving contact carrier having at least one moving contact corresponding to each of said pairs of fixed contacts, said moving contact carrier being arranged for rectilinear sliding movement within said housing along an axis, to bring said moving contacts into or out of engagement with said fixed contacts;

at least one fixed barrier provided within said housing and extending towards said moving contact carrier generally transversely to said axis of movement;

at least a second barrier provided on said moving contact carrier and extending generally transversely to said axis of movement;

the barriers serving to define at least one labyrinthine passage restricting the flow of gas between spaces of said housing each containing cooperating ones of said fixed and moving contacts;

the arrangement being such that as said moving contact carrier moves along said axis towards an open circuit condition of said contacts the respective barriers move towards one another to further restrict said labyrinthine passage;

and, the said housing assembly being provided with gas vents opening from s id spaces to the exterior of said switch housing.

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**4,748,432**

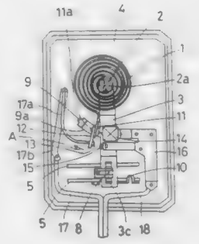
**DEVICE FOR THE AUTOMATIC CONTROL OF ROOM TEMPERATURE IN EXISTING AUTOMOBILES**

**Kiyoshi Yamada, 403, 3-2-21, Kishinosato, Nishinari-ku, Osaka, Japan**

**Filed Sep. 10, 1986, Ser. No. 905,457**

**Int. Cl.[4] H01H** *37/66*

**U.S. Cl. 337—366** **1 Claim**



1. A device for controlling the room temperature of an existing automobile comprising:

a base plate having a support shaft means at one end thereof;

a lever rotatably supported at one end thereof on said support shaft means, said lever extending toward the other end of said base plate, and terminating in a free end;

a temperature-responsive spiral bimetal means supported on the rotatably supported end of said lever; said spiral bimetal means including a spiral portion and a free end, said free end having an insulating plate attached thereto;

an iron piece attached to said insulating plate;

a magnet attached to said base plate in spaced opposed relation to said iron piece;

a contact attached to said insulating plate, said contact being spaced from said free end of said bimetal means and from said iron piece;

a mating contact attached to said base plate in spaced opposed relation to said contact on said insulating plate;

a lead wire means for each said contact and said mating contact for connecting said device in series with a blower motor of an existing automobile;

a knob means attached to said free end of said lever for rotating said lever and said bimetal means therewith; and

a stopper means for releasably retaining said knob means at a position in which said contact and mating contact contact each other regardless of the ambient temperature acting on said spiral bimetal means.

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**4,748,433**

**ELECTRO-CONDUCTIVE ELASTOMERIC DEVICES**

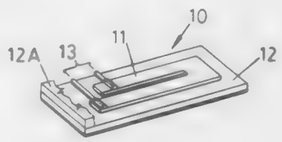
**John Jackson, Lesmahagow, and Seyed A. Angadjivand, Glasgow, both of Scotland, assignors to University of Strathclyde, Glasgow, Scotland**

**Filed Jan. 22, 1986, Ser. No. 821,282**

**Claims priority, application United Kingdom, Jan. 29, 1985, 8502197**

**Int. Cl.[4] G01B** *7/16*

**U.S. Cl. 338—6** **4 Claims**



1. An elastomeric electro-conductive strain gauge device for

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providing within a predetermined range of elastic elongation of the device sensory signals representative of the extent of elastic elongation imposed on the device, said device comprising an elastomeric substrate, an elastomeric electro-conductive member mounted on said elastomeric substrate, conductor means being connected to said member for enabling interconnection of said device to an electrical network, wherein said member and said substrate comprise substantially similar resistance-to-stretch characteristics within said predetermined range of elastic elongation, and wherein, within said predetermined range of elastic elongation, the resistance-to-stretch characteristic $\phi$ of said member and of said substrate is substantially constant and equal in value.

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**4,748,434**

**TAP OR CURRENT COLLECTOR FOR POTENTIOMETERS, DISPLACEMENT PICK-UPS, ETC.**

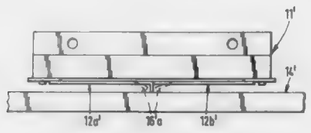
**Ernst Gass, Stuttgart, Fed. Rep. of Germany, assignor to Novotechnik GmbH, Ostfildern, Fed. Rep. of Germany**

**Filed Apr. 17, 1985, Ser. No. 724,085**

**Claims priority, application European Pat. Off., Apr. 21, 1984, 84104530.5**

**Int. Cl.[4] H01C** *10/38*

**U.S. Cl. 338—176** **9 Claims**




1. A tap for potentiometer having a resistance path lying in a preselected plane and adapted to carry an electric signal, and collector means; comprising first and second slider elements adapted to be connected to the same collector means, each of said first and second slider elements having at least one slider finger having contact points at the respective ends thereof, and a common slider carrier mounting both slider elements relative to each other in such a manner that one of said fingers is pulled while the other is pushed in response to the movement of said slider carrier in either direction whereby both slider elements are adapted to connect the resistance path to the same collector means when they are in contact therewith, the improvement comprising prebending the respective fingers of each slider element in such a manner that when the height of the slide carrier is adjusted to a given value above the plane of a resistance path the contact points of all the fingers lie on a common line, so that the influence of any dynamical effects encountered at the reversing points of the path of movement of the tap on a detected electrical signal on the resistance path will be compensated for.

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**4,748,435**

**HIGH-VOLTAGE RESISTANCE WIRE**

**Yoshimi Yukawa; Yoshio Watanabe, and Yoshinori Serizawa, all of Gotenba, Japan, assignors to Yazaki Corporation, Japan**

**Filed Jan. 5, 1987, Ser. No. 432**

**Claims priority, application Japan, Jan. 8, 1986, 61-000796**

**Int. Cl.[4] H01C** *3/06*

**U.S. Cl. 338—214** **11 Claims**




1. A high-voltage ignition resistance wire, comprising:
(a) a resistive conductor;
(b) an insulating layer covering said resistive conductor, said insulating layer having an outer surface; and
(c) a protective sheath layer having an inner surface surrounding said insulating layer and loosely fitted to said insulating layer so as to form a gap between the outer surface of said insulating layer and the inner surface of said protective sheath layer, said protective sheath being formed by applying a resin onto a tubular fiber braided body.

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**4,748,436**

**NOISE PREVENTION HIGH VOLTAGE RESISTANCE WIRE**

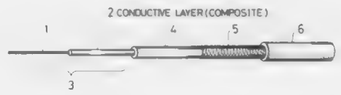
**Yasuo Kanamori, and Masahiro Kanda, both of Shizuoka, Japan, assignors to Yazaki Corporation, Japan**

**Filed May 21, 1987, Ser. No. 52,411**

**Claims priority, application Japan, May 22, 1986, 61-116103**

**Int. Cl.[4] H01C** *3/06*

**U.S. Cl. 338—214** **16 Claims**




1. In a noise prevention high voltage resistance wire including:
a non-metallic reinforcing core wire;
a conductive composite including carbon conductive material and formed so as to cover said reinforcing core wire; and
at least one insulating layer formed so as to cover said conductive composite, the improvement wherein said conductive composite includes gaseous phase growth carbon fiber.

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**4,748,437**

**CONNECTOR FOR A PICTURE TUBE**

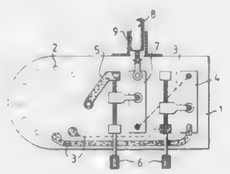
**Walter Goseberg, Hanover, Fed. Rep. of Germany, assignor to Telefunken Fernseh und Rundfunk GmbH, Hanover, Fed. Rep. of Germany**

**Filed Jul. 17, 1986, Ser. No. 886,358**

**Claims priority, application Fed. Rep. of Germany, Jul. 18, 1985, 3525639**

**Int. Cl.[4] H01C** *1/01*

**U.S. Cl. 338—315** **10 Claims**




1. A picture tube connecting device, comprising:
a single insulating part forming a common integral housing;
connector contacts in said common housing, said connector contacts being disposed on a side of said common housing and forming a means for directly mechanically and electrically contacting a picture tube on said side of said common housing; and
conducting means, in said common housing and electrically connected to said connector contacts, for conducting electrical current to the picture tube via said connector contacts, said conducting means including at least one potentiometer in said housing electrically connected to said connector contacts.



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**4,748,438**

**SIGNAL PROCESSING APPARATUS FOR SELECTIVELY FILTERING DIGITAL SIGNAL PARAMETER PACKETS**

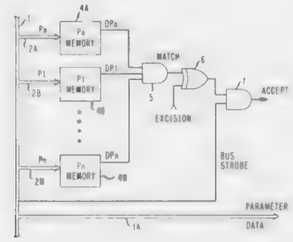
**James F. Mickeal, Ottawa, Canada, assignor to Her Majesty the Queen in right of Canada, as represented by the Minister of National Defence, Ottawa, Canada**

**Continuation of Ser. No. 917,506, Oct. 10, 1986, abandoned. This application Mar. 23, 1987, Ser. No. 38,489**

**Claims priority, application Canada, Oct. 29, 1985, 494096**

**Int. Cl.[4] G06F** *7/02*

**U.S. Cl. 340—146.2** **6 Claims**




1. A direct access filter for a digital signal parameter packet comprising:
a group of memories each containing a stored data signal including predetermined all "1's" or all "0's" at addressable storage locations corresponding to an individual parameter signal, and the other of "1's" or "0's" at its other storage locations;
means for addressing each memory with addressed signals corresponding to parameter signals of a packet to produce an output signal containing all predetermined "1's" or all "0's" if an addressed parameter signal corresponds to said individual parameter signal;
means for comparing the output signals from each memory to provide a match signal if all said output signals are "1's" or "0's" corresponding to the respective stored signal;
means coupled to the comparing means for providing an accept signal if all of said output signals are not "1's" or "0's";
said means for providing an accept signal including an Exclusive-OR gate for receiving the output of said comparing means at one input and an excision signal at another input so that a true signal is provided at its output when the match signal is false and the excision signal is true, and an accept AND gate receiving the output signal from the Exclusive-OR gate at one input and a strobe signal at another input to provide an accept true signal at its output in response to a true signal from said Exclusive-OR gate, said accept AND gate providing a false signal at its output when the match signal input to the Exclusive-OR gate is true and said excision signal is true.

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**4,748,439**

**MEMORY APPARATUS AND METHOD FOR RETRIEVING SEQUENCES OF SYMBOLS INCLUDING VARIABLE ELEMENTS**

**Ian N. Robinson, Mountain View, Calif.; Erik L. Brunvand, Pittsburgh, Pa., and Alan L. Davis, Half Moon Bay, Calif., assignors to Fairchild Semiconductor Corporation, Palo Alto, Calif.**

**Filed Aug. 13, 1985, Ser. No. 765,387**

**Int. Cl.[4] G06F** *7/20*

**U.S. Cl. 340—146.2** **18 Claims**



1. A memory system for the storage and retrieval of one or more data sequences of symbols comprising:
memory means for storing one or more said data sequences of symbols, said symbols including constants, variables, and delimiters;
means for receiving a query sequence of symbols coupled to said memory system, said symbols including constants, variables, and delimiters;
means for retrieving each data sequence of symbols from said memory means corresponding to said query sequence of symbols, a data sequence of symbols being defined as corresponding to said query sequence of symbols if the two sequences can be made identical by replacing each variable by a constant or combination of constants and delimiters, said combination beginning and ending with a delimiter, said retrieving means including means for comparing said query sequence of symbols to each data sequence of symbols stored in said memory means;
wherein said means for retrieving each data sequence of symbols from said memory means corresponding to said query sequence of symbols comprises:
first indicator means for identifying a data sequence symbol;
second indicator means for identifying a query sequence symbol;
comparing means for comparing the data sequence symbol identifed by said first indicating means with the query sequence symbol identified by said second indicator means and for generating an output signal having one of two alternative states, a matched state indicating that the two symbols compared were the same or that at least one of said symbols was a variable, and a not matched state indicating that the two symbols were different and neither was a variable;
flag means responsive to said comparing means output signal for indicating the generation of any output signal being in the not matched state;
indicator advancing means comprising means for causing said first indicator means to indicate the first symbol of a selected data sequence, said second indicator means to indicate the first symbol of said query sequence, and said comparing means to compare said identified symbols, and means for causing said first indicator means to identify a next data sequence symbol, said second indicator means to identify a next query sequence symbol, and said comparing means to compare said identified symbols until a termination condition is detected;
means for detecting said termination condition; and
means responsive to said termination condition for outputting said selecting data sequence if said flag means indi-

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cates that none of said comparisons resulted in the generation of a not matched output signal.

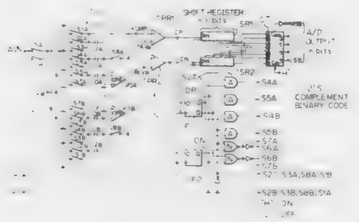
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**4,748,440**

**ANALOG-TO-DIGITAL CONVERSION SYSTEM**

**Osamu Kobayashi, Yokohama, Japan, assignor to Fujitsu Limited, Kawasaki, Japan**

**Filed Sep. 2, 1986, Ser. No. 902,586**
**Claims priority, application Japan, Sep. 2, 1985, 60-192039**
**Int. Cl.[4] H03M *1/00***
**U.S. Cl. 340—347 AD** **16 Claims**




1. An analog-to-digital conversion system for converting an input analog voltage to binary coded digital data in dependence upon a reference voltage, said system comprising:

voltage conversion means, operatively connected to receive an input voltage and the reference voltage, for generating one of three kinds of conversion voltages including—a first conversion voltage equal to double the input voltage, a second conversion voltage equal to the first conversion voltage plus the reference voltage and a third conversion voltage equal to the first conversion voltage minus the reference voltage, the input analog voltage being applied as the input voltage for an initial conversion cycle and the one of the three kinds of conversion voltages just generated being applied as the input voltage for each subsequent conversion cycle;

comparison means, operatively connected to receive first and second decision level voltages, for comparing the input voltage with each of the decision level voltages and outputting an output signal having one of three predetermined values in accordance with the result of the comparison, the first and second decision level voltages having opposite signs and each having an absolute value less than half of the absolute value of the reference voltage;

control means for controlling said voltage conversion means to generate a selected one of the three kinds of conversion voltages in accordance with the output signal from said comparison means; and

calculation means for converting the output signal obtained in a series of cyclic conversions by said voltage conversion means and comparisons by said comparison means into binary coded digital data.

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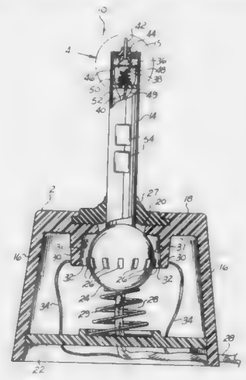
**4,748,441**

**MULTIPLE FUNCTION CONTROL MEMBER**

**Stephen R. M. Brzezinski, 1508 W. Dunham St., South Bend, Ind. 46619**

**Filed Sep. 17, 1986, Ser. No. 908,292**
**Int. Cl.[4] G09G *1/00***
**U.S. Cl. 340—709** **2 Claims**

1. A multiple function control member comprising a housing, said housing including an internal annulus having a bore therethrough defined by peripheral edge, first contacts positioned about said bore peripheral edge, a first control stick including an integral first ball member seated in said annulus, said first ball member including second contacts corresponding with said first contacts to complete an electric circuit upon touching of said first and second contacts, said first control stick also including an internal annulus spaced above said first ball member having a bore there-through defined by peripheral edges, third contacts positioned about said control stick annulus peripheral edge, a second ball member seated in said control stick annulus and including fourth contacts thereon corresponding with said third contacts to complete an electric circuit upon touching of said third and fourth contacts, outwardly accessible joystick means connected to said second ball member for controlling movement of said second ball member, a first series of leads extending from one of said first and second



contacts to a first operational control wherein touching of said first and second contacts activates said first operational control, and a second series of leads extending from one of said third and fourth contacts to a second operational control wherein touching of said third and fourth contacts activates said second operational control whereby said first control stick and said joystick means are operable simultaneously and independently of each other to allow said first and second operational controls to function simultaneously and independently.

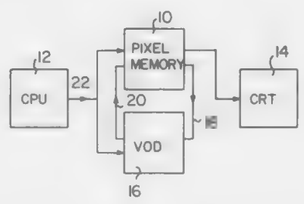
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**4,748,442**

**VISUAL DISPLAYING**

**Robert G. Allaire, One Castle Dr., Acton, Mass. 01720**

**Filed Nov. 9, 1984, Ser. No. 670,365**
**Int. Cl.[4] G09G *1/28***
**U.S. Cl. 340—750** **15 Claims**




1. A raster display system comprising a display having a plurality of picture elements (pixels), a pixel memory for storing data representative of the display, a respective portion of said memory being associated with each of said pixels and means for drawing at each of said pixels a pixel display representative of the data in the portion of said memory associated with the respective pixel, said system being characterized in that:

there is provided a look-up table having a plurality of addressable locations and a data output from each of said locations, the look-up table having input address lines and output data lines connected respectively to outputs from and inputs to said pixel memory;



said system is arranged to read data stored at a selected location of said look-up table and to write the data output from the addressed location into said selected portion of said pixel memory whereby said means draws at the pixel associated with said selected portion of said memory a pixel display representative of said data output from said addressed location;

the addresses of the addressable locations of said look-up table and the data generated by said look-up table each correspond to one of various data each of which is representative of a color of said display;

one of said data is a selected highlight color, a second of said data is a background color, and a third of said data is a color other than said highlight color and said background color;

one of said addresses is said second data and a second of said addresses is data other than said second data, and

said look-up table is arranged to generate modified data comprising said third data when said second data addresses said one address and to generate modified data comprising said first data when data other than said second data is read to said second address.

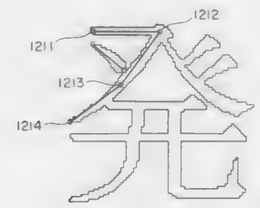
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**4,748,443**

**METHOD AND APPARATUS FOR GENERATING DATA FOR A SKELETON PATTERN OF A CHARACTER AND/OR A PAINTED PATTERN OF THE CHARACTER**

**Tetsuzou Uehara, Tokyo; Tutomu Itoh; Motohide Kokunishi, both of Hachioji, and Toshio Hirosawa, Machida, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Aug. 16, 1985, Ser. No. 766,435**
**Claims priority, application Japan, Sep. 7, 1984, 59-186319**
**Int. Cl.[4] G09G *1/16***
**U.S. Cl. 340—751** **9 Claims**




1. A method for generating data representative of a character skeleton pattern which is to be used to generate a painted character pattern and data representative of the painted character pattern, said character skeleton pattern data representing positions of skeleton points defining line segments each belonging to one of a plurality of basic elements, wherein those basic elements that are representative of the kinds of basic element for forming the character pattern have at least one corresponding line segment characterized by a substantially straight line connecting skeleton points, said method including the steps of:

(a) displaying a predetermined dot matrix pattern of a character on a display screen;

(b) receiving a data signal indicative of a kind of basic element, indicated by an operator, assigned for each line segment of the displayed pattern;

(c) detecting positions of points, indicated by the operator, on the display screen as points which are to be used as skeleton points of each basic line element;

(d) displaying a character skeleton pattern on the displayed screen based upon the detected points and overlapping the corresponding displayed dot matrix pattern;

(e) generating a character outline pattern based upon the assigned kinds of the basic elements and the positions of the indicated skeleton points so that respective portions of the outline pattern corresponding to respective basic elements are formed; and

(f) displaying one of said generated character outline pattern and a character painted pattern which is a painted pattern of the generated character pattern on the display screen in superposition with the dot matrix pattern and the skeleton pattern.

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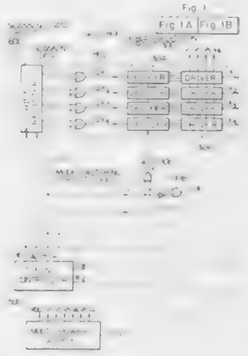
**4,748,444**

**LCD PANEL CMOS DISPLAY CIRCUIT**

**Yasuo Arai, Tokyo, Japan, assignor to OKI Electric Industry Co., Ltd., Tokyo, Japan**

**Filed Nov. 21, 1985, Ser. No. 800,342**
**Claims priority, application Japan, Nov. 22, 1984, 59-247434**
**Int. Cl.[4] G09G *3/36***
**U.S. Cl. 340—784** **4 Claims**






1. An LCD panel CMOS display circuit for line-scanning and controlling an LCD panel having a plurality of X and Y electrodes arranged in a matrix form and having a plurality of liquid crystal display cells between said X and Y electrodes, comprising:

(a) a timing control circuit for generating a serial scanning data signal, a serial display data signal, a first shift clock signal, a second shift clock signal, a first control signal, and a second control signal;

(b) a multi-power source for producing a first group of bias voltages and a second group of bias voltages;

(c) a scanning data converter coupled to said timing control circuit for sequentially converting said scanning data from said timing control circuit in response to said first shift clock signal so as to convert said scanning data into scanning data in a parallel form which are output on a plurality of output lines;

(d) a first gate having a plurality of output lines and coupled to said output lines of said scanning data converter for selectively transmitting said scanning data from said converter in response to said first control signal;

(e) an X-bias selection circuit coupled to said first gate and

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including a plurality of first decoders and a plurality of drivers, each of said plurality of decoders coupled to one of said output lines of said first gate for converting a signal supplied thereto into a specific coded signal in response to a third control signal, each of said plurality of drivers coupled to a different one of said plurality of decoders for delivering a specific one of said first group of bias voltages to one of said X electrodes of said LCD matrix panel in response to its specific coded signal;

(f) a display data holding circuit for converting said serial display data signal into parallel data in response to said second shift clock signal and for selectively outputting said parallel data on a plurality of output lines in response to said first shift clock signal;

(g) a second gate having a plurality of output lines and coupled to said output lines of said display data holding circuit for selectively transmitting said parallel data in response to said first control signal;

(h) a Y-bias selection circuit coupled to said second gate including a plurality of second decoders and a plurality of drivers, each of said plurality of decoders coupled to one of said output lines of said second gate for converting a signal supplied thereto into a specific coded signal in response to a fourth control signal, each of said plurality of drivers coupled to different one of said plurality of decoders for delivering a specific one of said second group of bias voltages to one of said Y electrodes of said LCD matrix panel in response to its specific coded signal; and

(i) a mode switching circuit coupled to said first and second pluralities of decoders for transmitting said second control signal to said first and second pluralities of decoders when said first control signal is in a first logic level, whereby said LCD panel is placed in a display mode, and for ceasing the transmission of said second control signal when said first control signal is in a second logic level, whereby the same bias voltage is provided to said X and Y electrodes of said LCD panel so as to place said LCD panel in a non-display mode.

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**4,748,445**

**MATRIX DISPLAY PANEL HAVING A DIODE RING STRUCTURE AS A RESISTIVE ELEMENT**

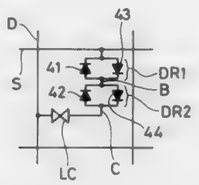
**Seigo Togashi; Kanetaka Sekiguchi; Hiroshi Tanabe; Katsumi Aota; Kazuaki Sorimachi, and Etsuo Yamamoto, all of Tokorozawa, Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan**

**Filed Jul. 5, 1984, Ser. No. 627,987**

**Claims priority, application Japan, Jul. 13, 1983, 58-127407; Mar. 26, 1984, 59-57979**

**Int. Cl.[4] G09G** *3/20*

**U.S. Cl. 340—784** **6 Claims**




1. A matrix display panel having a lattice formed by a plurality of column electrodes and a plurality of row electrodes, and a picture element connected to a said column electrode and to a said row electrode at each division of the lattice, each said picture element comprising:

a display element and a non-linear resistive element connected in series, said non-linear resistive element including a plurality of diode rings connected in series, each said diode ring including a pair of diodes of opposite polarity connected in parallel, each said diode ring being connected to an adjacent diode ring by a single juncture, wherein said plurality of diode rings is formed by a plurality of forward electrodes and a plurality of reverse electrodes, each said forward and reverse electrode being in the form of a strip, the strips of said forward electrodes intersecting the strips of said reverse electrodes, a pair of said diodes of each diode ring being formed at first intersections of a pair of said forward electrode strips with a pair of said reverse electrode strips, each said juncture of the diode ring being formed at a second intersection of said pairs of forward and reverse electrode strips other than said first intersection.

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**4,748,446**

**POSITION CODED PULSE TRAIN**

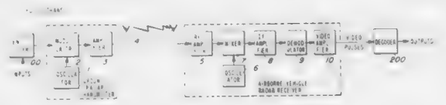
**Robert G. Hayworth, Vienna, Va., assignor to Vega Precision Laboratories, Inc., Vienna, Va.**

**Filed Oct. 19, 1983, Ser. No. 543,420**

**The portion of the term of this patent subsequent to May 26, 2004, has been disclaimed.**

**Int. Cl.[4] H04Q** *9/14;* **H04B** *9/00;* **B64C** *13/20*

**U.S. Cl. 340—825.640** **3 Claims**



1. In a communication system wherein a plurality of remote vehicles receive command control signals for a radar station via a plurality of pulse trains, a position coded electrical pulse train for transmitting the command signals, said pulse train comprising:

first and second pulses, the leading edges of which are separated by a first interpulse interval, the duration of the first interpulse interval being chosen to indicate the address of the particular remote vehicle being controlled;

a third pulse wherein the leading edges of the second and third pulses are separated by a second interpulse interval, the duration of the second interpulse interval being chosen to indicate channel information; and

a fourth pulse wherein the leading edges of the fourth and third pulse are separated by a third interpulse interval, the duration of the third interpulse interval being chosen to indicate the address of the vehicle being controlled and wherein the leading edges of the fourth and second pulses are separated by a fourth interpulse interval, the duration of the fourth interpulse interval being chosen to indicate the channel information such that the third and fourth interpulse intervals can be used to verify information contained within the first and second interpulse interval and thereby confirm the address and channel information being transmitted.

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**4,748,447**

**TIMING SIGNAL GENERATING APPARATUS FOR ROTATING DEVICES**

**Hidekazu Oshizawa, Higashimatsuyama, Japan, assignor to Diesel Kiki Co., Ltd., Japan**

**Filed Jun. 5, 1986, Ser. No. 870,787**

**Claims priority, application Japan, Jun. 13, 1985, 60-127113**

**Int. Cl.[4] G08B** *29/00*

**U.S. Cl. 340—870.20** **8 Claims**

1. A timing signal generating apparatus for rotating devices which outputs a timing signal showing that a rotating member of the rotating device has reached a target rotational angle position, said apparatus comprising:

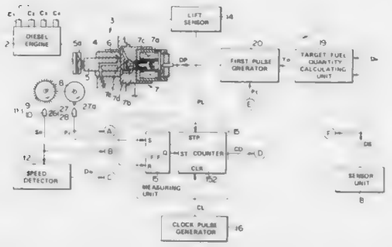
means producing a first data representing a target rotational angle position as an angular position of said rotating member;



a first generating means generating scale pulses every time said rotating member rotates N degrees;

a second generating means generating a reference pulse used for discriminating a prescribed scale pulse from scale pulses generated by the first generating means;

a calculating means, responsive to the first data which performs a calculation in which the target rotational angle position is the dividend and N is the divisor and outputs first and second calculation data which are determined in relation to a quotient A and a remainder B, respectively, for producing first calculating data,



a first means responsive to the reference pulse, the scale pulses and the first calculating data producing a first timing pulse indicating a timing when the rotating member has assumed a rotational angle position indicated by N x A; and

a second means producing a second timing pulse with a pulse width determined according to the second calculating data in response to the first timing pulse.

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**4,748,448**

**REMOTE SENSING APPARATUS FOR SATELLITES**

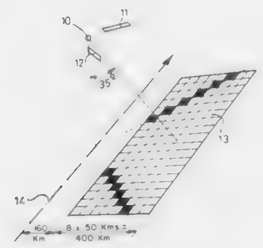
**Alan Thompson, Ryde, United Kingdom, assignor to Agence Spatiale Europeenne, France**

**Filed Jun. 28, 1983, Ser. No. 508,541**

**Claims priority, application France, Jun. 29, 1982, 82 11447**

**Int. Cl.[4] G01S** *13/84, 13/95*

**U.S. Cl. 342—26** **9 Claims**



1. Remote sensing apparatus for use on board a satellite for sensing the differing values of a variable geophysical parameter in a plurality of measurement cells definable in at least one elongated region of the surface of the earth adjacent to the satellite ground track, said variable parameter altering the back-scatter coefficient of radar signal echos, said apparatus comprising: transmitter-receiver means for illuminating said region with radar signals and receiving echos therefrom, said transmitter-receiver means including at least one frequency scanning antenna means, said transmitter-receiver means including control means for energizing said antenna means to transmit a succession of radar beams, each of said radar beams being transmitted at a predetermined angle of incidence to the earth's surface and illuminating a cell in said region, each of said radar beams having a predetermined frequency and transmission power output selected in accordance with the transmission angle of incidence, said control means energizing said antenna means at substantially the same transmission power for time periods of differing lengths, thereby to control the transmission power output of said antenna means for each of said radar beams, and said transmitter-receiver means including signal processing means coupled to said antenna means for obtaining back-scatter coefficient properties of the radar signal echos and the values of the variable geophysical parameter.

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**4,748,449**

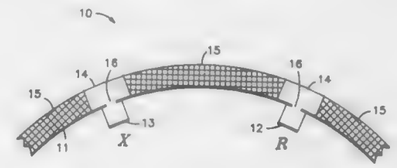
**RF ABSORBING ABLATING APPARATUS**

**James F. Landers, Jr., Tempe; R. Gordon Graham, Mesa, and Theodore Harp, III, Scottsdale, all of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Apr. 2, 1984, Ser. No. 595,868**

**Int. Cl.[4] H01Q** *17/00*

**U.S. Cl. 343—705** **5 Claims**




1. An RF absorbing, ablating apparatus comprising:

a body;

a transmission device being attached to said body;

a receiving device being attached to said body and spaced from said transmission device;

an ablating material including ethylenetetrofluoroethylene covering said transmission and receiving devices; and

an RF absorbing ablator covering said body between said ablating material covering said transmission and receiving devices, said absorbing ablator including ethylenetetrofluoroethylene having an RF absorbing material mixed therewith.

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**4,748,450**

**VEHICULAR MULTIBAND ANTENNA FEEDLINE COUPLING DEVICE**

**John N. Hines, Morristown, and Robert E. Myer, Denville, both of N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Jul. 3, 1986, Ser. No. 881,761**

**Int. Cl.[4] H01Q** *1/32*

**U.S. Cl. 343—820** **7 Claims**

1. A multiband antenna feedline coupling arrangement comprising:

a first transmission line segment having first and second conductors for providing energy transmission for a plurality of bands including a low band signal and a high band signal, said high band signal appearing on the first and second conductors and the low band signal appearing on said second conductor,

a second transmission line segment for providing energy transmission for the high band signal having a signal path and a ground return path, the signal path of the second transmission line segment being connected to the first conductor of the first transmission line segment,

a capacitor connected in series between the second conductor of the first transmission line segment and the ground return path of said second transmission line segment for presenting a much lower impedance to the frequencies of the high band signal than to the frequencies of the low band signal,

a third transmission line segment having a signal path and a

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ground return path for providing energy transmission for the frequencies of the low band signal including frequencies lower than frequencies in the high band signal, the third transmission line segment having a signal path and a ground return path and presenting a much lower impe-



dance to frequencies of the low band signal than is presented by said capacitor, and

means for connecting the third transmission line segment signal path to the second conductor of the first transmission line segment.

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**4,748,451**

**ADJUSTABLE BRACKET MOUNT**

**Ivan J. Edwards, 1200 Holiday Pl., Bossier City, La. 71112**

**Continuation-in-part of Ser. No. 529,484, Sep. 6, 1983, Pat. No. 4,565,346. This application Sep. 30, 1985, Ser. No. 782,024**

**The portion of the term of this patent subsequent to Jan. 21, 2003, has been disclaimed.**

**Int. Cl.[4] H01Q** *1/08*

**U.S. Cl. 343—880** **32 Claims**



1. In a satellite antenna having an antenna dish and a feed assembly, an adjustable bracket mount for supporting the feed assembly above the antenna dish comprising:

(a) a base for mounting on the antenna dish

(b) a bottom support provided in telescoping cooperation with said base;

(c) an offset bracket having a bottom support collar provided in telescoping cooperation with said bottom support above said base, with the center transverse axis of said bottom support collar oriented in a first plane; a top support collar spaced from said bottom support collar, with the center transverse axis of said top support collar oriented in a second plane, said second plane being parallel to said first plane; and a sloping, flat web spanning said bottom support collar and said top support collar;

(d) a top support provided in telescoping cooperation with said top support collar; and

(e) a top bracket having a top bracket collar provided in telescoping cooperation with said top support, said top bracket characterized by a bracket plate carried by said top bracket collar and a pair of inwardly curving bracket fingers projecting from said bracket plate for supporting the feed assembly.

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**4,748,452**

**METHOD OF PRODUCING AN IDENTIFICATION CARD**

**Thomas Maurer, Munich, Fed. Rep. of Germany, assignor to GAO Gesellschaft fur Automation und Organisation mbH, Munich, Fed. Rep. of Germany**

**Division of Ser. No. 602,079, Apr. 19, 1984, Pat. No. 4,597,593. This application Mar. 25, 1986, Ser. No. 843,617**

**Claims priority, application Fed. Rep. of Germany, Apr. 20, 1983, 3314327**

**Int. Cl.[4] G01D** *09/42;* **B42D** *15/00*

**U.S. Cl. 346—1.1** **6 Claims**



1. A method for visibly encoding an indentification card having alphanumeric characters present in a high-embossed form capable of use as a printing block and intermediate areas of card material between the embossed areas and non-embossed areas at which the surface of the card is inclined with respect to the plane of the card, comprising the steps of:

(a) feeding the personalized card to a laser recording apparatus; and

(b) encoding the card by inscribing a security pattern on at least a portion of the card material including the embossed characters in the form of, for example, lines, guilloches or characters, by means of the laser beam recorder such that the color of the card material is changed by the inscription and the security pattern extends over intermeidate and non-embossed areas of the card so that, when observed normally with respect to the card plane, the security pattern appears free of distortion.

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**4,748,453**

**SPOT DEPOSITION FOR LIQUID INK PRINTING**

**Larry W. Lin, Cupertino; Stuart L. Claassen, Santa Clara, and Chein-Hwa Tsao, Burlingame, all of Calif., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Jul. 21, 1987, Ser. No. 76,088**

**Int. Cl.[4] G01D** *15/16*

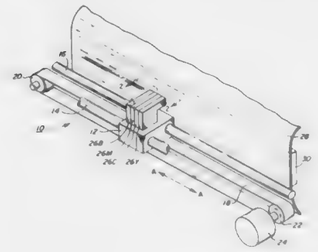
**U.S. Cl. 346—1.1** **8 Claims**

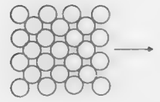
1. A method for improving graphic image formation generated by a liquid ink spot printing system so as to prevent non-uniform printing caused by ink beading, said method being characterized by depositing spots of liquid ink on selected abutting horizontal and vertical pixel areas on a substrate and comprising the steps of

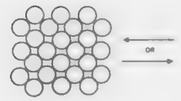
providing a substrate,

providing liquid ink spot producing means adjacent said substate capable of simultaneously depositing a number of spots onto said substrate on command, selectively energizing said liquid ink spot producing means for producing droplets of liquid ink and for propelling said droplets to said substrate where they form liquid ink spots, for depositing a first pattern of ink spots on an area of said substrate, including first spots located upon alternating horizontal and vertical pixel areas, each of said first spots being of a size so that diagonally adjacent ones are substantially in perimeter contact, and for depositing a second pattern of ink spots on said area of said substrate, including second









spots located upon alternating horizontal and vertical pixel area, each of said second spots being of a size so that diagonally adjacent ones are substantially in perimeter contact, said second pattern being complementary to said first pattern.

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**4,748,454**

**DEVICE FOR INDICATING WAVEFORM POSITION OF A DOT ARRAY RECORDER**

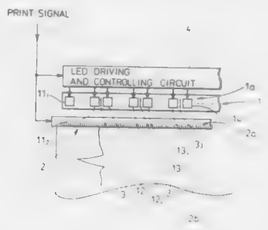
**Hiroshi Ikeda, and Katsuhiro Adachi, both of Tokyo, Japan, assignors to Nihon Kohden Corporation, Tokyo, Japan**

**Filed May 12, 1987, Ser. No. 49,123**

**Claims priority, application Japan, May 16, 1986, 61-73765[U]**

**Int. Cl.[4] G01D** *9/00;* **B41J** *29/42*

**U.S. Cl. 346—17** **4 Claims**




1. A device for indicating the position of a waveform to be recorded by a dot array recorder comprising:

a dot array head having an array of dot printing elements arrranged in a plurality of groups and for effecting dot printing at positions corresponding to the levels of an input print signal;

an LED array having an array of LEDs arranged at positions corresponding to the respective groups of said dot printing elements;

a mark provided between at least a pair of LEDs which belong to two adjacent groups of said dot printing elements, and at a position where a reference line of said recorder is to be placed; and

an LED driving and controlling circuit electrically coupled to the LED array for driving the LEDs, the LEDs arranged at positions corresponding to the respective groups of said dot printing elements being driven when said input print signal is at a level which corresponds to said respective groups of said dot printing elements, the LED driving and controlling circuit being adapted to drive said pair of LEDs intermittently to allow the position of the waveform to be recorded to be aligned at the mark between said pair of LEDs.

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**4,748,455**

**SYSTEM FOR DRIVING A THERMAL PRINT HEAD**

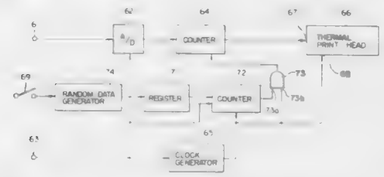
**Masaaki Mori, Kawasaki, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan**

**Continuation of Ser. No. 523,037, Aug. 12, 1983, abandoned. This application Apr. 28, 1986, Ser. No. 858,534**

**Claims priority, application Japan, Jan. 20, 1983, 58-7602**

**Int. Cl.[4] G01D** *15/10*

**U.S. Cl. 346—76 PH** **10 Claims**




1. A system for driving a thermal print head including a plurality of heat-producing elements and storing means for temporarily storing data for one print line to be supplied to said plurality of heat-producing elements, said system comprising:

first means for forming inverted data by inverting the data of one print line read out of said storing means;

second means for (i) forming preheat control data by subjecting said inverted data to AND processing with corresponding data of a next following print line which immediately follows said one print line each time said inverted data has been formed by said first means and (ii) storing said preheat control data in said storing means; and

means for supplying said preheat control data stored in said storing means to said plurality of heat-producing elements at predetermined timing.

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**4,748,456**

**PHOTOPLOTTER FOCUS METHOD**

**E. Thomas Luoma, 1555 Pleasant Hill Rd., Lafayette, Calif. 94549, and Max P. Henzi, 5706 Lewis Way, Concord, Calif. 94521**

**Filed Feb. 24, 1987, Ser. No. 17,491**

**Int. Cl.[4] G01D** *9/42, 9/00;* **G03B** *41/00;* **G01C** *3/08*

**U.S. Cl. 346—107 R** **15 Claims**

1. A method for obtaining the proper focus for a multiple light source raster photoplotter and accounting for differing print media thicknesses, the photoplotter having a light source mounting head positioned over a bed, comprising the following steps:

mounting the light sources to the mounting head, the mounting head having a datum surface, the light sources having focal points a common distance from the datum surface;

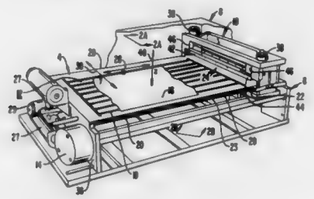
positioning the mounting head over the bed;

moving the mounting head towards the bed until the datum surface touches the bed; and

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moving the mounting head away from the bed a chosen distance, the chosen distance being uniform between the



datum surface and the bed, the chosen distance selected to achieve a desired focus for a print medium of a certain thickness.

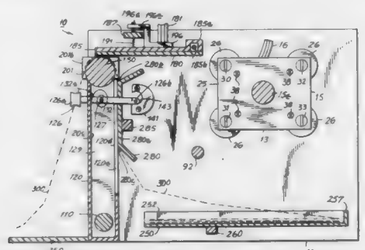
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**4,748,457**

## RECORDING DEVICE FOR RECORDING INFORMATION ON A PAPER MEDIUM

**Phillipp J. Quedens, Hartford, Conn., assignor to American Home Products Corporation (Del.), New York, N.Y.**

**Filed Jan. 5, 1987, Ser. No. 488**
**Int. Cl.[4] G01D** *15/24*
**U.S. Cl. 346—136** **15 Claims**



**1**. A recording device for recording information on a major surface of a paper medium comprising:

storage means for holding and dispensing the paper medium in a particular dispensing direction, said storage means having a generally horizontal storage surface with a side edge, the paper medium resting on said storage surface with its major surface parallel to the storage surface, said storage surface being at an acute angle with respect to the horizontal plane, said acute angle being in a plane generally orthogonal to said particular dispensing direction such that the paper is urged toward the side edge of said storage surface;

storage guide means located towards the side edge of said storage surface and intercepting the paper medium which is urged toward the side edge so as to align the paper medium, said storage guide means extending in a first plane which is generally parallel to the paper dispensing direction and generally orthogonal to the said storage surface; and

paper guide means for guiding one edge of the paper during its movement in a certain direction from said storage means to a location where said information is recorded thereon, said paper guide means extending in a second plane which is generally parallel to the paper movement direction and generally orthogonal to the paper surface, said second plane being at a fixed lateral distance from said first plane in a direction toward the center of the paper medium major surface such that said paper medium is urged against said paper guide means by stress created in the paper medium due to the lateral displacement of said second plane with respect to said first plane.

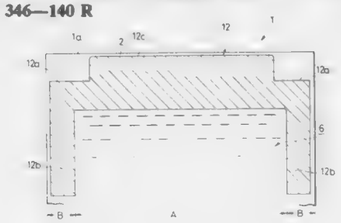
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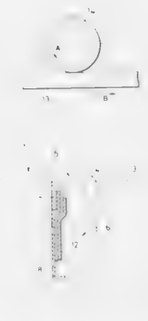
**4,748,458**

## THERMAL ELECTROSTATIC INK-JET RECORDING APPARATUS

**Nanao Inoue; Koichi Saito; Eiichi Akutsu; Yoshihiko Fujimura, and Kiyoshi Horie, all of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan**

**Filed May 1, 1987, Ser. No. 44,955**
**Claims priority, application Japan, May 7, 1986, 61-103133**
**Int. Cl.[4] G01D** *15/16*
**U.S. Cl. 346—140 R** **8 Claims**





**1**. An ink jet recording apparatus for applying both electric energy and thermal energy to a liquid coloring agent to thereby jet said liquid coloring agent toward a counter electrode provided for supporting a recording medium, comprising:

(a) means for containing said liquid coloring agent, said containing means comprising a pair of spaced apart, opposing plate members, each having an inner surface and at least one edge, said edges of said plate members defining an orifice portion for jetting said liquid coloring agent through said orifice portion;

(b) thermal energy applying means for heating said liquid coloring agent contained in said containing means, said thermal energy applying means comprising a plurality of heating elements arrayed on an inner surface of one of said plate members; and

(c) electrostatic energy applying means for applying an electric field to said liquid coloring agent contained in said containing means, said electric energy applying means comprising a counter electrode and an electrically conductive layer provided on one of said plate members, said electrically conductive layer having a central portion where said liquid coloring agent is present and having a peripheral portion where said liquid coloring agent is absent, said central portion extending substantially to said orifice portion, said peripheral portion being spaced away from said orifice portion.

**2**. An ink-jet recording apparatus according to claim **1**, wherein each of said heating elements comprises an exothermic resistor.



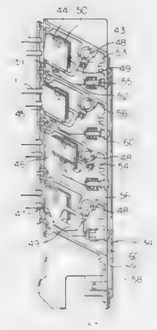
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**4,748,459**

## INK JET RECORDING APPARATUS AND CAPPING DEVICE

**Hiroo Ichihashi, Hiratsuka; Masakazu Ozawa, Ebina; Ryuichi Ebinuma, Hiratsuka, and Atsushi Saito, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Jul. 21, 1986, Ser. No. 887,722**
**Claims priority, application Japan, Jul. 25, 1985, 60-163017; Jul. 25, 1985, 60-163018; Jul. 26, 1985, 60-164030; Jul. 29, 1985, 60-165815**
**Int. Cl.[4] G01D** *15/16*
**U.S. Cl. 346—140 R** **14 Claims**



**1**. A capping device provided with a support frame of substantially L-shaped cross-section contained in a frame and supporting an ink absorbing member inside thereof, and a throttle plate in contact with the underside of said absorbing member and disposed substantially parallel to said support frame, said capping device being so disposed that the rear end edge of said throttle plate opposite to a recording head is situated vertically below the side edge surface of the recording head.

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**4,748,460**

## SELF-CONTAINED NON-CONTACT WRITING DEVICE

**Michael J. Piatt, Enon, and Harry V. March, Beavercreek, both of Ohio, assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Jan. 9, 1987, Ser. No. 1,775**
**Int. Cl.[4] G01D** *15/16;* **B43K** *8/00*
**U.S. Cl. 346—140 R** **3 Claims**



**1**. A self-contained, non-contact writing device for use with a drop-on-demand ink jet writing/cartridge of a type having a self-contained ink supply and jetting means for ejecting ink droplets, said device comprising:

a. inner housing means for retaining such a writing/cartridge;

b. circuit means for energizing the jetting means of a retained writing/cartridge to produce a writing stream of ink droplets;

c. conductor means, mounted on said inner housing means, for providing electrical contact between said circuit means and a retained writing/cartridge;

d. switching means coupled to said circuit means for activating said circuit means;

e. spacer means, coupled to said inner housing means, for providing proper spacing between the jetting means of a retained writing/cartridge and a writing substrate; and

f. outer housing means being slidably mounted on said inner housing means and constructed and located for the holding of said device during writing, said switching means being responsive to the movement of said outer housing means over said inner housing means and toward said spacer means to activate said circuit means.

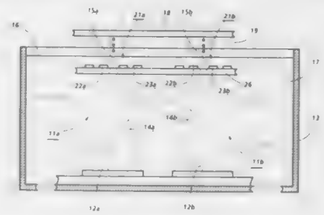
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**4,748,461**

## CAPILLARY WAVE CONTROLLERS FOR NOZZLELESS DROPLET EJECTORS

**Scott A. Elrod, Menlo Park, Calif., assignor to Xerox Corporation, Stamford, Conn.**

**Continuation of Ser. No. 921,893, Oct. 22, 1986, abandoned, which is a continuation of Ser. No. 820,045, Jan. 21, 1986, abandoned. This application Jun. 25, 1987, Ser. No. 65,137**
**Int. Cl.[4] G01D** *15/16*
**U.S. Cl. 346—140 R** **18 Claims**



**1**. In combination with a nozzleless droplet ejector having a pool of liquid with a free surface, and means for launching an acoustic wave into said pool such that said acoustic wave comes to a focus approximately at said free surface to exert a radiation pressure thereagainst, the improvement comprising a capillary wave emission controller for said ejector; said controller including

a conductor and a counter electrode, said conductor being shallowly immersed in said pool and being proximate to the focus of said acoustic wave, and

means coupled across said conductor and said counter electrode for applying voltage pulses thereacross on command to cause freely propagating capillary surface waves to radiate from said conductor, whereby said capillary waves interact with said radiation pressure to control at least one emission characteristic of said ejector.

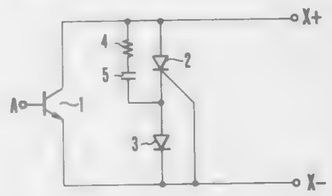
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**4,748,462**

## STARTING ARRANGEMENT FOR FLASH DEVICE

**Tadashi Okino, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 10, 1985, Ser. No. 807,289**
**Claims priority, application Japan, Dec. 13, 1984, 59-263660; Dec. 18, 1984, 59-266778**
**Int. Cl.[4] G03B** *15/05*
**U.S. Cl. 354—145.1** **20 Claims**




**1**. An adaptor to be interposed between an image sensing

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device and a flash device for synchronizing of said flash device with said image sensing device, comprising:

(a) a first switch arranged to shift from a first state thereof to a second state in response to an image sensing device, said first switch being a transistor; and

(b) a second switch for shifting from a first state to a second state in response to the shift of said first switch from the first state to the second state, said second switch being a thyristor and being arranged to cause said flash device to flash when said second switch shifts from the first state to the second state and to be brought back to the first state by said first switch when in the second state.

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**4,748,463**

## PRINTING APPARATUS

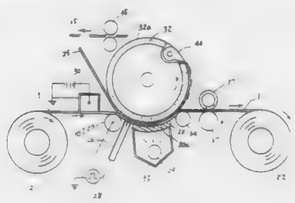
**Noboru Katakabe, Uji, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Sep. 9, 1986, Ser. No. 905,076**

**Claims priority, application Japan, Sep. 10, 1985, 60-199713; Sep. 10, 1985, 60-199722**

**Int. Cl.⁴ G01D** *15/00*

**U.S. Cl. 346—153.1** **3 Claims**



1. A printing apparatus for transferring ink from an ink sheet including a support layer, a conductive light reflective layer on one surface of the support layer and an ink layer on the other surface of the support layer onto a recording sheet, said apparatus comprising:

a supply means for supplying the ink sheet;

means for moving the ink sheet in a printing direction;

electrosensitive recording means for selectively passing an electric discharge current through a part of the conductive light reflective layer of the ink sheet to remove the part of the conductive light reflective layer from the ink sheet;

a cylindrical drum disposed downstream of the electrosensitive recording means in the printing direction, said cylindrical drum for holding the recording sheet on the cylidrical outer peripheral surface thereof, and means for rotating said drum in synchronism with the movement of the ink sheet;

overlaying means for overlaying the ink sheet on the recording paper with the ink layer contacting the recording paper;

a stationary transparent plate having a curved surface opposing and generally conformed to the outer cylindrical surface of said cylindrical drum,

said transparent plate for continuously pressing, along said curved surface thereof, the ink sheet overlaid on the recording paper against the outer cylindrical surface of said cylindrical drum; and

transfer means for transmitting light through said transparent plate to irradiate the ink layer through the conductive light reflective layer to melt a part of the ink layer corresponding to the removed part of the conductive light reflective layer onto the recording sheet.

**4,748,464**

## IMAGE-FORMING ELEMENT FOR AN ELECTROSTATIC PRINTER HAVING ELECTRODES IN THE FORM OF A GRID

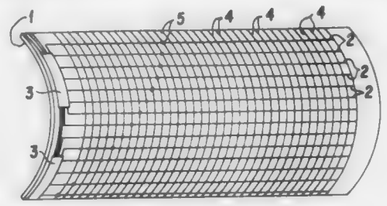
**Reinder Pannekoek, Venlo; Adrianus J. M. van Genuchten, Grubbenvorst, and Peter G. La Vos, Baarlo, all of Netherlands, assignors to Oce-Nederland B.V., Venlo, Netherlands**

**Filed Apr. 29, 1987, Ser. No. 43,877**

**Claims priority, application Netherlands, May 29, 1986, 8601376**

**Int. Cl.⁴ G01J** *15/10*

**U.S. Cl. 346—155** **9 Claims**



1. An image-forming element for an electrostatic printer comprising: an endless support with a dielectric surface layer thereon; a plurality of first electrodes provided beneath the dielectric surface layer, the first electrodes being insulated from one another and extending in the form of endless paths parallel to one another in the peripheral direction of the support; a plurality of second electrodes provided beneath the first electrodes, the second electrodes being insulated from one another, extending from a point near one end of the support in the direction of the other end of the support, and being electrically connected to only one of the first electrodes; and a voltage means for supplying voltage to the second electrodes.

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**4,748,465**

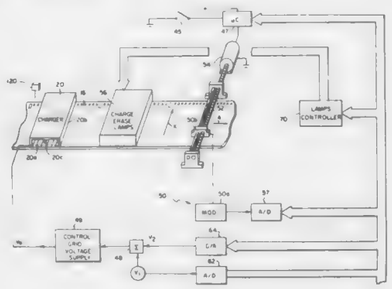
## METHOD AND APPARATUS FOR CONTROLLING CHARGE ON A PHOTOCONDUCTOR

**George N. Tsilibes, Rochester, and Allen J. Rushing, Webster, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Continuation-in-part of Ser. No. 538,294, Oct. 3, 1983. This application Sep. 9, 1986, Ser. No. 905,609**

**Int. Cl.⁴ G01D** *15/10*

**U.S. Cl. 346—160** **65 Claims**



1. In an electrophotographic reproduction apparatus including a member having a surface upon which an electrostatic latent image may be formed; means for charging the surface with an electrostatic charge; means for moving the surface relative to the charging means in a first direction; exposure means for exposing the charged surface to image-bearing radiation to form the latent image; measuring means for measuring the level of charge deposited on the surface by said charging means and charge-reducing means for reducing the level of charge on the surface to a referenced level, the improvement which comprises:

first means for controlling the measuring means to cause the measuring means to measure the level of charge at each of a plural number of locations lying across the surface in a second direction transverse to the first direction and to provide a signal commensurate with each such measurement; and

second means responsive to signals from the measuring means for controlling the charge-reducing means to selectively reduce the charge level at each of those transverse locations having a level of charge greater than said referenced level in accordance with the difference in charge level measurement for each such transverse location and the referenced level.



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**4,748,466**

## CAMERA PROVIDED WITH A LIGHT-SHIELDING MEANS

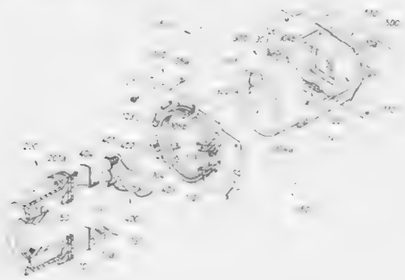
**Minoru Yamada; Kenji Miyama, both of Hachioji; Masataka Sawamura, Hino, and Eiji Ito, Hachioji, all of Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan**

**Filed Sep. 29, 1986, Ser. No. 913,135**

**Claims priority, application Japan, Oct. 3, 1985, 60-221243**

**Int. Cl.⁴ G03B** *3/00, 17/04*

**U.S. Cl. 354—187** **7 Claims**



1. A camera provided with a lens having a first optical axis forming an optical path and a light-shielding apparatus and having a collapsible barrel wherein a fixed, cylindrical light-shielding member is provided between a movable portion of said barrel and a frame of the camera body, said member terminating adjacent a film surface, said barrel surrounding said member and with respect thereto, along said first optical axis between a projecting position in which said barrel extends from said camera and a collapsed position wherein said barrel is retracted into said camera, there being a clearance between said barrel and said member, said barrel at least partially overlapping said member when in said projecting position.

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**4,748,467**

## MOUNT ARRANGEMENT AND INTERCHANGEABLE LENS UNIT FOR PHOTOGRAPHIC CAMERA

**Yukio Maekawa; Tsuneyo Metabi, and Masatake Niwa, all of Sakai, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Continuation of Ser. No. 748,647, Jun. 25, 1985, Pat. No. 4,620,780, which is a continuation of Ser. No. 645,939, Aug. 30, 1984, Pat. No. 4,536,071. This application Jul. 31, 1986, Ser. No. 891,999**

**Claims priority, application Japan, Sep. 2, 1983, 58-162362**

**Int. Cl.⁴ G03B** *17/00*

**U.S. Cl. 354—286** **10 Claims**

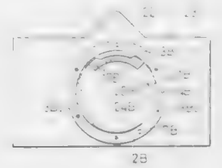
1. In a lens interchangeable photographic camera capable of automatic diaphragm control and automatic focusing and including a bayonet mount device which is adapted to mount and demount an interchangeable lens unit to and from a camera body through predetermined angle clockwise rotation and counterclockwise rotation of said lens unit relative to said camera body as viewed from the front of said camera, respectively, a mount arrangement comprising:

a lens unit mount member fixedly provided on said lens unit, and having bayonet claws and an annular mount face formed forwardly of said bayonet claws;

a camera body mount member fixedly provided on said camera body, and having an annular mount face arranged to be brought into contact with said mount face of said lens unit mount member with the mounting of said lens unit on said camera body completed and bayonet claws formed rearwardly of said mount face of said camera body mount member so as to be engageable with said bayonet claws of said lens unit mount member, said bayonet claws of said lens unit mount member and said bayonet claws of said camera body mount member constituting said bayonet mount device;

a positioning recess located on said mount face of said lens unit mount member at an immediate left side portion of said lens unit mount member as viewed from the rear of said lens unit with the mounting of said lens unit on said camera body completed;

a positioning member provided on said mount face of said camera body mount member at an immediate right side portion of said camera body mount member and urged to project from said mount face of said camera body mount member for engaging said positioning recess with the mounting of said lens unit on said camera body completed;



a driven shaft for the automatic focusing, provided on said mount face of said lens unit mount member at a lower left side portion of said lens unit mount member as viewed from the rear of said lens unit with the mounting of said lens unit on said camera body completed and angularly spaced from said positioning recess by an angle which is larger than said predetermined angle for the mounting and demounting of said lens unit to and from said camera body;

a driving shaft for the automatic focusing, provided on said mount face of said camera body mount member at a lower right side portion of said camera body mount member as viewed from the front of said camera body and arranged to be engageable with said driven shaft with the mounting of said lens unit on said camera body completed for driving said driven shaft;

lens unit electrical contacts having contact surfaces provided along the inner peripheral side of the upper portion of said lens unit mount member with the mounting of said lens unit on said camera body completed, the contact surfaces of said lens unit electrical contacts being arranged rearwardly of said mount face of said lens unit mount member and forwardly of the rear faces of said bayonet claws of said lens unit mount member:

camera body electrical contacts having contact surfaces provided along the inner peripheral side of an upper portion of said camera body mount member, the contact surfaces of said camera body electrical contacts being arranged rearwardly of said mount face of said camera body mount member so as to be brought into contact with

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the contact surfaces of said lens unit electrical contacts with the mounting of said lens unit on said camera body completed for signal transmission between said lens unit and said camera body;

a diaphragm interlocked member for the automatic diaphragm control, provided at the inner peripheral side of a left side portion of said lens unit mount member as viewed from the rear of said lens unit with the mounting of said lens unit on said camera body completed and having a rear end portion arranged rearwardly of said mount face of said lens unit mount member and forwardly of the contact surfaces of said lens unit electrical contacts; and

a diaphragm operating member for the automatic diaphragm control, provided at the inner peripheral side of a right side portion of said camera body mount member as viewed from the front of said camera body and having a front end arranged rearwardly of said mount face of said camera body mount member and forwardly of the contact surfaces of said camera body electrical contacts, said rear end portion of said diaphragm interlocked member and said front end portion of said diaphragm operating member being engageable with one another with the mounting of said lens unit on said camera body completed.

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**4,748,468**

## EXPOSURE DISPLAY DEVICE

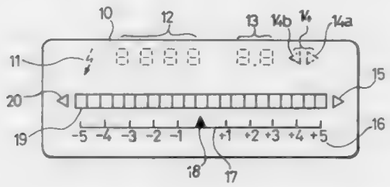
**Akihiko Fujino; Shuji Izumi, both of Sakai; Masaaki Nakai; Hiromu Mukai, both of Kawachinagano; Toshio Yamaki, Osaka, and Nobuyuki Taniguchi, Nishinomiya, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed Feb. 4, 1987, Ser. No. 10,967**

**Claims priority, application Japan, Feb. 17, 1986, 61-30987; Feb. 17, 1986, 61-30988**

**Int. Cl.[4] G03B** *3/00, 17/18, 7/28*

**U.S. Cl. 354—402** **12 Claims**




1. Exposure display device for a camera including a photographing lens, comprising:

means for measuring the brightness of an object field to be photographed by the photographing lens by dividing the object field into a plurality of sections to produce a plurality of brightness signals corresponding to the brightness of each section;

means for focusing the photographing lens with respect to a primary object located in a predetermined focusing area;

means for calculating a controlled exposure value used in the photographing operation of the camera, and an exposure value range corresponding to the brightness distribution in the object field reproduced on a film on the basis of the plurality of brightness signals; and

means for displaying the controlled exposure value, the exposure value range, and an exposure value corresponding to the brightness in the predetermined section of the object field corresponding to the predetermined focusing area.

**4,748,469**

## DISTANCE MEASURING DEVICE FOR CAMERA

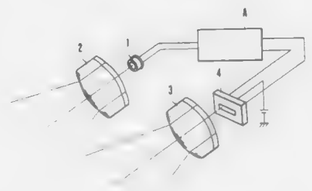
**Shuichi Tamura, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Japan**

**Continuation of Ser. No. 16,996, Feb. 19, 1987, abandoned, which is a continuation of Ser. No. 730,326, May 3, 1985, abandoned. This application Sep. 23, 1987, Ser. No. 102,828**

**Claims priority, application Japan, May 7, 1984, 59-90323; Apr. 24, 1985, 60-87821**

**Int. Cl.[4] G03B** *3/00;* **G01C** *3/08*

**U.S. Cl. 354—403** **46 Claims**




1. A distance measuring device for a camera capable of measuring distances of a plurality of points in a photographic scene area by projecting distance measuring signals to the points and receiving the signals reflected from the points, comprising:

(A) signal emitting means for projecting the distance measuring signals to the plurality of points in the scene area, said signal emitting means emitting a distance measuring signal of greater intensity to a central portion of the scene area than a distance measuring signal emitted by said signal emitting means to a marginal portion of the scene area, and said signal emitting means comprising:

(A-1) first light emitting means for projecting the distance measuring signal to the central portion of the scene area; and

(A-2) second light emitting means for projecting the distance measuring signal to the marginal portion of the scene area, the signal emitted from the second light emitting means being weaker than the signal emitted from the first light emitting means; and

(B) signal receiving means for receiving the distance measuring signals reflected by the points in the scene area, said signal receiving means forming a proper distance measuring information based on distance measuring information of the plurality of points in the scene area obtained from the reflected signals, and intensified with respect to the central portion than the marginal portion of the scene area according to the degrees of intensity of the reflected signals, wherein the light emission intensity of the first light emitting means and the light emission intensity of the second light emitting means satisfy the following condition:

$$\frac{\text{the light emission intensity of the second means}}{\text{the light emission intensity of the first means}} \geq \frac{1}{4}.$$



**4,748,470**

## AUTOMATIC DUPLEX ELECTROPHOTOGRAPHIC COPYING MACHINE

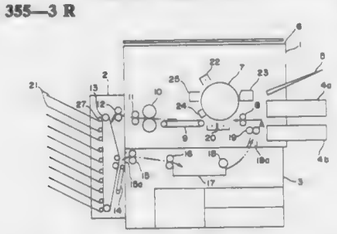
**Yoshiaki Ibuchi, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan**

**Continuation of Ser. No. 807,441, Dec. 10, 1985, abandoned. This application May 13, 1987, Ser. No. 48,964**

**Claims priority, application Japan, Dec. 10, 1984, 59-262173**

**Int. Cl.[4] G03G** *15/00*

**U.S. Cl. 355—3 R** **3 Claims**



1. An automatic electrophotgraphic duplex copying machine comprising:

a copying machine main body including a first paper feed section, a photoreceptor and its peripheral components constituting a toner image transfer portion, a first copy paper transport system and image fixing rollers;

a desk on which said copying machine main body is mounted provided with a second copy paper transport system, inclusive of a paper reservoir positioned in the upper portion of said desk beneath said copying machine main body, which communicate with said first paper feed section through a copy paper inlet formed at the bottom of said main body; and

a sorter having an upper portion and lower portion mounted vertically on said copying machine main body and said desk such that said upper portion of said sorter is juxapositioned to a copy paper outlet of said main body and said lower portion is juxtapositioned to a copy paper intake of said desk, said sorter containing a switch back mechanism completely housed therein for reversing the travel direction of a copy paper for the purpose of duplex copying, directing said copy paper to said copy paper intake and, via said second copy paper transport system, to be returned to said first paper feed section of said copying machine main body through said copy paper inlet formed at the bottom of said main body, said copying machine main body, desk and sorter being detachable from one another.

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**4,748,471**

## DEVELOPMENT APPARATUS HAVING MEANS FOR RAPIDLY SHUTTING OFF THE FLOW OF DEVELOPER TO A MAGNETIC BRUSH

**Kenneth D. Adkins, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

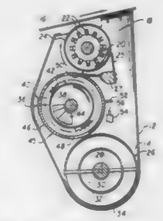
**Filed Jul. 6, 1987, Ser. No. 70,275**

**Int. Cl.[4] G03G** *15/08*

**U.S. Cl. 355—3 DD** **4 Claims**

1. In a development apparatus for applying developer material to a latent image on a photoconductor, the apparatus having a housing with a sump for holding a supply of developer material, a magnetic brush for applying developer material to the latent image, means for transporting developer material between the sump and the magnetic brush, a gating member movable between first and second positions relative to the transporting means for controlling the flow of developer material to the magnetic brush, the gating member having an opening so that developer material can flow through the opening to the magnetic brush when the gating member is in its first position, the improvement comprising:

means for immediately shutting off the flow of developer material through the opening and to the magnetic brush when the gating member is moved from its first position toward its second position, the shut-off means comprising a member closely adjacent the opening when the gating member is in its first position without interferring with the



flow of developer material through the opening to the magnetic brush, and the shut-off member being located with respect to the opening when the gating member is in its second position so that the member blocks the flow of developer material from the opening to the magnetic brush.

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**4,748,472**

## DEVELOPING APPARATUS WITH MULTIPLE BLADE DEVELOPER CONDITIONER

**Hideo Mukai, and Tomoyuki Asada, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Feb. 13, 1987, Ser. No. 14,776**

**Claims priority, application Japan, May 26, 1986, 61-120892**

**Int. Cl.[4] G03G** *15/00, 15/08*

**U.S. Cl. 355—3 DD** **18 Claims**



1. A developing apparatus for developing an electrostatic latent image by applying a developer to the latent image which is formed on the surface of an image carrier at a developing position facing the image carrier, comprising:

a housing for containing the developer;

a developer carrier for carrying the developer from the housing in a developer movement direction to the developing position; and

a plurality of blades pressed against the developer carrier, said plurality of blades including a first blade making contact with said developer carrier at a first point and having a first end spaced from said developer carrier and located upstream, relative to said developer movement direction, from said first point by a first distance, and a second blade making contact with said developer carrier at a second point and having a second end spaced from said developer carrier and located upstream, relative to said developer movement direction, from said second point by a second distance, wherein said first point is upstream of said second point relative to said developer movement direction and said first distance is shorter than said second distance.

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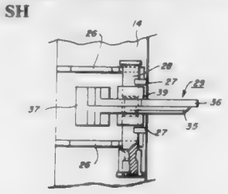


**4,748,473**

## PRINTING APPARATUS WITH DETACK DEVICE

**Ryoichi Tsuruoka, Hongo Ebina, Japan, assignor to Rank Xerox Limited, London, England**

**Filed Oct. 16, 1986, Ser. No. 919,728**
**Claims priority, application Japan, Oct. 21, 1985, 60-233409; Oct. 21, 1985, 60-233410; Oct. 21, 1985, 60-233412**
**Int. Cl.[4] B65H** *29/56*
**U.S. Cl. 355—14 SH** **20 Claims**



1. In a electrostatographic printing apparatus including an imaging member and a cleaning assembly, a paper detack device having a detack claw mounted on the bottom of the cleaning assembly such that the top of the claw is brought into contact with the imaging member detacking a copy sheet therefrom, said detack device including a rotatably mountable shaft supporting said detack claw, a pair of shaft support members extending downward from said cleaning assembly each having a recess in its lower corner adjacent said imaging member for supporting said shaft and at least one elastic support member extending downward from said cleaning assembly in cooperative association with said pair of shaft support members for pressing said shaft in said recess.

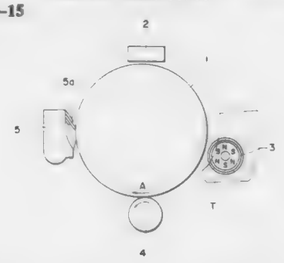
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**4,748,474**

## IMAGE FORMING METHOD AND APPARATUS USING DEVELOPER HAVING TONER GENERALLY FROM ONE TO FIVE MICRONS IN SIZE AND A LUBRICANT

**Katsumi Kurematsu, Kawasaki; Kenichi Takeda, and Yuji Sakemi, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Aug. 22, 1986, Ser. No. 899,400**
**Claims priority, application Japan, Aug. 27, 1985, 60-186673**
**Int. Cl.[4] G03G** *21/00*
**U.S. Cl. 355—15** **10 Claims**



1. An image forming apparatus, comprising:
an image bearing member, movable along an endless path, for bearing a toner image, said image bearing member having a surface with a critical surface tension of not more than 33 dyne/cm;
means for forming a toner image on said image bearing member by applying a developer, the developer containing toner, not less than 70% by weight of which has particles from 1 to 5 microns in size, and not less than 0.5% by weight of a lubricant based on the weight of the toner; and
means for cleaning said image bearing member by removing the toner image remaining on said image bearing member.

**4,748,475**

## COLOR PRINTING SYSTEM

**Keiichi Ishiyama; Makoto Ueda; Shigemi Misono; Tomoyuki Torii; Kazuto Shikino, and Toshiharu Aoyagi, all of Tokyo, Japan, assignors to Seiko Instruments Inc., Tokyo, Japan**

**Filed Jun. 8, 1987, Ser. No. 59,733**
**Claims priority, application Japan, Jun. 10, 1986, 61-135438**
**Int. Cl.[4] G03B** *27/32, 27/52*
**U.S. Cl. 355—27** **4 Claims**



1. Apparatus for forming an image on an image-receiving sheet, comprising:
an imaging sheet coating with rupturable dye-containing capsules;
means for making a plural monochrome pictures on a light-sensitive plate, corresponding to the pictures separated into three primary colors;
means for projecting said monochrome pictures onto a light-receiving station by lights of which wavelengths are different from one another;
means for moving said imaging sheet past said light-receiving station; and
means for pressing said imaging sheet and said image-receiving sheet with said capsules coating face of said imaging sheet facing said image-receiving sheet, so the layer of capsules lies sandwiched between said sheets.

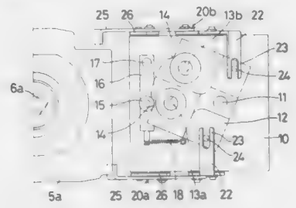
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**4,748,476**

## AUTOMATIC SCANNER LENS SELECTOR FOR USE WITH PHOTOGRAPHIC PRINTER

**Hiroto Nakao, Wakayama, Japan, assignor to Noritsu Kenkyu Center Co., Ltd., Wakayama, Japan**

**Filed Jun. 16, 1987, Ser. No. 62,647**
**Claims priority, application Japan, Jun. 20, 1986, 61-145598; Mar. 3, 1987, 62-49173**
**Int. Cl.[4] G03B** *27/44, 27/74, 27/80*
**U.S. Cl. 355—46** **1 Claim**



1. An automatic scanner lens selector for use with a photographic printer, comprising a lens deck, a plurality of lens plates each provided with a printing lens which differ in magnification from one another, each of said lens plates being adapted to be detachably mounted on said lens deck, a scanner body located ahead of said lens deck and provided with a receptor, a lens holder, a plurality of scanner lenses of different magnifications mounted on said lens holder, said lens holder being mounted on said scanner body so that said lenses will be put on the optical axis of said receptor from one to another, and a plurality of motion converters provided between said lens holder and said lens plate for converting a linear motion of said lens plate inserted into said lens holder to a motion of said lens holder to bring one of said scanner lenses into alignment with the optical axis of said receptor.



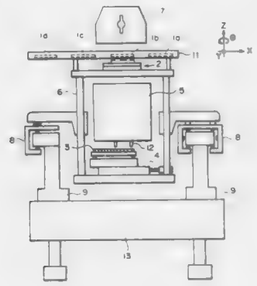
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**4,748,477**

## EXPOSURE APPARATUS

**Junji Isohata, Tokyo; Koichi Matsushita, Chiba; Hironori Yamamoto, Chigasaki; Makoto Miyazaki, Yokohama; Kunitaka Ozawa, Isehara, and Hideki Yoshinari, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 28, 1986, Ser. No. 856,222**
**Claims priority, application Japan, Apr. 30, 1985, 60-090898; Apr. 30, 1985, 60-090899**
**Int. Cl.[4] G03B** *27/42, 27/53*
**U.S. Cl. 355—53** **12 Claims**



1. An apparatus for exposing a plate-like member to a pattern with radiation so that images of the pattern are transfered onto different regions on the plate-like member, said apparatus comprising:
a carriage;
a stage for supporting the plate-like member and guidingly moving the plate-like member relative to said carriage;
means for supporting said carriage;
means for exposing the plate-like member to the pattern with radiation so that the image of the pattern is transferred onto the plate-like member, said exposing means exposing the plate-like member while moving said carriage with the aid of said supporting means; and
means for correcting a deviation in the position of the image of the pattern transferred onto the plate-like member due to a change in posture of said carriage caused by the movement of said stage relative to said carriage.

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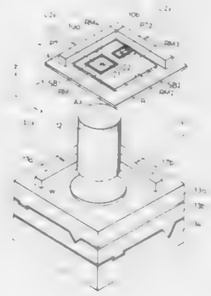
**4,748,478**

## PROJECTION EXPOSURE APPARATUS

**Kyoichi Suwa, and Hiroshi Tanaka, both of Yokohama, Japan, assignors to Nippon Kogaku K. K., Tokyo, Japan**

**Filed Dec. 16, 1986, Ser. No. 942,369**
**Claims priority, application Japan, Dec. 19, 1985, 60-286705**
**Int. Cl.[4] G03B** *27/42*
**U.S. Cl. 355—53** **12 Claims**

1. A projection exposure apparatus comprising means for supporting a plurality of patterns in a predetermined positional relationship, each of the plurality of patterns being disposed in a respective area of a plurality of different areas on a first plane;
light-shielding means disposed on the first plane to encircle each of the plurality of patterns;
means for supporting a substrate on a second plane;
a projection optical system arranged between the first and the second planes;
means for two-dimensionally moving the plurality of patterns along the first plane while maintaining the predetermined positional relationship, the plurality of patterns being moved such that the plurality of patterns sequentially intersect with an optical axis of said projection optical system; and



means for two-dimensionally moving said substrate along the second plane.

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**4,748,479**

## IMAGE FORMING APPARATUS CAPABLE OF DISPLAYING A CAPACITY AND/OR A REMAINING QUANTITY OF SHEETS OF PAPER

**Tadashi Ohira, Toyokawa; Masazumi Ito, Toyohashi, and Syuzi Maruta, Toyokawa, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed May 20, 1987, Ser. No. 52,729**
**Claims priority, application Japan, May 28, 1986, 61-122534**
**Int. Cl.[4] G03B** *27/58*
**U.S. Cl. 355—72** **16 Claims**

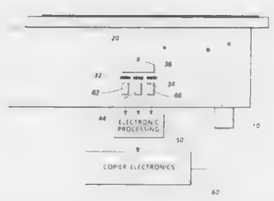



1. A paper feeding device used in an image forming apparatus, comprising:
a plurality of sheet storing means having different capacities;
means for sending out sheets of paper one by one from each of said storing means;
means for selecting one of said storing means for sending out sheets of paper; and
display means for displaying a capacity of the selected storing means.

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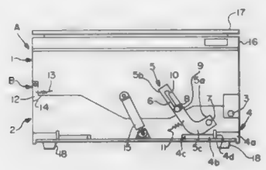


**4,748,480**
**CONTROLLED AUTHENTIC DOCUMENT RECOGNITION EQUIPMENT**
**Paul F. Jacobs, La Crescenta; Thomas A. Whatley, Northridge; John D. Worden, Mar Vista; William D. Green, Sunland, and Kenneth I. Gustafson, Glendora, all of Calif., assignors to Xerox Corporation, Stamford, Conn.**
**Filed Jun. 12, 1987, Ser. No. 61,257**
**Int. Cl.[4] G03G** *15/00*
**U.S. Cl. 355—133** **9 Claims**



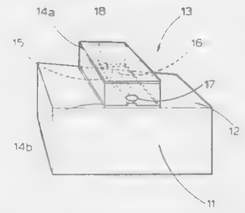

1. Apparatus for preventing the unauthorized reproduction of classified, or proprietary, or other documents on a photocopier comprising:
means adjacent the illumination and/or optical apparatus of said photocopier for detecting light reflected from said document, said detecting means being independent of the normal document reproduction apparatus,
said detecting means including lens means for gathering and focussing some of the reflected light from a document on said photocopier to be copied,
a plurality of spectral filter means receiving said focussed light and responsive to predetermined frequency bands to respond to a predetermined chemical compound group.
means responsive to the light transmitted by said spectral filter means for generating electrical signals to at least interrupt the operation of said photocopier.

**4,748,481**
**HOUSING FOR COPIER SEPARABLE INTO UPPER AND LOWER FRAMES**
**Hisashi Kunihiro, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan**
**Filed May 29, 1987, Ser. No. 55,686**
**Claims priority, application Japan, Jun. 11, 1986, 61-88955[U]**
**Int. Cl.[4] G03G** *15/00*
**U.S. Cl. 335—133** **6 Claims**



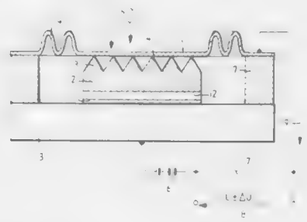
1. In a housing for an apparatus separable into an upper frame and lower frame which are connected to each other around a connecting axis such that said upper frame can be rotated with respect to said lower frame around said connecting axis to open and close said housing, said lower frame containing a handle which can be pulled out of said lower frame, the improvement wherein said housing further comprises
a locking member in contact with both said upper frame and said lower frame, an upper part of said locking member being formed with an elongated hole, said locking member being supported by said lower frame rotatably around a supporting axis, and
a sliding piece protruding from said upper frame and being slidably engaged with said locking member through said elongated hole,
said locking member being adapted to rotate around said supporting axis when said handle is pulled out of said lower frame or pushed into said lower frame, and said elongated hole being formed with a notch such that said sliding piece engages with said notch when said handle is pulled out of said lower frame.

**4,748,482**
**SUPPORT MEMBER**
**John V. Collins, Woodbridge, England, assignor to British Telecommunications Public Limited Company, United Kingdom**
**Continuation of Ser. No. 704,594, Feb. 22, 1985, abandoned.**
**This application Sep. 2, 1987, Ser. No. 93,121**
**Claims priority, application United Kingdom, Feb. 23, 1984, 8404782**
**Int. Cl.[4] H01L** *23/36*
**U.S. Cl. 357—17** **21 Claims**



1. An optical assembly comprising an optical semiconductor device having two ports located on opposing facets and a heat sink having a device support face for supporting said optical semiconductor device, the device support face having two opposing non-parallel straight sides inclined at an angle in the range of 7° to 15° and the optical semiconductor device being positioned so that each port overlies at least a point in a respective one of said straight sides with at least one of said straight sides being angularly offset with respect to the overlying port.

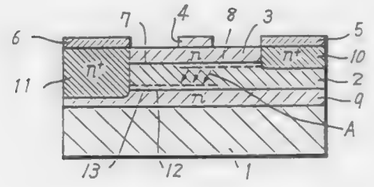
**4,748,483**
**MECHANICAL PRESSURE SCHOTTKY CONTACT ARRAY**
**Reinhard Dahlberg, Flein, Fed. Rep. of Germany, assignor to Higratherm Electric GmbH, Heilbronn, Fed. Rep. of Germany**
**Filed Jun. 9, 1980, Ser. No. 157,806**
**Claims priority, application Fed. Rep. of Germany, Jul. 3, 1979, 2926756**
**Int. Cl.[4] H01L** *23/48, 29/06, 29/44, 29/48*
**U.S. Cl. 357—15** **8 Claims**



1. A Schottky diode arrangement comprising a plate, disc or chip made from metallically conductive material and a plate, disc or chip made from semiconductor material, each said plate, disc or chip having on one of its two sides a structure with at least three raised portions in the form of parallel ridges, the plates, discs or chips being put together under pressure so that said ridges intersect and form a regular distribution of electrically parallel connected, rectifying pressure contacts in the region of the intersecting ridges, said rectifying pressure contacts constituting Schottky contacts.



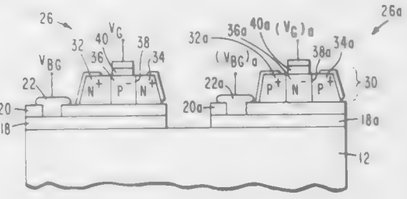
**4,748,484**
**HETEROJUNCTION FIELD EFFECT TRANSISTOR**
**Hidemi Takakuwa, and Yoji Kato, both of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan**
**Filed Jan. 29, 1986, Ser. No. 823,639**
**Claims priority, application Japan, Jan. 30, 1985, 60-16042**
**Int. Cl.[4] H01L** *29/80, 29/161, 29/48*
**U.S. Cl. 357—22** **5 Claims**



1. A heterojunction field effect transistor, comprising: first, second and third semiconductor layers which are sequentially stacked on each other; a first heterojunction formed between said first and second semiconductor layers; a second heterojunction formed between said second and third semiconductor layers; first and second two-dimensional electron gas layers formed in portions of said second semiconductor layer adjacent respectively to said first and second heterojunctions; a gate electrode, a source electrode and a drain electrode, one of said electrodes being formed on said first and the other on said third semiconductor layer, wherein said first two-dimensional electron gas layer extends from an area at the first heterojunction situated at a region below said gate electrode to said drain electrode and has one end extending to said drain electrode, said second two-dimensional electron gas layer extends from an area at the second heterojunction situated at a region below said gate electrode to said source electrode and has one end extending to said source electrode, and wherein the number of electrons migrating between said first and second two-dimensional electron gas layers is modulated, in the portion of said second semiconductor layer corresponding to said gate electrode, by a voltage to be applied to said gate electrode, thereby controlling the current flowing between said source electrode and said drain electrode.

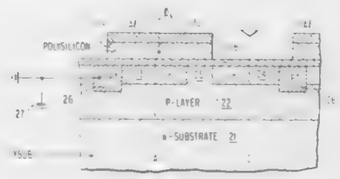
**4,748,485**
**OPPOSED DUAL-GATE HYBRID STRUCTURE FOR THREE-DIMENSIONAL INTEGRATED CIRCUITS**
**Prahalad K. Vasudev, Santa Monica, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.**
**Continuation of Ser. No. 714,286, Mar. 21, 1985, abandoned.**
**This application Jun. 9, 1987, Ser. No. 60,935**
**Int. Cl.[4] H01L** *29/78*
**U.S. Cl. 357—23.7** **11 Claims**

1. A semiconductor integrated circuit device, comprising:
an insulating substrate;
a first backgate electrode made of a layer of doped semiconductor material epitaxially related to said insulating substrate formed over a portion of said insulating substrate;
a second backgate electrode made of a layer of doped semiconductor material epitaxially related to said insulating substrate formed over another portion of said insulating substrate;
an insulating overlay made of nonconductive material overlying and epitaxially related to said first and second backgate electrodes;
a first gated semiconductor device including source, channel and drain regions overlying said insulating overlay and first backgate electrode wherein the extent of said first backgate electrode along said insulating overlay is greater than the lateral extent of the source, channel and drain regions of said first semiconductor device;



a second gated semiconductor device including source, channel and drain regions overlying said insulating overlay and second backgate electrode wherein the extent of said second backgate electrode along said insulating overlay is greater than the lateral extent of the source, channel and drain regions of said second semiconductor device; and
separate means for electrically biasing said first and second backgate electrodes independently.

**4,748,486**
**SOLID-STATE IMAGE SENSOR**
**Shigehiro Miyatake, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan**
**Filed Aug. 27, 1985, Ser. No. 769,924**
**Claims priority, application Japan, Aug. 27, 1984, 59-180209**
**Int. Cl.[4] H01L** *27/14*
**U.S. Cl. 357—30 V** **9 Claims**




1. A solid-state image sensor having a plurality of unit cells, each of said unit cells comprising:
a substrate;
an electroconductive layer formed on said substrate having a polarity different from the polarity of said substrate;
a photoelectric conversion area formed within a first region of said electroconductive layer for generating a signal charge when illumination of said photoelectric conversion area is attained; and
a CCD register area formed within a second region of said electroconductive layer for transferring the signal charge generated in said photoelectric conversion area,
wherein said photoelectric conversion are and said CCD register area are formed with a third region of said electroconductive layer therebetween and are formed substantially the same distance from said substrate, and
wherein said first and second regions of said electrconductive layer are completely depleted by the application of a reverse bias voltage between said electroconductive layer and said substrate so as to form first and second depleted regions, said first and second depleted regions providing

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for the transfer of excess charge generated in said photoelectric conversion area from said photoelectric conversion area into said substrate and also from said CCD register area into said substrate.

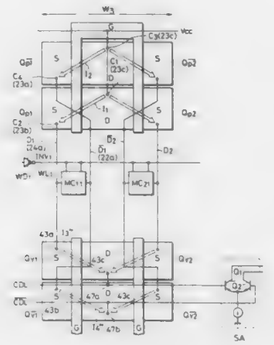
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**4,748,487**

## SEMICONDUCTOR MEMORY DEVICE

**Hideaki Uchida, Takasaki; Kinya Mitsumoto, Ohme; Yoshiaki Yazawa, Hitachi; Shinji Nakazato, Maebashi, and Masanori Odaka, Kodaira, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Division of Ser. No. 851,485, Apr. 14, 1986, Pat. No. 4,682,200. This application May 26, 1987, Ser. No. 53,479**
**Claims priority, application Japan, Apr. 12, 1985, 60-76551**
**Int. Cl.[4] H01L *27/02***
**U.S. Cl. 357—43** **7 Claims**



1. A memory device comprising:
(a) a substrate having a main surface;
(b) a plurality of memory cells formed at said main surface which store information;
(c) a plurality of word lines and a pair of complementary data lines formed on said main surface, said plurality of word lines and said pair of complementary data lines being coupled to said plurality of memory cells so that each memory cell is coupled to a word line and a pair of complementary data lines, one of said pair of complementary data lines having first and second ends, and the other of said pair of complementary data lines having third and fourth ends;
(d) a power source line for supplying an operating potential to said semiconductor memory, which said power source line is formed on said main surface;
(e) a first MISFET formed on said main surface, said first MISFET having a source-drain path coupled between said first end and said power source line;
(f) a second MISFET formed on said main surface, said second MISFET having a source-drain path coupled between said third end and said power source line; and
(g) sense means for reading information stored in the selected memory cell, said sense means being formed on said main surface and having a pair of inputs, one of said inputs coupled to said second end, and the other of said inputs coupled to said fourth end, wherein said sense means includes a first bipolar transistor having a base coupled to one of said inputs and a second bipolar transistor having a base coupled to the other of said inputs and having an emitter coupled to an emitter of said first bipolar transistor so that said first and second bipolar transistors construct a differential amplifier circuit,
wherein the direction of current flowing through said source-drain path of said first MISFET and the direction of current flowing through said source-drain path of said second MISFET are substantially the same direction from the perspective of a plan view of said memory device.

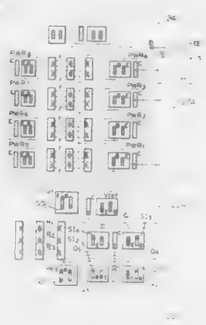
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**4,748,488**

## MASTER-SLICE-TYPE SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE

**Hirokazu Suzuki, Yamato; Takehiro Akiyama, and Teruo Morita, both of Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

**Filed Sep. 24, 1984, Ser. No. 653,523**
**Claims priority, application Japan, Sep. 29, 1983, 58-179265**
**Int. Cl.[4] H01L *27/04***
**U.S. Cl. 357—45** **59 Claims**



1. A master-slice-type semiconductor integrated circuit device, comprising:
a semiconductor substrate;
basic cell blocks each including basic cells formed on said substrate, each of said basic cells having at least one logical circuit element, and said basic cell blocks being arranged in a plurality of parallel rows, said plurality of parallel rows together forming a matrix on said semiconductor substrate;
said parallel rows being spaced from each other forming wiring channel areas extending parallel to the rows and lying between each adjacent pair of parallel rows;
current source cells formed separately from and adjacent to said basic cell blocks within said rows and for supplying current to said basic cells, each of said current source cells having at least one current source element; and
logic circuit wiring forming logic circuits by connecting at least one logical circuit element in one of said basic cells and at least one current source element in one of said current source cells in the same row as the basic cell block containing said at least one logical circuit element, to form each of the logic circuits, said logic circuit wiring being formed within said wiring channel area and extending along said wiring channel area parallel to the row containing said at least one current source element and said at least one logical circuit element.

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**4,748,489**

## INTEGRATED CIRCUIT SEMICONDUCTOR DEVICE HAVING IMPROVED ISOLATION REGION

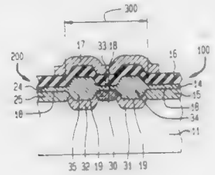
**Michio Komatsu, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed Mar. 24, 1986, Ser. No. 842,797**
**Claims priority, application Japan, Mar. 22, 1985, 60-57801**
**Int. Cl.[4] H01L *27/04***
**U.S. Cl. 357—50** **13 Claims**

1. An integrated circuit semiconductor device comprising a semiconductor substrate, a first area of one conductivity type positioned in said substrate and having a first impurity concentration, a first circuit element having an impurity region of the opposite conductivity type formed in said first area of said



substrate, a second circuit element having an impurity region of the opposite conductivity type formed in said first area of said substrate, and an isolation structure provided between the impurity regions of said first and second circuit elements, said isolation structure including a pair of thick insulating layers formed on the surface of said first area between said impurity regions of said first and second circuit elements, said pair of thick insulating layers being located with a gap therebetween, a thin insulating layer formed on a surface of said first area at said gap, said thin insulating layer being continuous with said



pair of thick insulating layers, a first impurity portion of said one conductivity type having a second impurity concentration higher than said first impurity concentration and formed at the surface of said first area at a location directly under said thin insulating film, and a pair of second impurity portions of said one conductivity type having a third impurity concentration higher than said first impurity concentration and lower than said second impurity concentration, said pair of second impurity portions being formed at the surface of said first area at locations directly under said pair of thick insulating layers.

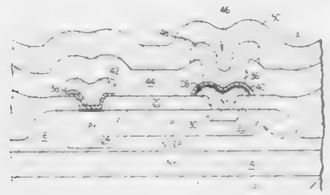
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**4,748,490**

## DEEP POLYSILICON EMITTER ANTIFUSE MEMORY CELL

**Deems R. Hollingsworth, Missouri City, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Continuation of Ser. No. 761,638, Aug. 1, 1985, abandoned. This application Apr. 13, 1988, Ser. No. 38,457**
**Int. Cl.[4] H01L *27/02, 29/72, 23/48***
**U.S. Cl. 357—51** **14 Claims**



1. An antifuse for a memory cell having at least two cell selection lines, comprising:
a transistor decoupling element having a base, a collector, and a emitter comprising polysilicon;
one of said selection lines being located over the base of said transistor and in electrical contact therewith;
an initially nonconductive antifuse layer;
a refractory conductive layer beneath said nonconductive antifuse layer;
a silicide layer between said polysilicon of said emitter and said refractory conductive layer;
a nonrefractory metal layer on said antifuse layer;
said antifuse layer, said nonrefractory metal layer and said polysilicon of said emitter being in vertical alignment;
said nonrefractory metal layer providing another cell selection lines; whereby metal from said nonrefractory metal layer diffuses through said antifuse layer to said refractory conductive layer upon application of a predetermined minimum potential between said nonrefractory layer and the base of said transistor to provide a conductive path between said nonrefractory layer and said emitter.

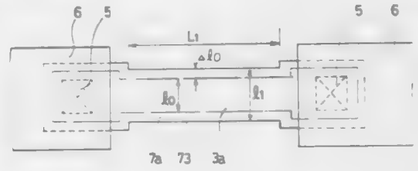
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**4,748,491**

## REDUNDANT CIRCUIT OF SEMICONDUCTOR DEVICE AND METHOD OF PRODUCING SAME

**Hiroshi Takagi, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 8, 1986, Ser. No. 916,632**
**Claims priority, application Japan, Oct. 9, 1985, 60-226518**
**Int. Cl.[4] H01L *27/02***
**U.S. Cl. 357—51** **5 Claims**



1. A redundant circuit of a semiconductor device comprising;
a first metal interconnection layer,
a second metal interconnection layer spaced apart from said first metal interconnection layer,
a fuse for electrically connecting said first and second metal interconnection layers, said fuse having a two-layer structure comprising a first linear film of a first material and a second linear film layer of a second material formed on said first film, and a line width of said first film being narrower than that of said second film, and
a glass film formed to cover said fuse.

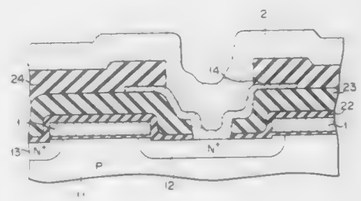
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**4,748,492**

## READ ONLY MEMORY

**Taira Iwase, Kawasaki; Shoji Arizumi, Tokyo, and Fujio Masuoka, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Continuation of Ser. No. 697,462, Feb. 1, 1985, abandoned. This application Mar. 3, 1987, Ser. No. 21,573**
**Claims priority, application Japan, Feb. 3, 1984, 59-17782**
**Int. Cl.[4] H01L *29/78, 27/02, 29/34, 23/48***
**U.S. Cl. 357—59** **4 Claims**



1. A read-only memory comprising:
a semiconductor substrate;
a pair of MOS transistors each having a separate source region and a common drain region;
a gate insulation film for each of said MOS transistors formed on said semiconductor substrate;
a gate electrode for each of said MOS transistors formed on said gate insulation film;
a first insulation film formed on said gate electrode for each of said MOS transistors;
a second insulation film formed on said first insulation film of each of said MOS transistors gate electrodes, said first and

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second insulation films defining a first contact hole leading to said common drain region;

a common drain electrode extending in said first contact hole and contacting said common drain region, said common drain electrode having an extended portion lying on said second insulation film above said gate electrode of each of said MOS transistors;

a third insulation film formed on said extended portion of said common drain electrode above said gate electrode for each of said MOS transistors, said third insulation film defining a second contact hole above said first contact hole; and

a conductive layer formed on said common drain electrode and said third insulation film, said conductive layer extending in said second contact hole and contacting said common drain electrode.

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**4,748,493**

## DIODE AND METAL STUD THEREFOR

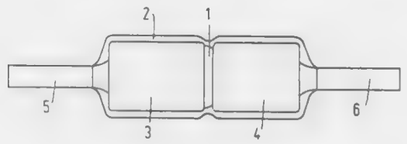
**Hendrikus H. Geenen, and Gerardus E. Snijders, both of Maarheeze, Netherlands, assignors to U.S. Philips Corp., New York, N.Y.**

**Continuation-in-part of Ser. No. 839,249, Mar. 13, 1986, abandoned. This application Dec. 18, 1986, Ser. No. 944,292**

**Claims priority, application Netherlands, Nov. 5, 1985, 8503023**

**Int. Cl.⁴ H01L** *29/46, 23/54, 21/447*

**U.S. Cl. 357—68** **8 Claims**




1. A diode comprising an electrically insulating envelope, within which a wafer of semiconductor material with a pn junction is enclosed between metal studs, and current conductors which are connected to a respective metal stud and project beyond the envelope, the metal studs being sintered bodies mainly comprising tungsten and a metallic sintering activator, characterized in that the metal studs further contain an oxidic material chosen from the group consisting of $Y_2O_3$, $SiO_2$, $Al_2O_3$, $ZrO_2$ and $ThO_2$.

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**4,748,494**

## LEAD ARRANGEMENT FOR REDUCING VOLTAGE VARIATION

**Toshio Yamada, Kokubunji, Japan; Hiroyuki Itho, Charlottesville, Va.; Masayoshi Yagyu, Kokubunji, and Akira Masaki, Musashino, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Apr. 21, 1986, Ser. No. 853,929**

**Claims priority, application Japan, Apr. 19, 1985, 60-82357**

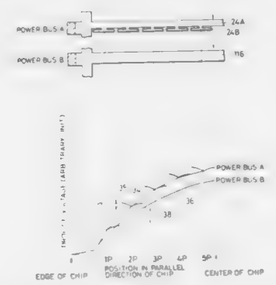
**Int. Cl.⁴ H01L** *29/52, 27/10*

**U.S. Cl. 357—68** **21 Claims**

1. A semiconductor device including a plurality of circuit groups each provided with a bias circuit having a supply voltage fluctuation compensating function, said semiconductor device comprising:

a first power bus for feeding power to predetermined ones of said circuit groups; and

second power buses respectively provided for said predetermined circuit groups such that each second power bus receives power from said first power bus and feeds the power to circuit elements in the corresponding circuit group, each of said second power buses being connected to said first power bus at a predetermined position to




reduce variations in the supply voltage within each of said circuit groups.

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**4,748,495**

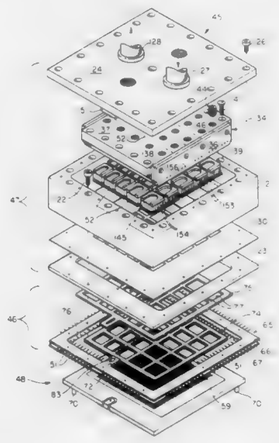
## HIGH DENSITY MULTI-CHIP INTERCONNECTION AND COOLING PACKAGE

**Andrzej Kucharek, Mountain View, Calif., assignor to Dypax Systems Corporation, Mountain View, Calif.**

**Filed Aug. 8, 1985, Ser. No. 763,957**

**Int. Cl.⁴ H02D** *1/00*

**U.S. Cl. 357—82** **53 Claims**



37. An interconnect assembly for providing external power and signal connections to an array of integrated circuit chips arranged to provide a large number of, and a high density of, terminals, comprising:

a plate having apertures therein for mounting said chips in a substantially planar array;

a bus plate assembly comprising at least two substantially planar bus plates assembled in mutually insulated fashion along two major faces with the first and second outer major faces, and having apertures corresponding to the locations of the integrated circuit chips;

an external assembly comprising an insulated mounting plate and a plurality of terminals extending through the insulated mounting plate for providing electrical connection to external signal circuits;

a housing for mounting the bus plate between the chip mounting plate and the connector assembly with the bus plate apertures aligned with the chip mounting plate apertures and with the first major surface of the bus plate



assembly facing the chip assembly and the second major surface of the bus plate assembly facing the connector assembly;

power supply pins mounted about the periphery of the housing for providing electrical connection to at least first and second power supply levels;

at least one chip connector subassembly, each said subassembly being sized and adapted for mounting within an aperture of the bus plate assembly, and comprising: planar insulator plate means supporting an array of flexible insulator springs on each major face thereof corresponding to the chip terminal pattern; a plurality of individual connectors, each providing a feed-through connection through the planar insulated plate to selectively connect chip power and signal terminals on said first side of the bus plate assembly to associated connector assembly terminals on said second major surface of the bus plate assembly and to associated power supply terminals, the individual feedthrough connectors being supported at said first and second major surfaces by an associated insulator spring for decreasing the transmission of stress between the feedthrough connectors and the chip terminals and between the feedthrough connectors and the connector assembly terminals as the result of relative movement between the chip plate and the bus plate assembly and the connector assembly; and a metallization pattern formed on said first and second major surfaces of the planar insulator plate selectively connected to a first and a second plurality of the feed-through connectors on either major surface corresponding to the two power supply voltage levels; and

at least a pair of patterned flexible conductor plates each overlying a separate one of said first and second bus plate surfaces and each being connected to one of said metallization patterns and associated power supply pins for selectively interconnecting the first and second power supply voltage levels to the associated first and second plurality of feed-through connectors.

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**4,748,496**

## TRANSMISSION AND RECEPTION OF TELEVISION SIGNALS TO PRODUCE EXTENDED DEFINITION PICTURES

**Gordon M. Drury, and Michael D. Windram, both of Hampshire, United Kingdom, assignors to Independent Broadcasting Authority, London, England**

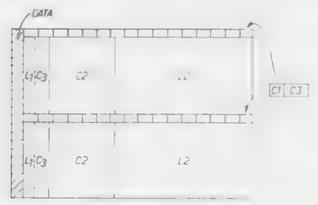
**PCT No. PCT/GB84/00244, § 371 Date Feb. 27, 1985, § 102(e) Date Feb. 27, 1985, PCT Pub. No. WO85/00492, PCT Pub. Date Jan. 31, 1985**

**PCT Filed Jul. 9, 1984, Ser. No. 708,957**

**Claims priority, application United Kingdom, Jul. 8, 1983, 8318602**

**Int. Cl.⁴ H04N** *11/18, 11/06*

**U.S. Cl. 358—12** **4 Claims**




1. A method of transmitting a Multiplexed Analogue Component (M.A.C.) television signal, comprising producing first chrominance component and luminance component signals representing lines of a television signal capable of reconstruction in a conventional M.A.C. television receiver to produce a first television picture having a first aspect ratio and a first number of lines, the component signals for each line being time compressed and placed sequentially at times appropriate to allow reconstruction of the television picture but occypying less than the whole line time, the improvement comprising generating further luminance component and chrominance component signals and adding said further chrominance and luminance component signals to portions of the television signal not containing said first signals, the further component signals being capable of reproduction together with the first signals to produce an extended definition picture, the further component signals not interfering with the reproduction from said first chrominance and luminance component signals of a television picture having said first aspect ratio and first number of lines.

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**4,748,497**

## TELEVISION RECEIVER AUTOMATIC COLOR TEMPERATURE ADJUSTING SYSTEM WITH START UP CONTROL

**Yoshinari Sengoku, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan**

**Filed May 6, 1987, Ser. No. 47,405**

**Claims priority, application Japan, May 16, 1986, 61-110675**

**Int. Cl.⁴ H04N** *9/73, 9/16*

**U.S. Cl. 358—29** **13 Claims**



1. An improved automatic color temperature adjusting system for a color television receiver of the type having a color picture tube which includes a power supply, an on/off switch for said power supply, and a plurality of cathodes each of whose beam currents are controlled by a different one of a plurality of corresponding primary color signals, and wherein the automatic color temperature adjusting system is of the type which includes for each cathode:

means for amplifying the corresponding primary color signal at a level controlled by a gain control signal;

means for supplying the amplified primary color signal to the corresponding cathode in said picture tube to thereby control the beam current of said cathode; and

means for feedback controlling the gain of said amplifying means so as to thereby adjust the cathode beam current of the white level at an optimal level, and

wherein the improvement comprises a transition control signal generator within said feedback controlling means, which is responsive to a turning on of the power supply, for generating a transition gain control signal to thereby adjust said gain of said amplifying means to thereby cause said cathode beam current to start at a predetermined minimum level and subsequently, gradually increase to a predetermined normal level in a given period of time.

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**4,748,498**

## LUMINANCE SIGNAL PROCESSING CIRCUIT WITH RECURSIVE FILTER FOR REDUCING NOISE WHILE RETAINING A HIGH VERTICAL RESOLUTION

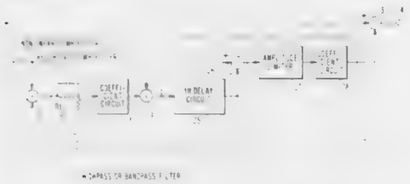
**Kazuhiro Yamanishi, Higashiosaka, and Kouichi Igata, Hirakata, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Nov. 17, 1986, Ser. No. 931,063**

**Claims priority, application Japan, Nov. 19, 1985, 60-258934; Dec. 6, 1985, 60-275319**

**Int. Cl.⁴ H04N** *5/213*

**U.S. Cl. 358—36** **13 Claims**



1. A luminance signal processing circuit comprising: a delay circuit for delaying a signal by one horizontal period time; a first adder for adding an input signal and an output signal of said delay circuit; a filter circuit for passing a specified frequency band of an output signal of said first adder; a first coefficient circuit for multiplying an output of said filter circuit with a specified coefficient; a second adder for adding said input signal and an output of said first coefficient circuit to use the sum output signal as an input signal of said delay circuit; a subtracter for subtracting the output signal of said delay circuit from the input signal of said delay circuit; an amplitude limiter for limiting the amplitude of an output signal of said subtracter; a second coefficient circuit for multiplying an output of said amplitude limiter with a specified coefficient; and an operation circuit for calculating a sum or difference of an output signal of said second coefficient circuit and said input signal, an output signal of said operation circuit being an output signal of said luminance signal processing circuit.

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**4,748,499**

## DEMULTIPLEXING AND NOISE REDUCTION CIRCUIT FOR TIME DIVISION MULTIPLEXED SIGNAL

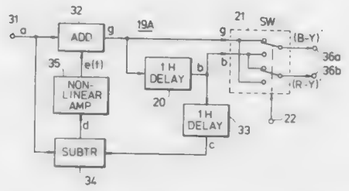
**Kazuhiko Ueda, Yokohama, Japan, assignor to Victor Company of Japan, Ltd., Japan**

**Filed Aug. 27, 1986, Ser. No. 900,707**

**Claims priority, application Japan, Sep. 3, 1985, 60-194289**

**Int. Cl.⁴ H04N** *5/217, 9/077, 9/64*

**U.S. Cl. 358—36** **7 Claims**




1. A circuit for simultaneously obtaining in parallel signals constituting a time division multiplexed signal, said circuit comprising:

adding means supplied with an input time division mulitplexed signal, said time division mulitplexed signal having been time-division-multiplexed with a constant repetition period corresponding to that of a television signal and having correlation for every said repetition period;

a first delay circuit supplied with an output signal of said adding means and having a delay time corresponding to a duration of one of the signals constituting said time division multiplexed signal;

a switching circuit supplied with an output signal of said first delay circuit and said output signal of said adding means for carrying out a switching operation every said constant repetition period so as to simultaneously output signals in parallel;

a second delay circuit supplied with the output signal of said first delay circuit and having a delay time identical to that of said first delay circuit;

feedback means supplied with said input time division multiplexed signal and an output signal of said second delay circuit for producing a feedback signal depending on a difference signal between said input time division mulitplexed signal and the output signal of said second delay circuit,

said feedback signal being supplied to said adding means so as to be added with said input time division multiplexed signal.

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**4,748,500**

## DEVICE FOR CORRECTING CONTOURS IN AN IMAGE AND USE OF SUCH A DEVICE IN A COLOR TELEVISION CAMERA

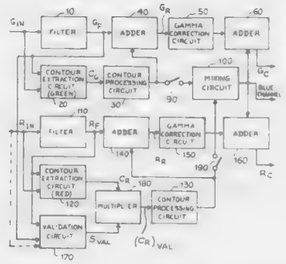
**Jean P. Lacoste, Villeneuve La Garenne; Christian Mourier, Le Chesnay, and Xavier Fleury, Garches, all of France, assignors to Thomson Video Equipment, Cergy Saint Christope, France**

**Filed Jun. 3, 1986, Ser. No. 870,016**

**Claims priority, application France, Jun. 5, 1985, 85 08532**

**Int. Cl.⁴ H04N** *9/64, 9/09*

**U.S. Cl. 358—37** **5 Claims**




1. A device for correcting contours of chrominance signals coming from scanning tubes of a color television camera, comprising:

green filter means, located in a green chrominance channel, for receiving and filtering a green chrominance signal to produce a filtered green chrominance signal;

first means for extracting green contour signals characteristic of transitions in the green chrominance signal by determining a difference between said green chrominance signal and said filtered green chrominance signal;

a contour processing circuit connected to said first means for processing said filtered green chrominance signal;

red filter means, located in a red chrominance channel, for receiving and filtering a red chrominance signal to produce a filtered red chrominance signal;

second means for extracting red contour signals characteristic of transitions in the red chrominance signal by determining a difference between said red chrominance signal and said filtered red chrominance signal;

validation means, receiving said red and green filtered chrominance signals and said red contour signal, for delivering a validated red contour signal when a level of said filtered red chrominance signal $R_F$ is greater than $kG_F$, wherein



$G_F$ is a level of said filtered green chrominance signal and k is a coefficient between 2 and 3;

a second contour processing circuit connected to an output of said validation means for processing said red chrominance signal;

a mixing circuit, connected to outputs of said first and second contour processig circuits, for producing a final contour correction signal;

a green output adder located in said green chrominance channel and having one adding input coupled to the green chrominance channel and a second adding input coupled to said final contour correction signal to produce a corrected green chrominance signal at an output thereof; and

a red output adder located in the red chrominance channel and having one adding input coupled to the red chrominance channel and another adding input coupled to said final contour correction signal to produce a corrected red chrominance signal at an output thereof.

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**4,748,501**

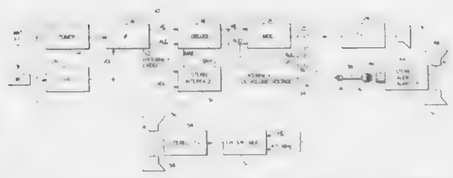
## CABLE CONVERTER FOR TELEVISION SIGNALS WITH STEREO AUDIO SIGNAL

**Michael E. Long, Western Springs, Ill., assignor to Zenith Electronics Corporation, Glenview, Ill.**

**Filed Dec. 11, 1984, Ser. No. 680,616**

**Int. Cl.⁴ H04N** *5/60, 7/10*

**U.S. Cl. 358—86** **5 Claims**



1. A converter, including an input terminal, a video output terminal and an audio output terminal, for translating received television signal transmissions including a video signal and a stereo audio signal comprising:

means for receiving said television signal transmissions at said input terminal and for developing therefrom said video signal and a 4.5 MHz aural intercarrier containing said stereo audio signal;

means supplying said video signal to said video output terminal;

means for developing a variable DC audio level signal for enabling control of the volume level of said stereo audio signal in an uninterrupted continuously variable manner; and

interface means for combining said 4.5 MHz aural intercarrier with said variable DC audio level signal and for applying them to said audio output terminal.

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**4,748,502**

## COMPUTER VISION SYSTEM BASED UPON SOLID STATE IMAGE SENSOR

**Mark B. Friedman, and Gary J. Kiliany, both of Pittsburgh, Pa., assignors to Sentient Systems Technology, Inc., Pittsburgh, Pa.**

**Filed Aug. 18, 1986, Ser. No. 897,497**

**Int. Cl.⁴ H04N** *3/14*

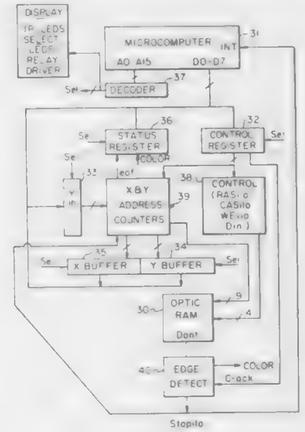
**U.S. Cl. 358—93** **24 Claims**

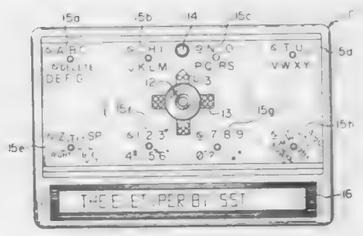
1. A system for computer vision based upon a solid state image sensor used in association with a host computer comprising:

(a) a solid state image sensor analogous to a memory device, said sensor comprising a two-dimensional array of light sensitive memory cells arranged in a plurality of rows and columns, each cell being accessible for reading, refreshing, and writing to set each cell to an initial signal value, the signals on said cells decaying at a rate related to light intensity thereupon, the output upon reading any cell being a signal indicative of darker if the signal on the cell has not decayed to a preset threshold or a signal indicative of lighter if the signal at said cell has decayed to said threshold,

(b) a lens for focussing a light image on said image sensor,

(c) clock means for continuously generating column address signals and row address signal for each cell during sequential accessing of each cell, said clock means having row




address and column address buffers that can be read to a computer data bus, and

(d) edge detecting means for processing an output bit stream from said image sensor when each cell is being sequentially accessed for detecting a change in the value of the bits indicative of an edge between lighter and darker areas of the light image focussed on said array, said edge detecting means including means for generating an interrupt signal for application to the computer whereby the computer can read the column and row address of the edge by reading the column and row buffers.

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**4,748,503**

## DATA REDUCTION CIRCUIT WITH A DIFFERENTIAL PULSE CODE MODULATOR FOR VIDEO SIGNALS

**Peter Pirsch, Ludwigsburg, Fed. Rep. of Germany, assignor to Deutsche ITT Industries GmbH, Freiburg, Fed. Rep. of Germany**

**Filed Apr. 13, 1987, Ser. No. 37,379**

**Claims priority, application European Pat. Off., Apr. 19, 1986, 86105444.3**

**Int. Cl.⁴ H04N** *7/12*

**U.S. Cl. 358—135** **5 Claims**

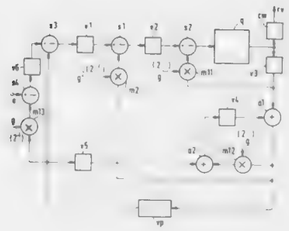
1. A data reduction circuit of the type used for reducing the

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number of bits of input data digital video signals (e) by employing a differential pulse code modulator, said modulator having a first delay element (v1) having an input adapted to receive said input data (e), and with said delay changing at the rate of a clock signal, with the output of said first delay element connected to the minuend input of a first subtractor (s1), with the output of the first subtractor (s1) connected to the input of a second delay element (v2) having an output connected to the minuend input of a second subtractor (s2) with the output of the second subtractor connected to the input of a quantizer (q) with the output of the quantizer coupled to the input of a third delay element (v3) whose output is coupled to one input of a first adder (a1) and to the input of a first constant multiplier (m11) multiplying by a first weighting factor (g) with the multiplier output coupled to the subtrahend input of said second subtractor (s2) with the output of said first adder connected to the input of a vertical predictor circuit (vp) with the delay of each of said first, second and third delay elements (v1, v2, v3) being equal to the period of said clock signal, the improvement in combination therewith of apparatus for providing a limiter for said input digital signals prior to application of said signals to said first delay element (v1) comprising:

a second constant multiplier circuit (m2) multiplying by a weighting factor equal to the square of the first weighting factor and having the input coupled to the output of said first adder (a1) and having the output coupled to the



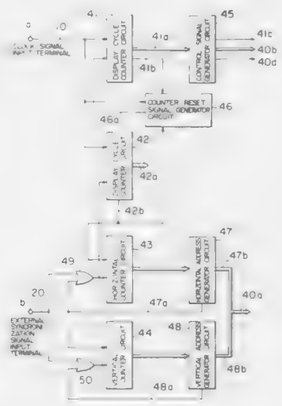
subtrahend input of said first subtractor (s1), with the output of said first adder (a1) further connected to the first input of a third constant multiplier circuit (m12) for receiving at the second input said first weighting factor (g) and having an output coupled to the input of a second adder (a2) having an output coupled to an input of a fourth delay element (v4) with the output of said fourth delay element coupled to the other input of said first adder (a1), with the output of said vertical predictor (vp) connected to an input of a fifth delay element (v5) having an output coupled to the other input of said second adder (a2), with the output of said vertical predictor (vp) further connected to the subtrahend input of a third subtractor (s3) and to the first input of a fourth constant multiplier circuit (m13) for receiving at the second input said first weighting factor (g) with the output of said fourth multiplier (m13) coupled to the subtrahend input of a fourth subtractor (s4) having the minuend input adapted to receive said input data digital signal (e), with the output of said fourth subtractor coupled to the input of a sixth delay element (v6) having an output coupled to the minuend input of said third subtractor (s3) with the output of said third subtractor coupled to the input of said first delay element (v1), with the delay of said fifth delay element (v5) equal to twice the clock period and that of said sixth delay element (v6) equal to one clock period.

**4,748,504**

## VIDEO MEMORY CONTROL APPARATUS

Tetsuya Ikeda; Yukitoshi Tsuboi, and Shigeru Hirahata, all of Yokohama, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 20, 1987, Ser. No. 4,556
Claims priority, application Japan, Jan. 29, 1986, 61-7917
Int. Cl.[4] H04N 7/08, 5/262
U.S. Cl. 358—142 4 Claims



1. A video memory control apparatus comprising:

a video memory for storing a video signal;

a clock signal input terminal for inputting a clock signal;

an external synchronization signal input terminal for inputting an external synchronization signal;

address generating means connected to said external synchronization signal input terminal and said video memory for generating an address signal to said video memory based on said external synchronization signal and for supplying the address signal to said video memory;

a first counter connected to said clock signal input terminal so as to be reset by a count reset signal for counting the clock signal and for outputting a first reset signal when a predetermined count value is reached;

memory control signal generating means connected to said first counter and said video memory for supplying to said video memory a read control signal corresponding to an output from said first counter;

a second counter connected to said clock signal input terminal so as to be reset by the external synchronization signal for repetitiously counting the clock signal up to the predetermined count value and for outputting a second reset signal when the predetermined count value is reached; and

count reset signal generating means connected to said first counter and said second counter for generating the counter reset signal from the first reset signal and the second reset signal and for supplying the counter reset signal to said first counter.

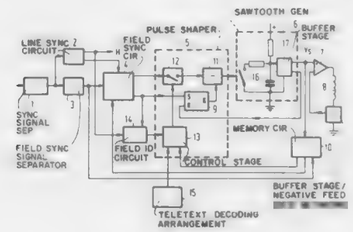


**4,748,505**

## SYNCHRONIZING CIRCUIT AND SAWTOOTH GENERATOR FOR THE FIELD DEFLECTION IN A PICTURE DISPLAY DEVICE

Wouter Smeulers, and Paulus J. M. Hovens, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 885,354, Jul. 14, 1986, abandoned. This application Sep. 18, 1987, Ser. No. 98,707
Claims priority, application Netherlands, Feb. 11, 1986, 8600327
Int. Cl.[4] H04N 5/04
U.S. Cl. 358—148 17 Claims



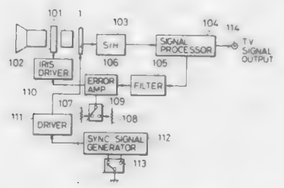
1. A circuit arrangement for the field deflection in a picture display device, comprising a sawtooth generator for generating a sawtooth-shaped signal having a trace and a retrace, and a field synchronizing circuit for generating a local field signal and for applying this signal to the sawtooth generator for each time initiating the retrace of the generated sawtooth-shaped signal, and for synchronizing the locally generated field signal with in incoming field synchronizing signal, characterized in that the circuit arrangement is provided with a switch operated by a control stage for switching over the duration of the retrace period between a first and second value, the second duration being shorter than the first, and in that a pulse shaper for deriving a signal from the local field signal for the supply thereof to the sawtooth generator is coupled to the field synchronizing circuit, which signal has substantially the same duration as the retrace of the sawtooth-shaped signal generated by the sawtooth generator, the pulse shaper including said switch for shortening or lengthening the duration of the said signal.

**4,748,506**

## IMAGE PICKUP APPARATUS WITH EXCESS-CHARGE CONTROL

Teruo Hieda, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 17, 1985, Ser. No. 809,915
Claims priority, application Japan, Dec. 28, 1984, 59-276972; Dec. 28, 1984, 59-276973; Dec. 28, 1984, 59-276974
Int. Cl.[4] H04N 3/14
U.S. Cl. 358—213.18 40 Claims



1. An image pickup apparatus comprising:

(a) image pickup means for converting an image into an electrical signal and for outputting the electrical signal at every predetermined interval, said image pickup means having a first mode, in which at least a part of the electrical signal is cleared off within said predetermined interval, and a second mode, in which the electrical signal is not cleared;

(b) control means for controlling said image pickup apparatus, in response to the electrical signal, such that said image pickup apparatus generates a proper signal representing the image; and

(c) adjusting means for adjusting said control means such that said control means is not influenced by a noise signal generated by said clearing-off performed by said image pickup means.

**4,748,507**

## SOLID STATE IMAGING DEVICE HAVING MEANS TO SHIFT THE IMAGE BETWEEN SCANS AND ASSOCIATED CIRCUITRY TO IMPROVE THE SCANNED IMAGE

Kenneth Gural, 7207 Dartmouth Ave., College Park, Md. 20740

Filed Oct. 17, 1986, Ser. No. 920,186
Int. Cl.[4] H04N 3/14
U.S. Cl. 358—213.28 24 Claims



1. In a method for deriving image signals from an imaging means having a plurality of image sensing elements and a plurality of image data storage locations, including at least a first cycle and a second cycle of the steps of:

(a) exposing the sensing elements to an image to develop image data,

(b) storing the image data in the plurality of storage locations, and

(c) scanning the plurality of storage locations to develop the image signal;

and for which there may be defined three finite periods of time, T1, T2, T3; whereby

T1 corresponds to a finite portion of step (a) of said first cycle,

T3 corresponds to a finite portion of step (a) of said second cycle, and

T2 lies between T1 and T3;

and wherein there is a tendency for the imaging means to produce less than a complete array of image pixels for each image signal; the improvement including

changing the location of the image relative to the image sensing elements during said finite period of time T2, such that substantially no image-degrading change in the location of the image relative to the image sensing elements occurs during said finite periods of time T1 and T3; and

compensating the derived image signal for said change in location of the image;

whereby missing portions of said complete array of image pixels are associated with different portions of the image during said at least two cycles.

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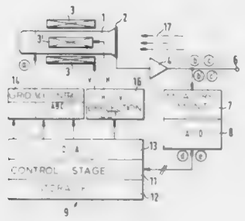


**4,748,508**

## SUCCESSIVE APPROXIMATION TYPE CONTROL OF THE ELECTRON BEAM OF A CAMERA TUBE

**Rainer Gehrmann, Alsbach-Hähnlein, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Dec. 19, 1986, Ser. No. 944,331**
**Claims priority, application Fed. Rep. of Germany, Dec. 21, 1985, 3545638**
**Int. Cl.[4] H04N** *5/21*
**U.S. Cl. 358—222** **9 Claims**



1. Equilibration method for automatic adjustment of the dynamic electron beam current reserve of a television camera tube necessary for the neutralizing of bright spots, comprising the steps of;

operating the signal electrode of the camera tube for a multiplicity of successive picture field period in a manner permitting charge to accumulate on a signal electrode with the result of general illumination of the signal electrode;

scanning the signal electrode with the camera tube electron beam giving several picture field periods in a line interlaced pattern of fields in measuring the video signals produced in the third field scan of the scanning of said several field periods;

comparing the video signal measured in said third field scanning with a first predetermined threshold value of video signal;

in the event said measured video signal is less than said first predetermined threshold value concluding the first phase of said equilibration method;

in the event said measured video signal value exceeds said predetermined first predetermined threshold value gradually magnifying the dynamic rise of the camera tube beam current until the conclusion of said first phase as aforesaid;

again accumulating the charge on the signal electrode for a multiplicity of picture periods;

thereafter scanning the signal electrode for a plurality of picture field periods in interlaced scanning pattern and during the scanning of the second picture field measuring the field signal produced;

comparing the video signal produced in the scanning of said second picture field with a second predetermined threshold value of video signals;

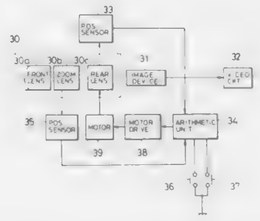
in the event said video signal measured during said second picture field is less than the second determined threshold value, magnifying the limiting adjustment for the rise of said in current to such an extent that in a further equilibration cycle repeating said second unit cycle, the video signal measured in said second view, exceeds said second predetermined threshold value.

**4,748,509**

## FOCUSING CONTROL AND INDICATION OF INFORMATION RELATING TO AN OBJECT

**Yoshichi Otake, Kamakura, and Kaichiro Nomoto, Tokyo, both of Japan, assignors to Victor Company of Japan, Ltd., Japan**

**Filed Sep. 17, 1987, Ser. No. 98,035**
**Claims priority, application Japan, Sep. 18, 1986, 61-220540; Oct. 2, 1986, 61-234954; Oct. 2, 1986, 61-234953**
**Int. Cl.[4] G03B** *3/10*
**U.S. Cl. 358—227** **9 Claims**



1. A video camera with an optical system including a zoom lens system and a rear lens system wherein focusing is performed by varying the distance between said rear lens system and an imaging pickup device of said video camera, comprising:

first sensor means for sensing the position of said rear lens system to detect a relative distance between said rear lens system and said image pickup device and for producing a first detection signal indicative of the detected relative distance;

second sensor means for sensing the position of said zoom lens system to detect a focal length of said optical system and for producing a second detection signal indicative of the detected focal length;

drive means for driving said rear leans system; and

control means responsive to said first and second detection signals from said first and second sensor means for calculating a distance to an object on the basis of the detected relative distance and the detected focal length, detecting a zooming operation of said optical system on the basis of the second signal produced by said second sensor means, and, in response to the detection of the zooming operation, calculating a relative distance between said rear lens system and said image pickup device on the basis of the calculated distance to said object and the focal length detected by said second sensor means, said control means generating a control signal to supplying it to said drive means to move said rear lens system so that the relative distance obtained by the signal from said first sensor means becomes equal to the calculated relative distance.

**4,748,510**

## DRIVE CIRCUIT FOR LIQUID CRYSTAL DISPLAY DEVICE

**Toshimitsu Umezawa, Kazo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Mar. 25, 1987, Ser. No. 30,070**
**Claims priority, application Japan, Mar. 27, 1986, 61-67083**
**Int. Cl.[4] H04N** *5/70, 3/14*
**U.S. Cl. 358—236** **11 Claims**

1. A drive circuit for a liquid crystal display device, comprising:

input means for receiving a signal to be displayed;

liquid crystal display means having a plurality of liquid crystal elements arranged in a matrix and having scanning electrodes and signal electrodes provided with respect to said liquid crystal elements;

scanning electrode driving means, coupled to said scanning electrodes, for sequentially driving said scanning electrodes;

a plurality of switching stages, coupled in columns, each of which includes a plurality of switch means, each of said switch means of the first switching stage having an input terminal coupled to said input means and having an output terminal branched so that said output terminal is coupled to input terminals of associated switch means located in a



succeeding switching stage, and output terminals of said switch means of the last switching stage being respectively coupled to said signal electrodes; and

drive control means, coupled to each of said switch means, for sequentially activating said switch means of said each switching stage one at a time in such a manner that said signal electrodes are sequentially driven by said signal to be displayed.

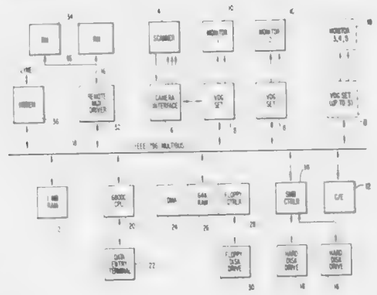


**4,748,511**

## TELERADIOLOGY SYSTEM

**John L. Nichols, Santa Clara; David Wang, Milpitas; Edward Kirkpatrick, Scotts Valley; Clark M. Viehweg, Los Gatos; Edwin S. Morton, Campbell; Van T. Hua, San Jose, and William G. King, Los Gatos, all of Calif., assignors to Raytel Systems Corporation, San Jose, Calif.**

**Filed Jun. 7, 1984, Ser. No. 618,346**
**Int. Cl.[4] H04N** *1/00, 5/32*
**U.S. Cl. 358—256** **15 Claims**



1. A system for storing and transmitting still, spatial images, said system comprising

scanning means for scanning said still, spatial image and for generating analog video signals in response thereto,

interface means for digitizing said video signals generated by said scanner means to obtain pixels,

means for assembling said pixels in one or more pixel blocks,

a single compressor/expander means for alternately compressing and expanding said pixels on a block-by-block basis, said compressor/expander means including a first buffer means for storing each of said pixel blocks during compression and expansion, a transform processor means connected to said first buffer means for storing each of said pixel blocks according to a cosine transformation during a compression operation in order to obtain a DC component value and a set of AC component values for each of said pixel blocks and for processing said DC component value and said set of AC component values from each of said pixel blocks according to a reverse cosine transformation during an expansion operation in order to obtain said pixels in each of said pixel blocks, a second buffer means for storing said DC value and said set of AC values from each of said pixel blocks, and an encoding/decoding means for encoding said DC component value and said set of AC component values from each of said pixel blocks during said compression operation and for decoding said encoded DC component value and said encoded of AC values from each of said pixel blocks during said expansion operation,

memory means for storing said encoded DC component value and said encoded set of AC component values from each of said pixel blocks,

bus means for transmitting selected ones of said pixels to one or more predetermined locations, and

display means for visually displaying X-ray type images corresponding to said transmitted pixels at said one or more locations.

**4,748,512**

## DATA COMPACTION PROCESS FOR DIGITIZED IMAGES

**Glynn E. Armstrong, Watauga, Tex., assignor to National Business Systems, Inc., Moonachie, N.J.**

**Filed Aug. 25, 1986, Ser. No. 899,639**
**Int. Cl.[4] H04N** *1/419*
**U.S. Cl. 358—261** **9 Claims**



1. A process for encoding a digitized image comprised of one or more lines with each line of the image having a plurality of sequential digitized points extending from a first point to a last point wherein the individual points are encoded as binary levels of 1 or 0 comprising:

(a) encoding each line of the digitized image with an integer number of fields of bits, comprising a first type encoding a number of sequential groups of points, with each group being encoded with bits of only one pre-designated binary level, extending from a starting point of the line to a group of points immediately preceding a group of points which has one or more points encoded with bits of the other binary level or to a group of points which is one more than the maximum number of groups which can be defined with the first type of field, a second type containing the actual bits of the group of image points which follow the image points encoded by the preceding field; and a third type encoding a number of sequential groups of points encoded with bits which contain only the level of the last bit in the second field type which immediately follow the last bit of the image points encoded by the second field type; and

(b) encoding any remainder of the line not encoded by the first, second and third field types by repeating the encod-

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ing process of part (a) using field types two and three, with respect to the remainder of the line until the group of points containing the last point is encoded.

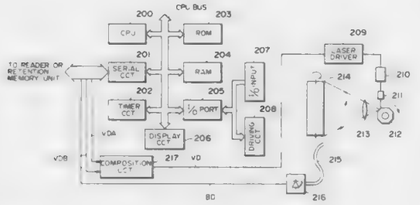
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**4,748,513**

## IMAGE PROCESSING SYSTEM

**Masanori Yamada, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Jan. 31, 1986, Ser. No. 825,103**
**Claims priority, application Japan, Jan. 31, 1985, 60-017064**
**Int. Cl.[4] H04N *1/04***
**U.S. Cl. 358—280** **14 Claims**




1. An image processing system comprising:

input means for inputting an image signal;

storage means for storing the image signal of at least one page input by said input means;

readout means for reading out the image signal from said storage means; and

control means for controlling reading out of the image signal from said storage means by said readout means, said control means being operable to control said readout means in either a first mode, in which the image signal is read out from said storage means at an arbitrary time after completion of storage of the image signal in said storage means, or a second mode, in which the image signal is read out from said storage means at a specified time after completion of storage of the image signal in said storage means,

wherein said control means inhibits the image signal read out from said storage means in the second mode from being read out from said storage means by said readout means in the first mode.

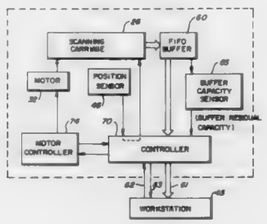
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**4,748,514**

## VARIABLE RATE SCANNING CONTROL

**Gregory E. Bell, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Dec. 22, 1986, Ser. No. 945,156**
**Int. Cl.[4] H04N *1/17***
**U.S. Cl. 358—288** **5 Claims**




1. A method for asynchronously operating a combined document scanner and workstation in which the scanner has at least one scanning array supported by a motor driven carriage for scanning documents to assure an adequate supply of image signals for said workstation and reduce stopping and starting of the scanner with minimal image signal buffering and reduced scanner cost and complexity, comprising the steps of:

(a) on a demand for image signals by said workstation, actuating said carriage to accelerate said carriage with said array to scan the document to be printed, acceleration of said carriage providing a carriage scanning speed;

(b) on movement of said carriage with said array through a distance equal to one scan line, actuating said array to scan said line to produce said image signals for use by said workstation;

(c) repeating step b for each scan line moved by said carriage;

(d) outputting the image signals produced by said array through a relatively small buffer to said workstation;

(e) continuing to accelerate said carriage to output said image signal at an increasing rate through said buffer to said work station until the rate at which said image signals are output by said array exceeds the rate at which said image signals are demanded by said workstation so that said buffer begins to fill with said image signals reducing the residual capacity of said buffer;

(f) monitoring said buffer residual storage capacity; and

(g) on a reduction in said buffer residual storage capacity below a predetermined number of said image signals, adjusting said carriage motor to reduce said carriage scanning speed and the rate at which said image signals are produced whereby to restore said buffer residual storage capacity back to said predetermined number of said image signals while matching the rate at which said image signals are output by said array with the rate at which image signals are demanded by said workstation.

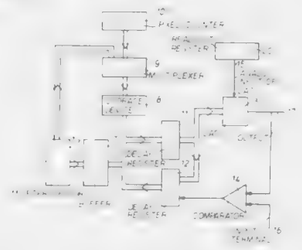
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**4,748,515**

## VIDEO OUTPUT SIGNAL CORRECTING METHOD AND APPARATUS

**Jean A. Van Daele, Bonheiden, and Patrick M. Pandelaers, Brussels, both of Belgium, assignors to Afga-Gevaert N.V., Mortsel, Belgium**

**Filed Oct. 6, 1986, Ser. No. 915,751**
**Claims priority, application European Pat. Off., Oct. 7, 1985, 85201614**
**Int. Cl.[4] H04N *1/10***
**U.S. Cl. 358—293** **4 Claims**



1. A method of generating correction factors with which a video signal, output of a sensor in an electro-optical document reading apparatus, is to be amplified in every pixel in order to compensate for apparatus performance anomalies, which method comprises the steps of developing an n-bit binary code correction work for an output value pertaining to each pixel in a scanning line or area taken as reference with which said output value has to be amplified to make it substantially equal to a predetermined reference signal level by performing a succesibe approximation procedure, said procedure comprising a sequence of checking cycles each including the steps of ampliying a sensor signal responsive to a uniformly irradiated line or area taken as reference with an initial n-bit binary code work having its most significant bit set to one and its other bits set to zero to give a modified video response signal and comparing said modified video response signal with said predetermined reference signal level to give a comparison signal; and changing the correction words bit by bit in dependance on said comparison signal and by changing a lower significant bit next to an amended bit to one in order to bring each of the correction works progressively into approximation with a required coded correction factor; wherein the successive approximation procedures for developing the plurality of correcting words are nested by performing in immediate succession to each other the sequence of checking cycles in respect of the most significant bits of different correction words, then performing in imediate succession to each other the sequence of checking cycles in respect of a next significant value bit of those correction words and so on until the successive approximation procedures for all the correction words are completed each sequency of checking cycles being performed after an exposure of said sensor to said uniformly illuminated reference line or area.



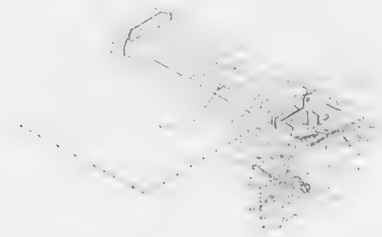
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**4,748,516**

## INPUT/OUTPUT DEVICE FOR IMAGE READING AND PRINTING

**Tetsuo Harano, Inazawa, and Eiichi Ohta, Handa, both of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Japan**

**Filed Mar. 12, 1986, Ser. No. 839,205**
**Claims priority, application Japan, Mar. 15, 1985, 60-52949; Apr. 26, 1985, 60-91806**
**Int. Cl.[4] H04N *1/04***
**U.S. Cl. 358—296** **20 Claims**



1. An input/output device, capable of reading first images on a surface of a first recording medium, and printing second images such as said first images, on a surface of a second recording medium, comprising:

a reading head of a reciprocating shuttle type having a plurality of reading portions for reading said first images on said first recording medium, said plurality of reading portions being spaced apart from each other in a direction perpendicular to a line of feed of said first recording medium, at a perdetermined pitch greater than a reading pitch corresponding to a predetermined reading resolution of said reading head, so as to cover an entire width of said first recording medium, said reading head being adapted to be in pressed contact with said surface of said first recording medium while said first images are read by said plurality of reading portions;

a printing head of a reciprocating shuttle type having a plurality of printing portions adapted to be in pressed contact with said surface of said second recording medium for printing thereon said second images, said plurality of printing portions being spaced apart from each other in a direction perpendicular to a line of feed of said second recording medium, at a predetermined pitch greater than a printing pitch corresponding to a predetermined printing density of said pring head, so as to cover an entire width of said second recording medium;

driving means for reciprocating said reading head and said printing head as a unit in said direction;

detecting means for detecting, during reciprocation of said reading and printing heads, reading positions of said reading head at said reading pitch, and printing positions of said printing head at said printing pitch;

control means for controlling said reading and printing heads responsive to an output of said detecting means; and

actuator means including first means for effecting separation of said reading head from the surface of said first recording medium and for effecting pressed contact of said reading head with the surface of said first recording medium, and second means, operable independent of said first means, for effecting separation of said printing head from the surface of said second recording medium and for effecting pressed contact of said printing head with the surface of said second recording medium.

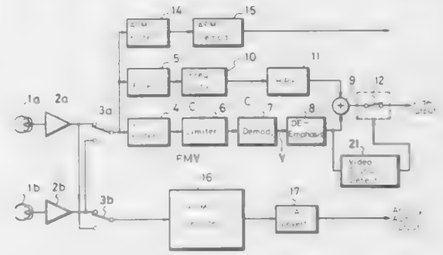
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**4,748,517**

## PCM AUDIO SIGNAL REPRODUCING APPARATUS

**Masahiro Shibata, Tokyo; Tatsuo Tsujibayashi; Hiroyuki Sato, both of Kanagawa; Yoshinori Machida; Daisuke Murakami, both of Tokyo, and Yoko Ohgane, Kanagawa, all of Japan, assignors to Sony Corporation, Tokyo, Japan**

**Filed Jun. 18, 1986, Ser. No. 875,538**
**Claims priority, application Japan, Jun. 18, 1985, 60-132640**
**Int. Cl.[4] H04N *9/79, 5/78***
**U.S. Cl. 358—310** **21 Claims**




1. Apparatus for reproducing an information signal recorded in a plurality of successive tracks on a record medium and comprising at least a digitized audio signal recorded in at least an overscan section of each track, said apparatus comprising:

transducer means for scanning the tracks to reproduce the information signal recorded in the plurality of successive tracks;

audio signal processing means for converting said digitized audio signal to an analog audio signal;

video signal processing means for processing any color video signal included in the reproduced information signal to provide a composite color video output signal having horizontal synchronizing pulses and color burst signals;

switch means for supplying said information signal reproduced during scanning of said overscan section of each track to said audio signal processing means and for supplying said information signal reproduced during scanning of a main section of each track to a selected one of said audio signal processing means and said video signal processing means;

video signal muting means for muting said composite color video output signal from said video signal processing means;

video signal detecting means for detecting any color video signal included in said information signal reproduced during scanning of said main section of each track; and

control means causing said video signal muting means to mute said composite color video output signal from said video signal processing means in response to an output signal from said video signal detecting means indicating the absence of a color video signal from a track being scanned.

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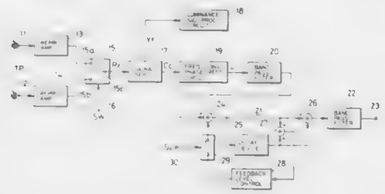


**4,748,518**

## CHROMINANCE SIGNAL PROCESSING CIRCUIT FOR COLOR VIDEO REPRODUCING APPARATUS

**Masao Suzuki, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan**

**Filed Dec. 31, 1986, Ser. No. 948,078**
**Claims priority, application Japan, Jan. 17, 1986, 61-8530**
**Int. Cl.⁴ H04N** *9/87*
**U.S. Cl. 358—312** **9 Claims**



1. In a color video reproducing apparatus having a rotary magnetic head assembly which reproduces a color video signal including a chrominance signal recorded on a magnetic tape in successive tracks extending obliquely across the tape and selectively having a first width or a second width narrower than said first width, a chrominance signal processing circuit comprising:

signal separating means for separating the chrominance signal from the color video signal reproduced by said rotary magnetic head assembly;

comb-filter means connected to receive the reproduced chrominance signal from said signal separating means and being selectively controllable to provide a simple comb-filter and a feedback-type comb-filter, respectively, for processing said reproduced chrominance signal; and

filter control means for causing said comb-filter means to provide said simple comb-filter when said rotary magnetic head assembly reproduces said color video signal from a magnetic tape having oblique tracks of said first width, and to provide said feedback-type comb-filter when said color video signal is being reproduced from oblique tracks of said second width.

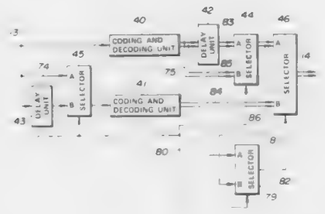
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**4,748,519**

## METHOD AND APPARATUS FOR RECORDING AND REPRODUCING CODED DIGITAL SIGNALS

**Roger Lagadec; Claudia Brandes, both of Rümlang, Switzerland, and Yukio Fukuju, Yokohama, Japan, assignors to Willi Studer AG & Sony Corporation, Tokyo, Japan**

**Filed Dec. 11, 1985, Ser. No. 807,741**
**Claims priority, application Switzerland, Dec. 18, 1984, 05981/84**
**Int. Cl.⁴ G11B** *5/09*
**U.S. Cl. 360—48** **20 Claims**




1. Method for processing sequential values of a digital signal for its coded recording on a recording medium, in which the values are assigned during coding to at least two different categories which correspond to even values and odd values of the digital signal, and in which the values belonging to different categories experience different delays, characterized by processing the values in a plurality of parallel channels according to the number of categories, and by imposing a predetermined different sequencing of said even values and said odd values in one channel with respect to the other channel.

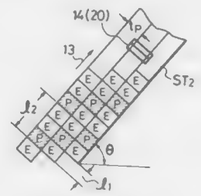
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**4,748,520**

## METHOD FOR RECORDING A DIGITAL INFORMATION SIGNAL AND TRACKING PILOT SIGNALS AT DIFFERENT LOCATIONS IN THE TRACK

**Kentaro Odaka, Kawasaki, Japan, assignor to Sony Corporation, Tokyo, Japan**

**Continuation of Ser. No. 560,958, Dec. 13, 1983, Pat. No. 4,665,447. This application Feb. 27, 1987, Ser. No. 19,936**
**Claims priority, application Japan, Dec. 13, 1982, 57-222298**
**The portion of the term of this patent subsequent to May 12, 2004, has been disclaimed.**
**Int. Cl.⁴ G11B** *5/02, 5/024, 27/10, 5/09*
**U.S. Cl. 360—77** **2 Claims**




1. A method for recording a digital information signal in which an information signal is digitized and then recorded in a plurality of slant tracks on a recording medium by a pair of rotary heads having different respective azimuth angles, comprising the steps of:

recording said digitized information signal in a first predetermined area of each of said slant tracks formed on said recording medium by said rotary head without a guard band between adjacent tracks;

recording a tracking pilot signal in a portion of at least a second predetermined area of each of said plurality of slant tracks independently of said digitized information signal; and

recording an erasing signal in another portion of each of said second predetermined areas where no tracking pilot signal is recorded, wherein said tracking pilot signals in said second predetermined areas of three adjacent tracks are arranged so as not to be sequentially encountered in a direction perpendicular to a tracking direction of said rotary head on said recording medium.

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**4,748,521**

## MAGNETIC RECORDING/REPRODUCING APPARATUS FOR RECORDING ONTO OR REPRODUCING FROM A MAGNETIC TAPE

**Atsuo Osawa; Kenji Ogiro; Shouzou Yokoo, all of Yokohama, and Hidekazu Takeda, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Apr. 21, 1986, Ser. No. 854,031**
**Claims priority, application Japan, Apr. 19, 1985, 60-82434**
**Int. Cl.⁴ G11B** *15/61, 15/18*
**U.S. Cl. 360—85** **6 Claims**

1. A magnetic recording/reproducing apparatus including:

a plurality of reel supports for supporting reels of a cassette with a tape-shaped recording medium wound on said reels;

a magnetic rotary head;

means for withdrawing said tape-shaped recording medium out of said cassette, winding the withdrawn recording medium on said magnetic rotary head and guiding said



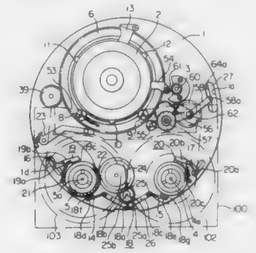
recording medium along a predetermined tape feeding path;

a capstan;

a pinch roller movable from an inoperative position to an operative position to cooperate with said capstan to pinch said recording medium therebetween when said recording medium is in a first running condition;

reel driving means including an idler gear movable from an inoperative position to an operative position to drive one of said reel supports when said recording medium is in a second running condition;

reel support braking means including brake shoes movable from an inoperative position to an operative position to brake rotations of said reel supports when said recording medium is in a third running condition;



operating members independently provided for said pinch roller, for said idler gear, and for said brake shoes for moving said pinch roller, said idler gear and said brake shoes between said operative positions and said inoperative positions, respectively, said operating members being respectively provided with cam followers;

a ring-shaped cam member having cam surfaces formed on radially inner and outer peripheries thereof, said cam followers being respectively operatively associated with said cam surfaces of said ring-shaped cam member so that when said ring-shaped cam member is rotated, said cam followers are respectively actuated by said cam surfaces whereby said pinch roller, said idler gear and said brake shoes are respectively moved from one of said two positions to the other.

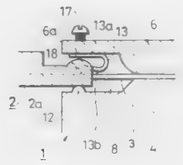
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**4,748,522**

## MAGNETIC HEAD ASSEMBLY HAVING VIBRATION CONTROLLING MEMBER

**Atsushi Takahashi; Atsushi Iwanaga, and Osamu Hatakeyama, all of Furukawa, Japan, assignors to Alps Electric Co., Ltd., Japan**

**Filed Oct. 17, 1986, Ser. No. 920,842**
**Claims priority, application Japan, Oct. 19, 1985, 60-159255[U]**
**Int. Cl.⁴ G11B** *5/54, 21/20, 21/22*
**U.S. Cl. 360—104** **3 Claims**



1. In a magnetic head assembnly including a movable carriage for moving a magnetic head with respect to a magnetic recording medium, a leaf spring hinge having one end portion fixed to said carriage and another end portion connected to a rear portion of an arm for pivotably mounting said arm to said carriage,

the improvement comprising:

a fulcrum portion projecting from a first part of said carriage to abut against a lower side of said rear portion of said arm;

an elastic member formed of a leaf spring in a U-shape in side elevation which is interposed between an upper side of said rear portion of said arm and a second part of said carriage opposed to said fulcrum portion of said first part, wherein said rear portion of said arm is pivotably supported on said carriage between said fulcrum portion and said elastic member, said leaf spring having an upper portion fixed by a screw threaded into said second part of said carriage and a lower portion elastically abutted against opposite projections formed on inner walls of said rear portion of said arm.

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**4,748,523**

## MAGNETIC-TAPE APPARATUS WITH COMBINED TAPE AND SERVO WHEEL DRIVE

**Ghislanus M. A. M. Aldenhoven, and Joseph G. Laudus, both of Hasselt, Belgium, assignors to U.S. Philips Corp., New York, N.Y.**

**Filed Jul. 14, 1986, Ser. No. 885,352**
**Claims priority, application Netherlands, Jul. 17, 1985, 8502056**
**Int. Cl.⁴ G11B** *5/54*
**U.S. Cl. 360—105** **19 Claims**



1. A magnetic tape apparatus comprising:

at least one switching device for switching an apparatus function, comprising a servo wheel rotatable about an axis of rotation,

two winding spindles having respective lower end portions, and a respective coaxial winding wheel connected to each spindle,

a reversible drive motor, and means for coupling said motor to a respective winding wheel when the apparatus is in an operating condition, said means including an idler wheel arranged rotatably about an idler axis between said winding wheels, and means for moving said idler wheel between an inoperative position free of engagement with either winding wheel, and a selected one of two operating positions in engagement with one or the other winding wheel,

a coupling wheel, and means, responsive to said apparatus being in a switching condition, for coupling said idler wheel to said coupling wheel to form a coupling between the drive motor and the switching device so as to activate said switching device to switch the apparatus function,

characterized in that the apparatus further comprises a servo member movable between a first position and a second position, and means including a latching spring for urging said member into said first position by the force of said spring, in said first position said member locking said servo wheel in a latched position against rotation; and in

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the second position said member releasing said servo wheel to switch the apparatus function,

means for switching the drive motor between first and second operating voltage levels, at the first level the motor producing a higher torque than at the second level, and

an at least temporarily stationary body with which the coupling wheel is in contact, arranged such that, as the coupling wheel rotates in a first direction, the coupling wheel rolls along the body, and urges the servo member towards the second position, the force exerted on the servo member by the coupling wheel being only large enough to overcome the force on the latching spring when the motor is switched to the first level torque.

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**4,748,524**

## ALIGNMENT DISK FOR USE IN ADJUSTING OR INSPECTING A MAGNETIC HEAD IN A FLOPPY DISK DRIVE UNIT

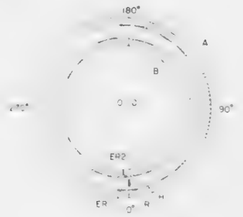
**Noburo Fukaya; Katsuhide Tanoshima, both of Tokyo, and Masatoshi Hisada, Yokohama, all of Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo and Tokyo Engineering Co., Ltd., Yokohama, both of, Japan**

**Filed Dec. 23, 1986, Ser. No. 945,544**

**Claims priority, application Japan, Dec. 24, 1985, 60-289437**

**Int. Cl.[4] G11B** *5/56*

**U.S. Cl. 360—109** **5 Claims**



1. An alignment disk for use in adjustment or inspection of a magnetic read/write head in a floppy disk drive unit, which further includes an erase head, said alignment disk being provided with first regions in which signals are prerecorded and second regions in which no signals are prerecorded, the first and the second regions being alternately disposed along a locus followed by the read/write head when the disk is rotated, wherein the length of each of the first regions is smaller than the distance between read/write head and the erase head and the length of each of the second regions is larger than the distance between the read/write head and the erase head.

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**4,748,525**

## PROBE HEAD FOR VERTICAL RECORDING

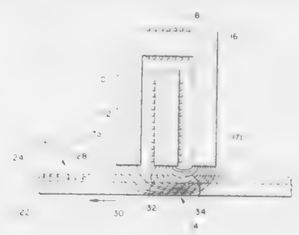
**Craig M. Perlov, Los Altos, Calif., assignor to Magnetic Peripherals Inc., Minneapolis, Minn.**

**Continuation of Ser. No. 829,598, Feb. 14, 1986, abandoned. This application Sep. 14, 1987, Ser. No. 96,082**

**Int. Cl.[4] G11B** *5/127, 5/17*

**U.S. Cl. 360—110** **1 Claim**

1. A magnetic recording head for vertically recording digital information onto a moving magnetic medium comprising a probe comprising a ferromagnetic metal bar having a lower end; a read/write coil means wrapped around said probe for inducing magnetic flux in said probe to establish a magnetic pole in the lower end of said probe; a substantially U-shaped member having a pair of legs and an upper body portion constructed of metal at least partially surrounding and spaced from said probe, said legs each having a lower end distal said upper body portion, the lower ends of said legs and the lower end of said probe being so disposed and arranged proximate to said moving magnetic medium that the lower end of one of said legs is leading the lower end of said probe and the lower end of the other of said legs is trailing the lower end of said probe in relation to the relative movement of said probe with respect to said medium and at least one of said legs provides an easy magnetic circuit for magnetic flux induced in said probe by said read/write coil means; and a focus coil means wrapped around said upper body portion of said U-shaped member for focusing the magnetic flux induced in said probe by said read/write coil means to a region of the magnetic medium between



the lower ends of the legs of said U-shaped member by establishing a magnetic pole in the lowe end of the leg leading said probe which is the same polarity as the magnetic pole established in said probe, said focus coil means establishing a magnetic pole in the lower end of the leg trailing said probe which is the opposite polarity as the magnetic pole established in said probe to thereby provide a magnetic flux return path from the magnetic medium to said probe during recording.

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**4,748,526**

## HEAD CLEANING CASSETTE FOR MAGNETIC TAPE CASSETTE APPARATUS

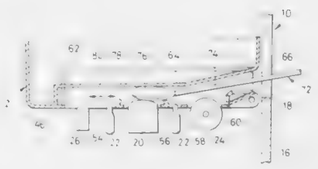
**Hirokazu Miyao, Koganei, and Hiroshi Ohkubo, Fussa, both of Japan, assignors to Teac Corporation, Tokyo, Japan**

**Filed Apr. 11, 1986, Ser. No. 850,756**

**Claims priority, application Japan, Apr. 15, 1985, 60-54724[U]**

**Int. Cl.[4] G11B** *5/41*

**U.S. Cl. 360—128** **3 Claims**



1. In combination with a magnetic tape cassette apparatus of the type including a housing defining an entrance slot through which a magnetic tape cassette is to be inserted longitudinally into the housing, and a row of components, including a transducer head, which are disposed within the housing and which are admitted into the tape cassette through a front longitudinal side thereof when the tape cassette is loaded in position within the housing, a cleaning cassette for use in cleaning at least some of the row of components with a cleaning stick having a body of absorbent material on one end of a shank, the cleaning cassette comprising:

(a) a casing shaped and sized like the tape cassette so as to be loaded in and unloaded from the tape cassette apparatus through the entrance slot thereof in the same way as the tape cassette, so that a front longitudinal side of the casing comes opposite the transducer head and other components to be cleaned upon loading of the cleaning cassette in position in the apparatus, the front longitudinal side of the casing being open to admit the row of components when the cleaning cassette is loaded in position in the apparatus; and

(b) means for defining within the casing a guide passageway for the cleaing stick extending along the front longitudinal side of the casing, the guide passageway having an entrance end which is an aperture in a side of the cassette extending transverse to said front side wherein when the cleaning cassette is loaded in position in the apparatus said aperture is open to the entrance slot thereof;

(c) whereby, following the loading of the cleaning cassette in position in the apparatus, the cleaning stick can be inserted in the guide passageway through the entrance slot of the apparatus and the entrance end of the guide passageway for cleaning at least some of the row of components, which are admitted into the cleaning cassette through the open front side thereof, by manipulating the cleaning stick back and forth along the guide passageway.

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**4,748,527**

## MAGNETIC HEAD DEVICE WITH BACK CORE INTEGRAL IN HOLDER SHELL

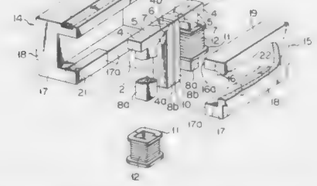
**Yoshiharu Fujioka, Yamato; Shoji Tsutaki, Yokohama; Mitsuo Katoh, Ayase; Hiroyuki Itou, Yokohama, and Toshinobu Yoshida, Kawasaki, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Oct. 25, 1985, Ser. No. 791,530**

**Claims priority, application Japan, Oct. 30, 1984, 59-228523; Dec. 13, 1984, 59-263318; Dec. 13, 1984, 59-263319**

**Int. Cl.[4] G11B** *5/10, 5/11*

**U.S. Cl. 360—129** **10 Claims**



1. A magnetic head device for magnetically recording data on and reading the recorded data from a magnetic recording medium; comprising:

a core formed of a magnetic material, said core including a sliding portion having at least one magnetic gap defined therein and a face adapted to be in sliding contact with the magnetic recording medium, and a pair of legs each having a proximal end coupled integrally with the sliding portion and a distal end extending away from the magnetic recording medium, the pair of legs, along with the sliding portion, defining part of a magnetic path passing through the magnetic gap;

a coil wound around one of the legs of the core; and

holder means for holding said core and said coil so that said face may contact the magnetic recording medium;

said holder means including a pair of holder shells formed of a nonmagnetic material and arranged so as to hold said core therebetween, each holder shell having one end coupled to the sliding portion of said core, another end extending toward and coupled with the distal ends of the two legs of said core, and a sliding surface provided at part of the holder shell and adapted, along with the face, to be in sliding contact with the magnetic recording medium; and a connecting portion formed of a magnetic material and constituting part of the leg coupling end of at least one of the holder shells so that the connecting portion and said core define a closed magnetic path passing through the magnetic gap said connecting portion being integrally formed with said holder means.



**4,748,528**

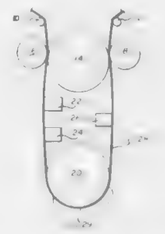
## APPARATUS HAVING A MAGNETIC TURNAROUND ROLLER TO REDUCE MAGNETOSTRICTIVE KNOCKDOWN

**Frederick J. Jeffers, Escondido, Calif., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Jan. 30, 1986, Ser. No. 824,045**

**Int. Cl.[4] G11B** *15/61, 15/60*

**U.S. Cl. 360—130.2** **4 Claims**



1. In an apparatus for transporting a magnetic recording medium having at least one member that exerts a force on said medium sufficient to cause magnetostriction knockdown, the improvement wherein said member is comprised of a magnetic material in the form of a continuous surface that bears against said member for substantially the full travel of said medium over said member, the magnetic permeability of said magnetic material being at least equal to the dimensionless number three.

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**4,748,529**

## MAGNETIC TAPE CASSETTE WITH ANTI-FRICTION TAPE GUIDES

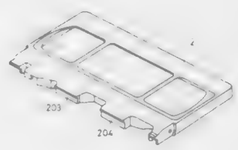
**Haruo Shiba, Komoro, and Kimio Tanaka, Saku, both of Japan, assignors to TDK Corporation, Tokyo, Japan**

**Filed May 13, 1986, Ser. No. 862,867**

**Claims priority, application Japan, Jun. 3, 1985, 60-83754**

**Int. Cl.[4] G11B** *23/08*

**U.S. Cl. 360—132** **1 Claim**



1. A magnetic tape cassette including a lower housing section and an upper housing section assembled into a housing, a pair of reels held in the housing and carrying a length of magnetic tape wound thereon, and at least one magnetic tape guide wall provided at the front of the housing, said at least one magnetic tape guide wall being formed in one piece with said lower housing section in such a relation that the magnetic tape guiding surface is substantially perpendicular to the outer bottom surface of said lower housing section and that said guiding surface is a matt surface having a surface roughness between 10 μm RZ and 30 μm RZ, whereby electrostatic sticking, scraping, deformation and stoppage of the tape is reduced.

VOL 1090 ISS 5 MY 31 1988 UMI



**4,748,530**

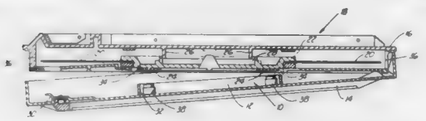
## DISK COVER COLLAR

**James L. Barnes, Elkhorn, Nebr., assignor to Magnetic Peripherals, Inc., Minneapolis, Minn.**

**Continuation-in-part of Ser. No. 460,671, Jan. 24, 1983, abandoned. This application Apr. 14, 1986, Ser. No. 851,590**

**Int. Cl.⁴ G11B** *23/03*

**U.S. Cl. 360—133** **8 Claims**



1. In combination with a disk cartridge of the type having a housing containing a rotatable data storage disk and hub assembly, the hub assembly having a circular plate centered on the hub and accessible through an aperture in the housing, the disk cover collar comprising:

collar means attachable to the housing for protecting the data storage disk in a storage mode thereof, the cover means comprising:

a flexible cover member removably supportable by the housing so as to cover the accessing aperture;

an annular ring supported by the cover member, the annular ring having an internal diameter disposable about the circular plate on the hub so that the resiliency of the cover member urges the annular ring against the circular plate and hub to permit same to center within the confinement of the annular ring after which the annular ring restrains radial movement of the hub; and

plural posts supported by the cover member within the annular ring and disposed to engage the bottom surface of the circular plate.

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**4,748,531**

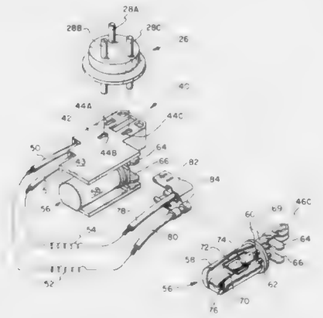
## COMPRESSOR TERMINAL BLOCK AND OVERLOAD PROTECTOR ASSEMBLY

**Arturo L. Ortiz, Tecumseh, Mich., assignor to Tecumseh Products Company, Tecumseh, Mich.**

**Filed Feb. 20, 1987, Ser. No. 16,842**

**Int. Cl.⁴ H02H** *5/04*

**U.S. Cl. 361—24** **10 Claims**



1. A hermetic compressor for a refrigeration system comprising:

a casing;

an electric motor having run and start windings mounted in said casing;

a terminal pin assembly secured to said casing and having a plurality of pins extending through a wall of said casing;

a terminal block including a plurality of apertures and having said plurality of pins respectively extending therethrough, said terminal block disposed in said casing;

first and second connector clips disposed in said terminal block and being removeably secured to a first and second of said pins;

first and second leads respectively connecting said first and second connector clips to respective first ends of said run and start windings;

a motor protector disposed in said terminal block;

a third connector clip disposed in said terminal block and secured to said motor protector for electrical contact therewith, said third connector clip being removeably secured to a third of said pins;

first and second push on terminals connected to said motor protector; and

third and fourth leads connecting said first and second push on terminals to the respective second ends of said run and start windings.

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**4,748,532**

## TRANSFORMER COUPLED POWER SWITCHING CIRCUIT

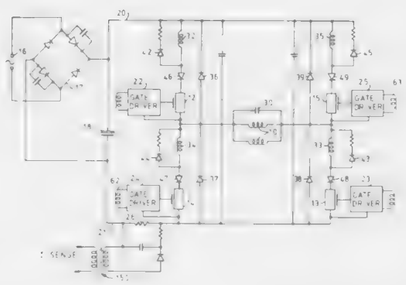
**Robert D. Commander, Twyford; Brian P. Fenton, Romsey, and John G. Ramage, Chandlers Ford, all of England, assignors to International Business Machines Corporation, Armonk, N.Y.**

**Continuation of Ser. No. 706,377, Feb. 27, 1985, abandoned. This application May 6, 1987, Ser. No. 25,914**

**Claims priority, application European Pat. Off., Feb. 29, 1984, 84301319.4**

**Int. Cl.⁴ H02H** *7/122;* **H02M** *3/335*

**U.S. Cl. 361—31** **9 Claims**



1. A power switching circuit for switching power repetitively to a load, comprising a power switching transistor responsive to a low frequency drive signal at a control input thereof to connect a power supply to a load for the duration of the drive signal, the low frequency lying within a predetermined range, and a drive circuit for providing such a drive signal to the control input of said power switching transistor, said drive circuit comprising a transformer and a primary circuit including a primary winding of said transformer, a source of high frequency periodic signals of frequency above said predetermined frequency range, amplitude modulating means arranged to produce from low frequency switching logic signals and said high frequency periodic signals a signal modulated at a frequency within said predetermined range in accordance with the switching logic signals and means for applying the modulated signal to said primary winding, the drive circuit further comprising a secondary circuit including a secondary winding of said transformer, in which a corresponding modulated signal is induced, amplitude detecting means for detecting the modulations by sensing non zero values and producing in response thereto such a low frequency drive signal for application to the control input of said power switching transistor, and rectifying means for rectifying the modulated secondary winding signal, the rectified signal being



connected to provide an independent power supply to the detecting means.

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**4,748,533**

## INTEGRATED CIRCUIT FOR THE PROTECTION OF SUBSCRIBER LINES AGAINST OVERVOLTAGES

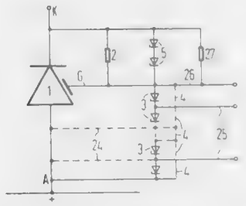
**Helmut Hertrich, Weng; Fritz Kirschner, Lohhof, and Jenö Tihanyi, Munich, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Nov. 4, 1986, Ser. No. 926,969**

**Claims priority, application Fed. Rep. of Germany, Nov. 4, 1985, 3539108**

**Int. Cl.⁴ H02H** *9/04*

**U.S. Cl. 361—56** **15 Claims**



1. Integrated circuit for protecting subscriber lines against overvoltages, comprising a semiconductor body with a field-controllable thyristor having a gate electrode, an anode electrode and a cathode electrode, said gate electrode being insulated from said semiconductor body; a resistor connected between said cathode electrode and said gate electrode; a series circuit of Zener diodes connected between said gate electrode and said anode electrode, each of said Zener diodes having an anode electrode and a cathode electrode; and short circuit jumpers each being connected between said anode electrode and said cathode electrode of a respective one of at least part of said Zener diodes; at least part of said jumpers being interrupted to set the breakdown voltage of said series circuit to a predetermined value; and said thyristor having a larger breakdown voltage than the combined breakdown voltages of said Zener diodes of said series circuit of Zener diodes.

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**4,748,534**

## DEVICE FOR ESTABLISHING BETWEEN CONDUCTORS A GALVANIC CONNECTION, WHICH IS BLOCKED FOR THE TRANSMISSION OF ELECTROMAGNETIC RADIATION

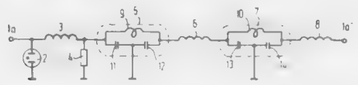
**Michiel Palm, 's-Hertogenbosch, Netherlands, assignor to Staat der Nederlanden (Staatsbedrijf der Posterijen, Telegrafie en Telefonie), The Hague, Netherlands**

**Filed Jan. 30, 1987, Ser. No. 8,774**

**Claims priority, application Netherlands, Feb. 6, 1986, 8600288**

**Int. Cl.⁴ H01C** *7/12;* **H02H** *1/04*

**U.S. Cl. 361—119** **6 Claims**



1. Apparatus for galvanically interconnecting one or more electric conductors, while preventing electromagnetic radiation from transferring energy between conductors thus interconnected, comprising:

a metal housing having a first side wall in which one or more first through connectors are mounted while being electrically insulated from said first side wall, and a second side wall in which one or more second through connectors are mounted while being electrically insulated from said second side wall;

each of said first through connectors being galvanically connected to a corresponding one of said second through connectors through a voltage-dependent $\pi$-filter section including a coil serially connected between the corresponding first and second through connectors;

an electrically conducting transverse partition being mounted within said housing between said first and second side walls;

the improvement being that each of said voltage-dependent $\pi$-filter sections is electrically connected to a lead-through component mounted in said partition in a manner to prevent electromagnetic radiation from leaking through said partition;

said lead-through component providing a first low-pass frequency-dependent $\pi$-filter section having a HF-inductance serially connected to said coil, said coil being located between said first sidewall and said transverse partition, and a capacitor included in a transverse branch of said frequency-dependent filter section;

said coil and said capacitor being dimensioned to provide a second low-pass frequency-dependent filter section;

said partition being circumferentially galvanically connected to said housing in a manner to prevent electromagnetic radiation from leaking from its one side to its other side and vice versa.

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**4,748,535**

## METHOD OF MAGNETIZING ROTOR OF MOTOR

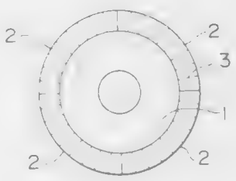
**Noriaki Arawaka, Tochigi; Kenichi Iizuka, Ashikaga; Hideo Uzuhashi, Tochigi; Masahiko Sugiyama, Nirasaki; Akihisa Hamaguchi, Kyoto, and Takashi Seshita, Tochigi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jan. 30, 1987, Ser. No. 9,292**

**Claims priority, application Japan, Mar. 5, 1986, 61-46117**

**Int. Cl.⁴ H01F** *13/00, 7/20*

**U.S. Cl. 361—148** **6 Claims**



1. A method of magnetizing a rotor in a motor assembly including said rotor made of an integrated magnet member and a stator having a stator winding, comprising the steps of:

magnetizing said integrated magnet member to form magnetic paths in predetermined directions by applying magnetic fields thereto, said integrated magnet member forming said rotor;

demagnetizing said magnetized integrated magnet member to completely remove a magnetic force from said magnet member;

assembling said rotor of said integrated magnet member into said stator;

aligning the directions of magnetic fields which are generated by supplying a current to said stator winding of said stator with the directions of the magnetic paths of said demagnetized integrated magnet member of said rotor; and

supplying a current to said stator winding in the state in which the directions of the magnetic fields are coincident with the directions of the magnetic paths of said inte-

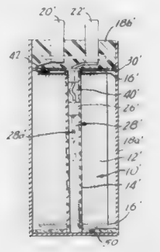
VOL 1090 ISS 5 MY 31 1988 UMI



grated magnet member of said rotor, thereby magnetizing said rotor.

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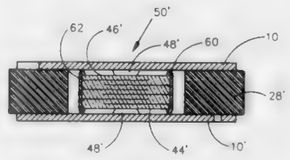
**4,748,536**
**PROTECTED CAPACITORS**
**William M. Robinson, 251 Nemasket St., New Bedford, Mass. 02740**
**Filed Jan. 15, 1987, Ser. No. 3,479**
**Int. Cl.[4] H01G *1/06***
**U.S. Cl. 361—272** **19 Claims**



1. A capacitor including a capacitor section comprising a winding of dielectric strips and electrodes separated by the dielectric strips, at least one of said electrodes being a metal-film electrode, a enclosure containing said capacitor section, and an interrupter in said enclosure constituting a series connection to said capacitor section for protecting the enclosure against exploding due to fault-induced pressure, said interrupter comprising a wall having one side exposed to a volume in the enclosure containing said capacitor section and in which fault-induced pressure develops, means including said wall for defining a cavity in said enclsoure at the side of the wall opposite said one side, said cavity accommodating pressure-responsive movement of at least part of said wall, and an essentially slack-free lead having a joint at one end thereof to a pressure-responsive portion of said wall and having a portion spaced from said end permanently fixed in position relative to said capacitor section such that tension develops in said lead when fault-induced pressure develops in said winding, said interrupter being adapted to rupture and form a gap breaking said series connection in response to said fault-induced pressure.

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**4,748,537**
**DECOUPLING CAPACITOR AND METHOD OF FORMATION THEREOF**
**Jorge M. Hernandez, and Rodney W. Larson, both of Mesa, Ariz., assignors to Rogers Corporation, Rogers, Conn.**
**Continuation of Ser. No. 839,686, Apr. 24, 1986, abandoned, which is a continuation-in-part of Ser. No. 730,468, May 3, 1985. This application Sep. 8, 1987, Ser. No. 94,441**
**Int. Cl.[4] H01G *1/14, 7/00;* H01B *7/00***
**U.S. Cl. 361—306** **63 Claims**



13. A capacitor including:
a first electrical conductor;
a second electrical conductor spaced from and in alignment with said first conductor;
a first active lead extending from said first conductor at a first position;
a second active lead extending from said second conductor at a second position;
a first dummy lead associated with said first conductor, but electrically isolated therefrom at a third position;
a second dummy lead associated with said second conductor, but electrically isolated therefrom at a fourth position;
central electrically insulative material between said first and second conductors, said central insulative material having a window therethrough wherein said window defines a recess communicating between said first and second conductors;
at least one multi-layer capacitive element in said recess and between said first and second conductors, said capacitive element having opposed first and second conductive top and bottom surfaces, said capacitive element further comprising dielectric material having a pair of opposed end surfaces and top and bottom surfaces with said conductive top and bottom surfaces on said respective top and bottom surfaces of said dielectric material, said capacitive element also having mutually parallel interleaved conductive layers between and parallel to said conductive top and bottom surfaces, with said top conductive surface being in electrical contact with said first conductor and said bottom conductive surface being in electrical contact with said second conductor whereby said first conductor, second conductor, conductive top surface, conductive bottom surface and interleaved conductive layers are all mutually parallel;
first and second conductive end terminations on said dielectric material end surfaces with alternating layers of said interleaved conductive layers being electrically connected and defining first and second groups of conductive layers, said first group of conductive layers terminating at said first conductive end termination and said second group of conductive layers terminating at said second conductive end termination, said top conductive surface being connected and substantially transverse to said first conductive end termination, said bottom conductive surface being connected and substantially transverse to said second conductive end termination, a first gap being defined between said top conductive surface and said second end termination and a second gap being defined between said bottom conductive surface and said first end termination;
an electrically insulative cap being provided over each of said first and second conductive end terminations wherein said conductive end terminations are encapsulated and wherein electrical bridging in said gap between said top conductive surface and said second end termination and in said gap between said bottom conductive surface and said first end termination is precluded by said insulative caps;
electrically insulative material on said first conductor opposite said central insulative material;
electrically insulative material on said second conductor opposite said central insulative material and;
wherein the above elements are bonded together to form a laminated assembly.

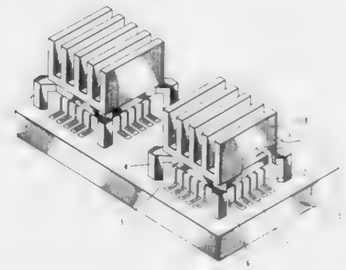
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**4,748,538**
**SEMICONDUCTOR MODULE**
**Mutsuo Tsuji, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**
**Filed Jul. 3, 1986, Ser. No. 881,656**
**Claims priority, application Japan, Jul. 8, 1985, 60-148217; Jul. 8, 1985, 60-148219**
**Int. Cl.[4] H05K *7/20***
**U.S. Cl. 361—386** **9 Claims**

1. A semiconductor module comprising:
a multi-layer wiring substrate provided at a first surface with a plurality of input and output terminals and at a second surface with lead terminals which are connected to the input and output terminals;



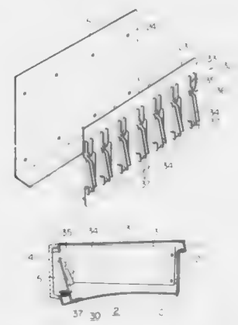
a rectangular cap and leg members provided on said second surface of said multi-layer wiring substrate, said leg members being fixed to four corners of said rectangular cap extending outwardly horizontally from a periphery of said cap and vertically downwardly to form between said multi-layer wiring substrate and said rectangular cap a space communicating with open air;
a semiconductor chip fixed to a surface of said rectangular cap which is exposed to said space, said chip being supported by said rectangular cap; and



lead wires each having two ends, one of which is connected to a terminal of said semiconductor chip, said lead wires extending outwardly horizontally beyond said semiconductor chip and from said periphery of said cap so that they can be visually confirmed from above said cap and bent vertically downwardly outside said periphery so that they can be visually confirmed from above said cap, and bent horizontally outwardly to permit the other end thereof to be electrically connected to said lead terminals.

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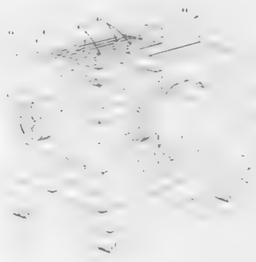
**4,748,539**
**CIRCUIT BOARD SUPPORTING ARRANGEMENT FOR ELECTRONIC EQUIPMENT**
**Katsuo Fukuyama, Kamakura, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan**
**Filed Jan. 21, 1987, Ser. No. 5,610**
**Claims priority, application Japan, Jan. 22, 1986, 61-11364; Apr. 9, 1986, 61-81418**
**Int. Cl.[4] H05K *5/04***
**U.S. Cl. 361—399** **9 Claims**



1. An arrangement for supporting at least one circuit board within an electronic equipment housing comprising;
first support means disposed in the housing for rigidly supporting a first end of the circuit board on the housing; and
second support means disposed in the housing opposite to said first support means for slidably receiving therein and elastically supporting a second end of the circuit board, wherein said second support means comprises a slot member having a slot for slidably receiving therein said second end of the circuit board and a biasing member disposed beween said slot member and the housing for biasing said slot member toward said first support means, thereby allowing said second support means to follow the second end when the second end of the circuit board moves relative to said housing.

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**4,748,540**
**COMPACT PACKAGING OF ELECTRONIC EQUIPMENT WITHIN A SMALL PROFILE ENCLOSURE**
**Helmut H. Henneberg, Canton, and Richard R. Dillon, Wellesley, both of Mass., assignors to Honeywell Bull Inc., Waltham, Mass.**
**Filed Apr. 24, 1987, Ser. No. 42,405**
**Int. Cl.[4] H05K *7/20***
**U.S. Cl. 361—424** **20 Claims**



1. An enclosure compactly packaging the electronic equipment of a computer system, said equipment including a tray of a plurality of electronic card equipment and a plurality of devices, said enclosure comprising:
a substantially rectangular open box-like frame with front and rear U-shaped integrated cable troughs mounted adjacent to the top at the front and rear of said frame;
said tray being mounted to said cable troughs and retaining said card elements in a vertical position, each of said card elements having a plurality of connectors;
a pair of vertical rail members mounted to the rear of said frame, said rail members having a plurality of fixed mounting positions and a number of modular vented shelf members mounted to different ones of said fixed mounting positions in a predetermined order, said rail and mounted shelf members collectively forming a bulkhead structure, each mounted shelf member having a predetermined downward tilt angle relative to a horizontal reference plane, said each shelf member including a plurality of cutouts mounting a corresponding number of connector plates; and,
a plurality of internal cables, each cable being connected at one end to a different one of said card connectors and being routed through said cable troughs and adjacent said tray in a predetermined manner and connected at the other end to a different one of said connector plates of one of said shelf members.

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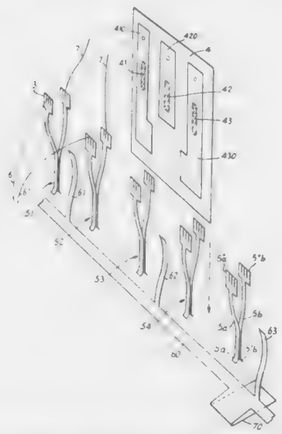
**4,748,541**
**MODULAR CONTACT SYSTEM FOR TELEPHONE CABLE HEAD**
**Jacques E. Nozick, 28 rue Broca, 75005 Paris, France**
**Filed Sep. 18, 1986, Ser. No. 909,044**
**Claims priority, application France, Sep. 24, 1985, 85 14110**
**Int. Cl.[4] H01R *9/00***
**U.S. Cl. 361—426** **6 Claims**

1. A modular contact arrangement to enable the connection of selected protective and/or monitoring devices to desired phase lines (6,6',7,7') at a cable head in a telephone distributor frame, comprising:

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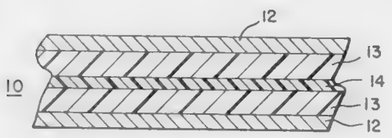
(a) a plurality of adjacent pairs (**51**, **52**; **53**, **54**) of elongate phase line contactors (**3**,**3'**,**3''**) disposed in parallel and in a row,
(b) each contactor comprising two flexible metal blades (*5a*,*5b*) resiliently self-biased towards each other at their one ends and defining a V-shaped mouth at their other, opposite ends,
(c) a plurality of resilient, elongate, ground contact blades (**61**,**62**,**63**) individually disposed between each pair of contactors and aligned therewith in a generally planar manner,



(d) a planar card (**4**) of non-conductive material insertable in a tongue-like manner into the mouths of a selected pair of contactors, and
(e) three parallel strips of conductive material (**410**,**420**,**430**) disposed on at least one face of the card and laterally spaced apart to correspond to spacings between a pair of contactors (**53**, **54**) and an interposed ground contact blade (**62**) such that said strips establish electrical contact with two contactor blades and a ground contact blade upon the insertion of the card, said strips extending outwardly from said mouths and being connectable to protective and/or monitoring devices.

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**4,748,542**
**SOLID STATE ELECTROCHEMICAL DEVICE**
**Jorgen S. Lundsgaard, Svendborg, Denmark, assignor to The Mead Corporation, Dayton, Ohio**
**Continuation-in-part of Ser. No. 3,546, Jan. 15, 1987, abandoned, which is a continuation of Ser. No. 735,880, May 20, 1985, Pat. No. 4,638,407. This application May 15, 1987, Ser. No. 51,099**
**Int. Cl.⁴ H01G** *9/00*
**U.S. Cl. 361—433** **8 Claims**




**1**. An all-solid-state multicell electrochemical device comprising:
(a) at least two electronically and ionically conducting structures; and
(b) at least one ionically conductive and electronically non-conductive solid-state electrolyte layer of an ionically conductive polymer material wherein said ionically conductive polymer is a solid solution of a metal salt and a polymer, said electrode structures and said electrolyte layers being functionally arranged to provide a capacitor.

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**4,748,543**
**HIDDEN SOURCE FLUORESCENT LIGHT WASH FIXTURE**
**Ralph W. Swarens, 417 W. Camino Real, Arcadia, Calif. 91006**
**Filed Jun. 29, 1987, Ser. No. 66,981**
**Int. Cl.⁴ F21S** *1/02*
**U.S. Cl. 362—147** **17 Claims**



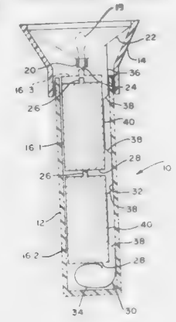
**1**. An improved fluorescent lighting fixture of the offset-reflector concealed-lamp type for uniformly illuminating a flat surface such as wall, floor or ceiling of a room while minimizing user-perceptable extraneous light in the region of the fixture itself comprising,
(a) a rigid reflector mounting body, defining a reflector mounting surface having a continuously concave cross-sectional shape approximating the letter J, the shape remaining constant along its length between perpendicular ends forming an offset trough-shaped lamp-surround portion adjoining a gradually-curved extension portion,
(b) a thin flexible sheet metal liner having a smooth highly reflective surface on one side its other side being affixed conformally against the concave mounting surface of said reflector mounting body, forming, in combination with said reflector mounting body, a reflector assembly having two opposite curved edges, one at each end, a straight surround edge and straight extension edge,
(c) a pair of end plates one attached to each end of said reflector body, each end plate having a straight free edge which, in combination with the two straight edges of said reflector assembly, forms a rectangular light-exit window,
(d) at least one U-shaped fluorescent lamp located within the surround region of said reflector assembly, substantially parallel to said reflective surface, said lamp being retained in place and electrically connected by a double-contact lamp socket mounted in one of said end plates and oriented so as to place said lamp in a plane approximately perpendicular to said light-exit window, and
(e) integral with said reflector mounting body at its surround edge, a reflector-body flange extending away from said lamp in a plane substantially parallel with the plane of said lamp, providing a support member for said reflector mounting body, said lamp being located to the side of the flange plane which faces away from said extension portion;

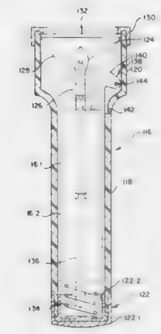


whereby direct and reflected light rays from said lamp are directed thru said light-exit window in a selected spatial density pattern as predetermined by the concave cross-sectional shape of the reflector assembly and the positioning of said lamp relative to said reflective surface.

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**4,748,544**
**TORCH**
**Rex D. I. Ince, P.O. box 2050, Cape Town, South Africa 8000**
**Filed Aug. 26, 1986, Ser. No. 900,379**
**Int. Cl.⁴ F21L** *7/00*
**U.S. Cl. 362—203** **13 Claims**



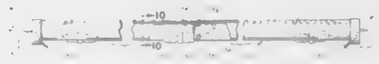


**1**. A torch which comprises a casing for receiving a cell, a head including means for mounting a bulb, means for exerting a lateral force on a cell inside the casing so that the cell is displaced laterally in the casing, a face on the opposite side of the cell to said means and against which said means urges the cell to frictionally restrain the cell and prevent it from moving along the casing until an inertial force of sufficient magnitude to overcome the frictional restraining force exerted on the cell by said means and face is exerted on the torch.

**13**. A torch which comprises a casing for receiving a cell, spring means for urging a cell in the casing towards an operative position in which the electrical circuit of the torch is complete and the torch is 'on', and an element which is displaceable between a first position in which it lies in the path along which the cell must move to reach said operative position and prevents said spring from urging the cell into said operative position, and a second position in which it is out of said path of movement and permits said spring to urge the cell to said operative position.

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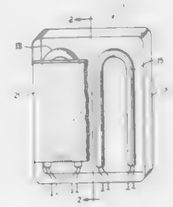
**4,748,545**
**ILLUMINATION SYSTEMS**
**Lawrence O. Schmitt, Los Alamitos, Calif., assignor to Reflector Hardware Corporation, Melrose Park, Ill.**
**Filed Feb. 20, 1986, Ser. No. 831,316**
**Int. Cl.⁴ F21S** *1/02*
**U.S. Cl. 362—219** **15 Claims**

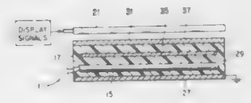


**1**. A modular illumination system insertable into spaced-apart power supply sockets comprising:
an elongated housing;
a plurality of spaced-apart light source sockets carried by said housing;
a plurality of spaced-apart, electrically energized, low-voltage, removeable and replaceable light sources offset from and carried by said housing;
reflector means carried by said housing; and
first and second conducting means affixed to and extending in part from respective first and second ends of said housing past the lengthwise extent of said housing, with each said conducting means axially oriented in part with respect to the lengthwise direction of said housing said conducting means engageable with the spaced-apart power supply sockets to mechanically support said housing inflexibly therefrom and electrically connect said light source sockets to, a power supply.

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**4,748,546**
**FLUORESCENT BACKLIGHTING UNIT**
**Orest J. Ukrainsky, Livingston, N.J., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.**
**Filed Feb. 2, 1987, Ser. No. 9,852**
**Int. Cl.⁴ F21S** *3/00*
**U.S. Cl. 362—223** **13 Claims**





**1**. Flat panel type display unit in which an optically passive active matrix display panel provides a display by means of changes in light transmissivity patterns on the panel, and further including a light source located behind the display panel, in which the light display selectively transmits light from the light source in order to provide a visual display of information, characterized by:
(a) the light source including at least one fluorescent lamp;
(b) the fluorescent lamp being embedded in a substantially transparent potting material;
(c) a conductive backplane located in close proximity to the fluorescent lamp; and

VOL 1090 ISS 5 MY 31 1988 UMI



(d) at least one light diffusion substrate being intraposed between the fluorescent lamp and the display panel.

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**4,748,547**
**UPLIGHT LUMINAIRE FOR ACHIEVING UNIFORM ILLUMINANCE ACROSS A CEILING**
**Glenn A. Baker, 6113 E. Calle Tuberia, Scottsdale, Ariz. 85251**
**Filed Feb. 6, 1987, Ser. No. 11,740**
**Int. Cl.[4] F21S** *3/00*
**U.S. Cl. 362—225** **3 Claims**



1. An uplight luminaire for emitting light in a pattern which obtains uniform intensity distribution of light impinging on the surface of a ceiling in the field of illumination of said uplight luminaire, said uplight luminaire comprising:

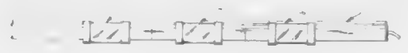
(A) an elongated, horizontally disposed reflector, said reflector, in cross section, including:

1. a central point;
2. first and second line segments symmetrically extending away from said central point in opposite directions and at respective downward angles falling within the range 5° to 15° with respect to the horizontal for identical first predetermined distances;
3. third and fourth line segments adjoining said first and second line segments and extending upwardly from the respective outboard terminations thereof at angles falling within the range 105° and 115° with respect to said first and second line segments, respectively, for identical second predetermined distances; and
4. fifth and sixth line segments adjoining said third and fourth line segments and extending upwardly from the respective outboard terminations thereof at angles falling within the range 160° and 165° with respect to said third and fourth line segments, respectively, for identical third predetermined distances; and

(B) first and second elongated fluorescent lamps situated in over and under mutual orientation and disposed with their axes vertically situated above said central point.

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**4,748,548**
**LIGHTING FIXTURE**
**Daniel W. Barton, 17170 Courtney La., Huntington Beach, Calif. 92649**
**Filed May 9, 1986, Ser. No. 861,599**
**Int. Cl.[4] F21V** *21/00*
**U.S. Cl. 362—249** **16 Claims**



1. A lighting fixture comprising:

an elongated housing of generally U-shaped cross-section, each arm of said U-shaped members comprising said housing having grooves extending longitudinally the length of said housing,

at least one light module having an L-shaped cross-section member with two equal length arms adapted to nest within said U-shaped member of said housing in a holding relationship,

said L-shaped member having a central cut-out for accepting a lamp and a lamp socket,

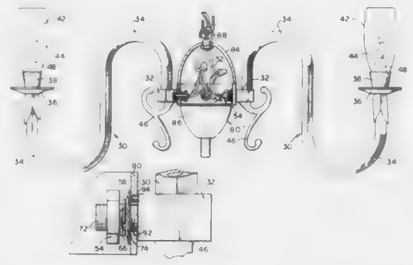
at least one elongated concave reflector nesting within said U-shaped housing for placement adjacent said central cut-out in said L-shaped member,

a removable elongated lens having a semi-circular cross-section located substantially over said central cut-out in said L-shaped member having end portions adapted to contacts at longitudinal grooves in said housing for completely encompassing said L-shaped member, and

a clip having a semi-circular cross-section and channeled end portions for completely encompassing said lens and in which said channeled end portions are adapted to engage said longitudinal grooves in said U-shaped members for holding said lens in a removable relationship.

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**4,748,549**
**COLLAPSIBLE LIGHT FIXTURE WITH RESILIENT MOUNTING**
**Raymond D. Scheer, Pines, Fla., assignor to Lamparas Europa, Spain**
**Continuation-in-part of Ser. No. 902,172, Aug. 29, 1986, abandoned. This application Aug. 14, 1987, Ser. No. 85,893**
**Int. Cl.[4] F21S** *1/06*
**U.S. Cl. 362—406** **16 Claims**



1. A collapsible light fixture, comprising:

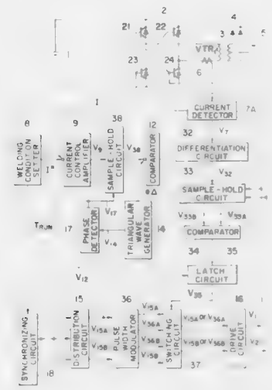
a hollow body with a peripheral wall having arm mounting means and positioning means;

a plurality of arms, each arm extending outward from the hollow body and being movably affixed to the hollow body at the arm mounting means, one of the arm and the body having a post extending into a corresponding arm mounting hole in the other of the arm and body, the post being rotatable in the arm mounting hole such that the arm is rotatable relative to the body, one of the arm and the body having a pin spaced from the post and positioned to extend into a positioning hole in the other of the arm and the body, the arm being aligned to the body when the pin is disposed in the positioning hole; and,

resilient means urging the arm toward the body.



**4,748,550**
**PULSE WIDTH MODULATOR USED FOR A POWER CONVERTER WITH A TRANSFORMER**
**Chihiro Okado, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**
**Filed Mar. 5, 1987, Ser. No. 22,623**
**Claims priority, application Japan, Mar. 7, 1986, 61-48639**
**Int. Cl.[4] H02M** *7/44*
**U.S. Cl. 363—98** **6 Claims**

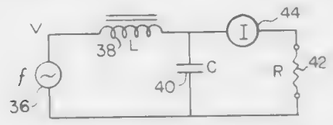


1. A pulse width modulator for use with a power converter to deliver a pulse produced based on a dc voltage to the primary side of a transformer with the polarity of said pulse being changed per half cycle, an ac power output from a secondary side of the transformer being adjusted by modulating a pulse width of said pulse, said power converter comprising:

current detector means for detecting a current on the primary side of said transformer, current change rate calculating means for calculating a current change rate from a detection signal detected by said current detector means, current change rate comparing means for separating said current change rate into change rates at positive and negative half cycles to compare said both change rates to judge whether or not the former is larger than the latter, and pulse width correcting means for modulating the pulse width of said pulse delivered to said primary side of said transformer on the basis of the compared result of said current change rate comparing means.

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**4,748,551**
**CONSTANT CURRENT SUPPLY FOR A VARYING RESISTANCE**
**Richard K. Dickey, San Luis Obispo, Calif., assignor to Peroxidation Systems, Inc., Tucson, Ariz.**
**Filed Dec. 22, 1986, Ser. No. 945,374**
**Int. Cl.[4] H02M** *7/00*
**U.S. Cl. 363—126** **7 Claims**



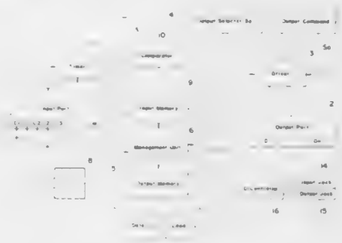

1. Apparatus for forcing the current flowing through a load to be constant, regardless of variations in the impedance of the load, said apparatus comprising:

a low-impedance source of a symmetrical alternating voltage wave composed of a fundamental and odd harmonics;

a transmission line having a delay equal to an odd number of quarter cycles of the fundamental, having one end connected to said low-impedance source and having its other end connected to the load.

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**4,748,552**
**SEQUENCE CONTROL SYSTEM**
**Tatsumi Seino, Fukushima, Japan, assignor to Goro Kikuchi, Tokyo, Japan**
**Filed May 28, 1986, Ser. No. 867,681**
**Int. Cl.[4] G06F** *15/46;* **G05B** *19/42*
**U.S. Cl. 364—140** **6 Claims**



1. A sequence control system comprising:

an output port means including a plurality of output ports to maintain and send out a binary control signal during each operation step of an article to be controlled, said article being connected to said output ports, and an output port selector means for manually selecting each of said output ports;

an input port means including a plurality of input ports each receiving a binary detected signal fed back from a detector means provided on mechanical gearing of said article to be controlled;

an output data memory means for storing a condition of each of said output ports in each of said operation steps of said article to be controlled in order to said operation steps;

an input data memory means for storing a condition of said binary detected signal fed back to said input port means on the condition of establishment of each of said operation steps;

a memory management means for controlling said output and input memory means and for designating a memory address for each of said output and input memory means;

a timer means for storing both real time calculation data and manual setting time data as step maintenance time data in said input memory means in both a teaching and a storing mode;

and a data comparator means for comparing various information stored in said input data memory means during both said teaching and storing modes with the feed back signal data momentarily supplied as the real time data to said input port means and with real time data from said timer means so as to read out and select said memory addresses of said output and input data memory means by said memory management means when said compared data are consistent with each other and to supply to an instruction signal to said output port means for sending out the read out data from said output data memory means whereby a sequence control is directly taught.

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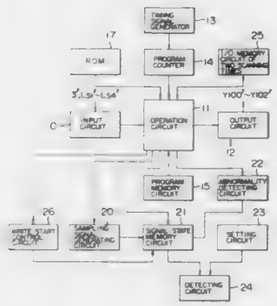


**4,748,553**

## SEQUENCE CONTROL APPARATUS

**Atsushi Itoh, Narashino; Mitsusuke Okamura, Togane; Katsuhiro Fujiwara, Funabashi, and Toshiro Kasahara, Narashino, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Feb. 10, 1986, Ser. No. 827,605**
**Claims priority, application Japan, Mar. 6, 1985, 60-42603**
**Int. Cl.⁴ G06F *11/00***
**U.S. Cl. 364—140** **9 Claims**




1. A sequence control apparatus comprising:
program memory means for storing a sequence program;
input means which receives external information necessary for sequence control;
operating means for executing logic operations of a plurality of signals including said external information received from said input means in accordance with an instruction from said sequence program read out from said program memory means;
output means for outputting control signals in accordance with the results of said logic operations by said operating means;
sampling signal generating means;
signal state memory means for storing, at any time within a single scanning period, states of a plurality of binary signals handled by said operating means in synchronism with a sampling signal which is generated from said sampling signal generating means;
signal state combination setting means for setting a special combination of the states of said plurality of binary signals; and
detecting means for detecting presence and absence of the combination of the signal states set by said setting means in said signal state memory means.

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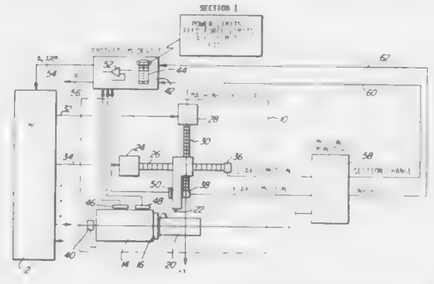
**4,748,554**

## MACHINE MONITORING SYSTEM USING MOTION DETECTION FOR SYNCHRONIZATION

**Paul Gebauer; John D. Begin, both of Warren, and Kenneth J. Cook, Troy, all of Mich., assignors to GTE Valeron Corporation, Troy, Mich.**

**Filed Aug. 14, 1986, Ser. No. 896,417**
**Int. Cl.⁴ G06F *15/46*; G05B *23/02***
**U.S. Cl. 364—474** **20 Claims**

1. In an automated machine tool having at least one linear slide axis, said tool being adapted to remove metal from a workpiece in a part cycle having a plurality of operational stages, said operational stages having different stored data associated therewith which defines acceptable criteria for a given parameter during machining of the workpiece, the improvement wherein means are provided for sensing motion along at least one axis and generating an output signal for synchronizing the comparison of said parameter as sensed in real time with the appropriate previously stored data; and means for coupling the output signal to monitoring means for



making said comparison and selectively altering machine operation as a function of the comparison.

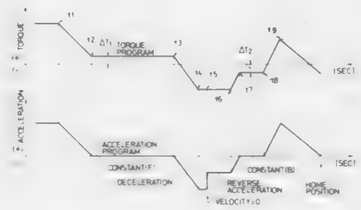
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**4,748,555**

## CONTROL UNIT FOR A MOVING BODY

**Hiroyuki Miyake, Kawasaki; Masanori Miyata, and Akihiro Kasiwabara, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 19, 1984, Ser. No. 602,009**
**Claims priority, application Japan, Apr. 25, 1983, 58-71542**
**Int. Cl.⁴ G05B *19/00***
**U.S. Cl. 364—174** **12 Claims**




1. A control unit for a moving body, comprising:
a moving body;
a motor for driving said moving body in response to drive data;
means for detecting a velocity of said moving body and generating velocity data;
means for detecting a position of said moving body and generating position data; and
means for controlling said moving body in accordance with the velocity data from said velocity detection means and the position data from said position detection means,
said control means including:
first storage means for storing preset target velocity data for controlling said moving body in accordance with the position data from said position detection means;
second storage means for storing preset drive data for driving said motor in accordance with the position data from said position detection means independently of said target velocity data;
means for comparing the velocity data from said velocity detection means and the target velocity data; and
means for outputting correction data for correcting the drive data in accordance with an output from said comparing means.

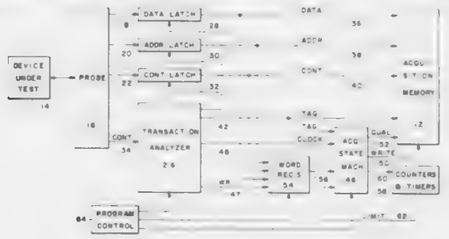


**4,748,556**

## VARIABLE TRACKING WORD RECOGNIZER FOR DETECTING THE OCCURRENCE OF A DYNAMIC-VARIABLE ADDRESS

**Gerd H. Hoeren, Lake Oswego; David D. Chapman; Robin L. Teitzel, both of Portland, and Steven R. Palmquist, Beaverton, all of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.**

**Filed May 28, 1985, Ser. No. 737,760**
**Int. Cl.⁴ G06F *11/30***
**U.S. Cl. 364—200** **5 Claims**




5. An apparatus for generating a first indicating signal when a program running on a processing device accesses a memory address of a dynamically addressed variable, the apparatus comprising:
a register for storing a base address occurring on a data bus of the processing device on occurrence of a fourth indicating signal,
an arithmetic logic unit for determining the difference between a current address on an address bus of the processing device and the stored base address,
a first word recognizer for generating the first indicating signal when said difference matches an address offset characterizing a relative address of the variable in relation to the base address,
a second word recognizer for generating a second indicating signal when an address of a base address pointer appears on the address bus during a processing device write cycle,
a third word recognizer for generating a third indicating signal when an address of a selected program step appears on the address bus, and
a logic circuit for generating the fourth indicating signal on occurrence of the second and third indicating signals.

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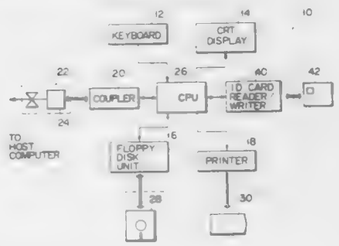
**4,748,557**

## DATA PROCESSING TERMINAL DEVICE FOR STORING ENCRYPTED JOURNAL DATA AND DECRYPTING THE DATA

**Masuo Tamada, Yokohama; Hitoshi Kokuryo, Sagamihara; Shinsuke Tamura, and Hiroshi Ozaki, both of Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Division of Ser. No. 698,876, Feb. 6, 1985. This application Sep. 2, 1986, Ser. No. 902,885**
**Claims priority, application Japan, Feb. 9, 1984, 59-22171; Feb. 9, 1984, 59-22172; Feb. 9, 1984, 59-22173**
**Int. Cl.⁴ G06F *1/00*; G06K *5/00***
**U.S. Cl. 364—200** **10 Claims**

1. In IC card system comprising:
an IC card,
a terminal device to which said IC card is connected, and
a host computer to which the terminal device is on-line connected, in which processing of input data is performed by said host computer, and a processed result of said processing is encrypted and returned to the terminal device as encrypted journal data,
wherein said IC card comprises:
(a) means for receiving the encrypted journal data from the host computer;
(b) means for decrypting the received encrypted journal data;
(c) means for modifying the decrypted journal data; and
(d) first recording means, for recording the modified journal data in the IC card; and




wherein said terminal device comprises:
second recording means, for recording the decrypted journal data on a recording medium.

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**4,748,558**

## LOAD BALANCING CONTROL METHOD FOR A LOOSELY COUPLED MULTI-PROCESSOR SYSTEM AND A DEVICE FOR REALIZING SAME

**Toshio Hirosawa, Machida; Kazumitu Kondo; Katsuto Miyazaki, both of Hachioji, and Kenji Fujikata, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed May 1, 1986, Ser. No. 858,791**
**Claims priority, application Japan, May 2, 1985, 60-93617**
**Int. Cl.⁴ G06F *15/16***
**U.S. Cl. 364—200** **12 Claims**



1. A load balancing method in a loosely coupled multiprocessor system, in which a plurality of processors, corresponding to a plurality of terminals, each of which includes a main memory exclusively used, are coupled in a loose coupling configuration comprising the steps of:
(a) continuously monitoring a load status of each of said plurality of processors;
(b) storing the load status of all the processors included in said multi-processor system in a global processor;
(c) storing a number representing the number of terminals connected to each of said processors in the main memory of each of said processors;
(d) setting an upper limit for the number of terminals which can be connected to a processor receiving a service demand to start a program based on said load status of the processor receiving the service demand, when a terminal other than the terminals connected to said processor receiving the service demand outputs the service demand;

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(e) comparing said upper limit with said number of terminals connected to said processor receiving the service demand;
(f) delivering information to said global processor indicating that it is impossible for said processor receiving the service demand to treat the demand from the terminal outputting said service demand to start the program, when the result of the comparing step indicates that said upper limit is less than or equal to the number of terminals connected to said processor receiving the service demand;
(g) selecting a processor having a lightest load status based on said load status of each of the processors and outputting an instruction to the selected processor to start a processing for the terminal outputting said service demand; and
(h) storing the the processing for said terminal receiving the service demand, when the result of the comparing step indicates that said upper limit is greater than the number of terminals connected to said processor receiving the service demand.

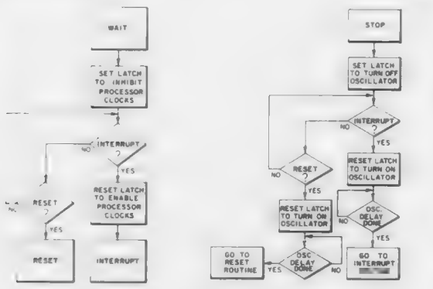
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**4,748,559**

## APPARATUS FOR REDUCING POWER CONSUMED BY A STATIC MICROPROCESSOR

**Philip S. Smith, and Kuppuswamy Raghunathan, both of Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Aug. 9, 1979, Ser. No. 65,293**
**Int. Cl.⁴ G06F** *1/04*
**U.S. Cl. 364—200** **6 Claims**




1. In a digital computing system which executes software instructions in synchronization with clock signals generated by a master clock oscillator in an enabled condition thereof, apparatus for reducing the energy consumed by said digital system comprising:
first logic means for decoding a predetermined software instruction selected for execution by said digital computing system, and for generating a firts control signal in response thereto;
first latching means, coupled to said first logic means, for assuming a first state in response to said first control signal, and for assuming a second state in response to a second control signal;
second logic means, coupled to said first latching means and interposed between said master clock oscillator and said digital computing system, for inhibiting passage of said clock signals from said master clock oscillator to said digital computing system in response to said first latching means assuming said first state, said second logic means continuing to inhibit passage of said clock signals for a predetermined length of time after said first latching means assumes said second state; and
third logic means, coupled to said first latching means, for disabling the generation of said clock signals by said master clock oscillator in response to said first latching means assuming said first state, and for enabling the generation of said clock signals by said master clock oscillator in response to said first latching means assuming said second state,
whereby the power required therefor is selectively conserved.

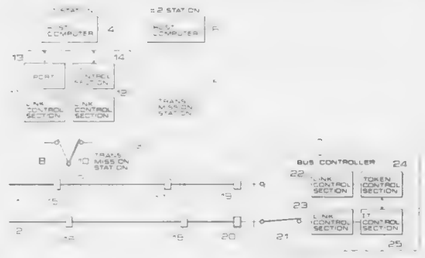
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**4,748,560**

## OCCUPANCY CONTROL SYSTEM FOR PLURAL SERIAL BUSES

**Isaburou Kataoka, Nagasaki, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 11, 1985, Ser. No. 786,826**
**Claims priority, application Japan, Oct. 15, 1984, 59-215659**
**Int. Cl.⁴ G06F** *13/14;* **H01H** *67/00;* **H04J** *3/02*
**U.S. Cl. 364—200** **2 Claims**




1. A system for controlling the occupancy of a first serial bus between plural stations connected to said first serial bus, said system comprising:
a second serial bus having a function independent of said first serial bus, said stations also being connected to said second serial bus, and
a bus controller connected to said first and second serial buses for controlling the occupancy of both of said serial buses;
said stations each having a host computer, a transmission station for transmission and reception of signals through said first and second serial buses under control of said host computer, and means provided in said transmission station for sending an interrupt request signal to said second serial bus in response to an urgent occupancy request issued by said host computer;
said bus controller having means for performing a token pass control to permit the stations to occupy said first serial bus successively in a predetermined order when none of the stations send an interrupt request signal to said second serial bus, and means for detecting an interrupt request signal provided from any one of the stations to said second serial bus, suspending the token pass control and permitting the interrupt request signal-issuing station to occupy said first serial bus;
each of said transmission stations including a port section and a first link control section connected to each other, said port section being connectible to said second serial bus through said first link control section in the event of a fault in said first serial bus, said bus controller including a token control section connected to a second link control section, said token control section being connectible to said second serial bus through said second link control section, a first switch in each transmission station for connecting said port section of the station to said second serial bus in the event of a fault in said first serial bus and a second switch in said bus controller for connecting said token control section to said second serial bus in the event of a fault in said first serial bus.



**4,748,561**

## METHOD OF PROTECTING COMPUTER SOFTWARE

**Mark Brown, 174 Elmsley Ct., Ridgewood, N.J. 07450**

**Continuation of Ser. No. 609,721, May 14, 1984, abandoned.**
**This application Jun. 27, 1986, Ser. No. 879,840**
**Int. Cl.⁴ G06F** *12/14*
**U.S. Cl. 364—300** **4 Claims**



1. A method of recording information on a permanent memory element, comprising the steps of
(a) providing a permanent memory element,
(b) providing a recording means,
(c) operating said recording means in conjunction with said permanent memory element preselected information in a form that is permanently stored on said permanent memory element and readable by a computer system,
(d) providing a computer system including reading means to read the preselected information recorded on said permanent memory element,
(e) inserting said permanent memory element into said reading means, and
(f) operating said computer system and said reading means in conjunction with said permanent memory element to ascertain and record onto said permanent memory element identifying information which is unique to said computer system,
(g) said preselected information including a set of instructions which is read and executed by a computer system to render operative said permanent memory element with a computer system if and only if there is a predetermined correspondence between the unique identifying information recorded on said permanent memory element pursuant to step (f) and corresponding identifying information obtained from the computer system in connection with which the permanent memory element is being used.

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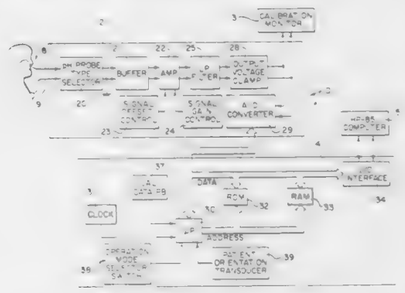
**4,748,562**

## PORTABLE CIRCUIT AND METHOD FOR PERFORMING A TIME STUDY AND ANALYSIS OF BODILY CHARACTERISTICS

**Joseph M. Miller; Stephen W. Fannin; Paul R. Steiner, all of Akron, and Bruce C. Taylor, Kent, all of Ohio, assignors to Akron City Hospital, Akron, Ohio**

**Continuation of Ser. No. 491,455, May 4, 1983, Pat. No. 4,618,929. This application Sep. 19, 1986, Ser. No. 910,253**
**The portion of the term of this patent subsequent to Oct. 21, 2003, has been disclaimed.**
**Int. Cl.⁴ G06G** *7/60;* **A61B** *5/05, 5/00*
**U.S. Cl. 364—415** **5 Claims**

1. A circuit for monitoring over a period of study time a bodily ionic characteristic comprising:
transducer means for measuring the ionic characteristic and generating an analog signal proportional thereto;
interface means for receiving said analog signal from said transducer means and converting said analog signal into a representative digital signal, said interface means including adjustment means for permitting variable correction for drift in calibration of said transducer means occurring during the period of study time; and,




processor means for receiving said digital signal, sampling said digital signal at preselected occasions over the study period, and storing said sampled digital signal for subsequent data analysis.

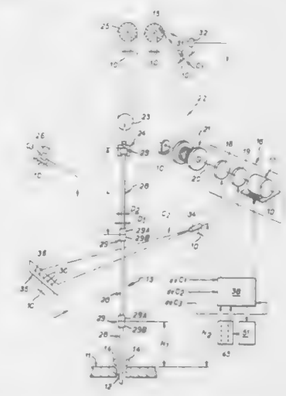
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**4,748,563**

## HAVE INVENTED CERTAIN NEW AND USEFUL IMPROVEMENTS IN METHOD AND APPARATUS FOR CONTROLLING THE LIFT TRAVEL OF A MAST OR DERRICK

**Gilles G. Anthoine, 12 Rue Martignon, 92500 Rueil Malmaison, France**

**Filed Feb. 8, 1985, Ser. No. 699,935**
**Claims priority, application France, Feb. 10, 1984, 84 02048**
**Int. Cl.⁴ G06F** *15/20*
**U.S. Cl. 364—420** **16 Claims**



1. A method for the automatic control of the lifting travel of an apparatus of a drilling mast and oil rig type including a platform on which a string of pipes variable in number of pipes and in length of individual pipes is suspended from a pulley under the control of a contorl unit, said control unit comprising a lifting motor and a stopping brake for positioning the strip of pipes in a position in which a joint between two specific pipes is at a specific level above the platform; the method comprising the steps of obtaining and storing data including order of succession, number and length of the pipes defining the string of pipes, said obtained and stored data being of sufficient accurracy to provide for a rough control of the positioning of a selected pipe joint of the string of pipes at a preselected height above the platform, monitoring the move-

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ment of the string of pipes and monitoring the presence in succession of joints between the pipes of the string of pipes in alignment with respect to a given reference mark, comparing an actual position of a monitored joint between pipes with the stored data, correcting the stored data as a function of the actual position of the monitored joint, and operating the control unit utilizing the corrected data to position a selected joint of the string of pipes at the preselected height above the platform.

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**4,748,564**

## ANTI-SKID BRAKE CONTROL SYSTEM WITH BRAKING FORCE QUICK TAKE-UP FEATURE

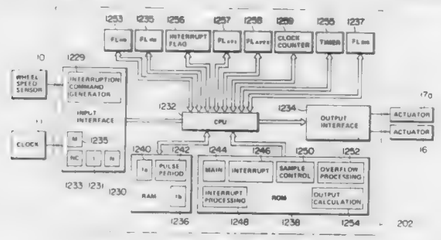
**Toshiro Matsuda, Sagamihara, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan**

**Filed May 14, 1985, Ser. No. 733,890**

**Claims priority, application Japan, May 15, 1984, 59-95605; May 15, 1984, 59-95606**

**Int. Cl.⁴ B60T** *8/32*

**U.S. Cl. 364—426** **40 Claims**




1. An anti-skid brake control system for an automotive brake system comprising:

a hydraulic brake system including a wheel cylinder for applying braking pressure to a vehicle wheel, and a pressure control valve associated with said wheel cylinder for adjusting fluid pressure in said wheel cylinder, said pressure control valve being operative to increase fluid pressure in said wheel cylinder in a first position thereof, to decrease fluid pressure in said wheel cylinder in a second position thereof, and to hold fluid pressure constant in a third position thereof;

a wheel speed sensor for detecting rotation speed of the wheel and producing a wheel speed indicative signal having a value indicative of the detected wheel speed; and

a controller for deriving a wheel acceleration value on the basis of the variation of said wheel speed indicative signal value, detecting a vehicular braking condition on the basis of said wheel acceleration indicative signal value and said wheel speed, selecting an operating mode on the basis of said detected vehicular braking condition from among a first mode for increasing said fluid pressure, which first mode is selected when said vehicular braking condition satisfies a predetermined first condition, a second mode for decreasing said fluid pressure, which second mode is selected when said vehicular braking condition satisfies a predetermined second condition and a third mode for holding said fluid pressure constant, which third mode is selected when said vehicular braking condition satisfies a predetermined third condition, and producing a control signal to control said pressure control valve to one of said first, second and third positions corresponding to the selected mode, said controller being responsive to the vehicular braking condition satisfying said first condition for initiating of said first mode to enable said third mode for a given first period so as to allow selection of said third mode when said vehicular braking condition satisfies said third condition during said first mode and to subsequently disable said third mode operation for a given second period for maintaining said first mode in said second period.

**4,748,565**

## APPARATUS FOR DETECTING SPEED OF VEHICLE WITH INTERNAL COMBUSTION ENGINE

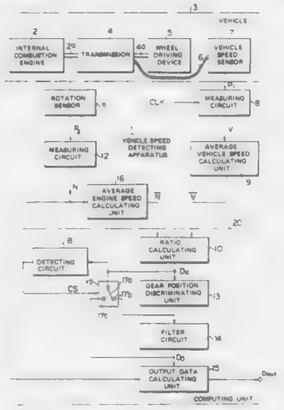
**Takaaki Toya, Higashimatsuyama, Japan, assignor to Diesel Kiki Co., Ltd., Japan**

**Filed Jul. 23, 1985, Ser. No. 758,048**

**Claims priority, application Japan, Jul. 24, 1984, 59-151993**

**Int. Cl.⁴ F02M** *51/00*

**U.S. Cl. 364—431.05** **8 Claims**




1. An apparatus for calculating an instantaneous speed of a vehicle powered by an internal combustion engine whose rotational output is supplied through a transmission, which is set in a selectable gear ratio, to a wheel driving mechanism of said vehicle, said apparatus comprising:

a first means for producing a first signal indicating an instantaneous rotational speed of the internal combustion engine;

a second means for producing a second signal indicating an average running speed of the vehicle;

a third means for calculating a gear ratio set in the transmission in accordance with said first and second signals and for producing a third signal representing the calculated gear ratio; and

a fourth means for calculating the instantaneous vehicle speed in accordance with said first and third signals and producing output data indicative of the calculated instantaneous vehicle speed.

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**4,748,566**

## ENGINE CONTROL APPARATUS

**Shoji Sasaki, and Kenji Tabuchi, both of Katsuta, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jul. 11, 1985, Ser. No. 753,855**

**Claims priority, application Japan, Jul. 11, 1984, 59-142366**

**Int. Cl.⁴ G05B** *9/02;* **F02D** *28/00*

**U.S. Cl. 364—431.11** **10 Claims**

1. A control apparatus for internal combustion engines having sensing means for providing signals of engine operating parameters representative of operational conditions of an internal combustion engine, comprising:

first computer means for outputting main engine control signals in dependence on the engine operating parameter signals from said sensor means and a first monitoring signal indicating the operational condition of said first computer means;

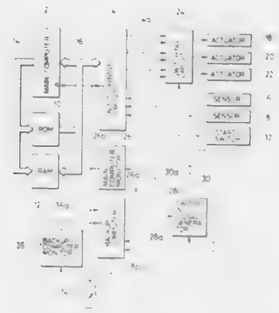
second computer means for outputting auxiliary engine control signals by which the engine is to be controlled during malfunction of said first computer means;

actuating means responsive to either the main or the auxiliary engine control signals to initiate a predetermined operation of the engine; and



switching means connected to receive outputted signals from said first and second computer means for supplying to said actuating means the main engine control signals in the absence of receipt of a switching signal and the auxiliary engine control signals upon receipt of a switching signal; wherein

said second computer means includes means responsive to said first monitoring signal indicating a malfunction of said



first computer means for producing a switching request signal and a second monitoring signal representing the operational condition of said second computer means; and further including

switching signal generating means for applying a switching signal to said switching means in response to receipt of the switching request signal and the second monitoring signal from said second computer means.

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**4,748,567**

## METHOD OF PERFORMING A FAIL SAFE CONTROL FOR AN ENGINE AND A FAIL SAFE CONTROL UNIT THEREOF

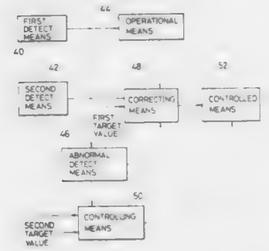
**Akio Sumizawa, Yokosuka; Toshimi Abo, Yokohama, and Takashi Ueno, Yokosuka, all of Japan, assignors to Nissan Motor Co., Ltd., Kanagawa, Japan**

**Filed May 31, 1985, Ser. No. 739,680**

**Claims priority, application Japan, Jun. 1, 1984, 59-110691**

**Int. Cl.⁴ F02B** *37/12*

**U.S. Cl. 364—431.11** **9 Claims**




1. A method of performing a fail safe control for a controlled means in accordance with different parameters, which comprises the steps of:

detecting at least one first parameter representative of the operating conditions of the controlled means through first detecting means;

detecting a second parameter representative of the operating conditions of the controlled means through second detecting means;

calculating through operational means a basic control value which controls said controlled means, based on the first parameter detected by said first detecting means;

detecting an abnormal condition of said first detecting means and for producing an abnormal signal through abnormal detecting means;

correcting said basic control value, by comparing the first parameter detected by said first detecting means with a predetermined first target value through correcting means (48) when the abnormal signal is not produced from said abnormal detecting means, in accordance with the difference therebetween; and

controlling said controlled means through controlling means, by comparing the second parameter detected by said second detecting means with a predetermined second target value which is set on a more safe side than the first target value to control said controlled means when the abnormal signal is produced from said abnormal detecting means, in accordance with a control value calculated from the difference therebetween.

3. A fail safe control unit for controlling an controlled means in a desired condition in accordance with different parameters, which comprises:

first detecting means for detecting at least one first parameter representative of the operating conditions of the controlled means;

second detecting means for detecting a second parameter representative of the operating conditions of the controlled means;

operational means for calculating a basic control value, which controls said controlled means in based on the first parameter detected by said first detecting means;

abnormal detecting means for detecting an abnormal condition of said first detecting means and for producing an abnormal signal;

correcting means for correcting said basic control value by comparing the first parameter detected by the first detecting means with a predetermined first target value when the abnormal signal is not produced from said abnormal detecting means, in accordance with the difference therebetween; and

controlling means for controlling said controlled means, by comparing the second parameter detected by said second detecting means with a predetermined second target value which is set on a more safe side than the first target value to said controlled means when the abnormal signal is produced from the abnormal detecting means, in accordance with a control value calculated from the difference therebetween.

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**4,748,568**

## APPARATUS FOR DRAWING IN WARP THREADS INTO A HARNESS

**Hans Tobler, Zelg-Wolfhalden, Switzerland, assignor to G. Bopp & Co. AG, Metallgewebe-und Drahtwarenfabrik, Zurich, Switzerland**

**PCT No. PCT/CH85/00087, § 371 Date Jan. 13, 1986, § 102(e) Date Jan. 13, 1986, PCT Pub. No. WO86/00346, PCT Pub. Date Jan. 16, 1986**

**PCT Filed May 30, 1985, Ser. No. 836,169**

**Claims priority, application Switzerland, Jun. 18, 1984, 2945/84**

**Int. Cl.⁴ D03J** *1/14*

**U.S. Cl. 364—470** **5 Claims**

1. Apparatus for drawing warp threads into a harness having a plurality of division means, said apparatus comprising:

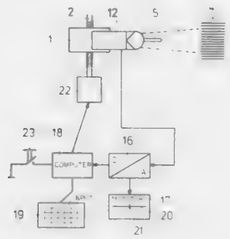
a slide movable generally perpendicularly stepwise of said division means such that said slide can be located generally opposite of the center defined between any two of said division means;

a sley hook slidably mounted to said slide and movable generally perpendicular of said slide and parallel of said division means such that said sley hook can be advanced between said division means and then withdrawn there-

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from when said slide is located generally opposite said centers defined between any two of said division means;



electro-optical means for sequentially and continuously measuring the distance between said division means to control the step movement of said slide such that said sley hook may be advanced between said division means.

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**4,748,569**

**HELICOPTER NAVIGATION AND LOCATION SYSTEM**

**Alastair C. Gordon, Dorking, United Kingdom, assignor to Bristow Helicopters Limited, United Kingdom**

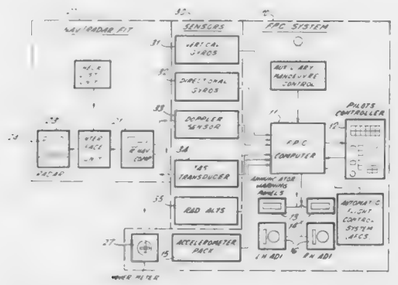
**PCT No. PCT/GB84/00350, § 371 Date Aug. 5, 1985, § 102(e) Date Aug. 5, 1985, PCT Pub. No. WO85/01809, PCT Pub. Date Apr. 25, 1985**

**PCT Filed Oct. 17, 1984, Ser. No. 756,496**

**Claims priority, application United Kingdom, Oct. 17, 1983, 8327760**

**Int. Cl.[4] G05D** *1/12;* **G06F** *15/50*

**U.S. Cl. 364—462** **26 Claims**



1. A helicopter having a controlled/navigation system comprising a forward looking electro-magnetic radiation detector, a screen display for providing an image of radiation sources detected thereby, a flight director means having actuating means for operation when the helicopter is positioned overhead of a particular object located by the detector and flight path computer means to provide signals for automatic control or pilot guidance of the helicopter in a predetermined flight pattern to navigate the helicopter through a path extending down-wind of the object and then into wind and at a preselected height and predetermined speed towards the location of the object and then to hover over the object hover mode, further comprising means to monitor the actual flight path of the helicopter and to provide a warning signal to abort the predetermined flight path if the helicopter should move out of the predetermined path.

**4,748,570**

**CLAMPING CONFIRMING DEVICE**

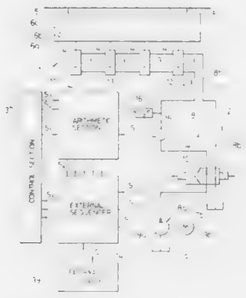
**Toshiyuki Shochi; Kenei Nakajima, and Nobuaki Joboji, all of Toyama, Japan, assignors to Kabushiki Kaisha Nippei Toyama, Tokyo, Japan**

**Filed Apr. 15, 1986, Ser. No. 852,690**

**Claims priority, application Japan, Apr. 16, 1985, 60-81894**

**Int. Cl.[4] G06F** *15/46*

**U.S. Cl. 364—474** **5 Claims**



1. In a clamping device in which a clamping actuator is operated by pressurized fluid supplied from a pressurized fluid source, and a workpiece is clamped or unclamped by operating a change-over valve provided in a pressurized fluid supply pipe path, a clamping confirming device comprising:

sensor means in said pipe path for generating a detection pulse signal indicative of a flow rate of the pressurized fluid;

arithmetic means for receiving said detection pulse signal and for providing output signals individually indicative of respective clamping positions of said actuator;

external sequencer means for confirming clamping conditions in response to said output signals from said arithmetic means and for providing instruction signals; and

control means for controlling said arithmetic means in response to said instruction signals provided by said external sequencer means.

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**4,748,571**

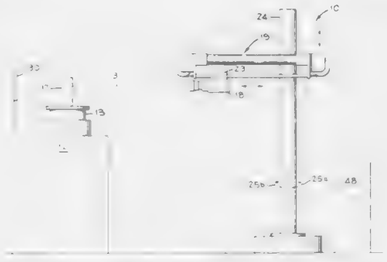
**LINE-UP VISION SYSTEM**

**Jack A. Shippy, Pomona, Calif., assignor to FMC Corporation, Chicago, Ill.**

**Filed Jan. 20, 1987, Ser. No. 4,947**

**Int. Cl.[4] G06F** *15/00*

**U.S. Cl. 364—513** **6 Claims**



1. A line-up vision system for use with automated machining apparatus to test for part alignment in said machining apparatus, said vision system comprising:

a light source mounted for illuminating a portion of said part to be aligned and for keeping another portion of said part relatively dark;

a camera mounted for viewing said part to be aligned, said camera viewing an edge between said illuminated area and said dark area, said camera providing a signal which indicates the position of said edge;

means for actuating said machining apparatus to enable said camera to observe the location of said edge as said machining apparatus moves said part; and

means for comparing the position of said edge relative to a predetermined position as said part is moved.



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**4,748,572**

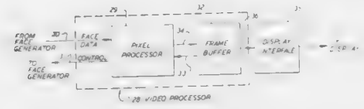
**VIDEO PROCESSOR ARCHITECTURE WITH DISTANCE SORTING CAPABILITY**

**Roy W. Latham, Newark, Calif., assignor to The Singer Company, Binghamton, N.Y.**

**Filed Dec. 5, 1984, Ser. No. 678,207**

**Int. Cl.[4] G06F** *15/40, 15/626*

**U.S. Cl. 364—518** **8 Claims**



1. In a video processor, having as input a means for generating faces of objects, comprising:

a frame buffer means for storing distance-related data, occlusion mask data, and color component data;

a pixel data processor means connected to the frame buffer means and having

(i) means for receiving data from the face generating means;

(ii) connection means interfacing from the pixel processor means back with the face generating means by which the faces of objects are caused to be generated for an image to be displayed;

(iii) connection means interfacing from the frame buffer means back with the pixel processor means by which the data stored in the frame buffer means is computed and updated based upon an initial pass through the generated faces and upon at least one subsequent pass through the generated faces; and

a display interface connected to the frame buffer means for receiving subsequently scanned color component data from the frame buffer means and for generating signals to drive a visual display.

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**4,748,573**

**TEST MANAGEMENT SYSTEM TO ACQUIRE, PROCESS AND DISPLAY TEST DATA**

**Bryan M. Sarandrea, Aurora; Philip Schaten, Englewood; Samir K. Dalal, Monument; Laurence V. Koppelberger, Littleton; Lester F. Schowe, Monument, and Andrew E. Richards, Littleton, all of Colo., assignors to Honeywell Inc., Minneapolis, Minn.**

**Filed Jun. 28, 1985, Ser. No. 749,837**

**Int. Cl.[4] G06F** *3/14, 15/36*

**U.S. Cl. 364—551** **18 Claims**

1. (Amended) A test management system for acquiring, processing and displaying test data comprising:

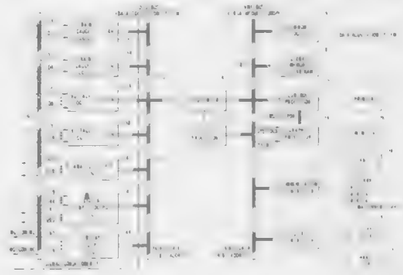
signal conditioner process means for sampling a plurality of analog signals, having means for converting each sample of said plurality of analog signals to normalized digital data signals and having means for storing said normalized digital data signals;

collecting process means coupled to said signal conditioner process means and having addressing means for addressing said storing means and receiving said normalized digital data signals, said collecting process means further having memory means for storing said normalized digital data signals;

file server means coupled to said collecting process means for storing said normalized digital data signals received from said memory means;

system master means coupled to said file server means and said collecting process means and having means for analyzing said normalized digital data signals received from said memory means and said file server means, said system master means further having real time data reduction means coupled to said test control means and said collecting process means for receiving said normalized digital data signals from said collecting process means for checking against predetermined limits and generating limit violation signals if said predetermined limits are exceeded; and

graphics means responsive to said system master means for displaying the result of analyzing said normalized digital data signals.



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**4,748,574**

**INTEGRATED EXECUTIVE DESK UNIT**

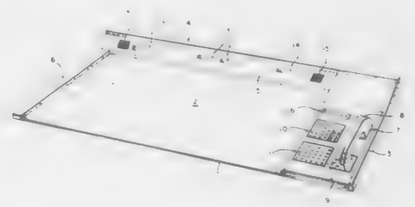
**Jeff Tuchto, Kanata, Canada, assignor to TeleQuest Systems Corporation, Ottawa, Canada**

**Continuation of Ser. No. 559,203, Dec. 8, 1983, abandoned. This application Oct. 21, 1986, Ser. No. 921,560**

**Claims priority, application Canada, Jul. 4, 1983, 431723**

**Int. Cl.[4] G06F** *1/00;* **G04B** *47/00*

**U.S. Cl. 364—705** **10 Claims**



1. In an executive desk pad for defining the working area on a desk and comprising a generally flat, portable rectangular base member having a planar underside for placement on the surface of the desk and an upperside, the major portion of the upperside forming a writing area in front of a user seated at the desk, said writing area serving exclusively to provide a support surface for documents placed thereon, the improvement wherein the base member comprises (a) a telephone handset mounted thereon and accessible to the user seated at the desk; (b) visual display means mounted on said base member and visible to a user facing the writing area; (c) keypad means

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accessible to a user facing the writing area for permitting said user to enter numerical information; and (d) (i) a housing mounted on said base member containing electronic circuitry, said electronic circuitry including a telephone circuit for establishing telephone calls with a remote facility, the called number being selected through said keypad means, (ii) means for performing calculations on number entered through said keypad means and displaying the results on said visual display means, and (iii) clock means for displaying the time on said visual display means.

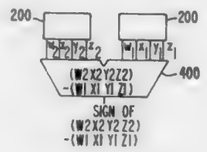
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**4,748,575**

## CIRCUIT FOR DETECTING TRAILING ZEROS IN NUMBERS

**Peter B. Ashkin, Los Gatos, and Andrew G. Heninger, Santa Clara, both of Calif., assignors to Zilog, Inc., Campbell, Calif.**

**Filed Dec. 21, 1984, Ser. No. 684,600**
**Int. Cl.[4] G06F *7/38***
**U.S. Cl. 364—715** **17 Claims**




**8**. A system for use with a multiplier system for detecting the presence of trailing zeros in the two operands to be multiplied by the multiplier and for determining which of the two operands has the more trailing zeros, said system comprising:

means for determining the location of the lowest order non-zero bit preceding trailing zeros of each of the two operands, if any; and

means for comparing the locations of said lowest order non-zero bits of the two operands to determine which of the two operands contains the more trailing zeros.

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**4,748,576**

## PSEUDO-RANDOM BINARY SEQUENCE GENERATORS

**Henry J. Beker, Reading, England; Luc Emiel L. Boes, Brussels, Belgium; Peter R. Brennand, Mitcham, England; Edmund R. Brown, Ilford, England; Gerald O. Crowther, Mitcham, England; Wilhelmus M. Dorn, Eindhoven, Netherlands; Stanley M. Edwardson; Stephen R. Ely, both of Tadworth, England; Louis C. Guillou, Bougbarre, France; Peter M. Jenner, Portsmouth, England; Sylvia M. Jennings, Reading, England; Michael J. Knee, Tadworth, England; Arthur G. Mason, Winchester, England, and Jean-Marie C. Nicolas, Limeil Brevannes, France, assignors to U.S. Philips Corporation, New York, N.Y.**

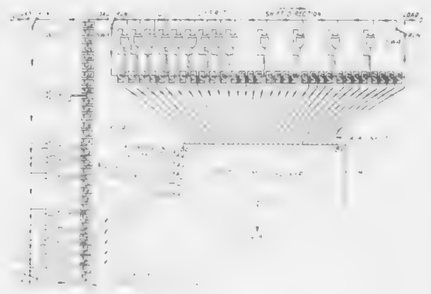
**PCT No. PCT/GB85/00051, § 371 Date Oct. 1, 1985, § 102(e) Date Oct. 1, 1985, PCT Pub. No. WO85/03678, PCT Pub. Date Aug. 29 1985**
**PCT Filed Feb. 4, 1985, Ser. No. 784,880**
**Claims priority, application United Kingdom, Feb. 6, 1984, 8403046; May 16, 1984, 8412431**
**Int. Cl.[4] G06F *1/02***
**U.S. Cl. 364—717** **13 Claims**

**1**. A pseudo-random binary sequence generator, comprising:

selector means having p data inputs and q address inputs ($2^q \geq p$) for selecting at any instant one of the data input bits in accordance with the address input word to provide the generator output;

recirculatory shift register means having a total of r stages and having s logic gates located between register stages for logically combining the outputs of selected stages to provide a pseudo-random sequence; and

means connecting the p data input of the selector means to the outputs of selected shift register stages and for connecting the q address inputs of the selector means to the outputs of q selected shift register stages, in which r and s are so chosen that:



$r > p+q$ and $2^s \geq r^2$.

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**4,748,577**

## LOGARITHMIC DATA COMPRESSION

**Jeffrey D. Marchant, Chandler, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Feb. 2, 1982, Ser. No. 344,914**
**Int. Cl.[4] G06F *1/02***
**U.S. Cl. 364—722** **3 Claims**




**1**. A multi-stage logarithmic data compression apparatus responsive to input word for producing an output word comprising:

means for separating said input word into a plurality of portions; and

a plurality of memory stages, a first of said stages being responsive to a first portion of said input word to produce a logarithm according to an optimal base, second and subsequent of said stages being responsive to an output of a previous stage and a portion of said input word to produce a logarithm according to an optimal base, a last of said stages producing said output word.

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**4,748,578**

## PROCESS AND APPARATUS FOR TRANSLATING THE SAMPLING RATE OF A SAMPLING SEQUENCE

**Roger Lagadec, Zurich, and Henry O. Kunz, Pfungen, both of Switzerland, assignors to Willi Studer, Regensdorf, Switzerland**

**Continuation-in-part of Ser. No. 325,043, Nov. 25, 1981, abandoned. This application Nov. 26, 1984, Ser. No. 674,633**
**Claims priority, application Switzerland, Nov. 26, 1980, 8754/80**
**Int. Cl.[4] G06F *15/31***
**U.S. Cl. 364—724** **8 Claims**

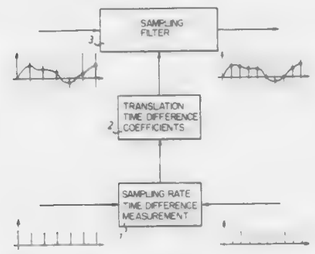
**1**. An apparatus for translating an input sampling sequence with an input sampling rate into an output sampling sequence with a selectable output sampling rate, comprising:

first circuit means for determining an instantaneous time difference between input and output sampling times and for producing signals representative of that difference;



translation circuit means for converting said signals representative of time difference into data representative of a set of filter coefficients; and

sampling filter circuit means for converting the input sampling sequence at the input sampling rate into the output sampling sequence at the output sampling rate in response to said filter coefficients




said first circuit means comprising an oscillator phase-coupled with and responsive to the input sampling rate and having a frequency which is an integral multiple of the input sampling rate and a counting circuit responsive to the oscillator and the output sampling rate and the input sampling rate for determining time intervals between the sampling times of the output sampling sequence and sampling times of the input sampling sequence by an integral number of time intervals of an oscillator output signal.

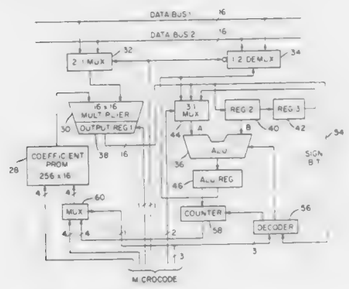
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**4,748,579**

## METHOD AND CIRCUIT FOR PERFORMING DISCRETE TRANSFORMS

**Israel B. Zibman, Newton, and Nigel P. Morgan, Belmont, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.**

**Filed Aug. 14, 1985, Ser. No. 765,918**
**Int. Cl.[4] G06F *15/332***
**U.S. Cl. 364—726** **27 Claims**




**1**. A method of performing a discrete transform of sample points in a digital electronic circuit including an arithmetic logic unit (ALU) which performs an operation in each of successive machine cycles, the method comprising applying a series of data inputs, including the sample points, to a digital multiplier and multiplying each data input with a predetermined multiplier coefficient to obtain a product, storing sequential products in a set of registers such that each sequential pair of products is stored in the set of registers for two machine cycles, and applying predetermined pairs of products from the set of registers to the ALU to perform an operation of addition on each pair of products.

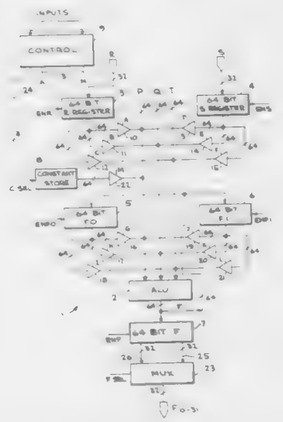
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**4,748,580**

## MULTI-PRECISION FIXED/FLOATING-POINT PROCESSOR

**Charles D. Ashton, Campbell; David K. Quong, Sunnyvale, both of Calif., and Alan G. Corry, Boston, Mass., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.**

**Filed Aug. 30, 1985, Ser. No. 771,385**
**Int. Cl.[4] G06F *7/48***
**U.S. Cl. 364—736** **9 Claims**




**1**. A single-chip floating-point arithmetic processor comprising:

a floating-point arithmetic logic unit having at least three input ports and an output port;

a first, a second, a third and a fourth storage register, each having at least one input port and at least one output port;

means for selectively transferring data from each of said output ports of said first, second, third and fourth registers to each of said input ports of said arithmetic logic unit;

means for transferring data from said output port of said arithmetic logic unit to said input ports of said first and said second storage registers;

means for coupling said input ports of said third and said fourth storage registers to a source of a first and a second operand, respectively;

a data output register having an input port; and

means for transferring data from said output port of said arithmetic logic unit to said input port of said data output register.

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**4,748,581**

## DIGITAL ROOT EXTRACTION CIRCUIT

**Nicholaas C. DeTroye, Eindhoven, Netherlands, assignor to U.S. Philips Corp., New York, N.Y.**

**Filed Aug. 29, 1985, Ser. No. 770,548**
**Claims priority, application Netherlands, Sep. 7, 1984, 8402740**
**Int. Cl.[4] G06F *7/552***
**U.S. Cl. 364—752** **1 Claim**

**1**. An improved circuit for extracting the square root of an input binary number of 2n bits which are in descending order of significance, such square root being an output binary number of n bits in descending order of significance, such circuit comprising:

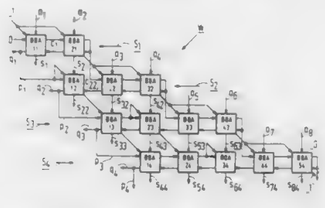
a plurality of controllable add/subtract cells each having a first data input ($a_i$), a second data input ($b_i$), a control input (p), a carry/borrow input ($C_i$), a carry/borrow output ($C_{i+1}$), and a sum/difference output ($S_i$), each such cell being controlled by a control signal bit at its control input (p) to select whether said cell adds or subtracts data bits at its first and second data inputs;

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a plurality n of successive subcircuits which respectively process progressively less significant pairs of bits of the input binary number, the $m^{th}$ of such subcircuits comprising a succession of (m+1) of said cells, where $1 \leqq m \leqq n$; the $m^{th}$ and $(m+1)^{th}$ of such cells respectively receiving on their first data input ($a_i$) data bits of the input binary number of significance (2m−1) and (2m); the carry/borrow output ($C_i+1$) of each cell in the $m^{th}$ subcircuit being connected to the carry/borrow input ($C_i$) of the preceding cell in such subcircuit, the carry/borrow output of the first of such cells constituting the $m^{th}$ significant bit of the output binary number produced by the root extraction circuit; the control input (p) of the first cell in the mth subcircuit being connected to the $(m-1)^{th}$ output of the root extraction circuit; the first data bit input ($a_i$) of such first cell being connected to the sum/difference output ($S_i$) of the second cell in the $(m-1)^{th}$ subcircuit; and the control input (p) of the $(m+1)^{th}$ cell in the $m^{th}$ subcircuit being connected to the carry/borrow input ($C_1$) of such cell;

such improvement being characterized in that:



a binary "1" bit is maintained at the second data bit input ($b_i$) of the first cell in the first subcircuit, and in any $m^{th}$ subcircuit the second data bit input ($b_i$) of the $m^{th}$ and $(m+1)^{th}$ cells are both connected to the second data bit input ($b_i$) of the last cell in the $(m-1)^{th}$ subcircuit, whereby all $m^{th}$ and $(m+1)^{th}$ cells always receive a binary "1" bit on their second data inputs ($b_i$);

a binary "0" bit is maintained at the control input (p) of the first cell in the first subcircuit, and in any $m^{th}$ subcircuit the control input (p) of the $m^{th}$ and $(m+1)^{th}$ cells are connected to the control input (p) of the last cell in the $(m-1)^{th}$ subcircuit, whereby all of the $m^{th}$ and $(m+1)^{th}$ cells always receive a binary "0" on their control inputs (p); and

in any $m^{th}$ subcircuit, the second data input ($b_i$) of the $(m-1)^{th}$ cell is connected to the control input (p) of such cell and the control input (p) of all cells other than the $m^{th}$ and $(m+1)^{th}$ cells are connected to the $(m-1)^{th}$ output of the root extraction circuit;

whereby the square root of the input binary number is extracted without inverting any bits on any inputs of any of said cells.

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**4,748,582**

## PARALLEL MULTIPLIER ARRAY WITH FORESHORTENED SIGN EXTENSION

**Bernard J. New, Los Gatos, and Timothy J. Flaherty, Santa Clara, both of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.**

**Filed Jun. 19, 1985, Ser. No. 747,073**
**Int. Cl.⁴ G06F** *7/52*
**U.S. Cl. 364—754** **12 Claims**

8. A multiplier array responsive to an external clock signal which cyclically processes a plural-bit multiplicand word and a plural-bit multiplier word and cyclically generates therefrom a sequence of plural-bit intermediate sum and carry words, each row of said array comprising:

first combining means responsive to said multiplicand word, predetermined bit positions of said multiplier word and signals representative of a next-preceding "intermediate sum and carry word" for generating a first portion of a current "intermediate sum and carry" word; and

second combining means responsive to predetermined bit positions comprising a most-significant portion of said



multiplicand word and to predetermined bit positions of said multiplier word and a signal representative of a "sign" signal generated by said second combining means in the next-preceding row for generating a second portion of said current intermediate sum and carry word.

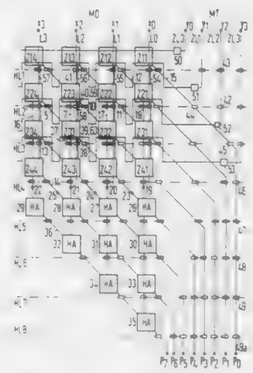
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**4,748,583**

## CELL-STRUCTURED DIGITAL MULTIPLIER OF SEMI-SYSTOLIC CONSTRUCTION

**Tobias Noll, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Aug. 5, 1985, Ser. No. 762,444**
**Claims priority, application Fed. Rep. of Germany, Sep. 17, 1984, 3434085**
**Int. Cl.⁴ G06F** *7/52*
**U.S. Cl. 364—758** **6 Claims**



1. A cell-structured, digital multiplier of semi-systolic construction, wherein all the bits of the multiplicand are respectively AND-logic-linked to one bit of a multiplier to form a group of partial product bits, and one such group is formed for each multiplier bit, comprising a first plurality of cells arranged in a first row which generates a first group of partial product bits and said first plurality of cells receiving all of the multiplicand bits to AND-logic-link them to the lowest value multiplier bit, further plurality of cells contained in further rows following said first row and assigned to further groups of partial product bits, and the cells of each further row generate the partial product bits formed by an AND-logic-link of all the multiplicand bits to one single multiplier bit, and the value of the multiplier bit which is used increases from row to row, a



first plurality of input lines to which the multiplicand bits are supplied and said first plurality of input lines connected to selected ones of said cells, a second plurality of input lines to which the multiplier bits are supplied and said second plurality of input lines connected to selected ones of said cells which are contained in a row, a plurality of sum paths which extend through those cells which are assigned to the partial product bits of equal values which are to be added to each other, a plurality of carry paths which extend through those cells which are assigned to partial product bits of rising value which are to be added to each other, a plurality of full adders contained in each of said first plurality and said further plurality of cells, and said full adders adding a sum signal supplied by one of said plurality of sum paths and a carry signal supplied by one of said plurality of carry paths and the partial product bit assigned to said cell, all of said first and furtner plurality of cells each contain a first logic-link element which performs an AND-logic-link of a multiplicand bit to a multiplier bit, all of said first and said further plurality of cells contain shift register stages which are connected to the sum output and the carry output of each cell, further shift register stages connected to first and second input lines such that all the input lines which are connected to the cells of one row each contain a number of further shift register stages which corresponds to the number of preceding rows, digital signals obtained from the ends of said sum paths and said carry paths combined to form product bits, a first logic-link element in said cells so as to form a partial product bit, a plurality of full-adders in which the partial product bit is added to a sum signal and possibly to a carry signal are each located in two separate cells (**Z23, Z33**) which are located in different rows, the row of the cell (**Z33**) which contains the full-adder is located following the row of the cell (Z23) which contains said first logic-link element, and the output of said first logic-link element extends across a connection line (**58**) to an input of said full-adder which has a shift register stage (**59**) connected to its connection which serves to intermediately store the formed partial product bits.

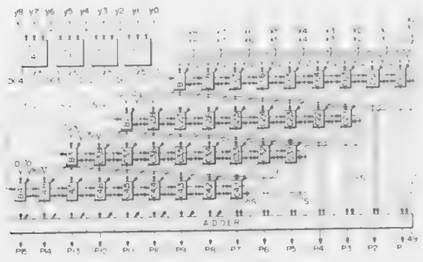
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**4,748,584**

## PARALLEL MULTIPLIER UTILIZING BOOTH'S ALGORITHM

**Makoto Noda, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed May 2, 1985, Ser. No. 729,661**
**Claims priority, application Japan, May 9, 1984, 59-92449**
**Int. Cl.⁴ G06F** *7/52*
**U.S. Cl. 364—760** **9 Claims**



1. A parallel multiplier for providing a product of a multiplicand X and a multiplier Y having N bits and M bits, respectively, the bits of the multiplicand X and the mulitplier Y being ordered from a least to a most significant bit, the parallel multiplier comprising:

a plurality of cells, each having a selecting means and a full adder, for adding addend, augend and carry data to obtain a partial product of the multiplicand X and the multiplier Y, the plurality of cells being arranged in a matrix of M/2 successive rows and N successive columns with each of the cells of a column corresponding to one of the N bits of the mulitplicand X;

means, operatively connected to the plurality of cells, for supplying each of the cells of a column with the corresponding one of the N bits of the multiplicand X and with an inverted corresponding bit of the mulitplicand X and for supplying each of the cells of a column with the next less significant bit of the mulitplicand X and with an inverted next less significant bit of the mulitplicand X;

decoder means, oepratively connected to the plurality of cells, for receiving the M bits of the multiplier Y and for decoding the M bits of the mulitplier Y to provide each of the cells of a row of the M/2 successive rows with select signals corresponding to that row;

the selecting means of each cell of a row being responsive to the corresponding select signals from the decoder means and to the supply means to selectively provide to the full adder of the cell, as addend data, the corresponding one of the N bits of the multiplicand X, as addend data, the inverted corrsponding bit, the next less significant bit of the multiplicand X, the inverted next less significant bit of the mulitplicand X, and zero data;

the full adder of each cell being responsive to the selecting means addend data, and to augend data from a cell in the previous one of the successive rows and in the same column, and carry data from a cell in the previous one of the successive rows and in a previous one of the successive columns and to predetermined data when no previous row exists, to obtain a partial product of augend data and carry data; and

a final adder responsive to augend and carry data from the plurality of cells for providing a product of the multiplicand X and the multiplier Y.

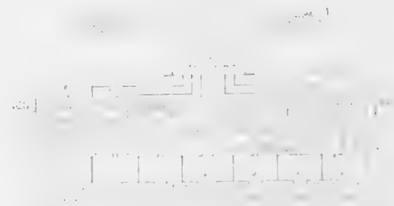
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**4,748,585**

## PROCESSOR UTILIZING RECONFIGURABLE PROCESS SEGMENTS TO ACCOMODATE DATA WORD LENGTH

**Donald M. Chiarulli, 4724 Newcomb Dr., Baton Rouge, La. 70808; W. G. Rudd, Dept. of Computer Science Oregon State University, Corvallis, Oreg. 97331, and Duncan A. Buell, 1212 Chippenham Dr., Baton Rouge, La. 70808**

**Filed Dec. 26, 1985, Ser. No. 817,814**
**Int. Cl.⁴ G06F** *9/00*
**U.S. Cl. 364—900** **6 Claims**



1. A method of operating an electronic computer processor having a plurality of ALU's which may be operated in combination to increase their effective word length comprising the steps of:

(a) synchronizing two or more of said ALU's;

(b) connecting two or more of said ALU's according to a field in a single instruction word, whereby each group of connected ALU's and each isolated ALU define a segment having a data word length equal to the combined word length of each ALU in said segment;

(c) entering a separate operation code and a separate operand instruction for each of said ALU's, said operation codes and said operand instructions being contained in a field in said single instruction word;

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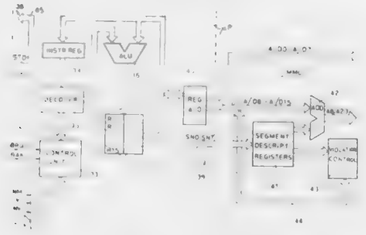
(d) generating a local status output for each of said ALU's;
(e) converting each of said local status outputs to a binary status bit;
(f) resolving said binary status bits into a single-bit condition code;
(g) selecting a common, next instruction word address for said ALU's based upon a status of a condition enable code which directs whether said selection is to be made unconditionally or whether said selection is to be made conditioned upon a status of said single-bit condition code.

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**4,748,586**
**DATA PROCESSING SYSTEM WITH INTERRUPT FACILITIES**

**Franco Bonci, Ivrea, Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy**

**Continuation of Ser. No. 870,433, Jun. 4, 1986, abandoned, which is a division of Ser. No. 437,322, Oct. 28, 1982, Pat. No. 4,615,019. This application Sep. 2, 1987, Ser. No. 93,139**
**Claims priority, application Italy, Nov. 13, 1981, 68475 A/81**
**Int. Cl.[4] G06F *9/00***
**U.S. Cl. 364—900** **2 Claims**

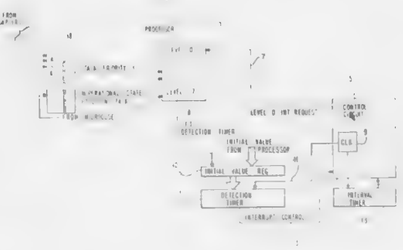


1. A data processing system including a central processing unit, a plurality of input-output units connected to said central processing unit by means of a system bus, a program operating system for controlling said central processing unit and said input-output units, a plurality of circuits for generating corresponding vectored interrupts for said central processing unit, each one of said circuits being associated with one of said input-output units, means conditionable for generating non-vectored interrupts for causing said central processing unit to effect corresponding services, said operating system being responsive to specific operations of said input-output units for so conditioning said non-vectored interrupt generating means, and an interrupt control unit for handling said vectored interrupts by giving them different priority levels, said non-vectored interrupts being divided in a plurality of priority levels according to the kind of services to be effected, said plurality of priority levels having lower priority with respect to the priority levels of said vectored interrupts and said non-vectored interrupts, the improvement comprising means included in said central processing unit for stacking said non-vectored interrupts in a plurality of different registers according to a relative priority level assigned to said non-vectored interrupts, a store included in said interrupt control unit for simultaneously storing one non-vectored interrupt at a time fetched from each of said registers, and a priority circuit for masking each time all interrupts stored in said store except for the one having the highest level of priority.

**4,748,587**
**DEVICE FOR IMPROVING DETECTION OF UNOPERATIONAL STATES IN NON-ATTENDED DRIVEN PROCESSOR**

**Jacques Combes, La Colle sur Loup; Jean-Claude Robbe, Cagnes sur Mer, and Paul Viallon, Vence, all of France, assignors to International Business Machines Corp., Armonk, N.Y.**

**Filed Nov. 25, 1985, Ser. No. 801,442**
**Claims priority, application European Pat. Off., Dec. 31, 1984, 84430050.9**
**Int. Cl.[4] G06F *11/34***
**U.S. Cl. 364—900** **3 Claims**



1. In an interrupt driven processor executing instructions on n priority levels, a device for detecting the unoperational states due to any malfunctions of the processor characterized in that it comprises:
clock means independent of the processor, providing clock pulses having a minimum step value;
means (**18**) for dispatching an unoperational state detection task running on the lowest priority level at time intervals smaller than a specified time out delay;
a detection timer (**1**) set at a first initial value by said processor each time the task is dispatched and responsive to the clock pulses which cause the value contained in the detection timer to be changed stepwise;
means (**20**) responsive to a predetermined threshold value provided by the detection timer to generate a processor interrupt request at the highest priority level, indicative that the task has not been dispatched within a time out delay corresponding to the predetermined threshold value provided by the detection times;
an interval timer (**13**) responsive to the clock pulses for providing output pulses having a period equal to at least the minimum step value;
gating means (**22,24**) responsive to the predetermined threshold provided by the detection timer and to the pulses from the interval timer to gate at an output, the pulses provided by the interval timer;
memory means (**26**) connected to the output of the gating means and responsive to the gated pulses from the interval timer for setting said memory means to a first state upon the occurrence of the first pulse from the interval timer, following the detection timer attaining the predetermined threshold value and being reset to a second state when the highest priority interrupt handling succeeds in correcting the malfunctions which have prevented the unoperational state detection task from being dispatched; and
power down indicating means (**28,32**) responsive to the first state of the memory means and to the interval timer output pulses to provide a signal indicating that the processor is non-operational when the memory means is at the first state at the occurrence of another output pulse from the interval timer following the detection timer reaching the said predetermined threshold value.



**4,748,588**
**FAST DATA SYNCHRONIZER**

**Vernon R. Norman; Sidney B. Schrum, Jr., and Charles R. Wicker, all of Cary, N.C., assignors to International Business Machines Corp., Armonk, N.Y.**

**Filed Dec. 18, 1985, Ser. No. 810,139**
**Int. Cl.[4] G06F *13/00***
**U.S. Cl. 364—900** **13 Claims**



1. A circuit arrangement for receiving data at a rate determined by a first clock and synchronizing the data at a rate determined by a second clock where the clocks are not generated from a common source comprising:
storage means having a plurality of storage locations with each location receiving and storing a unit of data;
a write select circuit means responsive to a first enabling signal for writing data into said storage means;
a read select circuit means responsive to a second enabling signal for extracting data from said storage means;
a first counting means coupled to said write select circuit means and when activated by the first clock to indicate a location in the storage means whereat the data is to be written;
a second counting means coupled to said read select circuit means and when activated by the second clock indicate a storage location from which data is to be read; and
a third means for comparing selected states within the first and second counting means and to generate one or more control signals representing the state of said storage means.

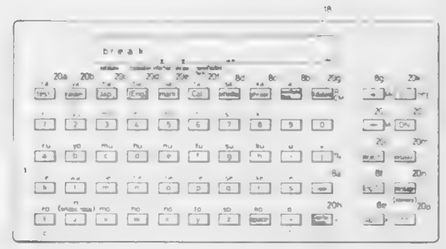
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**4,748,589**
**ELECTRONIC TRANSLATOR**

**Ikuo Kanou, Yamatokoriyama; Shigenobu Yanagiuchi, Tenri, and Takuro Omori, Yamatokoriyama, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Sep. 5, 1980, Ser. No. 184,269**
**Claims priority, application Japan, Sep. 6, 1979, 54-114815; Sep. 13, 1979, 54-118147; Sep. 13, 1979, 54-118150**
**Int. Cl.[4] G06F *9/00***
**U.S. Cl. 364—900** **1 Claim**

1. An electronic dictionary and language interpreter device wherein a first word represented in a first language is entered to obtain a second word represented in a second language equivalent to the first word, comprising:
input means for entering a first word in said first language;
first memory means for storing a plurality of words in said first language and corresponding words in said second language;
access means responsive to said input means for retrieving said input first word and its corresponding second word, said access means comprising:
second memory means for storing address information associated with letters of the alphabet of said first language and responsive to said input means for outputting first address information associated with the first letter of said input word;
third memory means for storing address information associated with letters of said alphabet;
first address means for receiving said first address information and addressing said third memory means in accordance with said first address information;



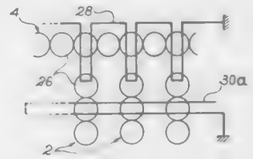
means associated with said input means for determining the second letter of said input word, said third memory means being responsive to said determining means for outputting second address information associated with the second letter of said input word; and
second address means for addressing said first memory means in accordance with said second address information;
and display means responsive to said access means for displaying said second word.

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**4,748,590**
**SWAP GATE IN AN ION-IMPLANTED BUBBLE MEMORY**

**Jean-Marc Fedeli, Saint Egreve, and Joël Magnin, Saint Martin D'Heres, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France**

**Filed Apr. 9, 1985, Ser. No. 721,366**
**Claims priority, application France, Apr. 12, 1984, 84 05812**
**Int. Cl.[4] G11C *19/08***
**U.S. Cl. 365—36** **6 Claims**



1. A swap gate for a magnetic bubble memory with ion-implanted patterns having a magnetic material layer in which bubbles can be displayed by applying a rotary field $H_T$ in first and second propagation paths, the first path being defined by a first system of ion-implanted patterns aligned along a first axis, the second path being defined by a second system of ion-implanted patterns aligned along a second axis, said axes being transverse to each other; said swap gate comprising: an activated electrical transfer conductor for transferring a bubble from the second propagation path to the first propagation path, and in addition also comprising an electrical erase conductor interrupting the first system of patterns along an axis perpendicular to the first axis of the patterns of said first systems.

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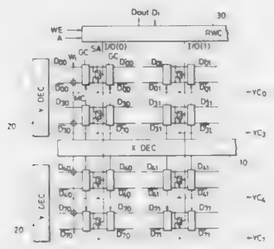


**4,748,591**

## SEMICONDUCTOR MEMORY

**Kiyoo Itoh, Higashikurume, and Ryoichi Hori, Nishitama, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Division of Ser. No. 717,490, Mar. 29, 1985, Pat. No. 4,675,845, which is a continuation of Ser. No. 380,409, May 20, 1982, abandoned. This application Apr. 14, 1987, Ser. No. 38,370**
**Claims priority, application Japan, May 29, 1981, 56-81042**
**Int. Cl.[4] G11C *11/40***
**U.S. Cl. 365—51** **21 Claims**



1. A memory device comprising:
a plurality of sub-arrays each having a plurality of word lines, a plurality of data lines which extend along a direction intersecting with said plurality of word lines, and a plurality of memory cells which are disposed at points of intersection between said plurality of word lines and said plurality of date lines;
a plurality of common lines each of which is arranged in common with at least two corresponding data lines;
a plurality of first means for connecting said data lines to said common lines, each of which first means connects a corresponding data line to a corresponding common line;
a plurality of control lines each of which simultaneously controls at least a corresponding two of said first means to control connection of two of said data lines which belong to the same sub-array to two of said common lines;
a first decoder for selecting at least one of said plurality of word lines; and
a second decoder for controlling the selection of said data lines.

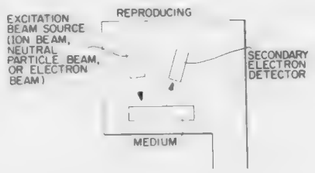
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**4,748,592**

## RECORDING AND REPRODUCING METHOD BY A CHANGE IN COMPOSITION ON A SOLID SURFACE

**Makoto Nagao; Akira Nahara, and Goro Akashi, all of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Japan**

**Continuation of Ser. No. 498,325, May 26, 1983, abandoned. This application Mar. 20, 1986, Ser. No. 842,719**
**Claims priority, application Japan, Jun. 18, 1982, 57-104820**
**Int. Cl.[4] G11C *13/04***
**U.S. Cl. 365—113** **14 Claims**




1. A recording and reproducing method comprising the steps:
in a vacuum,
(a) carrying out recording at a high recording density by causing a neutral particle beam or an ion beam modulated with a recording signal to converge and impinge upon an amorphous solid surface, thereby to locally develop a change in composition on said solid surface, said neutral particle beam or ion beam comprising an element selected from the group consisting of Cs, Li, Na, K, Rb and Ba where said element is attached to or implanted in said amorphous solid surface to thereby effect the locally developed change in said composition on the amorphous solid surface, said neutral particle beam or ion beam being converged to give a beam diameter of about 800 Å or less, and
(b) carrying out reproducing by causing an electron beam, an ion beam or a neutral particle beam to converge and impinge upon said amorphous solid surface, thereby to emit secondary electrons from said solid surface, and detecting the emitted secondary electrons to read out said change in composition, noise during said reproducing step, due to intergranular portions, being eliminated because of the amorphous structure of the solid surface.

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**4,748,593**

## HIGH SPEED NONVOLATILE MEMORY CELL

**James A. Topich, deceased, late of Centerville by Susan K. Topich, executor; Raymond A. Turi, Miamisburg, and George C. Lockwood, Dayton, all of Ohio, assignors to NCR Corporation, Dayton, Ohio**

**Filed Sep. 8, 1986, Ser. No. 904,586**
**Int. Cl.[4] G11C *7/00***
**U.S. Cl. 365—190** **15 Claims**



1. A direct write differential nonvolatile memory cell addressable by a word line and two bit lines, comprising:
a first conductive path in a semiconductor substrate, between a first bit line and a first node, including therein a serial connection of a first word line operable cell access transistor and a first floating gate sense transistor;
a second conductive path in the semiconductor substrate, between a second bit line and a second node, including therein a serial connection of a second word line operable cell access transistor and a second floating gate sense transistor;
first and second electrodes respectively connected to first and second program lines;
a first floating gate electrode for controlling the first floating gate sense transistor, having a first relatively small capacitive coupling to the first program line electrode and a second relatively large capacitive coupling to the second program line electrode; and
a second floating gate electrode for controlling the second floating gate sense transistor, having a first relatively small capacitive coupling to the second program line electrode and a second relatively large capacitive coupling to the first program line electrode.

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**4,748,594**

## INTEGRATED CIRCUIT DEVICE HAVING A MEMORY AND MAJORITY LOGIC

**Norihiko Iida, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed Nov. 12, 1985, Ser. No. 797,268**
**Claims priority, application Japan, Nov. 12, 1984, 59-237923**
**Int. Cl.[4] G11C *29/00***
**U.S. Cl. 365—200** **3 Claims**



1. An integrated circuit device comprising.
a memory having at least first, second and third memory locations;
an address decoder coupled to said memory;
a majority logic circuit having first, second and third input ends and an output end;
a single sense amplifier coupled to said memory such that data read out of said first to third memory locations are all transmitted through said single sense amplifier;
a common signal line coupled to an output end of said sense amplifier;
a first latch circuit coupled to said first input end of said majority logic circuit;
a second latch circuit coupled to said second input end of said majority logic circuit;
first means for operatively coupling said common signal line to said first latch circuit in response to a first control signal;
second means for operatively coupling said common signal line to said second latch circuit in response to a second control signal;
third means for coupling said common signal line to said third input end of said majority logic circuit;
fourth means coupled to said output end of said majority logic circuit for operatively deriving the output signal of said majority logic circuit in response to a third control signal;
fifth means for writing identical data to each of said first, second and third memory locations;
sixth means for receiving said first control signal and allowing said address decoder and said memory to output said data from said first memory location to said common signal line in response to a first address signal and at the same time allowing said first means to couple said common signal line to said first latch circuit;
seventh means for receiving said second control signal and allowing said address decoder and said memory to output said data from said second memory location to said common signal line in response to a second address signal applied later in time than said first address signal and at the same time allowing said second means to couple said common signal line to said second latch circuit; and
eighth means for receiving said third control signal and allowing said address decoder and said memory to output said data from said third memory location to said common signal line in response to a third address signal applied later in time than said second address signal and at the same time allowing said fourth means to derive the output of said majority logic circuit.

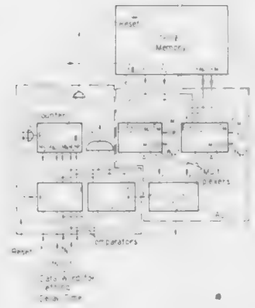
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**4,748,595**

## CIRCUIT ARRANGEMENT COMPRISING A MATRIX-SHAPED MEMORY ARRANGEMENT FOR VARIABLY ADJUSTABLE DELAY OF DIGITAL SIGNALS

**Hans J. Mattausch, Kirchheim, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany**

**Filed Jul. 28, 1986, Ser. No. 890,110**
**Claims priority, application Fed. Rep. of Germany, Sep. 4, 1985, 3531613**
**Int. Cl.[4] G11C *7/00***
**U.S. Cl. 365—194** **2 Claims**



1. In a memory of the type in which a plurality of three-transistor memory cells are arranged in a matrix of rows and columns and are operated with overlapping write/read cycles, a row selector comprises a plurality of serially connected stages and is clocked by an input data clock and is continuously steppable and arbitrarily resettable at any time, the row selector comprising two signal outputs per stage which are offset in phase relative to one another and respectively connected to and for selecting a write word line and a read word line each of which is connected to each cell of the respective row, in which a write bit line and a read bit line are provided per column and connected to each cell of the respective column, in which a plurality of disconnectible storage amplifiers is provided and each amplifier includes an input connected to the read bit line of a respective column and an output connected to the write bit line of the adjacent column and further serving as a delayed data output, in which the row selector stages each include a reset input connected to a common reset input for receiving a row selector reset signal, the first stage of the series further including a set input connected to said common reset input for receiving the row selector input signal to set the row selector to the respective row of cells, and in which a data input for receiving data signals to be delayed is connected to the write bit line of a first column and to an undelayed data output, the improvement comprising:
a column selector for selecting columns of the memory, said column selector comprising a plurality of data inputs connected to the undelayed and delayed data outputs, a delay setting input for receiving a portion of a delay time setting word defining a selection of a column, a control signal input for receiving a control signal, and switching means operable in response to said control signal to select the column corresponding to the time delay defined by said portion of the delay time setting word; and
a data clocked control means including an input for receiving the complete delay time setting word, an input for receiving an external reset signal, a control signal output connected to said control signal input of said column

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selector, a reset output connected to the common reset input of the row selector, and means responsive to said external reset signal and to said delay time setting word to reset said control means and the row selector.

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**4,748,596**

## SEMICONDUCTOR MEMORY DEVICE WITH SENSE AMPLIFIERS

**Mitsugi Ogura, and Yasuo Itoh, both of Yokohama, Japan, assignors to Kabushika Kaisha Toshiba, Kawasaki, Japan**

**Filed Oct. 28, 1985, Ser. No. 792,197**
**Claims priority, application Japan, Dec. 13, 1984, 59-263301**
**Int. Cl.⁴ G11C** *7/00*
**U.S. Cl. 365—205** **10 Claims**



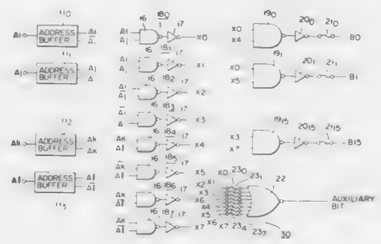
1. A dynamic semiconductor memory device comprising:
parallel bit line pairs formed on a substrate;
first word lines extending substantially perpendicularly to said bit line pairs;
a pair of second word lines extending substantially perpendicularly to said bit line pairs;
memory cells formed at intersections between said bit line pairs and said first word lines and arranged in a matrix form;
dummy cells formed at intersections between said bit line pairs and said second word lines;
first sense amplifiers connected to said bit line pairs for performing a pre-sensing operation such that a potential difference between a specific bit line pair consisting of a bit line connected to a selected memory cell and a bit line connected to a dummy cell corresponding to the selected memory cell is detected and gradually amplified in a data readout mode for reading out data from the selected memory cell;
second sense amplifiers connected to said bit line pairs, for performing a main sensing operation such that said potential difference of said specific bit line pair is further amplified in the data readout mode; and
driver means connected to said first and second sense amplifiers for activating said first sense amplifiers simultaneously to perform the pre-sensing operation, and for then activating a selected one of said second sense amplifiers which is connected to said specific bit line pair to perform the main sensing operation, thereby reading out the data from the selected memory cell.

**4,748,597**

## SEMICONDUCTOR MEMORY DEVICE WITH REDUNDANCY CIRCUITS

**Shozo Saito, Yokohama, and Syuso Fujii, Kawasaki, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Sep. 16, 1986, Ser. No. 907,966**
**Claims priority, application Japan, Sep. 18, 1985, 60-205747**
**Int. Cl.⁴ G11C** *7/00, 8/00*
**U.S. Cl. 365—230** **6 Claims**



1. A semiconductor memory device comprising:
address buffer means for receiving a plurality of address inputs and producing a plurality of first outputs having logic levels corresponding to said address inputs and a plurality of second outputs having logic levels complementary to said address inputs;
partial decoder means including a plurality of NAND gates, each of said NAND gates receiving one each of said first and second outputs of said address buffer means, with each NAND gate receiving a combination of said first and second outputs different from the combination received by each of the other NAND gates and wherein each NAND gate of said partial decoder means produces an output;
main decoder means including a plurality of NAND gates, each NAND gate receiving a predetermined combination of outputs of said partial decoder means, said combination of outputs being different from the outputs received by each of the other NAND gates of said main decoder means and producing an output to select a bit designated by said address signal; and
programmable decoder means including a plurality of fuse elements and a NOR gate, the NOR gate receiving the outputs of said partial decoder means via said fuse elements at times when a designated address bit from said main decoder means is defective and said main decoder means is disconnected, to select a spare bit.

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**4,748,598**

## METHOD TO CALIBRATE ACOUSTIC INSTRUMENTS, AND CALIBRATION SYSTEM

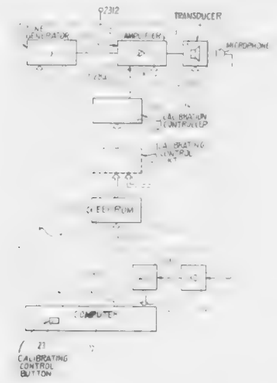
**Wolfgang Kopke, Berlin, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Jun. 20, 1986, Ser. No. 876,821**
**Claims priority, application Fed. Rep. of Germany, Aug. 20, 1985, 3529704**
**Int. Cl.⁴ H04B** *17/00*
**U.S. Cl. 367—13** **12 Claims**

1. Audiometer apparatus having a tone generator (11) generating tone frequencies at predetermined frequencies or frequency ranges;
a controlled amplifier (12) coupled to the tone generator (11),
said controlled amplifier having an amplification level control input (21);
a electroacoustic transducer (13) coupled to and receiving the output from the controlled amplifier (12) and providing an actual acoustic signal;



an acoustic-electro transducer (31) acoustically coupled to the electroacoustic transducer (13), and an analog/digital converter (30) connected to and digitizing the output from the acoustic-electro transducer (31);
means digitally storing data representative of frequencies and output levels of a test program;
and means to calibrate the apparatus to ensure actual output by said electroacoustic transducer (13) in accordance with frequency and level data of the test program, comprising
an electrically programmable read-only memory (EEPROM) (15) connected to and controlled by the test program storage means (22);
a calibrating stage (17, 18) having controllable calibrating elements (181) and means controlled by the read-only memory (15) coupled to and controlling the respective calibrating elements in accordance with digital data signals from the test program storage means (22);



wherein the calibrating elements comprise a plurality of resistors (181) forming a resistance chain connected between a source of voltage and a reference potential;
the means controlling the calibrating elements includes switching means (171, 172, 173) selectively switching respective resistors (181) in the resistance chain under control of data signals derived from the memory (15);
a fixed measuring resistor ($R_N$) serially connected to the resistance chain (181);
means (185) coupled to said amplifier controlled input (21) for deriving a calibration correction voltage ($U_K$) across the measuring resistor ($R_N$);
and wherein the test program storage means receives the output from the analog/digital converter (30) and includes means for comparing said actual acoustic output signal with the stored frequency and level data in the test program storage means to derive a deviation signal;
and means for recording the deviation signal as a calibrating signal in the read-only memory (15).

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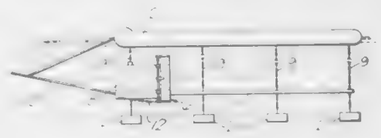
**4,748,599**

## CONTROL DEVICE FOR CABLES WITH SEISMIC EQUIPMENT, ESPECIALLY FOR GUN CABLES COMPRISING ONE OR SEVERAL GUN ARRAYS

**Einar Gjestrum, Oslo, and Ian Rogers, Sandvika, both of Norway, assignors to Geco A.S., Kjorbokollen N-1301, Sandvika, Norway**

**Filed Dec. 18, 1986, Ser. No. 943,096**
**Claims priority, application Norway, Dec. 18, 1985, 855143**
**Int. Cl.⁴ G01V** *1/38;* **B63H** *25/00*
**U.S. Cl. 367—17** **9 Claims**

1. In a device for controlling the position of a marine seismic gun towed behind a vessel at sea including a buoyant member towed by a towing cable and an air gun suspended by a connecting line from the buoyant member, the improvement comprising:
a securing member attached to said connecting line;
suspending tube means;
lug means connecting said suspending tube means to said securing member;
a frame structure connected to said suspending tube means and extending in a direction transverse to the towing direction of the towing cable and laterally outwardly with respect to said securing member comprising,
longitudinal frame members extending in said transverse direction,



intermediate transverse members disposed intermediately of said longitudinal members and each having a forward end and a rear end, said forward end being laterally outwardly with respect to said securing member farther than said rear end so that said transverse members extend in a direction substantially oblique to the direction of travel of said frame structure; and
means for connecting said frame structure to said suspending tube means so that when said buoyant member and air gun are towed through the water said frame member controls said buoyant member and air gun to travel in a path laterally displaced outwardly with respect to the path of travel of the towing vessel.

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**4,748,600**

## INTERACTIVE DRUG DISPENSER

**John Urquhart, Palo Alto, Calif., assignor to Aprex Corporation, Palo Alto, Calif.**

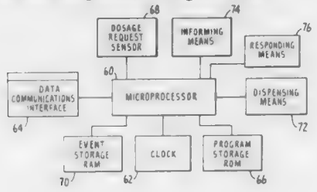
**Continuation-in-part of Ser. No. 899,412, Aug. 22, 1986. This application Jul. 31, 1987, Ser. No. 80,344**
**Int. Cl.⁴ G04B** *47/00;* **G07F** *11/00*
**U.S. Cl. 368—10** **27 Claims**

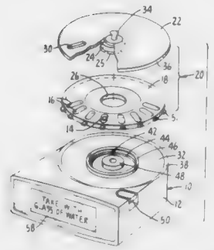
1. An interactive drug dispenser for dispensing a drug to a patient, comprising:
a time counter capable of recording one or more starting times and of measuring at least one elapsed time period from the one or more starting times;
means for recording a prescribed dispensing regimen, said regimen including information concerning the times for taking doses in a specified sequence;
means for recording the actual dispensing times;
means for comparing the actual dispensing times with the

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prescribed dispensing regimen and deriving the actual deviation from the prescribed regimen; and



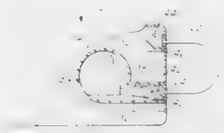



means for providing from the deviation a dosing error correction factor.

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**4,748,601**
**GAME MONITORING DEVICE**
**Dean K. Reidt, and Daryl R. Breitung, both of P.O. Box 33427, St. Paul, Minn. 55144-1000**
**Filed Dec. 19, 1986, Ser. No. 944,441**
**Int. Cl.[4] G04B *47/00***
**U.S. Cl. 368—10** **3 Claims**





**1.** A game monitoring device to determine the time of passage of an animal past a predetermined position, comprising:

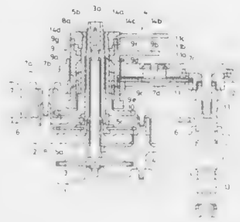
a timing module having a display to indicate visually the passage of time, a self-contained power supply for powering said timing module and two electrical leads extending from said timing module, wherein said timing module is capable of continuous time-keeping and display when said leads are removed from electrical contact, discontinuing said time-keeping when said leads are placed in electrical contact, retaining the time displayed when said leads were placed in electrical contact during the period when said leads are in electrical contact and re-commencing said time-keeping when said leads are once more removed from electrical contact; and

means for placing said leads in contact upon said passage of a said animal; and

wherein said leads each terminate in an electrical contact biased toward each other and said means for placing said leads in contact is an insulation barrier disposed between said contacts and a string or wire connected to said barrier and adapted to be pulled upon passage of said animal and thereby remove said barrier from between said contacts and permit electrical connection of said contacts.

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**4,748,602**
**ALARM MECHANISM**
**Keiichi Yoshizawa, and Kastuya Moritaka, both of Tokyo, Japan, assignors to Seikosha Co., Ltd., Tokyo, Japan**
**Filed Jul. 17, 1987, Ser. No. 74,946**
**Claims priority, application Japan, Jul. 18, 1986, 61-169179**
**Int. Cl.[4] G04B *23/02***
**U.S. Cl. 368—72** **7 Claims**



**1.** An alarm mechanism comprising:

an alarm hand and an hour hand arranged coaxially with each other, each hand having an annular portion and a pointer portion formed integrally with its respective annular portion, said annular portions having mutually opposed facing surfaces;

cam grooves formed in one of the mutually opposed facing surfaces of said annular portions, and cam pawls formed on the other facing surface to fit into said cam grooves; and

an alarm pinion formed integrally with a read-end portion of said annular portion of said alarm hand.

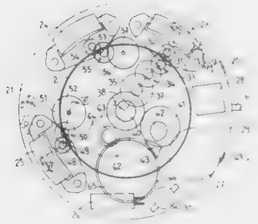
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**4,748,603**
**CHRONOGRAPH WATCH**
**Claude Ray, Canton of Neuchâtel, and Michiel Groothuis, Canton of Berne, both of Switzerland, assignors to Conseilray S.A., Canton of Neuchâtel, Switzerland**
**Filed May 28, 1987, Ser. No. 55,178**
**Claims priority, application Switzerland, May 29, 1986, 2164/86**
**Int. Cl.[4] G04B *19/04, 37/00***
**U.S. Cl. 368—80** **10 Claims**

**1.** A chronograph watch comprising a timepiece movement having a frame and driving a plurality of conventional time indicators including at least an hour and a minute indicator, an autonomous chronograph movement including a source of energy, a timekeeper and at least one indicator, said chronograph movement having an annular frame surrounding said frame of said timepiece movement.

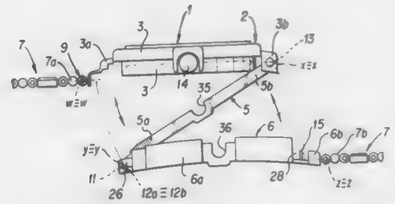






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**4,748,604**
**WATCH CASE FUNCTIONING AS A CLASP, THE CLASP-WATCH CASE, BEING LOCKED BY A PRESS BUTTON**
**Pierre Lambert, Goumois, Switzerland, assignor to Class S.p.A., Switzerland**
**PCT No. PCT/IT86/00017, § 371 Date Nov. 19, 1986, § 102(e) Date Nov. 19, 1986, PCT Pub. No. WO86/05077, PCT Pub. Date Sep. 12, 1986**
**PCT Filed Feb. 27, 1986, Ser. No. 934,612**
**Claims priority, application Italy, Mar. 5, 1985, 47771 A/85**
**Int. Cl.[4] G04B *37/00*; A44C *5/00*; A43C *11/00***
**U.S. Cl. 368—282** **3 Claims**



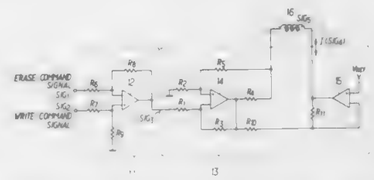
**1.** An articulated device. for increasing the length of a bracelet or band (**7**) having first and second ends (**7*a***, **7*b***, respectively) incorporating a wrist-watch and provided with an improved safety locking means, in which said device is formed by first, second and third elements (**2**, **5**, **6**, respectively) substantially rigid and connected to each other by hinges having first, second, and third parallel transverse rotation axes (x—x; y—y; z—z, respectively) so as to be foldable in a zig-zag relationship one on the other either so that said articulated device can take the minimum length or in which said first, second and third elements can be brought in a substantially mutual coplanar relationship of a maximum length, said second and third elements (**5**, **6**) having first end portions (**5*a***, **6*a***) and second end portions (**5*b***, **6*b***), respectively, wherein the first element (2) of the device comprises first and second parts (**3**, **4**, respectively) which in combination define an inner space open at its top and adapted to receive the wrist-watch (**1**, **1*a***), said first and second parts (**3**, **4**) being interconnected to each other by elastic pressure connection means, said first part (**3**) having first and second sides (**3*a***, **3*b***, respectively), said first side (**3*a***) being provided with means to be connected to said first end (**7*a***) of the bracelet (**7**) and being so shaped as to receive to elastically lock by locking means (**10**, **11**) the first end portions (**5*a***, **6*b***) of the first and second elements (**5** and **6**, respectively), when in their folded collapsed position, while the second side (**3*b***) of the first part (**3**) is provided with hinge means enabling the first part (**3**) and second end portion (**5*b***) of the second element (**5**), to pivotally rotate about the first axis (x—x), wherein the first end portion (**5*a***) of said second element (**5**) is hinged to the first end portion (**6*a***) of the third element (**6**) about said second transverse axis (y—y), and wherein the second end portion (**6*b***) of the third element (**6**) is provided with means for connecting it to said second end (**7*b***) of the band (**7**) about the third (z—z) axis, said articulated device having operatively mounted thereon a safety locking means for the articulated device, characterized by the fact that, said safety locking means comprises:

(i) a shaped hook member (**15**, **15*a***, **15*c***) extending outwardly from the second end portion (**6*b***) of the third element (**6**) and adapted to enter an orifice (**5*f***) arranged in the second end portion (**5*b***) of the second element (**5**), when the articulated device is in its collapsed folded position; and

(ii) a safety locking sliding member (**19**, **19*a***, **19*b***, **32**) which can be slidingly moved, parallel to the first axis (x—x) into and along a chamber (**31**) extending parallel to said first axis (x—x) and arranged in the lower part of the second side (**3*b***) of the first part (**3**), said chamber (**31**) being open at its bottom, and adapted to be closed by an upper shaped part of the second end portion (**5*b***) of the second element (**5**), when the articulated device is in its collapsed position, said safety locking sliding member (**19**, **19*a***, **19*b***, **32**) respectively acting in opposite directions in response to a first spring device (**16**, **17**, **37**, **37*a***), adapted to maintain the safety locking sliding member (**19**, **19*a***, **19*b***, **32**) and the hook member (**15**, **15*a***, **15*c***) in interengaged condition and, respectively, a second spring device (**21** to **24**) adapted to counteract the action of said first spring device in response to a pressure applied to a manually controllable outer releasing push-button (**22**), which is a part of said second spring device.

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**4,748,605**
**BIAS-MAGNETIC-FIELD GENERATING APPARATUS IN MAGNETO-OPTICAL INFORMATION WRITING AND ERASING SYSTEM**
**Mitsugu Sakai, and Shozi Yoshikawa, both of Hachioji, Japan, assignors to Olympus Optical Company Limited, Tokyo, Japan**
**Filed Sep. 26, 1985, Ser. No. 780,662**
**Claims priority, application Japan, Sep. 28, 1984, 59-145905[U]**
**Int. Cl.[4] G11B *5/02, 11/00***
**U.S. Cl. 369—13** **6 Claims**




**1.** A bias-magnetic-field generating apparatus of a magneto-optical memory system for erasing and writing information on

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a magnetic recording medium according to an erase command signal and a write command signal, comprising:

differential amplifying circuit means having a first input supplied with the erase command signal and a second input supplied with the write command signal to produce a differential output signal;

constant current power amplifying circuit means connected to receive the differential output signal from said differential amplifying circuit means and for generating a stable drive current according to the differential output signal; and

a bias-magnetic-field generating coil driven by the stable drive current fed from said constant current power amplifying circuit means so that a stable bias-magnetic-field is applied to said magnetic recording medium according to the differential output signal.

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**4,748,606**

## EXTERNAL MAGNETIC FIELD INVERTING APPARATUS FOR MAGNETO-OPTICAL DISC APPARATUS

**Takashi Naito, and Susumu Tosaka, both of Shinagawa, Japan, assignors to Sony Corporation, Tokyo, Japan**

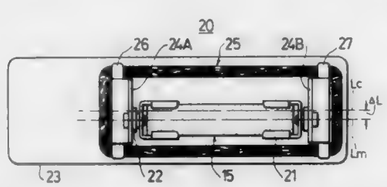
**PCT No. PCT/JP86/00216, § 371 Date Dec. 29, 1986, § 102(e) Date Dec. 29, 1986, PCT Pub. No. WO86/06534, PCT Pub. Date Nov. 6, 1986**

**PCT Filed Apr. 28, 1986, Ser. No. 12,458**

**Claims priority, application Japan, Apr. 29, 1985, 60-91992; Nov. 20, 1985, 60-260387**

**Int. Cl.[4] G11B** *5/03, 13/04, 11/14*

**U.S. Cl. 369—13** **7 Claims**




1. An external magnetic field inverting apparatus for magneto-optical disc apparatus comprising a rotatable permanent magnet located a predetermined distance from a magneto-optical disc surface in opposing relation thereto and for generating an external magnetic field passing through said disc surface perpendicularly and a winding means located so as to surround said permanent magnet, and further means for supplying current to said winding means to create a second magnetic field different from the magnetic field of said permanent magnet, permanent magnet is half-rotated by a rotation force generated on the basis of a force occurring between both of said magnetic fields and applied to said permanent magnet whereby to invert the direction of the external magnetic field generated by said permanent magnet.

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**4,748,607**

## TRACK ACCESSING SYSTEM USING AN INTEGRATED VELOCITY SIGNAL

**Hiroshi Nakane, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Jul. 9, 1986, Ser. No. 883,727**

**Claims priority, application Japan, Jul. 11, 1985, 60-153060**

**Int. Cl.[4] G11B** *21/08, 21/10, 7/095*

**U.S. Cl. 369—32** **12 Claims**

1. A record disc reproducing apparatus comprising:

means, movable in a radial direction with respect to said disc, for reading data from said disc;

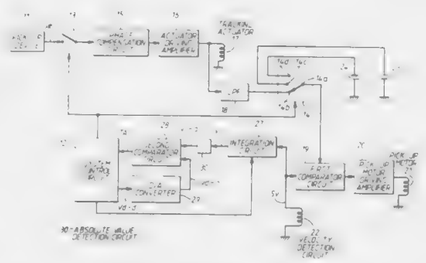
means for driving said reading means in said radial direction in proportion to a driving level applied thereto;

means for producing a velocity signal corresponding to a moving velocity of said reading means in said radial direction;

means for integrating said velocity signal;

means for generating distance data related to a desired distance of radial movement of said reading means;

means for comparing said integrated velocity signal and said distance data; and



means for energizing said driving means to drive said reading means at a velocity independent of said integrated velocity signal until said integrated velocity signal and said distance data assume a predetermined relationship, and energizing said driving means at a level to drive said reading means a different velocity after said integrated velocity signal and said distance data assume said predetermined relationship.

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**4,748,608**

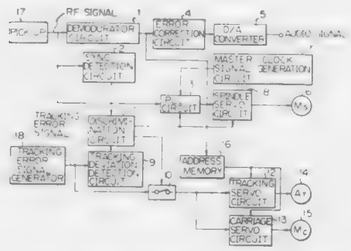
## SERVO APPARATUS FOR TRACKING AND ROTATIONAL SPEED CONTROL

**Keiichi Matsumoto, Tokorozawa, and Yoshio Aoyagi, Kawagoe, both of Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan**

**Filed Mar. 12, 1985, Ser. No. 692,918**

**Int. Cl.[4] G11B** *7/00*

**U.S. Cl. 369—43** **4 Claims**




1. An information playback system for playing back information signals, including a plurality of synchronizing signals, recorded on a recording disc having at least one recording track, said system having a pickup for picking up the information signal from the recording disc, and comprising:

a tracking error signal generating means for generating a tracking error signal from an output signal of said pickup, said tracking error signal being indicative of a relative distance between an information reading point of said pickup and said recording track in a direction perpendicular to the direction of said recording track;

a first servo control means reponsive to said tracking error signal for controlling a relative position of the information reading point of the pickup from the recording track along a radial direction of the disc;

a second servo system for controlling the rotational speed of the recording disc in accordance with the synchronizing signals contained in a playback signal from the pickup;

a first detection means responsive to said tracking error signal for detecting a first state in which said information reading point has moved across a first predetermined number of sections of the recording track and producing a first detection signal upon detection of said first state;

a second detection means for detecting a second state in which said synchronizing signal is not read out from the playback signal up to a second predetermined number regularly and producing a second detection signal upon detection of said second state; and

a control means responsive to said first and second detection means for suspending operation of at least one of said first and second servo control means in accordance with said first and second detection signals.

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**4,748,609**

## METHOD AND APPARATUS FOR COMPOSITE TRACKING SERVO SYSTEM WITH TRACK OFFSET CORRECTION AND ROTARY OPTICAL DISC HAVING AT LEAST ONE CORRECTION MARK FOR CORRECTING TRACK OFFSET

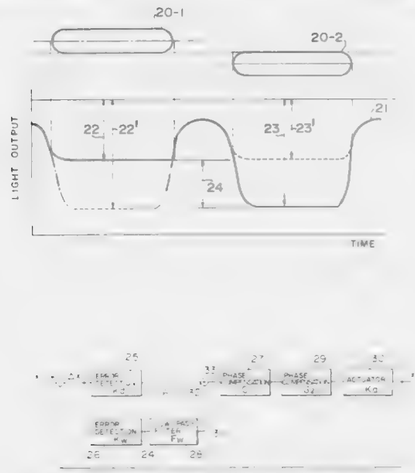
**Seiji Yonezawa, Hachioji; Masatoshi Ohtake, Ome; Masaru Ito, Sagamihara; Toshiaki Tsuyoshi, Kokubunji; Kazuo Ichino, Nishitama, and Harushige Nakagaki, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Mar. 28, 1986, Ser. No. 845,340**

**Claims priority, application Japan, Mar. 29, 1985, 60-63587; Jul. 5, 1985, 60-146507; Jul. 29, 1985, 60-165777**

**Int. Cl.[4] G11B** *7/095, 7/24*

**U.S. Cl. 369—44** **21 Claims**




1. A tracking control method for a composite wobbled tracking servo system, comprising the steps of:

preparing a rotary recording medium having a first field and a second field alternately arranged along the direction of rotation of the recording medium to provide a sector, pregrooves being provided at least in said second field, said first field including at least one pair of wobbled track marks disposed in a relation wobbled relative to the center of a track;

irradiating the recording surface of said recording medium with a light spot;

detecting a first tracking error signal from the reflection of said light spot diffracted by said pregrooves on said recording medium;

detecting a second tracking error signal from the reflection of said light spot traversing said wobbled track marks;

correcting said first tracking error signal on the basis of said second tracking error signal; and

using the corrected signal for the tracking control;

wherein a dc offset of said first tracking error signal is removed by a band-limited high-pass filter, and high frequency components of said second tracking error signal are removed by a band-limited low-pass filter, said two different tracking error signals covering different frequency ranges of said servo system.

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**4,748,610**

## SERVO SYSTEM IN DATA READING APPARATUS

**Junichi Nakata, and Katsumi Kawamura, both of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan**

**Filed Mar. 15, 1984, Ser. No. 589,802**

**Claims priority, application Japan, Mar. 16, 1983, 58-38538[U]**

**Int. Cl.[4] G11B** *7/095*

**U.S. Cl. 369—44** **5 Claims**



1. A servo control detecting system of a data reading apparatus for controlling a reading position of said apparatus, comprising:

means for providing a reading signal for data recorded at said reading position;

detecting means for providing a detection signal indicative of a level of said reading signal;

a source of a reference signal;

means for comparing said detection signal with said reference level and indicating when said detection signal falls below said reference level;

means for providing an error signal indicative of a direction and a magnitude of displacement of said reading position from a normal reading position, said error signal having an offset component;

means for providing an offset to said error signal to cancel said offset component from said error signal; and

means for eliminating said offset to said error signal in response to said comparing means indicating said detecting signal falling below said reference level.

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**4,748,611**

## INFORMATION RECORDING MEDIUM AND METHOD FOR REPRODUCING THE SAME

**Toshiaki Tsuyoshi, Kokubunji; Masatoshi Otake, Ome; Sachio Kumagai, Hachioji; Kazuo Ichino, Nishitama; Wasao Takasugi, Higashiyamato, and Seiji Yonezawa, Hachioji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Apr. 29, 1986, Ser. No. 857,088**

**Claims priority, application Japan, May 2, 1985, 60-93618**

**Int. Cl.[4] H04N** *5/76;* **G11B** *5/09*

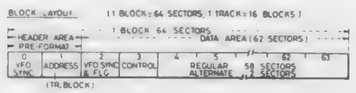
**U.S. Cl. 369—59** **2 Claims**

1. An information recording medium which is divided into a multiplicity of sectors and has a plurality of tracks on which information and data may be recorded, characterized in that each track is divided into a plurality of blocks, each block representing a data unit and being made up of a predetermined

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number of sequential sectors, each sector having a leading part in which a sector mark is pre-recorded and a remaining part forming a data recording area in which data is recorded, an initial part of each block comprising a plurality of pre-recorded sectors including one sector in which thereis recorded in the data recording area thereof a first synchronizing signal for controlling the generation of first clock pulses for reading block identification information for identifying the block and




another sector in which said block identification information is recorded in the data recordign area thereof, and a remaining part of each block having a first sector in which there is recorded in the data recordign area thereof a second synchronizing signal for controlling the generation of second clock pulses for reading of recorded data and a plurality of remaining sectors having said recorded data and a plurality of remaining sectors having said recorded data recorded in the data recording area thereof.

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**4,748,612**

## ARRANGEMENT FOR CUTTING INFORMATION INTO A RECORD CARRIER MADE OF METAL, PARTICULARY COPPER

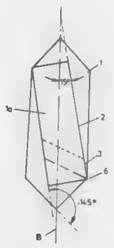
**Horst Redlich, Berlin, Fed. Rep. of Germany, assignor to Teldec Schallplatten GmbH, Hamburg, Fed. Rep. of Germany**

**Filed Dec. 2, 1985, Ser. No. 810,332**

**Claims priority, application Fed. Rep. of Germany, Apr. 2, 1984, 3412270**

**Int. Cl.[4] G11B** *3/44*

**U.S. Cl. 369—173** **8 Claims**



1. Arrangement for cutting information into a metal record carrier by means of a diamond body cut or ground out of a rough diamond (natural or synthetic octahedron crystal) under consideration of its hardness in the region of certain orientation lines for the cutting edge, particularly for the phonograph record industry, characterized in that, for the cutting process, the diamond body (1) is adjusted in such a manner that during cutting its cutting face (2) is operated at a canting angle of 5° to 20° and the diamond body (1) is ground in such a manner that its cutting face (2) forms an angle with respect to the (100) direction of the crystal lattice, such that during cutting at the canting angle, the atoms of the crystal lattice lie one behind the other in the cutting direction and the cutting edge (3) is stressed in the optimum hardness direction.

**4,748,613**

## DISC RECORDING APPARATUS PROVIDED WITH A MECHANISM FOR MOVING THE HEAD-CARRIAGE BY MEANS OF A METALLIC BELT

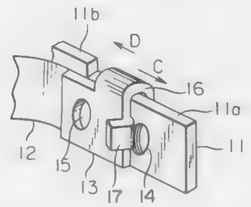
**Akihiro Isomura, and Chikahisa Kawakami, both of Ohme, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Jul. 28, 1986, Ser. No. 889,757**

**Claims priority, application Japan, Jul. 29, 1985, 60-165726**

**Int. Cl.[4] G11B** *5/56;* **F16H** *21/44*

**U.S. Cl. 369—215** **9 Claims**




1. A drive mechanism for a carriage of a disc drive, said mechanism comprising:
- a metal belt having first and second ends attached to said carriage;
- a stepping motor having a shaft, said belt being wound around said shaft to drive said carriage in response to rotational movement of said motor;
- a metal attachment plate affixed to said carriage;
- a metal attachment member affixed to one end of said belt and disposed to attach to said attachment plate; and
- means for fastening said attachment member to said attachment plate,
- wherein said attachment member includes guide means for slidingly engaging with said attachment plate, said attachment member further including means for tensioning said belt.

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**4,748,614**

## OPTICAL WAVELENGTH-MULTIPLEXING AND/OR DEMULTIPLEXING DEVICE

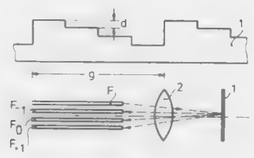
**Hans Dammann, Tangstedt; Ulrich Killat, Hamburg, and Gert Rabe, Pinneberg, all of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Apr. 11, 1983, Ser. No. 483,470**

**Claims priority, application Fed. Rep. of Germany, Apr. 15, 1982, 3213839**

**Int. Cl.[4] H04B** *9/00*

**U.S. Cl. 370—3** **8 Claims**




1. An optical wavelength multiplexing/demultiplexing device for combining a number of light beams of different component wavelengths into a single light beam, or for separating a single light beam of many component wavelengths into a number of separate light beams of different component wavelengths, said device comprising:
- a first light guide for transmitting a single light beam of many component wavelengths;



- at least three component light guides, each for transmitting a single light beam of a component wavelength; and
- a phase grating arranged between the first light guide and the component light guides;

characterized in that:
- the phase grating is a digital phase grating having at least four steps of different heights;
- the phase grating has a period which is a multiple of each component wavelength; and
- the grating parameters are chosen so that each component wavelength is diffracted into a single central diffraction order which differs from that of the other component wavelengths.

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**4,748,615**

## DIGITAL TDM SWITCHING EXCHANGE WHEREIN SWITCHING IS EFFECTED BY THE READ/WRITE SEQUENCES OF DATA STORES

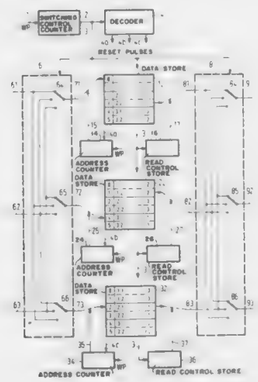
**Johann E. W. Krüger, Quickborn, and Wolfgang E. Jasmer, Hamburg, both of Fed. Rep. of Germany, assignors to U.S. Philips Corp., New York, N.Y.**

**Filed Nov. 12, 1986, Ser. No. 929,930**

**Claims priority, application Fed. Rep. of Germany, Nov. 26, 1985, 3541662**

**Int. Cl.[4] H04Q** *11/04*

**U.S. Cl. 370—58** **6 Claims**




1. A computer-controlled central switching exchange for switching digital time-interleaved data incoming in cyclically repeated TDM frames on a number of input lines of such exchange to an equal number of output lines of such exchange by means of a switching matrix, which exchange comprises:
- input change-over switches operating in parallel and which cyclically switch the data frames on each input line of the exchange frame-sequentially over each of a number of intermediate input lines of said matrix, the number of matrix input lines being equal to the number of exchange input lines;
- a central switching stage connected to the matrix input lines and including data stores, such central switching stage distributing the data frames on the matrix input lines over an equal number of matrix intermediate output lines, such distribution being determined in accordance with the connections to be established between the exchange input lines and the exchange output lines; and
- output change-over switches operating in parallel and which cyclically switch the data frames on each of the matrix intermediate output lines frame-sequentially over each of the output lines of the exchange;

such exchange being characterized in that:
- (a) the sequence of connections of the exchange input lines to the matrix intermediate input lines provided by the input change-over switches is identical to the sequence of connections of the matrix intermediate output lines to the exchange output lines provided by the output change-over switches;
- (b) the central switching stage comprises, for each matrix input line, a randomly addressable data store which, during each cycle of the input change-over switches, stores in respective addresses therein the data frames on all of the exchange input lines which are connected to such matrix input line during such cycle; and
- (c) the central switching stage further comprises an addressing arrangement which cyclically addresses all the data stores in the same address sequences but shifted by one data frame in the successive data stores, one of such sequence being for reading data frames from the data stores and another of such sequences being for writing data frames into the data stores, such sequences being set in accordance with the connections to be established between the exchange input lines and the exchange output lines.

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**4,748,616**

## METHOD AND ARRANGEMENT FOR TRANSMITTING AND EXTRACTING A TIMING SIGNAL

**Osamu Tanaka, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed May 20, 1986, Ser. No. 864,837**

**Claims priority, application Japan, May 20, 1985, 60-108636**

**Int. Cl.[4] H04J** *1/02*

**U.S. Cl. 370—74** **2 Claims**

1. A method for transmitting and extracting a timing signal for use in a multi-carrier parallel data transmission system having the carrier frequencies of channels arranged at baud rate intervals, comprising the steps of:
- (a) transmitting two of said carriers as a first pair of pilot signals which have a first frequency difference equal to the baud rate;
- (b) taking out a first signal having a reference phase and a frequency equal to the first frequency difference from said first pair of pilot signals;
- (c) transmitting a second pair of pilot signals having a second frequency difference which is n times the baud rate;
- (d) taking out a second signal having a frequency equal to the second frequency difference from said second pair of pilot signals;
- (e) producing a third signal having any one of n possible phases and a frequency equal to the baud rate by frequency-dividing by n said second signal; and
- (f) extracting a timing signal having a phase, out of said n possible phases, closest to said reference phase and a frequency equal to the baud rate from said third signal.

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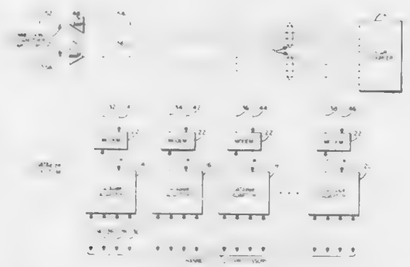


**4,748,617**

## VERY HIGH-SPEED DIGITAL DATA BUS

**Kenneth G. Drewlo, Maple Grove, Minn., assignor to Network Systems Corporation, Minneapolis, Minn.**

**Filed Dec. 20, 1985, Ser. No. 811,750**
**Int. Cl.[4] H04J *3/02*; G02F *1/00***
**U.S. Cl. 370—85** **17 Claims**





1. In a data communications system of the type including a communications medium, a plurality of geographically distributed nodes, modem means operatively coupling said nodes to said medium for permitting any one of said nodes to transmit messages to any other of said nodes in the system, said messages including a header block, a data block and a trailer block, any one of said nodes in said system being a conditionally designated bus reference for the purpose of synchronizing the transmission of said messages, the improvement comprising:

(a) means including said modem means for receiving a single signal bit stream representative of said message, there being a synchronization pattern of bits embedded in said header block defining a timing reference relative to a composite pipe cycle, a pipe cycle being a time interval comprising a plurality of slots, groups of said plurality of slots being assignable to said plurality of nodes;

(b) synchronization pattern detecting means in each of said nodes for detecting said synchronization pattern; and

(c) timing means in each of said nodes coupled to said bit pattern detecting means for establishing a valid time interval within said pipe cycle corresponding to the group of said plurality of slots assigned to a particular one of said plurality of nodes for transmission of said messages onto said medium from said particular node on a non-interfering basis with messages being transmitted over said medium from other of said nodes, said valid time interval (slots) being contiguously transmitted from separate nodes independent of the propagation delay of said communication medium and the transmission rate of said messages.

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**4,748,618**

## TELECOMMUNICATIONS INTERFACE

**Earl F. Brown, Piscataway, and Robert V. Kline, Somerville, both of N.J., assignors to Bell Communications Research, Inc., Livingston, N.J.**

**Filed May 21, 1986, Ser. No. 865,871**
**Int. Cl.[4] H04N *7/14*; H04L *11/20***
**U.S. Cl. 370—94** **13 Claims**

1. A telecommunications interface for receiving asynchronous input data packets at preselected input bit rates and employing preselected input protocols from one or more user sources and for retransmitting the input data at preselected output bit rates and employing preselected output protocols compatible with the requirements of one or more receiving devices,

said telecommunications interface comprising:

a memory for storing data contained in said input data packets,

input means for sequentially receiving said asynchronous input data packets, stripping said packets of protocol information, and sequentially writing said data contained in said input packets into said memory,

an address generator for generating the address in said memory where each of said input data packets is stored,

address storage means for storing in an organized fashion addresses generated by said address generator, and

means for retrieving particular addresses from said address storage means, means for retrieving the data stored in said memory means at said retrieved addresses, and output processors for receiving said retrieved data and for retransmitting said retrieved data at said preselected bit rates and employing said preselected protocols to said receiving devices.

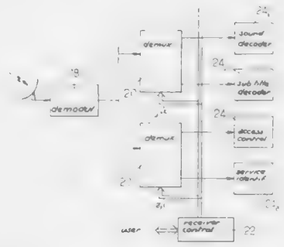
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**4,748,619**

## PACKET DEMULTIPLEXING OF A MAC/PACKET BROADCAST SIGNAL

**Jean-Pierre Vigarie, 32 Rue des Tilleuls, 35510 Cesson Sevigne, and Yves-Francois Dehery, 28 Rue V. Rault, 35000 Rennes, both of France, assignors to Jean-Pierre Vigarie and Yves-Francois Dehery, both of Rennes, France**

**Filed Feb. 20, 1987, Ser. No. 16,767**
**Claims priority, application France, Feb. 20, 1986, 86 02318**
**Int. Cl.[4] H04J *3/24***
**U.S. Cl. 370—94** **7 Claims**



1. A packet demultiplexing device for demultiplexing an incoming signal comprising successive bursts of digital data distributed into packets, each packet consisting of:

useful data, and

a header having a channel number indicating one of a plurality of service components to which said packet is assigned, additional information and a header error protection code, comprising:

circuit means for generating all error-free configurations consisting of a selected one of said channel numbers corresponding to a respective one of said service components and any possible form of said additional information;

encoding means for encoding all of said error-free configurations into all possible theoretical header configurations having said error protection code;



means for computing the Hamming distances between each packet header in said incoming signal and all said possible theoretical header configurations; and

means for directing those packets for which the Hamming distance is not greater than a predetermined value to an output interface; whereby those packets which are assigned to a predetermined service component are extracted and delivered on a respective output by said output interface.

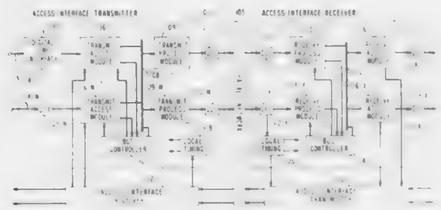
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**4,748,620**

## TIME STAMP AND PACKET VIRTUAL SEQUENCE NUMBERING FOR RECONSTRUCTING INFORMATION SIGNALS FROM PACKETS

**Harry W. Adelmann, Neptune, and James D. Tomcik, Aberdeen, both of N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Feb. 28, 1986, Ser. No. 834,612**
**Int. Cl.[4] H04J *3/24***
**U.S. Cl. 370—94** **27 Claims**



1. Apparatus for transmitting packets, comprising,

means for generating a packet including at least a packet header sequence number field,

means for generating a repeating sequence of numbers,

means for identifying the first packet in an information spurt, and

means for inserting one of the numbers of said sequence of numbers into said packet header sequence number field for a packet being generated and for inserting a distinct number in place of said one of the numbers from said sequence of numbers when the packet being generated is identified as the first packet in the information spurt.

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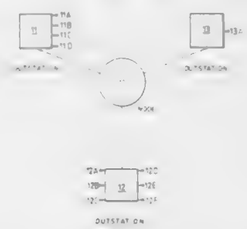
**4,748,621**

## TDMA/TDM INTERFACING

**John W. Ballance, and Steven J. Edwards, both of Ipswich, England, assignors to British Telecommunications public limited company, Great Britain**

**PCT No. PCT/GB86/00116, § 371 Date Oct. 17, 1986, § 102(e) Date Oct. 17, 1986, PCT Pub. No. WO86/05341, PCT Pub. Date Sep. 12, 1986**
**PCT Filed Mar. 4, 1986, Ser. No. 929,326**
**Claims priority, application United Kingdom, Mar. 4, 1985, 8505516**
**Int. Cl.[4] H04B *7/24, 7/185***
**U.S. Cl. 370—95** **16 Claims**

1. A communications system comprising a time division multi-access (TDMA) system having a plurality of outstations and a nodal station, in which the said stations include a first station connected to a first user via a first time division multiplex (TDM) link and a second station connected to a second user via a second TDM link, wherein the users are assigned only certain predetermined defined slots within a TDM frame, the first station includes interface means, said interface means having a first channel map store for containing data identifying the certain predetermined defined slots, and said interface means being arranged to select from received TDM signals data from all of the said slots identified by the contents of the first channel map store and to concatenate that data with TDMA information to produce a TDMA burst, and the second station has interface means, said interface means having a second channel map store and being arranged to extract the data from the received TDMA burst, to generate a TDM



frame structure and to insert the data into respective slots thereof identified by the contents of the second channel map store.

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**4,748,622**

## SATELLITE COMMUNICATION SYSTEM

**Takuro Muratani, Kanagawa; Tatsuo Watanabe; Michihisa Ohkawa, both of Tokyo, and Keiichiro Koga, Saitama, all of Japan, assignors to Kokusai Denshin Denwa Co., Ltd., Tokyo, Japan**

**Filed Jul. 29, 1986, Ser. No. 890,235**
**Claims priority, application Japan, Aug. 28, 1985, 60-187315**
**Int. Cl.[4] H04J *3/06***
**U.S. Cl. 370—100** **3 Claims**



1. A satellite communication system comprising:

a plurality of earth stations, at least one of said plurality of earth stations being an originating earth station and at least one of said plurality of earth stations being a destination earth station;

a relay earth station which transmits at a higher power than each of said earth stations;

a satellite coupled with said plurality of earth stations and said relay earth station through a wireless path;

said originating earth station sending a modulated signal in a digital form to said relay earth station through said satellite,

said relay earth station demodulating a reception signal from said origination earth station, effecting an error correction process, modulating said demodulated reception signal, and sending a modulated signal to said destination earth station through said satellite,

communication among said plurality of earth stations being provided through said relay earth station, said relay earth station multiplexing demodulated signals from said plurality of earth stations, and modulating and sending multiplexed signals to said destination earth stations through said satellite,

each of said plurality of earth stations having a clock derive circuit for deriving a clock signal from a continuous channel of a reception signal from said relay earth station, and transmitting a signal according to said derived clock sig-

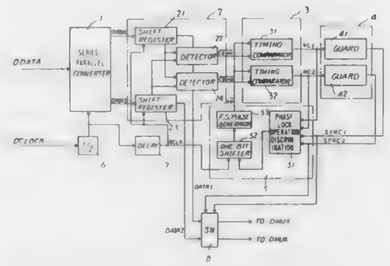
VOL 1090 ISS 5 MY 31 1988 UMI



nal, said relay earth station having a doppler absorption circuit for absorbing doppler error of frequency drift of said reception signal from said plurality of earth stations by synchronizing said reception signal with a fixed reference frequency in the relay earth station, so that the relay earth station sends a signal after absorbing doppler error of said reception signals.

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**4,748,623**
**FRAME SYNCHRONIZING CIRCUIT**
**Naonobu Fujimoto, Yokohama, Japan, assignor to Fujitsu Limited, Kawasaki, Japan**
**Filed Jun. 11, 1987, Ser. No. 60,488**
**Claims priority, application Japan, Jun. 18, 1986, 61-142511**
**Int. Cl.⁴ H04L** *1/02*
**U.S. Cl. 370—100** **7 Claims**

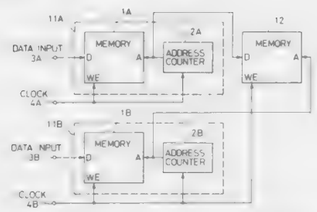



1. A frame synchronizing circuit, comprising:
signal separation means for separating an input signal, having a frame synchronizing pattern periodically inserted therein, into a predetermined number of signal trains;
frame synchronizing pattern detection means for detecting modified frame synchronizing patterns in the signal trains;
frame pulse output means for outputting a frame pulse with a timing corresponding to the period of the frame synchronizing pattern in the input signal;
timing comparison means for producing a noncoincidence signal indicating noncoincidence of the frame pulse and each of the modified frame synchronizing patterns;
synchronization guarding means for discriminating whether the frame pulse is synchronized with one of the modified frame synchronizing patterns; and
timing control means for adjusting the timing of the frame pulse when said timing comparison means detects noncoincidence and said synchronization guarding circuit indicates asynchronization of all of the modified frame synchronizing patterns.

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**4,748,624**
**SYSTEM FOR DETERMINING OCCURRENCE SEQUENCE OF SAMPLED DATA**
**Masayasu Sugimori, and Kenji Terada, both of Tokyo, Japan, assignors to Ando Electric Co., Ltd., Tokyo, Japan**
**Filed Jun. 18, 1986, Ser. No. 875,805**
**Claims priority, application Japan, Jun. 21, 1985, 60-135634**
**Int. Cl.⁴ G06F** *15/20*
**U.S. Cl. 371—15** **4 Claims**

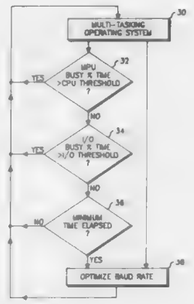
1. In a logic analyzer including first and second sampling channels operative with different clocks, a system for determining the sequence in which sampled data are generated in said channels, comprising:
a first memory having a data input supplied with address data of said first sampling channel, an address input supplied with address data of said second sampling channel and a write signal input supplied with the clock signal of said second sampling channel;




wherein the memory address of said first sampling channel is sampled simultaneously with the data sampling performed by said second sampling channel.

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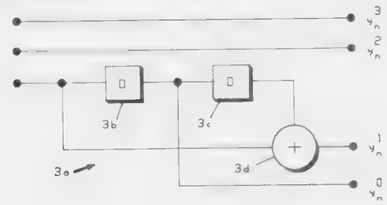
**4,748,625**
**OPTIMUM BAUD RATE TRANSMISSION SYSTEM**
**James J. Krause, Hanover Park; William C. Hepker, Vernon Hills, and Michael L. Singer, Hanover Park, all of Ill., assignors to Motorola, Inc., Schaumburg, Ill.**
**Filed Jul. 28, 1986, Ser. No. 890,052**
**Int. Cl.⁴ G06F** *11/00*
**U.S. Cl. 371—22** **4 Claims**

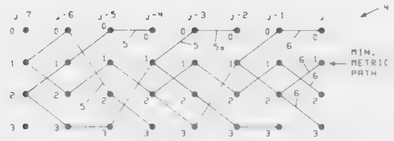



1. In a communication arrangement having a first and a second station which communicate with one another at one of a plurality of transmission rates, and wherein the first station has an MPU running a central program, a method for maintaining communication efficiency between the stations, comprising the steps of:
(a) providing a transmission rate routine which is capable of modifying the communication transmission rate between the stations and which may be called and executed under control by the central program;
(b) determining an idle time parameter of the MPU;
(c) providing a threshold against which the idle time parameter may be compared;
(d) comparing the idle time parameter of the MPU to the threshold; and
(e) executing the transmission rate routine when the idle time parameter is greater than the threshold, thereby periodically and automatically adjusting the transmission rate to maintain efficient communication between the stations.



**4,748,626**
**VITERBI DECODER WITH REDUCED NUMBER OF DATA MOVE OPERATIONS**
**Chin-Pan Wong, Davie, Fla., assignor to Racal Data Communications Inc., Sunrise, Fla.**
**Filed Jan. 28, 1987, Ser. No. 7,860**
**Int. Cl.⁴ G06F** *11/10;* **H04L** *1/00*
**U.S. Cl. 371—30** **22 Claims**




1. In a Viterbi decoder for determining a maximum likelihood path from a plurality of surviving paths through a trellis, said trellis having a plurality of states repeated for each one of a plurality of time units, with the number of said surviving paths being equal to the number of states in said trellis, said Viterbi decoder having means for storing and retrieving said plurality of surviving paths, the improvement in said means for storing and retrieving said plurality of surviving paths comprising:
memory means having a plurality of groups of addressable locations, the number of said groups being equal to the number of said states in said trellis and each one of said groups being associated with a unique one of said states;
said memory means further having each one of said addressable locations of each said group associated with a unique one of said plurality of time units;
means for storing in each said addressable location, associated with one of said states of one of said surviving paths, the previous state of said one of said surviving paths; and
means for retrieval of said maximum likelihood path by repeatedly reading one of said addressable locations associated with said maximum likelihood path to obtain said previous state of said maximum likelihood path and thereby to determine for the previous time unit which of said addressable locations is to be read.

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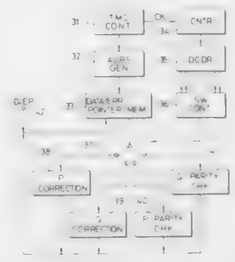
**4,748,627**
**SEMICONDUCTOR MEMORY DEVICE WITH AN ERROR CORRECTION FUNCTION**
**Takashi Ohsawa, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**
**Filed Mar. 19, 1986, Ser. No. 841,436**
**Claims priority, application Japan, Mar. 20, 1985, 60-56515**
**Int. Cl.⁴ G11C** *7/00*
**U.S. Cl. 371—38** **11 Claims**

1. A semiconductor memory device comprising:
a memory cell array;
data read/write means for reading out storage data from said memory cell array in data read, data write, and refresh modes, and rewriting data thereafter;
data output means directly connected to the data read/write means for outputting, to an external circuit, data which is read out by said data read/write means and not subjected to error detection/correction; and
error detection/correction means connected to the data read/write means for causing the readout data from said data read/write means to be subjected to error detection/correction and for supplying the error-corrected data to said data read/write means as rewritten data in the data read and refresh modes.



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**4,748,628**
**METHOD AND APPARATUS FOR CORRECTING ERRORS IN DIGITAL AUDIO SIGNALS**
**Hisayoshi Moriwaki, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan**
**Filed Oct. 22, 1986, Ser. No. 921,529**
**Claims priority, application Japan, Nov. 20, 1986, 61-P260666**
**Int. Cl.⁴ G06F** *11/00*
**U.S. Cl. 371—40** **5 Claims**




1. An apparatus for correcting errors in a received digital data signal including information data, a first parity series based on said information data, a second parity series based on said information data and said first parity series, and a CRC code determined by said information data and said first and second parity series, comprising:
parity check means for checking for errors in data of either said first parity series or said second parity series of said received digital data signal on the basis of error pointers generated by said CRC code included in the received digital data signal;
error correcting means for correcting checked error in the data of either said first parity series or said second parity series data; and
sequence control means coupled to said parity check means and said error correcting means for interposing at least one parity check operation by said parity check means in the midst of a plurality of error correcting operations by said error correcting means.

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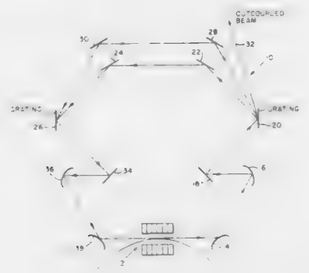


**4,748,629**

## PHASE LOCKED RF LINAC FREE ELECTRON LASER

George R. Edlin; Robert W. Jones, and James F. Perkins, all of Huntsville, Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 10, 1987, Ser. No. 131,476
Int. Cl.[4] H01S *3/00*
U.S. Cl. 372—2 4 Claims



1. A phase locked radio frequency linac free electron laser comprising a wiggler laser arrangement for producing a propogating laser beam in the form of mircopulses, means for expanding the laser beam to enlarge the propagating beam after it emerges from the laser wiggler, means for dividing said expanded laser beam into a major portion, a minor portion and a substantial output portion, first reflector means for reflecting said major portion about a path to recombining means, second reflector means for reflecting said minor portion about a path to said recombining means, said path for reflecting said minor portion being longer than said path for reflecting said major portion to delay said minor portion in time by at least the spacing between adjacent pulses of said micropulses to cause said micropulses to mix and phase lock, and recompressing means for receiving the beam from the recombining means to reduce the beam and then reintroduce the beam into the wiggler laser.

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**4,748,630**

## OPTICAL MEMORY DEVICE COMPRISING A SEMICONDUCTOR LASER HAVING BISTABILITY AND TWO INJECTION CURRENT SOURCES FOR INDIVIDUALLY CONTROLLING THE BISTABILITY

Kunio Nagashima, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jan. 15, 1986, Ser. No. 818,932
Claims priority, application Japan, Jan. 17, 1985, 60-6087; Jun. 28, 1985, 60-142269
Int. Cl.[4] H01S *3/19*
U.S. Cl. 372—8 13 Claims



1. An optical device including a bistable semiconductor laser, said bistable semiconductor laser comprising an active layer (19), first and second separate electrodes (26, 27) each parallel to said active layer, said active layer having first and second ends (21, 22) adjacent to said first and said second electrodes, respectively, first and second adjustable current sources (31, 32) for supplying first and second injection currents (I1, I2) to said active layer through said first and said second electrodes, respectively, and adjusting means for adjusting said first and said second injection currents to make said laser selectively memorize one of first and second optical signals (P1, P2) supplied to said first and said second ends, respectively.

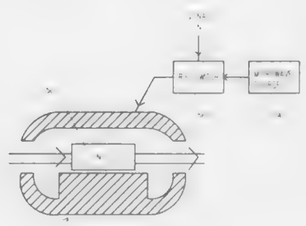
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**4,748,631**

## MODULATED LASER SOURCE FOR OPTICAL STORAGE

Gary C. Bjorklund, Los Altos, Calif., assignor to International Business Machines, Armonk, N.Y.

Filed May 6, 1987, Ser. No. 46,967
Int. Cl.[4] H01S *3/10*
U.S. Cl. 372—21 14 Claims



1. Apparatus for producing a time modulated source of frequency doubled laser radiation comprising:
a stripline electrical circuit;
a non-linear crystal forming part of said stripline electrical circuit;
laser means for producing laser radiation comprising a beam at a fundamental wavelength;
means for mounting said stripline electrical circuit so that said beam at a fundamental wavelength impinges on and propagates through said non-linear crystal;
a high bandwidth electrical signal; and
means for coupling said electrical signal into said stripline electrical circuit to produce an electric field across said non-linear crystal which controls the intensity of an output beam produced at the second harmonic wavelength.

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**4,748,632**

## METHOD AND APPARATUS FOR CONTROLLING LASERS

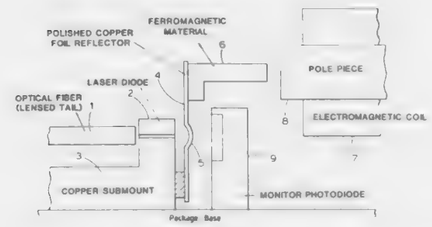
Keith R. Preston, Woodbridge, England, assignor to British Telecommunications plc, Great Britain

Filed Nov. 3, 1983, Ser. No. 548,480
Claims priority, application United Kingdom, Nov. 5, 1982, 8231608
Int. Cl.[4] H01S *3/13*
U.S. Cl. 372—32 18 Claims

1. A method of maintaining a semiconductor laser in single longitudinal mode operation, the laser having an external cavity defined by an external reflector, and the method comprising:
sensing the radiation output power of the semiconductor laser,
producing an electrical monitor signal representative of the magnitude of said sensed output power,
processing said monitor signal to provide a control signal representing deviation of said output power from a maximum value, and



utilizing said control signal to effect controlled adjustments of the optical path length of the external cavity to maintain the radiation output power of the semiconductor laser at a maximum.



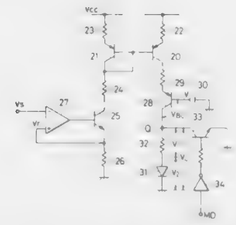

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**4,748,633**

## SEMICONDUCTOR LASER DRIVE CIRCUIT IN LASER BEAM PRINTER

Kiyoshi Negishi, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 11, 1987, Ser. No. 48,204
Claims priority, application Japan, May 9, 1986, 61-68777[U]; May 9, 1986, 61-68778[U]
Int. Cl.[4] H01S *3/00*
U.S. Cl. 372—38 9 Claims



1. A semiconductor laser drive circuit, comprising:
a semiconductor laser modulated in response to a moduiated drive current;
a first constant current circuit means for providing a constant drive current along a constant current path;
means for modulating said constant drive current to obtain said modulated drive current; and
buffer circuit means provided in said constant current path for isolating said current source from said voltage variations at said laser.

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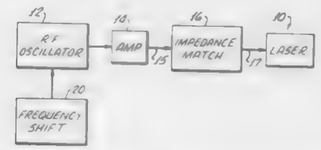
**4,748,634**

## PUMPING SYSTEM FOR RF EXCITED GAS DEVICES

John W. Hesterman, Fallbrook, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Mar. 20, 1987, Ser. No. 28,526
Int. Cl.[4] H01S *3/097*
U.S. Cl. 372—82 16 Claims

7. A starting system for an RF excited gas laser having a resonant frequency comprising:
power source means for generating an RF laser pumping signal having a frequency displaced from said resonant frequency,
means for applying said pumping signal to a laser to be started, and
means for momentarily shifting the frequency of said pumping signal toward said resonant frequency, thereby increasing the voltage applied to said laser and igniting discharge thereof.



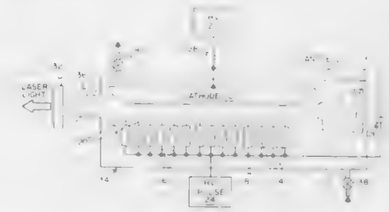

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**4,748,635**

## APPARATUS AND METHOD FOR UNIFORM IONIZATION OF HIGH PRESSURE GASEOUS MEDIA

Edward J. McLellan, 422 Connie Ave., Los Alamos, N. Mex. 87544

Filed Mar. 5, 1986, Ser. No. 836,251
Int. Cl.[4] H01S *3/097*
U.S. Cl. 372—87 12 Claims



1. An apparatus for uniformly ionizing a high pressure gaseous medium and substantially uniformly depositing a substantial energy therein, which apparatus comprises in combination:
a. a pair of rectangular electrodes including a metal cathode and a wire screen anode, said anode being spaced apart from, approximately coextensive with, and disposed in a substantially parallel manner to said cathode and forming a first volume therebetween enclosed on two sides by said pair of rectangular electrodes into which the gaseous medium can freely travel;
b. a close-packed array of high impedence elements disposed in a planar configuration, said array being spaced apart from, approximately coextensive with, and located in a substantially parallel manner to said anode on the opposite side thereof from said cathode and with said anode forming a second volume therebetween into which the gaseous medium can freely travel, said second volume being enclosed on two sides by said anode and said array, each of said impedance elements in said array thereof including a first electrical lead and a second electrical lead, all of said first electrical leads being unconnected, approximately of equal length and disposed in a manner substantially perpendicular to said planar configuration and pointing toward and spaced apart from said anode, and all of said second leads being brought into electrical contact forming an electrical bus thereby, said bus being disposed on said array in a direction away from said anode;
c. means for producing a low-energy, high voltage pulse between said bus and said anode, thereby forming a first electric discharge in the gaseous medium present in said second volume, said first electric discharge producing a uniform ionization of the gaseous medium in the second volume which extends into said first volume through said wire screen anode in a manner sufficient to produce substantial uniform ionization of the gaseous medium therein;
d. means for producing a second low-energy, high voltage pulse between said cathode and said anode forming

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thereby a second electric discharge in the gaseous medium present in said first volume generating thereby additional uniform ionization in the first volume on a timescale which is rapid compared to that for depositing large amounts of electrical energy in the gaseous medium in said first volume, thereby forming substantial additional substantial uniform ionization in the gaseous medium present in said first volume, said second electric discharge commencing substantially immediately after said substantial uniform ionization in said second volume of the gaseous medium therein by said first electric discharge, said second electric discharge being initiated and controlled by said substantial uniform ionization in said second volume of the gaseous medium therein by said first discharge; and

e. means for producing a high dc potential difference between said pair of electrodes, said potential difference being below the breakdown limit of the gaseous medium in said first volume before said second electric discharge causes said substantial increase in said substantial uniform ionization therein, said potential difference producing means being capable of delivering substantial energy to a third electric discharge, said third electric discharge occurring between said pair of electrodes and being initiated and controlled solely by said substantial increase in said substantial uniform ionization of the gaseous medium in said first volume, said third electric discharge depositing substantial energy in the gaseous medium.

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**4,748,636**

## METHOD AND APPARATUS OF TRANSMITTING IMAGE DATA IN A SATELLITE SYSTEM

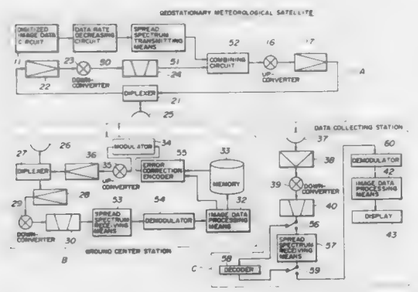
**Hironori Kato, Tokyo, Japan, assignor to NEC Corporation, Japan**

**Filed Apr. 21, 1987, Ser. No. 40,884**

**Claims priority, application Japan, Apr. 28, 1986, 61-99253; May 14, 1986, 61-110251**

**Int. Cl.[4] H04L** *27/30*

**U.S. Cl. 375—1** **6 Claims**




1. A method of transmitting image data in a satellite system comprising,

the first step of transmitting image data signals of a predetermined data rate produced by observations in a satellite and processed image data signals obtained in accordance with the processing of said image data signal in a ground center station simultaneously from said satellite to the ground, said first step comprising decreasing said predetermined data rate of said image data signals down to another predetermined data rate, spreading a spectrum of said image data signals of a decreased data rate, receiving said processed image data signals from said ground center station, combining spread spectrum image data signals of said decreased data rate and said processed image data signals, and radiating said image data signals to be processed and said processed image data signals thus combined,

the second step of receiving said image data signals to be processed which are transmitted from said satellite at said groud center station and transmitting said processed image data signals back to said satellite, said second step comprising reproducing said image data signals of said decreased data rate in accordance with spread spectrum image data signals, producing said processed image data signals in accordance with reproduced image data signals, and encoding said processed image data signals with error correction code to be transmitted back to said satellite, and

the third step of receiving said processed image data signals from said satellite at one of ground data collecting stations, said third step comprising decoding said processed image data signals which are encoded with said error correction code, and outputting image data to be utilized for display etc. in accordance with the further processing of said processed image data signals thus decoded.

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**4,748,637**

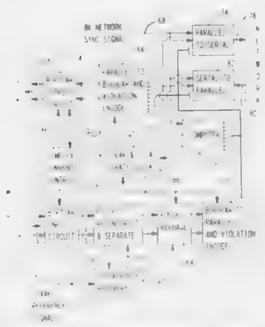
## DIGITAL SUBSCRIBER LOOP TERMINATION DEVICE

**Larry D. Bishop, Norcross, and Larry A. Jackson, Roswell, both of Ga., assignors to Conklin Instrument Corporation, Pleasant Valley, N.Y.**

**Filed Nov. 29, 1985, Ser. No. 802,828**

**Int. Cl.[4] H04B** *1/38;* **H04L** *5/16*

**U.S. Cl. 375—7** **12 Claims**



1. A digital subscriber loop termination device comprising

network input means for receiving a network sync pulse and N serial input bits of network data at a network bit rate $F_N$ and for converting the N serial input bits into a network input parallel word in synchronism with the network sync pulse;

customer input means for receiving C serial input bits of bipolar customer data at a customer bit rate $F_C$ and for converting the C serial input bits into a customer input parallel word;

means for generating a customer data sync pulse in synchronism with the customer input means receiving the C serial input bits;

network output means for generating N serial output bits of binary network data at the network bit rate $F_N$ from a network output parallel word in synchronism with the network sync pulse;

customer output means for generating C serial output bits of bipolar customer data at the customer bit rate $F_C$ from a customer output parallel data word in synchronism with the customer sync pulse; and

computer means responsive to the network sync pulse and connected to both of the input means and to both of the output means for (a) reading the customer input parallel word from the customer input means, (b) reading the network input parallel word from the network input means, (c) passing the network input parallel word as a customer output parallel word to the customer output means, and (d) passing the last read customer input parallel word as a network output parallel word to the network output means, wherein (a), (b) and (c) are in synchronism with the customer data sync pulse.



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**4,748,638**

## DATA TELECOMMUNICATIONS SYSTEM AND METHOD FOR TRANSMITTING COMPRESSED DATA

**Paul Friedman, Westwood, and Nathan Melhorn, Framingham, both of Mass., assignors to Microcom, Inc., Norwood, Mass.**

**Filed Oct. 30, 1985, Ser. No. 793,581**

**Int. Cl.[4] H04L** *23/00;* **H04B** *1/66*

**U.S. Cl. 375—8** **6 Claims**



1. A method of transmitting data in a compressed form between an initiating unit of data terminal equipment and a receiving unit of data terminal equipment connected over communication lines, one of said units having a compressing modem connected between said unit and telephone lines, and the other of said units having a decompressing modem connected between said other unit and telephone lines, said method comprising the steps of:

(a) fetching a next data character from a data stream to be sent over communication lines;

(b) transmitting a compressed character code assigned to said next data character to the decompressing modem, said compression code having a length indicating header part and a data part;

(c) incrementing a relative frequency counter for said next data character;

(d) comparing said relative frequency counter for said next data character to a relative frequency counter of a next more frequently occurring character;

(e) if the relative frequency of said next data character is greater than the relative frequency of said next more frequently occurring character, exchanging the compressed character codes assigned to said next data character and to said next more frequently occurring character;

(f) repeating steps (d) through (e) until the relative frequency of said next data character is less than the relative frequency of said next more frequently occurring character or it is the most frequent character;

(g) repeating steps (a) through (f) until said data stream is transmitted.

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**4,748,639**

## REVERSIBLE ENERGY SPREADING DATA TRANSMISSION TECHNIQUE

**John C. Feggeler, Holmdel, N.J., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.**

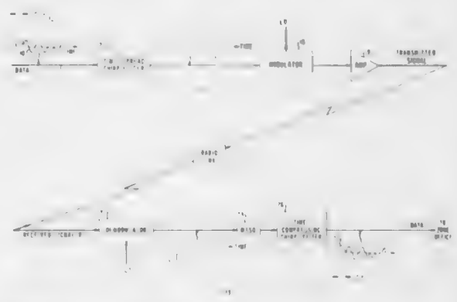
**Filed Apr. 25, 1985, Ser. No. 727,110**

**Int. Cl.[4] H04B** *1/62, 15/00*

**U.S. Cl. 375—58** **4 Claims**

2. A method for processing data bit signals occurring at a predetermined rate for transmission in a fast fading medium in which fade s are longer than a data bit time interval and the method comprising the steps of

predistorting said data bit signals before application to said meidum to transform said data bit signals into signals having a time-bandwidth product substantially greater than unity and essentially a constant magnitude inversely proportional to the square root of the substantially greater than unity time bandwidth product at said predetermined rate, applying said transformed signals to said medium, receiving said transformed signals from said medium, and



equalizing the transformed signals received from said medium to remove at least a predetermined portion of said predistortion.

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**4,748,640**

## DIGITAL CIRCUIT WITH BAND LIMITING CHARACTERISTICS FOR MODEM

**Peter Staley, Kings Park, N.Y., and David Coyne, Glenrothes, Scotland, assignors to General Instrument Corp., New York, N.Y.**

**Filed Feb. 21, 1986, Ser. No. 831,565**

**Int. Cl.[4] H03B** *28/00;* **H03K** *7/06;* **H04L** *27/10*

**U.S. Cl. 375—65** **10 Claims**



10. Apparatus for band limiting FSK or PSK input signals comprising means for detecting each transition in the input signal and for generating a control signal coincident therewith, means for generating timing signals, means for counting said timing signals, said counting means counting in different directions between first and second preselected values in accordance with said control signals, storage means containing information relating to possible divisors, said storage means being operatively connected to be addressed by the output of said counting means and to generate a divisor in accordance therewith, means for generating a reference frequency, divider means operatively connected to said storage means to receive said divisor and divide said reference frequency thereby, said divisor comprising first and second words, said divider means comprising means programmable to divide said reference frequency by each of said first and second words and to take the average thereof, said divider means comprising a loadable psuedo random counter, a counter control circuit connected to said pseudo random counter and overflow rate multiplier means operably connected to said counter control circuit.

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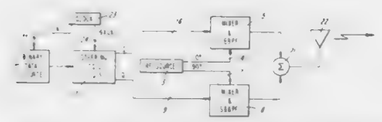


**4,748,641**

## SUPPRESSED CARRIER MODULATION METHOD

**Mark J. Dapper, Cincinnati, Ohio, assignor to Cincinnati Electronics Corporation, Cincinnati, Ohio**

**Filed Jul. 3, 1985, Ser. No. 751,584**
**Int. Cl.[4] H04L** *27/20*
**U.S. Cl. 375—67** **32 Claims**



1. A method of transmitting binary coded data between an earth-bound station and a satellite station by a signalling process having a power spectral density that is well contained in a predetermined bandwidth to minimize interference with adjacent channels comprising phase modulating a carrier with the binary coded data to produce a suppressed carrier constant amplitude wave, the carrier being phase modulated by shaping modulation for the carrier so the carrier phase changes gradually relative to the phase of a reference wave at the carrier frequency, the phase change being between predetermined values in response to each transition in the values of the binary coded data and the carrier phase changing by equal and opposite amounts relative to the phase of the reference wave in response to a predetermined number of plural transitions in the values of sequential bits of the binary coded data, and launching the phase modulated carrier from one of the stations toward the other station.

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**4,748,642**

## DOUBLE DETECTION VIDEO PROCESSING APPARATUS

**George J. Bertsche, Woodburn, Ind., assignor to ITT Aerospace Optical, Fort Wayne, Ind.**

**Filed Sep. 17, 1986, Ser. No. 908,484**
**Int. Cl.[4] H04L** *27/06*
**U.S. Cl. 375—94** **20 Claims**



1. In a double detection receiver apparatus of the type capable of detecting and demodulating a pulsed radio frequency signal and having a first wideband channel and a second narrow band channel with corresponding detectors in each channel for providing a pulse output and an subtractor circuit for responding to said pulse outputs for providing a difference pulse, in combination therewith apparatus for improving the performance of said receiver comprising:

frequency comparator means responsive to said difference pulse and operative to provide an output signal when said pulse is within an acceptable frequency range,

signal strength comparator means responsive to said pulse output in said wideband channel to provide an output signal indicative of an acceptable RF input signal level,

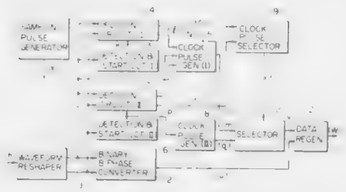
means responsive to said frequency comparator output signal and said signal strength comparator output signal to provide a pulse presence output signal only during the presence of both said frequency comparator and said signal strength comparator output signals.

**4,748,643**

## START BIT DETECTING CIRCUIT

**Kaoru Setoguchi, Chofu; Hiroki Hosoi, Tokyo; Teruyuki Kubo, and Masaji Muranaka, both of Yokohama, all of Japan, assignors to Iwatsu Electric Co., Ltd., Tokyo, Japan**

**Filed Mar. 13, 1987, Ser. No. 25,474**
**Claims priority, application Japan, Mar. 19, 1986, 61-59583**
**Int. Cl.[4] H04L** *25/38*
**U.S. Cl. 375—117** **1 Claim**



1. In a receiving circuit for a digital signal of three-values bidirectional-current, start-stop synchronization having a zero-level at the non-existence of a signal and a (+) side level and a (−) side level at the existence of a signal, a start bit detecting circuit comprising:

a waveform reshaper for converting a received waveform from a transmission line into a binary signal of a (+) side received signal and a (−) side received signal respectively by shaping it with two (+) side and (−) side threshold values for differentiating the non-existence of a signal and the (+) side received signal from the non-existence of a signal and the (−) side received signal;

a detection and start circuit for monitoring the pulse width of the (+) side or (−) side received signal and generating a detection start signal upon detection of a pulse width greater than a predetermined value;

a decision circuit whereby while the detection start signal is generated, the (+) side and (−) side received signals are monitored at a plurality of decision points, when the received signals differ from a predetermined pattern at two or more decision points, a detection stop pulse is applied to the detection start circuit to stop the detection start signal, and when the received signals coincide with the predetermined pattern at two or more decision points, a pattern information signal representing coincidence or noncoincidence at each decision point of the pattern are output together with a coincidence signal;

a plurality of clock pulse generators which detect the rise of the (+) side or (−) side received signal at two or more decision points and generate clock pulses on the basis of each decision point; and

a clock pulse selector for selecting one of the plurality of clock pulse generators in accordance with the coincidence signal and the pattern information.

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**4,748,644**

## METHOD AND APPARATUS FOR A CONSTANT FREQUENCY CLOCK SOURCE IN PHASE WITH A VARIABLE FREQUENCY SYSTEM CLOCK

**Robert T. Silver, Marlborough, Mass., and William A. Samaras, Seabrook, N.H., assignors to Digital Equipment Corporation, Maynard, Mass.**

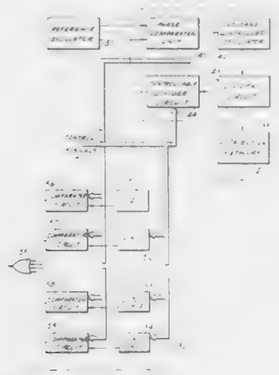
**Filed Jan. 29, 1986, Ser. No. 823,729**
**Int. Cl.[4] H03D** *3/24;* **H04L** *23/00*
**U.S. Cl. 375—120** **18 Claims**

1. Timing apparatus for use in a data processing unit comprising:

a reference oscillator;

clock means including a phase locked loop circuit and responsive to said reference oscillator for providing system clock signals having a controllable frequency; and

constant frequency means coupled to said clock means for providing constant frequency signals that are in phase with said clock signals;



wherein said system clock signals are provided to the data processing unit through distribution networks, one of said distribution networks being coupled in said phase locked loop.

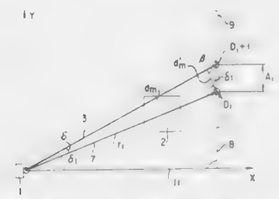
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**4,748,645**

## DEVICE FOR PRODUCING X-RAY PICTURES OF BODIES

**Gerhard Dönges, Am Markt 1, Kemel 1, Fed. Rep. of Germany 6209, and Cornelius Koch, Leberberg 20, Wiesbaden, Fed. Rep. of Germany 6200**

**PCT No. PCT/EP83/00213, § 371 Date Apr. 2, 1984, § 102(e) Date Apr. 2, 1984**
**PCT Filed Aug. 10, 1983, Ser. No. 598,294**
**Claims priority, application Fed. Rep. of Germany, Aug. 11, 1982, 3229914**
**Int. Cl.[4] A61B** *6/00;* **H05G** *1/64*
**U.S. Cl. 378—19** **4 Claims**



1. Device for producing X-ray pictures of bodies, comprising a test channel in which the bodies can be moved; an X-ray generator disposed in the channel; a linear detector array disposed at a side of the bodies facing away from the X-ray generator for measuring the intensity of the oncoming x-radiation, a device connected to said linear detection array for generating a picture composed of individual picture elements from measured values of the X-ray intensity fed thereto from the linear detection array, every picture element of the picture being adjusted in brightness in accordance with a respective measured value of the linear detector array, at least one measuring point at which a respective measured value is determined being spaced a distance from the X-ray generator which is different from that of others of said measuring points located adjacent said one measuring point in said detector array; each of said picture elements being spaced equally relative to the respective adjacent picture elements of the picture; and mutual spacings between two adjacent measuring points in the detector array being proportional to the product of the distance between one of said measuring points and the X-ray generator and the reciprocal value of the cosine of an angle between the incident X-ray and a perpendicular from the X-ray generator to a straight connecting line through the two adjacent measuring points.

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**4,748,646**

## X-RAY LITHOGRAPHY SYSTEM

**Toshihiko Osada, Ebina; Ichiro Honjo, Ibaraki, and Kenji Sugishima, Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

**Filed Mar. 18, 1987, Ser. No. 27,553**
**Claims priority, application Japan, Mar. 18, 1986, 61-58055**
**Int. Cl.[4] G21K** *5/00, 5/10*
**U.S. Cl. 378—34** **4 Claims**



1. An X-ray lithography system comprising:

means for generating synchrotron beams and separating an X-ray beam thereform

a vacuum chamber for defining a passage of the X-ray beam;

a scanning mirror arranged in one section of said vacuum chamber for reflecting the X-ray beam;

means for oscillating said scanning mirror so as to scan the reflected X-ray beam in a vertical direction;

a beryllium window defined as a part of said vacuum chamber, through which the X-ray beam is irradiated into an exposure chamber in which is arranged a work piece to be exposed to the X-ray radiation; and,

means for vertically oscillating said beryllium window in such a manner that the beryllium window is shifted up and down in synchronization with the scanning operation of the X-ray beam.

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**4,748,647**

## FUEL TUBE BARRIER GAUGE

**Bruce J. Kaiser, Cincinnati, Ohio; Fred C. Schoenig, Jr., and Alfred J. Zeits, both of Wilmington, N.C., assignors to General Electric Company, San Jose, Calif.**

**Filed Aug. 12, 1985, Ser. No. 764,455**
**Int. Cl.[4] G01B** *15/02*
**U.S. Cl. 378—50** **8 Claims**

1. Apparatus for measuring the thickness of a barrier layer on the inside surface of a cylindrical tube having a tube axis and a bore diameter less than approximately 0.5 inches, said tube comprising a material capable of x-ray fluorescence;

said apparatus comprising:

a source of gamma radiation in said tube having its own axis aligned with said tube axis, said source being positioned in said tube so as to directly irradiate a predetermined coaxial band of said tube material with gamma radiation;

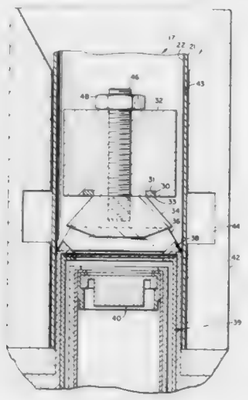
means aligned with said tube axis and axially spaced from said source for detecting the energy and intensity of x-ray fluorescence emitted by said band upon excitation by said gamma radiation from said source; and

a supporting base coaxially positioned in said tube and axially interposed between said source and said detecting means, said base being shaped to shield said detecting means from direct gamma radiation from said source and

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from x-rays traveling through said barrier layer which emanate outside said predetermined coaxial band;



whereby the thickness of said barrier layer in said tube band is determined from the energy and the intensity of the x-rays sensed by said detecting means.

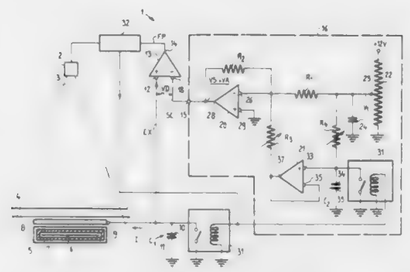
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**4,748,648**

**METHOD FOR AUTOMATIC DETERMINATION OF EXPOSURE OF A RADIOGRAPHIC FILM AND AN AUTOMATIC FILM-EXPOSING DEVICE FOR A DIAGNOSTIC RADIOLOGY INSTALLATION IN WHICH SAID METHOD IS EMPLOYED**

**Jean Boucle, Meudon, and Jacques Delair, Bois D'Arcy, both of France, assignors to Thomson-CGR, Paris, France**

**Filed Jul. 1, 1986, Ser. No. 880,741**
**Claims priority, application France, Jul. 1, 1985, 85 10201**
**Int. Cl.[4] H05G *1/42***
**U.S. Cl. 378—97** **16 Claims**



9. An automatic film-exposing device for a diagnostic radiology installation in which a radiographic film and an intensifying screen form a screen-film pair which is exposed to x-radiation during a period of exposure T, wherein said film-exposing device comprises:

a detector which is sensitive to x-rays and delivers a current proportional to the dose rate at the level of said screen-film pair;

an integrator which has the function of integrating said current with respect to time from the initial instant of said period of exposure T and delivering an exposure signal having absolute value which increases with time and represents the exposure of said screen-film pair;

means for generating a reference signal

a comparator having the function of comparing the magnitude of said exposure signal with the sum of the magnitude of a reference signal and the magnitude of said additional signal, wherein said film-exposing device is further provided with means so that an additional signal is generated from the initial instant of said period of exposure T at a magnitude which varies as a function of time, an end-of-exposure signal being delivered by said comaprator when the values of the magnitude of said exposure signal and the sum of the magnitudes of said reference signal and said additional signal are substantially equal.

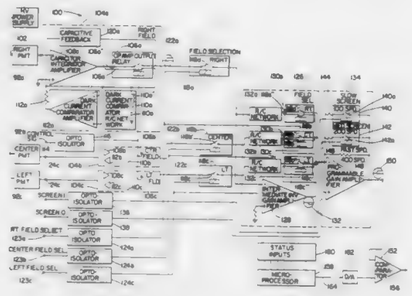
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**4,748,649**

**PHOTOTIMING CONTROL METHOD AND APPARATUS**

**Jerome J. Griesmer, Kirtland, and Hugh T. Morgan, Highland Heights, both of Ohio, assignors to Picker International, Inc., Cleveland, Ohio**

**Filed Aug. 4, 1986, Ser. No. 893,574**
**Int. Cl.[4] H05G *1/42***
**U.S. Cl. 378—97** **13 Claims**



8. Automatic exposure control means for use with a diagnostic imaging system comprising a penetrative radiation source for projecting a beam of radiation along a path, power supply means for energizing the radiation source including means for selecting the kilovoltage to be applied to the radiation source during energization, a radiation detector interposed in the beam path including a film and intensifying screen combination, said automatic exposure control means comprising;

(a) a phototiming paddle means at least partially interposed in the beam path between the source and the radiation detector, said paddle means comprising a plurality of electrical signal generating means for generating separate electrical signals in response to radiation incident on selected areas of said radiation detector, said electrical signal generating means also producing a leakage current in the absence or presence of incident radiation;

(b) offset means for correcting said electrical signals for leakage currents produced by said electrical signal generating means to produce corrected electrical signals;

(c) integrator means for separately integrating each of said corrected electrical signals during an exposure to produce first ramp signals;

(d) signal select means coupled to the integrator means for selecting at least one of said first ramp signals;

(e) mixing means coupled to the signal select means for combining said selected first ramp signals to form a mixed signal and for dividing said mixed signal by a factor proportional to the number of said first ramp signals selected to form a second ramp signal;

(f) gain select means coupled to the mixing means for varying the gain of the second ramp signal by a factor corresponding to the speed of different film and intensifying screen combinations to produce a third ramp signal;

(g) reference level generator means for producing a reference signal; and

(h) comparator means for comparing said reference signal with said third ramp signal and for producing a termination signal effective to terminate the energization of said radiation source.



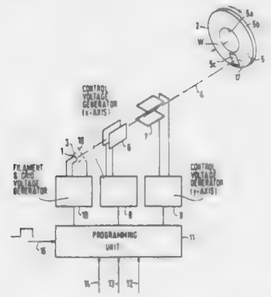
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**4,748,650**

**X-RAY DIAGNOSTIC INSTALLATION COMPRISING AN X-RAY TUBE**

**Ernst Ammann, Bubenreuth, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Continuation of Ser. No. 682,329, Dec. 17, 1984. This application Dec. 30, 1986, Ser. No. 948,423**
**Claims priority, application Fed. Rep. of Germany, Jan. 19, 1984, 3401749**
**Int. Cl.[4] H01J *35/14***
**U.S. Cl. 378—137** **9 Claims**



1. A method of effecting an x-ray exposure in an x-ray diagnostic system comprising a cathode for supplying an electron beam, and anode having a surface on which said electron beam is incident, and a deflection system for deflecting the electron beam said method comprising:

focussing said electron beam to a point,

directing the focussed electron beam to impinge on a focal region of the anode which is smaller in comparison to said anode surface to produce x-ray emission therefrom at the start of an x-ray exposure,

rotating the anode to move successive sectors of the anode surface into said focus region for distributing thermal loading of said electron beam on said anode, and

during the x-ray exposure controlling said deflection system to move said focussed electron beam along a path within the focal region to produce a resultant pulse of x-ray energy during said x-ray exposure.

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**4,748,651**

**MULTILINE TRANSMISSION LINE TEST RECEPTACLE WITH PROVISION FOR TESTING EACH LINE**

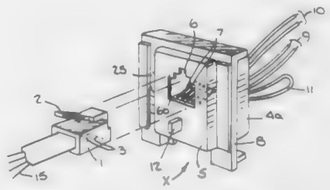
**Thomas J. Collins, Wall; Anthony L. Nieves, Bradley Beach, and Thomas G. Graham, Ocean, all of N.J., assignors to Keptel, Inc., Tinton Falls, N.J.**

**Filed Jun. 12, 1987, Ser. No. 62,089**
**Int. Cl.[4] H04B *3/46;* H04M *1/24***
**U.S. Cl. 379—22** **15 Claims**

1. A multiline test receptacle comprising:

receptacle means defining a cavity for receiving a plug means, said receptacle means having a plurality of contact means positioned within the cavity adapted to be connected to a plurality of transmission lines; and

movable means defining an opening disposed over said receptacle means, said movable means being positionable in at least two positions so that said opening is disposed in at least two different alignments with said cavity, whereby engagement of selected ones of the contact means of the receptacle means with selected ones of contact means of the plug means upon insertion of the plug means through the opening of the movable means and into the cavity of the receptacle means is provided in said at least two positions, thereby allowing testing of a first of said transmission lines in a first position of said movable means and



testing of a second of said transmission lines in a second position of said movable means.

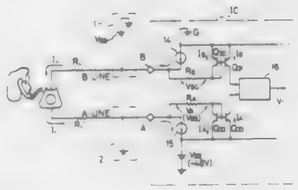
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**4,748,652**

**CIRCUIT FOR DETECTING ABNORMALITY IN FEEDER**

**Yasuo Nagai, Maebashi, and Kazuhiko Kawai, Takasaki, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jan. 22, 1987, Ser. No. 5,953**
**Claims priority, application Japan, Jan. 22, 1986, 61-10083**
**Int. Cl.[4] H04M *1/24, 3/08***
**U.S. Cl. 379—26** **14 Claims**



1. A detecting circuit for detecting short-circuit and ground line conditions in a pair of feeders to be coupled to a telephone set, comprising:

(1) first means for converting a voltage of one feeder of said pair of feeders into a first signal in response to a ground line condition of said one feeder; and

(2) second means for converting a voltage of the other feeder of said pair of feeders into a second signal in response to a short-circuit condition of said other feeder.

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**4,748,653**

**TOLL FRAUD CONTROL OVERRIDE**

**Howard A. Kerr, West Chicago, Ill., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Aug. 29, 1986, Ser. No. 901,960**
**Int. Cl.[4] H04N *1/66***
**U.S. Cl. 379—32** **18 Claims**

1. In a switching system responsive to a receipt of a call for establishing call connections between a calling and a called line, apparatus comprising:

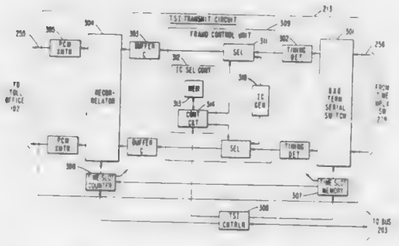
means responsive to the establishment of said call connections for disabling communications over one of said call connections until a receipt of answer supervision for said call, and

means responsive to an absence of said answer supervision

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and an actual answer of said call concurrently persisting during the absence of said answer supervision for removing the disabling of said communications over said one of said call connections.



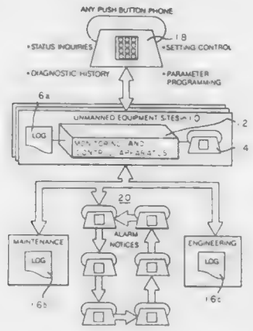
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**4,748,654**

## REMOTE SUPERVISORY MONITORING AND CONTROL SYSTEM

**William Gray, 1212 Ingleside Ave., McLean, Va. 22101**

**Filed Apr. 21, 1986, Ser. No. 853,893**
**Int. Cl.[4] H04M *11/00***
**U.S. Cl. 379—40** **4 Claims**




**1**. Apparatus which monitors and controls equipment at a remote site, said apparatus comprising::

monitorinq means for sensing conditions at a plurality of monitored points in equipment at a remote site and for producing data signals representing the sensed conditions;

programmable microprocessor means for controlling the operations of said apparatus in an operator-controlled mode and in an automatic mode, for receiving and storing data signals of said monitoring means, for producing alarm signals representing alarm conditions when the data signals of said monitoring means reach predetermimed values, and having output ports connected to circuits for controlling output parameters and carrying out equipment control functions to correct the alarm conditions;

transmitting means coupled to a public telephone net-work for producing and transmitting thereover a predetermined sequence of dual tone multi-frequency (DTMF) signals responsive to receipt of an alarm signal from said microprocessor means;

voice synthesizer means operable responsive to the alarm signal and an off hook condition of a telephone connected to the public telephone network for producing and transmitting over the telephone network an oral announcement of an alarm condition corresponding with an alarm signal;

receiving means for receiving DTMF signals produced by an operator of the off hook telephone, said apparatus having multiple privilege levels including an operator privilege level established when DTMF siqnals coupled though said receiving means are in the form of a prescribed operator privilege code and a programmer privilege level established when DMTF signals coupled through said receiving means are in the form of a prescribed programmer privilege code, and said apparatus having a different response to received DTMF siqnals depending on which privilege level is established in the apparatus;

said microprocessor means includinq means for communicating data signals and alarm signals to said voice synthesizer means, said voice synthesizer means, responsive thereto, producing and transmittinq over the public telephone network to an operator of the off hook telephone an oral announcement of the sensed equipment conditions including status reports of predetermined sensors and alarm conditions;

said microprocessor means including means, operable when said apparatus is in the operator-controlled mode and after the operator privilege level has been established, for receivinq subsequently transmitted DTMF signals representing desired states of said output ports of said microprocessor means and circuits connected thereto, and for setting said output ports of said microprocessor means and circuits connected thereto in the desired states to control output parameters and carry out equipment control functions in accordance with the contents of the subsequently transmitted DTMF signals;

programmable memory means in said microprocessor means for storing instructions and parameters for operation of said microprocessor means in both the operator-controlled mode and the automatic mode,

instructions stored in said memory means comprising programs used by said microprocessor means in both the operator-controlled mode and the automatic mode to monitor the status of equipment at the site, to detect alarm conditions based upon a comparison of the data signals produced by said monitoring means with the predetermined values, the predetermined values comprising input parameters stored in said memory means, and to generate alarm signals if the comparison detects alarm conditions;

instructions stored in said memory means also comprising programs used by said microprocessor means in the operator-controlled mode to set said output ports to control output parameters and carry out equipment control functions responsive to DTMF signals produced by the operator of the off hook telephone;

instructions in said memory means also comprising programs used by said microprocessor means in the automatic mode without operator intervention to set said output ports to control output parameters and carry out equipment control functions responsive to an alarm condition;

said microprocessor means including means operable after a programmer privilege level is established in said apparatus, for receiving subsequently transmitted DTMF signals to set said apparatus in either the automatic or operator-controlled modes and, when representing modifications to or changes in instructions and input and output parameters including privilege level codes, to reprogram said memory means in accordance with the contents of the last-mentioned subsequently transmitted DTMF signals.

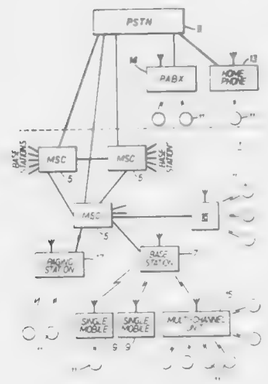


**4,748,655**

## PORTABLE TELEPHONES

**Keith R. Thrower; Peter J. Munday, and Trevor M. Gill, all of Reading, England, assignors to Racal Research Limited, Berkshire, England**

**Filed Jul. 24, 1985, Ser. No. 758,359**
**Claims priority, application United Kingdom, Jul. 25, 1984, 8419003**
**Int. Cl.[4] H04Q *7/04***
**U.S. Cl. 379—60** **13 Claims**



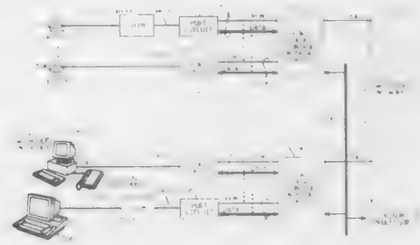

**1**. A communications system for use in conjunction with an existing cellular radio telecommunications network, having a network control, and a plurality of base stations each servicing a cell, said system including a plurality of gateway devices, each gateway device including a transmitter, a receiver, a memory, and control means operatively connected to said transmitter, receiver and memory to provide two way radio communication with said network control via a base station, and a plurality of portable telephones, each having a memory for an identification number and a transmitter and a receiver operative when said portable telephone is in an "on" state to provide two way radio communication on a plurality of fixed channels at low power with said transmitter and receiver of any said gateway device within range, and through said device to a said base station of the cell within which said gateway device is located, each said portable telephone when in said "on" state and in the vicinity of a said gateway device being operative to transmit its identification number from its memory to said gateway device, said control means of said gateway device being operative to store said identification number in said memory of said gateway device, and to transmit said identification number to said network control via a said base station, said control means of the gateway device thereafter being operative as a control for the portable telephone for setting up and handling off calls for the portable telephone, all communications between the portable telephone and the gateway device while the portable telephone is in an "on" state being carried out on a single fixed channel of said plurality of channels, said portable telephone and gateway device only being operable together as a conventional terminal of said existing cellular radio telecommunications network.

**4,748,656**

## PERSONAL COMPUTER—AS AN INTERFACE BETWEEN A TELEPHONE STATION SET AND A BUSINESS COMMUNICATION SYSTEM

**David C. Gibbs, Broomfield, and Norman W. Petty, Boulder, both of Colo., assignors to American Telephone and Telegraph Company and AT&T Information Systems Inc., both of Holmdel, N.J.**

**Filed Mar. 21, 1986, Ser. No. 842,685**
**Int. Cl.[4] H04M *11/00***
**U.S. Cl. 379—93** **39 Claims**



**1**. In a communication system having a plurality of port circuits, each of which is connected to a corresponding terminal device and communicates with said corresponding terminal device according to a predetermined protocol, an interface apparatus associated with at least one of said terminal devices and comprising:

processing means;

means interposed between said at least one terminal device and its corresponding port circuit for terminating communication signals passing between said at least one terminal device and said port circuit and also connected to said processing means for connecting said processing means to both said port circuit and said at least one terminal device; and

wherein said processing means is responsive to receipt of said communication signals from said port circuit or said at least one terminal device, for determining from said received communication signals a service to be provided and for communicating with said port circuit or terminal device according to said protocol to provide said service.

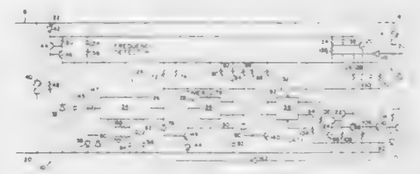
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**4,748,657**

## HANDSET ACTUATED SIGNAL INTERCEPT

**Will Rudd, Perris, and Dennis McCullough, Orange, both of Calif., assignors to Willard Rudd, Perris, Calif.**

**Filed May 22, 1986, Ser. No. 865,759**
**Int. Cl.[4] H04M *3/22***
**U.S. Cl. 379—189** **14 Claims**



**1**. A tone trap circuit for connection across the tip and ring leads of a telephone subscriber line in a telephone central office powered by subscriber line current comprising:

a dial tone detection circuit which produces an actuating signal output and which is connected across said tip and ring leads,

a timing circuit which receives said actuating signal output

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and which produces an enabling signal responsive thereto for a predetermined duration,

a tone sensitive circuit coupled across said tip and ring leads and which operates when enabled by said enabling signal to respond to at least one predetermined tone from a pushbutton pad on a telephone handset on said subscriber line to produce a gating signal, and

gating means responsive to said gating signal to produce an alternating current short circuit across said tip and ring leads.

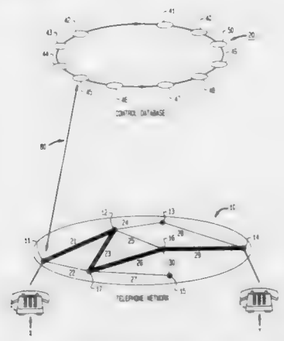
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**4,748,658**

## ARCHITECTURE FOR ALLOCATING RESOURCES IN A TELECOMMUNICATIONS NETWORK

**Gita Gopal, East Rutherford, and Abel Weinrib, Randolph, both of N.J., assignors to Bell Communications Research, Inc., Livingston, N.J.**

**Filed Jul. 16, 1986, Ser. No. 886,515**
**Int. Cl.⁴ H04M** *7/06*
**U.S. Cl. 379—221** **14 Claims**



1. An information communications system comprising;

a network including a plurality of switching nodes and a plurality of communications paths arranged in groups and interconnecting the switching nodes, and

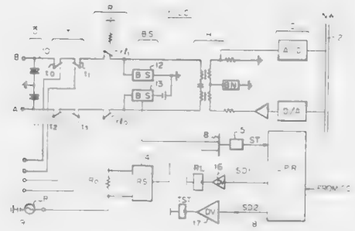
means in communication with said network for allocating routes in said network between particular switching nodes, said means maintaining a database containing a complete representation of the current number of busy communications paths in each group in said network and making available the contents of said database for all of said switching nodes, said means being adapted to receive route set-up requests from said network and to utilize said database to allocate preferred routes between particular pairs of said switching nodes, wherein said means comprises a ring-like network to circulate the contents of said database and wherein said ring-like network comprises a plurality of access points interspersed in the ring-like network, each access point comprising a processor.

**4,748,659**

## CALLING SIGNAL TRANSMISSION APPARATUS

**Kiyoshi Kasahara; Kenichi Ogawa, both of Yokohama; Kenji Takato, Kawasaki; Shoji Nojiri, Yokohama; Yoshimi Iijima, Shimotsuma; Yasuo Miyazaki, Fukuoka; Mitsutoshi Ayano, Tokyo; Kiyoshi Shibuya, Kawasaki, and Atsuo Serikawa, Yokohama, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

**Continuation-in-part of Ser. No. 738,657, May 28, 1985, abandoned. This application Sep. 8, 1986, Ser. No. 904,495**
**Claims priority, application Japan, May 30, 1984, 59-108502; Jul. 3, 1984, 59-136555; Sep. 29, 1984, 59-203011; Sep. 9, 1985, 60-197711**
**Int. Cl.⁴ H04M** *19/02*
**U.S. Cl. 379—253** **22 Claims**



1. A calling signal transmitting apparatus, comprising:

a communication line connected to a telephone set;

continuous ringing signal generating means for generating a continuous ringing signal;

switching means operatively connected between said communication line and said continuous ringing signal generating means, for interrupting said continuous ringing signal;

switch control means, operatively connected to said switching means, for changing said continuous ringing signal into an intermittent ringing signal and for transmitting said intermittent ringing signal to said communication line, by controlling said switching means, said intermittent ringing signal including a signalling period and a no-signal period;

loop detecting means, operatively connected to said communication line, for detecting an off-hook state of said telephone set during the no-signal period in said intermittent ringing signal and producing an output;

ring trip detecting means, operatively connected to said communication line, for detecting an off-hook state of said telephone set during the signalling period in said intermittent ringing signal and producing an output; and

logical OR gate means, operatively connected to said loop detecting means, said ring trip detecting means and said switch control means, for inputting into said switch control means, a status signal comprising a logical sum of the output of said loop detecting means and the output of said ring trip detecting means,

wherein said switch control means comprises means for resetting, when said status signal represents an off-hook state, said switching means to stop the supplying of said intermittent ringing signal to said communication line, and

wherein said switch control means further comprises means for supervising said status signal from said logical OR gate means at a predetermined time interval, and after the reset of said switching means, when said status signal represents an on-hook state of said telephone set after a predetermined number of the supervisions, said switching means is activated again to supply said intermittent ringing signal to said communication line.

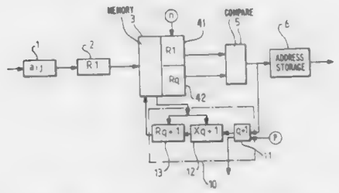


**4,748,660**

## PROCESS FOR DETERMINATION OF THE LAST INTERMEDIATE NODE IN A NETWORK OF NUMEROUS INTERCONNECTED NODES

**Pascal Deveze, Puteaux, France, assignor to Jeumont-Schneider Corporation, Puteaux cedex, France**

**Filed Jun. 26, 1985, Ser. No. 749,007**
**Claims priority, application France, Jul. 4, 1984, 84 10612**
**Int. Cl.⁴ H04Q** *9/00, 11/00*
**U.S. Cl. 379—272** **17 Claims**



1. In a network of p nodes interconnected by a number of links, p being a positive whole number, a method for determining the last intermediate node of a pathway from the m-th node to the n-th node through the minimum possible number of nodes, said method being especially useful for communications routing between interconnected computers and between interconnected telephone switchboard systems and comprising the steps of:

(a) electronically determining all direct links between nodes of said network;

(b) electronically establishing a square matrix $R_1 = \| a_{ij} \|_p$ and storing the matrix $R_1$ in a memory device, $a_{ij}$ being assigned a value of zero if there is no direct link between the i-th node and the j-th node of the network and being assigned a non-zero value if there is such a direct link,

(c) determining whether there is a two-link pathway from the m-th node to the n-th node by electronically comparing elements of equal rank in the m-th row and n-th column of the matrix $R_1$, the existence of non-zero elements of equal rank indicating the presence of a two-link pathway and the rank of such non-zero elements indicating the location of an intermediate node of that pathway; and

(d) in the absence of a two-link pathway, iterating the following steps over all q from 2 to p−2 until a pathway of q+1 links from the m-th node to the n-th node has been determined:

(1) electronically establishing elements of the square matrix $X_q = \| x_{ij} \|_p$, which is the product of the matrices $R_{q-1}$ and $R_1$;

(2) electronically establishing elements of the square matrix $R_q = \| b_{ij} \|_p$, $b_{ij}$ being assigned a non-zero value if one of $x_{ij}$ and $a_{ij}$ is non-zero and being assigned a value of zero if $x_{ij}$ and $a_{ij}$ are both zero, and

(3) electronically comparing elements of equal rank in the m-th row of matrix $R_q$ and the n-th column of matrix $R_1$, the existence of non-zero elements of the same rank indicating the presence of said pathway of q+1 links from the m-th node to the n-th node and the rank of such non-zero elements indicating the identity of the last intermediate node of such pathway.

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**4,748,661**

## CIRCUIT FOR TRANSLATING TELEPHONE NUMBERS

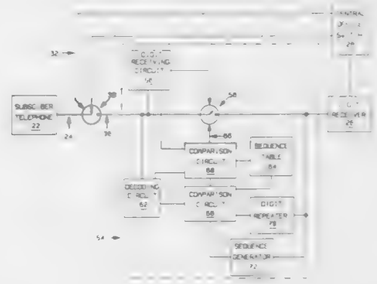
**Marvin G. Edelstein, San Rafael, and Robert A. Wilson, III, Fremont, both of Calif., assignors to Pacific Bell, San Francisco, Calif.**

**Filed Feb. 11, 1986, Ser. No. 828,633**
**Int. Cl.⁴ H04Q** *3/47*
**U.S. Cl. 379—289** **6 Claims**

1. An apparatus adapted for use in a telephone system including a telephone circuit for connecting a subscriber telephone to a central office switching system, said central office switching system including digit receiving means coupled to said telephone circuit for receiving the digits of a telephone number dialed on a subscriber telephone, said telephone comprising means for coupling signals indicative of said dialed telephone number onto said telephone circuit, said telephone system further including central office routing switch means for connecting and disconnecting said digit receiving means from said telephone circuit, an apparatus for converting each telephone number which is so dialed by a said subscriber and which belongs to a predetermined set of telephone numbers into a corresponding telephone number which is received by said digit receiving means wherein each of said telephone numbers in said predetermined set consists of a sequential set of digits comprising a switch sequence followed by an optional recognition sequence consisting of one or more digits and said corresponding telephone number consists of a sequential set of digits comprising said switch sequence followed by an optional end sequence consisting of one or more digits, said apparatus comprising:

means for connecting said apparatus into said telephone system at a location between said central office routing switch means and said digit receiving means such that said apparatus intercepts said signals indicative of said dialed telephone numbers prior to said signals entering said digit receiving means when said central office routing switch means has connected said telephone circuit to said digit receiving means;

enabling means for detecting signals indicative of the start of a telephone number dialed on said telephone circuit;



digit detecting means for detecting and decoding the signals indicative of the digits of a telephone number dialed on said telephone circuit at a point in said apparatus prior to the point at which said apparatus is connected to said digit receiving means;

table means for storing information specifying the switch sequence and recognition sequence for each telephone number in said predetermined set and the end sequence of the telephone number corresponding to each said telephone number;

disconnecting switch means for disconnecting said digit receiving means from said telephone circuit, said disconnecting switch means having a first state in which said digit receiving means is connected to said telephone circuit and receives the said signals indicative of each digit dialed on said telephone circuit and a second state in which said digit receiving means is disconnected from said telephone circuit and does not receive said signals, said disconnecting switch means being connected to said enabling means and being set to said first state when said enabling means detects the start of a telephone number dialed on said telephone circuit;

first comparing means, coupled to said table means, for determining if the digits detected by said digit detecting means match the switch sequence of any of the telephone numbers stored in said table means, said determination being made after each digit of said telephone number is

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detected on said telephone circuit, and for setting said disconnecting switch means to said second state when the digits so detected match the switch sequence of one of the telephone numbers stored in said table means; and

second comparing means, coupled to said table means and responsive to said disconnecting switch means being in said second state, for determining if the digits detected by said digit detecting means after said disconnecting switch means is set to said second state match the recognition sequence of a telephone number stored in said table means having a switch sequence which matched the digits detected by said digit detecting means before said disconnecting switch means is set to said second state, if such a match is found, for causing the end sequence stored for the telephone number whose switch sequence and recognition sequence match said digits, if such an end sequence exists, to be sent to said digit receiving means, and if such a match is not found for causing the digits detected after said disconnecting switch means is set to said second state to be sent to said digit receiving means, said match being defined to exist between a telephone number in said table means having no recognition sequence and having a switch sequence which matches the digits detected by said digit detecting means before said disconnecting switch means is set to said second state.

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**4,748,662**

## APPARATUS HAVING A DIAL CALLING FUNCTION

**Yoshihiro Hirata, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Dec. 23, 1985, Ser. No. 812,465**

**Claims priority, application Japan, Dec. 21, 1984, 59-268400; Dec. 21, 1984, 59-270463; Dec. 21, 1984, 59-270468**

**Int. Cl.⁴ H04M *11/00***

**U.S. Cl. 379—356** **7 Claims**



1. An apparatus having a dial calling function comprising:

dial request generating means for generating dial requests;

dial means for sending out a selection signal to an office line in response to a dial request for calling a selected destination party, said selection signal corresponding to a telephone number of an apparatus of the selected destination party;

timer means for counting time, said timer means starting its operation in response to a dial request generated by said dial request generating means;

paging detection means for detecting a paging signal transmitted from the office line, said paging signal being repeatedly discontinued for a predetermined discontinue time period at a predetermined frequency; and

means for permitting operation of said dial means, after said timer means counts out a predetermined time which is longer than the predetermined discontinue time period of said paging signal, in response to a dial request when a paging signal is not detected by said paging detection means.

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**4,748,663**

## LOUDSPEAKING TELEPHONE INSTRUMENT

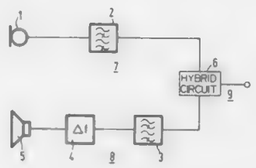
**Ian Phillips, Sherston; Lawrence J. Hibberd, Chippenham, and Leslie H. Williams, Swindon, all of England, assignors to U.S. Philips Corp., New York, N.Y.**

**Continuation of Ser. No. 714,597, Mar. 21, 1985, abandoned. This application Apr. 22, 1987, Ser. No. 42,543**

**Claims priority, application United Kingdom, Mar. 21, 1984, 8407361**

**Int. Cl.⁴ H04M *1/00***

**U.S. Cl. 379—388** **4 Claims**




1. An improved loudspeaking telephone instrument comprising a transmit path having an input including a microphone and an output to which speech signals are transmitted by such microphone, a receive path having an output including a loudspeaker and an input for receiving speech signals for transmission to such loudspeaker, and means for electrically coupling the output of the transmit path and the input of the receive path to a telephone line; such electrical coupling means also transmitting a fractional proportion of speech signals at the output of the transmit path to the input of the receive path; the loudspeaker and the microphone being acoustically coupled so that speech signals at the output of the transmit path and transmitted through the receive path are fed back to the input of the transmit path in a regenerative feedback loop; such improvement consisting of circuit means for limiting such regenerative feedback of speech signals produced at the output of the transmit path, such circuit means comprising:

a frequency shifter connected in series in one of the transmit and receive paths and producing a predetermined frequency shift of substantially all of the spectral frequency components of a speech signal transmitted through such one path originating from said microphone; and

a first comb filter connected in series in the other of the transmit and receive paths, such filter having successive frequency stop-bands spaced by successive frequency pass-bands, such spacing being an integral multiple M of the predetermined frequency shift produced by said frequency shifter;

said filter blocking those spectral frequency components of a speech signal at the input of such other path which are in the stop-bands of said filter from reaching the output of such other path;

whereby the spectral frequency components of a speech signal which has been fed back through said feedback loop M times by the acoustic coupling between said loudspeaker and said microphone are shifted into the frequency stop-bands of said first comb filter and are thereby blocked from again being fed back through said loop by said acoustic coupling.



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**4,748,664**

## TELEPHONE POWER SUPPLY

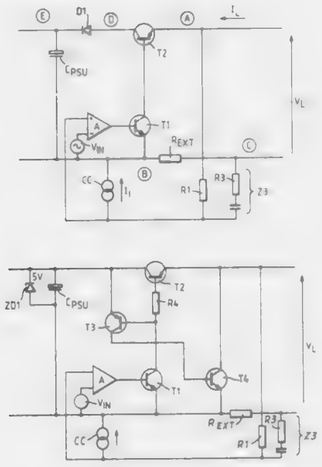
**Peter F. Blomley, Bishop's Stortford, Great Britain, assignor to STC Plc, London, England**

**Filed Nov. 14, 1986, Ser. No. 930,391**

**Claims priority, application United Kingdom, Nov. 28, 1985, 8529348**

**Int. Cl.⁴ H04M *1/60***

**U.S. Cl. 379—395** **3 Claims**




1. An electronic circuit for the supply of direct current power to the electronic circuits in a telephone subscriber's instrument, which electronic circuit includes:

a first transistor whose emitter-collector path is in one wire of a two-wire telephone line to which the instrument is connected;

a capacitor connected across the inputs of the telephone circuits which include said electronic circuits, said capacitor being charged by a current passing through the emitter-collector path of said transistor when the electronic supply circuit is connected to said telephone line, the charge on the capacitor serving to maintain the voltage across the wires of the telephone line;

a connection from the base of said transistor via the collector-emitter path of a second transistor to the other wire of the telephone line; a connection from the speech output of the instrument to the base of said second transistor; and

a diode such as a Schottky diode via which the collector-emitter path of the first transistor is connected to said capacitor, said diode being so poled as to isolate the capacitor from the line when the line voltage falls below the voltage to which said capacitor is charged.

2. An electronic circuit for the supply of direct current power to the electronic circuits in a telephone subscriber's instrument, which electronic circuit includes;

a first transistor whose emitter-collector path is in one wire of a two-wire telephone line to which the instrument is connected;

a capacitor connected across the inputs of the telephone circuits which include said electronic circuits, said capacitor being charged by a current passing through the emitter-collector path of said transistor when the electronic supply circuit is connected to said telephone line, the charge on the capacitor serving to maintain the voltage across the wires of the telephone line;

a connection from the base of said transistor via the collector emitter path of a second transistor to the other wire of the telephone line; a connection from the speech output of instrument to the base of said second transistor;

a resistive impedance included in the connection between the base of said first transistor and said second transistor;

a third transistor whose base is connected to the junction between said resistive impedance and said second transistor and whose emitter is connected to the junction between said first transistor and said capacitor; and

a fourth transistor whose emitter-collector path is connected between the wires of the telephone line on the line side of said second transistor and whose base is connected to the collector of said third transistor.

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**4,748,665**

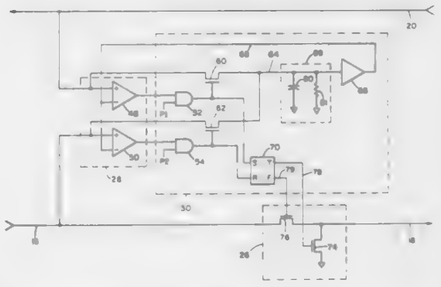
## ANALOG ECHO SUPPRESSOR

**David C. Nicholas, Cedar Rapids, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.**

**Filed Jul. 1, 1985, Ser. No. 750,796**

**Int. Cl.⁴ H04B *3/20***

**U.S. Cl. 379—407** **6 Claims**



1. An echo suppression circuit for use in a four-wire telephony circuit, the circuit having a network port with a network input and a network output, and a subscriber port having a subscriber input and a subscriber output, the circut preventing echo present on the subscriber input from reaching the network output comprising:

first means for establishing a communication channel between the network input and the subscriber output;

second means for establishing a communication channel between the subscriber input and the network output and having means for interrupting said second channel means;

means for comparing having first and second inputs operatively connected, respectively, to said network port input and said subscriber port input, means for storing a threshold value and having an output indicative of a signal of the network input or the subscriber input exceeding the value stored in said threshold storage means, and first and second comparators, each having a negative input for receiving said value stored in said threshold storage means and each having a positive input operatively connected, respectively, to said network input and said subscriber input, and each having an output;

a pair of analog switches, each having a signal input, a control input, and an output, and a pair of AND gates, the signal inputs of the analog switches connected to said network input and said subscriber input, the outputs of said analog switches connected together and to said threshold storage means, the control inputs of said analog switches connected to the outputs of said pair of AND gates, one input of each of said AND gates driven by one of two periodic pulsed signals, and another input of each of said AND gates driven, respectively, by said output of said first and said second comparators;

means for storing an identity of said new value as the network input or subscriber input; and

means for reducing the value stored in said threshold storage

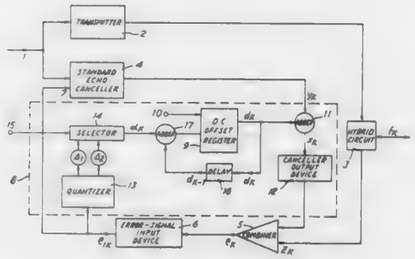
VOL 1090 ISS 5 MY 31 1988 UMI



means, said means for interrupting controlled by said means for storing the identity of said new value.

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**4,748,666**
**ECHO CANCELLING SYSTEM**
**David J. Pope, East Kew, Australia, assignor to EMI Limited, Hayes, England**
**Filed May 22, 1985, Ser. No. 736,671**
**Claims priority, application United Kingdom, May 22, 1984, 8413091**
**Int. Cl.[4] H04B *3/22***
**U.S. Cl. 379—410** **4 Claims**

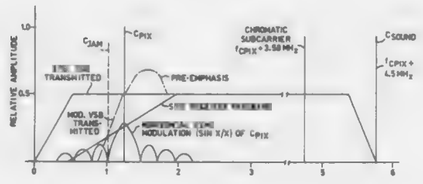



1. An echo-cancellation system comprising:
echo-cancelling means to provide an echo-cancelling signal for a signal input to the echo-cancelling means;
means to produce an error signal from an output of the echo-cancelling means;
means to pass the error signal output from the error-production means to an input of the echo-cancelling means; and
compensation means to derive a d.c. offset signal for the echo-cancelling means, the compensation means having means to apply a d.c. offset value for application to the output of the echo-cancelling means, means to produce an initial d.c. offset value when no signal is input to the echo-cancelling means, storage means for holding at least one d.c. offset value for passage to the application means, means for updating, at time intervals during operation of the system, the d.c. offset value for passage to the application means, the up-dating means having means to combine a predetermined increment or decrement with a d.c. offset value in the storage means in accordance with a signal output of the error-production means.

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**4,748,667**
**JAMMING SIGNAL SCRAMBLING AND DESCRAMBLING SYSTEMS FOR CATV**
**James O. Farmer, Lilburn; Anatoly Kozushin, Duluth; Herman A. Kruse, Winder; William P. LaFay; Christopher P. Lewis, both of Snellville; Frank R. Little, Jr., Alpharetta; Leo Montreuil, Atlanta; Leo J. Thompson, Lilburn; Lamar E. West, Jr., Maysville, and Joseph G. Mobley, II, Dunwoody, all of Ga., assignors to Scientific Atlanta, Atlanta, Ga.**
**Filed Nov. 4, 1986, Ser. No. 926,749**
**Int. Cl.[4] H04N *7/167*; H03H *7/00***
**U.S. Cl. 380—7** **65 Claims**

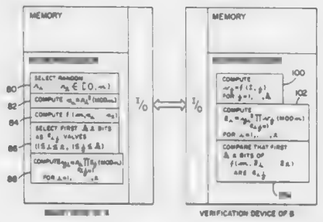
1. A system for processing television signals in the form of one sideband and the vestigial sideband of a picture carrier modulated by video and synchronization signals, including horizontal sync signals, in order to provide for the intelligible reception thereof by the TV receivers of certain subscribers, said system comprising means for combining said television signals with jamming signal energy the frequency of which is substantially at the frequency of one of the nulls in the spectrum of the modulation of said picture carrier by said horizontal sync signals means for transmitting said combined jamming and television signals to receiver locations, and means at said locations disposed ahead of said TV receivers defining a pass-band for the transmitted signals without substantial attenuation




except at a notch essentially in the frequency region containing said jamming signal energy.

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**4,748,668**
**METHOD, APPARATUS AND ARTICLE FOR IDENTIFICATION AND SIGNATURE**
**Adi Shamir, and Amos Fiat, both of Rehovot, Israel, assignors to Yeda Research and Development Company Limited, Rehovot, Israel**
**Filed Jul. 9, 1986, Ser. No. 883,247**
**Int. Cl.[4] H04L *9/00***
**U.S. Cl. 380—30** **42 Claims**




1. A method of creating a unique identifier for use by an entity which cannot be forged by others including those capable or verifying the entity, comprising the steps of:
(a) selecting a modulus n which is the product of at least two secret primes;
(b) selecting a pseudo random function f capable of mapping arbitrary strings to numbers;
(c) preparing a string I containing information unique to an entity;
(d) selecting k distinct values of j so that each $v_j=f(I,j)$ is a residue (mod n) having a root $s_j$;
(e) computing roots $s_j$ of $v_j^{-1}$ (mod n);
(f) recording on a retrievable medium of an identifier I, k, $s_j$ and related indices j.

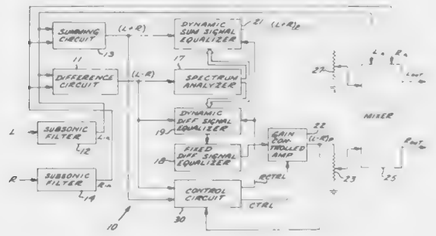
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**4,748,669**
**STEREO ENHANCEMENT SYSTEM**
**Arnold I. Klayman, Huntington Beach, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.**
**Continuation-in-part of Ser. No. 844,929, Mar. 27, 1986, abandoned. This application Nov. 12, 1986, Ser. No. 929,452**
**Int. Cl.[4] H04S *1/00***
**U.S. Cl. 381—1** **159 Claims**

1. A stereo image enhancement system for use in a stereo system having respective left and right signals, comprising:
means for providing the sum of the left and right signals as a sum signal and for providing the difference between the left and right signals as a difference signal;
processing means responsive to said sum and difference signals for selectively altering the relative amplitudes of components of said difference signal within respective predetermined frequency bands so as to boost difference



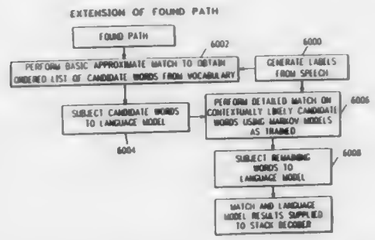
signal components as an inverse function of the level of difference signal components within said respective frequency bands to provide a processed difference signal, and for selectively altering the relative amplitudes of components of said sum signal within said respective predetermined bands so as to boost sum signal compo-




nents as a function of the level of difference signal components within said respective frequency bands to provide a processed sum signal; and
means for combining said processed difference signal, said processed sum signal, and the left and right signals to provide left and right output signals.

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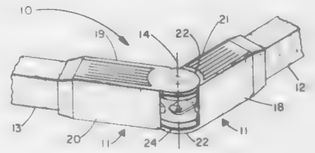
**4,748,670**
**APPARATUS AND METHOD FOR DETERMINING A LIKELY WORD SEQUENCE FROM LABELS GENERATED BY AN ACOUSTIC PROCESSOR**
**Lalit R. Bahl, Amawalk, and Frederick Jelinek, Briarcliff, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**
**Filed May 29, 1985, Ser. No. 738,911**
**Int. Cl.[4] G10L *5/00***
**U.S. Cl. 381—43** **17 Claims**




1. In a speech recognition system having an acoustic processor which generates a string of acoustic labels in response to speech input and a decoder which matches words in a vocabulary against generated labels in a string, a method of forming at least one likely sequence of words for a speech input, the method comprising the steps of:
(a) generating a string of labels in response to a speech input;
(b) selecting words from a vocabulary as possible first words corresponding to labels at the beginning of the string;
(c) for a subject selected word,
(i) locating a most likely boundary label interval in the string whereat the subject selected words has the highest probability of ending; and
(ii) evaluating a respective likelihood of the subject selected word at each label interval of the string up to and including the most likely boundary label interval;
(d) repeating step (c) for each selected word as the subject selected word; and
(e) classifying a given selected word as extendible if the likelihood at the particular label interval corresponding to the most likely boundary label interval thereof is within a predefined range of the highest likelihood for any selected word at said particular label interval.

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**4,748,671**
**MICROPHONE BOOM HINGE**
**Christopher D. Wiegel, Minneapolis, Minn., assignor to Telex Communications, Inc., Minneapolis, Minn.**
**Filed Nov. 21, 1986, Ser. No. 934,122**
**Int. Cl.[4] H04R *1/02*; E05C *17/64*; E05D *7/086*, *7/10***
**U.S. Cl. 381—169** **11 Claims**



1. A hinge for an articulating microphone boom comprising in combination;
an identical pair of hinge members, each having a longitudinally elongated body, first and third side walls disposed in spaced-apart parallel relationship and second and fourth side walls disposed in spaced-apart parallel relationship and perpendicular to said first and third side walls to form a longitudinally extending interior receptacle for receiving a microphone boom, said second and fourth side walls each having first and second ears of generally semicircular configuration extending longitudinally therefrom, said first ear being substantially the thickness and coplanar with said second side wall and including an aperture of circular cross-section disposed on an axis extending parallel to and intermediate said first and third side walls and said second ear extending from said fourth side wall and being spaced inwardly the thickness of said first ear and including an outwardly extending pivot pin of circular cross section, coaxial with said axis and of a length substantially the same as the thickness of said first ear, said hinge members being disposed in inter-fitting pivoting relationship with said pivot pins on said second ears disposed in said apertures in said first ears and said interior receptacles are rotatable about said axis.

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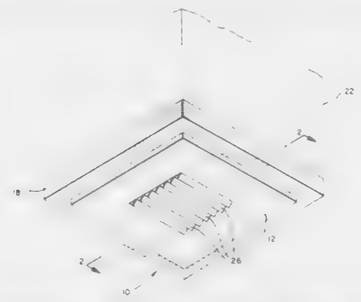
**4,748,672**
**INDUCED VIBRATION DYNAMIC TOUCH SENSOR SYSTEM AND METHOD**
**Gale E. Nevill, Jr., Gainesville, Fla., and Robert W. Patterson, Houston, Tex., assignors to University of Florida, Gainesville, Fla.**
**Filed Apr. 16, 1985, Ser. No. 723,644**
**Int. Cl.[4] G06K *9/00*; G01D *5/34***
**U.S. Cl. 382—1** **25 Claims**

1. Sensor apparatus comprising a membrane having a plurality of protrusions on a surface thereof; means for producing sliding contact between the membrane surface and an object to induce vibrations in the membrane; transducer means for sensing the vibrations and for producing an electrical signal corresponding to the vibrations; and means for deriving from the electrical signal a pattern characteristic of a surface area of the

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object contacted by the membrane, and wherein said membrane and said transducer means are commonly supported, and



said membrane is supported at peripheral portions such that most of said membrane may vibrate unobstructedly.

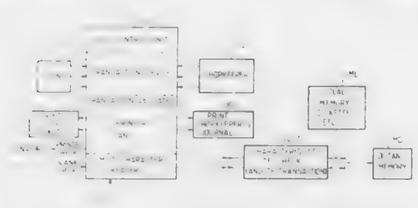
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**4,748,673**

## READER FOR READING MAGNETO-OPTICAL CHARACTERS, WITH THE OPTIONS OF PRINTING THEM OR STORING THEM

**Yvon Barre, Fleury; Bernard Deleuze, Paris, and Lionel Maury, Buc, all of France, assignors to Electronique Serge Dassault, Paris, France**

**Filed Jun. 4, 1985, Ser. No. 740,966**
**Claims priority, application France, Jun. 8, 1984, 84 09082**
**Int. Cl.[4] G06K** *9/18*
**U.S. Cl. 382—7** **9 Claims**



1. In a magneto-opical character reader for reading characters such as CMC7 characters, the reader comprising a path suitable for receiving and driving a document carrying such characters through predetermined positions, a premagnetization transducer for premagnetizing said characters, a read transducer for reading said characters, and electronic control and processing means connected to said transducers, the improvement wherein said path for receiving the document includes wheels having axes fixed relative to a frame, and said transducers being mounted opposite a respective one of said wheels and being controllably and resiliently urgeable towards said respective wheel.

said electronic control and processing means including read means comprising:

analog amplifier means having an anti-saturation gain characteristic;

first comparator means possessing hysteresis and having a signal input connected to the output of said analog amplifier means, and a reference input receiving a reference voltage close to zero volts, an output, and an output to said reference input to provide said hysteresis;

second, fast-acting comparator means having a signal input connected to the output of said analog amplifier means, a reference input connected to the output from the first comparator via a capacitative circuit including a diode, and an output connected to said input via a diode link; and

logic means for providing a logic signal representative of the characters read on the basis of the output signals from said two comparator means.

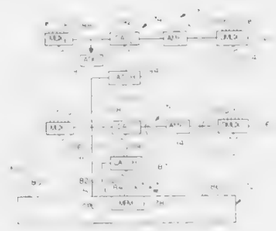
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**4,748,674**

## PATTERN LEARNING AND RECOGNITION DEVICE

**Walter J. Freeman, Berkeley, Calif., assignor to The Regents of the University of Calif., Berkeley, Calif.**

**Filed Oct. 7, 1986, Ser. No. 916,187**
**Int. Cl.[4] G06K** *9/62*
**U.S. Cl. 382—14** **12 Claims**



1. A parallel-circuit signal processing device comprising

a series of N integrative units $U_j$, each constructed to respond to the jth component of an N-dimensional input vector, to produce a time varying output signal $O_j$,

a multiplexer for sequentially sampling the $O_j$ values in each of the N receptor units,

means storing a matrix of $k_{ee}{}^{jk}$ coupling coefficients relating the output signal coupling between pairs of $U_j$, $U_k$ units in the device,

means for calculating, for each $O_j$ value sampled by said multiplexer, feedback input signals which relate the just-sampled $O_j$ value and the $k_{ee}{}^{jk}$ coupling coefficients between $U_j$ and other units in the device, and

a demultiplexer for applying, following each $O_j$ value sampled by the multiplexer, the feedback signals just calculated on the basis of the sampled $O_j$ value, to each of the corresponding units $U_k$.

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**4,748,675**

## METHOD FOR CONTROLLING IMAGE PROCESSING DEVICE

**Kenji Suzuki, Yokosuka; Seiji Hata, Fujisawa, and Masao Tsuji, Funabashi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Nov. 7, 1985, Ser. No. 795,775**
**Claims priority, application Japan, Nov. 9, 1984, 59-234957; Nov. 9, 1984, 59-234958**
**Int. Cl.[4] G06K** *9/48*
**U.S. Cl. 382—21** **3 Claims**

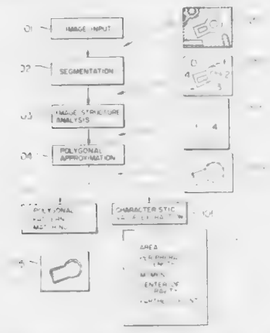
1. A method for controlling an image processing device wherein the contour of a segment forming part of an image is polygonal-approximated so that it is represented by a row of vertex data and said row of vertex data is processed to recognize the shape of the segment, comprising the steps of:

formulating an image processing procedure, to be carried out in a central processing unit in said image processing device, as a program using a programming language incorporating a group of image processing instructions corresponding to several basic processing steps in the flow of processing including a polygonal approximation processing procedure, said programming language having variables whose structure is inherently determined by an image input section of said image processing device and by run-time subroutines of said programming language; and

executing said program by using said central processing unit and an image processing section of said image processing device, wherein said image processing instructions comprise an image input instruction having image variables, a segmentation instruction having image variables, a structure analysis instruction having image variables, a polygonal approximation instruction having image variables for the input image, a polygonal pattern matching instruction, and a characteristic value extraction instruction for recognizing a shape of a segment, said image processing device performing the steps of:

inputting a composite of images in response to said image input instruction, including obtaining said composite of images from an image detector and storing said composite of images in an image memory through an image input section;

storing information regarding segments into a segment table by segmenting images selected from the inputted composite of images in response to said segmentation instruction;



obtaining a positional relation among said selected images from segment information from the segment table and selecting an image to be recognized in response to said structure analysis instruction;

polygonal-approximating the selected image to be recognized in response to said line-segmentation instruction and obtaining a vertex coordinate row relating thereto and

recognizing an orientation and a position of said selected image to be recognized by processing said vertex coordinate row selectively under control of the polygonal pattern matching instruction or the characteristic value extraction instruction, so that said polygonal approximation processing procedure can be made suitable for a particular use by changing the combination of the basic processing steps and by providing branches in dependence on intermediate results according to the different uses.

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**4,748,676**

## PATTERN ROTATION ANGLE DETECTING SYSTEM

**Michiaki Miyagawa, and Yutaka Ishizaka, both of Kanagawa, Japan, assignors to Fuji Electric Co., Ltd., Kawasaki, Japan**

**Filed May 14, 1987, Ser. No. 49,603**
**Claims priority, application Japan, May 16, 1986, 61-110685**
**Int. Cl.[4] G06H** *9/32*
**U.S. Cl. 382—46** **7 Claims**

1. A system for detecting a rotational angle of a two-dimensional pattern converted into binary picture information, comprising:

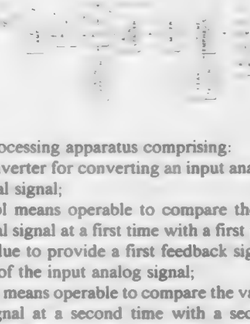
memory means for storing said picture information;

extracting means for extracting an area and a moment of inertia of said objective pattern from said picture information;

center of gravity detection means for determining a center of gravity of said objective pattern from said area and said moment of inertia of said objective pattern;

circular scanning means for scanning said stored picture information to describe a circle having a predetermined radius and a center at said center of gravity;

arcuate segment calculating means for calculating a plurality of arcuate segments from data produced by the circular scanning means, by using a reference arcuate segment having predetermined characteristics and by using at least one arcuate segment on each side of said reference arcuate segment, said plurality of arcuate segments being used to mate said pattern with a standard sample; and



final calculation means for detecting said rotational angle, said angle defined by an angle formed by a rotation angle reference point of said reference arcuate segment with respect to a predetermined reference line.

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**4,748,677**

## IMAGE PROCESSING APPARATUS

**Yoshikazu Yokomizo, Kawagoe, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Division of Ser. No. 326,269, Dec. 1, 1981, Pat. No. 4,589,034. This application Oct. 21, 1985, Ser. No. 789,839**
**Claims priority, application Japan, Dec. 5, 1980, 55-171878; Dec. 5, 1980, 55-171879; Dec. 5, 1980, 55-171880; Dec. 5, 1980, 55-171881; Dec. 5, 1980, 55-171882; Dec. 5, 1980, 55-171883**
**Int. Cl.[4] G06K** *9/38*
**U.S. Cl. 382—50** **10 Claims**



1. Signal processing apparatus comprising:

an A/D converter for converting an input analog signal to a first digital signal;

level control means operable to compare the value of the first digital signal at a first time with a first predetermined digital value to provide a first feedback signal to control the level of the input analog signal;

gain control means operable to compare the value of the first digital signal at a second time with a second predetermined digital value to provide a second feedback signal to control gain of the input analog signal; and

digital process means for performing a predetermined digital process on said first digital signal to produce a second digital signal.

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**4,748,678**

## METHOD OF STORING AND RETRIEVING IMAGE DATA

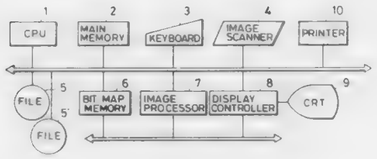
**Haruo Takeda, Kawasaki; Kuniaki Tabata, Nishitama; Tetsuo Machida, Sagamihara; Masatoshi Hino, Yokohama, and Kunihiro Nomura, Kawasaki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed May 14, 1986, Ser. No. 863,242**

**Claims priority, application Japan, May 22, 1985, 60-108122**

**Int. Cl.[4] G06K** *9/00*

**U.S. Cl. 382—56** **16 Claims**




1. A method of storing document data in a filing system comprising the steps of:

(a) storing data representing a processed image, which includes the content of an original document, and secondary data added to the document in a first memory region of said filing system;

(b) comparing the processed image as stored in said first memory region with the image of the original document in order to detect portions which differ in respective images;

(c) classifying the portions which differ as detected in the comparing step (b) according to predetermined classification standards;

(d) specifying at least one local region of said processed image which has a predetermined relationship in position that is determined by a selected classification standard with respect to the portion which differs in the processed image; and

(e) storing the data that represents said local region in a second memory region of said filing system as retrieval data together with a code that indicates the relationship of said retrieval data to said original document.

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**4,748,679**

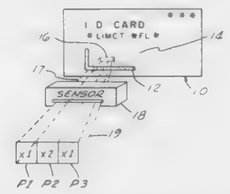
## WEIGHTED-PIXEL CHARACTERISTIC SENSING SYSTEM

**David G. Gold, Santa Monica, and Vahakn K. Gharibian, Los Angeles, both of Calif., assignors to Light Signatures, Inc., Los Angeles, Calif.**

**Filed Jul. 25, 1986, Ser. No. 889,575**

**Int. Cl.[4] G06K** *9/58*

**U.S. Cl. 382—61** **14 Claims**




1. A method of sensing a characteristic of an aritcle, as a document, by radiation from a specified window area of said article, comprising the steps of:

determining a located window area of said article with the objective that said located window area coincides in area and location with said specified window area;

sensing radiation from said located window area of said document by pixels to provide representative pixel signals for said located window area, thereby increasing the tolerance of the system to misalignment of the located window area with the specified window area;

weighting said representative pixel signals to enhance those specific pixel signal values that are centrally positioned in said located window area; and

processing said weighted pixel signal values by additive combination to provide characteristic data signals representative of said document characteristic at said specified window area and wherein said pixel signal values that are centrally positioned in said located window area are accorded greater significance.

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**4,748,680**

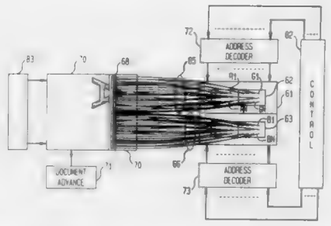
## COLOR DOCUMENT SCANNER

**George D. Margolin, Newport Beach, Calif., assignor to Photon Devices, Ltd., Newport Beach, Calif.**

**Filed Aug. 8, 1986, Ser. No. 894,612**

**Int. Cl.[4] H04N** *1/46;* **G06K** *7/10, 9/20*

**U.S. Cl. 382—65** **9 Claims**




1. Apparatus for scanning a document, said apparatus comprising first, second, and third optical fiber bundles, each of said bundles having an entrance face and an exit face, first, second, and third color filter means associated with said first, second, and third optical fiber bundles, respectively, means for maintaining said entrance faces in energy coupled proximity to a document to be scanned, first, second and third sensor array means energy coupled to said first, second and third exit faces for storing associated color information responsive to a first signal, permanent store means coupled to the sensors of each of said array means also responsive to said first signal for interrogating said sensors of said array means, said sensors being determined during a preceding initialization operation.

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**4,748,681**

## INTEGRATED-SERVICES RADIO TRANSMISSION SYSTEM

**Werner Schmidt, Lauf-Oedenberg, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Apr. 28, 1986, Ser. No. 856,916**

**Claims priority, application Fed. Rep. of Germany, May 4, 1985, 3516074**

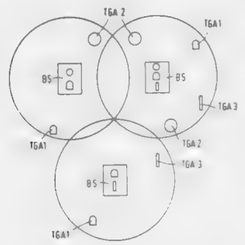
**Int. Cl.[4] H04Q** *7/00*

**U.S. Cl. 455—33** **7 Claims**

1. A two-way radio transmission system comprising:

at least one fixed base radio station (BS) for transmitting and receiving over at least one communication channel, said base radio station (BS) transmitting a plurality of messages for different types of receivers (TGAx) used in different services (DY), said base station transmitting an organizational data flow identifying said message type (TGAx) and services (DY); and

a plurality of different subscriber transmitter receiver sets (TG) dedicated to receive each message type (TGAx) and for transmitting messages to said base station, said receiver sets including a decoder for evaluating said organizational data flow, each subscriber receiver set including circuitry for processing only those messages (TGAx) and services (DY) which are associated with a given message and




service type, whereby a plurality of different classes of communication services may be offered using a common base station and said organizational data flow.

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**4,748,682**

## COMBINED DIVERSITY RECEIVING APPARATUS

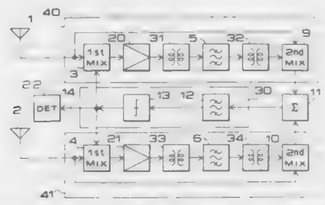
**Tadamasa Fukae, and Hiroshi Noda, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Jan. 7, 1986, Ser. No. 816,797**

**Claims priority, application Japan, Jan. 8, 1985, 60-1189; Jan. 8, 1985, 60-1190; Jan. 24, 1985, 60-12022; Jan. 28, 1985, 60-13828; Feb. 4, 1985, 60-19515; Feb. 4, 1985, 60-19517; Feb. 4, 1985, 60-19518**

**Int. Cl.[4] H04B** *11/16, 7/02*

**U.S. Cl. 455—137** **11 Claims**




1. A combined diversity receiving apparatus for receiving FM broadcasting signals which include a pilot signal at 19 kHz

first mixers for mixing received signals from at least two antennas respectively with a signal from a feedback circuit;

narrow band-pass filters connected to the outputs of said first mixers respectiely and having a band width such as to pass a random phase component due to fading and a main component of a modulation signal among received signals;

second mixers for mixing the output signals of said narrow band-pass filters with the received signals respectively;

a coupler for combining the outputs of said second mixers; and

a feedback circuit for feeding-back the output signal of said coupler to said first mixers;

the upper limit of the band width of said narrow band-pass filter being set so as not to pass the pilot signal of 19 kHz in FM broadcasting.



**4,748,683**

## ELECTRONIC TUNING TYPE FM RECEIVER

**Kazuhiro Sato, Shinagawa, Japan, assignor to Sony Corporation, Tokyo, Japan**

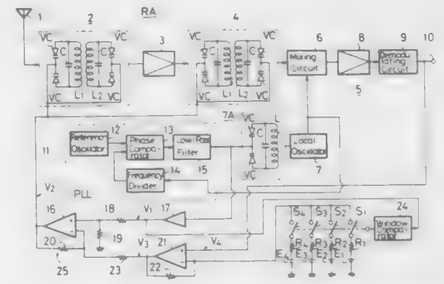
**PCT No. PCT/JP86/00217, § 371 Date Dec. 30, 1986, § 102(e) Date Dec. 30, 1986, PCT Pub. No. WO86/06565, PCT Pub. Date Nov. 6, 1986**

**PCT Filed Apr. 28, 1986, Ser. No. 12,669**

**Claims priority, application Japan, Apr. 30, 1985, 60-92807**

**Int. Cl.[4] H04B** *11/16, 1/10*

**U.S. Cl. 455—164** **3 Claims**




1. An electronic tuning type receiver comprising, a high frequency amplifying circuit (3) which receives the output of a tuning circuit (2) and having a voltage controlled type variable capacitance element (VC), a frequency converting circuit (6) which receives the output of said amplifying circuit, an intermediate frequency signal amplifying circuit (8) which receives the output of said frequency converting circuit, a demodulator circuit (9) which receives the output of said intermediate frequency signal amplifying circuit, a phase locked loop circuit (11), formed of a phase comparator 13, a reference oscillator (12) connected to said phase comparator (13), a programmable frequency divider (14) which supplies an input to said phase comparator and a low pass filter which receives the output of said phase comparator and the oscillation frequency of said frequency converting circuit is controlled by said programmable frequency divider, said electronic tuning type receiver including correcting voltage generating means (E1—E4:-Si—S4) for correcting the non-linearity of a tuning control voltage versus capacitance characteristics of said voltage-controlled type variable capacitance element, first adding means (21) for receiving a demodulated audio frequency signal (V4) from said demodulating circuit and an output (E1 or E2 or E3 or E4) of said correcting voltage generating means, and second adding means (16) receiving the output (V3) of said first adding means and an output (V1), of said low pass filter in said phase locked loop whereby the center frequency of said tuning circuit (2) is varied in response to the demodulated audio frequency signal and at the same time the non-linearity of said variable capacitor element is compensated.

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**4,748,684**

## FAST TUNING CONTROL FOR A TELEVISION SYSTEM

**W. Andrew Wright, Jr., Bethlehem, Pa., assignor to Information Resources, Inc., Chicago, Ill.**

**Continuation of Ser. No. 870,223, Jun. 3, 1986, abandoned. This application Jun. 29, 1987, Ser. No. 65,640**

**Int. Cl.[4] H04B** *1/16*

**U.S. Cl. 455—182** **17 Claims**

1. A fast tuning subsystem for use in switching from a current channel to a selected channel of a television system, said tuning subsystem comprising a tuner for selecting a channel to be received, said tuner including a voltage controlled oscillator having a control input for determining, in response to a control voltage applied to said control input, the channel frequency

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said tuner selectively receives; predictive means for supplying a selected predicted voltage signal to said control input of said oscillator, said predictive means including an associated memory means in which is stored signals corresponding to respective voltage signals predicted for applying to said oscillator to tune said tuner to receive the channel frequencies of the respective channels, and further including means interconnected between said memory means and said control input of said oscillator for applying a selected one of said respective predicted voltage signals as said selected predicted voltage signal to said control input of said oscillator, said oscillator being responsive to said selected predicted voltage signal to slew the channel frequency at a rapid slew rate to the frequency corresponding to said selected predicted voltage signal; error detecting means for generating a tuning error signal indicative of



the tuning error of the tuner off the frequency for the selected channel; and feedback means for combining said tuning error signal with said selected predicted voltage signal to provide a control signal at said control input for adjusting said channel frequency to reduce said tuning error, said feedback means having a correction mode and a station-keeping mode, said correction mode providing correction of any error in tuning of an acquired channel fast enough that the correction is substantially imperceptible to the eye and any residual error is substantially imperceptible to the eye, and said station-keeping mode operating slowly enough to filter out noise and spurious signals and maintain any residual error below a predetermined limit over long periods of time; and means for controlling the mode of said feedback means to enter the correction mode upon or shortly after application of said one of said predicted voltage signals and later to enter the station-keeping mode.

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**4,748,685**

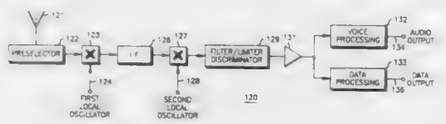
**MOBILE RADIO COMMUNICATIONS SYSTEM**

**Walter J. Rozanski, Jr., Hurst, Tex., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Oct. 10, 1986, Ser. No. 917,923**

**Int. Cl.[4] H01B** *1/16*

**U.S. Cl. 455—218** **4 Claims**




1. A remote squelch detect for use with a radio receiver having:

discriminator means for demodulating an incoming signal and for providing at an output thereof a demodulated signal;

squelch means for responding to said demodulated signal by closing a squelch gate in the presence of a viable demodulated signal and by opening said squelch gate in the absence of a viable demodulated signal;

signal processing means for rendering at least a portion of said demodulated signal audible when said squelch gate is open;

the remote squelch detect comprising:

(A) audio signal source means for providing an audio signal;

(B) switch means for selectively connecting said squelch means to said discriminator means output and to said audio signal source means; and

(C) signal detect means for detecting the presence of said audio signal at the output of said signal processing means, such that said signal detect means will provide a squelch indication signal whenever said switch means connects said audio signal source means to said squelch means and said squelch gate is opened.

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**4,748,686**

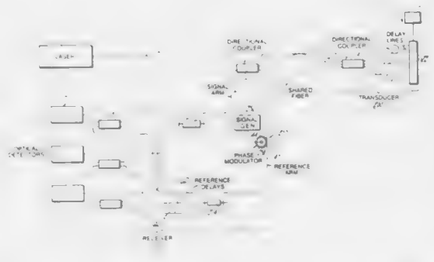
**COHERENCE MULTIPLEXED OPTICAL POSITION TRANSDUCER**

**Walter L. Glomb, Ellington, Conn., assignor to United Technologies Corporation, Hartford, Conn.**

**Filed Oct. 15, 1986, Ser. No. 919,274**

**Int. Cl.[4] H04B** *9/00*

**U.S. Cl. 455—605** **3 Claims**




1. A system for remotely sensing a parameter comprising:

a laser for generating an optical carrier signal of optical radiation at an optical carrier signal frequency and directing said optical radiation into a source optical fiber of a network of optical fibers, said optical radiation having a predetermined coherence length within said network of optical fibers;

a reference set of at least two reference optical fibers in a detection unit;

fiber optic transmission means, within said network of optical fibers, for carrying optical signals from said detection unit to a remote location and for carrying modulated optical signals from said remote location to said detection unit;

means for modulating said optical carrier signal;

a sensing unit having at least two sensing optical fibers corresponding to said at least two reference optical fibers;

means for detecting modulated signals; characterized in that;

a first optical coupler is attached to said source optical fiber for receiving said optical carrier signal and coupling optical radiation from said source fiber into a set of intermediate fibers and for coupling optical signals transmitted from said remote location into selected ones of said set of intermediate fibers;

a transmission fiber, that is one of said set of intermediate fibers, extends from said first directional coupler to said remote location;

a second optical coupler is located at said remote location for coupling radiation to and from said transmission fiber and said set of at least two sensor fibers which are connected in parallel to said second optical coupler; said set of at least two sensor fibers includes at least one nth sensor fiber, having a sensor fiber end and an nth sensor delay length, for receiving optical radiation at said carrier signal frequency, for transmitting said optical radiation to said sensor fiber end, and for transmitting an nth amplitude modulated sensor signal of optical radiation at said carrier signal frequency from said sensor fiber end to said second optical coupler;

a modulation device is positioned at said sensor end, for amplitude modulating said optical radiation in accordance with a data parameter and for coupling amplitude modulated optical radiation back into said sensor end;

said set of at least two reference fibers includes at least one reference optical fiber that is one of said set of intermediate fibers, having an nth reference delay length that corresponds to said nth sensor delay length, and being connected between said first optical coupler and an nth optical radiation detector, for receiving optical radiation coupled from said source optical fiber through said first optical coupler and for carrying said optical radiation as a reference optical signal;

said detection unit includes at least one signal optical fiber, connected to said first directional coupler, for receiving said nth sensor signal of optical radiation coupled from said transmission fiber through said first optical coupler and for transmitting said nth sensor signal to said nth optical radiation detector;

means for impressing a phase modulation signal at a phase modulation frequency on one of said reference optical signal in said at least one reference optical fiber or said nth sensor signal in said at least one signal optical fiber;

in which system, said predetermined coherence length is less than a predetermined delay length difference that is the smallest difference between any two delay lengths of said set of sensor fibers, whereby only said nth sensor signal is coherent with said nth reference optical signal at said nth optical detector, and said nth optical radiation detector generates a signal at said phase modulation frequency representative of said nth sensor signal.

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**4,748,687**

**NARROW BAND LASER TRANSMITTER**

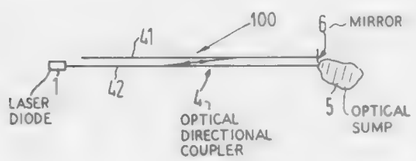
**Franz Auracher, Baierbrunn; Hartmut Schneider, Munich, and Georg Böeck, Berlin, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Jul. 22, 1985, Ser. No. 757,444**

**Claims priority, application Fed. Rep. of Germany, Sep. 25, 1984, 3435172**

**Int. Cl.[4] H04B** *9/00*; **H01S** *3/08*

**U.S. Cl. 455—609** **15 Claims**




1. In a narrow band laser transmitter comprising a semiconductor laser, an external optical resonator and means for coupling the laser to the resonator for generating very narrow line widths, the improvement comprising said external optical resonator being composed of a wavelength-selective optical directional coupler having two waveguides, one of the two waveguides being coupled to the laser with an end face of the one waveguide lying close to the laser, and the other of the two waveguides having an end remote from the laser being provided with a mirror.

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**4,748,688**

**ELECTROMAGNETIC WAVE RECEIVER**

**Ronald J. Coash, Lincoln, Nebr., assignor to Emhart Industries, Inc., Indianapolis, Ind.**

**Filed Apr. 28, 1986, Ser. No. 856,482**

**Int. Cl.[4] H04B** *1/10*

**U.S. Cl. 455—212** **4 Claims**



1. A receiver comprising:

means for receiving an electromagnetic carrier wave frequency modulated by a message signal said carrier wave characterized by a modulation frequency change,

detector circuit means for separating said message signal from said carrier wave and for producing a detector signal which includes said message signal, said detector circuit means characterized by a detectable bandwidth and having a Q ratio sufficiently low that the detectable bandwidth is more than twice as large as the modulation frequency change; and

output means responsive to said detector signal for providing an output signal when said carrier wave is being received.

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**4,748,689**

**FIBER-OPTIC DISTRIBUTION SYSTEM FOR BROADBAND SIGNALS**

**Friedemann Mohr, Renningen, Fed. Rep. of Germany, assignor to Alcatel, N.V., Amsterdam, Netherlands**

**Filed Jul. 24, 1986, Ser. No. 889,976**

**Claims priority, application Fed. Rep. of Germany, Aug. 7, 1985, 3528252**

**Int. Cl.[4] H04B** *9/00*

**U.S. Cl. 455—612** **3 Claims**



1. In a fiber-optic distribution system for broadband signals transmitted from a communications network to a plurality of subscribers and for narrowband signals transmitted from the individual subscribers, a network termination circuit for use with at least three subscriber terminals, the network termination circuit comprising:

a multiport optical coupler for separating a forward communications network channel and a backward communications network channel and for distributing the broadband signals to, and the narrowband signals from, each of at

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least three individual terminals, said fiber-optic multiport coupler (**10**) being made by fusing, and

at least three optical fibers each having a subscriber end which forms at least a portion of both the forward broadband channel to and the backward narrowband channel from one of the subscriber terminals,

wherein:

the other end of at least one of the optical fibers remote from its respective subscriber end forms the forward channel for the broadband signals from the communications network to the coupler, and

at least two other ends of the remaining optical fibers are optically combined to form the narrow-band backward channel.

# DESIGN PATENTS

## GRANTED MAY 31, 1988

### ERRATA

| For CLASS | See PATENT NO. |
|---|---|
| D09-305 | 295,946 |
| D19-085 | 295,992 |

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1090

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31

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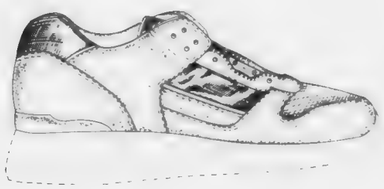


295,915
WAISTBAND FOR PANTS
Trevor I. Baptiste, 383 Grand Ave., Brooklyn, N.Y. 11238
Filed May 13, 1985, Ser. No. 733,697
Term of patent 14 years
U.S. Cl. D2—25

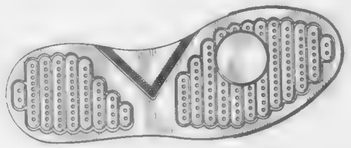


295,916
SHOE UPPER
Lawrence Selbiger, Portland, Oreg., assignor to AVIA Group International, Inc., Portland, Oreg.
Filed Aug. 21, 1987, Ser. No. 87,903
Term of patent 14 years
U.S. Cl. D2—314





295,917
SHOE OUTSOLE
Paul D. Brown, Hingham, and Juan A. Diaz, Weymouth, both of Mass., assignors to Reebok International Ltd., Canton, Mass.
Filed Feb. 6, 1987, Ser. No. 11,704
Term of patent 14 years
U.S. Cl. D2—320

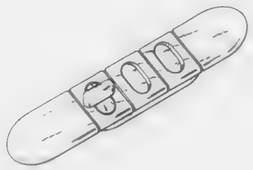




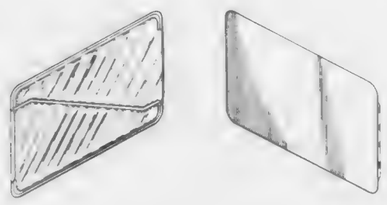
295,918
UMBRELLA HANDLE
Ann S. Cain, Cincinnati, Ohio, assignor to 'totes', incorporated, Loveland, Ohio
Filed Oct. 28, 1987, Ser. No. 114,526
Term of patent 14 years
U.S. Cl. D3—12



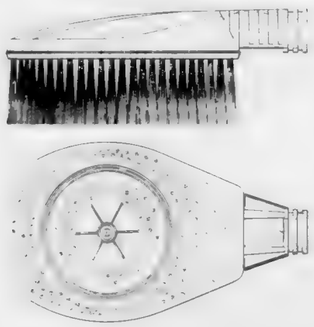
295,919
CLOSURE FOR BAG, KNAPSACK, OR THE LIKE
Hasuike Makio, Via Mario Donati no. 8, Milan, Italy
Filed Jul. 15, 1985, Ser. No. 754,887
Claims priority, application Italy, Jan. 24, 1985, 20583/85[U]
Term of patent 14 years
U.S. Cl. D3—54



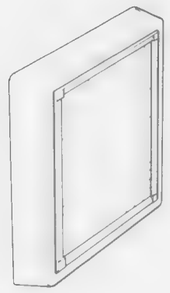
295,920
KEYCARD
Howard A. Osofsky, 75 Weiss Rd., Upper Saddle River, N.J. 07458, and Franklin H. Sinclair, Oradell, N.J., assignors to Howard A. Osofsky, Upper Saddle River, N.J.
Filed Oct. 29, 1984, Ser. No. 665,561
Term of patent 14 years
U.S. Cl. D3—61



295,921
ROTARY BRUSH FOR WASHING MOTOR VEHICLES OR THE LIKE
Oliviano Spadotto, Pordenone; Gianfranco Roman, Pasiano, and Claudio Da Rold, Pordenone, all of Italy, assignors to Claber S.p.A., Fiume Veneto, Italy
Filed Nov. 22, 1985, Ser. No. 806,171
Claims priority, application Italy, May 23, 1985, 21928/85[U]
Term of patent 14 years
U.S. Cl. D4—115



295,922
ILLUMINATED PICTURE FRAME
Arthur R. Huffman, Indian Trail, N.C., assignor to D.I.D. Corporation, Charlotte, N.C.
Filed Oct. 31, 1985, Ser. No. 793,182
Term of patent 14 years
U.S. Cl. D6—308



295,923
CHAIR
Violetta Williamson, 1423 Easton Ave., Bethlehem, Pa. 18018
Division of Ser. No. 705,440, Feb. 25, 1985. This application Aug. 6, 1987, Ser. No. 63,633
Term of patent 14 years
U.S. Cl. D6—358



295,924
CHAIR FRAME
Gerald T. Raney, Orange, Calif., assignor to Pacific Sun Casual Furniture, Inc., Hemet, Calif.
Filed Jan. 2, 1986, Ser. No. 815,805
Term of patent 14 years
U.S. Cl. D6—365

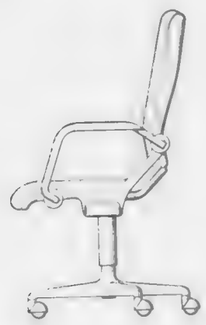




295,925
CHAIR
Claus Uredat-Neuhoff, Lindern, Fed. Rep. of Germany, assignor to Roeder GmbH Sitzmoebelwerke, Frankfurt, Fed. Rep. of Germany
Filed Apr. 12, 1985, Ser. No. 722,529
Claims priority, application Fed. Rep. of Germany, Oct. 15, 1984, 73 AR 677/84
Term of patent 14 years
U.S. Cl. D6—366



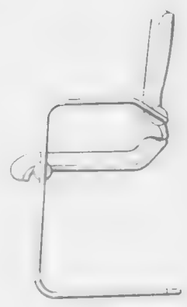
295,926
CHAIR
Claus K. Uredat, Lindern/Oldenburg, Fed. Rep. of Germany, assignor to Cirkel B.V., Zwanenburg, Netherlands
Filed Dec. 24, 1986, Ser. No. 813,082
Claims priority, application Benelux, Jun. 26, 1985, 60163-05
Term of patent 14 years
U.S. Cl. D6—366



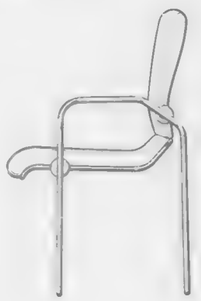
295,927
CHAIR
William S. Hickey, Grosse Pointe Farms, Mich., assignor to Willsboro Wood Products, Detroit, Mich.
Filed Oct. 28, 1985, Ser. No. 791,929
Term of patent 14 years
U.S. Cl. D6—370



295,928
CHAIR
Claus K. Uredat, Lindern/Oldenburg, Fed. Rep. of Germany, assignor to Cirkel B.V., Zwanenburg, Netherlands
Filed Dec. 24, 1985, Ser. No. 813,081
Claims priority, application Benelux, Jun. 26, 1985, 60163-01
Term of patent 14 years
U.S. Cl. D6—372



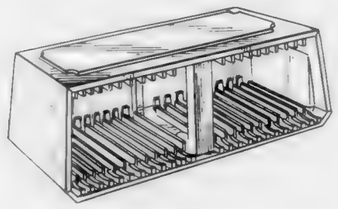
295,929
CHAIR
Claus K. Uredat, Lindern/Oldenburg, Fed. Rep. of Germany, assignor to Cirkel B.V., Zwanenburg, Netherlands
Filed Dec. 24, 1985, Ser. No. 813,083
Claims priority, application Benelux, Jun. 26, 1985, 60163-04
Term of patent 14 years
U.S. Cl. D6—379



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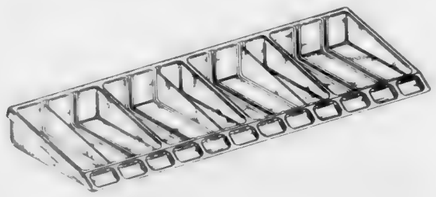
295,930
**STORAGE CASE FOR COMPACT DISCS OR THE LIKE**
Craig D. Drake, and Ross A. Jessen, both of Muscatine, Iowa, assignors to Ring King Visibles, Inc., Muscatine, Iowa
Filed Nov. 14, 1985, Ser. No. 804,980
Term of patent 14 years
U.S. Cl. D6—407



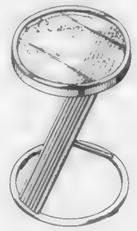
295,931
**DISPLAY RACK**
George A. Bezzerides, Suisun, Calif., assignor to Bezzerides Company, Benicia, Calif.
Filed Jun. 20, 1985, Ser. No. 746,966
Term of patent 14 years
U.S. Cl. D6—463



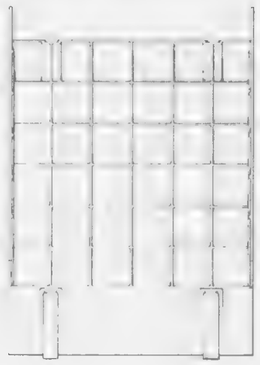
295,932
**DISPLAY BIN**
Derwyn Cugley, Brea, Calif., assignor to VSI Fasteners, Inc., Stanton, Calif.
Filed Nov. 27, 1985, Ser. No. 803,495
Term of patent 14 years
U.S. Cl. D6—476



295,933
**CIGARETTE TABLE**
Donald B. Colby, Sarasota, Fla., assignor to Tropitone Furniture Company, Inc., Sarasota, Fla.
Filed Apr. 29, 1986, Ser. No. 857,535
Term of patent 14 years
U.S. Cl. D6—483



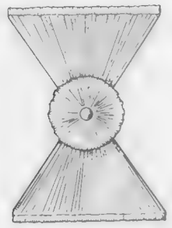
295,934
**MODULAR TICKET RACK**
Julian R. Dyrhood, 7416 Euper La., Fort Smith, Ark. 72901
Filed Apr. 1, 1985, Ser. No. 718,298
Term of patent 14 years
U.S. Cl. D6—571

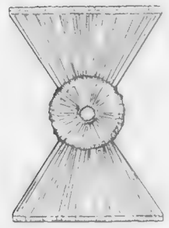




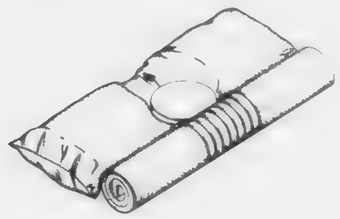


295,935
**CURTAIN**
Leona H. Estabrook, 212 S. Mariposa, Burbank, Calif. 91506
Filed Oct. 3, 1985, Ser. No. 783,914
Term of patent 14 years
U.S. Cl. D6—578

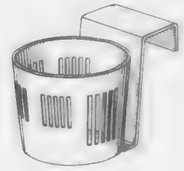


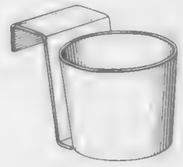


295,936
**ORTHOPEDIC PILLOW**
Janice L. Sanders, 3809 Lynbrook La., Arlington, Tex. 76015
Filed Nov. 29, 1985, Ser. No. 806,941
Term of patent 14 years
U.S. Cl. D6—601

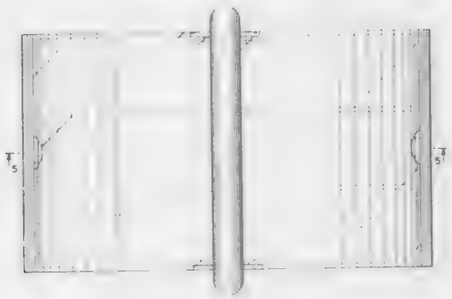


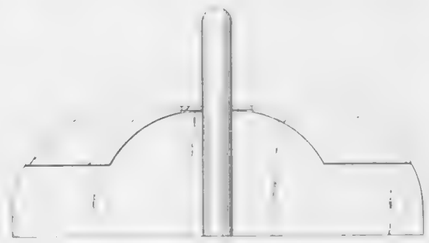
295,937
**PORTABLE RECEPTACLE**
Alan J. Corbett, 3175 Cauby St., #110, San Diego, Calif. 92110
Filed Aug. 30, 1985, Ser. No. 771,257
Term of patent 14 years
U.S. Cl. D7—70





295,938
**CUTLERY CANTEEN**
Furio Minuti, Macerata, Italy, assignor to Fratelli Guzzini S.p.A., Recanati, Italy
Filed Jul. 2, 1986, Ser. No. 881,201
Claims priority, application Italy, Jan. 8, 1986, 20417/86[U]
Term of patent 14 years
U.S. Cl. D7—73

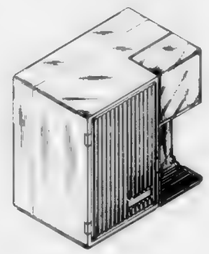


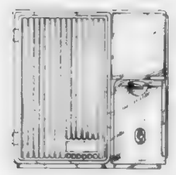


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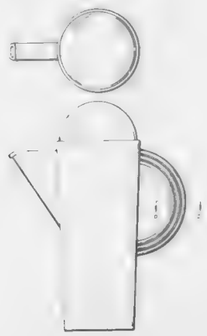


295,939
**IN-HOME BEVERAGE DISPENSER**
Charles M. Dole, Purdys, N.Y.; Gary L. Webster, Fairfield, Conn.; Scott W. Miller, Milford, Conn., and Robert G. Karlis, Fairfield, Conn., assignors to Cadbury Schweppes PLC, London, England
Filed Nov. 20, 1985, Ser. No. 805,894
Term of patent 14 years
U.S. Cl. D7—309





295,940
**COFFEE POT**
Mario Bellini, Milan, Italy, assignor to Rosenthal Aktiengesellschaft Rechtsabt., Fed. Rep. of Germany
Filed Aug. 21, 1985, Ser. No. 767,959
Claims priority, application Fed. Rep. of Germany, Feb. 21, 1985, 7477
Term of patent 14 years
U.S. Cl. D7—321

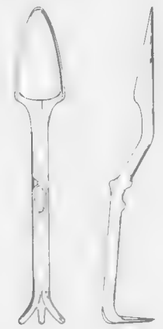


295,941
**COFFEE POT**
Bjorn Wiinblad, Lausanne, Switzerland, assignor to Rosenthal Aktiengesellschaft Rechts., Fed. Rep. of Germany
Filed Aug. 21, 1985, Ser. No. 767,954
Claims priority, application Fed. Rep. of Germany, Feb. 21, 1985, 7477
Term of patent 14 years
U.S. Cl. D7—321





295,942
**COMBINED TROWEL AND RAKE**
Elizabeth A. Featherman; Raymond B. Featherman, III, both of 1000 Black Rock Rd., Gladwyne, Pa. 19035, and Fred W. Bowen-Smith, Philadelphia, Pa., assignors to Elizabeth A. Featherman and Raymond B. Featherman, III, both of Gladwyne, Pa.
Filed Aug. 26, 1985, Ser. No. 769,013
Term of patent 14 years
U.S. Cl. D8—10

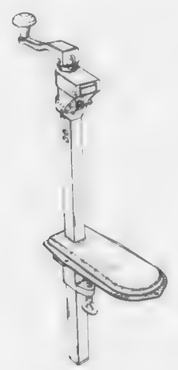




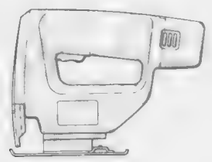
295,943
**FUME EXTRACTING SOLDERING IRON**
Neil J. Borley, Wallington, England, assignor to Adcola Products Limited, London, England
Filed Sep. 26, 1985, Ser. No. 780,179
Claims priority, application Canada, Jul. 12, 1985, 12-07-85-6
Term of patent 14 years
U.S. Cl. D8—30



295,944
**CAN-OPENER**
William A. Cooper, Uckfield, England, assignor to Mitchell & Cooper Limited, Sussex, England
Continuation-in-part of Ser. No. 461,127, Jan. 26, 1983, abandoned. This application Nov. 8, 1985, Ser. No. 804,003
Term of patent 14 years
U.S. Cl. D8—33



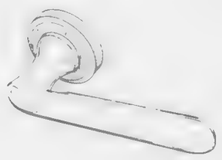
295,945
**PORTABLE ELECTRIC JIG SAW**
Masakazu Sakamoto, and Toshiaki Saito, both of Tokyo, Japan, assignors to Ryobi Ltd., Hiroshima, Japan
Filed Nov. 19, 1986, Ser. No. 932,905
Claims priority, application Japan, Jul. 30, 1986, 61-30081
Term of patent 14 years
U.S. Cl. D8—64



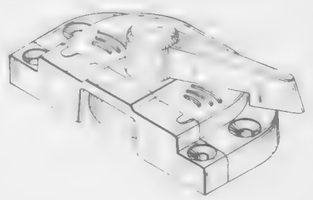
295,946
**WATER CONTAINER**
Raoul Gautier, Belmont-sur-Vair, 88800 Vittel, France
Filed Sep. 13, 1984, Ser. No. 650,047
Claims priority, application France, Mar. 22, 1984, 104
Term of patent 14 years
U.S. Cl. D9—305



295,947
**HANDLE**
Pasquale Valli, Renate, Italy, assignor to Valli & Colombo S.p.A., Italy
Filed Feb. 18, 1986, Ser. No. 833,742
Claims priority, application Italy, Aug. 30, 1985, 22857/85[U]
Term of patent 14 years
U.S. Cl. D8—308



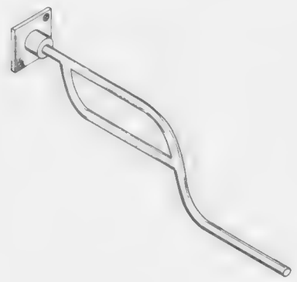
295,948
**WINDOW SASH LOCK**
Theodore J. Mandell, 14 Fox Ct., Syosset, N.Y. 11791
Filed Jan. 27, 1986, Ser. No. 822,534
Term of patent 14 years
U.S. Cl. D8—337



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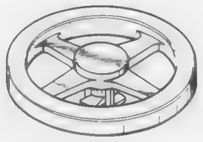
295,949
**COMBINATION CARGO BELT-STRAP WINDER ASSEMBLY**
Charles F. Ferrell, Rte. 3, Box 42, Steele, Mo. 68377-1314
Filed May 2, 1986, Ser. No. 859,257
Term of patent 14 years
U.S. Cl. D8—359



295,950
**PAIR OF SUPPORT BRACKETS FOR A SHELF OR THE LIKE**
Robert J. Johnston, Burlington, Canada, assignor to Arbell Inc., Ontario, Canada
Filed Sep. 4, 1986, Ser. No. 905,936
Term of patent 14 years
U.S. Cl. D8—381



295,951
**FASTENER OR THE LIKE**
Hiroshi Osada, Yokohama, Japan, assignor to Nifco Inc., Yokohama, Japan
Filed Dec. 10, 1985, Ser. No. 807,363
Claims priority, application Japan, Jun. 26, 1985, 60-27057
The portion of the term of this patent subsequent to May 17, 2002, has been disclaimed.
Term of patent 14 years
U.S. Cl. D8—382





295,952
**BUTT GLAZE GLASS CLIP**
John Frey, Monterey Park, Calif., assignor to International Aluminum Corporation, Monterey Park, Calif.
Filed May 21, 1985, Ser. No. 736,279
Term of patent 14 years
U.S. Cl. D8—382

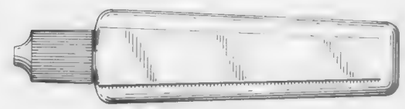




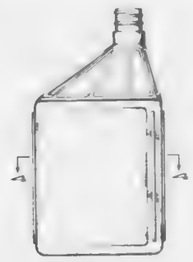
295,953
**FASTENER OR THE LIKE**
Toshie Tanaka, Yokohama, Japan, assignor to Nifco Inc., Yokohama, Japan
Filed Jun. 3, 1986, Ser. No. 870,336
Claims priority, application Japan, Dec. 20, 1985, 60-52727
Term of patent 14 years
U.S. Cl. D8—382



295,954
**CONTAINER FOR TYPE CORRECTION FLUID**
Kenneth J. Kirchhoff, Gem Lake, Minn., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.
Filed May 13, 1985, Ser. No. 733,490
Term of patent 14 years
U.S. Cl. D9—371



295,955
**BOTTLE**
Louis B. LeFevre, Houston, Tex., assignor to Conoco Inc., Ponca City, Okla.
Filed Sep. 23, 1985, Ser. No. 779,000
Term of patent 14 years
U.S. Cl. D9—375



295,956
**PACKAGING CONTAINER OR THE LIKE**
Robert D. Holewinski, Lakehurst, and Leslie Hamilton, Trenton, both of N.J., assignors to Johnson & Johnson Dental Products Company, East Windsor, N.J.
Filed Jul. 8, 1985, Ser. No. 752,869
Term of patent 14 years
U.S. Cl. D9—398



295,957
**HOLDER FOR A TISSUE BOX**
Howard Sussman, 3101 NW. 25th Ave., Pompano Beach, Fla. 33069
Filed Aug. 2, 1985, Ser. No. 761,853
Term of patent 14 years
U.S. Cl. D9—418



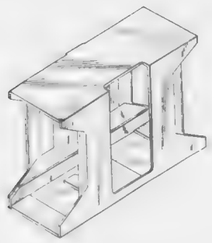
295,958
**PACKAGING CONTAINER**
Richard E. Pugh, Lancaster, Ohio, assignor to Anchor Hocking Corporation, Lancaster, Ohio
Division of Ser. No. 630,183, Jul. 12, 1984. This application Mar. 8, 1987, Ser. No. 21,015
Term of patent 14 years
U.S. Cl. D9—418



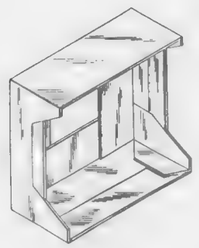
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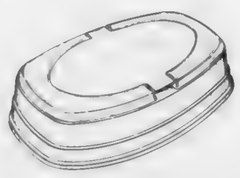
295,959
PACKAGING CONTAINER
Richard E. Pugh, Lancaster, Ohio, assignor to Anchor Hocking Corporation, Lancaster, Ohio
Division of Ser. No. 630,183, Jul. 12, 1984. This application Mar. 13, 1987, Ser. No. 25,803
Term of patent 14 years
U.S. Cl. D9—418



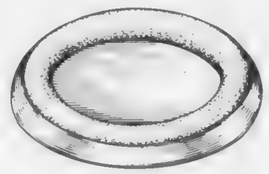
295,960
PACKAGING CONTAINER
Richard E. Pugh, Lancaster, Ohio, assignor to Anchor Hocking Corporation, Lancaster, Ohio
Division of Ser. No. 630,183, Jul. 12, 1984. This application Feb. 13, 1987, Ser. No. 15,331
Term of patent 14 years
U.S. Cl. D9—418



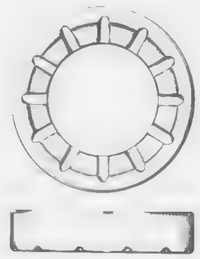
295,961
CONTAINER
Henry L. Holly, North Brunswick, N.J., assignor to Personal Products Company, Milltown, N.J.
Filed May 1, 1985, Ser. No. 729,492
Term of patent 14 years
U.S. Cl. D9—420



295,962
LABORATORY FLASK SUPPORT
Daniel R. Conlon, Jenkintown, Pa., assignor to Instruments For Research and Industry, Cheltenham, Pa.
Filed Dec. 20, 1985, Ser. No. 811,341
Term of patent 14 years
U.S. Cl. D9—455



295,963
LABORATORY FLASK SUPPORT
Daniel R. Conlon, Jenkintown, Pa., assignor to Instruments For Research and Industry, Cheltenham, Pa.
Filed Dec. 20, 1985, Ser. No. 811,342
Term of patent 14 years
U.S. Cl. D9—455



295,964
WALL CLOCK
Jonathan Woodward, 83 Norton Ave., Clinton, N.Y. 13323
Filed Jul. 12, 1985, Ser. No. 754,222
Term of patent 14 years
U.S. Cl. D10—22

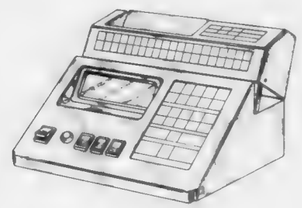





295,965
WATCH
Patrick J. Murphy, Buffalo, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.
Filed Nov. 1, 1985, Ser. No. 794,060
Term of patent 14 years
U.S. Cl. D10—32



295,966
SURFACE TESTING MACHINE
Karl Hutter, VS-Mühlhausen; Jürgen Wälde, Stuttgart; Thomas Weissweiler, Brigachtal-Klengen; Werner Lenz, Rimbach; Bernd Dreier, Mannheim; Jörg Schmidt, Dauchingen; Ernst Schwär, VS-Mühlhausen, and Eckehart Gortat, VS-Schwenningen, all of Fed. Rep. of Germany, assignors to Hommelwerke GmbH, Fed. Rep. of Germany
Filed Jun. 19, 1985, Ser. No. 746,990
Claims priority, application Fed. Rep. of Germany, Dec. 23, 1984, MR1235
Term of patent 14 years
U.S. Cl. D10—46



295,967
TROPHY ORNAMENT
Ray H. Pierce, Gravenhurst, Canada, assignor to Tromar Corporation Ltd., Mississauga, Canada
Filed Jan. 30, 1986, Ser. No. 823,930
Claims priority, application Canada, Jan. 6, 1986, 06-01-86-1
Term of patent 14 years
U.S. Cl. D11—161





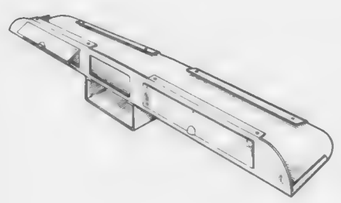
295,968
FINGER RING OR THE LIKE
Patricia J. Anderson, 4616 Ile Ct., Fayetteville, N.C. 28304
Filed Jul. 1, 1985, Ser. No. 750,025
Term of patent 14 years
U.S. Cl. D11—30



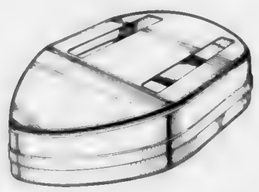
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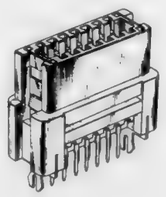
295,969
**TRUCK CAB INTERIOR CONSOLE**
Jerry D. Hooks, 6917 Windswept Cir., Fort Worth, Tex. 76135, and Jesse L. Thompson, 4921 White Settlement Rd., Fort Worth, Tex. 76114
Filed Sep. 22, 1986, Ser. No. 910,428
Term of patent 14 years
U.S. Cl. D12—155



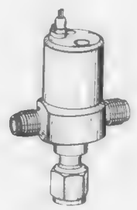
295,970
**WIND FAIRING**
Robert B. McNab, P.O. Box 3689, Bristol, Tenn. 37625, and James A. Wolfe, #9 Foxxborough La., Johnson City, Tenn. 37601
Filed Jul. 3, 1985, Ser. No. 751,426
Term of patent 14 years
U.S. Cl. D12—345



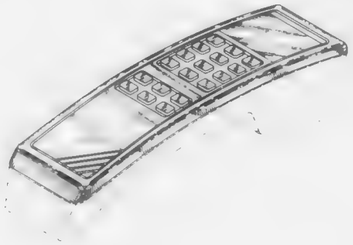
295,971
**ELECTRIC CONNECTOR RECEPTACLE OR THE LIKE**
Sigeru Kikuta, Tokyo, Japan, assignor to Hirose Electric Co., Ltd., Tokyo, Japan
Filed Mar. 29, 1985, Ser. No. 718,211
Claims priority, application Japan, Oct. 2, 1984, 59-40898; Oct. 2, 1984, 59-40899; Oct. 2, 1984, 59-40900; Oct. 2, 1984, 59-40901; Feb. 26, 1985, 60-7258; Feb. 26, 1985, 60-7259; Feb. 26, 1985, 60-7260; Feb. 26, 1985, 60-7261
Term of patent 14 years
U.S. Cl. D13—25



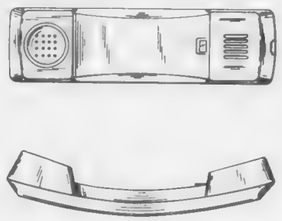
295,972
**ADJUSTABLE FLOW SWITCH**
Richard Hughes, c/o Autoflow Products Co., 18442 S. Broadway, Gardena, Calif. 90248
Filed Oct. 24, 1985, Ser. No. 791,136
Term of patent 14 years
U.S. Cl. D13—32



295,973
**OPERATIVE DIAL-TOP HOUSING PANEL FOR HANDSET TELEPHONE OR SIMILAR ARTICLE**
Albert L. Nagele, Wilmette, Ill., assignor to Motorola, Inc., Schaumburg, Ill.
Filed Mar. 3, 1987, Ser. No. 21,361
Term of patent 14 years
U.S. Cl. D14—66

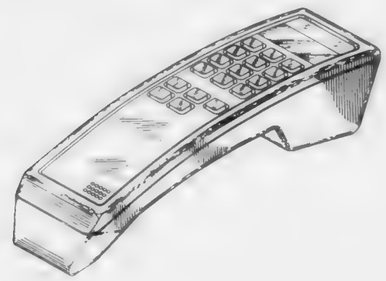


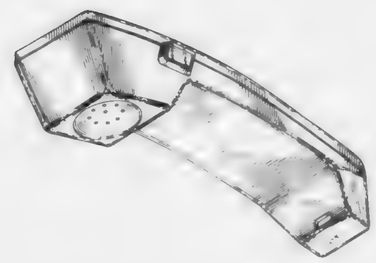
295,974
**TELEPHONE HANDSET**
Kenneth L. Reichenstein, 269-32P Grand Central Pkwy., Floral Park, N.Y. 11005
Filed Jun. 20, 1986, Ser. No. 876,899
Term of patent 14 years
U.S. Cl. D14—63



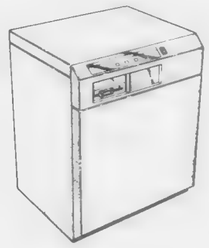


295,975
**HANDSET TELEPHONE OR SIMILAR ARTICLE**
Terrance N. Taylor, Cary, and Robert Stinauer, Glendale Heights, both of Ill.
Filed Sep. 27, 1985, Ser. No. 781,390
Term of patent 14 years
U.S. Cl. D14—64

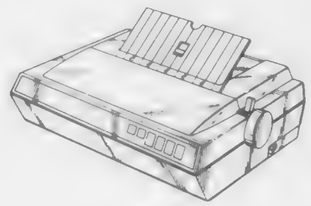




295,976
**MULTIFUNCTION COMMUNICATION CONTROLLER**
Leonard R. Aremka, Chicago; Albert Bischof, Norwood Park Township, Cook County; Detlef A. Brodrueck, Northbrook, all of Ill.; Donald M. Genaro, Haworth, N.J., and Chris G. Johnson, New York, N.Y., assignors to AT&T Teletype Corporation, Skokie, Ill.
Filed Nov. 14, 1985, Ser. No. 805,064
Term of patent 14 years
U.S. Cl. D14—102



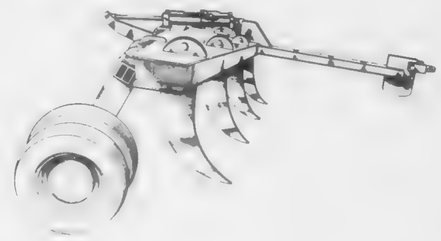
295,977
**PRINTER FOR A COMPUTER**
Akijiro Shibayama, Tokyo, Japan, assignor to C. Itoh & Co., Ltd., Osaka, Japan
Filed Oct. 10, 1985, Ser. No. 786,121
Claims priority, application Japan, Jul. 9, 1985, 60-28943
Term of patent 14 years
U.S. Cl. D14—111



295,978
**COMPUTER DISPLAY**
Robert Brunner, Palo Alto, Calif., assignor to TeleVideo Systems, Inc., Sunnyvale, Calif.
Filed Aug. 30, 1985, Ser. No. 771,331
Term of patent 14 years
U.S. Cl. D14—113



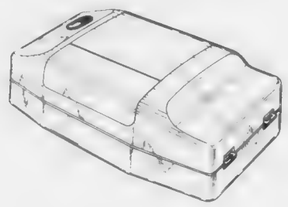
295,979
**CULTIVATOR TOOL**
Esmael Baeta, 21284 N. Ray Rd., Lodi, Calif. 95240
Filed May 31, 1985, Ser. No. 739,532
Term of patent 14 years
U.S. Cl. D15—27



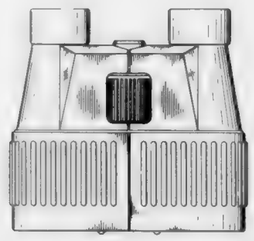
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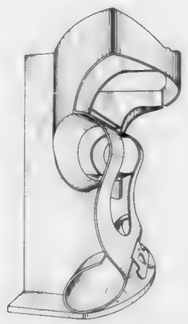
295,980
**CAMERA CASE OR SIMILAR ARTICLE**
John R. Peterson, Brooklyn; James M. Ryan, New York, both of N.Y.; George D. Whiteside, Lexington, and Richard A. Wingate, Medway, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.
Filed Jun. 4, 1986, Ser. No. 870,734
Term of patent 14 years
U.S. Cl. D16—10



295,981
**BINOCULARS**
Steven E. Hilko, Buffalo, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.
Filed Oct. 10, 1985, Ser. No. 786,293
Term of patent 14 years
U.S. Cl. D16—133



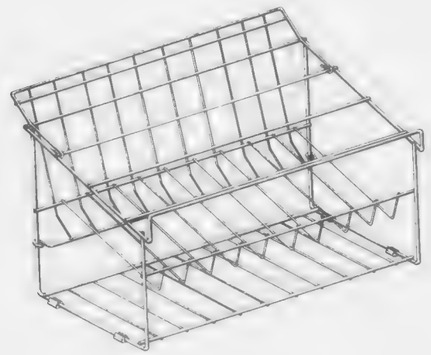
295,982
**CASE FOR AN ORCHESTRION**
Stephen J. Gagliano, 35 Coral Ct., Malverne, N.Y. 11565
Filed Oct. 29, 1985, Ser. No. 792,699
Term of patent 14 years
U.S. Cl. D17—5



295,983
**CLIP CALCULATOR**
William Chu, 14 Fl., 156 Nanking E. Road, Sec. 5, Taipei, Taiwan
Filed Jul. 29, 1985, Ser. No. 759,905
Term of patent 14 years
U.S. Cl. D18—2



295,984
**PRINTER STAND**
Wallace R. Currie, Dallas, Tex., assignor to Balt, Inc., Irving, Tex.
Filed Jun. 20, 1986, Ser. No. 876,388
Term of patent 14 years
U.S. Cl. D18—23



295,985
**BALL POINT PEN**
Claude Grossiord, Annecy, France, assignor to S. T. Dupont, Paris, France
Filed Sep. 17, 1985, Ser. No. 776,950
Claims priority, application France, Mar. 19, 1985, 85 1255
Term of patent 14 years
U.S. Cl. D19—49

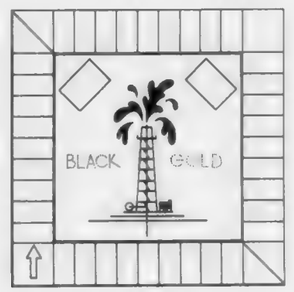




295,986
**SPEED-READING MACHINE**
Mou-Shih Wang, No. 40, Lane 64, Sze Wei Road, Taipei, Taiwan
Filed Dec. 30, 1985, Ser. No. 814,237
Term of patent 14 years
U.S. Cl. D19—60



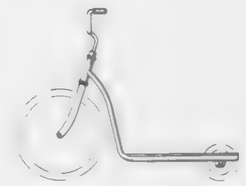
295,987
**GAME BOARD**
Roy L. Denton, and William H. Denton, both of P.O. Box 34, Dayton, Tenn. 37321
Filed May 3, 1985, Ser. No. 729,962
Term of patent 14 years
U.S. Cl. D21—25



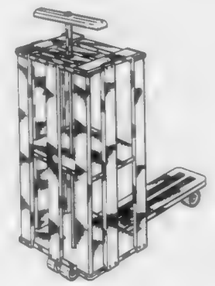

295,988
**TOY ROCKING KANGAROO**
Adrian Vanderlugt, Lot 6, Bennett Road, Strathdickie Proserpine, Queensland 4800, Australia
Filed Nov. 13, 1985, Ser. No. 805,106
Claims priority, application Australia, Aug. 7, 1985, 2152/85
Term of patent 14 years
U.S. Cl. D21—69

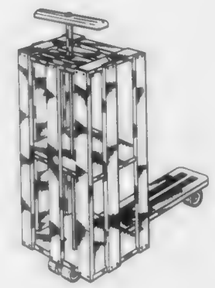


295,989
**SCOOTER FRAME**
Darold B. Cummings, 18720 Korablum Ave., Torrance, Calif. 90504
Filed Feb. 13, 1987, Ser. No. 14,915
Term of patent 14 years
U.S. Cl. D21—80



295,990
**SCOOTER**
Raymond W. Hanna, 32 Knighton Drive, Toronto, Ontario M4A 1W1, and Thomas Mulholland, 139 Oakmeadow Blvd., Scarborough, Ontario M1E 4H2, both of Canada
Filed Jun. 9, 1986, Ser. No. 872,434
Claims priority, application Canada, Jan. 2, 1986, 02-01-86-1
Term of patent 14 years
U.S. Cl. D21—81





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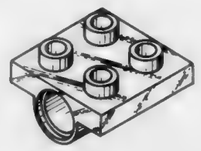
295,991
SCOOTER
Raymond W. Hanna, Toronto, and Thomas T. Mulholland, Scarborough, both of Canada, assignors to Skooter-Board Canada Inc., Toronto, Canada
Filed Nov. 17, 1986, Ser. No. 931,358
Claims priority, application Canada, Sep. 25, 1986, 29-09-86-4
Term of patent 14 years
U.S. Cl. D21—81



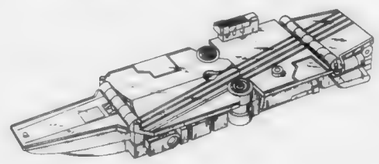
295,992
PEN SET
Arlan D. Lothe, Sun Prairie, Wis., assignor to Don Evans, Inc., DeForest, Wis.
Filed Aug. 19, 1985, Ser. No. 766,717
Term of patent 14 years
U.S. Cl. D19—85

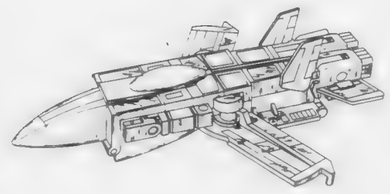


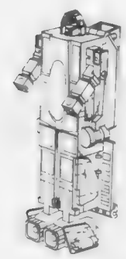
295,993
TOY CONSTRUCTION PIECE
Jens N. Knudsen, Billund, Denmark, assignor to Interlego A.G., Baar, Switzerland
Filed Nov. 26, 1986, Ser. No. 935,561
Term of patent 14 years
U.S. Cl. D21—108



295,994
RECONFIGURABLE TOY AIRCRAFT-CARRIER
Kaoru Matsumoto, Tokyo, Japan, assignor to Takara Co., Ltd., Tokyo, Japan
Filed Jan. 28, 1986, Ser. No. 823,360
Claims priority, application Japan, Dec. 17, 1985, 60-52520
Term of patent 14 years
U.S. Cl. D21—150







295,995
BATH DUCK TOY
Patrick Ryland, London, England, assignor to Simon Gompes, Amsterdam, Netherlands
Filed May 10, 1985, Ser. No. 732,848
Claims priority, application United Kingdom, Jan. 25, 1985, 1,024,671
Term of patent 14 years
U.S. Cl. D21—160





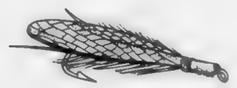
295,996
DOLL
Thomas W. Poster, 33 Horizon Ave., #201, Venice, Calif. 90291, and Jamie K. Oxman, 5827 Chairton, Los Angeles, Calif. 90056
Filed Nov. 4, 1985, Ser. No. 794,471
Term of patent 14 years
U.S. Cl. D21—183



295,997
DOLL
Judith C. Swink, 6557 Glendale, Troy, Mich. 48098, assignor to Judith C. Swink, Troy, Mich.
Filed Jan. 31, 1985, Ser. No. 613,234
Term of patent 14 years
U.S. Cl. D21—184



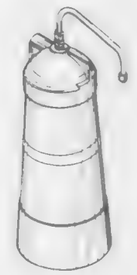
295,998
FLY FISHING FLY
Roman Moser, Gmunden, Austria, assignor to Rudi Heger, Siegsdorf, Fed. Rep. of Germany
Filed May 7, 1985, Ser. No. 731,666
Term of patent 14 years
U.S. Cl. D22—128



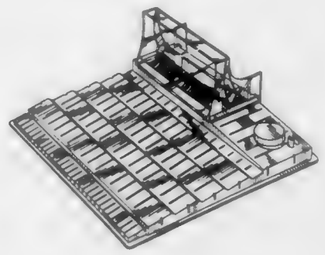
295,999
FISHING ROD TUBE
Koui Inoue, Tokyo, Japan, assignor to Daiwa Seiko, Inc., Tokyo, Japan
Filed Jan. 8, 1985, Ser. No. 689,686
Claims priority, application Japan, Sep. 5, 1984, 59-37019
Term of patent 14 years
U.S. Cl. D22—142



296,000
WATER PURIFIER OR SIMILAR ARTICLE
James M. Padilla, Covina Heights, Calif., assignor to Cuno Incorporated, Meriden, Conn.
Filed Mar. 3, 1986, Ser. No. 840,708
Term of patent 14 years
U.S. Cl. D23—208



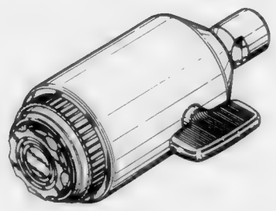
296,001
AQUARIUM FILTER
Ying Y. Ng, Hong Kong, Hong Kong, assignor to Veny Plastic Company Limited, Chaiwan, Hong Kong
Filed Jul. 17, 1986, Ser. No. 886,445
Claims priority, application United Kingdom, May 9, 1986, 1033982
Term of patent 14 years
U.S. Cl. D23—210



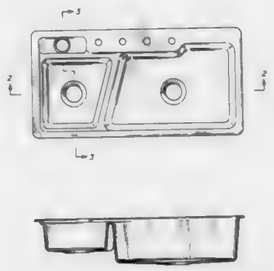
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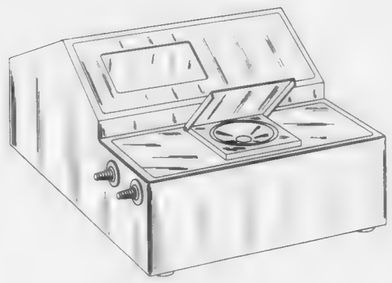
296,002
SHOWER HEAD
Andreas Haug, Altensteig, and Hans-Peter Leins, Rohrdorf, both of Fed. Rep. of Germany, assignors to Hans Grohe GmbH & Co. KG, Fed. Rep. of Germany
Filed Sep. 4, 1985, Ser. No. 772,356
Claims priority, application Fed. Rep. of Germany, Mar. 15, 1985, MR 1157 0b
The portion of the term of this patent subsequent to May 24, 2002, has been disclaimed.
Term of patent 14 years
U.S. Cl. D23—229



296,003
SINK
Javier G. L. Garza, San Pedro Garza Garcia, Mexico, assignor to Fabricas Orion S.A., Monterrey, Mexico
Filed Sep. 8, 1986, Ser. No. 905,059
Term of patent 14 years
U.S. Cl. D23—290



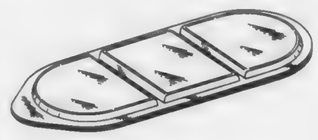
296,004
REFRACTOMETER
Robert M. Kahute, Honeoye Falls, N.Y., assignor to Warner-Lambert Technologies, Inc., Morris Plains, N.J.
Filed Nov. 21, 1985, Ser. No. 806,063
Term of patent 14 years
U.S. Cl. D24—17



296,005
EAR CLEANER
Merrill D. Alkire, 503 Marymount Rd., #1131, Salina, Kans. 67401
Continuation-in-part of Ser. No. 743,793, Jun. 12, 1985, Pat. No. Des. 293,378. This application May 27, 1987, Ser. No. 54,683
Term of patent 14 years
U.S. Cl. D24—59

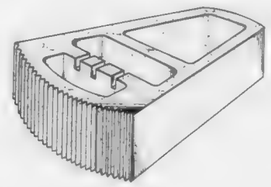


296,006
MULTICOMPARTMENTALIZED TRANSDERMAL PATCH FOR ADMINISTERING DRUGS TO THE SKIN
Henning Asche, Bettingen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.
Filed Dec. 19, 1985, Ser. No. 810,963
Claims priority, application Switzerland, Jun. 20, 1985, 114607
Term of patent 14 years
U.S. Cl. D24—63





296,007
WALL BLOCK
Paul J. Forsberg, Richfield, Minn., assignor to Keystone Retaining Wall Systems, Inc., Edina, Minn.
Filed May 27, 1986, Ser. No. 867,372
Term of patent 14 years
U.S. Cl. D25—116



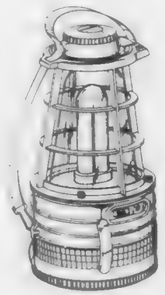
296,008
COMBINED LANTERN AND TORCH
Albert Wan, Tsuen Wan, Hong Kong, assignor to Fee Tat Plastic Factory Limited, Aberdeen, Hong Kong
Filed Feb. 12, 1985, Ser. No. 700,634
Claims priority, application United Kingdom, Dec. 6, 1984, 1023769
Term of patent 14 years
U.S. Cl. D26—42



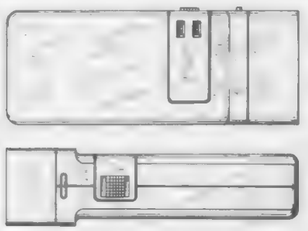
296,009
ELECTRIC LANTERN
David P. Witusik, P.O. Box 115, R.R. #6, and Brian W. Sanford, 6710 Dix Rd., P.O. Box 98, both of Rome, N.Y. 13440
Filed Aug. 7, 1985, Ser. No. 763,185
Term of patent 14 years
U.S. Cl. D26—41



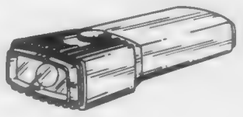
296,010
LANTERN
Albert Wan, Tsuen Wan, Hong Kong, assignor to Fee Tat Plastic Factory Limited, Aberdeen, Hong Kong
Filed Feb. 12, 1985, Ser. No. 700,635
Claims priority, application United Kingdom, Dec. 6, 1984, 1023768
Term of patent 14 years
U.S. Cl. D26—42



296,011
FLASHLIGHT
Duane D. Adams, Deep River, Conn., assignor to North American Philips Corporation, New York, N.Y.
Filed Dec. 19, 1985, Ser. No. 810,799
Term of patent 14 years
U.S. Cl. D26—46



296,012
FLASHLIGHT
Tor H. Petterson, Rancho Palos Verdes, Calif., assignor to Rayovac Corporation, Madison, Wis.
Filed Jun. 18, 1985, Ser. No. 746,049
Term of patent 14 years
U.S. Cl. D26—46



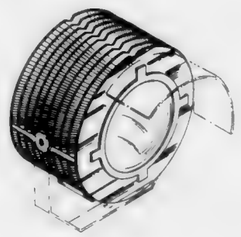
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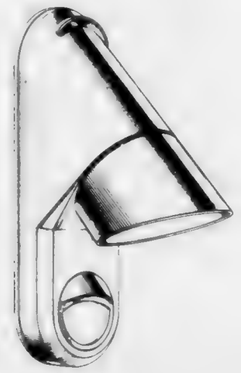
296,013
TRACK LIGHTING FIXTURE
Bruce N. Layne, Glendale Heights, and Mark F. Wilson, Addison, both of Ill., assignors to Cooper Industries, Houston, Tex.
Filed May 27, 1986, Ser. No. 867,709
Term of patent 14 years
U.S. Cl. D26—61



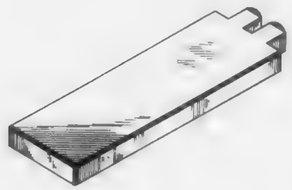
296,014
FLOODLIGHT
Julian J. Wierzbicki, Peabody, Mass., assignor to GTE Products Corporation, Danvers, Mass.
Filed Oct. 3, 1985, Ser. No. 783,711
Term of patent 14 years
U.S. Cl. D26—63



296,015
CONVENIENCE LIGHT
Robert P. Falconer, Fort Worth; Richard N. Claytor, Arlington; Truman D. Black, Arlington, and Fabio Fabiano, Arlington, all of Tex., assignors to R. P. Falconer Corporation, Fort Worth, Tex.
Filed Jan. 25, 1985, Ser. No. 694,979
Term of patent 14 years
U.S. Cl. D26—72



296,016
FIRE STARTER
Robert E. Carr; Robert L. Dunklee, both of Hampden County, Mass., and Peter R. Adams, New York, N.Y., assignors to Diamond Brands Incorporated, Minneapolis, Minn.
Filed Apr. 10, 1986, Ser. No. 851,404
Term of patent 14 years
U.S. Cl. D27—30



296,017
COMBINED LIGHTER AND CREDIT CARD OR THE LIKE
Poul E. Thoby, Pilevej 1A, Solrod Strand, Denmark DK-2680
Filed Feb. 5, 1986, Ser. No. 826,324
Claims priority, application Denmark, Aug. 6, 1985, 680/85
Term of patent 14 years
U.S. Cl. D27—38



296,018
PHARMACEUTICAL TABLET
James E. McDonald, Clifton, N.J., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.
Filed Jul. 15, 1985, Ser. No. 755,122
Term of patent 14 years
U.S. Cl. D28—2

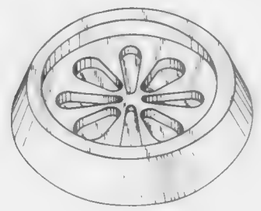




296,019
HAIR CLIPPER HEAD
Robert A. Mockovak, Newtown, Conn., assignor to Remington Products, Inc., Bridgeport, Conn.
Filed Feb. 25, 1986, Ser. No. 836,457
Term of patent 14 years
U.S. Cl. D28—54



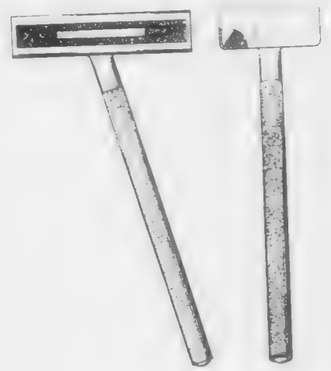
296,020
DOG FOOD BOWL
Clark McCarroll, 168 Hillcrest Dr., Munhall, Pa. 15120
Filed Nov. 21, 1986, Ser. No. 933,598
Term of patent 14 years
U.S. Cl. D30—130



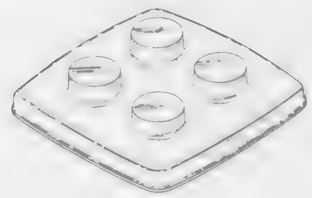
296,021
SPATULA CLEANER
Murray Conklin, 986 Evergreen Rd., Woodburn, Oreg. 97071
Filed May 12, 1986, Ser. No. 862,562
Term of patent 14 years
U.S. Cl. D32—46



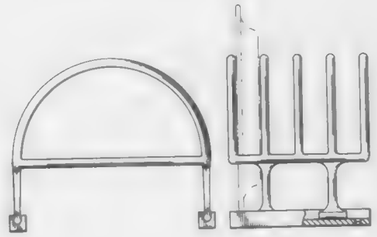
296,022
CEILING FAN BLADE CLEANING DEVICE OR THE LIKE
David J. Restivo, Orange Park, Fla., assignor to E.C.V. Company, Jacksonville, Fla.
Filed Jul. 7, 1986, Ser. No. 882,701
Term of patent 14 years
U.S. Cl. D32—51



296,023
LID FOR A BUCKET
Erik P. Tapdrup, Virum, Denmark, assignor to Interlego A.G., Baar, Switzerland
Filed Nov. 26, 1986, Ser. No. 935,578
Claims priority, application Denmark, Sep. 11, 1986, 910/86
Term of patent 14 years
U.S. Cl. D32—54



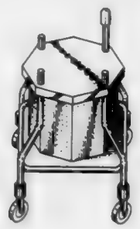
296,024
DINNERWARE RACK
Beverly A. Hayden, P.O. Box 565, Essex Junction, Vt. 05452
Filed Feb. 10, 1986, Ser. No. 827,870
Term of patent 14 years
U.S. Cl. D32—55



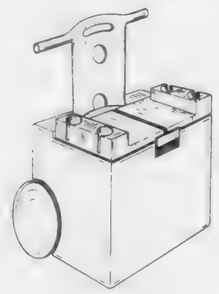
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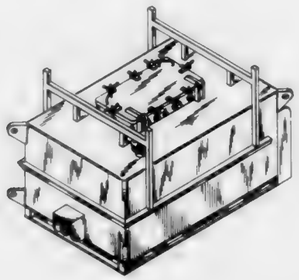
296,025
**TOOL CARRIER**
Lloyd D. Huether, 114 W. Indiana St., Wheaton, Ill. 60187
Filed May 29, 1985, Ser. No. 739,086
Term of patent 14 years
U.S. Cl. D34—19



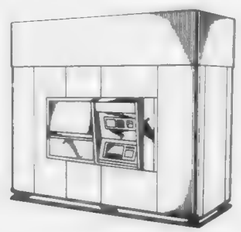
296,026
**BEACH CART**
Julie D. Sugarman, 744 Munevar Rd., Cardiff, Calif. 92007, and Thomas E. Stephenson, 7015 Carroll Rd., San Diego, Calif. 92121
Filed Jun. 3, 1985, Ser. No. 740,516
Term of patent 14 years
U.S. Cl. D34—25



296,027
**SHALE CUTTINGS CONTAINER**
Gary H. Dietzen, #10 Pebblestone Dr., Lafayette, La. 70508
Filed Mar. 22, 1985, Ser. No. 714,933
Term of patent 14 years
U.S. Cl. D34—39

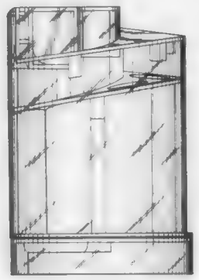


296,028
**AUTOMATIC TELLER MACHINE BUILDING**
Robert A. Foster, Walterboro, S.C., assignor to LPL Industries, Inc., Industry, Calif.
Filed Jun. 11, 1985, Ser. No. 743,405
Term of patent 14 years
U.S. Cl. D99—28



296,029
**COIN BANK**
William W. Knox, Mentor, Ohio, assignor to MAG-NIF Incorporated, Mentor, Ohio
Filed Aug. 27, 1985, Ser. No. 769,944
Term of patent 14 years
U.S. Cl. D99—35





# LIST OF PATENTEES

TO WHOM

## PATENTS WERE ISSUED ON THE 31ST DAY OF MAY, 1988

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Paul, Deborah A., 4,748,110, Cl. 435-5.000.
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Abe, Masaru: *See*—
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Abou-Gharbia, Magid A., to American Home Products Corporation. 2-[4-[4-(2-Pyrimidinyl)-1-piperazinyl]alkyl]alkyl]pyrido- and pyrazino-indole-1,3-dione derivatives as histamine $H_1$ antagonists. 4,748,247, Cl. 544-357.000.

Abou-Gharbia, Magid A.: *See*—
Stack, Gary P.; Abou-Gharbia, Magid A.; and Podlesny, Edward J., 4,748,240, Cl. 544-47.000.

Abramsohn, Dennis A.: *See*—
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ABU Garcia Produktion AB: *See*—
Karlsson, Jarding U., 4,747,560, Cl. 242-84.420.

Ackeret, Peter, to IDN Invention and Development of Novelties AG. Container for video and sound recording media. 4,747,484, Cl. 206-387.000.

Acocella, John; and David, Lawrence D., to International Business Machines Corporation. Metal etching process with etch rate enhancement. 4,747,907, Cl. 156-642.000.

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Gans, Leo; and Presinzano, Ronald, 4,747,621, Cl. 285-7.000.

Adachi, Katsuhiro: *See*—
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Adachi, Tetsuro: *See*—
Fujie, Fumiaki; Adachi, Tetsuro; Fukui, Tomonori; Oyama, Noboru; and Ueno, Yukiyasu, 4,748,336, Cl. 250-573.000.

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Clark, John A.; Adshead, Alan; and Butcher, David W., 4,748,097, Cl. 430-1.000.

Advanced Micro Devices, Inc.: *See*—
Ashton, Charles D.; Quong, David K.; and Corry, Alan G., 4,748,580, Cl. 364-736.000.
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Gluck, Eric H.; McDonald, Henry; Sabnis, Jayant S.; and Weinberg, Bernard C., 4,747,403, Cl. 128-204.210.

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Krumwiede, John F.; and Sims, Roy M., to PPG Industries, Inc. Continuously flushed thermocouple assembly. 4,747,883, Cl. 136-233.000.





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Kunihiro, Hisashi, to Sharp Kabushiki Kaisha. Housing for copier separable into upper and lower frames. 4,748,481, Cl. 335-133.000.

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LaCount, Dale F.; Holbrook, Richard L.; Mayer, Dean L.; and Kahlow, Kurt J., deceased (by Kanlow, Ronald A., executor), to Babcock & Wilcox Company, The. Integral joint forming of work-hardenable high alloy tubing. 4,747,431, Cl. 138-109.000.

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Lagadec, Roger; Brandes, Claudia; and Fukuju, Yukio, to Willi Studer AG & Sony Corporation. Method and apparatus for recording and reproducing coded digital signals. 4,748,519, Cl. 360-48.000

Lagadec, Roger; and Kunz, Henry O., to Studer, Willi. Process and apparatus for translating the sampling rate of a sampling sequence. 4,748,578, Cl. 364-724.000.

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Lanzer, Heribert, to Steyr-Daimler-Puch Aktiengesellschaft. Motor vehicle having two driven axles and brake system. 4,747,643, Cl. 303-2.000.

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Terauchi, Kiyoshi: *See*—
Sato, Tadashi; Mabe, Atsushi; and Terauchi, Kiyoshi, 4,747,756, Cl. 417-307.000.

Terry, Jack M.: *See*—
Terry, Michael D.; and Terry, Jack M., 4,747,372, Cl. 119-117.000.

Terry, Michael D.; and Terry, Jack M. Tether apparatus. 4,747,372, Cl. 119-117.000.

Terumo Kabushiki Kaisha: *See*—
Kousai, Tadashi; and Moriuchi, Yousuke, 4,747,833, Cl. 604-164.000.
Yamaguchi, Keiji, 4,747,412, Cl. 128-683.000.

Tesa Metrology Limited: *See*—
Aldred, Philip J. E., 4,747,689, Cl. 356-385.000.

Tetra Pak International AB: *See*—
Schulte, Diethard, 4,747,253, Cl. 53-433.000.

Teutscher, Michael: *See*—
Siepmann, Friedrich; and Teutscher, Michael, 4,748,127, Cl. 436-50.000.

Texaco Inc.: *See*—
Sung, Rodney L.; Behrens, Milton D.; Caggiano, Michael A.; Knifton, John F.; Larkin, John M.; and Zimmerman, Robert L., 4,747,851, Cl. 44-72.000.

Texas Instruments Incorporated: *See*—
Hollingsworth, Deems R., 4,748,490, Cl. 357-51.000.
McAlexander, Joseph C., III; White, Lionel S., Jr.; and Rao, G. R. Mohan, 4,748,349, Cl. 307-530.000.

Thacker, Fred E. Electrical apparatus for the electrocution of cattle. 4,747,185, Cl. 17-1.00E.

Thebault, Jacques, to Societe Europeenne de Propulsion. Composite materials constituted by a matrix in resin coke carbon, reinforced with pyrolytic carbon-coated refractory fibers. 4,748,079, Cl. 428-288.000.

Theeuwes, Felix: *See*—
Magruder, Paul R.; Wong, Patrick S. L.; Theeuwes, Felix; and Guittard, George V., 4,747,847, Cl. 604-892.100.

Theodor Groz & Sohne & Ernst Beckert Nadelfabrik Commandit-Gesellschaft: *See*—
Majer, Sigmar, 4,747,277, Cl. 66-122.000.

Therapicon s.r.l.: *See*—
Veronesi, Paolo A., 4,748,174, Cl. 514-226.500.

Thermal Dynamics Corporation: *See*—
Hatch, Bruce O.; and Spaulding, Richard A., 4,748,312, Cl. 219-121.0PR.

Thermal Science, Inc.: *See*—
Parker, John A.; Feldman, Rubin; and Bryant, Robert L., 4,748,255, Cl. 549-243.000.

Thibodeau, Jean: *See*—
Jacob, Jean-Louis; Sanschagrin, Gaetan; Thibodeau, Jean; and Guay, France, 4,747,829, Cl. 604-110.000.

Thiele, Hans-Jurgen: *See*—
Kallies, Karl-Heinz; Plaschnick, Dieter; Mohr, Peter; Thiele, Hans-Jurgen; Pahlitzsch, Conrad J.; Kretschmer, Lothar; and Kallies, Gert, 4,748,114, Cl. 435-14.000.

Thieme, Peter C.; Sauter, Hubert; and Reissenweber, Gernot, to BASF Aktiengesellschaft. Diastereoselective reduction of alpha-triazolylketones to betatriazolylcarbinols. 4,748,250, Cl. 548-262.000.

Thirion, Bernard: *See*—
Poupaert, Jean-Pierre; and Thirion, Bernard, 4,748,365, Cl. 310-316.000.

Thomas, Friedrich-Werner; and Sturmer, Johann, to Leybold Aktiengesellschaft. Inverter with power supply to chopper through parallel resonant circuit tuned to twice the chopper frequency. 4,748,311, Cl. 219-121.0EA.

Thompson, Alan, to Agence Spatiale Europeenne. Remote sensing apparatus for satellites. 4,748,448, Cl. 342-26.000.

Thompson, Leo J.: *See*—
Farmer, James O.; Kozushin, Anatoly; Kruse, Herman A.; LaFay, William P.; Lewis, Christopher P.; Little, Frank R., Jr.; Montreuil, Leo; Thompson, Leo J.; West, Lamar E., Jr.; and Mobley, Joseph G., II, 4,748,667, Cl. 380-7.000.

Thomson-CGR: *See*—
Aubert, Guy, 4,748,429, Cl. 335-299.000.
Boucle, Jean; and Delair, Jacques, 4,748,648, Cl. 378-97.000.
Guais, Noel, 4,748,430, Cl. 336-84.00C.

Thomson-CSF: *See*—
Tung, Pham N., 4,748,347, Cl. 307-450.000.

Thomson Video Equipment: *See*—
Lacoste, Jean P.; Mourier, Christian; and Fleury, Xavier, 4,748,500, Cl. 358-37.000.

Thong, Tran, to Tektronix, Inc. Multi-level pattern detector for a single signal. 4,748,348, Cl. 307-517.000.

Thorn EMI Varian Limited: *See*—
England, Melvin G., 4,748,424, Cl. 331-87.000.

Thorner, Michael O.: *See*—
Linkie, Daniel M.; and Thorner, Michael O., 4,747,825, Cl. 604-51.000.

Thrower, Keith R.; Munday, Peter J.; and Gill, Trevor M., to Racal Research Limited. Portable telephones. 4,748,655, Cl. 379-60.000.

Tiba, Omar; Culbertson, Billy M.; Deviney, Marvin L.; and Goel, Anil B., to Ashland Oil, Inc. Preparation of resin from phenolic and oxazoline using phosphine catalyst. 4,748,230, Cl. 528-211.000.

Tibesar, Marion A.: *See*—
Gilleo, Kenneth B.; Chabot, Stephen E.; and Tibesar, Marion A., 4,747,211, Cl. 29-852.000

Tihanyi, Jeno : *See*—
Hertrich, Helmut; Kirschner, Fritz; and Tihanyi, Jeno , 4,748,533, Cl. 361-56.000.

Tinnes, Bernhard; and Vetterli, Walter, to Metacon Ag. Pair of refractory plates for swivelling or rotary sliding closure unit and method of operation thereof. 4,747,580, Cl. 266-44.000.

Tipton Manufacturing Corporation: *See*—
Kobayashi, Hisamine; and Shimizu, Toshiharu, 4,747,233, Cl. 51-7.000.

Tobler, Alfred: *See*—
Berchtold, Oliver; and Tobler, Alfred, 4,747,727, Cl. 405-260.000.

Tobler, Hans, to G. Bopp & Co. AG, Metallgewebe-und Drahtwarenfabrik. Apparatus for drawing in warp threads into a harness. 4,748,568, Cl. 364-470.000.

Toda, Haruhisa; Tanibe, Toshiyuki; and Fugihisa, Hiroaki, to Mitsubishi Denki Kabushiiki Kaisha. Multi-pole circuit interrupter. 4,748,428, Cl. 335-10.000.

Todd, Harry V. Ice fishing accessory. 4,747,226, Cl. 43-4.000.

Togashi, Seigo; Sekiguchi, Kanetaka; Tanabe, Hiroshi; Aota, Katsumi; Sorimachi, Kazuaki; and Yamamoto, Etsuo, to Citizen Watch Co.,

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Kono, Toshiaki; Tokunaga, Takahisa; Yamaguchi, Goichi; Kitagawa, Hironoshin; and Hiraga, Tetsuo, 4,748,032, Cl. 426-321.000.

Tokyo Electric Co., Ltd.: *See—*
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Komori, Yasuo, 4,747,707, Cl. 400-82.000.

Tokyo Engineering Co., Ltd.: *See—*
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Tomoshige, Hideki; Tanigawa, Kou; and Akahori, Shigetaka, to Fujitsu Ten Limited; and Toyota Jidosha Kabushiki Kaisha. Fail-safe circuit of a fixed speed traveling apparatus. 4,747,460, Cl. 180-176.000.

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Tortelli, Vito: *See—*
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Trachte, Dietrich; and Giess, Helmut, to Robert Bosch GmbH. Fuel injection nozzle for internal combustion engines. 4,747,545, Cl. 239-533.900.

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Tsai, Yih-Wan, to PPG Industries, Inc. Burner design for melting glass batch and the like. 4,747,772, Cl. 431-354.000.

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Tsubota, Shinya, to Hitachi, Ltd. Brake system for magnetic recording and reproducing apparatus. 4,747,564, Cl. 242-204.000.

Tsuda, Mamoru: *See—*
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Tsuruoka, Makoto: *See—*
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Tuckey, Charles H., to Walbro Corporation. In-tank fuel reservoir and filter diaphragm. 4,747,388, Cl. 123-514.000.

Tuncel, Ozcan; and Mushnick, Sammuel, to General Electric Company. Condenser integrated turbine support. 4,747,360, Cl. 114-269.000.

Tung, Pham N., to Thomson-CSF. Logic coincidence gate, triplet of logic gates and sequential logic circuit using this logic gate. 4,748,347, Cl. 307-450.000.

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Tyson, Youree. Collector's stand. 4,747,494, Cl. 211-13.000.

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Uchiyama, Yasuji; and Suzuki, Hideo, to Nippon Gakki Seizo Kabushiki Kaisha. Electronic musical instrument forming tones by wave computation. 4,747,332, Cl. 84-1.230.

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Ueda, Hiroshi: *See—*
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Ueda, Hiroyuki; and Seki, Mitsuaki, to Canon Kabushiki Kaisha. Printing apparatus with variable impact pressure. 4,747,709, Cl. 400-157.300.

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Ueda, Kenji: *See—*
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Yamashita, Takaharu: *See*—
Kitagawa, Tohru; and Yamashita, Takaharu, 4,747,456, Cl. 177-211.000.

Yamashita, Takeo: *See*—
Kumasaka, Noriyuki; Shiiki, Kazuo; Otomo, Shigekazu; Shiroishi, Yoshihiro; Yamashita, Takeo; Saito, Noritoshi; Shinagawa, Kiminari; and Kudo, Mitsuhiro, 4,748,089, Cl. 428-635.000.

Yamauchi, Hiroshi; Sugiyama, Isao; Saito, Isao; Nomoto, Seiichiro; Kamiya, Takashi; Machida, Yoshimasa; and Negi, Shigeto, to Eisai Co., Ltd. Cephem compounds having at the 3-position a (1,4-methylene-1-piperidinio)methyl group or a (1-quinuclidinio)methyl group. 4,748,171, Cl. 514-202.000.

Yamaura, Tomio: *See*—
Kobayashi, Akira; Yamaura, Tomio; Nakayama, Mizuo; and Itaya, Hisao, 4,748,334, Cl. 250-563.000.

Yamazaki, Kiyoyasu: *See*—
Hama, Tomio; and Yamazaki, Kiyoyasu, 4,747,626, Cl. 285-308.000.

Yanagihara, Fumie. Disposable perspiration absorbing pad. 4,747,162, Cl. 2-53.000.

Yanagiuchi, Shigenobu: *See*—
Kanou, Ikuo; Yanagiuchi, Shigenobu; and Omori, Takuro, 4,748,589, Cl. 364-900.000.

Yang, Chihae; and Kaufmann, Edward J., to Clorox Company, The. PVA films with nonhydrolyzable anionic comonomers for packaging detergents. 4,747,976, Cl. 252-90.000.

Yang, Heng W.: *See*—
Liu, Ying B.; Yang, Heng W.; Ma, Shu L.; Liu, Shi Z.; and Li, Nai H., 4,747,407, Cl. 128-334.00R.

Yang, Tai-Her. Interconnected C-clamps and tensioning means therefor. 4,747,590, Cl. 269-45.000.

Yastroubinski, Adoplhe: *See*—
Climent, Jean-Pierre; Tronel, Jean-Claude; and Yastroubinski, Adoplhe, 4,748,416, Cl. 328-62.000.

Yasuhara, Isso; and Kusumi, Shunichi, to Nippon Seiki Co., Ltd. Light compensating liquid crystal display. 4,747,672, Cl. 350-345.000.

Yazaki Corporation: *See*—
Fukuda, Kiyohito; and Murakami, Takao, 4,747,793, Cl. 439-766.000.
Kanamori, Yasuo; and Kanda, Masahiro, 4,748,436, Cl. 338-214.000.
Kato, Kiyomitsu, 4,747,799, Cl. 464-52.000.
Nishio, Yukio, 4,747,791, Cl. 439-638.000.
Yukawa, Yoshimi; Watanabe, Yoshio; and Serizawa, Yoshinori, 4,748,435, Cl. 338-214.000.

Yazawa, Yoshiaki: *See*—
Uchida, Hideaki; Mitsumoto, Kinya; Yazawa, Yoshiaki; Nakazato, Shinji; and Odaka, Masanori, 4,748,487, Cl. 357-43.000.

Yeager, Donald F.: *See*—
Dutt, Herbert V.; Yeager, Donald F.; and Weir, Dixie L., 4,747,511, Cl. 220-307.000.

Yeda Research & Development Co. Ltd.: *See*—
Daren, Stephen L. J.; Vofsi, David; and Finkels, Aurelia, 4,748,286, Cl. 570-200.000.
Shamir, Adi; and Fiat, Amos, 4,748,668, Cl. 380-30.000.

Yi-Yan, Alfredo. Optical monomode guidance structure including low resolution grating. 4,747,654, Cl. 350-96.190.

Yingling, Bruce A.; and Peck, Richard A., to Barrett Industrial Trucks, Inc. Pallet sensor for lift truck. 4,747,610, Cl. 280-43.120.

Yissum Research and Development Company of the Hebrew University of Jerusalem: *See*—
Chet, Ilan; and Sivan, Alex, 4,748,021, Cl. 424-93.000.

Yli-Koski, Esko T.: *See*—
Kivipelto, Pekka J.; and Yli-Koski, Esko T., 4,747,578, Cl. 251-159.000.

Yokohama Rubber Co., Ltd., The: *See*—
Kawakami, Shinji; Misawa, Makoto; Inoue, Takekazu; Ishikawa, Yasuhiro; and Hirakawa, Hiroshi, 4,748,168, Cl. 524-474.000.

Yokomizo, Yoshikazu, to Canon Kabushiki Kaisha. Image processing apparatus. 4,748,677, Cl. 382-50.000.

Yokoo, Shouzou: *See*—
Osawa, Atsuo; Ogiro, Kenji; Yokoo, Shouzou; and Takeda, Hidekazu, 4,748,521, Cl. 360-85.000.

Yokota, Minoru: *See*—
Nishio, Masanobu; Sawada, Kazuo; Yokota, Minoru; and Kishida, Hitoshi, 4,747,889, Cl. 148-437.000.

Yokoyama, Kazumasa: *See*—
Iwai, Masakazu; Yokoyama, Kazumasa; and Fukushima, Tsunekazu, 4,748,157, Cl. 514-2.000.

Yonezawa, Seiji; Ohtake, Masatoshi; Ito, Masaru; Tsuyoshi, Toshiaki; Ichino, Kazuo; and Nakagaki, Harushige, to Hitachi, Ltd. Method and apparatus for composite tracking servo system with track offset correction and rotary optical disc having at least one correction mark for correcting track offset. 4,748,609, Cl. 369-44.000.

Yonezawa, Seiji: *See*—
Tsuyoshi, Toshiaki; Otake, Masatoshi; Kumagai, Sachio; Ichino, Kazuo; Takasugi, Wasao; and Yonezawa, Seiji, 4,748,611, Cl. 369-59.000.

Yorimoto, Yoshikazu; and Takahashi, Masashi, to Toppan Printing Co., Ltd. IC card. 4,748,320, Cl. 235-492.000.

Yoshiaki, Ebina: *See*—
Haruyoshi, Tatsu; Jun, Okabe; Akihiro, Naraki; Masatoshi, Abe; and Yoshiaki, Ebina, 4,748,223, Cl. 526-206.000.

Yoshida Kogyo K. K.: *See*—
Suzuki, Yasutoshi, 4,747,210, Cl. 29-768.000.

Yoshida, Kumi: *See*—
Kimura, Goro; Hirose, Yoshihiko; Yoshida, Kumi; Kuzuya, Fumio; and Fujita, Katsunari, 4,748,161, Cl. 514-182.000.

Yoshida, Makoto: *See*—
Kageyama, Takashi; and Yoshida, Makoto, 4,748,057, Cl. 427-356.000.

Yoshida, Toshinobu: *See*—
Fujioka, Yoshiharu; Tsutaki, Shoji; Katoh, Mitsuo; Itou, Hiroyuki; and Yoshida, Toshinobu, 4,748,527, Cl. 360-129.000.

Yoshikawa, Hiroshi: *See*—
Sawafuji, Shuji; Ozawa, Masahiro; and Yoshikawa, Hiroshi, 4,747,811, Cl. 474-135.000.

Yoshikawa, Masao, to NTN-Rulon Industries Co., Ltd. All-aromatic polyester resin composition. 4,748,213, Cl. 525-397.000.

Yoshikawa, Shozi: *See*—
Sakai, Mitsugu; and Yoshikawa, Shozi, 4,748,605, Cl. 369-13.000.

Yoshikumi, Chikao; Ohmura, Yoshio; Hirose, Fumio; Ikuzawa, Masanori; Matsunaga, Kenichi; Fujii, Takayoshi; Ohhara, Minoru; and Ando, Takao, to Kureha Kagaku Kogyo Kabushiki Kaisha. Method for the treatment of tumors. 4,748,159, Cl. 514-42.000.

Yoshimi, Kiyoharu: *See*—
Kuroda, Katsuhiko; Tagawa, Toru; Yoshimi, Kiyoharu; and Ozawa, Yasoji, 4,748,196, Cl. 524-43.000.

Yoshinaka, Toshio; Ida, Shuichiro; Nagano, Shuji; and Fukaya, Hiroomi, to Toyota Jidosha Kabushiki Kaisha. Diaphragm actuator mounting on a transfer case. 4,747,463, Cl. 180-247.000.

Yoshinari, Hideki: *See*—
Isohata, Junji; Matsushita, Koichi; Yamamoto, Hironori; Miyazaki, Makoto; Ozawa, Kunitaka; and Yoshinari, Hideki, 4,748,477, Cl. 355-53.000.

Yoshino, Akira; and Sanechika, Kenichi, to Asahi Kasei Kogyo Kabushiki Kaisha. Polyacetylene composite, process for production thereof, and method for use thereof. 4,748,047, Cl. 427-58.000.

Yoshino Gpysum Company, Ltd.: *See*—
Kuroda, Katsuhiko; Tagawa, Toru; Yoshimi, Kiyoharu; and Ozawa, Yasoji, 4,748,196, Cl. 524-43.000.

Yoshioka, Hiroshi; and Ono, Ichiro, to Shin-Etsu Chemical Co., Ltd. Synthetic resin modifier. 4,748,225, Cl. 528-26.000.

Yoshioka, Noriaki: *See*—
Ikeyama, Norio; Yoshioka, Noriaki; Tamaru, Shusaku; and Ichinose, Hisashi, 4,747,946, Cl. 210-321.800.

Yoshioka, Yasunori: *See*—
Fukuda, Kiyoshige; Yoshioka, Yasunori; and Uekita, Masakazu, 4,748,273, Cl. 562-495.000.

Yoshizawa, Keiichi; and Moritaka, Kastuya, to Seikosha Co., Ltd. Alarm mechanism. 4,748,602, Cl. 368-72.000.

Young, Archie R.: *See*—
Chianelli, Russell R.; Ho, Teh C.; Jacobson, Allan J.; and Young, Archie R., 4,748,142, Cl. 502-220.000.

Young, Raymond D.: *See*—
Whitehead, William A.; and Young, Raymond D., 4,747,977, Cl. 252-111.000.

Youssefyeh, Raymond D., to Rorer Pharmaceutical Corp. Phenoxyphenylacetates for use as potential modulators of arichidonic acid pathways. 4,748,272, Cl. 562-471.000.

Yukawa, Yoshimi; Watanabe, Yoshio; and Serizawa, Yoshinori, to Yazaki Corporation. High-voltage resistance wire. 4,748,435, Cl. 338-214.000.

Yukita, Hisashi; Kanamaru, Hisanobu; and Okazaki, Masaharu, to Hitachi, Ltd. Production method for ball support structures. 4,747,203, Cl. 29-439.000.

Yumiyama, Shigeru; and Kamiyama, Takaki, to Hitachi, Ltd. Silencer-carrying rotary vane pump. 4,747,761, Cl. 418-46.000.





Yung-Mao, Lin: *See*—
Autry, James C.; and Yung-Mao, Lin, 4,747,220, Cl. 36-59.00R.

Yuto, Kazuaki: *See*—
Takiguchi, Eiji; Yuto, Kazuaki; and Oniki, Toru, 4,748,199, Cl. 524-318.000.

Yuzawa, Haruo; Nishiyama, Masafumi; Nakamura, Katsuyuki; and Ishigami, Kazuhiro, to Nissan Motor Company, Limited. Crank angle detecting system for engines. 4,747,389, Cl. 123-643.000.

Zalesky, Dean R., to Randean, Inc. Slug trap. 4,747,230, Cl. 43-121.000.

Zambon S.p.A.: *See*—
Meneghin, Mariano, 4,748,271, Cl. 562-428.000.

Zambon SpA: *See*—
Donati, Daniele; Giordano, Claudio; and Castaldi, Graziano, 4,748,256, Cl. 549-453.000.

Zeets, Joseph S.: *See*—
Schack, Warren R.; Zeets, Joseph S.; and Powers, Richard G., 4,747,342, Cl. 99-472.000.

Zehnder, Jurg, to Swiss Aluminium Ltd. Unloading flap for pourable particulate material. 4,747,742, Cl. 414-299.000.

Zehner, Georgia L.: *See*—
Boland, Leona G.; Zehner, Georgia L.; and Stevens, Robert A., 4,747,846, Cl. 604-385.000.

Zeigler, Theodore R. Brackets for connecting adjacent exhibit frames together. 4,747,239, Cl. 52-109.000.

Zeiler, Hans-Joachim: *See*—
Schmidt, Gunter; Zeiler, Hans-Joachim; and Metzger, Karl G., 4,748,163, Cl. 514-194.000.

Zeits, Alfred J.: *See*—
Kaiser, Bruce J.; Schoenig, Fred C., Jr.; and Zeits, Alfred J., 4,748,647, Cl. 378-50.000.

Zembrowski, William J.: *See*—
Mylari, Banavara L.; and Zembrowski, William J., 4,748,280, Cl. 568-595.000.

Zenith Electronics Corporation: *See*—
Brodzik, Paul E.; and Lostumo, Arthur J., 4,748,405, Cl. 324-127.000.
Long, Michael E., 4,748,501, Cl. 358-86.000.
Oliver, Kirk, 4,748,384, Cl. 315-371.000.

Zerfass, Hans-Rainer: *See*—
Beyer, Horst; Zerfass, Hans-Rainer; Bechen, Heribert; Haack, Hans; and Kutnar, Franz, 4,748,075, Cl. 428-221.000.

Zeuna-Srarker GmbH & Co. KG: *See*—
Santiago, Enrique; Kugland, Peter; and Ullmer, Alois, 4,747,264, Cl. 60-274.000.

Zgorzelski, Geoffrey S.: *See*—
Baltz, Gene F.; and Zgorzelski, Geoffrey S., 4,747,381, Cl 123-413.000.

Zibman, Israel B.; and Morgan, Nigel P., to GTE Laboratories Incorporated. Method and circuit for performing discrete transforms. 4,748,579, Cl. 364-726.000

Zietlow, Thomas C., to Aerospace Corporation, The. Method for increasing radiation hardness of MOS gate oxides. 4,748,131, Cl. 437-24.000.

Zilog, Inc.: *See*—
Ashkin, Peter B.; and Heninger, Andrew G., 4,748,575, Cl. 364-715.000.

Zimmerman, Robert L.: *See*—
Sung, Rodney L.; Behrens, Milton D.; Caggiano, Michael A.; Knifton, John F.; Larkin, John M.; and Zimmerman, Robert L., 4,747,851, Cl. 44-72.000.

Zimmermann, Kurt: *See*—
Ruhle, Walter; Kleindieck, Peter; Zimmermann, Kurt: and Kropp, Manfred, 4,748,358, Cl. 310-154.000.

Zock, Patricia A.: *See*—
Blum, Patricia R.; Milberger, Ernest C.; Nicholas, Mark L.; and Zock, Patricia A., 4,748,140, Cl. 502-209.000.

Zoltowski, Zigmund, to Pyrene Chemical Services Limited. Solution and process for coating metals. 4,747,885, Cl. 148-6.15R.

Zukovics nee Sumeg, Katalin: *See*—
Tamas, Eva; Fekete, Pal; Kovacs, Tibor; Bezzegh, Denes; Bor nee Baumgartner, Ilona; Toth, Zoltan; and Zukovics nee Sumeg, Katalin, 4,748,023, Cl. 424-465.000.

Zupancic, Joseph J.; and Swedo, Raymond J., to Allied Corporation. Composite membranes based on interpenetrating polymer networks. 4,747,953, Cl. 210-651.000

501 C-Plast di Crupi D. & C. S.N.C.: *See*—
Crupi, Giuseppe, 4,747,768, Cl. 425-392.000.

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# LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 31ST DAY OF MAY, 1988

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Benscoter, Richard D.; Hadfield, Robert W.; and Bowman, Timothy S., to Butler Manufacturing Company. Economy poke-thru. Re. 32,678, Cl. 52-221.000.

Bowman, Timothy S.: *See*—
Benscoter, Richard D.; Hadfield, Robert W.; and Bowman, Timothy S., Re. 32,678, Cl. 52-221.000.

Brooks, Donald G., to Harvestaire Pty. Ltd. Pressure air manifold and outlets system for grain header or harvester cutting platforms. Re. 32,679, Cl. 56-12.900.

Butler Manufacturing Company: *See*—
Benscoter, Richard D.; Hadfield, Robert W.; and Bowman, Timothy S., Re. 32,678, Cl. 52-221.000.

Dages, Chuck, to General Instrument Corporation. Digital frequency lock tuning system. Re. 32,686, Cl. 455-182.000.

Eaton, Sargent S.; and Wooten, David, to INMOS Corporation. Folded bit line-shared sense amplifiers. Re. 32,682, Cl. 365-189.000.

Fairfield Industries, Inc.: *See*—
Ray, Clifford H., Re. 32,683, Cl. 367-23.000.

General Instrument Corporation: *See*—
Dages, Chuck, Re. 32,686, Cl. 455-182.000.

Hadfield, Robert W.: *See*—
Benscoter, Richard D.; Hadfield, Robert W.; and Bowman, Timothy S., Re. 32,678, Cl. 52-221.000.

Harvestaire Pty. Ltd.: *See*—
Brooks, Donald G., Re. 32,679, Cl. 56-12.900.

Hess, John M. Double flow reheat diaphragm. Re. 32,685, Cl. 415-139.000.

INMOS Corporation: *See*—
Eaton, Sargent S.; and Wooten, David, Re. 32,632, Cl. 365-189.000.

Lenhart, Ronald A., to Precision Metal Fabricators, Inc. Air table system. Re. 32,684, Cl. 406-84.000.

Pompa, Susan, to S. J. Kaplan and Associates, Inc. Protective cover for human limb joints. Re. 32,680, Cl. 128-132.00R.

Precision Metal Fabricators, Inc.: *See*—
Lenhart, Ronald A., Re. 32,684, Cl. 406-84.000.

Randolph, Travis M.; and Schreiner, Charles P. Three wheel vehicle. Re. 32,681, Cl. 280-261.000.

Ray, Clifford H., to Fairfield Industries, Inc. Stacked marine seismic source. Re. 32,683, Cl. 367-23.000.

S. J. Kaplan and Associates, Inc.: *See*—
Pompa, Susan, Re. 32,680, Cl. 128-132.00R.

Schreiner, Charles P.: *See*—
Randolph, Travis M.; and Schreiner, Charles P., Re. 32,681, Cl. 280-261.000.

Wooten, David: *See*—
Eaton, Sargent S.; and Wooten, David, Re. 32,682, Cl. 365-189.000.

# LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Aqua-Tech, Inc.: *See*—
Niederer, Otto C., B1 3,638,439, Cl. 405-159.000.

Armco Inc.: *See*—
Pierson, Marvin B.; and Flinchum, Charles, B1 4,330,574, Cl. 427-319.000.

CIP Inc.: *See*—
Matolcsy, Geza A., B1 4,464,224, Cl. 162-111.000.

Contour Med Partners, Ltd.: *See*—
White, David N., B1 4,436,684, Cl. 264-138.000.

Flinchum, Charles: *See*—
Pierson, Marvin B.; and Flinchum, Charles, B1 4,330,574, Cl. 427-319.000.

Matolcsy, Geza A., to CIP Inc. Process for manufacture of high bulk paper. B1 4,464,224, 5-31-88, Cl. 162-111.000.

Niederer, Otto C., to Aqua-Tech, Inc. Embedding cablelike members. B1 3,638,439, 5-31-88, Cl. 405-159.000.

Pacesetter Systems, Inc.: *See*—
Schulman, Joseph H., B1 4,232,679, Cl. 128-419.0PG.

Pierson, Marvin B.; and Flinchum, Charles, to Armco Inc. Finishing method for conventional hot dip coating of a ferrous base metal strip with a molten coating metal. B1 4,330,574, 5-31-88, Cl. 427-319.000.

Schulman, Joseph H., to Pacesetter Systems, Inc. Programmable human tissue stimulator. B1 4,232,679, 5-31-88, Cl. 128-419.0PG.

Smrt, Thomas J. Spraying apparatus. B1 4,641,780, 5-31-88, Cl. 239-150.000.

White, David N., to Contour Med Partners, Ltd. Method of forming implantable prostheses for reconstructive surgery. B1 4,436,684, 5-31-88, Cl. 264-138.000.

# LIST OF DESIGN PATENTEES

Adams, Duane D., to North American Philips Corporation. Flashlight. 296,011, 5-31-88, Cl. D26-46.000.

Adams, Peter R.: *See*—
Carr, Robert E.; Dunklee, Robert L.; and Adams, Peter R., 296,016, Cl. D27-30.000.

Adcola Products Limited: *See*—
Borley, Neil J., 295,943, Cl. D8-30.000.

Alkire, Merrill D. Ear cleaner. 296,005, 5-31-88, Cl. D24-59.000.

Anchor Hocking Corporation: *See*—
Pugh, Richard E., 295,958, Cl. D9-418.000.
Pugh, Richard E., 295,959, Cl. D9-418.000.
Pugh, Richard E., 295,960, Cl. D9-418.000.

Anderson, Patricia J. Finger ring or the like. 295,968, 5-31-88, Cl. D11-30.000.

Arbeil Inc.: *See*—
Johnston, Robert J., 295,950, Cl. D8-381.000.

Aremka, Leonard R.; Bischof, Albert; Brodrueck, Detlef A.; Genaro, Donald M.; and Johnson, Chris G., to AT&T Teletype Corporation. Multifunction communication controller. 295,976, 5-31-88, Cl. D14-102.000.

Asche, Henning, to Ciba-Geigy Corporation. Multicompartmentalized transdermal patch for administering drugs to the skin. 296,006, 5-31-88, Cl. D24-63.000.

AT&T Teletype Corporation: *See*—
Aremka, Leonard R.; Bischof, Albert; Brodrueck, Detlef A.; Genaro, Donald M.; and Johnson, Chris G., 295,976, Cl. D14-102.000.

AVIA Group International, Inc.: *See*—
Selbiger, Lawrence, 295,916, Cl. D2-314.000.

Baeta, Esmael. Cultivator tool. 295,979, 5-31-88, Cl. D15-27.000.

Balt, Inc.: *See*—
Currie, Wallace R., 295,984, Cl. D18-23.000.

Baptiste, Trevor I. Waistband for pants. 295,915, 5-31-88, Cl. D2-25.000.

Bellini, Mario, to Rosenthal Aktiengesellschaft Rechtsabt. Coffee pot. 295,940, 5-31-88, Cl. D7-321.000.

Bezzerides Company: *See*—
Bezzerides, George A., 295,931, Cl. D6-463.000.

Bezzerides, George A., to Bezzerides Company. Display rack. 295,931, 5-31-88, Cl. D6-463.000.





Bischof, Albert: *See*—
Aremka, Leonard R.; Bischof, Albert; Brodrueck, Detlef A.; Genaro, Donald M.; and Johnson, Chris G., 295,976, Cl. D14-102.000.

Black, Truman D.: *See*—
Falconer, Robert P.; Claytor, Richard N.; Black, Truman D.; and Fabiano, Fabio, 296,015, Cl. D26-72.000.

Borley, Neil J., to Adcola Products Limited. Fume extracting soldering iron. 295,943, 5-31-88, Cl. D8-30.000.

Bowen-Smith, Fred W.: *See*—
Featherman, Elizabeth A.; Featherman, Raymond B., III; and Bowen-Smith, Fred W., 295,942, Cl. D8-10.000.

Brodrueck, Detlef A.: *See*—
Aremka, Leonard R.; Bischof, Albert; Brodrueck, Detlef A.; Genaro, Donald M.; and Johnson, Chris G., 295,976, Cl. D14-102.000.

Brown, Paul D.; and Diaz, Juan A., to Reebok International Ltd. Shoe outsole. 295,917, 5-31-88, Cl. D2-320.000.

Brunner, Robert, to TeleVideo Systems, Inc. Computer display. 295,978, 5-31-88, Cl. D14-113.000.

C. Itoh & Co., Ltd.: *See*—
Shibayama, Akijiro, 295,977, Cl. D14-111.000.

Cadbury Schweppes PLC: *See*—
Dole, Charles M.; Webster, Gary L.; Miller, Scott W.; and Karlis, Robert G., 295,939, Cl. D7-309.000.

Cain, Ann S., to 'totes', incorporated. Umbrella handle. 295,918, 5-31-88, Cl. D3-12.000.

Carr, Robert E.; Dunklee, Robert L.; and Adams, Peter R., to Diamond Brands Incorporated. Fire starter. 296,016, 5-31-88, Cl. D27-30.000.

Chu, William. Clip calculator. 295,983, 5-31-88, Cl. D18-2.000.

Ciba-Geigy Corporation: *See*—
Asche, Henning, 296,006, Cl. D24-63.000.
McDonald, James E., 296,018, Cl. D28-2.000.

Cirkel B.V.: *See*—
Uredat, Claus K., 295,926, Cl. D6-366.000.
Uredat, Claus K., 295,928, Cl. D6-372.000.
Uredat, Claus K., 295,929, Cl. D6-379.000.

Claber S.p.A.: *See*—
Spadotto, Oliviano; Roman, Gianfranco; and Da Rold, Claudio, 295,921, Cl. D4-115.000.

Claytor, Richard N.: *See*—
Falconer, Robert P.; Claytor, Richard N.; Black, Truman D.; and Fabiano, Fabio, 296,015, Cl. D26-72.000.

Colby, Donald B., to Tropitone Furniture Company, Inc. Cigarette table. 295,933, 5-31-88, Cl. D6-483.000.

Conklin, Murray. Spatula cleaner. 296,021, 5-31-88, Cl. D32-46.000.

Conlon, Daniel R., to Instruments For Research and Industry. Laboratory flask support. 295,962, 5-31-88, Cl. D9-455.000.

Conlon, Daniel R., to Instruments For Research and Industry. Laboratory flask support. 295,963, 5-31-88, Cl. D9-455.000.

Conoco Inc.: *See*—
LeFevre, Louis B., 295,955, Cl. D9-375.000.

Cooper Industries: *See*—
Layne, Bruce N.; and Wilson, Mark F., 296,013, Cl. D26-61.000.

Cooper, William A., to Mitchell & Cooper Limited. Can-opener. 295,944, 5-31-88, Cl. D8-33.000.

Corbett, Alan J. Portable receptacle. 295,937, 5-31-88, Cl. D7-70.000.

Cugley, Derwyn, to VSI Fasteners, Inc. Display bin. 295,932, 5-31-88, Cl. D6-476.000.

Cummings, Darold B. Scooter frame. 295,989, 5-31-88, Cl. D21-80.000.

Cuno Incorporated: *See*—
Padilla, James M., 296,000, Cl. D23-208.000.

Currie, Wallace R., to Balt, Inc. Printer stand. 295,984, 5-31-88, Cl. D18-23.000.

D.I.D. Corporation: *See*—
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NOTE.—First number, class; second number, subclass; third number, patent number

**CLASS 2**
53 4,747,162
161 A 4,747,163
171 4,747,164
322 4,747,165

**CLASS 4**
144.1 4,747,166
234 4,747,167
504 4,747,168
[illegible] 4,747,169

**CLASS 5**
81 B 4,747,170
425 4,747,171
507 4,747,172

**CLASS 7**
156 4,747,173

**CLASS 15**
78 4,747,174
105 4,747,175
230.16 4,747,176
243 4,747,177
339 4,747,178
415 R 4,747,179

**CLASS 16**
35 R 4,747,180
82 4,747,181
87.4 R 4,747,182
228 4,747,183

**CLASS 17**
1 E 4,747,184
4,747,185
49 4,747,186

**CLASS 19**
80 R 4,747,187
300 4,747,188

**CLASS 24**
90 R 4,747,189

**CLASS 26**
74 4,747,190

**CLASS 29**
1.23 4,747,191
25.35 4,747,192
33 P 4,747,193
[illegible] 4,747,194
116 R 4,747,195
163.5 F 4,747,196
235 4,747,197
[illegible] 4,747,198
416 4,747,199
423 4,747,200
433 4,747,201
437 4,747,202
439 4,747,203
523 4,747,204
596 4,747,205
[illegible] 4,747,206
4,747,207
726 4,747,208
741 4,747,209
[illegible] 4,747,210
[illegible] 4,747,211

**CLASS 30**
92 4,747,212
296 R 4,747,213
[illegible] 4,747,214

**CLASS 33**
[illegible] 4,747,215
[illegible] 4,747,216
391 4,747,217

**CLASS 34**
73 4,747,218

**CLASS 36**
28 4,747,219
59 R 4,747,220
119 4,747,221

**CLASS [illegible]**
77.7 4,747,222

**CLASS 40**
219 4,747,223

**CLASS 42**
7 4,747,224
76.02 4,747,225

**CLASS 43**
[illegible] 4,747,226
18.1 4,747,227
42.31 4,747,228
112 4,747,229
121 4,747,230

**CLASS 44**
63 4,747,850
72 4,747,851

**CLASS 47**
33 4,747,231

**CLASS 49**
452 4,747,232

**CLASS 51**
7 4,747,233
154 4,747,234
211 R 4,747,235
281 C 4,747,236
328 4,747,237

**CLASS 52**
8 4,747,238
109 4,747,239
173 R 4,747,240
4,747,241
174 4,747,242
184 4,747,243
192 4,747,244
221 Re.32,678
309.7 4,747,245
311 4,747,246
[illegible] 4,747,247
455 4,747,248
543 4,747,249

**CLASS 53**
250 4,747,251
399 4,747,252
433 4,747,253
511 4,747,250
556 4,747,254

**CLASS 55**
1 4,747,852
21 4,747,853
[illegible] 4,747,854
74 4,747,855
143 4,747,856
269 4,747,857

**CLASS [illegible]**
10.4 4,747,255
11.3 4,747,256
12.9 Re.32,679
15.8 4,747,257
[illegible] 4,747,258
202 4,747,259
505 4,747,260

**CLASS 59**
84 4,747,261

**CLASS 60**
34.23 4,747,262
39.281 4,747,263
274 4,747,264
4,747,265
325 4,747,266
351 4,747,267
426 4,747,268
445 4,747,269
627 4,747,270
670 4,747,271

**CLASS 62**
17 4,747,858
22 4,747,859
4,747,860
136 4,747,272
238.6 4,747,273
371 4,747,274
419 4,747,275
[illegible] 4,747,276

**CLASS [illegible]**
3.12 4,747,861
4.1 4,747,862
17 4,747,863
102 4,747,864

**CLASS [illegible]**
122 4,747,277

**CLASS 70**
201 4,747,278
238 4,747,279
279 4,747,280
383 4,747,281
426 4,747,282

**CLASS 71**
90 4,747,865
92 4,747,866
4,747,867
4,747,868
4,747,869
4,747,870
94 4,747,871

**CLASS 72**
8 4,747,283
[illegible] 4,747,284
110 4,747,285
4,747,286
125 4,747,287
130 4,747,288
178 4,747,289
201 4,747,290
238 4,747,291
297 4,747,292
307 4,747,293
391 4,747,294

**CLASS 73**
1 DV 4,747,295
4 R 4,747,296
28 4,747,297
49.3 4,747,298
4,747,299
61 R 4,747,300
117.3 4,747,301
129 4,747,302
152 4,747,303
155 4,747,304
182 4,747,305
233 4,747,306
243 4,747,307
432.1 4,747,308
655 4,747,309
661 4,747,310
702 4,747,311
861.38 4,747,312
[illegible] 4,747,313
862.45 4,747,314
863.01 4,747,315
864.73 4,747,316
865.8 4,747,317

**CLASS 74**
25 4,747,318
89.15 4,747,319
411.5 4,747,320
[illegible] 4,747,321
715 4,747,322
763 4,747,323
798 4,747,324
[illegible] 4,747,325
4,747,326
[illegible] 4,747,327

**CLASS 75**
37 4,747,872
229 4,747,873
255 4,747,874

**CLASS 81**
54 4,747,328

**CLASS 83**
29 4,747,329
467 A 4,747,330
762 4,747,331

**CLASS 84**
1.23 4,747,332
422 R 4,747,333

**CLASS 89**
1.802 4,747,334

**CLASS 91**
361 4,747,335
376 R 4,747,336
420 4,747,337
461 4,747,338

**CLASS 92**
[illegible] 4,747,339
222 4,747,340

**CLASS 98**
31.5 4,747,341

**CLASS 99**
472 4,747,342

**CLASS 100**
145 4,747,343
173 4,747,344

**CLASS 101**
27 4,747,345
129 4,747,346
227 4,747,347
425 4,747,348

**CLASS 102**
306 4,747,350
[illegible] 4,747,349

**CLASS 104**
297 4,747,351

**CLASS 106**
21 4,747,875
35 4,747,876
90 4,747,877
97 4,747,878
100 4,747,879
207 4,747,880
209 4,747,881
[illegible] 4,747,882

**CLASS 108**
50 4,747,352
146 4,747,353

**CLASS 109**
24.1 4,747,354

**CLASS 110**
229 4,747,355
343 4,747,356

**CLASS 111**
82 4,747,357

**CLASS 112**
169 4,747,358

**CLASS 114**
144 B 4,747,359
269 4,747,360
270 4,747,361
343 4,747,362
361 4,747,363

**CLASS 116**
268 4,747,364

**CLASS 118**
221 4,747,365
[illegible] 4,747,366
715 4,747,367
4,747,368

**CLASS 119**
3 4,747,369
52 R 4,747,370
83 4,747,371
117 4,747,372

**CLASS 122**
510 4,747,373

**CLASS 123**
41.6 4,747,374
90.15 4,747,375
90.55 4,747,376
179 L 4,747,377
196 A 4,747,378
339 4,747,379
399 4,747,380
413 4,747,381
418 4,747,382
422 4,747,383
470 4,747,384
479 4,747,385
[illegible] 4,747,386
494 4,747,387
514 4,747,388
643 4,747,389

**CLASS 124**
6 4,747,390

**CLASS 126**
41 R 4,747,391
299 C 4,747,392

**CLASS 128**
20 4,747,393
4,747,394
4,747,395
54 4,747,396
61 4,747,397
[illegible] 4,747,398
75 4,747,399
92 Z 4,747,400
132 R Re.32,680
156 4,747,401
204.21 4,747,402
4,747,403
303 R 4,747,404
303.1 4,747,405
305 4,747,406
334 R 4,747,407
[illegible] 4,747,408
402 4,747,409
419 PG B1 4,232,679
581 4,747,410
660 4,747,411
683 4,747,412
736 4,747,413
754 4,747,414
774 4,747,415
[illegible] 4,747,416

**CLASS 131**
270 4,747,417
331 4,747,418

**CLASS 132**
73 4,747,419
112 4,747,420

**CLASS [illegible]**
201 4,747,421

**CLASS 135**
20 M 4,747,422
68 4,747,423

**CLASS [illegible]**
233 4,747,883

**CLASS 137**
1 4,747,424
116.3 4,747,425
220 4,747,426
270 4,747,427
315 4,747,428
351 4,747,429

**CLASS [illegible]**
97 4,747,430
109 4,747,431

**CLASS [illegible]**
102.5 4,747,432
150 4,747,433

**CLASS [illegible]**
175 4,747,434

**CLASS [illegible]**
2 4,747,884
6.15 R 4,747,885
9 R 4,747,886
131 4,747,887
304 4,747,888
437 4,747,889
439 4,747,890

**CLASS [illegible]**
19.4 4,747,891
20 4,747,892

**CLASS 152**
209 R 4,747,435
4,747,436
225 C 4,747,437
228 4,747,438
512 4,747,439
516 4,747,440

**CLASS 156**
64 4,747,893
73.1 4,747,894
73.3 4,747,895
85 4,747,896
148 4,747,897
153 4,747,898
160 4,747,899
172 4,747,900
220 4,747,901
244.11 4,747,902
366 4,747,903
403 4,747,904
542 4,747,905
624 4,747,906
642 4,747,907
652 4,747,908
653 4,747,909

**CLASS 160**
84.1 4,747,441
[illegible] 4,747,442

**CLASS 162**
111 B1 4,464,224
158 4,747,910
263 4,747,911

**CLASS 164**
58.1 4,747,443
457 4,747,444
476 4,747,445

**CLASS 165**
104.32 4,747,446
104.34 4,747,447
133 4,747,448
134.1 4,747,449
168 4,747,450

**CLASS 166**
53 4,747,451
311 4,747,452
379 4,747,453
380 4,747,454

**CLASS 173**
1 4,747,455

**CLASS 174**
52 S 4,748,294
117 PC 4,748,293

**CLASS 177**
211 4,747,456

**CLASS 178**
19 4,748,295

**CLASS 180**
19.1 4,747,457
79 4,747,458
120 4,747,459
176 4,747,460
197 4,747,461
233 4,747,462
247 4,747,463
248 4,747,464
287 4,747,465

**CLASS 181**
120 4,747,466
218 4,747,467

**CLASS 182**
9 4,747,468
185 4,747,469
230 4,747,470

**CLASS 184**
6.18 4,747,471

**CLASS 188**
73.1 4,747,472
73.2 4,747,473
299 4,747,474

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322.15 4,747,475

**CLASS 192**

107 M 4,747,476

**CLASS 193**

35 SS 4,747,477

**CLASS 194**

227 4,747,473

**CLASS 196**

132 4,747,912

**CLASS 198**

345 4,747,479
396 4,747,480
731 4,747,481
803.01 4,747,482

**CLASS 200**

6 B 4,748,296
11 J 4,748,297
12 4,748,298
84 C 4,748,299
4,748,300
144 C 4,748,301
147 R 4,748,302
148 B 4,748,303
148 R 4,748,304
4,748,305
307 4,748,306

**CLASS 202**

227 4,747,913

**CLASS 203**

22 4,747,914
89 4,747,915

**CLASS 204**

58.5 4,747,916
98 4,747,917
182.3 4,747,920
182.8 4,747,918
4,747,919
186 4,747,921
192.11 4,747,922
206 4,747,923
225 4,747,924
270 4,747,925
298 4,747,926
4,747,927
4,747,928
301 4,747,929
412 4,747,930

**CLASS 206**

329 4,747,483
387 4,747,484
427 4,747,485
4,747,486
429 4,747,487
[illegible] 4,747,488
446 4,747,489
542 4,747,490
633 4,747,491

**CLASS 208**

14 4,747,931
61 4,747,932
79 4,747,933
120 4,747,935
251 R 4,747,936
4,747,937
419 4,747,938

**CLASS 209**

20 4,747,939
167 4,747,940
4,747,941
455 4,747,942
459 4,747,943
534 4,747,492
4,747,493

**CLASS 210**

167 4,747,944
290 4,747,945
321.8 4,747,946
522 4,747,947
633 4,747,948
638 4,747,949
646 4,747,950
[illegible] 4,747,951
[illegible] 4,747,952
651 4,747,953
670 4,747,954
679 4,747,955
4,747,956
687 4,747,957
[illegible] 4,747,960
749 4,747,958
768 4,747,959
770 4,747,961
[illegible] 4,747,962

**CLASS 211**

13 4,747,494
4,747,495

**CLASS 215**

101 4,747,496
230 4,747,497
232 4,747,498
250 4,747,499
4,747,500
253 4,747,501
307 4,747,502
366 4,747,503

**CLASS 219**

10.49 R 4,748,307
10.55 E 4,748,308
56 4,748,309
69 W 4,748,310
121 EA 4,748,311
121 PR 4,748,312
271 4,748,313
274 4,748,314
275 4,748,315

**CLASS 220**

1.5 4,747,504
3.9 4,747,506
4 R 4,747,505
85 H 4,747,507
86 R 4,747,508
270 4,747,509
4,747,510
307 4,747,511
444 4,747,512
452 4,747,513

**CLASS 221**

4 4,747,514
116 4,747,515

**CLASS 222**

129.1 4,747,516
137 4,747,517
153 4,747,518
181 4,747,519
4,747,520
205 4,747,521
213 4,747,522
383 4,747,523
636 4,747,524
650 4,747,525

**CLASS 224**

155 4,747,526
224 4,747,527
315 4,747,528
325 4,747,529

**CLASS 227**

8 4,747,530
19 4,747,531

**CLASS 228**

47 4,747,532
180.1 4,747,533

**CLASS 229**

52 B 4,747,534
69 4,747,535
128 4,747,536

**CLASS 235**

454 4,748,316
462 4,748,317
472 4,748,318
4,748,319
492 4,748,320

**CLASS 237**

14 4,747,537

**CLASS 239**

20 4,747,538
56 4,747,539
76 4,747,540
127 4,747,541
127.3 4,747,542
4,747,543
150 B1 4,641,780
251 4,747,544
533.9 4,747,545
707 4,747,546

**CLASS 241**

19 4,747,547
21 4,747,548
55 4,747,550
188 R 4,747,551
292.1 4,747,552

**CLASS 242**

47.12 4,747,549
56 R 4,747,553
4,747,554
68.1 4,747,556
68.2 4,747,555
83 4,747,557
84.26 4,747,559
84.42 4,747,560
84.5 A 4,747,558
[illegible] 4,747,561
107.4 R 4,747,562
[illegible] 4,747,563
204 4,747,564

**CLASS 244**

3.22 4,747,568
122 B 4,747,565
173 4,747,566
4,747,567

**CLASS 248**

286 4,747,569
309.1 4,747,570
394 4,747,571
442.2 4,747,572

**CLASS 249**

184 4,747,573

**CLASS 250**

201 4,748,321
4,748,322
221 4,748,323
234 4,747,574
305 4,748,324
309 4,748,325
327.2 4,748,326
358.1 4,748,327
363 R 4,748,328
560 4,748,329
4,748,330
4,748,331
4,748,332
561 4,748,333
563 4,748,334
572 4,748,335
573 4,748,336

**CLASS 251**

30.02 4,747,575
60 4,747,576
158 4,747,577
159 4,747,578

**CLASS 252**

32.5 4,747,971
33.2 4,747,972
47.5 4,747,963
51.5 A 4,747,964
4,747,965
62.51 4,747,974
87 4,747,975
90 4,747,976
111 4,747,977
175 4,747,978
301.4 R 4,747,973
512 4,747,966
514 4,747,968

**CLASS 254**

386 4,747,579

**CLASS 260**

412.4 4,747,979
415 4,747,969
513 R 4,747,967

**CLASS 261**

96 4,747,970
129 4,747,980

**CLASS 264**

1.9 4,747,981
40.5 4,747,982
45.5 4,747,983
65 4,747,984
102 4,747,985
130 4,747,992
138 B1 4,436,684
177.11 4,747,986
182 4,747,987
211.17 4,747,988
223 4,747,989
322 4,747,990
[illegible] 4,747,991

**CLASS 266**

44 4,747,580
99 4,747,581
226 4,747,582
235 4,747,583
287 4,747,584

**CLASS 267**

140.1 4,747,585
161 4,747,586
220 4,747,587

**CLASS 269**

6 4,747,588
21 4,747,589
45 4,747,590

**CLASS 270**

52.5 4,747,591

**CLASS 271**

13 4,747,592
213 4,747,593

**CLASS 272**

72 4,747,594
118 4,747,595

**CLASS 273**

1 ES 4,747,596
1.5 R 4,747,597
73 C 4,747,598
167 G 4,747,599
269 4,747,600

**CLASS 277**

12 4,747,601
26 4,747,603
83 4,747,604
153 4,747,605
182 4,747,606
216 4,747,602

**CLASS 279**

1 E 4,747,608
1 L 4,747,607
4 4,747,609

**CLASS 280**

43.12 4,747,610
242 WC 4,747,611
261 Re.32,681
460 A 4,747,612
611 4,747,613
661 4,747,614
707 4,747,615
807 4,747,616
808 4,747,617

**CLASS 281**

5 4,747,618

**CLASS 282**

9 R 4,747,619

**CLASS 283**

86 4,747,620

**CLASS 285**

7 4,747,621
[illegible] 4,747,622
[illegible] 4,747,623
187 4,747,624
197 4,747,625
308 4,747,626

**CLASS 290**

31 4,748,337
42 4,748,338
55 4,748,339

**CLASS 291**

3 4,747,627

**CLASS 292**

51 4,747,628
92 4,747,629
263 4,747,630
307 R 4,747,631
347 4,747,632

**CLASS 294**

1.3 4,747,633
64.1 4,747,634

**CLASS 296**

107 4,747,635
186 4,747,636
218 4,747,637

**CLASS 297**

4,747,638
219 4,747,639
301 4,747,640
379 4,747,641

**CLASS 299**

11 4,747,642

**CLASS 303**

2 4,747,643

**CLASS 307**

53 4,748,340
[illegible] 4,748,341
[illegible] 4,748,342
135 4,748,343
150 4,748,344
[illegible] 4,748,345
270 4,748,346
450 4,748,347
517 4,748,348
530 4,748,349
566 4,748,350
571 4,748,351
592 4,748,352

**CLASS 310**

50 4,748,353
60 A 4,748,354
71 4,748,355
72 4,748,356
80 4,748,357
154 4,748,358
156 4,748,359
4,748,360
168 4,748,361
249 4,748,362
313 D 4,748,363
316 4,748,364
328 4,748,365
343 4,748,366
4,748,367

**CLASS 312**

140 4,747,644

**CLASS 313**

[illegible] 4,748,368
250 4,748,369
404 4,748,370
407 4,748,371
413 4,748,372
422 4,748,373
486 4,748,374
4,748,391
509 4,748,375
579 4,748,376

**CLASS 315**

3.5 4,748,377
39 4,748,378
39.55 4,748,379
57 4,748,380
200 R 4,748,381
241 P 4,748,382
248 4,748,383
371 4,748,384

**CLASS 318**

254 4,748,385
4,748,386
4,748,387
4,748,388
345 D 4,748,389
483 4,748,390
611 4,748,392
638 4,748,393
807 4,748,394

**CLASS 320**

17 4,748,395

**CLASS 322**

2 R 4,748,396

**CLASS 323**

222 4,748,397
285 4,748,398

**CLASS 324**

57 N 4,748,399
61 R 4,748,400
4,748,401
[illegible] 4,748,402
73 R 4,748,403
114 4,748,404
127 4,748,405
132 4,748,406
158 R 4,748,407
255 4,748,408
[illegible] 4,748,409
4,748,410
4,748,411
318 4,748,412
4,748,413
4,748,414
339 4,748,415

**CLASS 328**

62 4,748,416
72 4,748,417

**CLASS 330**

[illegible] 4,748,418
10 4,748,419
149 4,748,420
251 4,748,421
252 4,748,422
295 4,748,423

**CLASS 331**

87 4,748,424

**CLASS 332**

19 4,748,425

**CLASS 333**

22 R 4,748,426
227 4,748,427

**CLASS 335**

10 4,748,428
133 4,748,481
299 4,748,429

**CLASS 336**

84 C 4,748,430

**CLASS 337**

10 4,748,431
366 4,748,432

**CLASS 338**

6 4,748,433
176 4,748,434
214 4,748,435
4,748,436
315 4,748,437

**CLASS 340**

146.2 4,748,438
4,748,439
347 AD 4,748,440
709 4,748,441
750 4,748,442
751 4,748,443
784 4,748,444
4,748,445
825.640 4,748,446
870.20 4,748,447

**CLASS 342**

26 4,748,448

**CLASS 343**

705 4,748,449
820 4,748,450
880 4,748,451

**CLASS 346**

1.1 4,748,452
4,748,453
17 4,748,454
76 PH 4,748,455
107 R 4,748,456
136 4,748,457
140 R 4,748,458
4,748,459
4,748,460
4,748,461
153.1 4,748,463
155 4,748,464
160 4,748,465

**CLASS 350**

1.1 4,747,645
2.71 4,747,646
6.8 4,747,647
96.10 4,747,648
96.12 4,747,649
96.14 4,747,650
96.15 4,747,651
4,747,652
4,747,653
96.19 4,747,654
4,747,655
96.20 4,747,656
4,747,657
4,747,658
96.21 4,747,659
96.25 4,747,660
96.26 4,747,661
96.32 4,747,662
96.33 4,747,663
[illegible] 4,747,664
144 4,747,665
164 4,747,666
167 4,747,667
247 4,747,668
255 4,747,669
269 4,747,670
336 4,747,671
345 4,747,672
372 4,747,673
399 4,747,674
410 4,747,675
[illegible] 4,747,676
464 4,747,677
505 4,747,678
632 4,747,679

**CLASS 351**

[illegible] 4,747,680
139 4,747,681
203 4,747,682
206 4,747,683

**CLASS 354**

145.1 4,748,462
187 4,748,466
286 4,748,467
402 4,748,468
403 4,748,469

**CLASS 355**

3 DD 4,748,471
4,748,472
3 R 4,748,470
14 SH 4,748,473
15 4,748,474



27 4,748,475
46 4,748,476
53 4,748,477
4,748,478
72 4,748,479
133 4,748,480

**CLASS 356**

31 4,747,684
36 4,747,685
72 4,747,686
246 4,747,687
345 4,747,688
385 4,747,689

**CLASS 357**

15 4,748,483
17 4,748,482
22 4,748,484
23.7 4,748,485
30 V 4,748,486
43 4,748,487
45 4,748,488
[illegible] 4,748,489
51 4,748,490
4,748,491
59 4,748,492
68 4,748,493
4,748,494
82 4,748,495

**CLASS 358**

12 4,748,496
29 4,748,497
36 4,748,498
4,748,499
37 4,748,500
[illegible] 4,748,501
93 4,748,502
135 4,748,503
142 4,748,504
148 4,748,505
213.18 4,748,506
213.28 4,748,507
222 4,748,508
227 4,748,509
236 4,748,510
256 4,748,511
261 4,748,512
[illegible] 4,748,513
288 4,748,514
293 4,748,515
296 4,748,516
310 4,748,517
312 4,748,518

**CLASS 360**

[illegible] 4,748,519
77 4,748,520
85 4,748,521
104 4,748,522
105 4,748,523
[illegible] 4,748,524
110 4,748,525
128 4,748,526
129 4,748,527
130.2 4,748,528
132 4,748,529
133 4,748,530

**CLASS 361**

24 4,748,531
31 4,748,532
56 4,748,533
119 4,748,534
148 4,748,535
272 4,748,536
306 4,748,537
386 4,748,538
399 4,748,539
424 4,748,540
426 4,748,541
433 4,748,542

**CLASS 362**

147 4,748,543
203 4,748,544
219 4,748,545
223 4,748,546
225 4,748,547
249 4,748,548
406 4,748,549

**CLASS 363**

98 4,748,550
126 4,748,551

**CLASS 364**

[illegible] 4,748,552
4,748,553
174 4,748,555
200 4,748,556
4,748,557
4,748,558
4,748,559
4,748,560
300 4,748,561
415 4,748,562
420 4,748,563
426 4,748,564
431.05 4,748,565
431.11 4,748,566
4,748,567
462 4,748,569
470 4,748,568
474 4,748,554
4,748,570
513 4,748,571
518 4,748,572
551 4,748,573
705 4,748,574
715 4,748,575
717 4,748,576
722 4,748,577
724 4,748,578
726 4,748,579
736 4,748,580
752 4,748,581
754 4,748,582
758 4,748,583
760 4,748,584
[illegible] 4,748,585
4,748,586
4,748,587
4,748,588
4,748,589

**CLASS 365**

36 4,748,590
51 4,748,591
113 4,748,592
[illegible] Re.32,682
[illegible] 4,748,593
194 4,748,595
200 4,748,594
205 4,748,596
230 4,748,597

**CLASS 366**

[illegible] 4,747,690
160 4,747,691
164 4,747,692
208 4,747,693
265 4,747,694
291 4,747,695
307 4,747,696
339 4,747,697

**CLASS 367**

13 4,748,598
17 4,748,599
23 Re.32,683

**CLASS 368**

10 4,748,600
4,748,601
72 4,748,602
[illegible] 4,748,603
282 4,748,604

**CLASS 369**

13 4,748,605
4,748,606
32 4,748,607
43 4,748,608
44 4,748,609
4,748,610
59 4,748,611
173 4,748,612
215 4,748,613

**CLASS 370**

3 4,748,614
58 4,748,615
74 4,748,616
85 4,748,617
94 4,748,618
4,748,619
4,748,620
95 4,748,621
100 4,748,622
4,748,623

**CLASS 371**

15 4,748,624
22 4,748,625
30 4,748,626
38 4,748,627
40 4,748,628

**CLASS 372**

2 4,748,629
8 4,748,630
21 4,748,631
32 4,748,632
38 4,748,633
82 4,748,634
87 4,748,635

**CLASS 374**

[illegible] 4,747,698
109 4,747,699
135 4,747,700
149 4,747,712

**CLASS 375**

1 4,748,636
7 4,748,637
[illegible] 4,748,638
58 4,748,639
65 4,748,640
67 4,748,641
[illegible] 4,748,642
117 4,748,643
120 4,748,644

**CLASS 376**

205 4,747,993
215 4,747,994
[illegible] 4,747,995
261 4,747,996
4,747,997
336 4,747,998

**CLASS 378**

19 4,748,645
34 4,748,646
50 4,748,647
97 4,748,648
4,748,649
137 4,748,650

**CLASS 379**

22 4,748,651
26 4,748,652
32 4,748,653
[illegible] 4,748,654
60 4,748,655
93 4,748,656
189 4,748,657
221 4,748,658
253 4,748,659
272 4,748,660
289 4,748,661
356 4,748,662
388 4,748,663
395 4,748,664
407 4,748,665
410 4,748,666

**CLASS 380**

7 4,748,667
30 4,748,668

**CLASS 381**

1 4,748,669
43 4,748,670
169 4,748,671

**CLASS 382**

1 4,748,672
7 4,748,673
14 4,748,674
21 4,748,675
46 4,748,676
50 4,748,677
56 4,748,678
61 4,748,679
65 4,748,680

**CLASS 383**

33 4,747,701
63 4,747,702
119 4,747,703

**CLASS 384**

19 4,747,704
118 4,747,705

**CLASS 400**

70 4,747,706
82 4,747,707
144.2 4,747,708
157.3 4,747,709
175 4,747,710
196.1 4,747,711
202.4 4,747,713
214 4,747,714
248.3 4,747,715
249 4,747,716
616.2 4,747,717
625 4,747,718

**CLASS 401**

132 4,747,719
205 4,747,720

**CLASS 402**

73 4,747,721

**CLASS 403**

30 4,747,722
337 4,747,723
388 4,747,724

**CLASS 404**

10 4,747,725
123 4,747,726

**CLASS 405**

159 B1 3,638,439
260 4,747,727
263 4,747,728
296 4,747,729
[illegible] 4,747,730

**CLASS 406**

14 4,747,731
[illegible] Re.32,684
89 4,747,732

**CLASS 408**

241 R 4,747,733

**CLASS 409**

[illegible] 4,747,734
234 4,747,735

**CLASS 410**

54 4,747,736

**CLASS 411**

34 4,747,737
353 4,747,738
368 4,747,739

**CLASS 412**

11 4,747,740

**CLASS 414**

202 4,747,741
[illegible] 4,747,742
403 4,747,743
[illegible] 4,747,745
[illegible] 4,747,746
528 4,747,747

**CLASS 415**

47 4,747,748
139 Re.32,685
143 4,747,749
172 A 4,747,750

**CLASS 417**

36 4,747,751
68 4,747,752
222 4,747,753
4,747,754
4,747,755
282 4,747,756
307 4,747,757
366 4,747,758
397 4,747,759
407 4,747,744
420 4,747,760
443 4,747,760

**CLASS 418**

46 4,747,761
191 4,747,762
206 4,747,763
231 4,747,764

**CLASS 419**

49 4,747,999

**CLASS 420**

82 4,748,000
528 4,748,001

**CLASS 422**

112 4,748,003
116 4,748,002
185 4,748,004
186 4,748,005
256 4,748,006
300 4,748,007

**CLASS 423**

[illegible] 4,748,008
68 4,748,009
176 4,748,010
228 4,748,011
239 4,748,012
241 4,748,013
350 4,748,014
472 4,748,015
598 4,748,016
634 4,748,017

**CLASS 424**

87 4,748,018
92 4,748,019
4,748,020
93 4,748,021
195.1 4,748,022
465 4,748,023
489 4,748,024

**CLASS 425**

42 4,747,765
159 4,747,766
311 4,747,767
392 4,747,768
529 4,747,769
549 4,747,770

**CLASS 426**

43 4,748,025
4,748,026
96 4,748,027
130 4,748,028
231 4,748,029
233 4,748,030
288 4,748,031
321 4,748,032
330.2 4,748,034
330.3 4,748,033
407 4,748 035
413 4,748,036
448 4,748,037
456 4,748,038
513 4,748,039
569 4,748,040
601 4,748,041

**CLASS 427**

2 4,748,042
30 4,748,043
[illegible] 4,748,044
53.1 4,748,045
54.1 4,748,046
58 4,748,047
116 4,748,048
156 4,748,049
[illegible] 4,748,050
212 4,748,051
213 4,748,052
240 4,748,053
259 4,748,054
292 4,748,055
304 4,748,056
319 B1 4,330,574
356 4,748,057

**CLASS 428**

9 4,748,058
35 4,748,059
36 4,748,060
40 4,748,061
46 4,748,062
78 4,748,063
113 4,748,064
152 4,748,065
182 4,748,066
186 4,748,067
195 4,748,069
198 4,748,070
201 4,748,068
210 4,748,071
212 4,748,072
213 4,748,073
220 4,748,074
221 4,748,075
224 4,748,076
4,748,077
245 4,748,078
288 4,748,079
328 4,748,080
329 4,748,081
331 4,748,082
419 4,748,083
425.9 4,748,084
432 4,748,085
433 4,748,086
463 4,748,087
558 4,748,088
635 4,748,089
694 4,748,090

**CLASS 429**

31 4,748,091
35 4,748,092
81 4,748,093
90 4,748,094
101 4,748,095
211 4,748,096

**CLASS 430**

1 4,748,097
49 4,748,098
4,748,099
160 4,748,101
258 4,748,102
314 4,748,103
315 4,748,104
393 4,748,105
503 4,748,106
505 4,748,100
4,748,107
562 4,748,108

**CLASS 431**

1 4,747,771
326 4,747,781
354 4,747,772

**CLASS 432**

14 4,747,773
156 4,747,774
234 4,747,775

**CLASS 433**

26 4,747,776
141 4,747,777

**CLASS 434**

29 4,747,778
247 4,747,779
293 4,747,780
377 4,747,782

**CLASS 435**

5 4,748,109
4,748,110
7 4,748,111
4,748,112
12 4,748,113
14 4,748,114
21 4,748,115
23 4,748,116
76 4,748,117
172.3 4,748,118
4,748,119
173 4,748,120
176 4,748,121
[illegible] 4,748,122
240.241 4,748,124
261 4,748,123
287 4,748,125

**CLASS 436**

42 4,748,126
[illegible] 4,748,127
93 4,748,128
519 4,748,129

**CLASS 437**

2 4,748,130
24 4,748,131
25 4,748,132
43 4,748,133
062 4,748,134
102 4,748,135

**CLASS 439**

59 4,747,783
71 4,747,784
88 4,747,785
95 4,747,786
108 4,747,787
620 4,747,789
631 4,747,790
638 4,747,791
[illegible] 4,747,792
766 4,747,793
857 4,747,794

**CLASS 440**

75 4,747,795
83 4,747,796

**CLASS 441**

38 4,747,797

**CLASS 446**

47 4,747,798

**CLASS 455**

33 4,748,681
137 4,748,682
164 4,748,683
182 Re.32,686
4,748,684
212 4,748,688
218 4,748,685
605 4,748,686
609 4,748,687
612 4,748,689

**CLASS 464**

52 4,747,799
64 4,747,800
66 4,747,801
69 4,747,802
111 4,747,803
170 4,747,804
175 4,747,805
182 4,747,806

**CLASS 474**

28 4,747,807
4,747,808
4,747,809
135 4,747,810
4,747,811
252 4,747,812

**CLASS 489**

131 4,747,788

**CLASS 493**

10 4,747,813
[illegible] 4,747,814
194 4,747,815
407 4,747,816
438 4,747,817

**CLASS 501**

32 4,748,136
[illegible] 4,748,137
87 4,748,138
120 4,748,135

**CLASS 502**

209 4,748,140
216 4,748,141
220 4,748,142

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| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| [illegible] | 4,748,143 | 367 | 4,748,182 | 240 | 4,748,209 | | CLASS 540 | 388 | 4,748,264 | 469 | 4,748,292 |
| 316 | 4,748,144 | [illegible] | 4,748,183 | [illegible] | 4,748,210 | 350 | 4,748,238 | | CLASS 560 | [illegible] | 4,748,288 |
| 332 | 4,748,145 | 422 | 4,748,184 | 286 | 4,748,211 | 523 | 4,748,239 | 25 | 4,748,265 | | CLASS 604 |
| | CLASS 503 | 457 | 4,748,185 | 359.2 | 4,748,212 | | CLASS 544 | 51 | 4,748,266 | 8 | 4,747,818 |
| 201 | 4,748,146 | 478 | 4,748,186 | 397 | 4,748,213 | 47 | 4,748,240 | 158 | 4,748,267 | 20 | 4,747,819 |
| [illegible] | 4,748,147 | 492 | 4,748,187 | 479 | 4,748,215 | 173 | 4,748,241 | 205 | 4,748,268 | 22 | 4,747,820 |
| 220 | 4,748,148 | 493 | 4,748,188 | 503 | 4,748,214 | 222 | 4,748,242 | | 4,748,269 | | 4,747,821 |
| 227 | 4,748,149 | 781 | 4,748,189 | | CLASS 526 | 313 | 4,748,244 | 301 | 4,748,270 | 29 | 4,747,822 |
| | 4,748,150 | | CLASS 521 | 77 | 4,748,216 | 316 | 4,748,245 | | CLASS 562 | 49 | 4,747,823 |
| | 4,748,151 | [illegible] | 4,748,190 | [illegible] | 4,748,217 | 331 | 4,748,246 | 428 | 4,748,271 | 51 | 4,747,824 |
| | CLASS 514 | [illegible] | 4,748,191 | 84 | 4,748,218 | 357 | 4,748,247 | 471 | 4,748,272 | | 4,747,825 |
| 2 | 4,748,152 | 107 | 4,748,192 | [illegible] | 4,748,219 | | CLASS 546 | 495 | 4,748,273 | 52 | 4,747,826 |
| | 4,748,157 | | CLASS 523 | [illegible] | 4,748,220 | 68 | 4,748,248 | 507 | 4,748,274 | 54 | 4,747,827 |
| 10 | 4,748,153 | 156 | 4,748,193 | 153 | 4,748,221 | | CLASS 548 | | CLASS 564 | 67 | 4,747,828 |
| 16 | 4,748,154 | 427 | 4,748,194 | 174 | 4,748,222 | 202 | 4,748,243 | 298 | 4,748,275 | 110 | 4,747,829 |
| [illegible] | 4,748,155 | 445 | 4,748,195 | 206 | 4,748,223 | 262 | 4,748,249 | 386 | 4,748,276 | | 4,747,830 |
| 21 | 4,748,156 | | CLASS 524 | 242 | 4,748,224 | | 4,748,250 | 414 | 4,748,277 | | 4,747,831 |
| 25 | 4,748,158 | 13 | 4,748,166 | | CLASS 528 | 422 | 4,748,251 | | CLASS 568 | 135 | 4,747,832 |
| 42 | 4,748,159 | 43 | 4,748,196 | 26 | 4,748,225 | 432 | 4,748,252 | 438 | 4,748,278 | 164 | 4,747,833 |
| [illegible] | 4,748,160 | 114 | 4,748,197 | [illegible] | 4,748,226 | | CLASS 549 | [illegible] | 4,748,279 | [illegible] | 4,747,834 |
| [illegible] | 4,748,161 | 273 | 4,748,198 | 126 | 4,748,227 | 79 | 4,748,253 | 595 | 4,748,280 | 192 | 4,747,835 |
| 192 | 4,748,162 | 318 | 4,748,199 | 182 | 4,748,228 | [illegible] | 4,748,254 | 697 | 4,748,281 | 198 | 4,747,836 |
| 194 | 4,748,163 | 410 | 4,748,167 | 183 | 4,748,229 | 243 | 4,748,255 | 842 | 4,748,282 | | 4,747,837 |
| 201 | 4,748,170 | 474 | 4,748,168 | 211 | 4,748,230 | 353 | 4,748,256 | 851 | 4,748,283 | 218 | 4,747,838 |
| 202 | 4,748,171 | [illegible] | 4,748,169 | [illegible] | 4,748,231 | | 4,748,257 | | CLASS 570 | 240 | 4,747,839 |
| [illegible] | 4,748,172 | 591 | 4,748,200 | | CLASS 530 | 456 | 4,748,258 | 151 | 4,748,284 | 281 | 4,747,840 |
| 211 | 4,748,173 | 712 | 4,748,201 | 324 | 4,748,232 | | CLASS 556 | 169 | 4,748,285 | 291 | 4,747,841 |
| 212 | 4,748,164 | 823 | 4,748,202 | 351 | 4,748,233 | 132 | 4,748,259 | 200 | 4,748,286 | 309 | 4,747,842 |
| 226.5 | 4,748,174 | | CLASS 525 | 412 | 4,748,234 | 176 | 4,748,260 | 209 | 4,748,287 | 318 | 4,747,843 |
| 230.5 | 4,748,175 | 67 | 4,748,203 | 501 | 4,748,235 | [illegible] | 4,748,261 | | CLASS 585 | 319 | 4,747,844 |
| 256 | 4,748,165 | 72 | 4,748,204 | | CLASS 534 | 480 | 4,748,262 | 14 | 4,748,289 | 368 | 4,747,845 |
| 262 | 4,748,176 | 75 | 4,748,205 | 634 | 4,748,236 | | CLASS 558 | 271 | 4,748,290 | 385 | 4,747,846 |
| | 4,748,177 | 88 | 4,748,206 | | CLASS 536 | 80 | 4,748,263 | 418 | 4,748,291 | 892.1 | 4,747,847 |
| 270 | 4,748,178 | | 4,748,207 | 103 | 4,748,237 | | | | | | CLASS 623 |
| 292 | 4,748,179 | 151 | 4,748,208 | | | | | | | 1 | 4,747,848 |
| | 4,748,180 | | | | | | | | | 12 | 4,747,849 |
| 343 | 4,748,181 | | | | | | | | | | |

## CLASSIFICATION OF DESIGNS

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D2— | 25 | 295,915 | | 578 | 295,935 | | 371 | 295,954 | D14— | 63 | 295,974 | | | 295,991 | | [illegible] | 296,011 |
| | 314 | 295,916 | | 601 | 295,936 | | 375 | 295,955 | | [illegible] | 295,975 | | 105 | 295,993 | | | 296,012 |
| | 320 | 295,917 | D7— | 70 | 295,937 | | 398 | 295,956 | | [illegible] | 295,973 | | 150 | 295,994 | | 61 | 296,013 |
| D3— | 12 | 295,918 | | 73 | 295,938 | | 418 | 295,957 | | 102 | 295,976 | | 160 | 295,995 | | 63 | 296,014 |
| | [illegible] | 295,919 | | 309 | 295,939 | | | 295,958 | | 111 | 295,977 | | 183 | 295,996 | | 72 | 296,015 |
| | [illegible] | 295,920 | | 321 | 295,940 | | | 295,959 | | 113 | 295,978 | | 184 | 295,997 | D27— | 30 | 296,016 |
| D4— | 115 | 295,921 | | | 295,941 | | | 295,960 | D15— | 27 | 295,979 | D22— | 128 | 295,998 | | 38 | 296,017 |
| D6— | [illegible] | 295,922 | D8— | 10 | 295,942 | | 420 | 295,961 | D16— | 10 | 295,980 | | 142 | 295,999 | D28— | [illegible] | 296,018 |
| | 358 | 295,923 | | [illegible] | 295,943 | | 455 | 295,962 | | 133 | 295,981 | D23— | 208 | 296,000 | | 54 | 296,019 |
| | 365 | 295,924 | | 33 | 295,944 | | | 295,963 | D17— | [illegible] | 295,982 | | 210 | 296,001 | D30— | 130 | 296,020 |
| | 366 | 295,925 | | [illegible] | 295,945 | D10— | 22 | 295,964 | D18— | 2 | 295,983 | | 229 | 296,002 | D32— | [illegible] | 296,021 |
| | | 295,926 | | [illegible] | 295,947 | | 32 | 295,965 | | 23 | 295,984 | | 290 | 296,003 | | 51 | 296,022 |
| | 370 | 295,927 | | 337 | 295,948 | | [illegible] | 295,966 | D19— | 49 | 295,985 | D24— | 17 | 296,004 | | 54 | 296,023 |
| | 372 | 295,928 | | 359 | 295,949 | D11— | 30 | 295,968 | | [illegible] | 295,986 | | 59 | 296,005 | | 55 | 296,024 |
| | 379 | 295,929 | | 381 | 295,950 | | 161 | 295,967 | | 85 | 295,992 | | 63 | 296,006 | D34— | 19 | 296,025 |
| | 407 | 295,930 | | 382 | 295,951 | D12— | 155 | 295,969 | D21— | 25 | 295,987 | D25— | 116 | 296,007 | | 25 | 296,026 |
| | 463 | 295,931 | | | 295,952 | | 345 | 295,970 | | 69 | 295,988 | D26— | 41 | 296,009 | | 39 | 296,027 |
| | 476 | 295,932 | | | 295,953 | D13— | 25 | 295,971 | | [illegible] | 295,989 | | 42 | 296,008 | D99— | 28 | 296,028 |
| | 483 | 295,933 | | | | | 32 | 295,972 | | 81 | 295,990 | | | 296,010 | | 35 | 296,029 |
| | 571 | 295,934 | D9— | 305 | 295,946 | | | | | | | | | | | | |

## CLASSIFICATION OF PLANTS

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P— | 7 | 6,188 | | 8 | 6,189 | | 35 | 6,190 | | 48 | 6,191 | | 51 | 6,192 | | [illegible] | 6,193 |

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| 04 : | 4,747,216 | | 4,747,715 | | 4,748,551 | 10 : | 4,747,506 | | 4,747,391 | | 4,747,354 |
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